

PLN-8021-004

DMS-100 Family

North American DMS-100

Release Document Volume 1 of 2

LET0015 Preliminary 13.02 May 2001

About this document

When to use this document

The DMS-100 Family Software Product Computing Module Load Release Document (Release Document) is supplied for each software release. This Release Document provides software feature information for features new or changed in the new software load.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

How this document is organized

This document refers to feature numbers (featids) plus streams and releases. Streams and releases are made up of several features. Features are designed by BNR against a BNR featid.

The Release Document consists of cross reference tables and feature content sections.

Cross Reference Tables

The following cross reference tables appear in every Release Document

Table 1: Feature to Functional Group Cross Reference

This table lists all features by featid, which includes the title and functional group of each feature.

Table 2: New Features to Stream and Release Cross Reference

This table lists all features new to the release that are included in the Release Document. The stream and release are for each BNR featid.

Table 3: Documented Feature by Stream and Release

This table lists all documentation listed in the feature content section (indicated by 'Y'). The documentation is sorted first by stream and release and then by featid within the stream and release. For changed documentation (indicated by a 'C') the stream and release column indicates the stream and release in which the feature was first released.

Table 4: Feature to Stream and Release Cross Reference

This table lists featid plus corresponding stream and release.

Table 5: Feature Title to Feature Cross Reference

This table lists all features by feature titles. This table is not used as the basis for an exhaustive search, since the title does not always contain the keyword desired.

Table 6: Project to Feature Cross Reference

This table lists features sorted by project.

Table 7: History

This table lists new and changed features by feature ID, sections, stream, and release.

Feature Content Sections

The feature content sections contain the DMS-100 Family System documentation for features new or changed in the software release. Each office configuration is customized to meet operating company requirements. The following sections include information necessary to determine that the system software changes have occurred since the last software release.

Note: Only features NEW or CHANGED in the release are included in the Release Document.

Functional Descriptions (FN)

Summarizes the functions of the feature

Logs (LG)

Indicates major additions/changes to the LOGs

Data Schema (DS)

Indicates major additions/changes to the Data Schema table

Command interface (CI)

Indicates major additions/changes to the CIs

Operational Measurements(OM)

Indicates major additions/changes to the OM groups

Service Order (SO)

Indicates major additions/changes to SERVORD

Automatic Message Accounting (AM)

Indicates major additions/changes to the AMA

Office Parameters (PARM)

Indicates major additions/changes to the PARMs

Table 1: Feature to Functional Group Cross Reference

Featid	Title	Stream & Release	Functional Group	Status
A59006653	TOPS IP: Position Maintenance	TOP15	OSB00101	New
A59006658	TOPS IP: Posn Provisioning and OPP Data	TOP15	OSB00101	New
A59015863	TOPS IP: Call Processing for IP Voice	TOP15	OSB00101	New
A59015896	TOPS and Succession Interworking	TOP15		
A59017604	Digit manipulation over Circular Hunt	CCM15	NI000030	Active
A59017625	TOPS SOC Option Consolidation	TOP15	OSB00101	New
A59019176	XA-Core ethernet packetlet - OA&M	BAS16		
A59020499	TOPS IP: Global Support	TOP15		
A59020826	BCT CM Res Mgr	TL15		
A59021965	USNBD: ISUP Call Control Channels	CNA15	NBD00003	New
A59021972	GETS: HPC Call Queuing	CNA15	ENS00005	New
A59021979	USNBD: Agency Separation	CNA15	NBD00003	New
A59021986	E911 Wireless Phase II	CNA15	ENS00005	New
A59021993	E911: OffBoard Selective Routing Interf	CNA15	ENS00005	New
A59022041	DDN International Interworking	CCM15	CLAS	
A59022058	DLCM for IBN Lines	CCM15	RES00002	New
A59022240	TOPS Interworking with SDM	TOP15		
A59022288	TOPS IP: Voice Provisioning & Utilities	TOP15	OSB00101	New
A59022293	TOPS IP: IPGW Enhancements	TOP15	OSB00101	New
A59022361	EOL for TOPS15 Code Removal	TOP15	OSB00101	New

Table 1: Feature to Functional Group Cross Reference

Featid	Title	Stream & Release	Functional Group	Status
A59022437	E911: Tandem-Tandem Enhancements	CNA15	ENS00005	New
A59022448	ICM Call Hold-UnHold Event Reporting	CCM15		
A59022453	ICM Logon Enhancements and Re-Engg	CCM15	RES00081	New
A59022498	AIN:Extended ringing for STR-IP	CCM15, CNA15	AIN00291	New
A59022523	AIN:DP Converter for STR-IP and Collect	CNA15	AIN00292	New
A59022533	AINDENY And Group Based SFC/PFC Prov.	CNA15	AIN00294	New
A59022554	AIN:LINE ATTRIBUTES FOR PFC/TRAVER SUPPO	CNA15	AIN00293	New
A59022576	ICM CDN Display and Threshold Route Enha	CCM15	ICM00010	Active
A59022651	SERVORD-CDN command support for OPRT int	CCM15	SERV0001	New
A59022657	DTMF default capability	CCM15	SERV0001	New
A59022713	STS1 Provisioning - CM	SHR15		
A59022782	Sourcing of Patches LNP40 and NPA03	CNA15	LNP00100	New
A59022792	LNP:Routing calls to datafilled treatmen	CNA15	LNP00200	New
A59022816	APS Log Enhancements	TOP15		
A59023032	DFIL 110 Enhancement	CNA15		
A59023163	SysM Support for PE SOC	BAS16	BASE0001	New
A59023407	PRI DN Screening LTID Enhancements	CNA15	NI000043	New
A59023416	NTNA 4E/5E Variant Network Side Support	CNA15	NI000043	Active

Table 1: Feature to Functional Group Cross Reference

Featid	Title	Stream & Release	Functional Group	Status
A59023612	TOPS IP: Customer-assignable SX05 Route	TOP15		
A59023787	RLD Site Name	CCM15	BAS00012	New
A59024289	Servord Enhancement Command - CBLKDN	CCM15	Not applicable	
A59024393	IP-IW New MGP Pack Type	SHR15		
A59024411	DD for Capacity feature A29024411	BAS16		
A59024653	Wireless Centrex Features	CCM16		
A59024668	Debugging Tools Enhancements	BAS16		
A59024821	TOPS Remote Number Expansion	TOP15		
A59025809	Special Connections Support for SPM STM1	SHR15		
A59025965	DCS Prompt & Collect	CCM15		
A59026113	TOPS15 CM Enhancements	TOP15	OSB00101	Active
A59026166	RTER_ID size increase	TL15		
A59026377	UEMG MTA Line Test Support	CCM15		
A59026480	UOP ENHANCEMENTS	SHR15	LOC00005	New
A59026486	Release Link Trunking for EAEO	CNA15		
A59027128	SPM DS-1 Assignment SOC Control	SHR15	SPMS0016	New
S10380206	NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS ofcparm	SHR15		
S10387512	Desgin docs for UT00594	CCM15		

Table 2: New Features to Stream and Release Cross Reference

Featid	Title	Stream and Release
		BAS16
A59019176	XA-Core ethernet packetlet - OA&M	
A59023163	SysM Support for PE SOC	
A59024411	DD for Capacity feature A29024411	
A59024668	Debugging Tools Enhancements	
		CCM15
A59017604	Digit manipulation over Circular Hunt	
A59022041	DDN International Interworking	
A59022058	DLCM for IBN Lines	
A59022448	ICM Call Hold-UnHold Event Reporting	
A59022453	ICM Logon Enhancements and Re-Engg	
A59022498	AIN:Extended ringing for STR-IP	
A59022576	ICM CDN Display and Threshold Route Enha	
A59022651	SERVORD-CDN command support for OPRT int	
A59022657	DTMF default capability	
A59023787	RLD Site Name	
A59024289	Servord Enhancement Command - CBLKDN	
A59024653	Wireless Centrex Features	
A59025965	DCS Prompt & Collect	
A59026377	UEMG MTA Line Test Support	
S10387512	Desgin docs for UT00594	
		CNA15
A59021965	USNBD: ISUP Call Control Channels	
A59021972	GETS: HPC Call Queuing	
A59021979	USNBD: Agency Separation	

Table 2: New Features to Stream and Release Cross Reference

Featid	Title	Stream and Release
A59021986	E911 Wireless Phase II	
A59021993	E911: OffBoard Selective Routing Interf	
A59022437	E911: Tandem-Tandem Enhancements	
A59022498	AIN:Extended ringing for STR-IP	
A59022523	AIN:DP Converter for STR-IP and Collect	
A59022533	AINDENY And Group Based SFC/PFC Prov.	
A59022554	AIN:LINE ATTRIBUTES FOR PFC/TRAVER SUPPO	
A59022782	Sourcing of Patches LNP40 and NPA03	
A59022792	LNP:Routing calls to datafilled treatmen	
A59023032	DFIL 110 Enhancement	
A59023407	PRI DN Screening LTID Enhancements	
A59023416	NTNA 4E/5E Variant Network Side Support	
A59026486	Release Link Trunking for EAEO	
		SHR15
A59022713	STS1 Provisioning - CM	
A59024393	IP-IW New MGP Pack Type	
A59025809	Special Connections Support for SPM STM1	
A59026480	UOP ENHANCEMENTS	
A59027128	SPM DS-1 Assignment SOC Control	
S10380206	NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS ofcparm	
		TL15
A59020826	BCT CM Res Mgr	
A59026166	RTER_ID size increase	
		TOP15
A59006653	TOPS IP: Position Maintenance	
A59006658	TOPS IP: Posn Provisioning and OPP Data	

Table 2: New Features to Stream and Release Cross Reference

Featid	Title	Stream and Release
A59015863	TOPS IP: Call Processing for IP Voice	
A59015896	TOPS and Succession Interworking	
A59017625	TOPS SOC Option Consolidation	
A59020499	TOPS IP: Global Support	
A59022240	TOPS Interworking with SDM	
A59022288	TOPS IP: Voice Provisioning & Utilities	
A59022293	TOPS IP: IPGW Enhancements	
A59022361	EOL for TOPS15 Code Removal	
A59022816	APS Log Enhancements	
A59023612	TOPS IP: Customer-assignable SX05 Route	
A59024821	TOPS Remote Number Expansion	
A59026113	TOPS15 CM Enhancements	

Table 3: Documented Feature by Stream and Release

Stream and Release	Featid	FN	LG	DS	CI	OM	SO	AM
BAS16	A59019176	Y	Y		Y	Y		
	A59023163	Y	Y		Y			
	A59024411	Y						
	A59024668	Y			Y			
CCM15	A59017604	C		C				
	A59022041	Y		Y	Y			
	A59022058	Y					Y	
	A59022448	Y		Y		Y		
	A59022453	Y	Y	Y				
	A59022498	Y						
	A59022576	Y		Y				
	A59022651	Y					Y	
	A59022657	Y					Y	
	A59023787	Y		Y	Y			
	A59024289	Y						
	A59024653	C						
	A59025965	Y		Y				
	A59026377	Y		Y				
	S10387512	Y	Y					
CNA15	A59021965	Y	Y		Y			Y
	A59021972	Y	Y	Y				
	A59021979	Y	Y		Y			
	A59021986	Y	Y					
	A59021993	Y	Y	Y	Y			
	A59022437	Y		Y				

Table 3: Documented Feature by Stream and Release

Stream and Release	Featid	FN	LG	DS	CI	OM	SO	AM
	A59022498	Y						
	A59022523	Y			Y			
	A59022533	Y		Y	Y			
	A59022554	Y		Y	Y			
	A59022782	Y		Y				
	A59022792	Y		Y				
	A59023032	Y	Y					
	A59023407	Y		Y				
	A59023416	Y		Y				
	A59026486	Y	Y	Y	Y	Y		
SHR15	A59022713	C		C				
	A59024393	Y	Y	Y	Y			
	A59025809	Y	Y	Y	Y			
	A59026480	C		C				
	A59027128	Y		Y	Y			
	S10380206	Y						
TL15	A59020826	C	C	C				
	A59026166	Y		Y				
TOP15	A59006653	C	C	C	C			
	A59006658	C	C	C				
	A59015863	Y	Y					
	A59015896	C						
	A59017625	C						
	A59020499	C						
	A59022240	Y						
	A59022288	Y		Y				

Table 3: Documented Feature by Stream and Release

Stream and Release	Featid	FN	LG	DS	CI	OM	SO	AM
	A59022293	Y		Y				
	A59022361	Y	Y	Y				
	A59022816	C	C	C				
	A59023612	Y		Y				
	A59024821	Y		Y				
	A59026113	Y		Y				

Table 4: Feature to Stream and Release Cross Reference

Featid	Title	Stream & Release
A59006653	TOPS IP: Position Maintenance	TOP15
A59006658	TOPS IP: Posn Provisioning and OPP Data	TOP15
A59015863	TOPS IP: Call Processing for IP Voice	TOP15
A59015896	TOPS and Succession Interworking	TOP15
A59017604	Digit manipulation over Circular Hunt	CCM15
A59017625	TOPS SOC Option Consolidation	TOP15
A59019176	XA-Core ethernet packetlet - OA&M	BAS16
A59020499	TOPS IP: Global Support	TOP15
A59020826	BCT CM Res Mgr	TL15
A59021965	USNBD: ISUP Call Control Channels	CNA15
A59021972	GETS: HPC Call Queuing	CNA15
A59021979	USNBD: Agency Separation	CNA15
A59021986	E911 Wireless Phase II	CNA15
A59021993	E911: OffBoard Selective Routing Interf	CNA15
A59022041	DDN International Interworking	CCM15
A59022058	DLCM for IBN Lines	CCM15
A59022240	TOPS Interworking with SDM	TOP15
A59022288	TOPS IP: Voice Provisioning & Utilities	TOP15
A59022293	TOPS IP: IPGW Enhancements	TOP15
A59022361	EOL for TOPS15 Code Removal	TOP15
A59022437	E911: Tandem-Tandem Enhancements	CNA15
A59022448	ICM Call Hold-UnHold Event Reporting	CCM15
A59022453	ICM Logon Enhancements and Re-Engg	CCM15
A59022498	AIN:Extended ringing for STR-IP	CCM15, CNA15
A59022523	AIN:DP Converter for STR-IP and Collect	CNA15

Table 4: Feature to Stream and Release Cross Reference

Featid	Title	Stream & Release
A59022533	AINDENY And Group Based SFC/PFC Prov.	CNA15
A59022554	AIN:LINE ATTRIBUTES FOR PFC/TRAVER SUPPO	CNA15
A59022576	ICM CDN Display and Threshold Route Enha	CCM15
A59022651	SERVORD-CDN command support for OPRT int	CCM15
A59022657	DTMF default capability	CCM15
A59022713	STS1 Provisioning - CM	SHR15
A59022782	Sourcing of Patches LNP40 and NPA03	CNA15
A59022792	LNP:Routing calls to datafilled treatmen	CNA15
A59022816	APS Log Enhancements	TOP15
A59023032	DFIL 110 Enhancement	CNA15
A59023163	SysM Support for PE SOC	BAS16
A59023407	PRI DN Screening LTID Enhancements	CNA15
A59023416	NTNA 4E/5E Variant Network Side Support	CNA15
A59023612	TOPS IP: Customer-assignable SX05 Route	TOP15
A59023787	RLD Site Name	CCM15
A59024289	Servord Enhancement Command - CBLKDN	CCM15
A59024393	IP-IW New MGP Pack Type	SHR15
A59024411	DD for Capacity feature A29024411	BAS16
A59024653	Wireless Centrex Features	CCM16
A59024668	Debugging Tools Enhancements	BAS16
A59024821	TOPS Remote Number Expansion	TOP15
A59025809	Special Connections Support for SPM STM1	SHR15
A59025965	DCS Prompt & Collect	CCM15
A59026113	TOPS15 CM Enhancements	TOP15
A59026166	RTER_ID size increase	TL15
A59026377	UEMG MTA Line Test Support	CCM15

Table 4: Feature to Stream and Release Cross Reference

Featid	Title	Stream & Release
A59026480	UOP ENHANCEMENTS	SHR15
A59026486	Release Link Trunking for EAEO	CNA15
A59027128	SPM DS-1 Assignment SOC Control	SHR15
S10380206	NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS ofcparm	SHR15
S10387512	Desgin docs for UT00594	CCM15

Table 5: Feature Title to Feature Cross Reference

Title	Feature ID
AIN:DP Converter for STR-IP and Collect	A59022523
AIN:Extended ringing for STR-IP	A59022498
AIN:LINE ATTRIBUTES FOR PFC/TRAVER SUPPO	A59022554
AINDENY And Group Based SFC/PFC Prov.	A59022533
APS Log Enhancements	A59022816
BCT CM Res Mgr	A59020826
DCS Prompt & Collect	A59025965
DD for Capacity feature A29024411	A59024411
DDN International Interworking	A59022041
DFIL 110 Enhancement	A59023032
DLCM for IBN Lines	A59022058
DTMF default capability	A59022657
Debugging Tools Enhancements	A59024668
Desgin docs for UT00594	S10387512
Digit manipulation over Circular Hunt	A59017604
E911 Wireless Phase II	A59021986
E911: OffBoard Selective Routing Interf	A59021993
E911: Tandem-Tandem Enhancements	A59022437
EOL for TOPS15 Code Removal	A59022361
GETS: HPC Call Queuing	A59021972
ICM Call Hold-UnHold Event Reporting	A59022448
ICM Logon Enhancements and Re-Engg	A59022453
ICM CDN Display and Threshold Route Enha	A59022576
IP-IW New MGP Pack Type	A59024393
LNP:Routing calls to datafilled treatmen	A59022792
NTNA 4E/5E Variant Network Side Support	A59023416

Table 5: Feature Title to Feature Cross Reference

Title	Feature ID
NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS ofcparm	S10380206
PRI DN Screening LTID Enhancements	A59023407
RLD Site Name	A59023787
RTER_ID size increase	A59026166
Release Link Trunking for EAEO	A59026486
SERVORD-CDN command support for OPRT int	A59022651
SPM DS-1 Assignment SOC Control	A59027128
STS1 Provisioning - CM	A59022713
Servord Enhancement Command - CBLKDN	A59024289
Sourcing of Patches LNP40 and NPA03	A59022782
Special Connections Support for SPM STM1	A59025809
SysM Support for PE SOC	A59023163
TOPS IP: Position Maintenance	A59006653
TOPS IP: Posn Provisioning and OPP Data	A59006658
TOPS IP: Call Processing for IP Voice	A59015863
TOPS and Succession Interworking	A59015896
TOPS SOC Option Consolidation	A59017625
TOPS IP: Global Support	A59020499
TOPS Interworking with SDM	A59022240
TOPS IP: Voice Provisioning & Utilities	A59022288
TOPS IP: IPGW Enhancements	A59022293
TOPS IP: Customer-assignable SX05 Route	A59023612
TOPS Remote Number Expansion	A59024821
TOPS15 CM Enhancements	A59026113
UEMG MTA Line Test Support	A59026377
UOP ENHANCEMENTS	A59026480
USNBD: ISUP Call Control Channels	A59021965

Table 5: Feature Title to Feature Cross Reference

Title	Feature ID
USNBD: Agency Separation	A59021979
Wireless Centrex Features	A59024653
XA-Core ethernet packlet - OA&M	A59019176

Table 6: Project to Feature Cross Reference

Project	Featid	Title
ACDEDEV	A59022448	ICM Call Hold-UnHold Event Reporting
	A59022453	ICM Logon Enhancements and Re-Engg
	A59022576	ICM CDN Display and Threshold Route Enha
AINDEV	A59022498	AIN:Extended ringing for STR-IP
	A59022523	AIN:DP Converter for STR-IP and Collect
	A59022533	AINDENY And Group Based SFC/PFC Prov.
	A59022554	AIN:LINE ATTRIBUTES FOR PFC/TRAVER SUPPO
CCM_CUST_DEV	A59022041	DDN International Interworking
	A59022058	DLCM for IBN Lines
CPMDEV	A59023787	RLD Site Name
D250RCH	A59026166	RTER_ID size increase
DCSDEV	A59025965	DCS Prompt & Collect
E911DEV	A59021986	E911 Wireless Phase II
	A59021993	E911: OffBoard Selective Routing Interf
	A59022437	E911: Tandem-Tandem Enhancements
EADEV	A59023032	DFIL 110 Enhancement
	A59026480	UOP ENHANCEMENTS
	A59026486	Release Link Trunking for EAEO
GBASE	A59024668	Debugging Tools Enhancements
GETSDEV	A59021972	GETS: HPC Call Queuing
GIPH	S10387512	Desgin docs for UT00594
GPERFORM	A59024411	DD for Capacity feature A29024411
IDLC	A59026377	UEMG MTA Line Test Support
IPIWDEV	A59024393	IP-IW New MGP Pack Type
ISDNPRI	A59017604	Digit manipulation over Circular Hunt
	A59023407	PRI DN Screening LTID Enhancements

Table 6: Project to Feature Cross Reference

Project	Featid	Title
	A59023416	NTNA 4E/5E Variant Network Side Support
LNPDEV	A59022782	Sourcing of Patches LNP40 and NPA03
	A59022792	LNP:Routing calls to datafilled treatmen
LWW_DESIGN	A59024653	Wireless Centrex Features
NBDDEV	A59020826	BCT CM Res Mgr
OAMDEV	A59022651	SERVORD-CDN command support for OPRT int
	A59022657	DTMF default capability
SPARCDOCS	S10380206	NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS ofc- parm
SPMCMCAR	A59022713	STS1 Provisioning - CM
SPMDEV	A59025809	Special Connections Support for SPM STM1
SPMNA100	A59027128	SPM DS-1 Assignment SOC Control
TOPSDEV	A59006653	TOPS IP: Position Maintenance
	A59006658	TOPS IP: Posn Provisioning and OPP Data
	A59015863	TOPS IP: Call Processing for IP Voice
	A59015896	TOPS and Succession Interworking
	A59017625	TOPS SOC Option Consolidation
	A59020499	TOPS IP: Global Support
	A59022240	TOPS Interworking with SDM
	A59022288	TOPS IP: Voice Provisioning & Utilities
	A59022293	TOPS IP: IPGW Enhancements
	A59022361	EOL for TOPS15 Code Removal
	A59022816	APS Log Enhancements
	A59023612	TOPS IP: Customer-assignable SX05 Route
	A59024821	TOPS Remote Number Expansion
	A59026113	TOPS15 CM Enhancements
TRSDEV	A59024289	Servord Enhancement Command - CBLKDN

Table 6: Project to Feature Cross Reference

Project	Featid	Title
USNBDDEV	A59021965	USNBD: ISUP Call Control Channels
	A59021979	USNBD: Agency Separation
XALLMTN	A59019176	XA-Core ethernet packetlet - OA&M
XASYSMTC	A59023163	SysM Support for PE SOC

Table 7: History

Featid	Sect	New	Changed
A59006653	FN	TOP12	TOP13 TOP14 TOP15
	LG	TOP12	TOP13 TOP14 TOP15
	DS	TOP12	TOP13 TOP14 TOP15
	CI	TOP12	TOP13 TOP14 TOP15
A59006658	FN	TOP12	TOP13 TOP15
	LG	TOP12	TOP13 TOP15
	DS	TOP12	TOP13 TOP15
A59015863	FN	TOP15	
A59015896	FN	TOP14	TOP15
A59017604	FN	CCM14	CCM15
	DS	CCM14	CCM15
A59017625	FN	TOP14	TOP15
A59019176	FN	BAS15	BAS16
	LG	BAS15	BAS16
	CI	BAS15	BAS16
	OM	BAS15	BAS16
A59020499	FN	TOP14	TOP15
A59020826	FN	TL15	
	LG	TL15	
	DS	TL15	
A59021965	FN	CNA15	
	LG	CNA15	
	CI	CNA15	
	AM	CNA15	
A59021972	FN	CNA15	
	LG	CNA15	

Table 7: History

Featid	Sect	New	Changed
	DS	CNA15	
A59021979	FN	CNA15	
	LG	CNA15	
	CI	CNA15	
A59021986	FN	CNA15	
	LG	CNA15	
	DS	CNA15	
A59021993	FN	CNA15	
	LG	CNA15	
	DS	CNA15	
	CI	CNA15	
A59022041	FN	CCM15	
	DS	CCM15	
	CI	CCM15	
A59022058	FN	CCM15	
	SO	CCM15	
A59022240	FN	TOP15	
A59022288	FN	TOP15	
	DS	TOP15	
A59022293	FN	TOP15	
	DS	TOP15	
A59022361	FN	TOP15	
	LG	TOP15	
	DS	TOP15	
A59022437	FN	CNA15	
	DS	CNA15	
A59022448	FN	CCM15	

Table 7: History

Featid	Sect	New	Changed
	DS	CCM15	
	OM	CCM15	
A59022453	FN	CCM15	
	LG	CCM15	
	DS	CCM15	
A59022498	FN	CNA15	CCM15
A59022523	FN	CNA15	
	CI	CNA15	
A59022533	FN	CNA15	
	DS	CNA15	
	CI	CNA15	
A59022554	FN	CNA15	
	DS	CNA15	
	CI	CNA15	
A59022576	FN	CCM15	
	DS	CCM15	
A59022651	FN	CCM15	
	SO	CCM15	
A59022657	FN	CCM15	
	SO	CCM15	
A59022713	FN	SHR15	
	DS	SHR15	
A59022782	FN	CNA15	
	DS	CNA15	
A59022792	FN	CNA15	
	DS	CNA15	
A59022816	FN	TOP15	

Table 7: History

Featid	Sect	New	Changed
	DS	TOP15	
A59023032	FN	CNA15	
	LG	CNA15	
A59023163	FN	BAS16	
	LG	BAS16	
	CI	BAS16	
A59023407	FN	CNA15	
	DS	CNA15	
A59023416	FN	CNA15	
	DS	CNA15	
A59023612	FN	TOP15	
	DS	TOP15	
A59023787	FN	CCM15	
	DS	CCM15	
	CI	CCM15	
A59024289	FN	CCM15	
A59024393	FN	SHR15	
	LG	SHR15	
	DS	SHR15	
	CI	SHR15	
A59024411	FN	BAS16	
A59024653	FN	CCM15	
A59024668	FN	BAS16	
	CI	BAS16	
A59024821	FN	TOP15	
	DS	TOP15	
A59025809	FN	SHR15	

Table 7: History

Featid	Sect	New	Changed
	LG	SHR15	
	DS	SHR15	
	CI	SHR15	
A59025965	FN	CCM15	
	DS	CCM15	
A59026113	FN	TOP15	
	DS	TOP15	
A59026166	FN	TL15	
	DS	TL15	
A59026377	FN	CCM15	
	DS	CCM15	
A59026480	FN	SHR15	
	DS	SHR15	
A59026486	FN	CNA15	
	LG	CNA15	
	DS	CNA15	
	CI	CNA15	
	OM	CNA15	
A59027128	FN	SHR15	
	DS	SHR15	
	CI	SHR15	
S10380206	FN	SHR15	
S10387512	FN	CCM15	
	LG	CCM15	

Functional Group List of Features

a59006653	s10380206
a59006658	s10387512
a59015863	
a59015896	
a59017604	
a59017625	
a59019176	
a59020499	
a59020826	
a59021965	
a59021972	
a59021979	
a59021986	
a59021993	
a59022041	
a59022058	
a59022240	
a59022288	
a59022293	
a59022361	
a59022437	
a59022448	
a59022453	
a59022498	
a59022523	
a59022533	
a59022554	
a59022576	
a59022651	
a59022657	
a59022713	
a59022782	
a59022792	
a59022816	
a59023032	
a59023163	
a59023407	
a59023416	
a59023612	
a59023787	
a59024289	
a59024393	
a59024411	
a59024653	
a59024668	
a59024821	
a59025809	
a59025965	
a59026113	
a59026166	
a59026377	
a59026480	
a59026486	
a59027128	

1: Functional description (FN)

1.1 Feature name

TOPS IP (Internet Protocol): Position Maintenance

1.2 Feature synopsis

This activity provides DMS maintenance functionality for operator positions that have IP connectivity to the DMS switch through the IP-XPM. The functionality includes a new MAP level for maintaining IP positions, position state transitions and audits, position maintenance logs, and alarms.

1.3 Project introduction

Note: This document includes a number of statements to the effect that certain TOPS-IP functionalities were introduced, or are supported, in the TOPS13 and TOPS15 releases. These statements should be interpreted as describing which functionalities the TOPS-IP design groups intended to make available in those releases. At the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

This section includes project background, an overview of supported configurations, feature breakdown, and overall project limitations and restrictions. For additional limitations and restrictions, please refer to the appropriate sections of the individual feature documents.

The basic new TOPS-IP functionality in the 15 release is IP voice and data connectivity between the DMS and IWS operator positions. Because position connectivity and Operator Centralization (OC) connectivity are inter-related in an OC network, this section addresses OC issues as well as position connectivity issues.

1.3.1 Background

In TOPS13 and XPM15, the TOPS-IP project provided support for

- IP voice and data connectivity between North American TOPS OC host and remote switches, and
- IP data connectivity for QMS MIS in North American TOPS switches.

IP connectivity was achieved using the IP-XPM peripheral module. The IP-XPM is a DTC with an SX05DA main processor, 7X07AA IP Gateway (IPGW) cards in the P-side interface slots, and an MX76DA messaging card. The SX05 provides the IP interface for data messaging, while the 7X07 provides the call signaling and bearer interface for voice over IP (VoIP).

OC voice links are datafilled in the DMS CM as dynamic ISUP trunks minus the usual CCS7 datafill. A dynamic trunk is one that can terminate anywhere, rather than having a nailed-up far end. ISUP messaging is used only between the CM and the SX05 and 7X07. The 7X07 converts between ISUP on the C-side and H.225-based messaging on the IP side, and it converts between circuit-switched voice on the DMS network side and packet switched voice on the IP side.

For additional important background information, refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide.”

1.3.2 Overview of supported network configurations

This section shows and describes first a traditional network of operator positions and DMS TOPS switches, then the same network after it has been fully converted to IP connectivity for the positions and the OC links, and finally a hybrid IP/traditional network such as may exist during the conversion to TOPS-IP.

1.3.2.1 Traditional, non-IP network

Figure 1 shows a high-level view of a simple, traditional, TDM-based¹ network of operator positions and TOPS switches. This is a pre-TOPS-IP configuration. The DMS switch labeled “Standalone/OC Host TOPS Switch” could be a pure standalone TOPS switch in a non-OC environment, a pure OC host, or a combination.

Although not shown in the figure, the three TOPS switches are also connected to the public switched telephone network (PSTN) in the traditional way.

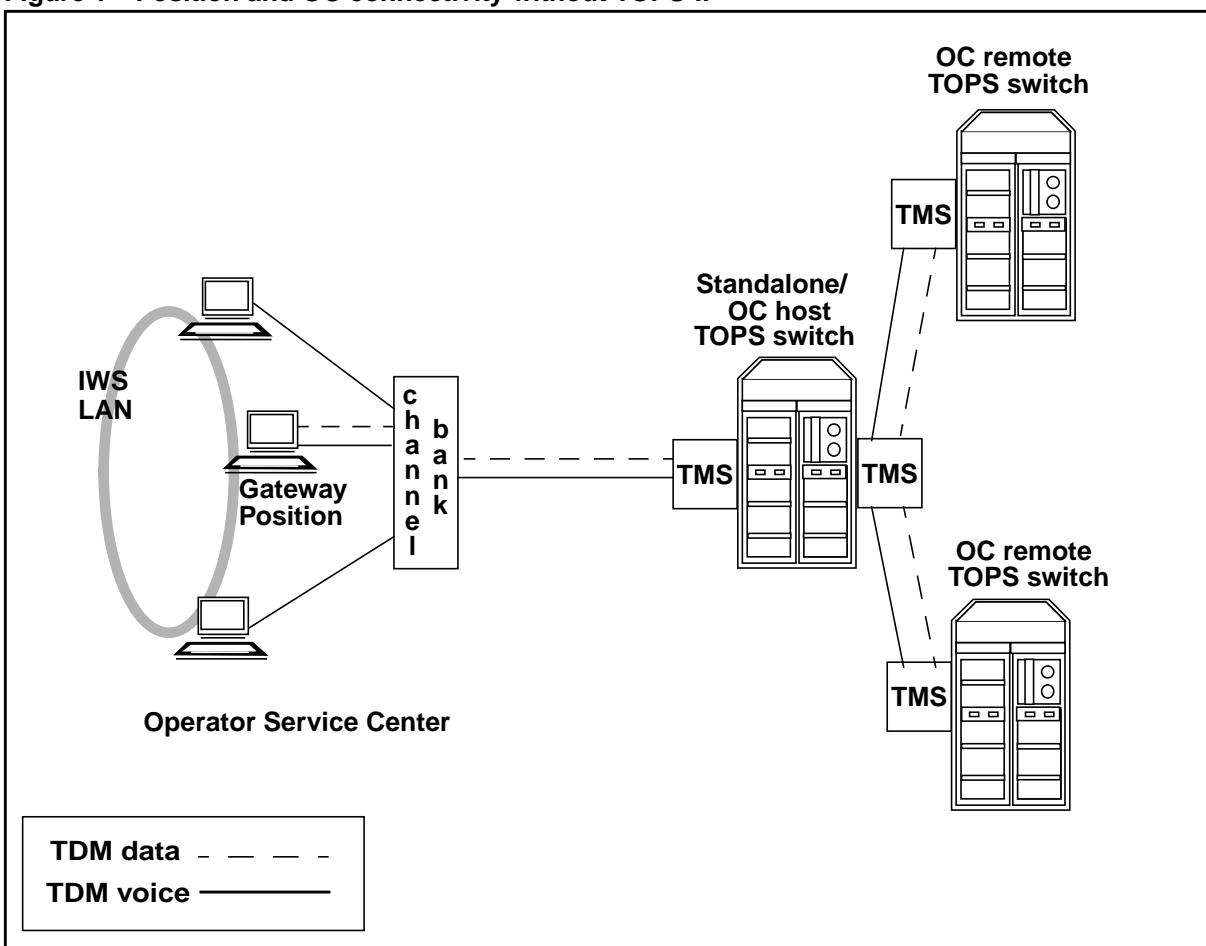
Dedicated position voice links are provisioned between the standalone or host TOPS switch and each position. These nailed-up TDM voice links are through the TMS peripheral, a DS1/T1 or PCM30/E1 carrier, a channel bank, and a DS0 link to the position.

¹Throughout this document, the term “TDM” is used to refer to pre-IP voice and data connectivity that uses traditional time division multiplexed trunking facilities to transmit non-packetized voice and data. However, it is recognized that an operating company may route its IP traffic over a SONET backbone, for example, and thus may be using an underlying TDM technology even with IP.

A data link is also provisioned between the standalone or host TOPS switch and each position. Like voice links, position data links use the TMS peripheral. Unlike the voice path, however, the data path to a position always passes through a Gateway Position which transmits data to and from the other positions on the IWS LAN. The Gateway Position also has maintenance responsibility for other positions in its cluster.

The OC remote switches in the figure have point to point TDM voice and data links to the OC host. In the figure these OC connections use TMS peripherals, but alternatively they could use DCM peripherals. The TOPS switch allocates OC voice links on a per-call basis; one OC voice link is required for each OC call. Many OC calls can simultaneously use an OC data link.

Figure 1 Position and OC connectivity without TOPS-IP



1.3.2.2 Fully converted TOPS15 IP network

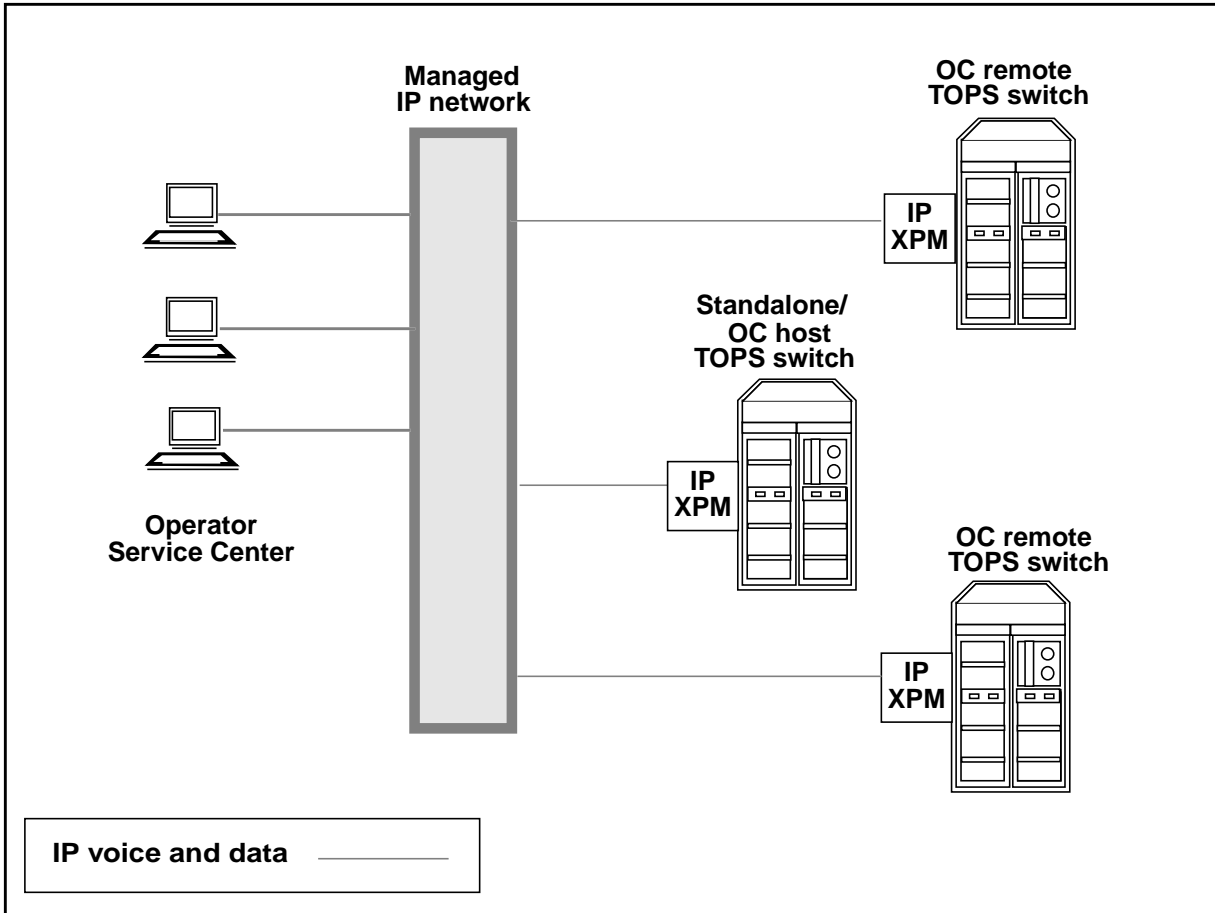
Figure 2 shows the same network fully converted to use the TOPS-IP interfaces that were developed in the 15 release. The operator positions and TOPS DMS switches all have IP voice and data connectivity to a managed IP

network. Refer to 297-8403-906, "TOPS Internet Protocol (IP) User's Guide," for more information about the IP-XPM and requirements for the managed IP network.

Although the positions are still on an IWS LAN, the LAN is considered part of the managed IP network, so it is not shown individually in the figure. It is an Ethernet LAN, not a token ring.

On the DMS side, the IP connectivity is through IP-XPM peripherals, which were introduced in TOPS13 and XPM15 for the OC-IP and QMS MIS IP applications. The TOPS-IP position application is added in TOPS15. The same IP-XPM can simultaneously support IP traffic for all three of these applications.

Figure 2 Position and OC connectivity with TOPS-IP



In the configuration of Figure 2, there is no longer a Gateway Position with maintenance and data messaging responsibility for other positions. Instead, each position exchanges data messages directly with the TOPS host switch over the managed IP network.

IP data communication is maintained between the position and the host switch as long as the position is in-service, regardless of whether the position is processing a call. In OC calls, OPP (Open Position Protocol) messages between the OC remote and the position always pass through the OC host.

Unlike data connections to positions, which persist over calls and route through the host for OC calls, voice connections to positions are established on a per-call basis and bypass the host in OC calls. The VoIP connection is directly between the OC remote switch and the position, and it uses no resources in the OC host.

One implication is that a position does not have a voice link to any DMS switch when it is not processing a call. Another implication is that the IP network must be configured in such a way that the remotes and positions, remotes and hosts, and hosts and positions can all route messages to each other.

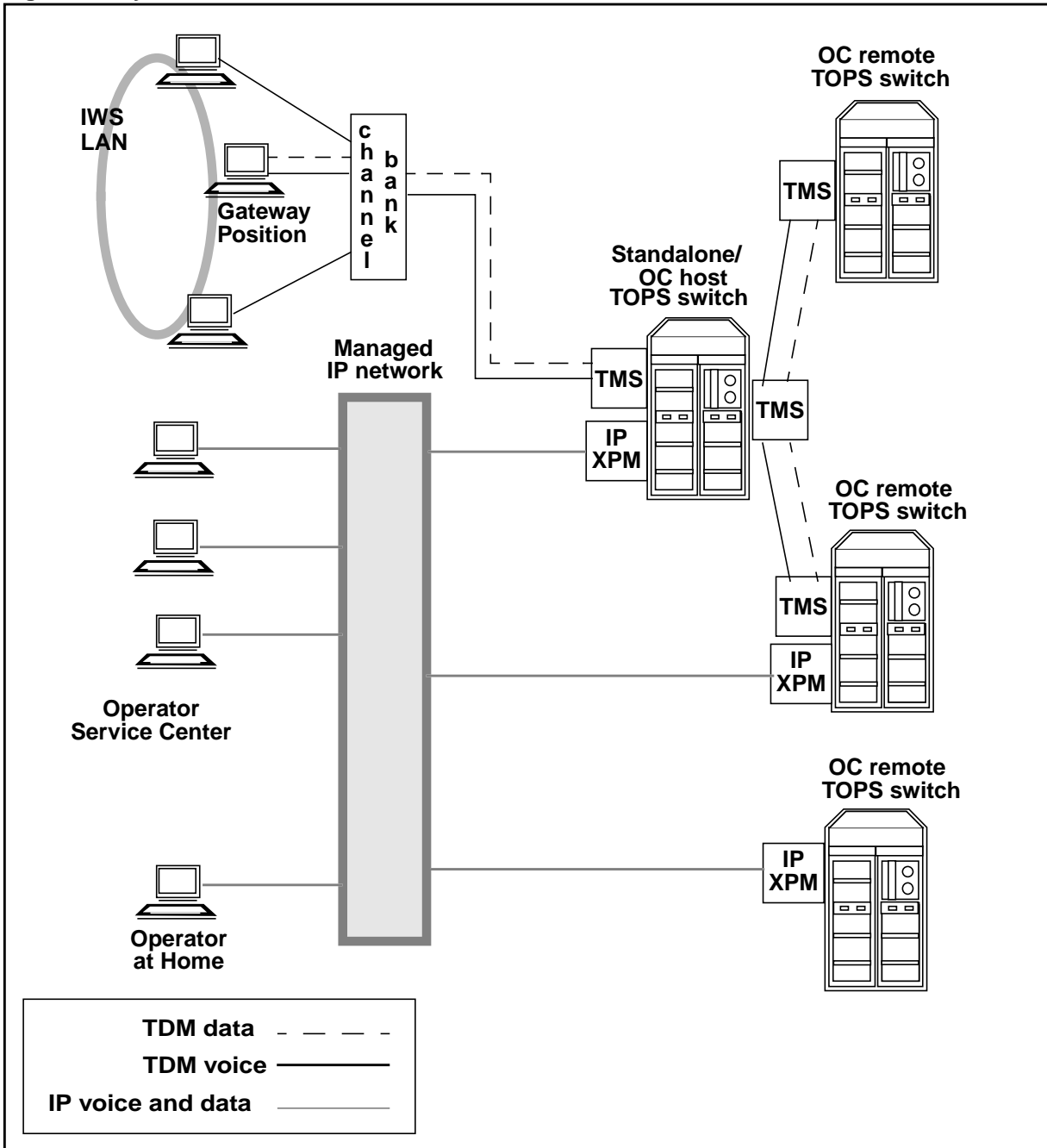
VoIP between positions and TOPS switches uses industry-standard protocols from the ITU-T H.323 suite, version 2. In the TOPS CM, the voice link to a position is datafilled as a dynamic ISUP trunk. The 7X07 IP Gateway card in the IP-XPM converts between H.323 protocols on the IP side (H.225 and H.245 for call signalling, RTP and RTCP for bearer), and ISUP messaging and circuit switched voice on the C-side. Supported codecs for VoIP are G.711 (Mu-law and A-law) and G.729.

1.3.2.3 Hybrid TOPS15 IP/TDM network

It is expected that during the transition to TOPS-IP, a network will include some combination of IP and traditional TDM connectivity for positions and OC links. Figure 3 illustrates the variety of supported configurations.

Figure 3 also shows that positions with IP connectivity need not be at an Operator Service Center, as long as the position is connected to the operating company's managed IP network. Position connectivity using the public Internet for voice or data is not supported.

Figure 3 Hybrid Traditional and TOPS-IP network



As shown in the figure, a single TOPS standalone or host switch can simultaneously support positions with traditional connectivity and positions with IP connectivity. Also, a single OC host or remote can support both traditional and IP connectivity to other nodes in the OC network.¹

¹However, if both IP and traditional OC connectivity exist between the same host-remote pair, each must have the other datafilled as two different offices in tables OCOFC and OCGRP.

Note: If an OC host has any IP positions, it is important that either (a) all of its remotes be upgraded to TOPS15 or later, or (b) QMS queuing be set up to ensure that an IP position cannot be selected for a call from a pre-TOPS15 remote. This is true regardless of whether the OC links are IP or traditional TDM. If an IP position is selected in the OC host for a pre-15 remote, the call is deflected.

The next several paragraphs describe the different combinations of TDM and IP connectivity for position and OC voice and data links. This information is summarized in Table 1.

If the OC remote selects an OC-IP data link for a call, and the host selects an IP position, Figure 2 applies. In this case, the operator voice link is always VoIP directly from the remote; that is, it always bypasses the host. On the other hand, the operator's data for the call passes through the OC host. The data connection is IP from remote to host, and then IP from host to position.

If the remote selects an OC-IP data link and the host selects a traditional, non-IP position, then host voice bypass is not available. The call uses an OC-IP voice link between the remote and the host. Packetized voice from the remote is converted to TDM voice in the 7X07 IPGW card in the host's IP-XPM, and travels through the DMS network in the host and out on the nailed-up TDM voice link to the position. Similarly, the operator's data for the call is IP between remote and host, but it uses the position's nailed-up data link between host and position (routing via the Gateway Position on the IWS LAN). This is the same as the TOPS13 OC-IP functionality, before the introduction of IP positions in TOPS15.

If the remote selects a traditional, non-IP OC data link and the host selects a non-IP position, the functionality is the same as it was prior to the TOPS-IP project. That is, the call uses traditional TDM-OC voice and data links between remote and host, and it uses traditional nailed-up voice and data links between host and position.

If the remote selects a traditional, non-IP OC data link and the host selects an IP position, then host voice bypass is not available. The call uses a traditional TDM-OC voice link between remote and host. Then in the host, the TDM voice from the remote goes through the DMS network and out to a 7X07 IPGW card in the IP-XPM that provides IP connectivity for the position. The IPGW converts between TDM voice on the C-side and packetized voice to the position. Similarly for data, the traditional TDM-OC data link is used between remote and host, and the IP-XPM in the host sends IP data to (and receives IP data from) the position.

These various configurations are summarized in Table 1 below.

Table 1 Supported configurations of IP and TDM position and OC connectivity

OC data link type	Position connectivity in host	Voice path used	Data path used
IP	IP	VoIP, remote to position (bypasses host)	DoIP remote to host to position
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	
IP	TDM	VoIP remote to host, TDM host to position.	DoIP remote to host, TDM host to position.
TDM	TDM	TDM remote to host, TDM host to position.	TDM remote to host, TDM host to position.
		This is the same configuration that existed prior to the TOPS-IP project.	
TDM	IP	TDM remote to host, IP host to position.	TDM remote to host, IP host to position.
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	

1.3.3 Feature breakdown

The following table shows the individual activities that make up the TOPS, XPM, and IWS IP projects for the 15 release.

Table 2 Feature Breakdown

CM Activities	
59022288	TOPS IP: Voice Provisioning and Utilities
	Provides data schema changes for VoIP to operator positions, and implements internal utilities to support VoIP call processing.
59006658	TOPS IP: Position Provisioning and OPP Data
	Provides data schema changes for IP-based operator positions, and support for OPP data messaging over IP.
59006653	TOPS IP: Position Maintenance
	Provides the CM maintenance functionality associated with IP-based operator positions.

Table 2 Feature Breakdown

59015863	TOPS IP: Call Processing for IP Voice
	Provides the high-level CM call logic to support operator positions with IP voice connectivity to the DMS.
59020499	TOPS IP: Global Support
	Documentation and test activity for support of a subset of TOPS-IP functionality in MMP loads.
59022293	TOPS IP: IPGW Enhancements
	Provides increased flexibility for engineering and provisioning of 7X07 IPGW cards and dynamic trunks.
7X07 Activity	
59022821	TOPS IP: 7X07 IP Gateway Support for VoIP
	Provides the 7X07 gateway functionality required for TOPS IP in the 15 release.
XPM Activities	
59022114	RSI Link Selection, Version control, Robustness
	Provides more even distribution over the IP-XPM's C-side links of data messages from the XPM to the CM for TOPS applications. Also provides internal enhancements.
IWS Activities	
RD000701	IWS Voice Over IP
	Provides VoIP functionality for operator positions.
RD983702	OPP Over IP
	Implements the OPP development needed to support positions with IP connectivity to the DMS.
RD002601	DHCP/DNS Support in IWS
	Provides position support for the Domain Host Configuration and Domain Name Service protocols.
RD002602	Verification of Voice Over IP Card
	Hardware activity to verify the third-party card used for VoIP in the IWS.
RD991614	OIA Direct Connect via HTML
	Provides support for OIA applications on positions with IP connectivity to the OIA data bases.

1.3.4 Project limitations and restrictions

This section includes limitations and restrictions of the overall TOPS15 TOPS-IP project. Individual activities in the project include additional limitations and restrictions.

- The original TOPS-IP design intent was to provide support for the following:
 - OC-IP between North American OC host and remote switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in North American TOPS switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in MMP loads, but not in GMP (GSP/MMP combo) loads, in the TOPS15 and later releases, and
 - IP voice and data connectivity between DMS switches and IWS operator positions in North American and MMP loads, but not GMP, in TOPS15 and later releases.

However, at the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

- Like OC-IP voice and data connectivity, TOPS-IP position connectivity is intended to be over a managed network that has been carefully engineered for reliability and adequate bandwidth.
- TOPS OC remote switches at TOPS14 and lower cannot process calls that are allocated IP positions in the host. Therefore, OC hosts at TOPS15 and higher deflect any calls that are allocated positions with IP connectivity, if the remote is pre-TOPS15.

It is recommended that all switches in the OC network be upgraded to TOPS15 before operators who serve OC calls log into IP positions. Alternatively, new QMS call queues may be set up for operators who log into IP positions. If this approach is taken, remotes that have not yet upgraded to TOPS15 must not be datafilled to route calls to the new call queues.

- Positions with IP data connectivity must also have IP voice connectivity, and vice versa.
- IP connectivity is supported for Nortel Networks IWS positions only. Third party OPP-compliant operator positions continue to be supported in TOPS15, but only with traditional TMS connectivity.
- It is not possible for an OC remote to route VoIP traffic for the position to the OC host and have the host forward VoIP to the position. If the OC and position links are both IP, host voice bypass is always used. So the remotes

must be on the same IP network as any positions they will use, as well as any hosts they will use.

- The scope of the TOPS-IP project in the 15 release is limited to position voice and data connectivity to TOPS DMS switches. The project does not convert any other TOPS interfaces to IP.

For example, the TOPS15 development does not change the data connectivity between the DMS and D1 databases, LIDB data bases, or PARS nodes. Nor does it provide VoIP between the DMS and OSSAIN service nodes or the ISN-DA audio server.

Also, the TOPS15 development does not convert existing TOPS applications that use the Ethernet Interface Unit (EIU) for IP data connectivity, to use the IP-XPM. For example, OSSAIN data links, OSAC data links, and TOPS devices are not converted to use the IP-XPM.

- For positions with TMS connectivity to the DMS switch, the TMS provides the interface between IWS positions and external OIA databases such as Nortel Networks Reference System (also referred to as NTR). There is no plan to enhance the IP-XPM or the Reference System to support use of this product in a TOPS-IP network. Refer to IWS documentation and third party vendors for information about any plans to convert other OIA applications to use other interfaces.
- Most call arrival tones at positions with IP connectivity to the DMS are generated by the position itself (based on OPP messages from the DMS), rather than by the DMS XPM. Therefore, it is possible that some call arrival tones may sound slightly different. Please refer to IWS documentation for more information.

The initial call arrival tones for ADAS Base and ADASPLUS calls are generated by the ADAS platform, regardless of whether the position has IP or traditional connectivity to the DMS.

- IWS positions with IP connectivity to the DMS cannot detect when the operator seats or unseats the headset. One consequence is that CSEs with stats capability will not be warned by UCP or UCD displays if an operator unseats the headset when a call is at position. Another consequence is that force management statistics continue to accumulate after the operator unjacks the headset if the operator does not use the appropriate softkey to log out. Please refer to IWS documentation for more information.
- Positions with IP connectivity to the DMS cannot be datafilled as Service Assistance (ASST) or In-Charge (IC).
- Monitoring voice links are not supported for a call with more than two operators. Whenever a third operator is connected to a call, the monitoring voice links are taken down to provide resources to connect the second *active* operator.

- If an IP operator is being monitored and attaches a CSE for the current call, the monitoring voice connection is taken down for the duration of that call.
- If an IP CSE is being monitored and receives a call with another operator attached, the monitoring voice connection is taken down for the duration of that call.

For both of these scenarios, data is still presented to the monitoring operator. The monitoring voice connection will be re-established for the next call which does not involve three operators.

- It is strongly recommended that if CSEs use positions with IP connectivity, the call queues designated in table TQMSFCQA for CSE assistance be datafilled in tables TQCQINFO and PKTVPROF to use the G.711 codec.
- Due to the processing overhead associated with establishing VoIP connections with operator positions, operator idle time will increase for operators at IP positions.
- Refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide” for capacity and engineering restrictions specific to the IP-XPM, and for capacity and engineering requirements for the managed IP network.

1.4 Feature Description

This feature provides maintenance functionality for operator positions that have IP connectivity to the DMS. This feature does not change the maintenance of positions that don't have IP connectivity.

1.4.1 IP position maintenance concepts

This section introduces several concepts that are important for understanding the maintenance of IP positions.

- **No TPC for IP positions**

Positions with IP connectivity to the DMS do not have the concept of a virtual TPC or Gateway Position which is responsible for providing group maintenance and for relaying messages between the position and the DMS. Instead, each IP position exchanges messages directly with the DMS over the managed IP network. These include both call processing and maintenance messages.

- **Position maintenance messages folded into OPP protocol**

Positions that are connected to a TMS have always used and still do use TMS-specific maintenance messaging that is not part of the OPP protocol. For IP positions, however, maintenance functionality has been added to the OPP protocol in TOPS15.

- **Position maintenance state depends only on data connectivity**

The maintenance state of a traditional TOPS position depends on the states of both the position's voice link and its data link. With IP positions, however, a dynamic voice trunk to the position is selected in the DMS for each new call to the position, and the position does not have voice connectivity to the DMS when there is no active call at the position. Therefore, the maintenance state of the position depends only on the position's data connectivity to the DMS.

- **Two levels of data connectivity**

Two levels of data connectivity are available for IP positions. These are referred to as peripheral data connectivity and application data connectivity.

- **peripheral data connectivity**

Peripheral data connectivity refers to the readiness of the IP-XPM that provides the position's data connectivity to receive messages from the position. Specifically, peripheral data connectivity is said to be available to a position if (a) the CM can communicate with the IP-XPM and (b) the IP-XPM has an open UDP port for communication with the position.

Peripheral data connectivity does not imply that the DMS can actually exchange data messages with the position, though it may be able to do so. For example, peripheral data connectivity could be available to a position but the DMS and position could be unable to exchange messages because the position was powered down.

— **application data connectivity**

The DMS CM is said to have application data connectivity with a position if it is able to exchange OPP messages with the position. Once application data connectivity is established, periodic end-to-end audits are used to verify that the connectivity is not lost.

Peripheral data connectivity is, obviously, a prerequisite for application data connectivity.

• **Position initiates in-service and out-of-service requests**

When a position is RTS'd at the MAP, the DMS attempts to make peripheral data connectivity available to the position. Once that has been done, the DMS does not immediately bring the position into service. Instead, it waits for the position to send an OPP In-Service Request message requesting to come into service.

There were several reasons for this design decision. One is that it permits the operating company to use a RAS server that dynamically assigns IP addresses to positions. This means that the same position could have a different IP address every time it comes into service. To allow this, the DMS must not know a position's IP address until the position itself provides it. The position provides it in its in-service request message.

A second reason is that giving the position responsibility for initiating the in-service request makes it possible for the position to connect to different host switches at different times. Assuming the position is datafilled in table TOPSPOS at more than one host, it simply sends its in-service request message to the host it wishes to connect to. Of course, the operating company can choose to datafill a position at only one host if this functionality is not desired. Refer to the vendor's position documentation for additional information.

Successful DMS processing of the position's OPP in-service request establishes application data connectivity between the position and the DMS. Either the DMS or the position can then initiate action to remove the position from service. It is expected that a position will send a out-of-service request to the DMS if it is about to make itself unavailable. If the position fails to send an out-of-service request to the DMS when it is about to make itself unavailable, the application data connectivity audit will detect that end-to-end connectivity has been lost and position will be made system busy (SYSB) by the DMS.

• **New position maintenance states reflect the two levels of data connectivity**

A traditional, non-IP position is in the RES (restricted idle) state when it is datafilled and in-service but not accepting calls. There is no RES state for positions with IP connectivity to the DMS. Instead, there are two new states: URES and CRES.

— **URES maintenance state (Unconnected Restricted Idle)**

When a position is in the URES state, peripheral data connectivity is available to the position but application data connectivity isn't. This could be because the position has not yet requested to go in service, or it could be because the position has requested to go out-of-service.

URES is an out-of-service state. A position enters this state when it is successfully RTS'd at the MAP. The DMS is expecting an in-service request message from a position in this state. As explained in a later section, the DMS waits no more than fifteen seconds for the expected in-service request and if it isn't received the DMS transitions the position to the System Busy (SYSB) state.

— **CRES maintenance state (Connected Restricted Idle)**

When a position is in the CRES state, the DMS has successfully processed an in-service request from the position, and application data connectivity is established, but the position is not accepting calls. (An operator may or may not be logged in when a position is in the CRES state. If an operator is logged in, the operator has chosen not to accept calls.)

CRES is an in-service state that closely resembles the RES state of traditional, non-IP positions.

1.4.2 Overview: Provisioning Data and Voice for IP positions

Activity A59006658, "TOPS IP: CallP and Provisioning" provides table TOPSPOS changes to allow datafilling positions with IP voice and data connectivity to the DMS. Please refer to that activity for specifics such as field names, ranges, and datafill restrictions. This activity provides a summary, to make the remainder of this document understandable.

Prior to TOPS15, table TOPSPOS datafill identified dedicated TDM circuits to be used for data and voice connectivity to each position. With the changes made by A59006658, new selectors allow different information to be entered for IP positions.

The new Packetized Voice selector prompts for the name of a dynamic trunk group to be used for packetized voice connectivity to the position. Since the voice connectivity is established on a per-call basis and is unrelated to the position's maintenance state, the voice information in table TOPSPOS is not considered further in this document.

The new IP data selector prompts for two sub-fields, a communication identifier (IPCOMID) and a Y/N field URESOK:

- **IPCOMID**

This is an index into table IPCOMID, which was introduced in TOPS13 by A59007541, "TOPS IP: Data Communications." Indirectly it identifies:

- which IP-XPM the position will communicate with when it comes into service on this switch,
- which transport-layer protocol is to be used for OPP data messaging with the position (only UDP, Universal Datagram Protocol, is supported), and
- which UDP port will be used for OPP data messaging with the position. This is the source port for outgoing OPP messages to the position, and the destination port to which the position should send OPP messages.

Many positions can share the same IP COMID. Positions with the same IP COMID use the same UDP socket on the same IP-XPM. Refer to the TOPS-IP User's Guide for more information on provisioning IP COMIDs for IP positions.

- **URESOK**

This field indicates whether the operating company wishes to allow the position to remain indefinitely in the URES state if peripheral data connectivity is available, but the position has not requested to be in service.

If Y is entered, the position can remain indefinitely in the URES state. This might be useful for a position that connects to different DMS switches at different times, or for any situation in which the position is not expected to be in service at this switch at all times.

If N is entered, the position transitions to the SYSB state fifteen seconds after being RTS'd if an in-service request hasn't been received. This would be useful for a position that is expected to be in service at this switch at all times.

1.4.2.1 Position Maintenance States

The following states are supported for positions with IP connectivity to the DMS:

- **NEQ** (Not Equipped). Position has been removed from datafill.
- **OFFL** (Off-Line). Position has been datafilled and is off-line. This state is equivalent to the INB state at the MP level of the MAP. The DMS ignores any messages sent by positions in this state.

-
- **MANB** (Manual Busy). The position has been manually removed from service. This state is identical to the ManB state at the MP level of the MAP. The DMS ignores any messages sent by positions in this state.
 - **URES** (Unconnected Restricted Idle). Peripheral data communication is available, and the DMS is waiting for an in-service message from the position.
 - **CRES** (Connected Restricted Idle). Peripheral data connectivity is available and application data connectivity is established, but the position is not accepting calls. (An operator may be logged on but not accepting calls, or there may be no operator logged on.)
 - **IDL** (Idle). The position is logged on and ready to accept a call.
 - **CPB** (Call Processing Busy). Call processing is taking place at the position.
 - **CPD** (Call Processing Deload). The position is awaiting a transition to the MANB state (because the BSY command was issued on it from the TOPSPOS MAP level), but the position must first complete the processing of the current call.
 - **SYSB** (System Busy). Application and/or Peripheral data connectivity to the position has been lost. If it was a peripheral data connectivity failure, the position transitions to the SYSB state and then to the URES when peripheral connectivity again becomes available. If it was an application data connectivity failure, the position transitions to the SYSB state. If the DMS receives an in-service request message from a SYSB position, the position transitions to the CRES state.

1.4.3 New TOPSPOS MAP Level

Positions with IP connectivity to the DMS are maintained from MAP level MAPCI->MTC->APPL->TOPSIP->TOPSPOS. TOPSPOS is added as menu item number "4" in the TOPSIP MAP level. The TOPSPOS MAP level contains new commands and states particular to IP positions.

Figure 4 shows an example display at the TOPSPOS MAP level.

Figure 4 MAPCI->MTC->APPL->TOPSIP->TOPSPOS

CM	MS	IOD	Net	PM	CCS	LnS	Trks	Ext	APPL
.
TOPSPOS			OAMAP	SDM	SWMTC	SDMBIL	TOPSIP		
0	Quit								
2	Post_								
3	ListSet	OCDL: . TOPSDEV: . IPPOS: . IPPDA: .							
4									
5	Status	OffL	ManB	URes	CRes	SysB			
6	Tst	TOPSPOS	0	1	5	10	0		
7	Bsy	POS 500 DTC 5 COMID 125 CRES							
8	Rts	Size of Post set: 1							
9	Offl								
10									
11									
12	Next								
13	FRls								
14									
15									
16									
17	ListAlms								
18	Info								
TEAM3									
Time 11:01 >									

The Status line provides a summary of the positions that are datafilled but not available for calls. It shows the number of positions in each of these states: OffL, ManB, URes, CRes, and SysB.

When a position is posted, its position number, XPM, COMID, and maintenance state are displayed on one line. The size of the post set is displayed in text below the posted position.

Since positions that use the same IP COMID share the same software connection endpoint (socket) in the same IP-XPM, the maintenance states of positions with the same COMID are related. For example, if a socket for a particular COMID encounters an error and is closed then all positions provisioned with this COMID that are not OFFL or MANB will become SYSB.

IP positions can be posted in various ways at the TOPSPOS level, and one way is by COMID. Thus group maintenance can be done on all positions with the same COMID.

When the first position associated with a COMID is RTS'd at the MAP, the IP-XPM creates and opens a socket for the COMID. When the last position associated with the COMID is busied, the IP-XPM closes the socket. Busying and RTSing all positions associated with a particular COMID thus has the effect of "resetting" the data port for these positions.

In some ways, posting and maintaining IP positions by COMID is similar to the ability to post and maintain TMS-connected positions by TPC at the MP MAP level. However, unlike TPCs, COMIDs are not, themselves, maintainable entities.

Once the DMS recognizes a position to be in the CRES state, indicating that the position has application data connectivity, the position can initiate a logon by sending an OPP message to the DMS. The logon request sequence must contain a valid operator id and possibly a password. Once the operator is logged in and accepting calls, the position transitions to the IDL state.

1.4.3.1 TOPSPOS MAP Level Commands

The following commands are provided at the TOPSPOS level of MAPCI;MTC;APPL;TOPSIP;TOPSPOS. (See the CI section of this DDOC for detailed information on each command.)

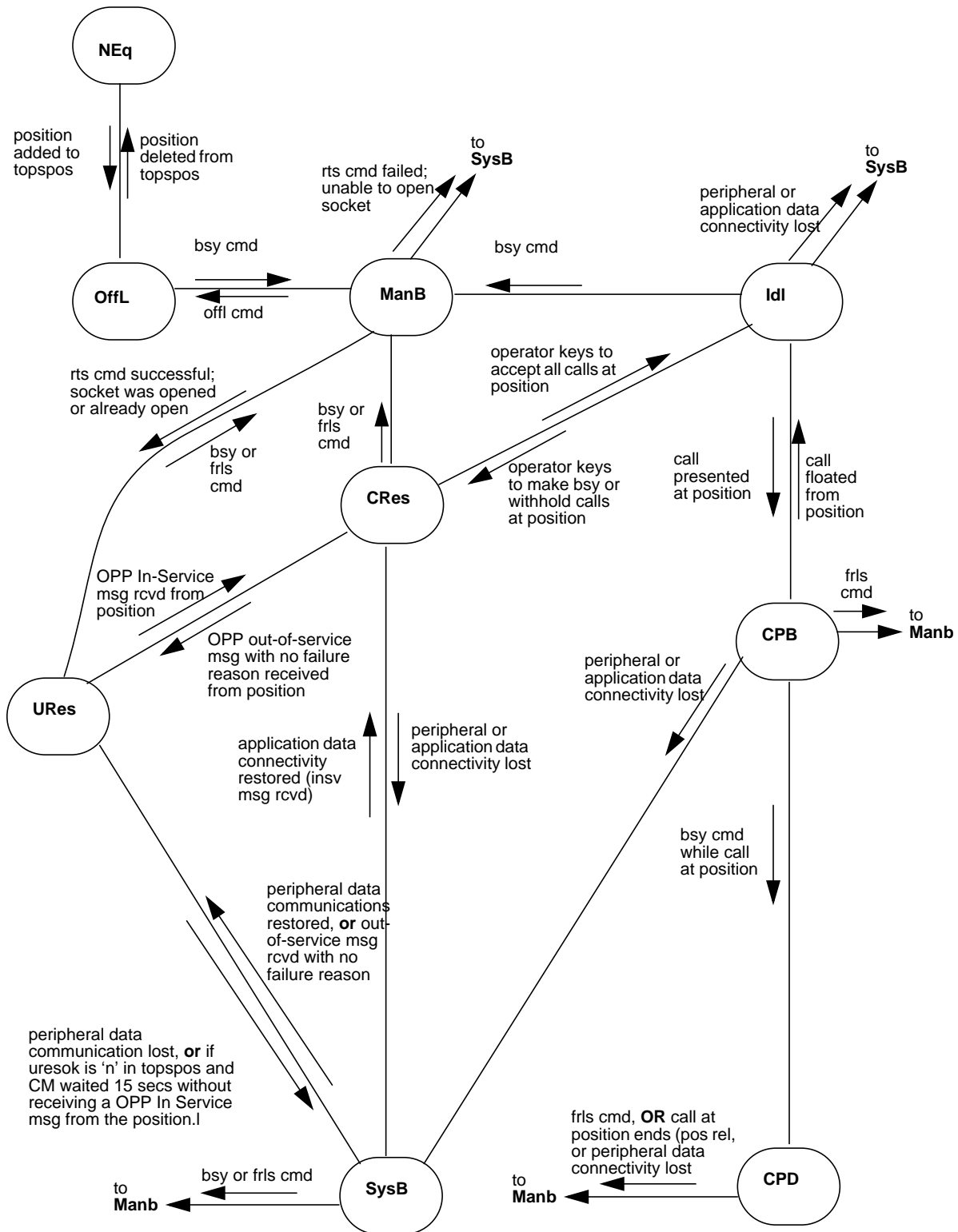
- **QUIT** - Quit out of the TOPSPOS MAP level.
- **POST** - Creates a post set and displays the first position in the post set. The state of the particular position, the IP-XPM, the COMID, and the position number are displayed at the MAP. This command also allows the user to post IP positions by position number, state, IP-XPM, COMID, or all datafilled IP positions.
- **LISTSET** - Lists all positions in the posted set.
- **TST** - While in the CRES state, this command can be used to initiate a position test request from the DMS to the position. If applicable, failure text is obtained from datafill in table MTCTEST.
- **BSY** - Position transitions to ManB or CPD state.
- **RTS** - This is an attempt to bring a MANB position into service. If successful, it transitions the position to the URES state, in which the DMS awaits an in-service request message from the position.
- **OFFL** - Position transitions from ManB state to the OFFL state.
- **NEXT** - Posts the next position in the post set.
- **FRLS** - Force Release the position.

- **LISTALMS** - List all alarm conditions for all TOPS-IP positions. Alarm conditions include SysB positions, External Data Base, and dead audit process alarms.
- **INFO** - This command displays the following information about the posted position:
 - the current or last known IP address and port of the position,
 - identification of the XPM that provides IP connectivity for the position,
 - the IP address and port of the XPM,
 - the operator voice trunk only when the operator is processing a call,
 - any existing alarm conditions (SysB or External DA (Directory Assistance) Database), and
 - a SysB Reason.
- **ABTK** - Abort the current maintenance task. This is an unlisted menu command.

1.4.3.2 Position Maintenance State Transitions

Figure 5 shows the maintenance states and state transitions for IP positions.

Figure 5 IP Position Call Processing And Maintenance State Diagram



1.4.4 IP Position Recovery

IP Positions may go out-of-service and if they do they will need to be recovered. Audits will attempt to bring these positions back into service quickly and automatically.

1.4.4.1 IP Position Peripheral Connectivity Audit

Once a minute, the IP Position Peripheral Connectivity Audit polls the COMIDs associated with IP Positions whose position states are URES or SYSB to detects sockets that are closed. If any are found, the audit attempts to open them. Once the sockets are successfully opened, the position states for the positions associated with these sockets are changed to URES. If, on the other hand, the socket fails to be opened, the audit changes the position states of these positions to SYSB.

1.4.4.2 IP Position Audit

OPP compatible IP positions which are in a CRES, IDL, CPB or CPD position state are periodically audited and set SYSB if the IP Position Audit detects that data connectivity has been lost between the CM and the IP position. To audit a position,, the IP Position Audit sends an OPP Audit Request to the position and expects to receive an OPP Audit Reply before the next audit cycle to confirm that data connectivity hasn't been lost. If the audit fails to receive the expected response, the audit sends another OPP Audit Request to that position. This is repeated until a response is received or the audit polling limit has been reached. If the threshold is reached, the audit changes the position state of that position to SYSB.

Two new parameters are added to table TOPSPARM.

- **IPPOS_AUDIT_INTERVAL**

This parameter specifies the interval of time between each audit cycle. The range of this interval may be set between five and fifteen seconds in one second increments with five seconds set as the default.

Setting this parameter higher saves CM realtime and messaging but may delay the time it takes for the audit and the position to recognize a loss of data connectivity. Setting it lower has the opposite effect.

- **IPPOS_AUDIT_THRESHOLD**

The parameter specifies how many consecutive times an OPP Audit Request should be sent to the position without receiving a response before the state of the position is changed to SYSB. This count may be set between two and five with three as the default.

Increasing the threshold increases the messaging and real time but it also reduces the number of positions being put in a SYSB state because of an occasional packet loss.

Note that a position may be removed from service because of a failure detected by the audit even if other OPP messages are being received from the position. This is to protect against the unlikely possibility of one-way data connectivity.

1.4.4.3 Restart Recovery

Operators logged into IP positions before a cold or reload restart are logged out. After the restart is over the position state of these positions are changed to URES. Positions in the MANB or SYSB state before the restart are changed to URES after the restart. Positions in the NEQ or OFFL position states before the restart remain in these states after the restart.

Positions in the URES state must be recovered after the cold or reload restart. To do this, the IP Position Peripheral Connectivity Audit attempts to open all sockets once the IP-XPM is returned to service.

1.4.4.4 SWACT Recovery

In preparation for a CM SWACT, IP positions must be in one of the following states: NEQ, OFFL, URES, CRES, IDL or CPB for the Status Check to pass. They cannot be MANB, SYSB or CPD as the Status Check will fail and the SWACT will halt. IP positions that are in a MANB, SYSB or CPD should be changed to OFFL. Assuming that the Status Check passes, a restart on the inactive side will be done prior to the SWACT.

During this restart, positions on the active side which are in a URES, CRES, IDL or CPB position state are set to a URES state on the in-active side. Positions on the active side which are in a NEQ or OFFL state are set to the same state on the inactive side.

If URESOK is set to 'N' for a position datafilled in table TOPSPOS, it is possible that before the SWACT occurs, the position could go SYSB.

Following the SWACT, the IP Position Peripheral Connectivity Audit attempts to open all the sockets for positions in the URES or SYSB state. Once the position's socket is opened, OPP In Service Requests can begin to be received from positions assuming they recognizes that they lost data connectivity with the CM and have reset themselves.

It is possible, that a position may not detect that data communications with the CM has been interrupted and therefore send a CallP OPP message to the TOPS CM. If this happens, while the position state is URES or SYSB, an OPP Out Of Service Request is sent to the position. This triggers the position to reinitialize itself and to begin sending OPP In Service Requests to the CM.

When an OPP In Service Request is received from a position, the position state changes to CRES. The operator may now log onto the position.

1.5 Hardware requirements

Refer to 297-8403-906, the TOPS Internet Protocol (IP) User's Guide and to TOPS Marketing.

1.6 Limitations and restrictions

This feature's functionality requires OPP Release 15.

1.7 Interactions

TOPS-IP position maintenance has no interactions with position maintenance of non-IP TOPS positions.

1.8 Logs (LG)

1.8.1 New/modified logs

Table 3 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)
TOPS	305	NEW	SOS
TOPS	505	NEW	SOS

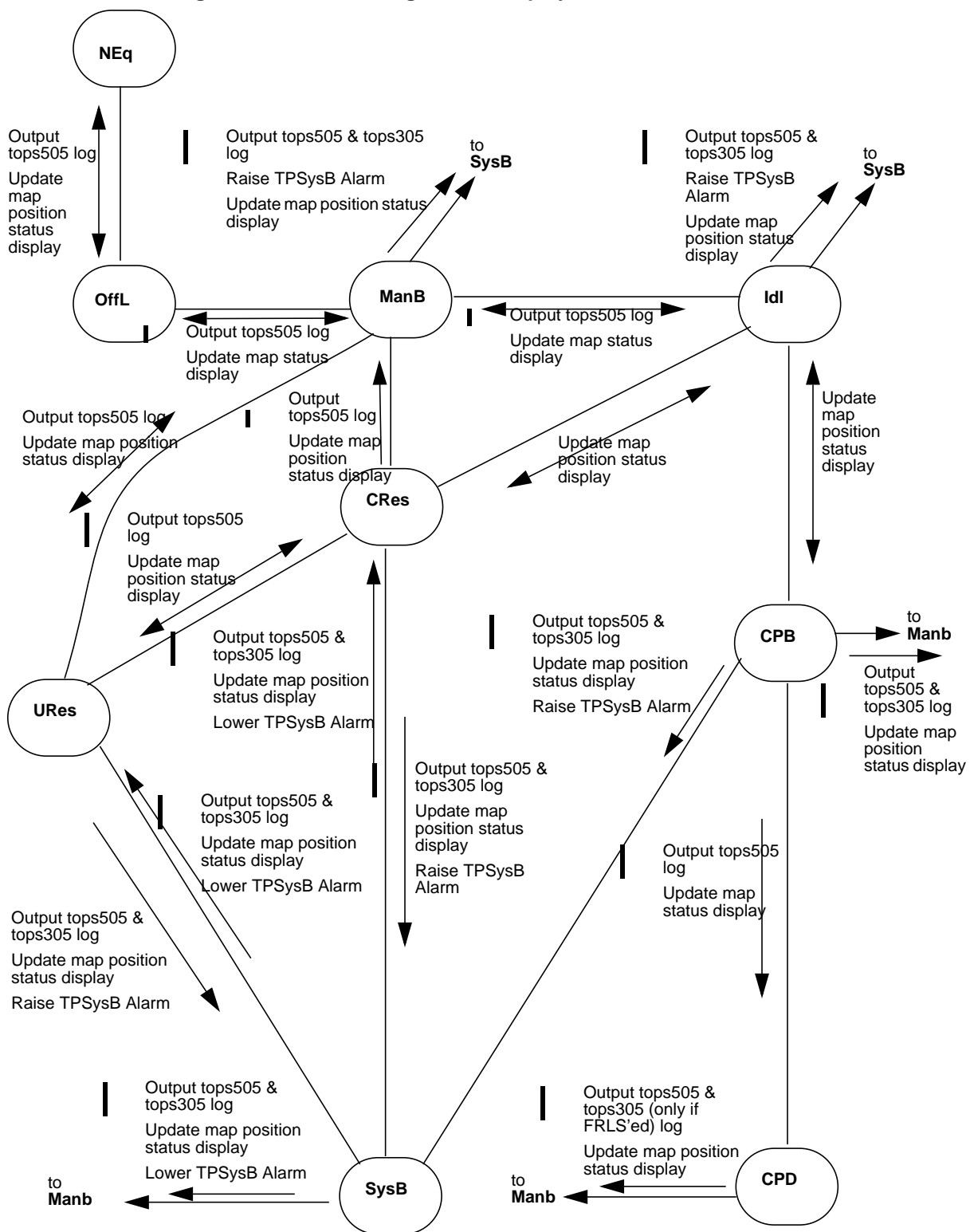
tops3055 is a TBL (trouble) log generated when an IP position goes into or out of the SYSB state, loses or regains communication with an external DA database, is CPB or CPD and is Force Released, or sends a successfully processed unsolicited busy message to the DMS. This log is also generated when a TOPS-IP position audit process (application or peripheral audit) dies or is recreated.

Note: When an IP position sends the CM an out-of-service message, a reason code is specified. The CM uses table MTCFAIL to obtain text associated with this reason code to insert into the TOPS305 log.

TOPS505 is an INFO log generated when an IP position transitions between various position states. Also the TOPS505 log is generated when an IP position is added to or removed from datafill in table TOPSPOS.

Figure 6 below summarizes the logs, MAP displays and alarms that accompany position state changes for IP positions. For comparison purposes, Table 7 shows similar information for TOPS MP positions that are connected through the TMS.

Figure 6 IP Position Logs, MAP Displays and Office Alarms



1.9 Data schema (DS)

1.9.1 New/modified tables

Table 4 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TOPSPARM	CHANGED	UNCHANGED

This activity adds two new parameters to table TOPSPARM:

- IPPOS_AUDIT_INTERVAL
- IPPOS_AUDIT_THRESHOLD.

These are described in "2.4.4 IP Position Recovery".

1.10 Office parameters (OP)

Not Applicable

1.11 Service orders (SO)

Not Applicable

1.12 Alarms (AL)

When alarm conditions related to TOPS-IP positions exist, an APPL alarm is raised. This alarm is visible at the MTC MAP level under APPL, at the APPL MAP level under TOPSIP, and at the TOPSIP MAP level beside IPOS and IPDB.

TOPS-IP position alarm conditions include:

- TOPS-IP position(s) in the SYSB state (Alarm Text = 'TPSysB') (Alarm Severity = Minor),
- TOPS-IP position(s) cannot communicate with an External DA DataBase(s) (Alarm Text = 'TPExDB') (Alarm Severity = Minor, Major).

When a TOPS-IP position goes SYSB, the TPSysB alarm is raised, and a tops305 log is generated indicating a TOPS-IP position went SYSB and the position number is listed.

When a TOPS-IP position indicates it has lost or regained communication with an External DA database, a tops305 log is generated indicating this.

1.12.1 New/modified directories

Not Applicable

1.13 Command interface (CI)

1.13.1 New/modified commands

Below are the new commands implemented by this feature.

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
TOPSPOS	NEW		TOPSIP	MENU
QUIT	NEW		TOPSPOS	MENU
POST	NEW		TOPSPOS	MENU
LISTSET	NEW		TOPSPOS	MENU
TST	NEW		TOPSPOS	MENU
BSY	NEW		TOPSPOS	MENU
RTS	NEW		TOPSPOS	MENU
OFFL	NEW		TOPSPOS	MENU
NEXT	NEW		TOPSPOS	MENU
FRLS	NEW		TOPSPOS	MENU
LISTALMS	NEW		TOPSPOS	MENU
INFO	NEW		TOPSPOS	MENU
ABTK	NEW		TOPSPOS	NON-MENU

1.14 Operational measurements (OM)

Not Applicable

1.15 AMA/Billing information (AM)

Not Applicable

1.16 Software optionality control (SOC)

Table 6 SOC

SOC option name:	OSB00102
SOC option title:	OPP Over IP
SOC option control type:	usage
New SOC option?	Yes
SOC option order code	OSB00102

Option defined in DRU:	TOPS
Affected products:	LLT, LET

This SOC limits the number of IP positions that can go from OFFL to MANB.

1.17 Glossary

Term	Description
CPB	Call Processing Busy
CC	Calling Card (Database)
CM	Computing Module
CRES	Connected, Restricted Idle
DA	Directory Assistance
DMS	Digital Multiplex System
DoIP	Data over IP
DTC	Digital Trunk Controller
EIU	Ethernet Interface Unit
FRLS	Force Release
IP	Internet Protocol
IP Address	Network Layer Address (32 bits) in the form of X.X.X.X
IPGW	IP Gateway
ISN-DA	Intelligent Service Node - Directory Assistance
IWS	Intelligent WorkStation
LAN	Local Area Network
LIDB	Line Information Data Base
MAP	Maintenance and Administrative Position
MIS	Management Information System
MP	Multipurpose Position
OC	Operator Centralization
OIA	Open Interface Access
OFFL	Off line

OPP	Open Position Protocol
PM	Peripheral Module
PMB	Peripheral Module Busy
PSTN	Public Switched Telephone Network
QMS	Queue Management System
RTCP	Real-Time Transport Control Protocol
RTP	Real-Time Transport Protocol
RTS	Return to Service
SOC	Software Optionality Control
SYSB	System Busy
TDM	Time Division Multiplexed
TMS	TOPS Message Switch
TOPS	Traffic Operator Position System
TP	TOPS Position
TPC	TOPS Position Controller
TST	Test
UCD	Unoccupied with Call Disconnected
UCP	Unoccupied with Call at Position
UDP	User Datagram Protocol
URES	Unconnected, Restricted Idle
VoIP	Voice over IP
VTB	Voice Trunk Busy
XPM	XMS-based Peripheral Module

1.18 References

Document ID	Title
297-8403-906	TOPS Internet Protocol (IP) User's Guide.

Note: The other activities that make up the TOPS, XPM, and IWS IP projects in the 15 release are listed in Table 2.

1.19 Appendix A: TMS Based Position Maintenance VS. IP Based Position Maintenance

The following is a list of commands and states for positions connected by a TMS (MP MAP level) compared to new commands used for positions with IP connectivity (TOPSPOS MAP level).

<u>TMS BASED FUNCTIONALITY</u>	<u>TOPSPOS CMD</u>	<u>MP CMD</u>
terminate maintenance	ABTK	ABTK
display info on posted position	INFO	QUERYPM
change MAP level	Quit	Quit
select a position or set of positions	POST	POST
display the set of positions in a state	POST;LISTSET	DISP
step to next position in post set	NEXT	NEXT
display voice trunk info on position	INFO	TRNSL
perform diagnostics on the posted position	TST	TST
manual busy the posted position	BSY	BSY
installation busy posted position	OFFL	BSY INB
manually return the pos. to service	RTS	RTS
rts position for training	Not Supported	RTS T
get prompt immediately after rts; nowait mtce	Not Supported	RTS NOWAIT
MB a pos. that is CPB or CPD	FRLS	FRLS
display state for each pos. in post set	LISTSET	Not Supported
display alarm conditions for all positions	LISTALMS	Not Supported

<u>POSITION STATE DESCRIPTION</u>	<u>TOPSPOS state</u>	<u>MP state</u>
VTB - Voice Trunk Busy	Not Supported	VTB
SB - System Busy	SysB	SysB
CPB - Call processing Busy	CPB	CPB
CPD- Call processing Deload	CPD	CPD
RTRN - Training	Not supported	RTRN
IDL - Idle	IDL	IDL
MB - Manual Busy	ManB	ManB
INI - Initializing - trying to come into service	Not Supported	INI
PMB - Peripheral Module Busy (TPC is Busy)	Not Supported	PMB
RES - Restricted Idle	Not Supported	RES
URES - Unconnected Restricted Idle	URES	Not Supported
CRES - Connected Restricted Idle	CRES	Not Supported
INB - Installation Busy -	OFFL	INB
NEQ- Not Equipped	NEQ	NEQ

<u>Current TPC states/Description</u>	<u>TOPSPOS state</u>	<u>TPC state</u>
OFFL - Off-line	N/A	OFFL
SysB - System Busy	N/A	SysB
CBsy - CM side busy	N/A	CBsy
ISTb - In-Service Trouble	N/A	ISTb
InSv - In-Service	N/A	InSv
ManB - Manual Busy	N/A	MB

1.20 Appendix B: Position logs and alarms for non-IP positions

Logs, MAP displays and alarms for IP positions were shown in Figure 6. For comparison purposes, the following table show the logs and alarms for positions with connectivity through the TMS. This feature does not change the logs that are generated for positions that do not have IP connectivity.

Table 7 Position Logs & Alarms for non-IP positions

Position From State	Position To State	MP Logs	Alarm Raised	Voice State
NEQ	INB	TOPS115: INFO Text: MP State Change	No	INB
INB	MANB	none	No	RES
MANB	RES	none	No	RES
RES	IDL	none	No	IDL
*	SYSB	TOPS115: INFO Text: Unsolicited BSY INFO: EC 151 - NO_POSITION_HEARTBEAT TOPS115: INFO Text: MP State Change	Yes	RES
IDL	CPB	none	No	CPB
IDL	RES	none	No	RES
CPB	CPD	none	No	CPD
CPB	MANB	TOPS102: TBL TEXT = TERMINAL FORCE RELEASED	No	RES
PMB	MANB	none	No	RES
RES	PMB	none	Yes	RES
MANB	INB	none	No	RES

Table 7 Position Logs & Alarms for non-IP positions

Position From State	Position To State	MP Logs	Alarm Raised	Voice State
SYSB	*	TOPS 115: INFO Text: MP State Change	No	RES
INB	NEQ	TOPS115: INFO Text: MP State Change	No	NEQ

2: Functional description (FN)

2.1 Feature name

TOPS IP: Position Provisioning and OPP Data

2.2 Feature Synopsis

This feature provides data schema changes for VoIP to operator positions, and implements internal utilities to support VoIP call processing and maintenance.

2.3 Project introduction

Note: This document includes a number of statements to the effect that certain TOPS-IP functionalities were introduced, or are supported, in the TOPS13 and TOPS15 releases. These statements should be interpreted as describing which functionalities the TOPS-IP design groups intended to make available in those releases. At the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

This section includes project background, an overview of supported configurations, feature breakdown, and overall project limitations and restrictions. For additional limitations and restrictions, please refer to the appropriate sections of the individual feature documents.

The basic new TOPS-IP functionality in the 15 release is IP voice and data connectivity between the DMS and IWS operator positions. Because position connectivity and Operator Centralization (OC) connectivity are inter-related in an OC network, this section addresses OC issues as well as position connectivity issues.

2.3.1 Background

In TOPS13 and XPM15, the TOPS-IP project provided support for

- IP voice and data connectivity between North American TOPS OC host and remote switches, and
- IP data connectivity for QMS MIS in North American TOPS switches.

IP connectivity was achieved using the IP-XPM peripheral module. The IP-XPM is a DTC with an SX05DA main processor, 7X07AA IP Gateway (IPGW) cards in the P-side interface slots, and an MX76DA messaging card. The SX05 provides the IP interface for data messaging, while the 7X07 provides the call signaling and bearer interface for voice over IP (VoIP).

OC voice links are datafilled in the DMS CM as dynamic ISUP trunks minus the usual CCS7 datafill. A dynamic trunk is one that can terminate anywhere, rather than having a nailed-up far end. ISUP messaging is used only between the CM and the SX05 and 7X07. The 7X07 converts between ISUP on the C-side and H.225-based messaging on the IP side, and it converts between circuit-switched voice on the DMS network side and packet switched voice on the IP side.

For additional important background information, refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide.”

2.3.2 Overview of supported network configurations

This section shows and describes first a traditional network of operator positions and DMS TOPS switches, then the same network after it has been fully converted to IP connectivity for the positions and the OC links, and finally a hybrid IP/traditional network such as may exist during the conversion to TOPS-IP.

2.3.2.1 Traditional, non-IP network

Figure 1 shows a high-level view of a simple, traditional, TDM-based¹ network of operator positions and TOPS switches. This is a pre-TOPS-IP configuration. The DMS switch labeled “Standalone/OC Host TOPS Switch” could be a pure standalone TOPS switch in a non-OC environment, a pure OC host, or a combination.

Although not shown in the figure, the three TOPS switches are also connected to the public switched telephone network (PSTN) in the traditional way.

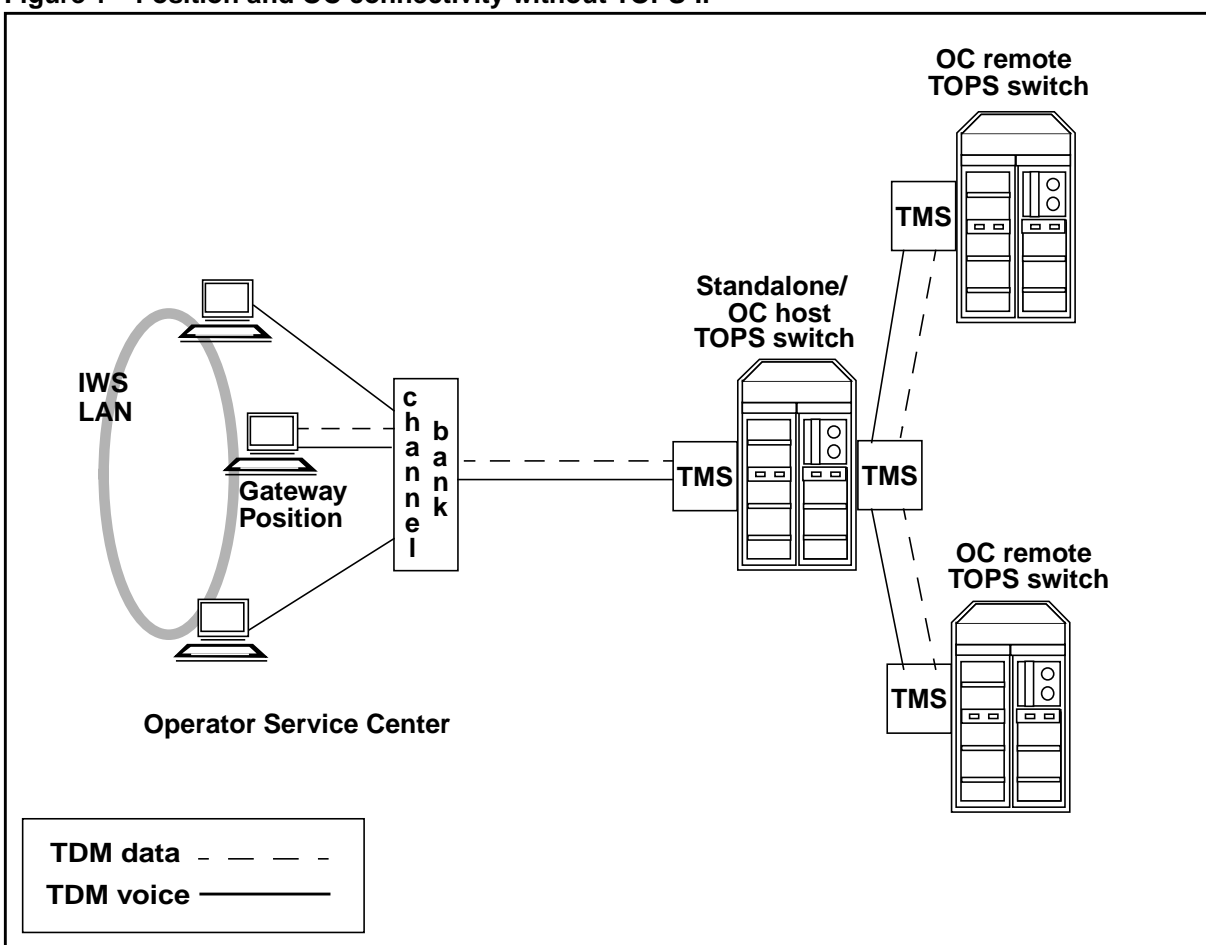
Dedicated position voice links are provisioned between the standalone or host TOPS switch and each position. These nailed-up TDM voice links are through the TMS peripheral, a DS1/T1 or PCM30/E1 carrier, a channel bank, and a DS0 link to the position.

¹Throughout this document, the term “TDM” is used to refer to pre-IP voice and data connectivity that uses traditional time division multiplexed trunking facilities to transmit non-packetized voice and data. However, it is recognized that an operating company may route its IP traffic over a SONET backbone, for example, and thus may be using an underlying TDM technology even with IP.

A data link is also provisioned between the standalone or host TOPS switch and each position. Like voice links, position data links use the TMS peripheral. Unlike the voice path, however, the data path to a position always passes through a Gateway Position which transmits data to and from the other positions on the IWS LAN. The Gateway Position also has maintenance responsibility for other positions in its cluster.

The OC remote switches in the figure have point to point TDM voice and data links to the OC host. In the figure these OC connections use TMS peripherals, but alternatively they could use DCM peripherals. The TOPS switch allocates OC voice links on a per-call basis; one OC voice link is required for each OC call. Many OC calls can simultaneously use an OC data link.

Figure 1 Position and OC connectivity without TOPS-IP



2.3.2.2 Fully converted TOPS15 IP network

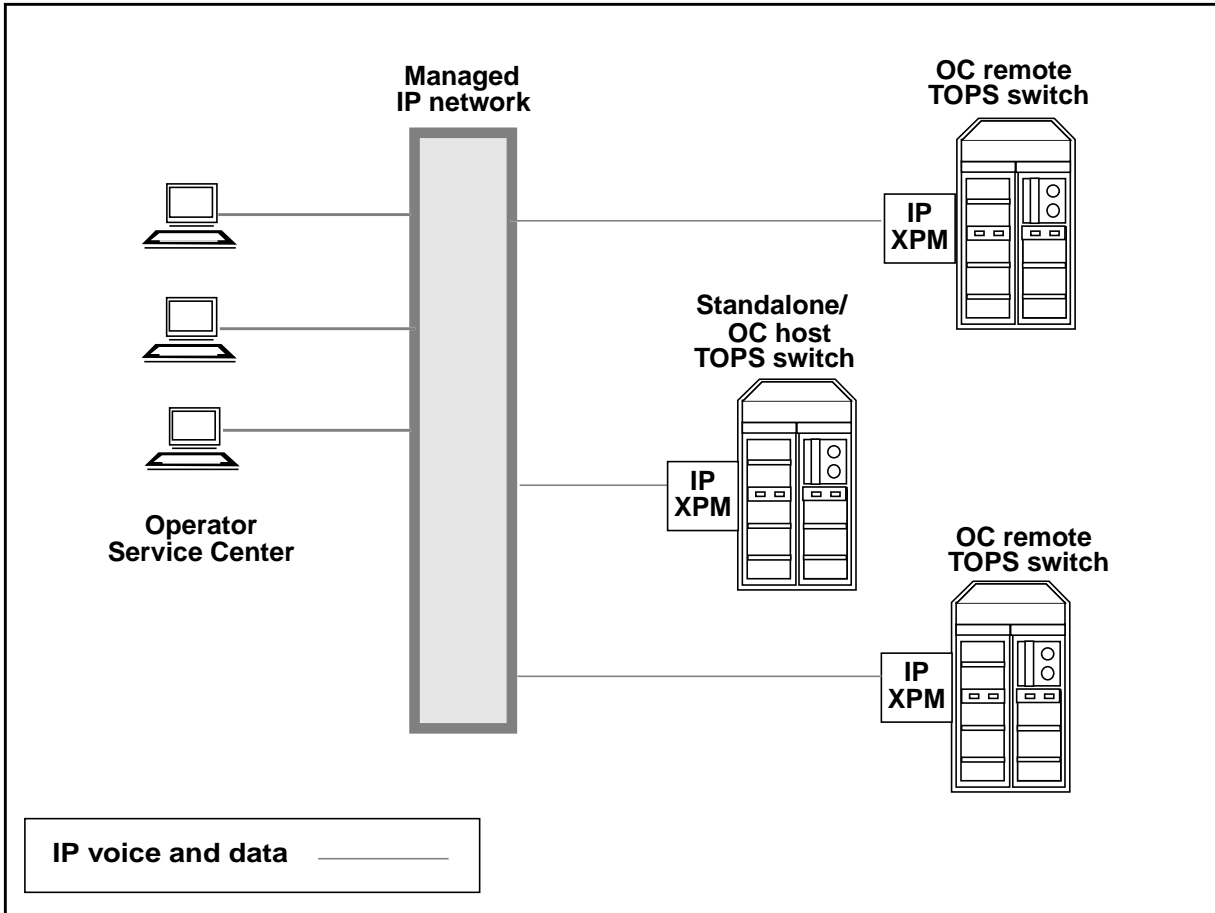
Figure 2 shows the same network fully converted to use the TOPS-IP interfaces that were developed in the 15 release. The operator positions and TOPS DMS switches all have IP voice and data connectivity to a managed IP

network. Refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide,” for more information about the IP-XPM and requirements for the managed IP network.

Although the positions are still on an IWS LAN, the LAN is considered part of the managed IP network, so it is not shown individually in the figure. It is an Ethernet LAN, not a token ring.

On the DMS side, the IP connectivity is through IP-XPM peripherals, which were introduced in TOPS13 and XPM15 for the OC-IP and QMS MIS IP applications. The TOPS-IP position application is added in TOPS15. The same IP-XPM can simultaneously support IP traffic for all three of these applications.

Figure 2 Position and OC connectivity with TOPS-IP



In the configuration of Figure 2, there is no longer a Gateway Position with maintenance and data messaging responsibility for other positions. Instead, each position exchanges data messages directly with the TOPS host switch over the managed IP network.

IP data communication is maintained between the position and the host switch as long as the position is in-service, regardless of whether the position is processing a call. In OC calls, OPP (Open Position Protocol) messages between the OC remote and the position always pass through the OC host.

Unlike data connections to positions, which persist over calls and route through the host for OC calls, voice connections to positions are established on a per-call basis and bypass the host in OC calls. The VoIP connection is directly between the OC remote switch and the position, and it uses no resources in the OC host.

One implication is that a position does not have a voice link to any DMS switch when it is not processing a call. Another implication is that the IP network must be configured in such a way that the remotes and positions, remotes and hosts, and hosts and positions can all route messages to each other.

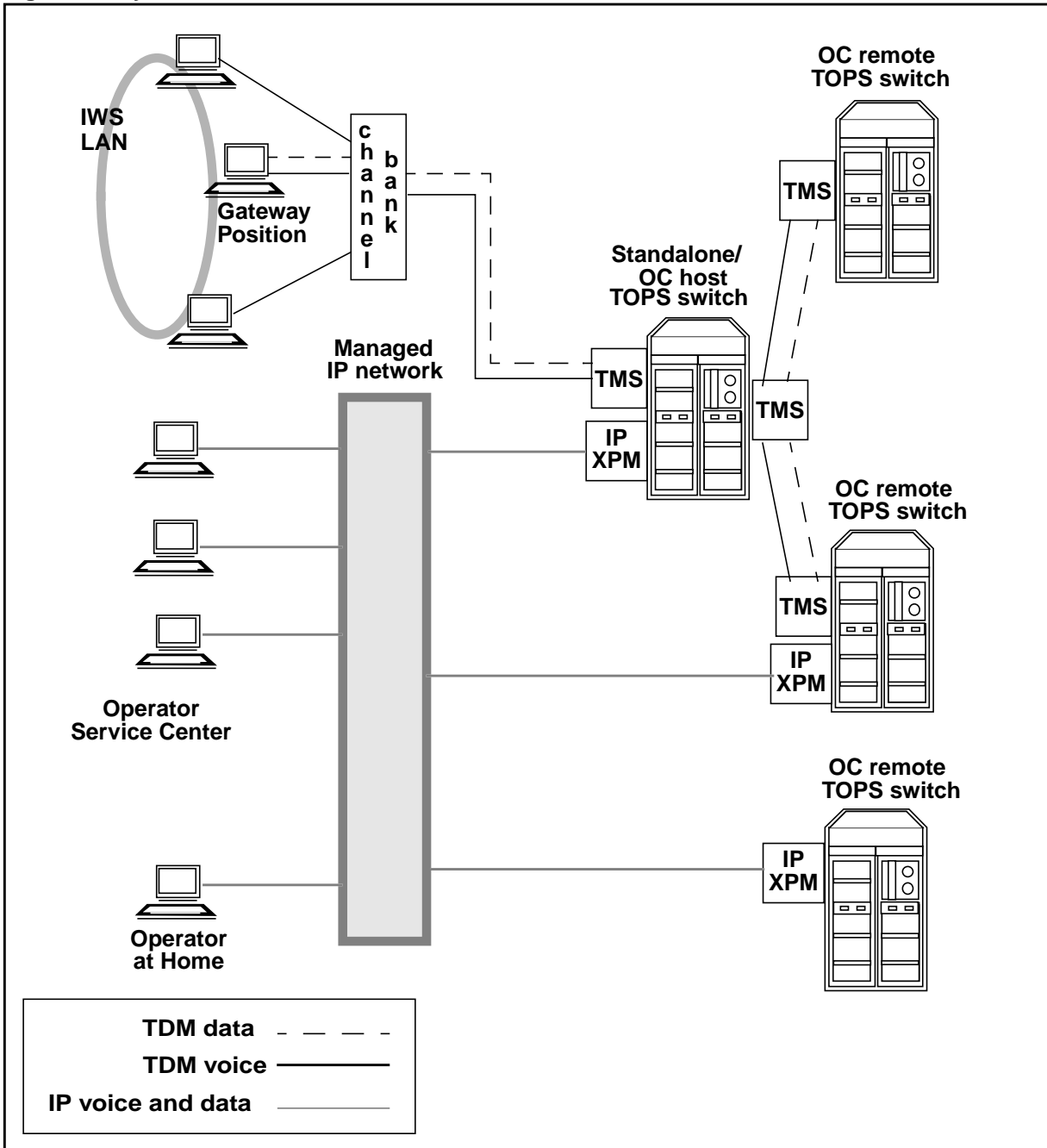
VoIP between positions and TOPS switches uses industry-standard protocols from the ITU-T H.323 suite, version 2. In the TOPS CM, the voice link to a position is datafilled as a dynamic ISUP trunk. The 7X07 IP Gateway card in the IP-XPM converts between H.323 protocols on the IP side (H.225 and H.245 for call signalling, RTP and RTCP for bearer), and ISUP messaging and circuit switched voice on the C-side. Supported codecs for VoIP are G.711 (Mu-law and A-law) and G.729.

2.3.2.3 Hybrid TOPS15 IP/TDM network

It is expected that during the transition to TOPS-IP, a network will include some combination of IP and traditional TDM connectivity for positions and OC links. Figure 3 illustrates the variety of supported configurations.

Figure 3 also shows that positions with IP connectivity need not be at an Operator Service Center, as long as the position is connected to the operating company's managed IP network. Position connectivity using the public Internet for voice or data is not supported.

Figure 3 Hybrid Traditional and TOPS-IP network



As shown in the figure, a single TOPS standalone or host switch can simultaneously support positions with traditional connectivity and positions with IP connectivity. Also, a single OC host or remote can support both traditional and IP connectivity to other nodes in the OC network.¹

¹However, if both IP and traditional OC connectivity exist between the same host-remote pair, each must have the other datafilled as two different offices in tables OCOFC and OCGRP.

Note: If an OC host has any IP positions, it is important that either (a) all of its remotes be upgraded to TOPS15 or later, or (b) QMS queuing be set up to ensure that an IP position cannot be selected for a call from a pre-TOPS15 remote. This is true regardless of whether the OC links are IP or traditional TDM. If an IP position is selected in the OC host for a pre-15 remote, the call is deflected.

The next several paragraphs describe the different combinations of TDM and IP connectivity for position and OC voice and data links. This information is summarized in Table 1.

If the OC remote selects an OC-IP data link for a call, and the host selects an IP position, Figure 2 applies. In this case the operator's voice link is always VoIP directly from the remote; that is, it always bypasses the host. On the other hand, the operator's data for the call passes through the OC host. The data connection is IP from remote to host, and then IP from host to position.

If the remote selects an OC-IP data link and the host selects a traditional, non-IP position, then host voice bypass is not available. The call uses an OC-IP voice link between the remote and the host. Packetized voice from the remote is converted to TDM voice in the 7X07 IPGW card in the host's IP-XPM, and travels through the DMS network in the host and out on the nailed-up TDM voice link to the position. Similarly, the operator's data for the call is IP between remote and host, but it uses the position's nailed-up data link between host and position (routing via the Gateway Position on the IWS LAN). This is the same as the TOPS13 OC-IP functionality, before the introduction of IP positions in TOPS15.

If the remote selects a traditional, non-IP OC data link and the host selects a non-IP position, the functionality is the same as it was prior to the TOPS-IP project. That is, the call uses traditional TDM-OC voice and data links between remote and host, and it uses traditional nailed-up voice and data links between host and position.

If the remote selects a traditional, non-IP OC data link and the host selects an IP position, then host voice bypass is not available. The call uses a traditional TDM-OC voice link between remote and host. Then in the host, the TDM voice from the remote goes through the DMS network and out to a 7X07 IPGW card in the IP-XPM that provides IP connectivity for the position. The IPGW converts between TDM voice on the C-side and packetized voice to the position. Similarly for data, the traditional TDM-OC data link is used between remote and host, and the IP-XPM in the host sends IP data to (and receives IP data from) the position.

These various configurations are summarized in Table 1 below.

Table 1 Supported configurations of IP and TDM position and OC connectivity

OC data link type	Position connectivity in host	Voice path used	Data path used
IP	IP	VoIP, remote to position (bypasses host)	DoIP remote to host to position
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	
IP	TDM	VoIP remote to host, TDM host to position.	DoIP remote to host, TDM host to position.
TDM	TDM	TDM remote to host, TDM host to position.	TDM remote to host, TDM host to position.
		This is the same configuration that existed prior to the TOPS-IP project.	
TDM	IP	TDM remote to host, IP host to position.	TDM remote to host, IP host to position.
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	

2.3.3 Feature breakdown

The following table shows the individual activities that make up the TOPS, XPM, and IWS IP projects for the 15 release.

Table 2 Feature Breakdown

CM Activities	
59022288	TOPS IP: Voice Provisioning and Utilities
	Provides data schema changes for VoIP to operator positions, and implements internal utilities to support VoIP call processing.
59006658	TOPS IP: Position Provisioning and OPP Data
	Provides data schema changes for IP-based operator positions, and support for OPP data messaging over IP.
59006653	TOPS IP: Position Maintenance
	Provides the CM maintenance functionality associated with IP-based operator positions.

Table 2 Feature Breakdown

59015863	TOPS IP: Call Processing for IP Voice
	Provides the high-level CM call logic to support operator positions with IP voice connectivity to the DMS.
59020499	TOPS IP: Global Support
	Documentation and test activity for support of a subset of TOPS-IP functionality in MMP loads.
59022293	TOPS IP: IPGW Enhancements
	Provides increased flexibility for engineering and provisioning of 7X07 IPGW cards and dynamic trunks.
7X07 Activity	
59022821	TOPS IP: 7X07 IP Gateway Support for VoIP
	Provides the 7X07 gateway functionality required for TOPS IP in the 15 release.
XPM Activities	
59022114	RSI Link Selection, Version control, Robustness
	Provides more even distribution over the IP-XPM's C-side links of data messages from the XPM to the CM for TOPS applications. Also provides internal enhancements.
IWS Activities	
RD000701	IWS Voice Over IP
	Provides VoIP functionality for operator positions.
RD983702	OPP Over IP
	Implements the OPP development needed to support positions with IP connectivity to the DMS.
RD002601	DHCP/DNS Support in IWS
	Provides position support for the Domain Host Configuration and Domain Name Service protocols.
RD002602	Verification of Voice Over IP Card
	Hardware activity to verify the third-party card used for VoIP in the IWS.
RD991614	OIA Direct Connect via HTML
	Provides support for OIA applications on positions with IP connectivity to the OIA data bases.

2.3.4 Project limitations and restrictions

This section includes limitations and restrictions of the overall TOPS15 TOPS-IP project. Individual activities in the project include additional limitations and restrictions.

- The original TOPS-IP design intent was to provide support for the following:
 - OC-IP between North American OC host and remote switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in North American TOPS switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in MMP loads, but not in GMP (GSP/MMP combo) loads, in the TOPS15 and later releases, and
 - IP voice and data connectivity between DMS switches and IWS operator positions in North American and MMP loads, but not GMP, in TOPS15 and later releases.

However, at the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

- Like OC-IP voice and data connectivity, TOPS-IP position connectivity is intended to be over a managed network that has been carefully engineered for reliability and adequate bandwidth.
- TOPS OC remote switches at TOPS14 and lower cannot process calls that are allocated IP positions in the host. Therefore, OC hosts at TOPS15 and higher deflect any calls that are allocated positions with IP connectivity, if the remote is pre-TOPS15.

It is recommended that all switches in the OC network be upgraded to TOPS15 before operators who serve OC calls log into IP positions. Alternatively, new QMS call queues may be set up for operators who log into IP positions. If this approach is taken, remotes that have not yet upgraded to TOPS15 must not be datafilled to route calls to the new call queues.

- Positions with IP data connectivity must also have IP voice connectivity, and vice versa.
- IP connectivity is supported for Nortel Networks IWS positions only. Third party OPP-compliant operator positions continue to be supported in TOPS15, but only with traditional TMS connectivity.
- It is not possible for an OC remote to route VoIP traffic for the position to the OC host and have the host forward VoIP to the position. If the OC and position links are both IP, host voice bypass is always used. So the remotes must be on the same IP network as any positions they will use, as well as any hosts they will use.

- The scope of the TOPS-IP project in the 15 release is limited to position voice and data connectivity to TOPS DMS switches. The project does not convert any other TOPS interfaces to IP.

For example, the TOPS15 development does not change the data connectivity between the DMS and D1 databases, LIDB data bases, or PARS nodes. Nor does it provide VoIP between the DMS and OSSAIN service nodes or the ISN-DA audio server.

Also, the TOPS15 development does not convert existing TOPS applications that use the Ethernet Interface Unit (EIU) for IP data connectivity, to use the IP-XPM. For example, OSSAIN data links, OSAC data links, and TOPS devices are not converted to use the IP-XPM.

- For positions with TMS connectivity to the DMS switch, the TMS provides the interface between IWS positions and external OIA databases such as Nortel Networks' Reference System (also referred to as NTR). There is no plan to enhance the IP-XPM or the Reference System to support use of this product in a TOPS-IP network. Refer to IWS documentation and third party vendors for information about any plans to convert other OIA applications to use other interfaces.

- Most call arrival tones at positions with IP connectivity to the DMS are generated by the position itself (based on OPP messages from the DMS), rather than by the DMS XPM. Therefore, it is possible that some call arrival tones may sound slightly different. Please refer to IWS documentation for more information.

The initial call arrival tones for ADAS Base and ADASPLUS calls are generated by the ADAS platform, regardless of whether the position has IP or traditional connectivity to the DMS.

- IWS positions with IP connectivity to the DMS cannot detect when the operator seats or unseats the headset. One consequence is that CSEs with stats capability will not be warned by UCP or UCD displays if an operator unseats the headset when a call is at position. Another consequence is that force management statistics continue to accumulate after the operator unjacks the headset if the operator does not use the appropriate softkey to log out. Please refer to IWS documentation for more information.
- Positions with IP connectivity to the DMS cannot be datafilled as Service Assistance (ASST) or In-Charge (IC).
- Monitoring voice links are not supported for a call with more than two operators. Whenever a third operator is connected to a call, the monitoring voice links are taken down to provide resources to connect the second *active* operator.
 - If an IP operator is being monitored and attaches a CSE for the current call, the monitoring voice connection is taken down for the duration of that call.

- If an IP CSE is being monitored and receives a call with another operator attached, the monitoring voice connection is taken down for the duration of that call.

For both of these scenarios, data is still presented to the monitoring operator. The monitoring voice connection will be re-established for the next call which does not involve three operators.

- It is strongly recommended that if CSEs use positions with IP connectivity, the call queues designated in table TQMSFCQA for CSE assistance be datafilled in tables TQCQINFO and PKTVPROF to use the G.711 codec.
- Due to the processing overhead associated with establishing VoIP connections with operator positions, operator idle time will increase for operators at IP positions.
- Refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide” for capacity and engineering restrictions specific to the IP-XPM, and for capacity and engineering requirements for the managed IP network.

2.4 Description

This feature is responsible for provisioning and call processing issues accompanying the transition from TMS based OPP compliant positions to IP connected OPP compliant positions. From a provisioning standpoint, these changes are relegated to table TOPSPOS modification. The modifications introduce the IP based position. Along with the table changes to allow for IP positions, accompanying call processing changes are necessary. Finally, some security issues are addressed via encryption of specific fields in the OPP protocol.

2.4.1 Provisioning OPP Compatible Positions

Table TOPSPOS is the principal vehicle for provisioning TOPS positions on the switch. Each tuple represents a single position entity and dictates the voice circuit and data link which are to be used for the position. The following figure shows an example tuple in table TOPSPOS prior to the changes made by this feature.

Table 3 Pre-IP Table TOPSPOS

POSNO	VCCKT	VCPDGRP	CARDCODE	DATAPATH	POSAREA ^a
500	TMS 0 3 5	NPDGP	DS1SIG	TMS MP OPP 8 0	.....

a. This area is unchanged by this feature; thus, it will not be discussed.

This feature restructures table TOPSPOS to allow the voice and data paths to be datafilled either with the traditional information (for non-IP positions) or

with the new information required for positions with IP connectivity. The following figure shows how the tuple for non-IP position 500 would appear after an ONP to TOPS15 or later.

Table 4 Table TOPSPOS - TDM Voice and TDM Datalink

POSNO	VLPATH		DATAPATH		POSAREA
	VLTYPE	voice fields	DATATYPE	data fields	
500	TDM	TMS 0 3 5 NPDGP DS1SIG	TMS	MP OPP 8 0	.....

New selector VLTYPE (voice link type) allows the voice path to be datafilled as TDM, in which case the refinement includes the traditional fields for the voice path, or with a new value indicating that the position has packetized (IP) voice, in which case the refinement is different. The DATAPATH area is the same as it was prior to TOPS15 except for the addition of new IP selector and refinement for IP positions. Note that a position must have both traditional TDM voice and data, or packetized voice and IP data. It is not possible for a position to use packetized IP voice with TMS data, or TDM voice with IP data.

The following figure shows example datafill for several positions that use packetized IP voice and IP data. The sections that follow the figure provide more information about datafilling the voice and data paths for such positions.

Table 5 Table TOPSPOS - Packetized Voice and IP Datalink

POSNO	VLPATH		DATAPATH			POSAREA
	VLTYPE	VLCLI	DATATYPE	IPCOMID	URESOK	
501	PKTV	POSCLI1	IP	1	Y	.....
502	PKTV	POSCLI2	IP	1	N	.....
503	PKTV	POSCLI2	IP	2	N	.....

2.4.1.1 Voice Provisioning for IP Positions

Selector field VLTYPE is datafilled with PKTV (packetized voice) for a position with IP connectivity to the DMS. With a VLTYPE value of PKTV, the VLCLI field is revealed. This field represents the CLI of the voice link to the position. This CLI must correspond to a dynamic trunk group which is datafilled in table TRKOPTS to use the POS application (as indicated in the example table below).

Table 6 Table TRKOPTS

OPTKEY						OPTINFO
POSCLLI1	DYNAMIC	DYNAMIC	ISUP	IP	IP	POS

There is an exception to the rule that an IP position's voice CLLI must be a POS dynamic trunk: if a centralized position (not standalone) will *always* use voice bypass for its voice link, and will neither need to place delay calls nor need to be involved in a monitoring interaction, then a placeholder CLLI -- a CLLI that doesn't actually correspond to a trunk entity -- may be entered instead.

For further details on packetized voice links to the operator position, refer to features A59022288 and A59015863.

2.4.1.2 Data Provisioning for IP positions

As shown in Table 5, selector field DATATYPE is datafilled with IP to indicate that the position's data path to the DMS is via IP. When the DATATYPE is IP, two new refinement fields appear: IPCOMID and URESOK.

Field IPCOMID indicates a reference into table IPCOMID. This table specifies which SX05-equipped IP XPM will be used for data messaging between the DMS and the position. Example IPCOMID datafill, which corresponds to our example TOPSPOS datafill, is shown below. Example datafill in related table IPSVCS is also shown.

Table 7 Table IPCOMID

COMID	SERVICE	XPMNAME
1	TOPSOPP	DTC 19
2	TOPSOPP	DTC 20

Table 8 Table IPSVCS

SERVICE	PORT	PROTOCOL
TOPSOPP	9000	UDP

In the example provided above, positions 501 and 502 are provisioned to use DTC 19 (via IPCOMID 1) for their data paths, while position 503 uses DTC 20 (via IPCOMID 2).

Each entry in table IPCOMID references a service in table IPSVCS. For IP positions, the associated service must have UDP datafilled as the protocol in table IPSVCS.

It is expected, but not required, that all positions that communicate with the DMS via the same IP XPM will use the same comid. This is shown in our example, in which positions 501 and 502 both use comid 1. Although it would be possible to provision more than one comid for use by IP positions on a single IP XPM, there is no advantage in doing so, and comids are a limited resource.¹

The number of positions which may be allocated per comid is constrained only by the capacity of the IP XPM. It is expected <TBD> that a single IP XPM will support up to 480 positions.

For further details on tables IPCOMID, IPSVCS, and their underlying IP mappings, refer to the TOPS IP User's Guide or to feature A59007541 -TOPS IP Data Communications.

Field URESOK in the DATAPATH area of table TOPSPOS is a Y/N field which is used to determine position disposition when the position resides within the URES maintenance state. If this field is set to N, then the position will transition to the SYSB state if the DMS does not receive a request from the position to go in-service within a fixed time interval. If the field is set to Y, then the position will remain in the URES state indefinitely, until some maintenance action forces a transition (eg, in-service request from the position). For more information, refer to A59006653, "TOPS IP: Position Maintenance."

It is expected that the URESOK field would be set to N in an office in which the operator positions are captive; that is, the operator positions are always expected to be 'up' and logged into that office, such as in a typical operator service center. If the operator position is more transitory in nature, then a URESOK value of Y would be more appropriate.

2.4.1.3 IP Provisioning Ramifications

The flexibility of IP makes it possible for a position to log out of one switch and subsequently log back in to another distinct switch to serve calls, if the necessary datafill (TOPSPOS, etc.) is present in each switch and the position permits this. In an OC configuration, if the position number selected for the call is datafilled in both the host and remote, then only the position datafill in the switch the position is logged into will be effective. For example, position datafill in the remote for an OC call will be ignored in lieu of the host datafill (since the position is logged into the host).

¹There is a maximum of 1024 comids per switch.

2.4.2 Security

With the volume of sensitive data (eg, calling cards) passed over the IP network during IP operator calls, security is a prominent issue. This section presents methods to assuage some security concerns.

2.4.2.1 Position Address Verification

Upon reception of an in-service request from the position, the IP address will be gleaned from the message and stored in the switch. When another maintenance message from the position is subsequently processed by the switch, the address correlated with this message will be tested against the previously received address value. If there is a discrepancy between the two, a TOPS 614 log will be generated to indicate the fault and the message will be discarded.

2.4.2.2 Encryption

During a typical operator call, several pieces of information are passed back and forth which should be secured from external view. This information includes the operator id, operator password, and calling/credit card numbers. In order to provide some obfuscation of this sensitive data, these fields will be optionally encrypted in the protocol messages. The optionality will be controlled by the OPP compliant position; that is, if the position indicates that it supports encryption¹, then the switch and the position will encrypt.

A by-product of this position control is that this sensitive data will be encrypted over whatever transport path is in effect for a given call. For instance, calling/credit card numbers transmitted from a position supporting encryption (whether TDM or IP) will be encrypted over the OC data links (again, whether TDM or IP) to the remote, and vice-versa.

For detailed information on the encryption method, contact the TOPS Marketing group.

2.4.3 Call Arrival Tones

A metamorphosis in call arrival tone generation is introduced with the genesis of packetized voice links. Whereas these tones were the province of the standalone (or remote in the case of TDM OC) switch for TDM voice, the position is now responsible for generating the appropriate arrival tones. This avoids the problem of garbling these tones due to a lossy selected codec. Additionally, this allows the position to synchronize the initial screen presentation with the generation of the tones more effectively since the position is responsible for both.

¹Refer to the OPP Protocol Specification for specific details.

2.5 Hardware requirements

Not applicable.

2.6 Limitations and restrictions

- The number of positions which may be provisioned per comid is governed by engineering rules pertaining to IP peripheral capacity. For further information, refer to the appropriate engineering specification.

2.7 Interactions

The transition of OPP positions to an IP-based interface necessitates accompanying changes in the OPP protocol. These changes include transitioning maintenance messages, eg, in service/out of service requests, into the OPP protocol and other necessary call handling changes. For complete details, refer to the OPP Protocol Specification.

2.8 Logs (LG)

2.8.1 New/modified logs

Table 9 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
TOPS	614	NEW	SOS

2.9 Data schema (DS)

2.9.1 New/modified tables

Table 10 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TOPSPOS	Changed	Unchanged
IPSVCS	Changed	Unchanged
IPCOMID	Changed	Unchanged

2.10 Office parameters (OP)

Not applicable.

2.11 Service orders (SO)

Not applicable.

2.12 Alarms (AL)

Not applicable.

2.13 Command interface (CI)

Not applicable.

2.14 Operational measurements (OM)

Refer to the OM section.

2.15 AMA/Billing information (AM)

Not applicable.

2.16 Software optionality control (SOC)

Refer to feature A59006653 for TOPS IP SOC interactions.

2.17 Glossary

AMA	Automatic Message Accounting
AQ	Auto Quote
ARP	Address Resolution Protocol
BLM	Business Line Management
BOOTP	Bootstrap Protocol
CDM	Configuration Data Manager
CI	Command Interpreter
CM	Computing Module
COMID	Communication Identifier
CRES	Connected Restricted Idle
DHCP	Dynamic Host Configuration Protocol
DMODEM	Digital Modem

DMS	Digital Multiplex System
DN	Directory Number
DNS	Domain Name Service
DRU	Development Release Unit
DTC	Digital Trunk Controller
EIU	Ethernet Interface Unit
ENET	Enhanced Network
EO	End Office
FMCRT	Force Management CRT
GARP	Gratuitous Address Resolution Protocol
HTTP	HyperText Transport Protocol
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IP Address	Network Layer address (32-bits) in the form of X.X.X.X (e.g. 47.192.3.114)
IWS	Intelligent WorkStation
LAN	Local Area Network
LPP	Link Peripheral Processor
LTCI	Line Trunk Controller for ISDN
MAC	Media Access Control
MAC Address	Physical Layer Address (48-bits) in the form of XX-XX-XX-XX-XX-XX (e.g. A2-59-ED-18-F5-7C)
MAP	Maintenance and Administrative Position
MIS	Management Information System
MTS	Message Transport System
OAP	Open Automated Protocol
OPP	Open Position Protocol
ORDB	Operator Reference DataBase
OSS	Operator Services Switch
OSSAIN	Operator Services System Advanced Intelligent Network
PCMCIA	Personal Computer Memory Card International Association

PSTN	Public Switched Telephone Network
QMS	Queue Management System
RSI	Remote Socket Interface
SN	Service Node
SOC	Software Optionality Control
SWACT	Switch of Activity
TELCO	Telephone Company
TCP	Transmission Control Protocol
TL	Telecom Layer
TMS	TOPS Message Switch
TOPS	Traffic Operator Position System
UDP	User Datagram Protocol
URES	Unconnected Restricted Idle
VoIP	Voice over IP
VQ	Voice Quote
XPM	eXtended Peripheral Module

2.18 References

297-8403-906	TOPS Internet Protocol (IP) User's Guide
NIS: Q214-1	Open Position Protocol
PCID 00022623	OPP over IP with OC Voice Host Bypass-Feature Specification Document," version 1.03 dated 31 March 2000.

3: Functional description (FN)

3.1 Feature name

TOPS IP: Call Processing for IP Voice

3.2 Feature Synopsis

This feature provides the call processing changes necessary for utilizing an IP voice connection to a TOPS IP position (IPPOS), including connections for standalone calls, calls utilizing TDM-OC, and calls in OC remotes that bypass the OC host and connect directly to the chosen TOPS IP operator defined and logged in at the OC host office.

3.3 Project introduction

Note: This document includes a number of statements to the effect that certain TOPS-IP functionalities were introduced, or are supported, in the TOPS13 and TOPS15 releases. These statements should be interpreted as describing which functionalities the TOPS-IP design groups intended to make available in those releases. At the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

This section includes project background, an overview of supported configurations, feature breakdown, and overall project limitations and restrictions. For additional limitations and restrictions, please refer to the appropriate sections of the individual feature documents.

The basic new TOPS-IP functionality in the 15 release is IP voice and data connectivity between the DMS and IWS operator positions. Because position connectivity and Operator Centralization (OC) connectivity are inter-related in

an OC network, this section addresses OC issues as well as position connectivity issues.

3.3.1 Background

In TOPS13 and XPM15, the TOPS-IP project provided support for

- IP voice and data connectivity between North American TOPS OC host and remote switches, and
- IP data connectivity for QMS MIS in North American TOPS switches.

IP connectivity was achieved using the IP-XPM peripheral module. The IP-XPM is a DTC with an SX05DA main processor, 7X07AA IP Gateway (IPGW) cards in the P-side interface slots, and an MX76DA messaging card. The SX05 provides the IP interface for data messaging, while the 7X07 provides the call signaling and bearer interface for voice over IP (VoIP).

OC voice links are datafilled in the DMS CM as dynamic ISUP trunks minus the usual CCS7 datafill. A dynamic trunk is one that can terminate anywhere, rather than having a nailed-up far end. ISUP messaging is used only between the CM and the SX05 and 7X07. The 7X07 converts between ISUP on the C-side and H.225-based messaging on the IP side, and it converts between circuit-switched voice on the DMS network side and packet switched voice on the IP side.

For additional important background information, please refer to 297-8403-906, "TOPS Internet Protocol (IP) User's Guide."

3.3.2 Overview of supported network configurations

This section shows and describes first a traditional network of operator positions and DMS TOPS switches, then the same network after it has been fully converted to IP connectivity for the positions and the OC links, and finally a hybrid IP/traditional network such as may exist during the conversion to TOPS-IP.

3.3.2.1 Traditional, non-IP network

Figure 1 shows a high-level view of a simple, traditional, TDM-based¹ network of operator positions and TOPS switches. This is a pre-TOPS-IP configuration. The DMS switch labeled "Standalone/OC Host TOPS Switch" could be a pure standalone TOPS switch in a non-OC environment, a pure OC host, or a combination.

Although not shown in the figure, the three TOPS switches are also connected to the public switched telephone network (PSTN) in the traditional way.

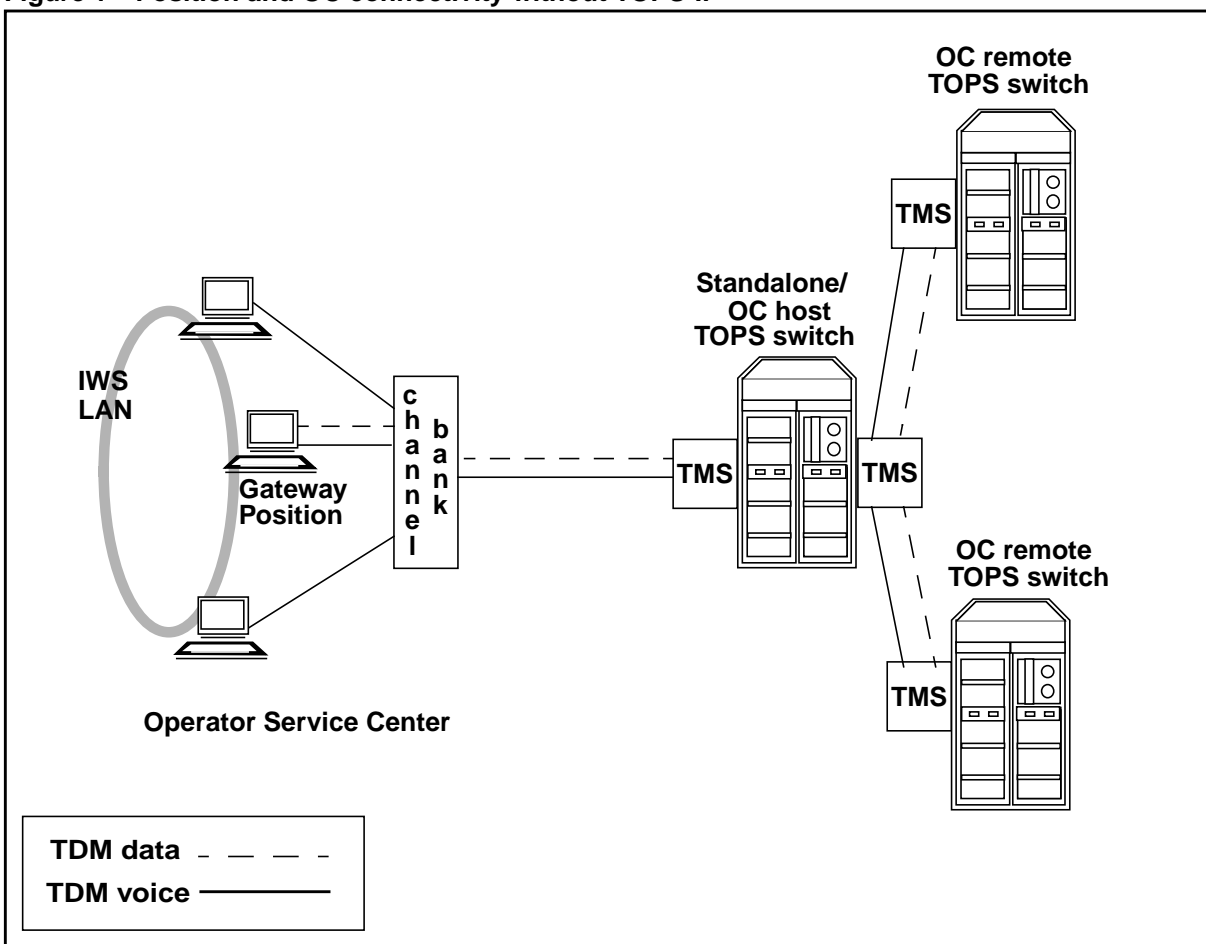
¹Throughout this document, the term "TDM" is used to refer to pre-IP voice and data connectivity that uses traditional time division multiplexed trunking facilities to transmit non-packetized voice and data. However, it is recognized that an operating company may route its IP traffic over a SONET backbone, for example, and thus may be using an underlying TDM technology even with IP.

Dedicated position voice links are provisioned between the standalone or host TOPS switch and each position. These nailed-up TDM voice links are through the TMS peripheral, a DS1/T1 or PCM30/E1 carrier, a channel bank, and a DS0 link to the position.

A data link is also provisioned between the standalone or host TOPS switch and each position. Like voice links, position data links use the TMS peripheral. Unlike the voice path, however, the data path to a position always passes through a Gateway Position which transmits data to and from the other positions on the IWS LAN. The Gateway Position also has maintenance responsibility for other positions in its cluster.

The OC remote switches in the figure have point to point TDM voice and data links to the OC host. In the figure these OC connections use TMS peripherals, but alternatively they could use DCM peripherals. The TOPS switch allocates OC voice links on a per-call basis; one OC voice link is required for each OC call. Many OC calls can simultaneously use an OC data link.

Figure 1 Position and OC connectivity without TOPS-IP



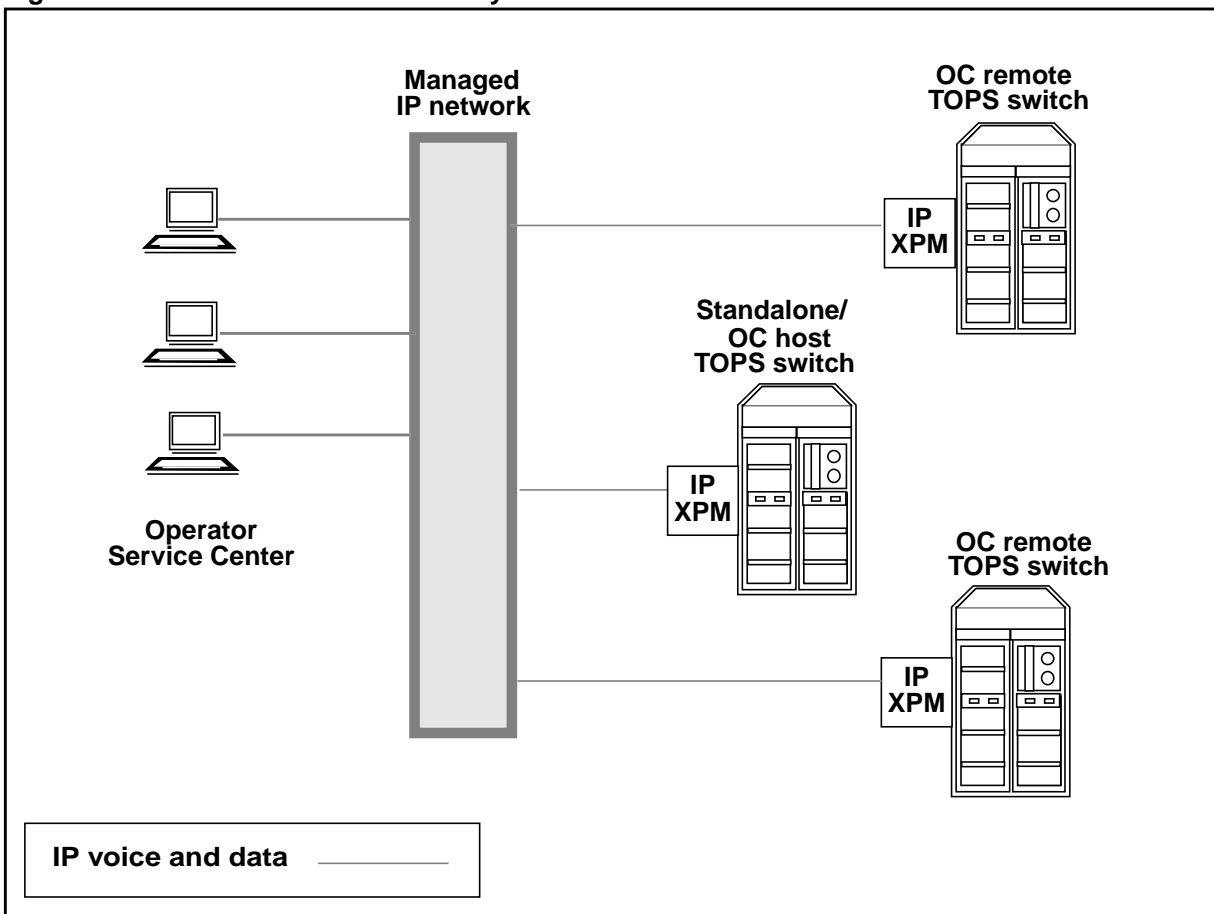
3.3.2.2 Fully converted TOPS15 IP network

Figure 2 shows the same network fully converted to use the TOPS-IP interfaces that were developed in the 15 release. The operator positions and TOPS DMS switches all have IP voice and data connectivity to a managed IP network. Please refer to 297-8403-906, "TOPS Internet Protocol (IP) User's Guide," for more information about the IP-XPM and requirements for the managed IP network.

Although the positions are still on an IWS LAN, the LAN is considered part of the managed IP network, so it is not shown individually in the figure. It is an Ethernet LAN, not a token ring.

On the DMS side, the IP connectivity is through IP-XPM peripherals, which were introduced in TOPS13 and XPM15 for the OC-IP and QMS MIS IP applications. The TOPS-IP position application is added in TOPS15. The same IP-XPM can simultaneously support IP traffic for all three of these applications.

Figure 2 Position and OC connectivity with TOPS-IP



In the configuration of Figure 2, there is no longer a Gateway Position with maintenance and data messaging responsibility for other positions. Instead, each position exchanges data messages directly with the TOPS host switch over the managed IP network.

IP data communication is maintained between the position and the host switch as long as the position is in-service, regardless of whether the position is processing a call. In OC calls, OPP (Open Position Protocol) messages between the OC remote and the position always pass through the OC host.

Unlike data connections to positions, which persist over calls and route through the host for OC calls, voice connections to positions are established on a per-call basis and bypass the host in OC calls. The VoIP connection is directly between the OC remote switch and the position, and it uses no resources in the OC host.

One implication is that a position does not have a voice link to any DMS switch when it is not processing a call. Another implication is that the IP network must be configured in such a way that the remotes and positions, remotes and hosts, and hosts and positions can all route messages to each other.

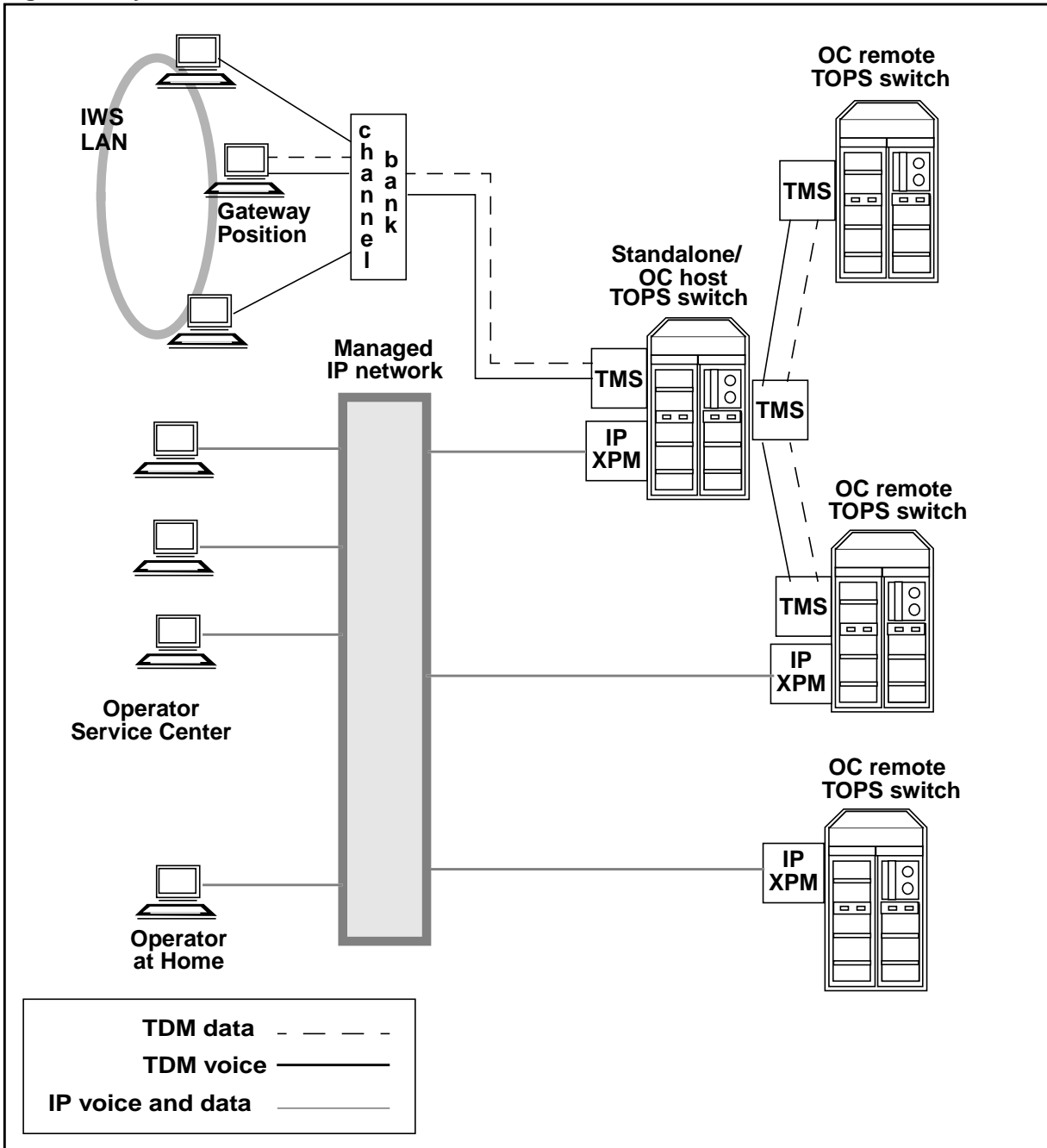
VoIP between positions and TOPS switches uses industry-standard protocols from the ITU-T H.323 suite, version 2. In the TOPS CM, the voice link to a position is datafilled as a dynamic ISUP trunk. The 7X07 IP Gateway card in the IP-XPM converts between H.323 protocols on the IP side (H.225 and H.245 for call signalling, RTP and RTCP for bearer), and ISUP messaging and circuit switched voice on the C-side. Supported codecs for VoIP are G.711 (Mu-law and A-law) and G.729.

3.3.2.3 Hybrid TOPS15 IP/TDM network

It is expected that during the transition to TOPS-IP, a network will include some combination of IP and traditional TDM connectivity for positions and OC links. Figure 3 illustrates the variety of supported configurations.

Figure 3 also shows that positions with IP connectivity need not be at an Operator Service Center, as long as the position is connected to the operating company's managed IP network. Position connectivity using the public Internet for voice or data is not supported.

Figure 3 Hybrid Traditional and TOPS-IP network



As shown in the figure, a single TOPS standalone or host switch can simultaneously support positions with traditional connectivity and positions with IP connectivity. Also, a single OC host or remote can support both traditional and IP connectivity to other nodes in the OC network.¹

¹However, if both IP and traditional OC connectivity exist between the same host-remote pair, each must have the other datafilled as two different offices in tables OCOFC and OCGRP.

Note: If an OC host has any IP positions, it is important that either (a) all of its remotes be upgraded to TOPS15 or later, or (b) QMS queuing be set up to ensure that an IP position cannot be selected for a call from a pre-TOPS15 remote. This is true regardless of whether the OC links are IP or traditional TDM. If an IP position is selected in the OC host for a pre-15 remote, the call is deflected.

The next several paragraphs describe the different combinations of TDM and IP connectivity for position and OC voice and data links. This information is summarized in Table 1.

If the OC remote selects an OC-IP data link for a call, and the host selects an IP position, Figure 2 on page 26 applies. In this case the operator's voice link is always VoIP directly from the remote; that is, it always bypasses the host. On the other hand, the operator's data for the call passes through the OC host. The data connection is IP from remote to host, and then IP from host to position.

If the remote selects an OC-IP data link and the host selects a traditional, non-IP position, then host voice bypass is not available. The call uses an OC-IP voice link between the remote and the host. Packetized voice from the remote is converted to TDM voice in the 7X07 IPGW card in the host's IP-XPM, and travels through the DMS network in the host and out on the nailed-up TDM voice link to the position. Similarly, the operator's data for the call is IP between remote and host, but it uses the position's nailed-up data link between host and position (routing via the Gateway Position on the IWS LAN). This is the same as the TOPS13 OC-IP functionality, before the introduction of IP positions in TOPS15.

If the remote selects a traditional, non-IP OC data link and the host selects a non-IP position, the functionality is the same as it was prior to the TOPS-IP project. That is, the call uses traditional TDM-OC voice and data links between remote and host, and it uses traditional nailed-up voice and data links between host and position.

If the remote selects a traditional, non-IP OC data link and the host selects an IP position, then host voice bypass is not available. The call uses a traditional TDM-OC voice link between remote and host. Then in the host, the TDM voice from the remote goes through the DMS network and out to a 7X07 IPGW card in the IP-XPM that provides IP connectivity for the position. The IPGW converts between TDM voice on the C-side and packetized voice to the position. Similarly for data, the traditional TDM-OC data link is used between remote and host, and the IP-XPM in the host sends IP data to (and receives IP data from) the position.

These various configurations are summarized in Table 1 below.

Table 1 Supported configurations of IP and TDM position and OC connectivity

OC data link type	Position connectivity in host	Voice path used	Data path used
IP	IP	VoIP, remote to position (bypasses host)	DoIP remote to host to position
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	
IP	TDM	VoIP remote to host, TDM host to position.	DoIP remote to host, TDM host to position.
TDM	TDM	TDM remote to host, TDM host to position.	TDM remote to host, TDM host to position.
		This is the same configuration that existed prior to the TOPS-IP project.	
TDM	IP	TDM remote to host, IP host to position.	TDM remote to host, IP host to position.
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	

3.3.3 Feature breakdown

The following table shows the individual activities that make up the TOPS, XPM, and IWS IP projects for the 15 release.

Table 2 Feature Breakdown

CM Activities	
59022288	TOPS IP: Voice Provisioning and Utilities
	Provides data schema changes for VoIP to operator positions, and implements internal utilities to support VoIP call processing.
59006658	TOPS IP: Position Provisioning and OPP Data
	Provides data schema changes for IP-based operator positions, and support for OPP data messaging over IP.
59006653	TOPS IP: Position Maintenance
	Provides the CM maintenance functionality associated with IP-based operator positions.

Table 2 Feature Breakdown

59015863	TOPS IP: Call Processing for IP Voice
	Provides the high-level CM call logic to support operator positions with IP voice connectivity to the DMS.
59020499	TOPS IP: Global Support
	Documentation and test activity for support of a subset of TOPS-IP functionality in MMP loads.
59022293	TOPS IP: IPGW Enhancements
	Provides increased flexibility for engineering and provisioning of 7X07 IPGW cards and dynamic trunks.
7X07 Activity	
59022821	TOPS IP: 7X07 IP Gateway Support for VoIP
	Provides the 7X07 gateway functionality required for TOPS IP in the 15 release.
XPM Activities	
59022114	RSI Link Selection, Version control, Robustness
	Provides more even distribution over the IP-XPM's C-side links of data messages from the XPM to the CM for TOPS applications. Also provides internal enhancements.
IWS Activities	
RD000701	IWS Voice Over IP
	Provides VoIP functionality for operator positions.
RD983702	OPP Over IP
	Implements the OPP development needed to support positions with IP connectivity to the DMS.
RD002601	DHCP/DNS Support in IWS
	Provides position support for the Domain Host Configuration and Domain Name Service protocols.
RD002602	Verification of Voice Over IP Card
	Hardware activity to verify the third-party card used for VoIP in the IWS.
RD991614	OIA Direct Connect via HTML
	Provides support for OIA applications on positions with IP connectivity to the OIA data bases.

3.3.4 Project limitations and restrictions

This section includes limitations and restrictions of the overall TOPS15 TOPS-IP project. Individual activities in the project include additional limitations and restrictions.

- The original TOPS-IP design intent was to provide support for the following:
 - OC-IP between North American OC host and remote switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in North American TOPS switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in MMP loads, but not in GMP (GSP/MMP combo) loads, in the TOPS15 and later releases, and
 - IP voice and data connectivity between DMS switches and IWS operator positions in North American and MMP loads, but not GMP, in TOPS15 and later releases.

However, at the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

- Like OC-IP voice and data connectivity, TOPS-IP position connectivity is intended to be over a managed network that has been carefully engineered for reliability and adequate bandwidth.
- TOPS OC remote switches at TOPS14 and lower cannot process calls that are allocated IP positions in the host. Therefore, OC hosts at TOPS15 and higher deflect any calls that are allocated positions with IP connectivity, if the remote is pre-TOPS15.

It is recommended that all switches in the OC network be upgraded to TOPS15 before operators who serve OC calls log into IP positions. Alternatively, new QMS call queues may be set up for operators who log into IP positions. If this approach is taken, remotes that have not yet upgraded to TOPS15 must not be datafilled to route calls to the new call queues.

- Positions with IP data connectivity must also have IP voice connectivity, and vice versa.
- IP connectivity is supported for Nortel Networks IWS positions only. Third party OPP-compliant operator positions continue to be supported in TOPS15, but only with traditional TMS connectivity.
- It is not possible for an OC remote to route VoIP traffic for the position to the OC host and have the host forward VoIP to the position. If the OC and position links are both IP, host voice bypass is always used. So the remotes

must be on the same IP network as any positions they will use, as well as any hosts they will use.

- The scope of the TOPS-IP project in the 15 release is limited to position voice and data connectivity to TOPS DMS switches. The project does not convert any other TOPS interfaces to IP.

For example, the TOPS15 development does not change the data connectivity between the DMS and D1 databases, LIDB data bases, or PARS nodes. Nor does it provide VoIP between the DMS and OSSAIN service nodes or the ISN-DA audio server.

Also, the TOPS15 development does not convert existing TOPS applications that use the Ethernet Interface Unit (EIU) for IP data connectivity, to use the IP-XPM. For example, OSSAIN data links, OSAC data links, and TOPS devices are not converted to use the IP-XPM.

- For positions with TMS connectivity to the DMS switch, the TMS provides the interface between IWS positions and external OIA databases such as Nortel Networks' Reference System (also referred to as NTR). There is no plan to enhance the IP-XPM or the Reference System to support use of this product in a TOPS-IP network. Refer to IWS documentation and third party vendors for information about any plans to convert other OIA applications to use other interfaces.
- Most call arrival tones at positions with IP connectivity to the DMS are generated by the position itself (based on OPP messages from the DMS), rather than by the DMS XPM. Therefore, it is possible that some call arrival tones may sound slightly different. Please refer to IWS documentation for more information.

The initial call arrival tones for ADAS Base and ADASPLUS calls are generated by the ADAS platform, regardless of whether the position has IP or traditional connectivity to the DMS.

- IWS positions with IP connectivity to the DMS cannot detect when the operator seats or unseats the headset. One consequence is that CSEs with stats capability will not be warned by UCP or UCD displays if an operator unseats the headset when a call is at position. Another consequence is that force management statistics continue to accumulate after the operator unjacks the headset if the operator does not use the appropriate softkey to log out. Please refer to IWS documentation for more information.
- Positions with IP connectivity to the DMS cannot be datafilled as Service Assistance (ASST) or In-Charge (IC).
- Monitoring voice links are not supported for a call with more than two operators. Whenever a third operator is connected to a call, the monitoring voice links are taken down to provide resources to connect the second *active* operator.

- If an IP operator is being monitored and attaches a CSE for the current call, the monitoring voice connection is taken down for the duration of that call.
- If an IP CSE is being monitored and receives a call with another operator attached, the monitoring voice connection is taken down for the duration of that call.

For both of these scenarios, data is still presented to the monitoring operator. The monitoring voice connection will be re-established for the next call which does not involve three operators.

- It is strongly recommended that if CSEs use positions with IP connectivity, the call queues designated in table TQMSFCQA for CSE assistance be datafilled in tables TQCQINFO and PKTVPROF to use the G.711 codec.
- Due to the processing overhead associated with establishing VoIP connections with operator positions, operator idle time will increase for operators at IP positions.
- Please refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide” for capacity and engineering restrictions specific to the IP-XPM, and for capacity and engineering requirements for the managed IP network.

3.4 Feature Description

As discussed in the prior "Project introduction" section, this feature is part of a group of features that provides support for IP voice and data connectivity, through the IP-XPM, to TOPS operator positions.

This feature provides the call processing functionality necessary for utilizing an IP voice connection to a TOPS operator position.

As stated before, position connectivity and OC connectivity are inter-related in an OC network. With this feature, TOPS calls now fit into one of the following configurations:

Table 3 Supported TOPS Call Configurations

Standalone/OC Call	OC Type (TDM/IP)	Position Type (TDM/IP)	OC Voice Bypass Utilized	Support Added By This Project
Standalone	N/A	TDM	N/A	No (existing)
Standalone	N/A	IP	N/A	Yes
OC	TDM	TDM	No	No (existing)
OC	TDM	IP	No	Yes
OC	IP	TDM	No	No (existing)
OC	IP	IP	Yes	Yes

This feature provides the call processing changes necessary to support IP voice connections in the three new configurations highlighted above.

The following subsections describe the changes required to provide this functionality, and they are:

- "2.4.1 Table Control Summary"
- "2.4.2 New Call Configurations"
- "2.4.3 Monitoring"
- "2.4.4 OSSAIN and Operator Simultaneous Connections"
- "2.4.5 Specifying VoIP Call Attributes"
- "2.4.6 Position Delay Calls and Booked Call Database Calls"
- "2.4.7 Assistance Requests"
- "2.4.8 Call Arrival Tones"
- "2.4.9 Error Scenarios"

3.4.1 Table Control Summary

While this feature includes no table control changes, it heavily relies on table control changes being made by other TOPS IP features in the TOPS15 release.

The following sections describe an overview of the table control changes being made that this feature directly relies upon. Please refer to the feature that implements a specified table for more detailed information.

TOPS IP features making table control changes in the TOPS15 release include:

- 59022293, TOPS IP: IPGW Enhancements
- 59022288, TOPS IP: Voice Provisioning and Utilities
- 59006658, TOPS IP: Position Provisioning and OPP Data

3.4.1.1 Table TRKOPTS

Feature 59022293, TOPS IP: IPGW Enhancements, adds a new TOPS dynamic trunking application (POS). This allows datafill in TRKOPTS to earmark trunks to be used for IP voice to TOPS operator positions.

An example of the TOPS15 representation of table TRKOPTS is as follows:

Table 4 Example of Table TRKOPTS

	OPTKEY					OPTINFO
POSCLLI1	DYNAMIC	DYNAMIC	ISUP	IP	IP	POS
POSCLLI2	DYNAMIC	DYNAMIC	ISUP	IP	IP	POS
IPHOST1VL	DYNAMIC	DYNAMIC	ISUP	IP	IP	OC
IPREMOTE1VL	DYNAMIC	DYNAMIC	ISUP	IP	IP	OC
HOSTBYPASS2	DYNAMIC	DYNAMIC	ISUP	IP	IP	OC

POS tuples (POSCLLI1 and POSCLLI2 above) are used for VoIP connections to TOPS IP positions for standalone calls, and calls utilizing TDM-OC with an IPPOS.

OC tuples are used for VoIP connections between a host and remote office, and for VoIP connections between a remote office and an IPPOS selected by the host office. With IP-OC, if the host selects a TDM position, the remote makes a VoIP connection with the host, and the host connects this with the TDM position voice connection. With IP-OC, if the host selects an IP position, the remote makes a VoIP connection directly with the selected IPPOS.

3.4.1.2 Table PKTVPROF

Feature 59022288, TOPS IP: Voice Provisioning and Utilities, implements this new table that defines packetized voice profiles. Combined with changes made to table TQCQINFO defined below, this allows a preferred CODEC and associated parameters (silence suppression) to be specified on a per call queue basis.

An example of the TOPS15 representation of table PKTVPROF is as follows:

Table 5 Example of Table PKTVPROF

PROFNUM	PKTVFLDS	
	CODEC	SILEN
0	G711	
1	G729	SILSUP
2	G729	NOSILSUP

3.4.1.3 Table TQCQINFO

Feature 59022288, TOPS IP: Voice Provisioning and Utilities, changes this table to include a PKTVPROF number. Combined with changes made to table PKTVPROF previously defined, this allows a preferred CODEC and associated parameters (silence suppression) to be specified on a per call queue basis.

An example of the TOPS15 representation of table TQCQINFO is as follows:

Table 6 Example of Table TQCQINFO

QTYPE	QMSSERV	CWOFF	CWON	TREAT	PKTVPROF	ALTAREA
CQ131	TOPS_TA	500	1000	VACT	0	N
CQ132	TOPS_TA	500	1000	VACT	1	N
CQ133	TOPS_TA	500	1000	VACT	2	N

Note that the PKTVPROF indicator is used for IP voice connections only.

3.4.1.4 Table TOPSPOS

Feature 59006658, TOPS IP: Position Provisioning and OPP Data, is changing table TOPSPOS to support the definition of IP operator positions. In the example tuples below, if the new VLTYPE field is set to PKTV, then the position uses packetized voice. This feature will key on this to establish a VoIP connection to the position when appropriate.

An example of the TOPS15 representation of IP positions in table TOPSPOS is as follows:

Table 7 Example of Table TOPSPOS

POSNO	VLPATH		DATAPATH			pos area
	VLTYPE	VLCLLI	DATATYPE	IPCOMID	URESOK	
501	PKTV	POSCLLI1	IP	1	Y	.....
502	PKTV	POSCLLI2	IP	2	N	.....

Note that it is possible to datafill a “placeholder CLLI” in the VLCLLI field of table TOPSPOS. A “placeholder CLLI” is a CLLI not associated with any trunk group members, and not defined as a dynamic POS trunk in TRKOPTS. This datafill may be desired in a switch where all calls are IP-OC calls, and positions are IP (thus voice bypass would always be used).

However, if a “placeholder CLLI” is used, the operator at the position will not be capable of servicing any standalone or TDM-OC calls, and will not be able to make delay calls. Please reference the implementing feature for full details.

3.4.1.5 Table OCGRP

Feature 59022288, TOPS IP: Voice Provisioning and Utilities, changes table OCGRP to allow the datafill of a “placeholder CLLI” in the VLGRP field for REMOTE OC IP offices. A “placeholder CLLI” is a CLLI not associated with any trunk group members, and not defined as a dynamic OC trunk in TRKOPTS.

This may affect this feature if a call from the specified remote is assigned a TDM position in the host containing a “placeholder CLLI” OC VLGRP. In this scenario an OC-IP voice trunk is needed to present this call to the operator, and “placeholder CLLI’s” have no associated voice trunks. Please refer to section "2.4.9 Error Scenarios" for information on the handling of this error scenario.

Existing functionality provided by table OCGRP is utilized by this feature for OC connectivity.

An example of the TOPS15 representation of table OCGRP is as follows:

Table 8 Example of Table OCGRP

OFFICE	OFCTYPE	VLGRP	DLOVRLAY	BCSLEVEL
IPHOST1	HOST	IPHOST1VL	IP	48
IPREMOTE1	REMOTE	IPREMOTE1VL	IP	48
BYPASSED_HOST2	HOST	HOSTBYPASS2	IP	50
BYPASSING_REMOTE2	REMOTE	PLACEHOLDER	IP	50
TDMHOST3	HOST	TDMHOST3VL	LAPD TMSOCDL1	50
TDMREMTOE3	REMOTE	TDMREMTOE3VL	LAPD TMSOCDL2	50

3.4.2 New Call Configurations

As previously discussed, this feature is adding support for three new call configurations:

- Standalone calls going to an IP position
- OC calls using TDM-OC and going to an IP position in the Host
- OC calls using IP-OC and going to an IP position in the Host

This section describes the steps necessary for establishing these types of calls.

Note: All new call flow functionality described in this section is also supported for OSSAIN calls. See section "2.4.4 OSSAIN and Operator Simultaneous" for more information.

Note: When VoIP calls are originated from the DMS, call attributes (such as CODEC usage and silence suppression indication) are specified to the IP-XPM. For more information on this topic refer to section "2.4.5 Specifying VoIP Call Attributes", and to feature 59022288, TOPS IP: Voice Provisioning and Utilities.

Note: For information about how the IP address of an IP position is obtained, please refer to activity 59006653, TOPS IP: Position Maintenance.

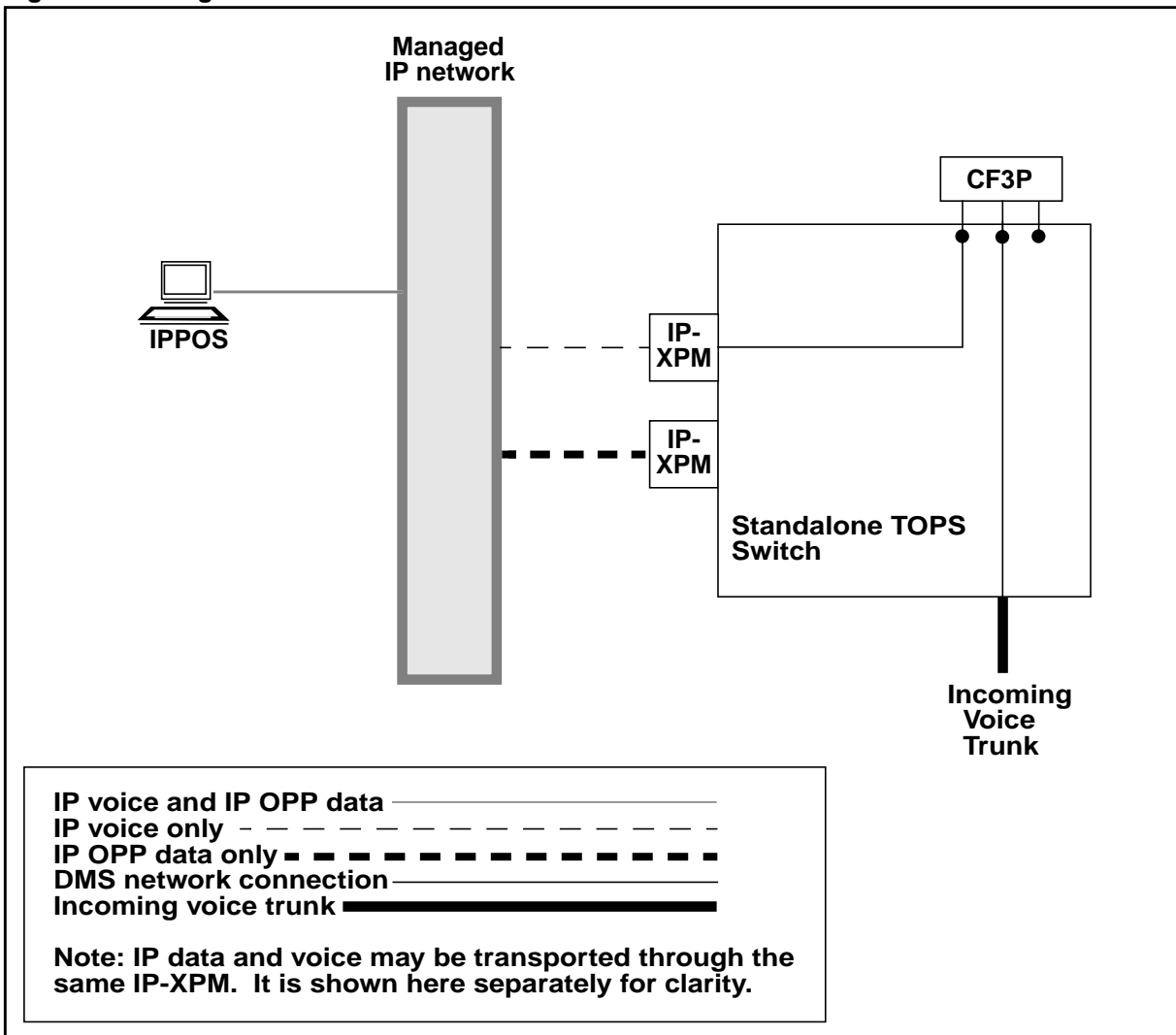
Note: For more information about the functionality provided by the 7X07 IP Gateway, please refer to activities 59022293, TOPS IP: IPGW Enhancements and 59022821, TOPS IP: 7X07 IP Gateway Support for VoIP.

3.4.2.1 Standalone IPPOS Call Configuration

This is a new call configuration introduced in TOPS15. In this configuration, IP OPP data and IP voice is exchanged between the TOPS standalone office and the IPPOS.

Following is a configuration diagram and a detailed call flow for this call configuration.

Figure 4 Configuration for a Standalone IPPOS Call



3.4.2.1.1 Standalone IPPOS Detailed Call Flow

Figure 5 Standalone IPPOS Call Flow

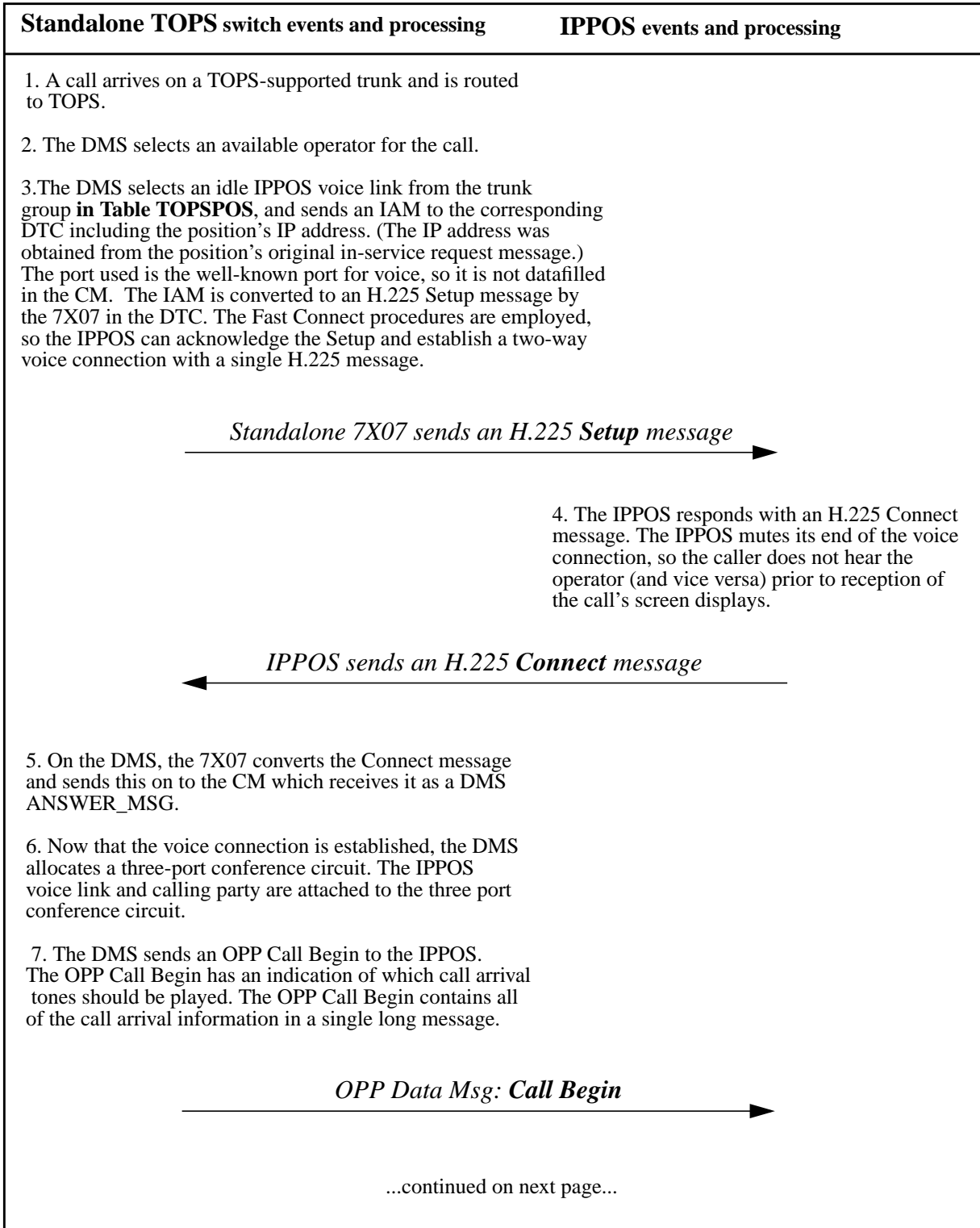
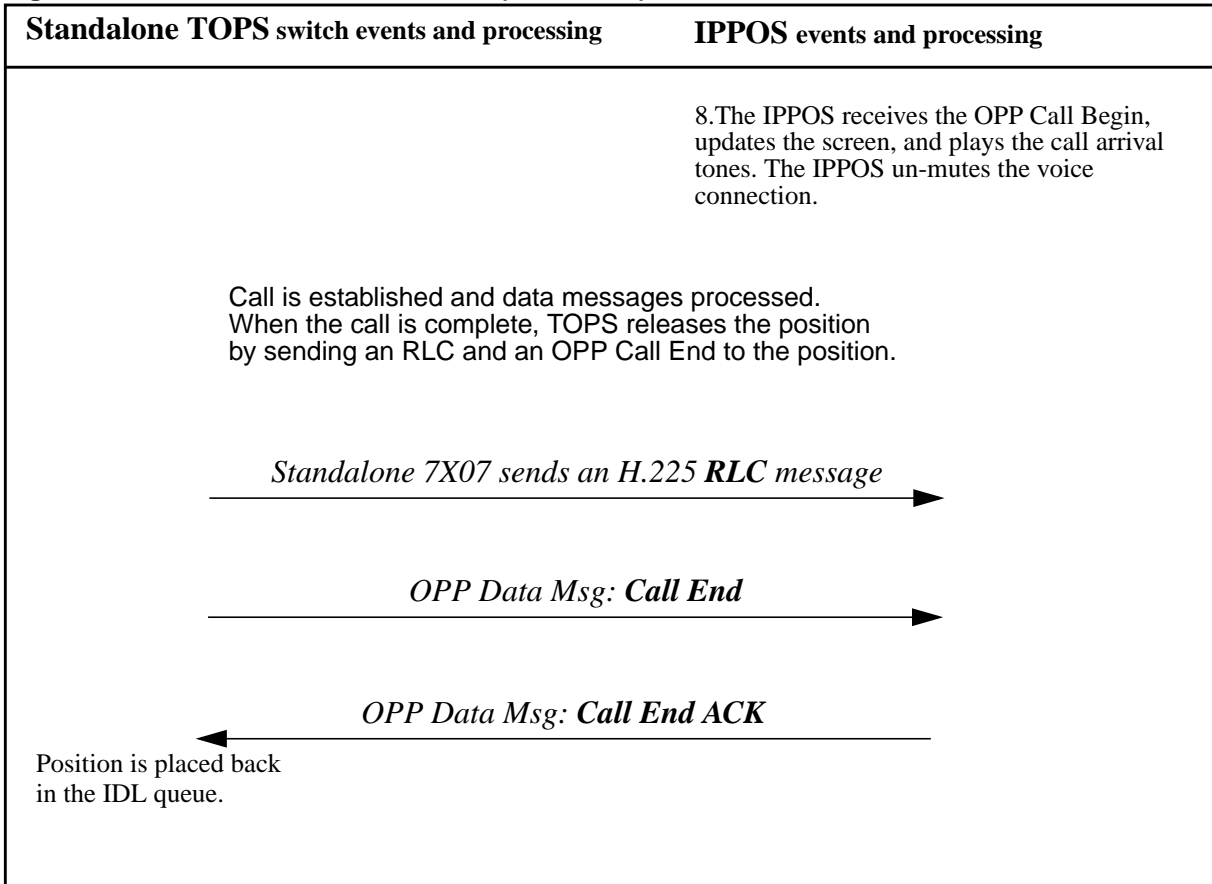


Figure 6 Standalone IPPOS Call Flow (Continued)



3.4.2.2 TDM-OC IPPOS Call Configuration

This is a new call configuration introduced in TOPS15. It is intended mainly for transitional purposes, so customers are not required to fully implement OC-IP throughout their OC network before adding TOPS-IP positions.

In this configuration, TDM-OC data and voice are exchanged between the TOPS host and remote offices, and IP OPP data and IP voice are exchanged between the TOPS host office and the IPPOS.

Following is a configuration diagram and a detailed call flow for this call configuration.

Figure 7 Configuration for a TDM-OC IPPOS Call

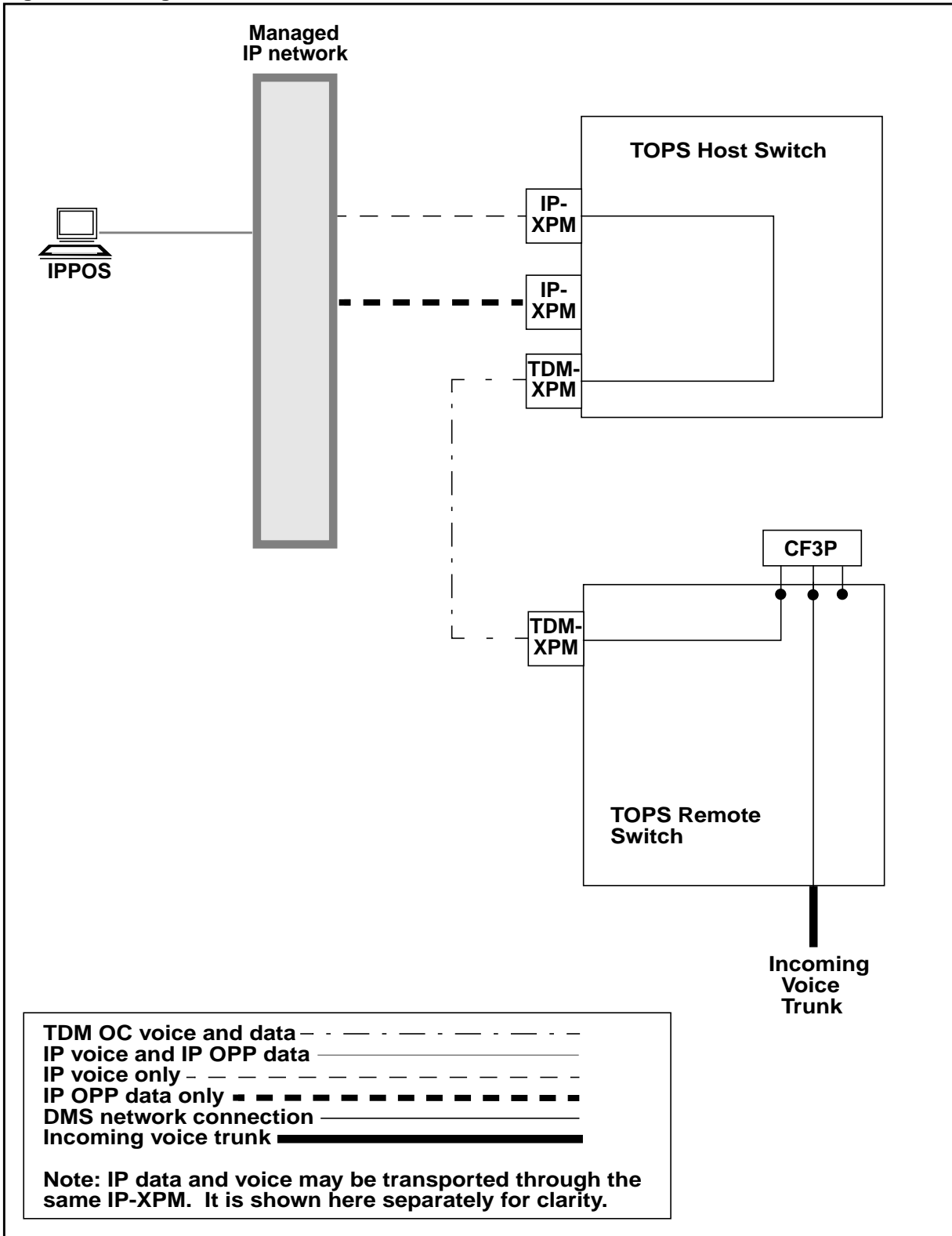


Figure 8 TDM-OC IPPOS Call Flow

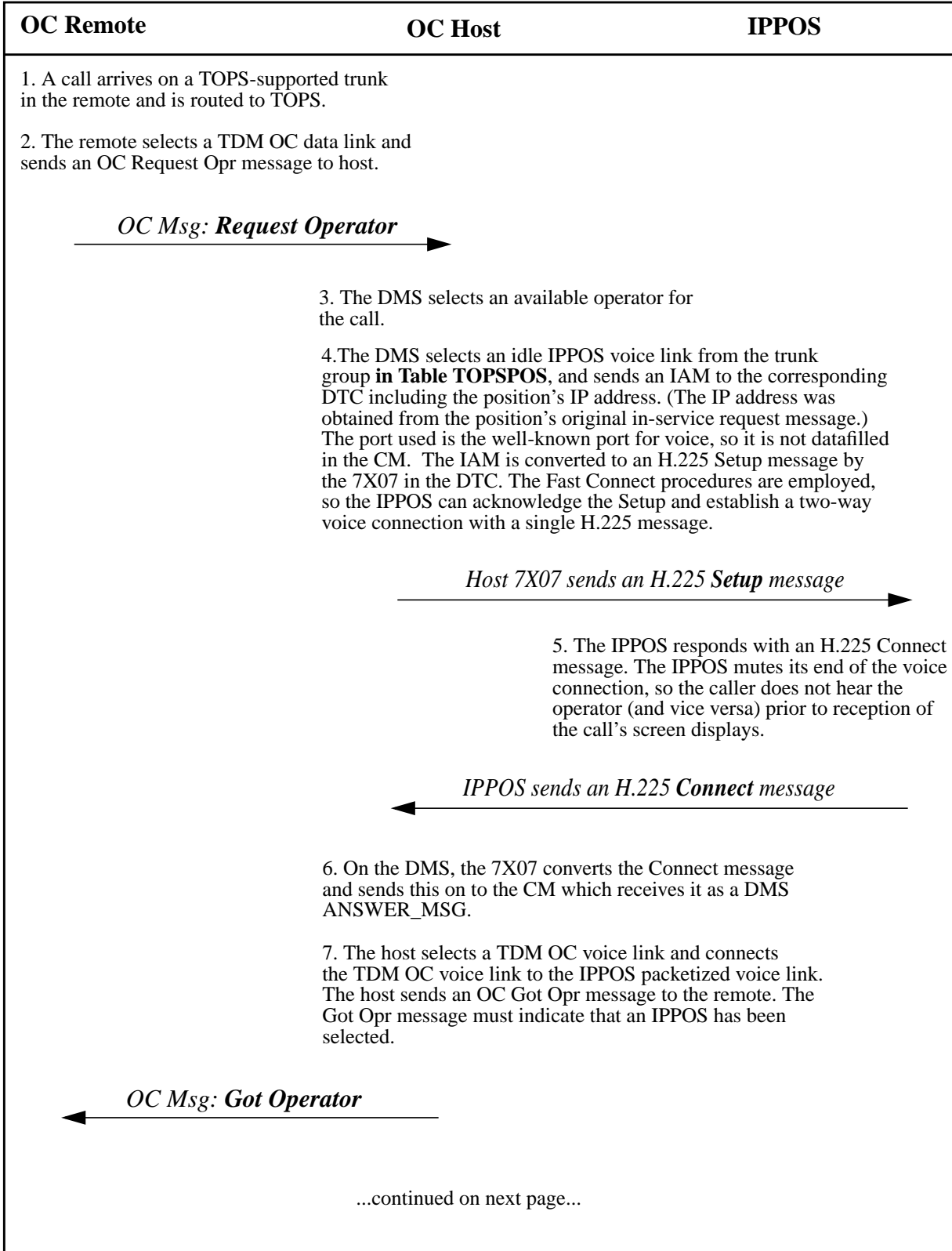


Figure 9 TDM-OC IPPOS Call Flow (Continued)

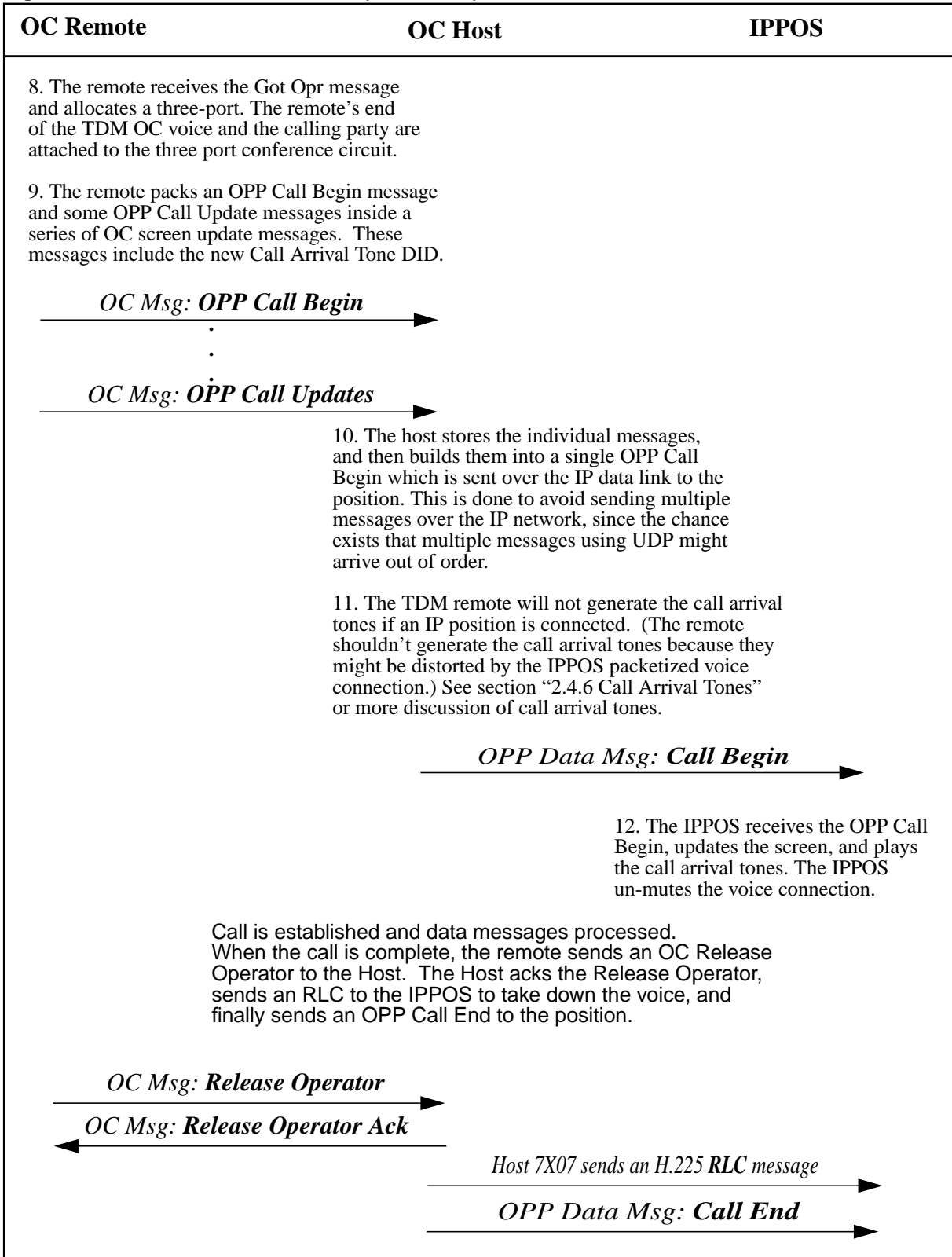
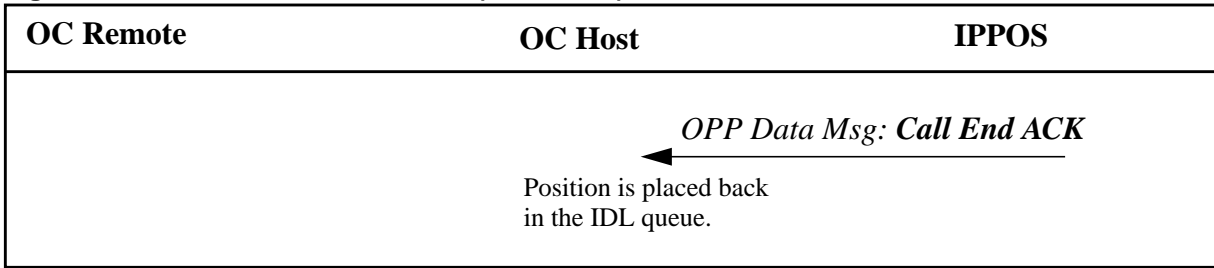


Figure 10 TDM-OC IPPOS Call Flow (Continued)



3.4.2.3 IP-OC IPPOS Call Configuration

This is a new call configuration introduced in TOPS15. In this configuration, IP-OC data is exchanged between the TOPS host and remote offices, IP OPP data is exchanged between the TOPS host office and the IPPOS, and IP voice is exchanged between the TOPS remote office and the IPPOS (bypassing the host office).

Note: If the position is IP and the OC links are IP, voice bypass will *always* be employed. A call using an IP voice link from the remote to the host, and another IP voice link from the host to the IPPOS, is not supported. This is because the call would use two IP hops, so its latency would be doubled. Also, there is the possibility that “double transcoding” would occur, meaning the call might employ a compressing codec on each leg. This has the potential to further reduce VoIP quality.

Following is a configuration diagram and a detailed call flow for this call configuration.

Figure 11 Configuration for an IP-OC IPPOS Call

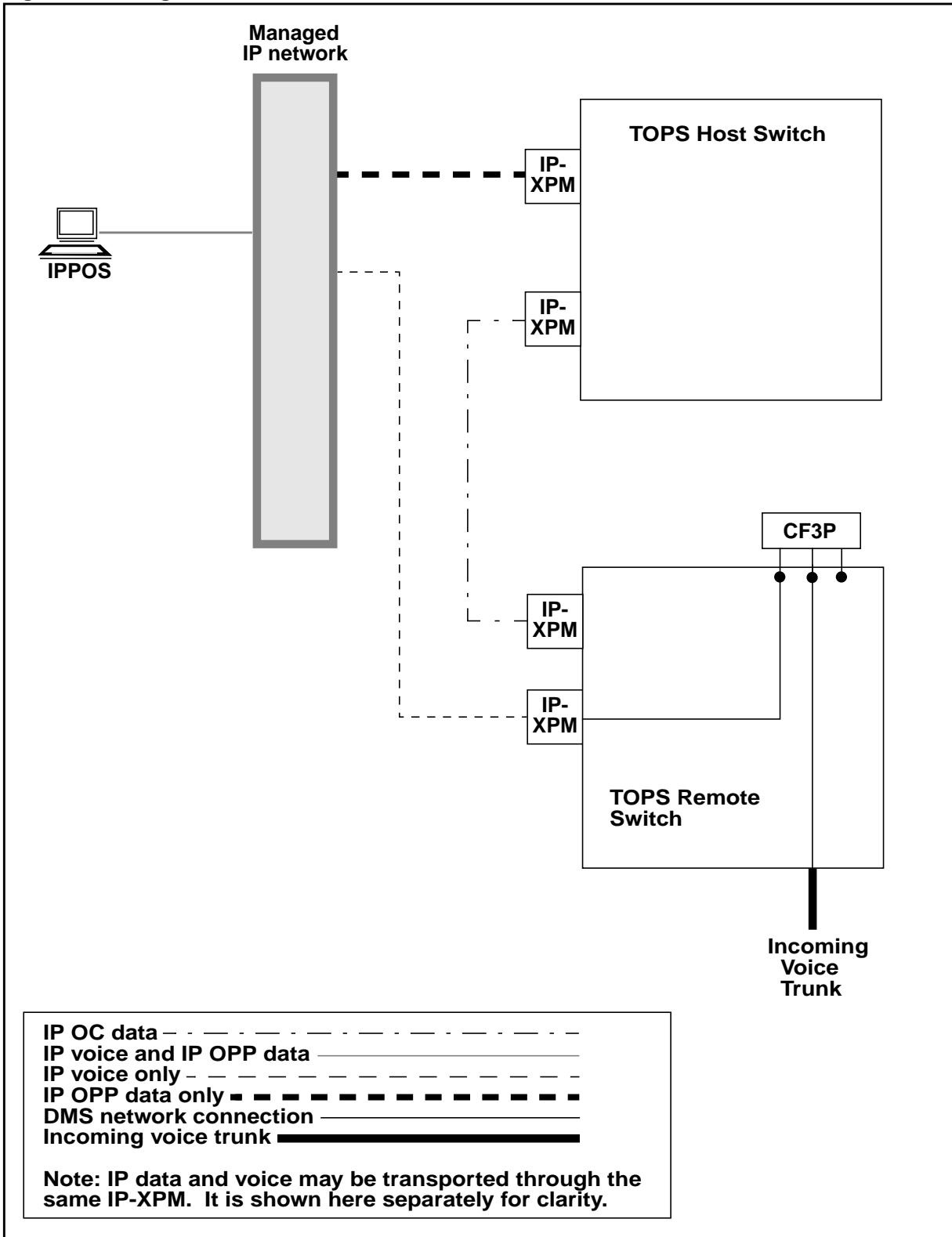


Figure 12 IP-OC IPPOS Call Flow

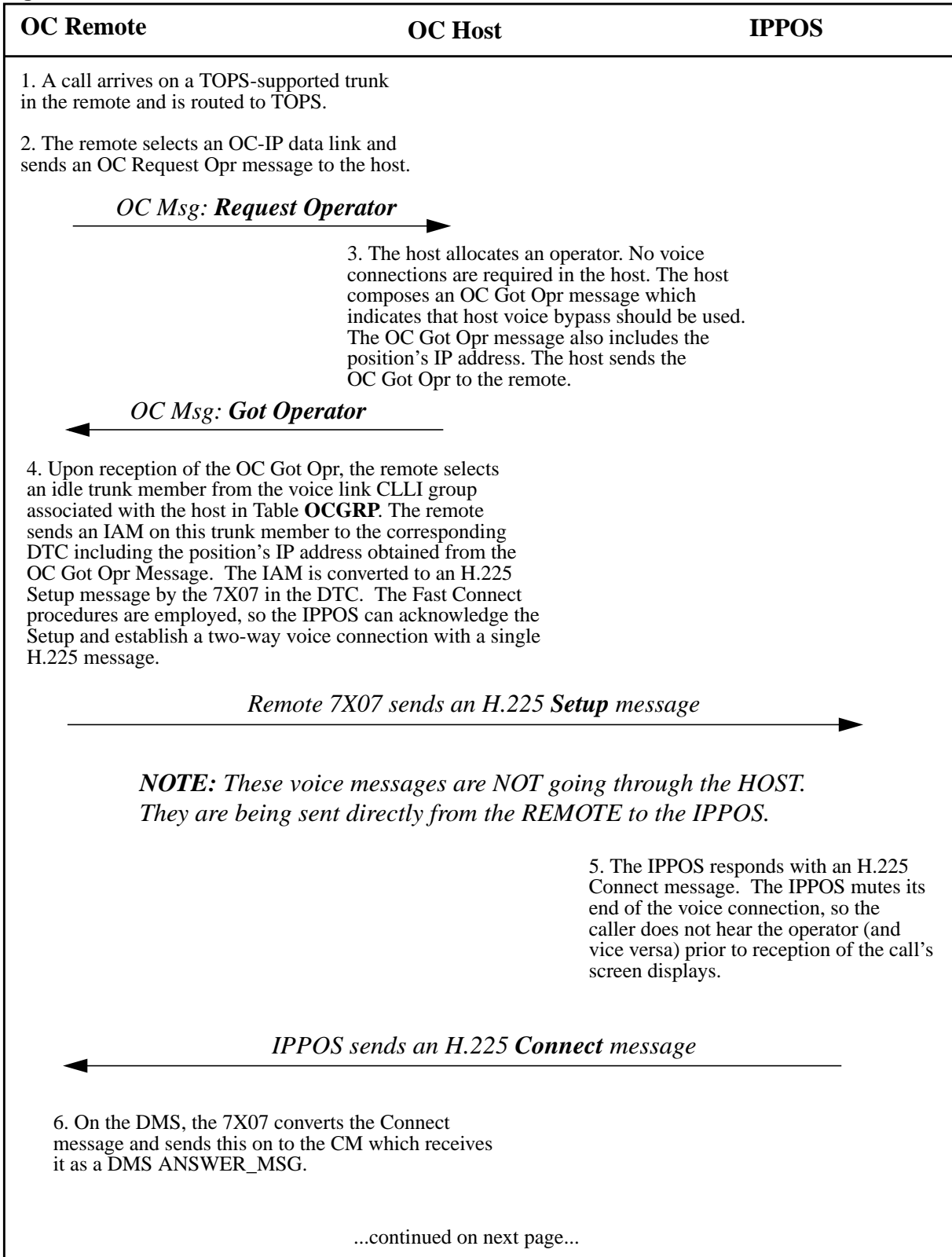
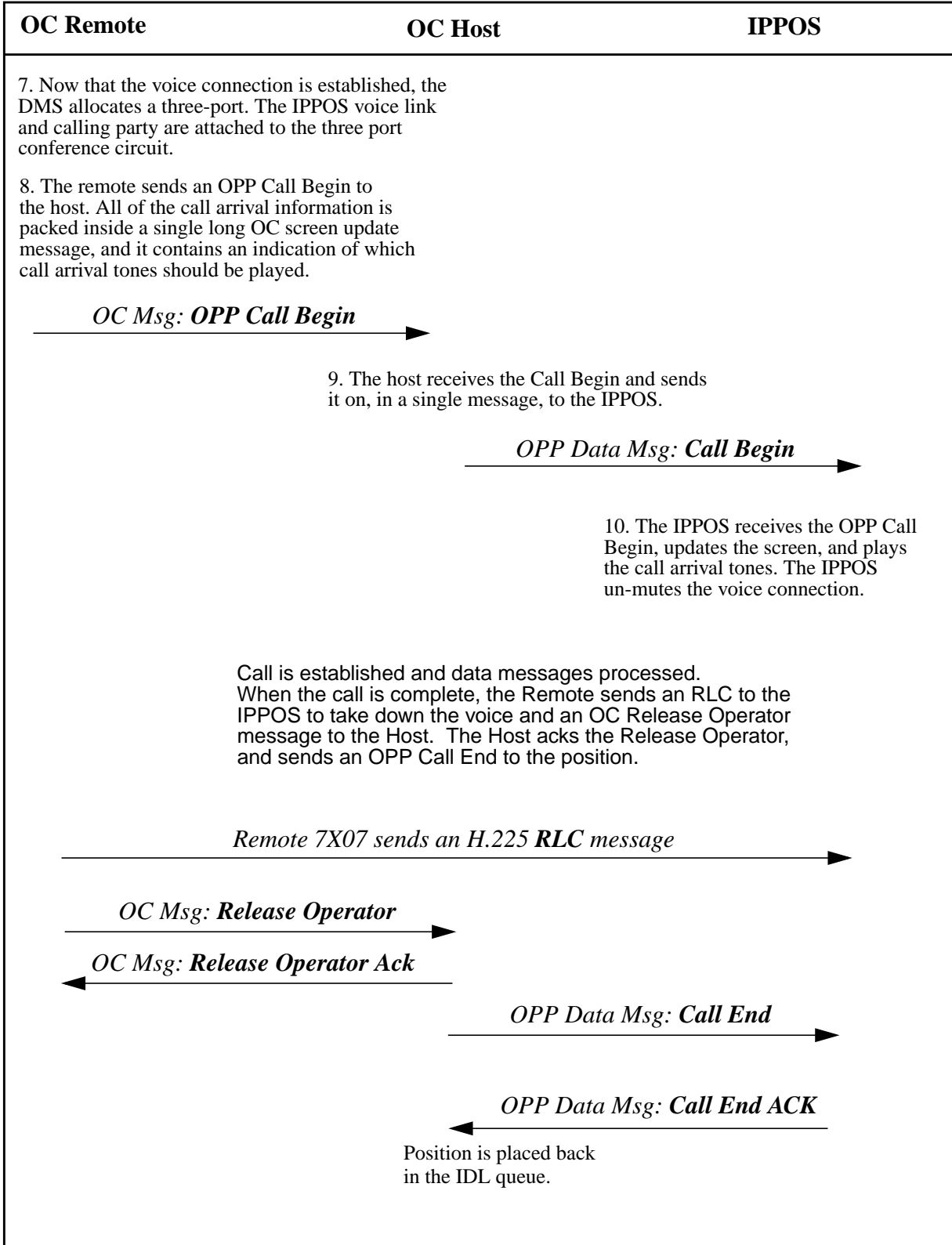


Figure 13 IP-OC IPPOS Call Flow (Continued)



3.4.3 Monitoring

TDM position monitoring¹ occurs purely in a host or standalone office. As all needed data and voice connections for TDM positions pass through the host, a monitoring three port conference circuit is allocated and all necessary voice circuits are connected.

Voice connections for IP position monitoring is complicated by the scenario where a call in the remote utilizes IP OC to communicate with a host, and the host assigns an IP position to the call. In this scenario, the operator's voice connection does not pass through the host ("host bypass") and is connected directly with the remote. As the host switch has no access to the operator's voice, monitoring voice connections are required in the remote switch in this scenario.

Thus, a new method is required for making monitoring voice connections for IP positions. Voice connections for IP position monitoring must take place where access for all needed parties is available. This varies depending on the call scenario, and is discussed in this section.

Data connections for IP positions always pass through the host or standalone office. So during monitoring, any data destined for a monitored IP position, can also be sent to a monitoring IP position.

The existing restriction that monitoring CSEs can only monitor other operators on a position of the same data type still applies. CSEs logged into IP positions can only monitor operators logged into other IP positions.

Another existing restriction that still applies is that both the monitoring and monitored operator must be logged into positions on the same host or standalone office. Although this project allows for operators to have the ability to login to multiple switches, they can only connect to one switch (from a maintenance perspective²) at a time.

Unless otherwise stated in this section it can be assumed that all existing restrictions concerning monitoring on TDM OPP positions also apply to monitoring on IP OPP positions.

For information on the interactions of monitoring and OSSAIN please refer to section "2.4.4 OSSAIN and Operator Simultaneous Connections".

The following sections go into more details about the data and voice connections for IP position monitoring.

¹Note that TDM position monitoring is not altered by this feature.

²See IWS activity RD983702, OPP Over IP for more information.

3.4.3.1 IP Monitoring Connections - Data

When a CSE at an IP position begins monitoring an operator at an IP position, information is stored that allows data destined for the monitored operator to be forwarded to the monitoring CSE. When monitoring begins, if the monitored operator is handling a call, the monitoring CSE may begin to see ***new*** screen update information that is sent to the monitored operator, but no attempt is made to catch the monitoring CSE up with previous screen updates for the current call and the IWS may not display all of the new screen updates.

When the monitored operator receives the first new call following the beginning of monitoring, data displayed to both the monitoring and monitored operators will be in sync.

3.4.3.2 IP Monitoring Connections - Voice

When a CSE keys to begin monitoring, the request is sent to the switch it has established data connectivity with (its host switch). If all previously existing monitoring requirements check out, the data portion of monitoring occurs as stated above.

All monitoring voice connections are only established when the monitored operator receives a ***new*** call. If monitoring begins in the middle of the monitored operator handling a call, new screen updates (data) are displayed to the monitoring CSE, but there are no voice connections made until the monitored operator receives a new call.

Monitoring voice connections are released at the end of every call, and re-established when the monitored operator receives another call. This is necessary as potentially with an OC-IP voice bypass call, all voice connections are only available from the remote switch. The next call the operator receives may be from another remote switch, or a standalone call. Thus, for monitoring, there is no static location (DMS switch) where a conference 3-port and voice connections can be maintained for the duration of an IP monitoring session.

For information on the VoIP call attributes used for the voice connection to the monitoring CSE position, please refer to section "2.4.5 Specifying VoIP Call Attributes".

Provisioning of conference 3-ports for monitoring is no longer only required in the host switch off of which the operator positions reside. The following table indicates the switch where a conference 3-port will be allocated based on the call scenario for IP position monitoring:

Table 9 IP Monitoring Conference 3-Port Allocation Location

Standalone/OC Call	OC Type (TDM/IP)	OC Voice Bypass Utilized	Conference 3-Port Allocation Location
Standalone	N/A	N/A	Standalone
OC	TDM	No	Host
OC	IP	Yes	Remote

3.4.3.2.1 IP Monitoring and CSE Interactions

If an IP operator is being monitored and any type (IP or TDM) of CSE assistant is attached to the call, voice connections for the monitoring session are lost. This is also the case if the CSE assistant is logged into an IPPOS and is being monitored. Supporting this would significantly complicate the voice connections required for monitoring, and is not supported in the TOPS15 release.

In these scenarios, the monitoring CSE continues to receive the screen updates (data) for the operator they are monitoring. Included in these is the attached operator information. So the monitoring CSE will be able to visually see that the operator they are monitoring is on a CSE assistance call, which will explain the lack of voice.

Consider the scenario of an IP operator being monitored and a new call is received. The monitoring CSE is receiving both the monitored data and voice. The operator then requests CSE assistance. When a CSE assistant is attached to the call, the allocated monitor conference 3-port and monitoring voice connections are released. The monitoring CSE is then only receiving monitored data. The monitoring session remains in this mode until the monitored operator receives a ***new*** call. So even if the CSE assistant that is attached to the call subsequently exits the call leaving the call with the original operator, the monitoring CSE will continue to only receive monitored data, until the monitored operator receives a new call.

Now consider this scenario of a CSE who is being monitored by another CSE. An operator handling a call requests CSE assistance and the CSE who is being monitored is attached to the call with the original operator. At this point the monitoring CSE begins receiving monitored data, but no monitored voice. As in the case above, the monitoring session will remain in this mode for the remainder of the CSE assistant's involvement with the call, regardless if the original operator releases from the call and the CSE assistant is left to handle the call alone. If the CSE assistant is also handling subscriber calls (as

opposed to requests for assistance above), the monitoring CSE will receive both monitored data and voice when the CSE assistant receives a ***new*** call of this type.

3.4.3.2.2 IP Monitoring Voice Connection Diagrams and Call Flows

This section contains diagrams and call flows of the support call scenarios involving an IP position that is being monitored. When monitoring begins, the necessary steps are taken for the monitoring CSE to begin receiving monitored data. This section covers the steps taken to establish monitoring voice connections when the monitored operator receives new calls.

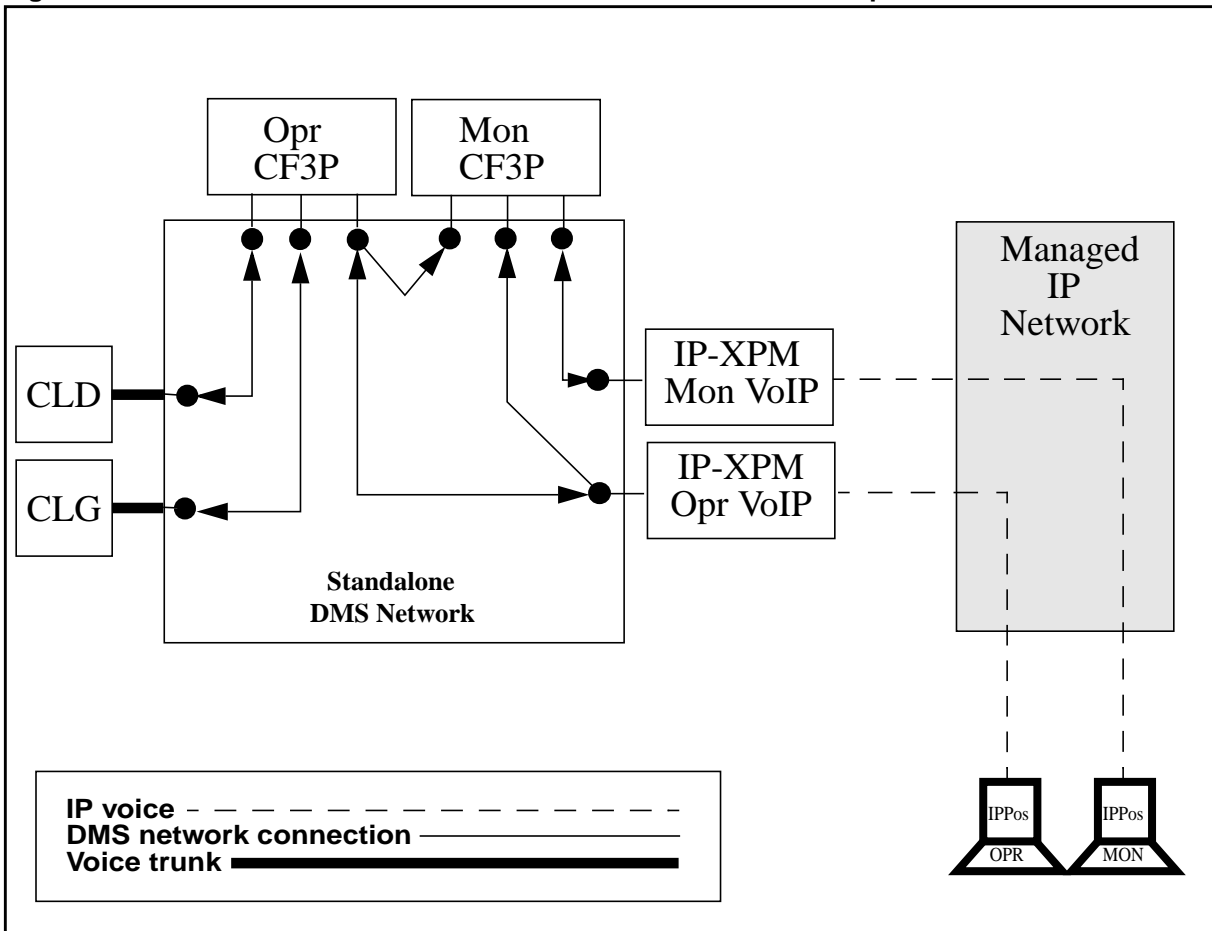
The supported call scenarios involving an IP position being monitored are:

- Monitored IP Operator Receives a Standalone Call
- Monitored IP Operator Receives a TDM-OC Call
- Monitored IP Operator Receives a IP-OC Call

Monitoring specific items appear in *italic* in the below call flows. These steps are performed in the order they are listed. The rest of the call flow steps are repeated information from section "2.4.2 New Call Configurations". If any of the steps to make voice connections for monitoring fail, the call proceeds as normal, the monitoring CSE will receive monitored data, but the monitoring CSE will hear no voice.

A. Monitored IP Operator Receives a Standalone Call

Figure 14 Voice connections for standalone call with a monitored operator



1. A call arrives on a TOPS-supported trunk and is routed to TOPS.
2. The DMS selects an available operator for the call.
3. The DMS selects an idle IPPOS voice link from the trunk group in **Table TOPSPOS**, and sends an IAM to the corresponding DTC including the position's IP address. (The IP address was obtained from the position's original in-service request message¹.) The port used is the well-known port for voice, so it is not datafilled in the CM. The IAM is converted to an H.225 Setup message by the 7X07² in the DTC. The Fast Connect procedures are employed, so the IPPOS can acknowledge the Setup and establish a two-way voice connection with a single message.

¹See activity 59006653, TOPS IP: Position Maintenance for more information.

²See activities 59022293, TOPS IP: IPGW Enhancements and 59022821, TOPS IP: 7X07 IP Gateway Support for VoIP for more information.

4. The IPPOS responds with an H.225 Connect message. The IPPOS mutes its end of the voice connection, so the caller does not hear the operator (and vice versa) prior to reception of the call's screen displays.
5. On the DMS, the 7X07 converts the Connect message and sends this on to the CM which receives it as a DMS ANSWER_MSG.
6. Now that the voice connection is established, the DMS allocates a three-port conference circuit. The IPPOS voice link and calling party are attached to the three port conference circuit.

6.1 Step 3 above is repeated for the monitoring CSE.

6.2 Step 4 above is repeated for the monitoring CSE.

6.3 Step 5 above is repeated for the monitoring CSE.

6.4 A monitoring three port conference circuit (CF3P) is allocated.

6.5 The monitoring CSE is attached to the CF3P with a two way voice connection.

6.6 A one-way voice connection is made to the monitoring CF3P from the monitored operator.

6.7 A one-way voice connection is made to the monitoring CF3P from the call's CF3P circuit that is connected to the monitored operator.

7. The DMS sends an OPP Call Begin to the IPPOS. The OPP Call Begin has an indication of which call arrival tones should be played. The OPP Call Begin contains all of the call arrival information in a single long message.

7.1 As this is data, the monitoring CSE's IPPOS will also receive this.

8. The IPPOS receives the OPP Call Begin, updates the screen, and plays the call arrival tones. The IPPOS un-mutes the voice connection.

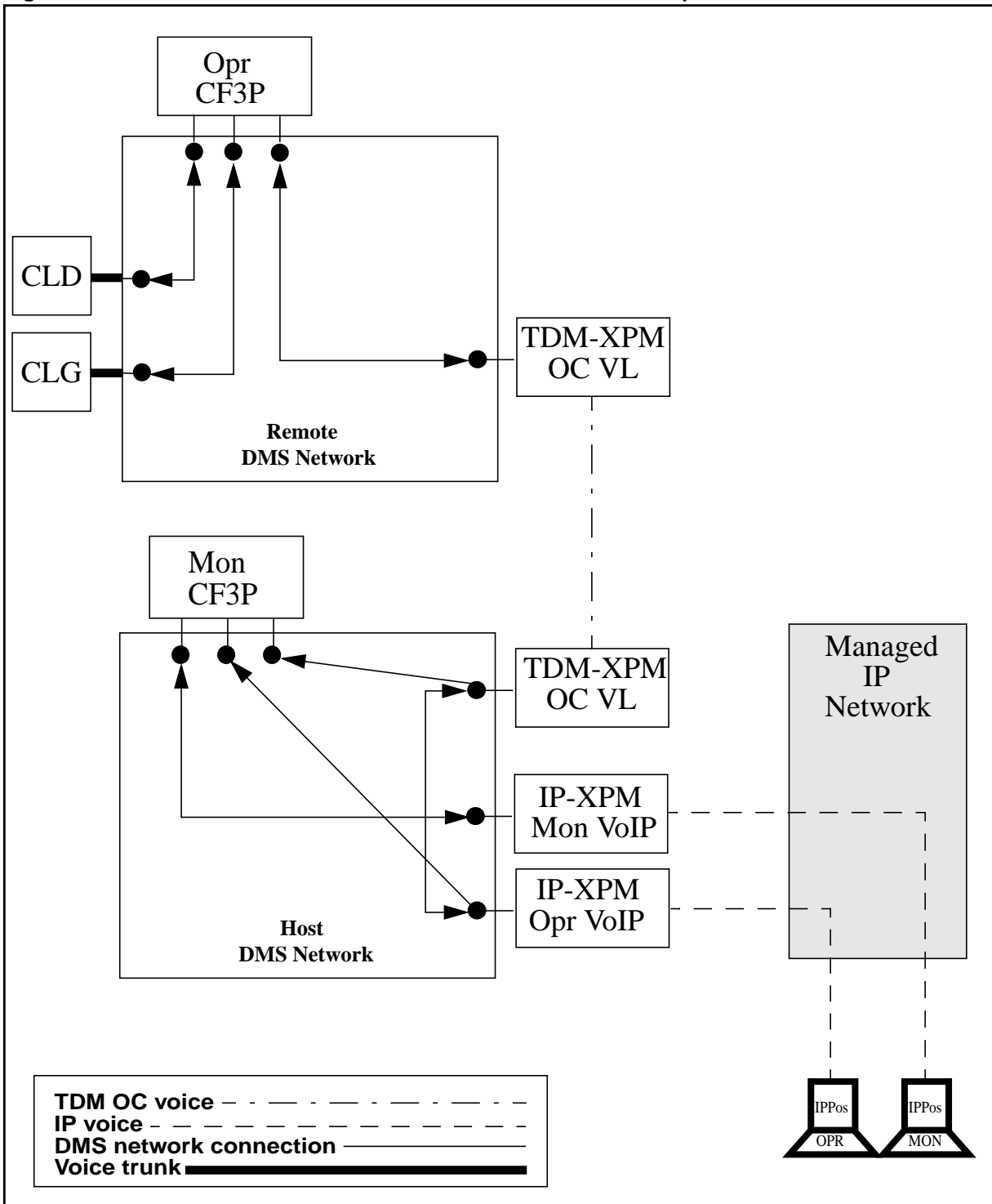
8.1 The monitoring IPPOS performs the same.

9. The caller and operator begin conversation.

9.1 The monitoring CSE now receives monitored data and voice.

B. Monitored IP Operator Receives a TDM-OC Call

Figure 15 Voice connections for TDM-OC call with a monitored operator



1. A call arrives on a TOPS-supported trunk in the remote and is routed to TOPS.
2. The remote selects a TDM OC data link and sends an OC Request Opr message to host.
3. The DMS selects an available operator for the call.
4. The DMS selects an idle IPPOS voice link from the trunk group in **Table TOPSPOS**, and sends an IAM to the corresponding DTC including the position's IP address. (The IP address was obtained from the position's original in-service request message¹.) The port used is the well-known port for voice, so it is not datafilled in the CM. The IAM is converted to an H.225 Setup message by the 7X07² in the DTC. The Fast Connect procedures are employed, so the IPPOS can acknowledge the Setup and establish a two-way voice connection with a single message.
5. The IPPOS responds with an H.225 Connect message. The IPPOS mutes its end of the voice connection, so the caller does not hear the operator (and vice versa) prior to reception of the call's screen displays.
6. On the DMS, the 7X07 converts the Connect message and sends this on to the CM which receives it as a DMS ANSWER_MSG.
7. The host selects a TDM OC voice link and connects the TDM OC voice link to the IPPOS packetized voice link. The host sends an OC Got Opr message to the remote. The Got Opr message must indicate that an IPPOS has been selected.
 - 7.1 Step 4 above is repeated for the monitoring CSE.
 - 7.2 Step 5 above is repeated for the monitoring CSE.
 - 7.3 Step 6 above is repeated for the monitoring CSE.
 - 7.4 A monitoring three port conference circuit (CF3P) is allocated.
 - 7.5 The monitoring CSE is attached to the CF3P with a two way voice connection.
 - 7.6 A one-way voice connection is made to the monitoring CF3P from the monitored operator.
 - 7.7 A one-way voice connection is made to the monitoring CF3P from TDM OC voice link to which the monitored operator is connected.
8. The remote receives the Got Opr message and allocates a three-port. The remote's end of the TDM OC voice and the calling party are attached to the three port conference circuit.
9. The remote packs an OPP Call Begin message and some OPP Call Update messages inside a series of OC screen update messages. These messages include the new Call Arrival Tone DID.

¹See activity 59006653, TOPS IP: Position Maintenance for more information.

²See activities 59022293, TOPS IP: IPGW Enhancements and 59022821, TOPS IP: 7X07 IP Gateway Support for VoIP for more information.

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- 10.** The host stores the individual messages, and then builds them into a single OPP Call Begin which is sent over the IP data link to the position. This is done to avoid sending multiple messages over the IP network, since the chance exists that multiple messages using UDP might arrive out of order.

10.1 As this is data, the monitoring CSE's IPPOS will also receive this.

- 11.** The TDM remote will not generate the call arrival tones if an IP position is connected. (The remote shouldn't generate the call arrival tones because they might be distorted by the IPPOS packetized voice connection.) See section "2.4.8 Call Arrival Tones" for more discussion of call arrival tones.
- 12.** The IPPOS receives the OPP Call Begin, updates the screen, and plays the call arrival tones. The IPPOS un-mutes the voice connection.

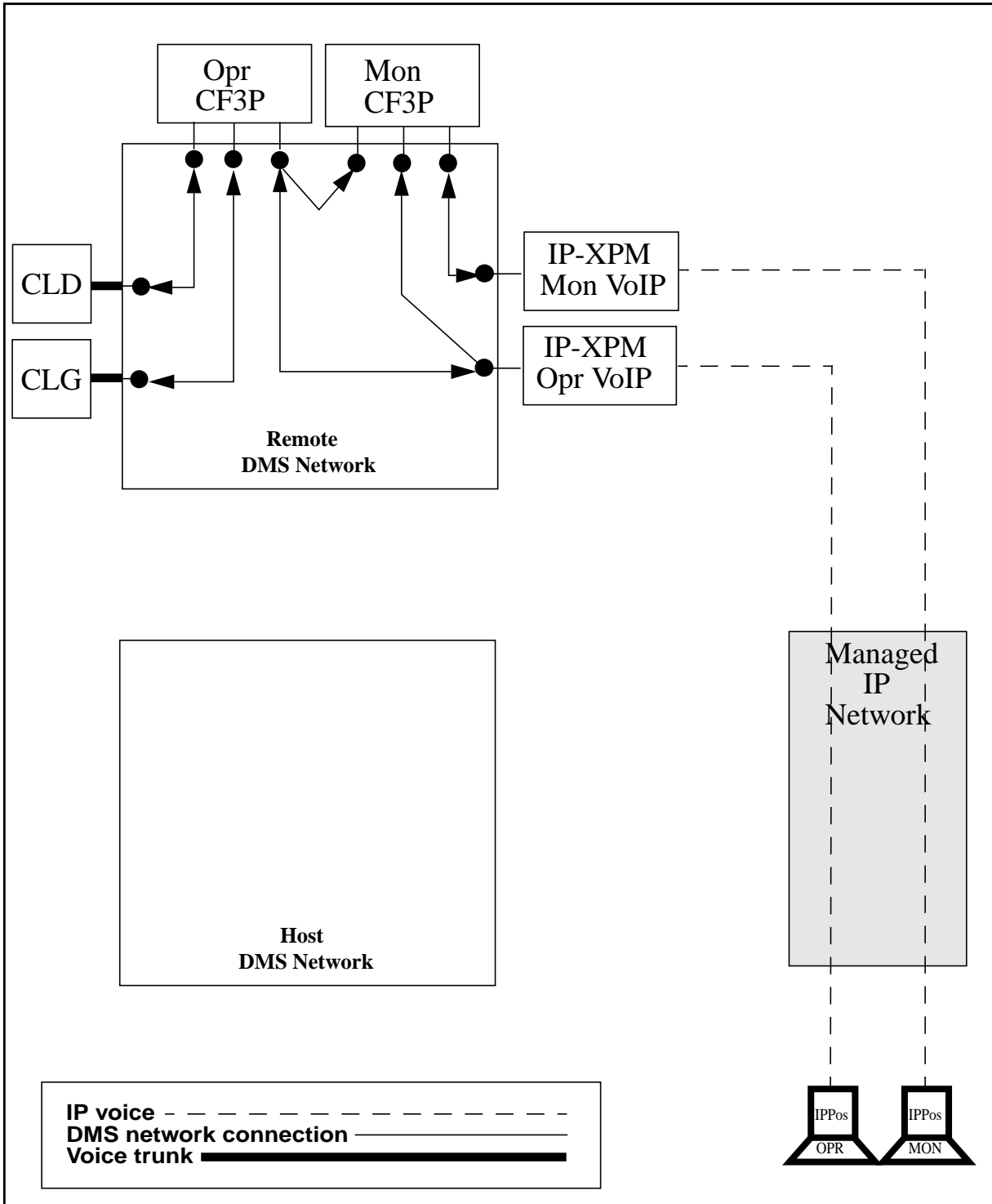
12.1 The monitoring IPPOS performs the same.

- 13.** The caller and operator begin conversation.

13.1 The monitoring CSE now receives monitored data and voice.

C. Monitored IP Operator Receives a IP-OC Call

Figure 16 Voice connections for IP-OC call with a monitored operator



- 1 A call arrives on a TOPS-supported trunk in the remote and is routed to TOPS.
2. The remote selects an OC-IP data link and sends an OC Request Opr message to the host.
3. The host allocates an operator. No voice connections are required in the host. The host composes an OC Got Opr message which indicates that host voice bypass should be used. The OC Got Opr message also includes the position's IP address¹. The host sends the OC Got Opr to the remote.

3.1 The OC Got Opr message also includes the monitoring position's IP address (footnote 1 also applies).

4. Upon reception of the OC Got Opr, the remote selects an idle trunk member from the voice link CLLI group associated with the host in **Table OCGRP**. The remote sends an IAM on this trunk member to the corresponding DTC including the position's IP address obtained from the OC Got Opr Message. The IAM is converted to an H.225 Setup message by the 7X07² in the DTC. The Fast Connect procedures are employed, so the IPPOS can acknowledge the Setup and establish a two-way voice connection with a single message.
5. The IPPOS responds with an H.225 Connect message. The IPPOS mutes its end of the voice connection, so the caller does not hear the operator (and vice versa) prior to reception of the call's screen displays.
6. On the DMS, the 7X07 converts the Connect message and sends this on to the CM which receives it as a DMS ANSWER_MSG.
7. Now that the voice connection is established, the DMS allocates a three-port. The IPPOS voice link and calling party are attached to the three port conference circuit.

7.1 Step 4 above is repeated for IP address of the monitoring CSE in the Got Opr message.

7.2 Step 5 above is repeated for the monitoring CSE.

7.3 Step 6 above is repeated for the monitoring CSE.

*7.4 A monitoring three port conference circuit (CF3P) is allocated in the *remote*.*

7.5 The voice connection to monitoring CSE is connected to the CF3P with a two way voice connection.

¹It does not include a port number, as a well-known port is used for VoIP.

² See activities 59022293, TOPS IP: IPGW Enhancements and 59022821, TOPS IP: 7X07 IP Gateway Support for VoIP for more information.

7.6 A one-way voice connection is made to the monitoring CF3P from the voice connection to the monitored operator.

7.7 A one-way voice connection is made to the monitoring CF3P from the call's CF3P circuit that is connected to voice connection to the monitored operator.

- 8.** The remote sends an OPP Call Begin to the host. All of the call arrival information is packed inside a single long OC screen update message, and it contains an indication of which call arrival tones should be played.
- 9.** The host receives the Call Begin and sends it on, in a single message, to the IPPOS.

9.1 As this is data, the monitoring CSE's IPPOS will also receive this.

- 10.** The IPPOS receives the OPP Call Begin, updates the screen, and plays the call arrival tones. The IPPOS un-mutes the voice connection.

10.1 The monitoring IPPOS performs the same.

- 11.** The caller and operator begin conversation.

11.1 The monitoring CSE now receives monitored data and voice.

3.4.4 OSSAIN and Operator Simultaneous Connections

The OSSAIN call environment supports the connection of an OSSAIN Service Node (SN) and a passive function provider within a call simultaneously¹. The passive function provider can be either another SN or an Operator. This activity enhances OSSAIN call processing to support IP voice connectivity to an IPPOS Operator in a simultaneous connection.

The existing passive operator restrictions are not changed by this feature. While in a simultaneous interaction the controlling or active agent is always the SN while the Operator is the inactive or passive agent. However, the Operator may release the active SN thereby making itself the controlling agent for the call. The following limited set of actions are allowed by an operator involved in an OSSAIN simultaneous connection:

- Release itself from the call (Pos Release key function)
- Release the active SN (Release Operator key function)
- Pass-through messaging (Passthru key function)

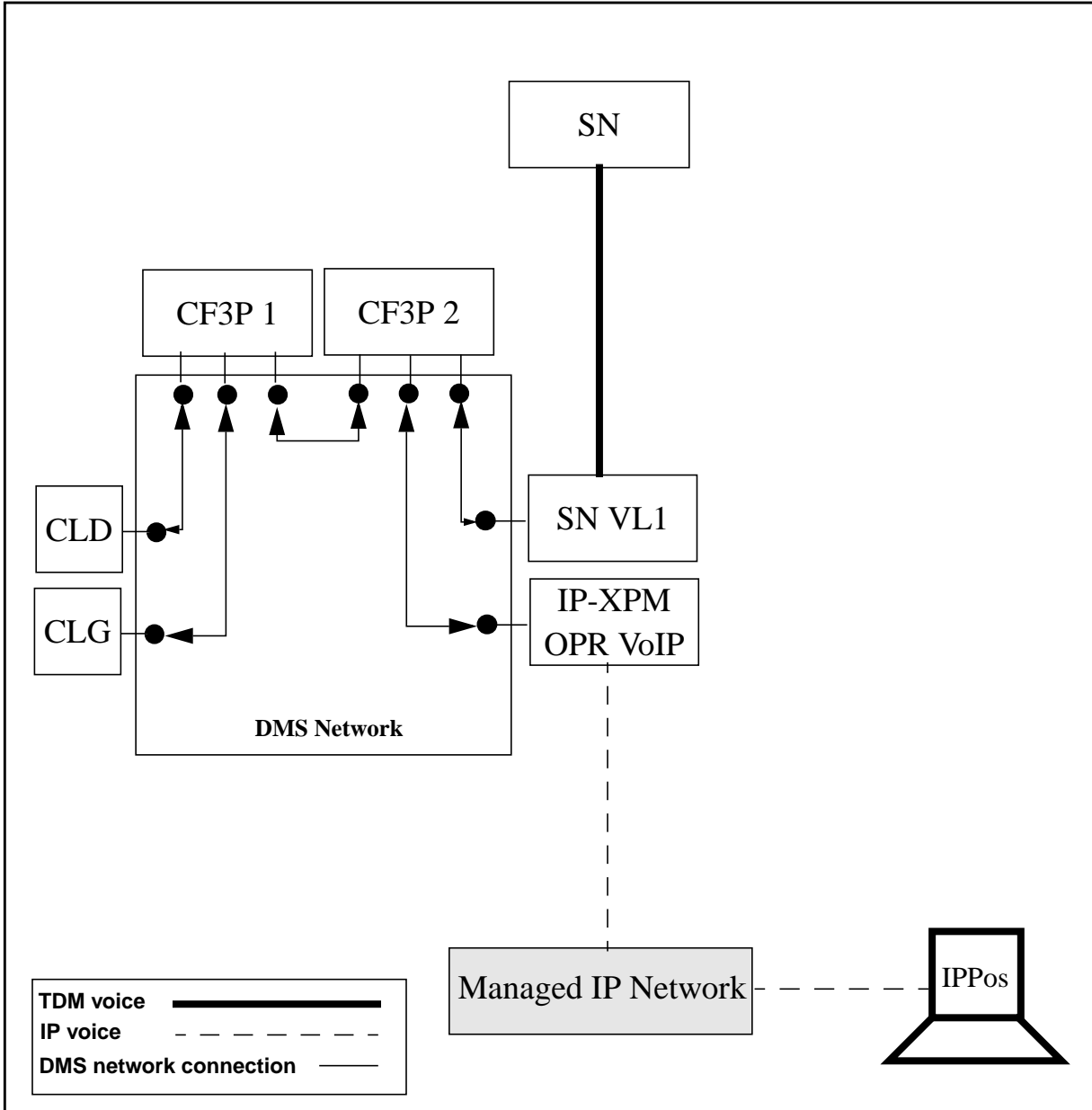
Note: An operator in an OSSAIN simultaneous connection cannot request assistance from either a SA/IC or CSE operator.

The functionality described elsewhere in this document pertaining to Standalone IPPOS, OC-IP with IPPOS (bypass), OC-TDM with IPPOS, and Monitoring connectivity also apply to Operators involved in an OSSAIN simultaneous connection.

The following figure illustrates how voice connections between the various entities in an OSSAIN simultaneous call are achieved via the DMS Network. The example shows an OSSAIN call with a SN connected simultaneously to a call with an Operator. The connections illustrated apply to both a Standalone IPPOS or OC-IP with IPPOS (bypass) configurations.

¹Refer to feature document AN1926-OSSAIN Simultaneous Interactions or the OSSAIN Users Guide for additional detail.

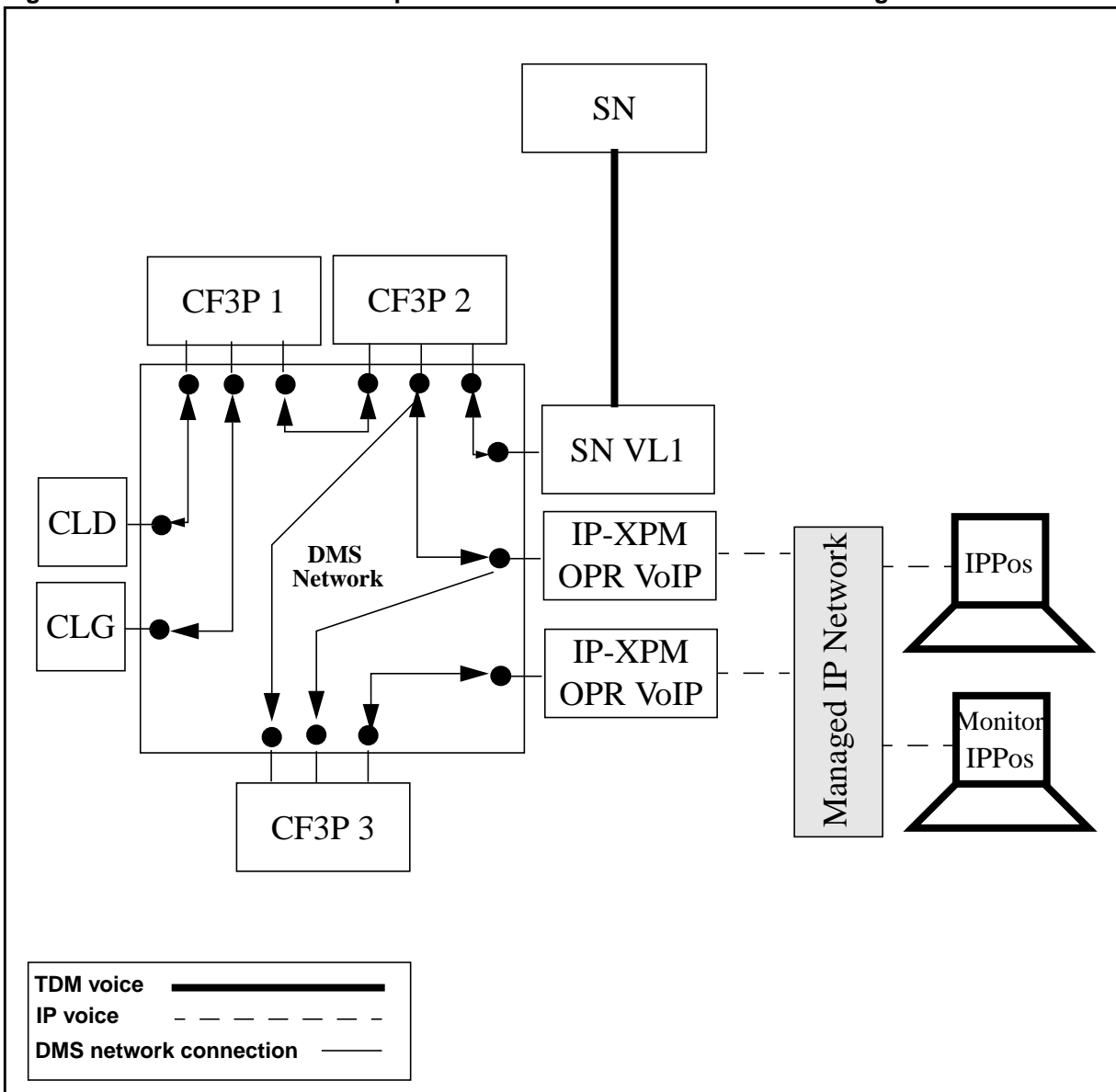
Figure 17 Simultaneous SN to Operator Voice connections



Prior to this activity only TDM voice connections could be made to an Operator. This activity enables OSSAIN calls to connect to an IPPOS in both the IPPOS Standalone and OC-IP with IPPOS (bypass) configurations. Note that the OSSAIN service node voice link connectivity between the DMS and the SN is via TDM and is unchanged by this activity.

When an IPPOS position is being monitored an additional conference circuit is utilized to connect the monitoring CSE. Note: to monitor an IPPOS the monitoring CSE must also be logged into an IPPOS. The following figure illustrates an OSSAIN simultaneous connection to an IPPOS operator being monitored by another IPPOS operator. As with the previous figure the connections illustrated apply to both the IPPOS Standalone and OC-IP with IPPOS (bypass) call environments.

Figure 18 Simultaneous SN to Operator Voice connections with Monitoring



3.4.5 Specifying VoIP Call Attributes

In the TOPS15 release, feature 59022288, TOPS IP: Voice Provisioning and Utilities, is removing the fields that specify a voice CODEC in table OCHOSTQ. The same feature is adding new table PKTVPROF and changing table TQCQINFO to allow VoIP call attributes to be specified on a per-call queue basis.

The call attributes that can be specified in table PKTVPROF in TOPS15 are CODEC usage and an indication of whether to utilize silence suppression. The two supported CODECs are G.711 and G.729. If CODEC G.711 is specified in a tuple, silence suppression is not used. If CODEC G.729 is specified, datafill determines silence suppression use.

Refer to feature 59022288 for more specifics if needed.

This feature utilizes the functionality described above when a VoIP call is generated over an IP-XPM to an IPPOS or to an OC host office (applies to all IP-OC calls regardless of the type of position that is selected to service the call). When the DMS TOPS office initiates the call, an IAM message is sent to the appropriate IP-XPM. Contained in the IAM message is an indication of the CODEC and silence suppression information for the IP-XPM to use when generating the VoIP call. This information is obtained from tables TQCQINFO and PKTVPROF (tables in the DMS that generates the IAM message) based on the call queue for the call.

In call scenarios where multiple IP operators are associated with the same call, voice between the operators will traverse 2 IP hops and thus incur twice the normal amount of latency. Also, the use of G.729 CODECs can cause further voice quality degradation between the operators due to multiple compressions/decompressions. However, from the subscriber's vantage point, all VoIP connections would only entail 1 IP hop and will experience no added degradation due to multiple IP operators being connected to a call.

Poor operator to operator voice quality is still not preferred, thus some limitations are imposed/recommended. The two possible call scenarios that can have multiple IP operators associated with the same call are IP Monitoring calls and CSE assistance calls.

For the reasons stated above voice connections made to an IP monitoring position will utilize the G.711 CODEC. This is not dependent on any switch datafill.

Call queues for CSE assistance are datafilled in table TQMSFCQA. For the same reasons previously stated, it is highly recommended that the G.711 CODEC be specified for call queues designated for CSE assistance in table TQMSFCQA if the CSE uses an IP position.

3.4.6 IP Position Delay Calls and Booked Call Database Calls

Accessing an idle loop initiates a *delay* call. It is called a delay call because operators occasionally spin up calls in this manner to set up a subscriber call which could not be established earlier for whatever reason (no available trunks, desired party not present, etc.). Delay calls are always standalone calls. This is true even if the operator has an OC call at their position and accesses their other (idle) loop, thereby initiating a delay call on the other loop. The delay call is still standalone, and it takes place only in the switch which is the operator's host for the OC call at their position.

Booked Call Database calls are delay calls that spin up automatically when their time-of-day timer expires. The discussion below applies to delay calls and booked call database calls.

Since IP positions do not have a dedicated voice link, any existing VoIP connection the position has for the current loop is released, and a new VoIP connection is established between the DMS and IPPOS for the delay call on the loop being accessed. The trunk CLLI specified in table **TOPSPOS** is used in obtaining a voice link and making the VoIP connection.

Proper provisioning of VoIP resources is necessary, even for positions on a Pure Host (handles no standalone calls) in a fully converted IP OC network. In this configuration, all calls to the IP positions in the Pure Host are OC-IP calls, and therefore would utilize OC voice bypass, connecting VoIP from the remote directly to the IPPOS. No voice resources would be necessary in the Pure Host (use of 'placeholder' CLLI in table TOPSPOS) if delay calls and booked call database calls are not desired. However, if no voice resources are provisioned in the Pure Host all delay/booked calls will fail.

If no voice links were available for these types of calls, previously existing logs and OMs are pegged. The IPPOS is then notified of the failure. Note that this failure would also occur if the operator had a call on one loop and tried to access the other (perhaps to call a third number without disconnecting the calling and called parties).

If a VoIP connection cannot be established for the delay call, the request to access the specified loop will fail. If the IPPOS previously had a VoIP connection (which was just released), actions are taken to re-establish it.

3.4.7 Assistance Requests

When an operator requests assistance, table TQMSFCQA is referenced based on the CT4Q of the call. Table TQMSFCQA specifies if the type of assistance for a CT4Q is SA or CSE.

3.4.7.1 SA Requests

If an operator at an IP position requests assistance and the CT4Q of the call specifies SA assistance is to be utilized, the request for assistance is denied. SA assistance is not supported from calls serviced by an operator at an IP position.

3.4.7.2 CSE Requests

CSE assistance (QMS CASE) is supported for calls serviced by operators at IP positions. There is no restriction on position types for either the requesting operator's position, or the CSE's position. Either could be a TDM position, an IP position, or any mix of these. Also, either operator can be obtained on the local switch (standalone) or from an OC host.

If the CSE operator selected is a TDM operator, then functionality available prior to TOPS15 connects the TDM operator to the call. If the CSE operator selected is an IPPOS operator, then one of the call configurations detailed in section "2.4.2 New Call Configuraton" is utilized to connect the IPPOS operator to the call. However, DMS network connections and CF3P usage is identical to when a TDM CSE is attached.

In all cases, when the CSE is attached, call detail information (including new Call Arrival Tone information) is sent to both operators. Please refer to section "2.4.8 Call Arrival Tones" for more information.

It is highly recommended that all operators on IP positions that service CSE assistance queues, be configured to use the G.711 CODEC. Please refer to section "2.4.5 Specifying VoIP Call Attributes" for a complete discussion of this topic.

For details of interactions between CSE assistance and IP monitoring, please refer to section "2.4.3.2.1 Monitoring and CSE Interactions".

3.4.8 Call Arrival Tones

Prior to TOPS15, the DMS generated call arrival tones heard by TOPS operators. In the newly supported call configurations, call arrival tones are played to operators logged into IP positions by the IP position. This enables the IP position to synchronize the playing of call arrival tones with the first screen updates for a given call.

3.4.9 Error Scenarios

Error scenarios are discussed in the following table by considering the consequences of errors at various points in the newly supported call flows. Common problems are grouped together.

The table discusses various messages transmitted during the IPPOS call. For reference, the CM will send an ISUP IAM to the XPM; however, the IAM is converted into an H.225 *Setup* message by the 7X07 card in the XPM. It is the *Setup* message which is sent out. In response, the 7X07 will receive an H.225 *Connect* message, which the 7X07 converts into an ISUP ANM message. Since the CM has supervised the XPM to report the ANM as a DMS answer_msg, the CM will receive a DMS answer_msg from the XPM.

Other general notes:

- OPP position will end a call when it receives a Call End message. It will also take the voice link down.
- OPP position will assume a new Call Begin means to end the old call but will not take the voice link down.
- DMS will time for an answer reply in response to sending the ISUP IAM.
- DMS will time for the Call End Acknowledgement.

Table 10 Error Processing

Error	Explanation	Reaction
No Resources	This includes no voice links available, no RUs, and no CF3Ps.	<p>The call is re-queued, the current position is released, marked CRES, and sent 'make busy' screen updates.</p> <p>For an OC call, the remote would send an OC No Resources message to the host. The host would release the position, mark it CRES, send the 'make busy' screen updates, and re-queue the call.</p> <p>For OSSAIN calls the service node is sent an error response with respect to the passive function provider (for an operator) request. The service node determines what action to take next.</p> <p>When a voice link is not available, a TOPS105 log with reason code, voice_link_not_available, is generated. If an OC extension block is not available the TOPS 105 will be generated with reason code of ext_block_unavailable.</p>

Table 10 Error Processing

Error	Explanation	Reaction
Answer Timer Expires	<p>When the CM sends an ISUP IAM message, it will set a timer to wait on the answer message (this is the H.225 Connect msg converted to an ISUP ANM and then to a DMS answer_msg).</p> <p>This could occur because the IAM/ Setup never made it out, or the position did not send any messages or the Connect/ANM was lost on the way back.</p>	<p>Whenever this timer expires, TOPS deflects the call and cancels the current request for an operator. Table OCHOSTQ may be used to re-route the call and try for another operator (even for standalone calls if setup) otherwise the call goes to treatment.</p> <p>For an OC call using VoIP bypass, the remote sends an OC Cancel Opr message to the host. The host cancels the operator request and returns an OC Operator Released message to the remote. The remote then performs deflection to another host or sends the call to treatment.</p> <p>For OSSAIN calls the service node is sent an error response with respect to the passive function provider (for an operator) request. The service node determines what action to take next.</p> <p>A TOPS105 log (either voice_link_conn_fail or voice_bypass_conn_fail for bypass) is generated.</p>
Call Begin Lost	<p>This applies to Standalone and Host offices for sending the OPP Call Begin to the IPPOS.</p> <p>It also applies to the Remote when sending the OC Call Begin to the Host.</p> <p>In either case, the Call Begin does not make it to the IPPOS.</p>	<p>A timer in the IP position will expire and take the call down by sending a RLC to the switch. The timer is 3-4 secs.</p> <p>For an OC Call Begin message, the host also has a 5-sec. timer. When the host timer expires, the call is taken down.</p> <p>For both scenarios, the TOPS 105 log with reason code of opr_ack_wait_timeout is generated.</p>
OPP Call End Lost/ Call End Ack not received	<p>CM will wait for a Call End Acknowledgement before making the position available for another call. Thus, the DMS would timeout waiting for the ACK if the Call End was lost or the ACK not received.</p>	<p>When sending the Call End, the DMS will set a short timer to wait for the ACK. If the timer expires, a second Call End is sent to the position and a longer timer is set. The second timer is set long enough for the position to recover. When the second timer expires, the DMS will try to make the position available for another call (audit timers may have taken the position out of service).</p>
RLC To IPPOS Lost	<p>RLC not received at the IPPOS</p>	<p>A Call End message also clears the voice connection from the position.</p>

Table 10 Error Processing

Error	Explanation	Reaction
Call Setup Not Accepted	If a position still has a voice link up for an old call and the DMS tries to present a new call, the IAM/Setup message will be ignored since a second TCP connection is not opened at the position.	<p>Since the DMS will wait for an ACK message or position reset, this will not happen. No action required.</p> <p>If by chance it does happen, an RLC will be returned to the CM and the call will be deflected as is done when the answer timer expires.</p>
Voice Not Clear Or Stops Functioning	At any point during a call, the voice connection may experience problems due to heavy traffic, missed messages, messages out of sequence, etc.	<p>Since these problems occur from network issues, there is nothing TOPS can do.</p> <p>The operator could try to put the call on hold and reaccess the loop; however, the connection will most likely be the same since the network would still be congested. Note that putting a call on hold to get another voice link connection will add to network congestion.</p> <p>These problems should not occur in a well-managed network as required by this project.</p>
Delayed Call Begin	<p>If the IPPOS timed out waiting for a Call Begin, it clears the call by sending an RLC message.</p> <p>The Call Begin could still arrive a little later.</p>	<p>If the Call Begin arrives at a position without a call, then the old call information is displayed on position. However, since the call is no longer active in the DMS, all key strokes are ignored. The operator could refresh the screen by doing a 'Make Busy' and Start or wait for the next call to arrive.</p> <p>If the Call Begin arrives in place of another Call Begin, the new call's Call Begin will arrive second and replace the data on screen. The new call would be fine.</p> <p>If the Call Begin arrives at a position with an active call, then the old call's data would be presented to the operator. Since the DMS does not consider the old Call Begin's call id active, all key functions would be ignored. However, the voice link is still connected and the operator can ask the caller to hang up and retry.</p>
Delayed Call End	If the Call End was lost, it could arrive at position at a later time.	The position will look at the call id. If it thinks it's an active call, it will take the call (and voice link) down and return an ACK. If it is not an active call id, only an ACK is returned.
Delayed RLC	If the RLC was lost, it could arrive later.	The RLC could only arrive if the connection was still open. If open, it is closed. If not open, the message is discarded.

Table 10 Error Processing

Error	Explanation	Reaction
No Messages Arrive At Their Destinations	Network is VERY congested and no messages are getting through.	Audits and sanity timers will take the call down. However, communication with the position is lost until the network recovers.
Different BCS Levels Across Switches	The host is at TOPS15 but the remote is at a pre-TOP15 level.	The host deflects the call if an IPPOS is selected.

3.5 Hardware requirements

Please refer to 297-8403-906, "TOPS Internet Protocol (IP) User's Guide" for hardware requirement information.

3.6 Limitations and restrictions

Please refer to the limitations and restrictions for the TOPS 15 IP project in section "2.4.3.2.1 Project limitations and restrictions". Following is a list of additional restrictions specific to this feature.

- IP positions capable of monitoring can only monitor other IP positions that are logged into the same DMS switch as the monitoring position.
- VoIP connections from TOPS switches to an IP monitoring CSE will always utilize the G.711 CODEC.
- It is highly recommended that the G.711 CODEC be specified for call queues designated for CSE assistance in table TQMSFCQA that are serviced by CSEs at IP positions.
- When putting a call on hold, VoIP connections for the call are disconnected. The VoIP connections are re-established when the call is reaccessed. Additional delay is incurred in re-establishing these VoIP connections, and it is possible for the re-establishment to fail.

3.7 Interactions

This feature has several interactions with Force Management.

3.7.1 Force Management

Force Management statistics are affected by the somewhat longer time it takes to set up a VoIP connection than to begin using a nailed-up voice link to a position. And, to a lesser extent, statistics may also be affected by OPP changes that require an extra data message for IP positions to release a call. In both cases the extra time is counted as Idle Time. Therefore, Idle Time is expected to increase somewhat for operators at IP positions.

The amount of the increase depends on a number of factors. It is greater for TOPS standalone calls than for OC calls, and it is greater for TDM-OC calls than for OC-IP calls. The amount of increase also depends on the performance and configuration of the data network, which may vary from customer to customer. Preliminary lab testing suggests that the increase in operator idle time for each call may be in the range of 250 to 575 msec.

IWS IP positions are not able to detect when the operator jacks or unjacks the headset. The recommended operator practice is to always use the softkeys to log in and out. If this practice is followed, and if operators keep their headsets jacked in while they are logged in, then FM stats will not be affected by

headset issues. UCP (unoccupied with call at position) and UCD (unoccupied with disconnected call) warnings are not available for IP positions, since these positions do not inform the DMS of the headset status. In addition, the DMS continues to accumulate work volume for operators who simply unjack the headset rather than logging out. Please refer to IWS documentation for more detail on Force Management interactions related to the operator headset.

3.8 Logs (LG)

3.8.1 New/modified logs

Table 11 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)
TOPS	105	Modified	SOS
TOPS	106	Modified	SOS

These are general purpose logs used to report trouble encountered by TOPS call processing. Two new fields, OCOFC and OCIPDLNUM, are added to each log along with new trouble code VOICE_BYPASS_CONN_FAIL.

Since IP positions do not have fixed voice links, a TOPS 105 log can now be generated on failures to obtain a voice link to a position as well as a failure to obtain an OC-IP voice link. Thus, it is now possible for a TOPS 105 log to be generated by a standalone call as well as host/remote OC calls.

Refer to the LG section of this document for further details.

3.9 Data schema (DS)

No table control changes are made by this feature. A brief discussion of table control changes made by other features in the TOPS IP project that this feature utilizes is found in section "2.4.1 Table Control Summary".

Details of these changes can be found in the following features:

- 59022293, TOPS IP: IPGW Enhancements
- 59006658, TOPS IP: Position Provisioning and OPP Data
- 59022288, TOPS IP: Voice Provisioning and Utilities

3.10 Office parameters (OP)

Not applicable

3.11 Service orders (SO)

Not applicable

3.12 Alarms (AL)

Not applicable

3.13 Command interface (CI)

Not applicable

3.14 Operational measurements (OM)

Not applicable

3.15 AMA/Billing information (AM)

Not applicable

3.16 Software optionality control (SOC)

This feature does not define a new SOC, but it's functionality is controlled indirectly via a SOC defined by feature 59006653, TOPSIP: Position Maintenance. Refer to this feature for details on SOC functionality.

3.17 Glossary

Term	Description
ACM	Address Complete Message
ACTID	ACTion IDentifier
ANM	ANswer Message
CCS7	Common Channel Signalling 7
CF3P	ConFerence 3-Port
CLD	CaLleD party
CLG	CaLlinG party
CM	Computing Module
CODEC	COder/DECoder
CSE	Customer Service Expert
DA	Directory Assistance
DCM	Digital Carrier Module
DID	Data IDentifier
DMS	Digital Multiplex System
DoIP	Data over IP
DTC	Digital Trunk Controller
EIU	Ethernet Interface Unit
GSP	Global Services Platform
IAM	Initial Address Message
IC	In-Charge operator
IP	Internet Protocol
IP Address	Network Layer Address (32 bits) in the form of X.X.X.X
IPGW	IP GateWay
IPPOS	Internet Protocol operator POSition
ISN-DA	Intelligent Service Node - Directory Assistance
ISUP	ISdn User Part
IWS	Intelligent WorkStation
LAN	Local Area Network

LIDB	Line Information Data Base
MIS	Management Information System
MMP	Multi Market Platform
OC	Operator Centralization
OIA	Open Interface Access
OPP	Open Position Protocol
OSAC	OSSAIN Centralization
OSSAIN	Operator Services System Advanced Intelligent Network
PM	Peripheral Module
PSTN	Public Switched Telephone Network
QMS	Queue Management System
RLC	ReLease Complete
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
RU	Recording Unit
SA	Service Assistant
SN	Service Node
SOC	Software Optionality Control
TDM	Time Division Multiplexed
TMS	TOPS Message Switch
TOPS	Traffic Operator Position System
TP	TOPS Position
TPC	TOPS Position Controller
UDP	User Datagram Protocol
VoIP	Voice over IP
XPM	XMS-based Peripheral Module

3.18 References

Document ID	Title
PCID 00022623	"OPP over IP with OC Voice Host Bypass-Feature Specification Document," version 1.03 dated 31 March 2000
297-8403-906	TOPS Internet Protocol (IP) User's Guide.
59006653	TOPSIP: Position Maintenance
59006658	TOPS IP: Position Provisioning and OPP Data
59022288	TOPS IP: Voice Provisioning and Utilities
59022293	TOPS IP: IPGW Enhancements
59022821	TOPS IP: 7X07 IP Gateway Support for VoIP
NIS: Q214-1	Open Position Protocol
AN1926	OSSAIN Simultaneous Interactions
297-8403-901	OSSAIN User's Guide

4: Functional description (FN)

4.1 Feature name

TOPS and Succession Interworking

4.2 Description

The purpose of this feature is to show how TOPS works with the new Succession architecture. The efforts of this feature have focused mainly on testing the current TOPS product family with Succession. There is no new product functionality provided by this feature. This feature has been tested with the SN02 release.

Succession is the name given to the next generation of network and switching architecture within Nortel Networks. One of the first offerings from Succession is the Voice Trunking over ATM (VToA) architecture that augments and eventually replaces the traditional ENET network with an ATM network. This activity along with feature 59017620: TOPS and Bearer Independent Call Control (BICC) Interworking enables operator services provided by TOPS on the VToA architecture. More specifically, this activity focuses on the single communication server VToA architecture using the ATM network.

There are three distinct areas this activity covers:

- How Succession interacts with TOPS (trunk connectivity) in a single node environment
- Interworking SPM (IW-SPM) usage
- Billing

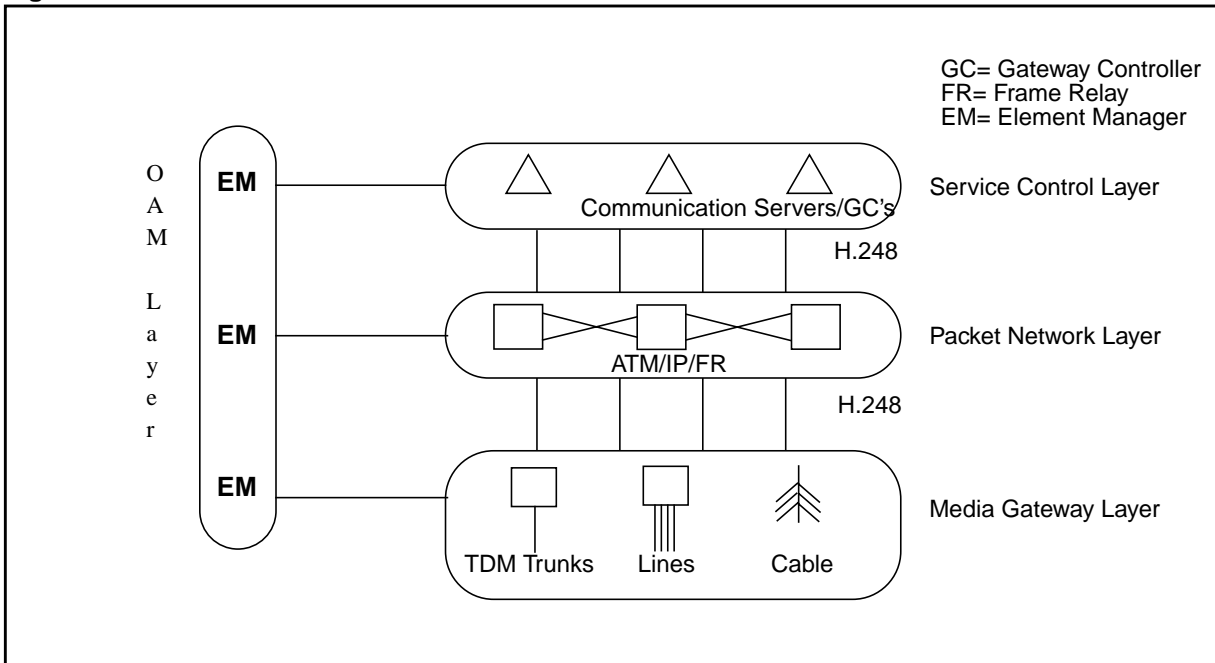
4.2.1 Background

This section provides a high level view of the Succession architecture and then of a single communication server VToA architecture, which is an instance of the Succession architecture.

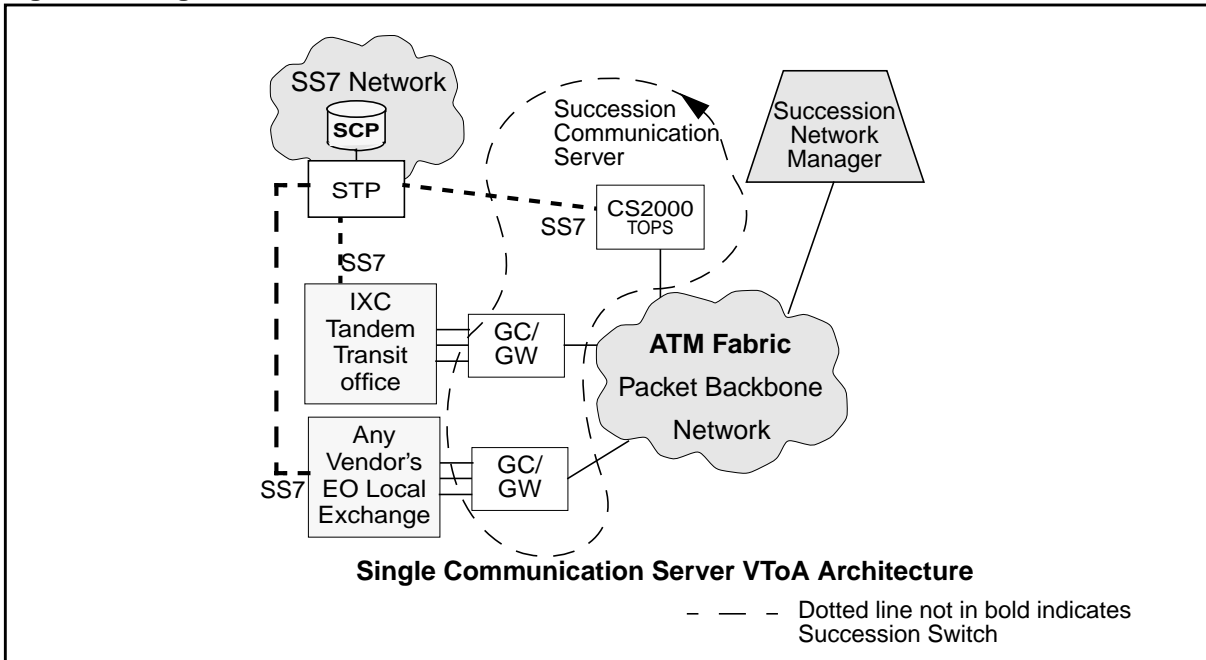
The Succession architecture is composed of four layers and is meant to be open industry standard interfaces, which are scalable and flexible. Those four layers are:

- Service Control layer- contains all the call processing and services control logic.
- Packet Network Layer- provides bearer channel transport using data packet technology such as IP, ATM, or Frame Relay (FR).
- Media Gateway Layer- contains all the agent access for trunks, lines, etc. It also interacts with the Service Control Layer using industry standard H.248 protocol.
- OAM Layer- provides Element Managers (EMs) that control all the components in the other three layers.

Figure 1 Succession Architecture



The VToA architecture uses the ATM network to provide bearer path (i.e. voice) connection between agents that are hosted only on that single communication server (CS2000). The following diagram shows a pictorial view of this architecture.

Figure 2 Single communication server VToA Architecture

The major components referenced in the architecture above are the following. These components are used in other diagrams in this document:

- Succession Communication Server (CS2000)

The Communication Server is the call processing component of the architecture. Nortel Networks is providing two types of Succession Communication Servers:

- CS2000 which contains an DMS XA Core as the processing engine and also has access to a traditional ENET network.
- CS3000 which contains a Sun Sparc machine as the processing engine with no ENET or other DMS peripherals.

At this time, TOPS delivers only with the CS2000 communication server.

- Gateway Controller (GC)/ Gateway (GW)

The Gateway Controller and Gateway provide TDM to ATM connection conversion. The interface to the GC from the CS2000 is a proprietary PPVM protocol. The interface between the GC and the GW is the industry standard H.248 (MEGACO) protocol. Any commercially available GW that supports H.248 can be used as the GW.

Nortel Networks is providing the following GCs and GWs:

- an SGC functioning as the GC
- an MG4000 using H.248 functioning as a GW

- ATM Fabric

The ATM Fabric is an engineered ATM network used to transport the bearer path connections from one GC/GW to another GC/GW. The Communication Server provides instructions on when to establish and release the connections. Any industry standard ATM switches can be used to establish the ATM fabric.

Nortel Networks is providing the following products ATM switches that can be used to configure the ATM fabric:

- Passport 15000K which is a lower capacity ATM/IP/FR switch
- Passport 15000KS which is a high capacity ATM-only switch

- Succession Network Manager

The Succession Network Manager provides integrated OAM interfaces for the Communication Server and GC/GWs in this architecture.

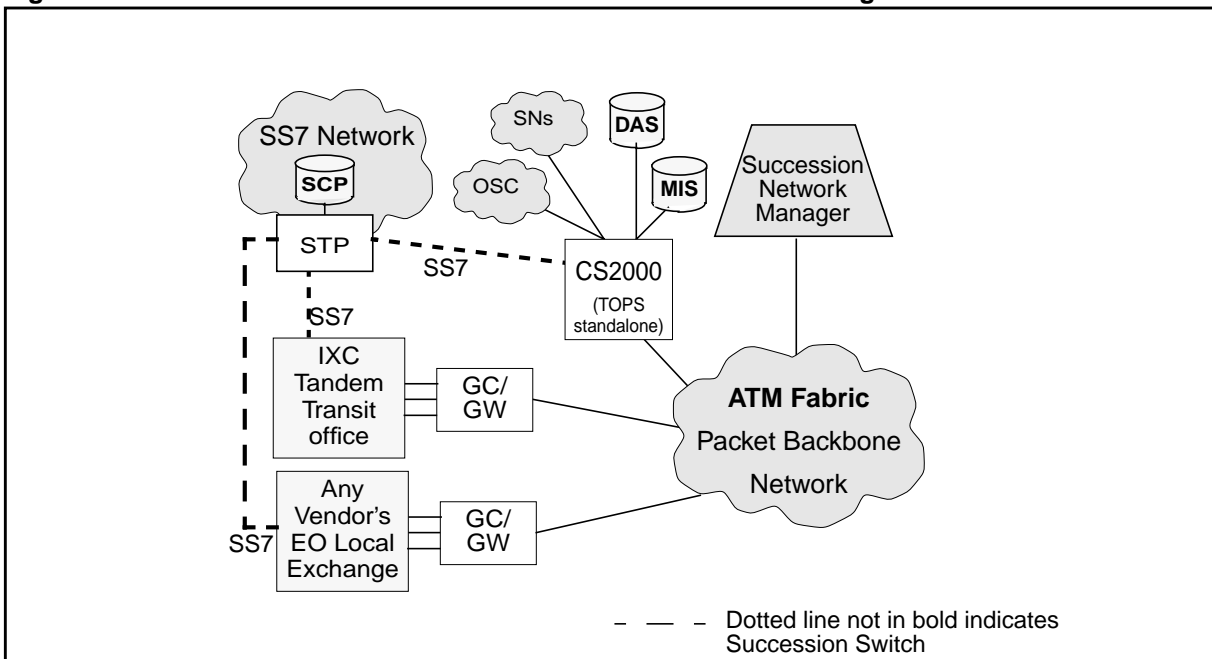
Nortel Networks is providing the SNM to provide integrated OAM.

4.2.2 TOPS in a single communication server VToA architecture

When TOPS is introduced into the single communication server VToA architecture, it can be configured in the following ways:

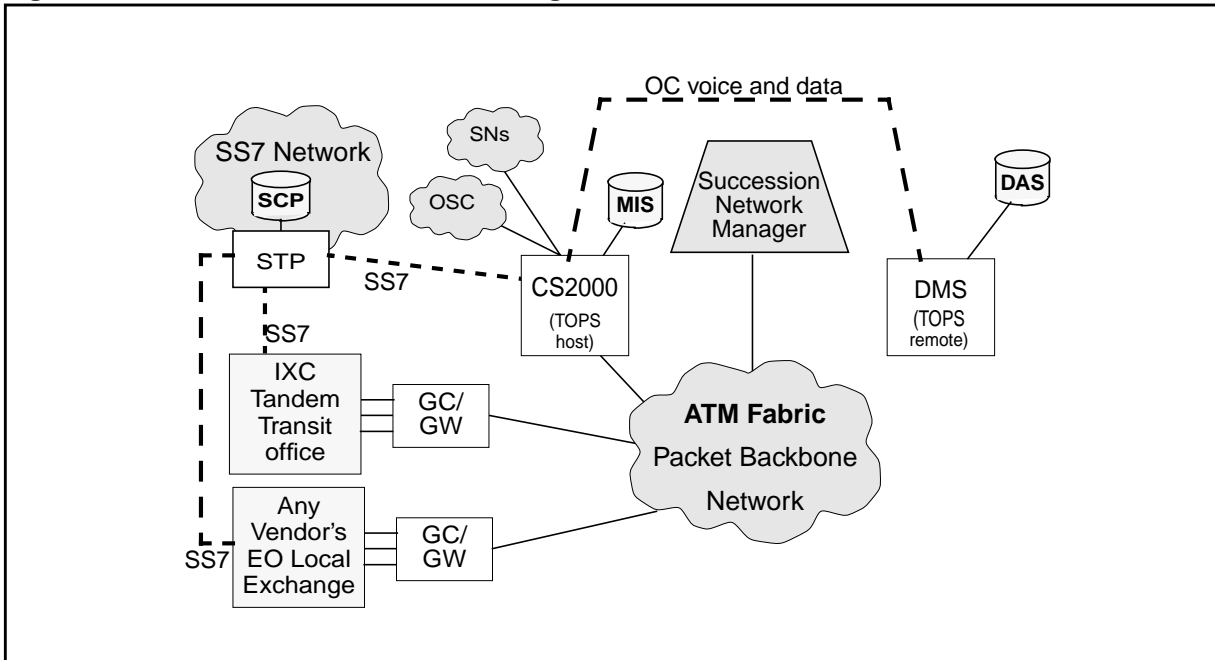
- a communication server with a standalone TOPS configuration serving operator traffic from a single node

Figure 3 One communication server with a standalone TOPS configuration



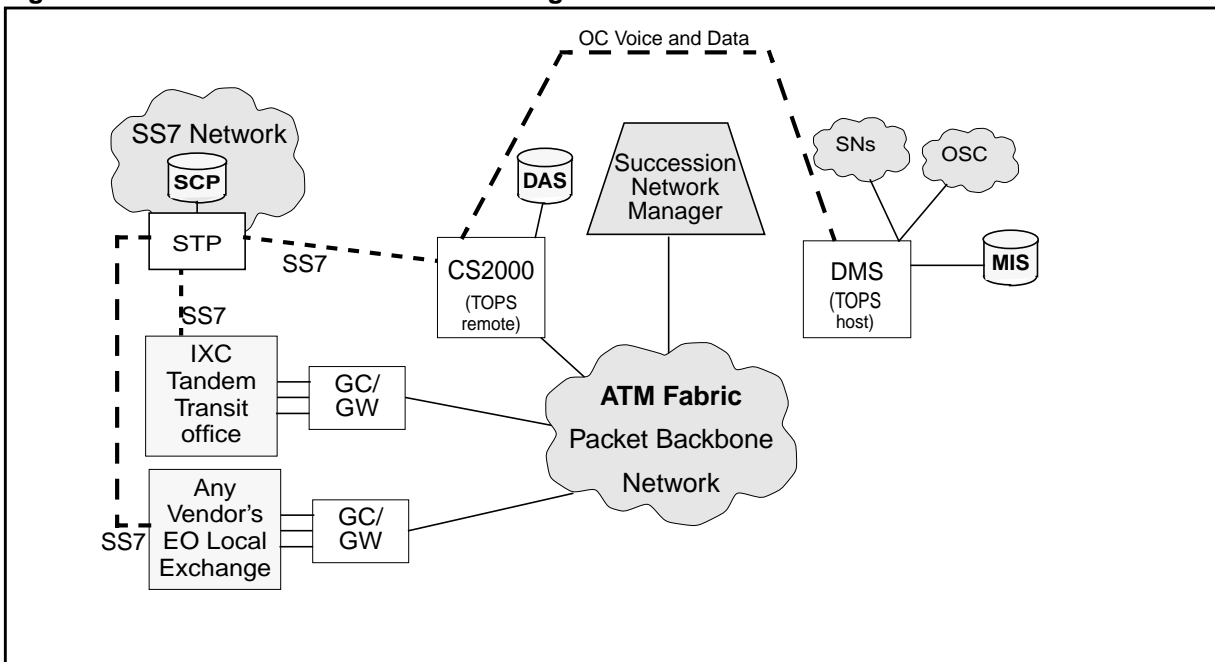
- one (or more) DMS's with a remote TOPS configuration and one (or more) CS2000's with a host TOPS configuration using traditional ETMS OC links over TDM to connect the TOPS host and remotes

Figure 4 Traditional ETMS OC TOPS configuration- host



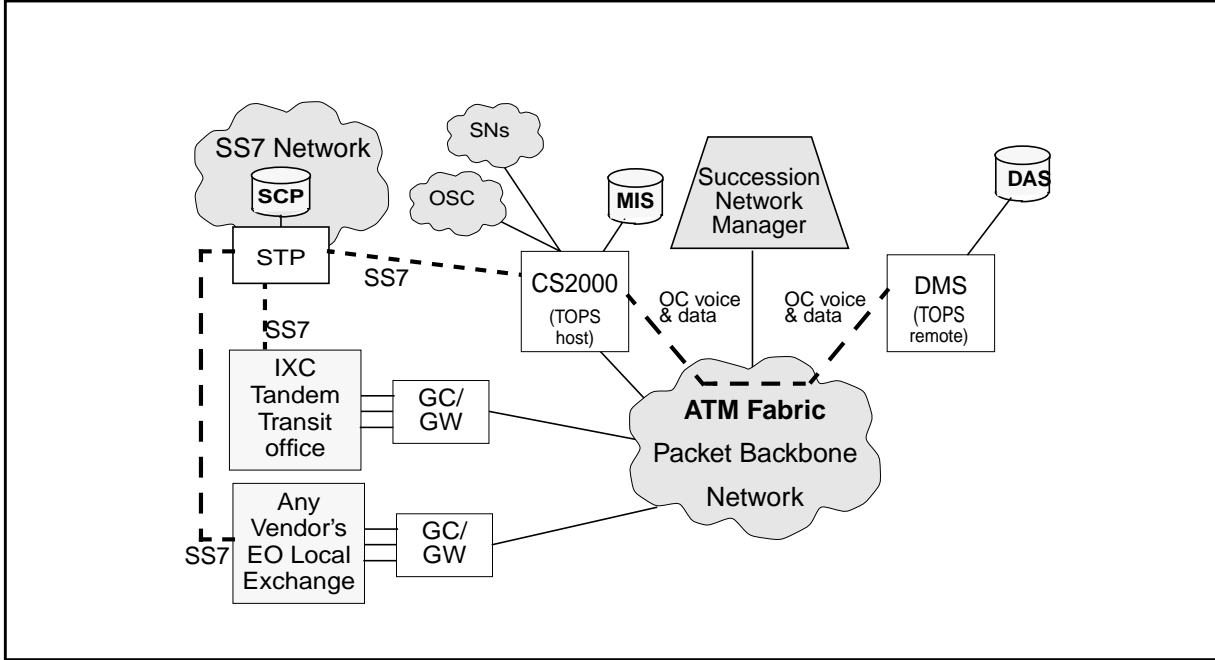
- one (or more) DMS's with a host TOPS configuration and one (or more) CS2000's with a remote TOPS configuration using traditional ETMS OC links over TDM to connect the TOPS host and remotes.

Figure 5 Traditional ETMS OC TOPS configuration- remote



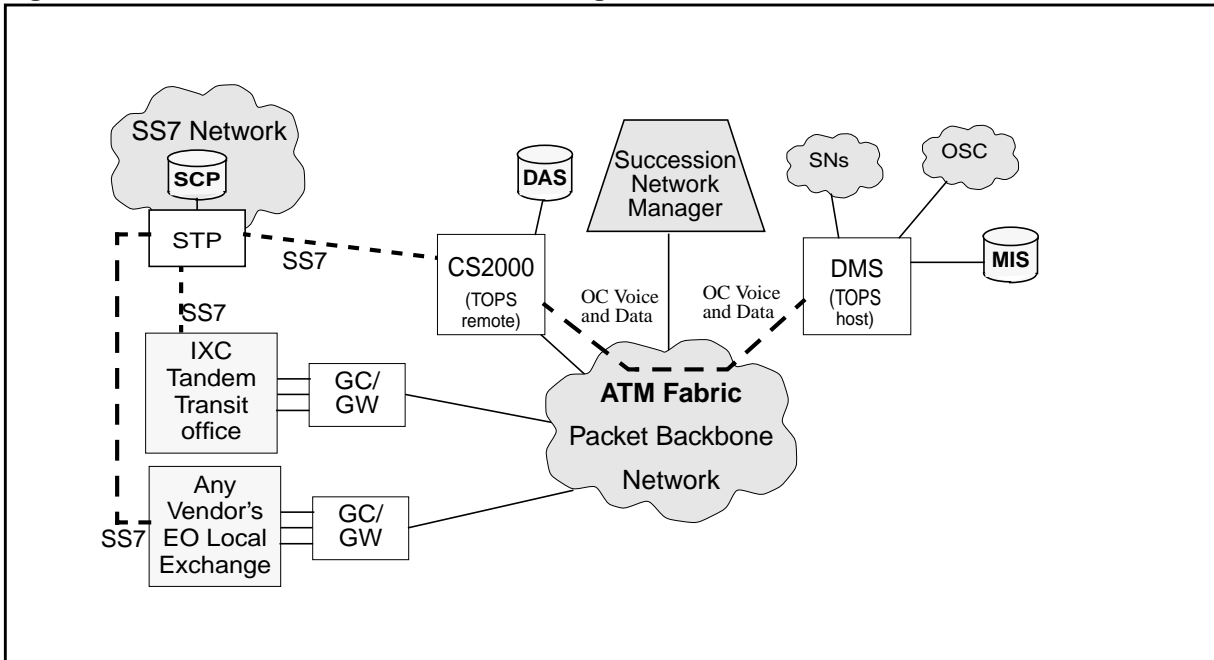
- one (or more) DMS's with a host TOPS configuration and one (or more) CS2000 with a remote TOPS configuration using OC IP data links over ATM to connect the TOPS host and remotes.

Figure 6 TOPS Succession OC IP TOPS configuration- host



- one (or more) CS2000 with a host TOPS configuration and one (or more) DMS's with a remote TOPS configuration using OC IP data links over ATM to connect the TOPS host and remotes.

Figure 7 TOPS Succession OC IP TOPS configuration- remote



4.2.3 Trunk Connectivity

MF-

In VToA release 1, only ISUP trunks are supported on the MG4000. Due to the large number of MF trunks still in service in the telephone companies, support for MF (a.k.a., Per-Trunk Signaling (PTS)) trunks has been added to VToA release 2. Please refer to activity 59018215 - PTS Succession for setup and datafill of MF trunks supported on MG4000's.

Because MF trunks are being supported on the MG4000 in release 2, this activity supports TOPS, IT, and ATC trunks. The following table details these operator services trunk agents that are supported in VToA release 2.

Table 1 Operator services trunk agents supported in VToA release 2

Environment	Direction	Trunk Group Type	Signaling Type
North American ^a	incoming	TOPS	<ul style="list-style-type: none"> • eaoss (mf) • comfgd (mf) • eafgd (mf) • oss (mf) • bell (mf)
		IT, ATC	<ul style="list-style-type: none"> • tops isup (AN1515) (ss7) • osnc (ss7)
	outgoing	IT, ATC	<ul style="list-style-type: none"> • tops isup (AN1515) (ss7) • osnc (ss7)

a. The non-North American environment is not being supported in VToA release 2 for TOPS.

As seen in the table above, the only supported direction for the TOPS trunk group type is incoming. This means that TOPS trunks cannot be used in a 2-way configuration when the trunks are hosted on an MG4000. Also, only a limited set of MF signaling types are supported on TOPS trunk group types hosted on an MG4000. Telephone companies that require either 2-way TOPS trunk group types or other MF signaling types on TOPS trunk group types should host these trunk groups on DTCs (or similar peripherals).

ISUP-

This activity supports ISUP (IT and ATC) trunks connecting over MG4000’s through the ATM network using ISUP (TOPS ISUP/AN1515/OSNC) signalling instead of using traditional DTCs. This activity also supports OSNC over MG4000’s. Refer to 59012548 OSNC Call Originations. BICC uses ISUP technology. For more information as to how TOPS and BICC interwork please refer to activity 59017620 TOPS and BICC Interworking.

While ISUP is supported, GOSS7 (ANSI and ETSI) ISUP are not supported by this activity.

For more information about setup and datafill for ISUP trunks please refer to NTP 297-5071-021 Succession Network VToA Application Release 1.

4.2.3.1 Hardware architecture

This activity does not intend to change the hardware connectivity of the existing operator services components. These components will continue to be

connected through the TDM Core. The following table associates operator services components that are external to the DMS with the hardware components in the Succession Communication Server¹ used to connect them.

Table 2 Operator Services external components to Succession Communication Server Hardware Mapping

Operator Services External Component	Succession Communication Server Hardware Component
Operator Positions (Voice link)	ETMS, DTC (7X07AA) or DTC
Operator Positions (Data link)	ETMS, DTC
Service Node (Voice link)	DTC
Service Node (Data link)	LPP (EIU (IP))
DA Call Control (Data link)	IOC (EMPC (X.25)), DTC
DA ARUs (Voice link)	DTC, DTC (7X07AA (IP))
OC (Voice link)	ETMS, DTC or DTC (7X07AA (IP))
OC (Data link)	ETMS or DTC (SX05 (IP))
QMS MIS (Data link)	IOC (EMPC (X.25)) or DTC
Service Node MIS (Data link)	LPP (EIU (IP))
OLNS (Data link)	LPP ((TCAP))
LIDB (Data link)	LPP ((TCAP))
LNP (Data link)	LPP ((TCAP))
External Rater (Data link)	LPP ((TCAP))
Service Node OSAC (Data link)	LPP (EIU (IP))
Service Node OSAC (Voice link)	(P)DTC
Devices (Data link)	MTM, DTC or LPP (EIU (IP))
PARS (Data link)	IOC (EMPC (X.25))

Operator services also makes use of other components internal to the DMS when processing calls. The following table provides a list of these internal components and the hardware on which they are generally located.

Table 3 Operator Services internal components to Succession Communication Server Hardware Mapping

Operator Services Internal Components	Succession Communication Server Hardware Component
EDRAM	MTM

¹This reflects the CS2000 Succession communication server.

Table 3 Operator Services internal components to Succession Communication Server Hardware Mapping

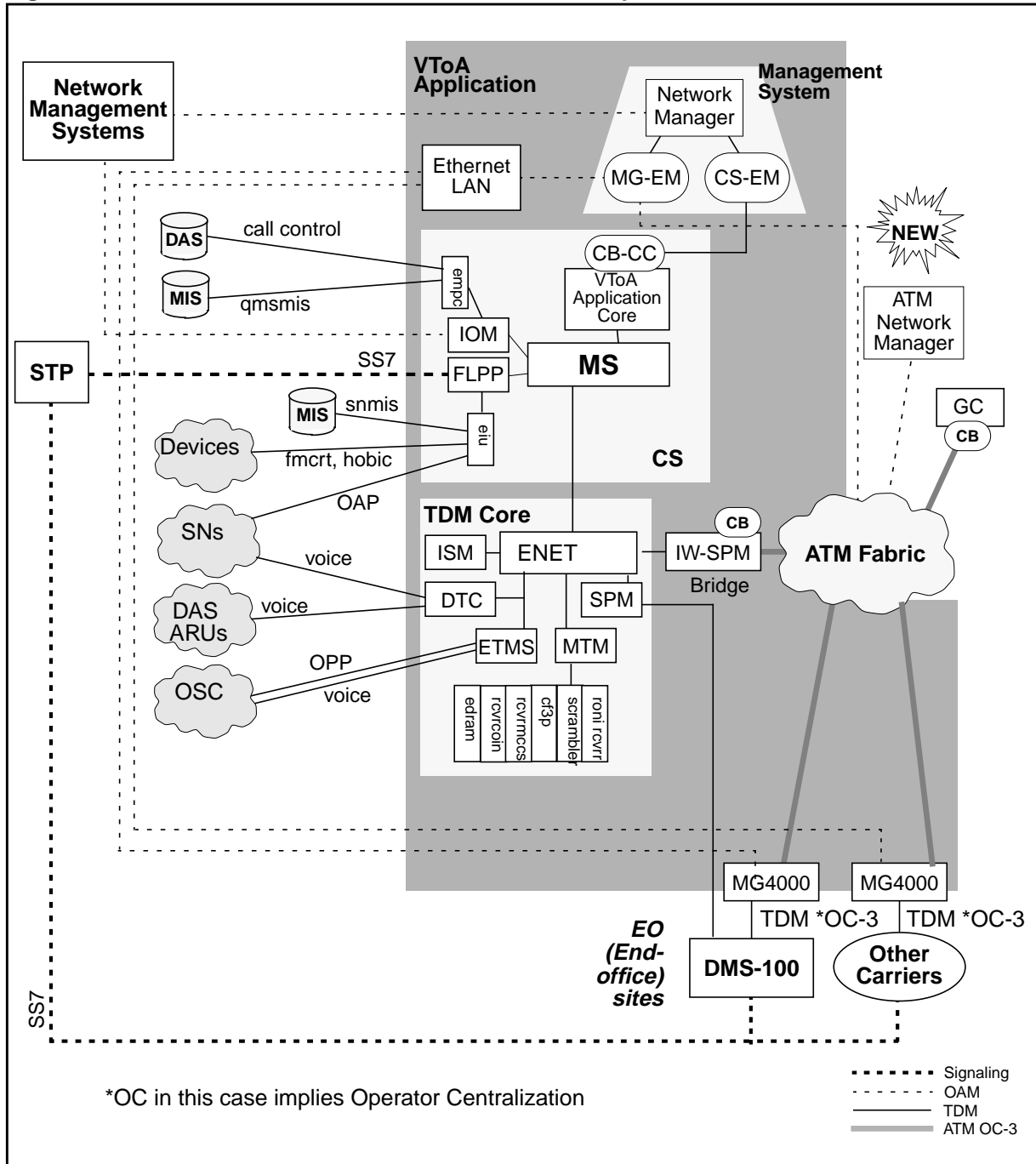
Operator Services Internal Components	Succession Communication Server Hardware Component
RCVRCOIN	MTM
RCVRMCCS	TM or MTM
CF3P	MTM
DMODEM	MTM
STR (STR171C card)	DTC
RCVR	TM or MTM
Scrambler (2X88AA card)	TM or MTM
RONI Receiver (2X81AA card)	TM or MTM

From a hardware architecture perspective there are five different views:

- VToA architecture with stand-alone operator services
- VToA architecture with remote operator services using traditional ETMS OC TOPS configuration
- VToA architecture with host operator services using traditional ETMS OC TOPS configuration
- VToA hardware architecture with remote operator services using TOPS Succession OC IP configuration
- VToA hardware architecture with host operator services using TOPS Succession OC IP configuration

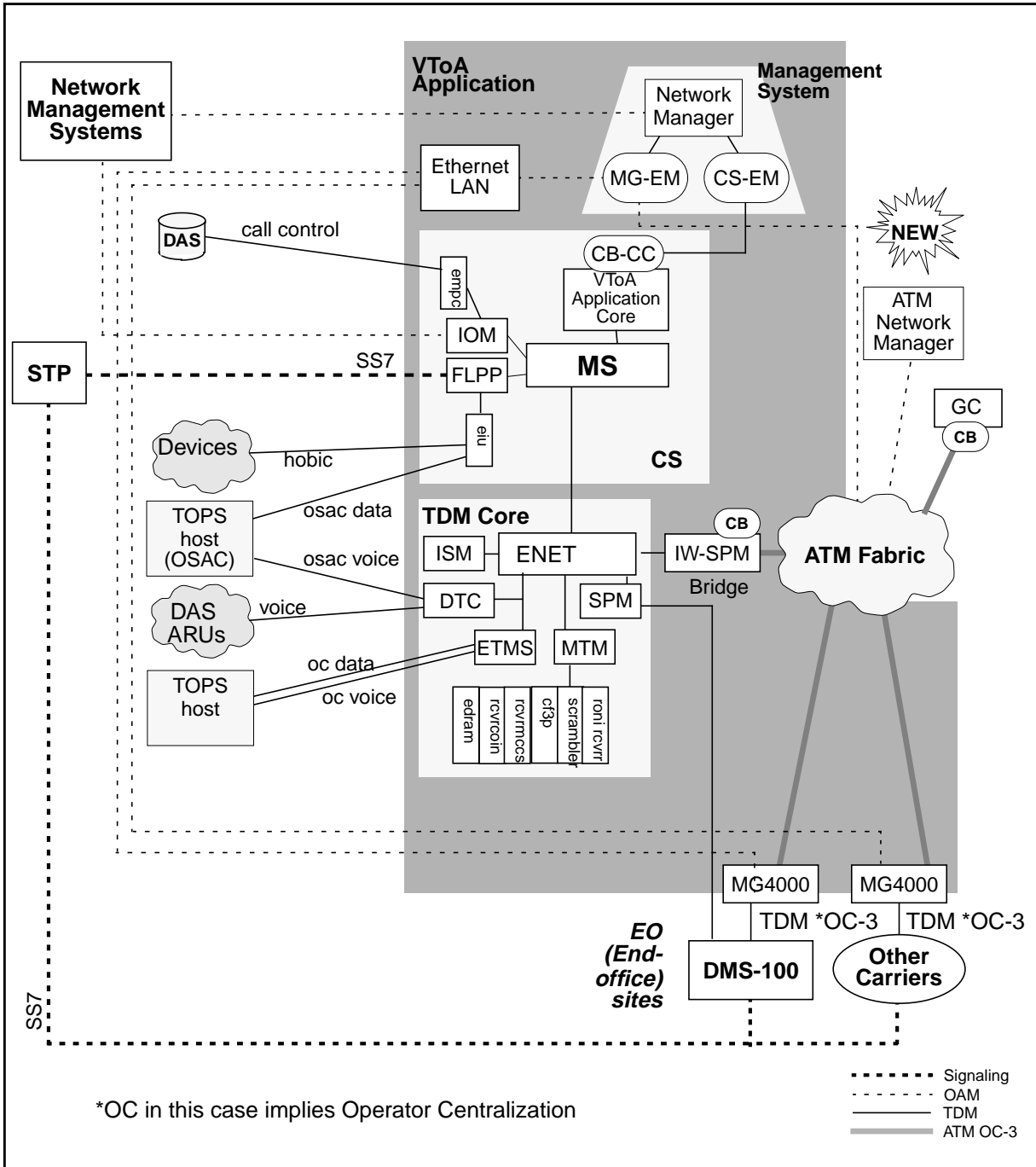
The following figures illustrate these hardware architectures. The following figures are just a few samples of possible hardware configurations.

Figure 8 VToA hardware architecture with stand-alone operator services



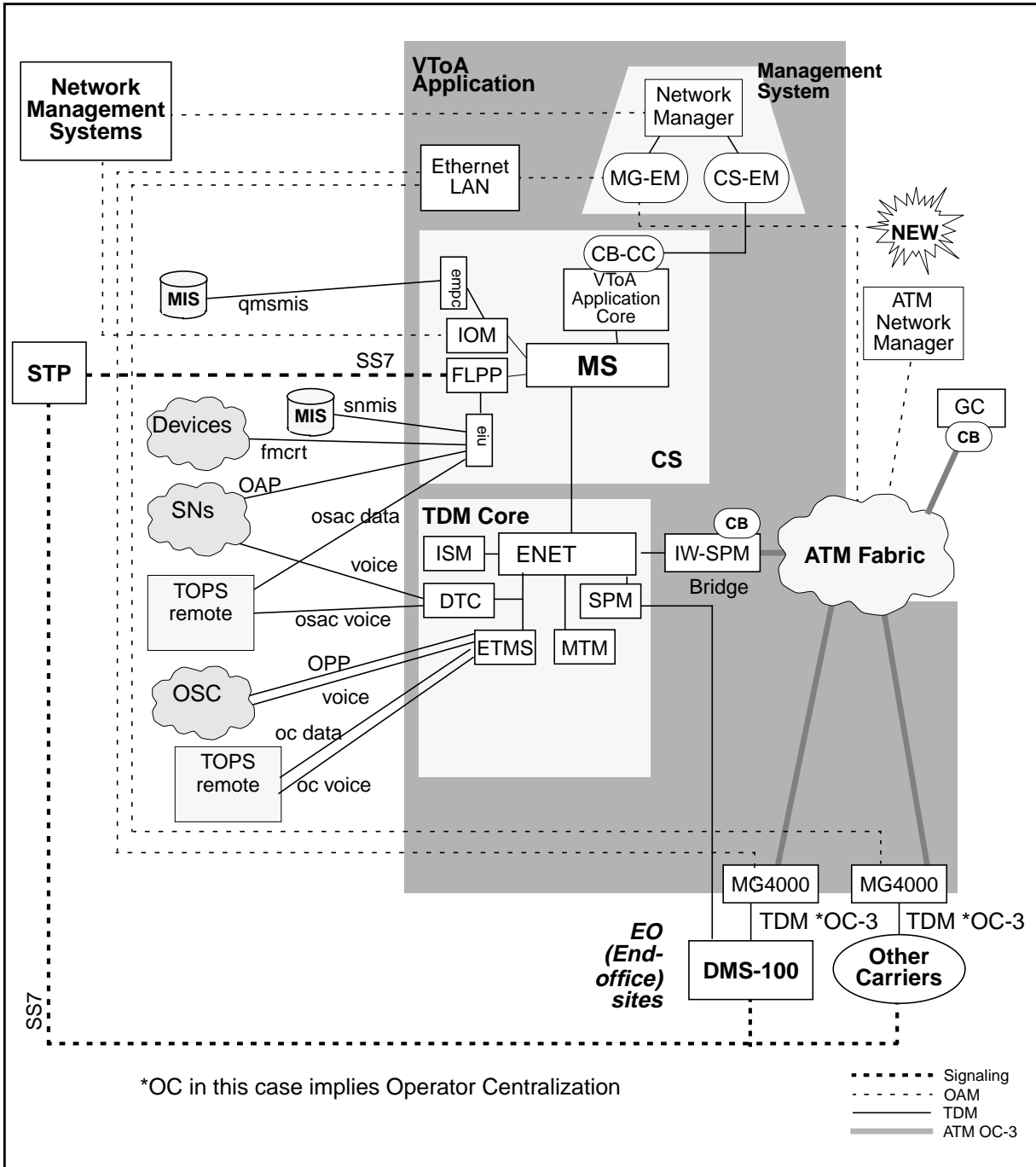
In the stand-alone operator services configuration, all of the external components (with the exception of the OC voicelink, OC datalink, OSAC voicelink and OSAC datalink) and all of the internal components are represented in this architecture.

Figure 9 VToA hardware architecture with remote operator services using traditional ETMS OC TOPS configuration.



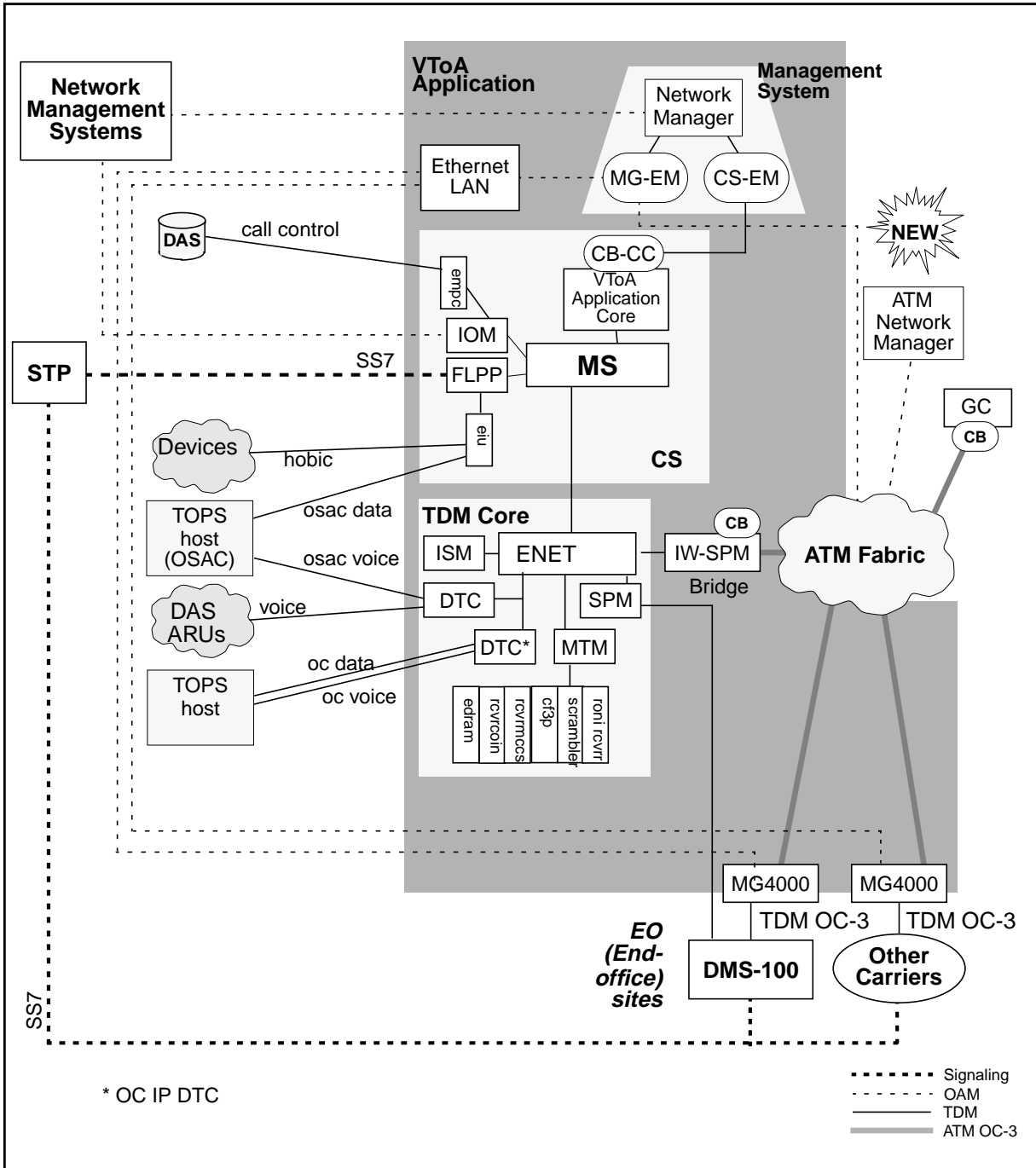
In the remote operator services configuration, the operator position links are replaced with OC voicelinks and OC datalinks that connect to a TOPS host switch. Also, the service node links are replaced by OSAC voicelinks and OSAC datalinks that connect to a TOPS host as well. All of the internal components are still accessed in the remote.

Figure 10 VToA hardware architecture with host operator services using traditional ETMS OC TOPS configuration.



In the host operator services configuration, both the operator position links and the service node links exist along with the OC and OSAC links to the various TOPS remote switches. Directory assistance links are not present (they are accessed only in the TOPS remote). Also, the internal components are accessed only in the TOPS remote, so they are not present.

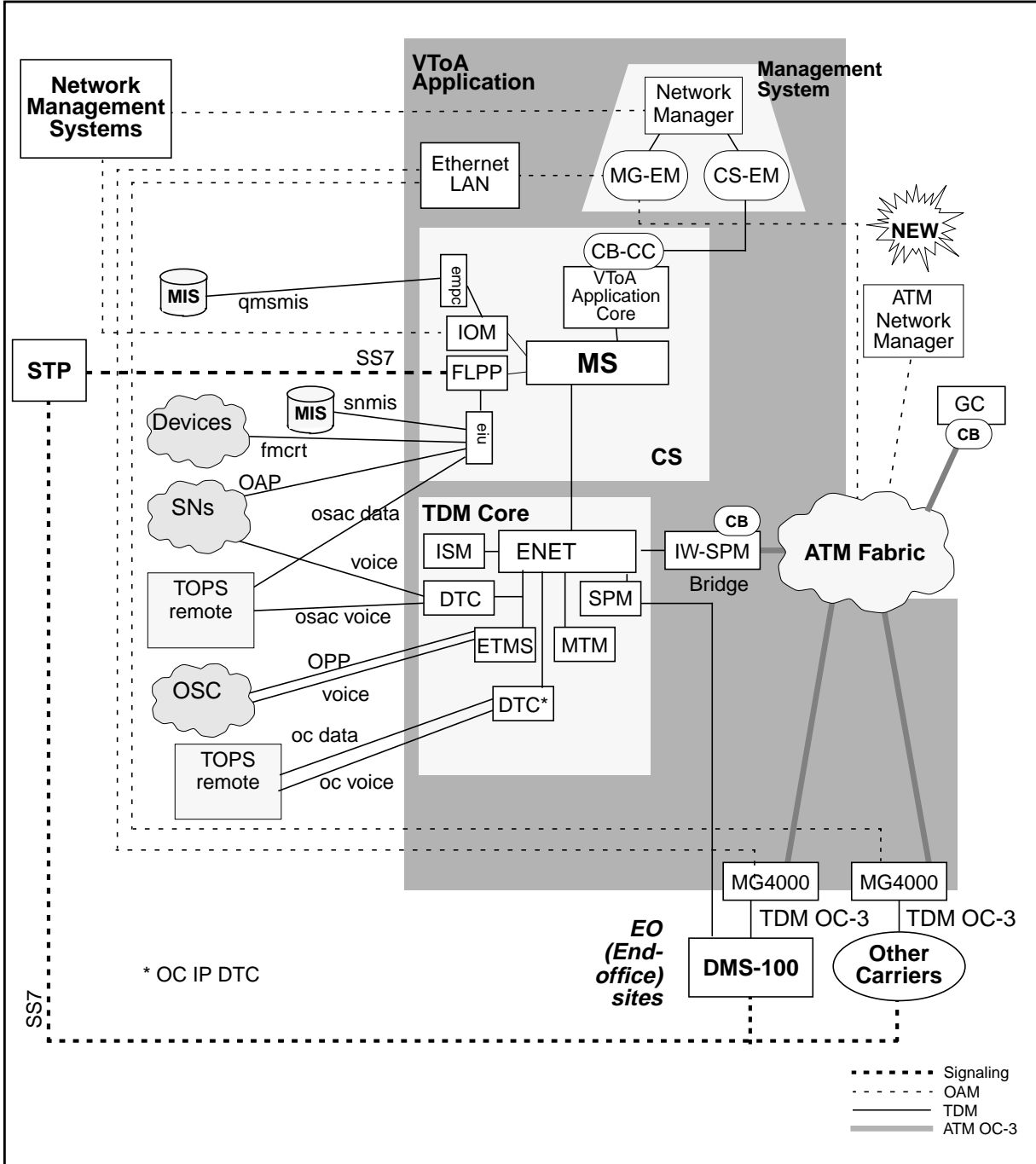
Figure 11 VToA hardware architecture with remote operator services using TOPS Succession OC IP configuration.



In the remote operator services configuration, the operator position links are replaced with OC voicelinks and OC datalinks that connect to a TOPS host switch. Also, the service node links are replaced by OSAC voicelinks and OSAC datalinks that connect to a TOPS host as well. All of the internal

components are still accessed in the remote. The ETMS is replaced with an OC IP DTC.

Figure 12 VToA hardware architecture with host operator services using TOPS Succession OC IP configuration.



In the host operator services configuration, both the operator position links and the service node links exist along with the OC and OSAC links to the various

TOPS remote switches. Directory assistance links are not present (they are accessed only in the TOPS remote). Also, the internal components are accessed only the TOPS remote, so they are not present. The OC voice and data links use the OC IP DTC instead of the ETMS.

4.2.4 Call Walk-throughs

This section provides some example call walk-throughs to illustrate how operator services calls utilize the single communication server VToA architectures. The following call examples are:

- 0+ call completion with alternate billing standalone TOPS Succession call
- 1+ directory assistance standalone TOPS Succession call
- 0+ call completion with alternate billing using traditional ETMS OC TOPS configuration- host
- 0+ call completion with alternate billing using traditional ETMS OC TOPS configuration- remote
- 1+ directory assistance call using traditional ETMS OC TOPS configuration- host
- 1+ directory assistance call using traditional ETMS OC TOPS configuration- remote
- 0+ call completion with alternate billing using TOPS Succession OC IP configuration- host
- 0+ call completion with alternate billing using TOPS Succession OC IP configuration- remote
- 1+ directory assistance call using TOPS Succession OC IP configuration- host
- 1+ directory assistance call using TOPS Succession OC IP configuration- remote
- Delay Call with standalone TOPS Succession.

The goal of the call flows is to show the messaging that occurs between the nodes in the network as well as the bearer path connections that are established at various points in the call flow. Each node (DMS/CS2000) depicted in the call flows is an independent switch. The following table provides a high level description of the components found in the call flows. Refer to feature 59017620: TOPS and BICC Interworking for more detailed information on multiple Succession VToA switches with TOPS. Note: The following call

flows assume the operator is immediately available. For ease of understanding, queueing has not been added in the following diagrams.

Table 4 Call walk-thru component description

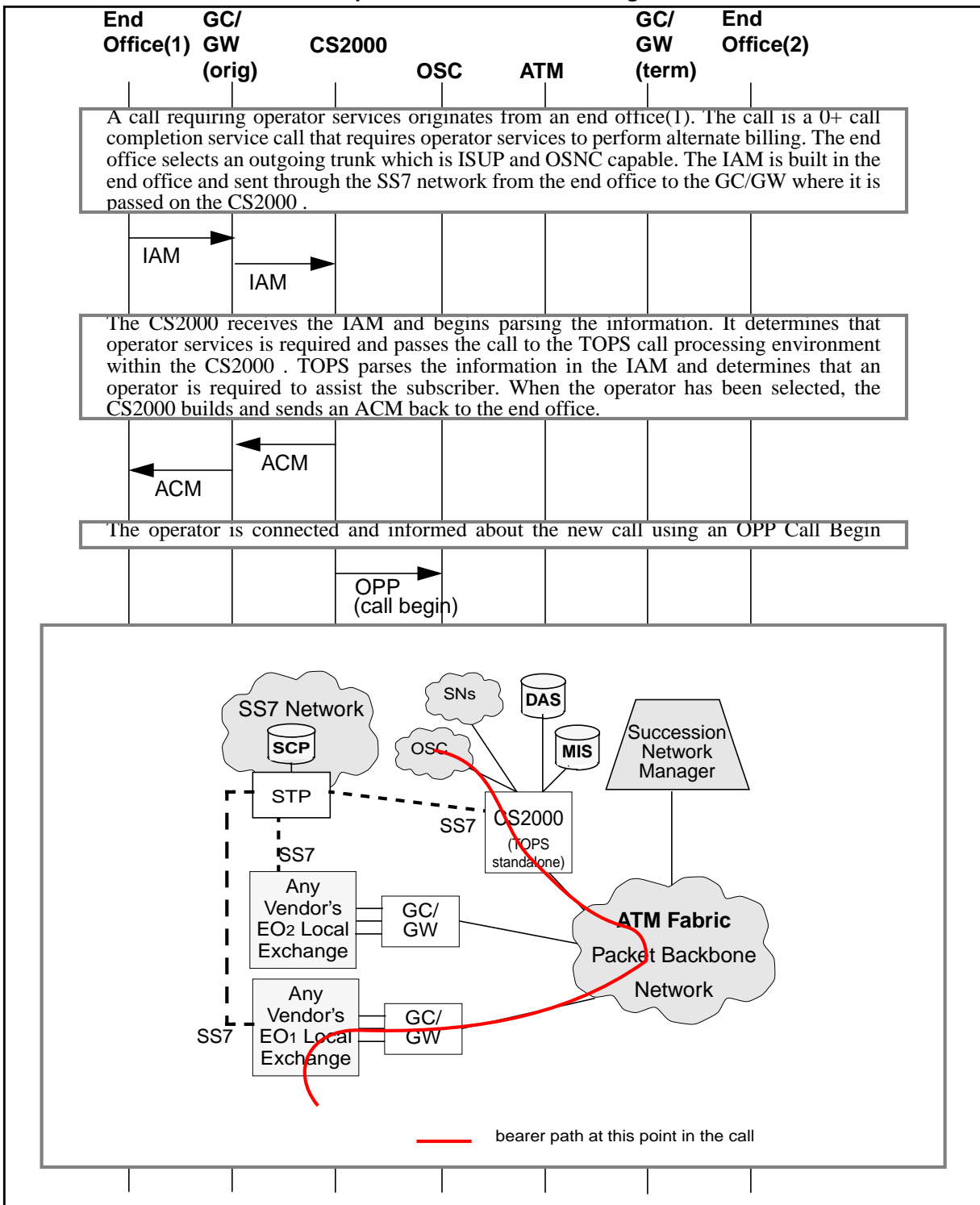
Succession Node^a	Description
XA Core	XA Core. The component within the CS2000 that contains the call processing logic.
Message Switch	Message Switch. The component within the CS2000 that provides message routing between the ENET and the XA Core.
ENET	Enhanced Network. The component within the CS2000 that provides TDM connections to DMS-type peripherals such as DTCs and MTMs.
ETMS	Enhanced TOPS Message Switch. The component within the CS2000 that provides connections to operator positions (both voice and data), connections to other TOPS offices when in an operator centralization environment (both voice and data), and connections to network databases such as Directory Assistance.
IW SPM	Interworking Spectrum Peripheral Module. The component within the CS2000 that provides connection bridges between the ATM switch and the ENET. When a call requires a bearer path connection between agents located on each network, a IW SPM is needed.
ATM Switch	ATM Switch. The component within the ATM network fabric that provides and manages ATM network ports.
GC/GW	<p>Gateway Controller/Gateway. The component within the CS2000 that provides agent connectivity over the ATM fabric. The call processing for the agents located here is provided by the CS2000's associated XA Core.</p> <p>NOTE: In all of the call walk-thrus, the BICC usage of GC/GWs is shown in an unoptimized configuration. This means that the BICC agent is 'hosted' on a different GC/GW than the other agent in the office. An optimized configuration would mean that the BICC agent could be located on the same GC/GW as the other agent and therefore minimize the number of ATM ports needed. Refer to feature 59017620: TOPS and BICC Interworking, specifically, the BICC and DPT features listed in "2.2.3 BICC" for more information on optimized vs. unoptimized configurations.</p>
OSC	Operator Services Center. A grouping of operator positions that handle calls. The operator positions are any Open Position Protocol (OPP) compatible positions that are available.

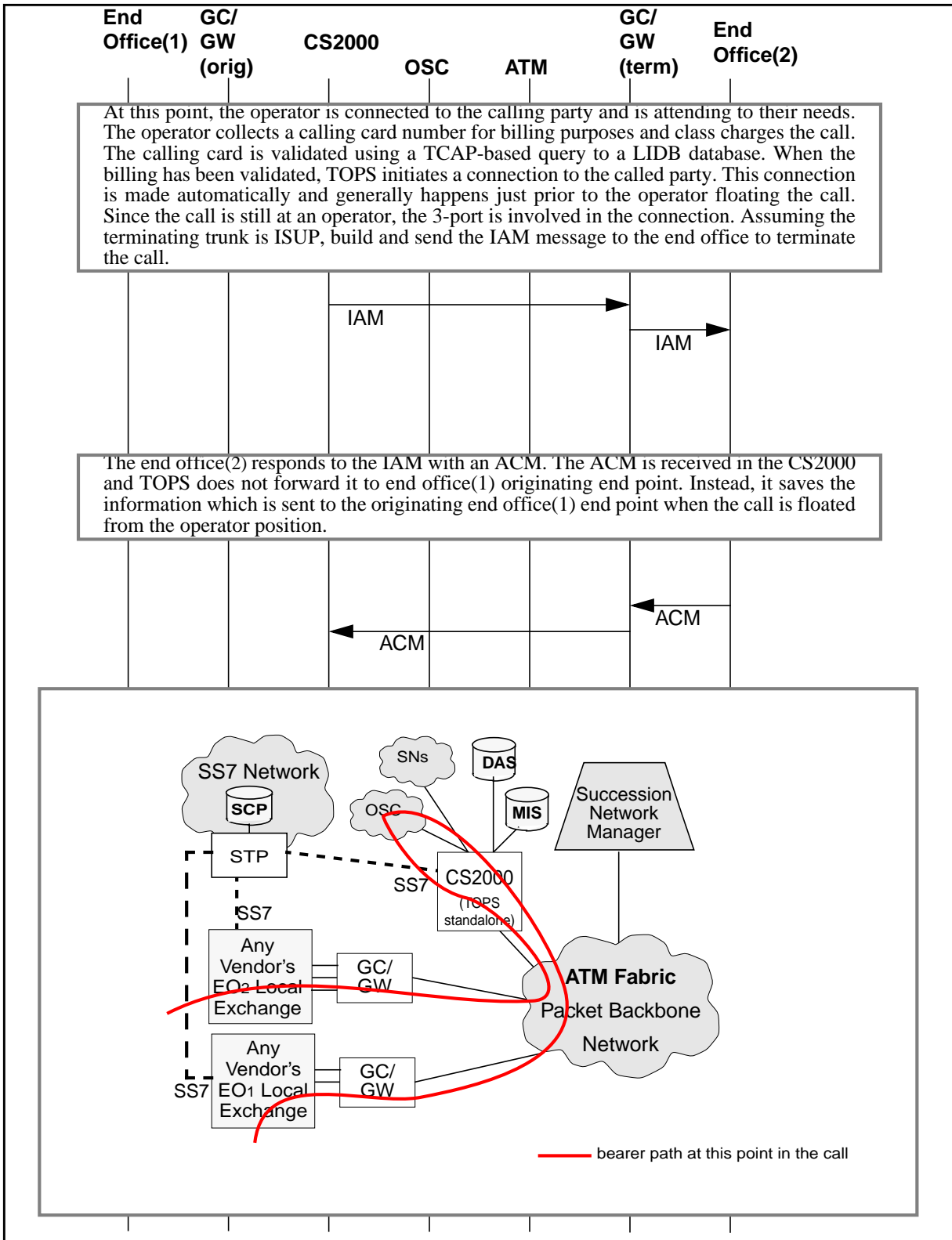
Table 4 Call walk-thru component description

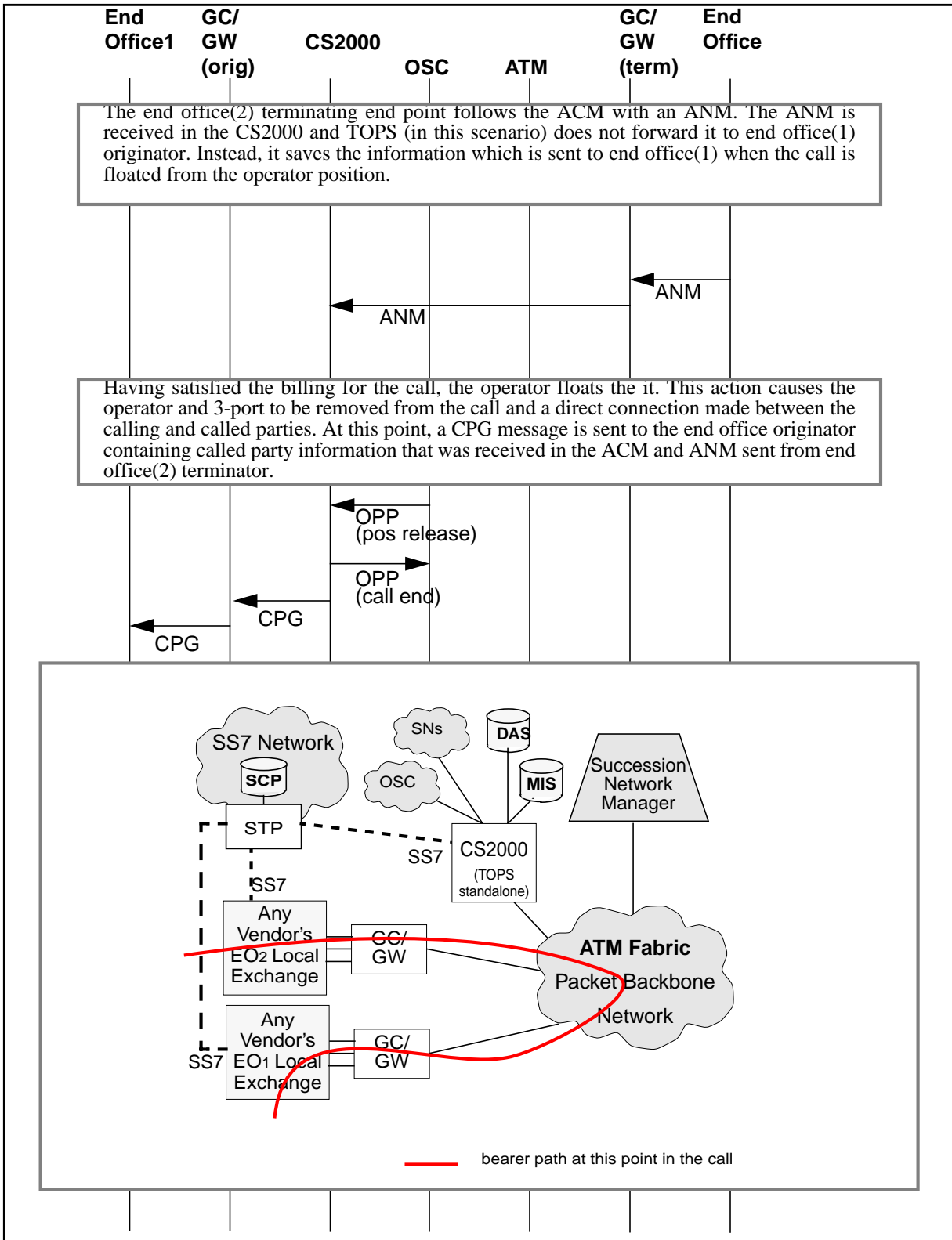
Succession Node^a	Description
EO	End Office. An independent switch that hosts mostly line agents. Access from the end office to the services provided on the CS2000 is through the GC/GW.
DTC	Digit Trunk Carrier. The component within the CS2000 that provides TDM trunk connectivity (including directory assistance Audio Recording Units (ARUs) and IP voice and data connectivity between TOPS offices in an operator centralization configuration.
CS2000	Succession Communication Server 2000. The component that provides call processing, services and connectivity using ATM and TDM fabrics. It contains the following nodes: <ul style="list-style-type: none"> • XA Core • Message Switch • ENET • ETMS • IW SPM • GC/GW • DTC • MTM
MTM	Maintenance Trunk Module. The component within the CS2000 that provides TDM trunk connectivity and service circuits (including 3-port conference circuits, DRAMs, busy line verification scrambler circuits, etc.).
RTR	Router. The component used to concentrate and route operator centralization traffic between an OC IP TOPS host and an OC IP TOPS remote. The route can convert from IP to ATM allowing the customer to use the ATM network for both VTtoA and OC IP.

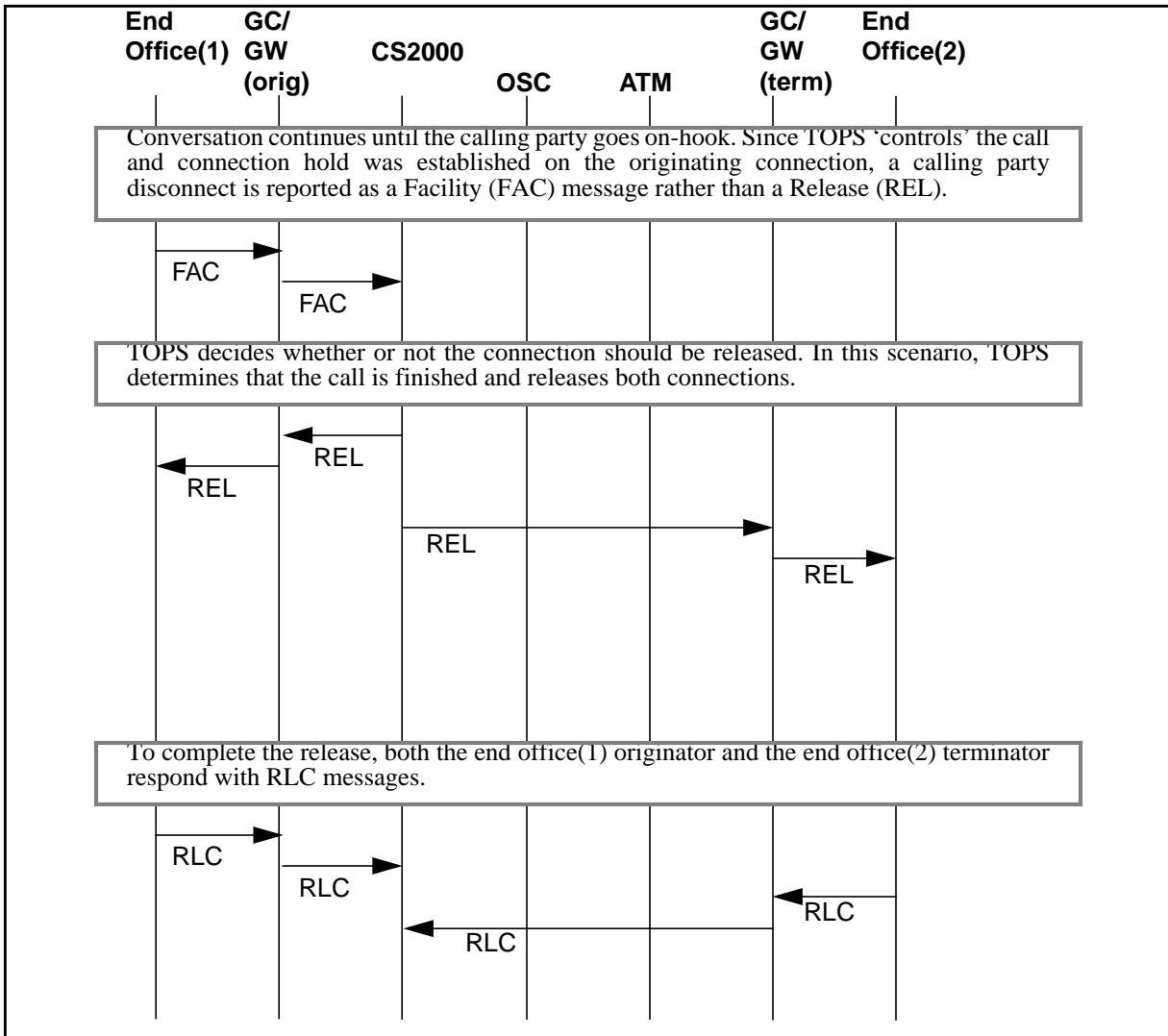
a. NOTE: The list of Succession nodes listed here is not a complete list, but are just the items needed to illustrate the operator services call flows.

4.2.4.1 0+ call completion with alternate billing standalone TOPS Succession

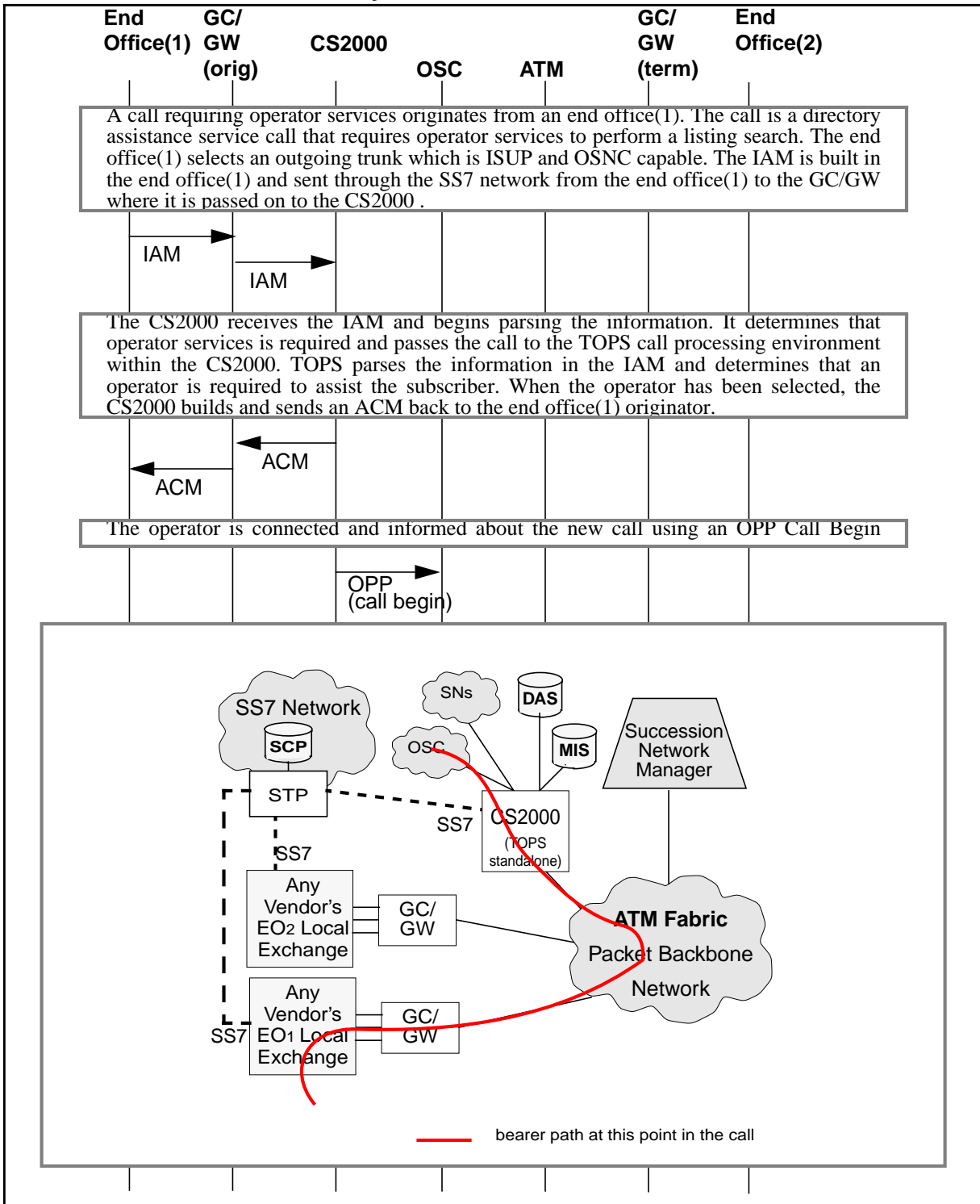


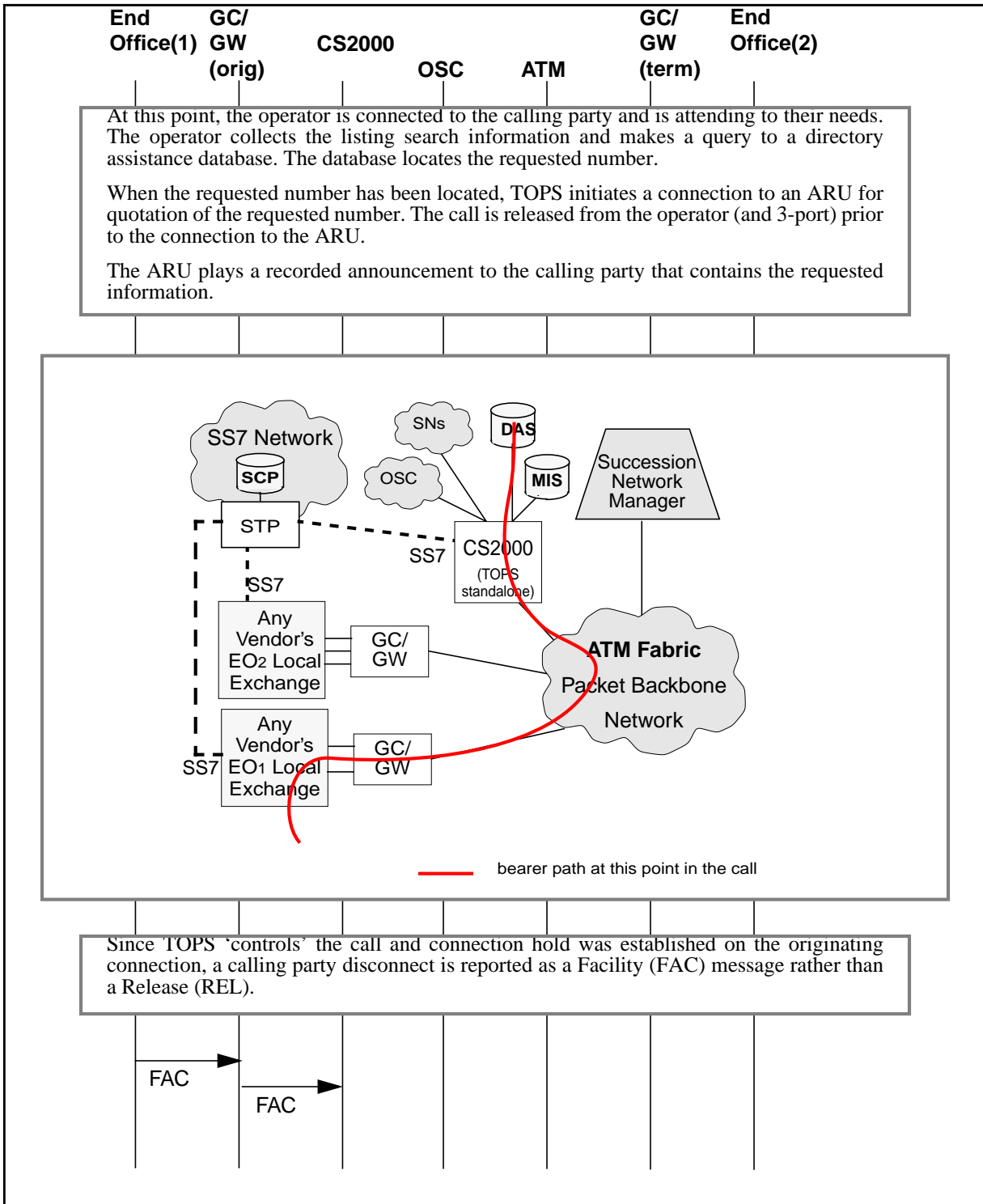


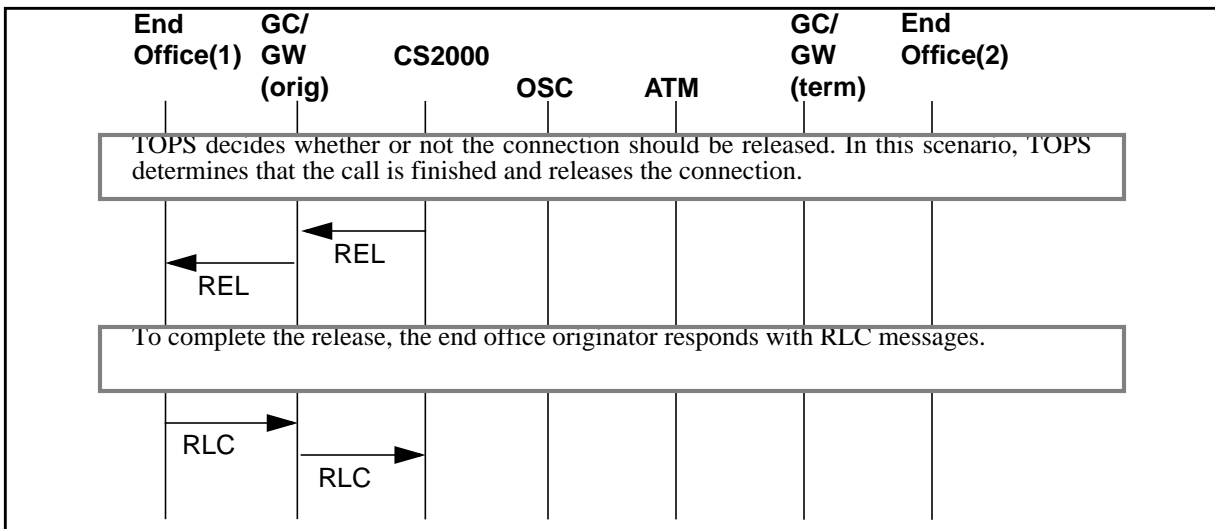




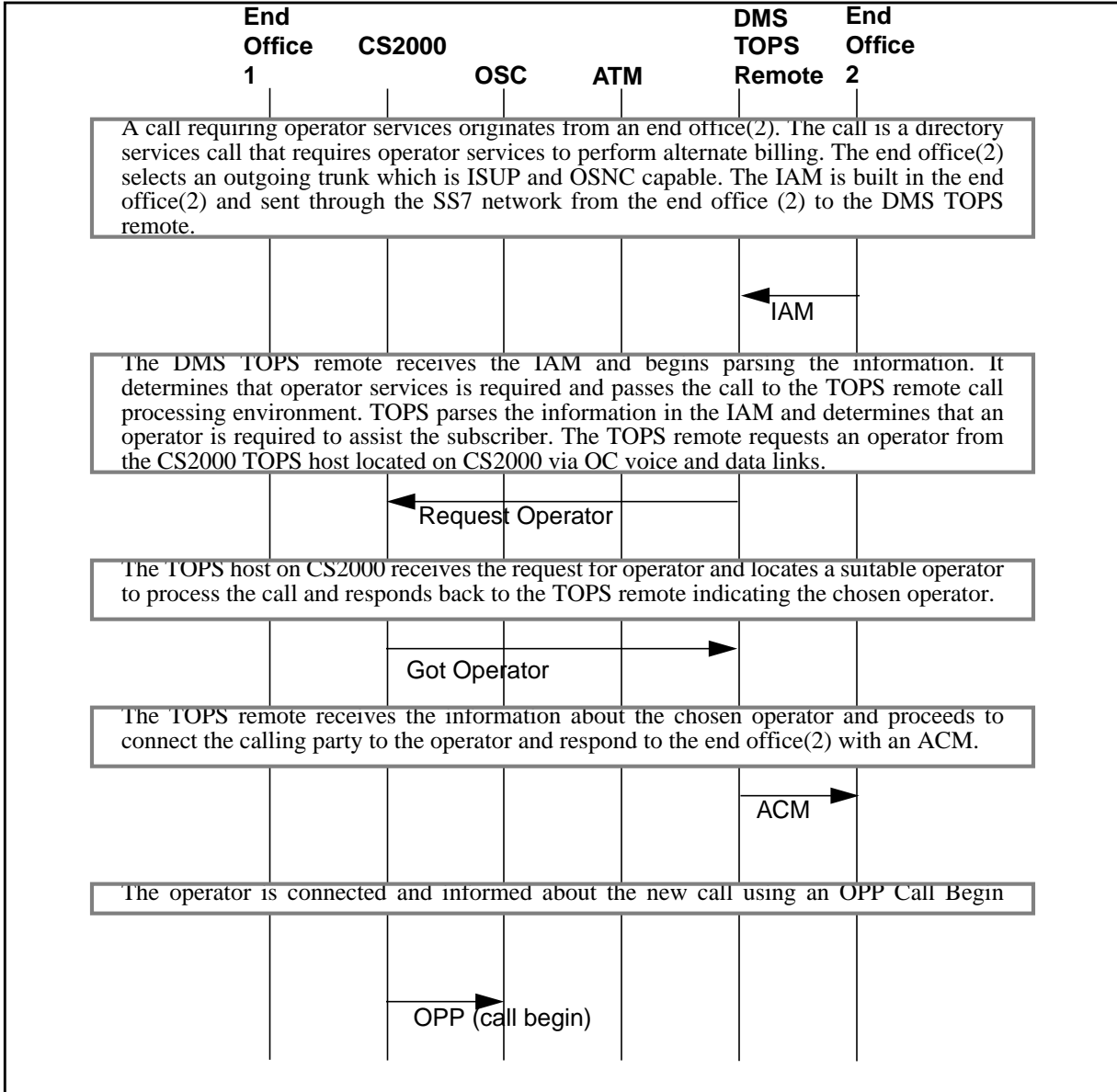
4.2.4.2 1+ directory assistance standalone TOPS Succession call

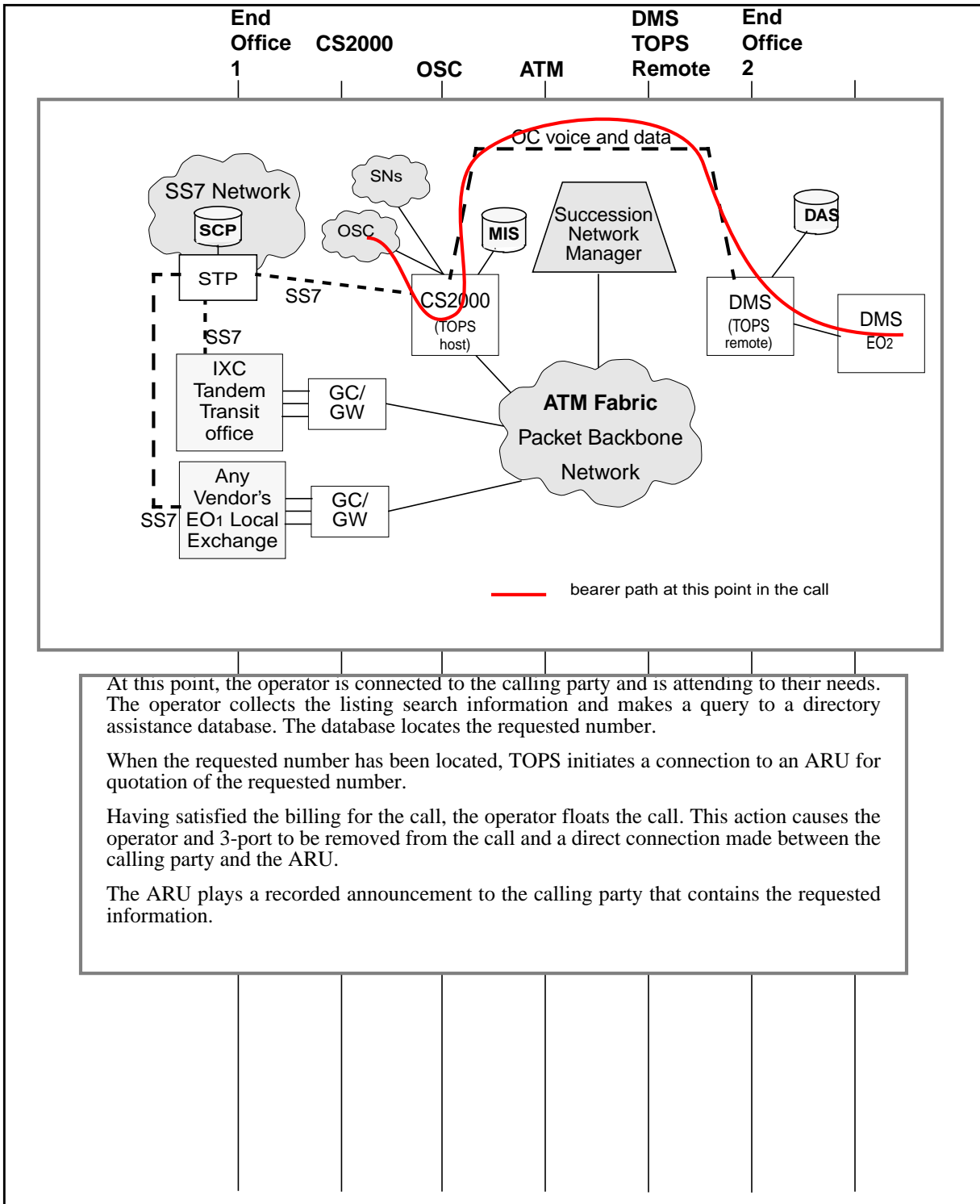


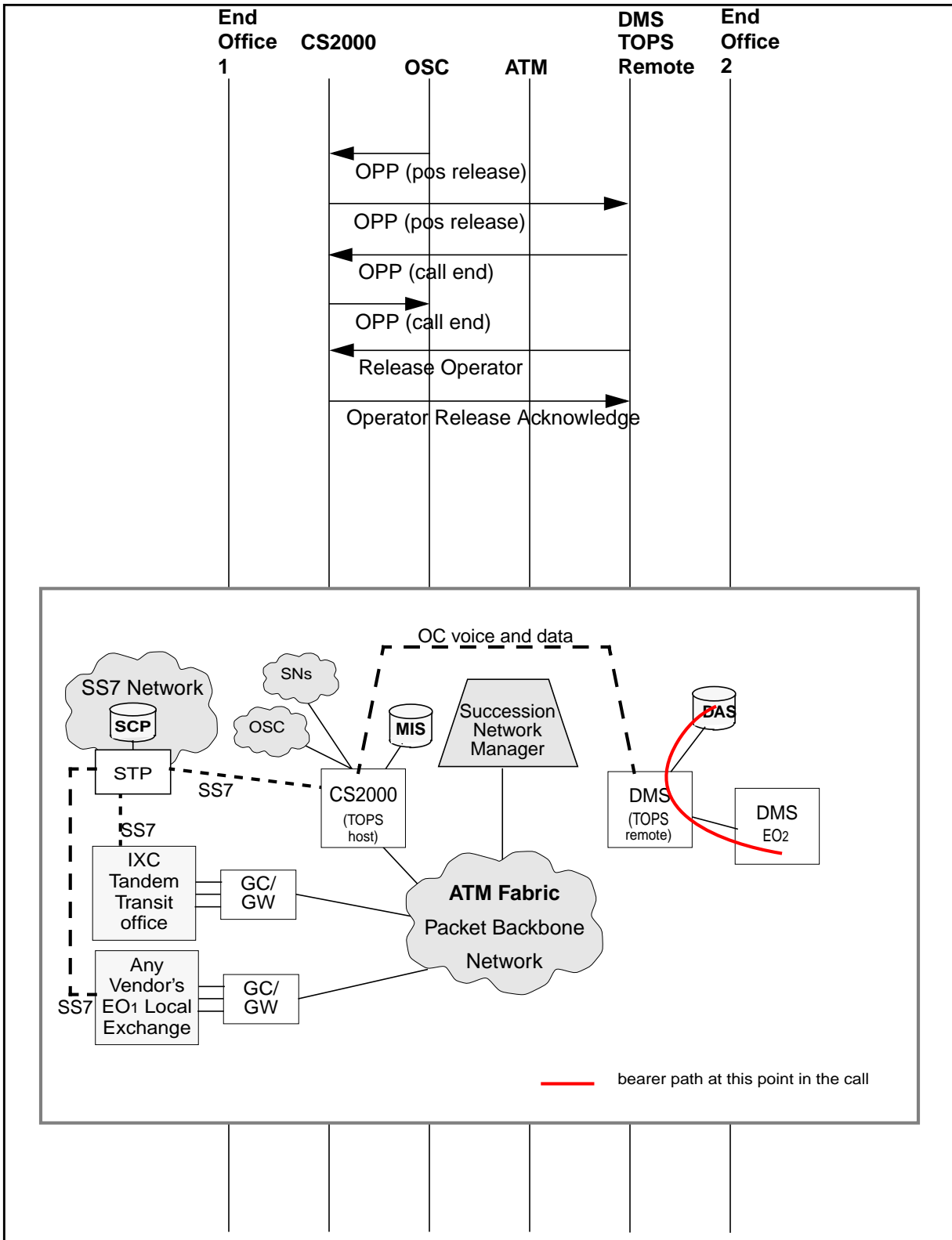


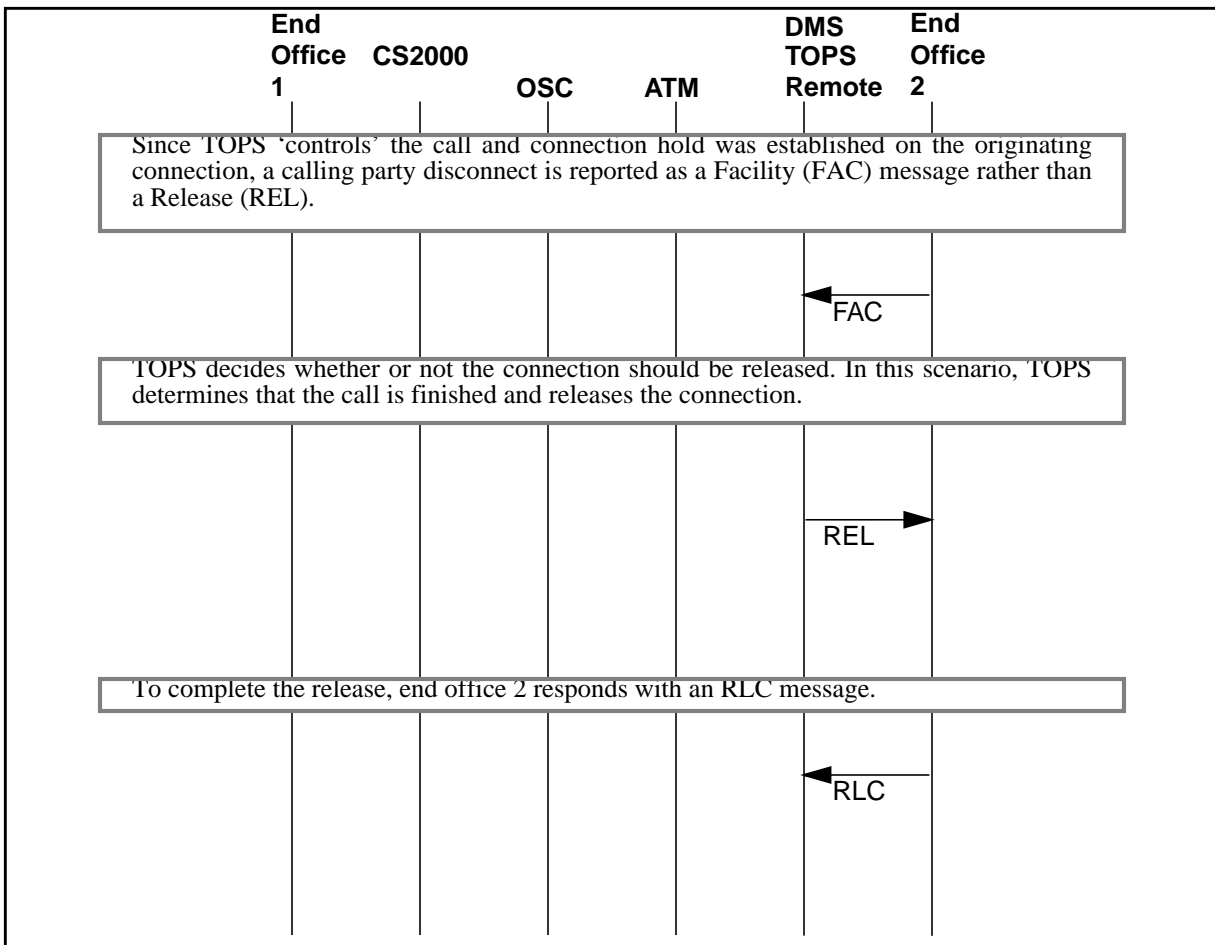


4.2.4.3 1+ directory assistance call using traditional ETMS OC TOPS configuration- host

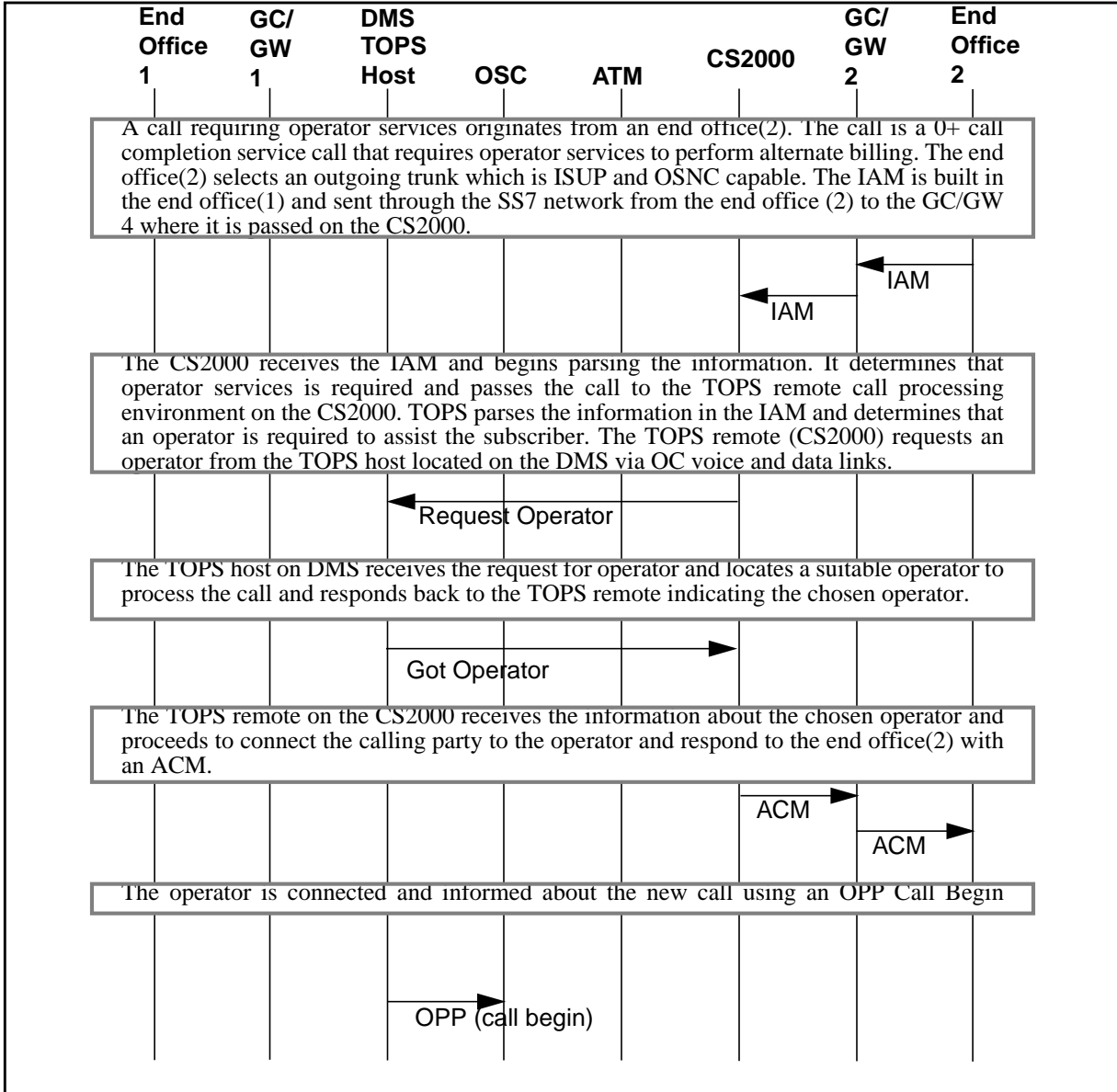


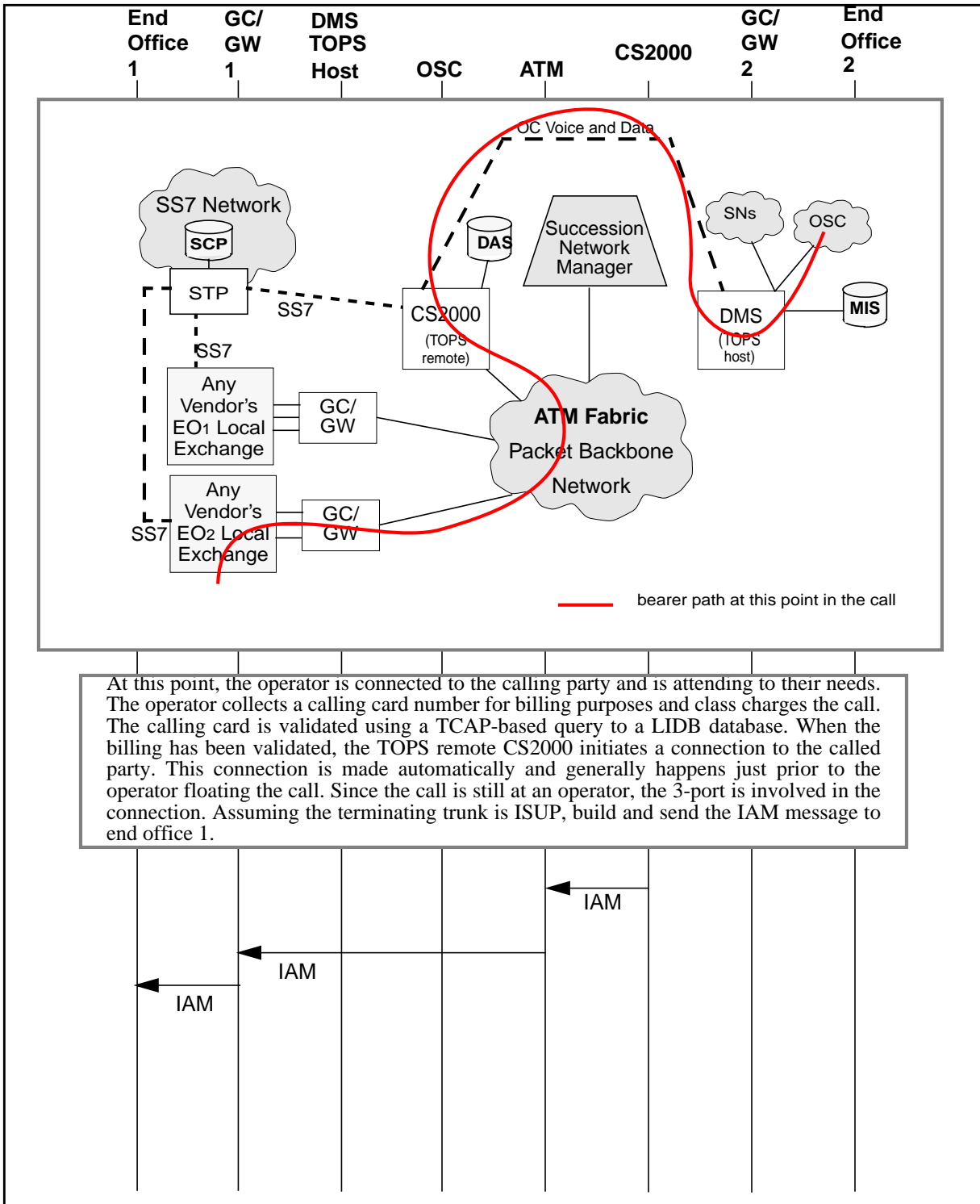


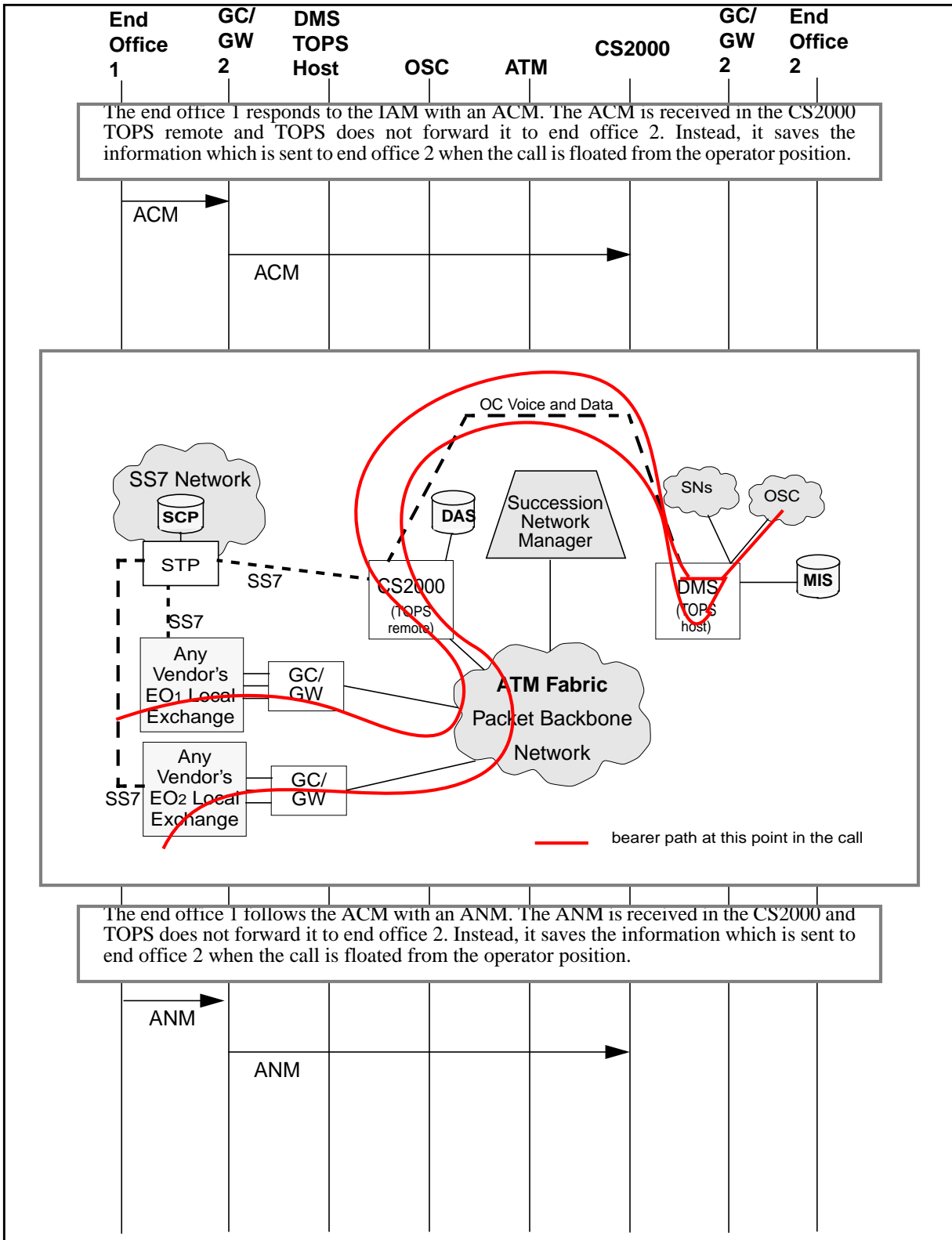


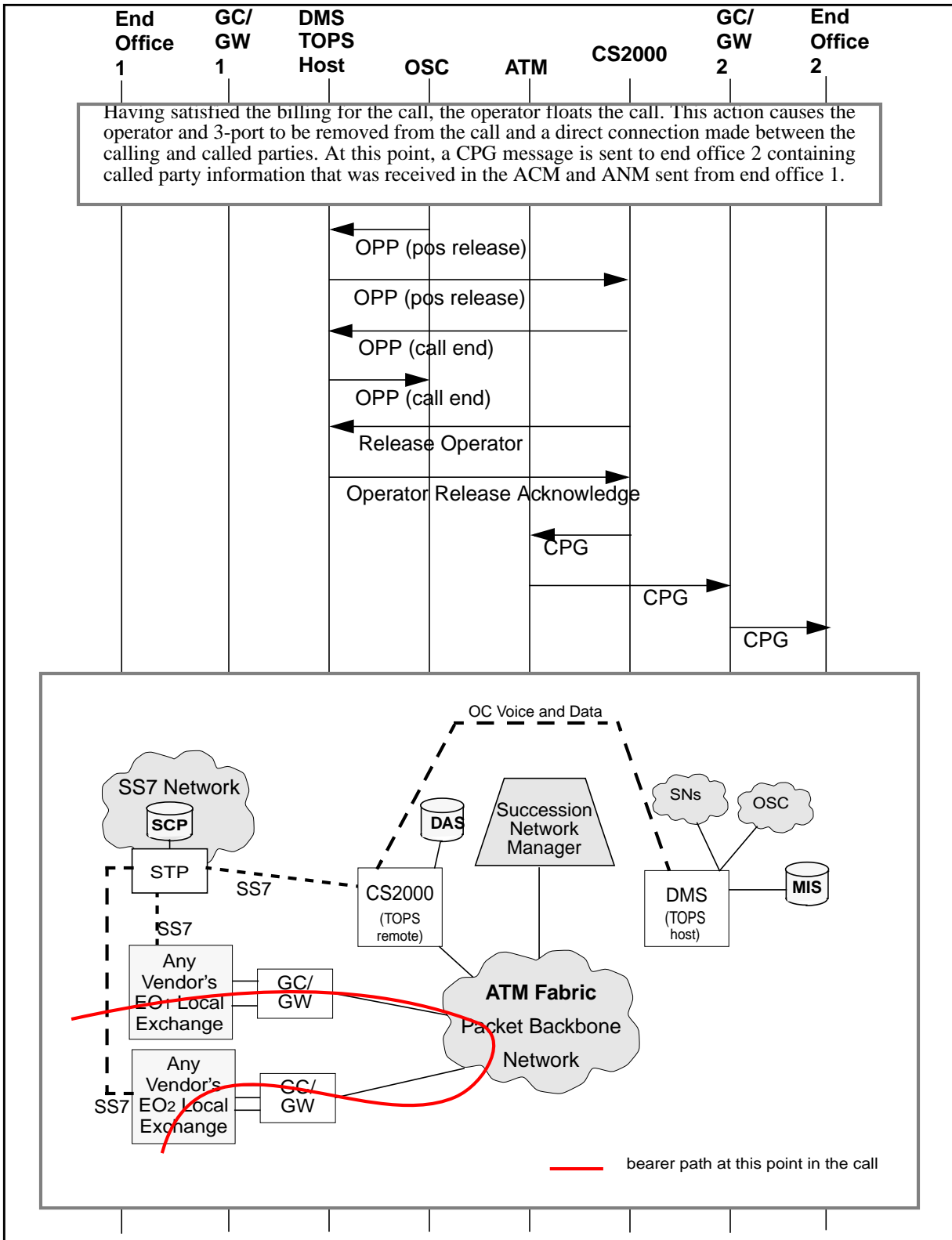


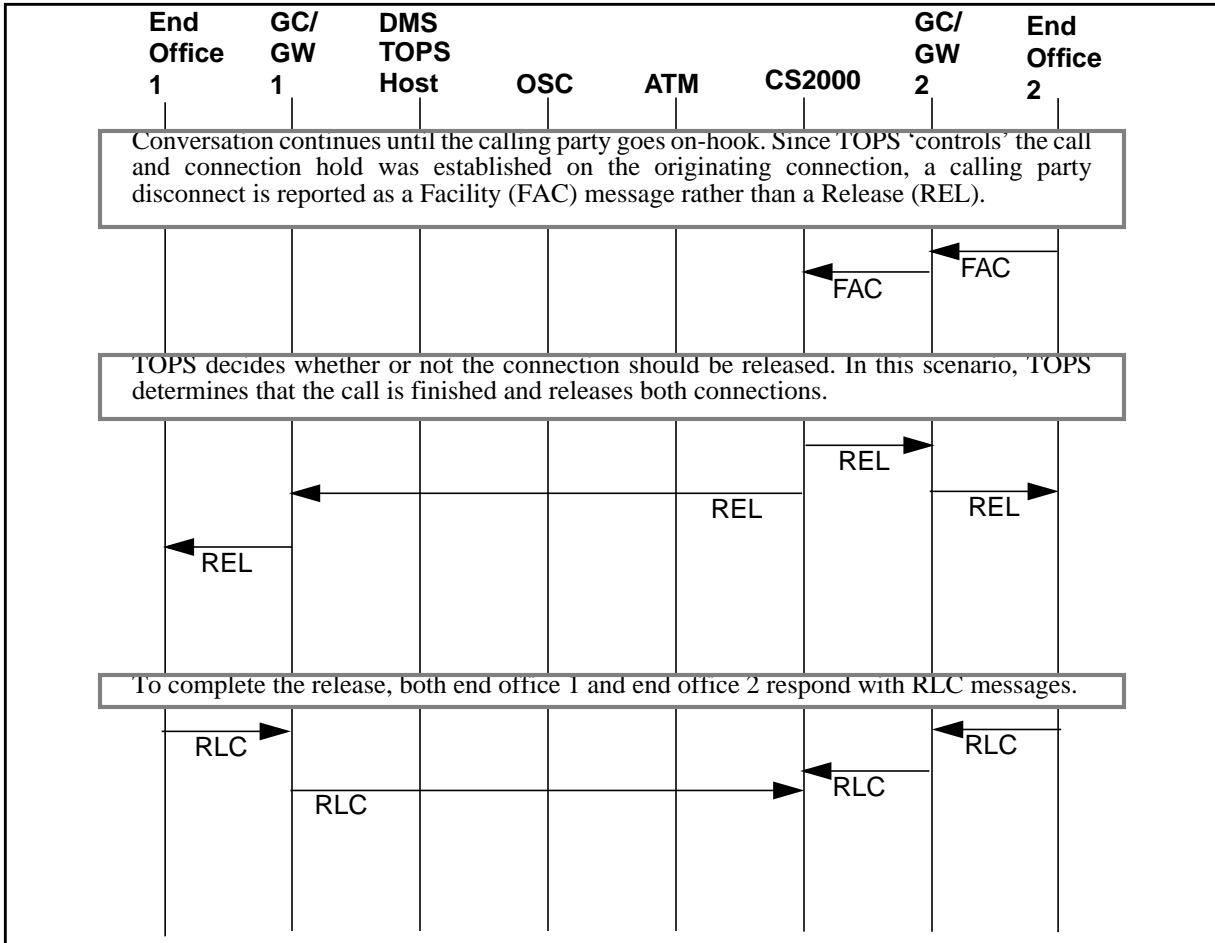
4.2.4.4 0+ call completion with alternate billing using traditional ETMS OC TOPS configuration- remote



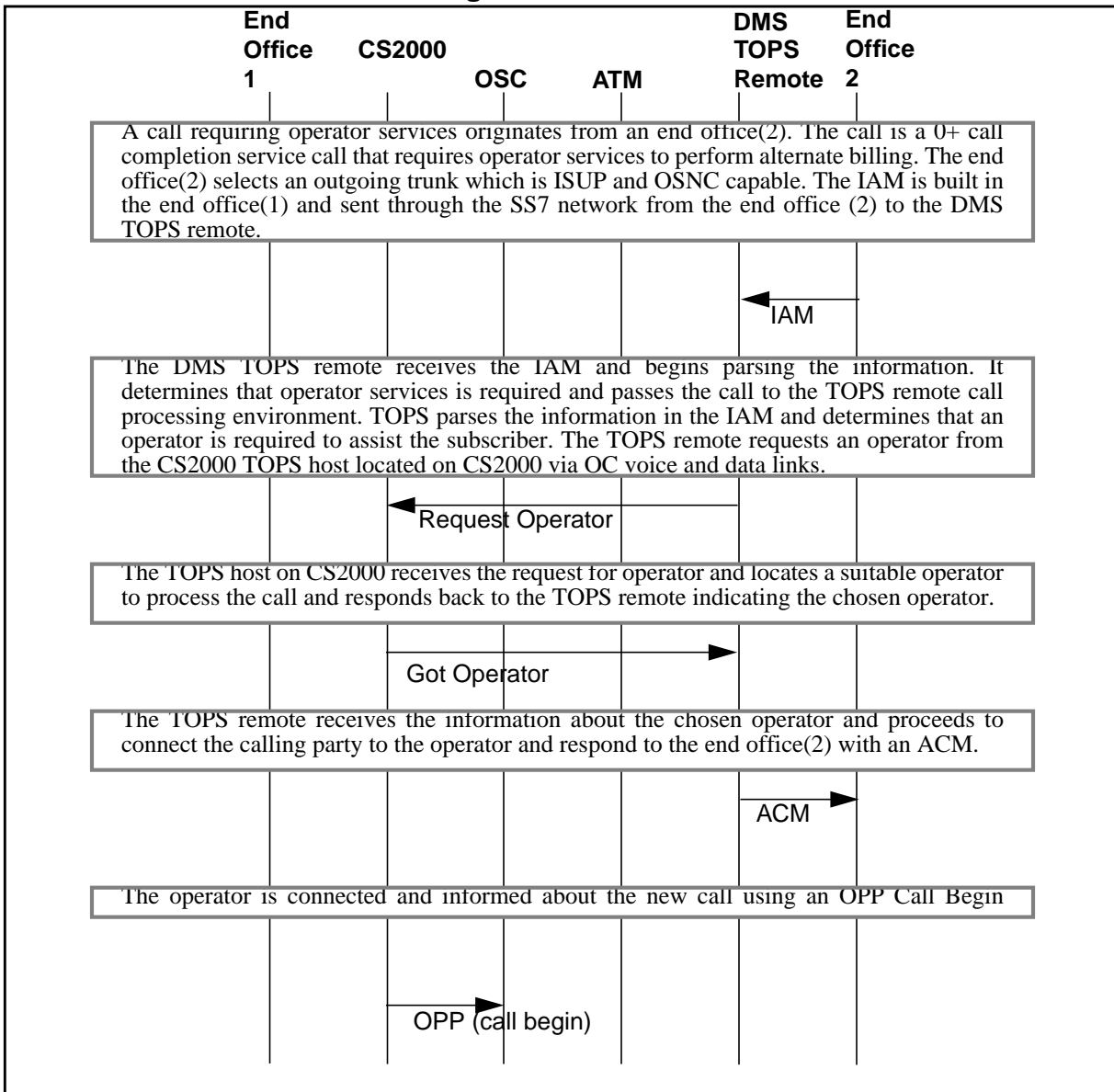


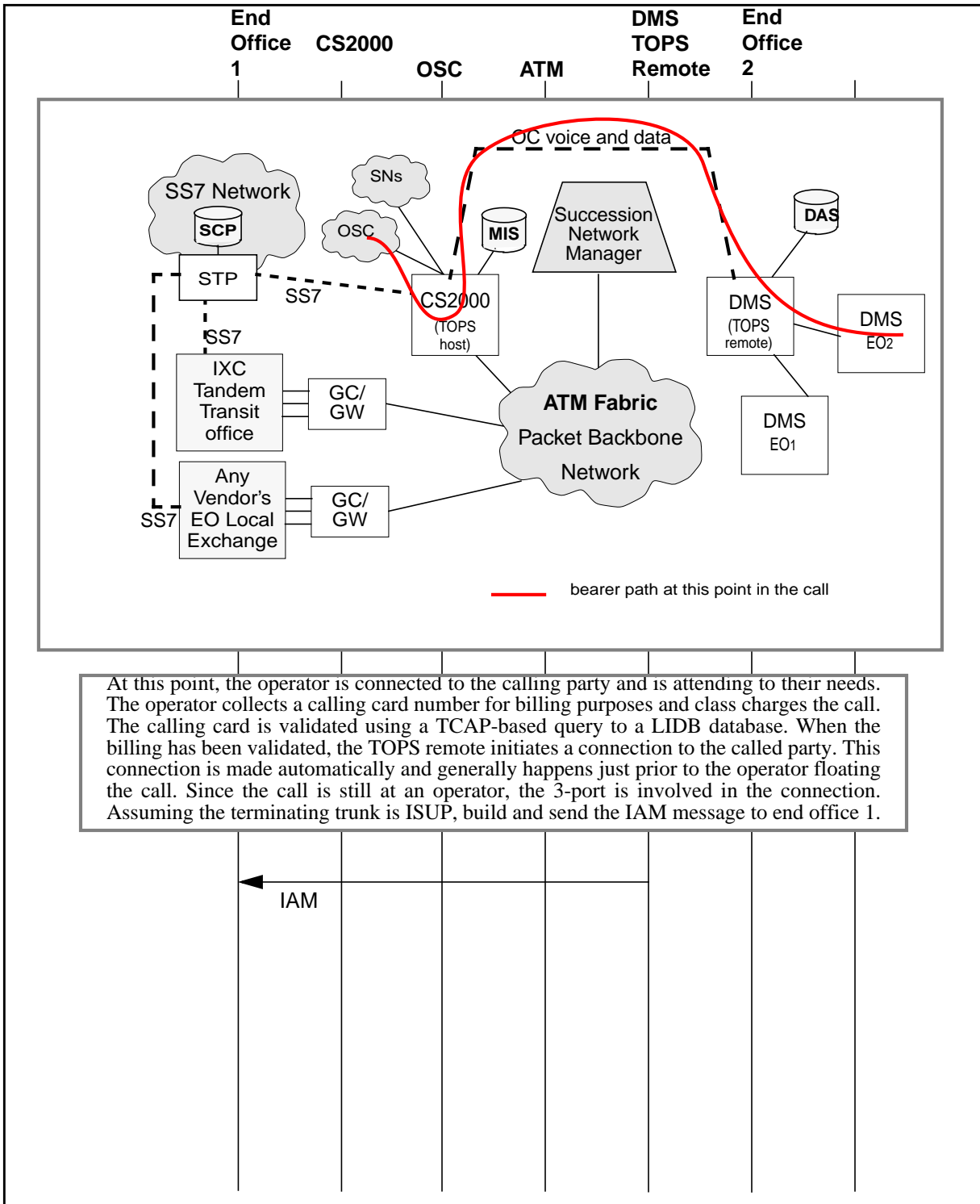


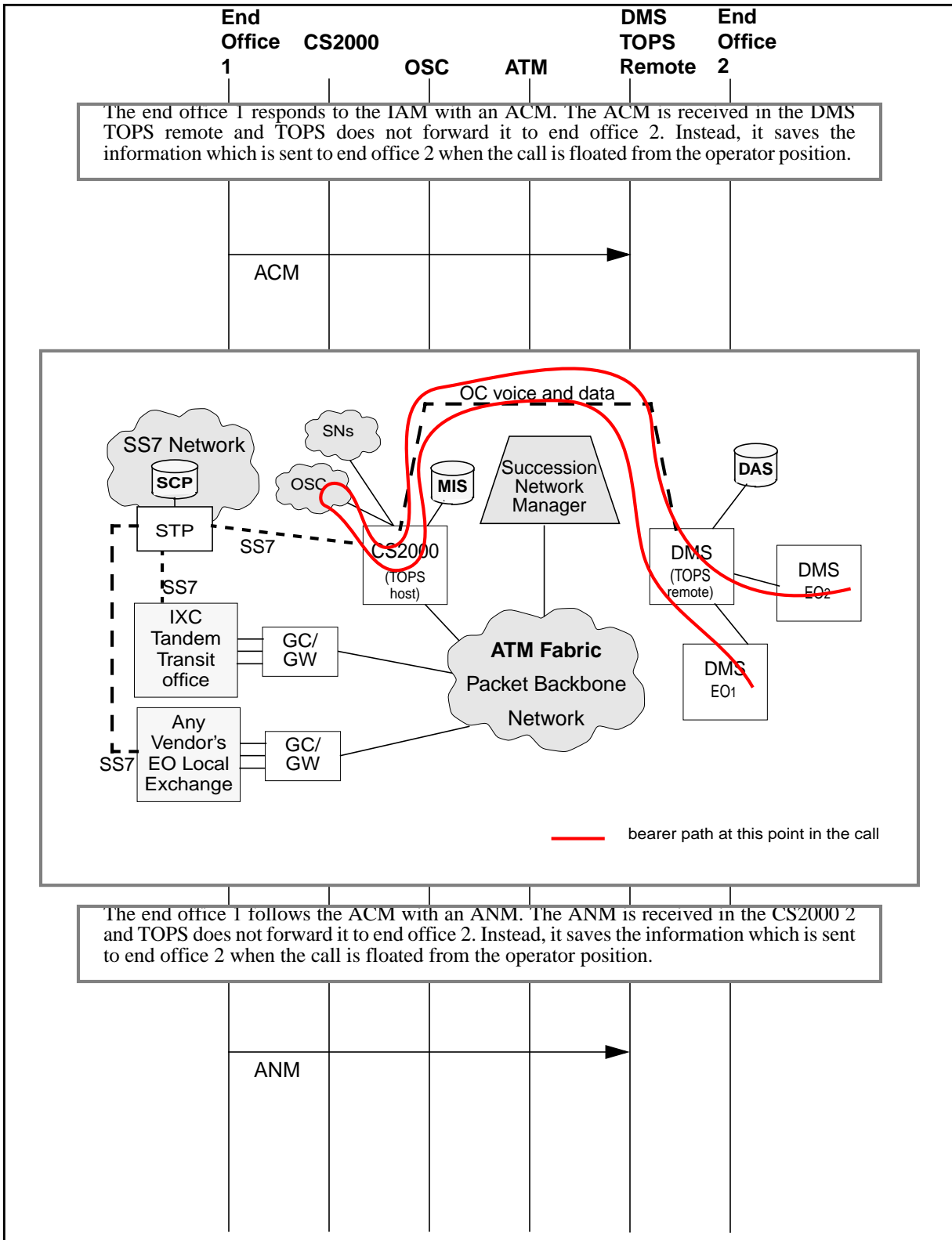


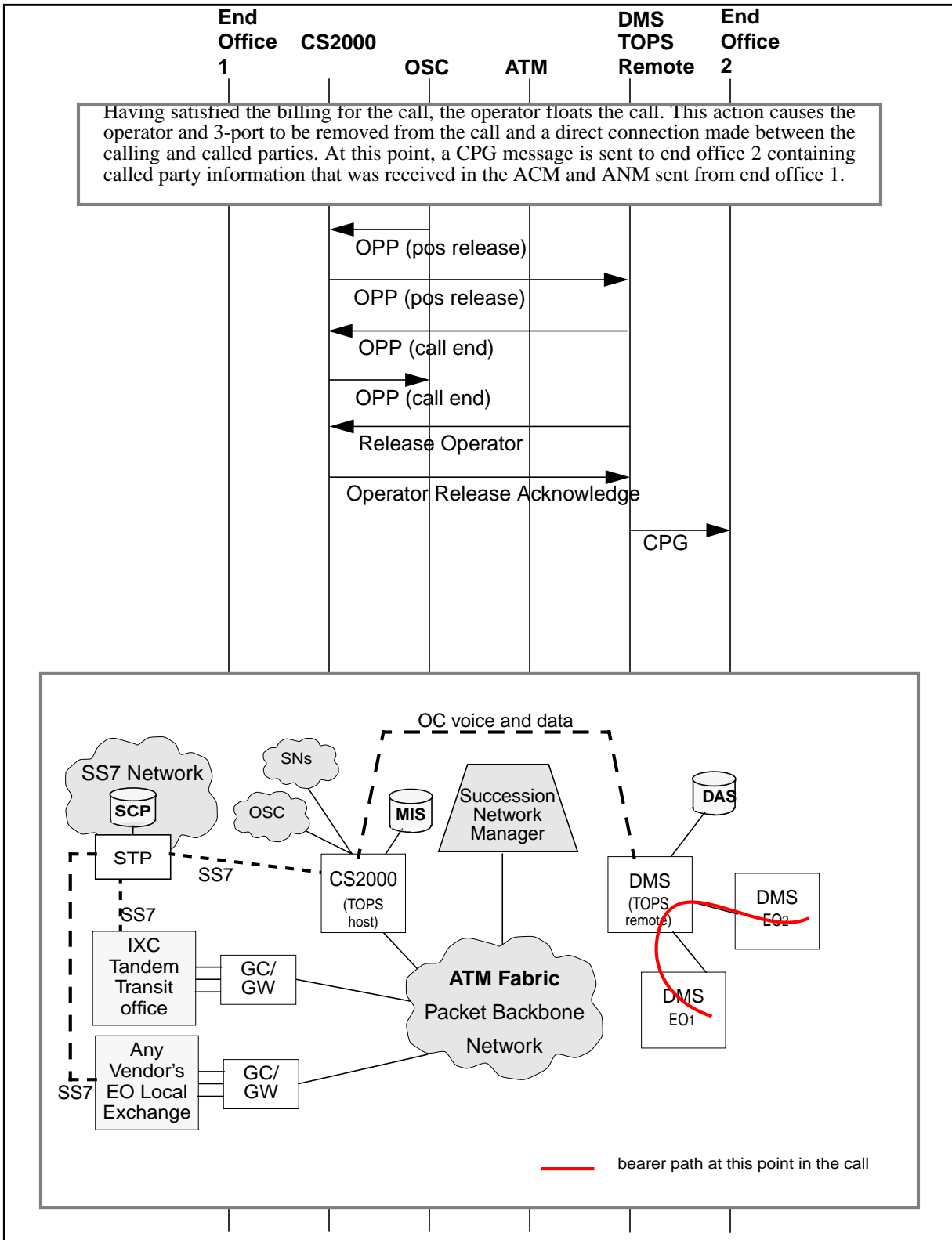


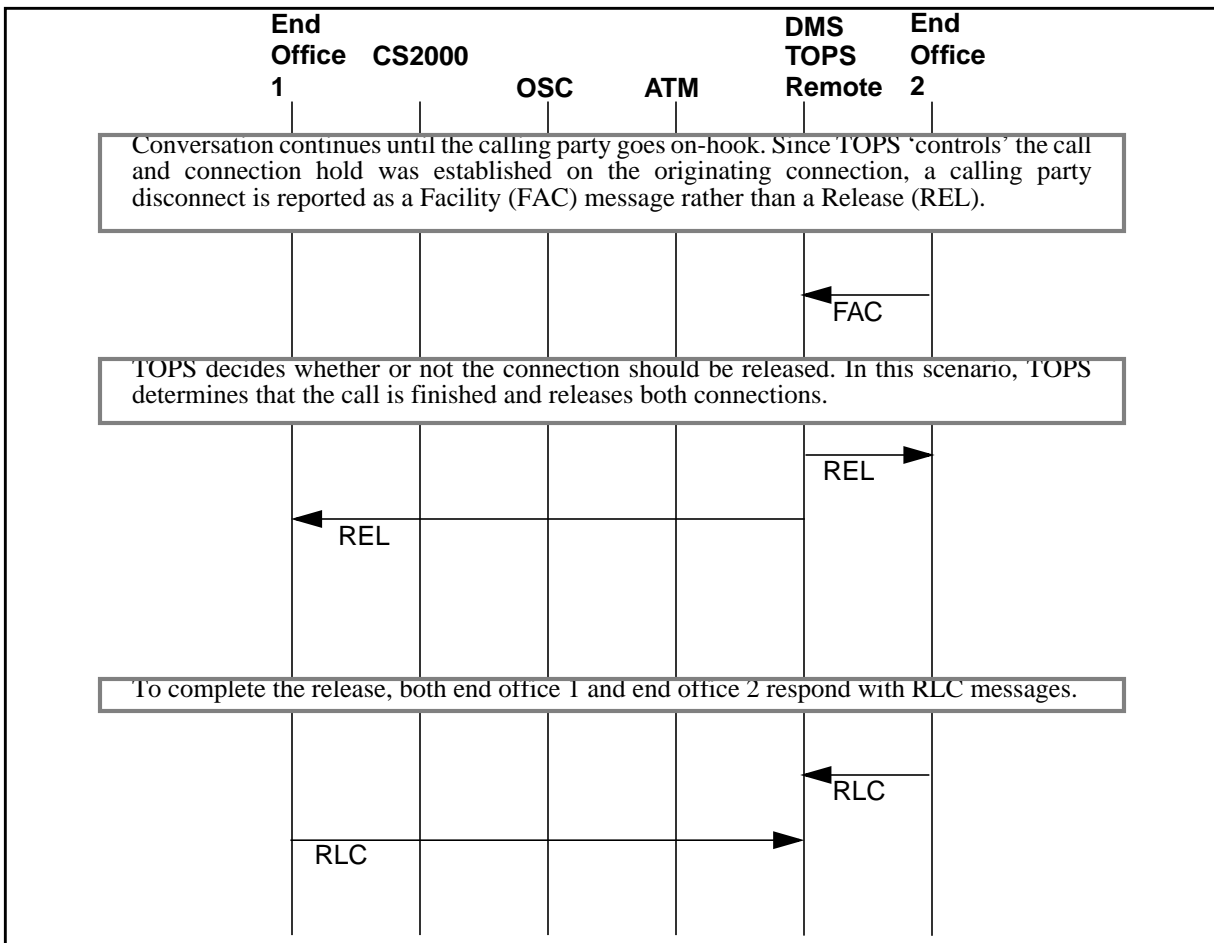
4.2.4.5 0+ call completion with alternate billing using traditional ETMS OC TOPS configuration- host



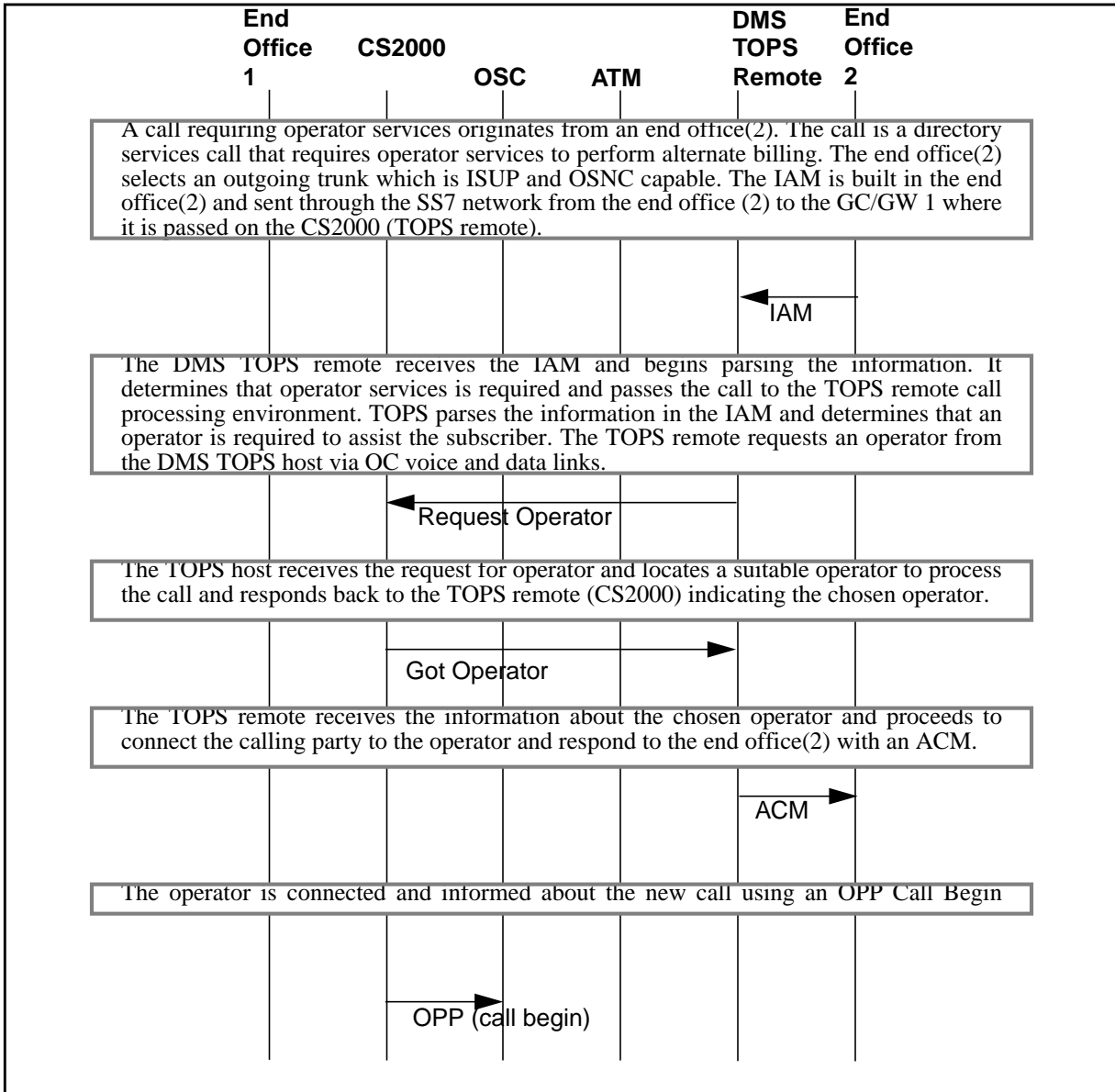


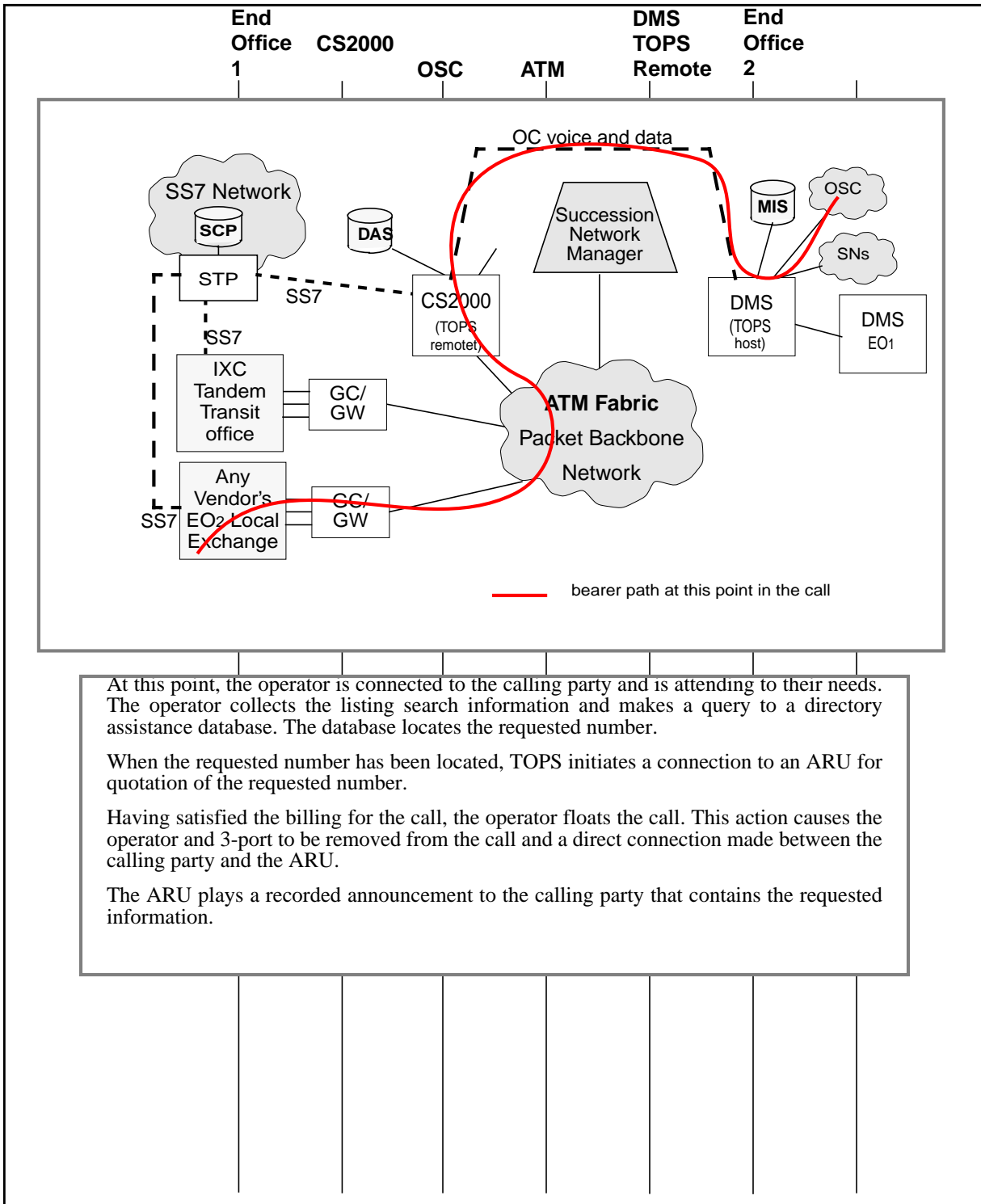


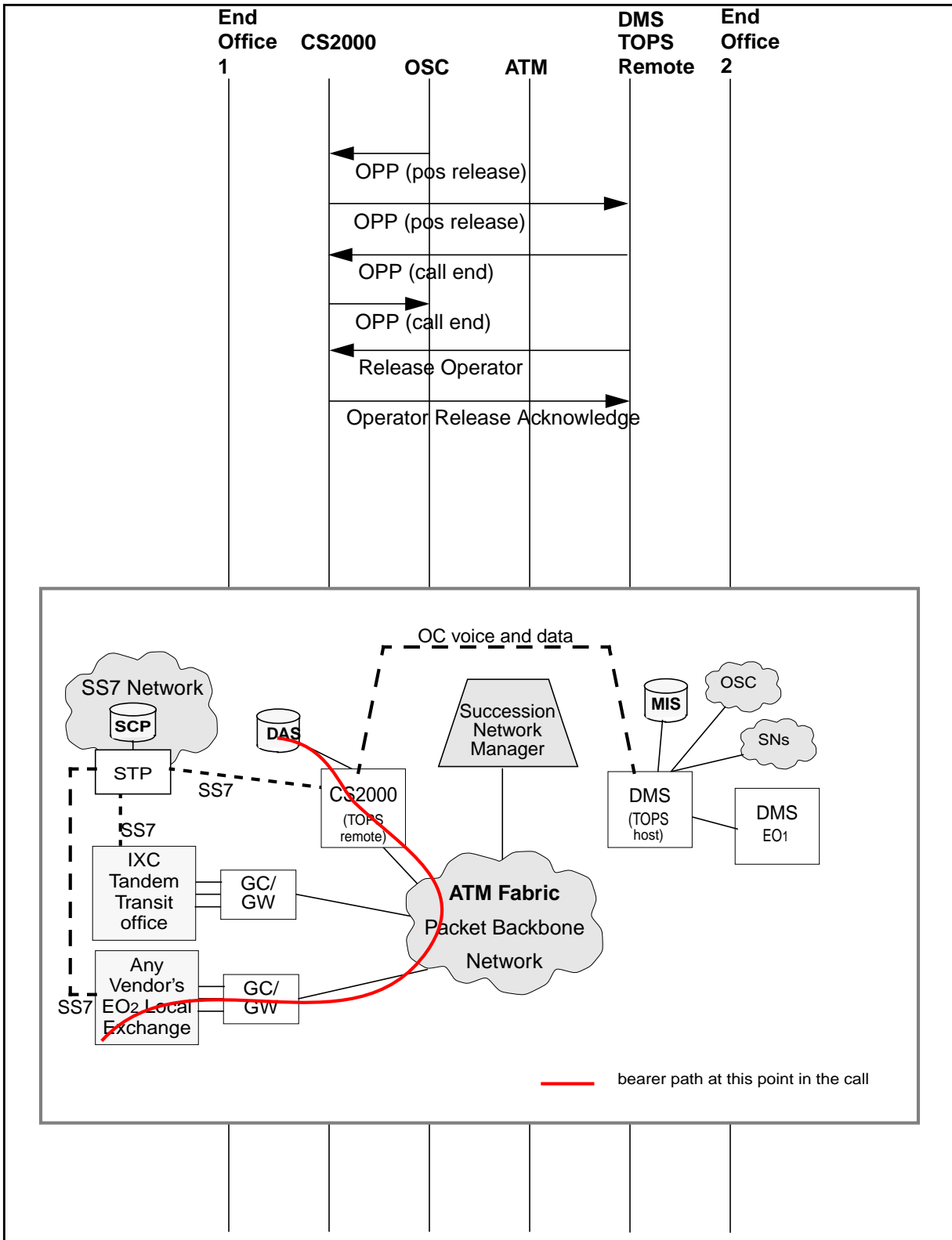


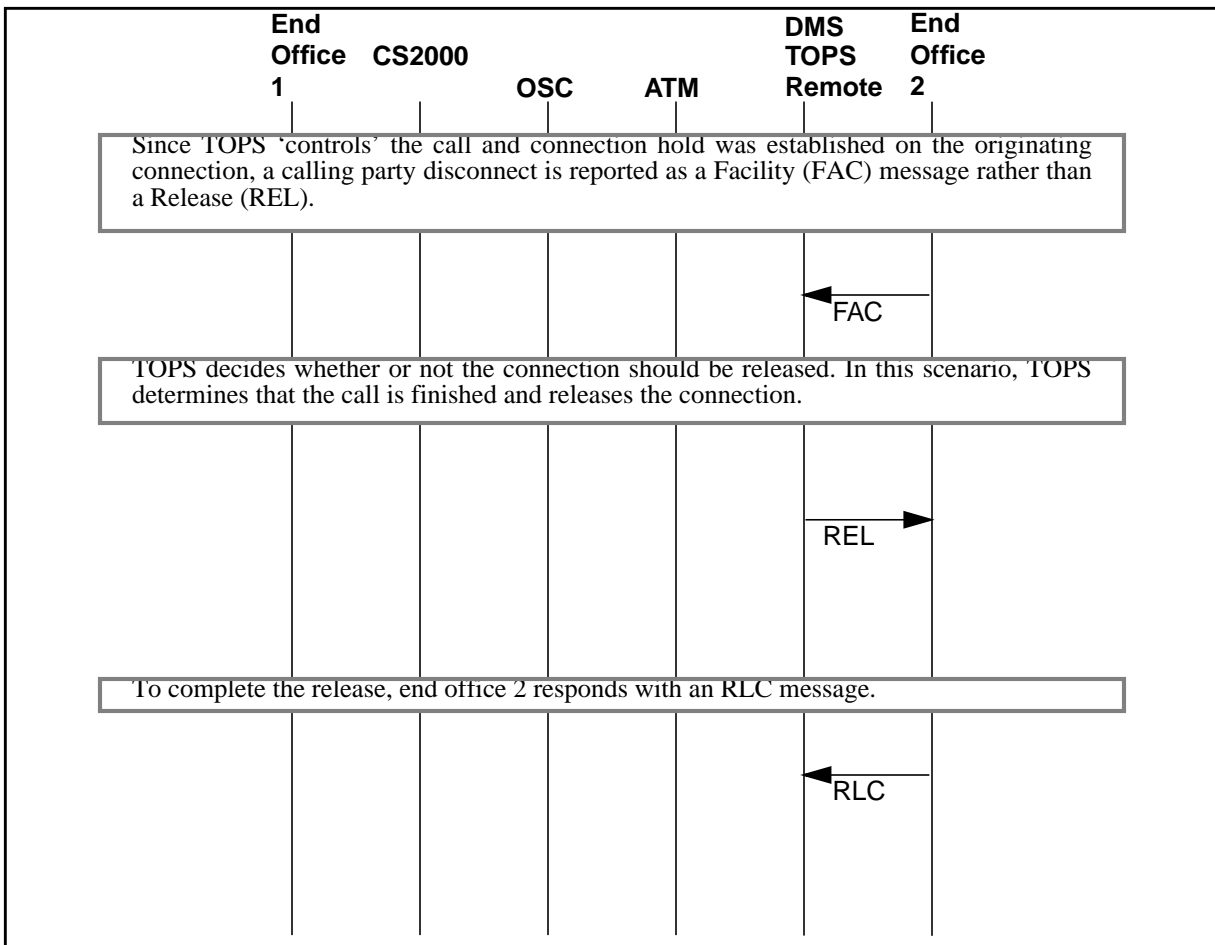


4.2.4.6 1+ directory assistance call using traditional ETMS OC TOPS configuration- remote

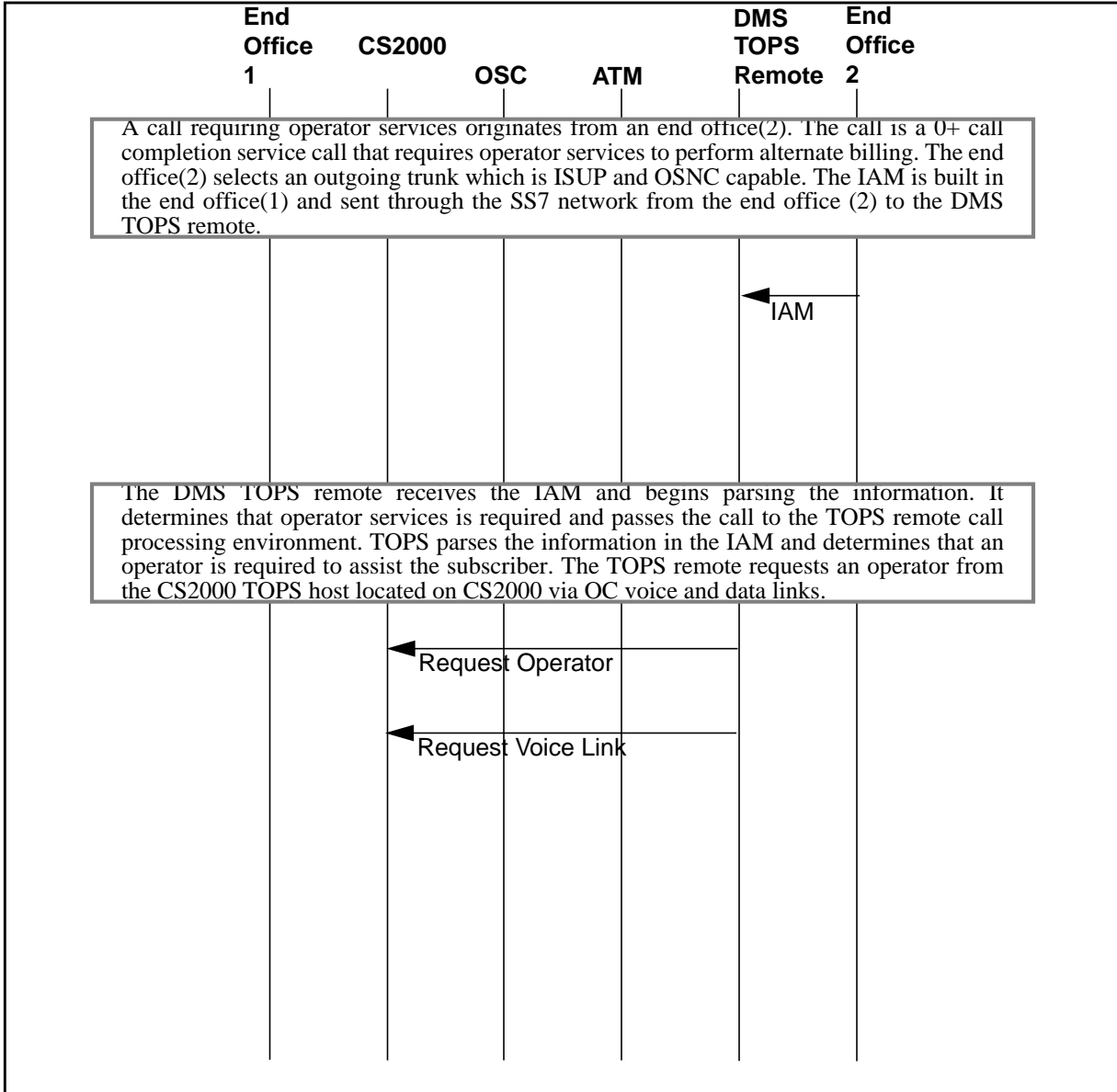


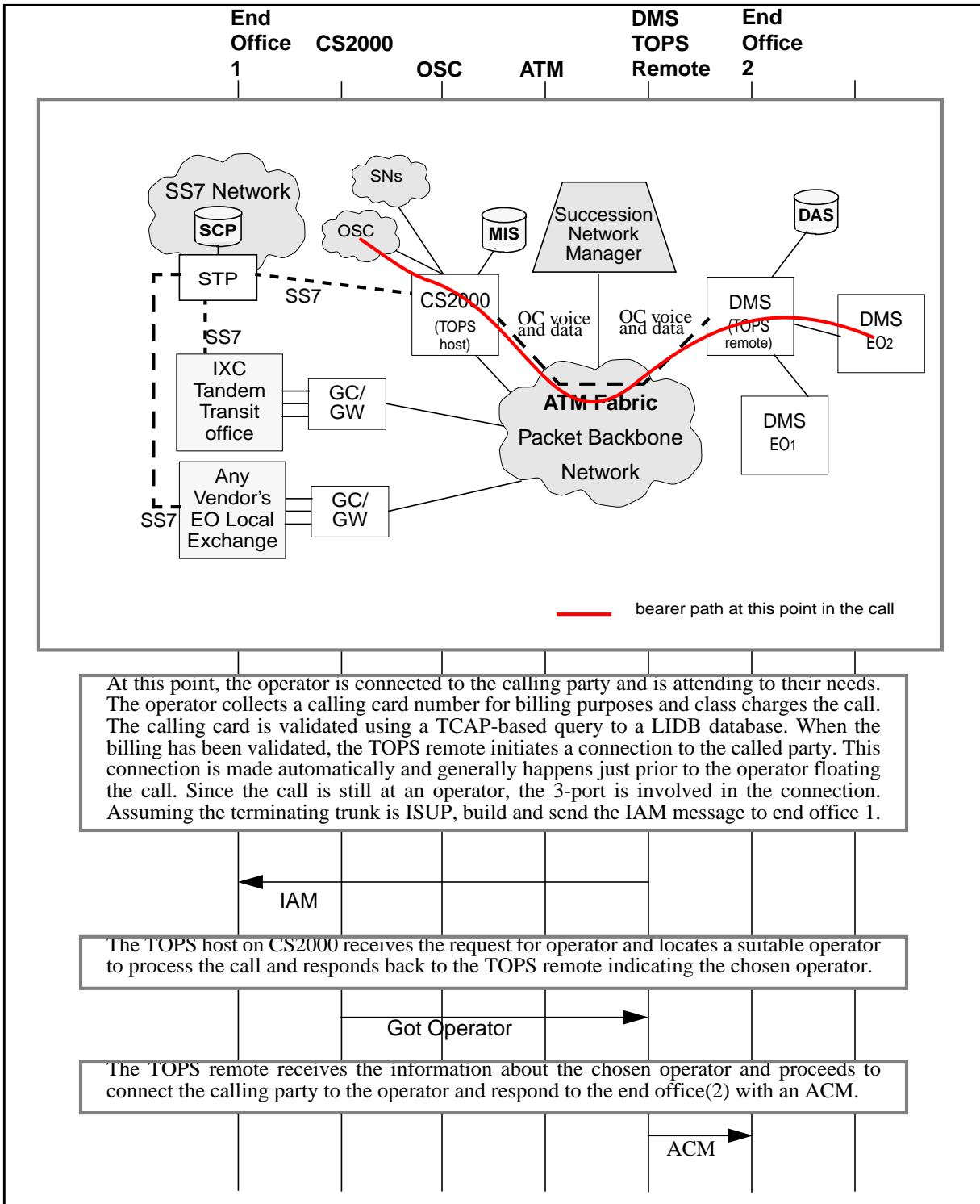


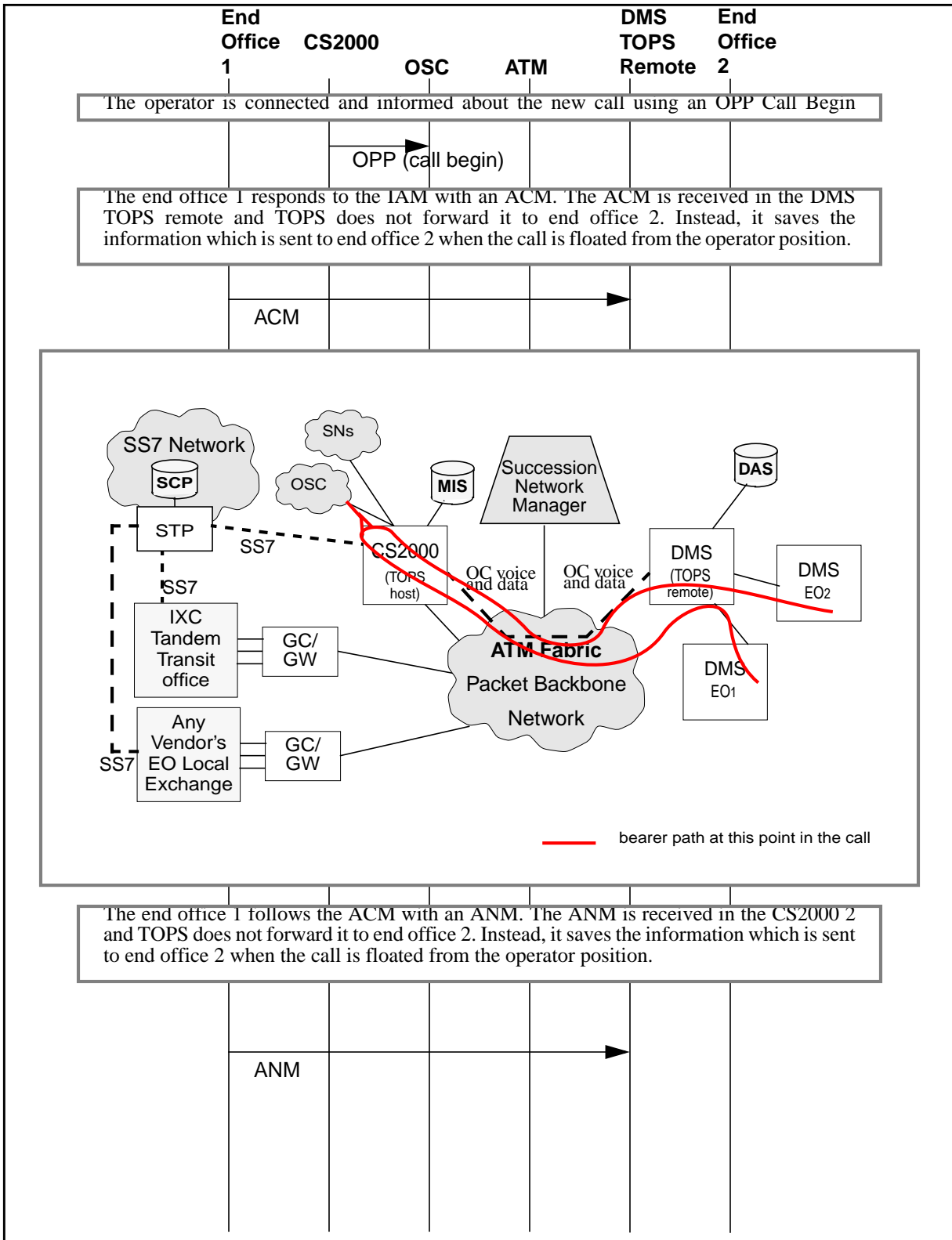


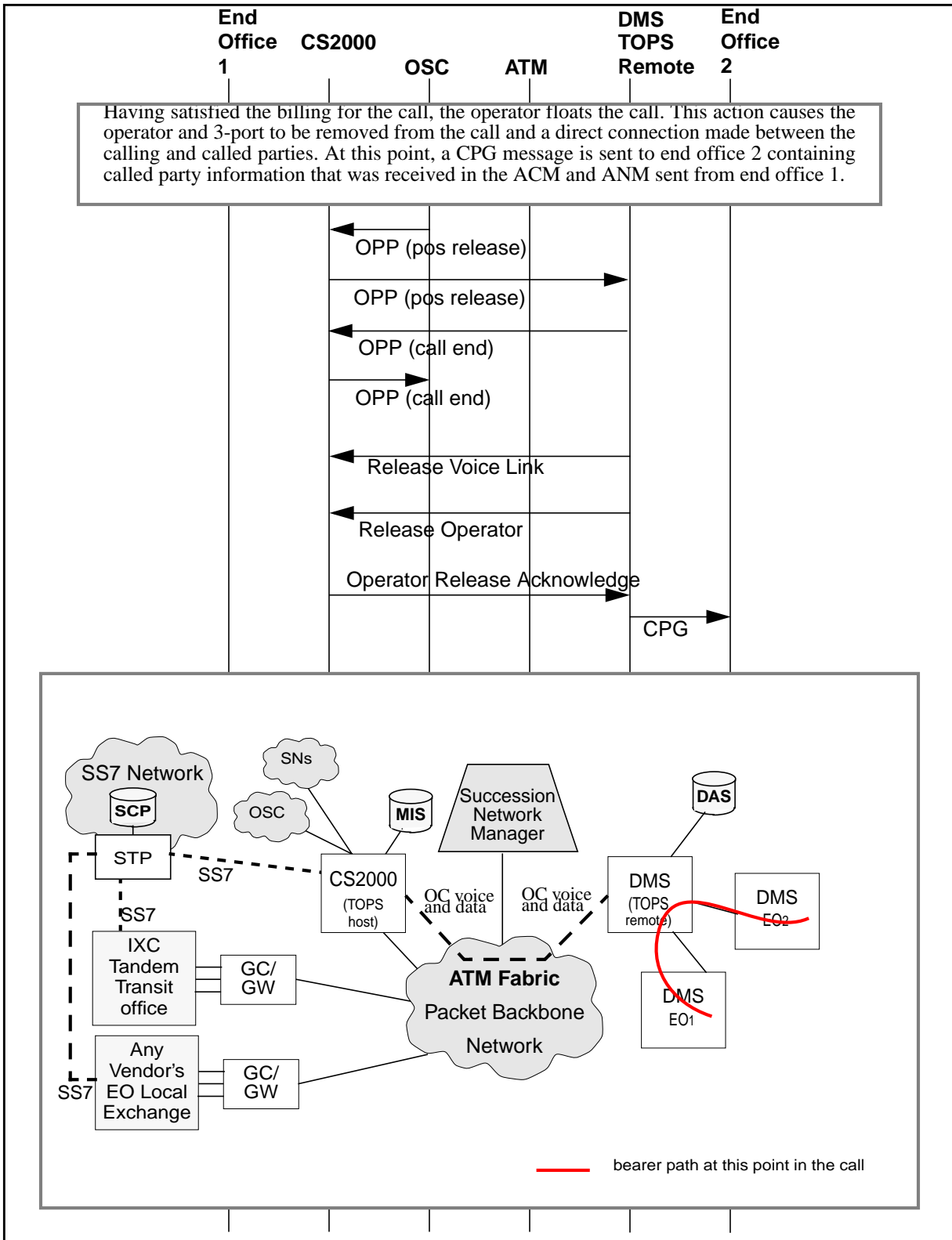


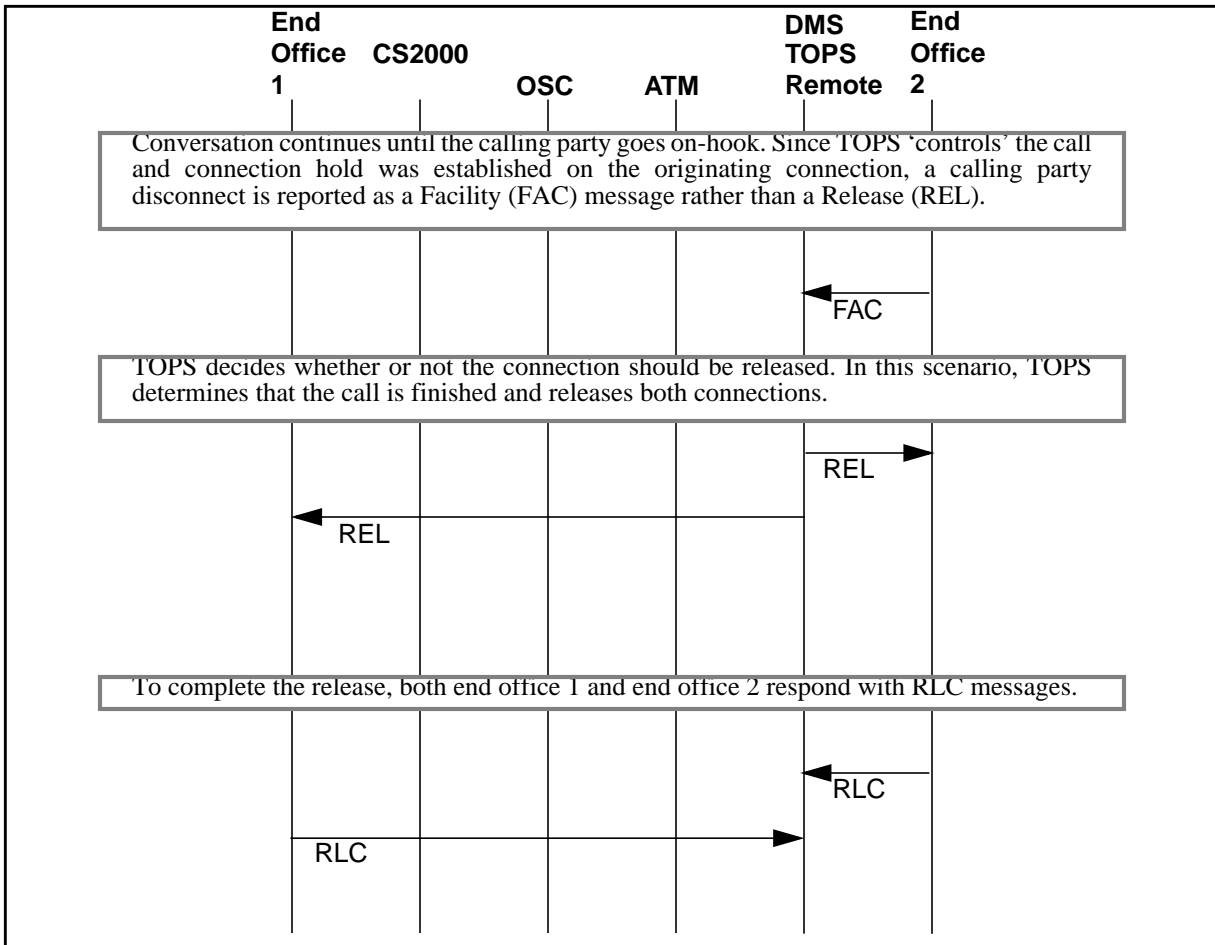
4.2.4.7 0+ call completion with alternate billing using TOPS Succession OC IP configuration- host



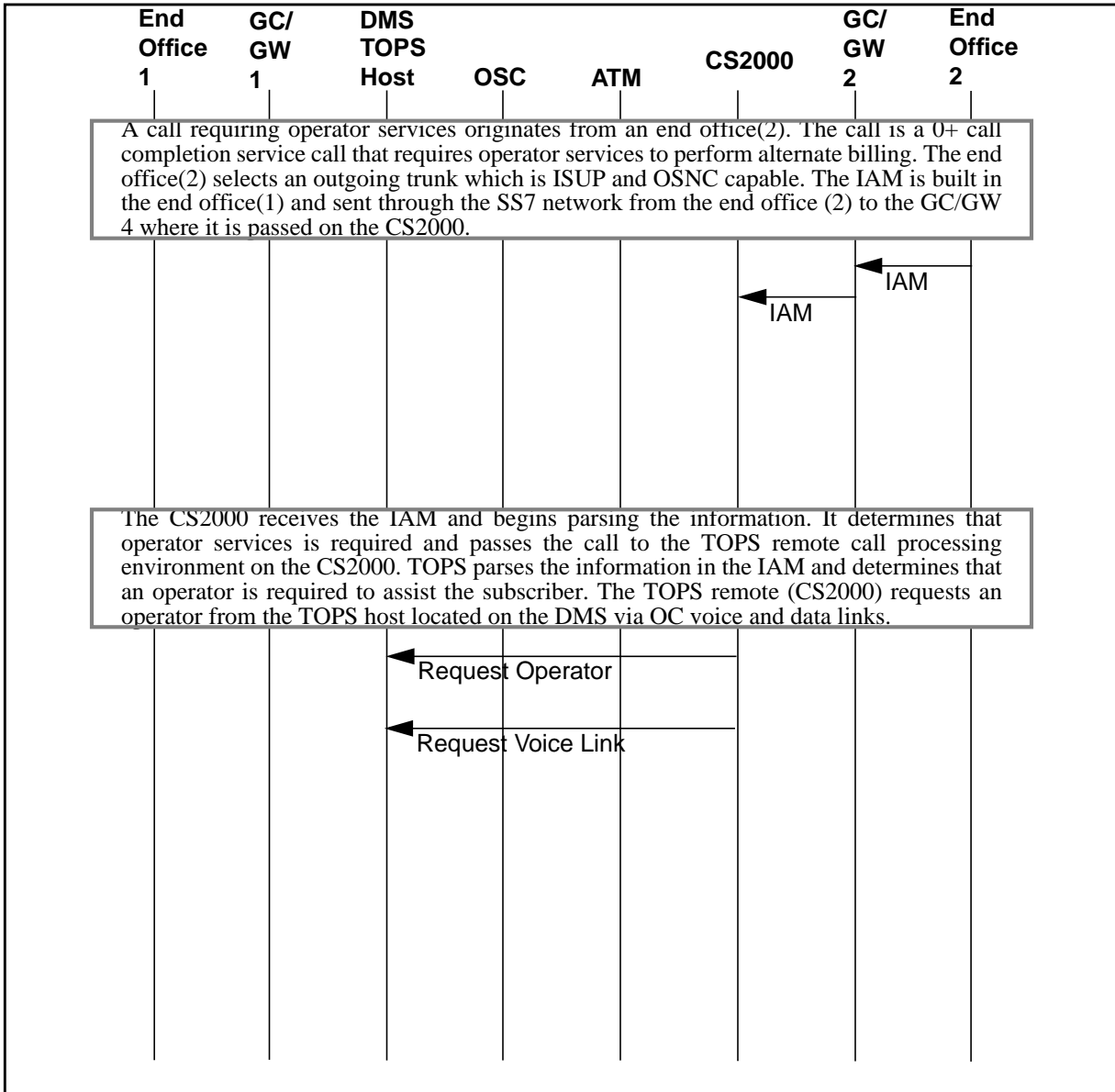


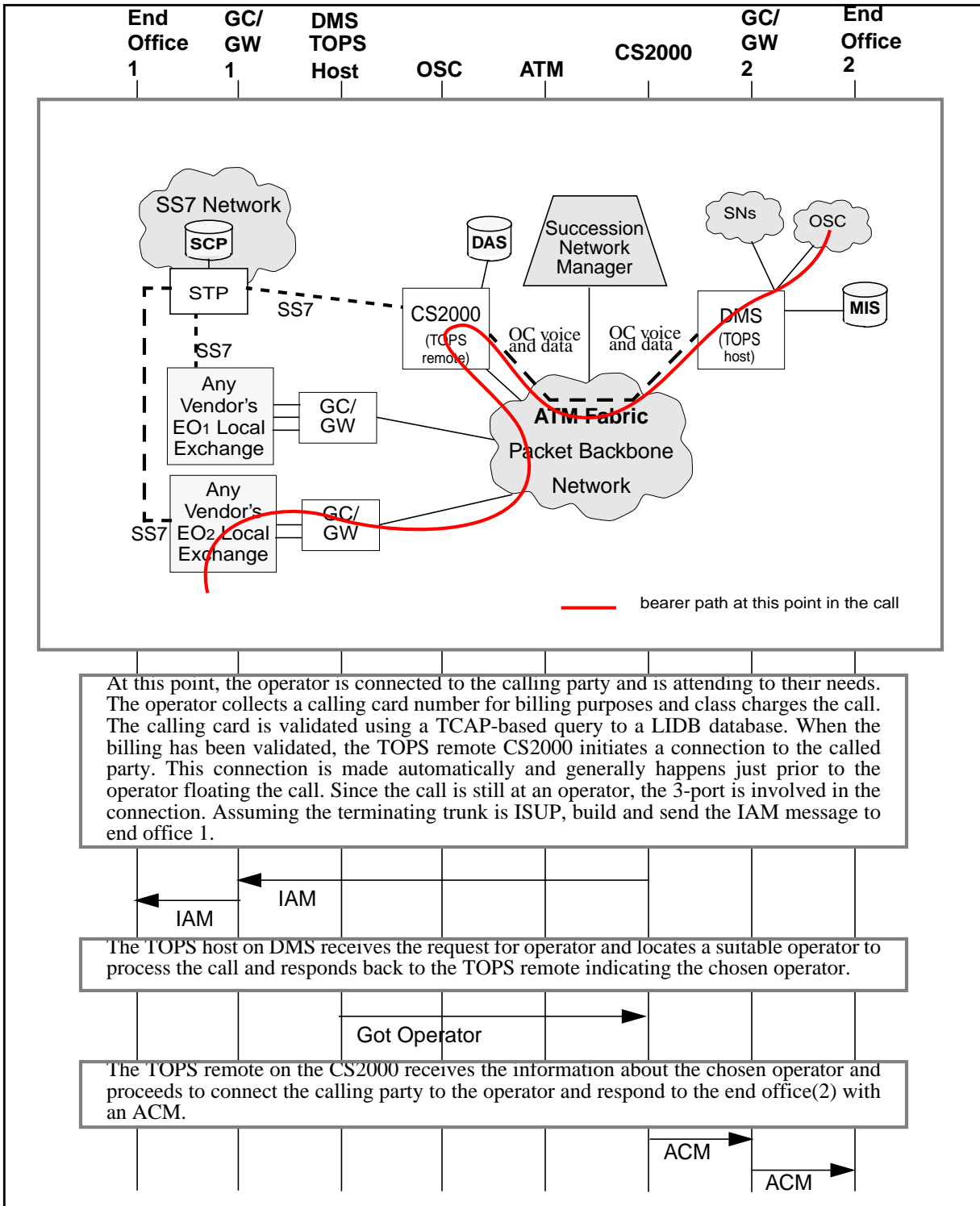


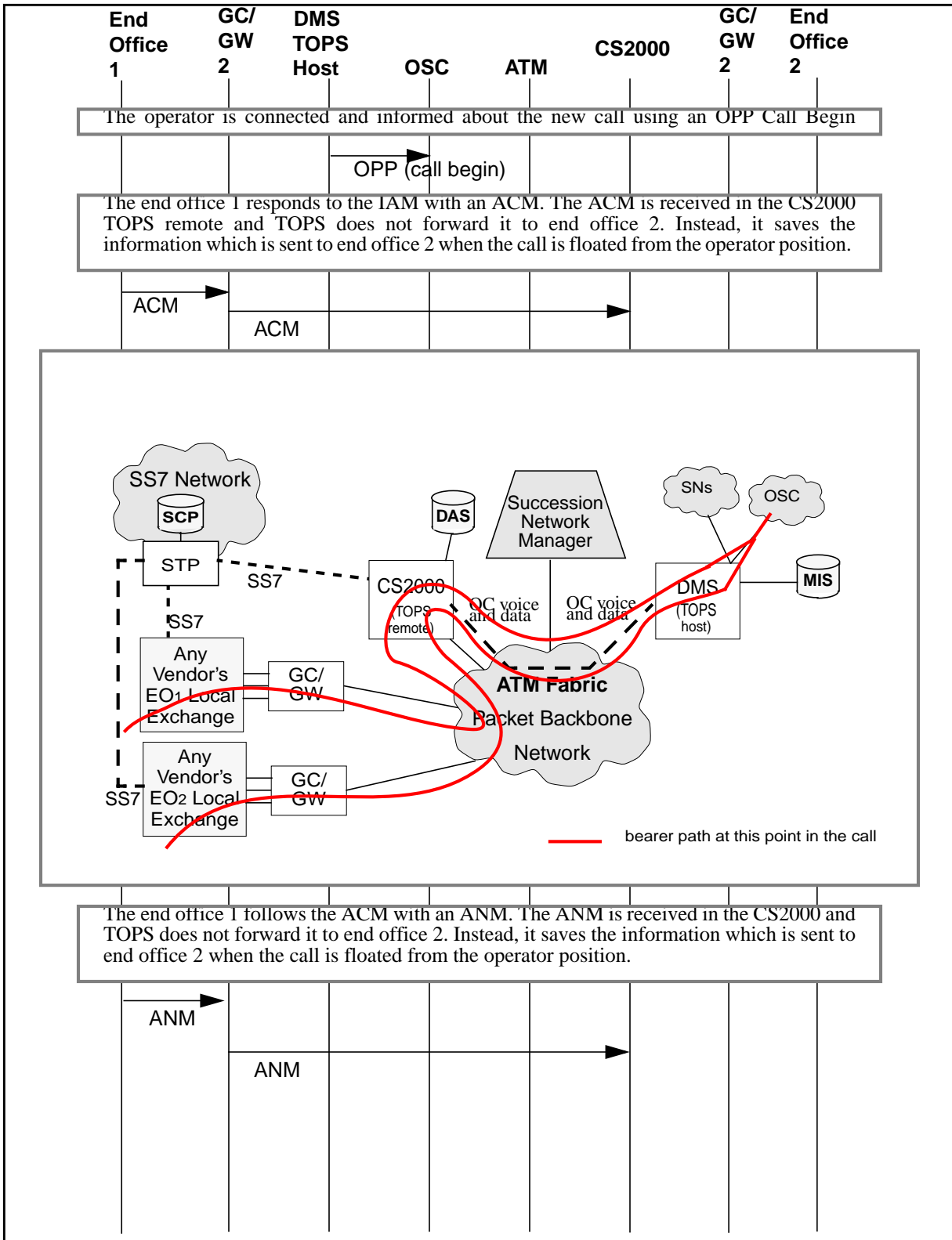


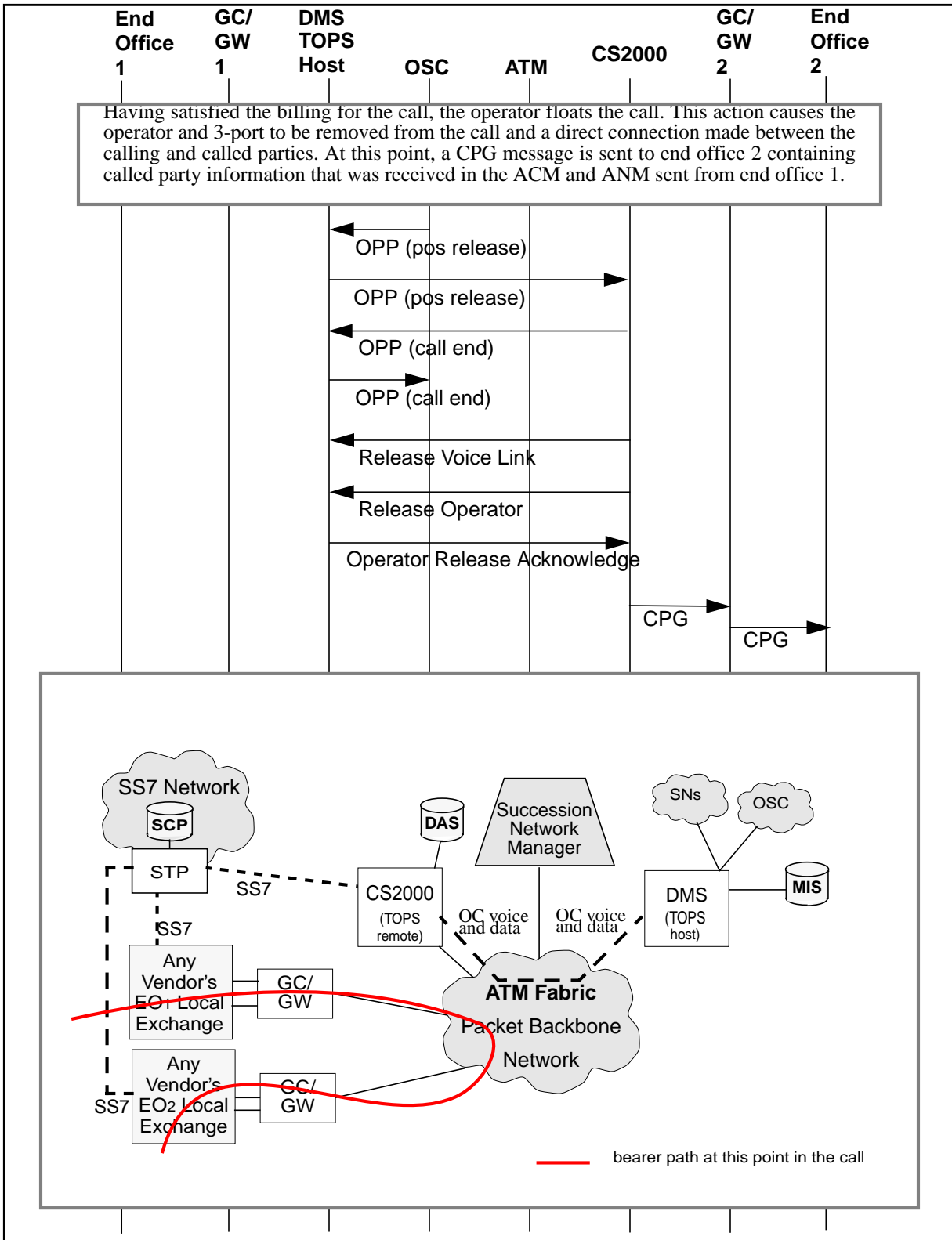


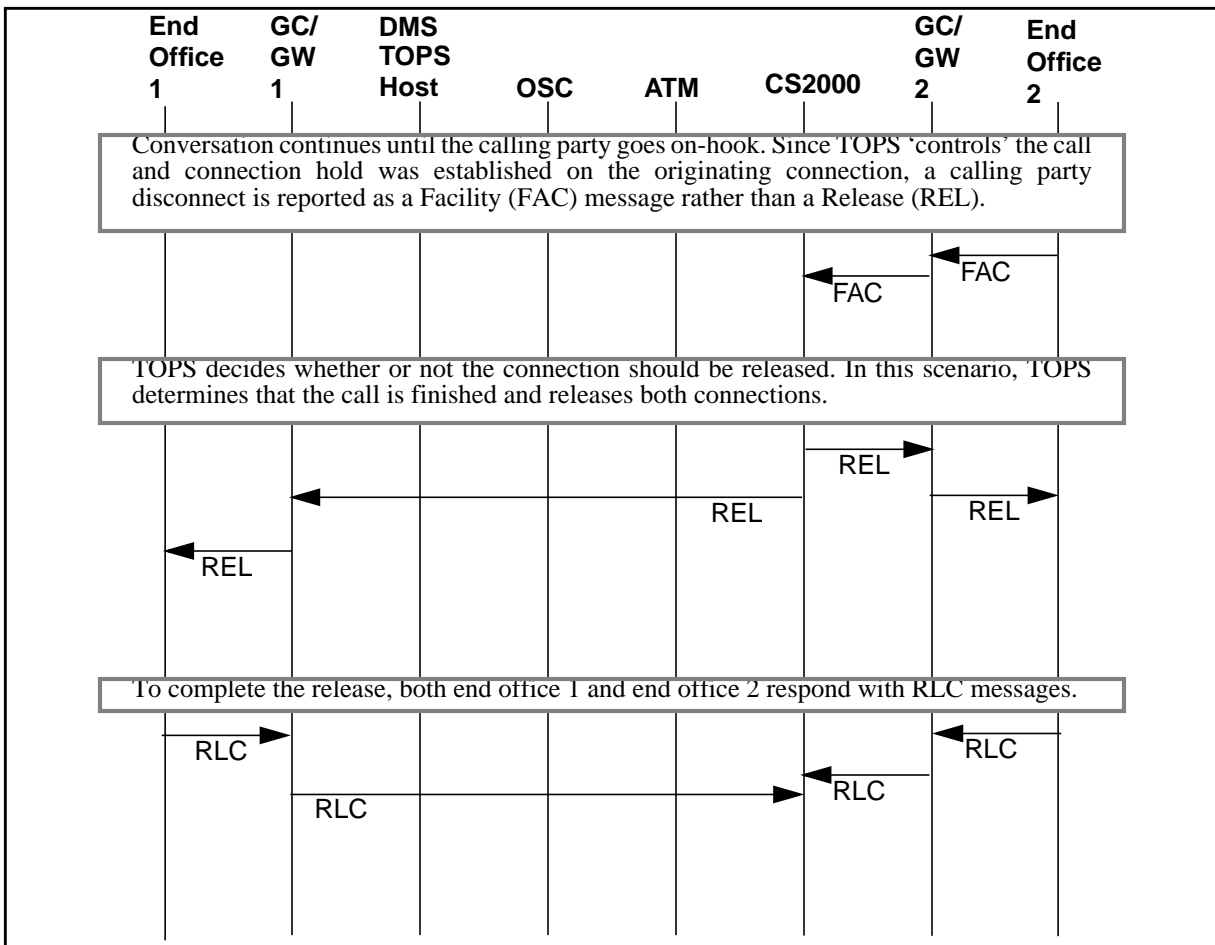
4.2.4.8 0+ call completion with alternate billing using TOPS Succession OC IP configuration- remote



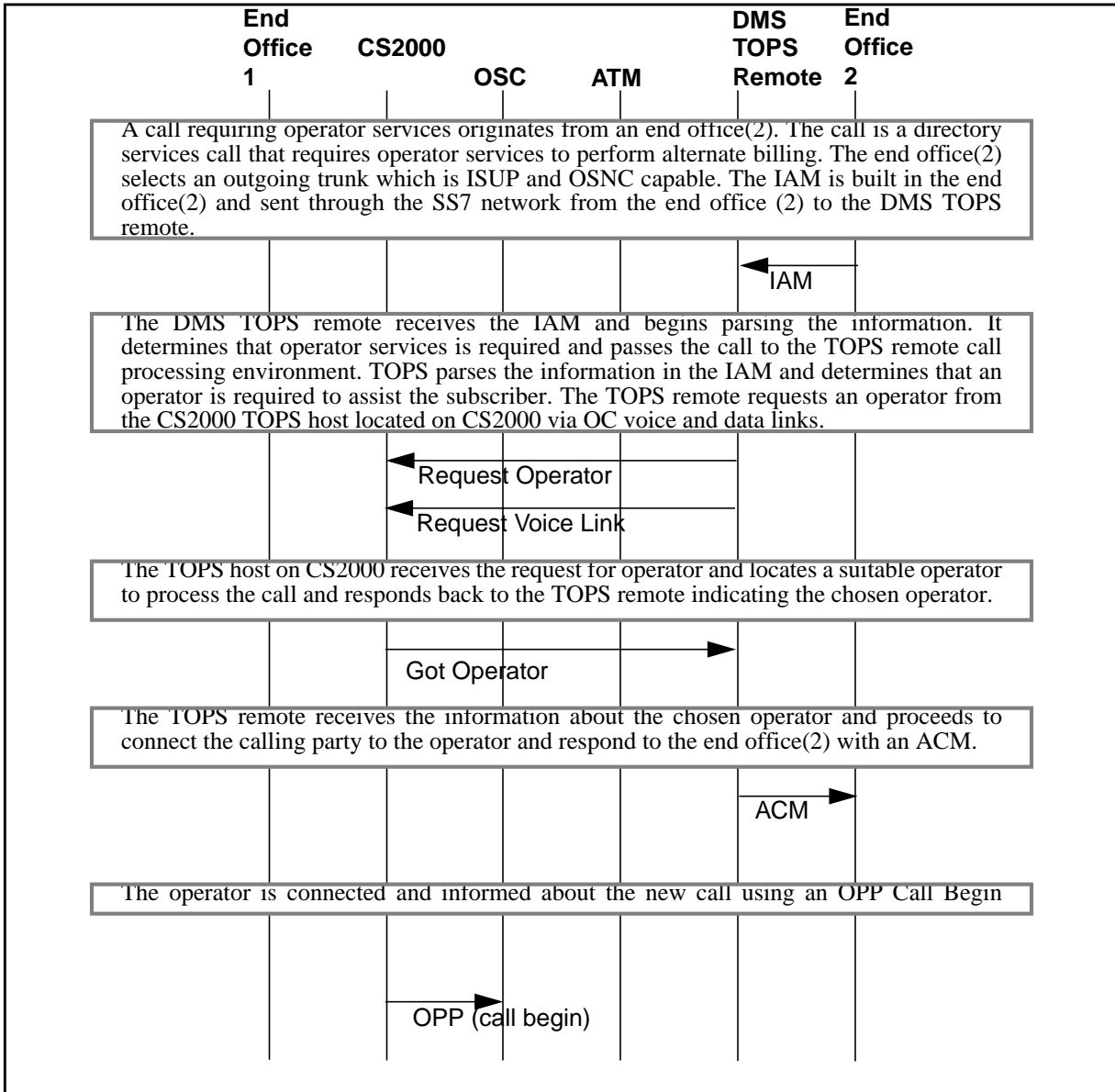


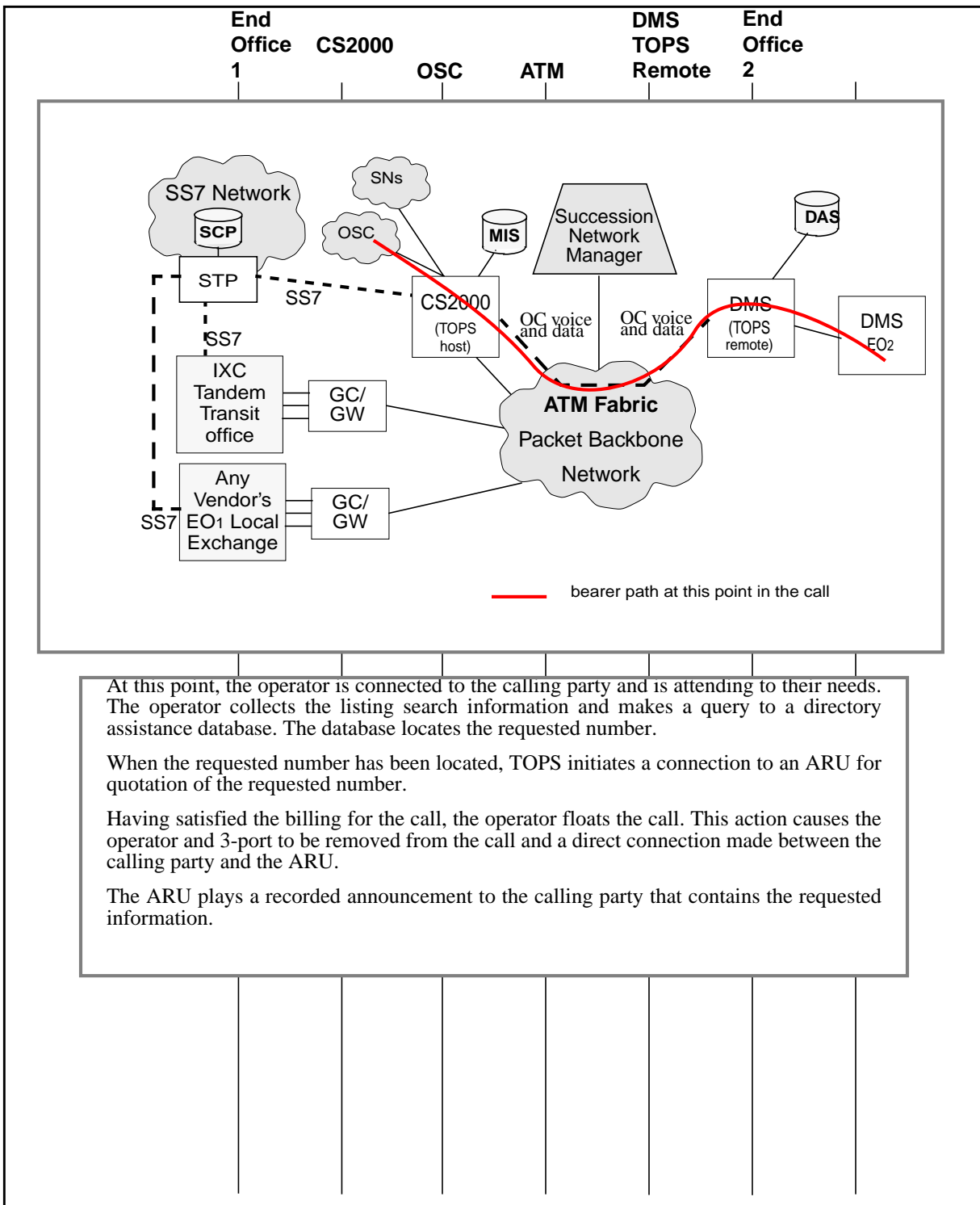


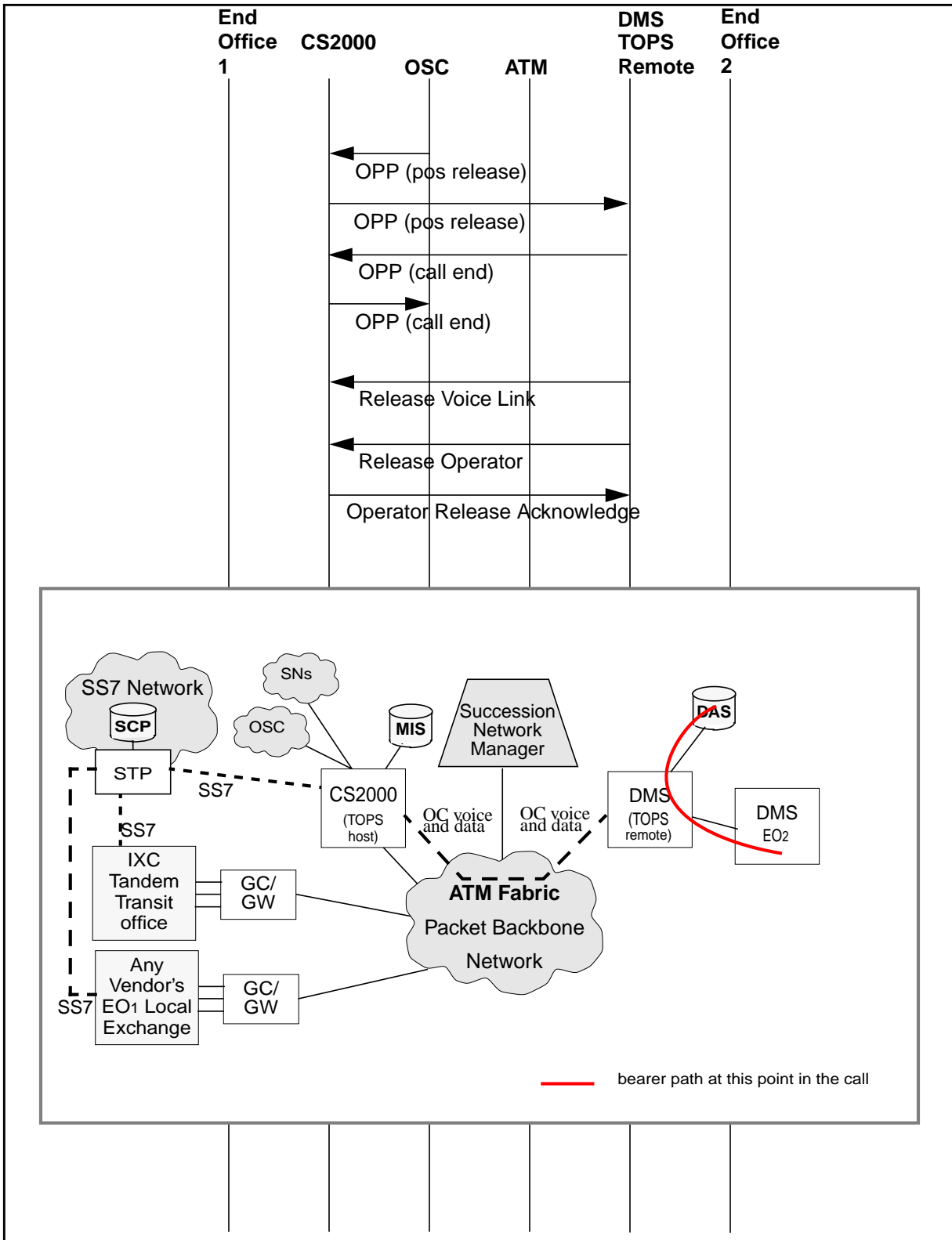


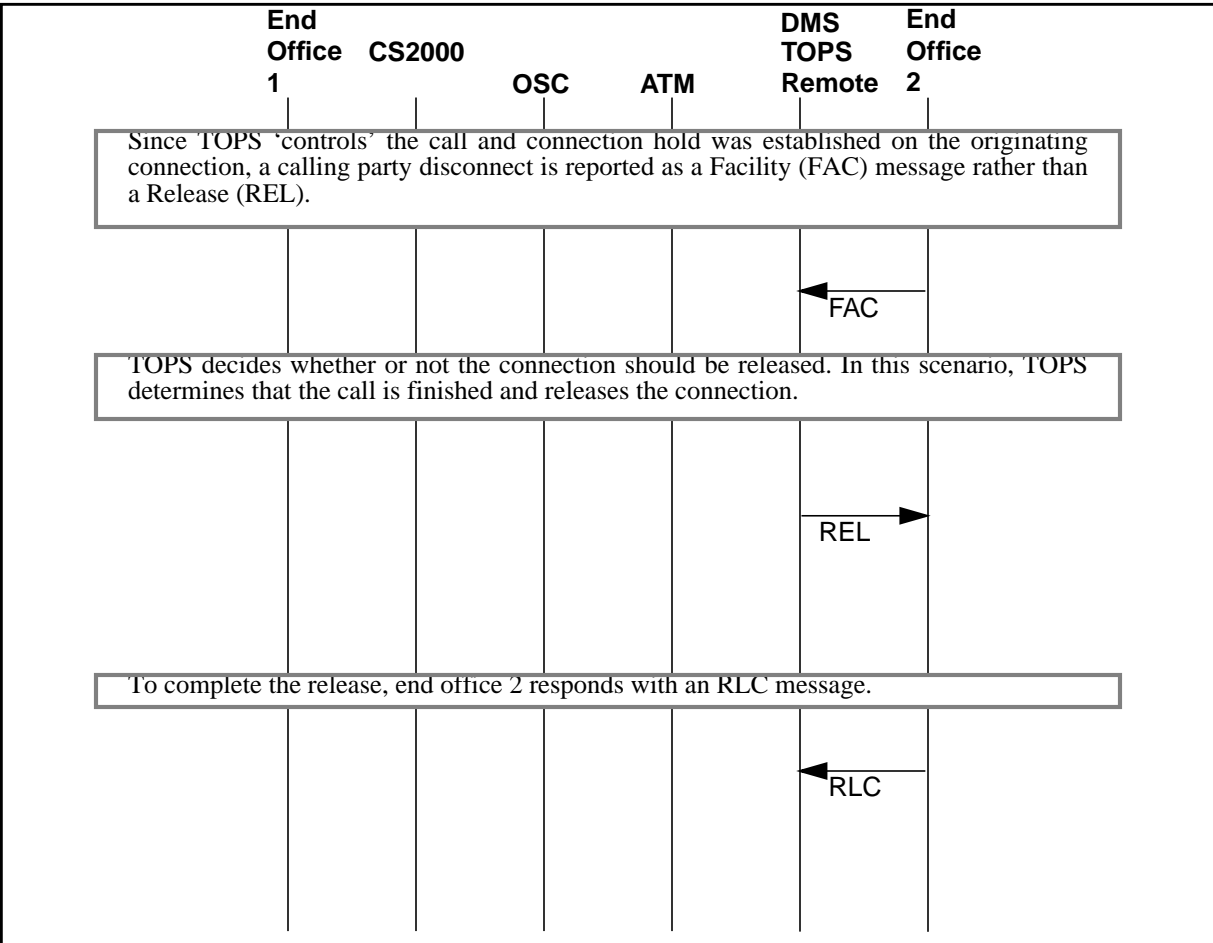


4.2.4.9 1+ directory assistance call using TOPS Succession OC IP configuration- host

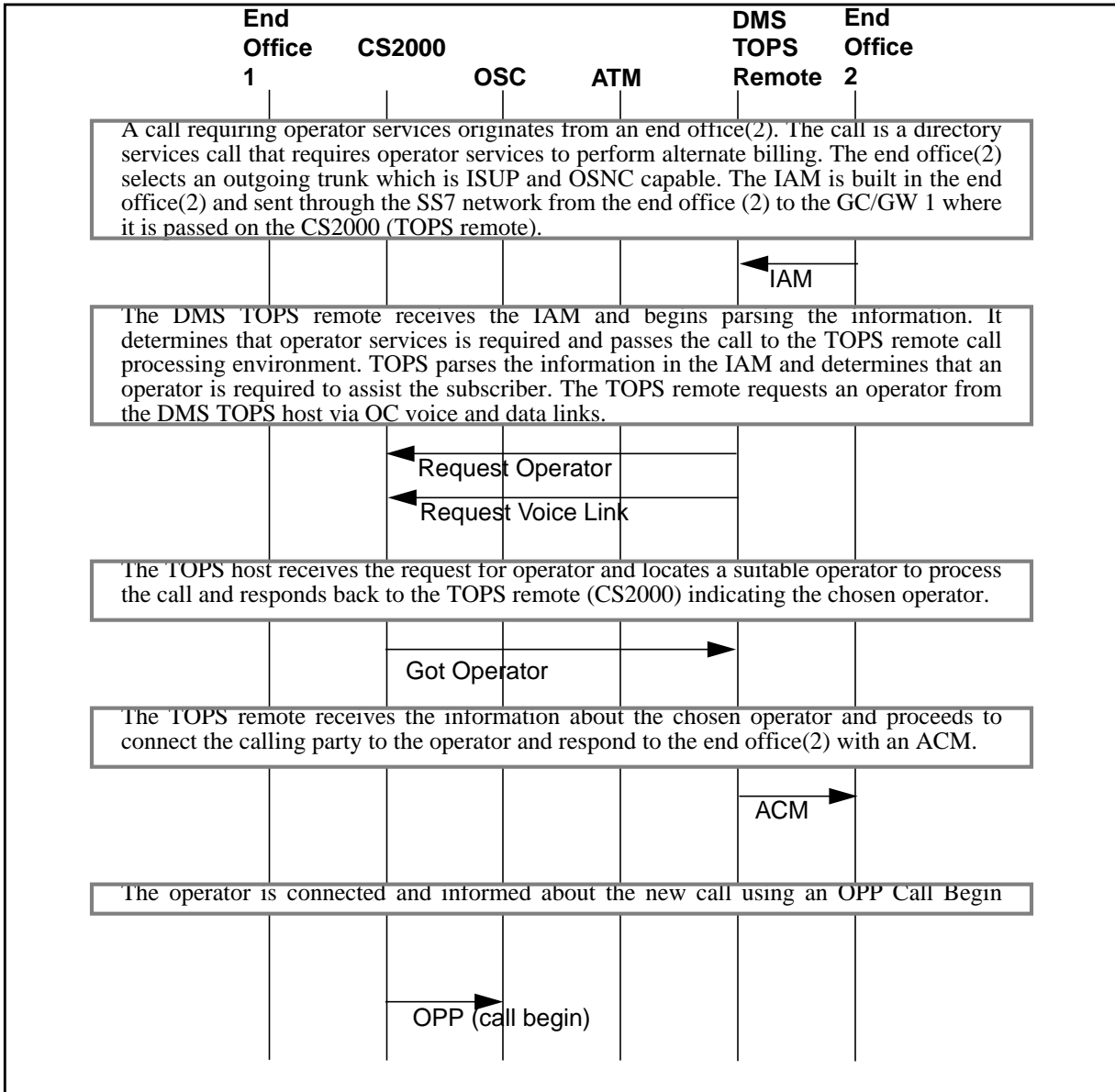


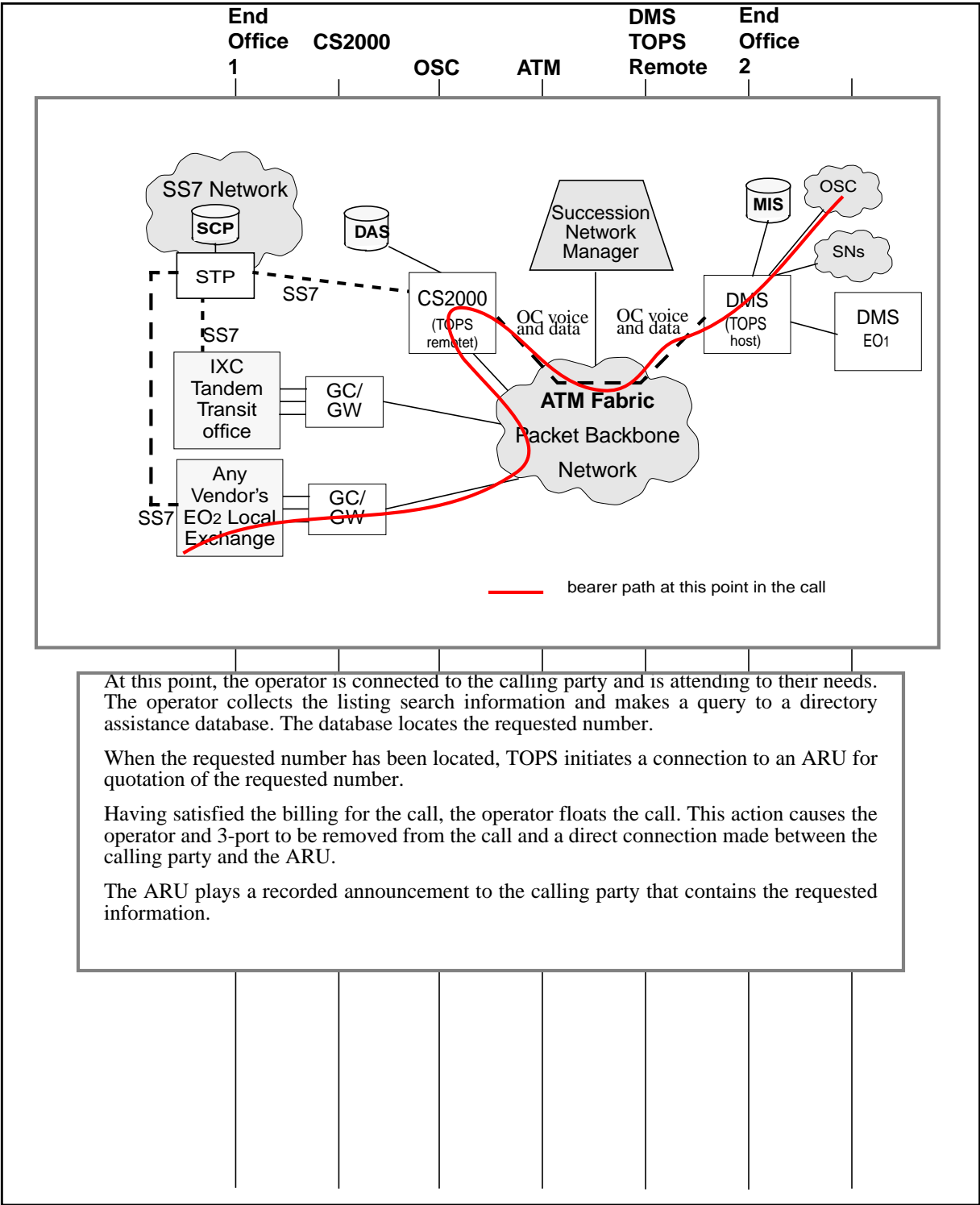


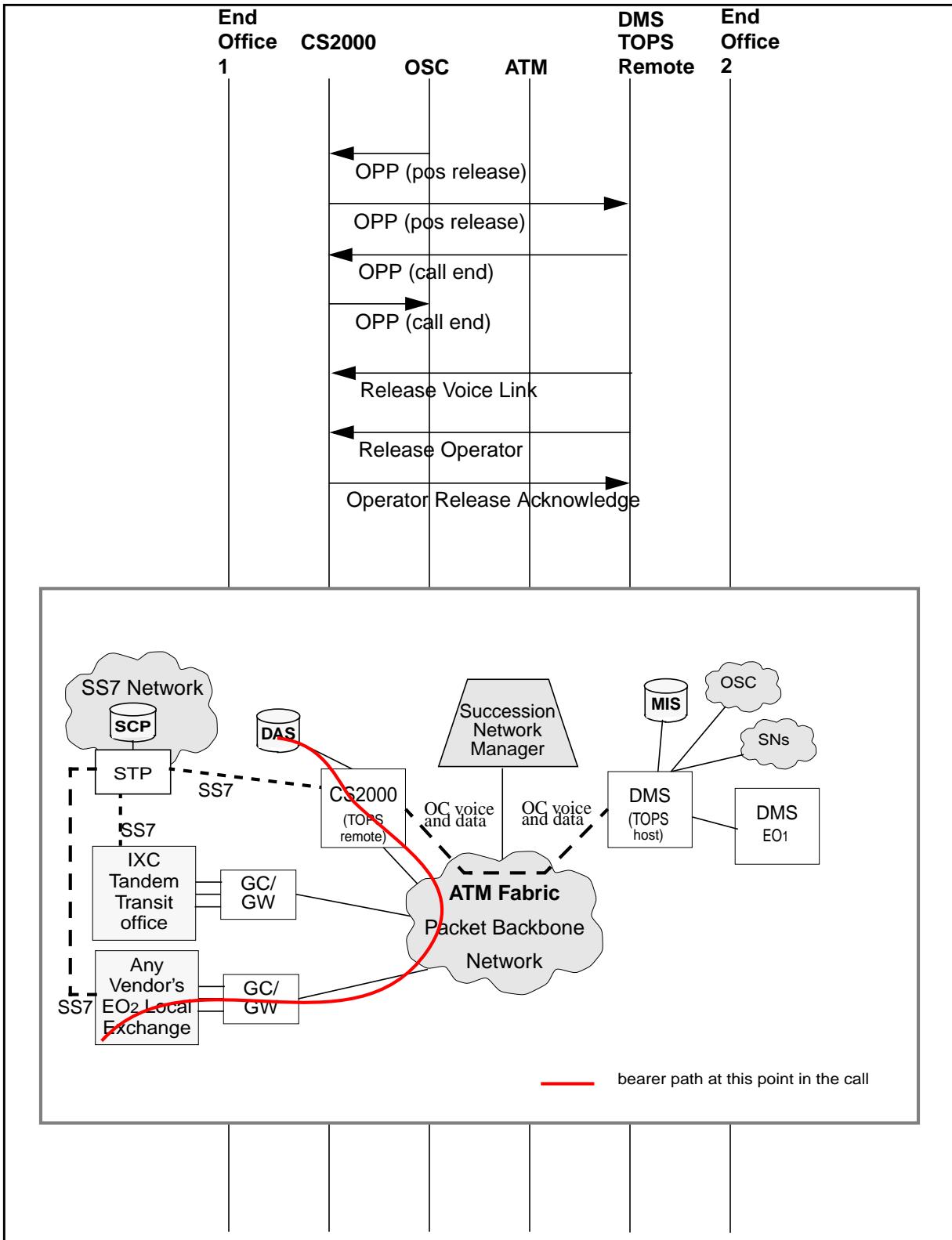


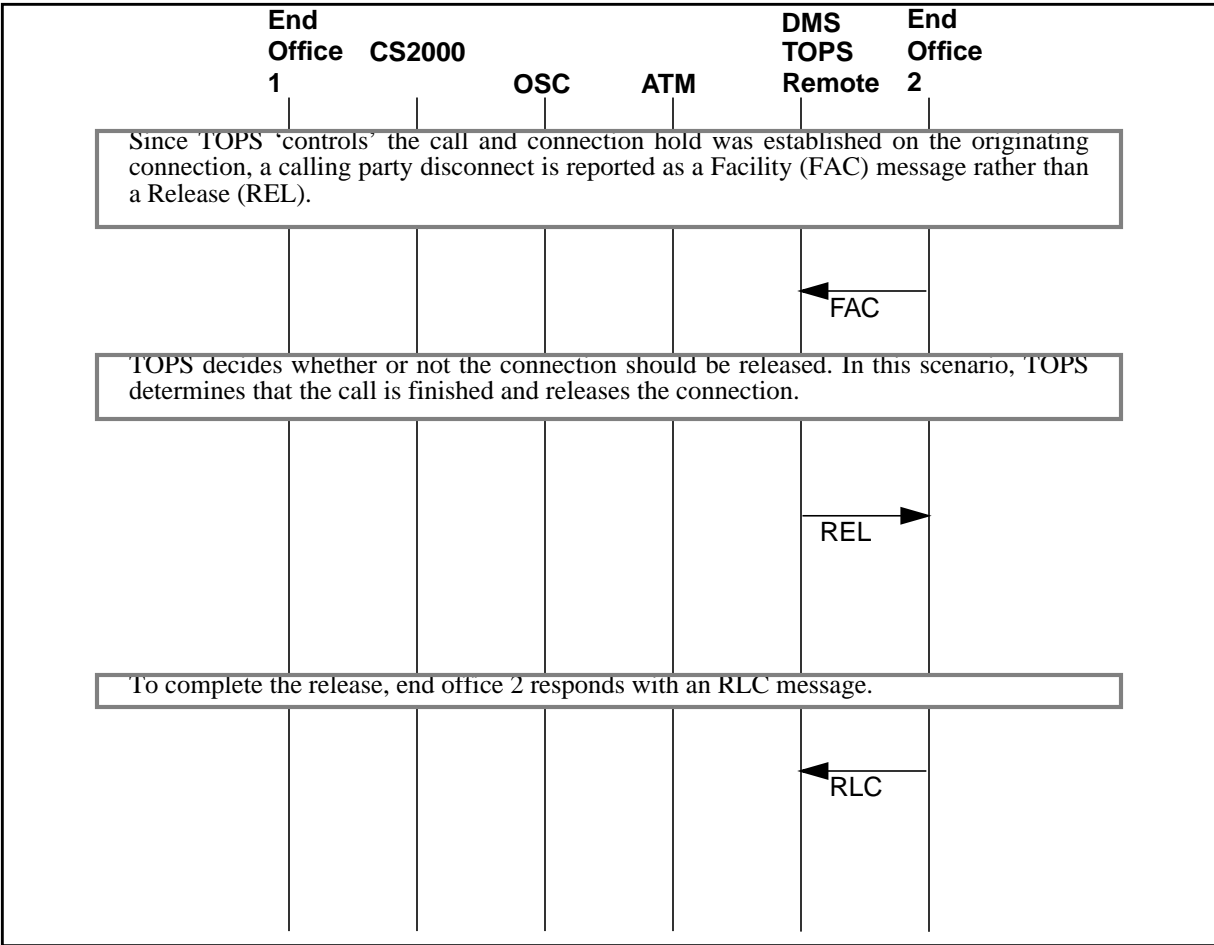


4.2.4.10 1+ directory assistance call using TOPS Succession OC IP configuration- remote

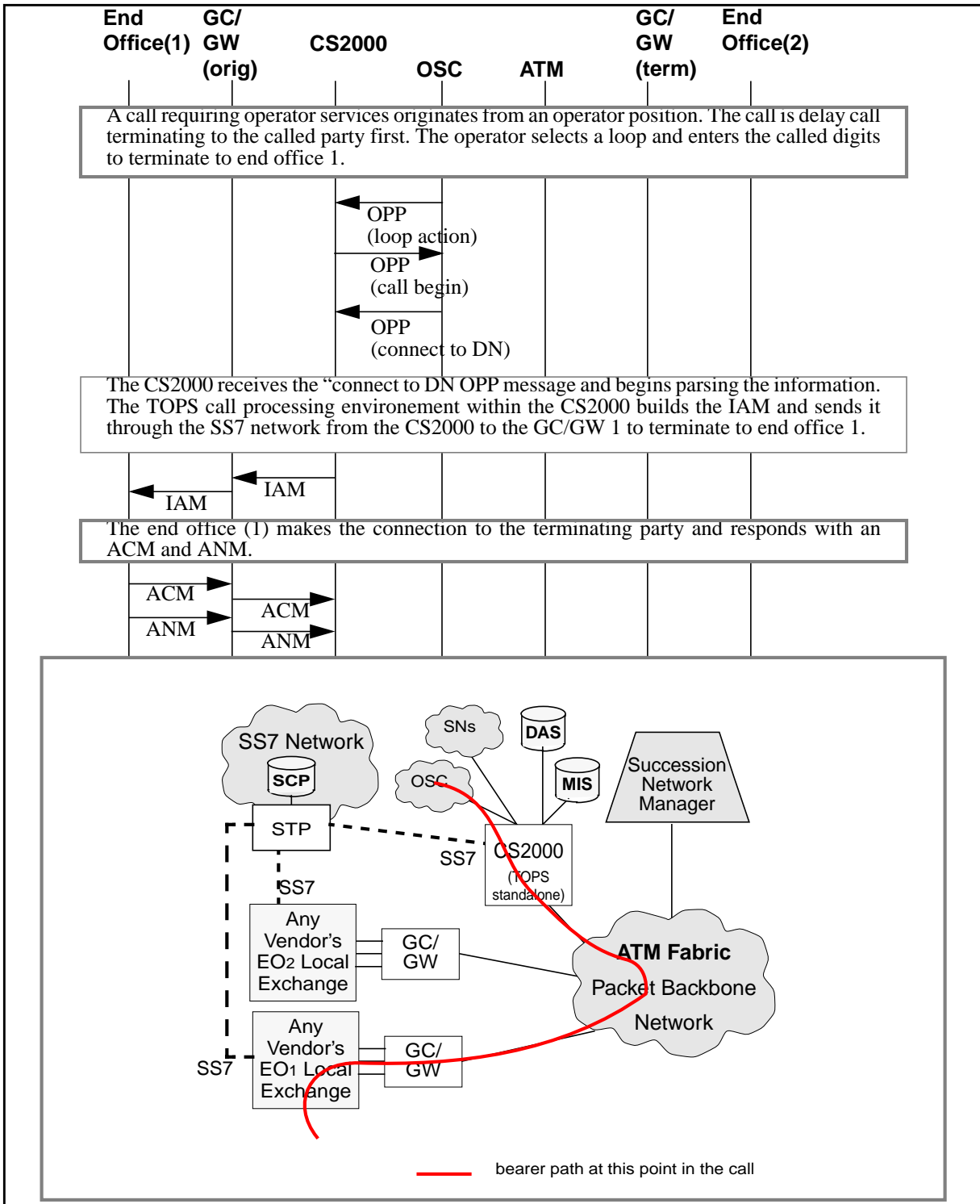


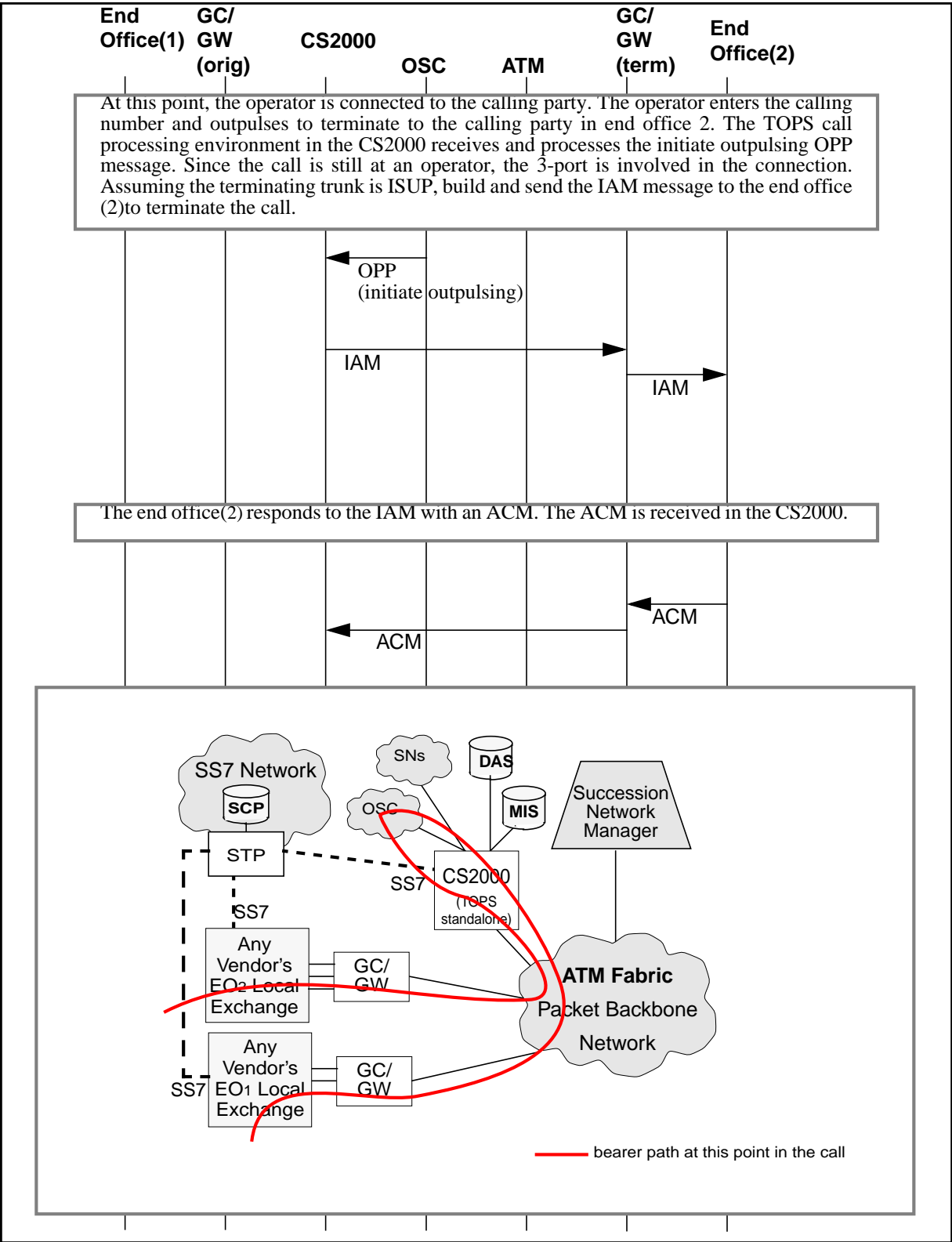


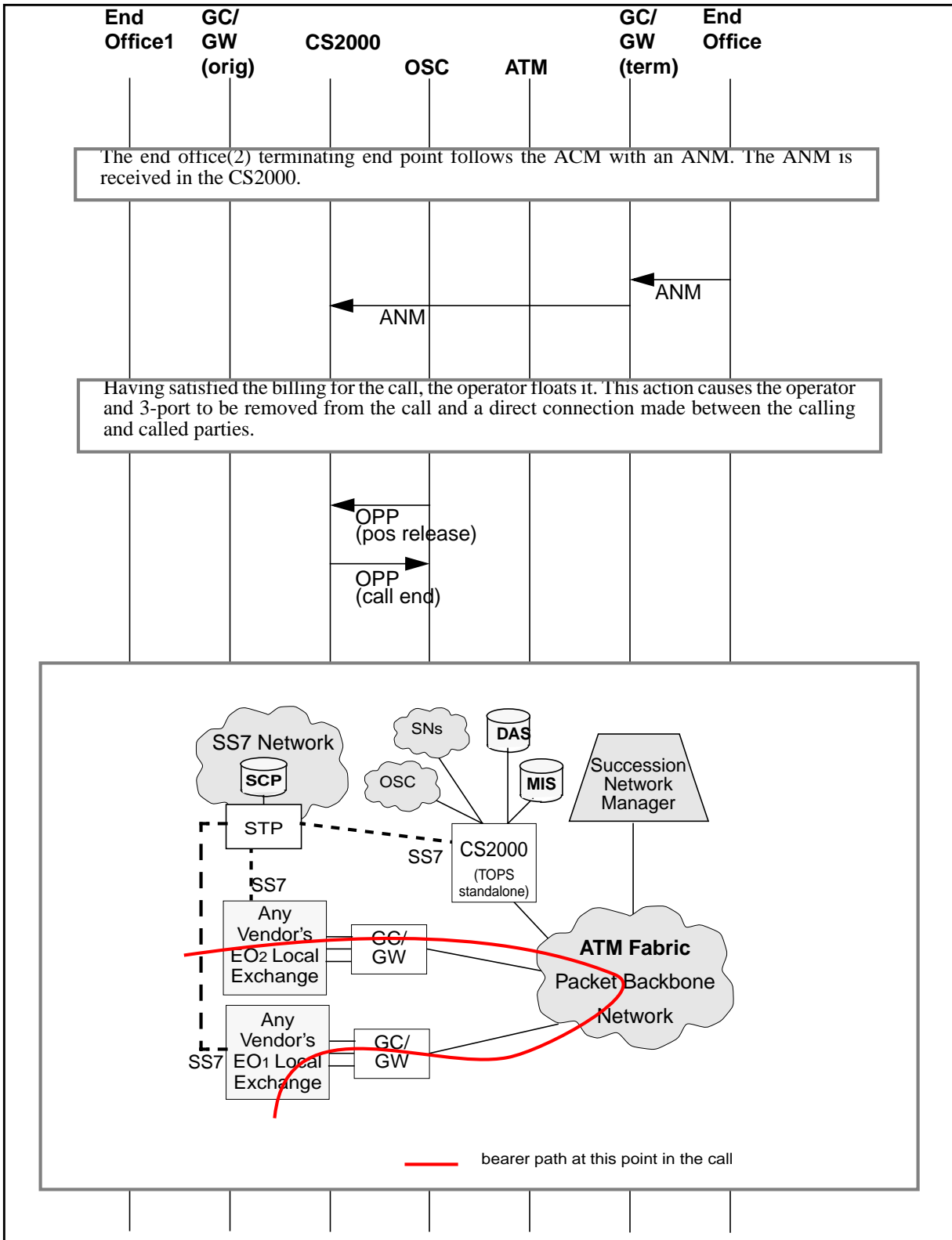


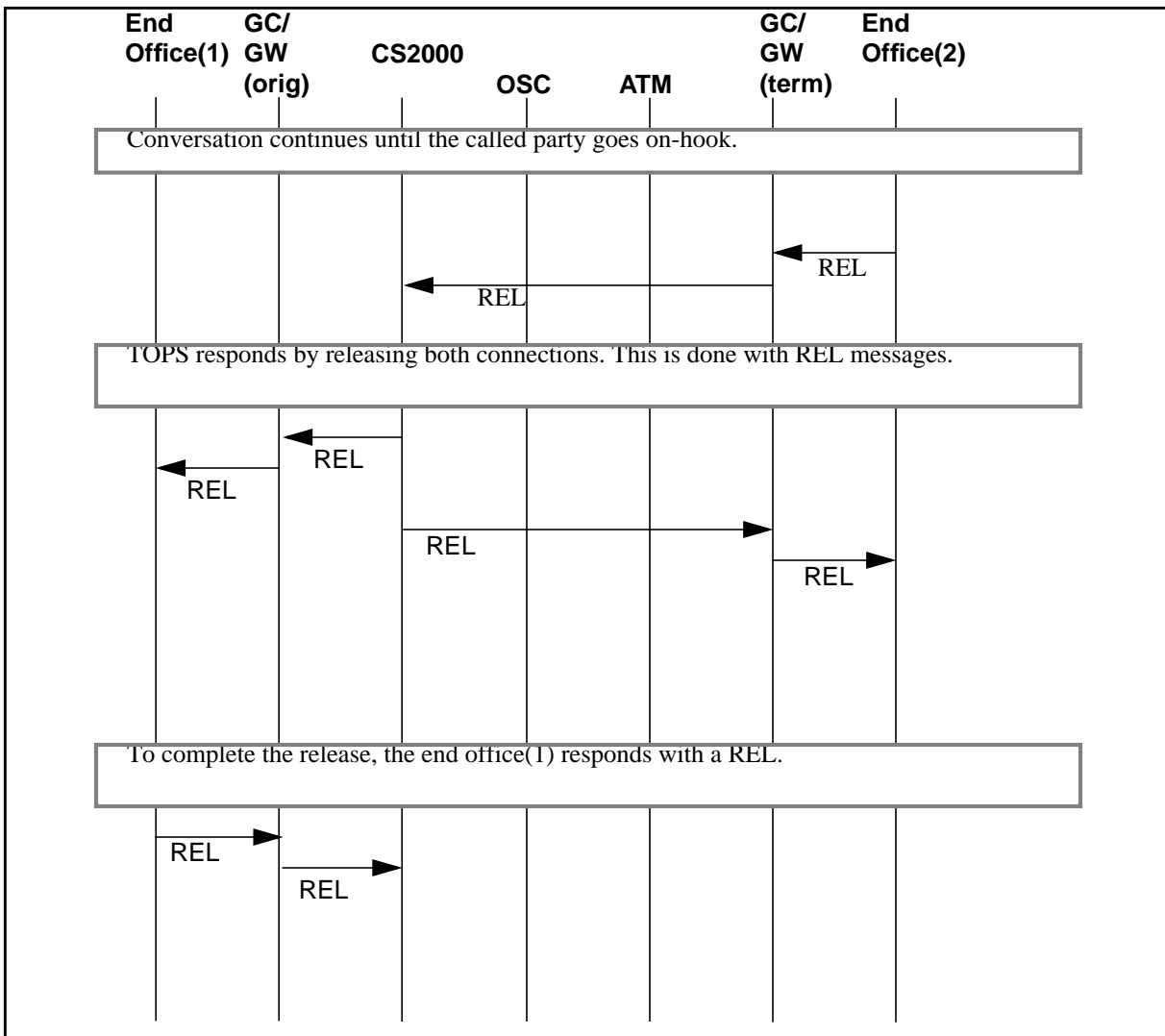


4.2.4.11 Delay call with standalone TOPS Succession







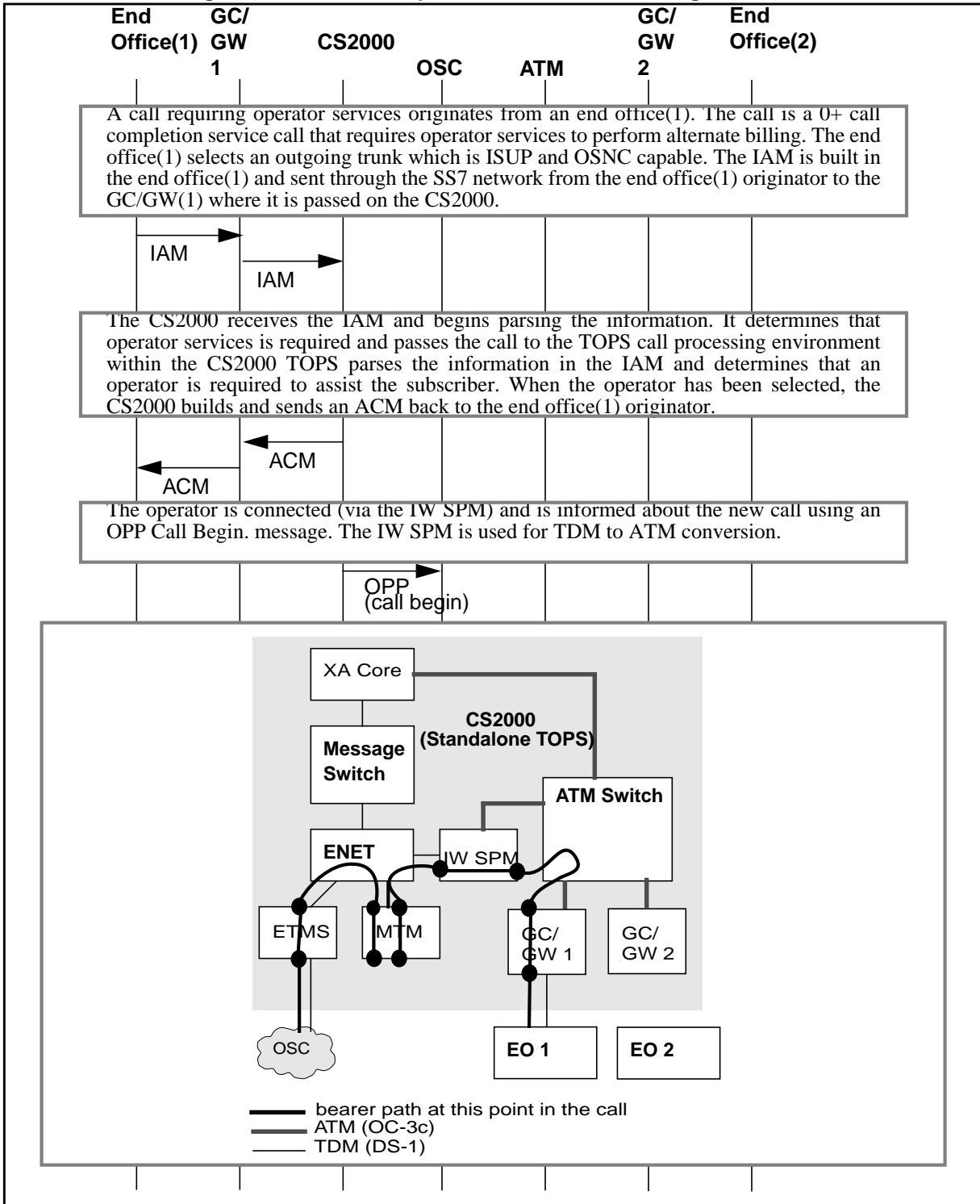


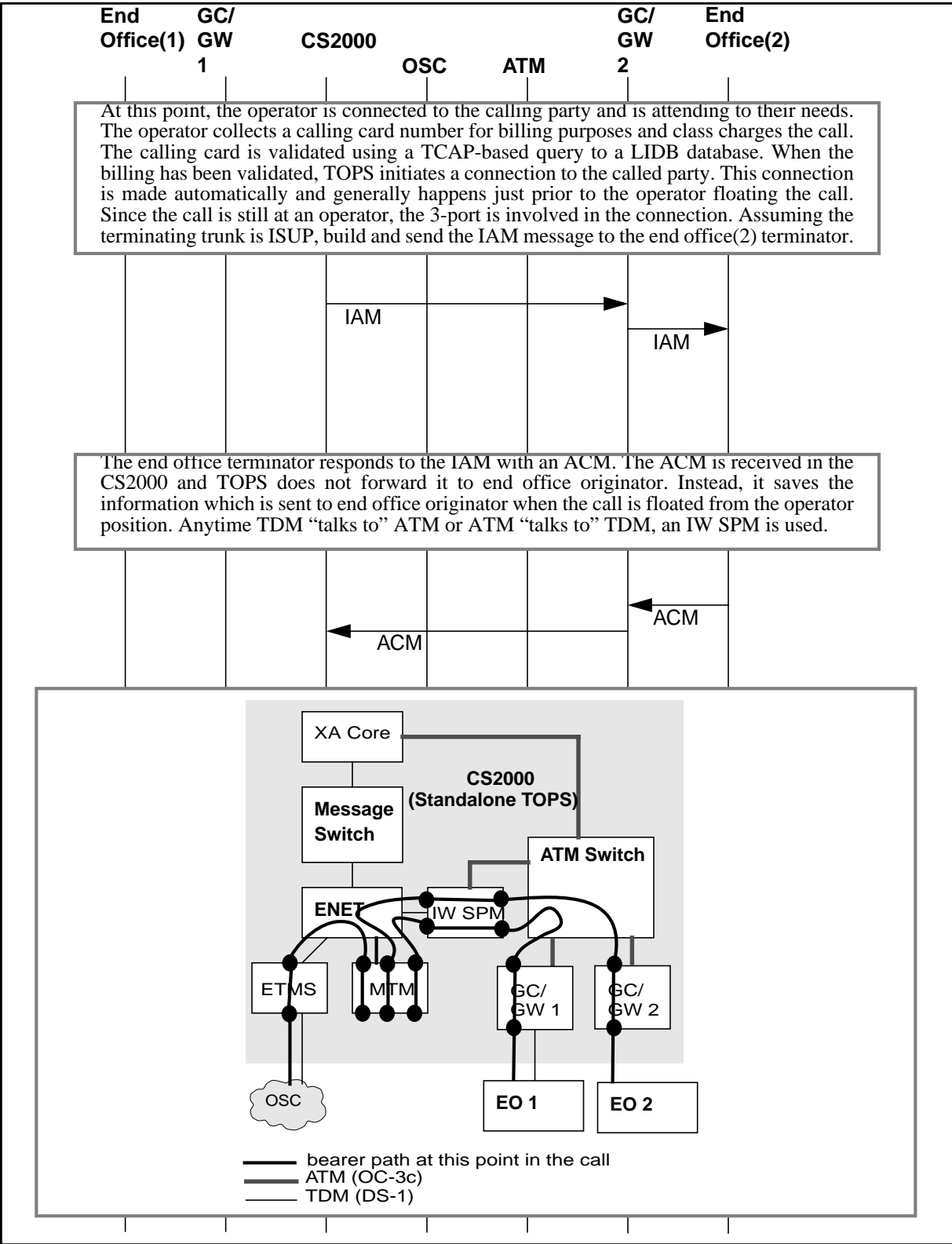
4.2.5 Interworking SPM

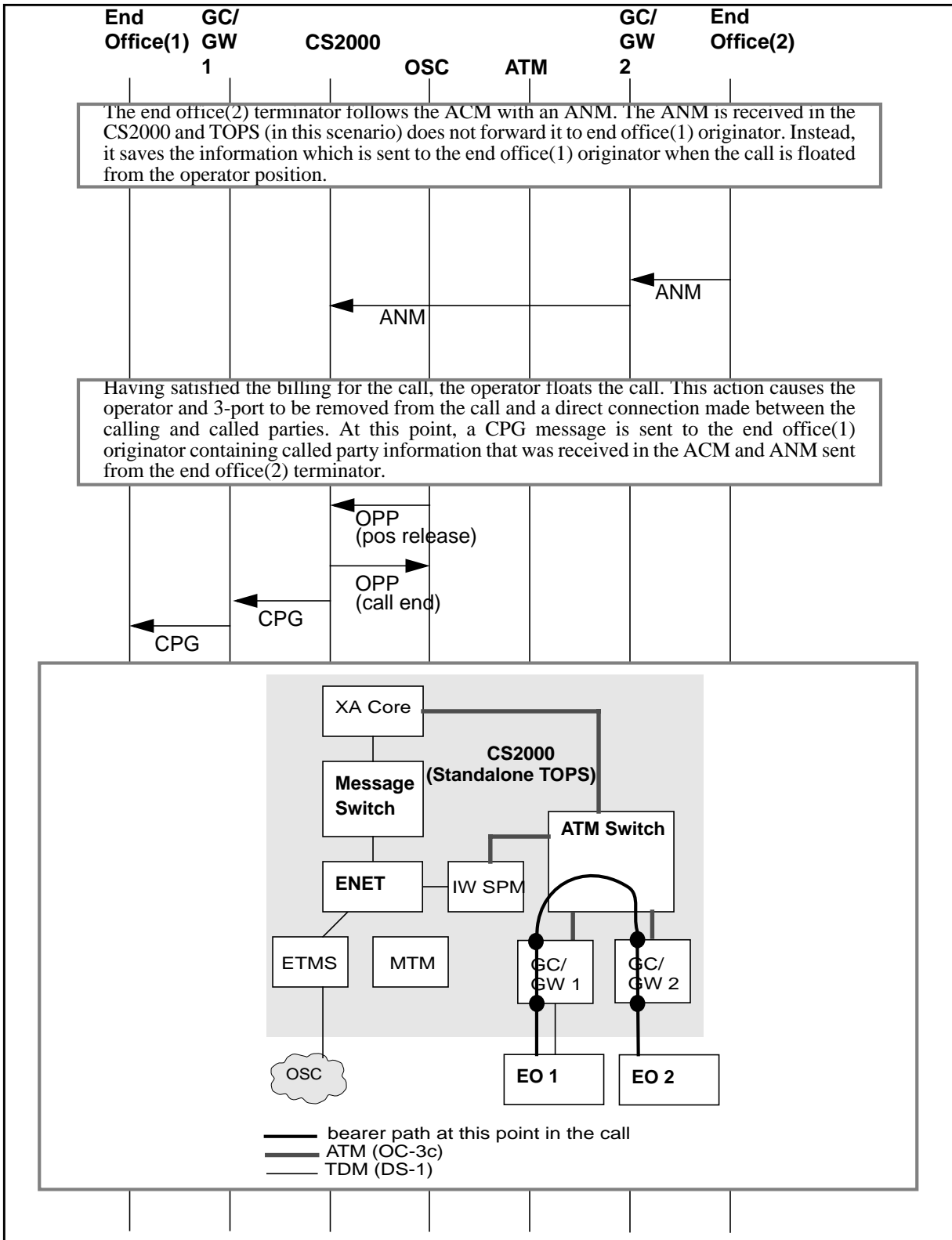
Since TOPS operator positions and other devices and service circuits are hosted on the ENET, calls that originate on MG4000s use the IW SPM to access operator services. Different operator services call types will occupy ports on the IW SPM for different amounts of time. There is currently a limit of eleven IW SPMs per VToA Core which provides 22,000 ports.

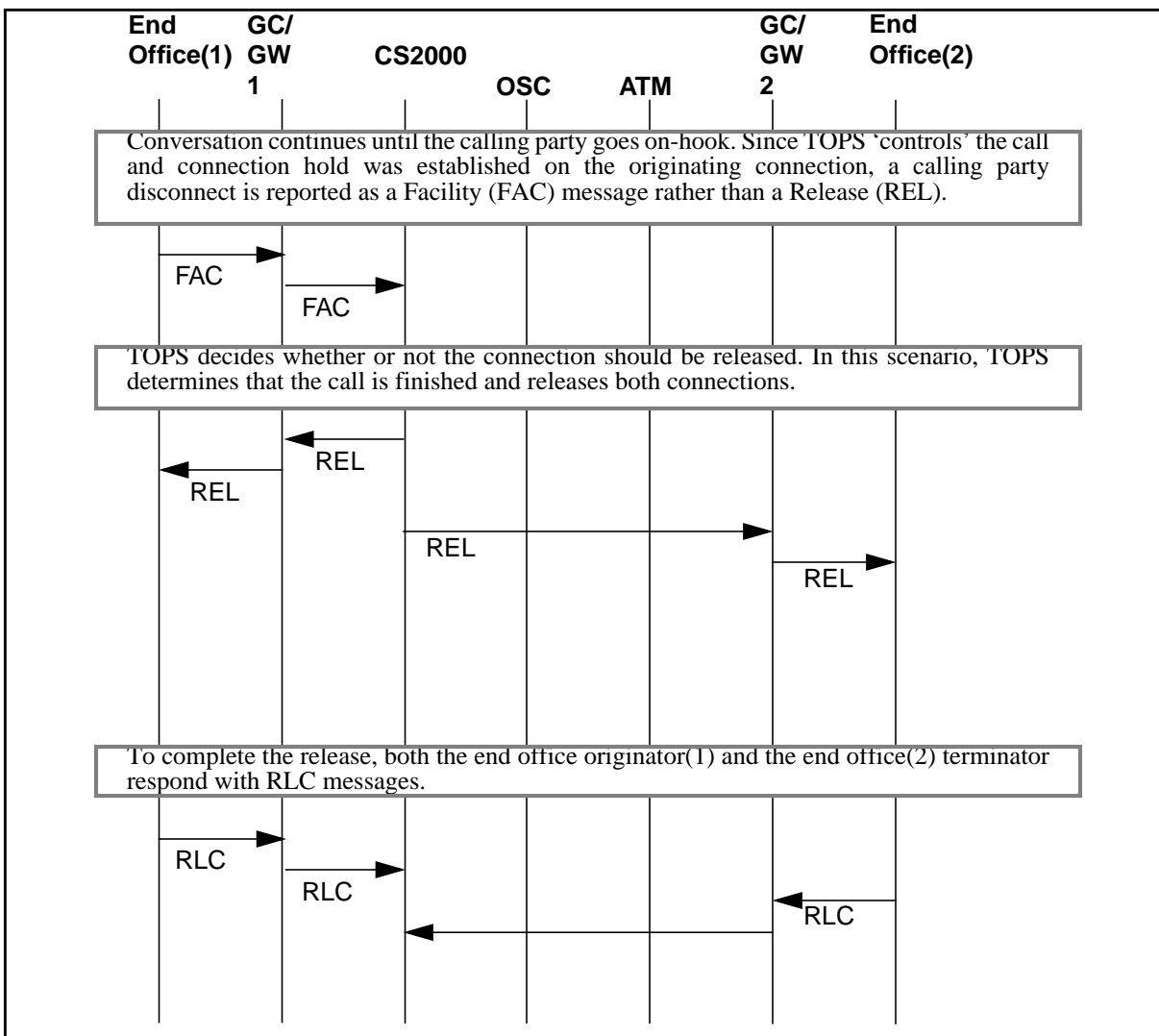
To better understand how IW SPMs are used refer to the following diagram. This diagram gives more detail to the same 0+ call depicted in "2.4.4.10+ call completion with alternate billing standalone TOPS Succession".

Figure 13 0+ call completion with alternate billing









4.2.5.1 IW SPM Usage and Capacity

All calls being served by operators/SN's require an IW SPM bridge for the entire length of the call (while at position/SN.) Once the operator/node is removed from the call, the bridge is no longer needed. However, TOPS is still monitoring for tones and digits that may cause the call to return to an operator or node.

4.2.6 Billing

This activity supports Bellcore AMA Format (BAF) on the Succession Network Manager (SNM). The development done to support billing in SN01 is supported by TOPS14 Succession Development. Refer to NTP 297-5071-021 Succession Network VToA Application Release 1 for more information.

The Supernode Billing Application (SBA) on the Succession Network Manager (SNM) is the AMA vehicle for VToA. With SBA, the billing records are still formatted on the Core and sent to the SNM for storage and transferred to the downstream processor. The SBA also provides tools similar to AMADUMP to search the billing files for particular records and structures.

Note: Only BAF is supported for TOPS billing on the SNM. TOPS Detailed Recording (TDR) is not supported.

4.3 Hardware requirements

Refer to NTP 297-5071-021 Succession Network VToA Application Release 1 for any hardware requirements for trunk connectivity.

4.4 Limitations and restrictions

The only supported direction for the TOPS trunk group type is incoming. This means that TOPS trunks cannot be used in a 2-way configuration when the trunks are hosted on an MG4000. Also, only a limited set of MF signaling types are supported on TOPS trunk group types hosted on an MG4000. Telephone companies that require either 2-way TOPS trunk group types or other MF signaling types on TOPS trunk group types should host these trunk groups on DTCs (or similar peripherals).

This activity does not support GOSS7 or ETSI ISUP connectivity with the MG4000. Affectively, this activity does not support Global offerings- GSP and MMP.

This activity does not support TDR billing.

4.5 Interactions

None known.

4.6 Logs (LG)

There are no log reports created or effected by this feature.

4.7 Data schema (DS)

There are no data schema changes made by this feature.

4.8 Office parameters (OP)

There are no log reports created or effected by this feature.

4.9 Service orders (SO)

There are no changes or additions to Service order made by this feature.

4.10 Alarms (AL)

There are no alarms created or changed by this feature.

4.11 Command interface (CI)

There are no new or modified CI commands created by this feature

4.12 Operational measurements (OM)

There are no new or modified OM groups associated with this feature.

4.13 AMA/Billing information (AM)

This activity supports Bellcore AMA Format (BAF) on the Succession Network Manager (SNM). The development done to support billing in SN01 is supported by TOPS14 Succession Development. Refer to NTP 297-5071-021 Succession Network VToA Application Release 1 for more information.

The Supernode Billing Application (SBA) on the Succession Network Manager (SNM) is the AMA vehicle for VToA. With SBA, the billing records are still formatted on the Core and sent to the SNM for storage and transferred to the downstream processor. The SBA also provides tools similar to AMADUMP to search the billing files for particular records and structures.

Note: Only BAF is supported for TOPS billing on the SNM. TOPS Detailed Recording (TDR) is not supported.

4.14 Software optionality control (SOC)

While this feature does not create any new SOC codes, it does rely on Basic Operator Services. Refer to the following table.

Table 5 SOC

SOC option name:	OSB
SOC option title:	Basic Operator Services
SOC option control type:	state
New SOC option?	No
SOC option order code	OSB00101
Option defined in DRU:	TOPS Core
Affected products:	LET, LLT, MMP, GSP, SNLCS

4.15 Glossary

Term	Description
ATM	Asynchronous Transfer Mode
BAF	Bellcore AMA Format

BICC	Bearer Independent Call Control
CS2000	Succession Communication Server
DTC	Digital Trunk Controller
EM	Element Manager
ENET	Enhanced Network
ETMS	Enhanced TOPS Message Switch
FR	Frame Relay
GW	GateWay
GC	GateWay Controller
IW SPM	Interworking SPM
IXC	InterExchange Carrier
MF	Multifrequency
PTS	Per-Trunk Signaling
SBA	Supernode Billing Application
SNM	Succession Network Manager
SPM	Service Peripheral Module
TDM	Time Division Multiplexing
TOPS	Traffic Operator Position System
TDR	TOPS Detail Recording
VToA	Voice Trunking over ATM

4.16 References

REF #	Description of Reference
59017620	TOPS and BICC Interworking
59012548	OSNC Call Originations
<i>Mubishir's feat</i>	
NTP 297-5071-021	Succession Network VToA Application Release 1
	TOPS and Succession Interworking FSD

59007393	MSH Interworking Trunk Selection
59005887	MSH Interworking Bridge Manager
NTP 297- 5051-300	DMS100 Family Supernode Data Manager Billing Application Guide
	<i>OC IP feature reference</i>

5: Functional description (FN)

5.1 Feature name

DIGMAN Support for Random and Circular Hunting (actid A59017604)

5.2 Description

5.2.1 Feature Synopsis

This activity enhances feature AJ4929, Random and Circular Hunting, which allowed an even distribution of calls across a set of possible trunk groups.

AJ4929 introduced a new table (SUPERTKG) into the translation and routing system. This table is used to associate trunk groups into super-groups. During routing, the calls are allocated to trunk groups from within the super-groups in an even manner. For further information on Random and Circular Hunting, please refer to the FNs for features AJ4929 (Random and Circular Hunting) and AF7338 (Random and Circular Hunting algorithm enhancement).

In addition, AF7338, ISP Even Call Distribution, further enhanced the AJ4929 feature so that circular hunt selection algorithms at the route (RTE) list and Trunk Group levels are provided. The circular hunt selection is accomplished by introducing two new algorithms, clockwise (CHCL) and counter-clockwise (CHCCL) at the RTE list level, and four new algorithms (SG_CWCTH, SG_CCWCTH, GRP_CWCTH, and GRP_CCWCTH) at the trunk member level. Please refer to the FN for feature AF7338 for more information concerning this enhancement.

This activity allows the manipulation of the digits and called party number characteristics, prior to outpulsing over a trunk. The ability to manipulate the digits, makes use of table DIGMAN and its associated functionality.

Table DIGMAN offers a flexible method for manipulating the called party number characteristics and digits. Different manipulation methods are available in table DIGMAN, including adding, removing and inserting digits. These different methods are discussed later in this document.

5.2.2 Feature Description

The SG selector is available in the following tables:

- IBNRTE, IBNRT2, IBNRT3, IBNRT4
- OFRT, OFR2, OFR3, OFR4
- HNPACONT, subtable RTEREF
- FNAPCONT, subtable RTEREF

This feature adds the DMI option to the SG selector. The option has one parameter (DMI) for specifying an index into table DIGMAN. This feature gives the SG selector access to the table DIGMAN commands, but does not alter the existing functionality of any DIGMAN command. For example, if a call is routed with the SG selector and the DIGMAN command (referenced by the DMI parameter) is specific to a type of trunk, or if the command is under SOC (Software Optionality Control), then those same restraints will apply.

Figure 1 demonstrates the use of the DMI option, with the relevant additions being highlighted. The table DIGMAN entry in this illustration (index 1010) contains the DTO (Digits To Outpulse) command which is being used to outpulse the last 7 digits from the called number before continuing through translations.

Figure 1 Example datafill showing the use the DMI option with the SG selector

TABLE SUPERTKG		
SGNAME		TRKGRPS

KNGARG	(KNGA2090FTBWE) (KNGA3084J2ICE)\$	
TABLE DIGMAN		
DMIKEY		DMIDATA

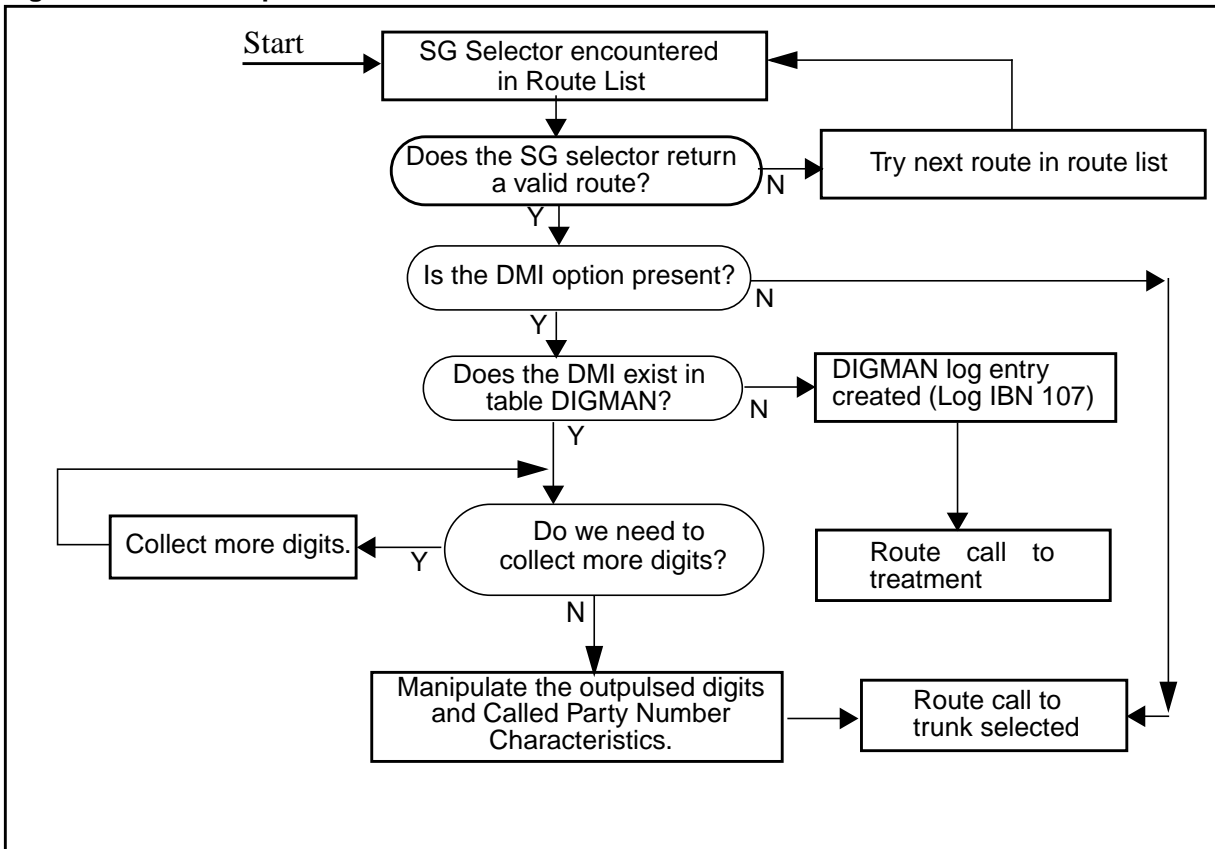
1010	(DTO 7)\$	
TABLE IBNRTE		
RTE		RTELIST OPTIONS

696	(SG CYC 10 KNGARG (DMI 1010) \$)\$	\$

Thus if a call is routed via this IBNRTE entry and the called digits are “9197225000”, then as a result of the DIGMAN command DTO , the resulting called digits will become “7225000”.

Figure 2 shows the interactions between the SG selector, table DIGMAN and the routing of a call.

Figure 2 The DMI option and its interactions



5.2.3 Functional verification

The function of the DMI option when used with the SG selector can be verified by using either the TRAVER or TRNSLVF utilities.

If TRAVER is used in conjunction with the NO TRACE option (NT) or the both option (B), then the manipulated digits will be displayed, as shown in Figure 3.

Figure 3 Example TRAVER of SG selector with DMI option with TRAVER NO TRACE option.

```
>traver 1 7222500 919199741001 nt
DIGIT TRANSLATION ROUTES
1 SGNACKL2          NCDN E164 NA 3367641001 NIL_NSF BC 3.1_KHZ_AUD
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

TRNSLVF will also display a similar output when used in conjunction with the TRACE option not specified.

When TRAVER or TRNSLVF is used in conjunction with the TRACE option (T), then the DMI tuple in table DIGMAN will be displayed after the SG tuple in table SUPERTKG. This is shown in Figure 4.

Figure 4 Example TRAVER of SG selector with DMI option with TRAVER TRACE option

```

>traver l 7222500 919199741001 t
TABLE IBNLINES
HOST 00 0 06 01 0 DT STN IBN 7222500 THE_FAR_SIDE 0 0 613 (LNR) $
TABLE DNATTRS
613 722 2500
(PUBLIC ( NAME PRI_IBN_0) $)$ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
THE_FAR_SIDE 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
THE_FAR_SIDE PXDK MERXLA FTCOMM 0 KDK
TABLE DIGCOL
KDK 9 POTS Y
TABLE IBNXLA: XLANAME PXDK
PXDK 9 NET N Y 1 Y POTS Y N DOD N 80 613_PKDK_80 L613_LATA1_69 NONE $
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
80 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 613_PKDK_80 L613_LATA1_69 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PKDK_80 FR01 613 PKDK NONE N $ $
TABLE RATEAREA
L613_LATA1_69 L613 NIL LATA1 $
TABLE STDPRTCT
PKDK ( 1) ( 0) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 19 19 N DD 1 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 995 1 ( 203) ( 1) ( 84) ( 0) 3 $
. SUBTABLE HNPACODE
. 919 919 HNPA 0
. 974 974 LRTE 974
. SUBTABLE RTEREF
. 974 T IBNRTE 974

```

(continued on next page)

Example TRAVER of SG selector with DMI option and TRAVER TRACE option (cont.)

```
. . TABLE IBNRTE
. . . 974 SG CHCCL 15 PRIHUNT7 (DMI 11)$
. . . TABLE SUPERTKG
. . . PRIHUNT7 (SGNACLK2) (SGNICLK3) (SGNACLK5) (SGNICLK6) $
. . . TABLE DIGMAN
. . . . 11 (CL BEG) (REM 6)
. . . . (INC 336764)
. . . . EXIT TABLE DIGMAN
. . . EXIT TABLE IBNRTE
. . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPACONT results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Further examples of TRAVER can be found in the following three figures. They demonstrate the use of Traver with the SG selector and the DMI option for the two main types of routing tables; IBN, and Office. A couple of these examples utilize the Traver trace option “both” (b) which causes the translation trace and the outpulsed digits to be displayed.

The example in Figure 5 shows a TRAVER where the DMI is not present in Table DIGMAN.

Figure 5 Example TRAVER of SG selector with DMI option where the DMI is non-existent

```

>traver 1 7222500 919199741001 t
TABLE IBNLINES
HOST 00 0 06 01 0 DT STN IBN 7222500 THE_FAR_SIDE 0 0 613 (LNR) $
TABLE DNATTRS
613 722 2500
(PUBLIC ( NAME PRI_IBN_0) $)$ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFPEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
THE_FAR_SIDE 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
THE_FAR_SIDE PXDK MERXLA FTCOMM 0 KDK
TABLE DIGCOL
KDK 9 POTS Y
TABLE IBNXLA: XLANAME PXDK
PXDK 9 NET N Y 1 Y POTS Y N DOD N 80 613_PKDK_80 L613_LATA1_69 NONE $
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
80 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 613_PKDK_80 L613_LATA1_69 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PKDK_80 FR01 613 PKDK NONE N $ $
TABLE RATEAREA
L613_LATA1_69 L613 NIL LATA1 $
TABLE STDPRTCT
PKDK ( 1) ( 0) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 19 19 N DD 1 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 995 1 ( 203) ( 1) ( 84) ( 0) 3 $
. SUBTABLE HNPACODE
. 919 919 HNPA 0
. 974 974 LRTE 974

(continued on next page)

```

Example TRAVER of SG selector with DMI option where the DMI is non-existent (cont.)

```
. SUBTABLE RTEREF
. 974 T IBNRTE 974
. . TABLE IBNRTE
. . . 974 SG CHCCL 15 PRIHUNT7 (DMI 11)$
. . . TABLE SUPERTKG
. . . . PRIHUNT7 (SGNACLK2) (SGNICK3) (SGNACLK5) (SGNICK6) $
. . . . TABLE DIGMAN
TUPLE NOT FOUND
. . EXIT TABLE IBNRTE
. EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: DMI trouble for route # 1; check LOGs
```

The example in Figure 6 shows a TRAVER where the call is routed through an IBN Routing table and the DMI causes the manipulation of the called digits as defined in Table DIGMAN.

Figure 6 Example TRAVER of SG selector with DMI option in an IBN routing table

```

>traver 1 7222500 919199741001 b
TABLE IBNLINES
HOST 00 0 06 01 0 DT STN IBN 7222500 THE_FAR_SIDE 0 0 613 (LNR) $
TABLE DNATTRS
613 722 2500
(PUBLIC ( NAME PRI_IBN_0) $) $ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
THE_FAR_SIDE 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2) $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
THE_FAR_SIDE PXDK MERXLA FTCOMM 0 KDK
TABLE DIGCOL
KDK 9 POTS Y
TABLE IBNXLA: XLANAME PXDK
PXDK 9 NET N Y 1 Y POTS Y N DOD N 80 613_PKDK_80 L613_LATA1_69 NONE $
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
80 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 613_PKDK_80 L613_LATA1_69 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PKDK_80 FR01 613 PKDK NONE N $ $
TABLE RATEAREA
L613_LATA1_69 L613 NIL LATA1 $
TABLE STDPRTCT
PKDK ( 1) ( 0) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 19 19 N DD 1 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 995 1 ( 203) ( 1) ( 84) ( 0) 3 $
. SUBTABLE HNPACODE
. 919 919 HNPA 0
. 974 974 LRTE 974

(continued on next page)

```

```

Example TRAVER of SG selector with DMI option in an IBN routing table (cont.)

. SUBTABLE RTEREF
. 974 T IBNRTE 974
. . TABLE IBNRTE
. . . 974 SG CHCCL 15 PRIHUNT7 (DMI 11)$
. . . TABLE SUPERTKG
. . . PRIHUNT7 (SGNACLK2) (SGNICLK3) (SGNACLK5) (SGNICLK6) $
. . . TABLE DIGMAN
. . . . 11 (CL BEG) (REM 6)
. . . . (INC 336764)
. . . EXIT TABLE DIGMAN
. . EXIT TABLE IBNRTE
. EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.

DIGIT TRANSLATION ROUTES

1 SGNACLK2          NCDN E164 NA 3367641001 NIL_NSF BC 3.1_KHZ_AUD

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

The example in Figure 7 shows a TRAVER where the call is routed through an Office Routing table and the DMI causes the manipulation of the called digits as defined in Table DIGMAN.

Figure 7 Example TRAVER of SG selector with DMI option in an Office routing table

```

>traver 1 7222500 919199871001 b
TABLE IBNLINES
HOST 00 0 06 01 0 DT STN IBN 7222500 THE_FAR_SIDE 0 0 613 (LNR) $
TABLE DNATTRS
613 722 2500
(PUBLIC ( NAME PRI_IBN_0) $)$ $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFPEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
THE_FAR_SIDE 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
THE_FAR_SIDE PXDK MERXLA FTCOMM 0 KDK
TABLE DIGCOL
KDK 9 POTS Y
TABLE IBNXLA: XLANAME PXDK
PXDK 9 NET N Y 1 Y POTS Y N DOD N 80 613_PKDK_80 L613_LATA1_69 NONE $
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
80 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 613_PKDK_80 L613_LATA1_69 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PKDK_80 FR01 613 PKDK NONE N $ $
TABLE RATEAREA
L613_LATA1_69 L613 NIL LATA1 $
TABLE STDPRTCT
PKDK ( 1) ( 0) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 19 19 N DD 1 NA
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 995 1 ( 203) ( 1) ( 84) ( 0) 3 $
. SUBTABLE HNPACODE
. 919 919 HNPA 0
. 987 987 LRTE 987

```

(continued on next page)

```

Example TRAVER of SG selector with DMI option in an Office routing table (cont.)

. SUBTABLE RTEREF
. 987 T OFRT 987
. . TABLE OFRT
. . . 987 SG CHCL 4 PRIHUNT7 (DMI 9)$
. . . . TABLE SUPERTKG
. . . . PRIHUNT7 (SGNACLK2) (SGNICK3) (SGNACK5) (SGNICK6) $
. . . . TABLE DIGMAN
. . . . . 9 (CL BEG) (REM 6)
. . . . . (INC 704821)
. . . . . EXIT TABLE DIGMAN
. . . EXIT TABLE IBNRTE
. . EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.

DIGIT TRANSLATION ROUTES

1 SGNACLK2          NCDN E164 NA 7048211001 NIL_NSF BC 3.1_KHZ_AUD

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 ATB

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

5.3 Hardware requirements

No new hardware requirements.

5.4 Limitations and restrictions

- **In the North American market, if the Universal Routing tables (ACRTE, PXRTE, CTRTE, FARTE, OFCRTE, FTRTE, and NSCRTE) are datafilled using the SG (Supertrunk Group) selector, the manipulation of the called digits via the DMI (Digit Manipulation Index) option is NOT supported. There is no software restriction preventing the datafilling of the DMI against the SG selector in these tables, but the DMI index will not be utilized to index into the DIGMAN table and modify the called digits. The called DN will remain unchanged.**
- In table SUPERTKG, where individual trunk groups are assigned to a super trunk group, it is assumed that all of these trunks are Primary Rate Interface (PRI or PRA) trunks. This is a basic expectation of the feature that implemented the SUPERTKG table. There is no software restriction preventing any other trunk type to be datafilled into a super trunk group,

but it is not supported. Only PRI trunks are supported in table SUPERTKG.

Thus, this feature “DIGMAN Support for Random and Circular Hunting” is supported only for PRI trunks. Although other trunk types can be assigned to super trunk groups and the called digits can now be manipulated, it is not supported.

- Commands in table DIGMAN that are associated with inband signalling are not supported.

5.5 Interactions

None.

5.6 Logs (LG)

No new logs will be introduced. However, table DIGMAN’s functionality produces a log entry when the required DMI for a call is not found, or where a DIGMAN command causes all called digits to be removed. Examples are shown in Figure 8 and Figure 9. For further information on the Logs, please refer to Log Report Reference Manual (Reference [4]).

Figure 8 Example log created when a DMI was non existent in table DIGMAN.

UKC2113BK	IBN107	MAR20	13:29:30	4988	TBL	DIGMAN_DATAFILL_PROBLEM
TYPE	DMI NOT DATAFILLED					
CHECK DMI	1099					
CALLING PARTY	REMI	31	0	03	06	DN 1818114201
DIALED DIGITS						10994202
TERMINATOR	CKT	KNGA2090FTBWE		1		
CALLID	32768					

Figure 9 Example log created when a DMI causes all called digits to be removed.

RTP5	IBN107	JUN16	14:12:36	9600	TBL	DIGMAN_DATAFILL_PROBLEM
TYPE	DMI RESULT CONTAIN NO DIGITS					
CHECK DMI	7					
CALLING PARTY	HOST	00	0	06	01	DN 6137222500
DIALED DIGITS						919199871001
TERMINATOR	CKT	NIPRI4BRIOG		1		
CALLID	32768					

5.7 Data schema (DS)

5.7.1 New/modified tables

Table 1 New or modified tables.

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
IBNRT _x ^a	Changed	Unchanged
OFR _x ^b	Changed	Unchanged
HNPACONT, subtable RTEREF	Changed	Unchanged
FNPAACONT, subtable RTEREF	Changed	Unchanged

a. Where x is one of E, 2, 3 or 4

b. Where x is one of T, 2, 3, 4

Please refer to the “pcnds.fm” chapter of this book for more details concerning the Data Schema changes.

5.8 Office parameters (OP)

Not applicable.

5.9 Service orders (SO)

Not applicable.

5.10 Alarms (AL)

Not applicable.

5.11 Command interface (CI)

Not applicable.

5.12 Operational measurements (OM)

Not applicable.

5.13 AMA/Billing information (AM)

Not applicable.

5.14 Software optionality control (SOC)

Not applicable.

5.15 Glossary

Term	Description
ANSI	American National Standards Institute
BRI	Basic Rate Interface
BTUP	British Telephony User Part
C6	C6 signaling
CCITT	International Telegraph and Telephone Consultative Committee
CDN	Called Number
DIGMAN	Digit Manipulation Table
DMI	Digit Manipulation Index
DMS	Digital Multiplex Switch
DN	Directory Number
DP	Dual Pulse signaling
DPNSS	Digital Private Network Signaling System
DT	Digitone signaling
DTO	Digits To Outpulse
DTMF	Dual Tone Multi Frequency
ETSI	European Telecommunications Standards Institute
FTUP	French Telephony User Part
IBN	Integrated Business Network
INAP	Intelligent Network Application Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
MF	Multi Frequency signaling
MMP	Multi Market Platform
N5MF	CCITT #5 signaling

N6	Reserved signaling
NCCI	New Common Carrier Interface
NP	No Pulse signaling
OF	Office
POTS	Plain Ordinary Telephone Set
PRA	Primary Rate Access
PRI	Primary Rate Interface
RP	Revertive signaling
RTE	Route
Q-SIG	Q Interface Signalling
SG	Super Group Selector
SGNAME	Super Trunk Group Name
SS7	CCITT #7 signaling
SUPERTKG	Super Trunk Group Table
TRAVER	Translations Verification
TRNSLVF	Translations Verification
VN4	Version Numeris 4

5.16 References

- [1] NTP 297-1001-451 MDC Customer Data Schema Reference Manual
- [2] FN AJ4929 Random and Circular Hunting
- [3] FN AF7338 Random and Circular Hunting enhancements.
- [4] NTP 297-1001-840 Log Report Reference Manual
- [5] NTP 297-8001-351 DMS-100 Family NA100 Customer Data Schema Reference Manual, Vol. 4 of 11 LEC0013 and up, pages 1-42 to 1-60

5.17 Appendix 1: Overview of table DIGMAN Commands

This appendix outlines the different commands available in table DIGMAN. For further information regarding these commands and their use, please refer to the table DIGMAN section in the NTP (Reference [1]) or the Customer Data Schema Manual (Reference [5]).

DIGMAN Command	DTO (DTCOUNT)
Description	Outpulse the last DTCOUNT digits of the digit string.
Protocol Independent	Y

DIGMAN Command	INC (INCDIGS)
Description	Include INCDIGS into the digit string at the current cursor position.
Protocol Independent	Y

DIGMAN Command	REM (REMCOUNT)
Description	Remove REMCOUNT digits of digits from the digit string at the current cursor position.
Protocol Independent	Y

DIGMAN Command	PAU (PAUSETIM)
Description	Pause outpulsing for PAUSETIM milliseconds.
Protocol Independent	N
Supported Protocols	Protocols that use inband signaling.

DIGMAN Command	ATD (ATDTONE)
Description	The Auto Tone Detect is used to detect tones returned from the Trunk. The command is used in conjunction with the NT5X29AC audio, answer, detect Digitone multi frequency circuit card. The ATDTONE can be one of AR, DT or GLARE depending on what tone you wish to detect.
Protocol Independent	N
Supported Protocols	All protocols supported by the NT5X29AC audio tone detection card.

DIGMAN Command	ANS (ANSTYPE)
----------------	---------------

Description	The Answer detect is used to detect an answer on terminating trunks from the far end switching unit for answer supervision generation. The command is used in conjunction with the NT5X29AC audio, answer, detect Digitone multi frequency circuit card. The ANSTYPE can be either VOX, ELEC, or ALL depending on the Answer Tone detection method required.
Protocol Independent	N
Supported Protocols	All protocols supported by the NT5X29AC audio tone detection card.

DIGMAN Command	ARDENY
Description	Alternate Route Denial is used in conjunction and before the ATD and ANS commands. If the system detects a failure, the system routes the caller to treatment. Failures that the system can detect include reorder, busy, or timeout. The system does not allow alternate routing.
Protocol Independent	N
Supported Protocols	All protocols supported by the NT5X29AC audio tone detection card.

DIGMAN Command	CL (POSITION)
Description	Set the cursor position to POSITION, for the subsequent command or method. POSITION can be either BEG for beginning or END for end.
Protocol Independent	Y

DIGMAN Command	CB (CBCOUNT)
Description	Move the cursor back CBCOUNT digits for the subsequent command or method.
Protocol Independent	Y

DIGMAN Command	CF (CFCOUNT)
Description	Move the cursor forward CFCOUNT digits for the subsequent command or method.
Protocol Independent	Y

DIGMAN Command	SETCDN (CDNNAME)
----------------	------------------

Description	Uses the CDNNAME to find the outgoing CDN value in table CDNCHAR. This enables the CalleD Number Characteristics to be modified. For further information on SETCDN, please refer to the NTP.
Protocol Independent	N
Supported Protocols	ANSI ISUP, NCCI ISUP, INAP, QSIG, Australian PRI, Japan PRI, ETSI ISUP (and all National Variants), ETSI BRI, ETSI PRI, Version Numeris 4 PRI & BRI

DIGMAN Command	CLI
Description	Calling Line ID retrieves the calling number from the call data block (if it exists) and inserts it in the outpulse file at the current cursor position. This command is dependent on the incoming protocol and the presentation of the CLI
Protocol Independent	N

DIGMAN Command	IPD
Description	Insert digits prefixed off by the standard pretranslator table (STDPRTCT) for outpulsing. Does not include the access code from table IBNXLA.
Protocol Independent	Y

DIGMAN Command	NEX (DMI)
Description	The subsequent DIGMAN digit manipulation index (DMI) that will be used.
Protocol Independent	Y

DIGMAN Command	CALL (DMI)
Description	Pass control over to another DMI. After this has finished, control will be returned. The difference between CALL and NEX is that CALL causes a branch and return, where as NEX calls the DMI after completion of the current
Protocol Independent	Y

DIGMAN Command	IFCC (CALLCHAR, VALUE, DMI)
----------------	-----------------------------

Description	Check the digit string for a range of digits. If the result is TRUE, then the subsequent DIGMAN digit manipulation index will be used. CALLCHAR is a call characteristic from table CALLCHR to which the system routes the translation. VALUE is either Y or N to specify whether to check the call characteristics. DMI specifies the DMI to which the call must proceed if the call characteristic contains the specified value.
Protocol Independent	Y

DIGMAN Command	COM (MINEXT, MAXEXT, DMI)
Description	Compare is used to perform additional digit manipulation on the dialed digits if the dialed digits are in a specified range of values. MINEXT and MAXEXT are the two extension numbers that compared. DMI is the DMI that will be called if the number is in the specified range.
Protocol Independent	Y

DIGMAN Command	SDN (MINEXT, MAXEXT, SUBEXT)
Description	Substitute DN is used to replace the directory number (DN) in the outpulse register with the digits specified by SUBEXT. The dialed number must be in a specified range of values for this condition to function. MINEXT and MAXEXT specify the range of the extension number, and SUBEXT specifies the extension number to replace the digits with.
Protocol Independent	Y

DIGMAN Command	SIG (PULSTYPE, IDGTIME)
Description	This command is used to outpulse digits on a dial pulse trunk. For example, it can be in combination with the ANS command to outpulse an Authcode and destination digits for use with DISA.
Protocol Independent	N
Supported Protocols	All protocols supported by the NT5X29AC audio tone detection card.

DIGMAN Command	FAIL
----------------	------

Description	This command is used to reject the current route list if the element does not apply to the current call. If the system encounters a FAIL command, translation continues with the next route list element. This action occurs when all trunks in the current route list element are busy.
Protocol Independent	Y

DIGMAN Command	FLD
Description	Enables one of the field refinements (IBNATD, DDD, COS, PVNTCM) to be entered. For further information on the functionality of these refinements, please refer to the table DIGMAN section in the NTP.
Protocol Independent	N
Supported Protocols	All protocols supported by the NT5X29AC audio tone detection card.

6: Functional description (FN)

6.1 Feature name

TOPS SOC Option Consolidation

6.2 Synopsis

As operator services transitions into the IP and ATM architectures, the software options associated with TOPS CM were analyzed. TOPS BLM recommended that the TOPS SOC be consolidated to better reflect the operator services functionality in this new architecture. This activity implements the changes in the TOPS CM to implement this new SOC view.

6.3 Background

The following table provides a list of the TOPS software options valid through TOPS 14.

Table 1 TOPS 14 SOCs

Functional Group	SOC	Description
ABS Alternate Billing Services	ABS00001	Alternate billing services
	ABS00002	Automated alternate billing services (AABS)
	ABS00003	Operator hand-off to AABS
	ABS00004	Account code billing
	ABS00005	French/English AABS
	ABS00006	AABS call screening
	ABS00007	TOPS directory number call screening
	ABS00008	TOPS commercial credit card support
	ABS00009	Automated hotel room and authorization number
	ABS00010	Calling card denial reason operator display and announcement
	ABS00011	AABS enhanced services
	ABS00012	TOPS Originating Line Number Screening (OLNS) interface
	ABS00013	TOPS authorization code billing
	ABS00014	Disallowed calling card issuer
ADVQ Advanced Queuing	ADVQ0001	Advanced queuing (i.e., QMS)
	ADVQ0002	TOPS close down
	ADVQ0005	Host/remote networking by queue type
	ADVQ0006	QMS Custom Service Enhancements (QMSCASE)
	ADVQ0007	QMS queue by billing satisfied
	ADVQ0008	Music and announcement in queue
	ADVQ0009	QMS host/remote queuing

Table 1 TOPS 14 SOCs

Functional Group	SOC	Description
ENSV Enhanced Services	ENSV0001	Enhanced services
	ENSV0002	Automated Coin Toll Service (ACTS)
	ENSV0003	TOPS alternate announcements
	ENSV0004	Screened service routing
	ENSV0005	Extended audio response host/remote
	ENSV0006	Two-digit ANI ID
	ENSV0007	Pre-paid coin
	ENSV0008	Enhanced TOPS operator centralization (OC)
	ENSV0009	External Rater Interface
	ENSV0010	Country direct
	ENSV0011	Enhanced OC - increased remote support
	ENSV0013	Message Delivery Service
	ENSV0018	Estimate of charges
	ENSV0021	OLNS foreign language
	ENSV0022	OLNS support for no automation
	ENSV0023	IN Interworking
ENSV0025	Seconds-based ACTS announcements	
ENSV0026	TOPS IP operator centralization	
EWSS Enhanced Workstation Software	EWSS0001	Enhanced workstation software
	EWSS0002	Automated OIA session start
	EWSS0003	TOPS directory assistance subtending TMS
	EWSS0004	TOPS Open Position Protocol (OPP)
	EWSS0005	TOPS Increased Multiplexing
	EWSS0006	TMS Networking
	EWSS0007	TMS processor upgrade

Table 1 TOPS 14 SOCs

Functional Group	SOC	Description
GOS Global Operator Services	GOS00001	Global operator services
	GOS00004	GOSS7 ANSI signaling
	GOS00005	GOSS7 ETSI signaling
	GOS00006	Competitive access
OSAN OSSAIN	OSAN0001	OSSAIN
	OSAN0002	OSSAIN initial release
	OSAN0003	OSSAIN 07 enhancements
	OSAN0004	OSSAIN 09 enhancements
	OSAN0005	OSSAIN 10 enhancements
	OSAN0006	OSSAIN 11 enhancements
	OSAN0007	OSSAIN 12 enhancements
	OSAN0100	OSSAIN session pricing
OSB Operator Services Basic	OSB00001	Operator services basic
OSDA Directory Assistance	OSDA0001	Directory assistance
	OSDA0002	Automatic DA call completion with alternate billing
	OSDA0003	Automatic Intercept call completion
	OSDA0004	Automated DA service (ADAS)
	OSDA0005	Cellular ADACC
	OSDA0006	Automated DA service (ADASPlus)
	OSDA0008	LPP/APU support

Table 1 TOPS 14 SOCs

Functional Group	SOC	Description
OSEA TOPS Equal Access	OSEA0001	TOPS equal access
	OSEA0002	TOPS InterLATA Carrier Service (TICS)
	OSEA0003	EAOSS signaling
	OSEA0004	EAFGD/COMFGD signaling
	OSEA0005	TOPS ISUP signaling (AN1515)
	OSEA0006	IntraLATA PIC from OLNS
	OSEA0007	TOPS/DMS250 release link trunking I
	OSEA0008	Local Number Portability (LNP)
	OSEA0009	TOPS/DMS250 release link trunking II
	OSEA0010	Bellcore LNP
	OSEA0011	Canadian equal access
	OSEA0012	FlexANI
	OSEA0013	OSNC signaling
UNBN Unbundling	UNBN0001	Unbundling
	UNBN0002	Queuing by SPID
	UNBN0003	Translations and routing by SPID
	UNBN0004	QMS statistics by SPID
	UNBN0005	Branding by SPID
	UNBN0006	Billing restrictions by SPID
	UNBN0007	Screening for billing agreement

6.4 Description

TOPS BLM has provided the following view of the TOPS SOC options for TOPS 15.

Table 2 TOPS 15 SOCs

Functional Group	SOC	Description	DRUs	PCLs^a
ABS Alternate Billing Services	ABS00101	Alternate billing service	TOPSCORE	LET, LLT, MMP, GMP

Table 2 TOPS 15 SOCs

Functional Group	SOC	Description	DRUs	PCLs^a
ENSV Enhanced Services	ENSV0101	ENSV Enhanced Services Base	TOPSCORE	LET, LLT, MMP, GMP
	ENSV0102	Automated Coin Toll Service (ACTS)	TOPSCORE	LET, LLT, MMP, GMP
	ENSV0103	External Rater Interface	TOPSCORE	LET, LLT, MMP, GMP
	ENSV0104	OLNS foreign language	TOPSCORE	LET, LLT, MMP, GMP
	ENSV0105	OLNS support for no automation	TOPSCORE	LET, LLT, MMP, GMP
	ENSV0106	IN Interworking	TOPSCORE	LET, LLT, MMP, GMP
	ENSV0107	TOPS IP operator centralization	TOPSCORE	LET, LLT, MMP, GMP
GOS Global Operator Services	GOS00101	Base global operator services	GLTOPS	MMP, GMP
	GOS00102	GOSS7 signaling	GLTOPS	MMP, GMP
	GOS00103	Competitive access	GLTOPS	MMP, GMP
OSAN OSSAIN	OSAN0101	OSSAIN base features	TOPSCORE	LET, LLT, MMP, GMP
	OSAN0102	OSSAIN enhanced features	TOPSCORE	LET, LLT, MMP, GMP
	OSAN0103	OSSAIN session pricing	TOPSCORE	LET, LLT, MMP, GMP

Table 2 TOPS 15 SOCs

Functional Group	SOC	Description	DRUs	PCLs^a
OSB Operator Services Basic	OSB00101	Basic Operator Services	TOPSCORE	LET, LLT, MMP, GMP
	OSB00102	OPP/IP	TOPSCORE	LET, LLT, MMP, GMP
OSDA Directory Assistance	OSDA0101	Directory assistance base	TOPSCORE	LET, LLT, MMP, GMP
	OSDA0102	Directory assistance call completion	TOPSCORE	LET, LLT, MMP, GMP
OSEA TOPS Equal Access	OSEA0101	TOPS equal access base	CNATOPS	LET, LLT
	OSEA0102	TOPS ISUP signaling	CNATOPS	LET, LLT
	OSEA0103	Local Number Portability (LNP)	CNATOPS	LET, LLT
UNBN Unbundling	UNBN0101	Unbundling base	TOPSCORE	LET, LLT, MMP, GMP
	UNBN0102	Queuing by SPID	TOPSCORE	LET, LLT, MMP, GMP
	UNBN0103	Branding by SPID	TOPSCORE	LET, LLT, MMP, GMP

a. These are the PCLs available at the time of the writing of this document. An effort to consolidate PCLs is currently underway which could cause the data in this column to change.

6.4.1 New Table TOPSFTR

As described above, several SOC options have been eliminated and/or consolidated into new SOC options in TOPS15. However, the ability to specify whether or not a SOC feature is enabled (even though the SOC option may be discontinued) has been preserved by creating a new table, TOPSFTR. This table enables the user to specify whether or not a feature is enabled. TOPSFTR contains tuples corresponding to the TOPS features. Each tuple contains the identification of the specific feature and its setting (i.e., whether or not it is enabled). A setting of Y in the data field column, FTRENABL, indicates that the feature is enabled and N indicates that the given feature is disabled. Details pertaining to the tuples are given in DS.

The size of the Table, TOPSFTR is fixed. It contains tuples representing the TOPS features, controlled earlier by the SOC Options that are since removed, as well as their enabled/disabled setting. Any given feature can be enabled by setting it to Y or disabled by setting it to N. Please see Table 3 in DS for an illustration of the contents of TOPSFTR.

Every individual TOPS SOC feature is now controlled by both its parent SOC option and its TOPSFTR entry. For a given TOPS feature to be functional, the parent SOC option must be ON as well as the corresponding FTRENABL setting in the TOPSFTR table for that feature must be set to Y.

Warning messages are provided in the SOC procedures to caution the user of conflicting interactions. For example, if a given SOC option is changed from IDLE to ON, then for each SOC feature controlled by that SOC option, a message is displayed listing the state as specified in TOPSFTR. This enables the user to be aware of what features are enabled when the given SOC option is turned ON. Similarly, if a given SOC option is changed from ON to IDLE, a message is displayed listing all SOC features that would no longer be active.

Warning messages are also displayed if there is a conflict in the enable/disable status of a feature in TOPSFTR and the state of the SOC option controlling that feature. For example, when the user attempts to enable a SOC feature in TOPSFTR by setting FTRENABL to Y, a warning message is displayed if the SOC option controlling that feature is IDLE.

6.4.2 ONP behavior

The procedure used for updating entries in TOPSFTR during an ONP depends on the current TOPSFTR entry, if it exists on the dump side, i.e., in the current release. All pre-TOPS15 versions do not contain TOPSFTR entries.

In the case, where a current TOPSFTR entry does not exist on the dump side, or where TOPSFTR does not exist at all on the dump side, SOC state data for the removed options are stored over the ONP. After the SOC data has been transferred, each TOPSFTR entry is checked against its previous SOC Option. If the state of the given SOC option on the dump side is ON, then it initializes the FRTENABL for that feature to Y. Otherwise, the FRTENABL feature is not updated.

6.4.3 ABS - alternate billing services

The ABS functional group is being completely collapsed from fourteen SOC options to one SOC option. The dependencies that the new option has are also

reflected in the table below. This would make the TOPS 15 view of the functional group be as follows:

Table 3 ABS functional group for TOPS 15

ABS SOC	Description	Contents	Dependencies	Type
ABS00101	Alternate billing service	Basic Alternate Billing Service functionality <ul style="list-style-type: none"> • Automated alternate billing services (AABS) • Operator hand-off to AABS • Account code billing • French/English AABS • AABS call screening • AABS enhanced services • TOPS directory number call screening Additional functionality enabled 3by Table TOPSFTR <ul style="list-style-type: none"> • AUTHORIZATION_CODE BILLING • AUTOMATED_ROOM_AND_AUTH_NUM_COLLECTION • CALLING_CARD_DENIAL_REASON • COMMERCIAL_CREDIT_CARD_SUPPORT • DISALLOWED_CARD_ISSUER • ORIGINATING_LINE_NUMBER_SCREENING 	OSB00101	state

Assuming OSB00101 is on, the transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is to automatically turn on ABS00101. All of the functionality controlled by ABS00101 will be available following the ONP. If OSB00101 is off, then ABS00101 will be off.

6.4.4 ADVQ - advanced queuing

The ADVQ functional group is being completely removed in TOPS 15. Its contents are being moved into the OSB functional group. Refer to "2.4.9 OSB - operator services basic" for information on the ADVQ options that are moved to the OSB functional group.

6.4.5 ENSV - enhanced services

The ENSV functional group is being collapsed from eighteen options to seven options. This would make the TOPS 15 view of the functional group be as follows:

Table 4 ENSV functional group for TOPS 15

ENSV SOC	Description	Contents	Dependencies	Type
ENSV0101	Enhanced Services Base	<ul style="list-style-type: none"> <place holder for the functional group> 	OSB00101	tracked
ENSV0102	Automated Coin Toll Service (ACTS)	<ul style="list-style-type: none"> Automated Coin Toll Service (ACTS) 	ENSV0101	tracked
ENSV0103	External Rater Interface	<ul style="list-style-type: none"> EXTERNAL_RATING SECONDS_BASED_ANNOUNCEMENTS 	ENSV0101	state
ENSV0104	OLNS foreign language	<ul style="list-style-type: none"> OLNS_FOREIGN_LANGUAGE 	ENSV0101	state
ENSV0105	OLNS support for no automation	<ul style="list-style-type: none"> OLNS_NO_AUTOMATION 	ENSV0101	state
ENSV0106	IN Interworking	<ul style="list-style-type: none"> IN_OPERATOR_BACKUP 	ENSV0101	state
ENSV0107	TOPS IP operator centralization	<ul style="list-style-type: none"> OPERATOR_CENTRALIZATION_IP 	ENSV0101	state

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is simple because most of the changes are just SOC option renames. The exception is ENSV0103 which combines two options together. If either option is on, then the ENSV0103 option will be turned on.

6.4.6 EWSS - enhanced workstation software

The EWSS functional group is being completely removed in TOPS 15. Its contents are being moved into the OSB functional group. Refer to "2.4.9 OSB - operator services basic" for information on the EWSS options that are moved to the OSB functional group.

6.4.7 GOS - global operator services

The GOS functional group is being collapsed from four options to three options. This would make the TOPS 15 view of the functional group be as follows:

Table 5 GOS functional group for TOPS 15

GOS SOC	Description	Contents	Dependencies	Type
GOS00101	Base Global Operator Services	<ul style="list-style-type: none"> <place holder for the functional group> 	OSB00101	tracked

Table 5 GOS functional group for TOPS 15

GOS SOC	Description	Contents	Dependencies	Type
GOS00102	GOS GOSS7 Signaling	<ul style="list-style-type: none"> • GOSS7_ANSI • GOSS7_ETSI 	GOS00101	state
GOS00103	GOS Competitive Access	<ul style="list-style-type: none"> • GLOBAL_COMPETITIVE_ACCESS 	GOS00101	state

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is simple because most of the changes are just SOC option renames. The exception is GOS00102 which combines two options together. If either option is on, then the GOS00102 option will be turned on.

6.4.8 OSAN - OSSAIN

The OSAN functional group is being collapsed from eight options to three options. The view is to have an OSSAIN base option, an OSSAIN enhancements option and then the OSSAIN sessions-based option. This would make the TOPS 15 view of the functional group be as follows:

Table 6 OSAN functional group for TOPS 15

OSAN SOC	Description	Contents	Dependencies	Type
OSAN0101	OSSAIN Base	<ul style="list-style-type: none"> • OSSAIN_INITIAL_RELEASE • OSSAIN_RELEASE_07 • OSSAIN_RELEASE_09 	OSB00101	state
OSAN0102	OSSAIN Enhancements	<ul style="list-style-type: none"> • OSSAIN_RELEASE_10 • OSSAIN_RELEASE_11 • OSSAIN_RELEASE_12 	OSAN0101	state
OSAN0103	OSSAIN session pricing	<ul style="list-style-type: none"> • OSSAIN session pricing 	N/A	usage

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is to examine the state of the options in TOPS 14 (or earlier) and if any option from the TOPS 14 (or earlier) side is on, then the option on the TOPS 15 side will be turned on.

6.4.9 OSB - operator services basic

The OSB functional group is being modified to include functionality that was moved from the ADVQ, EWSS and ENSV functional groups. The OSB functional group contained only one SOC option, OSB00001, which was a 'state' option. The additional functionality being moved into OSB are included

under the new option OSB00101. This would make the TOPS 15 view of the functional group be as follows:

Table 7 OSB functional group for TOPS 15

OSB SOC	Description	Contents	Dependencies	Type
OSB00101	Basic Operator Services	Basic Operator Services functionality <ul style="list-style-type: none"> • 09 realtime recovery • 800+ interworking • AMA Mods • AMA Table 281 • Attendant Pay Station • Automated OIA session start • Code removal of TOPS IV • DNSCRN Enhancements • DA/Toll Branding • Extended audio response host/remote • Host OC Datalink • Host/remote networking by queue type • Logical TID for T&C • MD Code removal and re-engineering • MIS over IP • Dial-Up Autoquote (DUAQ) • Table PICNAME expansion • Position/Device Evolution to IP • QMS host/remote queuing • RU Robustness • Remote OC Datalink • Screened service routing • TCAP TRID replacement • TOPS 0- XFR billing • TOPS 11 Robustness and Real-Time Recovery • TOPS alternate announcements • TOPS AMA Enhancements • TOPS AWT Enhancements • TOPSBC, STS and SNPA • TOPS Bellcore AMA • TOPS Call Processing Feature • TOPS Cityzone Rating • TOPS close down • TOPS directory assistance subtending TMS • TOPS E911 • TOPS Extended Bellcore AMA (EBAF) • TOPS IDDD 15 digit expansion • TOPS Increased Multiplexing 	none	state

Table 7 OSB functional group for TOPS 15

OSB SOC	Description	Contents	Dependencies	Type
OSB00101	Basic Operator Services	<p>Basic Operator Service functionality (cont)</p> <ul style="list-style-type: none"> • TOPS IP Evolution • TOPS Inward Validation • TOPS Multi-NPA Support • TMS Networking • TOPS NOTIS Format • TOPS NoRestartSWACT • TOPS Open Position Protocol (OPP) • TOPS Operator Password • TOPS Permanent Hold • TMS processor upgrade • TOPS Remote CAMA • TOPS Robustness • TOPS Service Billing • TOPS Yr2000 • TOPS/Carrier Interworking • TOPS06 Robustness • Table LATANAME Expansion • Table TOPSDISP Expansion • Two-digit ANI ID • XA-Core Analysis and Preparation <p>Additional functionality enabled by Table TOPSFTR</p> <ul style="list-style-type: none"> • COUNTRY_DIRECT • OPERATOR_CENTRALIZATION_INCREMENT • OPERATOR_CENTRALIZATION • ESTIMATE_OF_CHARGES • MESSAGE_DELIVERY_SERVICE • MUSIC_AND_ANN_IN_QUEUE • PRE_PAID_COIN • QMS_CASE • QMS_BILLING_SATISFIED • TOPS_ON_OFF_SWITCH 	none	state
OSB00102	OPP over IP	Voice and data over IP for OPP positions	N/A	usage

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is simple for OSB00001. In TOPS 14 (or earlier), all TOPS SOC's depended upon OSB00001. The transition strategy for OSB00001 is to rename it to OSB00101. The SOC options being collapsed into OSB00101 will not effect the value of OSB00101.

6.4.10 OSDA - directory assistance

The OSDA functional group is being collapsed from seven options to three options. The view is to really have three options: a Directory Assistance (DA) base option, a DA Over IP option and a DA call completion option. This would make the TOPS 15 view of the functional group be as follows:

Table 8 OSDA functional group for TOPS 15

OSDA SOC	Description	Contents	Dependencies	Type
OSDA0101	Directory assistance base	Basic functionality <ul style="list-style-type: none"> • Automated DA service (ADAS) • ADASPlus • LPP/APU support 	OSB00101	tracked
OSDA0102	Directory assistance call completion	Basic functionality <ul style="list-style-type: none"> • Automatic DA call completion with alternate billing • Automated intercept call completion Additional functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • CELLULAR_AUTOMATIC_DA_CALL_COMPLETION 	OSDA0101	tracked

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is simple because the options on the TOPS 15 side are all tracked options. There is no need to examine the state on the TOPS 14 (or earlier) side. Those features that had 'state' options in TOPS 14 (or earlier) are now managed as features under 'tracked' options in TOPS 15.

6.4.11 OSEA - TOPS equal access

The OSEA functional group is being collapsed from thirteen options to four options. This would make the TOPS 15 view of the functional group be as follows:

Table 9 OSEA functional group for TOPS 15

OSEA SOC	Description	Contents	Dependencies	Type
OSEA0101	TOPS equal access base	Basic functionality <ul style="list-style-type: none"> • TOPS InterLATA Carrier Service (TICS) • EAOSS signaling • EAFGD/COMFGD signaling Additional functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • INTRA_LATA_PIC_VIA_OLNS • CANADIAN_EQUAL_ACCESS • FLEX_ANI 	OSB00101 ABS00101	tracked
OSEA0102	TOPS ISUP signaling	Functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • ISUP_FOR_TOPS • OSS7_OSNC • RLT_FOR_ISUP • RLT2_FOR_ISUP 	OSEA0101	state
OSEA0103	Local Number Portability (LNP)	Functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • NUMBER_PORTABILITY • BELLCORE_NUMBER_PORTABILITY 	OSEA0101 LNP00100	state

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 varies for each new option. The OSEA0101 option is implemented as a 'tracked' option, so all of the TOPS 14 (or earlier) 'state' options do not need to be examined in the upgrade. Both OSEA0102 and OSEA0103 options are implemented as 'state' options. If any of the TOPS 14 (or earlier) options are on, then OSEA0102/OSEA0103 option will be turned on.

6.4.12 UNBN - unbundling

The UNBN functional group is being collapsed from seven options to three options. This would make the TOPS 15 view of the functional group be as follows:

Table 10 UNBN functional group for TOPS 15

UNBN SOC	Description	Contents	Dependencies	Type
UNBN0101	Unbundling base	Functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • UNBUNDLING_TRANSLATION_S_VIA_SPID • UNBUNDLING_SPID_IN_MIS_STREAM • CALL_REST_FOR_WSALE • SCREEN_FOR_BILLING_AGREEMENT 	OSB00101	state
UNBN0102	Queuing by SPID	Functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • UNBUNDLING_REFINEMENT_FOR_SPID 	UNBN0101	state
UNBN0103	Branding by SPID	Functionality enabled by Table TOPSFTR <ul style="list-style-type: none"> • UNBUNDLING_BRANDING_VIA_SPID 	UNBN0101	state

The transition strategy for switches with TOPS 14 (or earlier) upgrading to TOPS 15 is similar for each new option. UNBN0101, UNBN0102 and UNBN0103 options are implemented as a ‘state’ options. If any of the TOPS 14 (or earlier) options are on, then UNBN0101/UNBN0102/UNBN0103 option will be turned on.

6.4.13 Mapping of old and new SOC options

The following table presents the relationship between SOC options in TOPS14 and TOPS15.

Table 11 Relation between SOC options in TOPS14 and TOPS15

SOC Option ID in TOPS14	SOC Option ID in TOPS15	SOC Option Name in TOPS15
ABS00008	ABS00101	Alternate Billing Service
ABS00009		
ABS00010		
ABS00012		

Table 11 Relation between SOC options in TOPS14 and TOPS15

SOC Option ID in TOPS14	SOC Option ID in TOPS15	SOC Option Name in TOPS15
ABS00013 ABS00014		
ENSV0009 ENSV0025	ENSV0103	External Rater Interface
ENSV0021	ENSV0104	OLNS foreign language
ENSV0022	ENSV0105	OLNS support for no automation
ENSV0023	ENSV0106	IN Interworking
ENSV0008 ENSV0026	ENSV0107	TOPS IP operator centralization
GOS00004 GOS00005	GOS00102	GOS GOSS& Signaling
GOS00006	GOS00103	GOS Competetive Access
OSAN0003 OSAN0004	OSAN0101	
OSAN0005 OSAN0006 OSAN0007	OSAN0102	OSSAIN Enhancements
OSAN0100	OSAN0103	OSSAIN session pricing
OSB00001	OSB00101	Basic Operator Services
OSDA0006	OSDA0101	Directory assistance base
OSDA0005	OSDA0102	Directory assistance call completion
OSEA0006 OSEA0011 OSEA0012	OSEA0101	TOPS equal access base
OSEA0005 OSEA0007 OSEA0009 OSEA0013	OSEA0102	TOPS ISUP signaling
OSEA0008	OSEA0103	Local Number Portability

Table 11 Relation between SOC options in TOPS14 and TOPS15

SOC Option ID in TOPS14	SOC Option ID in TOPS15	SOC Option Name in TOPS15
OSEA0010		
UNBN0003	UNBN0101	Unbundling base
UNBN0004		
UNBN0006		
UNBN0007		
UNBN0002	UNBN0102	Queuing by SPID
UNBN0005	UNBN0103	Branding by SPID

6.5 Hardware requirements

None.

6.6 Limitations and restrictions

None.

6.7 Interactions

None.

6.8 Logs (LG)

None.

6.9 Data schema (DS)

6.9.1 New/modified tables

Table 12 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TOPSFTR	NEW	NEW

6.10 Office parameters (OP)

None.

6.11 Service orders (SO)

None.

6.12 Alarms (AL)

None.

6.13 Command interface (CI)

None.

6.14 Operational measurements (OM)

None.

6.15 AMA/Billing information (AM)

None.

6.16 Software optionality control (SOC)

Refer to "2.4 Description" for this information.

6.17 Glossary

Term	Description
AABS	Automated Alternate Billing Services
ACTS	Automated Coin Toll Service
ADACC	Automated Directory Assistance Call Completion
ADAS	Automated Directory Assistance Service
ARAN	Automated Room and Authorization Number
BLM	Business Line Management
DA	Directory Assistance
GCA	Global Competitive Access
IN	Intelligent Network
IP	Internet Protocol
LNP	Local Number Portability
OIA	Originating Information Access
OLNS	Originating Line Number Screening
OPP	Open Position Protocol
QMS	Queue Management System
QMSCASE	QMS Custom Service Enhancements
OC	Operator Centralization
OSNC	Operator Services Network Capability

RTU	Right To Use
SPID	Service Provider Identification
TICS	TOPS InterLATA Carrier Service

6.18 References

Document	Description
59006653	TOPS IP: Position Maintenance

7: Functional description (FN)

7.1 Feature name

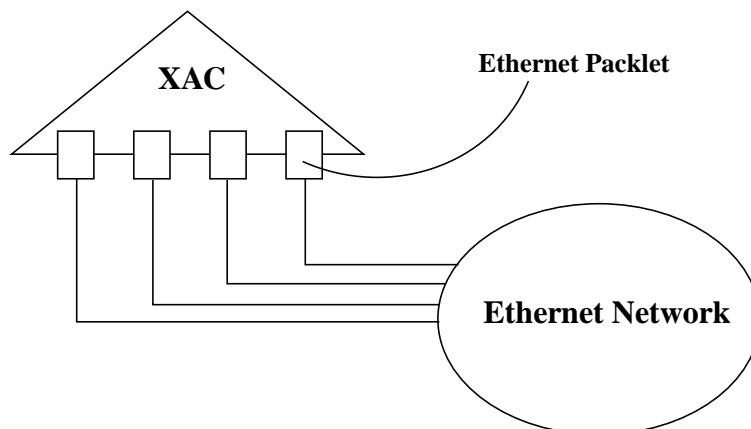
XA-Core Ethernet Maintenance (AT.59019176).

7.2 Description

This document provides an overview of the function provided by the system maintenance and OAM software for the ethernet links connecting the XA-Core to an ethernet network.

This feature provides the maintenance interface to the craftperson for monitoring and manipulating the state of the ethernet packet, port and link between the XA-Core and the ethernet network.

The XA-Core connects to the ethernet network using a minimum of two links (i.e., one active and one warm stand-by) and a maximum of four links (i.e., two active and two warm standby). Each ethernet packetlet can host one link; therefore there must be between two and four packetlets in the shelf to support this configuration. The customer should select a two or four packetlet configuration based on capacity requirements.



The OAM components provided by this feature will be consistent with the existing XA-Core OAM interface as well as the overall DMS OAM infrastructure. These include the MAP, logs, alarms, and Operational Measurements (OMs).

The software included in this feature provides the following functionality:

- A new MAP level to maintain the ethernet packets, ports, and links.
- Specific alarms, logs and operational measurements that report on the maintenance status of the XA-Core ethernet packets, ports, and links.

This feature is preparatory in CSP14. All¹ CSP14 Ethernet functionality is disabled by BOOLEANS around the maintenance code. The first delivery of the Ethernet functionality is for the Beta-1 trial and is being developed in the DCS13 stream. The next delivery of this feature is planned for SN02 which plans to use the Base DRU from CSP14. This Ethernet feature will be activated via patching for the SN02 product.

As development moves to CSP15, the Ethernet functionality will be enabled and complete product verification will be performed as part of the CSP.

7.3 Hardware requirements

To meet capacity requirements it is possible to configure the XA-Core with two or four ethernet packets.

With two ethernet packets:

- Two NTLX03AA Input/Output Processor (IOP) cards in slots 5R and 14R.
- Two NTLX09AA Ethernet packets located in the lower packet position of slots 5R and 14R.

With four ethernet packets:

- Four NTLX03AA Input/Output Processor (IOP) cards in slots 5R, 6R, 13R and 14R.
- Four NTLX09AA Ethernet packets located in the lower packet position of slots 5R, 6R, 13R and 14R.

For a description of the IOP card refer to NTP 297-8891-810 (XA-Core Reference Manual).

¹Although no Ethernet maintenance functions will be performed in CSP14, the 'Ether' MAP level, the Ethernet packet log definitions and Ethernet related OMs will be visible to the customers. The 'Ether' MAP level is empty, just like the 'AMDI' MAP level is empty when no AMDI packet is equipped in the system. The Ethernet packet logs are never generated and the Ethernet related OMs remain 0 at all times.

For further information regarding the installation of the IOP card refer to NTP 297-8891-510 (XA-Core Maintenance Manual).

For a description of the Ethernet packlet refer to NTP ???-????-???

For further information regarding the installation of the ethernet packlet refer to AT.59009527 (XA-Core Provisioning)

Figure 1 Sample Physical Layout Configuration

NOT AVAILABLE FOR USE	1F		
IOP (DISK/TAPE)	2F		
	3F	SIM	3R
PE	4F	IOP (CMIC/RTIF)	4R
PE	5F	IOP (ETHR/empty)	5R COD
SNSE Unaddressable ***	6F	IOP (ETHR/empty)	6R COD
SHARED MEMORY	7F	SHARED MEMORY	7R
SHARED MEMORY	8F	SHARED MEMORY (SNSE Unaddressable ***)	8R
SHARED MEMORY (SNSE Unaddressable ***)	9F	SHARED MEMORY	9R
SHARED MEMORY	10F	SHARED MEMORY	10R
SHARED MEMORY	11F	SHARED MEMORY (SNSE Unaddressable ***)	11R
SNSE Unaddressable ***	12F	<<EMPTY>>	12R
PE	13F	IOP (ETHR/empty)	13R COD
<<EMPTY>>	14F	IOP (ETHR/empty)	14R COD
NOT AVAILABLE FOR USE	15F	IOP (CMIC/RTIF)	15R
PE	16F	SIM	16R
IOP (DISK/TAPE)	17F	<input type="checkbox"/> Recommended Ethernet Slots *** These slots are unaddressable on a XA-Core SNSE Shelf but are addressable on a XA-Core SNSE Shelf Extension	
	18F		

7.4 Limitations and restrictions

For this feature, the following limitations and restrictions exist:

1. Currently, the only slots available for the additional ethernet packlets are also used by cutover devices (COD). If a cutover from an existing CM to an XA-Core is required, CODs are required and usually remain on the shelf for a maximum period of two weeks before being removed. Once the CODs are removed, the ethernet packlets can be inserted. Thus, for a period of up to two weeks, the XA-Core cannot be connected to an ethernet network. This restriction does not impact existing or new XA-Core offices.
2. For technical reasons, it is not possible for an IOP (NTLX03AA) to simultaneously host two AMDI, CMIC, or Ethernet packlets, or any combination of these packlets.

7.5 Interactions

This feature interacts directly with the XA-Core IP over Ethernet Connectivity feature AT.59013333

7.6 Provisioning and Deprovisioning of Ethernet Packlets

For provisioning and deprovisioning ethernet packlets, and associated IOPs, this feature makes use of the XA-Core provisioning feature. For a more detailed explanation of the provisioning feature please refer to FN-A59009527.

The recommended approach for provisioning an IOP with an ethernet packlet is to first insert an empty IOP into a recommended slot. The system will test the card and, if no faults are found, bring the card into service. Once the integrity of the card has been verified, the craftsperson should manually busy the IOP and insert the ethernet packlet into the lower packlet position. At this point an RTS of the IOP will attempt to bring the packlet into service.

To deprovision an IOP with an ethernet packlet, the craftsperson should first busy both the IOP and the ethernet packlet. While the IOP and packlet are manually busied, the craftsperson should physically remove the packlet, and if desired the IOP, from the shelf. At the ethernet MAP level, the “uneq_” command can be used to remove the packlet from the maintenance software’s inventory. The “uneq_” command can also be used from the IO MAP level to unequip the IOP once it has been removed from the shelf.

7.7 Logs (LG)

XA-Core logs related to this feature for the ethernet packlets, ports and links are divided into two functional categories:

- Information logs

- Action logs

Information logs provide information about an event that occurred in the XA-core, such as alarm clearing, configuration change or a status report.

Action logs are generated when a system alarm is raised. They provide information about the fault that caused the degraded service/reliability condition and indicate a recommended course of action a craftsperson should follow to bring the ethernet packet, port or link back to regular operation.

7.7.1 Information Type Log

An information type log does not suggest any action to be taken by the craftsperson. It does not have an associated alarm, and therefore the alarm field in the title is left blank. The following is a typical format for an information type log:

Figure 2 Info Log Template

```
XAC###  mmmdd hh:mm:ss ssdd INFO      Title text
DESCRIPTION:  description text
CARD: Type STATE  Site Fl Row Bay      Shf/Slot: EqPEC/Serial:
      tttt ssss   HOST 00 A00 DPCC:00 nn/nnc p  NTccccvv/nnnnnnnn
```

The following is an example of an ethernet information log:

Figure 3 Info Log Example

```
XAC629 OCT09 19:09:19 1900 INFO ETHR (Ethernet Condition Cleared)
DESCRIPTION: OOS link(s) restored to service.
CARD:Type State Site Fl Row Bay      Shf/Slot: EqPEC/Serial:
      ETHR Insv  HOST 00 A00 DPCC:00 00/05R L  NTLX09BA/NNTM171VY7
```

The log numbers in this group are in the following ranges:

- 600-699 for other information

The **XAC629** log number has been selected to represent ethernet info logs. This INFO log is consistent with the existing XA-Core log system.

The description statement field contains a description of the event that occurred. It may include the state change information (e.g. from ManB to InSv) of the card described in the “card field” with the following additional information:

- card type (IOP, ETHR, ETHR Port, ETHR Link)
- card state (InSv, IsTb, SysB, CBSy, ManB)
- card location (site, floor, row, bay, shelf/slot, packet)

- PEC and serial number of the card

7.7.2 Action Type Logs

A log of this type indicates that a fault was detected on a field replaceable unit in XA-core and suggests a course of action that should be taken by a craftsperson. The following is a typical format of an action type log:

Figure 4 Action Log Template

```
XAC### mmmdd hh:mm:ss ssdd FLT      Title text
IMPACT: text describing impact to system
CARD: Type STATE:Site Fl Row Bay      Shf/Slot:   EqPEC/Serial:
      tttt  ssss HOST 00 A00 DPCC:00 n/np frfr   NTccccvv/nnnnnnnn
Port <n>, Link <n>: <cccc>, <cccc>
REASON: reason/cause description
ACTION: suggested action text
CARDLIST: Type Site FL Row Bay        Shf/Slot      EqPEC/Serial
          cccc-cccc-nn-cnn-cccc:nn--nn/nnc-c--cccccccc/nnnnnnnnnnnn
          cccc-cccc-nn-cnn-cccc:nn--nn/nnc-c--cccccccc/nnnnnnnnnnnn
          cccc-cccc-nn-cnn-cccc:nn--nn/nnc-c--cccccccc/nnnnnnnnnnnn
```

The following is an example of an ethernet action log:

Figure 5 Action Log Example

```
**XAC329 OCT29 09:09:19 1199 FLT      ETHR ( Ethernet )
IMPACT: 1 of 4 Ethernet links on XA-CORE is in-service
CARD: Type STATE:Site Fl Row Bay      Shf/Slot:   EqPEC/Serial:
      ETHR Manb HOST 00 A00 DPCC:00 00/14R L   NTLX09BA/NNTM171VY7
Port 0, Link 0: CBSY, CBSY
REASON: Ethernet link(s) are OOS due to manually busied packet.
ACTION: Attempt to RTS packet.
```

The action type log has an associated alarm. The severity of the alarm is represented in the log with the following leading asterisk signs (part of the standard log format):

- ‘***’ for a critical alarm condition,
- ‘**’ for a major alarm condition,
- ‘*’ for a minor alarm condition, and
- ‘ ‘ for a “no alarm” condition,

The log numbers in this group are in the following ranges:

- 300-399 Log category trouble

The **XAC329** log number has been selected to represent ethernet action logs. This action log is consistent with the existing XA-Core log system.

The XAC329 log is generated on packet, port or link faults with the following information:

The 'IMPACT' statement field contains the description of the event that occurred. Redundancy checks and state changes are reported in the 'IMPACT' statement field.

The 'REASON' statement field contains the description of the fault that caused the reported alarm condition.

The card description part of the log contains the description of the device that the fault was detected on. The card description is omitted in logs which report occurrences of events that are not related to specific devices.

A device is described with:

- card type (IOP, ETHR, ETHR Port, ETHR Link).
- card state (InSv, IsTb, SysB, CBSy, ManB).
- card location (site, floor, row, bay, shelf/slot, packet).
- PEC and serial number of the card.

The 'Action' statement recommends the course of action which should be taken to clear the problem.

A card list is generated when the system detects a fault on a card, and more than one card can be the source of the fault.

7.7.3 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
XAC	329	NEW	SOS
XAC	629	NEW	SOS

7.8 Data schema (DS)

This feature does not introduce any new tables and does not modify any existing tables.

7.9 Office parameters (OP)

This feature does not introduce any new office parameters and does not modify any existing office parameters.

7.10 Service orders (SO)

This feature has no service order impacts.

7.11 Alarms (AL)

In addition to the existing XA-Core system alarm structure, this feature will add one extra system alarm to indicate problems with the ethernet packet, port or link. The new ethernet alarm will appear as “ETHR” under the XAC System Alarm header which is located at the top left hand corner of the DMS MAP screen. As with other DMS alarms, the “ETHR” alarm can be raised as a Critical, Major, or Minor alarm by displaying the corresponding characters below the alarm on the MAP screen (i.e., Critical = ‘*C*’, Major = ‘M’, Minor = ‘ ’).

Table 1

XA-Core Ethernet System Alarms		Severity	Name	Possible Cause
Communication with Ethernet Network	No communication	Critical	ETHR	IOP hosting an Ethernet Packet is OOS, Ethernet Packlets, Ports or Links are OOS.
	Loss of redundancy (exposure to an E1 condition)	Major		
	Loss of redundancy	Minor		
Non-critical fault on an IOP, packet, port or link (i.e.. Istb)		Minor	IOTrbl	IOP, Packet, Port or link istb due to a non-critical fault.

7.11.1 XA-Core System Alarm Hierarchy

The following table illustrates the hierarchy of the XA-Core system alarms including the new ethernet alarm.

Table 2 System Alarm Hierarchy

Rank	System Alarm
1	RExTst
2	ImgTst
3	Split
4	FWVersion
5	MemLim
6	LowPE
7	LowSM
8	MScomm

Table 2 System Alarm Hierarchy

Rank	System Alarm
9	AMDI
10	ETHR
11	Image
12	TOD
13	XATrap
14	DISK
15	RTIF
16	RExSch
17	TAPE
18	PEtrbl
19	IOtrbl
20	SMtrbl
21	RIBkey
22	WgSlot

7.11.2 New/modified directories

No new CI directories other than the MAPCI changes described in the CI section have been introduced by this feature.

7.12 Command interface (CI)

The Maintenance and Administration Position (MAP) refers to the component of the OAM interface that allows the craftsperson to access and manipulate the states of the DMS maintainable hardware components in real time. Real time status information is provided via the MAP display while commands and responses are handled by the MAP Command Interface (MAPCI).

The changes made to the MAPs by this feature are:

- New Ethernet (ETHR) MAP level is introduced.
- New “ETHR” command is introduced to the existing XAC MAP level (this is the navigational command that allows moving to the new ETHR level from other XAC MAP levels).
- Existing IO MAP level is modified to include the ethernet packets in its display.

- Existing XAC, and IO MAP level commands are modified (as required) to support the ethernet packets and links.

7.12.1 Change to existing XA-Core Port/Link maintenance.

As well as introducing a new MAP level to maintain the ethernet packet this feature also introduces a change to the way in which ports/links are currently maintained using the XA-Core OAM infrastructure. This change to the port/link maintenance strategy only affects the ethernet ports and links.

Currently the XA-Core OAM system represents the combination of a port (i.e., a hardware component on XA-Core) and a link (i.e., the transmission medium connecting the XA-Core to other nodes) as a single entity. This OAM strategy makes diagnosing port or link faults difficult since the MAPs and Logs cannot accurately indicate where the fault exists.

In an effort to improve fault isolation and system recovery the ethernet MAP level will show ports and links as separate entities. As with the old strategy, busying a port will cause applications to stop using the link, as well as disabling the port hardware. However, the craftsperson will now be able to busy only the link. This will cause the application to stop using the link, but keeps the hardware inservice.

Table 3 Link Availability on Packet/Port/Link state changes

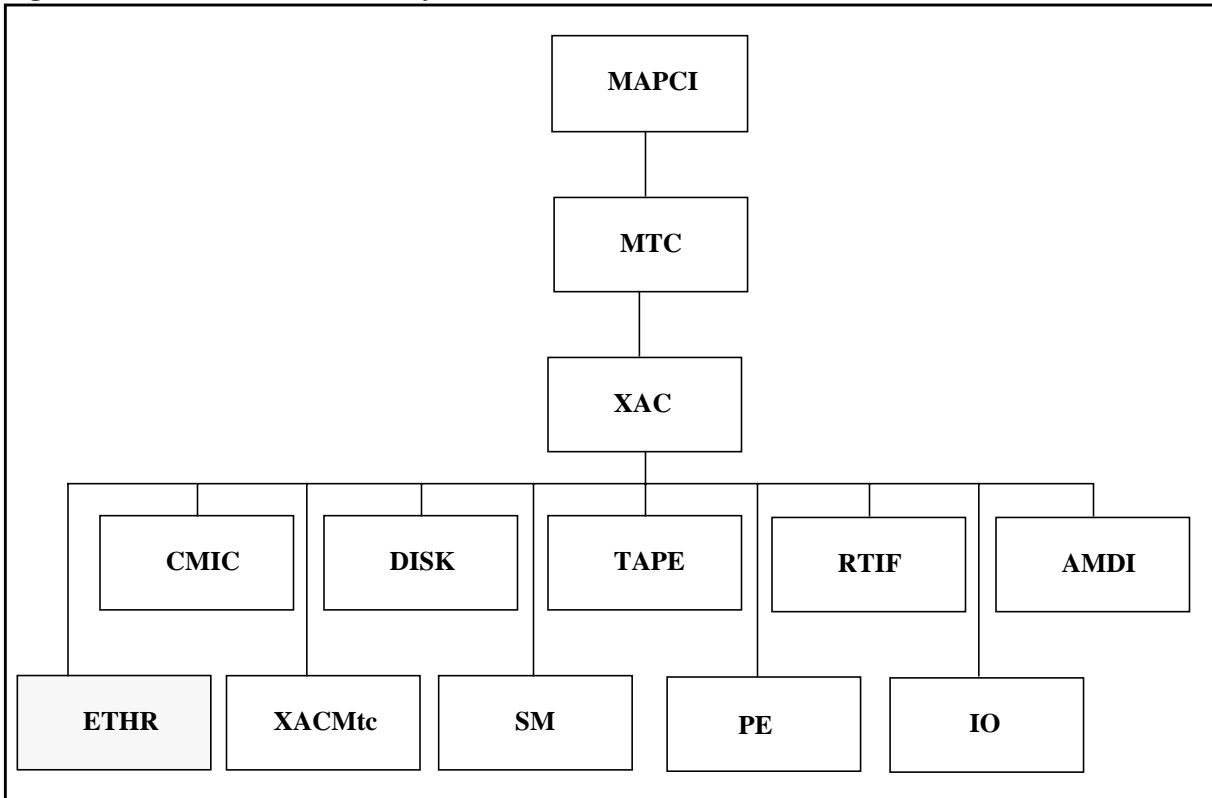
Packet State	Port State	Link State	Link available to applications
Insv	Insv	Insv	YES
Insv	Insv	OOS	NO
Insv	OOS	OOS	NO
OOS	OOS	OOS	NO

As an example of enhanced fault isolation consider the following. Currently if a fiber/cable is defective the MAP shows the link (which actually represents both port and link) as SysB. Because of this ambiguity the craftsperson may mistakenly attempt to replace the entire packet. Under the new strategy, if a cable/fiber is defective only the link level will be indicated as SysB, thereby alerting the craftsperson of a link problem.

7.12.2 MAP Hierarchy

The XA-Core MAPs use the familiar MAPCI based user interface. The new ETHR MAP is a child level of the existing XAC MAP. The resulting hierarchy is shown below:

Figure 6 XA-Core MAP Hierarchy



7.12.2.1 MAP Command Options Supported for Ethernet Packlets

Nowait

The “Nowait” command option allows maintenance commands to be executed without the craftsperson having to wait until the command has completed before issuing the next command. This option is generally used only for commands which may take a long time to execute.

Noprompt

The “Noprompt” command option eliminates warnings that would normally be displayed to prompt the craftsperson before the command is executed.

Force

The “Force” command option allows the craftsperson to override the maintenance software checks which would normally prevent an action from being executed. The craftsperson will not be permitted to use a Force option if the resulting action causes an E1 condition.

For information on which commands use which options, refer below to the commands listed under each MAP level.

7.12.2.2 XAC MAP Level

The XA-Core (XAC) MAP level has been modified to include the navigational command “ETHR” to allow the craftsperson to enter the ethernet MAP level. The ethernet MAP level can be accessed from any other XA-Core MAP level by entering “ETHR”, or from the XAC by entering “12”.

```

XAC      MS      IOD      Net      PM      CCS      Lns      Trks      Ext      APPL
.        .        .        .        .        .        .        .        .        .

XAC      Front:  111111111  Rear: 111111  SM      PE      IO      PKLT
0  Quit      123456789012345678  456789012345  .        .        .        .
2  Card_     Sta:  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
3  XACMtc    Dep:
4  SM
5  PE
6  IO
7  CMIC
8  RTIF
9  Tape
10 Disk
11 AMDI
12 ETHR
13
14 Alarm_
15
16
17 Indicat_
18 Query_
XMAP0
Time 14:12  >
    
```

7.12.2.3 IO MAP Level

The XA-Core Input/Output (IO) MAP screen is displayed by selecting the IO option from the main XA-Core level MAP screen (MAPCI;MTC;XAC;IO). The IO MAP is used to perform maintenance actions against the XA-Core IO cards (the common equipment and their associated packlets (disk, tape, CMIC, RTIF, AMDI, or ETHR)) and to navigate the XA-Core IO MAP screens.

The changes introduced by this feature, to the IO MAP level, are limited to the display of ethernet status in the packlet status field. No functional components of this MAP level have been changed.

Figure 7 Sample IO MAP Level Display

XAC	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.
IO		Front:	111111111	Rear:	111111	SM	PE	IO	PKLT
0 Quit			123456789012345678		456789012345	.	.	.	.
2		Sta:	. . - . . . . . . .		. . . . - . . . . .	0	0	0	0
3		Dep:							
4		Typ:	*	*	**	**			
5		Slot:	Side:	Status:	Packlets-Upper:		Lower:		
6		02	Front	.	Tape .		Disk .		
7 Tst_		17	Front	.	Tape .		Disk .		
8 Bsy_		04	Rear	.	RTIF .		CMIC .		
9 RTS_		05	Rear	.			ETHR .		
10 loadFW_		06	Rear	.			ETHR .		
11		13	Rear	.			ETHR .		
12 Uneq_		14	Rear	.			ETHR .		
13		15	Rear	.	RTIF .		CMIC .		
14 Alarm_		IO:							
15									
16									
17 Indicat_									
18 Query_									
XMAP0									
Time 14:12		>							

7.12.3 Ethernet MAP Level (ETHR)

The XA-Core ethernet MAP screen is displayed by selecting the ETHR option from the main XA-Core level MAP screen (MAPCI;MTC;XAC;ETHR). The ETHR MAP is used to perform maintenance actions against the XA-Core IO ETHR packet cards and their links.

Figure 8 Sample ETHR MAP Level Display

```

XAC      MS      IOD      Net      PM      CCS      Lns      Trks      Ext      APPL
ETHR     .       .       .       .       .       .       .       .       .
*C*
ETHR
0 Quit
2          Front: 111111111 Rear: 111111 SM PE IO PKLT
          123456789012345678 456789012345 . . . . ETHR M
3          Sta: . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
4          Dep:          FF      FF
4          Typ:          **      **
5          Slot: Side: Packlet: Status: Port: Link:
6          05 Rear lower M C C
7 Tst_     06 Rear lower . M C
8 Bsy_     13 Rear lower . . S
9 RTS_     14 Rear lower I . .
10 loadFW_ ETHR:
11
12 Uneq_
13
14 Alarm_
15
16
17 Indicatt_
18 Query_
XMAP0
Time 14:12 >
    
```

Table 4 Commands Specific to the ETHR MAP Level

Command	Meaning	Type	Options	Device
Quit	Quit the current level and return to the previous level.	Navigational	None	n/a
Tst_	Test an Input/Output (IO) ethernet packlet card (or its port/link). The type of IO ethernet test performed depends on the state of the packlet card or device (in-service or out-of-service) and the type of device: 1) If the card is in service, perform a non-destructive test. 2) If the card is out of service, perform more extensive tests.	Operational	Nowait Noprompt	Packlet, Port, and Link
Bsy_	Manually busy (take out of service) an ethernet packlet. The action will affect the state of the link. Before the Bsy request is carried out, a busy impact assessment is conducted in software to determine if it is safe to do so (based on redundancy requirements associated with the link). The Force option can be used to override the busy impact only if the action does not create a critical alarm condition.	Operational	Force Noprompt	Packlet, Port, and Link
RTS_	Return To Service an ethernet packlet.	Operational	NoWait	Packlet, Port, and Link
loadFW_	Upgrade packlet firmware	Operational	NoWait	Packlet

Table 4 Commands Specific to the ETHR MAP Level

Command	Meaning	Type	Options	Device
Uneq_	Deprovision packlet from the inventory. Packlet must first be physically removed from the shelf.	Operational	None	Packlet
Alarm_	Enable, Disable, or Query XA-Core maintenance level alarms. No parameters supplied results in an alarm query.	Operational/ Informational	None	n/a
Indicat_	Either turn on all XA-Core shelf LEDs to allow the craftsperson to visually ensure that all are functioning properly (use parameter TEST, no alarm will be raised), or allow the craftsperson to indicate which busied XA-core card should be removed first (by causing its red LED to wink). If a red LED is already winking when the TEST parameter is issued, that red LED will continue to wink while all the other LEDs are lit. To turn off the indicate function, use the CLEAR parameter, then the system will automatically return the LEDs to their normal operating state. Any attempt to indicate a card that is not ready for removal (i.e. its green LED is on and red LED is off) will be rejected.	Informational	None	Packlet
Query_	List information for a card (selected by slot and packlet number). The type of information listed could vary by card type, but for every card, list the PEC, serial number. A parameter of "Type <subsystem> {SM, PE, IO}" lists all of the slots in the shelf that contain cards of the type requested.	Informational	None	Packlet

7.12.4 New/modified commands

Table 2 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
ETHR	new		MAPCI;MTC;XAC	Menu
Quit	new		MAPCI;MTC;XAC;ETHR	Menu
Tst	new		MAPCI;MTC;XAC;ETHR	Menu
Bsy	new		MAPCI;MTC;XAC;ETHR	Menu
Rts	new		MAPCI;MTC;XAC;ETHR	Menu
loadFW	new		MAPCI;MTC;XAC;ETHR	Menu

Table 2 New or modified commands (Continued)

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
Uneq	new		MAPCI;MTC;XAC;ETHR	Menu
Alarm	new		MAPCI;MTC;XAC;ETHR	Menu
Indicat	new		MAPCI;MTC;XAC;ETHR	Menu
Query	new		MAPCI;MTC;XAC;ETHR	Menu
abtk	new		MAPCI;MTC;XAC;ETHR	Hidden

7.13 Operational measurements (OM)

7.13.1 XA-Core OM Group

Due to an OM system limitation, this feature must divide the existing XACORE OM group into two OM groups. The existing XACORE OM group will now contain only peg registers relating directly to the hardware while a new OM group, XACSVRC, will represent usage OMs, restart OMs, and XA-Core trap OM (XATRAP).

For a list of existing OMs used in the XA-Core platform, and belonging to OM group XACORE, refer to the functional description document of feature XA0015 “*XA-Core Operation Administration and Maintenance Functional Description*”.

7.13.2 Register Types

Although OMs are used for various types of switch administration activities, those pertaining to the XA-Core are mainly concerned with fault interrupts, and degraded service conditions.

Fault interrupts result in the identification of a faulty hardware resource, such as an ethernet packet. PEG registers are used to count the number of faults against these faulty hardware resources. A degraded service condition, such as a loss of link redundancy, leaves the switch in a vulnerable state. In this case, USAGE registers are used to record the duration of the condition.

7.13.3 XA-Core Ethernet OM Registers

Four new OM registers are required for regular maintenance of the ethernet packets and have been added to the existing XACORE OM group. Three peg registers have been included to count the number of critical faults on the ethernet packets, ports and links. One usage register has been included to record the duration of any major degraded service conditions caused by redundancy failure events that occur on the ethernet packets during normal operation.

Refer to Table 3 for a list of ethernet OMs.

Table 3 XA-Core ethernet OM Registers

OM Name	Description	Type	Group
XETHR XA-Core ethernet packet fault	The number of ethernet packet faults detected on the XA-Core.	PEG	XACORE
XETHRPRT XA-Core ethernet port fault	The number of ethernet port faults detected on the XA-Core.	PEG	XACORE
XETHRLNK XA-Core ethernet link fault	The number of ethernet link faults detected on the XA-Core.	PEG	XACORE
XETHRMJU XA-Core ethernet major loss of redundancy	The duration of ethernet redundancy major alarm conditions detected on the XA-Core.	USAGE	XACSRVC
XETHRCRU XA-Core ethernet critical loss of redundancy.	The duration of ethernet redundancy critical alarm conditions detected on the XA-Core	USAGE	XACSRVC

7.13.4 New/modified OM groups

The existing OM group *XACORE* will be modified to include the addition of the ethernet OMs as described in Table 3.

Table 5 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason
XACORE	XA-Core OM group	CHANGED	Added new ethernet peg OM registers to handle ethernet packet, port and link faults.
XACSRVC	XA-Core Service OM group.	NEW	Moved some of the XACORE OMs into this group in order to make room for Ethernet OMs. Added new ethernet usage OMs to handle loss of link redundancy

7.13.5 New OM grouping for new and existing XA-Core OMs.

Due to an OM system limitation, XA-Core System OM were split into two OM groups: XACORE, and XACSRVC.

Table 6 List of OMs in group: XACORE

OM Names			
XAPE	XARXPE	XASM	XARXSM
XAIOP	XARXIO	XADISK	XATAPE
XARTIF	XALOCP	XAREMP	XACMIC
XARXABRT	XARXBASE	XARXFULL	XARXALL
XAMDI	XAMDILNK	XETHR	XETHRPRT
XETHRLNK			

Table 7 List of OMs in group: XACSVRC

OM Names			
XAPEMAJU	XAPECRIU	XASSMPXU	XAMSMPXU
XARSMPXU	XASMCRIU	XALKMAJU	XAMDMAJU
XAMDCRIU	XETHRMJU	XETHRCRU	XATRAP
XASWINI	XAMWINI	AXSCINI	XAMCINI

7.14 AMA/Billing information (AM)

This feature does not introduce any AMA/Billing additions or modifications.

7.15 Software optionality control (SOC)

This feature does not introduce any SOC additions or modifications.

7.16 Glossary

Term	Description
AMDI	ATM Multi-Node Data Interface
COD	Cutover Device
ETHR	Ethernet
IOP	Input/Output Processor
OAM	Operation, Administration and Maintenance

PE	Processor Element
SM	Shared Memory

7.17 References

AT.59009527 (XA-Core Provisioning)

NTP 297-8891-510 (XA-Core Maintenance Manual)

NTP 297-8891-810 (XA-Core Reference Manual)

XA0015FN (XA-Core Operation Administration and Maintenance Functional Description)

8: Functional description (FN)

8.1 Feature name

TOPS IP: Global Support

8.2 Description

8.2.1 Introduction

Note: This document includes a number of statements to the effect that certain TOPS-IP functionalities were introduced, or are supported, in the TOPS13 and TOPS15 releases. These statements should be interpreted as describing which functionalities the TOPS-IP design groups intended to make available in those releases. At the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

This is a documentation and test activity for support of TOPS-IP functionality in non-North American markets using DMS CM loads MMP15 and higher. (No TOPS-IP functionality is supported in GMP loads.)

Only minor code changes were needed to support this functionality, and they were implemented under the following activities:

- TOPS14 SR 50322573

Removed restrictions in table TRKOPTS table control that disallowed TOPS-IP dynamic trunks from being datafilled in non-North American switches. Made minor changes in ISUP message processing to support TOPS-IP.

- XPM15 SR 50325736

XPM QD7 changes to support voice encoding differences required for international support.

- CCM15 SR 50343917
CCM changes to add an office parameter that allows customers to override the default PCM voice encoding settings for the 7X07 IP gateway's C-side links.
- TOPS 7X07 IP gateway release 3 activity 59022821
Changes in 7X07 load TGWY0003 to support voice encoding differences required for international support.

The supported TOPS-IP applications for non-North American markets include:

- QMS MIS with IP data links (QMS MIS-IP)
- IP voice and data connectivity for operator positions (Position IP)

The TOPS-IP application Operator Centralization with IP voice and data links (OC-IP) is not supported for Global markets in TOPS15 or earlier releases.

This document does not attempt to fully describe the TOPS-IP applications because their functionality is the same in both North American and non-North American loads. For information about QMS MIS-IP, refer to NTP 297-8403-906, "TOPS Internet Protocol User Guide." If information about the Position IP application is needed before the User Guide has been updated to include that, refer to Activity 59006653, "TOPS IP: Position Maintenance," which includes a list of all the TOPS-IP activities in the 15 release.

The following sections addresses several topics that are of particular interest in markets outside of North America. They assume the reader is familiar with more general TOPS-IP functionality.

8.2.2 IP-XPM

The XPM used for international TOP-IP applications is the same one that is used in North America. It is a DTC (*not* a PDTC) with a QD7 load, and is referred to as an IP-XPM. The IP-XPM has an SX05DA main processor, which provides the IP interface for data messaging. The 7X07 IP Gateway (IPGW) cards provide the call signaling and bearer interface for voice over IP (VoIP). Only NT7X07AA cards are supported in the IP-XPM's P-side interface slots. Trunk and line cards are not supported. The same 7X07 IPGW load is used in all countries.

For TOPS-IP, the only real differences between North American and non-North American environments are the voice encoding law (also referred to as companding) and the associated bit inversion pattern.

8.2.3 PCM Voice Encoding

Traditional TDM-based telephony networks in North America use μ -law speech companding, while most non-North American telephony networks use

a-law. In μ -law countries, the DMS network also uses μ -law. In a-law countries, the DMS network can use either of two a-law variants. OFCENG parameter `TYPE_OF_NETWORK` specifies the voice law, and also the bit inversion pattern, that is used in the DMS network. The possible values for this parameter are `INTERNATIONL`, `ALAW`, and `NORTH_AMERICAN`. None of this is new functionality.

The TOPS-IP project supports only the `INTERNATIONL` and `NORTH_AMERICAN` values for the `TYPE_OF_NETWORK`. The `ALAW` value has not been tested and is not supported. With this restriction, it is expected that no special customer datafill or intervention will be required to enable correct voice processing for TOPS-IP in any non-North American country.

By default, the 7X07 IP gateway is automatically configured for C-side link speech encoding characteristics that are consistent with the datafilled `TYPE_OF_NETWORK`. The following table shows the relationship between the datafillable values of `TYPE_OF_NETWORK` and speech encoding characteristics. Although TOPS-IP does not support the `ALAW` `TYPE_OF_NETWORK`, it is shown for completeness.

<code>TYPE_OF_NETWORK</code>	Speech Companding	Bit Inversions
<code>INTERNATNL</code>	A-Law	Even Bit Inversions
<code>ALAW</code>	A-Law	No Bit Inversions
<code>NORTH_AMERICAN</code>	Mu-Law	No Bit Inversions

To accomodate offices that may have non-standard ways of configuring the TDM voice path in the DMS, an office parameter has been added that enables customers to override the automatic IP gateway configuration described above. Using this new parameter, customers can specify speech companding and bit inversion patterns on the gateway's C-side links that differ from those indicated by the datafilled `TYPE_OF_NETWORK`. This new parameter is called `IPGW_PCM_SELECTION`. In offices with standard configurations, this new parameter should be left at its default value, `AUTO`.

If a G.711 codec is used on the IP side of the gateway,¹ then speech companding is also relevant to the IP side. The companding on the IP side is not directly configurable by the customer. In a standard configuration with a G.711 codec datafilled for the IP side, the 7X07 IP gateway uses the same companding on the IP side as on the TDM side.

Note: The voice law datafilled in table CARRMTC for the IPGW does not affect any TOPS-IP functionality.

¹The codec is datafilled in tables PKTVPROF and TQCQINFO. See A59022288 for more information. Speech companding on the IP network side is not an issue when a compressing codec such as G.729 is used; it is relevant only to the G.711 protocol. The G.729 codecs, as well as G.711, are fully supported in both mu-law and a-law countries.

8.2.4 Call arrival tones

Tones played to subscribers vary from market to market. The tone set is selected by setting the TONESET field in table LTCINV (for a given XPM) to the appropriate toneset identifier for the market. The tone parameters are downloaded from the CM as part of the XPM's static data on a Return To Service (RTS) of the peripheral.

For non-IP positions, the DMS generates the call arrival tones heard by TOPS operators as described above. In the newly supported call configurations, call arrival tones are played to operators logged into IP positions by the IWS position itself. This enables the IP position to synchronize the playing of call arrival tones with the first screen updates for a given call.

When the IWS position is generating call arrival tones for IP positions, it does not use the datafill from table LTCINV. Therefore call arrival tones heard by the operator are always from the North American toneset. Please refer to IWS documentation for more information.

8.3 Hardware requirements

Refer to the TOPS-IP User Guide for introductory information about TOPS-IP hardware requirements, and to TOPS Marketing for more detailed information.

8.4 Limitations and restrictions

In general, the same limitations and restrictions that apply to TOPS-IP in North America also apply to Global TOPS-IP and are documented in the User Guide.

The following limitations and restrictions either are specific to Global TOPS-IP, or are not Global-specific but may be of special interest outside of North America.

- The original TOPS-IP design intent was to provide support for the following:
 - IP voice and data connectivity between DMS switches and IWS operator positions in MMP loads, but not in GMP (GSP/MMP combo) loads, in TOPS15 and later releases,
 - IP data connectivity for QMS MIS in MMP loads, but not in GMP loads, in TOPS15 and later releases, and
 - No support for OC-IP in MMP or GMP loads until some release later than TOPS15.

However, at the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

- The IP-XPM is an IP-only peripheral that cannot be configured with any line or trunk cards. The only supported P-side interface is the NT7X07AA IP gateway card.
- The only values TOPS-IP supports for OFCENG parameter TYPE_OF_NETWORK are INTERNATIONAL and NORTH_AMERICAN . The ALAW value has not been tested and is not supported.
- Call arrival tones generated by the IWS position for TOPS-IP are always for the North American tone set.
- Although North American CM loads support both CIC and SGRPYLD Glare methods in table TRKSGRP, only the CIC Glare method can be datafilled with the Global MMP load. This is a trivial restriction, because the Glare method field does not affect call processing for IP calls.

8.5 Interactions

Although the 7X07 IP gateway is viewed as a remote node from a maintenance perspective, the voice law datafill in table CARRMTC for the IP gateway does not affect any functionality.

The switch NT6X44EA time switch card does not affect voice quality or voice law functionality of the IP-XPM or the 7X07 IP gateway. Either the NT6X44EA or an earlier time switch card may be used in the IP-XPM, with the same results. If the NT6X44EA is installed, it does not matter whether it is datafilled as an optional card in table LTCINV.

8.6 Logs (LG)

There are no Global-specific log changes for TOPS-IP.

8.7 Data schema (DS)

There are no Global-specific TOPS-IP data schema changes.

8.8 Office parameters (OP)

8.8.1 New/modified office parameters

Table 1 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
OFCENG	IPGW_PCM_SELECTION	NEW

8.9 Service orders (SO)

Not applicable.

8.10 Alarms (AL)

There are no Global-specific TOPS-IP changes in alarms.

8.11 Command interface (CI)

There are no Global-specific TOPS-IP CI changes.

8.12 Operational measurements (OM)

This activity documents new office parameter IPGW_PCM_SELECTION.

8.13 AMA/Billing information (AM)

TOPS-IP does not affect AMA or billing.

8.14 Software optionality control (SOC)

TOPS-IP has the same SOC controls in all loads that support TOPS-IP.

8.15 Glossary

Term	Description
DSP	Digital Signaling Processor
G.711	ITU-T Recommendation G.711, "Pulse Code Modulation (PCM) of Voice Frequencies"
G.729	ITU-T Recommendation "Coding of Speech at 8kbit/s using Conjugate Structure Algebraic-Code-Excited Linear-Predication (CS-ACELP)"
GMP	GSP/MMP Platform
IP	Internet Protocol
MIS	Management Information System
OC	Operator Centralization
OPP	Open Position Protocol
QD7	The load prefix for an XPM load on a DTC7+ (Digital Trunk Controller PLUS with SS7) on an SX05 processor
QMS	Queue Management System
TDM	Time-Division Multiplexing
XPM	Extended Peripheral Module

8.16 References

The TOPS-IP development activities done for the TOPS15 release are listed below because their functionality had not yet been added to the TOPS-IP User Guide at the time of this writing. The development activities that occurred earlier than the 15 release are not individually listed below because the TOPS-IP User Guide is the recommended source of information about them.

REF #	Description of Reference
NTP 297-8403-906	TOPS IP User Guide
A59022821	TOPS IP: 7X07 IP Gateway Support for VoIP
A59022293	TOPS IP: IPGW Enhancements
A59022288	TOPS IP: Voice Provisioning and Utilities
A59006658	TOPS IP: Position Provisioning and OPP Data
A59006653	TOPS IP: Position Maintenance
A59015863	TOPS IP: Call Processing for IP Voice
A59022114	RSI Link Selection, Version control, Robustness
RD000701	IWS Voice Over IP
RD983702	OPP Over IP
RD991614	OIA Direct Connect

9: Functional description (FN)

9.1 Feature name

Bearer Channel Tandeming (BCT).

9.2 Introduction

The BCT (Bearer Channel Tandeming) function permits the control of the bearer channel involved in Voice over Packet Network communications. This bearer channel control permits the content of the voice communication to be directed over one-way communication paths to multiple destinations in addition to the intended terminator of the communication path. This replication may permit services such as In-band digit detection, Calling Card Service, Codec re-negotiation, and Operator Services to be implemented in a consistent manner.

When BCT is involved in a call, there is no audible difference in the communications between the parties involved in the call. Specifically, there is no noticeable difference in communications lag time, quality of the communications stream, or noise during the communications (i.e. clicks, pops).

Within the context of BCT, the Centralized Replicator (CR)¹ provides only the low level forking capability. The services which utilize the BCT function reside in the MGC (Media Gateway Controller), and are outside the scope of this document

9.3 Hardware requirements

In order for services to use BCT, the Communication Server must have a subtending CR capable of BCT.

¹CR functionality is provided by the Universal Audio Server (UAS). For more information about BCT on the Audio Server, please refer to the UAS Bearer Channel Tandeming Functional Design (UASBCTFD)

9.4 Limitations and restrictions

None.

9.5 Interactions

None.

9.6 Logs (LG)

9.6.1 Overview

There are a number of logs generated by BCT in for a variety of reasons. BCT logs are divided into the following four groups;

- Resource Request Logs - errors that occur when a BCT resource is requested. BCT resources are endpoints on BCT capable cards of the CR through which calls are tandemed
- Resource Pool Logs - logs that are generated on a BCT Resource pool only (i.e. when there is no call context)
- BCT Memory Logs - generated when there is insufficient memory to perform a request
- BCT Audit Logs - generated when the BCT Audit discovers and removes inconsistencies in BCT related data. The BCT Audit is discussed further in "2.8 Auditing"

Table 1 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)
BCT	100	NEW	SOS
BCT	101	NEW	SOS
BCT	200	NEW	SOS
BCT	300	NEW	SOS
BCT	400	NEW	SOS
BCT	401	NEW	SOS

9.6.2 User Action

The following table outlines the steps to be taken when these logs are generated.

Table 2 BCT Log Conditions and System/User Actions

BCT Log	Error/Condition	System Action	User Action
Get resource failures			
BCT100	Pool empty	Disallow	Add more BCT cards to the CR.
BCT101	Failed to reserve	Disallow	Add more BCT capable CRs
Resource Pool Indications			
BCT200	Pool modified	N/A	None. For tracking purposes only.
Memory failures			
BCT300	Insufficient memory to activate BCT	N/A	Add more memory and re-attempt tuple in SERVSINV.
Auditing Discoveries			
BCT400	High water mark resource pool usage	N/A	None. For tracking purposes only.
BCT401	Audit Process Information -process death -requested audit start -requested audit done	Variable	Process death indicates that the BCT Audit process was not recreated. To fix the problem, run the BCT Audit. If this fails to solve the problem, contact the next level of support. The other two types of this log indicate when the Audit process was requested via the RUN_BCTAUDIT command and when it completed.

For more information on BCT logs, refer to the LG section of this book.

9.7 Data schema (DS)

9.7.1 New/modified tables

Changes have been made to the table SERVSINV. A new peripheral type has been added against which BCT resources are provisioned.

Table 3 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
SERVSINV	CHANGED	NEW

BCT resources are physically located on an CR, but are provisioned against a Gateway Controller.

The following table gives sample input for provisioning BCT resources. In this setup, there are two Gateway Controllers (GWC 01 and GWC 02) subtending the Call Server each with a subtending peripheral.

The CR subtending GWC 01 is capable of 1280 BCT resources. The audio server subtending GWC 02 is capable of audio functions (conferencing and announcements) and has 2048 resources available. The CR also subtending GWC 02 has 256 resources available for BCT.

Table 4 Sample Input

Table	Key	Data
SERVRINV	GWC 01	IP 101 101 101 101 \$ NORTHAM
SERVRINV	GWC 02	IP 102 102 102 102 \$ NORTHAM
SERVSINV	BCT 01	GWC 01 1280 \$
SERVSINV	AUD 01	GWC 02 2048 \$
SERVSINV	BCT 02	GWC 02 256 \$

For more information on the changes to table SERVSINV, refer to the DS section of this book.

9.8 Auditing

9.8.1 New Auditing

A new audit process has been created as part of the BCT activity. Its purpose is;

- to find and remove data inconsistencies in BCT internal data structures
- report BCT resource usage on a per pool basis

When the BCT Audit process discovers inconsistencies in BCT internal data, the inconsistencies are removed and a Software Error (SWER) is generated.

When the BCT Audit reports BCT Resource usage for pools, a BCT400 log is generated for each BCT Resource pool (i.e. for each UAS datafilled in table SERVSINV as having BCT resources).

The BCT Audit Process starts when BCT is activated. It will run once a day at 3:22am¹ switch time.

¹The time is chosen to be when the switch is experiencing low traffic.

The BCT Audit process will be recreated in the event of premature death. However, if the process has died five times in the last hour, then it will not be recreated and a BCT 401 log will be generated.

9.9 Operational measurements (OM)

9.9.1 New/modified OM groups

Two new OM groups have been introduced for BCT. These OM groups are used to;

- Track the number of calls that have been successfully tandemmed and the number of calls that BCT attempted to tandem
- track the number of resources successfully obtained from a pool and the number of resources that were requested from a BCT Resource pool

The following table describes these OM groups.

Table 5 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason
BCTTNDM	BCT Tandeming	NEW	Used for tracking the number of calls that are tandemmed (attempts and successes).
BCTPOOL	BCT Resource Pool	NEW	Used for tracking the number of resources requested from each BCT Pool (attempts and successes).

These OMs is described further in the OM section of this book.

9.9.2 BCTTNDM - BCT Tandeming Group

This OM group tracks the number of calls that tandemming was attempted for and the number of calls that were successfully tandemmed. There are two registers associated with this OM group;

- BCTTATT - The number of calls that tandemming was attempted for
- BCTTSUC - The number of calls that were successfully tandemmed

9.9.3 BCTPOOL - BCT Resource Pool Group

This OM group tracks the number of resources requested from a pool and the number of resources successfully obtained from a BCT Resource pool. This OM group provides 256 tuples numbered 0-255. Each tuple is indexed by BCT Resource pool number as indicated by table SERVSINV. Each tuple has four registers associated with it;

- BCTRQSTA[i] - The number of attempts made to request a resource from pool "i" (tuple "BCT i" in table SERVSINV)

- BCTRQSTS[i] - The number of resources successfully requested from pool “i” (tuple “**BCT i**” in table SERVSINV)
- BCTRSRVA[i] - The number of attempts made to reserve resources from pool “i” (tuple “**BCT i**” in table SERVSINV)
- BCTRSRVS[i] - The number of successful reservations of resources from pool “i” (tuple “**BCT i**” in table SERVSINV)

9.10 Glossary

Term	Description
BCT	Bearer Channel Tandeming
CR	Centralized Replicator
GWC	Gateway Controller
MGC	Media Gateway Controller
OM	Operational Measurement
UAS	Universal Audio Server

9.11 References

Universal Audio Server Bearer Channel Tandeming Functional Design (UASBCTFD)

10: Functional description (FN)

10.1 Feature name

59021965: ISUP Call Control Channels

10.2 Description

10.2.1 Background Information

Communications Assistance for Law Enforcement Act (CALEA) of 1994 requires that a service provider be able to support lawful surveillance of the traffic in its network. Lawful surveillance is the process of identifying a subjected set of traffic, and delivering data about the traffic and/or the content of the traffic itself to a remote law enforcement agency in real time.

United States Network Broadcast Delivery (USNBD) is the DMS-100 product designed to provide CALEA compliant surveillance functionality. It provides the capability to monitor the voice and voice-band data transmissions associated with a designated subject line, and to provide the relevant information to authorized Law Enforcement Agencies (LEAs).

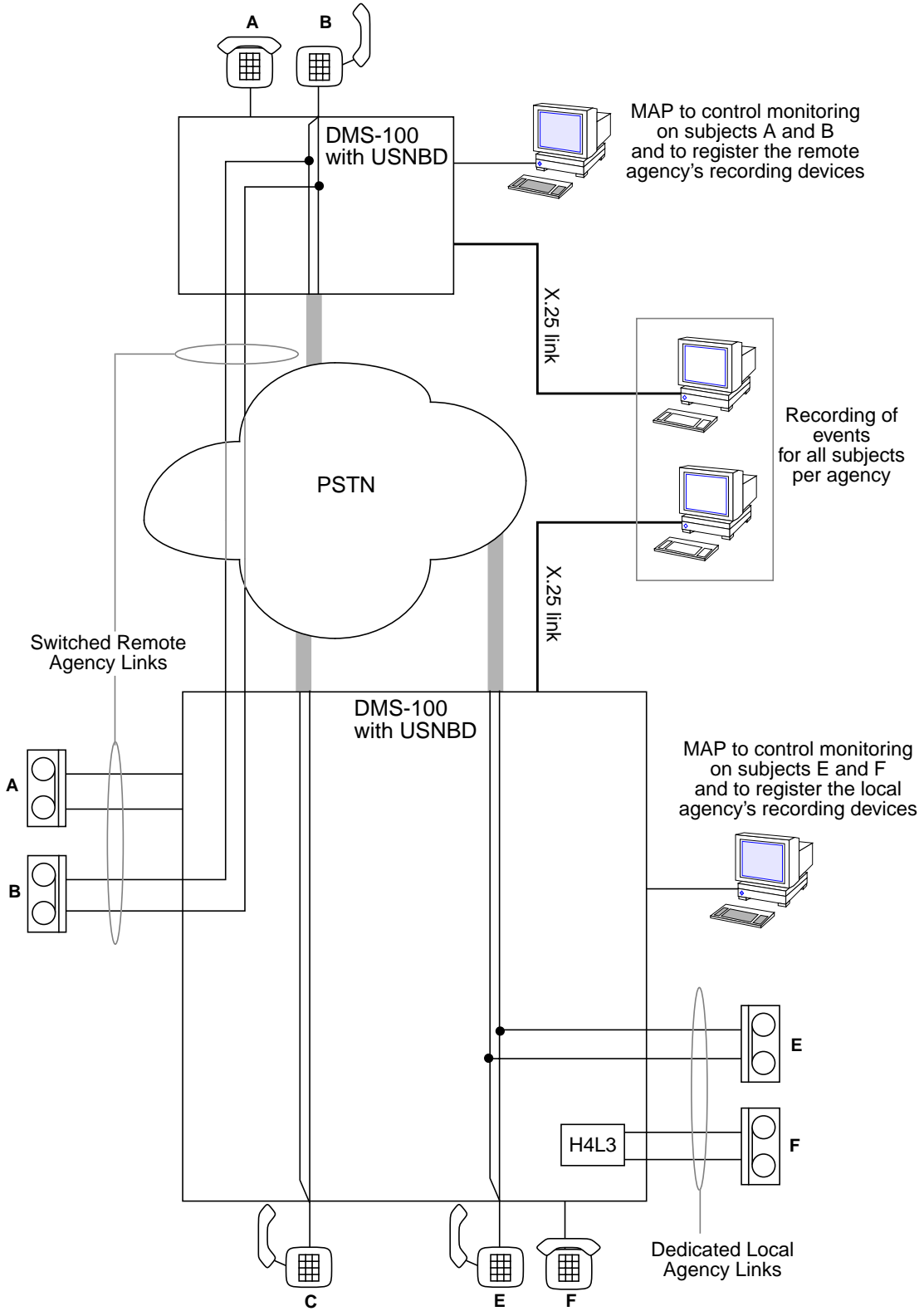
This feature enhances the monitoring capabilities of USNBD by adding switched access to the agencies recording devices which is attached to a remote end office. The connection to a SWITCHED recording device is established only when the associated subject is identified as the originator or the destination of a call.

Switched links can be local or remote to End Office hosting the subject. This activity only supports remote switched links.

10.2.2 Functional Description

Figure 1 compares the new switched access with the current dedicated access. Subjects A and B are being monitored with switched connections while subjects E and F are monitored with dedicated connections. Since subjects B and E are active on a call, the connections to the agency's recording devices are established and provided with the two speech sources.

Figure 1 Dedicated Vs Switched Access



The difference between dedicated and switched connections lies in the handling of an idle subject. Subject F, for instance, is idle but since a dedicated connection to the monitoring devices is established, an H4L3 tone is applied. The tone prevents the recorders from recording when a subject is idle. When the subject becomes active on a call (as subject E), the H4L3 tone is removed and recording starts. In the case of subjects A and the associated switched connections are not established because the subject is idle. Thus, for switched connections, there is no H4L3 tone when the associated subject is idle. However, as soon as a subject becomes active on a call, the connection is established and recording starts immediately.

The registration of remote recording devices (with the CCR ADD command) is done at the EO hosting the subject that will be monitored with the remote recording device. Thus, a USNBD user uses a MAP position at an EO to control the monitoring of the lines in this EO and to register remote recording devices. As before, the X.25 messages generated by USNBD in an EO are only related to the subjects in that EO.

It should be noted that the SWITCHED ISUP CCCs feature cannot verify if the same recorder DNs have been registered in more than one EO running USNBD. In this eventuality, multiple subjects could be associated to a single recorder. If, at one time, two or more subjects in different offices become active, there will be contention for accessing the shared recorder. Since only one subject can use the recorder at a time, the other active subject calls will NOT be recorded. However USNBD monitoring will still generate X.25 messages. It is therefore the service provider's and the law enforcements agency's responsibility to make sure that a one to one mapping exists between a subject and a recorder to avoid the risk of missing calls.

10.2.2.1 Feature Operation

When a subject is monitored resulting call content delivery process depends on the access type of the recording device that is specified with the CCR ADD command.

If the access to the agency's recording devices is registered as dedicated in the CCR ADD command of the USNBD level, the current USNBD operation applies:

1. Upon the CCR ASSOC command being entered, the CCR is signaled
2. At answer, a H4L3 tone is provided on the agency's link
3. Monitor the subject
4. When the subject is active on a call, replace the H4L3 tone with the proper speech data
5. When the subject disconnects, replace the speech data with the H4L3 tone

6. Return to step 3.

If the connection to the recording devices is registered as switched, the following steps are taken:

7. Monitor the subject
8. When the subject goes off-hook or is identified as the destination of a call, call the CCR associated with the recorder number
9. As soon as the links have answered and the network connections of the monitored call have been established, provide the speech data from the monitored call onto the agency's recorder links
10. When the subject disconnects, terminate the calls with the recorder DN(s) and generate the billing records (one per CCC call) if applicable
11. Return to step 7.

The Switched ISUP CCCs feature does not modify the current operation of the X.25 data link.

10.2.2.2 Modifications to USNBD CI commands

The USNBD CI modifications are briefly described in the following sub-sections. Refer to the CI section of this document for more details.

10.2.2.2.1 CCR ADD sub-command

Sub-commands CCR ADD is modified to allow an ACCESS parameter. Valid entries for the ACCESS parameter are SW (switched) and DE (dedicated) for the line CCR. CCR association to an agency is a must for Switched ISUP CCC functionality. This association is provided by Agency Separator feature (AT.59021979).

CCR ADD command is also modified not to prompt for signaling information since Switched ISUP CCR are always of non-signaling type. Whenever Switched CCR is added it is always taken as non-signaling type.

10.2.2.2.2 CCR ASSOC sub-command

Switched ISUP CCR association to a surveillance is not allowed if the agency data for the corresponding CCR is not present in the Agency table. CCR ASSOC sub-command functionality is modified to check for presence of agency data before associating switched CCR to the surveillance.

10.2.2.2.3 CCR LIST sub-command

Sub-command CCR LIST is modified to display the type of access specified with the CCR.

10.2.2.2.4 TEST sub-command

Sub-command TEST is created to simulate a test call for verifying the connections to an agency's recorder number.

10.2.2.2.5 AGENCY ADD sub-command

AGENCY ADD sub-command is created to accept parameters specific to agency. The parameters are agency name (AGENCY), the serving translation scheme (STS), the pretranslator name (PRETRANSLATOR), the local calling area name (LCANAME) and the billing number (BILLNO). These parameters are used for CCC DN translation to establish switched ISUP CCCs call.

10.2.2.2.6 AGENCY LIST sub-command

Sub-command AGENCY LIST is created to list the Agency with Switched ISUP CCCs and the associated parameters.

10.2.2.2.7 AGENCY DEL sub-command

Sub-command AGENCY DEL is created to delete the data specific to the agency from AGENCY table. Agency deletion is not allowed if the CCRs corresponding to the agency are associated to the surveillance.

10.2.2.2.8 UNB_OFCWIDE TEST_CALL_BILLNO sub-command

This is a new sub-command to allow add/delete/list of office-wide USNBD parameter, TEST_CALL_BILLNO.

10.2.2.2.9 UNB_OFCWIDE LIST sub-command

This is a new sub-command UNB_OFCWIDE LIST is created to list all the office wide USNBD parameters.

Refer to CI section for further details.

10.2.2.3 Recorder Link establishment

The establishment of the switched links to a recorder is attempted as soon as its associated subject is active on a call. The Bellcore ISUP TR-317 standard is the only signalling supported to reach remote recording devices. USNBD waits up to 30 seconds for a switched CCC to answer. Any failure or unexpected event that may occur during or after a call establishment will cause appropriate LOG to be generated to inform the agency of the problem. Upon failure during the call setup, USNBD makes only one retry after 5 seconds to establish a switched connection. For paired CCR if only one connection to the recording device completes successfully, recording will take place and only the party associated with this link will be recorded. The two connections to the recording device will be set up again only when the subject is involved in a subsequent call.

10.2.2.4 Recorder Links disconnection

Unlike dedicated connections which remain up until monitoring is disabled on the subject, switched connections will be taken down upon completion of the associated monitored call. The disconnection of remote links follows the ISUP TR-317 signalling standard.

CCClose CDC message is generated whenever the recorder link is disconnected. If the recorder links is disconnected due to a trouble event such as busy link, no answer etc. CCClose message is not generated.

10.2.2.5 Billing

The Switched ISUP CCCs feature supports remote billable connections towards an agency's recording device. Billing is done on the basis of call type. In other words, a call becomes billable when the standard pretranslator marks the call as direct dialed (DD) and the local calling area screening (LCANAME in table LCASCRCN) indicates that the call is non-local. A call dialed without prefix will be marked as no-prefix (NP) in the standard pretranslator and is not normally considered billable. However, when a prefix digit is dialed in error on a local call or when a prefix digit is omitted on a non-local call, it is the responsibility of the Telco to decide whether the call is allowed to complete or not by datafilling table PFXTREAT accordingly. For instance, If the Telco policy dictates that the dialing of prefix digits is optional for a non-local call then an NP-type call may be updated to DD to make the call billable.

When a connection type is switched and the call is identified as long-distance, this feature generates a Bellcore Format AMA record for each DN associated with the recorder number. It is assumed that the end office on which USNBD resides is equipped for Local Automatic Message Accounting (LAMA).

A module code 025 (circuit seizure/release) is appended to the AMA record of unanswered call provided unanswered call recording is in effect.

A module code 022 (long duration call) is appended to the AMA record when a call remains connected through two successive midnights.

The originating number and NPA are obtained from the BILLNO parameter of AGENCY table.

Billing may also apply to the calls made with the TEST command. If a call used to test the switched connections is long-distance, an AMA record is generated only if the duration of the test call is greater than the minimum charge duration (MCD) parameter (when MCD is enabled).

For Test call, billing record is generated against the test call billing number specified in the USNBD office wide parameter test_call_billno.

10.2.2.6 Robustness

10.2.2.6.1 Link failure

For paired CCR if one of the two switched or dedicated connections fails during the monitoring of a call, recording on that call continues with only the remaining connection. USNBD will not try to re-establish a switched connection which failed but dedicated links which failed will be re-established. The switched access links will be re-established for subsequent calls only.

10.2.2.6.2 Audit

The audit will not re-establish the switched links which are lost even though the associated monitored call is not over.

10.2.2.6.3 Restarts

The option assigned to recorder numbers (SWitched or DEDicated) as well as the STS, PRETRANSLATOR, LCHANAME and BILLNO parameters survive any type of system RESTART. The switched links survive WARM RESTART but not the COLD or RELOAD RESTART and the links are not re-established when the RESTART completes. Note that remote links are also affected by any COLD or RELOAD RESTART on tandem switches.

10.2.2.6.4 SWACTs

- MTCSWACT

The maintenance SWACT (MTCSWACT) is the recommended way of switching activity. MTCSWACT is used to reduce the switch outage time in order to perform some maintenance tasks which require a restart. When a MTCSWACT is performed, all links are taken down during the preparatory in-sync steps. When the MTCSWACT is over, unlike dedicated access links, the switched access links are not re-established.

- NORESTARTSWACT and RESTARTSWACT

When either one of the two above types of SWACTs is performed, all links are taken down during the LIMITED_PRESWACT.

- PM WARM SWACT

A PM Warm SWACT does not take down the switched links if they were recording. However, any link which has not been answered will be taken down if a PM Warm SWACT occurs.

- PM COLD SWACT

When a PM Cold SWACT occurs on a PM which hosts both links to a recording device (paired CCR), the links are taken down. If the two links are hosted by different PMs and a Cold SWACT is performed on one of them, only the link attached to the `SWACTed' PM will be taken down. USNBD will not attempt to recreate the switched links after the PM Cold SWACT.

10.2.2.6.5 Load Application (ONP)

USNBD transfers all monitoring and recording device information to the new load including the new datafill introduced by this feature. All recording links are taken down during PRESWACT. Only the dedicated links will be re-established on the new side. Switched links will not be re-established. If the

application process is aborted after the links have been forced down, only the dedicated links will be recreated.

- Upgrading to Switched ISUP CCCs

When upgrading from a pre-NA015 to a later release with Switched ISUP CCCs, the links ACCESS type will be automatically set to dedicated.

When upgrading from NA15 to a later release, the link ACCESS type is transferred from old load to new load as it is.

10.2.2.7 Switched ISUP CCC data

The agency data and the TEST_CALL_BILLNO is deleted when the USNBD SOC is turned IDLE.

10.2.2.8 Performance

USNBD consumes more real time to deliver call content with switched access than with dedicated access. With switched access the connections to the agency's recording device are established and disconnected repeatedly since they are requested on demand (only when the subject is present on a call). With dedicated access, the connections are established only when the SURV ACT command is issued. Switched access gives no guarantee that the connections to the agency's recording device will be ready before the monitored call starts. In that case, the first few seconds of the conversation may not be recorded. There are two variable delay factors that may slow down the establishment of the links:

1. The delay incurred when routing through the network.

CCS7 signalling is imposed when leaving the EO to reach a remote agency's recording device since it provides a faster call setup time than MF signaling. This feature forces the links to route out of the office on ISUP trunks. However, subsequent legs of the links may be routed over MF trunks (Per Trunk Signalling) which will further delay call setup.

2. The delay before the recording device answers.

It is the responsibility of the agency to make sure that the recording device answers and starts recording as soon as possible.

10.3 Hardware requirements

None.

10.4 Limitations and restrictions

- The feature imposes the connections to route out of the office on ISUP (T0, IT, T2) trunks using TR-317 ISUP signalling.
- Switched local links are not supported.

-
- For a given switch at a time only eight different agencies can have access to SWITCHED ISUP CCC.
 - No validation is done for existence of DN while adding SWITCHED ISUP CCC which is present on remote EO.
 - Recorder DNs should not be registered in more than one EO. Otherwise, there might be a risk that at one time USNBD tries to access the same recording device to monitor different subjects.
 - Equal Access translations are not supported (the DNs associated with a recording device cannot contain a Carrier Access Code).
 - This feature cannot guarantee that the recording is started before the monitored call is answered.
 - NT AMA format is not supported.
 - This feature does not introduce dedicated connections to remote recording devices.
 - Switched links which fail because of a RESTART, a failure or a SWACT when recording can not be re-established even if the monitored call is not finished.
 - All restrictions and limitations of USNBD shall apply to the SWITCHED ISUP CCCs feature.

10.5 Interactions

The feature does not modify the way USNBD interacts with other features. It mainly permits a more flexible access to the agency's facilities.

This feature requires Agency Separator feature (AT.59021979) to associate the CCR with an agency.

10.6 Logs (LG)

The existing C7UP logs is used to report ISUP troubles.

- UNB 302

These log reports are generated when an USNBD process cannot be started or terminates abnormally.

10.6.1 New/modified logs

The following UNB log is enhanced to report the problems specific to this feature:

- UNB 303

This log reports are generated when an USNBD recording link cannot be established or encounters a serious problem. These logs are enhanced to report problems related to switched remote access.

The following UNB log is created to report the problems specific to this feature:

- UNB 306

This log report is generated when an STS, pretranslator or lcaname assigned to an USNBD agency is deleted from their associated table.

Refer to the LG section of this document for more details.

Table 1 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)
UNB	303	MOD	SOS
UNB	306	NEW	SOS

10.7 Data schema (DS)

No new tables are created by this feature and none of the existing tables are modified by this feature.

10.8 Office parameters (OP)

No office parameter related changes are made by this feature.

10.9 Service orders (SO)

No Service order changes are made by this feature.

10.10 Alarms (AL)

No new alarms are added by this feature and none of the existing ones are modified by the feature.

10.11 Command interface (CI)

10.11.1 New/modified commands

Modifications are made to USNBD CI commands mentioned in Table 2.

Table 2 New or modified commands

Command name	NEW, CHANGED OR DELETED	Directory/MAP level name	MENU/NON-MENU /HIDDEN
AGENCY ADD	NEW	USNBD	NON-MENU
AGENCY LIST	NEW	USNBD	NON-MENU
AGENCY DEL	NEW	USNBD	NON-MENU
TEST	NEW	USNBD	NON-MENU

Table 2 New or modified commands (Continued)

Command name	NEW, CHANGED OR DELETED	Directory/MAP level name	MENU/NON-MENU /HIDDEN
CCR ADD	CHANGED	USNBD	NON-MENU
CCR LIST	CHANGED	USNBD	NON-MENU
UNB_OF CWIDE	CHANGED	USNBD	NON-MENU
HELP	CHANGED	USNBD	NON-MENU

Refer the CI section for more details.

10.12 Operational measurements (OM)

This feature does not introduce new OM groups. However, the ISUPCONN OM group will be pegged for unsuccessful ISUP link call attempts.

10.13 AMA/Billing information (AM)

Switched ISUP CCC feature supports remote billable connection to agency's recording device. Billing is done on basis of call type. This activity will generate a call code 006 (Station Paid) for any toll call towards the agency premises. This feature uses the existing structure codes for this call code.

For generating billing records for the Switched ISUP CCC calls the billing number specified for the agency is used as bill number. For the TEST calls the number specified in the USNBD office wide parameter TEST_CALL_BILLNO is used as the bill number.

10.14 Software optionality control (SOC)

No SOC related changes are made by this feature.

10.15 Glossary

Term	Description
AMA	Automatic Message Accounting
C7UP	CCS7 User Part
CALEA	Communications Assistance for Law Enforcement Act
CCC	Call Content Channel
CCR	Call Content Resource.
CCS7	Common Channel Signaling
CDC	Call Data Channel

DD	Direct Dialed
DE	Dedicated
DMS	Digital Multiplex System
EO	End Office
ISUP	ISDN User Part
LAMA	Local Automatic Message Accounting
LCANAME	Local Calling Area Screening Name
LEA	Law Enforcement Agencies
MAP	Maintenance and Administration Position
NP	No-prefix local
PM	Peripheral Module
PRETRANSLATOR	PRETRANSLATOR Name
STS	Serving Translation Scheme
SW	Switched
USNBD	United States Network Broadcast Delivery

10.16 References

S.No.	Reference
1.	USNBDFSD.AD02 - Feature Specification Document - US Network Broadcast Delivery - Issue 5.6 Final. (PLS FMDOC)
2.	AQ1291: FBS- REMOTE (1) (PLS DOC)
3.	AQ1292: SRA FN (PLS DOC)
4.	NBDHNDBK.AC02- USNBD Hand Book (PLS FMDOC)
5.	Agency Seperator feature (A59021979)

11: Functional description (FN)

11.1 Feature name

GETS - HPC Call Queuing

11.2 Description

11.2.1 Background

Government Emergency Telecommunications Service (GETS) is currently provided by the Office of the Manager, National Communications System (OMNCS), to give emergency access and specialized processing to authorized users in local and long-distance public telephone networks. The service has been developed in response to White House tasking to meet national security and emergency preparedness (NS/EP) requirements for the use of public telephone networks by authorized users, such as members of federal, state and local governments and other authorities.

A set of network capabilities included in a feature called GETS High Probability of Completion (HPC), is currently present in Local Exchange Carrier (LEC) networks to increase the probability of completing HPC calls. This set of network capabilities also allows the LECs to interact with the GETS service in the Inter-Exchange Carrier (IEC) networks.

One of the network capabilities in the GETS HPC feature, HPC Trunk Queuing (HPC TQ), queues an HPC call against a busy public trunk group in a route list until a member of that trunk group becomes idle or until a specified maximum queuing time elapses. If the queuing time elapses before a member becomes idle, the HPC call advances to the next treatment. When a member becomes idle before the timer expires, the queued HPC call is processed before any other calls. An announcement, if provisioned for that trunk group, can be provided to the originating user while the HPC call is queued. The HPC TQ capability is implemented via the HPCTQ option which is provisioned on a trunk group basis in Table TRKOPTS and is applicable to the following public trunks - Intertoll Trunk (IT), Two way Trunk group type (T2), Outgoing Trunk group type (TO), Access To Carrier Trunk (ATC) and Cellular trunk (CELL).

Another of the capabilities in the GETS HPC feature, HPC Egress Queuing (HPC EQ), queues an HPC call against a busy egress trunk group. The term "egress trunk"

refers to trunks which carry calls outside the Public Switched Telephone Network (PSTN). The egress trunk types supported by HPC EQ are PBX Digital Trunk (PX), PBX Analog Trunk (P2) and Primary Rate Access Trunk (PRA). The HPC EQ capability is provisioned on an office-wide basis via the office parameter HPC_EGRESS_QUEUING in Table OFCVAR. When HPC EQ is enabled, HPC calls are queued on the supported egress trunk groups. To exclude a particular egress trunk group from queuing of HPC calls, the HPCNOTQ option is assigned to the trunk group in Table TRKOPTS. This prevents HPC calls from queuing on that trunk group.

11.2.2 Overview

This feature introduces a new capability HPC Call Queuing (HPC CQ) which allows HPC calls to be queued on the same set of trunk group types as supported by HPC TQ, but provisioned on an office wide basis rather than a trunk group basis. This capability is in addition to the existing HPC TQ and HPC EQ functionality.

To exclude any supported public trunk group from HPC Call Queuing, the existing option HPCNOTQ in Table TRKOPTS is reused. No HPC calls are queued on trunk groups which are assigned with the HPCNOTQ option.

HPCTQ and HPCNOTQ options can not be assigned simultaneously on a particular trunk group.

11.2.3 Description

The HPC Call Queuing (HPC CQ) feature can be divided into five components that are described in details as follows.

11.2.3.1 Trunks supported by HPC Call Queuing

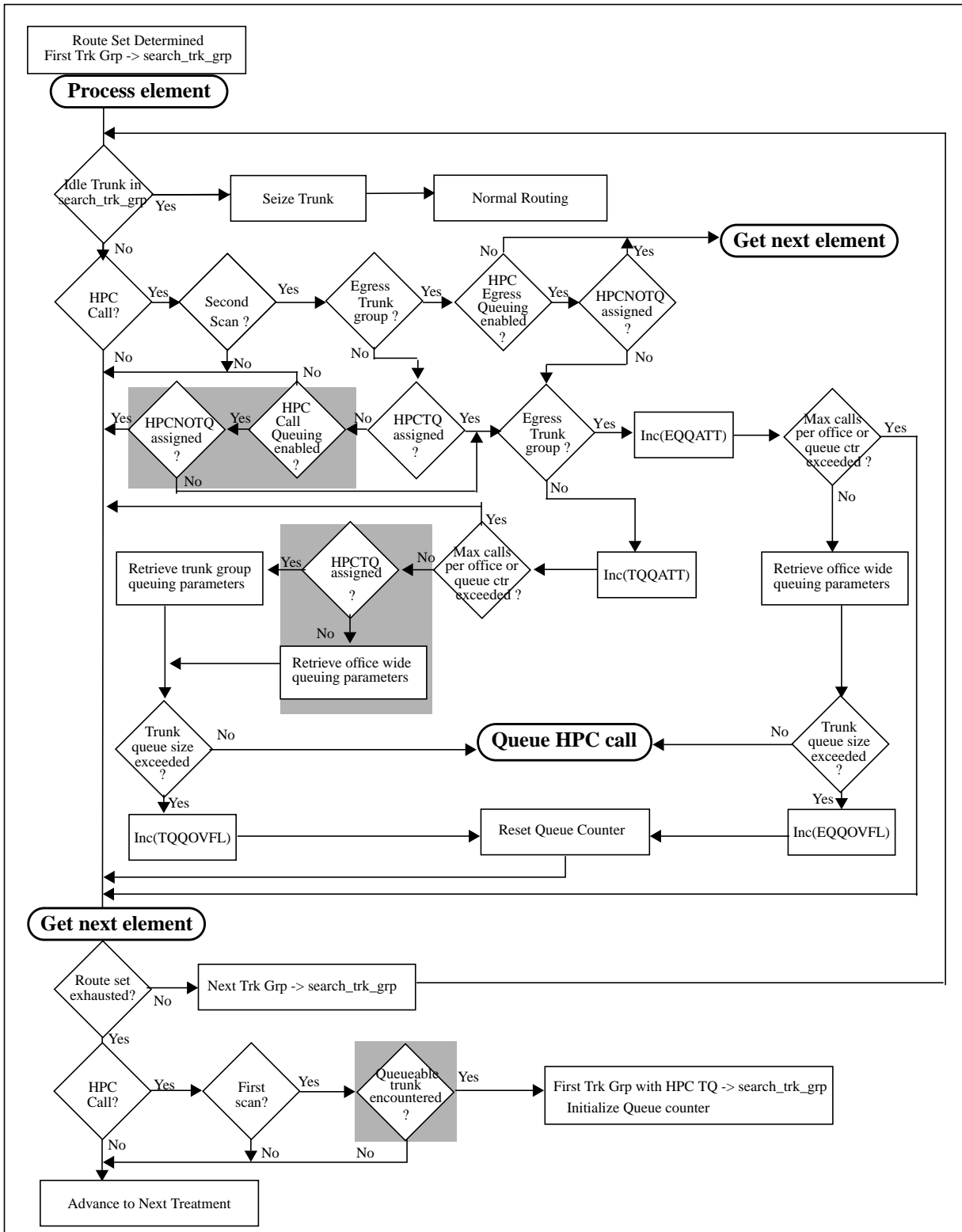
HPC Call Queuing supports the same set of trunk group types as HPC Trunk Queuing which are TO, IT, T2, ATC and CELL.

11.2.3.2 HPC Call Queuing Functionality

This feature (HPC CQ) enhances the queuing of HPC calls on supported public trunk group types by allowing the provisioning to be performed on an office wide basis. HPC CQ follows the limit set by existing office parm MAX_HPC_CALLS_QUEUED in Table OFCENG. This office parm defines the maximum number of HPC calls that can be queued in the office. HPC TQ has preference over HPC CQ. When HPC CQ is enabled and a trunk is assigned the HPCTQ option, an HPC call is queued using HPCTQ parameters. Figure 1 shows the modifications done for the HPC CQ feature in the existing GETS functionality. The shaded areas represent new or modified functionalities. In Figure 1, the expression “queueable trunk” seen at the bottom is extended to:

- A supported public trunk group assigned with HPCTQ option.

Figure 1 Modified routing algorithm for HPC Call Queuing (HPC CQ)



- A supported egress trunk group when the HPC EQ feature is enabled and the HPCNOTQ option is not assigned on the same trunk group.
- A supported public trunk group when the HPC CQ feature is enabled and the HPCNOTQ option is not assigned on the same trunk group.

11.2.3.3 Office wide provisioning

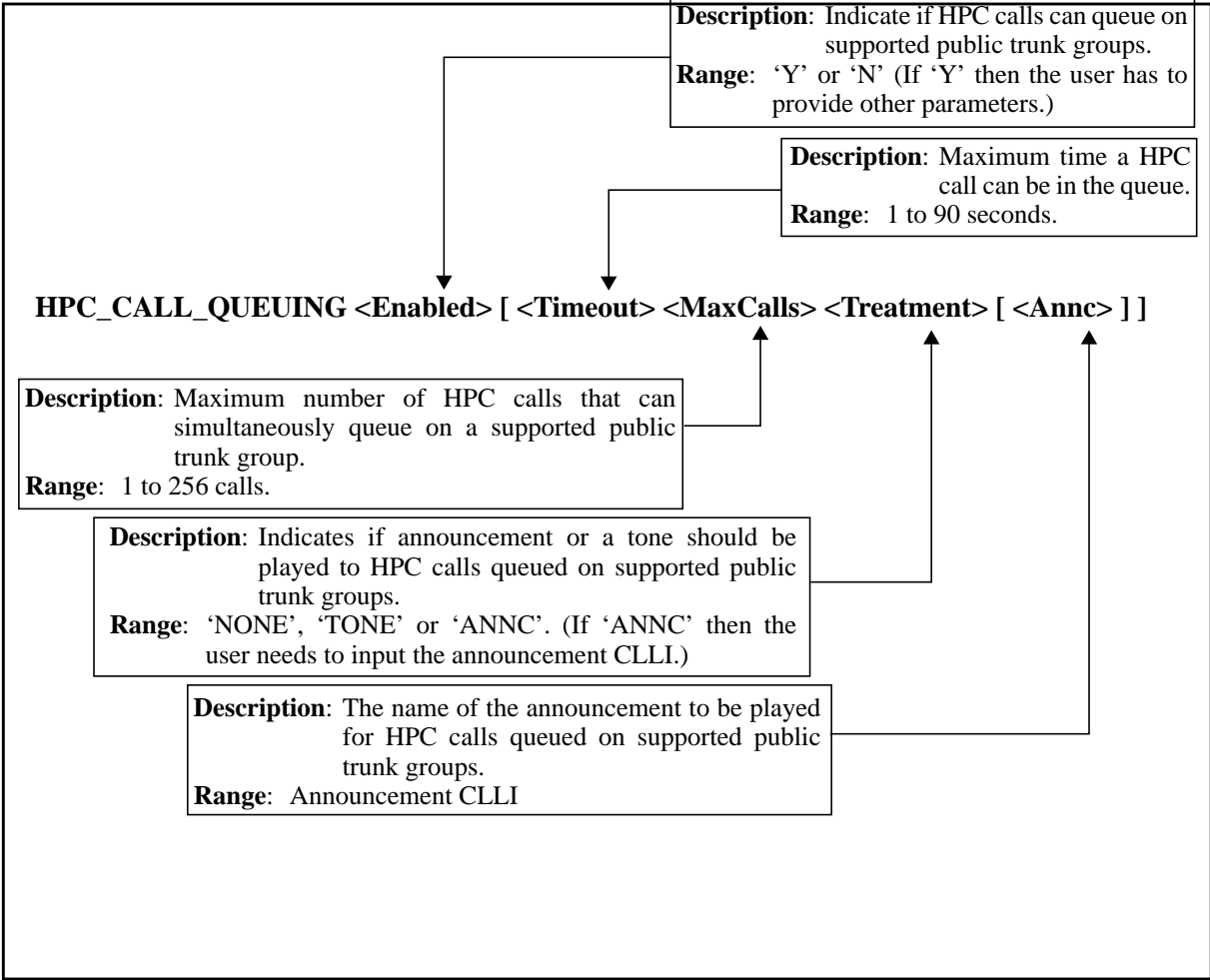
A new office parameter 'HPC_CALL_QUEUING' is introduced in Table OFCVAR to provision the HPC Call Queuing feature for supported public trunks on office wide basis. By default, the office parameter is set to N (i.e. HPC Call Queuing disabled). It is used to set the following HPC Call Queuing parameters:

- Maximum time for which HPC call is allowed to queue on an available trunk.
- Maximum number of HPC calls that can simultaneously queue on an supported public trunk group queue.
- Announcement or tone, if available, to be provided to HPC calls on a trunk group queue.

Figure 2 shows the format and syntax of the office parameter.

Treatment can be provided when queuing HPC calls on a supported public trunk group. The queuing treatment can be either an announcement ('ANNC') or a tone ('TONE'). The announcement can be specified in the HPC_CALL_QUEUING office parameter. The tone is a pre-defined tone called *held tone* that consists of two consecutive short beeps repeating every 4 seconds.

Figure 2 New HPC_CALL_QUEUING Office Parameter



11.2.3.4 HPCNOTQ option

The HPC CQ feature allows queuing of HPC calls on supported public trunk groups on an office wide basis. HPC CQ enhances the HPCNOTQ option to continue supporting the P2, PX, and PRA egress trunks, and additionally support the following public trunk group types - T2, TO, IT, ATC and CELL. This allows the HPCNOTQ option to be used to prevent queuing of HPC calls on a supported egress and public trunk group types by assigning the option to the trunk group in Table TRKOPTS. Figure 3 shows how to disable HPC Call Queuing on an supported public trunk group using the HPCNOTQ option.

Figure 3 HPCNOTQ option for HPC Call Queuing

```

CI:
>TABLE TRKOPTS
TABLE: TRKOPTS
>ADD ISUPT2 HPCNOTQ HPCNOTQ
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>Y
TUPLE TO BE ADDED:
      ISUPT2 HPCNOTQ      HPCNOTQ
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>Y
TUPLE ADDED
>
    
```

A supported trunk group *can not* be assigned with HPCTQ and HPCNOTQ options simultaneously in Table TRKOPTS.

11.2.3.5 HPC Call Queuing Operational Measurements (OMs)

No new OMs are introduced by the HPC Call Queuing feature. Existing HPC TQ OMs, HPCBASIC and HPCTRKGRP, are reused to measure the performance of HPC calls that attempt to queue on supported public trunk groups. Table 1 shows the HPCBASIC OMs pegged by HPC CQ. Table 2 shows the HPCTRKGRP OMs pegged by HPC CQ.

Table 1 HPC basic OM group

OM register	Description	Pegging location
LINEATT	The number of line origination (including PBX) attempts, recognized as HPC calls, on lines served by the measuring switch.	This measurement will be done when an HPC pattern matches the dialed digit. Pegging will be done in a GETS specific target.

Table 1 HPC basic OM group

OM register	Description	Pegging location
TRKATT	The number of calls, recognized as HPC calls, on incoming trunks of the measuring switch.	This measurement will be done when an ISUP message is received with an NS/EP CPC. Pegging will be done in a GETS specific target.
TERMLINE	The number of calls, recognized by the measuring switch as HPC calls, whose destination is a line served by the measuring switch.	HPC feature will stay on the call to enable the pegging of the terminating OMs within the HPC software.
TERMTRK	The number of calls that complete on trunks to points outside the measuring switch that the switch has recognized as HPC calls.	
TERMNC	The number of outgoing HPC calls encountering No Circuit (GNCT) treatment.	
TERMIEC	The number of outgoing HPC calls complete on ATC trunks to an IEC from the measuring switch.	
TERMIECN	Total HPC calls going to all IECs encountering GNCT.	
TQQATT	The number of attempts to place HPC calls in all supported trunk group queues.	This OM will be pegged in GETS specific software
TQQOVFL	The number of attempts to place HPC calls in trunk group queues that failed because the queues were full.	This OM will be pegged in GETS specific software
TQQABDN	The number of HPC calls that had been placed in trunk group queues but were abandoned while in queue.	This OM will be pegged in GETS specific software
TQQTM-REX	The number of HPC calls removed from trunk group queues due to time-out treatment	This OM will be pegged in GETS specific software

Table 1 HPC basic OM group

OM register	Description	Pegging location
ACGEXMPT	The number of HPC calls exempted from AIN ACG controls.	This OM will be pegged in GETS specific software
ACGBLOCK	The number of HPC calls blocked by AIN ACG controls.	This OM will be pegged in GETS specific software

Table 2 HPC trunk group OM group

OM register	Description	Pegging location
HPCATT	The number of times the switch tries to access a trunk in the trunk group to serve an HPC call.	This OM will be pegged in GETS specific software.
HPCOVFL	The number of times the switch tries to access a trunk in the supported trunk group and all trunks are busy.	This OM will be pegged in GETS specific software.
QUETMREX	The number of HPC calls removed from trunk group queues due to time-out treatment.	Same as TQQT MREX.
QUEOVFL	The number of attempts to place HPC calls in trunk group queues that failed because the queues were full.	Same as TQQOVFL.

11.3 Hardware requirements

No specific Hardware requirements.

11.4 Limitations and restrictions

HPC Call Queuing is applicable to the following trunks - IT, TO, T2, ATC and CELL.

11.5 Interactions

This feature does not modify any existing GETS HPC feature interactions. Existing feature interaction mentioned for GETS HPC calls in documents AQ1574, AJ4945 and HPCEQ are applicable to GETS HPC CQ feature also.

11.6 Logs (LG)

11.6.1 New/modified logs

Table 3 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)
DFIL	318	Modified	SOS

An existing log, DFIL318, is modified by this feature to notify the craftsperson that an error exists with the announcement specified for the HPC Call Queuing feature. The log is generated only when the CPU is not overloaded.

When an announcement is specified in the HPC_CALL_QUEUING office parameter, checking is performed to make sure that the CLLI provided is an announcement and that the announcement type is STND. However, an error can be introduced in the office parameter if the announcement type is changed afterward. When a HPC call attempts to queue on a trunk group with the office parameter containing such an error, no announcement is provided and instead a DFIL318 log is generated.

Refer to the log section for more information on the log format.

11.7 Data schema (DS)

An existing option called HPCNOTQ in table TRKOPTS is reused. Assigning this option on a supported public trunk group prevents HPC calls from queuing to that trunk group even when the HPC Call Queuing feature is enabled.

Table 4 Modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)	Reason
TRKOPTS	CHANGED	UNCHANGED	An existing trunk option HPCNOTQ is reused.

11.8 Office parameters (OP)

11.8.1 New/modified office parameters

A new office parameter called HPC_CALL_QUEUING is introduced in table OFCVAR. This new office parameter is used to provision HPC Call Queuing to supported public trunks.

Table 5 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
OFCVAR	HPC_CALL_QUEUING	New

11.9 Service orders (SO)

Not Applicable

11.10 Alarms (AL)

Not Applicable

11.11 Command interface (CI)

Not Applicable

11.12 Operational measurements (OM)

No new OMs are introduced nor existing OMs are modified. This functionality pegs the same OMs which are pegged by HPC TQ. Refer to section 11.2.3.5 for more details.

11.13 AMA/Billing information (AM)

Not Applicable

11.14 Software optionality control (SOC)

The HPC Call Queuing feature is controlled under the existing GETS SOC code GETS0001.

11.15 Performance Analysis

A complete performance analysis was done for trunk queuing which included the functionality added by GETS HPC CQ. Please refer to section 1.5.2 of AJ4945FN.

Table 6 SOC

SOC option name:	GETS
SOC option title:	Government Emergency Telecommunications Service
SOC option control type:	State
New SOC option?	No
SOC option order code	GETS0001
Option defined in DRU:	CNA
Affected products:	LET0015, LEC0015 & NCS0015

11.16 Glossary

Table 7 Abbreviation

Term	Description
ATC	Access To Carrier
CELL	Cellular
CLLI	Common Language Location Identifier
GETS	Government Emergency Telecommunications Service
HPC	High Probability of Completion
HPC CQ	HPC Call Queuing
HPC EQ	HPC Egress Queuing
HPC TQ	HPC Trunk Queuing
IAM	Initial Address Message
IEC	Inter-Exchange Carrier
IT	Intertoll Trunk
LEC	Local Exchange Carrier
NS/EP	National Security Emergency Preparedness
OM	Operational Measurement
P2	PBX Analog Trunk
PBX	Private Branch Exchange
PRA	Primary Rate Access
PSTN	Public Switched Telephone Network
PX	PBX Digital Trunk
T2	Two way Trunk group type
TO	Outgoing Trunk group type
SOC	Software Optionality Control

11.17 References

REF #	Description of Reference
AQ1574 (PLS DOC library)	DDOCs - GETS HPC Setting and Trunk Queuing, Issue AA19, May 1998

AJ4945 (PLS DOC library)	DDOCs - GETS Network Management Control Exemptions, Issue AA17, June1998
HPCEQ (PLS FMDOC library)	DDOCs - GETS HPC Queuing, Issue AA19
NTP 297-9501-001	Government Emergency Telecommunications Service High Probability of Completion (GETS HPC) Feature Guide, Northern Telecom, Standard 02.00, May 1998

12: Functional description (FN)

12.1 Feature name

59021979: USNBD Agency Separator

12.2 Description

12.2.1 Background Information

Communications Assistance for Law Enforcement Act (CALEA) of 1994 requires that a service provider be able to support lawful surveillance of the traffic in its network. Lawful surveillance is the process of identifying a targeted set of traffic, and delivering data about the traffic and/or the content of the traffic itself to a remote law enforcement agency in real time.

United States Network Broadcast Delivery (USNBD) is the DMS-100 product designed to provide CALEA compliant surveillance functionality. It provides the capability to monitor the voice and voice-band data transmissions associated with a designated subject line, and to provide the relevant information to authorized Law Enforcement Agencies (LEAs).

Prior to NA015, the data related to surveillances on any subject and the data related to call content and call data resources for surveillances on the switch were accessible to all the USNBD users. Any USNBD user could view or modify:

- Surveillance assigned to the subject by other agencies.
- Call data channels (CDC) of other agencies.
- Call content resources (CCR) of other agencies.

The UNB304 log is generated when the surveillance is modified or the subject is OUTed or when the Line Class Code (LCC) of the subject is modified. When the subject is OUTed or when LCC of subject is modified, this log gives enough information, like DN to identify the subject. Prior to NA015, this log can be viewed by all USNBD users.

12.2.2 Conventions

In this document, the following conventions are used

- User means USNBD Non-ADMIN user.
- ADMIN means USNBD ADMIN User.
- Data means USNBD static data, i.e, USER or SURV or CDC or CCR information.
- If a sub-command is not qualified, it implies that it can be part of any of the following USNBD commands: USER, SURV, CDC or CCR. e.g. ADD sub-command implies it can be 'USER ADD' or 'SURV ADD', 'CDC ADD' or 'CCR ADD'.
- Data agency means agency to which the data belongs to.
- User agency means the agency to which the user belongs to.

12.2.3 Functional Description

This feature confines the user access of data to user-specific agency data only. By introduction of this feature the user can view/modify only the data belonging to user's agency. The ADMIN has the privilege to view or modify data pertaining to any agency.

There is no limit for the number of different agencies allowed for agency separator feature.

12.2.3.1 Modifications to USNBD CI commands

The USNBD CI modifications are briefly described in the following sub-sections. Refer to the CI section of this document for more details.

12.2.3.1.1 ADD sub-command

ADD sub-command is used to add data. This sub-command is modified for ADMIN. When ADMIN tries to add any new data, the agency field is prompted. Maximum length of agency name is 16 char.

When user adds data, the user agency is taken as data agency. For user, the syntax for this sub-command is same as that in NA014.

For *USER ADD*, this feature makes the ADMIN parameter mandatory.

12.2.3.1.2 DEL sub-command

DEL sub-command is used to delete data. This sub-command is modified for user. User is allowed to delete only the data pertaining to user's agency. ADMIN has the privilege to delete any data.

12.2.3.1.3 SURV ACT/DEACT sub-command

SURV ACT/DEACT sub-command is used to activate/deactivate a surveillance. This sub-command is modified for user. User is allowed to activate/deactivate only the surveillance pertaining to user's agency. ADMIN has the privilege to activate/deactivate any surveillance

12.2.3.1.4 CDC/CCR ASSOC sub-command

CDC/CCR ASSOC sub-command is used to associate a CDC/CCR to a surveillance. The following modifications are made to the sub-command.

- The *ASSOC* sub-command is allowed only if CDC/CCR agency is same as Surveillance Agency. This is applicable for both ADMIN and user.
- User is allowed to associate only the CDC/CCR pertaining to user's agency. ADMIN has the privilege to associate any CDC/CCR provided the CDC/CCR agency is same as Surveillance agency.

12.2.3.1.5 CDC/CCR Disassoc sub-command

CDC/CCR DISASSOC sub-command is used to disassociate a CDC from a surveillance. This sub-command is modified for user. User is allowed to disassociate only the CDC/CCR pertaining to user's agency. ADMIN has the privilege to disassociate CDC/CCR belonging to any agency.

12.2.3.1.6 LIST sub-command

Data *LIST* sub-command is used to list the USNBD data. This sub-command is modified for ADMIN.

- For all options of *LIST* sub-command, the agency information of data is also displayed.
- A new list option, *agency* is introduced for ADMIN. This option lists all the data belonging to a particular agency.
- For USER *list* sub-command a new option, *all* is introduced. This option lists all the valid USNBD users in the switch.

12.2.3.1.7 Help Command

The *HELP* command is modified for the ADMIN. This command will show the *agency* field for *ADD* sub-command and *agency* option for *LIST* sub-command for ADMIN. For USER, the *HELP* command is not modified.

12.2.3.2 UNB304 Log modification

The UNB304 log is generated when the surveillance is modified or the subject is OUTed or when the LCC of the subject is modified. When the subject is OUTed or when LCC of the Subject is modified, this log generates the following information

- SIN
- Surveillance information (like DN of the subject, surv parameters etc.).
- CDC associated to surveillance.
- CCR associated to surveillance.

This feature modifies UNB304 log for the user when the subject is OUTed or when LCC of the subject is modified. The surveillance information of the log is generated only if the user agency is same as surveillance agency. Thus, it prevents the user of one agency from getting information about the surveillance belonging to another agency.

For ADMIN, the surveillance information is always generated. Also, the agency information of the surveillance is also displayed when the subject is OUTed or when LCC of the subject is modified for ADMIN.

Refer to the LG section of this document for more details.

12.2.3.3 Pre-NA015 Data:

All Pre-NA015 data has the agency of DEFAULT. This can be viewed/modified only by user having 'DEFAULT' as agency or ADMIN. The pre-NA015 user can view/modify only data having DEFAULT as agency.

12.2.3.4 Overriding agency separator

In some markets, if agency separator is not required, it can be overridden. For this, the USNBD administrator should give 'DEFAULT' as agency name when administrator adds any USNBD data.

When the Non-ADMIN USNBD user is created, the agency of the user is 'DEFAULT'. All the USNBD data added by this user will have 'DEFAULT' as agency. So any valid USNBD user can view/modify all USNBD data. By this, the behavior is same as pre-NA015 for Non-ADMIN USNBD user.

12.3 Hardware requirements

None.

12.4 Limitations and restrictions

None.

12.5 Interactions

None.

12.6 Logs (LG)

12.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
UNB	304	MOD	SOS

Refer to the LG section of this document for more details.

12.7 Data schema (DS)

No new tables are created by this feature and none of the existing tables are modified by this feature

12.8 Office parameters (OP)

No office parameter related changes are made by this feature.

12.9 Service orders (SO)

No Service order changes are made by this feature.

12.10 Alarms (AL)

No new alarms are added by this feature and none of the existing ones are modified by the feature.

12.11 Command interface (CI)

12.11.1 New/modified commands

Modifications are made to USNBD CI commands mentioned in Table 2.

Table 2 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
USER ADD	CHANGED	-	USNBD	NON-MENU
USER LIST	CHANGED	-	USNBD	NON-MENU

Table 2 New or modified commands (Continued)

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
SURV ADD	CHANGED	-	USNBD	NON-MENU
SURV DEL	CHANGED	-	USNBD	NON-MENU
SURV LIST	CHANGED	-	USNBD	NON-MENU
SURV ACT	CHANGED	-	USNBD	NON-MENU
SURV DEACT	CHANGED	-	USNBD	NON-MENU
CCR ADD	CHANGED	-	USNBD	NON-MENU
CCR DEL	CHANGED	-	USNBD	NON-MENU
CCR ASSOC	CHANGED	-	USNBD	NON-MENU
CCR DISASSOC	CHANGED	-	USNBD	NON-MENU
CCR LIST	CHANGED	-	USNBD	NON-MENU
CDC ADD	CHANGED	-	USNBD	NON-MENU
CDC DEL	CHANGED	-	USNBD	NON-MENU
CDC ASSOC	CHANGED	-	USNBD	NON-MENU
CDC DISASSOC	CHANGED	-	USNBD	NON-MENU
CDC LIST	CHANGED	-	USNBD	NON-MENU

Refer the CI section for more details.

12.12 Operational measurements (OM)

No OM changes are made by this feature

12.13 AMA/Billing information (AM)

No AMA/Billing changes are made by this feature.

12.14 Software optionality control (SOC)

No SOC related changes are made by this feature.

12.15 Glossary

Term	Description
CALEA	Communications Assistance for Law Enforcement Act
USNBD	United States Network Broadcast Delivery

LCC	Line Class Code
LEA	Law Enforcement Agencies
CDC	Call Data Channel
CCR	Call Content Resource.

12.16 References

S.No.	Reference
1.	USNBDFSD.AD02 - Feature Specification Document - US Network Broadcast Delivery - Issue 5.6 Final.
2.	AU2775FN.AA51, United States Network Broadcast Delivery - Functional Document
3.	NBDHNDBK.AC02- USNBD Hand Book

13: Functional description (FN)

13.1 Feature name

A59021986: E911: WIRELESS PHASE II - GEODETIC LOCATION PARM

13.2 Description

This feature allows the geodetic location of a wireless E911 call over the SS7 Network to be received at the PSAP's host DMS . This information will not be displayed at the PSAP in this preliminary geodetic location feature offering. The existing E911212 log will be enhanced to contain the latitude and longitude information if available on E911 wireless calls only. This log is output when the caller or E911 attendant disconnects or transfers the call to a secondary PSAP.

13.3 Hardware requirements

There are no new hardware requirements.

13.4 Limitations and restrictions

The longitude and latitude information will only be displayed in the E911212 log for E911 wireless calls via SS7 Network.

13.5 Interactions

There are no interactions with other features.

13.6 Logs (LG)

13.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)
E911212	E911212	MOD	SOS

The E911212 is enhanced to show the latitude and longitude of wireless calls if the Geodetic Location information is present. This log is output when the caller or E911 attendant disconnects or transfers the call to a secondary PSAP. Two new fields, LAT DEG and LONG DEG are added to the E911212 log. The values will show as N/A for all calls where the geodetic information is not available. The latitude and longitude will be displayed in degrees, minutes seconds otherwise. Direction will immediately follow the seconds. North and South latitudes will be abbreviated N and S respectively. East and West longitudes will be abbreviated E and W respectively.

An example of log report E911212 follows with the new fields in bold:

```
E911212 JAN10 15:10:25 0101 INFO E911 CALL EVENT RECORD
ANI PSAPNAME POSID LOGIN OFFER
9196211235 RALEIGHPOLICE 7708 8888 15:10:00
ANSW XFR DISC XFR DN
15:10:02 15:10:17 15:10:25 9196211901
XFR PSAPNAME XFR ANSW
RALEIGHFIRE 15:10:19
pANI LAT DEG LONG DEG
6139110747 45 59'59" N 170 59'59" E
```

13.7 Data schema (DS)

13.7.1 New/modified tables

There are no new or modified tables associated with this feature.

13.8 Office parameters (OP)

13.8.1 New/modified office parameters

There are no new or modified office parameters associated with this feature.

13.9 Service orders (SO)

There is no impact to Servord associated with this feature.

13.10 Alarms (AL)

13.10.1 New/modified directories

There are no new or modified alarms associated with this feature.

13.11 Command interface (CI)

13.11.1 New/modified commands

There are no new or modified CI commands associated with this feature.

13.12 Operational measurements (OM)

13.12.1 New/modified OM groups

There are no new or modified OMs associated with this feature.

13.13 AMA/Billing information (AM)

13.13.1 New/changed AMA/billing information

There are no new or changed AMA billing information associated with this feature.

13.14 Software optionality control (SOC)

There are no software controls on this feature.

13.15 Glossary

Term	Description
PSAP	Public Safety Answering Point

13.16 References

- T1S1 /99-276 ANSI TI.628-2000 for Telecommunications Emergency Calling Service
- FCC Mandate 94-102
- WGS-84 World Geodetic Systems, WGS-84. United States Department of Defense, MIL-STD-2401, 1984

- Enhanced Wireless 911 Phase 2, J-STD-036
- A60009384FN MSC Networking Enhancements for E911 Phase II --ELID Solution
- A60009385FN MSC Networking Enhancements for E911 Phase II -- Handset Based PDE Solution

14: Functional description (FN)

14.1 Feature name

Off-Board Selective Routing (OFBSR) Interface

14.2 Description

14.2.1 911 Call Routing Background

The geographical area served by an E911 office is divided into Emergency service Zones (ESZ). There is a number associated with each ESZ which is called the Emergency Service Number (ESN). Emergency service is provided to all subscribers in an ESZ by the same set of PSAPs. That is, every subscriber in an ESZ is associated with an ESN and every ESN is associated with a set of PSAPs. Also, since 911 calls are required to be routed, from an end office to the E911 tandem on dedicated E911 trunks, with the exception of calls routed on non-dedicated message and FX trunks, all the trunks have an ESN associated with them.

The method of routing a 911 call to PSAP depending on the ESN associated with the DN of the subscriber is called Selective Routing. Currently, when a 911 call arrives at an E911 tandem, the caller's ANI (Automatic Number Identification) is used to query the SRDB (Selective Routing Database). The SRDB contains the ESN for each subscriber in the area served by the E911 tandem for 911 service. The ESN is used then to determine the primary PSAP (Public Safety Answering Point) to which the 911 call should be routed.

The method of routing a 911 call based on the ESN of the incoming trunk group is called Default Routing. The ESN assigned to the incoming E911 trunk group is called the default ESN. 911 calls incoming to the E911 tandem on message or FX trunks are routed based on the default ESN datafilled in the pretranslator for that trunk group.

Circumstances may arise which prevent the E911 Tandem from terminating a 911 call to a PSAP. The E911 Tandem will then alternately route the call to another DN or ROUTE. This method of routing is called Alternate Routing.

After a 911 call has been routed to the primary PSAP, that PSAP has the capability to transfer the call to another agency. A highlight of E911 call transfer is selective call transfer. Selective transfer allows the PSAP attendant to transfer the call to a secondary PSAP which specifically serves the type of emergency the subscriber is experiencing. Selective transfer, like selective routing, selects the secondary PSAP based upon the subscriber's ESN.

NOTE: Currently, the SRDB is implemented as a standard table (E911SRDB) on the DMS-100 and may be updated and queried using standard DMS table control commands.

14.2.2 OFBSR Feature

This feature implements an interface from a DMS-100 serving as a E911 tandem to an external selective routing database server (OFBSR). Currently, such server database supports up to 1,024 ESN tuples for each subscriber in the area served by the E911 tandem. Each ESN tuple contains a primary PSAP DN and up to six selective transfer PSAP DNs.

This feature will also support the DUAL OFBSR interface, which will allow one switch to interface to two external databases for selective routing. In the event of communication failure between the DMS-100 and the primary OFBSR, the secondary OFBSR will be utilized for selective routing.

This feature will operate at the initial processing of an E911 call within the DMS-100 E911 call processing environment. At the point in processing where the selective routing function currently operates, a check will be made to determine if the Off-Board Selective Routing Interface will be utilized for the translation of the call. This check will be made in two forms:

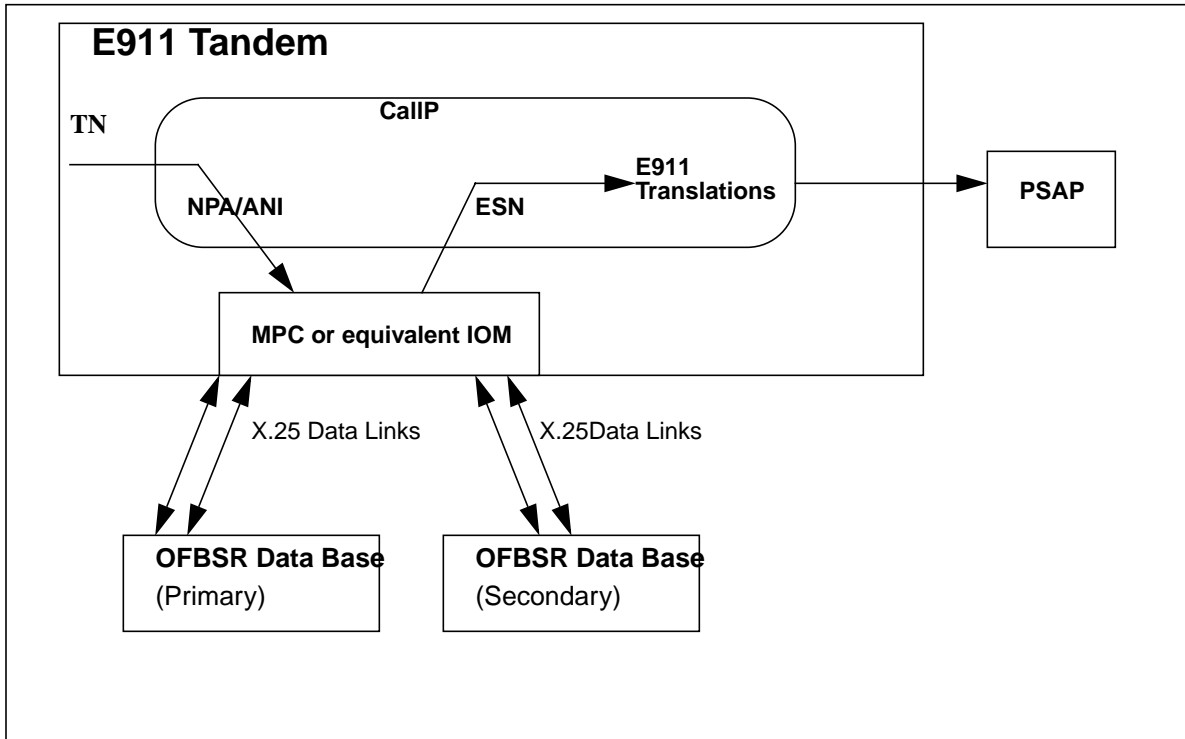
1. An option on the incoming E911 facility (trunk or VFG) to elect Off-Board Selective Routing.
2. An office-wide option (table E911OFC) which elects Off-Board Selective Routing for all E911 calls in the office

Once the determination to route off-board has been made, an X.25 query will be issued to the Off-Board Interface and a timer will be initialized for 750 mseconds. If the timer expires with no response to the query, a second query will be launched and the timer reset for another 750 mseconds. In the event that there is no response to the second query the call will then either be default routed based on the ESN of the E911 trunk or routed based on the ESN retrieved from the E911SRDB table.

This OFBSR feature will support and or generate the following messages (all of the messages conform to ISDN Application Processor Interface Specifications, Issue 10.01 from Lucent Technologies):

- ESN QUERY - Upon receipt of an E911 call, the switch will send an ESN QUERY message to the OFBSR server. This message contains the caller's NPA and ANI.
- ESN REPOSENSE - Upon the receipt of an ESN QUERY or an ENHANCED ESN QUERY message the OFBSR server will respond with an ESN REPOSENSE message containing a valid ESN index which will be used to complete the call. The ESN REPOSENSE message also contains the original NPA and ANI received in the ESN QUERY message.
- TEST QUERY - A CI command *QESN* can be modified to send this message to the OFBSR server to request the retrieval of the ESN. An NPA and a 7 digit ANI will be specified in the TEST QUERY message.
- HEALTH - The OFBSR Server sends this message to the network to provide its health status. The switch receives a HEALTH message from the server at 2 minute intervals and at such time when the server detects a change in its health. In case of a dual OFBSR interface, the switch will compare the health status of both servers and route the ESN queries to the one with better rating.

Figure 1 OFBSR:E911 Tandem to Off-Board Selective Routing Interface



14.3 Hardware requirements

The messaging between the DMS-100 and the Off-Board Selective Routing Database will be delivered over X.25 datalinks. This feature will make use of the Multi-Protocol Controller (MPC) input/output card (1X89) or equivalent functionality available on the Input/Output Module (IOM).

14.4 Limitations and restrictions

None

14.5 Interactions

None

14.6 Logs (LG)

The following new logs will be added to the E911 subsystem:

- E911233 - A problem has been encountered with the ESN query to the OFBSR database.
- E911234 - OFBSR messages routed to secondary database.
- E911235 - OFBSR messages routed to primary database.

Refer to the LG section of this document for more details.

14.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
E911	233	NEW	SOS
E911	234	NEW	SOS
E911	235	NEW	SOS

14.7 Data schema (DS)

14.7.1 New/modified tables

Following tables will be modified:

- VIRTGRPS
- TRKGRP

A new boolean option OFBSR will be added the above tables to indicate whether the facility has the Off-Board Selective routing interface option. This boolean will be initialized to N.

Two following new entries (application ids) will be added to the INDEX filed in table MPCFASTA.

- E911SR01
- E911SR02

The following two new E911 office parameters will be added to the table E911OFC:

- USE_OFBSR_INTERFACE - A boolean option to indicate whether the Off-Board Selective Routing Interface will be used for routing purposes.
- USE_ONBOARD_SRDB - A boolean option to indicated whether the On-Board Database (E911SRDB Table) will be used to route calls in the event of OFBSR failure.

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TRKGRP	Changed	Unchanged
VIRTGRPS	Changed	Unchanged
MPCFASTA	Changed	Unchanged
E911OFC	USE_OFBSR_INTERFACE	New
E911OFC	USE_ONBOARD_SRDB	New

14.8 Service orders (SO)

No Service Order changes are made by this feature.

14.9 Alarms (AL)

The following new alarms will be added by this feature:

- E911_OFBSR_CRITICAL - This alarm will be raised in the event when all the mpc links to both database servers become unavailable
- E911_OFBSR_MAJOR- This alarm will be raised in the event when all the mpc links to one of the database servers become unavailable.
- E911_OFBSR_MINOR- This alarm will be raised in the event when any mpc link to either of the two databases becomes unavailable.

14.10 Command interface (CI)

14.10.1 New/modified commands

The CI command QESN will be modified to send a TEST QUERY message to OFBSR server too request the retrieval of the ESN. A boolean parm OFBSR will be added to the CI command to indicate whether the on-board or off-board database should be queried.

Table 3 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
QESN	CHANGED	-	CI	NON-MENU

Table 4 QESN command parameters and variables

Command	Parameters and variables
QESN	<NPA> {0 TO 999} <TN> {2000000 TO 9999999} <OFBSR> {N, Y}
Parameters and variables	Description
NPA	Numbering Plan Area
TN	7 digit ANI
OFBSR	Boolean indicating whether the OFBSR Database will be queried.

Refer to the CI section for more details.

14.11 Operational measurements (OM)

14.11.1 New/modified OM groups

No OM changes are made by this feature. Existing MPC OMs will be pegged.

14.12 AMA/Billing information (AM)

14.12.1 New/changed AMA/billing information

No AMA/Billing changes are made by this feature.

14.13 Software optionality control (SOC)

Tracked.

14.14 Glossary

Term	Description
ALI	Automatic Location Identification
ASCII	American Standard Code for Information Interchange
ANI	Automatic Number Identification
E911	Enhanced 911
MDN	Mobile Directory Number
MPC	Multi-Protocol Controller
OFBSR	Off Board Selective Routing
pANI	Pseudo ANI
PSAP	Public Safety Answering Point
SERVORD	Service Order

14.15 References

- Lucent Technologies ISDN Application Processor Interface Specifications, Issue 10.01, March 1999.

15: Functional description (FN)

15.1 Feature name

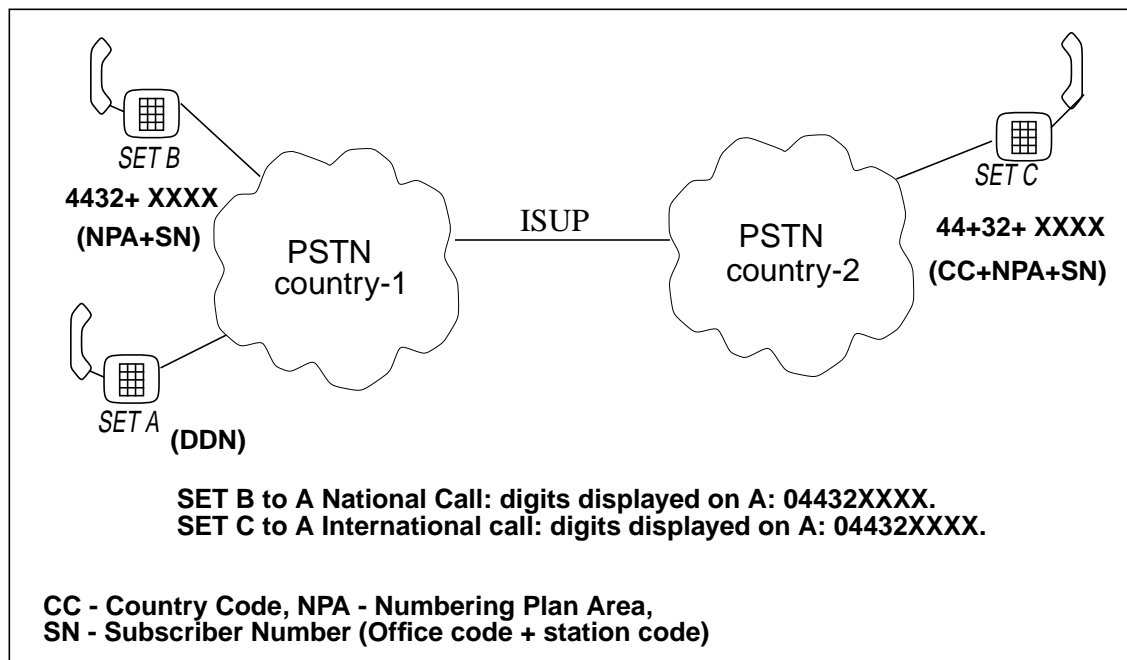
DDN International Interworking.

15.2 Description

15.2.1 Functional overview

The existing functional behavior of Dialable Directory Number (DDN) is shown in Figure 1.

Figure 1 Existing Functional Behavior Diagram



Presently, when one of the area codes in Country-1 is the same as the country code of Country-2 then for a national call (from set B to set A) the digits displayed on set A due to the DDN feature may contain an international access code (e.g. '00') as a prefix. For an international call i.e from set C to set A, the digits displayed on set A may contain a national access code (e.g. '0') as prefix. This ambiguity in the DDN display causes confusion to the user.

This feature removes the above defect by prefixing a national access code (e.g. '0') for national call and an international access code (e.g. '00') for an international call. This enables the user to distinguish whether the call is national or international. The feature also enhances the REVXLVER tool. This activity solve the problems reported by two CSRs, EM92256 'PRESENTATION INTERNATIONAL NUMBER WRONG' and EM92025 'REVERSE TRANSLATION TOOL'. The activity A59022041 works only for MMP market.

15.2.2 Feature background

Once a subscriber has been assigned the DDN feature, the calling information needs to be delivered to the CPE in a form which the subscriber would dial to reach the caller.

The means for determining the dialable format of the calling number is provided by datafill of tables DNREGION, DNREVLXA and CUSTNTWK. Proper derivation of the dialable directory number is dependent upon correct datafill of these three tables.

15.2.3 Feature description

This feature removes the existing defect by defining a new region name 'INTERNAT' similar to the default region name. The example datafill is as follows.

Table DNREVLXA

```
lonsxla      0      9 (INTERNAT 0 00 N)
              (DEFAULT 0 0 N) $
```

If this feature is active then only standard result (i.e INTERNAT) will be picked up for DDN feature for international calls. There will not be any change in the existing behavior of any other feature which uses table DNREVLXA.

This activity also enhances REVXLVER tool so as to allow DNs with more than 10 digits (up to 15 digits) for MMP market.

Since the feature depends on market and CLASS variants, optionality is provided. The activity 'DDN International Interworking' works only for MMP

market. Optionality will be provided by defining an office parameter 'DDN_INTERNATIONAL' in table OFCVAR. This feature works for class variants NTT, ETSI and BELLCORE and will be made compatible for ISUP, BTUP, FTUP, ETSI v1 and ETSI v2.

15.3 Hardware requirements

None

15.4 Limitations and restrictions

- The limitations and restrictions of this feature includes all that are listed for activity AG1515 - CLASS: Calling Number Delivery - Dialable Number.
- If this feature is active in office, the Telco must datafill table DNREVLXA such that the standard region name 'INTERNAT' is used for all results which are intended for international DDN calls. The 'INTERNAT' digit manipulation result will be used only for international DDN calls. For all features except DDN, the 'INTERNAT' region name behaves just like any other DN region name.
- 'INTERNAT' region name can be used to define a region in table DNREGION. But if this feature is active in office, DDN will ignore this datafill. All other features will continue using the datafill as usual.
- If a country is having more than one international access code to reach different countries then this feature won't work.

15.5 Interactions

No new interactions are introduced by this feature.

15.6 Logs (LG)

None.

15.7 Data schema (DS)

15.7.1 New/modified tables

This activity does not introduce any new tables. Changes are needed for the following existing tables to increase the size of their fields.

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
DNREGION	CHANGED	UNCHANGED

Table 1 New or modified tables (Continued)

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
DNREVLXA	CHANGED	UNCHANGED

15.8 Office parameters (OP)

Creating new office parameter “DDN_INTERNATIONAL” in table OFCVAR to make the feature optional. Default value of office parameter is ‘N’.

The following warning will be displayed when the Telco changes the parameter to Y:

`'DDN will now use INTERNAT result in table DNREVLXA for international calls.'`

When the Telco changes the parameter to N, the following message will be displayed:

`'Table DNREVLXA datafill for international DDN calls might need modification.'`

Table 2 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
OFVCVAR	DDN_INTERNATIONAL	NEW

15.9 Service orders (SO)

None.

15.10 Alarms (AL)

None.

15.11 Command interface (CI)

Creating new parameter for REVXLVER tool so as to identify international calls.

15.11.1 New/modified commands

Table 3 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
REVXLVER	CHANGED	Not applicable	REVXLVER	MENU

15.12 Operational measurements (OM)

None.

15.13 AMA/Billing information (AM)

None.

15.14 Software optionality control (SOC)

N/A

15.15 Glossary

- 1 DDN - Dialable Directory Number
- 2 CPE - Customer Premises Equipment

15.16 References

- a. AG1515 - CLASS: Calling Number Delivery - Dialable Number in OLDDOC2.
- b. AG0781 Class: Calling Number Delivery in OLDOC3 library
- c. A59017996 - Calling Number Delivery Enhancement in FMDOC.

16: Functional description (FN)

16.1 Feature name

Dual Line Call Management (DLCM) Enhancement under actid 59022058.

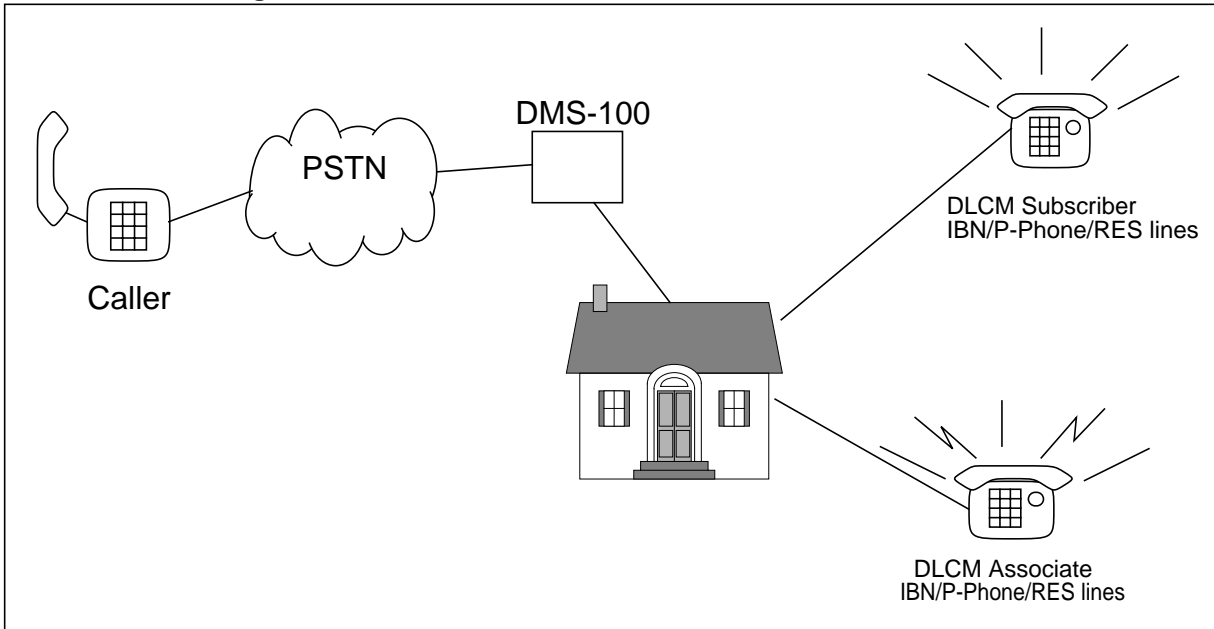
16.2 Description

16.2.1 Background

DLCM is useful in the work-at-home environment where end-users have a business line that is separate from their residential line. Typically different phone sets are connected to each line and are usually located in different places on the same premises.

DLCM allows the end-user to answer incoming calls directed to the business line from the residential line, and vice versa. Simultaneous ringing, call hold, and call answer functionalities are provided under this feature by dialing the Call Management Group (CMG) star access code. CMG is the line option for DLCM in Servord. A CMG group consists of only two phone lines within the same customer group.

In a DLCM call context, the DLCM line to which the call is originally directed is called the DLCM subscriber line. The other DLCM member line is then called the DLCM associate line. Refer to Figure 1 for the basic call scenario of the DLCM.

Figure 1 DLCM Basic Call Scenario

16.2.1.1 Simultaneous and Distinctive Ringing Functionality

If simultaneous ringing is active on the DLCM subscriber and an incoming call terminates to an idle DLCM subscriber line, normal ringing is applied to the DLCM subscriber line and distinctive ringing is applied to the DLCM associate line if it is idle. If the associate line is busy, no ringing is applied until the line becomes idle. However, if the DLCM subscriber line is busy, the DLCM feature is not activated.

If simultaneous ringing is inactive on the DLCM subscriber, only normal ringing is applied to the DLCM subscriber. The DLCM associate line does not ring.

16.2.1.2 Call Hold Functionality

The call hold functionality allows the end-user to put a DLCM call on hold (after the call has been answered) from either DLCM member via the CMG star access code.

To put a call on hold, the DLCM member must hook flash to receive special dial tone, then dial the CMG star access code. At this point, the DLCM member will hear regular dial tone for 10 seconds. During this 10 second interval, the DLCM member can initiate a new call, activate a feature, or go on-hook. If the 10 second interval expires, the DLCM member will hear silence. In order to receive another 10 seconds of dial tone, the DLCM member

must hook flash again. Note that there is no limit to the number of possible 10 second intervals of dial tone which the DLCM member can receive.

If the DLCM member initiates a new call after placing a call on hold, they can toggle between the new and original calls by hook flashing and re-dialing the CMG star access code. Toggling will put one call on hold and make the other call active.

When the DLCM member goes on-hook, either at the dial tone or after completing the new call, ringback is provided to the line and the DLCM member hears audible ringing. If simultaneous ringing is active on that line, ringback is also applied to the other DLCM line. However, if the line is busy, ringback is not applied until the line becomes idle. If simultaneous ringing is inactive on that line, ringback is not applied to the other DLCM line.

16.2.1.3 Call Answer/Retrieve Functionality

The call answer functionality allows the end-user to answer a DLCM call from the DLCM associate via the CMG star access code. This is the case when the simultaneous ringing is inactive on the DLCM subscriber and no ringing is applied to the DLCM associate. However, if simultaneous ringing is active, the end-user can answer the call from either the subscriber or associate line simply by going off-hook.

In the case of call hold, if ringback is applied, the end-user can retrieve the call by simply going off-hook. If no ringback is applied the end-user can still answer the call by going off-hook and dialing the CMG star access code.

16.2.2 Feature Description

Currently, DLCM is compatible only with RES lines. The purpose of this feature is to provide DLCM for IBN, V5.2 IBN lines, P-Phones and also for the international market.

16.2.2.1 Provisioning on IBN lines

The provisioning on IBN lines is same as that of RES lines. Both IBN and RES lines writes in the table IBNFEAT. So, changes are not required to make the DLCM feature compatible with IBN lines. Changes need to be made in table OPTOPT for the feature interactions. Refer to Figure 2 for the datafill of CMG on IBN lines.

Figure 2 Adding the CMG option using the ADO command for an IBN line

```

>ado
SONUMBER:      NOW  97  4 27 AM
>
DN_OR_LEN:
>7502511 (subscriber line)
OPTION:
>cmg
LINK_DN_OR_LEN:
>7502511 (subscriber line linked to itself)
DENY_SDN:
>Y
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 97 4 27 AM 7502511 ( CMG 7502511 Y) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y

>ado
SONUMBER:      NOW  97  4 27 AM
>
DN_OR_LEN:
>7502514 (associate line)
OPTION:
>cmg
LINK_DN_OR_LEN:
>7502511 (associate line linked with subscriber line)
DENY_SDN:
>Y
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 97 4 27 AM 7502514 ( CMG 7502511 Y) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y

```

Figure 3 Changing LCC for CMG Member from RES to IBN using CHG

```
>chg
SONUMBER:      NOW    0  9 20 AM
>
WHAT:
>line
DN_OR_LEN:
>4814220 (CMG MEMBER - RES having customer Group RGC)
LINE_INFO:
>lcc
NEW_LCC:
>ibn
GROUP:
>rgc
SUBGRP:
>0
NCOS:
>0
SNPA:
>919
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 4814220 LCC IBN RGC 0 0 919
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
MACHINES ARE OUT OF SYNC, SERVICE ORDERS NOT ALLOWED
JOURNAL FILE IS INACTIVE, SERVICE ORDERS NOT ALLOWED
SHOULD ORDER BE DONE ANYWAY? (Y OR N)
>y
```

Figure 4 Changing LCC for CMG Member from IBN to RES using CHG

```
>chg
SONUMBER:      NOW    0  9 20 AM
>
WHAT:
>line
DN_OR_LEN:
>4814220 (CMG MEMBER - IBN having same RES cust Group)
LINE_INFO:
>lcc
NEW_LCC:
>lfr
LATANAME:
>lata1
LTG:    0
>
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 4814220 LCC lFR LATA1 0
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
MACHINES ARE OUT OF SYNC, SERVICE ORDERS NOT ALLOWED
JOURNAL FILE IS INACTIVE, SERVICE ORDERS NOT ALLOWED
SHOULD ORDER BE DONE ANYWAY? (Y OR N)
>y
```


Figure 5 Changing Customer Group for CMG Member using CHG

```

>chg
SONUMBER:      NOW    0  9 20 AM
>
WHAT:
>line
DN_OR_LEN:
>7502514 (CMG MEMBER - IBN)
LINE_INFO:
>cust
CUSTGRP:
>rga
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 7502514 CUST RGA
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
Cannot change Customer Group of a CMG GROUP MEMBER
*** ERROR - INCONSISTENT DATA ***
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 7502514 CUST RGA
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>

```

V5.2 is an ETSI standard protocol for communication between Local Exchange (LE) and Access Network (AN). The Global Peripheral Platform (GPP) with E1 carriers is the only method by which a V5.2 line can be set up. For GPP peripherals the table V5RING is downloaded to the peripheral during the Dynamic Data Move (DDM). Table V5RING allows provisionable mappings between XPM Ring Chars (0-15) and V5.2 Cadenced-ringing types (0-31). These mappings can then be assigned to one or more V5.2 interface(s) using existing table GPPTRNSL. The telco has to datafill table V5RING and GPPTRNSL in a way that results in a supported ring type being sent to the AN. When the CMG feature sends a ringing pattern to any GPP peripheral, the GPP positions on that ring pattern and finds the ring pattern supported by the AN connected to that GPP. Refer to Figure 7 for the sample datafill of the tables GPPTRNSL and V5RING. The V5RINGID which is datafilled as DEFAULT in table GPPTRNSL (red in color) is datafilled under key DEFAULT in table V5RING. This Ring Mappings Supports only for the C3C ringing set.

Figure 6 Provisioning of tables GPPTRNSL and V5RING

```

>table gpptrns1
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: GPPTRNSL
>pos V5_2 00 4
V5_2 00 4 GPP 0 V5_2 (6) (7) $ 4 4 100 DEFAULT DEFAULT
>quit

>table v5ring
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: V5RING
>pos DEFAULT

DEFAULT 0 1 2 3 4 9 0 0 0 0 0 0 6 7 8 0
>quit

```

16.2.2.2 Provisioning on P-Phone

There are five types of KSET features - Set feature, Subset feature, DN feature, Code access feature and Key feature. Since CMG should be accessed by only the DNs in the CMG group, other DNs on the set should not be allowed to access this feature. Therefore, CMG will be a 'DN feature'. The P-Phone writes in the table KSETFEAT. Following LCC are supported for KSET (P-PHONE) M5008, M5009, M5112, M5208, M5209, M5212, M5216, M6310, M5312, M5316 and M6320

The two DNs in the CMG group will not be allowed to datafill on the same key set as the purpose of the DLCM feature will not be served. DENY_SDN will not be prompted for KSET since SDN is not compatible with KSET.

CMG Call Pickup activated by dialing Star activation code from the Primary DN key (CMG member) when the Associate member is ringing. CMG Call Hold cannot be activated in the KSET, because It needs flash key to dial Star activation Code in busy state.

Figure 7 Adding the CMG option using the ADO command for P-Phone

```
>ado
SONUMBER:      NOW  97  4 27 AM
>
DN_OR_LEN:
>7512531 (subscriber line)
OPTKEY:
>1
OPTION:
>cmg
LINK_DN_OR_LEN:
>7512531 (subscriber line linked to itself)
OPTKEY:
>$
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 97 4 27 AM 7512531 ( 1 CMG 7512531) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y

>ado
SONUMBER:      NOW  97  4 27 AM
>
DN_OR_LEN:
>7512532 (associate line)
OPTKEY:
>1
OPTION:
>cmg
LINK_DN_OR_LEN:
>7512531 (associate line linked to the subscriber line)
OPTKEY:
>$
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 97 4 27 AM 7512532 ( 1 CMG 7512531) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y
```

Figure 8 Changing Customer Group for a CMG member using CHG

```

>chg
SONUMBER:      NOW    0  9  20 AM
>
WHAT:
>line
DN_OR_LEN:
>2461170 (CMG MEMBER -KSET)
OPTKEY:
>1
LINE_INFO:
>cust
CUSTGRP:
>rgc
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 2461170 1 CUST RGC
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
Cannot change Customer Group of a CMG GROUP MEMBER
***  ERROR - INCONSISTENT DATA  ***
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 2461170 1 CUST RGC
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT

```

16.2.2.3 International Ringing

Each country in the international market has its own country specific ringing. The ringing pattern is picked up from the table CMGRING depending on which peripheral the CMG line subtends from. This ringing pattern is send to the peripheral.

Figure 9 Changing LCC for a CMG member from KSET to KSET using CHG

```

>chg
SONUMBER:      NOW    0  9  20 AM
>
WHAT:
>line
DN_OR_LEN:
>2461120 (CMG MEMBER - KSET)
OPTKEY:
>1
LINE_INFO:
>lcc
NEW_LCC:
>M5208
COMMAND AS ENTERED:
CHG NOW 0 9 20 AM LINE 2461120 1 LCC M5208
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>y
MACHINES ARE OUT OF SYNC, SERVICE ORDERS NOT ALLOWED
JOURNAL FILE IS INACTIVE, SERVICE ORDERS NOT ALLOWED
SHOULD ORDER BE DONE ANYWAY? (Y OR N)
>y

```

16.3 Hardware requirements

Not Applicable

16.4 Limitations and restrictions

- The two lines of a CMG group must be subtended from the same end-office and must be part of the same customer group.
- A CMG group is restricted to a maximum of two lines.
- A DLCM member cannot be part of more than one CMG group.
- The two CMG members can not be datafilled on the same KSET
- CMG Call Hold cannot be activated in KSET.
- CMG can be provisioned only on a Primary DN (KEY 1) of KSET.
- LCC change allowed only for RES to IBN, IBN to RES and KSET to KSET. If Line is a CMG Member.

- Customer Group change Not Allowed for CMG Member

16.5 Interactions

These are the interactions between the DLCM enhancement and each feature listed below. All other feature interactions are listed in the DLCM FN (FEAT.AJ4899).

16.5.1 Automatic Call Distribution (ACD) / Uniform Call Distribution (UCD)

The ACD/UCD feature allows calls to be evenly distributed to a number of predesignated stations known as ACD/UCD group members by dialing a ACD/UCD number.

A CMG member cannot be an ACD/UCD number or group member. ACD and UCD are added to the incompatible list of CMG.

16.5.2 Call Forward Busy (CFB)

Simultaneous ringing is not applied to a DLCM associate line if the original call directed to the DLCM subscriber line is forwarded to a third party.

Upon forwarding to a third party, a ring splash is applied to the DLCM subscriber line only.

If the forward-to party is a DLCM subscriber line, then simultaneous ringing will be applied to the DLCM associate line if it is activated. Upon answer from either the DLCM subscriber line or the DLCM associate line, a ring splash is applied to the forwarding party.

16.5.3 Call Forward Don't Answer (CFD)/ Call Forward Group Don't Answer (CFGD)

In the context of simultaneous ringing applied to a DLCM associate line, if the CFD/CFGD timer expires on the original call directed to the DLCM subscriber line, then simultaneous ringing is stopped, and the call is forwarded as specified by the datafill present on the DLCM subscriber line.

The CFD/CFGD feature and its timer are not activated on the simultaneous ringing on the DLCM associate line even if the line subscribes to the CFD/CFGD feature.

Upon forwarding to a third party, a ring splash is applied to the DLCM subscriber line only.

If the forward-to party is a DLCM subscriber line, then simultaneous ringing will be applied to the DLCM associate line if it is activated. Upon answer from either the DLCM subscriber line or the DLCM associate line, a ring splash is applied to the forwarding party.

16.5.4 Ring Again (RAG)

The RAG option allows a station user encountering a busy DN to be notified when the busy station becomes idle and the system automatically redials the same number.

If the subscriber who activates RAG is a DLCM subscriber, then for IBN lines it will be indicated by ringing and for P-Phone by the flash of the lamp. The associate line will not be notified.

16.5.5 Speed Calling Long list (SCL) / Speed Calling Short list (SCS)

The SCL option allows a customer to specify a list of frequently called numbers that can be called by dialing a 2 digit speed calling code instead of the complete number.

The SCS option allows a customer to specify a list of frequently called numbers that can be called by dialing a 1digit speed calling code instead of the complete number.

DLCM is a terminating feature and does not interact with the SCL/SCS feature. The DLCM subscriber and associate lines contains separate speed call lists.

16.5.6 Station Controlled Conference (CNF)

The CNF option allows a station to have conference call to a maximum of 30 parties.

The second leg of a conference call may be a call directed to a DLCM subscriber line. In this case, simultaneous ringing may be applied to the DLCM associate line if activated.

The CNF subscriber can flash to conference in the DLCM subscriber line and DLCM associate line as they simultaneously ring. Once the call is answered on either the DLCM subscriber line or the DLCM associate line, simultaneous ringing is stopped.

16.6 Logs (LG)

Not Applicable.

16.7 Data schema (DS)

Not Applicable.

16.8 Office parameters (OP)

Not Applicable.

16.9 Service orders (SO)

This feature makes DLCM compatible with the LCC IBN, M5312, M5316, M6310, M6320, and PSET.

16.10 Alarms (AL)

Not Applicable.

16.11 Command interface (CI)

Not Applicable.

16.12 Operational measurements (OM)

Not Applicable.

16.13 AMA/Billing information (AM)

Not Applicable.

16.14 Software optionality control (SOC)

Not Applicable.

16.15 Glossary

Term	Description
DLCM	Dual Line Call Management
CMG	Call Management Group
LOF	Line Option Framework
LE	Local Exchange
AN	Access Network
GPP	Global Peripheral Platform
LCC	Line Class Code
RES	Residential Enhanced Services
IBN	Integrated Business Network
ACB	Automatic Call Back
ACD	Automatic Call Distribution
UCD	Uniform Call Distribution
AIN	Advanced Intelligent Network
AR	Automatic Recall
BNN	Bridge Night Number
CFB	Call Forward Busy
CFD	Call Forward Don't Answer
CFGD	Call Forward Group Don't Answer
CFMDN	Call Forward MADN
CND	Calling Number Delivery
DDN	Dialable Directory Number
CNAMD	Calling Name Delivery
CPU	Call Pickup
CSMI	Call Screening, Monitor and Intercept
CWT	Call Waiting
CXR	Call transfer
SCA	Selective Call Acceptance
SCRJ	Selective Call Rejection

ACRJ	Anonymous Call Rejection
DRCW	Distinctive Ringing/Call Waiting
DTM	Denied Termination
DNH	Directory Number Hunt
DLH	Distributed Line Hunt
MLH	Multiline Hunt
ISA	In-Session Activation
LOD	Line Hunt Overflow to DN
LOR	Line Hunt Overflow to Route
LNR	Last Number Radial
MADN	Multiple Appearance Directory Number
MSB	Make Set Busy All Calls
MBSCAMP	Meridian Business Set Camp
MCH	MBS Malicious Call Hold
PLP	Plug-Up
RAG	Ring Again
SCMP	Series Completion
SCL	Speed Calling Long list
SCS	Speed Calling Short list
SDS	Special Delivery Service
SimRing	Simultaneous Ringing
SCWID	Spontaneous Call Waiting Identification
DSCWID	SCWID with disposition
SUS	SUSpend service
RSUS	Requested SUSpend service
SDN	Secondary Directory Number
CNF	Station Controlled Conference
3WC	Three-Way-Call
DDM	Dynamic Data Move

16.16 References

- Functional Description of DLCM, DOC AJ4899FN
- V5.2 Training Material, FMDOC V52TRAINING
- Functional Description of Feature Hooks for Feature Ringing, FMDOC A59016723

17: Functional description (FN)

17.1 Feature name

TOPS Interworking with SDM

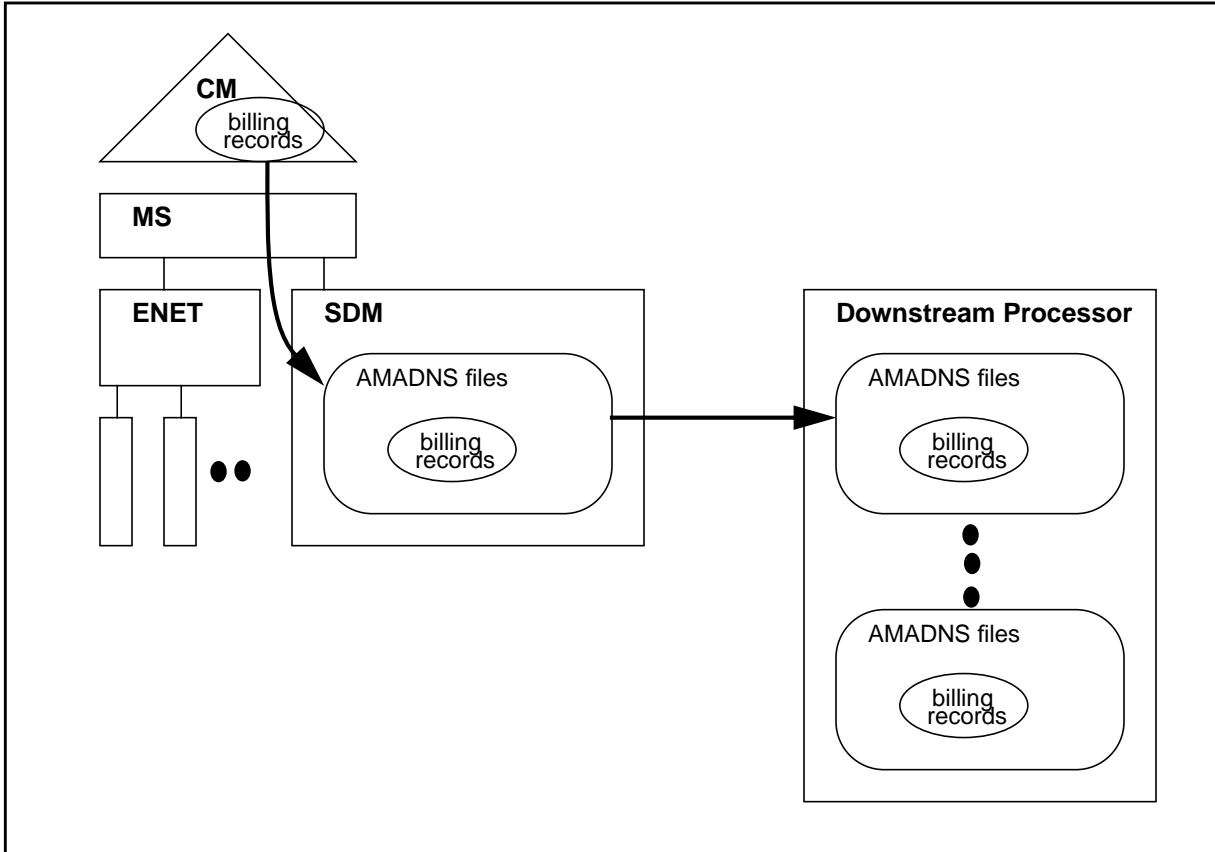
17.2 Description

This activity supports TOPS Bellcore AMA Format (BAF) on the Supernode Data Manager (SDM). The Supernode Billing Application (SBA) on the SDM is the AMA vehicle for AMA Data Networking System (AMADNS) on the DMS family of switches. With SBA, the billing records are still formatted on the Core and sent to the SDM for storage and transferred to the downstream processor. The SBA also provides tools similar to AMADUMP to search the billing files for particular records and structures.

Note: Only BAF is supported for TOPS billing on the SDM. TOPS Detailed Recording (TDR) is not supported.

The SBA includes software components that run under two hardware units in the DMS: the CM and the SDM. The primary purpose of SBA is to receive AMA records from the CM, move them to the SDM, perform processing and routing on those records, and then send them as billing files to the operator company's downstream processor(s).

Figure 1 SBA overview



No new capabilities are added to SBA. Refer to NTP 297-5051-300: DMS100 Family Supernode Data Manager Billing Application Guide for more information.

17.3 Hardware requirements

None.

17.4 Limitations and restrictions

This activity does not support the TOPS TDR billing format on the SDM.

17.5 Interactions

None.

17.6 Logs (LG)

17.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

17.7 Data schema (DS)

17.7.1 New/modified tables

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)

17.8 Office parameters (OP)

17.8.1 New/modified office parameters

Table 3 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

17.9 Service orders (SO)

17.10 Alarms (AL)

17.10.1 New/modified directories

Table 4 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

17.11 Command interface (CI)

17.11.1 New/modified commands

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN

17.12 Operational measurements (OM)

17.12.1 New/modified OM groups

Table 6 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

17.13 AMA/Billing information (AM)

17.13.1 New/changed AMA/billing information

Table 7 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

17.14 Software optionality control (SOC)

Table 8 SOC

SOC option name:	OSB
SOC option title:	Basic Operator Services
SOC option control type:	state
New SOC option?	No
SOC option order code	OSB00001
Option defined in DRU:	TOPS Core
Affected products:	LET, LLT

17.15 Glossary

Term	Description
AMADNS	Automatic Message Accounting Data Networking System
BAF	Bellcore AMA Format
SBA	Supernode Billing Application
SDM	Supernode Data Manager
TDR	TOPS Detail Recording

17.16 References

REF #	Description of Reference
NTP 297-5051-300	DMS100 Family Supernode Data Manager Billing Application Guide

18: Functional description (FN)

18.1 Feature name

TOPS IP: Voice Provisioning and Utilities

18.2 Description

This feature provides data schema changes for VoIP to operator positions, and implements internal utilities to support VoIP call processing for both the TOPS15 North American and Global MMP loads.

18.3 Project introduction

Note: This document includes a number of statements to the effect that certain TOPS-IP functionalities were introduced, or are supported, in the TOPS13 and TOPS15 releases. These statements should be interpreted as describing which functionalities the TOPS-IP design groups intended to make available in those releases. At the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

This section includes project background, an overview of supported configurations, feature breakdown, and overall project limitations and restrictions. For additional limitations and restrictions, please refer to the appropriate sections of the individual feature documents.

The basic new TOPS-IP functionality in the 15 release is IP voice and data connectivity between the DMS and IWS operator positions. Because position connectivity and Operator Centralization (OC) connectivity are inter-related in an OC network, this section addresses OC issues as well as position connectivity issues.

18.3.1 Background

In TOPS13 and XPM15, the TOPS-IP project provided support for

- IP voice and data connectivity between North American TOPS OC host and remote switches, and
- IP data connectivity for QMS MIS in North American TOPS switches.

IP connectivity was achieved using the IP-XPM peripheral module. The IP-XPM is a DTC with an SX05DA main processor, 7X07AA IP Gateway (IPGW) cards in the P-side interface slots, and an MX76DA messaging card. The SX05 provides the IP interface for data messaging, while the 7X07 provides the call signaling and bearer interface for voice over IP (VoIP).

OC voice links are datafilled in the DMS CM as dynamic ISUP trunks minus the usual CCS7 datafill. A dynamic trunk is one that can terminate anywhere, rather than having a nailed-up far end. ISUP messaging is used only between the CM and the SX05 and 7X07. The 7X07 converts between ISUP on the C-side and H.225-based messaging on the IP side, and it converts between circuit-switched voice on the DMS network side and packet switched voice on the IP side.

For additional important background information, please refer to 297-8403-906, "TOPS Internet Protocol (IP) User's Guide."

18.3.2 Overview of supported network configurations

This section shows and describes first a traditional network of operator positions and DMS TOPS switches, then the same network after it has been fully converted to IP connectivity for the positions and the OC links, and finally a hybrid IP/traditional network such as may exist during the conversion to TOPS-IP.

18.3.2.1 Traditional, non-IP network

Figure 1 shows a high-level view of a simple, traditional, TDM-based¹ network of operator positions and TOPS switches. This is a pre-TOPS-IP configuration. The DMS switch labeled "Standalone/OC Host TOPS Switch" could be a pure standalone TOPS switch in a non-OC environment, a pure OC host, or a combination.

Although not shown in the figure, the three TOPS switches are also connected to the public switched telephone network (PSTN) in the traditional way.

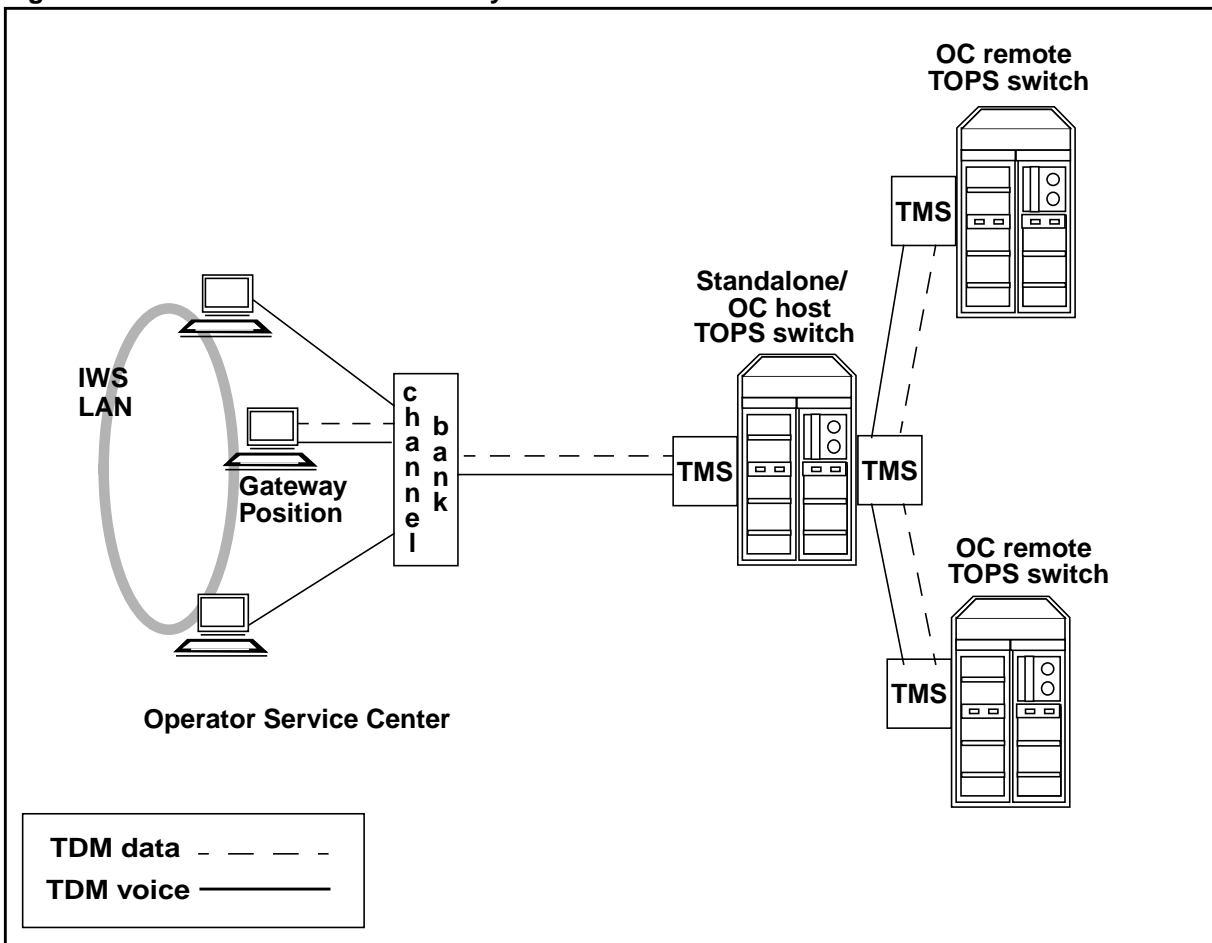
Dedicated position voice links are provisioned between the standalone or host TOPS switch and each position. These nailed-up TDM voice links are through the TMS peripheral, a DS1/T1 or PCM30/E1 carrier, a channel bank, and a DS0 link to the position.

¹Throughout this document, the term "TDM" is used to refer to pre-IP voice and data connectivity that uses traditional time division multiplexed trunking facilities to transmit non-packetized voice and data. However, it is recognized that an operating company may route its IP traffic over a SONET backbone, for example, and thus may be using an underlying TDM technology even with IP.

A data link is also provisioned between the standalone or host TOPS switch and each position. Like voice links, position data links use the TMS peripheral. Unlike the voice path, however, the data path to a position always passes through a Gateway Position which transmits data to and from the other positions on the IWS LAN. The Gateway Position also has maintenance responsibility for other positions in its cluster.

The OC remote switches in the figure have point to point TDM voice and data links to the OC host. In the figure these OC connections use TMS peripherals, but alternatively they could use DCM peripherals. The TOPS switch allocates OC voice links on a per-call basis; one OC voice link is required for each OC call. Many OC calls can simultaneously use an OC data link.

Figure 1 Position and OC connectivity without TOPS-IP



18.3.2.2 Fully converted TOPS15 IP network

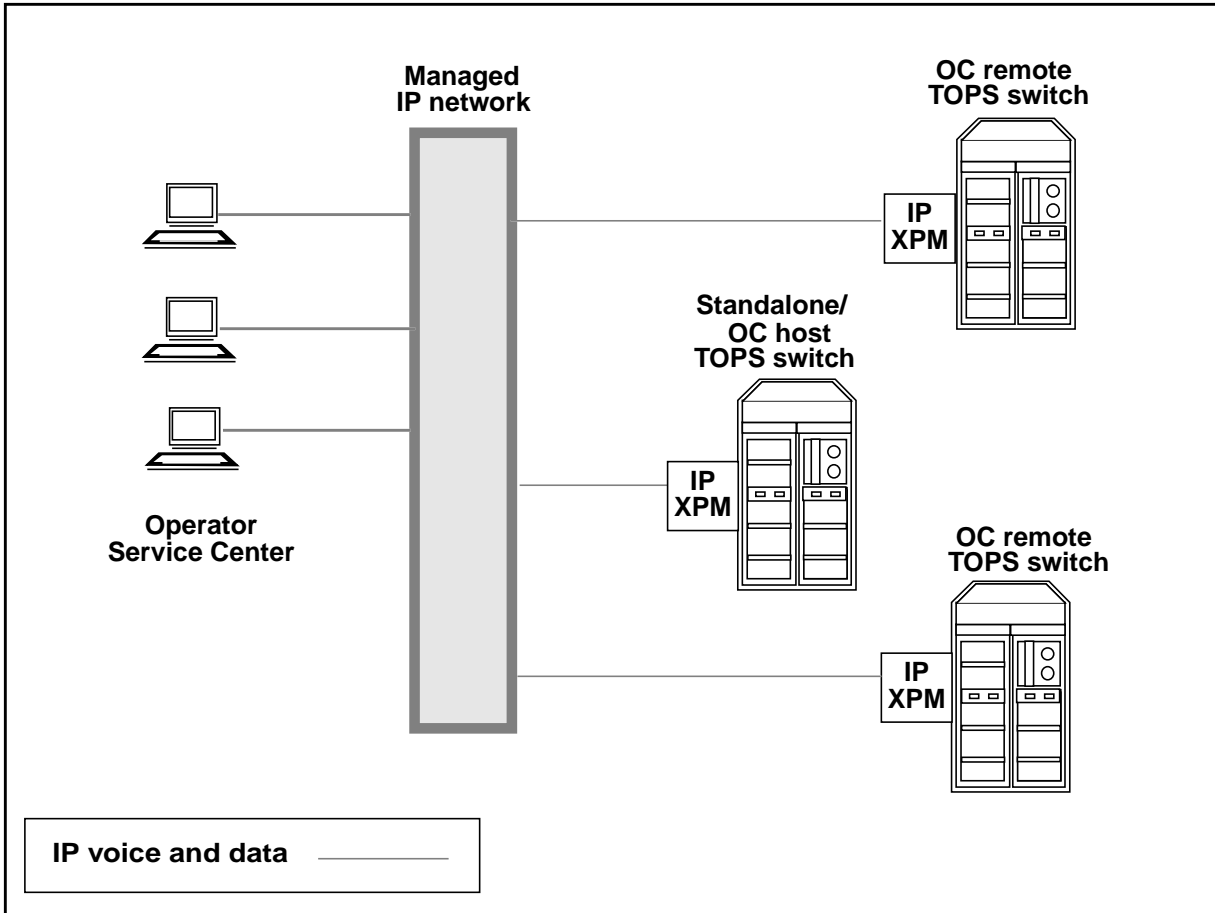
Figure 2 shows the same network fully converted to use the TOPS-IP interfaces that were developed in the 15 release. The operator positions and TOPS DMS switches all have IP voice and data connectivity to a managed IP

network. Please refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide,” for more information about the IP-XPM and requirements for the managed IP network.

Although the positions are still on an IWS LAN, the LAN is considered part of the managed IP network, so it is not shown individually in the figure. It is an Ethernet LAN, not a token ring.

On the DMS side, the IP connectivity is through IP-XPM peripherals, which were introduced in TOPS13 and XPM15 for the OC-IP and QMS MIS IP applications. The TOPS-IP position application is added in TOPS15. The same IP-XPM can simultaneously support IP traffic for all three of these applications.

Figure 2 Position and OC connectivity with TOPS-IP



In the configuration of Figure 2, there is no longer a Gateway Position with maintenance and data messaging responsibility for other positions. Instead, each position exchanges data messages directly with the TOPS host switch over the managed IP network.

IP data communication is maintained between the position and the host switch as long as the position is in-service, regardless of whether the position is processing a call. In OC calls, OPP (Open Position Protocol) messages between the OC remote and the position always pass through the OC host.

Unlike data connections to positions, which persist over calls and route through the host for OC calls, voice connections to positions are established on a per-call basis and bypass the host in OC calls. The VoIP connection is directly between the OC remote switch and the position, and it uses no resources in the OC host.

One implication is that a position does not have a voice link to any DMS switch when it is not processing a call. Another implication is that the IP network must be configured in such a way that the remotes and positions, remotes and hosts, and hosts and positions can all route messages to each other.

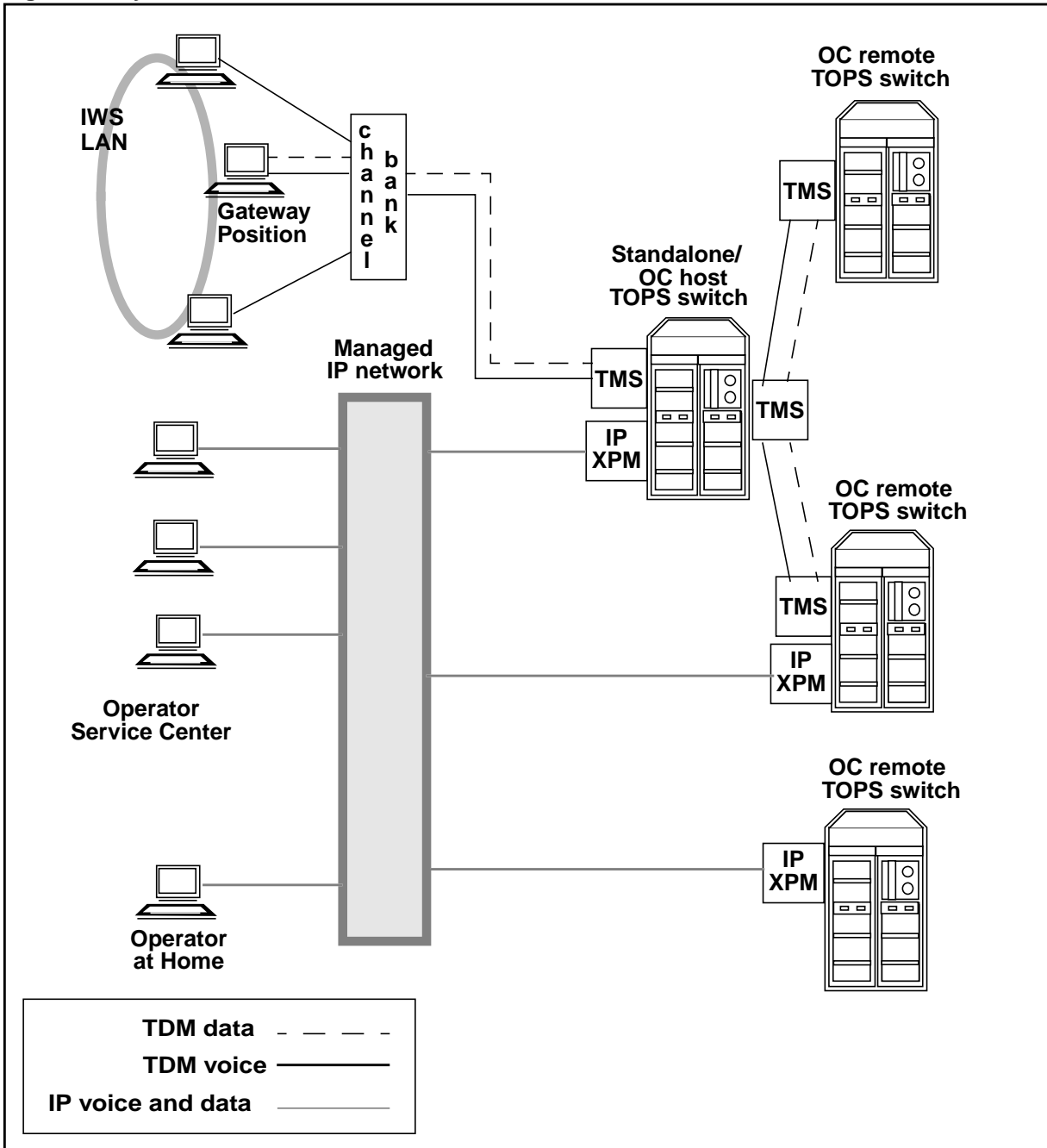
VoIP between positions and TOPS switches uses industry-standard protocols from the ITU-T H.323 suite, version 2. In the TOPS CM, the voice link to a position is datafilled as a dynamic ISUP trunk. The 7X07 IP Gateway card in the IP-XPM converts between H.323 protocols on the IP side (H.225 and H.245 for call signalling, RTP and RTCP for bearer), and ISUP messaging and circuit switched voice on the C-side. Supported codecs for VoIP are G.711 (Mu-law and A-law) and G.729.

18.3.2.3 Hybrid TOPS15 IP/TDM network

It is expected that during the transition to TOPS-IP, a network will include some combination of IP and traditional TDM connectivity for positions and OC links. Figure 3 illustrates the variety of supported configurations.

Figure 3 also shows that positions with IP connectivity need not be at an Operator Service Center, as long as the position is connected to the operating company's managed IP network. Position connectivity using the public Internet for voice or data is not supported.

Figure 3 Hybrid Traditional and TOPS-IP network



As shown in the figure, a single TOPS standalone or host switch can simultaneously support positions with traditional connectivity and positions with IP connectivity. Also, a single OC host or remote can support both traditional and IP connectivity to other nodes in the OC network.¹

¹However, if both IP and traditional OC connectivity exist between the same host-remote pair, each must have the other datafilled as two different offices in tables OCOFC and OCGRP.

Note: If an OC host has any IP positions, it is important that either (a) all of its remotes be upgraded to TOPS15 or later, or (b) QMS queuing be set up to ensure that an IP position cannot be selected for a call from a pre-TOPS15 remote. This is true regardless of whether the OC links are IP or traditional TDM. If an IP position is selected in the OC host for a pre-15 remote, the call is deflected.

The next several paragraphs describe the different combinations of TDM and IP connectivity for position and OC voice and data links. This information is summarized in Table 1.

If the OC remote selects an OC-IP data link for a call, and the host selects an IP position, Figure 2 applies. In this case the operator's voice link is always VoIP directly from the remote; that is, it always bypasses the host. On the other hand, the operator's data for the call passes through the OC host. The data connection is IP from remote to host, and then IP from host to position.

If the remote selects an OC-IP data link and the host selects a traditional, non-IP position, then host voice bypass is not available. The call uses an OC-IP voice link between the remote and the host. Packetized voice from the remote is converted to TDM voice in the 7X07 IPGW card in the host's IP-XPM, and travels through the DMS network in the host and out on the nailed-up TDM voice link to the position. Similarly, the operator's data for the call is IP between remote and host, but it uses the position's nailed-up data link between host and position (routing via the Gateway Position on the IWS LAN). This is the same as the TOPS13 OC-IP functionality, before the introduction of IP positions in TOPS15.

If the remote selects a traditional, non-IP OC data link and the host selects a non-IP position, the functionality is the same as it was prior to the TOPS-IP project. That is, the call uses traditional TDM-OC voice and data links between remote and host, and it uses traditional nailed-up voice and data links between host and position.

If the remote selects a traditional, non-IP OC data link and the host selects an IP position, then host voice bypass is not available. The call uses a traditional TDM-OC voice link between remote and host. Then in the host, the TDM voice from the remote goes through the DMS network and out to a 7X07 IPGW card in the IP-XPM that provides IP connectivity for the position. The IPGW converts between TDM voice on the C-side and packetized voice to the position. Similarly for data, the traditional TDM-OC data link is used between remote and host, and the IP-XPM in the host sends IP data to (and receives IP data from) the position.

These various configurations are summarized in Table 1 as follows.

Table 1 Supported configurations of IP and TDM position and OC connectivity

OC data link type	Position connectivity in host	Voice path used	Data path used
IP	IP	VoIP, remote to position (bypasses host)	DoIP remote to host to position
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	
IP	TDM	VoIP remote to host, TDM host to position.	DoIP remote to host, TDM host to position.
TDM	TDM	TDM remote to host, TDM host to position.	TDM remote to host, TDM host to position.
		This is the same configuration that existed prior to the TOPS-IP project.	
TDM	IP	TDM remote to host, IP host to position.	TDM remote to host, IP host to position.
		Note: This configuration is not supported unless the remote and host are both at TOPS15 or higher.	

18.3.3 Feature breakdown

The following table shows the individual activities that make up the TOPS, XPM, and IWS IP projects for the 15 release.

Table 2 Feature Breakdown

CM Activities	
59022288	TOPS IP: Voice Provisioning and Utilities
	Provides data schema changes for VoIP to operator positions, and implements internal utilities to support VoIP call processing.
59006658	TOPS IP: Position Provisioning and OPP Data
	Provides data schema changes for IP-based operator positions, and support for OPP data messaging over IP.
59006653	TOPS IP: Position Maintenance
	Provides the CM maintenance functionality associated with IP-based operator positions.

Table 2 Feature Breakdown

59015863	TOPS IP: Call Processing for IP Voice
	Provides the high-level CM call logic to support operator positions with IP voice connectivity to the DMS.
59020499	TOPS IP: Global Support
	Documentation and test activity for support of a subset of TOPS-IP functionality in MMP loads.
59022293	TOPS IP: IPGW Enhancements
	Provides increased flexibility for engineering and provisioning of 7X07 IPGW cards and dynamic trunks.
7X07 Activity	
59022821	TOPS IP: 7X07 IP Gateway Support for VoIP
	Provides the 7X07 gateway functionality required for TOPS IP in the 15 release.
XPM Activities	
59022114	RSI Link Selection, Version control, Robustness
	Provides more even distribution over the IP-XPM's C-side links of data messages from the XPM to the CM for TOPS applications. Also provides internal enhancements.
IWS Activities	
RD000701	IWS Voice Over IP
	Provides VoIP functionality for operator positions.
RD983702	OPP Over IP
	Implements the OPP development needed to support positions with IP connectivity to the DMS.
RD002601	DHCP/DNS Support in IWS
	Provides position support for the Domain Host Configuration and Domain Name Service protocols.
RD002602	Verification of Voice Over IP Card
	Hardware activity to verify the third-party card used for VoIP in the IWS.
RD991614	OIA Direct Connect via HTML
	Provides support for OIA applications on positions with IP connectivity to the OIA data bases.

18.3.4 Project limitations and restrictions

This section includes limitations and restrictions of the overall TOPS15 TOPS-IP project. Individual activities in the project include additional limitations and restrictions.

- The original TOPS-IP design intent was to provide support for the following:
 - OC-IP between North American OC host and remote switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in North American TOPS switches in the TOPS13 and later releases,
 - IP data connectivity for QMS MIS in MMP loads, but not in GMP (GSP/MMP combo) loads, in the TOPS15 and later releases, and
 - IP voice and data connectivity between DMS switches and IWS operator positions in North American and MMP loads, but not GMP, in TOPS15 and later releases.

However, at the time of publication, decisions about which functionalities would actually be supported, and in which releases and for which markets, had not been finalized. Please contact the appropriate Nortel Networks marketing group for current information.

- Like OC-IP voice and data connectivity, TOPS-IP position connectivity is intended to be over a managed network that has been carefully engineered for reliability and adequate bandwidth.
- TOPS OC remote switches at TOPS14 and lower cannot process calls that are allocated IP positions in the host. Therefore, OC hosts at TOPS15 and higher deflect any calls that are allocated positions with IP connectivity, if the remote is pre-TOPS15.

It is recommended that all switches in the OC network be upgraded to TOPS15 before operators who serve OC calls log into IP positions. Alternatively, new QMS call queues may be set up for operators who log into IP positions. If this approach is taken, remotes that have not yet upgraded to TOPS15 must not be datafilled to route calls to the new call queues.

- Positions with IP data connectivity must also have IP voice connectivity, and vice versa.
- IP connectivity is supported for Nortel Networks IWS positions only. Third party OPP-compliant operator positions continue to be supported in TOPS15, but only with traditional TMS connectivity.
- It is not possible for an OC remote to route VoIP traffic for the position to the OC host and have the host forward VoIP to the position. If the OC and position links are both IP, host voice bypass is always used. So the remotes

must be on the same IP network as any positions they will use, as well as any hosts they will use.

- The scope of the TOPS-IP project in the 15 release is limited to position voice and data connectivity to TOPS DMS switches. The project does not convert any other TOPS interfaces to IP.

For example, the TOPS15 development does not change the data connectivity between the DMS and D1 databases, LIDB data bases, or PARS nodes. Nor does it provide VoIP between the DMS and OSSAIN service nodes or the ISN-DA audio server.

Also, the TOPS15 development does not convert existing TOPS applications that use the Ethernet Interface Unit (EIU) for IP data connectivity, to use the IP-XPM. For example, OSSAIN data links, OSAC data links, and TOPS devices are not converted to use the IP-XPM.

- For positions with TMS connectivity to the DMS switch, the TMS provides the interface between IWS positions and external OIA databases such as Nortel Networks' Reference System (also referred to as NTR). There is no plan to enhance the IP-XPM or the Reference System to support use of this product in a TOPS-IP network. Refer to IWS documentation and third party vendors for information about any plans to convert other OIA applications to use other interfaces.
- Most call arrival tones at positions with IP connectivity to the DMS are generated by the position itself (based on OPP messages from the DMS), rather than by the DMS XPM. Therefore, it is possible that some call arrival tones may sound slightly different. Please refer to IWS documentation for more information.

The initial call arrival tones for ADAS Base and ADASPLUS calls are generated by the ADAS platform, regardless of whether the position has IP or traditional connectivity to the DMS.

- IWS positions with IP connectivity to the DMS cannot detect when the operator seats or unseats the headset. One consequence is that CSEs with stats capability will not be warned by UCP or UCD displays if an operator unseats the headset when a call is at position. Another consequence is that force management statistics continue to accumulate after the operator unjacks the headset if the operator does not use the appropriate softkey to log out. Please refer to IWS documentation for more information.
- Positions with IP connectivity to the DMS cannot be datafilled as Service Assistance (ASST) or In-Charge (IC).
- Monitoring voice links are not supported for a call with more than two operators. Whenever a third operator is connected to a call, the monitoring voice links are taken down to provide resources to connect the second *active* operator.

- If an IP operator is being monitored and attaches a CSE for the current call, the monitoring voice connection is taken down for the duration of that call.
- If an IP CSE is being monitored and receives a call with another operator attached, the monitoring voice connection is taken down for the duration of that call.

For both of these scenarios, data is still presented to the monitoring operator. The monitoring voice connection will be re-established for the next call which does not involve three operators.

- It is strongly recommended that if CSEs use positions with IP connectivity, the call queues designated in table TQMSFCQA for CSE assistance be datafilled in tables TQCQINFO and PKTVPROF to use the G.711 codec.
- Due to the processing overhead associated with establishing VoIP connections with operator positions, operator idle time will increase for operators at IP positions.
- Please refer to 297-8403-906, “TOPS Internet Protocol (IP) User’s Guide” for capacity and engineering restrictions specific to the IP-XPM, and for capacity and engineering requirements for the managed IP network.

18.4 Table Control

For OC-IP in TOPS13/TOPS14, a voice codec is datafilled on a call queue basis in table OCHOSTQ, and on an office wide basis in TOPSPARM. The codec is datafilled in these tables as follows:

- G711: Indicates that the G.711 (mu_law) voice codec will be used. This voice codec selection is applicable to both TDM-OC or OC-IP. If G711 is selected, the silence suppression voice quality (which discontinues the codec output if it detects parts of a signal where there is no speech) is always disabled.
- G729: Indicates that the **G.729A** voice codec (G.729A protocol with no silence suppression) will be used. This voice codec selection is applicable to both TDM-OC or OC-IP. If G729 is selected, the silence suppression voice quality (which discontinues the codec output if it detects parts of a signal where there is no speech) is always disabled.

Note: Although a voice codec can be selected for TDM-OC, it is ignored by the CM. The voice codec is pertinent only to Voice over IP (VoIP).

With the introduction of TOPS positions supporting IP connectivity, a voice codec is required for every call queue, not just for OC-IP. As a result, the datafill of the voice codec will need to be moved to a table which makes more sense in TOPS15

Prior to TOPS15, the silence suppression voice quality was always set to a default value. It is off for both G729 and G711. In TOPS15, the ability to activate or deactivate the silence suppression voice quality on a per call basis for the G729 codec will be provided.

18.4.1 Table OCHOSTQ

The table OCHOSTQ defines the primary and alternate hosts on a call queue basis. In TOPS13, table OCHOSTQ was modified so that a voice codec could be specified for both the primary and alternate hosts.

This feature will remove the CODEC and ALTCODEC fields from this table. Instead, the voice codec information will be available not just on an OC call queue basis, but for every call queue (using table TQCQINFO). Table OCHOSTQ will revert back to the pre-TOPS13 representation.

An example of the TOPS15 representation of table OCHOSTQ is as follows:

Table 3 Example of Table OCHOSTQ

QTYPE	PRIHOST	RRDATA
CQ131	HOSTIP1	N
CQ132	HOSTIP2	Y HOSTD QOVFLOW \$
CQ133	HOST1	N

18.4.2 Table PKTVPROF

As indicated earlier, the voice codec information will be datafilled on a call queue basis. There is a need to specify other voice characteristics such as silence suppression. To accommodate packetized voice characteristics, table PKTVPROF is introduced.

Table PKTVPROF defines the packetized voice profiles. The table is indexed by integer field PROFNUM, and contains selector field CODEC. The subfields for the CODEC selector are as follows:

- CODEC (G711 / G729) - This subfield indicates the packetized voice codec for the call queue. If G711 is selected, it indicates that the G.711 voice codec will be used, and no additional subfields will appear. If G729 is selected, it indicates that a G.729 voice codec will be used. The

SILEN subfield appears only for G729, and determines which of the G.729 codecs will be used.

- SILEN (NOSILSUP / SILSUP) - This subfield determines if silence suppression (which discontinues the codec output if it detects parts of a signal where there is no speech) is performed for the call. If SILSUP is indicated, then silence suppression will be performed. This is achieved using the G.729AB voice codec (G.729A protocol with silence suppression per G.729 Annex B). Otherwise, if NOSILSUP is indicated, then silence suppression will not be performed. This is achieved using the G.729A voice codec (G.729A protocol with no silence suppression).

Table 4 Example of Table PKTVPROF

PROFNUM	PKTVFLDS	
	CODEC	SILEN
0	G711	
1	G729	NOSILSUP
2	G729	SILSUP

Tuple 0 and 1 in the above table are default tuples. These tuples are added during the initialization of table PKTVPROF.

Tuple 1 in the above table has its CODEC datafilled a G729. If the tuple is applied against a call queue, then all calls using that call queue will use the G729 codec for voice packetization and silence suppression is NOT performed for the call.

Tuple 2 in the above table has its CODEC datafilled a G729. If the tuple is applied against a call queue, then all calls using that call queue will use the G729 codec for voice packetization and silence suppression performed for the call.

18.4.3 Table TQCQINFO

Table TQCQINFO defines the call queues. This table will be modified so that a packet voice profile can be assigned for each call queue. The new field PKTVPROF is an integer index into new table PKTVPROF.

An example of the TOPS15 representation of table TQCQINFO is as follows:

Table 5 Example of Table TQCQINFO

QTYPE	QMSSERV	CWOFF	CWON	TREAT	PKTVPROF	ALTAREA
CQ131	TOPS_TA	500	1000	VACT	0	N
CQ132	TOPS_TA	500	1000	VACT	1	N
CQ133	TOPS_TA	500	1000	VACT	2	N

With the introduction of this feature, the packetized voice characteristics will be obtained on a per call queue basis using TQCQINFO. The PKTVPROF index indicated in this table is the preferred profile. This means that this profile will apply to this call queue unless the call queue is not provisioned correctly.

For example, lets say the call queue is designated for OC, and the HOST is datafilled as IP, then the preferred profile in TQCQINFO can be used since G729 or G711 applies for IP. However, for this scenario, if the HOST is datafilled as TDM, and the preferred profile in TQCQINFO indicates G729, then the call queue will NOT use the preferred profile. This is because G729 is not applicable to TDM. Instead, the call queue will default to the G711 codec.

On an ONP from TOPS13 to TOPS15, each tuple in TQCQINFO on the new side will be assigned an index into table PKTVPROF. If the call queue has an entry in table OCHOSTQ, then the PKTVPROF field is populated with the index which corresponds to the value of the CODEC field (in table OCHOSTQ). Otherwise, the PKTVPROF field is populated with the index into PKTVPROF which corresponds to the value of the default CODEC(in table TOPSPARM OCIP_DEFAULT_CODEC). On an ONP from pre-TOPS13 to TOPS15, each tuple in TQCQINFO on the new side will be assigned an index of 0 into table PKTVPROF.

18.4.3.1 Provisioning TQCQINFO for OC-IP

There will be a packetized voice profile number for every call queue in this table. This means for OC-IP that both the host and the remote will have a packetized voice profile number. If OC-IP is being used, then the packetized voice profile datafill in the remote is used. But, if TDM-OC and IP positions is used, then the packetized voice profile datafill in the host is used.

18.4.4 Table TOPSPARM

The default OC-IP codec value in TOPSPARM is used solely on ONPs (from pre-TOPS15 to TOPS15) to populate new field PKTVPROF in table TQCQINFO. It serves no other purpose. As a result, the parameter in table TOPSPARM will be removed (OCIP_DEFAULT_CODEC).

18.4.5 Table OCGRP

With host voice bypass, an OC call will establish a packetized voice connection directly from the remote to the IP position. As a result, the tuple in OCGRP (host's entry) on the remote switch will no longer indicate the voice link CLLI to the host switch. Instead, with host voice bypass, the hosts's entry in OCGRP on the remote switch will indicate the voice link CLLI from the remote to the IP position.

For host voice bypass, the host will not need to provision voice links to that remote. Since an OC-IP voice link is NOT needed, a placeholder CLLI group can be datafilled in table CLLI for use in table OCGRP. This placeholder CLLI will be used on the host switch to datafill field VLGRP (for the remote's entry in table OCGRP with a BCSLEVEL of 50 or greater), instead of entering a provisioned OC-IP voice link.

But, if the data link is IP, and the OFCTYPE is HOST (which means the connection is from the remote switch to a HOST switch or an IP position), the voice link must be a dynamic trunk group in Table TRKOPTS (with the application of OC).

WARNING: PLACEHOLDER CLLI USED. OC TRAFFIC FROM THIS REMOTE WILL BE ADVERSELY AFFECTED UNLESS ALL ITS CALLS TO THIS HOST ROUTE TO IP POSITIONS.

In summary, table OCGRP will allow entering a CLLI name in Table OCGRP for a remote office (BCSLEVEL 50 or greater) which has no associated trunk group and members, if the data link indicates IP.

An example of some OCGRP datafill for TOPS15 is as follows:

Table 6 Example of Table OCGRP

OFFICE	OFCTYPE	VLGRP	DLOVRLAY	BCSLEVEL
BYPASSED_HOST	HOST	HOSTBYPASS1	IP	50
BYPASSING_REMOTE	REMOTE	PLACEHOLDER	IP	50

For the above OCGRP datafill, the first tuple will be contained on the remote switch. The VLGRP HOSTBYPASS1 is the voice link used to connect the remote to the IP position.

For the above OCGRP datafill, the second tuple will be contained on the host switch. The VLGRP is a placeholder CLLI.

18.5 Hardware requirements

Refer to the TOPS IP User Guide (297-8403-906 / TOPSIPUG in pls fmdoc).

18.6 Limitations and restrictions

- The deletion of a tuple from PKTVPROF is disallowed if the PROFNUM is datafilled in table TQCQINFO.
- The addition or change of a tuple from TQCQINFO is disallowed if the PKTVPROF index indicated is not datafilled in table PKTVPROF.

18.7 Interactions

Refer to the TOPS IP User Guide (297-8403-906 / TOPSIPUG in pls fmdoc).

18.8 Logs (LG)

Not applicable.

18.8.1 New/modified logs

Table 7 New or modified logs

Log name	Log number	NEW/MOD/DELETED	System (SOS/UNIX)

18.9 Data schema (DS)

18.9.1 New/modified tables

Prior to TOPS15, the voice codec information for OC-IP was datafilled in table OCHOSTQ and TOPSPARM . Starting in TOPS 15, OCHOSTQ and TOPSPARM will no longer contain voice codec information. Instead, the voice codec information will now be datafilled using table TQCQINFO and new table PKTVPROF. This applies to OC-IP, TOPS positions supporting IP connectivity, and future TOPS-IP voice applications.

Table 8 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
PKTVPROF	NEW	NEW
OCHOSTQ	CHANGED	NEW
TQCQINFO	CHANGED	NEW
TOPSPARM	CHANGED	NEW
OCGRP	CHANGED	NEW

18.10 Office parameters (OP)

Not applicable.

18.10.1 New/modified office parameters

Table 9 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

18.11 Service orders (SO)

Not applicable.

18.12 Alarms (AL)

Not applicable.

18.12.1 New/modified directories

Table 10 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

18.13 Command interface (CI)

Not applicable.

18.13.1 New/modified commands

Table 11 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN

18.14 Operational measurements (OM)

Not applicable.

18.14.1 New/modified OM groups

Table 12 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

18.15 AMA/Billing information (AM)

Not applicable.

18.15.1 New/changed AMA/billing information

Table 13 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

18.16 Software optionality control (SOC)

Refer to feature TOPS IP: Position Maintenance (A59006653 in pls fmdoc).

Table 14 SOC

SOC option name:	
SOC option title:	
SOC option control type:	<state/usage/combined>
New SOC option?	<Yes/No>
SOC option order code	<order code>
Option defined in DRU:	<DRU>
Affected products:	<PCL(s)>

18.17 Glossary

Term	Description
CPB	Call Processing Busy
CC	Calling Card (Database)
CM	Computing Module
CRES	Connected, Restricted Idle
DA	Directory Assistance
DMS	Digital Multiplex System
DoIP	Data over IP
DTC	Digital Trunk Controller
EIU	Ethernet Interface Unit

FRLS	Force Release
IP	Internet Protocol
IP Address	Network Layer Address (32 bits) in the form of X.X.X.X
IPGW	IP Gateway
ISN-DA	Intelligent Service Node - Directory Assistance
IWS	Intelligent WorkStation
LAN	Local Area Network
LIDB	Line Information Data Base
MAP	Maintenance and Administrative Position
MIS	Management Information System
MP	Multipurpose Position
OC	Operator Centralization
OIA	Open Interface Access
OFFL	Off line
OPP	Open Position Protocol
PM	Peripheral Module
PMB	Peripheral Module Busy
PSTN	Public Switched Telephone Network
QMS	Queue Management System
RTCP	Real-Time Transport Control Protocol
RTP	Real-Time Transport Protocol
RTS	Return to Service
SOC	Software Optionality Control
SYSB	System Busy
TDM	Time Division Multiplexed
TMS	TOPS Message Switch
TOPS	Traffic Operator Position System
TPC	TOPS Position Controller
TST	Test
UDP	User Datagram Protocol

URES	Unconnected, Restricted Idle
VoIP	Voice over IP
VTB	Voice Trunk Busy
XPM	XMS-based Peripheral Module

18.18 References

Refer to the TOPS IP User Guide (297-8403-906 / TOPSIPUG in pls fmdoc).

19: Functional description (FN)

19.1 Feature name

TOPS-IP: IPGW Enhancements

19.2 Description

19.2.1 Introduction

This activity is part of a larger TOPS15 project which adds support of IP connections from the DMS to TOPS positions. For more details on this project, refer to activity A59006653 in PLS FMDOC.

The enhancements provided by this activity in TOPS15 can also be used by the Operator Centralization over IP (OC-IP) product. For more information on the OC-IP product, refer to Northern Telecom Practice (NTP) 297-8403-906, the TOPS-IP User's Guide.

The TOPS-IP project employs the NT7X07AA IP gateway card (IPGW) to establish VoIP connections between the TOPS switch and various other network entities. This activity, A59022293, provides the following functionality:

- IPGW Usage Limits, and
- a new dynamic trunk application, POS, in Table TRKOPTS. POS dynamic trunks employ the IPGW card.

19.2.2 IPGW Usage Limits

Prior to this activity, TOPS dynamic trunks on the 7X07 IP Gateway cards were controlled in blocks of 48. If a customer wished to have 50 dynamic trunks in service, they would have to datafill two IPGW cards plus a spare¹, which would result in 144 available trunks. If the customer's IP network can handle only 50 simultaneous VoIP calls originating from the switch in question, capacity issues would arise. The DMS would continue to initiate VoIP connections until the 144 trunk maximum was reached. This use beyond the engineered limits would degrade the quality of all VoIP connections originating from the switch.

¹(n+1) sparing is recommended for NT7X07AA IP gateway cards; see the TOPS-IP User's Guide for more information.

With this activity, the customer can provision the maximum number of trunks which may be used by call processing. This provisioning is on a per trunk group basis. This provisioning is limited to dynamic trunks used for TOPS applications, since the datafill and call processing changes are specific to TOPS. This provisioning can be done on all TOPS dynamic trunk types: remote OC-IP voice links, host OC-IP voice links, and IP position voice links.

The trunks are still maintained in blocks of 48, but the new datafill allows call processing to limit the number used. For further information on dynamic trunks and their maintenance, see activity A59007550: “TOPS-IP: Other DRU Changes” from the CSP13 release.

This usage limiting can also be employed if it is necessary to throttle the overall number of calls presented to an XPM, due to C-side link capacity.

To provide this new control, this activity adds a new field in Table TOPSTOPT. The field is named MAXCONNS, and its range is 0 to 32767. It can be datafilled when the trunk group in question is a dynamic trunk for a TOPS application; otherwise it must be set to value 0. The field has no effect on trunks which are not datafilled as OC or POS dynamic trunks in Table TRKOPTS.

Currently the maximum number of trunks in a TOPS dynamic trunk group must be a multiple of 48, because trunk members are added in 48-member blocks. As such, the effective maximum number of trunks per TOPS dynamic trunk group is 2016, and the effective maximum value of MAXCONNS is 2016; if it is set higher, the maximum number of connections is still 2016.

The following figure shows a trunk group with a limit of 100 VoIP connections.

Figure 1 Example TOPSTOPT Datafill

TABLE: TOPSTOPT															
GRPKEY	ORGAREA	DISPCLG	ADASERV	ADASANS	ANITOCCLI	OLNSQRY	DCIBIDX	LNPLGAM	XLASCHEM	SPIDPRC	TRKSPID	BILLSCRN	ANIFSPL	MAXCONNS	
IPVLTOHOST	N	N	NONE	NA	N	NONE	0	N	N	N	N	N	N	N	100

This limit is spread evenly across in-service IPGW cards in the following manner.

- When the trunk group limit is imposed, the DMS will loop over all in-service IPGW cards for the affected trunk group. Each card normally supports 48 members. When a limit is in effect, the DMS will limit the number of members per card which can be used. The DMS will calculate a member limit for each card such that the 100 usable trunks will be distributed across all in-service IPGW cards. For example, out of three cards, the first will be limited to 34 members, and the second and third will be limited to 33.

- During call processing, the DMS will check IPGW trunk members as they are selected. If the trunk member is not usable due to its IPGW card limit, it will be placed on a holding queue, and another member will be selected. In this manner, the limited trunks will gradually be moved to the holding queue.
- Unusable trunks appear as restricted idle (RES) when viewed from the trunk test position (TTP) level of the MAP. The call processing delay (CPD) function is not used when the limit is imposed.
- If the `MAXCONN`s field is changed, the limit on each in-service card will be updated so the new limit will apply. The new subset of usable trunks will still be evenly distributed across the in-service cards. Members are moved into or out of the holding queue as necessary. No calls are ended as a result of a change to the `MAXCONN`s field.
- As cards are added and brought into service, the limit per card will be reduced such that each card has approximately the same number of available members. The reduction is done on a gradual basis: as newly limited trunk members are selected, they are placed on the holding queue, until the new lower card limit is achieved.
- Likewise, as cards are removed from service, the usable members will be distributed among the remaining cards. This is done by increasing the card limit on each card, and moving trunks from the holding queue back to the idle queue.
- TOPS-IP trunks are moved to the holding queue (and to the RES state) during trunk selection for new TOPS-IP calls. To reduce per-call CPU usage, TOPS-IP trunk selection will only move a handful of members to the holding queue during a single call. Subsequent calls will move additional members are moved to the holding queue.

As a result, there may be a short time during which the number of available members in a trunk group is more than the datafilled limit. As new calls arrive and further trunk selection occurs, more trunk members are moved to the holding queue (and to the RES trunk state), until eventually the number of usable trunks is equal to the datafilled limit.

The TOPS dynamic trunking applications affected by this limit are `OC` (introduced in CSP13) and `POS` (introduced in next section).

19.2.3 New Dynamic Trunking Application: POS

This activity introduces a change in Table `TRKOPTS` to indicate trunk groups which are to be used when establishing a TOPS VoIP connection. An existing application, `OC`, is used for VoIP connections between TOPS host switches and TOPS remote switches. This activity adds a new application, `POS`. Trunk groups with this application type are used when connecting from a TOPS host or standalone switch to a TOPS operator workstation which supports IP communications.

The application type used when connecting from a TOPS remote switch directly to a TOPS operator workstation is `OC`. This direct VoIP connection is new in TOPS15, and is termed *host voice bypass*.

The previous dynamic trunking application of `VIPER`, which is not used and cannot be datafilled, is renamed to `POS` by this activity.

The following figure shows example `TRKOPTS` datafill.

Figure 2 Example TRKOPTS Datafill

```
TABLE: TRKOPTS
OPTKEY OPTINFO
-----
HOSTIPPOS DYNAMIC DYNAMIC ISUP IP IP POS
```

There are several restrictions for TOPS dynamic trunks, as described in NTP 297-8403-906, the TOPS-IP User's Guide. These restrictions continue to apply to `OC-IP` trunks.

For the new `POS` application, these existing restrictions also apply. Differences are as follows:

- `POS` trunks may be outgoing only; two-way trunks are not allowed (as with `OC`).
- The datafill of `POS` trunks is not affected by any datafill in Table `OCGRP`, and vice versa. Instead, `POS` trunks are cross-checked with datafill in Table `TOPSPOS`. It is not possible to datafill a trunk `CLLI` in Table `TOPSPOS` if it is not marked as a `POS` application in Table `TRKOPTS`. Likewise, the `POS` application cannot be removed from the trunk group in Table `TRKOPTS`, if the `CLLI` is still datafilled in Table `TOPSPOS`.

This activity modifies the force release (`FRLS`) command for TOPS dynamic trunks at the `MAPCI;MTC;TRKS;TTP` level. The `FRLS` command ends the trunk's call (if one exists) and places the trunk member in the manual busy (`MB`) state. But since the `RTS` function is disallowed for dynamic trunks by existing dynamic trunk maintenance, the only way to `RTS` the member is to busy and `RTS` the entire `IPGW` card which "owns" the trunk member. This action briefly removes 48 trunk members from service.

So this activity adds a warning message which appears when the craftsperson attempts to `FRLS` a TOPS dynamic trunk. The warning informs the craftsperson that the only way to `RTS` the member is to busy and `RTS` the entire `IPGW` card at the `MAPCI;MTC;PM` level.

19.3 Hardware requirements

This activity does not introduce any new hardware requirements.

19.4 Limitations and restrictions

19.4.1 Table TRKOPTS

The new field `MAXCONN`s has no effect on trunk groups which are not datafilled in Table TRKOPTS, or are in TRKOPTS but do not use the `OC` or `POS` dynamic trunk applications. The `MAXCONN`s field must be set to 0 for trunk groups which are not datafilled as dynamic in Table TRKOPTS.

The effective maximum number of connections per trunk group is 2016, the same as the maximum members per `OC` or `POS` dynamic trunk group. Table control will allow the customer to datafill a value higher than 2016, but will print a warning indicating that the maximum number of connections is 2016.

Table TRKOPTS datafill restrictions for the new application `POS` are described in section 2.2.3.

19.4.2 Table OCGRP

A previous restriction in Table OCGRP is removed by this feature. Previously, in order to change the voice link CLLI (field `VLGRP`) for an OC-IP office, the customer had to remove all the office's datalinks from service, delete them from Table OCIPDL, and then delete and re-add the office in Table OCGRP with the new voice link CLLI name. This action resulted in a service outage.

This activity allows the customer to change the voice link CLLI for an office in Table OCGRP without deleting and re-adding the tuple. The customer can now use the change command to update the voice link CLLI. When the customer changes the CLLI, new OC-IP calls are immediately routed using the new voice link trunk group. Table control will print a warning to this effect.

The ability to change the voice link CLLI in Table OCGRP applies only to OC-IP entries in the table.

19.5 Interactions

None.

19.6 Logs (LG)

Not applicable.

19.7 Data schema (DS)

19.7.1 New/modified tables

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TOPSTOPT	CHANGED	UNCHANGED
TRKOPTS	CHANGED	UNCHANGED
OCGRP	CHANGED	UNCHANGED

19.8 Office parameters (OP)

Not applicable.

19.9 Service orders (SO)

Not applicable.

19.10 Alarms (AL)

Not applicable.

19.11 Command interface (CI)

Not applicable.

19.12 Operational measurements (OM)

Not applicable.

19.13 AMA/Billing information (AM)

Not applicable.

19.14 Software optionality control (SOC)

Not applicable.

19.15 Glossary

Term	Description
CM	Computing Module
CSP	Communications System Platform
DTC	Digital Trunk Controller
FRLS	Force Release

IP	Internet Protocol
IPGW	Internet Protocol Gateway
MAP	Maintenance and Administration Position
MB	Manual Busy
NT7X07AA	IPGW product equipment code
OC	Operator Centralization
POS	Position
RTS	Return to Service
TDM	Time Division Multiplexed
TOPS	Traffic Operator Position System
VoIP	Voice over IP
XPM	Extended Peripheral Module

19.16 References

TOPS15 activity A59021741: “IP in TOPS15 - HLD Only” contains the high level design for this activity.

TOPS15 activity A59006653: “TOPS-IP: Position Maintenance” contains a full list of references specific to the TOPS15 IP developments.

NTP 297-8403-906, the TOPS-IP User’s Guide, contains a full description of the overall TOPS-IP project, with many additional references.

Dynamic trunks were originally added in TOPS13 activity A59007550: “TOPS-IP: Other DRU Changes.”

TOPS15 activity A59022821: “TOPS IP: 7X07 Support for VoIP to OP Pos” describes changes to the NT7X07 card necessary for this project.

20: Functional description (FN)

20.1 Feature name

EOL for TOPS 15

20.2 Description

20.2.1 EOL Removal

This feature removes the following TOPS functionalities in TOPS15:

- Senior Operator
- Table TOPSTERM
- Tone Repeat¹
- Request CAMA²

The EOL notification upon usage of these functionalities (except for the last two listed) has been in place since TOPS12. This document describes the customer-visible changes resulting from the removal of these functionalities. These changes involve the deletion of some tables and the removal and/or transformation of tuples in other tables.

Customers must not upgrade to TOPS15 or higher if they are reliant upon any of the above functionalities. All related datafill on a pre-TOPS15 switch is dropped upon an ONP to a TOPS15 or higher load. Customers are responsible for taking the proper measures to replace the above functionalities with supported functionalities (where necessary) prior to upgrading to TOPS15 or higher.

¹Initial tones from an end office might still be heard (e.g. if a call arrives at an operator without any queuing). Only the ability to repeat the tones after call arrival via the tone repeat function is being removed.

²CAMA calls will still be supported. Only the ability to request specifically a CAMA call out of queue via the request CAMA function is being removed.

20.2.2 EOL Notification

This feature also designates additional functionality as scheduled for removal in TOPS18. (See feature 59006865 for details on the EOL Notification process.) The following areas of functionality are scheduled for EOL in the TOPS18 release:

- TOPS OC via ETMS¹
- Position via ETMS
- Authorization Code
- EAOSSIC Signaling
- MODBELL Signaling
- EAFGD Signaling

20.3 Hardware requirements

There are no new customer hardware requirements introduced by this feature.

20.4 Limitations and restrictions

This feature has no interactions with other features.

20.5 Interactions

Support for initial tones is not changed by this feature. Only the capability for operators to hear delayed tones is being removed.

Support for CAMA calls is not changed by this feature. Only the capability for operators to request specifically a CAMA call out of queue is being removed.

OPP positions attempting a tone repeat or a request CAMA will now always receive a no-action reason indicating an invalid operation action.

20.6 Logs (LG)

20.6.1 New/modified logs

This feature modifies the TOPS EOL log, which lists all areas of functionality used in the previous week that have been scheduled for removal. This list can now include functionalities scheduled for removal in TOPS18.

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
TEOL	100	MOD	SOS

¹The TMS was previously replaced by the ETMS. Some people may still reference a ETMS as simply a TMS, but the ETMS notifications still apply to it.

20.7 Data schema (DS)

20.7.1 New/modified tables

The TOPSTERM table only contained datafill for use by a removed functionality, so this table is removed for TOPS 15. The TQOGTKEY table possibly contained datafill for use by a removed functionality, so this table is changed for TOPS 15 to remove any such datafill.

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TOPSTERM	DELETED	UNCHANGED
TQOGTKEY	CHANGED	UNCHANGED

20.8 Office parameters (OP)

Not applicable.

20.9 Service orders (SO)

Not applicable.

20.10 Alarms (AL)

Not applicable.

20.11 Command interface (CI)

Not applicable.

20.12 Operational measurements (OM)

Not applicable.

20.13 AMA/Billing information (AM)

Not applicable.

20.14 Software optionality control (SOC)

Not applicable.

20.15 Glossary

Term	Description
EOL	End Of Life
ONP	One Night Process
TMS	TOPS Message Switch
ETMS	Enhanced TMS
TOPS	Traffic Operator Position System

20.16 References

For information on general EOL functionality, refer to TOPS12 feature 59006865. For information on specific old functionalities, references to original documentation are not provided since the functionalities are simply being deleted.

21: Functional description (FN)

21.1 Feature name

E911 Tandem - Tandem Enhancements

21.2 Description

21.2.1 Introduction

Basic 911 (B911) and Enhanced 911 (E911) are both emergency service products currently offered by the DMS switching family. This activity allow existing E911 functionality to be used in a unique network configuration consisting of “Dual Super E911 Tandems”. This feature has no effect on B911 functionality.

21.2.2 Background

A telephone company has developed a unique network configuration which employs the concept of two Super E911 tandems to serve a major Public Safety Answering Point (PSAP). This major PSAP is implemented using a single Network Automatic Call Distribution (ACD) group which spans both Super E911 tandems. The two Super E911 tandems are connected to six existing E911 tandems and each other via ISUP trunking. An overview diagram is included as Figure 4 on page 32.

In the traditional E911 network configurations, the original terminating PSAP (Primary PSAP) is located in the same E911 tandem which performed the Selective Routing. If this primary PSAP needs to send the caller to another PSAP, a transfer (Fixed, Manual, or Selective) may be performed. Fixed and Manual transfers involve speed calling, quick keys, or manually dialing digits to reach the alternate PSAP. Selective transfer uses tables E911ESN and E911PSAP to derive the DN of the alternate PSAP.

When the primary PSAP (e.g. LAPD Network ACD PSAP), does not reside in the E911 tandem which performed Selective Routing, PSAP transfers become more complex. For example, Fixed transfers using speed call codes could not be coordinated correctly between E911 tandems. Also, Selective transfers would require ESN mappings to be synchronized across all E911 tandems in the network, and this is not feasible.

21.2.3 Overview

This feature extends existing E911 functionality to the network configuration which employs “Dual *Super* E911 Tandems.” This is accomplished by implementing new E911 mechanisms which allow routing of PSAP transfers back to the E911 tandem which performed Selective Routing. This facilitates proper selection of the alternate PSAP.

Routing the call back to the tandem that did the selective routing is what happens today, hence present functionality is retained. Additional uses of these new E911 mechanisms may be found in future.

21.2.4 Description

The new E911 mechanisms implemented by this activity can be classified under:

- **Fixed and Manual Transfers**

a) Manual Transfer - Manual transfer allows the PSAP attendant to manually dial the DN or speed calling code of the secondary PSAP or location. These speed calling codes may be the codes assigned for selective or fixed transfer.

b) Fixed Transfer - Fixed transfer is used when either selective routing is not available, or when the calling party is reporting an emergency which exists beyond his Emergency Service Zone.

Fixed Transfer is activated by depressing a single key on the PSAP set. A typical example is a speed call.

- **Selective Routing / Selective Transfers**

a) Selective Routing - In selective routing, the ESN for the calling DN is retrieved after a database look-up in Table E911SRDB. Thus the call is selectively routed if the ESN is found from the database. In the absence of an entry in Table E911SRDB, the ESN is obtained from the trunk group data of the incoming trunk and thus the call is default routed

b) Selective Transfer - Selective transfer, like selective routing, selects the terminating agent based upon the calling party’s Emergency Service Number(ESN). The attendant invokes selective transfer by depressing a key on the PSAP set which is associated with the type of emergency.

Selective transfer codes are two digit codes whose first digit is 1, and whose second digit is in the range 1-6. This second digit is used to reference the secondary PSAP in Table E911ESN.

21.2.4.1 Fixed / Manual Transfer

The following new mechanisms are introduced by this activity for Fixed/Manual transfers.

21.2.4.1.1 Tandem Prefix Value - TDMPRFX

This activity introduces a new field, Tandem Prefix Value (TDMPRFX), in the E911 option of Table TRKGRP. TDMPRFX indicates the E911 tandem in the network which performed Selective Routing.

This value can range from 0 to 15 with a default of '0'. The E911 option (and hence the TDMPRFX field) only applies to ISUP IT trunks. This value is used in PSAP transfers to route the call back to the originating E911 tandem so that the proper alternate PSAP can be selected. The TDMPRFX is transported between E911 tandems in the network via a new GDP. The delivery of the TDMPRFX value in the new GDP behaves as follows:

- If a non-zero TDMPRFX is datafilled against an ISUP IT trunk with the E911 option, then a GDP is built containing the TDMPRFX and sent on outgoing 911 calls.
- If the TDMPRFX datafill against an ISUP IT trunk has a default value of '0', and if no TDMPRFX is received via a GDP, then outgoing 911 calls do not build the GDP containing the TDMPRFX.
- If a GDP containing the TDMPRFX is received at an E911 tandem, the value is stored. It takes precedence over any datafilled TDMPRFX values if the TDMPRFX datafilled in Table TRKGRP is non-zero. If datafilled value is '0', the TDMPRFX from GDP is dropped and not used for further processing.
- If the TDMPRFX datafill against an ISUP IT trunk has a default value of '0' and no GDP is received, the TDMPRFX is ignored.

It is recommended that the TDMPRFX field be datafilled in the *Super* E911 tandems for incoming ISUP IT trunks with the E911 option. The TDMPRFX field in other E911 tandems should not be datafilled, rather the value should be left at the default of zero.

On an ONP, if a non-zero TDMPRFX is not datafilled, a default value of '0' is transferred. A sample datafill of TDMPRFX in Table TRKGRP is as given below.

Figure 1 Datafill of TDMPRFX

```

> Table TRKGRP
> POS E911ICS7
> ADD
GRPTYP: IT
>
TRAFSNO: 0
.....
.....
OPTION: E911
>
ESCO: 747
>
ESN: 113
>
E911SIG: E911_STD
>
ORIGHOLD: N
>
ECPHTIME: 0
>
TDMPRFX:
>15
OPTION:
>$
WARNING: THE E911 OPTION SHOULD BE ASSIGNED ONLY TO TRUNKS
          WHICH ARE DEDICATED TO EMERGENCY TRAFFIC.
TUPLE TO BE CHANGED:
    E911ICS7 IT 0 ELO NCRT IC NIL MIDL 613 AT1 NSCR 613 000 N N
      (E911 747 113 E911_STD N 0 15) $
    ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.

```

21.2.4.1.2 E911 Route Selector (E911RTE)

This telephone company has developed a unique configuration in their network. The directory number associated with PSAPs is in the format of “911XXXX”. Table STDPRT is setup so that all transfers from a PSAP use the same entry in table STDPRT, namely “911 to 911”. Calls transferred from PSAPs are the only calls that go through this specific translation entry for this particular STDPRT.

This activity modifies the STDPRT entry in such a way that PSAP transfers are directed into a new table which allows specialized routing. This routing is done based on the E911 tandem which performed the Selective Routing(using TDMPRFX value) and the digits dialed by the primary PSAP to route the call to an alternative PSAP.

This activity creates a new selector, E911RTE, in table STDPRT which is used to direct PSAP transfers to the new E911 Tandem Routing table (E911TDRT). The following is an example of the new entry in table STDPRT:

Figure 2 Datafill of Selector E911RTE

```

Table STDPRTCT
> POS P621
> SUB 2
> ADD
> FROMDIGS:
>911
TODIGS:
>911
PRERTSEL:
TYPE OF PRERTSEL IS PRET_ROUTE_SELECTOR
TYPE IS PRET_ROUTE_SELECTOR
{S,T,D,N,L,P,V,R,X,F,Z,EA,NSC,FGB,ET,E911,FGDCL,
SFMT,SSP,E911RTE}

PRERTSEL:
>E911RTE
TYPCALL:
>OA
NOPREDIG:
>0
MINDIGSR:
>3
MAXDIGSR:
>7
TAB:
TYPE OF TAB IS TAB_NAME
TYPE IS TAB_NAME {E911TDRT,NONE}
TAB:
>E911TDRT
POS: NONE
>
TUPLE TO BE ADDED:
          911 911 E911RTE OA 0 3 7 E911TDRT NONE
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>y
TUPLE ADDED

```

For the new selector, MINDIGSR is the minimum number of digits before the system starts routing the call and MAXDIGSR is the maximum number of digits collected. The translations will start only after the minimum number of digits are dialled. The system then goes on and tries to find the route in Table E911TDRT with the min digits. If it does not find a match, it iterates and collects the next digits one by one till it finds a match.

If a route is present, for that combination of digits along with the TDMPRFX, the translations continue with the selected office route table. If not a treatment is given after timing out.

If the number of digits dialled is equal to the maximum digits, translations will immediately proceed to Table E911TDRT and try to find a route - if not a treatment is given immediately.

21.2.4.1.3 E911 Tandem Routing Table (E911TDRT)

A new table is introduced to datafill a mapping between PSAP transfers, the E911 tandem which performed Selective Routing, and an associated office route.

New table E911TDRT is datafilled to map the PSAP transfers to the office route associated with the E911 tandem which originally performed Selective Routing. This new table keys on the directory number associated with the PSAP transfer which is referred to as the E911 Tandem Routing DN (E911TRDN) and the TDMPRFX value for the PSAP transfer. These two pieces of information are used to map the PSAP transfer to the appropriate office route. An example configuration of table E911TDRT is shown below:

Figure 3 Sample Configuration of Table E911TDRT

<u>E911TRDN</u>	<u>TDMPRFX</u>	<u>ROUTE</u>
9111234	1	OFRT 1
9111234	2	OFRT 2
9111234	3	OFRT 3
9111234	4	OFRT 4
9111234	5	OFRT 5

This allows PSAP transfers which result in a directory number of 911-1234 to be routed to a specific office route based on the TDMPRFX value which indicates the E911 tandem which performed Selective Routing. If a PSAP transfer enters this table and does not find a match, it is routed to a REORDR TREATMENT. (e.g. Dialing a speed call number that does not exist).

Existing functionality in table OFRT allows deletion and prefixing of digits so that the appropriate directory number can be outputted.

21.2.4.1.4 Call Walk-Through - Fixed Transfer

In Figure 4 on page 32, a subscriber dials 911 which is mapped to a 10 digit number after an SRDB lookup in Tandem(T1). The 10 digit number which is the PSAP number is routed to PSAP2 through Tandem (ST2) as PSAP1 is busy.

The TDMPRFX has a default value of '0'(zero) and the table E911TDRT is not datafilled in tandems T1 to T6. The TDMPRFX is extracted from Table TRKGRP on the incoming side of Tandem(ST1).

Since PSAP1 is busy, the call is sent to PSAP2 and the IAM message from ST1 to ST2 carries the TDMPRFX number in a new Generic Digits Parameter(GDP) introduced by this activity.

Now PSAP2 dials *18 (Speed Call) which gets mapped to 9111234 (secondary PSAP in Tandem(T1)). From Table STDPRT, with the new selector, it points to Table E911TDRT. Table E911TDRT is populated with a key field (index) comprising of the dialled 911XXXX number and the TDMPRFX. The second field of Table E911TDRT is populated with the OFRT route for that combination of 911XXXX and TDMPRFX.

The call is routed from ST2 with the IAM message carrying the TDMPRFX which routes it back to Tandem (T1). The TDMPRFX transported in the IAM is the one which was got in the incoming IAM message and is tandemed.

Refer Figure 5 on page 413 & Figure 6 on page 413.

21.2.4.1.5 Routing to Primary PSAP with 911XXXX

In a scenario where the number (of primary PSAP) retrieved after the SRDB look-up in Tandem T1 is in the format of 911XXXX, the selector datafilled to translate this needs to be any other selector excluding E911RTE.

21.2.4.1.6 Traver for Fixed/ Manual Transfer

Traver is not supported for a manual transfer call with translations using the new selector. This is true for 911 transfers where the alternate PSAP number is dialled manually or mapped to a QCK key. The following message is displayed :

'TRAVER NOT SUPPORTED FOR E911RTE SELECTOR'

For transfers using '*' code (like speed call) , traver is presently not supported. Hence no modification to the traver tool is done.

Figure 4 Network Routing of 911 Calls

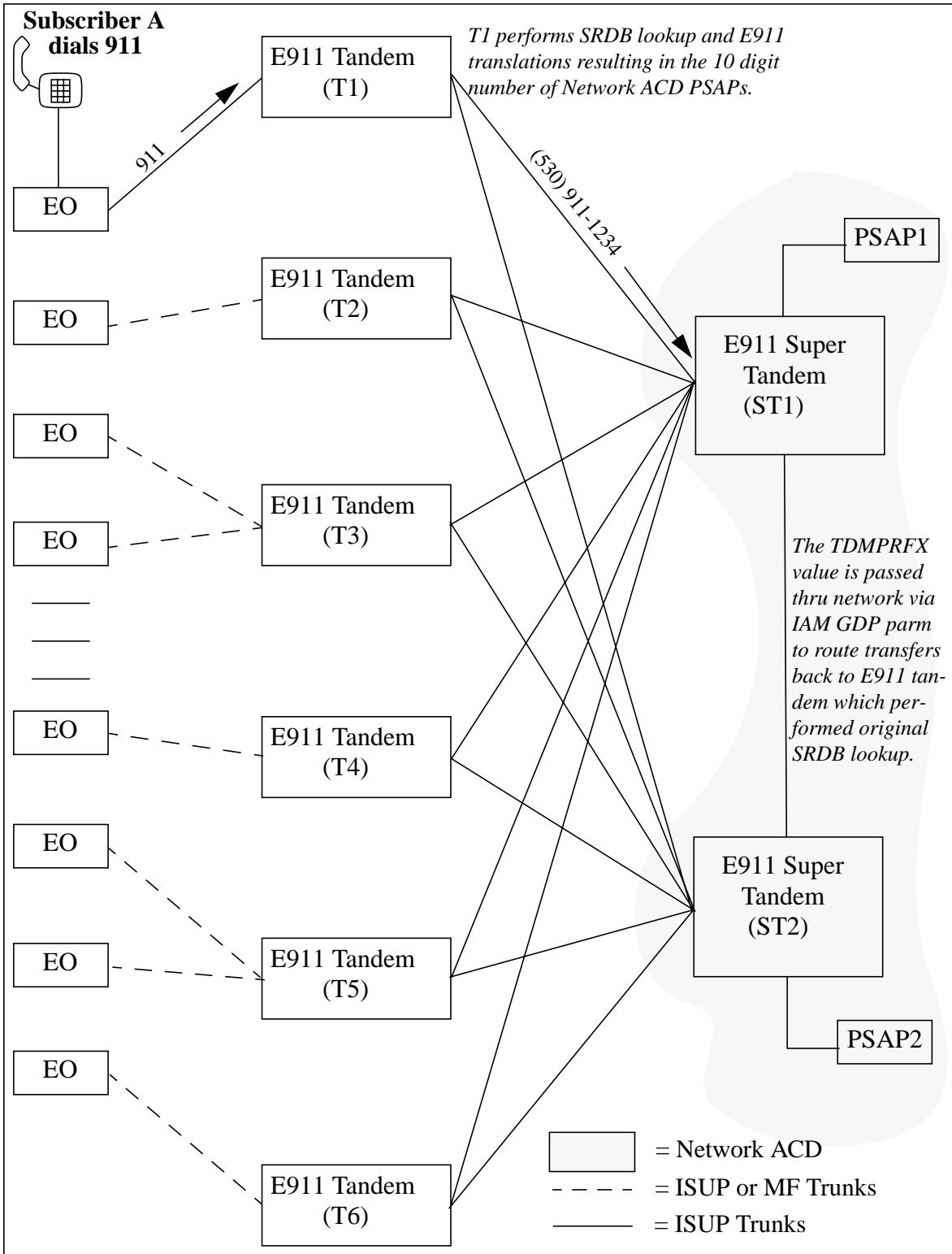


Figure 5 Present Routing of 911 Calls (Fixed/Manual) transferred from PSAP

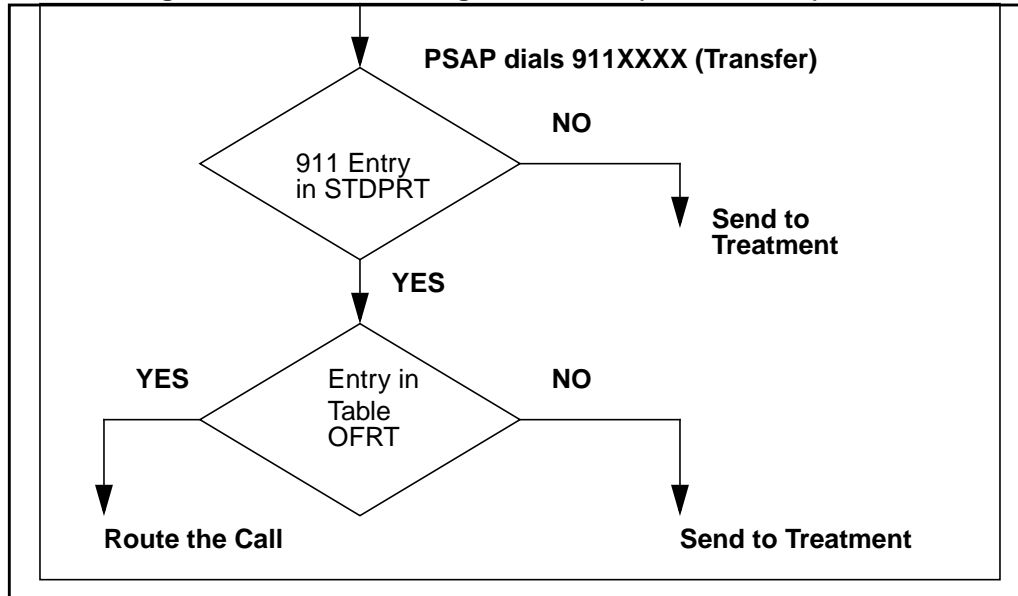


Figure 6 Proposed routing of 911 Calls(Fixed/Manual) transferred from PSAP

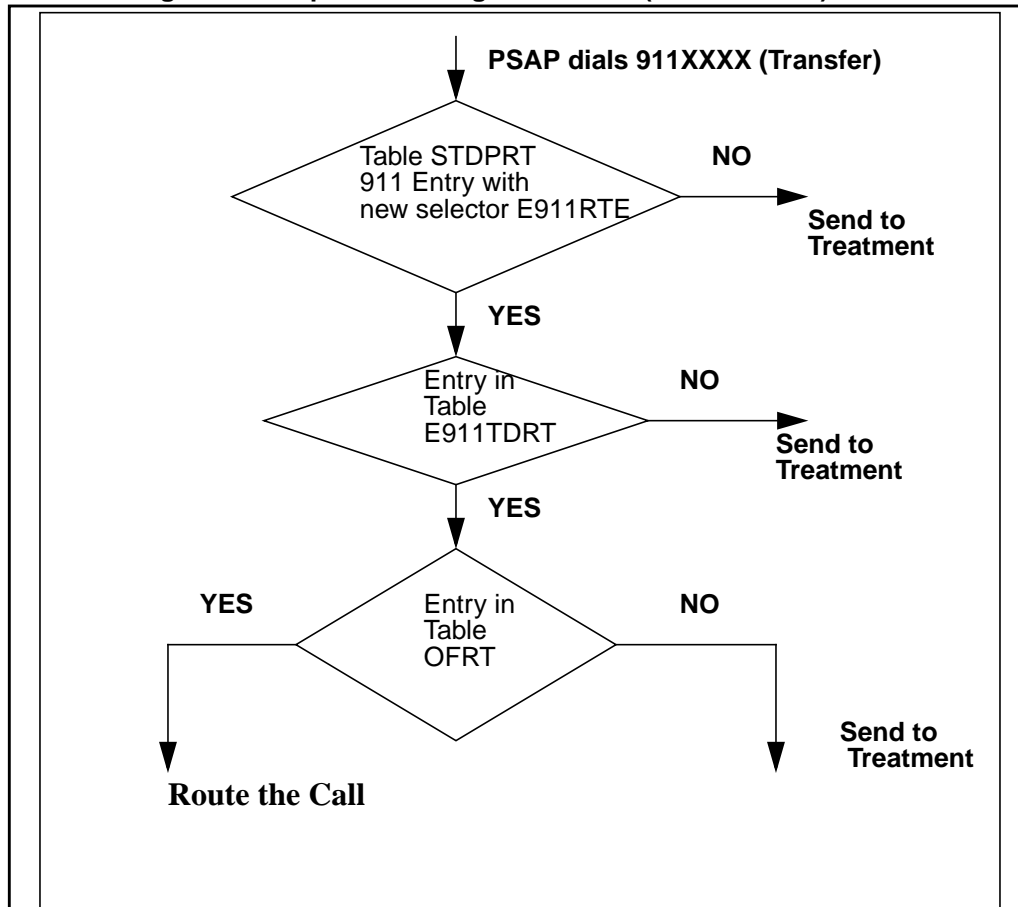


Figure 7 Present Routing of 911 Calls (Selective) transferred from PSAP

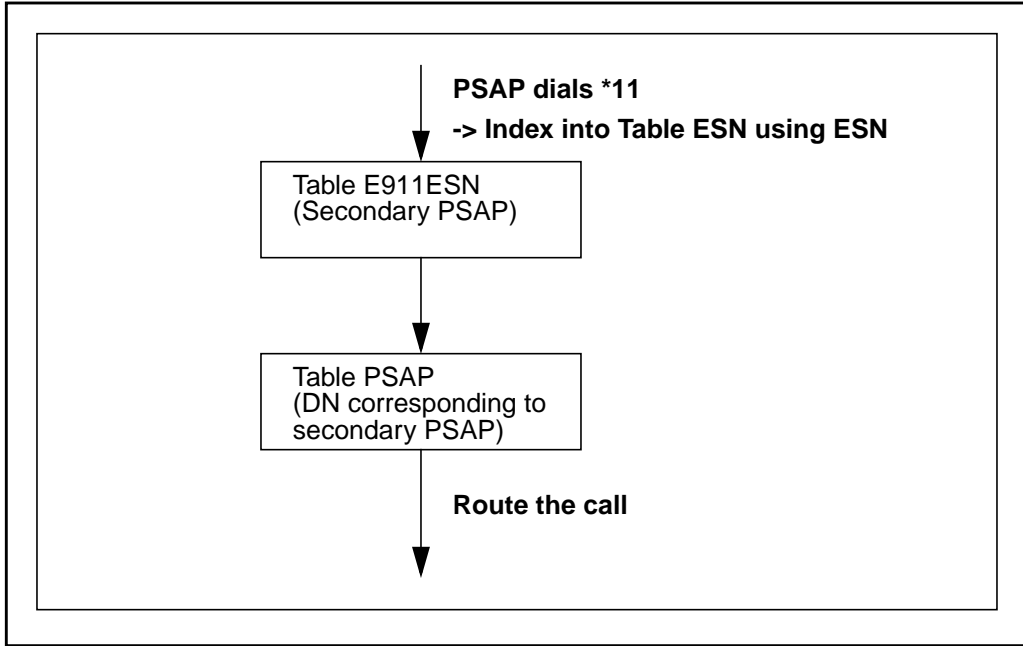
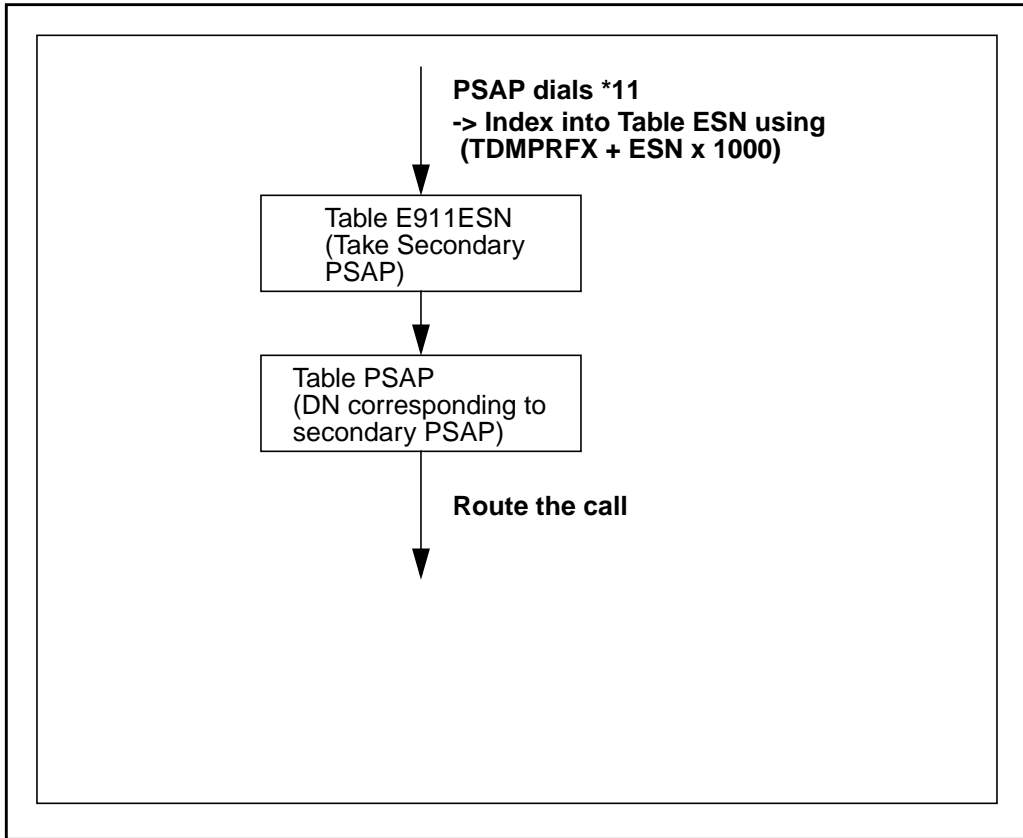


Figure 8 Proposed routing of 911 Calls(Selective) transferred from PSAP



21.2.4.2 Selective Transfer / Selective Routing

21.2.4.2.1 Unique ESN Values

This activity extends the present functionality to have access to an Emergency Service Number (ESN) which is unique within the customer's network.

The TDMPRFX value (retrieved from datafill or received via the GDP) is used in conjunction with the ESN value returned from the Selective Routing Database to calculate a new ESN which is unique. This is accomplished by multiplying the TDMPRFX value by 1000 and then adding the SRDB ESN. The telephone company has stated the ESN values in their network is always in the range of 1-999 (even though the DMS 100 supports ESN values of 0-15999), and the TDMPRFX value can be 0-15. If the ESN datafilled in Table E911SRDB is greater than or equal to 4 digits, the TDMPRFX is ignored.

Therefore the new "calculated" unique ESN are either 4 or 5 digits. The default TDMPRFX value is zero, therefore the ESN remains unchanged if the feature is not datafilled.

In selective routing, if the ESN entry is not available in Table E911SRDB, default routing is done after retrieving the ESN from the trunk group data of the incoming ISUP IT trunk and calculating the new ESN with the above calculation(if TDMPRFX is non-zero).

Examples are included below:

Table 1 ESN used in Selective transfer

Tandem	TDMPRFX	SRDB ESN	ESN in Table E911ESN
T1	1	7	1007
T1	1	20	1020
T2	2	113	2113
T3	3	200	3200
T4	4	11	4011
T5	5	112	5112
T6	6	22	6022
ST1	10	7	10007
ST2	15	162	15162

21.2.4.3 New Generic Digits Parameter (GDP) - GENERIC DIGITS E911TANDEM PREFIX

A new GDP (Generic Digits Parameter), Generic Digits E911Tandem Prefix is introduced by this activity. This allows the TDMPRFX to be passed between E911 Tandems in the customer's network. The delivery of the TDMPRFX value in the new GDP is as outlined in Section 2.2.4.1.1. Figure 9 on page 416 below gives a layout of the new GDP.

This feature does not impact E911 wireless calls which sends the GDP of type Generic Digits Wireless Emergency.

Figure 9 GDP Format in Initial Address Message (IAM)

```

OUTGOING 16:41:45.743  NODE TYPE= LTC_NODE
DS512: ENCAP MS_CARD= 23 MS_PORT= 1  NODE= 4317
NN= 001C TN= 0070 MSGTAG= 00 ROUTE= 10DD ERROR= 00 LENGTH= 2E
AGENT= CKT          E911OGS7      1
0F 01 00 22 00 E0 03 0A 10 01 00 01 02 02 00 01 00 06 81 10 26 21 11 03 0A 07
03 13 16 63 12 10 08 C1 02 1E 51 00
      CCS7 MESSAGE TYPE:
      DATA BYTES:          00 22 00 E0 03 0A 10 01 00 01
                           02 02 00 01 00 06 81 10 26 21
                           11 03 0A 07 03 13 16 63 12 10
                           08 C1 02 1E 51 00
      NATURE OF CONNECTION: ISUP_NO_SATELLITE, NO_ISUP_CONT_CHK
                           ISUP_NO_HALF_ECHO_SUP
.....
OPTIONAL PART:  CALLING PARTY :
                  EVEN_ODD_IND:          EVEN_NUM_NIBBLES
                  NATURE_OF_ADD:          UNIQUE_NATIONAL_SIG_NUMBER
                  ADDR_PRES_RESTRICTED_IND : PRESENTATION_ALLOWED
                  NUMBERING_PLAN :        ISDN_TELEPHONY_NUM_PLAN
                  SCREENING_IND :         NETWORK_PROVIDED
                  ADDRESS_INFORMATION = 6136210180
GENERIC DIGITS (#C1) :
GENERIC DIGITS MSG TYPE :   GENERIC DIGITS E911TANDEM PREFIX
ENCODING SCHEME :          BCD EVEN
GENERIC DIGITS :           15

```

21.2.4.3.1 Call Walk - Selective Transfer

In Selective transfer, once the call terminates to PSAP2 in the above example, *11 to *15 is outpulsed when corresponding keys on PSAP2 are pressed. As described earlier, this activity multiplies the TDMPRFX by 1000 and add the SRDB ESN to get the unique ESN. This combination of TDMPRFX and initial ESN retrieved from the SRDB is used to retrieve the secondary PSAP from Table E911ESN. The call is subsequently routed through Table E911PSAP to the secondary PSAP. Please refer Figure 7 on page 414 & Figure 8 on page 414.

21.2.4.3.2 Traver for Selective Routing / Selective Transfer

Traver tool is enhanced in Selective and default ESN routing to use the TDMPRFX before mapping with the unique ESN value into Table E911ESN.

No modification to the traver tool is done for selective transfer as this involves dialling of '*' code which is presently not supported by traver.

21.3 Hardware requirements

No specific hardware requirements.

21.4 Limitations and restrictions

- E911 option and hence TDMPRFX applies only to ISUP IT trunks. Therefore this functionality is limited to E911 calls using ISUP IT for selective routing and transfer.
- PRI PSAP is not supported for this activity.
- If there are entries in Table E911TDRT where the initial digits are the same, for example, 9111234 and 91112345 with the same TDMPRFX, as soon as 9111234 is dialled by the user, the system will route the call ignoring 91112345.

21.5 Interactions

This feature does not modify any existing E911 feature interactions.

21.6 Logs (LG)

Not Applicable

21.7 Data schema (DS)

21.7.1 New option TDMPRFX

A new field TDMPRFX is introduced under the E911 option for ISUP IT trunks. This takes the value from 0 to 15 with a default of '0'. A sample datafill is shown in Figure 1 on page 28. Refer to the DS section for more details.

Table 2 Modified tables - Table TRKGRP

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)	Reason
TRKGRP	CHANGED	UNCHANGED	To introduce a new option TDMPRFX under the E911 option for ISUP IT trunks.

21.7.2 New Selector E911RTE

A new selector, E911RTE, is introduced in Table STDPRT pointing to a new table E911TDRT. A sample datafill is shown in Figure 2 on page 409. Refer to the DS section for more details.

Table 3 Modified tables - Table STDPRT

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)	Reason
STDPRT	CHANGED	UNCHANGED	New Selector E911RTE pointing to a new table E911TDRT.

21.7.3 New Table E911TDRT

A new table E911TDRT is introduced by this feature. A sample configuration is shown in Figure 3 on page 410. Refer to the DS section for more details.

Table 4 New Table - E911TDRT

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)	Reason
E911TDRT	NEW	NEW	New table E911TDRT which routes a call based on the dialled digits and the TDMPRFX value.

21.8 Office parameters (OP)

Not Applicable

21.9 Alarms (AL)

Not Applicable

21.10 Command interface (CI)

Not Applicable

21.11 Operational measurements (OM)

Not Applicable.

21.12 AMA/Billing information (AM)

Not Applicable

21.13 Software optionality control (SOC)

Not Applicable

21.14 Glossary

Table 5 Abbreviation

Term	Description
B911	Basic 911
E911	Enhanced 911
ESN	Emergency Services Number
IAM	Initial Address Message
ISUP	Integrated Service User Part
PSAP	Public Safety Answering Point
SRDB	Selective Routing Database

21.15 References

REF #	Description of Reference
AF7231FN	E911 Incoming Wireless Calls (ISUP)
GR0317	LSSGR: Switching System Generic Requirements for Call Control Using the Integrated Services Digital Network User Part (ISDNUP)
GR0394	LSSGR: Switching System Generic Requirements for Interexchange Carrier Interconnection Using the Integrated Services Digital Network User Part (ISDNUP)

22: Functional description (FN)

22.1 Feature name

59022448:ICM Call Held Event Reporting

22.2 Description

Intelligent Call Manager(ICM), provides a data communications channel between a computer and a switch that allows a telephone company to provide coordinated switch-based services to applications residing on a customer's host computer. The coordination that can be provided through the messaging over the link allows for the implementation of specific solutions that can dramatically improve end-user productivity and competitiveness.

The protocol used across the link for ICM is the ANSI Switch-Computer Applications Interface (SCAI) protocol.

Currently, ICM services exist for the user of three types of customers:

DMS100/SL-100 Automatic Call Distribution (ACD) Customers

DMS100/SL-100 Meridian Digital Centrex (MDC) customers

DMS100 Residential (RES) customers.

Prior to CCM15, there exist certain limitations in the ICM status reporting with respect to the Hold and Unhold functionality. This activity addresses those limitations by informing Host computer of CTI system about the state of a call when a call has been put on hold. This activity also intends to extend the support of the DV-UNHOLD-CALL message, to unhold a call, which has been put on hold manually.

The current ICM hold/unhold functionality, manual hold/unhold functionality and the enhancement intended by this activity can be summarized as follows. please refer to Table 1 on Page 26.

NOTE: Permanent Hold (HLD) or Call Hold (CHD) features can be activated to put the call on hold for IBN users with 500 / 2500 sets. The HOLD key on the CPE can be used to put the call on hold in case of KSETs.

Table 1 Current and Proposed Behavior

HOLD	UNHOLD	CURRENT BEHAVIOR		PROPOSED BEHAVIOR	
		dv_call_held_u (Message did not exist prior to CCM15)	dv_call_unheld_u	dv_call_held_u (Message added in CCM15)	dv_call_unheld_u
ICM	ICM	Not Reported	Not Reported	Reported	Reported
ICM	DN KEY	Not Reported	Reported	Reported	Reported
CHD	ICM	Not Reported	Not Reported	Reported	Reported
HLD	ICM	Not Reported	Not Reported	Reported	Reported
HOLD KEY	ICM	Not Reported	Not Reported	Reported	Reported
CHD	CHD	Not Reported	Not Reported	Reported	Reported
HLD	HLD	Not Reported	Not Reported	Reported	Reported
HOLD KEY	DN KEY	Not Reported	Not Reported	Reported	Reported

22.2.1 Introduction

22.2.1.1 ICM HOLD & UNHOLD FUNCTIONALITY

- **DV-HOLD-CALL** - This message supports functionality to hold an active call on behalf of an ACD agent, Centrex line or a Residential line. The host sends a DV_HOLD_CALL in order to hold a call on behalf of a specific Directory Number (DN). DV_HOLD_CALL will contain the mandatory parameter - Holding Party, which can be specified as a positionID or stationNumber and identifies the user that the host is making the hold request on behalf of.
- **DV-UNHOLD-CALL**- This message supports functionality to unhold an active call on behalf of an ACD agent, Centrex line or a Residential line. The host sends a DV_UNHOLD_CALL in order to unhold a call on behalf of a specific Directory Number (DN). DV_UNHOLD_CALL will contain the mandatory parameter -unholding Party, which can be specified as a positionID or stationNumber and identifies the user that the host is making the unhold request on behalf of.

- **DV-CALL-UNHELD-U-** This is a call event message that is sent from switch to host, when a call has been unheld manually, which was put on hold using the call control message DV_HOLD_CALL. The call can be unheld by flashing (for IBN sets) or by pressing the DN key(for KSETs). This call event message is not reported to the host application in all the other hold - unhold scenarios.

22.2.1.2 Manual Hold and Unhold for IBN sets

22.2.1.2.1 CALL HOLD(CHD)

'Call Hold' is an optional feature available to an IBN user with 500/2500set. allowing the user to hold one call for any length of time provided neither party goes on hook. It is to be applied on a perline basis. The feature can be activated by flashing and dialling the feature code. A confirmation tone is heard when the call has been successfully put on hold. The feature can be deactivated by flashing and dialling the feature code. The user will get a dial tone after the first call has been put on hold. It is possible for user to originate a second call after putting first call on hold.

Please refer to activity "BC0948" for further details .

22.2.1.2.2 PERMANENT HOLD(HLD)

Permanent Hold is an optional feature available to an IBN user. This feature allows a station with a 500/2500 set to hold one active call against its own directory number . The feature can be activated by flashing and dialling the feature code. The user hears a confirmation tone when the call has been put on hold successfully. The user will not be able to add a second leg to the call. The feature can be deactivated by going onhook and then, offhook. The holding or the held party cannot originate or receive any calls .

Please refer to activity "BV0944" for further details .

22.2.1.2.3 Manual Hold and Unhold for KeySETS

A K-set user can hold an established call on any DN on the K-set . Pressing the HOLD key on the CPE will cause the active DN to be held and have it's associated lamp change from ON to flashing. The user may then originate or receive another call on any other idle DN. Alternatively, the call may be auto held by simply pressing any channel associated key (e.g. DN, CONF, or CWT if there is a call on the callwaiting key). Any held call may be reaccessed by pressing the key associated with the held call.

22.2.2 Functional Overview

22.2.2.1 Hold and Unhold event reporting.

This activity provides the following new ICM call event message.

- **DV_CALL_HELD_U**- This is a new event message that will be reported to the host application, when a call has been put on hold either through ICM or manually. The held event message will have information about the party who has put the call on hold , as 'Holding Party'. For putting the call on hold manually Table 2, "Sets and Features," on page 424

This activity extends the support of the following call control and call event messages.

- **DV-CALL-UNHELD-U**- This existing event message will be reported to the host application , when the call has been unheld either through ICM or manually. The unheld event message will have information about the party who has unheld the call , as 'Unholding Party'. The DN which is unholding the call should be associated to a SCAI session, for this call event to be reported.
- **DV-UNHOLD-CALL**- The support of this call control message is extended to unhold a call put on hold manually. Now, the user will be able to unhold the call by sending a DV-UNHOLD-CALL from the host application to the switch , which has been put on hold either through ICM or manually. The call event message DV-CALL-UNHELD-U will be reported to the host application by the switch, with the unholding party parameter set to the DN of the party on behalf of which the message was sent.

This activity does not change the present functionality of CHD/HLD features or HOLD KEY.

The above stated call control and call event messages is supported for ACD,MDC ,RES and CTX agents and for the sets and features listed in table2.. Please refer to Table 2, "Sets and Features," on page 424

Table 2 Sets and Features

Set / Feature	CPE Permanent Hold Key	Call Hold Feature	Permanent Hold Feature
K-SETS	Yes	Not Applicable	Not Applicable
POTS 500/2500	Not Applicable	Yes	Yes

22.2.2.2 Held and Unheld event reporting for 3WC scenarios.

The call event messages `dv_call_held_u` and `dv_call_unheld_u` will be reported when the first leg of the call is put on autohold, when the controller adds a second leg to the call using ICM call control message `dv_add_party`. When a `dv_add_party` message is send from the host application, a `dv_call_held_u` message is sent to the host application to indicate that the first leg of the call has been put on hold. When the second leg party is dropped by the controller using the ICM call control message `dv_dropparty` in a half three way call, a `dv_call_unheld_u` message will be reported.

After the second leg has been added, when a `dv_conference_party` message has been sent, to conference all the parties, a `dv_call_unheld_u` message is sent to the host application of the controller. When all the three parties are conferenced and then if the second leg of the call is dropped, through `dv_drop_party`, `dv_call_unheld_u` will not be reported.

After establishing the second leg of the call, if the call is transferred by the controller, through `dv_transfer_party`, `dv_call_unheld_u` message will not be reported.

NOTE: The call held and unheld event messages will not be supported, if the controller establishes a second leg of the call, manually, i.e., using any other 3WC features, like 3WC, CONF, XFER, etc..

22.2.2.3 Subscription for the new call event message.

The following changes in the table `SCAISSRV` are required to provide subscription to receive the new ICM call event message `DV_CALL_HELD_U`. Preconditions to be satisfied by a party in order to receive the new event message are also given in this section.

- A new default tuple `TPCC15$` under category `TPCC` will be created with the new function `CALLHELD`, for the new message `DV_CALL_HELD_U`.
- A new default tuple `SCAICC09$` under the category `SCAICC` will be created with the new function `CALLHELD`, for the new message `DV_CALL_HELD_U`.

The preconditions to be satisfied by a session in order to receive the new call event message '`DV_CALL_HELD_U`' are:

- The DN who is putting the call on hold must have ECM option, with the suboptions `CALL-EVENTS` and `SCAICC` set to 'Y'.
- The DN should be associated to a SCAI session.
- The service version should be atleast `SCAI16`.

- The ICM session on which the DV_CALL_HELD_U message is to be sent, must subscribe to the new default tuple TPCC15\$ and SCAICC09\$.

22.2.2.4 Message Protocol

The ASN.1 notations for the new call event message provided by this activity, DV_CALL_HELD_U is shown in this section. A sample X.209 hex encoding has been provided here. The length fields are variable because the length depends on the variable content. The tag values are taken from the ROSE protocols.

22.2.2.4.1 Call Held ASN.1 Definition

```
dv-CALL-HELD-U      OPERATION
                   ARGUMENT      CallHeldArgument
```

```
::= 50
```

```
CallHeldArgument ::=
    { networkCallID      [0] SEQUENCE
      { networkNodeID   [0] IMPLICIT SEQUENCE
        localCallID     [1] IMPLICIT INTEGER OPTIONAL,
                       [1] IMPLICIT INTEGER OPTIONAL }
      heldParty         [1] Address Type OPTIONAL }
    OPTIONAL }
```

```
AddressType ::=
    { positionID        [0] IMPLICIT INTEGER, (ONLY CHOICE)
      dialedDigits      [1] IMPLICIT IA5STRING,
      stationNumber     [2] IMPLICIT OCTET STRING,
      q.931Address      [3] Q.931AddressType }
```

```
Q.931AddressType ::=
    { numberTypeNumberPlan [0] IMPLICIT OCTET STRING OPTIONAL,
      presentationScreeningIndicator [1] IMPLICIT OCTET STRING OPTIONAL,
      digits                [2] IMPLICIT IA5STRING OPTIONAL }
```

22.2.2.4.2 Call Held Coded Example

This example illustrates when the user has put the call on hold either using DV-HOLD-CALL or manually. The scenario is, B(DN 919-2463001) calls A(DN 919-4814210) and both of them are in talking state. The host application of A send the call control message DV_HOLD_CALL to the switch. The new call event message DV_CALL_HELD_U, is sent back to the host application, indicating that the call on A has been put on hold.

DMS =====>HOST

Table 3 Call Held

Hex Dump			Information Element	Comments
Tag	Len	Content		
A1	1E		INVOKE	Message length is 30 bytes.

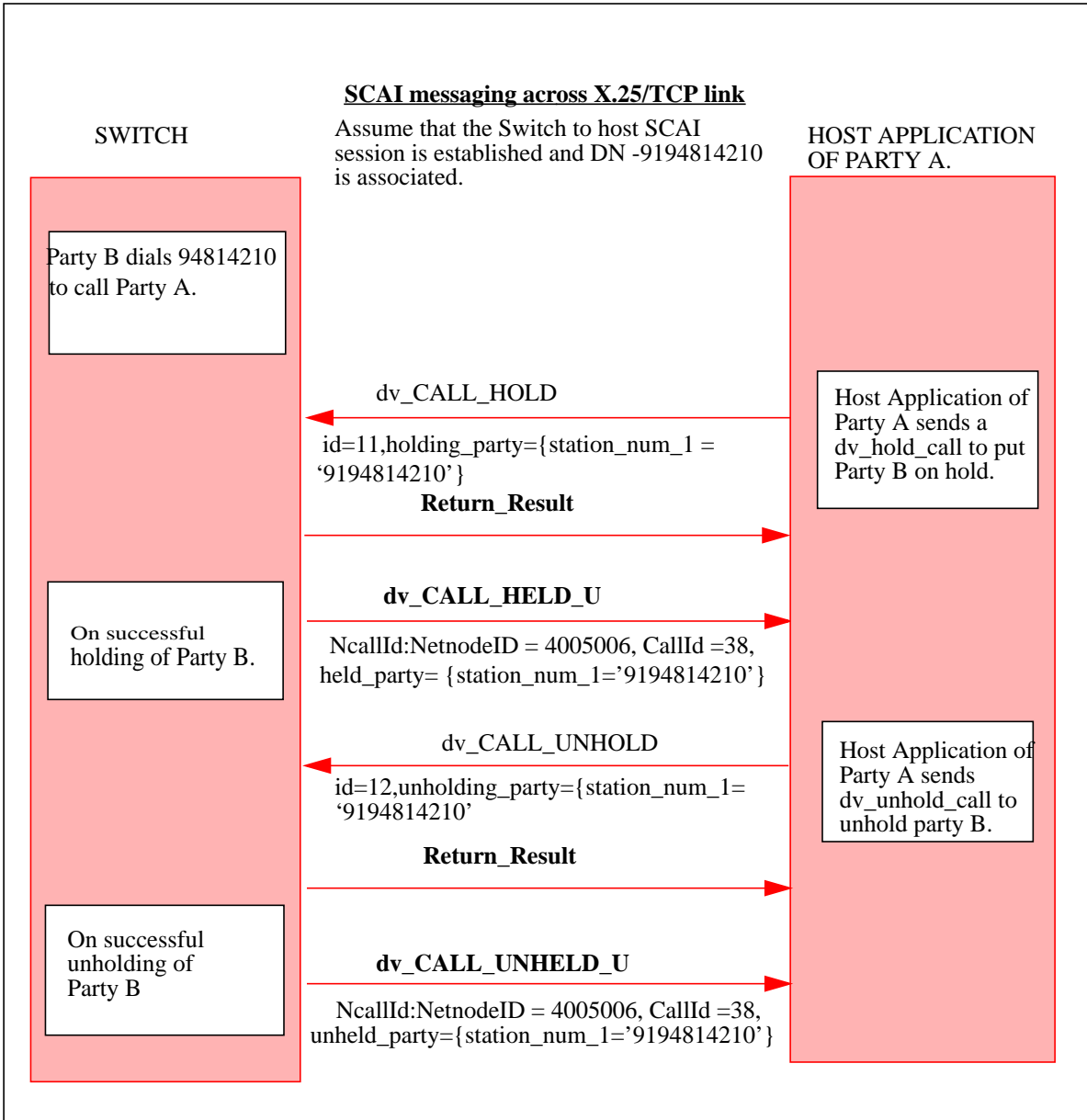
02	01	0F	.. InvokeID	Invoke ID is 15.
02	01	32	.. Operation	Operation value for dv_call_held_U is decimal 50.
30	16		.. CallHeldArgument	Type SEQUENCE and 22 bytes long.
A0	06		.....Network Call ID	NetworkCallId is of type Constructor and is 6 bytes long
80	01	02	.....NetworkNodeID	Network Node ID is 2
81	01	02	.....Local Call ID	Local Call ID is 2.
A1	0C		.....heldParty	HeldParty is a 12 byte constructor.
82	0A	39 31 39 34 38 31 34 32 31 30	.....stationNumber	The DN of the phone is 919-481-4210
Hex Dump = A1 1E 02 01 0F 02 01 32 30 16 A0 06 80 01 02 81 01 02 A1 0C 82 0A 39 31 39 34 38 31 34 32 31 30				

22.2.2.5 Message Flow Scenarios

Some message flow scenarios are considered in this section to get the better understanding of the feature functionality.

The proposed event messages are highlighted in the figures.

Figure 1 Call Held and Unheld through ICM



22.2.2.6 Call is Held and Unheld manually

22.2.2.6.1 IBN Setbased Hold and Unhold

CALL HOLD (CHD) Usage Scenario

Two parties ('A' and 'B') are in a talking state. Party 'A' has the Call Hold option assigned. During the conversation, 'A' wishes to put 'B' on hold while he/she performs some other task. 'A' flashes and receives special dial tone

(SDT). The Call Hold feature code is dialled. If properly executed, confirmation tone followed by regular dial tone will be heard by 'A'. Party 'B' will hear silence. A message DV_CALL_HELD_U will be received by the host application of A. 'B' is now held and 'A' can proceed with whatever he/she wanted to do. It should be noted that both 'A' and 'B' must remain off hook or the feature will be deactivated.

In order for 'A' to resume the conversation with 'B', the Call Hold feature is activated again. In this instance, 'A' flashes, receives SDT and dials the Call Hold activation code. The feature will detect that a call is on hold (only 1 is allowed) and will re-establish the connection. A message DV_CALL_UNHELD_U is sent to the host application from the switch.

Note : The unhold event message dv_call_unheld_u will not be reported to the host application, in the following scenario.

Party A has both CHD and CWT option and Party A is talking to Party B. Party C call waits in Party A. Party A hears the call waiting tone. Party A flashes and dials the feature code of CHD, to be connected to the waiting Party C. dv_call_unheld_u message will not be reported to the host application.

Figure 2 Call is Held and Unheld manually as in IBN sets by CHD feature

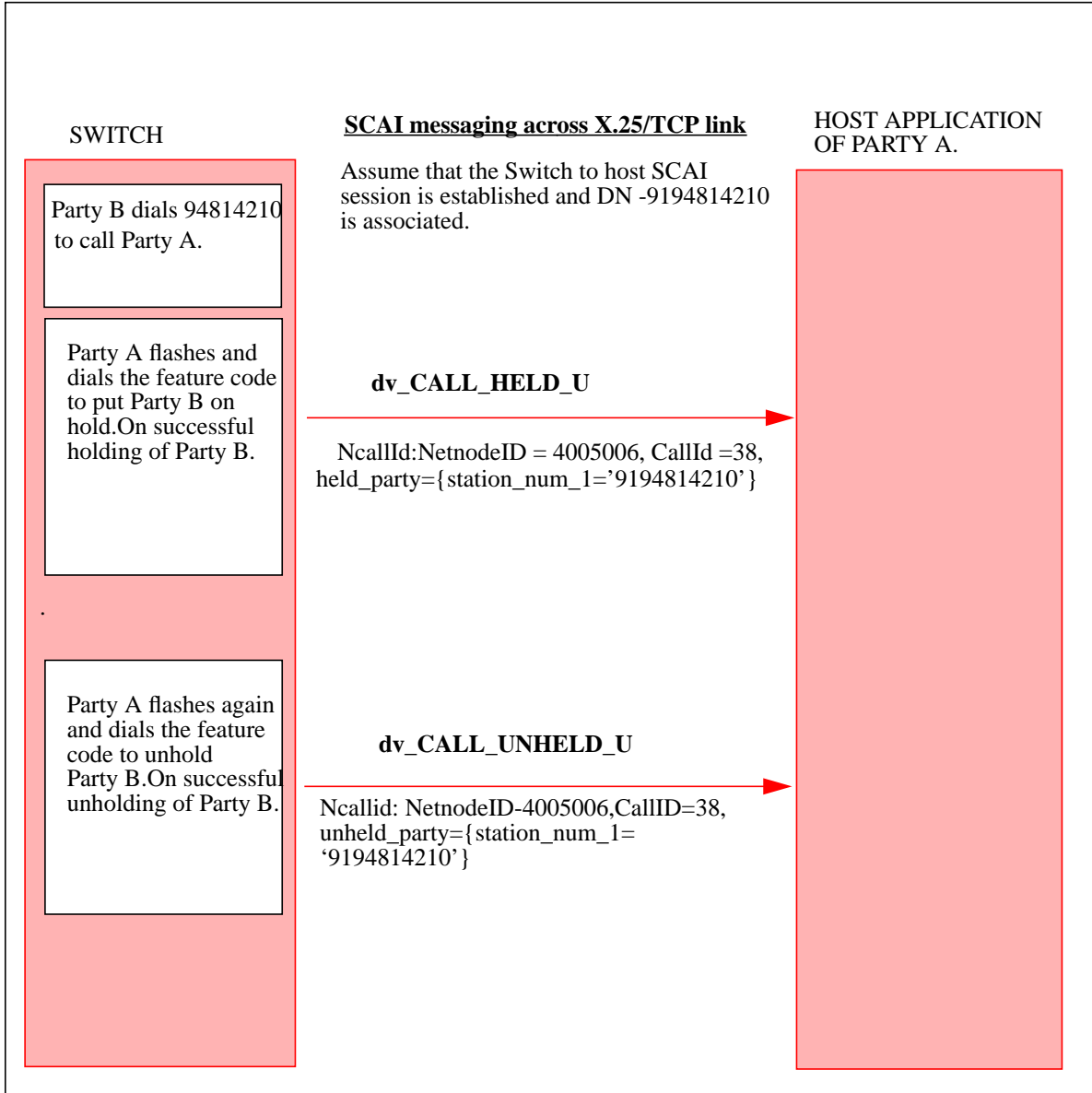
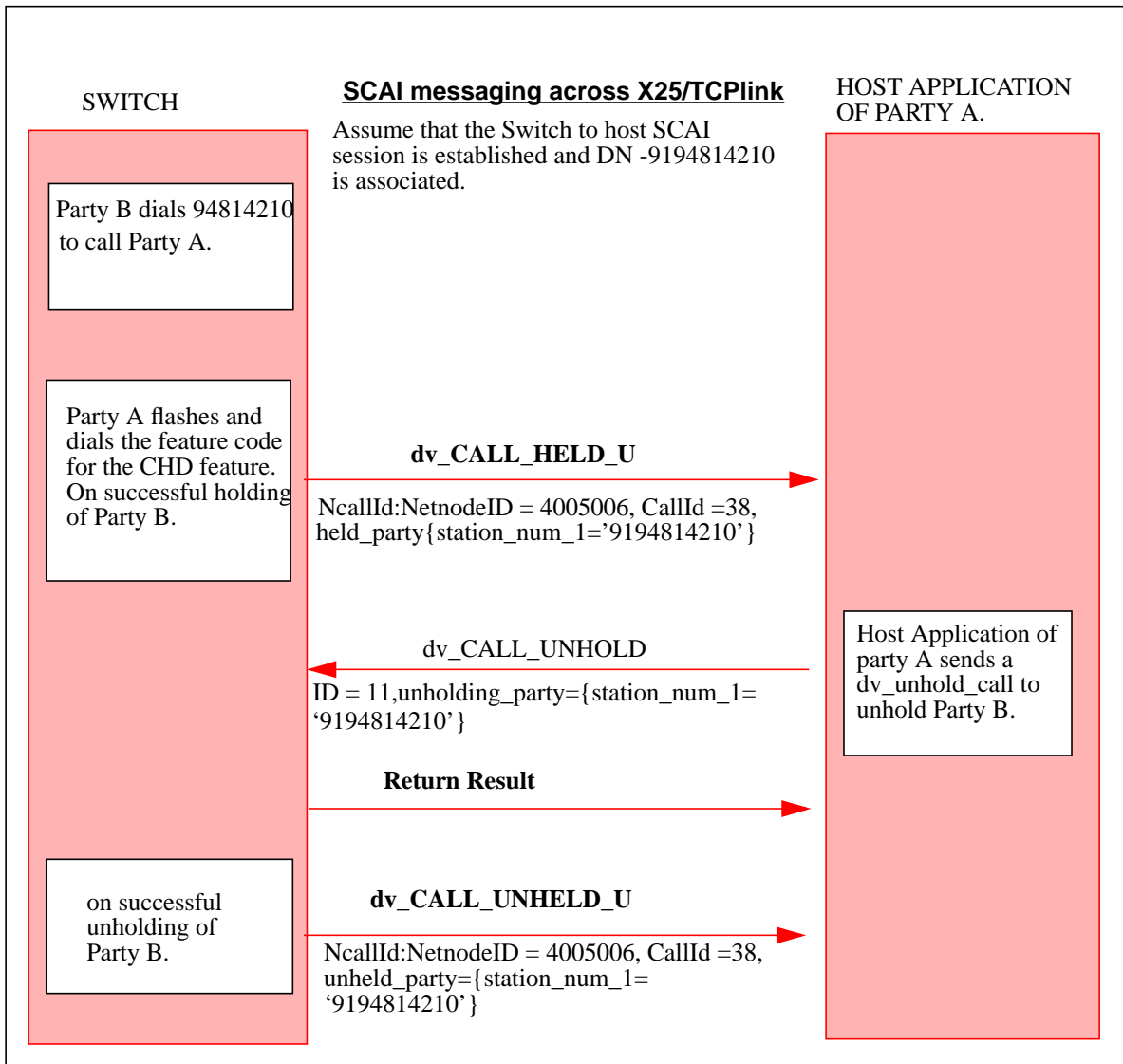


Figure 3 Call is Held manually by CHD feature and Unheld by ICM



Permanent Hold(HLD) Usage scenario

Two parties ('A' and 'B') are in a talking state. Party A is assigned the permanent hold feature. During conversation A flashes, hears special dial-tone and dials the permanent hold feature code. A hears confirmation tone indicating B is being held. B hears silence. A message DV_CALL_HELD_U is sent to the host computer application indicating a successful call hold. A can go on-hook and later retrieve B by going off-hook at which time the 2-port connection is reestablished. Again a message DV_CALL_UNHELD_U is sent to the host application of party A informing it of a successful unholding of the held call.

Figure 4 Call is Held and Unheld manually in IBN sets by HLD feature

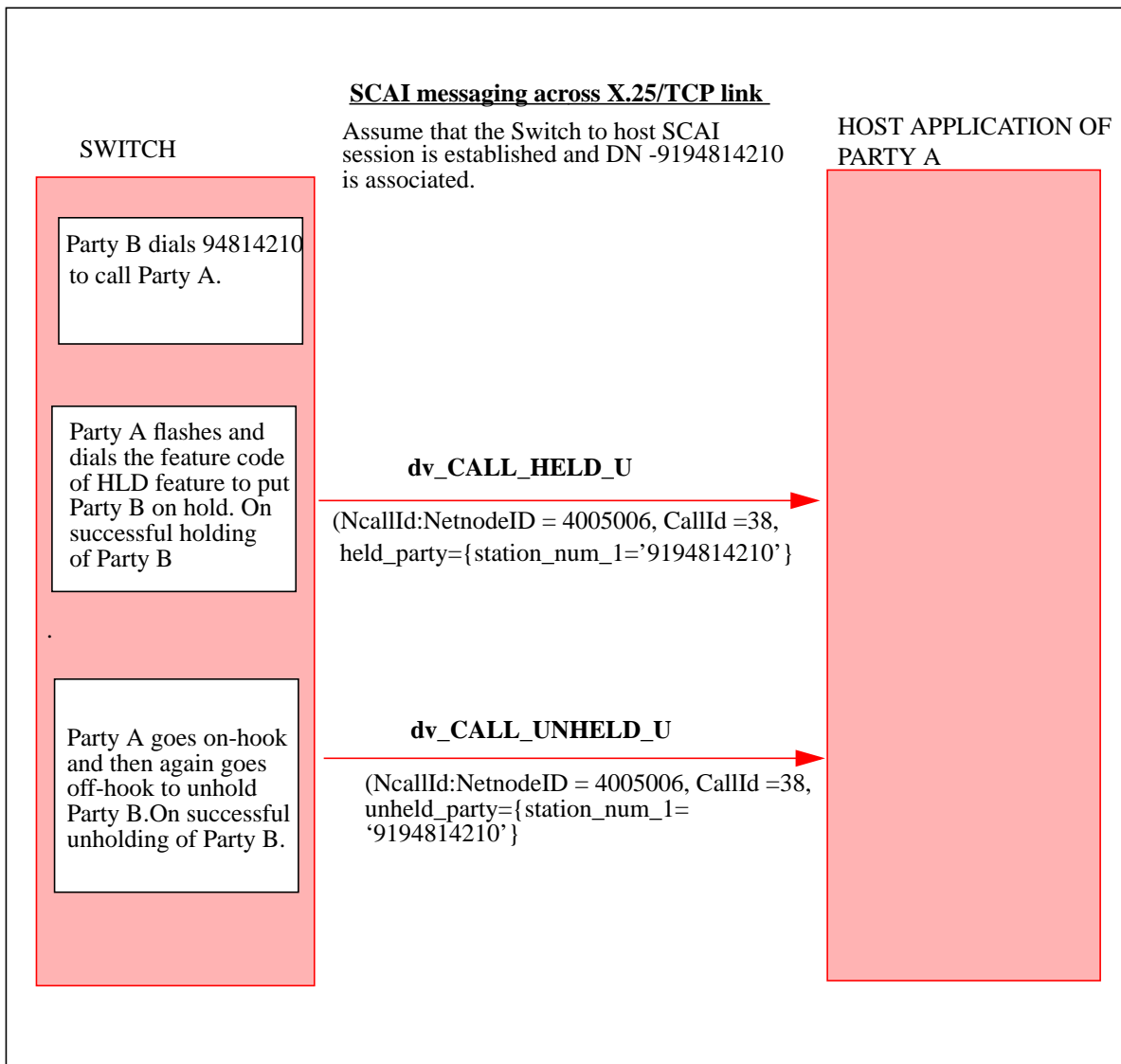
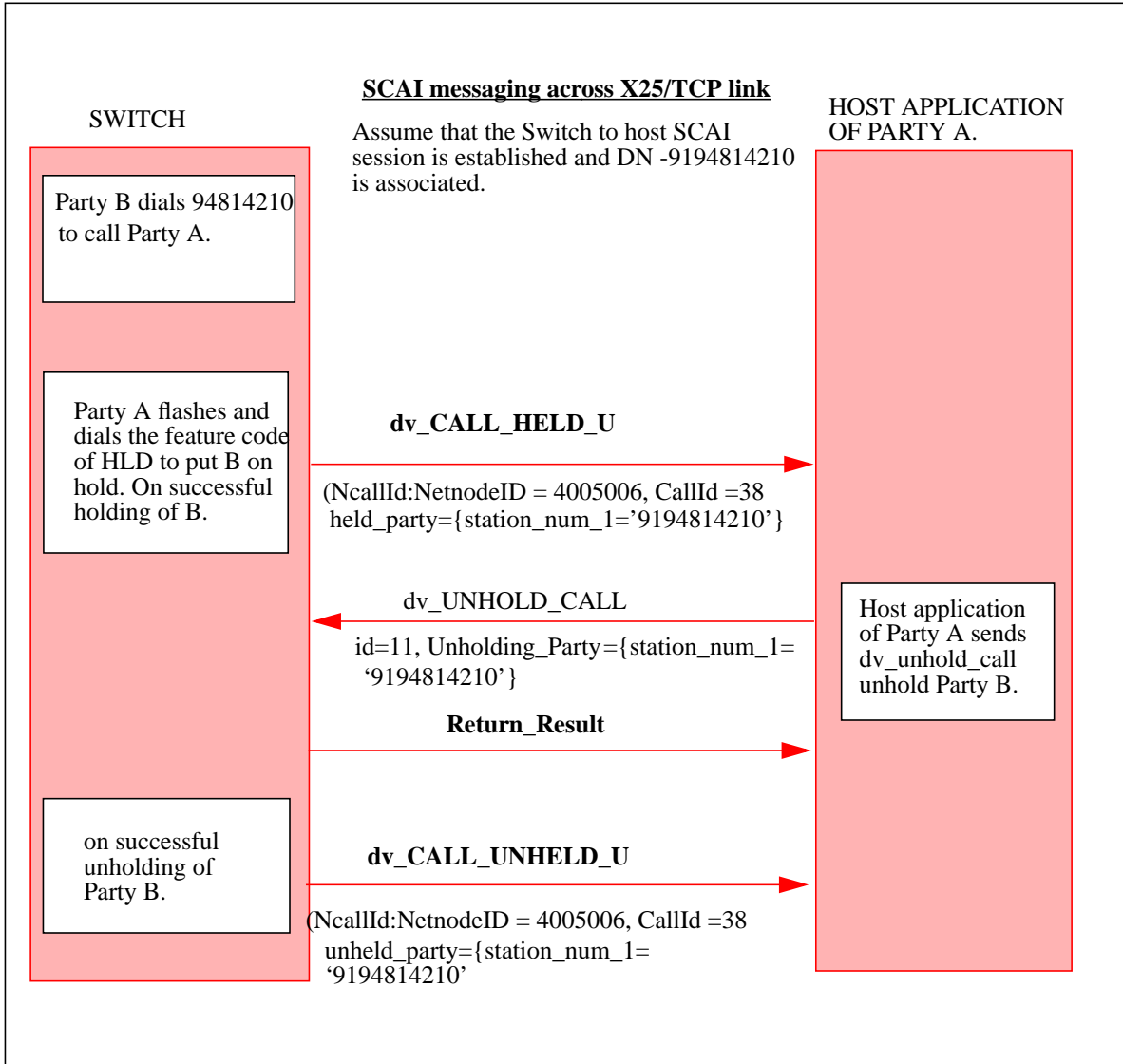


Figure 5 Call is Held manually by HLD feature and Unheld by ICM



22.2.2.6.2 KeySET based Hold and Unhold

The user has an active call and wishes to hold it and originate or receive a second call. Pressing the HOLD key will cause the active DN to be held and have its associated lamp change from ON to flashing. A new message DV_CALL_HELD_U will be sent to the host computer. Any held call may be retrieved by pressing the key associated with the held call. Another message DV_CALL_UNHELD_U will be sent to the host application from the switch on successful unholding of the call.

Figure 6 Call is Held and Unheld manually as in Key-sets

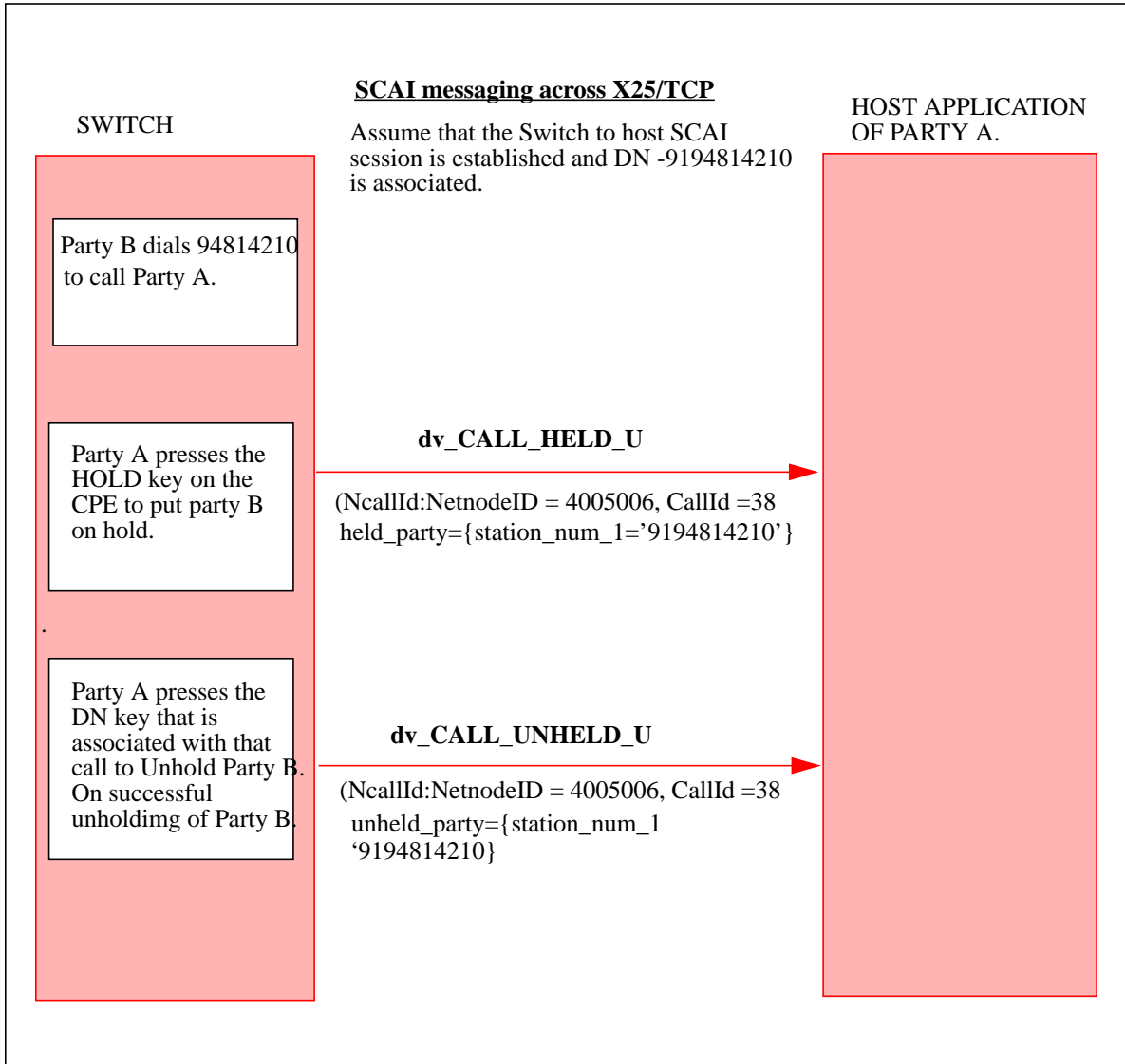


Figure 7 Call is Held manually by Key-Sets and Unheld by ICM

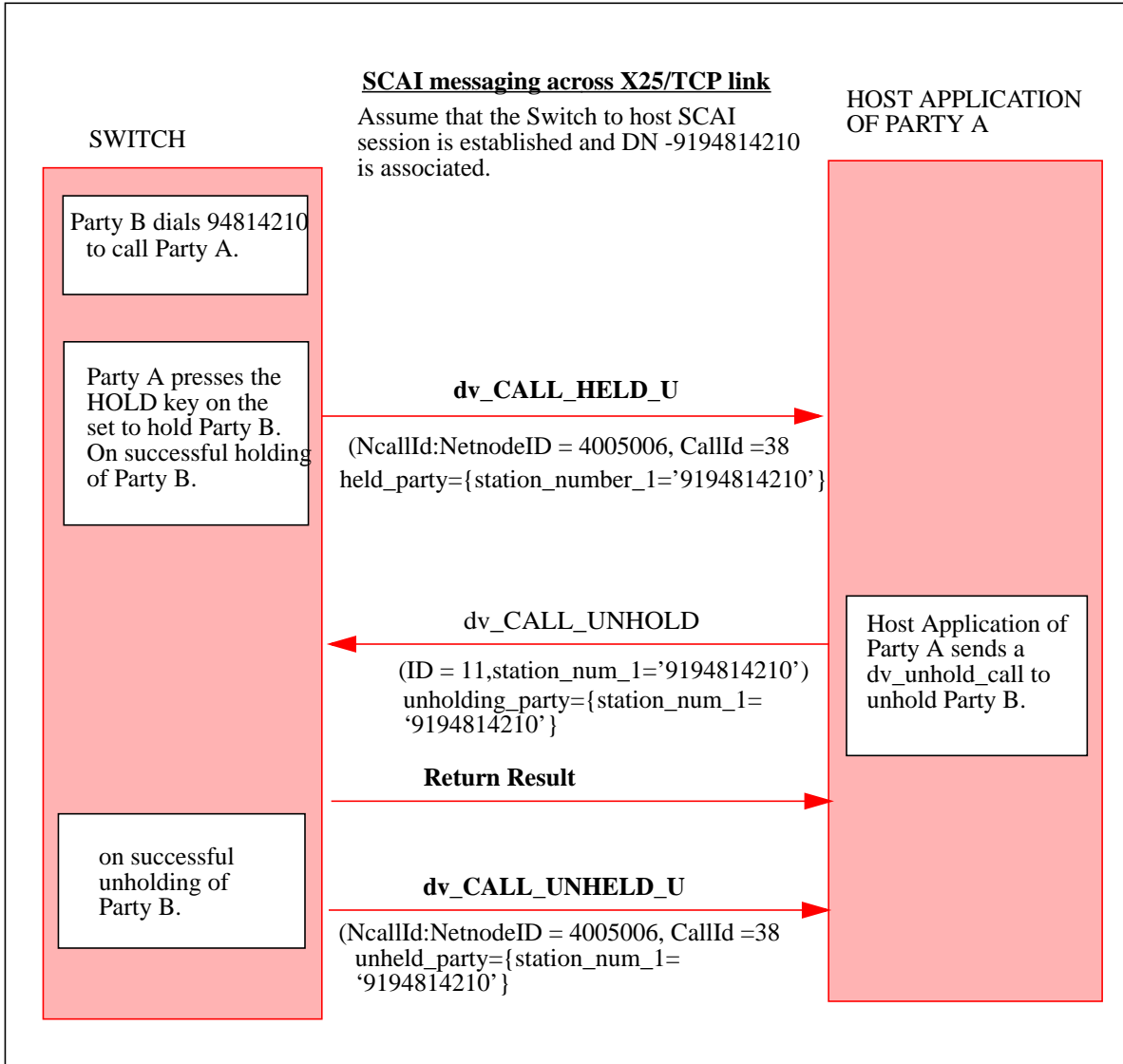


Figure 8 ICM 3Wc scenario: dv_add_party and dv_drop_party.

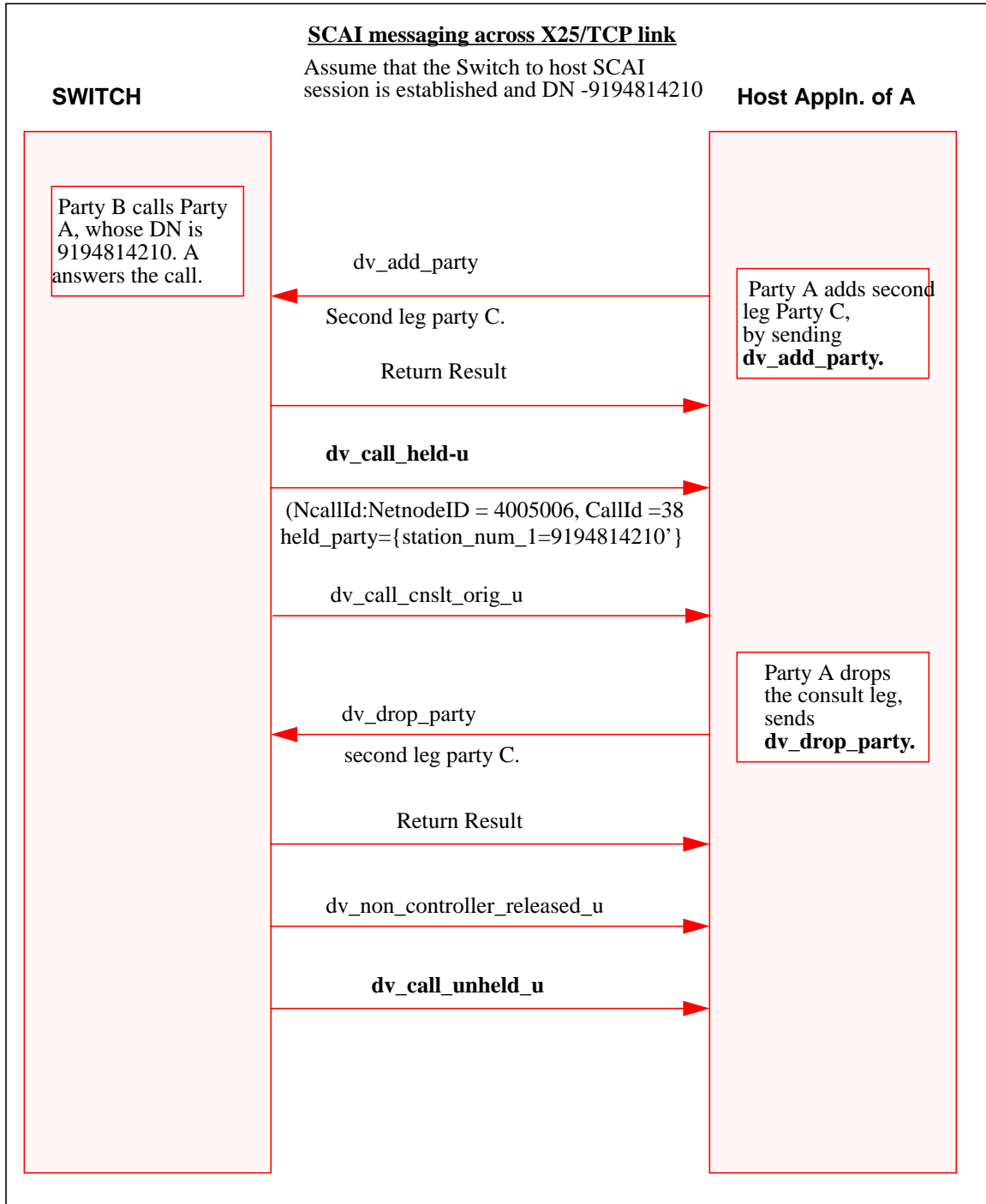
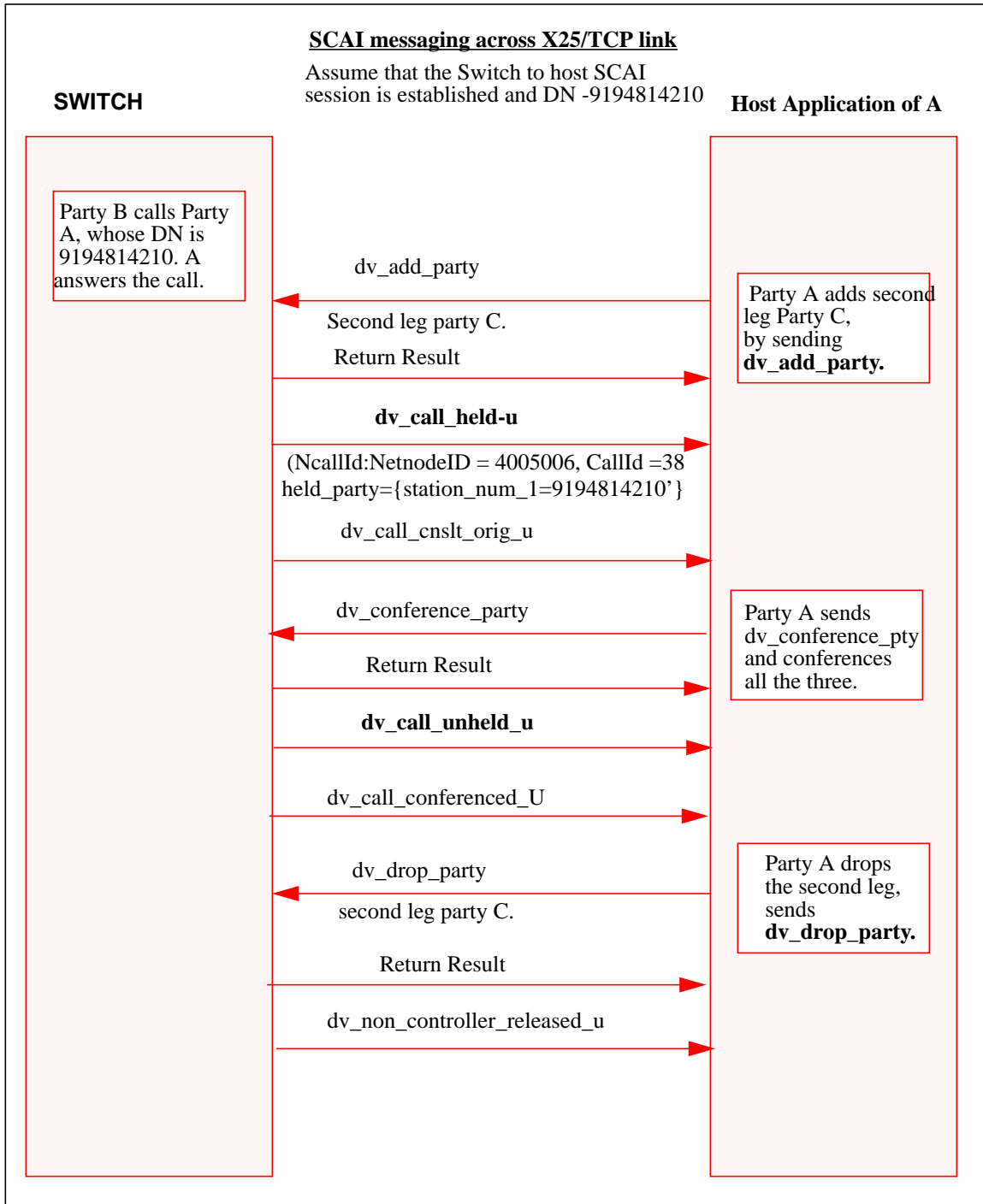


Figure 9 dv_add_party, dv_conference_party, dv_drop_party



22.3 Hardware requirements

Not Applicable

22.4 Limitations and restrictions

The limitations and restrictions that apply to the functionalities of the Call Hold (CHD) feature apply to this activity also .Please refer to FN of activity BC0948 for limitations and restrictions that apply to the Call Hold feature.

The limitations and restrictions that apply to the functionalities of the Permanent Hold (HLD)feature apply to this activity also. Please refer to FN of activity BV0944 for limitations and restrictions that apply to the Permanent Hold feature.

The event reporting for call held and unheld are not supported for manual 3WC features. If a notification from, XPM to CM is sent, then a held or unheld event might be reported. But , eliminating this message or support for this message is not done in this feature work, as there are lot of interactions involved with other 3WC features. And this work should be considered as the work for one more feature.

22.5 Interactions

None of the existing interactions will be affected or changed by this activity. No new interactions will be introduced by this activity.

22.6 Logs (LG)

Not Applicable.

22.6.1 New/modified logs

22.7 Data schema (DS)

22.7.1 New/modified tables

Table 4 New or modified tables

Table name	NEW,CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)
SCAISSRV	CHANGED	A new category TPCC15\$ is added

Table 4 New or modified tables

Table name	NEW,CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)
SCAISSRV	CHANGED	A new category SCAICC09\$ is added

22.8 Office parameters (OP)

Not Applicable.

22.8.1 New/modified office parameters**22.9 Service orders (SO)**

Not Applicable

22.10 Alarms (AL)

Not Applicable

22.10.1 New/modified directories**22.11 Command interface (CI)**

Not Applicable.

22.11.1 New/modified commands**22.12 Operational measurements (OM)****22.12.1 New/modified OM groups**

OM group SCAISRV4 has changed. A new register HELDU has been added to it as a new message CALL-HELD-U has been added.

The number of registers have been increased from 15 to 16.

Table 5 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW,CHANGED or DELETED	Reason
SCAISRV4	Switch Computer Application Interface SCAI Service 4	NEW	A new message Call-held is added to the table SCAISSRV so a new register HELDU is made to peg

22.13 AMA/Billing information (AM)

Not Applicable.

22.13.1 New/changed AMA/billing information

Not Applicable.

22.14 Software optionality control (SOC)

Not Applicable.

Table 6 SOC

SOC option name:	
SOC option title:	
SOC option control type:	<state/usage/combined>
New SOC option?	<Yes/No>
SOC option order code	<order code>
Option defined in DRU:	<DRU>
Affected products:	<PCL(s)>

22.15 Glossary

TERM	DESCRIPTION
ACD	Automatic Call Distribution

TERM	DESCRIPTION
ASN	Abstract Syntax Notation
CAS	Computer Aided Signalling
CHD	Call Hold Feature
CPE	Customer Premises Equipment
CTI	Computer Telephone Integration
CWT	Call Waiting
DN	Directory Number
HLD	Permanent Hold Feature
ICM	Intelligent Call Management
IBN	Integrated Business Network
LCS	Local Concrete Syntax
MDC	Meridian Digital Centrex
POTS	Plain Ordinary Telephone Service.
RES	Residential Enhanced Services
SCAICC	Switch Computer Application Interface Call Control
SCAISSRV	Switch Computer Application Interface SCAI Service
TPCC	Third party Call Control
SDT	Special Dial Tone

22.16 References

REF #	Description of Reference
1	CompuCALL Specifications NT NIS Q218 Rel 09.01
2	DID of 59022448

23: Functional description (FN)

23.1 Feature name

59022453: ICM Logon Enhancement and Re-engineering.

23.2 Description

23.2.1 Overview of SCAI data structures associated with sessions

A SCAI session established on the DMS-100 has three fundamental data structures associated with it, the 'session_data', 'transport_data' and the 'scaicomphys_tuple'. The implementation of the SCAI session on the switch is such that the 'session_data' associated with the session will have all the session related information such as the DN associations. This 'session_data' communicates/maps on to a unique 'transport_data' which in turn communicates with the actual protocol being used. The 'scaicomphys_tuple' is the data structure which has information about the options datafilled in the table SCAICOMS in addition to common information present in the 'session_data' and the 'transport_data'

When a SCAI session has been established successfully then all the three data structures will be updated and be in sync with each other, i.e contain the same entries in all the fields common to them. When a SCAI link is logged_off or aborted, the data structures are updated accordingly and the session information previously stored for that link is deleted.

However if any of the data structures falls 'out of sync' with the other two, it results in corruption of the SCAI data structures, which might prevent a legitimate attempt to establish new SCAI sessions from succeeding and/or cause a cascade effect and cause further corruption in the SCAI data structures.

23.2.2 DV_APPL_LOGON Message Enhancement

Prior to CCM15, there have been many instances, when the host application server has had an abnormal take down and the SCAI application was not notified of this. This results in the SCAI session on the DMS side not being

cleared up properly. When the host application comes back up and sends a DV_APPL_LOGON message to the DMS to establish a new session, the DMS responds with a return error of 'ALREADY LOGGED ON'.

This activity will modify the DV_APPL_LOGON message to include an additional parameter to specify a hard reset. Activating the Hard Reset parameter in the LOGON message will lead to the corrupt session data on the DMS 100 being cleared up, and the data structure being sanitized. The behavior of the modified DV_APPL_LOGON message can be summarized as follows:

BEHAVIOUR OF HARDRESET WHEN CORRUPTION IS FOUND IN SESSION OTHER THAN THE ONE BEING LOGGED ON TO (X.25)

SCENARIO/ IMPACT OF USING DV_APPL_LOGON WITH HARDRESET.	CORRUPTION ON A LINK (corrupt link is only link in session)	CORRUPTION ON A LINK (corrupt link is one of multiple links in the session)
IMPACT ON SESSION DATA	The session data of the corrupt SVC will be cleared.	The session data of the corrupt SVC will be cleared.
IMPACT ON SESSION RESOURCES	The session id will be released, all associations with session released	The session id will not be released, all associations with session will remain intact.
IMPACT ON TRANSPORT	If valid transport found for SVC, then the transport will be cleared.	If valid transport found for SVC, then the transport will be cleared.
IMPACT ON MESSAGES	All messages in queue hosed in corrupt SVC will be tossed.	All messages in queue hosed in corrupt SVC will be tossed.
LOGS GENERATED.	SCAI102 with reason of 'HARDRESET SESSION CLEAR'. If a valid transport was found for the SVC then SCAI102 with reason of 'HARDRESET TRANS CLEAR'	If a valid transport was found for the SVC then SCAI102 with reason of 'HARDRESET TRANS CLEAR'

BEHAVIOUR OF HARDRESET WHEN CORRUPTION IS FOUND IN THE SESSION BEING LOGGED ON TO (X.25)

SCENARIO/	CORRUPTION ON A LINK (corrupt link is only link in session)	CORRUPTION ON A LINK (corrupt link is one of multiple links in the session)
IMPACT OF USING DV_APPL_LOGON WITH HARDRESET.		
IMPACT ON SESSION DATA	The session data of the corrupt SVC will be cleared.	The session data of the corrupt SVC will be cleared.
IMPACT ON SESSION RESOURCES	The session id will not be released, all associations with session released	The session id will not be released, all associations with session will remain intact.
IMPACT ON TRANSPORT	If valid transport found for SVC, then the transport will be cleared.	If valid transport found for SVC, then the transport will be cleared.
IMPACT ON MESSAGES	All messages in queue hosed in corrupt SVC will be tossed.	All messages in queue hosed in corrupt SVC will be tossed.
LOGS GENERATED.	SCAI102 with reason of 'HARDRESET SESSION CLEAR'. If a valid transport was found for the SVC then SCAI102 with reason of 'HARDRESET TRANS CLEAR'	If a valid transport was found for the SVC then SCAI102 with reason of 'HARDRESET TRANS CLEAR'

BEHAVIOUR OF HARDRESET WHEN CORRUPTION IS FOUND IN SESSION OTHER THAN THE ONE BEING LOGGED ON TO (TCP)

SCENARIO/ IMPACT OF USING DV_APPL_LOGON WITH HARDRESET.	
IMPACT ON SESSION DATA	The session data of the corrupt session will be cleared.
IMPACT ON SESSION RESOURCES	The session id will be released, all associations with session released
IMPACT ON TRANSPORT	If valid transport found, then the transport will be cleared.
IMPACT ON MESSAGES	All messages in queue hosed in corrupt session will be tossed.
LOGS GENERATED.	SCAI102 with reason of 'HARDRESET SESSION CLEAR'. If a valid transport was found then SCAI102 with reason of 'HARDRESET TRANS CLEAR'

Please refer to “Figure 2 Processing of LOGON with HARD RESET SET” on page 28. This new parameter will be an optional parameter in the DV_APPL_LOGON message. A normal DV_APPL_LOGON will not have the new parameter and a DV_APPL_LOGON intending to do a hard reset should set the new parameter.

***NOTE:** The HARDRESET parameter should be used with discretion. The modified DV_APPL_LOGON message with the HARDRESET parameter set to TRUE must be used only when the normal DV_APPL_LOGON message without the parameter fails with a reason of 'already_logged_on'.*

In case of X.25 session with multiple SVC's (links), the modified DV_APPL_LOGON with the HARDRESET parameter set to TRUE will have to be sent over each of the SVC's separately.

Please refer to 'Table 1 Recommended Usage of HARDRESET'.

Table 1 Recommended Usage of HARDRESET.

SCENARIO	SHOULD HARDRESET BE DONE	CONSEQUENCE OF USING HARDRESET
<p>Attempt to logon to a session/ additional link which has been previously logged-off/ aborted fails and a return error of 'already logged on' is obtained.</p>	<p>YES</p> <p>This is case of data corruption and HARDRESET should be used to clear out the corruption.</p> <p>However all subsequent messages should be sent only after a RETURN_RESULT is obtained for the LOGON.</p>	<p>The session resources which have been corrupted will be cleared up and sanitized. A session will be established and a RETURN_RESULT will be obtained.</p> <p>All active SCAI sessions, will be impacted.</p>
<p>Attempt to logon to an already existing healthy session (TCP / X.25 session) with HardReset set.</p>	<p>NO</p> <p>This is not an expected operation. However if invoked accidentally, a normal DV_APPL_LOGON message will fail with the reason 'already logged on'.</p> <p>All messages queued against the link will be tossed. This could lead to severe message losses in extreme cases during high traffic conditions.</p>	<p>The session resources corresponding to the link on which the message is sent will be sanitized. All SCAI messages present in the queue corresponding to the link will be tossed. The DN's associated to the session will be unaffected. A RETURN_ERROR of 'already_logged_on' will be obtained.</p> <p>All active SCAI sessions, will be impacted.</p>
<p>Attempt to logon on to multiple SVC's in a X.25 session. (i.e logon to SVC's after the session has been established with a single SVC).</p>	<p>NO</p> <p>This is not an expected operation. A normal DV_APPL_LOGON message without the hardreset parameter activated should be used. The HARDRESET parameter should be set only if the normal LOGON fails with a reason of 'already_logged_on'</p>	<p>The session resources corresponding to the link that was logged on will be sanitized and any instances of corruption found among all the session active on the switch will be cleared up.</p> <p>All active SCAI sessions, will be impacted.</p>

Figure 1 Processing of LOGON with HARDRESET not SET

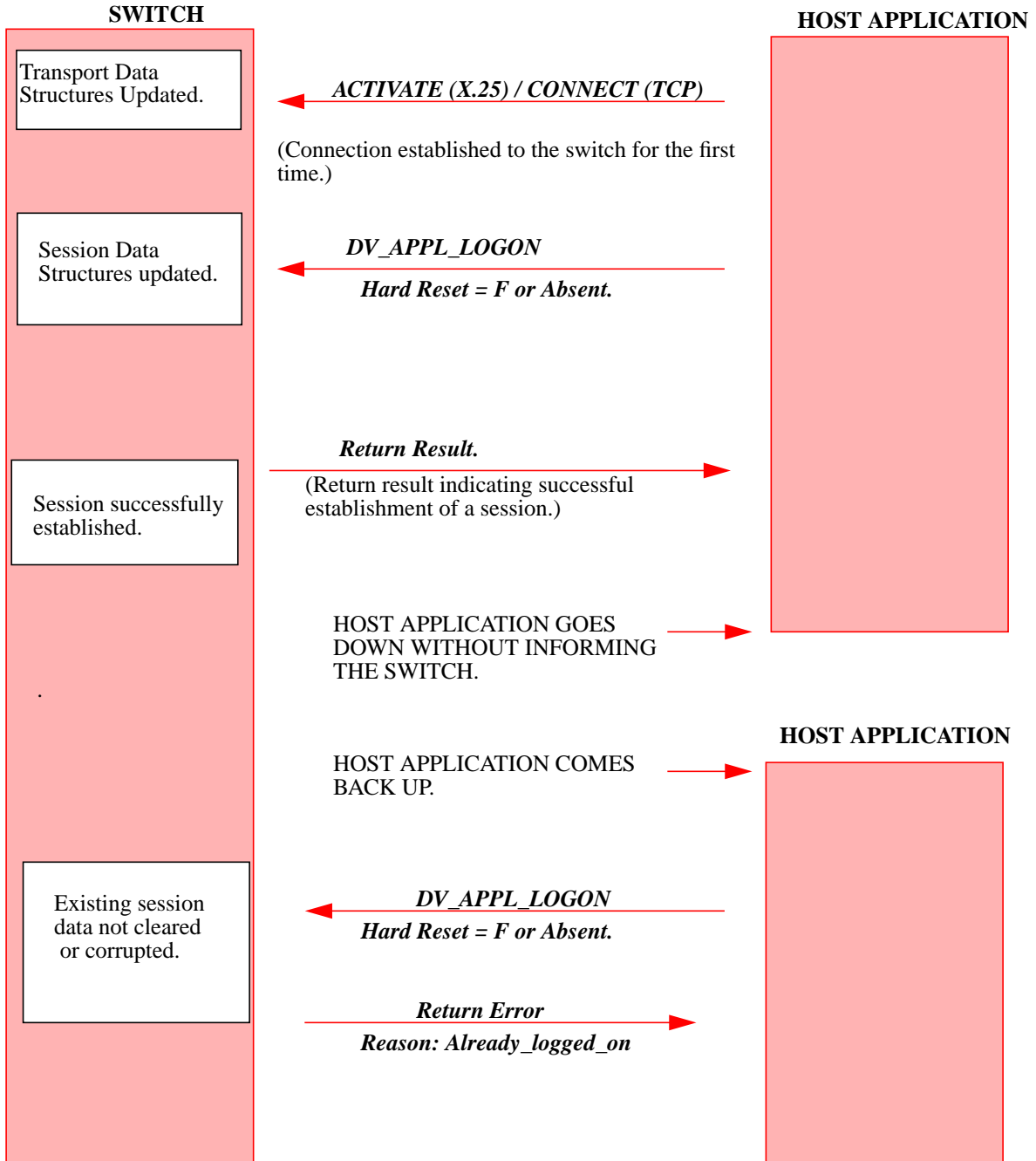
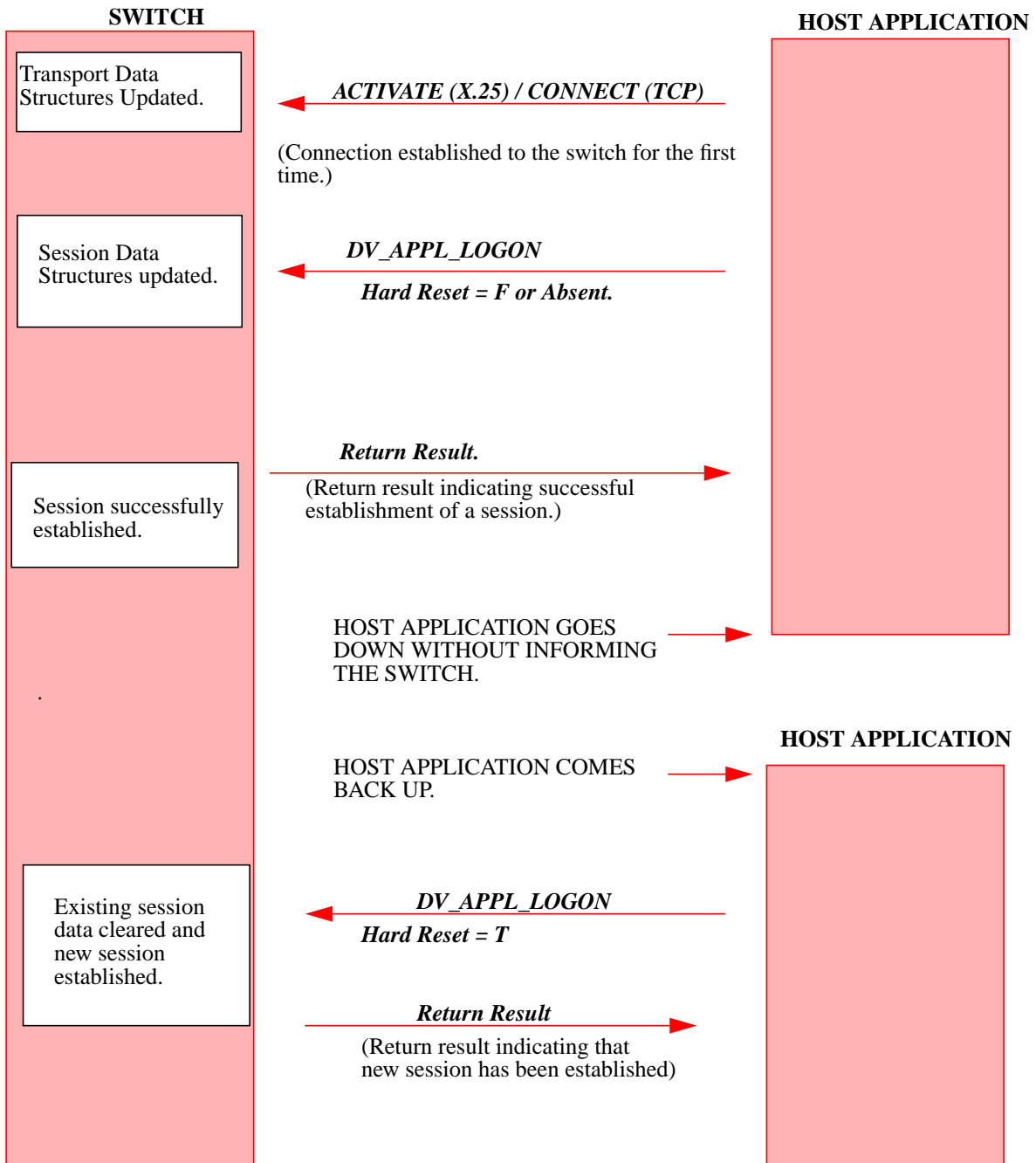


Figure 2 Processing of LOGON with HARD RESET SET



23.2.3 DRAWBACKS/DANGERS of using HARDRESET

- When the HARDRESET parameter is activated in the DV_APPL_LOGON and sent in over an healthy session, it uses the queue it has been sent as the ultimate reference. All instances of session data other than ours having the queue are treated as corrupt and cleared out. All messages on the queue will be tossed. If the DV_APPL_LOGON is sent in over a session that has already been established and is healthy, it will cause (a.) Loss of messages for that link (b.) Delay in the processing of all subsequent messages for that link.
- Processing of DV_APPL_LOGON with the HARDRESET takes a substantially longer period of time than, when the parameter is absent/not set. All messages subsequent to the LOGON with HARDRESET should be sent only after the RETURN_RESULT is obtained for the DV_APPL_LOGON, which would indicate that the corruption has been cleared and a new healthy link established. The time required for the RETURN_RESULT to the host would add to the total processing time of the DV_APPL_LOGON with HARDRESET.
- Setting this parameter in the DV_APPL_LOGON causes a check to be run on all active SCAI sessions on the DMS-100 and subsequently clears of any corrupt session resources. Thus the use of the modified DV_APPL_LOGON may affect any of the sessions.

Keeping in mind all the above mentioned drawbacks of using the HARDRESET parameter it is recommended that the parameter should NEVER be set, when the DV_APPL_LOGON is sent for the first time over a link and should be used ONLY when it has been verified that corruption of SCAI data structures is preventing a legitimate DV_APPL_LOGON from succeeding.

23.2.4 Re-engineering of LOGON, LOGOFF and ABORT for X.25 and TCP sessions

Under the current implementation different processes are involved in the processing of LOGON, LOGOFF and ABORT of a session. These processes update and/or access the same data structures depending on the message being processed.

When messages are sent in quick succession of each other, the processes may overrun each other, vying for the CPU time, resulting in simultaneous updation of data structures. This leads to data corruption.

In order to maintain data integrity, it is imperative that processes responsible for the messages, access the data structures sequentially. Hence, this activity

will move the processing of the DV_APPL_LOGON, DV_APPL_LOGOFF and DEACTIVATE/DISCONNECT messages from multiple processes to a single process. A message will not be processed, until the message sent prior to it (LOGON, LOGOFF or ABORT) has been fully processed and all relevant data structures have been updated. This will minimize the occurrence of race conditions and corruption.

23.2.5 Modification of RETURN_RESULT message to indicate session was taken down because of a RESTART/SWACT on the switch.

Under the current implementation, in case a RESTART or a SWACT occurs on the switch the host is only intimated that the links are being taken down by the switch. During a RESTART or a SWACT the call is cleared (except in a WARM RESTART where the established calls are maintained, but the link goes down) and the associated DN's are dis-associated. No explicit information is provided to the host as to why the link was taken down by the switch and if the host needs to associate the DN's previously associated with the session again or not. As a consequence of this the host application assumes that the DN's are associated, when it re-establishes the session.

This activity will modify the RETURN_RESULT message of the DV_APPL_LOGON, to include an additional parameter, which will indicate that the link was taken down as a consequence of a RESTART(WARM, COLD or RELOAD) or a SWACT and hence the DN's previously associated with the session need to be re-associated. This modified RETURN_RESULT will only be generated for the first logon to a session that was taken down as a result of the RESTART or SWACT occurring on the switch. (i.e If following a RESTART/SWACT, a new session that was not established previously is established the RETURN_RESULT will not contain the new parameter.)

NOTE:

The modified RETURN_RESULT with the DNASSOC parameter set to 1, will be sent only in response to the DV_APPL_LOGON message sent for the first link of a session taken down due to a RESTART/SWACT.

RETURN_RESULT messages sent in response to subsequent logons to other links in that session (multi link scenario) will not contain the new parameter.

23.2.5.1 Subscription for the new parameter in the Return Result

The new parameter in the Return Result will be subscribed through an option DNASSOC in table SCAICOMS.

If a customer subscribes to the DNASSOC option then the new parameter DNASSOC will be displayed in the Return Result of a DV_APPL_LOGON message, sent on a link, that was cleared due to a RESTART/SWACT. If the

customer does not subscribe to the new option the Return Result will not display the new parameter DNASSOC.

23.2.5.2 Interaction with Hard Reset functionality

In case the HARDRESET parameter is set to Y, while sending the first DV_APPL_LOGON message, to establish the session after the switch has completed a RESTART/SWACT the RETURN_RESULT sent in response will contain the new parameter (DNASSOC) set to 1. (It is however recommended that the HARDRESET parameter not be used for a initial logon.)

Now if the DV_APPL_LOGON message is accidentally sent over the same link again with the HARDRESET parameter set to Y, (i.e LOGON with HARDRESET over a healthy session) the existing session resources will be cleared and new sanitized resources allocated, but the RETURN_RESULT will not contain the new parameter.

23.2.5.3 Design limitations

When a SWACT occurs on the switch, there is transfer of some information from the previously active cm to the newly activated cm. However SCAI data structures are not transferred over. Thus modifications made to the data structures on the active side will not be transferred over to the inactive side when the two CM's are not in sync.

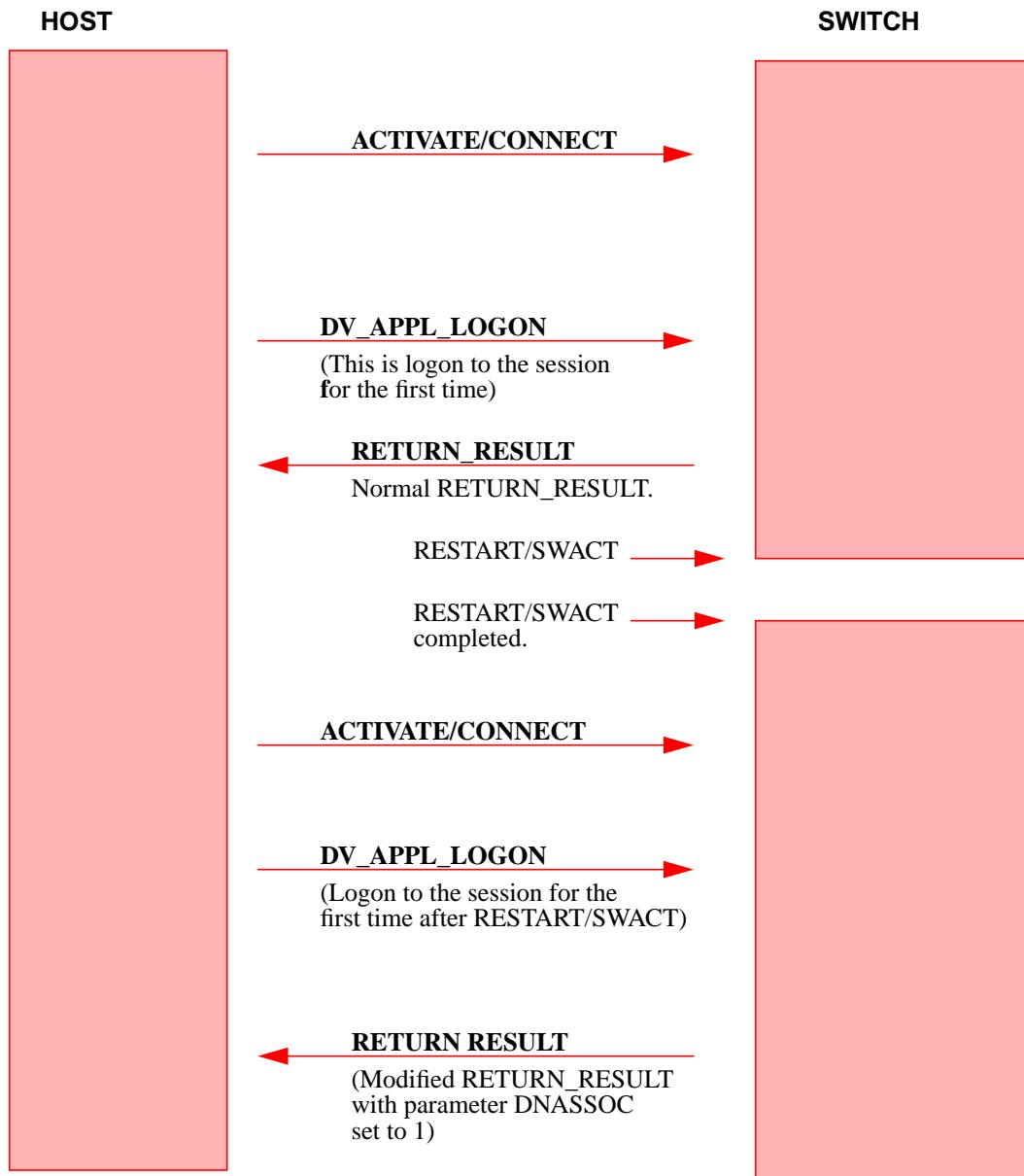
If a session is established prior to the SWACT and it is desired that the DNASSOC parameter be obtained in the RETURN_RESULT of the first LOGON following the SWACT onto the same session then

- The DNASSOC option in table SCAICOMS should be activated/set when the active and inactive CM's are in sync.
- The session should be established when the active and inactive CM's are in sync.

In summary the DNASSOC parameter will be obtained post-SWACT only if

- a. The DNASSOC option in table SCAICOMS was set when the CM's were in sync.
- b. The session was established when the CM's were in sync.
- c. The session went down during a SWACT.
- d. The DV_APPL_LOGON is the first, on the same session after the SWACT has been fully completed.

Figure 3 Modified RETURN_RESULT after RESTART/SWACT.



23.2.6 Modified ICM Messages

23.2.6.1 Modification of DV_APPL_LOGON message:

This feature introduces a new parameter, HARD RESET in the DV_APPL_LOGON message.

The ASN.1 notations for the DV_APPL_LOGON message provided by this activity are shown in this section. The tag values are taken from the Remote Operation Service Element (ROSE) protocol.

The DV-APPL-LOGON message currently includes the following parameters which must all be provided by the host.

A customer session involves only one Service ID, Application ID, Network Node ID, Business Group ID, and Password.

- **Network Node ID**

specifies the switch with which the host application wishes to communicate. This is the switch which the host connects to via the ICM link and is defined by the Telco.

- **Service ID**

identifies a Service Profile for a session. A Telco can define functions and parameters in Service Profiles on the DMS-100 switch. Also a Telco can assign a customer up to eight service IDs. The following are uses and functions of Service IDs:

- e. all are under the same password
- f. can refer to the same Service Profile
- g. an active session can use more than one
- h. customer can choose any eight assigned to a linkset datafilled

- **Service Version**

specifies the application level signaling version used by the host (i.e. 07 for SCAI07).

- **Business Group ID**

identifies the customer to whom the host application belongs. This is defined by the Telco.

- **Application ID**

identifies the specific customer host application (e.g. insurance company customer policy information database, outstanding claims database) initiating the logon request and is specified by the Host.

- **Password**

is used for security purposes and corresponds to a specific Business Group ID. One password datafiled for the customer is applicable to all eight service IDs.

- **Linkset Name**

specifies the linkset name.

This feature will introduce a new parameter HARDRESET.

- **HardReset (OPTIONAL)**

specifies if hardreset is to be performed or not. If this parameter is set to TRUE then the existing session data (if present) is cleared and a new session is established. If this parameter is set to FALSE or is absent the LOGON will be processed as an ordinary LOGON.

23.2.6.2 Modification of RETURN_RESULT message:

This activity modifies the RETURN_RESULT message sent from the Switch to the Host.

An additional parameter DNASSOC of type integer has been introduced in the RETURN_RESULT message to indicate that DN's associated with a session need to be re-associated, as they were dis-associated because of a RESTART/SWACT occurring on the switch.

23.2.7 X.25 Link DV-APPL-LOGON: ASN.1 Encoding

dv-APPL-LOGON	OPERATION ARGUMENT RESULT ERRORS	LogonArgument DnassocResult {link-Already-In-Use, missing-Parameter, invalid-Parameter, resource-Limitation, invalid-LinkSet-Name)
::= 1		
LogonArgument ::=	SEQUENCE	

{networkNodeID	[0] IMPLICIT INTEGER	OPTIONAL,
serviceID	[1] IMPLICIT INTEGER	OPTIONAL,
serviceVersion	[2] IMPLICIT INTEGER	OPTIONAL,
businessGroupID	[3] IMPLICIT INTEGER	OPTIONAL,
applicationID	[4] IMPLICIT INTEGER	OPTIONAL,
password	[5] IMPLICIT IA5String	OPTIONAL,
tcpLinksetName	[6] IMPLICIT IA5String	OPTIONAL,
hardreset	[7] IMPLICIT BOOL	OPTIONAL}

DnassocResult ::= Sequence OPTIONAL

{Dnassoc IMPLICIT BOOL }

link-Already-In-Use ERROR ::= 0

missing-Parameter ERROR ::= 1
PARAMETER MissingParameter

MissingParameter ::= SEQUENCE

{missingParameterType	[0] IMPLICIT ENUMERATED	
{missingNetworkNodeID	(0),	
missingServiceID	(1),	
missingServiceVersion	(2),	
missingBusinessGroupID	(3),	
missingApplicationID	(4),	
missingPassword	(5),	OPTIONAL}
missing TCPLinksetName(6)}		OPTIONAL}

invalid-Parameter ERROR ::= 2
PARAMETER InvalidParameter

InvalidParameter = SEQUENCE

{ invalidParameterType	[0] IMPLICIT ENUMERATED	
{ invalidNetworkNodeID	(0),	
invalidServiceID	(1),	
invalidServiceVersion	(2),	
invalidBusinessGroupID	(3),	
invalidApplicationID	(4),	
invalidPassword	(5),	OPTIONAL)
invalidLinkset	(6)}	
resource-Limitation	ERROR	:: = 3

23.2.8 TCP/IP Link DV-APPL-LOGON: ASN.1 Encoding

dv-Appl-Logon OPERATION

ARGUMENT	LogonArgument
RESULT	DnassocResult
ERRORS	{ link-Already-in-use, missing-Parameter, invalid-Parameter, resource-Limitation, invalid-LinkSet-Name }

::= 1

LogonArgument	::= SEQUENCE
{ networkNodeID	[0] IMPLICIT INTEGER OPTIONAL,
serviceID	[1] IMPLICIT INTEGER OPTIONAL,
serviceVersion	[2] IMPLICIT INTEGER OPTIONAL,
businessGroupID	[3] IMPLICIT INTEGER OPTIONAL,
applicationID	[4] IMPLICIT INTEGER OPTIONAL,
password	[5] IMPLICIT IA5String OPTIONAL,
tcpLinksetName	[6] IMPLICIT IA5String OPTIONAL,
<i>hardreset</i>	[7] IMPLICIT BOOL OPTIONAL }

<i>DnassocResult</i>	<i>::= Sequence</i>	<i>OPTIONAL</i>
----------------------	---------------------	-----------------

<i>{Dnassoc</i>	<i>IMPLICIT BOOL</i>	<i>}</i>
-----------------	----------------------	----------

link-Already-In-Use	ERROR	::= 0
---------------------	-------	-------

missing-Parameter	ERROR	::= 1
	PARAMETER	MissingParameter

MissingParameter ::= SEQUENCE

{ missingParameterType	[0] IMPLICIT ENUMERATED	
{ missingNetworkNodeID	(0),	
missingServiceID	(1),	
missingServiceVersion	(2),	
missingBusinessGroupID	(3),	
missingApplicationID	(4),	
missingPassword	(5),	OPTIONAL }
missing TCPLinksetName(6)		OPTIONAL }

invalid-Parameter	ERROR	::= 2
	PARAMETER	InvalidParameter

InvalidParameter = SEQUENCE

{ invalidParameterType	[0] IMPLICIT ENUMERATED
{ invalidNetworkNodeID	(0),
invalidServiceID	(1),

invalidServiceVersion (2),
 invalidBusinessGroupID (3),
 invalidApplicationID (4),
 invalidPassword (5), OPTIONAL)
 invalidLinkset (6}
 resource-Limitation ERROR ::= 3

23.2.9 TCP/IP Link DV-APPL-LOGON with HardReset: Coded Example

When the host application sends a normal DV_APPL_LOGON, it gets an error of ‘already logged on’ from the switch due to corruption of scai data structures. The host sends a modified DV-APPL-LOGON message with NetworkNodeID = (decimal), Service Version= 16, password = RRRR, InvokeID = 24 (18 Hex) and Hardreset = TRUE. The host receives RETURN-RESULT from the switch, indicating successful session establishment.

Table 2 ENCODED FORMAT OF MODIFIED DV APPL LOGON for TCP/IP.

INVOKE HOST ==> DMS

Hex Dump			Information Element	Comments
Tag	Length	Content		
A1	28		INVOKE	the message length is 40 bytes decimal
02	01	18	InvokeID	its Invoke ID is decimal 24
02	01	01	Operation	its operation value is dv-Appl-Logon [1] decimal
30	1D		Argument	Application Logon Arg is of type Sequence and is 29 bytes long decimal
80	03	3D 1C 8E	Network Node ID	the network node ID is 4005006.
81	01	00	Service ID	the service ID is 0.
82	01	07	Service Version	the service version is SCAI07.
83	01	15	Business Group ID	the Business Group ID is 15
84	01	01	Application ID	the application ID id 1
85	04	52 52 52 52	Pass Word	the password is RRRR
Hex dump = A1 28 02 01 18 02 01 01 30 1D 80 03 3D 1C 8E 81 01 00 82 01 10 83 01 15 84 01 01 85 04 52 52 52 52 86 04 54 43 50 32 87 01 01				

Hex Dump			Information Element	Comments
Tag	Length	Content		
86	04	54 43 50 32	TCP Linkset Name	the linkset name is TCP2.
87	01	01	HARD RESET	Hard Reset set to TRUE.
Hex dump = A1 28 02 01 18 02 01 01 30 1D 80 03 3D 1C 8E 81 01 00 82 01 10 83 01 15 84 01 01 85 04 52 52 52 52 86 04 54 43 50 32 87 01 01				

23.2.10 X.25 LINK DV APPL LOGON with HARDRESET:Coded Example

When the host application sends a normal DV_APPL_LOGON for a SVC in a session, it gets an error of 'already logged on' from the switch due to corruption of scai data structures. The host sends a modified DV_APPL_LOGON message with NetworkNodeID = 4005006, (decimal), Service Version= 16, password = RRRR, InvokeID = 01 and Hardreset = TRUE.

The host application now gets a RETURN-RESULT from the switch indicating that the SVC has been successfully logged on to.

Table 3 ENCODED FORMAT OF MODIFIED DV APPL LOGON for X.25

INVOKE HOST =====> DMS

Hex Dump			Information Element	Comments
Tag	Length	Content		
A1	22		INVOKE	this message is 34 bytes decimal
02	01	01	InvokeID	the InvokeID is 01 decimal
02	01	01	Operation	the operation value is DV_APPL_LOGON [1] decimal
30	18		Argument	Logon argument is of Sequence type and is 24 bytes long decimal

Hex Dump			Information Element	Comments
Tag	Length	Content		
80	03	3D 1C 8E	NetworkNodeID	the NetworkNodeID is 4005006 decimal.
81	01	00	ServiceID	the ServiceID is 0
82	01	07	SeviceVersion	the SeviceVersion is SCAI07
83	01	0F	BusinessGroupID	the BusinessGroupID is 15
84	01	01	ApplicationID	the ApplicationID is 1
85	04	52 52 52 52	Password	the Password is RRRR
87	01	01	HARDRESET	the HARDRESET parameter is set to TRUE.
Hex Dump=A1 1F 02 01 01 02 01 01 30 18 80 03 3D 1C 8E 81 01 00 82 01 10 83 01 0F 84 01 01 85 04 52 52 52 52 87 01 01				

23.2.11 RETURN RESULT when first logon is done after a RESTART/SWACT (coded example):

The host application establishes a multi-SVC session over X.25 links. The switch now does a SWACT/RESTART. As a result the links are taken down and when the switch comes back up the host application sends a DV_APPL_LOGON message for each of the SVC's to re-establish the session.

When the switch receives the DV_APPL_LOGON message for the first SVC of the session, a modified RETURN_RESULT is sent back to the host, with the new parameter DNASSOC set to a value of 1, indicating that the session had been taken down due to a SWACT/RESTART and that the DN's previously associated with the session need to be re-associated.

Table 4 ENCODED FORMAT OF MODIFIED RETURN RESULT.

RETURN-RESULT DMS =====> HOST

Hex Dump			Information Element	Comments
Tag	Length	Content		
A2	0B		RETURN RESULT	this message is 11bytes long
02	01	01	InvokeID	the InvokeID is 01 decimal
30	06		Argument	its argument is of type Sequence and is 6 bytes long
02	01	01	Operation	the operation is DV-APPL-LOGON[1]
01	01	01	Dnassoc	The Dnassoc bool is true 1.
Hex Dump=A2 0B 02 01 01 30 06 02 02 01 01 01 01				

23.3

Not Applicable

23.4 Limitations and restrictions

Not Applicable

23.5 Interactions

Not Applicable

23.6 Logs (LG)

23.6.1 New/modified logs

Table 5 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
SCAI102	102	MODIFIED	SOS

A SCAI 102 log with a reason of HARD RESET SESS CLEAR will be generated when a DV_APPL_LOGON with hard reset clears an existing corrupted session for X.25 and TCP and a SCAI 102 log with a reason of HARD RESET TRANS CLEAR will be generated when corrupt transport data is cleared.

23.7 Data schema (DS)

23.7.1 New/modified tables

Please see the Data Schema document for this feature.

Table 6 New or modified tables

Table name	NEW,CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)
SCAICOMS	CHANGED	UNCHANGED

23.8 Office parameters (OP)

23.8.1 New/modified office parameters

No office parameters are introduced or modified by this activity.

23.9 Service orders (SO)

Not Applicable

23.10 Alarms (AL)

23.10.1 New/modified directories

Not Applicable

23.11 Command interface (CI)

23.11.1 New/modified commands

Not Applicable

23.12 Operational measurements (OM)

Not Applicable

23.13 AMA/Billing information (AM)

23.13.1 New/changed AMA/billing information

Not Applicable

23.14 Software optionality control (SOC)

Not Applicable

23.15 Glossary

Term	Description
ASN	Abstract Syntax Notation
DMS	Digital Multiplex System
DN	Directory Number
ICM	Intelligent Call Management
IP	Internet Protocol
ROSE	Remote Operation Service Element
SCAI	Switch Computer Application Interface
TCP	Transmission Control Protocol

23.16 References

None

24: Functional description (FN)

24.1 Feature name

AT.59022498 Extended Ringing to External IP

24.2 Description

24.2.1 Overview

After receiving an O_No_Answer (O_NoA) query or T_No_Answer (T_NoA) query from the Service Switching Point (SSP) for a given call, the Service Control Point (SCP)/Adjunct can return a Send_To_Resource (STR) message. As a Response message, STR can play an announcement to the originator. As a Conversation package, it can play an announcement and collect digits.

ExtendedRinging parameter can be included in the STR message. Extended Ringing functionality allows a service provider to continue to offer the call to the called party, while playing an announcement/collecting digits to/from the originator. When the called party answers, the announcement played to the calling party is cancelled and a connection between the calling and called party is made.

This activity will implement the support for Extended Ringing capability when a resource external to the SSP -- an Intelligent Peripheral (IP) -- is required to play announcements and/or collect digits for O_NoA as well as T_NoA triggers and events.

Also, this activity will enhance the Extended Ringing capability when the resource is internal to the SSP, by providing support for T_NoA triggers and events, in addition to the O_NoA triggers and events internal STR currently supports. When the resource is internal, the DMS-100 plays an announcement or a tone to the originating party and collects digits.

24.2.2 Terminology

AR:	Analyze_Route
Calling Party:	The originating agent that caused the O_NOA query to be sent.
Called Party:	The terminating agent, that is applied ER, if applicable.
CI:	Collect_Info
ER:	Extended Ringing
External STR-ER:	Refers to STR with extended ringing to external IP.
FC:	Forward_Call
IP	Intelligent Peripheral
Internal STR-ER:	Refers to STR with extended ringing using internal resources.
O_NOA:	Refers to both the trigger and event for Originator-No-Answer, unless otherwise specified.
STR:	Send-To-Resource
T_NOA:	Refers to both the trigger and event for Terminator-No-Answer, unless otherwise specified.

24.2.3 Functional Description

The SCP can request the 'Extended Ringing' capability of the SSP, by simply including the parameter in the STR response message. This parameter indicates to the SSP, that it should continue alerting the called party, while the caller is connected to an announcement and prompted for digit collection during STR processing.

When the *DestinationAddress* parameter is in the STR message then the announcement and/or digit collection should be applied using external resources. The absence of parameter *DestinationAddress* in the STR message implies that the STR request is to be processed using the resources internal to the SSP.

24.2.3.1 Internal STR-ER

The support for Extended Ringing capability when *DestinationAddress* is NOT present within the STR message has been done in NA12 under ACTID 59006320, AIN Extended Ringing. Currently, 59006320 AIN Extended Ringing does not support T_NoA triggers and events. This feature will provide Extended Ringing capability when the *DestinationAddress* is NOT present within the STR message for T_NoA triggers and events.

For Internal STR-ER, the STR message must be received in a Conversation package. Otherwise, ER functionality is ignored, the STR is processed as usual, and a non-fatal unexpected parameter application error is detected. When the STR message is received in a Conversation package, the STR request can include digit collection. In this case, the SCP can request a specified tone, a standard announcement, or a custom announcement to be played prior to digit collection. This prompt can be non-interruptible (played to completion before allowing any digit collection), or interruptible (the prompt is interrupted upon the receipt of the first digit).

24.2.3.2 External STR-ER

For External STR-ER, the STR message must be received in a Conversation package, specifically, in response to an O_NoA query or a T_NoA query. Otherwise, ER functionality is ignored, the STR is processed as usual, and a non-fatal unexpected parameter application error is detected.

The *FlexParameterBlock* and *DestinationAddress* parameters only exist for External STR-ER:

FlexParameterBlock: The *FlexParameterBlock* is a field of the *STRParameterBlock* which simply contains data which is sent directly to the IP.

DestinationAddress: The Destination Address is the DN of the IP. It routes to the IP much the same way as an AnalyzeRoute routes to a regular DN.

For External STR-ER, a connection is made to an IP in order to play announcements and/or collect digits. The calling party interacts with the service on the IP rather than the SSP. Interactions between a SSP and the IP use Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), NI-2 variant.

The variant of the PRI link is specified in Table LTDEF (LTCLASS=PRA, VARIANT=NIPRI, ISSUE= NI2V1). The PRI to be used for External STR-ER connections must be provisioned for the AIN_IPI_STR option in table LTDATA. When the PRI variant is not NI-2 or when option AIN_IPI_STR is not present in table LTDATA than a Resource_CLEAR with ClearCause=Abort message is sent to the off-board processor.

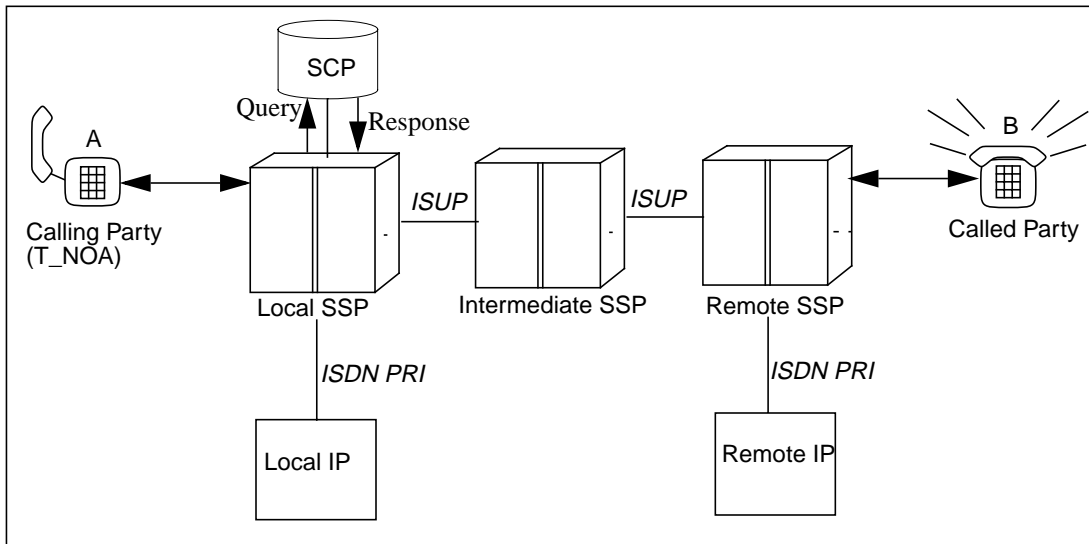
External STR-ER uses ISDN translations during response processing. It is necessary to ensure that the tables RCNAME and RTECHAR are properly datafilled. See AIN SE Service Implementation Guide: “Datafilling for toll-free service, “ or “Overview of AIN response translations”.

The SSP that encountered the trigger and received the request from the SCP to establish an STR-connection is referred to as the **local SSP**. The IP that is requested by the SCP may or may not have a direct PRI link to the local SSP:

- In a **local IP** configuration, the IP is connected to the switch which is triggering.
- If the IP is connected to a switch other than the one which is triggering, then it is referred to as a **remote IP**.
- The SSP that has a direct PRI connection to the remote IP is referred to as the **remote SSP**.

The connection between the local (triggering) SSP and the remote SSP, optionally through intermediate SSP(s), is ISUP. The following figure shows the External STR-ER topology with a local IP and a remote IP.

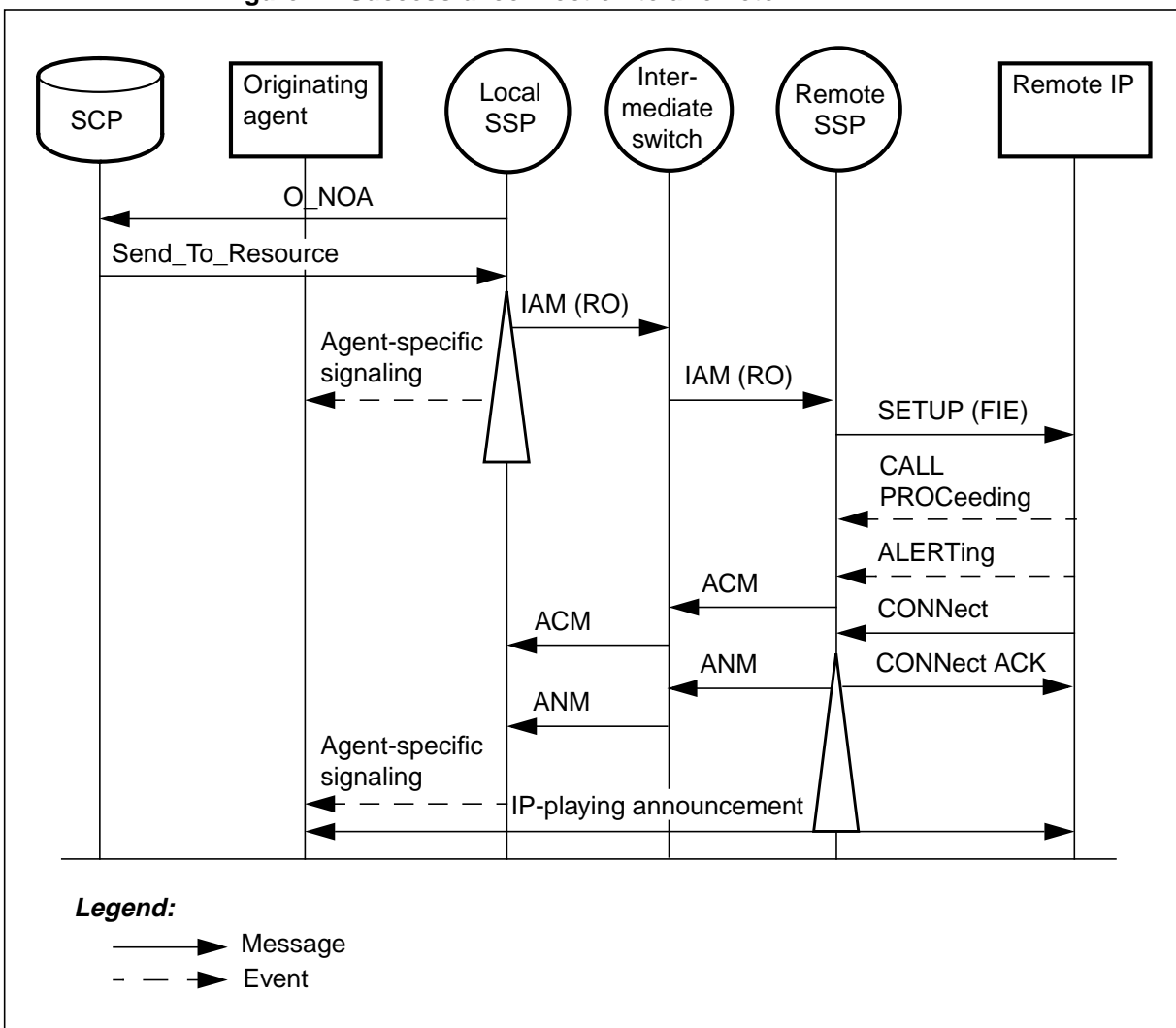
Figure 1 Example of External STR-ER Topology with local IP and remote IP



24.2.3.3 STR Connection to a remote IP

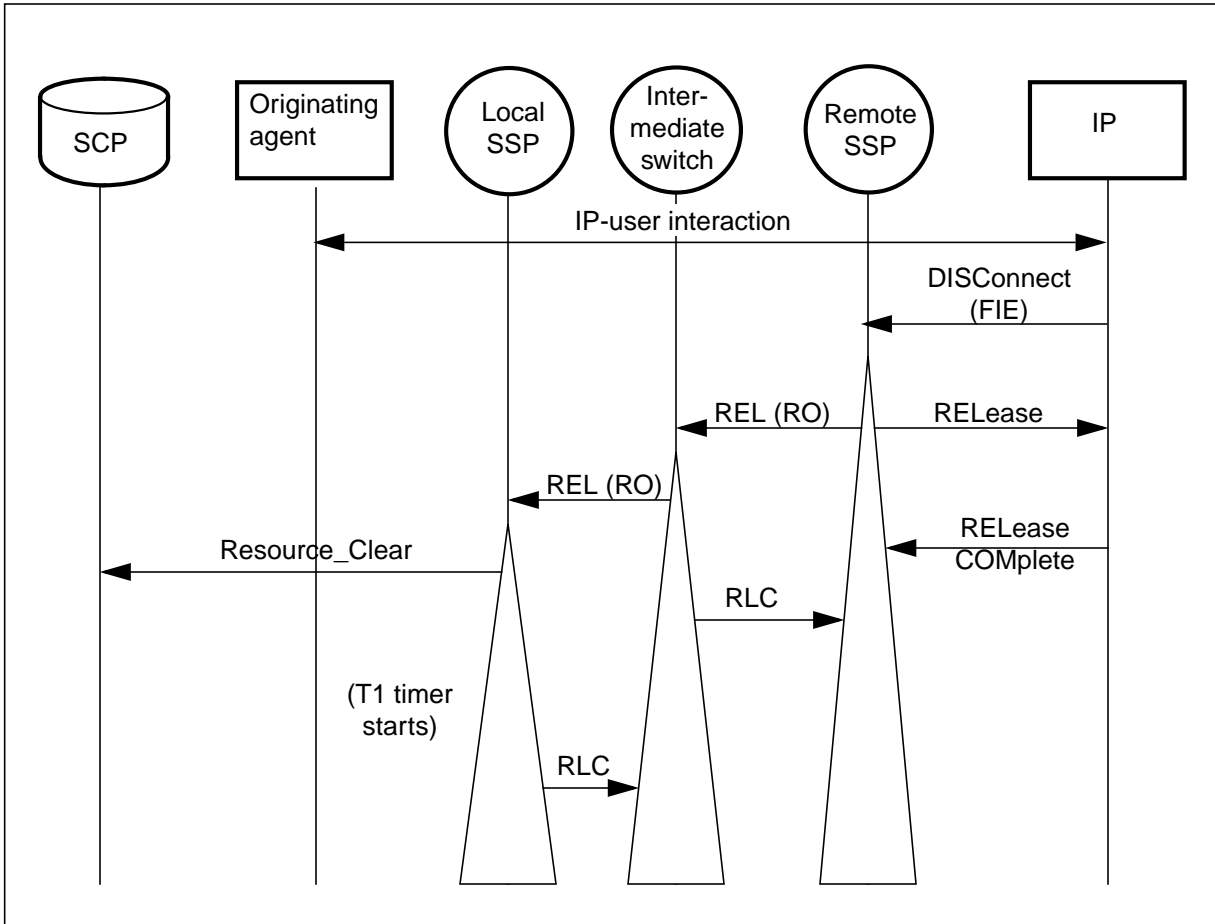
In the following scenario the local SSP receives a STR with the *DestinationAddress* of a remote IP. The following figure shows the valid D-channel signaling between the remote SSP and the remote IP and is taken from the AIN Service Implementation Guide.

Figure 2 Successful connection to a remote IP



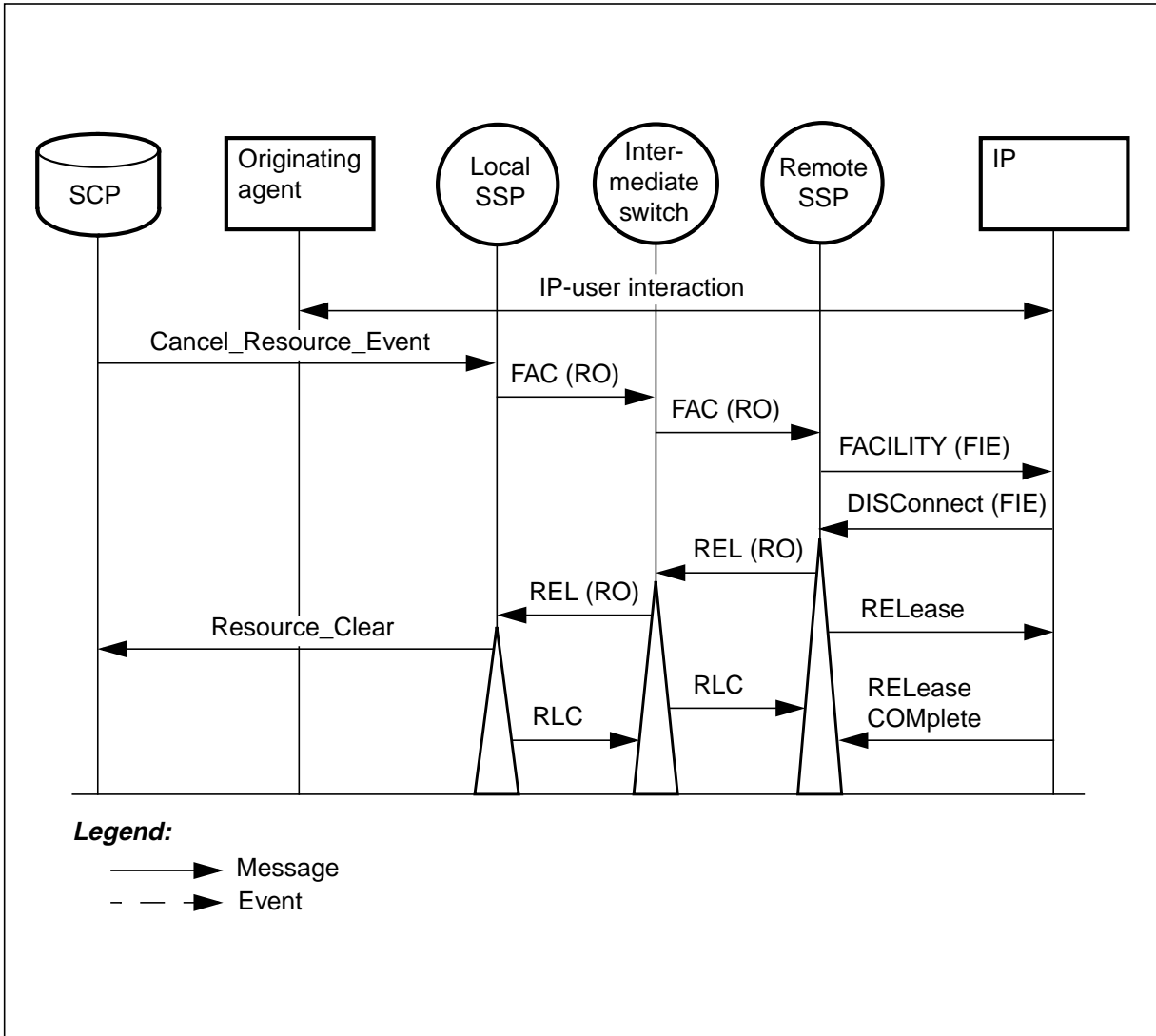
In the following scenario the remote IP starts a normal disconnect. The message flow for the remote IP (initiating normal disconnect and passing final information to the remote SSP) is the same as the message flow for a local IP initiating normal disconnect and passing final information to the local SSP

Figure 3 Successful release from a remote IP



When the local SSP receives a Cancel_Resource_Event message, while the IP and the user are interacting, it sends an ISUP FAC message, containing an RO parameter with the “CancelIPResource” Operation Code, indicating the desire to disconnect the remote IP.

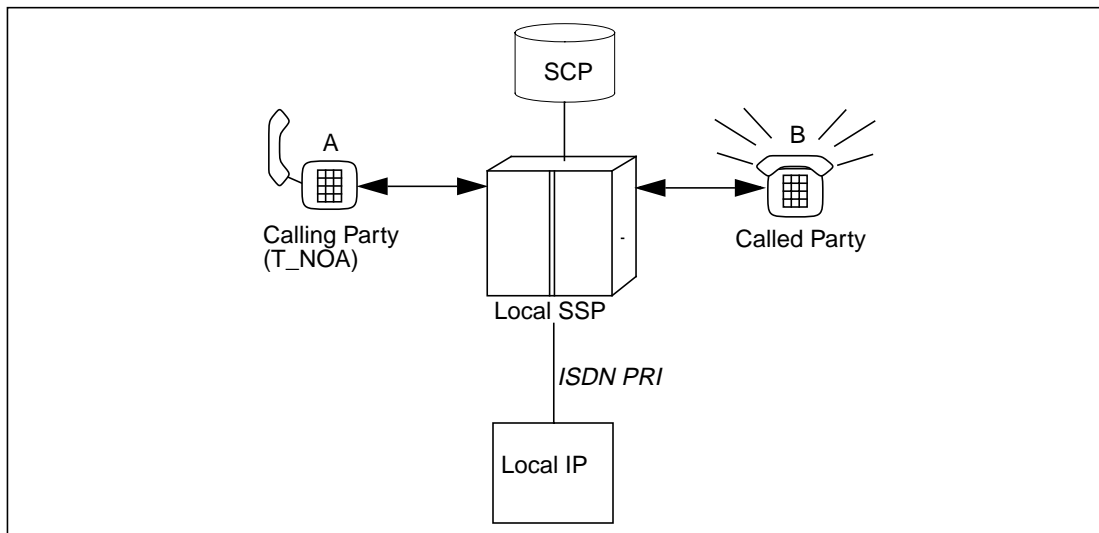
Figure 4 Local SSP initiated clearing of STR connection to remote IP



24.2.3.4 STR connection to a local IP

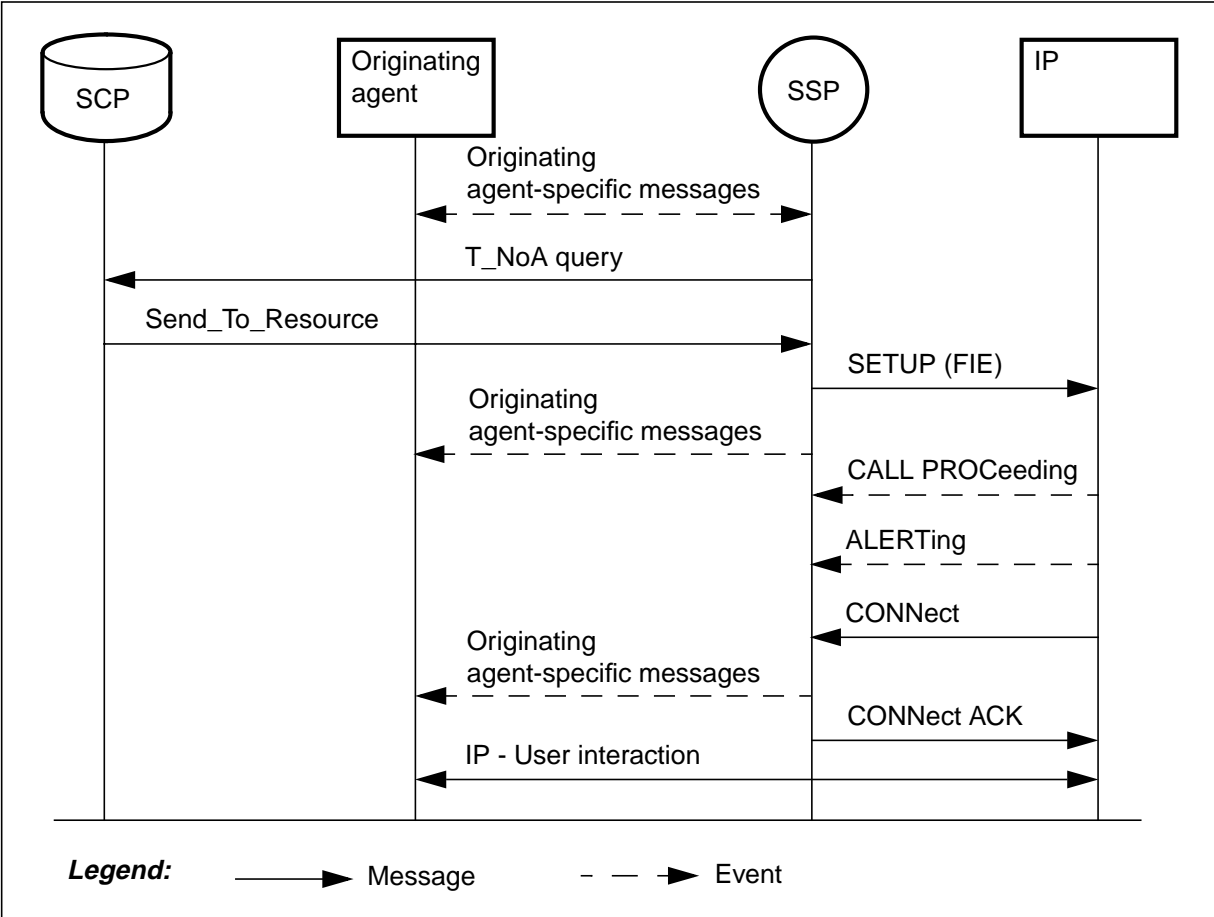
This figure shows the External STR-ER topology with only a local IP. The IP that is requested by the SCP has a direct PRI link to the local SSP

Figure 5 External STR-ER Topology with Local IP



The following scenario describes how STR connection is established between the SSP and Local IP.

Figure 6 Establishing STR connection to a local IP



24.2.4 Event Processing

Table 1 lists the standard events that can be detected during Internal STR-ER processing and External STR-ER processing.

Table 8 Event handling

	Event	Action	Query
1	Called party goes off-hook.	Connect the calling and called parties.	ONoa, TNoa
2	Calling party abandons.	Release the call and stop STR processing.	ONoa, TNoa
3	Analyze_Route message received in response to Resource_Clear.	Release the called party and process the Analyze_Route response message.	ONoA
4	STR message (with no <i>ExtendedRinging</i>) is received in response to the Resource_Clear.	Release the called party, and process the STR response message.	ONoa, TNoa
5	STR message (with <i>ExtendedRinging</i>) received in response to the Resource_Clear.	Continue extended ringing on called party, and process the STR response message.	ONoa, TNoa
6	Continue message received in response to the Resource_Clear.	Connect the calling and called parties.	ONoa, TNoa
7	Collect_Info message received in response to a Resouce_Clear	Release the called party, and process the Collect_Info response message.	ONoA
8	Forward_Call message received in response to a Resouce_Clear	Release the called party and process the Forward_Call response message.	TNoA

1. If the called party goes off-hook, the called and calling parties are connected. The SSP discards any buffered digits (obtained during digit collection for Internal STR-ER case) and in both cases returns a Resource_Clear with ClearCause = 'calledPartyAnswered'.
2. If the calling party abandons or exits the call, the call is released. The SSP returns a Resource_Clear with ClearCause = 'userAbandon'.
3. If the SCP responds to the SSP's Resource_Clear with an Analyze_Route response message, the SSP releases the called party, and re-routes the call based on the data obtained from the Analyze_Route response message.

-
4. If the SCP responds to the SSP's Resource_Clear with a new STR response message with no *ExtendedRinging* parameter, the SSP releases the called party, and applies the new STR processing to the calling party. Note, once a STR response message is received in a TCAP transaction without the *ExtendedRinging* parameter, for a call to a given party, the SSP ignores subsequent extended ringing requests that would apply to the same called party. However, if an *ExtendedRinging* parameter is received in a STR response message for a new called party, in the same extended transaction, then the request is processed by the SSP.

For example, when the initial STR in response to the O_No_Answer message is followed by an Analyze_Route message, and the new destination encounters the O_No_Answer event; if a STR message is received in response to the O_No_Answer EDP_Request message, that new STR response message can include the *ExtendedRinging* parameter, and ER functionality would be re-invoked.

5. If the SCP responds to the SSP's Resource_Clear with a new STR response message that contains an *ExtendedRinging* parameter, the SSP continues to provide ER functionality (station ringing to the called party) while processing the new STR response. This continues for all consecutive STR response messages as long as they contain the *ExtendedRinging* parameter, the called party does not answer, and the calling party does not hang up. If any subsequent STR response message does not contain this parameter, the called party is released from the call, and the response is processed without ER functionality.
6. If the SCP responds to the SSP's Resource_Clear with a Continue response message, the called and calling parties will be connected. The SSP continues to provide station ringing to the called party, and will re-apply audible ringing to the calling party.
7. When the SCP response to the SSP's Resource_Clear with an Collect_Info response the called party is released, while the call gets routed based on the data obtained from the Collect_Info response message.
8. If the SCP responds to the SSP's Resource_Clear with an Forward_Call response message, the SSP releases the called party, and re-routes the call based on the data obtained from the Forward_Call response message.

The diagram shown in Figure 7 illustrates message handling based on the type of response received from the SCP.

Figure 7 Response handling flow diagram for External STR-ER

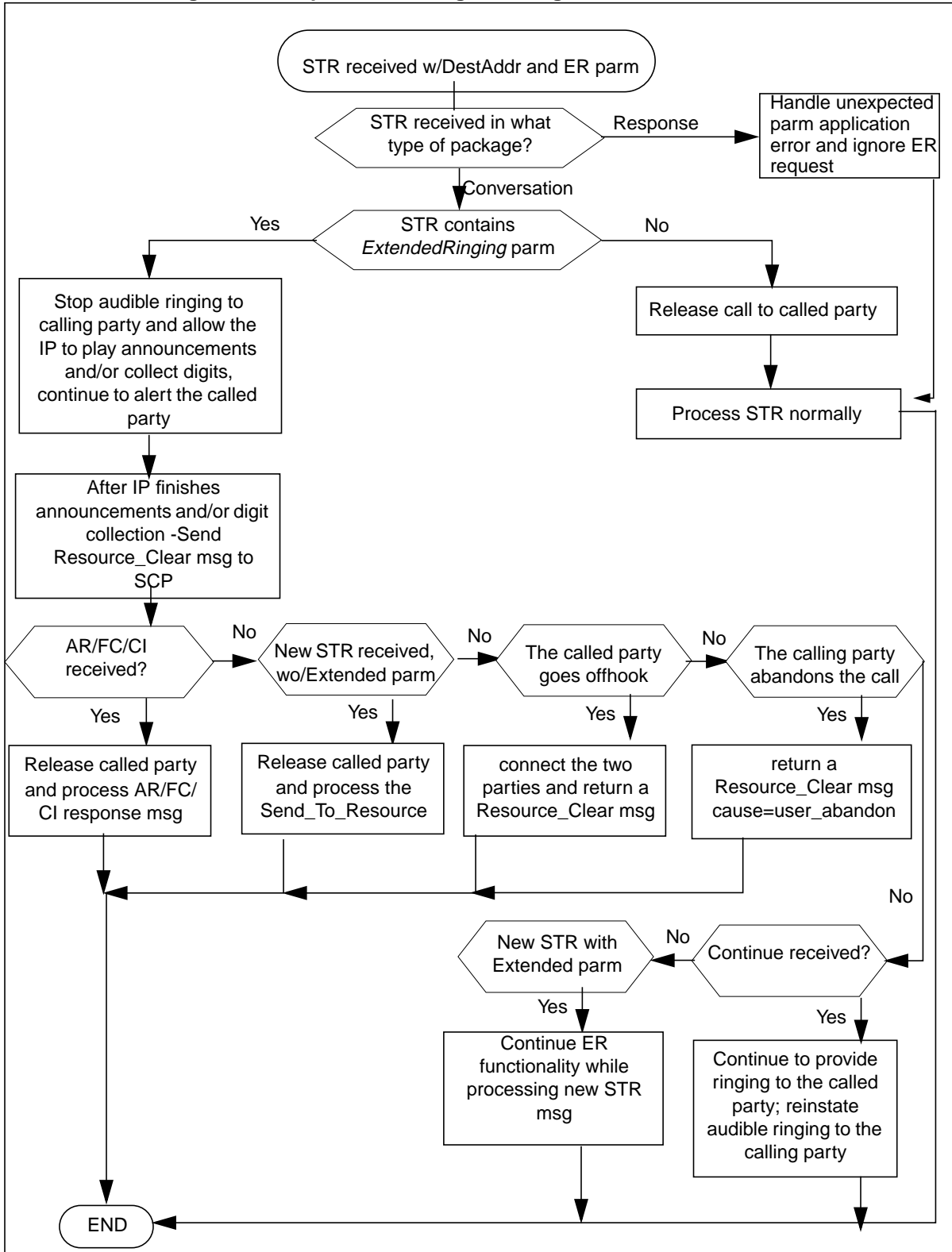


Table 2 lists the error conditions that can be detected during ER processing:

Table 9 Error handling

Error		Action
1	The <i>ExtendedRinging</i> parameter is contained in an STR response message that is received in a Response package.	The SSP detects a non-fatal unexpected parameter application error.
2	The <i>ExtendedRinging</i> parameter is contained in an STR response to a query other than O_No_Answer and T_No_Answer.	The SSP ignores the Extended Ringing request, processes the STR response.
3	The SSP receives a STR response message, but is not able to process the message because of the unavailability, busy state, or failure of SSP hardware or switch resources.	The SSP sends a Resource_Clear with ClearCause = "Failure" and with FailureCause = "unavailableResources" and waits for a response from the SCP. The SSP continues to apply ringing to called party, and waits for further instructions from the SCP.
4	NOTE: For Internal STR-ER only: The SSP detects a digit collection time-out, or an invalid digit string is received when the SSP is collecting "normal number of digits".	The SSP continues ringing the called party, sends a Resource_Clear with ClearCause = "invalidCode", and waits for further instructions from the SCP.
5	The SSP receives a Conversation package with a STR message and the ResourceType = "Play Announcement".	The SSP processes the STR message as a Play Announcement request, ignores Extended Ringing, and detects a non-fatal unexpected communication error.
6	The AIN T1 response timer expires while waiting for a response for the Resource_Clear message, since the SCP has not responded to the SSP.	The SSP re-connects the calling and called parties; continues to provide station ringing to the called party, and re-applies audible ringing to the calling party.
7	The SCP sends a Cancel_Resource_Event message.	The SSP stops the announcement, sends a Resource_Clear in a Conversation package with the ClearCause = "resourceCancelled", continues to apply ringing to called party, and waits for further instructions from the SCP.
8	The SCP sends a Cancel_Resource_Event message when not expected.	The SSP treats the message as a fatal unexpected message error; re-connects the calling and called parties, continues to provide station ringing to the called party, and re-applies audible ringing to the calling party.

24.2.5 Scenarios

The following scenarios help illustrate how the External STR-ER interaction is handled.

24.2.5.1 External STR-ER scenario: called party answers

When the SSP receives a `Send_To_Resource` message with `Extended Ringing` parameter in response to a `O_NoA` or `T_NoA` query, the called party continues to receive ringing, while the calling party is connected to an announcement through an IP. If during announcement, the called party answers, the announcement is taken down, the calling and called parties are connected, and a `Resource_Clear` message with `Cause=calledpartyanswer` is send to SCP.

24.3 Hardware requirements

This activity requires PRI trunks in order to connect the SSP to an IP.

24.4 Limitations and restrictions

- The `Extended Ringing` capability is supported for the `AIN O_NoA` and `AIN T_NoA` trigger and events. No other triggers or events are supported.
- According to GR-[1061] and GR-[1072], we should send a `Cancel_Resource` message towards IP to take down the IP connection. This means that the SSP should wait for a `DISConnect` message from the IP. However, this feature will continue to be non-compliant with this requirement, as had been previously done.
- The `Extended Ringing` capability is not supported when interacting with conferencing features (e.g., 3WC).
- The `Extended Ringing` capability continues the limitation found with the `AIN Extended Ringing (Internal STR)` feature with `Call Forward` flavors: e.g., for `O_NoA`, all call forwarding is completed before `STR` message is processed with the `AIN ExtendedRinging` parameter. For `T_NoA`, whichever timer expires first (`T_NoA` or `CFDA`), that feature will be processed, the other feature will be cleaned up.

24.5 Interactions

The ER functionality sustains the same level of feature interactions that were introduced by the `O_No_Answer EDP` activity (AJ4099) in NA007, by the `O_No_Answer TDP A59013226` activity in NA013. Please refer to these activities for more information. In addition, the ER feature does not modify any existing `AIN 0.2` precedences between `O_NOA` with respect to other events or triggers. Table 3 describes the additional behavior and interactions introduced by ER.

Table 10 Extended Ringing Feature Interactions

Feature	Description
<p>Automatic Call Back (ACB)</p> <p>Automatic Recall (AR)</p> <p><i>(AIN interaction with ACB/AR is provided through SOC: AIN00018)</i></p>	<p>ACB</p> <p>The ACB feature allows a subscriber to re-dial the last station that the subscriber called, and be queued against that station if it's busy. O_NOA or T_NoA encountered on the call (pre-ACB) has no influence on ACB.</p> <p>AR</p> <p>The AR feature allows a subscriber to recall the last station that called. O_NOA or T_NOA encountered on the original call (pre-AR) has no influence on AR.</p>
<p>Basic Rate Interface (BRI) specific Features</p> <ul style="list-style-type: none"> • Additional Call Offering Unconditional (ACOU), • Flexible Call (FC) 	<p>ACOU</p> <p>The ACOU feature is assigned to a Directory Number (DN) on a Basic Rate Access Functional Set (BRAFS) terminal to allow incoming calls to be presented to idle Additional Functional Call (AFC) keys when the single functional call (SFC) key is not available. A call that is routed to a line subscribed to ACOU can encounter O_NOA or T_NOA and invoke ER functionality when applicable.</p> <p>FC</p> <p>Flexible calling (FC) is a set of capabilities that allow ISDN users to establish and control two or more concurrent calls.</p> <p>Establishing a conference call during STR response processing deactivates ExtendedRinging functionality.</p>

Feature	Description
<p>Class Features</p> <ul style="list-style-type: none"> • Anonymous Call Rejection (ACRJ), • Selective Call Acceptance (SCA), • Selective Call Rejection (SCRJ) • Calling Name Delivery Blocking (CNAB) • Calling Number Delivery Blocking (CNDB) • Calling Number Blocking (CNB) • Calling Number Delivery (CND) • Calling Name and Number Blocking (CNNB) • Calling Name and Number Delivery (CNND) • Dialable Directory Number Delivery (DDND) • TCAP Name Delivery (TCAPND) 	<p>ACRJ - SCA - SCRJ</p> <p>Detection of O_NOA is based on the state of the line after the processing of ACRJ, SCA, or SCRJ. If the state is ringing, O_NOA is encountered, the STR/IP response message is processed, and ER is invoked, if applicable. T_NoA trigger is not detected when the call is rejected by this feature.</p> <p>CNAB - CNDB - CNB - CND - CNNB - CNND - DDND - TCAPND</p> <p>O_NOA & T_NOA has no impact on the delivery of display information on originating and terminating agents.</p>
<p>Call Blocking</p>	<p>When Call Blocking is activated on a line, any incoming call is sent to treatment. As a result O_NOA & T_NOA is not encountered.</p>

Feature	Description
<p>Redirecting Features</p> <ul style="list-style-type: none"> • Call Forward Programmable (CFWP) with Validation and/or courtesy • Call Forward Universal (CFU) • Call Forward (CFW) • Call Forward Busy (CFB) • Call Forward Busy Line (CFBL) • Call forward Don't Answer (CFD/CFDA/CFGD) • Selective Call Forwarding (SCF) • Call Forward Timer (CFT) 	<p>CFWP</p> <p>O_NOA can be encountered, and ER applied, while the forwarded DN is ringing during use of CFWP. CFWP behavior is not affected by ER functionality.</p> <p>Call forwarding variants that are not based on Busy/No_Answer conditions have precedence over T_NOA.</p> <p>CFDA/CFD</p> <p>Onoa</p> <p>Inter-switch: since the trunk to the terminating party is seized, any forwarding that occurs at the terminating side is transparent, and as such Extended Ringing is provided.</p> <p>Intra-switch: When the AIN ExtendedRinging SOC option is turned ON, the interaction between O_NOA and CFDA/CFD is modified to ensure that O_NOA occurs after call forwarding occurs. The interaction follows.</p> <p>If CFD/CFDA is detected on the terminator's line, both O_NOA and CFD/CFDA timers are compared. If the call forwarding timer is less than the O_NOA timer (by at least 2 seconds) the CFD/CFDA feature will be invoked followed by O_NOA, and ER would be applied. However, if the call forwarding timer is greater than or equal to the O_NOA timer, then the O_NOA timer would be delayed by the CFD/CFDA timer + 2 seconds. This would allow the CFD/CFDA feature to be invoked first, followed by ER.</p> <p>Tnoa</p> <p>When CFD/CFDA and T_NOA triggers are present at the terminating end, the feature that has the shortest no-answer timer has precedence.</p> <p>If CFD/CFDA timer is shorter than T_NOA timer, the T_NOA trigger will be cancelled . If the T_NOA timer is shorter than CFD/CFDA timer, CFD/CFDA feature will be cancelled.</p> <p>CFGD</p> <p>After the call is forwarded by CFGD, in case INTERNAL=YES, when the Extended ringing SOCs are ON, if the terminator doesn't answer, ONOA trigger/event timer is reset to CFGD timer +2 seconds when CFGD timer expires. O_NOA can be hit only when the call is terminated on the last member of hunt group. When STR/IP with ER is received, ER is applied the terminator.</p> <p>The interaction between CFGD & T_NOA is unsupported.</p>

Feature	Description
	<p>CFW Validation (CFWVAL) For CFWVAL with termination validation, the call can encounter O_NOA or T_NOA and when a STR/IP message is received with ER, ringing is provided to the called DN. When the called DN answers, the programming succeeds (for example, validation passes). The called DN is not programmed (for example, validation fails) when a STR/IP message is received with no ER parameter.</p> <p>Call Forward Timer (CFT) These options (CFTD or CFTB) can be added to lines which are already having CFD or CFB on it respectively. So the interaction will be same as for CFD and CFB with O_NOA & T_NOA.</p> <p>Others For other call forwarding features, the call is forwarded immediately, therefore ER would be applied to the forwarded DN, if applicable.</p>
<p>Called Number Display Called Name Display</p>	<p>The Called Number/Name displayed on the caller's station is not overwritten when the call encounters O_NOA with ER functionality.</p>
<p>Conference features</p> <ul style="list-style-type: none"> • Three-Way Call (3WC) • Usage sensitive 3WC (U3WC) • Call Transfer (CXR) 	<p>3WC/U3WC The 3WC/U3WC feature allows a subscriber/user to establish two speech calls and to join them in a conference. Assuming O_NOA or T_NOA is encountered during the process of establishing a second leg. If STR/IP with ER message comes as a response from SCP, the STR/IP will not be processed & a resource_clear with clear_cause "ABORT" is sent to SCP.</p> <p>CXR Call transfer allows a subscriber to connect an existing call with a new party. Trigger O_NOA or T_NOA can only be hit before the controller transfers the call. This trigger cannot be hit once the call transfer subscriber leaves the call.</p> <p>While the call is connected to the IP, the call cannot be transferred. All transfer attempts are ignored.</p>

Feature	Description
Call Pickup (CPU) Directed Call Pickup (DCPU)	<p>CPU-DCPU</p> <p>This is similar to an answer (but from a different terminating agent) which is transparent to the originator. Call pick up is a terminator feature. When a call is made to one of the members in a pick-up group, anyone in the CPU group can pick-up the call by dialing an access code.</p> <p>If O_NOA or T_NOA is invoked during the ringing stage & STR/IP with ER is received in the response, ER is applied. When a different terminating agent (agent having CPU) answers, a resource clear message with clear_cause "Called party answered" is sent to SCP & the agents are connected.</p>
Call Waiting Features <ul style="list-style-type: none"> • Call Waiting(CWT) • Call Waiting Intra-group (CWI) • Cancel Call Waiting (CCW) 	<p>CWT/CWI</p> <p>O_NOA or T_NOA is detected and ER functionality applies when the call terminates on an agent that has subscribed to CWT or CWI. The CWT or CWI subscriber will hear the alerting tone and is able to hook-flash (placing the current call on hold) to accept the new call.</p> <p>CCW</p> <p>O_NOA or T_NOA is not detected; ER is not applicable if the terminator has invoked CCW, since the line is considered busy.</p> <p><i>Note: The Extended Ringing feature does not modify the support of call waiting on the calling party. That is, if the calling party is in an audible ringing, play announcement or collect digit state, the calling party will not be alerted of an incoming call, and the incoming caller will receive busy treatment.</i></p>
Default Routing	<p>The AIN Default Routing feature, when active, dictates how to handle the call (depending on datafill, it sends the call to a treatment, an announcement or re-routes it to another DN) after encountering an expired AIN T1 response timer or a return error message from the SCP.</p> <p>This feature is not supported by both O_NOA & T_NOA.</p>
Dual Line Call Management (DLCM)	<p>DLCM allows for two distinct lines, usually located on the same premise to be linked. As a result, a call directed to a specific line can be answered on the associated line, which could then, in turn, be held and retrieved on the specific line. Simultaneous ringing, call hold, and call pick-up functionality is provided through DLCM. (Note, the DLCM feature is not activated when the called line is busy.)</p> <p>DLCM interacts with O_NOA or T_NOA when both lines don't answer. ER functionality is invoked if applicable.</p>
Distinctive Ringing / Call Waiting (DRCW)	<p>When the DRCW feature is activated on a line, calls incoming from DNs listed on the subscriber's DRCW list, are identified by a distinctive ring or tone pattern (a distinctive ring if the line is idle, or a tone if the line is busy). ER functionality will be invoked if applicable.</p>

Feature	Description
Hook Flash	Hook Flashes attempted during the processing of the STR/IP response are ignored.
Multiple Appearance DN (MADN)	There are two flavors of MADN: SCA and MCA. From O_NOA's & T_NOA's point of view, there is no difference in interaction. When an O_NOA or T_NOA agent calls a MADN group, all group members are alerted and are continued to be alerted when O_NOA or T_NOA is encountered, and a STR/IP with ER is received.
<p>Messaging Features</p> <ul style="list-style-type: none"> • Access to Messaging or Special Delivery Service (SDS) • In-Session Activation (ISA) 	<p>SDS</p> <p>The AIN O_No_Answer & T_NOA events and triggers have precedence over SDS. SDS will be permanently deactivated when the O_Noa trigger or event is detected.</p> <p>But SDS can be invoked when a continue message is sent by the SCP for the T_NOA trigger or EDPR.</p> <p>ISA</p> <p>The AIN O_No_Answer & T_NOA events and triggers have precedence over ISA. These switch-based features are deactivated permanently in case of O_NOA & T_NOA events.</p> <p>In addition, following receipt of an STR/IP message, the SSP will send a Resource_Clear message once STR/IP processing is complete. Even if a Continue message is received in response to this Resource_Clear message, the ISA or SDS features are not invoked.</p>
Spontaneous Call Waiting Identification (SCWID) and Deluxe SCWID (DSCWID)	<p>SCWID</p> <p>SCWID is used to display the calling name and number on incoming call-waited calls. The Interaction of SCWID with ER is supported in the same way as CWT.</p> <p>DSCWID</p> <p>DSCWID, gives the subscriber the ability to manipulate the incoming call-waited call. The subscriber can select one of the following sub-options:</p> <ol style="list-style-type: none"> 1. Hold call, 2. Answer call, 3. Forward call, 4. Drop call, 5. Conference call, or 6. Busy call. <p>The ER feature applies (when applicable) to a DSCWID subscriber, until the subscriber selects one of the DSCWID disposition options.</p> <p>When an option is selected, ER handles the call in the same way as if the Called Party Answered. The calling and called party are re-connected, ER is removed, and DSCWID takes control of the call.</p>

Feature	Description
Simultaneous Ringing (SimRing)	<p>Simultaneous ringing (SimRing) allows a pre-defined group of up to 5 directory number (DNs) to be alerted simultaneously when a specific member of this group, referred to as the pilot DN (PDN), is called. The first alerted DN that answers the call is connected to the calling party, while calls to other member DNs are released.</p> <p>When ER is encountered on the first call leg (for example, originator to Pilot DN), all members of the group will continue ringing. When ER is encountered on the second call leg (for example, Pilot to NPMDN call leg) it is ignored.</p>

24.6 Logs (LG)

24.6.1 New/modified logs

No existing logs are modified, and no new logs are created.

24.7 Data schema (DS)

24.7.1 New/modified tables

No changes.

24.8 Office parameters (OP)

24.8.1 New/modified office parameters

No existing office parameters are modified, no new office parameters are created.

24.9 Service orders (SO)

No changes.

24.10 Alarms (AL)

24.10.1 New/modified directories

Not applicable.

24.11 Command interface (CI)

24.11.1 New/modified commands

No changes.

24.12 Operational measurements (OM)

24.12.1 New/modified OM groups

No existing OMs are modified, and no new OMs are created.

24.13 AMA/Billing information (AM)

24.13.1 New/changed AMA/billing information

No new/changed AMA/billing information.

24.14 Software optionality control (SOC)

SOC gives the service provider the ability to turn the ER functionality ON/OFF through the ON/IDLE states respectively.

When the ER SOC is set to IDLE and the ExtendedRinging parameter is received in an STR response, the parameter is ignored and the STR is processed as usual.

If the SOC state is switched from ON -> IDLE, calls in progress that are using ER functionality will be allowed to continue. However, any new call that attempts to invoke, or any call in progress that attempts to re-invoke ER functionality is not allowed; the ER request will be ignored, and the STR response is processed as usual.

In addition, if the SOC state is switched from IDLE -> ON, any new call attempting to invoke ER functionality will be allowed, if ER is applicable.

Existing SOC option AIN00263 AIN SE R6 ExtndRing parm, for Internal STR-ER feature, will now support T_NoA queries as well as O_NoA queries.

The new SOC option for External STR-ER, AIN00291, will support O_NoA as well as T_NoA queries.

Table 11 SOC

SOC option name:	External STR-ER
SOC option title:	
SOC option control type:	state
New SOC option?	Yes
SOC option order code	AIN00291
Option defined in DRU:	CNA
Affected products:	NA100

24.15 Glossary

Term	Description
RO	Remote Operation
FIE	Facility Information Element

24.16 References

Bellcore GR-1129-Core “AIN GR: Switch - Intelligent Peripheral Interface (IPI)”

AIN SE Service Implementation Guide

25: Functional description (FN)

25.1 Feature name

59022523 - AIN:DP Converter For STR-IP and Collect Info

25.2 Description

This feature provides DP to DTMF Conversion on receiving the DP Converter parameter in the Send_To_Resource / Collect Info messages. DP to DTMF Conversion provides for outpulsing of both the dialed DP digits and the equivalent DTMF tones to the terminator / IP. DPConverter parameter will only be supported for SendToResource messages that contain a valid Destination Address parameter.

The DP Conversion is only supported for line originating agents. Refer to Table 1 for a list of line agents not supported by this feature.

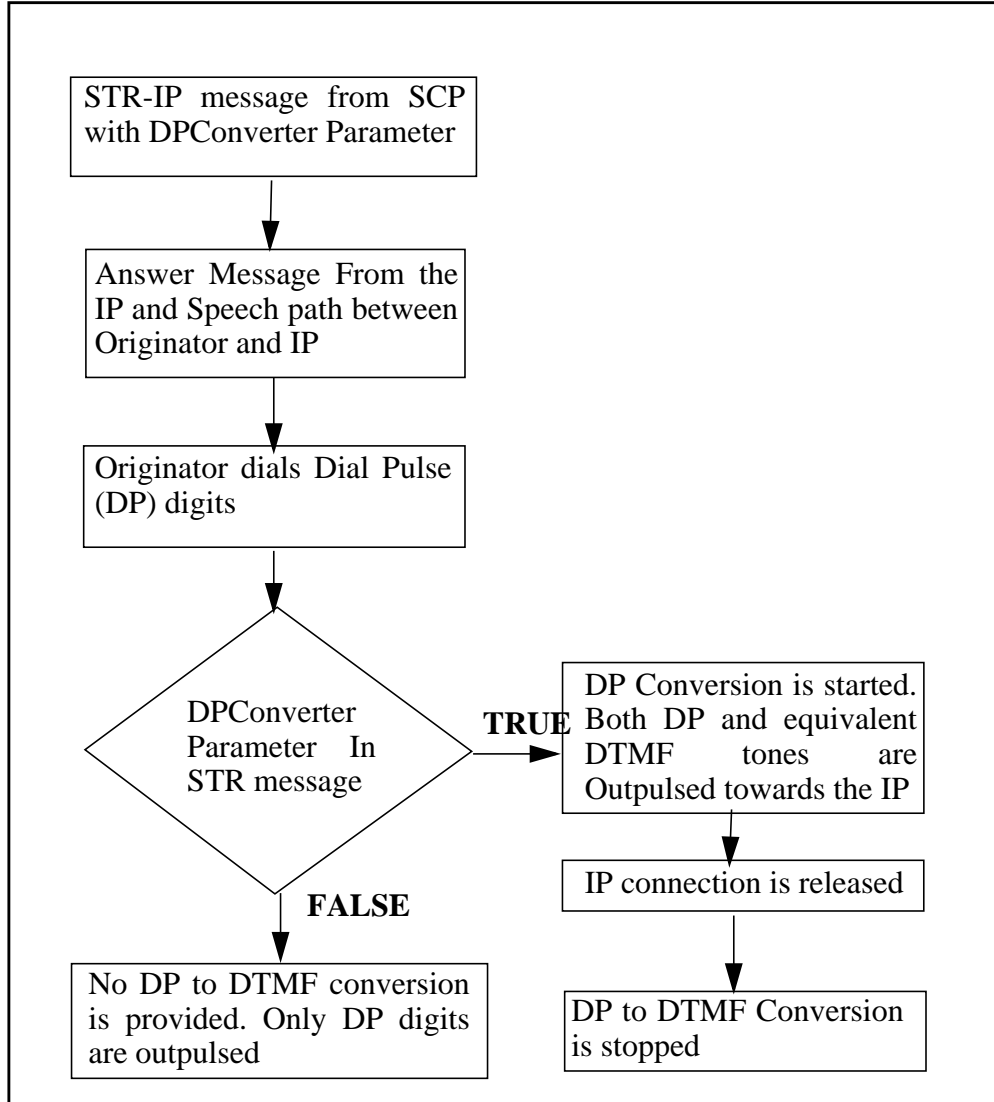
The DP to DTMF digit Conversion can be used for the following scenario:

- The Terminating access is an IP (Intelligent Peripheral) which can process only the DTMF tones which provides a menu driven service using the DTMF digits dialed by the originator. Ex. Telephone Banking, Ticket reservations etc.
- The Originating Line is a DP (Dial Pulse) CPE (Customer Premise Equipment)

25.2.1 DP to DTMF Conversion for STR-IP Conversion

When the SSP receives DPConverter parameter in the Send_To_Resource message, the DP to DTMF digit Conversion is performed only for the duration of the call to IP. Refer to Figure 1.

Figure 1 DP to DTMF Conversion for STR-IP

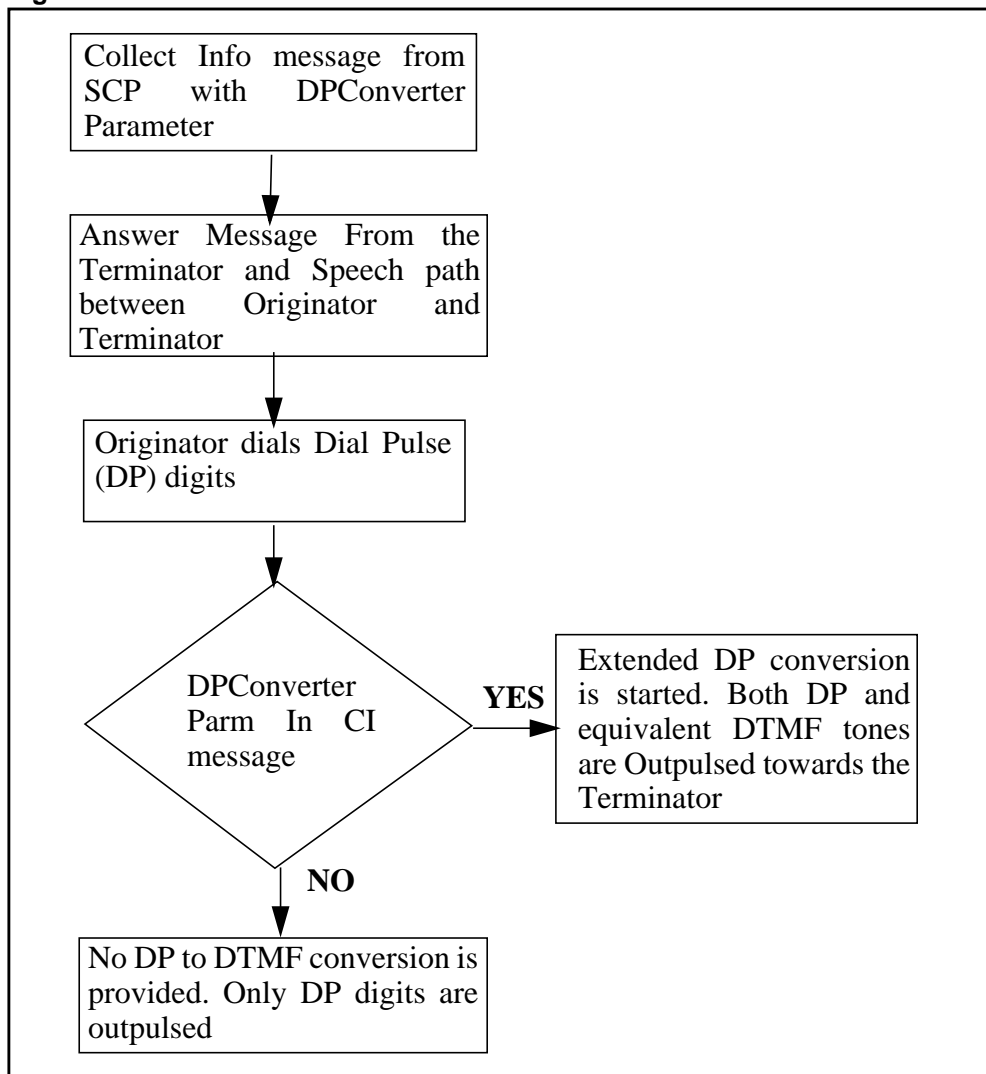


25.2.2 Extended DP to DTMF Conversion for Collect Info

When the SSP receives the DP Converter parameter in the Collect_Information message, the SSP provides the DP to DTMF conversion for the entire duration of the call after the speech path is established between the originator and the terminator. Refer to Figure 2.

When the Collet_Information message with DPConverter parameter set to TRUE is followed by another Collet_Information message with DPConverter parameter set to FALSE then the DP to DTMF conversion is not provided after the speech path is established between the originator and the terminator. The value of the DPConverter parameter in the last Collect_Information message in a call will override the DPConverter parameter in any of the previous Collect_Information messages.

Figure 2 DP to DTMF Conversion for Collect Info



Note: DP to DTMF Conversion is not done during digit collection by the SSP.
 Example: The DP Conversion is not performed during digit collection after the Collect_Info message

25.3 Hardware Requirements

N/A

25.4 Limitations and restrictions

- DP to DTMF Conversion is not Supported for ISDN and KSET line agents. Refer to Table 1 for more details.

Table 1 Originating Agents not supporting DPConverter parameter

Agent Type	Line Class Code
IBN - Basic	M5009
	M5112
	M5208
	M5209
	M5212
	M5312
	PSET
ISDN	ISDNKSET - MTF
	ISDNKSET - BRI - NI1 / NI2

- *Note:* The DP Converter parameter received in the Update message, Connect To Resource and Originate_Call Messages is not supported by this feature.

25.5 Interactions

25.5.1 Conference features

- **Meet-me conference:** Meet-me conference provides a six-port conference bridge and directory number that conference members dial at a specified time in order to hold a conference.preset conference
- **The Preset Conference feature:** Allows an originator belonging to a Centrex Group to dial a specific directory number (DN) that activates the switching office to automatically invoke a simultaneous ringing of a maximum of 25 preselected conference members. The conferees are specified in advance in Table PRECONF (Preset Conference).

- **Executive Conference MMCONF150:** Allows a meet-me conference size of up to 150 participants
- **CNF:** A call cannot be added to a station controlled conference (CNF), six-port conference (CNF6), or super conference (CNF30) conference

Table 2 Interaction with Conference Features

Feature	Interaction with DPConverter
Meet-me conference	When the Collect_Information message received from the SCP/Adjunct contains the DPConverter parameter, then the SSP will provide extended DP to DTMF conversion after the call has been placed into a conference. Both DP and DTMF tones will be audible to all other parties in the conference.
Preset Conference feature	
Executive Conference MMCONF150	
CNF	

25.5.2 Three Way Call

- **3WC:** Three-way calling (3WC) allows a call to be set up among three parties. As a subfeature of 3WC the consultation hold (CH) feature permits the transferring party to talk privately with the party at the transfer destination before actually transferring the call.
- **U3WC:** The usage sensitive three-way calling (U3WC) feature provides the 3WC feature on a pay-per-use basis. The U3WC user is charged each time the 3WC feature is requested instead of being charged a flat rate independent of the number of 3WC activations.

Table 3 Interaction with Three-way calling features

Feature	Interaction with DPConverter
3WC	When a Collect_Information message containing the DP Converter Parameter is received from the SCP/Adjunct in any of the call legs of the Three Way Call, then the SSP will perform extended DP to DTMF conversion for digits received from the originating line after the call has been placed into a conference. Both DP and DTMF tones will be audible to all parties conference to the call. When the Collect_Information message containing the DP Converter Parameter is received from the SCP/Adjunct in the first call leg of a three way call, then the SSP will not perform DP to DTMF conversion for the second leg of the three way call, if DPConverter parameter is not received in this call leg.
U3WC	

25.5.3 Call Waiting

- **CWT:** The call waiting (CWT) feature is a terminating service that informs a busy station user, by a burst of tone, that another call is waiting.
- **CWI:** Call waiting intragroup (CWI) is similar to CWT, but is possible within customer groups only
- **CWC:** Call waiting chaining (CWC) provides the capability to chain together CWT calls to non-controlling CWT parties. When two parties are talking, the party that is offered a second incoming call is the CWT controller and the other party of the established call and the waiting party of the second call are non-controllers.
- **CWO:** The call waiting originating (CWO) feature allows the calling party to impose call waiting on a busy called station.
- **CWD:** Dial - Call Waiting allows the calling party to impose call waiting on a called station by dialing a feature activation code followed by the extension number of the called party. Dial - Call Waiting differs from the call waiting originating feature in that an end user with Dial - Call Waiting must dial an access code followed by the extension number of the called station in order. When the calling party calls a busy IBN line within the same customer group, the caller hears either audible ringing, music, or a recorded announcement. The called party is informed of the incoming call by way of a special tone burst. The tone burst is repeated every 10 s after the first burst.
- **TCW:** Talking call waiting (TCW) is an enhancement to the existing CWT feature. TCW is a separate line option that must be assigned in conjunction with the CWT line option. The TCW feature replaces the tone of the first CWT alerting with an announcement from an offboard platform (service node). Typically, the announcement is composed of the CWT alerting tone immediately followed by an audible announcement of the calling party's name.
- **CWTC:** The call waiting conference (CWTC) feature provides conference functionality to CWT users by providing the capability to join a calling party onto an existing two-party call.
- **CCW:** Cancel call waiting (CCW) is an addition to the CWT feature and provides the CWT subscriber with the ability to disable the CWT feature for the duration of the call. There are two ways of activating CCW, before establishing a call and while in talking state. When activating CCW before establishing a call, the user goes off hook, dials the CCW access code, waits to receive a confirmation tone, and when received, dials the destination number. After the feature is activated, the call continues with normal call processing. When activating CCW while in a talking state, the end user flashes the switch hook, causing the current connection to be placed on hold. A special dial tone is returned and the end user dials the access code. After a 300 ms delay, the original connection is reestablished.

Table 4 Interaction with Call Waiting Features

Feature	Interaction with DPConverter
CWT	When the call is waited on the originating line and a Collect_Information message is received from the SCP/Adjunct contains the DPConverter Parameter, if the originating line flashes to accept the call, then the SSP will not perform DP to DTMF conversion for the corresponding call leg.If the originator flashes again to get connected to the original terminator then the SSP will restore the DP to DTMF conversion for this call leg.
CWI	
CWC	
CWO	
CWD	
TCW	
CWTC	When the Collect_Information message received from the SCP/ Adjunct contains the DPConverter parameter, then the SSP will provide extended DP to DTMF conversion after the call has been placed into a conference.
CCW	There is no interaction with cancel call waiting.

25.5.4 Call Pickup Features

- **CPU:** Call pickup (CPU) permits a station to answer incoming calls for another station in the same pickup group.
- **DCPU:** The directed call pickup (DCPU) option allows a station to answer incoming calls to another station in the same pickup group. The difference with the DPCU option is that the pickup station must dial both the pickup code and the extension of the called/ringing station.
- **DCBU:** Directed call pick up with non barge in (DCBU) allows an IBN station to use directed call pickup (DCPU) to answer a ringing line in the same customer group. The DCBU does not allow the station to barge-in on a line
- **DCBI:** Directed call pick up with barge in (DCBI) permits an IBN station to pick up a ringing line within the same customer group. If the called station answers the call before the instigating party completes the call pickup sequence, the instigating party can barge in to the answered call and be connected to a three-way call.

Table 5 Interaction with Call Pickup Features

Feature	Interaction with DPConverter
CPU	The Call pickup will be treated like an answer. if the Collect_Information message received from the SCP/Adjunct contains the DPConverter parameter, then the SSP will provide extended DP to DTMF conversion after the call has been picked up.
DCPU	
DCBU	

Feature	Interaction with DPConverter
DCBI	If the Collect_Information message received from the SCP/ Adjunct contains the DPConverter parameter, then the SSP will provide extended DP to DTMF conversion after the call has been placed into a conference.

25.5.5 NFA - Network Facility Access

This feature provides Network Facility Access (NFA). This functionality provides a direct connection between a subscriber line and an intelligent processor (IP). This ability provides the subscriber access to services provided directly by the IP. The connection can either be through implicit (auto) access or explicit (dialed) access.

With implicit access, the subscriber is directly connected to the IP simply by going off hook. With this method, the subscriber may interact with the IP, or may revert to regular call processing by dialing as normal.

With explicit access, the subscriber must first dial an NFA explicit access code. Once the connection to the IP is established, the subscriber may then interact with the IP. During this interaction, the subscriber may enter digits for the IP to interpret; if these digits are dial pulse (DP), they are converted to dual-tone multifrequency (DTMF) digits by the DMS before being relayed to the IP. This functionality is called DP Conversion.

NFA provide extended DP conversion for explicit connection. Whenever extended conversion is activated on an explicit connection to an NFA trunk, it will remain in effect throughout both the explicit connection and any call which the IP might dial for the subscriber.

Table 6 Interaction with NFA

Feature	Interaction with DPConverter
NFA explicit Connection	<p>Originating/Terminating Call Model STR-IP interactions</p> <ul style="list-style-type: none"> • When the NFA has started the extended DP conversion and the DPConverter parameter set to FALSE is received in the subsequent STR-IP message, then the DP conversion is stopped during IP conversation. The extended DP conversion is restarted after the IP conversation is over. <p>Terminating Call Model STR-IP Limitations</p> <p>When the following conditions apply</p> <ul style="list-style-type: none"> • Office not subscribed to AIN • Customer Group of the originating line not subscribed of AIN • Individual Triggers not subscribed to the Originating Agent <ol style="list-style-type: none"> 1. NFA has started the extended DP conversion and the DPConverter parameter set to TRUE is received in the subsequent STR-IP message in response to any terminating basic call model trigger/Query, then the DP conversion is stopped after the STR-IP connection is terminated. 2. NFA has started the extended DP conversion and the DPConverter parameter set to FALSE is received in the subsequent STR-IP message in response to any terminating basic call model trigger/Query, then the DP conversion is not stopped for the IP conversation and for the call towards the terminating access. <p>CollectInfo Interaction</p> <ul style="list-style-type: none"> • When the NFA has started the extended DP conversion and the DPConverter parameter set to FALSE is received in the subsequent CollectInfo message, then the DP conversion is stopped.
NFA Implicit Connection	No Interaction with this feature.

25.5.6 Collect Info and STR-IP

If the Collect_Information message received from the SCP/Adjunct contains the DPConverter parameter set to TRUE, then the SSP will not perform DP to DTMF conversion for any subsequent STR-IP conversations if the DPConverter parameter set to TRUE is not received in the STR message.

25.5.7 Features not interacting with DPConverter

Refer to Table 7 for the list of features not interacting with AIN DPConverter feature.

Table 7 Features not interacting with DPConverter

Feature Category / Name
Table 8 Analog Display Services Interface (ADSI) features Spontaneous Call Waiting Identification (SCWID) SCWID with Disposition (DSCWID)
Automatic Call Distribution (ACD) features ACD Call Forcing ACD Incalls Key ACD Transfer to InCalls Key ACD Login ACD Login Enhancement ACD Logout ACD Terminations
Bearer capability (BC)
Basic Rate Interface (BRI) Specific Features Additional Call Offering Unrestricted (ACOU) Additional Functional Call (AFC) Block Called Number (BLOCKCDN) Block Calling Number (BLOCKCGN) Flexible Calling (FC)
Billing features Account Codes Customer Dialed Account Recording (CDAR) Special Billing (SPB) Station Message Detail Recording (SMDR) Terminating Billing Option (TBO)
Busy Override Features Executive Busy Override (EBO)
Call-by-Call (CBC)
Call forwarding Features (Includes on ISDN terminals) Call Forwarding Features (CFU/CFW/RCF) Call Forward Busy Features (CFB/CFBL) Call Forward Don't Answer Features (CFD/CFDA) Call Forward Group Don't Answer Features (CFGD/CFGDA) Call Forward Programming (CFWP) Call Forwarding Remote Access (CFRA) Call Forwarding Timed (CFT) Call Forwarding Validation (CFWVAL)
Call Messenger features for RES Intentional Call Messenger (ICMSG) Standard Call Messenger (SCMSG)

Feature Category / Name
Call Park (CPK) Features Call Park (CPK) Directed Call Park (DCPK) Security Code (Directed Call Park) Call Park Recall Identification
Call Transfer Features Blind Transfer Recall Blind Transfer Identification Call Redirect (CRT) Call Transfer (CXR) MBS Single Button Transfer (QCK)
CLASS features CLASS—Anonymous Caller Rejection (ACRJ) CLASS—Automatic Call Back (ACB) — MDC and RES CLASS—Automatic Recall (AR) — MDC and RES CLASS—Automatic Recall Limited to One CLASS—Auto Recall Blocking of Private Calls (CABOP) CLASS—Bulk Calling Line Identification (BCLID) CLASS—Calling Name and Number Blocking (CNNB) — RES CLASS—Calling Name and Number Display (CNND) — RES CLASS—Calling Name Delivery (CNAMD) - TR1188 TCAP:MDC and RES CLASS—Calling Name Delivery (CNAMD) - Nodal — RES CLASS—Calling Number Blocking (CNB) — RES CLASS—Calling Number Delivery (CND) — RES CLASS—Calling Number Delivery Blocking (CNDB) — RES CLASS—Customer Originated Trace (COT) — MDC and RES CLASS—Dialable Directory Number Delivery (DDND) — RES CLASS—Distinctive Ringing/Call Waiting (DRCW) CLASS—Long Distance Indicator Enhancement (LDI) CLASS—Message Waiting Indicator (CMWI) CLASS—Selective Call Acceptance (SCA) — MDC and RES CLASS—Selective Call Forwarding (SCF) — MDC and RES CLASS—Selective Call Rejection (SCRJ) — MDC and RES
Class of Service Features Automatic Number Identification (ANI) ANI Failure Log Flexible ANI (FANI) Hotel/Motel (HOT) Restricted Sent Paid (RSP)
Cutoff on Disconnect (COD) Feature
Database Services Features Enhanced 800 (E800)
Dialed Number Identification Service (DNIS) Feature
Direct Dialing Overseas (DDO) Feature

Feature Category / Name
<p>Direct Inward System Access (DISA) Features Direct Inward System Access (DISA) Reset Dialing</p>
<p>Display Features Automatic Display (AUTODISP) Calling Line Number Display (CLIDSP) Calling Name Delivery Blocking (CNAB) Calling Name Display - CENTREX - NETWORK Name and Reason Display (REASDISP) PX (trunks) Calling Line Identification (PX CLID) Redirecting Number and Reason Delivery for ISDN Call Forwarding Special Handling of Presentation Restricted Numbers (SHPRN) Calling Name Delivery for MDC (TCAPNM for MDC)</p>
<p>Distinctive Ringing Features Distinctive Ringing (DRING)</p>
<p>Dual Line Call Management (DLCM) Feature</p>
<p>Emergency Service Features 911PREFDN Emergency Service Line (ESL) Enhanced 911 Emergency Service (E911) E911 Call Forward Log E911 Ringback</p>
<p>Enhanced Busy Call Return (ECBR) Features In-Session Activation (ISA) Special Delivery Service (SDS)</p>
<p>Feature Groups Feature Group A (FGA) Feature Group B (FGB) Feature Group C (FGC) Feature Group D (FGD)</p>
<p>Flash Ignore (FIG) Feature</p>
<p>Hold Features Call Hold (CHD) Key Set Music on Hold (KSMOH)</p>
<p>Hotline Features Automatic Dialing (AUD) Automatic Line (AUL) Custom IBN Disconnect Treatment (CDT) Manual Line (MAN)</p>

Feature Category / Name
Hunt Group Features Bridged Night Number (BNN) Directory Number Hunt (DNH) Distributed Line Hunt (DLH) Key-Set Short Hunt Group (KSH) Multiline Hunt (MLH) Multiple Position Hunt (MPH) Night Service Directory Number (NSDN) Stop Hunt (SHU) Terminating Billing Option - Hunt Groups (TRMBOPT)
Hunt Group Overflow Routing Features Line Overflow to DN (LOD) Line Overflow to Route (LOR)
Intercept Features Flexible Intercept (FLEXI)
Intercom Features Group Intercom (GIC) Group Intercom All Call (GIAC) MBS Intercom (ICM) Single Party Revertive Calling (INT)
Interswitch Call Trace (ICT) Feature
Last Number Redial (LNR) Feature
Local Coin Overtime (LCO) Feature
Local Number Portability (LNP) Feature
Long Distance Signal (LDS) and Toll Alert Feature
Long Distance Alert Enhancements (LDAE) Feature
Messaging Features Call Screening/Monitoring Intercept (CSMI) Executive Message Waiting (EMW) FAX-Thru Service (FTS) Selective Call Messaging (SCM) Special Offering Decoupling of SDS (SODS) Station Message Waiting (MWT) Universal Voice Messaging (UVM)

Feature Category / Name
<p>Multiple Appearance Directory Number (MADN) features MADN CACH (Call Appearance Call Handling) and CACH Bridging MADN Extension Bridging (EXB) MADN Multiple Call Arrangement (MCA) MADN Single Call Arrangement (SCA) and SCA Bridging Electronic Key Telephone Service (EKTS) and EKTS Hold Executive Busy Override on MADN (EBOM) MADN Hold MADN Lamp (MLAMP) MADN Privacy (PRV) and Privacy Release (PRL) MADN Release (MREL) MADN Ring Forward (MRF) Secondary MADN Call Forwarding (CFMDN) MADN MEMDISP and MEMNAME</p>
<p>No Double Connection (NDC) Feature</p>
<p>Network Access Registers (NAR) Feature</p>
<p>O A and M features Customer Data Change (CDC)</p>
<p>Private Virtual Networks (PVN) Feature</p>
<p>PRI Features ISDN PRI Calling Name Delivery (I-CNAM) PRI - E911 Screening Two B-channel Transfer (TBCT)</p>
<p>RES Simultaneous Ringing (SimRing) Feature</p>
<p>Restrictions to Dialing Privileges Feature Authorization Codes Authorization Code Immediate Dialing (ACID) Code Restrictions (CRL) Denied Origination (DOR) Restricted Dial Tone (RSDT) Station Origination Restrictions (SOR) Station Specific Authorization Codes (SSAC) Suspend / Request Suspension (SUS / RSUS)</p>
<p>Ring Again Features Call Back Queuing (CBQ) Network Ring Again (NRAG) Ring Again (RAG)</p>
<p>Routing Features Dynamically Controlled Routing (DCR) Expensive Route Warning Tone (ERWT) International Direct Distance Dialing through Automatic Route Selection (IDDD through ARS) Time of Day Routing (TOD)</p>
<p>Secondary Language (SL) Feature</p>

Feature Category / Name
Series Completion (SCMP) Feature
Simplified Message Desk Interface (SMDI) Feature
Single Line Variety Package (SLVP)—RES Feature
Softkey Display Features Softkey Transfer (SKDISP)
Speech Activated Intelligent Dialing features Speech Activated Intelligent Dialing (SAID) SAID Stringing of Digits (SOD)
Speed Calling Features Speed Calling Speed Call Programming (Long), (SC2 and SCL) Speed Call Programming (Short), (SC1 and SCS) MDC Speed Calling Group User (SCU) Network Speed Calling (NSC) Speed Call Pause Insertion (SCPAUSE)/End to End signaling
Suppressed Ringing Features Suppressed Ringing Access (SRA) Suppressed Ringing for Telemetry (UTS) Suppress Line Identification (SUPPRESS)
Teen Service Features Teen Service (SDN) Secondary Directory Number Identification (SDNID)
Termination Restrictions Features Denied Incoming (DIN) Denied Termination (DTM) Do Not Disturb (DND) Make Busy Key (MBK) Make Set Busy (MSB) Make Set Busy Intragroup (MSBI) Random Make Busy (RMB) Plug up (PLP) Suspended (SUS) and Request Suspended (RSUS) Line
Toll Restriction features Carrier Toll Denial (CTD) Equal Access Enhanced Carrier Toll Denial InterLATA Full Carrier Toll Denial (FCTDENTER) Toll Denial (TDN) Toll Diversion (TDV)
Trunk Answer From Any Station (TAFAS)
Universal Call Distribution (UCD) Features

Feature Category / Name
Virtual Facility Group (VFG) Features Virtual Facility Group (VFG) Virtual Facility Group Look Ahead (VFGLA)
Wide area telephone service (WATS) Features OUTWATS Enhanced OUTWATS and Universal OWT

25.6 Logs (LG)

N/A

25.7 Data schema (DS)

N/A

25.8 Office parameters (OP)

N/A

25.9 Service orders (SO)

N/A

25.10 Alarms (AL)

N/A

25.11 Command interface (CI)

25.11.1 New/Modified commands

The following CI commands are modified

- TstQuery
 - Enhanced to support DPConverter parameter.
- AINTRACE
 - Enhanced to support DPConverter parameter.

There is no change in the CI tool, only the functionality is enhanced.

Please refer to PCNCI section of the DDOC for more details.

Table 9 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
TstQuery	CHANGED		MAPCI- >TESTTOOL- >TSTQUERY	MENU
AINTRACE	CHANGED		AINTRACE	NON-MENU

25.12 Operational measurements (OM)

N/A

25.13 AMA/Billing information (AM)

N/A

25.14 Software optionality control (SOC)

25.14.1 AIN SOC features for NA015

Order Code AIN00292, AIN SE R9 - DP Converter optionalizes the DPConverter parameter support. When AIN00292 SOC is in IDLE state, the DPConverter parameter in CollectInfo and SendToResource message is ignored.

SOC ON-TO-IDLE warning messages

The following warning messages are displayed before the NA015 SOC options are toggled from the ON to the IDLE state. The warning messages indicate that the state transition disables the associated AIN Service Enablers functionality.

AIN00292 warning message:

```
SERVICE AFFECTING: This transition will disable AIN
Service Enablers Release 9 DPConverter parameter
support for all current and future subscribers.
```

The table below summarizes the SOC Option AIN00292 for DP Converter parameter.

Table 10 SOC

SOC option name:	AIN SE R9
SOC option title:	AIN SE R9 DP Converter

SOC option control type:	state
New SOC option?	Yes
SOC option order code	AIN00292
Option defined in DRU:	CNA
Affected products:	LLT00015, LEC00015, LET00015

25.15 Glossary

Term	Description
AIN	Advanced Intelligent Network
CI	Collect Information
DP	Dial Pulse
DTMF	Dual Tone Multi Frequency
IP	Intelligent Peripheral
NFA	Network Facility Access
SCP	Service Control Point
SSP	Service Switching Point
STR	Send To Resource

25.16 References

- a. GR1298 Issue 5, Nov. 1999 - AINGR: Switching Requirements.
- b. GR1299 Issue 5, Nov. 1999 - AINGR: Switch - Service Control Point (SCP)/Adjunct Interface.

26: Functional description (FN)

26.1 Feature name

59022533 - PFC Office Administration.

26.2 Description

The SFC/PFC Customer group subscription features allows for assigning PFC (Public Feature Code) and SFC (Specific Feature Code) trigger items to Customer groups. Individually subscribed triggers will take precedence over group based subscribed trigger. Only RES and ISDN BRI agents are allowed to trigger on PFC and SFC triggers that are subscribed at the customer group level. This functionality will only be implemented in the trigger item provisioning interface.

In order to facilitate widespread deployment of AIN services, it is desirable to provide a mechanism by which an AIN service can be assigned to a large set of lines like a customer group, while allowing the service to be disabled or enabled on individual lines within the customer group. This activity supports the per line exclusion of Public Feature Code (PFC) and Specific Feature Code (SFC) services. A new line option AINDENY is introduced by this activity. This line option will allow the calls on individual lines, to be excluded from triggering, when the PFC and SFC triggers are subscribed on the customer group.

The line option AINDENY provides a way of excluding individual lines from triggering for

- particular trigger item ids of PFC or SFC trigger types or
- all group-subscribed trigger items of PFC or SFC trigger types.

26.2.1 Administrative Interface for SFC/PFC Customer group subscription

In order to subscribe SFC/PFC triggers on a Customer group the following tables have to be datafilled.

- TRIGITM - To define the trigger item
- CUSTTIID - For assigning the trigger items to a Customer group
- CUSTSTN - For selecting trigger item provisioning interface for Customer groups.

Figure 1 shows the datafill hierarchy for provisioning SFC/PFC on a Customer group basis.

Figure 1 Datafill hierarchy for provision SFC/PFC on a Customer group basis

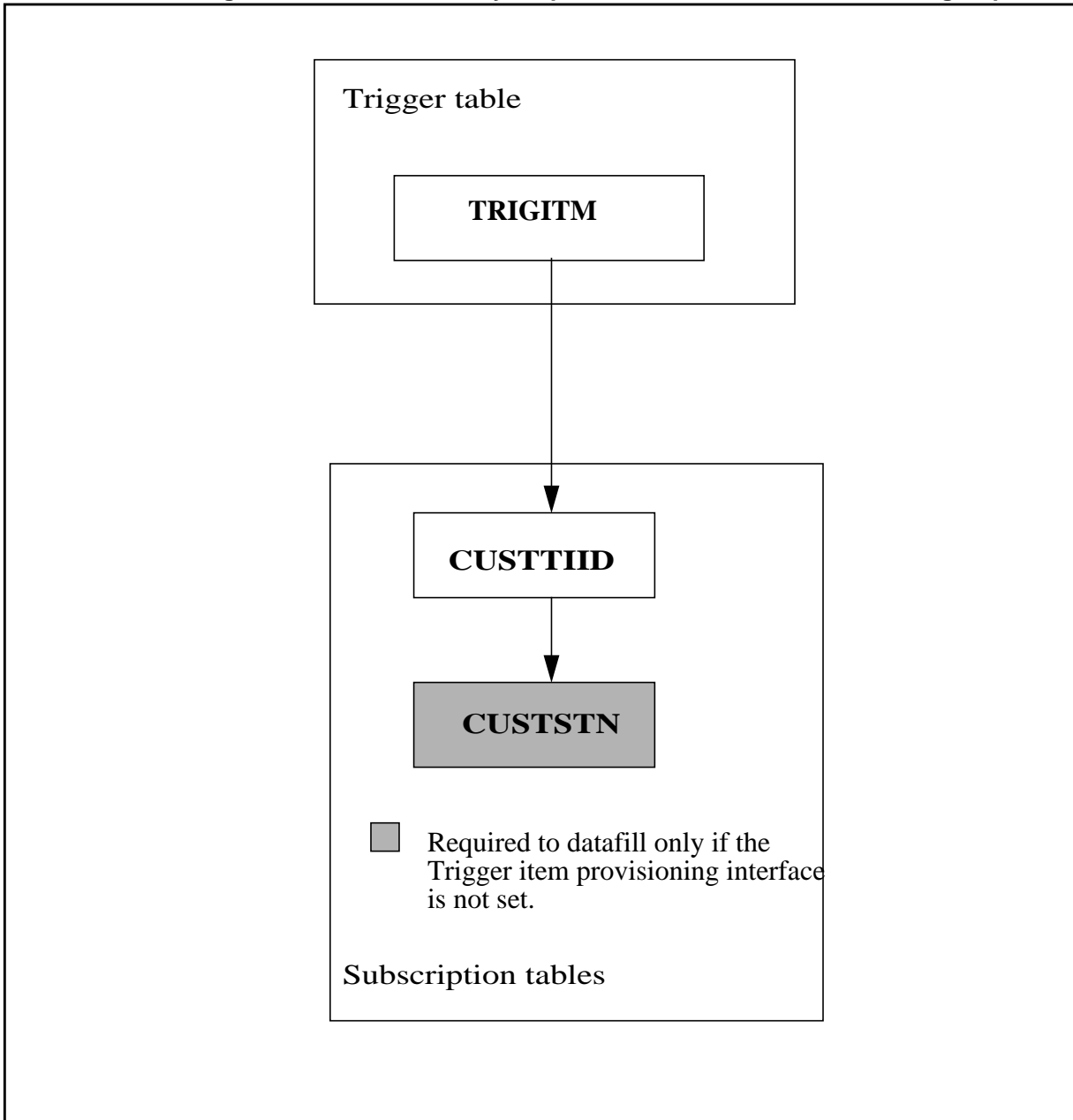


Table IBNFEAT stores subscriptions to AIN for RES lines. Table KSETFEAT stores subscriptions to AIN for ISDN BRI lines.

Table Control will be used to subscribe to SFC/PFC trigger items to a Customer group. When a customer group is subscribed to SFC/PFC triggers, only RES and ISDN BRI agents in the customer group can encounter the trigger. The following steps need to be followed.

- 1) Enter table CUSTIID and enter the add mode
- 2) In response to CUSTNAME, enter a valid customer group name.
- 3) In response to the TDP prompt, enter 4 to specify the Information Analyzed TDP.
- 4) In response to TINAME prompt, enter the alphanumeric string of a valid SFC trigger item from table TRIGITM.
- 5) In response to the TRIGACT prompt, enter ON or OFF for the trigger activation stage

The selector for the customer group in the table CUSTSTN needs to be checked to make sure that the customer group is using trigger item data model. The following steps need to be followed.

- 1) Enter the table CUSTSTN and position on the Customer Group.
- 2) In response to the CUSTNAME, enter the valid customer group name (as entered in table CUSTIID)
- 3) In response to OPTNAME prompt, enter AIN
- 4) The current AIN subscription if available is displayed for the customer group. It should be changed to TIID if it is not so, as this feature only supports the new data model.

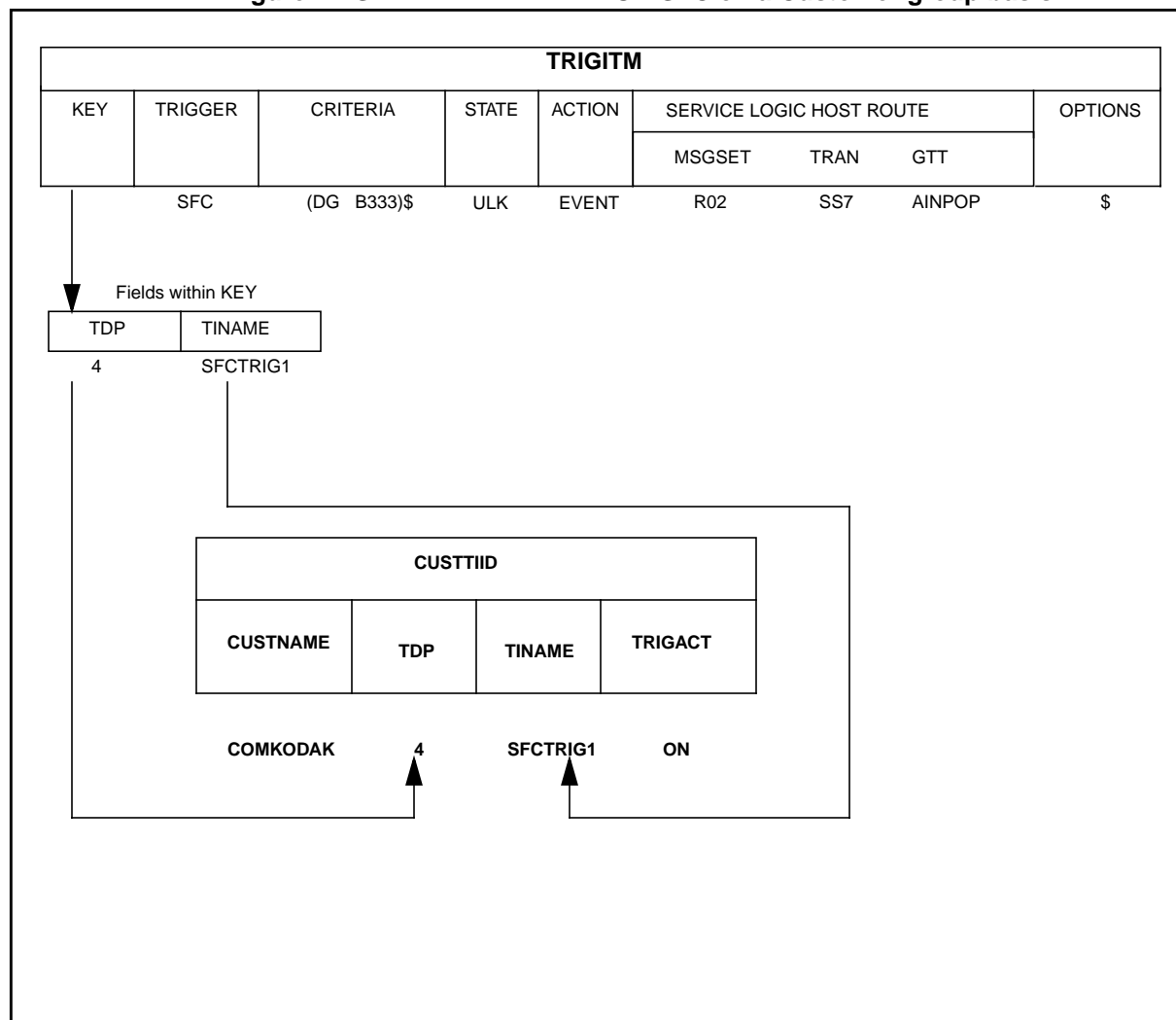
Table 1 shows the table definition and subscription required for SFC/PFC on a Customer group.

Figure 2 shows a sample datafill for customer group provisioning for a SFC trigger. A PFC trigger can also be provisioned in a similar way for a Customer group subscription. The only difference is that table TRIGITM need to have a PFC tuple.

Table 1 Table definitions and subscription tables for SFC/PFC trigger types

TDP	Trigger type	Criteria	Definition tables	Subscription basis	Subscription tables	Option	SERVORD
INFOANAL	SFC/PFC	CT	TRIGITM	Line (RES, ISDN)	IBNFEAT	AIN	YES
		DG(M)			KSETFEAT		
				Customer Group	CUSTTIID CUSTSTN	AIN	NO

Figure 2 SAMPLE DATAFILL FOR SFC on a Customer group basis



26.2.2 Provisioning of AINDENY option

[Req 14]

The line option AINDENY is available for RES and ISDN BRI agents only, as these are the only agents that can encounter PFC and SFC triggers. Hence AINDENY option entries can be successfully made in tables IBNFEAT and KSETFEAT only.

26.2.2.1 Format of the AINDENY option

[Req 16, 20, 21, 22, 23, 24, 25]

The format of the AINDENY option facilitates adding and removing one or more trigger item IDs and/or trigger types from the AINDENY option. They are:

- particular trigger item ids of PFC
- particular trigger item ids of SFC
- all trigger items of PFC
- all trigger items of SFC

Each DENY entry in the line option AINDENY is referred to as a DENY request. Lines subscribing to the line option AINDENY can have upto 4 DENY requests.

Each DENY request will have the following sub-fields:

ACTION - valid values: { **DENY, RESTORE** }

SCOPE - valid values: { **TIID, ALL** }

ELEMENT - valid values depend on the specified value of sub-field **SCOPE**.

For the case where the sub-field **SCOPE=TIID**, **ELEMENT** must be a valid trigger item ID from table TRIGITM.

For the case where the subfield **SCOPE=ALL**, **ELEMENT** must be a valid trigger type (SFC/PFC).

Table 2 shows datafill examples for table IBNFEAT.

Table 2 Example of AINDENY option in table IBNFEAT

LEN	DNNO	DF	FEATURE	DATA
HOST 00 00 01 13	0	AINDENY	AINDENY	(DENY TIID 4 PFC123)
HOST 00 00 01 14	0	AINDENY	AINDENY	(DENY TIID 4 SFC234) (DENY ALL PFC)

The first tuple shows the datafill for the denial of a single trigger item ID, PFC123. The second shows the denial of a single trigger item ID, SFC234 as well as all group-subscribed trigger items of trigger type PFC.

Similarly, Table 3 shows datafill examples for table KSETFEAT. The sample tuples in table KSETFEAT show how AINDENY appears on ISDN BRI lines. The first tuple shows ISDN BRI functional terminal ISDN 456 has the AINDENY option assigned to it with the denial of a single trigger item ID, PFC12. The second one shows the denial of trigger item ID, SFC2 as well as all group-subscribed trigger items of trigger type PFC.

Table 3 Example of AINDENY option in table KSETFEAT

FEATKEY			FEATURE	KVAR
LEN	KEY	FEAT		
ISDN 456	1	AINDENY	AINDENY	(DENY TIID 4 PFC12)
ISDN 556	1	AINDENY	AINDENY	(DENY TIID 4 SFC2) (DENY ALL PFC)

NOTE: Tables IBNFEAT and KSETFEAT are protected. All operations to these tables are done through servord.

26.2.2.2 Servord operations to deny triggering
[Req 17, 29]

In order to deny the triggering of group-subscribed PFC and SFC triggers for an individual lines, the AINDENY option will be added to the lines.

An agent may subscribe to the AINDENY option through Servord using the ADO command, refer to Figure 3.

Figure 3 Addition of AINDENY option using SERVORD ADO

```

SO:
>ado
SONUMBER:  NOW 98 2 11 PM
>
DN_OR_LEN:
>6136213911
OPTION:
>aindeny
ACTION:
>deny
SCOPE:
>tiid
ELEMENT:
>4 sfc123
ACTION:
>$
OPTION:
>$
COMMAND AS ENTERED:
ADO NOW 99 7 8 AM 6136213911 ( AINDENY (DENY TIID 4 SFC123 ) $) $
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT
>Y

```

Refer to the SO section of the document for more details and examples.

26.2.2.3 Servord operations to restore triggering [Req 15, 18, 26, 27, 28, 31]

To restore the triggering of group-subscribed PFC and SFC triggers on individual lines, the DENY request has to be removed from the line.

If triggering has be restored for all the denied TIIDs and all the denied trigger types, the AINDENY option will be removed from the line. AINDENY option is removed from the line using the Servord DEO command. Figure 4 shows an example.

Figure 4 Removal of the DENY request using DEO

The existing tuple in table IBNFEAT looks as follows:

```

table IBNFEAT
>pos HOST 0 0 1 13 0 AINDENY
HOST 0 0 1 13 0 AINDENY AINDENY (DENY TIID 4 PFC1) (DENY ALL SFC) $ $

```

The craftsperson issues the following DEO command through SERVORD:

```

SO:
>DEO $ HOST 0 0 1 13 AINDENY $

```

NOTE: The DEO operation will remove all the DENY requests on the line. A warning message will also be displayed.

To restore only a selected list of denied TIIDs or trigger types, the existing AINDENY assignment will be modified to have the corresponding trigger item ID(s) or trigger types removed from DENY request. Servord CHF/ADO commands will be issued. Using the CHF/ADO commands to restore a selected set of denied requests will leave the other deny requests unchanged. Figure 5 shows how this is done. A similar operation can also be performed using the ADO command.

Figure 5 Removal of a DENY request using CHF

The existing tuple in table IBNFEAT looks as follows:

```
table IBNFEAT
>pos HOST 0 0 1 13 0 AINDENY
HOST 0 0 1 13 0 AINDENY AINDENY (DENY TIID 4 PFC1) (DENY ALL SFC)
(DENY TIID 4 PFC2) $$
```

The crafts person issues the following CHF command through SERVORD:

```
SO:
>CHF $ HOST 0 0 1 13 AINDENY (RESTORE TIID 4 PFC1) (RESTORE ALL SFC) $ $
```

The resulting tuple in table IBNFEAT will appear as follows:

```
table IBNFEAT
>pos HOST 0 0 1 13 0 AINDENY
HOST 0 0 1 13 0 AINDENY AINDENY (DENY TIID 4 PFC2) $ $
```

Refer to the SO section for more details and examples.

26.2.2.4 Servord Query command [Req 36]

The query commands QDN, QLEN, QLT, QDNWRK and QLENWRK will show the AINDENY option if it was subscribed by the individual line, refer to Figure 6.

Figure 6 QDN for a line subscribed to AINDENY

```

>qdn 6215010
DN: 6215010
TYPE: SINGLE PARTY LINE
SNPA: 613 SIG: DT LNATTIDX: N/A
LINE EQUIPMENT NUMBER: HOST 05 0 00 10
LINE CLASS CODE: RES
IBN TYPE: STATION
CUSTGRP: IBNTST SUBGRP: 0 NCOS: 0
CARDCODE: 6X17AC GND: N PADGRP: STDLN BNV: NL MNO: N
PM NODE NUMBER : 49
PM TERMINAL NUMBER : 11

OPTIONS:
3WC CCW
RES OPTIONS:
AINDENY DENY TIID 4 SFC1 DENY TIID 4 PFC2

OFFICE OPTIONS: AIN TIID
Customer Group Options:
AIN TIID

```

26.2.2.5 Servord Redundant Feature activity [Req 45]

ADO redundancy for the AINDENY option will be supported regardless of the state of the SO_ALLOW_REDUNDANT_FEATURE office parameter.

With ADO redundancy the telcos can always use the ADO command to deny or restore AIN services for a given line, whether or not the line already has the AINDENY option. In essence the ADO command acts like a CHF command with ADO redundancy.

26.2.3 Traver

26.2.3.1 Traver for PFC/SFC Customer Group subscription

Traver will reflect the routing data of a simulated AIN Service Enablers call. If the SOC (AIN00294) is IDLE, PFC/SFC group subscription verification will be done, but a warning message will be displayed stating that an actual call will not trigger if the SOC AIN00294 is in IDLE state. If the SOC is ON (i.e. the call will proceed to trigger) such a message will not be displayed. A sample of a traver with SOC IDLE is given in Table 4, and a sample of a traver with SOC ON is given in Table 5..

Precedence will always be given to Individually subscribed trigger over group based trigger.

Table 4 Example of a traver with SOC IDLE

```
>Traver 1 4671022 B333 B
```

Table 4 Example of a tracer with SOC IDLE

```

TABLE IBNLINES
HOST 01 1 02 14 0 DT STN RES 4671022 403 416_PUB_403 L416_LATA1_400 416 $
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL 00 416_PUB_403 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 $ $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG416 AIN AIN TIID
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
NCOS FEAT XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME RESGSTAR
RESGSTAR 333 FTR 3 AIN IMMED
AIN Trigger: An actual call would not trigger on customer group
subscription as SOC option AIN00294 is IDLE
Checking AIN SFC Trigger Items as SFC is compatible with current call
. . TABLE CUSTTIID
. . RESG416 4 SAM_SFC ON
. . TABLE TRIGITM
. . 4 SAM_SFC SFC (DG B333) $ ULK EVENT R02 SS7 AINPOP $
. . . TABLE C7GTTYPE
. . . AINPOP ANSI7 6 $
. . . TABLE IBNFEAT
. . . TUPLE NOT FOUND
. . . TABLE C7GTT
. . . AINPOP 4164671022 4164671022 PCSSN (SIMTOOL RTESET SIMTOOL3 0) $ SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database would occur now.
Use the AINMQG option to save the query to a file for use in TstQuery.
Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

```

Table 4 Example of a traver with SOC IDLE

AIN Trigger: An actual call would not trigger on customer group subscription as SOC option AIN00294 is IDLE

AIN Info Analyzed TDP: trigger criteria met.
 Querying the database would occur now.
 Use the AINMQG option to save the query to a file for use in TstQuery.
 Use the AINRES option for further information

+++ TRAVER: SUCCESSFUL CALL TRACE +++

Table 5 Example of a Traver when SOC is ON

```
>Traver 1 4671022 B333 B
TABLE IBNLINES
HOST 01 1 02 14 0 DT STN RES 4671022 403 416_PUB_403 L416_LATA1_400 416 $
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 $ $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG416 AIN AIN TIID
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
NCOS FEAT XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME RESGSTAR
RESGSTAR 333 FTR 3 AIN IMMED
Checking AIN SFC Trigger Items as SFC is compatible with current call
. . TABLE CUSTTIID
. . RESG416 4 SAM_SFC ON
. . TABLE TRIGITM
```

Table 5 Example of a Traver when SOC is ON

```

. . 4 SAM_SFC SFC (DG B333) $ ULK EVENT R02 SS7 AINPOP $
. . . TABLE C7GTTYPE
. . . AINPOP ANSI7 6 $
. . . TABLE IBNFEAT
. . . TUPLE NOT FOUND
. . . TABLE C7GTT
. . . AINPOP 4164671022 4164671022 PCSSN (SIMTOOL RTESET SIMTOOL3 0) $
SSN
AIN Info Analyzed TDP: trigger criteria met.
Querying the database would occur now.
Use the AINMQG option to save the query to a file for use in TstQuery.
Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

AIN Info Analyzed TDP: trigger criteria met.
Querying the database would occur now.
Use the AINMQG option to save the query to a file for use in TstQuery.
Use the AINRES option for further information

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

26.2.3.2 Traver Example with AINDENY option [Req. 32, 33, 34, 35]

At the AIN Info analyzed TDP, for customer group based PFC and SFC triggers, when TRAVER detects that the line is subscribed to AINDENY option, it prints a warning message and routes the call to treatment.

If a line is subscribed to PFC or SFC trigger individually, than the triggering will not be suppressed due to the presence of AINDENY option on line.

Please refer to Table 6.

Table 6 Traver - PFC trigger - AINDENY with request to DENY a TIID

```

>TRAVER L 6136216138 B360 B
TABLE IBNLINES
HOST 00 0 02 18 0 DT STN RES 6216138 263 613_AIN2_263 L613_LATA1_0 613 $
TABLE LINEATTR
263 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_AIN2_263 L613_LATA1_0 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_AIN2_263 FR01 613 AIN2 TOPS Y RESG263 0 0 $

```



```

TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
HOST 00 0 02 18 0 AIN AIN TIID (4 PFC360 ON) $
TABLE CUSTSTN
RESG263 AIN AIN TIID
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG263 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG263 NXLA RXCMN263 RXCFNXXX 0 RES
TABLE DIGCOL
RES specified: RES digit collection
NCOS FEAT XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME RXCFNXXX
RXCFNXXX 360 FTR 3 AIN IMMED
Checking AIN PFC Trigger Items as PFC is compatible with current call
. . TABLE CUSTTIID
. . RESG263 4 PFC360 ON
. . TABLE IBNFEAT
. . HOST 00 0 02 18 0 AINDENY AINDENY (DENY TIID 4 PFC360) $
. . TABLE TRIGITM
. . 4 PFC360 PFC TRANS (DG B360) $ ULK EVENT R02 SS7 AINROCK $
. . . TABLE C7GTTYE
. . . AINROCK ANSI7 5 $
. . . TABLE IBNFEAT
. . . TUPLE NOT FOUND
. . . TABLE C7GTT
. . . AINROCK 6137224011 6137224011 SSNONLY (AINTTEST) $
AIN Info Analyzed TDP: trigger criteria not met.
Line is subscribed to option AINDENY. Triggering denied.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

AIN Info Analyzed TDP: trigger criteria not met.
Line is subscribed to option AINDENY. Triggering denied.

TREATMENT ROUTES. TREATMENT IS: AINF
1 T120
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

26.2.4 Agent Support

Only RES / ISDN BRI lines will be supported with this feature for Customer group based subscription of SFC/PFC triggers. This is because an individually subscribed, PFC/SFC triggers support only RES/ISDN BRI agents.

26.3 Hardware requirements

None

26.4 Limitations and restrictions

A Customer group maybe a heterogeneous group containing RES, IBN, EBS and ISDN lines. The SFC/PFC Customer group subscription only supports RES and ISDN BRI lines. While provisioning on a Customer group all the agents within that customer group will be subscribed without any warning or errors. The checking for an agent will only be done during run time (CallP) and only RES and ISDN BRI agents will trigger.

The SFC/ PFC triggers which are subscribed on a customer group will not support a Continue response. If a continue response is received, the call will be routed to AINF treatment.

26.5 Interactions

There is no impact on feature interactions by this feature. The existing feature interactions of SFC/PFC triggers will remain the same

26.6 Data schema (DS)

26.6.1 New/modified tables

Table 7 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
CUSTTIID	CHANGED	UNCHANGED
IBNFEAT	CHANGED	UNCHANGED
KSETFEAT	CHANGED	UNCHANGED

26.7 Service orders (SO)

This activity introduces a new line option AINDENY for RES and ISDN BRI agents. This line option will allow the individual lines to be excluded from triggering for customer group wide trigger item subscriptions of PFC and SFC triggers.

Refer to the SO section of the document for more details and examples.

26.8 Alarms (AL)

This activity does not create or change any alarms.

26.9 Command interface (CI)

26.9.1 New/modified commands

If TRAVER trigger criteria checking determines that the trigger query should be suppressed due to the AINDENY option, TRAVER will output a message indicating that AINDENY was found on line and the trigger will not be encountered. Traver will also output the details of the AINDENY entry that suppressed the trigger.

The line query commands, QDN, QLEN and QLT will be enhanced to display the information as to whether a DN, a LEN, or a logical terminal has AINDENY option assigned to it.

Refer to the CI section of this document for more details and examples.

26.10 Operational measurements (OM)

26.10.1 New/modified OM groups

No new operational measurements are created and no existing operational measurements are modified.

26.11 AMA/Billing information (AM)

26.11.1 Order code/changed AMA/billing information

AMA is not affected by this feature. This section is not applicable

26.12 Software optionality control (SOC)

Order code AIN00294, AIN SE R9 - PFC Trig Admin optionalizes the SFC/PFC Customer group subscription and AINDENY. When AIN00294 SOC is in IDLE state, the triggering and denial (on a per line basis) of SFC/PFC Customer group subscription is ignored. This SOC in the IDLE state will also disable the call processing of LARP (Line attribute parameter).

SOC-ON TO-IDLE warning messages

The following warning message is displayed when the PFC Office Administration SOC AIN00294 is toggled from ON to IDLE state. The warning message indicates that state transition disables the associated AIN Service Enablers functionality.

SERVICE AFFECTING: This transition will disable AIN Service Enablers Release 9 PFC Trig Admin support for all current and future subscribers.

The table below summarizes the SOC option AIN00294 for triggering and denial (on a per line basis) of SFC/PFC Customer group subscription.

Table 8 SOC

SOC option name:	AIN SE R9
SOC option title:	AIN SE R9 PFC Trig Admin
SOC option control type:	STATE
New SOC option?	YES
SOC option order code	AIN00294
Option defined in DRU:	CNA
Affected products:	LEC00015, LET00015, LLT00015

26.13 Glossary

Term	Description
AIN	Advanced Intelligent Networks
AINDENY	Denial of AIN Services
PFC	Public Feature code

SFC	Specific feature code
SOC	Software Optionality Control.

26.14 References

- GR1298 Issue 5, Nov.1999 - AINGR Switch requirements.
- GR1299 Issue 5, Nov.1999 - AINGR: Switch - Service Control Point (SCP)/Adjunct Interface.

27: Functional description (FN)

27.1 Feature name

Enhancement to trigger Line Attribute Response Processing (LARP).

TRAVER support to simulate LARP for AIN Response Translation for SDS/PFC/N11 triggers.

Line Attributes Response Processing support for N11

Line Attributes Response Processing support for Public Feature Code (PFC) trigger.

27.2 Description

This activity will enhance the existing LARP functionality and it also allows LARP for N11 and PFC triggers apart from the already existing SDS LARP support. This is a common document to feature actids A59022554 (LARP for N11) and A59022754 (LARP for PFC) and also for LARP enhancement.

The trigger item provisioning interface implements trigger-specific line attributes by datafilling the LARP option on an SDS/N11/PFC trigger item

The trigger group provisioning interface implements trigger-specific line attributes by datafilling table PODPATTR for only PODP trigger defined in a trigger group. This activity does not affect the PODPATTR or TRIGGER GROUP data model functionality. The pre-NA015 Trigger Group functionality will be preserved in NA015.

27.2.1 Enhancement to LARP

This activity is an enhancement to the existing Line Attribute Response Processing (LARP) functionality, which is only allowed for SDS triggers prior to NA015. LARP is enhanced to include new fields REDIR and FWDATTR (Forwarding Attributes). The forwarding attributes will be an optional attribute.

The operating companies have the flexibility to let the response processing, on a trigger having overriding line attributes to be treated as a redirection or no-redirection. This is achieved by introducing a new field in the table TRIGITM under LARP option called REDIR. The operating company has the control of overriding the redirecting parameters(redirecting party id and redirecting reason) and charge number, normally derived by the SSP in the absence of redirecting parameter and charge number, in the SCP analyze_route message. These values can be datafilled as part of the forwarding attributes, which is optional under LARP option in table TRIGITM.

As part of enhancement to the trigger LARP option, this feature will implement the redirection option with forwarding attributes applicable only to LARP option in table TRIGITM.

The Redirection and Forwarding Attributes represent additional information that can be associated with a particular trigger line attribute. The Redirection option treats the call associated with the trigger to be considered as a redirection in the response processing. To implement the redirection functionality a new field REDIR is included under LARP option. The forwarding attributes are optional attributes. This is controlled by the FWDATTR selector under LARP option in table TRIGITM. Forwarding Attributes consist of REDIR_REASON, REDIR_PARTY_ID, TCM and CHARGE_NUMBER,. This is in addition to LINEATTR, XLAPLAN, RATEAREA, PIC and LPIC attributes, which are already present.

When a set of line attributes is provisioned, the SSP will allow the forwarding attributes to be provisioned on an optional basis. That is, forwarding attribute need not be populated with any value, even if the other attributes in the set are provisioned with values.

The allowed values for forwarding attributes are:

- Redirecting Reason - any redirecting reason value(UNCOND, NOREPLY, BUSY, UNKNOWN)
- Redirecting Party ID - any redirecting party ID value(3-15 digits)
- Travelling Class Mark (TCM) - any TCM value(0-2 digits)
Note: 11 and 12 are reserved. 10 is spare.
- Charge Number - any charge number.(3-15 digits)

The supported default values for forwarding attributes are:

- Redirecting Reason: UNCOND
- Redirecting Party ID: \$
- TCM: \$
- Charge Number: \$

The forwarding attributes are intended to be used by the telephone operating company as redirection parameters in cases where the call has to be treated as a redirection using the REDIR functionality to forward a call after encountering SDS, PFC or N11 triggers.

If the SSP receives any of Redirection Reason, Redirecting Party ID, Charge Number, Charge Party Station Type, Carrier, or TCM from the SCP after encountering a subscribed trigger, then these values will take precedence over any forwarding attributes associated with the LARP and SSP-derivable information.

The SSP will use the forwarding attributes associated with a SDS/N11/PFC LARP if any of the following values were not provided by the SCP: Redirection Reason, Redirecting Party ID, Charge Number, Charge Party Station Type, Carrier, or TCM. Charge Party Station Type is derivable from line class attribute, and carrier can be determined by preferred carrier/nature of carrier list.

27.2.2 TRAVER support to simulate LARP

When the LARP option is datafilled, two TRAVERs are performed to verify the trigger. The first TRAVER encounters trigger SDS/N11/PFC with the overriding line attributes specified by the LARP option and a warning is displayed indicating a second TRAVER is required.

This activity implements the second TRAVER support to simulate the response processing. The customer can select the TRIGITM entry having the LARP option of the first TRAVER by entering the <TDP> <TINAME> under the LARP option of the AIN Response Translation on the TRAVER command line.

27.2.3 LARP for N11 and PFC

This activity extends the support of LARP functionality to Public Feature Code (PFC) and N11 triggers.

This feature addresses the need to allow the response from the SCP to a specific PFC and N11 trigger to bypass the originator's line screening by provisioning LARP. This allows the customer to overcome the toll restrictions imposed by the originator's line attribute.

To provision overriding line attributes for a trigger item, the option called LARP has to be datafilled in table TRIGITM. The LARP option is assigned on a per-trigger basis to SDS, PFC and N11 triggers defined in table TRIGITM. When this option is present, the line attributes information datafilled in the option override the originator's line attributes.

27.2.4 Datafilling for LARP with forwarding attributes for SDS and N11trigger in table TRIGITM

The LARP option provides overriding line attributes during post query processing for triggers. This option allows overriding line attributes to be assigned against individual trigger items that replace the originator's line attributes during response processing. When this option is not specified, the originator's line attributes are used. Overriding line attributes are defined by the following fields: LINEATTR, XLAPLAN, RATEAREA, PIC, and LPIC.

This functionality allows the triggers with overriding line attributes to be treated as redirection or not with the new field REDIR and forwarding attributes controlled by the selector FWDATTR.

The redirection attribute is defined by the field REDIR. The forwarding attribute is controlled by the selector field FWDATTR and the forwarding attributes are defined by the following fields: REDIR_REASON, REDIR_PARTY_ID, TCM and CHARGE_NUMBER.

The following steps describe how to datafill the LARP option for a trigger item:

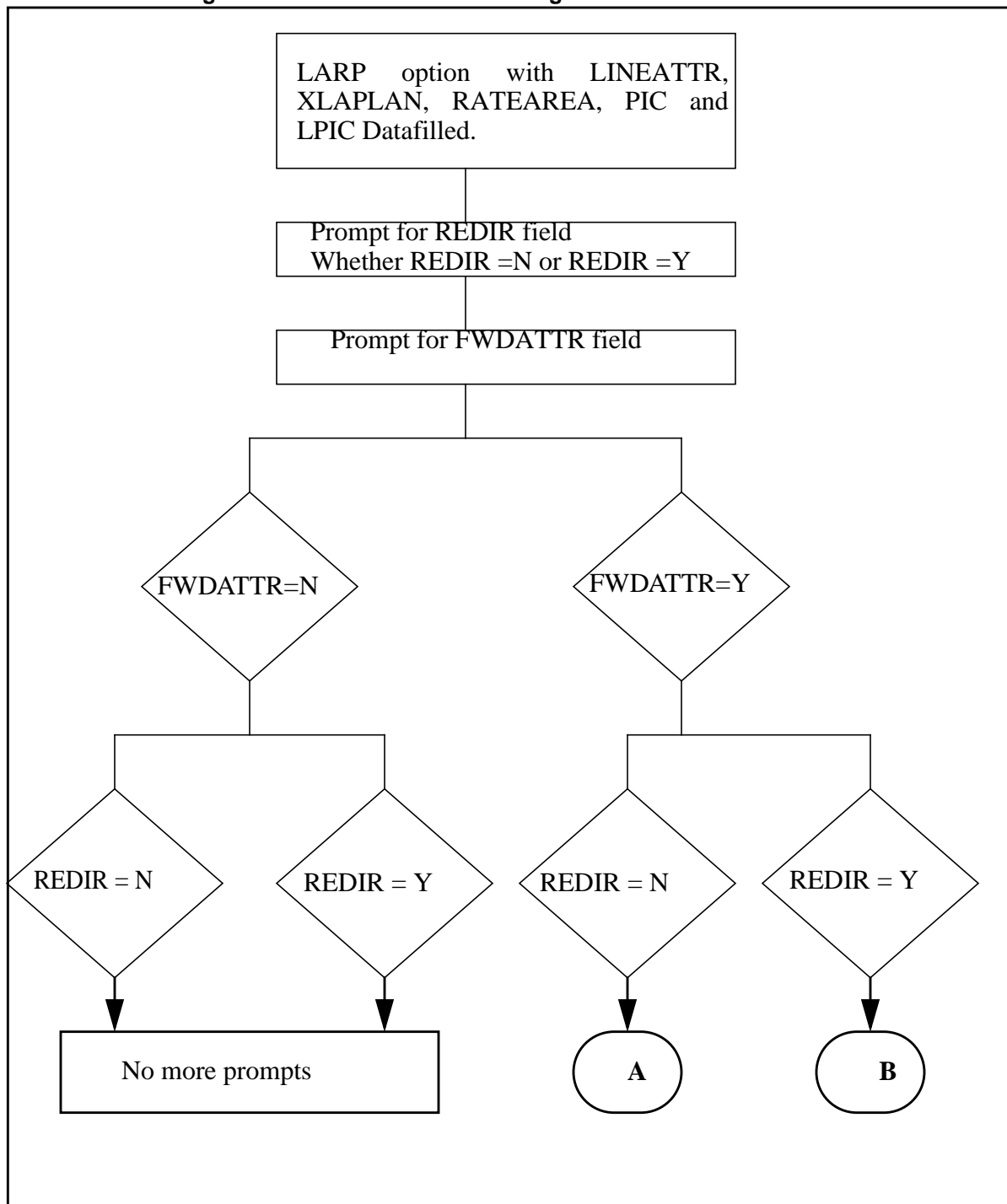
In response to the OPTION prompt, the LARP option can be specified but it is optional.

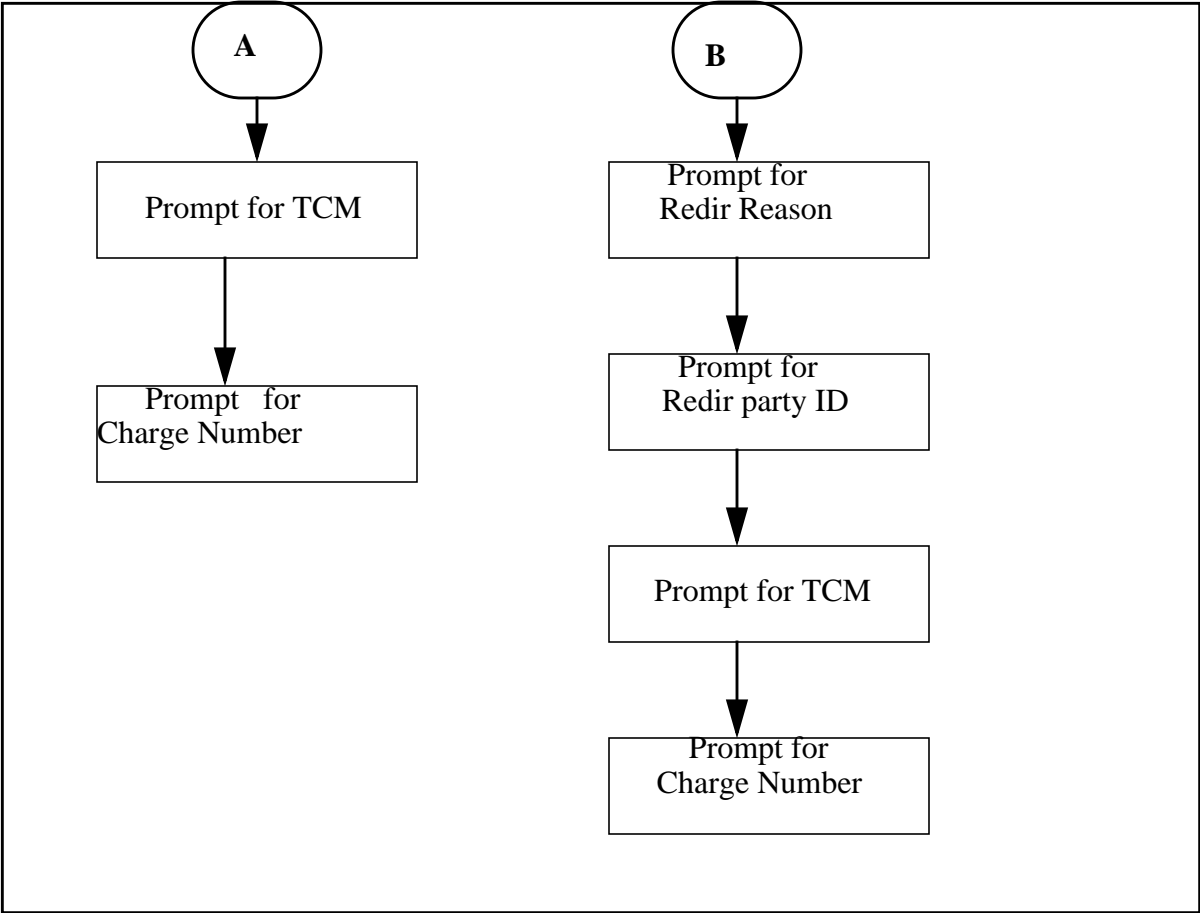
The following steps describe how to datafill the LARP option for a trigger item: Note: The following tables must be datafilled before the LARP option: LINEATTR, XLAPLAN, RATEAREA, OCCNAME, and OCCINFO.

1. Enter LARP at the OPTION prompt while datafilling the trigger item.
2. In response to the LINEATTR prompt, enter the value that associates the trigger with the corresponding index in table LINEATTR. This field is mandatory.
3. In response to the XLAPLAN prompt, enter the value that associates the trigger with the corresponding index in table XLAPLAN. This field is mandatory.
4. In response to the RATEAREA prompt, enter the value that associates the trigger with the corresponding index in table RATEAREA. This field is mandatory.
5. In response to the PIC prompt, enter the name of the Primary Inter exchange Carrier. It has a range of values corresponding to the tuple keys in table OCCNAME. In scenarios where no carrier is desired, the value NILC is used, denoting the equivalent of a NIL carrier.
6. In response to the LPIC prompt, enter the Local PIC. The local PIC can have the same values as the PIC field defined in step 5.

-
7. In response to REDIR prompt, enter 'N' or 'Y'.
 8. In response to the FWDATTR prompt, enter 'N' or 'Y'.
 - a. If REDIR='N' and FWDATTR='Y' go to step 9.
 - b. If REDIR='Y' and FWDATTR='Y' got to step 10.
 9. When REDIR='N' and FWDATTR='Y' then:
 - a. In response to TCM prompt, enter a valid TCM value or '\$' for a nil value.
Note: 11 and 12 are reserved. 10 is spare.
 - b. In response to CHARGE_NUMBER prompt, enter 3 to 15 digits or '\$' for nil value.
 10. When REDIR='Y' and FWDATTR='Y' then:
 - a. In response to REDIR_REASON prompt, enter a valid redirecting reason. The redirecting reason can have the values, UNCOND, UNKNOWN, BUSY, NOREPLY.
 - b. In response to the REDIR_PARTY_ID prompt, enter the 3 to 15 digits or '\$' for a nil value.
 - c. In response to TCM prompt, enter a valid TCM value or '\$' for a nil value.
Note: 11 and 12 are reserved. 10 is spare.
 - d. In response to CHARGE_NUMBER prompt, enter 3 to 15 digits or '\$' for nil value.

Figure 1 Functional Behavior Diagram





27.2.5 Datafilling for LARP with forwarding attributes for PFC triggers in table TRIGITM

The LARP option provides overriding line attributes during post query processing for triggers. This option allows overriding line attributes to be assigned against individual trigger items that replace the originator's line attributes during response processing. When this option is not specified, the originator's line attributes are used. Overriding line attributes are defined by the following fields: LINEATTR, XLAPLAN, RATEAREA, PIC, and LPIC.

This functionality allows the triggers with overriding line attributes to be treated as redirection or not with the new field REDIR and forwarding attributes controlled by the selector FWDATTR.

The redirection attribute is defined by the field REDIR. The forwarding attribute is controlled by the selector field FWDATTR and the forwarding attributes are defined by the following fields: REDIR_REASON, REDIR_PARTY_ID, TCM and CHARGE_NUMBER.

The following steps describe how to datafill the LARP option for a trigger item:

In response to the OPTION prompt, the LARP option can be specified but it is optional.

The following steps describe how to datafill the LARP option for a trigger item: Note: The following tables must be datafilled before the LARP option: LINEATTR, XLAPLAN, RATEAREA, OCCNAME, and OCCINFO.

1. Enter LARP at the OPTION prompt while datafilling the trigger item.
2. In response to the LINEATTR prompt, enter the value that associates the trigger with the corresponding index in table LINEATTR. This field is mandatory.
3. In response to the XLAPLAN prompt, enter the value that associates the trigger with the corresponding index in table XLAPLAN. This field is mandatory.
4. In response to the RATEAREA prompt, enter the value that associates the trigger with the corresponding index in table RATEAREA. This field is mandatory.
5. In response to the PIC prompt, enter the name of the Primary Inter exchange Carrier. It has a range of values corresponding to the tuple keys in table OCCNAME. In scenarios where no carrier is desired, the value NILC is used, denoting the equivalent of a NIL carrier.
6. In response to the LPIC prompt, enter the Local PIC. The local PIC can have the same values as the PIC field defined in step 5.

-
7. In response to REDIR prompt, enter 'N' or 'Y'.
 8. In response to the FWDATTR prompt, enter 'N' or 'Y'.
 - a. If REDIR='Y' and FWDATTR='N' this is an error condition and the user is not allowed to enter Y in response to FWDATTR.
 - b. If REDIR='Y' and FWDATTR='Y' got to step 9.
 9. When REDIR='Y' and FWDATTR='Y' then:
 - a. In response to REDIR_REASON prompt, enter a valid redirecting reason. The redirecting reason can have the values, UNCOND, UNKNOWN, BUSY, NOREPLY.
 - b. In response to the REDIR_PARTY_ID prompt, enter the 3 to 15 digits or '\$' for a nil value.
 - c. In response to TCM prompt, enter a valid TCM value or '\$' for a nil value.

Note: 11 and 12 are reserved. 10 is spare.

 - d. In response to CHARGE_NUMBER prompt, enter 3 to 15 digits or '\$' for nil value.

27.2.6 Datafill examples

27.2.6.1 Example1

The following example shows sample datafill for table TRIGITM, when REDIR='N' and FWDATTR='N', refer to Table 1.

Table 1 Datafilling LARP option in table TRIGITM

LARP OPTION						
L I N E A T T R	X L A P L A N	R A T E A R E A	P I C	L P I C	R E D I R	F W D A T T R
123	613_P621_123	613_LATA1_123	ATT	MCI	N	N

Where:

123 is the Line Attribute Index from the table LINEATTR

613_P621_123 is the XLAPLAN from table XLAPLAN, the pretranslator name is derived from this index

613_LATA1_123 is the RATEAREA from the table RATEAREA, LCANAME is derived from this index

ATT is the Primary Inter eXchange Carrier, should be datafilled in table OCCINFO

MCI is the Local Primary IntereXchange Carrier, should be datafilled in table OCCINFO

N indicates that this LARP is not considered as a redirection

N indicates no Forwarding Attributes are applicable.

27.2.6.2 Example 2

When REDIR='N' and FWDATTR='Y' only Charge_Number and TCM parameters are prompted, refer to Table 2.

Table 2 Datafilling LARP option in table TRIGITM

LARP OPTION								
L I N E A T T R	X L A P L A N	R A T E A R E A	P I C	L P I C	R E D I R	F W D A T T R	T C M	C H A R G E N U M B E R
123	613_P621_123	613_LATA1_123	ATT	MCI	N	Y	15	6136212121

Where:

123 is the Line Attribute Index from the table LINEATTR

613_P621_123 is the XLAPLAN from table XLAPLAN, the pretranslator name is derived from this index

613_LATA1_123 is the RATEAREA from the table RATEAREA, LCANAME is derived from this index

ATT is the Primary Inter eXchange Carrier, should be datafilled in table OCCINFO

MCI is the Local Primary IntereXchange Carrier, should be datafilled in table OCCINFO

N indicates that LARP is not considered as redirection

Y indicates that Forwarding attributes are applicable

15 is the TCM value will be used by the response processing in the absence of TCM parameter in the SCP response

6136212121 indicates the charge number to be used in the response processing in the absence of charge number parameter in the SCP response

27.2.6.3 Example 3

When REDIR='Y' and FWDATTR='Y', RedirectingReason, RedirectingPartyID, TCM and ChargeNumber fields are prompted, refer to Table 3.

Table 3 Datafilling LARP option in table TRIGITM

LARP OPTION										
LINEATTR	XLAPLAN	RATEAREA	PIC	LPIC	REDIR	FWDATTR	REDIRREASON	REDIRPARTYID	TCM	CHARGE NUMBER
123	613_P621_123	613_LATA1_123	ATT	MCI	Y	Y	UNCOND	6136213333	15	6136212121

Where:

123 is the Line Attribute Index from the table LINEATTR

613_P621_123 is the XLAPLAN from table XLAPLAN, the pretranslator name is derived from this index

613_LATA1_123 is the RATEAREA from the table RATEAREA, LCANAME is derived from this index

ATT is the Primary Inter eXchange Carrier, should be datafilled in table OCCINFO

MCI is the Local Primary IntereXchange Carrier, should be datafilled in table OCCINFO

N indicates that LARP is not considered as redirection

Y indicates that Forwarding attributes are applicable

UNCOND indicates the Redirecting Reason, this will be used by the response processing in the absence of redirecting reason parameter in the SCP response message

6136213333 indicates the redirecting party ID, this value will be used in the response processing in the absence of redirecting party id in the SCP response.

15 is the TCM value will be used by the response processing in the absence of TCM parameter in the SCP response

6136212121 indicates the charge number to be used in the response processing in the absence of charge number parameter in the SCP response

27.2.7 Analyze_Route Response Processing for overriding line attributes

Overriding line attributes replace the originator line attributes during response processing, when trigger SDS/N11/PFC with overriding line attributes receives an Analyze_Route message from the SCP. Overriding line attributes provide a method for the customer to overcome the toll restrictions imposed by the originator line attributes.

This functionality is available whether or not the switch has lines provisioned. The switch must be able to provision line attributes and trigger items in order to provide overriding line attributes for a trigger.

This feature allows a telephone operating company to assign overriding line attributes to SDS/N11/PFC triggers. This functionality applies to SDS/N11/PFC triggers provisioned in table TRIGITM using the trigger item provisioning interface. Characteristics used during response processing, such as the line attribute index, translations plan, the rate centre, the preferred inter exchange carrier, and the local primary intra-LATA carrier can be specified using the LARP option for SDS/N11/PFC trigger items. These specified characteristics override the characteristics of the originating line during response processing. This allows all calls that encounter the SDS/N11/PFC trigger item to behave consistently (desirable for virtual private network applications).

In particular, any toll restrictions on the originator can be bypassed. When trigger SDS/N11/PFC is encountered and the DMS-100 switch launches a query to the SCP, the SCP can screen and modify the call characteristics such as the calling DN, the carrier, and the called DN. The SDS/N11/PFC subscriber can have a class of service or a pre-translator that restricts toll calls in a certain way (900, 976, all toll calls), specified by its line attribute in the SSP. This feature enables the telephone operating company to specify a different line attribute to be used when the trigger is encountered. Thus, the subscriber's class of service and pre-translator can be overridden for the service initiated by triggers SDS/N11/PFC. This bypasses any toll limitation exercised through the characteristics of the original line attribute.

The LARP option provides overriding line attributes during post query processing for triggers. This option allows overriding line attributes to be assigned against individual trigger items that replace the originator line attributes during response processing. When this option is not specified, the originator line attributes are used.

27.2.8 Analyze_Route response processing for overriding line attributes with forwarding attributes

The implementation of the REDIR and forwarding attributes for the LARP option in no way affects the basic LARP which is already implemented prior to NA015.

The REDIR is only an enhancement to LARP. With REDIR the call associated with the trigger can be a redirection or no-redirection.

The LARP option with forwarding attributes provides the redirection parameters in case the call associated with the trigger is considered as a redirection. This is implemented by a new selector FWDATTR which is a BOOLEAN. The forwarding attributes option allows to override the Redirection parameters in the response processing, which would have been derived by the SSP in the absence of the Redirection parameters in the SCP analyze_route message. Similarly Charge Number can be overridden in post query processing using the forwarding attribute parameters.

27.2.8.1 The processing precedence logic of the forwarding attributes

Overriding line attributes are defined by the following fields: LINEATTR, XLAPLAN, RATEAREA, PIC, and LPIC.

The redirection attribute is defined by the field REDIR.

The forwarding attribute is controlled by the selector field FWDATTR and the forwarding attributes are defined by the following fields: REDIR_REASON, REDIR_PARTY_ID, TCM and CHARGE_NUMBER.

The following paragraphs describe the precedence for the redirection information when it can be obtained from the SSP, SCP, or forwarding attributes.

The precedence rule for determining the *RedirectingPartyID*, *RedirectingReason*, *TCM* and *ChargeNumber*, when Analyze_Route message is received in response to a trigger having LARP with forwarding attributes is given below:

1. SCP-provided
2. Parameters administered as a forwarding attribute of LARP associated with the trigger that initiated the transaction. If the RedirectingPartyID value is '\$' in forwarding attributes which is possible only for SDS/N11 triggers then the SDS/N11 digits will be used as the Redirecting parameters. If the ChargeNumber value is '\$' then pre-query value will be used.

3. SSP-derived.

The response processing logic when analyze_route message is received in response to a trigger having LARP option and for the different combinations of REDIR and FWDATTR are as below:

1. REDIR = 'N' and FWDATTR = 'N'

- a. If the associated with this combination of LARP option in table TRIGITM receives analyze_route message with redirecting parameters, it will be considered as a redirection. The redirection counter will be incremented.
- b. If the SCP analyze_route message does not contain redirecting parameters the response processing does not consider this condition as a redirection.
- c. If the SCP analyze_route message contains charge number it will be used in the response processing, else the pre-query value will be used.

2. REDIR = 'N' and FWDATTR = 'Y'

If the analyze_route message contains redirecting parameters, the response processing will consider this as a redirection. If there are not redirecting parameters then the response processing does not consider this condition as a redirection. But since FWDATTR is 'Y' the only possible forwarding attributes are TCM and ChargeNumber.

- a. If TCM parameter is sent in the SCP analyze_route message then it will be used in the response processing. If the TCM parameter is not sent in the SCP analyze_route message then the TCM parameter is derived from the forwarding attribute. This value will be used in future queries until it is overridden by any other condition.
- b. If Charge Number parameter is sent in the SCP response then it will be used in the response processing. If the Charge Number is not sent in the SCP analyze_route message and if the CHARGE_NUMBER in forwarding attributes was datafilled as '\$' then the pre-query value of the Charge Number will be used during response processing. If the CHARGE_NUMBER is not datafilled as '\$' then the datafilled value will be used in the response processing.

3. REDIR = 'Y' and FWDATTR = 'N'

Even if the SCP analyze_route message does not contain any RedirectingPartyID the response processing treats this as a redirection.

- a. If RedirectingPartyID is sent in the SCP analyze_route message, it will be used in the response processing. If the RedirectingPartyID is not sent in the SCP analyze_route message then the SDS digits will be used as RedirectingPartyID in the response processing.

- b. The Redirection Counter is incremented.
- c. The Redirecting Reason will be set as 'UNCONDITIONAL' in response processing in the absence of redirecting reason parameter in the SCP analyze_route message.
- d. The SDS digits will be used as Charge Number if the charge number parameter is not sent in the analyze_route message.

4. REDIR = 'Y' and FWDATTR = 'Y'

Even if the SCP analyze_route message does not contain any RedirectingPartyID the response processing treats this as a redirection. The forwarding attributes will be processed as below:

- a. The redirection counter is incremented
- b. If the redirecting Party ID is sent in the SCP analyze_route then it will be used. If the Redirecting Party ID is not sent in the SCP analyze_route message then the actual value of REDIR_PARTY_ID from the forwarding attributes will be used. If the REDIR_PARTY_ID value is '\$' then the SDS digits will be used as Redirecting Party ID.
- c. If the Redirecting Reason parameter is sent in the SCP analyze_route message then that will be used by the SSP. If the Redirecting Reason is not sent in the SCP analyze_route message then the actual value of REDIR_REASON from the forwarding attributes will be used by the response processing.
- d. If TCM parameter is sent in the SCP analyze_route message then that will be used. If the TCM parameter is not sent in the SCP analyze_route message then the actual value of TCM from the forwarding attributes will be used by the response processing. If the TCM value is '\$' then the pre-query value of TCM will be used.
- e. If Charge Number parameter is sent in the SCP response then it will be used in the response processing. If the Charge Number is not sent in the SCP analyze_route message and if the CHARGE_NUMBER in forwarding attributes was datafilled as '\$' then the pre-query value of Charge Number will be used for response processing. If the CHARGE_NUMBER is not datafilled as '\$' then the datafilled value will be used by the response processing.

27.2.9 Trigger Item Transition Tool (AINTITT)

In the trigger group provisioning interface, the PODPATTR table is used to specify overriding line attributes for PODP triggers, during response processing. PODPATTR is applicable only to PODP trigger. In the trigger item provisioning interface, this same functionality is provided by the LARP option in table TRIGITM for SDS triggers.

Overriding line attributes are defined by the following fields: LINEATTR, XLAPLAN, RATEAREA, PIC, and LPIC.

The redirection attribute is defined by the field REDIR.

The forwarding attribute is controlled by the selector field FWDATTR and the forwarding attributes are defined by the following fields: REDIR_REASON, REDIR_PARTY_ID, TCM and CHARGE_NUMBER.

During the CREATE command of the trigger item transition tool, the digits criteria of SDS triggers in a trigger group(table TRIGDIG) are matched against the keys of PODPATTR tuples. If a match is found, the TRIGITM tuple created by the transition tool has the LARP option datafilled with the overriding line attributes specified in the PODPATTR tuple with REDIR set to 'Y' and FWDATTR set to 'N'.

If POTUSE TFS option is applicable on the matched digits in trigger group(table TRIGDIG) the TRIGITM entries will be created with REDIR set to 'N' and FWDATTR 'N' by the transition tool.

27.2.10 Software Upgrade

27.2.10.1 When POTUSE TFS and LARP options are applicable in trigger item

During a software upgrade to NA015, SDS trigger item definitions with both LARP and POTUSE TFS options are enhanced to include REDIR='N' and FWDATTR='N'. This way the pre NA015 functionality of LARP with POTUSE TFS will be preserved after the software upgrade.

27.2.10.2 When only LARP option is applicable in trigger item

During a software upgrade to NA015, if SDS trigger item definitions with only LARP option, those trigger item entries are enhanced in NA015 to include REDIR='Y' and FWDATTR='N'. This way the pre NA015 functionality of LARP will be preserved after the software upgrade.

27.2.11 Example scenarios

The example scenarios depict the response processing of forwarding attributes. Only those parameters which are affected by the forwarding attributes used in subsequent query processing and/or ISUP and PRI signalling, are shown in the following examples. The other parameter processing are not affected by the feature and hence are not shown in the example depictions. For clarity and brevity, SDS trigger with line attributes is used in the examples. The functionality remains the same for N11/PFC trigger with line attributes.

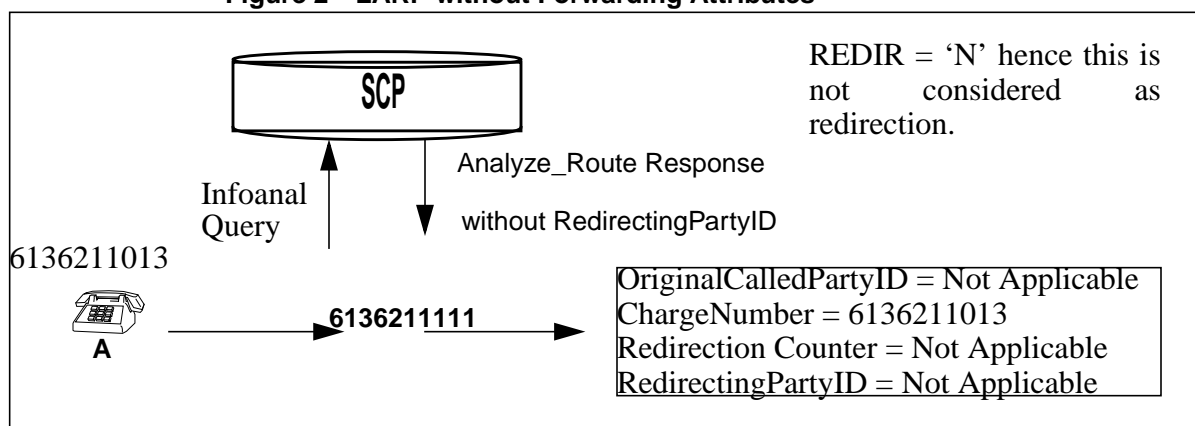
27.2.11.1 Example 1: No Redirection, normal processing

This example illustrates the LARP processing, where the overriding line attribute processing is not considered as a redirection.

Table 4 Table TRIGITM for example 1

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC N N) \$</p> <p>REDIR = N FWDATTR = N</p>
--

Figure 2 LARP without Forwarding Attributes



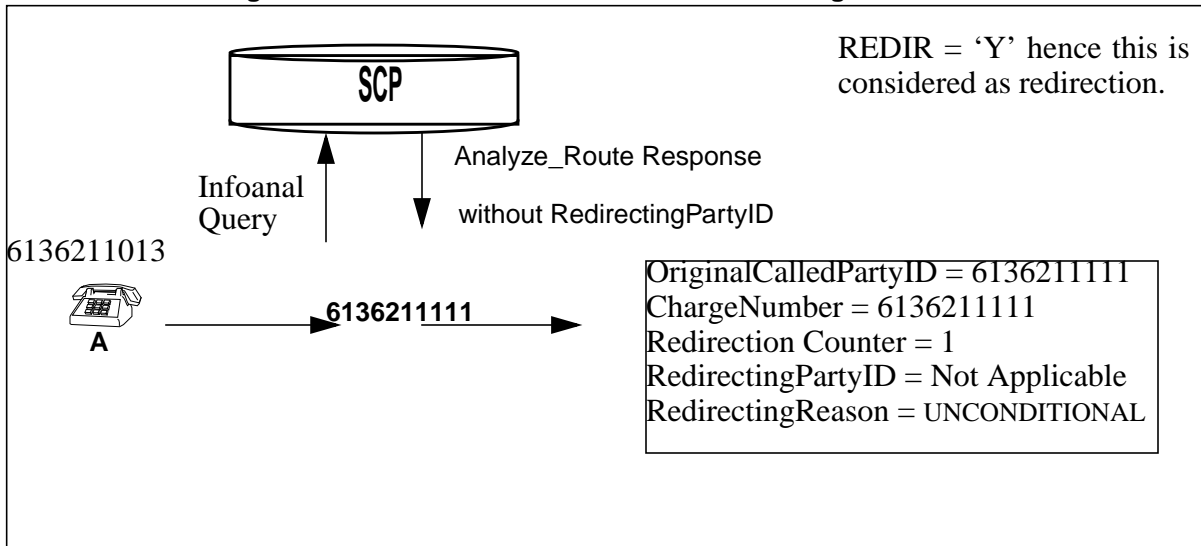
27.2.11.2 Example 2: Redirection processing, without forwarding attributes and no Redirecting parameters in SCP response

This example illustrates the LARP processing, where the overriding line attribute processing is considered as a redirection and the SDS digits are used as redirecting party id and charge number.

Table 5 Table TRIGITM for example 2

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC Y N) \$</p> <p>REDIR = Y FWDATTR = N</p>
--

Figure 3 LARP as redirection and no forwarding attributes



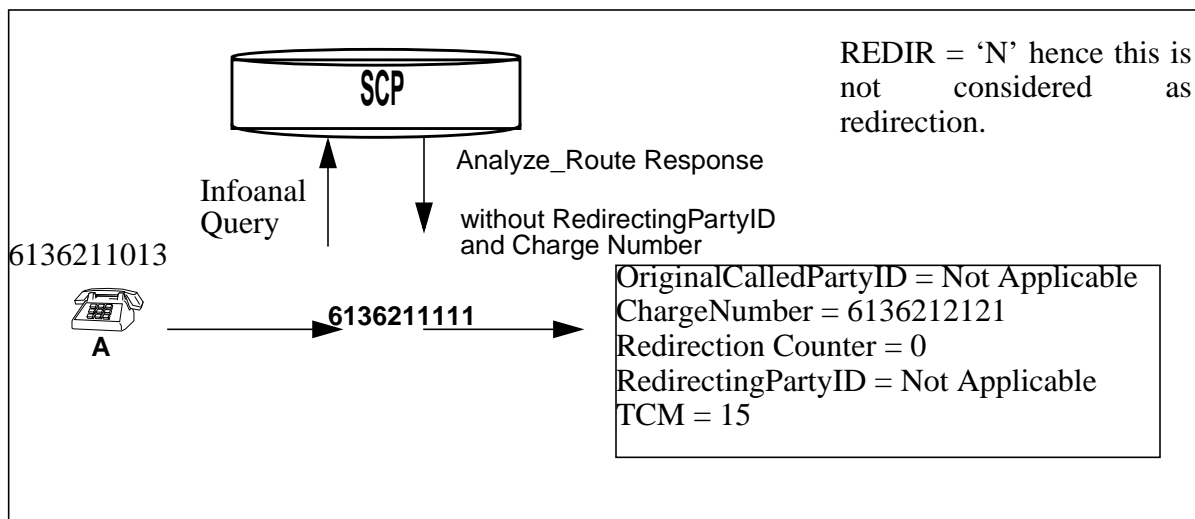
27.2.11.3 Example 3: Charge number and TCM from forwarding attributes

This example illustrates the LARP processing, where the overriding line attribute processing is not considered as a redirection. But the Charge Number and TCM parameters are derived from the forwarding attributes. These attributes will be used in subsequent query processing and/or ISUP and PRI signalling.

Table 6 Table TRIGITM for example 3

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC N Y 15 6136212121) \$</p> <p>REDIR = N FWDATTR = Y TCM = 15 CHARGE_NUMBER = 6136212121</p>
--

Figure 4 Forwarding Attributes processing on LARP, which will be used in subsequent query processing and/or ISUP and PRI signalling.



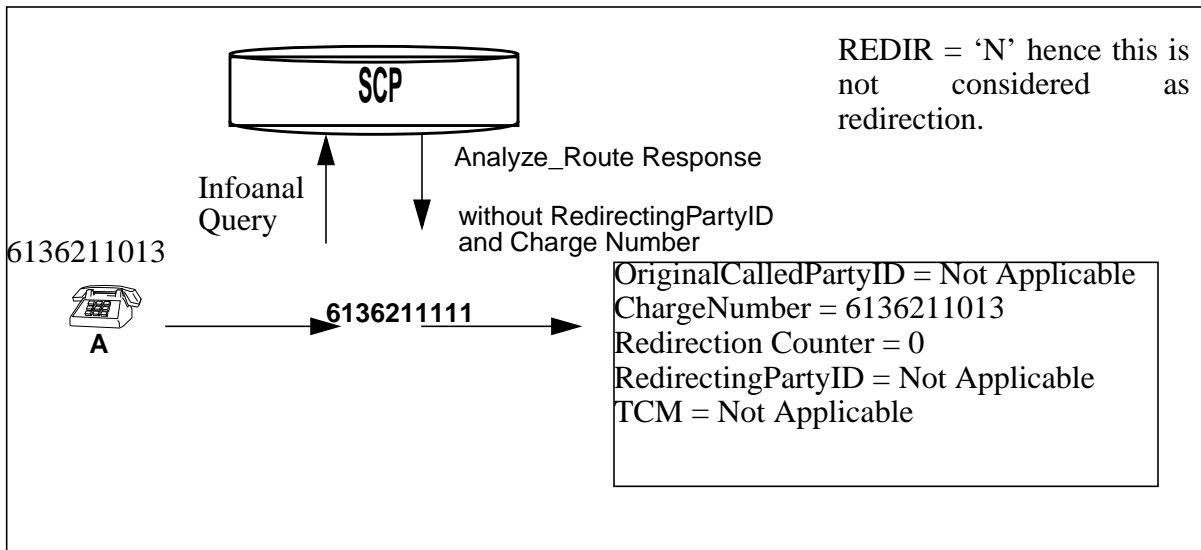
27.2.11.4 Example 4: LARP with REDIR=N and FWDATTR =Y

This example illustrates the LARP processing, where the overriding line attribute processing is not considered as a redirection. The forwarding attributes will have only charge number and TCM. The ChargeNumber has a value of '\$' in table trigitm. Therefore the SDS digits will be used as the Charge Number.

Table 7 Table TRIGITM for example 4

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC N Y \$ \$) \$</p> <p>REDIR = N FWDATTR = Y TCM = \$ CHARGE_NUMBER = \$</p>
--

Figure 5 LARP not as a redirection. Forwarding Attributes will be derived from LARP which will be used for subsequent query processing and/or ISUP and PRI signaling.



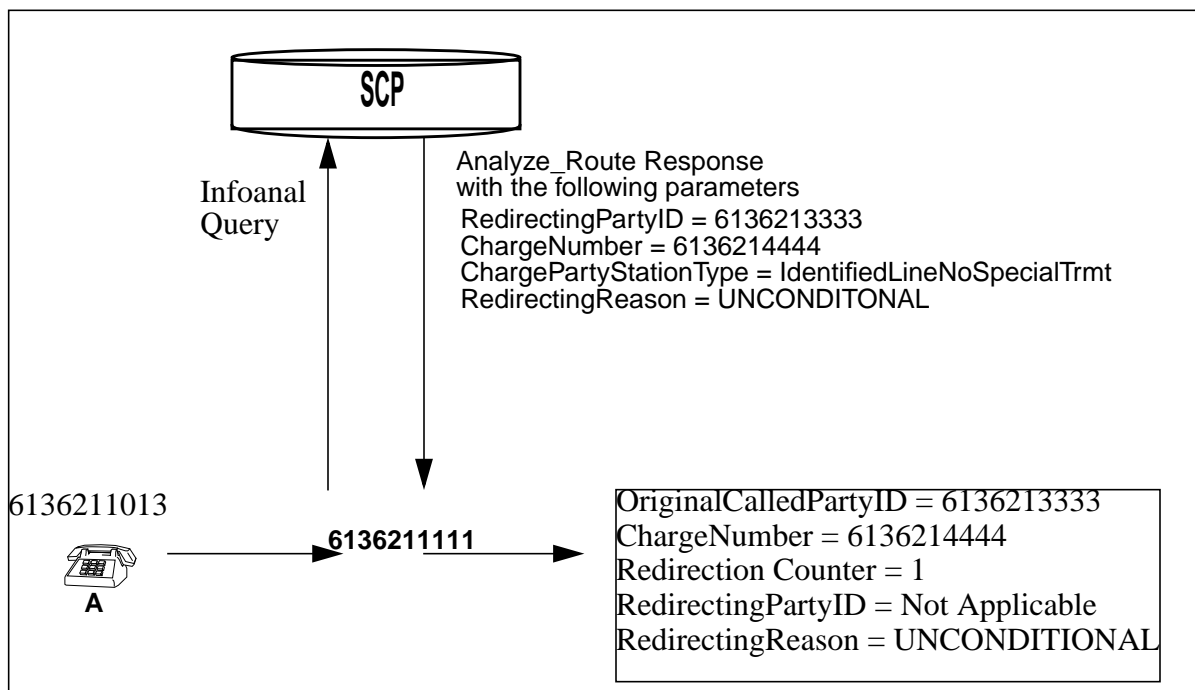
27.2.11.5 Example 5: Redirection parameters and Charge Number in the SCP analyze_route response

This example illustrates the LARP processing, when the analyze_route message has Redirecting Party ID and Chargenumber parameters. This is considered as a redirection.

Table 8 Table TRIGITM for example 5

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC N N) \$</p> <p>REDIR = N FWDATTR = N</p>
--

Figure 6 LARP without Forwarding Attributes. The AR response has redirection and charge number parameters.



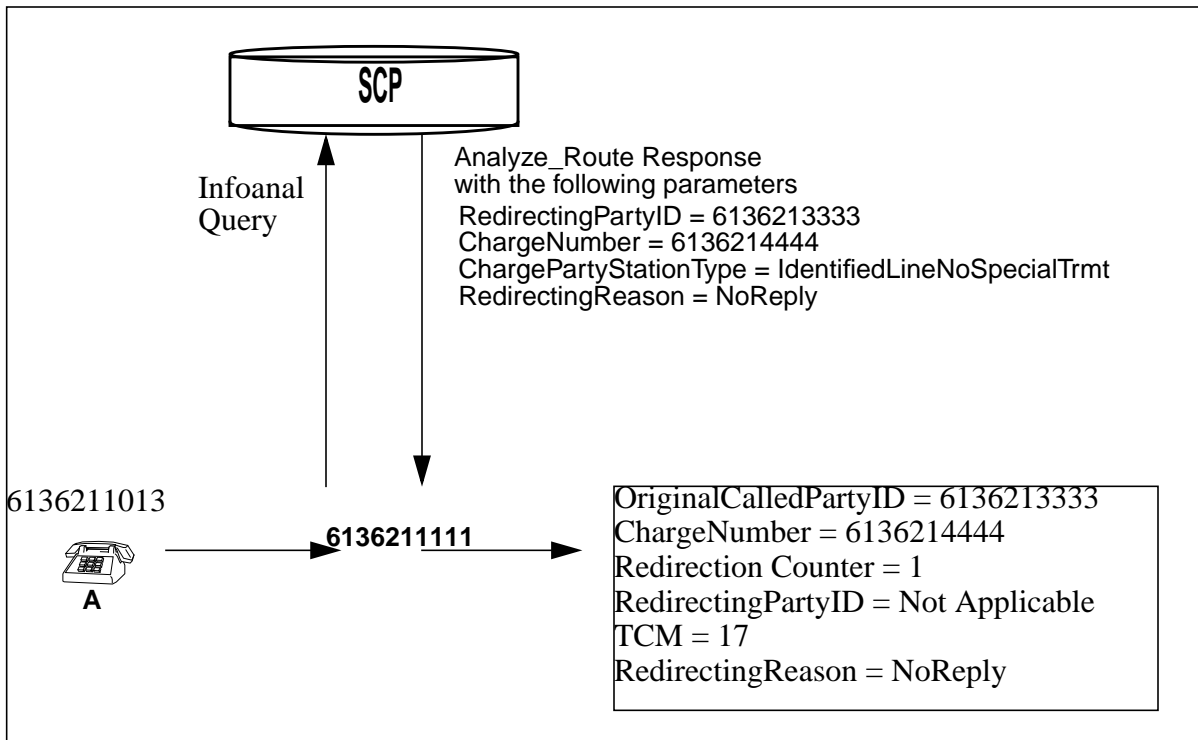
27.2.11.6 Example 6: Redirecting parameter in SCP response and Redirecting parameters in Forwarding Attributes. Redirecting parameters taken from SCP response

This example illustrates the LARP processing, where the SCP provided redirecting party id and charge number having precedence over the forwarding attributes.

Table 9 Table TRIGITM for example 6

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC Y Y UNCOND 6136212345 17 6136212121) \$</p> <p>REDIR = Y FWDATTR = Y REDIR_REASON = UNCOND REDIR_PARTY_ID = 6136212345 TCM = 17 CHARGE_NUMBER = 6136212121</p>
--

Figure 7 LARP as redirection. Precedence to redireting and charge number parameters included in AR response. Forwarding Attributes are not used is subsequent query processing and/or ISUP and PRI signalling.



27.2.11.7 Example 7: Redirecting parameters not sent in SCP analyze_route response and redirecting parameters present in forwarding attributes

This example illustrates the LARP processing, when redirecting party parameters and charge number is not provided in the analyze_route message. The redirecting party parameters and the charge number is derived from the forwarding attributes of the override line attributes.

Table 10 Table TRIGITM for example 7

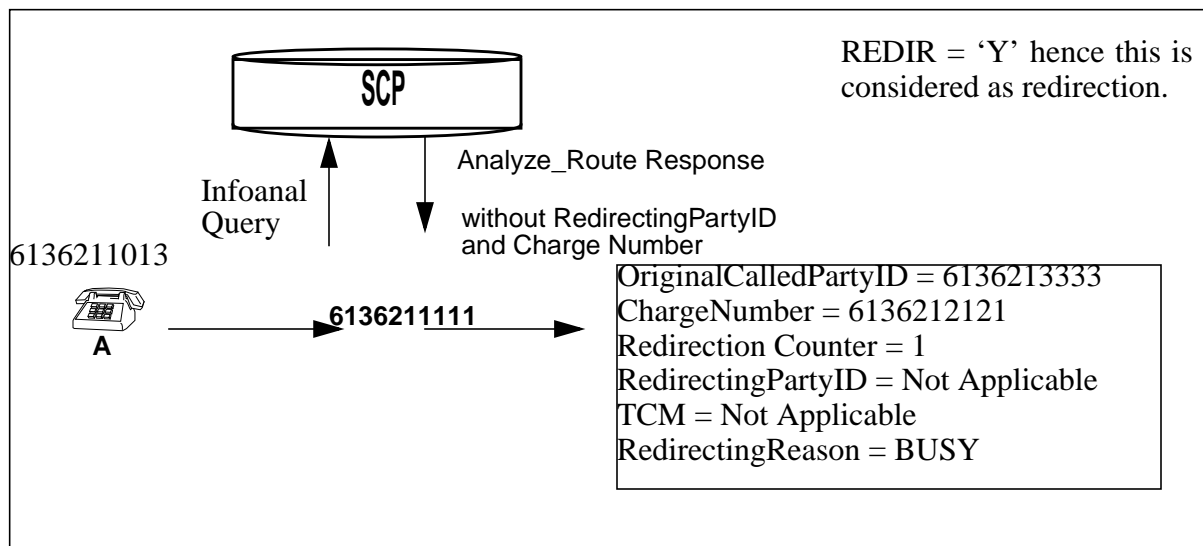
```

TABLE TRIGITM
4 SDSTRIG1 SDS (DG 6136211111) $ ULK EVENT R02 SS7
AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC Y
Y UNCOND 6136213333 $ 6136212121) $

REDIR = Y
FWDATTR = Y
REDIR_REASON = BUSY
REDIR_PARTY_ID = 6136213333
TCM = $
CHARGE_NUMBER = 6136212121

```

Figure 8 LARP as a redirection. redirecting and charge number parameters not sent in AR response. Forwarding attributes will be used for subsequent query processing and/or ISUP and PRI signaling.



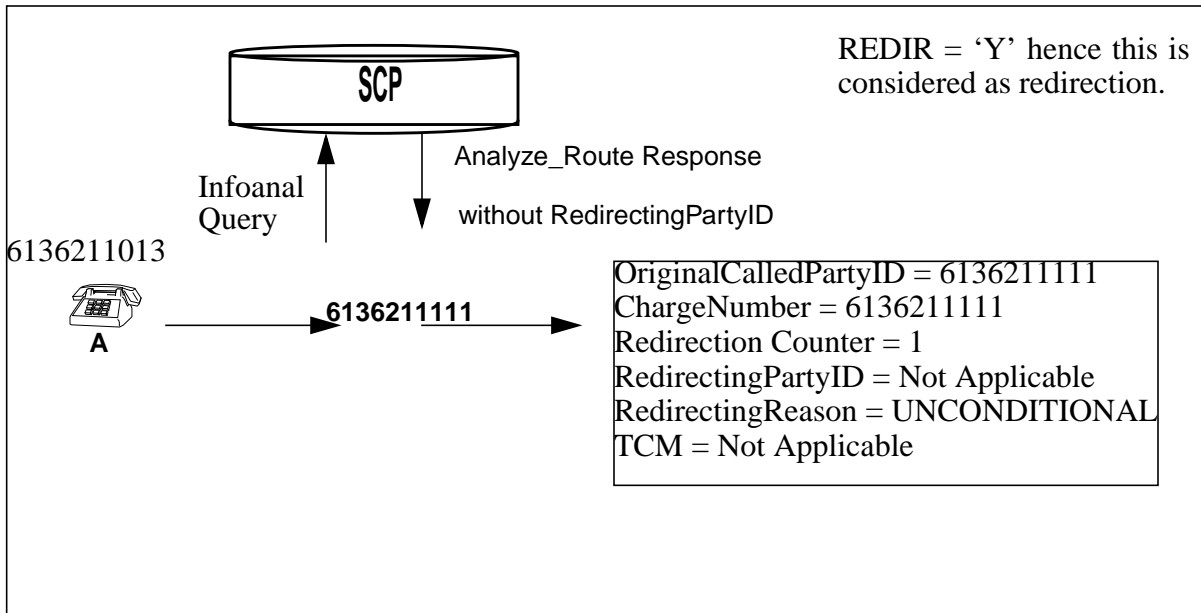
27.2.11.8 Example 8: SDS digits as Redirecting party and charge number

This example illustrates the LARP processing, where SDS digits are used as redirecting party parameter and charge number in the absence of redirecting party parameter and charge number of SCP analyze_route message. The redirecting party parameter and chargenumber has a '\$' or 'nil-value' datafilled in table trigitm.

Table 11 Table TRIGITM for example 8

<p>TABLE TRIGITM 4 SDSTRIG1 SDS (DG 6136211111) \$ ULK EVENT R02 SS7 AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC Y Y UNCONDITIONAL \$ \$ \$) \$</p> <p>REDIR = Y FWDATTR = Y REDIR_REASON = UNCOND REDIR_PARTY_ID = \$ TCM = \$ CHARGE_NUMBER = \$</p>

Figure 9 LARP as redirection. Nil-Values datafilled for forwarding attributes. precede logic in deriving the redirecting and charge number parameters to be used in subsequent query processing and/or ISUP and PRI signalling



27.2.11.9 Example 9: Serial triggering and forwarding attributes

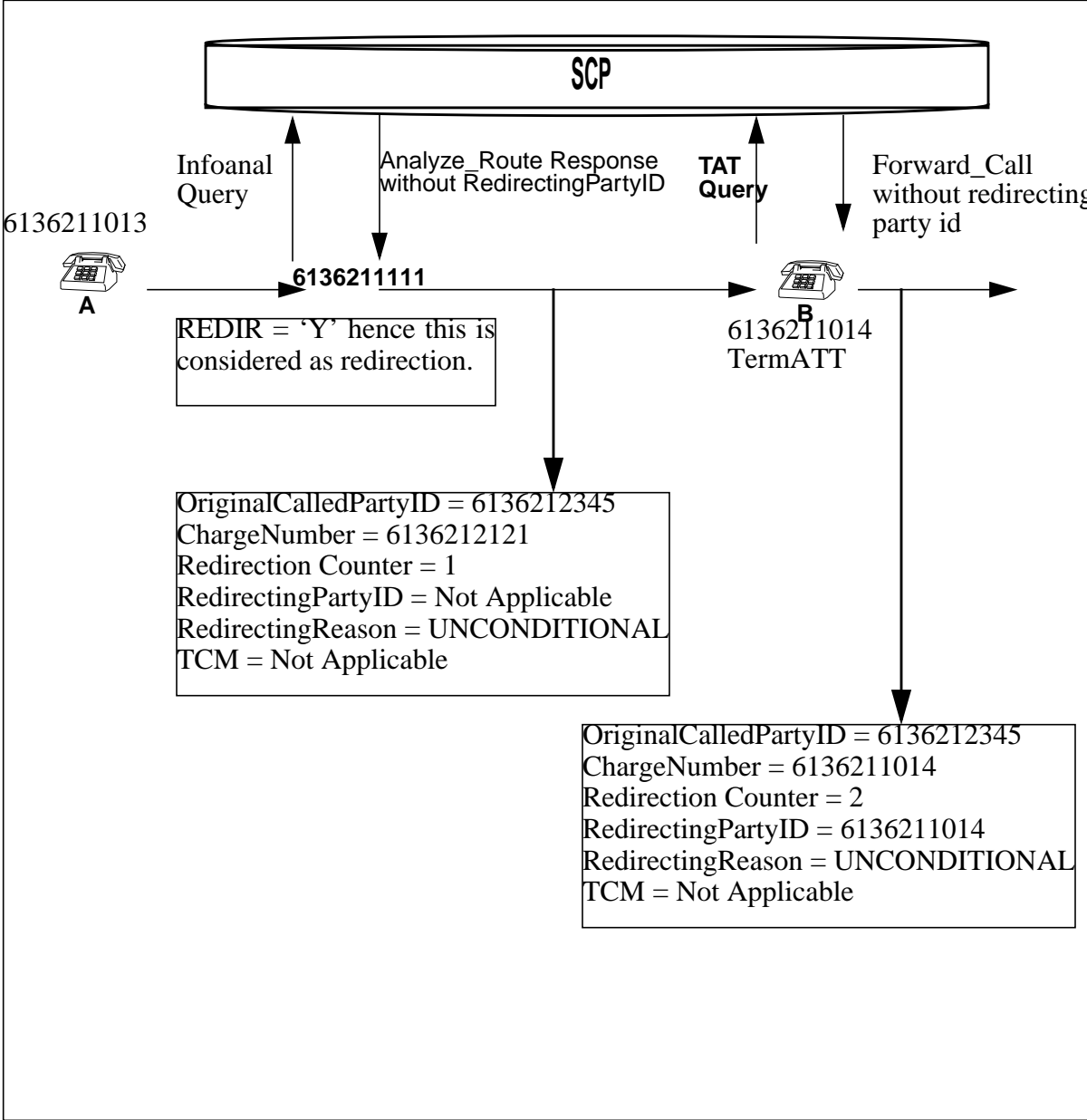
This example illustrates the LARP processing. In case of serial triggering how the redirecting party parameters and charge number derived from the forwarding attributes is overridden.

Table 12 Table TRIGITM for example 9

```
TABLE TRIGITM
4 SDSTRIG1 SDS (DG 6136211111) $ ULK EVENT R02 SS7
AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC Y
Y UNCOND 6136212345 $ 6136212121) $
```

```
REDIR = Y
FWDATTR = Y
REDIR_REASON = UNCOND
REDIR_PARTY_ID = 6136212345
TCM = $
CHARGE_NUMBER = 6136212121
```

Figure 10 LARP as redirection. The use of forwarding attributes in serial triggering query processing.



27.2.11.10 Example 10: Switch based redirection and LARP with forwarding attributes

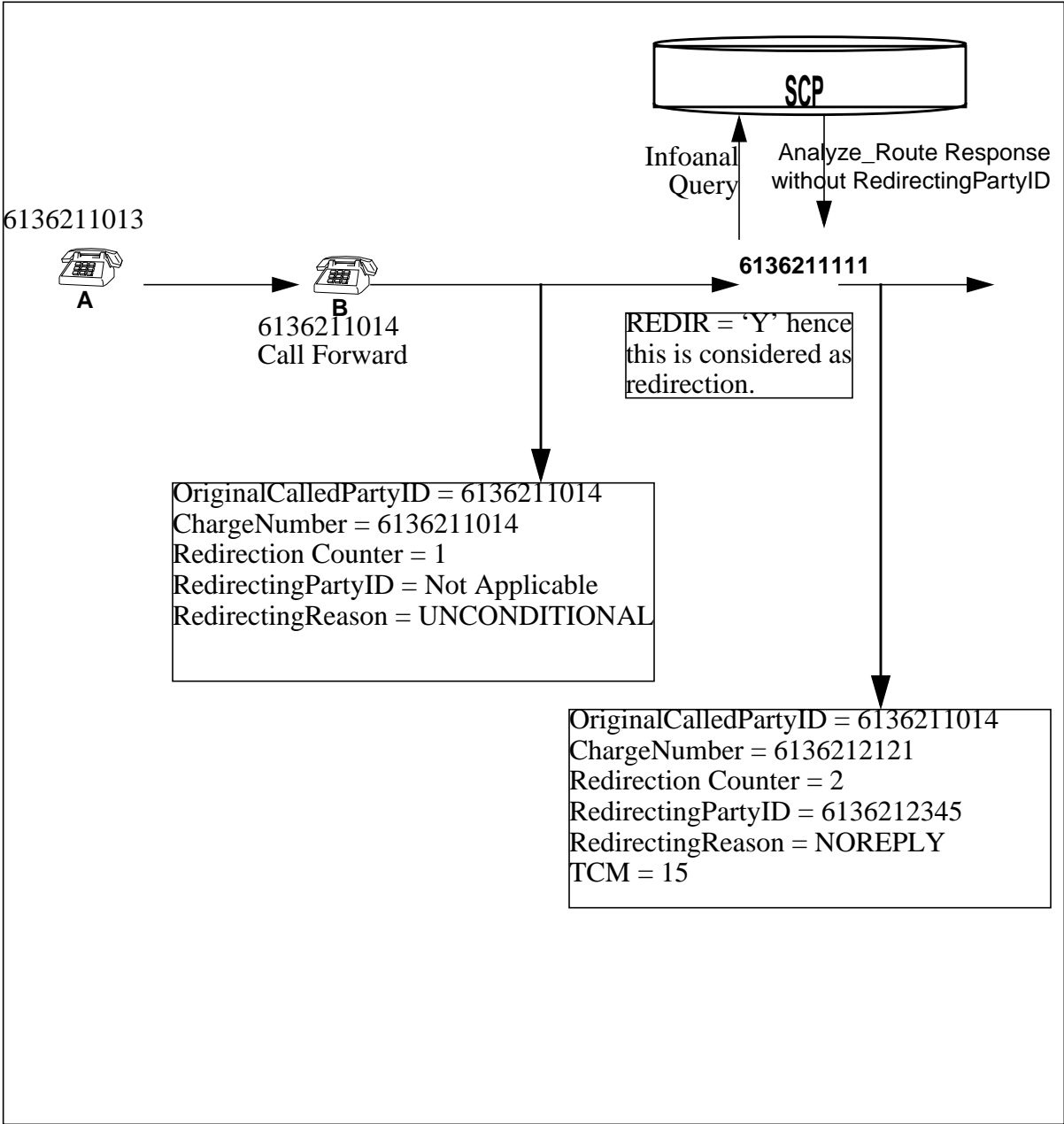
This example illustrates the LARP processing, for a trigger encountered after a switch based call forward. The LARP is considered as a redirection and the redirecting parameters from the forwarding attributes will be used in the response processing in the absence of redirecting parameters in the SCP response.

Table 13 Table TRIGITM for example 10

```
TABLE TRIGITM
4 SDSTRIG1 SDS (DG 6136211111) $ ULK EVENT R02 SS7
AINJAZZ (LARP 123 613_P621_123 613_LATA1_123 NILC NILC Y
Y UNCOND 6136212345 $ 6136212121) $
```

```
REDIR = Y
FWDATTR = Y
REDIR_REASON = NOREPLY
REDIR_PARTY_ID = 6136212345
TCM = 15
CHARGE_NUMBER = 6136212121
```

Figure 11 Switch based redirection and LARP as redirection interaction



27.3 Verifying TRAVER

This activity implements the TRAVER support to simulate the response processing, when the LARP option is datafilled in Table TRIGITM for the triggers SDS, PFC or N11. Two TRAVERs are performed to display the Call equivalent of:

- Query Processing
- Response Processing.

Parameter LARP on the TRAVER command line to test the Office datafill for the LARP. The operating company can verify the translation before activating the Software Optionality Contrl(SOC).

While the SOC for LARP on PFC or LARP on N11 is IDLE or Deactivated, the operating company can specify that it would like to see the results of a LARP in a TRAVER through the use of parameter LARP. TRAVERs performed without this parameter do not invoke LARP, therefore, the operating company can determine the result when the feature is active without affecting call processing. The operating company can further preserve the ability to use the TRAVER to determine current datafill.

It is important to note that even when using parameter LARP, it is better to perform two stage TRAVER which are:

1. The first TRAVER encounters the SDS/PFC/N11 triggers with the overriding line attributes specified by the LARP option and a warning message is displayed, indicating the need for a second TRAVER.
2. To simulate the Response Processing, TRAVER with AINRES option needs to be performed followed by the LARP option on the command line with the TDP and the TINAME as sub parameters derived from the first TRAVER.

27.3.1 Trigger Processing with LARP applicable on the trigger.

To simulate the Response Processing, TRAVER with AINRES option needs to be performed followed by the LARP option on the command line with the TDP and the TINAME as sub parameters.

27.3.1.1 Example 1 : SDS with LARP option

From a POTS line (DN 4164671001), dial 4164631009. The call triggers on the SDS digits 4164631009 and queries the database. Overriding line attributes are on trigger SDS, and TRAVER with the AINRES option must be performed to simulate the response processing. A warning message will be displayed indicating that a response TRAVER has to be performed with the

command line having the LARP option followed by the trigger attributes (TDP and TINAME) for which the LARP option has been provisioned, refer to Table 14, which illustrates the output of the TRAVER.

Table 14 POTS line originator encountering SDS trigger with LARP

Example 1 TRAVER output

TRAVER L 4671001 4164631009 B

TABLE LINEATTR

518 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_P621_418 L467_LATA1_418 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

416_P621_418 C467 416 P621 TSPTS N \$ \$

TABLE RATEAREA

L467_LATA1_418 L467 NIL LATA1 \$

TABLE DNATTRS

TUPLE NOT FOUND

TABLE DNGRPS

TUPLE NOT FOUND

TABLE LENFEAT

TUPLE NOT FOUND

TABLE OFCVAR

AIN_OFFICE_TRIGGRP TIID

AIN Orig Attempt TDP: no subscribed trigger.

TABLE STDPRTCT

P621 (1) (0) 1

. SUBTABLE STDPRT

WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE

BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO

DOCUMENTATION.

. 416 420 NT NP 0 NA \$

. SUBTABLE AMAPRT

. KEY NOT FOUND

. DEFAULT VALUE IS: NONE OVRNONE N

TABLE HPCPATTN

Table 14 POTS line originator encountering SDS trigger with LARP

Example 1 TRAVER output
TUPLE NOT FOUND
TABLE HNPACONT
416 Y 999 1 (52) (1) (4) (0) 4 \$
. SUBTABLE HNPACODE
. 416 416 HNP A 0
. 463 463 DN 416 463
TABLE TOFCNAME
416 463 \$
TABLE DNINV
416 463 1009 D BLDN
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE TMTCNTL
LNT (46)
. SUBTABLE TREAT
. BLDN Y T OFRT 50
. TABLE OFRT
. 50 S D VCA
. S D *OFLO
. S D LKOUT
. EXIT TABLE OFRT
LNP Info: Called DN is not resident.
LNP Info: HNP A results are used.
TABLE LCASCRCN
416 L467 (3) OPTL N N
. SUBTABLE LCASCR

Table 14 POTS line originator encountering SDS trigger with LARP

Example 1 TRAVER output	
. 416 416	
TABLE LCASCRCN	
416 L467 (3) OPTL N N	
. SUBTABLE LCASCR	
. 463 463	
TABLE PFXTREAT	
OPTL NP Y NP UNDT	
TABLE CLSVSCRC	
416 C467 NP 2 N NONE (1)	
. SUBTABLE CLSVSCR	
. KEY NOT FOUND	
AIN Info Collected TDP: no subscribed trigger.	
Checking AIN SDS Trigger Items as SDS is compatible with current call	
. . TABLE OFCTIID	
. . 4 SDSLARP ON	
. . TABLE TRIGITM	
. . 4 SDSLARP SDS (DG 4164631009) \$ ULK EVENT R02 SS7 AINPOP	
. . (LARP 101 416_P621_418 L467_LATA1_418 GTE MCI N N) \$	
. . . TABLE C7GTTTYPE	
. . . AINPOP ANS17 6 \$	
. . . TABLE C7GTT	
. . . AINPOP 4164631009 4164631009 PCSSN (SIMTOOL RTESET SIMTOOL3 0) \$ SSN	
WARNING: LARP option datafilled for SDS trigger. Perform	
a response TRAVER with LARP 4 SDSLARP on the command line	
after the AR response.	
AIN Info Analyzed TDP: trigger criteria met.	
Querying the database would occur now.	
Use the AINMQG option to save the query to a file for use in TstQuery.	
Use the AINRES option for further information	

Table 14 POTS line originator encountering SDS trigger with LARP

Example 1 TRAVER output

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

**WARNING: LARP option datafilled for SDS trigger. Perform
a response TRAVER with LARP 4 SDSLARP on the command line
after the AR response.**

AIN Info Analyzed TDP: trigger criteria met.

Querying the database would occur now.

Use the AINMQG option to save the query to a file for use in TstQuery.

Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

27.3.1.2 Example 2 : PFC with LARP option

From a POTS line (DN 4164671001), dial B333. The call triggers on the PFC digits B333 and queries the database. Overriding line attributes are on trigger PFC, and TRAVER with the AINRES option must be performed to simulate the response processing. A warning message will be displayed indicating that a response TRAVER has to be performed with the command line having the LARP option followed by the trigger attributes (TDP and TINAME) for which the LARP option has been provisioned, refer to Table 15, which illustrates the output of the TRAVER.

Table 15 RES line originator encountering PFC with LARP

Example 2 TRAVER output
>TRAVER L 4671001 B333 B
TABLE IBNLINES
HOST 01 1 00 02 0 DT STN RES 4671001 403 416_PUB_403 L416_LATA1_400 416 \$
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403 L416_LATA1_400 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 \$ \$
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 \$
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
HOST 01 1 00 02 0 AIN AIN TIID (3 SACOHD ON) (4 SAM_PFC ON) \$
TABLE CUSTSTN
RESG416 AIN AIN TIID
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS

Table 15 RES line originator encountering PFC with LARP

```

Example 2 TRAVER output
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
NCOS FEAT XLA name is NIL. Go to next XLA name.
TABLE IBNXLA: XLANAME RESGSTAR
RESGSTAR 333 FTR 3 AIN IMMED
Checking AIN PFC Trigger Items as PFC is compatible with current call
. . TABLE TRIGITM
. . 4 SAM_PFC PFC (DG B333) $ ULK EVENT R02 SS7 AINPOP
. . (LARP 101 613_P621_0 L613_LATA1_0 GTE MCI N N) $
. . . TABLE C7GTTYPE
. . . AINPOP ANS17 6 $
. . . TABLE IBNFEAT
. . . TUPLE NOT FOUND
. . . TABLE C7GTT
. . . AINPOP 4164671001 4164671001 PCSSN (SIMTOOL RTESET SIMTOOL3 0) $ SSN
WARNING: LARP option datafilled for PFC trigger. Perform
a response TRAVER with LARP 4 SAM_PFC on the command line
after the AR response.
AIN Info Analyzed TDP: trigger criteria met.
Querying the database would occur now.
Use the AINMQG option to save the query to a file for use in TstQuery.
Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: LARP option datafilled for PFC trigger. Perform
a response TRAVER with LARP 4 SAM_PFC on the command line

```

Table 15 RES line originator encountering PFC with LARP**Example 2 TRAVER output**

after the AR response.

AIN Info Analyzed TDP: trigger criteria met.

Querying the database would occur now.

Use the AINMQG option to save the query to a file for use in TstQuery.

Use the AINRES option for further information

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.1.3 Example 3 : N11 with LARP option

From a POTS line (DN 6136212111), dial 411. The call triggers at N11 on the digits 411 and queries the database. Overriding line attributes are on trigger N11, and TRAVEL with the AINRES option must be performed to simulate the response processing. A warning message will be displayed indicating that a response TRAVEL has to be performed with the command line having the LARP option followed by the trigger attributes (TDP and TINAME) for which the LARP option has been provisioned, refer to Table 16, which illustrates the output of the TRAVEL

Table 16 POTS line originator encountering N11 with LARP

Example 3 TRAVEL output
<pre> >TRAVEL L 6136212111 411 B TABLE LINEATTR 0 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_P621_0 L613_LATA1_0 \$ LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE TABLE XLAPLAN 613_P621_0 FR01 613 P621 TSPS N \$ \$ TABLE RATEAREA L613_LATA1_0 L613 NIL LATA1 \$ TABLE DNATTRS TUPLE NOT FOUND TABLE DNGRPS TUPLE NOT FOUND TABLE LENFEAT TUPLE NOT FOUND TABLE OFCVAR AIN_OFFICE_TRIGGRP TIID AIN Orig Attempt TDP: no subscribed trigger. TABLE STDPRTCT P621 (1) (0) 0 . SUBTABLE STDPRT WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO </pre>

Table 16 POTS line originator encountering N11 with LARP

Example 3 TRAVER output

DOCUMENTATION.

. 411 411 T OA 0 OFRT 44 3 3 NONE

.. TABLE OFRT

.. 44 N D DAC 3 N Y

.. EXIT TABLE OFRT

. SUBTABLE AMAPRT

. KEY NOT FOUND

. DEFAULT VALUE IS: NONE OVRNONE N

TABLE HPCPATTN

TUPLE NOT FOUND

TABLE LATA1A

TUPLE NOT FOUND

ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD

AIN Info Collected TDP: no subscribed trigger.

Checking AIN N11 Trigger Items as N11 is compatible with current call

.. TABLE OFCTIID

.. 4 N411D ON

.. **TABLE TRIGITM**.. **4 N411D N11 (DG 411) \$ ULK EVENT R02 SS7 AINJAZZ**.. **(LARP 101 613_P621_0 L613_LATA1_0 GTE MCI Y N) \$**

... TABLE C7GTTYPE

... AINJAZZ ANSI7 3 \$

... TABLE C7GTT

... AINJAZZ 4110000000 4110000000 SSNONLY (AINTTEST) \$

WARNING: LARP option datafilled for N11 trigger. Perform**a response TRAVER with LARP 4 N411 on the command line****after the AR response.**

AIN Info Analyzed TDP: trigger criteria met.

Querying the database would occur now.

Use the AINMQG option to save the query to a file for use in TstQuery.

Table 16 POTS line originator encountering N11 with LARP

Example 3 TRAVER output
<p>Use the AINRES option for further information</p> <p>+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++</p> <p>WARNING: LARP option datafilled for N11 trigger. Perform a response TRAVER with LARP 4 N411 on the command line after the AR response.</p> <p>AIN Info Analyzed TDP: trigger criteria met.</p> <p>Querying the database would occur now.</p> <p>Use the AINMQG option to save the query to a file for use in TstQuery.</p> <p>Use the AINRES option for further information</p> <p>+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++</p>

27.3.2 Response Processing with LARP option on the command line

To simulate the Response Processing, TRAVEL with AINRES option needs to be performed followed by the LARP option on the command line with the TDP and the TINAME as sub parameters.

27.3.2.1 Example 1 : Response Processing with POTS agent as originator

From a POTS line (DN 6136671001), dial 6136671001 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations, refer to Table 17, which illustrates the output of the TRAVEL.

Table 17 AIN response translation with LARP option for POTS agent

Example 1 TRAVEL output
<pre>>TRAVEL L 6671001 N CDN NA 6136671001 AINRES R02 AR LARP 4 SDSLARP B</pre>
<pre>Warning: Routing characteristics are present.</pre>
<pre> Originator must be able to send in characteristics specified.</pre>
<pre>Warning: Originator's Line attributes are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM</pre>
<pre>TABLE RTECHAR . LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$</pre>
<pre>TABLE LINEATTR 101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$</pre>
<pre>LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE</pre>
<pre>TABLE XLAPLAN 613_P621_0 FR01 613 P621 TSPS N \$ \$</pre>
<pre>TABLE RATEAREA L613_LATA1_0 L613 NIL LATA1 \$</pre>
<pre>TABLE DNATTRS</pre>

Table 17 AIN response translation with LARP option for POTS agent

Example 1 TRAVER output
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
. LECNA P621 (XLA P621)\$
TABLE STDPRTCT
P621 (1) (0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 613667 613669 NT NP 0 NA \$
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 939 2 (60) (1) (84) (0) 2 \$
. SUBTABLE HNPACODE
. 613667 6136737100 HNPA 0
. 667 667 DN 613 667
TABLE TOFCNAME
613 667 \$
TABLE DNINV
613 667 1001 L HOST 01 0 00 02

Table 17 AIN response translation with LARP option for POTS agent

Example 1 TRAVER output
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPAs results are used.
TABLE LCASCRCN
613 L613 (44) OPTL N N
. SUBTABLE LCASCR
. 613 613
TABLE LCASCRCN
613 L613 (44) OPTL N N
. SUBTABLE LCASCR
. 667 667
TABLE PFXTREAT
OPTL NP Y NP UNDT
TABLE CLSVSCRC
KEY NOT FOUND
Checking AIN SDS Trigger Items as SDS is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.
+++ TRAVER: SUCCESSFUL CALL TRACE +++
Warning: Originator's Line attributes are being overridden
by those provided by the LARP option from the
corresponding tuple in TABLE TRIGITM

Table 17 AIN response translation with LARP option for POTS agent

Example 1 TRAVER output		
DIGIT TRANSLATION ROUTES		
1 LINE	6136671001	ST
TREATMENT ROUTES. TREATMENT IS: GNCT		
1 *OFLO		
2 LKOUT		
+++ TRAVER: SUCCESSFUL CALL TRACE +++		

27.3.2.2 Example 2 : Response Processing with IBN agent as originator

From an IBN line (DN 4164771051), dial 4164671002 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations, refer to Table 18, which illustrates the output of the TRAVER.

Table 18 AIN Response translation with LARP option for IBN Agents

Example 2 TRAVER Output
<pre>>traver l 4771051 n cdn na 4164671002 ainres r02 ar larp 4 sdslarp b Warning: Routing characteristics are present. Originator must be able to send in characteristics specified. WARNING: Line Attributes of Originator are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM TABLE RTECHAR . LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$ TABLE LINEATTR 101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$ LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE TABLE XLAPLAN 613_P621_0 FR01 613 P621 TSPS N \$ \$ TABLE RATEAREA L613_LATA3_302 L613 NIL LATA3 \$ TABLE DNATTRS TUPLE NOT FOUND TABLE DNGRPS TUPLE NOT FOUND</pre>

Table 18 AIN Response translation with LARP option for IBN Agents

Example 2 TRAVER Output

TABLE LENFEAT
 TUPLE NOT FOUND
 TABLE OFCVAR
 AIN_OFFICE_TRIGGRP TIID
 TABLE PXLAMAP
 . LECNA P621 (XLA P621)\$
 TABLE STDPRTCT
 P621 (1) (0) 1
 . SUBTABLE STDPRT
 WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
 BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
 DOCUMENTATION.
 . 416 420 NT NP 0 NA \$
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS: NONE OVRNONE N
 TABLE HPCPATTN
 TUPLE NOT FOUND
 TABLE HNPACONT
 613 Y 932 2 (4) (1) (84) (0) 2 \$
 . SUBTABLE HNPACODE
 . 416 416 HNPA 0
 . 467 467 DN 416 467
 TABLE TOFCNAME
 416 467 \$
 TABLE DNINV
 416 467 1002 LC 0
 TABLE DNFEAT

Table 18 AIN Response translation with LARP option for IBN Agents

Example 2 TRAVER Output
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE CFW
0 LCL 416 4671002 NSCR Y F 1023 A 4771052 N N
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 (44) OPTL N N Y
. SUBTABLE LCASCR
. 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.
+++ TRAVER: SUCCESSFUL CALL TRACE +++
<p>WARNING: Line Attributes of Originator are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM</p>

Table 18 AIN Response translation with LARP option for IBN Agents

Example 2 TRAVER Output		
DIGIT TRANSLATION ROUTES		
1 LINE	4164671002	ST
TREATMENT ROUTES. TREATMENT IS: GNCT		
1 *OFLO		
2 LKOUT		
+++ TRAVER: SUCCESSFUL CALL TRACE +++		

27.3.2.3 Example 3 : Response Processing with RES agent as originator

From a RES line (DN 4164671021), dial 4164671002 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations, refer to Table 19, which illustrates the output of the TRAVER.

Table 19 AIN response translation with LARP option on RES agent.

Example 3 TRAVER Output
>traver l 4671021 n cdn na 4164671002 ainres r02 ar larp 4 sdslarp b
Warning: Routing characteristics are present.
Originator must be able to send in characteristics specified.
WARNING: Line Attributes of Originator are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM
TABLE RTECHAR
. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$
TABLE LINEATTR
101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_0 FR01 613 P621 TSPS N \$ \$
TABLE RATEAREA
L613_LATA3_302 L613 NIL LATA3 \$
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS

Table 19 AIN response translation with LARP option on RES agent.

Example 3 TRAVER Output

```

TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT NP 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 4) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416 416 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 LC 0

```

Table 19 AIN response translation with LARP option on RES agent.

Example 3 TRAVER Output

```

TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE CFW
0 LCL 416 4671002 NSCR Y F 1023 A 4771052 N N
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N Y
. SUBTABLE LCASCR
. 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: Line Attributes of Originator are being overridden
by those provided by the LARP option from the
corresponding tuple in TABLE TRIGITM

```

Table 19 AIN response translation with LARP option on RES agent.

Example 3 TRAVER Output

DIGIT TRANSLATION ROUTES

1 LINE 4164671002 ST

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.2.4 Example 4 : Response Processing with TRUNK originator

From a TRUNK (ISUPICITT), dial 6136671001 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations, refer to Table 20, which illustrates the output of the TRAVER.

Table 20 TRAVER example for a TRUNK Originator

Example 4 TRAVER Output
>traver tr isupicitt n cdn na 4164671002 ainres r02 ar larp 4 sdslarp b
Warning: Routing characteristics are present.
Originator must be able to send in
characteristics specified.
WARNING: Line Attributes of Originator are being overridden
by those provided by the LARP option from the
corresponding tuple in TABLE TRIGITM
TABLE RTECHAR
. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$
TABLE LINEATTR
101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_0 FR01 613 P621 TSPS N \$ \$
TABLE RATEAREA
L613_LATA3_302 L613 NIL LATA3 \$
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID

Table 20 TRAVER example for a TRUNK Originator

Example 4 TRAVER Output

```

TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT NP 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 4) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416 416 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 LC 0
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS

```

Table 20 TRAVER example for a TRUNK Originator

Example 4 TRAVER Output	
|	TUPLE NOT FOUND
|	TABLE CFW
|	0 LCL 416 4671002 NSCR Y F 1023 A 4771052 N N
|	LNP Info: Called DN is resident.
|	LNP Info: Called DN has native NPANXX.
|	LNP Info: HNP results are used.
|	TABLE LCASCRCN
|	613 L613 (44) OPTL N N Y
|	. SUBTABLE LCASCR
|	. 416 416
|	TABLE LCASCRCN
|	KEY NOT FOUND
|	LCASCRCN TUPLE MISSING
|	TABLE CLSVSCRC
|	KEY NOT FOUND
|	Checking AIN SDS Trigger Items as SDS is compatible with current call
|	Checking AIN N11 Trigger Items as N11 is compatible with current call
|	AIN Info Analyzed TDP: trigger criteria not met.
|	AIN Term Attempt TDP: no subscribed trigger.
|	+++ TRAVER: SUCCESSFUL CALL TRACE +++
|	WARNING: Line Attributes of Originator are being overridden
|	by those provided by the LARP option from the
|	corresponding tuple in TABLE TRIGITM
|	DIGIT TRANSLATION ROUTES

Table 20 TRAVER example for a TRUNK Originator

Example 4 TRAVER Output		
1 LINE	4164671002	ST
TREATMENT ROUTES. TREATMENT IS: GNCT		
1 *OFLO		
2 LKOUT		
+++ TRAVER: SUCCESSFUL CALL TRACE +++		

27.3.2.5 Example 5 : Response Processing with VFG-IBN Originator

From a VFG-IBN Originator (VCNCO1), dial 4164671002 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations. Please refer to Table 21 to illustrate the output of the TRAVER.

Table 21 TRAVER Example for VFG-IBN Originators

Example 5 TRAVER Output
<pre>>traver v vcnco1 n cdn na 4164671002 ainres r02 ar larp 4 sdslarp b</pre>
Warning: Routing characteristics are present.
Originator must be able to send in characteristics specified.
WARNING: Line Attributes of Originator are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM
TABLE RTECHAR
. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$
TABLE LINEATTR
101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_0 FR01 613 P621 TSPS N \$ \$
TABLE RATEAREA
L613_LATA3_302 L613 NIL LATA3 \$
TABLE PXLAMAP
. LECNA P621 (XLA P621)\$
TABLE STDPRTCT
P621 (1) (0) 1

Table 21 TRAVER Example for VFG-IBN Originators

Example 5 TRAVER Output	
|	. SUBTABLE STDPRT
|	WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
|	BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
|	DOCUMENTATION.
|	. 416 420 NT NP 0 NA \$
|	. SUBTABLE AMAPRT
|	. KEY NOT FOUND
|	. DEFAULT VALUE IS: NONE OVRNONE N
|	TABLE HPCPATTN
|	TUPLE NOT FOUND
|	TABLE HNPACONT
|	613 Y 932 2 (4) (1) (84) (0) 2 \$
|	. SUBTABLE HNPACODE
|	. 416 416 HNPA 0
|	. 467 467 DN 416 467
|	TABLE TOFCNAME
|	416 467 \$
|	TABLE DNINV
|	416 467 1002 LC 0
|	TABLE DNFEAT
|	TUPLE NOT FOUND
|	TABLE DNATTRS
|	TUPLE NOT FOUND
|	TABLE DNGRPS
|	TUPLE NOT FOUND
|	TABLE CFW
|	0 LCL 416 4671002 NSCR Y F 1023 A 4771052 N N
|	LNP Info: Called DN is resident.

Table 21 TRAVER Example for VFG-IBN Originators

Example 5 TRAVER Output

```

LNP Info: Called DN has native NPANXX.
LNP Info: HNSA results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N Y
. SUBTABLE LCASCR
. 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
TABLE CLSVSCRC
KEY NOT FOUND
TABLE CUSTSTN
COMKODAK AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE TRIGGRP
CDPCODE INFOANAL
. CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
. CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

Table 21 TRAVER Example for VFG-IBN Originators

Example 5 TRAVER Output

DIGIT TRANSLATION ROUTES

1 LINE 4164671002 ST

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.2.6 Example 6: Response Processing with AC Originator

From an AC Originator (ATTKDKD), dial 4164671002 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations. Please refer to Table 22 to illustrate the output of the TRAVER.

Table 22 TRAVER Example for AC Originators

Example 6 : TRAVER Output
<pre>>traver c attkdkd n cdn na 4164671002 ainres r02 ar larp 4 sdslarp b</pre>
Warning: Routing characteristics are present.
Originator must be able to send in characteristics specified.
WARNING: Line Attributes of Originator are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM
TABLE RTECHAR
. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$
TABLE LINEATTR
101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_0 FR01 613 P621 TSPS N \$ \$
TABLE RATEAREA
L613_LATA3_302 L613 NIL LATA3 \$
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID

Table 22 TRAVER Example for AC Originators

Example 6 : TRAVER Output

```

TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT NP 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 4) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416 416 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 LC 0
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS

```

Table 22 TRAVER Example for AC Originators

Example 6 : TRAVER Output

TUPLE NOT FOUND

TABLE CFW

0 LCL 416 4671002 NSCR Y F 1023 A 4771052 N N

LNP Info: Called DN is resident.

LNP Info: Called DN has native NPANXX.

LNP Info: HNSA results are used.

TABLE LCASCRCN

613 L613 (44) OPTL N N Y

. SUBTABLE LCASCR

. 416 416

TABLE LCASCRCN

KEY NOT FOUND

LCASCRCN TUPLE MISSING

TABLE CLSVSCRC

KEY NOT FOUND

Checking AIN SDS Trigger Items as SDS is compatible with current call

Checking AIN N11 Trigger Items as N11 is compatible with current call

AIN Info Analyzed TDP: trigger criteria not met.

AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: Line Attributes of Originator are being overridden
by those provided by the LARP option from the
corresponding tuple in TABLE TRIGITM

DIGIT TRANSLATION ROUTES

Table 22 TRAVER Example for AC Originators

Example 6 : TRAVER Output		
1 LINE	4164671002	ST
TREATMENT ROUTES. TREATMENT IS: GNCT		
1 *OFLO		
2 LKOUT		
+++ TRAVER: SUCCESSFUL CALL TRACE +++		

27.3.3 TRAVER Interactions of LARP with CarrierUsage and TNS parameter

This activity enhances the selection of a carrier for an Equal Access call. The interaction of this activity with CarrierUsage Parameter Processing are as in below given tables.

27.3.3.1 When CU = AlwaysOverride or CU =0 or CU is absent

Refer to Table 23, which illustrates the interaction of LARP and CarrierUsage when it takes a value AlwaysOverride (CU =0) or the CarrierUsage option is absent from the command line.

Table 23 Interaction of LARP with CarrierUsage when it takes a value AlwaysOverride or CU = 0

Originator's		LARP option present		TNS option present	Calltype	Carrier Used
PIC	LPIC	PIC	LPIC			
DC	DC	DC	DC	Y	DC	Use TNS
DC	N	Y	N	N	InterLATA	Use LARP PIC
					IntraLATA	Non - EA Call or use LEC
					LOCAL	Normal
DC	DC	Y	Y	N	InterLATA	Use LARP PIC
					IntraLATA	Use LARP LPIC
					LOCAL	Normal
Y	DC	N	Y	N	InterLATA	Use OPIC
					IntraLATA	Use LARP LPIC
					LOCAL	Normal
Y	Y	N	N	N	InterLATA	Use OPIC
					IntraLATA	Use OLPIC
					LOCAL	Normal
N	N	N	N	N	InterLATA	Office Default for POTS Customer Default for IBN and RES
					IntraLATA	Non - EA Call or use LEC
					LOCAL	Normal
DC - Don't Care CT - Calltype OLPIC - Originator's LPIC OPIC - Originator's PIC TNS - Transit Network Selector NOC - Nature of Carrier						

27.3.3.2 When CU = InterLATAOverride or CU =1

Refer to Table 24, which illustrates the interaction of LARP and CarrierUsage value INTERLATAOverride or CU=1.

Table 24 Interaction of LARP with CarrierUsage when it takes a value InterLATAOverride or CU =1

Originator's		LARP option present		TNS option present	Calltype	Carrier Used
PIC	LPIC	PIC	LPIC			
DC	DC	DC	DC	Y	InterLATA	Use TNS
DC	DC	DC	DC	N	InterLATA	Treatment
DC	DC	DC	Y	DC	IntraLATA	Use LARP LPIC
DC	Y	DC	N	DC	IntraLATA	Use OLPIC
DC	N	DC	N	DC	IntraLATA	Non - EA Call or use LEC
DC	DC	DC	DC	DC	Local	Normal Call

DC	-	Don't Care
CT	-	Calltype
OLPIC	-	Originator's LPIC
OPIC	-	Originator's PIC
TNS	-	Transit Network Selector
NOC	-	Nature of Carrier

27.3.3.3 When CU = OverridePICsOfNOCsSent or CU = 2

Refer to Table 25, which illustrates the interaction of LARP and CarrierUsagevalue OverridePICsOfNOCsSent (CU =2).

Table 25 Interaction of LARP with CarrierUsage when it takes a value OverridePICsOfNOCsSent

Originator's		LARP option present		TNS option present	Condition	Carrier Used	Calltype
PIC	LPIC	PIC	LPIC				
DC	DC	DC	DC	N	DC	Treatment	
DC	DC	DC	DC	Y	CT = NOC	Use TNS	
DC	DC	Y	Y	Y	CT != NOC	Use LARP PIC	InterLATA
						Use LARP LPIC	IntraLATA
Y	DC	N	DC	Y	CT != NOC	Use OPIC	InterLATA
						Use LPIC	IntraLATA
N	Y	N	N	Y	CT != NOC	Office Default for POTS	InterLATA
						Customer Default for IBN or RES	
Use OLPIC IntraLATA							
DC - Don't Care CT - Calltype OLPIC - Originator's LPIC OPIC - Originator's PIC TNS - Transit Network Selector NOC - Nature of Carrier							

27.3.3.4 Example 1 : Interaction of LARP with TNS when CarrierUsage = AlwaysOverride (CU=0) or Carrier Usage not given in the TRAVER command line

From a POTS line (DN 6136671001), dial 6136671001 with the TNS carrier and LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations. The TNS carrier overrides the LARP provisioned and Originator's PIC/LPIC and is used for routing. FIG 7 illustrates the output of the TRAVER.

Table 26 AIN response translation with LARP and TNS option

Example 1 TRAVER Output
<pre>>TRAVER L 6671001 N CDN NA 6136671001 TNS NA CIC 0488 AINRES R02 AR LARP 4 SDSLARP B</pre>
<pre>Warning: Routing characteristics are present. Originator must be able to send in characteristics specified.</pre>
<pre>Warning: Originator's Line attributes are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM</pre>
<pre>TABLE RTECHAR . IXCDDNA (CDN NA (TNS NA)\$) (BC 3_1KHZ (CDN NA) (TNS NA)\$)\$</pre>
<pre>TABLE LINEATTR 101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$</pre>
<pre>LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE</pre>
<pre>TABLE XLAPLAN 613_P621_0 FR01 613 P621 TSPS N \$ \$</pre>
<pre>TABLE RATEAREA L613_LATA1_0 L613 NIL LATA1 \$</pre>
<pre>TABLE DNATTRS TUPLE NOT FOUND</pre>
<pre>TABLE DNGRPS</pre>

Table 26 AIN response translation with LARP and TNS option

Example 1 TRAVER Output
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
. IXCDDNA P621 (XLA DDNA)\$
TABLE STDPRTCT
DDNA (1) (0) 5
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 10488 10488 EA DD 5 T NA ITT Y OFRT 900 5 20 N
. . TABLE OFRTMAP
. . . Tuple not found. Default to old index.
. . TABLE OFRT
. . 900 CND EA INTNL SK 2
. . N D ISUPOGITT 0 N N
. . CND ALWAYS SK 1
. . N D ISUPOGITT 15 N N
. . EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 939 2 (60) (1) (84) (0) 2 \$
. SUBTABLE HNPACODE

Table 26 AIN response translation with LARP and TNS option

Example 1 TRAVER Output
. 613667 6136737100 HNPA 0
. 667 667 DN 613 667
TABLE TOFCNAME
613 667 \$
TABLE DNINV
613 667 1001 L HOST 01 0 00 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 (44) OPTL N N
. SUBTABLE LCASCR
. 613 613
TABLE LCASCRCN
613 L613 (44) OPTL N N
. SUBTABLE LCASCR
. 667 667
TABLE PFXTREAT
OPTL DD Y DD UNDT
TABLE CLSVSCRC
KEY NOT FOUND
EA:Local override does not apply to this call.
TABLE LATAXLA
TUPLE NOT FOUND

Table 26 AIN response translation with LARP and TNS option

```
Example 1 TRAVER Output
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
TABLE OCCINFO
ITT 0488 EAP Y Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N N Y
TABLE EASAC
TUPLE NOT FOUND
OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
Using Equal Access (EA) route   OFRT 900 from Pretranslation
TABLE OFRTMAP
. Tuple not found. Default to old index.
TABLE OFRT
900 CND EA INTNL SK 2
  N D ISUPOGITT 0 N N
  CND ALWAYS SK 1
  N D ISUPOGITT 15 N N
TABLE OFRTMAP
. Tuple not found. Default to old index.
EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 ISUPOGITT      6136671001      ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```


27.3.3.5 Example 2: Interaction of LARP with CarrierUsage not being AlwaysOverride

From a POTS line (DN 6136671001), dial 6136671001 with the CarrierUsage option on the command line taking a value InterLataOverride. This is followed by the LARP option with the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations. Another warning message is displayed indicating that the LARP provisioned PIC/LPIC will override that of the Originator's and the corresponding PIC/LPIC is used for routing depending upon the Calltype. FIG 8 illustrates the output of the TRAVER.

Table 27 AIN response translation, interaction of CU and LARP

Example 2 TRAVER output
<pre> >TRAVER L 6671001 N CDN NA 6136671001 AINRES R02 AR CU 1 NOC INTRALT LARP 4 SDSLARP B CU available. Routing Characteristics may change NOC is ignored as TNS carrier is not given Warning: Routing characteristics are present. Originator must be able to send in characteristics specified. Warning: Originator's Line attributes are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM TABLE RTECHAR . LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$ TABLE LINEATTR 101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$ LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE TABLE XLAPLAN 613_P621_0 FR01 613 P621 TSPS N \$ \$ TABLE RATEAREA L613_LATA1_0 L613 NIL LATA1 \$ </pre>

Table 27 AIN response translation, interaction of CU and LARP

Example 2 TRAVER output
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
. LECNA P621 (XLA P621)\$
TABLE STDPRTCT
P621 (1) (0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 613667 613669 NT DD 0 NA \$
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 939 2 (60) (1) (84) (0) 2 \$
. SUBTABLE HNPACODE
. 613667 6136737100 HNPA 0
. 667 667 DN 613 667
TABLE TOFCNAME
613 667 \$
TABLE DNINV

Table 27 AIN response translation, interaction of CU and LARP

Example 2 TRAVER output
613 667 1001 L HOST 01 0 00 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNPA results are used.
TABLE LCASCRCN
613 L613 (44) OPTL N N
. SUBTABLE LCASCR
. 613 613
TABLE LCASCRCN
613 L613 (44) OPTL N N
. SUBTABLE LCASCR
. 667 667
TABLE PFXTREAT
OPTL DD Y DD UNDT
TABLE CLSVSCRC
KEY NOT FOUND
TABLE LENFEAT
HOST 01 0 00 02 S LPIC LPIC MCI Y
TABLE LENFEAT
HOST 01 0 00 02 S PIC PIC GTE Y
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
WARNING: LARP LPIC is used for Equal Access Translations

Table 27 AIN response translation, interaction of CU and LARP

Example 2 TRAVER output
<p>TABLE OCCINFO GTE 0777 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y TABLE EASAC TUPLE NOT FOUND OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED TABLE PXLAMAP . LECNA P621 (XLA P621)\$ TABLE STDPRTCT P621 (1) (0) 1 . SUBTABLE STDPRT WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION. . 107 109 F 0 STUTTER_DIALTONE EAP1 TABLE PXLAMAP . . Tuple not found. Default to old pretranslator name. . TABLE STDPRTCT . EAP1 (1) (0) 3 . . SUBTABLE STDPRT WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION. . . 10777 10777 EA DD 5 P PEA2 GTE Y OFRT 896 5 20 N . SUBTABLE AMAPRT . KEY NOT FOUND . DEFAULT VALUE IS: NONE OVRNONE N . . . TABLE OFRTMAP Tuple not found. Default to old index. . . . TABLE OFRT . . . 896 CND EA INTNL SK 2</p>

Table 27 AIN response translation, interaction of CU and LARP

Example 2 TRAVER output

```

. . . N D ISUPOGGTE 0 N N
. . . CND ALWAYS SK 1
. . . N D ISUPOGGTE 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA2 ( 1 ) ( 0 ) 2
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . . 6 9 EA DD 0 T NA GTE N
TABLE HPCPATTN
TUPLE NOT FOUND
Checking AIN SDS Trigger Items as SDS is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 ISUPOGTE 6136671001 ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

```

27.3.4 TRAVER examples for query and response when SOC state is IDLE.

27.3.4.1 Example 1 : PFC with SOC state = IDLE

From a POTS line (DN 4164671001), dial B333. The call triggers at PFC on the digits B333 and queries the database. Overriding line attributes are on trigger PFC, and a second TRAVER with the AINRES option must be performed to simulate the response processing. A warning message is displayed indicating that the SOC AIN00294 is IDLE and the Line Attributes Response Processing will not be done by CallProcessing. Another warning message will be displayed indicating that a response TRAVER has to be performed with the command line having the LARP option followed by the trigger attributes (TDP and TINAME) for which the LARP option has been provisioned. FIG 9 illustrates the output of the TRAVER.

Table 28 PFC with LARP SOC IDLE traver

Example 6 TRAVER Output
>TRAVER L 4671001 B333 B
TABLE IBNLINES
HOST 01 1 00 02 0 DT STN RES 4671001 403 416_PUB_403 L416_LATA1_400 416 \$
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403 L416_LATA1_400 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 \$ \$
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 \$
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
HOST 01 1 00 02 0 AIN AIN TIID (3 SACOHD ON) (4 SAM_PFC ON) \$
TABLE CUSTSTN
RESG416 AIN AIN TIID
TABLE OFCVAR

Table 28 PFC with LARP SOC IDLE traver

Example 6 TRAVER Output
<p>AIN_OFFICE_TRIGGRP TIID</p> <p>AIN Orig Attempt TDP: no subscribed trigger.</p> <p>TABLE NCOS</p> <p>RESG416 0 0 0 RNCOS \$</p> <p>TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL</p> <p>RESG416 NXLA RX416 RESGSTAR 0 RES</p> <p>TABLE DIGCOL</p> <p>RES specified: RES digit collection</p> <p>NCOS FEAT XLA name is NIL. Go to next XLA name.</p> <p>TABLE IBNXLA: XLANAME RESGSTAR</p> <p>RESGSTAR 333 FTR 3 AIN IMMED</p> <p>Checking AIN PFC Trigger Items as PFC is compatible with current call</p> <p>. . TABLE TRIGITM</p> <p>. . 4 SAM_PFC PFC (DG B333) \$ ULK EVENT R02 SS7 AINPOP</p> <p>. . (LARP 101 613_P621_0 L613_LATA1_0 GTE MCI N N) \$</p> <p>. . . TABLE C7GTTYTYPE</p> <p>. . . AINPOP ANS17 6 \$</p> <p>. . . TABLE IBNFEAT</p> <p>. . . TUPLE NOT FOUND</p> <p>. . . TABLE C7GTT</p> <p>. . . AINPOP 4164671001 4164671001 PCSSN (SIMTOOL RTESET SIMTOOL3 0) \$ SSN</p> <p>WARNING: LARP option datafilled for PFC trigger. Perform</p> <p>a response TRAVER with the following command line</p> <p>after the AR response: LARP 4 SAM_PFC</p> <p>WARNING: AIN00294 SOC option is IDLE. LineAttributes Response</p> <p>Processing will not be done by Call Processing.</p> <p>AIN Info Analyzed TDP: trigger criteria met.</p> <p>Querying the database would occur now.</p> <p>Use the AINMQG option to save the query to a file for use in TstQuery.</p> <p>Use the AINRES option for further information</p>

Table 28 PFC with LARP SOC IDLE traver

Example 6 TRAVER Output

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

**WARNING: LARP option datafilled for PFC trigger. Perform
a response TRAVER with the following command line
after the AR response: LARP 4 SAM_PFC**

**WARNING: AIN00294 SOC option is IDLE. LineAttributes Response
Processing will not be done by Call Processing.**

AIN Info Analyzed TDP: trigger criteria met.

Querying the database would occur now.

Use the AINMQG option to save the query to a file for use in TstQuery.

Use the AINRES option for further information

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.4.2 Example 2 : N11 with SOC state = IDLE

From a POTS line (DN 6136212111), dial 411. The call triggers at N11 on the digits 411 and queries the database. Overriding line attributes are on trigger N11, and a second TRAVER with the AINRES option must be performed to simulate the response processing. A warning message is displayed indicating that the SOC AIN00293 is IDLE and the Line Attributes Response Processing will not be done by CallProcessing. A warning message will be displayed indicating that a response TRAVER has to be performed with the command line having the LARP option followed by the trigger attributes (TDP and TINAME) for which the LARP option has been provisioned. FIG 10 illustrates the output of the TRAVER

Table 29 N11 with LARP SOC idle traver

>traver I 6136212111 411 B
TABLE LINEATTR
0 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_P621_0 L613_LATA1_0 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_P621_0 FR01 613 P621 TSPS N \$ \$
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 \$
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
AIN Orig Attempt TDP: no subscribed trigger.
TABLE STDPRTCT
P621 (1) (0) 0
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO

Table 29 N11 with LARP SOC idle traver

>traver I 6136212111 411 B
<p>DOCUMENTATION.</p> <p>. 411 411 T OA 0 OFRT 44 3 3 NONE</p> <p>.. TABLE OFRT</p> <p>.. 44 N D DAC 3 N Y</p> <p>.. EXIT TABLE OFRT</p> <p>. SUBTABLE AMAPRT</p> <p>. KEY NOT FOUND</p> <p>. DEFAULT VALUE IS: NONE OVRNONE N</p> <p>TABLE HPCPATTN</p> <p>TUPLE NOT FOUND</p> <p>TABLE LATA1A</p> <p>TUPLE NOT FOUND</p> <p>ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD</p> <p>AIN Info Collected TDP: no subscribed trigger.</p> <p>Checking AIN N11 Trigger Items as N11 is compatible with current call</p> <p>.. TABLE OFCTIID</p> <p>.. 4 N411D ON</p> <p>.. TABLE TRIGITM</p> <p>.. 4 N411D N11 (DG 411) \$ ULK EVENT R02 SS7 AINJAZZ</p> <p>.. (LARP 101 613_P621_0 L613_LATA1_0 GTE MCI) \$</p> <p>... TABLE C7GTTYPE</p> <p>... AINJAZZ ANSI7 3 \$</p> <p>... TABLE C7GTT</p> <p>... AINJAZZ 4110000000 4110000000 SSNONLY (AINTTEST) \$</p> <p>WARNING: LARP option datafilled for N11 trigger. Perform</p> <p>a response TRAVER with the following command line</p> <p>after the ar response: LARP 4 N411D</p> <p>WARNING: AIN00293 SOC option is IDLE. LineAttributes Response</p> <p>Processing will not be done by Call Processing.</p>

Table 29 N11 with LARP SOC idle traver

>traver I 6136212111 411 B
<p>AIN Info Analyzed TDP: trigger criteria met.</p> <p>Querying the database would occur now.</p> <p>Use the AINMQG option to save the query to a file for use in TstQuery.</p> <p>Use the AINRES option for further information</p> <p>+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++</p> <p>WARNING: LARP option datafilled for N11 trigger. Perform a response TRAVER with the following command line after the AR response: LARP 4 N411D</p> <p>WARNING: AIN00293 SOC option is IDLE. LineAttributes Response Processing will not be done by Call Processing.</p> <p>AIN Info Analyzed TDP: trigger criteria met.</p> <p>Querying the database would occur now.</p> <p>Use the AINMQG option to save the query to a file for use in TstQuery.</p> <p>Use the AINRES option for further information</p> <p>+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++</p>

27.3.4.3 Example 3: PFC in the response with SOC state IDLE

From a POTS line (DN 4164671001), dial 4164671002 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. The SOC AIN00294 has been turned IDLE. Then a warning message is displayed to indicate the same. However, TRAVER progresses uninterrupted. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations

Table 30 PFC in the response with SOC state IDLE

Example 3 : TRAVER Output
<pre>>traver l 4671001 n cdn na 4164671002 ainres r02 ar larp 4 pfclarp b</pre>
<p>WARNING: LARP option on PFC trigger does not apply as AIN00294</p> <p style="text-align: center;">SOC is IDLE. LARP option would not apply to an actual call</p>
<p>Warning: Routing characteristics are present.</p> <p style="padding-left: 40px;">Originator must be able to send in characteristics specified.</p>
<p>WARNING: Line Attributes of Originator are being overridden</p> <p style="text-align: center;">by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM</p>
<p>TABLE RTECHAR</p> <p style="padding-left: 40px;">. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$</p>
<p>TABLE LINEATTR</p> <p>101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$</p>
<p>LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE</p>
<p>TABLE XLAPLAN</p> <p>613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$</p>
<p>TABLE RATEAREA</p> <p>L613_LATA3_302 L613 NIL LATA3 \$</p>
<p>TABLE DNATTRS</p>

Table 30 PFC in the response with SOC state IDLE

Example 3 : TRAVER Output

```

| TUPLE NOT FOUND
| TABLE DNGRPS
| TUPLE NOT FOUND
| TABLE LENFEAT
| TUPLE NOT FOUND
| TABLE OFCVAR
| AIN_OFFICE_TRIGGRP TIID
| TABLE PXLAMAP
| . LECNA P621 ( XLA P621)$
| TABLE STDPRTCT
| P621 ( 1) ( 0) 1
| . SUBTABLE STDPRT
| WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
| BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
| DOCUMENTATION.
| . 416 420 NT DD 0 NA $
| . SUBTABLE AMAPRT
| . KEY NOT FOUND
| . DEFAULT VALUE IS: NONE OVRNONE N
| TABLE HPCPATTN
| TUPLE NOT FOUND
| TABLE HNPACONT
| 613 Y 932 2 ( 4) ( 1) ( 84) ( 0) 2 $
| . SUBTABLE HNPACODE
| . 416 416 HNPA 0
| . 467 467 DN 416 467
| TABLE TOFCNAME
| 416 467 $

```

Table 30 PFC in the response with SOC state IDLE

Example 3 : TRAVER Output	
|	TABLE DNINV
|	416 467 1002 L HOST 01 1 02 02
|	TABLE DNFEAT
|	TUPLE NOT FOUND
|	TABLE DNATTRS
|	TUPLE NOT FOUND
|	TABLE DNGRPS
|	TUPLE NOT FOUND
|	LNP Info: Called DN is resident.
|	LNP Info: Called DN has native NPANXX.
|	LNP Info: HNPA results are used.
|	TABLE LCASCRCN
|	613 L613 (44) OPTL N N Y
|	. SUBTABLE LCASCR
|	. 416 416
|	TABLE LCASCRCN
|	KEY NOT FOUND
|	LCASCRCN TUPLE MISSING
|	TABLE CLSVSCRC
|	KEY NOT FOUND
|	TABLE LATAXLA
|	LATA3 4164671002 INTER INTER STD
|	WARNING: LARP PIC is used for Equal Access Translations
|	TABLE OCCINFO
|	MCI 0120 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
|	TABLE EASAC
|	TUPLE NOT FOUND
|	OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED

Table 30 PFC in the response with SOC state IDLE

Example 3 : TRAVER Output

```

TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . . N D ISUPOGMCI 0 N N
. . . CND ALWAYS SK 1
. . . N D ISUPOGMCI 15 D179 N

```

Table 30 PFC in the response with SOC state IDLE

Example 3 : TRAVER Output

. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 (1) (0) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . . 4 9 EA DD 1 T NA MCI N
TABLE HPCPATTN
TUPLE NOT FOUND
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

**WARNING: Line Attributes of Originator are being overridden
by those provided by the LARP option from the
corresponding tuple in TABLE TRIGITM**

DIGIT TRANSLATION ROUTES

1 ISUPOGMCI 164671002 ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 *OFLO

Table 30 PFC in the response with SOC state IDLE

Example 3 : TRAVER Output
2 LKOUT +++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.4.4 Example 4: N11 in the response with SOC state IDLE

From a POTS line (DN 4164671001), dial 4164671002 with the LARP option on the command line followed by the trigger attributes (TDP and TINAME) of the trigger for which the LARP option has been provisioned. The SOC AIN00293 for N11 has been turned IDLE. Then a warning message is displayed to indicate the same. However, TRAVER progresses uninterrupted. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the LARP provisioned line attributes which are used for further translations

Table 31 N11 in the response with SOC state IDLE

Example 4 : TRAVER Output
<pre>>traver l 4671001 n cdn na 4164671002 ainres r02 ar larp 4 n11larp b WARNING: LARP option on N11 trigger does not apply as AIN00293 SOC is IDLE. LARP option would not apply to an actual call Warning: Routing characteristics are present. Originator must be able to send in characteristics specified. WARNING: Line Attributes of Originator are being overridden by those provided by the LARP option from the corresponding tuple in TABLE TRIGITM TABLE RTECHAR . LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$ TABLE LINEATTR 101 1MR NONE NT 0 11 NILSFC 0 NIL NIL 00 613_P621_0 L613_NILLA_1 \$ LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE TABLE XLAPLAN 613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$ TABLE RATEAREA L613_LATA3_302 L613 NIL LATA3 \$ TABLE DNATTRS</pre>

Table 31 N11 in the response with SOC state IDLE

Example 4 : TRAVER Output

```

TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT DD 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 5) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416467 4169 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $

```

Table 31 N11 in the response with SOC state IDLE

Example 4 : TRAVER Output	
|	TABLE DNINV
|	416 467 1002 L HOST 01 1 02 02
|	TABLE DNFEAT
|	TUPLE NOT FOUND
|	TABLE DNATTRS
|	TUPLE NOT FOUND
|	TABLE DNGRPS
|	TUPLE NOT FOUND
|	LNP Info: Called DN is resident.
|	LNP Info: Called DN has native NPANXX.
|	LNP Info: HNPA results are used.
|	TABLE LCASCRCN
|	613 L613 (44) OPTL N N Y
|	. SUBTABLE LCASCR
|	. 416 416
|	TABLE LCASCRCN
|	KEY NOT FOUND
|	LCASCRCN TUPLE MISSING
|	TABLE LATAXLA
|	LATA3 4164671002 INTER INTER STD
|	WARNING: LARP PIC is used for Equal Access Translations
|	TABLE OCCINFO
|	MCI 0120 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
|	TABLE EASAC
|	TUPLE NOT FOUND
|	OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
|	TABLE PXLAMAP
|	. LECNA P621 (XLA P621)\$

Table 31 N11 in the response with SOC state IDLE

Example 4 : TRAVER Output

```

TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . . N D ISUPOGMCI 0 N N
. . . CND ALWAYS SK 1
. . . N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP

```

Table 31 N11 in the response with SOC state IDLE

Example 4 : TRAVER Output

```

. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 ( 1) ( 0) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . . 4 9 EA DD 1 T NA MCI N
TABLE HPCPATTN
TUPLE NOT FOUND
Checking AIN SDS Trigger Items as SDS is compatible with current call
Checking AIN N11 Trigger Items as N11 is compatible with current call
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: Line Attributes of Originator are being overridden
by those provided by the LARP option from the
corresponding tuple in TABLE TRIGITM

DIGIT TRANSLATION ROUTES

1 ISUPOGMCI      164671002      ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

```

Table 31 N11 in the response with SOC state IDLE**Example 4 : TRAVER Output**

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.5 Trigger Processing with PODPATTR applicable on the trigger

To simulate the Response Processing, TRAVER with AINRES option needs to be performed followed by the PODPATTR option on the command line with the PODP_KEY as sub parameters.

27.3.5.1 Example 1 : Encountering PODP trigger

From a POTS line (DN 4164671001), dial 4164631009. The call triggers on the SDS digits 4164631009 and queries the database. Overriding line attributes are on trigger SDS, and TRAVER with the AINRES option must be performed to simulate the response processing. A warning message will be displayed indicating that a response TRAVER has to be performed with the command line having the LARP option followed by the trigger attributes (TDP and TINAME) for which the LARP option has been provisioned. Refer to Table 14, which illustrates the output of the TRAVER.

Table 32 Encountering PODP Trigger

Example 1 : TRAVER Output
>traver l 4671001 4164674444 b
TABLE IBNLINES
HOST 01 1 00 02 0 DT STN RES 4671001 403 416_PUB_403 L416_LATA1_400 416 \$
TABLE LINEATTR
403 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_PUB_403 L416_LATA1_400 \$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_PUB_403 NSCR 416 PUB TSPS Y RESG416 0 0 \$ \$
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 \$
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG416 AIN AIN CDPCODE

Table 32 Encountering PODP Trigger

Example 1 : TRAVER Output

```

TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
RESG416 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
RESG416 NXLA RX416 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE IBNXLA: XLANAME RX416
TUPLE NOT FOUND
Default from table XLANAME:
RX416
  (NET N N 0 N NDGT N Y GEN ( LATTR 413 416_EAP1_413 L416_LATA1_400)
  (EA NILC Y 0) $ )$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
413 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 416_EAP1_413 L416_LATA1_400 $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
416_EAP1_413 NSCR 416 EAP1 TSPS Y RESG416 0 0 $ $
TABLE RATEAREA
L416_LATA1_400 L416 NIL LATA1 $
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE

```

Table 32 Encountering PODP Trigger

Example 1 : TRAVER Output

BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
 DOCUMENTATION.
 . 41 42122 NT NP 0 NA \$
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS: NONE OVRNONE N
 TABLE HPCPATTN
 TUPLE NOT FOUND
 TABLE HNPACONT
 416 Y 939 1 (50) (1) (4) (0) 4 \$
 . SUBTABLE HNPACODE
 . 416 416 HNPA 0
 . 467 467 DN 416 467
 TABLE TOFCNAME
 416 467 \$
 TABLE DNINV
 416 467 4444 D BLDN
 TABLE DNFEAT
 TUPLE NOT FOUND
 TABLE DNATTRS
 TUPLE NOT FOUND
 TABLE DNGRPS
 TUPLE NOT FOUND
 TABLE TMTCNTL
 LNT (46)
 . SUBTABLE TREAT
 . BLDN Y T OFRT 50
 . TABLE OFRT

Table 32 Encountering PODP Trigger

Example 1 : TRAVER Output

```

. 50 S D VCA
. S D *OFLO
. S D LKOUT
. EXIT TABLE OFRT
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
TABLE LCASCRCN
416 L416 ( 27) OPTL N N Y
. SUBTABLE LCASCR
. TUPLE NOT FOUND. DEFAULT IS NON-LOCAL
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE LATAXLA
TUPLE NOT FOUND
ASSUMED TO BE DEFAULT INTRALATA, INTRASTATE, STD
AIN Info Collected TDP: no subscribed trigger.
TABLE TRIGGRP
CDPCODE INFOANAL
. CDPCODE ( DG CDPDIG)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
. CDPCODE ( DG CDPTRAF)$ NIL
Trigger AIN CDPCODE is applicable to customer group.
TABLE TRIGGRP
OFCTRIG INFOANAL
. N11 ( DG N11DIG)$ NIL
Trigger AIN N11 is applicable to office.
. PODP ( DG PODPDIG)$ NIL
Trigger AIN PODP is applicable to office.

```

Table 32 Encountering PODP Trigger

Example 1 : TRAVER Output

```

. . TABLE TRIGDIG
. . PODPDIG PODP 4164674444 PODP EVENT TCAP R02 SS7 AINPOP DFLT $
. . . TABLE C7GTTYPE
. . . AINPOP ANSI7 6 $
. . . TABLE C7GTT
. . . AINPOP 4164674444 4164674444 PCSSN (SIMTOOL RTESET SIMTOOL3 0) $ SSN
. . TABLE PODPATTR
. . 4164674444 102 613_P621_1 L613_LATA1_0 MCI GTE

```

WARNING: PODPATTR datafilled for PODP trigger. Perform a response TRAVER with the following command line after the AR response : PODPATTR 4164674444

AIN Info Analyzed TDP: trigger criteria met.

Querying the database would occur now.

Use the AINMQG option to save the query to a file for use in TstQuery.

Use the AINRES option for further information

+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: PODPATTR datafilled for PODP trigger. Perform a response TRAVER with the following command line after the AR response : PODPATTR 4164674444

AIN Info Analyzed TDP: trigger criteria met.

Querying the database would occur now.

Use the AINMQG option to save the query to a file for use in TstQuery.

Use the AINRES option for further information

Table 32 Encountering PODP Trigger

Example 1 : TRAVER Output
+++ AIN TRAVER: SUCCESSFUL CALL TRACE +++

27.3.6 Response Processing with PODPATTR on the command line

To simulate the Response Processing, TRAVER with AINRES option needs to be performed followed by the LARP option on the command line with the TDP and the TINAME as sub parameters.

27.3.6.1 Example 1 : Response Processing with POTS agent as originator

From a POTS line (DN 4671001), dial 4164671002 with the PODPATTR option on the command line followed by the trigger attributes (PODP_KEY) of the trigger . A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the PODPATTR option from Table PODPATTR. The warning message is followed by the display of the PODPATTR provisioned line attributes which are used for further translations.

Table 33 Response Processing with POTS agent as the Originator

Example 1 : TRAVER Output

```
>traver l 4671001 n cdn na 4164671002 ainres r02 ar podpattr 4164674444 b
```

Warning: Routing characteristics are present.

Originator must be able to send in
characteristics specified.

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

TABLE RTECHAR

. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$

TABLE LINEATTR

102 1FR NONE NT 0 11 NILSFC 0 NIL NIL 00 819_P622_2 L819_NILLA_2 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$

TABLE RATEAREA

L613_LATA3_302 L613 NIL LATA3 \$

TABLE DNATTRS

TUPLE NOT FOUND

Table 33 Response Processing with POTS agent as the Originator

Example 1 : TRAVER Output

```

TABLE DNGRPS
TUPLE NOT FOUND
TABLE LENFEAT
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT DD 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 5) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416467 4169 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV

```

Table 33 Response Processing with POTS agent as the Originator

Example 1 : TRAVER Output

```

416 467 1002 L HOST 01 1 02 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNP results are used.
TABLE LCASCRCN
613 L613 ( 44) OPTL N N Y
. SUBTABLE LCASCR
. 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
TABLE LATAXLA
LATA3 4164671002 INTER INTER STD
WARNING: LARP PIC is used for Equal Access Translations
TABLE OCCINFO
MCI 0120 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
TABLE EASAC
TUPLE NOT FOUND
OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT

```


Table 33 Response Processing with POTS agent as the Originator

Example 1 : TRAVER Output

```

P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . . N D ISUPOGMCI 0 N N
. . . CND ALWAYS SK 1
. . . N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.

```

Table 33 Response Processing with POTS agent as the Originator

Example 1 : TRAVER Output

```

. . TABLE STDPRTCT
. . PEA3 ( 1 ) ( 0 ) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . . 4 9 EA DD 1 T NA MCI N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE TRIGGRP
OFCTRIG INFOANAL
. N11 ( DG N11DIG)$ NIL
Trigger AIN N11 is applicable to office.
. PODP ( DG PODPDIG)$ NIL
Trigger AIN PODP is applicable to office.
. N11 ( DG N11TRAF)$ NIL
Trigger AIN N11 is applicable to office.
. PODP ( DG PODPTRAF)$ NIL
Trigger AIN PODP is applicable to office.
. LNP ( DG LNPDIG ) ( ESCEA ) ( ESCOP )$ NIL
Trigger AIN LNP is applicable to office.
AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR

```

Table 33 Response Processing with POTS agent as the Originator

Example 1 : TRAVER Output

DIGIT TRANSLATION ROUTES

1 ISUPOGMC1 164671002 ST

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.6.2 Example 2 : Response Processing with IBN agent as the originator

From an IBN line (DN 4164771051), dial 4164671002 with the PODPATTR option on the command line followed by the trigger attributes (PODP_KEY) of the trigger . A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the PODPATTR option from Table PODPATTR. The warning message is followed by the display of the PODPATTR provisioned line attributes which are used for further translations.

Table 34 Response Processing with IBN agent as the Originator

Example 2 : TRAVER Output

```
>traver l 4771051 n cdn na 4164671002 ainres r02 ar podpattr 4164674444 b
```

Warning: Routing characteristics are present.

Originator must be able to send in
characteristics specified.

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

TABLE RTECHAR

. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$

TABLE LINEATTR

102 1FR NONE NT 0 11 NILSFC 0 NIL NIL 00 819_P622_2 L819_NILLA_2 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$

TABLE RATEAREA

L613_LATA3_302 L613 NIL LATA3 \$

TABLE DNATTRS

TUPLE NOT FOUND

TABLE DNGRPS

TUPLE NOT FOUND

TABLE LENFEAT

Table 34 Response Processing with IBN agent as the Originator

Example 2 : TRAVER Output

```

TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT DD 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 5) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416467 4169 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 L HOST 01 1 02 02
TABLE DNFEAT
TUPLE NOT FOUND

```

Table 34 Response Processing with IBN agent as the Originator

Example 2 : TRAVER Output	
|	TABLE DNATTRS
|	TUPLE NOT FOUND
|	TABLE DNGRPS
|	TUPLE NOT FOUND
|	LNP Info: Called DN is resident.
|	LNP Info: Called DN has native NPANXX.
|	LNP Info: HNPAs results are used.
|	TABLE LCASCRCN
|	613 L613 (44) OPTL N N Y
|	. SUBTABLE LCASCR
|	. 416 416
|	TABLE LCASCRCN
|	KEY NOT FOUND
|	LCASCRCN TUPLE MISSING
|	TABLE LATAXLA
|	LATA3 4164671002 INTER INTER STD
|	WARNING: LARP PIC is used for Equal Access Translations
|	TABLE OCCINFO
|	MCI 0120 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
|	TABLE EASAC
|	TUPLE NOT FOUND
|	OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
|	TABLE PXLAMAP
|	. LECNA P621 (XLA P621)\$
|	TABLE STDPRTCT
|	P621 (1) (0) 1
|	. SUBTABLE STDPRT
|	WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE

Table 34 Response Processing with IBN agent as the Originator

Example 2 : TRAVER Output

```

BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . . N D ISUPOGMCI 0 N N
. . . CND ALWAYS SK 1
. . . N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 ( 1) ( 0) 3
. . . SUBTABLE STDPRT

```

Table 34 Response Processing with IBN agent as the Originator

Example 2 : TRAVER Output
<p>WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.</p> <p>. . . 4 9 EA DD 1 T NA MCI N</p> <p>TABLE HPCPATTN</p> <p>TUPLE NOT FOUND</p> <p>TABLE TRIGGRP</p> <p>OFCTRIG INFOANAL</p> <p>. N11 (DG N11DIG)\$ NIL</p> <p>Trigger AIN N11 is applicable to office.</p> <p>. PODP (DG PODPDIG)\$ NIL</p> <p>Trigger AIN PODP is applicable to office.</p> <p>. N11 (DG N11TRAF)\$ NIL</p> <p>Trigger AIN N11 is applicable to office.</p> <p>. PODP (DG PODPTRAF)\$ NIL</p> <p>Trigger AIN PODP is applicable to office.</p> <p>. LNP (DG LNPDIG) (ESCEA) (ESCOP)\$ NIL</p> <p>Trigger AIN LNP is applicable to office.</p> <p>AIN Info Analyzed TDP: trigger criteria not met.</p> <p>+++ TRAVER: SUCCESSFUL CALL TRACE +++</p> <p>WARNING: Line Attributes of Originator are being overridden by those provided by the PODPATTR option from the corresponding tuple in TABLE PODPATTR</p> <p>DIGIT TRANSLATION ROUTES</p>

Table 34 Response Processing with IBN agent as the Originator**Example 2 : TRAVER Output**

1 ISUPOGMC1 164671002 ST

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.6.3 Example 3 : Response Processing with RES agent as the Originator

From an RES line (DN 4164671021), dial 4164671002 with the PODPATTR option on the command line followed by the trigger attributes (PODP_KEY) of the trigger . A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the PODPATTR option from Table PODPATTR. The warning message is followed by the display of the PODPATTR provisioned line attributes which are used for further translations.

Table 35 Response Processing with RES agent as the Originator

Example 3 : TRAVER Output

```
>traver l 4671021 n cdn na 4164671002 ainres r02 ar podpattr 4164674444 b
```

Warning: Routing characteristics are present.

Originator must be able to send in
characteristics specified.

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

TABLE RTECHAR

. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$

TABLE LINEATTR

102 1FR NONE NT 0 11 NILSFC 0 NIL NIL 00 819_P622_2 L819_NILLA_2 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$

TABLE RATEAREA

L613_LATA3_302 L613 NIL LATA3 \$

TABLE DNATTRS

TUPLE NOT FOUND

TABLE DNGRPS

TUPLE NOT FOUND

TABLE LENFEAT

TUPLE NOT FOUND

Table 35 Response Processing with RES agent as the Originator

Example 3 : TRAVER Output

```

TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE PXLAMAP
. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT DD 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 5) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416467 4169 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 L HOST 01 1 02 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS

```

Table 35 Response Processing with RES agent as the Originator

Example 3 : TRAVER Output	
|	TUPLE NOT FOUND
|	TABLE DNGRPS
|	TUPLE NOT FOUND
|	LNP Info: Called DN is resident.
|	LNP Info: Called DN has native NPANXX.
|	LNP Info: HNPA results are used.
|	TABLE LCASCRCN
|	613 L613 (44) OPTL N N Y
|	. SUBTABLE LCASCR
|	. 416 416
|	TABLE LCASCRCN
|	KEY NOT FOUND
|	LCASCRCN TUPLE MISSING
|	TABLE LATA3
|	LATA3 4164671002 INTER INTER STD
|	WARNING: LARP PIC is used for Equal Access Translations
|	TABLE OCCINFO
|	MCI 0120 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
|	TABLE EASAC
|	TUPLE NOT FOUND
|	OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
|	TABLE PXLAMAP
|	. LECNA P621 (XLA P621)\$
|	TABLE STDPRTCT
|	P621 (1) (0) 1
|	. SUBTABLE STDPRT
|	WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
|	BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO

Table 35 Response Processing with RES agent as the Originator

Example 3 : TRAVER Output

```

DOCUMENTATION.
. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1 ) ( 0 ) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . .   N D ISUPOGMCI 0 N N
. . .   CND ALWAYS SK 1
. . .   N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 ( 1 ) ( 0 ) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE

```

Table 35 Response Processing with RES agent as the Originator

Example 3 : TRAVER Output

BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.

. . . 4 9 EA DD 1 T NA MCI N

TABLE HPCPATTN

TUPLE NOT FOUND

TABLE TRIGGRP

OFCTRIG INFOANAL

. N11 (DG N11DIG)\$ NIL

Trigger AIN N11 is applicable to office.

. PODP (DG PODPDIG)\$ NIL

Trigger AIN PODP is applicable to office.

. N11 (DG N11TRAF)\$ NIL

Trigger AIN N11 is applicable to office.

. PODP (DG PODPTRAF)\$ NIL

Trigger AIN PODP is applicable to office.

. LNP (DG LNPDIG) (ESCEA) (ESCOP)\$ NIL

Trigger AIN LNP is applicable to office.

AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

DIGIT TRANSLATION ROUTES

1 ISUPOGMCI 164671002 ST

Table 35 Response Processing with RES agent as the Originator**Example 3 : TRAVER Output**

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.6.4 Example 4 : Response Processing with a Trunk as the Originator

From a TRUNK (ISUPICITT), dial 4164671002 with the PODPATTR option on the command line followed by the trigger attributes (PODP_KEY) of the trigger. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the PODPATTR provisioned line attributes which are used for further translations. Refer to Table 36, which illustrates the output of the TRAVER.

Table 36 Response Processing with TRUNK as the Originator

Example 4 : TRAVER Output

```
>traver tr isupicitt n cdn na 4164671002 ainres r02 ar podpattr 4164674444 b
```

Warning: Routing characteristics are present.

Originator must be able to send in
characteristics specified.

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

TABLE RTECHAR

. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$

TABLE LINEATTR

102 1FR NONE NT 0 11 NILSFC 0 NIL NIL 00 819_P622_2 L819_NILLA_2 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$

TABLE RATEAREA

L613_LATA3_302 L613 NIL LATA3 \$

TABLE LENFEAT

TUPLE NOT FOUND

TABLE OFCVAR

AIN_OFFICE_TRIGGRP OFCTRIG

TABLE PXLAMAP

Table 36 Response Processing with TRUNK as the Originator

Example 4 : TRAVER Output

```

. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT DD 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 5) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416467 4169 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 L HOST 01 1 02 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND

```

Table 36 Response Processing with TRUNK as the Originator

Example 4 : TRAVER Output

LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNP results are used.
TABLE LCASCRCN
613 L613 (44) OPTL N N Y
. SUBTABLE LCASCR
. 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
TABLE CLSVSCRC
KEY NOT FOUND
TABLE LATA XLA
LATA3 4164671002 INTER INTER STD
WARNING: LARP PIC is used for Equal Access Translations
TABLE OCCINFO
MCI 0120 EAP Y Y Y Y N N Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
TABLE EASAC
TUPLE NOT FOUND
OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
TABLE PXLAMAP
. LECNA P621 (XLA P621)\$
TABLE STDPRTCT
P621 (1) (0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.

Table 36 Response Processing with TRUNK as the Originator

Example 4 : TRAVER Output

```

. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . .   N D ISUPOGMCI 0 N N
. . .   CND ALWAYS SK 1
. . .   N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 ( 1) ( 0) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO

```

Table 36 Response Processing with TRUNK as the Originator

Example 4 : TRAVER Output		
DOCUMENTATION.		
. . . 4 9 EA DD 1 T NA MCI N		
TABLE HPCPATTN		
TUPLE NOT FOUND		
TABLE TRIGGRP		
OFCTRIG INFOANAL		
. N11 (DG N11DIG)\$ NIL		
Trigger AIN N11 is applicable to office.		
. PODP (DG PODPDIG)\$ NIL		
Trigger AIN PODP is applicable to office.		
. N11 (DG N11TRAF)\$ NIL		
Trigger AIN N11 is applicable to office.		
. PODP (DG PODPTRAF)\$ NIL		
Trigger AIN PODP is applicable to office.		
. LNP (DG LNPDIG) (ESCEA) (ESCOP)\$ NIL		
Trigger AIN LNP is applicable to office.		
AIN Info Analyzed TDP: trigger criteria not met.		
+++ TRAVER: SUCCESSFUL CALL TRACE +++		
<p>WARNING: Line Attributes of Originator are being overridden by those provided by the PODPATTR option from the corresponding tuple in TABLE PODPATTR</p>		
DIGIT TRANSLATION ROUTES		
1 ISUPOGMCI	164671002	ST

Table 36 Response Processing with TRUNK as the Originator**Example 4 : TRAVER Output**

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.6.5 Example 5 : Response Processing with VFG-IBN as the Originator

From a VFG_IBN agent (VCNCO1) , dial 4164671002 with the PODPATTR option on the command line followed by the trigger attributes (PODP_KEY) of the trigger . A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the LARP option from Table TRIGITM. The warning message is followed by the display of the PODPATTR provisioned line attributes which are used for further translations. Refer to Table 37, which illustrates the output of the TRAVER.

Table 37 Response Processing with VFG-IBN as the Originator

Example 5 : TRAVER Output

```
>traver v vcnco1 n cdn na 4164671002 ainres r02 ar podpattr 4164674444 b
```

Warning: Routing characteristics are present.

Originator must be able to send in
characteristics specified.

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

TABLE RTECHAR

. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$

TABLE LINEATTR

102 1FR NONE NT 0 11 NILSFC 0 NIL NIL 00 819_P622_2 L819_NILLA_2 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$

TABLE RATEAREA

L613_LATA3_302 L613 NIL LATA3 \$

TABLE PXLAMAP

. LECNA P621 (XLA P621)\$

TABLE STDPRTCT

P621 (1) (0) 1

. SUBTABLE STDPRT

Table 37 Response Processing with VFG-IBN as the Originator

Example 5 : TRAVER Output

WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.

. 416 420 NT DD 0 NA \$

. SUBTABLE AMAPRT

. KEY NOT FOUND

. DEFAULT VALUE IS: NONE OVRNONE N

TABLE HPCPATTN

TUPLE NOT FOUND

TABLE HNPACONT

613 Y 932 2 (5) (1) (84) (0) 2 \$

. SUBTABLE HNPACODE

. 416467 4169 HNPA 0

. 467 467 DN 416 467

TABLE TOFCNAME

416 467 \$

TABLE DNINV

416 467 1002 L HOST 01 1 02 02

TABLE DNFEAT

TUPLE NOT FOUND

TABLE DNATTRS

TUPLE NOT FOUND

TABLE DNGRPS

TUPLE NOT FOUND

LNP Info: Called DN is resident.

LNP Info: Called DN has native NPANXX.

LNP Info: HNPA results are used.

TABLE LCASCRCN

Table 37 Response Processing with VFG-IBN as the Originator

Example 5 : TRAVER Output	
|	613 L613 (44) OPTL N N Y
|	. SUBTABLE LCASCR
|	. 416 416
|	TABLE LCASCRCN
|	KEY NOT FOUND
|	LCASCRCN TUPLE MISSING
|	TABLE CLSVSCRC
|	KEY NOT FOUND
|	TABLE LATAXLA
|	LATA3 4164671002 INTER INTER STD
|	WARNING: LARP PIC is used for Equal Access Translations
|	TABLE OCCINFO
|	MCI 0120 EAP Y Y Y Y N N Y Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
|	TABLE EASAC
|	TUPLE NOT FOUND
|	OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
|	TABLE PXLAMAP
|	. LECNA P621 (XLA P621)\$
|	TABLE STDPRTCT
|	P621 (1) (0) 1
|	. SUBTABLE STDPRT
|	WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
|	BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
|	DOCUMENTATION.
|	. 1012 109 F 0 STUTTER_DIALTONE EAP1
|	TABLE PXLAMAP
|	. . Tuple not found. Default to old pretranslator name.
|	. TABLE STDPRTCT

Table 37 Response Processing with VFG-IBN as the Originator

Example 5 : TRAVER Output

```

. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . . N D ISUPOGMCI 0 N N
. . . CND ALWAYS SK 1
. . . N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 ( 1) ( 0) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . . 4 9 EA DD 1 T NA MCI N
TABLE HPCPATTN
TUPLE NOT FOUND

```

Table 37 Response Processing with VFG-IBN as the Originator

Example 5 : TRAVER Output	
|	TABLE CUSTSTN
|	COMKODAK AIN AIN CDPCODE
|	TABLE OFCVAR
|	AIN_OFFICE_TRIGGRP OFCTRIG
|	TABLE TRIGGRP
|	CDPCODE INFOANAL
|	. CDPCODE (DG CDPDIG)\$ NIL
|	Trigger AIN CDPCODE is applicable to customer group.
|	. CDPCODE (DG CDPTRAF)\$ NIL
|	Trigger AIN CDPCODE is applicable to customer group.
|	TABLE TRIGGRP
|	OFCTRIG INFOANAL
|	. N11 (DG N11DIG)\$ NIL
|	Trigger AIN N11 is applicable to office.
|	. PODP (DG PODPDIG)\$ NIL
|	Trigger AIN PODP is applicable to office.
|	. N11 (DG N11TRAF)\$ NIL
|	Trigger AIN N11 is applicable to office.
|	. PODP (DG PODPTRAF)\$ NIL
|	Trigger AIN PODP is applicable to office.
|	. LNP (DG LNPDIG) (ESCEA) (ESCOP)\$ NIL
|	Trigger AIN LNP is applicable to office.
|	AIN Info Analyzed TDP: trigger criteria not met.
|	+++ TRAVER: SUCCESSFUL CALL TRACE +++
|	WARNING: Line Attributes of Originator are being overridden
|	by those provided by the PODPATTR option from the

Table 37 Response Processing with VFG-IBN as the Originator

Example 5 : TRAVER Output

corresponding tuple in TABLE PODPATTR

DIGIT TRANSLATION ROUTES

1 ISUPOGMCI 164671002 ST

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.3.6.6 Example 6 : Response Processing with AC as the Originator

From an AC agent , dial 4164671002 with the PODPATTR option on the command line followed by the trigger attributes (PODP_KEY) of the trigger for which the PODPATTR option has been provisioned. A warning message is displayed indicating that the Originator's line attributes (LINEATTR, XLAPLAN and RATEAREA) will be overridden by those provided by the PODPATTR option from Table PODPATTR. The warning message is followed by the display of the PODPATTR provisioned line attributes which are used for further translations. Refer to Table 38, which illustrates the output of the TRAVER.

Table 38 Response Processing with AC as Originator

Example 6 : TRAVER Output

```
>traver c atkdkd n cdn na 4164671002 ainres r02 ar podpattr 4164674444 b
```

Warning: Routing characteristics are present.

Originator must be able to send in
characteristics specified.

**WARNING: Line Attributes of Originator are being overridden
by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

TABLE RTECHAR

. LECNA (CDN NA \$) (BC 3_1KHZ (CDN NA)\$)\$

TABLE LINEATTR

102 1FR NONE NT 0 11 NILSFC 0 NIL NIL 00 819_P622_2 L819_NILLA_2 \$

LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLAPLAN

613_P621_1 FR01 613 P621 TSPS Y RESG200 0 6 \$ \$

TABLE RATEAREA

L613_LATA3_302 L613 NIL LATA3 \$

TABLE LENFEAT

TUPLE NOT FOUND

TABLE OFCVAR

AIN_OFFICE_TRIGGRP OFCTRIG

TABLE PXLAMAP

Table 38 Response Processing with AC as Originator

Example 6 : TRAVER Output

```

. LECNA P621 ( XLA P621)$
TABLE STDPRTCT
P621 ( 1) ( 0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 416 420 NT DD 0 NA $
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
TABLE HPCPATTN
TUPLE NOT FOUND
TABLE HNPACONT
613 Y 932 2 ( 5) ( 1) ( 84) ( 0) 2 $
. SUBTABLE HNPACODE
. 416467 4169 HNPA 0
. 467 467 DN 416 467
TABLE TOFCNAME
416 467 $
TABLE DNINV
416 467 1002 L HOST 01 1 02 02
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND

```

Table 38 Response Processing with AC as Originator

Example 6 : TRAVER Output

LNP Info: Called DN is resident.
LNP Info: Called DN has native NPANXX.
LNP Info: HNP results are used.
TABLE LCASCRCN
613 L613 (44) OPTL N N Y
. SUBTABLE LCASCR
. 416 416
TABLE LCASCRCN
KEY NOT FOUND
LCASCRCN TUPLE MISSING
TABLE CLSVSCRC
KEY NOT FOUND
TABLE LATAXLA
LATA3 4164671002 INTER INTER STD
WARNING: LARP PIC is used for Equal Access Translations
TABLE OCCINFO
MCI 0120 EAP Y Y Y Y N N Y Y Y LONG 14 FGRPC N N N N N N N N N N N N Y
TABLE EASAC
TUPLE NOT FOUND
OVERLAP CARRIER SELECTION (OCS) DOES NOT APPLY - AIN_OFFICE_TRIGGRP DEFINED
TABLE PXLAMAP
. LECNA P621 (XLA P621)\$
TABLE STDPRTCT
P621 (1) (0) 1
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.

Table 38 Response Processing with AC as Originator

Example 6 : TRAVER Output

```

. 1012 109 F 0 STUTTER_DIALTONE EAP1
TABLE PXLAMAP
. . Tuple not found. Default to old pretranslator name.
. TABLE STDPRTCT
. EAP1 ( 1) ( 0) 3
. . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. . 10120 10120 EA DD 5 P PEA3 MCI Y OFRT 897 5 20 N
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
. . . TABLE OFRTMAP
. . . . Tuple not found. Default to old index.
. . . TABLE OFRT
. . . 897 CND EA INTNL SK 2
. . .   N D ISUPOGMCI 0 N N
. . .   CND ALWAYS SK 1
. . .   N D ISUPOGMCI 15 D179 N
. . . EXIT TABLE OFRT
TABLE PXLAMAP
. . . Tuple not found. Default to old pretranslator name.
. . TABLE STDPRTCT
. . PEA3 ( 1) ( 0) 3
. . . SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO

```

Table 38 Response Processing with AC as Originator

Example 6 : TRAVER Output

DOCUMENTATION.

. . . 4 9 EA DD 1 T NA MCI N

TABLE HPCPATTN

TUPLE NOT FOUND

TABLE TRIGGRP

OFCTRIG INFOANAL

. N11 (DG N11DIG)\$ NIL

Trigger AIN N11 is applicable to office.

. PODP (DG PODPDIG)\$ NIL

Trigger AIN PODP is applicable to office.

. N11 (DG N11TRAF)\$ NIL

Trigger AIN N11 is applicable to office.

. PODP (DG PODPTRAF)\$ NIL

Trigger AIN PODP is applicable to office.

. LNP (DG LNPDIG) (ESCEA) (ESCOP)\$ NIL

Trigger AIN LNP is applicable to office.

AIN Info Analyzed TDP: trigger criteria not met.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

WARNING: Line Attributes of Originator are being overridden**by those provided by the PODPATTR option from the
corresponding tuple in TABLE PODPATTR**

DIGIT TRANSLATION ROUTES

1 ISUPOGMCI 164671002 ST

Table 38 Response Processing with AC as Originator**Example 6 : TRAVER Output**

TREATMENT ROUTES. TREATMENT IS: GNCT

1 *OFLO

2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

27.4 Hardware requirements

None

27.5 Limitations and restrictions

The trigger item provisioning interface implements trigger-specific line attributes by datafilling the LARP option on an SDS/N11/PFC trigger item

The trigger group provisioning interface implements trigger-specific line attributes by datafilling table PODPATTR for only PODP trigger defined in a trigger group. This activity does not affect the PODPATTR or TRIGGER GROUP data model functionality. The pre-NA015 Trigger Group functionality will be preserved in NA015.

TRAVER supported only for the Line Attribute Response Processing Simulation. The processing of Forwarding Attributes in TRAVER is not supported by this activity.

27.6 Interactions

27.6.1 Forwarding Attributes and TFS interaction

Prior to NA015, the TFS with LARP option was not considered as a redirection. To preserve the pre NA015 functionality for TFS with LARP the parameter REDIR has to be set to 'N' and the FWDATTR has to be set to 'N' in table TRIGITM. When the ChargePartyStationType and/or ChargeNumber parameter is not present in the Analyze_Route message, the ChargePartyStationType depends on the triggering agent rather than the line attributes associated with the toll-free trigger. AIN TFS uses the original values in the query for the ChargeNumber.

If forwarding attributes are datafilled in option LARP in table TRIGITM and POTUSE TFS option is also datafilled, refer to Section 2.2.8.1 for the response processing logic.

Refer to Section 2.16 for more feature interactions.

27.7 Logs (LG)

27.7.1 New/modified logs

Table 39 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

27.8 Data schema (DS)

27.8.1 New/modified tables

Please refer to the DS section

Table 40 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TRIGITM	CHANGED	NEW

27.9 Office parameters (OP)

27.9.1 New/modified office parameters

None

Table 41 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

27.10 Service orders (SO)

None

27.11 Alarms (AL)

27.11.1 New/modified directories

None

Table 42 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

27.12 Command interface (CI)

27.12.1 New/modified commands

Please refer to the CI section

Table 43 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
TRAVER	NEW		CI	NON-MENU

27.13 Operational measurements (OM)

27.13.1 New/modified OM groups

None

Table 44 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

27.14 AMA/Billing information (AM)

AMA billing will not be altered by this activity. Currently, if a call is made that hits an AIN trigger, the originator is billed unless extra billing information is received in the response from the SCP. With the support of Forwarding Attributes the billing number now can be derived from the *ChargeNumber*

attribute if the SCP response does not include a *ChargeNumber* parameter and the SSP cannot derive the *ChargeNumber*.

In the case of LARP, it is not usually the originator that should be billed (for eg. in the case of Work-at-Home, it would be the employer). For SDS triggers, this is not a problem since SDS has the SDS trigger digits to associate with the billing. But for PFC, the digits will usually correspond to a service. The SSP has no way of knowing who to bill the call to unless extra information is received from the SCP or the **Forwarding Attributes** are datafilled.

27.14.1 New/changed AMA/billing information

None

Table 45 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

27.15 Software optionality control (SOC)

27.15.1 Activating AIN SSP software

- AIN00293: AIN SE R9 - N11 LARP to control the NA015 AIN SE Line Attribute Response Processing for the N11 trigger.
- AIN00294: AIN SE R9 - PFC LARP to control the NA015 AIN SE Line Attribute Response Processing for the PFC trigger.

Note: AIN00294 is implemented by ACTID 59022553 - PFC/SFC Customer Group subscription. Please refer to 59022553 FN for actual message.

To activate AIN SSP call processing, both AIN00002 and AIN00006 SOC options must be in the ON state. When these SOC options are ON, triggering is enabled at the TDPs, thus making database queries possible. When they are IDLE, triggering is disabled and only datafilling and testing are allowed.

- The Service Enablers Release 9 N11 LARP SOC option AIN00293 controls the AIN Service Enablers N11 LARP functionality and must be in the ON state if it is desired.
- The Service Enablers Release 9 PFC LARP SOC option AIN00294 controls the AIN Service Enablers PFC LARP functionality and must be in the ON state if it is desired.

Note: AIN00294 is implemented by ACTID 59022553 - PFC/SFC Customer Group subscription. Please refer to 59022553 FN for actual message.

27.15.2 Summary of AIN SOC options and SOC controlled functionality

AIN00260	SE R6 Base	Track	NA012
Track option associated with AIN SE Release 6 functionality. This option tracks the functionality introduced by features 59006039, 59007218, 59010421, 59008267, 10202203, 10216514, 10206792 and 10206878.			
Number of redirections limitation removal AIN 0.0-0.1 Interworking code removal Redirection interactions with Busy/NoAnswer triggers AIN line attribute response processing (provisioning) Network tools enhancements AIN equal access CAC dialing enhancements AIN Display Text for MADN AIN response processing DFIL log			
AIN00293	SE R9 N11 LARP	State	NA015
Controls the NA015 AIN SE N11 LARP functionality introduced by feature 59022554.			
AIN00294	SE R9 PFC LARP	State	NA015
Controls the NA015 AIN SE PFC LARP functionality introduced by feature 59022553.			

27.15.3 AIN SOC features for NA015

Order Code AIN00293, AIN SE R9 - N11 LARP optionalizes the N11 LARP functionality.

Order Code AIN00294, AIN SE R9 - PFC LARP optionalizes the PFC LARP functionality.

Order Code	Order Name	Option Type
AIN00293	AIN SE R9 N11 LARP	State
AIN00294	AIN SE R9 PFC LARP	State

SOC ON-TO-IDLE warning messages

The following warning messages are displayed before the NA015 SOC options are toggled from the ON to the IDLE state. The warning messages indicate that the state transition disables the associated AIN Service Enablers functionality.

AIN00293 warning message:

```
SERVICE AFFECTING: This transition will disable AIN
Service Enablers Release 9 N11 LARP functionality for
all current and future subscribers.
```

AIN00294 warning message:

SERVICE AFFECTING: This transition will disable AIN Service Enablers Release 9 PFC LARP functionality for all current and future subscribers.

Note: AIN00294 is implemented by ACTID 59022553 - PFC/SFC Customer Group subscription. Please refer to 59022553 FN for actual message.

Table 46 SOC

SOC option name:	AIN SE R9 N11 Line Attrs
SOC option title:	AIN00293
SOC option control type:	STATE
New SOC option?	Yes
SOC option order code	<order code>
Option defined in DRU:	PCA
Affected products:	LEC00015, LET00015, LLT00015

Table 47 SOC

SOC option name:	AIN SE R9 PFC Line Attrs
SOC option title:	AIN00294
SOC option control type:	STATE
New SOC option?	Yes
SOC option order code	<order code>
Option defined in DRU:	PCA
Affected products:	LEC00015, LET00015, LLT00015

27.16 AIN Feature Interactions Checklist

Table 48 Feature Interactions Checklist

Feature Category / Name	Check (X)
Analog Display Services Interface (ADSI) features Spontaneous Call Waiting Identification (SCWID) SCWID with Disposition (DSCWID)	
Automatic Call Distribution (ACD) features ACD Call Forcing ACD Incalls Key ACD Transfer to InCalls Key ACD Login ACD Login Enhancement ACD Logout ACD Terminations	
Bearer capability (BC)	
Basic Rate Interface (BRI) Specific Features Additional Call Offering Unrestricted (ACOU) Additional Functional Call (AFC) Block Called Number (BLOCKCDN) Block Calling Number (BLOCKCGN) Flexible Calling (FC)	
Billing features Account Codes Customer Dialed Account Recording (CDAR) Special Billing (SPB) Station Message Detail Recording (SMDR) Terminating Billing Option (TBO)	
Busy Override Features Executive Busy Override (EBO)	
Call-by-Call (CBC)	
Call forwarding Features (Includes on ISDN terminals) Call Forwarding Features (CFU/CFW/RCF) Call Forward Busy Features (CFB/CFBL) Call Forward Don't Answer Features (CFD/CFDA) Call Forward Group Don't Answer Features (CFGD/CFGDA) Call Forward Programming (CFWP) Call Forwarding Remote Access (CFRA) Call Forwarding Timed (CFT) Call Forwarding Validation (CFWVAL)	
Call Messenger features for RES Intentional Call Messenger (ICMSG) Standard Call Messenger (SCMSG)	

Table 48 Feature Interactions Checklist (Continued)

Feature Category / Name	Check (X)
<p>Call Park (CPK) Features Call Park (CPK) Directed Call Park (DCPK) Security Code (Directed Call Park) Call Park Recall Identification</p>	
<p>Call Pickup (CPU) features Call Pickup (CPU) Directed Call Pickup (DCPU) Directed Call Pickup with Barge-In (DCBI) Directed Call Pickup with Non-Barge-In (DCBU)</p>	
<p>Call Transfer Features Blind Transfer Recall Blind Transfer Identification Call Redirect (CRT) Call Transfer (CXR) MBS Single Button Transfer (QCK)</p>	
<p>Call Waiting (CWT) Features Call Waiting (CWT) Call Waiting Intragroup (CWI) Call Waiting Chaining (CWC) Call Waiting Conference (CWTC) Call Waiting Originating (CWO) Cancel Call Waiting (CCW) Dial Call Waiting (CWD) Talking Call Waiting (TCW)</p>	
<p>CLASS features CLASS—Anonymous Caller Rejection (ACRJ) CLASS—Automatic Call Back (ACB) — MDC and RES CLASS—Automatic Recall (AR) — MDC and RES CLASS—Automatic Recall Limited to One CLASS—Auto Recall Blocking of Private Calls (CABOP) CLASS—Bulk Calling Line Identification (BCLID) CLASS—Calling Name and Number Blocking (CNNB) — RES CLASS—Calling Name and Number Display (CNND) — RES CLASS—Calling Name Delivery (CNAMD) - TR1188 TCAP:MDC and RES CLASS—Calling Name Delivery (CNAMD) - Nodal — RES CLASS—Calling Number Blocking (CNB) — RES CLASS—Calling Number Delivery (CND) — RES CLASS—Calling Number Delivery Blocking (CNDB) — RES CLASS—Customer Originated Trace (COT) — MDC and RES CLASS—Dialable Directory Number Delivery (DDND) — RES CLASS—Distinctive Ringing/Call Waiting (DRCW) CLASS—Long Distance Indicator Enhancement (LDI) CLASS—Message Waiting Indicator (CMWI) CLASS—Selective Call Acceptance (SCA) — MDC and RES CLASS—Selective Call Forwarding (SCF) — MDC and RES CLASS—Selective Call Rejection (SCRJ) — MDC and RES</p>	

Table 48 Feature Interactions Checklist (Continued)

Feature Category / Name	Check (X)
Class of Service Features Automatic Number Identification (ANI) ANI Failure Log Flexible ANI (FANI) Hotel/Motel (HOT) Restricted Sent Paid (RSP)	
Conference Features Meet-me Conference Preset Conference Executive Conference (MMCONF 150) Station Controlled Conference (CNF) Six-Port Conference (CNF6) Super Conferencing (CNF30)	
Cutoff on Disconnect (COD) Feature	
Database Services Features Enhanced 800 (E800)	
Dialed Number Identification Service (DNIS) Feature	
Direct Dialing Overseas (DDO) Feature	
Direct Inward System Access (DISA) Features Direct Inward System Access (DISA) Reset Dialing	
Display Features Automatic Display (AUTODISP) Calling Line Number Display (CLIDSP) Calling Name Delivery Blocking (CNAB) Calling Name Display - CENTREX - NETWORK Name and Reason Display (REASDISP) PX (trunks) Calling Line Identification (PX CLID) Redirecting Number and Reason Delivery for ISDN Call Forwarding Special Handling of Presentation Restricted Numbers (SHPRN) Calling Name Delivery for MDC (TCAPNM for MDC)	
Distinctive Ringing Features Distinctive Ringing (DRING)	
Dual Line Call Management (DLCM) Feature	
Emergency Service Features 911PREFDN Emergency Service Line (ESL) Enhanced 911 Emergency Service (E911) E911 Call Forward Log E911 Ringback	

Table 48 Feature Interactions Checklist (Continued)

Feature Category / Name	Check (X)
Enhanced Busy Call Return (ECBR) Features In-Session Activation (ISA) Special Delivery Service (SDS)	
Feature Groups Feature Group A (FGA) Feature Group B (FGB) Feature Group C (FGC) Feature Group D (FGD)	
Flash Ignore (FIG) Feature	
Hold Features Call Hold (CHD) Key Set Music on Hold (KSMOH)	
Hotline Features Automatic Dialing (AUD) Automatic Line (AUL) Custom IBN Disconnect Treatment (CDT) Manual Line (MAN)	
Hunt Group Features Bridged Night Number (BNN) Directory Number Hunt (DNH) Distributed Line Hunt (DLH) Key-Set Short Hunt Group (KSH) Multiline Hunt (MLH) Multiple Position Hunt (MPH) Night Service Directory Number (NSDN) Stop Hunt (SHU) Terminating Billing Option - Hunt Groups (TRMBOPT)	
Hunt Group Overflow Routing Features Line Overflow to DN (LOD) Line Overflow to Route (LOR)	
Intercept Features Flexible Intercept (FLEXI)	
Intercom Features Group Intercom (GIC) Group Intercom All Call (GIAC) MBS Intercom (ICM) Single Party Revertive Calling (INT)	
Interswitch Call Trace (ICT) Feature	
Last Number Redial (LNR) Feature	
Local Coin Overtime (LCO) Feature	
Local Number Portability (LNP) Feature	

Table 48 Feature Interactions Checklist (Continued)

Feature Category / Name	Check (X)
Long Distance Signal (LDS) and Toll Alert Feature	
Long Distance Alert Enhancements (LDAE) Feature	
Messaging Features Call Screening/Monitoring Intercept (CSMI) Executive Message Waiting (EMW) FAX-Thru Service (FTS) Selective Call Messaging (SCM) Special Offering Decoupling of SDS (SODS) Station Message Waiting (MWT) Universal Voice Messaging (UVM)	
Multiple Appearance Directory Number (MADN) features MADN CACH (Call Appearance Call Handling) and CACH Bridging MADN Extension Bridging (EXB) MADN Multiple Call Arrangement (MCA) MADN Single Call Arrangement (SCA) and SCA Bridging Electronic Key Telephone Service (EKTS) and EKTS Hold Executive Busy Override on MADN (EBOM) MADN Hold MADN Lamp (MLAMP) MADN Privacy (PRV) and Privacy Release (PRL) MADN Release (MREL) MADN Ring Forward (MRF) Secondary MADN Call Forwarding (CFMDN) MADN MEMDISP and MEMNAME	
No Double Connection (NDC) Feature	
Network Access Registers (NAR) Feature	
O A and M features Customer Data Change (CDC)	
Private Virtual Networks (PVN) Feature	
PRI Features ISDN PRI Calling Name Delivery (I-CNAM) PRI - E911 Screening Two B-channel Transfer (TBCT)	
RES Simultaneous Ringing (SimRing) Feature	

Table 48 Feature Interactions Checklist (Continued)

Feature Category / Name	Check (X)
Restrictions to Dialing Privileges Feature Authorization Codes Authorization Code Immediate Dialing (ACID) Code Restrictions (CRL) Denied Origination (DOR) Restricted Dial Tone (RSDT) Station Origination Restrictions (SOR) Station Specific Authorization Codes (SSAC) Suspend / Request Suspension (SUS / RSUS)	
Ring Again Features Call Back Queuing (CBQ) Network Ring Again (NRAG) Ring Again (RAG)	
Routing Features Dynamically Controlled Routing (DCR) Expensive Route Warning Tone (ERWT) International Direct Distance Dialing through Automatic Route Selection (IDDD through ARS) Time of Day Routing (TOD)	
Secondary Language (SL) Feature	
Series Completion (SCMP) Feature	
Simplified Message Desk Interface (SMDI) Feature	
Single Line Variety Package (SLVP)—RES Feature	
Softkey Display Features Softkey Transfer (SKDISP)	
Speech Activated Intelligent Dialing features Speech Activated Intelligent Dialing (SAID) SAID Stringing of Digits (SOD)	
Speed Calling Features Speed Calling Speed Call Programming (Long), (SC2 and SCL) Speed Call Programming (Short), (SC1 and SCS) MDC Speed Calling Group User (SCU) Network Speed Calling (NSC) Speed Call Pause Insertion (SCPAUSE)/End to End signaling	
Suppressed Ringing Features Suppressed Ringing Access (SRA) Suppressed Ringing for Telemetry (UTS) Suppress Line Identification (SUPPRESS)	
Teen Service Features Teen Service (SDN) Secondary Directory Number Identification (SDNID)	

Table 48 Feature Interactions Checklist (Continued)

Feature Category / Name	Check (X)
Termination Restrictions Features Denied Incoming (DIN) Denied Termination (DTM) Do Not Disturb (DND) Make Busy Key (MBK) Make Set Busy (MSB) Make Set Busy Intragroup (MSBI) Random Make Busy (RMB) Plug up (PLP) Suspended (SUS) and Request Suspended (RSUS) Line	
Three-Way Calling (3WC) Features Three-Way Calling (3WC) Consultation Hold Usage Sensitive Three-way Calling (U3WC)	
Toll Restriction features Carrier Toll Denial (CTD) Equal Access Enhanced Carrier Toll Denial InterLATA Full Carrier Toll Denial (FCTDNTER) Toll Denial (TDN) Toll Diversion (TDV)	The line attributes information datafilled in the option override the originator's line attributes. This allows the customer to overcome the toll restrictions imposed by the originator's line attribute.
Trunk Answer From Any Station (TAFAS)	
Universal Call Distribution (UCD) Features	
Virtual Facility Group (VFG) Features Virtual Facility Group (VFG) Virtual Facility Group Look Ahead (VFGLA)	
Wide area telephone service (WATS) Features OUTWATS Enhanced OUTWATS and Universal OWT	
NA014 new Features: Will be updated soon.	
Other Features	

27.17 Glossary

Term	Description
LARP	Line Attribute Response Processing
PODPATTR	Public Office Dial Plan Attribute
REDIR	Redirection
SDS	Specific Digit String

27.18 References

Table 49 References

REF#	Document
1	AT.59008267 - Line Attribute Response Processing for the PFC trigger
2	BellCore GR-1298-CORE Issue 5, November 1999
3	AR1501: AIN Response Translations Enhancements
4	AR1691: CNA Response Translations Enhancements
5	AU3272: Line Attribute Index Expansion
5	A59022553: PFC/SFC Customer Group subscription
5	A59016521: Carrier Usage

28: Functional description (FN)

28.1 Feature name

59022576: ICM CDN DISPLAY AND THRESHOLD ROUTE ENHANCEMENTS

28.2 Description

28.2.1 Introduction to ICM

Intelligent Call Management (ICM) provides a data communications channel between a computer and a switch that allows a telco to provide coordinated switch-based services to applications residing on a customer's host computer. The coordination that can be provided through the messaging over the link allows for the implementation of specific solutions that dramatically improve end-user productivity and competitiveness.

The protocol used across the link for ICM is the ANSI Switch-Computer Applications Interface (SCAI) protocol.

The Switch-Computer Applications Interface (SCAI) specifies an architecture and an Open Systems Interconnection (OSI) application layer protocol suite for peer-to-peer data communication between host computer applications and switch applications, thereby enabling the functional integration of computer systems and telephony switching systems.

Remote Operation Service Element (ROSE) is used to support the interactive communication between the switch and host application.

Currently, ICM services exist for the use of three types of customers:

- Automatic Call Distribution (ACD) customers
- Meridian Digital Centrex (MDC) and ISDN BRI customers
- Residential Enhanced Services (RES) customers

28.2.2 Introduction to CDN

A CDN is a logical entity identified by a Dialable Number (DN) that holds onto calls waiting to be routed via an application's (for ex., ICM) routing instructions/treatments. The application can route calls to any addressable local or external party, including agent positions, ACD DNs, and even other CDNs. In addition, call treatments (music, RAN, silence, ringback and busy) can be applied to calls while they are in CDNs queue.

For each incoming call to a CDN, the switch informs the application about the call's arrival and starts a timer waiting for the routing instruction or treatments. The caller hear silence while waiting. The switch will handle the call according to the application's response. Activity AU2441 allows the host application to apply treatment/announcement to a call; and Activity AU2341 allows the host application to route calls held in the queue. If the timer expired before a response is received, the switch will route the call to a default ACD DN which is defined for the CDN on the switch.

Using the existing base ACD model on DMS, a CDN can be viewed as an 'ACD DN' with the following characteristics:

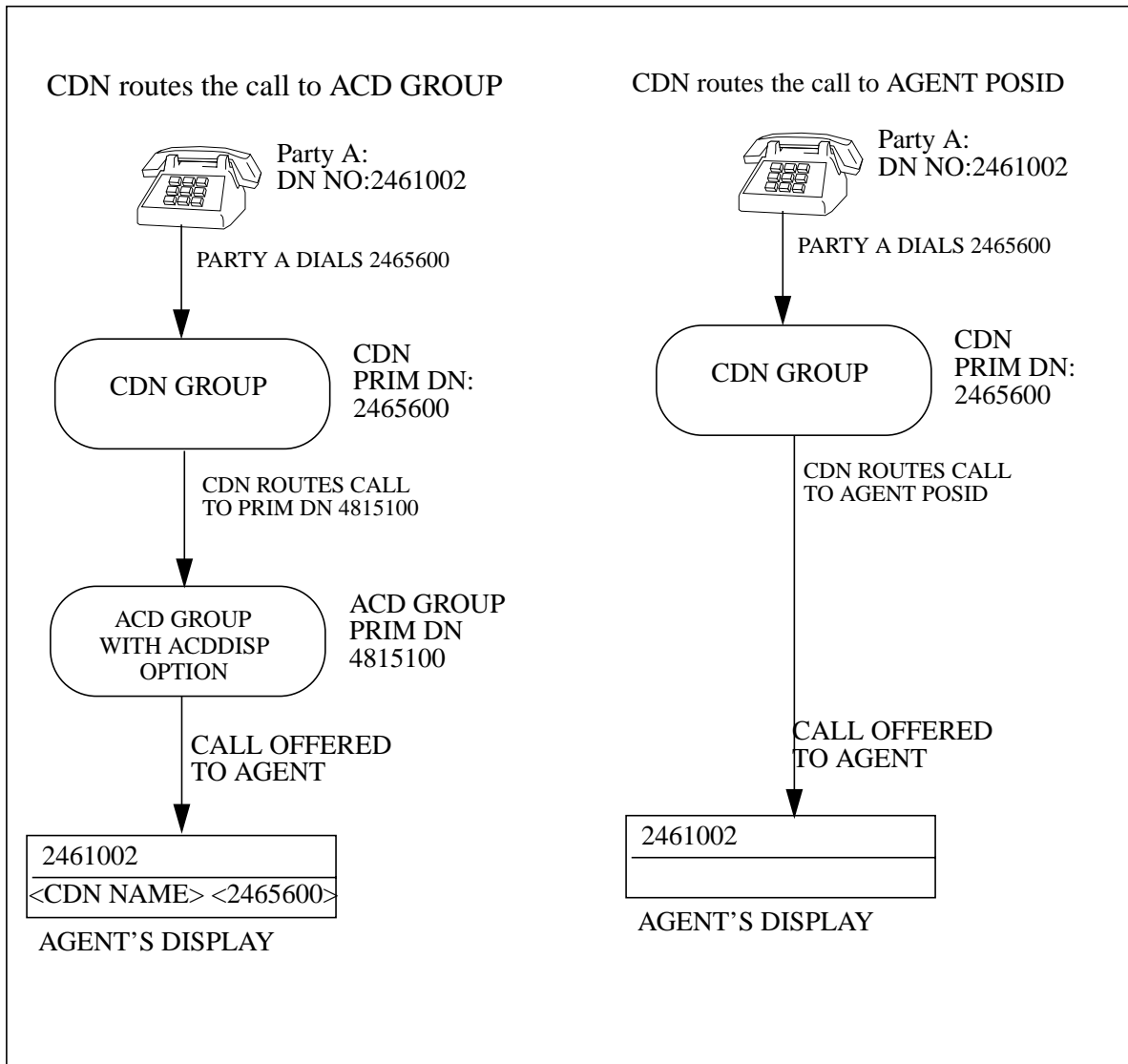
- There are no agents/supervisors directly associated with a CDN
- There are no subgroups belonging to a CDN
- A CDN does not have it's own Overflow In, Overflow Out queue, or Call Transfer Queue
- A CDN has a default ACD DN which is datafilled on the switch
- A CDN can have the following states
 - DEFAULT - incoming calls will be routed to the default ACD DN
 - CONTROLLED - incoming calls will be handled by the application
 - REVERT TO DEFAULT- all incoming calls and the existing calls in the CDN queues will be routed to the default ACD DN

In addition, the state can be set by the application (ICM) or the switch.

In the normal operation, the switch does not control the Audio, Overflow, or Routing for a CDN ACDGRP. i.e., calls in the CDN are handled by the host application (ICM). The existing ACDGRP fields like ACD Ring Threshold, Priority Promotion, Forced Night Service etc. are not applicable to a ACDGRP that has the CDN option

The current limit of the number of calls that can exists on a CDN queue (DMS) is 512

Please refer to activity "AU2339" for further details.

Figure 1 Current Behavior of CDN DISPLAY

28.2.3 CDN Display Enhancement

Prior to CCM15, if the call is routed from CDN incoming call queue to ACD agent then agents display do not show the name and number of the dialled party.

Please refer to “Figure 1 Current Behavior of CDN DISPLAY” on page 683.

- CDN routes the call to ACD GROUP, call is offered to idle agent and it displays the dialled digit and name.

-
- CDN routes the call to AGENT POSID, call is offered to agent(POSID) it does not display dialled digit and name.

This feature will remove the restrictions and will allow ACD agent to display name and number of the dialled party(if ACDDISP option is given for agents ACD GROUP)for both the scenario of Figure 1 ,this functionality is similar to call being routed to ACDGRP by CDN.(Please refer to “Figure 2 Proposed Behavior of CDN DISPLAY” on page 685.)

ACDDISP (ACD Name/Number display feature) is a group option given to ACD Group. **Refer to feature AD1131** for further details.

Following sets supports ACDDISP.

- NT4X20 (EBS with display)
- 2X16 character display set
- M5209
- M5312
- 2X24 character display sets.

Following display features are not compatible with EBS set.

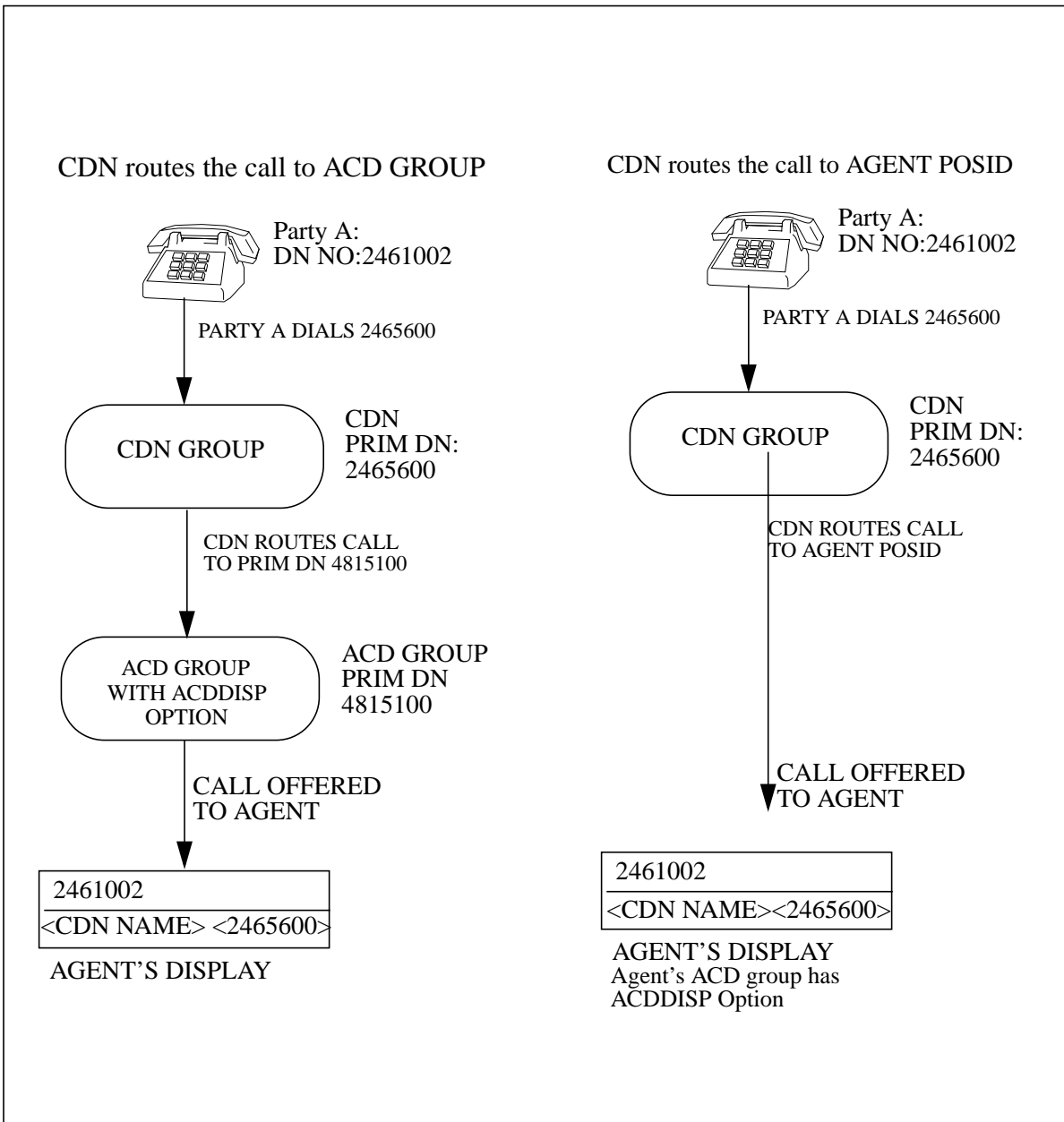
- CNAB
- CNAMD
- CND
- CNDB
- CNNB
- CNDB

If IBN set is provisioned as ACD agent then ACDDISP does not have any effect on the agents display.

Following display features are compatible with IBN sets (ACD agent).

- CNAMD
- CND

Figure 2 Proposed Behavior of CDN DISPLAY

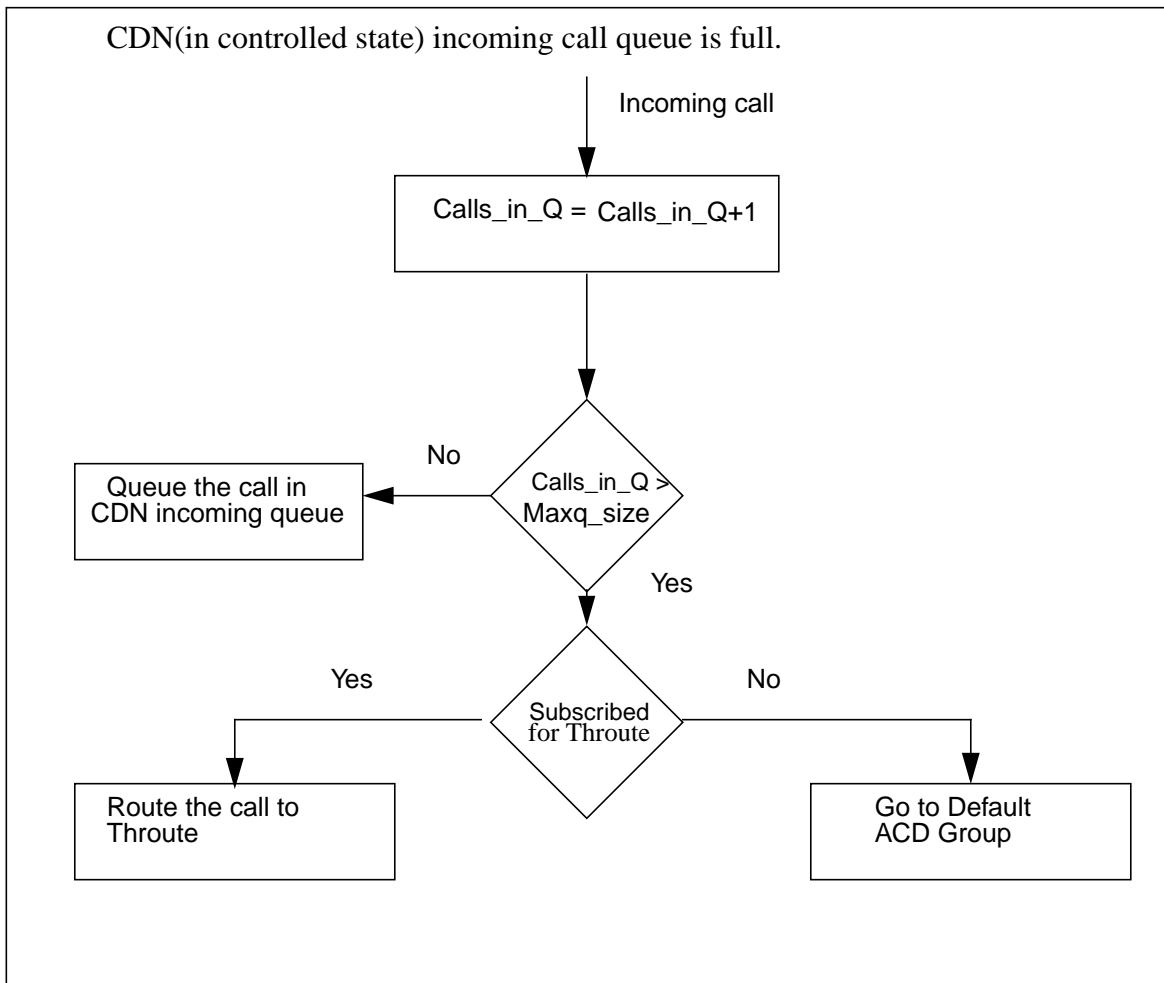


28.2.4 Threshold Route option

Prior to CCM15, if the incoming call queue size(of CDN)is full then next incoming call is routed to default ACD group.

This activity, will give customer option of specifying threshold route or default ACD group to route the incoming call when incoming call queue is full. Please refer to “Figure 3 Proposed routing of Calls when CDN Queue is full” on page 686.

Figure 3 Proposed routing of Calls when CDN Queue is full



28.2.5 DATAFILL FOR THROUTE

Prior to CCM15, the THROUTE option cannot be given for a CDN group. Even though datafilling THROUTE was mandatory for creating ACD group, it had no effect, if the group was given CDN option.

With this activity, THROUTE is activated if the CDN is in Controlled state and incoming call queue is full, the next incoming call will be routed to the Threshold route if the customer subscribes for Threshold routed, otherwise calls are routed to default ACD group.

Note: In the case of CDN, Throuete datafilled in Table ACDGRP gets activated only if customer subscribes for it by making the option CDN_THROUTE set to 'Y'. Please refer to "Figure 4 Data Filling THROUTE For CDN" on page 688.

Figure 4 Data Filling THROUTE For CDN

Example: Providing THROUTE option to CDN group in Table ACDGRP

```

>add
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>y
ACDNAME:
>xyz
CUSTGRP:
>PFDEFAULT
ACDRNGTH:
>0
TABNAME:
>ofrt
INDEX:
>99
TABNAME
>ofrt
INDEX:
>99
PRIOPRO:
>0
DBG:
>n
MAXQSIZ:
>9
MAXWAIT:
>9
ACDMIS:
>n
MSQS:
>n
DISTRING:
>none
OBSWTONE:
>n
FRCNGTSV:
>n
OPTION:
>cdn
DEFAULTGRP:
>abc
RESPTM:
>45

```


CDN_THROUTE:

>y

OPTION:

>\$

CAUTION - FIELD MAXWAIT will be overwritten with the default value due to the CDN option

TUPLE TO BE ADDED:

```

      XYZ  PFDEFAULT  0    OFRT  99
      OFRT 99  0 N    9    0
                                     N
                                     N  NONE  N
      N
                                     (  CDN ABC 45 Y)$

```

ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT

>y

TUPLE ADDED.

JOURNAL FILE INACTIVE

NOTE:Creating ACD GROUP XYZ with CDN option,customer can activate thruete option by setting CDN_THROUTE(sub-field) to 'Y'.

28.3 Hardware requirements

Not Applicable

28.4 Limitations and restrictions

This feature has the same restrictions and limitations as the current display features (ACDDISP) and ACD THROUTE.

28.5 Interactions

No new interactions will be introduced by this activity.

28.6 Logs (LG)

Not Applicable.

28.6.1 New/modified logs

28.7 Data schema (DS)

28.7.1 New/modified tables

Table 1 New or modified tables

Table name	NEW,CHANGED or DELETED	Table Control (NEW/OLD/ UNCHANGED)
ACDGRP	CHANGED	CDN_THROUTE

28.8 Office parameters (OP)

Not Applicable.

28.8.1 New/modified office parameters

28.9 Service orders (SO)

Not Applicable

28.10 Alarms (AL)

Not Applicable

28.10.1 New/modified directories

28.11 Command interface (CI)

Not Applicable.

28.11.1 New/modified commands

28.12 Operational measurements (OM)

Not Applicable.

28.12.1 New/modified OM groups

Not Applicable

28.13 AMA/Billing information (AM)

Not Applicable.

28.13.1 New/changed AMA/billing information

Not Applicable.

28.14 Software optionality control (SOC)

Not Applicable.

28.15 Glossary

TERM	DESCRIPTION
ACD	Automatic Call Distribution
CDN	Controlled Directory Number
CCM	DMS Common DRU
CTI	Computer Telephony Integration
DN	Directory Number
DMS	Digital Multiplex System
FSD	Feature Specification Document
ICM	Intelligent Call Management
MDC	Meridian Digital Centrex
RES	Residential Enhanced Services
SCAITT	Scai Computer Application Interface Testing Tool
RAN	Recorded Announcement

28.16 References

REF #	Description of Reference
NIS Q218	CompuCALL interface specifications
AU2339	CompuCALL Interaction with ICCM

BC1116	ACD Overview
--------	--------------

29: Functional description (FN)

29.1 Feature Name

ServOrd-CDN command support for OPRT intercept.

29.2 Description

29.2.1 Feature Synopsis

This NA015 feature A59022651 addresses ServOrd CDN command support for an ANCT or an OPRT intercept.

This feature addresses the intercept restriction problem and the changes to be implemented by ServOrd for a DMS-100 directory number to be put to work for an Operator or a Machine type of intercept.

This capability exists for the ServOrd NEW, EST and ADD commands, and in this feature it will be incorporated for the ServOrd CDN command.

This feature will significantly reduce the amount of unnecessary delays to the customers and the requirement of manual intervention of the central official personnel when using flow through Service Order procedures.

Note: This feature does not implement this capability for the CHDN command.

29.2.2 Functional Overview

The NA015 release addresses the intercept restrictions imposed by the ServOrd CDN command. This feature suggests the solution for the above mentioned problem as follows:

- The ServOrd CDN command will allow the DN of an existing line to be changed using the CDN command even if the new DN is associated with an ANCT, an OPRT or a BLDN type of intercept.

29.2.3 Functional Description

The ServOrd CDN command will fail as of now, if the new DN to which the DN of an existing line has to be changed to, is associated with an intercept other than BLDN; or; if it is associated with an existing working line

After the code changes introduced in this feature, the ServOrd CDN command will reject the command based on the type of intercept, if

- The DN is associated with an intercept other than ANCT, OPRT or BLDN.
OR
- The new DN is associated with an existing working line.

29.2.4 Message Protocols

Not Applicable

29.3 Hardware requirements

29.3.1 Engineering hardware information

Not Applicable

29.4 Limitations and restrictions

Not applicable.

29.5 Interactions

All changes will be made in Command Driver procedure. There is no potential problem at this point.

29.6 Logs (LG)

29.6.1 New/modified logs

None.

29.7 Data schema (DS)

29.7.1 New/modified tables

None.

29.8 Office parameters (OP)

None.

29.9 Service orders (SO)

The SERVORD command affected is CDN.

For more details refer to SO document.

29.10 Alarms (AL)

None.

29.11 Command interface (CI)

None.

29.12 Operational measurements (OM)

None.

29.13 AMA/Billing information (AM)

None.

29.14 Software Optionality Control (SOC)

None.

29.15 Glossary

Table 1 Definitions & abbreviations

SR No.	Acronyms	Name
1	ANCT	Machine Intercept
2	BLDN	Blank Line Intercept
3	CDN	Change Directory Number
4	DMS	Digital Multiplex System
5	DN	Directory Number
6	OPRT	Operator Intercept

30: Functional description (FN)

30.1 Feature name

DTMF Default Capability

30.2 Description

30.2.1 Feature Synopsis

This NA015 feature A59022657 discusses the problem of Default Signalling type in the DMS 100 switch and ServOrd changes that have to be made to change this default capability.

In this feature, Servord changes will allow the customer to select default signalling type by providing an office parameter through which one can select the default signalling type of a line either DP (Dial Pulse) or DT (Digitone). This is applicable only to non-keyset lines.

30.2.2 Functional Overview

This NA015 feature addresses the selection of signalling type of customers' choice either DP or DT. This feature suggests the solution for the above mentioned problem as follows:

- DTMF Default Capability facilitates the customer to select the default signalling types of his/her choice either DP or DT whenever a non-keyset lines are provisioned.

30.2.3 Functional Description

The functional Description of DTMF Default Capability is as follows:

Presently in the DMS 100 switch, switch default is Dial Pulse (DP), rather than Digitone (DGT).If DGT is not specified on the service order, the switch will automatically provision the customer's line with signalling type as DP.

After implementing the code changes in the feature, the customer can select the default signalling type of his/her choice.

Even when default signalling type is set to either DP or DT, the customer can have the signalling type of his/her choice depending on the line option associated with the line (provisioned or existing).

This feature is applicable to only non-keyset lines.For the list of LCCs refer SO document section 13.2.2.

30.2.4 Message Protocols

Not Applicable

30.3 Hardware requirements

30.3.1 Engineering hardware information

Not Applicable

30.4 Limitations and restrictions

- This feature allows user to add only 29/59 options to a line since one line option is reserved for signalling type DGT/DP.

30.5 Interactions

All changes will be done in newly created option Check and Update procedures.Additional code will be added to create new line option DP. One office parameter will be added to the table OFCVAR to support the functionality.

30.6 Logs (LG)

30.6.1 New/modified logs

None.

30.7 Data schema (DS)

30.7.1 New/modified tables

None.

30.8 Office parameters (OP)

To activate and deactivate the DTMF Default Capability, an office parameter DEFAULT_SIGNALLING_TYPE will be available in the table OFCVAR. This parameter will be set to either DP or DT to enable default signalling type of non-keyset lines provisioned.

For more details refer OP document.

30.9 Service orders (SO)

The SERVORD commands affected are NEW, ADO, DEO, ADD, EST, EXBADD, EXBADO, EXBDEO, EXBEST.

For more details refer to SO document.

30.10 Alarms (AL)

None.

30.11 Command interface (CI)

None.

30.12 Operational measurements (OM)

None.

30.13 AMA/Billing information (AM)

None.

30.14 Software optionality control (SOC)

None.

30.15 Glossary

Table 1 :Abbreviations and Definitions

SR #	Acronym	Name
1.	DGT	Digitone
2.	DT	Digitone
3.	DTMF	Dual Tone Multi Frequency
4.	DP	Dial Pulse
5.	LCC	Line Class Code

31: Functional description (FN)

31.1 Feature name

A59022713: STS1 Provisioning - CM

31.2 Description

31.2.1 Background

This feature provides a description of the carrier provisioning for STS-1 from the perspective of central carrier maintenance in the DMS Core. Carrier provisioning is responsible for all STS-1 datafill.

This activity allows a craftsperson to datafill a STS1S and STS1L carrier in table MNHSCARR. With this functionality one can add and delete multiple STS1S and STS1L carriers on the MG4000.

31.2.2 Example carrier datafill

31.2.2.1 STS1S carrier

To add a new STS1S carrier in table MNHSCARR, with default values for Performance Monitoring and Defect Monitoring, the following datafill can be entered:

```
> add SPM_01_STS1S_01 1 STS1S SPM 1 0 11 $ $
```

The fields in this tuple can be broken down into their component parts. The following table lists the individual elements that make up an MNHSCARR tuple.

Table 12 Components of an STS1S tuple in table MNHSCARR

Field Name	Example	Purpose
CARRKEY	SPM_01_STS1S_01	A unique key for the table. Up to 38 characters
CCTNO	1	Circuit number
CARRTYPE	STS1S	Carrier type - STS1S is the new carrier type
PHYLINK	SPM 1 0 11	The physical location of the carrier - Peripheral number, shelf number, slot number and carrier number.
STS1SPM	\$	Performance Monitoring information. \$ gives the default values. See below for more information.
STS1SFALL	\$	Defect Monitoring information. \$ gives the default values. See below for more information.

Positioning this tuple from MNHSCARR will provide the following display.

```
>pos SPM_01_STS1S_01
      SPM_01_STS1S_01   1
STS1S SPM 1 0 11 (SEFS 17 7 MN) (CV 4430 1772 MN) (ES 864 346 MN)
      (SES 4 2 MN) $ (LOS CR RPT) (LOF CR RPT) $
```

The default values are detailed further in section 2.2.4.

Deleting STS1S tuples in table MNHSCARR can be done in the same way as for any other carrier type. The CARRKEY (SPM_01_STS1S_01 in the sample datafill above) is used to select the tuple, using the 'pos' command. Once this is done, it is possible to delete the tuple with the 'del' command.

```
>pos SPM_01_STS1S_01
>del
```

Following are the performance parameter types for STS1S.

Table 13 Supported PM Types for the STS1S Carrier type

PM Type	Description
SEFS	Severely Errored Framing Seconds
CV	Coding Violation
ES	Errored Seconds
SES	Severely Errored Seconds

Following table describes the Defect Monitoring Failure types for STS1S carrier.

Table 14 Supported Failure Types for the STS1S Carrier Type

Failure	Description
LOS	Loss of signal
LOF	Loss of frame

31.2.2.2 STS1L Carrier

To add a new STS1L carriers in table MNHSCARR, with default values for Performance Monitoring and Defect Monitoring, the following datafill can be entered:

```
>add SPM_01_STS1L_01 2 sts1l SPM_01_STS1S_01 3 5 hscarr $ $ $
```

The fields in this tuple can be broken down into their component parts. Following table lists the individual elements that make up an MNHSCARR STS1L tuple.

Table 15 Components of an STS1L tuple in table MNHSCARR

Field Name	Example	Purpose
CARRKEY	SPM_01_STS1L_01	A unique key for the table. Up to 38 characters
CCTNO	2	Circuit number
CARRTYPE	STS1L	Carrier type - STS1L is the new carrier type
PCRRNAME	SPM_01_STS1S_01	Parent carrier name.
BER limits	3 5	These are the Bit Error Ratio limits that will be permitted before a signal degrade or excessive error alarm is reported.
Carrier Class	HSCARR	Carrier Class supported by the carrier
GENFLT	\$	General Fault Attributes. \$ gives the default values.
STS1LPM	\$	Performance Monitoring information. \$ gives the default values. See below for more information.
STS1LFAIL	\$	Defect Monitoring information. \$ gives the default values. See below for more information.

Positioning this tuple from MNHSCARR will provide the following display:

```
>pos SPM_01_STS1L_01
```

```
SPM_01_STS1L_01 2 STS1L SPM_01_STS1S_01 3 5 HSCARR (SFBERX
MN RPT)(SDBERX MN RPT) $ (CV 4430 1772 MN) (ES 864 346 MN)(SES
4 2 MN) (UAS 10 10 MN) $ (AIS MN NRPT) (RFI MN NRPT) $
```

Deleting STS1L tuples in table MNHSCARR can be done in the same way as for any other carrier type. The CARRKEY (SPM_01_STS1L_01 in the sample datafill above) is used to select the tuple, using the 'pos' command. Once this is done, it is possible to delete the tuple with the 'del' command.

```
>pos SPM_01_STS1L_01
>del
```

There are 4 supported Performance Monitoring types for STS1L. The following table describes the supported parameters.

Table 16 Supported PM Types for the STS1L Carrier Type

PM Type	Description
CV	Coding Violation
ES	Errored Seconds
SES	Severely Errored Seconds
UAS	Unavailable Seconds

There are 2 supported Defect Monitoring failure types. The following table describes the Failure types which are supported.

Table 17 Supported Failure Types for the STS1L Carrier Type

Failure	Description
AIS	Alarm Indication Signal
RFI	Remote Defect Indication

31.2.3 STS1P Carrier

This carrier is already exist in table MNHSCARR. This feature is adding one more failure alarm in STS1P carrier which will be supported on SUP (STS1 Unit Processor) RM.

The datafill for STS1P will be like this :

```
>add SPM_01_STS1P_01 2 sts1p SPM_01_STS1L_01 1 VT
SPM_01_STS1S_01_STS1L_01_STS1P_01 $ $
```

Positioning this tuple from MNHSCARR will provide the following display.

```
pos SPM_01_STS1P_01
```

```
>SPM_10_STS1P_01 2 STS1P SPM_01_STS1L_01 1 VT
SPM_01_STS1S_01_STS1L_01_STS1P_01 (CV 125 15 MN) (ES 100 12
MN) (SES 7 3 MN) (UAS 10 10 MN) (CVFE 125 15 MN) (ESFE 100 12 MN)
(SSEFE 7 3 MN) (UASFE 10 10 MN) $ (LOP MN NRPT) (AIS MN NRPT)
(RFI MN NRPT) (PLM MN RPT) (TIM MN NRPT) $
```

Deleting STS1P tuples in table MNHSCARR can be done in the same way as for any other carrier type. The CARRKEY (SPM_01_STS1P_01 in the sample datafill above) is used to select the tuple, using the 'pos' command. Once this is done, it is possible to delete the tuple with the 'del' command.

31.2.4 Default carrier values

The default values for each part of the STS1S and STS1L tuple are listed in the table below. These are the values entered into the tuple if the default values are requested (using the \$ sign).

Table 18 Default values for the STS1S and STS1L Carrier tuple

Field	Default Value
SEFS	Day Threshold = 17, 15 Minute Threshold = 7, Severity = Minor
CV	Day Threshold = 4430, 15 Minute Threshold = 1772, Severity = Minor
ES	Day Threshold = 864, 15 Minute Threshold = 346, Severity = Minor
SES	Day Threshold = 4, 15 Minute Threshold = 2, Severity = Minor
UAS	Day Threshold = 10, 15 Minute Threshold = 10, Severity = Minor
LOS	Severity = Critical, Action = Report Alarm (LOS MN RPT)
LOF	Severity = Critical, Action = Report Alarm (LOF MN RPT)
AIS	Severity = Minor, Action = Not Report Alarm (AIS MN NRPT)
RFI	Severity = Minor, Action = Not Report Alarm (RFI MN NRPT)
TIM	Severity = Minor, Action = Not Report Alarm (TIM MN NRPT)

31.3 Hardware requirements

In order that an STS1 carrier may be provisioned, an SUP device must have been provisioned previously in table MNCKTPAK. This device must be provisioned using the new PEC code NTLX74AA. The provisioning of this SUP device will be handled by the future A59027019.

31.4 Limitations and restrictions

This design only covers the ability to provision STS1S and STS1L carriers in table MNHSCARR. It does not support DS3 carriers to be provisioned on SUP RM.

31.5 Interactions

The implementation of this feature has the dependency on the following features:

59022725 - STS1 carriers MAP/LOGS/TEST.

59027019 - STS1 RM provisioning/MAP.

59022719 - STS1 Provisioning - Local.

31.6 Logs (LG)

None.

31.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

31.7 Data schema (DS)

31.7.1 New/modified tables

MNHSCARR

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
MNHSCARR	CHANGED	UNCHANGED

```

>table mnhscarr
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
TABLE: MNHSCARR
>ran
 1 CARRKEY          T_SPMCRT_KEY
 2 CCTNO           T_SPMCRT_CCT_NO
 3 CARRINFO        T_SPMCRT_CARR
LOGICAL TUPLE TYPE: T_SPMCRT_LT
>ran 3
3 CARRINFO          T_SPMCRT_CARR
TYPE IS T_SPMCRT_CARR      MULTIPLE WITH
  CARRTYPE           T_CARR_TYPE REFINEMENTS:
  {sts1S}           MULTIPLE WITH
    PHYLINK          MULTIPLE WITH
      NODETYPE       PM_TYPE
      NODEID         {0 TO 63}
      SHELFID        {0 TO 1}
      SLOTNUM        {1 TO 28}
    STS1PM           VECTOR OF UP TO 4 MULTIPLES WITH
      PARM           {SEFS,CV,ES,SES}
      ATTR           MULTIPLE WITH
        DAYLIM       RANGE 0 TO 4294967295
        MIN15LIM    {0 TO 32767}
        ALRMSEV     {NA,MN,MJ,CR}
    STS1FAIL        VECTOR OF UP TO 2 MULTIPLES WITH
      FAILURE       {LOS,LOF}
      ATTR          MULTIPLE WITH
        SEVERITY    {NA,MN,MJ,CR}
        ACTION      {NRPT,RPT}
  {STS1L}           MULTIPLE WITH
    PCRRNAME        VECTOR OF UP TO 38 CHAR'S
    SFBERLIM        {3 TO 5}
    SDBERLIM        {5 TO 9}
    CARRCLAS        {HSCARR}
    GENFLT          VECTOR OF UP TO 2 MULTIPLES WITH
      FAULT         {SFBERX,SDBERX}
      ATTR          MULTIPLE WITH
        SEVERITY    {NA,MN,MJ,CR}
        ACTION      {NRPT,RPT}
    STS1PM          VECTOR OF UP TO 4 MULTIPLES WITH
      PARM          {CV,ES,SES,UAS}
      ATTR          MULTIPLE WITH
        DAYLIM       RANGE 0 TO 4294967295
        MIN15LIM    {0 TO 32767}
        ALRMSEV     {NA,MN,MJ,CR}
    STS1FAIL        VECTOR OF UP TO 2 MULTIPLES WITH
      FAILURE       {AIS,RFI}
      ATTR          MULTIPLE WITH
        SEVERITY    {NA,MN,MJ,CR}
        ACTION      {NRPT,RPT}

```

31.7.2 Error conditions

For each part of the STS1S and STS1L tuple, checks are performed to ensure that invalid data is not entered. This section describes the possible errors that may be observed when adding a new STS1S and STS1L carrier.

31.7.2.1 Invalid Circuit Number

The range for the circuit number is currently 0 to 181 - however, entering a value of either 0 or 181 will result in the following error message being displayed on screen:

Error : CTNO 0 or 181 is currently not supported

This makes the actual valid range for circuit number between 1 and 180. Entering a value for the circuit number which is outside the valid range, the following error is generated, and the user is asked to enter a new circuit number.

```
*** ERROR ***
182 STS1S SPM 1 0 11 $ $ $
|
TYPE OF CCTNO IS T_SPMCRT_CCT_NO
CCTNO:
>
```

(Feature xxxxx will increase this circuit number range to 183).

31.7.2.2 Invalid RM

The device for provisioning STS1 carriers is SUP (STS1 Unit Processor). So if the craftperson provision the STS1 carriers with some other device except SUP. It will give the error message.

>Error : Can not find the host STS-1 circuit pack

31.7.2.3 Invalid carrier DS3 on SUP

If the craftperson tries to provision DS3 carriers on SUP device it will give the error message that DS3 carriers are not supported on SUP.

>Error : DS3 is not supported on SUP.

31.7.2.4 Incorrect Physical Location

The SUP device that the STS-1 carrier is to be located on must itself be located in specific slots. These locations are:

Shelf 0, Slot 11

Shelf 1, Slot 3

Shelf 1, Slot 9

These are the logical slot numbers if the values are not correct following errors will be printed (depending on the value entered for the shelf number):

>Error : The slot is invalid, only valid for shelf 0.

>Error : The slot is invalid, only 3 and 9 are valid for shelf 1.

The user can then re-enter the correct PM data.

The user can then re-enter the correct fault management data.

31.8 Office parameters (OP)

None.

31.9 Service orders (SO)

None.

31.10 Alarms (AL)

None.

31.11 Command interface (CI)

None.

31.12 Operational measurements (OM)

None.

31.13 AMA/Billing information (AM)

None.

31.14 Glossary

Term	Description
AIS	Alarm Indication Signal
BBE	Background Block Error
BER	Bit Error Rate
CI	Command Interface
CS	Controlled Slip
CSS	Controlled SLIP Seconds
ES	Errored Seconds

IEM	Interface Electronics Module
LFA	Loss of Frame Alignment
LOS	Loss of Signal
LOF	Loss of frame
MNCKTPAK	Management Network CircuiT PAck
MNHSCARR	Management Network High Speed CARRier
PEC	Product Equipment Code
RFI	Remote Defect Indication
SES	Severely Errored Seconds
SUP	STS1 Unit Processor
TIM	Trace Identifier Mismatch
UAS	Unavailable Seconds

31.15 References

A59022725, STS-1 Carrier MAP/LOGS/TEST. Located in the PLS FMDOC library.

MG400 PPVM STS-1 Technical Requirements Specification, Issue 2.1.0

A59027019, STS-1 RM Provisioning/Map. Located in the PLS FMDOC library.

32: Functional description (FN)

32.1 Feature name

Sourcing of patches LNP40 and NPA03 and Routing of Local Number Portability (LNP) calls to datafilled treatment on Fault Overload Detection (FOD).

32.2 Description of work items

This activity deals with the following work items:

- Sourcing patch LNP40 into NA015 design stream - elimination of conflict between ISDN BRI and LNP response translations.
- Sourcing patch NPA03 into NA015 design stream¹ - optional removal of NPA in the called number returned by the SCP.
- Routing LNP calls with 10 digit ACG control to datafilled treatment.

The work items are discussed individually in the following sections.

32.3 Sourcing of patch LNP40

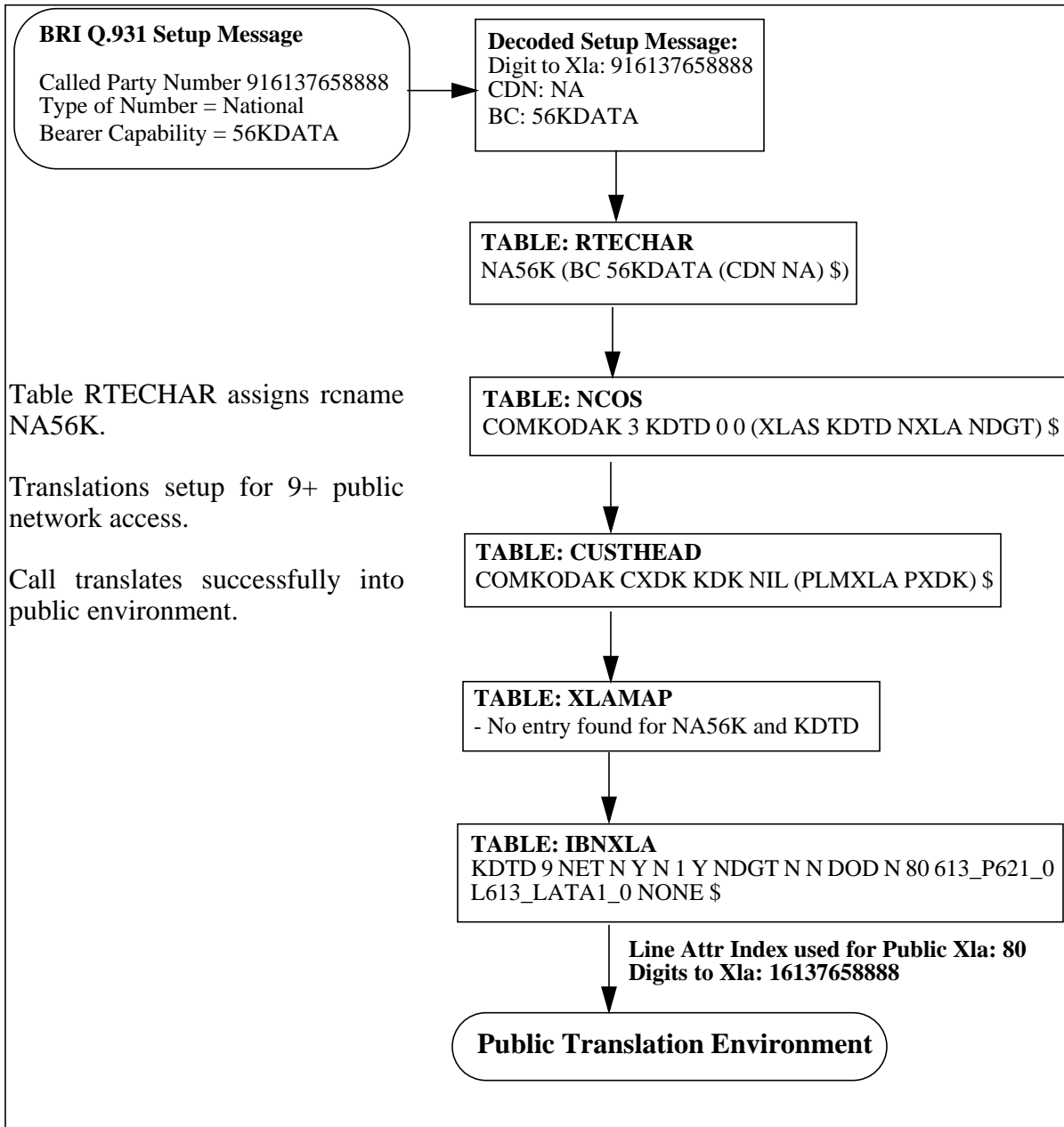
32.3.1 Description

BRI sets that are not compliant with ISDN Q.931 protocol send in numbers consisting of 9+1+NPANXXXXXX and 9+NPANXXXXXX (centrex dialing plan) with the Type of Number (TON) set to NATIONAL. The translation datafill to handle these non-compliant ISDN BRI sets is not compatible with 10 digit based AIN/LNP response translation.

The non-compliant BRI calls are translated as follows.

¹This work item will be delivered under A59022792.

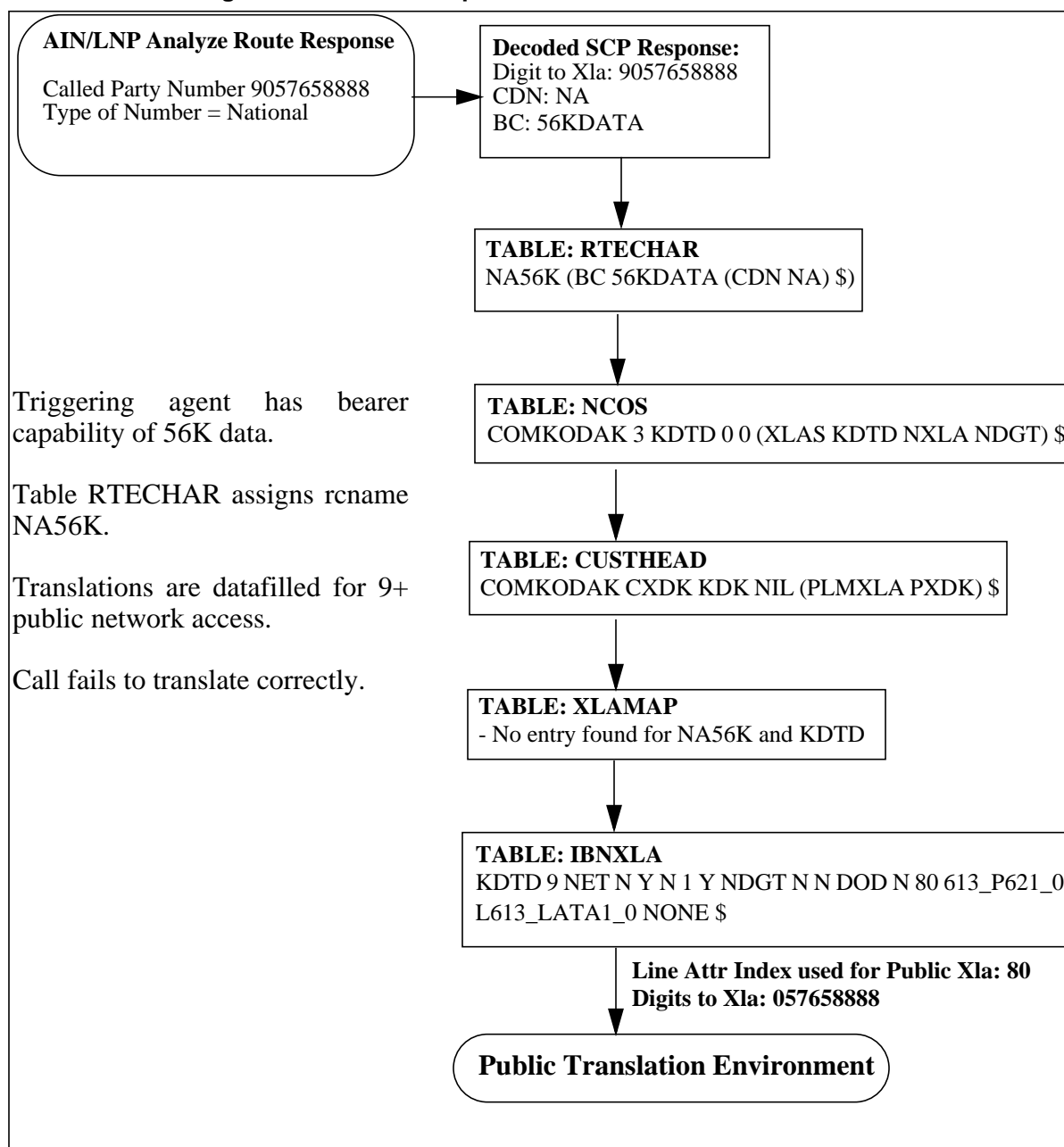
Figure 1 Non-Compliant BRI Translation Flow



AIN/LNP response translation for national number (TON) responses is based on 10 digits and uses ISDN translation system. ISDN translation system cannot differentiate BRI and AIN/LNP calls and the same RCNAME is assigned for BRI and AIN/LNP translations. BRI and AIN/LNP calls thus share the same translation path.

When translations are setup for 9+ public network access, AIN/LNP response translation fails as 10 digit numbers cannot be translated from the private environment in the same manner as 9+ public network access calls.

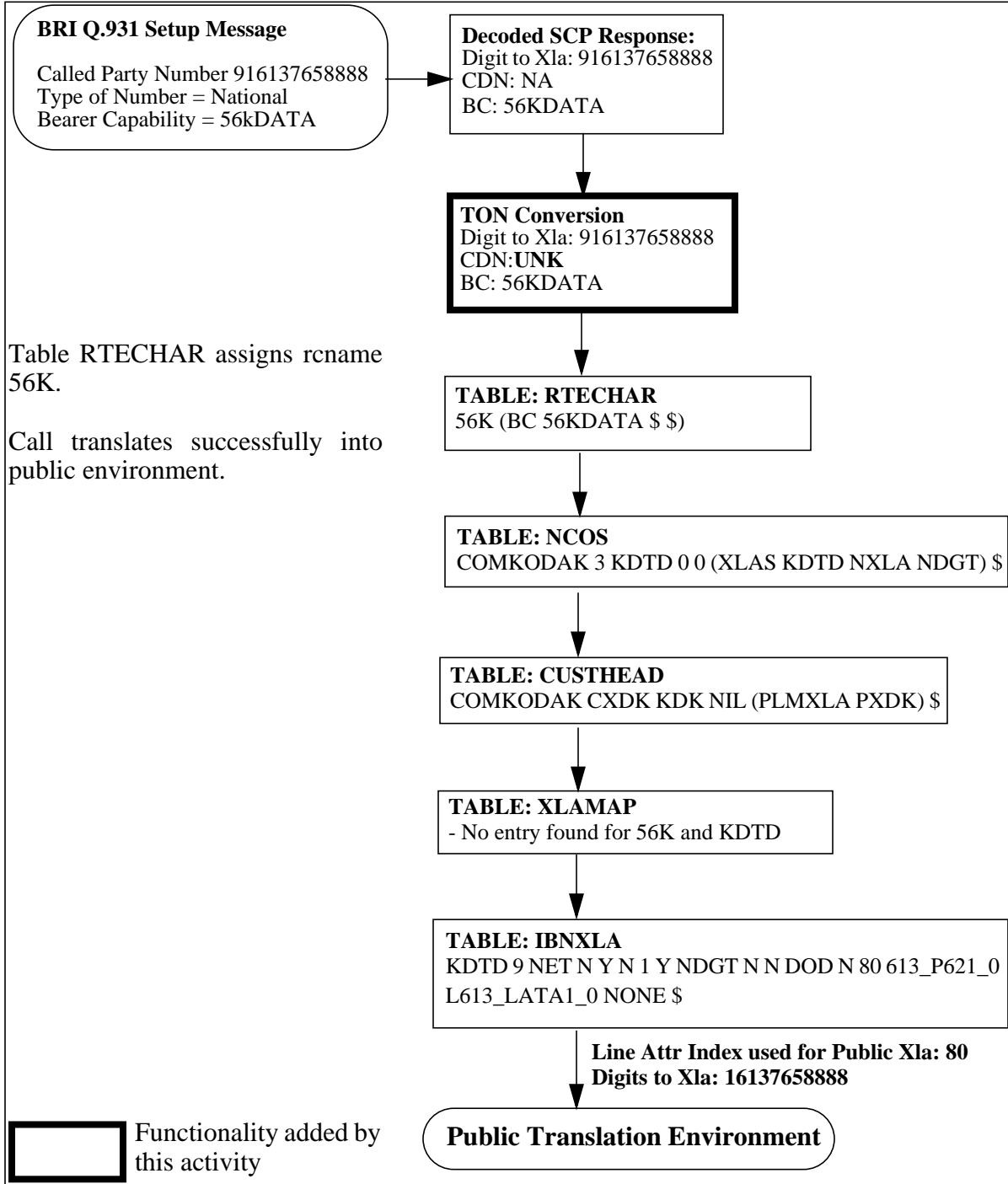
Figure 2 AIN/LNP Response Translation Flow



This activity provides the capability to disable CDN (TON) based routing for BRI originators when the incoming setup message has “national” Type of Number. It resolves the conflict between BRI and AIN/LNP translations by changing the type of number of BRI calls from “national” to “unknown”. This

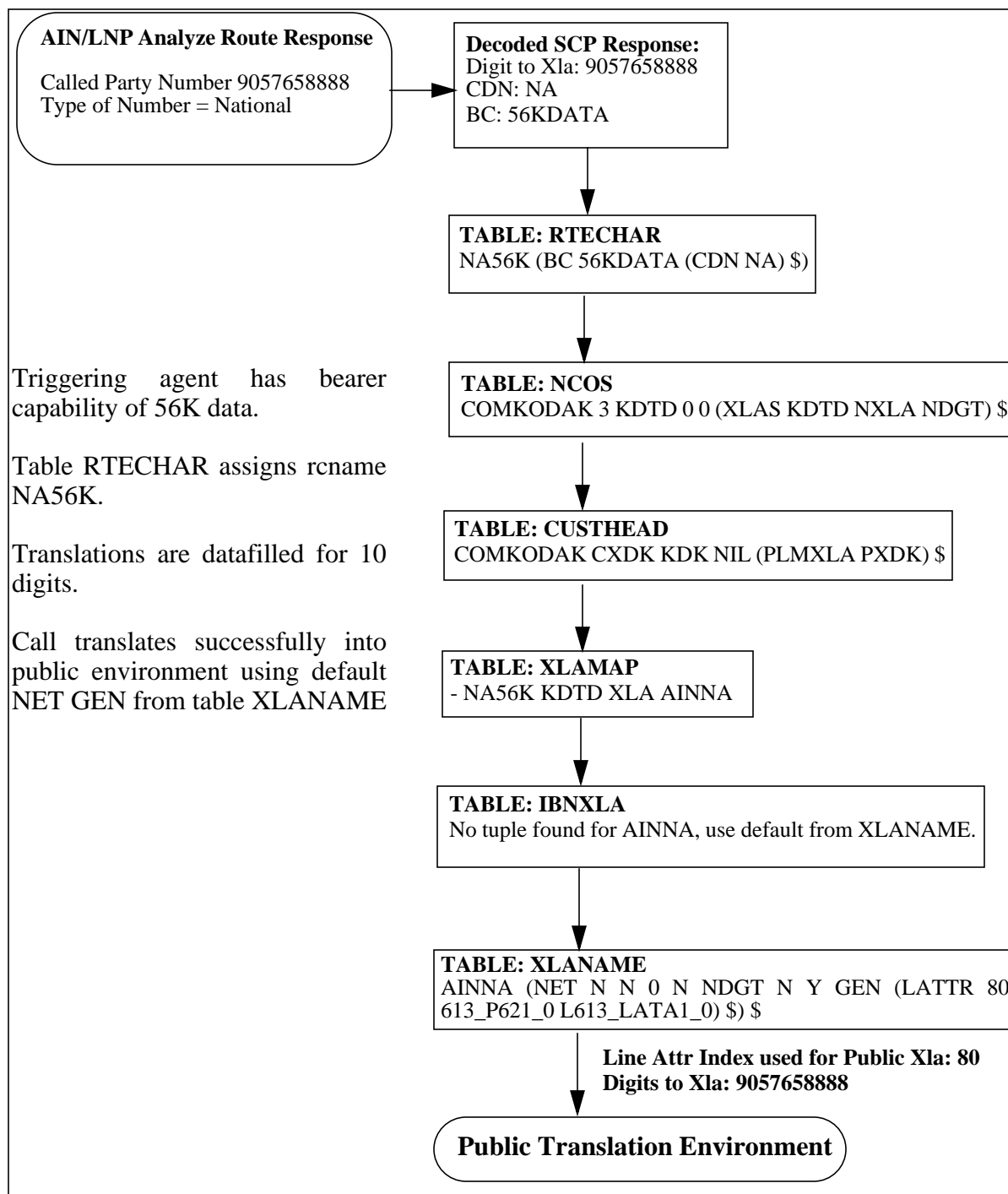
conversion of the TON enables BRI and AIN/LNP calls to have different RCNAMEs which then permits them to have separate paths through the translation system. This requires customers to provide separate tuples for BRI and AIN/LNP translations as given below.

Figure 3 BRI Translation Flow with TON=Unknown



AIN/LNP response translation is unaffected. With appropriate datafill in table XLAMAP, AIN/LNP call translates successfully into public environment.

Figure 4 AIN/LNP Response Translation flow with TON=NA



32.3.1.1 RTECHAR Datafill

Changing the TON resolves the conflict only when separate tuples are provisioned in RTECHAR for BRI and AIN/LNP translations. This requires customers to break-out RTECHAR tuples without (CDN NA).

Figure 5 Table RTECHAR Datafill

For example, the following tuple in table RTECHAR:

56KDATA (BC 56KDATA (CDN NA) \$) (BC 56KDATA \$) \$

should be broken up into two tuples as shown below:

56K (BC 56KDATA \$) \$----- (*for BRI*)
 NA56K (BC 56KDATA (CDN NA) \$) \$ ----- (*for AIN/LNP*)

32.3.1.2 New Customer Group Option

The functionality of changing the TON is made optional and is offered on a customer group basis. A new customer group option, BRITONUN is created and can be datafilled against any valid customer group in table CUSTSTN.

Figure 6 New Option in CUSTSTN

TABLE CUSTSTN

<u>CUSTNAME</u>	<u>OPTNAME</u>	<u>OPTION</u>
COMKODAK	BRITONUN	BRITONUN

The TON of the BRI call is changed to unknown only when

- i. the incoming setup message has national TON and
- ii. the customer group of the BRI originator has BRITONUN option assigned.

32.3.1.3 Software Upgrade

During software upgrade from an old load, it is checked if patch LNP40 is active on the old load. If it is, then the option BRITONUN is automatically added in table CUSTSTN for all the customer groups on the switch. If the patch was not applied or inactive on the old load, then the option is not added in CUSTSTN for any customer group. Thus, this activity ensures that the transition from the patch to the source is transparent to the customer.

After software upgrade, if the customer wishes to turn the feature functionality ON in a switch which did not have patch LNP40 activated or applied prior to

software upgrade, the option/tuple has to be added manually in CUSTSTN table for the required customer group.

32.3.1.4 Traver Enhancements

TRAVER tool is modified to change the TON from national to unknown when all of the following conditions are satisfied.

- a. the originator is a BRI set
- b. routing characteristics are specified in the command line
- c. TON specified is national
- d. originator's customer group has BRITONUN option

Traver is also enhanced to issue a message when the TON is changed

Figure 7 Traver Enhancements¹

Table RTECHAR

```
NA56K (BC 56KDATA (CDN NA) $) $
56K (BC 56KDATA $) $
```

NOTE: LECNA is not referenced in the traver below

```
>traver 1 4771079 n cdn na 96136771058 bc 56kdata b
Warning: Routing characteristics are present.
Originator must be able to send in
characteristics specified.
AIN Info: BRITONUN option present in table CUSTSTN
AIN Info: CDN changed from NA to UNK
TABLE RTECHAR
56K (BC 56KDATA $) $
TABLE KSETLINE
MFT 261 1 DN Y 4771079 MDC416 0 0 416 $ BRI UNDEF N $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE KSETFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
```

32.3.2 Hardware requirements

None.

32.3.3 Limitations and restrictions

- Requires customers to break-out tuples in table RTECHAR and thus provide separate tuples for BRI and AIN/LNP translations.

¹NOTE: TRAVERs shown in this document are not complete. Only relevant portions are shown.

- Disables routing based on CDN (TON) for BRI originated calls when the customer group of the originator has BRITONUN option and the TON is national. This behavior will also be documented in various NTPs, especially North American DMS-100 translation guide and National ISDN BRI Service Implementation guide where the capability of routing ISDN calls based on CDN (TON) has been documented.
- Before adding the BRITONUN option to a customer group, especially on switches which did not have patch LNP40 applied previously, it is recommended that:
 - the customer go through NTPs which state that BRI routing based on TON would not be supported anymore for that customer group and
 - if required, change the datafill accordingly.

32.3.4 Interactions

None.

32.3.5 Logs (LG)

32.3.5.1 New/modified logs

This activity does not add any new logs and does not modify any existing logs.

32.3.6 Data schema (DS)

32.3.6.1 New/modified tables

Table 1 Modified Table

Table Name	NEW, CHANGED or DELETED	Nature of Change
CUSTSTN	CHANGED	Added a new option

32.3.7 Office parameters (OP)

32.3.7.1 New/modified office parameters

None.

32.3.8 Service orders (SO)

None.

32.3.9 Alarms (AL)

None.

32.3.9.1 New/modified directories

None.

32.3.10 Command interface (CI)

32.3.10.1 New/modified commands

None.

32.3.11 Operational measurements (OM)

32.3.11.1 New/modified OM groups

None.

32.3.12 AMA/Billing information (AM)

32.3.12.1 New/changed AMA/billing information

None.

32.3.12.2 Software optionality control (SOC)

None.

32.4 Sourcing of Patch NPA03

32.4.1 Description

This work item enhances AIN Response Translation Simplification feature.

AIN Response Translation Simplification feature (AR2104) provides the capability to reuse existing pretranslators and translation datafill for AIN response translation. The reuse of this datafill requires conversion of the called digits received in the SCP response, into a digit format which is consistent with the translation datafill to be reused.

32.4.1.1 Digit Conversion for National Numbers

The conversion process for 10 digit National Numbers is based on the following logic:

1. Table HNPACONT datafill is used to determine if the 10D number should be converted to 7D or 10D. The NPA is removed from the 10D called number, if one of the following conditions are met:
 - Indexing HNPACODE with the 10D called number results in VCT HNPI.
 - Originator’s NPA is equal to the NPA of the 10D called number; and, the HNPACODE subtable contains no entry for the NPA of the called number.
2. Table LCASCRCN datafill is used to determine if a call is local or toll. If NPANXX of the called number is found in subtable LCASCR then it is local. If NPANXX is not found, then if the originator's NPA is equal to the called number's NPA and NXX is datafilled in subtable LCASCR then it is local. Otherwise, it is toll.
3. Using PFXFOR10 of table LCASCRCN and the local/toll result from step 2, the called number is modified as shown in table 3.
4. Carrier Access: If the response includes a Carrier ID, prefix 10XXX or 101XXXX at the beginning of the digits.

Table 2 Digit Conversion for National Numbers

Digits after Step 1 (HNPACONT)	Local/Toll	PFXFOR10	Originator’s NPA = Called NPA	Result
7D	Local	Y	Not Applicable	7D
7D	Local	N	Not Applicable	7D
7D	Toll	Y	Not Applicable	7D
7D	Toll	N	Not Applicable	1+7D
10D	Local	Y	N	1+10D
10D	Local	Y	Y	7D
10D	Local	N	Not Applicable	10D
10D	Toll	Y	Not Applicable	1+10D
10D	Toll	N	Not Applicable	1+10D

32.4.1.2 Problem with Digit Conversion

AIN Response Translation Simplification feature removes the NPA of the called number returned in the AIN response if all of the following conditions are true.

- SOC AIN00026 is ‘ON’

- the call is local
- PFXFOR10 option is TRUE in LCASCRCN or LCAINFO tables
- the NPA of the SCP number is the same as the originator's NPA

This scenario is shown in bold in table 3.

The above functionality is a problem in areas where 1+10 digit dialing is mandatory (for toll and local calls). The stripping of NPA results in a 7 digit number and the call is then sent to treatment. Calls to DN's in portable NPANXX within the home NPA fail when all the above conditions are satisfied. AIN Response Translation simplification is thus not compatible with 1+10 digit local dialing.

This activity allows the above logic to be disabled when it is not desirable, through datafill.

32.4.1.3 Optional Stripping of NPA

This activity makes the stripping of NPA optional and allows the customer to decide whether or not to strip the NPA. An additional field, STRIPNPA, is added to tables LCASCRCN and LCAINFO. The NPA is stripped only when all the above four conditions are satisfied and STRIPNPA is TRUE in either LCASCRCN or LCAINFO (depending on LCANAME of the translator). In other words, STRIPNPA is an additional condition for stripping the NPA.

The role of STRIPNPA in the digit conversion process is depicted in table 4.

Table 3 Digit Conversion with STRIPNPA

Digits after Step 1 (HNPACONT)	Local/Toll	PFXFOR10	Originator's NPA = Called NPA	STRIPNPA	Result
7D	Local	Y	Not Applicable	Not Applicable	7D
7D	Local	N	Not Applicable	Not Applicable	7D
7D	Toll	Y	Not Applicable	Not Applicable	7D
7D	Toll	N	Not Applicable	Not Applicable	1+7D
10D	Local	Y	N	Not Applicable	1+10D
10D	Local	Y	Y	N	10D
10D	Local	Y	Y	Y	7D
10D	Local	N	Not Applicable	Not Applicable	10D

Table 3 Digit Conversion with STRIPNPA

Digits after Step 1 (HNPACONT)	Local/Toll	PFXFOR10	Originator's NPA = Called NPA	STRIPNPA	Result
10D	Toll	Y	Not Applicable	Not Applicable	1+10D
10D	Toll	N	Not Applicable	Not Applicable	1+10D

Tables LCASCRCN and LCAINFO facilitate setting STRIPNPA to TRUE or FALSE on “area” basis, as every tuple corresponds to a local calling area.

Figure 8 New Field in LCASCRCN and LCAINFO

<p>TABLE LCASCRCN</p> <p><u>NPALOCNM LCASCR PFXSELEC PFXFOR10 LOCALOVR STRIPNPA</u> 613 L613 (2) OPTL N N Y</p> <p>TABLE LCAINFO</p> <p><u>LCANAME PFXSELEC LOCALOVR DPCTNAME STRIPNPA</u> SGFDSS OPTL N PFXFOR10 Y</p>

32.4.1.4 Software Upgrade

During software upgrade from an old load, the new field, STRIPNPA is added to the tables LCASCRCN and LCAINFO. It is checked if patch NPA03 is active on the old load. If it is, then STRIPNPA is automatically set to FALSE in all tuples in both tables. If the patch was not applied or inactive on the old load, then the field is set to TRUE in all tuples. Thus, this activity ensures that the transition from the patch to the source is transparent to the customer.

After software upgrade, if the customer wishes to turn the feature functionality ON in a switch, which did not have patch NPA03 turned on or applied prior to software upgrade, STRIPNPA has to be manually changed to FALSE in the required tuple in tables LCASCRCN or LCAINFO.

32.4.1.5 Traver Enhancements

Traver uses the same code as the call processing, so no additional modifications are necessary for traver.

Figure below shows the TRAVERs for both the cases when all other conditions (section 2.4.1.2) are satisfied.

32.4.2 Hardware requirements

None.

32.4.3 Limitations and restrictions

None.

32.4.4 Interactions

None.

32.4.5 Logs (LG)

32.4.5.1 New/modified logs

This activity does not add any new logs and does not modify any existing logs.

32.4.6 Data schema (DS)

32.4.6.1 New/modified tables

Table 4 New or modified tables

Table name	NEW, CHANGED or DELETED	Nature of change
LCASCRCN	CHANGED	Added a new field
LCAINFO	CHANGED	Added a new field

Figure 9 Traver : STRIPNPA FALSE

```

traver 1 6671031 n cdn na 6136211031 ainres r02 ar digconv b
Warning: Routing characteristics are present.
        Originator must be able to send in
        characteristics specified.
TABLE RTECHAR
. LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 11 0 DT STN RES 6671031 404 613_PUB_404 L613_LATA1_0
613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
. Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
      (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414
L613_LATA1_0)
      (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 C667 613 EAP1 TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE PXLAMAP
. Tuple not found. Default to old pretranslator name.
. NOTE: ISDN Digit Conversion has been performed:
. Resulting digits are: 6136211031
TABLE STDPRCT
EAP1 ( 1) ( 0) 3
....

```

Figure 10 Traver : STRIPNPA TRUE

```

traver 1 6671031 n cdn na 6136211031 ainres r02 ar digconv b
Warning: Routing characteristics are present.
        Originator must be able to send in
        characteristics specified.
TABLE RTECHAR
. LECNA (CDN NA $) ( BC 3_1KHZ (CDN NA)$)$
TABLE IBNLINES
HOST 01 0 02 11 0 DT STN RES 6671031 404 613_PUB_404 L613_LATA1_0
613 $
TABLE LINEATTR
404 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_PUB_404 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_PUB_404 NSCR 613 PUB TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
RESG613 AIN AIN CDPCODE
TABLE OFCVAR
AIN_OFFICE_TRIGGRP OFCTRIG
TABLE NCOS
RESG613 0 0 0 RNCOS $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT,
AND DIGCOL
RESG613 NXLA RX613 RESGSTAR 0 RES
TABLE DIGCOL
RES specified: RES digit collection
TABLE XLAMAP
. Tuple not found. Default is use original XLANAME.
TABLE IBNXLA: XLANAME RX613
TUPLE NOT FOUND
Default from table XLANAME:
RX613
        (NET N N 0 N NDGT N Y GEN ( LATTR 414 613_EAP1_414
L613_LATA1_0)
        (EA NILC Y 0) $ $)$ 9
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
414 1FR NONE NT 0 10 NILSFC 0 NIL NIL 00 613_EAP1_414 L613_LATA1_0
$
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
613_EAP1_414 C667 613 EAP1 TSPS Y RESG613 0 0 $ $
TABLE RATEAREA
L613_LATA1_0 L613 NIL LATA1 $
TABLE PXLAMAP
. Tuple not found. Default to old pretranslator name.
. NOTE: ISDN Digit Conversion has been performed:
. Resulting digits are: 6211031
TABLE STDPRTCT
EAP1 ( 1) ( 0) 3

```

32.4.7 Office parameters (OP)**32.4.7.1 New/modified office parameters**

None.

32.4.8 Service orders (SO)

None.

32.4.9 Alarms (AL)

None.

32.4.9.1 New/modified directories

None.

32.4.10 Command interface (CI)**32.4.10.1 New/modified commands**

None.

32.4.11 Operational measurements (OM)**32.4.11.1 New/modified OM groups**

None.

32.4.12 AMA/Billing information (AM)**32.4.12.1 New/changed AMA/billing information**

None.

32.4.12.2 Software optionality control (SOC)

None.

32.5 Routing LNP calls with 10D ACG control to datafilled treatment**32.5.1 Description**

ACG (Automatic Call Gapping) is a component that allows the Advanced Intelligent Network (AIN) Service Switching Point (SSP) to control queries to the Service Control Point (SCP) database and to protect the SCP from effects

of overload. Calls blocked are routed to a treatment or routed to default routing, if provisioned.

When SOC LNP00200 is active, LNP call encountering an active 10 digit ACG is currently routed to the AIN Final treatment.

This activity enables the customers to select the desired treatment from a list of extended treatments. The 10 digit ACG blocked LNP calls are routed to the selected treatment only.

32.5.1.1 New LNP Option

A new tuple is defined in table LNPOPTS, the generic LNP options table. The desired treatment is selected via this tuple. Figure below shows the new tuple in LNPOPTS.

Figure 11 New Tuple in LNPOPTS

TABLE LNPOPTS	
<u>KEY OPTIONS</u>	
ACG_10D_TRMT	ACG_10D_TRMT AINF

By default, AIN Final (AINF) treatment is datafilled. This can be changed to any extended treatment.

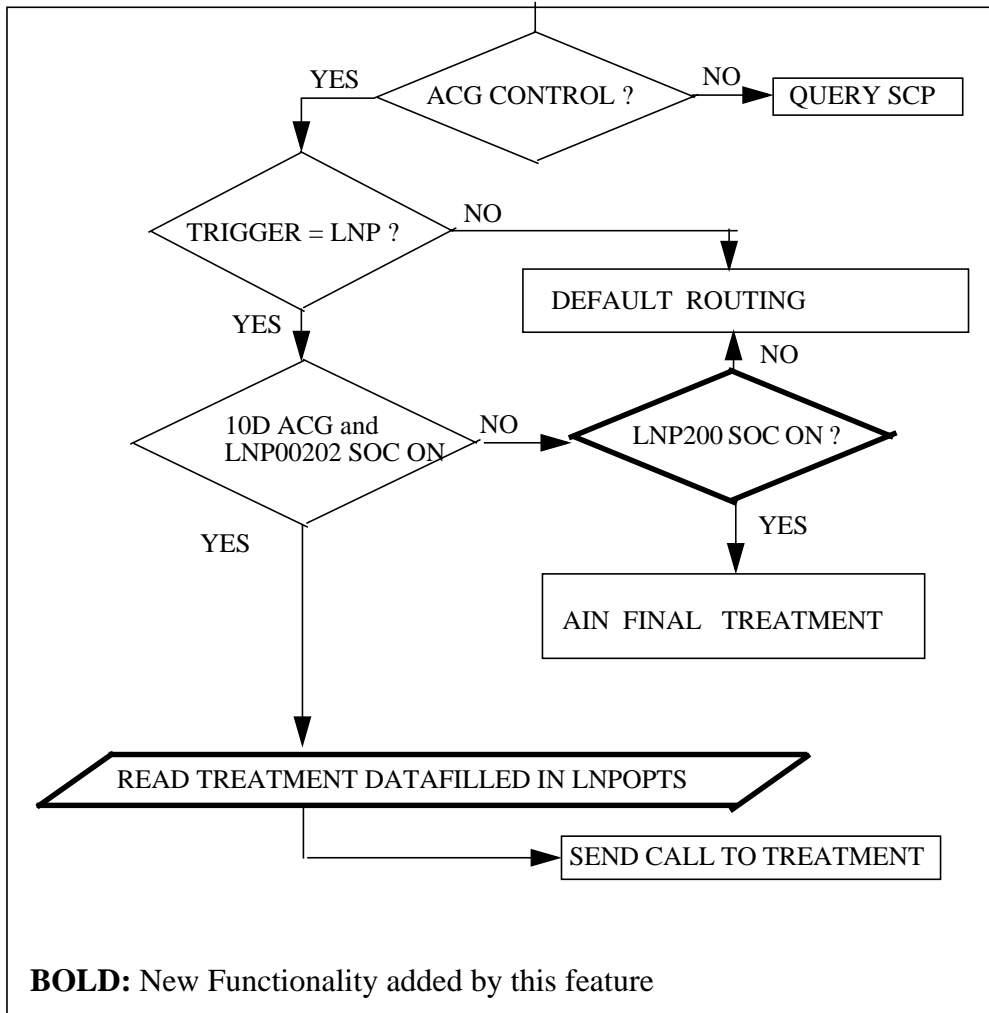
32.5.1.2 New LNP SOC

The new functionality is offered under a new SOC, LNP00202. The new SOC is a controlled option belonging to the LNP group within the SOC structure. The above functionality is present when the SOC state is 'ON', and absent when the SOC is 'IDLE'.

The state of LNP00202 SOC is dependent on the state of LNP00200 SOC in such a manner that the LNP00202 option may not be activated unless the LNP00200 option is active. Similarly, the LNP00200 option may not be deactivated unless the LNP00202 option is deactivated.

When LNP call encounters 10D ACG control and LNP00202 SOC is 'ON', the treatment datafilled in LNPOPTS is retrieved and the call is sent to that treatment.

Figure 12 Functional Behavior



32.5.2 Hardware requirements

None.

32.5.3 Limitations and restrictions

- Requires LNP00202 SOC to be in ON state.

32.5.4 Interactions

None.

32.5.5 Logs (LG)

This activity does not add any new logs and does not modify any existing logs.

32.5.6 Data schema (DS)

32.5.6.1 New/modified tables

Table 5 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
LNPOPTS	CHANGED	Added a new option/tuple

32.5.7 Office parameters (OP)

32.5.7.1 New/modified office parameters

None.

32.5.7.2 Service orders (SO)

None.

32.5.8 Alarms (AL)

None.

32.5.8.1 New/modified directories

None.

32.5.9 Command interface (CI)

32.5.9.0.1 New/modified commands

None.

32.5.10 Operational measurements (OM)

32.5.10.1 New/modified OM groups

None.

32.5.11 AMA/Billing information (AM)

32.5.11.1 New/changed AMA/billing information

None.

32.5.12 Software optionality control (SOC)

Table 6 LNP00202 SOC

SOC option name:	LNP00202
SOC option title:	SSP Rte on FOD
SOC option control type:	state
New SOC option?	Yes
SOC option order code	LNP00202
Option defined in DRU:	CNA
Affected products:	NA100

32.6 Glossary

Table 7 Glossary

Term	Description
LNP	Local Number Portability
FOD	Fault Overload Detection
AIN	Advanced Intelligent Network
ISDN	Integrated Services Digital Network
NPA	Numbering Plan Area
BRI	Basic Rate Interface
SCP	Service Control Point
ACG	Automatic Call Gapping
TON	Type of Number
SOC	Software Optionality Control
AINF	AIN Final

32.7 References

Table 8 References

Document	Description
NA13 LNP SIG	LNP Service Implementation Guide
AU2779	LNP Query Enhancements
AR2104	AINSSP: Response Translation Simplification
LNP40 ADMIN	Patch Admin File
LNP40 Bulletin	Bulletin to customers on patch LNP40
NPA03 ADMIN	Patch Admin File
AIN SIG	AIN Service Implementation Guide

33: Functional description (FN)

Kindly refer to document A59022782 submitted in FMDOC.

34: Functional description (FN)

34.1 Feature name

Attendant Pay Station (APS) Log Enhancements.

34.2 Description

This activity provides Attendant Pay Station log enhancements in MMP15 release.

A service hall is a public site where people can place calls under the supervision of an attendant. The attendant assigns telephones to customers, and collects the charges incurred from those calls.

APS feature is already implemented by the below activities:

- 59008302, Attendant Pay Station (operator assist and direct dial) and hotel line.
- AJ5198, Attendant Pay Station (Direct Dial)
- AJ5196, Attendant Pay Station (Operator Assist)

The APS feature is available for IBN line class code only, and can be assigned to lines through SERVORD. Upon completion of each call that originated from the service hall, a log is generated containing the following call details:

- **Calling number (maximum 18 digits)**
- **Called number (maximum 18 digits)**
- **Date (4 digits) - MM:DD.**
- **Answer Time (4 digits) - HH:MM.**
- **Duration (3 digits) - MIN.**
- **Charges (10 digits)**
- **Booth number -** Where the call is originated from. This is always zero in the case of direct dial calls (non-operated assisted).

The example of the existing APS log format is as follows:

```

APS118 MAY01 14:22:39 9806 INFO APS LOG ENTRY
MSG COUNT      = 1
CALLING DN     = 1027835473
CALLED DN     = 1027835475
DATE          = 05/01
ANSWER TIME   = 14:22
DURATION      = 1
CHARGES       = $0.01
BOOTH         = 0

```

APS log can be generated for both local and toll calls.

For local calls, the log is generated at the local office containing charges based on the metering datafill in tariff tables if available, otherwise zero charges.

For toll calls, there is one log report generated at local office as for local calls and another generated at toll office containing charges based on GTOPS rating system datafill if available, otherwise zero charges.

Charges based on metering take precedence over charges based on the GTOPS rating system.

Although this existing APS functionality has a generic design, Turkish market only needs APS log generation at the originating local office for both local and toll calls.

For more information please refer to activities stated above.

This activity only enhances the “CHARGES” field format of the log, creating a new parameter APS_DISPLAY_DOLLAR_SIGN in TOPSPARM table. The range of this parameter is “Y” or “N”. If the parameter is “N”, “\$” sign is suppressed.

The default value of the parameter is as follows not to impact existing format.

- APS_DISPLAY_DOLLAR_SIGN Y

This activity does not impact the charge value indicated by “CHARGES” field. The following existing parameters are used to calculate the charge value:

- METER_PULSE_MONETARY_RATE in table OFCVAR is charge factor and has a value range of 0 to 100. It determines charges that increase per pulse count.
- CHG_DISPLAY_DECIMAL in table TOPSPARM has a value range of 0 to 3 and determines the digit length of decimal part.

The example of the new APS log with the new and existing parameters is as follows:

- In TOPSPARM, APS_DISPLAY_DOLLAR_SIGN N
- In TOPSPARM, CHG_DISPLAY_DECIMAL 0
- In OFCVAR, METER_PULSE_MONETARY_RATE 20

```

APS118 MAY01 14:22:39 9806 INFO APS LOG ENTRY
MSG COUNT      = 1
CALLING DN     = 1027835473
CALLED DN     = 1027835475
DATE          = 05/01
ANSWER TIME   = 14:22
DURATION      = 1
CHARGES      = 20
BOOTH        = 0

```

34.3 Hardware requirements

N/A.

34.4 Limitations and restrictions

Since APS log is only needed in the originating local office, the new format is not supported on HOBIC devices.

34.5 Interactions

N/A.

34.6 Logs (LG)

34.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
APS Log	APS1XX	MOD	SOS

For more information, please refer to LG section.

34.7 Data schema (DS)

34.7.1 New/modified office parameters

Table 2 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
TOPSPARM	APS_DISPLAY_DOLLAR_SIGN	NEW

For more information, please refer to DS section.

34.8 Office parameters (OP)

N/A.

34.9 Service orders (SO)

N/A.

34.10 Alarms (AL)

N/A.

34.11 Command interface (CI)

N/A.

34.12 Operational measurements (OM)

N/A.

34.13 AMA/Billing information (AM)

N/A.

34.14 Software optionality control (SOC)

N/A.

34.15 Glossary

Term	Description
New term	definition
APS	Attendant Pay Station

34.16 References

1. A59008302, Attendant pay station and hotel line

-
2. AJ5198, Attendant Pay Station (Direct Dial)
 3. AJ5196, Attendant Pay Station (Operator Assist)

35: Functional description (FN)

35.1 Feature name

DFIL110 Log Enhancement

35.2 Description

2.2.1 Introduction

The Customer requires this functionality for increased maintenance efficiency.

The DFIL110 log is produced when the carrier specified by the E800 or PVN database is not represented in table OCCINFO. Currently the log only gives the carrier digits that were present in the database for this particular number. The information is available in the LINE138 log to obtain the routing number for the DFIL, once the proper set-up has been arranged. See the examples below. These examples demonstrate the DFIL110 and the LINE138 log prior to NA15.

End Office Senario

Figure 1

```
RTPT14BB * DFIL110 JUN29 15:50:35 5716 FAIL SSP CARRIER DATA ERROR
HOST 02 0 04 05 DN 6136210048
UNDATAFILLED CARRIER
CARRIER DIGITS = 1234
```

In TABLE TMTCNTL, if the log for treatment UNIN is turned on, it will identify the called number.

```
RTPT14BB LINE138 JUN29 15:50:35 5817 INFO TRMT
HOST 02 0 04 05 DN 6136210048
TREATMENT SET = UNIN CALLED NO = 6136210045
CALLID= 01E5 0007
```

Tandem Senarios

Figure 2

```

RTPT14BB * DFIL110 JUN29 11:53:28 4710 FAIL SSP CARRIER DATA ERROR
  CKT   ISUP2WITEA   3
  UNDATAFILLED CARRIER
  CARRIER DIGITS = 1234

RTPT14BB TRK138 JUN29 12:05:02 5403 INFO TRMT
  CKT   EATANDEMIC   1
  TREATMENT SET = UNIN  CALLED NO =           6136210045
  CALLID= 0069 001B

```

The log only shows the CIC of the carrier and not the routing number, causing the problem of trying to match the DFIL110 log to LINE138 log. In order to resolve this issue, the customer requests to have the routing number in the DFIL110 log.

The effort for the maintenance personnel to match the DFIL110 and LINE138 logs is excessive. The Customer requires this new functionality for increased efficiency.

2.2.2 Desired Behavior

Figure 3 shows the output of a DFIL110 log that illustrates the proposed changes to the log. As illustrated in Figure 3 the number displayed in the dialed digits field, will be the E800 or PVN number that the customer dialed. The routing digits field is also displayed so that a correlation between Line138 and DFILL110 log can easily be established.

Figure 3

```

RTPT14BC * DFIL110 JUL11 10:40:27 5400 FAIL SSP CARRIER DATA ERROR
  HOST 02 0 04 05  DN 6136210048
  UNDATAFILLED CARRIER
  CARRIER DIGITS = 1234
  DIALED DIGITS =           18005671002

  ROUTING DIGITS = 6136210048

```

2.2.3 Restrictions and Limitations

In cases where the MF trunking protocol is used the dialed digits may not be available to display. In that case the log will appear as it does in figure 4.

Figure 4

RTPT14BC * DFIL110 JUL11 10:40:27 5400 FAIL SSP CARRIER DATA ERROR
 HOST 02 0 04 05 DN 6136210048
 UNDATAFILLED CARRIER
 CARRIER DIGITS = 1234
DIALED DIGITS = \$
ROUTING DIGITS = 6136210048

35.3 Logs (LG)

35.3.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
DFIL	110	MOD	SOS

35.4 Glossary

Term	Description
Dialed Number	The number actually dialed by the user
Routing Number	The number returned from the database

35.5 References

MSG00030

36: Functional description (FN)

36.1 Feature name

System Maintenance Support for SOC-enforced PE Configurations

36.2 Description

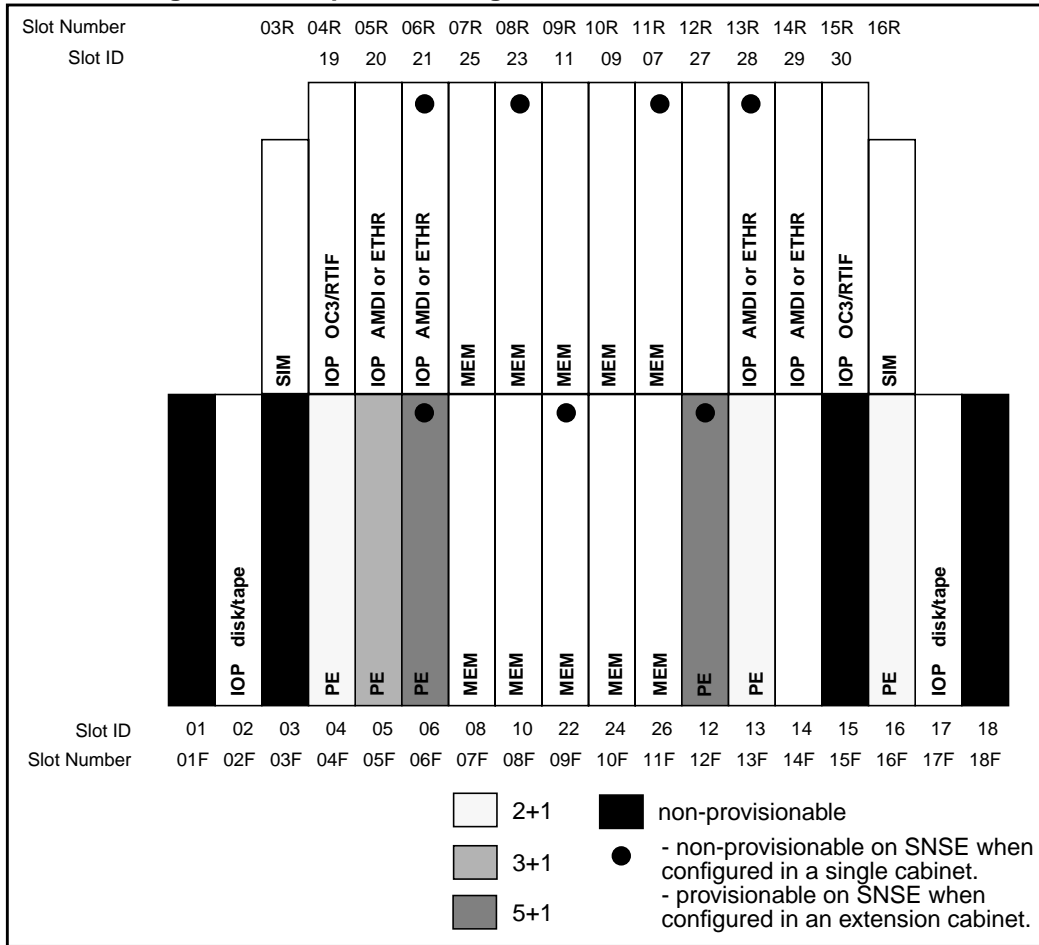
The purpose of this feature is to provide support for multiple PE configurations on an XA-Core. In the first multi-processing release of XA-Core, a single fixed PE configuration (3+1) was supported. In this release, three different PE configurations are supported: 2+1, 3+1, and 5+1.

This feature introduces a new Software Optionality Control usage option to allow the customer to specify the desired PE configuration. The usage limit for this option represents the total number of in-service PE cards in the configuration. This total is made up of the number of PE cards necessary to maintain engineered capacity, along with the number of additional PE cards provided for reliability.

36.3 Hardware requirements

This feature does not introduce any new hardware.

Figure 1 Sample PE Configurations



36.4 Limitations and restrictions

The number of PE cards allowed to go in-service will be limited by the configuration specified in the new SOC option. If more PE cards are provisioned than specified in the SOC option:

- For a hard SOC limit, the system will refuse requests to return-to-service the extra PE cards.
- For a soft SOC limit, the system will permit requests to return-to-service the extra PE cards. Nortel will be notified via the SOC utility that the limit has been exceeded.

36.5 Interactions

This feature interacts with feature 59024411, Rated Power/Alarm Interface and Speedometer Algorithm Tuning, which provides the Capacity Tools support.

There is a dependency between the new SOC option for maximum power and the existing office parameter for rated power in table OFCENG. These values must be set consistently, since both values are used in the calculation of the LowPE alarm severity. The difference between the two values represents the additional PE cards provided for reliability.

36.6 Logs (LG)

36.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
LowPE	XAC302	MOD	SOS

For a hard SOC limit, return-to-service of a PE card will be refused if the number of in-service PE cards is already equal to the limit defined in the SOC option. The XAC302 log will indicate the reason for the RTS failure. The SOC utility will also generate a SOC803 log indicating that the usage request was refused.

Figure 2 Sample of the XAC302 LowPE Log

```
* XAC302 AUG16 20:41:08 3900 FLT LowPE (Low Processor Element)
  IMPACT: A PE card is out of service.
         A PE card has changed state from ManB to SysB
  CARD: Type State Site FL Row Bay      Shf/Slot      EqPEC/Serial
        PE SysB  HOST 01 A00 DPCC:00   00/06F      NTLX02CA/NNTM6441B1G7
  REASON: Maximum allowed number of PE cards already in-service.
  ACTION: Deprovision PE card(s).
```

For a soft SOC limit, return-to-service of a PE card will be permitted if the number of in-service PE cards is already equal to or greater than the limit defined in the SOC option. The SOC utility will generate a SOC801 log indicating that usage has exceeded the limit.

36.7 Data schema (DS)

36.7.1 New/modified tables

There are no table changes associated with this feature.

36.8 Office parameters (OP)

36.8.1 New/modified office parameters

There are no office parameter changes associated with this feature.

36.9 Service orders (SO)

There are no service order changes associated with this feature.

36.10 Alarms (AL)

For a hard SOC limit, return-to-service of a PE card will be refused if the number of in-service PE cards is already equal to the limit defined in the SOC option. The reason for the RTS failure will be indicated in the PE SubSystem Status Field (SSSF) and in the response to a LowPE alarm query.

Figure 3 Sample PE Level MAP Display

XAC	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
LowPE	.	.	.	.	.	.	.	.	.
PE		Front:	111111111	Rear:	111111	SM	PE	IO	PKLT
0 Quit			123456789012345678		456789012345	.	config	.	.
2	Sta	. . .S. . . . .	. . . . .	. . . . .	. . . . .	0	1	0	0
3	Dep								
4	Typ	***	*	*					
5	alarm	lowpe							
6 Tst_	Alarm	Severity		Status					
7 Bsy_	LowPE	Minor		Enabled					
8 RTS_									
9	Cause			FRU/device	State	Slot	Side	Packlet	
10 LoadFW_	Wrong configuration			PE	SysB	6	front		
11									
12 Uneq_									
13									
14 Alarm_									
15									
16 Trnsl_									
17 Indicat_									
18 Query_									
TEAM3									

36.11 Command interface (CI)

36.11.1 New/modified directories

There are no directory changes associated with this feature.

36.11.2 New/modified commands

Table 2 New/modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
Bsy	changed		MAPCI;MTC;XAC;PE	Menu

When the PE bsy command with the force option is used, the craft must acknowledge a warning if the command will cause degradation to either engineered capacity or system capacity. The last PE card is not allowed to be manually busied.

Figure 4 Sample MAP Response for PE Bsy with Force Option

```
>bsy 5 f force
Warning: Bsy command will take it out of service.
Please confirm ("YES", "Y", "NO", or "N"):
>y
Command Submitted.
Warning: Bsy force command will degrade system capacity.
Please confirm ("YES", "Y", "NO", or "N"):
>y
Bsy 5 front completed
```

36.12 Operational measurements (OM)

36.12.1 New/modified OM groups

There are no OM changes associated with this feature.

36.13 AMA/Billing information (AM)

36.13.1 New/changed AMA/billing information

There are no AMA/billing changes associated with this feature.

36.14 Software optionality control (SOC)

Table 3 SOC

SOC option name:	BASE XA-Core Max Power
SOC option title:	
SOC option control type:	usage
New SOC option?	yes

SOC option order code	BASE????
Option defined in DRU:	BASE
Affected products:	All products using XA-Core

36.15 Glossary

Term	Description
PE	Processor Element
RTS	Return To Service
SOC	Software Optionality Control
SSSF	SubSystem Status Field

36.16 References

none

37: Functional description (FN)

37.1 Feature name

PRI SCREENING - PRI DN SCREENING LTID ENHANCEMENT

37.2 Feature Synopsis

This activity provides the necessary changes to support the enhancement for PRI Calling Number (CGN) and Redirecting Number(RN) screening . This feature increases the number of LTIDS/PRI Interfaces that can be screened against a DN in Table DNSCRN to 2172.

Prior to NA015, only 12 LTIDS could be screened against a DN in Table DNSCRN. The following functionality is impacted by the increased number of LTIDS/PRI interfaces per DN:

CGN per-interface screening for the NTNA variant

CGN per-interface screening for the NI variant

RN screening for the NI variant

In general it should be noted that when “screening” is discussed in this document, it implies the Screening Indicator (SI) is being examined or changed.

37.3 Functional Overview

37.3.1 CGN and RN Editing and Screening

This feature enhances the CGN (Calling Number) screening capability. Currently CGN screening is provided on a per PRI trunk group basis. According to this design, table DNSCRN will take on two new attributes to support a range of SCRGRPS(SCREENING GROUPS) per DN (Directory Number). In adding these new attributes to DNSCRN table, per-interface screening will match the LTID of the incoming call to one of the LTIDs in the listed SCRGRPS for that DN and set the screening indicator (SI) accordingly.

This feature also includes Redirecting Number (RN) screening. It is closely tied with the above mentioned CGN Screening feature.

37.4 Description

37.4.1 Calling and Redirecting Number Screening

37.4.1.1 CGN Per-Interface Editing and Screening

For both NTNA and NI PRI, CGN Per-Interface Editing and Screening table DNSCRN takes on two new attributes to support a range of LTIDs per DN. Each of these optional attributes, SCRGRP1 and SCRGRP2, are able to hold the data of six SCRGRPS for a total of 12 per tuple (ie, per interface). Each of these SCRGRPS are defined in Table SCRGRP and can contain up to 180 LTIDS for a total of 2172 LTIDs per DN.

When the PBX sends the SETUP message to the DMS with a CGN IE (Calling Party Number Information Element), the CGN may be edited and screened (CGN is screened only if there are no Redirecting Number Information Elements present in the message). Table LTDATA is checked to retrieve screening/editing instructions. If the TN/NPI of the CGN is set to private numbering plan, international, or unknown, then screening is considered failed and the SI (Screening Indicator) is set to Network Provided. If the TN/NPI is set to LOCAL or NATIONAL then check for the EDITCLI (Edit Calling Line Identifier) option and perform editing if required. Lastly, screening involves searching the DNSCRN table for the CLILTID (Calling Line Identifier Logical Terminal Identifier) or SCRGRP attribute for the CGN and matching the LTID datafill with the LTID of the PRI trunk group of the call. The Screening Indicator (SI) is then set accordingly.

NTNA variant:

If the CGN's trunk group LTID matches the CLILTID datafill in DNSCRN table, then screening passes and the Screening Indicator (SI) is set to **“User provided, verified, and passed”**. The SI is set to **“Network Provided”** under the following conditions:(i) if CGN does not exist in the DNSCRN table, (ii) if there is no CLISI datafilled in table DNSCRN for that CGN (iii) if the LTID does not match the CLILTID or SCRGRP in the tuple for the CGN in table DNSCRN.

If the digits = 7-digits after screening has taken place, the area code is to be added to the number. The CGN digits and Type Of Number (TON) will be changed to CGN digits = 10-digits and TON = NATIONAL. Adding the 3-digit area code to the 7-digit number makes it 10-digits and a national number. The area code is taken from the default CGN defined for that interface in table LTDATA (DN selector). This is an optional (datafillable) quantity, so if it has not been datafilled the CGN digits will remain unchanged in this case.

NOTE: It is strongly suggested that a default CGN be datafilled (in table LTDATA) for each PRI interface, but there are situations where a default CGN should NOT be datafilled, e.g., police department phones used to making calls to suspects, international banking secure phones, etc. If a default CGN is datafilled in these situations where there is no CGN in the SETUP message, then the default CGN can be displayed to the far end (caller id). Telco personnel should review the usage of each PRI interface to determine if a default CGN should be set.

NI variant:

If the CGN's trunk group LTID matches the CLILTID or SCRGRP datafill in DNSCRN table, then screening passes and the Screening Indicator (SI) is set to **"User provided, verified, and passed"**. A SI value of **"User Provided Not Screened"** is set when the screening option (CLI) is not found in table LTDATA. A SI value of **"Network Provided"** is set when the CGN IE element and the CGN digits were not included in the incoming SETUP message. Also, the SI is set to **"Network Provided"** under the following conditions: (i) If TON/NPI in the CGN is private numbering plan, international or unknown, (ii) if TON in the CGN is unknown and SI/PI is Number not available, (iii) if CGN does not exist in the DNSCRN table, (iv) if there is no CLISI datafilled in table DNSCRN for that CGN (v) if the LTID does not match the CLILTID or SCRGRP in the tuple for the CGN in table DNSCRN, (vi) if during editing the CGN digits are less than the count of the OVLY.

If the digits = 7-digits after screening has taken place, the area code is to be added to the number if the following criteria is met:

1. Digits = 7-digits
2. TON = LOCAL
3. NPI = E164
4. SI = User provided, verified, and passed or User Provided Not Screened

the CGN digits and Type Of Number (TON) will be changed to CGN digits = 10-digits and TON = NATIONAL. Adding the 3-digit area code to the 7-digit number makes it 10-digits and a national number. The area code is taken from the default CGN defined for that interface in table LTDATA (DN selector). This is an optional (datafillable) quantity, so if it has not been datafilled the CGN digits will remain unchanged in this case.

NOTE: The incoming SI value from the SETUP message is initially changed to User Provided Not Screened (UPNS). The results of screening may alter this SI value further. It's important to note that the incoming SI value is NOT preserved if screening is not performed on the CGN.

NOTE: It is strongly suggested that a default CGN be datafilled (in table LTDATA) for each PRI interface, but there are situations where a default CGN should NOT be datafilled, e.g., police department phones used to making calls to suspects, international banking secure phones, etc. If a default CGN is datafilled in these situations where there is no CGN in the SETUP message, then the default CGN can be displayed to the far end (caller id). Telco personnel should review the usage of each PRI interface to determine if a default CGN should be set.

37.1 Hardware requirements

No new hardware dependencies are introduced by this feature.

37.2 Logs (LG)

Not Applicable.

37.2.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

37.3 Data schema (DS)

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
DNSCRN	CHANGED	UNCHANGED
SCRGRP	NEW	NEW

The following sections details the table control changes introduced by this feature for CGN/RN Screening and editing.

37.3.1 Table DNSCRN

Two new attributes, SCRGRP1 and SCRGRP2, will be added to this table in order to accommodate six screening groups per attribute for a total of twelve screening groups. These attributes will be stored against the DN. Their purpose is to serve as valid interfaces for a particular CGN. These attributes will be analyzed in order to establish if a screened CGN has passed or failed.

Each SCRGRP attribute will contain one subfield:

- SCRGRP_IDX - This subfield contains the name of the screening group in which the incoming ltid will be screened against for the CGN. The scrgrp_idx field will take as an input, an alphanumeric string, that can be from one to sixteen characters.

Please note that the screening groups provisioned against SCRGRP1 and SCRGRP2 **must be** datafilled in the new Table SCRGRP prior to being datafilled in Table DNSCRN.

The following Figure illustrates the new DNSCRN attributes, SCRGRP1 and SCRGRP2. Each attribute can be datafilled with up to six screening groups. These screening groups are defined in Table SCRGRP.

Figure 1 Table DNSCRN

DN	ATTROPTS
6137229999 (CLISI)	
(CLILTID1 (ISDN 1) \$)	
(SCRGRP1 (PGRP1) (PGRP2) (PGRP3) (PGRP4) (PGRP5) (PGRP6)\$)	
(SCRGRP2 (CGRP1) (CGRP2) (CGRP3) (CGRP4) (CGRP5) (CGRP6)\$)\$	

37.3.2 Table SCRGRP

This feature will create a new Table SCRGRP. This table will define the contents of the new screening selectors being added to Table DNSCRN. A screening group must be defined in this table, before it can be provisioned to Table DNSCRN. Each scrgrp can have up to 180 NI-2/NTNA ltids provisioned against it. Which means that a DN provisioned in Table DNSCRN can have a total of 12 scrgrps (180 ltids/scrgrp) plus the 12 original ltids. This means that a DN can be screened against 2172 PRI interfaces.

Note: Please note that the maximum number of LTIDS that can be datafilled on a DMS is 2175. The 2172 ltids that this feature allows to be screened against a DN in Table DNSCRN, takes into account that a particular ltid could appear in different screening groups(SCRGRPS). Also note that in the past, table DNSCRN did not allow for duplicates between attributes. However, with the addition of two new attributes (SCRGRP1 and SCRGRP2) table DNSCRN will allow for duplicate attributes to be added. This gives more flexibility to the user.

The following figure illustrates datafilled tuples in Table SCRGRP.

Figure 2 Table SCRGRP

SCRGNAME	SCRGRPS
PGRP1	(ISDN 1) (ISDN 2) ... (ISDN 180)\$
PGRP2	(SPRI 1) (SPRI 2) ... (SPRI 180)\$
SCRGNAME	SCRGRPS
PGRP3	(ISDN 1) (ISDN 5) (ISDN 7) (ISDN 8)\$
PGRP4	(ISDN 2) (ISDN 5) (ISDN 7) (ISDN 9)\$

37.4 Limitations and restrictions

37.4.1 Call Processing

Please refer to AF6863FN for existing screening limitations and restrictions

37.4.2 Table Control

37.4.2.1 Table DNSCRN

- [SCRGRP must exist in Table SCRGRP](#)

A corresponding Screening Group (SCRGRP) must be provisioned in Table SCRGRP when attempting to datafill attribute SCRGRP1 or SCRGRP2 in Table DNSCRN.

37.4.3 Table SCRGRP

- [SCRGRP name must not exceed sixteen characters](#)
- [An LTID must be provisioned in Table LTDEF before it can be provisioned against an SCRGRP in Table SCRGRP.](#)
- [All LTIDs provisioned in Table SCRGRP must be PRI LTIDS](#)

If an attempt is made to provision an LTID that is not a PRI LTID, then the following error message is generated:

“LTID IS NOT A PRI LTID”

- [The only PRI LTIDS that this table supports are NI-2 and NTNA.](#)

If an attempt is made to provision a PRI LTID that is not NI-2 or NTNA, then the following error message is generated:

“Only NI-2 and NTNA PRI LTIDS are allowed”

37.5 Interactions

This feature is dependent on activities AF6862 - ISDN PRI NA08 CALL Processing and feature AF6863 - PRI Call Screening.

37.6 Office parameters (OP)

Not Applicable

37.6.1 New/modified office parameters

Table 3 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

37.7 Service orders (SO)

Not Applicable.

37.8 Alarms (AL)

Not Applicable.

37.8.1 New/modified directories

Table 4 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

37.9 Command interface (CI)

Not Applicable.

37.9.1 New/modified commands

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN

37.10 Operational measurements (OM)

Not Applicable.

37.10.1 New/modified OM groups

Table 6 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

37.11 AMA/Billing information (AM)

There are no functional changes to AMA Billing to be introduced by this feature.

37.11.1 New/changed AMA/billing information

Table 7 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

37.12 Software optionality control (SOC)

Not Applicable.

Table 8 SOC

SOC option name:	
SOC option title:	
SOC option control type:	<state/usage/combined>
New SOC option?	<Yes/No>
SOC option order code	<order code>
Option defined in DRU:	<DRU>
Affected products:	<PCL(s)>

37.13 Glossary

Term	Description
CDN	Called Party Number
CLLI	Common Language Location Identifier
CGN	Calling Number
CLI	Calling Line Identifier
CLISI	Calling Line Identifier Screening Indicator
CPDDN	Calling Party Default Directory Number
DS	Data Schema
FN	Functional Description
IE	Information Element
IP	Intelligent Peripheral
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part

LG	Logs
NA008	North American release 008
NA015	North American release 015
NI	National ISDN
NIPRI	National ISDN Primary Rate Interface
NPI	Network Plan Identifier
NSF	Network Specific Facility
NTNA	Nortel North American
PRI	Primary Rate Interface
RN/CPN	Redirecting Number / Calling Party Number
SOC	Software Optionality Control
SPCS	Stored Program Control System
TNS	Transit Network Selection
TON	Type of Number
UPFS	User Provided, Failed Screening
UPNS	User Provided, Not Screened
UPNS RN/CPN	User Provided, Not Screened Redirecting Number / Calling Part Number
UPPS	User Provided, Pass Screening
XPM	Extended Peripheral Module
LTID	Logical Terminal Identifier
DN	Directory Number

37.14 References

- AN1928.AB06, SCREENING ON NTNA PRI
- AF6863.AC01, PRI Call Screening

38: Functional description (FN)

38.1 Feature name

Network Side support of PRI trunks for the DMS 100 to the 4ESS, 5ESS and the AT&T System-85 PBX.

38.2 Description

The purpose of this feature (A59023416) is to provide basic interworking to the Network side 4ESS/5ESS for the NA15 release.

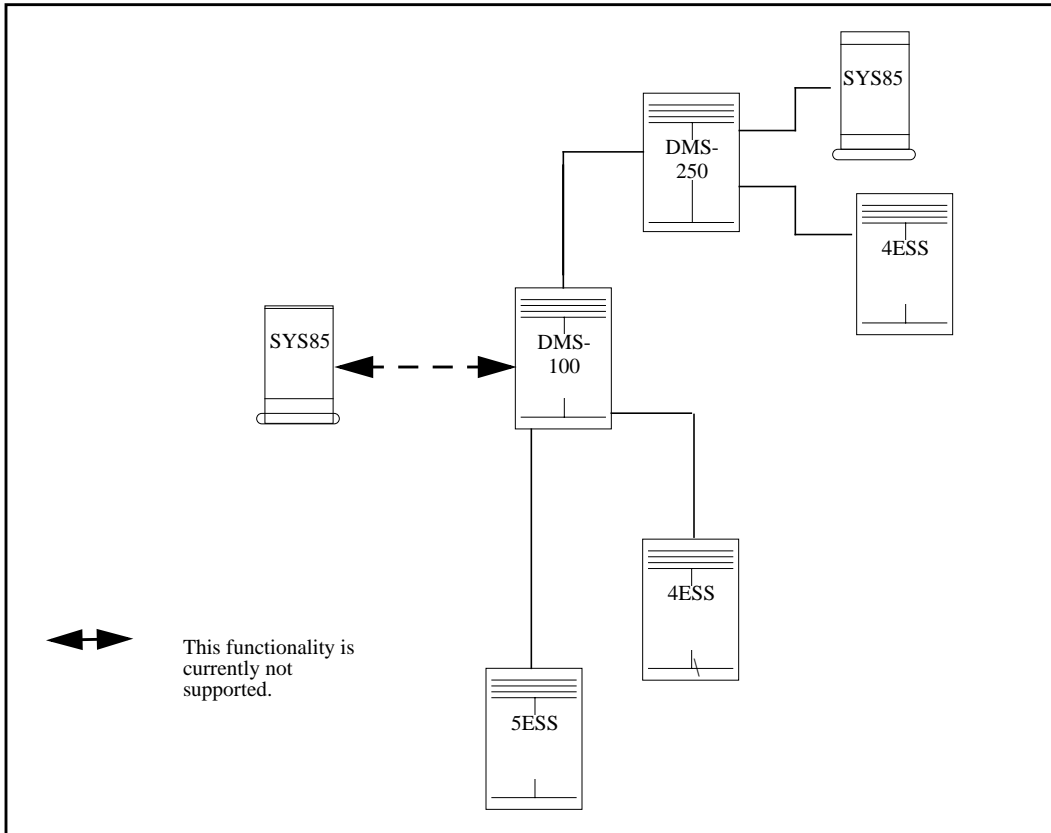
This feature builds upon the following features:

Features AD2229, AD2247 and AM0162 are applicable to the support of the AT&T TR-41449 PRI interface to AT&T switches. Connectivity supported by these modules is to a System 85 PBX, 4ESS, or 5ESS. This feature provides support for the following trunk types to be provisioned: U449, U459 and N449.

The prostar 10155075 enabled AIN to be provisioned on the USER side for the 4ESS and 5ESS variants.

The feature AF7571 brought the User side 4ESS and 5ESS variants into the PRI PRO architecture.

Table 1 ISDN Network



38.3 Limitations and restrictions

For interactions with Local Number Portability (LNP) the patches DMO043 and DMO044 will still need to be applied. The purpose of these patches is to provide by the addition of two tables the detection of a ported called party (LNP applies) and to change the route from an outgoing PRI trunk to an ISUP trunk which supports the parameters GAP and FI which contain information on the ported DN for LNP.

The following trunk agents, IBNT1 and IBNT2 do not support OCPB and ONOA triggers.

38.4 Interactions

This feature will interact with AIN. The following triggers will be supported: Offhook Delay, PRI Channel Setup, Custom Dial Plan, Specific Digit String, Specified Carrier, One Plus Prefix, International prefix, Operator Services, N11,

Automatic Flexible Routing, O_Called_Party_Busy and O_NO_Answer trigger.

LNP will be supported when using ISUP trunk between switches.

This feature will be applicable to DTCL, LTC and SPM.

38.5 Logs (LG)

Not Applicable.

38.6 Data schema (DS)

Table 19 Modified Tables

Table Name	NEW, CHANGED or DELETED	Table Control(NEW/OLD/ UNCHANGED)
LTDEF	CHANGED	UNCHANGED
PRIPROF	CHANGED	UNCHANGED

38.6.1 Table LTDEF

An additional option, N449PRI, is added to the table LTDEF.

TYPE OF VARIANT IS PROT_VARIANT_TYPE

TYPE IS PROT_VARIANT_TYPE
{NTNAPRI,U449PRI,U459PRI,**N449PRI**,NIPRI}

The N449PRI variant can be datafilled as follows:

ISDN 500 B PRA 5 5 1 1 **N449PRI V1** NIL (NOPMD) \$

38.6.2 Table PRIPROF

An additional option, N449PRI, is added to the table PRIPROF.

TYPE IS PRI_VAR_ISSUE MULTIPLE WITH VARIANT
{NTNAPRI,U449PRI,U459PRI,N449PRI,NIPRI}

38.7 Office parameters (OP)

Not Applicable.

38.8 Service orders (SO)

Not Applicable.

38.9 Alarms (AL)

Not Applicable.

38.10 Command interface (CI)

Not Applicable.

38.11 Operational measurements (OM)

No new OMS were introduced.

38.12 AMA/Billing information (AM)

There are no functional changes to AMA Billing to be introduced by this feature.

38.13 Software optionality control (SOC)

This feature will not require a SOC option.

38.14 Glossary

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Term	Description
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AIN	Advanced Intelligent Network
AFR	Automatic Flexible Routing
ARS	Alternative Route Select
CT	Call Type criterion
DTCI	ISDN Digital Trunk Controller
GAP	Generic Address Parameter
FCI	Forward Call Indicator
IBN	Integrated Business Network
ISDN	Integrated Services Digital Network
LNP	Local Number Portability
LTC	Line/Trunk Controller
PIC	Point In Call
PODP	Public Office Dial Plan
PRA	Primary Rate Access
PRI	Primary Rate Interface
SSP	Service Switching Point
SCP	Service Control Point
SPM	Spectrum Peripheral Module
TDP	Trigger Detection Point

38.15 References

AD2229 - PRA 250 WITH SYS 85 INTERWORK

AD2247 - ENHANCEMENTS TO SIGMAN TO INTERWORK 5ESS

AM0162 - ENHANCEMENT FOR #4ESS AND #5ESS

AF7571 - PRI PRO Phase 2

AT&T TR-41449

39: Functional description (FN)

39.1 Feature name

TOPS IP : Customer Assignable SX05 Route Monitoring A59023612

39.2 Description

This activity provides optionality for the dynamic rerouting capability of the IP-XPM. Prior to this activity the functionality was always present.

If multiple default routers are specified, an XPM node should detect failure of the main default router and re-route IP datagrams using back-up routers if they work..This is known as dynamic re-routing.

There are cases where the default gateways/routers to be used do not (or are unable to) respond to ping (i.e., the router is a virtual router and handles its own dynamic re-routing). In order for the XPM to use these gateways/routers, the XPM must be made aware these gateways do not require dynamic re-routing. Because the XPM will not be performing dynamic re-routing, the router/gateway itself is responsible for dynamic re-routing.

The XPM will be informed whether to perform dynamic re-routing by using static data sent from the CM.

This document contains the CM portion of the feature in TOPS15 . The XPM portion of the feature is A59023722.

39.2.1 Table Control

The XPM will be informed whether to perform dynamic re-routing by using static data sent from the CM. This is done by introducing a new field in table XPMIPMAP . This table contains the bootstrapping information for the XPM.This field will be of { Y, N } type. Customer will be allowed to datafill

this field. Based on this field, in the XPM, the dynamic rerouting capability will be turned on or off. The current functionality i.e prior to this activity is equivalent to the new field =Y.

39.2.2 STATIC DATA

The new field will be downloaded to the XPM node during loading and during an XPM return to service(RTS) if needed through static data .

39.2.3 UPGRADE STRATEGY

To insure this feature works correctly, the following upgrade order must occur.

To turn dynamic re-routing off

1. First the XPM is upgraded,
2. Next, the CM is upgraded, and the static table updated to turn dynamic re-routing off,
3. Only then should the router(s) that do not support dynamic re-routing be installed.

To turn dynamic re-routing on

- 1 Install the router(s) that do support dynamic re-routing first,
- 2 Next the XPM must be upgraded,
- 3 Last, the CM must be upgraded, and the static table updated to turn dynamic re-routing on.

39.3 Hardware requirements

Not Applicable

39.4 Limitations and restrictions

1. If the customers turn off the dynamic rerouting functionality (i.e. change it to N) then their routers are now responsible for the rerouting functionality.

39.5 Interactions

This Feature needs the following ACTIDS to be fully operational.

TOPS Customer assignable SX05 dynamic re-routing A59023722(XPM Part)

39.6 Logs (LG)

39.6.1 New/modified logs

No changes in logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

39.7 Data schema (DS)

39.7.1 New/modified tables

- A new field **Routmon** will be added which will allow Customer to datafill the dynamic rerouting capability of IP-XPM to Y or N.

Table 2

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
XPMIPMAP	Changed	Unchanged

39.8 Office parameters (OP)

39.8.1 New/modified office parameters

Not applicable

Table 3 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

39.9 Service orders (SO)

Not Applicable

39.10 Alarms (AL)

39.10.1 New/modified directories

Not Applicable

Table 4 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

39.11 Command interface (CI)

39.11.1 New/modified commands

Not Applicable

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN

39.12 Operational measurements (OM)

39.12.1 New/modified OM groups

Not Applicable

Table 6 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

39.13 AMA/Billing information (AM)

39.13.1 New/changed AMA/billing information

Not Applicable

Table 7 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

39.14 Software optionality control (SOC)

Table 8 SOC

SOC option name:	NA
SOC option title:	NA
SOC option control type:	NA
New SOC option?	NA
SOC option order code	NA
Option defined in DRU:	NA
Affected products:	NA

39.15 Glossary

ACTID	Activity ID
BOOTP	Bootstrap Protocol
IP	Internet Protocol
RTS	Return To Service
TOPS	Traffic Operator Position System
XPM	eXtended Peripheral Module

39.16 References

- a. A59007541 , PLS FMDOC, TOP IP Data Communication
- b. A59007341, PLS FMDOC, IP ON XPM
- c. A59023722. PLS FMDOC, TOPS Customer assignable SX05 dynamic re-routing

40: Functional description (FN)

40.1 Feature name

AT.59023787 - "RLD Site Naming".

40.2 Description

This feature provides the ability to define a Remote Line Drawer (RLD) line using the RLD site (which can be different from the Hub site), RLD frame and RLD number.

The following paragraphs provide some background information on RLDs and on the motivation of this feature:

The STAR Hub, which is a node that hosts the RLD, is a LCM variant. It is datafilled in table LCMINV as any other LCM.

The Remote Line Drawer (RLD, or: STAR Module) is a drawer type supported off the STAR Hub. The RLD provides POTS and ISDN services for up to 64 subscribers. It is connected to the STAR Hub by one or two DS1 links. RLDs are datafilled in table LCMDRINV with the LDCPEC NTTR70AA or NTTR70AB and the DRWRPEC NTTR45AA, NTTR45AB, or NTTR40AA.

Unlike any other drawer type, the RLD can be physically located either in the same site of the STAR Hub, or in another site.

According to the line definition convention in the DMS-100, a RLD line is defined today with HUB site, HUB frame and HUB number. This makes no problem when the RLD is located in the same site of the HUB. But when the RLD is located in a remote site, use of the HUB site in the line definition is misleading, the site that is derived from the LEN does not represent the real location of the line.

The main purpose of this feature is therefore to enable definition of a RLD LEN with the real site of the RLD, which may differ from the Hub site.

The functional components changed by this feature are listed below, and are detailed in the next sub-sections:

- LCMDRINV and LNINV Table Control
- RLDSITE display
- QLEN command output

40.2.1 LCMDRINV and LNINV Table Control

This component provides the user the interface needed to define a site for a RLD and to use it in RLD line definition. The main features are:

- The RLD site, frame & unit are defined in the new field “RLDNAME” in the RLD tuple in table LCMDRINV.
- When the RLDNAME field is defined, LCMDRINV table control aspects verify that:
 - The same RLDNAME (i.e. site + frame number + unit number) is not used yet by any other RLD or by any LCM/Hub.
 - The string entered as RLD site name is a valid site datafilled in table SITE. If so, the MODCOUNT field of this site entry is incremented in table SITE.
- The RLD can be provisioned in the same location of the Hub. In this case, the site name + frame number + unit number of the hosting Hub should be datafilled in the RLDNAME field.
- It is not allowed to defined a new LCD with the same site, frame and unit that are already used by an existing RLD.
- The existing RLDSITE field (8-char string, used for administrative information only) is not changed, for upgrade compatibility and for preservation of any information saved in this field. However its name is changed to LOCATION, to reduce confusion with the new RLDNAME field.
- Table LNINV is enhanced to accept RLD site, frame & unit for RLD line definition, according to the RLDNAME datafill in table LCMDRINV.
- Wrong RLD LENS are treated as any other wrong LEN. That is:
 - In table LNINV: When a wrong/invalid RLD LEN is entered (i.e. using the Hub site instead of the RLD site), the user is prompted again for the LEN field,
 - In LTP level: When a wrong/invalid RLD LEN is posted, a suitable error message is displayed: “Unequipped Frame or Bay.” or “Module ID Invalid.”.
- Changing the RLDNAME in LCMDRINV is not limited by the RLD state or by the existence of lines on this RLD. This concept is needed to enable changing of the RLDNAME after the first ONP to the CM 15 load.
- When changing the RLDNAME, it should be clear to the customer that:
 - The RLDNAME should at any moment reflect the real site of the RLD.
 - Any existing subtending line will be displayed in table LNINV with the new site, frame and unit.

Example:

Consider the datafill sequence in Figure 1.

Data of interest is presented in **bold** face. The new RLDNAME field data is presented in *red italic* face. The existing RLDSITE data is presented in *green* face.

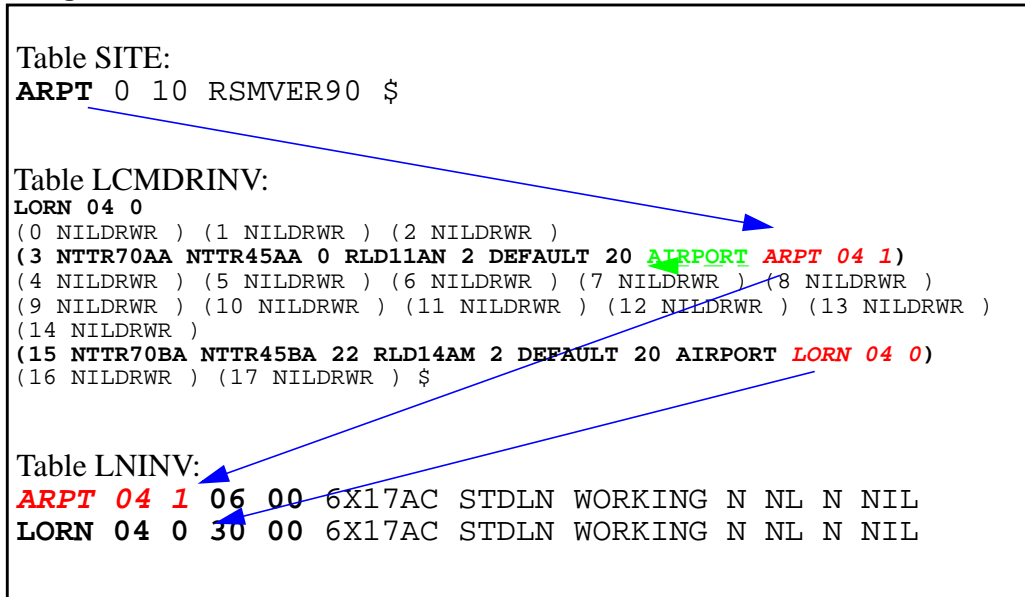
The Hub is “LORN 4 0” located at site “LORN”.

Two RLDs are defined (**bold**), in physical drawers 3 and 15.

Lines of the first RLD will be defined in table LNINV as “ARPT 4 1 x x”.

Lines of the second RLD will be defined as “LORN 4 0 x x”.

Figure 1 Definition of RLD line with RLDNAME



40.2.2 RLDSITE display

This activity creates the possibility to define the RLD site in two different fields: RLDSITE and RLDNAME. Technically these two definitions can be different, because in the RLDSITE field up to two eight character strings are already defined in active DMS-100 switches, while the new RLDNAME field supports up to four characters only for the site name, as limited by table SITE.

Today, the existing RLDSITE field is displayed in the following RLD HMI entities as part of the RLD identity:

- in “RLD”, “RLDPES” and “RLDCARR” map levels,
- in “PM” and “PES” logs in Logutil that refer to a RLD,
- in RLD OM display,
- in the “QLEN”/“QLENWRK” command output that refer to a RLD line,
- in the “QueryTE” command output in the “LMU” map level.

On the other hand, RLD lines may be represented now by the site name defined in the new RLDNAME field, which may be a different string.

The use of a double site name may lead to inconsistency and confusion in the RLD identity.

The following conventions are therefore implemented, to ensure consistency in the presentation of the RLD site name and maximal clarity in the RLD identity:

- The existing RLDSITE field is not removed from table LCMDRINV, to facilitate upgrade compatibility and to save any useful information that is already entered in this field.
- The name of the RLDSITE field is changed to LOCATION.
- Wherever the LOCATION field is displayed today, it is replaced by the new site name which is datafilled in the new RLDNAME field (except in QLEN output, where both fields are displayed).
This design ensures consistency in the use of the RLD site name.
- It is recommended that the LOCATION field be a description of the site name, and not a name of another site.

For an example, please refer to Figure 2.

40.2.3 QLEN command output

Since the LEN of a RLD line may now indicate either the site of the RLD or the site of the STAR Hub, the craftsperson should be able to retrieve from the DMS-100 clear information about the Hub and the RLD locations of any RLD line.

For this purpose, the QLEN command output is updated to print the STAR Hub site in a new line, next to the RLD site that is already printed today. This change is implemented for RLD lines only.

In addition, both the existing RLDSITE field (renamed to LOCATION) and the new SITE field of the RLDNAME are printed (today only the RLDSITE field is printed).

The same changes are visible in the QLENWRK command output, which is basically a sequence of QLEN results.

Examples to QLEN command output are provided in Figure 2. The new/changed site indications are presented in **bold** face.

Figure 2 QLEN enhancement

```

Table LCMDRINV:
LORN 04 0
(0 NILDRWR ) (1 NILDRWR ) (2 NILDRWR )
(3 NTR70AA NTR45AA 0 RLD11AN 2 DEFAULT 20 AIRPORT ARPT 04 1)
(4 NILDRWR ) (5 NILDRWR ) (6 NILDRWR ) (7 NILDRWR ) (8 NILDRWR )
(9 NILDRWR ) (10 NILDRWR ) (11 NILDRWR ) (12 NILDRWR ) (13 NILDRWR )
(14 NILDRWR )
(15 NTR70BA NTR45BA 22 RLD14AM 2 DEFAULT 20 AIRPORT LORN 04 0)
(16 NILDRWR ) (17 NILDRWR ) $

>qlen ARPT 04 1 06 00
-----
LEN:   ARPT 04 1 06 00
RLD LINE LOCATION: AIRPORT  SITE: ARPT
HUB SITE: LORN
TYPE: SINGLE PARTY LINE
SNPA: 613
.....

>qlen LORN 04 0 30 00
-----
LEN:   LORN 04 0 30 00
RLD LINE LOCATION: AIRPORT  SITE: LORN
HUB SITE: LORN
TYPE: SINGLE PARTY LINE
SNPA: 613
.....

```

40.3 Hardware requirements

None

40.4 Limitations and restrictions

- This feature is supported for RLD only. No changes are implemented for other drawer types (ILD, XNET, etc.).
- Table SITE is not expanded. Although the DMS-100 system supports up to 1000 RLDs, the limit of table SITE (up to 256 sites in the whole switch) is unchanged.
- The RLD site name used in the LEN is 4-char long, as limited by table SITE.
- This feature is provided in NA15. To apply it in older products (NA11 to NA14), feature patch is needed.
- At data transfer to the NA15 load, all RLD sites will be datafilled with the hosting STAR Hub site. The craftsperson will have to update the RLD site and the sub tending line definitions as desired.

40.5 Interactions

None

40.6 Logs (LG)

N/A

40.7 Data schema (DS)

40.7.1 New/modified tables

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
LCMDRINV	CHANGED	UNCHANGED
LNINV	CHANGED	UNCHANGED

40.8 Office parameters (OP)

N/A

40.9 Service orders (SO)

N/A

40.10 Alarms (AL)

N/A

40.11 Command interface (CI)

40.11.1 New/modified commands

Table 2 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
QLEN	CHANGED	unchanged	unchanged	unchanged
QLENWRK	CHANGED	unchanged	unchanged	unchanged

40.12 Operational measurements (OM)

N/A

40.13 AMA/Billing information (AM)

N/A

40.14 Software optionality control (SOC)

N/A

40.15 Glossary

Term	Description
LEN	Line Equipment Number
LSG	Line Sub-Group (Each LCM / Hub drawer consists of two LSGs)
LCM	Line Concentrating Module
STAR Hub	LCM variant, developed by Telrad
RLD, RLDR	Remote Line Drawer (Star Module), supported off STAR Hub
HMI	Human Machine Interface

40.16 References

“Star Remote Line Drawer - CM”, HLD document for the RLD (CM), module RLDCMHL.D.AA03 in PLS FMDOC library.

41: Functional description (FN)

41.1 Feature name

AT.59024289 : Servord Enhancement Command - Change Block Directory Numbers (CBLKDN).

41.2 Description

41.2.1 Background

In NA012, the feature A59005973 introduced a restriction on the North American Number format by making it 3-3-1 or 3-3-4 (NPA-NXX-XXXX). This means that the station code digits for any North American DN can have either 1 or 4 digits. This led to a lot of tuple failures during an ONP as there were many tuples in table DNROUTE with 2 and 3 digit station code DNs. This was rectified by expanding all the existing 2 and 3 digit station codes to 4 digits.

The tuples in table DNROUTE with 2 digit station codes actually represented a block of 100 DNs while those with 3 digit station codes represented a block of 10 DNs. Prior to NA012, the attributes to these block of DNs could be changed by simply changing the tuple in table DNROUTE. However, after all the tuples were expanded, changing the attributes required the customer to manually change all the 100/10 tuples in table DNROUTE to reflect the same change. The proposed SO command CBLKDN will have the functionality to change the attributes for a specified block of DNs using a single command.

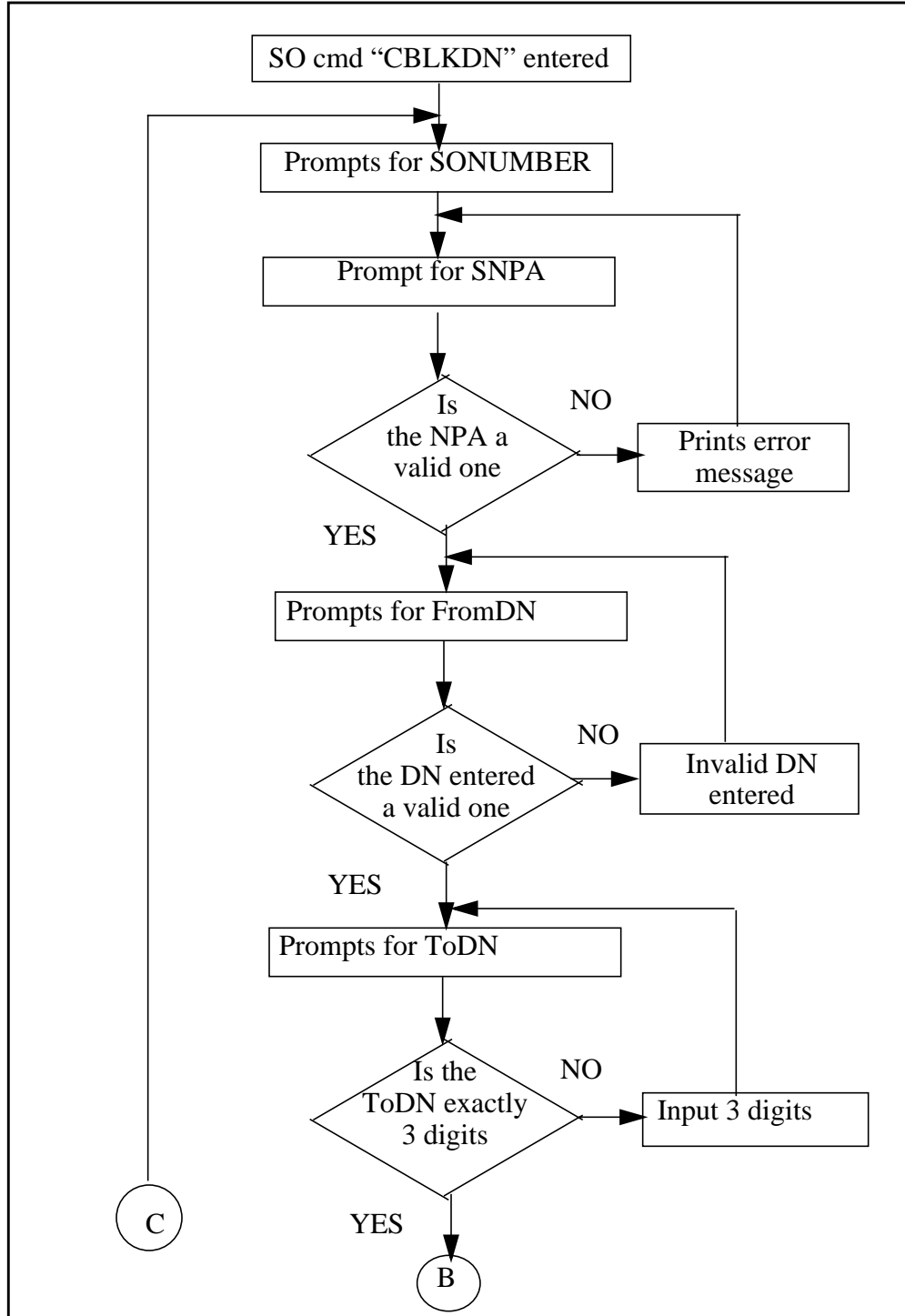
41.2.2 Functionality

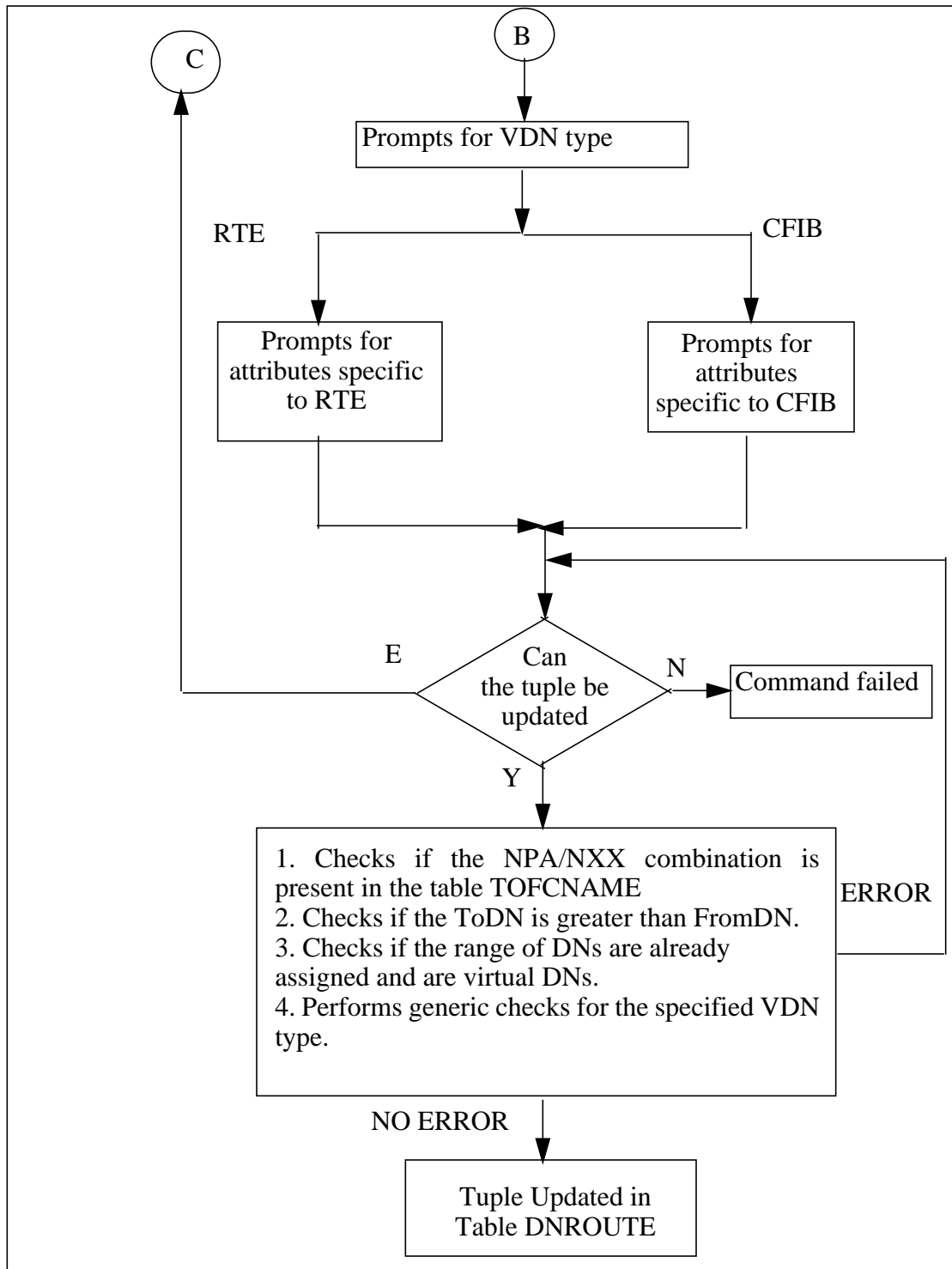
This activity provides the facility to change the attributes of a block of DNs using SO System. Currently, it is possible to assign a block of DNs using the SO NEWDN command. It is also possible to remove a block of DNs using the SO OUTDN command. But, to change the attributes of a block of DNs each entry in that block must be manually changed using the CHA table command by actually entering into the table DNROUTE. This feature provides a new SO command called CBLKDN - Change Block Directory Numbers, which can be used to change the attributes of a block of DNs.

41.2.3 Behavior of the CBLKDN command

The behavior is that the user must be able to change the attributes associated with a block of DNs through SO.

Figure 1 Behavior for CBLKDN command





41.2.4 CBLKDN command parameters and variables

Figure 2 Syntax for the CBLKDN command for VDNTYPE of RTE

```

CBLKDN CARRIAGE RETURN ] <SNPA> <FROM_DN> <TO_DN> <VDNTYPE>
          $
          CURRENT_DATE
          FUTURE_DATE
<ROUTE> <RTEIDX>
    
```

Note: Use CBLKDN only to change the attributes of a block of VDNs from RTE to RTE and CFIB to CFIB.

Table 1 SO command CBLKDN parameters and variables

Parameters and Variables		Description
S O N U M B E R	Carriage return	This represents the action of pressing the ENTER key. This parameter accepts a default value in prompt entry mode. (Service orders entered with the current date are processed immediately)
	\$	This parameter either accepts a default value, indicates the end of an options list, or closes a series of feature entries. In the first vertical selection list, the \$ parameter forces the system to default to using the current date while you are using no-prompt entry mode. (Service orders entered with the current date are processed immediately.)
	current_date	This variable specifies the current date as the SO number. This entry is valid when using either prompt entry mode or no-prompt entry mode. (Service orders entered with the current date are processed immediately). The current date is the default date for the SO number entry. The default date can be accepted by pressing the ENTER key while using prompt entry mode or by entering the \$ parameter while using no-prompt entry mode.
	future_date	This variable specifies the future date on which you want the pending service order or bulk service orders to be activated. (Service orders entered with a future date are processed on the specified date.)

Table 1 SO command CBLKDN parameters and variables

Parameters and Variables	Description
SNPA	<p>This variable specifies the area code of the block of DNs.</p> <p>NOTE1: SNPA is prompted only when the bool DUP_OFCCODE_PRESENT is set to FALSE.</p> <p>NOTE2: This bool is set to true when the first entry containing a duplicate office code has been manually added to table TOFCNAME.</p> <p>The valid entry is any SNPA available on the switch.</p>
FROM_DN	<p>This variable specifies the block assignment of DNs. This entry is the starting DN.</p> <p>The valid entry value is either seven or ten digits.</p> <p>NOTE: SNPA and the SNPA value of the specified 10 digit national DN must be the same.</p>
TO_DN	<p>This variable specifies the block assignment of DNs. This entry is the last three digits of the last DN in the block. The valid entry is three digits.</p>
VDNTYPE	<p>This variable specifies the assignment of a block of DNs. This entry is the selector for the type of DN.</p> <p>RTE (Route)</p> <p>CFIB (Call Forward Interface Busy)</p>
ROUTE	<p>This variable specifies the block assignment of DN. The valid entry value is office route.</p>
RTEIDX	<p>This variable specifies the route reference index. The valid entry range is 0-1023.</p>

41.2.5 Examples

41.2.5.1 NO-PROMPT Mode

Command entered : CBLKDN \$ 613 6631011 324 RTE OFRT 56

where

\$	Specifies the default time
613	Specifies the SNPA
6631011	Specifies the starting DN
324	Specifies the ending DN 6631324.
RTE	Specifies the VDNTYPE
OFRT	Specifies the ROUTE
56	Specifies the RTEIDX.

TASK : Change the specified block of Directory Numbers

RESPONSE: COMMAND AS ENTERED:
CBLKDN NOW 0 7 19 PM 613 6631011 324 RTE OFRT 56
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT

DESCRIPTION: This command changes the attributes of the specified range of DNs.

41.2.5.2 PROMPT Mode

Command Entered is:

```
>CBLKDN
SONUMBER: NOW 0 7 19 PM
>
SNPA:
>613
FROM_DN:
>6631011
TO_DN:
>324
VDNTYPE:
>rte
ROUTE:
>ofrt
RTEIDX:
>56
```

TASK : Change the specified block of Directory Numbers

RESPONSE: COMMAND AS ENTERED:
CBLKDN NOW 0 7 19 PM 613 6631011 324 RTE OFRT 56
ENTER Y TO CONFIRM,N TO REJECT OR E TO EDIT

DESCRIPTION: This command changes the attributes of the specified range of DNs.

41.2.6 ERROR Scenarios

The following are the error scenarios for the CBLKDN command.

- SNPA entered does not exist.
- DN Block entered is not valid.
 - i. DN Block specified has one or more directory numbers which are not virtual.
 - ii. DN Block specified has a directory number that does not exist in table DNROUTE.
 - iii. The entire block of DNs does not match with the VDNtype entered.
 - iv. NPA/NXX combination is not present in the table TOFCNAME.
 - v. TO_DN is not exactly 3 digits.
 - vi. FROM_DN is greater than or equal to TO_DN.
- VDNtype specified is neither RTE nor CFIB.
- RTEIDX specified does not exist in the specified ROUTE table.

41.3 Hardware requirements

None.

41.4 Limitations and restrictions

CBLKDN command supports only Virtual DNs.

41.5 Interactions

None.

41.6 Logs (LG)

None.

41.7 Data schema (DS)

None.

41.8 Office parameters (OP)

None.

41.9 Service orders (SO)

CBLKDN SO command does not change any other existing SO command.

41.10 Alarms (AL)

None.

41.10.1 New/modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES
SO	CHANGED		ALL	RES

41.11 Command interface (CI)

None.

41.12 Operational measurements (OM)

None.

41.13 AMA/Billing information (AM)

41.13.1 New/changed AMA/billing information

None.

41.14 Software optionality control (SOC)

Not Applicable.

41.15 Glossary

Term	Description
SO	Service Order
CBLKDN	Change Block of Directory Numbers
NEWDN	SO command to assign a single or block of DNs
LEN	Line Equipment Number
OUTDN	SO command to remove a single or block of DNs
VDN	Virtual Directory Number

41.16 References

NTP 297-8001-8081 North American DMS-100 SERVORD Reference Manual.

NTP 297-8001-8203 Non-Menu Commands Reference Manual

42: Functional description (FN)

42.1 Feature name

Internet Protocol-InterWorking (IP-IW) New Media Gateway Processor (MGP) Pack Type

42.2 Description

This design adds a new circuit pack type to table MNCKTPAK for the IP-IW SPM. The Viper circuit pack will be provisioned as a Media Gateway Processor (MGP) pack to give it a unique identity in table MNCKTPAK. This feature will enable the MGP pack to have its own map level, device maintenance, alarms, loading targets, etc. The MGP pack will be registered with Integrated Device Maintenance (IDM) so that it can be integrated into Integrated Node Maintenance (INM) similar to other MNCKTPAK RM types.

42.3 Hardware requirements

A Viper circuit pack(s), NTLX67AA, is required by this feature.

42.4 Limitations and restrictions

None.

42.5 Interactions

As stated in the description, this feature adds a new circuit pack type to other existing circuit pack types in existing table MNCKTPAK.

42.6 Logs (LG)

42.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
Fault Report Log	SPM300	MOD	SOS
Failed spare log	SPM331	MOD	SOS
State Change Log	SPM500	MOD	SOS
Successful Spare Log	SPM630	MOD	SOS

42.7 Data schema (DS)

42.7.1 New/modified tables

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
MNCKTPAK	CHANGED	UNCHANGED

42.8 Office parameters (OP)

42.8.1 New/modified office parameters

Table 3 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

42.9 Service orders (SO)

42.10 Alarms (AL)

42.10.1 New/modified directories

Table 4 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

42.11 Command interface (CI)

42.11.1 New/modified commands

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
Quit	New		MGP	Menu
ListSet	New		MGP	Menu
Tst	New		MGP	Menu
Bsy	New		MGP	Menu
RTS	New		MGP	Menu
Offl	New		MGP	Menu
LoadMod	New		MGP	Menu
Select	New		MGP	Menu
QueryMod	New		MGP	Menu
ListAlm	New		MGP	Menu
Prot	New		MGP	Menu
ResetMod	New		MGP	Non-menu
Next	New		MGP	Non-menu
Wait	New		MGP	Non-menu
Abtk	New		MGP	Non-menu

Table 5 New or modified commands (Continued)

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
Post	New		MGP	Non-menu

42.12 Operational measurements (OM)

42.12.1 New/modified OM groups

Table 6 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

42.13 AMA/Billing information (AM)

42.13.1 New/changed AMA/billing information

Table 7 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

42.14 Software optionality control (SOC)

Table 8 SOC

SOC option name:	
SOC option title:	
SOC option control type:	<state/usage/combined>
New SOC option?	<Yes/No>
SOC option order code	<order code>
Option defined in DRU:	<DRU>

Affected products:	<PCL(s)>
--------------------	----------

42.15 Glossary

Term	Description
New term	definition

42.16 References

43: Functional description (FN)

43.1 Feature Name

Rated Power/ Alarm Interface and Speedometer Algorithm Tuning

43.2 Description

The initial release of multi-processing XA-Core was a single fixed PE card 3+1 system. Subsequent releases will thrive on multiple PE card configurations. In particular, the CSP15 release will yield three supported configurations, including a 2+1, 3+1, and a 5+1 system. Future releases will give way to more potential configurations and as such support for n+1 will be provided.

To accommodate these changes, this feature will support a modifiable RATED_POWER office parm based on the configurations being supported.

43.3 Hardware requirements

Implementation of this feature is intended for multi-processing XA-Core in CSP15 and beyond.

43.4 Limitations and restrictions

In CSP15, this feature will support 2+1, 3+1, and 5+1 configurations.

43.5 Interactions

None

43.6 Office parameters (OP)

43.6.1 Modified office parameters

The RATED_POWER office parm in table OFCENG is currently configured for a 3+1 system and as such is only supported for a Rated Power of 3. This

parameter will require the ability of the user to be able to modify this value to other power ratings in accordance to what is available to be supported.

Table 1 Modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
OFCENG	RATED_POWER	CHANGED

44: Functional description (FN)

44.1 Feature name

Wireless Centrex Directed Call Pickup and Call Park Retrieve

44.2 Description

The purpose and main function for Directed Call Pickup (DCP) is to allow a mobile subscriber to pickup a ringing wireline phone, within the same Centrex customer group, by dialing the DCP access code and the extension digits of the ringing wireline phone.

For example, all after hour calls for employees on a shop floor come into a wireline phone connected to a PA system. When employees hear the phone ring, they can pick up the call with their Centrex mobile phone by dialing the DCP access code and extension number of the ringing wireline phone.

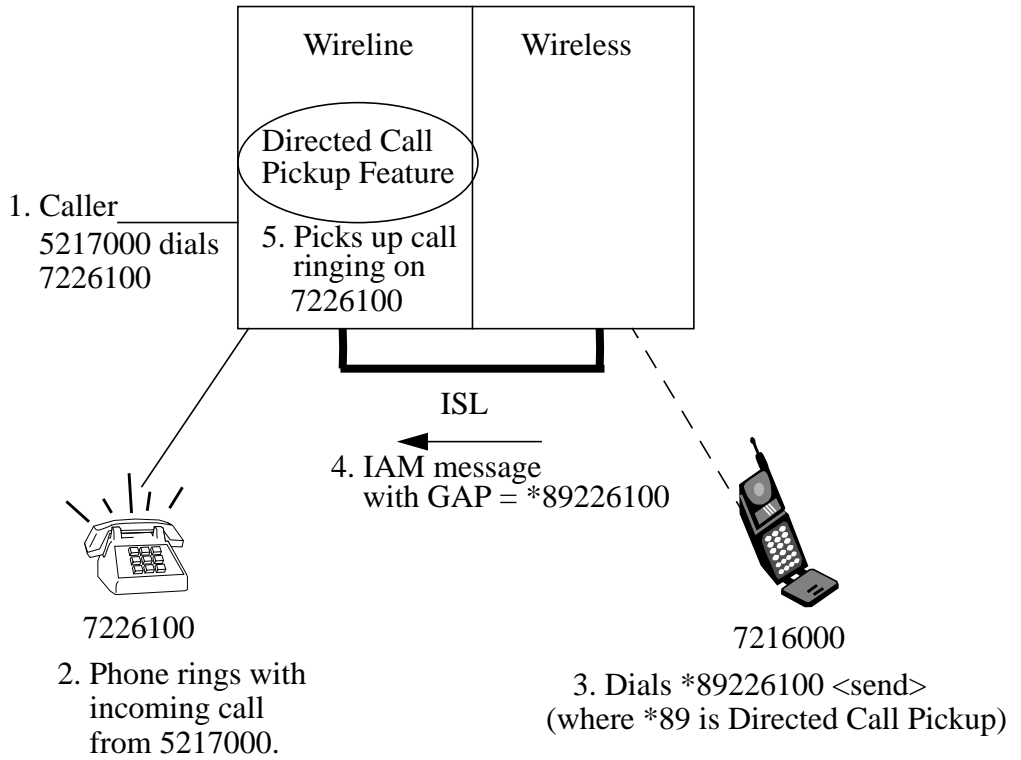
Figure 1 shows the desired behavior of Directed Call Pickup.

The purpose and main function for Call Park Retrieve (PRKR) is to allow a mobile subscriber to retrieve a parked wireline call, within the same Centrex customer group, by dialing the PRKR access code and the extension number the call is parked against.

For example, all calls for employees on a shop floor come into a secretary on a wireline set. When a call comes in, the secretary parks the call and announces it to the floor workers. The designated worker then retrieves the parked call using their Centrex mobile by dialing the PRKR access code and the extension number the call is parked against.

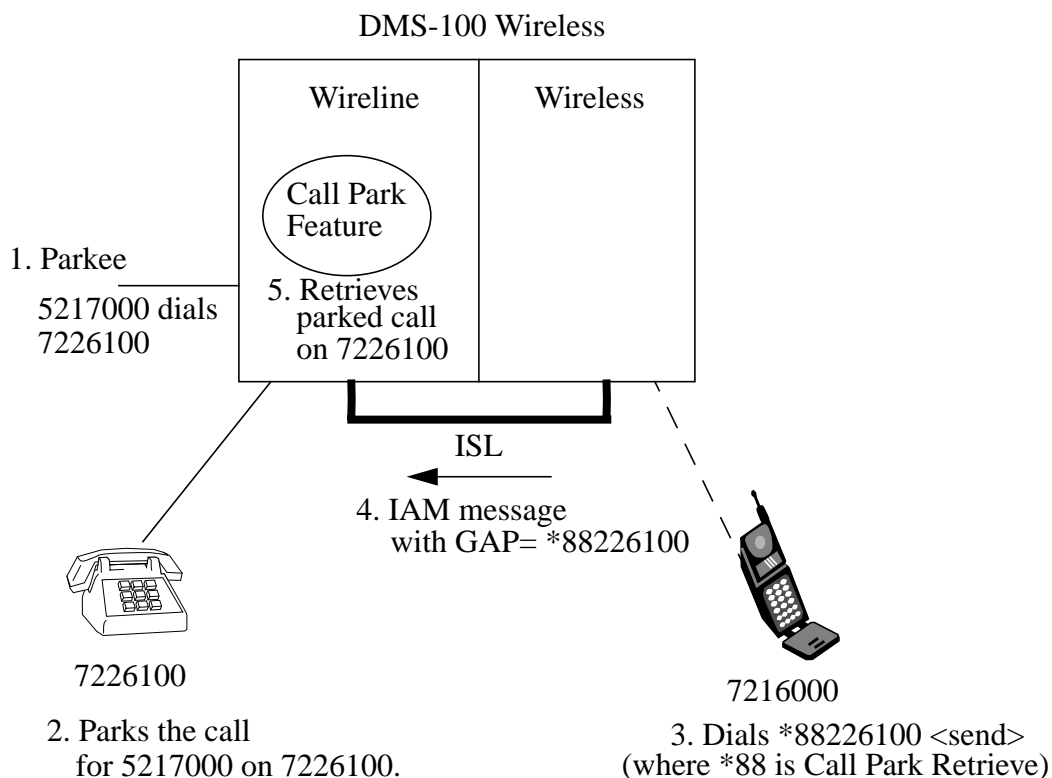
Figure 2 shows the desired behavior of Call Park Retrieve.

Figure 1 Directed Call Pickup Behavior Diagram
DMS-100 Wireless



Note:

1. 722 and 721 are in the same customer group and use 6-digit dialing.
2. Feature Code (FC) (e.g. 89) is assigned by customer.
3. Wireless FC matches the wireline FC.

Figure 2 Call Park Retrieve Behavior Diagram

Note:

1. 722 and 721 are in the same customer group and use 6-digit dialing.
2. Feature Code (FC) (e.g. 88) is assigned by customer.
3. Wireless FC matches the wireline FC.

All wireless centrex members automatically support these 2 features, provided that DCP and PRKR are already datafilled in table IBNXLA.

44.3 Hardware requirements

No new customer hardware dependencies.

44.4 Limitations and restrictions

1. In order to Pickup or Retrieve a call, the wireless Centrex subscriber must be in the same customer group as the wireline phone.
2. Asterisk (*) is the first part of activation code.

3. Unlike wireline Directed Call Pickup and Call Park Retrieve, there is no second dial tone provided after the mobile subscriber dials the Feature Code. Feature Code and extension number need to be dialed en bloc and sent together.
4. Wireless Centrex mobiles do not verify or restrict from using the Directed Call Pickup or Call Park Retrieve feature when a user sends the asterisk (*) plus Feature Code and extension number to the wireline side.

44.5 Interactions

1. Wireline phones cannot access Directed Call Pickup (DCP) and Call Park Retrieve (PRKR) across multiple switches via the IT trunk. In this case, the call will be routed to treatment.
2. DCP and PRKR can be done successfully on a Centrex wireless phone on either the first or second leg of Three Way Calling (3WC).
3. Call Waiting (CWT) is available during DCP and PRKR.
4. DCP and PRKR can access a forwarded call in the same Centrex group.
5. Call Transfer (CXR) is not supported while using these 2 features.

44.6 Logs (LG)

No new or modified logs.

44.7 Data schema (DS)

No new or modified Data schema (DS).

44.8 Office parameters (OP)

No new or modified Office Parameters.

44.9 Service orders (SO)

There are no provisioning changes.

44.10 Alarms (AL)

No New or modified alarms.

44.11 Command interface (CI)

No new/modified CI required.

44.12 Operational measurements (OM)

No new or modified OM groups.

44.13 AMA/Billing information (AM)

No new or changed AMA/Billing information.

44.14 Software optionality control (SOC)

No new SOC option will be created. But feature will be controlled by existing option LWW00066.

Table 1 SOC

SOC option name:	LWW00066
SOC option title:	Integrated Wireless Centrex
SOC option control type:	State
New SOC option?	No
SOC option order code	LWW00066
Option defined in DRU:	MTXWOW06
Affected products:	LWW

44.15 Glossary

Term	Description
BG	Business Group
DCP	Directed Call Pickup
DN	Directory Number
FC	Feature Code / Access Code
IAM	Initial Address Message
ISL	Integrated Services Link
GAP	Generic Address Parameter
PRKR	Call Park Retrieve

44.16 References

Wireless Centrex Feature A59006698.AA48 section C59006698 pcnfn.fm.

45: Functional description (FN)

45.1 Feature name

DEBUGGING TOOLS ENHANCEMENTS on Multi-Core for CSP15.

45.2 Description

45.2.1 Blocking Detection Tools

This section provides details on the Blocking Detection Tools enhancements for CSP15 on Multi-Core.

45.2.1.1 TOPBLOCK

45.2.1.1.1 Summary information at each one minute interval

At each one minute interval, TOPBLOCK displays the top N blocking events, the total number of blocking events, average total number of blocking events since start, and blocking for this period vs the average number.

Topblock sample output is on the next page.

There were 4 blocked locations in the past scanning period

2000/08/18 01:06 LOG MESSAGE IS NOT SET
Time: 2000/08/18 00:03:22 Output_count: 3
Top 10 Counts this interval: 516
Total Counts this interval: 516
Avg total counts/interval since START: 377
Blocking this period vs Average: N/A

DS	hh	TOTAL	_BTIME	COUNT	AVG	_BTIME	ggOWNER	nmHS/Dyn	STORE	_TYPE	nmmsSIZE	RETADDR	PS	ADDR						
44A801A0	kk	123514		nm	187		660	QNPUJ	.AB03	sh++	#	01A0	DSFPERM_MIXED	B	nm#00000280	01834D5C	0190AE40	MPSCHIM.AJ82	CONCURRENT_COMMIT_R	#0000
44A80140		86898		fh	hh	178	488	QNPUJ	.AB03	sh+	#	0140	DSFPERM_MIXED	B	nm#00000280	0275FE3C	0276FF6C	QNPUJ.AB03	QNP_TAKE	#0038
44A80120		71393		fh	hh	150	475	QNPUJ	.AB03	sh+	#	0120	DSFPERM_MIXED	B	nm#00000280	01834D5C	0190AE40	MPSCHIM.AJ82	CONCURRENT_COMMIT_R	#0000
421FF028		n2065		fh	hh	1	nmrr	2065g	FILESYS	.GB01	dyn	#00007CB8	DSSOS_BLOCKING	#00003F30	005EDC70	0182F8B8	MPSCHIM.AJ82	SELECT	G+	#00F8

kkkkk 283870 IIII516

Topblock sample output

45.2.1.1.2 Summary table at each one hour interval

At each one hour interval or at stop time, TOPBLOCK displays the load name, the total elapsed time that the tool has been running, the average total rate of blocking per minute, the average top rate of blocking per minute, and a summary table which provides top numbers of blocking, total numbers for blocking, and rating vs the average number of blockings of each one minute interval of the previous hour.

Sample output:

```
2000/08/18 01:06 ptcna14bg xasky
Tool Start Time: 2000/08/18 00:00:24 Current Time: 2000/08/18 00:03:38
Elapsed Time: 3 mins
Average total rate of blocking/minute: 50
Average top rate of blocking/minute: 50
```

Interval	TOP 10 counts	Interval_Count	Rating_vs_Avg
1	50	80	Med
2	80	90	Med
3	12	15	Low
.....
60	20	75	Med
	-----	-----	
	820	1259	

45.2.1.2 BLOKTRAK

BLOKTRAK is a member of the blocking tool suite. It allows users to track blocking events in a system. It is primarily used for debugging blocking problems. BLOKTRAK's buffer is a circular buffer which allows data to survive warm, cold, and reload restarts.

BLOKTRAK reports the following data:

- Blocked memory information, such as data store location, and store owner.
- Blockee information, such as PE id, process id, process name, SRR0, and LR.
- Blocker information, such as PE id, process id, and process name.
- A timestamp.

Sample output:

```
----- process accessing owned memory ----- memory line owner -----
DS_ADDR  OWNER      iii PE PROCESS/INTERRUPT ccccPS_ADDR RETADDRnnnnnnPE PROCESS/INTERRUPT  Timestamp
45A6FAE0 DADINVKR.BL04 15 #A503 #4080: TPSPROC 01F8CEA8 01456BDC 5 #8510 #1004: INVOKER 15:22:19.800.375
45A6FAE0 DADINVKR.BL04 5n#A503 #4080: TPSPROC 01F8CEA8 01456BDC 15#8510 #1004: INVOKER 15:22:03.823.500
45A6FAE0 DADINVKR.BL04 9h#A503 #4080: TPSPROC 01F8CEA8 01456BDC 6 #8510 #1004: INVOKER 15:22:02.524.750
45A6FAE0 DADINVKR.BL04 15 #A503 #4080: TPSPROC 01F8CEA8 01456BDC 9 #8510 #1004: INVOKER 15:21:32.133.375
44060160 MTCBASII.CU02 6 h#A503 #7092: XENPR g012A1B20 012A1A84 5 #C512 #70C6: MTCMAINP 15:21:28.232.000
45A6FAE0 DADINVKR.BL04 9 r#A503 #4080: TPSPROC 01F8CEA8 01456BDC 15#8510 #1004: INVOKER 15:21:27.883.375
```

45.2.1.2.1 DISPLAY <num>

DISPLAY <num> displays the recent <num> blocking events.

Example:

>BLOKTRAK DISPLAY 400

45.2.1.2.2 RESTART BEFORE <num>

RESTART BEFORE <num> displays <num> blocking events captured before the last restart.

Example:

>BLOKTRAK RESTART BEFORE 300

45.2.1.2.3 RESTART AFTER <num>

RESTART AFTER <num> displays <num> blocking events captured since after the last restart.

Example:

>BLOKTRAK RESTART AFTER 100

45.3 Hardware requirements

Hardware requirement for blocking detection tools is PowerPC.

45.4 Limitations and restrictions

Not applicable.

45.5 Interactions

Not applicable.

45.6 Logs (LG)

45.6.1 New/modified logs

None.

45.7 Data schema (DS)

45.7.1 New/modified tables

None.

45.8 Office parameters (OP)

45.8.1 New/modified office parameters

None.

45.9 Service orders (SO)

None.

45.10 Alarms (AL)

45.10.1 New/modified directories

None.

45.11 Command interface (CI)

45.11.1 New/modified commands

Table 1 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
BLOKTRAK DISPLAY	CHANGED		CI	NON-MENU
BLOKTRAK RESTART BEFORE	NEW		CI	NON-MENU
BLOKTRAK RESTART AFTER	NEW		CI	NON-MENU

45.12 Operational measurements (OM)

45.12.1 New/modified OM groups

None.

45.13 AMA/Billing information (AM)

45.13.1 New/changed AMA/billing information

None.

45.14 Software optionality control (SOC)

None.

45.15 Glossary

Term	Description
PE	Processor element
LR	Return address
SRR0	SRR0 is set to point to an instruction at that a collision occurs.

45.16 References

46: Functional description (FN)

46.1 Feature name

TOPS Remote Number Expansion to 62

46.2 Description

Operator centralization (OC)¹ allows a number of TOPS remote offices to share the operator positions provided by one TOPS host office. This is accomplished by communication links between the remote offices, where the calls originate, and the host offices, where the positions reside.

This feature increases the maximum number of OC nodes² supported in an OC network from 31 to 62³. The following areas are enhanced to support the new OC node limit.

46.2.1 Table Control

The following tables are affected by the new max OC node limit. Please refer to the DS section of this document for more information.

46.2.1.1 Table OCGRP

Table OCGRP specifies if an office is a host or remote, the voice link group, data link group, and OC protocol version to be used. Prior to this feature, only offices with office numbers between 1 and 31 were allowed to be used in this table. This feature updates this table to also allow offices with office numbers between 32 and 62 to be datafilled in this table.

The maximum number of tuples for this table is increased to 62.

¹For details on OC, please refer to Translations Guide.

²An OC node refers to either a host or remote office in an OC network.

³With Basic OC, a single office can communicate with up to 62 other OC nodes. However, if an office is using Host/Remote Networking by Queue Type (HRNQT), then the office itself must be defined as an OC node in table OCOFC. This limits the number of other OC nodes it can communicate with to 61.

46.2.1.2 Table OCDLGRP

Table OCDLGRP defines OC data link group for ETMS OC data links. The range for the table index is expanded to 0 to 62. The maximum number of tuples for this table is increased to 63 (0 to 62).

46.2.1.3 Table OCIPDL

Table OCIPDL defines and provides IP connectivity information for the OC-IP data links used to communicate with each distant office. Up to 8 datalinks can be datafilled against each distant office, so the maximum number of tuples for this table is increased to 496 ($8 \times 62 = 496$).

46.2.1.4 Table VLMEM

Table VLMEM associates an office¹ with the individual voice links in its voice link group. Up to 2047 voice links can be datafilled against each office, so the maximum number of tuples for this table is increased to 126914 ($2047 \times 62 = 126914$).

46.2.2 Protocols

In order for other TOPS applications to support more than 31 OC nodes, the far end configuration may need to be changed. In particular, the switch id (or office id) field in the following application protocols need to be extended from 31 to 62.

- PARS (Personal Audio Response System)
- QMSMIS (Queue Management System Management Information System)
- OPP² (Open Position Protocol)

The OC protocol and Standard Nortel-DMS/DAS Protocol already support the expanded OC node range, so no updates are needed. The Open Automated Protocol (OAP) does not reference the OC switch id, so it also does not need to be updated.

46.2.3 OMs

OM groups TOPSOC and TOPSVC peg their OMs based on the OC office number. As a result of extending the range for the maximum number of OC nodes from 31 to 62, the number of entries in OM groups TOPSOC and TOPSVC are automatically increased from 31 to 62. There is no change to the way these OMs are pegged.

OM group TOPQOCPS pegs its OMs based on the office name and QMS Force Manager (FM) call class. The formula for calculating the number of tuples in this OM group is:

¹Table VLMEM is not used by OC IP offices.

²The OPP supports the expanded office range (field Switch ID - 0 to 62) . However, TOPS' implementation of OPP only supports switch id from 0 to 31.

[(1 + number of offices with the OFCTYPE field in table OCGRP datafilled as REMOTE) x (1 + number of QMS FM call classes datafilled in table TQCLSNAM)]

As a result of extending the range for the maximum number of OC nodes from 31 to 62, the maximum number of tuples in OM group TOPQOCPS is automatically increased to 1008 $[(1+62) \times (1+15)]$. There is no change to the way these OMs are pegged.

46.3 Hardware requirements

Not Applicable.

46.4 Limitations and restrictions

- The current limit of supporting a maximum of 15 OC nodes will remain unchanged for the DCM OC configurations. The extension to 62 OC nodes is only supported with the ETMS and IP OC platforms. OC connections using DCM data links must use OC office numbers between 1 and 15. OC connections using ETMS or IP data links may use OC office numbers between 1 and 62.
- Although a maximum of 62 OC nodes is supported with the ETMS platform, the current maximum of 256 ETMS OC datalinks for the entire office is unchanged. This means, for a host office with 62 remotes, the average messaging capacity per remote is reduced since each remote may only have an average of 4 datalinks.
- As with the existing ETMS platform, the correct engineering analysis must be applied and the provisioning rules followed for proper OC network operation.
- It is required to upgrade OPP-compatible positions to a software version that supports the new maximum office range if either of the following conditions are met in the host which serves the positions:
 - traffic is being routed to the OPP-compatible positions from a remote that is datafilled in the host's OCOFC table with a value greater than 31.
 - standalone traffic in the host is routed to the OPP-compatible positions when the host's SWITCH_NAME tuple in table OCPARMS points to an OCOFC value greater than 31.

46.5 Interactions

- In order for other TOPS applications to support more than 31 OC nodes, the far end configuration may need to be changed. In particular, the switch id (or office id) field in the following application protocols need to be extended from 31 to 62.
 - PARS

— QMSMIS

— OPP

46.6 Logs (LG)

Not Applicable.

46.7 Data schema (DS)

46.7.1 New/modified tables

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
OCGRP	Changed	Unchanged
OCDLGRP	Changed	Unchanged
OCIPDL	Changed	Unchanged
VLMEM	Changed	Unchanged

46.8 Office parameters (OP)

Not Applicable.

46.9 Service orders (SO)

Not Applicable.

46.10 Alarms (AL)

Not Applicable.

46.11 Command interface (CI)

Not Applicable.

46.12 Operational measurements (OM)

- OM groups TOPSOC and TOPSVC peg their OMs based on the OC office number. As a result of extending the range for the maximum number of OC nodes from 31 to 62, the number of entries in OM groups TOPSOC and TOPSVC are automatically increased from 31 to 62. There is no change to the way these OMs are pegged.
- OM group TOPQOCPS pegs its OMs based on the office name and QMS Force Manager (FM) call class. As a result of extending the range for the maximum number of OC nodes from 31 to 62, the maximum number of

tuples in OM group TOPQOCPS is automatically increased to 1008. There is no change to the way these OMs are pegged.

46.13 AMA/Billing information (AM)

Not Applicable.

46.14 Software optionality control (SOC)

Not Applicable.

46.15 Glossary

Term	Description
OC	Operator Centralization
ETMS	Enhanced TOPS Message Switch
OPP	Open Position Protocol
PARS	Personal Audio Response System
QMSMIS	Queue Management System Management Information System
FM	Force Manager
OAP	Open Automated Protocol
IP	Internet Protocol
DCM	Digital Carrier Module

46.16 References

NTP 297-YYYY-350, Translations Guide

47: Functional description (FN)

47.1 Feature name

This feature provides the ability to specify a 64 kBit/s clear path nailed-up connection between two P-side endpoints (ports), where one or both endpoints reside on a Spectrum peripheral module (SPM) equipped with the 155 Mbit/s synchronous transfer mode 1 (STM-1) interface. The nailed-up connection is provisioned by datafill in the SPECCONN table in the computing module (CM).

This feature will be delivered across two releases. Activity AT.59025809 will be delivered in release 15 and will include CM content only. Activity AT.59022028 will be delivered in release 16 and will include SPM content only. CM content delivered in release 15 will be made 'benign' until activated by using a patch. In essence, datafill for an SPM in table SPECCONN will not be allowed until activated by the patch.

47.2 Description

The ability to provision nailed-up connections using table SPECCONN already exists within the DMS switch for XPM peripherals. The properties of these existing nailed-up connections areas follows:

1. The connection is permanent. Once made, it can be removed only through deliberate action by operating company personnel.
2. The connection is a dedicated 64 kBit/s data communication path. It can carry voice and/or signalling information from the P-side on an extended peripheral module (XPM) to a P-side on the same or a different XPM. The connection can also carry four 16 kBit/s time division multiplexed (TDM) D-channels.
3. The connection is defined and controlled by the CM through special connection information downloaded as datafill to the XPM.
4. The connection generally appears to the outside world (operating company personnel) as a datafilled tuple in the CM table SPECCONN.

5. Special Connections are maintained/re-established through peripheral maintenance actions (e.g. re-establishing connections when the peripheral module (PM) is brought into service).

This feature is extending the list of valid peripherals on which an endpoint can reside to include an SPM equipped with STM-1 resource modules (RM). The D-channel functionality mentioned in item 2 above will not be supported by this feature. Support for the digital test access (DTA), or ISDN line card (ISLC) functionality currently supported for XPMs is outside the scope of this feature and will not be supported for the SPM.

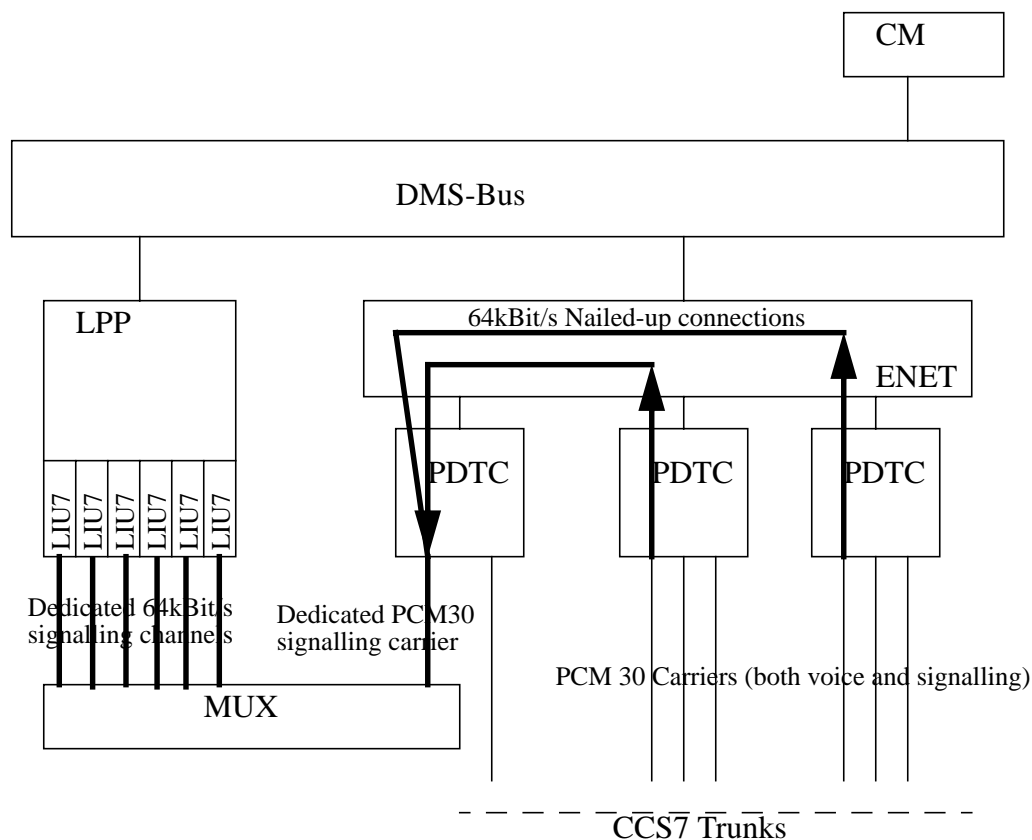
This feature is being developed to support a specific application of nailed-up connections, non-channelized access CCS7 signalling described in the following section.

47.2.1 Non-channelized access CCS7 signalling

The driver for supporting Special Connections on the SPM STM-1 is non-channelized access CCS7 signalling application. In this instance the nailed up connection provisioned via table SPECCONN forms part of the connection path a 64 kBits/s CCS7 signalling time slot is routed over in going between the terminating peripheral module (e.g. PDTC) for the physical carrier, and the LIU7 peripheral where the CCS7 signalling itself terminates.

Figure 1 below illustrates the path the signalling takes through the DMS. These signalling links are 64KBit/s channels in a shared PCM 30 carrier. The other 64KBit/s channels on the carrier are trunk circuits used for voice and data traffic.

Figure 1 Routing CCS7 signalling links using nailed-up connections



The PDTC terminates the PCM 30 carrier which is incoming to the DMS. The signalling links (64kBit/s channels) are groomed out and attached to nailed-up connections (NUCs) through the switching network (ENET). The NUCs route the signalling links to 64kBit/s channels in a PCM 30 carrier which is dedicated to CCS7 signalling. This PCM 30 signalling carrier is connected to an external multiplexer which in turn connects each signalling link to a V.35 based 64kBit/s channel which is terminated on an LIU7 in an LPP.

The purpose of the multiplexer is to extract 64kBit/s signalling links from the PCM 30 signalling carrier and route them to LIUs or conversely to multiplex 64kbit/s signalling links from individual LIU7s into a PCM-30 stream. The interface between the multiplexer and the LPP is a V.35 synchronous interface. Therefore the multiplexer also provides conversion between V.35 and PCM-30 formats to provide PCM-30 access to signalling from the DMS.

This feature would allow the PDTCs terminating the incoming carriers to be replaced by an SPM equipped with STM-1 interface resource modules.

47.2.2 Datafill of table SPECCONN

Example datafill for table SPECCONN is given below:

Table 1 Example SPECCONN data-fill

ENDPT1	ENDPT2	CONTYPE	STATUS
D30 SPM 2 0 1	D30 PDTC 9 10 16	CON	ACTIVE
D30 SPM 16 0 5	D30 PDTC 9 10 18	CON	ACTIVE

The SPECCONN tuple consists of two endpoints, a connection type and a connection status. The first field in an endpoint specifies its type. There are a number of existing endpoint types including D30 (used for PCM30-based peripherals such as PDTCs, PLGCs), and DS1 (used for DS1-based peripherals such as DTCs, LGCs).

An SPM equipped with STM-1 RMs provides 63 E1s and will therefore be datafilled in table SPECCONN as a D30 endpoint type. When equipped with OC-3 RMs, the SPM provides 84 T1s and would therefore be datafilled using the DS1 endpoint specifier. The current SPECCONN table control functionality already lists the SPM as a valid peripheral type for both DS1 and D30 endpoint types, however a tuple containing the SPM will currently be rejected. This feature will only provide the ability to datafill an SPM using the D30 endpoint type.

The KEY for table SPECCONN can be either ENDPT1 or ENDPT2. Therefore it is possible to position on an entry in the table by using either ENDPT1 or ENDPT2. If the operating company personnel wish to change an endpoint in a SPECCONN tuple, it is necessary to delete the tuple and then add it again. The table editor change command cannot be used to change the endpoint information.

The field after the endpoint type represents the peripheral type (PDTC or SPM) which then indicates the meaning of the final three fields. For a peripheral type of PDTC or SPM the fields have the following meaning:

- equipment module number (0 to 511)
- equipment module circuit number (0 to 19 for PDTCs and 0 to 181 for SPMs)
- equipment module time slot (1 to 31 for PDTCs and SPMs)

The CONTYPE field indicates the connection type and can be PENDING, REServed, CONnected, or CAB (connected AB).

- **PEND**

A PENDING connection type indicates that the connection endpoints are datafilled in SPECCONN but no connection will be established in the peripheral. In order to establish the connection, the operating company personnel must change the connection type from PENDING to CON using the table editor.

- **RES**
A REServed connection type indicates that the connection endpoints are datafilled in SPECCONN and the connection resources have been reserved in the peripheral but the connection has not been nailed up. This is not datafillable.
- **CON**
A CONnected connection type indicates that the connection endpoints are datafilled in SPECCONN and the connection is to be downloaded and established in the peripheral.
- **CAB**
A CAB (connected AB) connection type indicates that the connection endpoints are datafilled in SPECCONN and the connection information is downloaded as a CONNAB connection to the peripheral. The connection is established in the peripheral. This connection type indicates A/B bit signalling on the connection and is used for subscriber module urbans (SMU) only. This connection type will not be supported by this feature.

In all cases, if the CONTYPE indicates that the connection information is to be downloaded to the peripheral, the STATUS field indicates the actual status of the connection. Therefore, if the tuple was datafilled as CON, but the resulting STATUS indicated that it was INACTIVE, this means that although the operating company personnel requested that the connection be established, for some reason, the peripheral was unable to nail up the connection. Further detail on the meaning of the STATUS field is given in section 47.2.4.

47.2.3 Processing table SPECCONN tuples

A single nailed-up connection can span more than one peripheral module. As an example, given the following SPECCONN datafill:

ENDPT1	ENDPT2	CONTYPE	STATUS
D30 SPM 11 6 24	D30 PDTC 15 3 5	CON	ACTIVE

the following connection “segments” would need to be made:

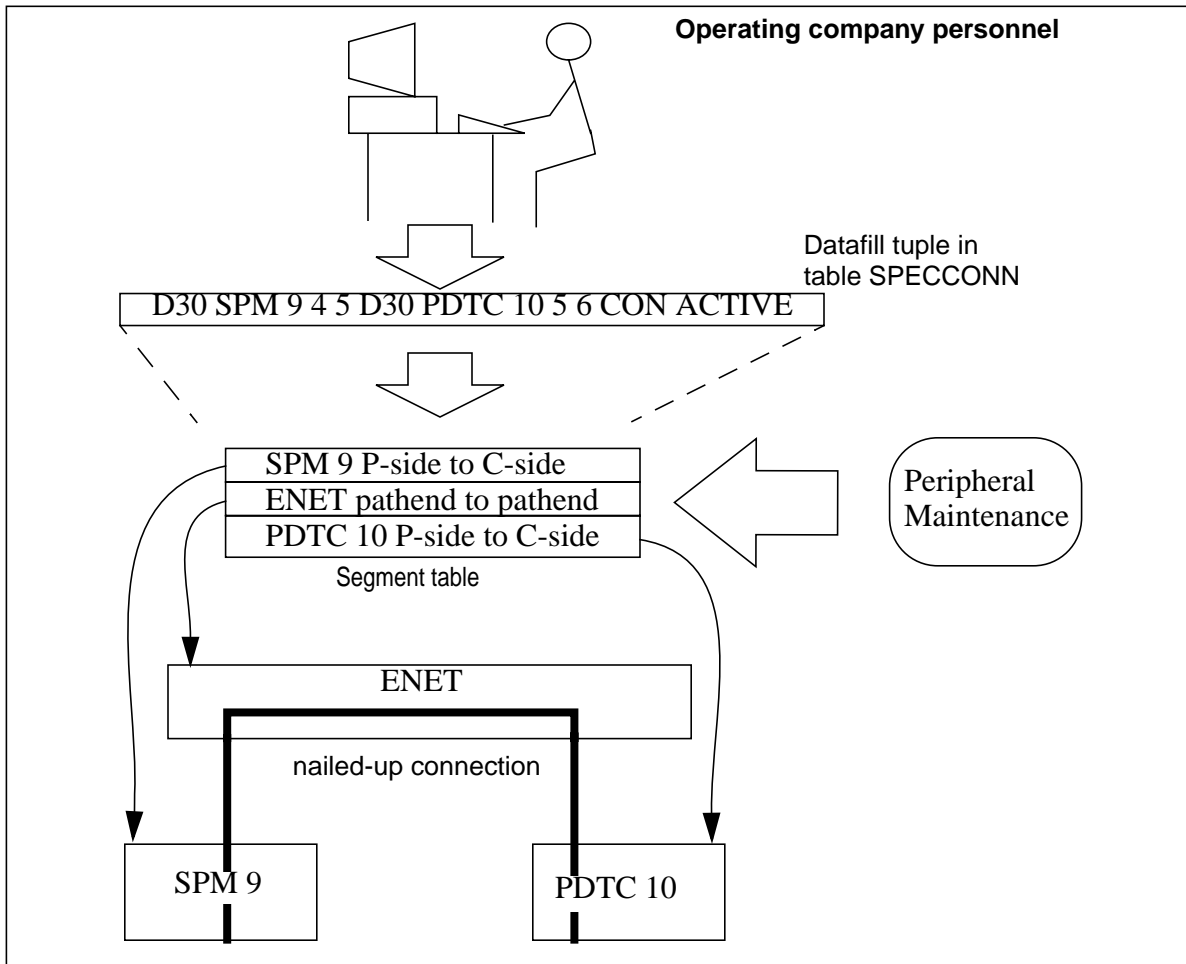
- on SPM 11, from P-side circuit 6 time slot 24 to a C-side channel (network pathend)
- on PDTC 15, from P-side circuit 3 time slot 5 to a C-side channel (network pathend)
- on the enhanced network (ENET), a connection between the two network pathends identified above

Each segment describes a physical portion of the connection and corresponds to an actual connection to be made. This processing is performed within the CM. An operator interface command is also available and can be used to query

the state of these individual connection segments, namely QSCONN. This command will be extended to support queries where the SPM is specified as an endpoint.

Details of each segment are then downloaded from the CM to the relevant peripheral. The peripheral processes the segment data and establishes the specified connection. A reply is sent from the peripheral to the CM indicating whether the segment data has been successfully processed and the specified connection made.

Figure 2 Overview of SPECCONN functionality



47.2.4 Reporting connection status

An operator interface command, QSCONN, is available and can be used to query the state of individual connections. This command will be extended to support queries where the SPM is specified as an endpoint.

The current status of a nailed-up connection is also reported via table SPECCONN. The last field in a SPECCONN tuple denotes the current status of the nailed-up connection. Valid values are:

- **PMBUSY**
The peripheral in which the connection is made, is out of service. If the connection goes through the network and therefore involves two peripherals, then the status is PMBUSY if one or both peripherals are out of service.
- **ACTIVE**
The connection has been established in the peripheral or in both peripherals if the connection goes through the network.
- **INACTIVE**
The connection has not been set up in the peripheral (i.e. the peripheral rejected the tuple when it was downloaded). If the connection goes through the network, if either peripheral was unable to set up the connection, then the tuple status is set to INACTIVE. This will also be the status when the connection type is PENDING.
- **MTC**
The connection is INACTIVE and is being used by maintenance (i.e. a Bd loopback has been set so that the Packet Handler can run a continuity test).
- **NOINTEG**
The special connection is physically made, but integrity has not been found, or has been lost. This implies that both peripherals are in service, (only applies where nailed-up connection goes via the network).

47.2.5 Resilience of nailed-up connections

The nailed-up connections are maintained/re-established through peripheral maintenance actions. For example, if an SPM were to come in service, all the connection segments datafilled against that peripheral will be downloaded and re-established. The connections though the ENET will also be re-made if required.

A nailed-up connection will survive a protection switch of either the SPM common equipment module (CEM) or the STM-1 RM. The nailed-up connections will be maintained on a CM warm restart and re-made following cold and reload restarts.

47.2.6 Checking connection integrity

Integrity checking is performed on nailed-up connections where the connection path includes a network (ENET) segment. When the nailed-up connection is first established, an attempt is made to find integrity on the connection. If this is not found, then the status of the connection is set to NOINTEG.

All changes in state of integrity on nailed-up connections are written to a log in the CM.

47.2.7 Auditing table SPECCONN

The SPECCONN audit is a system-invoked audit process to maintain the validity between the table SPECCONN tuples and the channel connection information in the peripherals. The audit also updates the peripherals with new tuple information and enables connections to be made while the peripherals are in service.

A log is generated by the audit whenever there is a change in the channel connection information in the peripheral, when the status has changed for a SPECCONN tuple in the CM, or when a discrepancy between the CM and the peripheral is found but the audit failed to correct the fault.

The audit consists of two main phases. The first phase of the audit checks for INACTIVE and NOINTEG tuples and sends down the corresponding segment connection requests to the peripheral. If the request is successful the status of these tuples in the CM is changed to ACTIVE. This phase of the audit is executed every 30 minutes. The second phase of the audit is performed each night and consists of the first phase and also a validity check between the CM and the peripheral over all of the SPECCONN tuples (excluding tuples with NOINTEG status). If a discrepancy is found then corrective action is taken in the CM or in the peripheral. The validity check over all of the SPECCONN tuples is NOT done every 30 minutes, to reduce the amount of messaging between the CM and the peripherals during peak call traffic periods. The validity check only verifies that the CM tuples are in the peripheral and that the connection type is correct. It does not check that all peripheral connections are valid. The CM has no way of determining if there are any connections in the peripheral that are not datafilled in the CM, it is only possible to audit the connections that the CM knows about.

47.3 Hardware requirements

There are no new hardware dependencies introduced by this feature.

47.4 Limitations and restrictions

This feature will provide the ability to provision clear path nailed-up connections via table SPECCONN only. No alternative methods for nailing up connections are supported.

Endpoint type interworkings supported by this feature will be as follows:

- D30 to D30.

The SPM will only be datafillable as a D30 endpoint type. No other combinations will be directly supported for the SPM STM-1 peripheral in this

feature. Functionally it will be possible as a result of this feature to datafill a nailed-up connection from a time slot on an SPM STM-1 peripheral to a time slot on a peripheral currently supported by the DS1 endpoint type (i.e. a D30 to DS1 interworking). However, this functionality will not be supported by the feature and only D30 to D30 interworking will be tested as part of the feature delivery.

The current functionality provided by the QSCONN command to query the connection segments using the C-side port will not be supported for the SPM STM-1 peripheral. The reason for this is that the SPM uses DS512 links on its C-side rather than the DS30 links used by XPMs, and therefore a query on the SPM C-side port could return up to an unmanageable 512 entries. See section 47.10 for further details.

Support for the DTA, or ISLC functionality currently supported for XPMs is outside the scope of this feature and will not be supported for the SPM.

47.5 Logs (LG)

Special Connections on the DMS switch has a number of logs associated with it. No changes will be made to the format of these logs. However, as a result of this feature, entries will be made into these logs for Special Connections residing on an SPM.

47.5.1 New/modified logs

Table 2 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
SPECCON Audit log	PM231	MOD	SOS
SPECCON Audit log	PM232	MOD	SOS
SPECCON Audit log	PM233	MOD	SOS
SPECCON Audit log	PM234	MOD	SOS
SPECCONN Integrity log	PM236	MOD	SOS

47.6 Data schema (DS)

47.6.1 New/modified tables

Table control for table SPECCONN will be modified by this feature to allow the SPM to be accepted as a valid peripheral type for D30 endpoint types.

Note that the SPM is already listed as a valid peripheral type for both D30 and DS1 endpoint types if the “range” command is issued for table SPECCONN. However attempts to actually datafill a tuple containing an SPM-based endpoint will fail.

Table 3 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
SPECCONN	CHANGED	UNCHANGED

47.7 Office parameters (OP)

47.7.1 New/modified office parameters

No office parameters are affected by this feature.

47.8 Service orders (SO)

No service orders are impacted by this feature.

47.9 Alarms (AL)

No new alarms are created or changed by this feature.

47.9.1 New/modified directories

This feature will have no impact on directories.

47.10 Command interface (CI)

47.10.1 New/modified commands

One command will be modified by this feature: QSCONN. This command provides the ability to query the special connections datafilled on the switch.

The modification will be to add the SPM peripheral type to those recognized by the command.

Note that the functionality provided by QSCONN to query table SPECCONN using a C-side port will not be supported for the SPM. There are two reasons for this:

- The SPM connects to the ENET via four DS512 links rather than the DS30 links used by XPMs and therefore a query on a link could potentially produce up to 512 entries.

- The SPM will always be directly connected to the ENET. There will never be an interposing peripheral as there can be for XPMs, so having the ability to query based on the C-side link has little relevance.

Table 4 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
QSCONN	CHANGED	-	-	

47.11 Operational measurements (OM)

47.11.1 New/modified OM groups

This feature has no impact on operational measurements.

47.12 AMA/Billing information (AM)

47.12.1 New/changed AMA/billing information

This feature has no impact on AMA/billing information.

47.13 Glossary

Term	Description
CEM	common equipment module
CM	computing module
CCS7	common channel signalling no. 7
DMS	digital multiplex switch
DS1	digital signal level 1
DS30	32 channel message-signalling link implemented in the DMS SuperNode
DS512	fibre optic transmission link implemented in the DMS SuperNode
DTA	digital test access
DTC	digital trunk controller
E1	2.048 Mbit/s rate used by European CEPT carriers
ENET	enhanced network (DMS switch component)
ISLC	ISDN line card
LGC	line group controller
LIU	link interface unit - terminates CCS7 signalling links
MMP	multi market platform - software release now used in the international market (formerly DMS-100E).
OC-3	optical carrier 3
PCM30	pulse code modulation 30
PDTC	PCM30 digital trunk controller
PLGC	PCM30 line group controller
PM	peripheral module
QSCONN	Utility available at the user interface to the DMS to query the special connections data.
RM	resource module
SMU	subscriber module urban
SPM	Synergy/Spectrum peripheral module
STM-1	synchronous transfer mode 1

T1	1.544 Mbit/s rate; a North American voice/data standard
TDM	time division multiplexing
XPM	extended peripheral module

48: Functional description (FN)

48.1 Feature name

DCS Services: Lines Prompt & Collect

48.2 Description

This feature verifies both broadcast and custom announcements used as digit collection prompts on a Communication Server 2000 with both Universal Audio Server (UAS) and DTM (Interworking SPM required, also). Specifically, the following features are supported.

- Customer Originated Trace Two-Level activation (COT Two Level)
- Automatic Recall Two-Level with DN voiceback (ARDDN, AR Two-Level).
- Call Forward Remote Access (CFRA)
- Call Blocking with Programmable PIN(SACB with SPP)
- Screening List Editing for Selective Call Forwarding (SCF), Selective Call Rejection (SCRJ), Selective Call Acceptance (SCA), Distinctive Ringing & Call Waiting (DRCW)

The Arris Packetport, Mediatrix Analog Station Gateway and the UEMG are supported gateways for this release.

48.3 Hardware requirements

The prompt and collect functionality requires:

- Universal Audio Server (UAS) for the IP network configuration.
- DRAM/EDRAM on an MTM, with an Interworking MSP for the ATM/IP network configuration.
- Arris Packetport or Mediatrix Analog Station Gateway for IP network.
- UEMG for ATM network configuration.

48.4 Limitations and restrictions

This feature only supports Prompt & Collect functionality on the (line) gateways mentioned above.

48.5 Interactions

None.

48.6 Logs (LG)

Not Applicable.

48.7 Data schema (DS)

The following are suggested phrases for use in the features enabled by this activity. Suggested datafill for tables CLLI, ANNS, ANNMEMS, DRMUSERS and ANNAUDID is also provided. This datafill is only applicable for an IP-network configuration with a universal audio server.

48.7.1 List of suggested announcement phrases

Table 1 List of Common Announcement Phrases

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
1	BLDN	"We're sorry, your call cannot be completed as dialed. Please check the number and dial again or call your operator for assistance."		640
2	COT CONF	"You have successfully traced your last incoming call. Please contact your operating company for further assistance."	CENG9	546
3	COT FAIL	"A complete trace cannot be generated for your last incoming call. Please contact your operating company for further assistance."	CENG14	547
4	ACRJ Call Rejection	"Your call has been properly delivered, but the party you are trying to reach is not accepting calls from callers who do not allow delivery of their telephone number. Please hang up, do not block delivery of your number, and call again."		548/569
5	SCA Call Rejection	"Your call has been properly delivered, but the number you are calling has its Selective Call Acceptance service activated. Calls from your number are not being accepted by the called party."		549
6	SCRJ Call Rejection	"Your call has been properly delivered, but the number you are calling has its Selective Call Rejection service activated. Calls from your number are not being accepted by the called party."		550

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
7	FNAL	"You have dialed a service to which you do not subscribe. For more information, please contact your local phone center."		551
8	COT FNAL	"You have dialed the Customer Originated Trace feature. If you wish to subscribe to this service, please contact your local phone center."		552
9	ACB FNAL	"You have dialed the Automatic Call Back feature. If you wish to subscribe to this service, please contact your local phone center."		553
10	AR FNAL	"You have dialed the Automatic Recall feature. If you wish to subscribe to this service, please contact your local phone center."		554
11	SCA FNAL	"You have dialed the Selective Call Acceptance feature. If you wish to subscribe to this service, please contact your local phone center."		555
12	SCRJ FNAL	"You have dialed the Selective Call Rejection feature. If you wish to subscribe to this service, please contact your local phone center."		556
13	SCF FNAL	"You have dialed the Selective Call Forwarding feature. If you wish to subscribe to this service, please contact your local phone center."		557
14	DRCW FNAL	"You have dialed the Distinctive Ringing Call Waiting feature. If you wish to subscribe to this service, please contact your local phone center."		558
15	CND FNAL	"You have dialed the Calling Number Delivery feature. If you wish to subscribe to this service, please contact your local phone center."		559
16	CNAMD FNAL	"You have dialed the Calling Name Delivery feature. If you wish to subscribe to this service, please contact your local phone center."		560
17	DDN FNAL	"You have dialed the Dialable Directory Number feature. If you wish to subscribe to this service, please contact your local phone center."		561
18	CNDB FNAL	"You have dialed the Calling Number Display Blocking feature. If you wish to subscribe to this service, please contact your local phone center."		562
19	CNAB FNAL	"You have dialed the Calling Name Display Blocking feature. If you wish to subscribe to this service, please contact your local phone center."		563
20	ACRJ FNAL	"You have dialed the Anonymous Caller Rejection feature. If you wish to subscribe to this service, please contact your local phone center."		564

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
21	ACRJ Activation	Anonymous calls will no longer be sent to your telephone.	ACRJACT	567
22	ACRJ Deactivation	Anonymous calls will now be sent to your telephone.	ACRJDEACT	568
23	CND activation	Caller ID will now be displayed on your set.	CENG30	570
24	CND deactivation	Caller ID will no longer be display on your telephone.	CENG31	571
25	CFRA 1	Please enter the _____ digit telephone number to forward, followed by your PIN number.	CFRAEDNPIN1	1210 (1451)
26	CFRA 2	Please enter a code to activate or deactivate call forwarding	CFRAEFAC	1211
27	CFRA 3	Calls to your number will be forwarded to another number. Please enter this number now.	CFRAEFWDN	1212
28	CFRA 4 (a)	Calls to your telephone will be forwarded to _____.	CFRAEFDW1	1213
29	CFRA 4(b)	To confirm this, press 1; to forward to a different number, press 2; to cancel this, hang up now.	CFRAEFDW2	1214
30	CFRA 5(a)	Your calls cannot be forwarded to _____.	CFRAEERR1	1215
31	CFRA 5(b)	Please enter another number now.	CFRAEERR2	1216
32	CFRA 6	Your calls cannot be forwarded to _____.	CFRAEERR1	(same as CFRA 5 (b))
33	SPP Initial Use	Access to this feature is prohibited until you change your PIN number. The PIN number change must be made from your own phone.	CFRAFRST	1217
34	SPP 1	"Please enter the feature access code for the PIN you wish to change."	SPPANNC1	1218
35	SPP 2	"Please enter your PIN number."	SPPANNC2	1219
36	SPP 3	"Please enter your new PIN number."	SPPANNC3	1220
37	SPP 4	"Please re-enter your new PIN number."	SPPANNC4	1221
38	SPP 5	"The new PIN number has been saved"	SPPANNC5	1222
39	SPP 6	"You have entered an incorrect PIN number."	SPPANNC6	1223
40	SPP 7	"You have exceeded the number of retries. Please hang up and try again."	SPPANNC7	1224
41	SPP 8	"Call Forwarding Remote Access."	SPPANNC8	1225
42	SPP 9	"Subscriber Activated Call Blocking"	SPPANNC9	1226

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
43	COTPRMT1	"This is the Customer Originated Trace feature. To activate a trace of your last incoming call, dial one now. Otherwise, please hangup."	COTPRMPT1	578
44	COTPRMTN	"You have not entered the proper digit. To activate a trace of your last incoming call, dial one now. Otherwise, please hang up."	COTPRMPT2	579
45	AR Long Distance Indicator	"This was a long distance call."	ENGLDI	1205
46	AR Error	"You have not entered the correct digit."	ARERROR	1204
47	AR private dn	"The last number that called your line cannot be given out."	CENG12	1203
48	AR unknown dn	"We're sorry, the last number that called your line is not known Please hang up now."	CENG7	581
49	AR deactivate	You have cancelled all of your requests to return calls. Please hang up now."	CENG6	1206
50	AR2 (a)	"The last number that called your line was ____ (DN) ____."	CENG16	582/575
51	AR2 (b)	"The call was received on ____ (DATETIME) ____."	CENG22	1207
52	AR2 (c)	"To call this number, enter one; otherwise, hang up now."	CENG17	583
53	AR2 activation	"The line is busy. You will be notified by special ringing when the line is free. Please hang up now."	CENG10	584
54	AR/ACB short-term denial	"We're sorry, the number cannot be reached now by this method. Please hang up and try again later."	CENG11	585
55	AR long-term denial	"We're sorry, the number cannot be reached now by this method. Please hang up now."	CENG8	586
56	ACB conf	You have activated Automatic Call Back.	CENG2	1208
57	AR1 cofn	You have activated Automatic Recall.	CENG5	572
58	AR1 conf(b)	You will be connected to your party now.		573
59	ACB activate	The last number you have called is busy. You will be notified by a special ringing when the line is free. Please hang up now.	CENG7	574
60	ACB long-term denial	We're sorry, the last number that you called cannot be given out. Please consult the introductory pages of your telephone directory for further instructions. Please hang up now.		576

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
61	ACB Deactivation	"You have canceled all of your requests to call someone back. Please hang up now."	CENG3	1209
62	ACB Requeueing	"The line was free, but it has just become busy again. You will be notified by special ringing when the line is free. Please hang up now."	CENG4	565
63	AR Requeueing	"The party you have automatically recalled is busy. The Automatic recall request will be requeued."	ARREQUEUE	566
64	SACB 1	"Please enter your PIN"	SACBANNC1	1227
65	SACB 2	"The Subscriber Call Blocking feature is activated. To override this restriction, please enter your PIN number."	SACBANNC2	1228
66	SACB 3	"The Subscriber Call Blocking feature has been activated."	SACBANNC3	1229
67	SACB 4	"The Subscriber Call Blocking feature has been deactivated."	SACBANNC4	1230
68	SACB 5	"You have entered an incorrect PIN number."	SACBANNC5	1231
69	SACB 6	"Please re-enter your PIN"	SACBANNC6	1232
70	SACB 7	"You have exceeded the number of retries. Please hang up and try again."	SACBANNC7	1233
71	SLE 4	Prompt Tone.	SLEENG004	1234
72	SLE 1	After hearing an entry, you may dial 0, 7 to delete it and continue reviewing your list.	SLEENG001	1235
73	SLE 7	If this number is correct, dial 1. If this number is incorrect, dial 0.	SLEENG007	1236
74	SLE 8	There is one entry on your list, including one private entry.	SLEENG008	1237
75	SLE 9-19, 210-215	The number of entries on your list is: _____ The number of private entries on your list is: _____.	SLEENG009 SLEENG010	1238(1309,1310)
76	SLE 20	The number you have dialed is not permitted.	SLEENG020	1239
77	SLE 21	Next,	SLEENG021	1240
78	SLE 22	Next, extension	SLEENG022	1241
79	SLE 24	Please continue, or dial 0 for instructions.	SLEENG024	1242
80	SLE 25	Please continue, dial 0 for instructions or hang up.	SLEENG025	1243
81	SLE 26	Please dial now.	SLEENG026	1244
82	SLE29	Please start again, or dial 0 for instructions.	SLEENG029	1245

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
83	SLE 30	Please start again, dial 0 for instructions or hang up.	SLEENG030	1246
84	SLE 31	Please try other options or dial 0 for instructions.	SLEENG031	1247
85	SLE 32	Repeating.	SLEENG032	1248
86	SLE 33	Repeating, extension	SLEENG033	1249
87	SLE 34	The number is already on your list as a private entry.	SLEENG034	1250
88	SLE35	The number you have dialed,	SLEENG035	1251
89	SLE 36	The number you have added is _____.	SLEENG036	1252
90	SLE 37	The number you have added is extension _____.	SLEENG037	1253
91	SLE 38	The number you have added is a private entry.	SLEENG038	1254
92	SLE 39	The number you have removed is _____.	SLEENG039	1255
93	SLE 40/83	The number you have removed is extension _____.	SLEENG040	1256
94	SLE 41	The number your have removed is a private entry.	SLEENG041	1257
95	SLE 42	The number to be removed is not on your list.	SLEENG042	1258
96	SLE 43-44	There is one entry on your list.	SLEENG044	1259
97	SLE 45-66	There number of entries on your list is: _____	SLEENG045	1260(13 09)
98	SLE 67	There is one private entry on your list.	SLEENG067	1261
99	SLE 68-78	There number of private entries on your list is _____.	SLEENG068	1262(13 10)
100	SLE79	There are no entries on your list.	SLEENG079	1263
101	SLE 80	There are no more entries on your list.	SLEENG080	1264
102	SLE 81	There are no more private entries on your list.	SLEENG081	1265
103	SLE 82	The first entry on your list is _____.	SLEENG082	1266
104	SLE 83	The first entry on your list is extension	SLEENG083	1267
105	SLE 84	This is the end of your list.	SLEENG084	1268
106	SLE 85	This is the end of your list. Your list is now empty.	SLEENG085	1269
107	SLE 86	This number is already on your list.	SLEENG086	1270
108	SLE 87	This number is already on your list. Extension	SLEENG087	1271

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
109	SLE 91	To turn on this service, you must add an entry to your list.	SLEENG091	1272
110	SLE 94	To add an entry, dial 1, 2.	SLEENG094	1273
111	SLE 96	To add an entry, please press the number sign key.	SLEENG096	1274
112	SLE 105	We are sorry. Please try adding the number again in a few minutes.	SLEENG105	1275
113	SLE 106	We are sorry. The number you have dialed is not available with this service.	SLEENG106	1276
114	SLE 107	We are sorry. The number you have dialed is incorrect.	SLEENG107	1277
115	SLE 108	We are sorry. The number of the last calling party is not available.	SLEENG108	1278
116	SLE 109	We are sorry. The digits dialed are not a valid command.	SLEENG109	1279
117	SLE 110	We are sorry. There are no entries on your list.	SLEENG110	1280
118	SLE 111	We are sorry. This service is being interrupted. Please hang up and try again in a few minutes.	SLEENG111	1281
119	SLE 114	We are sorry. You must dial a telephone number after dialing the number sign key or the star key.	SLEENG114	1282
120	SLE 115	We are sorry. You must dial a telephone number after dialing 1, 2, or 1,1.	SLEENG115	1283
121	SLE 116	We are sorry. Your list is full. You must remove an entry before adding another.	SLEENG116	1284
122	SLE 117	We are sorry, please hang up now, consult your written instructions, and try again later.	SLEENG117	1285
123	SLE 118	You may dial during the announcements for faster service. When you are finished, hang up.	SLEENG118	1286
124	SLE 119	You have cleared the digits dialed.	SLEENG119	1287
125	SLE 120	Your calls will be forwarded to _____.	SLEENG120	1288
126	SLE 123	Your Selective Call Rejection service is on.	SLEENG123	1289
127	SLE 124	Your Selective Call Rejection service is off.	SLEENG124	1290
128	SLE 127	Your Selective Call Forwarding service is now on.	SLEENG127	1291
129	SLE 128	Your Selective Call Forwarding service is now off.	SLEENG128	1292
130	SLE 129	Your Distinctive Ringing Call Waiting service is now on.	SLEENG129	1293

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
131	SLE 130	Your Distinctive Ringing Call Waiting service is now off.	SLEENG130	1294
132	SLE 139	To reject the last calling party, press the number sign key, dial 0, 1 and then press the number sign key again.	SLEENG139	1295
133	SLE 140	To reject the last calling party, dial 1, 2 and then dial 0, 1.	SLEENG140	1296
134	SLE 141	To turn this service on, dial 3, to add an entry, press the number sign key, to remove one or more entries, press the star key, to hear the entries on your list, dial 1, to hear these instructions repeated, dial 0, Please dial now.	SLEENG141	1297
135	SLE 142	To turn this service off, dial 3, to add an entry, press the number sign key, to remove one or more entries, press the star key, to hear the entries on your list, dial 1, to hear these instructions repeated, dial 0, Please dial now.	SLEENG142	1298
136	SLE 143	To turn this service on, dial 3, to add an entry, dial 1, 2, to remove one or more entries, dial 1,1, to hear the entries on your list, dial 1, to hear these instructions repeated, dial 0, Please dial now.	SLEENG143	1299
137	SLE 144	To turn this service off, dial 3, to add an entry, dial 1, 2, to remove one or more entries, dial 1, 1, to hear the entries on your list, dial 1, to hear these instructions repeated, dial 0, Please dial now.	SLEENG144	1300
138	SLE 146	Please dial the number to which you want your calls forwarded, then press the number sign key. Please dial now.	SLEENG146	1301
139	SLE 147	Please dial the number to which you want your calls forwarded. Please dial now.	SLEENG147	1302
140	SLE 168	Dial the number to be added, then press the number sign key again. To add the last calling party, dial 0, 1 then press the number sign key again. Please dial now.	SLEENG168	1303
141	SLE 169	Dial the number to be added. To add the last calling party, dial 0, 1. Please dial now.	SLEENG169	1304
142	SLE 170	Dial the number to be removed, then press the star key again. To remove all entries, dial 0, 8 then press the star key again, to remove just the private entries, dial 0, 9 then press the star key again	SLEENG170	1305

Ann #	Announcement "Name"	Announcement Phrase	DRMUSERS PHRASE	UAS ID
143	SLE 171	Dial the number to be removed. To remove all entries, dial 0, 8, to remove just the private entries, dial 0, 9, to hear these instructions repeated, dial 0. Please dial now.	SLEENG171	1306
144	SLE 229	Your Avoid-a-Call service is now on. (SCA)	SLEENG229	1307
145	SLE 230	Your Avoid-a-Call service is now off. (SCA)	SLEENG230	1308

48.7.2 Suggested Announcement Datafill

Table 1 Table CLLI Suggested datafill

SACBANN	100	30	SACB_Announcement
SPPANN	101	30	SPP_Announcement
CFRAANN	106	30	CFRA_Announcement
CLASSANN	105	30	Class Announcements
SLEENG1	102	30	SLE_Announcements
SLEENG2	103	30	SLE_Announcements
SLEENG3	104	30	SLE_Announcements

Table 2 Table ANNS Suggested datafill

SACBANN	SACB	30	1	0	1
SPPANN	SPP	30	1	0	1
CFRAANN	CFRA	30	1	0	1
SLEENG1	SLEENG	30	1	0	1
SLEENG2	SLEENG	30	1	0	1
SLEENG3	SLEENG	30	1	0	1
CLASSANN	CLASS	30	1	0	1

Table 3 Table Annmems Suggested Datafill

SACBANN	1	AUD	AUD	7	1
SPPANNC	1	AUD	AUD	7	2
CFRAANN	1	AUD	AUD	7	7
SLEENG1	1	AUD	AUD	7	3
SLEENG2	1	AUD	AUD	7	4

Table 3 Table Annmems Suggested Datafill

SLEENG3	1	AUD	AUD	7	5
CLASSANN	1	AUD	AUD	7	6

Table 4 Table DRMUSERS Suggested Datafill

SACBANN	1	SACBANNC1	\$			
SACBANN	2	SACBANNC2	\$			
SACBANN	3	SACBANNC3	\$			
SACBANN	4	SACBANNC4	\$			
SACBANN	5	SACBANNC5	\$			
SACBANN	6	SACBANNC6	\$			
SACBANN	7	SACBANNC7	\$			
SPPANNC	1	SPPANNC1	\$			
SPPANNC	2	SPPANNC2	\$			
SPPANNC	3	SPPANNC3	\$			
SPPANNC	4	SPPANNC4	\$			
SPPANNC	5	SPPANNC5	\$			
SPPANNC	6	SPPANNC6	\$			
SPPANNC	8	SPPANNC8	\$			
SPPANNC	9	SPPANNC9	\$			
CFRAANN	1	LANGUAGE1	CFRAEDNPIN1	CFRAEDIGITS	CFRAEDNPIN2	\$
CFRAANN	2	LANGUAGE1	CFRAEFAC	\$		
CFRAANN	3	LANGUAGE1	CFRAEFWDN	\$		
CFRAANN	4	LANGUAGE1	CFRAEFWD1	ENGWARDNF	CFRAEFWD2	\$
CFRAANN	5	LANGUAGE1	CFRAEERR1	ENGWARDNF	CFRAEERR2	\$
CFRAANN	6	LANGUAGE1	CFRAEERR1	ENGWARDNF	\$	
CFRAANN	7	CFRAFRST	CFRAFRST	\$		
CLASSANN	1	CENG30	\$			
CLASSANN	2	CENG31	\$			
CLASSANN	3	CENG5	\$			
CLASSANN	4	CENG11	\$			
CLASSANN	5	CENG8	\$			
CLASSANN	6	CENG10	CENG4	CENG10	\$	

Table 4 Table DRMUSERS Suggested Datafill

CLASSANN	7	CENG6	\$				
CLASSANN	8	CENG12	CENG22	ENGDATIME	CENG17	\$	
CLASSANN	9	CENG7	CENG8	\$			
CLASSANN	10	CENG16	ENGVARDNF	CENG22	ENGDATIME	CENG17	\$
CLASSANN	11	CENG10	CENG5	CENG10	\$		
CLASSANN	12	SILENCE	CENG11	\$			
CLASSANN	13	SILENCE	CENG8	\$			
CLASSANN	14	CENG10	CENG2	CENG10	\$		
CLASSANN	15	CENG11	\$				
CLASSANN	16	CENG8	\$				
CLASSANN	17	CENG3	\$				
CLASSANN	18	ACRJACT	ACRJINFO	\$			
CLASSANN	19	ACRJDEACT	ACRJINFO	\$			
CLASSANN	20	SILENCE	CENG9	\$			
CLASSANN	21	SILENCE	CENG14				
SLEENG1	14	INITSERV	PAUSE2	\$			
SLEENG1	15	LISTEDIT	PROMPT	\$			
SLEENG1	16	LISTADD	PROMPT	\$			
SLEENG1	17	LISTDEL	PROMPT	\$			
SLEENG1	19	PROGRDN	PROMPT	\$			
SLEENG1	20	FORCEADD	PAUSE1	ADDENTRY	PROMPT	\$	
SLEENG1	21	FORCEADD	PAUSE1	ADDENTRY	PROMPT	\$	
SLEENG1	23	CANCELLED	PAUSE2	RESTART	PROMPT	\$	
SLEENG1	24	ERASED	PAUSE4	RESTART	PROMPT	\$	
SLEENG1	26	ADDPRIV	PAUSE4	CONTEXIT	PROMPT	\$	
SLEENG1	28	DELPRIV	PAUSE4	CONTEXIT	PROMPT	\$	
SLEENG1	29	ALLDEL	PAUSE4	CONTEXIT	PROMPT	\$	
SLEENG1	30	PRIVDEL	PAUSE4	CONTEXIT	PROMPT	\$	
SLEENG1	32	PAUSE0	\$				
SLEENG1	33	INVCMD	PAUSE2	\$			
SLEENG1	34	NOLASTDN	PAUSE4	RESTART	PROMPT	\$	

Table 4 Table DRMUSERS Suggested Datafill

|	SLEENG1	35	INVDIGS	PAUSE4	RESTART	PROMPT	\$
|	SLEENG1	36	ENTERDN	PAUSE4	RESTART	PROMPT	\$
|	SLEENG1	38	PRIVPRES	PAUSE4	CONTEXIT	PROMPT	\$
|	SLEENG1	39	ABSENT	PAUSE4	RESTARTX	PROMPT	\$
|	SLEENG1	40	ILLEGAL	PAUSE4	RESTART	PROMPT	\$
|	SLEENG1	41	FULL	PAUSE4	CONTINUE	PROMPT	\$
|	SLEENG1	42	EMPTY	PAUSE4	OTHEROPT	PROMPT	\$
|	SLEENG1	43	NOPRIV	PAUSE2	CONTEXIT	PROMPT	\$
|	SLEENG1	48	SERVINTR	\$			
|	SLEENG1	49	VALFAIL	PAUSE4	CONTINUE	PROMPT	\$
|	SLEENG1	50	LISTEDIT	PROMPT	\$		
|	SLEENG1	51	LISTADD	PROMPT	\$		
|	SLEENG1	52	LISTDEL	PROMPT	\$		
|	SLEENG1	54	PROGRDN	PROMPT	\$		
|	SLEENG1	55	FORCEADD	PAUSE2	ADDENTRY	PROMPT	\$
|	SLEENG1	56	LISTEDIT	PROMPT	\$		
|	SLEENG1	57	LISTADD	PROMPT	\$		
|	SLEENG1	58	LISTDEL	PROMPT	\$		
|	SLEENG1	60	PROGRDN	PROMPT	\$		
|	SLEENG1	61	FORCEADD	PAUSE2	ADDENTRY	PROMPT	\$
|	SLEENG2	1	STATINFO	\$			
|	SLEENG2	2	STATINFO	PAUSE4	CONTEXIT	PROMPT	\$
|	SLEENG2	3	LISTINFO	\$			
|	SLEENG2	4	FIRSTDN	DNEND	\$		
|	SLEENG2	5	NEXTDN	DNEND	\$		
|	SLEENG2	6	PREVDN	DNEND	\$		
|	SLEENG2	7	CURRDN	DNEND	\$		
|	SLEENG2	8	PUBDNWARN	DNEND	\$		
|	SLEENG2	9	SILENCE	PRIVDNWARN	\$		
|	SLEENG2	10	SILENCE	ALLWARN	\$		
|	SLEENG2	11	SILENCE	PRIVWARN	\$		

Table 4 Table DRMUSERS Suggested Datafill

SLEENG2	12	REMDN	\$				
SLEENG2	13	STATINFO	LISTINFO	INITSLE	PAUSE3	\$	
SLEENG2	18	LISTREV	PAUSE1	\$			
SLEENG2	22	CONFIRM	PROMPT	\$			
SLEENG2	25	ADDED	DNEND	PAUSE4	CONTEXTIT	PROMPT	\$
SLEENG2	27	DELETED	DNEND	PAUSE4	CONTEXTIT	PROMPT	\$
SLEENG2	31	ENDOFLIST	PAUSE1	\$			
SLEENG2	37	PRESENT	DNEND	PAUSE4	CONTEXTIT	PROMPT	\$
SLEENG2	44	LISTINFO	PAUSE4	OTHEROPT	PROMPT	\$	
SLEENG2	45	NOPREVDN	PAUSE2	\$			
SLEENG2	46	DIALED	DNMID	NOTPERM	PAUSE2	\$	
SLEENG2	47	MANUALS	\$				
SLEENG2	53	LISTREV	PROMPT	\$			
SLEENG2	59	LISTREV	\$				
SLEENG3	62	LISTINFO	\$				
SLEENG3	63	STATINFO	LISTINFO	INITSLE	PAUSE3	\$	
SLEENG3	64	LISTINFO	PAUSE4	OTHEROPT	PROMPT	\$	

Table 2 Table ANNAUDID Suggested Datafill

PHRASE	UAS ID
CENG9	546
CENG14	547
ACRJACT	567
ACRJDEACT	568
CENG30	570
CENG31	571
CFRAEDNPIN1	1210
CFRAEFAC	1211
CFRAEFWDN	1212
CFRAEFDW1	1213

PHRASE	UAS ID
CFRAEFDW2	1214
CFRAEERR1	1215
CFRAEERR2	1216
CFRAFRST	1217
SPPANNC1	1218
SPPANNC2	1219
SPPANNC3	1220
SPPANNC4	1221
SPPANNC5	1222
SPPANNC6	1223
SPPANNC7	1224
SPPANNC8	1225
SPPANNC9	1226
COTPRMPT1	578
COTPRMPT2	579
ENGLDI	1205
ARERROR	1204
CENG12	1203
CENG7	581
CENG6	1206
CENG16	582/575
CENG22	1207
CENG17	583
CENG10	584
CENG11	585
CENG8	586
CENG2	1208
CENG5	572
CENG7	574
CENG3	1209
CENG4	565

PHRASE	UAS ID
ARREQUEUE	566
SACBANNC1	1227
SACBANNC2	1228
SACBANNC3	1229
SACBANNC4	1230
SACBANNC5	1231
SACBANNC6	1232
SACBANNC7	1233
SLEENG004	1234
SLEENG001	1235
SLEENG007	1236
SLEENG008	1237
SLEENG009	1238
SLEENG020	1239
SLEENG021	1240
SLEENG022	1241
SLEENG024	1242
SLEENG025	1243
SLEENG026	1244
SLEENG029	1245
SLEENG030	1246
SLEENG031	1247
SLEENG032	1248
SLEENG033	1249
SLEENG034	1250
SLEENG035	1251
SLEENG036	1252
SLEENG037	1253
SLEENG038	1254
SLEENG039	1255
SLEENG040	1256

PHRASE	UAS ID
SLEENG041	1257
SLEENG042	1258
SLEENG044	1259
SLEENG045	1260
SLEENG067	1261
SLEENG068	1262
SLEENG079	1263
SLEENG080	1264
SLEENG081	1265
SLEENG082	1266
SLEENG083	1267
SLEENG084	1268
SLEENG085	1269
SLEENG086	1270
SLEENG087	1271
SLEENG091	1272
SLEENG094	1273
SLEENG096	1274
SLEENG105	1275
SLEENG106	1276
SLEENG107	1277
SLEENG108	1278
SLEENG109	1279
SLEENG110	1280
SLEENG111	1281
SLEENG114	1282
SLEENG115	1283
SLEENG116	1284
SLEENG117	1285
SLEENG118	1286
SLEENG119	1287

PHRASE	UAS ID
SLEENG120	1288
SLEENG123	1289
SLEENG124	1290
SLEENG127	1291
SLEENG128	1292
SLEENG129	1293
SLEENG130	1294
SLEENG139	1295
SLEENG140	1296
SLEENG141	1297
SLEENG142	1298
SLEENG143	1299
SLEENG144	1300
SLEENG146	1301
SLEENG147	1302
SLEENG168	1303
SLEENG169	1304
SLEENG170	1305
SLEENG171	1306
SLEENG229	1307
SLEENG230	1308

48.8 Office parameters (OP)

Not Applicable.

48.9 Service orders (SO)

Not Applicable.

48.10 Alarms (AL)

Not Applicable.

48.11 Command interface (CI)

Not Applicable.

48.12 Operational measurements (OM)

Not Applicable.

48.13 AMA/Billing information (AM)

Not Applicable.

48.14 Software optionality control (SOC)

Not Applicable.

48.15 Glossary

Term	Description
New term	definition

48.16 References

49: Functional description (FN)

49.1 Feature name

TOPS15 CM Enhancements

49.2 Description

This feature provides the ability for TOPS to interwork with an external billing platform, such that billing validation is not performed by TOPS.

To support this interworking, this feature provides the following capabilities:

- ISUP support for the following:
 - Generic Digits Parameter, Correlation ID Type of Digits
 - Generic Address Parameter, Dialed Number Type of Address
- Open Position Protocol (OPP) updates to:
 - inform the position of the Correlation ID that was received in the Generic Digits Parameter from the preceding office
 - allow OPP to specify whether or not billing validation should be done on calls
 - allow OPP to send updated Entry Code information to the switch. The Entry Code is a field in the Operator Information¹ parameter in an RLT FAR message.

This feature also provides the following:

- Optional branding based on CIC or SPID when both are present on a carrier call.
- Facility based control of display of SPID at operator position for carrier calls.
- Optional generation of Module Code 315 for recording of dialed number signaled in GAP parameter.

¹The Operator Information parameter is supported in RLT_FAR versions 1 and 2.

49.2.1 ISUP Generic Digits Parameter (GDP)

Support for the following Type of Digits is added by this feature.

- Correlation ID (value 30 or #1E)

When a GDP parameter with a Type of Digits of Correlation ID is received by the TOPS switch, the Correlation ID digits will be forwarded to the OPP-compatible operator position.

49.2.2 ISUP Generic Address Parameter (GAP)

Support for the following Type of Address is added by this feature.

- Dialed Number (value 0)

When a GAP parameter with a Type of Address of Dialed Number is received by the TOPS switch and the TOPAMAOP parameter RECORD_DNIS_IN_MODULE_315 is turned on, then the Dialed Number received in the GAP will be recorded in a 315 module and appended to the billing record for the call.

If parameter RECORD_DNIS_IN_MODULE_315 is turned off, then the GAP is ignored.

49.2.3 OPP Changes

OPP changes are made to:

- Allow the switch to send the Correlation ID digits received in the IAM GDP message to the operator position
- Allow the position to inform the switch if billing validation should not be done by the switch.
- Allow the position to send Entry Code digits to the switch. Entry Code is a three-digit value that is passed to the preceding switch as part of the Operator Information¹ parameter in an RLT FAR message. The Entry Code provides information on how the call was billed.

Complete details on the OPP changes can be found in the *Open Position Protocol (Q214-1)* document.

49.2.4 Call processing

49.2.4.1 Generic Digits Parameter

When an ISUP GDP with Type of Digits equal to Correlation ID (value 30) is received in the incoming IAM, the Correlation ID digits will be sent to the OPP-compatible position. Further use of the Correlation ID digits is defined by the position application.

¹The Operator Information parameter is supported in RLT_FAR versions 1 and 2.

Note that the ISUP GDP parameter is not signalled forward to the terminating office.

If the ISUP GPD with Correlation ID digits is signalled on a call that is tandemed through the TOPS office, the ISUP GPD will not be forwarded.

49.2.4.2 Billing Validation

When OPP sends a Billing Validation value of 'Do Not Validate', the switch will **NOT** attempt to do any billing validation. That means that **NO** LIDB queries will be made for collect, third-number, or calling card billed calls. Tables CCVINFO/CCVPARMS and BNSINFO/BNSPARMS are not accessed. The billed number will merely be treated as valid.

In addition, any type of switch-based validation done for any of the existing billing types will be bypassed. This includes, but is not limited to, the following:

- Table HOTLIST
- Table DOMBILL
- Table OVSBILL
- Table RESTBIL
- Table DARSTBIL
- SNTPDRST in table ISUPTRK

For more details, refer to Section 2.5.

Note that once the position has requested that switch-based billing validation be turned off on the call, it remains in effect for the duration of the call; i.e., it cannot be turned back on for that call. The “no switch validation” remain in affect even when a call is transferred from one operator to another.

49.2.4.3 Entry Code

The ISUP Operator Information (OI) parameter includes a field called Entry Code. The Entry Code field is a three-digit field that contains information on how the call was billed. The OI Parameter is part of the FAR message, which is sent to the preceding office when an RLT request is made. Normally, the DMS determines the Entry Code based on the billing method and class charge (for example, person collect, station paid, etc.) of the call. This feature allows the OPP position to send an Entry Code value to the switch to be recorded in the OI parameter.

When the switch receives a valid¹ Entry Code value from OPP, it will **not** try to determine one based on the billing method and class charge, and will merely pass the value received from OPP back in the FAR message.

Note that the entry code from OPP is optional. If OPP does not send an entry code, then existing functionality with respect to entry code value applies; otherwise, the entry code received from OPP will be used, and sent in the OI. The switch will not do any type of validation on the entry code received from OPP. The switch will merely pass it along to the preceding office as is.

If the switch received multiple entry code values from the position, then the last one sent will override the previous ones sent and will be signalled in the OI.

Additional, the OI parameter, consequently Entry Code, is only supported for RLT_FAR versions 1 and 2 as datafilled in table ISUPTRK.

49.2.5 Branding

Today, if both a SPID and a CIC are associated with a carrier call, then the CIC will be used for front-end branding . This feature allows the operating company to specify on a trunk group basis whether SPID or CIC should be used to brand a carrier call when both are present.

This functionality is activated via field BRANDCHC in table ISUPTRK. When BRANDCHC is set to N, existing functionality remains unchanged. When BRANDCHC is set to Y, then the operating company will be prompted to specify whether **carrier calls**² should be branded based on CIC or SPID.

When both CIC and SPID are present on the call, the BRANDCHC datafill will determine if the brand should be based on the CIC or the SPID. This functionality applies regardless of how the SPID and/or CIC were obtained; i.e., datafilled or signalled.

This functionality is only supported for ISUP trunks.

BRANDCHC only impacts front-end branding. Any further processing on the call remains unchanged from what occurs today when both SPID and CIC are present.

If the operating company chooses to brand carrier calls based on SPID and the SPID associated with the call is the same as the office wide SPID defined in table TOPSPARM, parameter DEFAULT_SPID, then parameter BRAND_USING_DEFAULT_SPID will determine if the call will be branded based on SPID or not. If the parameter is set to Y, then the call will be branded

¹A valid entry code is anything in the range of 1 to 127. Zero (0) is defined as unknown and if this value is received from the position, then TOPS will try to determine the entry code based on the billing method and class charge of the call.

²Note that BRANDCHC does not apply to LEC calls.

based on the SPID. If the parameter is set to N, then the call will be branded based on the CIC. The following tables illustrates what will be used for branding based on the various fields and parameters.

Table 20 Branding matrix for BRANDCHC

BRANDCHC equals	Orig AO SPID present	CIC present	DEFAULT_SPID equals	BRAND_USING_DEFAULT_SPID equals	BRAND BASED ON
N	YES	YES	n/a	n/a	CIC
Y SPID	YES	YES	N	n/a	SPID
Y SPID	YES (CLEC)	YES	Y ILEC	n/a	SPID (CLEC)
Y SPID	YES (ILEC)	YES	Y ILEC	N	CIC
Y SPID	YES (ILEC)	YES	Y ILEC	Y	SPID (ILEC)
Y CIC	YES	YES	n/a	n/a	CIC

The following provides an illustration of table ISUPTRK datafill:

Figure 1 Table ISUPTRK

ANI2CLI	GRPKEY	CONNTYPE	LCANAME	BILLCD	CALLSRC	BRANDCHC
	RLT SNTPRST	DNLKUP	DISPLAY	ININTWRK		
ISUP2WIT		NONE	NLCA	TOPSBC	1	TERM
Y	NONE	N	0	NONE		Y SPID
T11161ISUP		NONE	NLCA	TOPSBC	1	ORIG
Y	NONE	N	Y	20	NONE	N

Additionally, the following SOC code must be ON to be able to brand based on SPID:

- UNBN0101 - Unbundling Base
- UNBN0103 - Branding by SPID

49.2.6 SPID Display

Table SPIDDB defines all of the valid SPIDs for the office. In addition, this table allows the operating company to associate a unique operator screen display per SPID. Normally, SPID processing doesn't apply to carrier calls since the CIC overrides. This feature allows the operating company to specify whether or not the SPID display (field SCRNDISP) in table SPIDDB should be sent to the operator position for carrier calls. This functionality is controlled via field DISPSPID in table TOPSTOPT on a per trunk group basis.

When DISPSPID is set to Y, the display from table SPIDDB is sent to the position in addition to the CIC.

Figure 2 Table TOPSTOPT

```

TABLE: TOPSTOPT
>list all
TOP
      GRPKEY          ORGAREA          DISPCLG  ADASERV          ADASANS
ANITOC LI  OLNSQRY  DCIBIDX  LNPCLGAM  XLASCHEM  SPIDPRC  TRKSPID
      BILLSCRN          ANIFSP L  MAXCONNS  DISPSPID
-----
      ISUP2WIT          N          Y          NONE          NA
Y      NONE          0          N          N          Y          N
      N          N          0          Y
      T11I61ISUP          N          Y          NONE          NA
N      NONE          0          N          N          Y          N
      N          N          0          N
    
```

Note that existing TOPSPARM parameter, OPP_ALWAYS_SEND_SPID_INFO does the same thing except on an office wide basis. Field DISPSPID allows the operating company to control this capability on a trunk group basis. The following table illustrates the parameter and field interactions:

Figure 3 Field and Parameter interactions for SPID display

Table TOPSTOPT field DISPSPID equals	Table TOPSPARM parameter OPP_ALWAYS_SEND_SPID_INFO equals	SPID display sent to position
N	N	NO
Y	N	YES
N	Y	YES
Y	Y	YES

49.3 Hardware requirements

Not applicable.

49.4 Limitations and restrictions

- Only a limited set of Type of Digits are supported for the GDP parameter. This feature only adds support for Correlation ID to the extent described in this document.
- Only a limited set of Type of Address' are supported for the GAP parameter. This feature only adds support for Dialed Number to the extent described in this document

- If the preceding switch refuses RLT, then the Entry Code value received from OPP will not be recorded on AMA.
- Optional front-end branding based on CIC or SPID when both are present on carrier calls is only supported for ISUP trunks.
- Once billing validation has been deactivated on the call, it remains in affect for the duration of the call. It cannot be toggled back on.
- This feature only address toll and assist calls. Directory Assistance (DA) is not covered by this feature.

49.5 Interactions

- Parameter SPECIAL_HANDLING_COLLECT in table TOPSPARM, when active, blocks billing from being changed to collect when a called party is already connected. When OPP class charges a call as collect and indicates that no billing validation be performed on the collect number, the class charge will be allowed regardless of the setting of SPECIAL_HANDLING_COLLECT.
- For Country Direct (CDIR) calls, table CDCTRY defines all of the valid country codes for CDIR calls and defines billing restrictions associated with those countries. The possible billing options for CDIR calls are calling card, third, and/or collect. When the OPP indicates that no billing validation should be done on any of these billing types, the CDCTRY checks for CDIR calls are bypassed.
- If the calling number is blocked (i.e., caller ID blocking is active for the calling number), then collect billing is not allowed. If OPP class charges the call as collect and indicates that no billing validation be done, then the collect class charge will be allowed.
- When OPP specifies that billing validation is not to be done, the following checks will be bypassed:
 - Sntpdrst (which blocks sent paid billing on the trunk group) in table ISUPTRK
 - Tables RESTBIL/DARSTBIL

Note: Table RESTBIL and DARSTBIL checks are bypassed when OPP sends a class charge request with no billing validation specified. However, tables RESTBIL and DARSTBIL are also accessed at call setup to determine station type and calling number restrictions for calls signalled with ANIID of 07 or if DNLKUP is set to Y. This feature makes no changes to setup call processing. If the operating company is not doing any switch based billing validations, then the incoming trunk group should be datafilled with DNLKUP set to N in ISUPTRK. However, calls signalled with an OLI of 07 (restricted) will attempt to query tables SPLDNID or TDBCLASS for restrictions. If the calling number is

not found in these tables, the calls are normally handled as ANI Fail (ANIF) call. To override this functionality, ensure that field ANIFSPL¹ in table TOPSTOPT be set to Y for the incoming trunk group.

- No LIDB query will be launched on calling card, collect, or third billing. This means that CCVINFO, CCVPARMS, BNSINFO, and BNSPARMS are bypassed.
- No format checks will be made on calling card numbers when OPP indicates that no billing validation should be done. This applies to all types of cards.
- If the carrier does not allow online rating (field PUBRATE/PRIVRATE in table TOPEACAR), then station/person paid billing will be blocked at the switch for public stations (hotel, coin, restricted). This is existing functionality and is not changed by this feature. It is recommended that these fields be set to Y; otherwise, station paid billing will be blocked from public stations.
- For overseas and domestic calls, tables OVSBILL and DOMBILL are bypassed when OPP indicates that no billing validation should be done.
- The Restriction for Wholesaling feature will not apply when OPP indicates that no billing validation should be done. It is recommended that for the trunk group this functionality be turned off (field BILLSCRN = N in table TOPSTOPT).
- Table HOTLIST will not be checked when OPP indicates that no billing validation should be done on calling card and third number billed calls.
- Table SLTANIID will not apply when OPP indicates that no billing validation should be done on the call.
- The Disallowed Card Issuer Blocking (DCIB) feature will not apply when OPP indicates that no billing validation should be done on calling card calls. The DCIB feature in TOP06 provided the Local Exchange Carrier (LEC) the ability to block subscribers from using Card Issuer Identifier (CIID) and International Telegraph and Telephone Consultative Committee (CCITT)² calling cards issued by the InterLATA Exchange Carriers (IEC) if the LEC and IEC did not have a mutual honoring agreement.
- The Screening for Billing Agreement feature will not apply when OPP indicates that no billing validation should be done on calling card calls. The Screening for Billing Agreement feature was introduced in TOPS13 to allow alternately billed calls to be blocked if the service provider of the

¹This functionality can also be activated for the whole office via TOPSPARM parameter OVERRIDE_ANIFSPL_HANDLING.

²Refer to Appendix A for details on CIID and CCITT credit card formats. For this feature, CCITT does not include commercial credit cards.

billed-to entity did not have an agreement with the service provider of the calling party.

- It is recommended that Originating Line Number Screening (OLNS) be turned off for the incoming trunk group (field OLNSQRY in table TOPSTOPT be set to NONE) if all of the traffic on that trunk group will be doing billing validation using an external platform.
- MCCS and AABS must be turned off for the trunk group via tables MCCSOST and AABSOST if all of the traffic on that trunk group will be doing billing validation using an external platform; otherwise, calls routed to MCCS or AABS will result in a LIDB query from the switch.
- Table RAO is bypassed.
- No billing validation remains in affect for the whole call. Performing a GEN AMA function will not change the status of the billing validation; i.e., it remains turned off. Additionally, transferring the call change will not change the status of the billing validation; it remains off.

49.6 Logs (LG)

Not applicable.

49.7 Data schema (DS)

49.7.1 New/modified tables

A new field, BRANDCHC (Brand Choice), is added to table ISUPTRK. This field will determine, on a trunk group basis, whether it should be branded based on the CIC or the SPID when both are present on a carrier call.

A new field, DISPSPID (Display SPID), is added to table TOPSTOPT. This field will determine, on a trunk group basis, whether or not the SPID display information from table SPIDDB should be sent to the OPP-compatible position on carrier calls.

A new parameter, RECORD_DNIS_IN_MODULE_315, is added to table TOPAMAOP. This parameter controls the generation of Module Code 315 when a GAP with Dialed Number Type of Address is received.

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
ISUPTRK	CHANGED	UNCHANGED
TOPSTOPT	CHANGED	UNCHANGED
TOPAMAOP	CHANGED	UNCHANGED

49.8 Office parameters (OP)

Not applicable.

49.9 Service orders (SO)

Not applicable.

49.10 Alarms (AL)

Not applicable.

49.11 Command interface (CI)

Not applicable.

49.12 Operational measurements (OM)

Not applicable.

49.13 AMA/Billing information (AM)**49.13.1 Module Code 52**

Module Code 52, Alternate Billing Service, is the module generated when a call is billed collect, third, or calling card. Although no changes are made to this module, the following fields will be populated as follows:

- Field 46 - RAO Number
 - Characters 1-3 = FFF
- Field 286 - LIDB Response
 - Character 1 = OLSN Query Not Made (value 4)
 - Characters 2-3 = LIDB Query Not Made (value 10)
- Field 291 - Operator Service System Action
 - Character 1 = Automatically Accepted (value 1)

49.13.2 Module Code 315

Module Code 315 is appended to the AMA record when a GAP parameter with Dialed Digits Type of Address is received and the TOPAMAOP parameter, RECORD_DNIS_IN_MODULE_315, is turned on. Refer to the AMA section for further details.

49.14 Software optionality control (SOC)

This feature does not introduce any new SOC codes; however, the functionality discussed in this document depend on the following SOC codes¹:

¹Note that these SOC codes reflect the SOC restructuring done in TOPS15 under feature A59017625 - TOPS SOC Option Consolidation. In addition to turning SOC options ON, some additional datafill changes may be required in table TOPSFTR; for example, ISUP, in addition to OSEA0101, will require that Table TOPSFTR parameter ISUP_FOR_TOPS be set to Y.

- OSB00101 - Basic Operator Services
- OSEA0101 - TOPS equal access base
- OSEA0102 - TOPS ISUP signaling
- UNBN0101 - Unbundling
- UNBN0103 - Branding by SPID

49.15 Glossary

Term	Description
ActID	Action Identifiers
AMA	Automatic Message Accounting
CCITT	International Telegraph and Telephone Consultative Committee (CCITT)
CDIR	Country Direct
CIC	Carrier Identification Code
CIID	Card Issuer Identifier (CIID)
DID	Data Identifiers
FAR	Facility Request Message
GDP	Generic Digits Parameter
IAM	Initial Address Message
IEC	InterLATA Exchange Carrier
ISUP	ISDN User Part
LEC	Local Exchange Carrier
LIDB	Line Information Data Base
OLNS	Originating Line Number Screening
OPP	Open Position Protocol
RLT	Release Link Trunking
SPID	Service Provider Identification
SOC	Software Optionality Code

49.16 References

- 297-8403-903 - *TOPS Unbundling User's Guide*
- 297-1001-830 - *Bellcore Format Automatic Message Accounting Reference Guide*
- 297-2621-345 - *UCS DMS-250 SS7 RLT Feature Application Guide*
- 297-8403-907 - *Operator Services Network Capability (OSNC) Protocol Specification*
- Q214-1 - *Open Position Protocol*

50: Functional description (FN)

50.1 Feature name

A59026166 Increase RTER_ID

50.2 Description

This feature increase the RTER_ID from { 0 To 63 } to { 0 To 127}, at the mean time, OVR40 to OVR89, GCSROUTE and GCSRTE2 tables. Note that GCS* tables are of the same structure as the OVR tables.

50.2.1 Background

Before this activity, RTER_ID is limited to 63 which limits the applications utilizing routing tables.

50.2.2 Functional description

This feature increase the RTER_ID from { 0 To 63 } to { 0 To 127}, at the mean time, OVR40 to OVR89, GCSROUTE and GCSRTE2 tables. Note that GCS* tables are of the same structure as the OVR tables.

As with the OVR tables, GCSROUTE and GCSRTE2 also needs to be recursive in order to successfully perform table transfer. As a result, new procedures will be created for adding temporary tuples for the GCS* tables, which are executed during table transfer.

50.2.3 End-user/Subscriber requirements

N/A.

50.2.4 Network / service provider requirements

N/A.

50.3 Hardware requirements

N/A.

50.4 Limitations and restrictions

N/A.

50.5 Interactions

N/A.

50.6 Logs (LG)

No new logs are introduced by this feature.

50.7 Data schema (DS)

50.7.1 New/modified tables

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
OVR40 to OVR89	New	New
GCSRROUTE, GCSRTE2	New	New

50.8 Office parameters (OP)

N/A.

50.9 Service orders (SO)

N/A.

50.10 Alarms (AL)

N/A.

50.11 Command interface (CI)

N/A.

50.12 Operational measurements (OM)

N/A.

50.13 AMA/Billing information (AM)

N/A.

50.14 Software optionality control (SOC)

N/A.

50.15 Glossary

Term	Description
New term	definition

50.16 References

51: Functional description (FN)

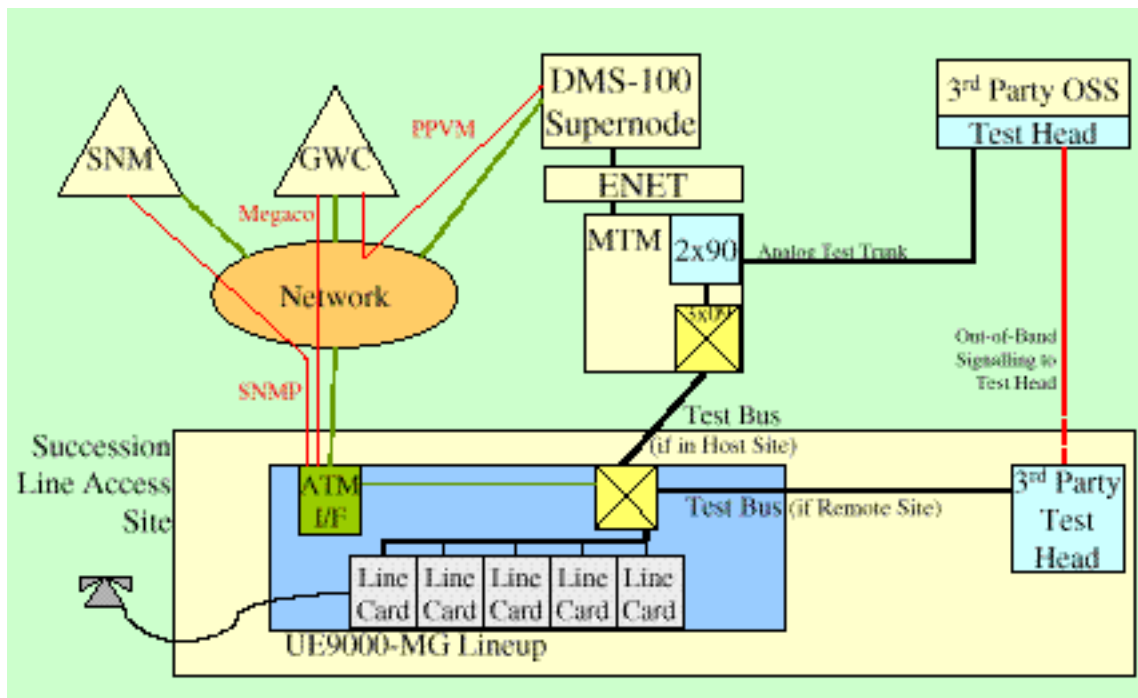
51.1 Feature name

Universal Edge 9000 Media Gateway Metallic Test Access Line Test

51.2 Description

For Beta trials and first release, Lucent's LMOS/MLT and Teradyne's 4TEL will be supported by using the legacy No Test Trunk interface in DMS-100 MTM. Please refer to figure 1 for details.

Figure 1 Functional Behavior Diagram



The signalling and test interface between LMOS/MLT or 4TEL test heads and UE9000-MG is NTT using the legacy NTT interface in DMS-100. The metallic interface in the UE9000-MG between each inter-frame test bus and test head is via Tip and Ring pairs, connected through a DMS MTA.

The metallic test access points are data filled in the TABLE LGRPINV and MTAVERT in the Call Server.

51.3 Hardware requirements

This requires the call server (XACore) to have an E-net and sub tending MTMs and any other legacy component required for Metallic Access. All tests are initiated from a Test Equipment which communicates to DMS using NTT interface. So NTT Test Equipments are required.

51.4 Limitations and restrictions

- Line Testing cannot be initiated from MAPCI.
- Subscriber Premise Testing is not provided/supported.
- ALT/ShowerQ commands are not provided/supported.
- Line Diagnostics is not provide/supported.

51.5 Interactions

None.

51.6 Logs (LG)

None.

51.7 Data schema (DS)

51.7.1 Modified tables

Tables LGRPINV and MTAVERT are modified to hold line test information.

Table 1 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
LGRPINV	CHANGED	UNCHANGED
MTAVERT	CHANGED	UNCHANGED

51.8 Office parameters (OP)

Not Applicable.

51.9 Service orders (SO)

Not Applicable.

51.10 Alarms (AL)

Not Applicable.

51.11 Command interface (CI)

Not Applicable.

51.12 Operational measurements (OM)

Not Applicable.

51.13 AMA/Billing information (AM)

Not Applicable.

51.14 Glossary

Term	Description
NTT	Numbered Test Trunk
ALT	Automatic Line Testing
MTA	Metallic Test Access

51.15 References

A59026382 - DSUM for UE9K-MTA NTT support.

AF1780 - Metallic Test Access.

GR-844-CORE -Generic Requirements for Metallic Loop Testing.

52: Functional description (FN)

52.1 Feature name

A59026480: Uniform Outpulsing Enhancements

52.2 Description

UOP(Uniform Outpulsing), introduced with software release NA009, was designed to provide a basic solution for outpulsing digits in a uniform fashion with digit manipulation. UOP allows the Telcos to set up uniform outpulsing for Direct Inward Dial (DID) calls to Automatic Intercept System (AIS), and Private Branch Exchange (PBX).

When UOP was developed, certain restrictions and limitations were involved. These limitations included UOP interworking with only certain trunks (listed in table 1), UOP does not support Equal Access signaling, UOP is not supported on routes from standard pretranslations, and only 7 or 10 digits can be dialed when the call is routed to an AIS(Automatic Intercept System). Due to the restriction on non supported routes from standard pretranslations, and the number of digits restriction when calls are routed to an AIS, the customer has requested the following requirements to be supported with UOP.

1. The use of the combination V(variable) selector and the L(line) route selector in table STDPRTCT->STDPRT.
2. The use of the L selector in table STDPRTCT->STDPRT.
3. Treatment extension dialing when UOP is used with AI (Automatic Intercept) trunks with the called number present in tables DNROUTE/DNINV.
4. Extension dialing for non-treatment cases routing out of DNROUTE/DNINV.
5. The ability to derive a 10 digit dn for UOP/ISA/SG calls that dialed seven digits or less.

For each of these requirements to be supported with UOP, the call must route out of tables DNROUTE/DNINV.

The trunk types supported with UOP are the same with this new functionality. They are listed in the following table.

Table 21 Supported Trunk Types

Trunk Type	Trunk Signalling	Routing Selector
AI	PTS	UOP
IBNTO/IBNT2	PTS/ISDN	UOP/ISA
PX/P2	PTS	UOP
TO/T2	PTS	UOP
PRA/PRI	ISDN	ISA

52.2.1 Support of UOP with the V and L selectors

UOP Enhancements will allow support of UOP from standard pretranslations, only when the V selector is used with the L route selector or when the L selector is used. When either of these two scenarios are datafilled in STDPRT, a route index in table DNROUTE or DNINV must be datafilled to point to the routing table for UOP to occur. When the route is datafilled in table OFRT/OFR2/OFR3/OFR4 and RTEREF using the UOP selector, a DMI parameter is specified to point to the DIGMAN table. The following travers illustrate this.

Figure 1 Using the V selector with the L route selector in STDPRT.

```

>traver tr allti 6620051 b
TABLE TRKGRP
AL1TI TI 51 NPDGP NCRT NIL PEA NSCR 613 LCL N N $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP TIID
TABLE STDPRTCT
PEA ( 1 ) ( 0 ) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 662 662 V 7 NP 0 L 519 662 N 7 NP 0 L 519 662 0
TABLE TOFCNAME
519 662 $
TABLE DNINV
519 662 0051 T OFRT 895
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
. TABLE OFRT
. 895 UOP D CARYIBNT0 1 N N
. . TABLE DIGMAN
. . . 1 (DTO 4)
. . . EXIT TABLE DIGMAN
. EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call
+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES
1 CARYIBNT0 0051 ST
TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120 +++ TRAVER: SUCCESSFUL CALL TRACE ++

```

Figure 2 Using the L selector in STDPRT.

```

>traver tr allti 6620051 b
TABLE TRKGRP
AL1TI TI 51 NPDGP NCRT NIL PEA NSCR 613 LCL N N $
TABLE OFCVAR
AIN_OFFICE_TRIGGRP LNPOFFICE
TABLE STDPRTCT
PEA ( 1 ) ( 0 ) 2
. SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE
BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
DOCUMENTATION.
. 662 662 L NP 0 519 662
TABLE TOFCNAME
519 662 $
TABLE DNINV
519 662 0051 T OFRT 895
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
. TABLE OFRT
. 895 UOP D CARYIBNTO 1 N N
. . TABLE DIGMAN
. . 1 (DTO 4)
. . EXIT TABLE DIGMAN
. EXIT TABLE OFRT
. SUBTABLE AMAPRT
. KEY NOT FOUND
. DEFAULT VALUE IS: NONE OVRNONE N
AIN Info Collected TDP: no subscribed trigger.
Checking AIN SDS Trigger Items as SDS is compatible with current call

+++ TRAVER: SUCCESSFUL CALL TRACE +++
DIGIT TRANSLATION ROUTES
1 CARYIBNTO 0051 ST
TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120
+++ TRAVER: SUCCESSFUL CALL TRACE ++

```

52.2.2 Support of UOP with Extension Dialing

UOP will be supported with treatment or non-treatment extension dialed calls. These extension calls can be one of the following:

- A treatment extension dialed call routing to an AIS using UOP.
- A seven digit dialed call routing to an AIS using UOP
- A non-treatment extension dialed call routing to a PBX using UOP.

10 digit dn will be derived by the software for seven digit or extn dialed calls. This 10 digit derivation will be done for UOP, ISA and SG selectors.

A new bool, TENDIG_REQD, will be created in the tables that support UOP/ISA/SG to determine if 10 digit derivation should be done or not. The following table shows tables that are compatible with UOP/ISA/SG, that will be supported with the 10 digit derivation for outpulsing .

Table 22 Supported Tables

UOP	ISA	SG
Tables OFRT, OFR2, OFR3, OFR4	Tables OFRT, OFR2, OFR3, OFR4	Tables OFRT, OFR2, OFR3, OFR4
Table HNPACONT-RTREF	Table HNPACONT-RTREF	Table HNPACONT-RTREF
Table FNPACONT-RTREF	Table FNPACONT-RTREF	Table FNPACONT-RTREF
	Tables IBNRTE, IBNRT2, IBNRT3, IBNRT4	Tables IBNRTE, IBNRT2, IBNRT3, IBNRT4

The new bool, TENDIG_REQD will default to FALSE. Once the bool is set to true, the software will derive the 10 digit dn for manipulation and outpulsing. The customer must know that manipulation and outpulsing will then be based on the 10 digit dn and not what was dialed.

The TENDIG_REQD bool can only be used for UOP/ISA/SG and if a DMI value is present. If the DMI value is nil, then the TENDIG_REQD bool will not be allowed to be set to TRUE.

Currently, for treatment extension calls (without UOP) that route on an AI trunk, seven digits (NXX-XXXX) are sent to the AIS(Automatic Intercept System). With this new functionality, the entire 10 digit called number (NPA-NXX_XXXX) will be derived by the software to send to an AIS. However, the

AIS does not receive more than seven digits for trmt extension calls. Therefore, when UOP is used with trmt extn calls, the 10 digit called number can be manipulated to be compliant with AIS and send only 7 digits. With this new design, the trmt extn calls will have the 10 digits available to manipulate and output up to 7 digits to an AIS.

Note: Although AIS supports only 7 digits today, in the future AIS may require 10 digits. Until then, the customer can provision DIGMAN to remove the NPA if only 7 digits are required.

For non-treatment extension calls to a PBX using UOP, the 10 digit called number will be derived by the software to manipulate and output as opposed to only manipulating and outputting the dialed extension.

Note: The 10 digit dn will only be derived for seven digit or extn dialed calls, only if the bool in the supported tables is set.

52.2.2.1 Example TENDIG_REQD BOOL DATAFILLS

- OFR(X) Tables

```
>add
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>Y
RTE:
>1000
RTESEL:
>uop
CONNTYPE:
>d
CLLI:
>ais
DMI:
>1
CANCNORC:
>n
TENDIG_REQD:
>Y
RTESEL:
>$
OPTION:
>$
TUPLE TO BE ADDED:
1000          (          UOP          D          AIS          1 N Y)$
                                                    $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>Y
TUPLE ADDED
JOURNAL FILE INACTIVE
```

- RTEREF Tables

```
>add
MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT
>y
RTE:
>1000
RTESEL:
>uop
CONNTYPE:
>d
CLLI:
>ais
DMI:
>2
CANCNORC:
>n
TENDIG_REQD:
>y
RTESEL:
>$
TUPLE TO BE ADDED:
1000          (          UOP          D          AIS          2 N y)$
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>y
TUPLE ADDED
JOURNAL FILE INACTIVE
```

• IBNRT(X) Tables

MACHINES NOT IN SYNC - DMOS NOT ALLOWED
JOURNAL FILE UNAVAILABLE - DMOS NOT ALLOWED
ENTER Y TO CONTINUE PROCESSING OR N TO QUIT

>Y

RTE:

>1000

IBNRTSEL:

>sg

ALGORITHM:

>rnd

ATTEMPTS:

>1

SUPERTKG_NAME:

>vickie

OPTION:

>dmi

TENDIG_REQD:

>Y

DMI:

>1

OPTION:

>\$

IBNRTSEL:

>\$

OPTION:

>\$

TUPLE TO BE ADDED:

1000 (SG RND 1 VICKIE (DMI Y 1)\$)\$
\$

ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.

>Y

TUPLE ADDED

JOURNAL FILE INACTIVE

The following are examples of extension dialed calls.

Figure 3 will illustrate a treatment extn (extension) dialed call outpulsed to an AIS (Automatic Intercept System) using UOP.

Figure 3 A treatment extension dialed call routing to an AIS using UOP

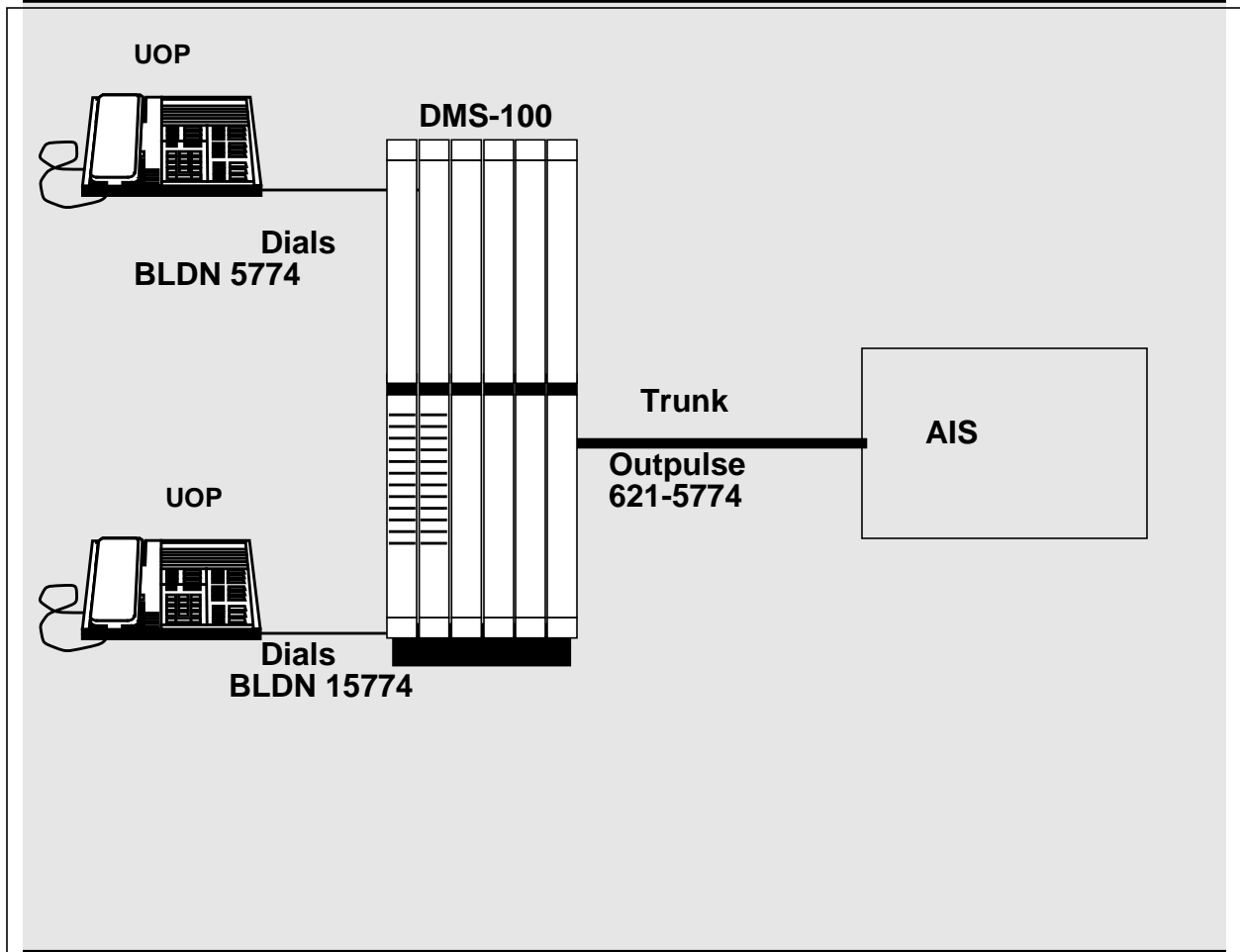


Figure 4 will illustrate a non-treatment extension dialed call routing to a PBX using UOP.

Figure 4 A non-treatment extension dialed call routing to a PBX using UOP.

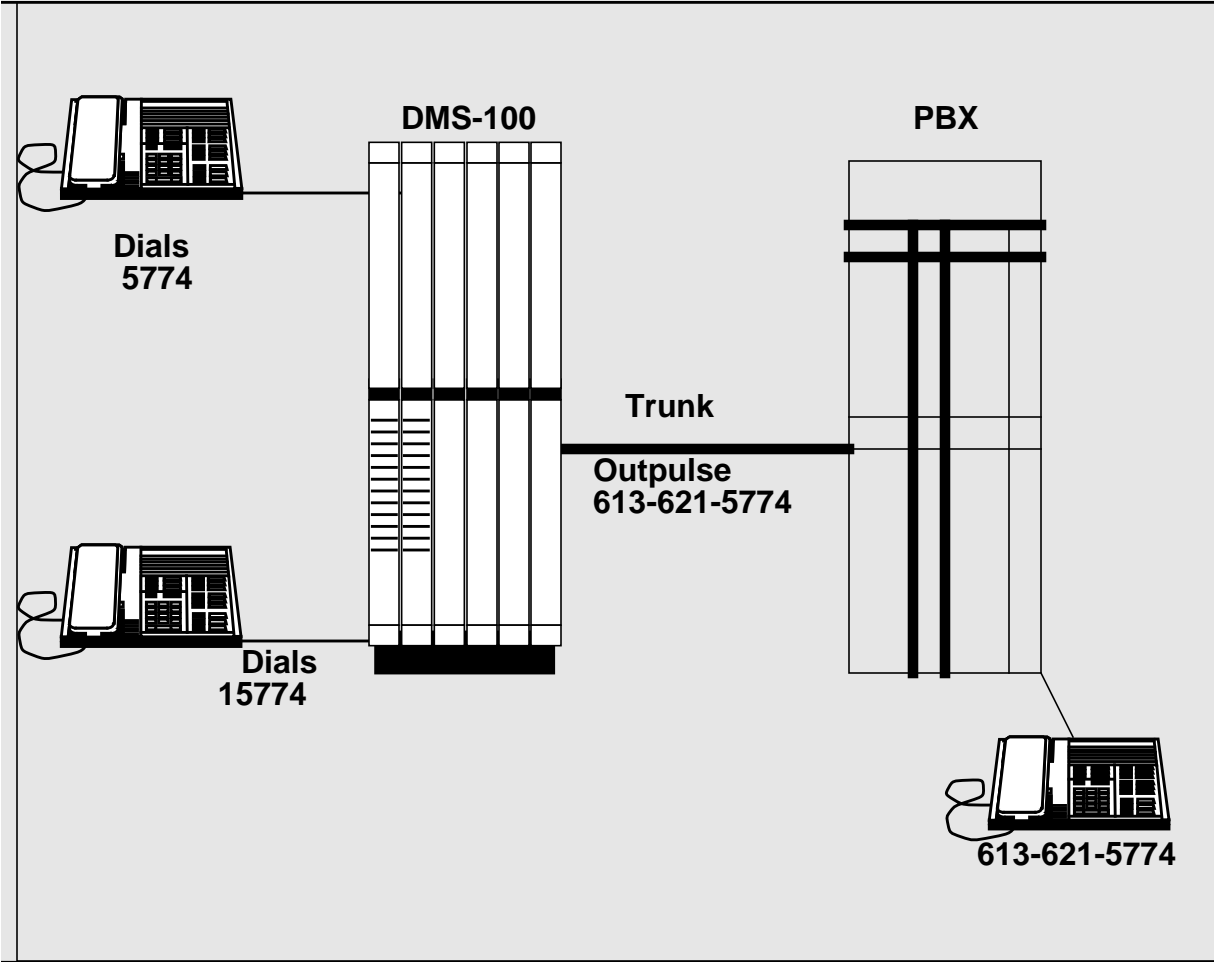


Figure 5 displays a tracer illustrating the translations of a non-treatment extension dialed call using UOP

Figure 5 Non-treatment extension dialed call using UOP routing out of table DNINV

```

>tracer 1 6215021 5774 b
TABLE KSETLINE
HOST 05 0 01 21 1 DN Y 6215021 IBNTST 0 0 613 $ MBS
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE KSETFEAT
TUPLE NOT FOUND
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
IBNTST 0 0 0 TST10 ( XLAS CXT1 RXCFN NDGT) ( OHQ 0 TONE_OHQ) ( CBQ 0 1 Y 2) (
ERWT ) ( ACR N)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND
DIGCOL
IBNTST NXLA CXT3 RXCFN 0 NDGT
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE IBNXLA: XLANAME CXT1
CXT1 5 EXTN Y Y 613 621 4 $ $
TABLE TOFCNAME
613 621 $
TABLE DNINV
613 621 5774 T OFRT 5
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
. TABLE OFRT
. 5 UOP D CARYIBNTO 1 N Y
. . TABLE DIGMAN
. . . 1 (DTO 6)
. . EXIT TABLE DIGMAN
. EXIT TABLE OFRT
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.

```

AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 CARYIBNTO 215774 ST

TREATMENT ROUTES. TREATMENT IS: GNCT

52.3 Hardware requirements

N/A

52.4 Limitations and restrictions

- UOP Enhancements feature interworks with the existing supported trunks(listed in table 1) of UOP.
- The V selector with the L route selector is a supported route with UOP from standard pretranslations.
- The L selector is a supported route with UOP from standard pretranslations.
- UOP does not support any other routes from standard pretranslations.
- UOP does not support equal access (ea) calls.

Note: A check is currently made when datafilling a STDPRT tuple, any tuple other than the V and L selectors that route the call out of STDPRT will be rejected. A backward table control check to STDPRT is not provided when changing routing table tuples. If a routing table tuple selector is changed to UOP, STDPRT needs to be checked to ensure there are no entries that use that route. Any entries that do exist will result in routing to datafill treatment.

- The existing DIGCOMs (Digit Manipulation Commands) are used in table DIGMAN to accomplish Uniform Outpulsing. To achieve uniform outpulsing, the Digits to Outpulse, (DTO) command must either be the only command or the last command.

For example:

Case 1: Outpulse 7 digits

Datafill:(DTO 7)

Case 7: Substitute the station code and outpulse 4 digits

Datafill:(CL END) (CB 4) (REM 4) (INC xxxx) (DTO 4)

where xxxx equals the desired station code.

- UOP Enhancements will use the existing SOC (LOC00005) that UOP uses.
- All Table DIGMAN selectors are still supported with UOP.
- The 10 derivation for the DTO command will be supported with UOP, ISA and SG for seven digit dialed calls and extn dialed calls.
- The DMI value in the supported tables has to be present, to make a datafill with the TENDIG_REQD bool set to true.
- 10 digit derivation will not be done if there is a NIL DMI value.

- Only in the North American market TENDIG_REQD bool can be set to TRUE. In all other Markets the bool will always be set to FALSE.

52.5 Interactions

None

52.6 Logs (LG)

N/A

52.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

52.7 Data schema (DS)

52.7.1 New/modified tables

N/A

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
Tables OFRT, OFR2, OFR3, OFR4	CHANGED	OLD
Table HNPACONT-RTREF	CHANGED	OLD
Table FNPACONT-RTREF	CHANGED	OLD
Tables IBNRTE, IBNRT2, IBNRT3, IBNRT4	CHANGED	OLD
Table INWERTE	CHANGED	OLD
Table INWORIRT	CHANGED	OLD

52.8 Office parameters (OP)

52.8.1 New/modified office parameters

N/A

Table 3 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED

52.9 Service orders (SO)

N/A

52.10 Alarms (AL)

N/A

52.10.1 New/modified directories

N/A

Table 4 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

52.11 Command interface (CI)

52.11.1 New/modified commands

N/A

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN

52.12 Operational measurements (OM)

52.12.1 New/modified OM groups

N/A

Table 6 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

52.13 AMA/Billing information (AM)

52.13.1 New/changed AMA/billing information

N/A

Table 7 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

52.14 Software optionality control (SOC)

Table 8 SOC

SOC option name:	LOC00005
------------------	----------

SOC option title:	Dial Plan Translations Enhancement
SOC option control type:	state/usage
New SOC option?	No
SOC option order code	<order code>
Option defined in DRU:	<DRU>
Affected products:	<PCL(s)>

52.15 Glossary

Abbreviation	Definition
AIS	Automatic Intercept System
BLDN	Blank Directory Number
CCB	Call Condense Block
DID	Direct Inward Dial
DIGCOM	Digit Manipulation Command
DIGMAN	Digit Manipulation
DN	Directory Number
DTO	Digits To Outpulse
EXTN	Extension
L	Line
NPA	Numbering Plan Area
OFRT	Office Route
RTEREF	Route Reference
V	Variable
PBX	Private Branch Exchange
SOC	Software Optionality Control
STDPRT	Standard Pretranslations
UOP	Uniform Outpulsing

52.16 References

- AU3171 Uniform Outpulsing

53: Functional description (FN)

53.1 Feature name

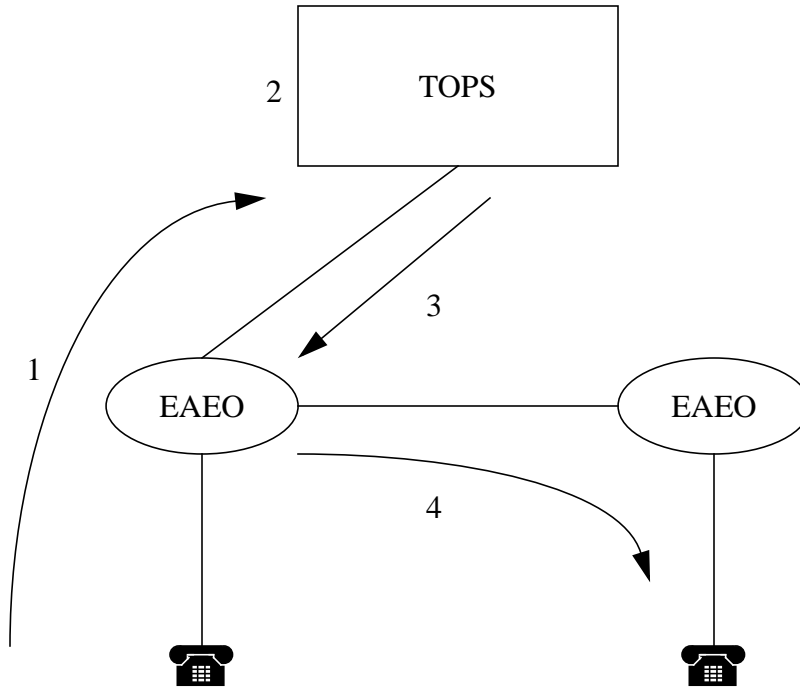
Release Link Trunking for Equal Access End Office - 59026486

53.2 Description

Release link trunking (RLT) refers to the capability of a TOPS office to relinquish control of a call to the originating office which then performs call completion. With this functionality, TOPS offices realize savings in trunk resources since the EAEO's trunks, in lieu of the TOPS office's trunks, are occupied with the call completion attempt.

53.3 RLT Example

Figure 1 Release Link Trunking Example



In the scenario depicted in the figure, the following events occur:

- 1 A calling customer dials 411 from a phone. The call is routed to a TOPS switch on an ISUP trunk with RLT capability.
- 2 The desired listing is retrieved and call completion is offered.
- 3 The customer accepts call completion. The TOPS switch indicates to the End Office that RLT is requested by sending a REL (Release) with a SAP (Service Activation Parameter) which has a feature code of RLT_REQUEST_MSG and a GAP (Generic Activation Parameter) attached. The TOPS switch also generates an AMA record billing for the DA service, which documents that RLT service is provided. The End Office replies with an RLC and drops the connection to the TOPS switch.
- 4 The calling customer's EAO completes the call to the desired listing number. This call may be a local or a toll scenario. The End Office may generate an AMA record based on the type of call.

53.4 Functional Overview

When a subscriber selects to have the TOPS office complete the DA call, the EAEO receives an ISUP REL with a SAP value of RLT_REQUEST_MSG. This indicates to the EAEO that RLT should be attempted. Before the processing of the RLT call is performed, the software will confirm that the new RLT option is assigned. This new option, RLT, is implemented as a per trunk option in Table TRKOPTS which can only be assigned to ISUP IT trunks. If an RLT request is received on a trunk without RLT provisioned the call will be routed to FNAL (feature not allowed) treatment and a DFIL324 will be generated. This error detection ensures that the EAEO and TOPS offices are synchronized for RLT processing. If RLT is datafilled, then the connection to the TOPS office would be deallocated. At this point the EAEO would generate any AMA records associated with the call to the TOPS office. Next the number in the GAP is converted to a dialable format. RLT2DIAL, a new pre-defined reverse translator name, is used for all RLT calls to force that reverse translation simplification is utilized. After the dialable number is derived, the call translates, routes, and bills as if the subscriber had dialed the number.

Please refer to the following sections for additional information:

- “53.4.1 SAP: Feature Code” on page 900
- “53.4.2 Table TRKOPTS: RLT & OM Group: RLT” on page 901
- “53.4.3 RLT Translations” on page 901

53.4.1 SAP: Feature Code

A new SAP feature code is implemented for this feature. The value is RLT_REQUEST_MSG, #98 or 1001 1000. This feature code is proprietary and it has been chosen from the range specified in GR-246-Core as spare. There are no plans to submit it to Telcordia for inclusion.

```

INCOMING 15:54:00.487 NODE TYPE= LTC_NODE   CCS7_UP_MSG
NN= 0095 TN= 0244 MSGTAG= 00 ROUTE= 4000 ERROR= 00 LENGTH= 1F
AGENT= CKT          BFIT2WS7      3
30 01 0C 02 04 02 C0 90 E2 01 98 C0 08 04 03 81 14 80 84 36 39 00 00
  CCS7 MESSAGE TYPE: ISUP_REL
  MANDATORY ELEMENTS:
    CAUSE INDICATORS :
      LOCATION          :
      CODING STANDARD   :
      CAUSE INDICATOR  :
    OPTIONAL PART :
      SERVICE ACTIVATION:
      FEATURE CODE     :
    GENERIC_ADDRESS :
      TYPE_OF_ADD      :
      NATURE_OF_ADD    :
      EVEN_ODD_IND     :
      SCREENING        :
      ADDR_PRES_RESTRICTED_IND :
      NUMBERING_PLAN   :
      TEST_CALL_IND    :
      (or NI_INDICATOR) :
      ADDRESS_INFORMATION = 4108486393
      END_USER
      NATIONAL_STANDARD
      CI_NORMAL_CLEARING
      RLT_REQUEST_MSG
      COMPLETION NUMBER
      NATIONAL_SIG_NUMBER
      EVEN_NUM_NIBBLES
      USER_PROVIDED_PASS_SCREEN
      PRESENTATION_ALLOWED
      UNKNOWN_NUM_PLAN
      LNP_TEST_CALL
      CLG_PTY_INCOMPLETE

```

53.4.2 Table TRKOPTS: RLT & OM Group: RLT

A new trunk group option, RLT, is introduced in Table TRKOPTS for ISUP IT trunks only. When an ISUP REL message is received with a SAP of RLT_REQUEST_MSG, the software verifies that the RLT option is assigned. If an RLT request is received on a trunk without RLT provisioned the call will be routed to FNAL (feature not allowed) treatment and a DFIL324 will be generated. If RLT is provisioned then the RLTATMPT (RLT ATteMPT) register in the new OM group RLT is incremented for an office wide total and RLT processing continues.

EXAMPLES

```
Table TRKOPTS
OPTKEY OPTINFO
-----
ISUP2WIT RLT RLT

OMSHOW RLT ACTIVE
CLASS: ACTIVE
-----
KEY (REGISTER_INDEX_RANGE) RLTATMPT
0                               32

LOGUTIL
-----
URTPB04BA * DFIL324 APR07 14:37:37 6600 INFO Missing Datafill
CKT   RPTBSS7IT   0
Missing RLT option in table TRKOPTS.
Called DR = 411
```

53.4.3 RLT Translations

53.4.3.1 RLT2DIAL Translator

A new pre-defined reverse translator, RLT2Dial, is introduced by this feature. It is automatically used by all RLT calls. This ensures that RLT call always use the new reverse translation simplification to derive the dialable number. RLT2DIAL is blocked from datafill in tables CUSTHEAD and CUSTNTWK. This enforces that only RLT calls use the RLT2DIAL reverse translator. If an attempt is made to datafill RLT2DIAL in those tables the following message is generated:

“Cannot Specify RLT2DIAL - Reserved for Release Link Trunking”

53.4.3.2 Public Line/Trunk Agents

In order to reuse the originating agent's pretranslator for translation of the RLT number, the digits received in the GAP must be converted into a format consistent with the originator's dialing plan. For public agents the associated STS and LCANAME drives the digit conversion according to the rules described in "53.4.3.4 Digit Conversion" on page 903. For the purpose of this document public line/trunk agents are POTS, RES, 1MR, 2FR, 4FR, PX, and P2. POTS and 1MR lines are associated to a STS and LCANAME based on the their LINEATTR index. PX/P2 trunks are assigned an STS and LCANAME in Table TRKGRP.

The digit conversion process is as follows:

- Use the LCANAME and STS associated with the line attribute index to convert the number in the GAP into a dialable format. This process is explained in "53.4.3.4 Digit Conversion" on page 903.
- Allow the call to continue through the translation system as if the digits were dialed manually. If applicable, AMA records are generated as if the digits were dialed manually.

53.4.3.3 IBN Agents

When the IBN agent encounters RLT the call must be translated in the public environment. This allows the call to reuse existing public network access datafill. This datafill is in Table IBNXLA and XLANAME with NET DOD/ GEN selectors. The digit conversion process needs a LINEATTR index and public network access code from Table NCOS. The intent is to prefix and manipulate the called number digits such that the originator's IBN translation datafill can be used to access the public translation environment. For the purpose of this document IBN agents are IBN lines, P-phones, Huntgrps, Madn, MF IBN, and SS7 IBN.

Digit conversion process needs a line attribute index and a network access code in order to be performed. These two parameters are provisioned in tables NCOS and CUSTHEAD.

The digit conversion process is as follows:

- Retrieve the line attribute index and public network access code from table NCOS. If not datafilled, use the default in table CUSTHEAD. If default is not datafilled, then the call is routed to feature not allowed treatment (FNAL).
- Use the LCANAME and STS associated with the line attribute index to convert the number in the GAP into a public dialable format. This process is explained in "53.4.3.4 Digit Conversion" on page 903.

-
- If datafilled, prefix the network access code to the resulting digits.
 - Allow the call to continue through the IBN translation system as if the digits were dialled manually. If applicable, AMA records are generated as if the digits were dialled manually.

Note, the line attribute index provisioned in Table NCOS or CUSTHEAD should be the same as the one specified in the NET DOD/GEN datafill to be used for public translation of national direct dial calls. Or, it should at least contain STS and LCANAME which are the same as the line attribute index values used in the NET DOD/GEN datafill for national direct dial calls.

53.4.3.4 Digit Conversion

Since TOPS offices will always return a 10D (digit) national number, the conversion of the 10D called party number into a dialable format is based on existing translation datafill in tables LCASCRCN/LCA6SCRN and HNPACONT. The resulting digits will be in 7D, 1+7D, 10D, or 1+10D format, consistent with the originator's dialing plan. The following RLT National Number conversion process uses the AIN Reverse Translation Simplification, AR2104 and AU2509 when three digit screening applies. If six digit screening applies, RLT National Number conversion process is similar to AIN Reverse Translation Simplification described in AF7475.

The National Number conversion process using three digit screening, i.e. LCANAME is less than 5 characters, is based on the following logic:

- 1** Table HNPACONT datafill is used to determine if the 10D number should be converted to 7D or 10D. The NPA is removed from the 10D called number, if one of the following conditions are met:
 - a. Indexing HNPACODE with the 10D called number results in VCT HNPI.
 - b. Originator's NPA is equal the NPA of the 10D called number; and, the HNPACODE subtable contains no entry for the NPA of the called number.
- 2** Table LCASCRCN datafill is used to determine if a call is local or toll. If NPANXX of the called number is found in subtable LCASCR then it is local. If NPANXX is not found, then if the originator's NPA is equal to the called number's NPA and NXX is datafilled in subtable LCASCR then it is local.
- 3** Using PFXFOR10 and STRIPNPA of table LCASCRCN and the local/toll result from step 2, the called number is modified as follows:.

Digits after Step 1 (HNPACONT)	Local/Toll	PFXFOR10	Originator's NPA = Called NPA	STRIPNPA	Result
7D	Local	Y	Not Applicable	Not Applicable	7D
7D	Local	N	Not Applicable	Not Applicable	7D
7D	Toll	Y	Not Applicable	Not Applicable	7D
7D	Toll	N	Not Applicable	Not Applicable	1+7D
10D	Local	Y	N	Not Applicable	1+10D
10D	Local	Y	Y	N	10D
10D	Local	Y	Y	Y	7D
10D	Local	N	Not Applicable	Not Applicable	10D
10D	Toll	Y	Not Applicable	Not Applicable	1+10D
10D	Toll	N	Not Applicable	Not Applicable	1+10D

Using six-digit screening the following steps are applied in the conversion process:

For calls that use six-digit screening, i.e., LCANAME 5-8 characters, the digit conversion process used for three digit screening is slightly modified. Instead of using Table LCASCRN and the rules associated with PFXFOR10, six-digit screening uses Tables LCAINFO, DPCTSCRN and LCA6SCRN to help determine whether the NPA and/or prefix digit is required.

- 1 If the called number's NPA matches the caller's home NPA and the NPA is not present in HNPACODE, then 7 digits are assumed else 10 digits are assumed.
2. The presence of a local (NP) or toll (DD) number is determined by Table LCA6SCRN. If an NPA and NXX entry exist in the table, then the assumption is local. If an entry is vacant, then the assumption is toll.
- 3 After determining the digit count, and whether the number is local or toll, the appropriate screening option in Table DPCTSCRN is determined. Table DPCTSCRN is used to define the screening rules for six-digit screening. For three digit screening, RLT considered only the PFXFOR10 rule. For six-digit screening, the rules are controlled by customer datafill (SCRNOPTS) in Table DPCTSCRN. Table 1 "Digit Conversion Rules Using Six-Digit Screening" on page 906 provide the rules used for six-digit screening.

Table DPCTSCRN provides twelve different dialing patterns and call type combinations (SCRNOPTS) datafilled on a customer basis. Since RLT digit conversion only considers those calls which are National, the OA call type is not used in the conversion process. This leaves only the DD and NP call types for use during conversion. The precedence order proceeds sequentially until a UNDT treatment result is located. A UNDT result determines the appropriate dialing pattern that allows the call to complete during re-translations.

Figure 3 Precedence of SCRNOPTS for RLT Digit Conversion

igit local	: (SEVEND NP)-->(PFXSEVEND NP)--> (TEND NP)-->(PFXTEI
igit Toll	: (SEVEND DD)-->(PFXSEVEND DD)-->(TEND DD)-->(PFXTEI
igit local	: (TEND NP)-->(PFXTEND NP)-->(SEVEND NP)-->(PFXSEVEI

It is also worth noting, the user has complete control over the treatment settings in Table DPCTSCRN. For example if a 1+7-digit DD call is treated, e.g., (PFXSEVEND DD MSLC), then the user can simply change the treatment setting to UNDT to allow the call to complete.

Table 1 Digit Conversion Rules Using Six-Digit Screening

Lookup Result from step 1	LCA6SCRN Result ^b step 2	DD call type ^a (Toll) Entry not found in LCA6SCRN				NP call type (Local) Entry found in LCA6SCRN			
		pfxplus10d	tend	pfxplus7d	sevend	pfxplus10d	tend	pfxplus7d	sevend
7-digit	Y					4th choice	3rd choice	2nd choice	1st choice
7-digit	N	3rd choice	2nd choice	1st choice	4th choice				
10-digit	Y					2nd choice	1st choice	4th choice	3rd choice
10-digit	N	1st choice	4th choice	3rd choice	2nd choice				

a. The call type will always be DD or NP.

b. Indicates whether an entry was found in Table LCA6SCRN. (NPA+NXX entry)

To fully understand the conversion process and the precedence order used in determining which SCRNOPT to select, the following example provides a typical RLT call conversion.

For example, in determining that a call is 10 digits and toll, i.e., NPA is not the caller’s home NPA and no entry is found in LCA6SCRN, the reverse translation logic first looks at the ‘Prefix 10 digit toll’ option, e.g., (PFXPLUS10D DD). Depending on the treatment assigned, the search either continues to the next option in the precedence order, or uses the current dial plan option. If a treatment option of UNDT is found, the search stops. If anything other than UNDT is found, the search continues until UNDT treatment is located. A UNDT entry represents the call type that would allow completion on the re-translation leg of the call¹.

¹If a dial plan option is not datafilled, it takes on a default treatment value of UNDT. In most cases the user enters only those dial plans considered for treatment, such as MSLC, MSCA, etc., and lets the default setting serve as the UNDT required setting for the call.

For Calls that are determined to be 10 digits, the TENDLOC field in Table LCA6SCRN may override the automatic local assumption as discussed above. For example, if the number is determined to be 10 digits, and the TENDLOC is set to “N”, then the call is considered toll. Although the NPA and NXX are present in the table, usually meaning a local (NP) call, setting the TENDLOC field to “N” classifies the call as 10 digit toll instead, i.e., as if the NPA and NXX were not actually found in the table. Hence, instead of starting the search with a TEND NP dial plan, the call would use a TEND DD dial plan instead.

53.5 Hardware requirements

N/A

53.6 Limitations and restrictions

- The EAEO must be connected directly to the TOPS office using an ISUP IT trunk as described in AN1515 or 59011294. RLT is not supported routing the call through an access tandem or EAEO to EAEO then to TOPS.
- This features supports only the following originators:
lines - POTS, RES, IBN, 2FR, 4FR, 1MR, BRI, P-phones, Huntgrps, and Madn
trunks - MF/SS7 IBN, PX, and P2.
- RLT must be assigned to the ISUP IT trunk in Table TRKOPTS.
- Agents that are not supported for RLT are Attendant Console and PRI/BRI.
- RLT requires that a 10 digit number is received in the GAP.
- REVXLER, the CI command for reverse translations, only supports POTS, IBN, and RES agents for RLT.
- RLT does not support a multi port call (e.g. three way call) in the conference state.

53.7 Interactions

In the TOPS 15 software a new parameter in table TOPSPARM is added. The parameter is RLT_REL_VIA_CCTO. It controls the SAP feature code value sent in the RLT REL message from TOPS. The default value is Y which results in the feature code being CCTO_ALL_ISUP . When the tuple is set to N, the new RLT_REQUEST_MSG feature code is sent in the SAP.

Therefore, this feature - 59026486 - requires that RLT_REL_VIA_CCTO is set to N.

AIN, E800, LNP, and VFGs can all be encountered on the first or second leg of an RLT call. However, there is no direct interaction with the RLT functionality. Please refer to the listed scenarios.

- Scenario 1: Encountered AIN/E800/VFG Prior to RLT: Subscriber A dials 621-1234 which encounters an AIN trigger in the first leg of the call. The AIN response routes the call to the TOPS office for DA service. The desired listing is retrieved and call completion is offered. The customer accepts call completion. The EAEO releases the connection to the TOPS office. Next the EAEO derives the dialable number from the national number received in the GAP based on the subscriber's attributes. The call translates, routes, and bills as if the subscriber had manually dialed the number. The fact that AIN was encountered on the first leg has *no impact* on the second leg. This same example holds true for E800, and VFGs.
- Scenario 2: AIN/E800/LNP/VFG Encountered After RLT: Subscriber B dials 411 which routes the call to the TOPS office for DA service. The desired listing is retrieved and call completion is offered and accepted by the subscriber. The EAEO releases the connection to the TOPS office. Next the EAEO derives the dialable number from the national number received in the GAP based on the subscriber's attributes. The call translates, routes, and bills as if the subscriber had manually dialed the number. This implies that it is *possible* for AIN, E800, LNP, or VFGs to be encountered during the routing of the second leg of the call. This *does not impact* the RLT functionality.

Although it is not likely that a subscriber has their phone call forwarded to a directory assisted number, it is possible. Refer to the following scenario:

- Scenario 3: CFW to DA Service: Subscriber A calls Subscriber B who has their phone forwarded to NPA-555-1212. The call is routed to the TOPS operator for directory assistance. The desired listing is retrieved for Subscriber A and call completion is accepted. The listing number is returned to the EAEO that serves Subscriber B. At this point the call is routed to FNAL - feature not allowed treatment instead of terminating to the requested listing number.

53.8 Upgrade Considerations

This feature introduces requirements on the XPM software. If the XPM is an SX05 then the load must be XPM15 or greater. If the XPM is an MX77 with a ED7 14 load, then patch XSI17 must be applied prior to the upgrade.

53.9 Logs (LG)

For additional information refer to the LG section of this document.

53.9.1 New/modified logs

Table 2 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)
DFIL	324	New	SOS

53.10 Data schema (DS)

For additional information refer to the DS section of this document.

53.10.1 New/modified tables

Table 3 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)
TRKOPTS	Changed	New

53.11 Office parameters (OP)

N/A

53.11.1 New/modified office parameters

Table 4 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
N/A		

53.12 Service orders (SO)

N/A

53.13 Alarms (AL)

N/A

53.13.1 New/modified directories

N/A

Table 5 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

53.14 Command interface (CI)

For additional information refer to the CI section of this document.

53.14.1 New/modified commands

Table 6 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
REVLVER	Change	N/A	N/A	N/A

53.15 Operational measurements (OM)

For additional information refer to the OM section of this document.

53.15.1 New/modified OM groups

Table 7 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason
RLT	Release Link Trunking	New	Counts number of office wide attempts to use RLT in the EAEO.

53.16 AMA/Billing information (AM)

N/A

53.16.1 New/changed AMA/billing information

Table 8 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards
N/A			

53.17 Software optionality control (SOC)

This feature is not controlled by SOC.

Table 9 SOC

SOC option name:	N/A
SOC option title:	
SOC option control type:	<state/usage/combined>
New SOC option?	<Yes/No>
SOC option order code	<order code>
Option defined in DRU:	<DRU>
Affected products:	<PCL(s)>

53.18 Glossary

s

ADACC	Automated Directory Assistance Call Completion
AMA	Automatic Message Accounting
CCB	Call Condense Block
CCTO	Call Completion with Trunk Optimization
DD	Direct Dialed
EAE0	Equal Access End Office
GAP	Generic Address Parameter
IBN	Integrated Business Network line
ISUP	Integrated Services Digital Network User Part
NP	No Prefix

OM	Operational Measurement
RLC	ReLease Complete message
RLT	Release Link Trunking
SAP	Service Activation Parameter
TOPS	Traffic Operator PoSition

53.19 References

AF7475	LCASCRN 6-Digit Screening and STS Decoupling
AG2329	Directory Assistance with Call Completion
AN1515	ISUP to TOPS Enhancement
AR2104	LNPSSP- AIN Response Translation Evolution
AU2509	AIN Response Translation - Part 2
59011294	ISUP Support for Operator Services

54: Functional description (FN)

54.1 Feature name

SPM DS-1 Assignment SOC Control

54.2 Description

Assuming a maximum of 56 SPM's (Spectrum Peripheral Module) per office and 84 SPM carriers per SPM, the maximum SPM carriers per office is 4704. In addition, each SPM carrier can house 24 trunks, bringing the totals to 2016 trunks per SPM and 112,896 trunks per office. No capability exists to restrict SPM carrier provisioning on SPM's in a DMS (Digital Multiplex System) office, customers must buy their SPM trunks in SPM-sized batches (i.e. 2016). Since some of Nortel Networks customers do not wish to buy SPM trunks in such large batches, they want to purchase a right-to-use license for a portion of the 2016 trunks-per-spm currently available.

In feature A59018431 (release NA014), the following tuples were added in table OFCOPT to control the number of carriers assigned to SPM's in a single office through the use of office parameters.

- SPM_MAX_MSGTRK_CARRIER tuple controls the provisioned SPM carriers with assigned ISUP and PTS trunks.
- SPM_MAX_PRITRK_CARRIER tuple controls the provisioned SPM carriers with assigned PRI trunks.

Table OFCOPT is password protected and only accessed by Nortel Networks personnel.

This feature adds SOC functionality to activity A59018431. However, the two tuples in table OFCOPT are obsolete in NA015. This feature provides SOC functionality for the SPMS_MSGTRK_CARRIER and SPMS_PRITRK_CARRIER.

The SOC functionality provides the hard usage control for provisioned SPM DS1P carriers assigned with either ISUP/PTS trunks or PRI trunks.

SOC functionality allows operating company personnel to select optional groups of one or more features, called options. Customers control these options through the SOC CI Level. Nortel Networks support personnel control passwords for activation, deactivation, and limits of the right-to-use (RTU) on all options. See NTP 297-8991-901 for further information on the SOC functionality and its implementation.

This activity implements two hard usage options, which controls the feature by assigning a limit to the number of resources that the option controls.

- This activity restricts the number of provisioned DS1P carriers assigned with either ISUP/PTS or PRI trunks to a limit set through the SOC CI Level.
- Initially, the limit of carriers allowed to be provisioned is zero.
- Using an RTU password purchased from Nortel Networks, this number may be increased up to a maximum of 32767 in single increments for each of the options.
- When a new carrier is provisioned in table MNHSCARR, a counter is incremented provided that the limit has not been reached. Similarly, a counter is decremented when a carrier is deleted from MNHSCARR.
- A warning message is displayed when the value of carriers provisioned reaches to 75% of the limit of either options.
- Once the limit has been reached any attempts to provision another carrier will be denied and a error message is displayed.

54.3 Hardware requirements

No special hardware configuration required.

54.4 Limitations and restrictions

After querying the number of carriers provisioned, make sure this number is less than the usage limit set in the SOC options.

54.5 Interactions

Not applicable.

54.6 Logs (LG)

Not applicable.

54.7 Data schema (DS)

54.7.1 Warning and Error messages

54.7.1.1 Table MNHSCARR

RESPONSE: ADDITION DENIED: Adding this carrier would exceed the maximum number of SPM carriers for this office

Meaning: You have reached the upper limit of provisioned carrier allowed in this office

System or user actions: If you require more carriers for this office, please contact NORTEL NETWORKS to increase the limit.

The limits are set through the SOC options SPMS0016 and SPMS0017.

RESPONSE: ERROR: Failed to determine the current number of SPM carriers

Meaning: Upon calculating the number of carriers, a transient problem has resulted in failure to determine the number of carriers

System or user actions: Try the command again. If this error persists, contact support group at NORTEL NETWORKS

RESPONSE: Warning: You have reached 75% of the total limit of carriers provisioned in this office

Meaning: You have reached 75% of the total limit of provisioned carriers assigned with either PRI or ISUP/PTS trunks in this office

System or user actions: NONE

RESPONSE: ERROR: The office has reached its upper limit of carriers provisioned

Meaning: The upper limit of provisioned carriers with either PRI or ISUP/PTS has been reached

System or user actions: If you need to add additional tuple, request NORTEL NETWORKS for more provisioning

54.8 Office parameters (OP)

54.8.1 New/modified office parameters

Table 1 New or modified commands

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
OFCOPT	SPM_MAX_MSGTRK_CARRIER	DELETED
OFCOPT	SPM_MAX_PRITRK_CARRIER	DELETED

54.9 Service orders (SO)

Not applicable.

54.10 Alarms (AL)

Not applicable.

54.11 Command interface (CI)

54.11.1 New/modified commands

Table 2 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN
SPM_MAX_MSGTRK_CARRIER	DELETED			NON-MENU
SPM_MAX_PRITRK_CARRIER	DELETED			NON-MENU

54.12 Operational measurements (OM)

Not applicable.

54.13 AMA/Billing information (AM)

Not applicable

54.14 Software optionality control (SOC)

Table 3 SOC

SOC option name:	SPMS0016
SOC option title:	SPMS MSGTRK CARRIER
SOC option control type:	USAGE
New SOC option?	YES
SOC option order code	SPMS0016
Option defined in DRU:	SHR15
Affected products:	<PCL(s)>

Table 4 SOC

SOC option name:	SPMS0017
------------------	----------

SOC option title:	SPMS PRITRK CARRIER
SOC option control type:	USAGE
New SOC option?	YES
SOC option order code	SPMS0017
Option defined in DRU:	SHR15
Affected products:	<PCL(s)>

54.15 Glossary

Term	Description
New term	definition

54.16 References

SOC User's Manual NTP 297-8991-901, Standard 02.03

A59018431 Control of SPM carrier Provisioning

55: Functional description (FN)

55.1 Feature name

NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS parameter in OFCENG and/or OFCAUT.

55.2 Description

The parameter NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS defines the number of medium-sized extension blocks which are allocated for the Embedded Object Framework (EBOF). These extension blocks are used by the Agent Data Decoupling (ADD) and Topology Mapping Environment (TOME) call processing frameworks.

The software which binds the NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS parameter in tables OFCENG and OFCAUT is found in the SHR DRU. However, because of some hidden dependencies, this software is being included in products such as MTX, GSM and UCS even though they do not actually make use of these frameworks. This results in the parameter being present in these products when in actual fact it is not required.

Beginning with the SHR15 release, the binding of this parameter will be controlled by the CCM DRU such that products which are not built on top of CCM software will no longer see this parameter.

55.3 Hardware requirements

Not applicable.

55.4 Limitations and restrictions

Due to the fact that this parameter is only being removed from certain product lines, it is not possible to provide a software solution which would prevent the fallout of the NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS from tables OFCENG and/or OFCAUT when upgrading non-CCM based products such as MTX, GSM and UCS to a release which includes the SHR15 DRU software.

As a result, the NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS tuple(s) will appear as failing to be restored in the new release. However, this is to be expected and the fallout should simply be ignored.

55.5 Interactions

None.

DDOC section summaries

55.6 Logs (LG)

Not Applicable.

55.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/ DELETED	System (SOS/UNIX)

55.7 Data schema (DS)

55.7.1 New/modified table

Not applicable.

Table 2 New or modified tables

Table name	NEW, CHANGED or DELETED	Table Control (NEW/OLD/UNCHANGED)

55.8 Office parameters (OP)

55.8.1 New/modified office parameters

The office parameter NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS which appears in tables OFCENG and/or OFCAUT is being removed from products which are not based on the CCM (DMS-100 Common) DRU, such as GSM, MTX and UCS.

However, this parameter will continue to be required in CCM-based products such as CNA, MSL and WT.

Table 3 New or modified parameters

Parm table	Parameter name	NEW/CHANGED/ DELETED/RELOCATED
OFCENG	NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS	DELETED from products not based on CCM DRU.
OFCAUT	NUMBER_OF_EBOF_MEDIUM_AUX_BLOCKS	DELETED from products not based on CCM DRU.

55.9 Service orders (SO)

Not applicable.

55.10 Alarms (AL)

Not applicable.

55.10.1 New/modified directories

Indicate if directory is RESident or NONRESident in the load.

Table 4 New or modified directories

Directory name	NEW, CHANGED OR DELETED	New name (if renamed)	Target	RES/ NONRES

55.11 Command interface (CI)

Not applicable.

55.11.1 New/modified commands

List all the commands effected by this feature. Command names must not exceed 12 characters.

Table 5 New or modified commands

Command name	NEW, CHANGED OR DELETED	New name (if renamed)	Directory/MAP level name	MENU/NON-MENU /HIDDEN

55.12 Operational measurements (OM)

Not applicable.

55.12.1 New/modified OM groups

Indicate how many registers there are in this group.

Table 6 New or modified OM groups

Group name (acronym)	Group name (expanded)	NEW, CHANGED or DELETED	Reason

55.13 AMA/Billing information (AM)

Not applicable.

55.13.1 New/changed AMA/billing information

STANDARDS: Specifications -- LSSGR, CCITT, NTL,

Table 7 New or modified AMA/billing information

Billing format	NEW/CHANGED	Application	Standards

55.14 Software optionality control (SOC)

Not applicable.

Table 8 SOC

SOC option name:	
SOC option title:	
SOC option control type:	<state/usage/combined>
New SOC option?	<Yes/No>
SOC option order code	<order code>
Option defined in DRU:	<DRU>
Affected products:	<PCL(s)>

55.15 Glossary

Term	Description
ADD	Agent Data Decoupling framework
CCM	DMS-100 Common software layer
DRU	Development Release Unit
EBOF	Embedded Object Framework
SHR	Shared Library software layer
TOME	TOpology Mapping Environment

55.16 References

- 1 AF7759 - EBOF real-time enhancements
- 2 AF7426/AF7064- ADD phase I
- 3 AF7401/AF7402 - TOpology Mapping Environment (TOME)

56: Functional description (FN)

56.1 Feature name

Generating log in CM for CRC Errors on D-Channel in XLIU.

56.2 Description

The activity deals with the packet terminals unable to bring up its Layer 3 due to CRC Errors. Thus the solution to the problem was to peg the CRC Error count from HFP at regular intervals and report them to the CM in way of logs, as there was no way to know about them previously.

A problem is reported with the way that network parity errors go unreported, which causes ISDN packet lines to stay in a PSU state. These parity errors causes CRC errors in the packets that go across the Bd chnl (nailed up connection via table SPECCONN) between the LGC and the NIU. Since the DMS does not attempt system recovery on these Bd chnls for this type of error, or even create a log, it makes it very difficult to identify the root cause of these PSU lines.

Initially analysis of this problem reveals that the NIU was never designed to detect parity errors from the network links. Since the NIU only looks for integrity hits on the network links, a parity error can go unreported and show up as a CRC error at the XLIU. This causes the HFP (layer 2 controller of the XLIU) to toss the packet containing the CRC error. Since a hardware redesign of the NIU is unlikely (parity checking is done via hardware), our approach is to log the CRC Errors through software.

In our approach the OM's are pegged form the HFP every 10 minutes and a log (PKT 200) is generated in the CM if the differential Error (defined later) exceeds 5%.

56.3 Hardware requirements

None.

56.4 Limitations and restrictions

The CRC Errors are pegged only for the D-Channels in the XLIU and a log is generated if the differential Error is more than 5%.

The differential Error is calculated as follows:

Let

A = Previous CRC Error Frames

B = CRC Error Frames

C = Previous Total Frames

D = Total Frames

Then differential Error is

$$(B - A)$$

$$\frac{(B - A)}{(B - A) + (D - C)}$$

56.5 Interactions

The activity uses the existing qcounts utility available in CM. The request sent from the XLIU is similar to the one sent by qcounts from CM.

56.6 Logs (LG)

56.6.1 New/modified logs

Table 1 New or modified logs

Log name	Log number	NEW/MOD/DELETED	CM / XLIU	System (SOS/UNIX)
CRC Error	PKT 200	NEW ¹	CM	SOS

56.7 Data schema (DS)

56.7.1 New/modified tables

None.

¹ The logs will be generated in the CM whenever the CRC (differential percentage, defined earlier) errors exceed 5%.

56.8 Office parameters (OP)

56.8.1 New/modified office parameters

None.

56.9 Service orders (SO)

None.

56.10 Alarms (AL)

56.10.1 New/modified directories

None.

56.11 Command interface (CI)

56.11.1 New/modified commands

None.

56.12 Operational measurements (OM)

56.12.1 New/modified OM groups

None.

56.13 AMA/Billing information (AM)

56.13.1 New/changed AMA/billing information

None.

56.14 Software optionality control (SOC)

None.

56.15 Glossary

56.16 References

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