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SERIES M: TMN AND NETWORK MAINTENANCE:
INTERNATIONAL TRANSMISSION SYSTEMS,
TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE
AND LEASED CIRCUITS

Telecommunications management network

Overview of TMN Recommendations

ITU-T Recommendation M.3000

(Formerly CCITT Recommendation)

ITU-T M-SERIES RECOMMENDATIONS

TMN AND NETWORK MAINTENANCE: INTERNATIONAL TRANSMISSION SYSTEMS, TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE AND LEASED CIRCUITS

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For further details, please refer to ITU-T List of Recommendations.

OVERVIEW OF TMN RECOMMENDATIONS

Summary

This overview of TMN Recommendations describes the aim, subject areas and the range of TMN-related Recommendations developed or to be developed within the ITU-T. Annexes A and B contain the current lists of TMN-related Recommendations.

Source

ITU-T Recommendation M.3000 was revised by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on 4 February 2000.

Keywords

List of TMN Recommendations, overview of TMN Recommendations, subject areas of TMN Recommendations, Telecommunications Management Network (TMN), TMN-referenced Recommendations.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the 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.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Introduction

The study of TMN requires various expertise and TMN-related Recommendations are being developed in various Study Groups within ITU-T. This Recommendation has been developed to present a stable framework in the form of an umbrella Recommendation as a guide to all relevant development activities.

Recommendation M.3000

OVERVIEW OF TMN RECOMMENDATIONS

1 Scope

The purpose of this Recommendation is to serve as an umbrella Recommendation for the development and use of TMN Recommendations within ITU-T. TMN Recommendations describe principles, architecture, definitions and specifications necessary to implement all types of TMNs.

The contents of this Recommendation are the fields of application of TMN, areas to be studied (subject areas) in TMN Recommendations and areas of Recommendations that are referenced by TMN Recommendations (TMN-referenced Recommendations).

Annexes A and B list the current TMN-related Recommendations.

The users of this Recommendation are expected to be the experts who develop individual TMN-related Recommendations, those who utilize TMNs to manage telecommunication networks, and vendors and suppliers who implement TMNs.

2 Fields of application

TMNs provide the means used to transport, store and process information used to support the management of telecommunication networks and services.

TMNs can be used for the management of telecommunication networks operated by Administrations, ROAs, customers, or other organizations and individuals. When these telecommunication networks are connected with each other, their TMNs provide the means of exchanging information required to manage end-to-end telecommunication services.

All types of telecommunication networks and network elements – such as analogue networks, digital networks, public networks, private networks, switching systems, transmission systems, telecommunication software, and logical resources of the network (such as a circuit, path, or telecommunication services supported by these resources) are candidates for management by a TMN.

There is in principle no limit to the fields of application. Since TMN Recommendations are still being developed, however, there is currently a practical limit to the variety of application fields that can be implemented.

3 Abbreviations

This Recommendation uses the following abbreviations:

ACSE	Association Control Service Element
AN	Access Network
AOM	Application OSI Management (profile)
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
CMIP	Common Management Information Protocol

CMISE	Common Management Information Service Element
CNM	Customer Network Management
CORBA	Common Object Request Broker Architecture
DCN	Data Communication Network
EDI	Electronic Data Interchange
ET	Exchange Termination
FTAM	File Transfer, Access and Management
GIOP	General Inter-ORB Protocol
ICS	Implementation Conformance Statement
IOP	Internet Inter-ORB Protocol
IN	Intelligent Network
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization
ISP	International Standardized Profile
LE	Local Exchange
MCS	Management Conformance Statement
MOCS	Managed Object Conformance Statement
MRCS	Management Relationship Conformance Statement
MS	Management Service
NE	Network Element
NSAP	Network Service Access Point
OAM&P	Operations, Administration, Maintenance & Provisioning
ODMA	Open Distributed Management Architecture
OS	Operations System
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
RM-ODP	Reference Model for Open Distributed Processing
ROA	Recognized Operating Agency
ROSE	Remote Operation Service Element
SDH	Synchronous Digital Hierarchy
SG/WP	Study Group/Working Party
SN	Service Node
STASE	Security Transformations Application Service Element
TCP/IP	Transmission Control Protocol/Internet Protocol
TIB	Task Information Base

TMN	Telecommunications Management Network
UML	Unified Modelling Language

4 Definitions

TMN-specific technical terms are defined in each TMN Recommendation as well as clause 2/M.60 or in Recommendations dedicated to specific areas of technology.

5 Subject areas of TMN Recommendations

5.1 Evolution of TMN

The study of TMN within ITU-T originated in the definition of interfaces and the specification of interface protocols between OSs and transmission terminals. The concept of TMN was soon established to include the development of Recommendations for the information network operating in support of the management of all telecommunication networks and services.

TMN Recommendations are thus expected to be developed over a long period, to suit the growing demands resulting from continuously evolving telecommunication networks and services.

To avoid inconsistency and duplication in different telecommunication domains, TMN Recommendations are developed in a planned order and with an organized structure. The subject areas of TMN Recommendations are introduced to help understand the purpose of individual Recommendations and to make the assessment of Recommendations easier from the viewpoint of avoiding inconsistencies and duplications.

Identified TMN subject areas are:

- Architecture;
- Interface specification methodology;
- Management services;
- Management functions (protocol independent);
- Management information models and catalogue;
- Management information registration;
- Communication protocols;
- Systems management services and management messages (protocol specific);
- Conformance requirements;
- International standard profiles;
- Terminology;
- Security.

To derive TMN requirements or introduce specifications as a tool to develop a TMN, TMN Recommendations reference other Recommendations and/or Standards. The areas of TMN-referenced Recommendations/Standards are:

Referenced areas:

- Telecommunication services;
- Telecommunication network architecture;
- Telecommunication network management for traffic;
- Telecommunication network maintenance;

- Telecommunication network security;
- Telecommunication network components;
- Telecommunication network provisioning;
- Communication protocols;
- OSI systems management services;
- OSI layer management functions;
- ISPs or implementation requirements;
- Managed object naming and addressing.

The relationships between TMN subject areas as well as TMN and referenced areas are shown in Figure 1.

When an individual TMN Recommendation is developed, the subject area(s) to which it contributes is/are identified, and to avoid overlap the contents of the Recommendation are compared with those of other Recommendations concerned with the same area(s). Depending on the users' convenience, the documentation of TMN Recommendations may or may not follow the classification of subject areas.

5.2 TMN subject areas

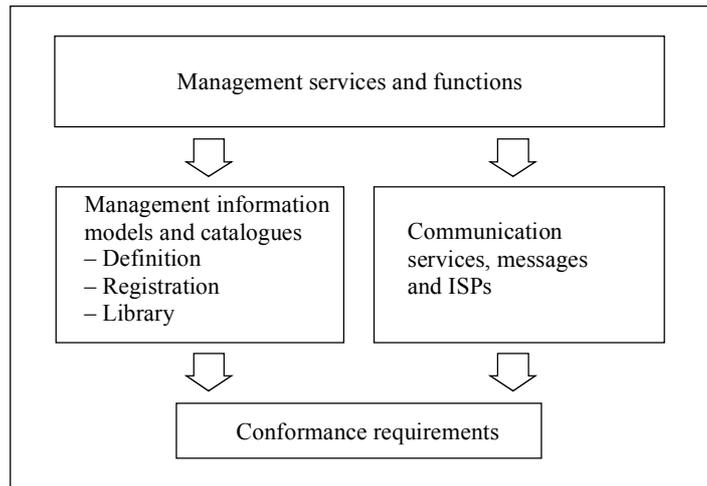
TMN subject areas are explained in this clause as a guide for the further development of TMN Recommendations.

5.2.1 Architecture

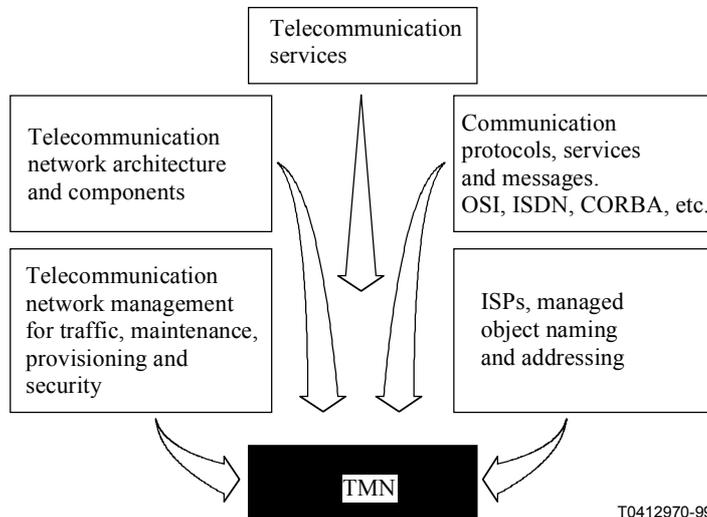
The TMN architecture is described in Recommendation M.3010, "Principles for a Telecommunications Management Network". Three basic aspects are included in the TMN architecture.

These are:

- the TMN functional architecture;
- the TMN information architecture; and
- the TMN physical architecture.



a) Subject areas of TMN Recommendations



b) Areas of TMN-referenced Recommendations

Figure 1/M.3000

The TMN functional architecture describes the appropriate distribution of functionality within the TMN, appropriate in the sense of allowing for the creation of function blocks from which a TMN of any complexity can be implemented. The definition of function blocks and reference points between them leads to the requirements for the TMN-recommended interface specifications.

The TMN information architecture is based on standardized open management paradigms that support the standardized modelling of the information to be communicated. TMN standardization activities will not develop a specific management paradigm but build upon industry recognized solutions, focusing primarily on object-oriented techniques. Specific management paradigms may be used in TMN standards when judged to be adequate.

The TMN physical architecture describes interfaces that can actually be implemented and examples of physical components that make up the TMN.

5.2.2 Interface specification methodology

This methodology is described in Recommendation M.3020 and shows the precise steps in determining the individual items needed for the complete specification of TMN interfaces. Definitions and specifications made at each step are important in maximizing the multiple use of the individual items of Recommendations. The TMN methodology shall therefore be followed when ITU-T Study Groups develop TMN Recommendations.

5.2.3 TMN management services

Described from the user's viewpoint of Operation, Administration, Maintenance and Provisioning (OAM&P) requirements, the TMN management service addresses an area of management activity that provides for the support of an aspect of OAM&P of a telecommunication network.

The management services are used as a mechanism to capture the management requirements and document them in a uniform way. The management services are the subject of Recommendations M.32xx.

5.2.4 TMN management functions

TMN management functions are used by the TMN management service to implement their functionality when communicating with other functional entities across the TMN interfaces. TMN management functions that logically belong together are grouped to increase their usability.

TMN management functions are the collection of the functional requirements for the TMN interface specifications. These functions are also described from the user's perspective and are protocol independent. The management functions are the subject of Recommendation M.3400.

5.2.5 Management information models and catalogue

TMN information models that are abstractions of managed telecommunication resources include:

- a) generic network information model;
- b) technology-specific models, e.g. for SDH.

Support information models are defined as abstractions of processes by which specific functional aspects of management are achieved. Examples of the latter are included in the Q.820-series Recommendations.

Management is carried out across the TMN standards interfaces using standard communication protocols and management-aspect protocols, the latter transporting management information defined in TMN management information models.

5.2.6 Management information registration

The assignment of object identifiers for TMN management information is structured in a fashion similar to the assignment of identifiers to OSI systems management information and is described in Recommendation X.722. Properly defined management information is given a globally unique object identifier and, with the approval of the defining Recommendation, is registered automatically.

The development of a computerized database library of TMN management information is under study within the ITU-T.

5.2.7 Communication protocols

Communication and management-aspect protocols in ITU-T Recommendations and ISO Standards are selected for the transfer of management information across TMN interfaces. Communication transport protocols include OSI, ISDN, Signalling System No.7, and TCP/IP. Management-specific protocols include OSI's CMIP, FTAM, X.500, EDI and CORBA's GIOP transported over IP (IIOP). Selected protocols are organized into protocol suites or profiles for specific TMN interfaces. The transfer syntax employed is described in the binary encoding rules (see Recommendation X.690).

5.2.8 Systems management services and management messages

TMN utilizes the OSI systems management services defined in the X.730-series Recommendations and also provides additional management application functionality by means of TMN management messages in Q.820-series Recommendations. This management functionality is made available for use across TMN interfaces by including it in a TMN-defined systems management application service element.

5.2.9 Conformance

TMN conformance requirements are a set of statements for protocols and information models to which TMN implementations must conform. These conformance statements are the basis upon which conformance testing tools for TMN are developed and then applied to products claiming conformance to TMN Recommendations.

5.2.10 International standardized profiles

The need for TMN ISPs has been recognized and will be addressed in the future.

5.2.11 Terminology

Most of the TMN specific terms are defined and described in clause 2/M.60 and 3/M.3010 which is dedicated to the terminology used in the management of telecommunication network.

5.2.12 Security

For a practical TMN implementation, security requirements associated with the TMN management services should be precisely defined, thus general aspects and guidelines on TMN security services are provided within the scope of TMN Recommendations.

5.3 Referenced areas

The areas of TMN-referenced Recommendations are explained here as a guide to selecting the Recommendations to be referenced.

5.3.1 Telecommunication services

Telecommunication services are defined in ITU-T Recommendations and TMN Recommendations will reference those Recommendations as basis for developing TMN Recommendations that deal with management of telecommunication services.

5.3.2 Telecommunication network architecture

Telecommunication network architecture gives the fundamental structure of a telecommunication network. A typical example is the SDH network architecture described in Recommendation G.803. The telecommunication network architecture may mainly be referenced by Recommendations covering the area of network management information modelling in order to give the fundamental idea of the abstraction of the telecommunication network.

5.3.3 Telecommunication network management for traffic

Traffic management of telecommunication network is one of the important application areas of TMN, and Recommendations dealing with traffic management will be referenced by TMN requirements Recommendations.

5.3.4 Telecommunication network maintenance

Maintenance is one of the main categories of TMN management services, and Recommendations concerning this subject will be referenced while developing TMN management requirements Recommendations.

5.3.5 Telecommunication network security

There are two aspects for security, i.e. security of management and management of security. Recommendations concerning network security will be taken into account when TMN security is studied. Those Recommendations will also be referenced when TMN requirements Recommendations are developed for management of telecommunication network security.

5.3.6 Telecommunication network components

Telecommunication network components Recommendations, such as transmission systems and switching systems, describe the functions of components that provide a basis for developing network or components management information models.

5.3.7 Telecommunication network provisioning

Recommendations concerning telecommunication network provisioning describe the mechanisms to provide telecommunication network services to the customer. TMN Recommendations will reference Recommendations of this area when developing TMN management requirements Recommendations.

5.3.8 Communication protocols

TMN interface protocols are selected from communication protocol Recommendations such as those described in 5.2.7.

5.3.9 OSI systems management services

OSI systems management services defined in the X.730/X.740-series Recommendations are referenced by TMN Recommendations (see 5.2.8).

5.3.10 OSI layer management functions

Functions related to the management of the OSI layers such as activation and error control are described in the X.28x-series Recommendations.

5.3.11 ISP and implementation requirements

A profile specifies a set of protocols, including available PICS, or managed objects, including available MOCS, combined to provide a specific functionality while minimizing optionality. Internationally recognized profiles are organized into ISPs which may add additional conformance statements. ISPs form the basis for the preparation of conformance testing.

5.3.12 Managed object naming and addressing

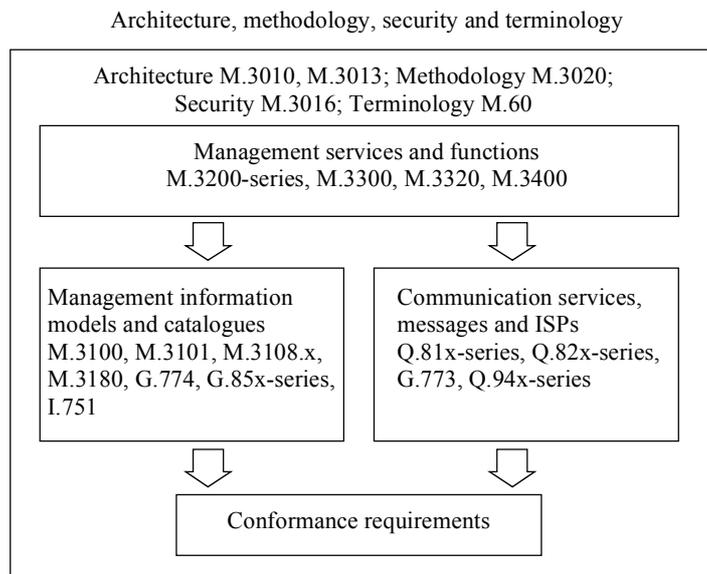
To define the TMN managed object, TMN management information Recommendations will reference Recommendations concerning managed object naming and addressing.

6 Range of Recommendations

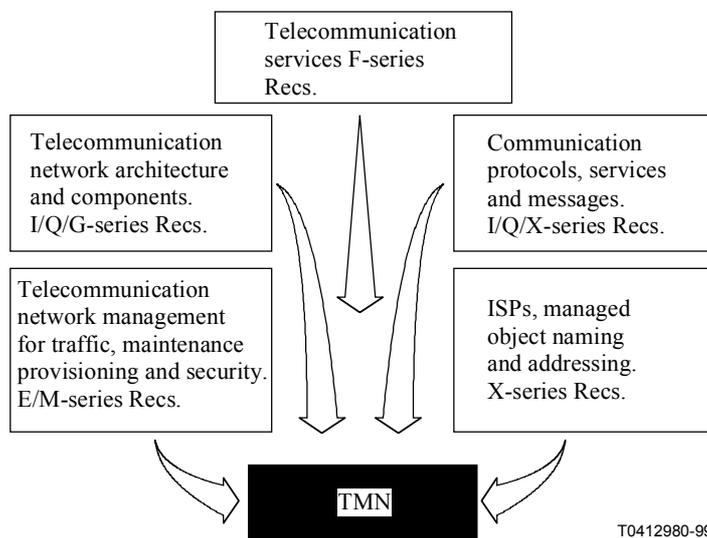
TMN-related Recommendations are being developed within ITU-T. Some examples were mapped on the TMN subject areas as shown in Figure 2.

6.1 TMN Recommendations

Recommendations that cover subject area(s) described in 5.2 are classified into the category of TMN Recommendations, which are listed in Annex A.



a) Mapping of TMN Recommendations



b) Mapping of TMN-referenced Recommendations

Figure 2/M.3000

6.2 TMN-referenced Recommendations

Recommendations that are referenced by TMN Recommendations are classified as TMN-referenced Recommendations.

Typical TMN-referenced Recommendations are those of communication protocols used in the TMN protocol suites. Some Recommendations concerning telecommunication network architecture, telecommunication network management, telecommunication network maintenance, etc., may be referenced implicitly. Some main Recommendations referenced explicitly will be listed in Annex B.

Annexes A and B contain the lists of some main TMN-related Recommendations developed within ITU-T. Recommendations are interdependent. Figure A.1 shows some examples of the dependencies among TMN-related Recommendations. These relations need to be taken into account when developing Recommendations.

ANNEX A

List of TMN Recommendations

TMN Recommendations developed within ITU-T are listed here.

The TMN subject areas are denoted as follows:

SA-1	Architecture
SA-2	Interface specification methodology
SA-3	Management services
SA-4	Management functions
SA-5	Management information models and catalogue
SA-6	Management information registration
SA-7	Communication protocols
SA-8	Systems management services and management messages
SA-9	International standardized profiles
SA-10	Conformance
SA-11	Terminology
SA-12	Security

Some Recommendations provide contributions to more than one area. For these, all significant areas of contribution are shown in order of that contribution.

M-series

REC/STD: M.3000

TITLE: Overview of TMN Recommendations (present Recommendation)

REC/STD: M.3010

TITLE: Principles for a TMN

ABSTRACT: The TMN supports management activities associated with telecommunication networks. This Recommendation introduces the TMN concept, defines its scope, describes the functional and information architecture, and gives examples of physical architecture. It also provides a functional reference model and identifies concepts necessary for supporting the TMN architecture.

KEYWORDS: TMN/Architecture/Reference Model/Telecommunications Management Network/Interfaces/ Principles.

QUESTION: 13/4

SUBJECT AREA(S): SA-1

AVAILABILITY: Available

REC/STD: M.3013

TITLE: Considerations for a telecommunications management network

ABSTRACT: The Telecommunications Management Network (TMN) supports management activities associated with telecommunication networks. This Recommendation introduces the

essential considerations needed to support the installation and operation of a TMN based on the TMN principles, concepts and architecture described in Recommendation M.3010.

KEYWORDS: TMN/Architecture/Telecommunications Management Network.

QUESTION: 13/4

SUBJECT AREA(S): SA-1

AVAILABILITY: Available

REC/STD: M.3016

TITLE: TMN security overview

ABSTRACT: This Recommendation provides an overview and framework that identifies security threats to a TMN and outlines how available security services can be applied within the context of the TMN functional architecture, as described in Recommendation M.3010. This Recommendation is generic in nature and does not identify or address the requirements for a specific TMN interface. This Recommendation does not seek to define new security services but uses existing security services defined in other ITU-T Recommendations and ISO Standards. It is envisaged that this Recommendation, along with Recommendation M.3400, will provide a basis for future standardization of TMN security services in the ITU-T.

QUESTION: 13/4

SUBJECT AREA(S): SA-12

AVAILABILITY: Available

REC/STD: M.3020

TITLE: TMN interface specification methodology

ABSTRACT: This Recommendation provides a methodology for describing functional specifications and protocol specifications for TMN interfaces. Emphasis is placed on multiple applications of the methodology and on building specifications by reusing previous results.

KEYWORDS: User requirements/Management Services/Management Functions/Information Model/Managed Objects/Messages/Protocols/Tasks/Task Information Base.

QUESTION: 12/4

SUBJECT AREA(S): SA-2

AVAILABILITY: Available

REC/STD: M.3100

TITLE: Generic network information model

ABSTRACT: This Recommendation provides a generic information model. The model describes managed object classes and their properties that are generic and useful in describing information exchanged across all interfaces defined in M.3010 TMN architecture. These generic managed object classes are intended to be applicable across different technologies, architectures and services. The managed object classes in this Recommendation may be specialized to support the management of various telecommunications networks.

KEYWORDS: Generic Network Information Model/Managed Object Class/Attributes/Notifications/Actions.

QUESTION: 15/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: M.3101

TITLE: Managed object conformance statements for the generic network information model

ABSTRACT: This Recommendation provides implementation conformance statement proformas for management information defined in ITU-T Recommendation M.3100.

KEYWORDS: Conformance/MRCS/MOCS/MCS.

QUESTION: 15/4

SUBJECT AREA(S): SA-10, SA-5

AVAILABILITY: Available

REC/STD: M.3108.x

TITLE: TMN management services for dedicated and reconfigurable circuits network: Information model

ABSTRACT: This series of Recommendations provides a GDMO-based information model to cope with the management services defined in the series of Recommendations M.3208.x. This Recommendation provides Managed Objects and a Unified Modelling Language (UML) view of the GDMO-based information model.

KEYWORDS: GDMO.

QUESTION: 15/4

SUBJECT AREA(S): SA-10, SA-5

AVAILABILITY: Available

REC/STD: M.3180

TITLE: Catalogue of TMN management information

ABSTRACT: This Recommendation defines the scope of TMN management information, identifies specification techniques, describes the relationships between ITU-T documents defining management information and references definitions of currently available management information.

KEYWORDS: Catalogue/managed object/resources/models/fragments/OSI Systems Management.

QUESTION: 14/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: M.3200

TITLE: TMN management services and telecommunications managed areas: Overview

ABSTRACT: This Recommendation contains information resulting from task information bases (TIBs) A and B of the ITU-T Recommendation M.3020. The information will be used by the object modelling teams to provide a basis to the ITU-T Recommendation M.3100 and specific network models. It therefore provides a link between the TMN Methodology and TMN Management Information Models. This information may also provide a basis on which an Administration compiles its own telecommunications management services.

KEYWORDS: Telecommunications Management Network/Management Service/Object Modelling/
Task Information Base/Mediation Device.

QUESTION: 15/4

SUBJECT AREA(S): SA-3

AVAILABILITY: Available

REC/STD: M.3207.x

TITLE: TMN management service: Maintenance aspects of B-ISDN management

ABSTRACT: This series of Recommendations describes the TMN management service for the maintenance aspect of B-ISDN management with using GDMS (Guideline for the Definition of TMN Management Service).

KEYWORDS: Telecommunications Management Network/TMN Management Service.

QUESTION: 15/4

SUBJECT AREA(S): SA-3

AVAILABILITY: Available

REC/STD: M.3208.x

TITLE: TMN management services for dedicated and reconfigurable circuits network

ABSTRACT: This Recommendation is one of the M.3200-series TMN management service Recommendations that provide descriptions of management services, goals and context for the Dedicated and Reconfigurable Circuits Network.

KEYWORDS: Dedicated and Reconfigurable Circuits Network/Leased Circuits/Leased Circuit Services/Telecommunications Management Network (TMN)/TMN Management Service.

QUESTION: 15/4

SUBJECT AREA(S): SA-3

AVAILABILITY: Available

REC/STD: M.3211.x

TITLE: TMN management service: Fault and performance management of the ISDN access

ABSTRACT: This series of Recommendations describes the TMN management service for the maintenance of 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).

QUESTION: 15/4

SUBJECT AREA(S): SA-3

AVAILABILITY: Available

REC/STD: M.3300

TITLE: TMN F interface requirements

ABSTRACT: This Recommendation provides an overview of the TMN management capabilities presented for human information or intervention or both. This Recommendation describes the human-machine supporting functions in the five OSI functional areas and the management capabilities from the perspective of TMN application services.

KEYWORDS: TMN/Management Capabilities/Human-machine interaction/Interface.

QUESTION: 16/4

SUBJECT AREA(S): SA-3

AVAILABILITY: Available

REC/STD: M.3320

TITLE: Management requirements framework for the TMN X-interface

ABSTRACT: This Recommendation is part of a series dealing with the transfer of information for the management of telecommunication networks and services. The purpose of this Recommendation is to define a requirements framework for all functional, service and network-level requirements for the TMN exchange of information between Administrations. This Recommendation also provides for the general framework of using the TMN X-Interface for the exchange of information between Administrations, Recognized Operating Agencies, other Network Operators, Service Providers, Customers and other entities.

KEYWORDS: International Aspects/Management Information Exchange/Security consideration/TMN X-interface.

QUESTION: 17/4

SUBJECT AREA(S): SA-3

AVAILABILITY: Available

REC/STD: M.3400

TITLE: TMN management functions

ABSTRACT: A TMN management function is the smallest part of the TMN management service as perceived by the user of the service. In reality it will generally consist of a sequence of actions on a defined managed object or objects. The TMN Management Functions specified in this Recommendation provide the generic and specialized functionalities needed for all telecommunications activities (identified at this time) such as circuit testing, alarm surveillance, traffic management, etc.

KEYWORDS: TMN Management Function/OSI Systems Management Function.

QUESTION: 2/4

SUBJECT AREA(S): SA-4, SA-5

AVAILABILITY: Available

REC/STD: M.36xx

TITLE: Management of ISDNs

ABSTRACT: This series of Recommendations covers ISDNs (ISDN and B-ISDN) management and the relationship with TMN as follows:

- M.3600: Principle for the management of ISDNs.
- M.3602: Application of maintenance principles to ISDN subscriber installations.
- M.3603: Application of maintenance principles to ISDN basic rate access.
- M.3604: Application of maintenance principles to ISDN primary rate access.
- M.3605: Application of maintenance principles to static multiplexed ISDN basic rate access.
- M.3610: Principles for applying the TMN concept to the management of B-ISDN.
- M.3611: Test management of the B-ISDN ATM layer using the TMN.
- M.3620: Principles for the use of ISDN test calls, systems and responders.
- M.3621: Integrated management of the ISDN customer access.
- M.3640: Management of the D-channel – Data link layer and network layer.
- M.3641: Management information model for the management of the data link and network layer of the ISDN D-channel.
- M.3650: Network performance measurements of ISDN calls.
- M.3660: ISDN interface management services.

KEYWORDS: ISDN management architecture/ISDN management principles/ISDN management/management service provider/OAM-centre/subscriber access/subscriber installation.

QUESTION: 20/4

SUBJECT AREA(S): SA-4, SA-5

AVAILABILITY: Available

G-series

REC/STD: G.773

TITLE: Protocol suites for Q-interfaces for management of transmission systems

ABSTRACT: This Recommendation defines the characteristics of protocol suites for Q-interfaces, used to connect transmission systems/equipment, defined in Recommendation M.3010. Protocol suites for the Q-interfaces of other systems/equipment will be specified in other Recommendations. The interfaces will support bidirectional data transfer for the management of telecommunications systems.

This Recommendation defines:

- the layer services;
- the layer protocols;
- the application service elements and protocols;
- the conformance requirements to be met by an implementation of these interfaces.

KEYWORDS: Not provided.

QUESTION: 13/15

SUBJECT AREA(S): SA-7

AVAILABILITY: Available

REC/STD: G.774.1

TITLE: Synchronous Digital Hierarchy (SDH) performance monitoring for the network element view

ABSTRACT: This Recommendation provides an information model for the Synchronous Digital Hierarchy (SDH). This model describes the managed object classes and their properties that are useful to describe information exchanged across the interfaces defined in the TMN architecture in Recommendation M.3010. This Recommendation specializes the generic object classes of Recommendation M.3100 to provide management information specifically for the SDH.

KEYWORDS: Synchronous Digital Hierarchy/Information Model/Managed Object Class/Attribute/Notification/Action/ GDMO/ASN.1.

QUESTION: 14/15

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: G.85x

TITLE: Management of the transport network

ABSTRACT: This series of Recommendations provides an information model for the Transport Network. The definition and specification is described based on RM-ODP "Reference of Open Distributed Processing" methodology.

KEYWORDS: Transport Network/RM-ODP.

QUESTION: 18/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

Q-series

REC/STD: Q.811

TITLE: Lower layer protocol profiles for the Q3 and X interfaces

ABSTRACT: This Recommendation provides the lower-layer protocol profiles for the Q3 and X-interfaces defined in Recommendation M.3010. It also provides a method for interworking.

KEYWORDS: Q3-Interface/TMN/Protocol Profiles/DCN/ISDN/X.25/NSAP/Interworking.

QUESTION: 19/4

SUBJECT AREA(S): SA-7

AVAILABILITY: Available

REC/STD: Q.812

TITLE: Upper layer protocol profiles for the Q3 and X interfaces

ABSTRACT: This Recommendation provides the upper-layer (5-7) protocol profiles for the Q3 and X-interfaces defined in Recommendation M.3010.

KEYWORDS: Q3-Interface/TMN/Protocol Profiles/CMISE/FTAM/ACSE/ASN.1/EDI/X.500/CORBA/GIOP/IOP.

QUESTION: 19/4

SUBJECT AREA(S): SA-7

AVAILABILITY: Available

REC/STD: Q.813

TITLE: Security Transformations Application Service Element for Remote Operations Service Element (STASE-ROSE)

ABSTRACT: This Recommendation provides specifications to support security transformations, such as encryption, hashing, sealing and signing, focusing on whole Remote Operations Service Element (ROSE) Protocol Data Units (PDUs). Security transformations are used to provide various security services such as authentication, confidentiality, integrity and non-repudiation. This Recommendation describes an approach to the provisioning of security transformations that is implemented in the application layer and requires no security-specific functionality in any of the underlying OSI stack layers.

QUESTION: 19/4

SUBJECT AREA(S): SA-12

AVAILABILITY: Available

REC/STD: Q.821

TITLE: Stage 2 and stage 3 description for the Q3 interface – Alarm surveillance

ABSTRACT: This Recommendation provides Stage 2 and Stage 3 Descriptions for the Q3-Interface in a TMN. Its focus is on Alarm Surveillance. Included in this Description are specifications of the functions, management information, services, functional units and protocols related to Alarm Surveillance. Significant reuse of OSI Systems Management specifications in the X.700-series Recommendations are described. Because of the desirability of providing common TMN solutions, this Recommendation is expected to be applicable to other TMN interfaces and TMN-related interfaces.

KEYWORDS: Performance Management/Performance monitoring/Function/Objectclass/Attribute/Parameter/Service/ Functional unit/Protocol/ASN.1.

QUESTION: 20/4

SUBJECT AREA(S): SA-8

AVAILABILITY: Available

REC/STD: Q.822

TITLE: Stage 1, stage 2 and stage 3 description for the Q3 interface – Performance management

ABSTRACT: This Recommendation provides Stage 1, Stage 2 and Stage 3 Descriptions for the Q3-Interface in a Telecommunications Management Network. Its focus is on the parameter collection and storage aspects and the thresholding aspects of Performance Management as they apply to the areas of performance monitoring, traffic management, and quality of service. Included in this Description are specifications of the functions, management information services, functional units and protocols related to Performance Management. Significant reuse of OSI Management protocols in the X.700-series Recommendations is described.

Because of the desirability of providing common TMN solutions, this Recommendation is expected to be applicable to other TMN interfaces and TMN-related interfaces.

KEYWORDS: Performance Management/Performance monitoring/Function/Objectclass/Attribute/Parameter/Service/ Functional unit/Protocol/ASN.1.

QUESTION: 20/4

SUBJECT AREA(S): SA-8

AVAILABILITY: Available

REC/STD: Q.823

TITLE: Stage 2 and stage 3 functional specifications for traffic management

ABSTRACT: The scope of this Recommendation is to provide an information model which covers the management aspects of the traffic management service functions in an exchange. The scope is limited only to circuit switched networks using hierarchical routing. This Recommendation focuses on the Stage 2 and Stage 3 descriptions of the Q3-interface between Network Elements (NEs) and Operations Systems (OSs). The Stage 1 description is provided in the E.410-series Recommendations and in Recommendation E.502.

KEYWORDS:

QUESTION: 20/4

SUBJECT AREA(S): SA-8

AVAILABILITY: Available

REC/STD: Q.824x

TITLE: Stages 2 and 3 description for the Q3 interface – Customer administration

ABSTRACT: The purpose of this series of Recommendations is to provide the common Stages 2 and 3 descriptions of the Q3-interface between a local exchange and the Telecommunications Management Network (TMN) for the support of configuration management functions in support of customer administration. Customer administration is a management activity that the network operator performs in order to exchange with the customer all the customer related management data and functions required to offer a telecommunications service, and to exchange with the network all the customer related management data and functions necessary for the network to produce that telecommunications service. These Recommendations support the administration of the customer configuration in the local exchange by the TMN. In these Recommendations the common non-technology specific managed objects are defined.

KEYWORDS:

QUESTION: 20/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: Q.825

TITLE: Specification of TMN applications at the Q3 interface: Call detail recording

ABSTRACT: This Recommendation specifies the management functionality and the management information model required to support the management aspects of the Call Detail Recording function. The model applies to the Operation System to Network Elements (OS/NE) interface. The scope of the Recommendation is to support:

- Data collection requirements for the analogue, digital and Integrated Services Digital Network (ISDN) subscribers.
- Data collection requirements in connection with Intelligent Network (IN).

KEYWORDS:

QUESTION: 20/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: Q.831

TITLE: Fault and performance management of V5 interface environments and associated customer profiles

ABSTRACT: The purpose of this Recommendation is to define the Q3-interface between a Local Exchange (LE) and an Access Network (AN) and the Telecommunications Management Network (TMN) related to fault and performance management functions for V5 interfaces, as described in Recommendations G.964 and G.965, and their associated user ports.

KEYWORDS: Access Network (AN)/ Fault Management/Performance Management/Information Model/Local Exchange/Line and Circuit Test Management/Q3-Interface/TMN/V5 Interface.

QUESTION: 20/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: Q.832.1

TITLE: VB5.1 Management

ABSTRACT: This Recommendation specifies the Q3-interfaces between a Service Node (SN) and the Telecommunications Management Network and between an Access Network (AN) and the TMN for the management associated with VB5.1 interfaces.

KEYWORDS: Access Network (AN)/Fault Management/Performance Management/Information Model/Local Exchange/Line and Circuit Test Management/Q3-Interface/TMN/VB5.1 Interface.

QUESTION: 21/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

REC/STD: Q.832.2

TITLE: VB5.2 Management

ABSTRACT: This Recommendation specifies the Q3-interfaces between a Service Node (SN) and the Telecommunications Management Network and between an Access Network (AN) and the TMN for the management associated with VB5.2 interfaces. The managed object classes needed in addition to those defined for VB5.1 (Rec. Q.832.1) are defined.

KEYWORDS: Access Network (AN)/Fault Management/Performance Management/Information Model/Local Exchange/Line and Circuit Test Management/Q3-Interface/TMN/VB5.2 Interface.

QUESTION: 21/4

SUBJECT AREA(S): SA-5

AVAILABILITY: Available

I-series

REC/STD: I.751

TITLE: Asynchronous transfer mode management of the network element view

ABSTRACT: This Recommendation provides management requirements and an information model which pertain to the plane management of the ATM network element. The information model describes the managed object classes and their properties that are used to describe the information exchanged across management interfaces defined in Recommendation M.3010, Telecommunications Management Network (TMN) architecture. This Recommendation specializes the generic object classes of Recommendations M.3100, Q.821 and Q.822 to provide the information model specific to the ATM network element.

KEYWORDS: Action/ASN.1/Asynchronous Transfer Mode/Attribute/DMO/Information Model/Managed Object Class/Notification.

QUESTION: 15/4

SUBJECT AREA(s): SA-5

AVAILABILITY: Available

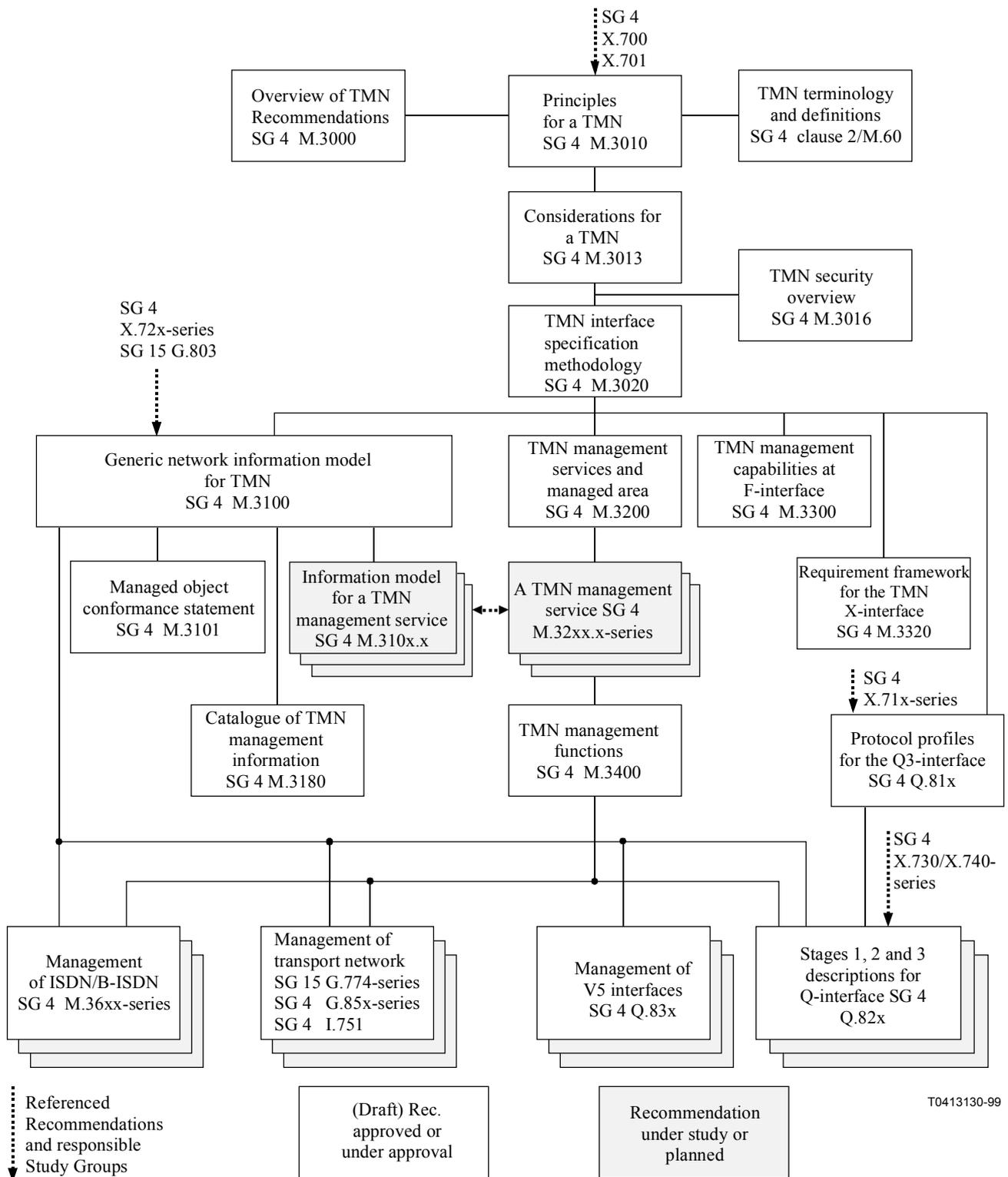


Figure A.1/M.3000 – Example of relation between TMN-related Recommendations

ANNEX B

List of TMN-related Recommendations

Some main Recommendations that are referenced by TMN Recommendations are listed here.

Telecommunication network architecture area

REC/STD: G.803

TITLE: Architecture of transport networks based on the synchronous digital hierarchy (SDH)

REC/STD: G.805

TITLE: Generic functional architecture of transport networks

REC/STD: I.326

TITLE: Functional architecture of transport networks based on ATM

These Recommendations are referenced by Recommendations M.3100, G.85x, I.751 and G.774 to develop TMN Network Information Models.

OSI Management

The following list of Data Network and OSI System Communication Recommendations is referenced to develop and maintain relevant TMN Management Recommendations.

Maintenance

- X.160 Architecture for customer network management service for public data networks
- X.161 Definition of customer network management services for public data networks
- X.162 Definition of management information for customer network management service for public data networks to be used with the CNMc interface
- X.162 Amd.1 Implementation Conformance Statement (ICS) proformas
- X.163 Definition of management information for customer network management service for public data networks to be used with the CNMe interface
- X.170 Network-to-network management architecture for data networks
- X.171 Network-to-network management services for data networks

Layer Managed Objects

- X.281 Information technology – Elements of management information related to the OSI Physical Layer
- X.282 Elements of management information related to the OSI data link layer
- X.282 Amd.1 Implementation Conformance Statement proformas
- X.283 Information technology – Elements of management information related to the OSI Network Layer
- X.284 Information technology – Elements of management information related to the OSI Transport Layer

Systems Management Framework and Architecture

- X.700 Management framework for Open Systems Interconnection (OSI) for CCITT applications
- X.701 Information technology – Open Systems Interconnection – Systems management overview
- X.702 Information technology – Open Systems Interconnection – Application context for systems management with transaction processing
- X.703 Information technology – Open Distributed Management Architecture
- X.703 Amd.1 Support using common object Request Broker Architecture (CORBA)

Management Communication Service and Protocol

- X.710 Information technology – Open systems Interconnection – Common management information service
- X.711 Information technology – Open systems Interconnection – Common management information protocol: Specification
- X.712 Information technology – Open Systems Interconnection – Common management information protocol: Protocol Implementation Conformance Statement (PICS) proforma

Structure of Management Information

- X.720 Information technology – Open Systems Interconnection – Structure of management information: Management information model
- X.720 Amd.1 Generalization of terms
- X.721 Information technology – Open Systems Interconnection – Structure of management information: Definition of management information
- X.721 Amd.1 Enhanced event control
- X.722 Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects
- X.722 Amd.1 Set by create and component registration
- X.722 Amd.2 Addition of the NO-MODIFY syntax element and guidelines extension
- X.722 Amd.3 Guidelines for the use of Z in formalizing the behaviour of managed objects
- X.723 Information technology – Open Systems Interconnection – Structure of management information: Generic management information
- X.724 Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management
- X.725 Information technology – Open Systems Interconnection – Structure of management information: General relationship model
- X.727 Information technology – Open Systems Interconnection – Structure of management information: Systems management application layer managed objects

Management functions and ODMA functions

- X.730 Information technology – Open Systems Interconnection – Systems Management: Object management function
- X.730 Amd.1 Implementation Conformance Statement proformas
- X.731 Information technology – Open Systems Interconnection – Systems Management: State management function
- X.731 Amd.1 Implementation Conformance Statement proformas
- X.732 Information technology – Open Systems Interconnection – Systems Management: Attributes for representing relationships
- X.732 Amd.1 Implementation Conformance Statement proformas
- X.733 Information technology – Open Systems Interconnection – Systems Management: Alarm reporting function
- X.733 Amd.1 Implementation Conformance Statement proformas
- X.734 Information technology – Open Systems Interconnection – Systems Management: Event Report Management Function
- X.734 Amd.1 Implementation Conformance Statement proformas
- X.735 Information technology – Open Systems Interconnection – Systems Management: Log control function
- X.735 Amd.1 Implementation Conformance Statement proformas
- X.736 Information technology – Open Systems Interconnection – Systems Management: Security alarm reporting function
- X.736 Amd.1 Implementation Conformance Statement proformas
- X.737 Information technology – Open Systems Interconnection – Systems Management: Confidence and diagnostic test categories
- X.738 Information technology – Open Systems Interconnection – Systems Management: Summarization function
- X.738 Amd.1 Implementation Conformance Statement proformas
- X.739 Information technology – Open Systems Interconnection – Systems Management: Metric objects and attributes
- X.739 Amd.1 Implementation Conformance Statement proformas
- X.740 Information technology – Open Systems Interconnection – Systems Management: Security audit trail function
- X.741 Information technology – Open Systems Interconnection – Systems management: Objects and attributes for access control
- X.742 Information technology – Open Systems Interconnection – Systems management: Usage metering function for accounting purposes
- X.742 Amd.1 Implementation Conformance Statement proformas
- X.743 Information technology – Open Systems Interconnection – Systems Management: Time management function
- X.744 Information technology – Open Systems Interconnection – Systems Management: Software management function

- X.745 Information technology – Open Systems Interconnection – Systems Management: Test management function
- X.746 Information technology – Open Systems Interconnection – Systems Management: Scheduling function
- X.748 Information technology – Open Systems Interconnection – Systems Management: Response time monitoring function
- X.749 Information technology – Open Systems Interconnection – Systems Management: Management domain and management policy management function
- X.750 Information technology – Open Systems Interconnection – Systems Management: Management knowledge management function
- X.750 Amd.1 Relationship knowledge
- X.751 Information technology – Open Systems Interconnection – Systems Management: Changeover function
- X.753 Information technology – Open Systems Interconnection – Systems Management: Command sequencer for systems management
- X.770 Open Distributed Management Architecture (ODMA) functions: Notifications, selection and dispatch function
- X.790 Trouble management function for ITU-T applications
- X.790 Amd.1 Implementation Conformance Statement proformas
- X.791 Profile for trouble management function for ITU-T applications
- X.792 Configuration audit support function for ITU-T applications

ISP and implementation requirements area

REC/STD: ISO/IEC ISP 11183

DESCRIPTION: This three-part standard specifies two network management profiles. ISP 11183 Part 1 identifies the requirements (including values in some cases) of parameters in session, presentations and ACSE protocol data units and functional units. ISP 11183 Part 2 specifies requirements on ROSE and CMIP with all the functional units of CMIP except the extended functional unit. ISP 11183 Parts 1 and 2 are referred to as the AOM 12 profile. ISP 11183 Part 3 specifies the requirements on ROSE and CMIP with only the CMIP kernel functional unit. ISP 11183 Parts 1 and 3 are referred to as the AOM 11 profile.

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