ATIS-1000622.a.1998(S2018)

Message Waiting Indicator and Notification Supplementary Services and Associated Switching and Signaling Specifications

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ATIS-1000622.a.1998(S2018), *Message Waiting Indicator and Notification Supplementary Services and Associated Switching and Signaling Specifications*

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American National Standard

for Telecommunications –

Message Waiting Indicator and Notification Supplementary Services and Associated Switching and Signaling Specifications

Approved January 14, 1998   Secretariat: Alliance for Telecommunications Industry Solutions

1 Introduction

This supplement to *American National Standard for Telecommunications - Message Waiting Indicator and Notification Supplementary Services and Associated Switching and Signaling Specifications*, ANSI T1.622-1992, revises the standard to improve and expand the applicability of this standard, in particular, when interfacing to an NT2.

2 Changes to existing text

The changes made to the existing ANSI T1.622 are indicated below.

1. In clause 2, Normative references, the following references shall be added:

    ANSI T1.607a-1996, *Telecommunications - Digital Subscriber Signaling System Number 1 (DSS1) - Layer 3 Signaling Specification for Circuit-Switched Bearer Services*[1]

    ANSI T1.610-1998, *Telecommunications - Generic Procedures for the Control of ISDN Supplementary Services*

2. In 6.1, the contents (not including subclauses) shall be replaced with the following:

    The Networked Call Independent, Connection-Oriented Signaling (NCICS) messages SETUP, CONNECT, FACILITY, RELEASE, and RELEASE COMPLETE as well as the INFORMATION message shall be used for the invocation of MWI Control and Notification service, as defined in ANSI T1.607 and T1.610:

    a) The NCICS messages shall be used to send MWI Control requests and responses between the MSR System and the network. The NCICS messages shall also be used to send detailed notification to an ISDN Client User.

    b) The INFORMATION message shall be used to provide MWI Notification service to the ISDN client user.

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[1] At the time of publication, this standard was being revised. Please contact the secretariat for more recent information.

3. Within 6.1.1, the contents shall be replaced with the following

The Networked Call Independent, Connection-Oriented Signaling (NCICS) messages [SETUP, CONNECT, FACILITY, RELEASE, and RELEASE COMPLETE], the INFORMATION message and the REGISTER message shall be used for the invocation of MWI Control and Notification service, as defined in ANSI T1.607 and T1.610:

a) The NCICS messages shall be used to send MWI Control requests and responses between the MSR System and the network. The NCICS messages shall also be used to send detailed notification to an ISDN Client User.

b) The INFORMATION message shall be used to provide MWI Notification service to the ISDN client user.

c) The REGISTER, FACILITY, and RELEASE COMPLETE messages may be used to send detailed notification to an ISDN TE.

4. In 6.1.3, the contents shall be replaced with the following:

The following information elements, defined in ANSI T1.607, are used: Protocol Discriminator, Call Reference, Message Type, Calling Party Number, and Called Party Number.

The following information elements defined in ANSI T1.610, are used: Bearer Capability, Channel Identification, Facility, and Feature Indication

5. In 6.1.4, the contents shall be replaced with the following:

The codepoints, as defined in ANSI T1.610 and in this standard, shall be utilized in the MWICN service operation, as appropriate. In addition, the protocol profile field of the Facility information element shall be coded to "Networking Extensions" for this service. The NFE may be excluded if a local NCICS connection is established; otherwise it shall be included. When included, the NFE shall be coded as follows: sourceEntity = endPINX, destinationEntity = endPINX.

6. In 6.2.1.1, the contents shall be replaced with the following:

MWICN is call independent as defined in ANSI T1.610 and utilizes the connection-oriented signaling procedures. Additional service states required are:

a) Service Null: no service has been requested;

b) Service requested: Awaiting response.

7. In 6.2.1.2, timer MWI-T1 shall be modified to support a range of 10 seconds to 25 seconds with a default of 10 seconds.

8. In 6.2.1.2, the following shall be added:

Timer MWI-T3: This timer specifies the maximum length of time that the serving switch will wait for a response to a Detailed Notification sent to an NT2. The range of this timer shall be from 4 seconds to 7 seconds. The default value is 4 seconds.

9. In 6.2.2, the contents shall be replaced with the following:

The MWI Control service is invoked by an MSR System by sending an Invoke component to the network in a Facility information element contained in an NCICS SETUP or FACILITY message.

10. In 6.2.3, the following shall be added as the last paragraph:

Notification of waiting messages is provided to an NT2 as described in 6.2.4.3.

11. In 6.2.4.1.1, the first and second paragraphs (including the two dashed items) shall be replaced with the following:

When the MSR System wishes to notify a client user of a waiting message, the MSR System shall send an MWI Control request to its serving network. The MWI Control request is carried in the Facility information element contained in the NCICS SETUP or FACILITY message that uses the call reference established by an NCICS SETUP message. A FACILITY message may be sent at any time by the MSR System after receiving the CALL PROCEEDING message. The network shall send an acknowledgement of a successful or unsuccessful completion to the MSR System in a Facility information element in an NCICS CONNECT or FACILITY message with the same call reference in accordance with ANSI T1.610. The MSR System is allowed to initiate multiple MWI control transactions using the same call reference. The MSR System should clear the call reference with a RELease message when the following conditions exist:

- all outstanding invocations have received a response from the network; and
- the MSR System does not wish to initiate any additional invocations for the moment.

Under normal conditions, the network should not initiate clearing of an NCICS connection initiated by the user side of the ISDN interface.

Each logical MWI entity which resides in a network switch shall be assigned an E.164 address for the purpose of establishing an NCICS connection. In the case of a user directly served by the public network, the MSR System establishes an NCICS connection to its serving network switch over which MWI Control requests are sent. The TON/NPI field of the Called Party Number information element is coded to Subscriber number/ (ISDN/telephony numbering plan) with digits representing the local 7-digit address of the logical MWI entity or National number/(ISDN/telephony numbering plan) with digits representing the national 10-digit address of the logical MWI entity. When the network switch receives an NCICS SETUP message containing this addressing information, it shall establish an NCICS connection between the MSR System and the logical MWI entity indicated by the E.164 address digits.

12. In 6.2.4.1.9, the definition of the invalidArgument error shall be changed to include a PARAMETER "invalidArgumentIdentifier" that is defined to include the invalid parameter received in the operation. The invalidMSRID parameter shall be removed as it is no longer necessary. The new error definition for the invalidArgument error shall be as shown below:

> invalidArgument ERROR
> > PARAMETER {controltype, destinationDN, mSRID}
> > ::= **{1 2 840 10005 1 101}**
> > *--used when an argument provided by the requesting user in the*
> > *--messageWaitingIndicatorControl operation is not valid. The error*
> > *--PARAMETER contains the argument(s) that were determined to be*
> > *--invalid.*

13. In 6.2.4.1.9, the comment describing the coding of the "bearerCapability" argument of the "messageWaitingIndicatorControl" operation in the ASN.1 description shall be clarified as follows (new text underlined, deleted text stricken through):

> bearerCapability [3] IMPLICIT OCTET STRING OPTIONAL,
> > -- coded as shown for octets 3 and 4 following in the bearer
> > -- capability information element defined in ANSI T1.607

14. In 6.2.4, the following 3 subclauses shall be added:

6.2.4.3 Message Waiting Notification to an NT2

This subclause includes the protocol and procedures for sending a detailed notification to an NT2.

6.2.4.3.1 Sending a Message Waiting Notification to an NT2

When the network receives and accepts a request from an MSR System to send an MWI control request to an NT2, and the interface to the NT2 is permitted to receive such a notification, the network shall send a detailed notification using the NCICS procedures. The detailed notification shall be sent in an Invoke component contained in a Facility information element in either an NCICS SETUP message (which also initiates a new NCICS connection) or in a FACILITY message (if an appropriate NCICS connection already exists between the network and the NT2). The contents of the Invoke component are described in 6.2.4.3.2. If a new NCICS connection is established for the sending of the MWI control request, the network may code the Called Party Number information element to indicate a local NCICS connection or a networked connection, as appropriate. Whether or not to establish and clear an NCICS connection for each notification, or to keep the NCICS connection up for long term is a network option.

The coding of the operation and error value in the ASN.1 description in 6.2.4.3.2 uses object identifiers. The national-specific operation value for the "message waiting notification detailed" operation is defined with an ISO object identifier in number form as { 1 2 840 10005 0 7}. In name form this object identifier can also be written as {iso member-body us ansi-t1-610 operations messageWaitingNotificationNT2}. The numbers (and names) in braces represent, in sequence, International Organization for Standardization [ISO], member body, United States of America, ANSI T1.610, operations, and the specific subidentifier for "message waiting notification-detailed notification to an NT2."

After sending the Invoke component, the network shall start timer MWI-T3. The NT2 shall indicate a successful notification by sending a Return Result component in a Facility information element contained in a FACILITY or CONNect message, as appropriate. Upon receiving this response, the network switch serving the NT2 shall stop timer MWI-T3, and return an indication of successful completion to the MSR System that originated the request.

The NT2 may reject the notification by sending a Return Error component with an appropriate Error value, for example, "notification unavailable to destination DN" (see 6.2.5.3 for more information). If the Detailed Notification application is not supported by the NT2, the NT2 should reject the notification using a Reject component with the Problem value "unrecognized operation." The NT2 should reject a notification which contains protocol errors using a Reject component with the appropriate Problem value (see ANSI T1.610). These Return Error and Reject components shall be returned in a Facility information element contained in a FACILITY or CONNect message, as appropriate.

When the serving switch receives a rejection of Detailed Notification from the NT2, the switch shall stop timer MWI-T3 and send an indication of an unsuccessful notification attempt corresponding to the received indication, for example, "notification unavailable to destination DN," to the requesting MSR System. Upon expiry of timer MWI-T3, the network shall send a RELEASE COMPLETE to the NT2 and return an indication of an unsuccessful notification attempt, corresponding to "notification unavailable to destination DN," to the requesting MSR System.

In the case of data link layer failure between the network and the NT2, the network shall return an indication of the unsuccessful attempt, corresponding to "notification is unavailable to the destination DN," to the requesting MSR System.

6.2.4.3.2 ASN.1 Description of Message Waiting Notification - Detailed Notification to an NT2

```
messageWaitingNotificationNT2 OPERATION
ARGUMENT SEQUENCE {
        controlType [0] IMPLICIT ENUMERATED {
                        activate (0),
                        deactivate (1)},
        destinationDN [1] IMPLICIT Digits,
        mSRID [2] IMPLICIT NumericString SIZE (10) OPTIONAL,
        bearerCapability [3] IMPLICIT OCTET STRING OPTIONAL,
                        -- coded as shown for octets 3 and 4  in the Bearer
                        -- capability information element defined in ANSI T1.607
        callingNumber [4] IMPLICIT Digits OPTIONAL,
        timestamp UTCTime OPTIONAL,
        mwiType [5] IMPLICIT ENUMERATED {
                        active1 (1), -- normal
                        active2 (2),
                        active3 (3)}    OPTIONAL
        }

RESULT
        --to indicate successful completion

ERRORS
                {
                unassignedDN,
                missingCustomerRecord,
                notificationUnavailableToDestinationDN,
                mSRIDdidNotMatchUserProfile,
                resourcesUnavailable
                }
```

::= **{1 2 840 10005 0 7}**

Digits::= OCTET STRING

> -- *coded as shown for octets 3 and following in the Called party number*
> -- *information element defined in ANSI T1.607*

-- *UTCTime is coded as YYMMDDhhmm   plus or minus   hhmm*
--   *local time   Time difference from*
--   *Greenwich Mean Time*

--*The following errors are of global significance.*

```
unassignedDN ERROR
        PARAMETER {destinationDN}
        ::= {1 2 840 10005 1 14}
```
> --*used when the destination DN is not currently assigned*
> --*to an active interface*

```
missingCustomerRecord ERROR

        PARAMETER {destinationDN}
        ::= {1 2 840 10005 1 4}
```
> --*used when the destination DN/BC is not subscribed to the*
> --*Message Waiting Notification feature*

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notificationUnavailableToDestinationDN ERROR
        ::= **{1 2 840 10005 1 16}**
                        --used when the notification cannot be provided to the
                        --destination DN for some short term reason (e.g., the
                        --line is temporarily out of service)

mSRIDdidNotMatchUserProfile ERROR
        PARAMETER {mSRID}
        ::= **{1 2 840 10005 1 17}**
                        --used when the MSRID did not match the
                        --Authorized MSRID(s) in the client user's DN profile
--The following error is of local significance on the switch which serves
--the ISDN User equipment receiving this detailed notification.

resourcesUnavailable ERROR
        ::= **11**
                        --used to provide flow control on the local access

15.   In subclause 6.2.5.1.1, to align with the above changes, the supporting text shall be revised as follows (new text underlined, deleted text stricken through):

        If the "controlType" argument is not valid, then the MWI control request shall be rejected with a Facility information element contained in a FACILITY message. The Facility information element shall contain a Return Error component with the error "invalid argument," containing the "controlType" argument received in the "messageWaitingIndicatorControl" operation in the Error PARAMETER.

        If the "destination DN" argument is present, but the network determines that the argument does not contain a valid DN, and that a valid DN cannot be derived, the network shall reject the MWI control request with a Facility information element in a FACILITY message. The Facility information element shall contain a Return Error component with the error "invalid argument," and containing the "destinationDN" argument received in the "messageWaitingIndicatorControl" operation in the Error PARAMETER.

        If the "MSRID" argument does not pass screening, then the MWI control request shall be rejected with a Facility information element contained in a FACILITY message. The Facility information element shall contain a Return Error component with the error ~~"invalid MSRID."~~ "invalid argument," containing the "mSRID" argument received in the "messageWaitingIndicatorControl" operation in the Error PARAMETER.

16.   In 6.2.5, the following new subclause (i.e., 6.2.5.3) shall be added

6.2.5.3 Message Waiting Notification function to an NT2

If timer MWI-T3 expires, or if the MWI notification attempt is determined to be unsuccessful, the network shall report the failure in a Facility information element contained in a FACILITY message sent from the network to the MSR System as described in 6.2.5.1.1. As described in 6.2.4.3, the error indications received by the network that consitute a valid but unsuccessful notification attempt include:

1.   unassigned DN - used when the destination DN (provided in the "destination DN" argument, or derived from it) is not currently assigned to an active interface;

2.   missing customer record - used when the client user identified by the destination DN is not subscribed to Message Waiting Notification;

3.   notification unavailable to destination DN - used when the MWN cannot be provided to the destination DN for some short term reason (e.g., the line is temporarily out of service) or when Detailed Notification cannot be provided;

4.   MSRID did not match user profile - used when the MSRID did not match information in the client user's profile.
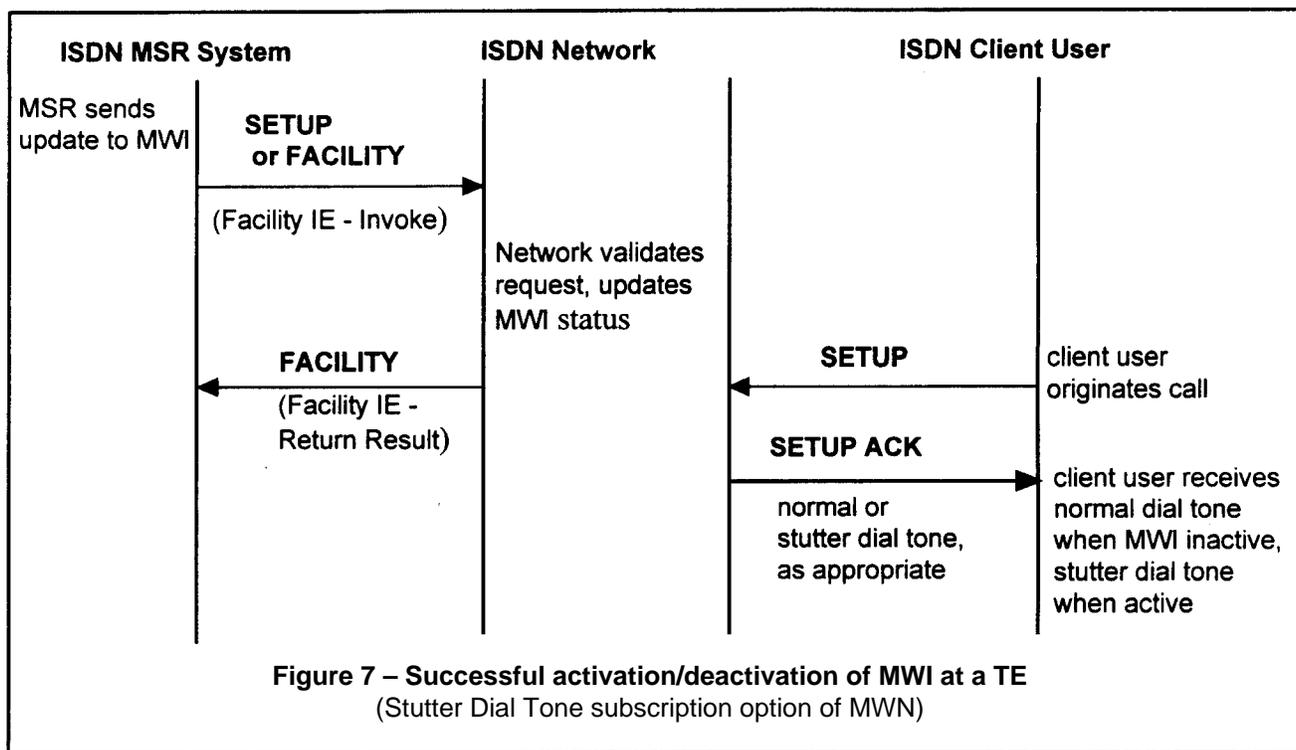
Under normal conditions, the network shall clear the NCICS connection. However, under exceptional conditions (e.g., system recovery), the NT2 may clear the NCICS connection.
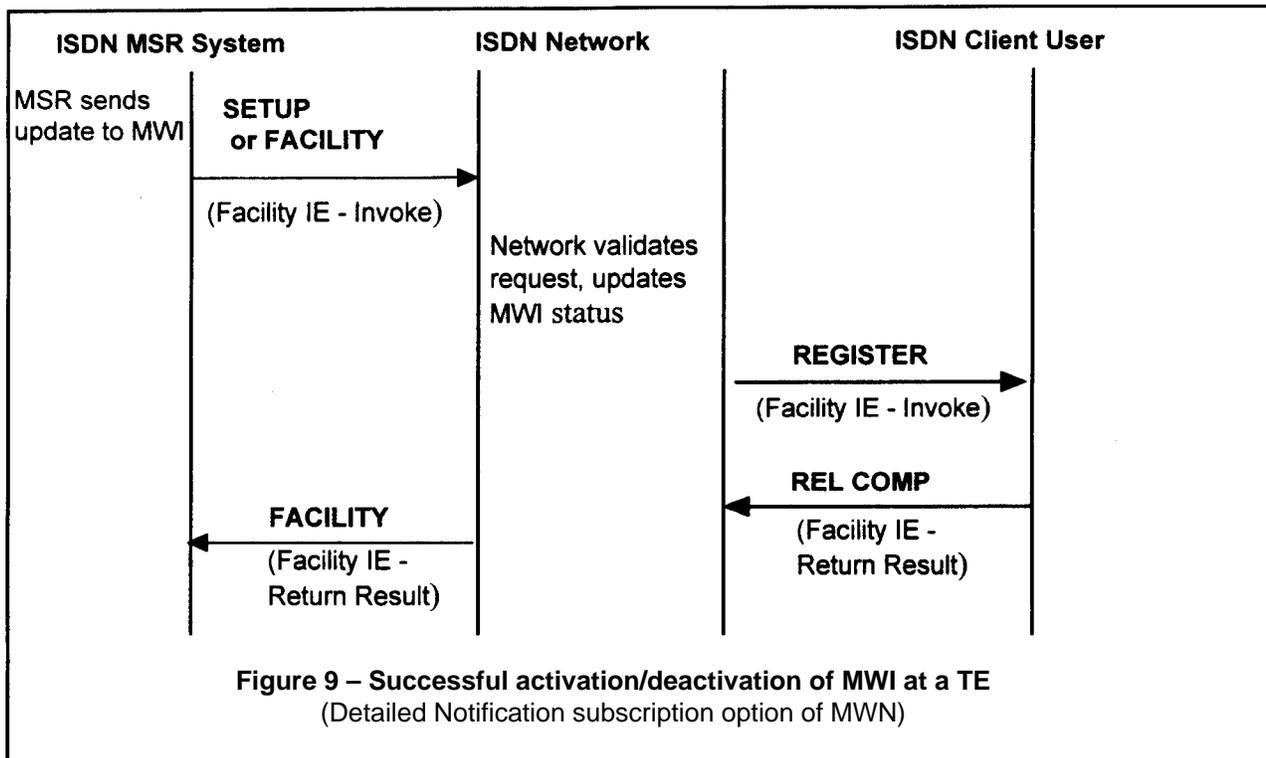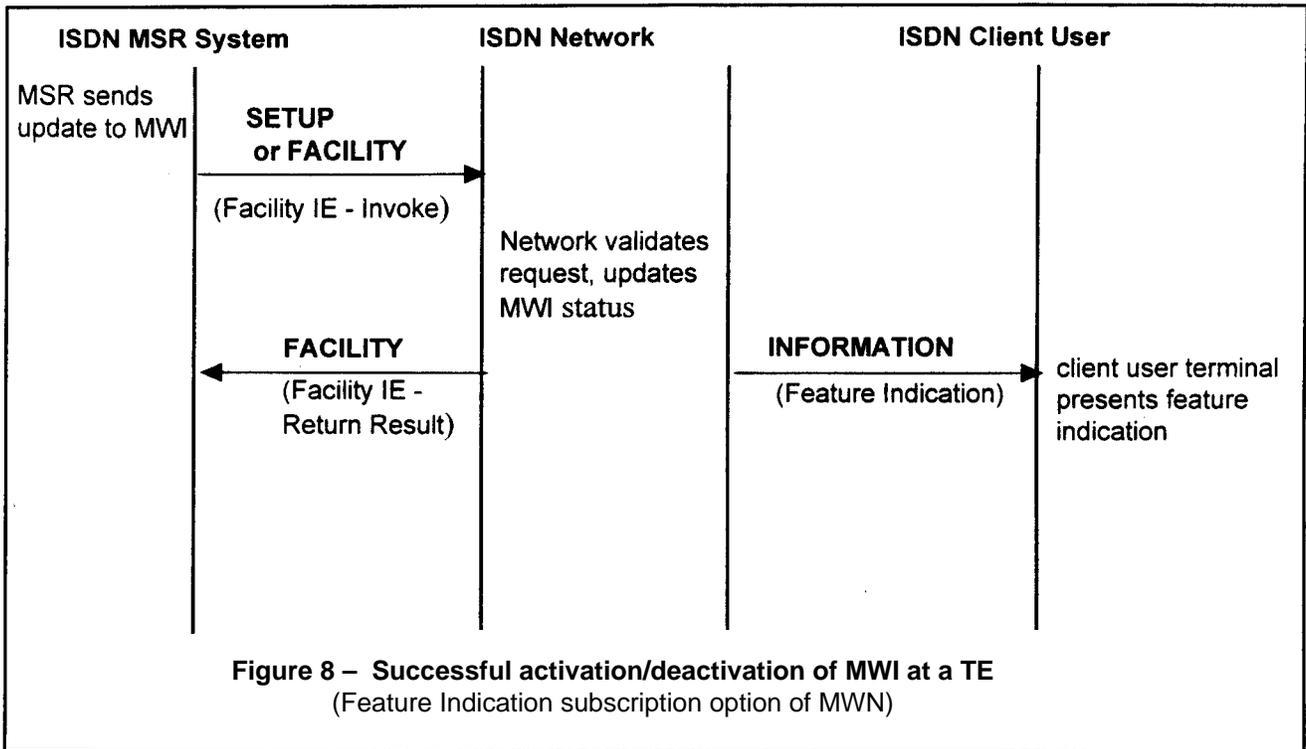
17. In 6.4, the last sentence shall be replaced with the following:

Figures 10(a), 10(b), and 10(c) show the message flows for an unsuccessful attempt to control (activate/deactivate) an MWI. Figure 10(a) shows the general case, figure 10(b) shows the case when Detailed Notification to a Terminal Equipment (TE) fails, and figure 10(c) shows the case when Detailed Notification to an NT2 fails.

Figure 10(d) shows the message flows for a successful attempt to control (activate/deactivate) an MWI at an NT2.

18. Figures 7, 8, 9, 10(a), and 10(b) shall be replaced with the following figures.

Figure 7 – Successful activation/deactivation of MWI at a TE
(Stutter Dial Tone subscription option of MWN)

Figure 8 – Successful activation/deactivation of MWI at a TE
(Feature Indication subscription option of MWN)

Figure 9 – Successful activation/deactivation of MWI at a TE
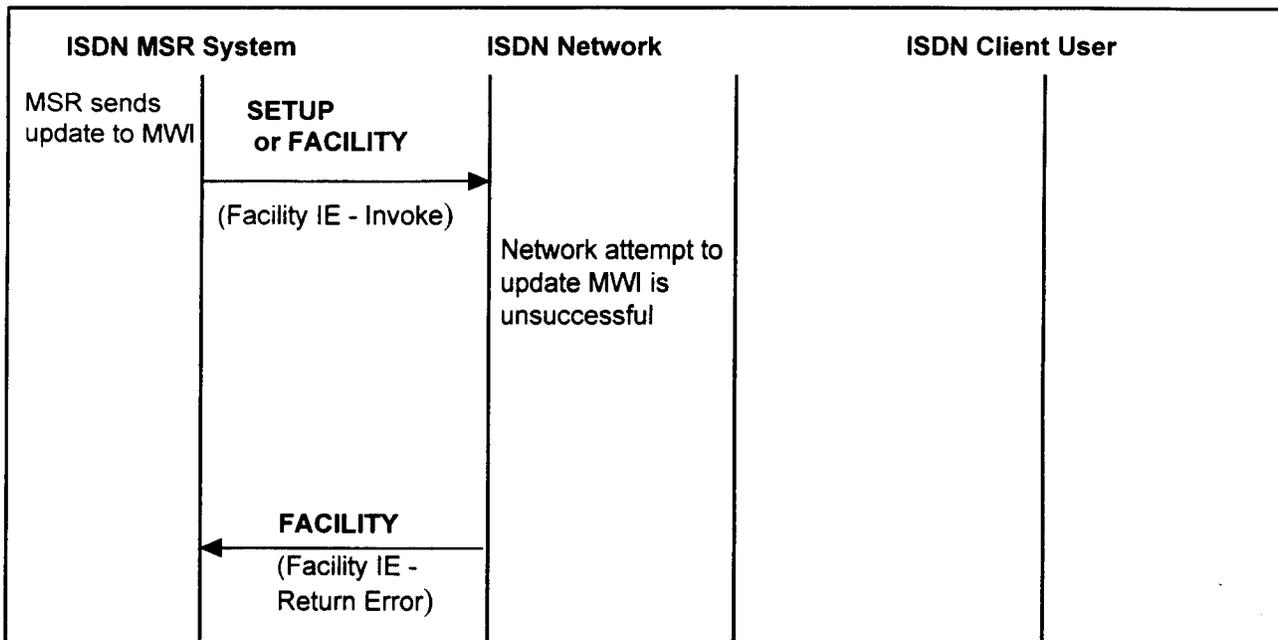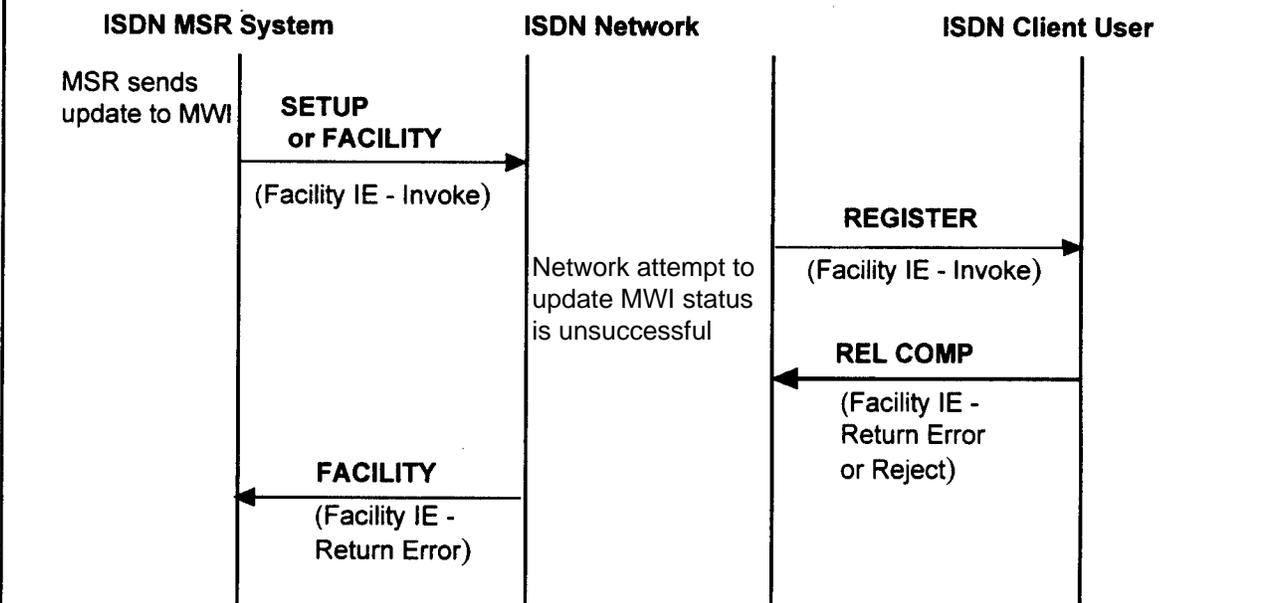(Detailed Notification subscription option of MWN)

Figure 10(a) – Unsuccessful activation/deactivation of MWI

Figure 10(b) – Unsuccessful activation/deactivation of MWI to a TE
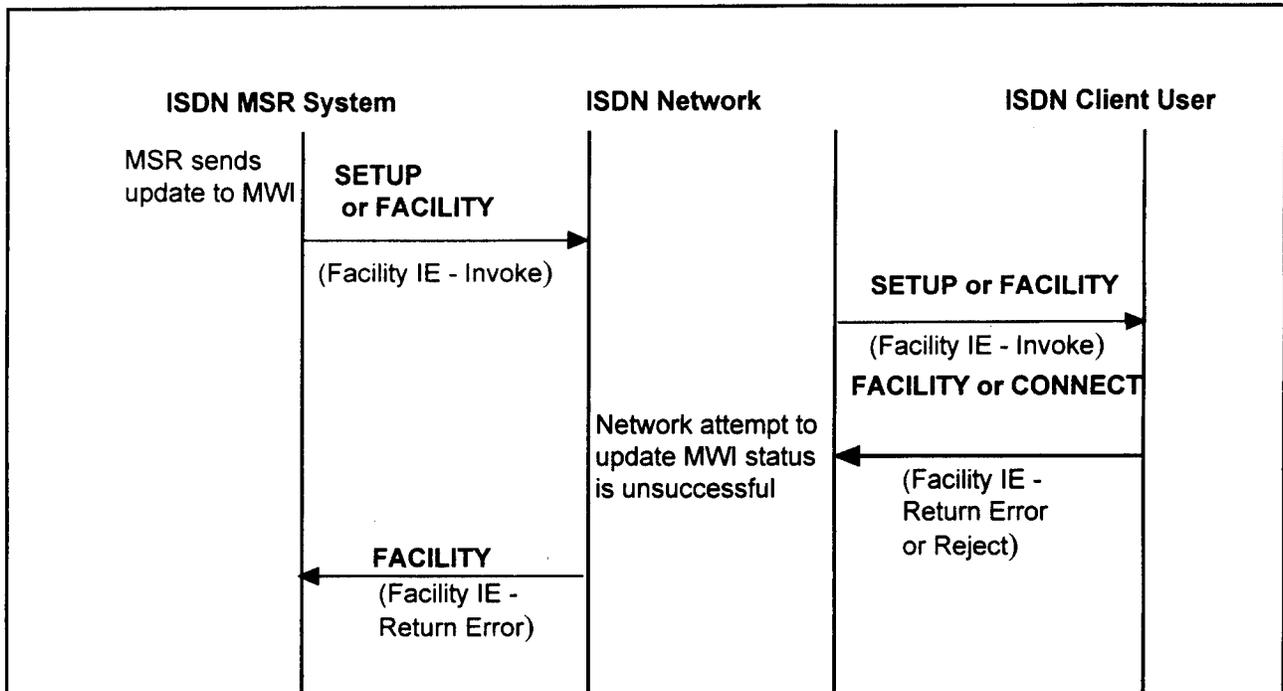(Detailed Notification subscription of MWN)

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ISDN MSR System   **ISDN Network**   **ISDN Client User**

MSR sends update to MWI | **SETUP or FACILITY**

(Facility IE - Invoke)

SETUP or FACILITY

(Facility IE - Invoke)
FACILITY or CONNECT

Network attempt to update MWI status is unsuccessful

(Facility IE - Return Error or Reject)

FACILITY
(Facility IE - Return Error)

Figure 10(c) – Unsuccessful activation/deactivation of MWI at an NT2 (Provision of MWI to an NT2)

ISDN MSR System   **ISDN Network**   **ISDN Client User**

MSR sends update to MWI | **SETUP or FACILITY**

(Facility IE - Invoke)

SETUP or FACILITY

(Facility IE - Invoke)

Network attempt to update MWI status is successful

FACILITY or CONNECT
(Facility IE - Return Result)

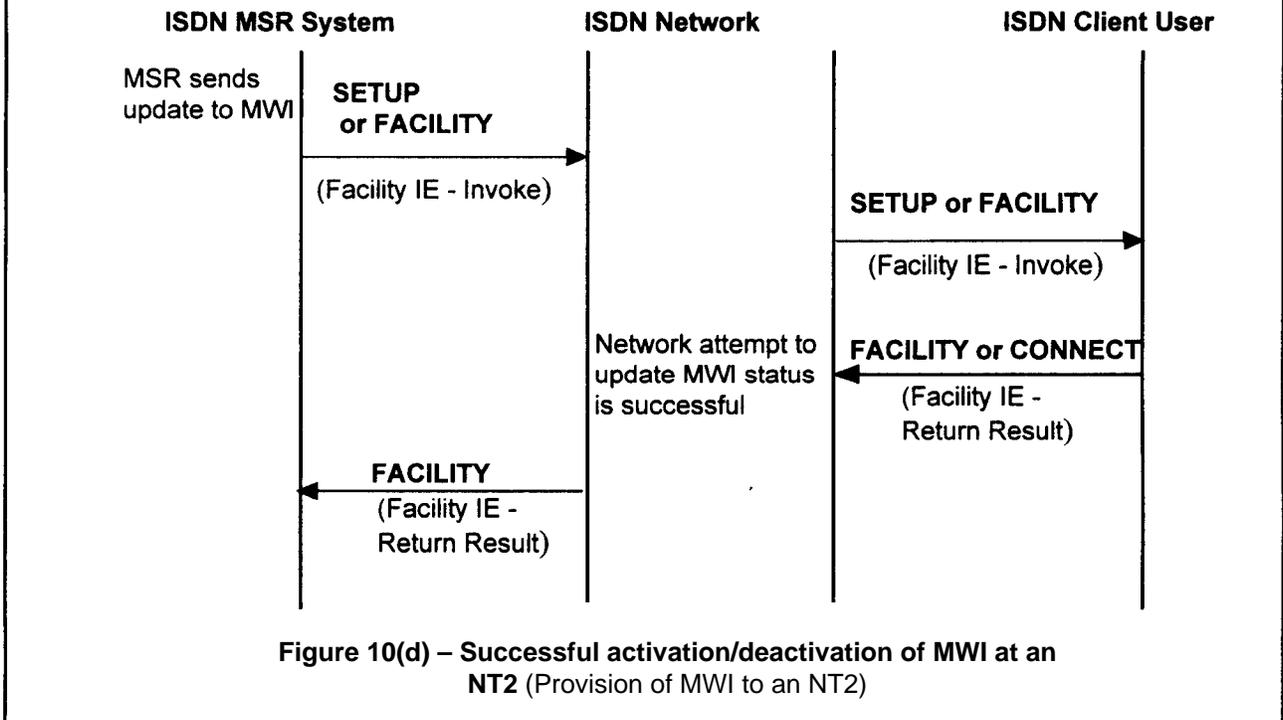**FACILITY**
(Facility IE - Return Result)

Figure 10(d) – Successful activation/deactivation of MWI at an NT2 (Provision of MWI to an NT2)