



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.161

(08/97)

SERIES X: DATA NETWORKS AND OPEN SYSTEM
COMMUNICATION

Public data networks – Maintenance

**Definition of customer network management
services for public data networks**

ITU-T Recommendation X.161

(Previously CCITT Recommendation)

ITU-T X-SERIES RECOMMENDATIONS
DATA NETWORKS AND OPEN SYSTEM COMMUNICATION

PUBLIC DATA NETWORKS	X.1–X.199
Services and facilities	X.1–X.19
Interfaces	X.20–X.49
Transmission, signalling and switching	X.50–X.89
Network aspects	X.90–X.149
Maintenance	X.150–X.179
Administrative arrangements	X.180–X.199
OPEN SYSTEM INTERCONNECTION	X.200–X.299
Model and notation	X.200–X.209
Service definitions	X.210–X.219
Connection-mode protocol specifications	X.220–X.229
Connectionless-mode protocol specifications	X.230–X.239
PICS proformas	X.240–X.259
Protocol Identification	X.260–X.269
Security Protocols	X.270–X.279
Layer Managed Objects	X.280–X.289
Conformance testing	X.290–X.299
INTERWORKING BETWEEN NETWORKS	X.300–X.399
General	X.300–X.349
Satellite data transmission systems	X.350–X.399
MESSAGE HANDLING SYSTEMS	X.400–X.499
DIRECTORY	X.500–X.599
OSI NETWORKING AND SYSTEM ASPECTS	X.600–X.699
Networking	X.600–X.629
Efficiency	X.630–X.649
Naming, Addressing and Registration	X.650–X.679
Abstract Syntax Notation One (ASN.1)	X.680–X.699
OSI MANAGEMENT	X.700–X.799
Systems Management framework and architecture	X.700–X.709
Management Communication Service and Protocol	X.710–X.719
Structure of Management Information	X.720–X.729
Management functions	X.730–X.799
SECURITY	X.800–X.849
OSI APPLICATIONS	X.850–X.899
Commitment, Concurrency and Recovery	X.850–X.859
Transaction processing	X.860–X.879
Remote operations	X.880–X.899
OPEN DISTRIBUTED PROCESSING	X.900–X.999

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

ITU-T RECOMMENDATION X.161

DEFINITION OF CUSTOMER NETWORK MANAGEMENT SERVICES FOR PUBLIC DATA NETWORKS

Summary

This Recommendation defines the management services which may be provided to a customer and collectively described as Customer Network Management (CNM). CNM is a service which provides customers with the ability to access (and in some cases modify) management information relating to the services provided to them by the network.

Source

ITU-T Recommendation X.161 was revised by ITU-T Study Group 7 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 9th of August 1997.

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.

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

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.

© ITU 1998

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

Page

1	Scope	1
2	References	1
2.1	Identical Recommendations International Standards	1
2.2	Paired Recommendations International Standards equivalent in technical content	1
2.3	Additional references	2
3	Definitions	2
4	Abbreviations	2
5	Conventions	3
6	Overview of Customer Network Management services	3
7	CNM services definitions	3
7.1	Fault Management	4
7.1.1	CNM Alarm Notification Service	4
7.1.2	CNM Fault History Service	4
7.1.3	CNM Trouble Report Service	5
7.1.4	CNM Loop Set-up Service	6
7.1.5	CNM Test Host Service	7
7.1.6	CNM Protocol Monitoring Service	8
7.2	Configuration Management	8
7.2.1	CNM Configuration Inquiry Service	8
7.2.2	CNM Reconfiguration Service	8
7.2.3	CNM Ordering Service	9
7.2.4	CNM Cancellation Service	9
7.2.5	CNM Systematic Call Redirection Service	10
7.2.6	CNM Inventory Inquiry Service	10
7.3	Accounting Management	11
7.3.1	CNM Periodic Billing Service	11
7.3.2	CNM Detailed Accounting Service	11
7.3.3	CNM Quota Control Service	12
7.3.4	CNM Real-time Charging Information Service	12
7.4	Performance Management	12
7.4.1	CNM Traffic Information Service	12
7.4.2	CNM Quality of Service Information Service	13
7.4.3	CNM Network Statistics Service	13
7.5	Security Management	13
7.5.1	CNM Password Change Service	13
7.5.2	CNM Access Rights Definition Service	13
7.6	CNM supporting services	14
7.6.1	CNM Service Request Service	14
8	Compliance with Recommendation X.161	14
	Annex A – Summary of CNM services	15
	Annex B – CNM Service sets	16
	Annex C – Typical sequences of CNM services	17
C.1	Introduction	17
C.2	Fault Management	17
C.2.1	CNM Alarm Notification	17
C.2.2	CNM Fault history	17
C.2.3	CNM Trouble Report	19
C.2.4	CNM Loop set-up	19
C.2.5	CNM Test host	19
C.2.6	CNM Protocol monitoring	19

Documents

Recommendation X.161 (08/97) Document Sharing Hub

	<i>Page</i>
C.3 Configuration Management	19
C.3.1 Configuration inquiry.....	19
C.3.2 Service Reconfiguration.....	20
C.3.3 Ordering Service	20
C.3.4 Inventory inquiry	21
C.3.5 Systematic call redirection	21
C.4 Accounting Services	21
C.4.1 Periodic billing.....	21
C.4.2 Detailed accounting	21
C.4.3 Quota control	21
C.4.4 Real-time charging information	21
C.5 Performance Management Service	22
C.5.1 Traffic information.....	22
C.5.2 Quality of Service information	22
C.6 Security Management	22
C.6.1 Password change.....	22
C.6.2 Access rights	22

Recommendation X.161**DEFINITION OF CUSTOMER NETWORK MANAGEMENT SERVICES
FOR PUBLIC DATA NETWORKS***(revised in 1997)***1 Scope**

This Recommendation defines the management services and supporting functions for CNM. Where possible, reference is made to other Recommendations which define management services and functions. This Recommendation is intended to complement TMN specifications and provide a specification for the non-TMN environment. The relationship of this Recommendation to other Recommendations for CNM is presented in Recommendation X.160. Definitions of management information for the currently defined CNM interfaces are in Recommendations X.162 and X.163.

This Recommendation is applicable to provision of the CNM Service in the Public Data Network (PDN) environment. In future, this may extend to other network technologies. The specification contained in this Recommendation is written such that it may be developed to be generic to all network technologies where the requirement for CNM is identified.

2 References

The following ITU-T 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.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.701 (1997) | ISO/IEC 10040:1997, *Information technology – Open Systems Interconnection – Systems management overview.*
- CCITT Recommendation X.721 (1992) | ISO/IEC 10165-2:1992, *Information technology – Open Systems Interconnection – Structure of management information: Definition of management information.*
- CCITT Recommendation X.730 (1992) | ISO/IEC 10164-1:1993, *Information technology – Open Systems Interconnection – Systems Management: Object management function.*
- CCITT Recommendation X.731 (1992) | ISO/IEC 10164-2:1992, *Information technology – Open Systems Interconnection – Systems Management: State Management Function.*
- CCITT Recommendation X.733 (1992) | ISO/IEC 10164-4:1992, *Information technology – Open Systems Interconnection – Systems Management: Alarm reporting function.*
- CCITT Recommendation X.734 (1992) | ISO/IEC 10164-5:1993, *Information technology – Open Systems Interconnection – Systems Management: Event report management function.*
- CCITT Recommendation X.735 (1992) | ISO/IEC 10164-6:1993, *Information technology – Open Systems Interconnection – Systems Management: Log control function.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.710 (1991), *Common management information service definition for CCITT applications.*

ISO/IEC 9595:1991, *Information technology – Open Systems Interconnection – Common management information service definition.*

- CCITT Recommendation X.711 (1991), *Common management information protocol specification for CCITT applications*.
- ISO/IEC 9596-1:1991, *Information technology – Open Systems Interconnection – Common management information protocol – Part 1: Specification*.

2.3 Additional references

- ITU-T Recommendation F.400/X.400 (1996) – *Message handling system and service overview*.
- CCITT Recommendation M.3010 (1992), *Principles for a telecommunications management network*.
- ITU-T Recommendation M.3020 (1995), *TMN interface specification methodology*.
- ITU-T Recommendation Q.821 (1993), *Stage 2 and stage 3 description of the Q3 interface – Alarm surveillance*.
- ITU-T Recommendation Q.822 (1994), *Stage 1, stage 2 and stage 3 description of the Q3 interface – Performance management*.
- ITU-T Recommendation X.160 (1996), *Architecture for customer network management service for public data networks*.
- ITU-T Recommendation X.162 (1997), *Definition of management information for customer network management service for public data network to be used with the CNMc interface*.
- ITU-T Recommendation X.163 (1995), *Definition of management information for customer network management service for public data network to be used with the CNMe interface*.
- ITU-T Recommendation X.411 (1995), *Information Technology – Message Handling Systems (MHS): Message transfer system – Abstract service definition and procedures*.
- ITU-T Recommendation X.790 (1995), *Trouble management function, for ITU-T applications*.

3 Definitions

This Recommendation makes use of the following terms defined in Recommendation X.160:

- CNMc;
- CNMe;
- Customer's Management System;
- Service Provider's CNM System.

This Recommendation makes use of the following terms defined in Recommendation M.3020:

- TMN Management Function (or function);
- TMN Management Function Set.

4 Abbreviations

This Recommendation uses the following abbreviations:

CMIS	Common Management Information Service
CNM	Customer Network Management
CNMc	Customer Network Management using CMIP
CNMe	Customer Network Management using EDI/MHS
EDI	Electronic Data Interchange
EFD	Event Forwarding Discriminator
FU	Functional Unit
ISP	International Standardised Profile
MAPDU	Management Application Protocol Data Unit

MHS	Message Handling System
MIB	Management Information Base
OSI	Open Systems Interconnection
PDN	Public Data Network
TMN	Telecommunications Management Network

5 Conventions

The following conventions apply to the tables contained in this Recommendation.

M	Mandatory
O	Optional
–	Not defined
N/A	Not Applicable
FS	Further Study
C	Conditional

6 Overview of Customer Network Management services

A CNM service is a capability that is provided to a customer across a CNM interface. A CNM service is provided for example by using CMIS, OSI Systems Management Functions and appropriate management information. Alternatively, a CNM service can be provided by exchanging EDI forms over MHS.

The services currently defined in this Recommendation (and summarised in Annex A) are those services which are considered to be of most importance to customers, and are therefore priorities for provision. Further services are identified but are considered to be of lower priority. Other CNM services may be added in future when further OSI System Management Functions have been completed and additional business requirements have been identified.

The CNM services defined in this Recommendation are, for convenience, classified into six groups:

- Fault Management;
- Accounting Management;
- Configuration Management;
- Performance Management;
- Security Management;
- CNM supporting services.

This Recommendation should be read in conjunction with Recommendation X.160, which defines the CNM Architecture, and Recommendations X.162 and X.163, which define management information for CNMc and CNMe interfaces, respectively.

7 CNM services definitions

The following clauses describe the CNM services that may be provided across the CNM interfaces.

When the service is provided across the CNM interface, the description is made in accordance with the TMN interface specification methodology defined in Recommendation M.3020. In the case of the CNMc interface, the term "CNM service" is fully equivalent to the term "TMN Management function set" and the associated management information is defined in Recommendation X.162. When the service is provided across the CNMe interface, the description is made using EDI forms. These forms are defined in Recommendation X.163.

Elements of procedure to be used for provision of CNM services are described in Recommendation X.162 for the CNMc interface.