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MAINTENANCE: ISDN

**PRINCIPLES FOR THE MANAGEMENT
OF ISDNs**



Recommendation M.3600

FOREWORD

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Recommendation M.3600 was revised by Study Group IV and was approved under the Resolution No. 2 procedure on the 5th of October 1992.

CCITT NOTE

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

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Recommendation M.3600**PRINCIPLES FOR THE MANAGEMENT OF ISDNs***(Melbourne 1988 as Rec. M.36; revised and renumbered in 1992)**Abstract*

This recommendation provides the management principles and architecture of the ISDN. Management functions and their relationships are defined in detail.

Keywords:

- ISDN management architecture;
- ISDN management principles;
- ISDN management;
- management service provider;
- OAM-centre;
- subscriber access;
- subscriber installation.

1 General

The purpose of this Recommendation is to provide management principles and architecture to be adopted by administrations, RPOAs and other Management Service Providers (MSP) in order to manage ISDNs.

1.1 Scope of application

In providing this guidance, due consideration has been given to the principles identified in the following Recommendations:

- Recommendation M.20 [1] defines the maintenance philosophy for telecommunications networks;
- Recommendation M.3010 [2] defines the principles for the telecommunications management network;
- Recommendation M.32 [3] defines the principles for using alarm information for maintenance of international transmission systems and equipment;
- Recommendation M.34 [4] defines the performance monitoring on international transmission systems and equipment;
- Recommendations Q.940 and Q.941 [6] describe the model, service elements and protocols to be provided at the ISDN user/network interfaces for management;
- Recommendation M.2100 [9] provides the maintenance limits for digital paths and sections to achieve the performance objectives given in Recommendation G.821 [10].

This Recommendation defines the ISDN management concepts with respect to areas of fault, performance and configuration management of subscriber installations, networks, including the transit network, and interworking between ISDNs, and other networks, including both existing and future public and private networks¹⁾.

¹⁾ Other aspects of management are for further study.

This Recommendation takes into consideration basic ISDN features such as:

- open communication via the S/T reference points;
- portability of terminals between S/T reference points, from subscriber installation to subscriber installation, and from ISDN-to-ISDN.

For information on ISDN channels, terminations and interfaces, see Recommendations I.411 and I.412 [8].

1.2 *Relation to other Recommendations*

This Recommendation is the overview Recommendation in a Series of Recommendations on ISDN management. The other Recommendations are the following:

- a) Other M.3600-Series Recommendations describe reference configuration and general architecture for maintenance of ISDN subscriber access and subscriber installation as follows:
 - Recommendation M.3602 [11] is concerned with the maintenance of the ISDN subscriber installation. The maintenance principles are given in a general way for functions which are dependent on the design of NT2 and TE and more precisely where it impacts on the S or T interface (i.e. in relation to Recommendations I.430 and I.431 [8]). These functions are supervised and/or controlled by the subscriber installation.
 - Recommendation M.3603 [12] describes maintenance for the network portion of the ISDN basic rate access (144 kbit/s). A common format with other similar Recommendations, in conformance with Recommendation M.20 [1], is used. The functions performed by the digital transmission section and the exchange termination (ET) are identified. These functions are supervised and/or controlled by the network or administration.
 - Recommendation M.3604 [13] describes maintenance of the network portion of the ISDN primary rate access (2048 and 1544 kbit/s) following the same principles as given in Recommendation M.3603 [12]. The functions provided by the digital transmission section and the exchange termination (ET) are identified. The functions are supervised and/or controlled by the network or administration.
 - Recommendation M.3605 [14] describes the maintenance of a multiplexed basic rate system. Reference is made to Recommendations M.3603 [12] and M.3604 [13] when common mechanisms are applied. The functions performed by the digital section of the ISDN basic rate access, the basic access multiplexer, the digital link, and the exchange termination (ET) are identified. These functions are supervised and/or controlled by the network or administration.
- b) Recommendation M.3620 [15] describes ISDN test calls originating from a test system and terminated by a test call responder. It also describes their application as part of end-to-end ISDN maintenance.
- c) Recommendation M.3640 [16] describes management of layers 2 and 3 of the D-channel communications.
- d) Recommendation M.3660 [17] describes ISDN interface management services and their use in maintaining ISDN.

The ISDN management protocols which provide this activity are contained in Recommendation Q.941 [6] on ISDN user-network management protocols.

2 Definitions

2.1 Reference definitions

2.1.1 Organizational component definitions

2.1.1.1 Subscriber Installation (SI)

An SI is an organization located in the subscriber side, that contains people, TEs, NEs and, if needed, operations systems, which together have the responsibility for and capability of maintaining subscriber installation facilities.

2.1.1.2 Local Exchange Centre (LEC)

An LEC is an organization that is in charge of operating and maintaining local exchanges and subscriber accesses. It may contain people, local exchanges and local exchange operation systems, which together have the responsibility for and capability of maintaining local exchanges and ISDN subscriber accesses.

2.1.1.3 Operation Administration Maintenance Centre (OAMC)

An OAMC is an organization that is in charge of operating and maintaining networks and services. It is located somewhere within the network and contains people and operations systems, which together have the responsibility for and capability of maintaining ISDNs.

2.1.1.4 Management Service Provider (MSP)

MSP is an organization which provides management services to subscribers. An MSP contains people and operation systems, which together have the responsibility for and capability of providing a limited management service for ISDNs.

- Agreement on responsibility for management between subscriber and the MSP for each part or parts of the subscriber installation should be made at the time of subscription (this may take the form of a commercial contract). In any case, provision to allow a customer to change the management service provider(s) is recommended. The subscriber may choose not to make such an agreement with an MSP.
- Management service providers can be:
 - private providers; or
 - the administration; or
 - the subscriber.
- It is the responsibility of a subscriber installation and not of the network to ensure that an unauthorized MSP cannot access management functions in the subscriber installation.

2.1.2 System definitions

2.1.2.1 SI Operation System (SI-OS)

SI-OS is a system that performs operation functions within SI and communicates with other OSs within other organizations in order to facilitate the management of subscriber access and ISDN services. This OS may be realized as part of the equipment located within the subscriber installation.

2.1.2.2 Local Exchange Operation System (LE-OS)

LE-OS is a system that is located in a local exchange centre and performs local exchange operation functions to maintain local exchanges and subscriber access. This OS may be realized as part of the local exchanges. This OS communicates with other OSs within other organizations in order to facilitate the management of subscriber access and ISDN services.

2.1.2.3 OAMC Operation System (OAMC-OS)

OAMC-OS is a system that is located in OAMC and performs network operation functions to maintain ISDN facilities and services. This OS communicates with other OSs in other organizations in order to facilitate the management of ISDN facilities and services.

2.1.2.4 MSP Operation System (MSP-OS)

MSP-OS is a system that is located in MSP and performs part of management functions in SI. This OS communicates with other OSs in other organizations in order to increase its management functions.

2.1.3 Management function definitions

2.1.3.1 Subscriber Installation Management Function (SIMF)

A SIMF represents a group of dedicated functions contained within the functional groups (as specified in Recommendation I.411 [8]) of the subscriber installation which may have one or more of the following purposes:

- interaction with the (human) user;
- handling of management protocol from the SAMF and /or an MSP-MF;
- control of internal testing and maintenance mechanism.

It is considered that the functions may be distributed throughout the protocol layers implemented in the subscriber equipment, SI-OS, and MSP-OSs, including NT1 functions in some applications, but the precise architecture and protocol of the SIMF implementation is not a subject of this Recommendation.

Examples of SIMFs are:

- control TE loopbacks;
- identification of TE service capability;
- control generation of test signals for maintenance of subscriber installation wiring;
- provide access to performance data within subscriber installation, e.g. layer two and three protocol performance;
- security screening of requests from MSP-MF.

2.1.3.2 Subscriber Access Management Function (SAMF)

A SAMF represents a group of functions for managing the subscriber access and communication with other management functions in other OS. The SAMF may be distributed throughout a local exchange OS and OAMC-OS but precise architecture of the SAMF implementation is not a subject of this Recommendation.

Examples of SAMFs are:

- control loopbacks in an NT1 or LT;
- supervise the service state of the subscriber access;
- provide access to subscriber access performance information.

2.1.3.3 OAMC Management Function (OAMC-MF)

An OAMC-MF represents a group of functions for managing the network including facilities and services. The OAMC-MF may be distributed to several OAMC-OSs but the precise architecture of the OAMC-MF implementation is not a subject of this Recommendation.

Examples of OAMC-MF functions are:

- request SAMF to control loopback activation;
- supervise the bringing into service of a subscriber access;
- obtain performance information on the subscriber access from the SAMF;
- manage teleservices provided to a subscriber;
- screen requests from MSPs for authorization.

2.1.3.4 MSP Management Function (MSP-MF)

An MSP-MF represents a group of functions for managing the subscriber installation or a part of the subscriber installation. An MSP-MF cannot control the management functions of the subscriber access. If authorized, it can request information from the OAMC-MF about the subscriber access.

Examples of MSP-MF functions are:

- Request SIMF maintenance activity;
- request OAMC-MF management information that is allowed;
- provide test responders function.

2.2 Other definitions

2.2.1 Network

A network is the public part of the ISDN which is managed under the responsibility of the administration or a RPOA.

2.2.2 Operation, Administration and Maintenance (OAM)

These three aspects form the base for the necessary management functions for ISDN.

2.2.3 ISDN Interface Management Services

These services are defined on the User Network Interface UNI and provide a customer with management capabilities.

3 Management principles for ISDN

3.1 General maintenance principles for ISDN

The fundamental maintenance strategy is to rely on performance monitoring wherever possible in order to apply the controlled maintenance principles of Recommendation M.20 [1].

The maintenance capabilities provided must allow for the clear differentiation of troubles between subscriber and network equipment.

The maintenance capabilities provided must allow for clear differentiation between failures and legitimate subscriber activities.

An MSP should be able to localize the fault in its domain without disturbing the network or other domains. This should be possible locally and remotely, i.e. across networks and between any allowed management entities.

Testing will be needed both to supplement the performance monitoring for trouble detection and to provide additional trouble localization ability.

The subscriber installation should be able to receive failure or performance information if sent from the network side. The network should be able to receive failure or performance information from the subscriber side.

A capability should be provided to control the status of the subscriber access and of the subscriber equipment during maintenance operations.