

CorNet-NQ

5.3.3 - Supplementary Service Message Waiting Indication (SS-MWI)

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History of Change

<u>CorNet-NQ issues of chapter 5.3.3</u>	<u>Based on standards</u>
<u>CorNet-NQ V2.0, Dec. 95</u>	- SS-MWISD fifth (proposed final), September 1995 - QSIG Stage 3 SS-MWI final draft, November 1995
<u>CorNet-NQ V2.1, September 1996</u>	- ECMA 241, June 1996 (submitted to ISO/IEC using fast track procedure) - ECMA 242, June 1996 (submitted to ISO/IEC using fast track procedure)

1 Scope

This CorNet-NQ specification specifies supplementary service Message Waiting Indication (SS-MWI), which is applicable to various basic services supported by Private Integrated Services Networks (PISN). Basic services are specified in ISO /IEC 11574.

The supplementary service MWI enables a served user to be sent a Message Waiting Indication and enables this Message Waiting Indication to be cancelled. In addition, a served user may interrogate for SS-MWI.

Service specifications are produced in three Stages, according to the method described in ETS300 387. This CorNet-NQ specification contains the Stage 1 and Stage 3 specifications of SS-MWI.

Stage 1 (section 6) specifies the supplementary service/feature as seen by users of PISNs.

No Stage 2 specification is used in this CorNet-NQ specification.

Stage 3 (section 7) specifies the signalling protocol (procedures, and the coding of messages, information elements and (ASN.1) operations applicable to SS-MWI) for the support of the SS-MWI at the Q reference point between Private Integrated Services Network Exchanges (PINX) connected together within a Private Integrated Services Network (PISN). The Q reference point is defined in ISO/IEC 11579-1. The signalling protocol for SS-MWI operates on top of the signalling protocol for basic circuit switched call control, as specified in CorNet-NQ chapter 5.1.1, and uses certain aspects of the generic procedures for the control of supplementary services specified in CorNet-NQ chapter 5.1.1.

The Stage 3 specification also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between SS-MWI and other supplementary services and ANFs.

<<<NQ: Stage 1 of this CorNet-NQ specification is based on ECMA-241, June 1996. Stage 3 of this CorNet-NQ specification is based on ECMA-242, June 1996. >>>.

Note: Additional interactions that have no impact on the signalling protocol at the Q reference point can be found in the relevant Stage 1 specifications.

2 Conformance

In order to conform to this CorNet-NQ specification, a PINX shall satisfy those requirements identified in the Protocol Implementation Conformance Statement (PICS) in Part X of this CorNet-NQ specification that relate to the SS-MWI.

Conformance to this CorNet-NQ specification includes conforming to those sections that specify protocol interactions between SS-MWI and other supplementary services and ANFs for which signalling protocols

at the Q reference point are supported in accordance with the Stage 3 specification concerned.

3 References

ISO / IEC 11579-1 (1994)	Information Technology - Telecommunications and Information Exchange Between Systems - Private Integrated Services Network - Reference Configuration for PISN Exchanges (PINX) (1994)
ISO/IEC 11582	Information technology - Telecommunications and Information Exchange Between Systems - Private Integrated Services Network - Generic Functional Protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol (1995)
ISO/IEC 11574	Information technology - Telecommunications and Information Exchange Between Systems - Private Integrated Services Network - Circuit mode 64kbit/s bearer services - service description, functional capabilities and information flows (1994)
ISO/IEC 11873	Information technology - Telecommunications and Information Exchange Between Systems - Private Integrated Services Network - Inter-exchange signalling protocol - Diversion Supplementary Services (1995)
ECMA-241	Private Integrated Services Network (PISN); Specification, Functional model and Information flow; Message Waiting Indication Supplementary Services; June 96.
ECMA-242	Private Integrated Services Network (PISN) - Inter-Exchange Signalling Protocol - Message Waiting Indication Supplementary Service; June 96
ETS 300 387	Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services (1994).
CCITT Rec. I.112 (1988)	Vocabulary of terms for ISDNs
CCITT Rec. I.210 (1988)	Principles of telecommunication services supported by an ISDN and the means to describe them
CCITT Rec. Z.100 (1988)	Specification and description language (1988)
ITU-T Rec. Q.950	Digital Subscriber Signalling System No. 1 (DSS1) - Supplementary Service Protocols, Structure and General Principles (1993)

4 Definitions

For the purpose of this CorNet-NQ specification, the following definitions shall apply.

4.1 External Definitions

This specification uses the following terms defined in other documents or in other chapters of this CorNet-NQ specification:

- | | |
|---|---------------------------|
| - Application Protocol Data Unit (APDU) | (CorNet-NQ chapter 5.1.1) |
| - Basic service | (CCITT Rec. I.210) |

- Call, Basic Call	(CorNet-NQ chapter 5.1.1)
- Connection	(CCITT Rec. I.112))
- Incoming Gateway	(CorNet-NQ chapter 5.1.1)
- Originating PINX	(CorNet-NQ chapter 5.1.1)
- Outgoing Gateway PINX	(CorNet-NQ chapter 5.1.1)
- Private Integrated Services Network (PISN)	(ISO/IEC 11579-1)
- Private Integrated Services Network Exchange (PINX)	(ISO/IEC 11579-1)
- Private Telecommunication Network (PTN)	(CorNet-NQ chapter 5.1.1)
- Private Telecommunication Network Exchange (PTNX)	(CorNet-NQ chapter 5.1.1)
- Service	(ITU-T Rec. I.112)
- Signalling	(ITU-T Rec. I.112)
- Supplementary Service	(ITU-T Rec. I.210)
- Supplementary Service Control Entity	(CorNet-NQ chapter 5.1.1)
- Terminating PINX	(CorNet-NQ chapter 5.1.1)

4.2 Message Centre PINX

The PINX serving the Message Centre Entity for Activation and Deactivation.

<<<NQ: Depending on the Reference configuration between Message Center and Message Center PINX (i.e. "Q" or "S" Reference point) the Message Center may take over the functions of the Message Centre PINX given in this specification (e.g. CorNet-N "Generic Server").>>>

4.3 Message Center

The entity which activates or deactivates the Message Waiting Indication as a result of storage or retrieval of messages.

<<<NQ: The Message Center entity may be a Server (e.g. Generic Server, Phonemail, Voicemail, Text/Fax Server, VMX, ...) or a Terminal device ("Message Waiting Callback")>>>

4.4 Message Waiting Indication

An indication to the served user when messages are waiting for the served user.

<<<NQ: Note: The indication may be an LED, special tone, display etc. This is outside of this CorNet-NQ specification.>>>

4.5 <<<NQ: Message Waiting Callback (call)

A Calling User A may send a SS-MWI against a Served User B after the served user was met busy, not answering or on a call-unrelated basis, if the calling User wants to be called back by the Served User.>>>

4.6 Served User

The user to whom the Message Waiting Indication is sent on initiative of the Message Center.

5 List of Acronyms

ANF	Additional Network Feature
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no.1
CC	Call Control
ISDN	Integrated Services Digital Network
MWI	Message Waiting Indication
NFE	Network Facility Extension
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network
PTN	Private Telecommunication Network
PTNX	Private Telecommunication Network Exchange
SDL	Specification and Description Language
SS	Supplementary Service
TE	Terminal Equipment
VMS	Voice Mail Server
TCS	Telecommunication Server
PM	Phonemail Server
GS	Generic Server

6 SS-MWI Stage 1 Specification

6.1 Description

6.1.1 General Description

The supplementary service MWI enables a served user to be sent a Message Waiting Indication and also enables the Message Waiting Indication to be cancelled.

Note: The Message Waiting Indication is sent by the Message Center when messages are available for the served user. The Message Waiting Indication is cancelled by the Message Center when no more messages are available for the served user.

6.1.2 Qualifications on Applicability to Telecommunication Services

This supplementary service does not apply directly to any basic telecommunication service. However, a MWI relates to a basic service for which there are messages waiting. It can relate to any of the basic services defined in ISO/IEC 11574.

6.1.3 Provision / Withdrawal

SS-MWI may be provided or withdrawn after pre-arrangement with the service provider or may be generally available to all users.

6.1.4 Normal Procedures

6.1.4.1 Activation, Deactivation and Interrogation

The PISN shall provide activation / deactivation by the Message Center. In addition, the PISN may provide

Interrogation by Served User.

To activate or deactivate SS-MWI, the Message Centre shall supply the PISN number and the basic service for which there is a message waiting and, as an implementation option, the identity of the Message Centre <<<NQ: the identity of the Message Centre in form of its PISN number is mandatory in CorNet-NQ >>> and, as an implementation option in the case of activation, the number of messages waiting for the served user for that basic service and/or the priority of the highest priority message waiting for that basic service. After activation, SS-MWI may be activated again whenever the number of waiting message changes. <<<NQ: In addition, the type of Message Waiting Indication (e.g. Server or Terminal MWI) may be sent at SS-MWI activation and SS-MWI deactivation >>>.

To deactivate SS-MWI, the Message Centre shall supply the PISN number and the basic service for which there is no longer a message waiting.

As a result of activation, a MWI shall be sent to the served user. The MWI may include information on messages waiting, if provided by the Message Centre. As a result of deactivation, the MWI at the served user, for the basic service concerned, shall be cancelled.

When the Message Centre activates or deactivates SS-MWI at the served user, it shall be provided with an indication of acceptance.

When the Served User interrogates SS-MWI for a particular basic service, the message Centre shall provide the Served User with an indication of whether SS-MWI is activated for that basic service and, as an implementation option, the number of messages waiting and / or the priority of the highest priority message waiting. When the Served user interrogates SS-MWI for all basic services, the Message Centre shall provide the Served User with a list of basic services for which SS-MWI is active and, as an implementation option, for each basic service, the number of messages waiting and/or the priority of the highest priority message waiting.

Note: It may be necessary to include the number of messages waiting, due to requirements of the Message Centre which are outside the scope of this specification.

<<<NQ: MWI Callback call - After SS-MWI was placed against the served user, the served user may request to be connected to the Message Centre>>>.

6.1.4.2 Invocation and Operation

Not applicable.

6.1.5 Exceptional Procedures

6.1.5.1 Activation, Deactivation and Interrogation

If the served user cannot accept activation or deactivation, then the Message Center shall be informed and may also be given the reason. If the PISN cannot accept interrogation, then the Served User shall be informed and may also be given a reason.

6.1.5.2 Invocation and Operation

None.

6.2 Interaction with Other Supplementary Services and ANFs

6.2.1 <<<NQ: Common Information

The served user information about the support of Message waiting indication provided by means of Common Information ANF in the first end-to-end backwards message, may be used by the Message Centre (Calling User) to decide whether to invoke SS-MWI against the served user.

Refer to CorNet-NQ chapter 9.7 "Common Information" for more details >>>.

6.2.2 Call Completion on Busy Subscriber / No Reply

No interactions.

6.2.3 Call Offering

No interactions.

6.2.4 Intrusion

No interactions.

6.2.5 Call Waiting

No interaction.

<<<NQ: While a calling user (Message Centre) is waiting for the busy called user (served user) the originating PINX allows the calling user to activate the Message Waiting feature against the busy called user. Since the method used to activate Message Waiting is switch and/or device dependent, e.g., the calling user splits away from alerting call and dials the Message Waiting access code or depresses a feature key to invoke Message Waiting, the terminating ISPBX will allow the call waiting to be cancelled .

Message Waiting overrides camp-on, so the terminating ISPBX will cancel the camp-on upon receiving a Message Waiting Indication from the calling user which explicitly invokes the Message Waiting feature.
>>>

6.2.6 Identification Service

No interactions.

6.2.7 DND / DND Override

No interactions.

6.2.8 Name Identification

No interactions.

6.2.9 Call Forwarding

No interactions.

<<<NQ:

If the served User has Call Forwarding active, the SS-MWI request will not be forwarded. Call Forwarding is ignored by the served user's PINX and Message Waiting Indication is set against the served user.

If the Message Center PINX has Call Forwarding active, a Message Waiting callback call is not forwarded by the Message Centre PINX >>>.

6.2.10 <<<NQ:Chief Secretary

A Message Waiting Indication against a served user chief-secretary configuration is placed against the chief >>>.

6.2.11 Advice of Charge

No interactions.

6.2.12 <<<NQ: Billing

If Billing of Connection oriented signalling connections is required, SS-MWI is charged to either the message centre entity (Calling user) or to the served user >>>.

6.2.13 <<<NQ: Hold / Enquiry / Alternating

A served user may receive a Message Waiting Indication while being held.

A consulting party may place a Message Waiting Indication request against the consulted party.

A party on hold may invoke MWI against the holding party. >>>

6.2.14 Call Transfer

No interactions.

6.2.15 Conference

No interaction.

6.2.16 Automatic Recall

No interactions.

6.2.17 Path Replacement

No interactions.

6.2.18 <<<NQ: Routing Information (Node Number Concept)

No interactions.

6.2.19 Identification of Calls

No interactions.

6.2.20 Feature Protocol negotiation

Refer to CorNet-NQ chapter 9.9 Feature Protocol negotiation.

6.2.21 Additional Progress description

Refer to CorNet-NQ chapter 9.8 Additional Progress description

>>>.

6.3 Interworking Considerations

A PISN may be able to accept MWIs from a Message Centre in another network. In this case, the PISN may also be able to interrogate that Message Centre.

A PISN may be able to send MWIs to a Served user in another network. In this case, the PISN may also be able to accept interrogation requests from that Served User.

7 SS-MWI Stage 3 Specification

7.1 SS-MWI Description

SS-MWI enables a served user to be sent a Message Waiting Indication and also enables this Message Waiting Indication to be cancelled.

This service also includes an option to interrogate the Message Waiting Indication stored against the served user.

7.2 SS-MWI Operational requirements

7.2.1 Requirements on a Message Centre PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in CorNet-NQ chapter 5.1.1 for an Originating PINX and for a Terminating PINX, shall apply.

7.2.2 Requirements on a Served user PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in CorNet-NQ chapter 5.1.1 for a Terminating PINX and for an Originating PINX, shall apply.

7.2.3 Requirements on a Transit PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in CorNet-NQ chapter 5.1.1 for a Transit PINX, shall apply.

7.3 SS-MWI Coding Requirements

Only specific messages and IEs are described which are directly relevant to SS-MWI.

7.3.1 Operations

The operations defined in ASN.1 in table 5.3.3-1 shall apply.

Table 5.3.3 - 1: Operations in Support of SS-MWI

```

SS-MWI-Operations
    { iso(1) identified-organization(3) icd-ecma(0012) standard(0)
      qsig-message-waiting(242) message-waiting-operations(0) }

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS
    OPERATION, ERROR FROM Remote-Operation-Notation
        { joint-iso-ccitt (2) remote-operations (4) notation (0) }
    Extension FROM Manufacturer-specific-service-extension-definition
        { iso (1) standard (0) pss1-generic-procedures (11582) msi-definition
          (0) }
    basicServiceNotProvided, notActivated, notSubscribed,
    invalidServedUserNr FROM
        { ccitt(2) recommendation(0) q(17) 950 general-error-list(1) }
    PartyNumber FROM Addressing-Data-Elements {iso(1) standard(0)
        pss1-generic-procedures(11582) addressing-data-elements(9) }
    Basic Service FROM Call-Diversion-Operations
        { iso(1) standard(0) pss1-call-diversion(13873)
          call-diversion-operations(0) };

MWIActivate ::= OPERATION
    ARGUMENT MWIActivateArg
    RESULT DummyRes
    ERRORS { notSubscribed,
            invalidServedUserNr,
            basicServiceNotProvided,
            unspecified }

MWIDeactivate ::= OPERATION
    ARGUMENT MWIDeactivateArg
    RESULT DummyRes
    ERRORS {notSubscribed,
            invalidServedUserNr,
            basicServiceNotProvided,
            unspecified }

MWIInterrogate ::= OPERATION
    ARGUMENT MWIInterrogateArg
    RESULT MWIInterrogateRes
    ERRORS { notSubscribed,
            invalidServedUserNr,
            notActivated,
            unspecified }
    
```



```

MWIActivateArg ::= SEQUENCE {
    basicService      BasicService,
    servedUserNr     PartyNumber,
    msgCentreId     MsgCentreId OPTIONAL,
    nbOfMessages     [2] IMPLICIT NbOfMessages OPTIONAL,
    priority         [3] IMPLICIT INTEGER (0..9) OPTIONAL,
    -- The value 0 means the highest priority and 9 the lowest
    argumentExt     CHOICE {
        extension     [4] IMPLICIT Extension,
        multipleExtension [5] IMPLICIT SEQUENCE OF Extension
    } OPTIONAL
}

DummyRes ::= CHOICE {
    null NULL,
    extension [1] IMPLICIT Extension,
    multipleExtension [2] IMPLICIT SEQUENCE OF Extension
}

MWIDeactiveArg ::= SEQUENCE {
    servedUserNr     PartyNumber,
    basicService     BasicService,
    msgCentreId     MsgCentreId OPTIONAL,
    argumentExt     CHOICE {
        extension [2] IMPLICIT Extension,
        multipleExtension [3] IMPLICIT SEQUENCE OF Extension
    } OPTIONAL
}

MWIInterrogateArg ::= SEQUENCE {
    basicService     BasicService,
    servedUserNr     PartyNumber,
    msgCentreId     MsgCentreId OPTIONAL,
    argumentExt     CHOICE {
        extension [2] IMPLICIT Extension,
        multipleExtension [3] IMPLICIT SEQUENCE OF Extension
    } OPTIONAL
}

```

```

MWIInterrogateRes ::= SEQUENCE SIZE(1..10) OF MWIInterrogateResElt

MWIInterrogateResElt ::= SEQUENCE {
    basicService      BasicService,
    msgCentrId       MsgCentrId OPTIONAL,
    nbOfMessages     [2] IMPLICIT NbOfMessages OPTIONAL,
    priority          [3] IMPLICIT INTEGER (0..9) OPTIONAL,
    -- The value 0 means the highest priority and 9 the lowest
    argumentExt      CHOICE {
        extension [4] IMPLICIT Extension,
        multipleExtension [5] IMPLICIT SEQUENCE OF Extension
    } OPTIONAL
}

MsgCentrId ::= CHOICE {
    integer           [0] IMPLICIT INTEGER (0..65535),
    partyNumber      [1] Party Number
}

NbOfMessages ::= INTEGER (1..65535)

mwiActivate      MWIActivate      ::= 80
mwiDeactivate    MWIDeactivate    ::= 81
mwilInterrogate  MWIInterrogate   ::= 82

Unspecified ::= ERROR PARAMETER Extension

unspecified      Unspecified ::= 1008

END -- of SS-MWI-Operations
    
```

Table 5.3.3 - 1a: CorNet-NQ specific Operations and Extensions in Support of SS-MWI

```

CorNet-NQ-Message-Waiting
    { iso(1) identified-organization(3) icd-ecma(0012) member-company(2)
      siemens-units(1107) pn(2) cornet-nq-specification(0)
      message-waiting(1) }
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
IMPORTS
    OPERATION FROM Remote-Operation-Notation
        { joint-iso-ccitt (2) remote-operations (4) notation (0) }
    EXTENSION FROM Manufacturer-specific-service-extension-definition
        { iso (1) standard (0) pss1-generic-procedures (11582) msi-definition
          (0) };
EXPORTS
    MWIActivateExt, MWIDeactivateExt, MWIResultExt, MwcbExecute
cnq OBJECT IDENTIFIER ::= { iso (1) identified-organization (3) icd-ecma (0012)
    member-company(2) siemens-units(1107) pn(2)
    cornet-nq-signalling(1) }

MwcbExecute ::= OPERATION
                ARGUMENT          NULL

MWIActivateExt EXTENSION          -- of MWIActivateArg
                ARGUMENT ENUMERATED { invokeMWIGeneral (0), newVMSmail (2),
                invokePM (4), newMWIGeneralHighPrio (7), onlyOldMWIGeneral (8),
                newVMSmailHighPrio (9), onlyOldVMSmail (10), newTCSmail (11),
                newTCSmailHighPrio (13), onlyOldTCSmail (14), newGSmal (15),
                newGSmalHighPrio (17), onlyOldGSmal (18), newVMXmail (19) }

MWIDeactivateExt EXTENSION        -- of MWIDeactivateArg
                ARGUMENT ENUMERATED { cancelMWIGeneral(1), noVMSmail (3),
                cancelPM (5), cancelGeneralMWICalledSide (6), noTCSmail (12),
                noGSmal (16), noVMXmail (20) }

MWIResultExt   EXTENSION          -- of DummyRes
                ARGUMENT ENUMERATED { invokeMWIGeneral (0), cancelMWIGeneral(1),
                newVMSmail (2), noVMSmail (3), invokePM (4), cancelPM (5),
                cancelGeneralMWICalledSide (6), newMWIGeneralHighPrio (7),
                onlyOldMWIGeneral (8), newVMSmailHighPrio (9), onlyOldVMSmail
                (10), newTCSmail (11), noTCSmail (12), newTCSmailHighPrio (13),
                onlyOldTCSmail (14), newGSmal (15), noGSmal (16),
                newGSmalHighPrio (17), onlyOldGSmal (18), newVMXmail (19),
                noVMXmail (20) }

```

```
mwcbExecute      MwcbExecute ::= { cnq mwcb-execute (12) }
mwiActivateExt   MWIActivateExt ::= { cnq mwi-activateExt (20000) }
mwiDeactivateExt MWIDeactivateExt ::= { cnq mwi-deactivateExt (20001) }
mwiResultExt     MWIResultExt ::= { cnq mwi-resultExt (20002) }

END              -- of CorNet-NQ-Message-Waiting
```

7.3.2 Information Elements

7.3.2.1 Facility Information Element

The operations defined in 7.3.1 shall be coded in the Facility information element in accordance with CorNet-NQ chapter 5.1.1.

When conveying the invoke APDU of operations defined in 7.3.1, the **destinationEntity** data element of the NFE shall contain value endPINX.

When conveying the invoke APDU of operations **mwiActivate**, **mwiDeactivate** and **mwilInterrogate**, the interpretation APDU shall be omitted.

<<<**NQ**: When conveying the invoke APDU of operation **mwcbExecute**, the interpretation APDU shall be available and shall be set to **discardAnyUnrecognizedInvokePdu**. >>>

7.3.2.2 Other Information Elements

Any other information element (e.g. Calling party number) shall be coded in accordance with CorNet-NQ chapter 4 and 5.1.1.

7.3.3 Messages

The Facility information element shall be conveyed in messages as specified in CorNet-NQ chapter 5.1.1.

7.4 SS-MWI State definitions

7.4.1 States at the Message Centre PINX

The procedures for the Message Centre PINX are written in terms of the following conceptual states existing within the SS-MWI Supplementary Service Control entity in that PINX in association with a activation or deactivation request from the Message Centre entity.

7.4.1.1 State MWI-MC-idle

Activation, Deactivation is not in progress. The Message Center PINX is ready for receipt of mwilInterrogate invoke APDU.

7.4.1.2 State MWI-MC-Wait

A mwiActivate or mwiDeactivate invoke APDU has been sent. The Message Centre PINX is waiting for the response.

7.4.2 States at the Served user PINX

The procedures for the Served User PINX are written in terms of the following conceptual states existing within the SS-MWI Supplementary Service Control entity in that PINX in association with a particular call-independent signalling connection for the Served User.

7.4.2.1 State MWI-Ser-Idle

The Served User PINX is ready for receipt of mwiActivate, mwiDeactivate or mwilInterrogate invoke APDU.

7.4.2.2 State MWI-Ser-Wait

A mwilInterrogate invoke APDU has been sent. The Served User PINX is waiting for the response.

7.5 SS-MWI Signalling procedures

Examples of message sequences are shown in annex A.

7.5.1 Actions at the Message Centre PINX

The SDL representation of procedures at the Message Centre PINX is shown in annex B.

7.5.1.1 Normal procedures

7.5.1.1.1 Activation/Deactivation

On receipt of an activation/deactivation request from the Message Centre entity, the Message Centre PINX shall send a mwiActivate/mwiDeactivate invoke APDU <<<NQ: optionally including mwiActivateExt/mwiDeactivateExt >>> to the Served User PINX using the call reference of a call-independent signalling connection. The call-independent signalling connection shall be established (or used, if an appropriate connection is already available) in accordance with the procedures specified in chapter 5.1.1 of CorNet-NQ. The Message Centre PINX shall start timer T1 and enter the MWI-Mc-Wait state. The mwiActivate/mwiDeactivate invoke APDU shall contain the PISN number of the Served User <<<NQ: and shall contain the msgCentrelid of type PartyNumber >>> and the basic service for which the activation/deactivation applies.

The Message Centre PINX may optionally include the number of messages for the Served User in the element nbOfMessages in the mwiActivate/mwiDeactivate invoke APDU.

The Message Centre PINX may optionally include the highest priority of the message for the Served User in the element priority in the mwiActivate/mwiDeactivate invoke APDU.

<<<NQ: The following table 5.3.3-1 gives an overview of the mwiActivateExt and mwiDeactivateExt values used in CorNet-NQ. If no mwiActivateExt/mwiDeactivateExt is received in CorNet-NQ, a "Generic Server MWI" shall be assumed as default :

mwiActivateExt / mwiDeactivateExt / mwiResultExt values (refer to section 7.3.1)		Note	Value used in mwiActivateExt	Value used in mwiDeactivateExt	Value used in mwiResultExt
0	invokeMWIGeneral (0)	1	yes	-	yes
1	cancelMWIGeneral(1)	2	-	yes	yes
2	newVMSmail (2)	3	yes	-	yes
3	noVMSmail (3)	4	-	yes	yes
4	invokePM (4)	5	yes	-	yes
5	cancelPM (5)	6	-	yes	yes
6	cancelGeneralMWICalledSide (6)	7	-	yes	yes
7	newMWIGeneralHighPrio (7)	8	yes	-	yes
8	onlyOldMWIGeneral (8)	9	yes	-	yes
9	newVMSmailHighPrio (9)	10	yes	-	yes
10	onlyOldVMSmail(10)	11	yes	-	yes
11	newTCSmail (11)	12	yes	-	yes
12	noTCSmail (12)	13	-	yes	yes
13	newTCSmailHighPrio (13)	14	yes	-	yes
14	onlyOldTCSmail (14)	15	yes	-	yes
15	newGSmail (15)	16	yes	-	yes
16	noGSmail (16)	17	-	yes	yes
17	newGSmailHighPrio (17)	18	yes	-	yes
18	onlyOldGSmail (18)	19	yes	-	yes
19	newVMXmail (19)	20	yes	-	yes
20	noVMXmail (20)	21	-	yes	yes

1. Codepoint used for Message Waiting Indication invoked by a User A against a Served User B on busy, on No Reply or Call-unrelated.
2. Codepoint used for Cancellation of Message Waiting Indication by the Calling User A against the Served User B.
3. MWI Activation from Voice Mail Server
4. MWI Deactivation/Cancellation from Voice mail server
5. MWI Activation from CorNet-T Phonemail Server
6. MWI Deactivation / Cancellation from CorNet-T Phonemail Server
7. Codepoint used for Cancellation of Message Waiting Indication by the Server User.
8. Codepoint used for Message Waiting Indication invoked by a User A against a Served User B on busy, on No Reply or Call-unrelated, if high priority is to be indicated.
9. Not used in CorNet-NQ
10. MWI Activation with high priority from Voice Mail Server
11. MWI Activation from Voice Mail Server (only old mail). Message Waiting Indication (LED) cleared, but SS-MWI information (e.g. msgCentrelid) maintained in the Served User PINX.
12. MWI Activation from Telecommunication Server (Text/Tax Server)
13. MWI Deactivation/Cancellation from Telecommunication Server (Text/Tax Server)
14. MWI Activation with high priority from Telecommunication Server (Text/Tax Server)

15. MWI Activation from Telecommunication Server (only old TCS mail). Message Waiting indication (LED) is cleared at served user terminal, but SS-MWI information (e.g. msgCentred) maintained in the Served User PINX.

16. MWI Activation from Generic Server (e.g. CorNet-N Server). If no mwiActivateExt is received (e.g. from an other vendor's QSIG PINX), this codepoint shall be assumed as the default. As an alternative value (17) newGSMailHighPrio may be assumed, depending on the priority parameter received in mwiActivate invoke APDU

17. MWI Deactivation from Generic Server (e.g. CorNet-N Server). If no mwiDeactivateExt is received (e.g. from an other vendor's QSIG PINX), this codepoint shall be assumed.

18. MWI Activation from Generic Server with high priority. This value may be assumed, if no mwiActivateExt is received (e.g. from an other vendor's QSIG PINX) and if the priority parameter received in mwiActivate invoke APDU is received indicating high priority (network administration manner).

19. MWI Activation from Generic Server (only old mail). Message Waiting Indication (LED) cleared at served user terminal, but SS-MWI information (e.g. msgCentred) maintained in the Served User PINX.

20. MWI Activation from analogue server

21. MWI Deactivation from analogue server

>>>.

In state MWI-Mc-Wait, on receipt of a mwiActivate or mwiDeactivate return result APDU <<<NQ: containing mwiResultExt, if mwiActivateExt/mwiDeactivateExt was sent previously in mwiActivate/mwiDeactivate invoke APDU >>>, the message Centre PINX shall stop timer T1, and enter state MWI-Mc-Idle.

Note:

The Message Centre PINX should indicate acceptance to the Message Centre entity.

The message centre PINX is responsible for clearing the call independent signalling connection towards the Served User PINX. This may occur on receipt of the return result APDU. Alternatively, the signalling connection may be retained for other applications, if appropriate.

7.5.1.1.2 Interrogation

In state MWI-Mc-idle, on receipt of a mwilInterrogate invoke APDU using the call reference of a call-independent signalling connection (as specified in CorNet-NQ chapter 5.1.1) and if the interrogation is possible, the Message Centre PINX shall get the status of SS-MWI, send back a mwilInterrogate return result APDU to the Served User PINX and stay in MWI-Mc-Idle.

7.5.1.1.3 <<<NQ: Callback Call after SS-MWI

In state MWI-Mc-Idle, the Message Centre PINX may receive a mwcbExecute invoke APDU in a SETUP message, indicating that this call is a call back call to a previously sent SS-MWI. For further actions to be taken by the Message Centre PINX, refer to section 7.6 "Interactions with other Services"

NOTE:

If no mwcbExecute invoke APDU is received in the SETUP message (e.g. from an other vendor's QSIG PINX), normal Basic Call treatment according to CorNet-NQ chapter 4 shall apply. >>>.

7.5.1.2 Exceptional procedures

7.5.1.2.1 Activation/Deactivation

In state MWI-Mc-Wait, on receipt of a mwiActivate/mwiDeactivate return error or reject APDU from the Served User PINX, the Message Centre PINX shall stop timer T1 and enter state MWI-Mc-Idle.

If timer T1 expires, the Message Centre PINX shall enter state MWI-Mc-Idle.

Note

The Message Centre PINX should indicate rejection to the Message Centre entity.

The Message Centre PINX is responsible for clearing the call independent signalling connection towards the Served User PINX. This may occur on receipt of a return error or ~~reject~~-APDU or on timer T1 expiry. Alternatively, the signalling connection may be retained for other applications, if appropriate.

7.5.1.2.2 Interrogation

On receipt of a mwiInterrogate invoke APDU ~~in a SETUP message~~ using the call reference of a call-independent signalling connection (as specified in 5.1.1 of CorNet-NQ) and if the interrogation is not possible, the Message Centre PINX shall send back a mwiInterrogate return error or ~~reject~~-APDU to the Served User PINX.

7.5.2 Actions at the Served User PINX

The SDL representation of procedures at the Served User PINX is shown in annex B.

7.5.2.1 Normal procedures**7.5.2.1.1 Activation/Deactivation**

On receipt of a mwiActivate/mwiDeactivate invoke APDU ~~in a SETUP message~~ <<<NQ: optionally containing mwiActivateExt/mwiDeactivateExt >>> using the call reference of a call-independent signalling connection (as specified in chapter 5.1.1 of CorNet-NQ) and if the activation/deactivation is possible, the Served User PINX shall activate/deactivate SS-MWI and send back a mwiActivate/mwiDeactivate return result APDU <<<NQ: with mwiResultExt if mwiActivateExt/mwiDeactivateExt was received >>> to the Message Centre PINX and remain in MWI-Ser-Idle.

7.5.2.1.2 Interrogation

On receipt of an interrogation request from the Served user, the Served User PINX shall send a mwiInterrogate invoke APDU to the Message Centre PINX using the call reference of a call-independent signalling connection. The call-independent signalling connection shall be established (or used, if an appropriate connection is already available) in accordance with the procedures specified in chapter 5.1.1 of CorNet-NQ. The Served User PINX shall start timer T2 and enter the MWI-Ser-Wait state. The mwiInterrogate invoke APDU shall contain the PISN number of the Served User.

In state MWI-Ser-Wait, on receipt of a mwiInterrogate return result APDU, the Served User PINX shall stop timer T2, and enter state MWI-Ser-Idle.

Note

The Served User PINX should indicate the result to the Served User.

The Served User PINX is responsible for clearing the call independent signalling connection towards the Message Centre PINX. This may occur on receipt of a return result APDU. Alternatively, the signalling connection may be retained for other applications, if appropriate.

7.5.2.1.3 <<<NQ: Callback Call after SS-MWI

The Served User may choose to be connected with the Message Centre entity which has activated SS-MWI against the Served User before. For this reason, a Basic Call SETUP shall be established in state MWI-Ser-Idle by the Served User PINX to the Message Centre PINX which shall contain a mwcbExecute invoke APDU according to the procedures defined in chapter 5.1.1 of CorNet-NQ specification. The Called party Number Information element shall be taken from the msgCentrelid which was received within the

mwiActivate invoke APDU during SS-MWI Activation. >>>

7.5.2.2 Exceptional procedures

7.5.2.2.1 Activation/Deactivation

On receipt of a mwiActivate/mwiDeactivate invoke APDU and if the activation/deactivation request cannot be accepted, the Served User PINX shall send a mwiActivate/mwiDeactivate return error APDU with an appropriate error value and remain in state MWI-Ser-Idle.

7.5.2.2.2 Interrogation

In state MWI-Ser-Wait, on receipt of a mwilInterrogate return error or ~~reject~~ APDU from the Message Centre PINX, the Served User PINX shall stop timer T2 and enter state MWI-Ser-Idle.

If timer T2 expires, the Served User PINX shall enter MWI-Ser-Idle.

NOTE

The Served User PINX should indicate rejection to the served user.

The Served User PINX is responsible for clearing the call independent signalling connection towards the Message Centre PINX. This may occur on receipt of a return ~~error result~~ APDU or on expiry of timer T2. Alternatively, the signalling connection may be retained for other applications, if appropriate.

7.5.3 Actions at a Transit PINX

Not applicable.

7.6 Protocol interactions between SS-MWI and other supplementary services and ANFs

Note

Simultaneous conveyance of APDUs for SS-MWI and another supplementary services or ANFs in the same message, each in accordance with the requirements of its respective stage 3 Standard, does not, on its own, constitute a protocol interaction.

7.6.1 Identification Services (SS-CLIP, SS-COLP, SS-CLIR)

No Interaction.

7.6.2 Calling/Connected Name Identification Presentation/Restriction (SS-CNIP, SS-CONP, SS-CNIR)

No Interaction.

7.6.3 Call Transfer (SS-CT)

No Interaction.

7.6.4 Call Diversion (SS-DIV)

No interaction.

NOTE

A MWI should be not redirected to the diverted-to user. The indication may be given to the Served User.

7.6.5 Call Completion on Busy Subscriber (SS-CCBS)

No interaction.

7.6.6 Call Completion on No Reply (SS-CCNR)

No interaction.

7.6.7 Call Offer (SS-CO)

No interaction.

7.6.8 Call Intrusion (SS-CI)

No interaction.

7.6.9 Do not Disturb (SS-DND) / Do Not Disturb Override (SS-DNDO)

No interaction.

7.6.10 Path Replacement (ANF-PR)

No interaction.

7.6.11 Recall (SS-RE)

No interaction.

7.6.12 Call Interception (ANF-CINT)

No interaction.

7.6.13 Cordless Terminal Location Registration (SS-CTLR)

No interaction.

NOTE

A MWI may be directed to the new location.

7.6.14 Cordless Terminal Authentication (SS-CTAT)

No interaction.

7.6.15 Outgoing CTM Call handling (SS-CTMO)

No interaction.

7.6.16 <<<NQ: Hold/Enquiry/Alternating

No interaction.

7.6.17 Advice of Charge

No interaction.

7.6.18 ANF- Billing

No interaction

7.6.19 ANF - Identification of Calls (ANF-IOC)

No interaction.

7.6.20 Routing Information (ANF-RI)

No interaction.

7.6.21 Chief/Secretary (SS-C/S)

No interaction.

7.6.22 Call Waiting

No interaction.

7.6.23 Conference

No interaction.

7.6.24 Common Information (ANF-CMN)

Refer to CorNet-NQ chapter 9.7 "Common Information".

7.6.25 Feature Negotiation (ANF-FN)

Refer to CorNet-NQ chapter 9.9 "Feature Negotiation". >>>

7.7 SS-MWI Parameter values (timers)

7.7.1 Timer T1

Timer T1 shall operate at the Message Centre PINX during state MWI-Mc-Wait. Its purpose is to protect against an absence of response to the mwiActivate or mwiDeactivate invoke APDU.

Timer T1 shall have value not less than 15 seconds.

7.7.2 Timer T2

Timer T2 shall operate at the Served User PINX during state MWI-Ser-Wait. Its purpose is to protect against an absence of response to the mwiInterrogate invoke APDU.

Timer T2 shall have a value not less than 15 seconds.

7.8 SS-MWI Impact of interworking with public ISDNs

The SS-MWI procedures specified in this standard are compatible with the public ISDN procedures for the T reference point. When interworking with public ISDN, a Gateway PINX shall perform the procedures specified below.

Note

The interrogation function is not supported in the corresponding public ISDN service.

7.8.1 Incoming Gateway PINX procedures

If a MWI activation or deactivation request is received from the public ISDN, the Incoming Gateway PINX shall translate the received APDU and convert it into a mwiActivate or mwiDeactivate invoke APDU and the procedures specified in 7.5.1 or 7.5.2 shall applied.

The Incoming Gateway PINX shall translate the mwiActivate or mwiDeactivate return result APDU received from the Served User PINX into corresponding information and send it to the public ISDN.

7.8.2 Outgoing Gateway PINX procedures

The Outgoing Gateway PINX shall translate the mwiActivate or the mwiDeactivate invoke APDU and send it to the public ISDN according to the procedures for the T reference point.

When receiving a response, the Outgoing Gateway PINX shall generate a mwiActivate or mwiDeactivate return result APDU (if the activation/deactivation was accepted) or a mwiActivate or mwiDeactivate return error APDU (if the activation/deactivation was rejected).

7.9 SS-MWI Impact of interworking with non-ISDNs

Not applicable.

7.10 <<<NQ: SS-MWI Impact of interworking with CorNet-N Networks

Interworking between CorNet-NQ and CorNet-N for SS-Message Waiting Indication shall follow the rules as defined in this section 7.10.

Mapping between CorNet-N Codeset 7 PNSF (57) "Message Waiting" and its additional information provided in octet 4 and the CorNet-NQ mwiActivate/Deactivate invoke APDU with mwiActivateExt/ mwiDeactivateExt is given in the following table 5.3.3 - 2.

Mapping of example Signalling flows between CorNet-N and CorNet-NQ SS-MWI is given in the figures 5.3.3 -1 to 5.3.3 - 6a.

TABLE 5.3.3 - 2: Mapping of MWI Activate / Deactivate codepoints

CorNet-N PNSF (57) octet 4 coding		<->	CorNet-NQ Coding	
Value	Name		mwiActivate.inv plus mwi- Activate- Ext value of type ENUMER- ATED:	mwiDeactivate.inv plus mwi- Deactivate- Ext value of type ENUMER- ATED:
0	Invocation, general - New MWI general with normal priority		0	
1	Cancellation, general - No MWI general at all			1
2	Invocation, voice mail - New VMS mail in mail- box with normal priority		2	
3	Cancellation, voicemail - no VMS mail in mailbox at all			3
4	Invocation, Phonemail		4	
5	Cancellation, Phonemail			5
6	Cancellation general by called side			6
7	New MWI general with high priority		7	
8	Only old MWI general		8	
9	New VMS mail in mail- box with high priority		9	
10	Only old VMS mail in mailbox		10	
11	New TCS mail in mailbox with normal priority		11	
12	No TCS mail in mailbox at all			12
13	New TCS mail in mailbox with high priority		13	
14	Only old TCS mail in mailbox		14	
15	New Generic Server mail in mailbox with normal priority ¹		15	

TABLE 5.3.3 - 2: Mapping of MWI Activate / Deactivate codepoints

CorNet-N PNSF (57) octet 4 coding		<->	CorNet-NQ Coding	
16	No generic server mail in mailbox at all ²			16
17	New Generic server mail in mailbox with high priority ³		17	
18	Only old Generic Server mail in mailbox		18	
19	New VMX mail in mailbox		19	
20	No VMX mail in mailbox			20

1. If no mwiActivateExt is received, the Gateway PINX shall mapp to a PNSF 57/15 as default (or alternatively to a PNSF 57/17, if the priority received in mwiActivate is received indicating high priority; network administration matter).
2. If no mwiDeactivateExt is received from CorNet-NQ/QSIG, the Gateway PINX shall mapp to PNSF 57/16 as default.
3. If no mwiActivateExt is received, the Gateway PINX shall mapp to a PNSF 57/15 as default (or alternatively to a PNSF 57/17, if the priority received in mwiActivate is received indicating high priority; network administration matter).

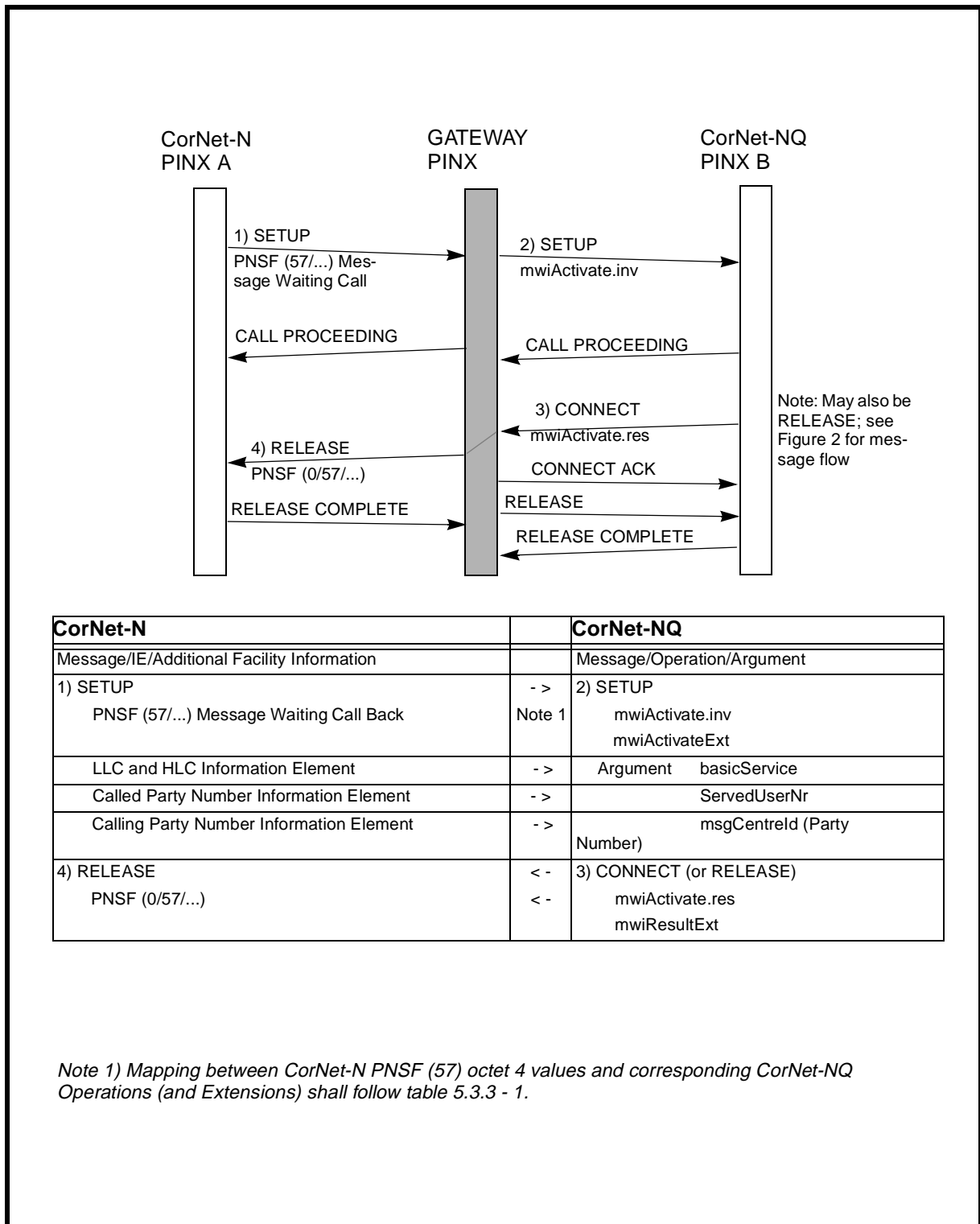


Figure 5.3.3 - 1: Activation of SS-MWI (Call from CorNet-N to CorNet-NQ)

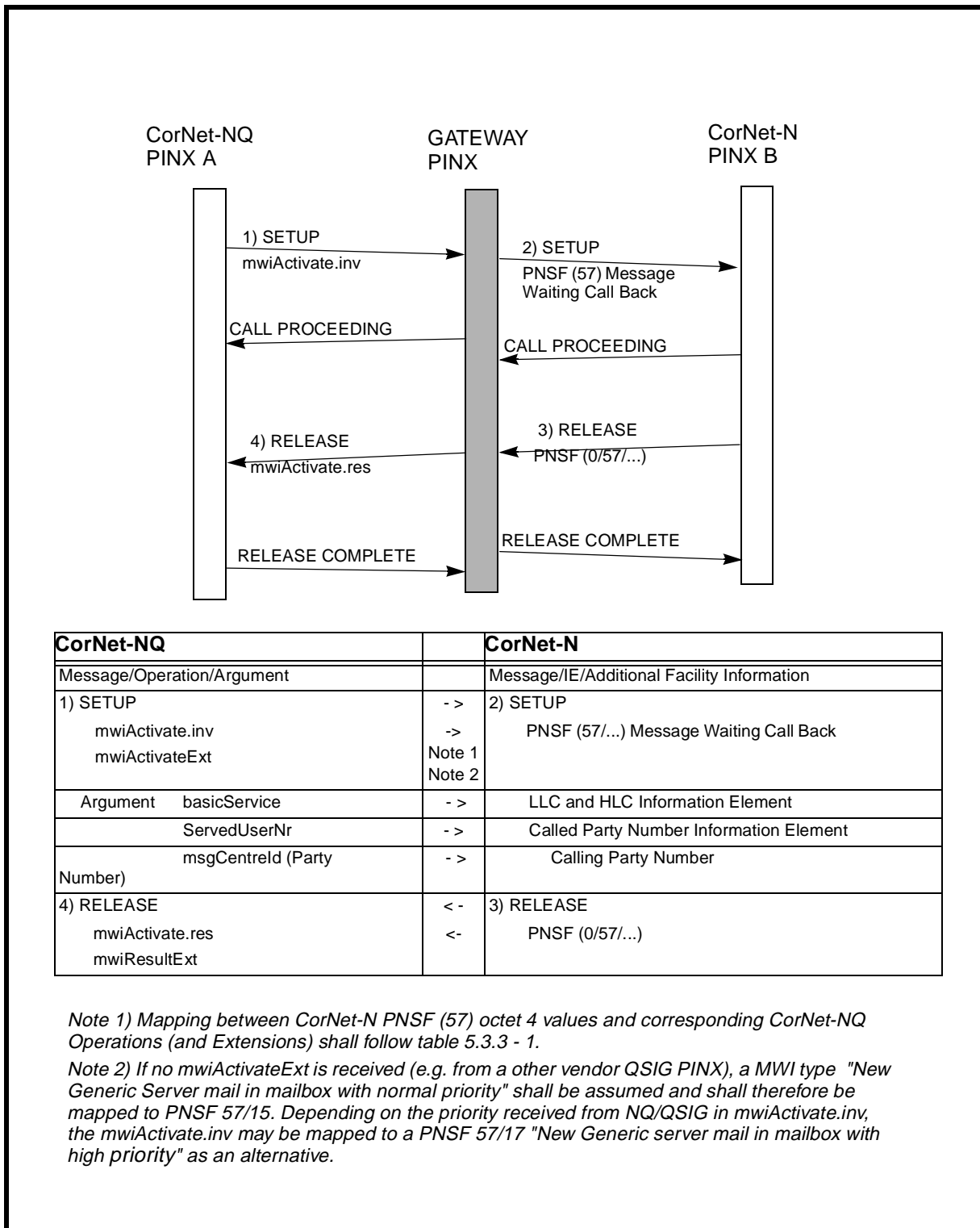


Figure 5.3.3 - 1a: Activation of SS-MWI (Call from CorNet-NQ to CorNet-N)

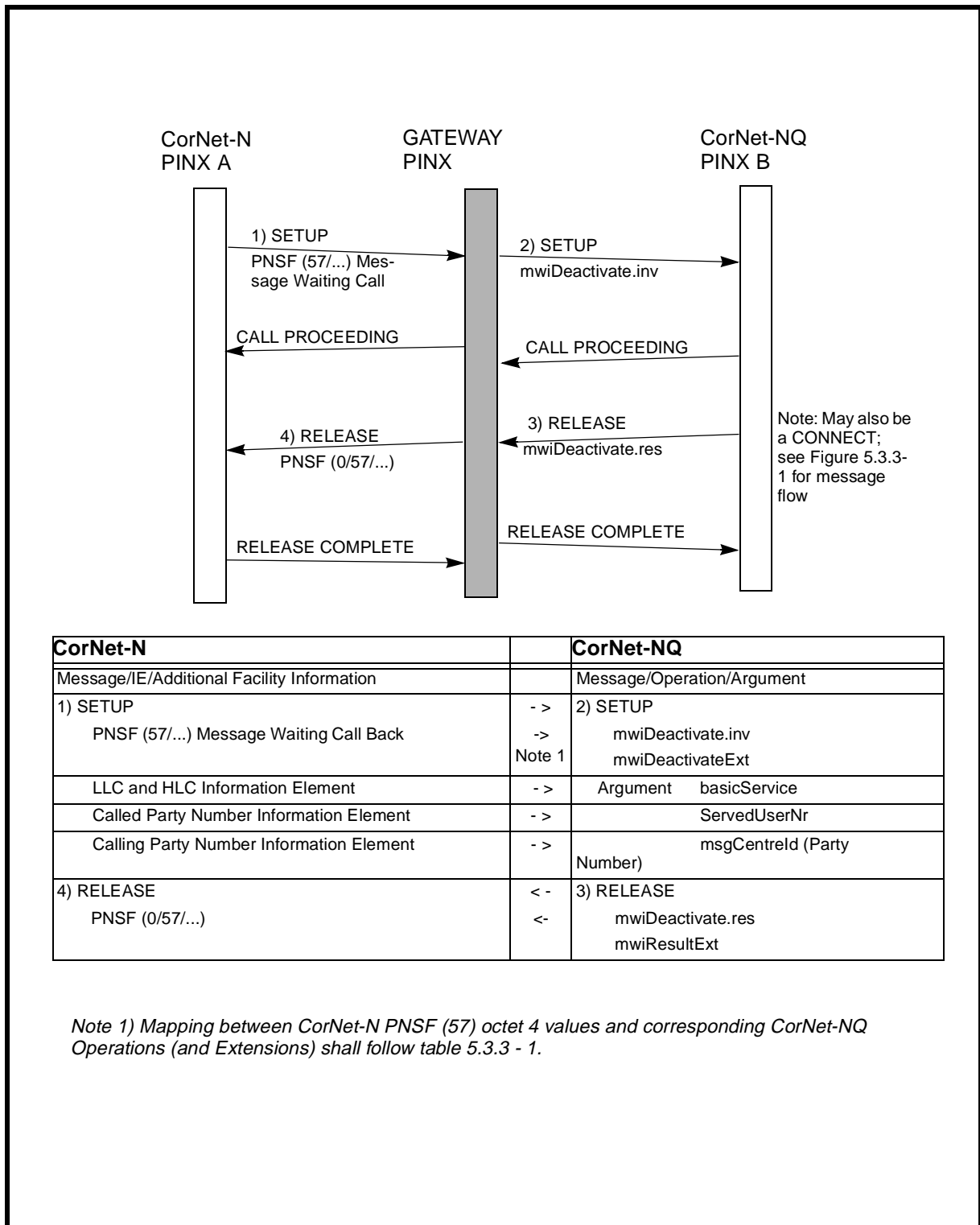


Figure 5.3.3 - 2: Deactivation of SS-MWI (Call from CorNet-N to CorNet-NQ)

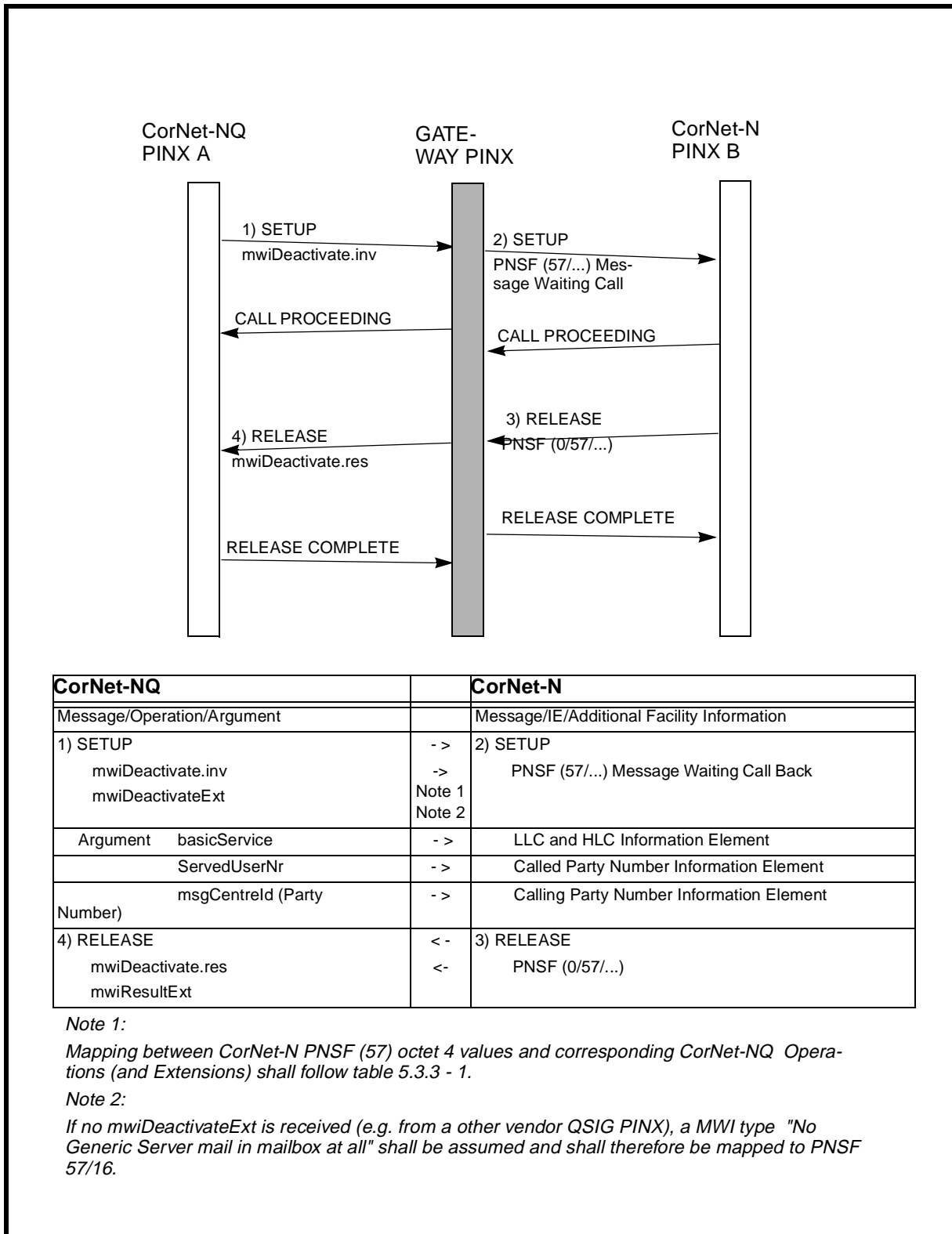
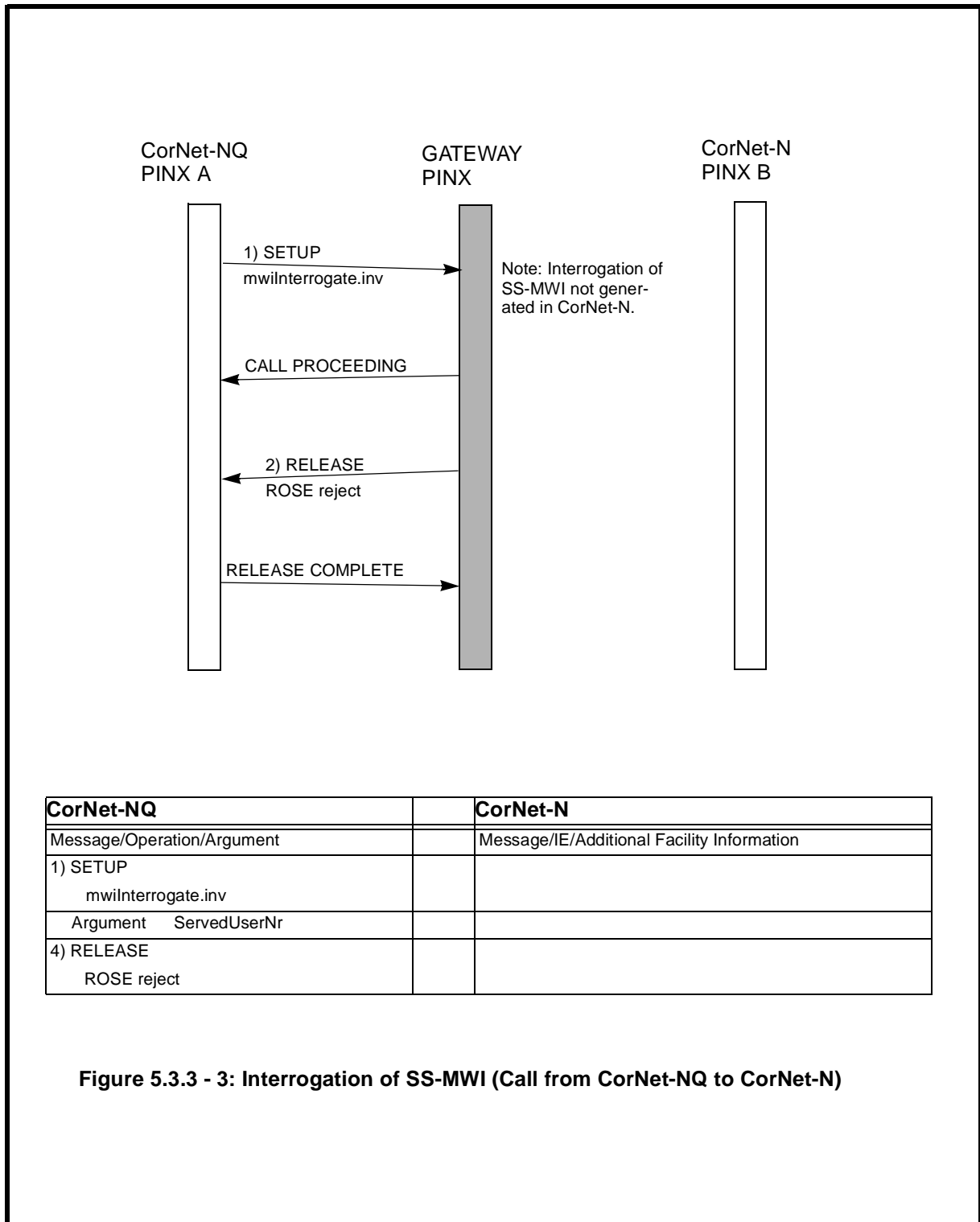


Figure 5.3.3 - 2a: Deactivation of SS-MWI (Call from CorNet-NQ to CorNet-N)



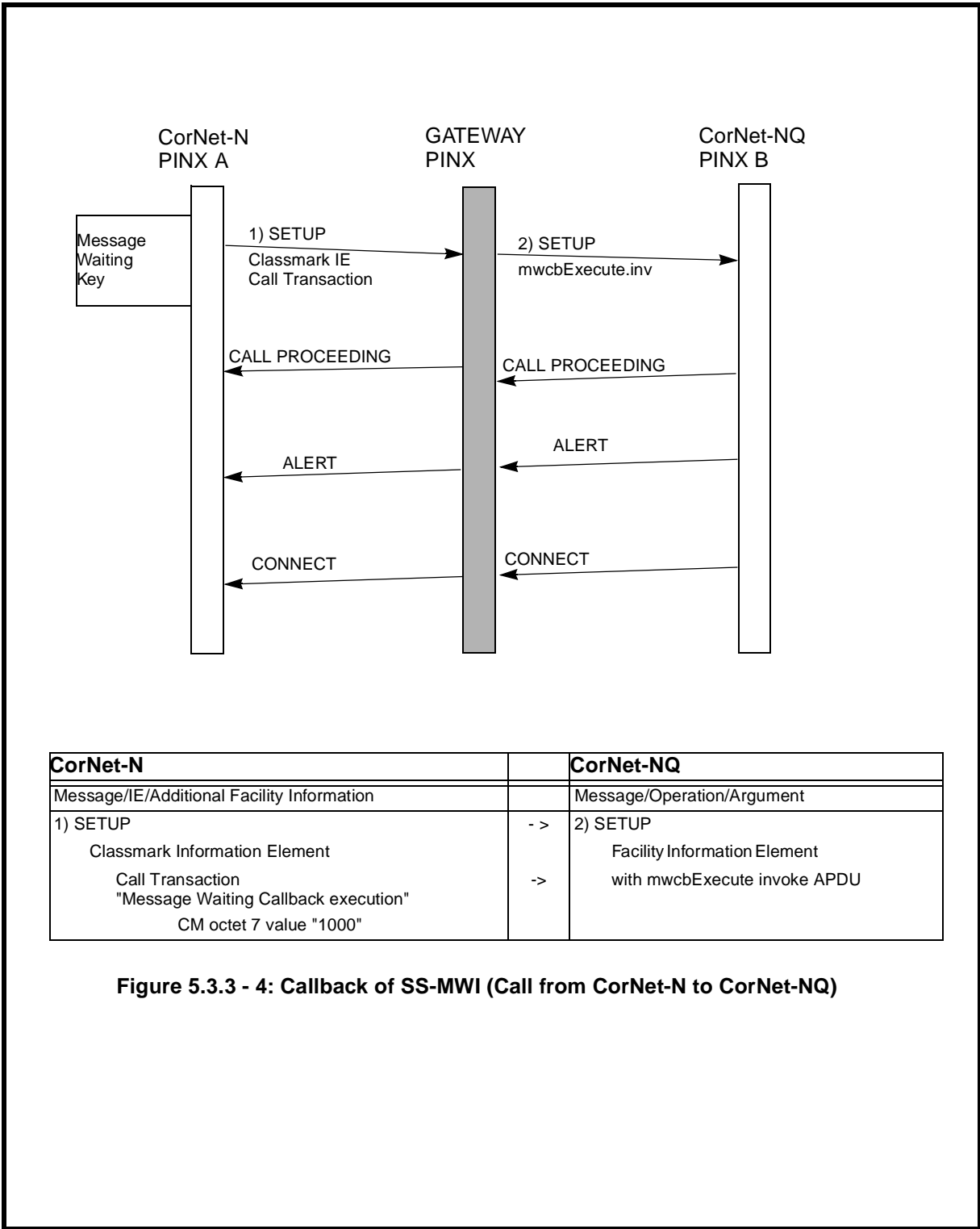
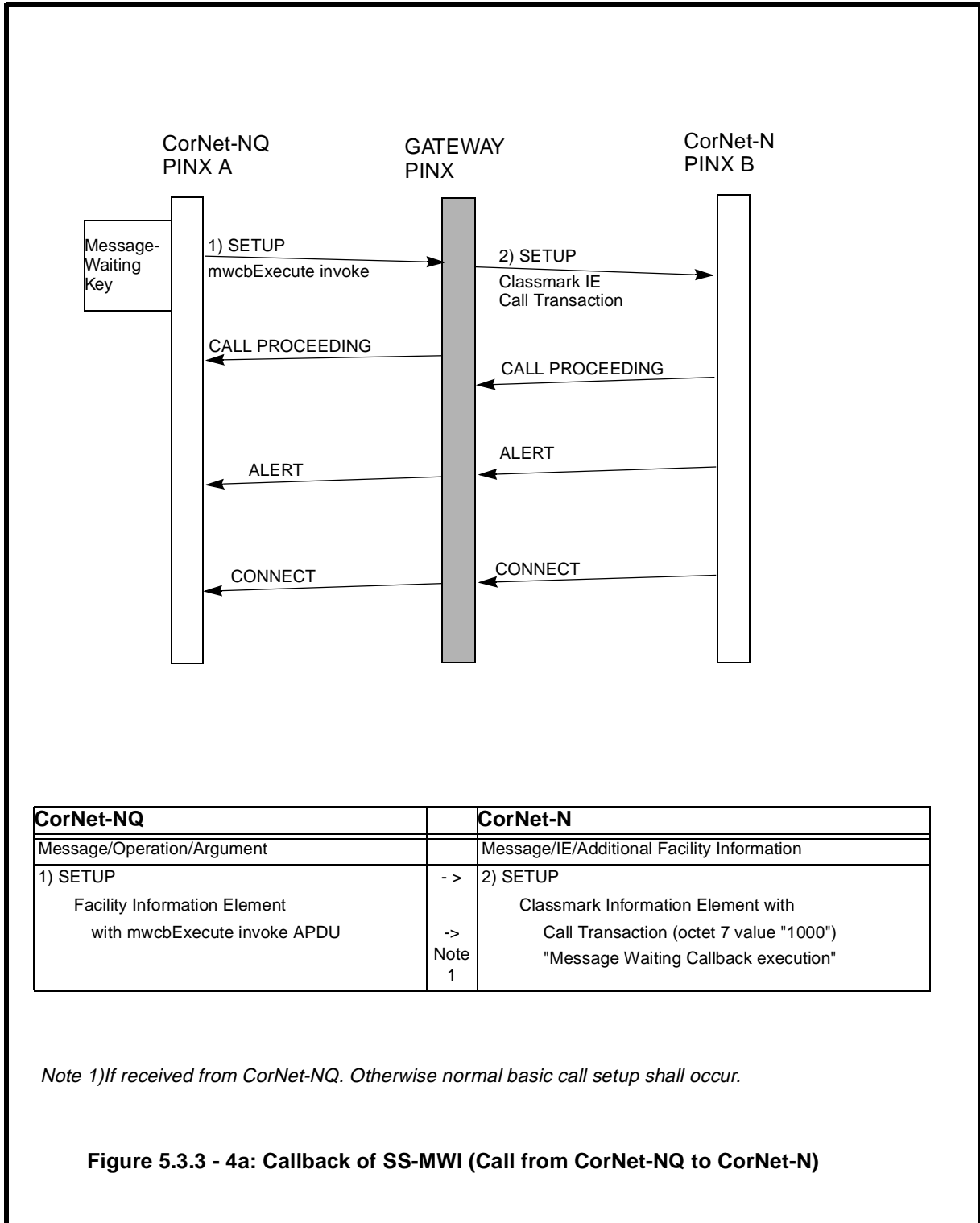


Figure 5.3.3 - 4: Callback of SS-MWI (Call from CorNet-N to CorNet-NQ)



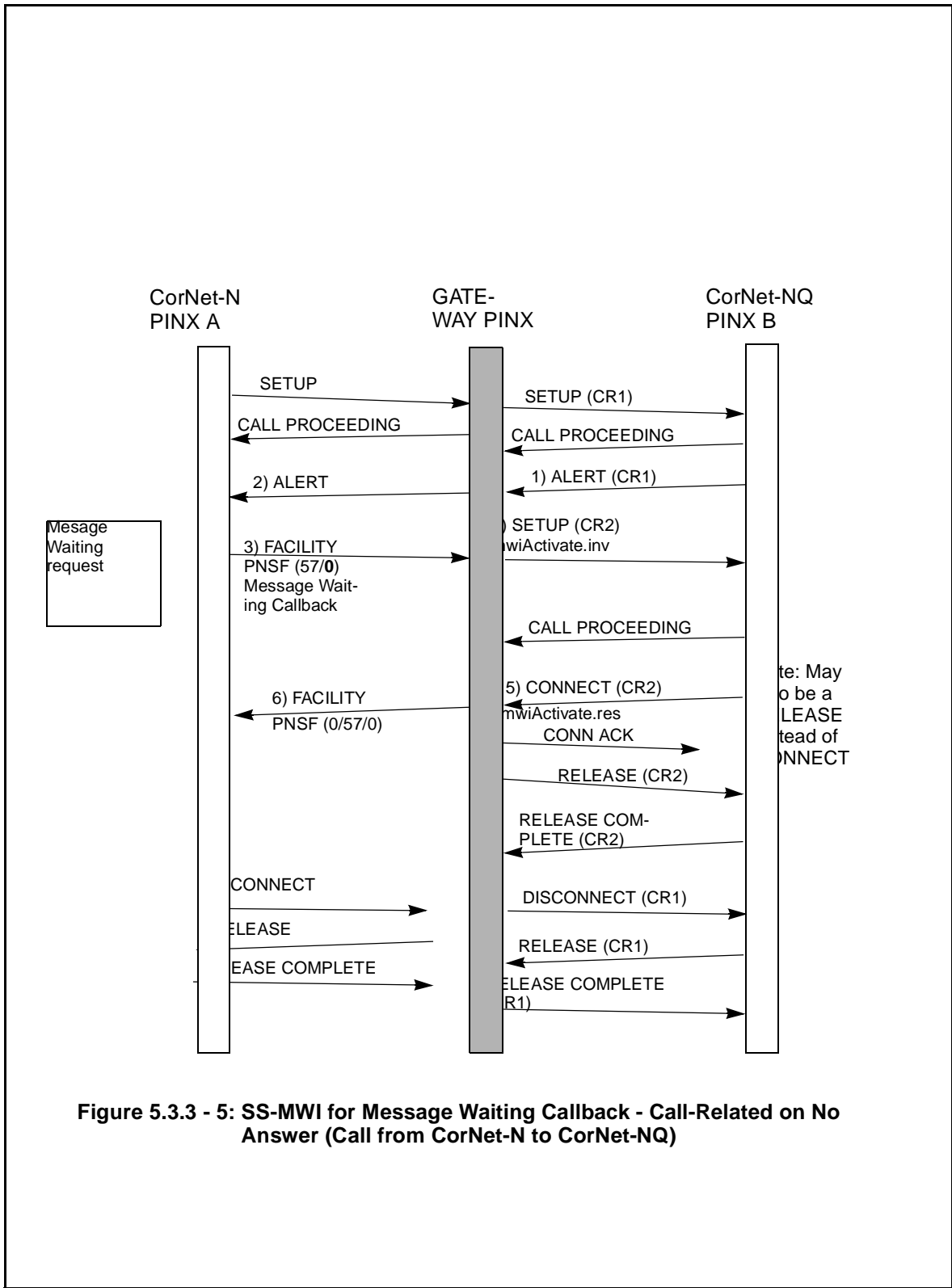


Figure 5.3.3 - 5: SS-MWI for Message Waiting Callback - Call-Related on No Answer (Call from CorNet-N to CorNet-NQ)

CorNet-N		CorNet-NQ
Message/IE/Additional Facility Information		Message/Operation/Argument
2) ALERT	<-	1) ALERT
CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available"	<- Note 1	Facility IE with CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available" embedded in CorNet-N Transport operation
	<- Note 1	Facility IE with Common Information (NQ Feature List - backwards direction) indicating CorNet-NQ variant of MWI possible.
3) FACILITY PNSF (57/0) Message Waiting Call Back / Invocation general	-> ->	4) SETUP (CR2) mwiActivate.inv mwiActivateExt invokeMWIGeneral (0)
	-> Note 2	Argument basicService
	-> Note 2	ServedUserNr
	-> Note 2	msgCentreId (Party Number)
6) FACILITY PNSF (0/57/0)	<- <-	5) CONNECT (or RELEASE) mwiActivate.res mwiResultExt invokeMWIGeneral (0)

Note 1)

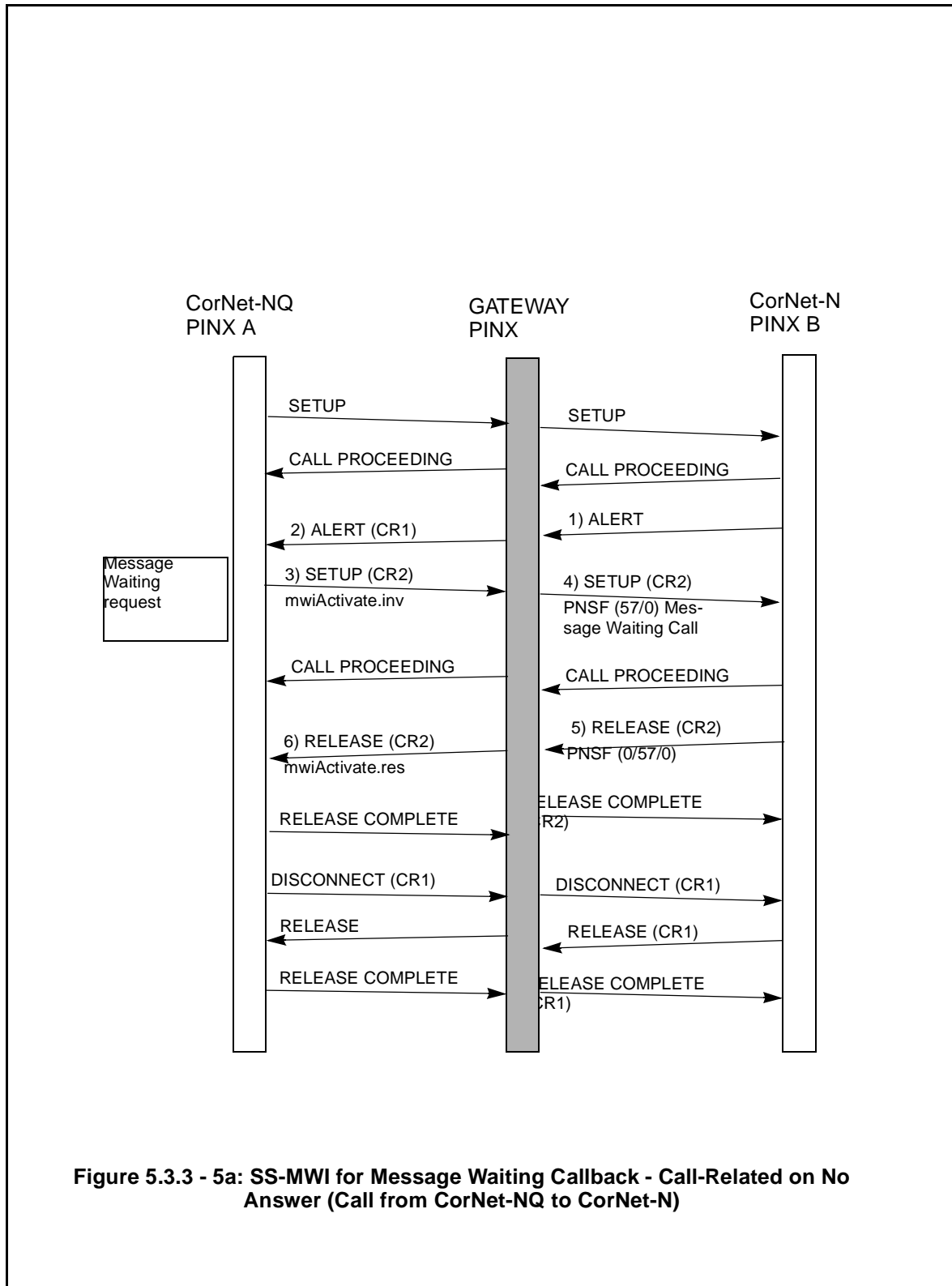
ISPBX B supports both, CorNet-N variant and CorNet-NQ variant of MWI. Since the Gateway PINX is capable of feature interworking for MWI, the CorNet-NQ variant of this feature is invoked in the no. 4 SETUP message.

If PINX B would support MWI only the CorNet-N variant, the indication in the NQ Feature List (Common Information ANF) would be set to FALSE. In this case, MWI is still possible using PNSF MWI Information element embedded in CorNet-N Transport operation. For more details regarding Feature Negotiation, refer to CorNet-NQ chapter 9.9.

Note 2)

LLC, HLC, Calling and Called party Number IE has to be stored in the Gateway PINX from the first SETUP message.

Figure 5.3.3 - 5 continued

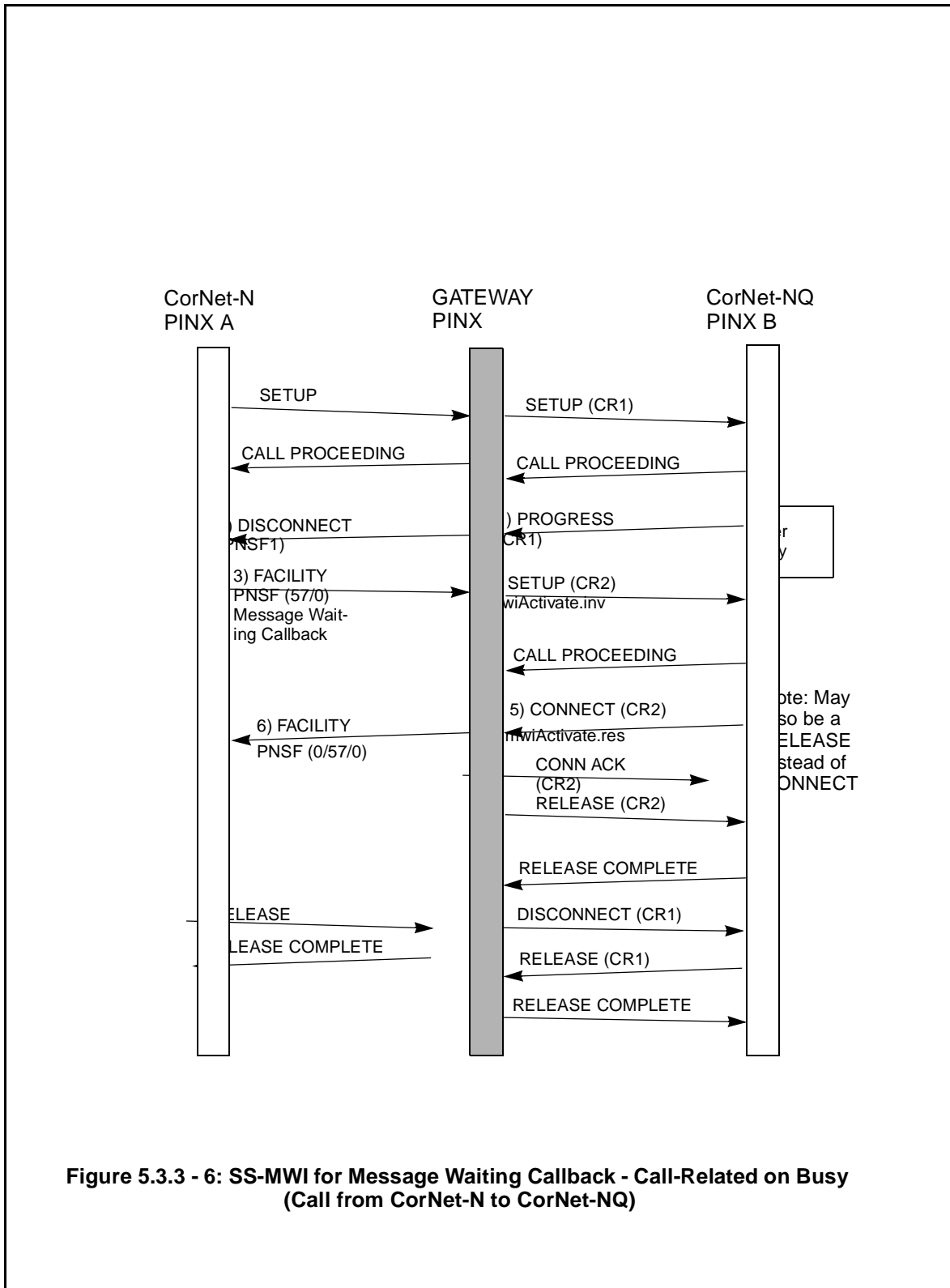


CorNet-NQ		CorNet-N
Message/Operation/Argument		Message/IE/Additional Facility Information
2 ALERT	< -	1) ALERT
Facility IE with CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available" embedded in CorNet-N Transport operation	< -	CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available"
Facility IE with Common Information (NQ Feature List - backwards direction) indicating CorNet-NQ variant of MWI possible.	< - Note 1	
gatewayInfo invoke APDU (optional) Note 2		
3) SETUP mwiActivate.inv mwiActivateExt invokeMWIGeneral (0) gatewayInfo invoke APDU (optional)	- > ->	4) SETUP PNSF (57/0) Message Waiting Call Back / Invocation general
Argument basicService	- >	LLC and HLC Information Element
ServedUserNr	- >	Called Party Number Information Element
Number) msgCentreId (Party	- >	Calling Party Number Information Element
6) RELEASE mwiActivate.res mwiResultExt invokeMWIGeneral (0)	< - <-	5) RELEASE PNSF (0/57/0)

Note 1)
In this example, the gateway PINX can perform feature interworking for MWI. Therefore, the CorNet-NQ Feature list is set accordingly and the MWI request in the no. 3 SETUP is sent using the CorNet-NQ variant of MWI. For more details, refer to CorNet-NQ chapter 9.9 "Feature Negotiation"

Note 2)
gatewayInfo invoke APDU optionally sent in ALERT, to enable the Originating PINX to route the no. 3 SETUP through the original Gateway. This is especially then required, if the CorNet-N network does not support MWI request in a new SETUP. The Gateway PINX may then send the MWI request on the existing call reference in FACILITY.

Figure 5.3.3 - 5a continued



CorNet-N		CorNet-NQ
Message/IE/Additional Facility Information		Message/Operation/Argument
2) DISCONNECT (PNSF(1))		1) PROGRESS
CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available"	< - Note 1	Facility IE with CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available" embedded in CorNet-N Transport operation
	< - Note 1	Facility IE with Common Information (NQ Feature List - backwards direction) indicating CorNet-NQ variant of MWI possible.
3) FACILITY PNSF (57/0) Message Waiting Call Back	- > ->	4) SETUP (CR2) mwiActivate.inv mwiActivateExt invokeMWIGeneral (0)
	- > Note 2	Argument basicService
	- > Note 2	ServedUserNr
	- > Note 2	msgCentreId (Party Number)
6) FACILITY PNSF (0/57/0)	< -	5) CONNECT (or RELEASE) mwiActivate.res mwiResultExt invokeMWIGeneral (0)

Note 1)

PINX B supports both CorNet-N variant and CorNet-NQ variant of MWI. Since the Gateway PINX is capable of feature interworking for MWI, the CorNet-NQ variant of this feature is invoked in the no. 4 SETUP message.

If PINX B supports only the CorNet-N variant of MWI, the indication in the CorNet-NQ Feature List (Common Information ANF) would be set to FALSE. In this case, MWI is still possible using PNSF MWI Information element embedded in CorNet-N Transport operation. For more details regarding Feature Negotiation refer to CorNet-NQ chapter 9.9

Note 2)

LLC, HLC, Calling and Called Party Number has to be stored in the Gateway PINX from the first SETUP message.

Figure 5.3.3 - 6 continued

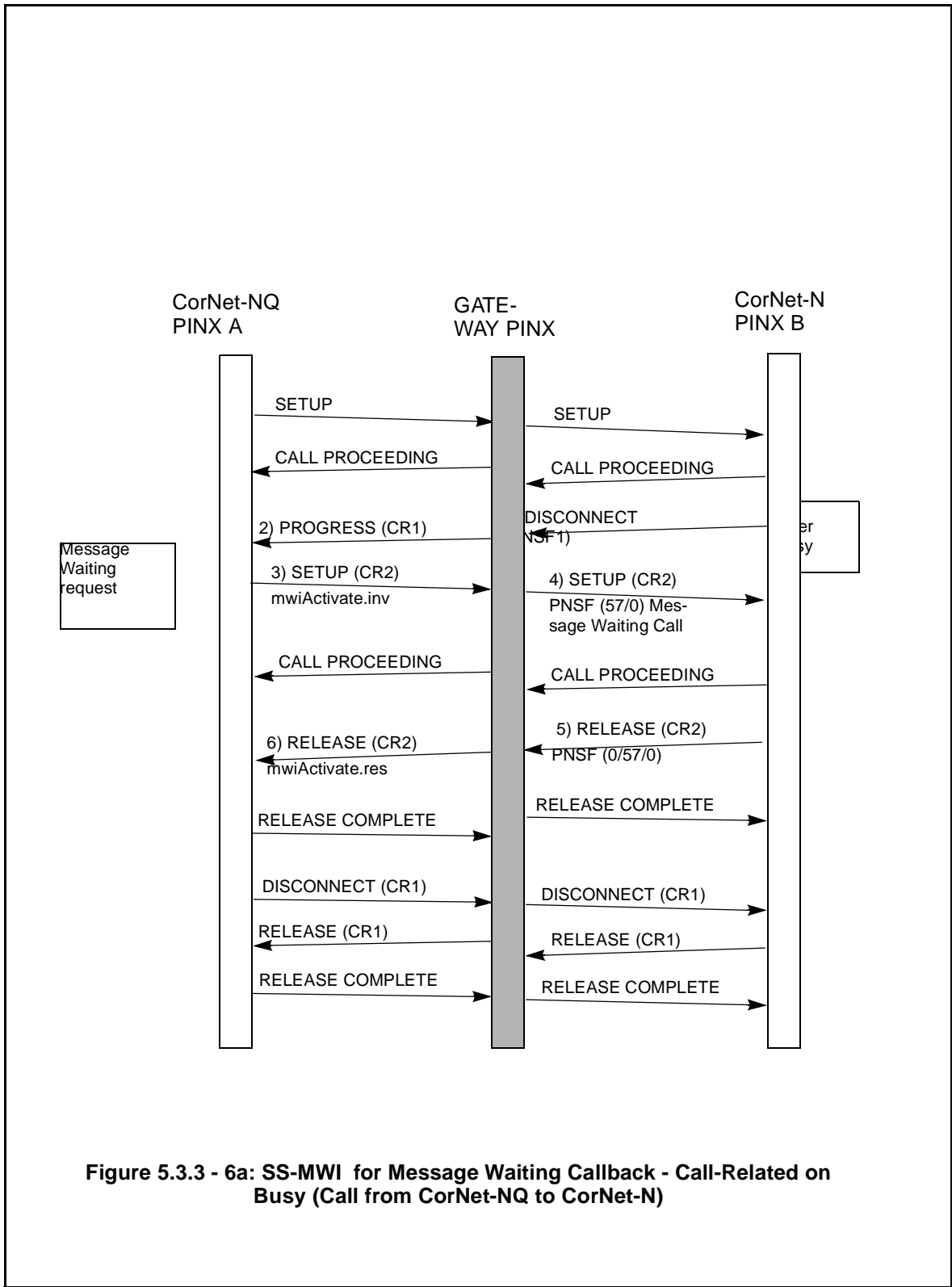


Figure 5.3.3 - 6a: SS-MWI for Message Waiting Callback - Call-Related on Busy (Call from CorNet-NQ to CorNet-N)

CorNet-NQ		CorNet-N
Message/Operation/Argument		Message/IE/Additional Facility Information
2) PROGRESS	< -	1) DISCONNECT (PNSF (1))
Facility IE with CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available" embedded in CorNet-N Transport operation	< -	CM Feature Indicator octet 3b bit 5 "List of incoming calls or Message Waiting callback available"
Facility IE with Common Information (NQ Feature List - backwards direction) indicating CorNet-NQ variant of MWI possible.	< - Note 1	
gatewayInfo invoke APDU (optional) Note 2	< -	
3) SETUP mwiActivate.inv mwiActivateExt invokeMWIGeneral (0)	- >	4) SETUP PNSF (57/0) Message Waiting Call Back Invocation general (0)
Argument basicService	- >	LLC and HLC Information Element
ServedUserNr	- >	Called Party Number Information Element
Number) msgCentreId (Party	- >	Calling Party Number Information Element
gatewayInfo invoke APDU (optional)		
6) RELEASE mwiActivate.res mwiResultExt invokeMWIGeneral (0)	< -	5) RELEASE PNSF (0/57/0)

Note 1)
In this example, the gateway PINX can perform feature interworking for MWI. Therefore, the CorNet-NQ Feature list is set accordingly and the MWI request in the no 3 SETUP is sent using the CorNet-NQ variant of MWI. For more details, refer to CorNet-NQ chapter 9.7 "Feature Negotiation"

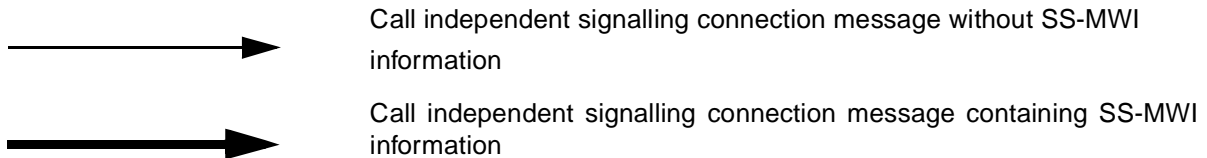
Note 2)
gatewayInfo invoke APDU optionally sent in PROGRESS, to enable the Originating PINX to route the no. 3 SETUP through the original Gateway. This is especially then required, if the CorNet-N network does not support MWI request in a new SETUP. The Gateway PINX may then send the MWI request on the existing call reference in FACILITY.

Figure 5.3.3 - 6a continued

Annex A: Examples of Message Sequences (informative)

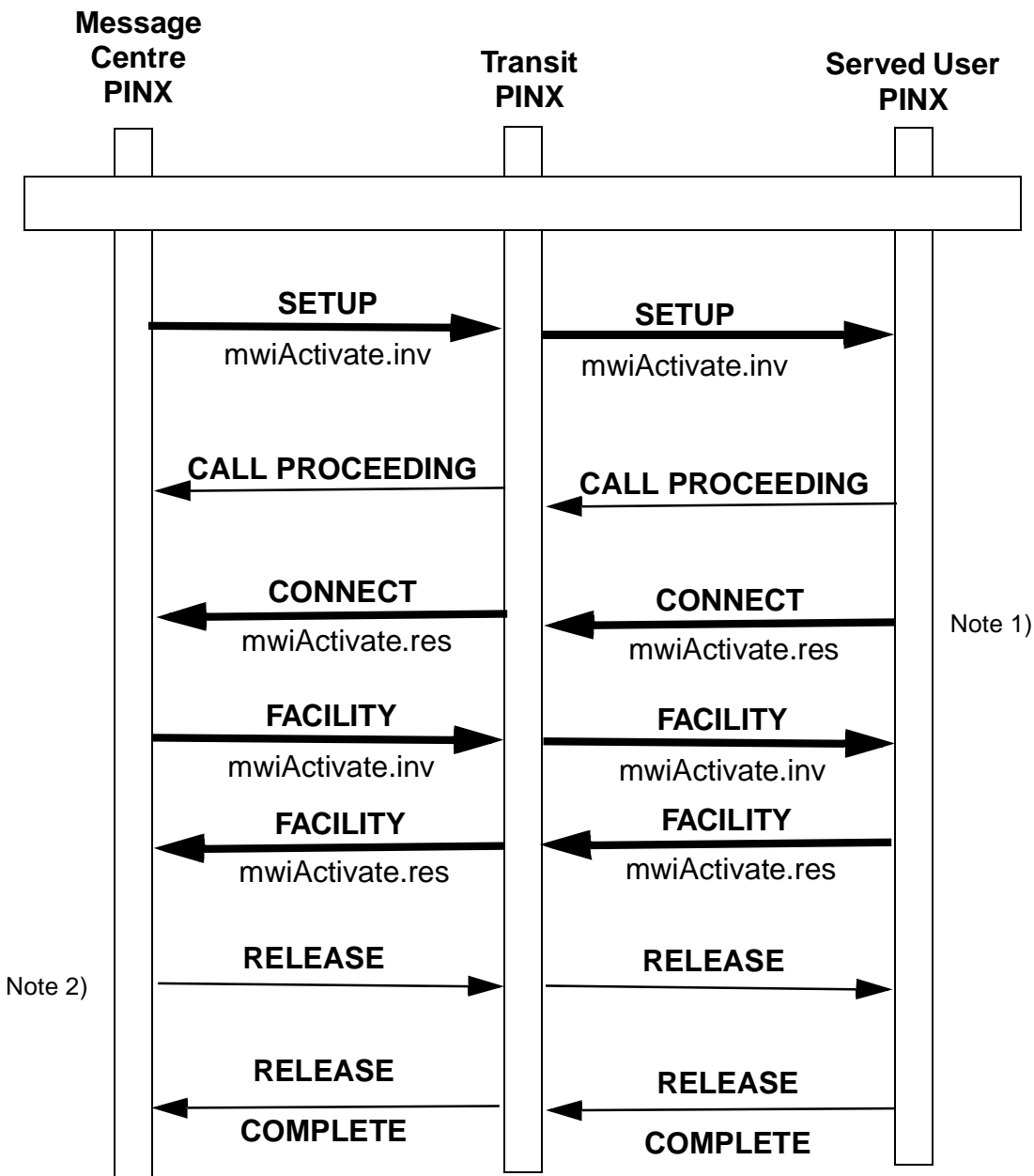
This annex A describes some typical message flows for SS-MWI. The following conventions are used in the figures of this annex.

1. The following notation is used:



2. The figures show messages exchanged via Protocol Control between PINXs involved in SS-MWI. Only messages relevant to SS-MWI are shown.
3. Only the relevant information content (e.g. remote operation APDUs, notifications, information elements) is listed below each message name. The Facility and Notification indicator information elements containing remote operation APDUs and notifications are not explicitly shown. Information with no impact on SS-MWI is not shown.
4. Some interactions with users are included in the form of symbolic primitives. The actual protocol at the terminal interface is outside the scope of this CorNet-NQ specification.

Figure 5.3.3-A1 shows an example of activation of SS-MWI where the connection is not cleared by the Message Centre PINX after the first activation of SS-MWI.

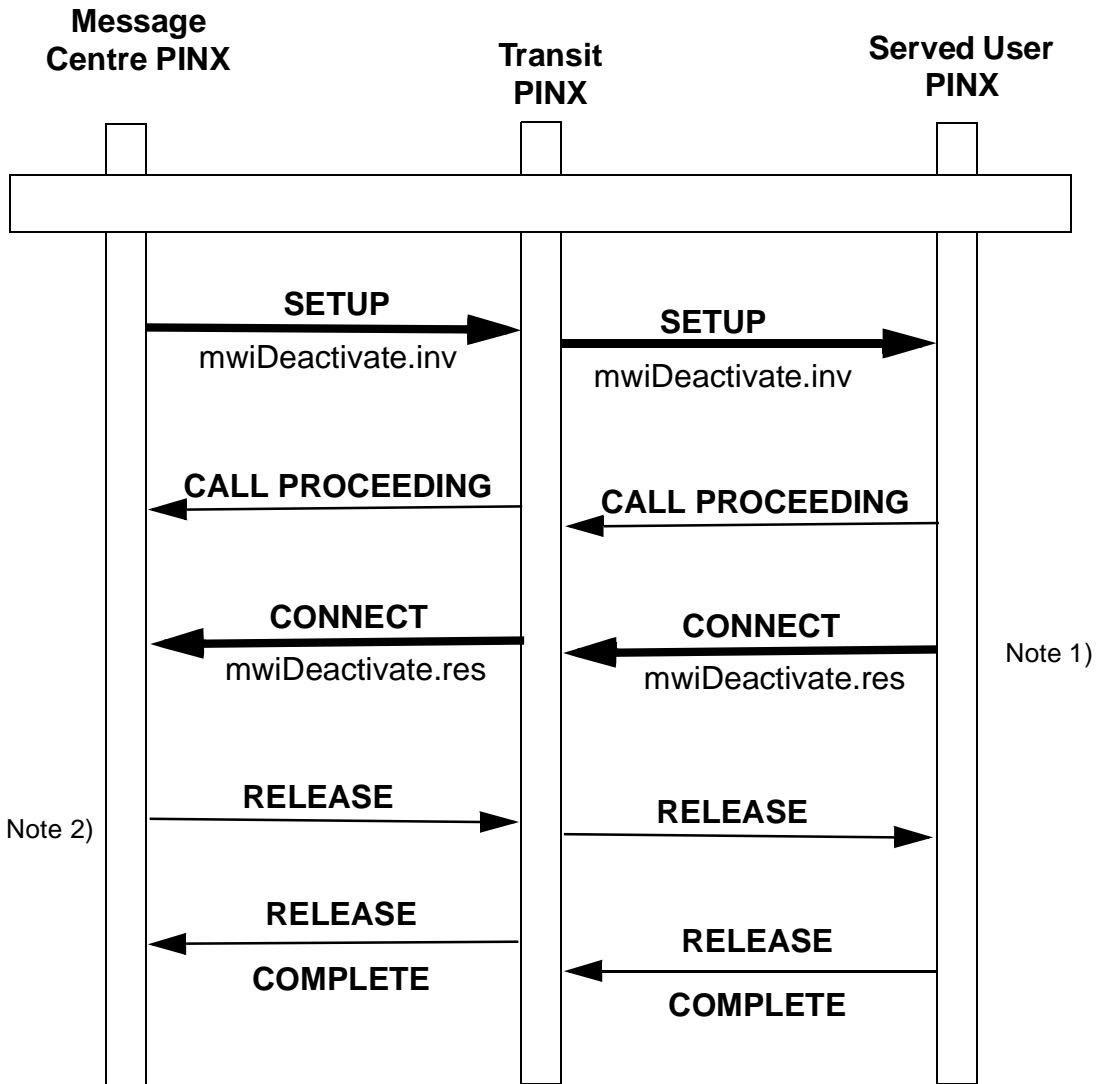


<<<NQ: Note 1: The mwiActivate.res may also be returned in a immediate RELEASE.

Note 2: The Message Centre PINX is responsible for call clearing. >>>

Figure 5.3.3 - A1 - Example of activation of SS-MWI (Connection Retention)

Figure 5.3.3-A2 shows an example of deactivation of SS-MWI.

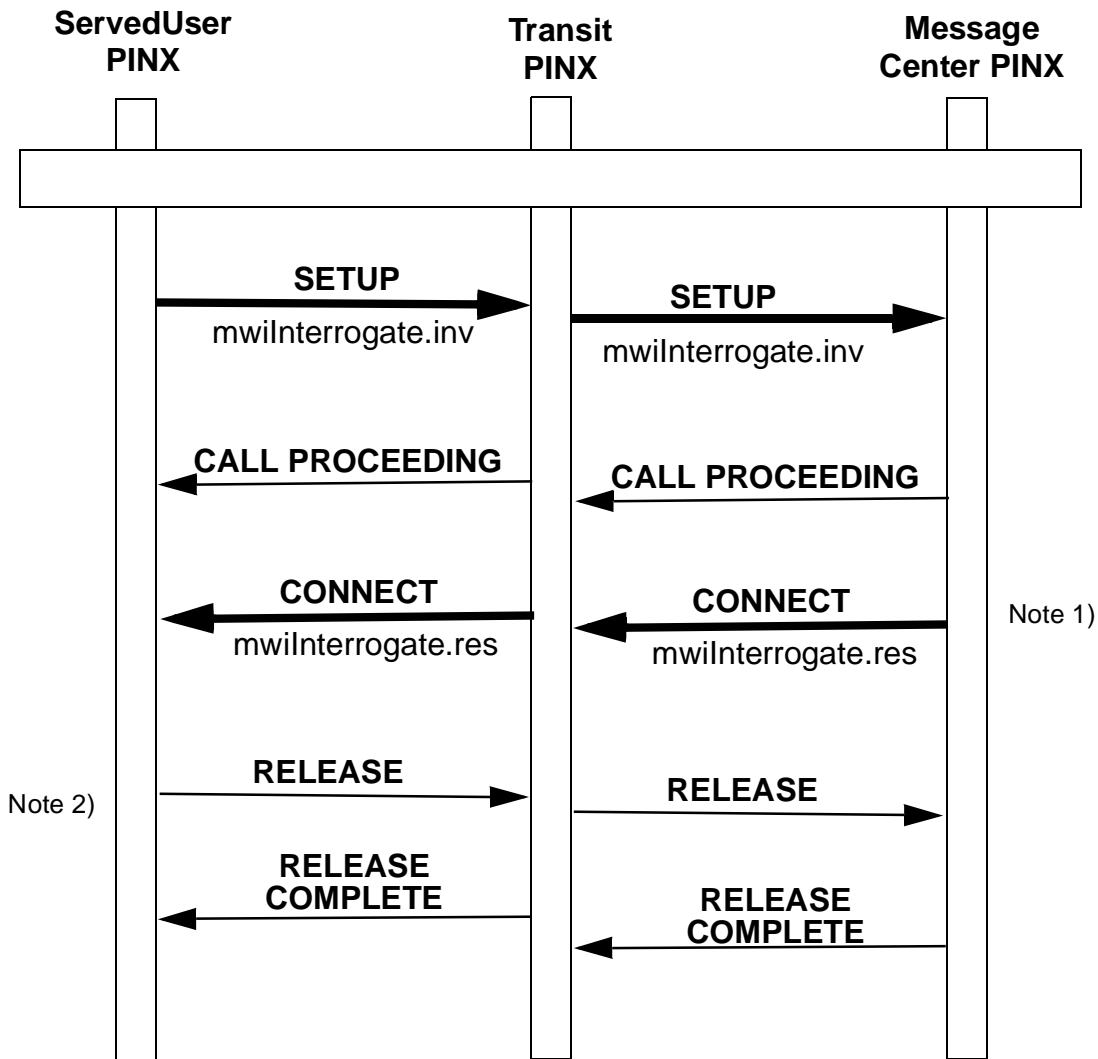


<<<NQ: Note 1: The mwiDeactivate.res may also be returned in a immediate RELEASE.

Note 2: The Message Centre PINX is responsible for call clearing. >>>>>>

Figure 5.3.3 - A2 - Example of deactivation of SS-MWI

Figure 5.3.3-A3 shows an example of interrogation of SS-MWI.

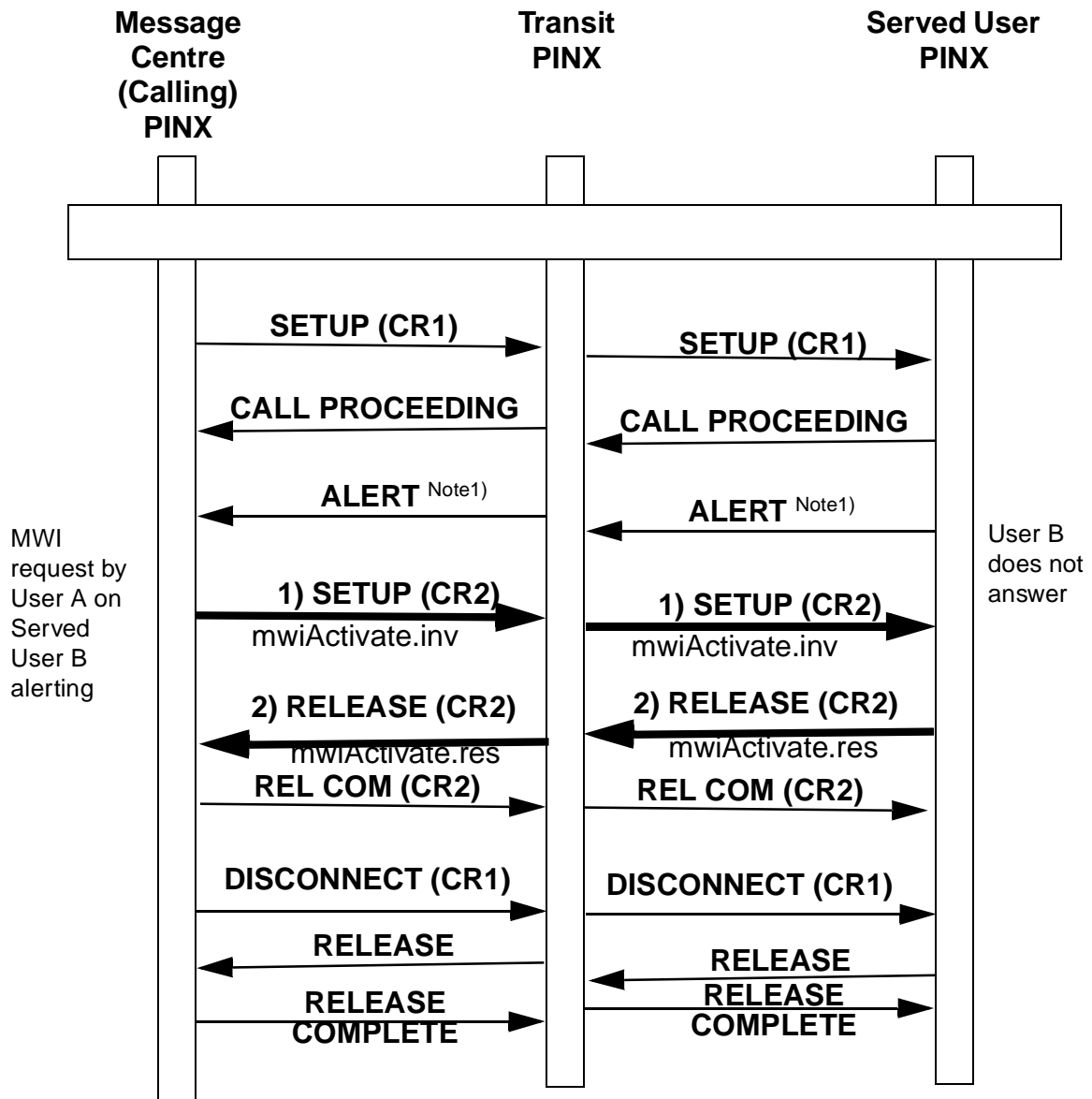


<<<NQ: Note 1: The mwilInterrogate.res may also be returned in a immediate RELEASE.

Note 2: The Served User PINX is responsible for call clearing. >>>>>

Figure 5.3.3 - A3 - Example of interrogation of SS-MWI

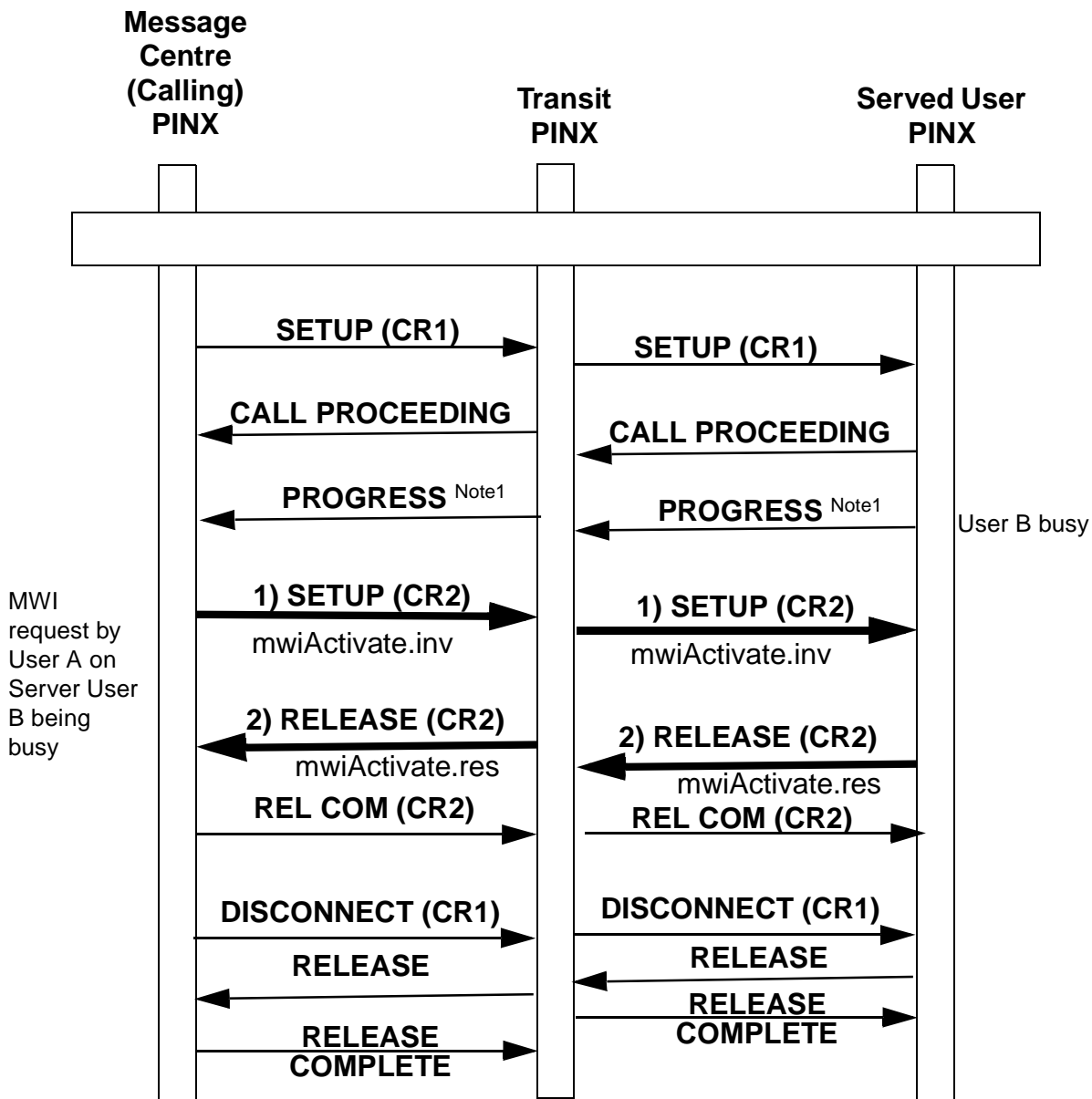
<<< CorNet-NQ:



Note 1: The Served User PINX indicates whether it is capable of MWI according to a) CorNet-N variant of MWI (indicated by setting CM octet 3b bit 5 in CNT), b) CorNet-NQ/QSIG variant of MWI (indicated by NQ Feature List (ANF Common Information) or c) both (indicated by both, CM and NQ Feature list).

Note 2: *mwiActivate.res* may also be returned in a CONNECT instead of RELEASE. The Message Centre (Calling) PINX is responsible for call clearing of CR2 as well as CR1.

Figure 5.3.3 - A4 - Example of SS-MWI for Message Waiting Callback - Call-Related on No Answer



Note 1: The Served User PINX indicates whether it is capable of MWI according to a) CorNet-N variant of MWI (indicated by setting CM octet 3b bit 5 in CNT), b) CorNet-NQ/QSIG variant of MWI (indicated by NQ Feature List (ANF Common Information) or c) both (indicated by both, CM and NQ Feature list).

Note 2: mwiActivate.res may also be returned in a CONNECT instead of RELEASE. The Calling (Message Centre) PINX is responsible to clear the CR2 and CR1.

Figure 5.3.3 - A5 - Example of SS-MWI for Message Waiting Callback- Call-Related on Busy

>>>

Annex B: SDLs (Informative)

Specification and Description Language (SDL) Representation of Procedures

<<<NQ: Editors note: When updating this CorNet-NQ Message Waiting chapter for CorNet-NQ issue 2.1 no layout alignment with the SDLs of Draft Standard ECMQ-QSIG-MWI, March 1996 Annex C "SDLs" was done.>>>.

The diagrams in this annex use the Specification and Description Language defined in CCITT Rec. Z.100 (1988).

Each diagram represents the behavior of an SS-MWI Supplementary Service Control entity at a particular type of PTNX. In accordance with the protocol model described in CorNet-NQ chapter 5.1.1, the Supplementary Service Control entity uses, via the Coordination Function, the services of Generic Functional Procedures Control and Basic Call Control.

Where an output symbol represents a primitive to the Coordination Function, and that primitive results in a message being sent, the output symbol bears the name of the message and any remote operations APDU(s) or notification(s) contained in that message. In the case of a message specified in CorNet-NQ chapter 5.1.1, basic call actions associated with the sending of that message are deemed to occur.

Where an input symbol represents a primitive from the Coordination Function, and that primitive is the result of a message being received, the input symbol bears the name of the message and any remote operations APDU(s) or notification(s) contained in that message. In the case of a message specified in CorNet-NQ chapter 5.1.1, basic call actions associated with the receipt of that message are deemed to have occurred.

The following abbreviations are used:

inv.	invoke APDU
res.	return result APDU
err.	return error APDU
rej.	reject APDU

<<< CorNet-NQ: No messages are shown in the following SDLs, since SS-MWI signalling may be contained in all call independent signalling connection messages which allow Facility IE to be transported. However, CorNet-NQ basically uses SETUP and RELEASE messages for SS-MWI signalling transport, but shall support CONNECT, FACILITY, PROGRESS etc. as well, at least in receiving direction. >>>

SDL Representation of SS-MWI

Figure B.1 shows the behavior of an SS-MWI Supplementary Service Control entity within the Activating (Message Centre) PTNX. Figure B.2 shows the behavior of an SS-MWI Supplementary Service Control entity within the Deactivating (Message Centre) PTNX. Figure B.3 shows the behavior of an SS-MWI Supplementary Service Control entity within the Interrogating (Served User) PTNX.

In figure B.1, B.2 and B.3 input signals from the left and output signals to the left represent primitives from and to the MC. Input signals from the right and output signals to the right represent primitives from and to and from the Coordination Function. Also protocol timer expiry is indicated by an input signal from the right.

Figure B.4 shows the behavior of an SS-MWI Supplementary Service Control entity within the Served User PTNX for SS-MWI Activation and SS-MWI Deactivation.

In figure B.4 input signals from the right and output signals to the right represent primitives from and to the user. Input signals from the left and output signals to the left represent primitives from and to and from the Coordination Function.

<<<NQ: Figure B.5 shows the behavior of an SS_MWI Supplementary Service Control entity within the Message Centre PTNX for SS-MWI Interrogation.

In figure B.5 input signals from the left and output signals to the left represent primitives from and to the Coordination Function. Input signals from the right and output signals to the right represent primitives from and to the MC. **>>>**

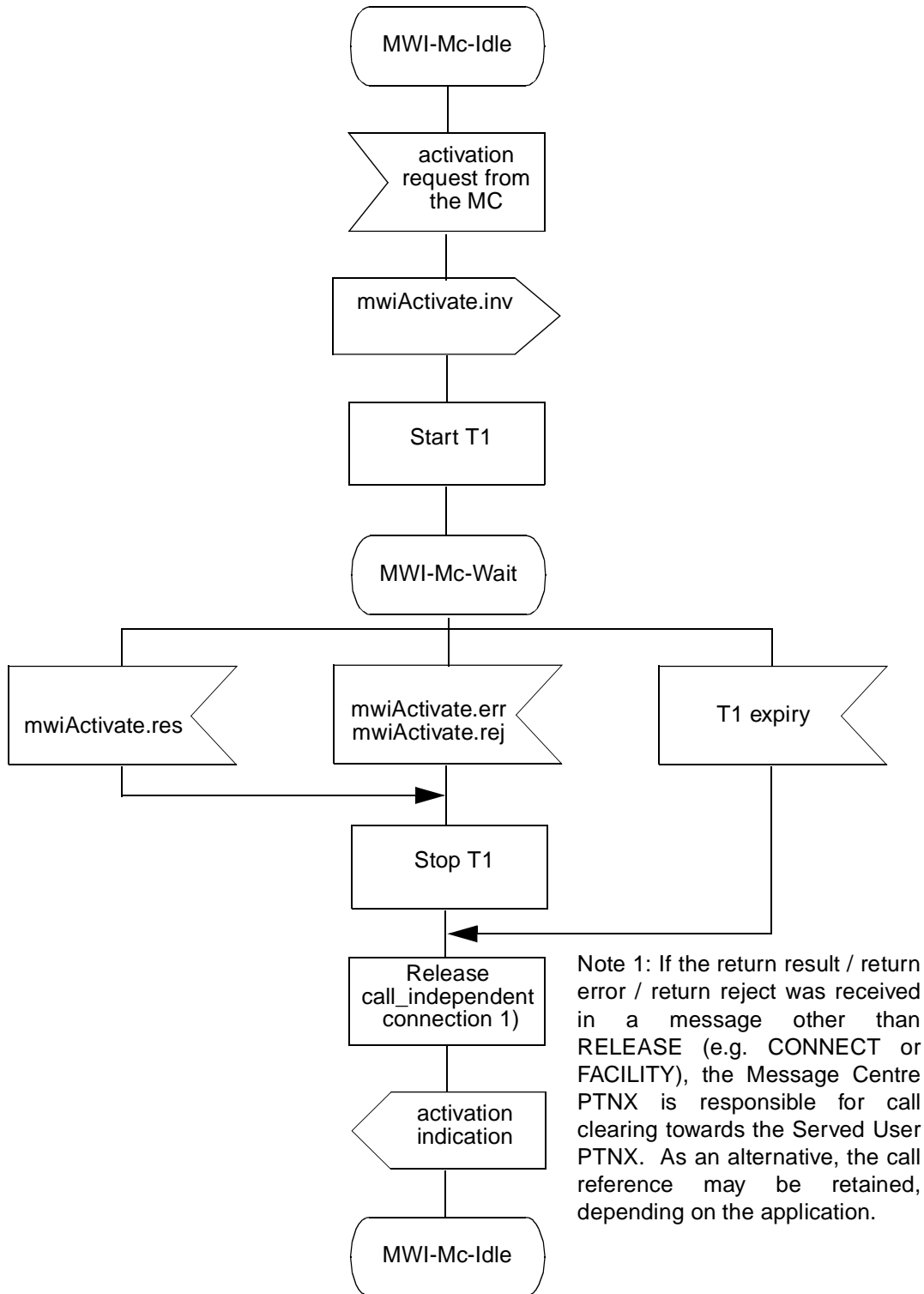


Figure 5.3.3 - B1 - SDL Representation of SS-MWI for Activation at the Message Centre PTNX

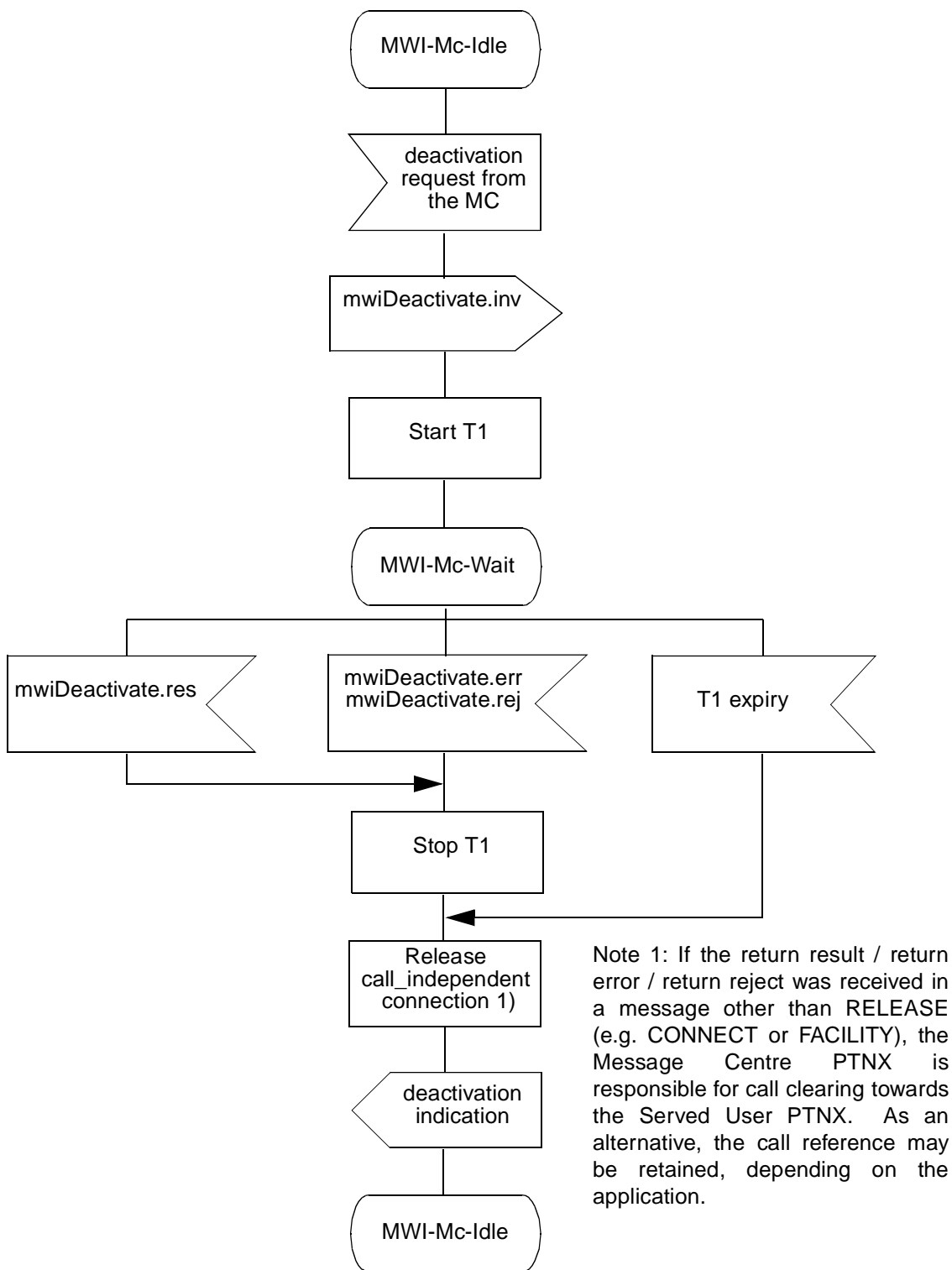


Figure 5.3.3 - B2 - SDL Representation of SS-MWI for Deactivation at the Message Centre PTNX

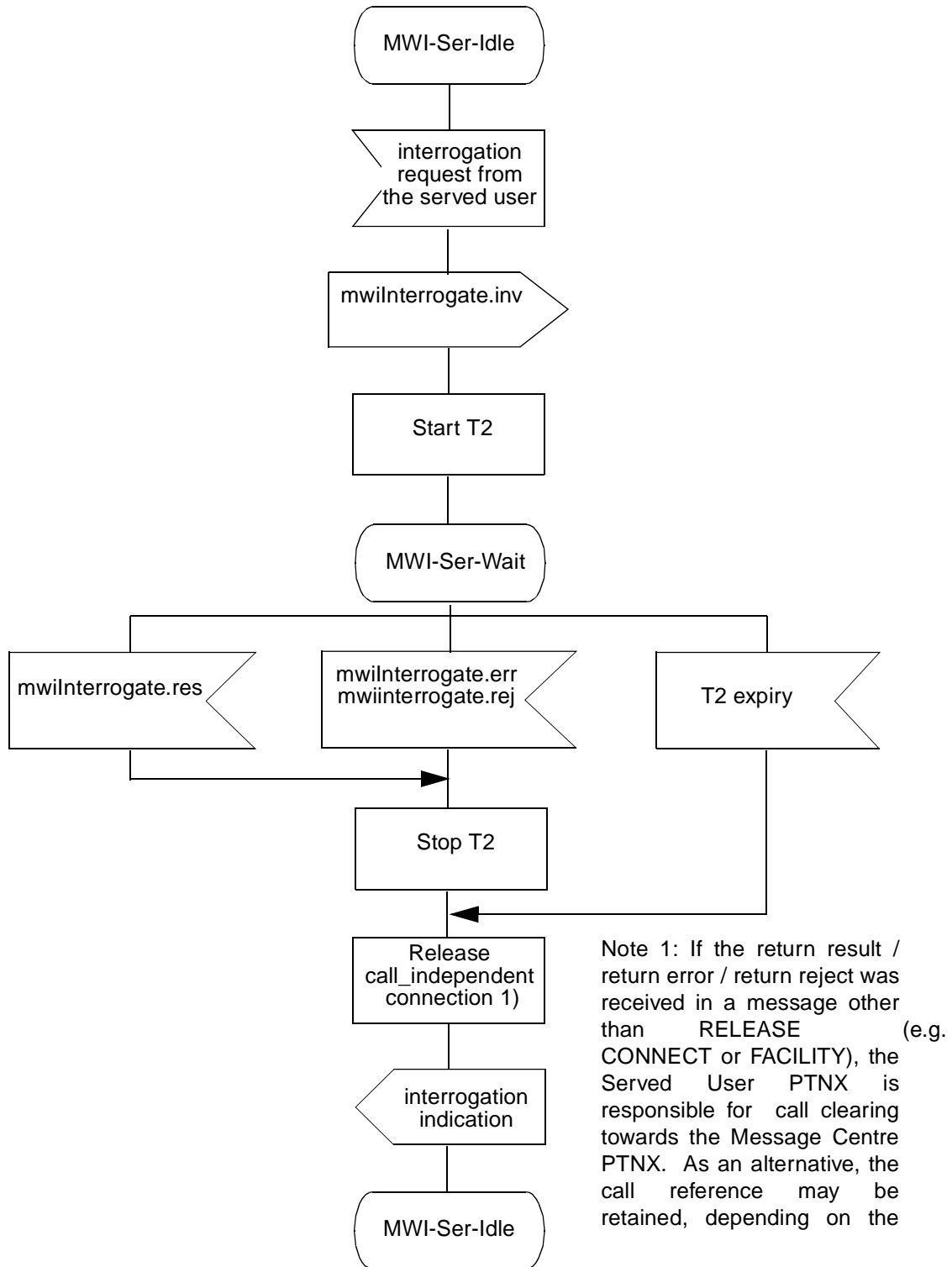


Figure 5.3.3 - B3 - SDL Representation of SS-MWI for Interrogation at the Served User PTNX

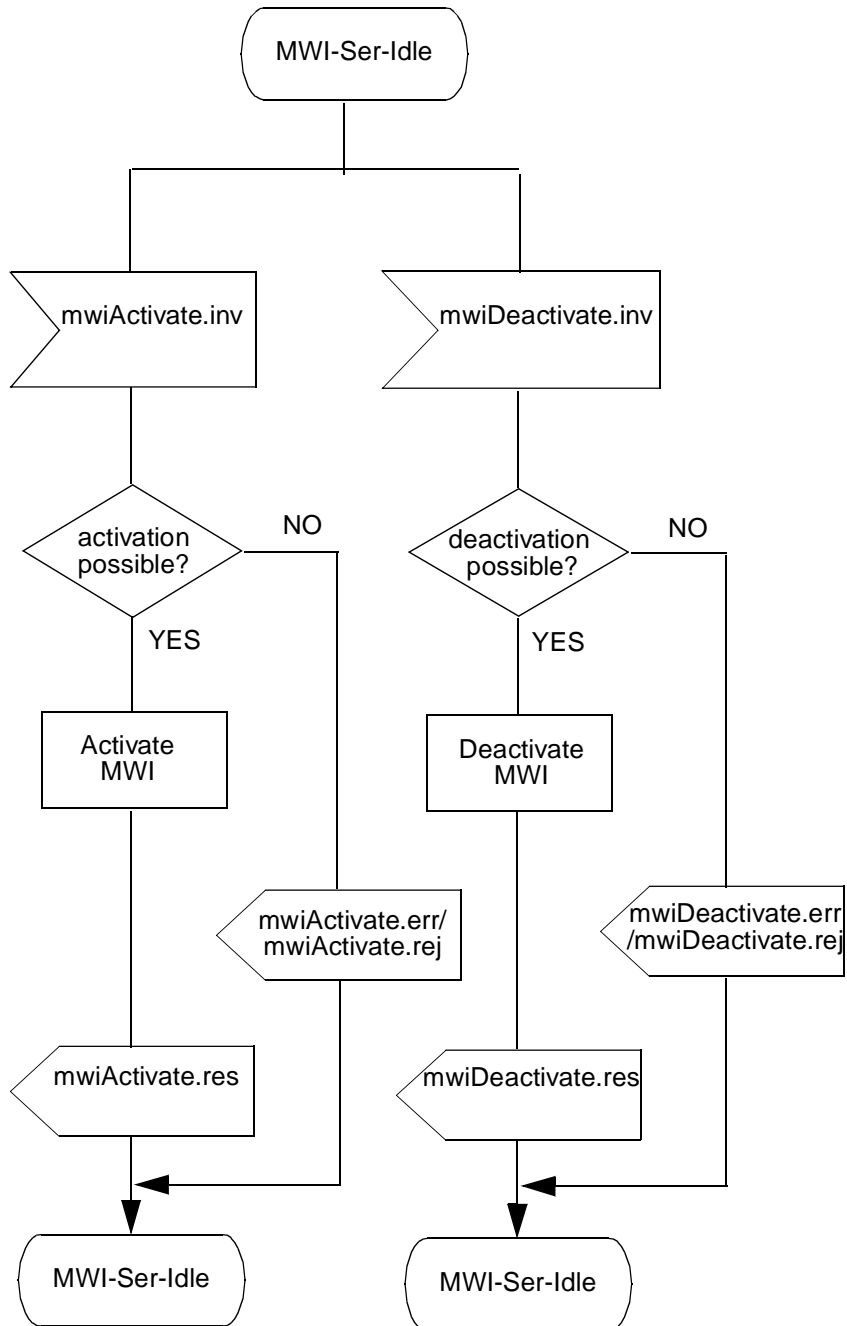


Figure 5.3.3 - B4 - SDL Representation of SS-MWI for Activation and Deactivation at the Served User PTNX

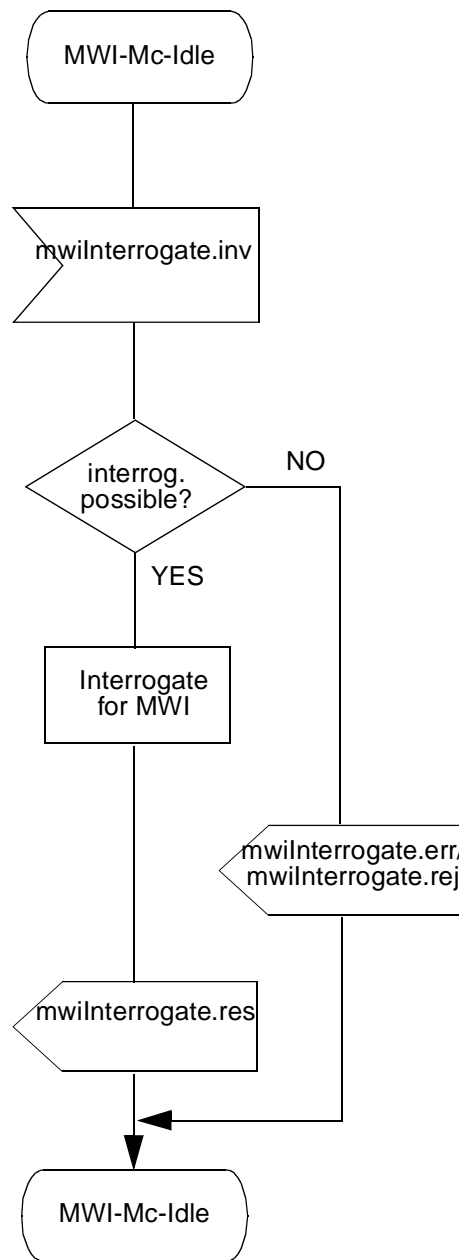


Figure 5.3.3 - B5 - SDL Representation of SS-MWI for Interrogation at the Message Centre PTNX

Annex C: Summary of Differences between CorNet-NQ V2.0 and CorNet-NQ V2.1 versions of Message Waiting Indication (Informative)

Section 3: References: ISO references have been added.

Section 7.3.1. Operations:

The following tables (Table 3.3.3-1 and Table 3.3.3-1a) list the changes made in CorNet-NQ V2.1 ASN.1 Modules for chap. 5.3.3 compared to the ASN.1 tables included in CorNet-NQ V2.0. Only those tables are shown, where changes have been made. Changes are visible with revision marks (underline and strike through):

```

SS-MWI-Operations
    { iso(1) identified-organization(3) icd-ecma(0012) standard(0)
      qsig-message-waiting(xxx242) message-waiting-operations(0) }

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS
    OPERATION, ERROR FROM Remote-Operation-Notation
        { joint-iso-ccitt (2) remote-operations (4) notation (0) }
    Extension FROM ECMA-MANmanufacturer-specific-service-extension-definition
        { iso (1) standard (0) pss1-generic-procedures (11582) msi-definition
          (0) }
    basicServiceNotProvided, notActivated, notSubscribed,
    invalidServedUserNr FROM
        { ccitt(2) recommendation(0) q(17) 950 general-error-list(1) }
    PartyNumber FROM Addressing-Data-Elements {iso(1) standard(0)
        pss1-generic-procedures(11582) addressing-data-elements(9) }
    Basic Service FROM Call-Diversion-Operations
        { iso(1) standard(0) pss1-call-diversion(13873)
          call-diversion-operations(0) };

MWIActivate ::= OPERATION
    ARGUMENT MWIActivateArg
    RESULT DummyRes
    ERRORS { notSubscribed,
            invalidServedUserNr,
            basicServiceNotProvided,
            unspecified }

MWIDeactivate ::= OPERATION
    ARGUMENT MWIDeactivateArg
    RESULT DummyRes
    ERRORS {notSubscribed,
            invalidServedUserNr,
            basicServiceNotProvided,
            unspecified }

MWIInterrogate ::= OPERATION
    ARGUMENT MWIInterrogateArg
    RESULT MWIInterrogateRes
    ERRORS { notSubscribed,
            invalidServedUserNr,
            notActivated,
            unspecified }
    
```

```

MWIInterrogateRes ::= SEQUENCE SIZE(1..10) OF MWIInterrogateResElt

MWIInterrogateResElt ::= SEQUENCE {
    basicService      BasicService,
    msgCentrId       MsgCentrId OPTIONAL,
    nbOfMessages     [2] IMPLICIT NbOfMessages OPTIONAL,
    priority          [3] IMPLICIT INTEGER (0..9) OPTIONAL,
    -- The value 0 means the highest priority and 9 the lowest
    argumentExt      CHOICE {
        extension [4] IMPLICIT Extension,
        multipleExtension [5] IMPLICIT SEQUENCE OF Extension
    } OPTIONAL
}

MsgCentrId ::= CHOICE {
    integer          [0] IMPLICIT INTEGER (0..65535),
    partyNumber      [1] Party Number
}

NbOfMessages ::= INTEGER (1..65535)

notActivated          ERROR ::= 43

mwiActivate           MWIActivate           ::= 80
mwiDeactivate        MWIDeactivate          ::= 81
mwiInterrogate       MWIInterrogate         ::= 82

Unspecified          ::= ERROR PARAMETER Extension

unspecified          Unspecified ::= 1008

END                  -- of SS-MWI-Operations

```

```

CorNet-NQ-Message-Waiting
    { iso(1) identified-organization(3) icd-ecma(0012) member-company(2)
      siemens-units(1107) pn(2) cornet-nq-specification(0)
      message-waiting(1) }
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
IMPORTS      OPERATION FROM Remote-Operation-Notation
              { joint-iso-ccitt (2) remote-operations (4) notation (0) }
              EXTENSION FROM Manufacturer-specific-service-extension-definition
              { iso (1) standard (0) pss1-generic-procedures (11582) msi-definition
                (0) CCITT(0) identified-organization (3) etsi (0)
                -qsig-generic-procedures (239) msi-definition (0) };
EXPORTS      MWIActivateExt, MWIDeactivateExt, MWIResultExt, MwcbExecute
cnq OBJECT IDENTIFIER ::= { iso (1) identified-organization (3) icd-ecma (0012)
      member-company(2) siemens-units(1107) pn(2)
      cornet-nq-signalling(1) }

MwcbExecute ::= OPERATION
              ARGUMENT          NULL

MWIActivateExt EXTENSION          -- of MWIActivateArg
              ARGUMENT ENUMERATED { invokeMWIGeneral (0), newVMSmail (2),
              invokePM (4), newMWIGeneralHighPrio (7), onlyOldMWIGeneral (8),
              newVMSmailHighPrio (9), onlyOldVMSmail (10), newTCSmail (11),
              newTCSmailHighPrio (13), onlyOldTCSmail (14), newGSmail (15),
              newGSmailHighPrio (17), onlyOldGSmail (18), newVMXmail (19)}

MWIDeactivateExt EXTENSION          -- of MWIDeactivateArg
              ARGUMENT ENUMERATED { cancelMWIGeneral(1), noVMSmail (3),
              cancelPM (5), cancelGeneralMWICalledSide (6), noTCSmail (12),
              noGSmail (16), noVMXmail (20) }

MWIResultExt EXTENSION          -- of DummyRes
              ARGUMENT ENUMERATED { invokeMWIGeneral (0), cancelMWIGeneral(1),
              newVMSmail (2), noVMSmail (3), invokePM (4), cancelPM (5),
              cancelGeneralMWICalledSide (6), newMWIGeneralHighPrio (7),
              onlyOldMWIGeneral (8), newVMSmailHighPrio (9), onlyOldVMSmail
              (10), newTCSmail (11), noTCSmail (12), newTCSmailHighPrio (13),
              onlyOldTCSmail (14), newGSmail (15), noGSmail (16),
              newGSmailHighPrio (17), onlyOldGSmail (18), newVMXmail (19),
              noVMXmail (20) }
    
```