297-8403-907

DMS-100 Family

Operator Services Network Capability (OSNC)

Protocol Specification

TOPS15 and up Standard 03.01 May 2001

NORTEL NETWORKS™

DMS-100 Family

OSNC

Protocol Specification

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Version 03.01 Standard release for TOPS15

Added note that the DMS-250 does not support phase two re-origination on OSNC. This note was added to the Signalling Flows and Examples Flows sections under heading “RLT bridge (variant two): phase two (re-origination)”

Added meaning for digit range 010000-011110 to Generic Digits in Parameters section.

November 2000

Version 02.02 Standard release for TOPS14

Updated document with cosmetic and editorial changes

August 2000

Version 02.01 Standard release for TOPS14.

- Added feature Release Link Trunking (Variant 2) Enhancements (59022000)
- Added OSNC Enhancements feature (59019041), which provides:

—coin functionality interworking between OSNC signaling and Multi-Frequency (MF) signaling

—a new TOPSPARM parameter to allow all outgoing ISUP calls to default to OSNC signaling

—a coin signal timer, which ensures that Traffic Operator Position System (TOPS) is not waiting for a lost coin signal

March 2000

Version 01.01 Standard release for LET0013.

Contents

About this document

This document provides the protocol specification for Operator Services Network Capability (OSNC). OSNC is an ISUP or SS7-based protocol that incorporates operator services signaling functionality such as connection hold and coin signals.

OSNC is based upon the ANSI standard. Requirements are also found in the document GR-1144-CORE of Telcordia, formerly known as Bellcore. This document provides a view of the protocol from the perspective of TOPS. It not only describes the components of the signaling protocol, but also how TOPS interprets and generates these components.

Chapters in this book

Following is a summary of each chapter.

Part 1: Introduction

Chapter 1: OSNC overview

This chapter provides an introduction to OSNC and illustrates its place in the network.

Part 2: Functional Description

Chapter 2: Signaling flows

This chapter provides generic signaling flows for various operator services call types and situations.

Chapter 3: Example Flows

This chapter provides example signaling flows that pull together the generic signaling flows from the previous chapter.

Part 3: Interactions

Chapter 4: Interworking

This chapter provides a view of how OSNC interworks with other signaling protocols, both ISUP-based and MF-based.

Part 4: Planning and engineering

Part 5: Provisioning

Chapter 5: OSNC Data Schema

This chapter describes the table and parameter datafill associated with OSNC.

Chapter 6: OSNC SOC

This chapter describes the OSNC SOC.

Part 6: Billing

Part 7: Operator, administration and maintenance

Chapter 7: OSNC logs

This chapter describes the logs associated with OSNC.

Part 8: Appendix

Chapter 8: Messages

This chapter describes the OSNC messages.

Chapter 9: Parameters

This chapter describes the OSNC parameters.

List of terms

This chapter lists OSNC terms and definitions.

Feature activity

The features listed in the following table provide OSNC capability for TOPS.

OSNC features

Feature name	Activity ID
OSNC Call Originations	59012548
OSNC Call Terminations	59014261
OSNC Mid-Call Flows	59014265
OSNC Release Call Flows	59014276
OSNC Enhancements	59019041
Release Link Trunking (Variant 2) Enhancements	59022000

References in this book

Following are the documents referred to in this book:

- OSSGR Section 6: Signaling,
  GR-1144-CORE
- Operator Services: Switching System Generic Requirements Using Integrated Services Digital Network User Part (ISUP),
  GR-1277-CORE
- LSSGR:Switching System Generic Requirements for Call Control using the Integrated Services Digital Network User Part (ISDNUP),
  GR-317-CORE
- LSSGR: Switching System Generic Requirements for Interexchange Carrier Interconnection using the Integrated Services Digital Network User Part (ISDNUP),
  GR-394-CORE
- ISUP to TOPS Enhancements,
  AN1515
- DMS-100 Family TOPS Translations and Screening User's Guide,
  297-8403-905
- RLT Interworking with TOPS and OSSAIN,
  AN1900
- Carrier Release Link Trunking: Phase II,
  AF7134
- UCS DMS-250 SS7 RLT Feature Application Guide,
  297-2621-345
- Software Optionality Control User's Manual,
  297-8991-901
- Log Report Reference Manual
- Translations Guide

Part 1: Introduction

Part 1: “Introduction”contains the following chapters:

- Chapter 1: “OSNC overview” beginning on page 21.

Chapter 1: OSNC overview

Operator Services Network Capability (OSNC) is the name given to a Signaling System #7 (SS7) trunk signaling protocol that supports operator services calls. OSNC, whose requirements are defined by Telcordia in GR-1144-CORE and GR-1277-CORE, builds upon the SS7 signaling specified by Telcordia in GR-317-CORE and GR-394-CORE. This chapter gives an overview of the OSNC capabilities.

The last section in this chapter provides a *road map* to detailed OSNC information in this book.

OSNC capabilities

The following operator services specific functions distinguish OSNC, as defined in GR-1144-CORE and GR-1277-CORE, from GR-317-CORE and GR-394-CORE:

- connection hold capabilities
- coin signaling
- network recall
- ringback request
- coin signaling interworking
- intercept call type indication
- forwarding of non-operator services related parameters
- end-to-end signaling
- combined operator and non-operator traffic on a single trunk group

Connection hold capabilities

Before OSNC, all SS7 trunks released the connection when the associated party (calling or called) disconnected. There were no provisions for the facilities (both trunk facilities and line facilities) to remain connected when the party went on-hook. Connection hold provides a means to preserve the connection facilities when the associated party disconnects.

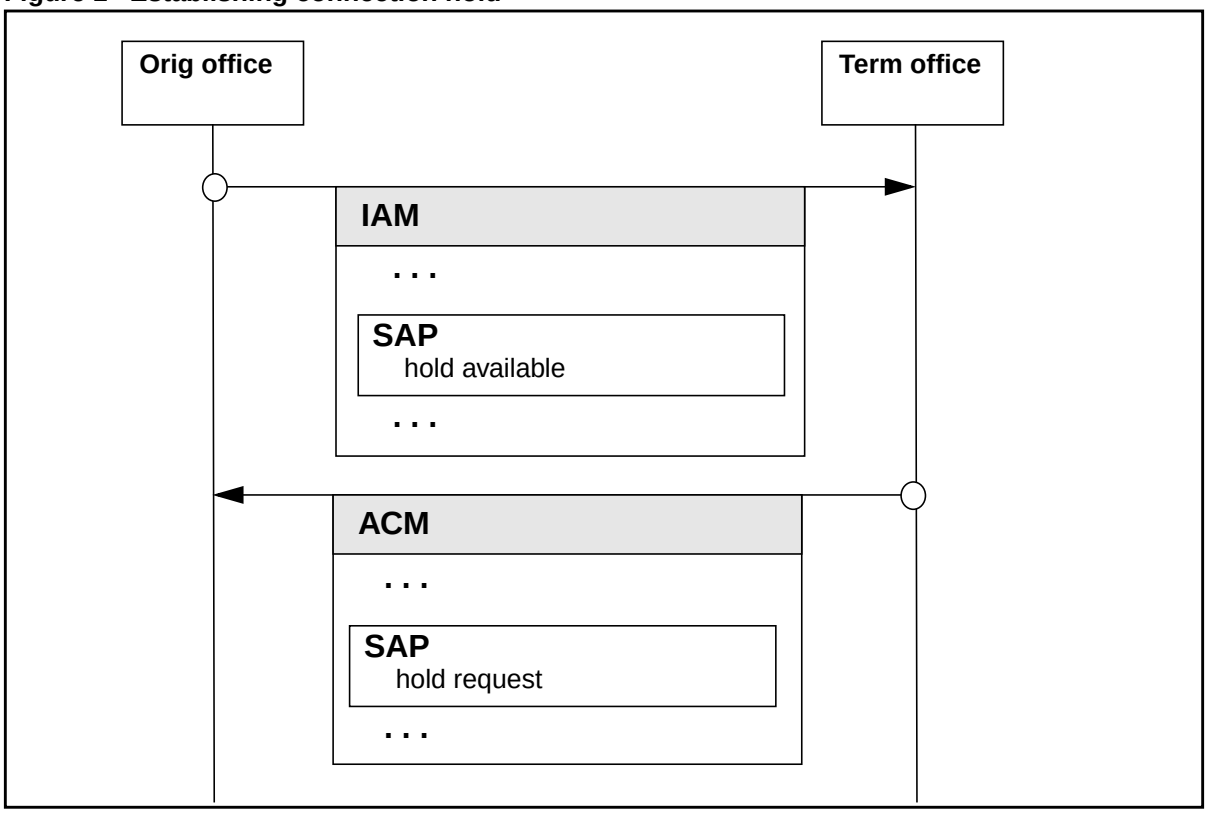
Connection hold is needed in the operator services environment. In this environment, connection hold is needed for the calling party in the following situations:

- coin sent paid calls so that coins can be collected at the end of the call
- time and charges so that charge information can be quoted at the end of the call

Connection hold can also be offered to the terminating office when the terminating office provides operator services. An example of this scenario is an instance in which TOPS transfers a call to a carrier operator. Connection hold is extended to the carrier operator and TOPS becomes a tandem – it just passes the messages through the TOPS switch without processing them. For more information regarding connection hold, please refer to table OSNCCAP in Chapter 5: "OSNC Data Schema."

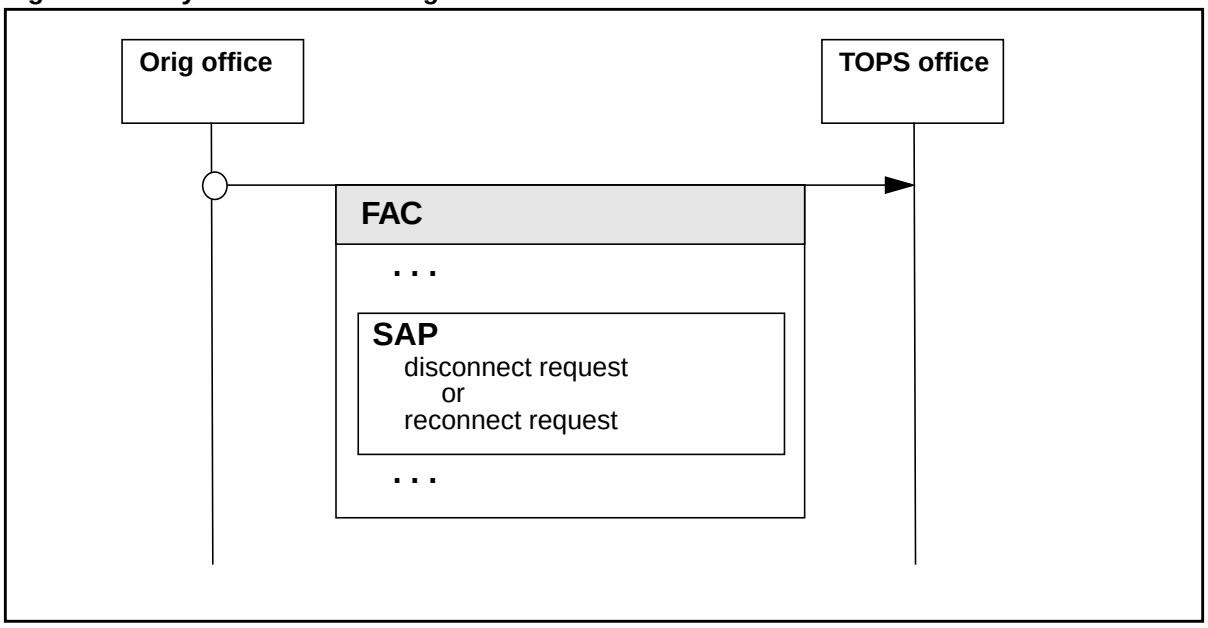
The mechanism for establishing connection hold is use of the Service Activation Parameter (SAP) in the Initial Address Message (IAM). The originating office offers connection hold. The terminating office responds with another SAP parameter in the Address Complete Message (ACM) accepting connection hold. TOPS could be the terminating office when establishing connection hold to the calling party or TOPS could be the originating office when extending connection hold to a carrier operator. Connection hold will end when appropriate to allow flash functionality.

Figure 1 Establishing connection hold



When connection hold has been established, the operator services switch controls when the connections are released. The party associated with a connection on which there is connection hold reports on-hooks and off-hooks to the operator services switch using Facility (FAC) messages containing a Service Activation parameter. The operator services switch evaluates the services required on the call and determines if the connection should be retained or released.

Figure 2 Party hook status change



Coin signaling

Coin signaling is a function performed by operator services to control both the flow of coins through the coin phone and the state of the keypad. Calls originated from coin phones that use coins to pay for the call are referred to as ‘coin sent paid’ calls. The operator services switch has the following responsibilities on a coin sent paid call:

- calculate the charges associated with the call
- instruct the subscriber when and how much money is owed
- count the coins deposited
- collect the coins at various intervals

Other calls that are not coin sent paid calls but are originated from coin phones may still require coin signals to change the state of the keypad and control the flow of coins through the phone. The following is a list of situations that require the operator services switch to interact with the coin phone:

- coin-first phones require the deposited coin to be returned. A coin-first phone is a coin phone that requires the user to deposit a coin in order to get dial-tone and to initiate a call
- 0+ dialed calls require the keypad to be enabled so that automated systems can collect calling card and other alternate billing information

The mechanism for sending coin signals provided by OSNC is the Facility (FAC) message containing the Service Activation Parameter (SAP). The message is originated from the operator services office and sent to the originating office.

OSNC to MF message conversion

This section addresses the messages that need to be converted from OSNC messages to MF messages. These messages are from the originator and need to be forwarded to the carrier. They consist of flash, calling on-hook, and calling reconnect. This functionality applies to both coin and non-coin calls. The following information provides details about each of the three types of messages mentioned.

- **Flash.** A flash message comes from the originating end office (EO) when the calling party hook-flashes to recall back to an operator. For an incoming OSNC call, a facility (FAC) message is received that contains a Service Activation Parameter (SAP) with a Feature Code Indicator (FCI) of Network Service Recall. This flash message needs to be converted from an OSNC message to an MF message to be forwarded to the carrier office.

  TOPS will receive the OSNC FAC with Network Service Recall and will send out supervision signaling to indicate flash. An analog (MF) flash is an on-hook followed by an off-hook within a predetermined time frame. The flash has a minimum and maximum time in which the off-hook must follow the on-hook to be considered a flash.

  The full range, specified in *GR-506-Core: LSSGR Signaling for Analog Interfaces*, can be from 200 to 1550 milliseconds. However, this scenario typically uses a range of 400 to 800 milliseconds.

  Note: An off-hook received before the minimum timer value is considered a hit and is ignored.

  TOPS will send these signals (on-hook then off-hook) using the predetermined times specified in the peripheral based upon the card type.

- **Calling On-hook.** When the calling party goes on-hook, TOPS will receive a FAC message with the SAP FCI set to ‘Disconnect Request’ if connection hold is in effect. TOPS will not release the connection, but it will forward an MF ‘on-hook’ to the carrier.

  If connection hold is not in effect, then TOPS would receive a REL message and release the connection. TOPS would also forward an MF ‘on-hook’ to the carrier.

- **Calling Off-hook (with connection hold).** When the calling party goes back off-hook during a call with connection hold in effect, TOPS will receive a FAC message with the SAP FCI set to ‘Reconnect Request.’ Because connection hold is in effect, TOPS will forward an MF ‘off-hook’ to the carrier.

  If connection hold is not in effect, TOPS will not receive this message.

The following table illustrates these OSNC to MF message conversions.

Table 1 OSNC to MF message conversions:

Incoming OSNC FCI	Outgoing MF
Network Service Recall (#84)	On-hook followed by an off-hook
Disconnect Request (#8D)	On-hook
Reconnect Request (#8E)	Off-hook

Note: OSNC uses a done_msg (FCI-#B8) to indicate that the end office (EO) has finished processing the coin function (coin collect or coin return). However, there is no MF signal into which this message can be converted. The MF done_msg received on the incoming trunk (to the carrier position) is sent from the trunk's PM — not signaled from the other office. If timing issues arise, then the carrier office will possibly require addition of a delay before processing the done_msg.

Connection hold and interworking

Support for most of this functionality is possible only if the call has connection hold in effect. Connection hold, also known as operator hold, allows the operator to maintain control of the call, even after the calling party has gone on-hook. When connection hold is in effect, messages can be passed through one office to the next one through TOPS. For example, an OSNC on-hook received as a facility message (FAC) is forwarded to the carrier as an MF on-hook message.

The following messages cannot be supported without connection hold:

- calling disconnect
- calling reconnect
- ringback

Ringback is signaled in the same manner as the coin signals. The ringback functionality applies to both coin and non-coin calls for the interworking scenario that the OSNC activity supports.

The following messages cannot be supported without connection hold after the calling party hangs up because the connection would be released when the on-hook was detected:

- coin collect
- coin return
- operator attached/released

Connection hold can be established on the incoming OSNC connection when the call arrives at TOPS. It can be set up for an outgoing Access to Carrier (ATC) trunk in table TRKGRP through field OPRHOLD. Feature Group C (FGC) requires that connection hold be in effect; thus, datafill enforces field OPRHOLD to be set to Y for BELLI and BELLII, which is the signaling type that FGC uses. Because OSNC only supports FGC, connection hold needs to be available for the outgoing trunk.

The OSNC features will maintain the connection hold status of the incoming party when transferring to the carrier based upon the OPRHOLD setting.

Connection hold and the OSNC functionality apply to both coin and non-coin calls for the interworking scenario that OSNC supports.

Note: If the incoming party does not have connection hold in effect, then interworking is limited as described in the section above that discusses absence of connection hold.

Note: There is a parameter in table OFCENG called CONNECTION_HOLD_TIMER_IN_MINS. This parameter is a one- to four-minute timer that will end connection hold when the timer expires after the calling party has gone on-hook. When the timer expires the end office (EO) sends an ISUP REL to TOPS, which releases the connection and ends the call.

The following MF coin messages incoming from the terminating trunk will be converted into OSNC messages and sent to the originating trunk:

- coin collect
- coin return
- operator attached
- operator released
- operator released/coin collect
- ringback

The following OSNC messages incoming from the originating trunk will be converted into MF messages and sent to the terminating trunk:

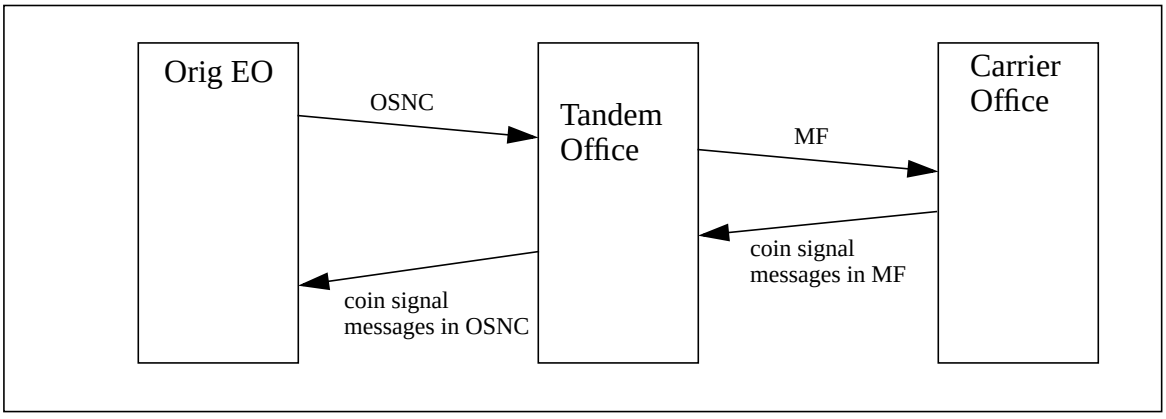
- flash/recall
- calling disconnect
- calling reconnect

Tandem scenarios for coin interworking

This section highlights various coin interworking issues that can appear with various network configurations. It also discusses TOPS interactions and necessary features to support coin interworking.

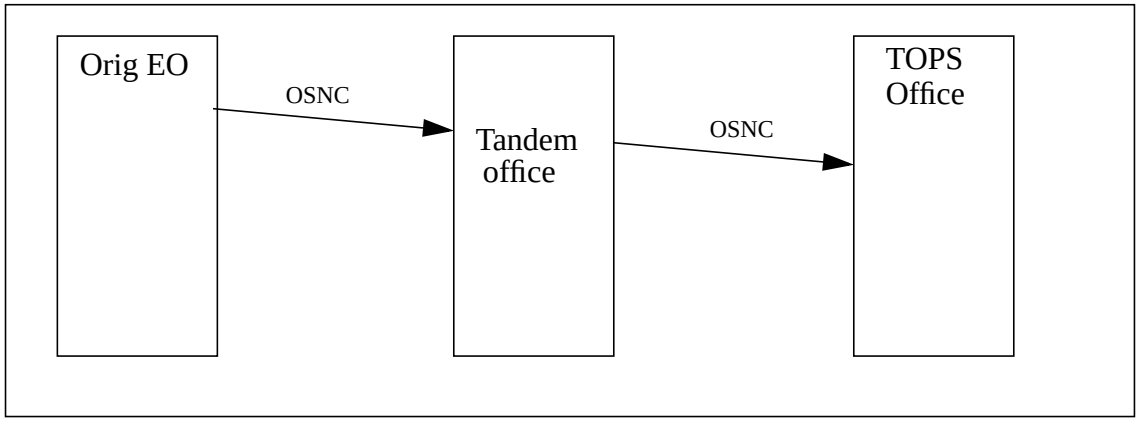
"Figure 3, EO-Tandem-Interexchange Carrier," illustrates calls routing through an Access Tandem to a carrier office. In this scenario, the calls are not presented to TOPS. Thus, the OSNC activity does not support this scenario. A tandem feature is required to support coin interworking in this situation. The tandem feature would also have to include support for forwarding the Automatic Number Identification (ANI) and flex ANI.

Figure 3 EO-Tandem-Interexchange Carrier



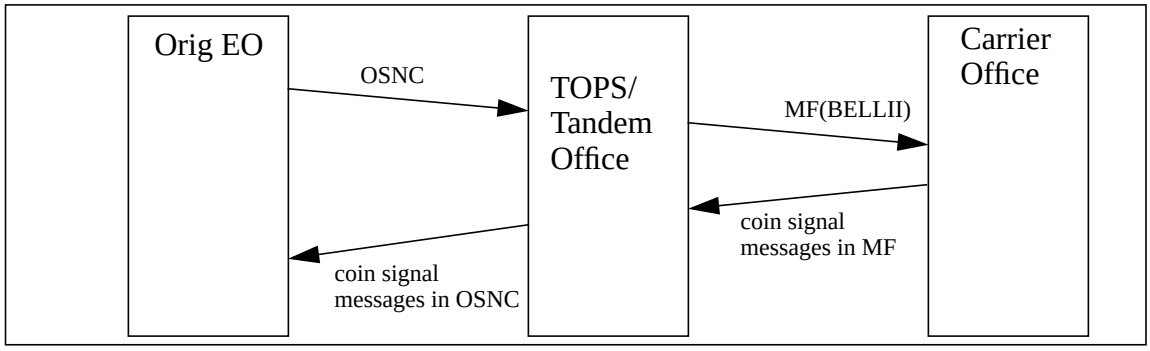
"Figure 4, EO-Tandem-TOPS," illustrates a call routing through a tandem to TOPS with use of OSNC. This scenario does not require coin interworking features for this portion of the call. This situation is included to illustrate that OSNC software is a possible requirement in the tandem but TOPS software is not. Furthermore, flex ANI is passed through the Originating Line Information (OLI) for this scenario. It is not necessary to datafill OSNC on the trunk going to TOPS from the tandem because the Service Activation Parameter (SAP) will be passed along through the tandem.

Figure 4 EO-Tandem-TOPS



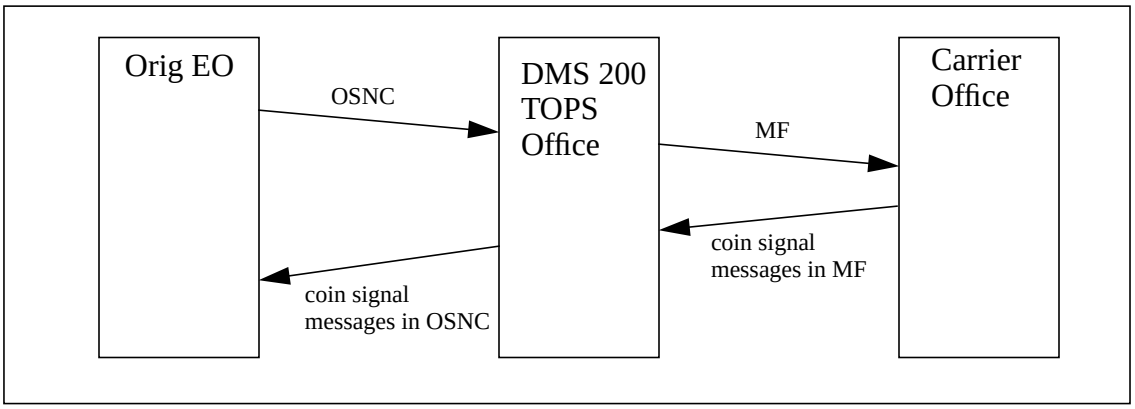
"Figure 5, EO-TOPS/Tandem-IXC," shows calls routing from the EO to the TOPS/tandem switch on IXC-dedicated trunks for NOSERV carriers. For this scenario, coin calls are now presented to TOPS with OSNC enhancements. The tandem, not TOPS, still routes non-coin NOSERV traffic. TOPS will route incoming NOSERV carrier coin calls instead of letting the tandem route the call.

Figure 5 EO-TOPS/Tandem-IXC



"Figure 6, EO-TOPS-IXC," illustrates traffic incoming to TOPS on shared trunks. TOPS processes and routes all incoming NOSERV coin carrier traffic. The tandem routes non-coin NOSERV traffic. TOPS processes all incoming SERV carriers. All 0- traffic is routed to TOPS, and then TOPS routes NOSERV traffic. The OSNC Enhancements feature supports coin interworking for this scenario for calls processed by TOPS.

Figure 6 EO-TOPS-IXC



Network recall

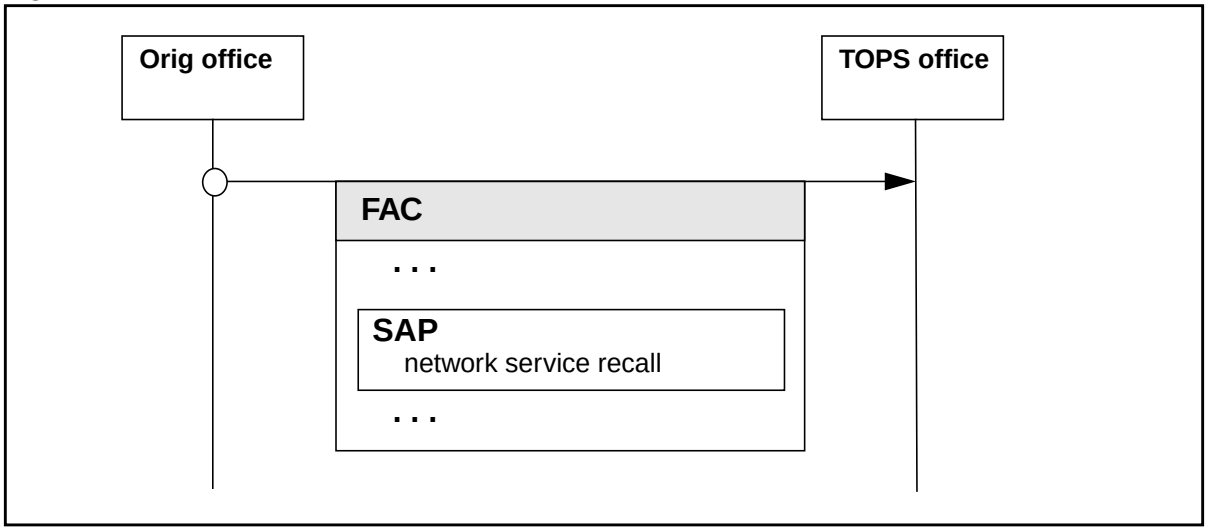
Network recall is a means for the calling party to request connection to an operator after the call has been set up. Connection hold must be established in order for the network recall to be available. This instance is the equivalent of a hook-flash in non-SS7 signaling. There are certain times during a call when the calling party can request an operator:

- a coin sent paid call during the initial period
- after a notify has been established but before the notify period expires
- a trigger for additional services

In OSNC, a network recall is requested by the calling party using a Facility (FAC) message containing a Service Activation Parameter (SAP). The message is originated from the originating office and sent to the operator services office.

As stated above, if a calling party hook-flashes, the calling party will recall to the operator if it is appropriate. At other times during the call, the hook-flash may cause features to be activated on the calling party's line or the hook-flash will be ignored.

Figure 7 Network recall

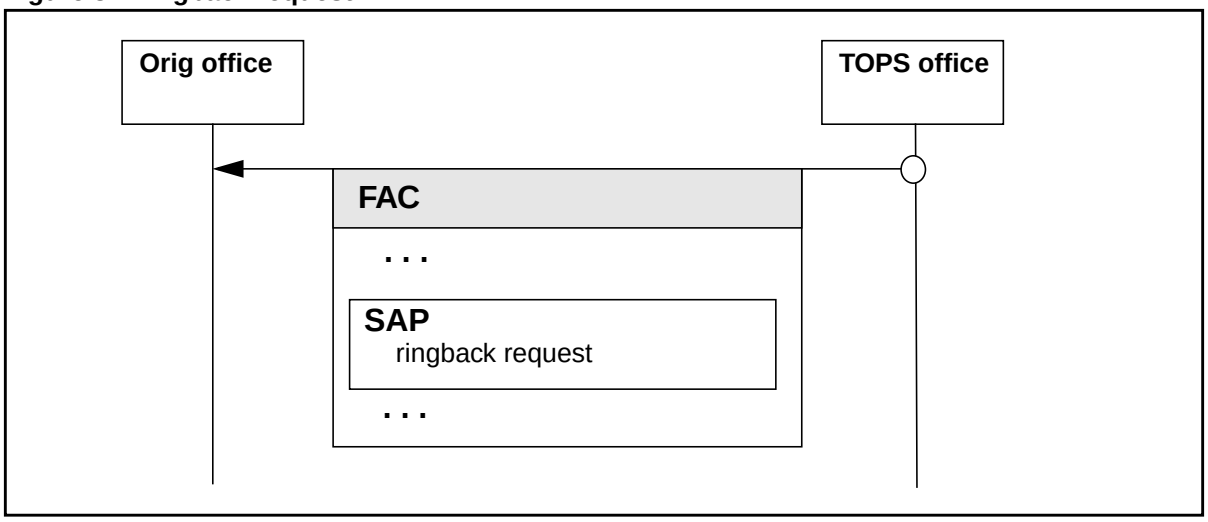


Ringback request

A ringback request is a means for the operator/service node to cause the calling party's phone to ring. Connection hold must be established in order for the ringback request to be available. A ringback request is needed when the calling party goes on-hook and the operator/service node requires further dialog with the calling party. The operator/service node requests the originating office to ring the calling party's phone.

In OSNC, a ringback request is requested by operator services using a Facility (FAC) message containing a Service Activation Parameter (SAP). The message is originated from the operator services office and sent to the originating office.

Figure 8 Ringback request

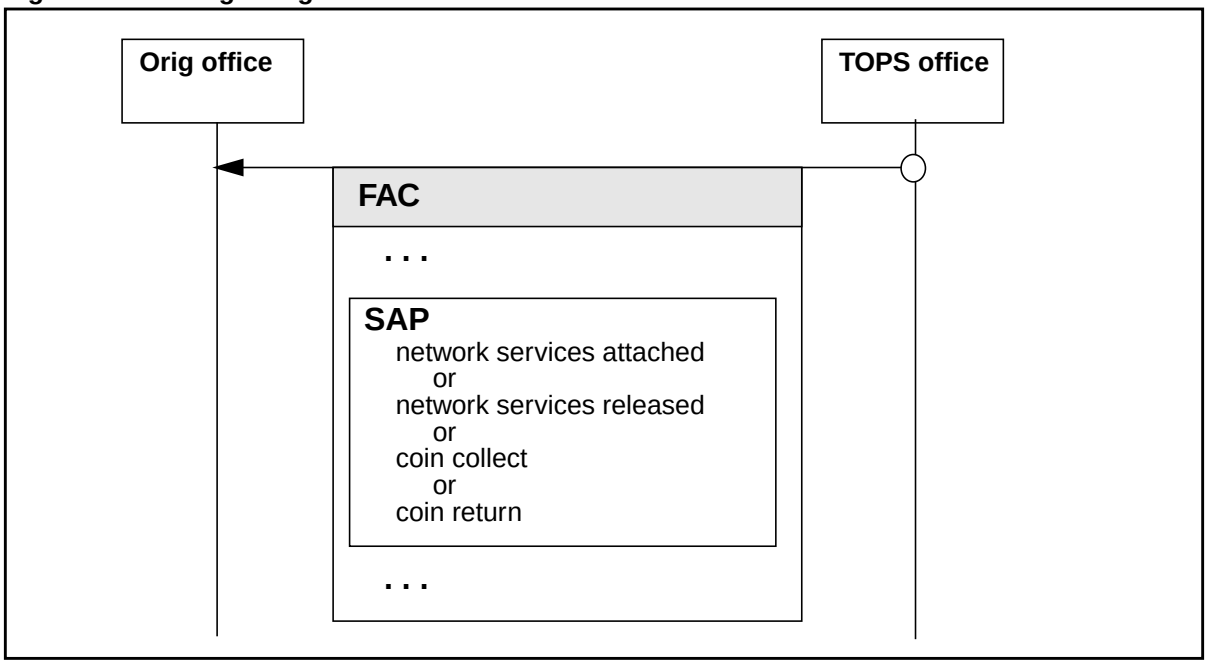


Coin signal interworking

The TOPS14 feature OSNC Enhancements introduces a coin signal timer. For inband and expanded inband signaling, TOPS is notified that a coin signal is approaching through a flash message. When TOPS receives the flash message, a receiver is connected to capture the coin signal. A new coin signal timer is started for seven seconds to ensure that TOPS is not endlessly waiting for a coin signal that is possibly lost. Thus, this internal timer is started whenever a flash message is received from the carrier to indicate that a coin signal is approaching.

Note: Because the coin signal indicates activity on the call, the OPRHOLD timer is reset when a coin signal arrives. If the calling party is on-hook but still connected when the coin signal finishes, the OPRHOLD timer is re-started.

Figure 9 Coin signaling



OSNC and MF interworking for coin functionality

OSNC allows interworking for coin calls arriving to TOPS with OSNC signaling and terminating with Multi-Frequency (MF) signaling. Certain OSNC messages incoming on the originating trunk need to be converted into MF messages to be sent to the terminator.

With the TOPS14 feature OSNC Enhancements, OSNC incoming calls are supported to terminate to an outgoing Access to Carrier (ATC) trunk that uses the following:

- BELLI or BELLII signaling with either inband or expanded inband coin signaling
- a Feature Group C (FGC) Carrier Identification Code (CIC)

This capability is only supported for offices with a direct connection to the carrier office through an ATC trunk. It is unsupported if there is a tandem with Intertoll (IT) trunks between TOPS and the carrier office. The OSNC activity supports NOSERV coin calls to route through TOPS to use the coin signal converter.

The TOPS14 feature allows coin calls incoming with a NOSERV carrier to be routed through TOPS to use the coin signal convertor. Alternate carriers are also supported for calls that tandem through TOPS. Calls that are forwarded to a carrier office by tandeming through TOPS will produce Automatic Message Accounting (AMA) records with a 625 structure code and either a 110 or 251 call code depending on datafill.

Note: There is no need to route NOSERV calls to TOPS in a DMS100/200 TOPS combo office and tie up additional resources. Therefore, NOSERV calls originating in a TOPS combo office need to be directly routed to the carrier from the DMS-100 side and not looped around to TOPS. Thus, these calls do not use OSNC, and interworking is not an issue here.

MF to OSNC message conversion

This activity supports both inband signaling and expanded inband signaling for coin controls from the terminating trunk. TOPS will analyze these messages and convert them into OSNC messages to be forwarded back to the originating end office (EO).

Note: Incoming MF to terminating OSNC interworking for coin signaling is not supported.

The basic methods applied to sending these coin control signals are to:

- send on-hook wink (flash)
- wait the post-wink duration
- send the MF tone that represents the corresponding coin signal

Please reference the *GR506-Core: LSSGR: Signaling for Analog Interfaces* and the *Translations Guide* for more information.

To support the interworking scenario, MF coin messages incoming from the terminating trunk need to be captured with a receiver and converted into OSNC messages to be sent to the originator. OSNC supports use of standard MF receivers, Universal Tone Receivers (UTRs), and Global Tone Receivers (GTRs) to capture incoming messages from the terminating trunk.

Note: UTR cards are NT6X92BB, BC, and CA. Cards NT6X92BB and NT6X92BC are manufacture-discontinued.

Note: GTRs are LSSGR/CCITT compliant tone receivers and can be used in all markets. The Product Engineering Code (PEC) for the GTR cards is NT6X92EA, and it is orderable through NTZZ02FC.

TOPS looks for MF coin control signals and converts them into OSNC messages. OSNC uses Facility (FAC) messages to send these signals by adding the Service Activation Parameter (SAP) to the message with the appropriate Feature Control Indicator (FCI). The following table shows the MF coin control signals and the corresponding OSNC FCIs.

Table 2 Inband, Expanded Inband, and OSNC coin control signals

Inband	Expanded Inband	OSNC FCI
Coin Collect	Coin Collect	Coin Collect
Coin Return	Coin Return	Coin Return
Ringback/Re-ring	Ringback/Re-ring	Ringback Request
not supported	Operator Released	Network Service Released
not supported	Operator Attached	Network Service Attached
not supported	Operator Released & Coin Collect	Network Service Released & Coin Collect

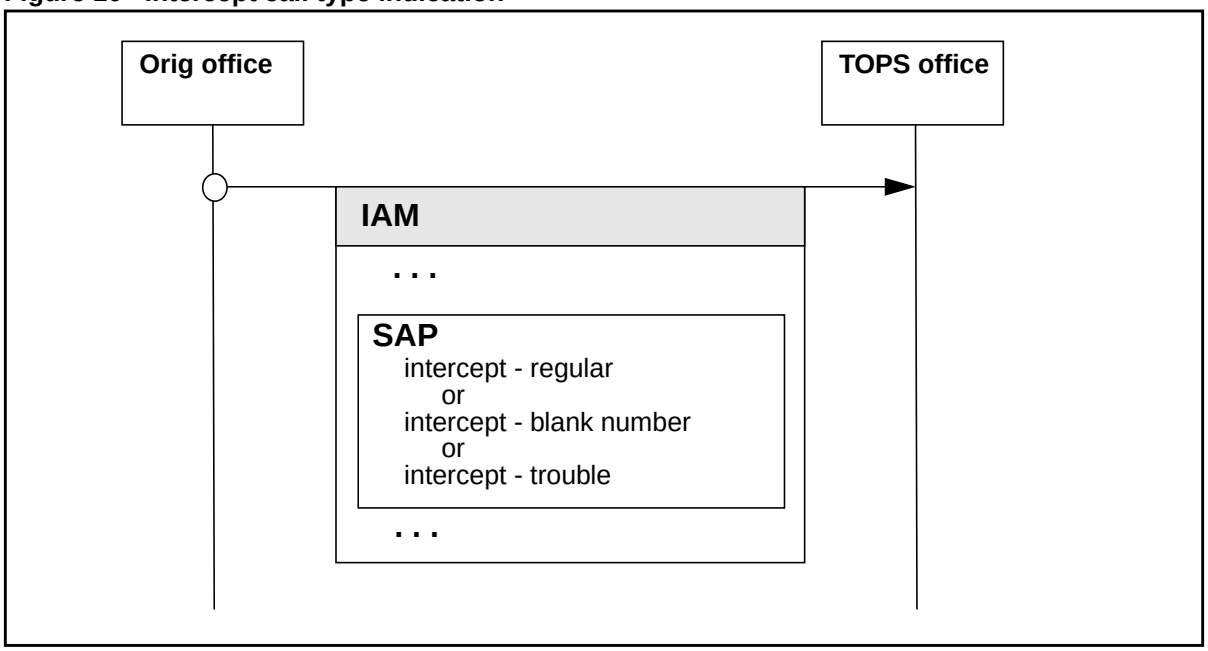
TOPS signals ringback in the same manner as it does the coin control signals. Ringback is included in Table 2, “Inband, Expanded Inband, and OSNC coin control signals.” The ringback functionality applies to both coin and non-coin calls for the interworking scenario that the TOPS14 feature OSNC Enhancements supports.

Intercept call type indication

Before OSNC, SS7 signaling could not distinguish between the different types of intercept calls. These intercept call types are passed from TOPS to the intercept database and are used to select announcements used to inform the subscriber of the new number.

In OSNC, the intercept call type indication is sent using an Initial Address Message (IAM) containing a Service Activation Parameter (SAP). The message is originated from the originating office and sent to the operator services office.

Figure 10 Intercept call type indication



Forwarding of non-operator services related parameters

Before OSNC, TOPS supported a version of SS7 (both incoming and outgoing) as documented in feature AN1515, ISUP to TOPS Enhancements. Both the originating connection to TOPS and the terminating connection from TOPS were viewed as independent connections. Non-operator services parameters received from the originating connection were not forwarded to the terminating connection.

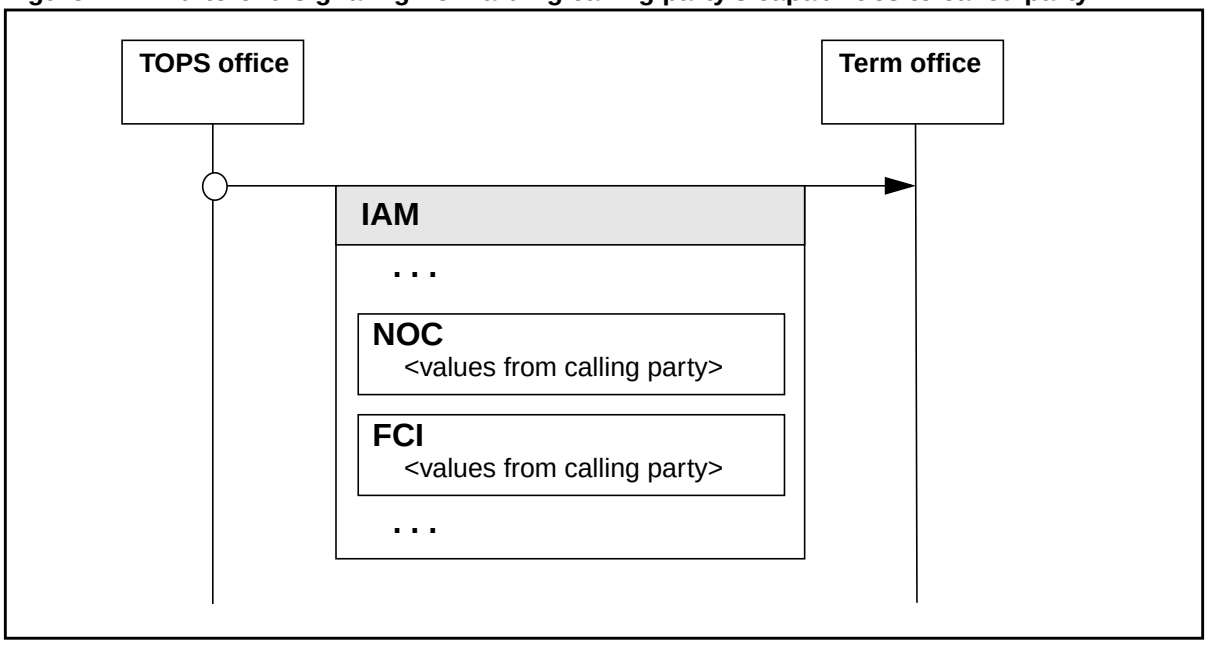
In OSNC, the originating and terminating connections are usually viewed as a single connection. Most non-operator services parameters are passed from the originating connection to the terminating connection.

End-to-end signaling

End-to-end signaling is the ability to pass information about the calling party to the called party or information about the called party to the calling party. As stated above, before OSNC, the originating connection to TOPS and the terminating connection from TOPS were viewed as independent connections. To the originating connection, the called party was the operator/service node., and to the terminating connection, the calling party was the operator/service node. The calling and called parties did not know each other's capabilities.

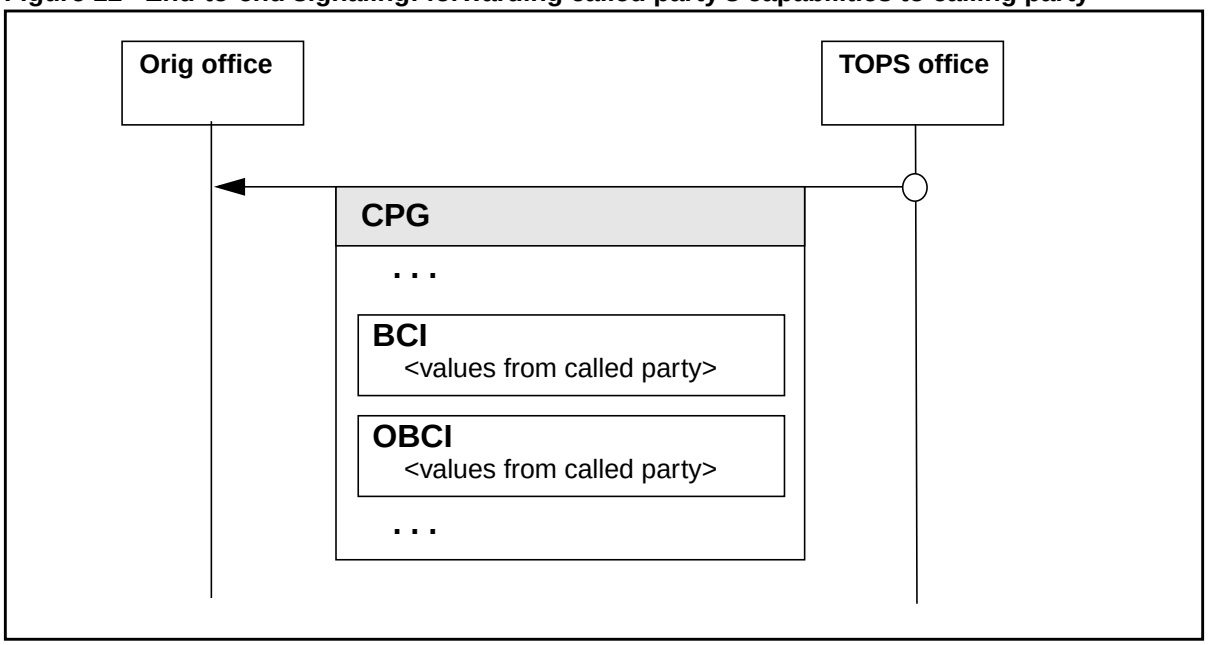
In OSNC, provisions are made to both inform the calling and called parties of each other's capabilities as well as to inform the calling party when the operator/service node is attached and should be viewed as the called party. When the terminating connection is established, the called party is informed about the calling party's capabilities by forwarding the Nature of Connection (NOC) and Forward Call Indicator (FCI) parameters (received from the incoming Initial Address Message (IAM) in the outgoing IAM message.

Figure 11 End-to-end signaling: forwarding calling party's capabilities to called party



The called party's capabilities are sent in the Backwards Call Indicator (BCI) and Optional Backwards Call Indicator (OBCI) parameters. The called party sends this information in either the Address Complete Message (ACM), the Answer Message (ANM) or both. TOPS forwards this information back to the calling party using a Call Progress (CPG) Message when the operator/service node floats the call.

Figure 12 End-to-end signaling: forwarding called party's capabilities to calling party

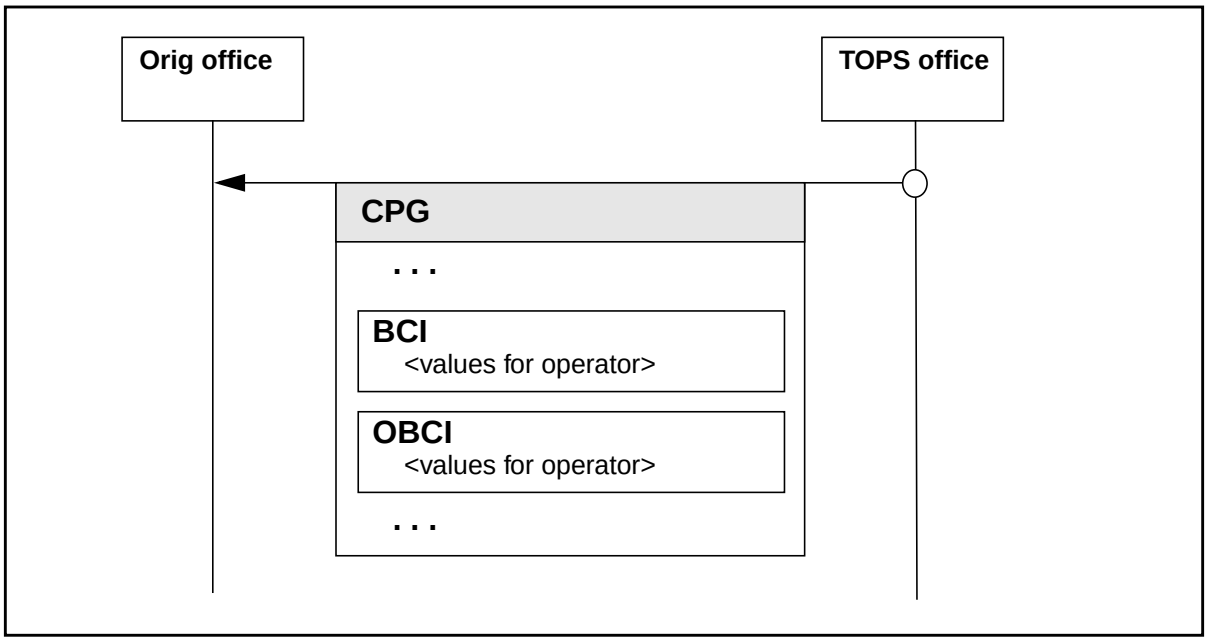


After both connections are established and the operator/service node has floated the call, it may be necessary to recall to an operator/service node with both connections still established. The following are some example situations:

- coin recall
- notify recall
- calling party-initiated network recall

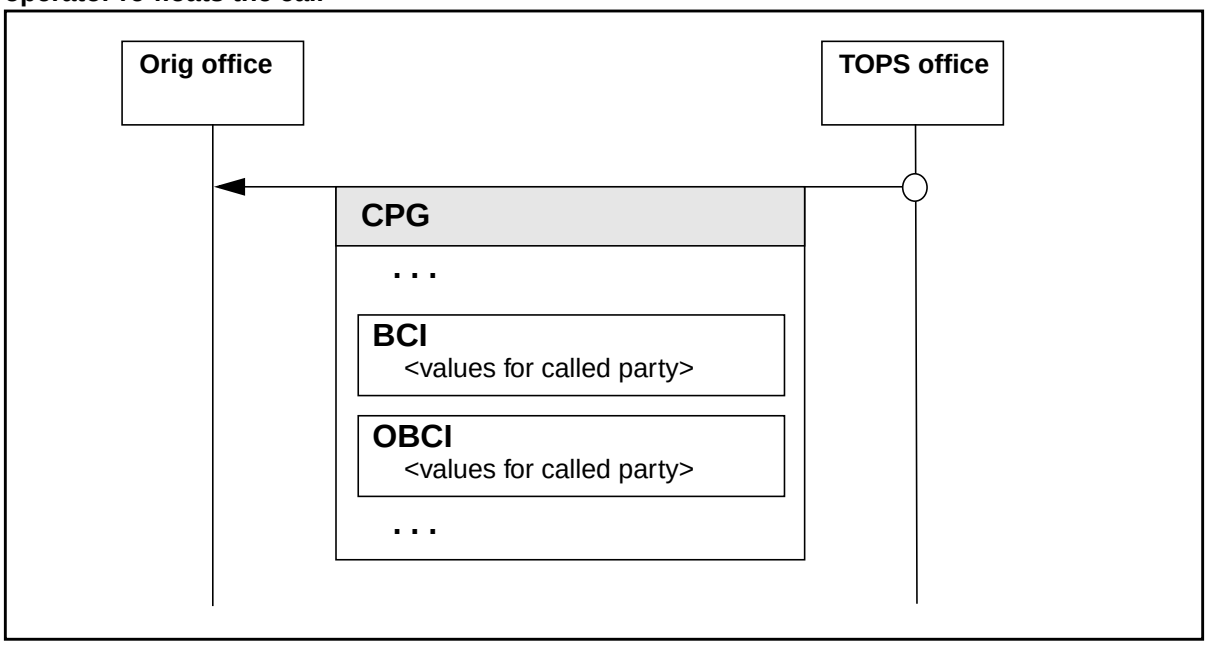
When the operator/service node is re-attached, the calling party is informed of the operator's capabilities because TOPS sends a Call Progress (CPG) Message containing Backwards Call Indicators (BCI) and Optional Backwards Call Indicator (OBCI) parameters encoded to represent the capabilities of the operator/service node.

Figure 13 End-to-end signaling: forwarding operator's capabilities to calling party when operator is re-attached



When the operator/service node re-floats the call, then the calling party is updated with the called party's capabilities, which were stored when the Address Complete Message (ACM) and/or Answer Message (ANM) was received from the terminating connection.

Figure 14 End-to-end signaling: forwarding called party's capabilities to calling party when operator re-floats the call



There is no means defined in GR-1144-CORE to update the called party in this situation. The Forward Call Indicators (FCI) and Nature of Connection (NOC) parameters are only sent in an Initial Address Message (IAM). The called party is not aware that the operator/service node has been re-attached to the call.

Combined operator and non-operator traffic on a single trunk group

Before OSNC, it was difficult to combine operator services and non-operator services calls on the same trunk group. The Called Party Number (CDN) parameter contained a field called Nature of Address (NOA) that indicated whether the call requested operator services. This field was encoded to set values meaning operator requested when 0+ or 0- prefixes were dialed. There are other calls that require operator services that are not dialed as 0+/0- such as the following:

- 1+ calls from a coin phone
- 1+ calls from a hotel phone
- 411 and 555-1212 calls for directory assistance
- intercept calls

In OSNC, the Operator Services Information (OSI) parameter sent in the Initial Address Message (IAM) is introduced to provide explicit information about the prefix that was dialed. This allows the Called Party Number (CDN) parameter Nature of Address (NOA) field to be encoded to reflect operator services requested on 1+ dialed and other no prefix dialed calls. Use of both the Called Party Number (CDN) parameter Nature of Address (NOA) field and the Operator Services Information (OSI) parameter together are referred to as the ‘modified’ NOA.

The ‘modified’ NOA has the most impact on tandems, not operator services switches. The concept was for tandems to be able to route calls based upon the Called Party Number (CDN) parameter Nature of Address (NOA) field and pass operator-requested calls to operator services switches and non-operator services-requested calls to the terminating office. Refer to GR-1277-CORE for more information on how the tandem handles the ‘modified’ NOA.

TOPS supports functions of the ‘modified’ and the ‘basic’ NOAs for originating connections. Refer to “‘Modified’ NOA vs. ‘basic’ NOA” on page 47 for more detailed information. However, for terminating connections, TOPS only supports the ‘basic’ NOA.

Release Link Trunking

Release Link Trunking (RLT) allows for release of a connection from a previous office to TOPS while yet maintaining the call in the previous switch. There are two variants of RLT, both of which work with OSNC: variant one and variant two. The various phases of RLT are further discussed in Chapter 2: "Signaling flows."

OSNC information road map

OSNC signaling has several components, which are documented in this book. Extensive user information on OSNC parameters, messages and usage appears in the chapters that follow.

The following road map is a guide to the location of specific information in the *OSNC Protocol Specification*.

- Part 2: “Functional Description”
  - — Chapter 2: “Signaling flows” describes detailed message and parameter exchanges for various call-type components.

  - Chapter 3: “Example Flows” provides example message and parameter exchanges for various call types by putting together the call-type components documented in the previous chapter.
- Part 3: “Interactions”
  - Chapter 4: “Interworking” provides details on how OSNC connects to and interworks with other signaling methods.
- Part 4: “Planning and engineering”
- Part 5: “Provisioning”
  - Chapter 5: “OSNC Data Schema” provides details on the tables and office parameters associated with OSNC.
  - Chapter 6: “OSNC SOC” provides details on the software optionality control associated with OSNC.
- Part 6: “Billing”
- Part 7: “Operator, administration and maintenance”
  - Chapter 7: “OSNC logs” provides a description of all the logs associated with OSNC.
- Part 8: “Appendix”
  - Chapter 8: “Messages” provides a complete list of the OSNC messages and the parameters that are included in each message.
  - Chapter 9: “Parameters” provides a complete dictionary of the parameters and supported code points within each parameter.
- The list of terms defines OSNC concepts and abbreviations.

Part 2: Functional Description

Part 2: “Functional Description” includes the following chapters:

- Chapter 2: “Signaling flows” beginning on page 47.
- Chapter 3: “Example Flows” beginning on page 203.

Chapter 2: Signaling flows

There are many different services and reasons to route a call to TOPS, but from the signaling perspective, the calls can be grouped into a few unique signaling flows. This chapter documents generic signaling flow components that together describe the signaling for the entire call. These generic signaling flow components fall into the following categories:

- originating connection signaling
- terminating connection signaling
- mid-call signaling
- release signaling

Originating connection signaling

Originating connection signaling flows begin with an Initial Address Message (IAM) sent to TOPS. TOPS responds with an Address Complete Message (ACM).

When the IAM arrives, TOPS examines the information contained in it and decides whether operator services is needed and whether TOPS can provide it in this switch. The ‘modified’ Nature of Address (NOA) is introduced in OSNC to assist in that determination.

‘Modified’ NOA vs. ‘basic’ NOA

GR-1144-CORE introduces the concept of a ‘modified’ NOA. The ‘modified’ NOA does not involve any new parameters or code points within existing parameters. ‘Modified’ NOA differs from ‘basic’ NOA in the rules surrounding the encoding of the Called Party Number (CDN) parameter Nature of Address (NOA) field for 1+ dialed calls that also require operator services such as coin, hotel and restricted originated calls.

For ‘basic’ NOA, the Called Party Number (CDN) parameter Nature of Address (NOA) is used to infer the dialed prefix for the call. Calls dialed as 1+ did not reflect an NOA value that included ‘operator requested’ while calls dialed as 0+ or 0- did reflect an NOA value that included ‘operator requested.’ As stated above, there are certain 1+ dialed calls that require operator services even if the subscriber did not explicitly indicate the need by dialing the 0+/0- prefix. It is up to the switch to look at other data such as the Originating Line Information (OLI) parameter, which contains the Automatic Number Identification (ANI) ID digits to determine whether operator services were required for the 1+ call.

There is a ‘modified’ NOA rule for 1+ dialed calls that require operator services. The Operator Services Information (OSI) parameter with the dialed prefix information should be included in the IAM. The OSI parameter with dialed information should be included along with the Called Party Number (CDN) parameter Nature of Address (NOA) set to a value that indicates ‘operator requested.’

In order to properly interpret the Called Party Number (CDN) parameter Nature of Address (NOA), the switch must know what set of rules was used to encode the CDN parameter Nature of Address (NOA). The switch makes that determination based upon the presence of the Operator Services Information (OSI) parameter in the IAM.

The following table illustrates various call originations and how both the Called Party number (CDN) parameter Nature of Address (NOA) field and optionally the Operator Services Information (OSI) parameter would be encoded using ‘basic’ NOA rules and ‘modified’ NOA rules.

Table 3 ‘Modified’ NOA vs. ‘basic’ NOA

Calling line class	Dialing	‘Basic’ NOA rules	‘Modified’ NOA rules	
		Called Party Number NOA	Called Party Number NOA	Operator Services Information Access Prefix
All	(101XXX)+01+CC+NN	international number, operator requested	international number, operator requested	0+ or 01+
	(010XXX)+0+NPA+NXX+XXXX (NXX is not 555)	national (significant) number, operator requested	national (significant) number, operator requested	0+ or 01+
	0+NXX-XXXX	subscriber number, operator requested	subscriber number, operator requested	0+ or 01+
	0, 00, 101XXX+0	no number present, operator requested	no number present, operator requested	0-
	(101XXXX)+0+NPA+555-XXXX	national (significant) number, operator requested	national (significant) number, operator requested	0+ or 01+
	0+411, 0+555-XXXX	subscriber number, operator requested	subscriber number, operator requested	0+ or 01+

Table 3 ‘Modified’ NOA vs. ‘basic’ NOA

Calling line class	Dialing	‘Basic’ NOA rules	‘Modified’ NOA rules	
		Called Party Number NOA	Called Party Number NOA	Operator Services Information Access Prefix
Restricted or special lines (i.e., coin, hotel, etc.)	(101XXXX)+011+CC+NN	international number	international number, operator requested	1+ or 011+
	(101XXXX)+1+NPA+NXX+XXXX (NXX is not 555)	national (significant) number	national (significant) number, operator requested	1+ or 011+
	NXX-XXXX	subscriber number	subscriber number, operator requested	not included
	(101XXXX)+1+NPA+555-XXXX	national (significant) number	national (significant) number, operator requested	1+ or 011+
	1+411	subscriber number	subscriber number, operator requested	1+ or 011+
	411, 555-XXXX	subscriber number	subscriber number, operator requested	not included

Table 3 ‘Modified’ NOA vs. ‘basic’ NOA

Calling line class	**Dialing**	**‘Basic’ NOA rules**	**‘Modified’ NOA rules**	
		Called Party Number NOA	**Called Party Number NOA**	**Operator Services Information Access Prefix**
Non-restricted or non-special lines (i.e., POTS lines)	(101XXXX)+011+CC+NN	international number	international number	not included
	(101XXXX)+1+NPA+NXX+XXXX (NXX is not 555)	national (significant) number	national (significant) number	not included
	NXX-XXXX	subscriber number	subscriber number	not included
	(101XXXX)+1+NPA+555-XXXX	national (significant) number	national (significant) number	1+ or 011+
	1+411	subscriber number	subscriber number, operator requested	1+ or 011+
	411	subscriber number	subscriber number, operator requested	not included
	555-XXXX	subscriber number	subscriber number	not included

Will the call be handled by TOPS?

When the call arrives at the TOPS office, TOPS analyzes the call and decides whether it requires operator services. If the call requires operator services, TOPS further decides whether it can be handled in this TOPS office. If the call does not require operator services or cannot be handled by this TOPS switch, then the call should be forwarded to another operator services switch. This document refers to these call types as ‘no-serv’ originations.

Note: TOPS handles coin no-serv calls.

The following steps are taken as part of the analysis to determine whether the call will be handled by TOPS:

- OSNC capabilities
- table ISUPTRK datafill
- SOC checks
- operator services requested in the Initial Address Message (IAM)
- operator services required
- operator services requested or required but not provided by TOPS in this switch

OSNC capabilities

An OSNC origination is defined as an IAM that contains a Service Activation Parameter (SAP) with any feature code set to one of the following values:

- hold available
- hold not available
- intercept - regular
- intercept - blank
- intercept - trouble

If the IAM does not indicate OSNC capabilities, then the call is handled using TOPS ISUP. Refer to feature AN1515 for more information about TOPS ISUP calls.

SOC checks

Originating OSNC capabilities are controlled by the OSEA0013 SOC. This SOC is checked on all OSNC originations. If a call arrives with an IAM that contains a SAP as described above, then the OSEA0013 SOC is checked. If the SOC is ‘on’, then the processing of the IAM continues. If the SOC is ‘idle’, then a log is generated and the call is handled as a TOPS ISUP call. Refer to AN1515: ISUP to TOPS Enhancements for more information on TOPS ISUP handling.

If a call arrives with an IAM that does not contain a Service Activation Parameter (SAP) as described above, then this is not considered an OSNC capable call. The analysis continues to determine whether operator services are needed or requested.

Table ISUPTRK datafill

Table ISUPTRK is a customer datafillable table that is used to identify originating ISUP trunk groups that are carrying calls that require operator services in this TOPS office. By datafilling an originating trunk group in table ISUPTRK, TOPS software will be invoked to examine the IAM on each OSNC call origination. If the originating trunk group is not datafilled in table ISUPTRK, then TOPS software will not be invoked to analyze the IAM. These call originations become OSNC no-serv originations by default.

Operator services requested in the IAM

The originating trunk group may be carrying combined traffic meaning calls that need operator services and calls that do not need operator services. These combined trunks must be datafilled in table ISUPTRK so that the calls that need operator services can be handled by TOPS.

As stated above, when an originating trunk is datafilled in table ISUPTRK, then TOPS analysis will be invoked on every OSNC call origination. TOPS examines the information in the IAM. Those calls with information in the IAM that explicitly indicate that operator services is needed are referred to as ‘operator requested’. The signaling information specifically requests operator services. The following table details the parameters and values in the IAM that can indicate that the call requests operator services.

Table 4 IAM parameters used to indicate requested operator services calls

IAM parameter	Values indicating operator services calls
called party number (CDN): nature of address (NOA) field	inward operator code subscriber number, operator requested national number, operator requested international number, operator requested no number present, operator requested
service activation (SAP)	intercept - regular intercept - blank number intercept - trouble

Operator services required

Lack of a specific operator services request in the IAM does not mean that operator services is not needed on the call. Certain datafill in the TOPS switch can indicate that operator services are ‘required’. An example of this is translations and routing datafill.

As stated above, when an originating trunk is datafilled in table ISUPTRK, then TOPS analysis will be invoked on every OSNC call origination. TOPS examines the information in the Initial Address Message (IAM). Those calls that do not explicitly request operator services or implicitly require operator services become no-serv originations by default. The following table details the parameters and values in the IAM that can indicate that the call requires operator services.

Table 5 IAM parameters used to indicate required operator services calls

IAM parameter	Values indicating operator services calls
originating line information (OLI)	ANI ID digits datafilled in table OSSCAT with a calling service feature of ‘coin’, ‘hotel’ or ‘restricted’
called party number (CDN): address digits field	called digits that translate to a route in table TOPS

Operator services requested or required but not provided by TOPS in this switch

In this case, the call origination has been identified as either requesting or requiring operator services, but checks must be performed to determine whether this particular TOPS office can service the call.

The most likely example of this flow is a carrier call that requests operator services. A TOPS office can be configured (in table TOPEACAR) to provide operator services on behalf of a carrier. During the call analysis, if the call is a carrier call, then this configuration data is checked. If operator services are provided on behalf of the carrier, then the TOPS switch will handle the call as a normal origination flow. However, if operator services are not provided on behalf of the carrier, then the call is forwarded to the carrier as a no-serv origination flow.

Another means exists to cause a carrier call to bypass operator services and proceed directly to the carrier. Table TOPEATRK provides the means to configure, against the originating trunk group, that hotel originated calls and 0- calls should bypass operator services. If these bypass options are configured and the call meets the bypass criteria, then the call is forwarded to the carrier as a no-serv origination flow.

The determination of whether the call is a carrier call is made based upon the presence of the Transit Network Service (TNS) parameter in the IAM. If the Transit Network Service (TNS) parameter is present, then TOPS extracts the carrier digits from the parameter and indexes table TOPEACAR. If the carrier is not found, then the default behavior is to treat the call as if operator services is not provided for this carrier and the call becomes a no-serv origination. If the carrier is found, then the 'OPSERV' field is accessed. This field indicates if operator services are provided on behalf of the carrier. If so, then the call becomes a normal origination. If not, then the call becomes a no-serv origination.

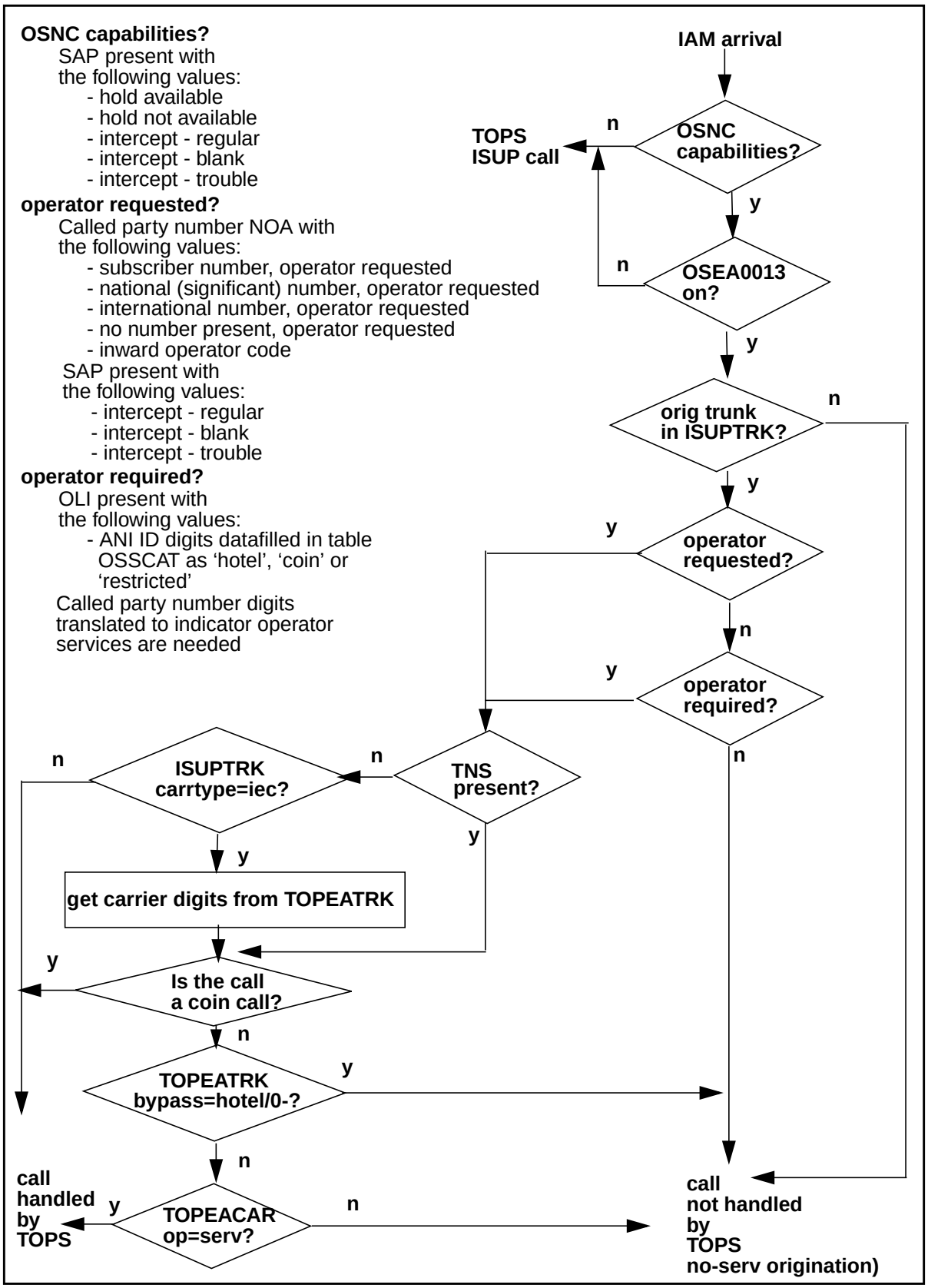
If the Transit Network Service (TNS) parameter is not present, then the call may still be a carrier call. Table ISUPTRK datafill can configure an originating trunk to a dedicated carrier trunk using the CONNTYPE field. This datafill means that all calls originating on the trunk are carrier calls regardless of the presence of the Transit Network Service (TNS) parameter. If the trunk is configured this way, then the associated carrier digits are obtained from table TOPEACAR and the same indexing into table TOPEACAR occurs as stated above. The OPSERV field will indicate if operator services are provided on behalf of that carrier.

The following table details the parameters and values in the Initial Address Message (IAM) that can indicate that the call is a carrier call and whether or not TOPS provides operator service on behalf of that carrier.

Table 6 IAM parameters used to indicate TOPS supported carrier calls

IAM parameter	Values indicating operator services calls
transit network service (TNS)	carrier digits datafilled in table TOPEACAR as a 'serve' carrier
<no transit network service (TNS) parameter>	index table ISUPTRK, if the CONNTYPE field is set to any value other than 'none' and the (subfield CARTYPE) is set to 'iec' then all calls on this originating trunk are carrier calls. Pull the carrier digits from table TOPEATRK and use them to index table TOPEACAR. The carrier should be datafilled as a 'serv' carrier.

Figure 15 Determination of TOPS handling of the call origination


OSNC capabilities?
SAP present with
the following values:
- hold available
- hold not available
- intercept - regular
- intercept - blank
- intercept - trouble
operator requested?
Called party number NOA with
the following values:
- subscriber number, operator requested
- national (significant) number, operator requested
- international number, operator requested
- no number present, operator requested
- inward operator code
SAP present with
the following values:
- intercept - regular
- intercept - blank
- intercept - trouble
operator required?
OLI present with
the following values:
- ANI ID digits datafilled in table OSSCAT as 'hotel', 'coin' or 'restricted'
Called party number digits translated to indicator operator services are needed
IAM arrival
OSNC capabilities?
n
TOPS ISUP call
y
OSEA0013 on?
n
y
orig trunk in ISUPTRK?
n
y
operator requested?
y
n
operator required?
y
n
TNS present?
n
ISUPTRK carrtype=iec?
n
y
get carrier digits from TOPEATRK
y
Is the call a coin call?
n
TOPEATRK bypass=hotel/0-?
y
n
TOPEACAR op=serv?
y
call handled by TOPS
n
call not handled by TOPS no-serv origination)

Translations and screening interactions with OSNC

As described in the previous section, TOPS uses both data contained in the Initial Address Message (IAM) as well as the results of switch-based translations and screening to determine whether the call should be handled by TOPS.

Before support for OSNC, translations and screening within the TOPS environment was done at two points in the call:

- initial call set-up
- at operator/service node

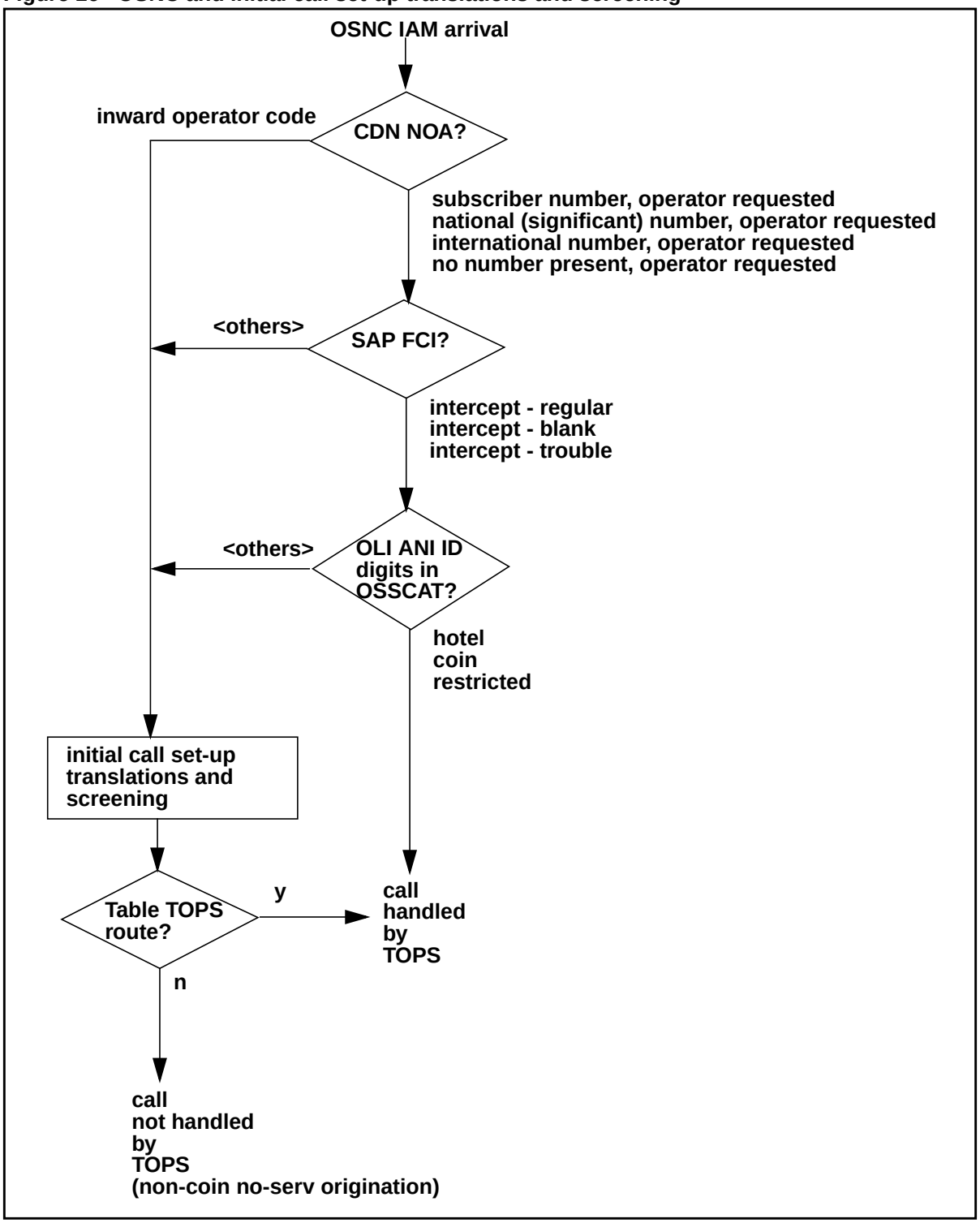
The goal of initial call set-up translations and screening is to determine whether the call requires operator services. The route determined by translations and screening usually points to an entry in table TOPS. This route causes the call to be presented to an operator/service node.

Once the call is presented to the operator/service node, the initial route is overridden by a second translations and screening that occurs at the operator/service node. This second translations and screening provides a route out of the TOPS office to the called party.

As described in the previous section, TOPS uses both data contained in the Initial Address Message (IAM) as well as the results of switch-based translations and screening to determine whether the call should be handled by TOPS. When this determination is made using signalled data, the initial call set-up translations and screening does not need to be performed. TOPS call processing bypasses this step. The only exception to this is rule is inward call originations. With inward call originations, the Called Party Number (CDN) Nature of Address (NOA) field is set to ‘inward operator code’, however the call will also perform initial call set-up translations and screening. This step is needed to select the specific inward call origination (usually based upon the inward operator code). In this case, the signaling indicates an operator services call, but initial call set-up translations and screening is also performed.

The following figure illustrates when initial call set-up translations and screening is performed for OSNC calls.

Figure 16 OSNC and initial call set-up translations and screening



LATA screening interactions with OSNC

LATA screening is a means to determine whether the call is a carrier call. As stated in "Operator services requested or required but not provided by TOPS in this switch" on page 54, OSNC calls rely on the presence of a Transit Network Service (TNS) parameter or table ISUPTRK datafill to determine whether the call is a carrier call. OSNC calls do not perform LATA screening during initial call set-up.

Note: TOPS supports two methods of LATA screening: table LATAXLA and table EASCRN. Refer to 'TOPS Translations and Screening User's Guide' for more information.

LATA screening is performed when the OSNC call is at an operator/service node. This screening is performed at this point in the call because the operator/service node can change call data that may affect the LATA status of the call.

Determination of call origination type

In TOPS, the call origination type is the initial data needed to begin the selection of an operator/service node. The call origination type is set based upon the following information:

- data received in signaling
- ANI ID digit
- translations and screening

Information contained in the Service Activation Parameter (SAP) and the Operator Services Information (OSI) parameter can directly set the call origination type. The following table maps the signaled values to the call origination type.

Table 7 OSNC parameters to call origination type mapping

OSNC parameter	Call origination type
service activation (SAP), feature capability indicator set to one of the following: intercept - regular intercept - blank intercept - trouble	intc
operator services information (OSI), original access prefix set to the following: 1+ or 011+	dd
operator services information (OSI), original access prefix set to the following: 0+ or 01+	oa

Table 7 OSNC parameters to call origination type mapping

OSNC parameter	Call origination type
operator services information (OSI), original access prefix set to the following: 0-	oh

Table OSSCAT provides information related to the ANI ID digits that are received in the Originating Line Information (OLI) parameter. The calling service feature provides information on the type of phone used to originate the call. The following table illustrates how the calling service feature information in table OSSCAT affects the call origination type.

Table 8 Table OSSCAT CLGSERV to call origination type mapping

Table OSSCAT Calling Service Feature	Call origination type
intc, bldnintc, trblintc	intc
alm	alm
mobile	mobile
station, hotel, special, coin	<none>

Translations and screening can affect the call origination type in two ways:

- explicit routing to table TOPS
- setting the calltype

By routing to table TOPS, the call origination type is explicitly selected because the index to table TOPS is the call origination type. This allows inwards codes and other special access codes to set the appropriate call origination type.

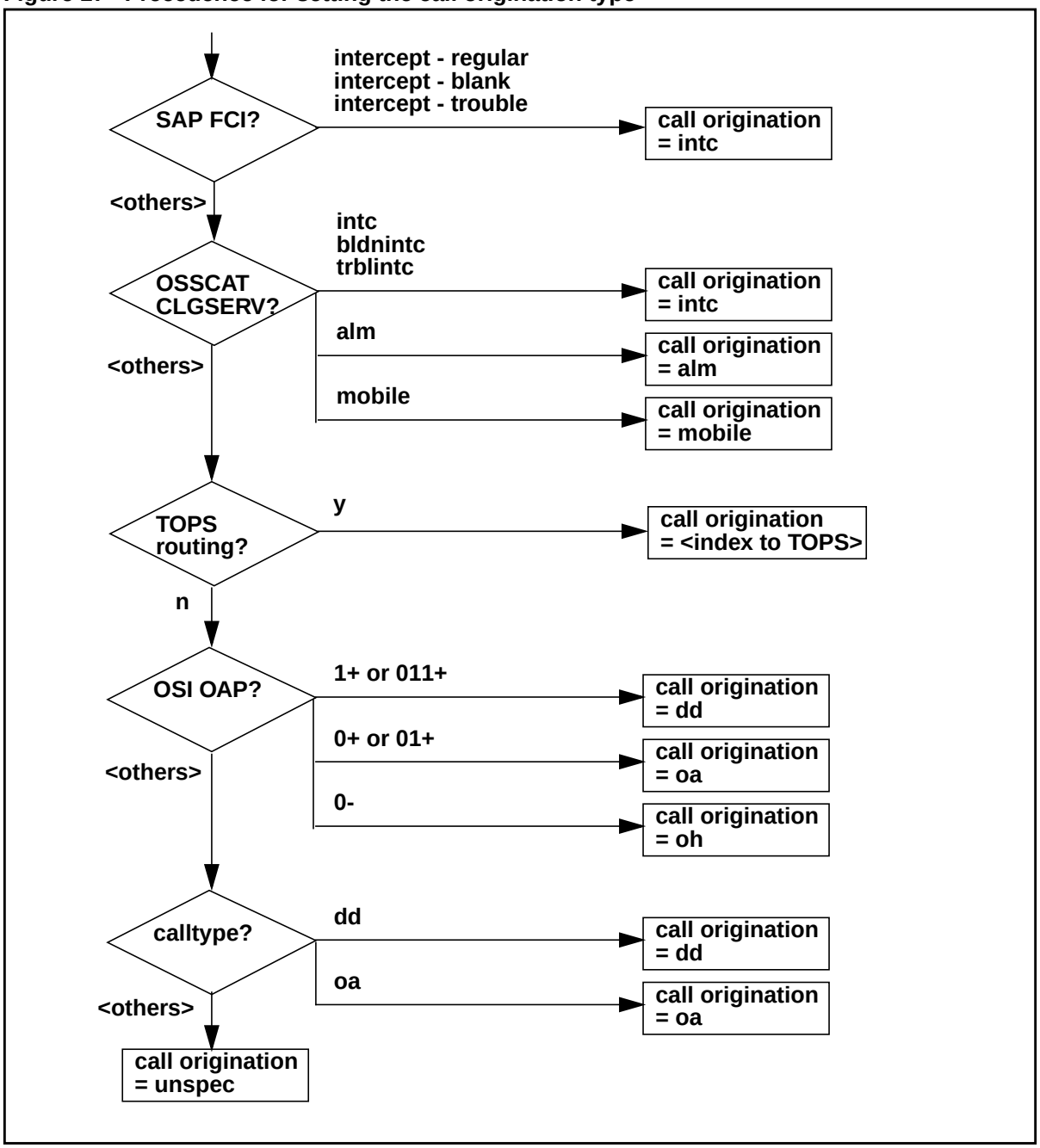
Translations and screening also sets the calltype as it traverses the many translations and screening tables. The following table maps the calltype values to the call origination type.

Table 9 Calltype to call origination type mapping

Calltype	Call origination type
oa	oa
dd	dd

There is a precedence applicable for setting the call origination type. The following figure illustrates the order.

Figure 17 Precedence for setting the call origination type



Origination flows

The following types of originations are discussed in more detail:

- normal originations
- coin originations
- intercept originations
- inwards originations
- non-coin no-serv originations

Normal originations

Normal origination flows are initiated by an end office when a subscriber dials an access code or directory number indicating that an operator is desired on the call or a service provided by TOPS is requested.For certain class of lines (i.e., coin, hotel, restricted, etc.), operator assistance can be required even if not specifically requested by the caller. The connection to the subscriber's end office may be a direct trunk connection or it may be tandemed through one or more intermediate switches.

Many of the parameters received in the IAM are not used by TOPS in the identification and delivery of normal originations. Parameters in the IAM that are unused are received and stored for future use. The following table lists the IAM parameters that are used by TOPS.

Table 10 IAM parameters used by TOPS for normal originations

IAM parameter	Information extracted
called party number (CDPN)	Contains the called party's digits which may address an actual subscriber's line or be a service access code. The NOA may indicate that an operator is requested.
calling party's category (CPC)	Indicates that the originator was an ordinary subscriber as opposed to being another operator.
user service information (USI)	Contains the requested bearer capability among other data. TOPS looks at the information transfer capability to ensure that the requested call is a voice call (i.e., speech or 3.1 kHz audio). All other bearer capabilities will cause TOPS to release the call.
calling party number (CPN)	Contains the calling party's digits. If a Charge Number (CN) parameter is not received, then TOPS uses these digits to represent the calling party.

Table 10 IAM parameters used by TOPS for normal originations

IAM parameter	Information extracted
carrier information (CIP)	Contains the carrier selected by the calling party. If a Transit Network Service (TNS) parameter is not received, then TOPS uses the carrier received here as the carrier associated with the call. Even if TOPS store the carrier digits here, this does not make the call a carrier call.
carrier selection (CS)	Contains information about how the carrier was chosen for the call. This information pertains to the carrier digits associated with either the Carrier Information parameter of the Transit Network Service (TNS) parameter. TOPS stores this information for use in AMA records.
charge number (CN)	Contains the ANI of the calling party. If this parameter is received, then TOPS uses these digits to represent the calling party rather than using the digits in the Calling Party Number (CPN) parameter.
local service provider information (LSPI)	This parameter could appear twice in the Initial Address Message (IAM), once containing the account owner information and a second time containing the switch owner information. TOPS extracts the account owner local service provider information and uses it as the calling party's account owner service provider ID (SPID). TOPS ignores the switch owner information.
jurisdiction information (JIP)	Contains the calling party's location routing number (LRN) needed for local number portability (LNP). TOPS extracts the LRN and stores it for billing purposes only when Bellcore LNP (OSEA0010) is being used.
operator services information (OSI)	Contains the prefixed dialed by the subscriber and the type of equipment used by the subscriber (i.e., dial pulse vs. DTMF). TOPS extracts both pieces of information. The type of equipment is used to determine whether automated handling allowed. The prefix dialed information is used by call processing. This is used along with other information to set the call origination type.

Table 10 IAM parameters used by TOPS for normal originations

IAM parameter	Information extracted
originating line information (OLI)	Contains the ANI ID digits. TOPS extracts the ANI ID digits and uses them to determine the calling service feature (i.e., station, coin, hotel, restricted).
service activation (SAP)	Contains the offer of connection hold from the previous office (i.e., end office). TOPS extracts this data and generally responds to establish connection hold (if offered).
transit network service (TNS)	Identifies the call as a carrier call and contains the carrier id to be used. TOPS notes the receipt of the parameter and pulls the carrier digits from the parameter. If TOPS provides operator services on behalf of the carrier and the call requires operator services, then the call is processed in the TOPS environment. If TOPS does not provide operator services on behalf of the carrier, then the call is processed in the tandem environment.

After receiving the Initial Address Message (IAM) and it has been determined that the call requires operator services within the TOPS environment, TOPS sends an Address Complete Message (ACM) in response. The following table lists the parameters created by TOPS in the message along with the information populated by TOPS.

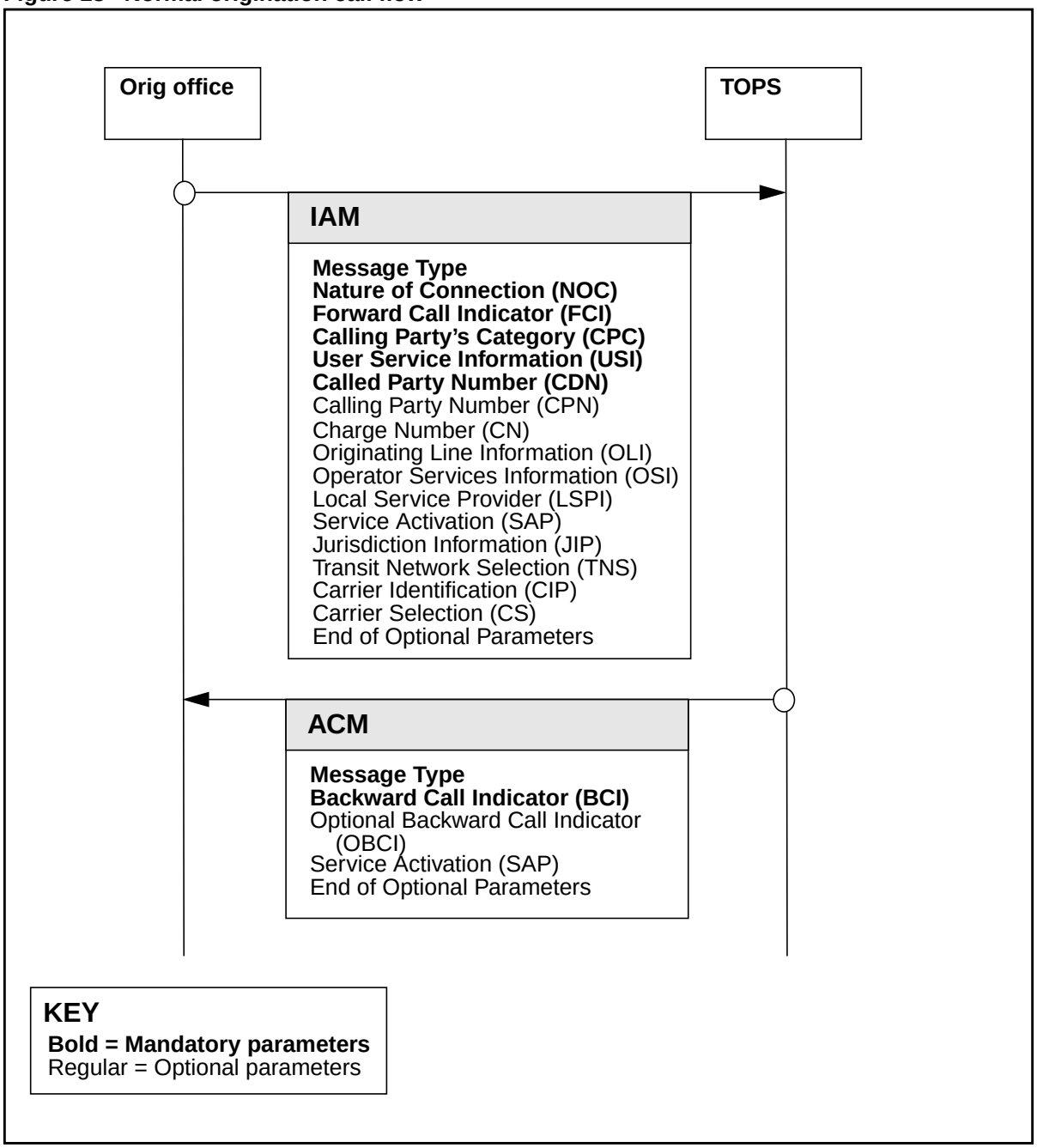
Table 11 ACM parameters populated by TOPS for normal originations

ACM parameter	Information populated
backwards call indicators (BCI)	Contains information about the called party and its connection. At this point, the called party is really the operator, so TOPS populates this parameter with information that reflects the operator as the called party. Note that this information is updated in future messages when an actual called party is connected.
optional backwards call indicators (OBCI)	Contains additional information about the called party and its connection. Just as with the Backwards Call Indicator (BCI) parameter, TOPS populates most of the fields to reflect the operator as the called party. The exception is the user-network interaction indicator. TOPS populates this field to indicate that the voice connection should be cut-through at this time. This will allow the operator to communicate with the calling party.

Table 11 ACM parameters populated by TOPS for normal originations

ACM parameter	Information populated
service activation (SAP)	Contains the acceptance or rejection of connection hold for the originating connection. TOPS always responds with connection hold acceptance (if offered) with the exception of inwards call. For inwards calls and intercept calls, TOPS rejects connection hold.

Figure 18 Normal origination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 12 Normal origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM
Nature of connection	satellite indicator	<not used by TOPS>
	continuity check indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	spare	<not used by TOPS>
Forward call indicators	national/international call indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	ISDN user part preference indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
	spare	<not used by TOPS>
	translated called number	<not used by TOPS>
	QoR attempt	<not used by TOPS>
	reserved for national use	<not used by TOPS>
Calling party's category		ordinary calling subscriber
User service information	extension bits	<not used by TOPS>
	coding standard	<not used by TOPS>
	information transfer capability	speech
		3.1Khz audio
	transfer mode	<not used by TOPS>
	information transfer rate	<not used by TOPS>
	user layer protocol identification	<not used by TOPS>

Table 12 Normal origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	subscriber number
		national (significant) number
		international number
		subscriber number, operator requested
		national (significant) number, operator requested
		international number, operator requested
		no number present, operator requested
	nature of address (modified NOA)	subscriber number, operator requested
		national (significant) number, operator requested
		international number, operator requested
		no number present, operator requested
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<called party's digits>
Calling party number	nature of address	unique national (significant) number
		non-unique national (significant) number
	odd/even	<all values are supported>
	screening	<not used by TOPS>
	presentation	presentation allowed
		presentation restricted
	numbering plan	ISDN (telephony) numbering plan
	address information	<calling party's digits>
Carrier identification	spare	<not used by TOPS.
	type of network	<not used by TOPS>
	network identification plan	4-digit carrier identification code
	digit	<carrier digits>

Table 12 Normal origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Carrier selection	carrier selection information	no indication
		selected carrier identification code presubscribed and not input by the calling party
		selected carrier identification code presubscribed and input by the calling party
		selected carrier identification code presubscribed, no indication whether input by calling party
		selected carrier identification code not presubscribed and input by calling party
Charge number	nature of address	ANI of the calling number, subscriber number
		ANI of the calling number, national number
		ANI not available or not provided
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<charge digits>
Local service provider id (LSPI)	LSPI type	account owner
	encoding scheme	<not used by TOPS>
	context identification	<not used by TOPS>
	characters	<LSPI characters>
Local service provider id (LSPI)	LSPI type	switch owner
	encoding scheme	<not used by TOPS>
	context identification	<not used by TOPS>
	characters	<not used by TOPS>
Jurisdiction information (JIP)	digits	<calling party's LRN digits>
Operator services information (OSIP)	original access prefix (modified NOA)	unknown (default)
		1+ or 011+
		0+ or 01+
		0-
	access signaling	unknown (default)
		dial pulse
		dual-tone multifrequency
Originating line information (OLIP)	originating line information	<ANI id digits>

Table 12 Normal origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Service activation (SAP)	feature code indicator	hold available
		hold not available
	feature code indicator	<other values not used by TOPS>
Transit network selection (TNS)	spare	<not used by TOPS.
	type of network identification	<not used by TOPS>
	network identification plan	4-digit carrier identification
	digits	<carrier digits>
	circuit code	unspecified
		international call, no operator requested
		international call, operator requested
	reserved	<not used by TOPS>
End of optional parameter		00000000

Table 13 Normal origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
		subscriber free
	called party's category indicator	no indication
		ordinary (non-payphone) subscriber
	end-to-end method indicator	no end-to-end method
	interworking indicator	no interworking encountered
	IAM segmentation indicator	no indicator
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication

Table 13 Normal origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Optional backward call indicator	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent in a segmentation message
	MLPP user information	no indication
	reserved	reserved for national use
	network excessive delay indicator	no indication
	user-network interaction indicator	user-network interaction occurs, cut-through in both directions
Service activation (SAP)	feature code indicator	hold request
End of optional parameter		00000000

Coin originations

Coin origination flows are initiated by an end office when a subscriber dials from a coin phone an access code or directory number indicating that an operator is desired on the call or a service provided by TOPS is requested. The connection to the subscriber's end office may be a direct trunk connection or it may be tandemed through one or more intermediate switches.

Many of the parameters received in the IAM are not used by TOPS in the identification and delivery of normal originations. Parameters in the IAM that are unused are received and stored for future use. The following table lists the IAM parameters that are used by TOPS.

Table 14 IAM parameters used by TOPS for coin originations

IAM parameter	Information extracted
called party number (CDPN)	Contains the called party's digits which may address an actual subscriber's line or be a service access code. The NOA may indicate that an operator is requested.
calling party's category (CPC)	Indicates that the originator was an ordinary subscriber as opposed to being another operator.

Table 14 IAM parameters used by TOPS for coin originations

IAM parameter	Information extracted
user service information (USI)	Contains the requested bearer capability among other data. TOPS looks at the information transfer capability to ensure that the requested call is a voice call (i.e., speech or 3.1 kHz audio). All other bearer capabilities will cause TOPS to release the call.
calling party number (CPN)	Contains the calling party's digits. If a Charge Number (CN) parameter is not received, then TOPS uses these digits to represent the calling party.
carrier information (CIP)	Contains the carrier selected by the calling party. If a Transit Network Service (TNS) parameter is not received, then TOPS uses the carrier received here as the carrier associated with the call. Even if TOPS store the carrier digits here, this does not make the call a carrier call.
carrier selection (CS)	Contains information about how the carrier was chosen for the call. This information pertains to the carrier digits associated with either the Carrier Information parameter of the Transit Network Service (TNS) parameter. TOPS stores this information for use in AMA records.
charge number (CN)	Contains the ANI of the calling party. If this parameter is received, then TOPS uses these digits to represent the calling party rather than using the digits in the Calling Party Number (CPN) parameter.
local service provider information (LSPI)	This parameter could appear twice in the Initial Address Message (IAM), once containing the account owner information and a second time containing the switch owner information. TOPS extracts the account owner local service provider information and uses it as the calling party's account owner service provider ID (SPID). TOPS ignores the switch owner information.
jurisdiction information (JIP)	Contains the calling party's location routing number (LRN) needed for local number portability (LNP). TOPS extracts the LRN and stores it for billing purposes only when Bellcore LNP (OSEA0010) is being used.

Table 14 IAM parameters used by TOPS for coin originations

IAM parameter	Information extracted
operator services information (OSI)	Contains the prefixed dialed by the subscriber and the type of equipment used by the subscriber (i.e., dial pulse vs. DTMF). TOPS extracts both pieces of information. The type of equipment is used to determine whether automated handling is allowed. The prefix dialed information is used by call processing. This is used along with other information to set the call origination type.
originating line information (OLI)	Contains the ANI ID digits. TOPS extracts the ANI ID digits and uses them to determine the calling service feature (i.e., station, coin, hotel, restricted).
service activation (SAP)	Contains the offer of connection hold from the previous office (i.e., end office). TOPS extracts this data and generally responds to establish connection hold (if offered).
transit network service (TNS)	Identifies the call as a carrier call and contains the carrier id to be used. TOPS notes the receipt of the parameter and pulls the carrier digits from the parameter. If TOPS provides operator services on behalf of the carrier and the call requires operator services, then the call is processed in the TOPS environment. If TOPS does not provide operator services on behalf of the carrier, then the call is processed in the tandem environment.

After receipt of the IAM and a determination that the call requires operator services within the TOPS environment, TOPS sends an Address Complete Message (ACM) in response. The following table lists the parameters created by TOPS in the message along with the information populated by TOPS.

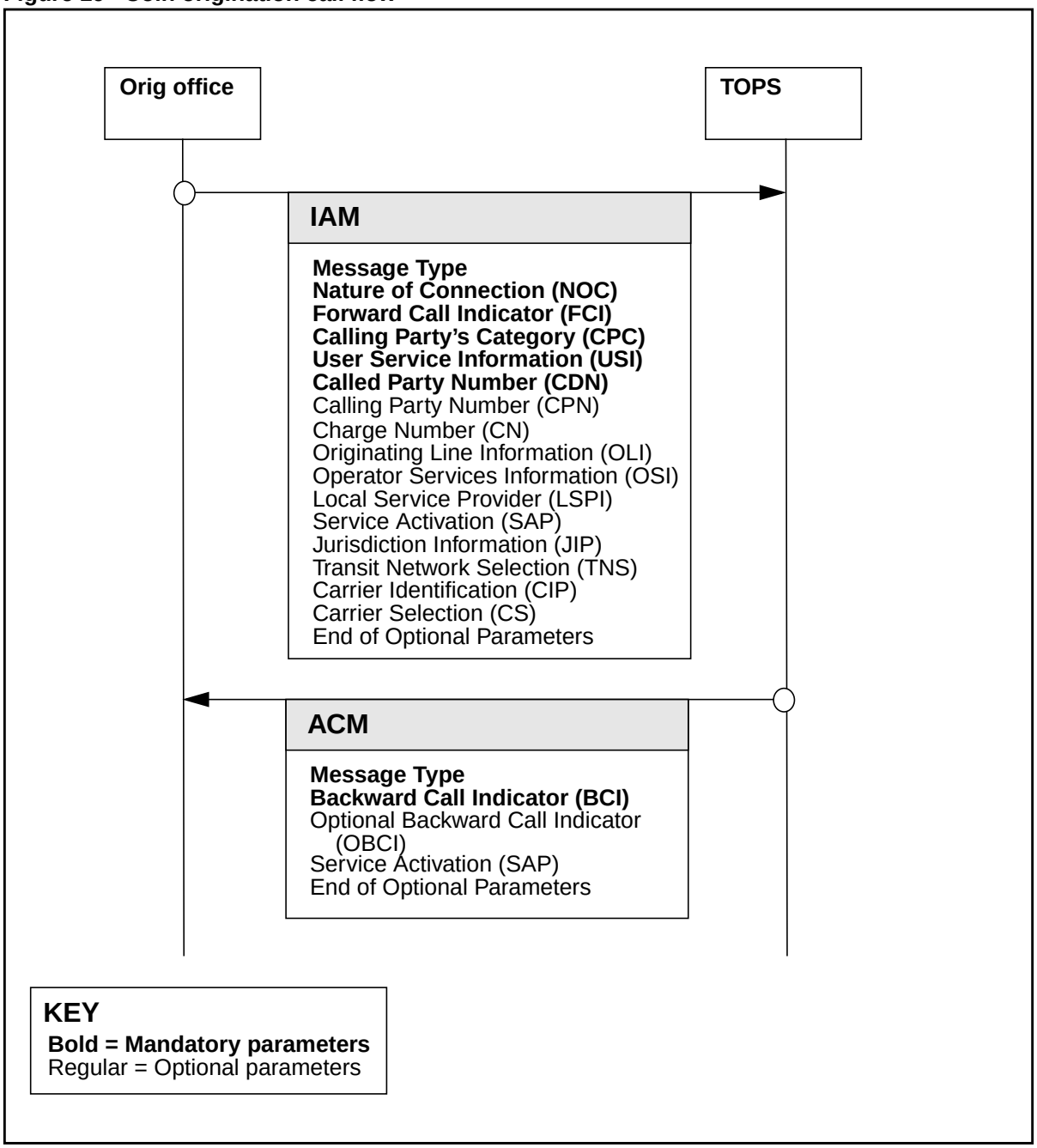
Table 15 ACM parameters populated by TOPS for normal originations

ACM parameter	Information populated
backwards call indicators (BCI)	Contains information about the called party and its connection. At this point, the called party is really the operator, so TOPS populates this parameter with information that reflects the operator as the called party. Note that this information is updated in future messages when an actual called party is connected.

Table 15 ACM parameters populated by TOPS for normal originations

ACM parameter	Information populated
optional backwards call indicators (OBCI)	Contains additional information about the called party and its connection. Just as with the Backwards Call Indicator (BCI) parameter, TOPS populates most of the fields to reflect the operator as the called party. The exception is the user-network interaction indicator. TOPS populates this field to indicate that the voice connection should be cut-through at this time. This will allow the operator to communicate with the calling party.
service activation (SAP)	Contains the acceptance or rejection of connection hold for the originating connection. TOPS always responds with connection hold acceptance (if offered) with the exception of inwards call. For inwards calls and intercept calls, TOPS rejects connection hold. Also it may, but generally doesn't, contain the initial coin signals used to control the keypad. Refer to " Coin signaling" on page 138 for more detailed information.

Figure 19 Coin origination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 16 Coin origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM
Nature of connection	satellite indicator	<not used by TOPS>
	continuity check indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	spare	<not used by TOPS>
Forward call indicators	national/international call indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	ISDN user part preference indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
	spare	<not used by TOPS>
	translated called number	<not used by TOPS>
	QoR attempt	<not used by TOPS>
	reserved for national use	<not used by TOPS>
Calling party's category		ordinary calling subscriber
User service information	extension bits	<not used by TOPS>
	coding standard	<not used by TOPS>
	information transfer capability	speech
		3.1Khz audio
	transfer mode	<not used by TOPS>
	information transfer rate	<not used by TOPS>
	user layer protocol identification	<not used by TOPS>

Table 16 Coin origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	subscriber number
		national (significant) number
		international number
		subscriber number, operator requested
		national (significant) number, operator requested
		international number, operator requested
		no number present, operator requested
	nature of address (modified NOA)	subscriber number, operator requested
		national (significant) number, operator requested
		international number, operator requested
		no number present, operator requested
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<called party's digits>
Calling party number	nature of address	unique national (significant) number
		non-unique national (significant) number
	odd/even	<all values are supported>
	screening	<not used by TOPS>
	presentation	presentation allowed
		presentation restricted
	numbering plan	ISDN (telephony) numbering plan
	address information	<calling party's digits>
Carrier identification	spare	<not used by TOPS.
	type of network	<not used by TOPS>
	network identification plan	4-digit carrier identification code
	digit	<carrier digits>

Table 16 Coin origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Carrier selection	carrier selection information	no indication
		selected carrier identification code presubscribed and not input by the calling party
		selected carrier identification code presubscribed and input by the calling party
		selected carrier identification code presubscribed, no indication whether input by calling party
		selected carrier identification code not presubscribed and input by calling party
Charge number	nature of address	ANI of the calling number, subscriber number
		ANI of the calling number, national number
		ANI not available or not provided
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<charge digits>
Local service provider id (LSPI)	LSPI type	account owner
	encoding scheme	<not used by TOPS>
	context identification	<not used by TOPS>
	characters	<LSPI characters>
Local service provider id (LSPI)	LSPI type	switch owner
	encoding scheme	<not used by TOPS>
	context identification	<not used by TOPS>
	characters	<not used by TOPS>
Jurisdiction information (JIP)	digits	<calling party's LRN digits>
Operator services information (OSIP)	original access prefix (modified NOA)	unknown (default)
		1+ or 011+
		0+ or 01+
		0-
	access signaling	unknown (default)
		dial pulse
		dual-tone multifrequency
Originating line information (OLIP)	originating line information	<ANI id digits>

Table 16 Coin origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Service activation (SAP)	feature code indicator	hold available
		hold not available
	feature code indicator	<other values not used by TOPS>
Transit network selection (TNS)	spare	<not used by TOPS.
	type of network identification	<not used by TOPS>
	network identification plan	4-digit carrier identification
	digits	<carrier digits>
	circuit code	unspecified
		international call, no operator requested
		international call, operator requested
	reserved	<not used by TOPS>
End of optional parameter		00000000

Table 17 Coin origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
		subscriber free
	called party's category indicator	no indication
		ordinary (non-payphone) subscriber
	end-to-end method indicator	no end-to-end method
	interworking indicator	no interworking encountered
	IAM segmentation indicator	no indicator
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication

Table 17 Coin origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Optional backward call indicator	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent in a segmentation message
	MLPP user information	no indication
	reserved	reserved for national use
	network excessive delay indicator	no indication
	user-network interaction indicator	user-network interaction occurs, cut-through in both directions
Service activation (SAP)	feature code indicator	hold request
		network service attached
		network service released
End of optional parameter		00000000

Intercept origination

Intercept origination flows are initiated by a point in the local or national network which received a call request for a line that is out of service. At this point, the network may send the call to an operator services switch for look-up and quotation of the new number.

Many of the parameters received in the IAM are not used by TOPS in the identification and delivery of intercept service. Parameters in the IAM that are unused are received and stored for future use. The following table lists the IAM parameters that are used by TOPS.

Table 18 IAM parameters used by TOPS for intercept originations

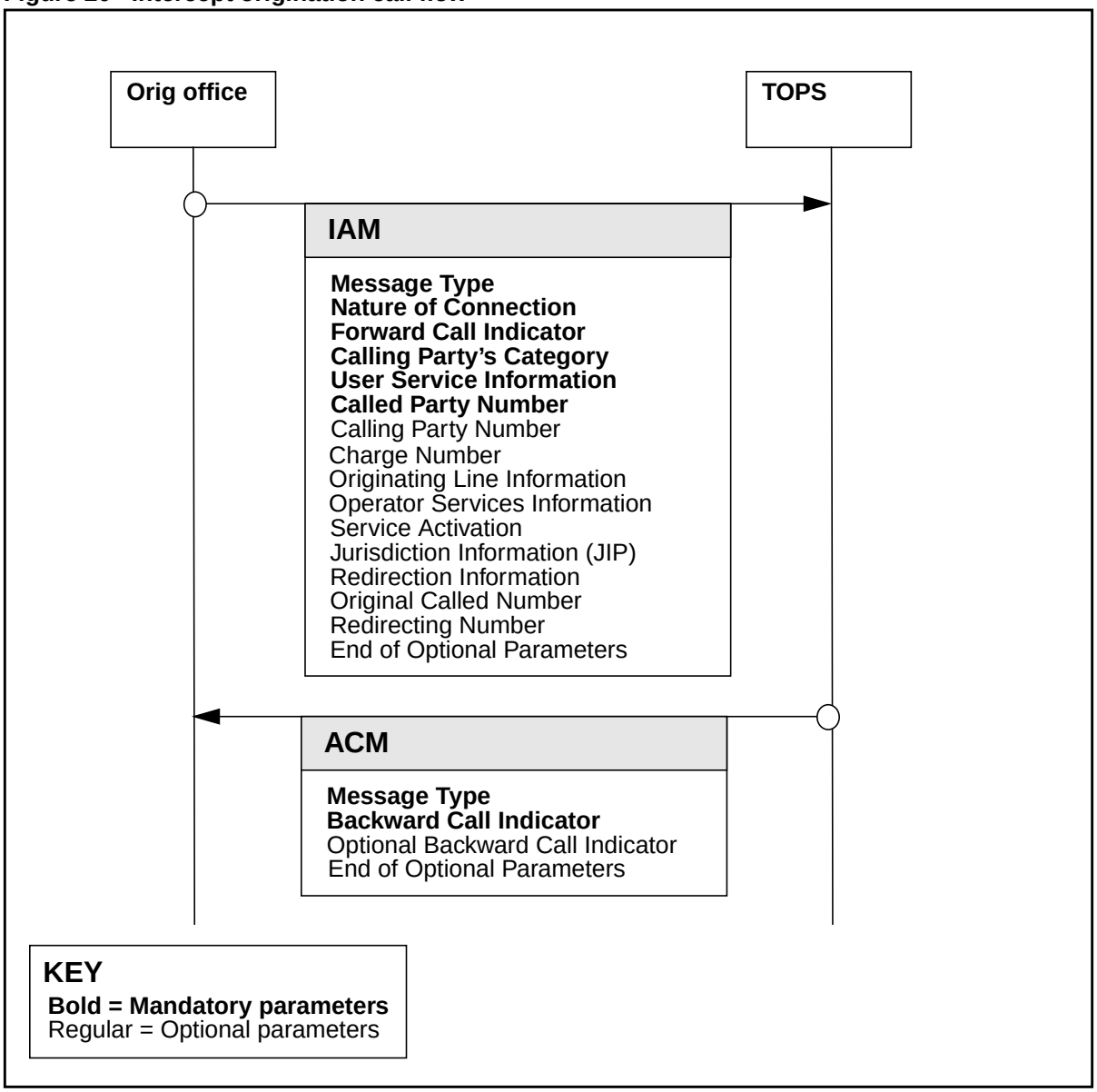
IAM parameter	Information extracted
Called party number	Contains the intercepted number. The NOA can be used to determine is operator services is needed for the call, but is not used to provide intercept services.
Service activation	Indicates the type of intercept encountered. The three possible values include the following: intercept - blank number intercept - trouble intercept - regular
Originating line information	Contains the ANI ID digits that could be mapped in Table OSSCAT to indicate intercept service.
User service information	Contains the requested bearer capability among other data. TOPS looks at the information transfer capability to ensure that the requested call is a voice call (i.e., speech or 3.1 kHz audio). All other bearer capabilities will cause TOPS to release the call.

After receiving the IAM and the call required operator services within the TOPS environment, TOPS sends an ACM in response. The following table lists the parameters created by TOPS in the message along with the information populated by TOPS.

Table 19 ACM parameters populated by TOPS for intercept originations

ACM parameter	Information populated
Backwards call indicators	Contains information about the called party and its connection. At this point, the called party is really the operator, so TOPS populates this parameter with information that reflects the operator as the called party. Note that this information is updated is future messages when an actual called party is connected.
Optional backwards call indicators	Contains additional information about the called party and its connection. Just as with the backwards call indicator, TOPS populates most of the fields to reflect the operator as the called party. The exception is the user-network interaction indicator. TOPS populates this field to indicate that the voice connection should be cut-through at this time. This will allow the operator to communicate with the calling party.

Figure 20 Intercept origination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 20 Intercept origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM

Table 20 Intercept origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Nature of connection	satellite indicator	<not used by TOPS>
	continuity check indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	spare	<not used by TOPS>
Forward call indicators	national/international call indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	ISDN user part preference indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
	spare	<not used by TOPS>
	translated called number	<not used by TOPS>
	QoR attempt	<not used by TOPS>
	reserved for national use	<not used by TOPS>
Calling party's category		ordinary calling subscriber
User service information	extension bits	<not used by TOPS>
	coding standard	<not used by TOPS>
	information transfer capability	speech
		3.1Khz audio
	transfer mode	<not used by TOPS>
	information transfer rate	<not used by TOPS>
	user layer protocol identification	<not used by TOPS>
Called party number	nature of address (basic NOA)	national (significant) number
	nature of address (modified NOA)	national (significant) number, operator requested
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<intercepted party's digits>

Table 20 Intercept origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Calling party number	nature of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	screening	<not used by TOPS>
	presentation	<not used by TOPS>
	numbering plan	<not used by TOPS>
	address information	<not used by TOPS>
Charge number	nature of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	numbering plan	<not used by TOPS>
	address information	<not used by TOPS>
Jurisdiction information (JIP)	digits	<not used by TOPS>
Original called number	nature of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	screening indicator	<not used by TOPS>
	presentation restriction indicator	<not used by TOPS>
	number plan	<not used by TOPS>
	spare	<not used by TOPS>
	address information	<not used by TOPS>
Operator services information (OSIP)	access signaling	unknown (default)
		dial pulse
		dual-tone multifrequency
Originating line information (OLIP)	originating line information	<ANI id digits>
Redirection information	redirecting indicator	<not used by TOPS>
	original redirecting reason	<not used by TOPS>
	redirection counter	<not used by TOPS>
	redirecting reason	<not used by TOPS>

Table 20 Intercept origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Redirection number	nature of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	screening indicator	<not used by TOPS>
	presentation restriction indicator	<not used by TOPS>
	number plan	<not used by TOPS>
	spare	<not used by TOPS>
	address information	<not used by TOPS>
Service activation (SAP)	feature code indicator	intercept - blank number
		intercept - trouble
		intercept - regular
	feature code indicator	<other values not used by TOPS>
End of optional parameter		00000000

Table 21 Intercept origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
		subscriber free
	called party's category indicator	no indication
		ordinary (non-payphone) subscriber
	end-to-end method indicator	no end-to-end method
	interworking indicator	no interworking encountered
	IAM segmentation indicator	no indicator
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication

Table 21 Intercept origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Optional backward call indicator	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent in a segmentation message
	MLPP user information	no indication
	reserved	reserved for national use
	network excessive delay indicator	no indication
	user-network interaction indicator	user-network interaction occurs, cut-through in both directions
End of optional parameter		00000000

Inward origination

Inward origination flows are initiated by other operator services switches to request operator services. Inward calls are originated when one operator needs to make a connection to another operator. Inward calls are not originated by subscribers. An example of an inward call is inward busy line verification, in which an operator in one switch dials an access code to a second operator switch that can perform a busy line verification on the requested directory number.

Many of the parameters received in the IAM are not used by TOPS in the identification and delivery of inward service. Parameters in the IAM that are unused are received and stored for future use. The following table lists the IAM parameters are used by TOPS.

Table 22 IAM parameters used by TOPS for inward originations

IAM parameter	Information extracted
Called party number	Contains the operator services code. The NOA indicates an inward operator code.
Calling party's category	Indicates that the originator was another operator rather than a subscriber. It may also contain the preferred language of the originating operator which is used in QMS to select the appropriate TOPS operator.

Table 22 IAM parameters used by TOPS for inward originations

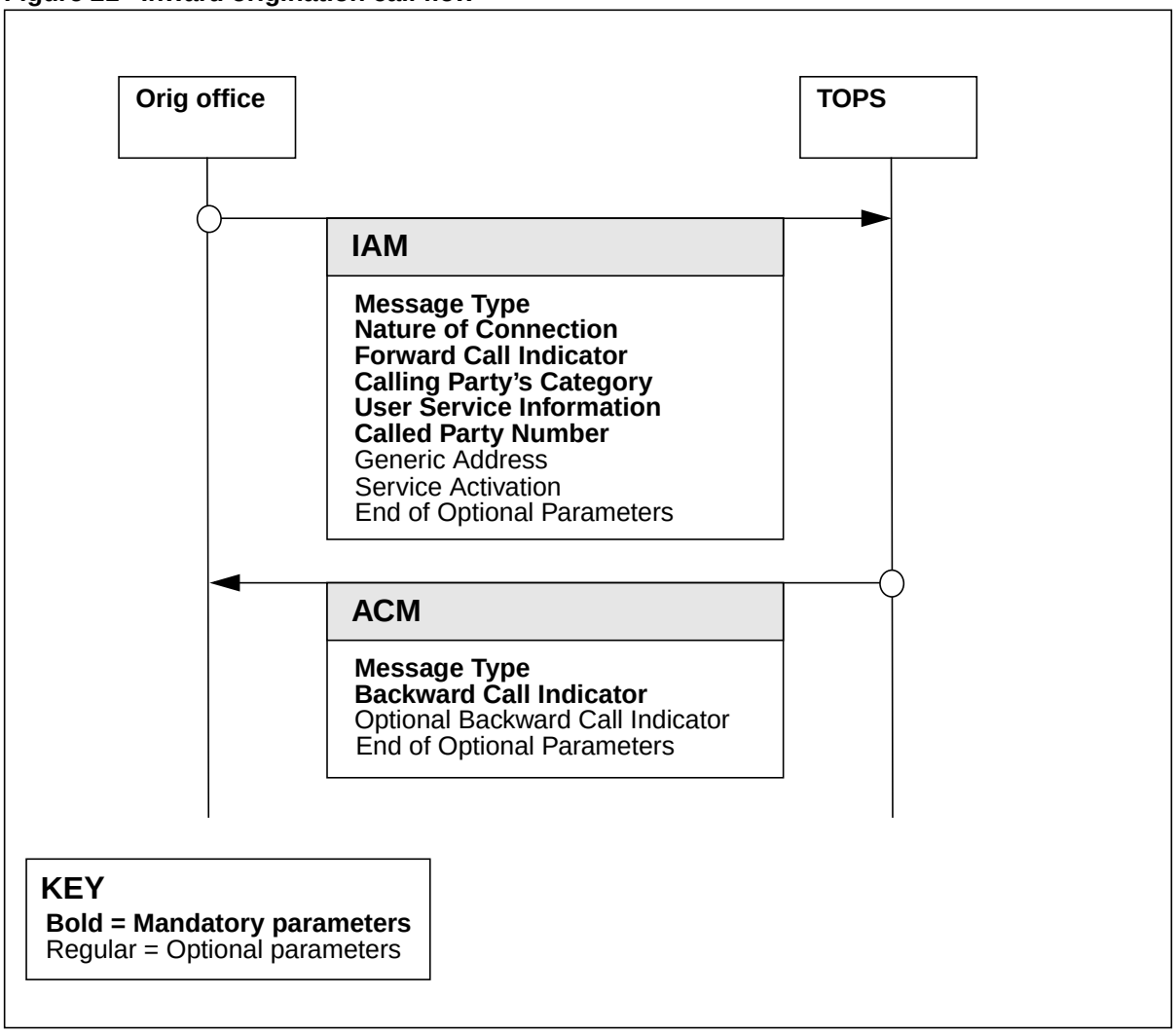
IAM parameter	Information extracted
User service information	Contains the requested bearer capability among other data. TOPS looks at the information transfer capability to ensure that the requested call is a voice call (i.e., speech or 3.1 kHz audio). All other bearer capabilities will cause TOPS to release the call.
Service Activation	Contains information about the availability of connection hold. TOPS requires the SAP to be in the message in order to consider the originating connection to have OSNC capabilities. However, connection hold is generally not supported for inwards originations, so the expected value in the feature code indicator should reflect this.

After receiving the IAM and the call required operator services within the TOPS environment, TOPS sends an ACM in response. The following table lists the parameters created by TOPS in the message along with the information populated by TOPS.

Table 23 ACM parameters populated by TOPS for inwards originations

ACM parameter	Information populated
Backwards call indicators	Contains information about the called party and its connection. At this point, the called party is really the operator, so TOPS populates this parameter with information that reflects the operator as the called party. Note that this information is updated is future messages when an actual called party is connected.
Optional backwards call indicators	Contains additional information about the called party and its connection. Just as with the backwards call indicator, TOPS populates most of the fields to reflect the operator as the called party. The exception is the user-network interaction indicator. TOPS populates this field to indicate that the voice connection should be cut-through at this time. This will allow the operator to communicate with the calling party.

Figure 21 Inward origination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 24 Inward origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM

Table 24 Inward origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Nature of connection	satellite indicator	<not used by TOPS>
	continuity check indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	spare	<not used by TOPS>
Forward call indicators	national/international call indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	ISDN user part preference indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
	spare	<not used by TOPS>
	translated called number	<not used by TOPS>
	QoR attempt	<not used by TOPS>
	reserved for national use	<not used by TOPS>
Calling party's category	calling party's category	operator, language french
		operator, language english
		operator, language german
		operator, language russian
		operator, language spanish
		national operator
User service information	extension bits	<not used by TOPS>
	coding standard	<not used by TOPS>
	information transfer capability	speech
		3.1Khz audio
	transfer mode	<not used by TOPS>
	information transfer rate	<not used by TOPS>
	user layer protocol identification	<not used by TOPS>

Table 24 Inward origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	inward operator code
	nature of address (modified NOA)	inward operator code
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<inward operator code digits>
Generic address	type of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	nature of address	<not used by TOPS>
	spare	<not used by TOPS>
	numbering plan	<not used by TOPS>
	presentation restriction indicator	<not used by TOPS>
	reserved	<not used by TOPS>
	address information	<not used by TOPS>
Service activation (SAP)	feature code indicator	hold not available
End of optional parameter		00000000

Table 25 Inward origination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM

Table 25 Inward origination - ACM

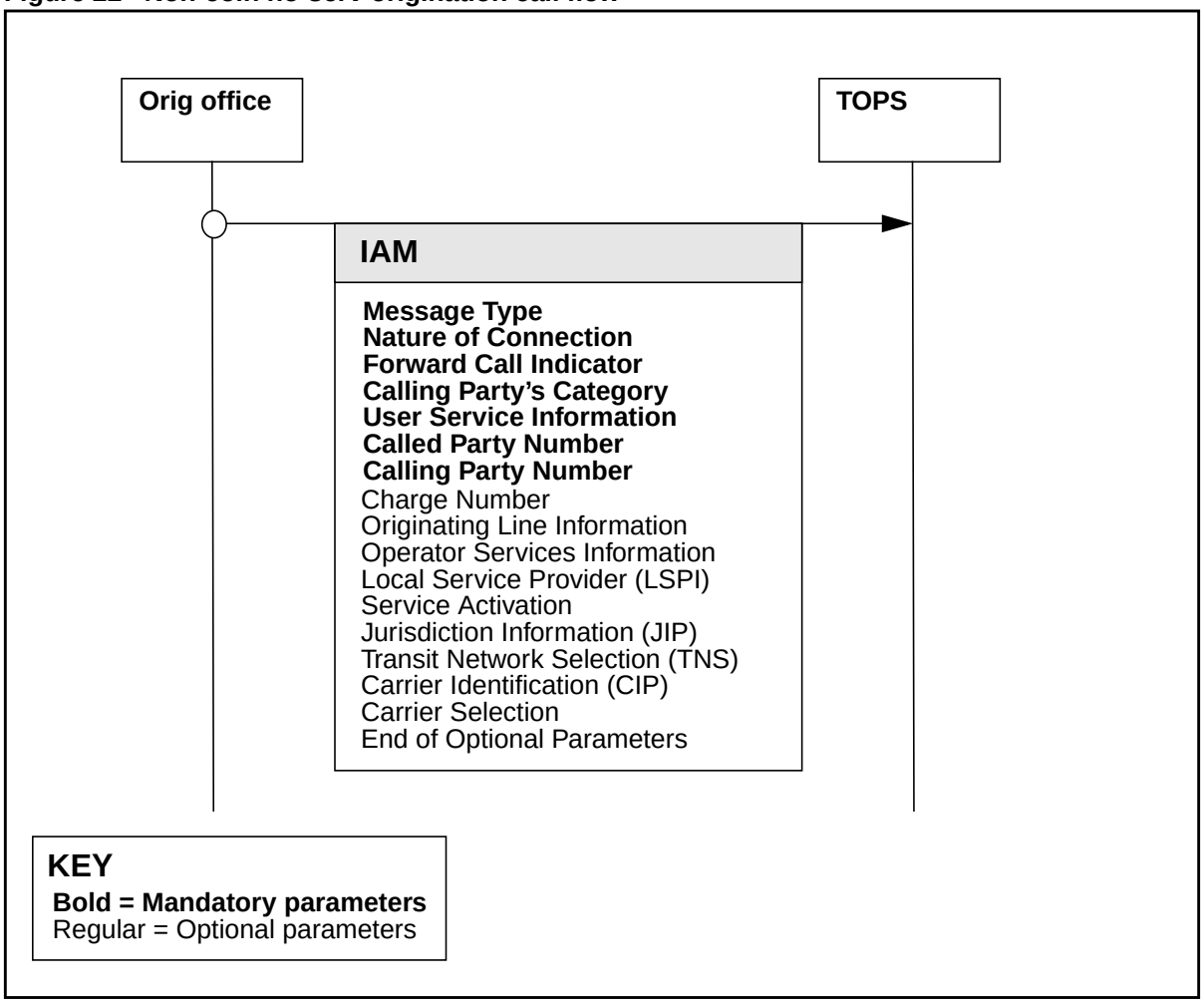
ACM parameters	FIeld	Expected values for this call flow
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
		subscriber free
	called party's category indicator	no indication
		ordinary (non-payphone) subscriber
	end-to-end method indicator	no end-to-end method
	interworking indicator	no interworking encountered
	IAM segmentation indicator	no indicator
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication
Optional backward call indicator	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent in a segmentation message
	MLPP user information	no indication
	reserved	reserved for national use
	network excessive delay indicator	no indication
	user-network interaction indicator	user-network interaction occurs, cut-through in both directions
End of optional parameter		00000000

Non-coin no-serv origination

Non-coin no-serv origination flows are initiated in the same manner as normal origination flows. When the call arrives at the TOPS office, TOPS analyzes the call and decides that it cannot be handled by TOPS in this office. The call should be forwarded to another operator services switch or handled as a tandem call.

The call reverts to standard DMS ISUP processing for the forwarding of the IAM and handling of the Address Complete Message (ACM). This flow does not show an ACM message being returned because that ACM message is not built by TOPS software. An ACM message is likely returned by the next office and is whistled through the TOPS office back to the originating office.

Figure 22 Non-coin no-serv origination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 26 Non-coin no-serv origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM
Nature of connection	satellite indicator	<not used by TOPS>
	continuity check indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	spare	<not used by TOPS>

Table 26 Non-coin no-serv origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Forward call indicators	national/international call indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	ISDN user part preference indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
	spare	<not used by TOPS>
	translated called number	<not used by TOPS>
	QoR attempt	<not used by TOPS>
	reserved for national use	<not used by TOPS>
Calling party's category		ordinary calling subscriber
User service information	extension bits	<not used by TOPS>
	coding standard	<not used by TOPS>
	information transfer capability	<not used by TOPS>
	transfer mode	<not used by TOPS>
	information transfer rate	<not used by TOPS>
	user layer protocol identification	<not used by TOPS>

Table 26 Non-coin no-serv origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	subscriber number
		national (significant) number
		international number
		subscriber number, operator requested
		national (significant) number, operator requested
		international number, operator requested
		no number present, operator requested
	nature of address (modified NOA)	subscriber number, operator requested
		national (significant) number, operator requested
		international number, operator requested
		no number present, operator requested
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<called party's digits>
Calling party number	nature of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	screening	<not used by TOPS>
	presentation	<not used by TOPS>
	numbering plan	<not used by TOPS>
	address information	<not used by TOPS>
Carrier identification	spare	<not used by TOPS>
	type of network	<not used by TOPS>
	network identification plan	<not used by TOPS>
	digit	<not used by TOPS>
Carrier selection		<not used by TOPS>
Charge number	nature of address	<not used by TOPS>
	odd/even	<not used by TOPS>
	numbering plan	<not used by TOPS>
	address information	<not used by TOPS>
Local service provider id (LSPI)	LSPI type	account owner
	encoding scheme	<not used by TOPS>
	context identification	<not used by TOPS>
	characters	<not used by TOPS>

Table 26 Non-coin no-serv origination - IAM

IAM parameters	FIeld	Expected values for this call flow
Local service provider id (LSPI)	LSPI type	switch owner
	encoding scheme	<not used by TOPS>
	context identification	<not used by TOPS>
	characters	<not used by TOPS>
Jurisdiction information (JIP)	digits	<not used by TOPS>
Operator services information (OSIP)	original access prefix	<not used by TOPS>
	access signaling	<not used by TOPS>
Originating line information (OLIP)	originating line information	<ANI id digits>
Service activation (SAP)	feature code indicator	hold available
		hold not available
Transit network selection (TNS)	spare	<not used by TOPS>
	type of network identification	<not used by TOPS>
	network identification plan	4-digit carrier identification
	digits	<carrier digits>
	circuit code	unspecified
		international call, no operator requested
		international call, operator requested
	reserved	<not used by TOPS>
End of optional parameter		00000000

Terminating connection signaling

Terminating connection signaling begins with an Initial Address Message (IAM) sent by TOPS. In most situations, the destination switch responds with an Address Complete Message (ACM), which is eventually followed by an Answer Message (ANM). However, if the terminating connection is made to another operator in the destination switch, then the destination switch responds with an ACM followed by a Call Progress (CPG) Message.

Formulating an outgoing IAM

The following types of information can affect the formulation of the terminating connection IAM:

- Connection hold availability
- Including calling party information
- Calling number information
- Carrier information
- Carrier routing information
- Called party information
- Parameters not included
- Additional parameters

Connection hold information in an outgoing IAM

For originating connections, the signaling identifies the call as having OSNC capabilities based upon the presence of a Service Activation Parameter (SAP) with a feature code indicator set to one of the following values:

- hold available
- hold not available
- intercept - regular
- intercept - blank
- intercept - trouble

When building the outgoing IAM, TOPS uses both the type of originating connection as well as customer datafill to determine whether the IAM should contain a SAP and if so, what the feature code indicator should contain. For more information regarding datafill, please refer to “Chapter 5: OSNC Data Schema” on page 391, specifically table OSNCCAP.

The ‘OSNC’ routing selector (refer to “Chapter 5: OSNC Data Schema” on page 391 for more information) is available to be placed in the route list pointed to by translations. This selector provides the ability for the customer to control both the presence of the SAP as well as the value of the feature code indicator for all subsequent routes in the route list.

Even if “hold available” is signaled in the incoming IAM, there are times when connection hold on the originating connection is taken down. Connection hold is not ended on the incoming connection for coin calls. Following are examples of when connection hold is ended on the incoming connection:

- For normal call completion for all non-coin calls, once billing is satisfied and the operator floats the call connection is ended on the incoming connection.
- If an ACM is received on the terminating connection on a transfer to carrier call indicating connection hold is not available, connection hold on the originating connection is ended.

The following table captures the different information available and its impact on the Service Activation Parameter (SAP).

Table 27 Service Activation Parameter (SAP) included in an outgoing IAM

Originating call type?	Datafill	Service Activation parameter in IAM	Feature code indicator value
OSNC capabilities not present	n/a	no	n/a
OSNC capabilities present with connection hold	OSNC capabilities present, offer connection hold	yes - only for Inwards and Transfer to carrier	hold not available - Inwards
			hold available-transfer to carrier
OSNC capabilities present without connection hold	OSNC capabilities present, offer connection hold	yes - only for Inwards and Transfer to carrier	hold not available
OSNC capabilities present	OSNC capabilities present, do not offer connection hold	yes - only for Inwards and Transfer to carrier	hold not available
OSNC capabilities present	OSNC capabilities not present	no	n/a

Calling party information included in an outgoing IAM

Including calling party information in the IAM means that the IAM will include some or all of the following parameters:

- Calling Party Number
- Originating Line Information (OLI)
- Charge Number

Note: GR-1144-CORE includes the User Service Information (USI) parameter as part of the calling party information. It is not included in this implementation because it is a mandatory parameter in the IAM.

The determination of whether to send the calling party information in the terminating IAM is not always based upon whether or not there is a calling party present. There are some situations where the calling party is present, but the terminating connection is made as if the operator originated the call.

In order for TOPS to determine if the calling party information should be included in the terminating connection, the following questions need to be answered:

- Is the terminating connection an inward operator request, transfer to carrier operator, third number verification or normal terminating connection?
- Is there a calling party present?
- Does the next switch want to receive calling party information?

The following table takes the answers to all three questions into account and provides a indication as to whether the calling party information is sent in the outgoing IAM.

Table 28 Calling party information included in an outgoing IAM

Call type?	Calling party present?	Datafill	Calling party information in IAM
inward operator request	n/a	n/a	no
transfer to carrier operator	yes	OCCINFO fields = Y	yes
transfer to carrier operator	yes	OCCINFO fields = N	no
third number verification	n/a	n/a	no
normal termination (carrier call)	yes	OCCINFO fields = Y	yes

Table 28 Calling party information included in an outgoing IAM

Call type?	Calling party present?	Datafill	Calling party information in IAM
normal termination (carrier call)	yes	OCCINFO fields = N	no
normal termination (non-carrier call)	yes	n/a	yes

In the table above there is a reference to datafill checks in table OCCINFO to determine whether the calling party information should be sent. The following table provides details on which fields affect which particular parameters. Those parameters not listed in the table below are not controlled by datafill.

Table 29 Table OCCINFO fields to parameter mapping

Table OCCINFO field	Associated parameters
INCCPN	Calling Number parameter
ANI	Charge Number parameter Originating Line Number parameter

Calling number information in an outgoing IAM

Calling number information in an outgoing IAM includes the following parameters:

- Calling Party Number
- Charge Number

Whether to include the calling number information is covered in the previous section (refer to “Calling party information included in an outgoing IAM” on page 101). This section provides information on how the parameters are populated once it has been determined that they should be included in the outgoing IAM.

The values that TOPS sends in the outgoing IAM for the calling number depend upon the values that were received in the incoming IAM. If the Calling Party Number and the Charge Number contain identical address digits, then only the Calling Party Number parameter should have been received in the incoming IAM. If the Calling Party Number and Charge Number address digits are different, then the originating office can send both parameters in the incoming IAM. TOPS receives both, stores both and sends both in the outgoing IAM. If the Charge Number is not received in the incoming IAM, then TOPS does not construct a Charge Number for the outgoing IAM. The following table illustrates when the parameters are sent.

Table 30 Calling number information encoding

Parameters received on originating connection	Parameters sent on terminating connection
Calling Party Number	Calling Party Number
Calling Party Number Charge Number	Calling Party Number Charge Number

ANI ID digits in an outgoing IAM

ANI ID digits in an outgoing IAM are conveyed in the following parameter:

- Originating Line Information

Whether or not to include the ANI ID digits is covered in the previous section (refer to “Calling party information included in an outgoing IAM” on page 101). This section provides information on how the parameter is populated once it has been determined that it should be included in the outgoing IAM.

The method used to populate the Originating Line Information parameter depends upon whether or not the call is a carrier call as well as the activation of the FlexANI feature.

Note: The FlexANI feature is controlled by the OSEA0012 SOC.

The following table illustrates the rules surrounding the encoding of the parameter.

Table 31 Originating line information parameter encoding

Calltype?	FlexANI?	ANI ID digit source
non-carrier call	n/a	ANI ID digits received on the originating connection in the incoming IAM. If no originating ANI ID digits are received, then the Originating Line Information parameter is not included in the outgoing IAM.

Table 31 Originating line information parameter encoding

Calltype?	FlexANI?	ANI ID digit source
carrier call	n	Table EAANIID is used to obtain the ANI ID digits for the outgoing IAM. The index is determined using one of the following methods: DN-based screening using tables DNSCRN, TOPSDB and TDBCLASS can provide the index to the table. Calling party class of service can be used to calculate the index to the table. Restricted billing sets returned from OLNS can affect the index chosen. Outgoing ATC trunk group datafill in table TRKGRP (field OSIND) can affect the index chosen. When OSIND is set to 'Y', the OLI value in the outgoing IAM will be updated to show that the call received operator handling at the TOPS switch.
carrier call	Y	ANI ID digits received on the originating connection in the incoming IAM.

Carrier information in an outgoing IAM

Carrier information in an outgoing IAM includes the following parameters:

- Carrier Information (CIP)
- Carrier Selection

This section provides information on how the parameters are populated as well as when they should be included in the outgoing IAM.

The Carrier Information parameter identifies the carrier associated with the call. If TOPS identifies a carrier for the call, then it may be encoded into a Carrier Information parameter based upon the rules cited below. Inclusion of the Carrier Information parameter is based on the following information:

- the type of outgoing trunk
- the presence of the CICSET option against the outgoing trunk group
- the presence of the carrier digits for the call in the set of allowable carrier digits associated with the outgoing trunk through table CICSETS

The following table illustrates the possible permutations and how they affect the presences on the Carrier Information parameter in the outgoing IAM.

Table 32 Carrier Information parameter encoding

Carrier identified?	Outgoing trunk group type?	CICSET option?	CICSET name?	Table CICSETS datafill?	CIP present?
no	n/a	n/a	n/a	n/a	no
yes	IT	n/a	n/a	n/a	yes
yes	ATC	no	n/a	n/a	no
yes	ATC	yes	SSET	n/a	yes
yes	ATC	yes	<any other name>	yes	yes
yes	ATC	yes	<any other name>	no	no

The Carrier Selection (CS) parameter provides information on whether the selected carrier was presubscribed or casually dialed by the calling party. The inclusion of the Carrier Selection (CS) parameter is based upon the call being a carrier call and datafill in table OCCINFO. The following table provides details on which fields affect the parameter.

Table 33 Table OCCINFO fields to Carrier Selection (CS) parameter mapping

Table OCCINFO field	Associated parameters
PICIND	Carrier Selection parameter

The following table documents the source of the carrier digits and the associated values that are encoded in the Carrier Selection parameter.

Table 34 Carrier Selection parameter encoding

Source of carrier digits	Carrier selection information encoding
originating connection signaling (i.e., CIP or TNS parameter) with Carrier Selection parameter also received	<forward value received in originating IAM Carrier Selection parameter>
originating connection signaling (i.e., CIP or TNS parameter) with Carrier Selection parameter not received	no indication
DN-based look-up on TOPS switch using OLNS query, table DNSCRN or table DNPIC	selected carrier presubscribed and not input
trunk group based look-up on TOPS switch using table TOPEATRK	selected carrier presubscribed and not input
operator/service node	selected carrier not presubscribed and input

Carrier routing information in an outgoing IAM

Including carrier routing information in an outgoing IAM means that the IAM will include the following parameter:

- Transit Network Service (TNS)

Whether or not to include the carrier routing information is not based upon whether or not the call is a carrier call. Just because the call is a carrier call does not mean that the carrier routing information is included in the IAM. The TNS parameter is used by intermediate switches to determine a route to the carrier. It is also used on international calls to help route the call through the carrier's network.

In order for TOPS to determine whether the carrier routing information should be included in the terminating connection, the following questions need to be answered:

- Is the call a carrier call?
- What type of trunk is used to access the carrier from the TOPS switch?
- Is the call an international call?

The following table takes the answers to all three questions into account and provides a indication as to whether the carrier routing information is sent in the outgoing IAM.

Table 35 Carrier routing information included in an outgoing IAM

Call type?	Trunk group type?	International call?	Carrier information in IAM
carrier call	ATC	yes	yes
carrier call	ATC	no	no
carrier call	IT	n/a	yes
non-carrier call	n/a	n/a	no

Called party information in an outgoing IAM

At this time, TOPS does not support the encoding of the called party information in an outgoing IAM using the modified nature of address rules. TOPS uses the basic nature of address rules. This means that the Operator Services Information parameter with the Access Prefix indicator is not included in the outgoing IAM.

In order to encode the Called Party Number parameter nature of address field, the following questions need to be answered:

- Is the terminating connection an inward operator request, transfer to carrier operator, third number verification or normal terminating connection?
- What is the format of the called number?

An assumption is made about all transfer to carrier operator connections. The assumption is that if TOPS software is making a terminating connection to the carrier, then the nature of address must always include ‘operator requested’. This assumption is made because calls that are transferred to the carrier operator are marked as ‘NOSERV’ in table TOPEACAR. This call must have entered the TOPS office as either a 0- call or a plus-dialed call that was not originally a carrier call. These are interpreted as operator assisted even if they were dialed as 1+ originally.

Remember that carrier call processing is done at origination time and any call that is not served in this office is immediately tandemed to the carrier. So, these calls have been excluded from the set of calls that are establishing terminating connections in this section.

Third number verification and normal terminations never include ‘operator requested’ in the nature of address.

The following table takes the answers to the questions into account and provides an indication as to how the called party number nature of address is encoded in the outgoing IAM.

Table 36 Called Party Number nature of address encoded in an outgoing IAM

Call type?	Called number type?	Called Party Number nature of address in IAM
inward operator request	n/a	inward operator code
transfer to carrier	international number	international number, operator requested
transfer to carrier	10-digit number	national (significant) number, operator requested
transfer to carrier	< 10-digit number	subscriber number, operator requested
transfer to carrier	no number (i.e., 0-, 00-)	no number present, operator requested
third number verification	10-digit number	national (significant) number
third number verification	<10-digit number	subscriber number
normal termination	international number	international number
normal termination	10-digit number	national (significant) number
normal termination	< 10-digit number	subscriber number

Parameters not included in an outgoing IAM

The following list of parameters are intentionally not included in the IAM even if they are received by the originating connection:

- Local Service Provider Information (both account owner and switch owner instances)
- Jurisdiction Information

  Note: If the TOPS Bellcore LNP SOC (OSEA0010) is on, then the Jurisdication Information (JIP) parameter is not included in the outgoing Initial Address Message

(IAM). However, if the SOC is off, then the Jurisdiction Information (JIP) parameter is included in the outgoing IAM.

- Operator Services Information
- User-to-user Information
- Generic Address with Type of Address field encoded to one of the following values:
  - — supplemental user-provided calling address - not screened
  - — supplemental user-provided calling address - failed network screening
- Access Transport

Additional parameters in an outgoing IAM

Most additional parameters not mentioned in the previous sections are forwarded as they were received on the originating connection provided the terminating connection is OSNC capable. The terminating connection is OSNC capable if the ‘OSNC’ route selector is included in the selected route list; if the TOPS parameter OSNC_OUTGOING_DEFAULT is set appropriately; and if the originating connection is also OSNC capable. (Refer to “Chapter 5: OSNC Data Schema” on page 391 for more information.)

The following table is a current list of IAM parameters based on GR317, GR394, GR1144, and GR1277. It also includes additional parameters which are built by lower level software for TOPS calls. It shows which of the parameters are supported for OSNC. Any other parameters not listed in this table are not supported for outgoing OSNC IAMs; however most parameters stored are forwarded.

An ‘X’ indicates the parameter is built for OSNC outgoing IAMs. A ‘U’ means the parameter is currently stored and will be built for the OSNC outgoing IAM if there is room in the IAM message. An ‘N’ indicates the parameter is not be forwarded for OSNC calls.

A hex value in parenthesis (4E) means the parameter is defined with this hex value in one of the above GRs, but not defined in software. Therefore, it may be forwarded.

Table 37 TOPS Supported Parameters in Outgoing IAM

Code (HEX)	Parameter	OSNC Support
03	Access Transport (ATP)	N
C6	Business Group (BG)	X
04	Called Party Number (CDPN)	X

Table 37 TOPS Supported Parameters in Outgoing IAM

Code (HEX)	Parameter	OSNC Support
0A	Calling Party Number (CGPN)	X
09	Calling Party's Category (CPC)	X
01	Call Reference (CR)	N
C5	Carrier Identification (CIP)	X
EE	Carrier Selection (CS)	X
25	Channel Assignment Map (CAM)	N
EB	Charge Number (CN)	X
1A	Close User Group Interlock Code	N
21	Connected Number Parameter (CNP)	N
0D	Connection Request	U
C3	Egress Service / Net Info Parm	X
98	Facility Request	N
07	Forward Call Indicators (FCI)	X
C0	Generic Address (GAP)	X
C1	Generic Digits (GD)	X
C7	Generic Name (GN)	X
3D	Hop Counter (HOP)	X
0E	Information Request Indicator	U
C4	Jurisdiction Information (JIP)	N
73	Local Service Provider Info (LSPI)	N
06	Nature of Connection (NOC)	X
F6	Network ICM Information	X
5B	Network Management Controls	U
FB	Network Specific Facilities	N
EF	Network Transport Parm (NTP)	X
70	Operator Information (OI)	N
74	Operator Services Indicator (OSI)	N

Table 37 TOPS Supported Parameters in Outgoing IAM

Code (HEX)	Parameter	OSNC Support
C2	Operator Services Info Access (OSIA)	N
08	Optional Forward Call Indicators	N
D0	Original Called ACD DN Parm	X
28	Original Called Number (OCDPN)	X
EA	Originating Line Information (OLI)	X
FC	Party Info Parm	X
3A	Precedence	N
(4E)	Redirect Capability	U
(77)	Redirect Counter	U
0B	Redirecting Number	X
13	Redirection Indicator	X
32	Remote Operations	N
33	Service Activation (SAP)	X
(EC)	Service Code (SAC)	U
ED	Special Processing Request	U
FE	Suppl E to E Info Req	X
E4	Supplementary Line Info (SLI)	X
F2	Supplementary Service Info (SSI)	X
E3	Transaction Request	X
23	Transit Network Selection (TNS)	X
-	Unrecognized/Unknown (UNK)	X
1D	User Service Information (USI)	X
30	User Service Info Prime	U
2A	User To User Indicator	N
20	User To User Information (UUI)	N
71	Validation Response (VR)	N

Note: An analysis of where incoming IAM parameters are stored shows that the JIP is stored software if LNP is not SOC'd on. If the JIP is stored it may be forwarded.

Note: The USI is also known as Bearer Capabilities (BC).

Processing the ACM

After building and sending the IAM, TOPS expects to receive an ACM. The ACM can contain the following information:

- Backwards Call Indicator
- Optional Backwards Call Indicator
- Service Activation

Backwards Call Indicator in an incoming ACM

The Backwards Call Indicator parameter contains information about the called party. TOPS receives this information and stores it. When the operator/service node is released from the call, then this information is sent back to the originating connection using a Call Progress message (CPG). No other processing is performed on this parameter.

Optional Backwards Call Indicator in an incoming ACM

The Optional Backwards Call Indicator parameter also contains information about the called party. TOPS receives this information and stores it. When the operator/service node is released from the call, then this information is sent back to the originating connection using a Call Progress message (CPG).

TOPS also examines the value in the user-network interaction indicator field within the parameter. If the value is set to ‘user-network interaction occurs, cut through in both directions’, then the voice connection between the called party, the calling party and the operator/service node (if the operator/service node is still present on the call) is established.

TOPS also uses this value to determine what message to expect next in the call flow. The value of ‘user-network interaction occurs, cut through in both directions’ is interpreted to mean that no Answer Message (ANM) will be sent, but that additional Call Progress messages (CPGs) will be sent. This means that TOPS needs to perform the following functions upon receipt of the ACM with this indication:

- inform the operator/service node that the voice path to the called party has been established
- if the call is a carrier call, update the call event status so that the call appears to be answered
- do not mark the call as answered, but start notify timing or coin initial period timing (if applicable)

Service Activation in an incoming ACM

The Service Activation Parameter (SAP) may be optionally included in the ACM. The associated feature code indicator may be encoded to indicate a request for connection hold. This is encoded with the feature code indicator set to ‘hold request’. Upon receiving this value, TOPS passes control of the call to the next office and begins tandeming messages rather than examining them.

Terminating connection flows

The following types of terminations are discussed in more detail:

- normal termination
- inwards termination
- third-number billing termination
- transfer to carrier termination

Normal termination

This call flow describes a typical normal termination flow. This is usually a connection to a subscriber. The following table illustrates what optional information would likely be included in the IAM for this call flow.

Table 38 Expected normal termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
end-to-end signaling	Nature of Connection Forward Call Indicator	yes These are mandatory parameters that are encoded differently to support end-to-end signaling. Since end-to-end signaling is being supported (by the presence of the 'OSNC' route in the route list), they are encoded with the values received in the originating IAM.
connection hold	Service Activation	no Even if the 'OSNC' route selector is encountered, this parameter is not included in the IAM.
calling party information	Calling Party Number Originating Line Information Charge Number	yes It is expected that this information was received in the originating IAM.
carrier information	Carrier Information Carrier Selection	optional These parameters are included only if the call is a carrier call and if the table OCCINFO datafill allows it to be included.

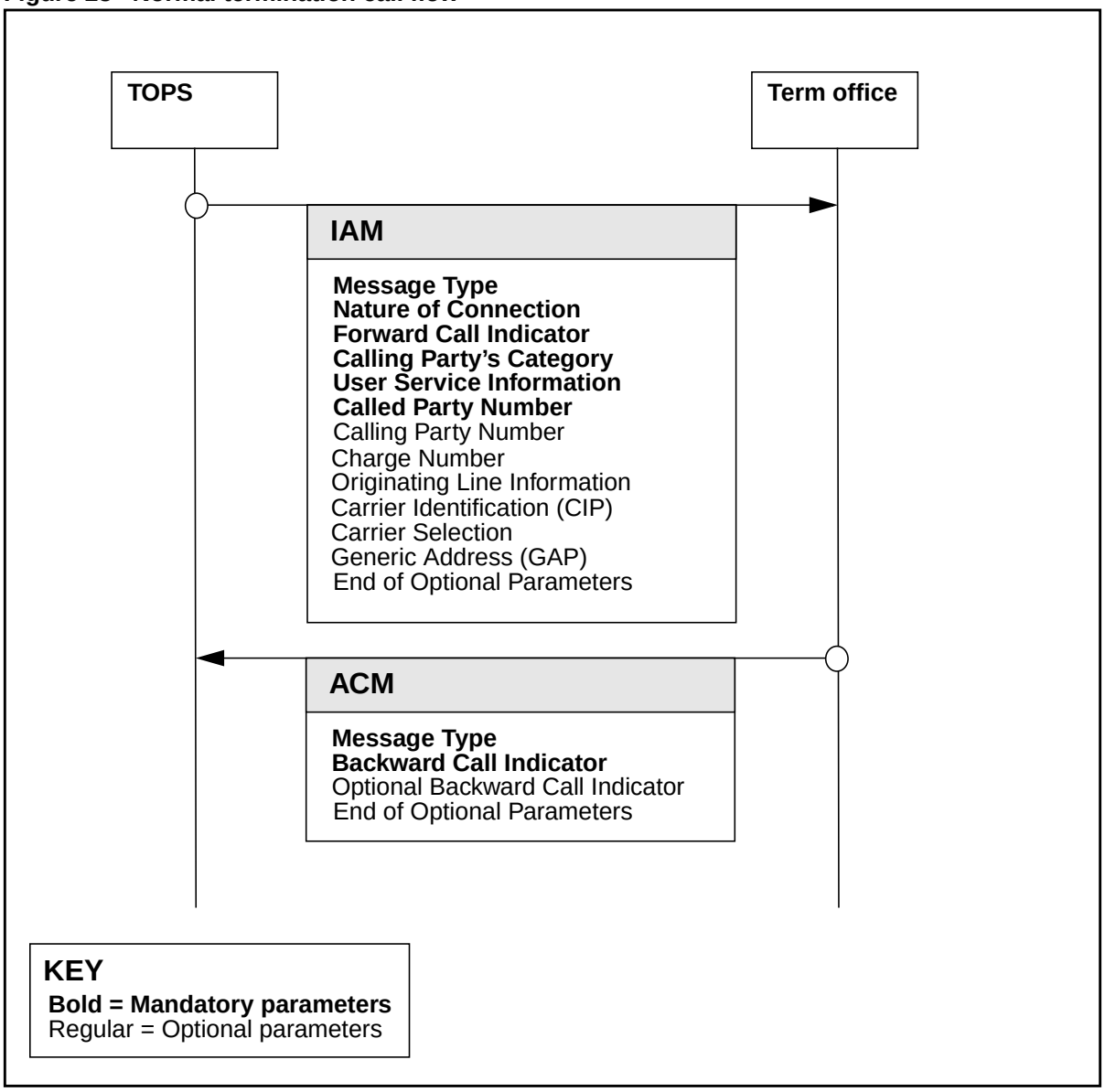
Table 38 Expected normal termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
carrier routing information	Transit Network Service	no Most routes to the carrier are expected to be ATC trunks. Also, this call is not expected to be an international call.

Table 39 Typical normal termination information encoded in incoming ACM

Information	Associated parameters	Included in ACM?
cut through voice	Optional Backwards Call Indicator: user-network interaction indicator = user-network interaction occurs, cut through in both directions	no This call is not expected to terminate to another operator.
connection hold	Service Activation	no This call is not expected to terminate to another operator.

Figure 23 Normal termination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<forwarded from originating connection>' means that the value received in the originating parameter is encoded in the terminating parameter.

Table 40 Normal termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM
Nature of connection	satellite indicator	<forwarded from originating connection>
	continuity check indicator	<forwarded from originating connection>
	echo control device indicator	<forwarded from originating connection>
	spare	<forwarded from originating connection>
Forward call indicators	national/international call indicator	<forwarded from originating connection>
	end-to-end method indicator	<forwarded from originating connection>
	interworking indicator	<forwarded from originating connection>
	IAM segmentation indicator	<forwarded from originating connection>
	ISDN user part indicator	<forwarded from originating connection>
	ISDN user part preference indicator	<forwarded from originating connection>
	ISDN access indicator	originating access non-ISDN
	SCCP method indicator	<forwarded from originating connection>
	spare	<forwarded from originating connection>
	translated called number	number not translated
		number translated
	QoR attempt	<forwarded from originating connection>
	reserved for national use	<forwarded from originating connection>
Calling party's category		ordinary calling subscriber
User service information	extension bits	<forwarded from originating connection>
	coding standard	<forwarded from originating connection>
	information transfer capability	<forwarded from originating connection>
	transfer mode	<forwarded from originating connection>
	information transfer rate	<forwarded from originating connection>
	user layer protocol identification	<forwarded from originating connection>

Table 40 Normal termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	national (significant) number
		subscriber number
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<called party's digits>
Calling party number	nature of address	unique national (significant) number
		non-unique national (significant) number
	odd/even	<all values are supported>
	screening	reserved
	presentation	presentation allowed
		presentation restricted
	numbering plan	ISDN (telephony) numbering plan
	address information	<calling party's digits>
Carrier identification	spare	<forwarded from originating connection>
	type of network	<forwarded from originating connection>
	network identification plan	4-digit carrier identification code
	digit	<carrier digits>
Carrier selection	carrier selection information	no indication
		selected carrier identification code presubscribed and not input by the calling party
		selected carrier identification code presubscribed and input by the calling party
		selected carrier identification code presubscribed, no indication whether input by calling party
		selected carrier identification code not presubscribed and input by calling party
Charge number	nature of address	ANI of the calling number, subscriber number
		ANI of the calling number, national number
		ANI not available or not provided
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<charge digits>

Table 40 Normal termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Originating line information (OLIP)	originating line information	<ANI id digits>
Generic Address (GAP)	type of address	ported number
	nature of address	national (significant) number
	odd/even	<all values are supported>
	screening	reserved
	presentation	presentation restricted
	numbering plan	ISDN (telephony) numbering plan
	address information	<dialed called party's digits>
End of optional parameter		00000000

Table 41 Normal termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM
Backward call indicator	charge indicator	<not used by TOPS>
	called party's status indicator	<not used by TOPS>
	called party's category indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	holding indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>

Table 41 Normal termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Optional backward call indicator	inband information indicator	<not used by TOPS>
	call forwarding may occur indicator	<not used by TOPS>
	simple segmentation indicator	<not used by TOPS>
	MLPP user information	<not used by TOPS>
	reserved	<not used by TOPS>
	network excessive delay indicator	<not used by TOPS>
	user-network interaction indicator	no indication
End of optional parameter		00000000

Inwards termination

This call flow describes an inwards termination flow. This is usually a connection to another operator. The following table illustrates what optional information would likely be included in the IAM for this call flow.

Table 42 Expected inwards termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
end-to-end signaling	Nature of Connection Forward Call Indicator	no These are mandatory parameters that are encoded differently to support end-to-end signaling. Since end-to-end signaling is not being supported (the presence of the ‘OSNC’ route in the route list is ignored), they are encoded with the values that represent the operator.

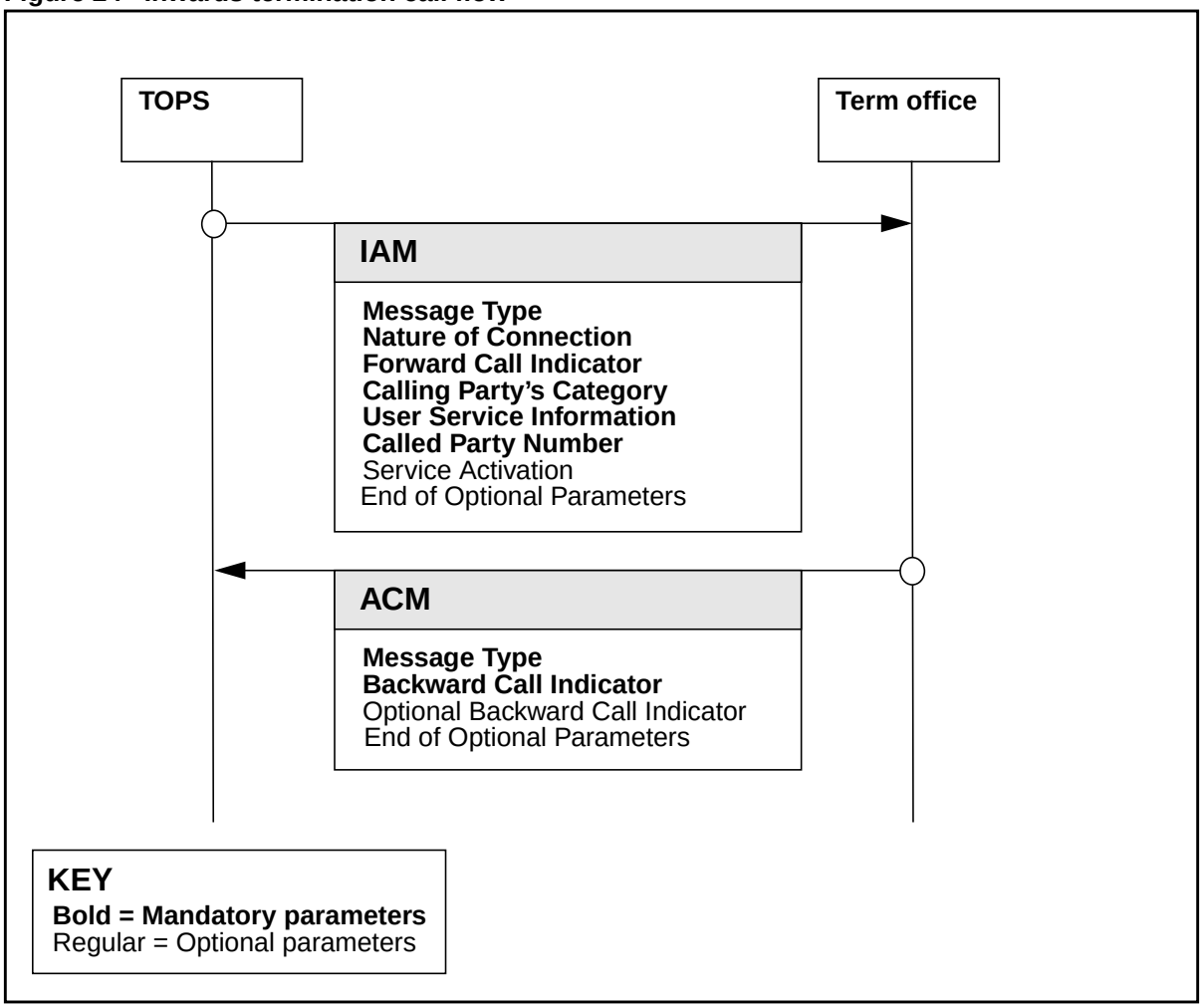
Table 42 Expected inwards termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
connection hold	Service Activation	yes The ‘OSNC’ route selector is expected to be encountered because the call is terminating to another operator. The Service Activation Parameter (SAP) is included but always encoded to be ‘hold not available’ even if the datafill indicates otherwise.
calling party information	Calling Party Number Originating Line Information Charge Number	no An inward connection is established as if the operator is the originator, so calling party information is not included in the Initial Address Message (IAM).
carrier information	Carrier Information Carrier Selection	no An inward call is not considered a carrier call, so carrier information is not included in the IAM.
carrier routing information	Transit Network Service	no An inward call is not considered a carrier call, so carrier routing information is not included in the IAM.

Table 43 Typical normal termination information encoded in incoming ACM

Information	Associated parameters	Included in ACM?
cut through voice	Optional Backwards Call Indicator: user-network interaction indicator = user-network interaction occurs, cut through in both directions	yes This call is expected to terminate to an operator.
connection hold	Service Activation	no This call is expected to terminate to an operator, but connection hold was not offered in the IAM.

Figure 24 Inwards termination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 44 Inwards termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM

Table 44 Inwards termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Nature of connection	satellite indicator	no satellite circuit in the connection
	continuity check indicator	continuity check not required
		continuity check required on this circuit
		continuity check performed on a pervious circuit
	echo control device indicator	outgoing half echo suppressor not included
	spare	spare
Forward call indicators	national/international call indicator	not an incoming international call
	end-to-end method indicator	no end-to-end method available
	interworking indicator	interworking encountered
	spare	spare
	ISDN user part indicator	ISDN user part not used all the way
	ISDN user part preference indicator	ISND user part preferred all the way (default)
	ISDN access indicator	originating access non-ISDN
	SCCP method indicator	no indication (default)
	spare	spare
	translated called number	number not translated
	QoR attempt	no QoR attempt in progress
	reserved for national use	reserved for national use
Calling party's category		national operator
User service information	extension bits	<forwarded from originating connection>
	coding standard	<forwarded from originating connection>
	information transfer capability	<forwarded from originating connection>
	transfer mode	<forwarded from originating connection>
	information transfer rate	<forwarded from originating connection>
	user layer protocol identification	<forwarded from originating connection>
Called party number	nature of address (basic NOA)	inward operator code
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<inward operator code digits>

Table 44 Inwards termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Service activation (SAP)	feature code indicator	hold not available
End of optional parameter		00000000

Table 45 Inwards termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM
Backward call indicator	charge indicator	<not used by TOPS>
	called party's status indicator	<not used by TOPS>
	called party's category indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	holding indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
Optional backward call indicator	inband information indicator	<not used by TOPS>
	call forwarding may occur indicator	<not used by TOPS>
	simple segmentation indicator	<not used by TOPS>
	MLPP user information	<not used by TOPS>
	reserved	<not used by TOPS>
	network excessive delay indicator	<not used by TOPS>
	user-network interaction indicator	user-network interaction occurs, cut-through in both directions
End of optional parameter		00000000

Third-number billing termination

This call flow describes a third-number termination flow. This is usually a connection to a subscriber for billing acceptance only. The following table illustrates what optional information would likely be included in the IAM for this call flow.

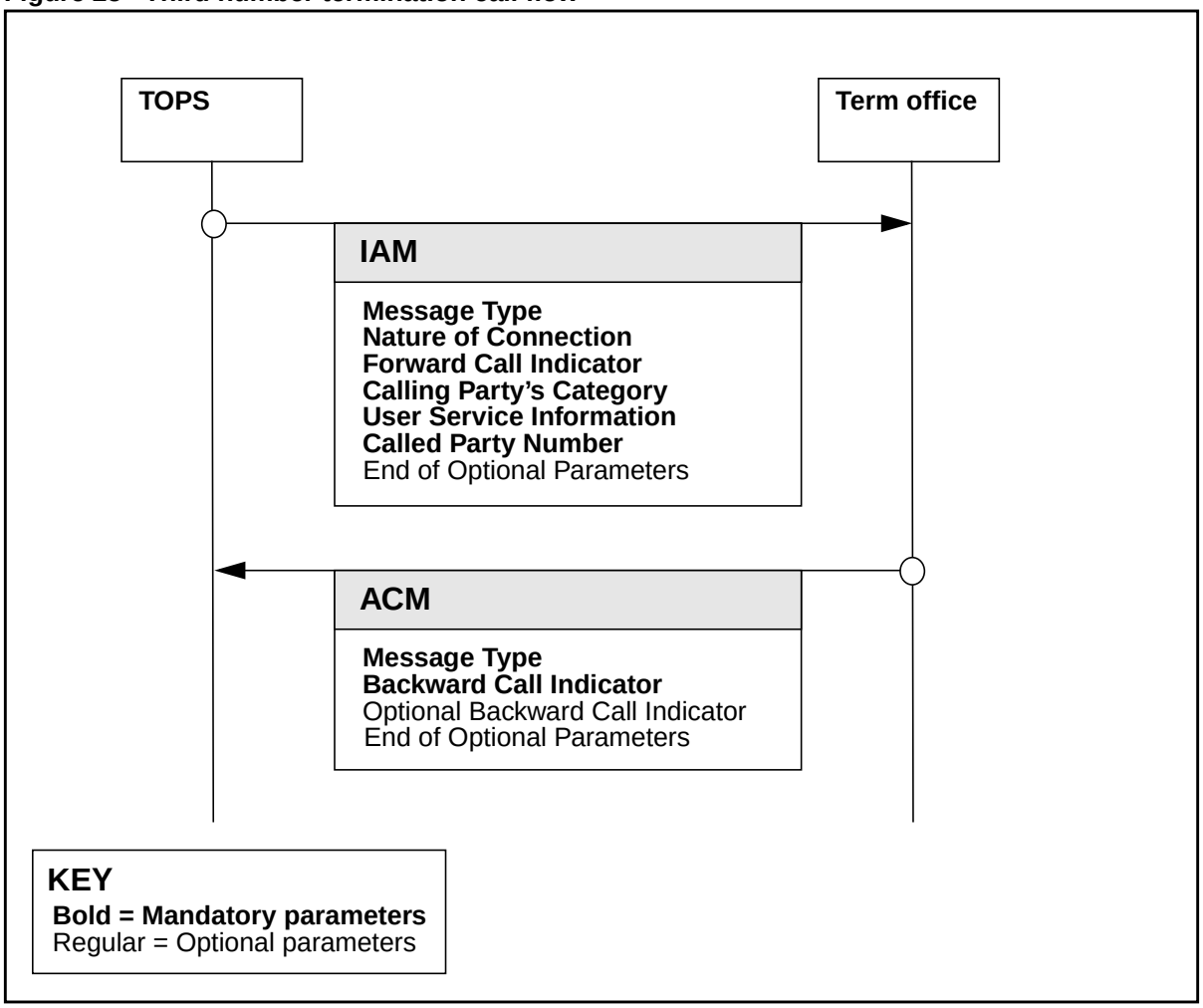
Table 46 Expected third number termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
end-to-end signaling	Nature of Connection Forward Call Indicator	no These are mandatory parameters that are encoded differently to support end-to-end signaling. Since end-to-end signaling is not being supported (the presence of the 'OSNC' route in the route list is ignored), they are encoded with the values that represent the operator.
connection hold	Service Activation	no Even if the 'OSNC' route selector is encountered, this parameter is not included in the IAM.
calling party information	Calling Party Number Originating Line Information Charge Number	no A third-number billing connection is established as if the operator is the originator, so calling party information is not included in the IAM.
carrier information	Carrier Information Carrier Selection	no A third-number billing call is not considered a carrier call, so carrier information is not included in the IAM.
carrier routing information	Transit Network Service	no A third-number billing call is not considered a carrier call, so carrier routing information is not included in the IAM.

Table 47 Typical third number termination information encoded in incoming ACM

Information	Associated parameters	Included in ACM?
cut through voice	Optional Backwards Call Indicator: user-network interaction indicator = user-network interaction occurs, cut through in both directions	no This call is not expected to terminate to another operator.
connection hold	Service Activation	no This call is not expected to terminate to another operator.

Figure 25 Third number termination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 48 Third number termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM

Table 48 Third number termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Nature of connection	satellite indicator	no satellite circuit in the connection
	continuity check indicator	continuity check not required
		continuity check required on this circuit
		continuity check performed on a pervious circuit
	echo control device indicator	outgoing half echo suppressor not included
	spare	spare
Forward call indicators	national/international call indicator	not an incoming international call
	end-to-end method indicator	no end-to-end method available
	interworking indicator	interworking encountered
	spare	spare
	ISDN user part indicator	ISDN user part not used all the way
	ISDN user part preference indicator	ISND user part preferred all the way (default)
	ISDN access indicator	originating access non-ISDN
	SCCP method indicator	no indication (default)
	spare	spare
	translated called number	number not translated
	QoR attempt	no QoR attempt in progress
	reserved for national use	reserved for national use
Calling party's category		national operator
User service information	extension bits	<forwarded from originating connection>
	coding standard	<forwarded from originating connection>
	information transfer capability	<forwarded from originating connection>
	transfer mode	<forwarded from originating connection>
	information transfer rate	<forwarded from originating connection>
	user layer protocol identification	<forwarded from originating connection>

Table 48 Third number termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	national (significant) number
		subscriber number
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<third number digits>
End of optional parameter		00000000

Table 49 Third number termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM
Backward call indicator	charge indicator	<not used by TOPS>
	called party's status indicator	<not used by TOPS>
	called party's category indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	holding indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>

Table 49 Third number termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Optional backward call indicator	inband information indicator	<not used by TOPS>
	call forwarding may occur indicator	<not used by TOPS>
	simple segmentation indicator	<not used by TOPS>
	MLPP user information	<not used by TOPS>
	reserved	<not used by TOPS>
	network excessive delay indicator	<not used by TOPS>
	user-network interaction indicator	no indication
End of optional parameter		00000000

Transfer to carrier termination

This call flow describes a typical transfer to carrier termination flow. This is usually a connection to a carrier operator. The following table illustrates what optional information would likely be included in the IAM for this call flow.

Table 50 Expected transfer to carrier termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
end-to-end signaling	Nature of Connection Forward Call Indicator	yes These are mandatory parameters that are encoded differently to support end-to-end signaling. Since end-to-end signaling is being supported (by the presence of the ‘OSNC’ route in the route list), they are encoded with the values received in the originating IAM.

Table 50 Expected transfer to carrier termination information encoded in outgoing IAM

Information	Associated parameters	Included in IAM?
connection hold	Service Activation	yes The 'OSNC' route selector is expected to be encountered because the call is terminating to another operator. The Service Activation Parameter (SAP) is included and the connection hold indicator is encoded based upon the datafill and the presence of connection hold on the originating connection.
calling party information	Calling Party Number Originating Line Information Charge Number	yes It is expected that this information was received in the originating IAM and the table OCCINFO datafill is set to send this information.
carrier information	Carrier Information Carrier Selection	yes These parameters are included only if the table OCCINFO datafill allows it to be included.
carrier routing information	Transit Network Service	no Most routes to the carrier are expected to be ATC trunks. Also, this call is not expected to be an international call.

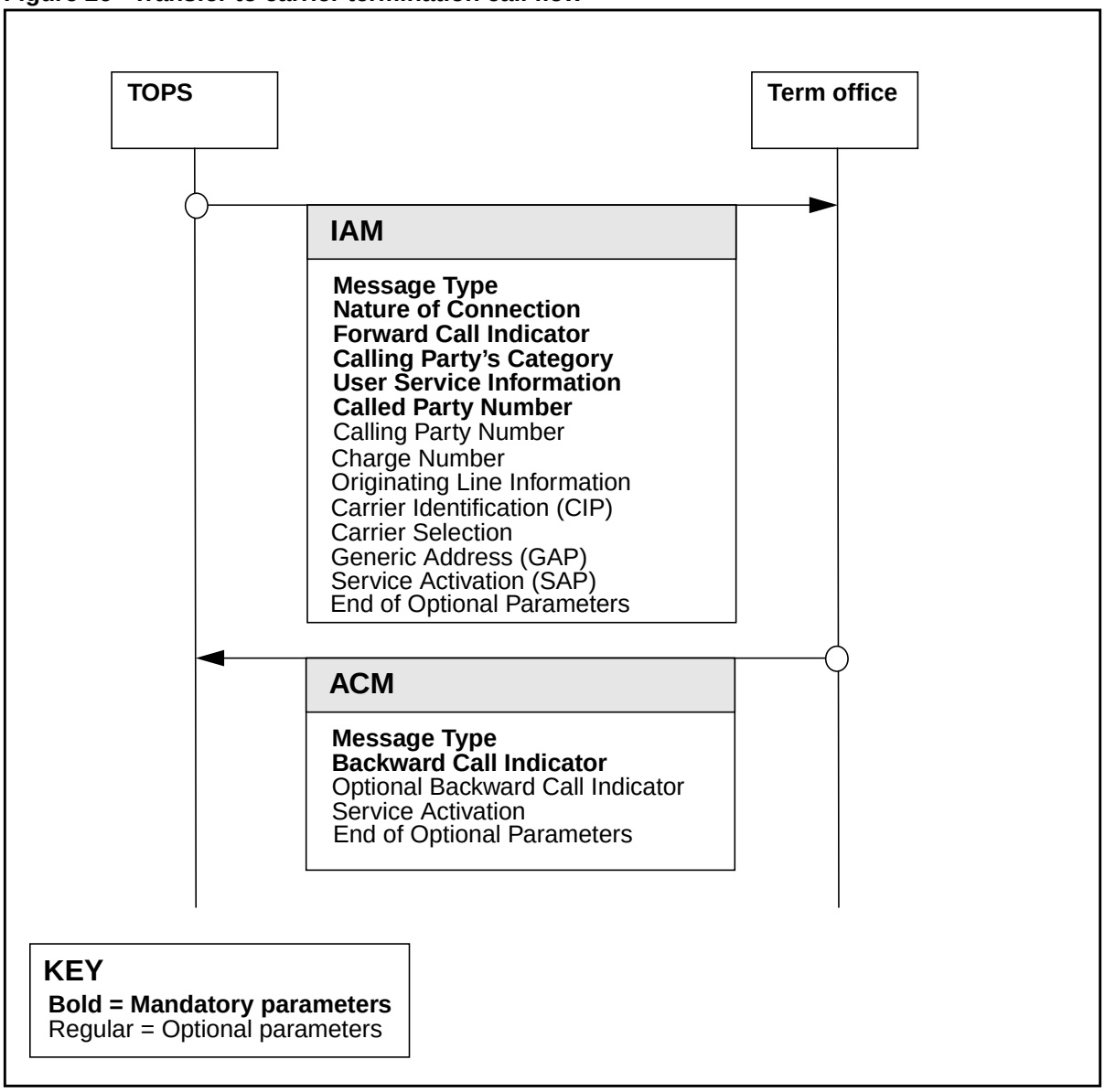
Table 51 Typical transfer to carrier termination information encoded in incoming ACM

Information	Associated parameters	Included in ACM?
cut through voice	Optional Backwards Call Indicator: user-network interaction indicator = user-network interaction occurs, cut through in both directions	yes This call is expected to terminate to an operator.

Table 51 Typical transfer to carrier termination information encoded in incoming ACM

Information	Associated parameters	Included in ACM?
connection hold	Service Activation	yes This call is expected to accept connection hold if it was offered in the IAM.

Figure 26 Transfer to carrier termination call flow



The following tables show the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 52 Transfer to carrier termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Message type		IAM

Table 52 Transfer to carrier termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Nature of connection	satellite indicator	<forwarded from originating connection>
	continuity check indicator	<forwarded from originating connection>
	echo control device indicator	<forwarded from originating connection>
	spare	<forwarded from originating connection>
Forward call indicators	national/international call indicator	<forwarded from originating connection>
	end-to-end method indicator	<forwarded from originating connection>
	interworking indicator	<forwarded from originating connection>
	IAM segmentation indicator	<forwarded from originating connection>
	ISDN user part indicator	<forwarded from originating connection>
	ISDN user part preference indicator	<forwarded from originating connection>
	ISDN access indicator	originating access non-ISDN
	SCCP method indicator	<forwarded from originating connection>
	spare	<forwarded from originating connection>
	translated called number	number not translated
		number translated
	QoR attempt	<forwarded from originating connection>
	reserved for national use	<forwarded from originating connection>
Calling party's category		ordinary calling subscriber
User service information	extension bits	<forwarded from originating connection>
	coding standard	<forwarded from originating connection>
	information transfer capability	<forwarded from originating connection>
	transfer mode	<forwarded from originating connection>
	information transfer rate	<forwarded from originating connection>
	user layer protocol identification	<forwarded from originating connection>

Table 52 Transfer to carrier termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Called party number	nature of address (basic NOA)	national (significant) number, operator requested
		subscriber number, operator requested
		international number, operator requested
		no number present, operator requested
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<called party's digits>
Calling party number	nature of address	unique national (significant) number
		non-unique national (significant) number
	odd/even	<all values are supported>
	screening	reserved
	presentation	presentation allowed
		presentation restricted
	numbering plan	ISDN (telephony) numbering plan
	address information	<calling party's digits>
Carrier identification	spare	<forwarded from originating connection>
	type of network	<forwarded from originating connection>
	network identification plan	4-digit carrier identification code
	digit	<carrier digits>
Carrier selection	carrier selection information	no indication
		selected carrier identification code presubscribed and not input by the calling party
		selected carrier identification code presubscribed and input by the calling party
		selected carrier identification code presubscribed, no indication whether input by calling party
		selected carrier identification code not presubscribed and input by calling party

Table 52 Transfer to carrier termination - IAM

IAM parameters	FIeld	Expected values for this call flow
Charge number	nature of address	ANI of the calling number, subscriber number
		ANI of the calling number, national number
		ANI not available or not provided
	odd/even	<all values are supported>
	numbering plan	ISDN (telephony) numbering plan
	address information	<charge digits>
Originating line information (OLIP)	originating line information	<ANI id digits>
Generic Address (GAP)	type of address	ported number
	nature of address	national (significant) number
	odd/even	<all values are supported>
	screening	reserved
	presentation	presentation restricted
	numbering plan	ISDN (telephony) numbering plan
	address information	<dialed called party's digits>
Service activation (SAP)	feature code indicator	hold available
End of optional parameter		00000000

Table 53 Transfer to carrier termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Message type		ACM

Table 53 Transfer to carrier termination - ACM

ACM parameters	FIeld	Expected values for this call flow
Backward call indicator	charge indicator	<not used by TOPS>
	called party's status indicator	<not used by TOPS>
	called party's category indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	holding indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
Optional backward call indicator	inband information indicator	<not used by TOPS>
	call forwarding may occur indicator	<not used by TOPS>
	simple segmentation indicator	<not used by TOPS>
	MLPP user information	<not used by TOPS>
	reserved	<not used by TOPS>
	network excessive delay indicator	<not used by TOPS>
	user-network interaction indicator	user-network interaction occurs, cut-through in both directions
Service activation (SAP)	feature code indicator	hold request
End of optional parameter		00000000

Mid-call signaling

This section deals with messages received and sent between the time the connection is established and the time the release is initiated. This section covers both the originating and terminating connections and addresses the following events:

- coin signaling
- calling party ringback
- network recall
- calling party disconnect with connection hold in effect
- called party cut-through
- tandem cut-through
- recall to operator/service node followed by a re-float
- recall to operator/service node, called party has been released

Coin signaling

Determination of coin originated call

The following table details the methods used to determine in a call originated from a coin station.

Table 54 Coin station originated call?

Method	Description
ANI ID digits	The ANI ID digits received in the Originating Line Information parameter can indicate a coin station through datafill in the TOPS switch. There are several means to achieve this in datafill: table OSSCAT (CLGSERV = ‘coin’) table OSSCAT (CLGSERV = ‘restrict’) and DN-based datafill indicates coin. This DN-based datafill uses tables DNSCRN, TOPSDB and TDBCLASS or table SPLDNID.

Table 54 Coin station originated call?

Method	Description
Trunk group	Datafill against the trunk group can cause a DN-based look-up to be performed: table ISUPTRK (DNLKUP = 'y') and DN-based datafill indicates coin. This DN-based datafill uses tables DNSCRN, TOPSDB and TDBCLASS or table SPLDNID. NOTE: There is no means to dedicate all traffic on a trunk group as being originated from a coin station. For IT and ATC trunk group types there is no equivalent datafill to the table TRKGRP, field STATCLAS = COIN for TOPS trunk group types.
OLNS	An OLNS query may be performed. The response can contain a Modified Service or Equipment indicator that can indicate a coin station.
operator	The operator can mark the originating line as a coin station based upon a verbal exchange with the calling party.

Determination of coin station characteristics

Once the call has been identified as originating from a coin station, TOPS needs to determine some information about the coin station. This information includes the following:

- type of coin station
- initial keypad state

This information is determined based upon datafill in table TOPSCOIN. This information is set on a trunk group basis meaning that all coin station originated calls on that trunk group have the same characteristics. The following table describes the values available for each characteristic.

Table 55 Coin station characteristics

Characteristic	TOPSCOIN	Value	Description
type of coin station	COINTYPE	ccf	Coin first station. A coin must be entered prior to receiving dial-tone.
		cdf	Dial-tone first station. A coin is not needed prior to receiving dial-tone and making a call.
		ccfcdf	Unknown station. TOPS treats these stations as coin first stations.

Table 55 Coin station characteristics

Characteristic	TOPSCOIN	Value	Description
initial keypad state	PADSTAT0	y	Indicates the keypad status on 0- and 0+ dialed calls. In this case, the keypad is enabled
		n	Indicates the keypad status on 0- and 0+ dialed calls. In this case, the keypad is disabled
	PADSTAT1	y	Indicates the keypad status on 1+ and coin test dialed calls. In this case, the keypad is enabled
		n	Indicates the keypad status on 1+ and coin test dialed calls. In this case, the keypad is disabled
	PADSTATB	y	Indicates the keypad status on FGB dialed calls. In this case, the keypad is enabled
		n	Indicates the keypad status on FGB dialed calls. In this case, the keypad is disabled
	PADSTAT8	y	Indicates the keypad status on 800 dialed calls. In this case, the keypad is enabled
		n	Indicates the keypad status on 800 dialed calls. In this case, the keypad is disabled

Coin signal types

There are four basic coin signals that are sent by the TOPS switch. The following table identifies each signal and its describes its purpose.

Table 56 Coin signals

Coin signal	Description
coin collect (CC)	Instructs the coin station to collect the coins that have been deposited. Coins are generally held in an intermediate hopper when they are deposited until either a coin collect or coin return signal is received.
coin return (CR)	Instructs the coin station to return the coins that have been deposited. Coins are generally held in an intermediate hopper when they are deposited until either a coin collect or coin return signal is received.

Table 56 Coin signals

Coin signal	Description
operator attached (OA)	Instructs the coin station to disable the keypad so that the operator will not hear any DTMF tones while attached to the call.
operator released (OR)	Instructs the coin station to enable the keypad. This enables calling card entry and other interactions with automated nodes.

Coin signaling flows

This section provides example flow diagrams of calls that are originated from coin stations. The purpose of the diagrams is to illustrate the points in the call where coin signals are sent by the TOPS switch. The following calls are included:

- 1+ toll call
- 0+ toll call
- 0- toll call, 800/950 call
- directory assistance call (411/555-1212)

Figure 27 1+ toll call coin signaling flow

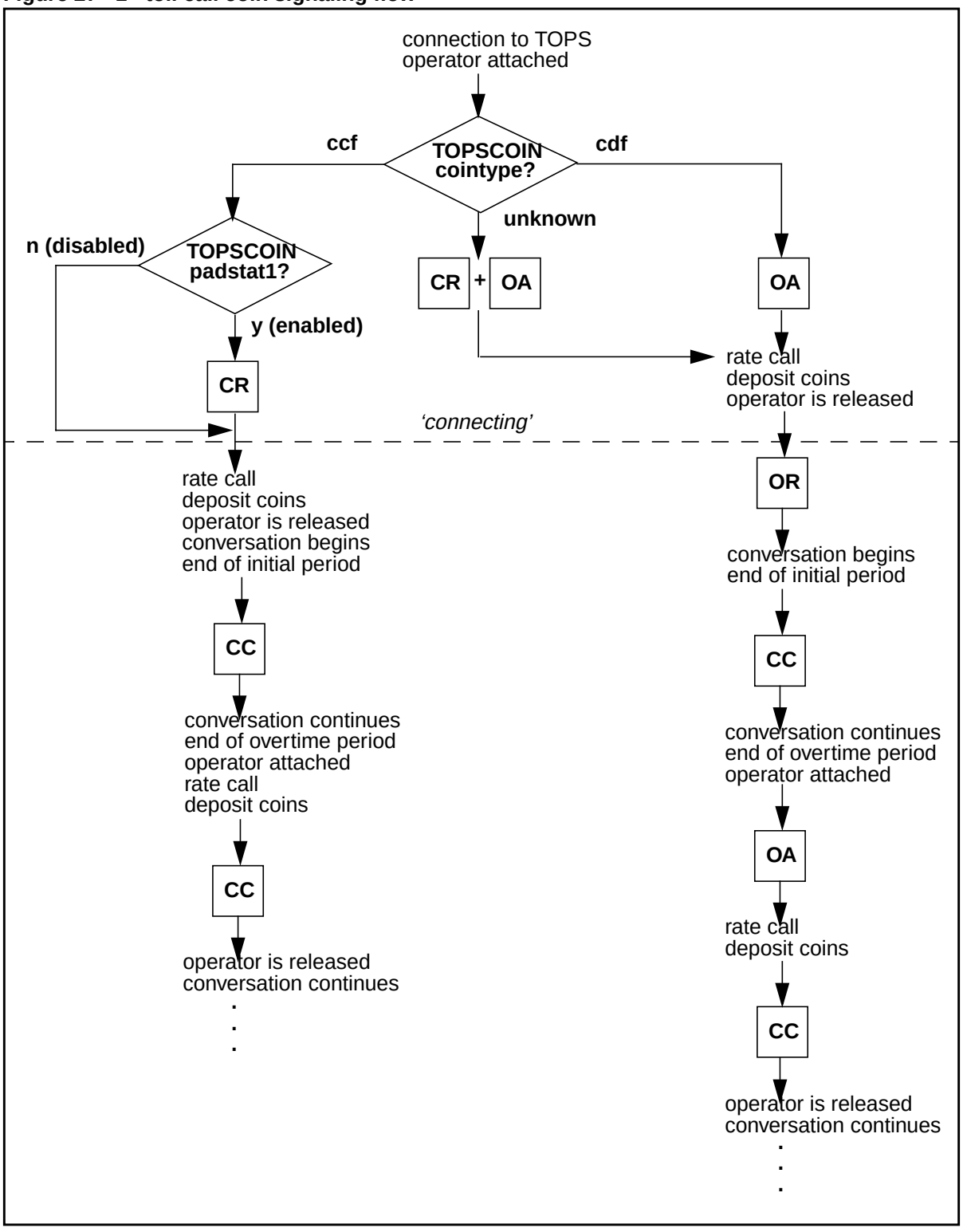


Figure 28 0+ toll call coin signaling flow

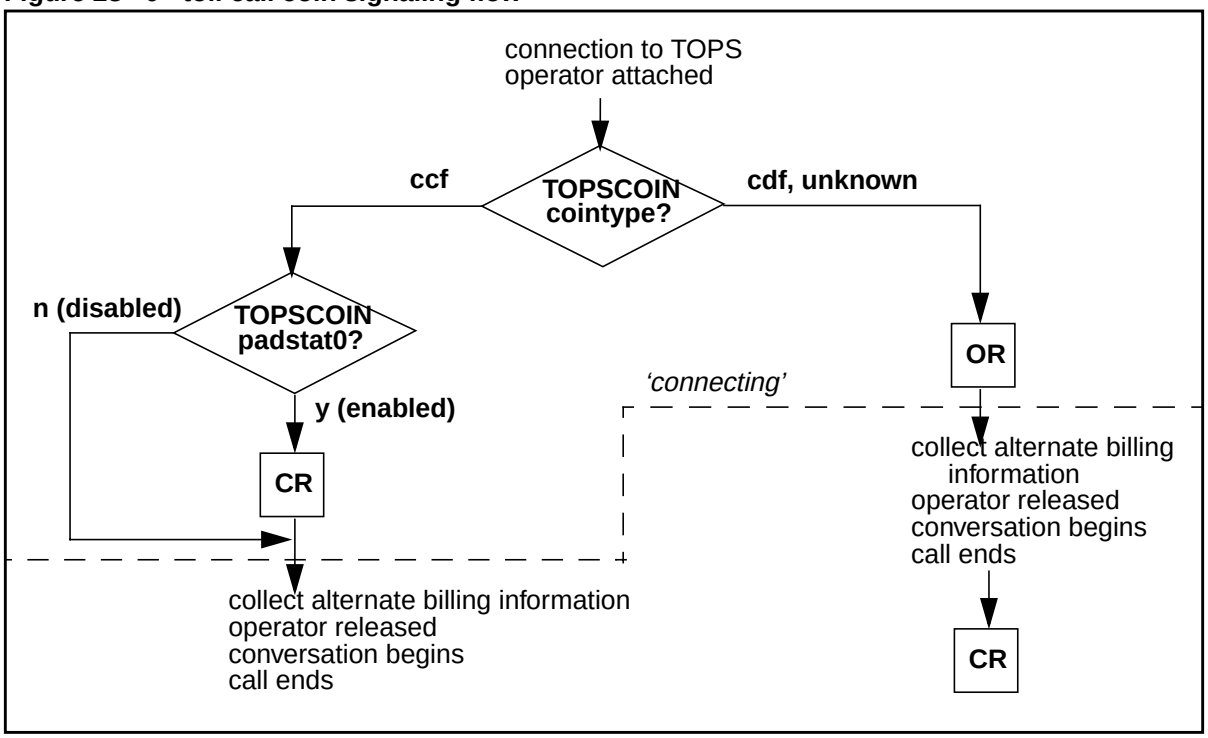


Figure 29 800/950 call coin signaling flow

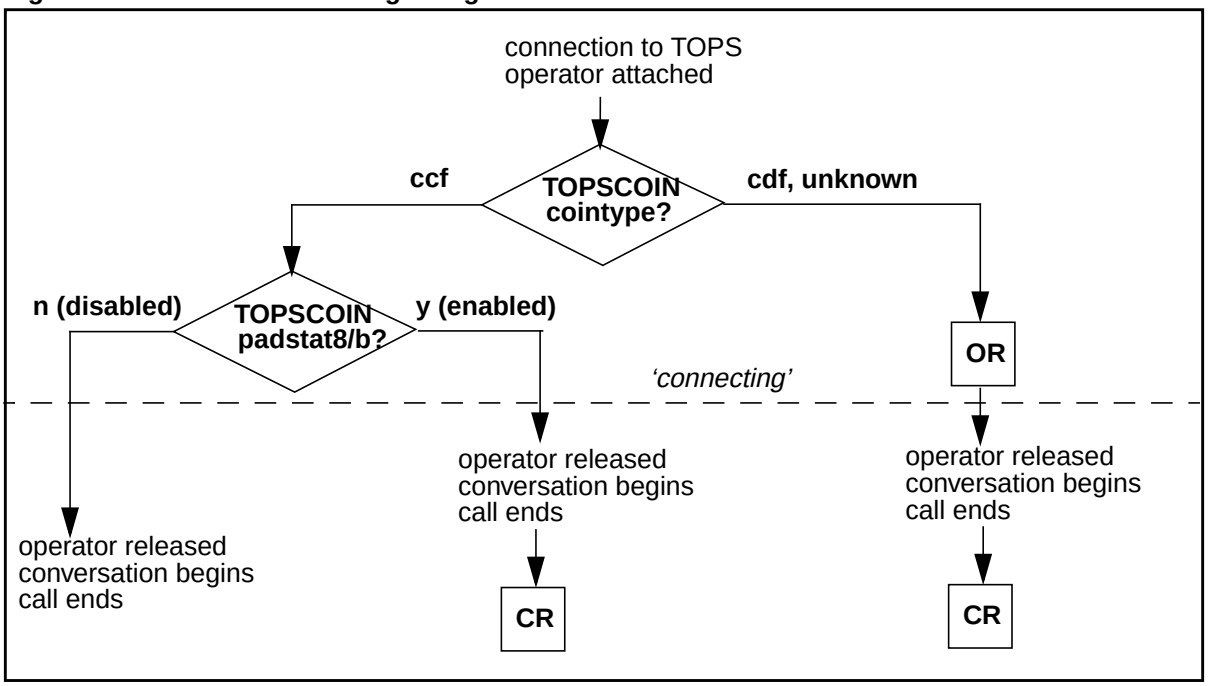


Figure 30 0- toll call coin signaling flow

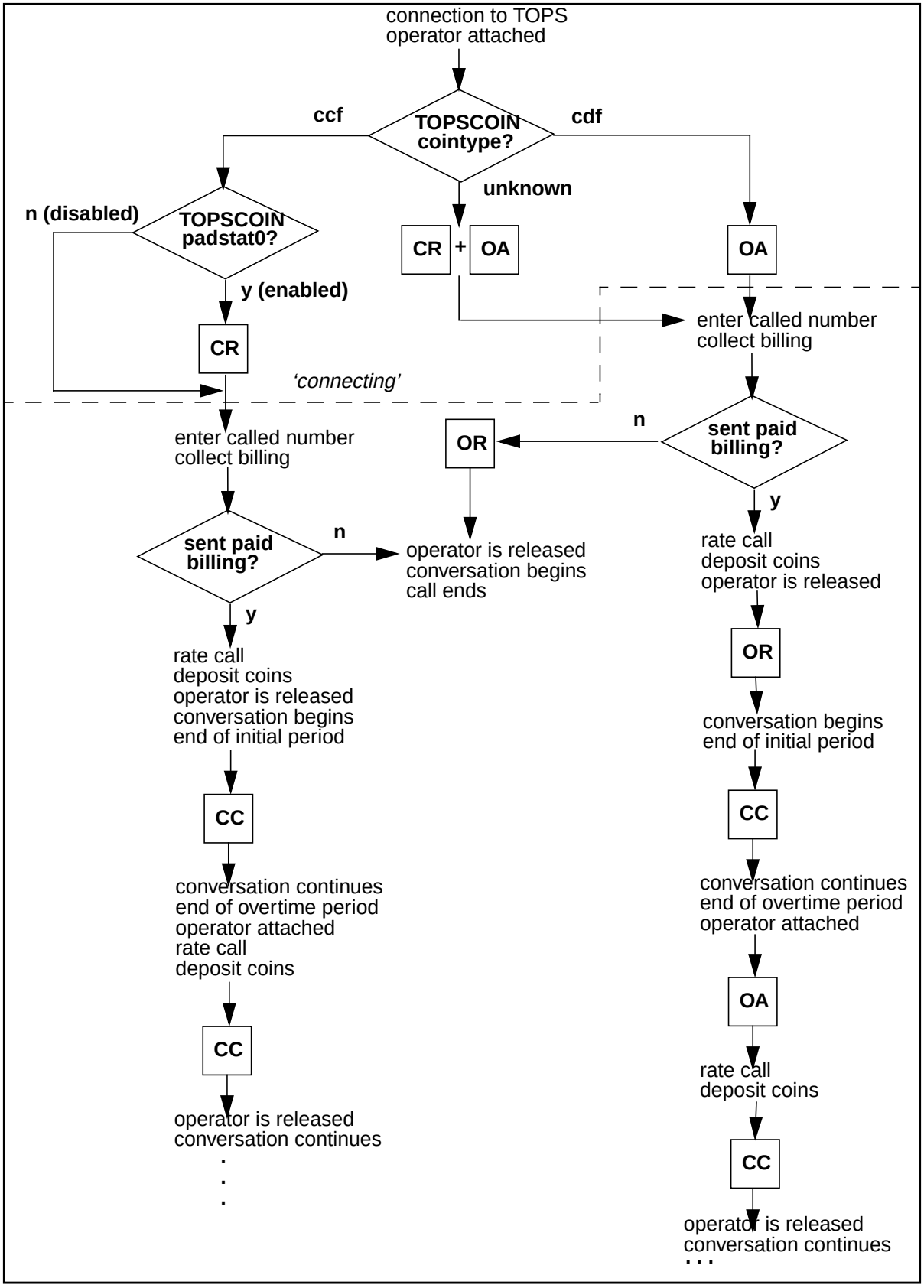
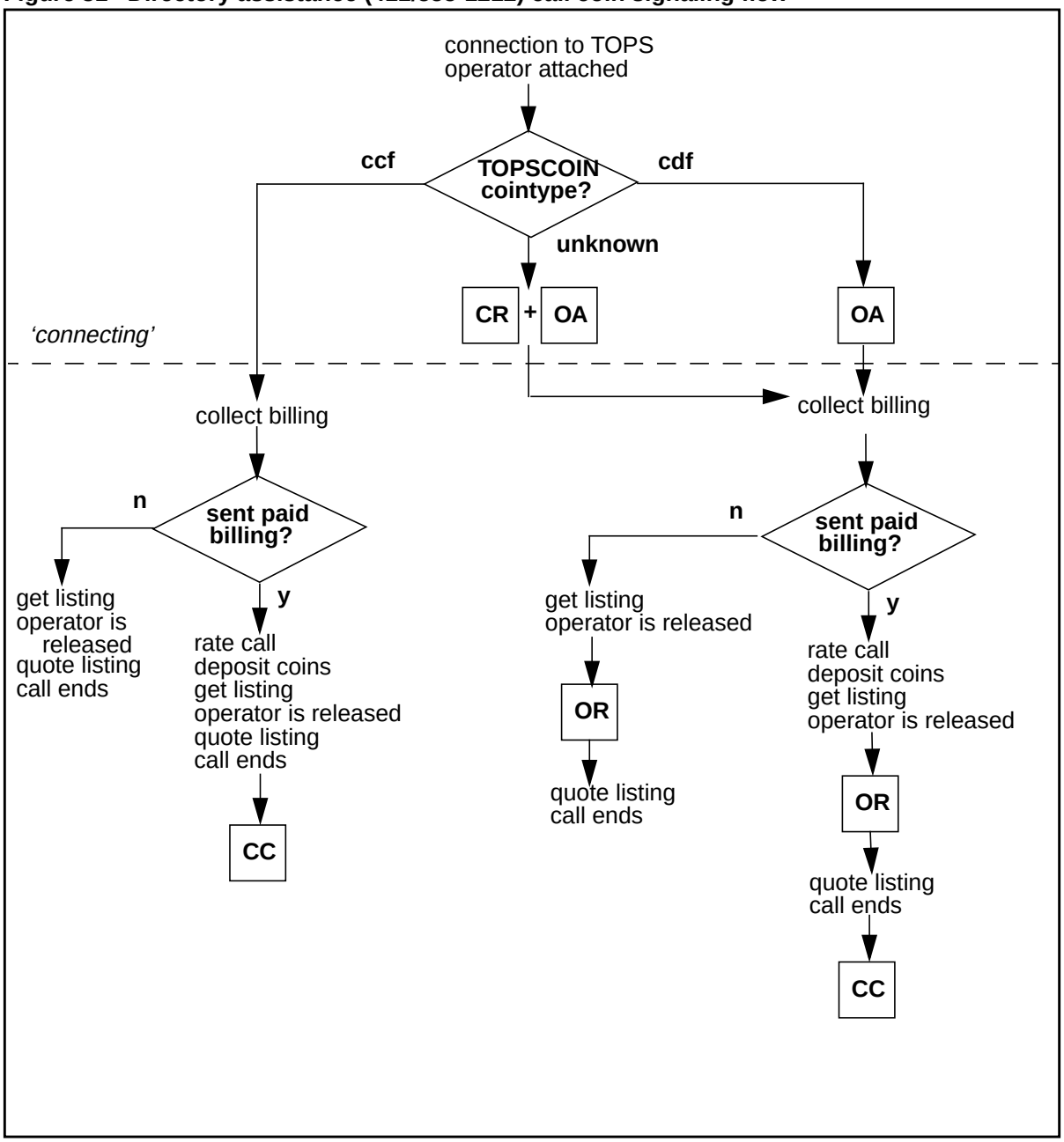

connection to TOPS operator attached
TOPSCOIN cointype?
ccf
cdf
unknown
TOPSCOIN padstat0?
n (disabled)
y (enabled)
CR
CR + OA
OA
'connecting'
enter called number collect billing
sent paid billing?
n
y
OR
operator is released conversation begins call ends
rate call deposit coins operator is released
conversation begins end of initial period
CC
conversation continues end of overtime period operator attached rate call deposit coins
operator is released conversation continues
. . .

Figure 31 Directory assistance (411/555-1212) call coin signaling flow



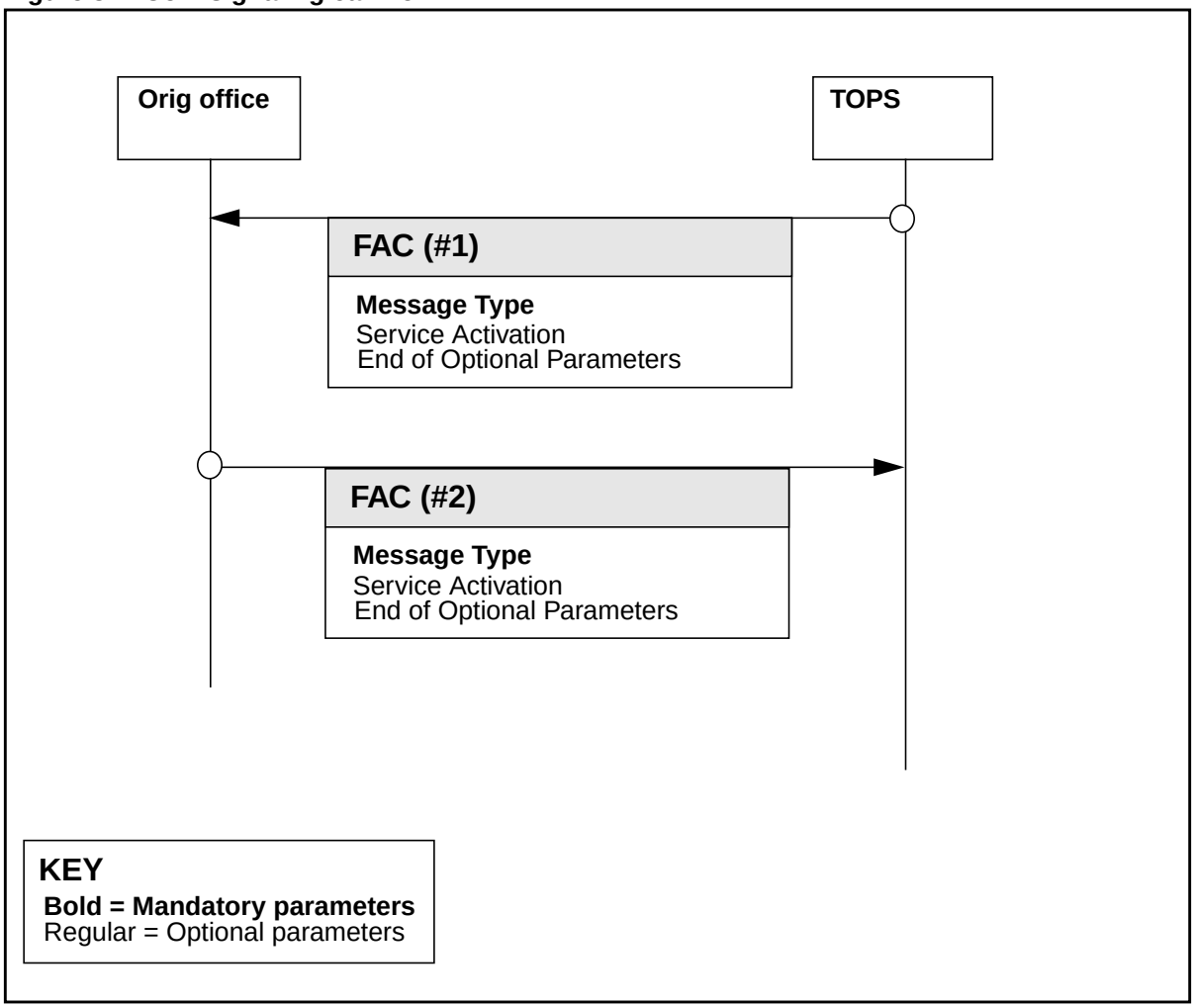
Coin signals can be sent in either a Facility (FAC) message or an Address Complete Message (ACM). The ACM message may be used to send the first set of coin signals, OA or OR, using the Service Activation Parameter (SAP) (refer to " Coin originations" on page 72 for more information). These coin signals are shown in the previous flows in the 'connecting' portion of the diagrams. The Facility message also contains a Service Activation Parameter (SAP) with a value that indicates the type of coin signal being sent. The following table maps the coin signals to values encoded in the SAP. Note that

on scenarios where two coin signals are sent at the same time, a single SAP is present in the message encoded with two feature code indicators in the order that they should be processed by the coin station.

Table 57 Coin signals to Service Activation parameter value mapping

Coin signal	Service Activation parameter value
coin collect (CC)	coin collect
coin return (CR)	coin return
operator attached (OA)	network service attached
operator released (OR)	network service released

Figure 32 Coin signaling call flow



The following tables show the supported code points, fields, and messages applying to this call flow.

The FAC (#1) message contains only one coin signal encoded in the first feature code indicator field in the SAP.

The second feature code indicator field may contain a “request coin signal complete acknowledgement” code point. This code point is encoded in the SAP only if:

- the ISUP trunk over which TOPS is preparing to send the FAC is connected to a DMS switch as indicated by datafill in the ADJNODE table
- the first feature code indicator field contains a coin collect or coin return code point.

Note that the request coin signal complete acknowledgement is not encoded in FAC (#1) when the FAC (#1) contains a network service attached or released code point.

If the ISUP trunk over which TOPS is preparing to send the FAC is not connected to a DMS as indicated by datafill in the ADJNODE table but the first feature code indicator field contains a coin collect or coin return code, TOPS will wait two seconds for the end office to finish processing the coin collect or coin return before sending another coin signal.

Table 58 Coin signaling - FAC (#1)

FAC parameters	Field	Expected values for this call flow
Message type		FAC
Service activation (SAP)	first feature code indicator	network service attached
		network service released
		coin collect
		coin return
	second feature code indicator	request coin signal complete acknowledgement
End of optional parameter		00000000

When the request coin signal complete acknowledgement code point has been encoded in FAC (#1), TOPS will receive FAC (#2) with coin signal complete acknowledgment when the end office finishes processing the coin collect or coin return signal.

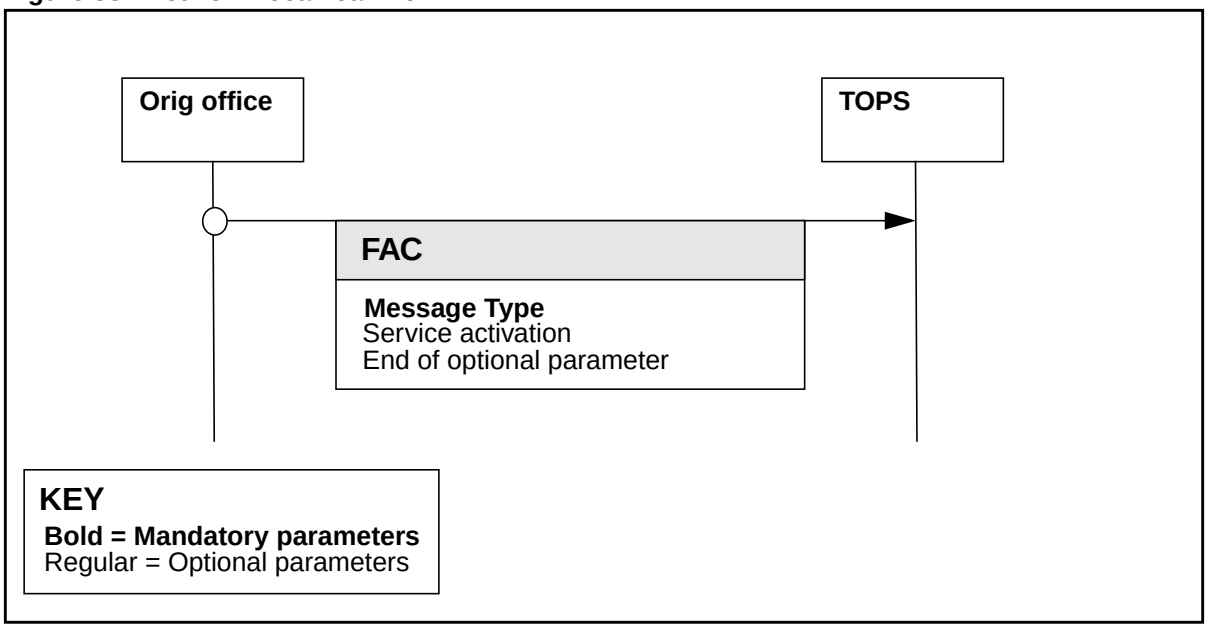
Table 59 Coin signaling - FAC (#2)

FAC parameters	Field	Expected values for this call flow
Message type		FAC
Service activation (SAP)	feature code indicator	coin signal complete acknowledgement
End of optional parameter		00000000

Network recall

Network recall is a signal that means that the calling party is requesting to be reconnected to an operator/service node. This signal is an indication of a hook flash by the subscriber. Connection hold does not have to be in effect on the originating connection in order for TOPS to process a network recall signal. However, DMS-100 end offices interpret a hook flash as a request for re-connection to an operator/service node only if connection hold is in effect.

Figure 33 Network recall call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 60 Network recall - FAC

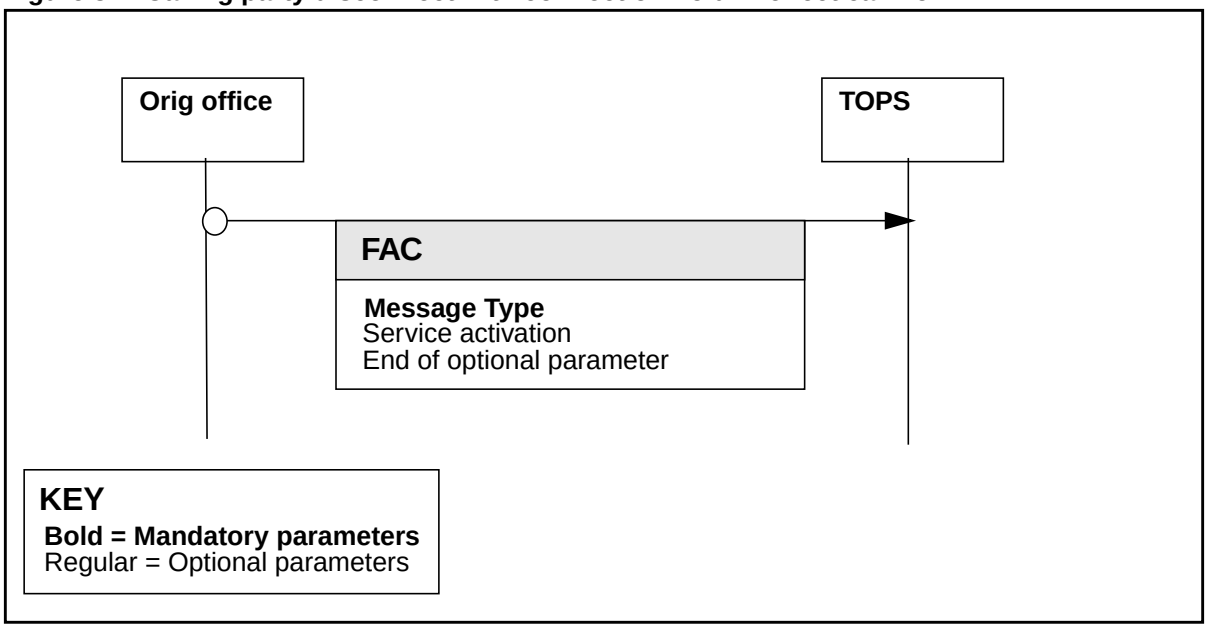
FAC parameters	Field	Expected values for this call flow
Message type		FAC
Service activation	feature code indicator	network service recall
End of optional parameter		00000000

Calling party disconnect with connection hold in effect

When connection hold is in effect on the originating connection, the connection is not released when the calling party goes on-hook. When the on-hook is detected, the originating end office sends a Facility message with a Service Activation Parameter (SAP) encoded to indicate a disconnect request. The TOPS office receives the message and processes it. Depending upon the call type, TOPS may take one of the following actions:

- If the call is currently at the operator/service node, then TOPS informs the operator/service node that the calling party has gone on-hook and waits for the operator/service node to request the next action (which may be to release the originating connection or ringback the calling party)
- If the call is not currently at the operator/service node, then TOPS determines if the call requires additional interaction with the operator/service node. If that interaction is not needed, then the originating connection is released. If that interaction is needed, then the call is reconnected to an operator/service node for further processing.

Figure 34 Calling party disconnect with connection hold in effect call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 61 Calling party disconnect with connection hold in effect - FAC

FAC parameters	Field	Expected values for this call flow
Message type		FAC

Table 61 Calling party disconnect with connection hold in effect - FAC

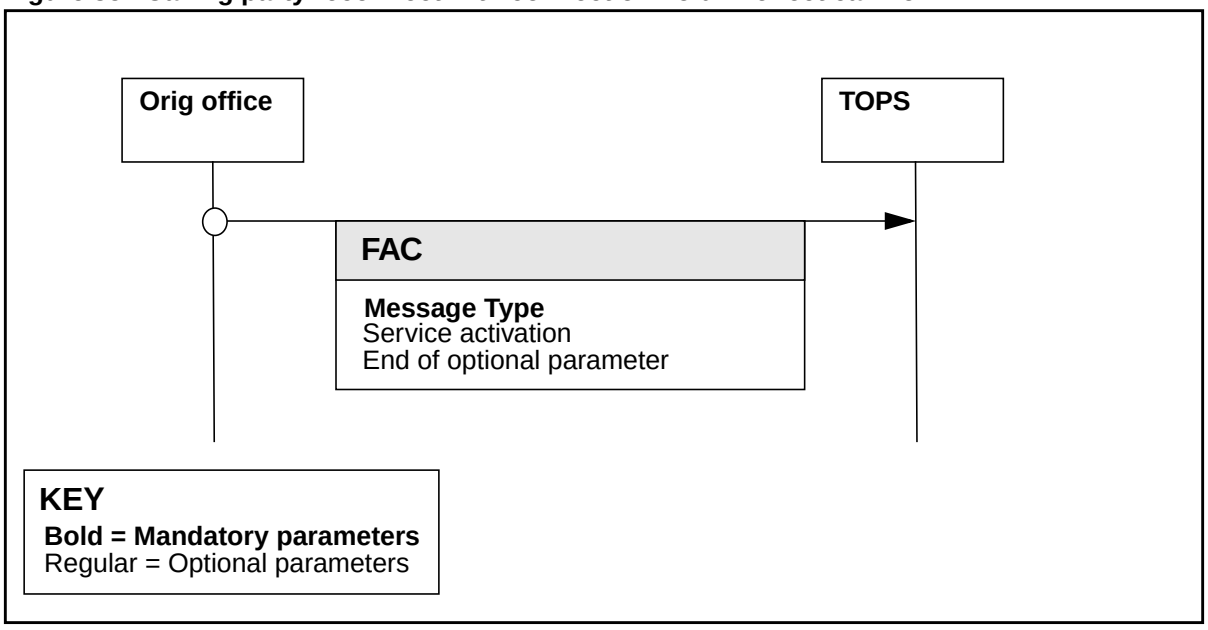
FAC parameters	Field	Expected values for this call flow
Service activation	feature code indicator	disconnect request
End of optional parameter		00000000

Calling party reconnect with connection hold in effect

When connection hold is in effect on the originating connection, the connection is not released when the calling party goes on-hook. When the on-hook is detected, the originating end office sends a Facility message with a Service Activation Parameter (SAP) encoded to indicate a disconnect request. When the calling party goes back off-hook, the originating end office sends a Facility message with a SAP encoded to indicate a reconnect request. The TOPS office receives the message, processes it and takes the following actions:

- TOPS informs the operator/service node that the calling party has gone off-hook and waits for the operator/service node to request the next action

Figure 35 Calling party reconnect with connection hold in effect call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 62 Calling party reconnect with connection hold in effect - FAC

FAC parameters	Field	Expected values for this call flow
Message type		FAC

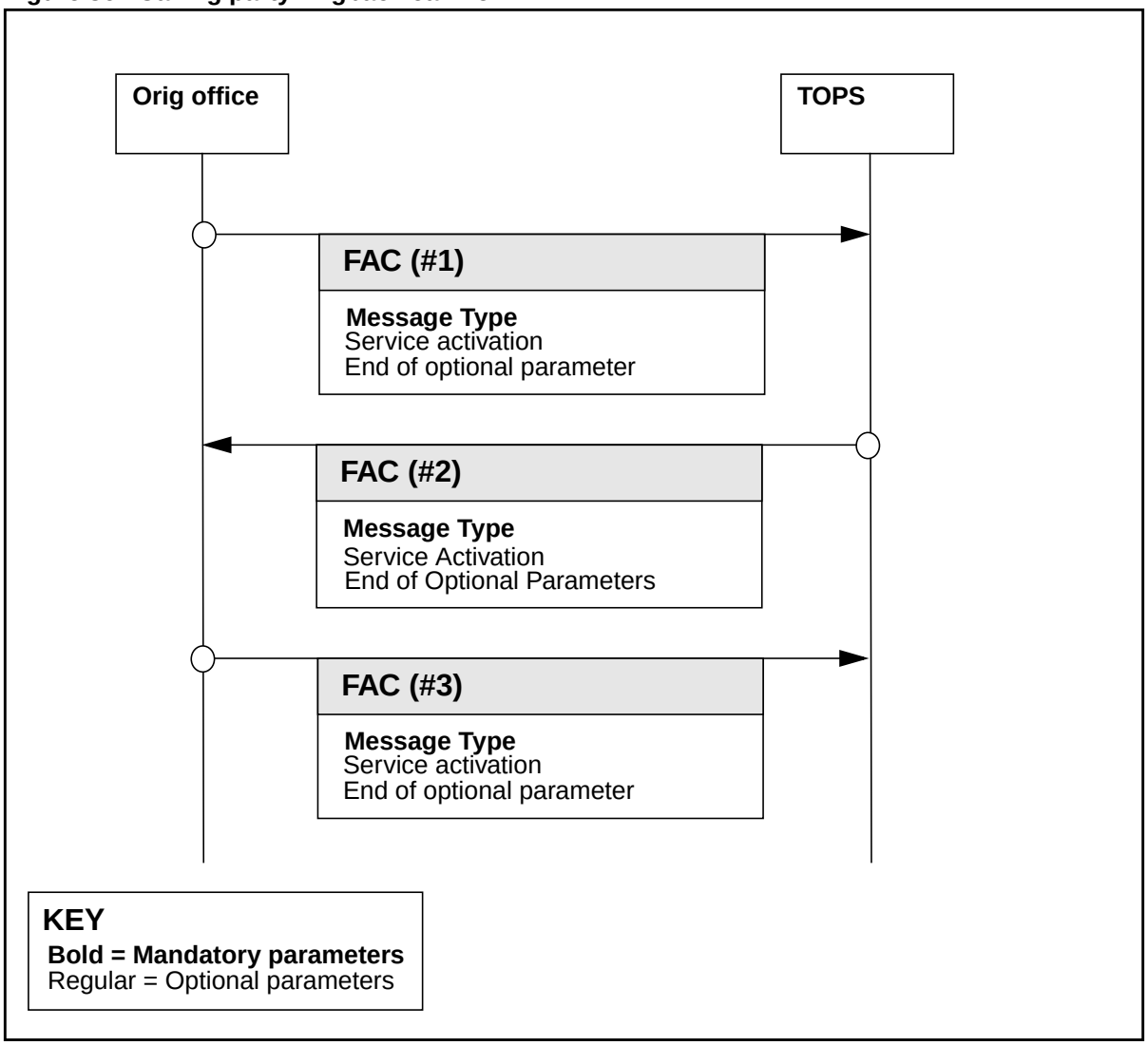
Table 62 Calling party reconnect with connection hold in effect - FAC

FAC parameters	Field	Expected values for this call flow
Service activation	feature code indicator	reconnect request
End of optional parameter		00000000

Calling party ringback

Calling party ringback is a request made by an operator/service node to ring the calling party's phone usually after the calling party has gone on-hook. This function is only usable if connection hold is in effect for the originating connection. If connection hold is not in effect, then when the calling party goes on-hook, the originating connection is released. There is no connection available on which to send a ringback request.

Figure 36 Calling party ringback call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 63 Calling party ringback - FAC (#1)

FAC parameters	FIeld	Expected values for this call flow
Message type		FAC
Service activation (SAP)	feature code indicator	disconnect request
End of optional parameter		00000000

Table 64 Calling party ringback - FAC (#2)

FAC parameters	FIeld	Expected values for this call flow
Message type		FAC
Service activation (SAP)	feature code indicator	ringback request
End of optional parameter		00000000

Table 65 Calling party ringback - FAC (#3)

FAC parameters	FIeld	Expected values for this call flow
Message type		FAC
Service activation (SAP)	feature code indicator	reconnect request
End of optional parameter		00000000

Called party cut-through

An assumption being made by TOPS is that if the ‘OSNC’ routing selector (refer to “Chapter 5: OSNC Data Schema” on page 391 for more information) is associated with the terminating connection and the originating connection is OSNC capable, then the call becomes eligible to support end-to-end signaling. End-to-end signaling is the passing of forward call indicators, backward call indicators, nature of connection and other unrecognized parameters between the calling and called parties.

Called party cut-through really means sending messages to the originating connection identifying the capabilities of the ‘called’ party throughout the course of the call. For an operator services call, when an operator/service node is attached, then the ‘called’ party is the operator/service node. When the operator/service node floats the call, then the ‘called’ party is the called subscriber. The following table details the originating connection’s view of the ‘called’ party at various stages of a call.

Table 66 Originating connection’s view of the ‘called’ party

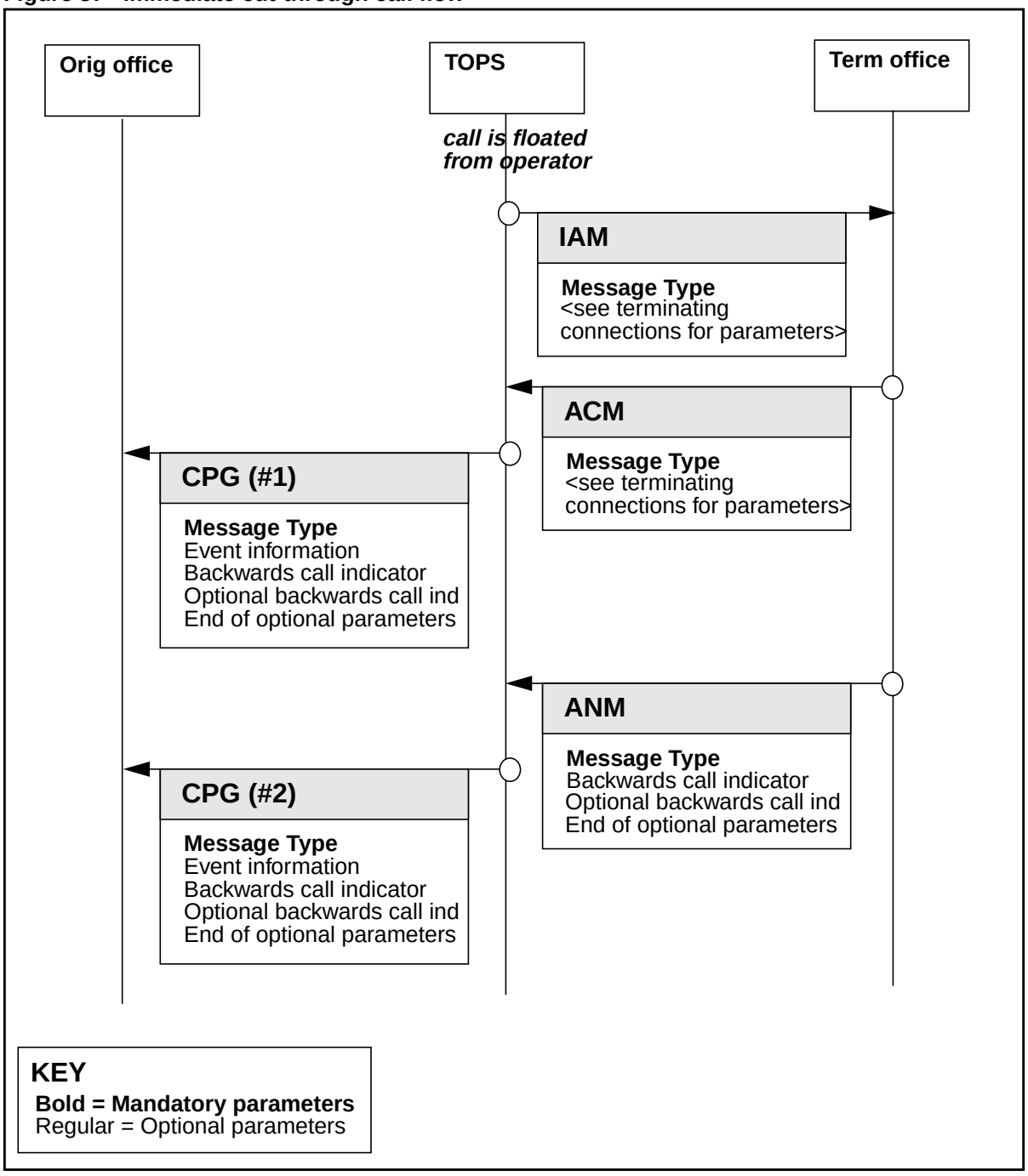
Event	Operator / service node present?	Called party present (i.e., answered)?	‘Called’ party?
initial call arrival	yes	no	operator/service node
connection initiated to called party	yes	yes	operator/service node
	no	yes	called party
call recalls to operator/ service node for notify or coin recall	yes	yes	operator/service node
call refloats from operator/service node for notify or coin recall	no	yes	called party
call recalls to operator/ service node for time and charges to calling party (i.e., called party has been released)	yes	no	operator/service node

The originating connection is informed of the change of ‘called’ party using a Call Progress message containing Backward Call Indicator and Optional Backwards Call Indicator parameters. The following call flows describe when this message is sent and how the parameters are encoded.

Immediate cut-through

The immediate cut-through call flow illustrates when a terminating connection is initiated after the operator/service node has floated the call. At the beginning of this flow, the call has been at an operator/service node, so the originating connection has a view of the ‘called’ party as the operator/service node. The operator/service node floats the call which triggers a connection to be established to the called party. This call flow does not go into detail about the contents of the terminating connection IAM. Refer to “Terminating connection signaling” on page 98 for more information.

Figure 37 Immediate cut-through call flow



The following table shows the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 67 Immediate cut-through - CPG (#1)

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress
Backward call indicator	charge indicator	<value forwarded from ACM>
	called party's status indicator	<value forwarded from ACM>
	called party's category indicator	<value forwarded from ACM>
	end-to-end method indicator	<value forwarded from ACM>
	interworking indicator	<value forwarded from ACM>
	IAM segmentation indicator	<value forwarded from ACM>
	ISDN user part indicator	<value forwarded from ACM>
	holding indicator	<value forwarded from ACM>
	ISDN access indicator	<value forwarded from ACM>
	echo control device indicator	<value forwarded from ACM>
	SCCP method indicator	<value forwarded from ACM>
Optional backward call indicator	inband information indicator	<value forwarded from ACM>
	call forwarding may occur indicator	<value forwarded from ACM>
	simple segmentation indicator	<value forwarded from ACM>
	MLPP user information	<value forwarded from ACM>
	reserved	<value forwarded from ACM>
	network excessive delay indicator	<value forwarded from ACM>
	user-network interaction indicator	<value forwarded from ACM>
End of optional parameter		00000000

Table 68 Immediate cut-through - ANM

ANM parameters	Field	Expected values for this call flow
Message type		ANM
Backward call indicator	charge indicator	<not used by TOPS>
	called party's status indicator	<not used by TOPS>
	called party's category indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	holding indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
Optional backward call indicator	inband information indicator	<not used by TOPS>
	call forwarding may occur indicator	<not used by TOPS>
	simple segmentation indicator	<not used by TOPS>
	MLPP user information	<not used by TOPS>
	reserved	<not used by TOPS>
	network excessive delay indicator	<not used by TOPS>
	user-network interaction indicator	<not used by TOPS>
End of optional parameter		00000000

Table 69 Immediate cut-through - CPG (#2)

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress

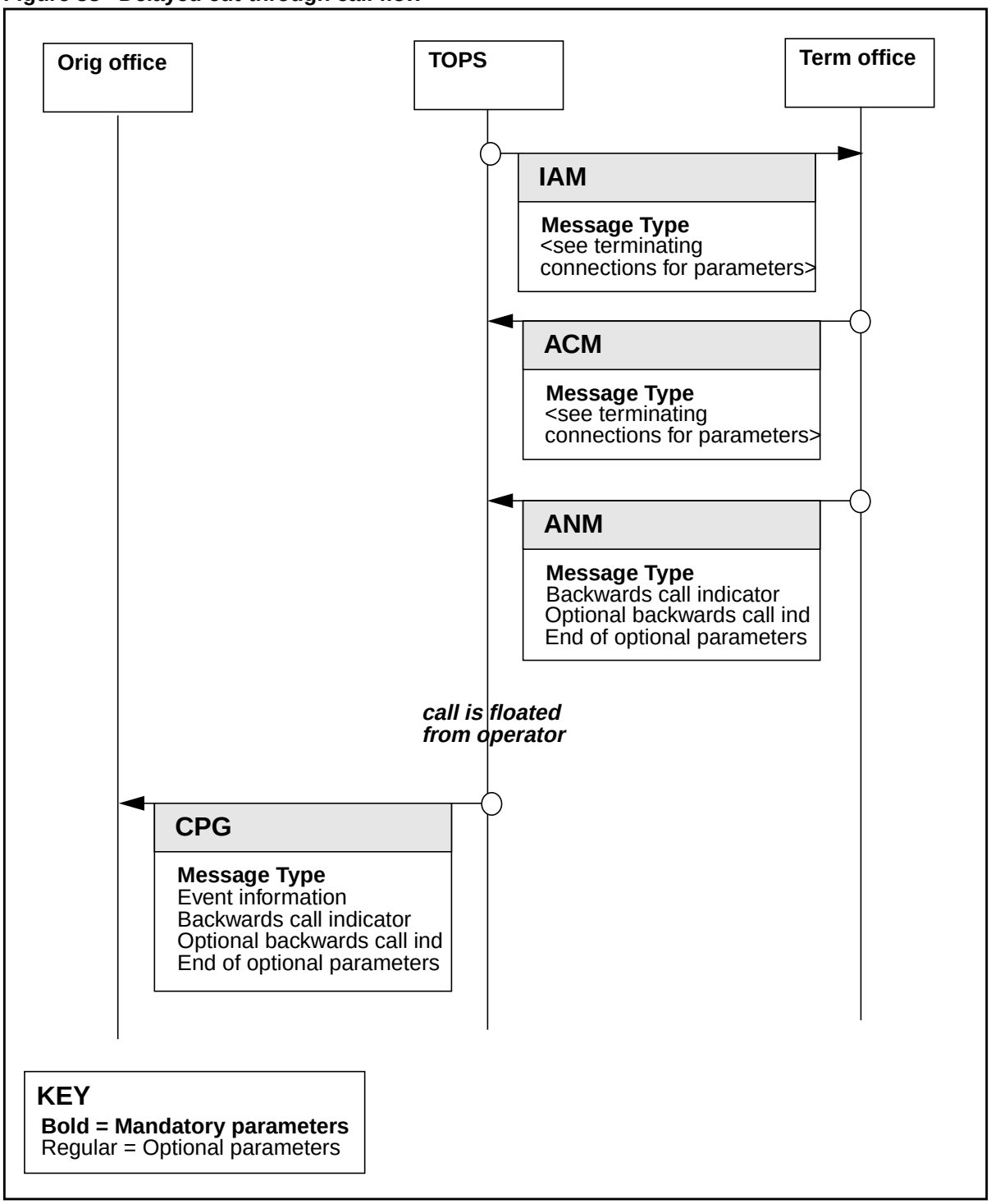
Table 69 Immediate cut-through - CPG (#2)

CPG parameters	Field	Expected values for this call flow
Backward call indicator	charge indicator	<value forwarded from ANM>
	called party's status indicator	<value forwarded from ANM>
	called party's category indicator	<value forwarded from ANM>
	end-to-end method indicator	<value forwarded from ANM>
	interworking indicator	<value forwarded from ANM>
	IAM segmentation indicator	<value forwarded from ANM>
	ISDN user part indicator	<value forwarded from ANM>
	holding indicator	<value forwarded from ANM>
	ISDN access indicator	<value forwarded from ANM>
	echo control device indicator	<value forwarded from ANM>
	SCCP method indicator	<value forwarded from ANM>
Optional backward call indicator	inband information indicator	<value forwarded from ANM>
	call forwarding may occur indicator	<value forwarded from ANM>
	simple segmentation indicator	<value forwarded from ANM>
	MLPP user information	<value forwarded from ANM>
	reserved	<value forwarded from ANM>
	network excessive delay indicator	<value forwarded from ANM>
	user-network interaction indicator	<value forwarded from ANM>
End of optional parameter		00000000

Delayed cut-through

The delayed cut-through call flow illustrates when a terminating connection is initiated before the operator/service node has floated the call. At the beginning of this flow, the call has been at an operator/service node, so the originating connection has a view of the ‘called’ party as the operator/service node. The operator/service node initiates the terminating connection and receives called party answer. After interacting with the called party, the operator/service node floats the call. This call flow does not go into detail about the contents of the terminating connection IAM. Refer to “Terminating connection signaling” on page 98 for more information.

Figure 38 Delayed cut-through call flow



The following table shows the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 70 Delayed cut-through - ANM

ANM parameters	Field	Expected values for this call flow
Message type		ANM
Backward call indicator	charge indicator	<not used by TOPS>
	called party's status indicator	<not used by TOPS>
	called party's category indicator	<not used by TOPS>
	end-to-end method indicator	<not used by TOPS>
	interworking indicator	<not used by TOPS>
	IAM segmentation indicator	<not used by TOPS>
	ISDN user part indicator	<not used by TOPS>
	holding indicator	<not used by TOPS>
	ISDN access indicator	<not used by TOPS>
	echo control device indicator	<not used by TOPS>
	SCCP method indicator	<not used by TOPS>
Optional backward call indicator	inband information indicator	<not used by TOPS>
	call forwarding may occur indicator	<not used by TOPS>
	simple segmentation indicator	<not used by TOPS>
	MLPP user information	<not used by TOPS>
	reserved	<not used by TOPS>
	network excessive delay indicator	<not used by TOPS>
	user-network interaction indicator	<not used by TOPS>
End of optional parameter		00000000

Table 71 Delayed cut-through - CPG

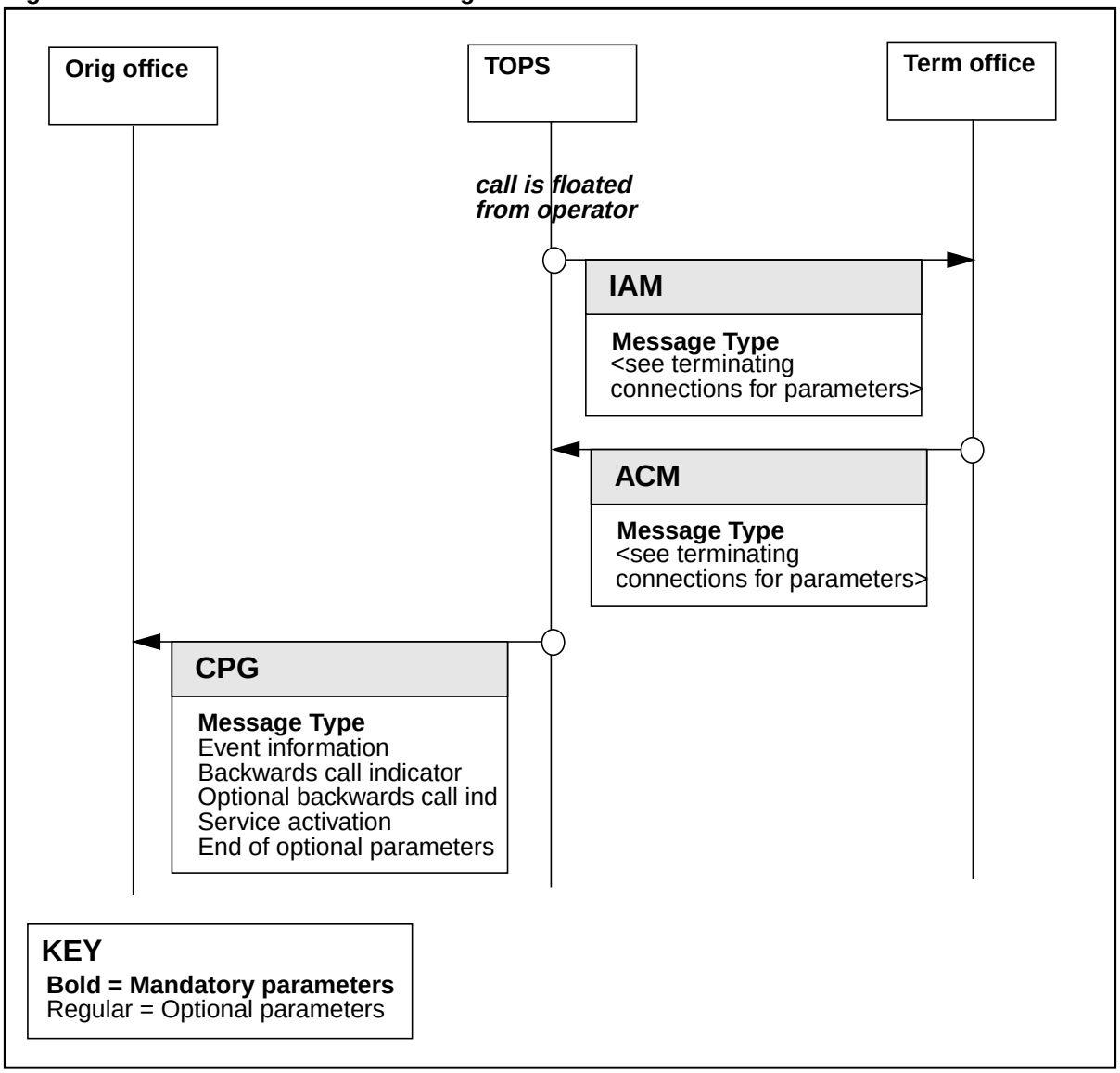
CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress
Backward call indicator	charge indicator	<value forwarded from ANM>
	called party's status indicator	<value forwarded from ANM>
	called party's category indicator	<value forwarded from ANM>
	end-to-end method indicator	<value forwarded from ANM>
	interworking indicator	<value forwarded from ANM>
	IAM segmentation indicator	<value forwarded from ANM>
	ISDN user part indicator	<value forwarded from ANM>
	holding indicator	<value forwarded from ANM>
	ISDN access indicator	<value forwarded from ANM>
	echo control device indicator	<value forwarded from ANM>
	SCCP method indicator	<value forwarded from ANM>
Optional backward call indicator	inband information indicator	<value forwarded from ANM>
	call forwarding may occur indicator	<value forwarded from ANM>
	simple segmentation indicator	<value forwarded from ANM>
	MLPP user information	<value forwarded from ANM>
	reserved	<value forwarded from ANM>
	network excessive delay indicator	<value forwarded from ANM>
	user-network interaction indicator	<value forwarded from ANM>
End of optional parameter		00000000

Transfer to carrier cut-through

The transfer to carrier cut-through call flow illustrates when a terminating connection to a carrier operator is initiated after the operator/service node has floated the call. Connection hold can be offered to the carrier (based upon routing datafill and the presence of connection hold on the originating connection). The carrier may either accept connection hold or reject connection hold. If connection hold is rejected or not even offered on the terminating connection, then connection hold is ended on the originating connection by sending a Service Activation Parameter (SAP) in the Call Progress (CPG) Message.

At the beginning of this flow, the call has been at an operator/service node, so the originating connection has a view of the ‘called’ party as the operator/service node. The operator/service node initiates the terminating connection to a carrier operator. The carrier operator’s information is forwarded back to the calling party. This call flow does not go into detail about the contents of the terminating connection IAM. Refer to “Terminating connection signaling” on page 98 for more information.

Figure 39 Transfer to carrier cut-through call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

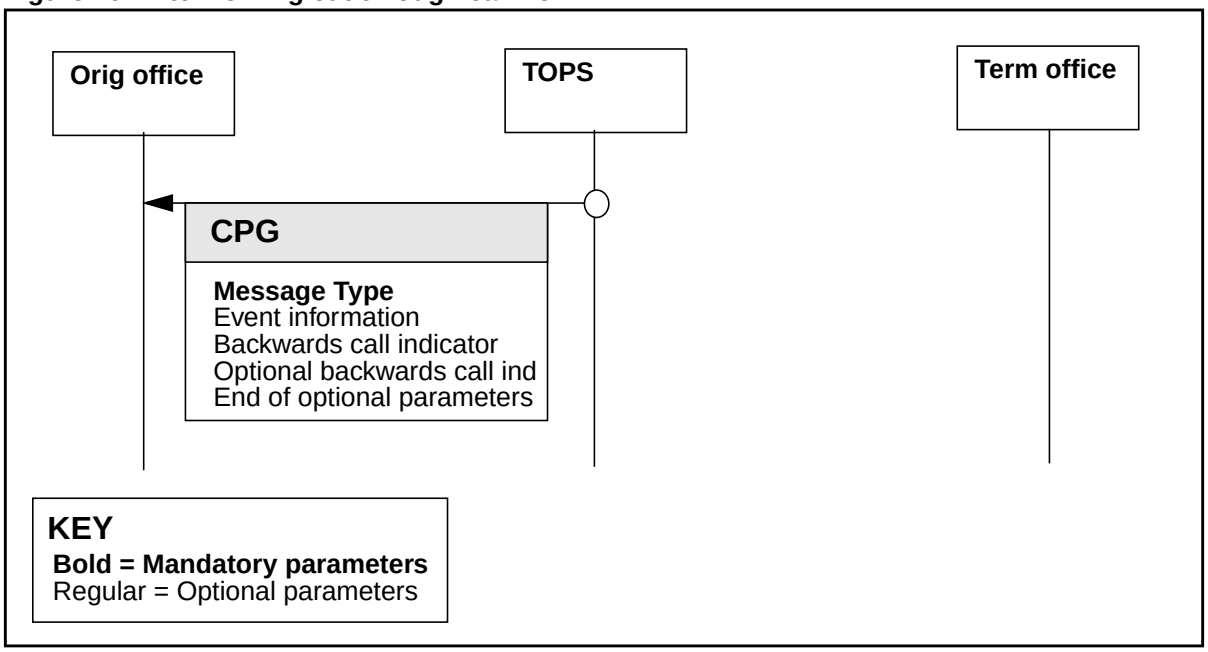
Table 72 Transfer to carrier cut-through - CPG

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress
Backward call indicator	charge indicator	<value forwarded from ACM>
	called party's status indicator	<value forwarded from ACM>
	called party's category indicator	<value forwarded from ACM>
	end-to-end method indicator	<value forwarded from ACM>
	interworking indicator	<value forwarded from ACM>
	IAM segmentation indicator	<value forwarded from ACM>
	ISDN user part indicator	<value forwarded from ACM>
	holding indicator	<value forwarded from ACM>
	ISDN access indicator	<value forwarded from ACM>
	echo control device indicator	<value forwarded from ACM>
	SCCP method indicator	<value forwarded from ACM>
Optional backward call indicator	inband information indicator	<value forwarded from ACM>
	call forwarding may occur indicator	<value forwarded from ACM>
	simple segmentation indicator	<value forwarded from ACM>
	MLPP user information	<value forwarded from ACM>
	reserved	<value forwarded from ACM>
	network excessive delay indicator	<value forwarded from ACM>
	user-network interaction indicator	<value forwarded from ACM>
Service activation	feature code indicator	hold release request
End of optional parameter		00000000

Interworking cut-through

The interworking cut-through call flow illustrates when a terminating connection using non-OSNC signaling is initiated. End-to-end signaling is not supported in this case, but the originating connection should be informed that interworking was encountered. This information is sent to the originating connection in a Call Progress (CPG) Message. This call flow does not go into detail about the contents of the terminating connection IAM. Refer to “Terminating connection signaling” on page 98 for more information.

Figure 40 Interworking cut-through call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 73 Interworking cut-through - CPG

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress

Table 73 Interworking cut-through - CPG

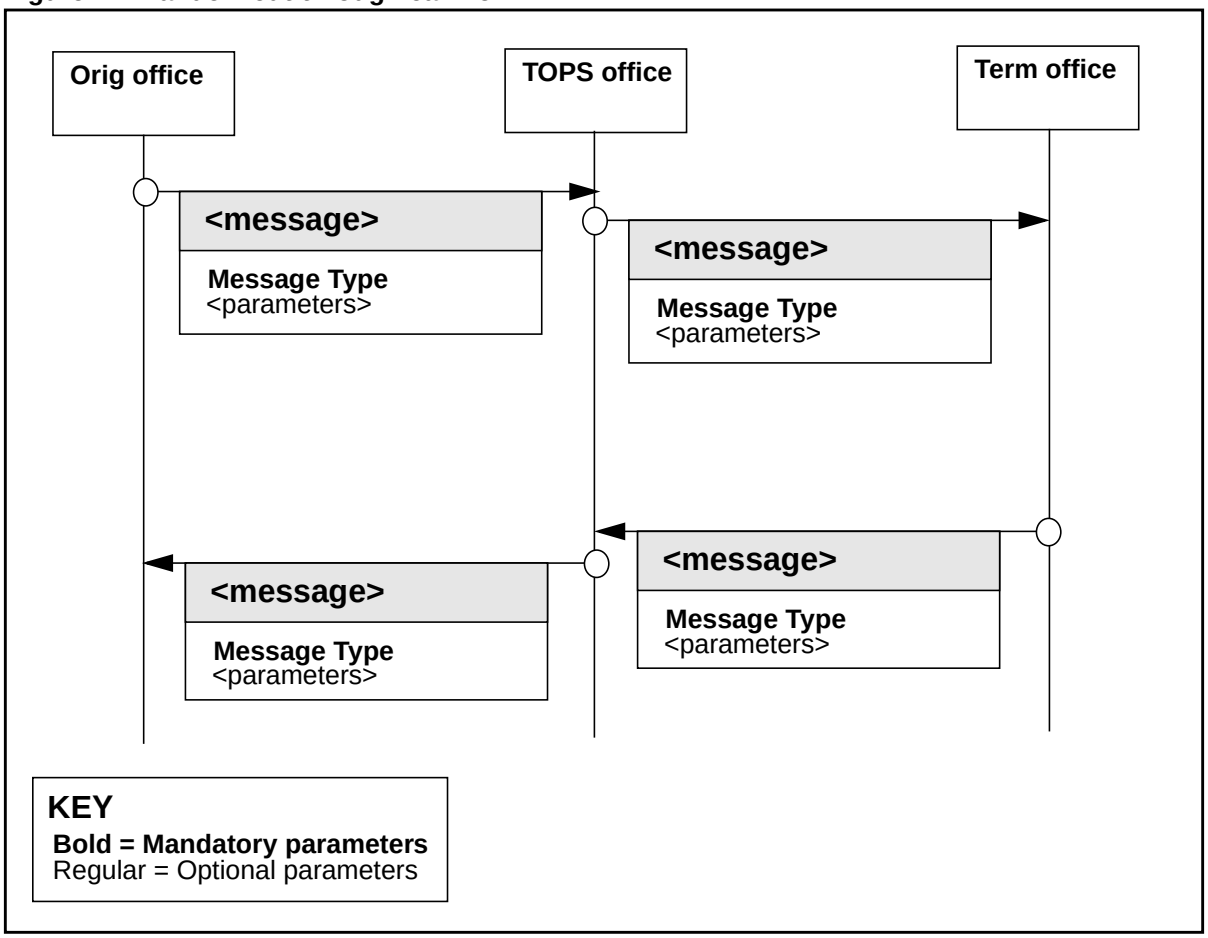
CPG parameters	Field	Expected values for this call flow
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
		subscriber free
	called party's category indicator	no indication
		ordinary (non-payphone) subscriber
	end-to-end method indicator	no end-to-end method
	interworking indicator	interworking encountered
	IAM segmentation indicator	no indicator
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
Optional backward call indicator	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication
	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent in a segmentation message
	MLPP user information	no indication
	reserved	reserved for national use
End of optional parameter		00000000

Tandem cut-through

The tandem cut-through call flow illustrates how messages are passed through the TOPS switch when a terminating connection is established. An likely example of this situation is a call that is transferred to a carrier. When OSNC is established on the terminating connection, TOPS passes control over the call and the releasing of the connections to the terminating switch. This means that the TOPS switch begins just passing the messages received after the Address Complete Message (ACM) on the originating and terminating connections through rather that processing them. Release (REL) messages are not passed through but are processed as they are received. This passing of messages is similar to how a tandem switch passes messages between the connections.

The following flow diagram portrays a generic message that is received from the originating connection and is passed to the terminating connection. The TOPS switch does not look at the message. The same behavior is shown for a message received from the terminating connection where that message is passed to the originating connection.

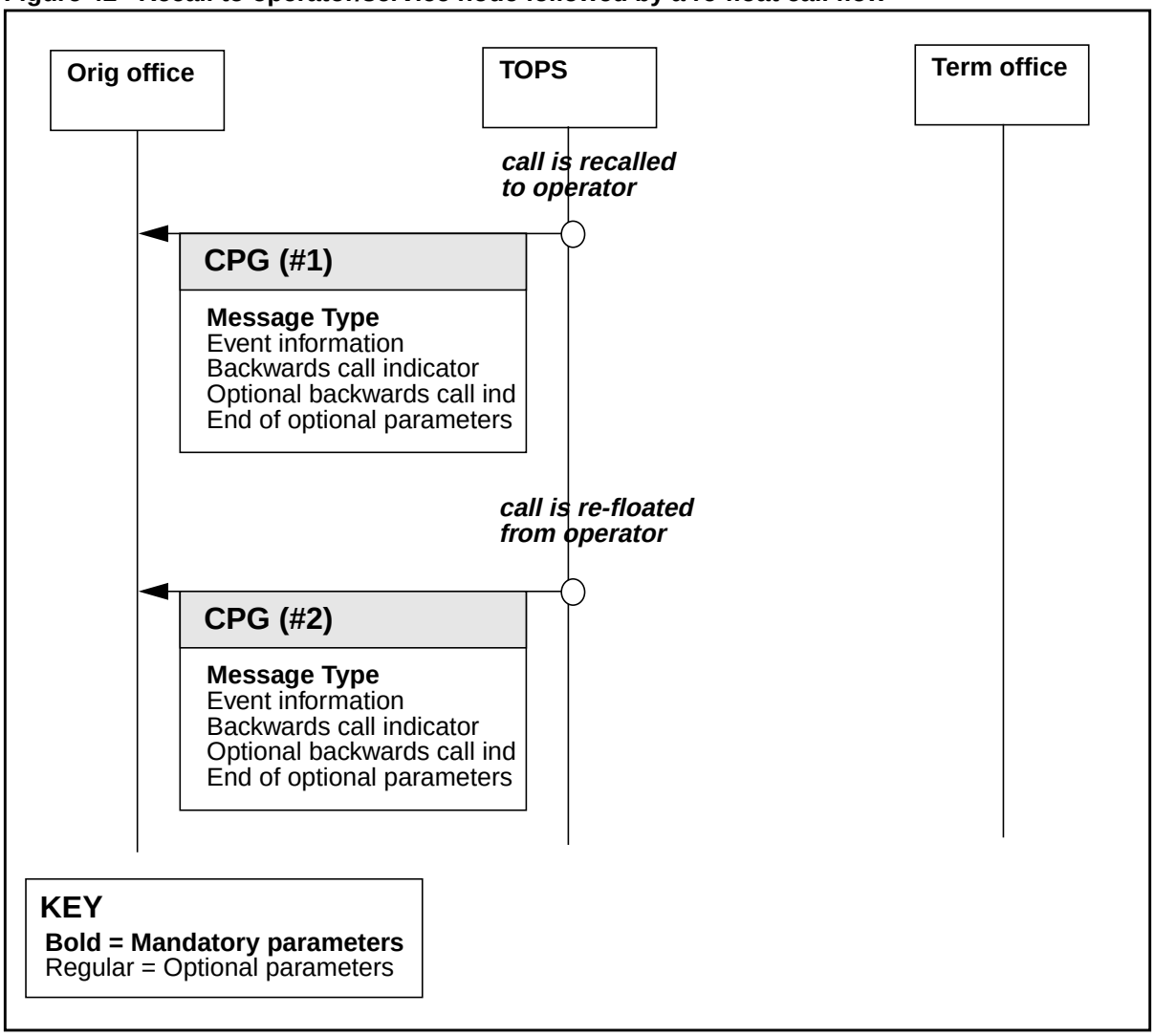
Figure 41 Tandem cut-through call flow



Recall to operator/service node followed by a re-float

The recall to operator/service node followed by a re-float call flow illustrates when an operator is re-attached to the call for the purposes of a coin recall, network services recall, notify recall or other reason to recall an operator/service node. At the beginning of this flow, the call has been floated, so the originating connection has a view of the ‘called’ party as the called party. The operator/service node is re-attached, so the originating connection is updated to have a view of the ‘called’ party as the operator/service node. After interacting with the appropriate parties, the operator/service node re-floats the call with the originating connection being updated to have a view of the ‘called’ party as the original called party again.

Figure 42 Recall to operator/service node followed by a re-float call flow



The following table shows the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 74 Recall to operator/service node followed by a re-float - CPG (#1)

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress

Table 74 Recall to operator/service node followed by a re-float - CPG (#1)

CPG parameters	Field	Expected values for this call flow
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
	called party's category indicator	no indication
	end-to-end method indicator	no end-to-end method available
	interworking indicator	no interworking encountered
	IAM segmentation indicator	no indication
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication
Optional backward call indicator	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent
	MLPP user information	no indication
	reserved	reserved for national use
	network excessive delay indicator	no indication
	user-network interaction indicator	no indication
End of optional parameter		00000000

Table 75 Recall to operator/service node followed by a re-float - CPG (#2)

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress

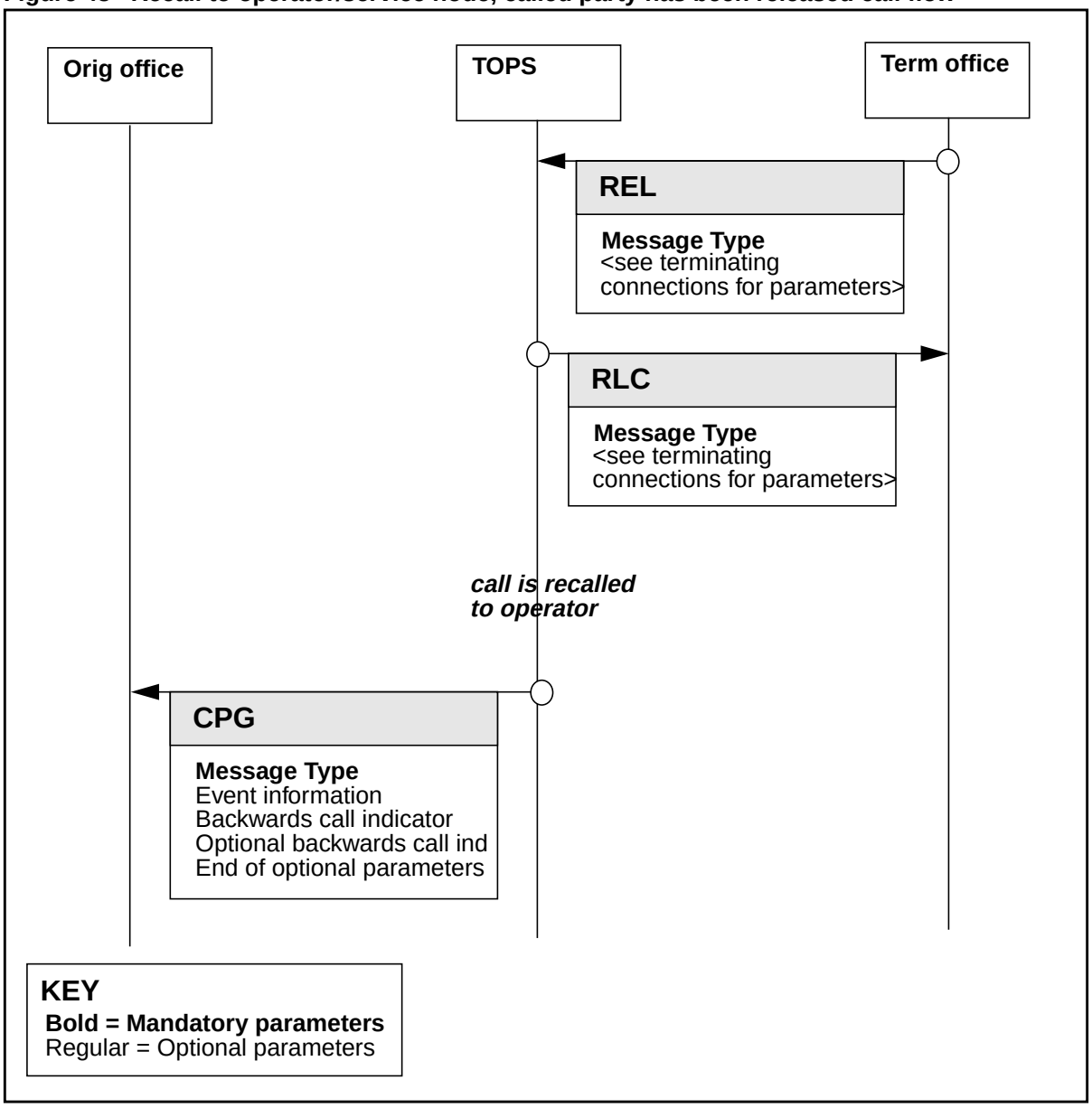
Table 75 Recall to operator/service node followed by a re-float - CPG (#2)

CPG parameters	Field	Expected values for this call flow
Backward call indicator	charge indicator	<value forwarded from ANM>
	called party's status indicator	<value forwarded from ANM>
	called party's category indicator	<value forwarded from ANM>
	end-to-end method indicator	<value forwarded from ANM>
	interworking indicator	<value forwarded from ANM>
	IAM segmentation indicator	<value forwarded from ANM>
	ISDN user part indicator	<value forwarded from ANM>
	holding indicator	<value forwarded from ANM>
	ISDN access indicator	<value forwarded from ANM>
	echo control device indicator	<value forwarded from ANM>
	SCCP method indicator	<value forwarded from ANM>
Optional backward call indicator	inband information indicator	<value forwarded from ANM>
	call forwarding may occur indicator	<value forwarded from ANM>
	simple segmentation indicator	<value forwarded from ANM>
	MLPP user information	<value forwarded from ANM>
	reserved	<value forwarded from ANM>
	network excessive delay indicator	<value forwarded from ANM>
	user-network interaction indicator	<value forwarded from ANM>
End of optional parameter		00000000

Recall to operator/service node, called party has been released

The recall to operator/service node, called party has been released call flow illustrates when an operator is re-attached to the call after the called party has been released for the purposes of a coin recall, time and charges notification, sequence calls or other reason to recall an operator/service node. At the beginning of this flow, the call has been floated, so the originating connection has a view of the ‘called’ party as the called party. The terminating connection is released. The operator/service node is re-attached, so the originating connection is updated to have a view of the ‘called’ party as the operator/service node. This call flow does not go into detail about the contents of the terminating connection REL. Refer to “Release signaling” on page 177 for more information.

Figure 43 Recall to operator/service node, called party has been released call flow



The following table shows the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the

outgoing signaling.

Table 76 Recall to operator/service node, called party has been released - CPG

CPG parameters	Field	Expected values for this call flow
Message type		CPG
Event information	event indicator	progress
Backward call indicator	charge indicator	no indication
	called party's status indicator	no indication
	called party's category indicator	no indication
	end-to-end method indicator	no end-to-end method available
	interworking indicator	no interworking encountered
	IAM segmentation indicator	no indication
	ISDN user part indicator	ISDN user part not used all the way
	holding indicator	holding not required
	ISDN access indicator	terminating access non-ISDN
	echo control device indicator	incoming half echo control device not included
	SCCP method indicator	no indication
Optional backward call indicator	inband information indicator	no indication
	call forwarding may occur indicator	no indication
	simple segmentation indicator	no additional information will be sent
	MLPP user information	no indication
	reserved	reserved for national use
	network excessive delay indicator	no indication
	user-network interaction indicator	no indication
End of optional parameter		00000000

Release signaling

This section addresses how TOPS releases both the originating and terminating connections. The following scenarios are addressed:

- originating/terminating office initiated release
- TOPS initiated release
- terminating connection suspend and resume
- terminating connection suspend and release
- release link trunking (variant one)
- release link trunking (variant two)

Originating/terminating office initiated release

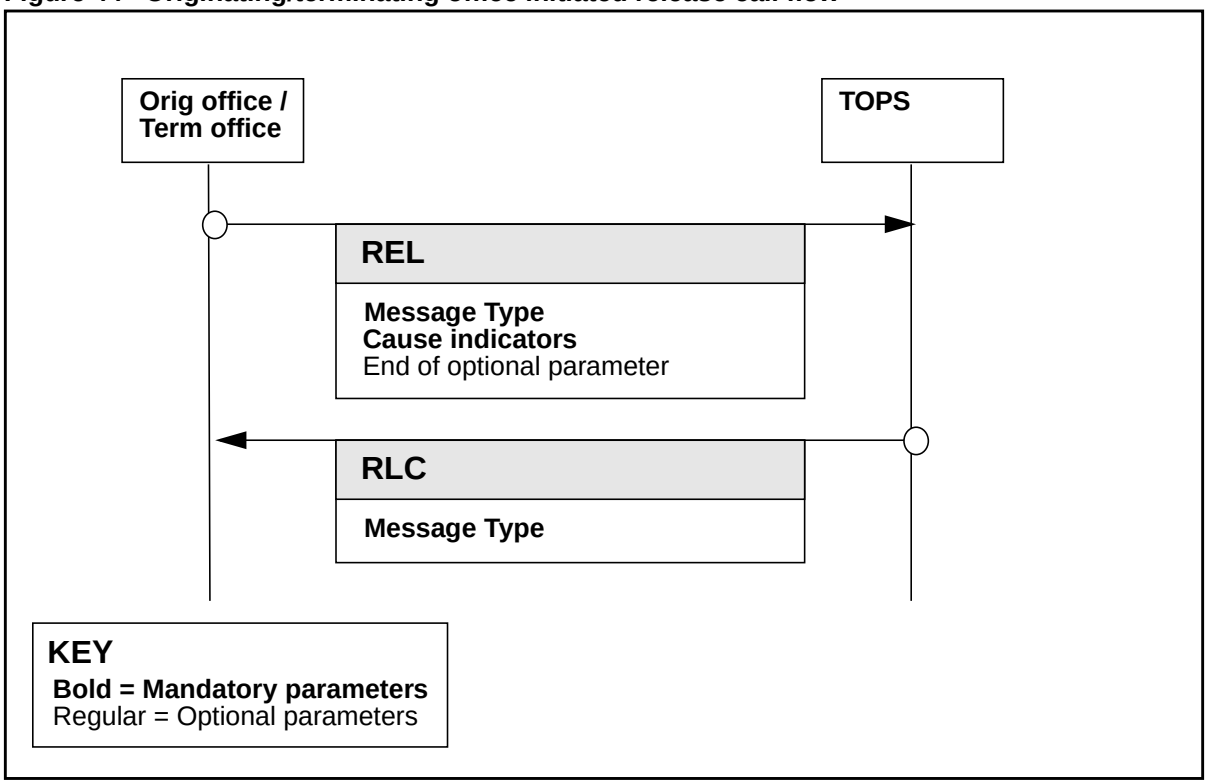
In this flow, the originating or terminating office can release the connection by sending a Release message to TOPS. Whether or not connection hold is available on the connection does not influence how TOPS handles the message. TOPS releases the connection and responds with a Release Complete message.

If connection hold is available on the originating connection, then a calling party on-hook is expected to be reported to TOPS using a Facility message (refer to “Calling party disconnect with connection hold in effect” on page 150 for more information). However, if the originating office sends a Release message because of some error situation, TOPS honors the release and processes the release as a calling party disconnect. If further operator services are required, then an operator/service node is attached with an indication that the calling party is not present. The operator/service node may then end the call or attempt to reconnect[2] (meaning establish a new connection to) the calling party.

If connection hold is available on the terminating connection, then TOPS is functioning more as a tandem. TOPS processes the release and then sends a release to the originating connection as well (refer to “TOPS-initiated release” on page 179 for more information). The call at the TOPS switch is ended.

2. At this point, a reconnect connection is not supported with OSNC.

Figure 44 Originating/terminating office initiated release call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 77 Originating/terminating office initiated release - REL

REL parameters	FIeld	Expected values for this call flow
Message type		REL
Cause indicators	location	user
	spare	spare
	coding standard	CCITT standard
	extension indicator	octet continues through the next octet
	cause value	<all values>
	extension indicator	last octet
End of optional parameter		00000000

Table 78 Originating/terminating office initiated release - RLC

RLC parameters	FIeld	Expected values for this call flow
Message type		RLC

TOPS-initiated release

In this flow, TOPS releases the originating/terminating connection. This release can be generated as a result of the operator keying to release the connection or as a result of TOPS making the determination that the call is over.

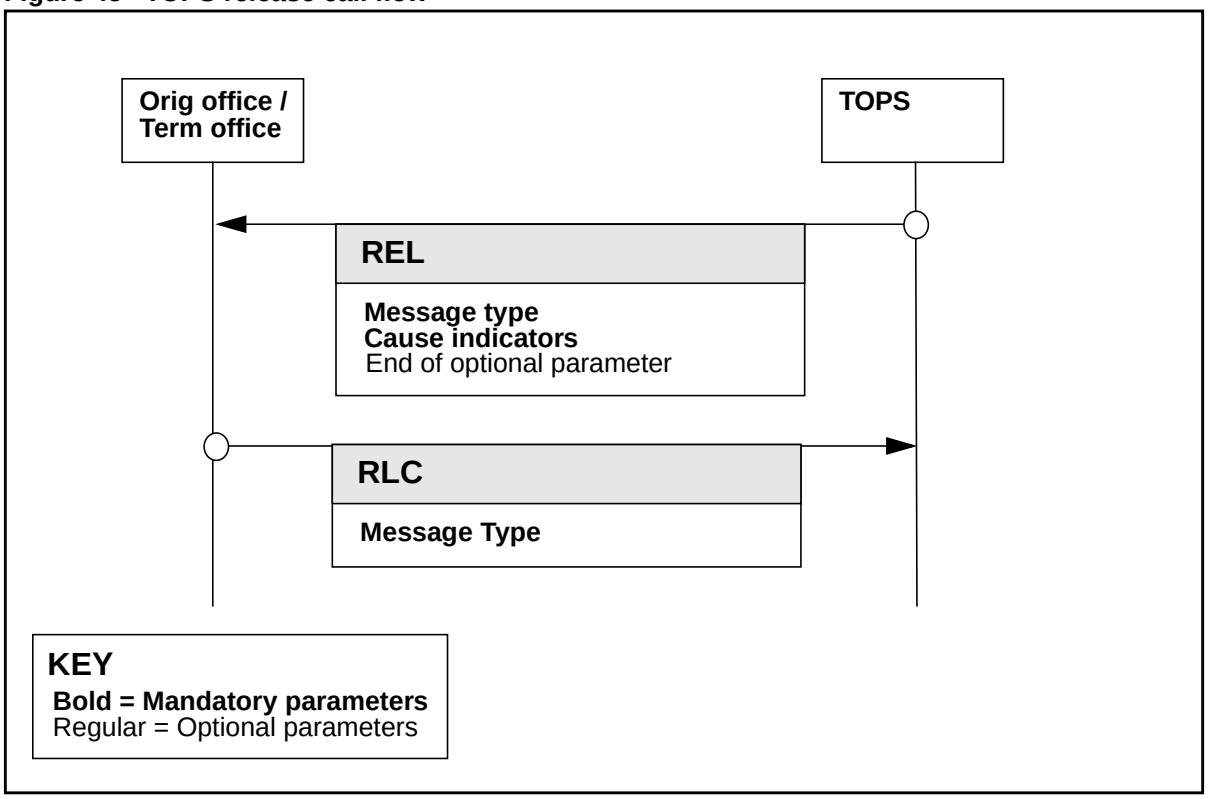
For OSNC coin interworking scenarios, OSNC needs to ensure that the call is properly taken down when necessary. In call scenarios that include an incoming OSNC trunk and an outgoing MF ATC trunk, TOPS will ensure the following:

- A REL received from the incoming trunk will take down the call at the TOPS office. Because the TOPS office has no way of knowing if the call is at a carrier position, floated in a ringing state, or floated during the talking state, TOPS cannot provide any additional functionality except to take the call down.

  Note: The call would still be active in the carrier office and the carrier office would either have to take its call down or find a way to re-establish the connection to the calling party. A ringback would not be possible at this point because the trunks would have been released. The carrier operator would need to release the calling party and then re-outpulse.
- An on-hook from the carrier will take the call down.
- When the OPRHOLD timer (HLDTIMER) expires, the call is taken down — a scenario similar to receiving a REL from the originator.

  This set-up is datafillable in table TRKGRP as field HLDTIMER, which is a subfield of OPRHOLD=Y. When operator hold is in effect, the HLDTIMER starts when the calling party goes on-hook. If the carrier office does not release the call before the timer expires, TOPS will release the call. This timer is 0–60 minutes; the recommendation is to set the timer high in order to ensure that emergency calls can be treated properly. A TOPS122 log is produced when the call is taken down as a result of expiration of the hold time-out timer.

Figure 45 TOPS release call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 79 TOPS initiated release - REL

REL parameters	FIeld	Expected values for this call flow
Message type		REL
Cause indicators	location	user
	spare	spare
	coding standard	CCITT standard
	extension indicator	octet continues through the next octet
	cause value	<all values>
	extension indicator	last octet
End of optional parameter		00000000

Table 80 TOPS initiated release - RLC

RLC parameters	FIeld	Expected values for this call flow
Message type		RLC

Terminating connection suspend and resume

In this flow, the called party has gone on-hook but the terminating office reports a ‘suspend’ to the TOPS office rather than a ‘release.’ The terminating office sends a Suspend message to the TOPS office. The TOPS office begins a suspend timer and waits for either the timer to expire or the called party to go off-hook which would result in a Resume message to be sent from the terminating office. In this case, the called party does go back off-hook and the Resume message is received by TOPS.

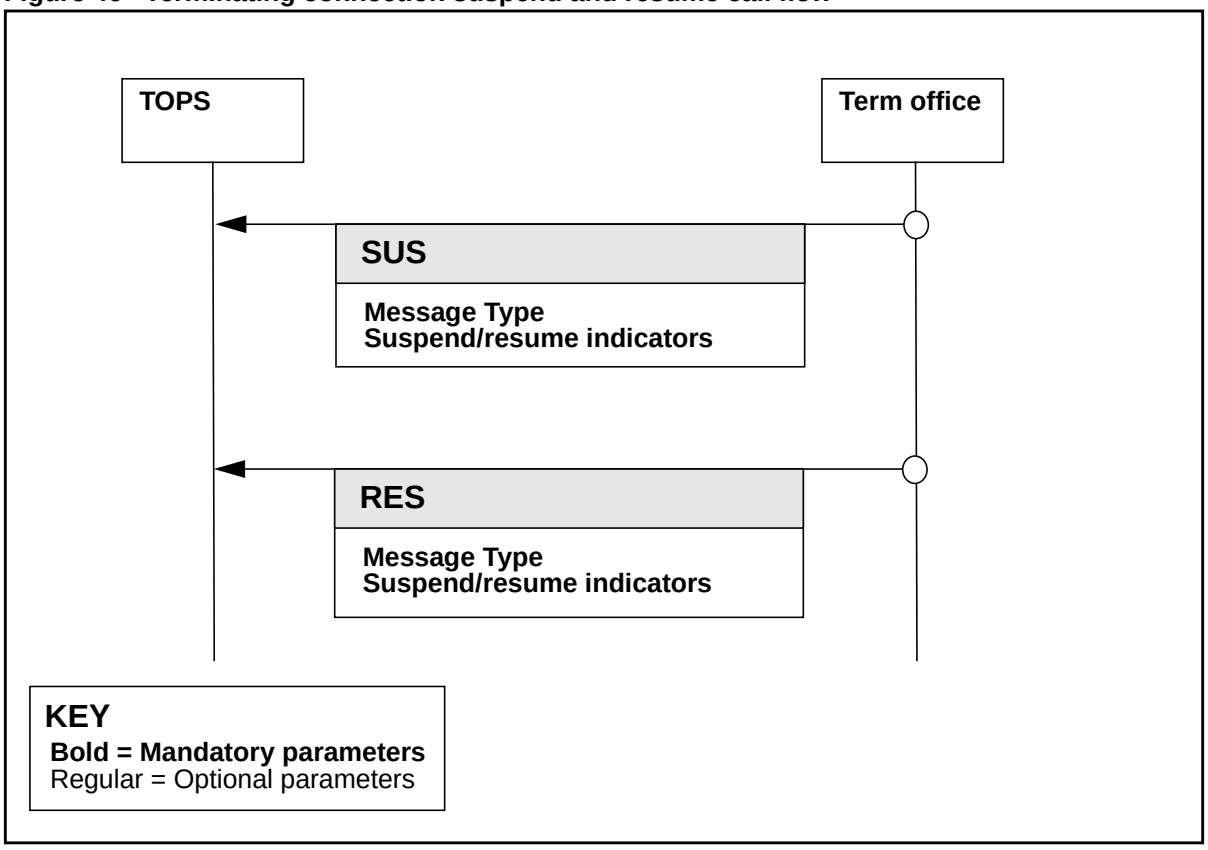
The value of the suspend timer is different based upon the type of operator environment from which the call is floated. In each case, the value is a constant in the software and cannot be changed by the craftsperson. The following table details the various environments and the value of the suspend timer used.

Table 81 Suspend timer values for various operator environments

Operator environment	Suspend timer value
ACTS	2 seconds
AABS	.5 seconds
MCCS	.5 seconds
OSSAIN	.5 seconds
operator	.5 seconds

If the call is still at the operator/service node, then the Suspend message causes the operator/service node to be informed that the called party has gone on-hook. When TOPS receives the Resume message, the operator/service node is informed that the called party has gone off-hook.However, if the call has been floated from the operator/service node, then both the Suspend and Resume messages do not affect the hook status of the called party.

Figure 46 Terminating connection suspend and resume call flow



The following table shows the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 82 Terminating connection suspend and resume - SUS

SUS parameters	FIeld	Expected values for this call flow
Message type		SUS
Suspend/resume indicators	suspend/resume indicator	<not used by TOPS>
	spare	spare

Table 83 Terminating connection suspend and resume - RES

RES parameters	FIeld	Expected values for this call flow
Message type		RES

Table 83 Terminating connection suspend and resume - RES

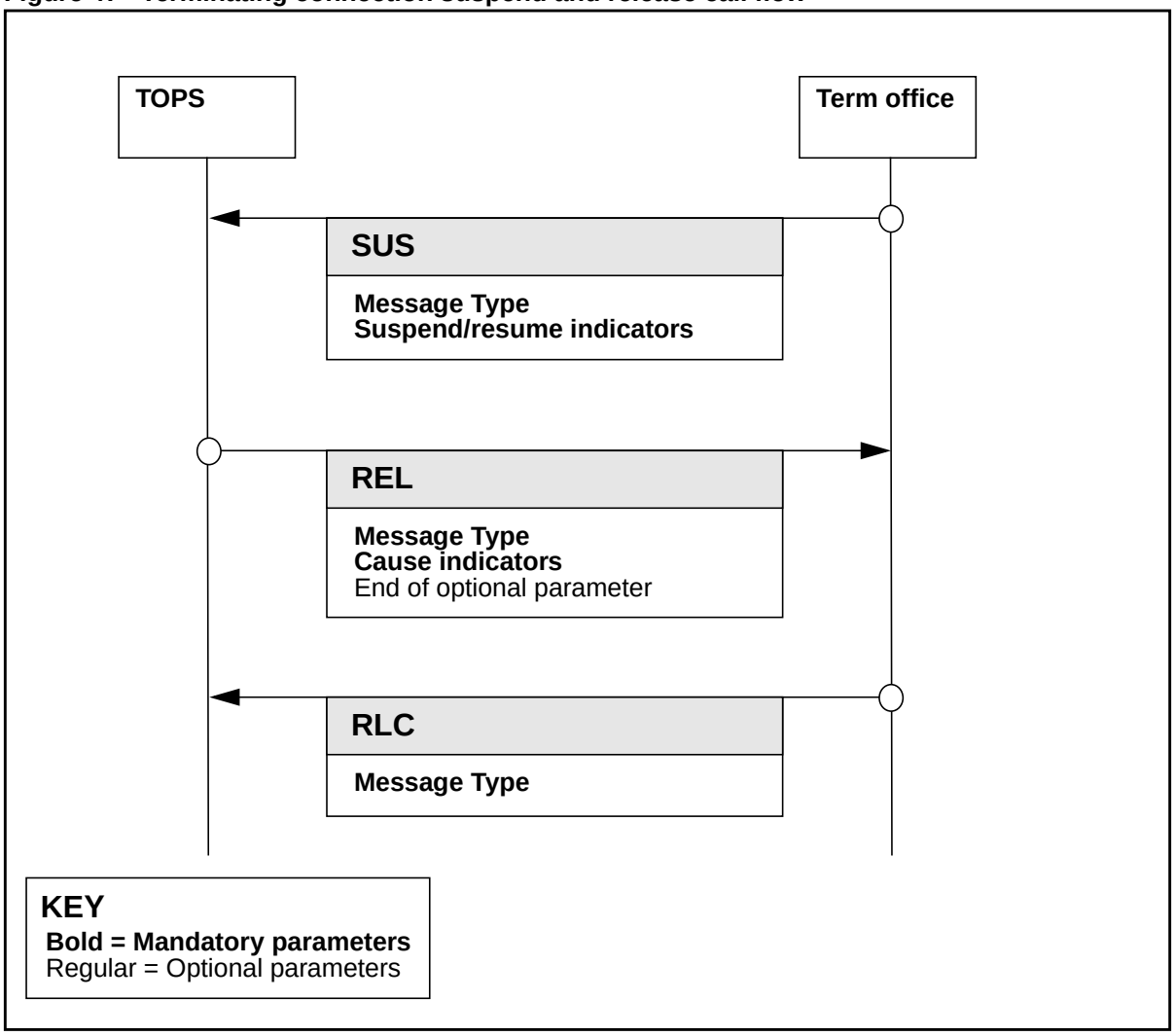
RES parameters	FIeld	Expected values for this call flow
Suspend/resume indicators	suspend/resume indicator	<not used by TOPS>
	spare	spare

Terminating connection suspend and release

In this flow, the called party has gone on-hook but the terminating office reports a ‘suspend’ to the TOPS office rather than a ‘release’. The terminating office sends a Suspend message to the TOPS office. The TOPS office begins a suspend timer and waits for either the timer to expire or the called party to go off-hook which would result in a Resume message to be sent from the terminating office. In this case, the timer expires and TOPS releases the connection.

If the call is still at the operator/service node, then the Suspend message causes the operator/service node to be informed that the called party has gone on-hook. When the timer expires, the operator/service node is informed that the called party has been released. However, if the call has been floated from the operator/service node, then the Suspend message does not affect the hook status of the called party.

Figure 47 Terminating connection suspend and release call flow



The following table shows the supported code points, fields, and messages applying to this call flow. The expected value of '<not used by TOPS>' means that the parameter field is not important to operator services call processing; however, it may be received and stored by TOPS to be forwarded in the outgoing signaling.

Table 84 Terminating connection suspend and release - SUS

SUS parameters	FIeld	Expected values for this call flow
Message type		SUS
Suspend/resume indicators	suspend/resume indicator	<not used by TOPS>
	spare	spare

Table 85 Terminating connection suspend and release - REL

REL parameters	FIeld	Expected values for this call flow
Message type		REL
Cause indicators	location	user
	spare	spare
	coding standard	CCITT standard
	extension indicator	octet continues through the next octet
	cause value	<all values>
	extension indicator	last octet
End of optional parameter		00000000

Table 86 Terminating connection suspend and release - RLC

RLC parameters	FIeld	Expected values for this call flow
Message type		RLC

Release Link Trunking

Release Link Trunking (RLT) is a means of releasing the connection from a previous office to TOPS and still maintaining the call in the previous switch. TOPS supports the following variants of RLT:

- variant one
- variant two

TOPS RLT allows a TOPS office to request a previous office to complete a call. It helps to release TOPS office resources—in particular, trunk facilities, for the duration of the conversation. Provided that functionality OSEA0005 is enabled, variant one works with DMS-100 switches in the following PCLs: LEC, LET and LLT. RLT will also function with non-DMS equipment that duplicates the functionality of OSEA0005.

For variant two, RLT maximizes use of the Signaling System (SS7) Integrated Services User Part (ISUP) Intermachine-Machine Trunk (IMT) trunks by releasing connections between a previous Universal Carrier Switch (UCS)-250 and a TOPS switch. The TOPS switch uses the Universal Carrier Protocol (UCP) ISUP protocol to signal call completion, connect the forward party, and release the connection to TOPS.

Note: The Telcordia standard Release To Pivot (RTP) is not supported in OSNC.

For additional information about RLT, refer to the *Translations Guide*.

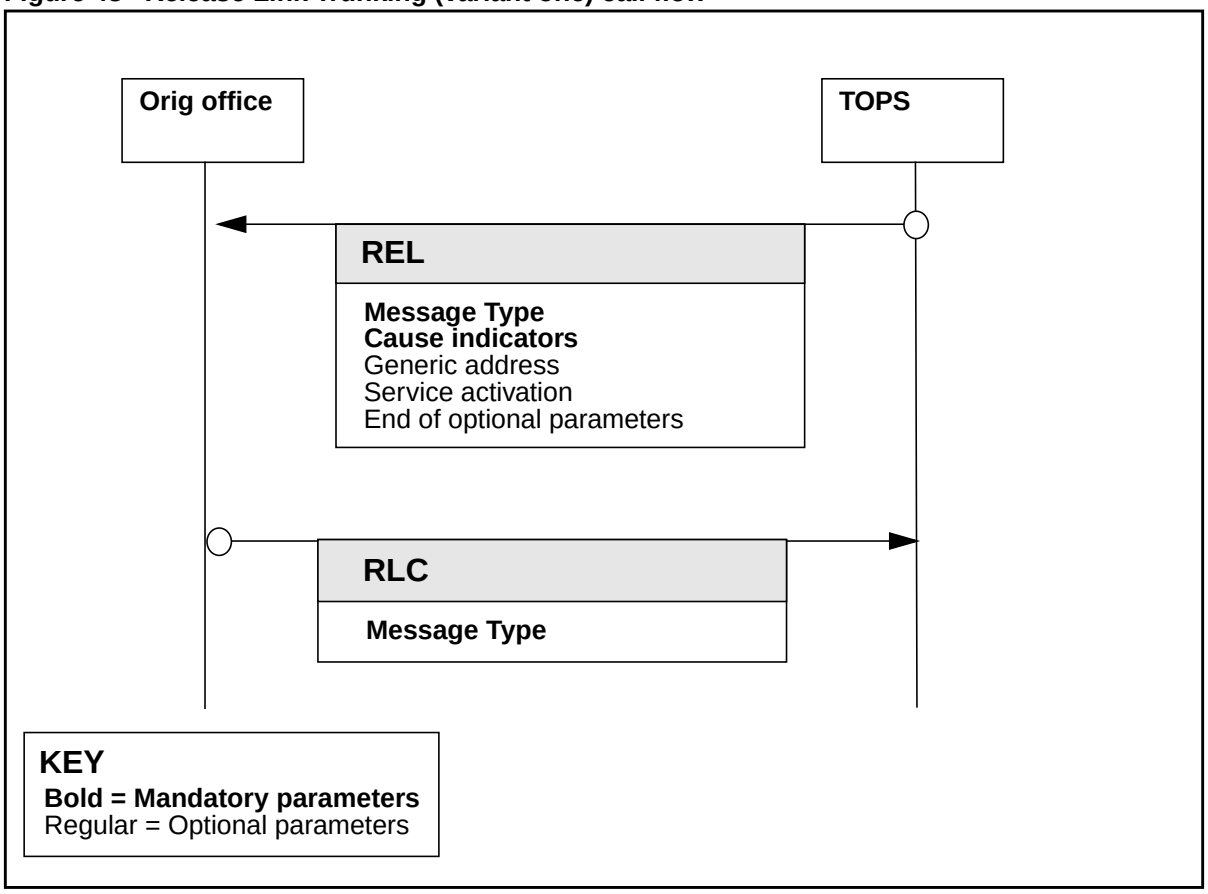
Variant one

Variant one, which feature AN1515 implemented, uses the optional parameters Generic Address (GAP) parameter and Service Activation Parameter (SAP) to transport routing information to a previous office. These parameters are appended to an ISUP Release (REL) message when releasing the call.

In this flow, TOPS initiates the release to a previous office, and in doing so, requests the office to make a connection to the party whose directory number is found in GAP. A previous office responds to TOPS with a Release Completion (RLC) message and then proceeds to make the connection as requested. TOPS is no longer involved with the call at this point.

If call completion fails in a previous office, this variant does not provide any additional call completion mechanisms. Variant one version of RLT is only functional with non-coin sent paid Automatic Directory Assistance Call Completion (ADACC) for OSNC. This variant only supports RLT transfer. The RLT transfer type operates differently with variant one. With this variant, TOPS performs RLT regardless of end office status.

Figure 48 Release Link Trunking (variant one) call flow



The following table shows the supported code points, fields, and messages applying to this call flow.

Table 87 Release Link Trunking (variant one) - REL

REL parameters	FIeld	Expected values for this call flow
Message type		REL
Cause indicators	location	user
	spare	spare
	coding standard	CCITT standard
	extension indicator	octet continues through the next octet
	cause value	<all values>
	extension indicator	last octet

Table 87 Release Link Trunking (variant one) - REL

REL parameters	FIeld	Expected values for this call flow
Generic address	type of address	completion number
	nature of address	subscriber number
		national (significant) number
	odd/even indicator	even
		odd
	screening indicator	reserved
	presentation indicator	presentation allowed
		presentation restricted
	numbering plan indicator	ISDN (telephony) numbering plan
	address signal	<completion DN>
Service activation	feature code indicator	complete call request, ISUP used all the way
		complete call request, ISUP not used all the way
End of optional parameter		00000000

Table 88 Release Link Trunking (variant one) - RLC

RLC parameters	FIeld	Expected values for this call flow
Message type		RLC

Variant two

There are two phases of RLT variant two:

- phase one, feature AN1900 (RLT Interworking with TOPS and OSSAIN), which introduced the second variant of RLT and supports Directory Assistance Call Completion (DACC); bill-to-third number calls; collect calls; and non-coin Sent Paid calls
- phase two, feature AF7134 (Carrier Release Link Trunking for TOPS: Phase Two), which provides RLT functionality for calling card services

This variant uses ISUP Facility Request (FAR), Facility Accept (FAA), and Facility Reject (FRJ) messages to provide routing and releasing information. Variant two provides additional call completion capabilities if the call fails to complete in a previous office. It also provides RLT functionality for a wider variety of services than RLT (variant one). Variant two supports RLT transfer and bridge.

TOPS14 feature Release Link Trunking (Variant Two) Enhancements allows RLT (variant two) software to maximize use of services developed under OSNC. This feature introduces three enhancements to the two phases of variant two.

One of the enhancements is to both phases 1 and 2. It allows TOPS to send a request to a previous end office (EO) to end operator hold immediately before TOPS signals an RLT bridge or RLT transfer request to the USC-250 switch.

Note: It only ends connection hold when the call is an OSNC call. If the call is a non-OSNC call, the end of connection hold does not apply.

An RLT bridge occurs when a first call leg and a second call leg are joined in one call by a previous UCS-250 due to an RLT request by the TOPS switch.

An RLT transfer refers to re-translation of the originating call at a previous UCS-250 to the called number specified by the TOPS switch. RLT transfer occurs when the TOPS office requests RLT on a single connection, causing that connection to be retranslated to a number provided by TOPS.

Note that if the call is an OSNC call, only TOPS and a previous EO are aware that connection hold is in effect; the intermediate switches are not aware of it.

The second enhancement modifies RLT bridge for phases 1 and 2. With this enhancement, if TOPS has received the called party's call progress information, the information can be forwarded to the calling party before TOPS sends the RLT bridge request to the UCS-250. There are only a few cases in which TOPS would not have received the call progress information and thus could not forward it to the calling party.

Consider a scenario in which the incoming trunk is OSNC and the outgoing trunk is TOPS to ISUP. In this situation, TOPS sends the RLT bridge request before the called party answers. In this interworking case, because the Answer Message (ANM) was not received yet, TOPS did not have any Call Progress information to send.

The third enhancement modifies RLT bridge and transfer for phase two re-originations. The change ensures that connection hold is not requested when the calling party initiates a re-origination.

These enhancements are further discussed in the following sections.

RLT bridge (variant two): phase one

RLT bridge is used for collect and person-to-person calls. An OSNC call originates from an EO and routes through a UCS-250 to TOPS for operator services establishing the first leg of the call. Depending on the type of service requested, the call will possibly be serviced at an operator position, automated system, or Operator Services System Advanced Intelligent Network (OSSAIN) service nodes (SNs). One of these provides a forward number, billing number, and class charge (using the operator information parameter) to TOPS, and TOPS completes the call to the forward party.

On a collect call, TOPS completes the second leg of the call to verify that the called party accepts the charges. On a person-to-person call, TOPS completes the second leg of the call to verify that the called party is present.

With establishment of the second leg and billing satisfied, TOPS can send an RLT start billing request to the UCS-250. The UCS-250 can accept or reject this request. It accepts this request by replying with an FAA message or it can reject this request with a Facility Reject (FRJ) message.

If the request is accepted, when TOPS is ready to float the call, TOPS formulates a Call Progress (CPG) Message to include a Backwards Call Indicator (BCI) parameter; Optional Backwards Call Indicators (OBCI) parameter; and a Service Activation Parameter (SAP).

The BCI and OBCI parameters are encoded with the called party's call progress information that TOPS received in the ACM and ANM from the terminating office. The SAP contains a release connection hold request code point to end connection hold between TOPS and the end office (EO). TOPS sends the CPG to the originating EO.

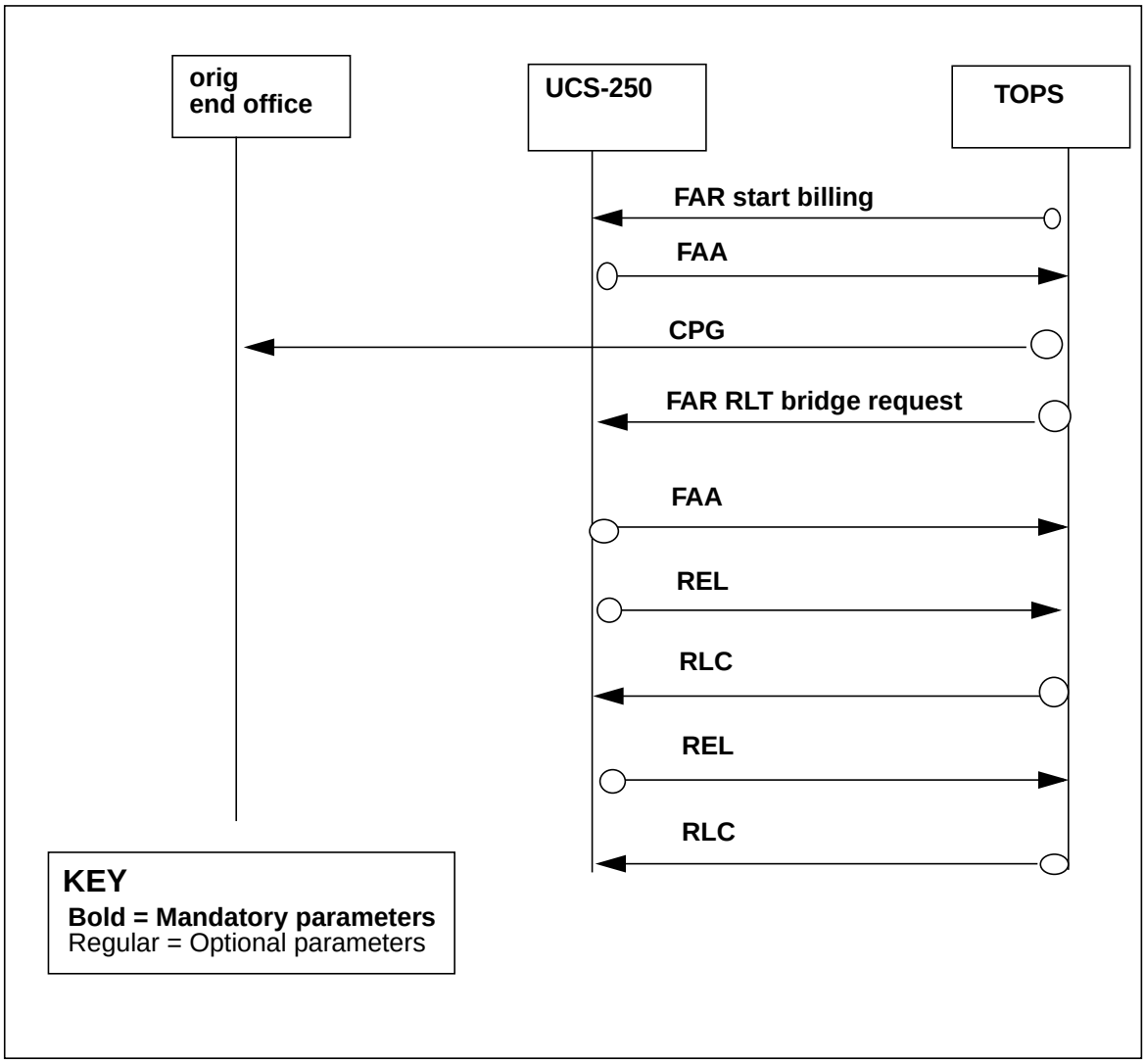
Note that if the called party's call progress information is unavailable when TOPS is ready to send this CPG to the originating EO, then TOPS will send a FAC message to end connection hold instead.

As a call is released, a FAR containing the forward number, billing number, point codes, call identification of the calls to be joined, and a class charge is sent back to the previous exchange. The previous exchange is expected to positively acknowledge the FAR by sending an FAA message to the TOPS switch, resulting in a release back to the UCS DMS-250 switch. Refer to Figure 49, "Call flow for RLT bridge (variant two): phase one," on page 192. The UCS-250 then bridges the two connections. From the TOPS switch's perspective, RLT bridge is independent of the direction of the first call leg.

If the DMS-250 cannot bridge the call, an FRJ message is sent in place of the FAA. If it rejects the request, TOPS abandons any further attempt to RLT the call and TOPS maintains control of the call. In this case, the TOPS switch maintains the connection of both call legs.

Connection hold ends regardless of whether this request is accepted. This is acceptable because TOPS ends connection hold when these calls are floated—billing information has been collected and there is no reason to recall back to TOPS.

Figure 49 Call flow for RLT bridge (variant two): phase one



RLT transfer (variant two): phase one

RLT transfer is used in Directory Assistance Call Completion (DACC) and bill-to-third number calls. An OSNC call originates from an end office (EO) and routes through a UCS-250 to TOPS for operator services establishing the first leg of the call. Depending on the type of service requested, the call will possibly be serviced at an operator position, automated system, or Operator Services System Advanced Intelligent Network (OSSAIN) services nodes (SNs). One of these provides a forward number, billing number, and class charge (using the operator information parameter) to the previous exchange in a FAR message.

When the method of billing is satisfied, an operator or automated system can send a request to the UCS-250 to start billing in a FAR message.

This request is sent in a FAR message containing a start billing request. The UCS-250 can choose to accept or reject this request. If the request is accepted, TOPS continues with the process to RLT the call.

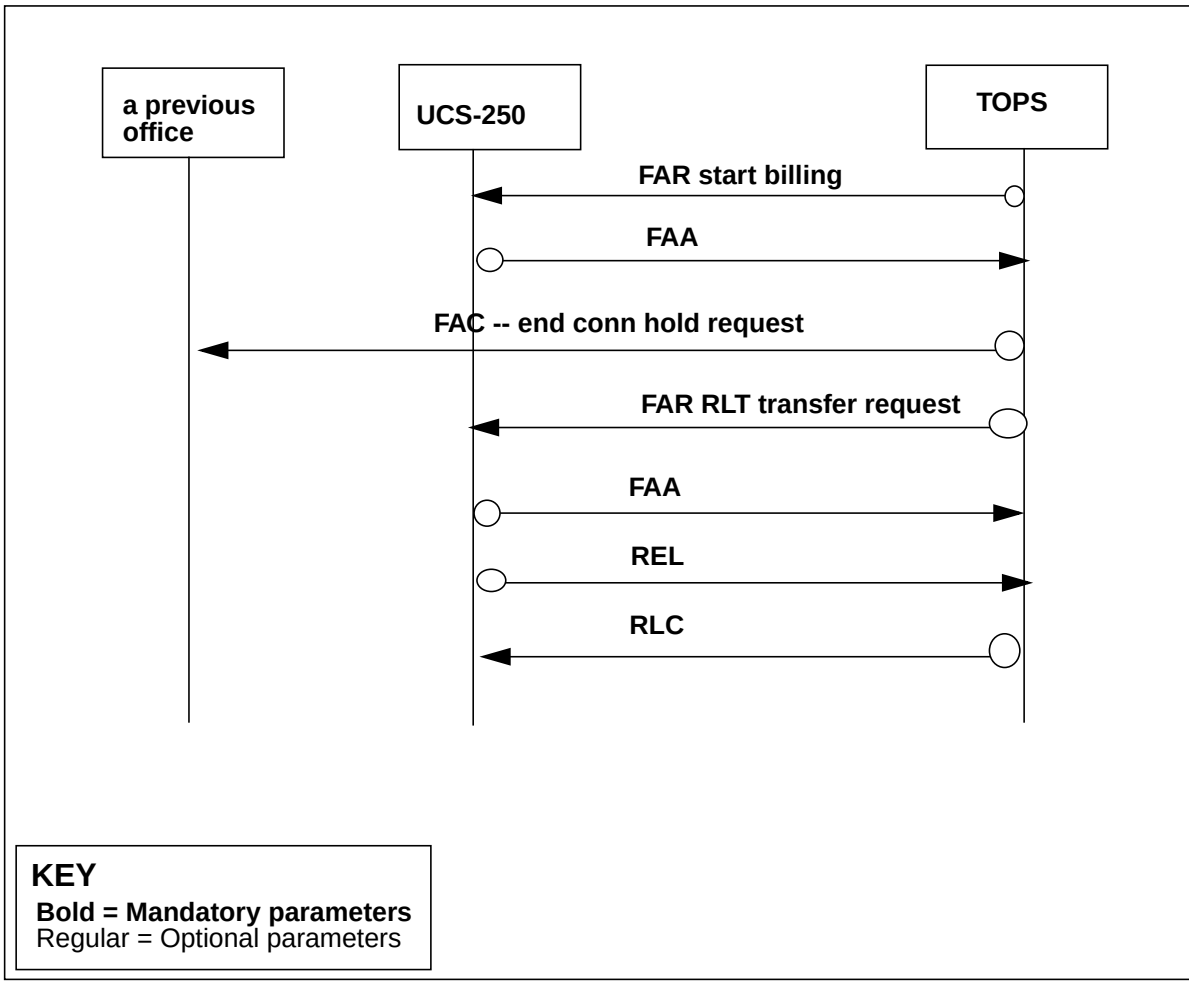
The TOPS14 RLT feature allows TOPS to end connection hold between TOPS and the originating EO. It ends connection hold immediately before TOPS signals RLT transfer to the UCS-250. Connection hold ends when TOPS sends a FAC message with a Service Activation Parameter (SAP) containing a hold release request to the originating EO.

TOPS signals to the UCS-250 that an RLT transfer is requested by sending a FAR message with the RLT transfer request set in the facility indicator parameter. The UCS-250 accepts this request by replying with an FAA message. (Refer to Figure 50, “Call flow for RLT transfer (variant two): phase one,” on page 194.) In this case, the UCS-250 sends a REL message to release the ISUP trunk between the UCS-250 and TOPS. Lastly, the USC-250 completes the second leg of the call.

If the previous exchange cannot perform the transfer, a Facility Reject (FRJ) message is sent in place of the FAA. In this case, the TOPS office makes the forward connection. In this case, TOPS completes the call to the terminating EO, and the call remains connected at TOPS.

Connection hold ends, regardless of whether the request is accepted. TOPS ends connection hold when these calls are floated — billing information has been collected at this point, and there is no reason to recall back to TOPS.

Figure 50 Call flow for RLT transfer (variant two): phase one



RLT bridge (variant two): phase two

The difference between the RLT bridge (variant two): phase two and the RLT transfer (variant two): phase two is that with the RLT bridge (variant two): phase two, TOPS completes the call before signaling a request to UCS-250 to RLT the call. With the second leg of the call established and billing satisfied, TOPS can send an RLT start billing request to the UCS-250.

The UCS-250 accepts this request by replying with an FAA message. It rejects it by replying with an FRJ message. (In this case, TOPS abandons any further attempt to RLT the call, and TOPS maintains control of the call.)

As TOPS is ready to float the call, TOPS sends a FAR to the UCS-250 with a context block. This block carries the information needed for re-origination. The UCS-250 can accept or reject the context block. It can accept it by replying with a FAA message or it can reject it by replying with an FRJ message. If the UCS-250 rejects the context block, then TOPS maintains control of the call.

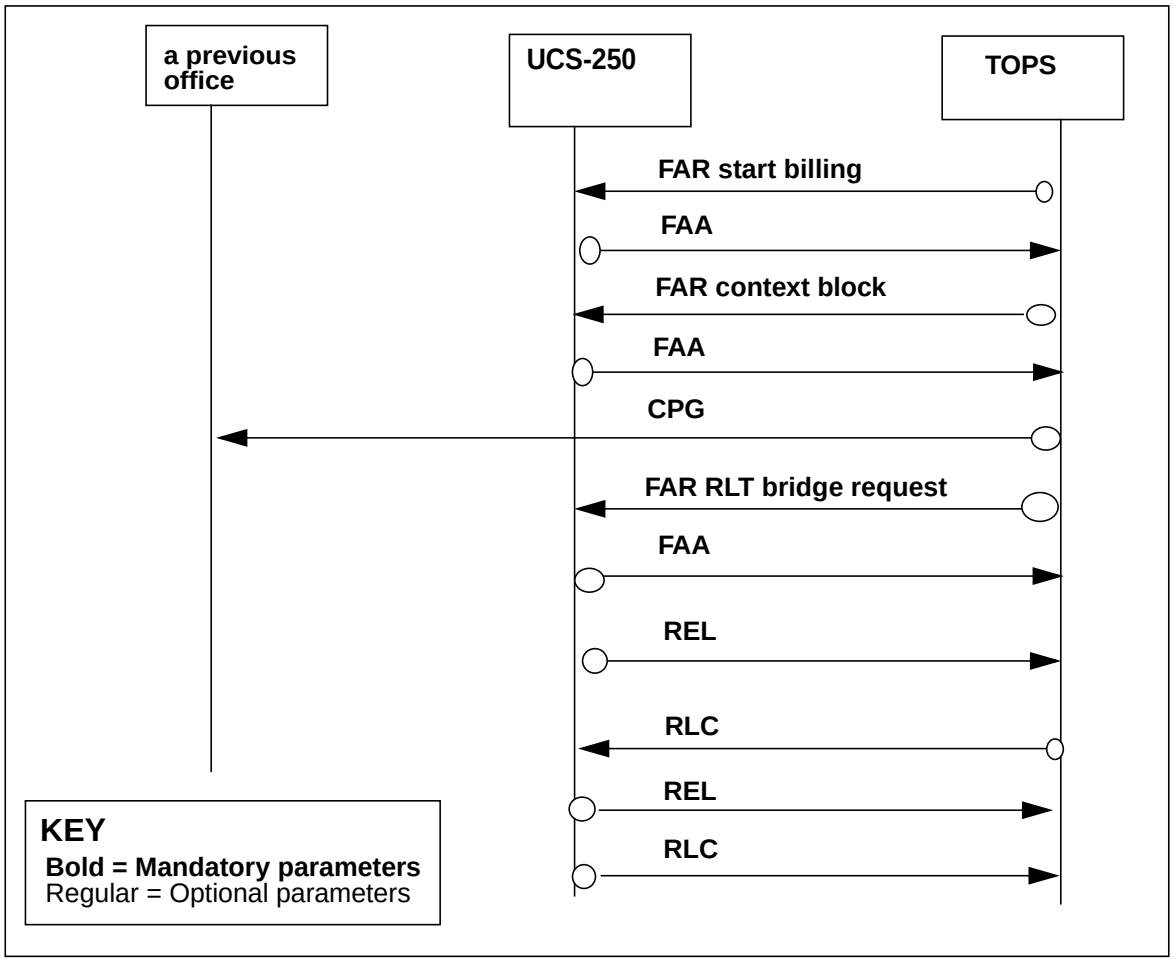
If the context block is accepted, TOPS continues with the process to RLT the call. Next, TOPS formulates a Call Progress (CPG) Message to include a Backward Call Indicator (BCI); Optional Backwards Call Indicators (OBCI); and a Service Activation Parameter (SAP). The BCI and OBCI contain called party's call progress information that TOPS received in the ACM and ANM from the terminating end office. The SAP contains a release connection hold request code point to end connection hold between TOPS and the end office. TOPS sends this CPG to the originating end office.

Next, TOPS sends an RLT bridge request to the UCS-250, which the UCS-250 can either accept or reject. The UCS-250 can accept it by replying with an FAA message. It can reject it by replying with an FRJ message. In this case, TOPS abandons any further attempt to RLT the call. If the request is accepted, the UCS-250 releases both trunks to TOPS, and the UCS takes control of the call.

The connection hold ends regardless of whether the request is accepted. This is acceptable because TOPS ends connection hold when these calls are floated as billing information has been collected and there is no reason to call back to TOPS.

Refer to Figure 51, "Call flow for RLT bridge (variant two): phase two," on page 196.

Figure 51 Call flow for RLT bridge (variant two): phase two



RLT bridge (variant two): phase two (re-origination)

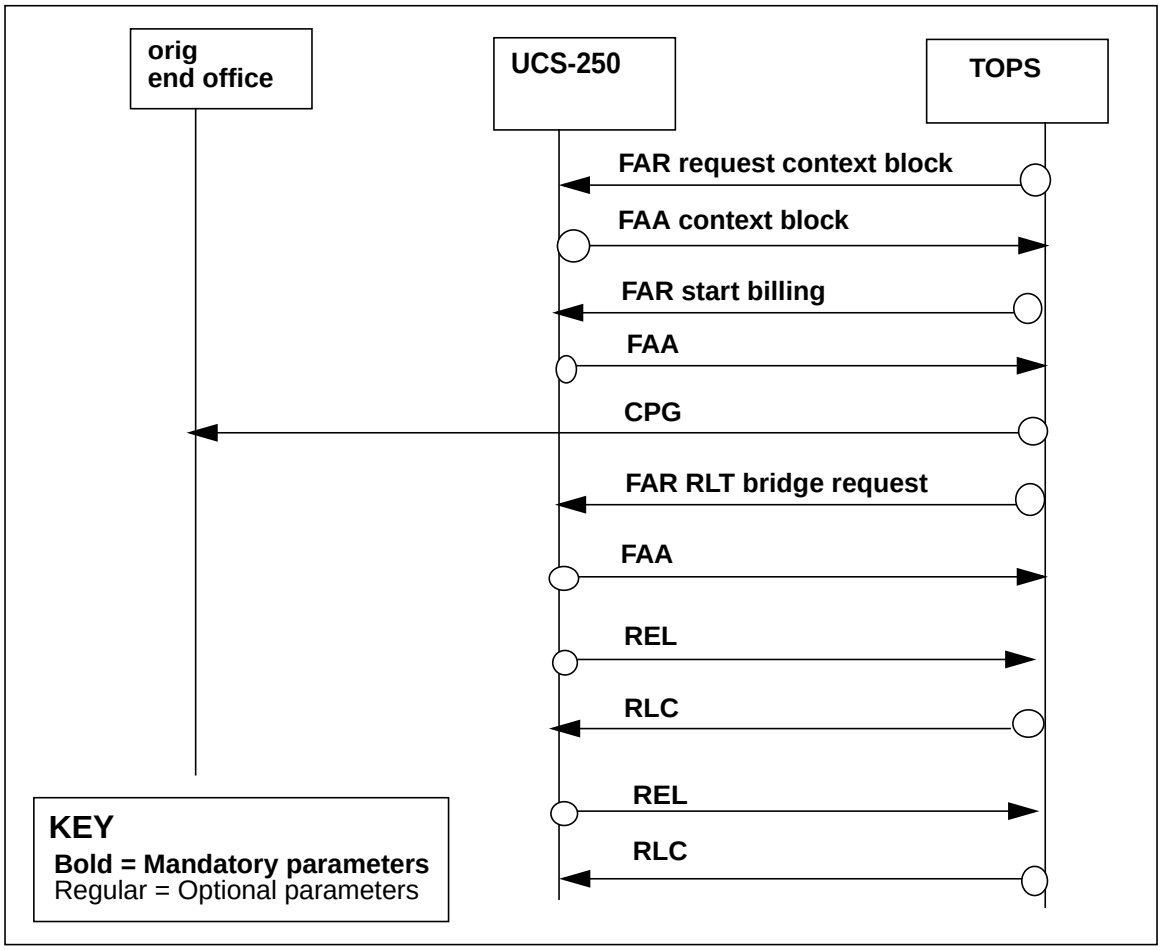
The TOPS14 feature RLT (Variant Two) Enhancements also affects RLT bridge—phase two re-origination. It is enhanced to ensure that on a re-origination connection, connection hold is not requested even though the Service Activation Parameter (SAP) in the incoming IAM might indicate that it is available.

The TOPS14 release enhances RLT bridge (variant two): phase 2 (re-origination) to send a Call Progress (CPG) Message to the originating end office (EO) with a Backwards Call Indicator (BCI) parameter and Optional Backwards Call Indicators (OBCI) parameter. The BCI and OBCI would be received in the ACM and ANM from the called party.

At the present time, the DMS-250 does not support phase two re-origination on Operator Services Network Capability (OSNC).

Refer to Figure 52, “Call flow for RLT bridge (variant two): phase two (re-origination),” on page 197.

Figure 52 Call flow for RLT bridge (variant two): phase two (re-origination)



RLT transfer: phase two

An RLT transfer: phase two is very similar to RLT transfer: phase one. The main difference between them is that phase 2 supports RLT account code billing for non-calling card calls and sub-account billing for calling card calls. Phase two also supports sequence calls that Mechanized Calling Card Service (MCCS)/Automatic Calling Card Service (ACCS) or Operator System Services Advanced Intelligent Network (OSSAIN) service nodes (SNs) handle.

An OSNC call begins at the originating end office (EO) and routes through the UCS-250 to Traffic Operator Position System (TOPS) for operator services to establish the first leg of the call. TOPS prompts the calling party to enter billing information such as the following:

- calling card number
- personal information number (PIN)
- account code digits

An automated system, TOPS operator, or OSSAIN SN validates the information.

When billing is satisfied and the call is ready to float, TOPS sends a Facility Request Message (FAR) to the UCS-250 with a context block. This block carries information that is necessary for a re-origination, which is the repeat routing of a call to the TOPS switch.

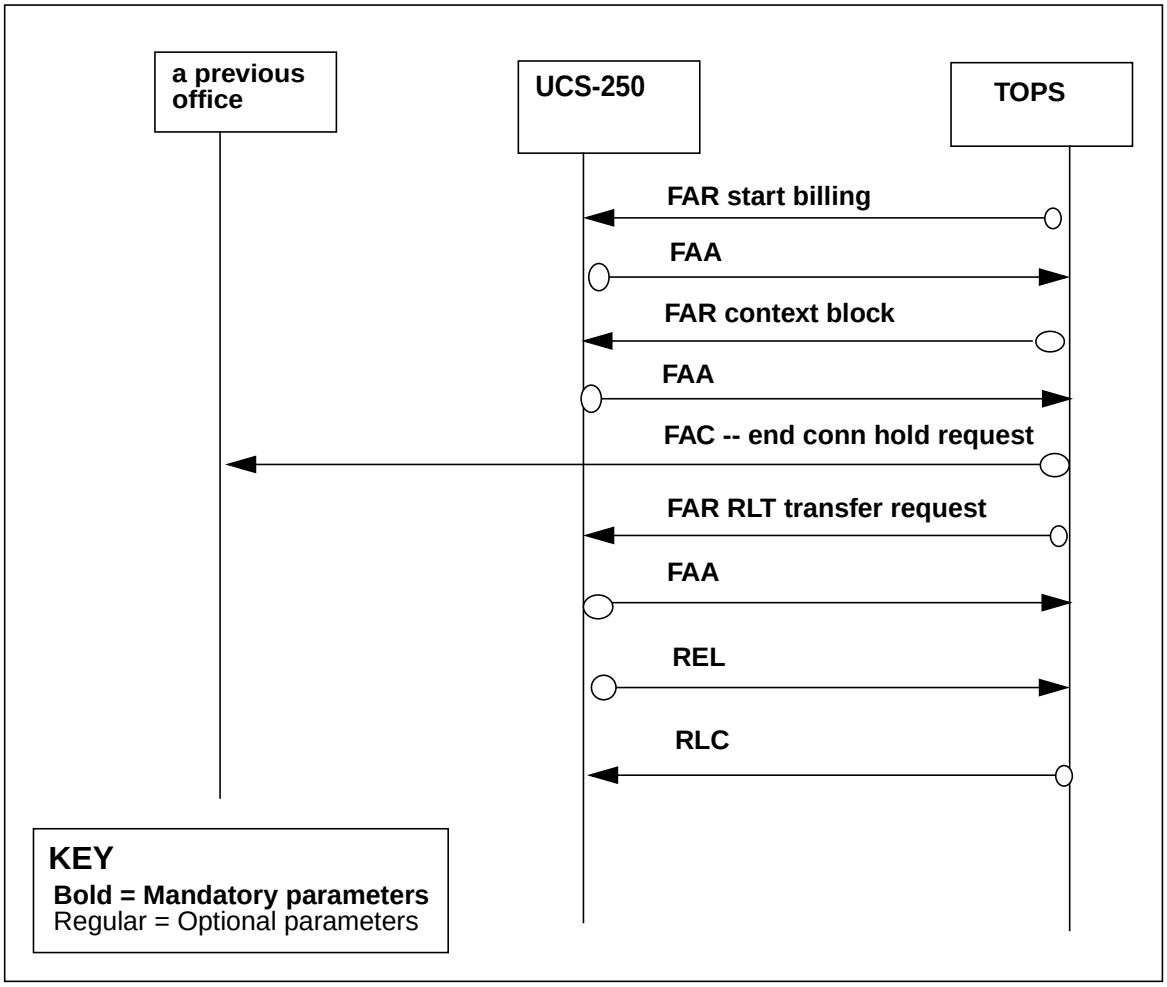
The UCS-250 can accept or reject this context block with a Facility Accept (FAA) message or Facility Reject (FRJ) message, respectively. If the UCS-250 rejects the context block, TOPS completes the call to the terminating EO, and the call remains connected to TOPS. If the UCS-250 accepts the context block, TOPS continues with the process to RLT the call. Then TOPS ends connection hold between TOPS and the originating EO. Connection hold ends when TOPS sends a Facility (FAC) message with a Service Activation Parameter (SAP) containing a hold release request to the originating office.

Next, TOPS signals to the UCS-250 that an RLT transfer is requested. It performs this task by sending a FAR message with the RLT transfer request set in the facility indicator parameter. The UCS-250 can accept or reject this request by signaling to TOPS with a Facility Accept (FAA) or Facility Reject (FRJ), respectively. (Refer to Figure 53, “Call flow for RLT transfer (variant two): phase two,” on page 199.)

If the request is accepted, the UCS-250 sends a REL message to release the ISUP trunk between the UCS-250 and TOPS. Finally, the UCS-250 completes the second leg of the call. If the UCS-250 rejects the request, then TOPS completes the call to the terminating EO. The call remains connected at TOPS.

Connection hold ends regardless of whether the request is accepted. TOPS would usually end connection hold when these calls are completed at TOPS — at this point, billing information has been collected, and there is no reason to recall back to TOPS.

Figure 53 Call flow for RLT transfer (variant two): phase two



RLT transfer (variant two): phase two (re-origination)

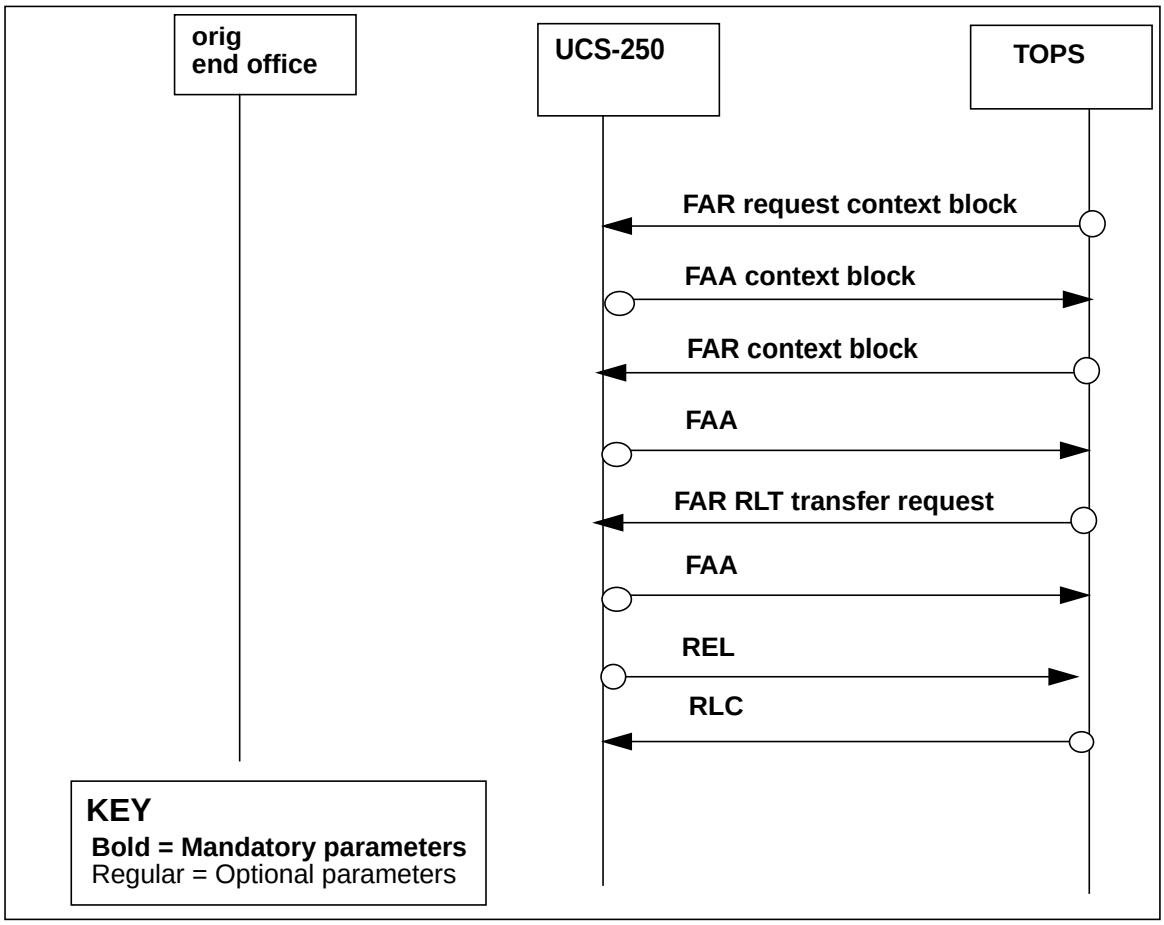
With the RLT transfer (variant two): phase two (re-origination), on receipt of the IAM, TOPS detects that the OSNC call is a re-origination because of the presence of the generic digits parameter. Unlike the initial origination, on a re-origination, TOPS does not request connection hold in the ACM even though the SAP in the incoming IAM might indicate that it is available. Connection hold is not actually available because TOPS ended connection hold when this call was originally in the process of RLT.

Note: Because connection hold is not in effect, it is not necessary for TOPS to send a FAC to the originating end office.

The TOPS14 release changes the call flow for RLT transfer —phase 2 (re-origination) in order to ensure that TOPS does not request connection hold.

Refer to Figure 54, “Call flow for RLT transfer (variant two): phase two (re-origination),” on page 200.

Figure 54 Call flow for RLT transfer (variant two): phase two (re-origination)



The following table shows the supported code points, fields, and messages applying to these call flows for Release Link Trunking (variant two): transfer and bridge.

Table 89 Release Link Trunking (variant two) - REL for bridge and transfer

REL parameters	FIeld	Expected values for this call flow
Message type		REL
Cause indicators	location	user
	spare	spare
	coding standard	CCITT standard
	extension indicator	octet continues through the next octet
	cause value	<all values>
	extension indicator	last octet

Table 90 Release Link Trunking (variant two) - RLC for transfer and bridge

RLC parameters	FIeld	Expected values for this call flow
Message type		RLC

Additional information about TOPS14 RLT (Variant Two) Enhancements

The UCS-250 will not forward the OBCI parameter encoded in the ACM sent by TOPS through the UCS-250 to the previous office.

Connection hold is not in effect on sequence calls.

When the UCS-250 completes an OSNC call between two EOs as a result of an RLT transfer, the terminating EO sends an ANM to the originating EO. This occurrence does not agree with GR-1144 or GR-1277. The UCS-250 is supposed to formulate and send a CPG message to the originating EO based on the ANM message received from the terminating EO. However, this change would require development in the UCS-250.

When the UCS-250 completes an OSNC call resulting from the RLT transfer request, the UCS-250 might include an SAP in the outgoing IAM indicating availability of connection hold. There is a recommendation to change the UCS-250 software to not include this SAP in the outgoing IAM—this leg of the call is not an operator call.

According to specifications of Telcordia, formerly Bellcore, a call is not considered answered unless answered for more than two seconds.When a call is floated from an operator or node, it takes less than two seconds for the process of RLT to occur. Timing in the DMS-250 switch starts when the FAR message is received to initiate RLT. All conversation timing will be recorded in the DMS-250.

Chapter 3: Example Flows

This chapter provides example call flows for various operator services calls. It uses the signaling flows documented in “Chapter 2: Signaling flows” on page 47 as building blocks for the example call flows presented in this chapter.

The following table provides an alphabetical list of the example call flows and a reference page for each.

Table 91 Example call flows

Example call flows	Page number
coin (ccf), call completion, calling card	page 263
coin (ccf), call completion, collect	page 271
coin (ccf), call completion, ring back	page 274
coin (ccf), call completion, sent paid	page 255
coin (ccf), call completion, sent paid with operator request	page 259
coin (ccf), call completion, third number	page 266
coin (ccf), directory assistance, calling card	page 279
coin (ccf), directory assistance, sent paid	page 278
coin (ccf), directory assistance, third number	page 282
coin (ccf), directory assistance with call completion	page 285
coin (ccf), transfer to carrier	page 290
coin (cdf), call completion, calling card	page 303
coin (cdf), call completion, collect	page 311
coin (cdf), call completion, ring back	page 314
coin (cdf), call completion, sent paid	page 293
coin (cdf), call completion, sent paid with operator request	page 297

Table 91 Example call flows

Example call flows	Page number
coin (cdf), call completion, third number	page 306
coin (cdf), directory assistance, calling card	page 320
coin (cdf), directory assistance, sent paid	page 319
coin (cdf), directory assistance, third number	page 323
coin (cdf), directory assistance with call completion	page 326
non-coin, call completion, calling card	page 207
non-coin, call completion, collect	page 215
non-coin, call completion, notify	page 218
non-coin, call completion, ring back	page 221
non-coin, call completion, sent paid	page 206
non-coin, call completion, third number	page 210
non-coin, call completion, time and charges	page 224
non-coin, directory assistance, calling card	page 228
non-coin, directory assistance, sent paid	page 227
non-coin, directory assistance, third number	page 231
non-coin, directory assistance with call completion	page 234
non-coin, directory assistance with call completion with RLT (variant one)	page 242
non-coin, directory assistance with call completion, RLT bridge (variant two): phase one	page 238
non-coin, directory assistance with call completion, RLT transfer (variant two): phase one	page 240
non-coin, directory assistance with call completion, RLT bridge (variant two): phase two	page 242
non-coin, directory assistance with call completion, RLT bridge (variant two): phase two (re-origination)	page 245
non-coin, directory assistance with call completion, RLT transfer (variant two): phase two	page 246
non-coin, directory assistance with call completion, RLT transfer (variant two): phase two (re-origination)	page 248
non-coin, terminating inwards	page 253

Table 91 Example call flows

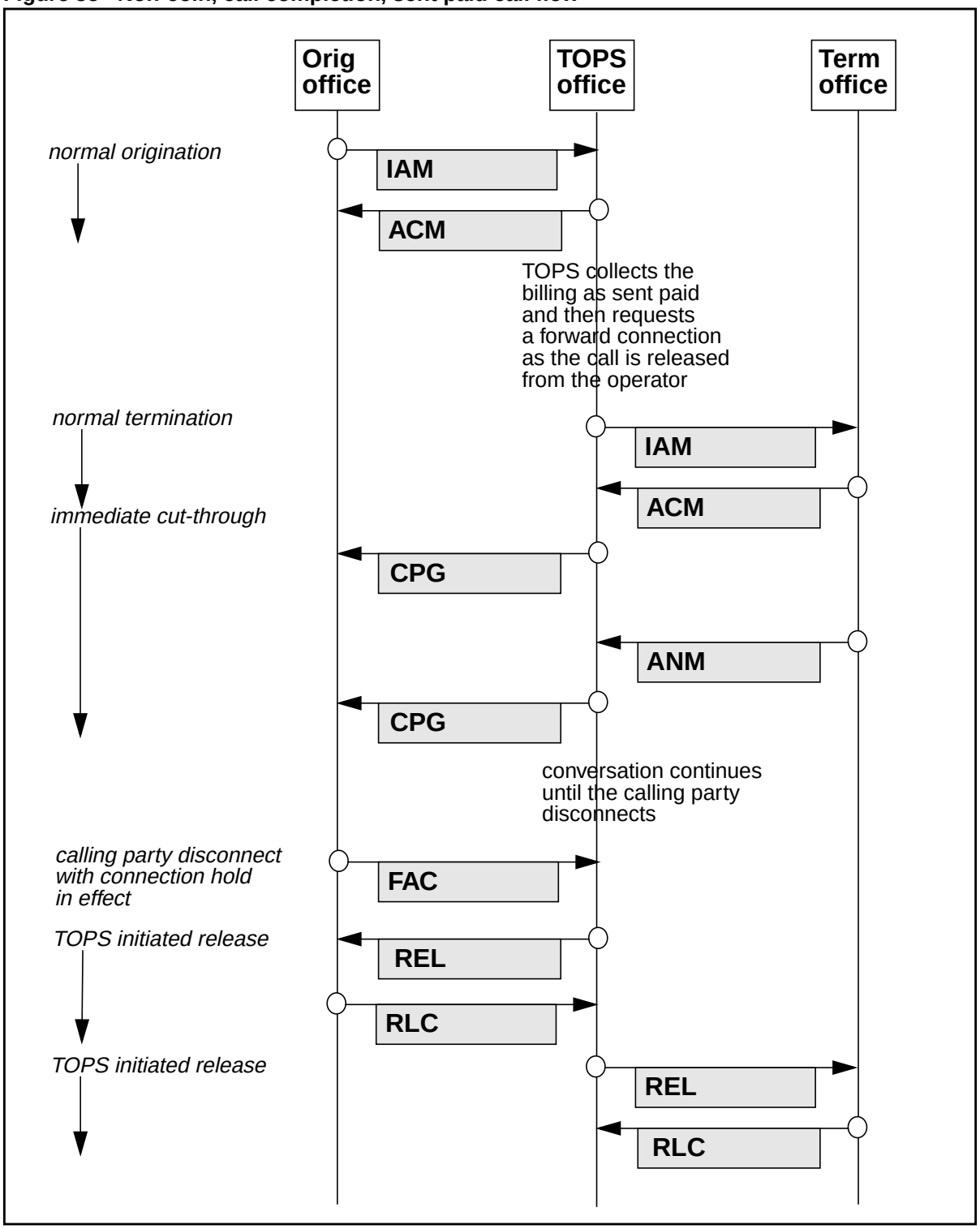
Example call flows	Page number
non-coin, transfer to carrier	page 250
operator, originating inwards	page 334
other, intercept	page 336
other, intercept with call completion	page 337
other, not served by TOPS	page 339

Non-coin originating type

Call completion service

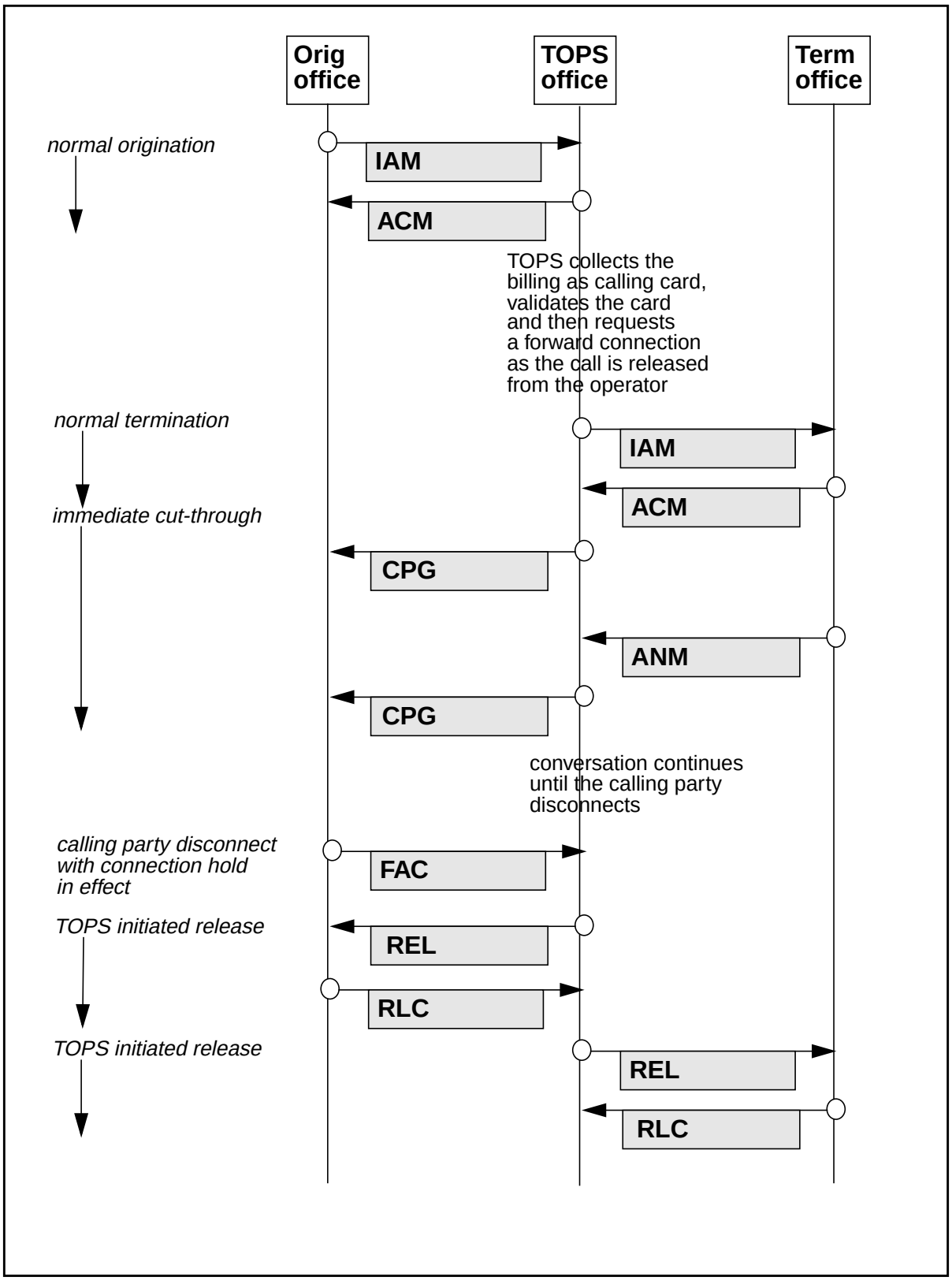
Sent paid

Figure 55 Non-coin, call completion, sent paid call flow



Calling card

Figure 56 Non-coin, call completion, calling card call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as calling card, validates the card and then requests a forward connection as the call is released from the operator
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Third number

Figure 57 Non-coin, call completion, third number call flow

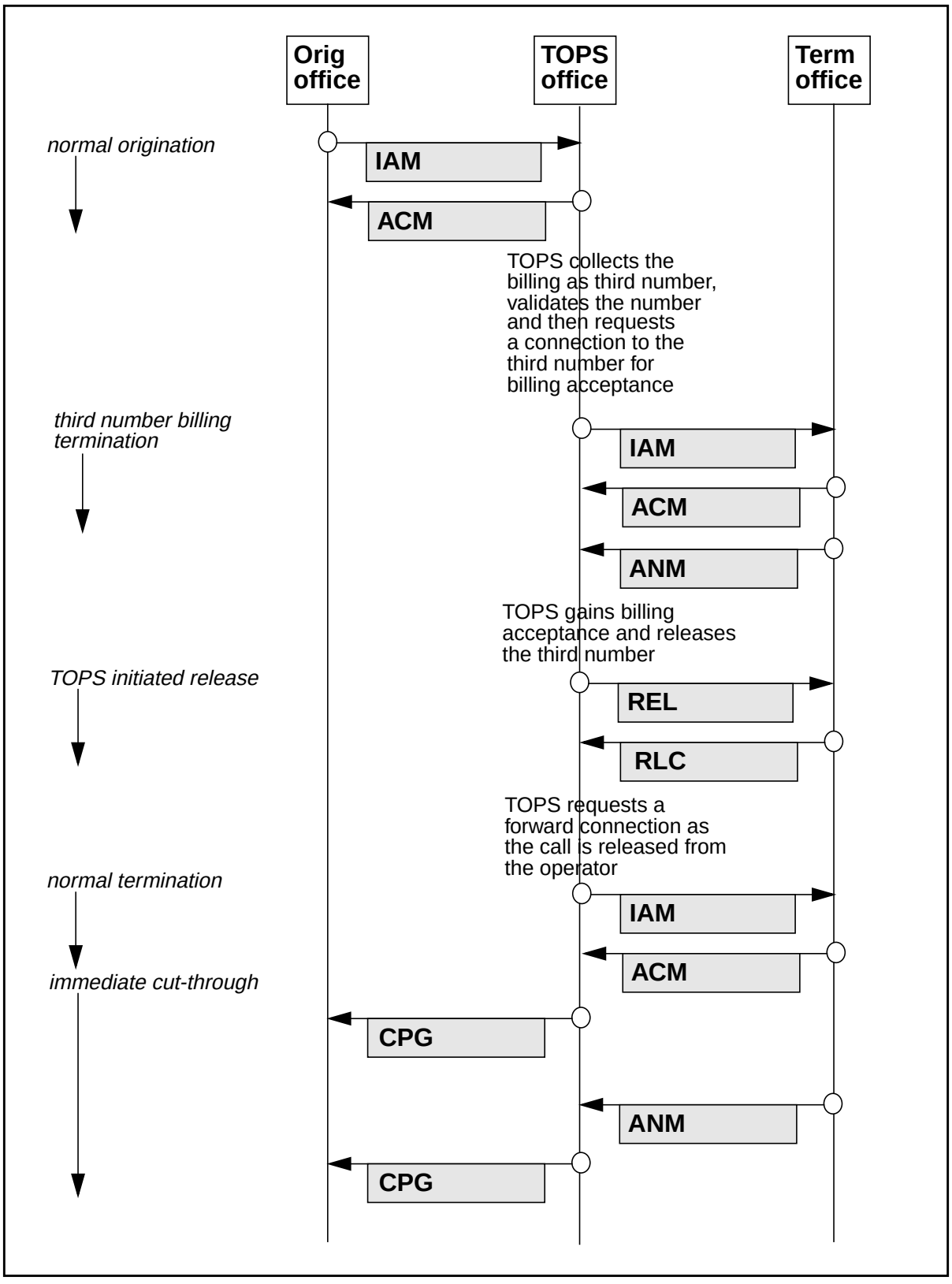
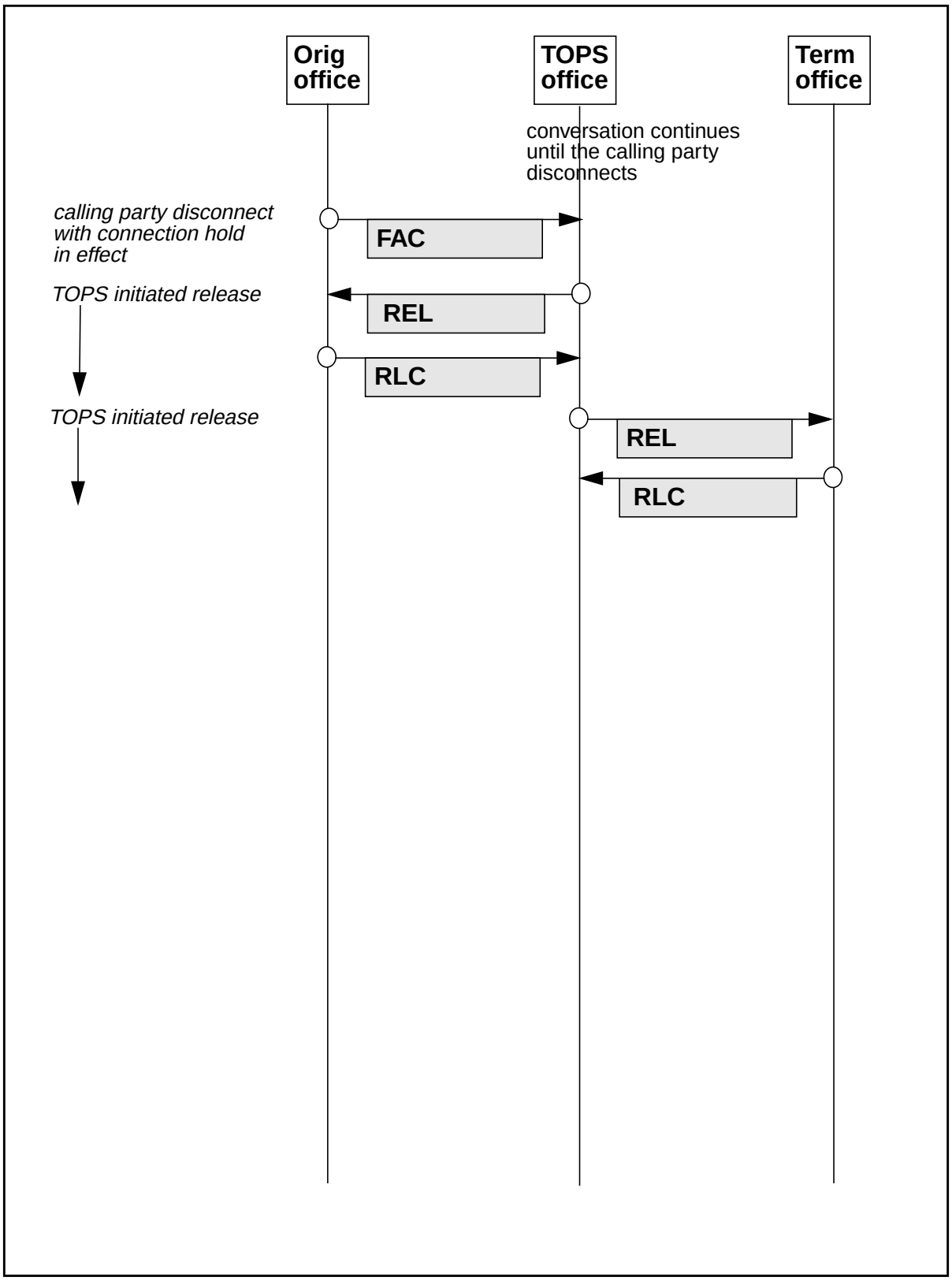
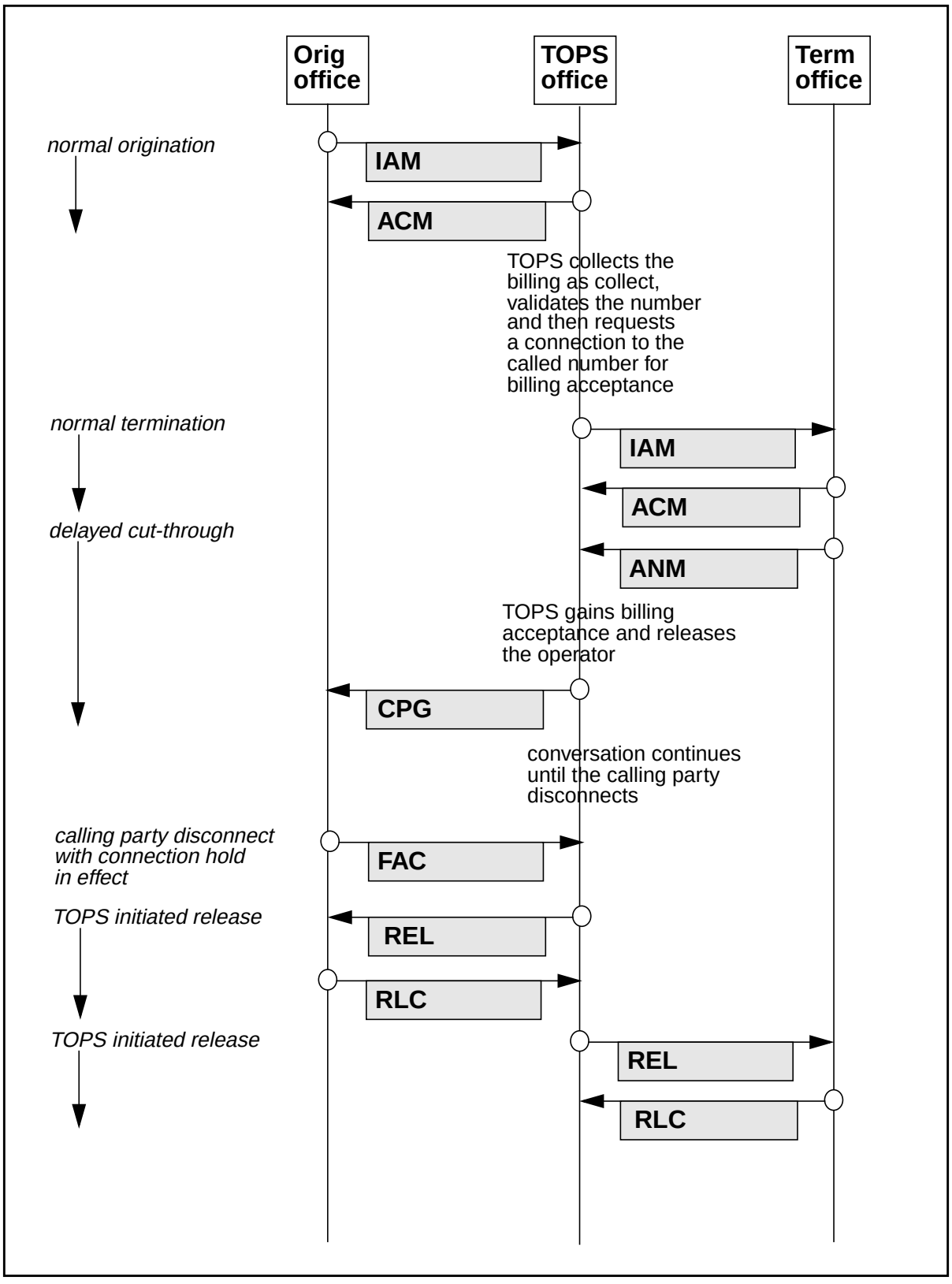

Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as third number, validates the number and then requests a connection to the third number for billing acceptance
third number billing termination
IAM
ACM
ANM
TOPS gains billing acceptance and releases the third number
TOPS initiated release
REL
RLC
TOPS requests a forward connection as the call is released from the operator
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG

Figure 58 Non-coin, call completion, third number call flow (continued)


Orig office
TOPS office
Term office
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

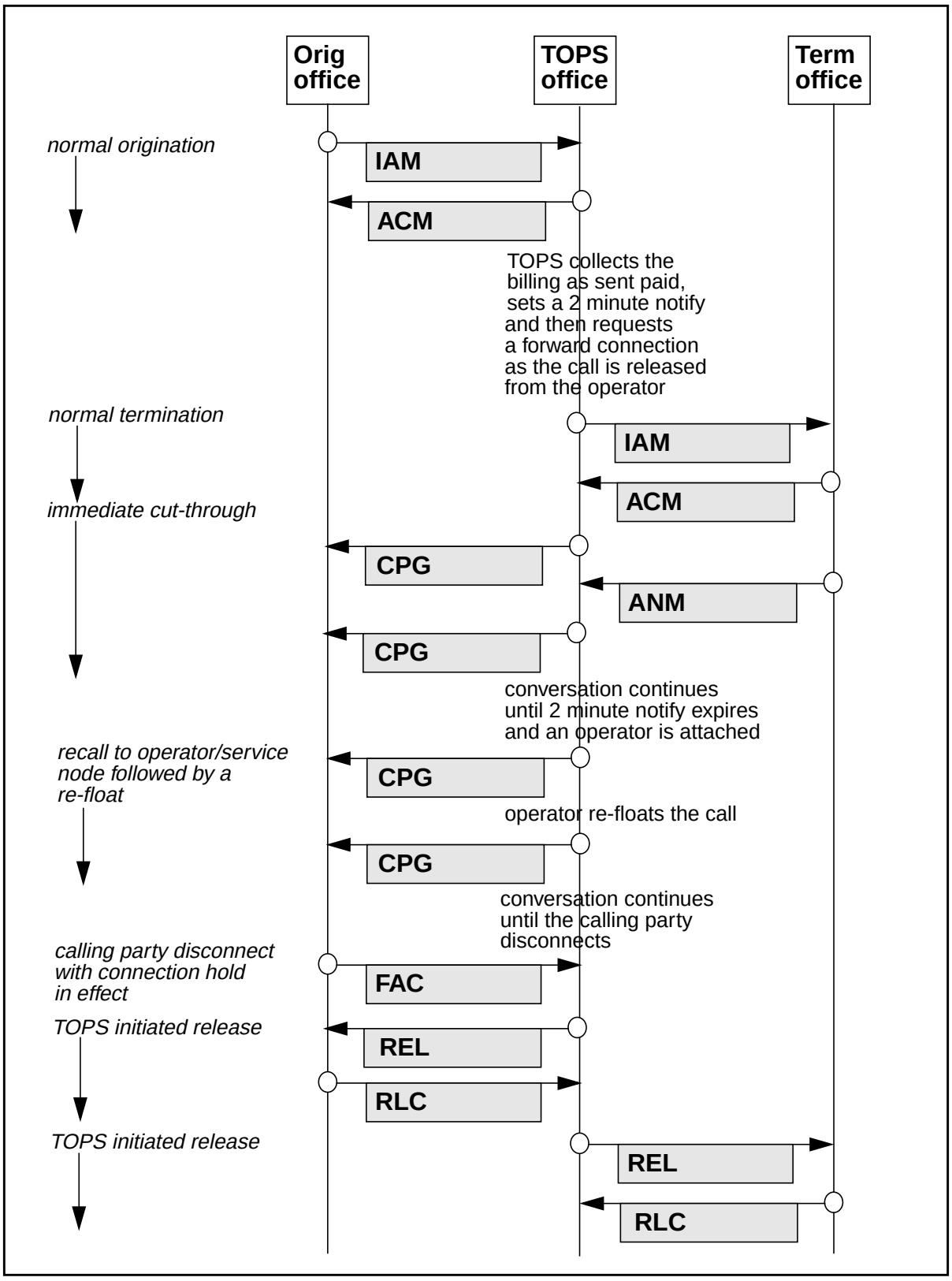
Collect

Figure 59 Non-coin, call completion, collect call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
normal termination
IAM
ACM
delayed cut-through
ANM
TOPS gains billing acceptance and releases the operator
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

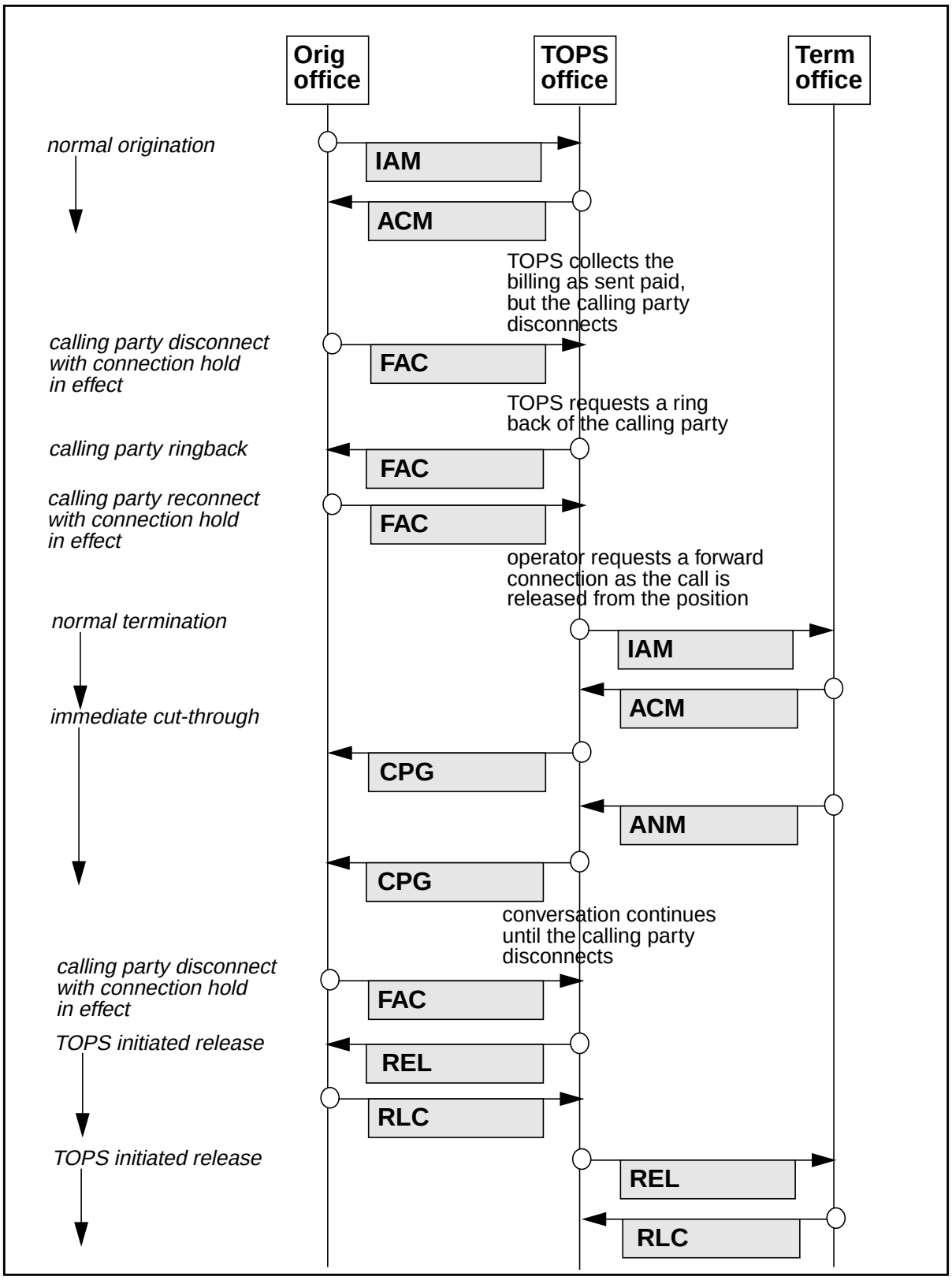
Notify

Figure 60 Non-coin, call completion, notify call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as sent paid, sets a 2 minute notify and then requests a forward connection as the call is released from the operator
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG
conversation continues until 2 minute notify expires and an operator is attached
recall to operator/service node followed by a re-float
CPG
operator re-floats the call
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

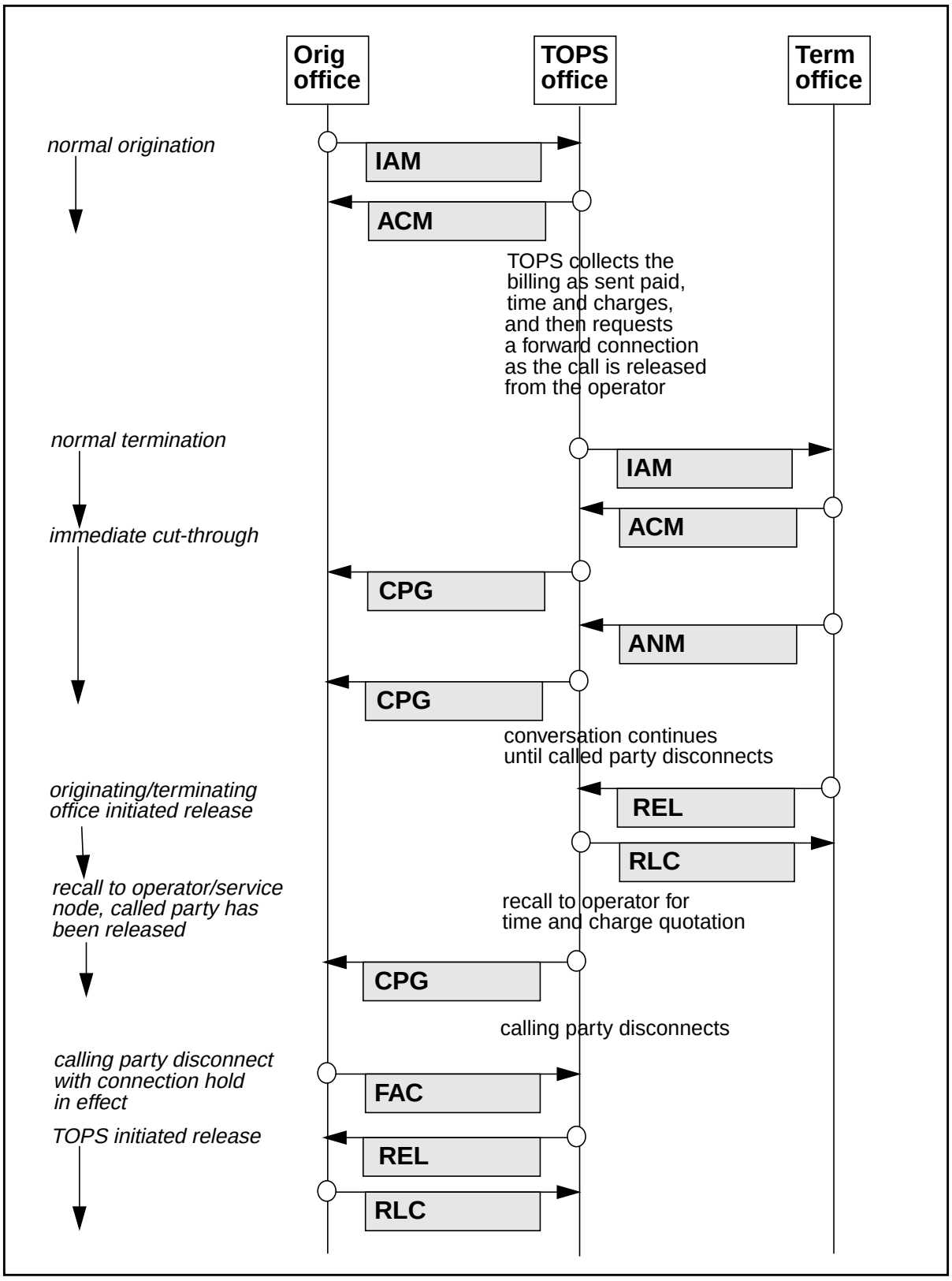
Ring back

Figure 61 Non-coin, call completion, ring back call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as sent paid, but the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS requests a ring back of the calling party
calling party ringback
FAC
calling party reconnect with connection hold in effect
FAC
operator requests a forward connection as the call is released from the position
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Time and charges

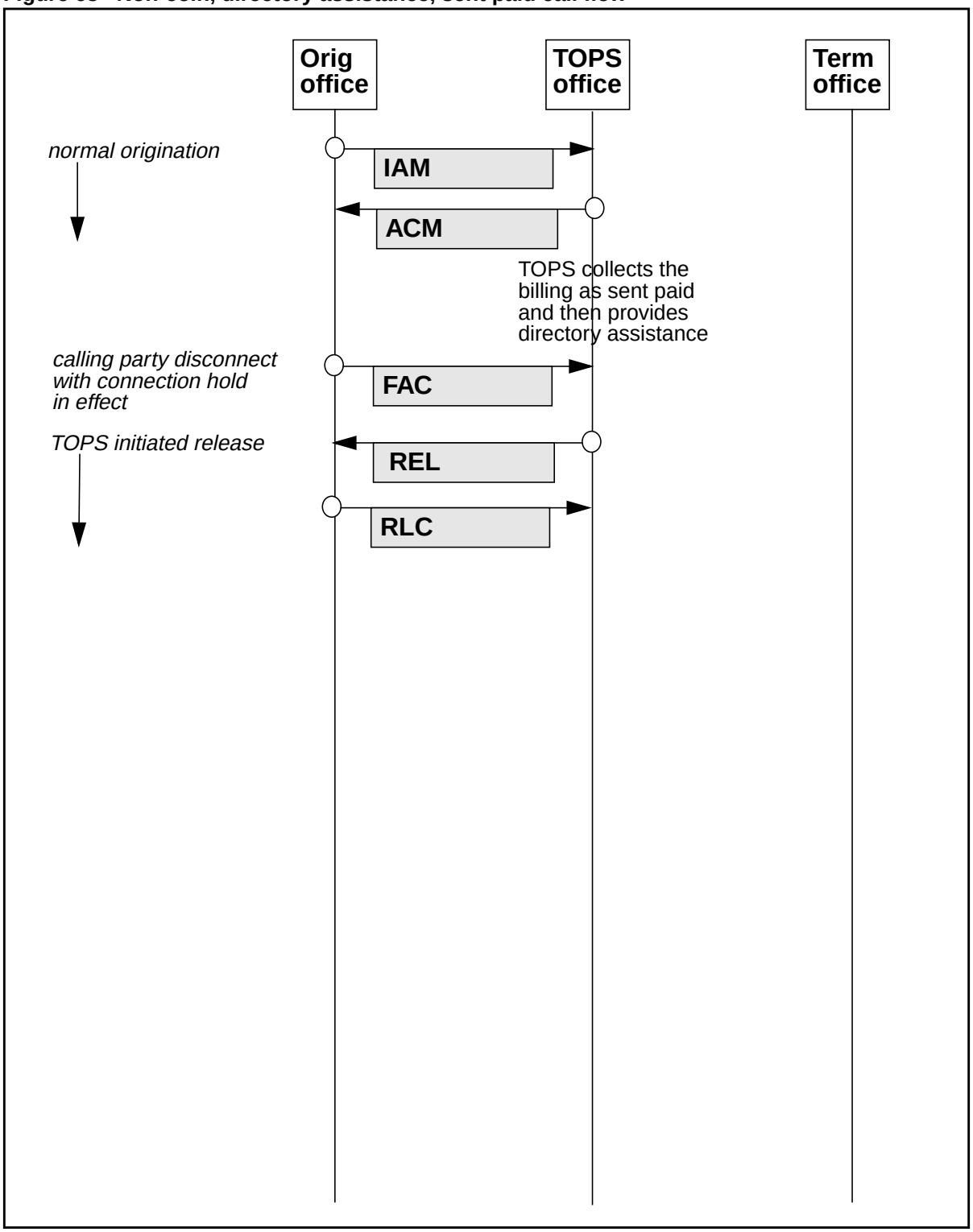
Figure 62 Non-coin, call completion, time and charges call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as sent paid, time and charges, and then requests a forward connection as the call is released from the operator
normal termination
IAM
immediate cut-through
ACM
CPG
ANM
CPG
conversation continues until called party disconnects
originating/terminating office initiated release
REL
RLC
recall to operator/service node, called party has been released
recall to operator for time and charge quotation
CPG
calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Directory assistance service

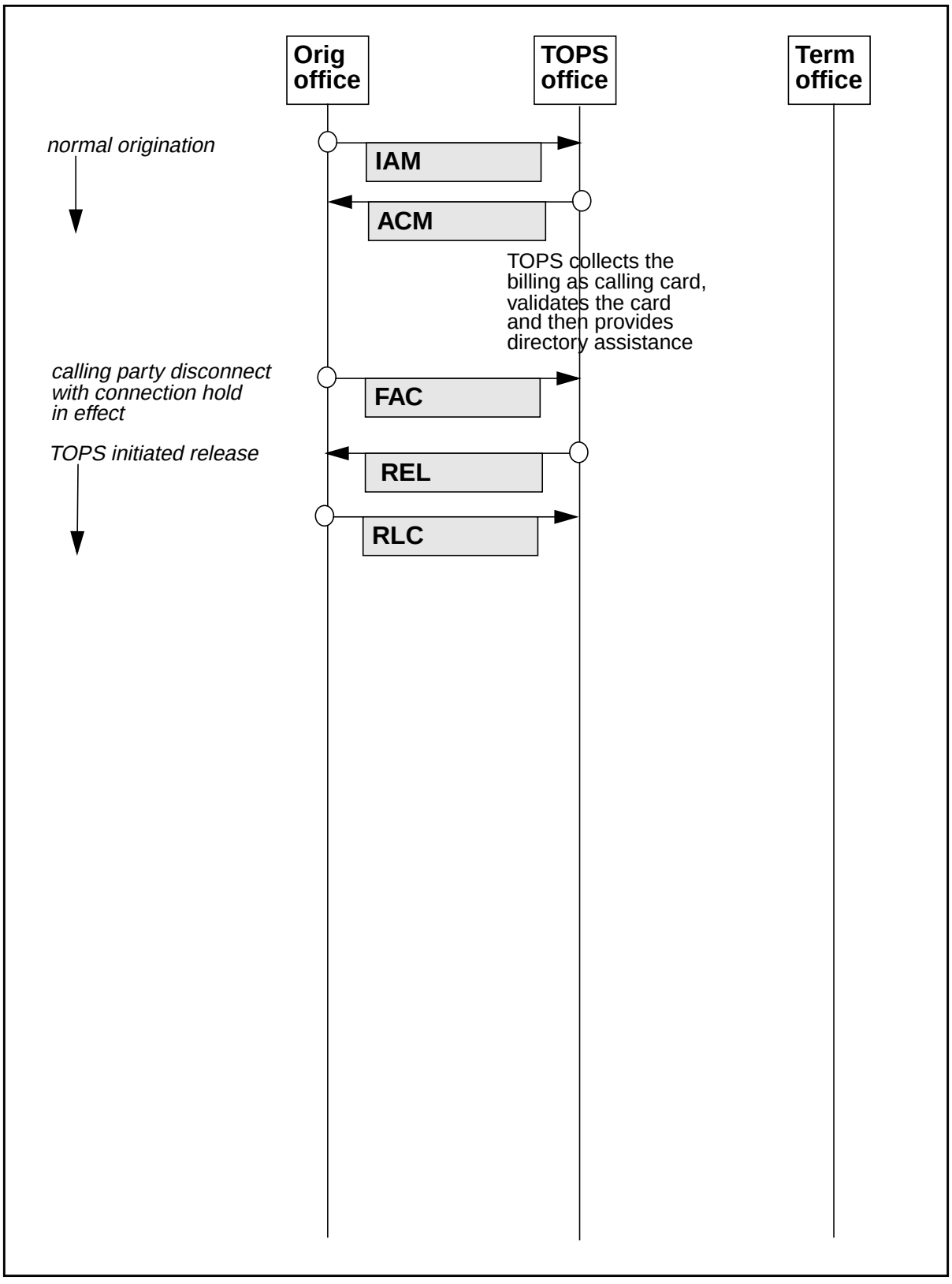
Sent paid

Figure 63 Non-coin, directory assistance, sent paid call flow



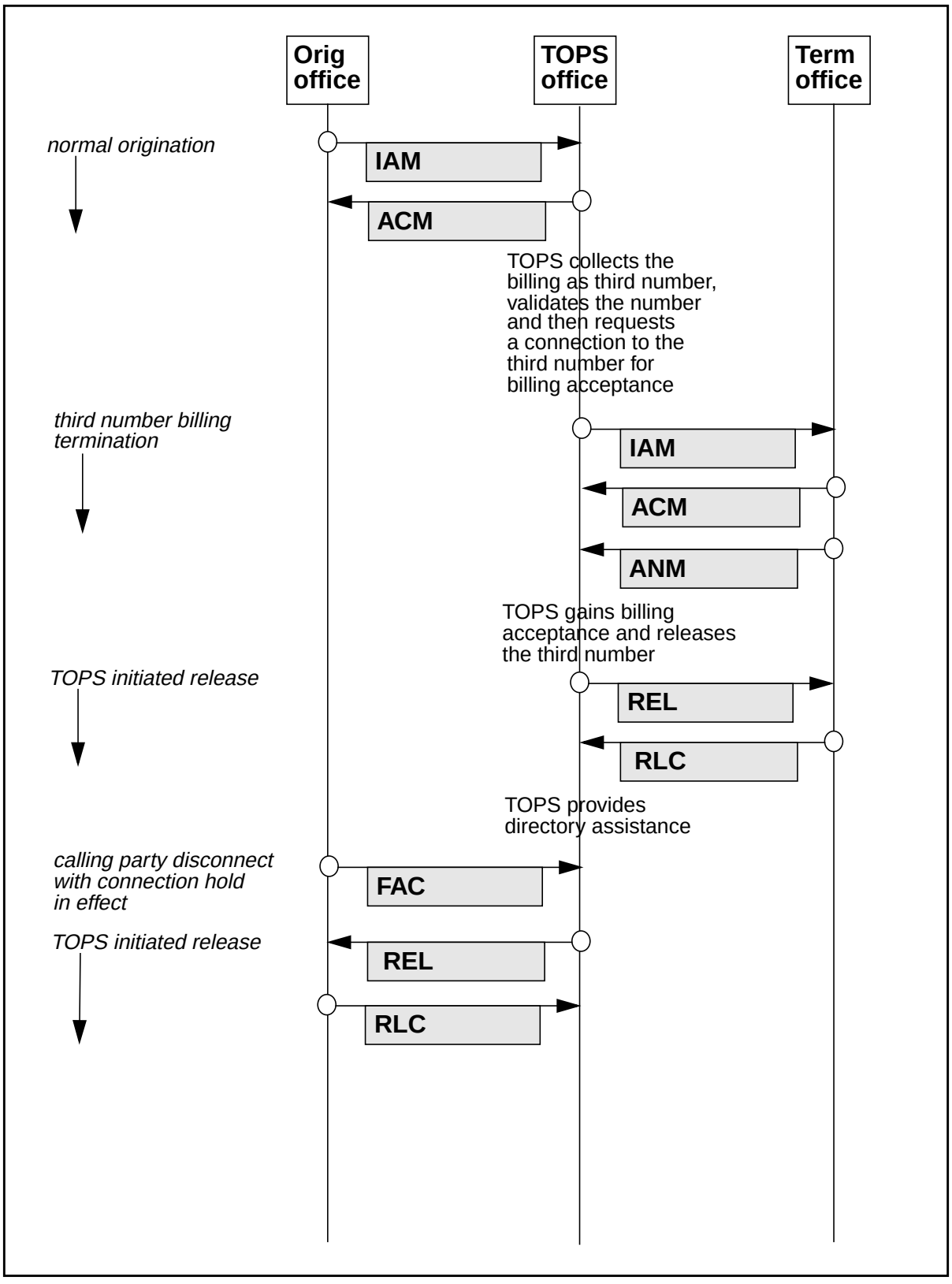
Calling card

Figure 64 Non-coin, directory assistance, calling card call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as calling card, validates the card and then provides directory assistance
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Third number

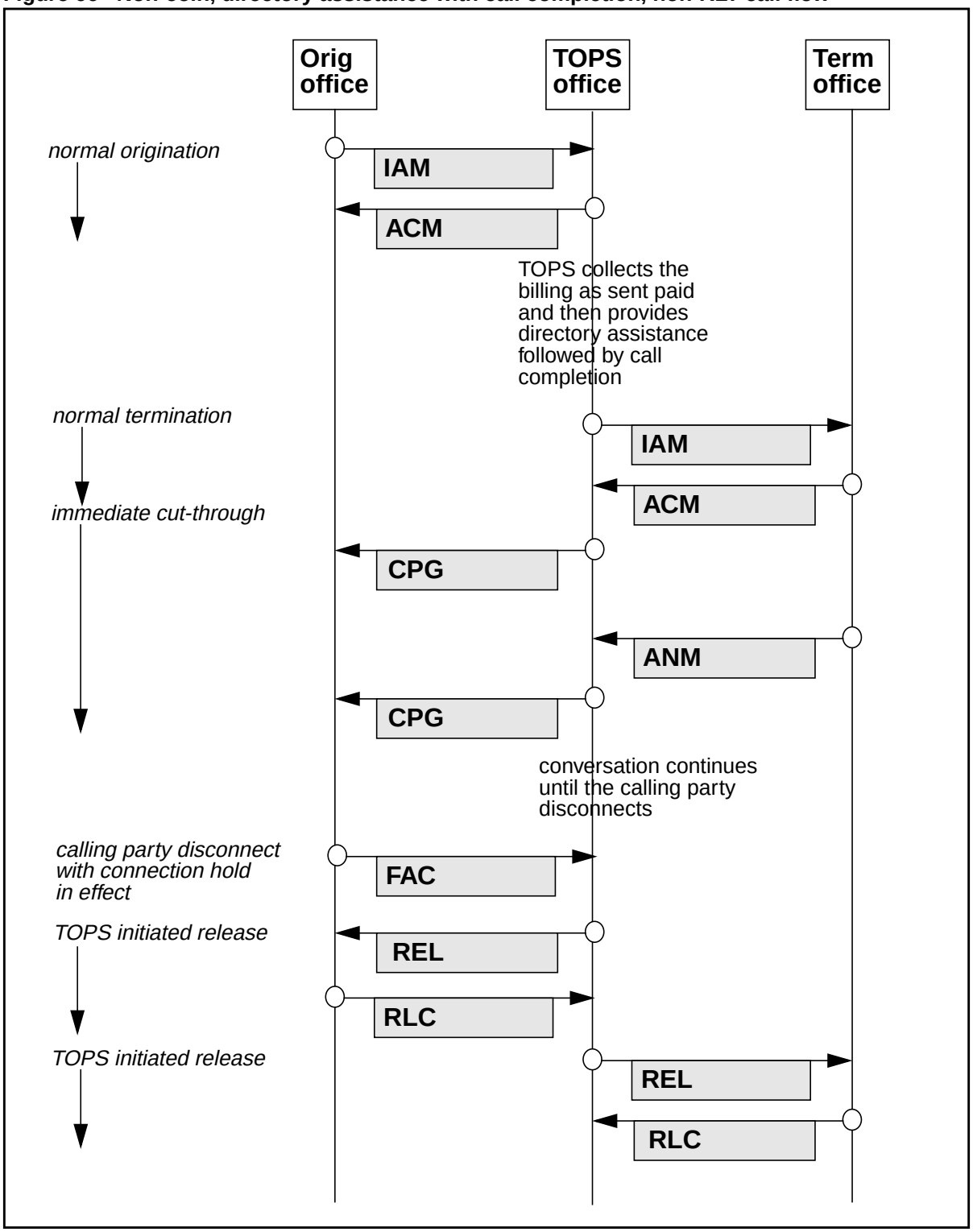
Figure 65 Non-coin, directory assistance, third number call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as third number, validates the number and then requests a connection to the third number for billing acceptance
third number billing termination
IAM
ACM
ANM
TOPS gains billing acceptance and releases the third number
TOPS initiated release
REL
RLC
TOPS provides directory assistance
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Directory assistance with call completion service

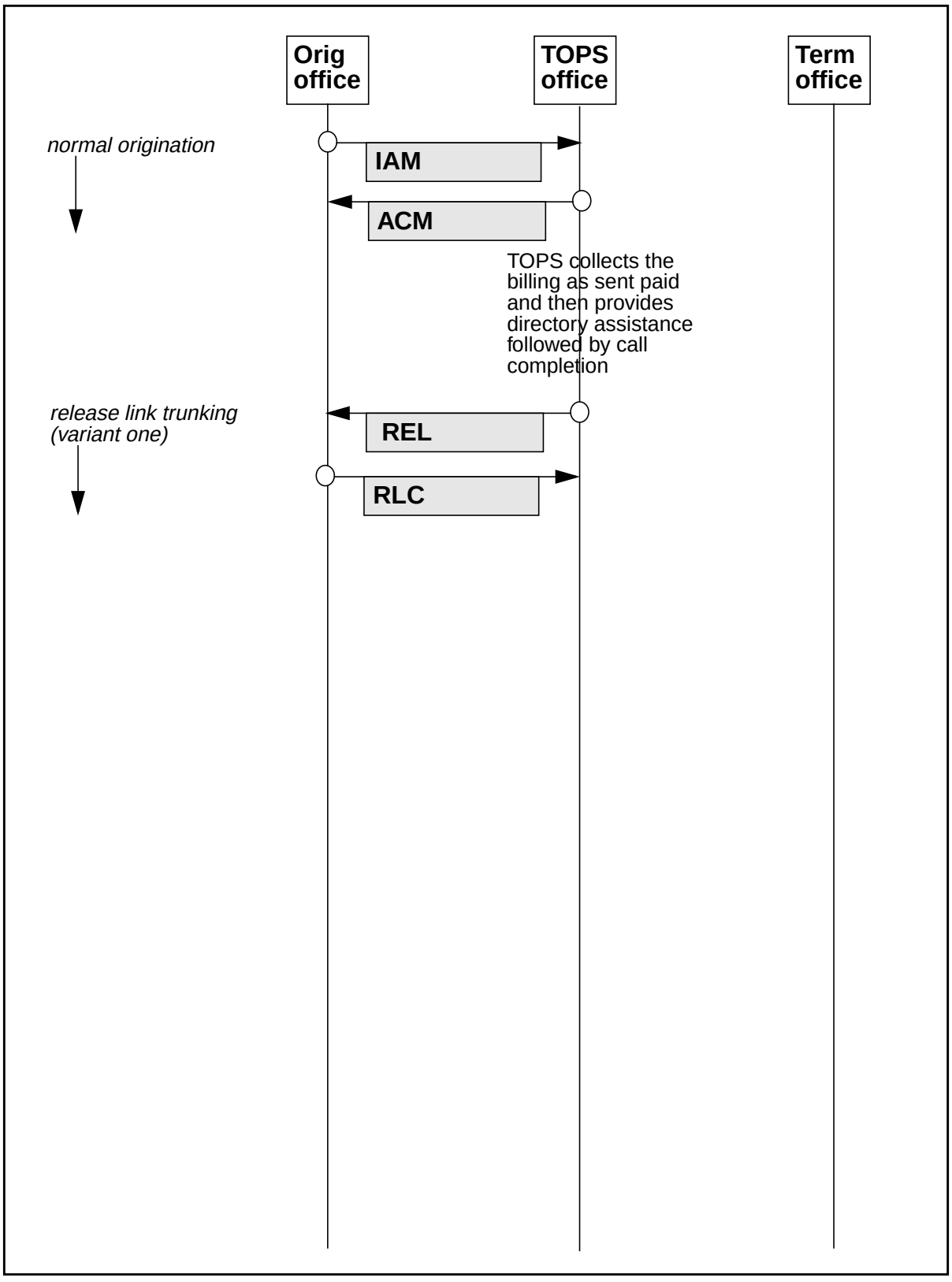
Non-RLT (variant one)

Figure 66 Non-coin, directory assistance with call completion, non-RLT call flow



RLT (variant one)

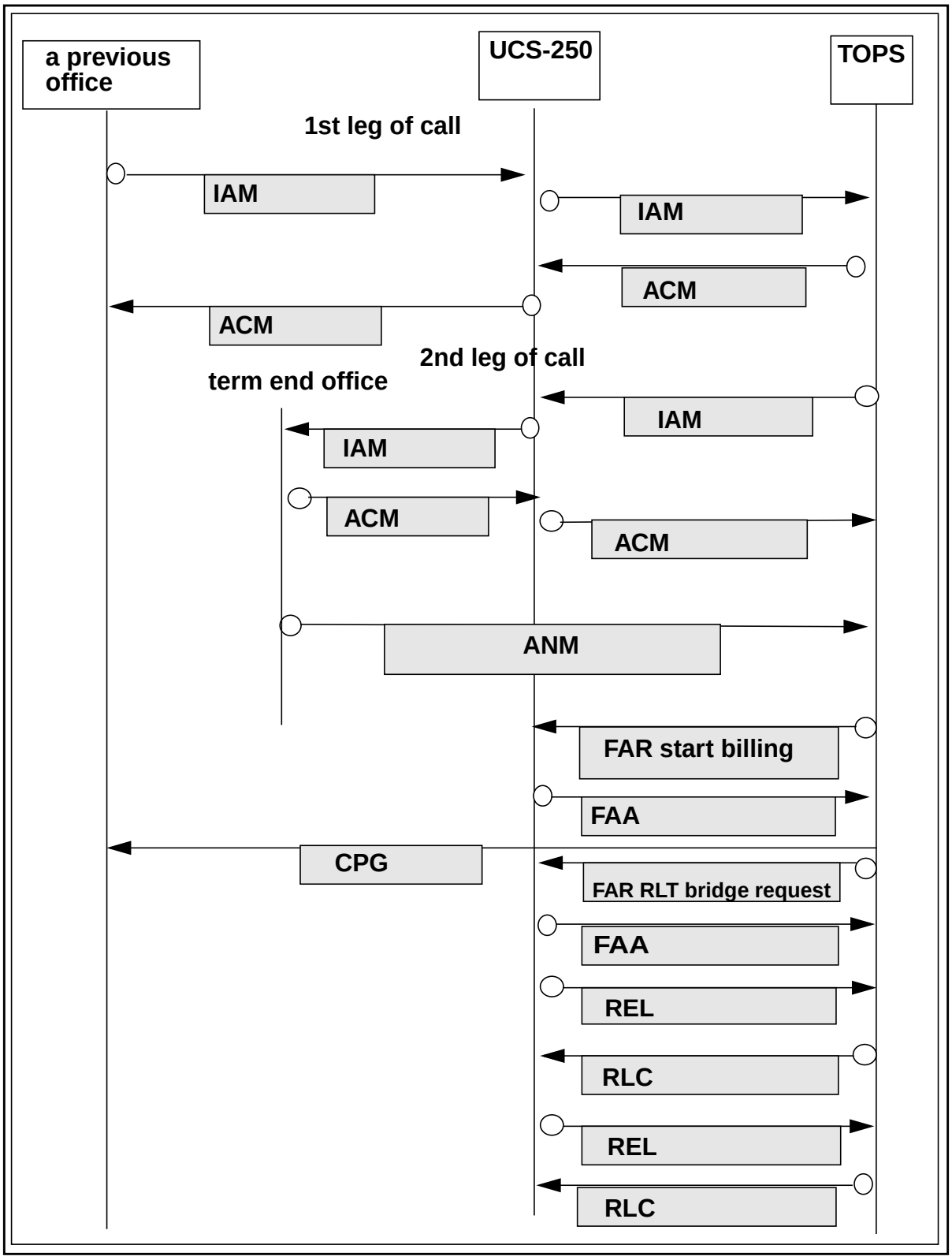
Figure 67 Non-coin, directory assistance with call completion, RLT (variant one) call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as sent paid and then provides directory assistance followed by call completion
release link trunking (variant one)
REL
RLC

RLT bridge (variant two): phase one

Figure 68 Non-coin, directory assistance with call completion, RLT bridge (variant two): phase

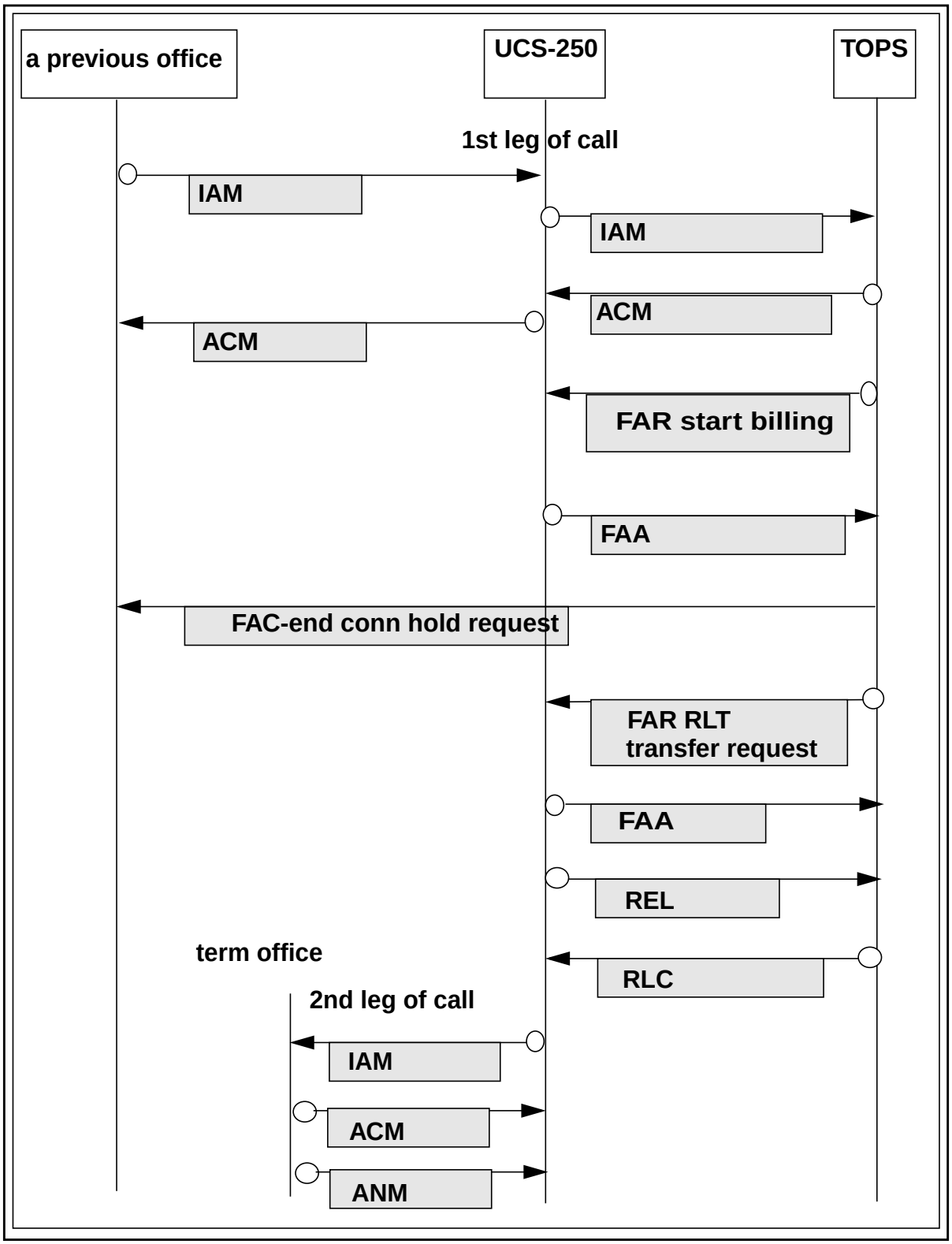
one


a previous office
UCS-250
TOPS
1st leg of call
IAM
IAM
ACM
ACM
2nd leg of call
term end office
IAM
IAM
ACM
ACM
ANM
FAR start billing
FAA
CPG
FAR RLT bridge request
FAA
REL
RLC
REL
RLC

RLT transfer (variant two): phase one

Figure 69 Non-coin, directory assistance with call completion, RLT transfer (variant two): phase

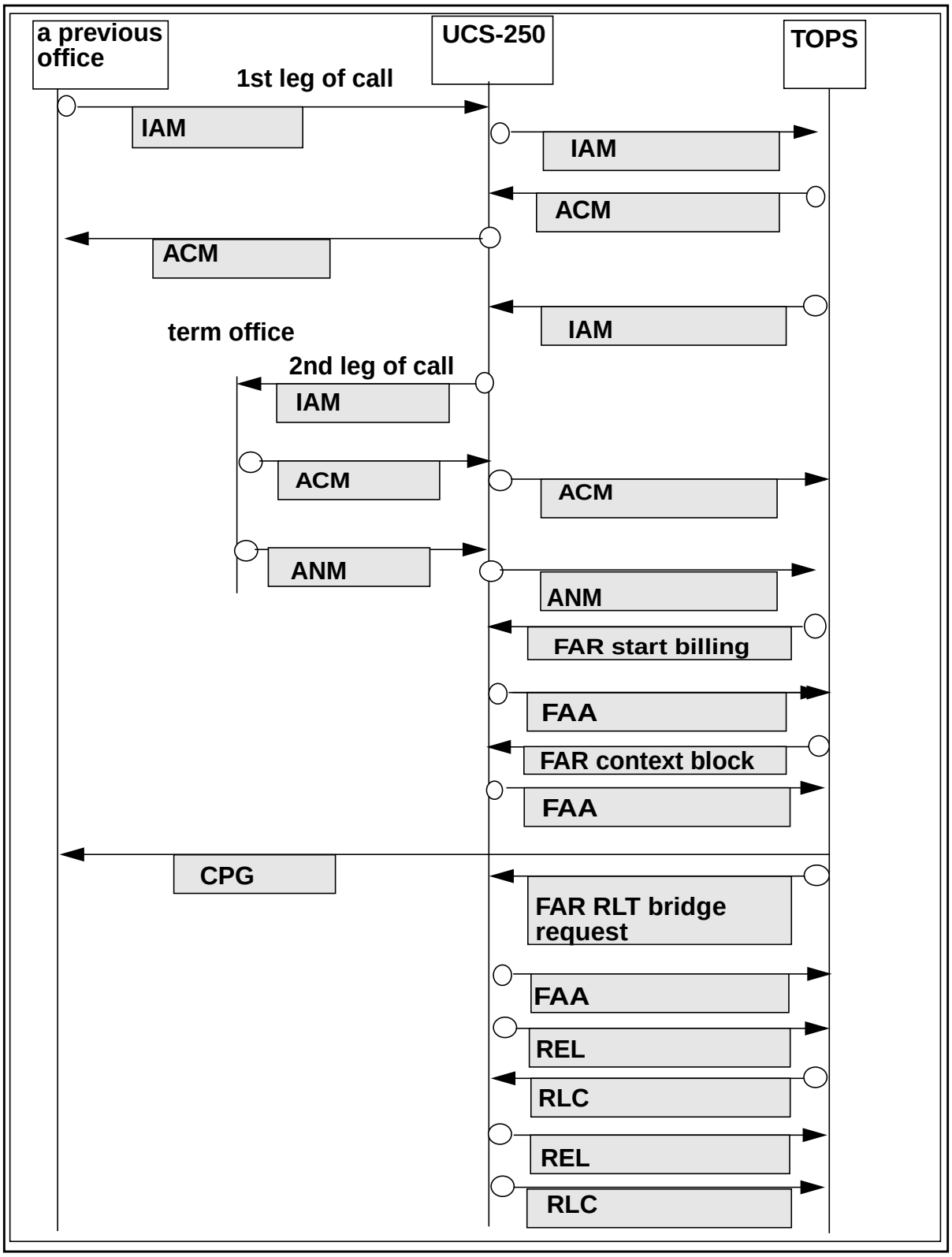
one


a previous office
UCS-250
TOPS
1st leg of call
IAM
IAM
ACM
ACM
FAR start billing
FAA
FAC-end conn hold request
FAR RLT
transfer request
FAA
REL
RLC
term office
2nd leg of call
IAM
ACM
ANM

RLT bridge (variant two): phase two

Figure 70 Non-coin, directory assistance with call completion, RLT bridge (variant two): phase

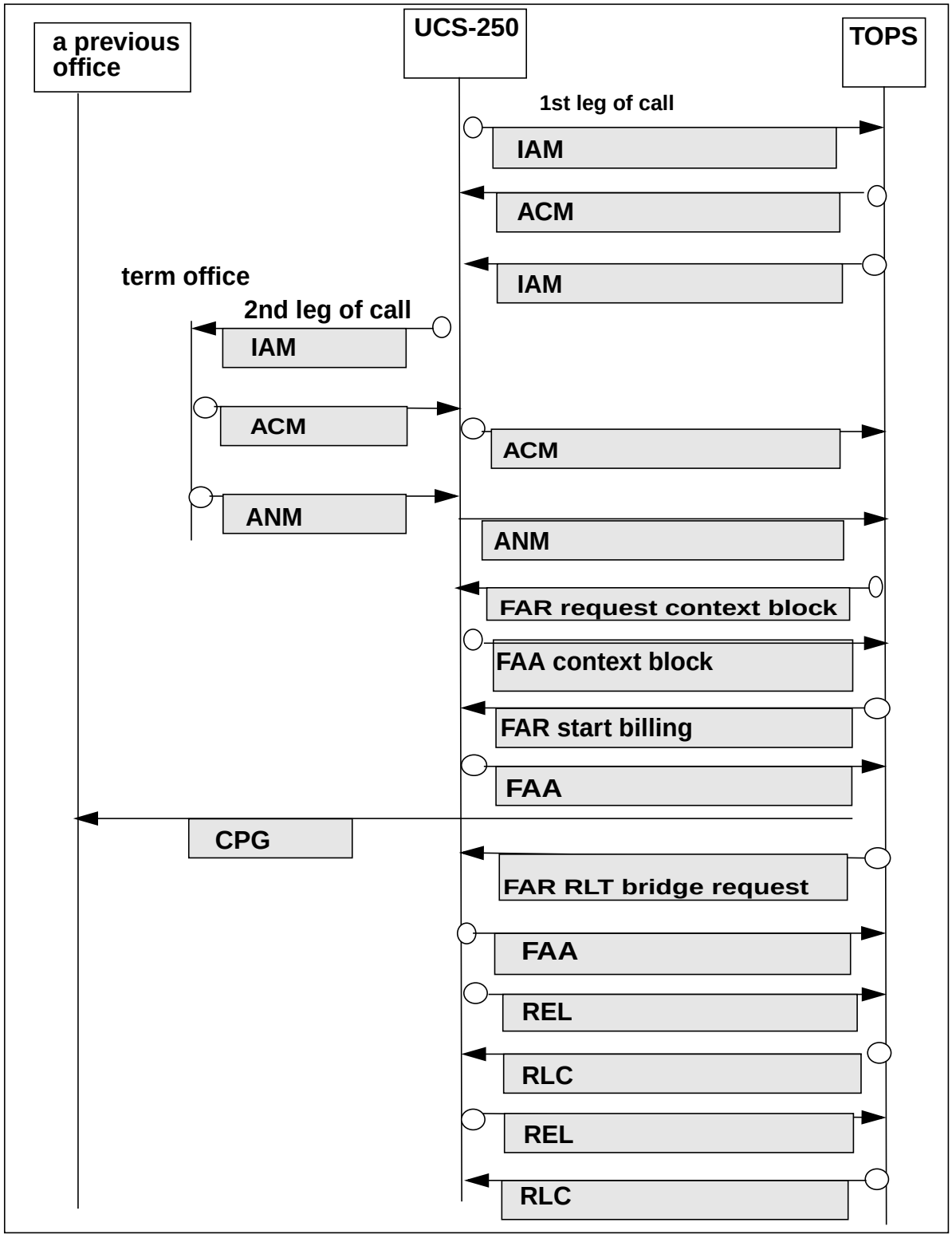
two


a previous office
UCS-250
TOPS
1st leg of call
IAM
IAM
ACM
ACM
IAM
term office
2nd leg of call
IAM
ACM
ACM
ANM
ANM
FAR start billing
FAA
FAR context block
FAA
CPG
FAR RLT bridge request
FAA
REL
RLC
REL
RLC

RLT bridge (variant two): phase two (re-origination)

Note: The DMS-250 currently does not support Operator Services Network Capability (OSNC) protocol, which is used for phase two re-origination.

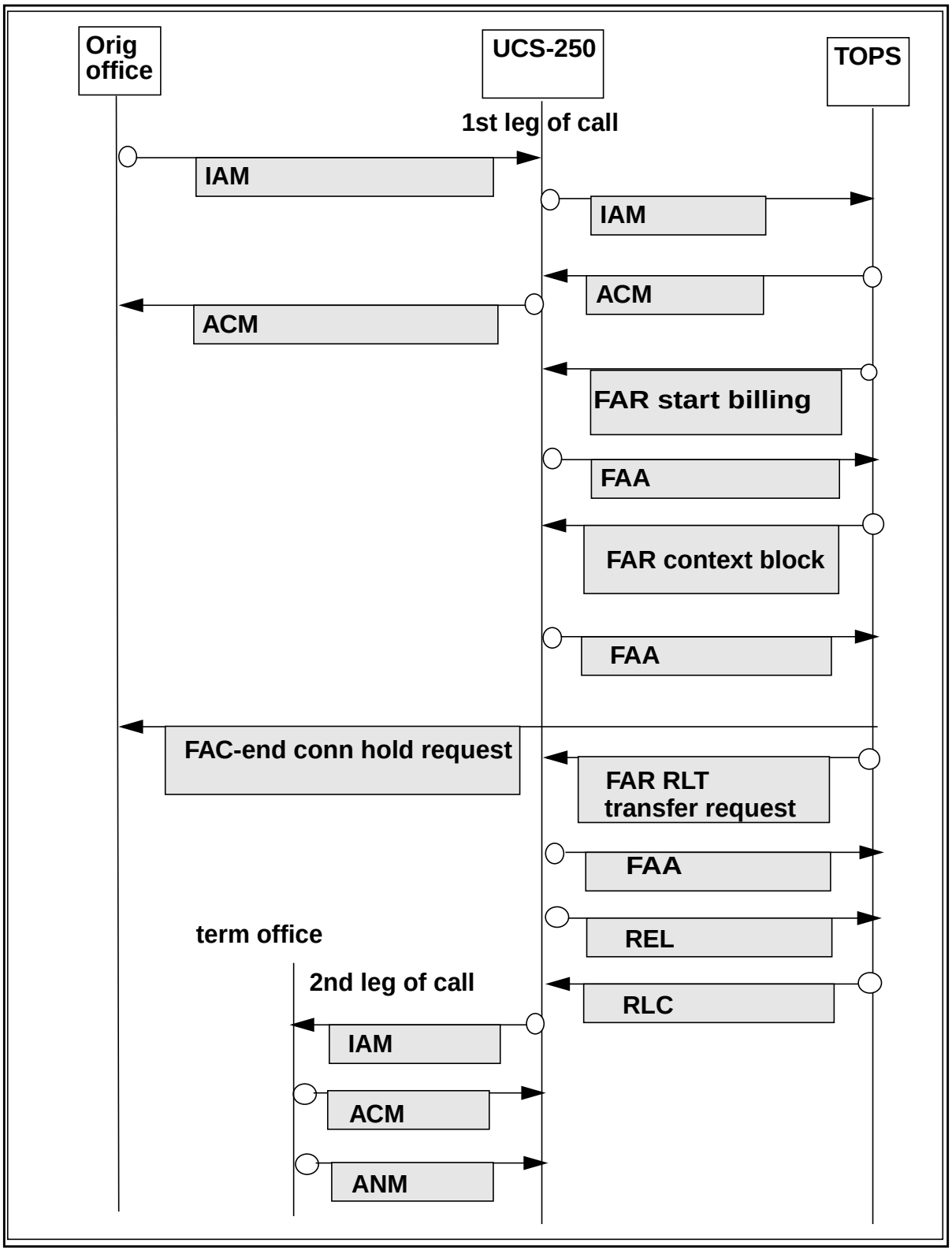
Figure 71 Non-coin, directory assistance with call completion, RLT bridge (variant two): phase two (re-origination)



RLT transfer (variant two): phase two

Figure 72 Non-coin, directory assistance with call completion, RLT transfer (variant two): phase

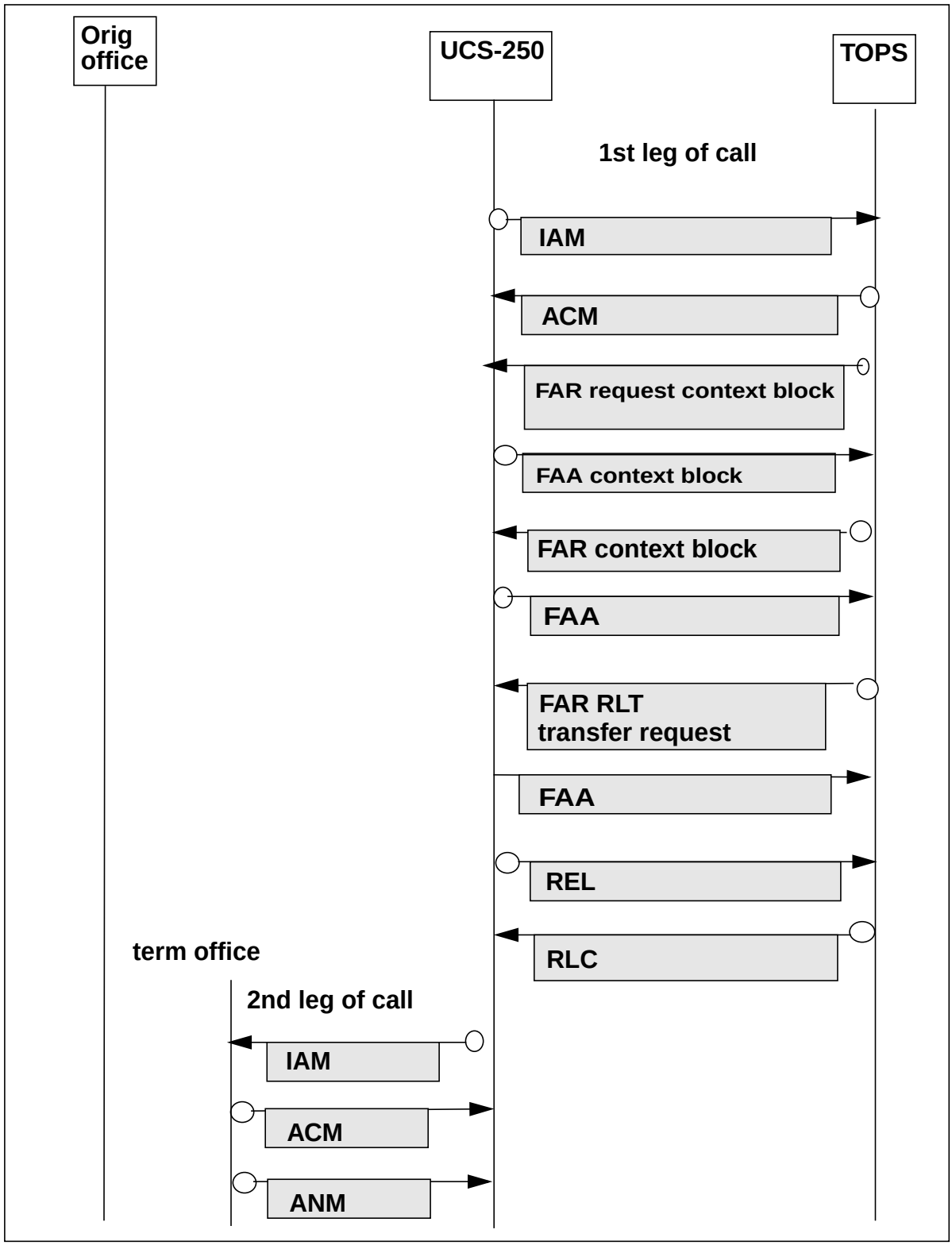
two


Orig office
UCS-250
TOPS
1st leg of call
IAM
IAM
ACM
ACM
FAR start billing
FAA
FAR context block
FAA
FAC-end conn hold request
FAR RLT transfer request
FAA
REL
RLC
term office
2nd leg of call
IAM
ACM
ANM

RLT transfer (variant two): phase two (re-origination)

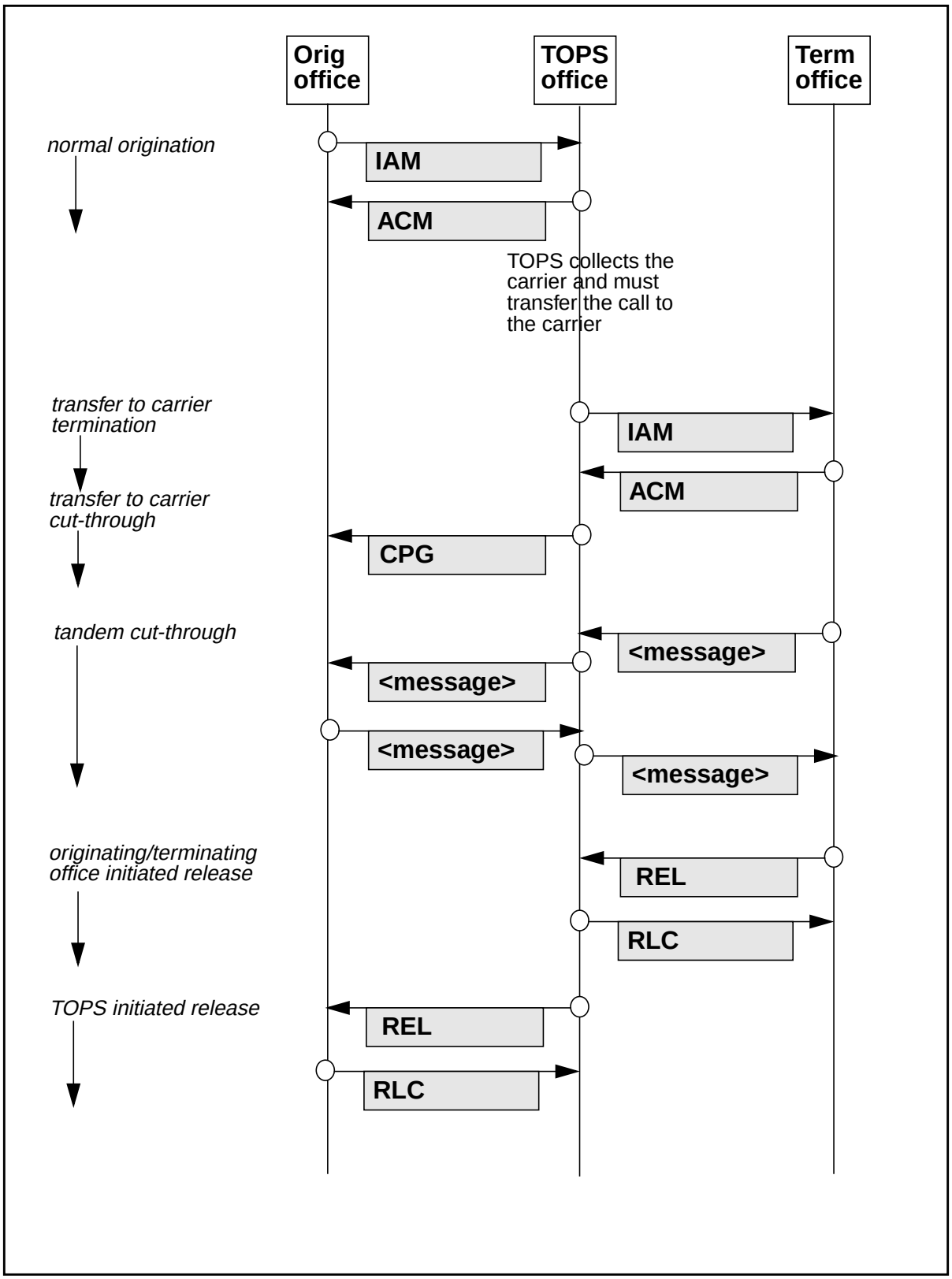
Figure 73 Non-coin, directory assistance with call completion, RLT transfer (variant two): phase

two (re-origination)



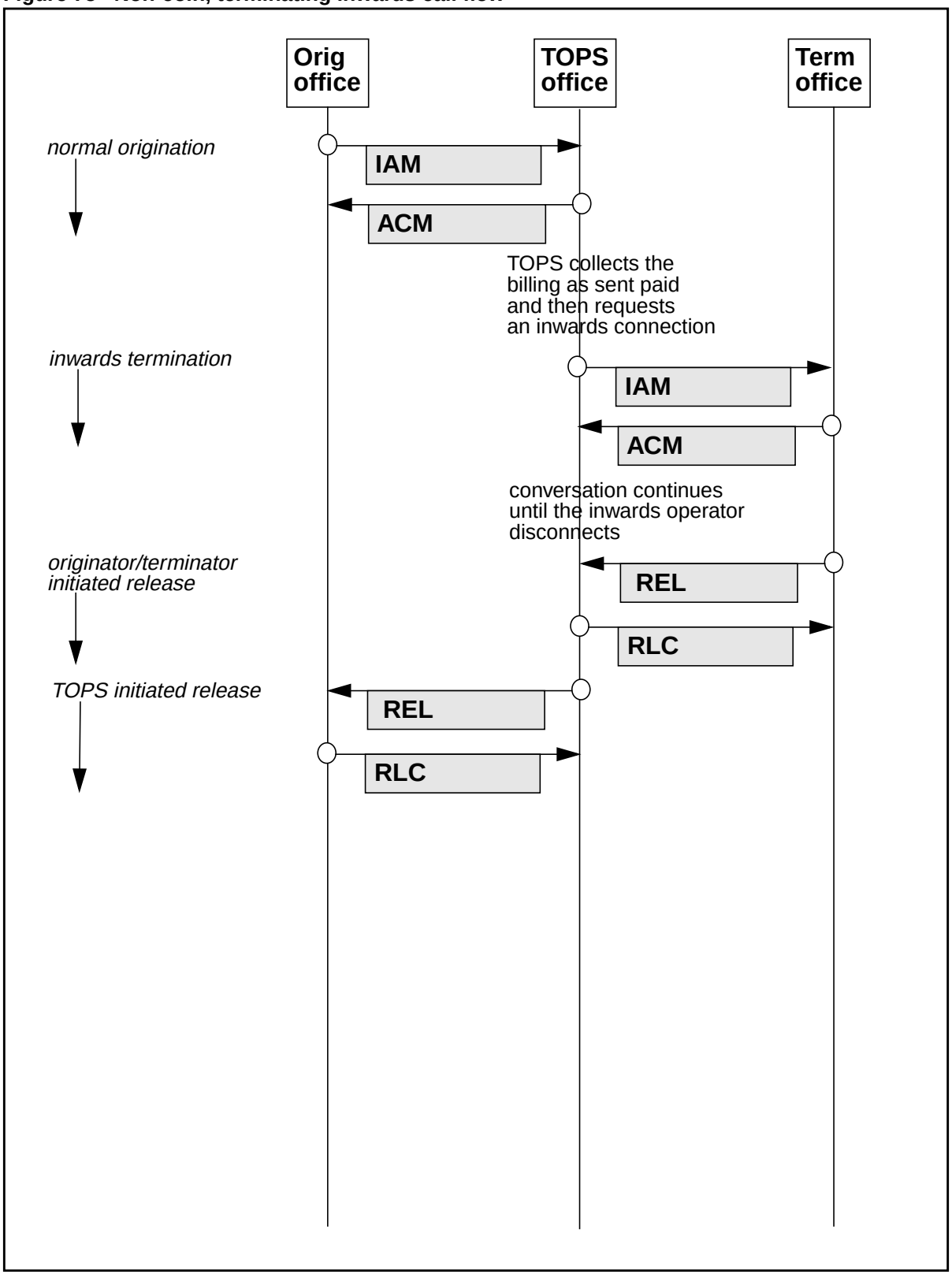
Transfer to carrier service

Figure 74 Non-coin, transfer to carrier service call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the carrier and must transfer the call to the carrier
transfer to carrier termination
IAM
ACM
transfer to carrier cut-through
CPG
tandem cut-through
<message>
<message>
<message>
<message>
originating/terminating office initiated release
REL
RLC
TOPS initiated release
REL
RLC

Terminating inwards service

Figure 75 Non-coin, terminating inwards call flow



Coin (ccf) originating type

Call completion service

Sent paid

Figure 76 Coin (ccf), call completion, sent paid call flow

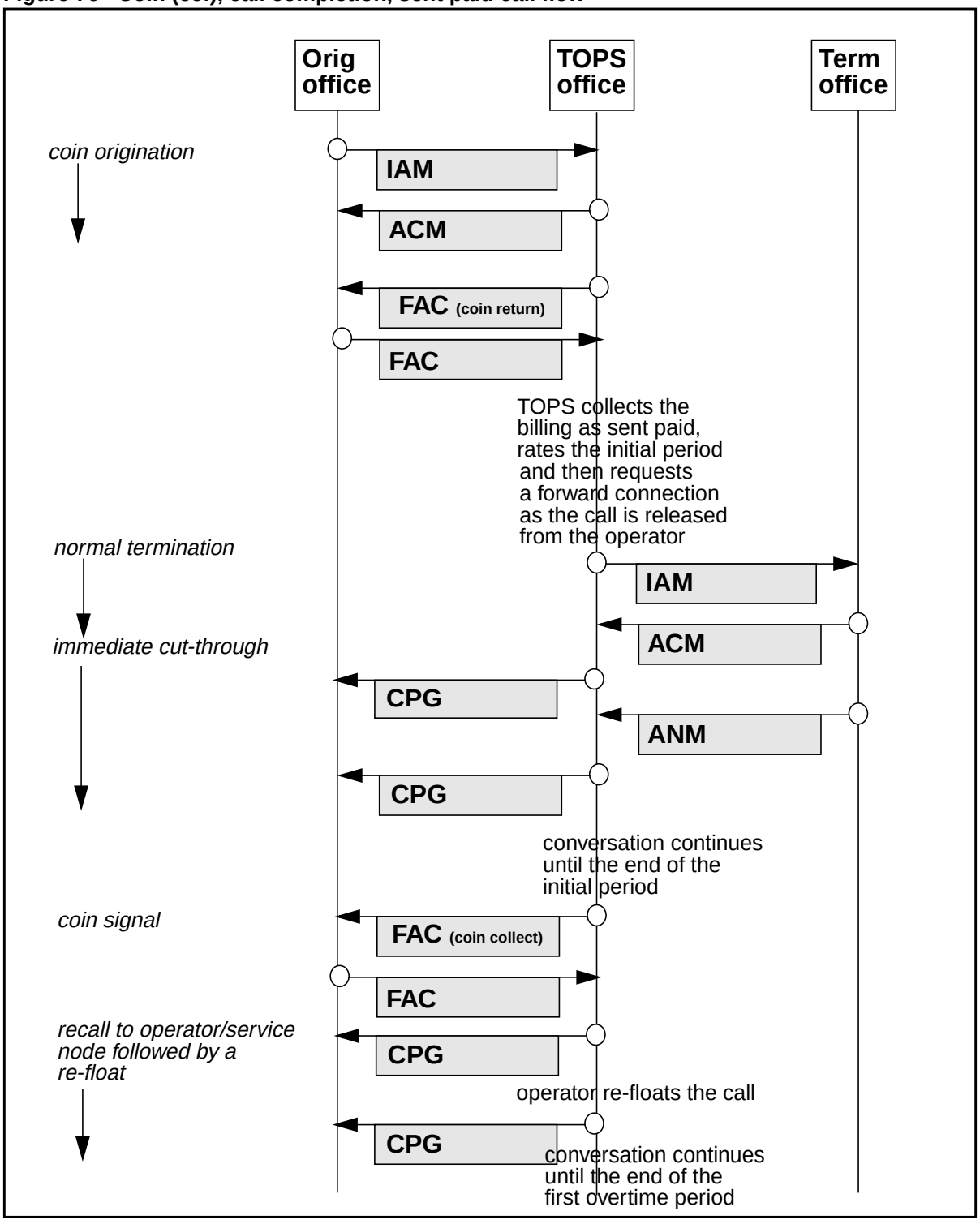
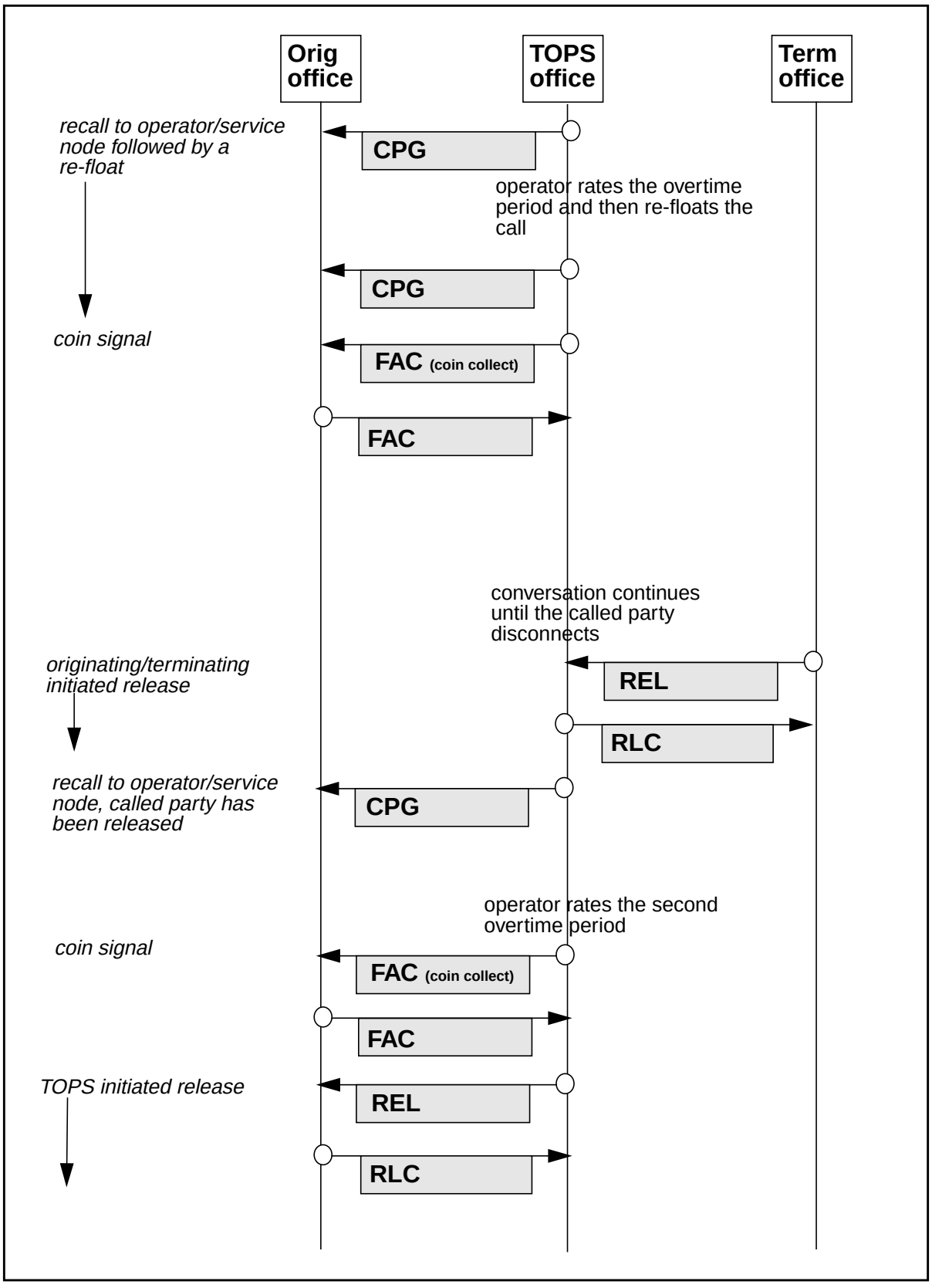


Figure 77 Coin (ccf), call completion, sent paid call flow (continued)


Orig office
TOPS office
Term office
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
coin signal
FAC (coin collect)
FAC
conversation continues until the called party disconnects
originating/terminating initiated release
REL
RLC
recall to operator/service node, called party has been released
CPG
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
TOPS initiated release
REL
RLC

Sent paid with request for operator

Figure 78 Coin (ccf), call completion, sent paid with request for operator call flow

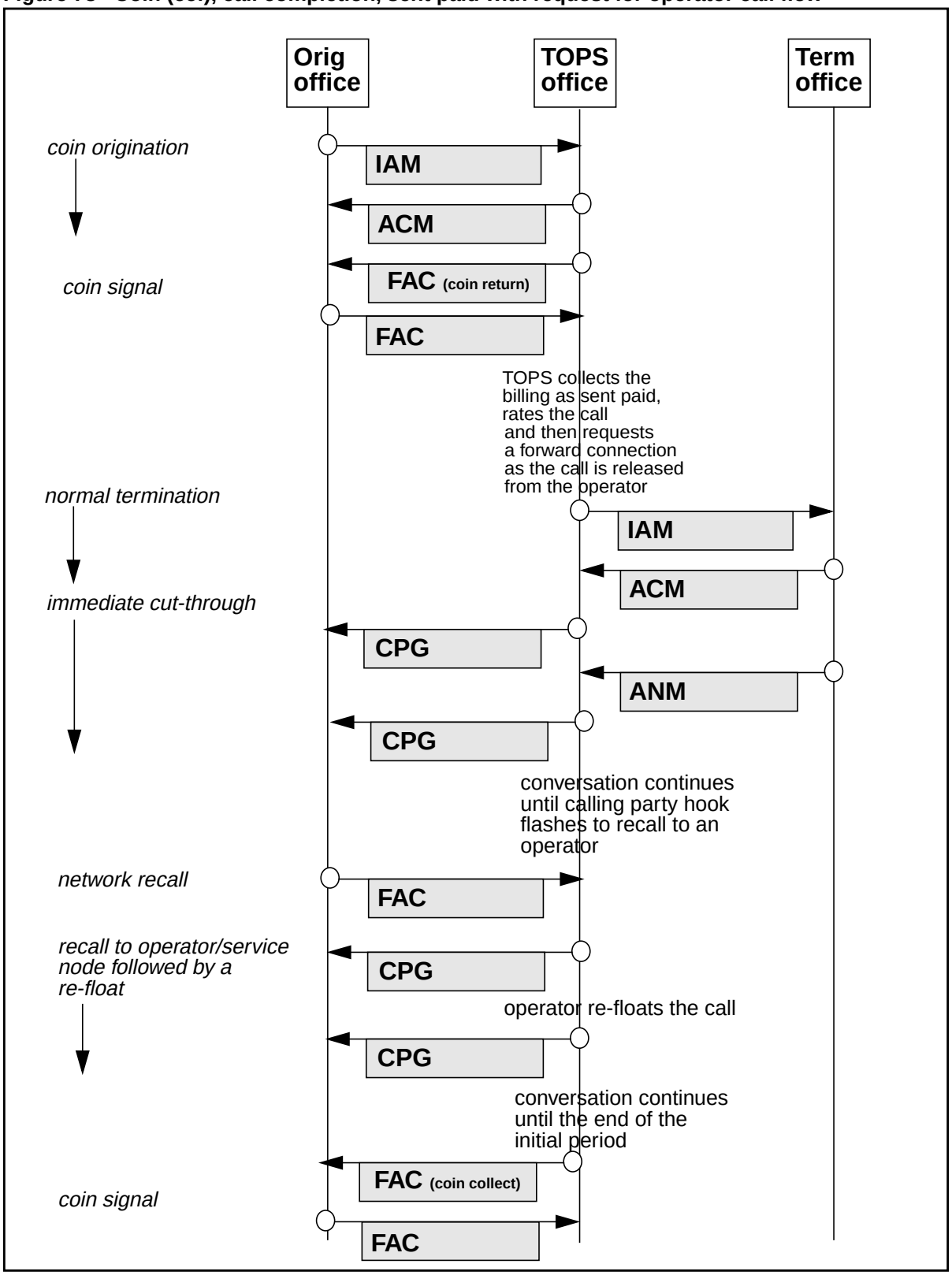
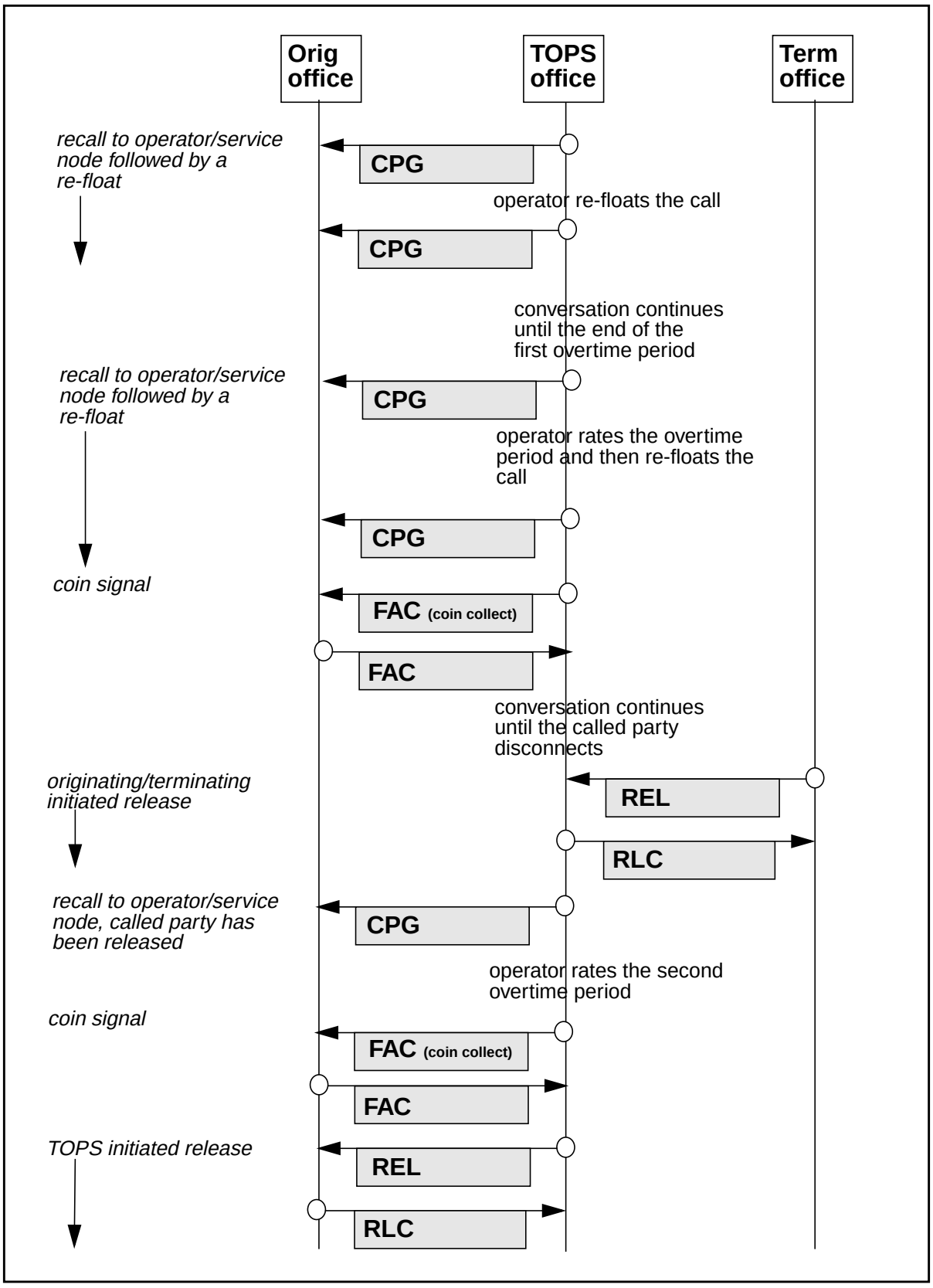
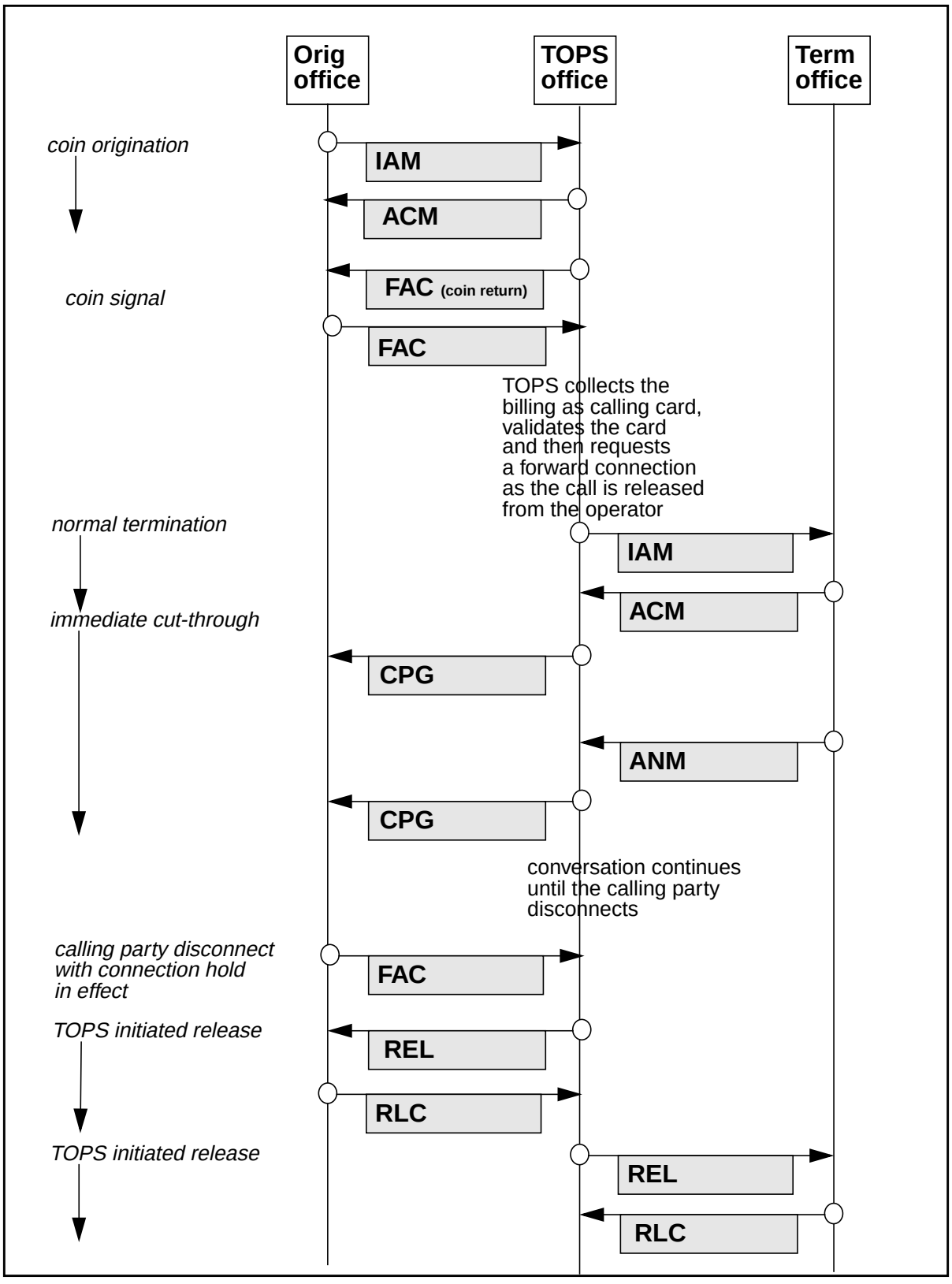


Figure 79 Coin (ccf), call completion, sent paid with request for operator call flow (continued)


Orig office
TOPS office
Term office
recall to operator/service node followed by a re-float
CPG
operator re-floats the call
CPG
conversation continues until the end of the first overtime period
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
coin signal
FAC (coin collect)
FAC
conversation continues until the called party disconnects
originating/terminating initiated release
REL
RLC
recall to operator/service node, called party has been released
CPG
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
TOPS initiated release
REL
RLC

Calling card

Figure 80 Coin (ccf), call completion, calling card call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (coin return)
coin signal
FAC
TOPS collects the billing as calling card, validates the card and then requests a forward connection as the call is released from the operator
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Third number

Figure 81 Coin (ccf), call completion, third number call flow

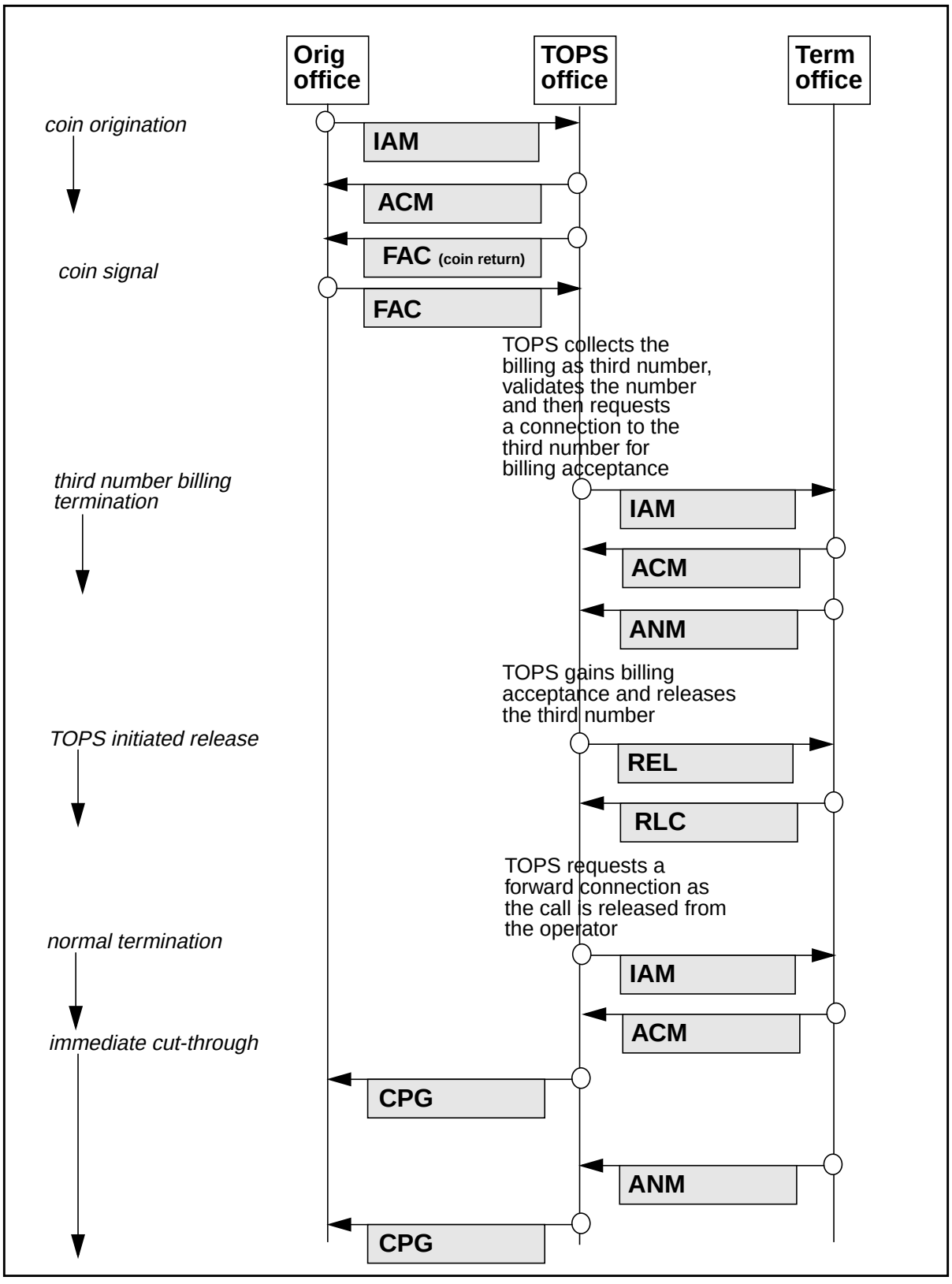
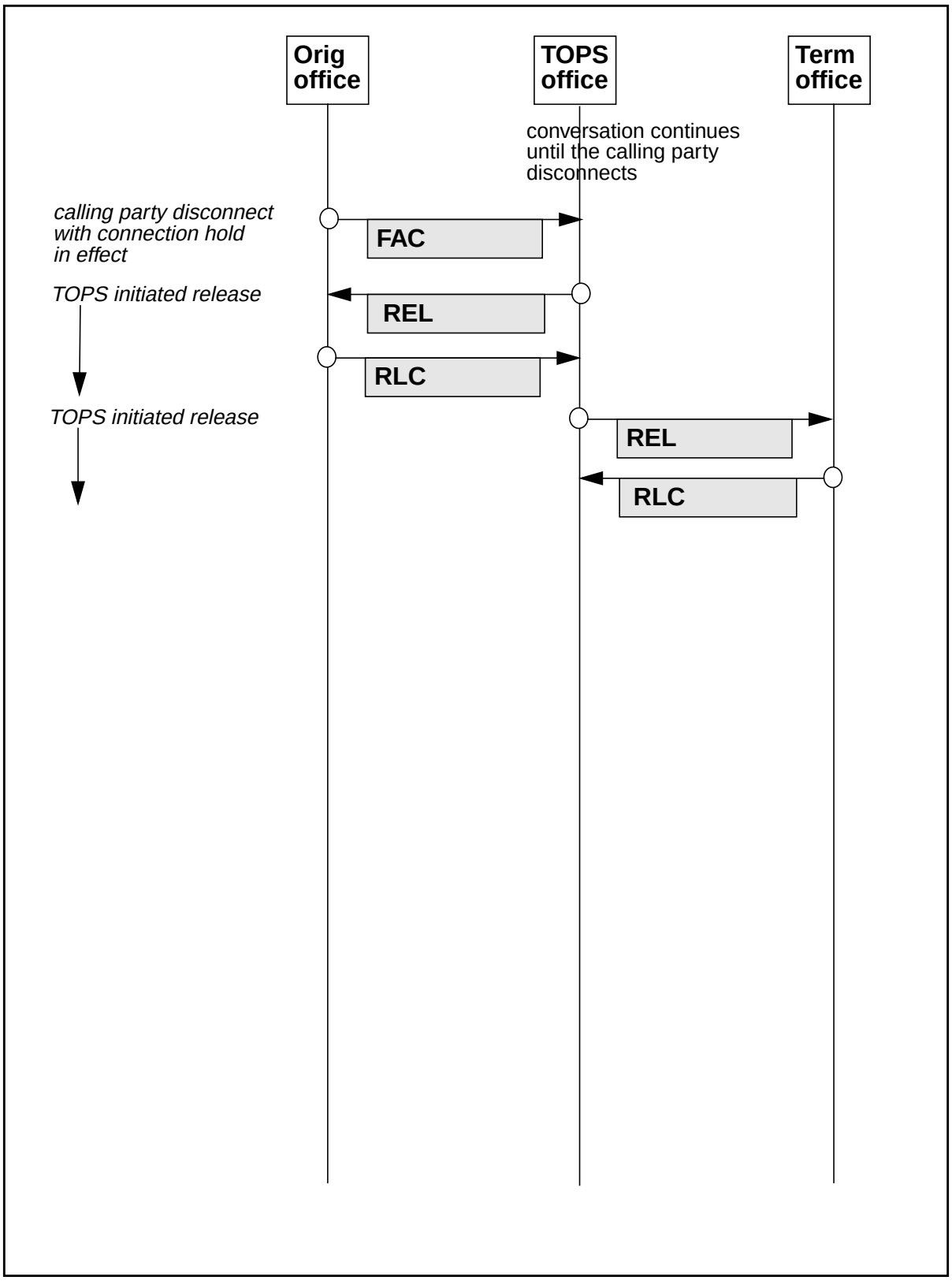
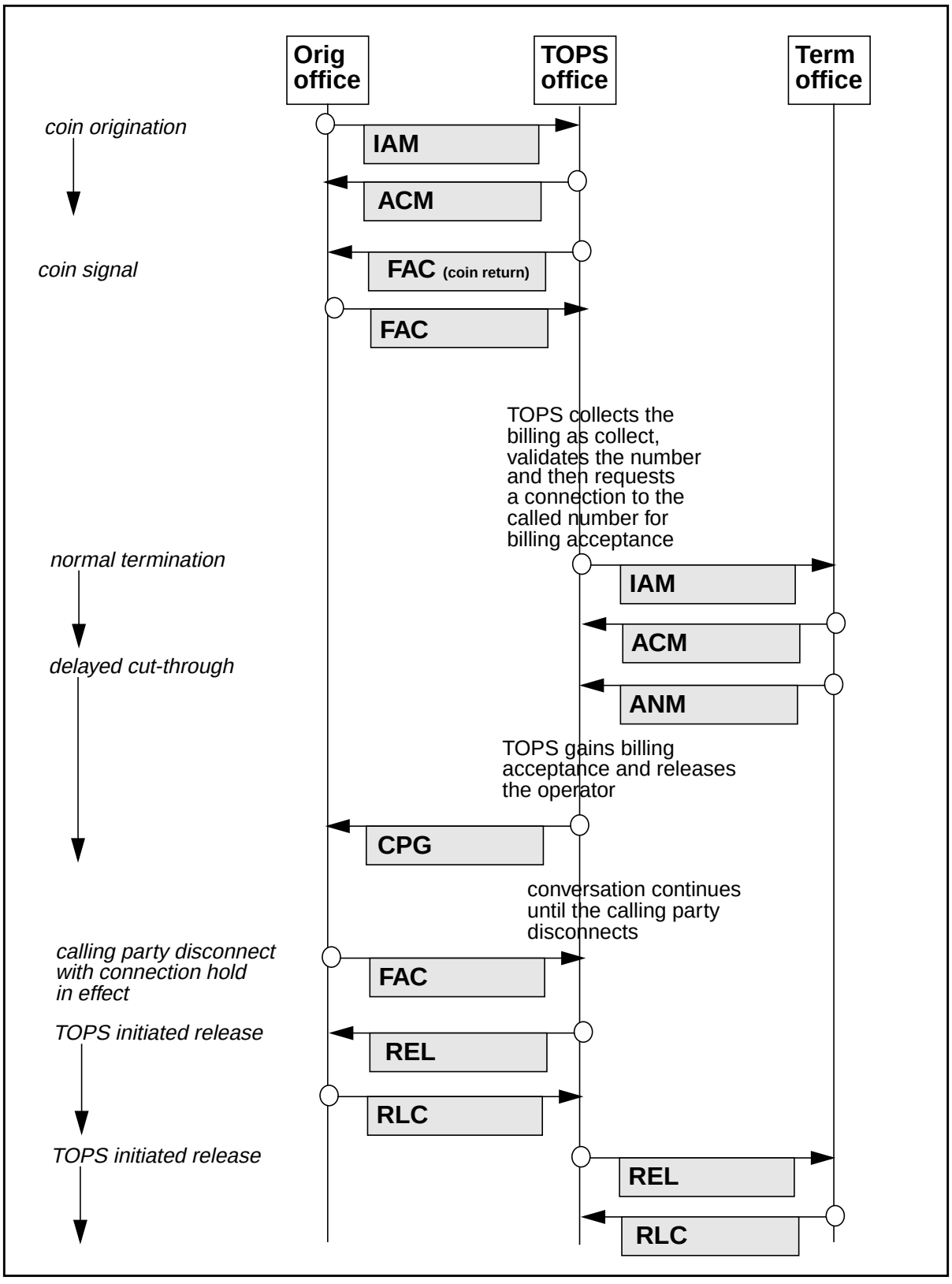

Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (coin return)
coin signal
FAC
TOPS collects the billing as third number, validates the number and then requests a connection to the third number for billing acceptance
third number billing termination
IAM
ACM
ANM
TOPS gains billing acceptance and releases the third number
TOPS initiated release
REL
RLC
TOPS requests a forward connection as the call is released from the operator
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG

Figure 82 Coin (ccf), call completion, third number call flow (continued)


Orig office
TOPS office
Term office
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Collect

Figure 83 Coin (ccf), call completion, collect call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
coin signal
FAC (coin return)
FAC
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
normal termination
IAM
ACM
delayed cut-through
ANM
TOPS gains billing acceptance and releases the operator
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Ring back

Figure 84 Coin (ccf), ring back call flow

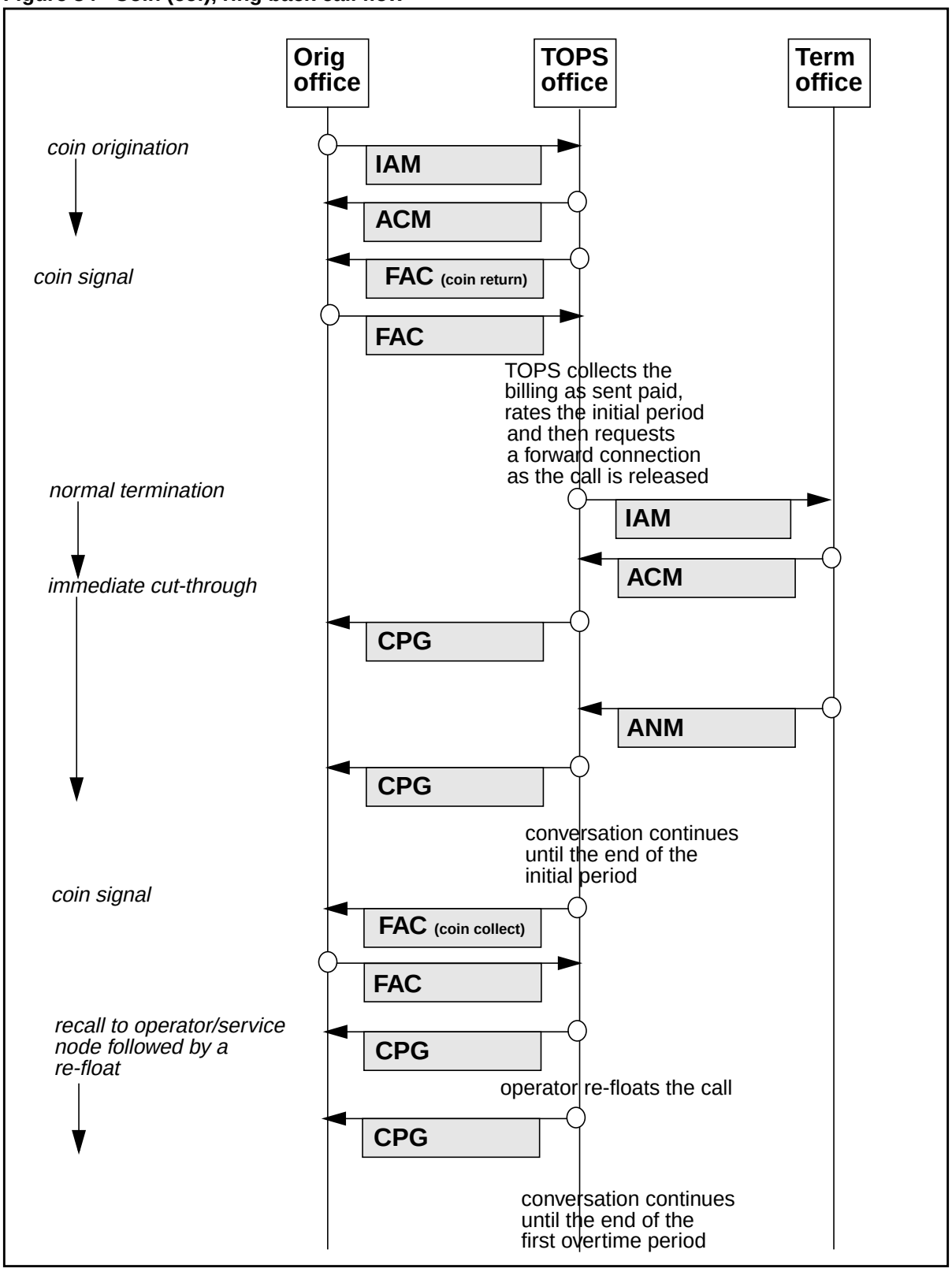
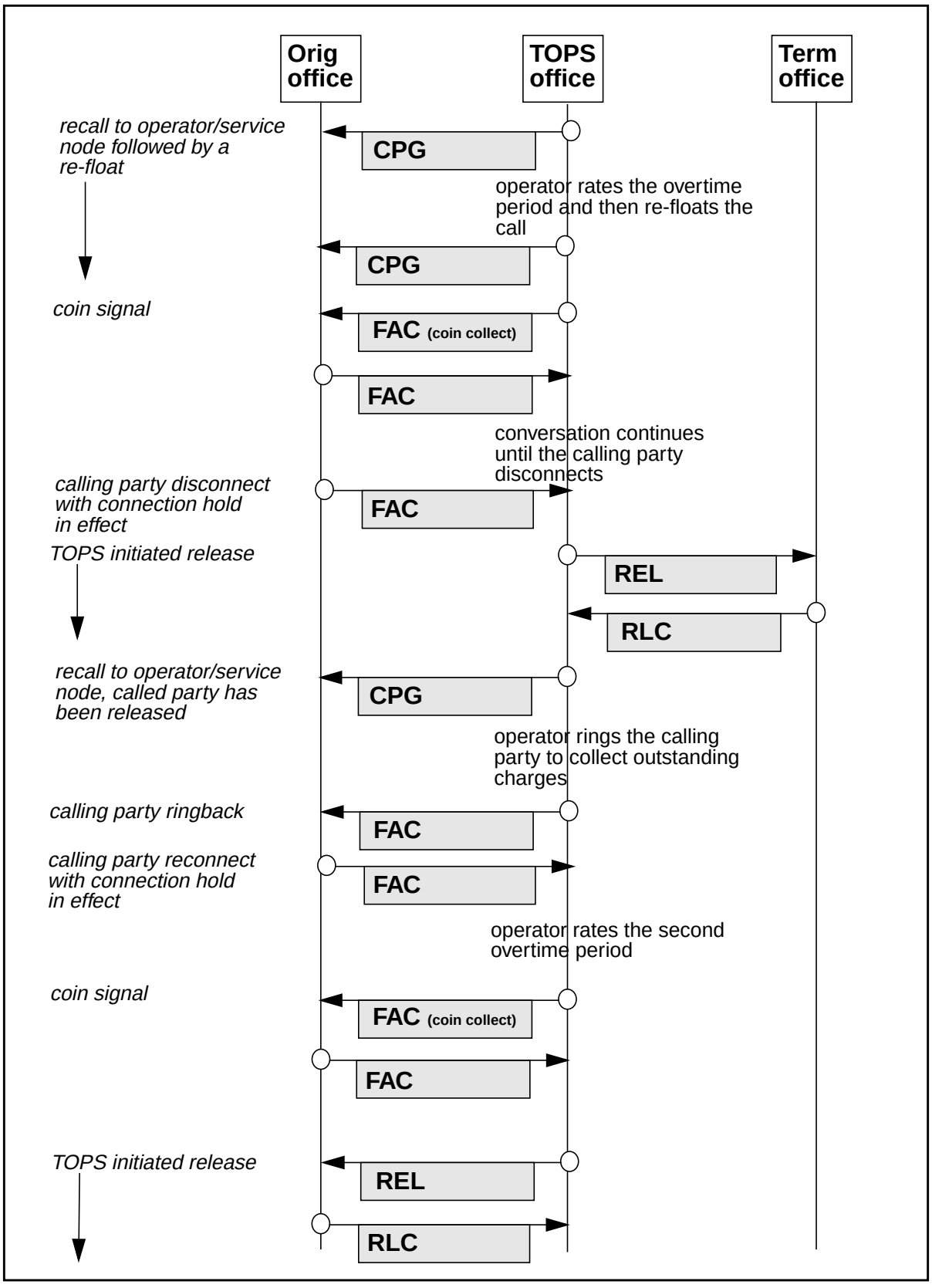


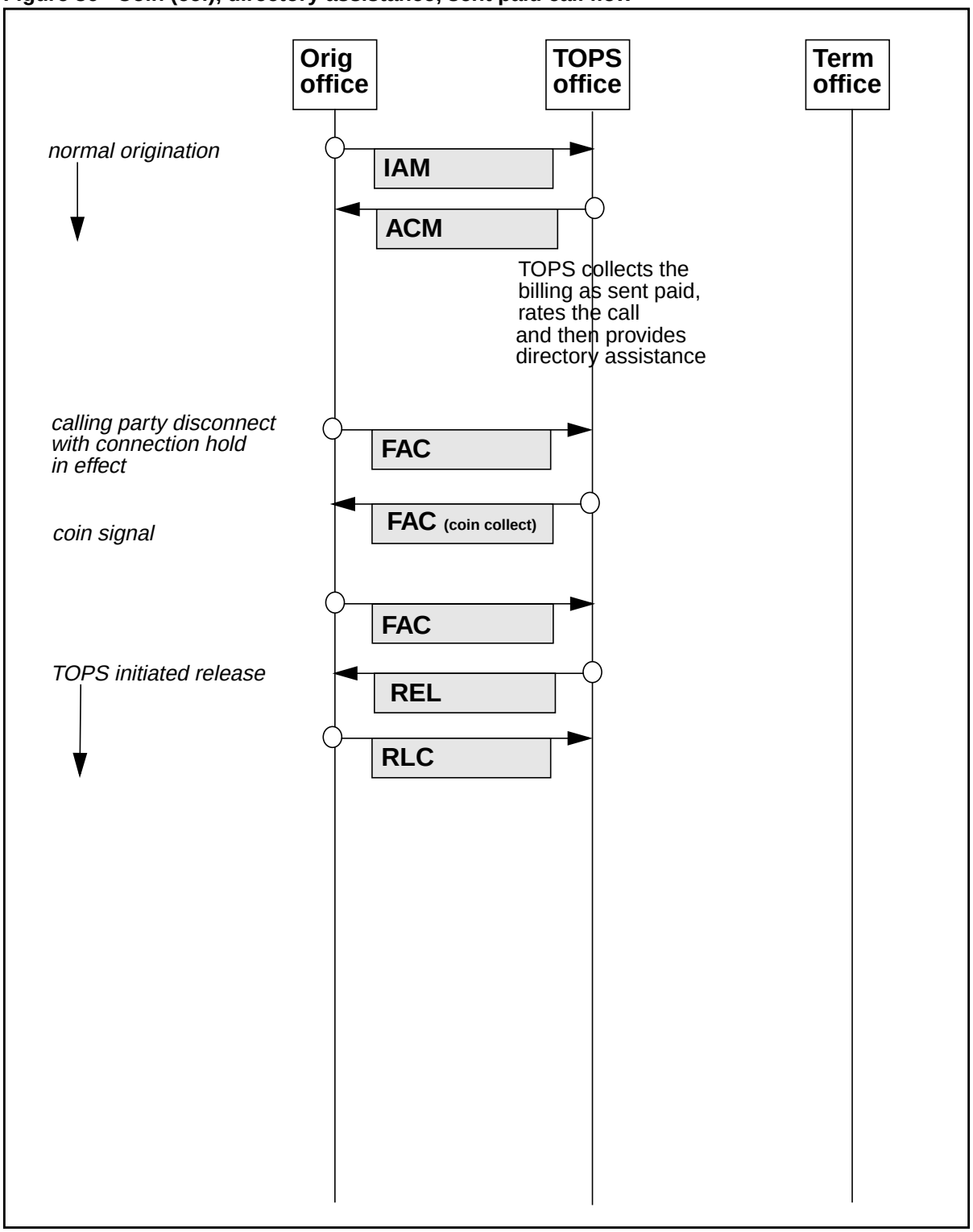
Figure 85 Coin (ccf), ring back call flow (continued)


Orig office
TOPS office
Term office
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
coin signal
FAC (coin collect)
FAC
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
recall to operator/service node, called party has been released
CPG
operator rings the calling party to collect outstanding charges
calling party ringback
FAC
calling party reconnect with connection hold in effect
FAC
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
TOPS initiated release
REL
RLC

Directory assistance service

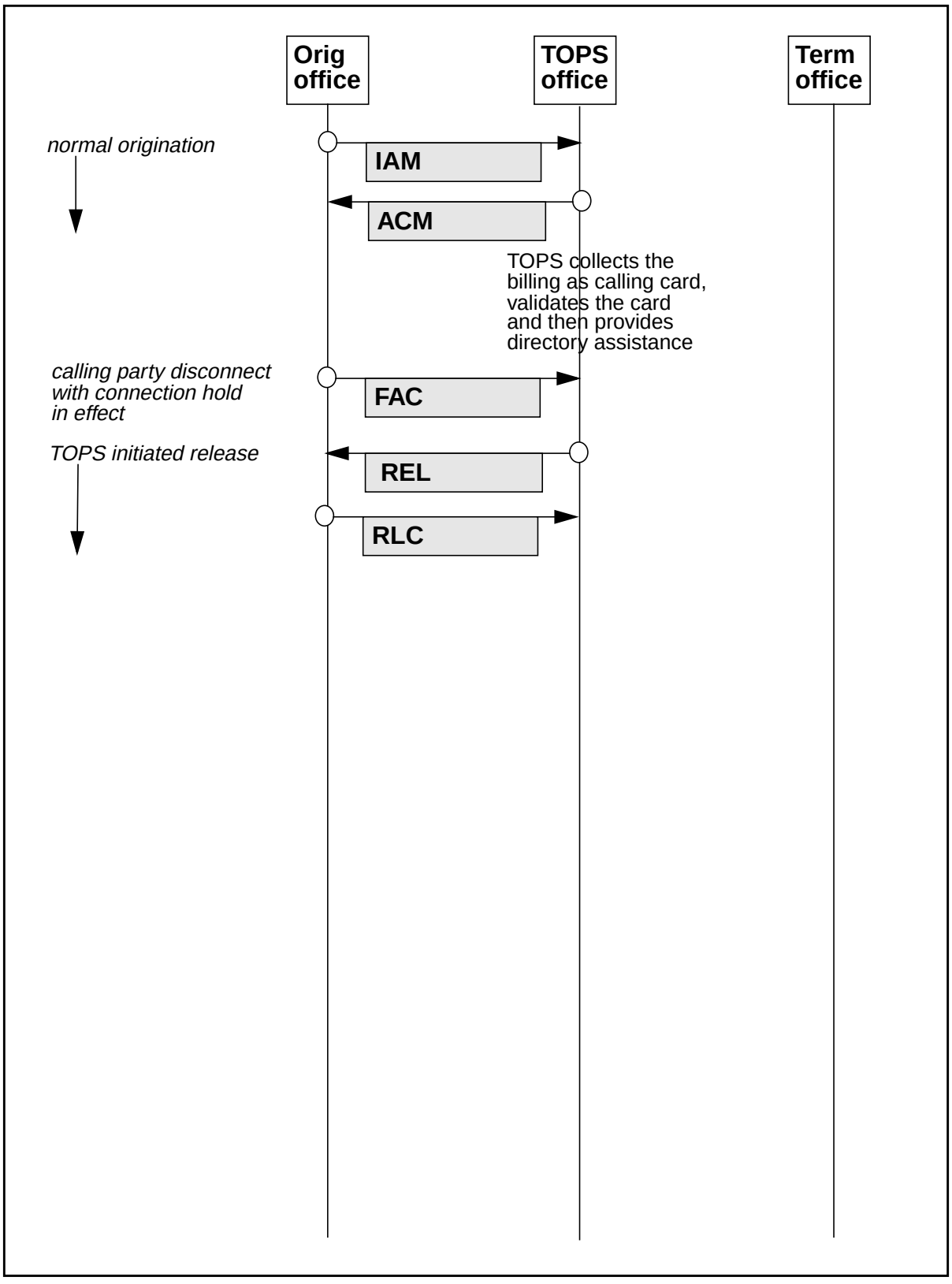
Sent paid

Figure 86 Coin (ccf), directory assistance, sent paid call flow



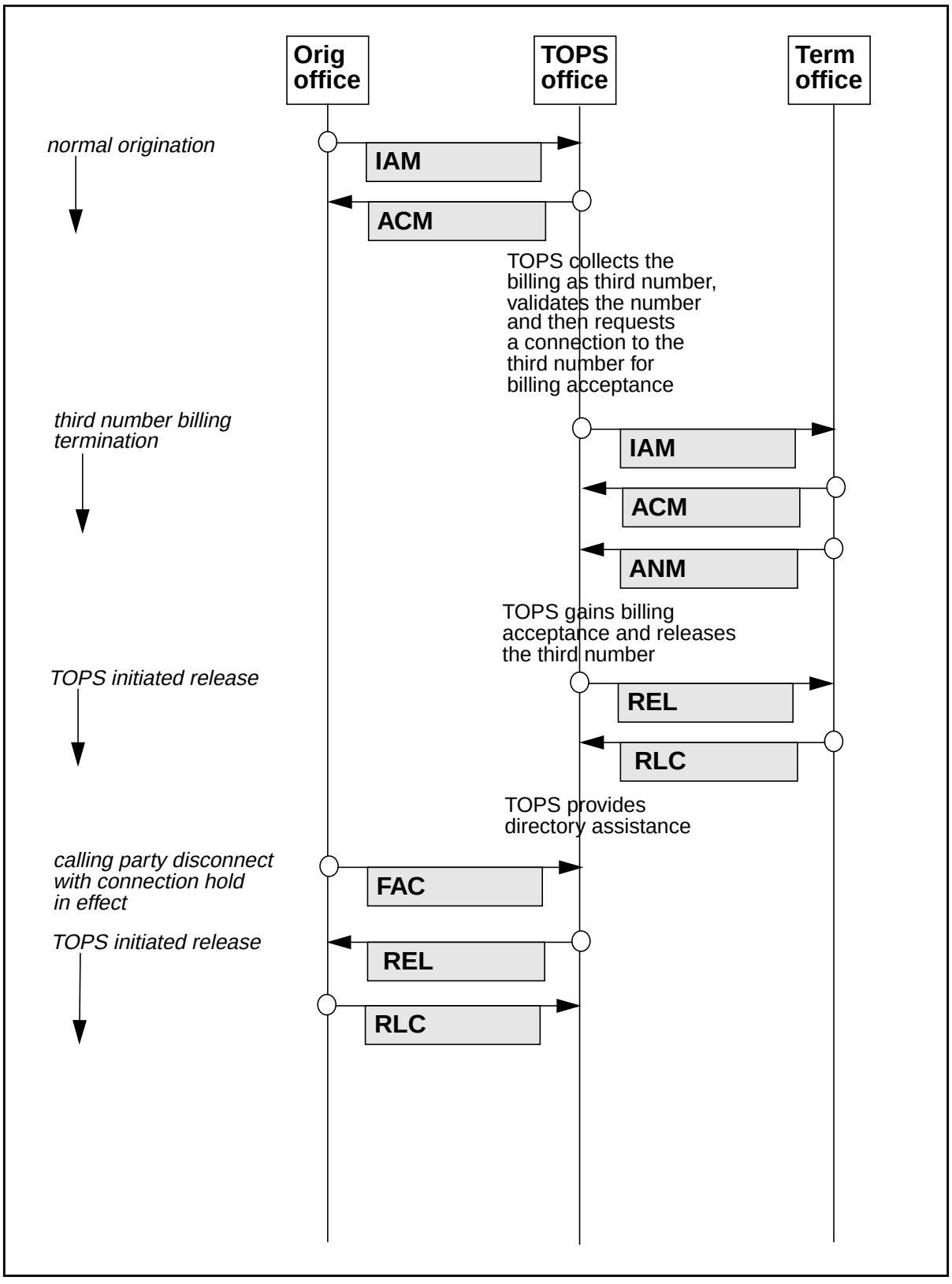
Calling card

Figure 87 Coin (ccf), directory assistance, calling card call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as calling card, validates the card and then provides directory assistance
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Third number

Figure 88 Coin (ccf), directory assistance, third number call flow


Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as third number, validates the number and then requests a connection to the third number for billing acceptance
third number billing termination
IAM
ACM
ANM
TOPS gains billing acceptance and releases the third number
TOPS initiated release
REL
RLC
TOPS provides directory assistance
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Directory assistance with call completion service

Figure 89 Coin (ccf), directory assistance with call completion call flow

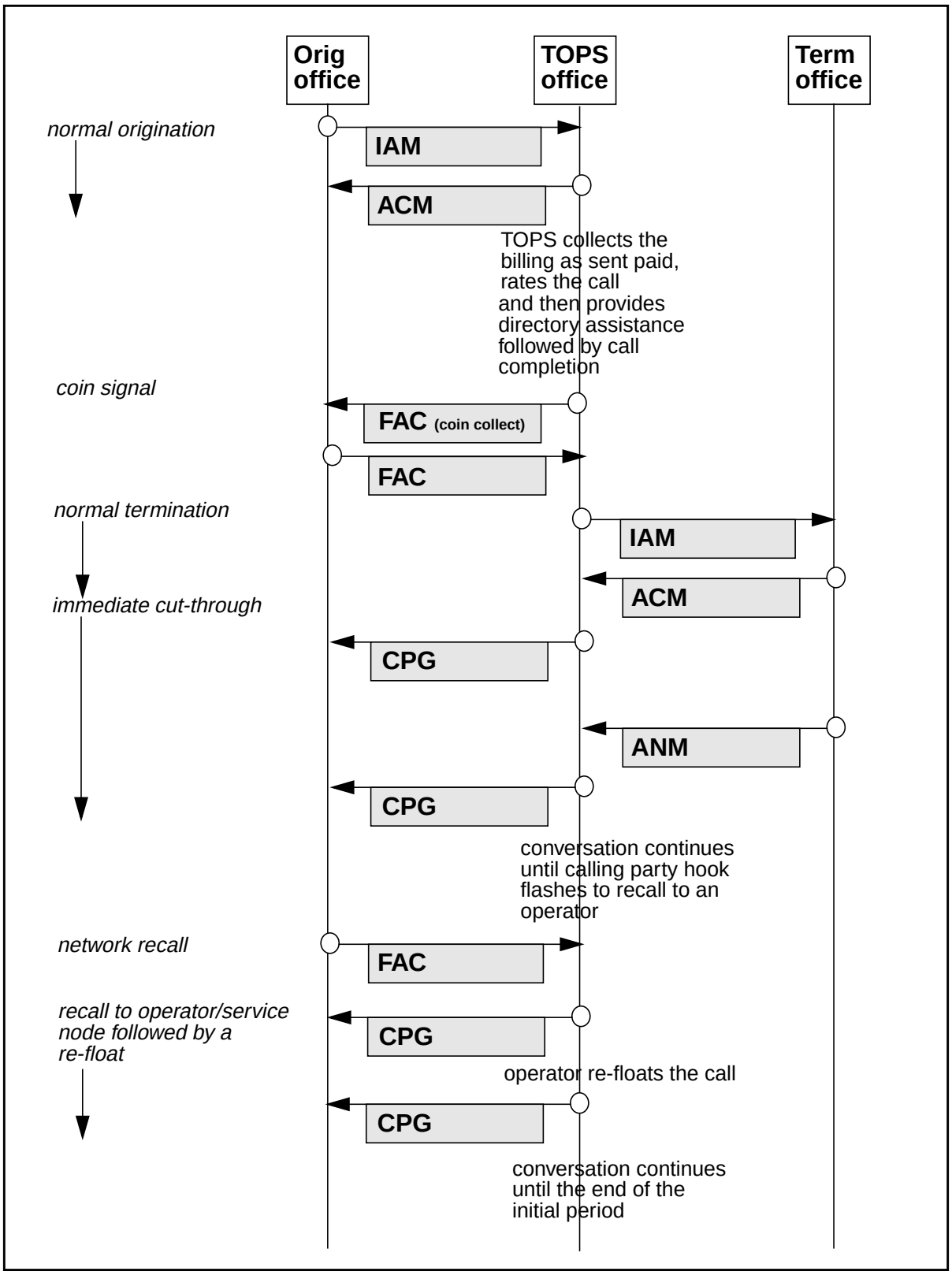
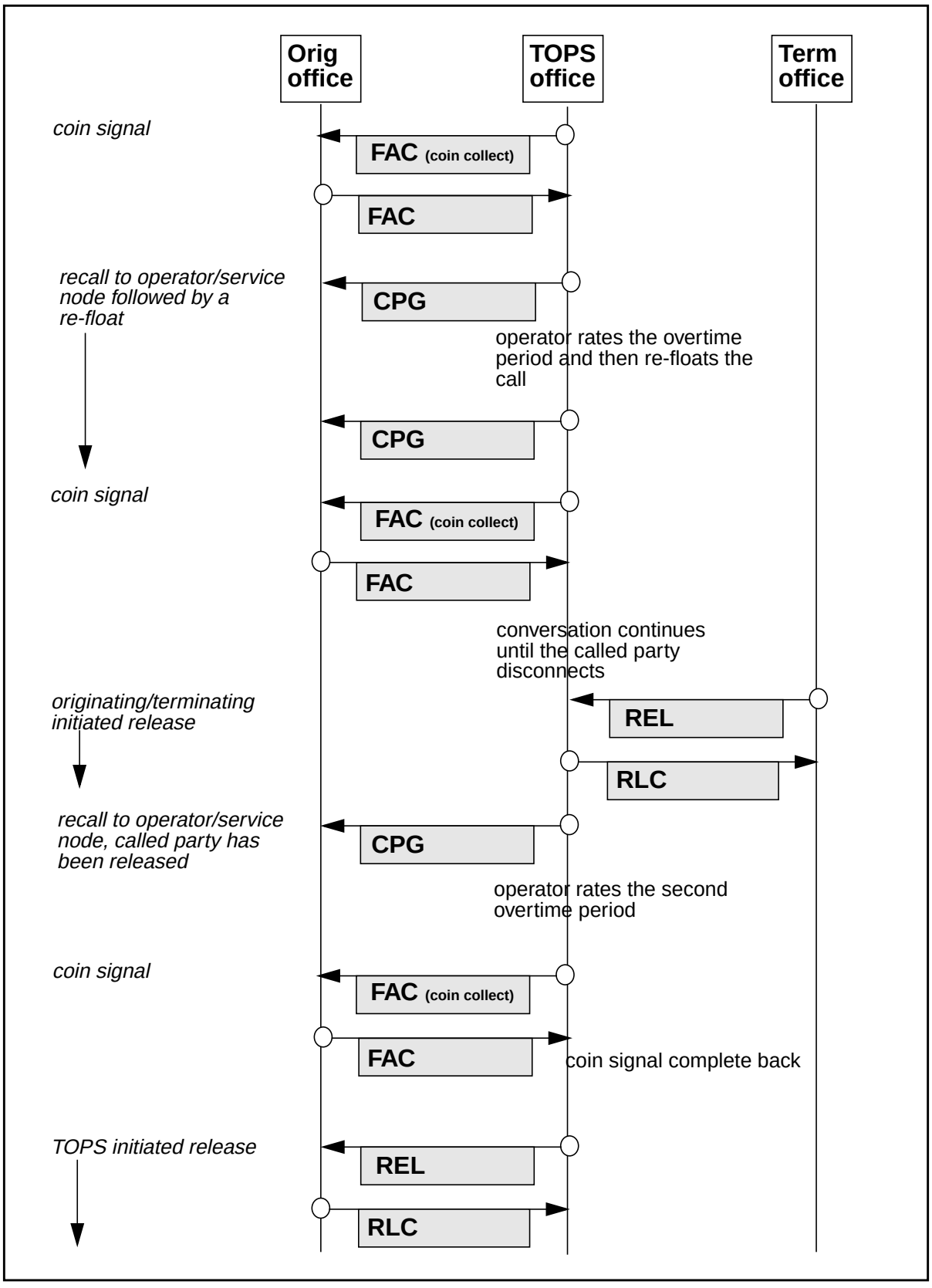
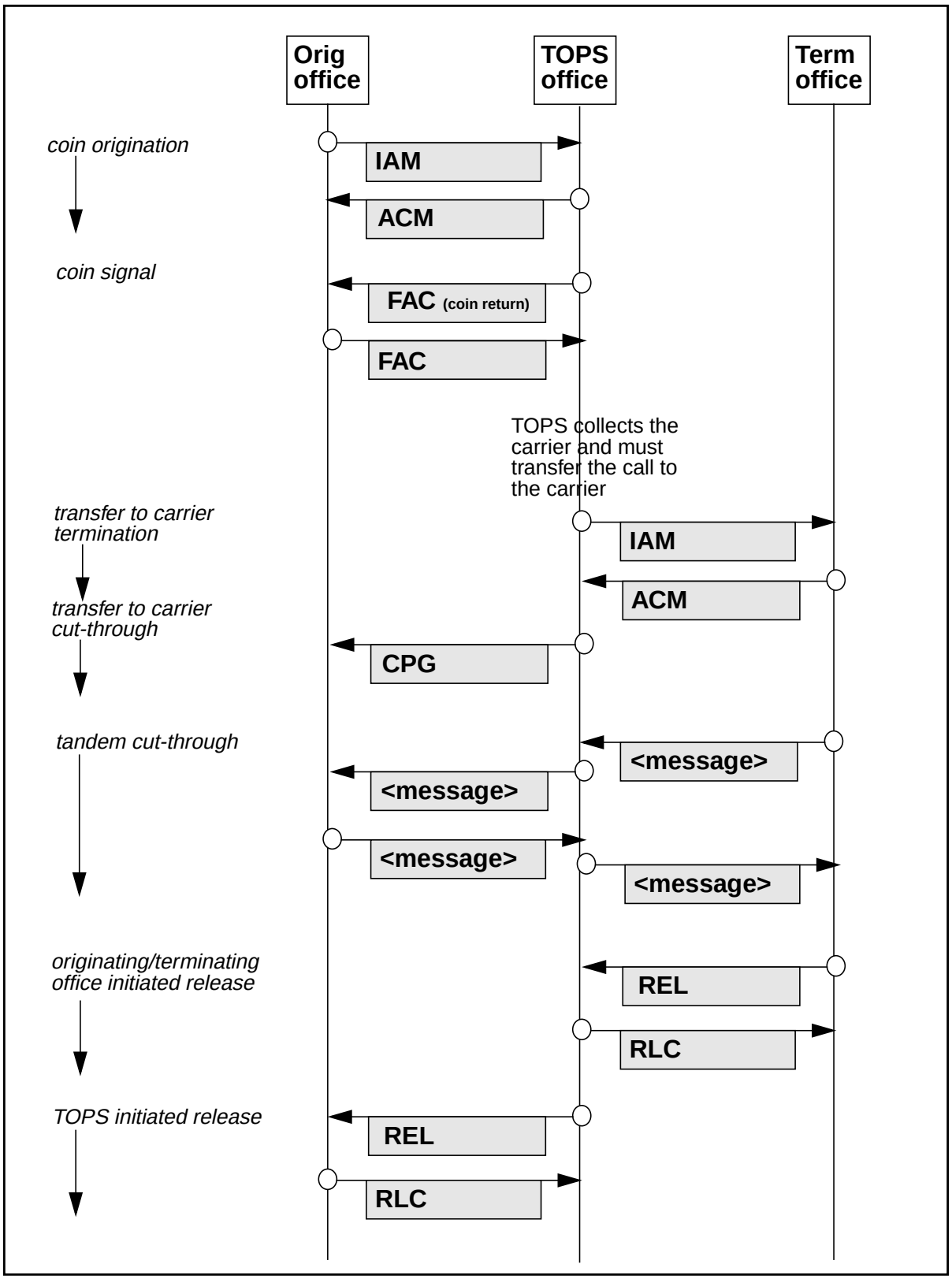

Orig office
TOPS office
Term office
normal origination
IAM
ACM
TOPS collects the billing as sent paid, rates the call and then provides directory assistance followed by call completion
coin signal
FAC (coin collect)
FAC
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG
conversation continues until calling party hook flashes to recall to an operator
network recall
FAC
recall to operator/service node followed by a re-float
CPG
operator re-floats the call
CPG
conversation continues until the end of the initial period

Figure 90 Coin (ccf), directory assistance with call completion call flow (continued)


Orig office
TOPS office
Term office
coin signal
FAC (coin collect)
FAC
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
coin signal
FAC (coin collect)
FAC
conversation continues until the called party disconnects
originating/terminating initiated release
REL
RLC
recall to operator/service node, called party has been released
CPG
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
coin signal complete back
TOPS initiated release
REL
RLC

Transfer to carrier service

Figure 91 Coin (ccf), transfer to carrier service call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
coin signal
FAC (coin return)
FAC
TOPS collects the carrier and must transfer the call to the carrier
transfer to carrier termination
IAM
ACM
transfer to carrier cut-through
CPG
tandem cut-through
<message>
<message>
<message>
<message>
originating/terminating office initiated release
REL
RLC
TOPS initiated release
REL
RLC

Coin (cdf) originating type

Call completion service

Sent paid

Figure 92 Coin (cdf), call completion, sent paid call flow

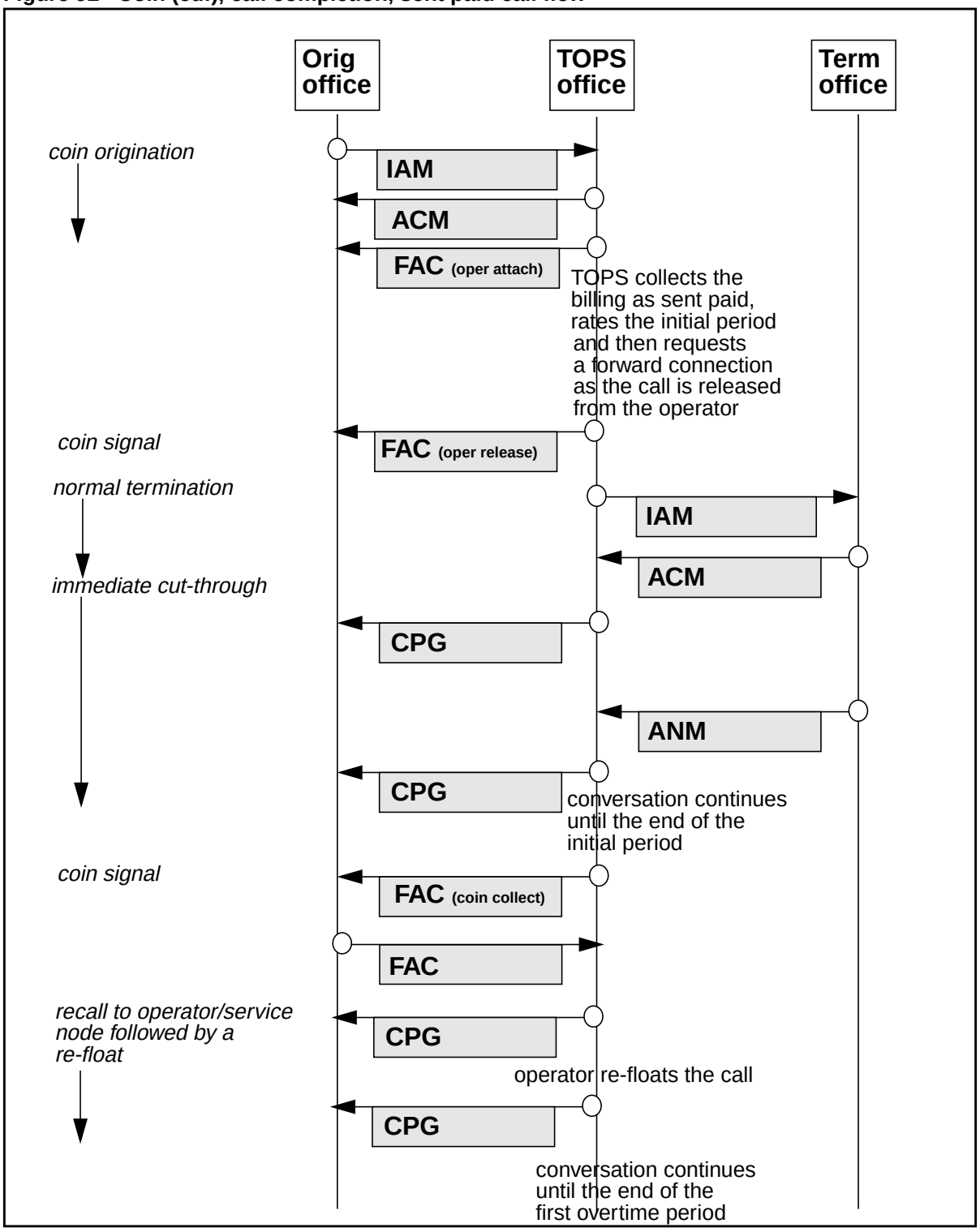
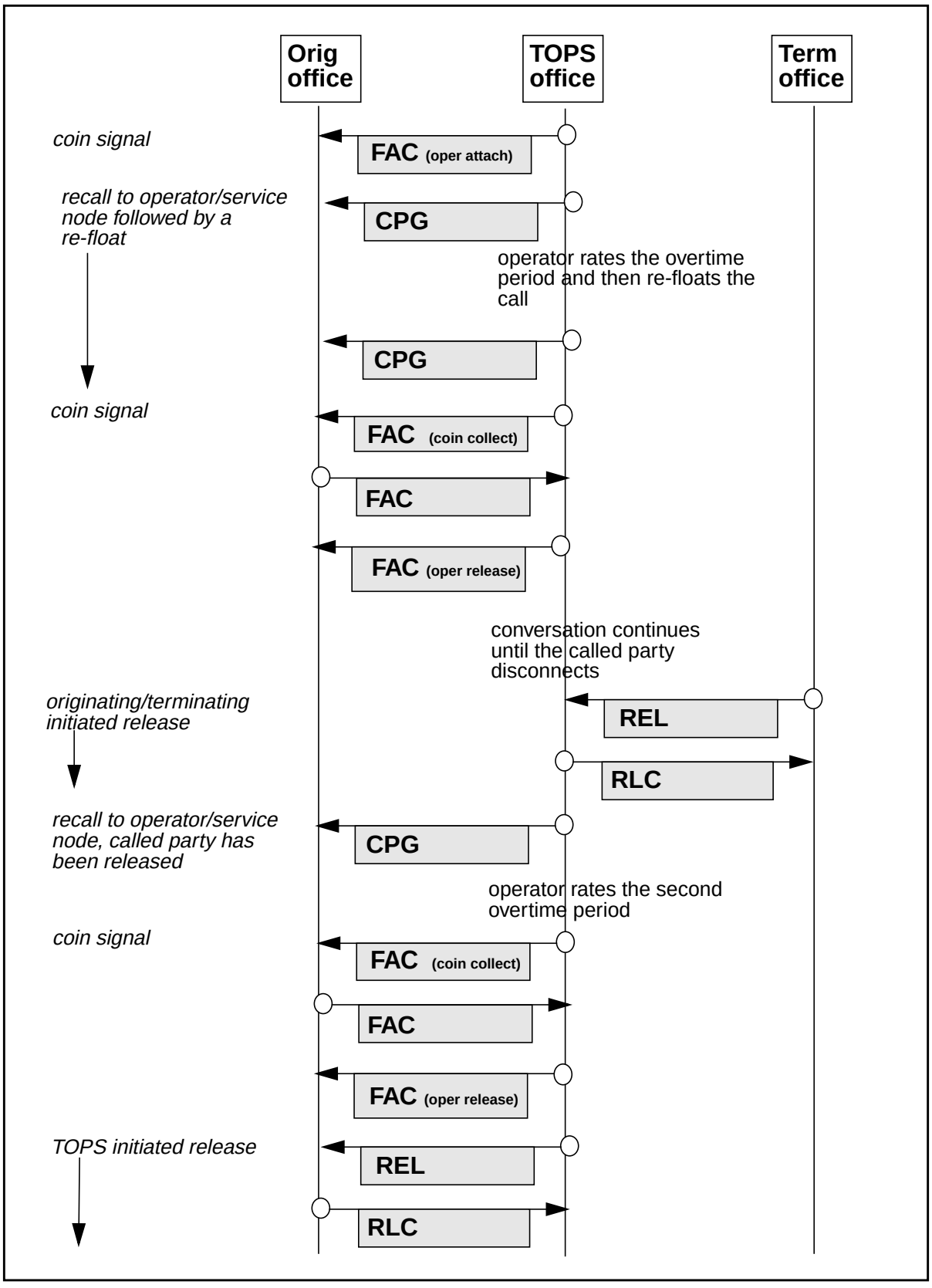


Figure 93 Coin (cdf), call completion, sent paid call flow (continued)


Orig office
TOPS office
Term office
coin signal
FAC (oper attach)
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
coin signal
FAC (coin collect)
FAC
FAC (oper release)
conversation continues until the called party disconnects
originating/terminating initiated release
REL
RLC
recall to operator/service node, called party has been released
CPG
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
FAC (oper release)
TOPS initiated release
REL
RLC

Sent paid with request for operator

Figure 94 Coin (cdf), call completion, sent paid with request for operator call flow

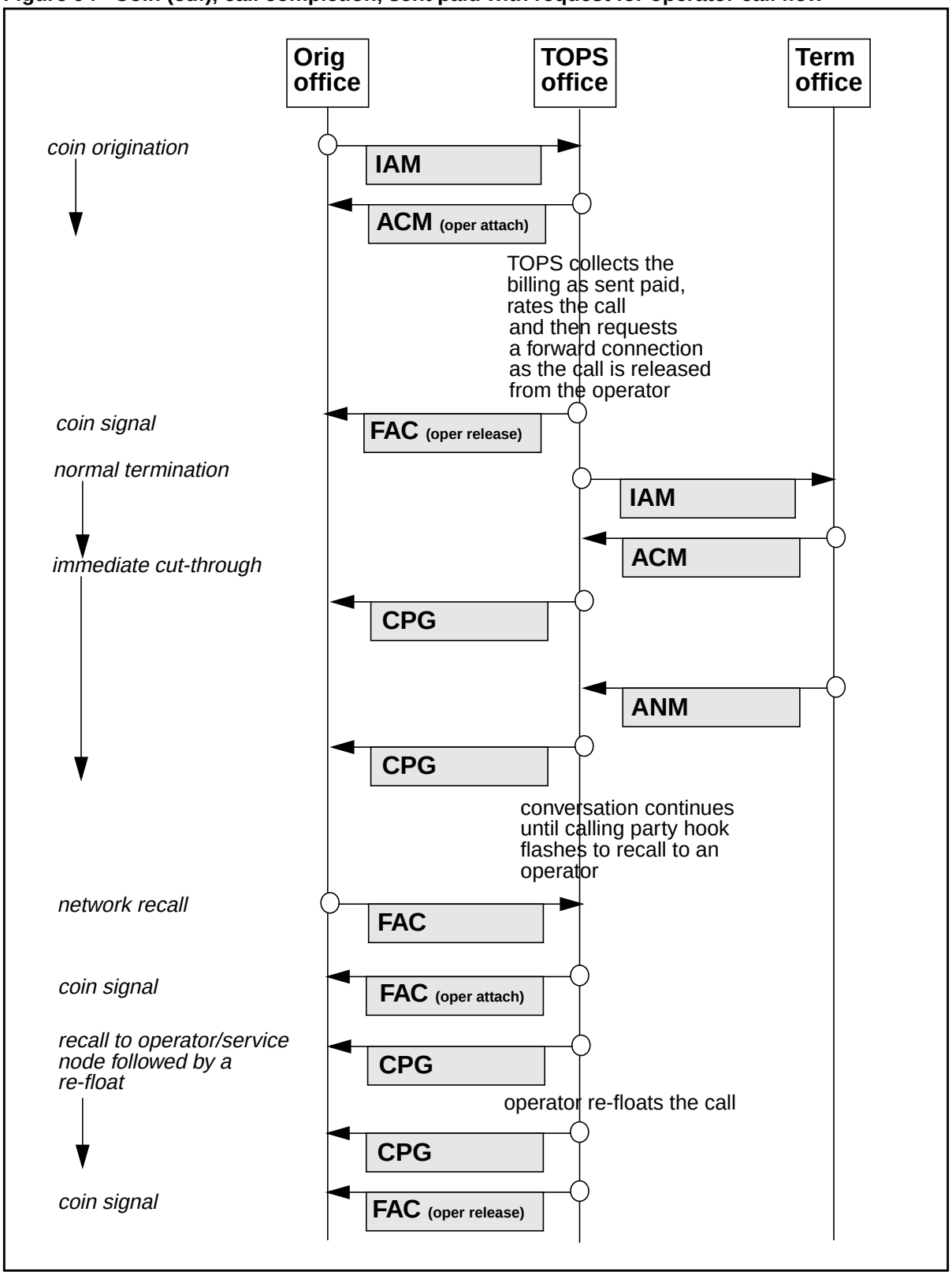


Figure 95 Coin (cdf), call completion, sent paid with request for operator call flow (continued)

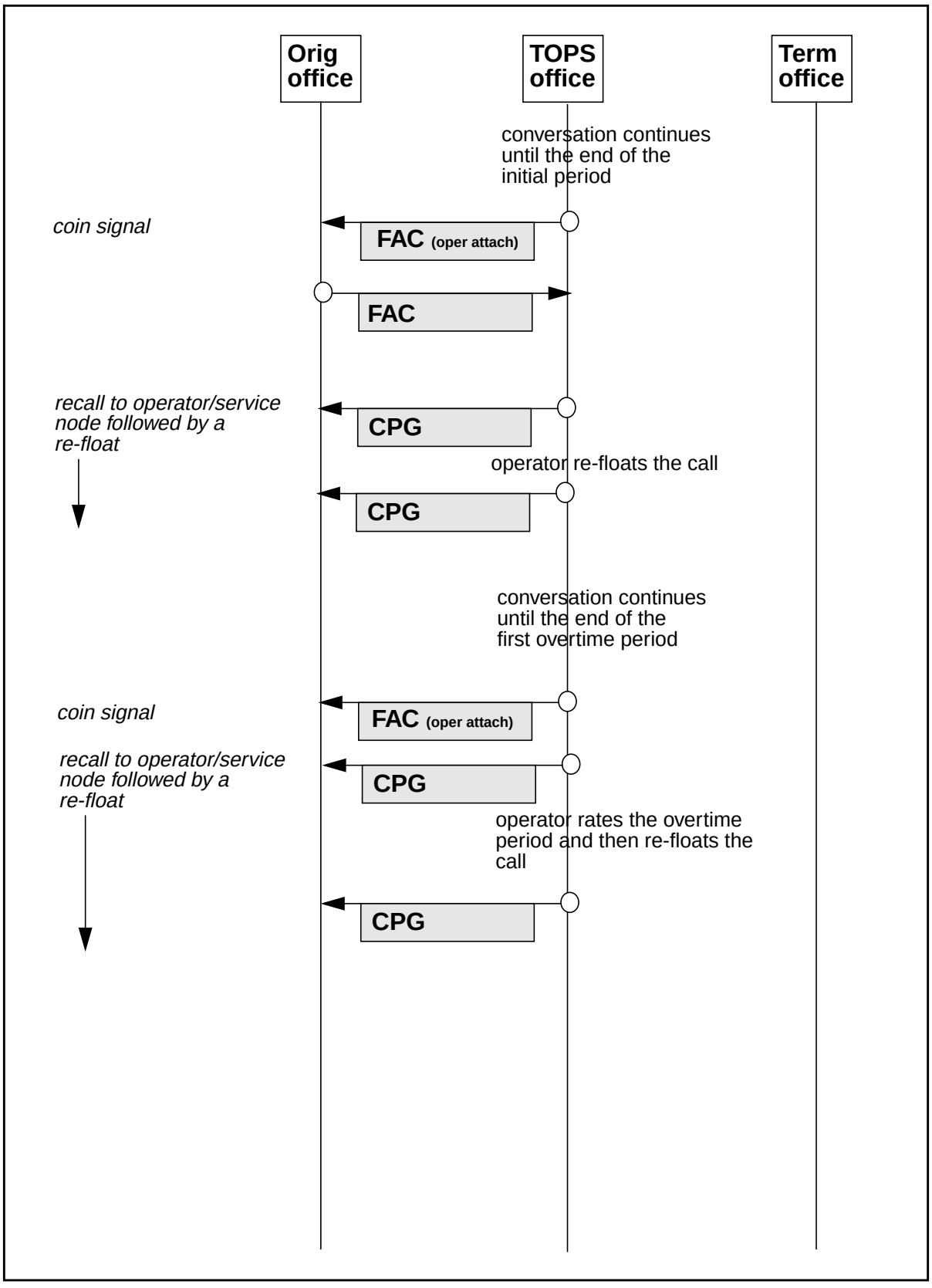
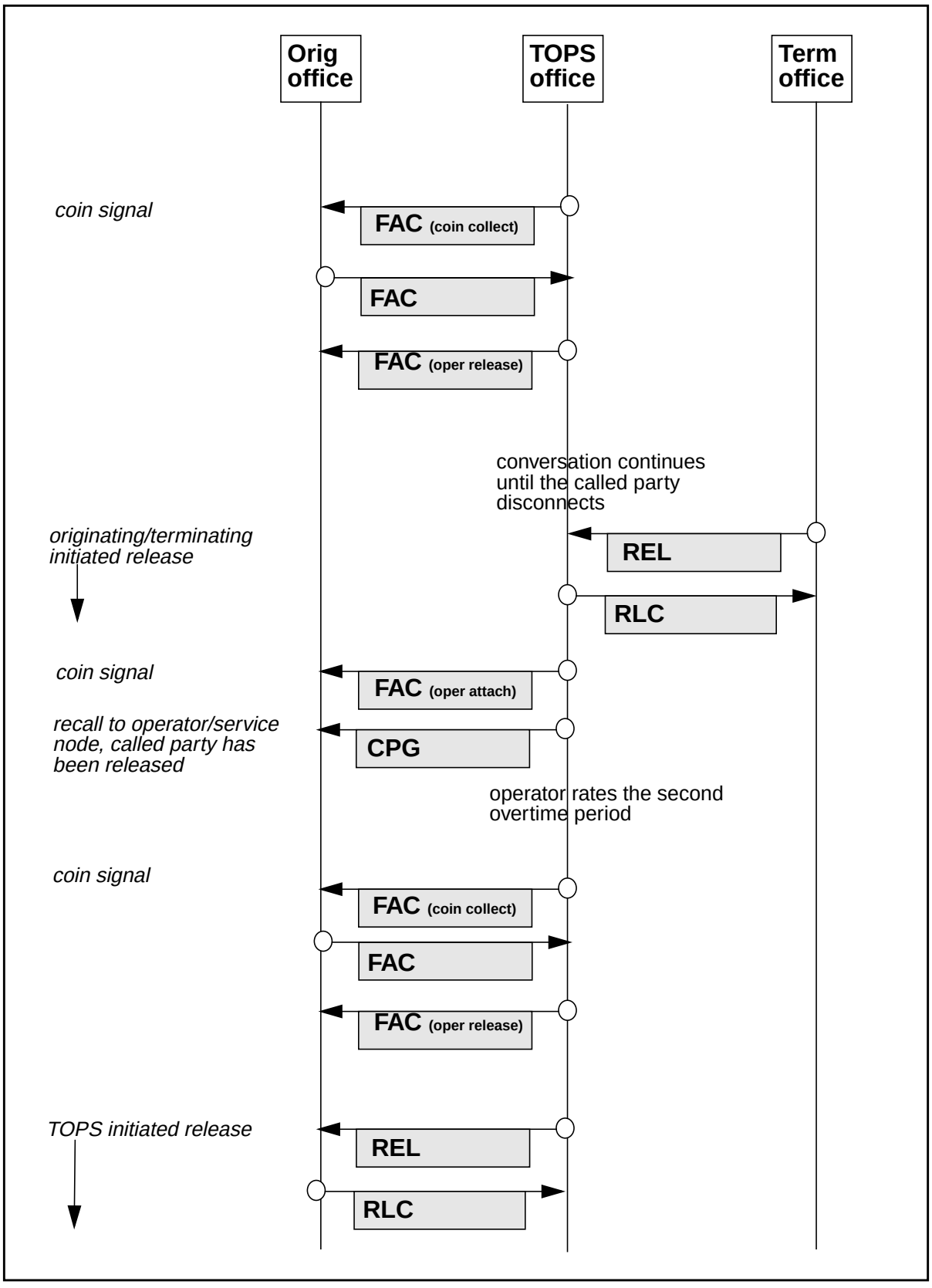
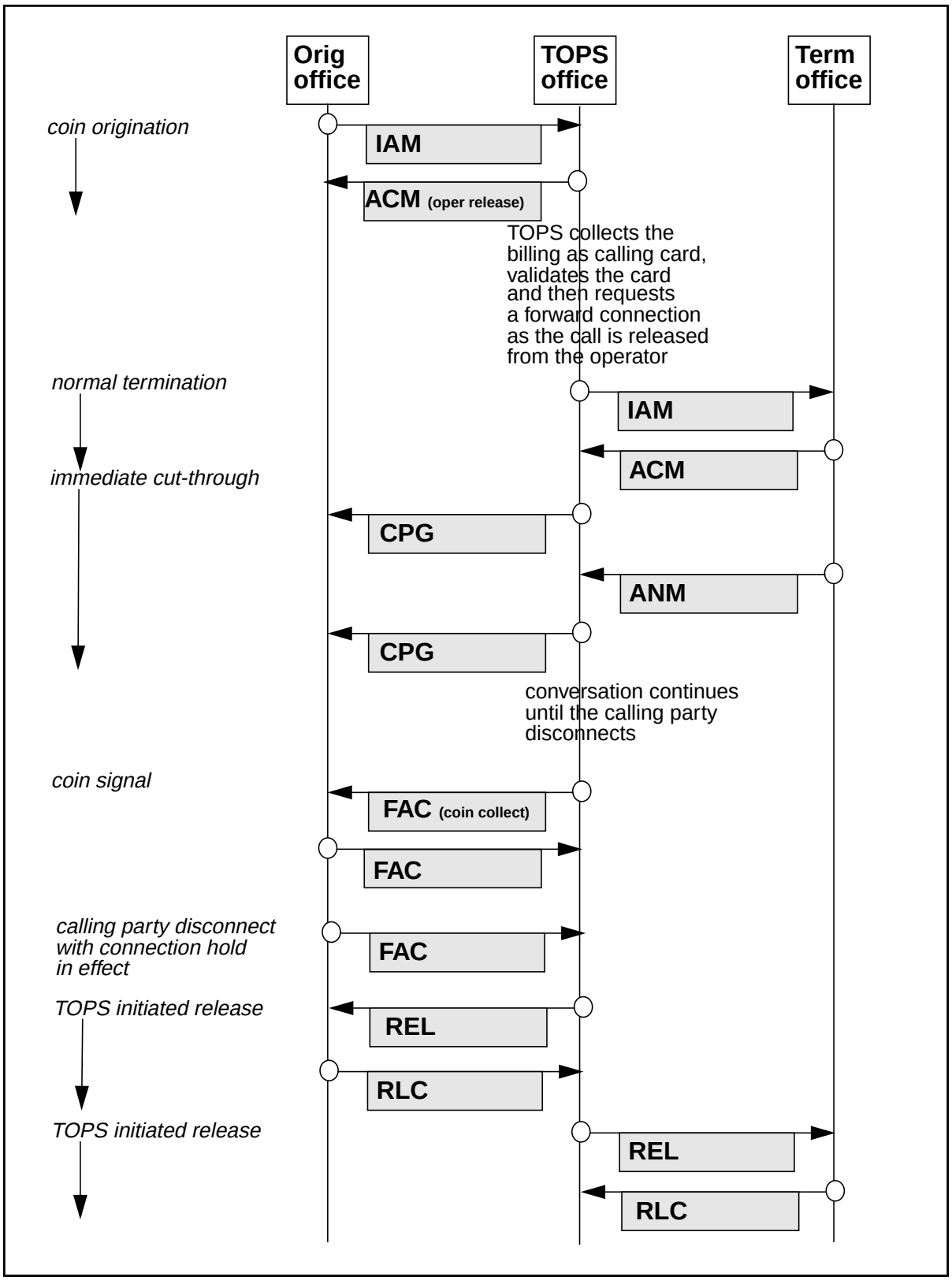

Orig office
TOPS office
Term office
conversation continues until the end of the initial period
coin signal
FAC (oper attach)
FAC
recall to operator/service node followed by a re-float
CPG
operator re-floats the call
CPG
conversation continues until the end of the first overtime period
coin signal
FAC (oper attach)
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG

Figure 96 Coin (cdf), call completion, sent paid with request for operator call flow (continued)


Orig office
TOPS office
Term office
coin signal
FAC (coin collect)
FAC
FAC (oper release)
conversation continues until the called party disconnects
originating/terminating initiated release
REL
RLC
coin signal
FAC (oper attach)
recall to operator/service node, called party has been released
CPG
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
FAC (oper release)
TOPS initiated release
REL
RLC

Calling card

Figure 97 Coin (cdf), call completion, calling card call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM (oper release)
TOPS collects the billing as calling card, validates the card and then requests a forward connection as the call is released from the operator
normal termination
IAM
immediate cut-through
ACM
CPG
ANM
CPG
conversation continues until the calling party disconnects
coin signal
FAC (coin collect)
FAC
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Third number

Figure 98 Coin (cdf), call completion, third number call flow

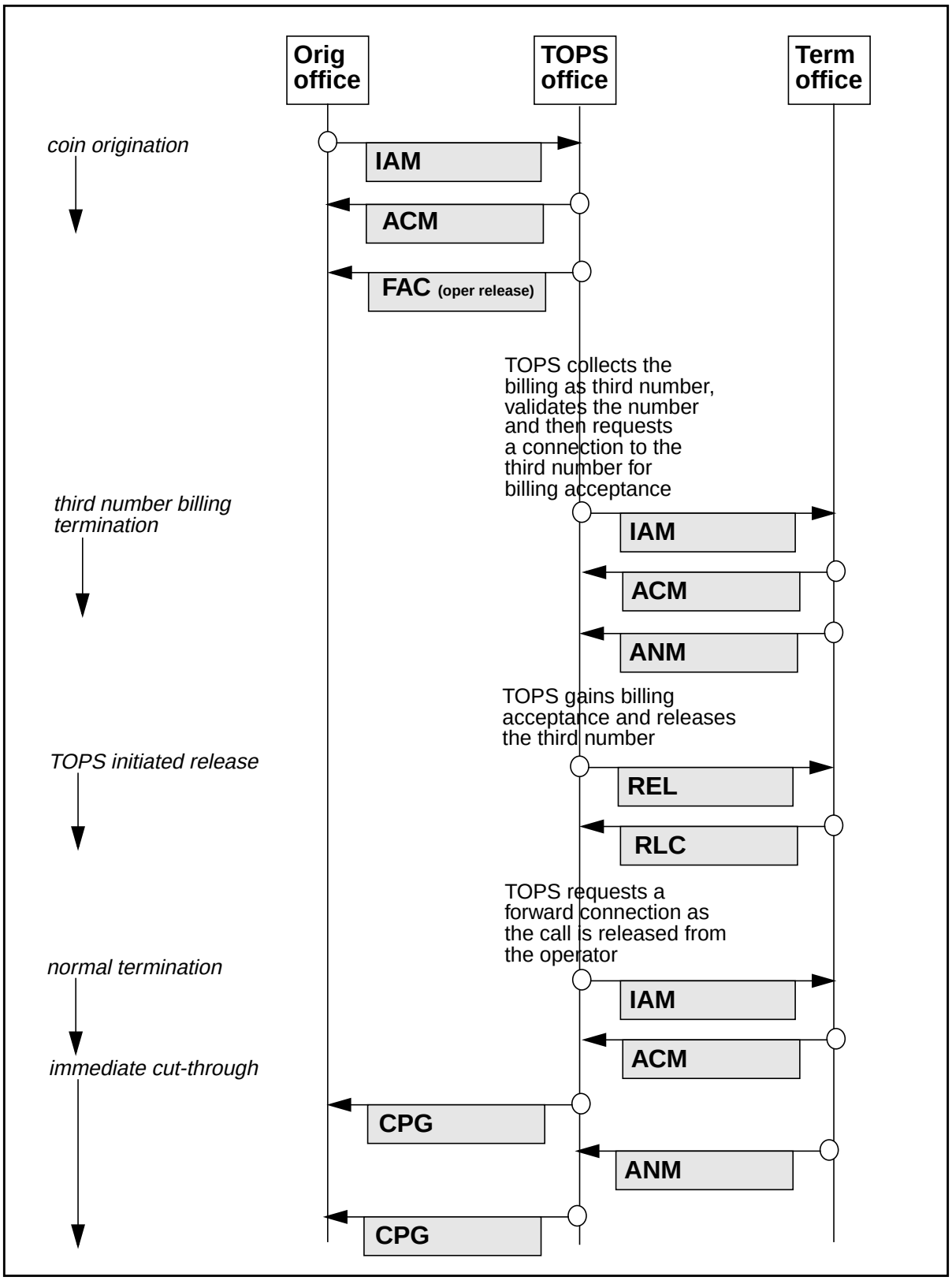
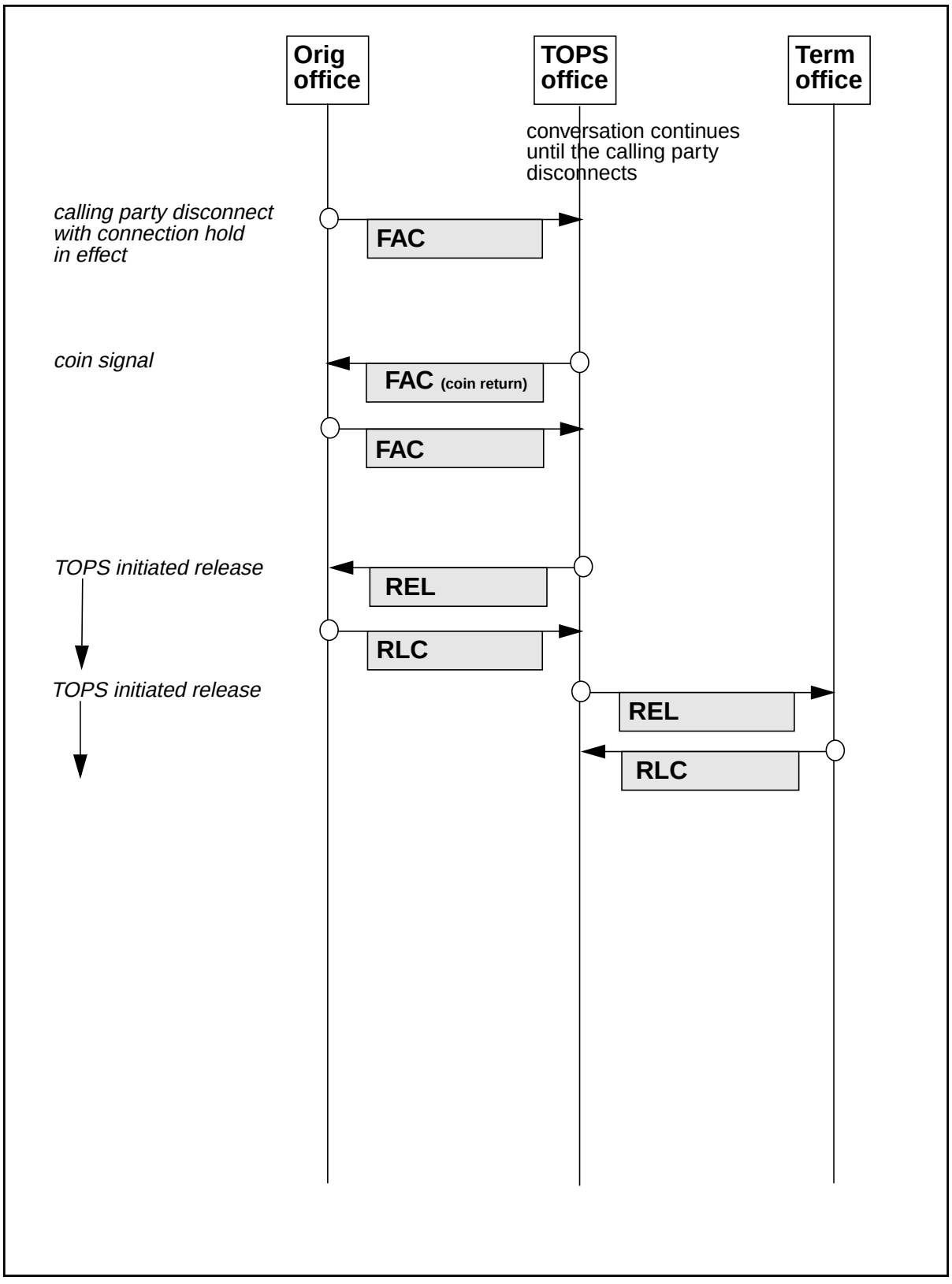
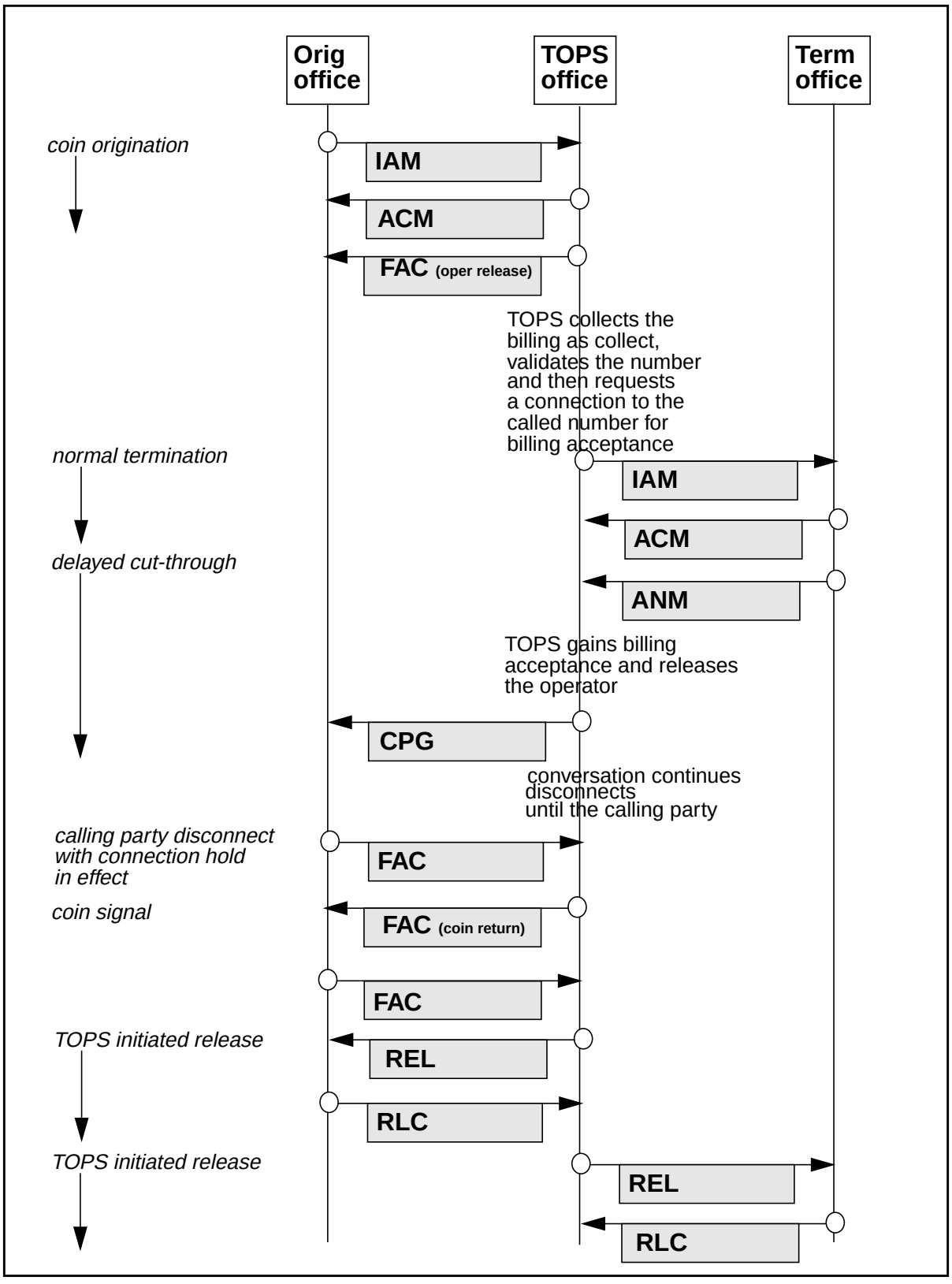

Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (oper release)
TOPS collects the billing as third number, validates the number and then requests a connection to the third number for billing acceptance
third number billing termination
IAM
ACM
ANM
TOPS gains billing acceptance and releases the third number
TOPS initiated release
REL
RLC
TOPS requests a forward connection as the call is released from the operator
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG

Figure 99 Coin (cdf), call completion, third number call flow (continued)


Orig office
TOPS office
Term office
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
coin signal
FAC (coin return)
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Collect

Figure 100 Coin (cdf), call completion, collect call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (oper release)
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
normal termination
IAM
ACM
delayed cut-through
ANM
TOPS gains billing acceptance and releases the operator
CPG
conversation continues disconnects until the calling party
calling party disconnect with connection hold in effect
FAC
coin signal
FAC (coin return)
FAC
TOPS initiated release
REL
RLC
TOPS initiated release
REL
RLC

Ring back

Figure 101 Coin (cdf), call completion, ring back call flow

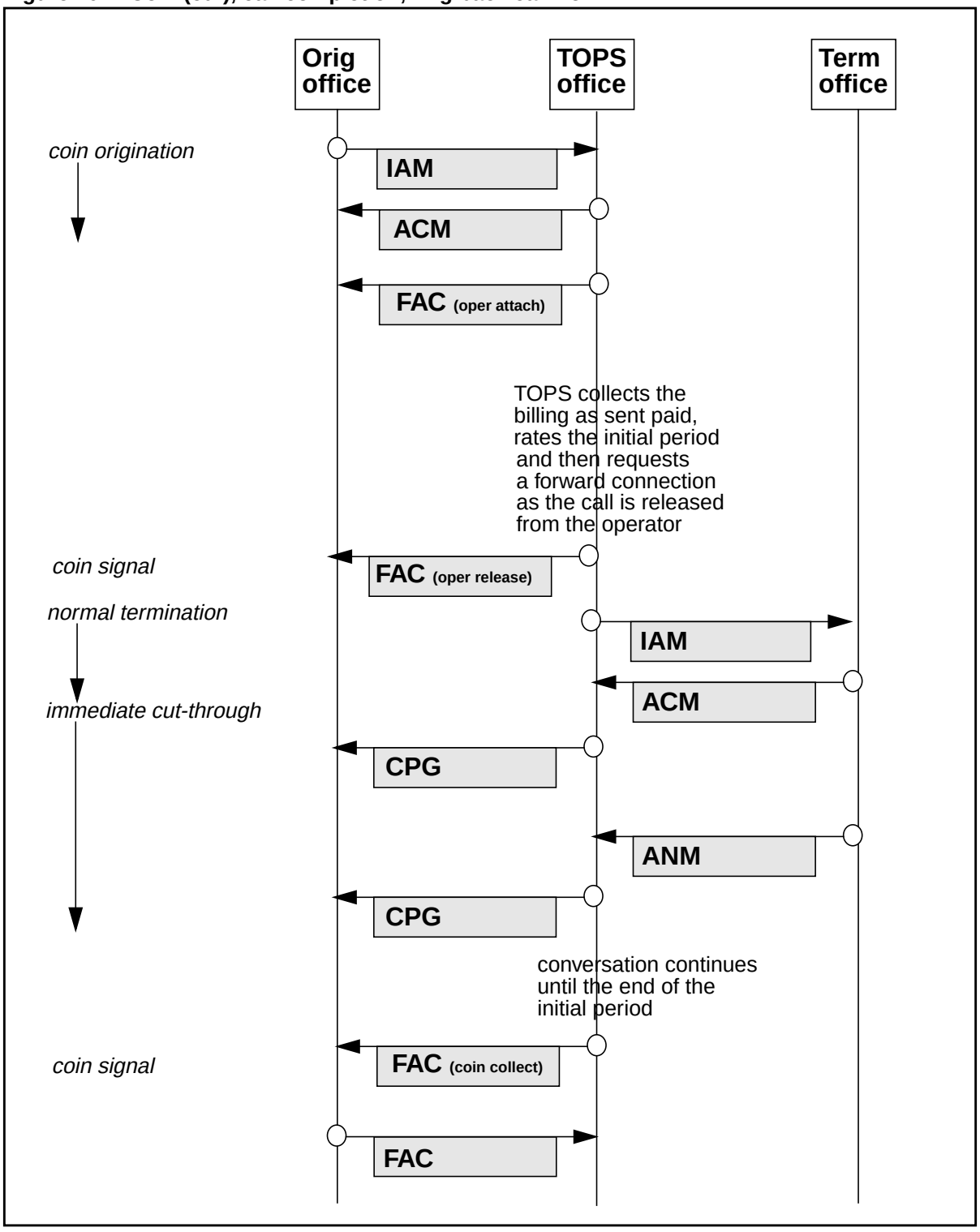


Figure 102 Coin (cdf), call completion, ring back call flow (continued)

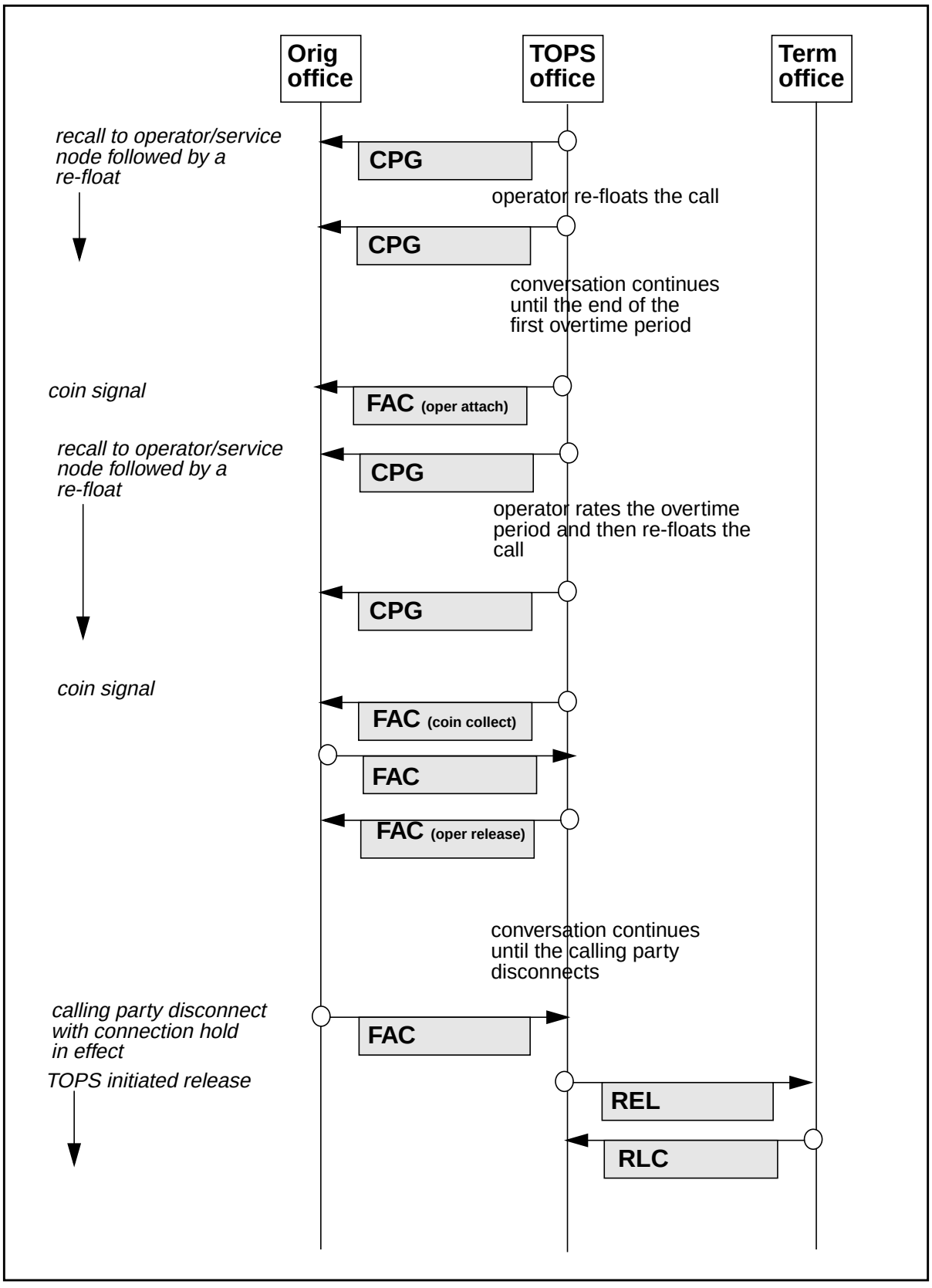
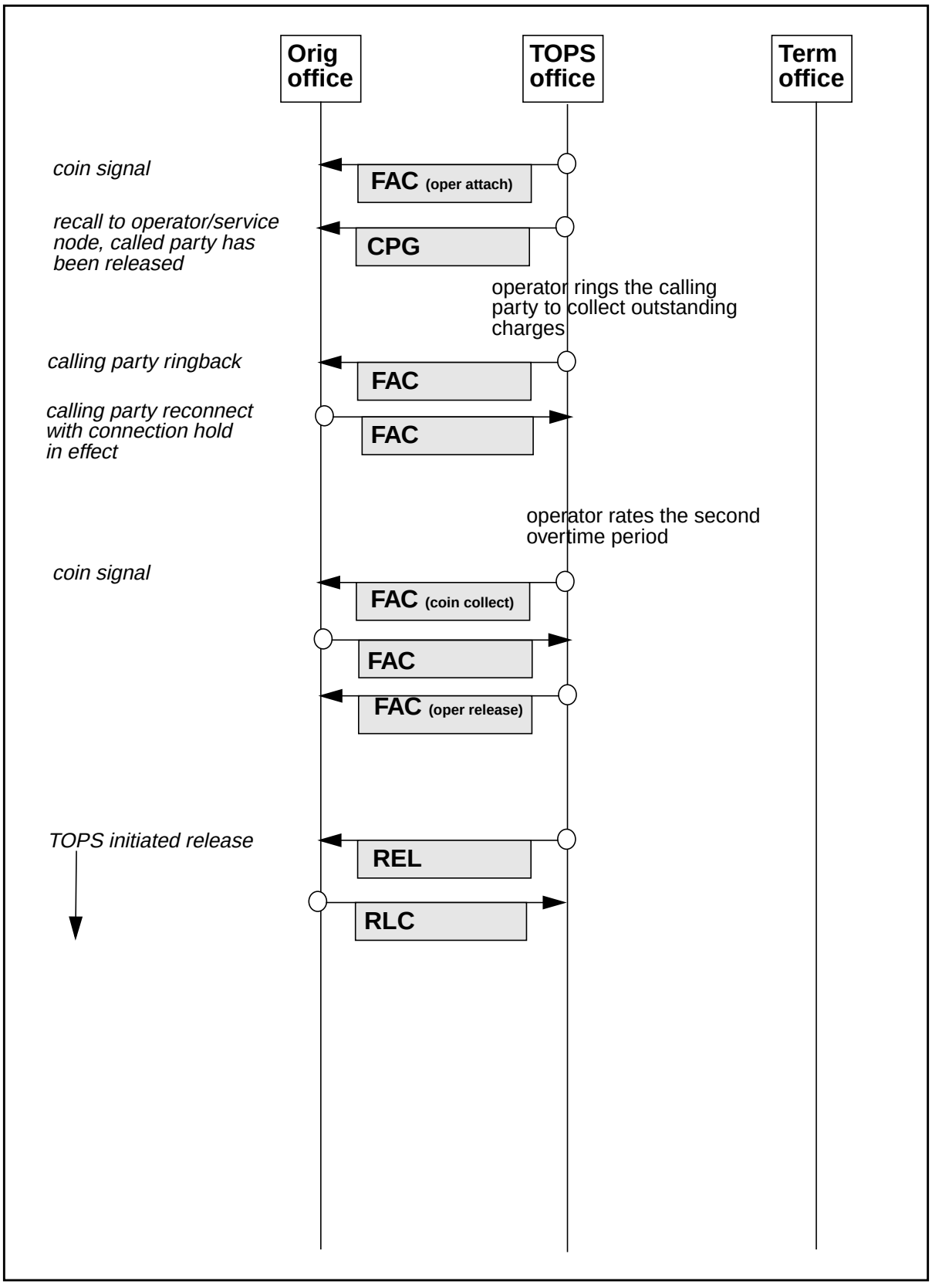

Orig office
TOPS office
Term office
recall to operator/service node followed by a re-float
CPG
operator re-floats the call
CPG
conversation continues until the end of the first overtime period
coin signal
FAC (oper attach)
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
coin signal
FAC (coin collect)
FAC
FAC (oper release)
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Figure 103 Coin (cdf), call completion, ring back call flow (continued)


Orig office
TOPS office
Term office
coin signal
FAC (oper attach)
recall to operator/service node, called party has been released
CPG
operator rings the calling party to collect outstanding charges
calling party ringback
FAC
calling party reconnect with connection hold in effect
FAC
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
FAC (oper release)
TOPS initiated release
REL
RLC

Directory assistance service

Sent paid

Figure 104 Coin (cdf), directory assistance, sent paid call flow

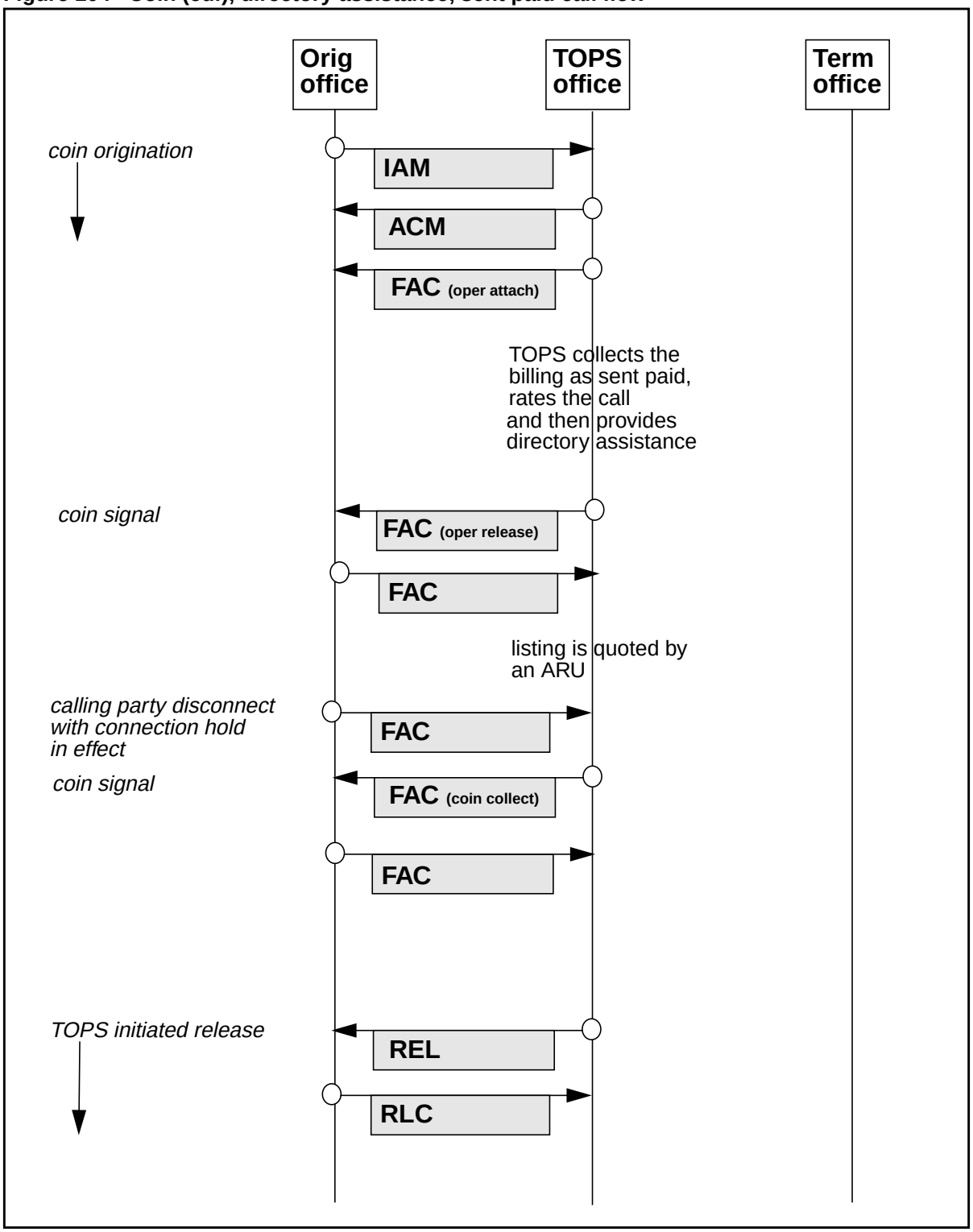
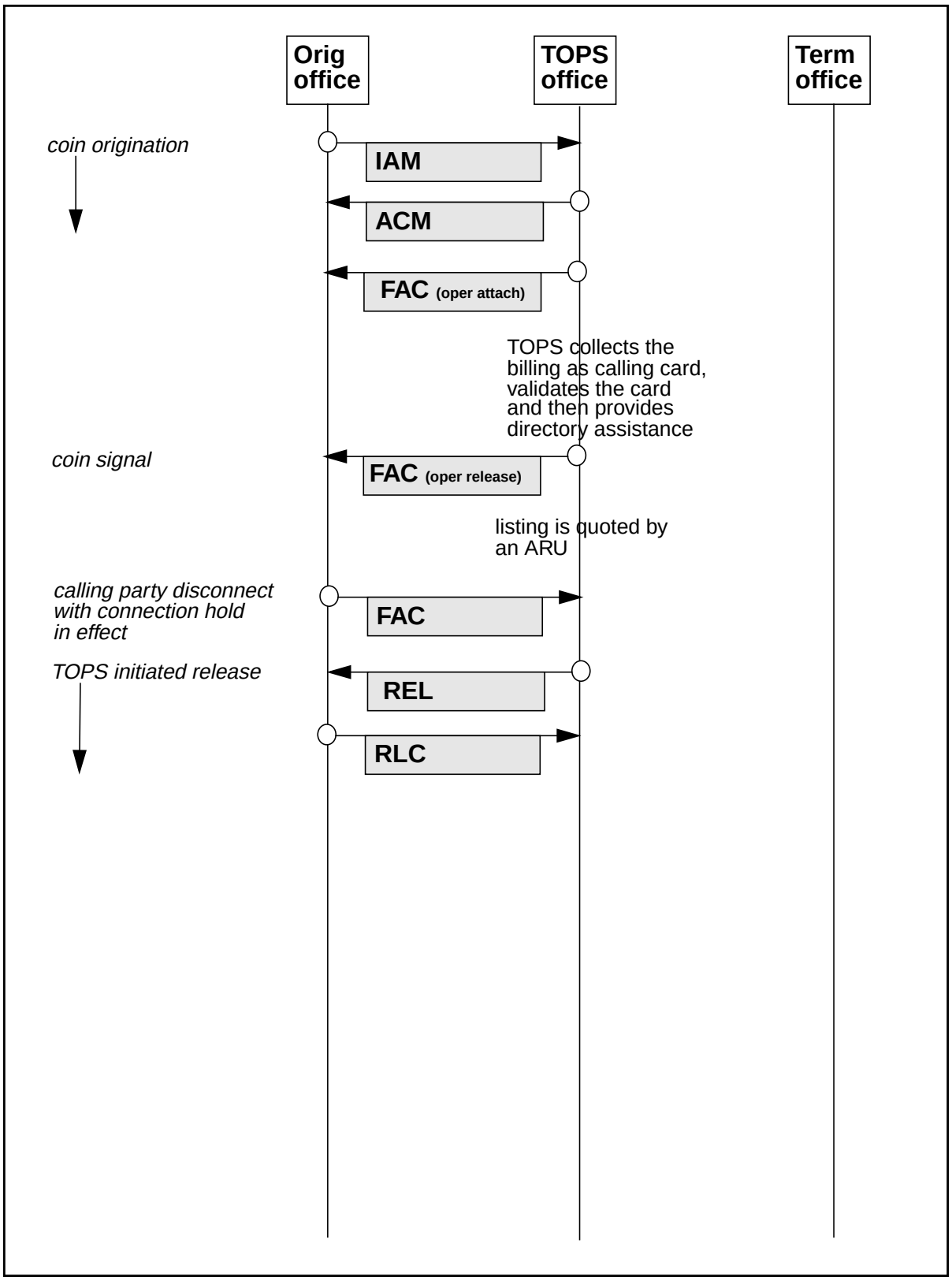
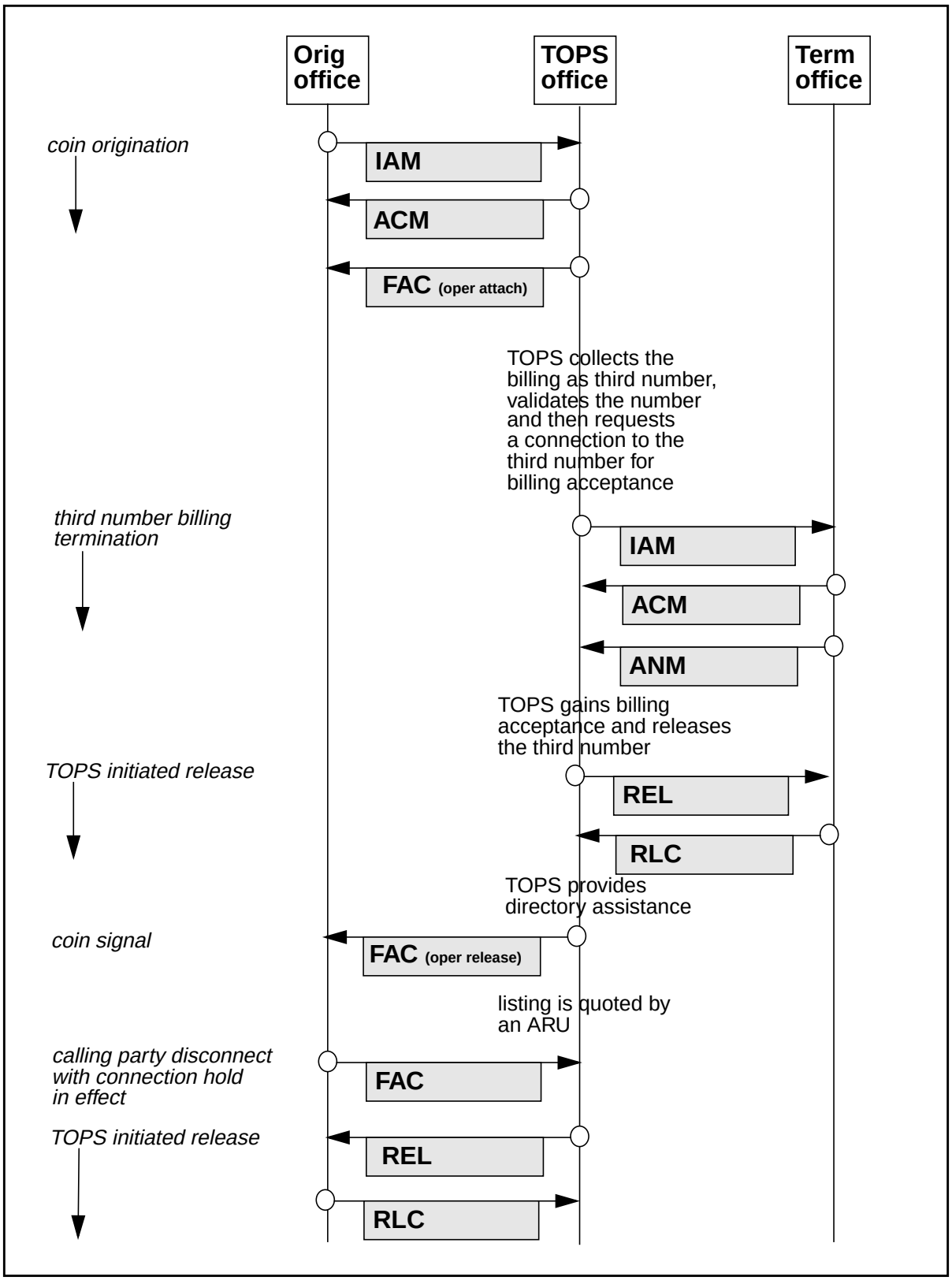


Figure 105 Coin (cdf), directory assistance, calling card call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (oper attach)
TOPS collects the billing as calling card, validates the card and then provides directory assistance
coin signal
FAC (oper release)
listing is quoted by an ARU
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Third number

Figure 106 Coin (cdf), directory assistance, third number call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (oper attach)
TOPS collects the billing as third number, validates the number and then requests a connection to the third number for billing acceptance
third number billing termination
IAM
ACM
ANM
TOPS gains billing acceptance and releases the third number
TOPS initiated release
REL
RLC
TOPS provides directory assistance
coin signal
FAC (oper release)
listing is quoted by an ARU
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC

Directory assistance with call completion service

Figure 107 Coin (cdf), directory assistance with call completion call flow

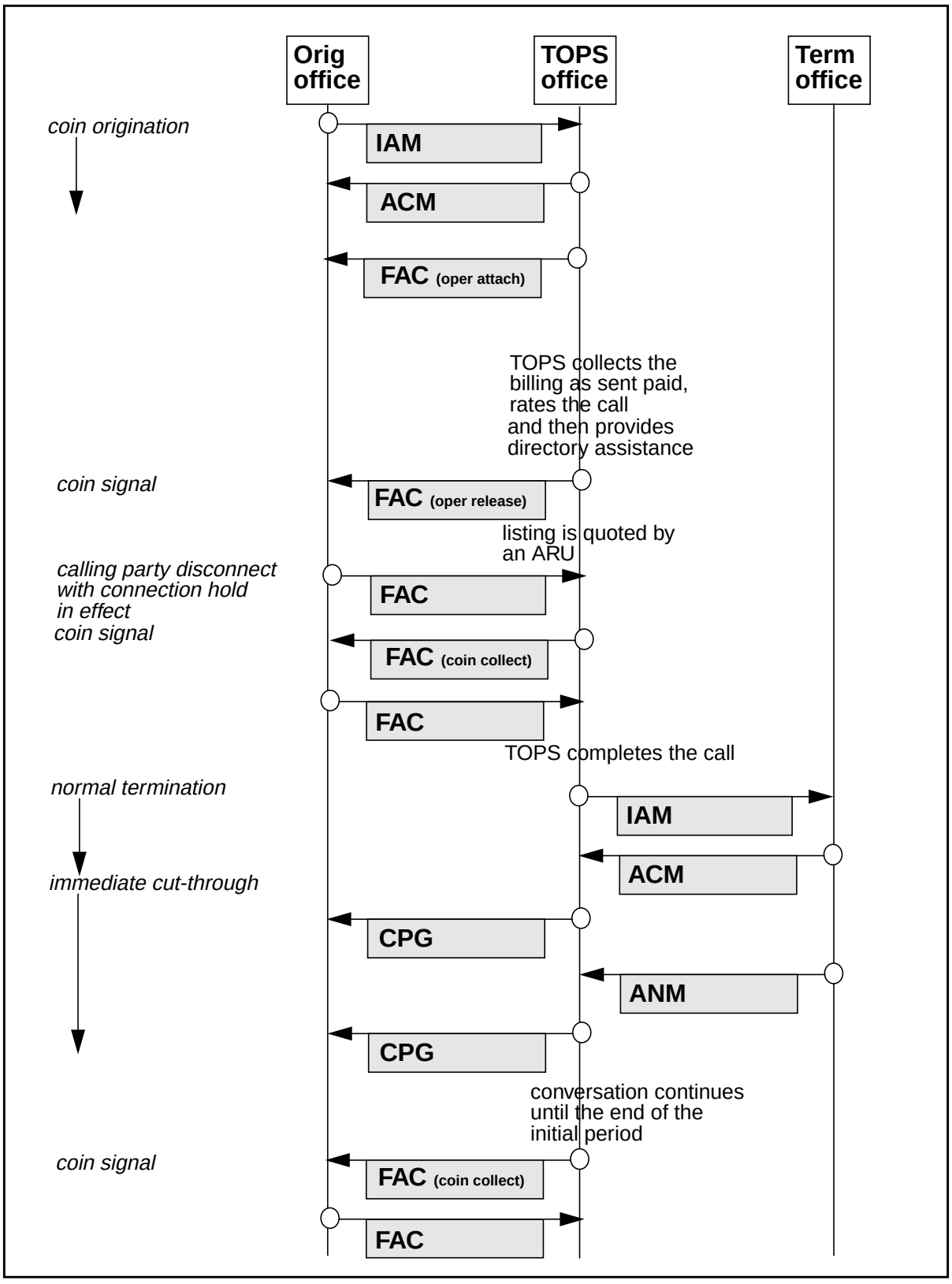
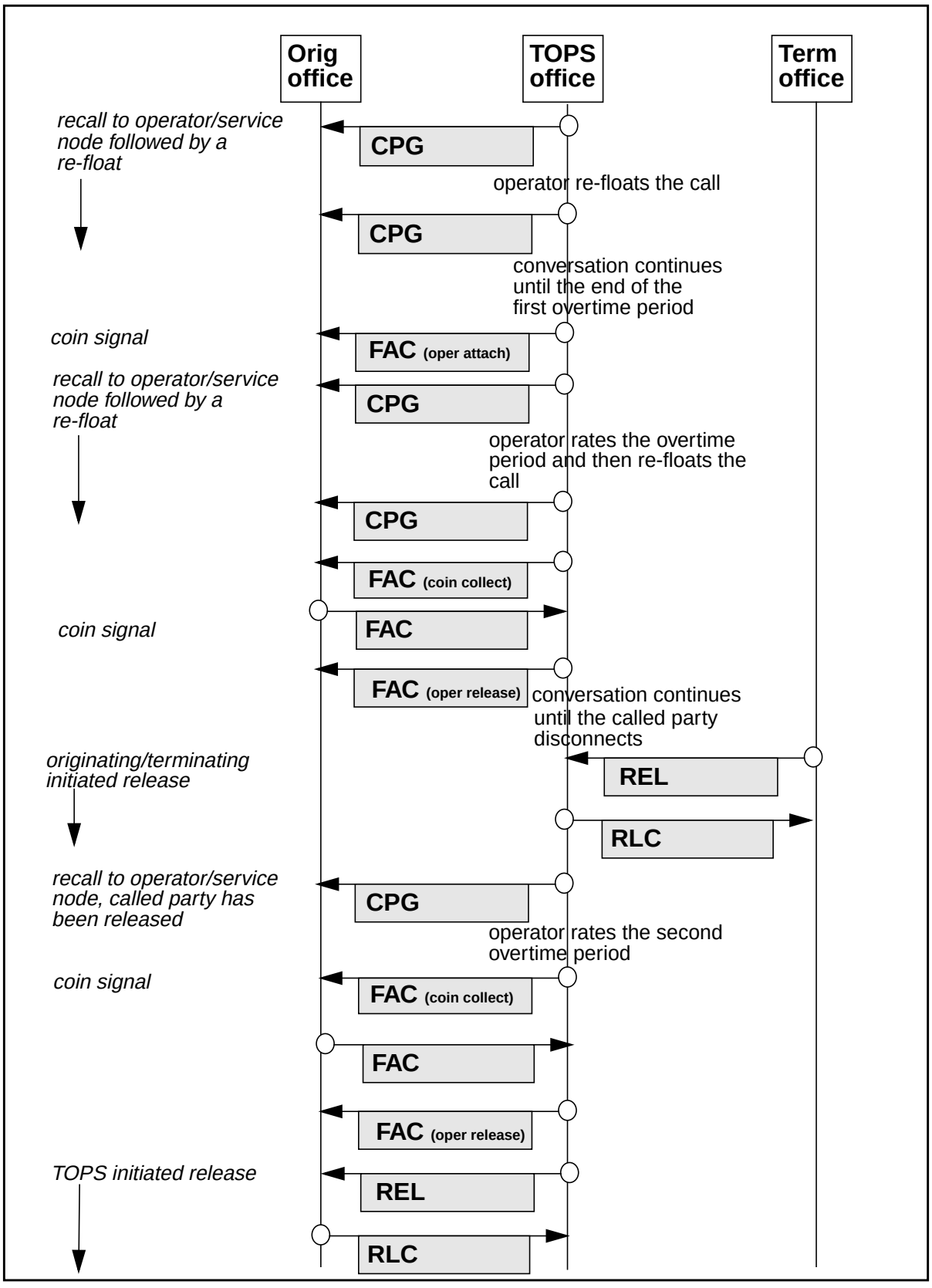
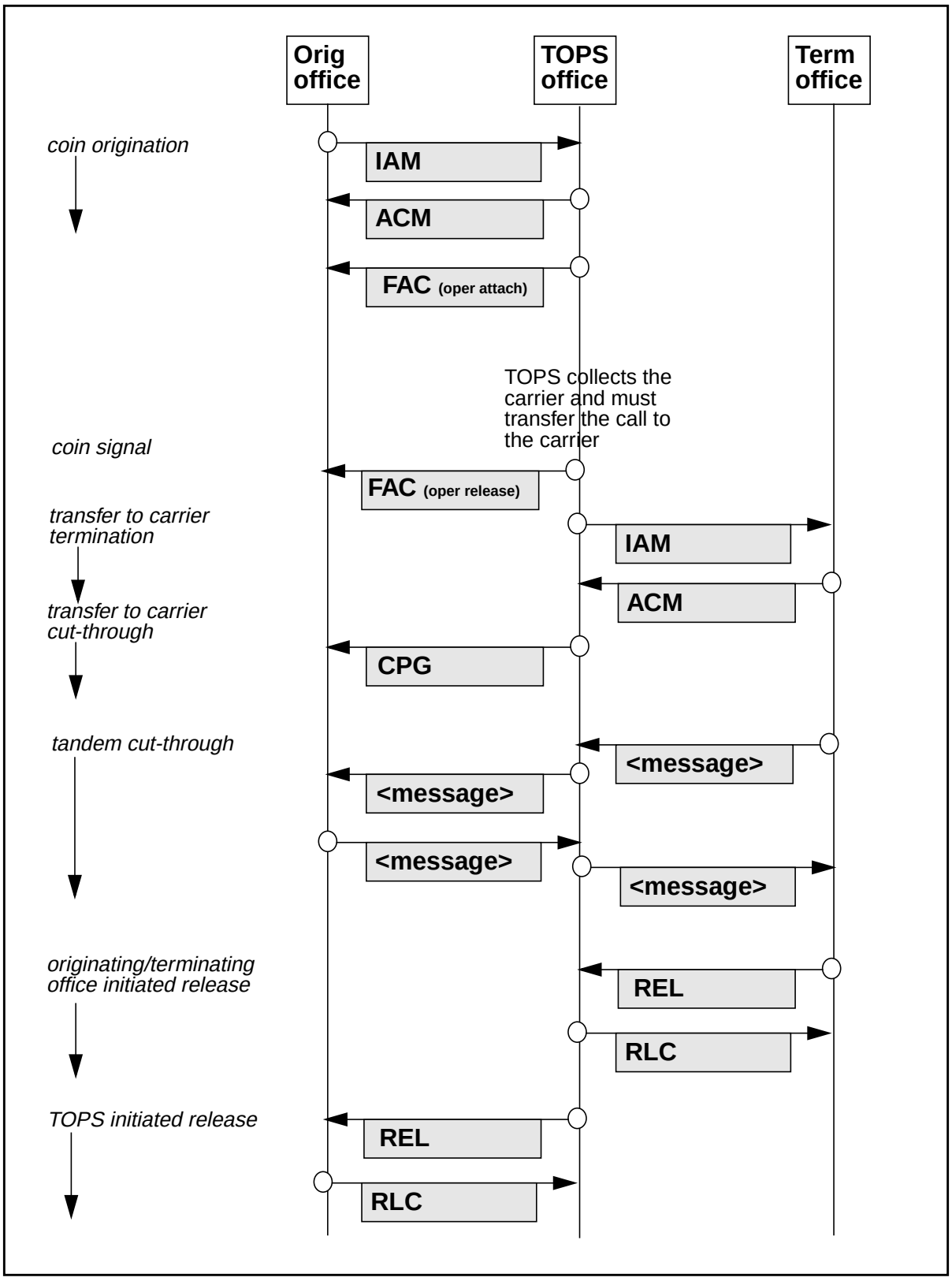

Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (oper attach)
TOPS collects the billing as sent paid, rates the call and then provides directory assistance
coin signal
FAC (oper release)
listing is quoted by an ARU
calling party disconnect with connection hold in effect
coin signal
FAC
FAC (coin collect)
FAC
TOPS completes the call
normal termination
IAM
ACM
immediate cut-through
CPG
ANM
CPG
conversation continues until the end of the initial period
coin signal
FAC (coin collect)
FAC

Figure 108 Coin (cdf), directory assistance with call completion call flow (continued)


Orig office
TOPS office
Term office
recall to operator/service node followed by a re-float
CPG
operator re-floats the call
CPG
conversation continues until the end of the first overtime period
coin signal
FAC (oper attach)
recall to operator/service node followed by a re-float
CPG
operator rates the overtime period and then re-floats the call
CPG
FAC (coin collect)
coin signal
FAC
FAC (oper release)
conversation continues until the called party disconnects
originating/terminating initiated release
REL
RLC
recall to operator/service node, called party has been released
CPG
operator rates the second overtime period
coin signal
FAC (coin collect)
FAC
FAC (oper release)
TOPS initiated release
REL
RLC

Transfer to carrier service

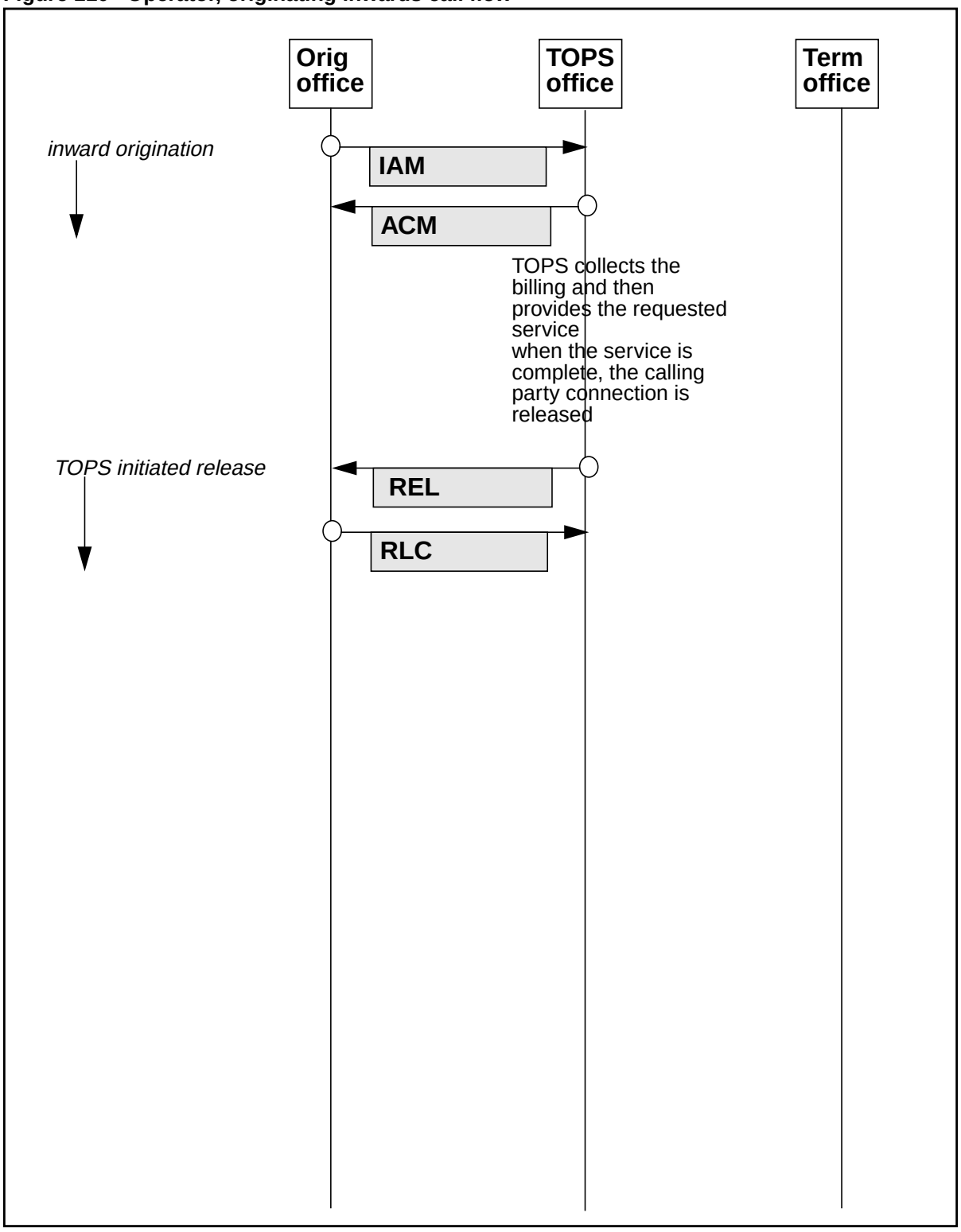
Figure 109 Coin (cdf), transfer to carrier service call flow


Orig office
TOPS office
Term office
coin origination
IAM
ACM
FAC (oper attach)
TOPS collects the carrier and must transfer the call to the carrier
coin signal
FAC (oper release)
transfer to carrier termination
IAM
ACM
transfer to carrier cut-through
CPG
tandem cut-through
<message>
<message>
<message>
<message>
originating/terminating office initiated release
REL
RLC
TOPS initiated release
REL
RLC

Operator originating type

Originating inwards service

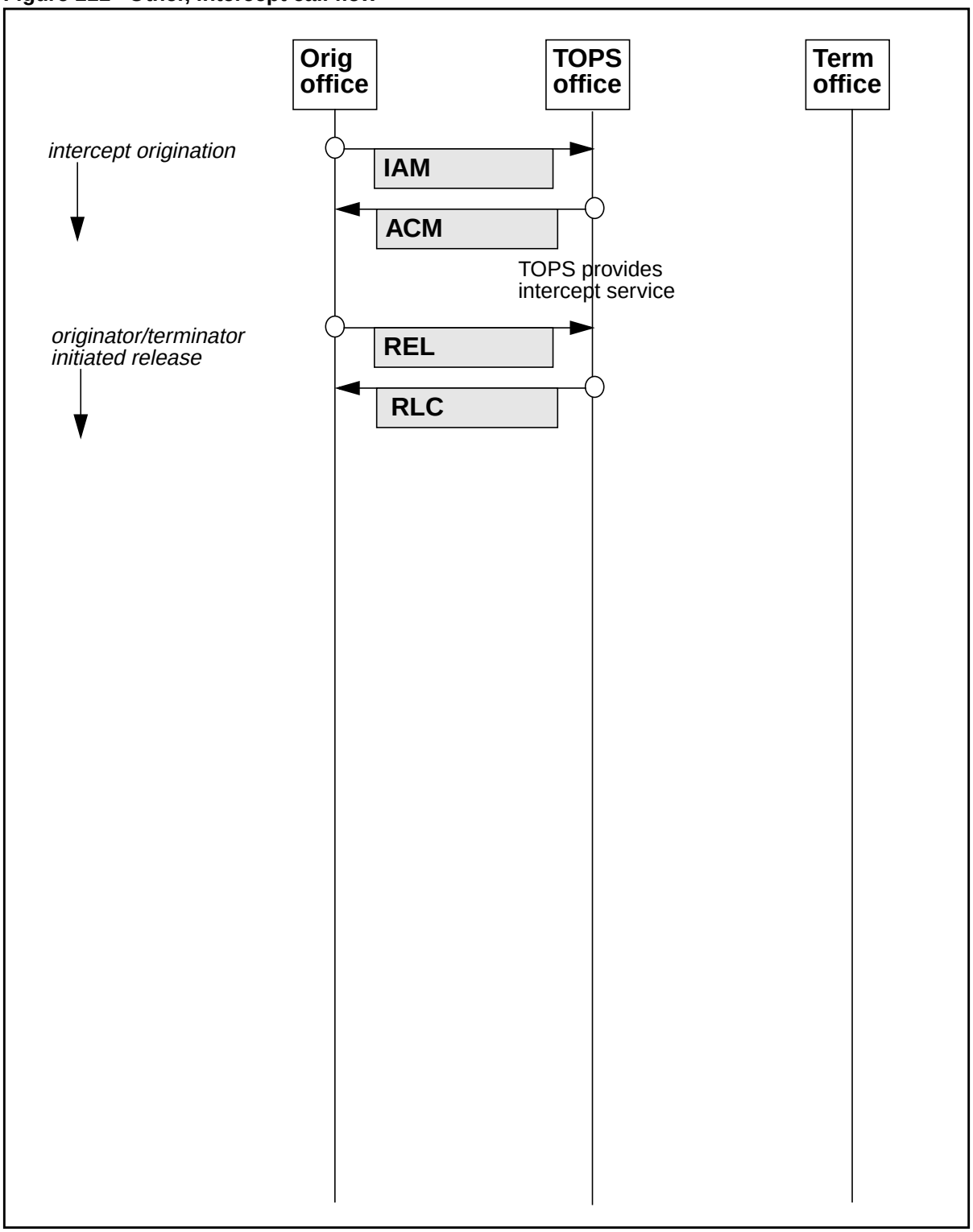
Figure 110 Operator, originating inwards call flow



Other originating types

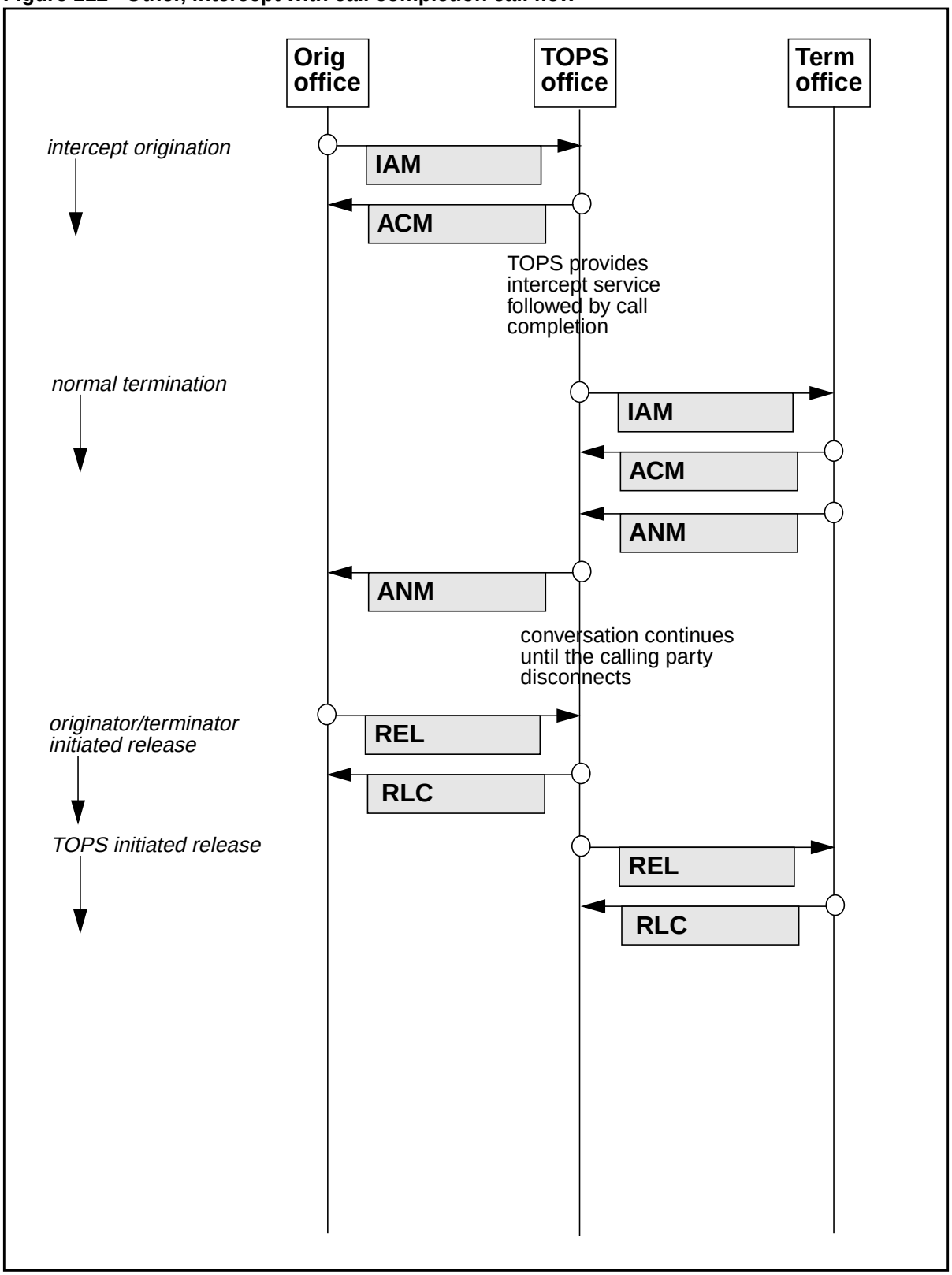
Intercept service

Figure 111 Other, intercept call flow



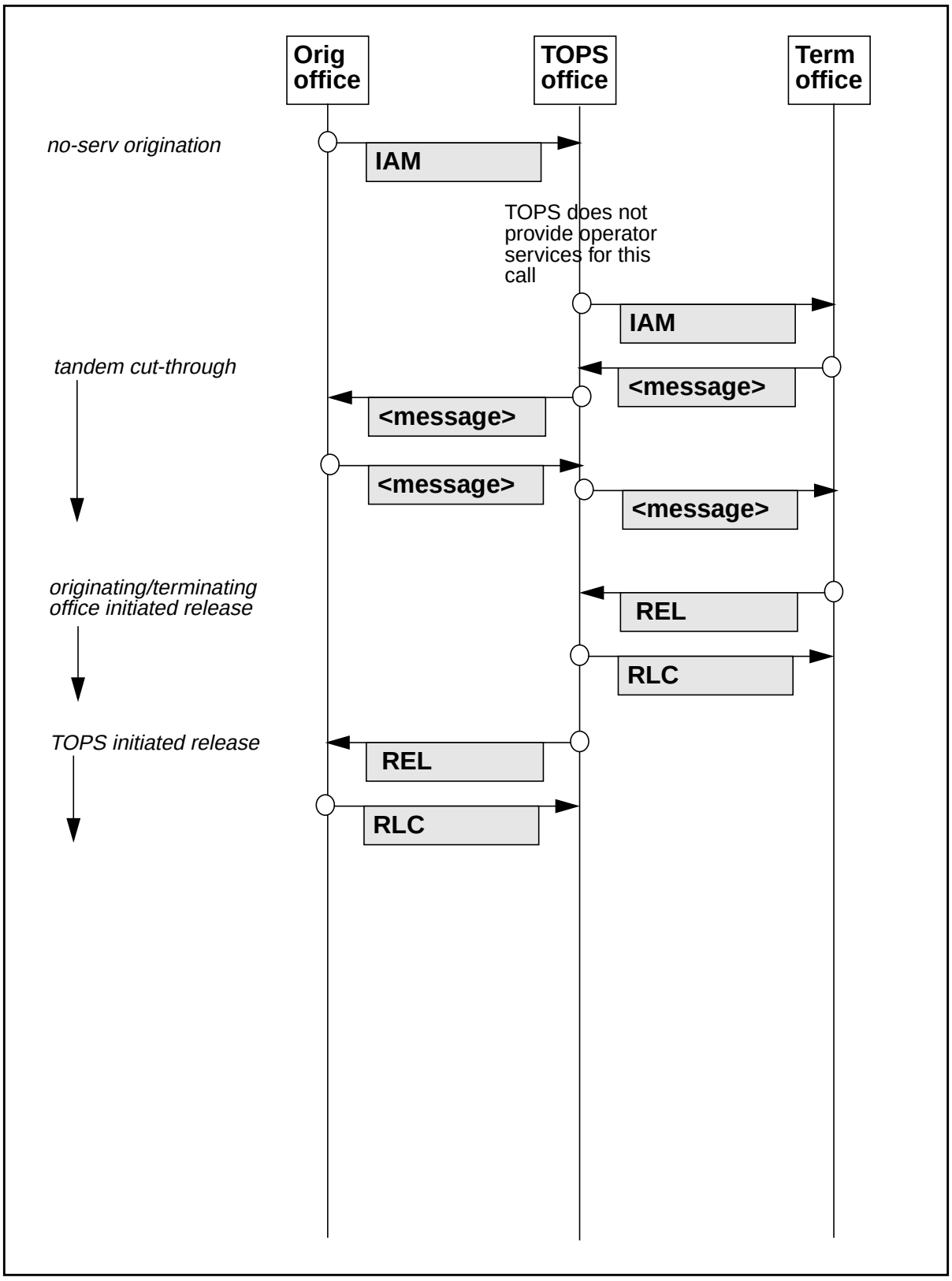
Intercept with call completion service

Figure 112 Other, intercept with call completion call flow



Not served by TOPS

Figure 113 Other, not served by TOPS call flow


Orig office
TOPS office
Term office
no-serv origination
IAM
TOPS does not provide operator services for this call
IAM
tandem cut-through
<message>
<message>
<message>
<message>
originating/terminating office initiated release
REL
RLC
TOPS initiated release
REL
RLC

Part 3: Interactions

Part 3: “Interactions” includes the following chapters:

Chapter 4: Interworking

This chapter discusses the interworking between OSNC and non-OSNC signaling. OSNC capabilities can be provided on both the originating connection and the terminating connection.

Interworking is possible in the scenario in which calls arrive to TOPS with OSNC signaling and terminate with MF signalling. Coin calls, flash, ringback and operator hold functionalities are supported for coin and non-coin calls that occur in this scenario. OSNC incoming calls are supported to terminate to an outgoing access to carrier (ATC) trunk using BELLI or BELLII signaling with either inband or expanded inband signaling and using a Feature Group C (FGC) Carrier Identification Code (CIC). In this case, it is interworking supported for operators working with Traffic Operator Position System (TOPS) and Operator Services Systems Advanced Intelligent Network (OSSAIN).

For coin interworking, this capability is only supported for offices with a direct connection to the carrier office through an ATC trunk. It is unsupported if there is a tandem with Intertoll (IT) trunks between TOPS and the carrier office.

The following table describes the signaling types for each connection and whether or not interworking between them is supported.

Table 92 OSNC signaling interworking

Originating connection signaling		Terminating connection signaling		Supported interworking?
Trunk group type	**Signaling type**	**Trunk group type**	**Signaling type**	
IT or ATC	osnc	IT	osnc	yes
IT or ATC	osnc	IT	TOPS ISUP[a]	yes
IT or ATC	osnc	IT	intertoll (mf)	yes
IT or ATC	osnc	ATC	osnc	yes
IT or ATC	osnc	ATC	TOPS ISUP	yes
IT or ATC	osnc	ATC	eaplan (mf)	yes

Table 92 OSNC signaling interworking

Originating connection signaling		Terminating connection signaling		Supported interworking?
Trunk group type	**Signaling type**	**Trunk group type**	**Signaling type**	
IT or ATC	osnc	ATC	bellii (mf)	yes
IT or ATC	osnc	ATC	belli (mf)	yes
IT or ATC	osnc	ATC	fgb (mf)	no
IT or ATC	osnc	TOPS	intertoll (mf)	no
IT or ATC	osnc	OP	bell (mf)	no
IT or ATC	mf	IT or ATC	osnc	no
TOPS	eaoss (mf)	IT or ATC	osnc	no
TOPS	dani (mf)	IT or ATC	osnc	no
TOPS	amr5 (mf)	IT or ATC	osnc	no
TOPS	bell (mf)	IT or ATC	osnc	no
TOPS	comfgd (mf)	IT or ATC	osnc	no
TOPS	eafgd (mf)	IT or ATC	osnc	no
TOPS	modbell (mf)	IT or ATC	osnc	no
TOPS	oni (mf)	IT or ATC	osnc	no
TOPS	oss (mf)	IT or ATC	osnc	no
TOPS	ais (mf)	IT or ATC	osnc	no

a. Refer to feature AN1515: ISUP to TOPS Enhancements for a description of TOPS ISUP signaling.

The OSNC-to-OSNC interworking call flows are described in “Chapter 3: Example Flows” on page 203. “Chapter 4: Interworking” describes example call flows for the remaining supported signaling interworkings.

The interworking complexities center around establishing cut-through. The interworking examples detailed in this chapter describe focus on the following situations:

- immediate cut-through
- delayed cut-through
- transfer to carrier service
- intercept with call completion

The following table provides an alphabetical list of the OSNC interworking call flows and a reference page for each.

Table 93 OSNC interworking call flows

OSNC interworking call flows	Page number
OSNC-to-ATC trunk with belli (mf) signaling, transfer to carrier (non-coin calls)	page 362
OSNC-to-ATC trunk with belli (mf) signaling, coin calls at carrier interworkings	page 364
OSNC-to-ATC trunk with bellii (mf) signaling, transfer to carrier (non-coin calls)	page 366
OSNC-to-ATC trunk with bellii (mf) signaling, coin calls at carrier interworkings	page 369
OSNC-to-ATC trunk with eaplan (mf) signaling, delayed cut through	page 373
OSNC-to-ATC trunk with eaplan (mf) signaling, immediate cut-through	page 371
OSNC-to-ATC trunk with eaplan (mf) signaling, transfer to carrier	page 376
OSNC-to-ATC trunk with TOPS ISUP signaling, delayed cut through	page 381
OSNC-to-ATC trunk with TOPS ISUP signaling, immediate cut-through	page 379
OSNC-to-ATC trunk with TOPS ISUP signaling, transfer to carrier	page 384
OSNC-to-IT trunk with intertoll (mf) signaling, delayed cut-through	page 351
OSNC-to-IT trunk with intertoll (mf) signaling, immediate cut-through	page 350
OSNC-to-IT trunk with intertoll (mf) signaling, intercept call completion	page 354
OSNC-to-IT trunk with TOPS ISUP signaling, delayed cut-through	page 358
OSNC-to-IT trunk with TOPS ISUP signaling, immediate cut-through	page 356

Table 93 OSNC interworking call flows

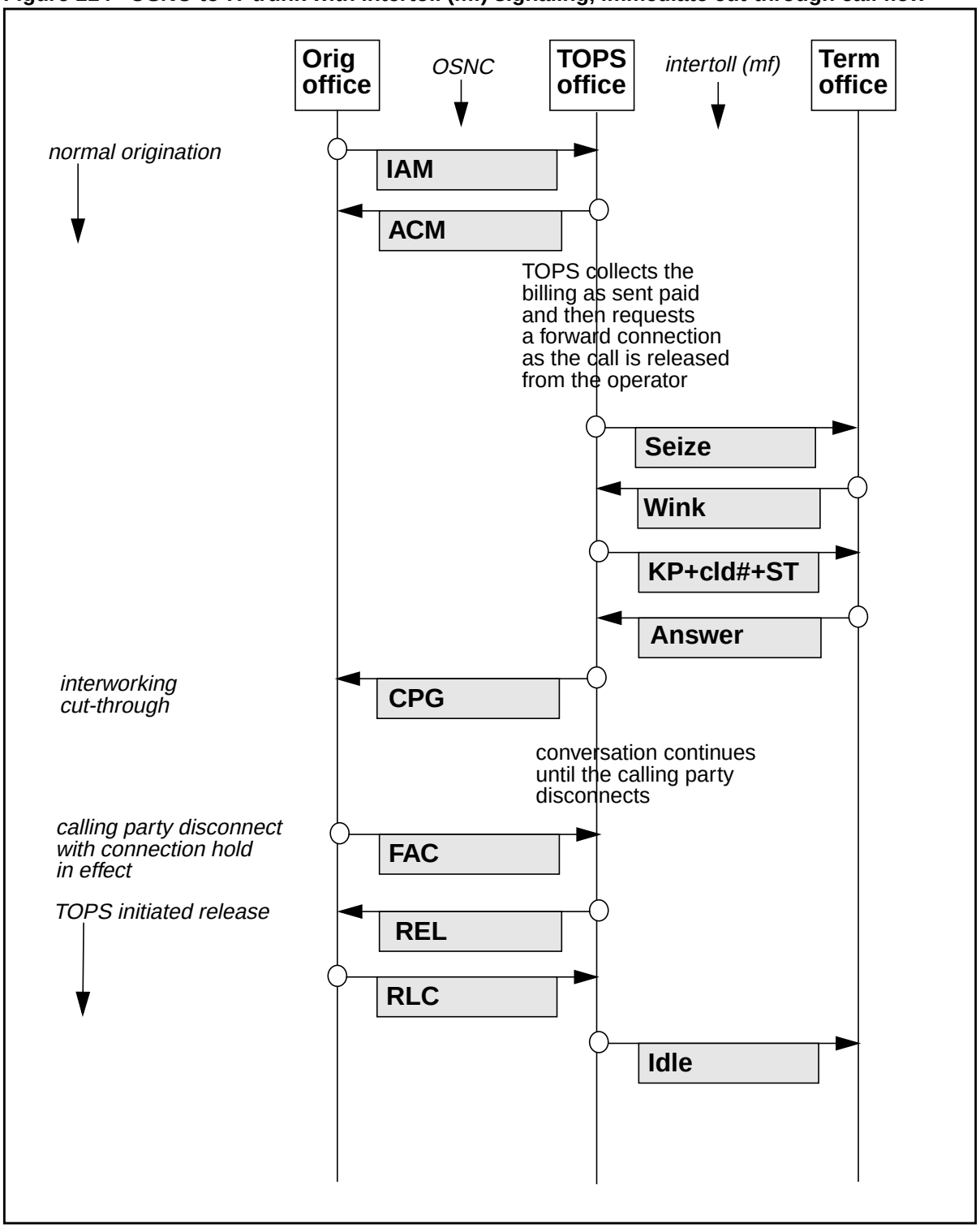
OSNC interworking call flows	Page number
OSNC-to-IT trunk with TOPS ISUP signaling, intercept call completion	page 361

OSNC-to-IT trunk interworking

Intertoll (mf) signaling

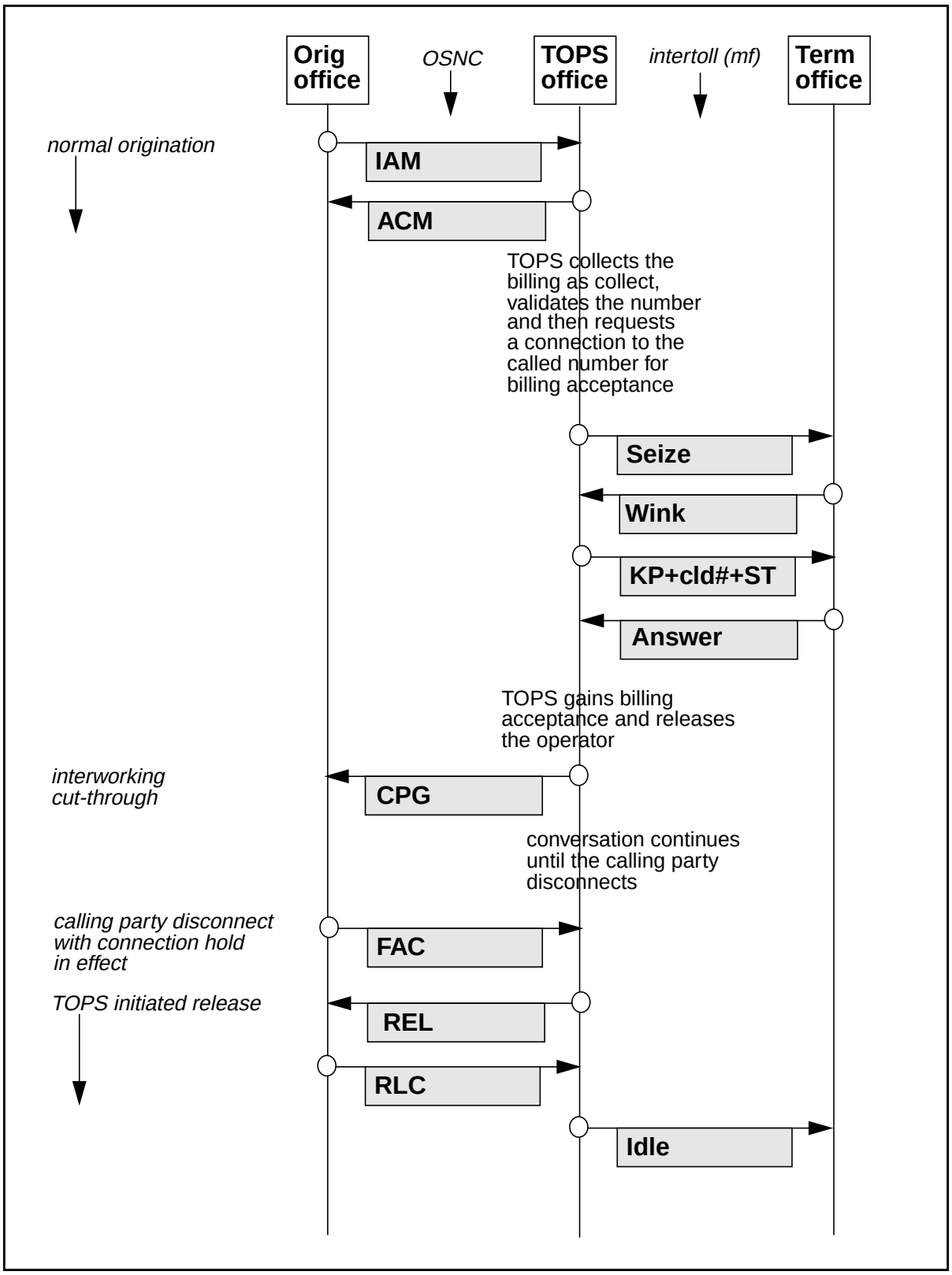
Immediate cut-through

Figure 114 OSNC-to-IT trunk with intertoll (mf) signaling, immediate cut-through call flow



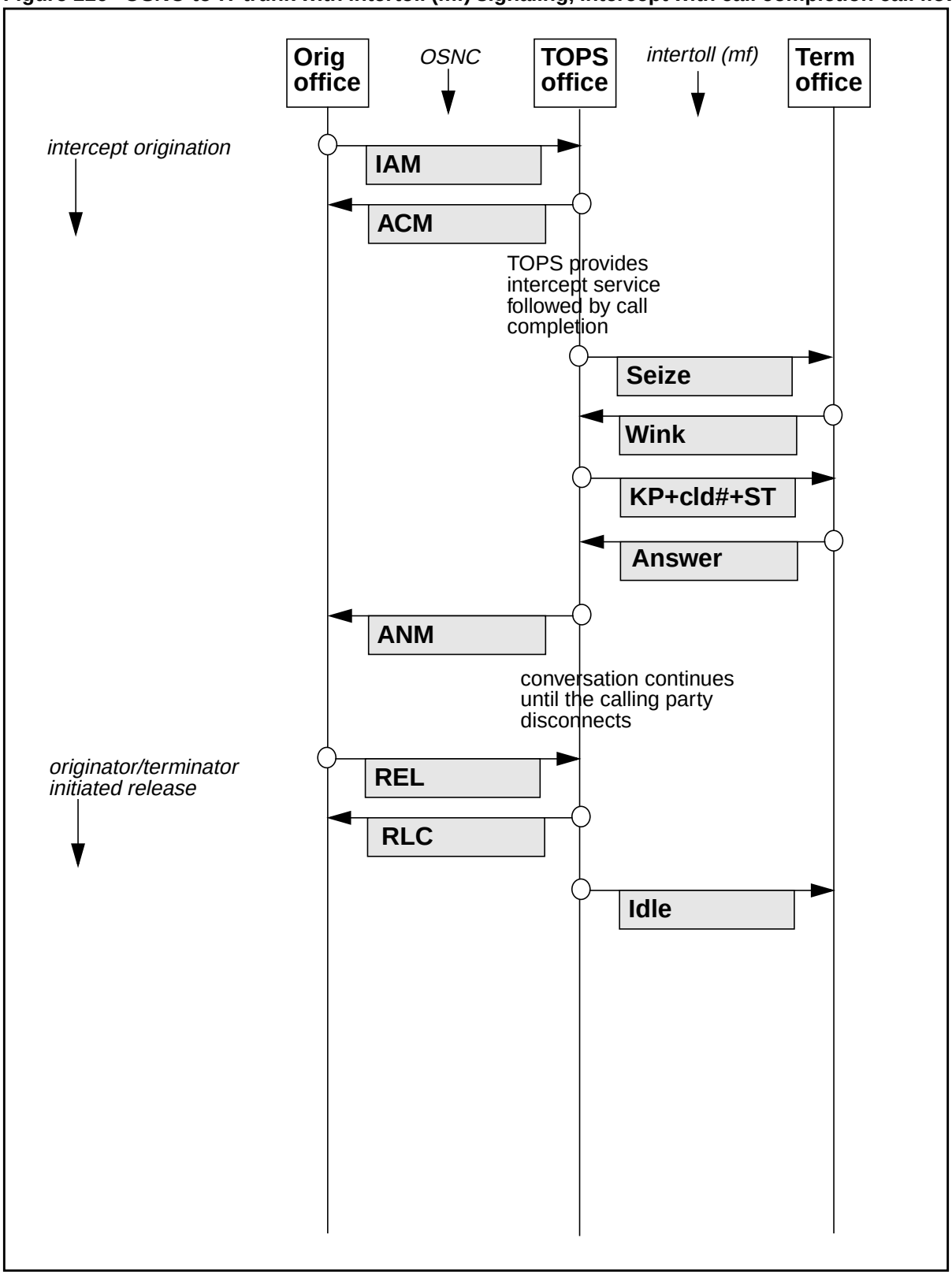
Delayed cut-through

Figure 115 OSNC-to-IT trunk with intertoll (mf) signaling, delayed cut-through call flow


Orig office
OSNC
TOPS office
intertoll (mf)
Term office
normal origination
IAM
ACM
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
Seize
Wink
KP+cld#+ST
Answer
TOPS gains billing acceptance and releases the operator
interworking cut-through
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
Idle

Intercept with call completion service

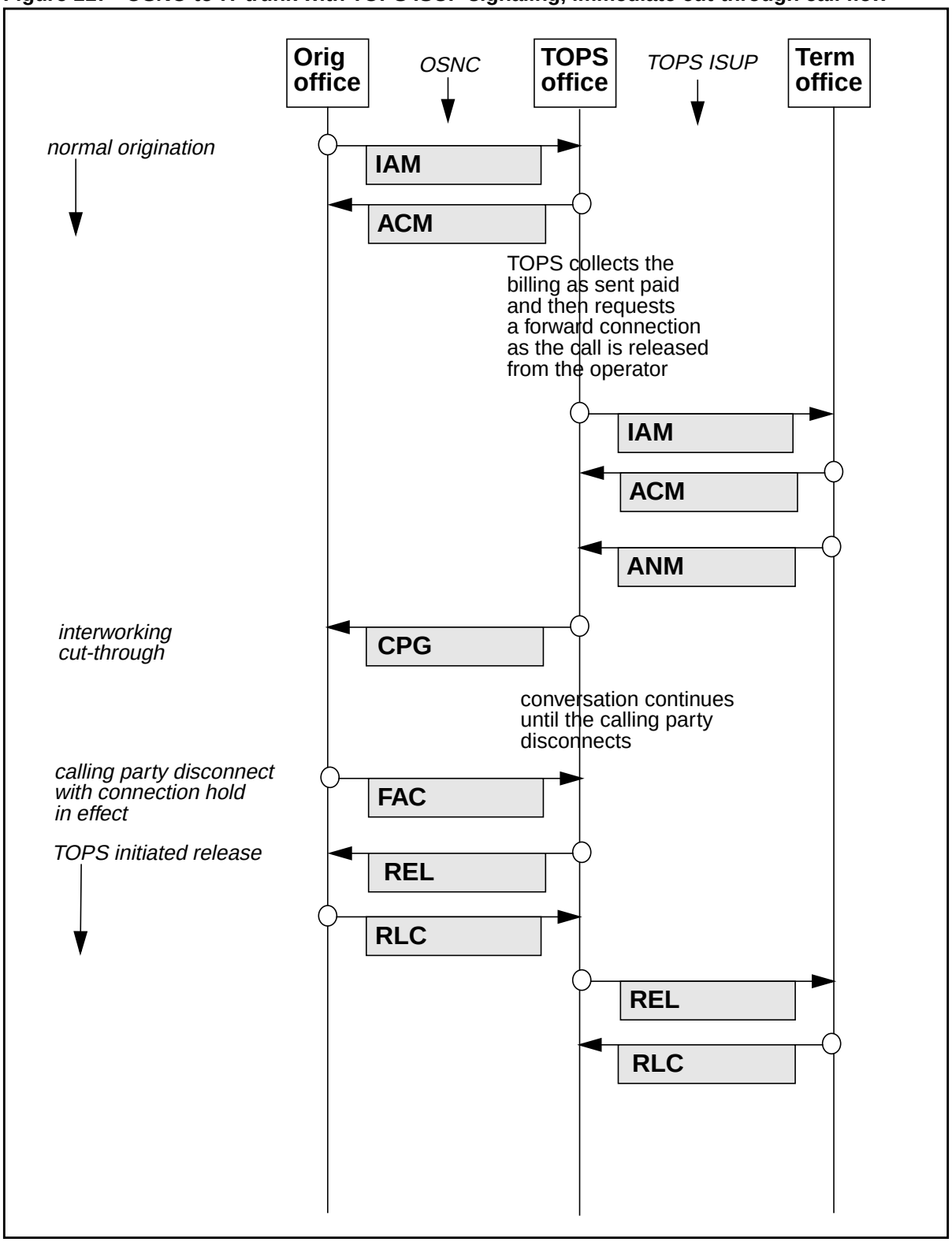
Figure 116 OSNC-to-IT trunk with intertoll (mf) signaling, intercept with call completion call flow



TOPS ISUP signaling

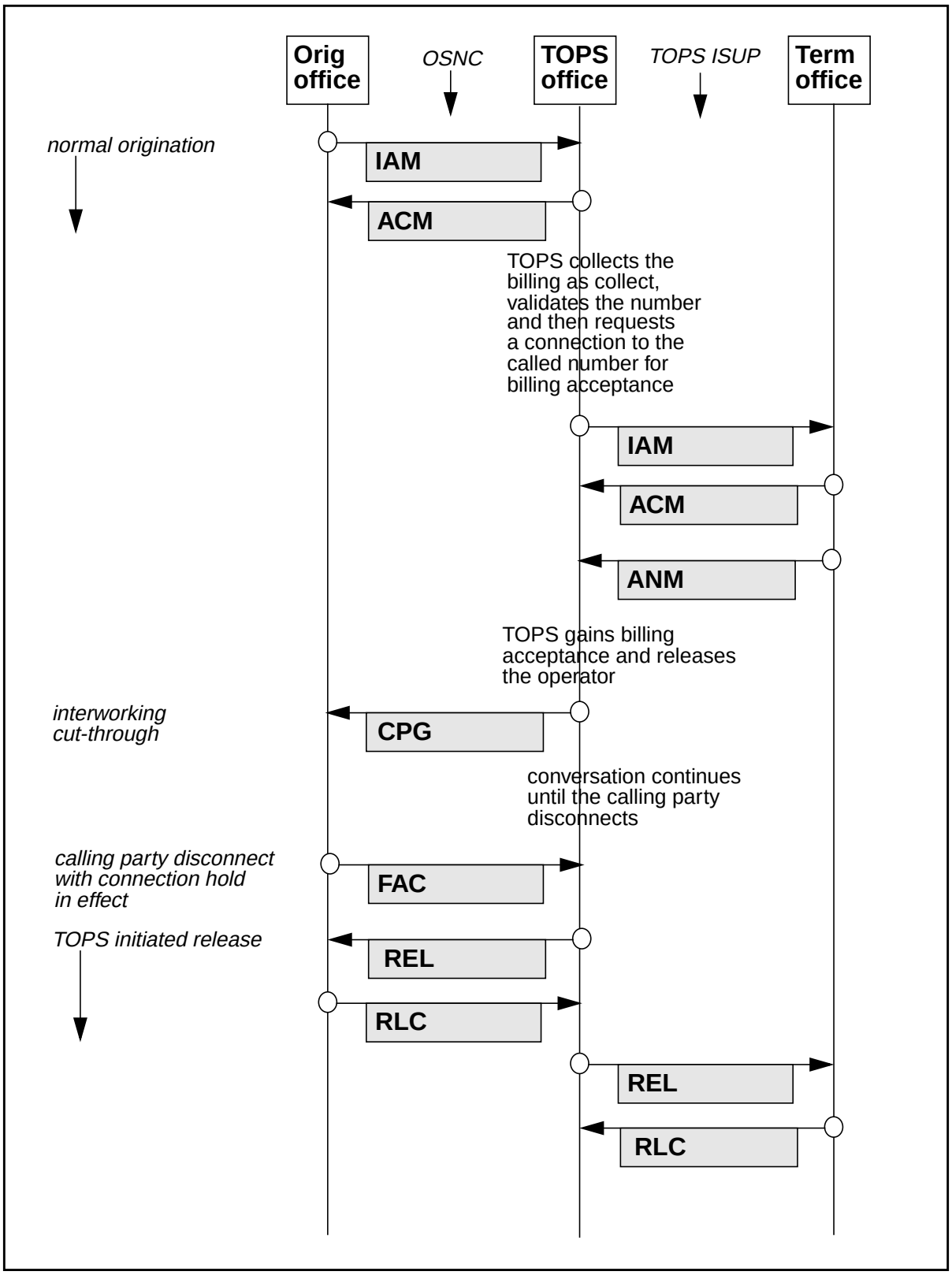
Immediate cut-through

Figure 117 OSNC-to-IT trunk with TOPS ISUP signaling, immediate cut-through call flow



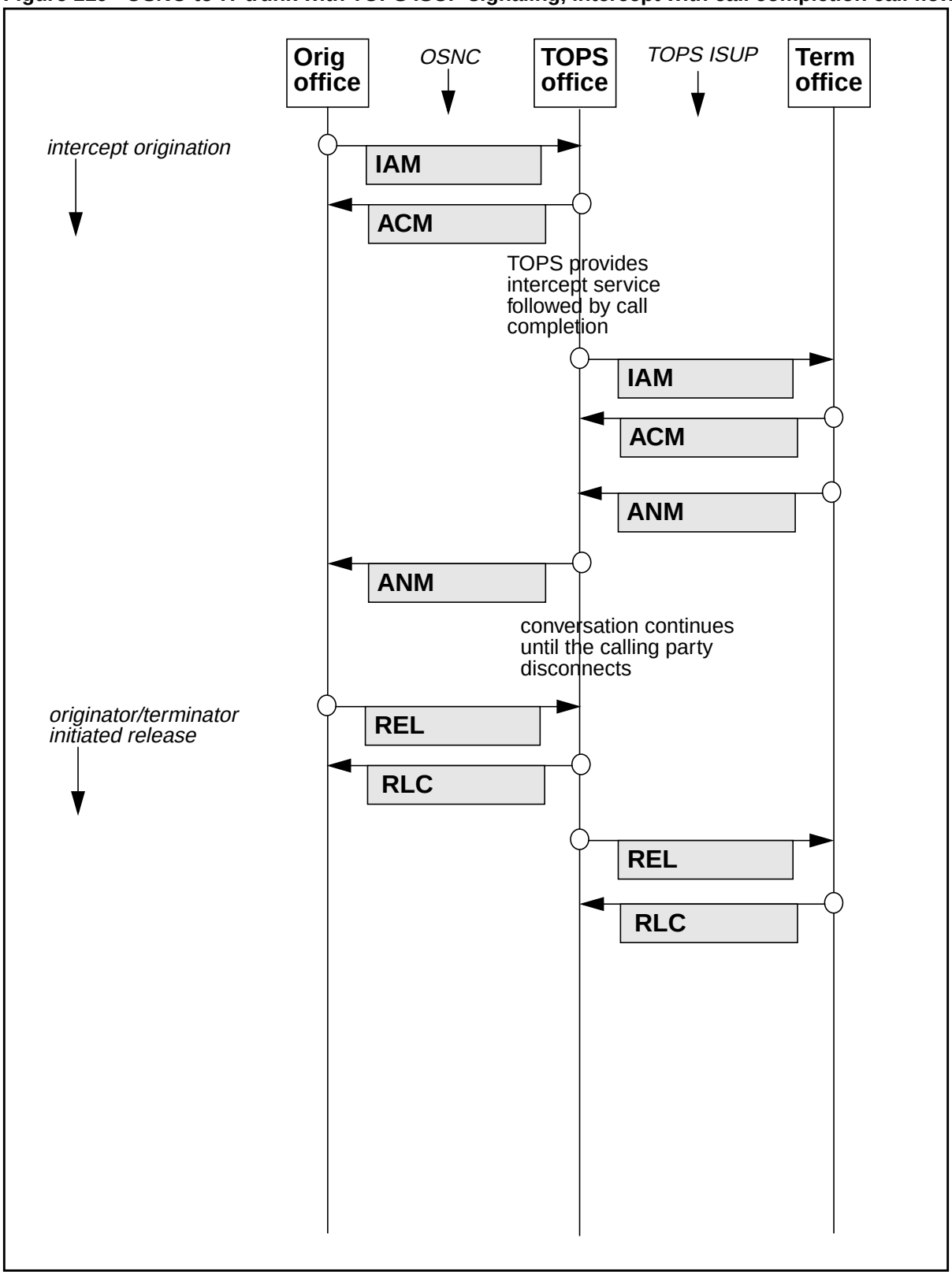
Delayed cut-through

Figure 118 OSNC-to-IT trunk with TOPS ISUP signaling, delayed cut-through call flow


Orig office
OSNC
TOPS office
TOPS ISUP
Term office
normal origination
IAM
ACM
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
IAM
ACM
ANM
TOPS gains billing acceptance and releases the operator
interworking cut-through
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
REL
RLC

Intercept with call completion service

Figure 119 OSNC-to-IT trunk with TOPS ISUP signaling, intercept with call completion call flow

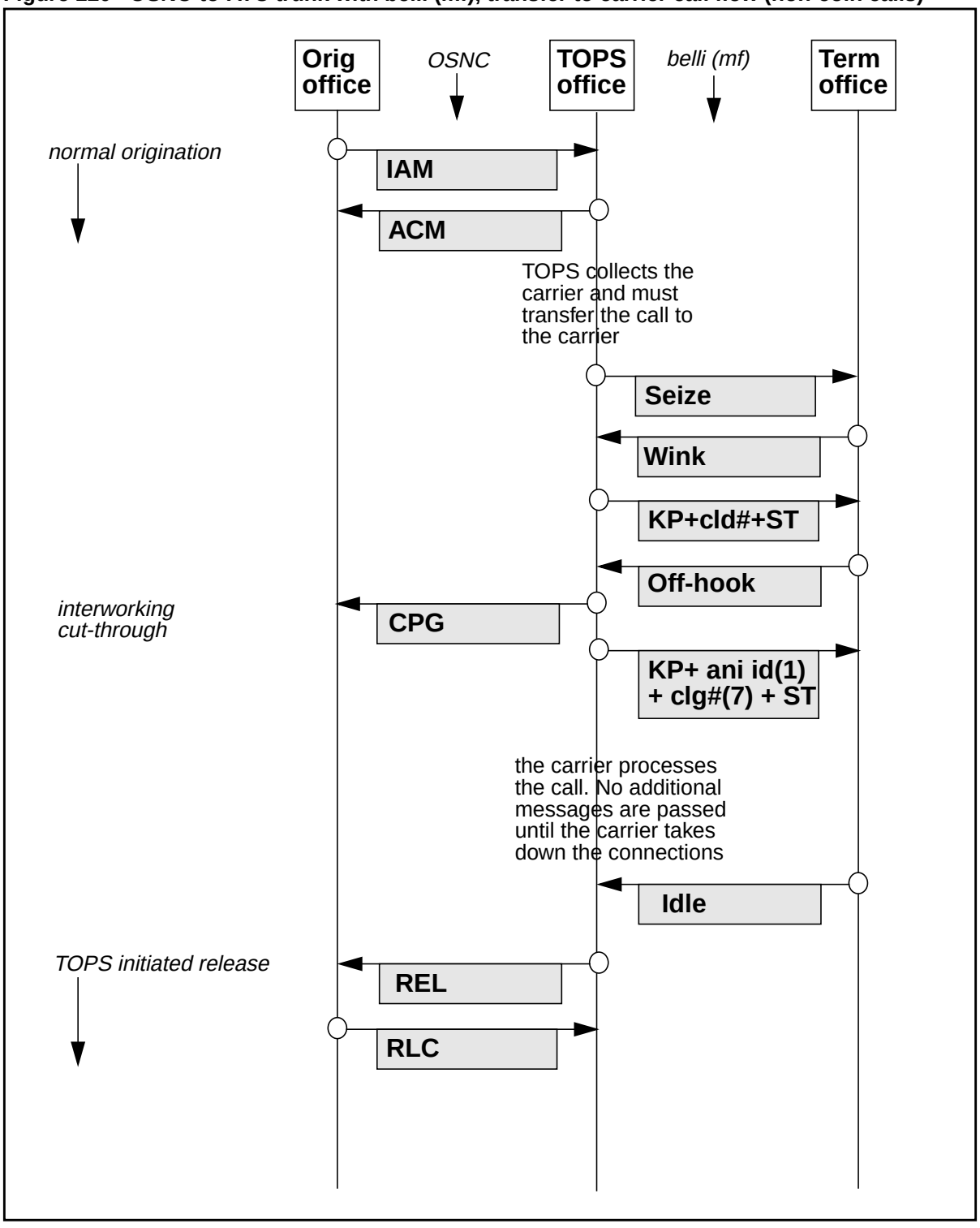


OSNC-to-ATC trunk interworking

Belli (mf) signaling

Transfer to carrier (non-coin calls)

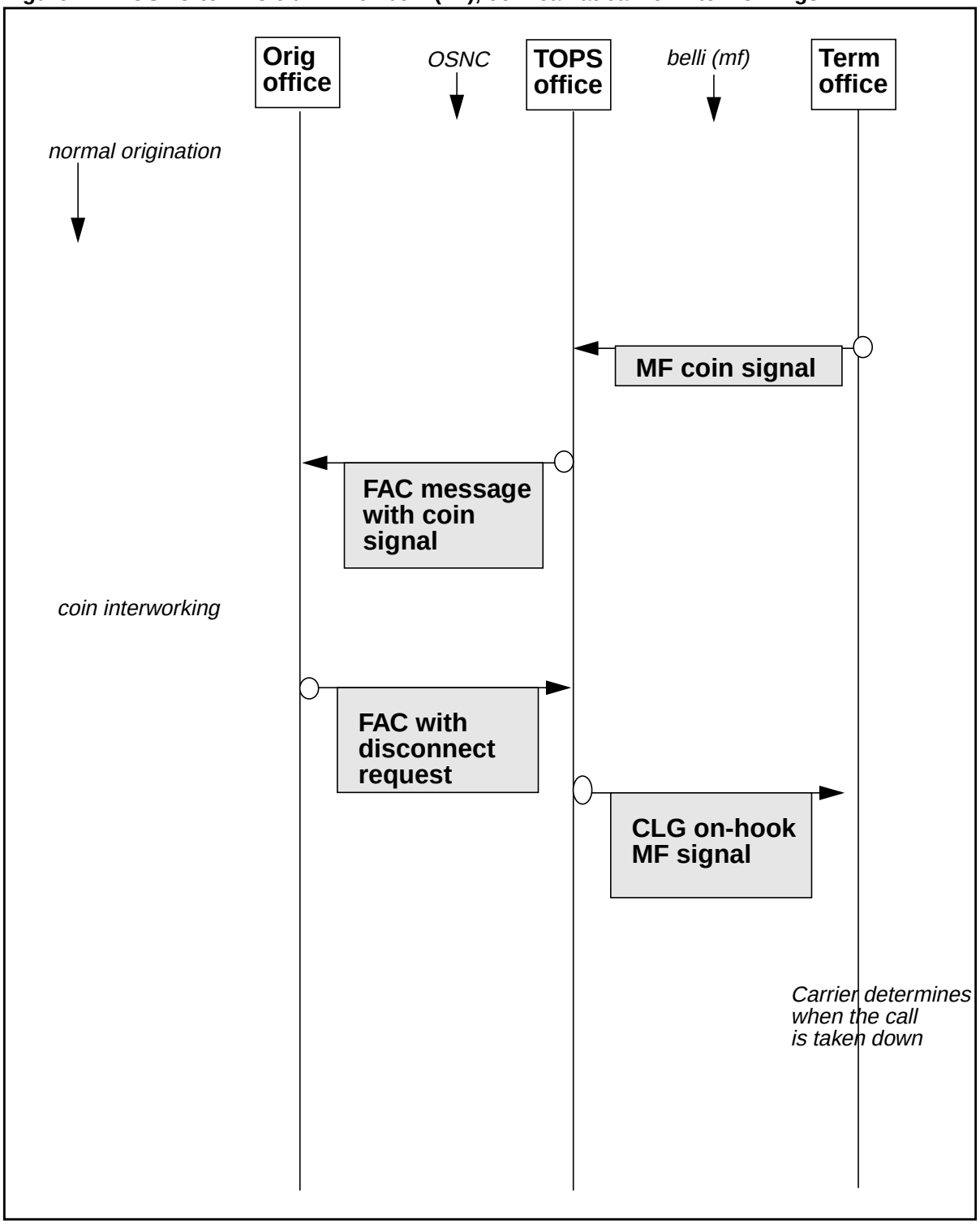
Figure 120 OSNC-to-ATC trunk with belli (mf), transfer to carrier call flow (non-coin calls)



Belli (mf) signaling

Coin calls at carrier interworkings

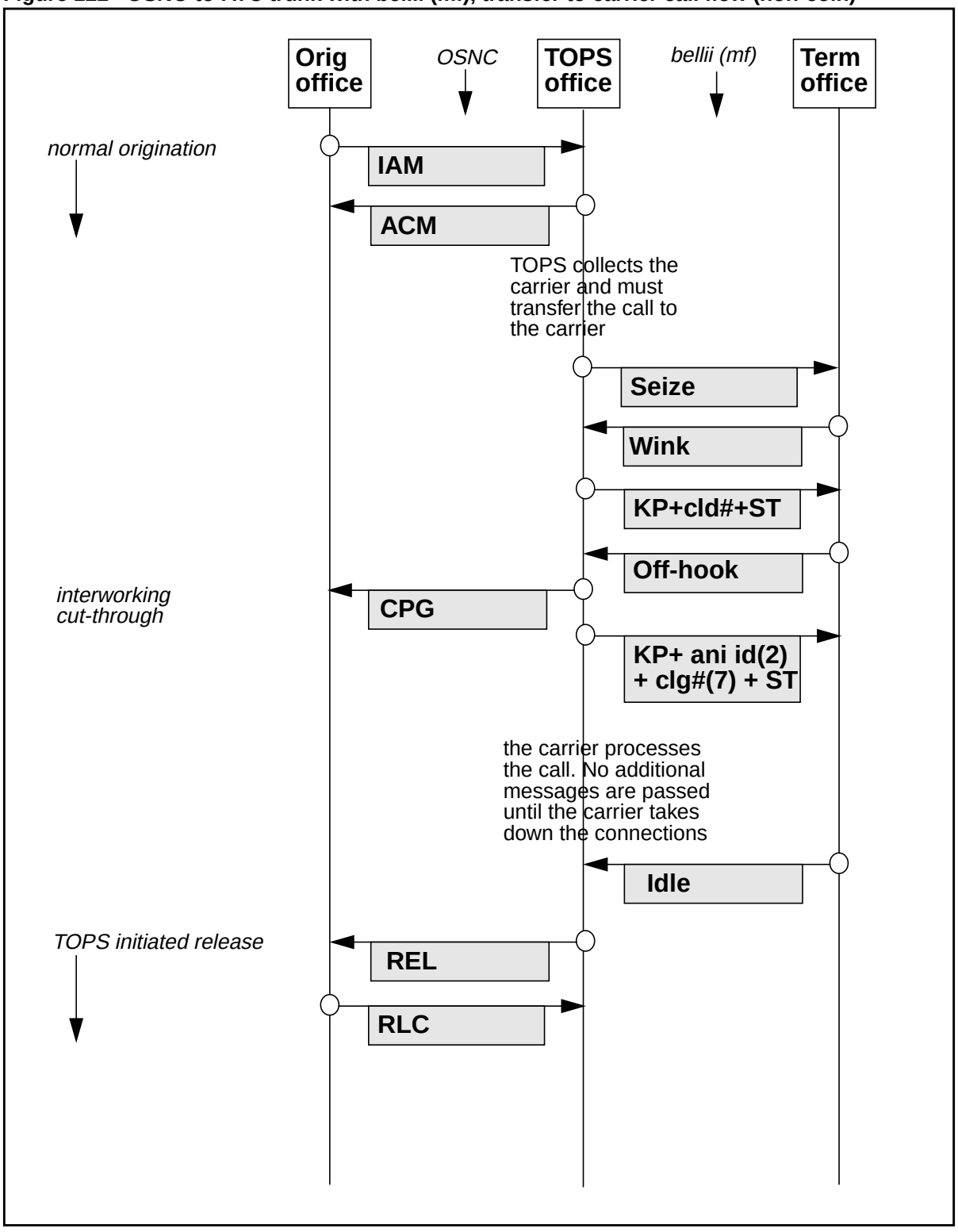
Figure 121 OSNC-to-ATC trunk with belli (mf), coin call at carrier interworkings



Bellii (mf) signaling

Transfer to carrier (non-coin)

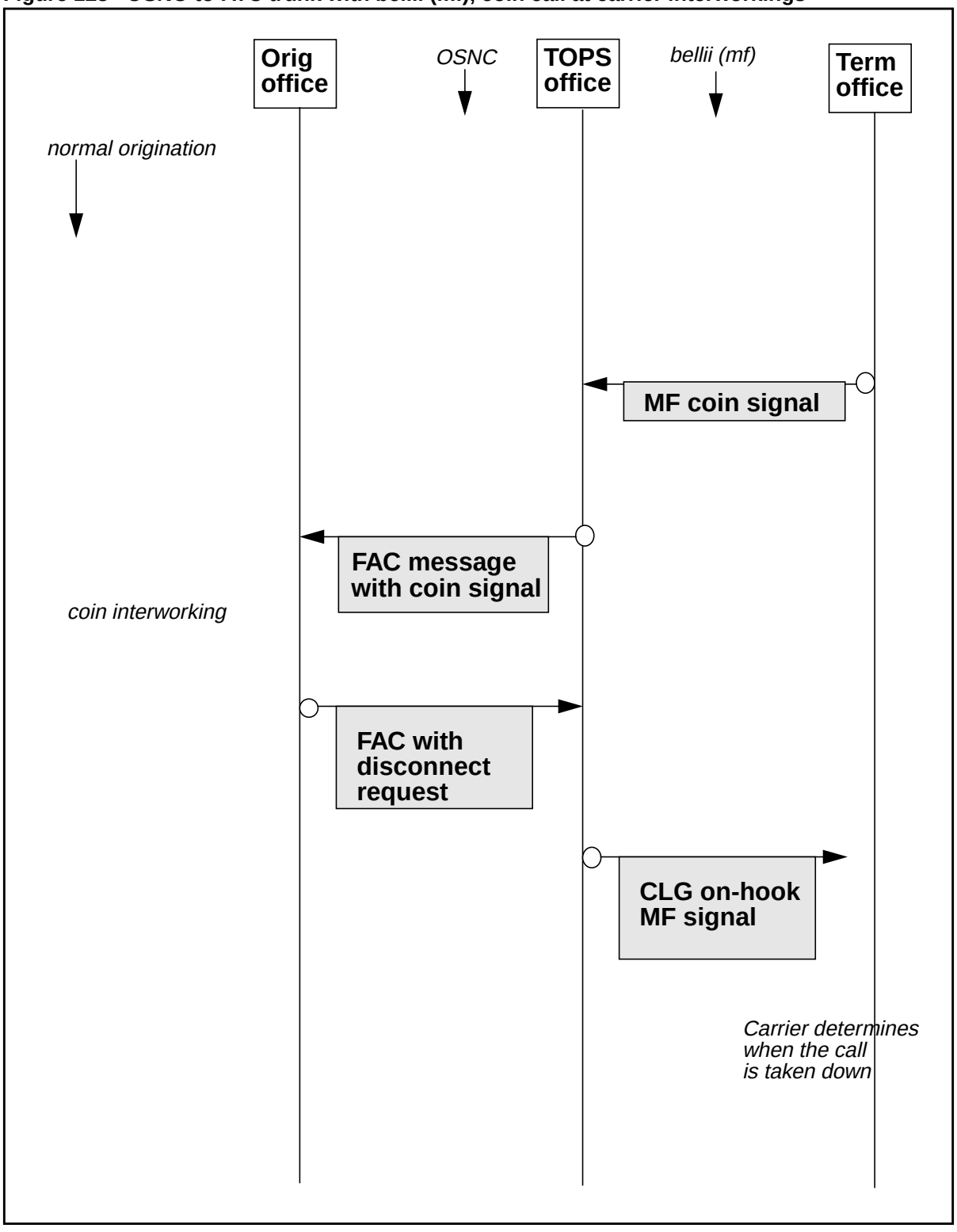
Figure 122 OSNC-to-ATC trunk with bellii (mf), transfer to carrier call flow (non-coin)



Bellii (mf) signaling

Coin calls at carrier interworkings

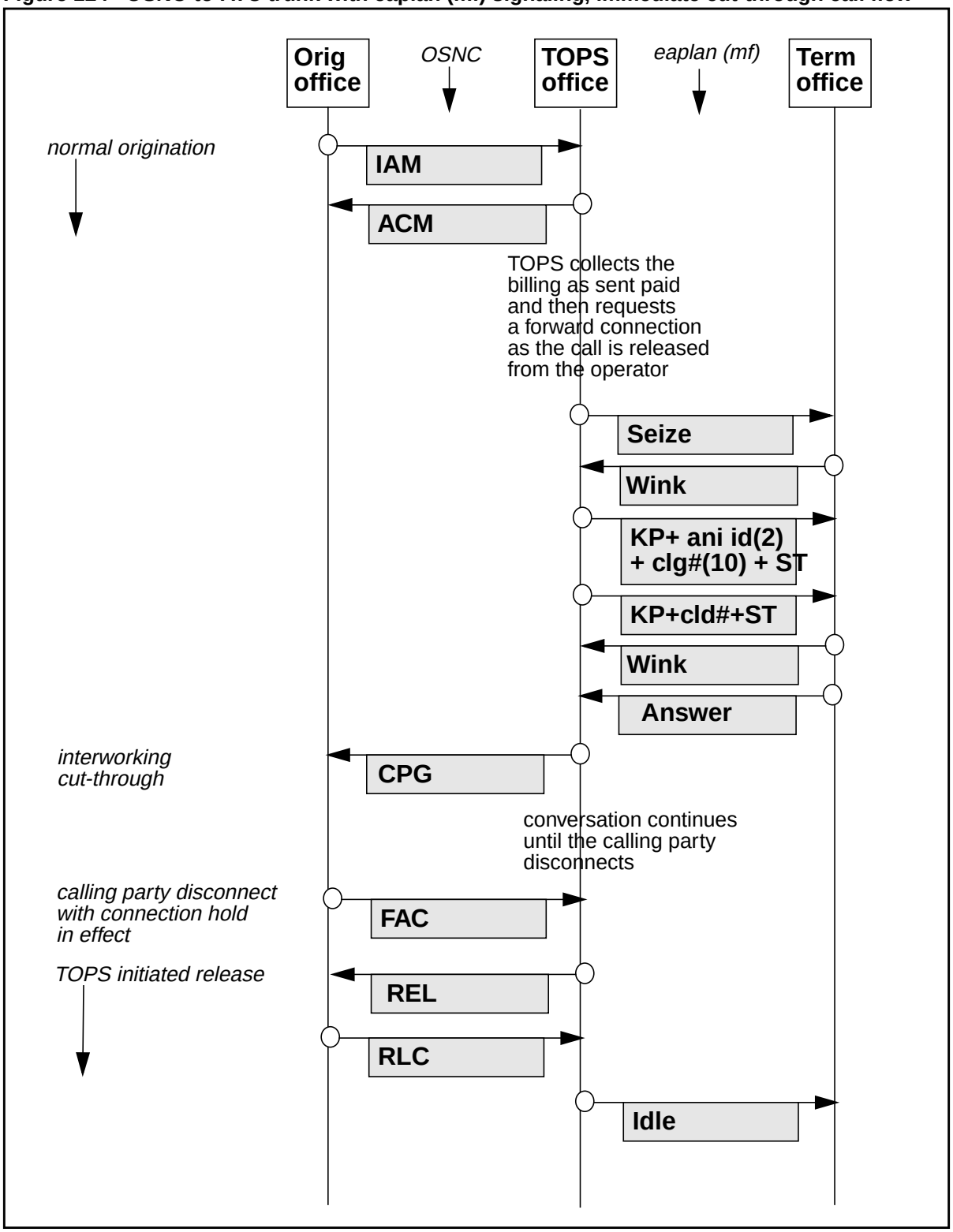
Figure 123 OSNC-to-ATC trunk with bellii (mf), coin call at carrier interworkings



Eaplan (mf) signaling

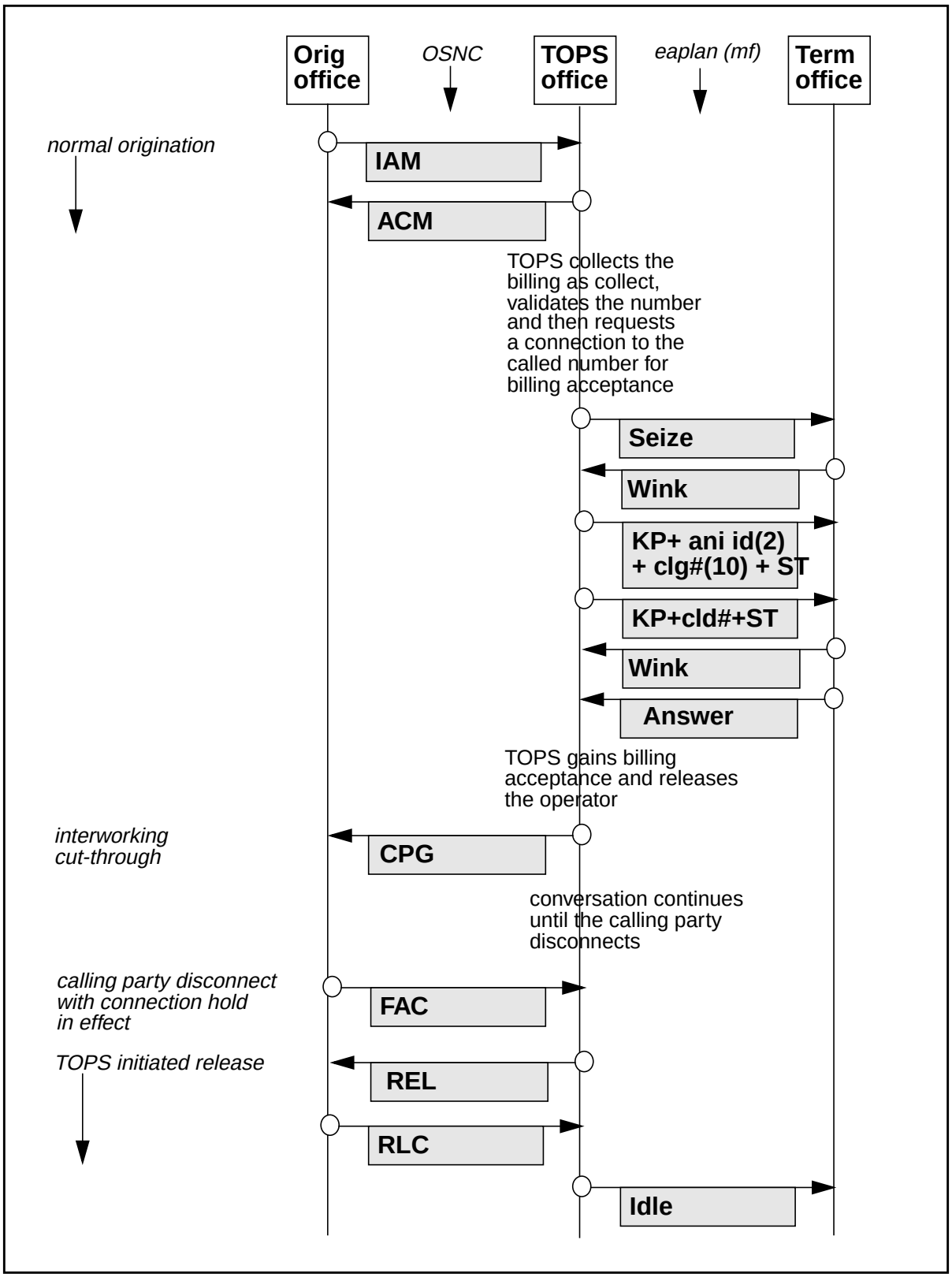
Immediate cut-through

Figure 124 OSNC-to-ATC trunk with eaplan (mf) signaling, immediate cut-through call flow



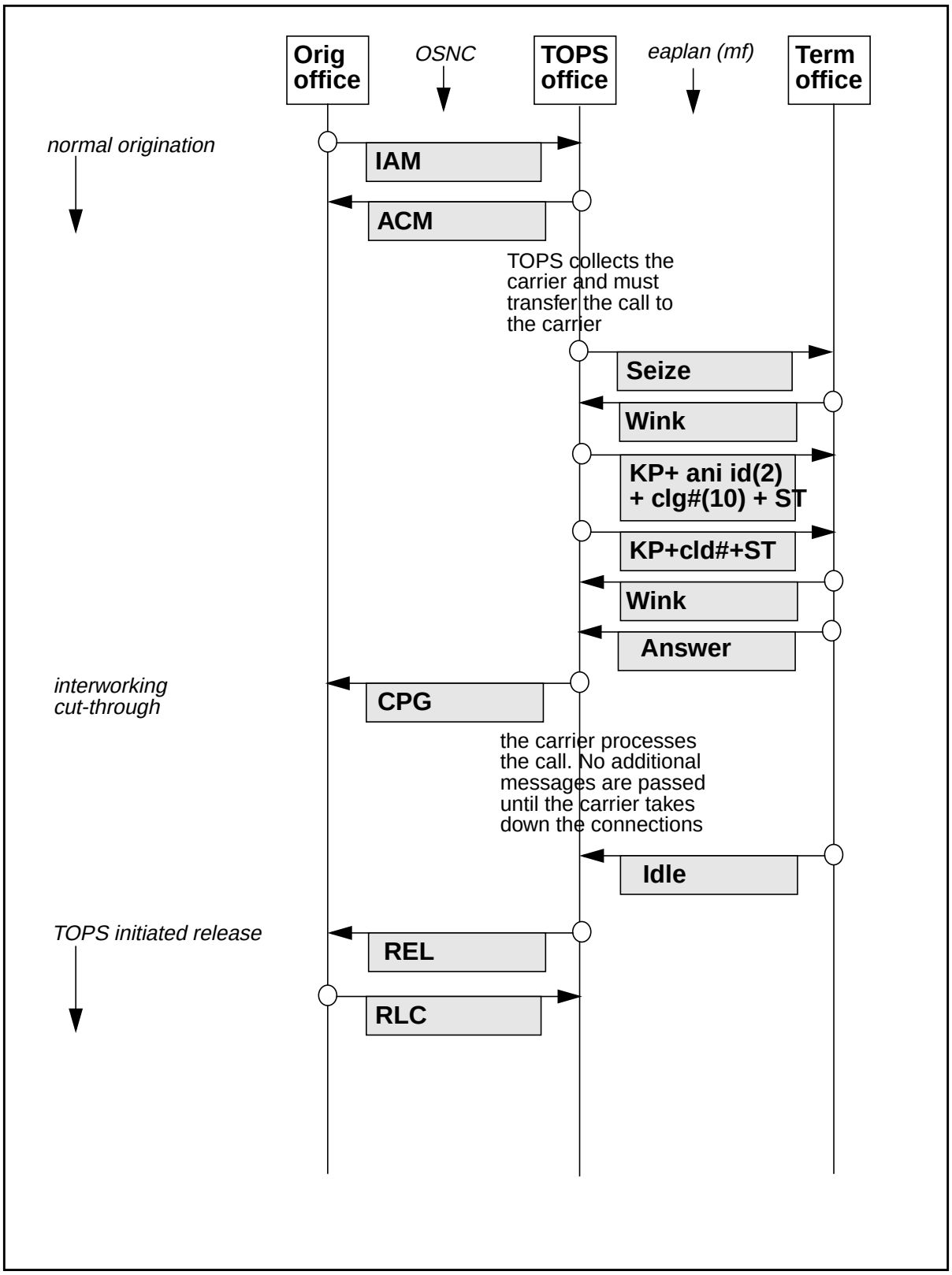
Delayed cut-through

Figure 125 OSNC-to-ATC trunk with eaplan (mf) signaling, delayed cut-through call flow


Orig office
OSNC
TOPS office
eaplan (mf)
Term office
normal origination
IAM
ACM
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
Seize
Wink
KP+ ani id(2) + clg#(10) + ST
KP+cld#+ST
Wink
Answer
TOPS gains billing acceptance and releases the operator
interworking cut-through
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
Idle

Transfer to carrier

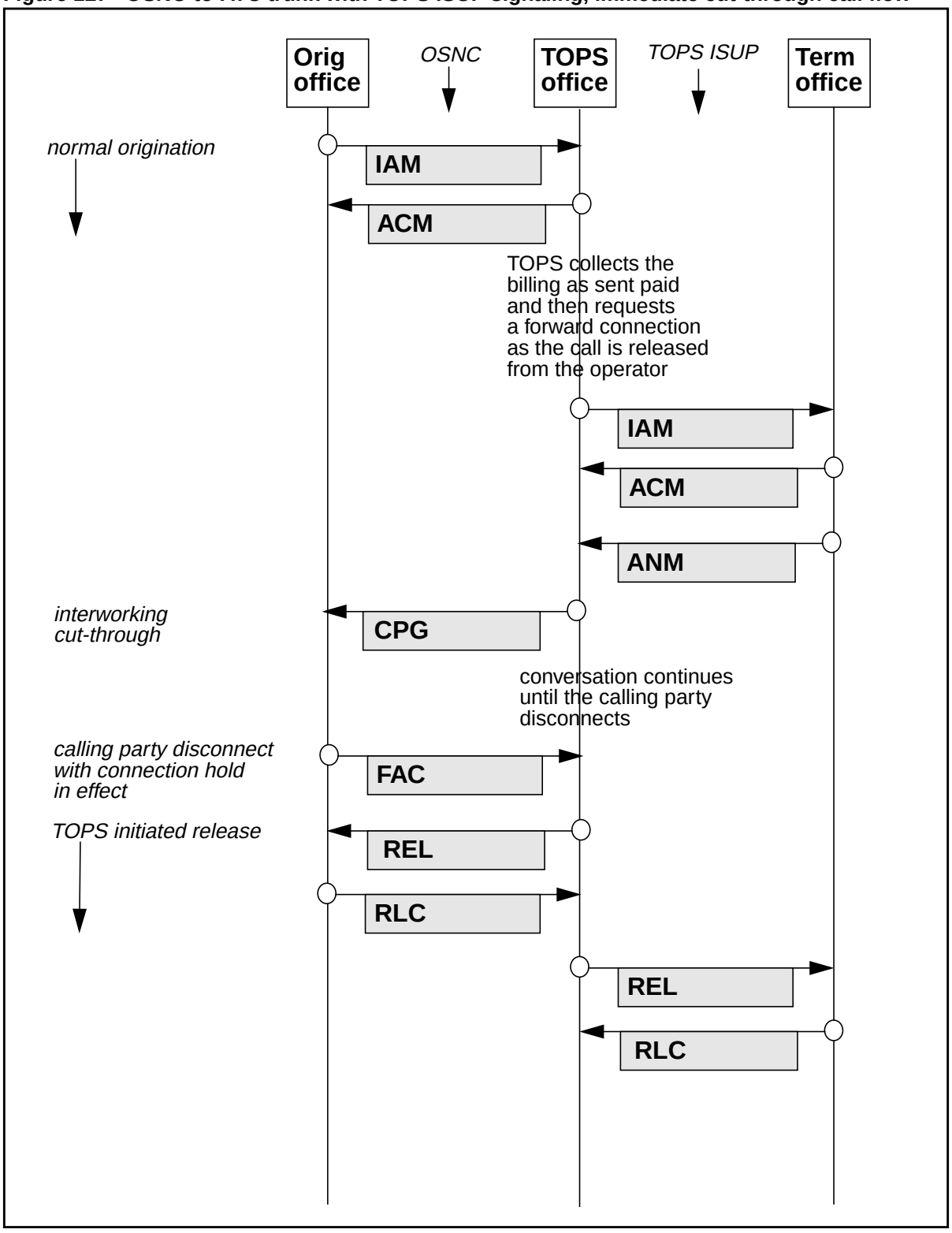
Figure 126 OSNC-to-ATC trunk with eaplan (mf), transfer to carrier call flow


Orig office
OSNC
TOPS office
eaplan (mf)
Term office
normal origination
IAM
ACM
TOPS collects the carrier and must transfer the call to the carrier
Seize
Wink
KP+ ani id(2) + clg#(10) + ST
KP+cld#+ST
Wink
Answer
interworking cut-through
CPG
the carrier processes the call. No additional messages are passed until the carrier takes down the connections
Idle
TOPS initiated release
REL
RLC

TOPS ISUP signaling

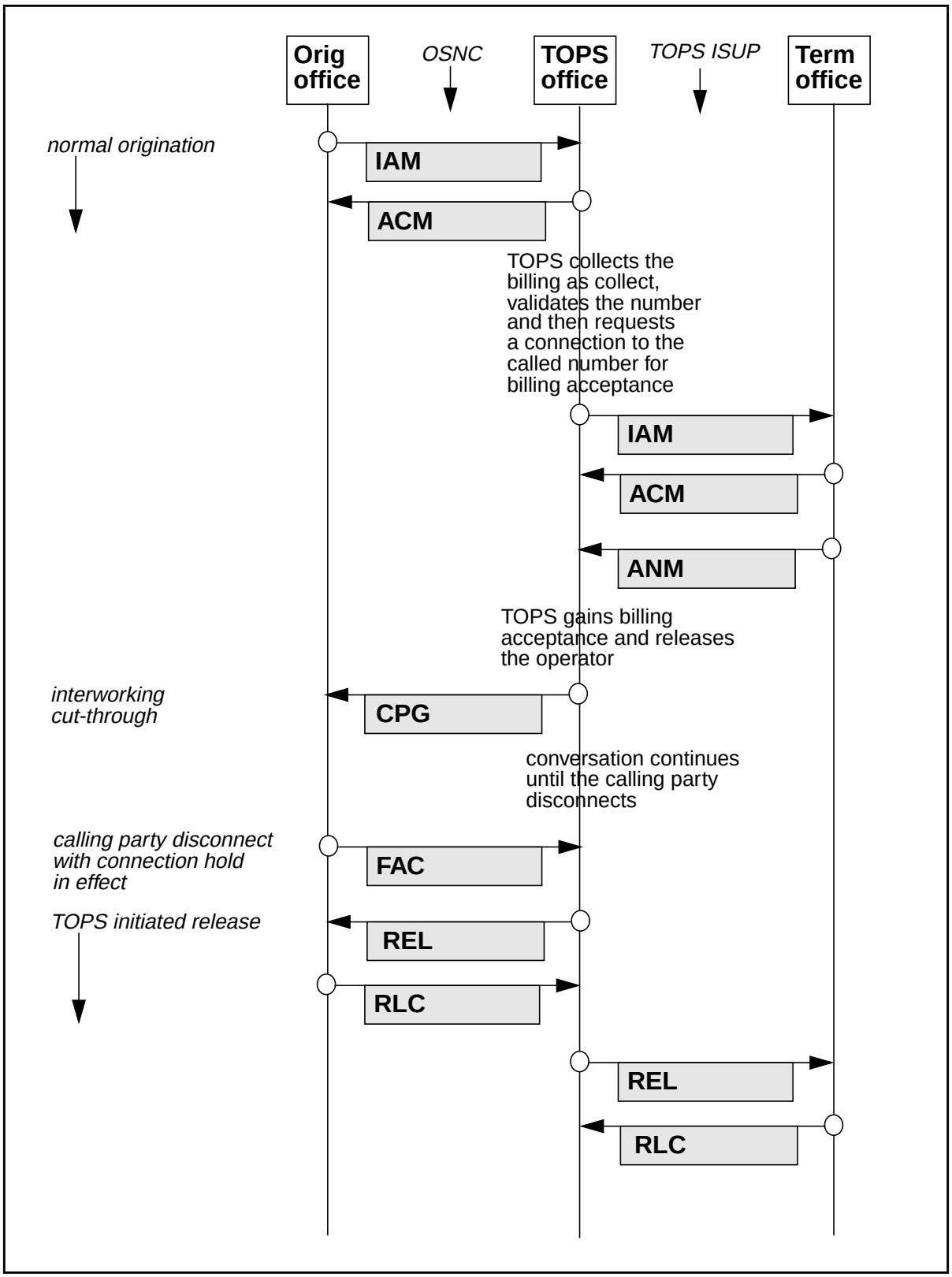
Immediate cut-through

Figure 127 OSNC-to-ATC trunk with TOPS ISUP signaling, immediate cut-through call flow



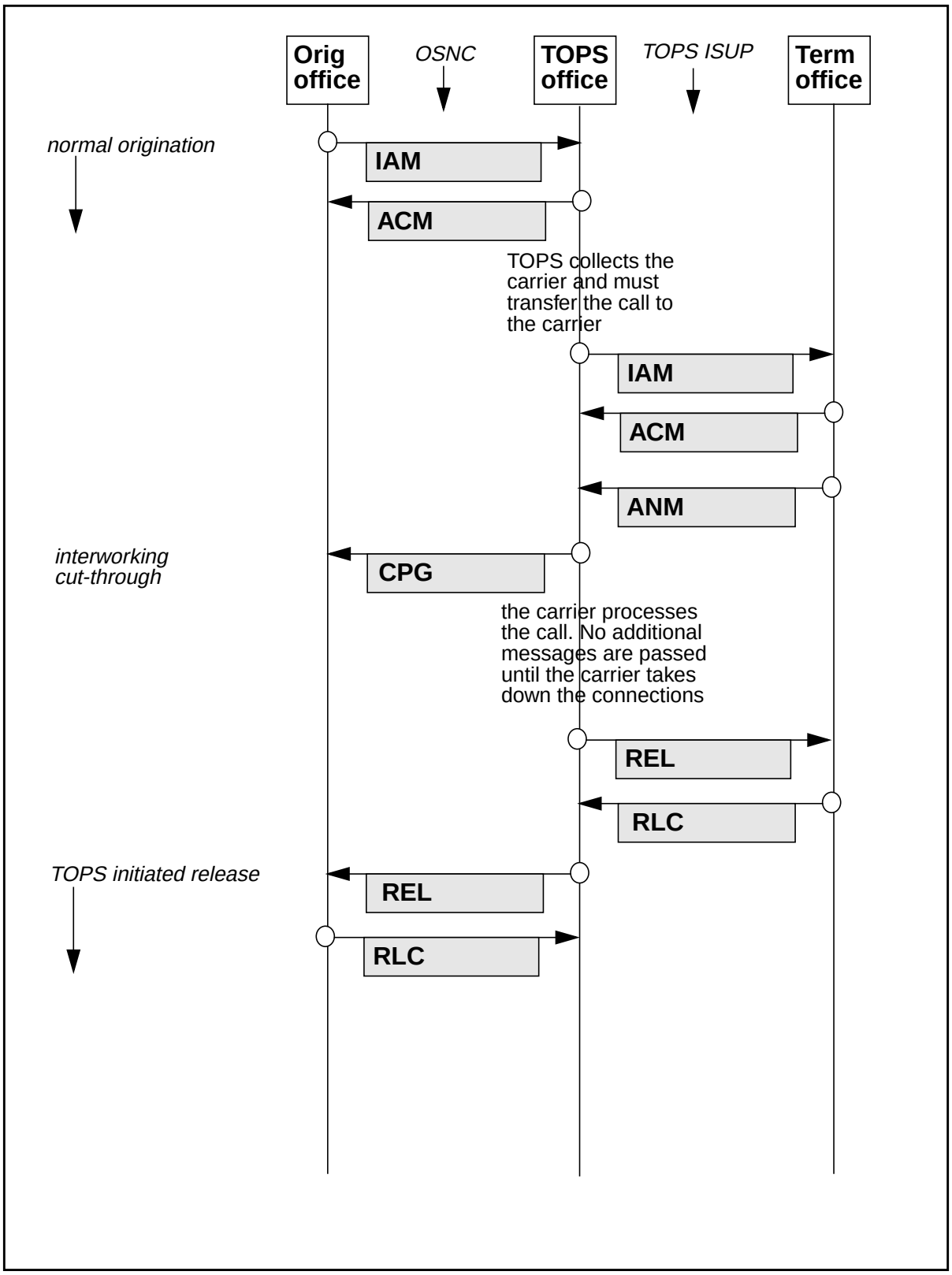
Delayed cut-through

Figure 128 OSNC-to-ATC trunk with TOPS ISUP signaling, delayed cut-through call flow


Orig office
OSNC
TOPS office
TOPS ISUP
Term office
normal origination
IAM
ACM
TOPS collects the billing as collect, validates the number and then requests a connection to the called number for billing acceptance
IAM
ACM
ANM
TOPS gains billing acceptance and releases the operator
interworking cut-through
CPG
conversation continues until the calling party disconnects
calling party disconnect with connection hold in effect
FAC
TOPS initiated release
REL
RLC
REL
RLC

Transfer to carrier

Figure 129 OSNC-to-ATC trunk with TOPS ISUP, transfer to carrier call flow


Orig office
OSNC
TOPS office
TOPS ISUP
Term office
normal origination
IAM
ACM
TOPS collects the carrier and must transfer the call to the carrier
IAM
ACM
ANM
interworking cut-through
CPG
the carrier processes the call. No additional messages are passed until the carrier takes down the connections
REL
RLC
TOPS initiated release
REL
RLC

Part 4: Planning and engineering

Part 4: “Planning and engineering” does not include any chapters for this particular release of the document.

Part 5: Provisioning

Part 5: “Provisioning” includes the following chapters:

Chapter 5: OSNC Data Schema

This chapter provides information on how to datafill tables used by OSNC. It discusses each table and shows any interdependencies among the tables. The datafill information given is specific to OSNC, with an explanation of fields, values and an example.

OSNC datafill requirements

The datafill descriptions and examples in this chapter are organized around the following OSNC processing elements:

- SS7 trunk configuration
- Originating TOPS OSNC trunks
- OSNC coin phone type determination
- OSNC route selector

Alphabetical reference for OSNC table descriptions

The following table lists each table in alphabetical order and the page where its description begins.

Table 94 Alphabetical reference for OSNC table descriptions

Table name	Page number
ADJNODE	page 395
C7LINK	page 403
C7LKSET	page 401
C7NETWRK	page 400
C7RTESET	page 404
C7TRKMEM	page 407
CLLI	page 394
HNPACONT::HNPACODE	page 414
HNPACONT::RTEREF	page 415

Table 94 Alphabetical reference for OSNC table descriptions

Table name	Page number
ISUPDEST	page 406
ISUPTRK	page 408
OFR2	page 418
OFR3	page 419
OFR4	page 420
OFRT	page 417
OSNCCAP	page 421
TOPSCOIN	page 410
TOPSPARM	page 425
TRKGRP	page 396
TRKMEM	page 399
TRKSGRP	page 398

SS7 trunk configuration

This section provides an overview on how to configure SS7 trunks for OSNC. OSNC is supported on IT and ATC trunk group types.

Datafill sequence

The SS7 trunk configuration related tables are described in the following table. The tables are listed in the order in which they should be datafilled.

Table 95 Datafill sequence for SS7 trunk configuration

Table name	Explanation
CLLI	The common language location identifier table identifies network links and link sets, routes and route sets and transmission links of SS7 trunks.
TRKGRP	The trunk group table defines data associated with each SS7 trunk group.
ADJNODE	The adjacent node table contains information on adjacent nodes.
TRKSGRP	The trunk subgroup table contains supplementary information for each subgroup assigned to the SS7 trunk group.
TRKMEM	The trunk member table assigns the voice path connection for each SS7 trunk member.
C7NETWRK	The CCS7 network table describes signaling networks used by SS7 trunks.

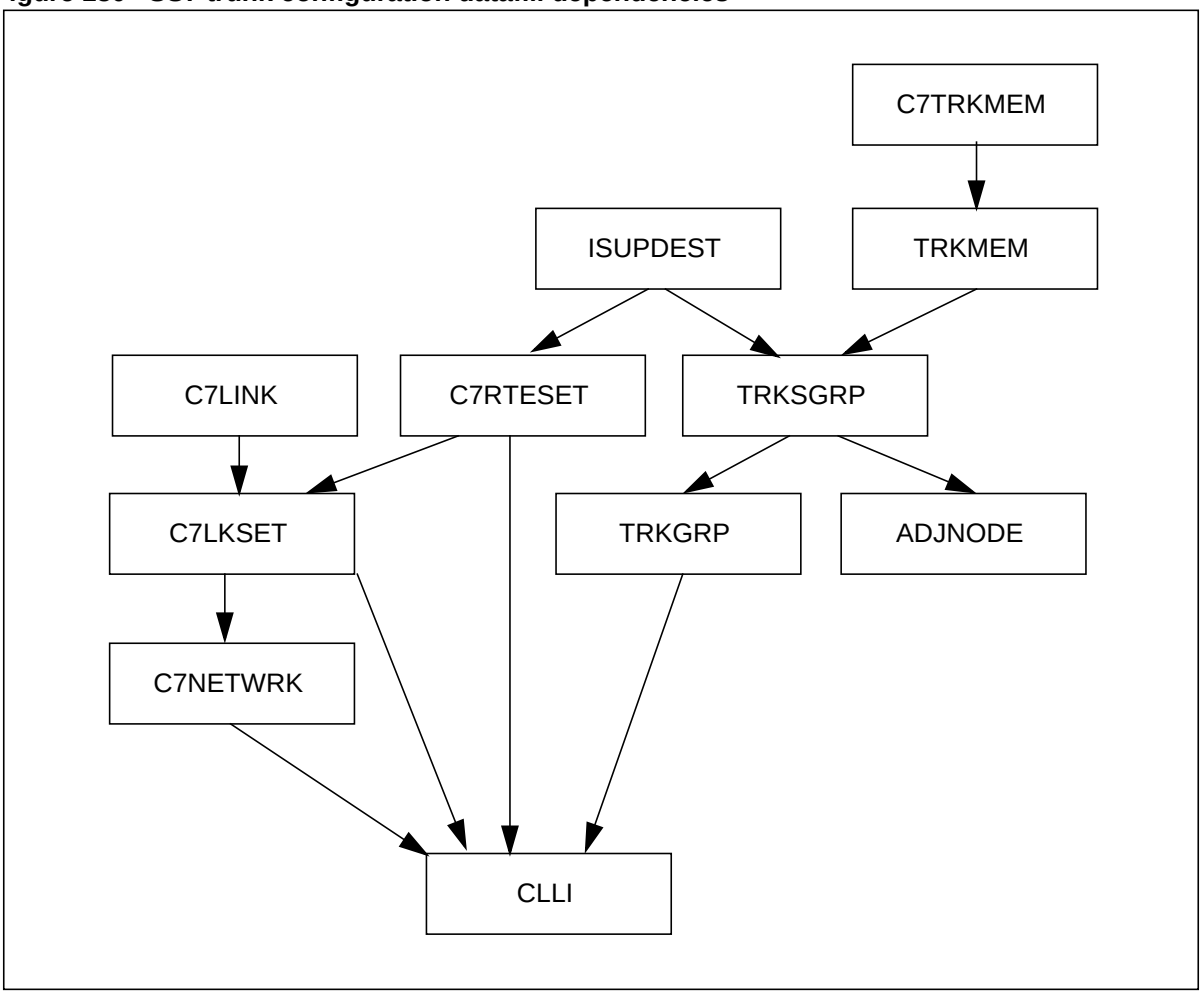
Table 95 Datafill sequence for SS7 trunk configuration

Table name	Explanation
C7LKSET	The CCS7 link set table defines and configures the lines between two adjacent signaling points.
C7LINK	The CCS7 link table associates the physical aspects of a link with the logical view of a link as a member of a link set.
C7RTESET	The CCS7 route set table associates a CCS7link with a route set.
ISUPDEST	The ISUP destination table associates an SS7 trunk subgroup with a route set.
C7TRKMEM	The CCS7 trunk member table associates an SS7 trunk member with a Circuit Identification Code (CIC).

Table dependencies

The following figure show table dependencies of the SS7 trunk configuration datafill.

Figure 130 SS7 trunk configuration datafill dependencies



CLLI

Table CLLI provides a place to define names of trunk groups, link sets and route sets needed for SS7 trunks. The following table describes the datafill in table CLLI that is specific to SS7 trunks.

Table 96 Datafilling table CLLI

Field	Subfield or refinement	Entry	Explanation and action
CLLI		alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter a string of up to 16 alphanumeric characters to define a trunk group name, link set name or route set name.
ADNUM		0 to 8191	Administrative Number.

Table 96 Datafilling table CLLI

Field	Subfield or refinement	Entry	Explanation and action
TRKGRSIZ		0 to 2047	Trunk Group Size. Enter a number to provide a maximum number of group members that may be assigned to the trunk group, link set or route set.
ADMININF		alphanumeric (1 to 32 characters)	Administrative Information. Enter a string of up to 32 alphanumeric characters to describe the trunk group, link set or route set.

CLLI datafill example

The following figure shows example datafill.

Figure 131 MAP display example for table CLLI

```
CLLI      ADNUM  TRKGRSIZ  ADMININF
-----------------------------------------------------------------
C7LKSET1  302    10        CCS7_LINKSET_1
C7LKSET2  303    10        CCS7_LINKSET_2
C7RTESET1 304    10        CCS7_ROUTESET_1
C7RTESET2 305    10        CCS7_ROUTESET_2
ISUP2WIT  309    10        CCS7_2WAY_IT
ISUP2WATC 310    10        CCS7_2WAY_ATC
```

ADJNODE

The following table describes the datafill in table ADJNODE that is specific to SS7 trunks.

Table 97 Datafilling table ADJNODE

Field	Subfield or refinement	Entry	Explanation and action
ADJNODEK		alphanumeric (1 to 12 characters)(	Adjacent Node Key. Enter a string of up to 12 alphanumeric characters to define the name of a connecting SS7 switch.

Table 97 Datafilling table ADJNODE

Field	Subfield or refinement	Entry	Explanation and action
SIGDATA		ISUP	Signaling Data. This field identifies the type of signaling used for each trunk subgroup connected with the site. The entry should always be ISUP for OSNC trunks.
	PRODUCT	alphanumeric	Product Type. Enter the product type (such as DMS) of the adjacent SS7 switch.
	OPTION	NOCQT, NOGRPBLK, DONTSENDACL, NOCVT, NONSTDREDIR, NONACDNTP, SPN, NOJIP, INHIBITACL	ISUP Option Element. Enter a list of the options associated with a connection to the adjacent SS7 switch.

ADJNODE datafill example

The following figure shows example datafill.

Figure 132 MAP display example for table ADJNODE

```
ADJNODEK  SIGDATA
------------------------------------------------------------------
ISUP      ISUP DMS (NOGRPBLK) $
```

TRKGRP

OSNC is only supported on IT and ATC trunk group types. The following table describes the datafill in table TRKGRP that is specific to SS7 trunks.

Table 98 Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
GRPKEY		alphanumeric (1 to 16 characters)	Group Key. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI

Table 98 Datafilling table TRKGRP

Field	Subfield or refinement	Entry	Explanation and action
GRPINFO	GRPTYPE	IT, ATC	Group Type. Enter IT for intertoll trunk groups. Complete the following subfields associated with IT trunk groups: • TRAFSNO • PADGRP • NCCLS • DIR • TRAFCLAS • SELSEQ • CONNGNPA • PRTMN • SCRNCL • SNPA • TERNTC • TOLLCOMP • CCWKVLD • OPTIONS Enter ATC for carrier trunk groups. Complete the following subfields associated with ATC trunk groups: • TRAFSNO • PADGRP • NCCLS • DIR • TRAFCLAS • SELSEQ • PRTMN • SCRNCL • SNPA • CARRNM • ANI • SIGTYPE • OPRHOLD • HLDTIMER • STNCLS • OSIND • OPTIONS

TRKGRP datafill example

The following figure shows example datafill.

Figure 133 MAP display example for table TRKGRP

```
GRPKEY    GRPINFO
-------------------------------------------------------------------
ISUP2WIT  IT 0 ELO NCRT 2W NIL MIDL 407 PEA NSCR 619 000 N N $
ISUP2WATC ATC 0 ELO NCRT 2W NIL MIDL IT7 NSCR 619 C111 Y EAPLAN Y 0
              COMB N $
```

TRKSGRP

The following table describes the datafill in table TRKSGRP that is specific to SS7 trunks.

Table 99 Datafilling table TRKSGRP

Field	Subfield or refinement	Entry	Explanation and action
SGRPKEY	CLLI	alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI and table TRKGRP
	SGRP	0 to 1	Subgroup. Enter either a 0 to 1 to distinguish between the two possible subgroups available to a trunk group.
CARDCODE		DS1SIG	Card Code. Only DS1SIG is supported for SS7 trunks.
SGRPVAR		C7UP	Variable Subgroup Data: Enter C7UP to designate the trunk subgroup as being SS7.Complete the following subfields associated with C7UP subgroups: • DIR • ESUPR • SAT • ECSELECT • ABCNTL • PROTOCOL • CONTCHK • COTREQ • ADJNODE • OPTIONS • TMRNAME • GLAREVAR

TRKSGRP datafill example

The following figure shows example datafill.

Figure 134 MAP display example for table TRKSGRP

```
SGRPKEY     CARDCODE  SGRPVAR
-----------------------------------------------------------------------
ISUP2WIT  0  DS1SIG   C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL CIC
ISUP2WIT  1  DS1SIG   C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL CIC
ISUP2WATC 0  DS1SIG   C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL CIC
ISUP2WATC 1  DS1SIG   C7UP 2W F N UNEQ ACTIVEA Q764 THRL 0 ISUP $ NIL CIC
```

TRKMEM

The following table describes the datafill in table TRKMEM that is specific to SS7 trunks.

Table 100 Datafilling table TRKMEM

Field	Subfield or refinement	Entry	Explanation and action
CLLI		alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI and table TRKGRP
EXTRKNM		0 to 9999	External Trunk Name. Enter the trunk member number for the SS7 trunk.
SGRP		0 to 1	Subgroup. Enter the trunk subgroup that should be associated with the SS7 trunk member.
MEMVAR		Refer to the *North American DMS-100 Translations Guide*, 297-8021-350 for the exhaustive list of possible values.	Variable Member Data. Enter the peripheral circuit number where the SS7 trunk member's voice connection exists.

TRKMEM datafill example

The following figure shows example datafill.

Figure 135 MAP display example for table TRKMEM

```
CLLI      EXTRKNM  SGRP  MEMVAR
-----------------------------------------------------------------------
ISUP2WIT  0        0     DTC 0 0 3
ISUP2WIT  1        1     DTC 0 3 3
ISUP2WIT  2        0     DTC 0 0 4
ISUP2WIT  3        1     DTC 0 3 4
ISUP2WATC 0        0     DTC 0 0 5
ISUP2WATC 1        1     DTC 0 3 5
ISUP2WATC 2        0     DTC 0 0 6
ISUP2WATC 3        1     DTC 0 3 6
```

C7NETWRK

The following table describes the datafill in table C7NETWRK that is specific to SS7 trunks.

Table 101 Datafilling table C7NETWRK

Field	Subfield or refinement	Entry	Explanation and action
NETNAME		alphanumeric (1 to 16 characters)	Network Name.Enter a string to define the network name.
NODETYPE		SSP	Node Type.
PTCODE	NETTYPE	ANSI7	Network Type. If the network type is North American, then enter ANSI7 and complete the following subfields: • NETWORK • CLUSTER • MEMBER
NI		NATL, INTL, NATLSPARE, INTLSPARE	Network Indicator.
SLSROT		Y, N	Signaling Link Selector Rotation. Enter Y if the rotation of links in the link set is required for load sharing purposes. Enter N if link rotation is not needed.
TFR		Y, N	Transfer Restricted. Enter Y if transfer restricted is part of the messaging network. Otherwise, enter N.

Table 101 Datafilling table C7NETWRK

Field	Subfield or refinement	Entry	Explanation and action
MCS		1, 3	Multiple Congestion. Enter 1 or 3 to indicate the level of congestion required.
CLUSTERS		Y, N	Cluster Messages. Enter Y if cluster messages can be received. Otherwise, enter N. Cluster messages include the following: • Transfer Cluster Restricted (TCR) • Transfer Cluster Prohibited (TCP) • Transfer Cluster Allowed (TCA)
RCTEST		Y, N	Route Set Congestion Test. Enter Y if a route set congestion test is used to relieve remote route set congestion. Otherwise, enter N.
MTPRES		Y, N	
CHGCONT		Y, N	

C7NETWRK datafill example

The following figure shows example datafill.

Figure 136 MAP display example for table C7NETWRK

```
NETNAME    NODETYPE  PTCODE                NI
   SLSROT  TFR  MCS  CLUSTERS  RCTEST MTPRES CNGCONT
-------------------------------------------------------------------
NATLSPARE  SSP       ANSI7 (54) (55) (56)  NATLSPARE
   Y       Y    3    Y         N      Y       Y
INTLSPARE  SSP       ANSI7 (51) (52) (53)  INTLSPARE
   Y       Y    3    Y         N      Y       Y
```

C7LKSET

The following table describes the datafill in table C7LKSET that is specific to SS7 trunks.

Table 102 Datafilling table C7LKSET

Field	Subfield or refinement	Entry	Explanation and action
LINKSET		alphanumeric (1 to 16 characters)	Link Set. Enter a string to define the link set.

Table 102 Datafilling table C7LKSET

Field	Subfield or refinement	Entry	Explanation and action
LSTYPE		FLINK	Link Set Type. Enter FLINK to specify the connection between two SSPs, which is needed for SS7 trunks.
NETNAME		alphanumeric (1 to 16 characters)	Network Name.Enter a string to identify the associated network as defined in table C7NETWRK.
FEPC	NETTYPE	ANSI7	Network Type. If the network type is North American, then enter ANSI7 and complete the following subfields: • NETWORK • CLUSTER • MEMBER
FECLLI		alphanumeric (1 to 16 characters)	Far End CLLI. Enter a string to denote the CLLI of the office at the far end of the link set.
SIGLKTST		Y, N	Signaling Link Set Test. Enter Y if an SL test is to be performed upon link activation. Otherwise, enter N.
RSTEST		Y, N	Route Set Test. Enter Y if a route set test is to be performed when a link set comes into service. Otherwise, enter N.
INHTEST		Y. N	Management Inhibit Test. This test audits the inhibit indicates at either end of a link set and corrects any inconsistencies. Enter Y to perform this test when any link is inhibited. Otherwise, enter N.
Q704		0 to 31	Q704 Timer Index. Enter a number to specify the timer tuple datafilled in table C7TIMER.
CNGSTN		0 to 63	Congestion Index. Enter the index to table C7CNGSTN that defines the congestion thresholds used by this link set.
NUMFLAGS		1 to 255	Number of Flags Sent Between Consecutive Signaling Units.
MTPRES		Y, N	
CHNGSLS		Y, N	
SCCPONLY		Y, N	

Table 102 Datafilling table C7LKSET

Field	Subfield or refinement	Entry	Explanation and action
NIRPLMT		NIL, NATL. INTL, NATLSPARE, INTLSPARE	Network Indicator Replacement Type.
AUTOINH		Y, N	

C7LKSET datafill example

The following figure shows example datafill.

Figure 137 MAP display example for table C7LKSET

```
LINKSET   LSTYPE  NETNAME    FEPC
   FECLLI    SIGLKTST  RSTEST  INHTEST  Q704  CNGSTN  NUMFLAGS
   MTPRES  CHNGSLS  SCCPONLY  NIRPLMT   AUTOINH
------------------------------------------------------------------
C7LKSET1  FLINK   NATLSPARE  ANSI7 (51) (52) (53)
   C7LKSET1  N         N       N        0     0       1
   Y       N        N         NIL       Y
C7LKSET2  FLINK   INTLSPARE  ANSI7 (54) (55) (56)
   C7LKSET2  N         N       N        0     0       1
   Y       N        N         NIL       Y
```

C7LINK

The following table describes the datafill in table C7LINK that is specific to SS7 trunks.

Table 103 Datafilling table C7LINK

Field	Subfield or refinement	Entry	Explanation and action
LINKNAME	LINKSET	alphanumeric (1 to 16 characters)	Link Set. Enter a string to identify the link set as defined in table C7LKSET.
	LINKSLC	0 to 15	Signaling Link Number. Identifies a unique physical link within the link set.
LINKDATA	ALLOC	LIUBASIC	Allocation Scheme. Enter LIUBASIC if the LIU7 is used to meet the throughput requirements of an STP. Complete the following subfields: • LIUTYPE • LIUNO

Table 103 Datafilling table C7LINK

Field	Subfield or refinement	Entry	Explanation and action
CLASDATA	LINKCLAS	MTP2	Link Classification. Enter MTP2.
	Q703_INDEX	0 to 31	Q703 Timer Index. Enter a number to specify the timer tuple datafilled in table C7TIMER.
Q707		0 to 31	Q707 Timer Index. Enter a number to specify the timer tuple datafilled in table C7TIMER.
LINKOPT	OPTIONS	$	Link Options.

C7LINK datafill example

The following figure shows example datafill.

Figure 138 MAP display example for table C7LINK

```
LINKNAME     LINKDATA            CLASDATA  Q707  LINKOPT
-------------------------------------------------------------------
C7LKSET1 0   LIUBASIC LIU7 106   MTP2 0    0     $
C7LKSET2 0   LIUBASIC LIU7 107   MTP2 0    0     $
```

C7RTESET

The following table describes the datafill in table C7RTESET that is specific to SS7 trunks.

Table 104 Datafilling table C7RTESET

Field	Subfield or refinement	Entry	Explanation and action
RTESET		alphanumeric (1 to 16 characters)	Route Set. Enter a string to define the route set.
NETNAME		alphanumeric (1 to 16 characters)	Network Name.Enter a string to identify the associated network as defined in table C7NETWRK.
TFPBCAST		N	Transfer Prohibited Broadcast. Enter N.

Table 104 Datafilling table C7RTESET

Field	Subfield or refinement	Entry	Explanation and action
DPC	NETTYPE	ANSI7	Network Type. If the network type is North American, then enter ANSI7 and complete the following subfields: • NETWORK • CLUSTER • MEMBER
ROUTES		up to 6 link sets	Signaling Point Routes. Enter a list of up to 6 link sets (as datafilled in table C7LKSET) associated with this route set.

C7RTESET datafill example

The following figure shows example datafill.

Figure 139 MAP display example for table C7RTESET

```
RTESET     NETNAME     TFPBCAST  DPC
                                   ROUTES
-------------------------------------------------------------------
C7RTESET1  NATLSPARE   N         ANSI7 (51) (52) (53)
                                   (C7LKSET1 0)$
C7RTESET2  INTLSPARE   N         ANSI7 (54) (55) (56)
                                   (C7LKSET2 0)$
```

ISUPDEST

The following table describes the datafill in table ISUPDEST that is specific to SS7 trunks.

Table 105 Datafilling table ISUPDEST

Field	Subfield or refinement	Entry	Explanation and action
DESTKEY	CLLI	alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI and table TRKGRP
	SGRP	0 to 1	Subgroup. Enter the trunk subgroup that should be associated with the SS7 trunk member.
ISUPROUT		alphanumeric (1 to 16 characters)	ISUP Route Set. Enter a string to identify the route set as defined in table C7RTESET.

ISUPDEST datafill example

The following figure shows example datafill.

Figure 140 MAP display example for table ISUPDEST

```
DESTKEY       ISUPROUT
-------------------------------------------------------------------
ISUP2WIT  0   C7RTESET1
ISUP2WIT  1   C7RTESET2
ISUP2WATC 0   C7RTESET1
ISUP2WATC 1   C7RTESET2
```

C7TRKMEM

The following table describes the datafill in table C7TRKMEM that is specific to SS7 trunks.

Table 106 Datafilling table C7TRKMEM

Field	Subfield or refinement	Entry	Explanation and action
MEMKEY	CLLI	alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI and table TRKGRP
	MEMNAME	0 to 9999	Trunk Member Name. Enter the trunk member number for the SS7 trunk.
CIC		0 to 16383	Circuit Identification Code. Enter a value to represent the CIC of the trunk circuit.

C7TRKMEM datafill example

The following figure shows example datafill.

Figure 141 MAP display example for table C7TRKMEM

```
MEMKEY           CIC
-----------------------------------------------------------------------
ISUP2WIT  0      16374
ISUP2WIT  1      16374
ISUP2WIT  2      16374
ISUP2WIT  3      16374
ISUP2WATC 0      16378
ISUP2WATC 1      16378
ISUP2WATC 2      16378
ISUP2WATC 3      16378
```

Originating TOPS OSNC trunks

In order for a OSNC call originating on an IT or ATC trunk to be processed by TOPS, the trunk group must be datafilled in table ISUPTRK. The datafill provides a means for the TOPS software to determine if the call should be processed in this switch or tandemed on the to next switch.

The reason behind this check is the fact that TOPS software is packaged in the LET PCL for the North American Incumbent Local Exchange Company (ILEC) market and the LLT PCL for the North American Competitive Local Exchange Company (CLEC) market. The TOPS software exists in the switch, but there may not be any operator services provided on that switch. The lack of datafill in table ISUPTRK is the stimulus for the TOPS software to bypass handling on the call. Refer to " Will the call be handled by TOPS?" on page 52 for more information.

ISUPTRK

The following table describes the datafill in table ISUPTRK that is specific to SS7 trunks.

Table 107 Datafilling table ISUPTRK

Field	Subfield or refinement	Entry	Explanation and action
GRPKEY		alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI and table TRKGRP
CONNTYPE		TYPE_A, TYPE_B, TYPE_D, NONE, LOCAL_TRANS, CELL_MOBILE	Connection Type.
	CARTYPE	IEC, NBEC	Carrier Type. Indicates that all traffic on the trunk group is dedicated as carrier or NBEC traffic. If the field is set to NBEC, then complete the following subfields: • NBECID
LCANAME		alphanumeric (4 to 8 characters)	Local Call Area Name. Enter the local call area screening name as defined in table LCASCRCN to associate a local calling area with all calls originating on this trunk.

Table 107 Datafilling table ISUPTRK

Field	Subfield or refinement	Entry	Explanation and action
BILLCD	BCTYPE	ENHBC, TOPSBC	Bill Code Type. Enter the method for bill code screening associated with this trunk group. If ENHBC is entered, then complete the following subfields: • CLGVER • DISPDIGS If TOPSBC is entered, then complete the following subfields: • NUMBC
CALLSRC		ORIG, TERM, OPER	Call Source. Enter the associated call source.
ANI2CLI		Y, N	ANI to Calling Line Identifier. This field indicates whether the ANI received should be mapped to a CLI in terminating connection signaling.
RLT	RLTVAR	NONE, RLT_FAR, RLT_REL	Release Link Trunking Variant. Enter the variant of release link Trunking supported for this trunk group. If RLT_FAR or RLT_REL is entered, then complete the following subfields: • RLT_VERSION
SNTPDRST		Y, N	Sent Paid Restricted. This field indicates whether or not sent paid billing is allowed for calls that originate on this trunk.
DNLKUP		Y, N	DN Look-up. This field indicates whether or not restricted billing screening is performed for all calls originating on this trunk.
DISPLAY		0 to 254	Operator Display. Enter a value that is used to index table TOPSDISP to retrieve a display associated with this trunk.
ININTWRK		NONE	Intelligent Network Interworking. IN Interworking is not compatible with OSNC.

ISUPTRK datafill example

The following figure shows example datafill.

Figure 142 MAP display example for table ISUPTRK

```
GRPKEY     CONNTYPE    LCANAME  BILLCD         CALLSRC  ANI2CLI
   RLT        SNTPDRST   DNLKUP  DISPLAY  ININTWRK
-------------------------------------------------------------------
ISUP2WIT   TYPE_D IEC  NLCA    ENHBC N 407623  ORIG     Y
   RLT_REL 1  N          Y       20       NONE
ISUP2WATC  TYPE_A IEC  NLCA    ENHBC N 613776  ORIG     Y
   NONE       N          Y       20       NONE
```

OSNC coin phone type determination

OSNC allows coin originated calls to be signaled using ISUP signaling. The coin signaling provided differs for the two types of coin phones (coin first and dialtone first). The TOPS office needs to be able to determine the type of coin phone. Non-OSNC coin calls used table TOPSCOIN to provide that information. OSNC coin calls will also use table TOPSCOIN to obtain the information needed.

TOPSCOIN

The following table describes the datafill in table TOPSCOIN that is specific to OSNC trunks.

Table 108 Datafilling table TOPSCOIN

Field	Subfield or refinement	Entry	Explanation and action
GRPKEY		alphanumeric (1 to 16 characters)	Common Language Location Identifier. Enter the alphanumeric string that identifies the trunk group. That alphanumeric string is defined in table CLLI and table TRKGRP
CNSDELAY		0 to 200	Coin Signal Delay. Enter 0 for OSNC trunks because coin signal delays are not used for ISUP signaling. Coin signal delays are only needed for MF trunks.
PADSTAT0		UNKNOWN, ENABLED, DISABLED	Keypad State for 0-/0+ Calls. Enter the coin phone keypad state for 0- and 0+ dialed calls.
PADSTAT1		UNKNOWN, ENABLED, DISABLED	Keypad State for 1+ Calls. Enter the coin phone keypad state for 1+ dialed calls.

Table 108 Datafilling table TOPSCOIN

Field	Subfield or refinement	Entry	Explanation and action
COINTYPE		CCFCDF, CCF, CDF	Coin Phone Type. Enter the coin phone type. Enter CCF if the coin phone is a coin first phone. Enter CDF if the coin phone is a dialtone first phone. Enter CCFCDF if the coin phone type is unknown. CCFCDF (or unknown) coin phones are generally treated like dialtone first coin phones.
CCFCNRET		Y, N	Coin First Phone Coin Return. This field indicates whether or not a coin return should automatically be done when the call arrives at the TOPS switch.
PADSTATB		UNKNOWN, ENABLED, DISABLED	Keypad State for FGB Calls. Enter the coin phone keypad state for FGB dialed calls.
PADSTAT8		UNKNOWN, ENABLED, DISABLED	Keypad State for 800+ Calls. Enter the coin phone keypad state for 800+ dialed calls.
OTTYPE		POST, PRE	Overtime Type. Enter the handling method for coin overtime periods. Enter POST if the overtime period is post paid (meaning the subscriber pays for the overtime period after the period in complete). Enter PRE if the overtime period is pre-paid (meaning the subscribed pays for the overtime period prior to the beginning of the period).

TOPSCOIN datafill example

The following figure shows example datafill.

Figure 143 MAP display example for table TOPSCOIN

```
GRPKEY    CNSDELAY  PADSTAT0  PADSTAT1  COINTYPE  CCFCNRET  PADSTATB
    PADSTAT8  OTTYPE
-------------------------------------------------------------------
ISUP2WIT  0         UNKNOWN   UNKNOWN   CCFCDF    Y         UNKNOWN
    UNKNOWN   POST
ISUP2WATC 0         ENABLED   ENABLED   CDF       N         ENABLED
    ENABLED   POST
```

OSNC route selector

The OSNC route selector is used to determine if the terminating connection should be signaled using OSNC. The following components comprise OSNC functionality on the terminating connection:

- end-to-end signaling
- inclusion of the Service Activation (SAP) parameter
- offer of connection hold

Control of these components is placed in the route list rather than on the terminating trunk group to provide added flexibility on a per-call basis. For example, called number A and called number B could both translate and route to the same terminating trunk group, but connection hold could be offered independently for each call. By having separate route lists for called number A and called number B, connection hold can be configured independently.

The TOPSPARM parameter OSNC_OUTGOING_DEFAULT also plays a role in determination of whether OSNC signaling is used. Refer to “TOPSPARM” on page 425 for more information.

Datafill sequence

The OSNC route selector related tables are described in the following table. The tables are listed in the order in which they should be datafilled.

Table 109 Datafill sequence for OSNC route selector

Table name	Explanation
OSNCCAP	The OSNC Capabilities table associates a route index with the following set of OSNC components: • end-to-end signaling • inclusion of the Service Activation (SAP) parameter • offer of connection hold
OFRT	The Office Route table associates a route list index with a set of routes which can consist of trunk groups, tones and announcements.
OFR2	The Office Route #2 table is an extension of table OFRT and associates a route list index with a set of routes which can consist of trunk groups, tones and announcements.
OFR3	The Office Route #3 table is an extension of table OFR2 and associates a route list index with a set of routes which can consist of trunk groups, tones and announcements.
OFR4	The Office Route #4 table is an extension of table OFR3 and associates a route list index with a set of routes which can consist of trunk groups, tones and announcements.

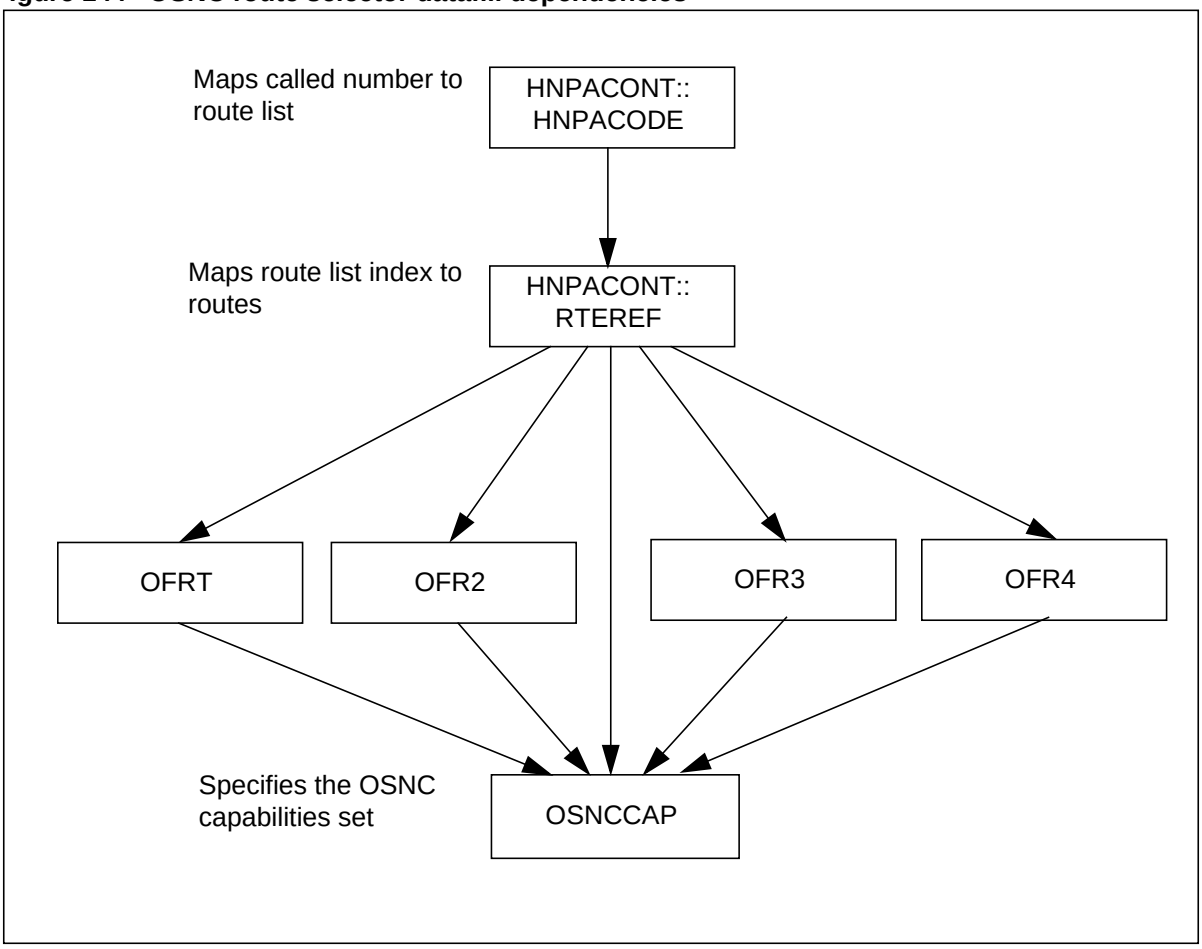
Table 109 Datafill sequence for OSNC route selector

Table name	Explanation
HNPACONT:: RTEREF	The Home Numbering Plan Area Control:: Route Reference table associates a route list index with a set of routes which can consist of trunk groups, tones and announcements.
HNPACONT:: HNPACODE	The Home Numbering Plan Area Control:: Home Numbering Plan Area Code table associates the digits of the called number with a route list index in one of the following route tables: • HNPACONT::RTEREF • OFRT • OFR2 • OFR3 • OFR4

Table dependencies

The following figure show table dependencies of the OSNC route selector datafill.

Figure 144 OSNC route selector datafill dependencies



HNPACONT::HNPACODE

Table HNPACONT contains several subtables. The HNPACODE subtable provides a mapping of the called number (or portions of the called number such as the NPA) to a route list index. That route list index is found in table HNPACONT::RTEREF.

Table 110 Datafilling table HNPACONT::HNPACODE

Field	Subfield or refinement	Entry	Explanation and action
FROMDIGS		digits	Start of the range for called number
TODOGS		digits	End of range for called number
CDRRTMT		HRTE <index>, LRTE <index>	Code Route. The entries listed here are the most common ones used. Note that there are other entries that do exist. The <index> is the key to the entry in table HNPACONT::RTEREF.

HNPACONT::HNPACODE example

The following figure shows example datafill.

Figure 145 MAP display example for table HNPACONT::HNPACODE

```
FROMDIGS  TODIGS     CDRRTMT
-------------------------------------------------------------------
201100    201199     HRTE 10
201200    201799     HRTE 11
201800    201800     HRTE 12
201801    201999     HRTE 13
919       919        HRTE 14
```

HNPACONT::RTEREF

Table HNPACONT contains several subtables. The RTEREF subtable provides a set of route lists that are pointed to from the HNPACODE subtable. A route list is composed of one or more routes. A route can be a terminating trunk group, a tone, an announcement, or a pointer to another routing table. The other routing tables that are of interest to OSNC are the following:

- table OFRT
- table OFR2
- table OFR3
- table OFR4
- table OSNCCAP

Table 111 Datafilling table HNPACONT::RTEREF

Field	Subfield or refinement	Entry	Explanation and action
RTE		route list index	Route. This is the route list index that is set in the HNPACONT::HNPACODE subtable.
RTELIST		one or more routes	Route List. This is a set of routes that are selected in the order that they are presented in the list. There are many route selectors that are valid but the T selector is the one of interest. The T selector allows the route to point to another routing table such as table OFRT or table OSNCCAP with an associated index into that table. When the T selector appears with the OSNCCAP table, the call will use the OSNC capabilities associated with the index for all subsequent routes encountered for the termination. Since table OSNCCAP does not contain a terminating agent, the routing function returns back to the route list and proceeds to the next route. When the next route is selected, the OSNC capabilities are still active for that agent.

HNPACONT::RTEREF example

The following figure shows example datafill.

Figure 146 MAP display example for table HNPACONT::RTEREF

```
RTE  RTELIST
-------------------------------------------------------------------
10   (T OFRT 100)$
11   (T OFR2 100)$
12   (T OFR3 100)$
13   (T OFR4 100)$
14   (T OSNCCAP 1) (N D TRUNKOG1 0 N N)$
```

OFRT

The OFRT table provides a set of route lists that are pointed to from other routing tables such as table HNPACONT::RTEREF. A route can be a terminating trunk group, a tone, an announcement, or a pointer to another routing table. The other routing tables that are of interest to OSNC are the following:

- table OSNCCAP

Table 112 Datafilling table OFRT

Field	Subfield or refinement	Entry	Explanation and action
RTE		route list index	Route. This is the route list index that is set in other routing tables such as table HNPACONT::RTEREF using a T selector.
RTELIST		one or more routes	Route List. This is a set of routes that are selected in the order that they are presented in the list. There are many route selectors that are valid but the T selector is the one of interest. The T selector allows the route to point to another routing table such as table OFR2 or table OSNCCAP with an associated index into that table. When the T selector appears with the OSNCCAP table, the call will use the OSNC capabilities associated with the index for all subsequent routes encountered for the termination. Since table OSNCCAP does not contain a terminating agent, the routing function returns back to the route list and proceeds to the next route. When the next route is selected, the OSNC capabilities are still active for that agent.

OFRT example

The following figure shows example datafill.

Figure 147 MAP display example for table OFRT

```
RTE  RTELIST
-----------------------------------------------------------------
100  (T OSNCCAP 1) (N D TRUNKOG1 0 N N) (T OSNCCAP 2) (S D T120)$
```

OFR2

The OFR2 table provides a set of route lists that are pointed to from other routing tables such as table HNPACONT::RTEREF. A route can be a terminating trunk group, a tone, an announcement, or a pointer to another routing table. The other routing tables that are of interest to OSNC are the following:

- table OSNCCAP

Table 113 Datafilling table OFR2

Field	Subfield or refinement	Entry	Explanation and action
RTE		route list index	Route. This is the route list index that is set in other routing tables such as table HNPACONT::RTEREF using a T selector.
RTELIST		one or more routes	Route List. This is a set of routes that are selected in the order that they are presented in the list. There are many route selectors that are valid but the T selector is the one of interest. The T selector allows the route to point to another routing table such as table OFR3 or table OSNCCAP with an associated index into that table. When the T selector appears with the OSNCCAP table, the call will use the OSNC capabilities associated with the index for all subsequent routes encountered for the termination. Since table OSNCCAP does not contain a terminating agent, the routing function returns back to the route list and proceeds to the next route. When the next route is selected, the OSNC capabilities are still active for that agent.

OFR2 example

The following figure shows example datafill.

Figure 148 MAP display example for table OFR2

```
RTE  RTELIST
-----------------------------------------------------------------
100  (T OSNCCAP 3) (N D TRUNKOG2 0 N N) (T OSNCCAP 2) (S D T120)$
```

OFR3

The OFR3 table provides a set of route lists that are pointed to from other routing tables such as table HNPACONT::RTEREF. A route can be a terminating trunk group, a tone, an announcement, or a pointer to another routing table. The other routing tables that are of interest to OSNC are the following:

- table OSNCCAP

Table 114 Datafilling table OFR3

Field	Subfield or refinement	Entry	Explanation and action
RTE		route list index	Route. This is the route list index that is set in other routing tables such as table HNPACONT::RTEREF using a T selector.
RTELIST		one or more routes	Route List. This is a set of routes that are selected in the order that they are presented in the list. There are many route selectors that are valid but the T selector is the one of interest. The T selector allows the route to point to another routing table such as table OFR4 or table OSNCCAP with an associated index into that table. When the T selector appears with the OSNCCAP table, the call will use the OSNC capabilities associated with the index for all subsequent routes encountered for the termination. Since table OSNCCAP does not contain a terminating agent, the routing function returns back to the route list and proceeds to the next route. When the next route is selected, the OSNC capabilities are still active for that agent.

OFR3 example

The following figure shows example datafill.

Figure 149 MAP display example for table OFR3

```
RTE  RTELIST
-----------------------------------------------------------------------
100  (T OSNCCAP 4) (N D TRUNKOG2 0 N N) (T OSNCCAP 2) (S D T120)$
```

OFR4

The OFR4 table provides a set of route lists that are pointed to from other routing tables such as table HNPACONT::RTEREF. A route can be a terminating trunk group, a tone, an announcement, or a pointer to another routing table. The other routing tables that are of interest to OSNC are the following:

- table OSNCCAP

Table 115 Datafilling table OFR4

Field	Subfield or refinement	Entry	Explanation and action
RTE		route list index	Route. This is the route list index that is set in other routing tables such as table HNPACONT::RTEREF using a T selector.
RTELIST		one or more routes	Route List. This is a set of routes that are selected in the order that they are presented in the list. There are many route selectors that are valid but the T selector is the one of interest. The T selector allows the route to point to another routing table such as table OFRT or table OSNCCAP with an associated index into that table. When the T selector appears with the OSNCCAP table, the call will use the OSNC capabilities associated with the index for all subsequent routes encountered for the termination. Since table OSNCCAP does not contain a terminating agent, the routing function returns back to the route list and proceeds to the next route. When the next route is selected, the OSNC capabilities are still active for that agent.

OFR4 example

The following figure shows example datafill.

Figure 150 MAP display example for table OFR4

```
RTE  RTELIST
-------------------------------------------------------------------
100  (T OSNCCAP 1) (N D TRUNKOG3 0 N N) (T OSNCCAP 2) (S D T120)$
```

OSNCCAP

The OSNCCAP table provides a set of OSNC capabilities that are applied to the terminating connection. Encountering this route in the route list just associates these OSNC capabilities with all subsequent items in the route list, it does not provide a terminating agent.

The following table describes the fields that define the OSNC terminating capabilities.

Table 116 Datafilling table OSNCCAP

Field	Subfield or refinement	Entry	Explanation and action
OSNCIDX		0 to 254	OSNC Capability Index. This is the route list index that is set in other routing tables such as table HNPACONT::RTEREF and table OFRT using a T selector.

Table 116 Datafilling table OSNCCAP

Field	Subfield or refinement	Entry	Explanation and action
OSNCINFO	STATE	ON, OFF	OSNC Capability Index State. This field determines if the capability set should be applied to the next items in the route list or not. When OFF is selected, OSNC capabilities are not applied on outgoing IT/ATC TOPS-to-ISUP trunks. Also, no other fields follow. When ON is selected, OSNC capabilities are applied on outgoing IT/ATC ISUP trunks for calls arriving to TOPS and services nodes with OSNC capabilities. This enables end-to-end signaling. Also, the OSNCCAP subfield follows.
	OSNCCAP	SAP	OSNC Capability. This field provides a list of capabilities. Currently there is only one capability available. When the SAP is selected, it is included in the Initial Address (IAM) message to establish an outgoing connection. The value of the feature code indicator within SAP parameter is determined by the value provided in the CONNHOLD field which is prompted for as the next field.
	CONNHOLD	Y, N	Connection Hold. This field indicates whether or not connection hold should be offered. When set to N, connection hold is not available on the outgoing connection. The Service Activation (SAP) parameter has the feature code indicator encoded as ‘hold not available.’ When set to Y, connection hold is available on the outgoing connection. The SAP has the feature code indicator encoded as ‘hold available.’

Even though table OSNCCAP is encountered in the route list, there are other factors that determine whether or not the capabilities will be applied to the terminating connection. The following table lists the OSNC terminating capabilities and the associated factors.

Table 117 OSNCCAP terminating capability applicability

OSNCCAP terminating capability	Associated factors
end-to-end signaling	Field STATE in table OSNCCAP must be set to ON. The originating connection must be present and be OSNC, meaning that a Service Activation (SAP) parameter was received containing one of the following values: • hold available • hold not available • intercept - regular • intercept - blank • intercept - trouble Also, the terminating agent that is selected must be an IT or ATC trunk group using ISUP signaling.
inclusion of the Service Activation (SAP) parameter	Field OSNCCAP in table OSNCCAP must include SAP. The originating connection must be present and be OSNC, meaning that a Service Activation (SAP) parameter was received containing one of the following values: • hold available • hold not available • intercept - regular • intercept - blank • intercept - trouble Also, the terminating agent that is selected must be an IT or ATC trunk group using ISUP signaling.

Table 117 OSNCCAP terminating capability applicability

OSNCCAP terminating capability	Associated factors
offer of connection hold	Field CONNHOLD on table OSNCCAP must be set to Y. The originating connection must be present and be OSNC, meaning that a Service Activation (SAP) parameter was received containing one of the following values: • hold available • hold not available • intercept - regular • intercept - blank • intercept - trouble Also, the terminating agent that is selected must be an IT or ATC trunk group using ISUP signaling. Also, connection hold must be established on the originating connection as well.

The following table gives more detail as to how datafill affects when connection hold is offered on the terminating connection. It describes when a connection hold SAP is sent on the terminating connection and how datafill in OSNCCAP can or cannot affect sending a SAP.

Table 118 Connection hold SAP on terminating connection

	Normal Call Completion Calls	Inward Calls	Transfer to Carrier Calls
OSNCCAP SAP = Y (connhold)	No SAP is sent (datafill is ignored)	SAP is sent to indicate no connection hold is available	SAP is sent to indicate connection hold is available
OSNCCAP SAP = N (no connhold	No SAP is sent (datafill is ignored)	SAP is sent to indicate no connection hold is available	SAP is sent to indicate no connection hold is available
OSNCCAP SAP = $ **(no SAP is datafilled)**	No SAP is sent (datafill is ignored)	No SAP is sent	SAP is sent to indicate no connection hold is available

OSNCCAP example

The following figure shows example datafill.

Figure 151 MAP display example for table OSNCCAP

```
OSNCIDX  OSNCINFO
-----------------------------------------------------------------------
1        ON $
2        OFF
3        ON (SAP Y)$
4        ON (SAP N)$
```

TOPSPARM

The TOPS14 release adds the parameter OSNC_OUTGOING_DEFAULT to TOPSPARM to default outgoing ISUP signaling for the office to OSNC if the incoming party utilized OSNC signaling.

If OSNC_OUTGOING_DEFAULT is set to N, then OSNC signaling is used only if the OSNCCAP selector is applied to the route list with an index which has the OSNCINFO STATE set to ON in table OSNCCAP.

If OSNC_OUTGOING_DEFAULT is set to Y, then the OSNCCAP selector does not need to be in the route list to obtain OSNC signaling. OSNC signaling will be used unless the OSNCCAP selector has been added to the route list with an index that has the OSNCINFO STATE set to OFF in table OSNCCAP.

OSNC signaling will still only be used for an outgoing ISUP trunk if the incoming party used OSNC signaling.

*The OSNCCAP selector must still be used to obtain a connection hold via the SAP parameter in the outgoing IAM.*Example:
MSGFROM = ATUP
If the entry in subfield MSGFROM is ATUP, datafill field ATUPMSG as shown in the field description table.

Table 119 Datafilling table TOPSPARM

Parmname	New or Changed	Entry	Explanation and action
OSNC_OUTGOING_DEFAULT	New	Y/N	N (default) indicates to abide by the route list selector 'OSNCCAP' to obtain OSNC signaling on outgoing ISUP trunks. Y indicates to default to using OSNC signaling on outgoing ISUP trunks if the incoming party used OSNC signaling. However, the OSNCCAP selector can override the default by being indexed to a tuple where the OSNCINFO STATE is datafilled as OFF in table OSNCCAP.

TOPSPARM example

The following figure shows example datafill.

Figure 152 MAP display example for table TOPSPARM

```
PARMNAME                                        PARMVAL
-------------------------------------------------------------------
OSNC_OUTGOING_DEFAULT                           Y
```

Chapter 6: OSNC SOC

All functionality in a product computing module load (PCL) is categorized as either base or optional. Base functionality is available for use immediately. Optional functionality is grouped into commercial units called software optionality control (SOC) options.

As a tool for managing the options in a PCL, SOC provides an interface at the MAP terminal. Users can enable or disable options, track the state of SOC options and generate reports about SOC options.

This chapter provides a brief description of how OSNC implements SOC. For detailed information on how to use the SOC tool, please refer to *Software Optionality Control User's Manual*, 297-8991-901.

OSNC SOC option

The functional group to which OSNC software belongs is OSEA (Operator Services Equal Access). OSNC is a North American feature and delivered on with the LET and LLT loads. OSNC is controlled by the OSEA0013 - 'OSEA Opr Svcs Ntwk Capabi'.

Prerequisite switch software

OSEA0013 requires the following software functionality order codes:

- OSEA0005 - OSEA ISUP to/from TOPS
- OSEA0001 - OSEA TOPS Equal Access
- OSB0001 - OSB Operator Services Basic

OSNC SOC states

The SOC option OSEA0013 is a *state* option. A state option has a right-to-use (RTU_ setting of Y (yes) or N (no). The state can be ON or IDLE. The RTU setting must be Y to change the state of the option. The state setting for OSEA0013 must be ON to use OSNC.

OSEA0013

When OSEA0013 is ON, calls which contain a Service Activation Parameter (SAP) in the Initial Address Message (IAM) with a Feature Code Indicator (FCI) of “hold available”, “hold not available”, “intercept-blank number”, “intercept-trouble”, or “intercept-regular” are processed as described in this document. When OSEA0013 is IDLE and if calls to TOPS contain this SAP with these Feature Code Indicator (FCI) values, the SAP is ignored and the call is processed as if it were signalled as TOPS/ISUP and a TOPS 614 log is generated. Refer to “Chapter 7: OSNC logs” on page 433 for more information on the TOPS 614 log.

Part 6: Billing

Part 6: “Billing” does not have any chapters for this particular release.

Part 7: Operator, administration and maintenance

Part 7: “Operator, administration and maintenance” includes the following chapters:

Chapter 7: OSNC logs

This chapter provides information on logs for OSNC. For each log, there is a brief description, example, action and list of any associated OM registers. For complete information on all log reports for the DMS switch, refer to the *Log Report Reference Manual*.

TOPS614

This log is generated when the OSEA0013 SOC option is set to IDLE and a call arrives with OSNC capabilities. OSNC capabilities are determined by the presence on a Service Activation Parameter (SAP) in the Initial Address Message (IAM) that contains one of the following Feature Code Indicators (FCIs):

- hold available
- hold not available
- intercept - regular
- intercept - blank
- intercept - trouble

The following figure shows an example log report.

Figure 153 Example log report for TOPS614

```
TOPS614  OCT31  17:44:03  1234  INFO  OSNC SOC not enabled
    CKT ISUP2WATC 0
```

Action

Activate the SOC OSEA0013, or change the datafill in the previous end office so that it does not send OSNC signalling for the specified trunk group.

Associated OM register

None.

TOPS122

This log is generated for operator hold errors. The TOPS14 release adds a value to indicate when an incoming OSNC coin call does not have connection hold. It is generated when transferring the coin call to a carrier using MF FGC signaling. Because connection hold is unavailable, this feature cannot be fully supported.

Figure 154 Example log reports

```
Format 1 TOPS122 NOV30 21:56:34 4900 Info Opr Hold Error
  OPR HOLD INFO   = NO_OPRHOLD_ON_INCOMING
  CALLING DN      = 619-520-1122
  ORIG AGENT      = CKT       TOPSOSNC1        1
  CALLED DN       = 201-220-1234
  TERM AGENT      = CKT       TATCC111OG1      1
```

Action

Investigate why connection hold is not being offered for the incoming party. Provision the end office to send OSNC coin signaling.

Associated OM register

None.

Part 8: Appendix

Part 8: “Appendix” includes the following chapters:

- Chapter 8: “Messages” beginning on page 437.
- Chapter 9: “Parameters” beginning on page 451.

Chapter 8: Messages

The information in this chapter specifies the format and encoding of messages used in OSNC. The following topics are discussed:

- formatting principles
- message introduction
- parameter to OSNC message mapping
- message formats

Formatting principles

Each OSNC message consists of a message type and zero or more parameters. The message type is a mandatory field that uniquely defines the function and format of each OSNC message.

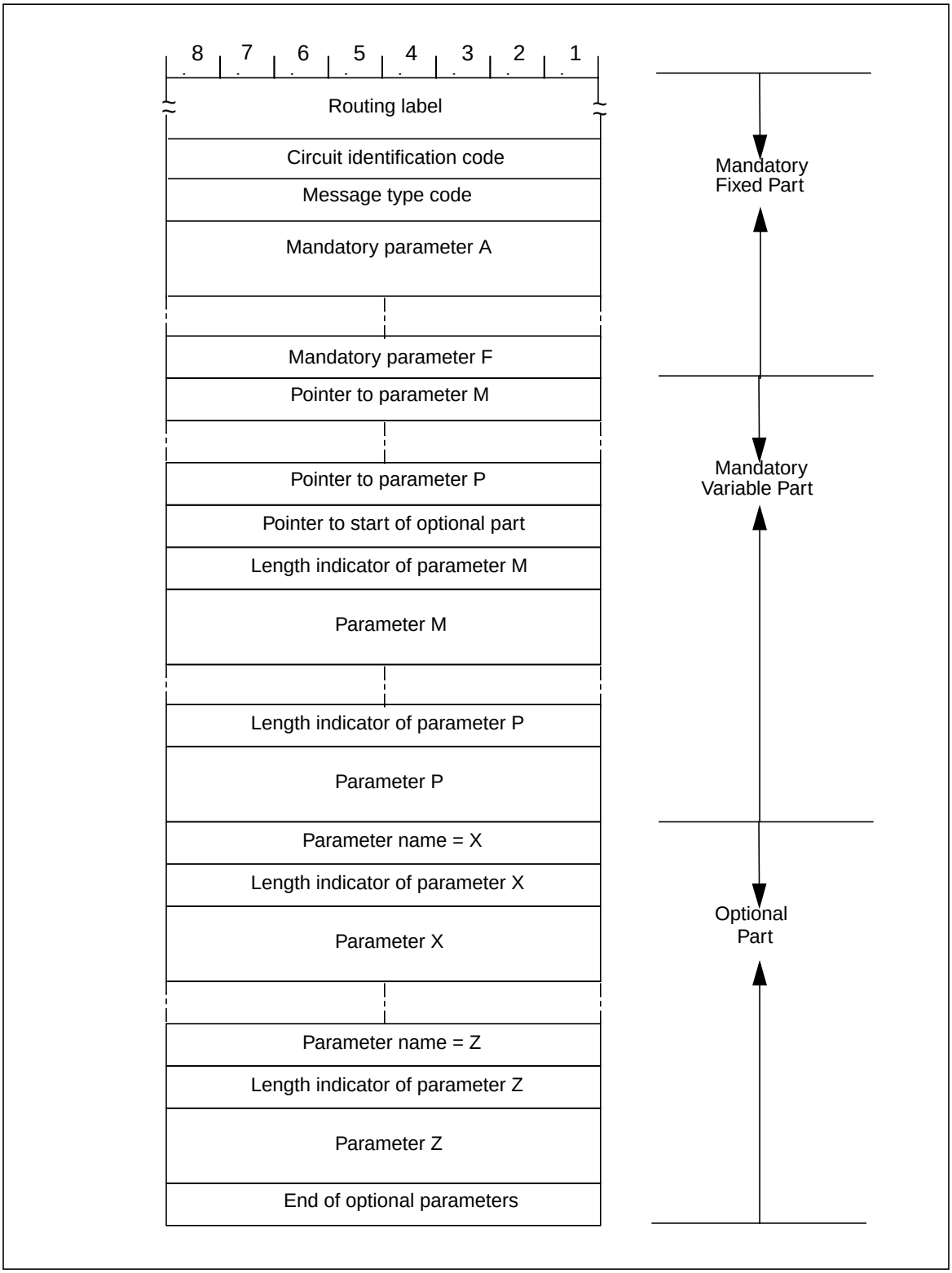
All OSNC messages have a defined layout that includes groups of data presented in the following table.

Table 120 Alphabetical reference for OSNC messages

Data group	Description
mandatory fixed group	Parameters that are mandatory and of fixed length for a particular message type are included in this part of the message. The name, length and order of the parameters is uniquely defined by the message type meaning that the name of the parameter (1 octet) and the length of the parameter (1 octet) is not included in this part of the message.
mandatory variable group	Parameters that are mandatory and of variable length for a particular message type are included in this part of the message. A pointer (1 octet) is used to indicate the beginning of each parameter. The name and order of the parameters is uniquely defined by the message type. A pointer is also included to indicate the beginning of the optional group. If the message type indicates that there are no optional parameters, then this pointer is not present. All pointers are sent consecutively at the beginning of the mandatory variable part of the message. Each parameter then contains its associated length (1 octet) followed by its contents.
optional group	Parameters that may or may not occur in any particular message type. Both fixed and variable length parameters may be included. Parameters may be placed in the message in any order. Each parameter includes the parameter name (1 octet) and the length (1 octet) followed by its contents.

The following figure illustrates a generic message format.

Figure 155 General OSNC message format



Message introduction

The following table lists each message type in alphabetical order, its description and the encoding value used to identify the message

Table 121 Alphabetical reference for OSNC messages

Message	Description
Address complete (ACM)	A message sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received.
Answer (ANM)	A message sent in the backward direction indicating that the call has been answered. It generally signifies the start of billable conversation time.
Call progress (CPG)	A message sent in the forward or backward direction indicating that an event has occurred in the progress of a call.
Facility (FAC)	A message sent by a switch in either direction and in any phase of the call to request an action at another switch. The message may also be used by the switch in which the action is being performed to notify the requesting switch of the success or failure of the requested action.
Facility Request (FAR)	A message sent in the backward direction to initiate release link trunking.
Facility Accept (FAA)	A message received from the backward direction to acknowledge release link trunking.
Facility Reject (FRJ)	A message received from the backward direction to reject release link trunking.
Initial address (IAM)	A message sent in the forward direction to initiate seizure of an outgoing circuit and to transmit number and other information relating to the routing and handling of a call.
Release (REL)	A message sent in either direction indicating that the circuit identified in the message is being released due to the reason (cause) supplied and is ready to be put in the idle state on receipt of the Release Complete (RCL) message.
Release complete (RLC)	A message sent in either direction in response to the receipt of a Release (REL) message when the associated circuit has been brought into the idle condition.

Table 121 Alphabetical reference for OSNC messages

Message	Description
Resume (RES)	A message sent in the backward direction to indicate re-answer from an interworking node or that a non-ISDN called party has gone off-hook within a certain time after going on-hook during the active phase of a call.
Suspend (SUS)	A message sent in the backward direction to indicate clear-back from an interworking node or that a non-ISDN called party has gone on-hook during the active phase of a call.

Parameter to OSNC message mapping

The following table provides information as to what parameters can be found in each OSNC message. Those parameters marked as ‘M’ are mandatory parameters for that message. Those parameters marked as ‘O’ are optional for that message.

Table 122 Parameters for OSNC messages

Parameter	ACM	ANM	CPG	FAC	IAM	REL	RCL	RES	SUS
Backward call indicators	M	O	O						
Called party number					M				
Calling party number					O				
Calling party’s category					M				
Carrier identification					O				
Carrier selection					O				
Cause indicators	O		O			M			
Charge number					O	O			
End of optional parameters	O	O	O	O	O	O			
Event information			M						
Forward call indicators					M				
Generic address					O	O			
Generic digits					O				
Jurisdiction information					O				
Local service provider information	O	O			O	O			
Message type	M	M	M	M	M	M	M	M	M
Nature of connection					M				
Operator services information					O				
Optional backward call indicators	O	O	O						
Original called number					O				
Originating line information					O				
Redirecting number			O		O				

Table 122 Parameters for OSNC messages

Parameter	ACM	ANM	CPG	FAC	IAM	REL	RCL	RES	SUS
Redirecting number information	O				O				
Service activation	O	O	O	O	O	O			
Suspend/resume indicators								M	M
Transit network selection					O				
User service information					M				

Message formats

The following section provides information on the contents of each OSNC message. For each message, a list of relevant parameters is given and for each parameter, the following information is provided:

- Type of parameter
  - mandatory
  - optional
- Format of the parameter
  - fixed
  - variable
- Length of the parameter
  - number of octets

The length of the parameter includes different types of octets based upon the type and format of the parameter. Refer to the following table for the rules on how the parameter length is determined.

		Type of parameter	
		Mandatory	**Optional**
Format of parameter	**Fixed**	Length (in octets) includes parameter contents only	Length (in octets) includes the parameter name (1 octet), the length indicator (1 octet) and the parameter contents.
	Variable	Length (in octets) includes the length indicator (1 octet) and the parameter contents. The minimum and maximum lengths are listed.	Length (in octets) includes the parameter name (1 octet), the length indicator (1 octet) and the parameter contents. The minimum and maximum lengths are listed.

For each message, the mandatory parameters are listed in the order that they should appear in the message. Optional parameters may appear in any order.

Address complete (ACM)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Backward call indicators	mandatory	fixed	2
Cause indicators	optional	variable	4 to n
Local service provider information	optional	variable	5 to 8
Optional backward call indicators	optional	fixed	3
Redirection information	optional	fixed	4
Service activation	optional	variable	3 to n
End of optional parameters	optional	fixed	1

Answer (ANM)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Backward call indicators	optional	fixed	2
Local service provider information	optional	variable	5 to 8
Optional backward call indicators	optional	fixed	3
Service activation	optional	variable	3 to n
End of optional parameters	optional	fixed	1

Call progress (CPG)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Event information	mandatory	fixed	1
Backward call indicators	optional	fixed	2
Cause indicators	optional	variable	4 to n
Optional backward call indicators	optional	fixed	3
Redirection information	optional	fixed	4
Service activation	optional	variable	3 to n

Parameter	Type	Format	Length (in octets)
End of optional parameters	optional	fixed	1

Facility (FAC)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Service activation	optional	variable	3 to n
End of optional parameters	optional	fixed	1

Facility accept (FAA)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Facility indicator	mandatory	fixed	1
Call reference	optional	fixed	6
Generic digits	optional	variable	3 to n
End of optional parameters	optional	fixed	1

Facility request (FAR)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Facility indicator	mandatory	fixed	1
Call reference	optional	fixed	6
Called party number	optional	variable	2 to 11
Calling party number	optional	variable	5 to 12
Charge adjustment	optional	fixed	8
Charge number	optional	variable	3 to 12
Generic digits	optional	variable	4 to n
Operator information	optional	variable	6 to 12
Originating line information	optional	fixed	3
End of optional parameters	optional	fixed	1

Facility reject (FRJ)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Facility indicator	mandatory	fixed	1

Parameter	Type	Format	Length (in octets)
Cause indicator	mandatory	variable	4 to n

Initial address (IAM)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Nature of connection	mandatory	fixed	2
Forward call indicators	mandatory	fixed	2
Calling party's category	mandatory	fixed	1
User service information	mandatory	variable	3 to n
Called party number	mandatory	variable	2 to 11
Calling party number	optional	variable	5 to 12
Carrier identification	optional	fixed	5
Carrier selection information	optional	fixed	3
Charge number	optional	variable	3 to 12
Generic address	optional	variable	6 to 13
Generic digits	optional	variable	4 to n
Jurisdiction	optional	variable	2 to 5
Local service provider information	optional	variable	5 to 8
Operator services information	optional	variable	3 to 8
Original called number	optional	variable	5 to 12
Originating line information	optional	fixed	3
Redirecting number	optional	variable	5 to 12
Redirection information	optional	fixed	4
Service activation	optional	variable	3 to n
Transit network selection	optional	variable	5 to 6
End of optional parameters	optional	fixed	1

Release (REL)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Cause indicators	mandatory	variable	4 to n
Charge number	optional	variable	3 to 12
Generic address	optional	variable	6 to 13
Local service provider information	optional	variable	5 to 8
Service activation	optional	variable	3 to n
End of optional parameters	optional	fixed	1

Release complete (RLC)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1

Resume (RES)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Suspend/resume indicators	mandatory	fixed	1

Suspend (SUS)

Parameter	Type	Format	Length (in octets)
Message type	mandatory	fixed	1
Suspend/resume indicators	mandatory	fixed	1

Chapter 9: Parameters

The following table lists each parameter in alphabetical order, its description, the page where its description begins and the encoding value used to identify the parameter.

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Backward call indicators	Information sent in the backward direction consisting of the following data: • charge indicator • called party's status indicator • called party's category indicator • end-to-end method indicator • interworking indicator • end-to-end information indicator • ISDN user part indicator • holding indicator • ISDN access indicator • echo control device indicator • SCCP method indicator	page 458	00010001
Call reference	Information sent in the backward direction consisting of the following data: • call identifier • re-origination type • point code	page 460	00000001
Called party number	Information sent in the forward direction to identify the called party and consisting of the following data: • odd/even indicator • nature of address indicator • numbering plan indicator • address signals (digits)	page 461	00000100

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Calling party number	Information sent in the forward direction to identify the calling party and consisting of the following data: • odd/even indicator • nature of address indicator • numbering plan indicator • address presentation restriction indicator, • screening indicator • address signals (digits)	page 464	00001010
Calling party's category	Information sent in the forward direction indicating the category of the calling party (i.e., ordinary subscriber, test call, etc.)	page 467	00001001
Carrier identification	Information sent in the forward direction to the transit network indicating the carrier network selected by the originating subscriber.	page 470	11000101
Carrier selection	Information sent in the forward direction to indicate whether the calling user selected the carrier network by presubscription or dialed input and if presubscribed whether or not the carrier identification code was also dialed.	page 472	11101110
Cause indicators	Information sent in either direction consisting of the following data: • coding standard • location • cause value • diagnostics It indicates the reason for sending the message in which it is contained (i.e., REL) and identifies the reason associated with the release of the facility.	page 473	00010010

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Charge adjustment	Information sent in the backward direction consisting of the following data: • charge adjust time (hours and minutes) • charge adjust type • charge adjust indicator • charge adjust amount • charge adjust entry code	page 478	01110010
Charge number	Information sent in either direction indicating the chargeable number for the call and consisting of the following data: • odd/even indicator • nature of address • numbering plan indicator • address signals (digits)	page 480	11101011
End of optional parameters	Information sent in either direction indicating the there are no more optional parameters contained in the message.	page 483	00000000
Event information	Information sent in either direction consisting of the following data: • event indicator • event presentation restricted indicator	page 484	00100100
Facility indicator	Information sent in either direction indicating the type of facility action being taken.	page 485	00011000
Forward call indicators	Information sent in the forward direction consisting of the following data: • incoming international call indicator • end-to-end method indicator • interworking indicator • end-to-end information indicator • ISDN user part indicator • ISDN user part preference indicator • ISDN access indicator • SCCP method indicator	page 486	00000111

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Generic address	Information in the form of an address pertaining to a supplementary service (i.e., dialed number for LNP) and consisting of the following data: • type of address • odd/even indicator • nature of address • numbering plan indicator • address presentation restriction indicator • screening indicator • address signals (digits)	page 488	11000000
Generic digits	Information in the form of digits pertaining to a supplementary service (i.e., bill-to number) and consisting of the following data: • type of digits • encoding scheme • digits	page 494	11000001
Jurisdiction information	Information sent in the forward direction indicating the geographic origination of the call (i.e., calling party's LRN)	page 497	11000100
Local service provider information	Information sent in the both directions indicating the local service provider of the associated party (i.e., calling or called) and consists of the following data: • LSPI type • encoding scheme • context identification • characters (alphanumeric)	page 499	01110011
Message type	Information sent in both directions indicating the type of message.	page 501	none
Nature of connection	Information sent in the forward direction consisting of the following data: • satellite indicator • continuity check indicator • echo control device indicator	page 502	00000110

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Operator information	Information sent in the backward direction consisting of the following data: • operator number • re-origination type • entry code • operator re-origination indicator • trouble indicator • time and charges indicator • action response • bridge re-origination control • feature code • terminating route control • ANM billing indicator • re-origination trigger type • UTR digit • STR digit • STR key duration at talking • STR key duration at non-talking • re-origination allowed • immediate re-origination • disconnect timer	page 503	01110000
Operator services information	Information sent in the forward direction between operator services entities primarily identifying charging and service type options.	page 506	11000010
Optional backward call indicators	Information sent in the backward direction consisting of the following data: • inband information indicator • call forwarding may occur indicator • simple segmentation indicator • network excessing delay indicator • user-network interaction indicator	page 510	00101001

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Original called number	Information sent in the forward direction to indicate, in the case of call redirection (i.e., call forwarding), the number of the user who initiated the initial redirection. It consists of the following data: • odd/even indicator • nature of address indicator • numbering plan indicator • address presentation restriction indicator, • screening indicator • address signals (digits)	page 511	00101000
Originating line information	Information sent in the forward direction indicating a toll class of service for the call.	page 514	11101010
Redirecting number	Information sent in the forward direction indicating the number from which the call was last redirected and consisting of the following data: • odd/even indicator • nature of address indicator • numbering plan indicator • address presentation restriction indicator, • screening indicator • address signals (digits)	page 515	00001011
Redirecting number information	Information sent in the forward direction consisting of the following data: • original redirecting reason • redirection counter • redirecting reason	page 518	00010011
Service activation	Information sent in either direction to indicate the invocation of one or more supplementary services.	page 519	00110011

Table 123 Alphabetical reference for OSNC parameters

Parameter	Description	Page number	Encoding
Suspend/resume indicators	Information sent in the Suspend (SUS) and Resume (RES) messages to indicate whether suspend/resume was initiated by an ISDN subscriber of ny the network.	page 522	00100010
Transit network selection	Information sent in the forward direction indicating the transit (i.e., carrier) network(s) requested for the routing of the call and consisting of the following data: • type of network identification • network identification plan • network identification (carrier id) • circuit code	page 523	00100011
User service information	Information sent in the forward direction indicating the bearer capability requested by the calling party and consisting of the following data as a minimum: • coding standard • information transfer capability • transfer mode • information transfer rate	page 526	00011101

Backward call indicators

Parameter format

	8	7	6	5	4	3	2	1
1	H	G	F	E	D	C	B	A
2	P	O	N	M	L	K	J	I

Parameter encoding

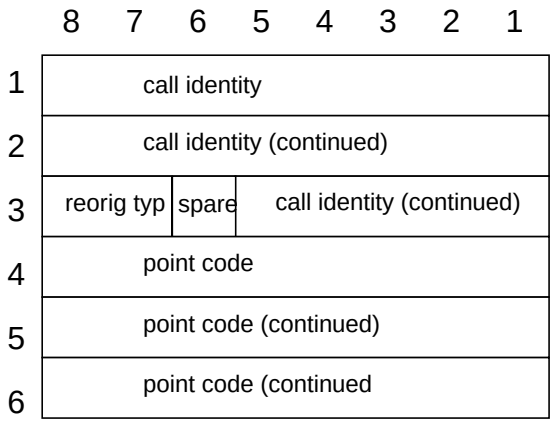
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Charge indicator	A-B							0	0	no indication (default)
								0	1	no charge
								1	0	charge (no U.S.)
								1	1	spare
Called party's status indicator	C-D					0	0			no indication (default)
						0	1			subscriber free
						1	0			connect when free (no U.S.)
						1	1			excessive delay
Called party's category indicator	E-F			0	0					no indication (default)
				0	1					ordinary subscriber
				1	0					payphone (no U.S.)
				1	1					spare
End-to-end method indicator	G-H	0	0							no end-to-end method available
		0	1							pass along method available
		1	0							SCCP method available
		1	1							pass along and SCCP methods available

Fields	Location	Values								Meaning
		P	O	N	M	L	K	J	I	
Interworking indicator	I								0	no interworking encountered
									1	interworking encountered

Fields	Location	Values								Meaning
		P	O	N	M	L	K	J	I	
IAM segmentation indicator	J							0		no indication
								1		additional information has been received and incorporated into call setup
ISDN user part indicator	K						0			ISDN user part not used all the way
							1			ISDN user part used all the way
Holding indicator	L					0				holding not required (default)
						1				holding required (no U.S.)
ISDN access indicator	M				0					terminating access non-ISDN
					1					terminating access ISDN
Echo control device indicator	N			0						incoming half echo control device not included
				1						incoming half echo control device included
SCCP method indicator	O-P	0	0							no indication (default)
		0	1							connectionless method available (no U.S.)
		1	0							connection oriented method available (no U.S.)
		1	1							connectionless and connection oriented methods available (no U.S.)

Call reference

Parameter format

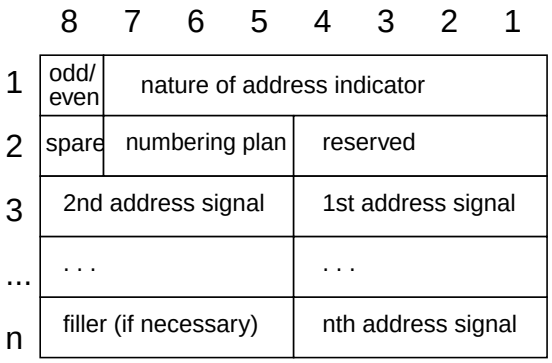


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Call identity	(1) A-H, (2) A-H, (3) A-E	n	n	n	n	n	n	n	n	switch generated call identifier
Spare	(3) F			0						spare
Re-origination type	(3) G-H	0	0							provide dial tone to originator
		0	1							immediately translate and route
		1	0							deny re-origination
		1	1							spare
Point code	(4) A-H, (5) A-H, (6) A-H	n	n	n	n	n	n	n	n	signaling point code

Called party number

Parameter format



Parameter encoding

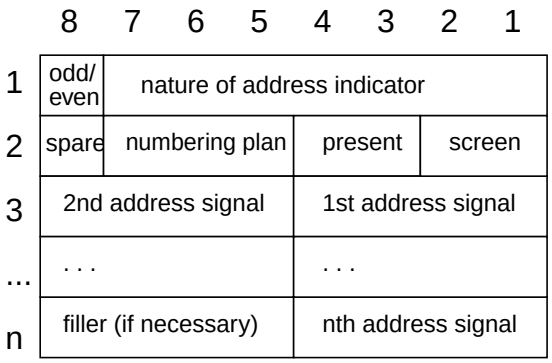
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator	(1) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	national (significant) number
			0	0	0	0	1	0	0	international number
			1	1	1	0	0	0	0	inward operator code
			1	1	1	0	0	0	1	subscriber number, operator requested
			1	1	1	0	0	1	0	national number, operator requested
			1	1	1	0	0	1	1	international number, operator requested
			1	1	1	0	1	0	0	no number present, operator requested
			1	1	1	0	1	0	1	no number present, cut-through call to carrier
			1	1	1	0	1	1	0	950+ call from local exchange carrier public station, hotel/motel, or non-exchange access end office
			1	1	1	0	1	1	1	test line test code
Odd/even indicator	(1) H	0								even number of address digits
		1								odd number of address digits

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Reserved	(2) A-D					0	0	0	0	reserved
Numbering plan indicator	(2) E-G		0	0	0					unknown (no interpretation)
			0	0	1					ISDN (telephony) numbering plan
			0	1	0					spare
			0	1	1					reserved (CCITT: data numbering plan)
			1	0	0					reserved (CCITT: telex numbering plan)
			1	0	1					private numbering plan
			1	1	0					spare
			1	1	1					spare
Spare	(2) H	0								spare
Address Signal (1st)	(3) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(3) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										
Filler	(n) E-H	0	0	0	0					filler

Calling party number

Parameter format



Parameter encoding

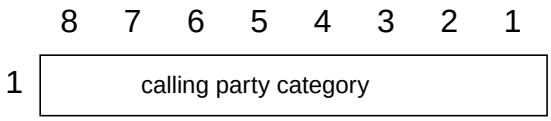
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator	(1) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	unique subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	unique national (significant) number
			0	0	0	0	1	0	0	unique international number
			1	1	1	0	0	0	1	non-unique subscriber number
			1	1	1	0	0	1	0	spare, reserved for national use
			1	1	1	0	0	1	1	non-unique national (significant) number
			1	1	1	0	1	0	0	non-unique international number
			1	1	1	0	1	0	1	spare
			1	1	1	0	1	1	0	spare
			1	1	1	0	1	1	1	test line test code
Odd/even indicator	(1) H	0								even number of address digits
		1								odd number of address digits
Screening indicator	(2) A-B							0	0	reserved
								0	1	user provided, screening passed
								1	0	reserved
								1	1	network provided

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address presentation restricted indicator	(2) C-D					0	0			presentation allowed
						0	1			presentation restricted (default)
						1	0			spare
						1	1			spare
Numbering plan indicator	(2) E-G		0	0	0					unknown (no interpretation)
			0	0	1					ISDN (telephony) numbering plan
			0	1	0					spare
			0	1	1					reserved (CCITT: data numbering plan)
			1	0	0					reserved (CCITT: telex numbering plan)
			1	0	1					private numbering plan
			1	1	0					spare
			1	1	1					spare
Spare	(2) H	0								spare
Address Signal (1st)	(3) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(3) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										
Filler	(n) E-H	0	0	0	0					filler

Calling party’s category

Parameter format



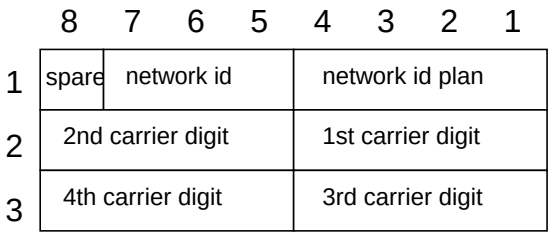
Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Calling party category	(1) A-H	0	0	0	0	0	0	0	0	calling party's category unknown (default)
		0	0	0	0	0	0	0	1	operator, language french
		0	0	0	0	0	0	1	0	operator, language english
		0	0	0	0	0	0	1	1	operator, language german
		0	0	0	0	0	1	0	0	operator, language russian
		0	0	0	0	0	1	0	1	operator, language spanish
		0	0	0	0	0	1	1	0	reserved
		0	0	0	0	0	1	1	1	available to administrations for selecting a particular language by mutual agreement
		0	0	0	0	1	0	0	0	
		0	0	0	0	1	0	0	1	national operator (NOTE: CCITT recommendation Q.104 allows national networks to use this code to indicate that the calling party is a national operator)
		0	0	0	0	1	0	1	0	ordinary calling subscriber
		0	0	0	0	1	0	1	1	calling subscriber with priority (no U.S.)
		0	0	0	0	1	1	0	0	data call (voice data band) (no U.S.)
		0	0	0	0	1	1	0	1	test call
		0	0	0	0	1	1	1	0	spare
		0	0	0	0	1	1	1	1	payphone (no U.S.)
		0	0	0	1	0	0	0	0	CCITT spare
		to								
		1	1	0	1	1	1	1	1	
		1	1	1	0	0	0	0	0	emergency service call
		1	1	1	0	0	0	0	1	high priority emergency service call

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
		1	1	1	0	0	0	1	0	national security and emergency preparedness call
		1	1	1	0	0	0	1	1	ANSI spare
		to								
		1	1	1	0	1	1	1	1	
		1	1	1	1	0	0	0	0	network specific use
		to								
		1	1	1	1	1	1	1	0	
		1	1	1	1	1	1	1	1	reserved for expansion

Carrier identification (CIP)

Parameter format



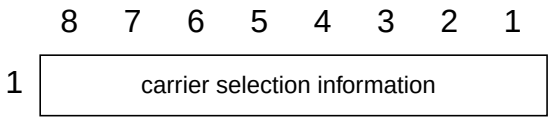
Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Network identification plan	(1) A-D					0	0	0	0	unknown (no interpretation)
						0	0	0	1	3-digit carrier identification
						0	0	1	0	4-digit carrier identification
						0	0	1	1	spare (no interpretation)
						to				
						1	1	1	1	
Type of network identification	(1) E-G		0	0	0					spare (no interpretation)
			0	0	1					spare (no interpretation)
			0	1	0					national network identification
			0	1	1					spare (no interpretation)
			to							
			1	1	1					
Spare	(1) H	0								spare

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Carrier digit (1st)	(2) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)
Carrier digit (2nd)	(2) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional carrier digits as needed>										

Carrier selection

Parameter format

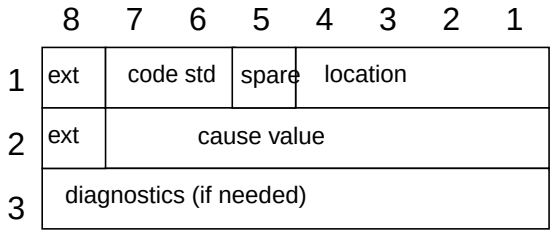


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Carrier selection information	(1) A-H	0	0	0	0	0	0	0	0	no indication (default)
		0	0	0	0	0	0	0	1	selected carrier identification presubscribed and not input by calling party
		0	0	0	0	0	0	1	0	selected carrier identification presubscribed and input by calling party
		0	0	0	0	0	0	1	1	selected carrier identification presubscribed, input by calling party undetermined
		0	0	0	0	0	1	0	0	selected carrier identification not presubscribed and input by calling party
		0	0	0	0	0	1	0	1	spare
		to								
		1	1	1	1	1	1	1	0	
		1	1	1	1	1	1	1	1	reserved

Cause indicators

Parameter format



Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Location	(1) A-D					0	0	0	0	user
						0	0	0	1	local private network
						0	0	1	0	local network
						0	0	1	1	transit network
						0	1	0	0	remote local network
						0	1	0	1	remote private network
						0	1	1	0	local interface controlled by this signaling link
						0	1	1	1	international network
						1	0	1	0	network beyond interworking point (default)
Spare	(1) E				0					spare
Coding standard	(1) F-G		0	0						CCITT standard (default)
			0	1						reserved for other international standards
			1	0						ANSI standard
			1	1						reserved
Extension indicator	(1) H	0								octet continues through the next octet (for example, octet 1 to 1a, 2 to 2a)
		1								last octet

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Cause value	(2) A-G		0	0	0	0	0	0	1	(1) unallocated (unassigned) number
			0	0	0	0	0	1	0	(2) no route to specified transit network
			0	0	0	0	0	1	1	(3) no route to destination
			0	0	0	0	1	0	0	(4) send special information tone

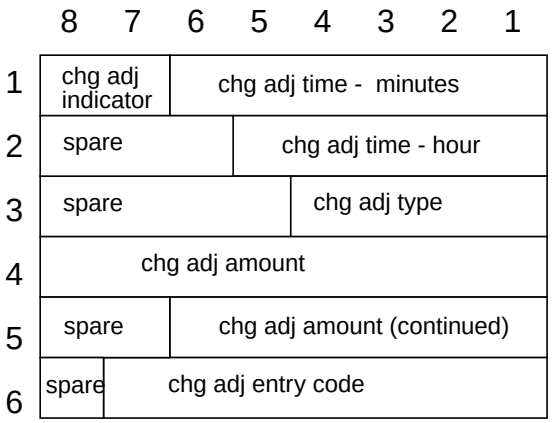
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
			0	0	0	0	1	0	1	(5) misdialed trunk prefix (no U.S.)
			0	0	0	1	0	0	0	(8) preemption
			0	0	0	1	0	0	1	(9) preemption - circuit reserved for reuse
			0	0	1	0	0	0	0	(16) normal clearing
			0	0	1	0	0	0	1	(17) user busy
			0	0	1	0	0	1	0	(18) no user responding
			0	0	1	0	0	1	1	(19) no answer from user (user alerted)
			0	0	1	0	1	0	0	(20) subscriber absent
			0	0	1	0	1	0	1	(21) call rejected
			0	0	1	0	1	1	0	(22) number changed
			0	0	1	0	1	1	1	(23) redirect to new destination (CCITT)
			0	0	1	0	1	1	1	(23) unallocated destination number (ANSI)
			0	0	1	1	0	0	0	(24) unknown business group
			0	0	1	1	0	0	1	(25) exchange routing error
			0	0	1	1	0	1	0	(26) misrouted call to a ported number
			0	0	1	1	0	1	1	(27) destination out of service (CCITT)
			0	0	1	1	0	1	1	(27) number portability query on release - number not found (no U.S.) (ANSI)
			0	0	1	1	1	0	0	(28) invalid number format (address incomplete)
			0	0	1	1	1	0	1	(29) facility rejected
			0	0	1	1	1	1	1	(31) normal - unspecified (default)
			0	1	0	0	0	1	0	(34) no circuit/channel available
			0	1	0	0	1	1	0	(38) network out of order
			0	1	0	1	0	0	1	(41) temporary failure
			0	1	0	1	0	1	0	(42) switch equipment congestion
			0	1	0	1	0	1	1	(43) access information discarded
			0	1	0	1	1	0	0	(44) requested circuit/channel not available
			0	1	0	1	1	0	1	(45) preemption
			0	1	0	1	1	1	0	(46) precedence call blocked

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
			0	1	0	1	1	1	1	(47) resource unavailable - unspecified (default)
			0	1	1	0	0	1	0	(50) requested facility not subscribed
			0	1	1	0	0	1	1	(51) call type incompatible with service request
			0	1	1	0	1	0	1	(53) outgoing calls barred within CUG (no U.S.)
			0	1	1	0	1	1	0	(54) call blocked due to group restrictions
			0	1	1	0	1	1	1	(55) incoming calls barred within CUG (no U.S.)
			0	1	1	1	0	0	1	(57) bearer capability not authorized
			0	1	1	1	0	1	0	(58) bearer capability not presently available
			0	1	1	1	1	1	0	(62) inconsistency on designated outgoing access information and subscriber class
			0	1	1	1	1	1	1	(63) service or option not available - unspecified (default)
			1	0	0	0	0	0	1	(65) bearer capability not implemented
			1	0	0	0	1	0	1	(69) requested facility not implemented
			1	0	0	0	1	1	0	(70) only restricted digital information bearer capability is available
			1	0	0	1	1	1	1	(79) service or option not implemented - unspecified (default)
			1	0	1	0	1	1	1	(87) user not member of CUG (no U.S.)
			1	0	1	1	0	0	0	(88) incompatible destination
			1	0	1	1	0	1	0	(90) non-existent CUG (no U.S.)
			1	0	1	1	0	1	1	(91) invalid transit network selection
			1	0	1	1	1	1	1	(95) invalid message - unspecified (default)
			1	1	0	0	0	0	1	(97) message type non-existent or not implemented

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
			1	1	0	0	0	1	1	(99) information element/ parameter non-existent or not implemented (discarded)
			1	1	0	0	1	1	0	(102) recovery on timer expiry
			1	1	0	0	1	1	1	(103) parameter non-existent or not implemented (passed on)
			1	1	0	1	1	1	0	(110) message with unrecognized parameter, discarded
			1	1	0	1	1	1	1	(111) protocol error - unspecified (default)
			1	1	1	1	1	1	1	(127) interworking - unspecified (default)
Extension indicator	(2) H	0								octet continues through the next octet (for example, octet 1 to 1a, 2 to 2a)
		1								last octet
Diagnostic	(3) A-H									the format and existence of this octet is dependent upon the cause value and the location of generation. refer to CCITT and ANSI standards for more information.

Charge adjustment

Parameter format



Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Charge adjust time - minutes	(1) A-F			0	0	0	0	0	0	binary equivalent of minutes (0 to 59)
				to						
				1	1	1	0	1	1	
Charge adjust indicator	(1) G-H	0	0							no indicator
		0	1							minutes to be credited
		1	0							dollars and cents to be credited
		1	1							entire call to be credited
Charge adjust time - hour	(2) A-E				0	0	0	0	0	binary equivalent of hours (0 to 23)
					to					
					1	0	1	1	1	
Spare	(2) F-H	0	0	0						spare

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Charge adjust type	(3) A-D					0	0	0	0	wrong number
						0	0	0	1	cancel previous charge adjust
						0	0	1	0	poor transmission
						0	0	1	1	not used
						0	1	0	0	not used
						0	1	0	1	cut-off call
						0	1	1	0	manually rated
						0	1	1	1	change billing
						1	0	0	0	walkaway
						1	0	0	1	coin credit
Spare	(3) E-H	0	0	0	0					spare
Charge adjust amount	(4) A-H, (5) A-F	n	n	n	n	n	n	n	n	binary equivalent of the amount (0 to 9999 if charge adjust indicator = ‘dollars and cents to be credited’, 0 to 99 if charge adjust indicator = ‘minutes to be credited’)
Spare	(5) F-H	0	0	0						spare
Charge adjust entry code	(6) A-G		0	0	0	0	0	0	0	binary equivalent of charge adjust entry code (0 to 127)
			to							
			1	1	1	1	1	1	1	
Spare	(6) H	0								spare

Charge number

Parameter format

	8	7	6	5	4	3	2	1
1	odd/ even	nature of address indicator						
2	spare	numbering plan			reserved			
3	2nd address signal				1st address signal			
...	. . .				. . .			
n	filler (if necessary)				nth address signal			

Parameter encoding

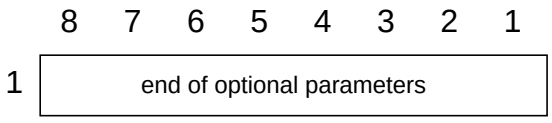
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator	(1) A-G		0	0	0	0	0	0	0	spare
			0	0	0	0	0	0	1	ANI of the calling party, subscriber number
			0	0	0	0	0	1	0	ANI not available or not provided
			0	0	0	0	0	1	1	ANI of the calling party, national number
			0	0	0	0	1	0	0	spare
			0	0	0	0	1	0	1	ANI of the called party, subscriber number
			0	0	0	0	1	1	0	ANI of the called party, no number present
			0	0	0	0	1	1	1	ANI of the called party, national number
			0	0	0	1	0	0	0	spare
			to							
			1	1	1	0	1	1	1	
			1	1	1	1	0	0	0	reserved for network specific use
			to							
			1	1	1	1	1	1	0	
			1	1	1	1	1	1	1	spare
Odd/even indicator	(1) H	0								even number of address digits
		1								odd number of address digits

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Reserved	(2) A-D					0	0	0	0	reserved
Numbering plan indicator	(2) E-G		0	0	0					unknown (no interpretation)
			0	0	1					ISDN (telephony) numbering plan
			0	1	0					spare
			0	1	1					reserved (CCITT: data numbering plan)
			1	0	0					reserved (CCITT: telex numbering plan)
			1	0	1					private numbering plan
			1	1	0					spare
			1	1	1					spare
Spare	(2) H	0								spare
Address Signal (1st)	(3) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(3) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										
Filler	(n) E-H	0	0	0	0					filler

End of optional parameters

Parameter format

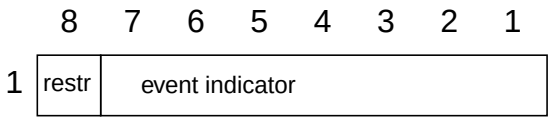


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
End of optional parameters	(1) A-H	0	0	0	0	0	0	0	0	end of optional parameters (default)

Event information

Parameter format

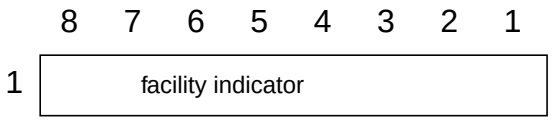


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Event indicator	(1) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	alerting
			0	0	0	0	0	1	0	progress
			0	0	0	0	0	1	1	inband information or appropriate pattern is now available
			0	0	0	0	1	0	0	call forwarded on busy (no U.S.)
			0	0	0	0	1	0	1	call forwarded on no reply (no U.S.)
			0	0	0	0	1	1	0	call forwarded unconditional (no U.S.)
			0	0	0	0	1	1	1	call deflected
			0	0	0	1	0	0	0	notification for supplementary service
			0	0	0	1	0	0	1	spare (no interpretation)
			to							
			1	1	0	1	1	1	0	
			1	1	0	1	1	1	1	service information included
			1	1	1	0	0	0	0	spare (no interpretation)
			to							
			1	1	1	1	1	1	0	
			1	1	1	1	1	1	1	reserved (no interpretation)
Event presentation restricted indicator	(1) H	0								no indication
		1								presentation restricted

Facility indicator

Parameter format



Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Facility indicator	(1) A-H	0	0	0	1	0	0	0	0	RLT for third party interaction call
		0	0	0	1	0	0	0	1	RLT for operator re-direct
		0	0	0	1	0	0	1	0	request information from remote
		0	0	0	1	0	0	1	1	start billing time
		0	0	0	1	0	1	0	0	cancel billing time
		0	0	0	1	0	1	0	1	restart billing time at zero, no accumulation
		0	0	0	1	0	1	1	0	billing information only

Forward call indicators

Parameter format

	8	7	6	5	4	3	2	1
1	H	G	F	E	D	C	B	A
2	P	O	N	M	L	K	J	I

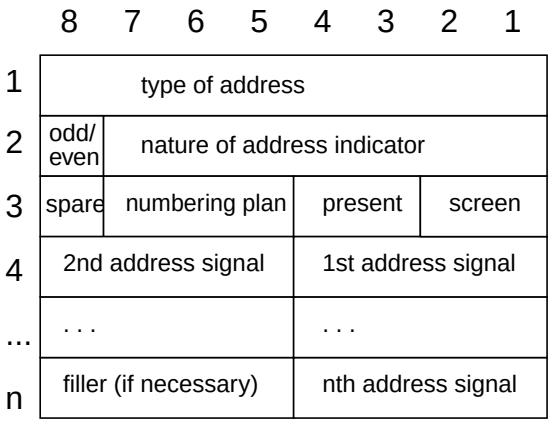
Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Incoming international call indicator	(1) A								0	not an incoming international call
									1	incoming international call
End-to-end method indicator	(1) B-C						0	0		no end-to-end method available
							0	1		pass along method available
							1	0		SCCP method available
							1	1		pass along and SCCP methods available
Interworking indicator	(1) D					0				no interworking encountered (No. 7 signaling all the way)
						1				interworking encountered
Spare	(1) E				0					spare
ISDN user part indicator	(1) F			0						ISDN user part not used all the way
				1						ISDN user part used all the way
ISDN user part preference indicator	(1) G-H	0	0							ISDN user part preferred all the way (default)
		0	1							ISDN user part not required all the way
		1	0							ISDN user part required all the way
		1	1							spare

Fields	Location	Values								Meaning
		P	O	N	M	L	K	J	I	
ISDN access indicator	I								0	originating access non-ISDN
									1	originating access ISDN
SCCP method indicator	J-K						0	0		no indication (default)
							0	1		connectionless method available (no U.S.)
							1	0		connection oriented method available (no U.S.)
							1	1		connectionless and connection oriented methods available (no U.S.)
Spare	L					0				spare
Ported number translation indicator	M				0					number not translated
					1					number translated
Query on release (QoR) attempt indicator	N			0						no QoR attempt in progress
				1						QoR routing attempt in progress
Reserved	O-P	0	0							reserved for national use

Generic address (GAP)

Parameter format



Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Type of address	(1) A-H	0	0	0	0	0	0	0	0	dialed number
		0	0	0	0	0	0	0	1	destination number
		0	0	0	0	0	0	1	0	supplemental user provided calling address - failed network screening
		0	0	0	0	0	0	1	1	supplemental user provided calling address - no screening
		0	0	0	0	0	1	0	0	completion number
		0	0	0	0	0	1	0	1	CCITT spare
		to								
		0	1	1	1	1	1	1	1	
		1	0	0	0	0	0	0	0	network specific use
		to								
		1	0	1	1	1	1	1	1	
		1	1	0	0	0	0	0	0	ported number
		1	1	0	0	0	0	0	1	ANSI spare
		to								
		1	1	1	1	0	1	0	1	
		1	1	1	1	0	1	1	0	alternately billed number (third number)
		1	1	1	1	0	1	1	1	associated forward number
		1	1	1	1	1	0	0	0	transfer number 6
		1	1	1	1	1	0	0	1	transfer number 5
		1	1	1	1	1	0	1	0	transfer number 4
		1	1	1	1	1	0	1	1	transfer number 3
		1	1	1	1	1	1	0	0	transfer number 2
		1	1	1	1	1	1	0	1	transfer number 1
		1	1	1	1	1	1	1	0	caller’s emergency service identification (CESID)
		1	1	1	1	1	1	1	1	reserved for expansion

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator (for type of address = supplemental user provided calling address)	(2) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	unique subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	unique national (significant) number
			0	0	0	0	1	0	0	unique international number
			1	1	1	0	0	0	1	non-unique subscriber number
			1	1	1	0	0	1	0	spare, reserved for national use
			1	1	1	0	0	1	1	non-unique national (significant) number
			1	1	1	0	1	0	0	non-unique international number
			1	1	1	0	1	0	1	spare
			1	1	1	0	1	1	0	spare
			1	1	1	0	1	1	1	test line test code
Nature of address indicator (for type of address = dialed number, destination number)	(2) A-G		0	0	0	0	0	0	0	spare
			0	0	0	0	0	0	1	subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	national
			0	0	0	0	1	0	0	international number
			0	0	0	0	1	0	1	spare
			0	0	0	0	1	1	0	abbreviated number
			0	0	0	0	1	1	1	spare
			to							
			1	1	1	1	1	1	1	
Nature of address indicator (for type of address = ported number)	(2) A-G		0	0	0	0	0	1	1	national (significant) number

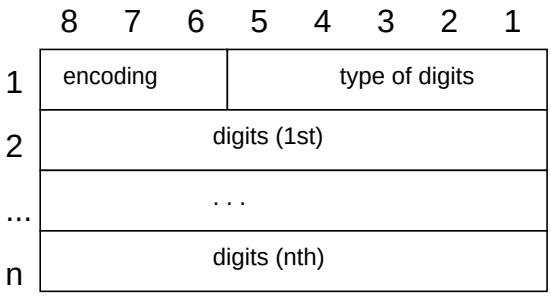
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator (for type of address = completion number)	(2) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	national (significant) number
			0	0	0	0	1	0	0	international number
			1	1	1	0	0	0	1	subscriber number, operator requested
			1	1	1	0	0	1	0	national number, operator requested
			1	1	1	0	0	1	1	international number, operator requested
			1	1	1	0	1	0	0	no number present, operator requested
			1	1	1	0	1	0	1	no number present, cut-through call to carrier
			1	1	1	0	1	1	0	950+ call from local exchange carrier public station, hotel/motel, or non-exchange access end office
			1	1	1	0	1	1	1	test line test code
Odd/even indicator	(2) H	0								even number of address digits
		1								odd number of address digits
Screening indicator	(3) A-B							0	0	reserved
								0	1	user provided, screening passed
								1	0	reserved
								1	1	network provided
Address presentation restricted indicator	(3) C-D					0	0			presentation allowed
						0	1			presentation restricted (default)
						1	0			spare
						1	1			spare
Numbering plan indicator (for type of address = ported number)	(3) E-G		0	0	1					ISDN (telephony) numbering plan

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Numbering plan indicator (for type of address ^= ported number)	(3) E-G		0	0	0					unknown (no interpretation)
			0	0	1					ISDN (telephony) numbering plan
			0	1	0					spare
			0	1	1					reserved (CCITT: data numbering plan)
			1	0	0					reserved (CCITT: telex numbering plan)
			1	0	1					private numbering plan
			1	1	0					spare
			1	1	1					spare
Spare	(3) H	0								spare
Address Signal (1st)	(4) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(4) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										
Filler	(n) E-H	0	0	0	0					filler

Generic Digits

Parameter format



Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Type of digits	(1) A-E				0	0	0	0	0	account code
					0	0	0	0	1	authorization code
					0	0	0	1	0	private network traveling class mark
					0	0	0	1	1	business communication group identity
					0	0	1	0	0	ANSI spare
					0	0	1	0	1	call identification
					0	0	1	1	0	ANSI spare
					to					
					0	1	1	0	0	
					0	1	1	0	1	cell site/sector identifier
					0	1	1	1	0	originating party service provider
					0	1	1	1	1	bill-to number
					1	0	0	0	0	OSID plus OTG
					1	0	0	0	1	IMT information
					1	0	0	1	0	hotel room
					1	0	0	1	1	hotel guest name
					1	0	1	0	0	division identifier
					1	0	1	0	1	trunk information
					1	0	1	1	0	00Y
					1	0	1	1	1	reserved for network specific use
					1	1	0	0	0	transport information
					1	1	0	0	1	super generic digit
					1	1	0	1	0	fallback context block
					1	1	0	1	1	keyed fallback digits
					1	1	1	0	0	access node origination information
					1	1	1	0	1	E911 tandem prefix
					1	1	1	1	0	correlation id
					1	1	1	1	1	reserved for expansion

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Encoding scheme	(1) F-H	0	0	0						spare
		0	0	1						BCD odd
		0	1	0						BCD even
		0	1	1						IA5
		1	0	0						binary
		1	0	1						spare
		to								
		1	1	1						
Digits (1st) (for encoding scheme = BCD, this is the first digit of he LSPI)	(2) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
Digits (1st) (for encoding scheme = BCD, this is the second digit of he LSPI)	(2) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
Digits (1st) (for encoding scheme = IA5 or binary, this is the first digit of the LSPI)	(2) A-H	x	x	x	x	x	x	x	x	<value representing a numeric character>
<additional digits as needed>										

Jurisdiction information (JIP)

Parameter format

	8	7	6	5	4	3	2	1
1	2nd address digit				1st address digit			
2	4th address digit				3rd address digit			
3	6th address digit				5th address digit			

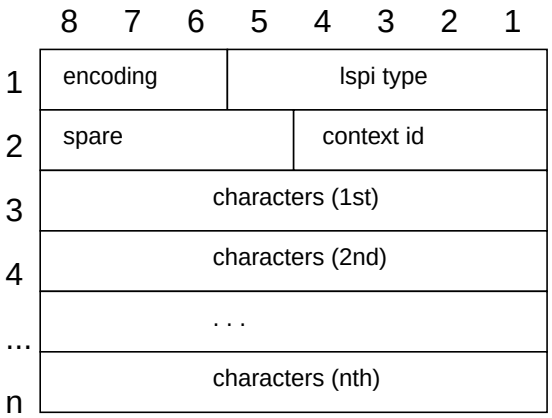
Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (1st)	(1) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(1) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										

Local service provider information (LSPI)

Parameter format



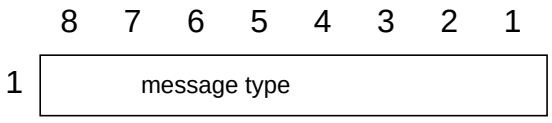
Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
LSPI type	(1) A-E				0	0	0	0	0	spare
					0	0	0	0	1	switch owner
					0	0	0	1	0	account owner
					0	0	0	1	1	spare
					to					
					1	1	1	1	1	
Encoding scheme	(1) F-H	0	0	0						spare
		0	0	1						BCD odd
		0	1	0						BCD even
		0	1	1						IA5
		1	0	0						binary
		1	0	1						spare
		to								
		1	1	1						

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Context identification	(2) A-D					0	0	0	0	null
						0	0	0	1	native
						0	0	1	0	unbundled
						0	0	1	1	resold
						0	1	0	0	spare
						to				
						1	1	1	1	
Spare	(2) E-H	0	0	0	0					spare
Characters (1st) (for encoding scheme = BCD, this is the first digit of he LSPI)	(3) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
Characters (1st) (for encoding scheme = BCD, this is the second digit of he LSPI)	(3) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
Characters (1st) (for encoding scheme = IA5 or binary, this is the first digit of the LSPI)	(3) A-H	x	x	x	x	x	x	x	x	<value representing an alphanumeric character>
<additional characters as needed>										

Message type

Parameter format

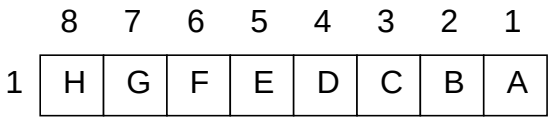


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Message type	(1) A-H	0	0	0	0	0	0	0	0	reserved
		0	0	0	0	0	0	0	1	initial address (IAM)
		0	0	0	0	0	1	1	0	address complete (ACM)
		0	0	0	0	1	0	0	1	answer (ANM)
		0	0	0	0	1	1	0	0	release (REL)
		0	0	0	0	1	1	0	1	suspend (SUS)
		0	0	0	0	1	1	1	0	resume (RES)
		0	0	0	1	0	0	0	0	release complete (RCL)
		0	0	0	1	1	1	1	1	facility request (FAR)
		0	0	1	0	0	0	0	0	facility accept (FAA)
		0	0	1	0	0	0	0	1	facility reject (FRJ)
		0	0	1	0	1	1	0	0	call progress (CPG)
		0	0	1	1	0	0	1	1	facility (FAC)

Nature of connection

Parameter format

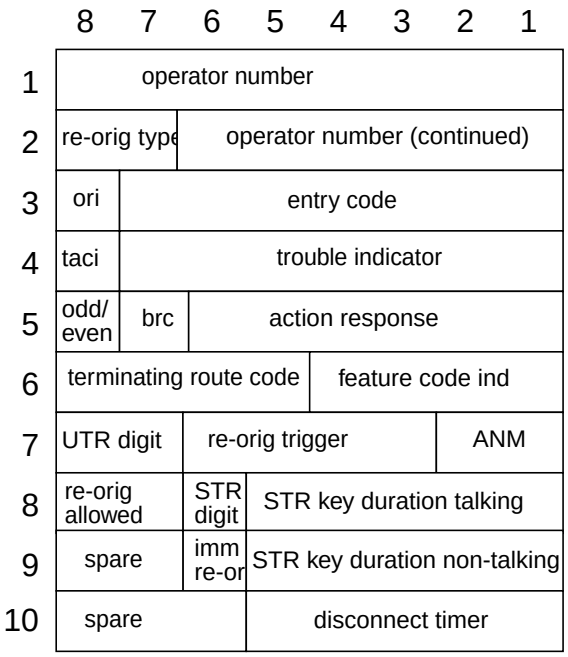


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Satellite indicator	(1) A-B							0	0	no satellite circuit in the connection
								0	1	one satellite circuit in the connection
								1	0	two satellite circuits on the connection
								1	1	three or more satellite circuits in the connection
Continuity check indicator	(1) C-D					0	0			continuity check not required (default)
						0	1			continuity check required on this circuit
						1	0			continuity check performed on a previous circuit
						1	1			spare
Echo control device indicator	(1) E				0					outgoing half echo control device not included
					1					outgoing half echo control device included
Spare	(1) F-H	0	0	0						spare

Operator information

Parameter format



Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Operator number	(1) A-H, (2) A-F									binary representation of the operator number ranging from 0 to 4096
Re-origination type	(2) G-H	0	0							normal re-origination
		0	1							boomerang re-origination
		1	0							block re-origination
		1	1							look-up parameters

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Entry code	(3) A-G		0	0	1	0	1	0	0	station paid (non-overseas)
			0	0	1	0	1	0	1	station collect (non-overseas)
			0	0	1	0	1	1	0	station special calling (non-overseas)
			0	0	1	0	1	1	1	person paid (non-overseas)
			0	0	1	1	0	0	0	person collect (non-overseas)
			0	0	1	1	0	0	1	person special calling (non-overseas)
			0	0	1	1	0	1	0	auto collect (non-overseas)
			0	0	1	1	0	1	1	station special called (non-overseas)
			0	0	1	1	1	0	0	person special called (non-overseas)
			0	0	1	1	1	0	1	person call back paid (non-overseas)
			0	0	1	1	1	1	0	person call back special calling (non-overseas)
			0	1	1	1	1	0	0	station paid (overseas)
			-	1	1	1	1	0	1	station collect (overseas)
			0	1	1	1	1	1	0	station special calling (overseas)
			0	1	1	1	1	1	1	person paid (overseas)
			1	0	0	0	0	0	0	person collect (overseas)
			1	0	0	0	0	0	1	person special calling (overseas)
			1	0	0	0	0	1	0	auto collect (overseas)
			1	0	0	0	0	1	1	station special called (overseas)
			1	0	0	0	1	0	0	person special called (overseas)
			1	0	0	0	1	0	1	person call back paid (overseas)
			1	0	0	0	1	1	0	person call back special calling (overseas)
			1	1	0	0	0	0	1	class charge unspecified (non-overseas)
			1	1	0	0	0	1	0	class charge unspecified (overseas)
Operator re-origination indicator	(3) H	0								not allowed
		1								allowed
Trouble indicator	(4) A-G		0	0	0	0	0	0	0	none
Time and charge indicator	(4) H	0								time and charge not requested
		1								time and charge requested

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Action response	(5) A-F			0	0	0	0	0	0	no indication
Bridge re-origination control	(5) G		0							not allowed
			1							allowed
Odd/even indicator	(5) H	0								odd
		1								even
Feature code indicator	(6) A-D					0	0	0	0	no indication
Terminating route code	(6) E-H	0	0	0	0					no indication
ANM billing indicator	(7) A-B							0	0	office parameter
								0	1	first ANM
								1	0	last ANM
								0	0	spare
Re-origination trigger	(7) C-F			0	0	0	0			no change
				0	0	0	1			automatic on disconnect
				0	0	1	0			manual on keying by subscriber
UTR digit	(7) G-H	0	0							digit ‘*’
		0	1							digit ‘**’
		1	0							digit ‘#’
		0	0							spare
STR key duration at talking	(8) A-E				0	0	0	0	0	0 units of 100ms (0ms)
					to					
					1	1	1	1	0	30 units of 100ms (3000 ms)
STR digit	(8) F			0						digit ‘*’
				1						digit “#’
Re-origination allowed	(8) G-H	0	0							no change
		0	1							normal re-origination
		1	0							boomerang re-origination
		0	0							spare
STR key duration at non-talking	(9) A-E				0	0	0	0	0	0 units of 100ms (0ms)
					to					
					1	1	1	1	0	30 units of 100ms (3000 ms)
Immediate re-origination	(9) F			0						no
				1						yes
Spare	(9) G-H	0	0							spare

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Disconnect timer	(10) A-E				0	0	0	0	0	0 units of 100ms (0ms)
					to					
					1	1	1	1	0	30 units of 100ms (3000 ms)
Spare	(10) F-H	0	0	0						spare

Operator services information

Parameter format

	8	7	6	5	4	3	2	1
1	ext	information type			information value			

Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Information value (for information type = original access prefix)	(1) A-D					0	0	0	0	unknown
						0	0	0	1	1+ or 011+
						0	0	1	0	0+ or 01+
						0	0	1	1	0-
						0	1	0	0	spare
						to				
						1	0	0	1	
						1	0	1	0	reserved for network specific use
						to				
						1	1	1	1	

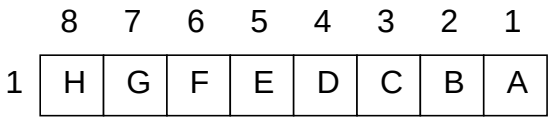
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Information value (for information type = bill-to information entry type and handling type)	(1) A-D					0	0	0	0	information entry unknown, unknown handling
						0	0	0	1	information entry manual by operator, station handling
						0	0	1	0	information entry manual by operator, person handling
						0	0	1	1	information entry automated by tone input, station handling
						0	1	0	0	information entry unknown, station handling
						0	1	0	1	information entry unknown, person handling
						0	1	1	0	information entry manual by operator, unknown handling
						0	1	1	1	information entry automated by tone input, unknown handling
						1	0	0	0	information entry automated by tone input, person handling
						1	0	0	1	information entry automated by spoken input, unknown handling
						1	0	1	0	information entry automated by spoken input, station handling
						1	0	1	1	information entry automated by spoken input, person handling
						1	1	0	0	spare
						to				
						1	1	0	1	
						1	1	1	0	reserved for network specific use
						to				
						1	1	1	1	

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Information value (for information type = bill-to type)	(1) A-D					0	0	0	0	unknown
						0	0	0	1	card - 14 digit format
						0	0	1	0	card - 89C format
						0	0	1	1	card - other format
						0	1	0	0	collect
						0	1	0	1	third number
						0	1	1	0	sent paid
						0	1	1	1	spare
						to				
						1	0	1	0	
						1	0	1	1	reserved for network specific use
						to				
						1	1	1	1	
Information value (for information type = bill-to specific information)	(1) A-D					0	0	0	0	unknown
						0	0	0	1	NIDB authorizes
						0	0	1	0	NIDB reports, verify by automated means
						0	0	1	1	NIDB reports, verify by operator
						0	1	0	0	no NIDB query
						0	1	0	1	no NIDB response
						0	1	1	0	NIDB reports unavailable
						0	1	1	1	no NIDB response, time-out
						1	0	0	0	no NIDB response, reject component
						1	0	0	1	no NIDB response - ACG in effect
						1	0	1	0	no NIDB response, SCCP failure
						1	0	1	1	spare
						1	1	0	0	reserved for network specific use
						to				
						1	1	1	1	

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Information value (for information type = special handling)	(1) A-D					0	0	0	0	unknown
						0	0	0	1	call completion
						0	0	1	0	rate information
						0	0	1	1	trouble reporting
						0	1	0	0	time and charges
						0	1	0	1	credit reporting
						0	1	1	0	general assistance
						0	1	1	1	spare
						to				
						1	0	1	0	
						1	0	1	1	reserved for network specific use
						to				
						1	1	1	1	
Information value (for information type = access signaling)	(1) A-D					0	0	0	0	unknown
						0	0	0	1	dial pulse
						0	0	1	0	dual tone multifrequency
						0	0	1	1	spare
						to				
						1	0	0	1	
						1	0	1	0	reserved for network specific use
						to				
						1	1	1	1	
Information type	(1) E-G		0	0	0					unknown
			0	0	1					original access prefix
			0	1	0					bill-to information entry and handling type
			0	1	1					bill-to type
			1	0	0					bill-to specific information
			1	0	1					special handling
			1	1	0					spare
			1	1	1					access signaling
Extension indicator	(1) H	0								octet continues through the next octet
		1								last octet

Optional backward call indicators

Parameter format

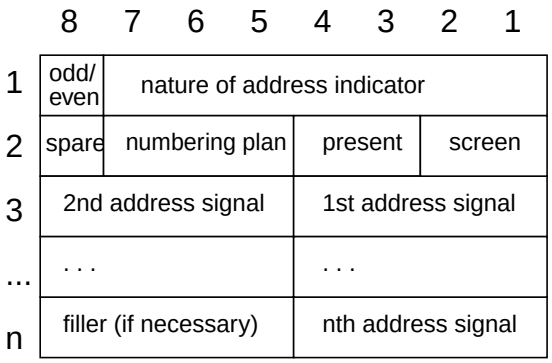


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Inband information indicator	(1) A								0	no indication
									1	inband information or an appropriate patterns in now available
Call forwarding may occur indicator	(1) B							0		no indication
								1		call forwarding may occur (no U.S.)
Simple segmentation indicator	(1) C						0			no additional information will be sent
							1			additional information will be sent in a segmentation message
MLPP user information	(1) D					0				no indication
Reserved	(1) E-F			0	0					reserved for national use
Network excessive delay indicator	(1) G		0							no indication
			1							network excessive delay encountered
User-network interaction indicator	(1) H	0								no indication
		1								user-network interaction occurs, cut through in both directions

Original called number

Parameter format



Parameter encoding

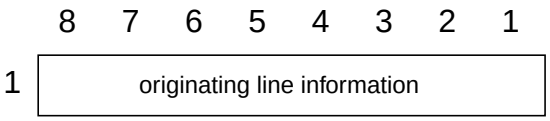
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator	(1) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	unique subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	unique national (significant) number
			0	0	0	0	1	0	0	unique international number
			1	1	1	0	0	0	1	non-unique subscriber number
			1	1	1	0	0	1	0	spare, reserved for national use
			1	1	1	0	0	1	1	non-unique national (significant) number
			1	1	1	0	1	0	0	non-unique international number
			1	1	1	0	1	0	1	spare
			1	1	1	0	1	1	0	spare
			1	1	1	0	1	1	1	test line test code
Odd/even indicator	(1) H	0								even number of address digits
		1								odd number of address digits
Screening indicator	(2) A-B							0	0	reserved
								0	1	user provided, screening passed
								1	0	reserved
								1	1	network provided

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address presentation restricted indicator	(2) C-D					0	0			presentation allowed
						0	1			presentation restricted (default)
						1	0			spare
						1	1			spare
Numbering plan indicator	(2) E-G		0	0	0					unknown (no interpretation)
			0	0	1					ISDN (telephony) numbering plan
			0	1	0					spare
			0	1	1					reserved (CCITT: data numbering plan)
			1	0	0					reserved (CCITT: telex numbering plan)
			1	0	1					private numbering plan
			1	1	0					spare
			1	1	1					spare
Spare	(2) H	0								spare
Address Signal (1st)	(3) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(3) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										
Filler	(n) E-H	0	0	0	0					filler

Originating line information

Parameter format

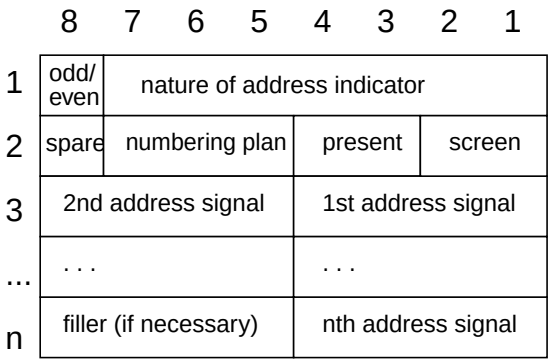


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Originating line information	(1) A-H	0	0	0	0	0	0	0	0	binary equivalent of the II (00 - 99) digits (administered by the North American Numbering Plan Administration)
		to								
		0	1	1	0	0	0	1	1	
		0	1	1	0	0	1	0	0	reserved for future expansion
		to								
		1	1	1	1	1	1	1	1	

Redirecting number

Parameter format



Parameter encoding

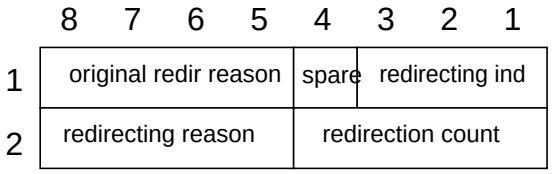
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Nature of address indicator	(1) A-G		0	0	0	0	0	0	0	spare (no interpretation)
			0	0	0	0	0	0	1	unique subscriber number
			0	0	0	0	0	1	0	spare, reserved for national use
			0	0	0	0	0	1	1	unique national (significant) number
			0	0	0	0	1	0	0	unique international number
			1	1	1	0	0	0	1	non-unique subscriber number
			1	1	1	0	0	1	0	spare, reserved for national use
			1	1	1	0	0	1	1	non-unique national (significant) number
			1	1	1	0	1	0	0	non-unique international number
			1	1	1	0	1	0	1	spare
			1	1	1	0	1	1	0	spare
			1	1	1	0	1	1	1	test line test code
Odd/even indicator	(1) H	0								even number of address digits
		1								odd number of address digits
Screening indicator	(2) A-B							0	0	reserved
								0	1	user provided, screening passed
								1	0	reserved
								1	1	network provided

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address presentation restricted indicator	(2) C-D					0	0			presentation allowed
						0	1			presentation restricted (default)
						1	0			spare
						1	1			spare
Numbering plan indicator	(2) E-G		0	0	0					unknown (no interpretation)
			0	0	1					ISDN (telephony) numbering plan
			0	1	0					spare
			0	1	1					reserved (CCITT: data numbering plan)
			1	0	0					reserved (CCITT: telex numbering plan)
			1	0	1					private numbering plan
			1	1	0					spare
			1	1	1					spare
Spare	(2) H	0								spare
Address Signal (1st)	(3) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Address Signal (2nd)	(3) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional address signals as needed>										
Filler	(n) E-H	0	0	0	0					filler

Redirecting number information

Parameter format

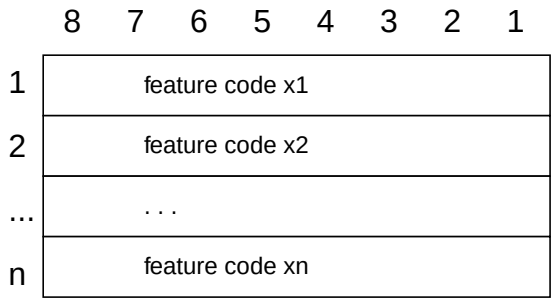


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Redirecting indicator	(1) A-C						0	0	0	no indication
Spare	(1) D					0				spare
Original redirecting reason	(1) E-H	0	0	0	0					unknown.not available (default)
		0	0	0	1					user busy
		0	0	1	0					no reply
		0	0	1	1					unconditional
		0	1	0	0					deflection
		0	1	0	1					spare
		to								
		1	1	1	0					
		1	1	1	1					reserved
Redirection counter	(2) A-D					0	0	0	0	number of redirections the call has undergone as a binary number
						to				
						1	1	1	1	
Redirecting reason	(2) E-H	0	0	0	0					unknown/not available (default)
		0	0	0	1					user busy
		0	0	1	0					no reply
		0	0	1	1					unconditional
		0	1	0	0					deflection
		0	1	0	1					spare
		to								
		1	1	1	0					
		1	1	1	1					reserved

Service activation (SAP)

Parameter format



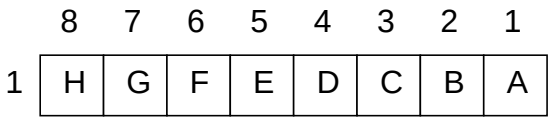
Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Feature code indicator	(n) A-H	0	0	0	0	0	0	0	0	reserved for international use
		to								
		0	1	1	1	1	0	1	1	
		0	1	1	1	1	1	0	0	call waiting originating invoked
		0	1	1	1	1	1	0	1	dial call waiting invoked
		0	1	1	1	1	1	1	0	complete call request, ISDN user part used all the way
		0	1	1	1	1	1	1	1	complete call request, ISDN user part not used all the way
		1	0	0	0	0	0	0	0	network service attached
		1	0	0	0	0	0	0	1	network service released
		1	0	0	0	0	0	1	0	coin collect
		1	0	0	0	0	0	1	1	coin return
		1	0	0	0	0	1	0	0	network service recall
		1	0	0	0	0	1	0	1	billing verification
		1	0	0	0	0	1	1	0	hold available
		1	0	0	0	0	1	1	1	hold not available
		1	0	0	0	1	0	0	0	hold request
		1	0	0	0	1	0	0	1	hold acknowledgment
		1	0	0	0	1	0	1	0	hold release request
		1	0	0	0	1	0	1	1	hold release acknowledgment
		1	0	0	0	1	1	0	0	hold continuation request
		1	0	0	0	1	1	0	1	disconnect request
		1	0	0	0	1	1	1	0	reconnect request

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
		1	0	0	0	1	1	1	1	number portability - release to pivot (no U.S.)
		1	0	0	1	0	0	0	0	intercept - regular
		1	0	0	1	0	0	0	1	hold request, acknowledgment required
		1	0	0	1	0	0	1	0	hold release request, acknowledgment required
		1	0	0	1	0	0	1	1	resume operator services
		1	0	0	1	0	1	0	0	ICD notification (end-to-end significance)
		1	0	0	1	0	1	0	1	ringback request
		1	0	0	1	0	1	1	0	intercept - blank number
		1	0	0	1	0	1	1	1	intercept - trouble
		1	0	0	1	0	1	1	0	spare
		to								
		1	0	1	1	0	1	1	1	
		1	0	1	1	1	0	0	0	coin signal complete acknowledgement
		1	0	1	1	1	0	0	1	request coin signal complete acknowledgement
		1	0	1	1	1	0	1	0	spare
		to								
		1	0	1	1	1	1	1	1	
		1	1	0	0	0	0	0	0	network specific use
		to								
		1	1	1	1	1	1	1	0	
		1	1	1	1	1	1	1	1	reserved for network specific use

Suspend/resume indicators

Parameter format

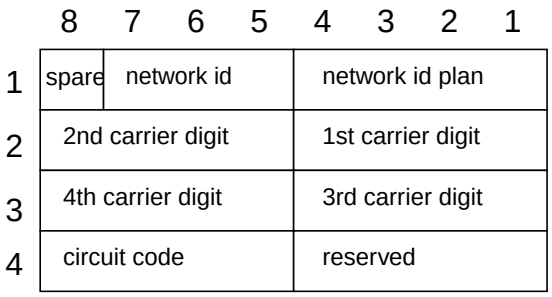


Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Suspend/resume indicator	(1) A								0	ISDN subscriber initiated (no U.S.)
									1	network initiated
Spare	(1) B-H	0	0	0	0	0	0	0		spare

Transit network service (TNS)

Parameter format



Parameter encoding

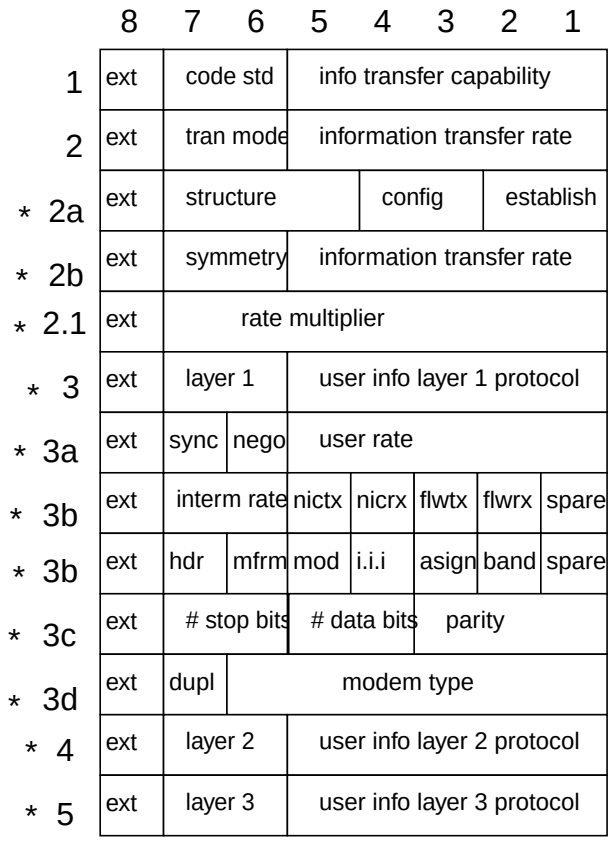
Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Network identification plan (for type of network identification = national network identification)	(1) A-D					0	0	0	0	unknown (no interpretation)
						0	0	0	1	3-digit carrier identification
						0	0	1	0	4-digit carrier identification
						0	0	1	1	spare (no interpretation)
						to				
						1	1	1	1	
Network identification plan (for type of network identification = CCITT - standardization identification)	(1) A-D					0	0	0	0	spare (no interpretation)
						to				
						0	0	1	0	
						0	0	1	1	public data network identification code
						0	1	0	0	spare (no interpretation)
						0	1	0	1	spare (no interpretation)
						0	1	1	0	public land mobile network identification code
						0	1	1	1	spare (no interpretation)
						to				
						1	1	1	1	

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Type of network identification	(1) E-G		0	0	0					CCITT - standardization identification
			0	0	1					spare (no interpretation)
			0	1	0					national network identification
			0	1	1					spare (no interpretation)
			to							
			1	1	1					
Spare	(1) H	0								spare
Carrier digit (1st)	(2) A-D					0	0	0	0	digit 0
						0	0	0	1	digit 1
						0	0	1	0	digit 2
						0	0	1	1	digit 3
						0	1	0	0	digit 4
						0	1	0	1	digit 5
						0	1	1	0	digit 6
						0	1	1	1	digit 7
						1	0	0	0	digit 8
						1	0	0	1	digit 9
						1	0	1	0	spare
						1	0	1	1	code 11
						1	1	0	0	code 12
						1	1	0	1	spare
						1	1	1	0	spare
						1	1	1	1	ST (reserved) (no interpretation)

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Carrier digit (2nd)	(2) E-H	0	0	0	0					digit 0
		0	0	0	1					digit 1
		0	0	1	0					digit 2
		0	0	1	1					digit 3
		0	1	0	0					digit 4
		0	1	0	1					digit 5
		0	1	1	0					digit 6
		0	1	1	1					digit 7
		1	0	0	0					digit 8
		1	0	0	1					digit 9
		1	0	1	0					spare
		1	0	1	1					code 11
		1	1	0	0					code 12
		1	1	0	1					spare
		1	1	1	0					spare
		1	1	1	1					ST (reserved) (no interpretation)
<additional carrier digits as needed>										
Circuit code	(4) E-H	0	0	0	0					unspecified (no interpretation)
		0	0	0	1					international call, no operator requested
		0	0	1	0					international call, operator requested
		0	0	1	1					spare
		to								
		0	1	1	1					
		1	0	0	0					reserved for network specific use
		to								
		1	1	1	1					

User service information

Parameter format



* Optional octet

Parameter encoding

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Information transfer capability	(1) A-E				0	0	0	0	0	speech
					0	0	0	0	1	reserved
					to					
					0	0	1	1	1	
					0	1	0	0	0	unrestricted digital information
					0	1	0	0	1	restricted digital information
					0	1	0	1	0	reserved
					to					
					0	1	1	1	1	
					1	0	0	0	0	3.1 kHz audio
					1	0	0	0	1	unrestricted digital information with tones and announcements
					1	0	0	1	0	reserved
					to					
					1	1	1	1	1	
Coding standard	(1) F-G		0	0						CCITT standard coding
			0	1						reserved
			1	0						national standard
			1	1						reserved
Extension	(1) H, (2) H, (2a) H, (2b) H, (2.1) H, (3) H, (3a) H, (3b) H, (3c) H, (3d) H, (4) H, (5) H	0								octet continues through the next octet
		1								last octet

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Information transfer rate	(2) A-E, (2b) A-E				0	0	0	0	0	packet mode calls
					0	0	0	0	1	reserved
					to					
					0	1	1	1	1	
					1	0	0	0	0	64 kbit/s
					1	0	0	0	1	reserved
					1	0	0	1	0	reserved
					1	0	0	1	1	384 kbit/s
					1	0	1	0	0	1472 kbit/s
					1	0	1	0	1	1536 kbit/s
					1	0	1	1	0	1920 kbit/s
					1	0	1	1	1	reserved
					1	1	0	0	0	multi-rate (64 kbit/s based)
					1	1	0	0	1	reserved
					to					
					1	1	1	1	1	
Transfer mode	(2) F-G		0	0						circuit mode
			0	1						reserved
			1	0						packet mode
			1	1						reserved
Establishment	(2a) A-B							0	0	demand
								0	1	reserved (no interpretation)
								to		
								1	1	
Configuration	(2a) C-D					0	0			point-to-point
						0	1			reserved (no interpretation)
						to				
						1	1			
Structure	(2a) E-G		0	0	0					default
			0	0	1					8 kHz integrity
			0	1	0					reserved
			0	1	1					reserved
			1	0	0					service data unit integrity
			1	0	1					reserved
			1	1	0					reserved
			1	1	1					unstructured

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Symmetry	(2b) F-G		0	0						bi-directional symmetric
			0	1						reserved (no interpretation)
			to							
			1	1						
Rate Multiplier	(2.1) A-G		0	0	0	0	0	0	0	reserved
			0	0	0	0	0	0	1	1 to 24
			to							
			0	0	1	1	0	0	0	
			0	0	1	1	0	0	1	reserved
			to							
			1	1	1	1	1	1	1	
User information layer 1 protocol	(3) A-E				0	0	0	0	0	reserved
					0	0	0	0	1	CCITT standardized rate adaption V.110/X.30
					0	0	0	1	0	recommendation G.711 m-law speech
					0	0	0	1	1	reserved
					0	0	1	0	0	reserved
					0	0	1	0	1	recommendation G.722 and G.725 7 kHz audio
					0	0	1	1	0	reserved
					0	0	1	1	1	non-CCITT standardized rate adaption
					0	1	0	0	0	CCITT standardized rate adaption V.120
					0	1	0	0	1	CCITT standardized rate adaption X.31 HDLC flag stuffing
					0	1	0	1	0	reserved
					to					
					1	1	1	1	1	
Layer 1	(3) F-G		0	0						reserved

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
User rate	(3a) A-E				0	0	0	0	0	rate is indicated by E-bites specified in Rec.I.460
					0	0	0	0	1	0.6 kbit/s
					0	0	0	1	0	1.2 kbit/s
					0	0	0	1	1	2.4 kbit/s
					0	0	1	0	0	3.6 kbit/s
					0	0	1	0	1	4.8 kbit/s
					0	0	1	1	0	7.2 kbit/s
					0	0	1	1	1	8.0 kbit/s
					0	1	0	0	0	9.6 kbit/s
					0	1	0	0	1	14.4 kbit/s
					0	1	0	1	0	16.0 kbit/s
					0	1	0	1	1	19.2 kbit/s
					0	1	1	0	0	32.0 kbit/s
					0	1	1	0	1	38.4 kbit/s
					0	1	1	1	0	48.0 kbit/s
					0	1	1	1	1	56.0 kbit/s
					1	0	0	0	0	64 kbit/s
					1	0	0	0	1	reserved
					1	0	0	1	0	reserved
					1	0	0	1	1	28.8 kbit/s
					1	0	1	0	0	reserved
					1	0	1	0	1	0.1345 kbit/s
					1	0	1	1	0	0.100 kbit/s
					1	0	1	1	1	0.075/1.2 kbit/s
					1	1	0	0	0	1.2/0/075 kbit/s
					1	1	0	0	1	0.050 kbit/s
					1	1	0	1	0	0.075 kbit/s
					1	1	0	1	1	0.110 kbit/s
					1	1	1	0	0	0.150 kbit/s
					1	1	1	0	1	0.200 kbit/s
					1	1	1	1	0	0.300 kbit/s
					1	1	1	1	1	12 kbit/s
Negotiation	(3a) F			0						in-band negotiation not possible
				1						in-band negotiation possible

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Synchronous/ asynchronous	(3a) G		0							synchronous
			1							asynchronous
Spare	(3b) A								0	spare
Flow control on reception (RX)	(3b) B							0		cannot accept data with flow control mechanism
								1		can accept data with flow control mechanism
Flow control on transmission (TX)	(3b) C						0			not required to send data with flow control mechanism
							1			required to send data with flow control mechanism
Network independent clock (NIC) on reception (RX)	(3b) D					0				cannot accept data with independent clock
						1				can accept data with independent clock
Network independent clock (NOC) on transmission (TX)	(3b) E				0					not required to send data with network independent clock
					1					required to send data with network independent clock
Intermediate rate	(3b) F-G		0	0						not used
			0	1						8 kbit/s
			1	0						16 kbit/s
			1	1						32 kbit/s
In-band/out-of-band negotiation	(3b) B							0		not applicable to this standard
								1		negotiation is done in-band using logical link zero
Assignor/assignee	(3b) C						0			message originator is ‘default assignee’
							1			message originator is ‘assingor only’
Logical link identifier (LLI) negotiation	(3b) D					0				default LLI=256
						1				LLI negotiation
Mode of operation	(3b) E				0					bit transparent mode of operation
					1					protocol sensitive mode of operation
Multiple frame establishment support in data link	(3b) F			0						multiple frame establishment not supported
				1						multiple frame establishment supported

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
Rate adaption header/no header	(3b) G		0							rate adaption header no included
			1							rate adaption header included
Parity information	(3c) A-C						0	0	0	odd
							0	0	1	reserved
							0	1	0	even
							0	1	1	none
							1	0	0	forced to 0
							1	0	1	forced to 1
							1	1	0	reserved
							1	1	1	reserved
Number of data bits excluding parity bit	(3c) D-E				0	0				not used
					0	1				5 bits
					1	0				7 bits
					1	1				8 bits
Number of stop bits	(3c) F-G		0	0						not used
			0	1						1 bit
			1	0						1.5 bits
			1	1						2 bits
Modem type	(3d) A-F			0	0	0	0	0	0	coded according to network specific rules
				to						
				1	1	1	1	1	1	
Duplex mode	(3d) G		0							half duplex
			1							full duplex
User information layer 2 protocol	(4) A-E				0	0	0	0	0	reserved
					0	0	0	0	1	reserved
					0	0	0	1	0	ANSI T1.602
					0	0	0	1	1	reserved
					0	0	1	0	0	reserved
					0	0	1	0	1	reserved
					0	0	1	1	0	Rec. X,25 link level
					0	0	1	1	1	reserved
					to					
					1	1	1	1	1	
Layer 2	(4) F-G		0	0						reserved

Fields	Location	Values								Meaning
		H	G	F	E	D	C	B	A	
User information layer 3 protocol	(5) A-E				0	0	0	0	0	reserved
					0	0	0	0	1	reserved
					0	0	0	1	0	ANSI T1.607
					0	0	0	1	1	reserved
					0	0	1	0	0	reserved
					0	0	1	0	1	reserved
					0	0	1	1	0	Rec. X,25 packet layer
					0	0	1	1	1	reserved
					to					
					1	1	1	1	1	
Layer 3	(5) F-G		0	0						reserved

List of terms

AABS

Automated Alternate Billing Service

ACCS

Automatic Calling Card Service

ACG

Automatic Code Gapping

ACM

Address Complete Message

ADAS

Automated Directory Assistance Service

ADASPLUS

Automated Directory Assistance Service Plus

Address Complete Message (ACM)

A message type of Common Channel Signaling No. 7 sent backward. This message indicates that all address signals needed to route a call are in place.

AMA

Automatic Message Accounting

AMADUMP

A billing record file search tool that supports several billing formats such as Bellcore AMA, NT AMA, SMDR and TDR.

ANI

Automatic Number Identification

ANM

Answer Message

Answer Message (ANM)

A message type of Common Channel Signaling No. 7 (CCS7) that travels in a backward direction. The ANM indicates that the called party answers and the terminating office connects the voice path.

Automated Alternate Billing Service (AABS)

A DMS TOPS feature that allows automated call completion of a calling card, collect, and third-number billed calls. AABS is the only existing TOPS automated system that can be datafilled in an OSSAIN control list.

Automated Directory Assistance Service (ADAS)

A feature using the AABS protocol that prompts the subscriber for the locality and name. It records the subscriber's input and plays it to the operator when the operator is attached.

Automated Directory Assistance Service Plus (ADASPLUS)

A feature using the DA Standard protocol that prompts the subscriber for the locality and name. It records the subscriber's input and plays it to the operator when the operator is attached.

Automatic Calling Card Service (ACCS)

A feature that allows the subscriber to dial a call and bill it to a calling card number provided by the operating company.

Automatic Code Gapping (ACG)

A network management mechanism that allows the service control point (SCP) to reduce the number of queries it receives.

Automatic Message Accounting (AMA)

An automatic recording system that documents all the necessary billing data of subscriber-dialed long distance calls.

Automatic Number Identification (ANI)

A system whereby a calling number is identified automatically and transmitted to the automatic message accounting (AMA) office equipment for billing.

BAF

Bellcore AMA format

Bellcore AMA format (BAF)

The standard format for AMA data used by Bell operating companies. The format consists of a structure code that identifies the format of the data fields in the call record, a call code that identifies the type of call recorded in the call record, other data fields that define the attributes of the call, and if needed, one or more module codes that identify the format of any additional data appended to the call record.

Billed Number Screening (BNS)

A Common Channel Signaling 7 (CCS7) application process that performs a validation check on the number to which a call is billed. This check is initiated by the operator on operator-assisted collect and third-number billed calls.

BLV

Busy Line Verification

BNS

Billed Number Screening

Busy Line Verification (BLV)

A DMS TOPS service that allows the subscriber to obtain operator assistance to determine whether a called line is in use or out of order.

Call Detail Recording (CDR)

The standard format for AMA data used by interLATA carriers. The format consists of a record code that identifies the format of the data fields in the call record. CDR is generally fixed length and fixed format.

Call Type for Queuing (CT4Q)

In TOPS and OSSAIN, a method of characterizing an incoming call based on certain criteria, so that the call can be assigned a queue to receive service.

CALLDUMP

A billing buffer search tool that supports several billing formats such as Bellcore AMA, NT AMA and SMDR. Note that it does not support TDR.

Calling Card Validation (CCV)

A Common Channel Signaling 7 (CCS7) application process that performs a validation check on the number to which a call is billed. This check is initiated by the operator on operator-assisted calling card billed calls.

Calling Line Identification (CLI)

In data transmission, a feature provided by the network that allows a called terminal to be notified by the network of the address from which the call has originated.

Carrier Identification Code (CIC)

A three- or four-digit code that identifies a carrier

CCITT

From the French for International Telegraph and Telephone Consultative Committee (Commite Consultatif International Telegraphique et Telephonique). The CCITT is one of the four permanent groups within the International Telecommunications Union (ITU). The CCITT is responsible for studying technical, operating, and tariff issues. This organization also prepares recommendations relating to telegraphy and telephony.

CCS7

Common Channel Signaling #7

CCV

Calling Card Validation

CDR

Call Detail Recording

CI

Command Interpreter

CIC

Carrier Identification Code

CLI

Calling Line Identification

Command Interpreter (CI)

A component in the Support Operating System that functions as the main interface between the machine and the user.

Common Channel Signaling #7 (CCS7)

A digital message-based network signaling standard, defined by the CCITT, that separates call signaling information from voice channels so that interoffice signaling is exchanged over a separate signaling link.

CT4Q

Call Type for Queuing

DA

Directory Assistance service

Digital Multiplex System (DMS)

A central office switching system in which all external signals are converted to digital data and stored in assigned time slots. Switching is performed by reassigning the original time slots.

DIRP

Device Independent Recording Package

DMS

Digital Multiplex System

DTMF

Dual-Tone Multi-Frequency

Dual-Tone Multi-Frequency (DTMF) signaling

A signaling method that uses set combinations of two specific voice-band frequencies. One of these voice-band frequencies is selected from a group of four low frequencies, and the other is selected from a group of three or four relatively high frequencies.

EBAS

Enhanced Billing and Access Services

End Office (EO)

A switching office (SO) arranged for terminating subscriber lines and provided with trunks for establishing connections to and from other SOs.

enhanced billing and access services (EBAS)

An OSSAIN based automated system that provides services such as 0- automation and 0+ automated alternate billing service.

EO

End Office

Feature Group C

A plan for equal access (EA) that implements the equal access plan (EAP) with the following exceptions: it uses FGC signaling (predivestiture signaling), and it uses additional trunk group types.

FAA

Facility Accept message

Facility Accept (FAA) Message

A message type sent by a previous switch and indicates that it successfully processed the Release Link Trunk (RLT) request.

Facility Action Request (FAR) Message

A message type sent by the TOPS switch and requests that a previous switch perform RLT. It is within the ISUP protocol used to request an action to be done on the connected facility.

Facility Reject (FRJ) Message

A message type sent by a previous switch and indicates that it rejected the TOPS request to perform RLT.

FAR

Facility Action Request message

FCI

Feature Code Indicator

Feature Code Indicator (FCI)

As part of the Service Activation (SAP) parameter of the Initial Address Message (IAM), the FCI indicates if a call requires OSNC functionality.

FGC

Feature Group C

FRJ

Facility Reject Message

Global Tone Receiver (GTR)

A circuit pack that identifies and processes pulse code modulation (PCM) tones from 32 voice channels on a parallel speech bus (SB). The SB is on the common peripheral module extended multiprocessor system (XMS)-based peripheral module (XPM). The GTR detects tones that a subscriber telephone keypad or a central office sends.

GTR

Global Tone Receiver

HOBIC

Hotel Billing Center

Hotel Billing Center (HOBIC)

A device or group of devices that receive near real-time billing information for calls billed to a hotel room. The telephone charges can be applied to the guest's room bill.

IAM

Initial Address Message

IC

InterLATA Carrier

Initial Address Message (IAM)

The first message within the ISUP protocol that is used to set-up a call.

Integrated Services Digital Network (ISDN)

A set of standards proposed by the CCITT to establish compatibility between the telephone network and various data terminals and device. ISDN is a fully digital network, in general evolving from a telephone integrated digital network. It provides end-to-end connectivity to support a wide range of services, including circuit-switched voice, circuit-switched data, and packet-switched data over the same local facility.

interLATA

Telecommunication services, revenues, and functions that originate in one local access and transport area (LATA) and terminate either outside that LATA or inside another LATA.

InterLATA Carrier

Any carrier that provides telecommunication services between a point inside a local access and transport area (LATA) and a point either outside that LATA or inside another LATA.

ISDN

Integrated Service Digital Network

ISDN User Part (ISUP)

A common channel signaling 7 (CCS7) message-based signaling protocol that acts as a transport carrier for ISDN services. ISUP provides the functionality in a CCS7 network for voice and data services.

ISUP

ISDN User Part

JIP

Jurisdiction Information Parameter

Jurisdiction Information Parameter (JIP)

An optional parameter within the ISUP protocol that is used to send the calling party's LRN through the network.

LATA

Local Access and Transport Area

Least Significant Bit (LSB)

Within a word (i.e., 16 bits of data), the LSB is lowest order bit.

LIDB

Line Information Database

Line Information Database (LIDB)

A database used to query alternate billed intra-LATA calls. The LIDB relays to the DMS switch information regarding billing number verification for a given dialing number.

Listing Services Database (LSDB)

A database used by directory assistance and intercept services to retrieve the requested information.

LNP

Local Number Portability

Local Access and Transport Area (LATA)

A geographic area within which an operating company may offer telecommunications-related services.

Local Number Portability (LNP)

A circuit switched network capability that allows telephone subscribers to keep their directory number (DN) when they change service providers. The subscriber keeps the same DN when the DN is moved, or *ported*, to a different end office. Other subscribers can connect to the ported DN without changing their dialing procedure.

Location Routing Number (LRN)

A ten-digit number used to uniquely identify a switch that has ported numbers.

LRN

Location Routing Number

LSB

Least Significant Bit

LSDB

Listing Services Database

Maintenance and Administration Position (MAP)

A group of components that provides a user interface between operating company personnel and the DMS-100 Family of switches. The interface consists of a video display unit and keyboard, a voice communications module, test facilities, and special furniture.

MAP

Maintenance and Administration Position

MCCS

Mechanized Calling Card Service

Mechanized Calling Card Service (MCCS)

A service that allows a subscriber to make chargeable long-distance calls without operator assistance. A subscriber makes these calls by using a credit card and entering special billing information.

MF

Multi-Frequency

Most Significant Bit (MSB)

Within a word (i.e., 16 bits of data), the MSB is the highest order bit.

MSB

Most Significant Bit

Multi-Frequency (MF)

A signaling method that makes use of pairs of standard toes to transmit signaling codes, digit pulsing, and coin-control signals. The method is used by interregister signaling on analog trunks.

Nortel Networks technical publication (NTP)

A document that contains descriptive information about Nortel Networks hardware or software modules and performance-oriented practice for installing, testing, or maintaining the system. The document is often supplied as part of the standard documentation package provided to an operating company.

NPA

Numbering Plan Area

NTP

Nortel Networks technical publication

Numbering Plan Area (NPA)

Any of the designated geographical divisions of the United States, Canada, Bermuda, Caribbean, Northwestern Mexico within which no two telephones have the same seven-digit number. Each NPA is assigned a unique three-digit area code. The NPA of the directory number 613-621-1234 is 613.

NXX

The three-digit office code. The NXX of the directory number 613-621-1234 is 621.

OA

Operator-assisted

Operator-assisted (OA)

Subscriber-dialed calls that require help from the operator

OGT

Outgoing Trunk key

OLNS

Originating Line Number Screening

OM

Operational Measurements

ONI

Operator Number Identification

Operational Measurements (OM)

The hardware and software resource of the DMS-100 Family switches that control the collection and display of measurements taken on an operating system. The OM subsystem organizes the measurement data and manages its transfer to displays and records. The OM data is used for maintenance, traffic, accounting, and provisioning decisions.

Operator Number Identification (ONI)

A feature that brings an operator into the circuit to check the calling number when a subscriber has direct-dialed a long distance call that is to be charged on an itemized bill by centralized automatic message accounting (CAMA) equipment.

Operator Services System Advanced Intelligent Network (OSSAIN)

A generic switch-to-service node (SN) interface that allows SNs to control switch functionality associated with operator services. There are two basic OSSAIN network configurations: stand-alone OSSAIN and centralized OSSAIN.

Originating Line Number Screening (OLNS)

An external database containing information associated with a directory number such as the preferred carrier and billing restriction set. The database is access using the CCS7 network.

OSSAIN

Operator Services System Advanced Intelligent Network

OSSCCSC

Operator Services System Call Completion Service Conditions

Outgoing Trunk (OGT)

A trunk used for calls going out to a distant toll center.

PCL

Product Computing module Load

Personal Identification Number (PIN)

A set of digits used to identify the user of a calling card. In north america, the PIN is usually 4 digits and is validated by a LIDB database.

PIN

Personal Identification Number

Plain Old Telephone Service (POTS)

A class of service given to a directory number that usually describes a residential phone that subscribes to few additional end-office services such as call forwarding, etc.

portable number

A directory number (DN) that may be ported.

POTS

Plain Old Telephone Service

Product Computing module Load (PCL)

The software load delivered to the operating company. A PCL contains both base and optional functionalities.

QMS

Queue Management System

Queue Management System (QMS)

A software package that provides enhanced capabilities for the management of call and agent queues.

RAO

Regional Accounting Office

Regional Accounting Office (RAO)

An identifier used to indicate the entity or company that performs billing collection on behalf of the billed party.

REL

Release Message

Release Link Trunking (RLT)

A method to increase the capacity of ISUP trunks by releasing ISUP connections between a previous switch and a TOPS switch. After RLT is performed, ISUP connections are released, making circuits available for additional traffic.

Release (REL) Message

A message type within the ISUP protocol used to release a connection.

Remote Operator Number Identification (RONI)

A service that involves the operator being connected to collect the calling party's directory number. The number is sent back to the originating office for verification and call completion.

RLT

Release Link Trunking

SAP

Service Activation Parameter

Service Activation Parameter (SAP)

A message, which is part of the Initial Address Message (IAM), that contains the Feature Code Indicator (FCI).

RONI

Remote Operator Number Identification

SCP

Service Control Point

scrambler circuit

A circuit used to scramble the voice path so that the operator cannot understand a subscriber's conversation. The scrambler circuit is a DMS-100 analog trunk circuit pack consisting of an outgoing trunk, an incoming trunk and electronic scrambling equipment. The trunks use per-trunk signaling (PTS).

Service Control Point (SCP)

A node in a common channel signaling 7 (CCS7) network that supports application databases. The function of an SCP is to accept a query for information, retrieve the requested information from one of its application databases, and send a response message to the originator of the request.

Service Node (SN)

An external node that interacts with the switch to provide OSSAIN services.

Service Provider Identifier (SPID)

A code that uniquely identifies the service provider of the party.

SLT

Subscriber Line Treatment

SN

Service Node

SO

Switching Office

SOC

Software Optionality Control

Software Optionality Control (SOC)

A tool for controlling and monitoring the options in a product computing module load (PCL).

SPID

Service Provider Identifier

Switching Office (SO)

A node in the common channel signaling 7 (CCS7) network that originates and terminates signaling messages related to the set up and take down of associated ISDN user part (ISUP) trunks.

TDR

TOPS call detail recording

TOPS

Traffic Operator Position System

TOPS call detail recording (TDR)

An alternative to EBAF for billing record formats for TOPS calls. TDR is meant to be similar to CDR in its formatting rules and assumptions.

Traffic Operator Position System (TOPS)

A call processing system made up of a number of operator positions. Each operator position consists of a visual display unit (VDU), a controller, a keyboard, and a headset.

UCS

Universal Carrier Switch

Universal Carrier Switch (UCS)

A switching software load tailored for the carrier market. It is designed to accommodate the needs to all carriers.'

Universal tone receiver (UTR)

An optional service card in the peripheral module (PM) that serves as a Digitone receiver for lines and as a multi-frequency receiver for trunks. UTR cards located in a particular digital trunk controller (DTC), line group controller (LGC), or link trunk controller (LTC) module service all lines and trunks connected to that module. The UTR is a 32-channel tone receiver. Thirty channels detect dual-tone multi-frequency (DTMF) tones and analyze the samples. The results are sent to the signaling processor (SP).

UTR

Universal Tone Receiver

DMS-100 Family

Operator Services Network Capability (OSNC)

Protocol Specification

Publication number: 297-8403-907
Product release: TOPS15 and up
Document release: Standard 03.01
Date: May 2001
Printed in United States of America