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Foreword

This final draft European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Voting phase of the ETSI standards approval procedure.

This ETS is part 1 of a multi-part standard covering the Signalling System No.7 Transaction Capabilities (TC) Application Service Element (ASE) for the Message Waiting Indication (MWI) supplementary service, as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification".

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the supplementary telecommunication services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's standpoint;

- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and

- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 3 aspects (signalling system protocols and switching functions) needed to support the MWI supplementary service. The stage 1 aspects are detailed in ETS 300 650. The stage 2 aspects of the MWI supplementary service have not been specified.

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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1 Scope

This first part of ETS 300 754 specifies the stage three of the Message Waiting Indication (MWI) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by the European public telecommunications operators by means of the Signalling System No.7 Transaction Capabilities (TC) application protocol. The stage three identifies the protocol procedures and switching functions needed to support a telecommunication service (see CCITT Recommendation I.130 [7]).

This ETS specifies the additional requirements where the service is provided to the user via an intermediate ISDN.

This ETS does not specify the additional requirements where the service is provided to the user via a telecommunication network that is not an ISDN.

The MWI supplementary service is provided independently of a call and is therefore applicable to a number of telecommunication services.

Charging principles are outside the scope of this ETS.

Testing and maintenance requirements are outside the scope of this ETS.

The MWI supplementary service enables the network, upon the request of a controlling user to indicate to the receiving user that there is at least one message waiting.

NOTE: The MWI supplementary service is typically used between a mail box service provider (controlling user) and a user (receiving user) of the mail box service provided.

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 009 (1991): "Integrated Services Digital Network (ISDN); CCITT Signalling System No.7; Signalling Connection Control Part (SCCP) [connectionless service] to support international interconnection".

[2] ETS 300 196-1 (1993): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol Part 1: Protocol specification".

[3] ETS 300 287 (1993): "Integrated Services Digital Network (ISDN); CCITT signalling System No.7; Transaction Capabilities Application Part (TCAP) version 2".

[4] ETS 300 356-1 (1995): "Integrated Services Digital Network (ISDN); Signalling System No.7 ISDN User Part (ISUP) version 2 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1993), modified]".

[5] ITU-T Recommendation E.164 (1993): "Numbering plan for the ISDN era".

[6] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[7] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[8] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".

[9] CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

[10] ITU-T Recommendation X.680 | ISO/IEC 8824-1 (1994) including amendment 1 (1995): "Information Technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

3 Definitions

For the purposes of this ETS, the following definitions apply:

active instance: An instance of message waiting indication at the receiving user's exchange, which is addressed by the controlling user number and basic service received.

basic call procedures: The procedures by which a call (as an instance of a telecommunication service) is established and terminated.

controlling user: The user who is connected to the public local exchange which activates and deactivates the MWI supplementary service.

NOTE 1: The controlling user is likely to be a mail box.

deferred invocation mode: A message waiting indication sent to the receiving user when that user makes an outgoing call attempt.

immediate invocation mode: A message waiting indication transferred to the receiving user immediately upon reception from the controlling user.

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [6], definition 308.

ISDN number: A number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164 [5].

mail box: A system, inside or outside the public network infrastructure, capable to handle mail.

NOTE 2: The definition of the mail box service is outside the scope of this ETS.

network operator: Entity which provides the network operating elements and resources for the execution of the MWI supplementary service.

receiving user: The user who is connected to the public local exchange which receives the message waiting indication.

service; telecommunication service: See ITU-T Recommendation I.112 [6], definition 201.

service provider: Entity which offers the MWI supplementary service subscription. The network operator may be the service provider.

supplementary service: See ITU-T Recommendation I.210 [8], subclause 2.4.

4 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ASE	Application Service Element
ASN.1	Abstract Syntax Notation one
GT	Global Title
ISDN	Integrated Services Digital Network
MWI	Message Waiting Indication
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
SCCP	Signalling Connection Control Part
SSN	Sub System Number
TC	Transaction Capabilities

5 Description

The MWI supplementary service enables the network, upon the request of a controlling user to indicate to the receiving user, that there is at least one message waiting. The indication is delivered to the receiving user:

- when the MWI supplementary service is activated for a certain basic service and the receiving user makes an outgoing call attempt; and/or

- as soon as the MWI supplementary service has been activated or deactivated.

NOTE: Having received this indication, the receiving user can subsequently access the mail box, to have the mail delivered. The means by which the receiving user accesses and manages the mail box are outside the scope of this ETS.

6 Operational requirements

6.1 Provision and withdrawal

The MWI supplementary service shall be provided to the receiving user after prior arrangements with the service provider. The MWI supplementary service shall be withdrawn at the receiving user's request, or for administrative reasons. As a network option, the receiving user can have a subscription option to register the controlling user numbers that can activate and deactivate the MWI supplementary service.

The MWI supplementary service shall be provided to the controlling user after prior arrangements, with the service provider. The MWI supplementary service shall be withdrawn at the controlling user's request, or for administrative reasons.

Table 1: Network options

Network options	Values
Support of subscription option for registration of the ISDN number(s) of the controlling user(s)	- yes - no
Provide additional information during deferred invocation	- yes - no
Maximum number of controlling users' ISDN numbers registered by the network	any integer value
Maximum number of active instances per receiving user	any integer value

The maximum number of controlling user ISDN numbers that can be registered for a receiving user is a network option.

In addition, the following subscription options shall be made available to the receiving user:

Table 2: Subscription options

Subscription options	Values
Invocation mode	a) deferred mode: invocation when the supplementary service is activated and the receiving user makes an outgoing call; b) immediate mode: invocation as soon as the supplementary service has been activated or deactivated; c) combined mode: in this case both the deferred and immediate mode apply.
Override of invocation mode by controlling user allowed	- yes - no
Registration of the ISDN number(s) of the controlling user(s)	- yes - no

6.2 Requirements on the controlling user's network side

The controlling user's exchange needs the capabilities of Signalling Connection Control Part (SCCP, see ETS 300 009 [1]) and TC (see ETS 300 287 [3]) with an MWI-ASE.

6.3 Requirements on intermediate exchanges

The intermediate exchanges involved in the transmission of the MWI operation need the capability of SCCP (see ETS 300 009 [1]).

6.4 Requirements on the receiving user's network side

The receiving user's exchange needs the capabilities of SCCP (see ETS 300 009 [1]) and TC (see ETS 300 287 [3]) with an MWI-ASE.

7 Coding requirements

7.1 Application Service Element (ASE) for MWI

7.1.1 Protocol element list

From the controlling user's exchange to the receiving user's exchange:

a) MWISet (invoke) class 1;

b) MWIReset (invoke) class 1.

From the receiving user's exchange to the controlling user's exchange:

a) MWISet (result, error) class 1;

b) MWIReset (result, error) class 1.

7.1.2 List of parameter types

Addressing and identification parameters:

a) Receiving user number;

b) Controlling user number.

The country code shall be included in the controlling user number, in case of international MWI.

Service management parameters:

a) Number of messages;

b) Basic service;

c) Time;

d) Controlling user provided number;

e) Mode;

f) Message identity.

7.1.3 Error types

a) Receiving user not subscribed;

b) Indication not delivered;

c) Supplementary service interaction;

d) Resource unavailable;

e) Invalid receiving user number;

f) Invalid controlling user number;

g) Maximum number of controlling users reached;

h) Maximum number of active instances reached.

7.1.4 Abstract syntax, general

Subclause 7.2 specifies the abstract syntax for the MWI-ASE protocol, using the Abstract Syntax Notation one (ASN.1), as defined in CCITT Recommendation X.208 [9] and ITU-T Recommendation X.680 [10].

The mapping of OPERATION, RESULT and ERROR components to TC primitives is described in subclause 9.4.

The ASN.1 data type which follows the keywords "PARAMETER" or "RESULT" (for OPERATION and ERROR) is always optional from a syntactic point of view. However, except when explicitly specified otherwise, it has to be considered as mandatory from a semantic point of view.

When a mandatory element is missing in any component or inner data structure, a reject component is returned (if the dialogue still exists). The problem cause to be used is "Mistyped parameter".

7.2 ASN.1 module

Table 3 shows the definitions of the operations, errors and types required for the MWI supplementary services using ASN.1 as specified in CCITT Recommendation X.208 [9] and ITU-T Recommendation X.680 [10] and using the OPERATION and ERROR macros as defined in ETS 300 287 [3].

The formal definition of the component types to encode these operations, errors and types is provided in ETS 300 287 [3].

Table 3: Definition of operations and errors for the MWI supplementary service

```
MWI-Operations-and-Errors {ccitt identified-organization etsi(0) 754 modules(2)
                           operations-and-errors(1) version1(1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS     OPERATION,
            ERROR
            FROM TCAPMessages
                {ccitt recommendation q 773 modules(2) messages(1) version2(2)}

            BasicService
            FROM Basic-Service-Elements                              -- from ETS 300 196-1 [2]
                {ccitt identified-organization etsi(0) 196 basic-service-elements(8)}
;

-- operation types

MWISet      ::= OPERATION
                PARAMETER SEQUENCE {
                    receivingUserNumber                 CalledPartyNumber,
                    controllingUserNumber               CallingPartyNumber,
                    basicService                        BasicService,
                    numberOfMessages                [1] MessageCounter      OPTIONAL,
                    time                            [2] GeneralizedTime     OPTIONAL,
                    controllingUserProvidedNumber   [3] CallingPartyNumber  OPTIONAL,
                    mode                            [4] InvocationMode      OPTIONAL,
                    messageIdentity                 [5] MessageIdentity     OPTIONAL,
                    ...}
                RESULT
                ERRORS {
                    receivingUserNotSubscribed,
                    indicationNotDelivered,
                    supplementaryServiceInteraction,
                    resourceUnavailable,
                    maxNumOfControllingUsersReached,
                    maxNumOfActiveInstancesReached,
                    invalidReceivingUserNumber,
                    invalidControllingUserNumber}
-- Timer T = MWI-Tsup
-- End of MWISet operation definition

MWIReset    ::= OPERATION
                PARAMETER SEQUENCE {
                    receivingUserNumber         CalledPartyNumber,
                    controllingUserNumber       CallingPartyNumber,
                    basicService                BasicService,
                    mode                    [1] InvocationMode      OPTIONAL
                    ...}
                RESULT
                ERRORS {
                    receivingUserNotSubscribed,
                    indicationNotDelivered,
                    supplementaryServiceInteraction,
                    resourceUnavailable,
                    invalidReceivingUserNumber,
                    invalidControllingUserNumber}

-- Timer T = MWI-Tsup
-- End of MWIReset operation definition

--error type definitions

ReceivingUserNotSubscribed      ::= ERROR
IndicationNotDelivered          ::= ERROR
InvalidControllingUserNumber    ::= ERROR
InvalidReceivingUserNumber      ::= ERROR
SupplementaryServiceInteraction ::= ERROR
ResourceUnavailable             ::= ERROR
maxNumOfControllingUsersReached ::= ERROR
maxNumOfActiveInstancesReached  ::= ERROR
```

Table 3 (concluded): Definition of operations and errors for the MWI supplementary service

```
-- constants and data type definitions

CalledPartyNumber   ::= OCTET STRING (SIZE(1..10))
-- the number shall be coded as called party number as described in ETS 300 356-1 [4]

CallingPartyNumber  ::= OCTET STRING (SIZE(1..10))
-- the number shall be coded as calling party number as described in ETS 300 356-1 [4]

MessageCounter      ::= INTEGER (0..65535)

InvocationMode      ::= ENUMERATED {
                            deferred (0),
                            immediate (1),
                            combined (2)}

MessageIdentity     ::= SEQUENCE{
                            messageRef  MessageRef,
                            status      MessageStatus}

MessageRef          ::= INTEGER (0..65535)

MessageStatus       ::= ENUMERATED {
                            addedMessage(0),
                            removedMessage (1)}

mWIOID OBJECT IDENTIFIER    ::= {ccitt identified-organization etsi(0) 754
                                 operations-and-errors(1)}

mWISet                          MWISet                          ::= globalValue : {mWIOID 1}
mWIReset                        MWIReset                        ::= globalValue : {mWIOID 2}

receivingUserNotSubscribed      ReceivingUserNotSubscribed      ::= globalValue : {mWIOID 10}
invalidControllingUserNumber    InvalidControllingUserNumber    ::= globalValue : {mWIOID 11}
invalidReceivingUserNumber      InvalidReceivingUserNumber      ::= globalValue : {mWIOID 12}
indicationNotDelivered          IndicationNotDelivered          ::= globalValue : {mWIOID 13}
supplementaryServiceInteraction SupplementaryServiceInteraction ::= globalValue : {mWIOID 14}
resourceUnavailable             ResourceUnavailable             ::= globalValue : {mWIOID 15}
maxNumOfControllingUsersReached MaxNumOfControllingUsersReached ::= globalValue : {mWIOID 16}
maxNumOfActiveInstancesReached  MaxNumOfActiveInstancesReached  ::= globalValue : {mWIOID 17}

END -- of MWI-Operations-and-Errors
```

8 State definitions

No specific state definitions are required.

9 Signalling procedures

9.1 Activation, deactivation and registration

9.1.1 Activation

9.1.1.1 Actions at the controlling user's exchange

9.1.1.1.1 Normal procedure

On receipt of an MWI supplementary service activation request the controlling user's exchange shall send an MWISet invoke component to the receiving user's exchange. The invoke component shall contain a receivingUserNumber parameter, a controllingUserNumber parameter, the basicService parameter and as a controlling user's option the time parameter, the numberOfMessages parameter, the controllingUserProvidedNumber parameter, the mode parameter, and the messageIdentity parameter.

NOTE 1: The use of the mode parameter is based on agreement between the controlling and the receiving users.

In case the MWI supplementary service activation request provides the controlling user provided number information, the controlling user's exchange shall code the controllingUserProvidedNumber parameter with the address presentation restricted indicator set to "presentation allowed" and the screening indicator set to "user provided, not verified".

The TC-INVOKE primitive shall include the value of the MWI supervision operation timer MWI-Tsup.

When the controlling user's exchange receives an MWISet return result component, this means that the operation has been successfully performed, the access signalling system shall then be informed accordingly and the TC resources shall be released.

NOTE 2: The MWI supervision operation timer MWI-Tsup is stopped by TC when the TC-RESULT primitive is received.

9.1.1.1.2 Exceptional procedure

a) MWISet return error component is received

If the controlling user's network receives an MWISet return error component, the exchange will consider that the operation has not been successfully performed. The received error value shall be forwarded to the access signalling system and the TC resources shall be released.

b) TC cancellation or SCCP routing failure

On receipt of either a TC-P-ABORT, TC-U-ABORT, TC-U-REJECT, TC-L-CANCEL,TC-L-REJECT, TC-R-REJECT or a TC-NOTICE primitive as response to the MWISet invoke component, the exchange shall consider the activation request as not successful and provide the access signalling system with the error value "indication not delivered" as a reason and the TC-resources shall be released.

c) Resource unavailable

If a connection with TC-dialogue primitives can not be established, the exchange provides the access signalling system with the error value "resource unavailable" as a reason.

9.1.1.2 Actions at the Receiving user's exchange

9.1.1.2.1 Normal operation

On receipt of the MWISet invoke component, depending on the receiving user's subscribed invocation mode (see table 2) and the received parameter indicating the mode to be used. The receiving user's exchange shall apply one of the procedures as identified in table 4.

Table 4

Receiving user subscription mode	Mode received from the controlling user			
	no indication	**deferred**	**immediate**	**combined**
deferred without override	deferred	deferred	deferred	deferred
deferred with override	deferred	deferred	immediate	combined
immediate without override	immediate	immediate	immediate	immediate
immediate with override	immediate	deferred	immediate	combined
combined without override	combined	combined	combined	combined
combined with override	combined	deferred	immediate	combined

a) deferred:

The receiving user's exchange shall validate the activation request and store it per received basic service and the controlling user number. Furthermore the receiving user shall be given an indication as follows when the receiving user makes an outgoing call attempt:

- If the network option "provide additional information during deferred invocation" does not apply, the receiving user's exchange shall indicate that MWI is active and no further action is taken.

- If the network option "provide additional information during deferred invocation" applies, the receiving user's exchange shall indicate to the receiving user the list of all stored MWI active instances. Each MWI consists of the controlling user number, basic service and any provided information from the controlling user.

In case the activation request identifies an MWI active instance and the network option "provide additional information during deferred invocation" applies, then the received additional information shall replace the old one.

NOTE: For the deferred invocation mode, the information related to the message identity is always ignored.

b) immediate:

The receiving user's exchange shall validate the activation and send the activation request to the access signalling system.

c) combined:

The receiving user's exchange shall act as described in a) and b).

In all cases, when the activation request has been accepted the receiving user's exchange shall send an MWISset return result component to the controlling user's exchange. Any reserved resources shall be released.

9.1.1.2.2 Exceptional procedures

If the MWI supplementary service cannot be activated, the receiving user's exchange shall send an MWISet return error component to the controlling user's exchange and indicate one of the following reasons:

- "invalidReceivingUserNumber", if the ISDN number provided to identify the receiving user is not a valid number;

- "supplementaryServiceInteraction", if the provision of the MWI supplementary service is precluded due to an interaction with one or more other supplementary services;

- "resourceUnavailable", if the resources required to perform adequately the MWI supplementary service are not available;

- "invalidControllingUserNumber", if the received ISDN number identifying the controlling user is a non authorized number (in case of registration subscription option applies) or an invalid number;

- "receivingUserNotSubscribed", if the MWI supplementary service has not been subscribed to by the receiving user;

- "indicationNotDelivered", if indicated by the access signalling system;

- "maxNumOfControllingUsersReached", if the receiving user's network cannot handle any further controlling users;

- "maxNumOfActiveInstancesReached", this error value shall be used when the maximum number of activations for the receiving user has been reached and a further activation has been requested.

9.1.2 Deactivation

9.1.2.1 Actions at the controlling user's exchange

9.1.2.1.1 Normal operation

On receipt of an MWI supplementary service deactivation request the controlling user's exchange shall send a MWIReset invoke component to the receiving user's exchange. The invoke component shall contain a receiving user number parameter, a controlling user number parameter, the basic service parameter and as a controlling user's option the mode parameter

The use of the mode parameter is based on agreement between the controlling and the receiving users. The TC-INVOKE primitive shall include the value of the MWI supervision operation timer MWI-Tsup.

When the controlling user's exchange receives an MWIReset return result component, this means that the operation has been successfully performed, the access signalling system shall then be informed accordingly and the TC resources shall be released.

NOTE: The MWI supervision operation timer MWI-Tsup is stopped by TC when the TC-RESULT primitive is received.

9.1.2.1.2 Exceptional procedures

a) MWIReset return error component is received

If the controlling user's network receives an MWIReset return error component, the exchange will consider that the operation has not been successfully performed. The received error value shall be forwarded to the access signalling system that shall be informed accordingly and the TC resources shall be released.

b) TC cancellation or SCCP routing failure

On receipt of either a TC-P-ABORT, TC-U-ABORT, TC-U-REJECT, TC-L-CANCEL,TC-L-REJECT, TC-R-REJECT or a TC-NOTICE primitive as response to the MWIReset invoke component, the exchange shall consider the deactivation request as not successful and provide the access signalling system with the error value "indication not delivered". as a reason and the TC-resources shall be released.

c) Resource unavailable

If a connection with TC-dialogue primitives can not be established, the exchange provides the access signalling system with the error value "resource unavailable" as a reason.

9.1.2.2 Actions at the receiving user's exchange

9.1.2.2.1 Normal operation

On receipt of the MWIReset invoke component, depending on the receiving user's subscribed invocation mode (see table 2) and the received parameter indicating the mode to be used. The receiving user's exchange shall apply one of the procedures as identified in table 3:

a) deferred:

The receiving user's exchange shall validate the deactivation request, delete the stored information stored per received basic service and controlling user number.

In case the deactivation request addresses the last MWI active instance, then an indication shall not be given when the receiving user makes an outgoing call attempt.

b) immediate:

The receiving user's exchange shall validate the deactivation request and send the deactivation request to the access signalling system.

c) combined:

The receiving user's exchange shall act as described in a) and b).

In all cases, when the deactivation request has been accepted the receiving user's exchange shall send an MWIReset return result component to the controlling user's exchange. Any reserved resources shall be released.

9.1.2.2.2 Exceptional procedures

If the MWI supplementary service cannot be deactivated, the receiving user's exchange shall send a MWIReset return error component to the controlling user's exchange and indicate one of the following reasons:

- "indicationNotDelivered", if indicated by the access signalling system;
- "invalidReceivingUserNumber", if the ISDN number provided to identify the receiving user is not a valid number;
- "supplementaryServiceInteraction", if the provision of the MWI supplementary service is precluded due to an interaction with one or more other supplementary services;
- "resourceUnavailable", if the resources required to perform adequately the MWI supplementary service are not available;
- "invalidControllingUserNumber", if the received ISDN number identifying the controlling user is a non-authorized number (in case of registration subscription option applies) or an invalid number;
- "receivingUserNotSubscribed", if the MWI supplementary service has not been subscribed to by the receiving user.

9.1.3 Registration

Not applicable.

9.2 Invocation and operation

9.2.1 Actions at the controlling user's exchange

No invocation procedure exist in the network.

9.2.2 Actions at the receiving user's exchange

No invocation procedure exist in the network.

9.3 Use of TC and SCCP

The service monitoring and management signals are defined as TC-based application messages (i.e. operations and corresponding results, see ETS 300 287 [3]). The coding of these messages is given in subclause 7.2.

9.3.1 Routeing in the SCCP network

For routing based on the Global Title (GT) translation mechanism within the national network, the coding of the called party address and the calling party address in SCCP (see ETS 300 009 [1]) shall comply with the following restrictions:

SSN indicator:	1	(SSN for ISDN supplementary services is always included)
GT indicator:	0100	(includes a translation type, numbering plan, encoding scheme and nature of address)
Translation type:	0001 0001	(translation table)
Numbering plan:	0001	(ISDN/Telephony Numbering plan E.164)
Routeing indicator:	0	(Routeing on global title)

9.3.2 Number information used for routing

The exchange which initiates a dialogue using the GT translation mechanism, shall give its ISDN number (see ITU-T Recommendation E.164 [5]) as GT in the SCCP calling party address field and the receiving user's ISDN number as the GT in the SCCP called party address field.

In case the SCCP called party address is coded as international number format, then the SCCP calling party address shall be coded as international number format.

The exchange which responds to the MWI dialogue may give its ISDN number as GT in the SCCP calling party address field and shall give the received SCCP GT calling party address as the GT in the SCCP called party address field.

9.3.3 SCCP message return procedure

The SCCP message return procedure shall always be requested by means of TC-primitives between the MWI-ASE and the TC protocols.

9.4 ASE for MWI

9.4.1 Subsystem number

The subsystem number 000 1011, dedicated to the ISDN supplementary services ASEs, shall be used.

9.5 Dialogue

9.5.1 General

The dialogues defined for the MWI supplementary service between the peer-to-peer entities (TC-users) are structured dialogues. The dialogue ID parameter is used in both operation handling and transmission (dialogue) handling primitives to determine which component(s) pertain(s) to which dialogue.

Each TC-user has its own reference for a given dialogue. These references are local references and mapping of these local references into protocol references transaction ID, included in the messages, is done by TC.

Only class 1 operations are used.

Each TC message shall convey a single MWI operation.

9.5.2 Dialogue beginning

The controlling user's exchange establishes the dialogue by using a TC-BEGIN request primitive with a TC-INVOKE request primitive to transmit either a MWISet invoke component or a MWIReset invoke component to the receiving user's exchange.

9.5.3 Dialogue ending

Two ways of ending the dialogue are used.

a) Basic end:

The dialogue end is requested by the receiving user's exchange by using a TC-END request primitive upon the following cases:

- with TC-INVOKE request primitive to transmit either an MWISet or MWIReset return result component if the result is positive;

- with TC-U-ERROR request primitive to transmit either an MWISet or MWIReset return error component if the result is negative;

- with TC-U-REJECT request primitive if the component check fails.

b) Abnormal end:

- the TC-user may abandon the service. In this case a peer to peer information shall be delivered at the time the abort is issued, to the remote TC-user, by sending a TC-END request primitive to transmit the TC-U-ABORT request primitive without abort reason;

- when the MWI supervision operation timer MWI-Tsup expires, at the controlling user's exchange, the MWI-ASE receives a TC-L-CANCEL indication primitive as response to either an MWI activation request or an MWI deactivation request. In this case the request shall be rejected with an appropriate reason ;

- on receipt of TC-P-ABORT,TC-L-REJECT, TC-R-REJECT or a TC-NOTICE indication primitive, the TC-dialogue shall be terminated.

10 Interaction with other networks

10.1 Interworking with a network part without MWI-ASE capability

Interworking with a network part without MWI-ASE capability is not possible.

10.2 Interworking with a network without SCCP/TC capability

In case where the SCCP/TC capability is not supported by either the controlling user's network or the receiving user's network, interworking is not possible.

In case where an intermediate network does not support SCCP/TC capability the message return procedure is invoked. The controlling user's exchange will receive a TC-NOTICE indication. This may happen when the MWISet component or when the MWIReset component is sent. The reception of this indication shall be notified to the controlling user via the access.

10.3 Interworking with a PSTN user

Users in the PSTN may receive a message waiting indication.

If the deferred MWI-indication is given by means of a special dial tone, it will not be provided for a CCBS call.

10.4 Interworking with a Public Switched Telephone Network (PSTN)

This interworking scenario is a national matter.

10.5 Interworking with a Public Land Mobile Network (PLMN)

The MWI supplementary service may be supported in case of interworking with a PLMN. The signalling systems used to interwork with a PLMN supporting MWI shall be compatible, on a functional and a protocol level, with the signalling systems specified in this ETS.

10.6 Procedures for interworking with private ISDNs

When interworking with private ISDNs, the public network shall forward the received MWI information to and from the private network.

11 Interaction with other supplementary services

11.1 Advice of charge services

11.1.1 Charging information at call set-up time

No impact.

11.1.2 Charging information during the call

No impact.

11.1.3 Charging at the end of a call

No impact.

11.2 Call waiting

No impact.

11.3 Call hold

No impact.

11.4 Explicit call transfer

No impact.

11.5 Number identification services

11.5.1 Calling line identification presentation

No impact.

11.5.2 Calling line identification restriction

No impact.

11.5.3 Connected line identification presentation

No impact.

11.5.4 Connected line identification restriction

No impact.

11.6 Closed user group

No impact.

11.7 Completion of calls to busy subscriber

No impact.

11.8 Conference services

11.8.1 Conference call, add-on

No impact.

11.8.2 Meet-me conference

No impact.

11.9 Direct dialling in

No impact.

11.10 Diversion services

11.10.1 Call forwarding unconditional

No impact.

11.10.2 Call forwarding busy

No impact.

11.10.3 Call forwarding no reply

No impact.

11.10.4 Call deflection

No impact.

11.11 Freephone

No impact.

11.12 Malicious call identification

No impact.

11.13 Multiple subscriber number

No impact.

11.14 Subaddressing

No impact.

NOTE: In the MWI-ASE operations, the subaddress information is not supported.

11.15 Terminal portability

No impact.

11.16 Three party

No impact.

11.17 User-to-user signalling

No impact.

11.18 Message waiting indication

No impact.

12 Parameter values (timers)

12.1 Timers in the controlling user's exchange

MWI-Tsup MWI supervision operation timer.

Supervision of response to either an MWISet or an MWIReset operation, sent from the controlling user's exchange to the receiving user's exchange. MWI-Tsup will expire if signalling is not possible, at signalling failures or if the receiving user's exchange cannot respond. Duration = 10 seconds.

12.2 Timers in the receiving user's exchange

No need for timers has been identified.

13 Dynamic description (SDL diagrams)

No dynamic description is required.

Annex A (informative): Signalling flows

This annex contains arrow diagrams showing the MWI-ASE signal flows for different cases of the MWI supplementary service.

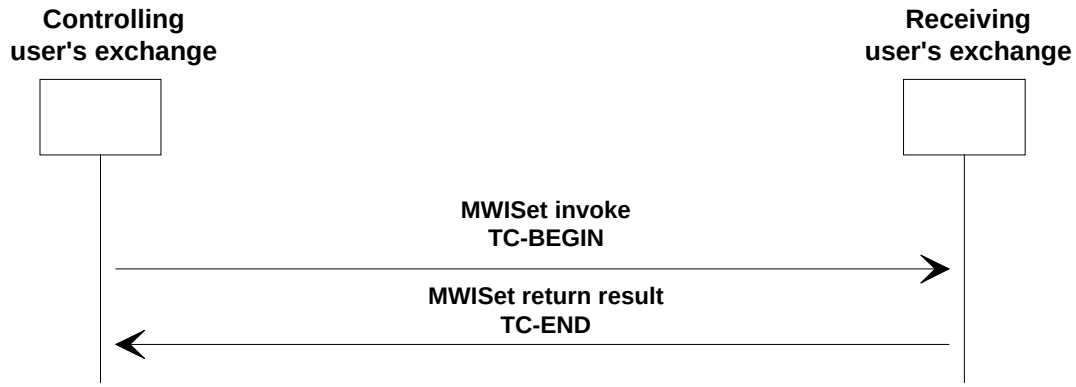

Figure A.1: Successful activation

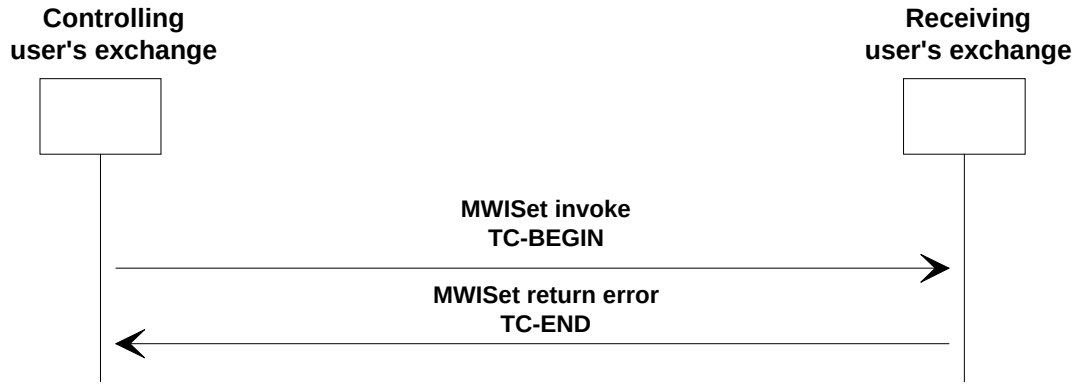

Figure A.2: Unsuccessful activation

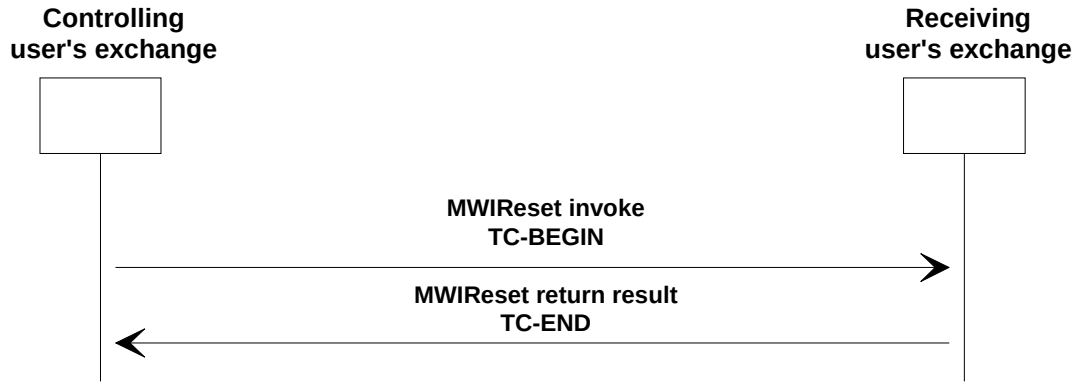

Figure A.3: Successful deactivation

Annex B (informative): Assignment of object identifier values

The following object identifier values are assigned in this ETS:

{ccitt identified-organization etsi(0) 754 operations-and-errors(1)};

{ccitt identified-organization etsi(0) 754 operations-and-errors(1) 1};

{ccitt identified-organization etsi(0) 754 operations-and-errors(1) 2};

{ccitt identified-organization etsi(0) 754 operations-and-errors(1) 10} to
{ccitt identified-organization etsi(0) 754 operations-and-errors(1) 17}.

History

Document history			
May 1996	Public Enquiry	PE 106:	1996-05-20 to 1996-09-13
April 1997	Vote	V 9724:	1997-04-15 to 1997-06-13