INTERNATIONAL TELECOMMUNICATION UNION

ITU-T M.3211.1

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(05/96)

MAINTENANCE

TELECOMMUNICATION MANAGEMENT NETWORK

TMN MANAGEMENT SERVICE: FAULT AND PERFORMANCE MANAGEMENT OF THE ISDN ACCESS

ITU-T Recommendation M.3211.1

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation M.3211.1 was prepared by ITU-T Study Group 4 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 12th of May 1996.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

			Page
1	Scope		1
2	References		1
3	Abbreviations		1
4	Management service description		2
	4.1	Relationship to other TMN management services	2
	4.2	Management goals	2
	4.3	Management context description	2
	4.4	Architecture	6

ABSTRACT

This Recommendation describes the TMN management services for the maintenance of the ISDN access.

These management services provide both the generic and specialized functionalities needed for the fault and performance management of the ISDN access.

KEYWORDS

Exchange Termination (ET), ISDN access, Management Service (MS), Telecommunications Management Network (TMN).

Recommendation M.3211.1

TMN MANAGEMENT SERVICE: FAULT AND PERFORMANCE MANAGEMENT OF THE ISDN ACCESS

(Geneva, 1996)

1 Scope

This Recommendation describes the TMN management services for the maintenance of basic and primary rate ISDN access.

2 References

The following Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision: all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Recommendation M.3020 (1995), *TMN interface specification methodology*.

[2] CCITT Recommendation M.3200 (1992), *TMN management services: overview*.

[3] CCITT Recommendation M.3400 (1992), *TMN management functions*.

[4] CCITT Recommendation M.3600 (1992), *Principles for the management of ISDNs*.

[5] CCITT Recommendation M.3602 (1992), *Application of maintenance principles to ISDN subscriber installations*.

[6] CCITT Recommendation M.3603 (1992), *Application of maintenance principles to ISDN basic rate access*.

[7] CCITT Recommendation M.3604 (1992), *Application of maintenance principles to ISDN primary rate access*.

[8] CCITT Recommendation M.3640 (1992), *Management of the D-channel – Data link layer and network layer*.

[9] ITU-T Recommendation M.3641 (1994), *Management information model for the management of the data link and network layer of the ISDN D-channel*.

[10] CCITT Recommendation M.3660 (1992), *ISDN interface management services*.

[11] ITU-T Recommendation Q.931 (1993), *Digital subscriber Signalling System No. 1 (DSS 1) – ISDN user-network interface layer 3 specification for basic call control*.

3 Abbreviations

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

ET Exchange Termination

GDMS Guidelines for the Definition of TMN Management Services

ISDN Integrated Services Digital Network

NEF Network Element Function

OSF Operations System Function

TE Terminal Equipment

TEI Terminal Equipment Identifier

TIB Task Information Base

TMN Telecommunications Management Network

4 Management service description

The management service, fault and performance management of the ISDN access, has been defined using the methods contained in Recommendation M.3020 [1]. That Recommendation gives the guidelines for the definition of TMN management services (GDMS) that should be adopted when specifying the management requirements appertaining to a specific TMN management service. The GDMS makes use of references to the functions in Recommendation M.3400 [3]. The references in this Recommendation are referring to the published 1992 version of Recommendation M.3400. Best efforts have been made to accommodate current developments in Recommendation M.3400.

TIB-A (as defined in Recommendation M.3020) gives a prose description of the sphere of management to which that service refers, along with a list of the components of that service.

TIB-B (as defined in Recommendation M.3020) lists the management functions. These management functions have been produced by analysing each of the components and subsequently deriving a series of messages that will flow across the management interface between the management system and the resources to be managed. In general in this Recommendation, OSF and NEF take manager and agent roles, respectively.

4.1 Relationship to other TMN management services

Management of the ISDN access is related to the management services for the following managed areas identified in Recommendation M.3200 [2]:

- Access and Terminal Equipment Network;
- Switching Telephone Network;
- Switched Data Network;
- N-ISDN.

This Management service is dedicated to the management of ISDN customer access and ISDN switching.

4.2 Management goals

This management service defines the ISDN management concepts with respect to areas of fault and performance management of subscriber installations and accesses. This will take into account certain management activities from the exchange termination up to and including certain aspects of the customer terminal equipment. The functions described within this Recommendation have been specified by addressing management of Layer 1, 2 and 3 of the ISDN access.

The management of the physical layer is based on functionality defined in Recommendations M.3603 [6] and M.3604 [7]. The management of the datalink and network layers is based on the functionality defined in Recommendation M.3640 [8]. It should also be noted that Recommendation M.3641 [9] defines the managed object model (TIB X) to support Recommendation M.3640 [8].

4.3 Management context description

This subclause contains information relevant to the management of fault and performance at the ISDN access.

4.3.1 Roles

The roles identified for this management context are:

- performance monitoring;
- protocol monitoring;
- testing;

– measurement summarization;

– alarms.

The ISDN access is managed by the network operator via the q-reference points supporting the local exchange and access network.

4.3.2 Resources

These resources in the NE layer are used in the management of ISDN access:

– B-channel termination on the local exchange;

– D-channel termination on the local exchange;

– basic rate access termination on the local exchange;

– primary rate access termination on the local exchange;

– D-channel datalink layer measured entity (see Recommendation M.3641 [9]);

– D-channel network layer measured entity (see Recommendation M.3641 [9]);

– ISDN access physical layer equipment.

4.3.3 TMN management functions

4.3.3.1 TMN management function sets found in Recommendation M.3400

4.3.3.1.1 Alarm surveillance

All management function sets in M.3400 Alarm surveillance (see 3.1/M.3400), may be applied to this failure information:

1) ET-NEF or subscriber access equipment sends failure information to the OSF when a specified failure occurs. This includes when the automatic supervision detects malfunctioning of the subscriber access.

2) ET-NEF sends OSF information that a specific timer has expired.

4.3.3.1.2 Performance management

Performance monitoring, protocol abnormalities, timer expires, etc. are covered in this subclause.

The following are performed using the function sets in M.3400 Performance management (see clause 2/M.3400) and Log control (see A.5/M.3400):

1) ET-NEF sends OSF a notification after a counter threshold is exceeded;

2) OSF directs ET-NEF to send the current value of a counter;

3) OSF directs ET-NEF to send the value daily or after a specified time interval has elapsed;

4) OSF directs ET-NEF to reset a counter;

5) OSF directs ET-NEF to set a counter threshold;

6) the OSF directs the ET-NEF to set the count duration, for one or more counters, before they are reset;

7) ET-NEF notifies OSF when the oldest entry in a full log is less than “n” hours old;

8) OSF directs ET-NEF to send current log information;

9) OSF directs ET-NEF to start the logging over a specified time interval;

10) OSF directs ET-NEF to send log information after a specified time interval has elapsed;

11) OSF directs ET-NEF to discriminate between events that are logged;

12) OSF sets log options (halt, wrap) (see Annex C/M.3640);

13) OSF directs ET-NEF to start logging specified information (see Annex C/M.3640);

14) OSF directs ET-NEF to delete all or a part of the log (see Annex C/M.3640);

15) OSF directs ET-NEF to perform a specific measurement summarization function;

16) ET-NEF sends OSF specific measurement information.

4.3.3.1.3 Testing

The following are performed using the function sets in M.3400 testing (see 3.4/M.3400):

1) The OSF directs the ET-NEF to perform a specified test (Continuity test, loopback, line parameter measurements) on a specified access or a number of accesses.

2) The ET-NEF sends the OSF the results of a test.

3) The OSF directs the ET-NEF to establish/release a loopback at a specific point in the local access. The parameters used in establishing a loopback will depend on the type of test and the media, e.g. metallic, fibre or other.

4.3.3.1.4 Control functions

The following is performed using the M.3400 provisioning function set, (see 4.1/M.3400):

1) OSF directs ET-NEF to bring into service or take out of service a specified access;

2) OSF directs the ET-NEF to report the service state of a specific access.

4.3.3.2 Function sets not found in Recommendation M.3400

4.3.3.2.1 ISDN layer 1 control function set

4.3.3.2.1.1 Management requirements

This TMN management function set provides the ability to apply/remove continuous activation to an access in order to facilitate testing and collection of performance data for a specific access. For other types of testing (for example metallic, bit-error rate, sealing current, verifying activation/deactivation) this set provides the ability to activate or deactivate an access. In addition, this function set provides control of access powering.

4.3.3.2.1.2 Functional model

For basic rate accesses that support activation/deactivation, this TMN management set controls the activation/deactivation functions.

The functionalities of the ISDN layer 1 controls include:

– query of the activation status of an access;

– application of continuous activation to an access;

– removal of continuous activation from an access;

– activation or deactivation of an access;

– query of the powering status of an access;

– control of the powering of an access.

The resource that is subject to manipulation is an ISDN basic rate access.

4.3.3.2.1.3 TMN management functions

1) OSF requests ET-NEF to apply continuous activation to an access;

2) OSF requests ET-NEF to remove continuous activation from an access;

3) OSF requests ET-NEF to activate or deactivate an access;

4) the OSF directs the ET-NEF to remove or restore the power from an access (transmission system);

5) the OSF requests the ET-NEF to report the activation status of an access;

6) the OSF requests the ET-NEF to report the powering status of an access.

4.3.3.2.2 ISDN layer 2 function set

4.3.3.2.2.1 Management requirements

This TMN management function set provides the ability to maintain the data link layer of the D-channel on an ISDN basic rate access. It also includes two functions that applies to both primary and basic rate. This includes the ability to query and change TEI related information as well as to activate/deactivate the data link layer.

4.3.3.2.2.2 Functional model

The functionalities of the ISDN layer 2 controls include:

- notification of the approach of TEI information/resource exhaustion;
- performance of TEI check procedure;
- providing a list of free and assigned TEI values;
- notification of exhaustion of the list of free TEI values;
- activation/deactivation of a layer 2 link (this applies to both primary and basic rate);
- query of the state of the layer 2 links associated with a D-channel (this applies to both primary and basic rate).

The resource that is subject to manipulation is an ISDN D-channel data link layer.

4.3.3.2.2.3 TMN management functions

1) ET-NEF notifies the OSF when the TEI information/resources exhaustion is approached;
2) OSF directs the ET-NEF to perform a TEI check procedure for all or a specified set of TEI values;
3) ET-NEF sends OSF a list of free and assigned TEI values on demand;
4) ET-NEF notifies OSF that exhaustion of the list of free TEI values has occurred;
5) OSF directs ET-NEF to activate/deactivate a layer 2 link (this applies to both basic and primary rate);
6) OSF requests the ET-NEF to report the state of the layer 2 links associated with a D-channel (this applies to both basic and primary rate).

4.3.3.2.3 ISDN layer 3 management function set

4.3.3.2.3.1 Management requirements

This TMN management function set provides the ability to maintain the network layer of the D-channel on an ISDN basic or primary rate access.

4.3.3.2.3.2 Functional model

The functionality of the ISDN layer 3 controls include:

- the ability to query the status of the calls on an interface;
- the ability to force the clearing of a specific call;
- the ability to query the states of the calls on a specific channel;
- the ability to clear all calls associated with a specific channel (RESTART).

4.3.3.2.3.3 TMN management functions

1) OSF directs ET-NEF to send a STATUS ENQUIRY message to the subscriber D-channel or specific TE associated with the D-channel;
2) ET-NEF notifies the OSF of the results of an enquiry reported in the STATUS message received from subscriber D-channel or specific TE associated with the D-channel;

3) OSF directs ET-NEF to clear a specific call;

4) OSF directs the ET-NEF to report the states of calls on a given channel;

5) OSF directs the ET-NEF to send the Q.931 [11] RESTART message for a particular channel.

4.4 Architecture

This management service defines functions needed between the OSF that manages the local exchange supporting ISDN access and NEF of that exchange. The functions are across a q3-reference point. For more information see Recommendation M.3600 [4].