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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Message centre monitoring and mailbox identification supplementary services

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 20117 was prepared by ECMA (as ECMA-347) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

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Introduction

This International Standard is one of a series defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC.

This International Standard specifies the signalling protocol for use at the Q reference point in support of the Message Centre Monitoring supplementary service as well as the Mailbox Identification supplementary service. The protocol defined in this International Standard forms part of the PSS1 protocol (informally known as QSIG).

SS-MCM is based on SS-MWI and includes its entire functionality. The interoperability with SS-MWI is therefore guaranteed. Compared to SS-MWI, SS-MCM offers an enhanced functionality for monitoring status changes of messages stored in the Served User's Mailbox as follows:

- individual activation and deactivation for the monitoring of messages of different Message Type(s) within the Mailbox as well as interrogation of the actual SS-MCM configuration;
- retrieval of information about all messages (i.e. new and retrieved messages) in the mailbox independent of the Message Status;
- request of detailed updated information about messages stored in the mailbox.

This International Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Message centre monitoring and mailbox identification supplementary services

1 Scope

This International Standard specifies the signalling protocol for the support of the Message Centre Monitoring supplementary service (SS-MCM) as well as the Mailbox Identification supplementary service (SS-MID) at the Q reference point between Private Integrated services Network eXchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

The supplementary service MCM enables a Served User to get informed by a Message Centre about the status and status changes of messages stored in that Served Users Mailbox.

The supplementary service MID enables a Message Centre to identify a specific mailbox of a Served User in case the Served User has more than one mailbox within the Message Centre. In addition SS-MID enables a Served User to authenticate himself/herself at a specific mailbox located within the Messages Centre.

The Q reference point is defined in ISO/IEC 11579-1.

Service specifications are produced in three stages and according to the method specified in ETS 300 387. This International Standard contains the stage 3 specification for the Q reference point and satisfies the requirements identified by the stage 1 and stage 2 specifications in ISO/IEC 20116.

The signalling protocol for SS-MCM and SS-MID uses certain aspects of the generic procedures for the control of supplementary services specified in ISO/IEC 11582.

This International Standard also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between SS-MCM as well as SS-MID and other supplementary services and ANFs.

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 International Standard, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in Annex A.

Conformance to this International Standard includes conforming to those clauses that specify protocol interactions between SS-MCM as well as SS-MID and other supplementary services and ANFs for which signalling protocols at the Q reference point are supported in accordance with the stage 3 standards concerned.

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3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11572:2000, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit mode bearer services — Inter-exchange signalling procedures and protocol*

ISO/IEC 11574:2000, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit-mode 64 kbit/s bearer services — Service description, functional capabilities and information flows*

ISO/IEC 11579-1:1994, *Information technology — Telecommunications and information exchange between systems — Private integrated services network — Part 1: Reference configuration for PISN Exchanges (PINX)*

ISO/IEC 11582:2002, *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*

ISO/IEC 13873:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call Diversion supplementary services*

ISO/IEC 15505:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Message Waiting Indication supplementary service*

ISO/IEC 15506:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Message Waiting Indication supplementary service*

ISO/IEC 20116:2004, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Message centre monitoring and mailbox identification supplementary services*

ISO 8601:2000, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ETS 300 387:1994, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them*

ITU-T Rec. Q.950:2000, *Digital Subscriber Signalling System No. 1 (DSS 1) — Supplementary services protocols, structure and general principles*

ITU-T Rec. Z.100:1999, *Specification and Description Language*

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4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1 External definitions

This International Standard uses the following terms defined in other documents:

- Address Header (ISO/IEC 20116)
- Application Protocol Data Unit (APDU) (ISO/IEC 11582)
- Call-Independent (ISO/IEC 11582)
- Complete Information (ISO/IEC 20116)
- Compressed Information (ISO/IEC 20116)
- Gateway PINX (ISO/IEC 11582)
- Mailbox (ISO/IEC 20116)
- Message Centre (MC) (ISO/IEC 20116)
- Message Status (ISO/IEC 20116)
- Message Type (ISO/IEC 20116)
- Message Waiting Signal (ISO/IEC 20116)
- New Message (ISO/IEC 20116)
- Originating PINX (ISO/IEC 11582)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Retrieved Message (ISO/IEC 20116)
- Served User (ISO/IEC 20116)
- Signalling (ITU-T Rec. I.112)
- Supplementary Service (ITU-T Rec. I.210)
- Supplementary Service Control Entity (ISO/IEC 11582)
- Terminating PINX (ISO/IEC 11582)
- Transit PINX (ISO/IEC 11582)

4.2 Other definitions

4.2.1
Message Centre PINX
The PINX where the Message Centre is located.

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4.2.2
Served User PINX
The PINX where the Served User is located.

5 Acronyms

ANF	Additional Network Feature
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
ISDN	Integrated Services Digital Network
MCM	Message Centre Monitoring
MID	Mailbox Identification
NFE	Network Facility Extension
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS	Supplementary Service

6 Signalling protocol for the support of SS-MCM

6.1 SS-MCM description

The supplementary service MCM enables a Message Centre to inform a registered Served User about the status and status changes of messages stored in the Served User's Mailbox. This can be due to the arrival of New Messages or due to the change of the Message Status of stored messages (e.g. retrieval or deletion of messages). Additionally the Served User can request the current status of the messages in the Mailbox from the Message Centre.

If there are new messages for the Served User stored in the mailbox, a Message Waiting Signal may be set at the Served User's terminal.

Additionally a Served User might activate, deactivate or interrogate Message Centre Monitoring individually for the different Message Types.

6.2 SS-MCM operational requirements

6.2.1 Requirements on a Message Centre PINX

Call establishment procedures for the incoming and outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for an Originating PINX and for a Terminating PINX, shall apply.

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6.2.2 Requirements on a Served User PINX

Call establishment procedures for the incoming and outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for a Terminating PINX and for an Originating PINX, shall apply.

6.2.3 Requirements on a Transit PINX

Basic Call procedures, specified in ISO/IEC 11572 for a Transit PINX, shall apply.

Generic procedures for call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

6.3 SS-MCM coding requirements

6.3.1 Operations

The operations defined in Abstract Syntax Notation One (ASN.1) in Table 1 shall apply.

NOTE The coding includes the operations as defined in SS-MWI (ISO/IEC 15506) but with the new operations names of SS-MCM.

The following operations are identical in SS-MCM and SS-MWI:

SS-MCM operations		**SS-MWI operations**
mCMNewMsg	←→	mWIActivate
mCMNoNewMsg	←→	mWIDeactivate
mCMUpdateReq	←→	mWIInterrogate

Table 1 — Operations in support of SS-MCM

```
SS-MCM-Operations-asn1-97
{iso (1) identified-organization (3) icd-ecma (0012) standard (0)
qsig-message-centre-monitoring (347)
message-centre-monitoring-operations-asn1-97 (1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS           OPERATION, ERROR FROM
                       Remote-Operations-Information-Objects
                       {joint-iso-itu-t remote-operations (4) informationObjects (5)
                       version1 (0)}

                  EXTENSION, Extension{} FROM
                       Manufacturer-specific-service-extension-class-asn1-97
                       {iso standard pss1-generic-procedures (11582)
                       msi-class-asn1-97 (11)}
```

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Table 1 — Operations in support of SS-MCM (continued)

```
                basicServiceNotProvided, userNotSubscribed, invalidServedUserNr
                     FROM General-Error-List
                     {itu-t (0) recommendation (0) q (17) 950 (950)
                     general-error-list (1)}

                PresentedAddressUnscreened, PartyNumber  FROM
                     Addressing-Data-Elements-asn1-97
                     {iso standard pss1-generic-procedures (11582)
                     addressing-data-elements-asn1-97 (20)}
            Name FROM Name-Operations-asn1-97
                 {iso standard pss1-name (13868) name-operations-asn1-97 (1)}
            ;


MCM-Operations   OPERATION ::= {
                               mCMNewMsg |
                               mCMNoNewMsg |
                               mCMUpdate |
                               mCMUpdateReq |
                               mCMService |
                               mCMInterrogate |
                               mCMailboxFull }


mCMNewMsg        OPERATION ::= {
                 ARGUMENT      MCMNewMsgArg
                 RESULT        MCMDummyRes
                 ERRORS        {userNotSubscribed |
                               invalidServedUserNr |
                               basicServiceNotProvided |
                               unspecified}
                 CODE          local: 80}  -- same code as for mWIActivate in SS-MWI


mCMNoNewMsg      OPERATION ::= {
                 ARGUMENT      MCMNoNewMsgArg
                 RESULT        MCMDummyRes
                 ERRORS        {userNotSubscribed |
                               invalidServedUserNr |
                               basicServiceNotProvided |
                               unspecified}
                 CODE          local: 81} -- same code as for mWIDeactivate in SS-
MWI


mCMUpdate        OPERATION ::= {
                 ARGUMENT      MCMUpdateArg
                 RESULT        MCMDummyRes
                 ERRORS        {userNotSubscribed |
                               invalidServedUserNr |
                               unspecified}
                 CODE          local: 115}
```


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Table 1 — Operations in support of SS-MCM (continued)

```
mCMUpdateReq      OPERATION ::= {
                  ARGUMENT      MCMUpdateReqArg
                  RESULT        MCMUpdateReqRes
                  ERRORS        {userNotSubscribed |
                                invalidServedUserNr |
                                basicServiceNotProvided |
                                unspecified}
                  CODE          local: 82}
                                -- same code as for mWIInterrogate in SS-MWI


mCMService          OPERATION   ::= {
                    ARGUMENT        MCMServiceArg
                    RESULT          MCMDummyRes
                    ERRORS          {userNotSubscribed |
                                    invalidServedUserNr |
                                    basicServiceNotProvided |
                                    mCMModeNotProvided |
                                    unspecified}
                    CODE            local: 116}


mCMInterrogate      OPERATION   ::= {
                    ARGUMENT        MCMInterrogateArg
                    RESULT          MCMInterrogateRes
                    ERRORS          {userNotSubscribed |
                                    invalidServedUserNr |
                                    basicServiceNotProvided |
                                    mCMModeNotProvided |
                                    unspecified}
                    CODE            local: 117}


mCMailboxFull       OPERATION   ::= {
                    ARGUMENT        MCMailboxFullArg
                    RETURN RESULT   FALSE
                    ALWAYS RESPONDS FALSE
                    CODE            local: 118}


MCMailboxFullArg  ::= SEQUENCE
                            {
                            partyInfo           PartyInfo,
                            mailboxFullFor      MailboxFullFor,
                            extensions          MCMExtensions    OPTIONAL,
                            ...
                            }

MailboxFullFor    ::= SEQUENCE OF MailboxFullPar

MailboxFullPar    ::= SEQUENCE
                            {
                            messageType         MessageType,
                            capacityReached     INTEGER (0..100) OPTIONAL
                            -- percentage of storage capacity already used
                            }
```

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Table 1 — Operations in support of SS-MCM (continued)

```
MCMServiceArg      ::= SEQUENCE
                       {

                       partyInfo         PartyInfo,
                       mCMChange         MCMChange,
                       extensions        MCMExtensions    OPTIONAL,
                       ...
                        }

MCMChange          ::= CHOICE
                       {
                       activateMCM         [1] IMPLICIT SEQUENCE OF MCMServiceInfo,
                       deactivateMCM       [2] IMPLICIT SEQUENCE OF MessageType,
                       setToDefaultValues  NULL
                       }

MCMServiceInfo     ::= SEQUENCE
                       {
                       messageType         MessageType,
                       mCMModeNew          [1] IMPLICIT MCMMode    OPTIONAL,
                       mCMModeRetrieved    [2] IMPLICIT MCMMode    OPTIONAL
                       }

MCMInterrogateArg  ::= SEQUENCE
                       {
                       partyInfo           PartyInfo,
                       interrogateInfo     SEQUENCE OF MessageType,
                       extensions          MCMExtensions    OPTIONAL,
                       ...
                       }

MCMInterrogateRes  ::= SEQUENCE
                       {
                       interrogateResult   SEQUENCE OF MCMServiceInfo,
                       extensions          MCMExtensions    OPTIONAL,
                       ...
                       }

MCMNewMsgArg       ::= SEQUENCE
                       {
                       servedUserNr         PartyNumber,
                       specificMessageType  MessageType,
                       msgCentreId          MsgCentreId                    OPTIONAL,
                       nrOfMessages         [3] IMPLICIT NrOfMessages      OPTIONAL,
                       originatingNr        [4] PartyNumber                OPTIONAL,
                       timestamp            TimeStamp                      OPTIONAL,
                       priority             [5] IMPLICIT INTEGER (0..9)    OPTIONAL,
                       argumentExt   CHOICE {
                            extension           [6] IMPLICIT Extension{{MCMExtSet}},
                            multipleExtension   [7] IMPLICIT SEQUENCE OF
                                                     Extension{{MCMExtSet}}
                             } OPTIONAL
                       }
```

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Table 1 — Operations in support of SS-MCM (continued)

```
MCMNoNewMsgArg      ::= SEQUENCE
                        {
                        servedUserNr           PartyNumber,
                        specificMessageType    MessageType,
                        msgCentreId            MsgCentreId          OPTIONAL,
                        argumentExt            CHOICE {
                             extension           [3] IMPLICIT Extension{{MCMExtSet}},
                             multipleExtension   [4] IMPLICIT SEQUENCE OF
                                                  Extension{{MCMExtSet}}
                             } OPTIONAL
                        }

MCMUpdateArg      ::= SEQUENCE
                        {
                        partyInfo              PartyInfo,
                        messageType            MessageType,
                        updateInfo             UpdateInfo,
                        moreInfoFollows        BOOLEAN DEFAULT FALSE,
                        extensions             MCMExtensions        OPTIONAL,
                        ...
                        }


MCMUpdateReqArg   ::= SEQUENCE
                        {
                        servedUserNr          PartyNumber,
                        specificMessageType   MessageType,
                        msgCentreId           MsgCentreId         OPTIONAL,
                        argumentExt           CHOICE {
                           extension             [3] IMPLICIT Extension{{MCMExtSet}},
                           multipleExtension     [4] IMPLICIT SEQUENCE OF
                                                 Extension{{MCMExtSet}}
                           } OPTIONAL
                        }


MCMUpdateReqRes   ::= SEQUENCE SIZE (1..10) OF MCMUpdateReqResElt


MCMUpdateReqResElt  ::= SEQUENCE
                        {
                        specificMessageType    MessageType,
                        msgCentreId            MsgCentreId                OPTIONAL,
                        nrOfMessages           [3] IMPLICIT NrOfMessages  OPTIONAL,
                        originatingNr          [4] PartyNumber            OPTIONAL,
                        timestamp              TimeStamp                  OPTIONAL,
                        priority               [5] IMPLICIT INTEGER (0..9) OPTIONAL,
                        argumentExt            CHOICE {
                             extension           [6] IMPLICIT
Extension{{MCMExtSet}},
                             multipleExtension   [7] IMPLICIT SEQUENCE OF
                                                  Extension{{MCMExtSet}}
                             } OPTIONAL
                        }
```

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Table 1 — Operations in support of SS-MCM (continued)

```
MCMMode         ::= INTEGER
                    {
                    compressed      (0),
                    complete        (1)
                    }

MCMDummyRes     ::= MCMExtensions


PartyInfo  ::= SEQUENCE
                    {
                    servedUserNr        PartyNumber,
                    messageCentreID     MsgCentreId
                    }

UpdateInfo      ::= CHOICE
                    {
                    newMsgInfoOnly          [1] MessageInfo,
                    retrievedMsgInfoOnly    [2] MessageInfo,
                    allMsgInfo              AllMsgInfo
                    }


AllMsgInfo      ::= SEQUENCE
                    {
                    newMsgInfo          MessageInfo,
                    retrievedMsgInfo    MessageInfo
                    }


MessageInfo     ::= CHOICE
                    {
                    completeInfo        [1] IMPLICIT CompleteInfo,
                    compressedInfo      [2] IMPLICIT CompressedInfo,
                    noMsgsOfMsgType     NULL
                    }


CompleteInfo    ::= SEQUENCE OF AddressHeader


AddressHeader   ::= SEQUENCE
                    {
                    originatorNr        PartyNumber,
                    timeStamp           [1] IMPLICIT TimeStamp       OPTIONAL,
                    priority            [2] IMPLICIT Priority        OPTIONAL
                    }


CompressedInfo    ::= SEQUENCE
                      {
                      nrOfMessages        NrOfMessages,
                      lastTimeStamp       TimeStamp         OPTIONAL,
                      highestPriority     Priority          OPTIONAL
                      }


NrOfMessages      ::= INTEGER (0..65535)
```


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Table 1 — Operations in support of SS-MCM (continued)

```
Priority          ::= INTEGER (0..9)      -- the value 0 means the highest priority
                                          -- and 9 the lowest

MsgCentreId       ::= CHOICE
                      {
                      integer          [0] IMPLICIT INTEGER (0..65535),
                      partyNumber      [1] PartyNumber,
                      numericString    [2] IMPLICIT NumericString (SIZE(1..10))
                      }


TimeStamp         ::= GeneralizedTime (SIZE (12..19))
                --  a VisibleString containing:
                --    - the (local) date in 8 digits (YYYYMMDD),
                --    - followed by (local) time of day in 4 or 6 digits (HHMM[SS]),
                --    - optionally followed by the letter "Z" or
                --      by a local time differential in 5 digits ("+"HHMM or "-"HHMM);
                --      this date and time representation follows ISO 8601
                --  Examples:      1) 19970621194530, meaning 21 June 1997, 19:45:30;
                --                 2) 19970621194530Z, meaning the same as 1);
                --                 3) 19970621194530-0500, meaning the same as 1),
                --                    5 hours retarded in relation to UTC time


MessageType       ::= ENUMERATED
                      {
                   -- Note: for the following message type see also Annex D.4
                      allServices                    (0),
                   -- Note: for the following message types see also Annex D.1
                   -- For compatibility among vendors, speech is recommended for
                   -- voice mail indications
                      speech                          (1),
                      unrestrictedDigitalInformation  (2),
                      audio3100Hz                     (3),
                      telephony                      (32),
                      teletex                        (33),
                      telefaxGroup4Class1            (34),
                      videotextSyntaxBased           (35),
                      videotelephony                 (36),
                      telefaxGroup2-3                (37),
                      reservedNotUsed1               (38),
                      reservedNotUsed2               (39),
                      reservedNotUsed3               (40),
                      reservedNotUsed4               (41),
                      reservedNotUsed5               (42),
                   -- Note: for the following message types see also Annex D.2
                      email                          (51),
                      video                          (52),
                      fileTransfer                   (53),
                      shortMessageService            (54),
                   -- Note: for the following message types see also Annex D.3
                      speechAndVideo                 (55),
                      speechAndFax                   (56),
                      speechAndEmail                 (57),
                      videoAndFax                    (58),
                      videoAndEmail                  (59),
                      faxAndEmail                    (60),
                      speechVideoAndFax              (61),
```

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Table 1 — Operations in support of SS-MCM (concluded)

```
                        speechVideoAndEmail             (62),
                        speechFaxAndEmail               (63),
                        videoFaxAndEmail                (64),
                        speechVideoFaxAndEmail          (65),
                     -- Note: for the following message types see also Annex D.4
                        multimediaUnknown               (66),
                        serviceUnknown                  (67),
                        futureReserve1                  (68),
                        futureReserve2                  (69),
                        futureReserve3                  (70),
                        futureReserve4                  (71),
                        futureReserve5                  (72),
                        futureReserve6                  (73),
                        futureReserve7                  (74),
                        futureReserve8                  (75)
                        }

MCMExtensions   ::= CHOICE
                    {
                    none               NULL,
                    extension          [1] IMPLICIT Extension {{MCMExtSet}},
                    multipleExtension  [2] IMPLICIT SEQUENCE OF
                                            Extension {{ MCMExtSet }}
                    }

mCMModeNotProvided      ERROR   ::= {
                        CODE       local 1037}

unspecified            ERROR ::= {
                       PARAMETER    Extension{{MCMExtSet}}
                       CODE        local 1008}

MCMExtSet     EXTENSION ::= {...}


END        -- of SS-MCM-Operations-asn1-97
```

6.3.2 Information elements

6.3.2.1 Facility information element

The operations defined in 6.3.1 shall be coded in the Facility information element in accordance with ISO/IEC 11582.

When conveying the invoke APDU of operations defined in 6.3.1, the destination Entity data element of the NFE shall contain the value endPINX.

When conveying the mCMailboxFull invoke APDU defined in 6.3.1, the interpretation APDU shall be set to discardAnyUnrecognisedInvokePDU. When conveying any other invoke APDU of operations defined in 6.3.1, the interpretation APDU shall either be omitted or have the value rejectAnyUnrecognisedInvokePdu.

6.3.2.2 Other information elements

Any other information element shall be coded in accordance with ISO/IEC 11582.

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6.3.3 Messages

The Facility information element shall be conveyed in messages as specified in Clause 10 of ISO/IEC 11582.

6.4 SS-MCM state definitions

6.4.1 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-MCM Supplementary Service Control entity in that PINX.

6.4.1.1 State MCM-MC-idle

SS-MCM is not operating.

6.4.1.2 State MCM-MC-wait

The invoke APDU of one of the following operations has been sent: mCMNewMsg, mCMNoNewMsg and mCMUpdate operation. The Message Centre PINX is waiting for the corresponding response.

6.4.2 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-MCM Supplementary Service Control entity in that PINX.

6.4.2.1 State MCM-SU-idle

SS-MCM is not operating.

6.4.2.2 State MCM-SU-wait

The invoke APDU of one of the following operations has been sent: mCMService, mCMInterrogate or mCMUpdateReq operation. The Served User PINX is waiting for the corresponding response.

6.4.2.3 State MCM-SU-update

The invoke APDU of the operation mCMUpdate has been received with value “moreInfoFollows” set to TRUE. The Served User PINX is waiting for the consecutive mCMUpdate invoke APDU.

6.5 SS-MCM signalling procedures

For the exchange of the SS-MCM APDUs a call independent signalling connection shall be used between the Message Centre PINX and the Served User PINX. If no such connection exists the sender of the invoke APDU of the operations defined in 6.3.1 (either the Message Centre PINX or the Served User PINX) shall establish a call independent signalling connection as specified in 7.3 of ISO/IEC 11582. The corresponding return result or return error APDU shall use the same Call Reference as the invoke APDU. Call clearing is the responsibility of the sender who has established the call independent signalling connection. This may occur on receipt of a return result, return error or reject APDU. Alternatively, the signalling connection may be retained for other applications, if appropriate.

Examples of message sequences are shown in Clause B.1 of Annex B.

6.5.1 Actions at the Message Centre PINX

The SDL representation of procedures at the Message Centre PINX is shown in Clause C.1 of Annex C.

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6.5.1.1 Normal procedures

6.5.1.1.1 Activation, deactivation and interrogation

SS-MCM shall be available in a default configuration as arranged by the service provider. Within the default configuration an activation (i.e. re-activation after a previous deactivation or change of actual parameters) and/or deactivation of the monitoring of messages of specific Message Types can be done. Therefore, in general, upon receipt of a mCMService invoke APDU the Message Centre PINX shall check if the request (i.e. activation or deactivation of Message Types) is allowed due to the service provider's default configuration.

Upon receipt of a mCMService invoke APDU with an activation request for the monitoring of messages of one or more Message Types, the Message Centre PINX shall remain in state MCM-MC-idle and shall

- inform the Message Centre with an appropriate indication about the activation request, (i.e. activation of monitoring for new and/or retrieved messages either in compressed or complete information style of one or more specific Message Types);
- send a mCMService return result APDU towards the Served User PINX to confirm the activation request and
- start the update procedure for the activated Message Types as described in 6.5.1.1.4.

Upon receipt of a mCMService invoke APDU containing a deactivation request for the monitoring of messages of one or more Message Types, the Message Centre PINX shall remain in state MCM-MC-idle and shall

- inform the Message Centre with an appropriate indication about the deactivated Message Types and
- send a mCMService return result APDU towards the Served User PINX to confirm the deactivation request.

NOTE After the deactivation of one or more Message Types no update procedure shall be started by the Message Centre PINX.

Upon receipt of a mCMService invoke APDU with the argument set to the value "set to default", the Message Centre PINX shall remain in state MCM-MC-idle and shall

- inform the Message Centre with an appropriate indication about the resetting to the default configuration as provided by the service provider;
- send a mCMService return result APDU towards the Served User PINX to confirm the request and
- start the update procedure as described in 6.5.1.1.4 for those Message Types which have been influenced by the request.

Upon receipt of a mCMInterrogate invoke APDU with one or more Message Types, the Message Centre PINX shall send a mCMInterrogate return result APDU to the Served User PINX and remain in MCM-MC-idle. The mCMInterrogate return result APDU indicates whether complete or compressed information is provided for new and/or retrieved messages of every Message Type mentioned in the mCMInterrogate invoke APDU.

6.5.1.1.2 Incoming New Message

Upon receipt of an appropriate indication for the arrival of a new message from the Message Centre, the Message Centre PINX shall send a mCMNewMsg invoke APDU towards the Served User PINX, start timer T1 and enter state MCM-MC-wait. The mCMNewMsg invoke APDU shall contain the following elements:

- optionally, the identity of the Message Centre;
- the address of the Served User;

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- the Message Type of the specific New Message.

In addition, and depending on the presentation style that was selected in the configuration for New Messages of that specific Message Type (i.e. compressed or complete information), the mCMNewMsg invoke APDU shall contain the following elements:

a) Compressed Mode:

- the number of New Messages waiting for the specific Message Type;
- optionally, the priority of the latest highest priority New Message waiting for the specific Message Type;
- optionally, the address of the user that left the latest highest priority New Message;
- optionally, the time when the latest highest priority New Message was left.

b) Complete Mode:

- the address of the user that left that last incoming message;
- optionally, the number of New Messages waiting for the specific Message Type;
- optionally, the priority of the last incoming message;
- optionally, the time of the last incoming message.

NOTE This structure is the same as the mWIActivate.invoke APDU in SS-MWI.

In state MCM-MC-wait, upon receipt of mCMNewMsg return result APDU, the Message Centre PINX shall stop timer T1 and re-enter state MCM-MC-idle.

6.5.1.1.3 No New Messages of a Message Type available at the Served User's mailbox

Upon receipt of an appropriate indication from the Message Centre, that there are no New Messages in the Served User's mailbox anymore, the Message Centre PINX shall send a mCMNoNewMsg invoke APDU towards the Served User PINX, start timer T1 and enter state MCM-MC-wait. The mCMNoNewMsg invoke APDU shall contain the following elements:

- optionally, the identity of the Message Centre;
- the address of the Served User;
- the Message Type(s) for which New Messages are not available anymore.

NOTE This structure is the same as the mWIDeactivate invoke APDU in SS-MWI.

In state MCM-MC-wait, upon receipt of mCMNoNewMsg return result APDU the Message Centre PINX shall stop timer T1 and re-enter state MCM-MC-idle.

6.5.1.1.4 Update of Message Centre Information (update procedure)

The update of Message Centre information is performed on the basis of the different Message Types. That means that the update procedure is done separately and sequentially for every Message Type whose number of New and Retrieved Messages has been changed due to a Served User action.

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In state MCM-MC-idle, upon receipt of an appropriate update indication for a specific Message Type from the Message Centre the Message Centre PINX shall start the update procedure by sending a mCMUpdate invoke APDU to the Served User PINX. The mCMUpdate invoke APDU shall contain the following elements:

- the address of the Served User;
- the identity of the Message Centre PINX;
- an indication about the Message Type and
- update-information for the Served User.

The update-information includes

- either complete information;
- or compressed information

and shall be for

- either the new messages only;
- or the retrieved messages only;
- or for both kind of messages (new and retrieved)

of a specific Message Type stored in the Served User's mailbox.

The information related to a specific Message Type may have to be split over several consecutive mCMUpdate invoke APDUs, due to its length. In this case, parameter “moreInfoFollows” shall be included with value TRUE in all APDUs except the last one.

After sending the mCMUpdate invoke APDU, the Message Centre PINX shall start timer T1 and enter state MCM-MC-wait.

In state MCM-MC-wait, upon receipt of the corresponding mCMUpdate return result APDU, the Message Centre PINX shall act as follows: If further update information is to be sent, the Message Centre PINX shall send the consecutive mCMUpdate invoke APDU, restart Timer T1 and remain in state MCM-MC-wait. Otherwise the Message Centre PINX shall stop Timer T1 and enter state MCM-MC-idle.

6.5.1.1.5 Update request from the Served User

In state MCM-MC-idle, upon receipt of a mCMUpdateReq invoke APDU the Message Centre PINX shall transmit the Served User request in an appropriate manner to the Message Centre and remain in state MCM-MC-idle. After the receipt of the requested updated information about the New Messages of a specific Message Type from the Message Centre the Message Centre PINX shall send a mCMUpdateReq return result APDU containing the following elements, depending on the mode (i.e. compressed or complete information) which is adopted in the current configuration for the New Messages:

a) Compressed Mode:

- Message Type for which the Served User has requested an update;
- optionally, the number of New Messages waiting for that specific Message Type;
- optionally, the priority of the highest priority New Message waiting for that specific Message Type;
- optionally, the identity of the Message Centre;

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- optionally, the address of the user that left that highest priority New Message;
- optionally, the time when the highest priority New Message was left.

b) Complete Mode:

- Message Type for which the Served User has requested an update;
- optionally, the identity of the Message Centre;
- optionally, the number of New Messages waiting for that specific Message Type.

NOTE This structure is the same as the mWIInterrogate invoke APDU in SS-MWI. After having sent mCMUpdateReq return result APDU, the Message Centre PINX shall start the update procedure as described in 6.5.1.1.4.

6.5.1.1.6 Mailbox-full indication

In state MCM-MC-idle, upon an incoming indication from the Message Centre, indicating that the Served User's mailbox for one or more Message Types is full (i.e. no more messages of those Message Types can be stored) or has reached a certain threshold (e.g. 80% of storage capacity for the Message Type), the Message Centre PINX shall send a mCMailboxFull invoke APDU towards the Served User PINX and remain in state MCM-MC-idle. The mCMailboxFull invoke APDU shall contain the Message Types for which the Served User's mailbox has reached its threshold and, optionally, the percentage of storage capacity currently used for that Message Type.

6.5.1.2 Exceptional procedures

6.5.1.2.1 Activation, deactivation and interrogation

Upon receipt of an invalid mCMService invoke APDU (e.g. activation request for monitoring of a Message Type which is not provided by the service provider) the Message Centre PINX shall respond with a mCMService return error APDU and remain in state MCM-MC-idle.

Upon receipt of an invalid mCMInterrogate invoke APDU (e.g. interrogation request for a Message Type which is not provided by the service provider) the Message Centre PINX shall respond with a mCMInterrogate return error APDU and remain in state MCM-MC-idle.

6.5.1.2.2 Incoming New Message

In state MCM-MC-wait, upon receipt of mCMNewMsg return error APDU the Message Centre PINX shall stop timer T1, re-enter state MCM-MC-idle and inform the Message Centre with an appropriate error indication. Any further action is the responsibility of the Message Centre.

In state MCM-MC-wait, on expiry of timer T1, the Message Centre PINX shall release the call independent signalling connection with the Served User PINX unless the connection is still required for other purposes, enter MCM-MC-idle and send an appropriate error indication to the Message Centre, which may take further action.

6.5.1.2.3 No New Messages of a Message Type available at the Served User's mailbox

In state MCM-MC-wait, upon receipt of mCMNoNewMsg return error APDU, the Message Centre PINX shall stop timer T1, re-enter state MCM-MC-idle and inform the Message Centre with an appropriate error indication. Any further action is the responsibility of the Message Centre.

In state MCM-MC-wait, on expiry of timer T1, the Message Centre PINX shall release the call independent signalling connection with the Served User PINX unless the connection is still required for other purposes, enter MCM-MC-idle and send an appropriate error indication to the Message Centre, which may take further action.

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6.5.1.2.4 Update of Message Centre Information

In state MCM-MC-wait, upon receipt of a mCMUpdate return error APDU, the Message Centre PINX shall stop timer T1, re-enter state MCM-MC-idle and inform the Message Centre with an appropriate error indication. Any further action is the responsibility of the Message Centre.

In state MCM-MC-wait, on expiry of timer T1, the Message Centre PINX shall release the call independent signalling connection with the Served User PINX unless the connection is still required for other purposes, enter MCM-MC-idle and send an appropriate error indication to the Message Centre, which may take further action.

In state MCM-MC-wait, upon receipt of a mCMUpdate reject APDU, the Message Centre PINX shall stop timer T1, re-enter state MCM-MC-idle and inform the Message Centre with an appropriate error indication. Any further action is the responsibility of the Message Centre. However, additional update information should not be sent.

6.5.1.2.5 Update request from the Served User

Upon receipt of an invalid mCMUpdateReq invoke APDU (e.g. update information request for New Messages of a Message Type which is not provided by the service provider), the Message Centre PINX shall respond with a mCMUpdateReq return error APDU containing an appropriate error value and remain in state MCM-MC-idle.

6.5.2 Actions at the Served User PINX

The SDL representation of procedures at the Served User PINX is shown in Clause C.2 of Annex C.

6.5.2.1 Normal procedures

6.5.2.1.1 Activation, deactivation and interrogation

In state MCM-SU-idle, upon receipt of an appropriate indication from the Served User to activate, deactivate or reset SS-MCM parameters, the Served User PINX shall send a mCMService invoke APDU, start timer T2 and enter state MCM-SU-wait.

The mCMService invoke APDU shall contain the following elements:

- the address of the Served User;
- the identity of the Message Centre PINX;
- one of the following requests:
    - either an activation request for new and/or retrieved messages of one or more Message Types together with an optional indication whether complete or compressed information is requested while monitoring is active for messages of these Message Types;
    - or a deactivation request for the monitoring of messages of one or more Message Types;
    - or a reset of monitoring parameters to the default configuration as arranged by the service provider.

In state MCM-SU-wait, upon receipt of mCMService return result APDU, the Served User PINX shall stop timer T2, re-enter state MCM-SU-idle and inform the Served User in an appropriate manner.

In state MCM-SU-idle, upon request of the Served User, the Served User PINX shall send a mCMInterrogate invoke APDU, enter MCM-SU-wait and start timer T2. The mCMInterrogate invoke APDU shall contain the Message Types for which the Served User requests information.

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In state MCM-SU-wait, upon receipt of mCMInterrogate return result APDU, the Served User PINX shall stop timer T2, re-enter state MCM-SU-idle and deliver the received information in an appropriate manner to the Served User.

6.5.2.1.2 Incoming New Message

In state MCM-SU-idle, upon receipt of a mCMNewMsg invoke APDU, the Served User PINX shall respond with a mCMNewMsg return result APDU, may give an appropriate indication to the Served User and shall remain in state MCM-SU-idle.

NOTE A Message Waiting Signal can be set for that specific Message Type at the Served User's terminal.

6.5.2.1.3 No New Messages of a Message Type available at the Served User's mailbox

In state MCM-SU-idle, upon receipt of a mCMNoNewMsg invoke APDU, the Served User PINX shall respond with a mCMNoNewMsg return result APDU, may give an appropriate indication to the Served User and shall remain in state MCM-SU-idle.

NOTE If a Message Waiting Signal was set for that specific Message Type, the Message Waiting Signal is cancelled at the Served User's terminal.

6.5.2.1.4 Update of Message Centre Information (update procedure)

In state MCM-SU-idle or MCM-SU-update, upon receipt of a mCMUpdate invoke APDU, the Served User PINX shall respond with a mCMUpdate return result APDU and may give an appropriate indication to the Served User.

In addition,

- in state MCM-SU-idle, when parameter “moreInfoFollows” is set to TRUE, the Served User PINX shall start Timer T3 and enter state MCM-SU-update;
- in state MCM-SU-update, when parameter “moreInfoFollows” is set to TRUE, the Served User PINX shall restart Timer T3 and remain in state MCM-SU-update;
- in all other cases, the Served User PINX shall stop Timer T3, if running, and enter state MCM-SU-idle.

6.5.2.1.5 Update request from the Served User

In state MCM-SU-idle, upon the arrival of an appropriate Served User request for updated information, the Served User PINX shall send a mCMUpdateReq invoke APDU and enter state MCM-SU-wait. The mCMUpdateReq invoke APDU shall contain the following elements:

- the address of the Served User;
- Message Type for which the Served User requests an update;
- optionally, the identity of the Message Centre PINX.

In state MCM-SU-wait, upon receipt of mCMUpdateReq return result APDU, the Served User PINX shall stop timer T2, re-enter state MCM-SU-idle and shall inform the Served User in an appropriate manner.

6.5.2.1.6 Mailbox-full indication

In state MCM-SU-idle, upon receipt of a mCMailboxFull invoke APDU, the Served User PINX may inform the Served User in an appropriate manner that the Served User's mailbox has reached a certain threshold for messages of all indicated Message Types and shall remain in state MCM-SU-idle.

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6.5.2.2 Exceptional procedures

6.5.2.2.1 Activation, deactivation and interrogation

In state MCM-SU-wait, on receipt of a mCMService return error APDU, the Served User PINX shall stop timer T2, enter MCM-SU-idle, release the call independent signalling connection with the Message Centre PINX unless the connection is still required for other purposes, and send an appropriate error indication to the Served User.

In state MCM-SU-wait, on receipt of a mCMInterrogate return error APDU, the Served User PINX shall stop timer T2, enter MCM-SU-idle, release the call independent signalling connection with the Message Centre PINX unless the connection is still required for other purposes, and send an appropriate error indication to the Served User.

In state MCM-SU-wait, on expiry of timer T2, the Served User PINX shall release the call independent signalling connection with the Message Centre PINX unless the connection is still required for other purposes, enter MCM-SU-idle and send an appropriate error indication to the Served User.

6.5.2.2.2 Incoming New Message

In state MCM-SU-idle, upon receipt of an invalid mCMNewMsg invoke APDU (e.g. Message Type not supported, user not subscribed), the Served User PINX shall respond with the mCMNewMsg return error APDU containing an appropriate error value and remain in state MCM-SU-idle.

6.5.2.2.3 No New Messages of a Message Type available at the Served User's mailbox

In state MCM-SU-idle, upon receipt of an invalid mCMNoNewMsg invoke APDU (e.g. Message Type not supported, user not subscribed) the Served User PINX shall respond with the mCMNoNewMsg return error APDU containing an appropriate error value and remain in state MCM-SU-idle.

6.5.2.2.4 Update of Message Centre Information (update procedure)

In state MCM-SU-idle or in state MCM-SU-update, upon receipt of an invalid mCMUpdate invoke APDU (e.g. Message Type not supported, user not subscribed), the Served User PINX shall stop Timer T3, if running, respond with the mCMUpdate return error APDU containing an appropriate error value and enter or remain in state MCM-SU-idle.

In state MCM-SU-update, on expiry of Timer T3, the Served User PINX shall enter state MCM-SU-idle. In addition, the Served User PINX may send a mCMUpdateReq invoke APDU in order to restart the update procedure and may send an indication to the Served User.

6.5.2.2.5 Update request from the Served User

In state MCM-SU-idle, upon receipt of a mCMUpdateReq return error APDU, the Served User PINX shall re-enter state MCM-SU-idle, release the call independent signalling connection with the Message Centre PINX unless the connection is still required for other purposes, and send an appropriate error indication to the Served User.

6.5.3 Actions at a Transit PINX

Not applicable.

6.6 SS-MCM impact of interworking with public ISDNs

Not applicable.

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6.7 SS-MCM impact of interworking with non-ISDNs

Not applicable.

6.8 Protocol interactions between SS-MCM and other supplementary services and ANFs

This Clause specifies protocol interactions with other supplementary services and ANFs for which stage 3 standards had been published at the time of publication of this International Standard. For interactions with supplementary services and ANFs for which stage 3 standards are published subsequent to the publication of this International Standard, see those other stage 3 standards.

NOTE Simultaneous conveyance of APDUs for SS-MCM and another supplementary service or ANF 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.

6.8.1 Calling Line Identification Presentation (SS-CLIP)

No protocol interaction.

6.8.2 Connected Line Identification Presentation (SS-COLP)

No protocol interaction.

6.8.3 Calling/Connected Line Identification Restriction (SS-CLIR)

No protocol interaction.

6.8.4 Calling Name Identification Presentation (SS-CNIP)

No protocol interaction.

6.8.5 Calling/Connected Name Identification Restriction (SS-CNIR)

No protocol interaction.

6.8.6 Connected Name Identification Presentation (SS-CONP)

No protocol interaction.

6.8.7 Call Forwarding Unconditional (SS-CFU)

No protocol interaction.

6.8.8 Call Forwarding Busy (SS-CFB)

No protocol interaction.

6.8.9 Call Forwarding No Reply (SS-CFNR)

No protocol interaction.

6.8.10 Path Replacement (ANF-PR)

No protocol interaction.

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6.8.11 Call Transfer (SS-CT)

No protocol interaction.

6.8.12 Call Deflection (SS-CD)

No protocol interaction.

6.8.13 Completion of Calls to Busy Subscribers (SS-CCBS)

No protocol interaction.

6.8.14 Completion of Calls on No Reply (SS-CCNR)

No protocol interaction.

6.8.15 Call Offer (SS-CO)

No protocol interaction.

6.8.16 Do Not Disturb (SS-DND)

No protocol interaction.

6.8.17 Do Not Disturb Override (SS-DNDO)

No protocol interaction.

6.8.18 Call Intrusion (SS-CI)

No protocol interaction.

6.8.19 Advice of Charge (SS-AOC)

No protocol interaction.

6.8.20 Recall (SS-RE)

No protocol interaction.

6.8.21 Call Interception (SS-CINT)

No protocol interaction.

6.8.22 Transit Counter (ANF-TC)

No protocol interaction.

6.8.23 Route Restriction Class (ANF-RRC)

No protocol interaction.

6.8.24 Message Waiting Indication (SS-MWI)

No protocol interaction.

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NOTE SS-MCM is based on SS-MWI and includes its entire functionality. The operations of SS-MWI are included in SS-MCM, therefore backward compatibility with SS-MWI is guaranteed. However, the use and meaning of the optional elements within the mWIActivate.inv APDU are not described in SS-MWI as strictly as in SS-MCM. Therefore, the complete benefit of SS-MCM may not be achieved when interworking with SS-MWI.

6.8.25 Wireless Terminal Location Registration (SS-WTLR)

No protocol interaction.

6.8.26 Wireless Terminal Incoming Call (SS-WTMI)

No protocol interaction.

6.8.27 Wireless Terminal Outgoing Call (SS-WTMO)

No protocol interaction.

6.8.28 Wireless Terminal Authentication of a WTM User (SS-WTAT)

No protocol interaction.

6.8.29 Wireless Terminal Authentication of the PISN (SS-WTAN)

No protocol interaction.

6.8.30 Common Information (SS-CMN)

No protocol interaction.

6.8.31 Call Priority Interruption (Protection) (SS-CPI(P))

No protocol interaction.

6.8.32 Private User Mobility Incoming Call (ANF-PUMI)

No protocol interaction.

6.8.33 Private User Mobility Outgoing Call (ANF-PUMO)

No protocol interaction.

6.8.34 Private User Mobility Registration (SS-PUMR)

No protocol interaction.

6.8.35 Single Step Call Transfer (SS-SSCT)

No protocol interaction.

6.8.36 Simple Dialog (SS-SD)

No protocol interaction.

6.8.37 Call Identification and Call Linkage (ANF-CIDL)

No protocol interaction.

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6.8.38 Short Message Service (SS-SMS)

No protocol interaction.

6.8.39 Make Call Request (SS-MCR)

No protocol interaction.

6.8.40 Mailbox Identification (SS-MID)

If the identification and authentication procedures of SS-MID are used in conjunction with SS-MCM operations the following interworking shall occur upon receipt of a SS-MID operation return error or reject APDU:

Upon receipt of a mIDMailboxID return error or reject APDU an invoke APDU of the SS-MCM operations mCMNewMsg, mCMNoNewMsg, mCMUpdate and mCMailboxFull may be sent.

Upon receipt of a mIDMailboxAuth return error or reject APDU an invoke APDU of the SS-MCM operations mCMUpdateReq, mCMService and mCMInterrogate shall not be sent.

6.9 SS-MCM parameter values (timers)

6.9.1 Timer T1

Timer T1 shall operate at the Message Centre PINX during state MCM-MC-wait. Its purpose is to protect against an absence of a response to an invoke APDU sent by the Message Centre PINX.

Timer T1 shall have a value between 15 and 30 seconds.

6.9.2 Timer T2

Timer T2 shall operate at the Served User PINX during state MCM-SU-Wait. Its purpose is to protect against an absence of a response to an invoke APDU sent by the Served User PINX.

Timer T2 shall have a value not less than 10 seconds.

6.9.3 Timer T3

Timer T3 shall operate at the Served User PINX during state MCM-SU-update. Its purpose is to protect against an incomplete update procedure.

Timer T3 shall have a value not less than 35 seconds.

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7 Signalling protocol for the support of SS-MID

7.1 SS-MID description

The supplementary service MID enables a Message Centre to identify a specific Mailbox of a Served User in case the Served User has more than one Mailbox within the Message Centre. In addition, SS-MID enables a Served User to authenticate himself/herself at a specific Mailbox located within the Message Centre.

7.2 SS-MID operational requirements

7.2.1 Requirements on a Message Centre PINX

Call establishment procedures for the incoming and outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for an Originating PINX and for a Terminating PINX, shall apply.

7.2.2 Requirements on a Served User PINX

Call establishment procedures for the incoming and outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for a Terminating PINX and for an Originating PINX, shall apply.

7.2.3 Requirements on a Transit PINX

Basic Call procedures, specified in ISO/IEC 11572 for a Transit PINX, shall apply.

Generic procedures for call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

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7.3 SS-MID coding requirements

7.3.1 Operations

The operations defined in Abstract Syntax Notation One (ASN.1) in Table 2 shall apply.

Table 2 — Operations in support of SS-MID

```
SS-MID-Operations-asn1-97
{iso (1) identified-organization (3) icd-ecma (0012) standard (0)
qsig-mailbox-identification (347) mailbox-identification-operations-asn1-97 (2)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS    OPERATION, ERROR FROM
                Remote-Operations-Information-Objects
                {joint-iso-itu-t remote-operations (4) informationObjects (5)
                version1 (0)}

            EXTENSION, Extension{} FROM
                Manufacturer-specific-service-extension-class-asn1-97
                {iso standard pss1-generic-procedures (11582)  msi-class-asn1-97
                (11)}

            basicServiceNotProvided, userNotSubscribed, invalidServedUserNr
                FROM General-Error-List
              {itu-t (0) recommendation (0) q (17) 950 (950) general-error-list (1)}

            PresentedAddressUnscreened  FROM
                Addressing-Data-Elements-asn1-97
                {iso standard pss1-generic-procedures (11582) addressing-data-
                elements-asn1-97 (20)}

            Name FROM
                Name-Operations-asn1-97
                {iso standard pss1-name (13868) name-operations-asn1-97 (1)}

            MessageType, MsgCentreId FROM
                SS-MCM-Operations-asn1-97
                {iso (1) identified-organization (3) icd-ecma (0012) standard (0)
                qsig-message-centre-monitoring (347)
                message-centre-monitoring-operations-asn1-97 (1)}
            ;

MID-Operations     OPERATION ::= {mIDMailboxAuth |
                                  mIDMailboxID}

mIDMailboxAuth     OPERATION ::= {
                   ARGUMENT      MIDMailboxAuthArg
                   RESULT        MIDDummyRes
                   ERRORS        {userNotSubscribed |
                                 invalidServedUserNr |
                                 invalidMailbox |
                                 authorizationFailed |
                                 unspecified}
                   CODE          local 119}
```


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Table 2 — Operations in support of SS-MID (continued)

```
mIDMailboxID         OPERATION ::= {
                     ARGUMENT      MIDMailboxIDArg
                     RESULT        MIDDummyRes
                     ERRORS        {userNotSubscribed |
                                   invalidServedUserNr |
                                   invalidMailbox |
                                   unspecified}
                     CODE          local 120}


MIDMailboxAuthArg    ::= SEQUENCE
                         {

                         partyInfo           PartyInfo,
                         servedUserName      Name             OPTIONAL,
                         mailBox             [8]String        OPTIONAL,
                         password            String,
                         extensions          MIDExtensions    OPTIONAL,
                         ...
                         }


MIDMailboxIDArg     ::= SEQUENCE
                        {

                        partyInfo            PartyInfo,
                        servedUserName       Name             OPTIONAL,
                        mailBox              String,
                        extensions           MIDExtensions    OPTIONAL,
                        ...
                        }


MIDDummyRes         ::= MIDExtensions

PartyInfo       ::= SEQUENCE
                        {
                        servedUserNr         PresentedAddressUnscreened,
                        messageType          MessageType      OPTIONAL,
                        messageCentreID      MsgCentreId
                        }

String              ::= CHOICE
                        {
                        stringBmp            BMPString,
                        stringUtf8           UTF8String
                        }


MIDExtensions       ::= CHOICE
                        {
                        none                 NULL,
                        extension            [1] IMPLICIT Extension {{MIDExtSet}},
                        multipleExtension    [2] IMPLICIT SEQUENCE OF
                                             Extension {{ MIDExtSet }}
                        }
```

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Table 2 — Operations in support of SS-MID (concluded)

```
invalidMailbox          ERROR ::= {
                        CODE      local 1039}


authorizationFailed     ERROR ::= {
                        CODE      local 1040}

unspecified             ERROR ::= {
                        PARAMETER Extension{{MIDExtSet}}
                        CODE      local 1008}

MIDExtSet               EXTENSION ::= {...}

END        -- of SS-MID-Operations-asn1-97
```

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 ISO/IEC 11582.

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

When conveying the invoke APDU of operations defined in 7.3.1, the interpretation APDU shall either be omitted or have the value rejectAnyUnrecognizedInvokePdu.

7.3.2.2 Other information elements

Any other information element shall be coded in accordance with ISO/IEC 11582.

7.3.3 Messages

The Facility information element shall be conveyed in messages as specified in Clause 10 of ISO/IEC 11582.

7.4 SS-MID 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-MID Supplementary Service Control entity in that PINX.

7.4.1.1 State MID-MC-idle

SS-MID is not operating.

7.4.1.2 State MID-MC-wait

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

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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-MID Supplementary Service Control entity in that PINX.

7.4.2.1 State MID-SU-idle

SS-MID is not operating.

7.4.2.2 State MID-SU-wait

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

7.5 SS-MID signalling procedures

Examples of message sequences are shown in Clause B.3 of Annex B.

7.5.1 Actions at the Message Centre PINX

The SDL representation of procedures at the Message Centre PINX is shown in Clause C.3 of Annex C.

7.5.1.1 Normal procedures

7.5.1.1.1 Activation, deactivation and interrogation

Not applicable.

7.5.1.1.2 Invocation and operation

In state MID-MC-idle, upon receipt of an appropriate indication from the Message Centre (e.g. that the following information belongs to a specific Mailbox of the Server User), the Message Centre PINX shall send a mIDMailboxID invoke APDU towards the Served User PINX, start timer T1 and enter state MID-MC-wait. The mIDMailboxID invoke shall contain the following elements:

- the address of the Served User;
- optionally, the Message Type of the messages which are stored in that specific Mailbox;
- the identity of the Message Centre;
- optionally, the name of the Served User;
- the identifier (e.g. name) of the specific Served User Mailbox.

In state MID-MC-wait, upon receipt of mIDMailboxID return result APDU, the Message Centre PINX shall stop timer T1 and re-enter state MID-MC-idle.

In state MID-MC-idle, upon receipt of a mIDMailboxAuth invoke APDU from the Served User PINX, the Message Centre PINX shall perform the following consecutive actions:

- verification of the Served User's authentication request;

  NOTE It is an implementation option if this is done by the Message Centre PINX itself or in conjunction with the Message Centre.

- send a mIDMailboxAuth return result APDU towards the Served User PINX, if the verification is valid, and remain in state MID-MC-idle.

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7.5.1.2 Exceptional procedures

7.5.1.2.1 Activation, deactivation and interrogation

Not applicable.

7.5.1.2.2 Invocation and operation

In state MID-MC-wait, upon receipt of a mIDMailboxID return error APDU, the Message Centre PINX shall stop timer T1, re-enter state MID-MC-idle and inform the Message Centre with an appropriate error indication. Any further action is the responsibility of the Message Centre.

In state MID-MC-wait, on expiry of timer T1, the Message Centre PINX shall release the call independent signalling connection with the Served User PINX unless the connection is still required for other purposes, send an appropriate error indication to the Message Centre and enter state MID-MC-idle.

In state MID-MC-idle, on receipt of an invalid mIDMailboxAuth invoke APDU (e.g. invalid Served User password), the Message Centre PINX shall respond with a mIDMailboxAuth return error APDU with an appropriate error value towards the Served User PINX and remain in state MID-MC-Idle.

7.5.2 Actions at the Served User PINX

The SDL representation of procedures at the Served User PINX is shown in Clause C.4 of Annex C.

7.5.2.1 Normal procedures

7.5.2.1.1 Activation, deactivation and interrogation

Not applicable.

7.5.2.1.2 Invocation and operation

In state MID-SU-idle, upon receipt of a mIDMailboxID invoke APDU, the Served User PINX shall respond with a mIDMailboxID return result APDU, may give an appropriate indication to the Served User and shall remain in state MID-SU-idle.

In state MID-SU-idle, upon receipt of an appropriate indication from the Served User, the Served User PINX shall send a mIDMailboxAuth invoke APDU, start timer T2 and enter state MID-SU-wait. The mIDMailboxAuth invoke APDU shall contain the following elements:

- the address of the Served User;
- optionally, the Message Type of the messages which are stored in that specific Mailbox;
- the identity of the Message Centre;
- optionally, the name of the Served User;
- optionally, the identifier (e.g. name) of the specific Served User Mailbox;
- the authentication string (i.e. password) from the Served User to identify himself/herself at that specific Mailbox.

In state MID-SU-wait, upon receipt of the corresponding mIDMailboxAuth return result APDU, the Served User PINX may indicate the valid authentication at the Message Centre by sending an appropriate indication to the Served User. Any further action is the responsibility of the Served User PINX.

NOTE These further actions can be triggered by Served User actions or timer expiry.

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7.5.2.2 Exceptional procedures

7.5.2.2.1 Activation, deactivation and interrogation

Not applicable.

7.5.2.2.2 Invocation and operation

In state MID-SU-idle, on receipt of an invalid mIDMailboxID invoke APDU (e.g. invalid Mailbox identifier), the Served User PINX shall send a mIDMailboxID return error APDU with an appropriate error value towards the Message Centre PINX and remain in state MID-SU-idle.

In state MID-SU-wait, upon receipt of a mIDMailboxAuth return error APDU, the Served User PINX shall stop timer T2, re-enter state MID-SU-idle and may inform the Served User with an appropriate error indication. Any further action is the responsibility of the Served User.

In state MID-SU-wait, on expiry of timer T2, the Served User PINX shall release the call independent signalling connection with the Message Centre PINX unless the connection is still required for other purposes, may send an appropriate error indication to the Served User and shall enter state MID-SU-idle.

7.5.3 Actions at a Transit PINX

Not applicable.

7.6 SS-MID impact of interworking with public ISDNs

Not applicable.

7.7 SS-MID impact of interworking with non-ISDNs

Not applicable.

7.8 Protocol interactions between SS-MID and other supplementary services and ANFs

This Clause specifies protocol interactions with other supplementary services and ANFs for which stage 3 standards had been published at the time of publication of this International Standard. For interactions with supplementary services and ANFs for which stage 3 standards are published subsequent to the publication of this International Standard, see those other stage 3 standards.

NOTE Simultaneous conveyance of APDUs for SS-MID and another supplementary service or ANF 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.

7.8.1 Calling Line Identification Presentation (SS-CLIP)

No protocol interaction.

7.8.2 Connected Line Identification Presentation (SS-COLP)

No protocol interaction.

7.8.3 Calling/Connected Line Identification Restriction (SS-CLIR)

No protocol interaction.

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7.8.4 Calling Name Identification Presentation (SS-CNIP)

No protocol interaction.

7.8.5 Calling/Connected Name Identification Restriction (SS-CNIR)

No protocol interaction.

7.8.6 Connected Name Identification Presentation (SS-CONP)

No protocol interaction.

7.8.7 Call Forwarding Unconditional (SS-CFU)

No protocol interaction.

7.8.8 Call Forwarding Busy (SS-CFB)

No protocol interaction.

7.8.9 Call Forwarding No Reply (SS-CFNR)

No protocol interaction.

7.8.10 Path Replacement (ANF-PR)

No protocol interaction.

7.8.11 Call Transfer (SS-CT)

No protocol interaction.

7.8.12 Call Deflection (SS-CD)

No protocol interaction.

7.8.13 Completion of Calls to Busy Subscribers (SS-CCBS)

No protocol interaction.

7.8.14 Completion of Calls on No Reply (SS-CCNR)

No protocol interaction.

7.8.15 Call Offer (SS-CO)

No protocol interaction.

7.8.16 Do Not Disturb (SS-DND)

No protocol interaction.

7.8.17 Do Not Disturb Override (SS-DNDO)

No protocol interaction.

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7.8.18 Call Intrusion (SS-CI)

No protocol interaction.

7.8.19 Advice of Charge (SS-AOC)

No protocol interaction.

7.8.20 Recall (SS-RE)

No protocol interaction.

7.8.21 Call Interception (SS-CINT)

No protocol interaction.

7.8.22 Transit Counter (ANF-TC)

No protocol interaction.

7.8.23 Route Restriction Class (ANF-RRC)

No protocol interaction.

7.8.24 Message Waiting Indication (SS-MWI)

No protocol interaction.

7.8.25 Wireless Terminal Location Registration (SS-WTLR)

No protocol interaction.

7.8.26 Wireless Terminal Incoming Call (SS-WTMI)

No protocol interaction.

7.8.27 Wireless Terminal Outgoing Call (SS-WTMO)

No protocol interaction.

7.8.28 Wireless Terminal Authentication of a WTM User (SS-WTAT)

No protocol interaction.

7.8.29 Wireless Terminal Authentication of the PISN (SS-WTAN)

No protocol interaction.

7.8.30 Common Information (SS-CMN)

No protocol interaction.

7.8.31 Call Priority Interruption (Protection) (SS-CPI(P))

No protocol interaction.

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7.8.32 Private User Mobility Incoming Call (ANF-PUMI)

No protocol interaction.

7.8.33 Private User Mobility Outgoing Call (ANF-PUMO)

No protocol interaction.

7.8.34 Private User Mobility Registration (SS-PUMR)

No protocol interaction.

7.8.35 Single Step Call Transfer (SS-SSCT)

No protocol interaction.

7.8.36 Simple Dialog (SS-SD)

No protocol interaction.

7.8.37 Call Identification and Call Linkage (ANF-CIDL)

No protocol interaction.

7.8.38 Short Message Service (SS-SMS)

No protocol interaction.

7.8.39 Make Call Request (SS-MCR)

No protocol interaction.

7.8.40 Message Centre Monitoring (SS-MCM)

If the identification and authentication procedures of SS-MID are used in conjunction with SS-MCM operations the following interworking shall occur upon receipt of a SS-MID operation return error or reject APDU:

Upon receipt of a mIDMailboxID return error or reject APDU an invoke APDU of the SS-MCM operations mCMNewMsg, mCMNoNewMsg, mCMUpdate and mCMailboxFull may be sent.

Upon receipt of a mIDMailboxAuth return error or reject APDU the invoke APDU of the SS-MCM operations mCMUpdateReq, mCMService and mCInterrogate shall not be sent.

7.9 SS-MID parameter values (timers)

7.9.1 Timer T1

Timer T1 shall operate at the Message Centre PINX during state MID-MC-wait. Its purpose is to protect against an absence of response to the mIDMailboxID invoke APDU.

Timer T1 shall have a value not less than 15 seconds.

7.9.2 Timer T2

Timer T2 shall operate at the Served User PINX during state MID-SU-wait. Its purpose is to protect against an absence of response to the mIDMailboxAuth invoke APDU.

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

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Annex A
(normative)

Protocol Implementation Conformance Statement (PICS) Proforma

A.1 Introduction

The supplier of a protocol implementation which is claimed to conform to this International Standard shall complete the following Protocol Implementation Conformance Statement (PICS) proforma.

A completed PICS proforma is the PICS for the implementation in question. The PICS is a statement of which capabilities and options of the protocol have been implemented. The PICS can have a number of uses, including use:

— by the protocol implementor, as a check-list to reduce the risk of failure to conform to the standard through oversight;

— by the supplier and acquirer, or potential acquirer, of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard's PICS proforma;

— by the user or potential user of the implementation, as a basis for initially checking the possibility of interworking with another implementation - while interworking can never be guaranteed, failure to interwork can often be predicted from incompatible PICSs;

— by a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

A.2 Instructions for completing the PICS proforma

A.2.1 General structure of the PICS proforma

The PICS proforma is a fixed-format questionnaire divided into sub-clauses each containing a group of individual items. Each item is identified by an item number, the name of the item (question to be answered), and the reference(s) to the clause(s) that specifies (specify) the item in the main body of this International Standard.

The “Status” column indicates whether an item is applicable and if so whether support is mandatory or optional. The following terms are used:

m mandatory (the capability is required for conformance to the protocol);

o optional (the capability is not required for conformance to the protocol, but if the capability is implemented it is required to conform to the protocol specifications);

o.<n> optional, but support of at least one of the group of options labelled by the same numeral <n> is required;

x prohibited;

<c.cond> conditional requirement, depending on support for the item or items listed in condition <cond>;

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<item>:m simple conditional requirement, the capability being mandatory if item number <item> is supported, otherwise not applicable;

<item>:o simple conditional requirement, the capability being optional if item number <item> is supported, otherwise not applicable.

Answers to the questionnaire items are to be provided either in the “Support” column, by simply marking an answer to indicate a restricted choice (Yes or No), or in the “Not Applicable” column (N/A).

A.2.2 Additional information

Items of additional information allow a supplier to provide further information intended to assist the interpretation of the PICS. It is not intended or expected that a large quantity will be supplied, and a PICS can be considered complete without any such information. Examples might be an outline of the ways in which a (single) implementation can be set up to operate in a variety of environments and configurations.

References to items of additional information may be entered next to any answer in the questionnaire, and may be included in items of exception information.

A.2.3 Exception information

It may occasionally happen that a supplier will wish to answer an item with mandatory or prohibited status (after any conditions have been applied) in a way that conflicts with the indicated requirement. No pre-printed answer will be found in the Support column for this. Instead, the supplier is required to write into the Support column an x.<i> reference to an item of exception information, and to provide the appropriate rationale in the exception item itself.

An implementation for which an exception item is required in this way does not conform to this International Standard. A possible reason for the situation described above is that a defect in the Standard has been reported, a correction for which is expected to change the requirement not met by the implementation.

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A.3 PICS proforma for SS-MCM

A.3.1 Implementation identification

Supplier	
Contact point for queries about the PICS	
Implementation name(s) and version(s)	
Other information necessary for full identification, e.g., name(s) and version(s) for machines and/or operating systems; system name(s)	

Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

The terms name and version should be interpreted appropriately to correspond with a supplier's terminology (e.g. type, series, model).

A.3.2 Protocol summary

Protocol version	1.0
Addenda implemented (if applicable)	
Amendments implemented	
Have any exception items been required (see A.2.3)?	No [ ] Yes [ ] (The answer Yes means that the implementation does not conform to this International Standard)

Date of Statement	

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A.3.3 General

Item	Question/feature	References	Status	N/A	Support
A1	Behaviour as a Message Centre PINX for SS-MCM		o.1	[ ]	Yes [ ] No[ ]
A2	Behaviour as a Served User PINX for SS-MCM		o.1	[ ]	Yes [ ] No[ ]
o.1: at least one of the items					

A.3.4 Procedures

Item	Question/feature	References	Status	N/A	Support
B1	Support of relevant ISO/IEC 11582 procedures at the Message Centre PINX	6.2.1	A1:m	[ ]	m:Yes [ ]
B2	Support of relevant ISO/IEC 11582 procedures at the Served User PINX	6.2.2	A2:m	[ ]	m:Yes [ ]
B3	Procedures at the Message Centre PINX for activation and deactivation of monitoring messages for specific Message Types	6.5.1	A1:o	[ ]	Yes [ ] No[ ]
B4	Procedures at the Message Centre PINX for interrogation of current monitoring configuration	6.5.1	A1:o	[ ]	Yes [ ] No[ ]
B5	Procedures at the Message Centre PINX for the arrival of new messages	6.5.1	A1:m	[ ]	m:Yes [ ]
B6	Procedures at the Message Centre PINX for indicating no New Messages of a specific Message Type are available	6.5.1	A1:m	[ ]	m:Yes [ ]
B7	Procedures at the Message Centre PINX for an update of Message Centre information	6.5.1	A1:m	[ ]	m:Yes [ ]
B8	Procedures at the Message Centre PINX for an update request of Message Centre information	6.5.1	A1:m	[ ]	m:Yes [ ]
B9	Procedures at the Message Centre PINX for a mailbox-full indication	6.5.1	A1:o	[ ]	Yes [ ] No[ ]
B10	Procedures at the Served User PINX for activation and deactivation of monitoring messages for specific Message Types	6.5.2	A2:o	[ ]	Yes [ ] No[ ]
B11	Procedures at the Served User PINX for interrogation of current monitoring configuration	6.5.2	A2:o	[ ]	Yes [ ] No[ ]
B12	Procedures at the Served User PINX for the arrival of new messages	6.5.2	A2:m	[ ]	m:Yes [ ]

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Item	Question/feature	References	Status	N/A	Support
B13	Procedures at the Served User PINX for indicating no New Messages of a specific Message Type are available	6.5.2	A2:m	[ ]	m:Yes [ ]
B14	Procedures at the Served User PINX for an update of Message Centre information	6.5.2	A2:m	[ ]	m:Yes [ ]
B15	Procedures at the Served User PINX for an update request of Message Centre information	6.5.2	A2:m	[ ]	m:Yes [ ]
B16	Procedures at the Served User PINX for a mailbox-full indication	6.5.2	A2:o	[ ]	Yes [ ] No[ ]

A.3.5 Coding

Item	Question/feature	References	Status	N/A	Support
C1	sending of mCMNewMessage invoke APDU and receiving of mCMNewMessage return result or return error APDU	6.3.1	A1:m	[ ]	m:Yes [ ]
C2	receipt of mCMNewMessage invoke APDU and sending of mCMNewMessage return result or return error APDU	6.3.1	A2:m	[ ]	m:Yes [ ]
C3	sending of mCMNoNewMessage invoke APDU and receiving of mCMNoNewMessage return result or return error APDU	6.3.1	A1:m	[ ]	m:Yes [ ]
C4	receipt of mCMNoNewMessage invoke APDU and sending of mCMNoNewMessage return result or return error APDU	6.3.1	A2:m	[ ]	m:Yes [ ]
C5	sending of mCMUpdate invoke APDU and receiving of mCMUpdate return result or return error APDU	6.3.1	A1:m	[ ]	m:Yes [ ]
C6	receipt of mCMUpdate invoke APDU and sending of mCMUpdate return result or return error APDU	6.3.1	A2:m	[ ]	m:Yes [ ]
C7	receipt of mCMUpdateReq invoke APDU and sending of mCMUpdateReq return result or return error APDU	6.3.1	A1:m	[ ]	m:Yes [ ]
C8	sending of mCMUpdateReq invoke APDU and receiving of mCMUpdateReq return result or return error APDU	6.3.1	A2:m	[ ]	m:Yes [ ]
C9	receipt of mCMService invoke APDU and sending of mCMService return result or return error APDU	6.3.1	B3:m	[ ]	m:Yes [ ]
C10	sending of mCMService invoke APDU and receiving of mCMService return result or return error APDU	6.3.1	B10:m	[ ]	m:Yes [ ]

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Item	Question/feature	References	Status	N/A	Support
C11	receipt of mCMInterrogate invoke APDU and sending of mCMInterrogate return result or return error APDU	6.3.1	B4:m	[ ]	m:Yes [ ]
C12	sending of mCMInterrogate invoke APDU and receiving of mCMInterrogate return result or return error APDU	6.3.1	B11:m	[ ]	m:Yes [ ]
C13	sending of mCMailboxFull invoke APDU	6.3.1	B9:m	[ ]	m:Yes [ ]
C14	receipt of mCMailboxFull invoke APDU	6.3.1	B16:m	[ ]	m:Yes [ ]

A.3.6 Timers

Item	Question/feature	References	Status	N/A	Support
D1	Support of Timer T1	6.9.1	A1:m	[ ]	m:Yes [ ] value: ...
D2	Support of Timer T2	6.9.2	A2:m	[ ]	m:Yes [ ] value: ...
D3	Support of Timer T3	6.9.3	A2:m	[ ]	m:Yes [ ] value: ...

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A.4 PICS proforma for SS-MID

A.4.1 Implementation identification

Supplier	
Contact point for queries about the PICS	
Implementation name(s) and version(s)	
Other information necessary for full identification, e.g., name(s) and version(s) for machines and/or operating systems; system name(s)	

Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

The terms name and version should be interpreted appropriately to correspond with a supplier's terminology (e.g. type, series, model).

A.4.2 Protocol summary

Protocol version	1.0
Addenda implemented (if applicable)	
Amendments implemented	
Have any exception items been required (see A.2.3)?	No [ ] Yes [ ] (The answer Yes means that the implementation does not conform to this International Standard)

Date of Statement	

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A.4.3 General

Item	Question/feature	References	Status	N/A	Support
A1	Behaviour as Message Centre PINX for SS-MID		o.1	[ ]	Yes [ ] No[ ]
A2	Behaviour as Served User PINX for SS-MID		o.1	[ ]	Yes [ ] No[ ]
o.1: at least one of the items					

A.4.4 Procedures

Item	Question/feature	References	Status	N/A	Support
B1	Support of relevant ISO/IEC 11582 procedures at the Message Centre PINX	7.2.1	A1:m	[ ]	m:Yes [ ]
B2	Support of relevant ISO/IEC 11582 procedures at the Served User PINX	7.2.2	A2:m	[ ]	m:Yes [ ]
B3	Procedures at the Message Centre PINX for identification of Served User mailboxes	7.5.1	A1:o2	[ ]	Yes [ ] No[ ]
B4	Procedures at the Message Centre PINX for authentication of a Served User at his/her mailbox	7.5.1	A1:o2	[ ]	Yes [ ] No[ ]
B5	Procedures at the Served User PINX for identification of Served User mailboxes	7.5.2	A2:o3	[ ]	Yes [ ] No[ ]
B6	Procedures at the Served User PINX for authentication of a Served User at his/her mailbox	7.5.2	A2:o3	[ ]	Yes [ ] No[ ]
o.2: at least one of the items o.3: at least one of the items					

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A.4.5 Coding

Item	Question/feature	References	Status	N/A	Support
C1	sending of mIDMailboxID invoke APDU and receiving of mIDMailboxID return result or return error APDU	7.3.1	B3:m	[ ]	m:Yes [ ]
C2	receipt of mIDMailboxID invoke APDU and sending of mIDMailboxID return result or return error APDU	7.3.1	B5:m	[ ]	m:Yes [ ]
C3	receipt of mIDMailboxAuth invoke APDU and sending of mIDMailboxAuth return result or return error APDU	7.3.1	B4:m	[ ]	m:Yes [ ]
C4	sending of mIDMailboxAuth invoke APDU and receiving of mIDMailboxAuth return result or return error APDU	7.3.1	B6:m	[ ]	m:Yes [ ]

A.4.6 Timers

Item	Question/feature	References	Status	N/A	Support
D1	Support of Timer T1	7.9.1	B3:m	[ ]	m:Yes [ ] value: ...
D2	Support of Timer T2	7.9.2	B6:m	[ ]	m:Yes [ ] value: ...

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Annex B
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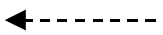
Examples of Message Sequences

This Annex describes some typical message flows for SS-MCM as well as SS-MID. The following conventions are used in the Figures of this Annex.

1. The following notation is used:


Call Independent Signalling Connection messages containing SS-MCM or SS-MID information


Call Independent Signalling Connection messages without SS-MCM or SS-MID information


SS-MCM or SS-MID information for the Served User or the Message Centre

2. The Figures show messages exchanged via Protocol Control between PINXs involved in SS-MCM and SS-MID. Only messages relevant to SS-MCM as well as SS-MID 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-MCM and SS-MID is not shown.

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B.1 Example message sequence for SS-MCM

B.1.1 Example message sequence for activation, deactivation and interrogation

The Figures B.1.1 – B.1.3 show an example for activation, deactivation and interrogation of monitoring of messages.

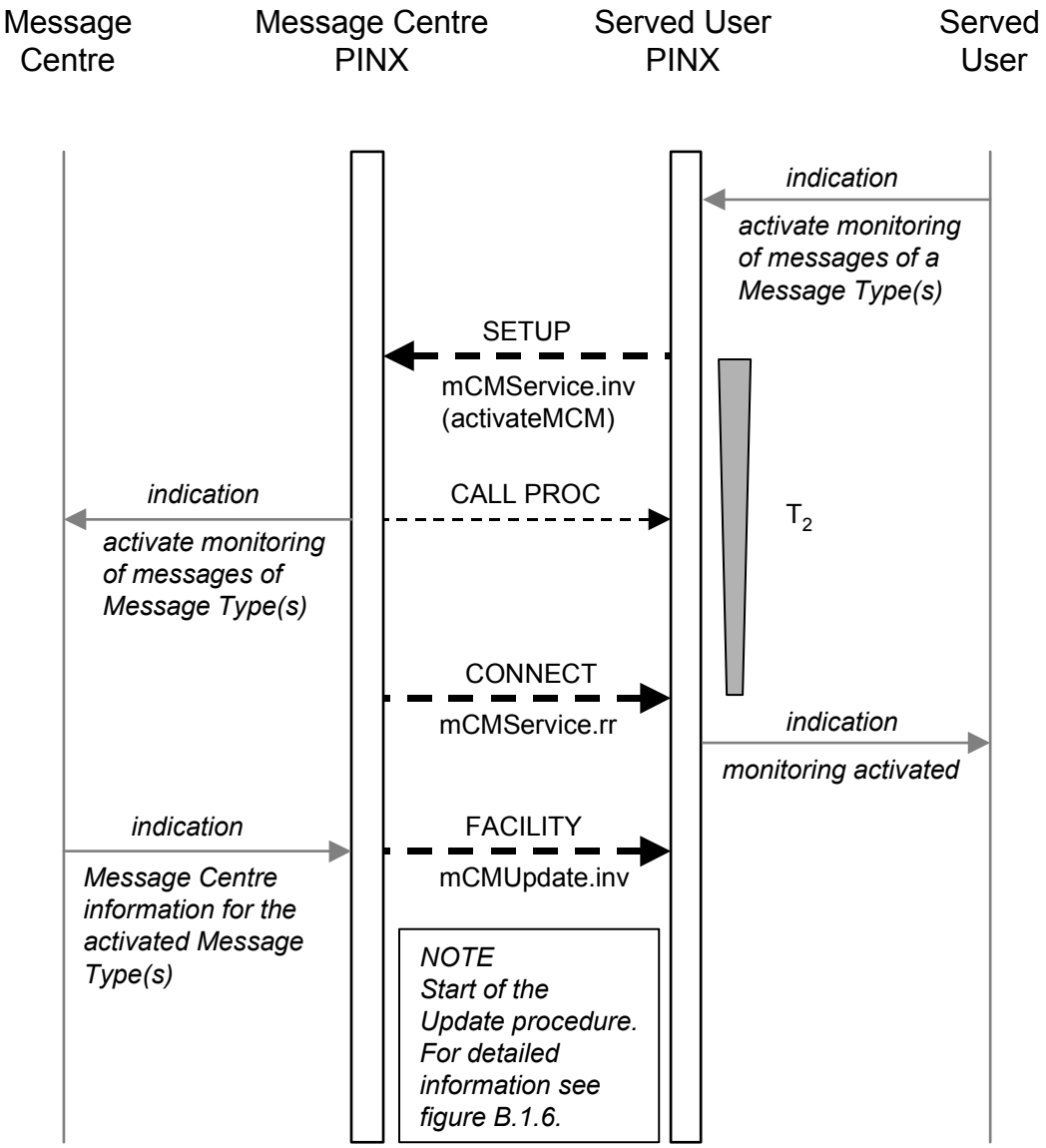

Figure B.1.1 — Example of activation of monitoring of messages of a specific Message Type

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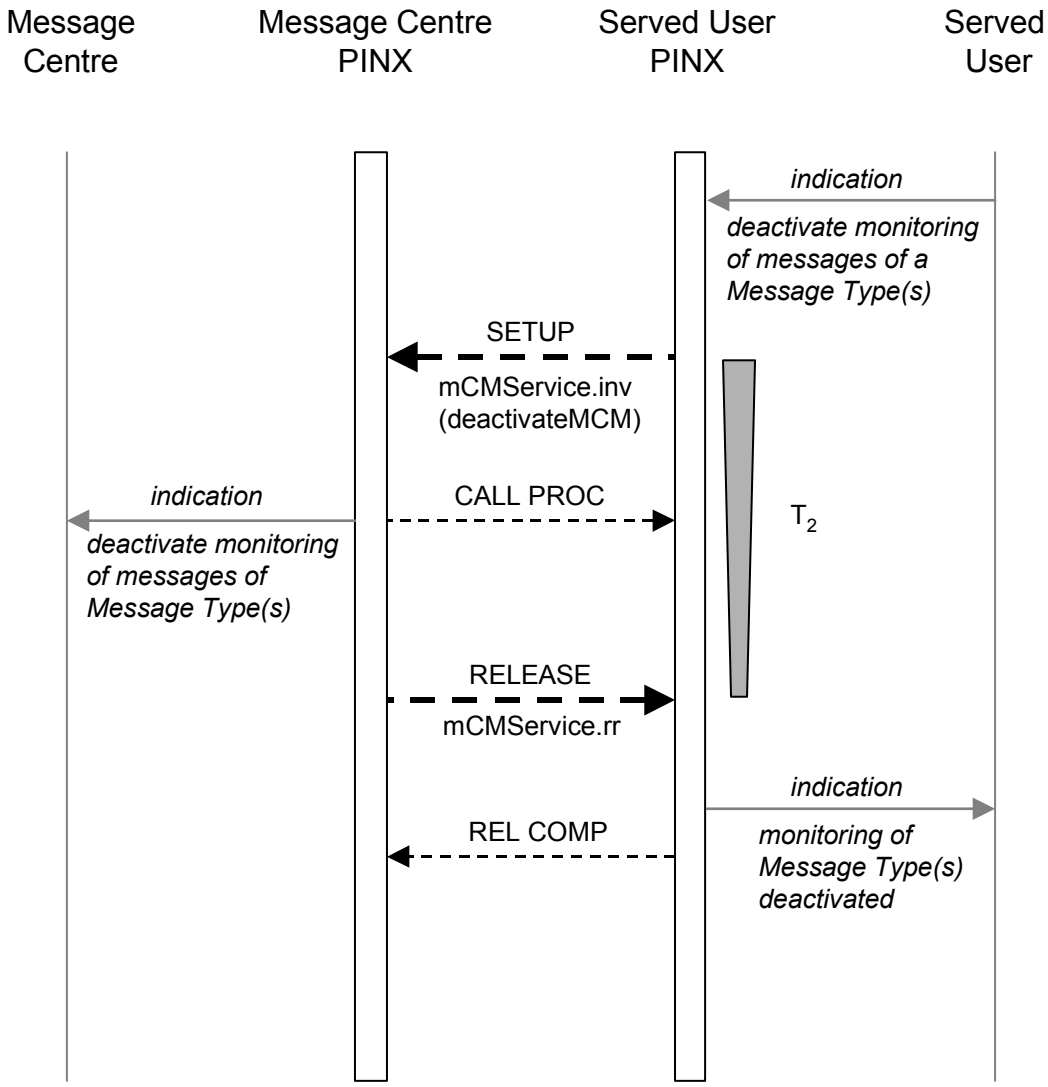

Figure B.1.2 — Example of deactivation of monitoring of messages of a specific Message Type

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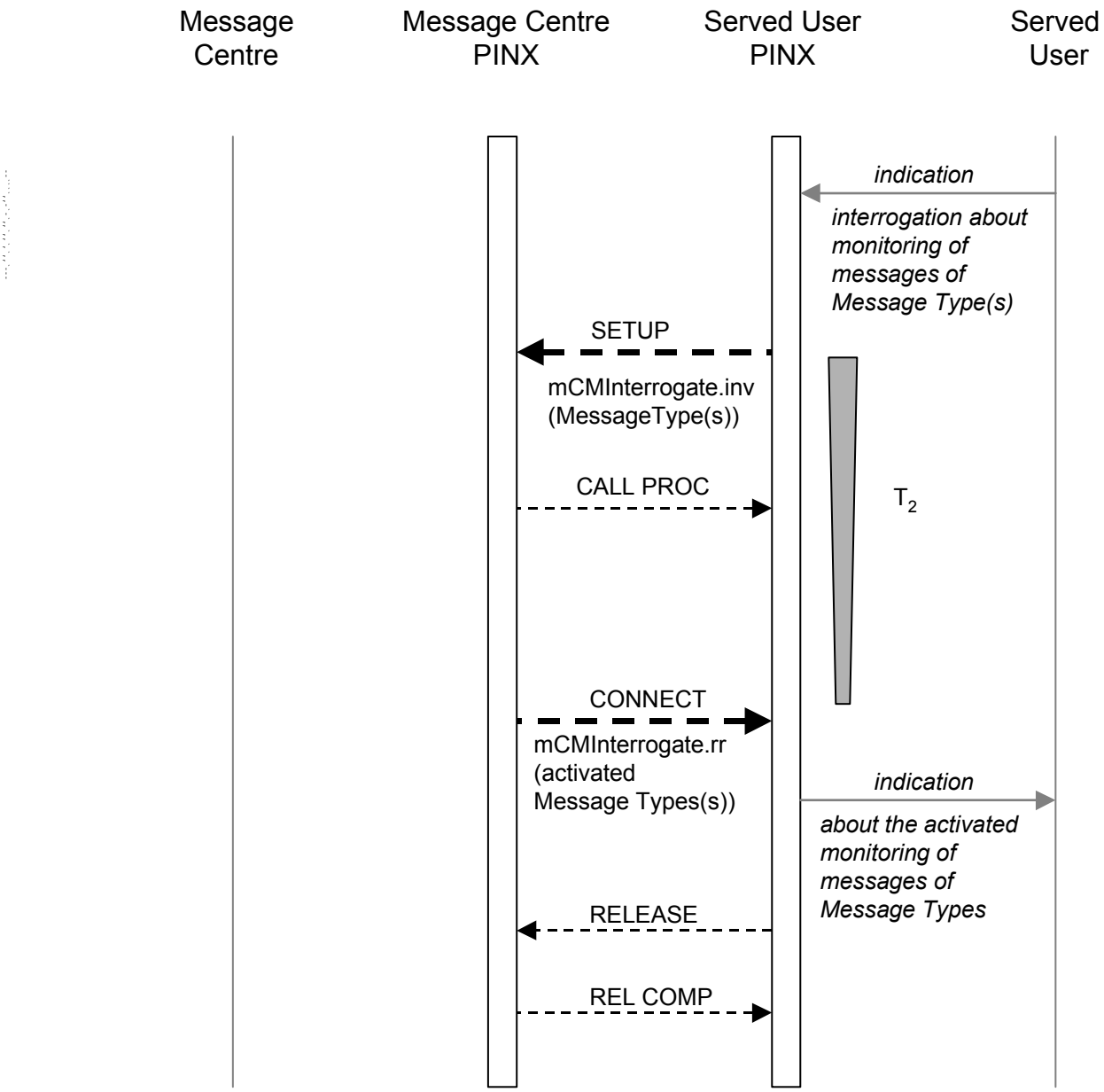

Figure B.1.3 — Example for interrogation of monitoring of messages

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B.1.2 Example message sequence for the arrival of a New Message

Figure B.1.4 shows an example for the Incoming New Message procedure.

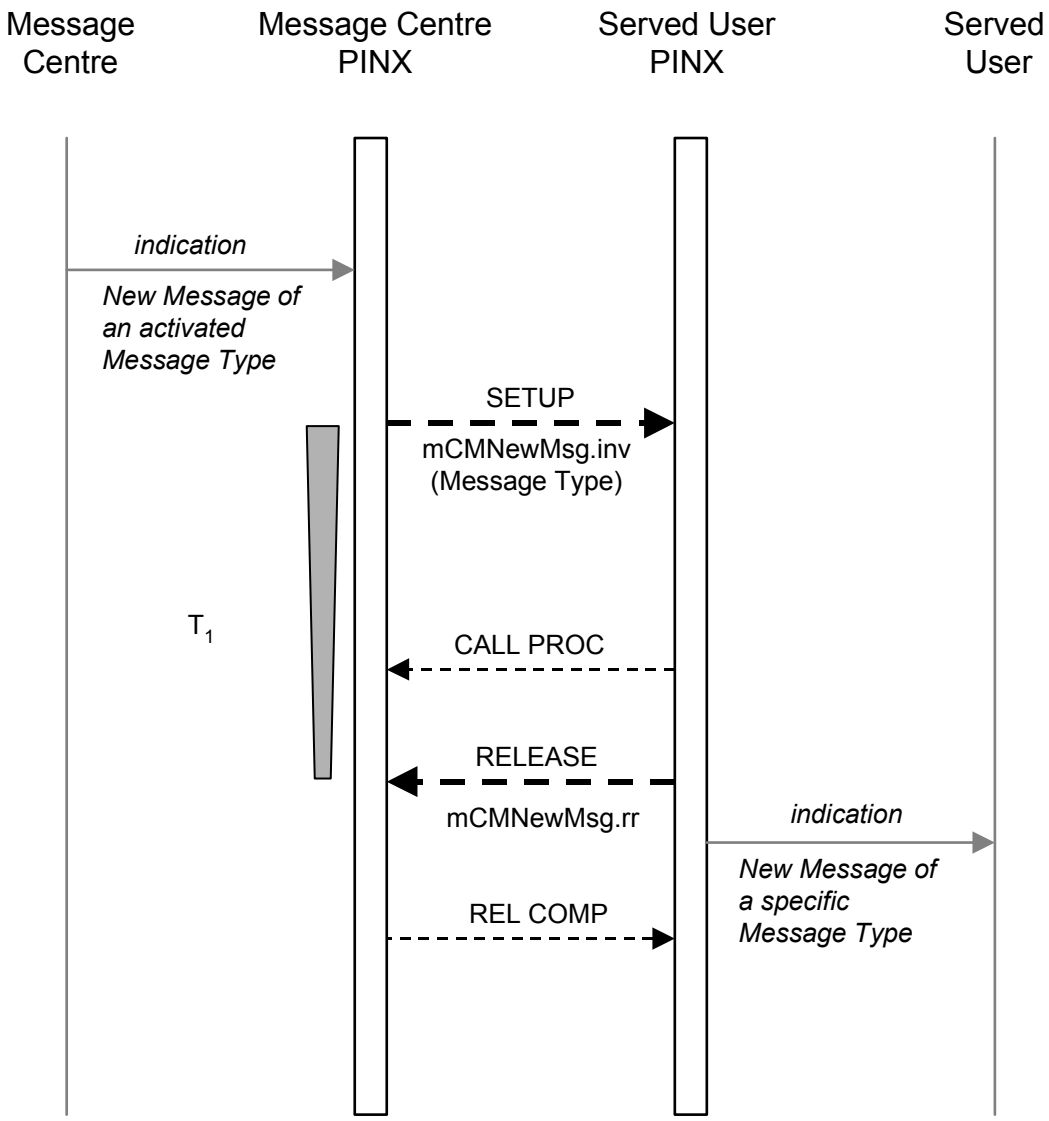

Figure B.1.4 — Example for the SS-MCM Incoming New Message procedure

--`,,`-`-`,,`,,`,`,,`---
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B.1.3 Example message sequence for the sending of the NoNewMessage indication

Figure B.1.5 shows an example for the sending of the NoNewMessage indication.

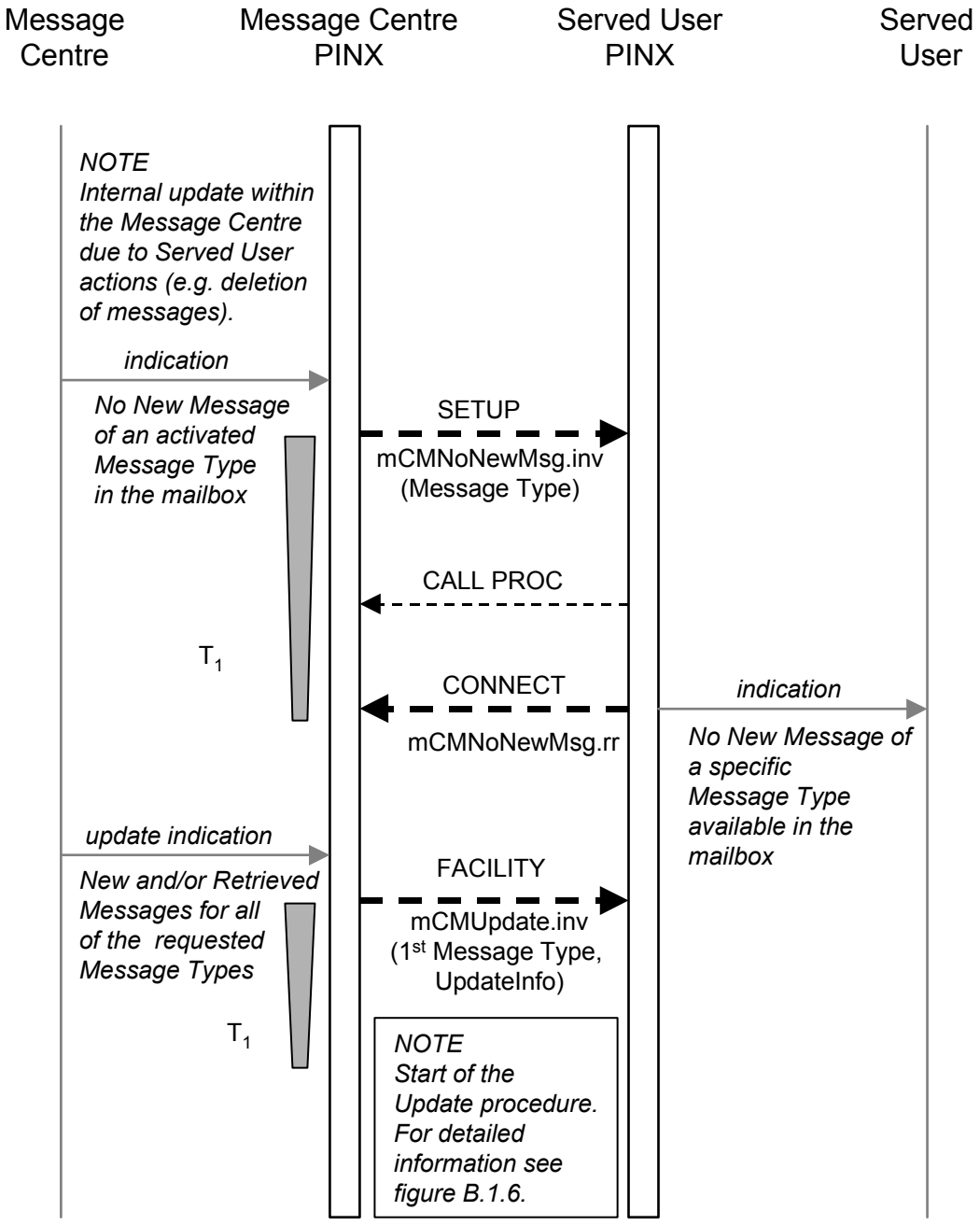

Figure B.1.5 — Example for the SS-MCM indication that NoNew Messages are in the mailbox

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B.1.4 Example message sequence for the Update of Message Centre Information (update procedure)

Figure B.1.6 shows an example for the update procedure for various (n) Message Types, whereby the information on each Message Type does not exceed the limited length of a mCMUpdate invoke APDU. Therefore, parameter"moreInfoFollows" is set to FALSE in each APDU.

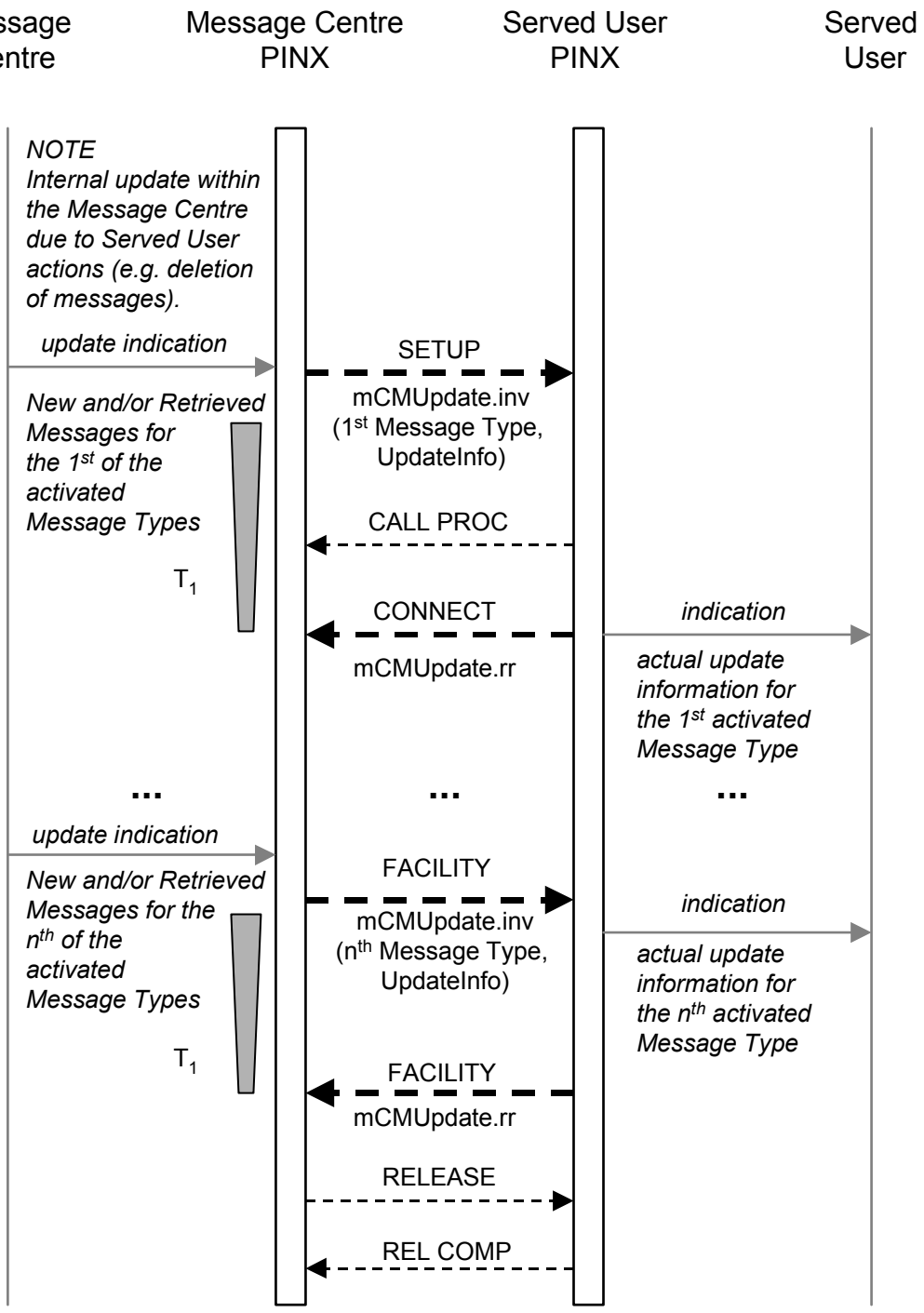

Figure B.1.6 — Example for the SS-MCM Update procedure

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B.1.5 Example message sequence for the SS-MCM Update request from the Served user

Figure B.1.7 shows an example for an update request from the Served User.

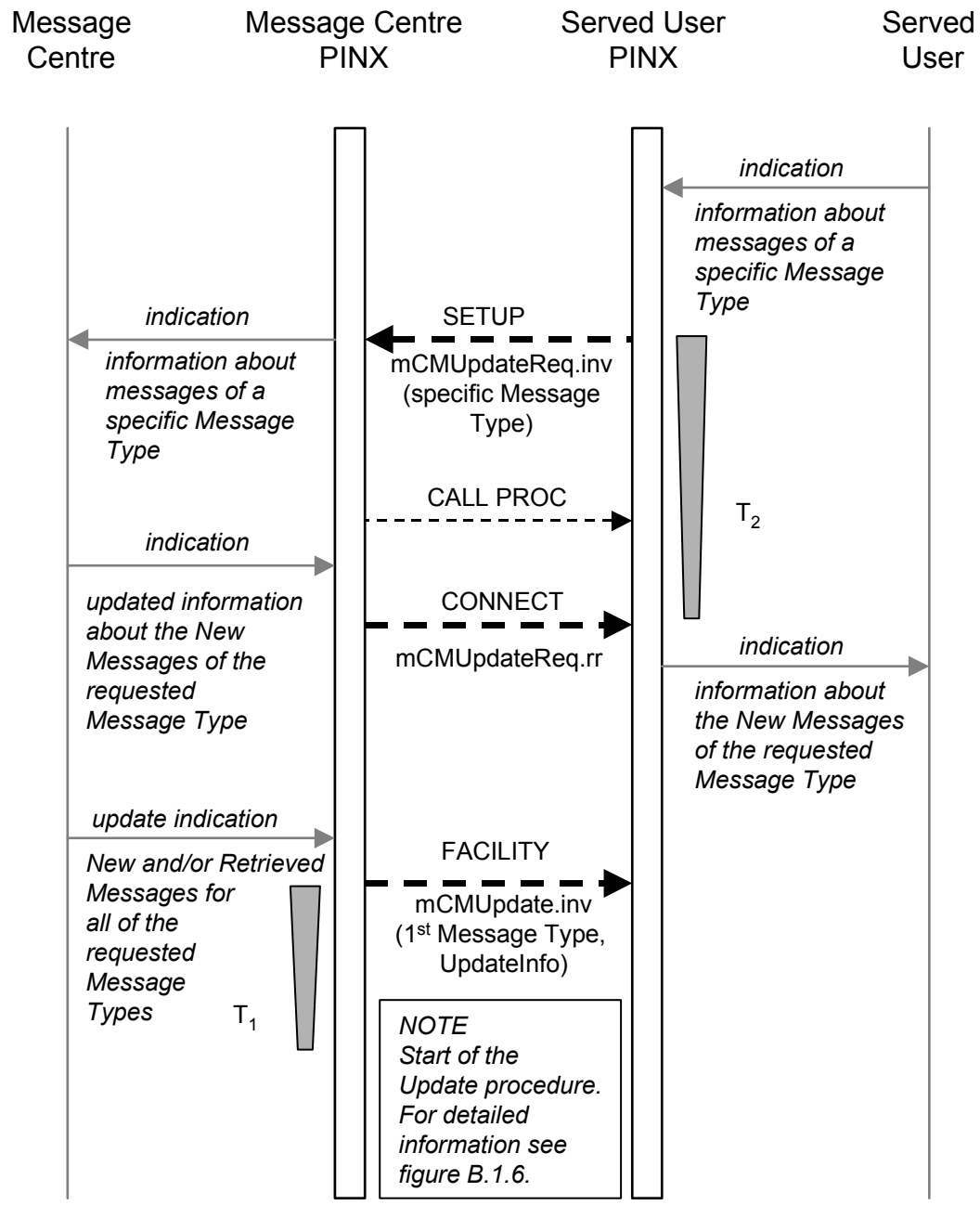

Figure B.1.7 — Example for the SS-MCM Update Request procedure

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B.1.6 Example message sequence for the SS-MCM Mailbox-Full indication

Figure B.1.8 shows an example for a MailboxFull indication procedure.

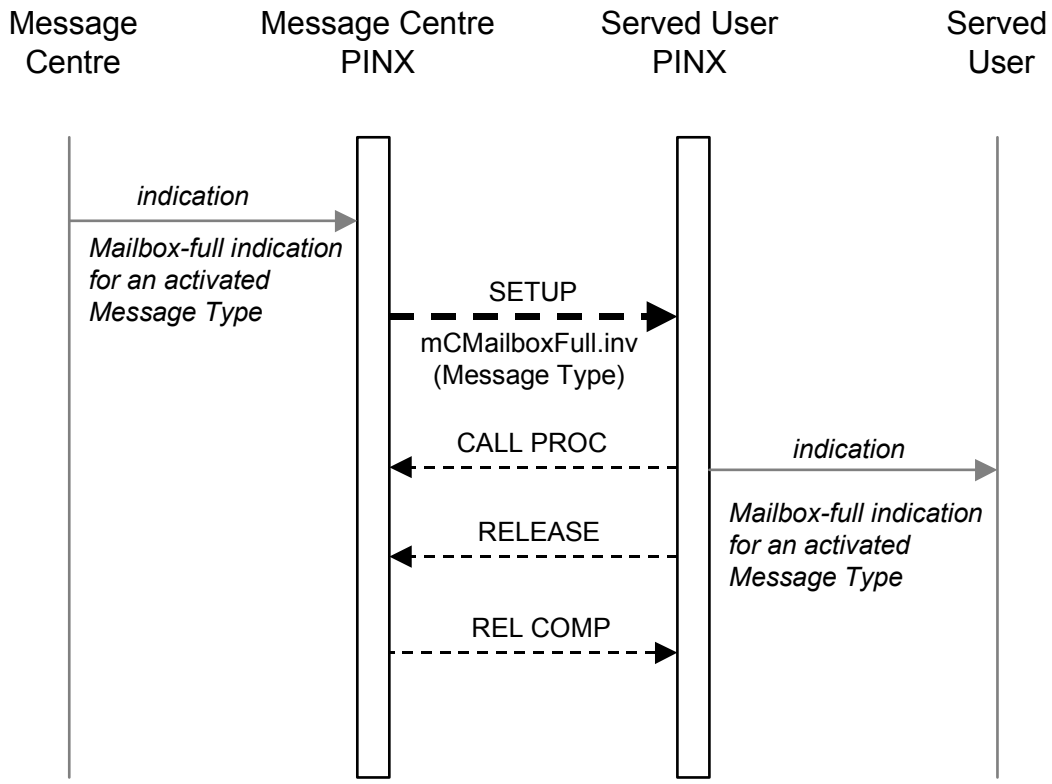

Figure B.1.8 — Example for the SS-MCM Mailbox-full indication

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B.2 Example message sequences for interworking between for SS-MCM and SS-MWI

B.2.1 SS-MCM is implemented at the Message Centre PINX

Interworking scenarios between SS-MCM and SS-MWI if SS-MCM is implemented at the Message Centre PINX whereas SS-MWI is implemented at the Served User PINX.

For simplification reasons the messages are conveyed within a FACILITY message.

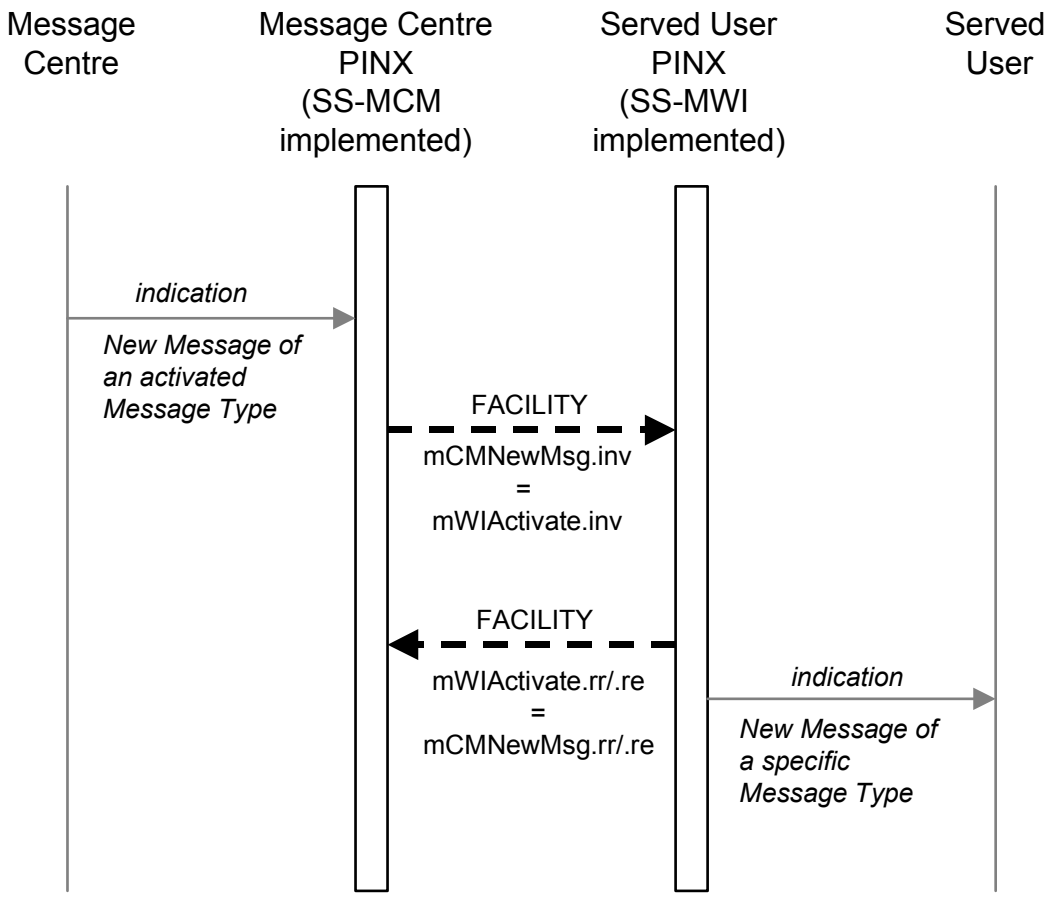

Figure B.2.1.1 — Example for interworking with the SS-MCM Incoming New Message procedure

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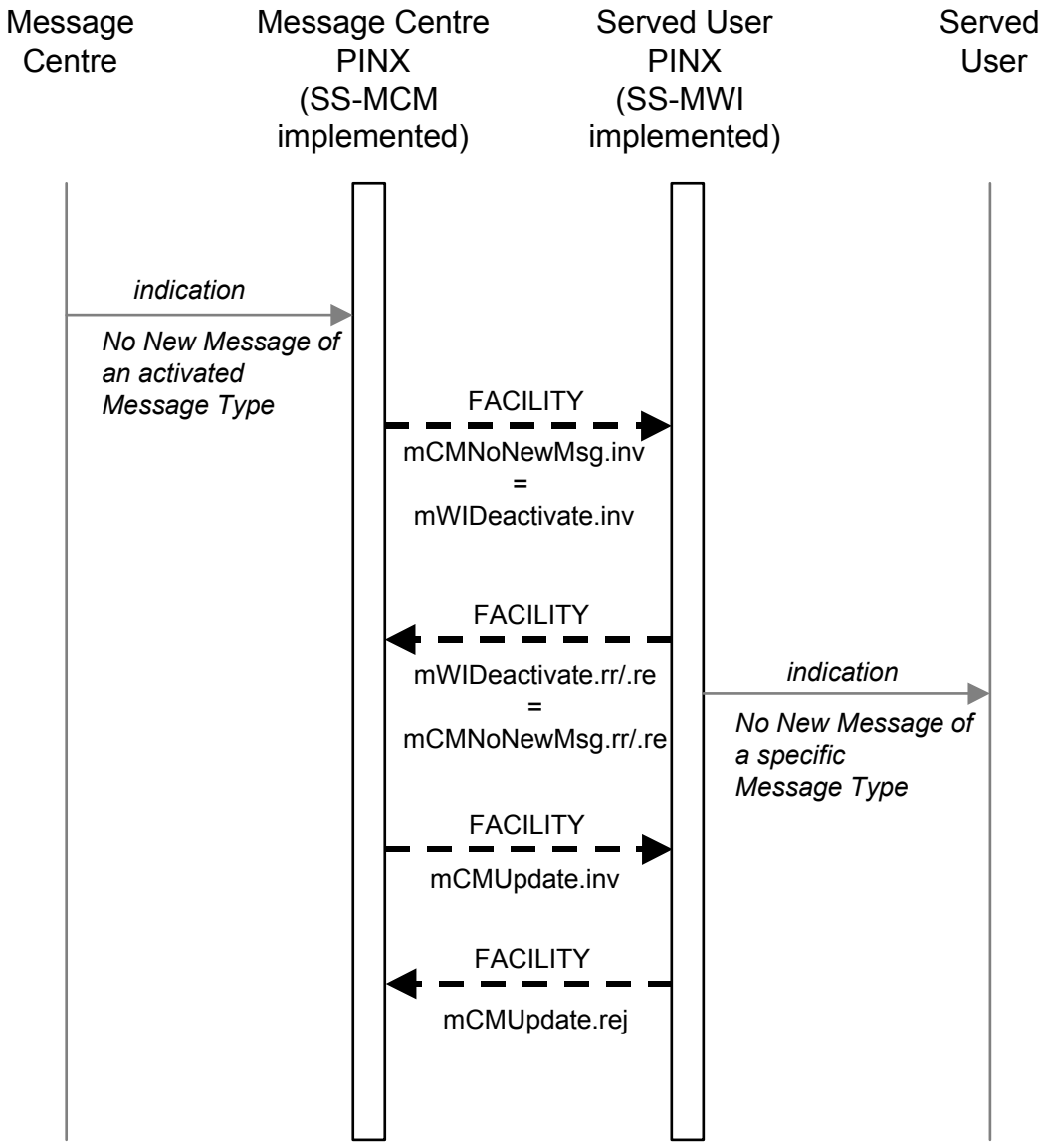

Figure B.2.1.2 — Example for interworking with the SS-MCM indication that No New Messages are in the mailbox

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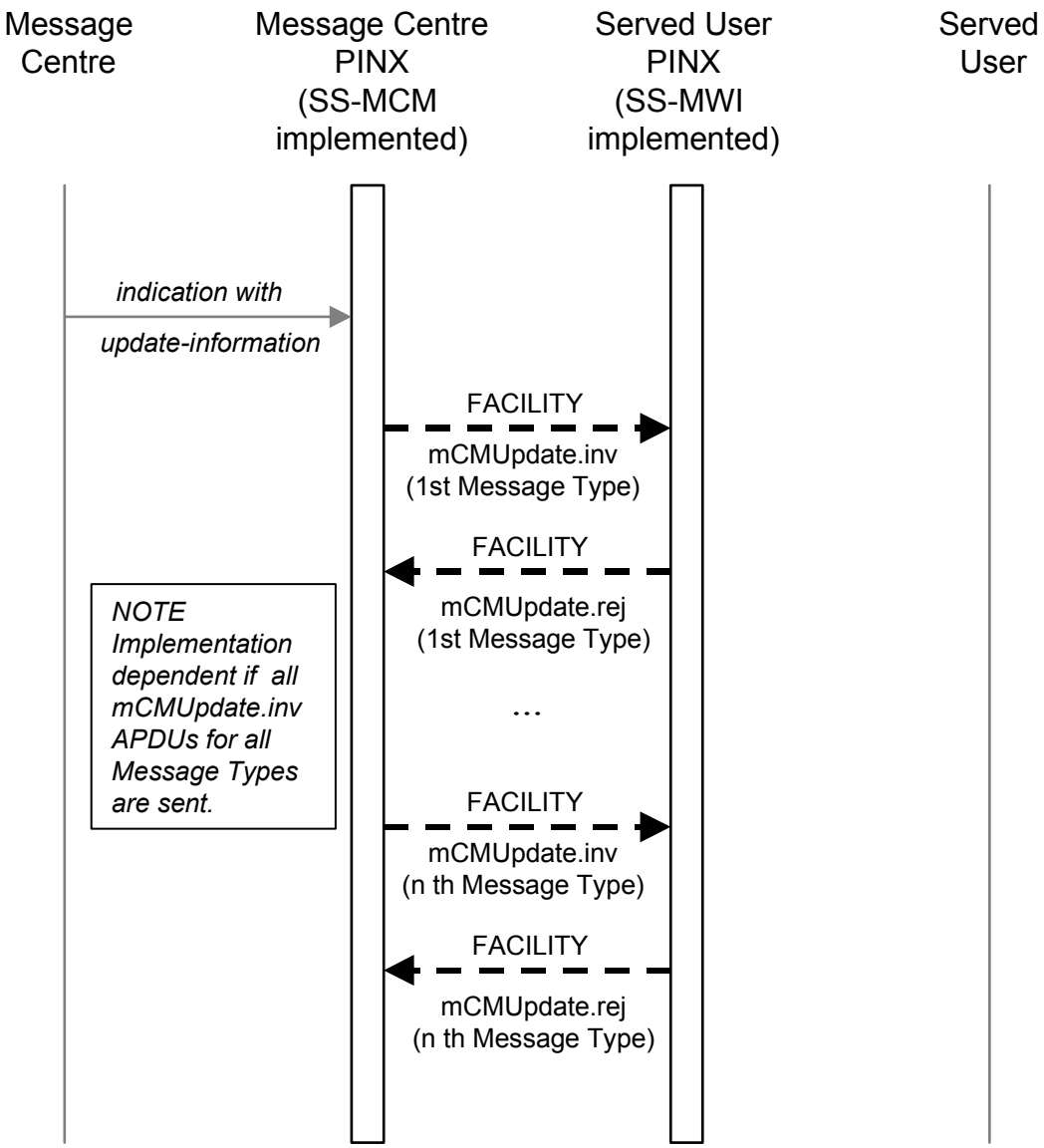

Figure B.2.1.3 — Example for the interworking with the SS-MCM Update procedure

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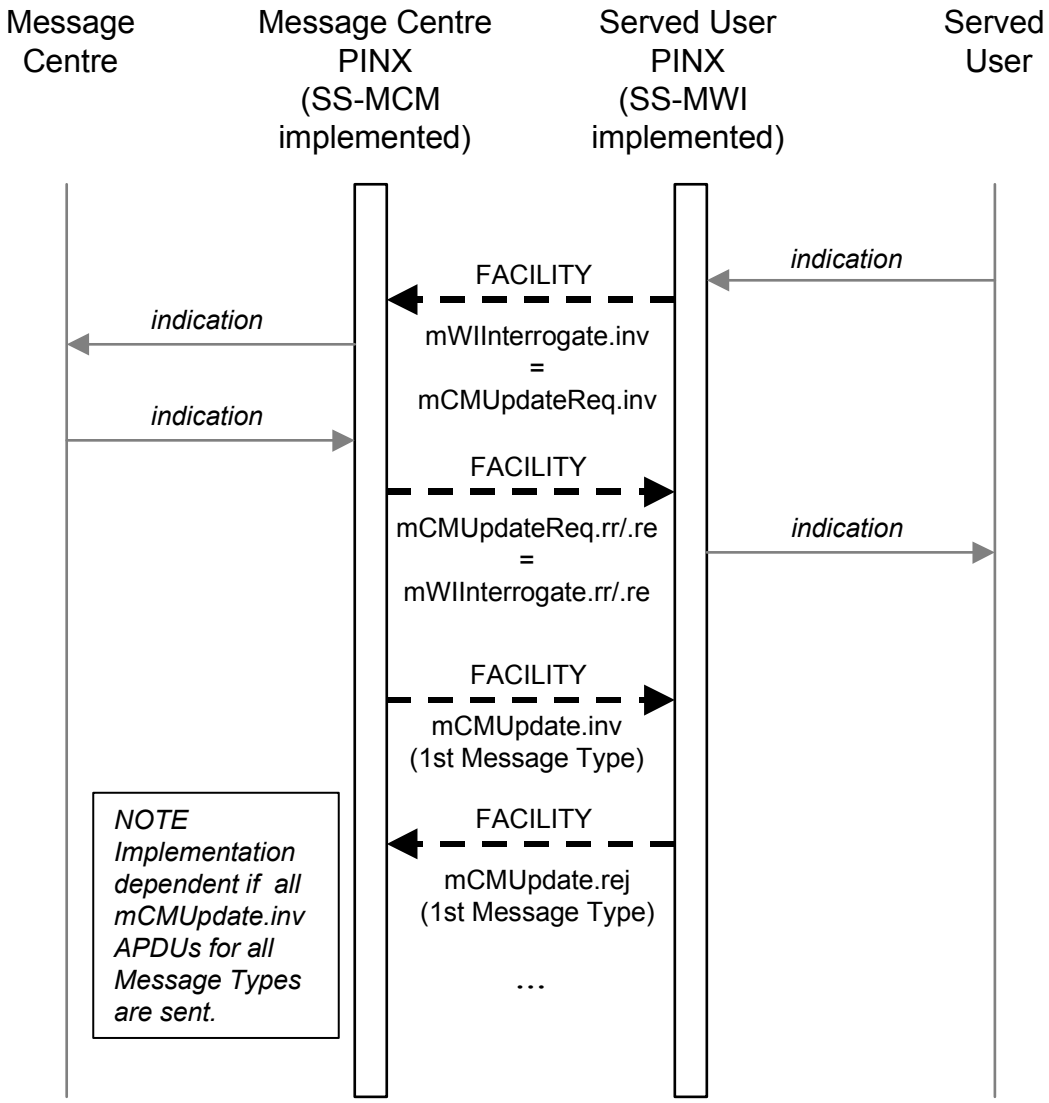

Figure B.2.1.4 — Example for interworking for the SS-MCM Update Request procedure

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B.2.2 SS-MCM is implemented at the Served User PINX

Interworking scenarios between SS-MCM and SS-MWI, if SS-MCM is implemented at the Served User PINX whereas SS-MWI is implemented at the Message Centre PINX.

For simplification reasons the messages are conveyed within a FACILITY message.

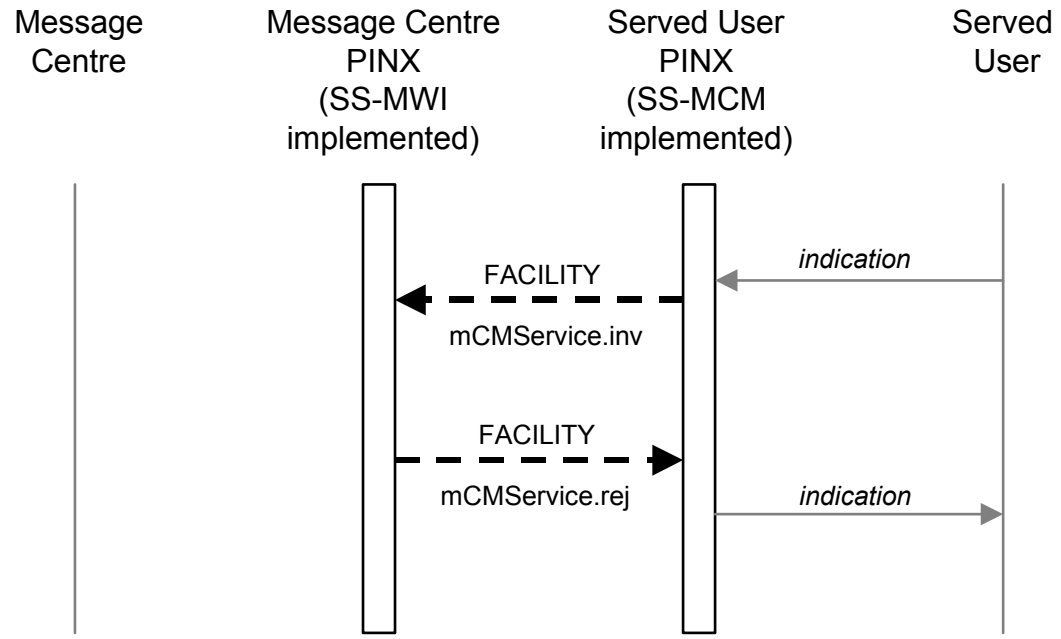

Figure B.2.2.1 — Example for interworking for the SS-MCM activation and deactivation procedure

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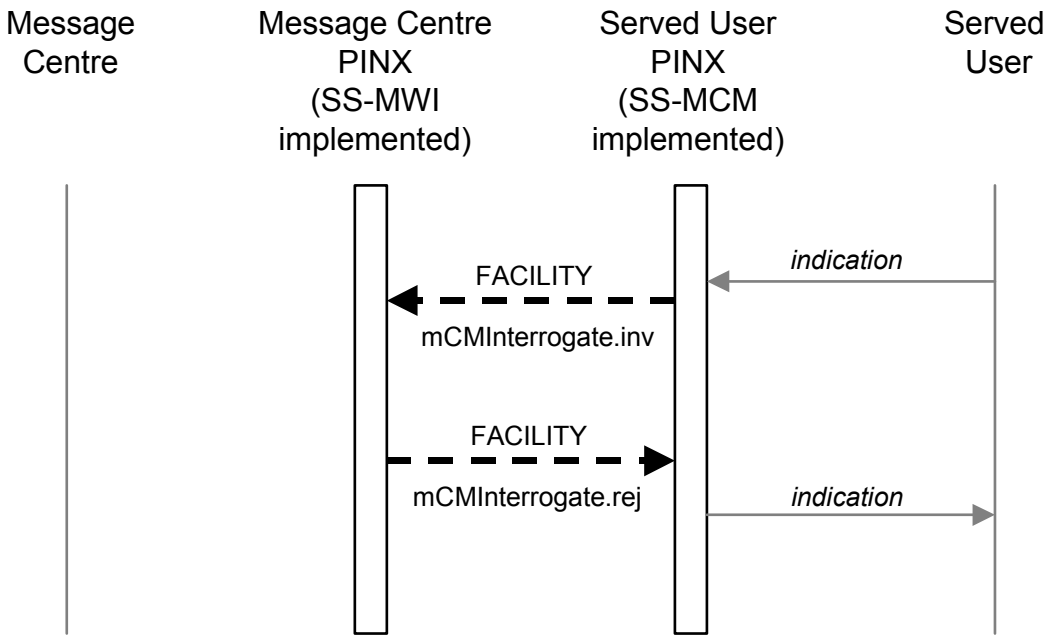

Figure B.2.2.2 — Example for interworking for the SS-MCM interrogation procedure

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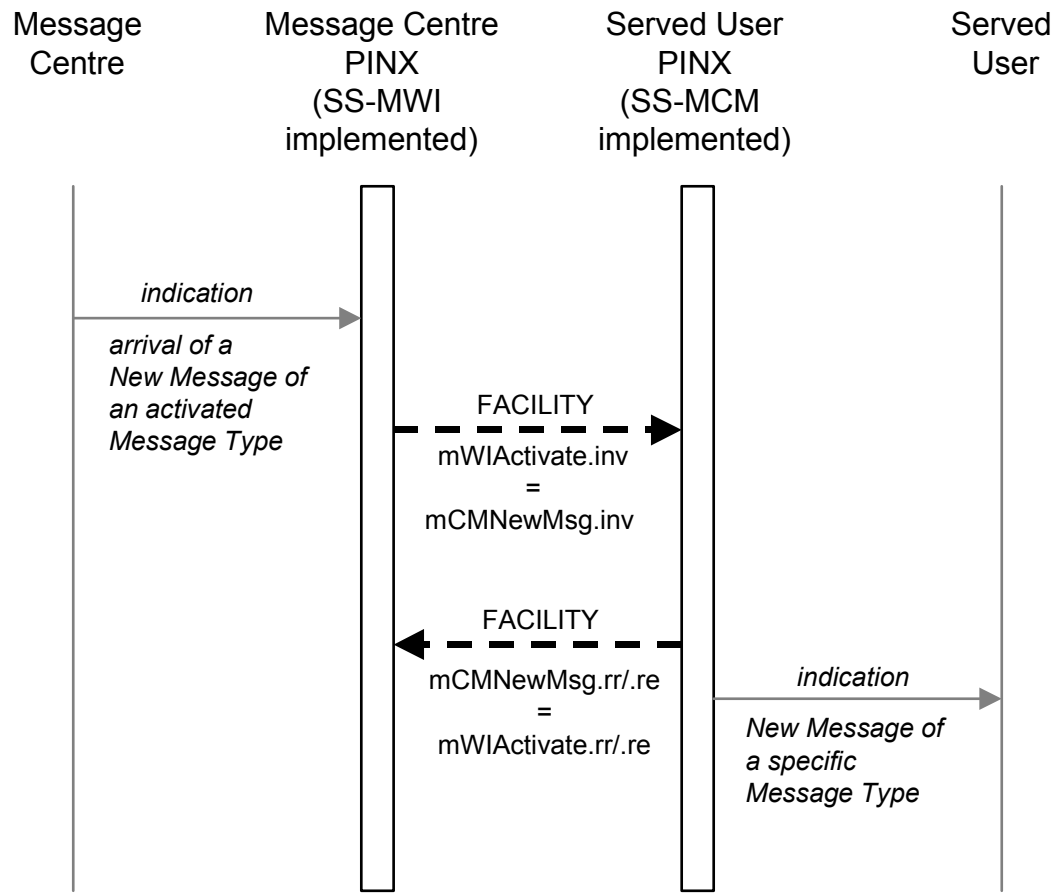

Figure B.2.2.3 — Example for interworking with the SS-MCM Incoming New Message procedure

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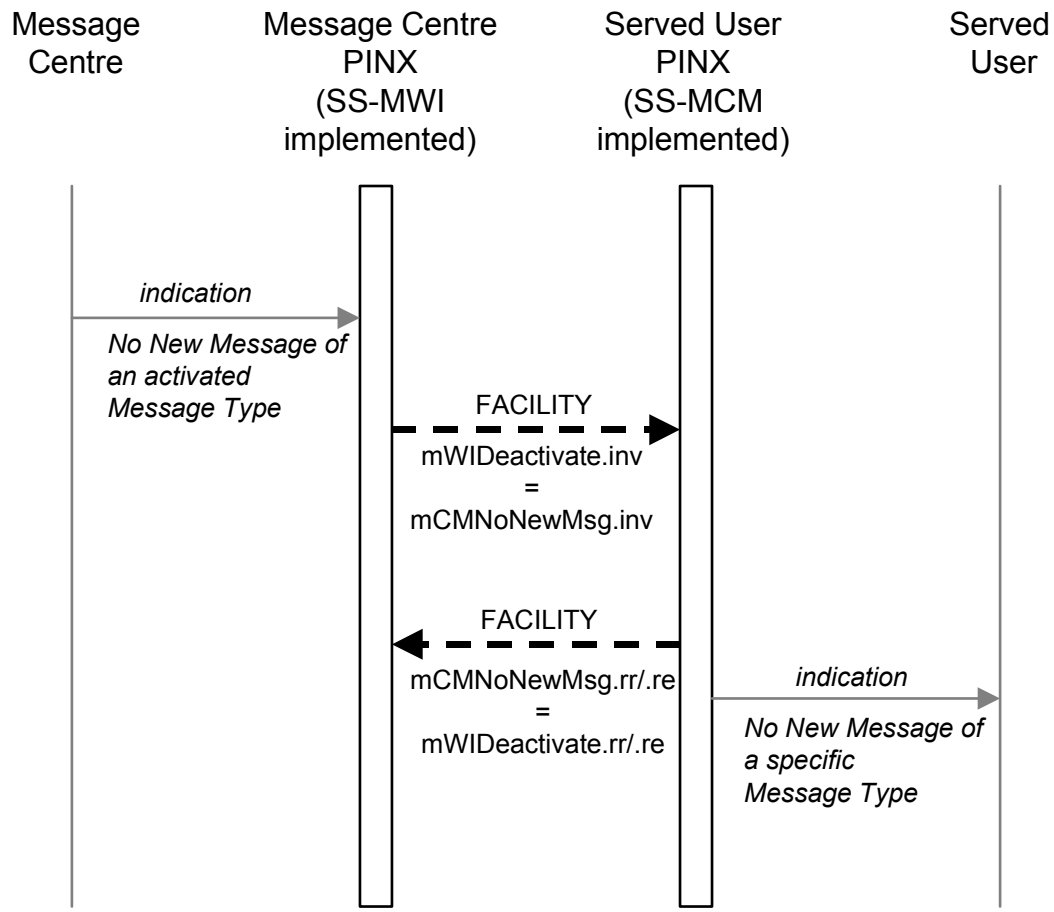

Figure B.2.2.4 — Example for interworking with the SS-MCM indication that No New Messages are in the mailbox

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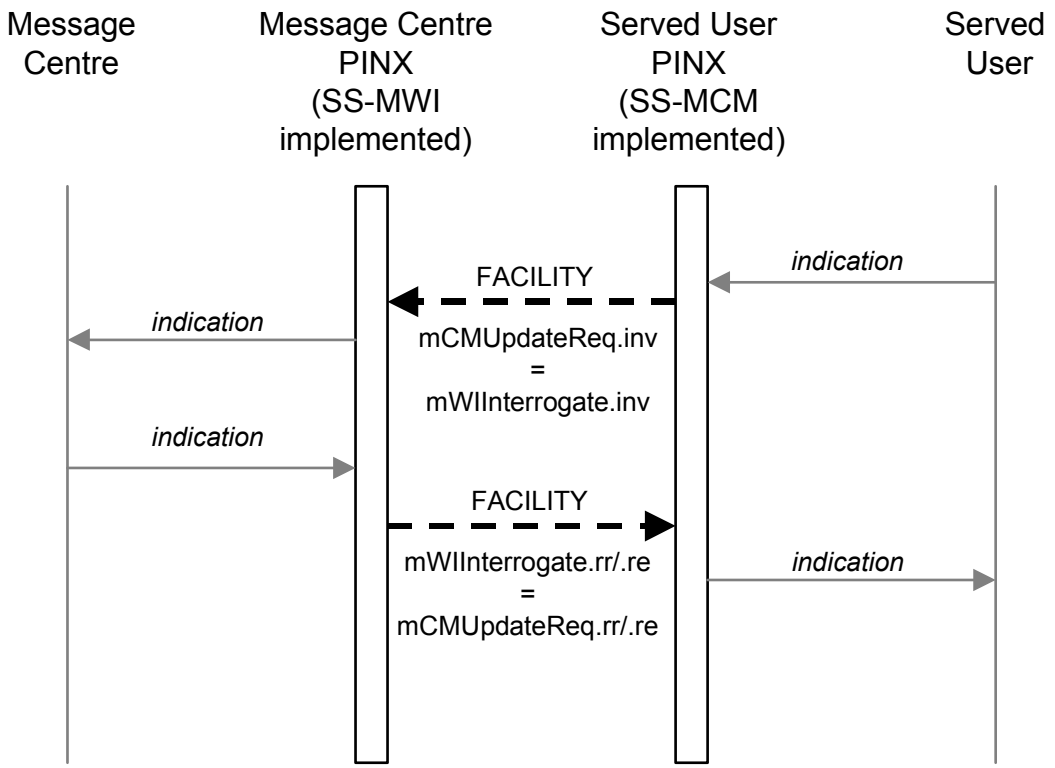

Figure B.2.2.5 — Example for interworking for the SS-MCM Update Request procedure

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B.3 Example message sequence for SS-MID

B.3.1 Example message sequence for identification of a specific Served User Mailbox

Figure B.3.1 shows an example for Mailbox identification within SS-MID.

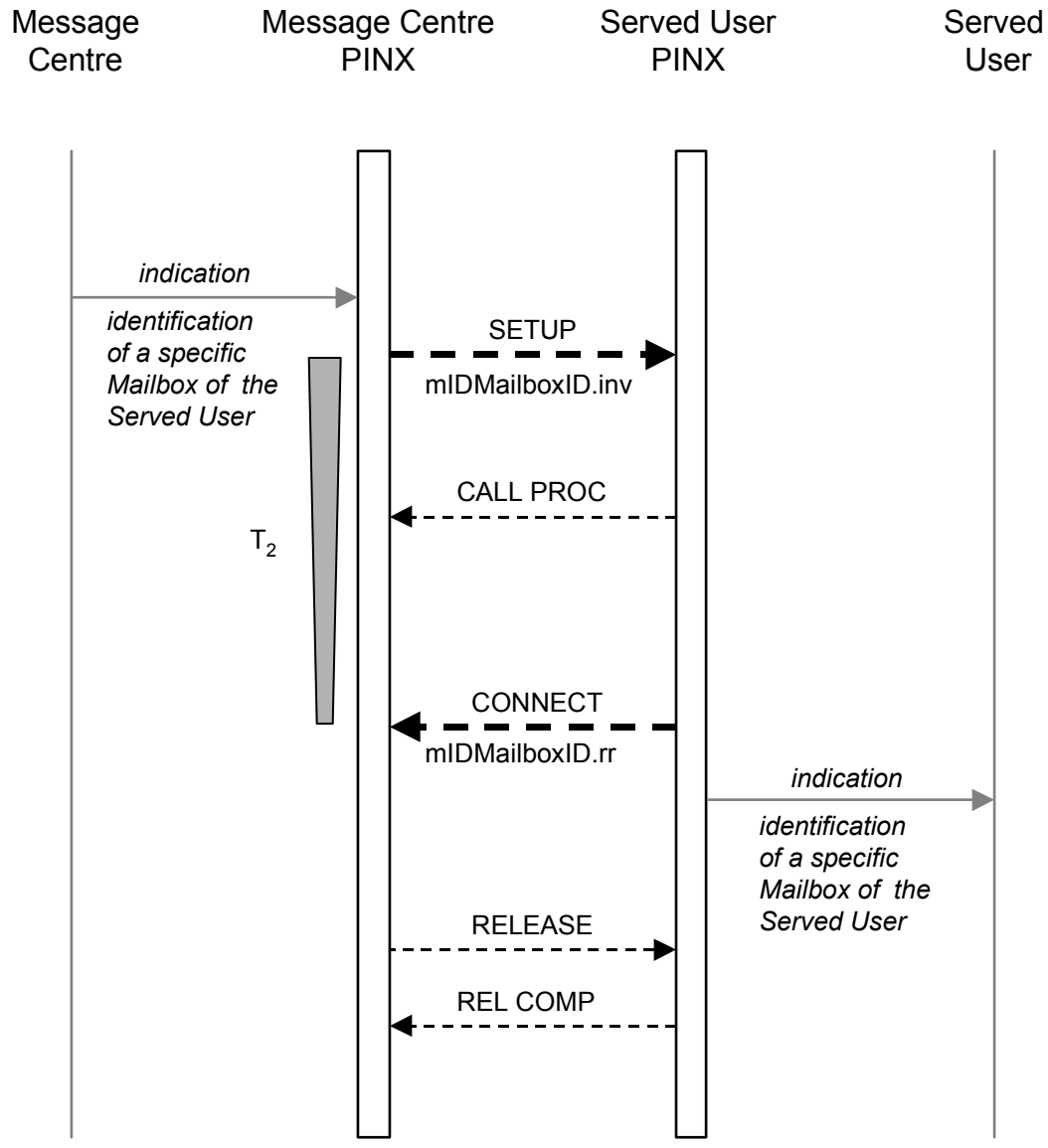

Figure B.3.1 — Example for Mailbox identification within SS-MID

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B.3.2 Example message sequence for authentication of a Served User at a specific Mailbox

Figure B.3.2 shows an example for the authentication within SS-MID.

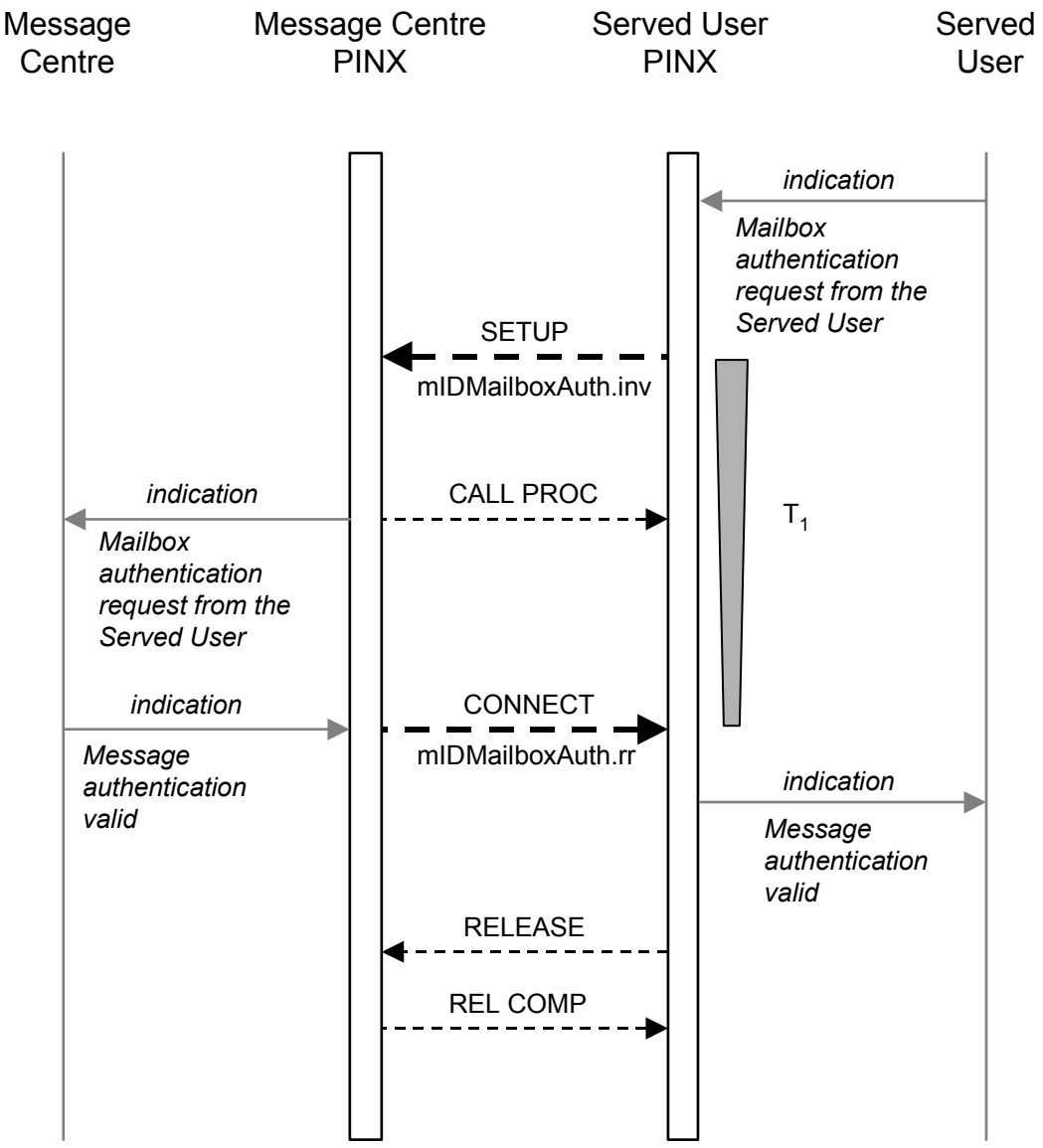

Figure B.3.2 — Example for authentication within SS-MID

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Annex C
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Specification and Description Language (SDL) Representation of Procedures

The diagrams in this Annex use the Specification and Description Language defined in ITU-T Rec. Z.100 (1999).

Each diagram represents the behaviour of an SS-MCM or SS-MID Supplementary Service Control entity at a particular type of PINX. In accordance with the protocol model described in ISO/IEC 11582, the Supplementary Service Control entity uses, via the Coordination Function, the services of Generic Functional Procedures 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.

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. The following abbreviations are used:

.inv invoke APDU

.res return result APDU

.err return error APDU

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C.1 SDL representation of SS-MCM at the Message Centre PINX

Figures C.1.1, C.1.2, C.1.3, C.1.4, C.1.5, C.1.6 and C.1.7 show the behaviour of an SS-MCM Supplementary Service Control entity within the Message Centre PINX.

Input signals from the left and output signals to the left represent primitives from and to the Message Centre or internal events (e.g. timer expiry events).

Input signals from the right and output signals to the right represent primitives from and to the Served User PINX.

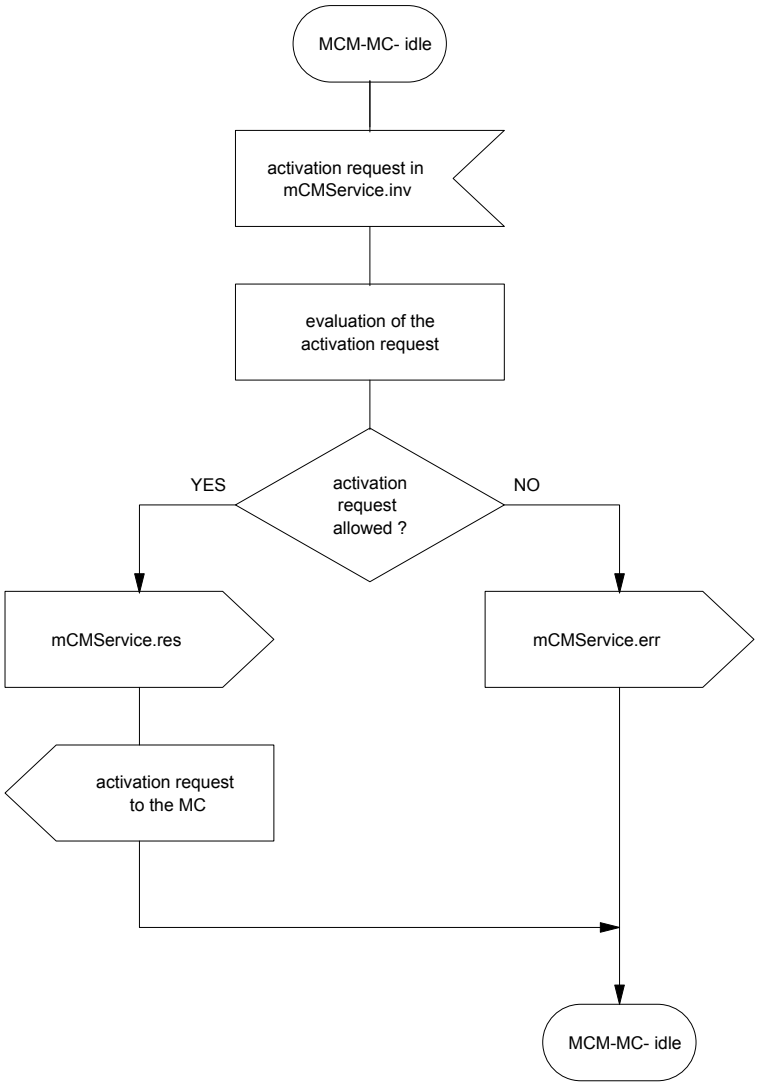

Figure C.1.1 — SDL representation of SS-MCM activation at the Message Centre PINX

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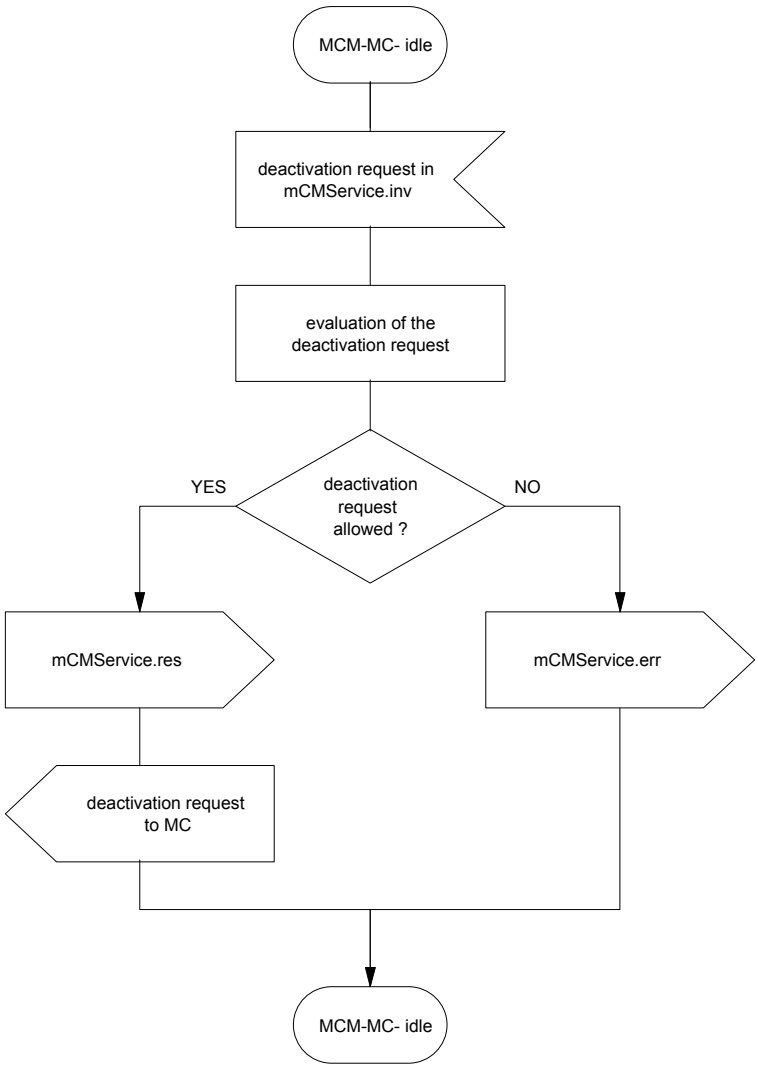

Figure C.1.2 — SDL representation of SS-MCM deactivation at the Message Centre PINX

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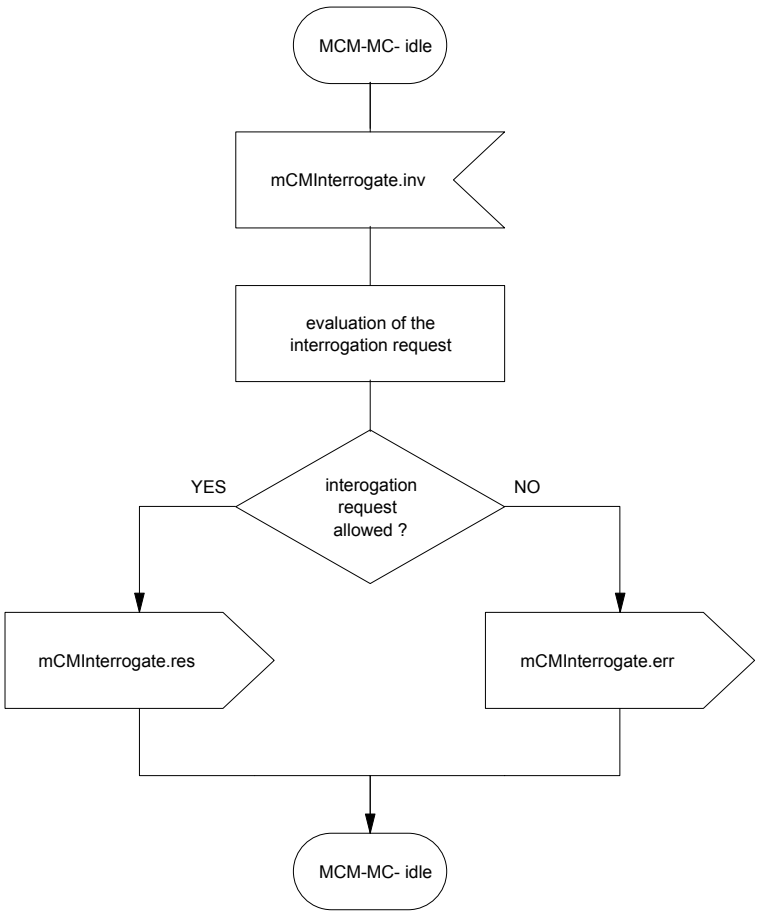

Figure C.1.3 — SDL representation of SS-MCM interrogation at the Message Centre PINX

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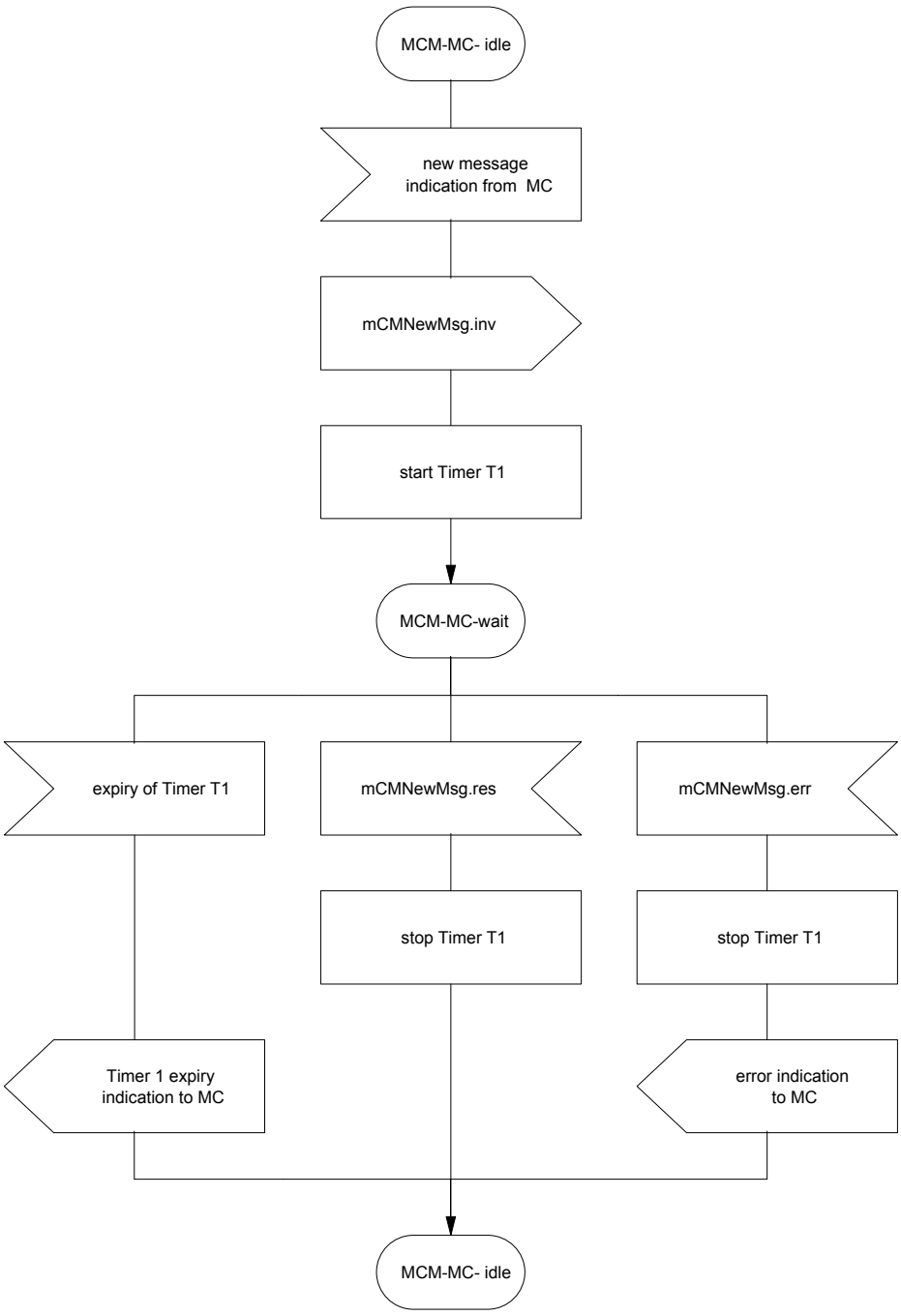

Figure C.1.4 — SDL representation of SS-MCM incoming New Message at the Message Centre PINX

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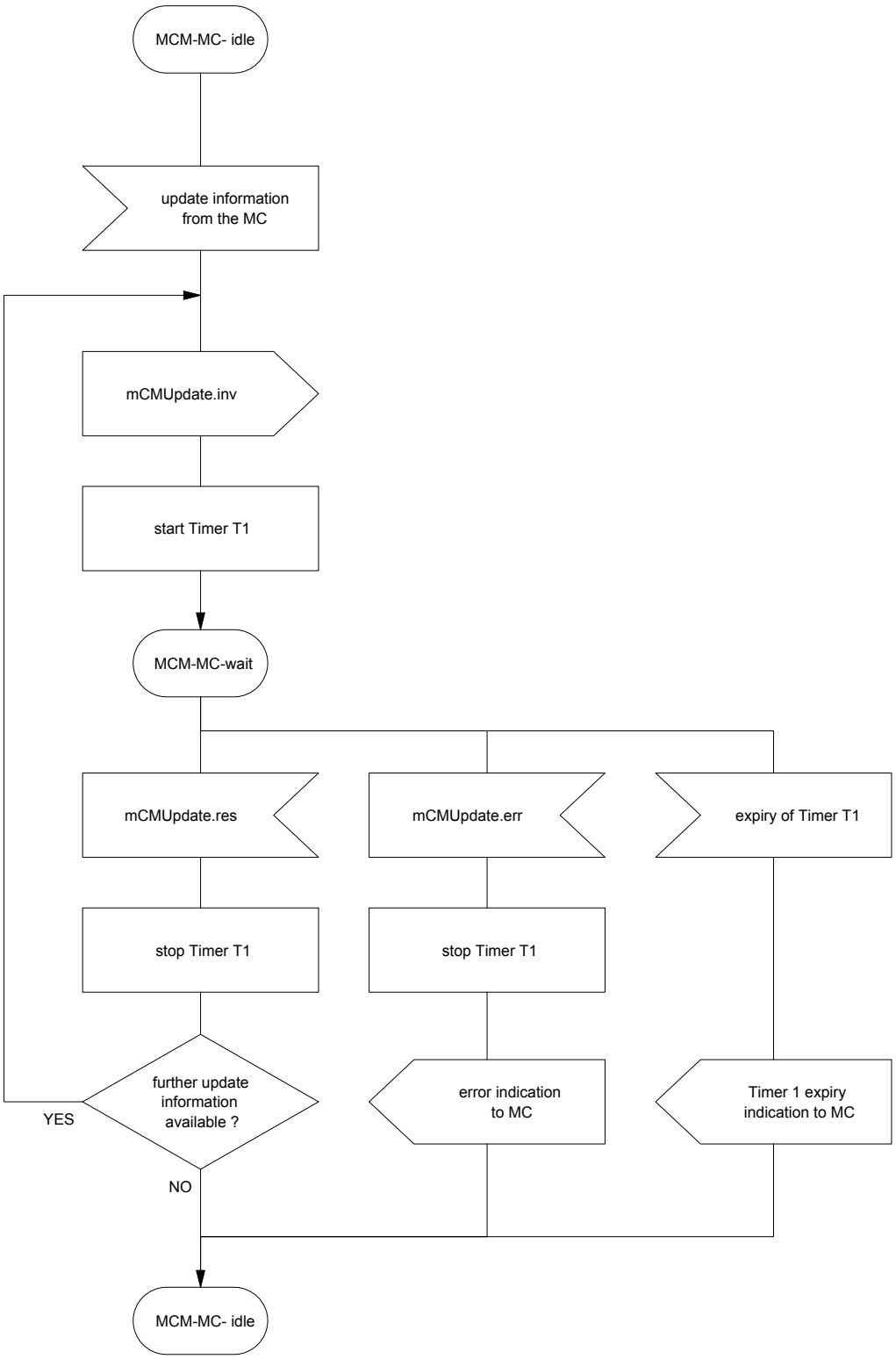

Figure C.1.5 — SDL representation of SS-MCM update of Message Centre information at the Message Centre PINX

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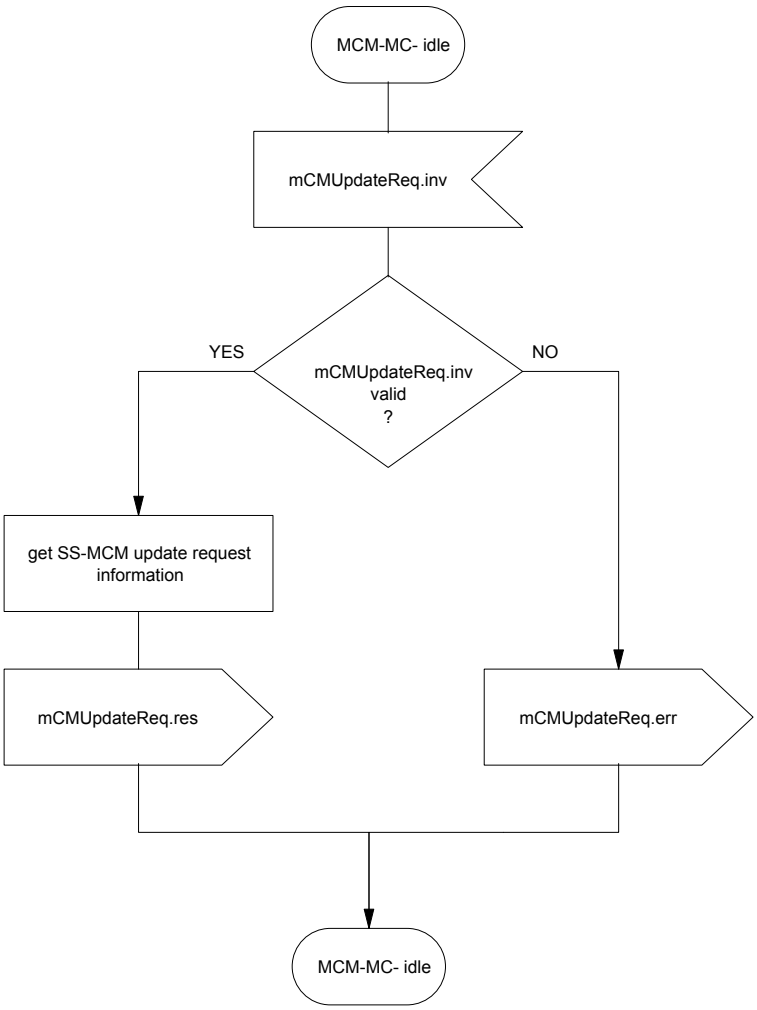

Figure C.1.6 — SDL representation of SS-MCM update request at the Message Centre PINX

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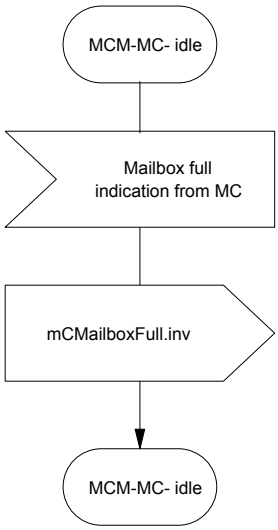

Figure C.1.7 — SDL representation of SS-MCM Mailbox-full indication at the Message Centre PINX

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C.2 SDL representation of SS-MCM at the Served User PINX

Figures C.2.1, C.2.2, C.2.3, C.2.4, C.2.5, and C.2.6 show the behaviour of an SS-MCM Supplementary Service Control entity within the Served User PINX.

Input signals from the right and output signals to the right represent primitives from and to the Served User or internal events (e.g. timer expiry events).

Input signals from the left and output signals to the left represent primitives from and to the Message Centre PINX.

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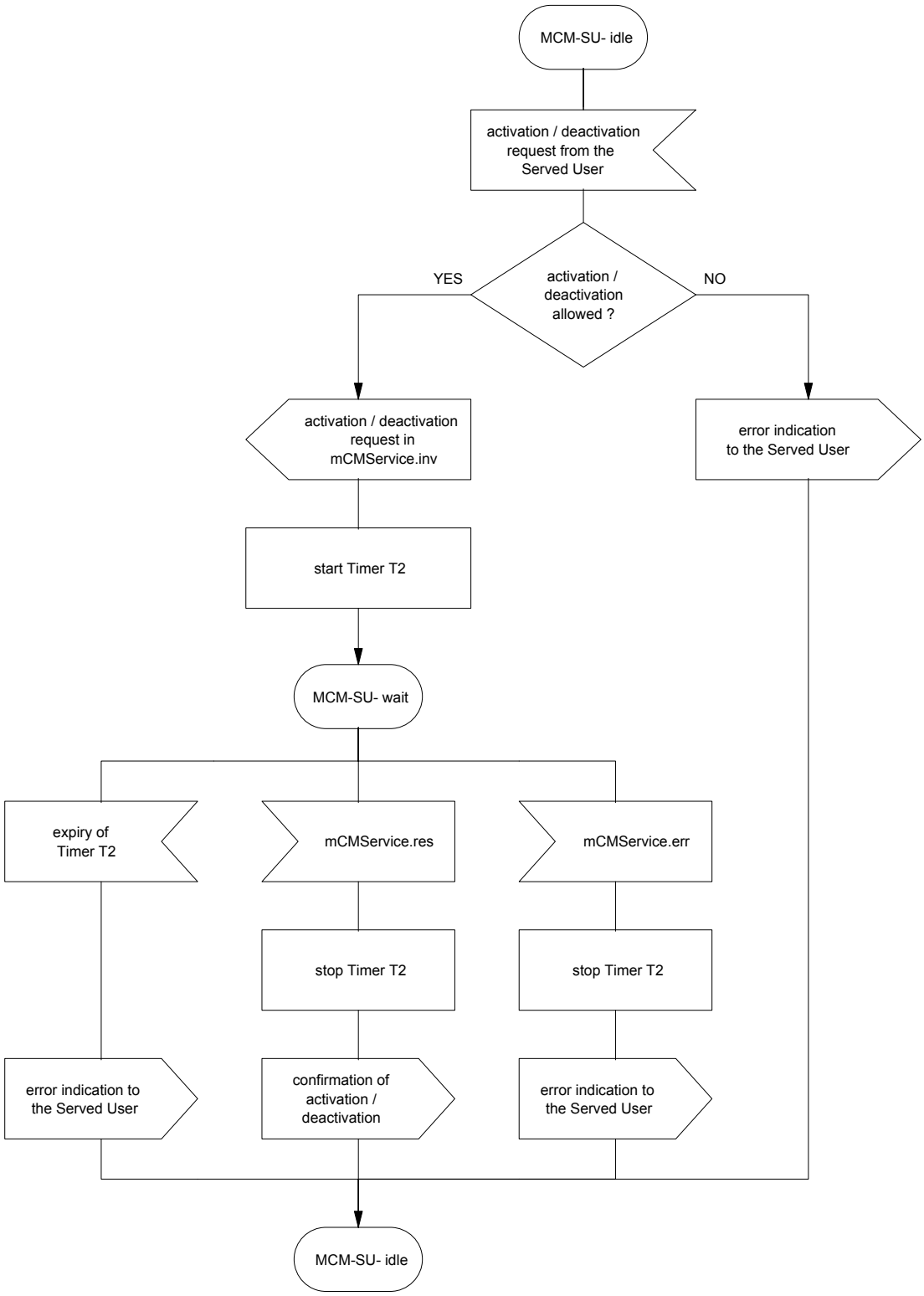

Figure C.2.1 — SDL representation of SS-MCM activation / deactivation at the Served User PINX

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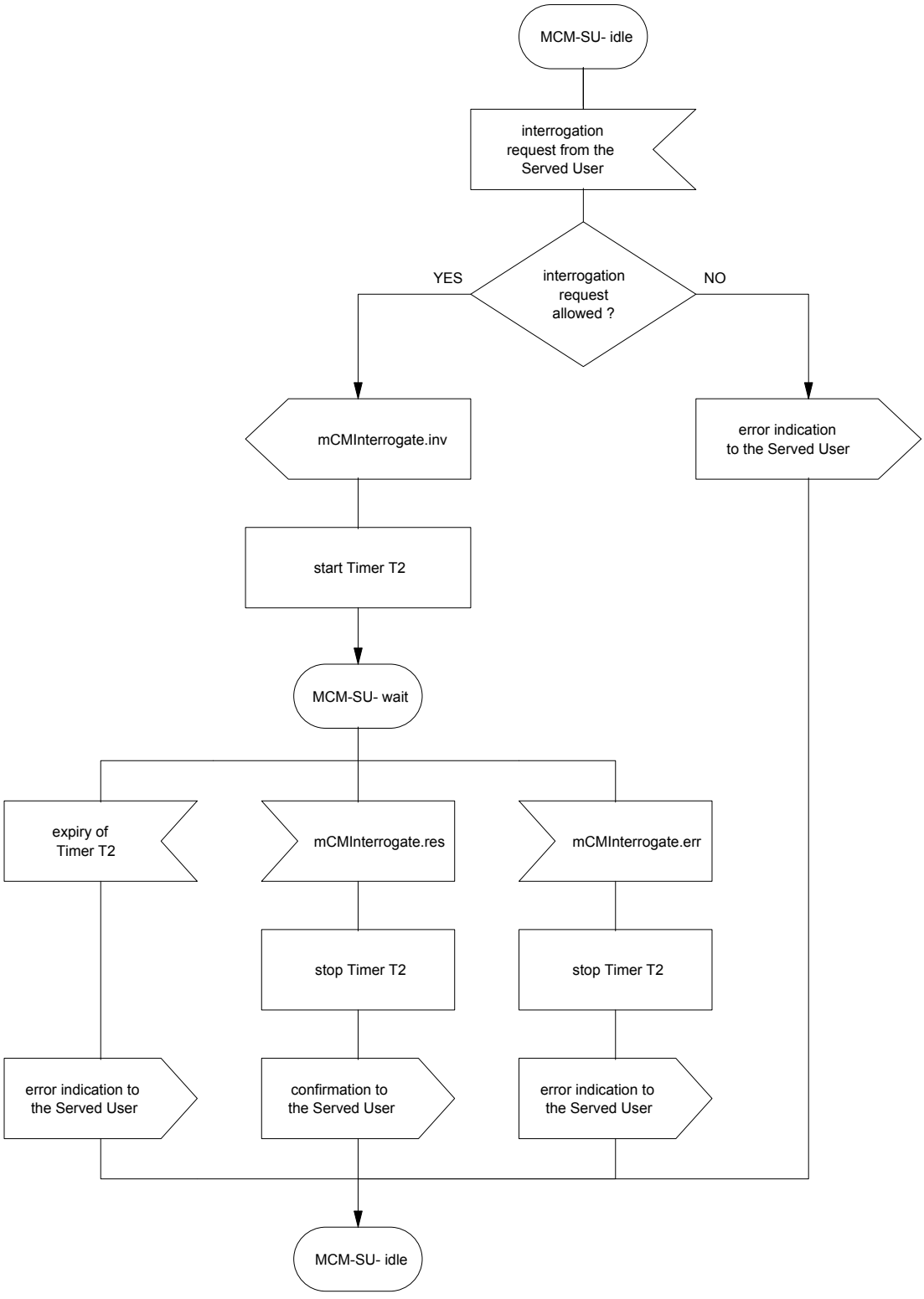

Figure C.2.2 — SDL representation of SS-MCM interrogation at the Served User PINX

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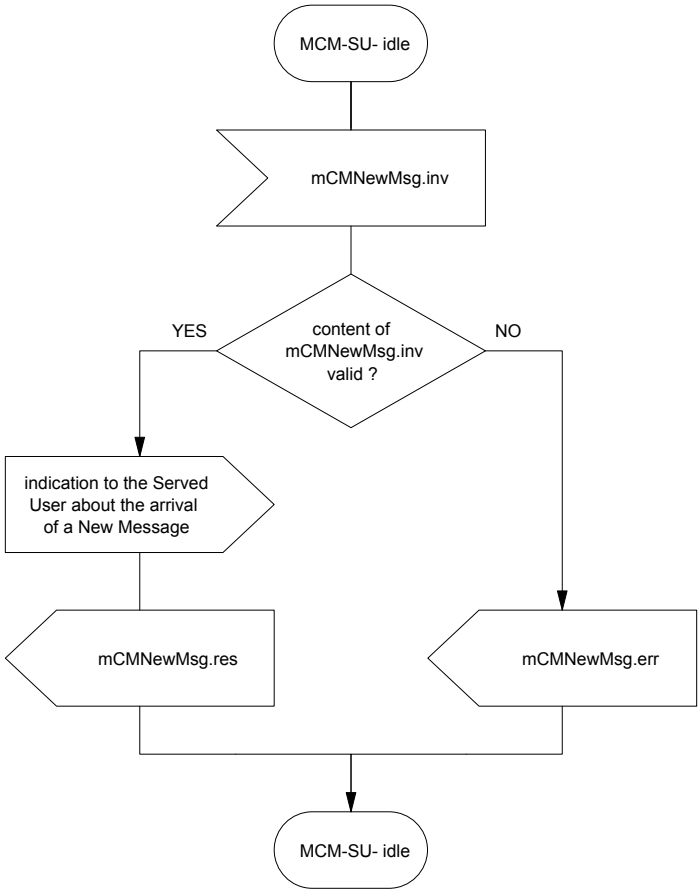

Figure C.2.3 — SDL representation of SS-MCM incoming New Message at the Served User PINX

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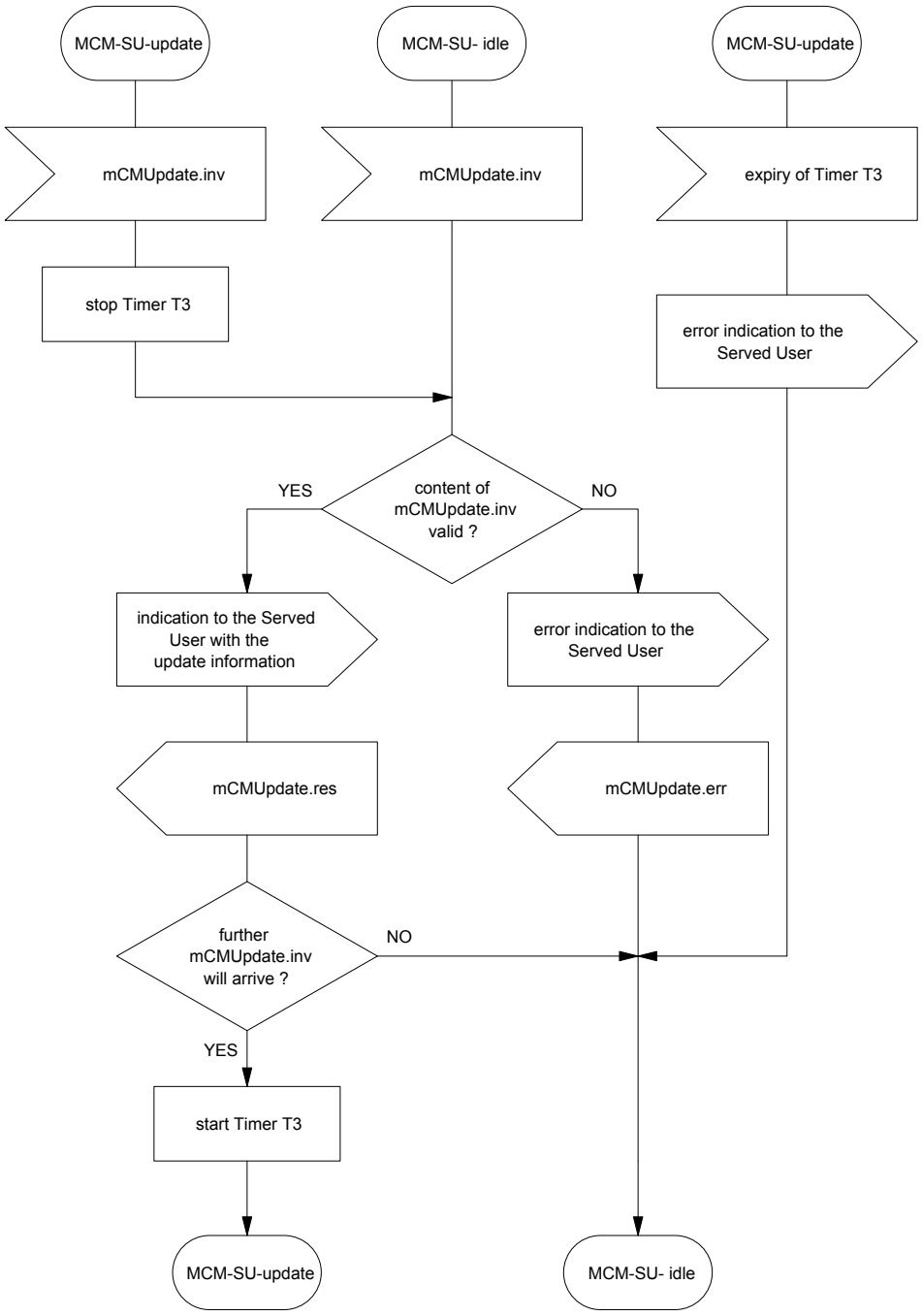

Figure C.2.4 — SDL representation of SS-MCM update of Message Centre information at the Served User PINX

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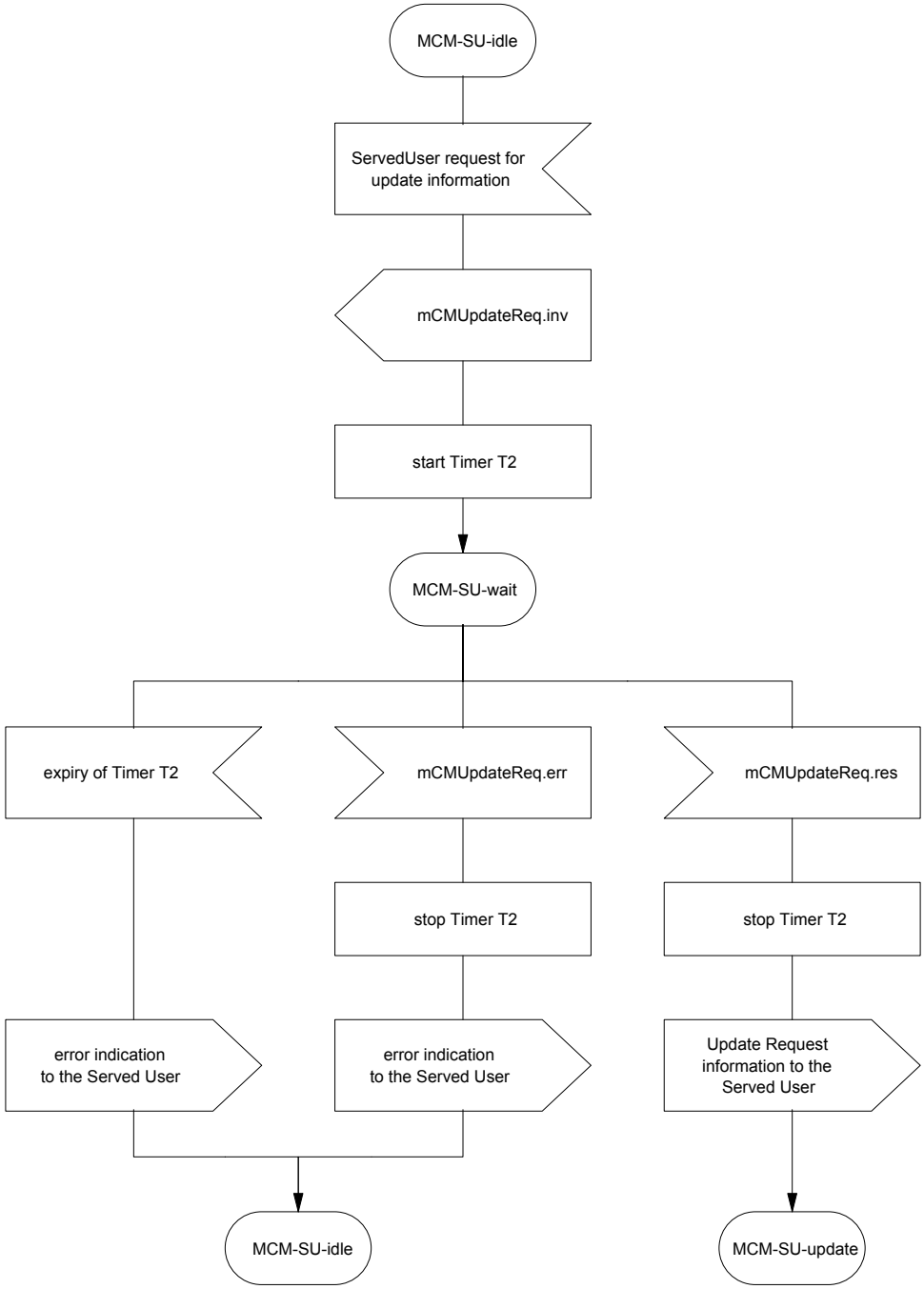

Figure C.2.5 — SDL representation of SS-MCM update request at the Served User PINX

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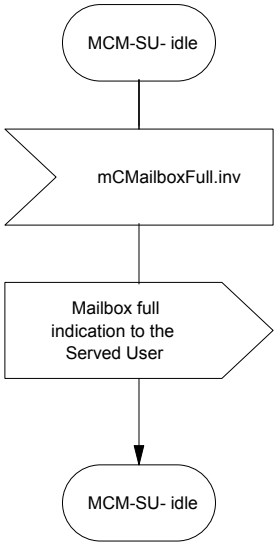

Figure C.2.6 — SDL representation of SS-MCM Mailbox-full indication at the Served User PINX

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C.3 SDL representation of SS-MID at the Message Centre PINX

Figure C.3.1 and C.3.2 show the behaviour of an SS-MID Supplementary Service Control entity within the Message Centre PINX.

Input signals from the left and output signals to the left represent primitives from and to the Message Centre or internal events (e.g. timer expiry events).

Input signals from the right and output signals to the right represent primitives from and to Served User PINX.

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Figure C.3.1 — SDL representation of SS-MID at the Message Centre PINX

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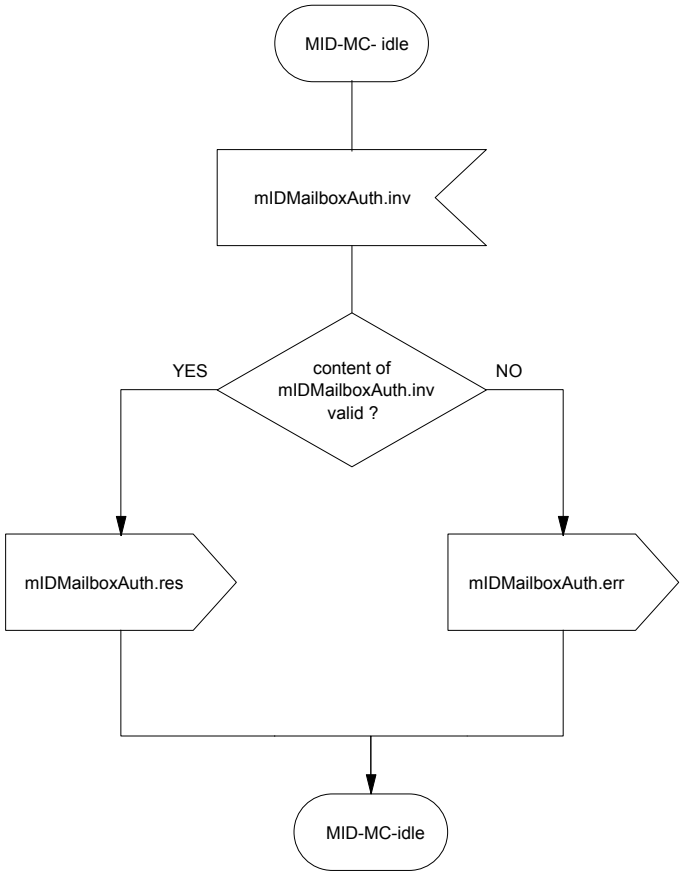

Figure C.3.2 — SDL representation of SS-MID at the Message Centre PINX

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C.4 SDL representation of SS-MID at the Served User PINX

Figure C.4.1 and C.4.2 show the behaviour of an SS-MID Supplementary Service Control entity within the Served User PINX.

Input signals from the right and output signals to the right represent primitives from and to the Served User or internal events (e.g. timer expiry events).

Input signals from the left and output signals to the left represent primitives from and to the Message Centre PINX.



Figure C.4.1 — SDL representation of SS-MID at the Served User PINX

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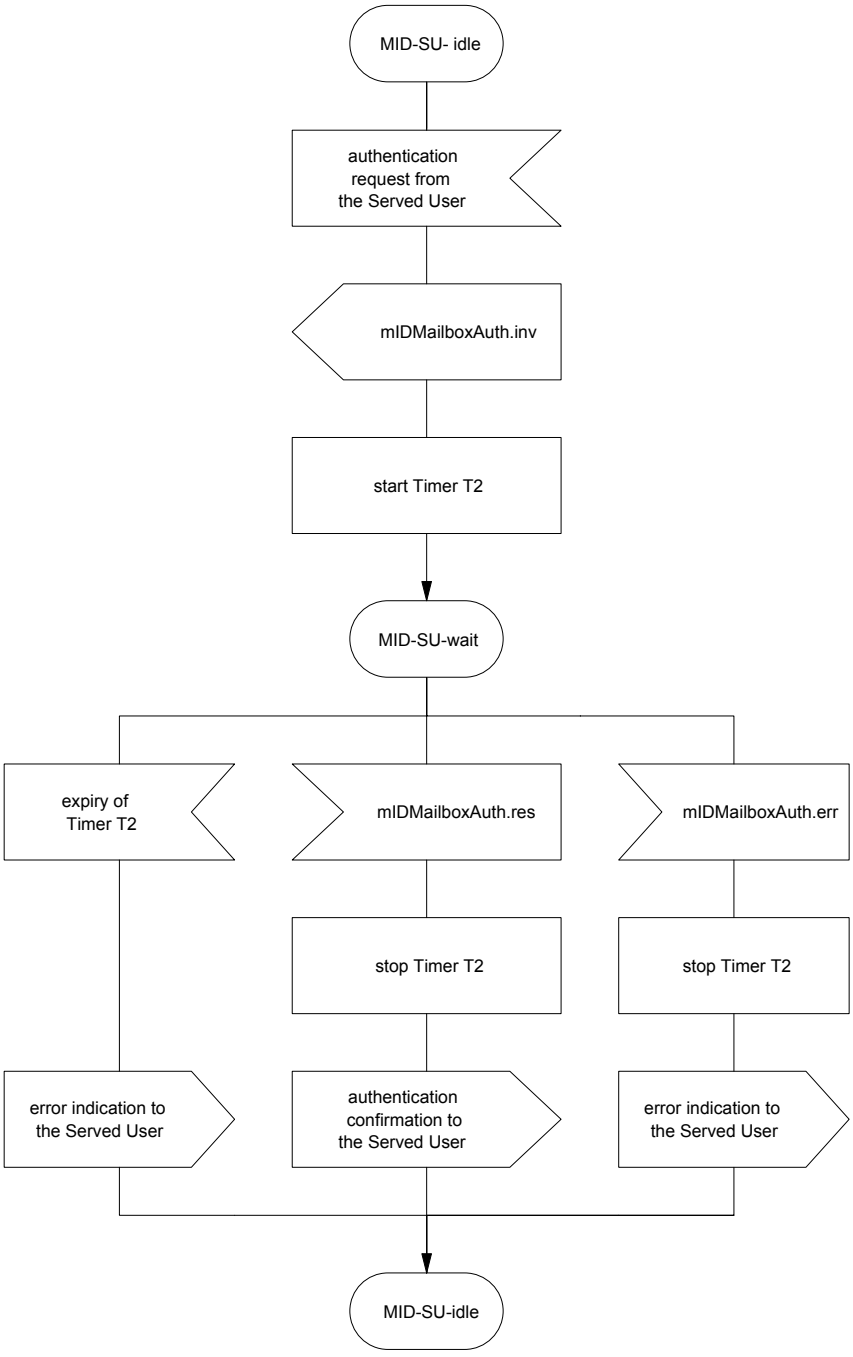

Figure C.4.2 — SDL representation of SS-MID at the Served User PINX

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Annex D
(informative)

List of Message Types

The following types of messages may be supported by a Message Centre:

D.1 Telephony Type Messages

D.1.1 speech

Messages for which the incoming call indicated a Bearer Capability / Information Transfer Capability set to „Speech“, as defined in ISO/IEC 11574.

D.1.2 unrestrictedDigitalInformation

Messages for which the incoming call indicated a Bearer Capability / Information Transfer Capability set to „Unrestricted Digital Information“, as defined in ISO/IEC 11574.

D.1.3 audio3100Hz

Message for which the incoming call indicated a Bearer Capability / Information Transfer Capability set to „3,1kHz audio (encoded)“, as defined in ISO/IEC 11574. No further indication about the type of message was available.

D.1.4 telephony

Message for which the incoming call did not indicate any specific telephony Bearer Capability.

D.1.5 teletex

D.1.6 telefaxGroup4Class1

Message for which the incoming call indicated Teleservice “Telefax Group 4”, as defined in ISO/IEC 11574.

D.1.7 videotextSyntaxBased

Message for which the incoming call indicated Teleservice “Circuit-mode syntax-based videotext teleservice”, as defined in ISO/IEC 11574.

D.1.8 videotelephony

D.1.9 telefaxGroup2-3

Message which was determined as a Telefax Group 2 or Telefax Group 3.

D.2 Data Type Messages

The following message types are data network specific and require specific applications or equipment for retrieval, (e.g. email client or text to voice converter).

D.2.1 email

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D.2.2 video

D.2.3 fileTransfer

D.2.4 shortMessageService

D.3 Combination of Messages

The following combination of messages shall be used for Message Centre Monitoring, to indicate that several messages of different Message Types are waiting.

The item “speech” refers to Message Type “speech” as described in D.1.1.

The item “Video” refers to Message Type “videotelephony” as described in D.1.8.

The item “Fax” refers to Message Type “telefaxGroup4Class1” as described in D.1.6.

The item “Email” refers to Message Type “email” as described in D.2.1.

⇒ speechAndVideo

⇒ speechAndFax

⇒ speechAndEmail

⇒ videoAndFax

⇒ videoAndEmail

⇒ faxAndEmail

⇒ speechVideoAndFax

⇒ speechVideoAndEmail

⇒ speechFaxAndEmail

⇒ videoFaxAndEmail

⇒ speechVideoFaxAndEmail

D.4 Additional Message Types

It is recommended, that the Message Types in this section are not used.

D.4.1 allServices

This Message Type indicates, that messages of different types are waiting at the Message Centre.

D.4.2 multimediaUnknown

A Data Type Message, which does not conform to one of the Message Types listed in D.2.

D.4.3 serviceUnknown

No information about the type of message is available.

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