

COMMON-ISDN-API

Version 2.0

Part III

Supplementary Services

5th Edition

December 2009

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5th Edition / December 2009

Publisher:

CAPI Association e.V.

<http://www.capi.org/>

Contents (Part III)

ANNEX C (NORMATIVE): SUPPLEMENTARY SERVICES	7
C.1 OVERVIEW	7
C.2 MESSAGES	10
C.2.1 <i>FACILITY_REQ</i>	10
C.2.2 <i>FACILITY_CONF</i>	16
C.2.3 <i>FACILITY_IND</i>	20
C.2.4 <i>FACILITY_RESP</i>	27
C.3 PARAMETERS	32
C.4 STATE DIAGRAM (EXTENDED FOR SUPPLEMENTARY SERVICES)	36
C.5 FLOW CHARTS (INFORMATIVE, FOR SUPPLEMENTARY SERVICES)	38
C.5.1 <i>Hold and Retrieve</i>	38
C.5.1.1 Activation of Hold	38
C.5.1.2 Activation of Retrieve	38
C.5.2 <i>Suspend & Resume</i>	39
C.5.2.1 Activation of Suspend	39
C.5.2.2 Successful Activation of Resume	39
C.5.2.3 Unsuccessful Activation of Resume	40
C.5.3 <i>Hold, Retrieve, Suspend & Resume Notifications</i>	41
C.5.3.1 Hold and Retrieve Notifications	41
C.5.3.2 Suspend and Resume Notifications	41
C.5.4 <i>Three-Party-Conference</i>	42
C.5.4.1 Activation of 3PTY with One Active and One Held Call	42
C.5.4.2 Deactivation of 3PTY	42
C.5.4.3 Disconnection of the Held Connection During 3PTY	42
C.5.4.4 Disconnection of the Active Connection During 3PTY	43
C.5.4.5 Disconnection by the Remote Active Party During 3PTY	43
C.5.4.6 Disconnection by the Remote Held Party During 3PTY	44
C.5.5 <i>Explicit Call Transfer</i>	45
C.5.5.1 Activation of ECT	45
C.5.6 <i>Call Forwarding</i>	46
C.5.6.1 Activation of CF	46
C.5.6.2 Deactivation of CF	46
C.5.6.3 Interrogate Numbers	47
C.5.6.4 Interrogate Parameters	47
C.5.6.5 Activation of Call Deflection	47
C.5.7 <i>Malicious Call Identification</i>	49
C.5.7.1 Activation of MCID	49
C.5.8 <i>Completion of Calls to Busy Subscriber</i>	50
C.5.8.1 Successful Activation of CCBS by Application	50
C.5.8.2 Unsuccessful Activation of CCBS by Application	51
C.5.8.3 Successful Deactivation of CCBS by Application	52
C.5.8.4 Deactivation of CCBS by Network (e.g. after timeout)	52
C.5.8.5 Remote Party Becomes "Not Busy"	53
C.5.9 <i>Message Waiting Indication</i>	55
C.5.9.1 Activation of MWI	55
C.5.9.2 Deactivation of MWI	55
C.5.9.3 Indication of MWI	55
C.5.10 <i>Completion of Calls on No Reply</i>	57
C.5.10.1 Activation of CCNR	57
C.5.10.2 Interrogation of CCNR	57
C.5.11 <i>CONF Functions</i>	58
C.5.11.1 Beginning a Conference with one Held Call	58
C.5.11.2 Adding an existing Active Call to the Held Conference Call	58
C.5.11.3 Isolate a Remote User	58
C.5.11.4 Reattach a Remote User	59

C.5.11.5	Split a Remote User from the Conference	59
C.5.11.6	Disconnect a Remote User by served User.....	60
C.5.11.7	Disconnect by Remote User	60
C.5.11.8	Clear the Conference	60
INDEX (PART III).....		62

ANNEX C (NORMATIVE): SUPPLEMENTARY SERVICES

C.1 Overview

Certain supplementary services are supported by **COMMON-ISDN-API** Part I:

- **MSN (Multiple Subscriber Number, ETS 300 050)**
see parameter *Called/Calling Party Number*
- **CW (Call Waiting, ETS 300 056)**
see parameter *B Channel Information*
- **SUB (Subaddressing, ETS 300 059)**
see parameters *Called/Calling Party Subaddress, Connected Subaddress*
- **DDI (Direct Dialing In, ETS 300 062)**
see parameters *Called Party Number* and *Info Mask* (bit 7)
- **CLIP/CLIR (Calling Line Identification Presentation/Restriction, ETS 300 089/090)**
see parameters *Calling Party Number/Subaddress*
- **COLP/COLR (Connected Line Identification Presentation/Restriction, ETS 300 094/095)**
see parameter *Connected Party Number/Subaddress*
- **AOC (Advice of Charge, ETS 300 178-180)**
see parameter *Info Mask* (bit 6)
- **UUS1 (User-User Signaling Stage 1, ETS 300 284)**
see parameter *Additional Info*
- **Redirection Number (ETS 300 207)**
see parameter *Info Mask* (bit 10)
- **Redirecting Number (ETS 300 207)**
see parameter *Info Mask* (bit 10)
- **Name Identification (ETS 300 238-1)**
see parameter *Additional Info, Info Mask* (bit 13)

COMMON-ISDN-API Part III covers the following supplementary services:

- **HOLD (Call Hold, ETS 300 139)**
- **TP (Terminal Portability, ETS 300 053)**
- **CF (Call Forwarding, ETS 300 199-201)**
- **CD (Call Deflection, ETS 300 202)**
- **ECT (Explicit Call Transfer, ETS 300 367)**
- **3PTY (Three-Party-Conference, ETS 300 186)**
- **MCID (Malicious Call Identification, ETS 300 128)**
- **CCBS (Completion of Calls to Busy Subscriber, ETS 300 359-1 excluding Section 10)**
- **MWI (Message Waiting Indication, ETS 300 650, ECMA-242, ITU H.450.7)**
- **CCNR (Completion of Calls on No Reply, ETS 301 065)**
- **CONF (Conference call, ETS 300 185-1)**

Access to these supplementary services is provided by the **COMMON-ISDN-API** messages **FACILITY_REQ**, **FACILITY_CONF**, **FACILITY_IND** and **FACILITY_RESP**. A new facility selector introduces new functions, which are described below.

COMMON-ISDN-API indicates support for these supplementary services in the **CAPI_GET_PROFILE** structure, Global Options bit field. If **COMMON-ISDN-API** indicates support for supplementary services, then it must support at least the function **GetSupportedServices**.

The message parameters are described in the following chapter. The extended state diagrams reflect support for supplementary services. These are followed by flow charts

which illustrate the usage of **COMMON-ISDN-API** messages and parameters to support supplementary services.

C.2 Messages

C.2.1 FACILITY_REQ

Facility Request Parameter (struct)
--

The purpose of the facility request parameter is to offer additional information concerning the message FACILITY_REQ. This parameter is coded as a structure with the following elements, depending on the value of the value of *facility selector*:

Facility selector:

0x0003 Supplementary Services:

Function	word	0x0000: Get Supported Services
		0x0001: Listen
		0x0002: Hold
		0x0003: Retrieve
		0x0004: Suspend
		0x0005: Resume
		0x0006: ECT (Explicit Call Transfer)
		0x0007: 3PTY Begin (Three Party Conference)
		0x0008: 3PTY End
		0x0009: CF Activate (Call Forwarding)
		0x000A: CF Deactivate
		0x000B: CF Interrogate parameters
		0x000C: CF Interrogate numbers
		0x000D: CD (Call Deflection)
		0x000E: MCID (Malicious Call Identification)
		0x000F: CCBS request (Completion of Calls to Busy Sub.)
		0x0010: CCBS deactivate
		0x0011: CCBS interrogate
		0x0012: CCBS call
		0x0013: MWI Activate
		0x0014: MWI Deactivate
		0x0015: CCNR request
		0x0016: CCNR interrogate
		0x0017: CONF Begin
		0x0018: CONF add
		0x0019: CONF split
		0x001A: CONF drop
		0x001B: CONF isolate
		0x001C: CONF reattach
		0x001D: MWI Interrogate
		0x001E..0x7FFF: reserved
		The following values are reserved for notifications, and are therefore not applicable in the FACILITY_REQ message:
		0x8000: Hold Notification
		0x8001: Retrieve Notification
		0x8002: Suspend Notification
		0x8003: Resume Notification
		0x8004: Call is Diverting Notification
		0x8005: Diversion Activated Notification
		0x8006: CF Activate Notification
		0x8007: CF Deactivate Notification
		0x8008: Diversion Information
		0x8009: Call Transfer Alerted Notification
		0x800A: Call Transfer Active Notification
		0x800B: Conference Established Notification
		0x800C: Conference Disconnect Notification
		0x800D: CCBS erase call linkage ID
		0x800E: CCBS status
		0x800F: CCBS remote user free
		0x8010: CCBS B-free
		0x8011: CCBS erase
		0x8012: CCBS stop alerting
		0x8013: CCBS info retain
		0x8014: MWI Indication
		0x8015: CCNR info retain
		0x8016: CONF partyDISC
		0x8017: CONF Notifications
		0x8018..0xFFFF: reserved
	struct	Supplementary Service-specific parameter

Supplementary Service-specific parameter:

0x0000 Get Supported Services
Parameter does not apply (coded as struct with length 0)

0x0001 Listen

Notification mask	dword	Bit field, coding as follows: [0]: Hold / Retrieve Notifications [1]: Terminal portability Notifications [2]: ECT Notifications [3]: 3PTY Notifications [4]: Call Forwarding/Deflection Notifications/Information [5]: reserved (no Notifications for Call-Deflection) [6]: reserved (no Notifications for MCID) [7]: CCBS Notifications/Information [8]: MWI Indication [9]: CCNR Notification [10]: CONF Notifications/Information [11]: MWI Interrogation Notification [12 to 31]: reserved
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Note:

The *Notification mask* applies to all connections on the specified controller, so the parameter *Controller/PLCI/NCCI (FACILITY_REQ)* identifies the controller.

If Bit 9 (CCNR) is set, Bit 7 (CCBS) must also be set because CCNR uses CCBS notifications. CCBS without CCNR is possible, whereas CCNR implies CCBS facilities.

0x0002 Hold
0x0003 Retrieve
Parameter does not apply (coded as struct with length 0)

0x0004 Suspend

Call Identity	struct	Unique identifier, coded in accordance with ETS 300 102 [4.5.6]
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0x0005 Resume

Call Identity	struct	Unique identifier, coded in accordance with ETS 300 102 [4.5.6]
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x0006 ECT
0x0007 3PTY Begin
0x0008 3PTY End

PLCI	dword	Call in state P-HELD
------	-------	----------------------

0x0009 CF Activate

Handle	dword	Unique identification of this operation
Type of Call Forwarding	word	0x0000: CFU (Call Forwarding Unconditional) 0x0001: CFB (Call Forwarding Busy) 0x0002: CFNR (Call Forwarding No Reply) 0x0003 to 0xFFFF: reserved
Basic Service	word	Basic Service, coded in accordance with ETS 300 196 [D.5]
Served User Number	struct	Coding as for Facility Party Number (if empty, all numbers are affected)
Forwarded-to Number	struct	Coding as for Facility Party Number
Forwarded-to Sub-address	struct	Coding as for Called Party Subaddress, see CAPI 2.0, Part I
Activating User Number	struct	Coding as for Facility Party Number
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x000A CF Deactivate
0x000B CF Interrogate Parameters

Handle	dword	Unique identification of this operation
--------	-------	---

Type of Call Forwarding	word	0x0000: CFU (Call Forwarding Unconditional) 0x0001: CFB (Call Forwarding Busy) 0x0002: CFNR (Call Forwarding No Reply) 0x0003 to 0xFFFF: reserved
Basic Service	word	Basic Service, coded in accordance with ETS 300196 [D.5]
Served User Number	struct	Coding as for Facility Party Number (if empty, all numbers are affected)
Deactivating/Interrogating User Number	struct	Coding as for Facility Party Number
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x000C CF Interrogate Numbers

Handle	dword	Unique identification of this operation
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x000D CD

Presentation Allowed	word	0x0000: Display of Own Address Not Allowed 0x0001: Display of Own Address Allowed 0x0002 to 0xFFFF: reserved
Deflected-to Number	struct	Coding as for Facility Party Number
Deflected-to Subaddress	struct	Coding as for Called Party Subaddress, see CAPI 2.0, Part I
Await Connect	word	0x0000: release the original call upon ALERTING received 0x0001: release the original call upon CONNECT received

0x000E MCID request

Parameter does not apply (coded as struct with length 0)

0x000F CCBS request

Handle	dword	Unique identification of this operation
CCBS Call Linkage ID	word	As received in CCBS info retain indication
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x0010 CCBS deactivate

Handle	dword	Unique identification of this operation
CCBS Reference	word	As received in CCBS request indication
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x0011 CCBS interrogate

Handle	dword	Unique identification of this operation
CCBS Reference	word	Identifies ring-back
Facility Party Number	struct	Served User Number
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x0012 CCBS call

CCBS Reference	word	Identifies ring-back
CIP Value	word	See CAPI 2.0, Part I
Reserved	word	Reserved, coded as 0
B protocol	struct	See CAPI 2.0, Part I
BC	struct	See CAPI 2.0, Part I
LLC	struct	See CAPI 2.0, Part I
HLC	struct	See CAPI 2.0, Part I
Additional Info	struct	See CAPI 2.0, Part I

0x0013 MWI Activate

Basic Service	word	Basic Service, coded in accordance with ETS 300 196 [D.5]
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Number of Messages	dword	0x00000000 .. 0x0000FFFF: Number of messages 0xFFFFFFFF: suppress Number of Messages
Message Status	word	0x0000: added Message(s) 0x0001: removed Message(s) 0xFFFF: suppress Message Status and Message Reference
Message Reference	word	used only if MessageStatus available
Invocation Mode	word	0x0000: deferred 0x0001: immediate 0x0002: combined 0xFFFF: suppress Invocation Mode
Receiving User Number	struct	Coding as for Facility Party Number (mandatory element)
Controlling User Number	struct	Coding as for Facility Party Number (optional element, may be coded as an empty struct)
Controlling User Provided Number	struct	Coding as for Facility Party Number (optional element, may be coded as an empty struct)
Time	struct	Generalized time, coded in accordance with X.208 §32 (optional element, may be coded as an empty struct)
Handle	dword	Unique identification of this operation

0x0014 MWI Deactivate

Basic Service	word	Basic Service, coded in accordance with ETS 300 196 [D.5]
Invocation Mode	word	0x0000: deferred 0x0001: immediate 0x0002: combined 0xFFFF: suppress Invocation Mode
Receiving User Number	struct	Coding as for Facility Party Number (mandatory element)
Controlling User Number	struct	Coding as for Facility Party Number (optional element, may be coded as an empty struct)
Handle	dword	Unique identification of this operation

0x0015 CCNR request

Handle	dword	Unique identification of this operation
CCBS Call Linkage ID	word	As received in CCNR info retain indication
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x0016 CCNR interrogate

Handle	dword	Unique identification of this operation
CCBS Reference	word	identifies ring-back
Facility Party Number	struct	Served User Number
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x0017 CONF Begin

Conference Size	dword	maximum number of remote users 0x80 .. 0xFFFFFFFF: reserved (may be coded 0x00 if unknown)
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0x0018 CONF add

PLCI	dword	PLCI of the related Conference Call
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0x0019 CONF split 0x001A CONF drop 0x001B CONF isolate 0x001C CONF reattach

Party Identifier	dword	identifier of the Conference user 0x80 .. 0xFFFFFFFF: reserved
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x001D MWI Interrogate

Handle	dword	Unique identification of this operation
Basic Service	word	Basic Service, coded in accordance with ETS 300 196 [D.5]
Served User Number	struct	Coding as for Facility Party Number (mandatory element)
Controlling User Number	struct	Coding as for Facility Party Number (mandatory element)

This information element appears in:

FACILITY_REQ

C.2.2 FACILITY_CONF

Facility Confirmation Parameter (struct)

The purpose of the facility confirmation parameter is to offer additional information concerning the message FACILITY_CONF.

This parameter is coded as a structure with the following elements, depending on the value of *facility selector*:

Facility selector:

0x0003 Supplementary Services:

Function	word	0x0000: Get Supported Services 0x0001: Listen 0x0002: Hold 0x0003: Retrieve 0x0004: Suspend 0x0005: Resume 0x0006: ECT (Explicit Call Transfer) 0x0007: 3PTY Begin (Three Party Conference) 0x0008: 3PTY End 0x0009: CF Activate (Call Forwarding) 0x000A: CF Deactivate 0x000B: CF Interrogate Parameters 0x000C: CF Interrogate Numbers 0x000D: CD (Call Deflection) 0x000E: MCID (Malicious Call Identification) 0x000F: CCBS request (Completion of Calls to Busy Sub.) 0x0010: CCBS deactivate 0x0011: CCBS interrogate 0x0012: CCBS call 0x0013: MWI Activate 0x0014: MWI Deactivate 0x0015: CCNR request 0x0016: CCNR interrogate 0x0017: CONF Begin 0x0018: CONF add 0x0019: CONF split 0x001A: CONF drop 0x001B: CONF isolate 0x001C: CONF reattach 0x001D: MWI Interrogate 0x001E..0x7FFF: reserved
	struct	Supplementary Service-specific parameter

Supplementary Service-specific parameter:

0x0000 Get Supported Services

Supplementary Service Info	word	0x0000: success
Supported Services	dword	<p>Bit field, coding as follows:</p> <p>[0]: Hold / Retrieve supported (includes functions 0x0002, 0x0003, 0x8000, 0x8001)</p> <p>[1]: Terminal Portability supported (includes functions 0x0004, 0x0005, 0x8002, 0x8003)</p> <p>[2]: ECT supported (includes functions 0x0006, 0x8009, 0x800A)</p> <p>[3]: 3PTY supported (includes functions 0x0007, 0x0008, 0x800B, 0x800C)</p> <p>[4]: Call-Forwarding supported (includes functions 0x0009...0x000C, 0x8004... 0x8008)</p> <p>[5]: Call-Deflection supported (includes function 0x000D)</p> <p>[6]: MCID supported (includes function 0x000E)</p> <p>[7]: CCBS supported (includes functions 0x000F...0x0012, 0x800D... 0x8013)</p> <p>[8]: MWI supported (includes functions 0x0013, 0x0014, 0x8014)</p> <p>[9]: CCNR supported (includes functions 0x0015, 0x0016, 0x8015)</p> <p>[10]: CONF supported (includes functions 0x0017...0x001C, 0x8016, 0x8017)</p> <p>[11]: MWI Interrogate supported (includes functions 0x001D, 0x8018)</p> <p>[12 to 31]: reserved</p> <p>Note: For each group supported, COMMON-ISDN-API must support all functions.</p>

0x0001 Listen
0x0002 Hold
0x0003 Retrieve
0x0004 Suspend
0x0006 ECT
0x0007 3PTY Begin
0x0008 3PTY End
0x000E: MCID request

Supplementary Service Info	word	<p>0x0000: Success</p> <p>0x300E: Supplementary service not supported</p> <p>0x3010: Request not allowed in this state</p>
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0x0005 Resume
0x000A CF Deactivate
0x000B CF Interrogate Parameters
0x000C CF Interrogate Numbers
0x000F: CCBS request
0x0010: CCBS deactivate
0x0011: CCBS interrogate

Supplementary Service Info	word	<p>0x0000: Success</p> <p>0x300E: Supplementary service not supported</p> <p>0x3010: Request not allowed in this state</p> <p>0x3306 : TEI Selection failure, no more instances available</p> <p>0x3307 : TEI Selection failure, <i>Layer 2 Link Handle</i> invalid</p> <p>0x3308 : TEI Selection failure, <i>Fixed TEI Value</i> collision</p>
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0x0009 CF Activate

Supplementary Service Info	word	0x0000: Success 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state 0x3305: Rejected by Supplementary Services Supervision 0x3306 : TEI Selection failure, no more instances available 0x3307 : TEI Selection failure, <i>Layer 2 Link Handle</i> invalid 0x3308 : TEI Selection failure, <i>Fixed TEI Value</i> collision
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0x000D CD

Supplementary Service Info	word	0x0000: Success 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state 0x3305: Rejected by Supplementary Services Supervision
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0x0012: CCBS call

Info / Supplementary Service Info	word	0x0000: Success 0x2007: Illegal message parameter coding 0x3001: B1 protocol not supported 0x3002: B2 protocol not supported 0x3003: B3 protocol not supported 0x3004: B1 protocol parameter not supported 0x3005: B2 protocol parameter not supported 0x3006: B3 protocol parameter not supported 0x3007: B protocol combination not supported 0x3009: CIP Value unknown 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state 0x3306 : TEI Selection failure, no more instances available 0x3307 : TEI Selection failure, <i>Layer 2 Link Handle</i> invalid 0x3308 : TEI Selection failure, <i>Fixed TEI Value</i> collision
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**0x0013: MWI Activate
0x0014: MWI Deactivate**

Supplementary Service Info	word	0x0000: Success 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state
----------------------------	------	---

Note

Call Forwarding (CF Activate) could be rejected for security reason (Supplementary Service Info = 0x3305) if parameters (Basic Service, Served User Number, Forwarded-to Number and Forwarded-to Subaddress) of the corresponding FACILITY_REQ are not allowed.

Call Deflection (CD) could be rejected for security reason (Supplementary Service Info = 0x3305) if parameters of the corresponding FACILITY_REQ (Deflected-to Number and Deflected-to Subaddress) and CONNECT_IND (CIP Value) are not allowed.

**0x0015: CCNR request
0x0016: CCNR interrogate**

Supplementary Service Info	word	0x0000: Success 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state 0x3306 : TEI Selection failure, no more instances available 0x3307 : TEI Selection failure, <i>Layer 2 Link Handle</i> invalid 0x3308 : TEI Selection failure, <i>Fixed TEI Value</i> collision
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**0x0017: CONF Begin
0x0018 CONF add
0x001A CONF drop
0x001B CONF isolate
0x001C CONF reattach
0x001D MWI Interrogate**

Supplementary Service Info	word	0x0000: Success 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state
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0x0019 CONF split		
Supplementary Service Info	word	0x0000: Success 0x300E: Supplementary service not supported 0x3010: Request not allowed in this state 0x3306 : TEI Selection failure, no more instances available 0x3307 : TEI Selection failure, <i>Layer 2 Link Handle</i> invalid 0x3308 : TEI Selection failure, <i>Fixed TEI Value</i> collision

This information element appears in:

FACILITY_CONF

C.2.3 FACILITY_IND

Facility Indication Parameter (struct)

The purpose of the facility indication parameter is to offer additional information concerning the message FACILITY_IND.

This parameter is coded as a structure with the following elements, depending on the value of *facility selector*:

Facility selector:

0x0003 Supplementary Services:

Function	word	
		0x0002: Hold
		0x0003: Retrieve
		0x0004: Suspend
		0x0005: Resume
		0x0006: ECT (Explicit Call Transfer)
		0x0007: 3PTY Begin (Three Party Conference)
		0x0008: 3PTY End
		0x0009: CF Activate (Call Forwarding)
		0x000A: CF Deactivate
		0x000B: CF Interrogate Parameters
		0x000C: CF Interrogate Numbers
		0x000D: CD (Call Deflection)
		0x000E: MCID (Malicious Call Identification)
		0x000F: CCBS request (Completion of Calls to Busy Sub.)
		0x0010: CCBS deactivate
		0x0011: CCBS interrogate
		0x0012: CCBS call
		0x0013: MWI Activate
		0x0014: MWI Deactivate
		0x0015: CCNR request
		0x0016: CCNR interrogate
		0x0017: CONF Begin
		0x0018: CONF add
		0x0019: CONF split
		0x001A: CONF drop
		0x001B: CONF isolate
		0x001C: CONF reattach
		0x001D: MWI Interrogation Result
		0x8000: Hold Notification
		0x8001: Retrieve Notification
		0x8002: Suspend Notification
		0x8003: Resume Notification
		0x8004: Call is Diverting Notification
		0x8005: Diversion Activated Notification
		0x8006: CF Activate Notification
		0x8007: CF Deactivate Notification
		0x8008: Diversion Information
		0x8009: Call Transfer Alerted Notification
		0x800A: Call Transfer Active Notification
		0x800B: Conference Established Notification
		0x800C: Conference Disconnect Notification
		0x800D: CCBS erase call linkage ID
		0x800E: CCBS status
		0x800F: CCBS remote user free
		0x8010: CCBS B-free
		0x8011: CCBS erase
		0x8012: CCBS stop alerting
		0x8013: CCBS info retain (Completion of Calls to Busy Sub.)
		0x8014: MWI Indication
		0x8015: CCNR info retain
		0x8016: CONF partyDISC
		0x8017: CONF Notifications
		0x8018: MWI Interrogate Notification

	struct	Supplementary Service-specific parameter
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Supplementary service-specific parameter:

0x0002 **Hold**
0x0003 **Retrieve**
0x0004 **Suspend**
0x0005 **Resume**
0x0006 **ECT**
0x0007 **3PTY Begin**
0x0008 **3PTY End**

Supplementary Service Reason	word	See C.3
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0x0009 **CF activate**
0x000A **CF deactivate**

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation

0x000B **CF interrogate parameters**

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation
Instances	struct	Struct containing structs of type Interrogate-Response

Interrogate-Response struct

Type of CF	word	0x0000: CFU (Call Forwarding Unconditional) 0x0001: CFB (Call Forwarding Busy) 0x0002: CFNR (Call Forwarding No Reply) 0x0003 to 0xFFFF: reserved
Basic Service	word	Basic Service, coded in accordance with ETS 300196 [D.5]
Served User Number	struct	Coding as for Facility Party Number
Forwarded-to Number	struct	Coding as for Facility Party Number
Forwarded-to Sub-address	struct	Coding as for Called Party Subaddress, see CAPI 2.0, Part I
Remote enabled	word	0x0000: Remote not enabled 0x0001: Remote enabled 0x0002 to 0xFFFF: reserved

0x000C **CF interrogate numbers**

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation
Served User Numbers	struct	Struct containing Facility Party Number structs

0x000D **CD**
0x000E **MCID request**

Supplementary Service Reason	word	See C.3
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0x000F **CCBS request**

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation
CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Reference	word	Identifies ring-back

0x0010 **CCBS deactivate**

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation

0x0011 **CCBS interrogate**

Supplementary Service Reason	Word	See C.3
Handle	dword	Unique identification of this operation
CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Instances	struct	Struct containing structs of type CCBS-Interrogate-Response

0x0012 CCBS call

Supplementary Service Reason	Word	See C.3
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Note: FACILITY_IND/CCBS call is sent on failure only.

0x0013 MWI Activate

0x0014 MWI Deactivate

Supplementary Service Reason	Word	See C.3
Handle	dword	Unique identification of this operation

0x0015 CCNR request

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation
CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Reference	word	Identifies ring-back

0x0016 CCNR interrogate

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation
CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Instances	struct	Struct containing structs of type CCBS-Interrogate-Response

0x0017: CONF Begin

0x0018 CONF add

Supplementary Service Reason	Word	See C.3
Party Identifier	dword	identifier of the Conference user 0x80 .. 0xFFFFFFFF: reserved

0x0019 CONF split

Supplementary Service Reason	Word	See C.3
PLCI	dword	PLCI of the splitted Remote User Call

0x001A CONF drop

0x001B CONF isolate

0x001C CONF reattach

Supplementary Service Reason	Word	See C.3
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0x001D MWI Interrogation Result

Supplementary Service Reason	word	See C.3
Handle	dword	Unique identification of this operation
MWI Interrogation result	struct	Struct containing structs of type MWI Interrogation result element

0x8000 Hold Notification

0x8001 Retrieve Notification

0x8002 Suspend Notification

0x8003 Resume Notification

0x8004 Call Being Diverted Notification

0x8005 Diversion Activated Notification

Parameter does not apply (coded as struct with length 0)

0x8006 CF Activate Notification

Type of Call Forwarding	word	0x0000: CFU (Call Forwarding Unconditional) 0x0001: CFB (Call Forwarding Busy) 0x0002: CFNR (Call Forwarding No Reply) 0x0003 to 0xFFFF: reserved
Basic Service	word	Basic Service coded in accordance with ETS 300196 [D.5]
Served User Number	struct	Coding as for Facility Party Number
Forwarded-to Address	struct	Coding as for Facility Party Number
Forwarded-to Sub-address	struct	Coding as for Called Party Subaddress, see CAPI 2.0, Part I

0x8007 CF Deactivate Notification

Type of Call Forwarding	word	0x0000: CFU (Call Forwarding Unconditional) 0x0001: CFB (Call Forwarding Busy) 0x0002: CFNR (Call Forwarding No Reply) 0x0003 to 0xFFFF: reserved
Basic Service	word	Basic Service, coded in accordance with ETS 300196 [D.5]
Served User Number	struct	Coding as for Facility Party Number

0x8008 Diversion Information

Basic Service	word	Basic Service, coded in accordance with ETS 300196 [D.5]
Diversion Reason	word	0x0000: unknown 0x0001: CFU (Call Forwarding Unconditional) 0x0002: CFB (Call Forwarding Busy) 0x0003: CFNR (Call Forwarding No Reply) 0x0004: CD Alerting 0x0005: CD Immediate 0x0006 to 0xFFFF: reserved
Last diverting reason	word	0x0000: unknown 0x0001: CFU (Call Forwarding Unconditional) 0x0002: CFB (Call Forwarding Busy) 0x0003: CFNR (Call Forwarding No Reply) 0x0004: CD Alerting 0x0005: CD Immediate 0x0006 to 0xFFFF: reserved
Served User Sub-address	struct	Coding as for Called Party Subaddress, see CAPI 2.0, Part I
Calling number	struct	Coding as for Facility Party Number
Calling subaddress	struct	Coding as for Called Party Subaddress, see CAPI 2.0, Part I
Original called number	struct	Coding as for Facility Party Number
Last diverting number	struct	Coding as for Facility Party Number

0x8009 Call Transfer Alerted Notification

0x800A Call Transfer Active Notification

CT Redirection Number	struct	Address of the transferred remote user
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0x800B Conference Established Notification

0x800C Conference Disconnect Notification

Parameter does not apply (coded as struct with length 0)

0x800D CCBS erase call linkage ID

CCBS Call Linkage ID	word	Unique identifier of call
Called Party Number	struct	See CAPI 2.0, Part I
Called Party Subaddress	struct	See CAPI 2.0, Part I

0x800E CCBS status

CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Reference	word	Identifies ring-back
CIP Value	word	See CAPI 2.0, Part I
BC	struct	See CAPI 2.0, Part I
LLC	struct	See CAPI 2.0, Part I

HLC	struct	See CAPI 2.0, Part I
Called Party Number	struct	See CAPI 2.0, Part I
Called Party Sub-address	struct	See CAPI 2.0, Part I

0x800F CCBS remote user free

CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Reference	word	Identifies ring-back
CIP Value	word	See CAPI 2.0, Part I
BC	struct	See CAPI 2.0, Part I
LLC	struct	See CAPI 2.0, Part I
HLC	struct	See CAPI 2.0, Part I
Called Party Number	struct	See CAPI 2.0, Part I
Called Party Sub-address	struct	See CAPI 2.0, Part I
Facility Party Number	struct	Address of B-party
Facility Party Sub-address	struct	Subaddress of B-party, coded as Called Party Subaddress, see CAPI 2.0, Part I

0x8010 CCBS B-free

CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Reference	word	Identifies ring-back
CIP Value	word	See CAPI 2.0, Part I
BC	struct	See CAPI 2.0, Part I
LLC	struct	See CAPI 2.0, Part I
HLC	struct	See CAPI 2.0, Part I
Called Party Number	struct	See CAPI 2.0, Part I
Called Party Subaddress	struct	See CAPI 2.0, Part I
Facility Party Number	struct	Address of B-party
Facility Party Sub-address	struct	Subaddress of B-party

0x8011 CCBS erase

CCBS Recall Mode	word	Specifies who may respond to ring-back
CCBS Reference	word	Identifies ring-back
CCBS Erase Reason	word	Reason why ring-back has been erased by network
CIP Value	word	See CAPI 2.0, Part I
BC	struct	See CAPI 2.0, Part I
LLC	struct	See CAPI 2.0, Part I
HLC	struct	See CAPI 2.0, Part I
Called Party Number	struct	See CAPI 2.0, Part I
Called Party Subaddress	struct	See CAPI 2.0, Part I
Facility Party Number	struct	Address of B-party
Facility Party Sub-address	struct	Subaddress of B-party, coded as Called Party Subaddress, see CAPI 2.0, Part I.

0x8012 CCBS stop alerting

CCBS Reference	word	Identifies ring-back
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0x8013 CCBS info retain

CCBS Call Linkage ID	word	Unique identifier of call
----------------------	------	---------------------------

0x8014 MWI Indication

Basic Service	word	Basic Service, coded in accordance with ETS 300 196 [D.5]. 0xFFFF: Basic Service not available
Number of Messages	dword	0x00000000 .. 0x0000FFFF: Number of Messages 0xFFFFFFFF: Unknown Number of Messages 0xFFFFFFFF: Number of Messages not available
Message Status	word	0x0000: added Message 0x0001: removed Message 0xFFFF: Message Status & Message Reference not available

Message Reference	word	Valid only if Message Status available
Controlling User Number	struct	Coding as for Facility Party Number
Controlling User Provided Number	struct	Coding as for Facility Party Number
Time	struct	Generalized time, coded in accordance with X.208 §32
Called Party Number	struct	See CAPI 2.0, Part I

0x8015 CCNR info retain

CCBS Call Linkage ID	word	Unique identifier of call
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0x8016 CONF partyDISC

Party Identifier	dword	identifier of the Conference user 0x80 .. 0xFFFFFFFF: reserved
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0x8017 CONF Notifications

Notification Identifier	dword	0xC2 CONF established 0xC3 CONF disconnected 0xC4 CONF other party added 0xC5 CONF isolated 0xC6 CONF reattached 0xC7 CONF other party isolated 0xC8 CONF other party reattached 0xC9 CONF other party split 0xCA CONF other party disconnected
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0x8018 MWI Interrogate Notification

Basic Service	Word	Basic Service, coded in accordance with ETS 300 196 [D.5]
Served User Number	struct	Coding as for Facility Party Number (mandatory element)
Controlling User Number	Struct	Coding as for Facility Party Number (mandatory element)

This information element appears in:

FACILITY_IND

C.2.4 FACILITY_RESP

Facility Response Parameter (struct)

The purpose of the facility *response* parameter is to offer additional information concerning the message FACILITY_RESP.

This parameter is coded as a structure with the following elements, depending on the value of *facility selector*:

Facility selector:

0x0003 Supplementary Services:

Function	word	
		0x0002: Hold
		0x0003: Retrieve
		0x0004: Suspend
		0x0005: Resume
		0x0006: ECT (Explicit Call Transfer)
		0x0007: 3PTY Begin (Three Party Conference)
		0x0008: 3PTY End
		0x0009: CF Activate (Call Forwarding)
		0x000A: CF Deactivate
		0x000B: CF Interrogate Parameters
		0x000C: CF Interrogate Numbers
		0x000D: CD (Call Deflection)
		0x000E: MCID (Malicious Call Identification)
		0x000F: CCBS request (Completion of Calls to Busy Sub.)
		0x0010: CCBS deactivate
		0x0011: CCBS interrogate
		0x0012: CCBS call
		0x0013: MWI Activate
		0x0014: MWI Deactivate
		0x0015: CCNR request
		0x0016: CCNR interrogate
		0x0017: CONF Begin
		0x0018: CONF add
		0x0019: CONF split
		0x001A: CONF drop
		0x001B: CONF isolate
		0x001C: CONF reattach
		0x001D: MWI Interrogation Result
		0x8000: Hold Notification
		0x8001: Retrieve Notification
		0x8002: Suspend Notification
		0x8003: Resume Notification
		0x8004: Call is Diverting Notification
		0x8005: Diversion Activated Notification
		0x8006: CF Activate Notification
		0x8007: CF Deactivate Notification
		0x8008: Diversion Information
		0x8009: Call Transfer Alerted Notification
		0x800A: Call Transfer Active Notification
		0x800B: Conference Established Notification
		0x800C: Conference Disconnect Notification
		0x800D: CCBS erase call linkage ID
		0x800E: CCBS status
		0x800F: CCBS remote user free
		0x8010: CCBS B-free
		0x8011: CCBS erase
		0x8012: CCBS stop alerting
		0x8013: CCBS info retain
		0x8014: MWI Indication
		0x8015: CCNR info retain
		0x8016: CONF partyDISC
		0x8017: CONF Notifications
		0x8018: MWI Interrogate Notification

	struct	Supplementary Service-specific parameter
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Supplementary Service-specific parameter:

0x0002: Hold
 0x0003: Retrieve
 0x0004: Suspend
 0x0005: Resume
 0x0006: ECT
 0x0007: 3PTY Begin
 0x0008: 3PTY End
 0x0009: CF Activate
 0x000A: CF Deactivate
 0x000B: CF Interrogate Parameters
 0x000C: CF Interrogate Numbers
 0x000D: CD
 0x000E: MCID (Malicious Call Identification)
 0x000F: CCBS request
 0x0010: CCBS deactivate
 0x0011: CCBS interrogate
 0x0012: CCBS call
 0x0013: MWI Activate
 0x0014: MWI Deactivate
 0x8000: Hold Notification
 0x0015: CCNR request
 0x0016: CCNR interrogate
 0x0017: CONF Begin
 0x0018: CONF add
 0x0019: CONF split
 0x001A: CONF drop
 0x001B: CONF isolate
 0x001C: CONF reattach
 0x001D: MWI Interrogation Result
 0x8001: Retrieve Notification
 0x8002: Suspend Notification
 0x8003: Resume Notification
 0x8004: Call is Diverting Notification
 0x8005: Diversion Activated Notification
 0x8006: CF Activate Notification
 0x8007: CF Deactivate Notification
 0x8008: Diversion Information
 0x8009: Call Transfer Alerted Notification
 0x800A: Call Transfer Active Notification
 0x800B: Conference Established Notification
 0x800C: Conference Disconnect Notification
 0x800D: CCBS erase call linkage ID
 Parameter does not apply (coded as struct with length 0)

0x800E: CCBS status

CCBS Status Report	word	Current application status
Dynamic TEI Selection Info	struct	Information to select a specific TEI

0x800F: CCBS remote user free
 0x8010: CCBS B-free
 0x8011: CCBS erase
 0x8012: CCBS stop alerting
 0x8013: CCBS info retain
 0x8014: MWI Indication
 0x8015: CCNR info retain
 0x8016: CONF partyDISC
 0x8017: CONF Notifications
 Parameter does not apply (coded as struct with length 0)

0x8018 MWI Interrogate Notification

Supplementary Service Reason	Word	See C.3
MWI Interrogation result	Struct	Struct containing structs of type MWI Interrogation result element

An MWI interrogate notification will be broadcasted to all applications that have the MWI Interrogation Notification bit set in the Notification mask. The application that responds first with the corresponding RESP will provide the answer that is sent to the remote entity requesting the MWI Interrogate.

This information element appears in:

FACILITY_RESP

C.3 Parameters

CCBS Call Linkage ID (word)

The parameter CCBS Call Linkage ID is used in the CCBS procedure to provide a link between the application and a call currently in progress which is rejected by the network with cause "user busy". The CCBS Call Linkage ID allows the application to request the CCBS service even after the call has been completely released and the associated PLCI no longer exists. The unique value of the CCBS Call Linkage ID (from 0 to 127) is assigned by the network and remains valid for a certain time (cf. ETS 300 359-1, timer T-RETENTION).

This information element appears in:

FACILITY_REQ
FACILITY_IND

CCBS Reference (word)

The parameter CCBS Reference is to identify an activated ring-back. The unique value of CCBS Reference is in the range from 0 to 127 and is assigned by the network. If used in the CCBS interrogation procedure, the value 0x00FF indicates that the interrogation is intended for **all** CCBS References managed by the network rather than for a single CCBS Reference. This capability is provided by the network (internally, the controller maps the value 0x00FF to the ASN.1 null tag).

This information element appears in:

FACILITY_REQ
FACILITY_IND

CCBS Status Report (word)

The parameter CCBS Status Report provides the current status of the application to the network.

The following values are defined:

0x0000	Busy
0x0001..0xFFFF	Free

This information element appears in:

FACILITY_RESP

CCBS Recall Mode (word)

The parameter CCBS Recall Mode specifies which applications may respond to a FACILITY_IND / CCBS remote user free message.

The following values are defined:

0x0000	Global call-back: all applications may try to answer the call
0x0001	Specific call-back: only the initiator of the CCBS procedure may try to answer the call

This information element appears in:

FACILITY_IND

CCBS Erase Reason (word)

The parameter CCBS Erase Reason provides detailed information why the network has deleted an activated CCBS request (e.g., timers have expired, deactivation by the application or the ring-back has been completed successfully). Reception of this message implies deletion of the associated CCBS Reference value.

The low byte of this parameter contains the values as defined in ETS 300 359; the high byte is zero.

This information element appears in:

FACILITY_IND

CCBS-Interrogate-Response (struct)

The parameter CCBS-Interrogate-Response provides the information the application requested in a FACILITY_REQ / CCBS interrogate message.

The parameter has the following structure:

CCBS Reference	word	Identifies ring-back
CIP Value	word	See CAPI 2.0, Part I
BC	struct	See CAPI 2.0, Part I
LLC	struct	See CAPI 2.0, Part I
HLC	struct	See CAPI 2.0, Part I
Facility Party Number	struct	Address of B-party
Facility Party Sub-address	struct	Subaddress of B-party, coded as Called Party Subaddress: see CAPI 2.0, Part I
Initiator Party Sub-address	struct	Subaddress of A-party, coded as Called Party Subaddress: see CAPI 2.0, Part I

This information element appears in:

FACILITY_IND

CT Redirection Number (struct)

The parameter *Redirection Number* is used in the ECT procedure to signal the transferred remote user's address, provided by the network, after completion of the call transfer. The coding is in accordance with ETS 300 207-1:

Byte 0	Type of number and numbering plan as received from the network.
Byte 1	Presentation indicator as received from the network.
Bytes 2..n	Digits of the <i>Redirection Number</i> information element.

This information element appears in:

FACILITY_IND

Facility Party Number (struct)

The purpose of the parameter *facility party number* is to identify origin and destination numbers in Supplementary Service calls.

Byte 0	Type of facility party number: 0x00: Unknown 0x01: Public Party Number 0x02 to 0xFF: reserved
Byte 1	Type of number and numbering plan identification (coding as for byte 0 of the <i>calling party number</i>). This byte is only valid if byte 0 contains the value 0x01: Public Party Number.
Byte 2	Presentation and screening indicator (coding as for byte 1 of the <i>calling party number</i>). This byte is only valid if byte 0 contains the value 0x01: Public Party Number.
Bytes 3..n	Digits of the <i>facility party number</i> information element.

This information element appears in:

FACILITY_REQ FACILITY_IND

MWI-Interrogation-Result-Element (struct)

The parameter MWI-Interrogation-Result-Element provides the information the application requested in a FACILITY_REQ / MWI interrogate message.

The parameter has the following structure:

Basic Service	word	Basic Service, coded in accordance with ETS 300 196 [D.5]
Number of Messages	dword	0x00000000 .. 0x0000FFFF: Number of messages 0xFFFFFFFF: suppress Number of Messages
Controlling User Number	struct	Coding as for Facility Party Number (optional element)
Controlling User Provided Number	struct	Coding as for Facility Party Number (optional element)
Time	struct	Generalized time, coded in accordance with X.208 §32

This information element appears in:

FACILITY_IND

Supplementary Service Info (word)

The purpose of the parameter *Supplementary Service Info* is to provide error information to the application.

Value	Reason
0x0000	Success
0x300E	Supplementary service not supported
0x3305	Rejected by Supplementary Services Supervision
0x3010	Request not allowed in this state

This information element appears in:

FACILITY_CONF

Supplementary Service Reason (word)

The purpose of the parameter *Supplementary Service Reason* is to provide error information to the application concerning Supplementary Services. The defined values are:

0x3303: Time-out: network did not respond within the required time.

Class 0x34xx: Disconnect cause from the network according to Q.850/ETS 300 102-1. The cause value received within a cause information element (octet 4) from the network is indicated in the field "xx".

Class 0x36xx: Error information concerning the requested supplementary service. The field "xx" contains the failure reason, coded in accordance with ETS 300 196 [D.2].

Class 0x37xx: Error information regarding the context of a supplementary service request. The field "xx" contains the failure reason, coded in accordance with ETS 300 196 [D.1], "InvokeProblem".

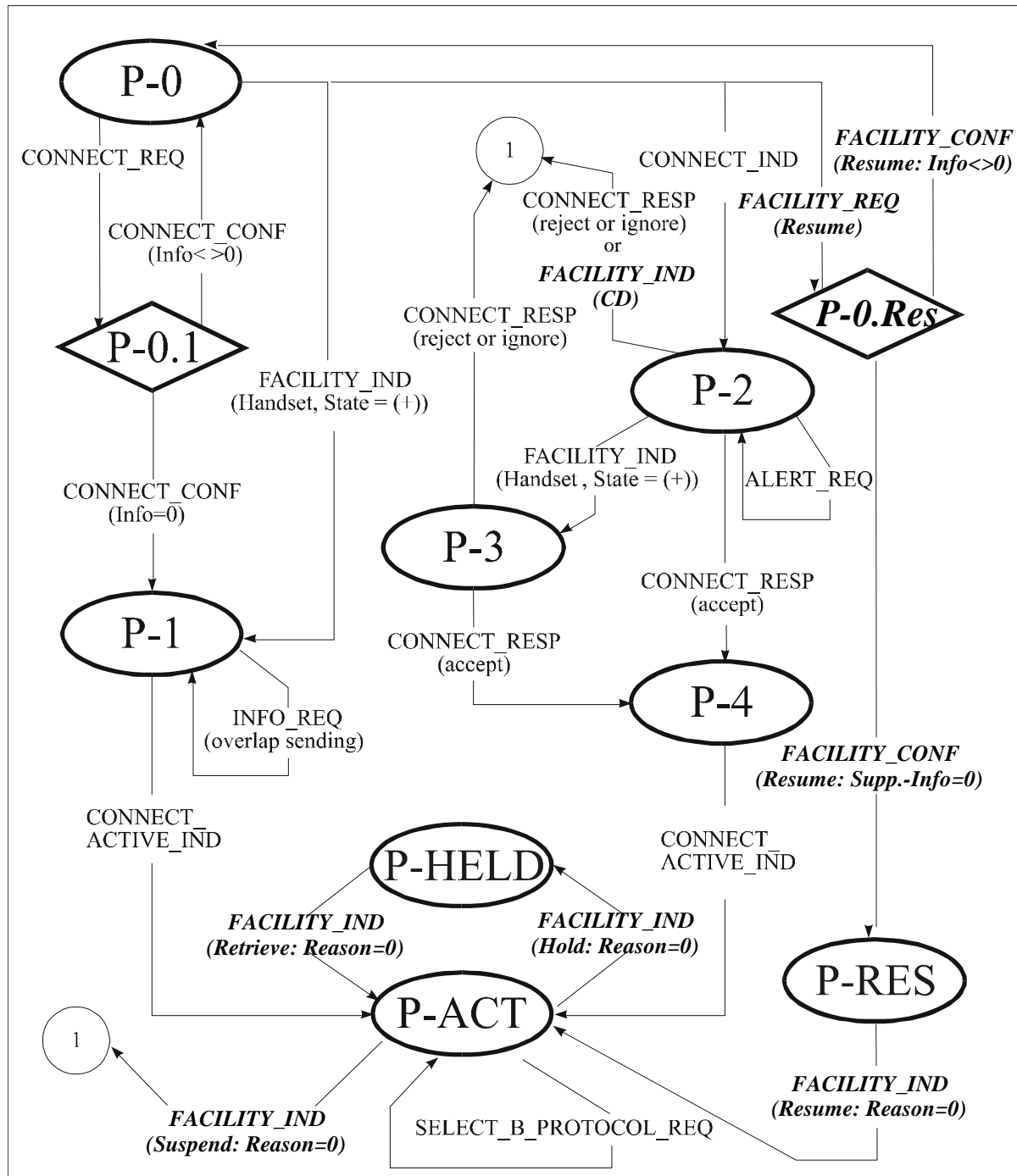
This information element appears in:

FACILITY_IND

C.4 State Diagram (Extended for Supplementary Services)

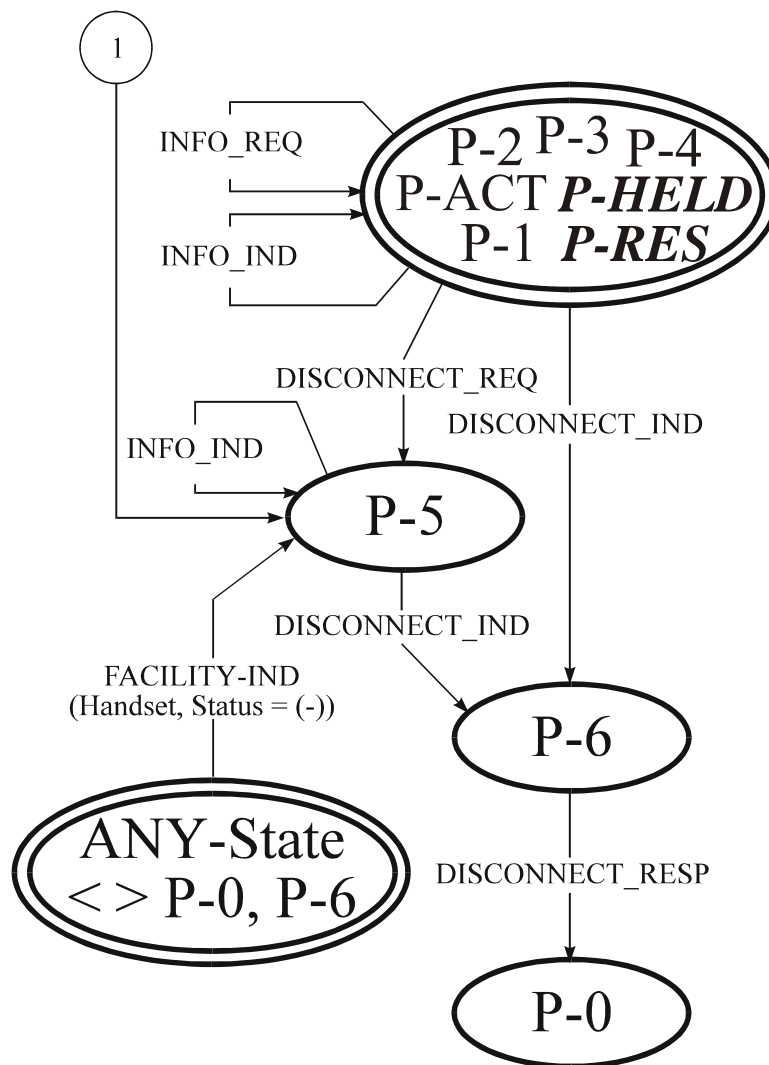
PLCI - state machine 1/2

*extended for supplementary services



PLCI - state machine 2*/2

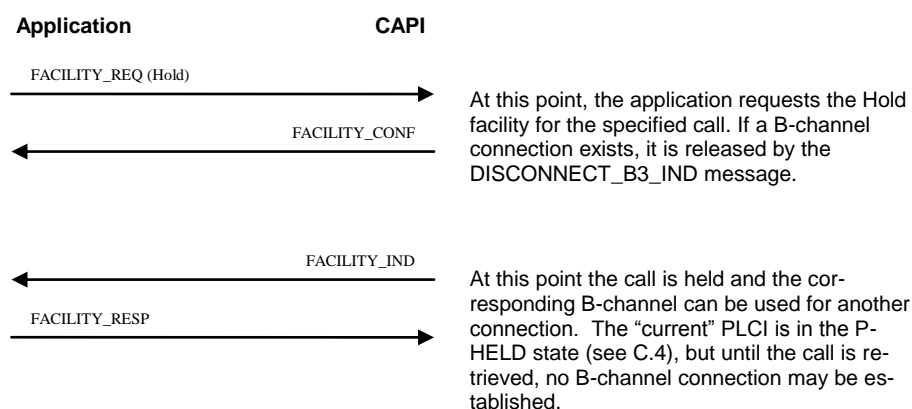
*extended for supplementary services



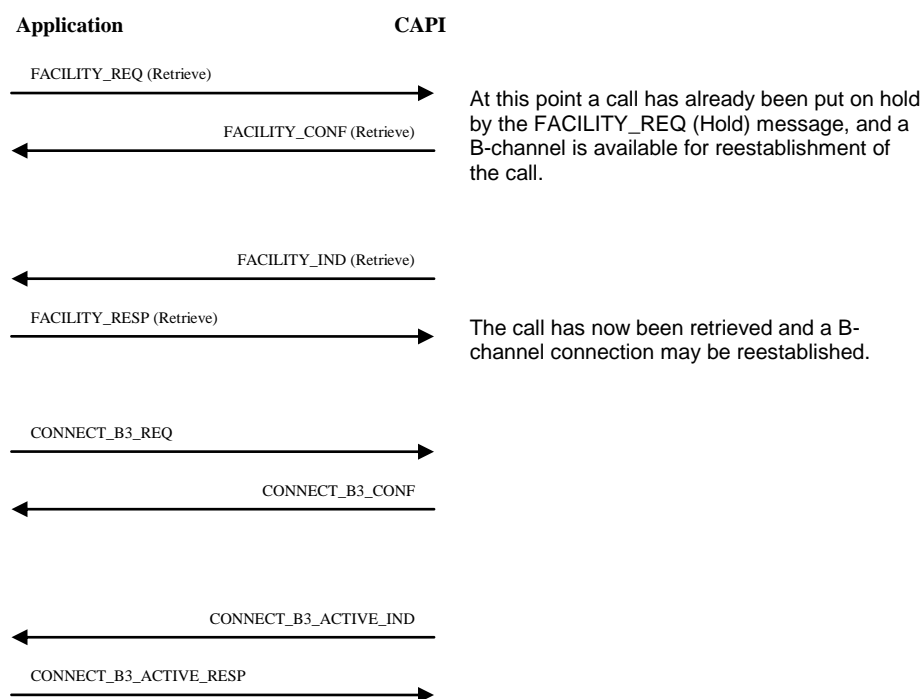
C.5 Flow Charts (Informative, for Supplementary Services)

C.5.1 Hold and Retrieve

C.5.1.1 Activation of Hold



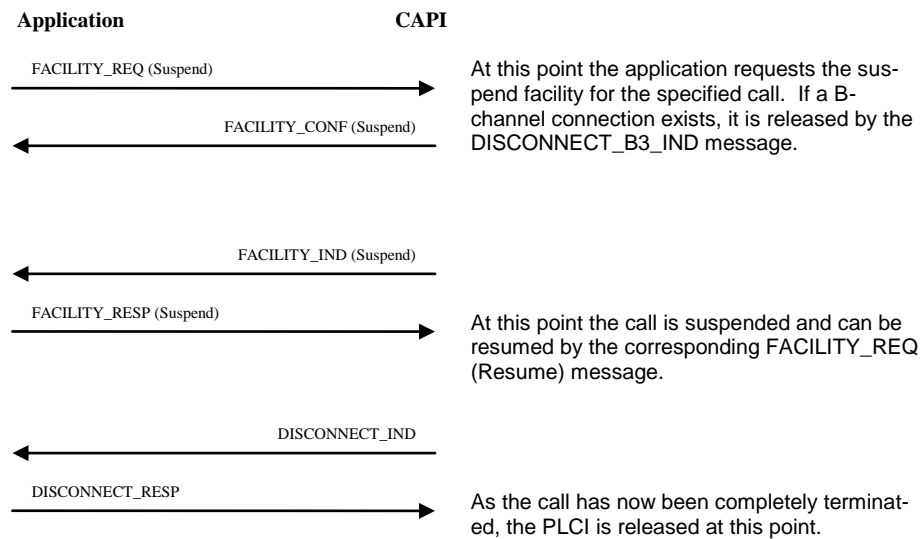
C.5.1.2 Activation of Retrieve



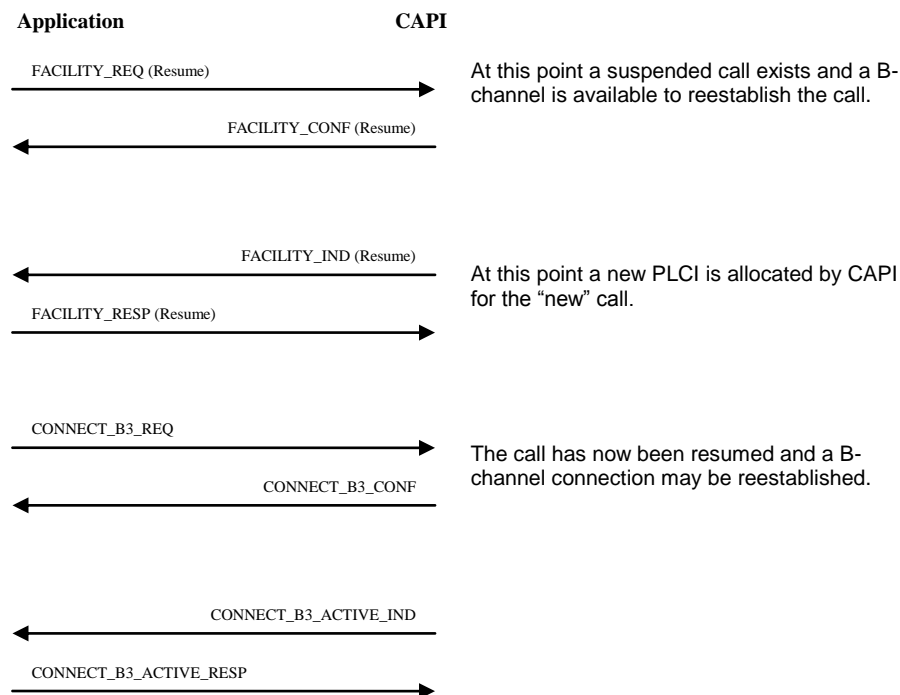
Note for connectionless protocols: An application must always initiate the B-channel connection after retrieving a call, even if this connection was associated with an incoming call.

C.5.2 Suspend & Resume

C.5.2.1 Activation of Suspend

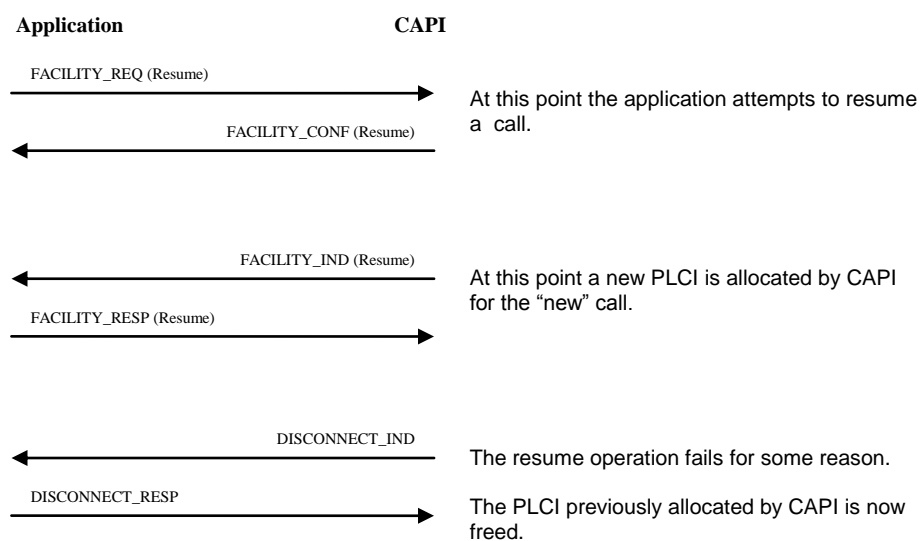


C.5.2.2 Successful Activation of Resume



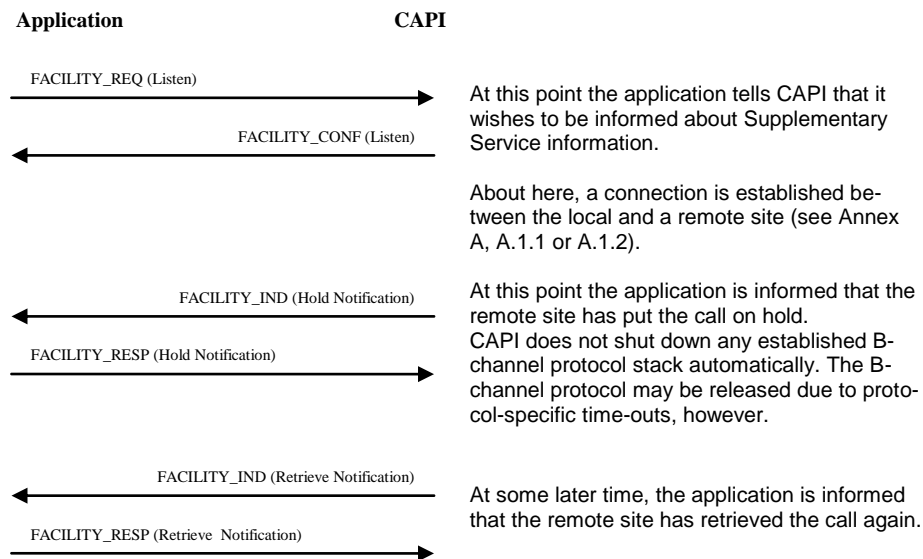
Note for connectionless protocols: An application must always initiate the B channel connection after resuming a call, even if this connection was associated with an incoming call.

C.5.2.3 Unsuccessful Activation of Resume

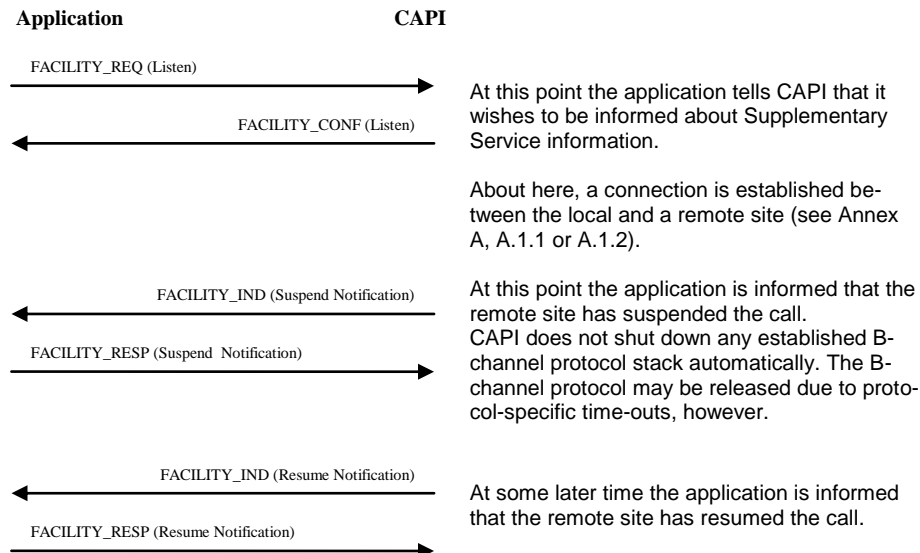


C.5.3 Hold, Retrieve, Suspend & Resume Notifications

C.5.3.1 Hold and Retrieve Notifications

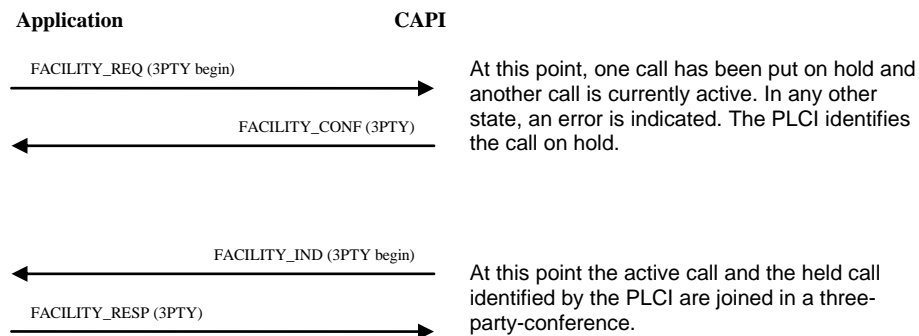


C.5.3.2 Suspend and Resume Notifications

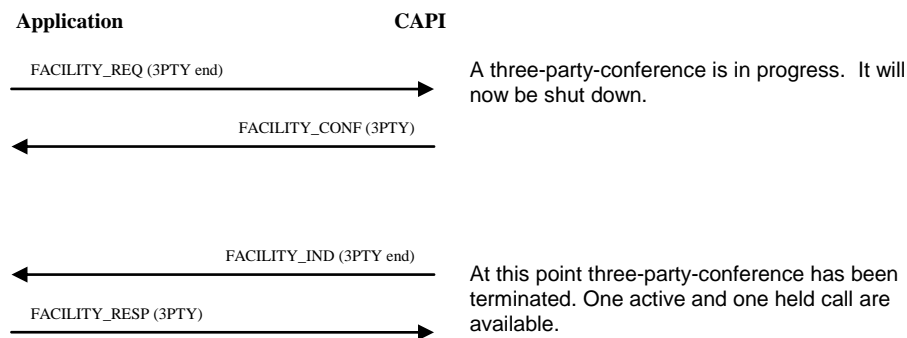


C.5.4 Three-Party-Conference

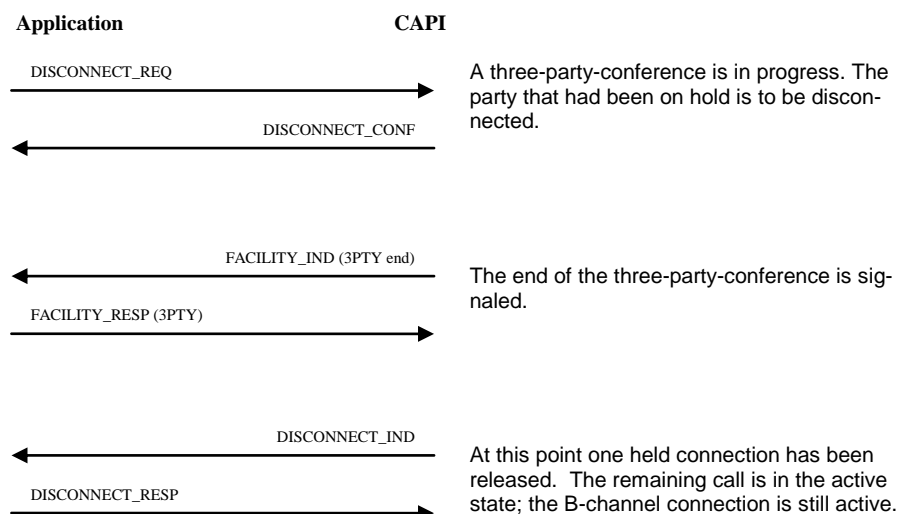
C.5.4.1 Activation of 3PTY with One Active and One Held Call



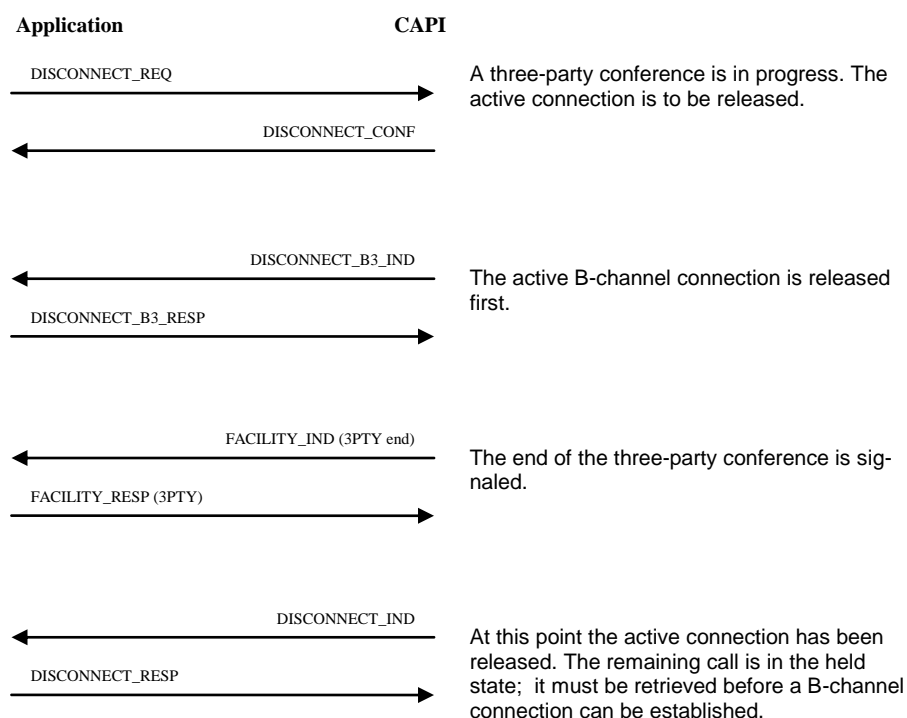
C.5.4.2 Deactivation of 3PTY



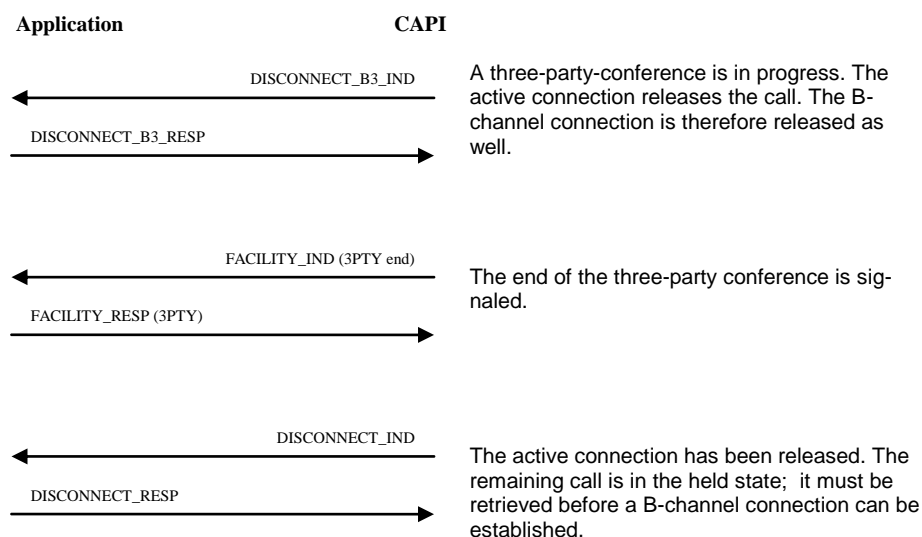
C.5.4.3 Disconnection of the Held Connection During 3PTY



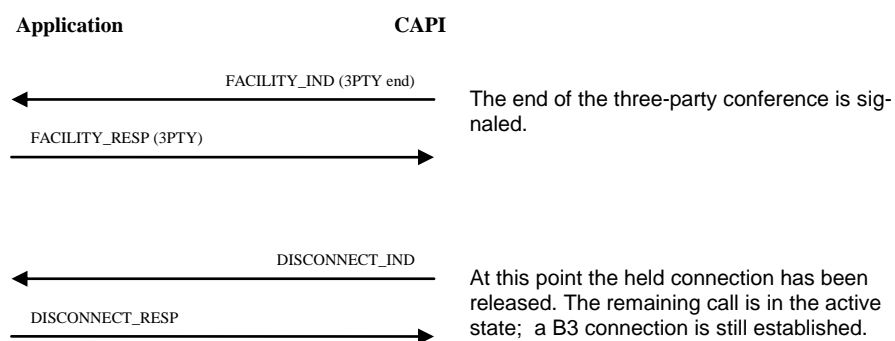
C.5.4.4 Disconnection of the Active Connection During 3PTY



C.5.4.5 Disconnection by the Remote Active Party During 3PTY

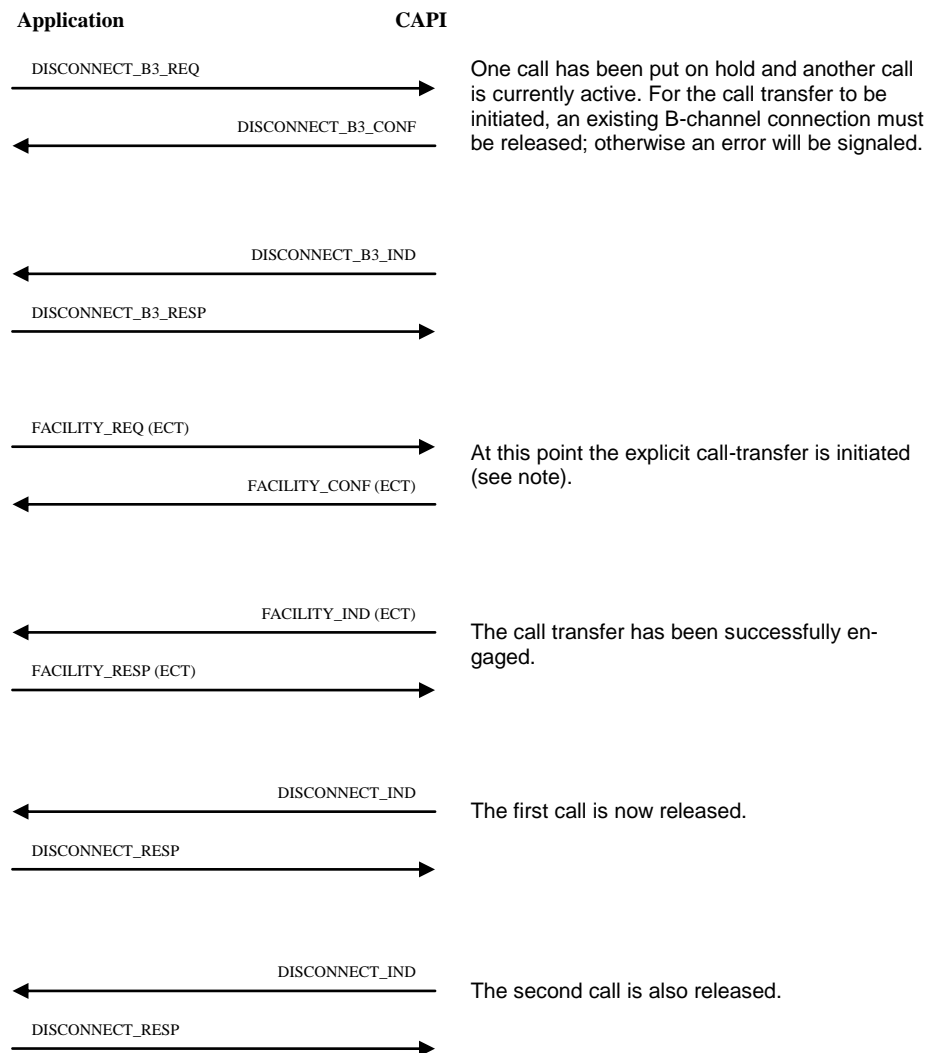


C.5.4.6 Disconnection by the Remote Held Party During 3PTY



C.5.5 Explicit Call Transfer

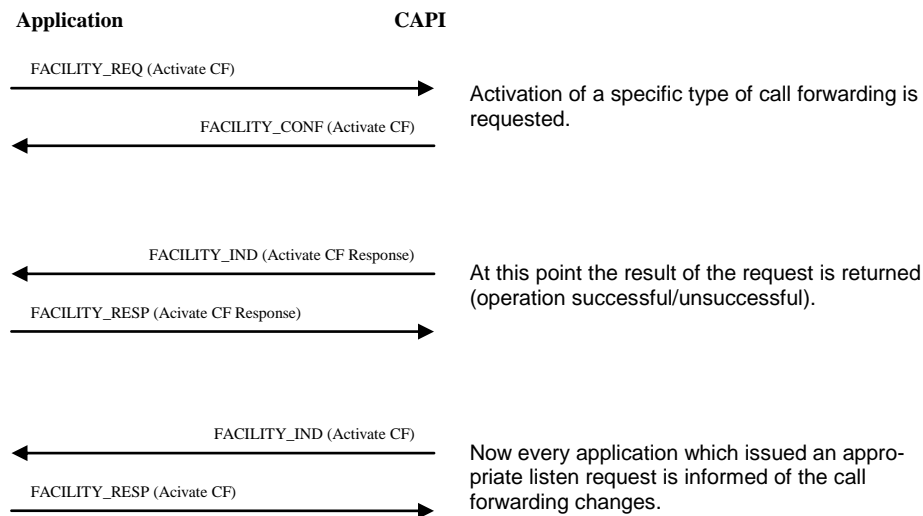
C.5.5.1 Activation of ECT



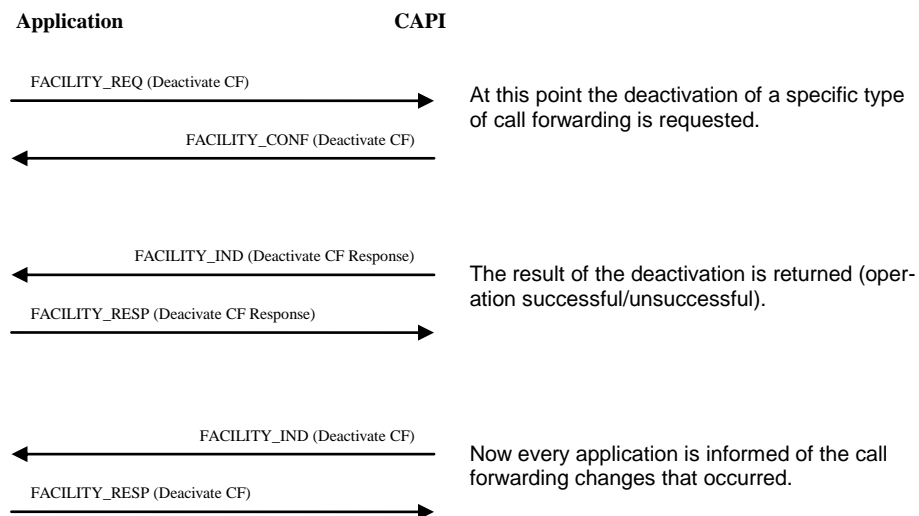
Note: ECT can be invoked implicitly and explicitly. For explicit invocation, the application must provide both PLCIs in the FACILITY_REQ (ECT). The PLCI of the active connection is in the parameter *PLCI*, and the PLCI of the held connection is in the parameter *Facility Request Parameter/Supplementary Service-specific parameter/PLCI*. For implicit invocation, the application must offer only the held PLCI in both parameters.

C.5.6 Call Forwarding

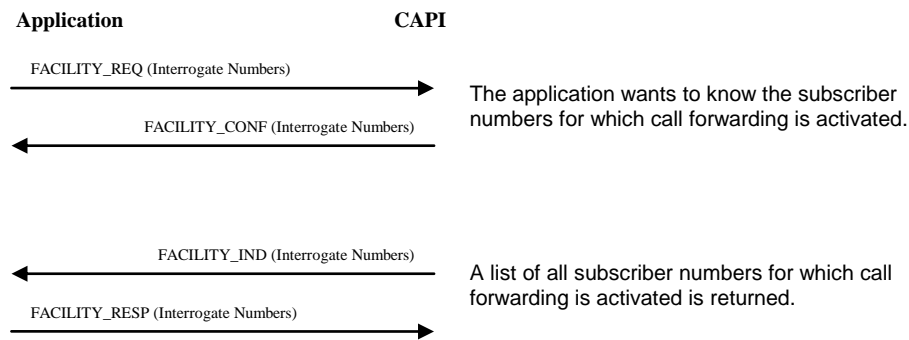
C.5.6.1 Activation of CF



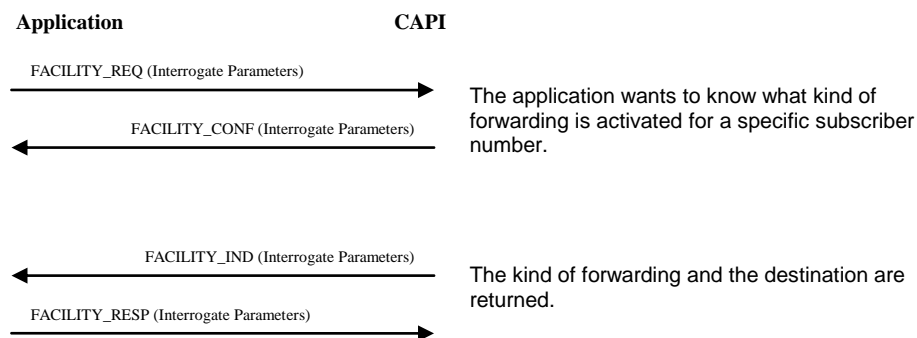
C.5.6.2 Deactivation of CF



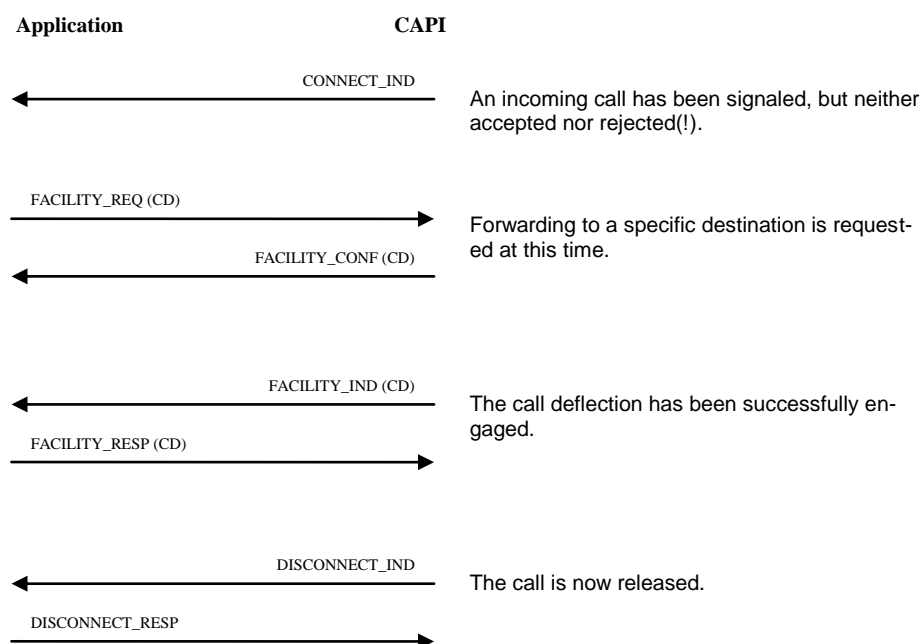
C.5.6.3 Interrogate Numbers



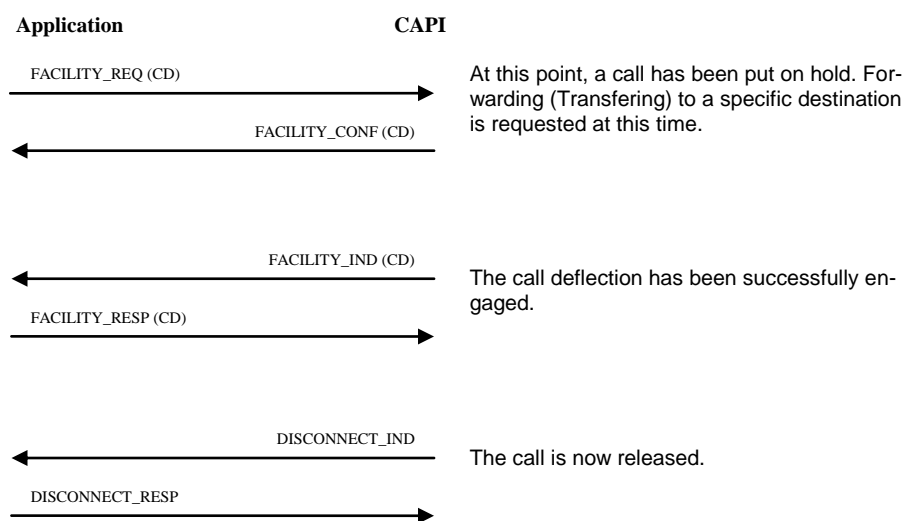
C.5.6.4 Interrogate Parameters



C.5.6.5 Activation of Call Deflection – Call has been signaled

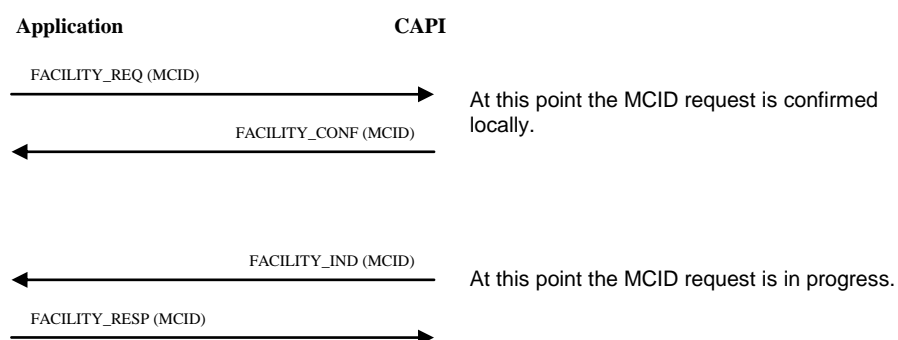


C.5.6.6 Activation of Call Deflection - Held Call in active State



C.5.7 Malicious Call Identification

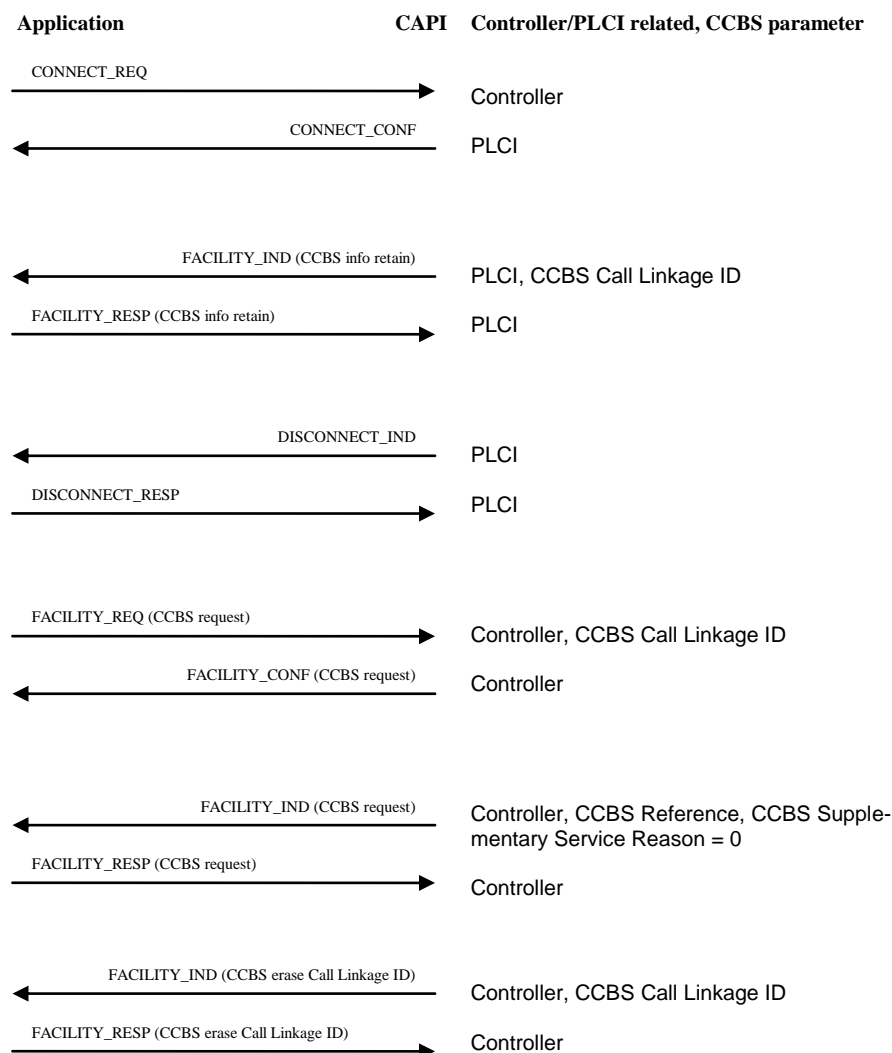
C.5.7.1 Activation of MCID



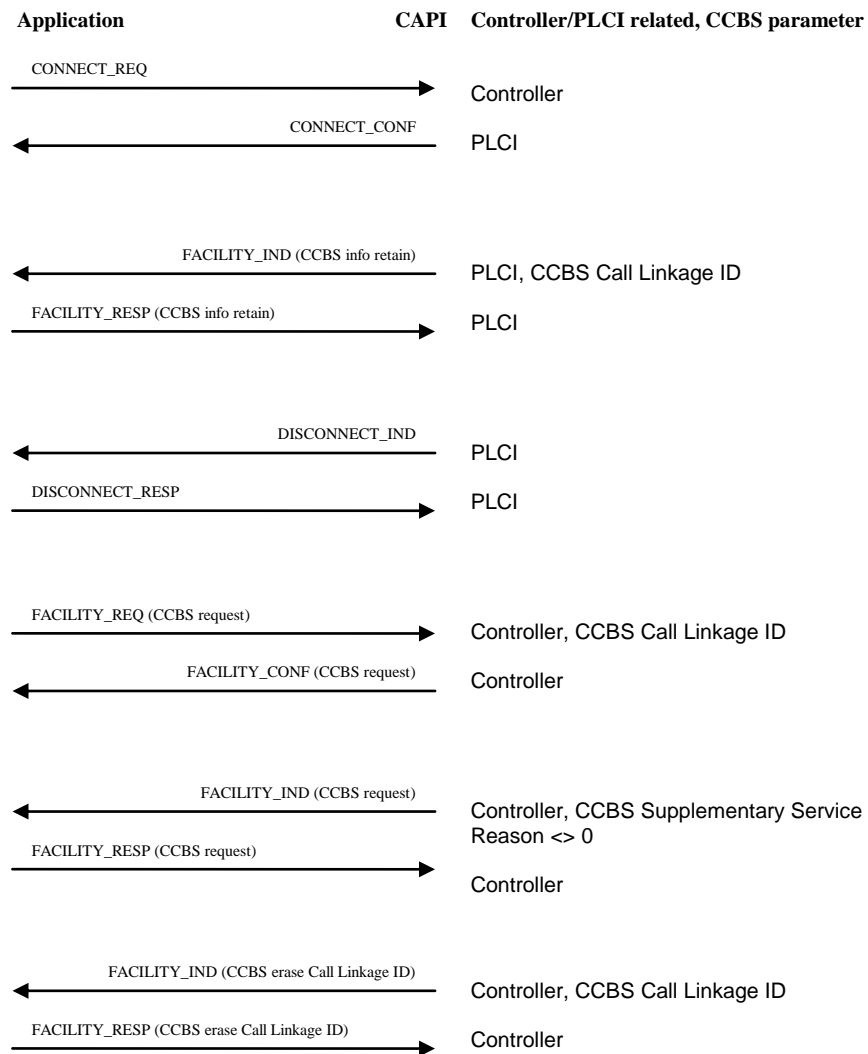
C.5.8 Completion of Calls to Busy Subscriber

These flowcharts are based on the diagrams given in the ETS 300 359-1 document.

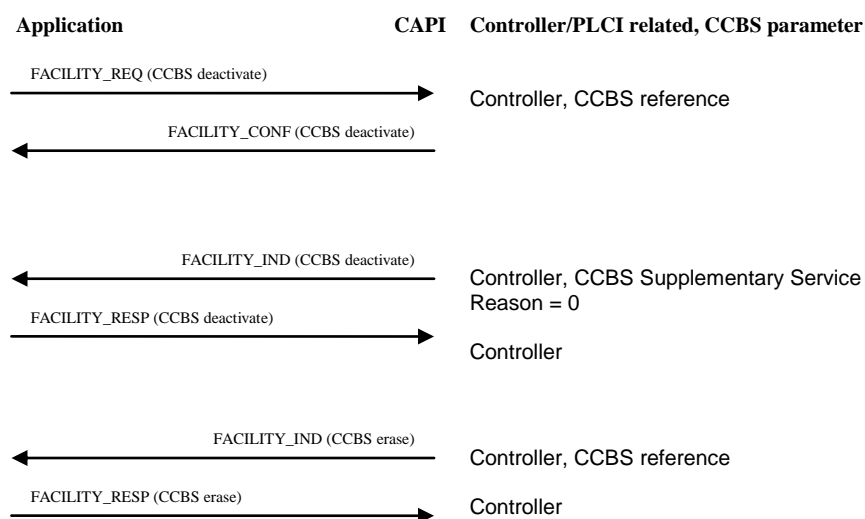
C.5.8.1 Successful Activation of CCBS by Application



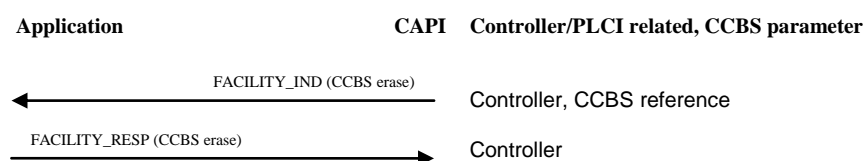
C.5.8.2 Unsuccessful Activation of CCBS by Application



C.5.8.3 Successful Deactivation of CCBS by Application

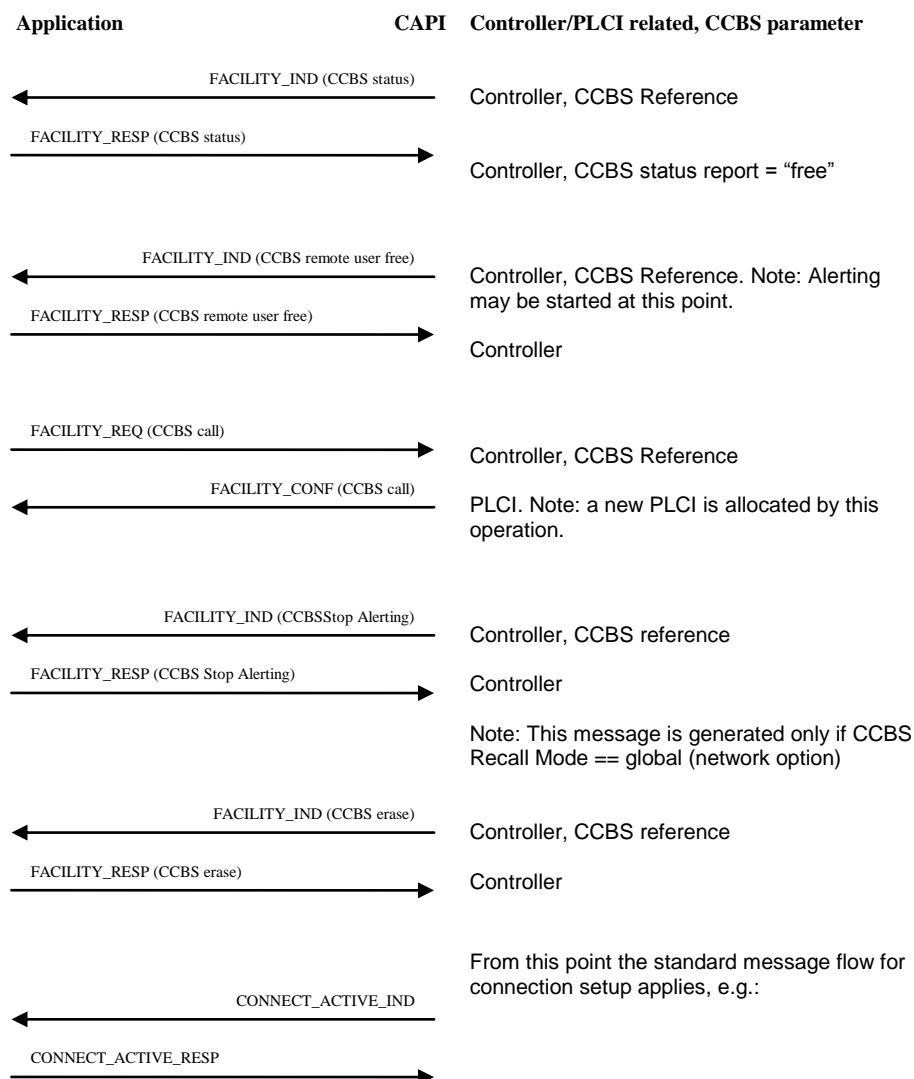


C5.8.4 Deactivation of CCBS by Network (e.g. after timeout)

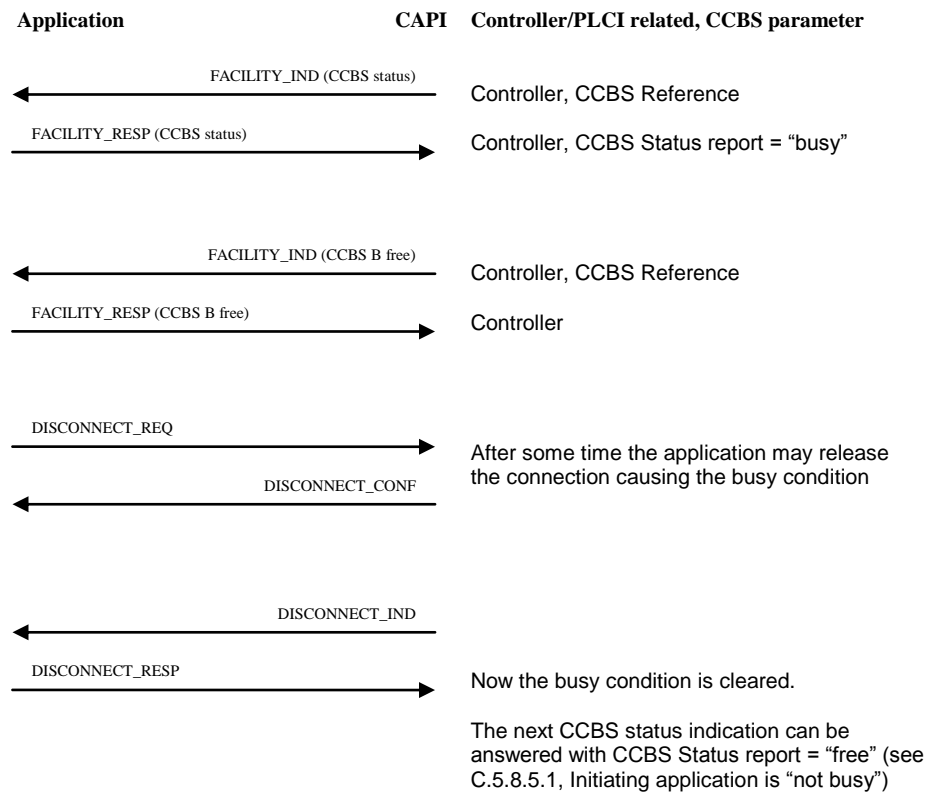


C.5.8.5 Remote Party Becomes "Not Busy"

C.5.8.5.1 Initiating Application is "Not Busy"

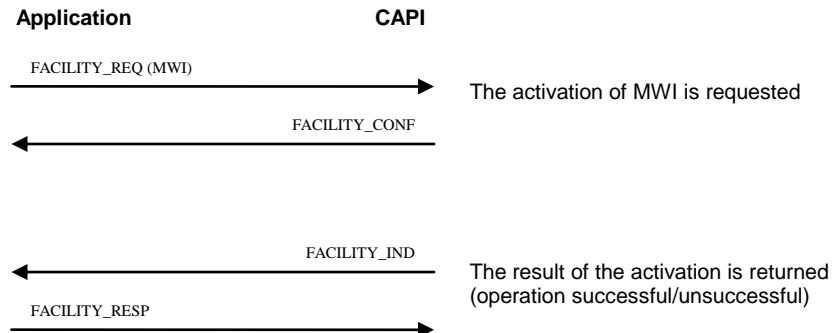


C.5.8.5.2 Initiating Application Has Become "Busy"

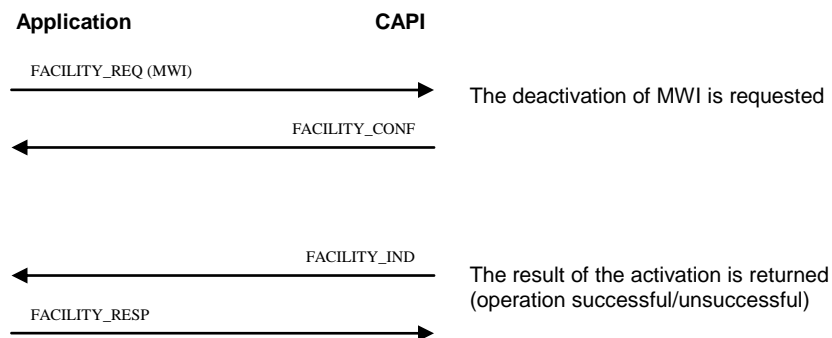


C.5.9 Message Waiting Indication

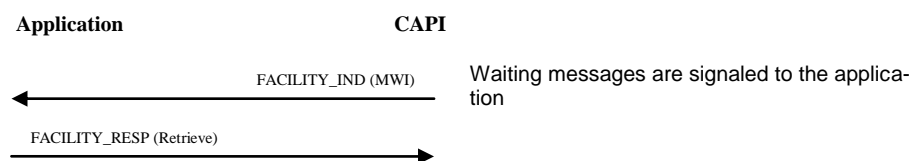
C.5.9.1 Activation of MWI



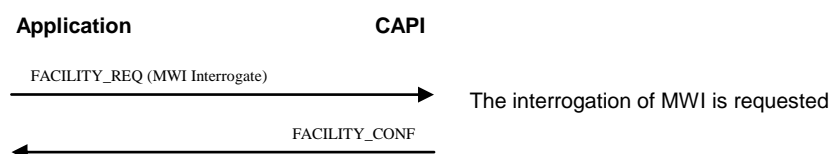
C.5.9.2 Deactivation of MWI

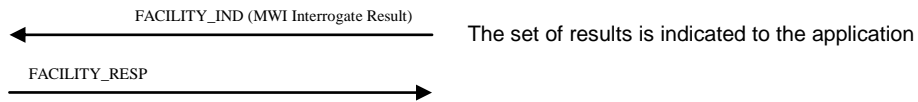


C.5.9.3 Indication of MWI

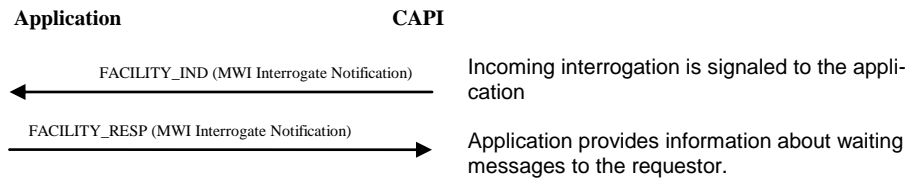


C.5.9.4 Active Interrogation of MWI (Softphone for example)





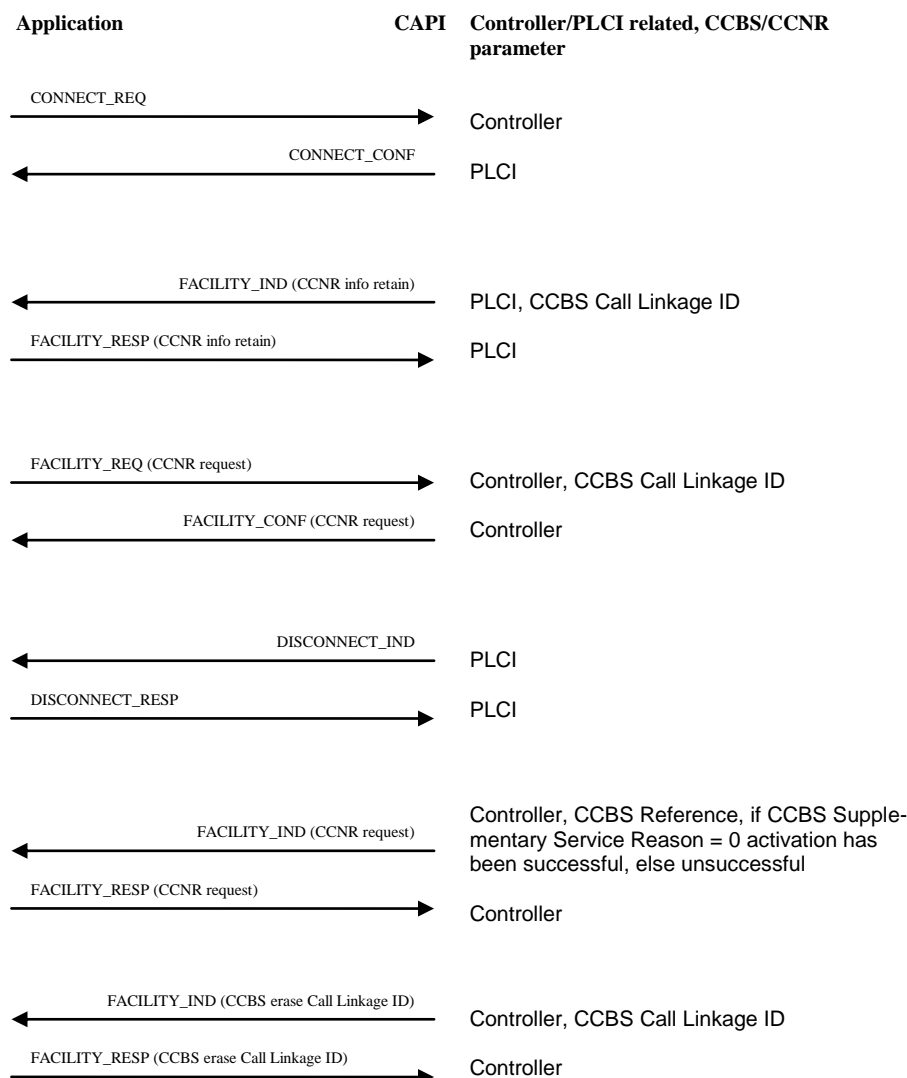
C.5.9.5 Passive Interrogation of MWI (Voicemail-Server for example)



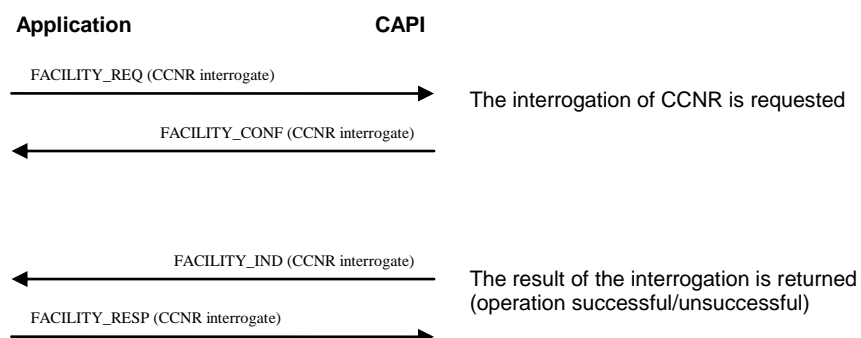
C.5.10 Completion of Calls on No Reply

Note: the message flow of CCNR is nearly identical to CCBS. There are CCNR specific messages for activation and interrogation, the other flow charts are identical to CCBS.

C.5.10.1 Activation of CCNR

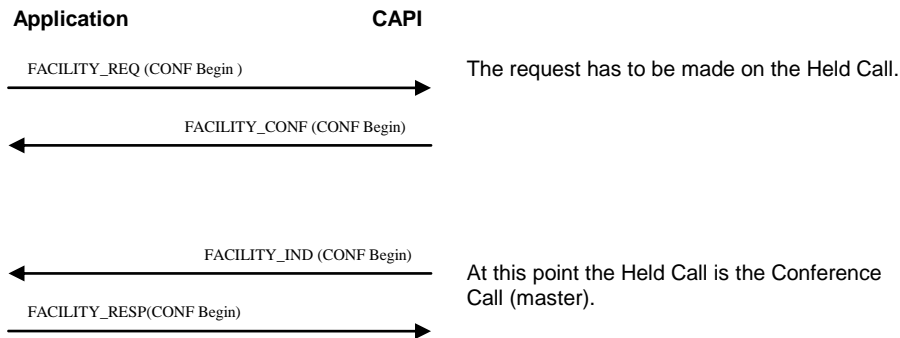


C.5.10.2 Interrogation of CCNR

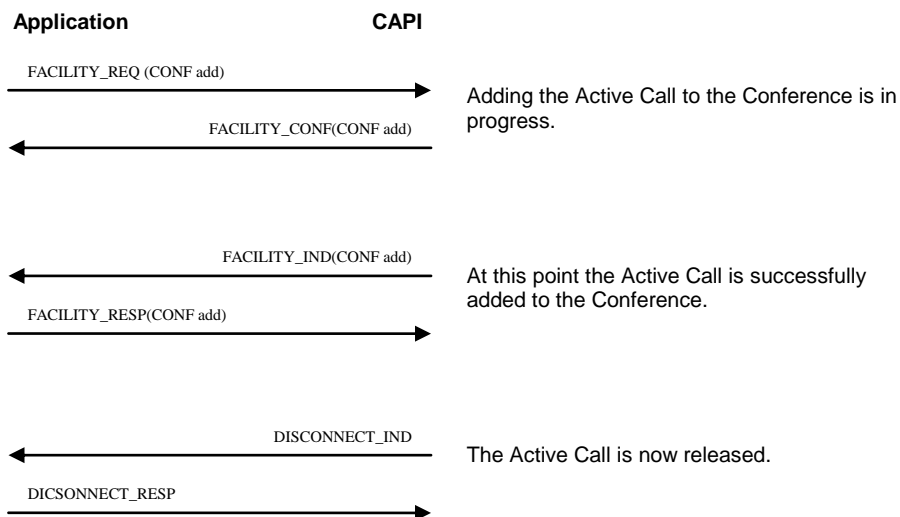


C.5.11 CONF Functions

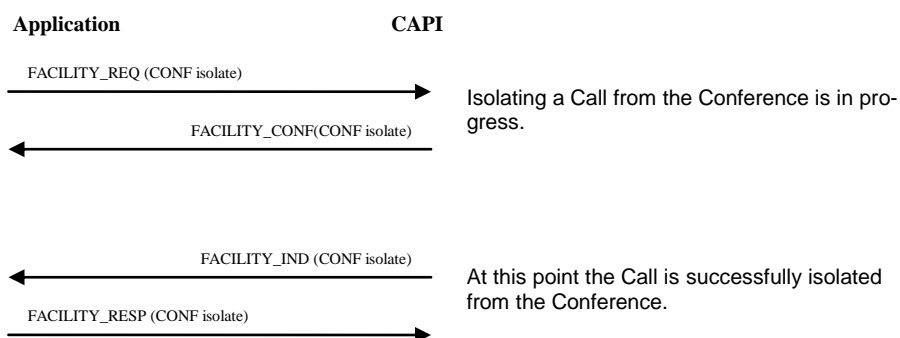
C.5.11.1 Beginning a Conference with one Held Call



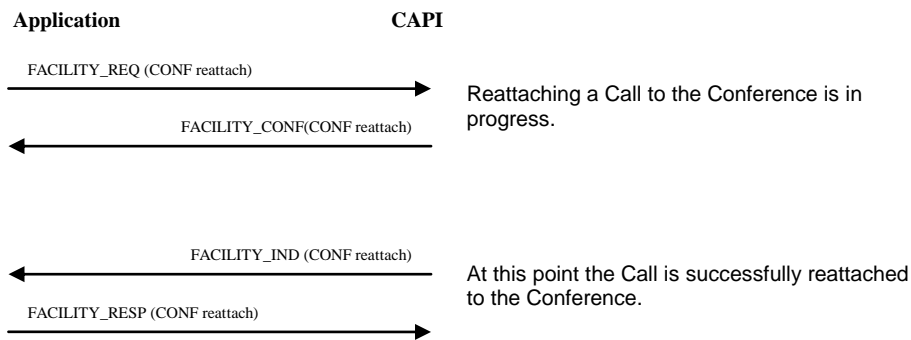
C.5.11.2 Adding an existing Active Call to the Held Conference Call



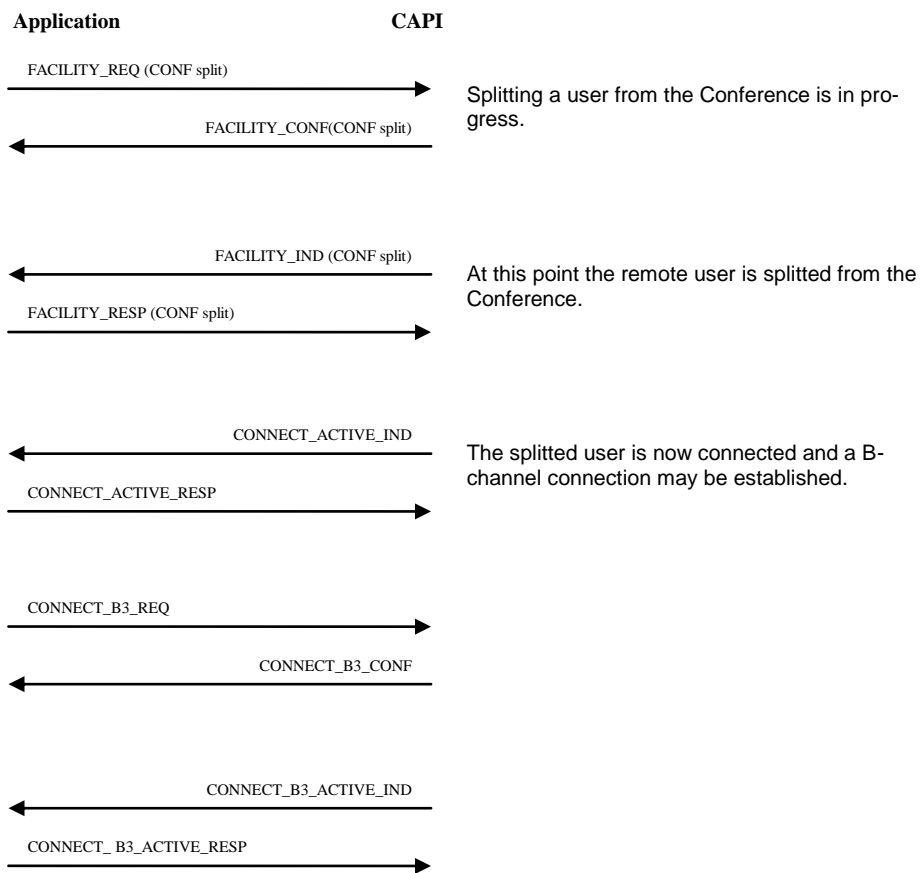
C.5.11.3 Isolate a Remote User



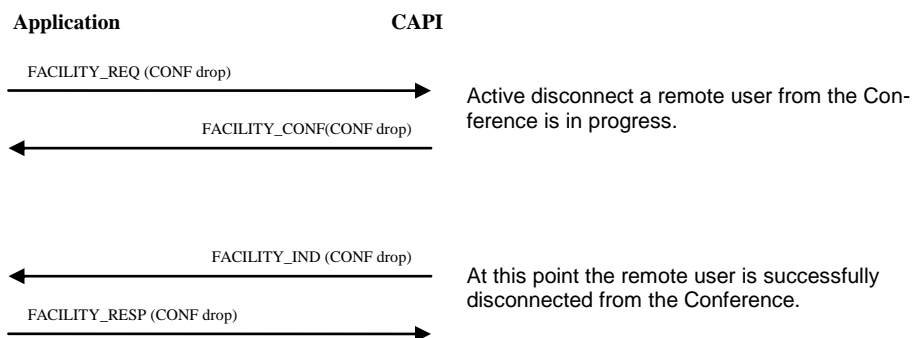
C.5.11.4 Reattach a Remote User



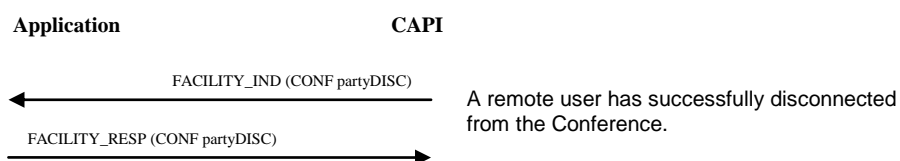
C.5.11.5 Split a Remote User from the Conference



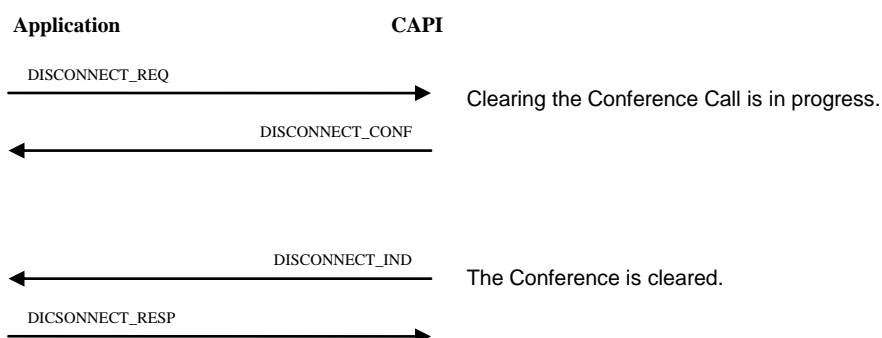
C.5.11.6 Disconnect a Remote User by served User



C.5.11.7 Disconnect by Remote User



C.5.11.8 Clear the Conference



INDEX (PART III)

CCBS Call Linkage ID.....	27
CCBS Erase Reason.....	28
CCBS Recall Mode.....	27
CCBS Reference	27
CCBS Status Report.....	27
CCBS-Interrogate-Response	28
CT Redirection Number.....	28
Facility Confirmation Parameter	14
Facility Indication Parameter	17
Facility Party Number	29
Facility Request Parameter.....	9
Facility Respond Parameter	23
Supplementary Service Info	29
Supplementary Service Reason	29