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INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

X.162

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(04/95)

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

PUBLIC DATA NETWORKS – MAINTENANCE

DEFINITION OF MANAGEMENT INFORMATION FOR CUSTOMER NETWORK MANAGEMENT SERVICE FOR PUBLIC DATA NETWORKS TO BE USED WITH THE CNMc INTERFACE

ITU-T Recommendation X.162

Superseded by a more recent version

(Previously "CCITT Recommendation")

Superseded by a more recent version

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 X.162 was prepared by ITU-T Study Group 7 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 10th of April 1995.

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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ITU-T X-SERIES RECOMMENDATIONS

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

(February 1994)

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SUMMARY

This Recommendation intends to become one of a set of Recommendations for the customer network management service for data networks, which cover the architecture, services, and management information required to achieve such services between a network and a customer.

This Recommendation is, in particular, concerned with the definition of information for the customer network management service, such as managed objects, attributes, name bindings, in the OSI Systems Management context (CMISE).

This Recommendation corresponds to Recommendation X.163, which defines management information to be used with the CNMe interface.

Superseded by a more recent version

Recommendation X.162

DEFINITION OF MANAGEMENT INFORMATION FOR CUSTOMER NETWORK MANAGEMENT SERVICE FOR PUBLIC DATA NETWORKS TO BE USED WITH THE CNMc INTERFACE

(Geneva, 1995)

1 Scope

ITU-T Recommendation X.162:

- applies to the CNMc interface defined in Recommendation X.160;
- corresponds to Recommendation X.163, which defines management information to be used with the CNMe interface;
- defines management information, such as the Managed Object (MO) classes, attribute types, action types, notification types, etc., for the customer network management service specified in Recommendation X.161, documented in accordance with Recommendation X.722, the Guidelines for the Definition of Managed Object;
- specifies compliance requirements placed on other ITU-T Recommendations definitions.
- specifies conformance requirements.

This Recommendation is applicable to the development of the customer network management service and provides generic definitions which support that service. These definitions may also be used in other Recommendations specifying MO classes, attributes, notifications and action types.

NOTE – Currently, this Recommendation only considers the definition of management information for X.25 packet-mode access to PSPDN's. These definitions use some of Managed Information definitions under development within ISO/IEC JTC1 and ITU-T.

It is recognized that other types of access to PSPDN's exist; PAD's, X.32 (PSTN access to X.25), and other networks, e.g. ISDN, and CSPDN. The definition of management information specifically related to each of these is for further study. Some definitions within the current version of this Recommendation are, however, generic to all access types and networks.

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 currently valid ITU-T Recommendations is regularly published.

NOTE – The CNM service sets will conform to specific elements of the part of the functional ISPs. These functional ISPs include 11183-1,11183-2 and 11183-3, 12060 and 12059 Series.

2.1 Identical Recommendations | International Standards

- CCITT Recommendation X.701 (1992) | ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – System management overview*.
- CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1:1993, *Information technology – Open Systems Interconnection – Structure of management information: Management information model*.
- CITTT 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.722 (1992) | ISO/IEC 10165-4:1992, *Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects*.
- ITU-T Recommendation X.723 (1993) | ISO/IEC 10165-5:1993, *Information technology – Open Systems Interconnection – Structure of management information: Generic management information*.
- ITU-T Recommendation X.724 (1993) | ISO/IEC 10165-6:1994, *Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for Implementation conformance statement proformas associated with OSI management*.
- 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 10164-2:1993, *Information technology – Open Systems Interconnection – Systems management: State management function*.
- CCITT Recommendation X.732 (1992) | ISO/IEC 10164-3:1993, *Information technology – Open Systems Interconnection – Systems management: Attributes for representing relationships*.
- 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*.
- CCITT Recommendation X.736 (1992) | ISO/IEC 10164-7:1992, *Information technology – Open Systems Interconnection – Systems management: Security alarm reporting function*.
- ITU-T Recommendation X.738 (1993) | ISO/IEC 10164-13:1994, *Information technology – Open Systems Interconnection – Systems management: Summarization function*.
- ITU-T Recommendation X.739 (1993) | ISO/IEC 10164-11:1994, *Information technology – Open Systems Interconnection – Systems management: Metric objects and attributes*.
- CCITT Recommendation X.740 (1992) | ISO/IEC 10164-8:1993, *Information technology – Open Systems Interconnection – Systems management: Security audit trail*.

2.2 Paired Recommendations | International Standards

- ITU-T Recommendation X.281[1)], *Information technology – Elements of management information related to the OSI physical layer*.

  ISO/IEC 13642[1)], *Information technology – Telecommunications and information exchange between systems – Elements of management information related to OSI Physical Layer standards*.
- ITU-T Recommendation X.282 (1995), *Elements of management information related to the OSI data link layer*.

  ISO/IEC 10742:1994, *Information technology – Telecommunications and information exchange between systems – Elements of management information related to OSI Data Link Layer standards*.
- ITU-T Recommendation X.283 (1993), *Elements of management information related to the OSI network layer*.

  ISO/IEC 10733:1993, *Information technology – Telecommunications and information exchange between systems – Elements of management information related to OSI Network Layer standards*.
- CCITT Recommendation X.700 (1992), *Management framework for Open Systems Interconnection (OSI) for CCITT applications*.

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1) To be published.

ISO/IEC 7498-4:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 4: Management framework*.

– 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

– CCITT Recommendation M.3010 (1992) – *Principles for a telecommunications management network*.

– CCITT Recommendation M.3020 (1992) – *TMN interface specification methodology*.

– CCITT Recommendation M.3100 (1992) – *Generic network information model*.

– ITU-T Recommendation Q.822 (1994) – *Stage 1, stage 2 and stage 3 description for the Q3 Interface – Performance management*.

– ITU-T Recommendation X.2 (1993), *International data transmission services and optional user facilities in public data networks and ISDNs*.

– ITU-T Recommendation X.160 (1994), *Architecture for customer network management service for public data networks*.

– ITU-T Recommendation X.161 (1995), *Definition of customer network management services for public data networks*.

– ITU-T Recommendation X.163 (1995), *Definition of management information for customer network management service for public data networks to be used with the CNMe interface*.

– ITU-T Recommendation X.790[1)], *Trouble management function for ITU-T applications*.

3 Definitions

For the purposes of this Recommendation, the following definitions apply.

3.1 X.160 definitions

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

– Customer Network Management;

– CNM;

– CNMc;

– CNMe.

3.2 X.701 Management Framework definitions

This Recommendation makes use of the following terms defined in CCITT Rec. X..701 | ISO/IEC 10040:

– Managed object;

– agent;

– manager;

[1)] To be published.

– notification;

– Managed object class.

3.3 X.710 CMIS definitions

This Recommendation makes use of the following terms defined in CCITT Rec. X.710 | ISO/IEC 9595:

– Attribute;

– M-REPORT operation;

– M-GET operation;

– M-SET operation;

– M-ACTION operation;

– M_CREATE operation;

– M_DELETE operation;

– M_CANCEL_GET operation.

3.4 X.722 GDMO definitions

This Recommendation makes use of the following definitions defined in Recommendation X.722.

– Behaviour;

– Package;

– Conditional Package;

– Name binding;

– Action Type;

– Parameter.

3.5 Imported definitions

Some of the MO classes, the attributes, and the ASN.1 Module definitions are imported from ITU-T Recommendations or ISO/IEC JTC1 International Standards. These definitions are expressed as 'derived from Rec. XXX|ISO/IEC YYY', or ' “Rec. ZZZ”: ---' in the clauses of the Management Information definitions. They are also identified in each clause of specific service related management information.

4 Abbreviations

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

CMIP	Common Management Information Protocol
CMISE	Common Management Information Service Element
CNM	Customer Network Management
CNMc	CNM Interface using CMIP
CNMe	CNM Interface using EDI/MHS
CSPDN	Circuit Switched Public Data Network
CUG	Closed User Group (see also Recommendation X.25)
DLE	Data Link Layer Entity
DLMO	Data Link Layer Managed Object (see also ITU-T Rec. X.282 | ISO/IEC 10742)
DMI	Definition of Management Information (see also CCITT Rec. X.721 | ISO/IEC 10165-2)

DTE	Data Terminal Equipment (see also Recommendation X.25)
EFD	Event Forwarding Discriminator (see also CCITT Rec. X.721 | ISO/IEC 10165-2)
GDMO	Guidelines for the Definition of Managed Objects (see also Recommendation X.722)
GMI	Generic Management Information (see also ITU-T Rec. X.723 | ISO/IEC 10165-5)
GNM	Generic Network Information Model (see also Recommendation M.3100)
HG	Hunt Group (see also Recommendation X.25)
ICS	Implementation Conformance Statement (see also ITU-T Rec. X.724 | ISO/IEC 10165-6)
ISDN	Integrated Services Digital Network
MLP	Multi-Link Procedure (see also Recommendation X.25)
MO	Managed Object
NLMO	Network Layer Managed Object (see also ITU-T Rec. X.283 | ISO/IEC 10733)
PAD	Packet Assembly/Disassembly
PLE	Packet Layer Entity
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
RDN	Relative Distinguished Name
SLP	Single Link Procedure (see also Recommendation X.25)

5 Conventions

The convention applied to this Recommendation is the Guidelines for the Definition of Managed Objects (GDMO), defined in Recommendation X.722.

6 Management Information Overview for CNM

This Recommendation defines generic management information for the CNM services. It includes the definition of MO classes, related attribute, package, action type, etc. This Recommendation is referenced by the other CNM related Recommendations, i.e. Recommendations X.160 and X.161. For providing the services, the generic definition in this Recommendation is to be used, and may be extended or refined by adding specific properties in some cases, e.g. for extended services.

6.1 Basic Concept of Management Information in the CNM Service

When the CNMc interface is used, the management information is defined as below.

Management information for the CNM services is defined based on customers' concerns and service providers' security. CNM MOs contain common elements or characteristics of CNM services defined in Recommendation X.161. Information elements provided to customers are limited due to security reasons.

These MOs are defined as generic MO classes and they may be refined by adding specific features to extend CNM services by each service provider, i.e. a network that provides CNM services. Other MOs which exhibit customer network management properties can also be defined by using the static packages defined in this Recommendation.

There are many generic MO definitions in other Recommendations and International Standards which can also be used in the CNM service. Such MOs are imported to this Recommendation, some being sub-classed to define CNM MOs. However, it is recognized that the suitability of certain generic MOs for importing and sub-classing is for further study.

Which object may be accessed by its customer or which conditional package should be offered is based on the agreement between the service provider and the customer.

6.2 Management Information Structure

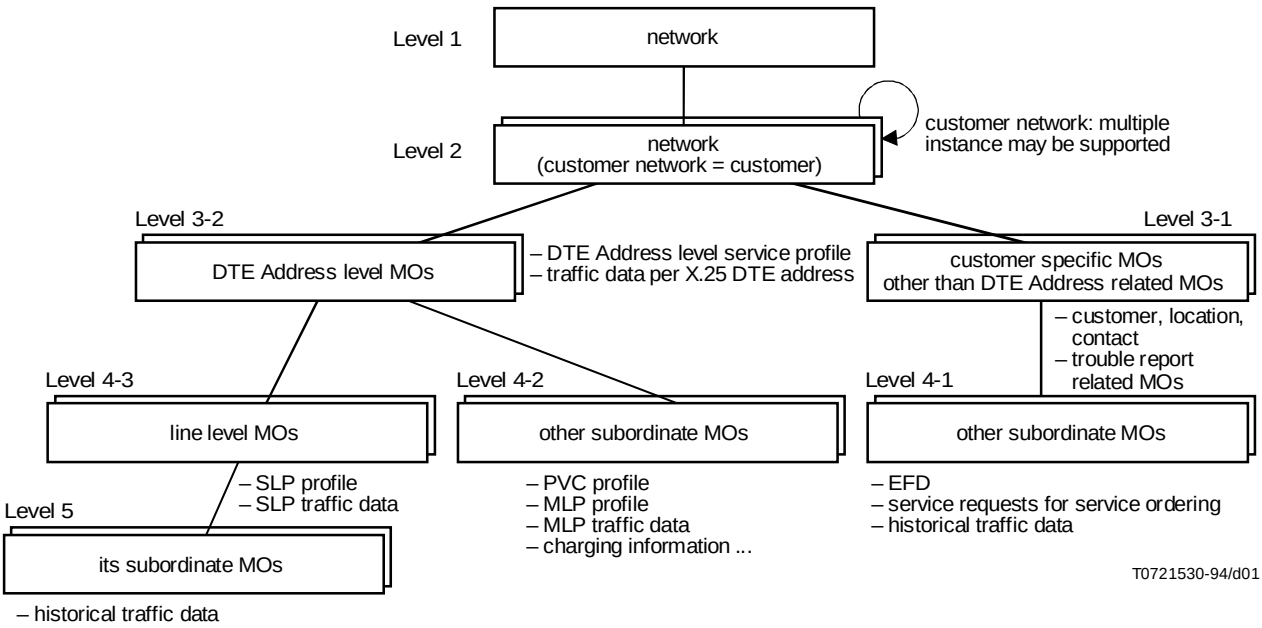
This subclause will describe an overview of the Management Information Model for CNM.

The CNM object hierarchy consists of several levels as shown in Figure 1. Each level is categorized as follows:

- **Level 1** – The service provider's network (the starting point of the naming).
- **Level 2** – A subset of the network related to a customer (customer network).

  NOTE – This object represents all the resources that a customer possesses. Note that if the customer wants to have a hierarchical customer network structure, it may recursively contain other network objects.
- **Level 3-1** – Customer specific objects (objects owned by the customer) except the DTE address related objects (level 3-2).
- **Level 3-2** – Objects related to a DTE address owned by the customer.
- **Level 4-1** – Objects that are subordinated to objects of level 3-1 and are irrelevant to the DTE address (customer related objects).
- **Level 4-2** – Objects that are subordinated to objects of level 3-2 (DTE address related objects).
- **Level 4-3** – Objects related to an access line or a data link (SLP).
- **Level 5** – Objects that are subordinated to objects of level 4-3.

What object each level includes is explained in Figure 1.



NOTE – This figure does not specify a specific instance containment tree.

FIGURE 1/X.162

The CNM Information General Structure

6.3 Management Information Models for Specific CNM Services

This subclause will describe the management information model for each CNM service in accordance with the TMN methodology defined in Recommendation M.3020.

6.3.1 Fault Management

6.3.1.1 Alarm notification service model

This subclause is intended to provide a conceptual framework for understanding how the various MO classes are used to provide the Alarm Notification service.

The object model for the alarm notification service is shown in Figure 2. When a trouble is detected in a resource involved in a customer's communication, an alarm is issued. Alarms related to the customer's equipment are emitted from the Equipment object, and ones related to the X.25 communication are emitted from the X.25 Termination Point object.

Alarms may be discriminated in accordance with a criterion. This criterion may be controlled by the Event Forwarding Discriminator (EFD) defined in CCITT Rec. X.721 | ISO/IEC 10165-2. This object is contained in the Managed Element object.

The specific MOs in the model are:

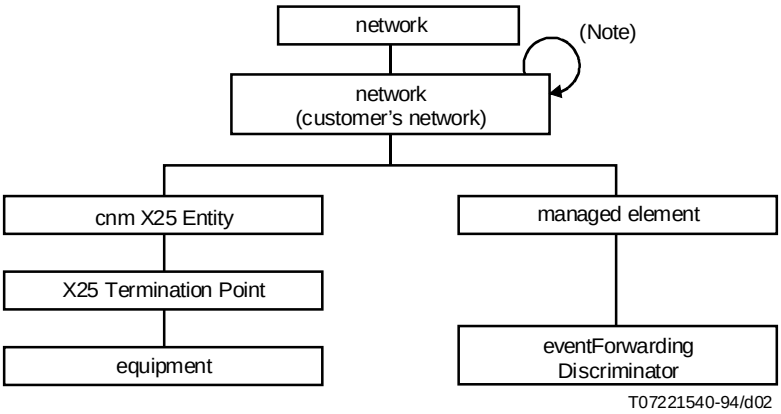
cnmX25Entity – The cnmX25Entity MO class represents the entity that is related to a DTE address. This object is used to contain one or more X.25 Termination Points for this service.

x25TerminationPoint – The x25TerminationPoint MO class, derived from terminationPoint defined in Recommendation M.3100, represents the access line, which corresponds to the Data Link. Alarms related to an access line or the Data Link are emitted from this object. This object is contained by the cnmX25Entity object.

equipment – The equipment MO class, imported from Recommendation M.3100, represents a resource dedicated to a customer. From this object, alarms related to the equipment are emitted.

managedElement – The managedElement MO class, of which the class definition is imported from Recommendation M.3100, is used for the name binding. That is, it is the superior object of the eventForwardingDiscriminator object.

eventForwardingDiscriminator – The eventForwardingDiscriminator MO class, imported from CCITT Rec. X.721 | ISO/IEC 10165-2, discriminates notifications in accordance with a criterion of the customer.



NOTE – The part owned by a customer. It may have a hierarchical structure.

FIGURE 2/X.162

Alarm Notification Information Structure

6.3.1.2 Fault history service model

This service is for further study.

6.3.1.3 Trouble report service model

This subclause is intended to provide a conceptual framework for understanding how the various MO classes are used to provide the trouble report service.

The object model for the trouble report service is shown in Figure 3. When a customer finds the occurrence of trouble in his communication, he informs the service provider by creating a Telecommunications Trouble Report object containing attributes that represents information about the trouble. The customer can retrieve the format provided by the service provider. Several formats, as defined in Recommendation X.790, may be offered. Repair activities can be retrieved from the Repair Activity object, which has attributes for records of activities performed to resolve the trouble, such as activity information and activity person.

When the network (the service provider) finds the occurrence of trouble in a customer's communication, the provider creates a Telecommunication Trouble Report object and notifies the customer of the trouble.

The Telecommunication Trouble Report object has linkage with the object which represents a resource in trouble.

Customers are notified also when planned maintenance or preventive maintenance action is scheduled, to prevent future trouble. The Provider Trouble Report object is used for this purpose.

This Recommendation uses the definition of these MO classes defined in or derived from Recommendation X.790. In the CNM environment, they are modeled as follows:

Managed Object in Trouble – This MO class, for which a trouble report is created, represents any resource in trouble related to the customer's communication.

pdnTelecommunicationsTroubleReport – The pdnTelecommunications TroubleReport MO class, derived from telecommunicationsTroubleReport defined in Recommendation X.790, is created by a customer or by the service provider to notify the occurrence of a trouble in a resource related to the customer's communication. This object is contained by the managedElement object.

providerTroubleReport – The providerTroubleReport MO class, imported from Recommendation X.790, is created by the service provider to inform the customer of plans of maintenance that affects the customer's communication. It is contained by the network (customer network) object.

troubleReportFormatDefinition – The troubleReportFormatDefinition MO class, imported from Recommendation X.790, represents a format defined for expressing a trouble report. This object is contained by the network (customer network) object.

contact – The contact MO class, imported from Recommendation X.790, represents information about contact persons of either the service provider. Necessary object instances are created and pointed by the pdnTelecommunicationsTroubleReport object. It is contained by the network (customer network) object.

repairActivity – The repairActivity MO class, imported from Recommendation X.790, represents records of activities performed to resolve the trouble. This object is used unless the Repair Activity List is used. It is contained by the pdn TelecommunicationsTroubleReport object.

pdnTroubleHistoryRecord – The pdnTroubleHistoryRecord MO class, derived from Trouble History Record defined in Recommendation X.790, represents records of trouble occurrence and results of repair activities. This object is contained by the log object.

log – The log MO class, imported from CCITT Rec. X.721 | ISO/IEC 10165-2, is used for logging trouble history records. This object is contained by the managedElement object.

6.3.1.4 Loop set-up service model

This service is for further study.

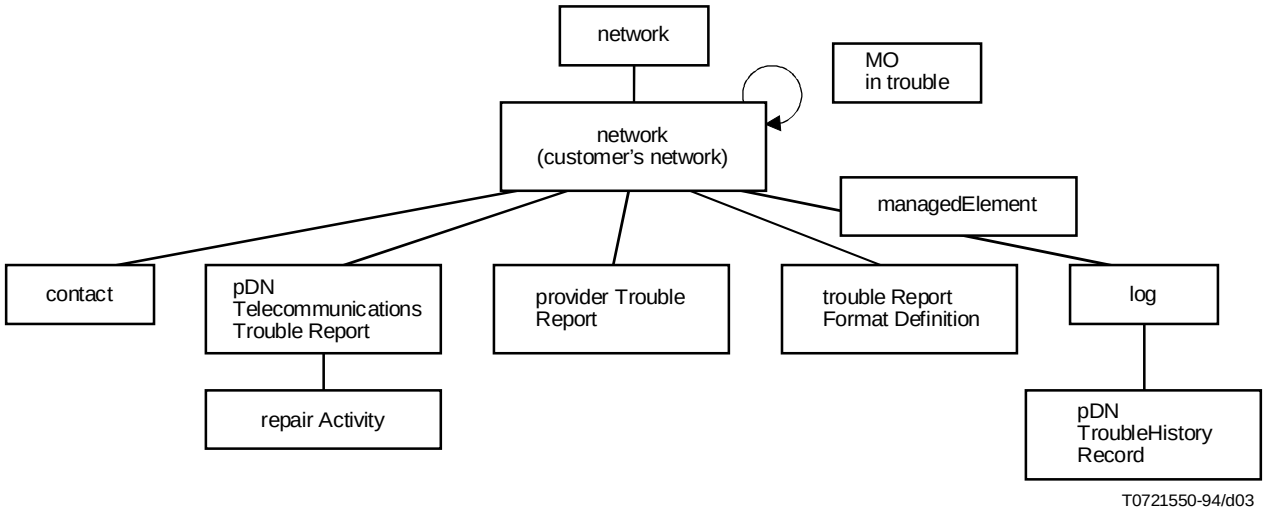


FIGURE 3/X.162

Trouble Report Information Structure

6.3.1.5 Test host service model

This service is for further study.

6.3.1.6 Protocol monitoring service model

This service is for further study.

6.3.2 Configuration Management

6.3.2.1 Configuration Inquiry service model

This subclause is intended to provide a conceptual framework for understanding how the various MO classes are used to provide the Configuration Inquiry service.

The object model for the configuration inquiry service is shown in Figure 4. To retrieve configuration information, the customer may access the contact, location, customer, cnmUser, x25TerminationPoint, equipment, and all of the service profile objects.

The specific objects in the model are:

contact – This MO class is the same as that defined for the trouble report service. It includes the service provider's telephone number, facsimile number, name, or other details so that customers can correspond with the service provider.

location – The location MO class contains the postal address, geographic coordinate, etc., for each access line, to confirm information about the customer's own equipment.

customer – The customer MO class includes attributes for representing the customer title, etc.

cnmUser – The cnmUser MO class has information about a sub-organization or an access-line-group under a customer.

x25TerminationPoint – In addition to the Alarm Notification service, the x25TerminationPoint MO class is used also for the Configuration Inquiry service. This MO class represents an access line or a Data Link. The customer who owns it may retrieve its communication status from this object.

equipment – This MO class is imported from Recommendation M.3100. From this object, the customer may retrieve equipment data such as the operating system, the release version number, the function name, the product label, and the software name.

serviceProfile objects – These MO classes represent subscription data of X.25 services. They includes the service profiles for the X.25 Packet Layer, the Multi-Link Procedure (MLP), the Single-Link Procedure (SLP), the Permanent Virtual Circuit (PVC), the Closed User Group (CUG), and the Hunt Group (HG).

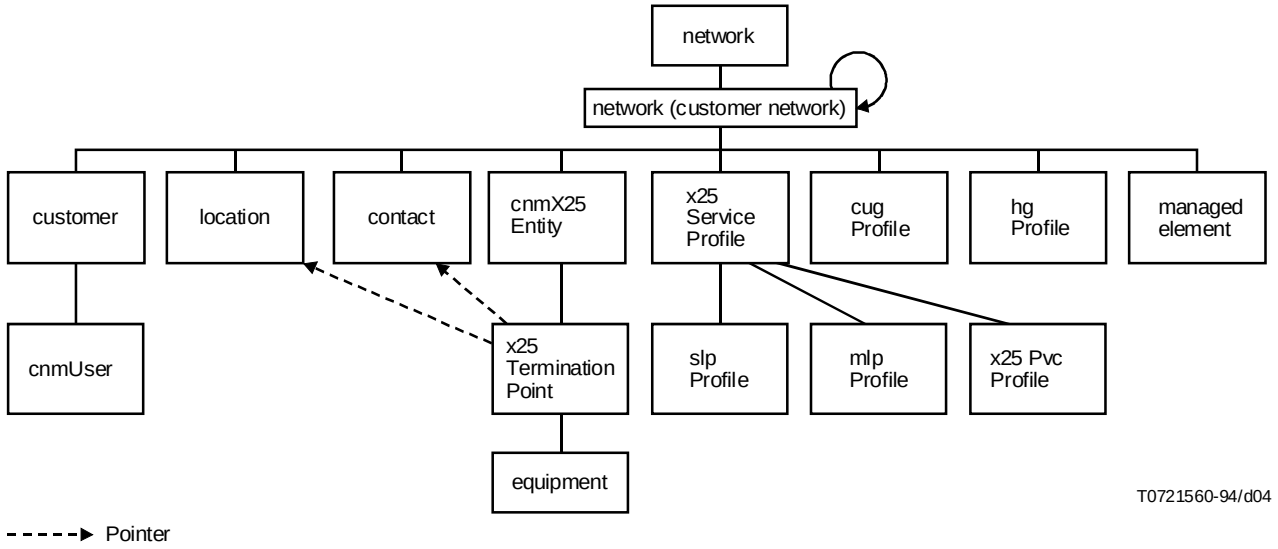


FIGURE 4/X.162

Configuration Inquiry Information Structure

6.3.2.2 CNM Reconfiguration service model

This subclause is intended to provide a conceptual framework for understanding how the various MO classes are used to provide the CNM Reconfiguration service.

The object model for the Service Configuration service is similar to the Configuration Inquiry service as shown in Figure 5. The customer may modify parameters associated with configurable aspects of his network services. MO classes that do not have configurable attributes, e.g. the contact MO, are outside the scope of this service.

The specific objects in the model are:

location – The location MO class is the same as that for the Service Inquiry service. The attributes representing the postal address, geographic coordinate, etc., may be modified by the customer.

customer – The customer MO class is the same as that for the Service Inquiry service. The attributes representing the customer title, etc., may be modified by the customer.

cnmUser – The cnmUser MO class is the same as that for the Service Inquiry service. The attributes representing information about the customer's sub-organization or an access-line-group under the customer may be modified by the customer.

cnmX25Entity – The cnmX25Entity MO class is the same as that for the Alarm Notification service. The X.25 service may be suspended or resumed by controlling the administrative state of this object.

x25TerminationPoint – The x25TerminationPoint MO class is the same as that for the Alarm Notification service. Each physical line and the Data Link overriding it may be activated or deactivated by controlling the administrative state of this object.

equipment – The equipment MO class is the same as that for the Alarm Notification service. The attributes representing equipment data may be modified by the customer.

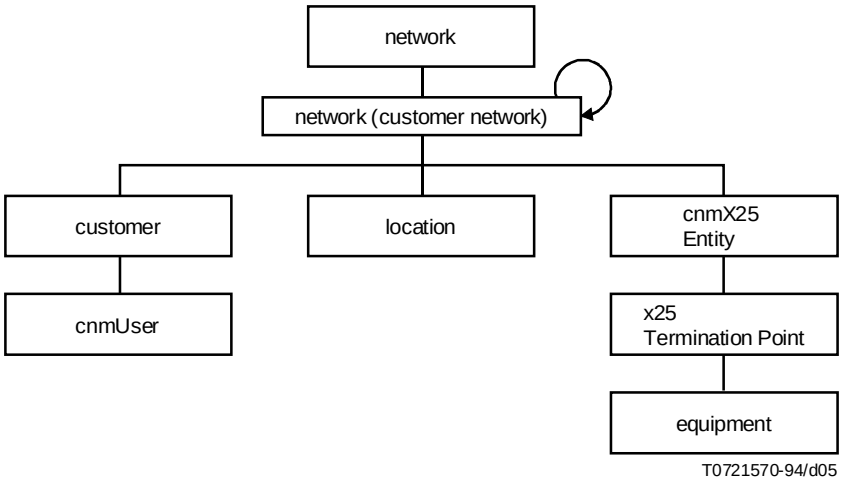


FIGURE 5/X.162

Reconfiguration Service Information Structure

6.3.2.3 Ordering service model

This subclause is intended to provide a conceptual framework for understanding how the various MO classes are used to provide the service ordering service.

The object model for the service ordering is shown in Figure 6. There are two cases for X.25 service subscription:

– one with MLP; and

– one without MLP.

For the first case, necessary attributes of the X.25 Service Profile (x25ServiceProfile) and SLP Profile (slpProfile) objects are set through the Service Request object. The x25ServiceProfile has the necessary parameters for the packet layer. The SLP Profile object has the necessary parameters for the data link layer. To indicate the linkage with the X.25 Service Profile object, the SLP Profile object has the localDTEAddress attribute to point to the x25ServiceProfile object.

For the second case, the necessary attributes of the X.25 Service Profile, the MLP Profile and as many SLP Profile as required are set through a Service Request object.

At the time of subscription, also performance related objects (x25MonitoredPoint, mlpMonitoredPoint and x25TerminationPoint) shall be created. Note that the MLP Monitored Point and additional X.25 Termination Point objects are created when MLP service is subscribed to.

All these profile object and performance related objects with initial attribute values are specified by the Create Argument parameter of the Service Profile object.

The modification of service items and the deletion of the subscription are also done through a Service Request object newly instantiated for that purpose. This object allows negotiation between the customer and the service provider, and the delay or scheduling of the activation of the X.25 service.

The CUG Profile and the HG Profile objects are defined as X.25 additional service profiles. They include necessary service information, i.e. member DTE Addresses. Each object is also controlled by a Service Request object.

The X.25 PVC Profile object includes parameters necessary for setting a PVC. It is create by a Service Request object.

The specific objects in the model are:

x25ServiceProfile, mlpProfile, slpProfile – These MO classes include the X.25 packet layer parameters, multi-link parameters and data link layer parameters, respectively. The x25ServiceProfile object is contained by the network (customer network) object. In turn, the mlpProfile object and slpProfile object(s) is contained by it. Creation, modification and deletion of the subscription are handled through a ServiceRequest object. At the same time, they also creates performance related objects, i.e. cnmX25Entity, mlpMonitoredPoint and x25TerminationPoint for that interface.

x25PvcProfile – The x25PvcProfile MO class includes parameters necessary for establishing a PVC. This object is created through the ServiceRequest Modification of the subscription is done by deletion of the x25PvcProfile object by a serviceRequest object and the creation of a new x25PvcProfile objects by another serviceRequest.

cugProfile – The cugProfile MO class contains the service items necessary for the CUG facility defined in Recommendation X.25. The DTE addresses within a closed user group are defined in this object in accordance with the type of CUG. Creation, modification and addition of the subscription shall be handled through serviceRequest objects.

hgProfile – The hgProfile MO class contains the service items necessary for the Hunt Group facility defined in Recommendation X.25. The DTE addresses within a hunt group are defined in this object. The identifications of the hunt group address is also defined in this object. Creation, modification and addition of the subscription shall be handled through ServiceRequest objects.

6.3.2.4 Cancellation service model

This service is for further study.

6.3.2.5 Systematic call redirection service model

This service is for further study.

6.3.2.6 Inventory inquiry service model

This service is for further study.

6.3.3 Accounting Management

6.3.3.1 Periodic billing service model

This service is for further study.

6.3.3.2 Detailed accounting service model

This service is for further study.

6.3.3.3 Quota control service model

This service is for further study.

6.3.3.4 Real time changing information service model

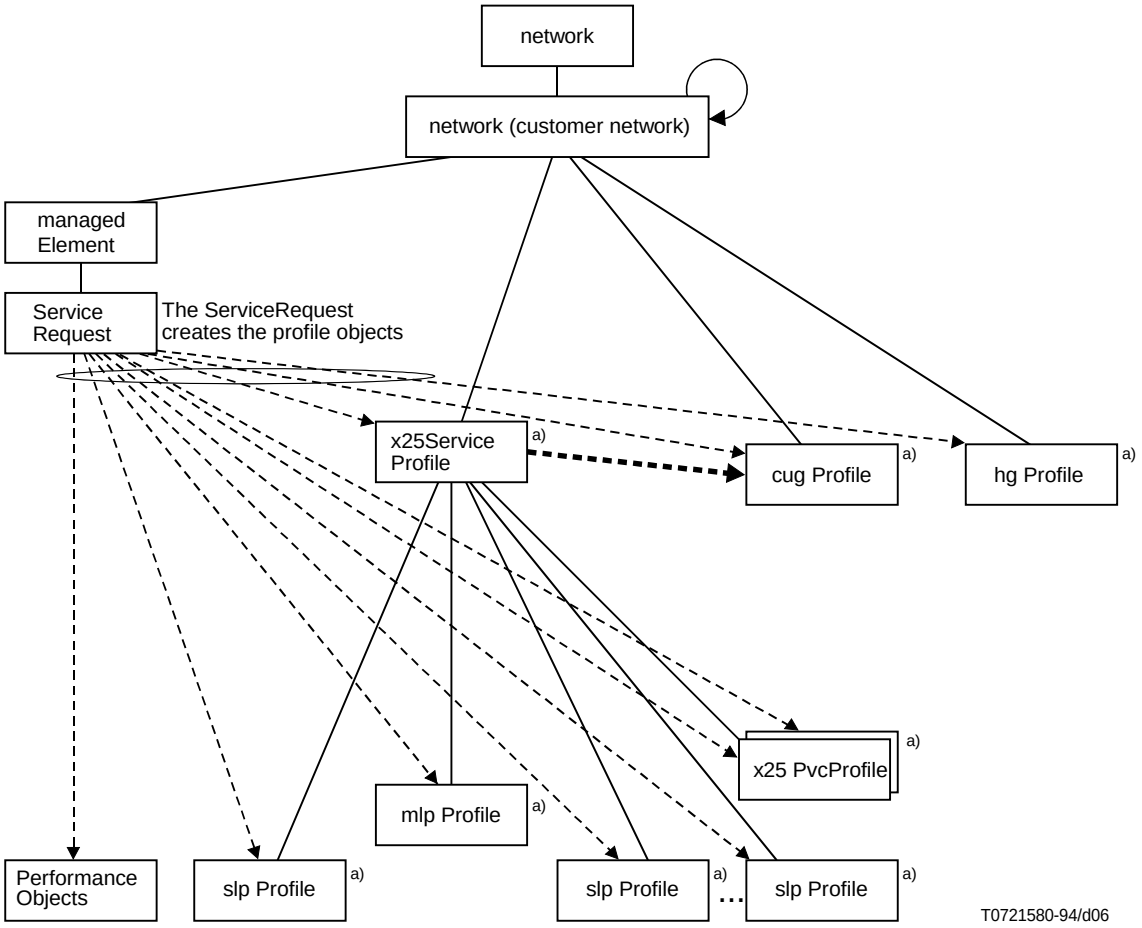
This service is for further study.

6.3.4 Performance Management

6.3.4.1 Traffic information service model

This subclause is intended to provide a conceptual framework for understanding how the various managed object classes are used to provide the traffic information service.

The object model for the traffic information service is shown in Figure 7. Current traffic data is collected for a Monitored Object by a sub-class of Current Traffic Data object defined in Recommendation Q.822. Instances of it are contained by the Monitored Object. This object may always be accessed for the retrieval of current traffic measurement data. At the end of each performance interval, the duration of which is determined by the granularityPeriod attribute, an instance of a sub-class of the History Traffic Data MO class, defined in Recommendation Q.822, may be created to record the traffic measurements for that interval. The aggregation of traffic measurement is not supported for the time being.



– cnmX25Entity
– mlpMonitoredPoint
– x25TerminationPoint

NOTE – At the subscription time these performance objects are also created.

Containment relationship
Automatic object creation
Pointer

a) These objects are linked by the localDTEAddress attribute.

FIGURE 6/X.162

Service Ordering Related Objects

For an X.25 subscription with MLP, the necessary traffic counters are as follows:

[SLP level]

– SLP counters;

[X.25 interface level (DTE address level)]

– packet counters;

– MLP counters.

To count these traffic items, a scanner is necessary for each of them. A sub-class of the “ITU-T Recommendation Q.822”: currentData MO class is used.

The specific objects in the model are:

Monitored Object – This object is the managed object for which the traffic measurements are being collected. It represents the resource being measured that is dedicated for a specific customer. There are three types of objects: cnmX25Entity; mlpMonitoredPoint, and x25TerminationPoint. Monitored objects contain no counters as ITU-T Rec. X.283 | ISO/IEC 10733. In the containment tree, this object shall contain currentTrafficData object instance and be used for naming.

currentTrafficData related objects – The currentTrafficData MO class includes the measurements for the resource being monitored for a specified time interval (typically 1 hour). It is a sub-class of currentData defined in Recommendation Q.822 and shall have traffic measurement attributes for the X.25 packet layer, the MLP, or one or more SLPs. This object may be accessed at any time after the creation. At the end of each interval, a historyTrafficData object for each type of the current data may be created containing the same attributes as the currentTrafficData object with values of the traffic measurements at the end of the interval.

historyTrafficData related object – The historyTrafficData MO class is imported from Recommendation Q.822. This object has a copy of traffic related attributes that are present in the object for the current Traffic data at the end of the current interval (typically 1 hour). A new instance of this MO class is created automatically at the end of each interval. There are three types objects: historyPacketTrafficData, historyMlpTrafficData, and historySlpTrafficData.

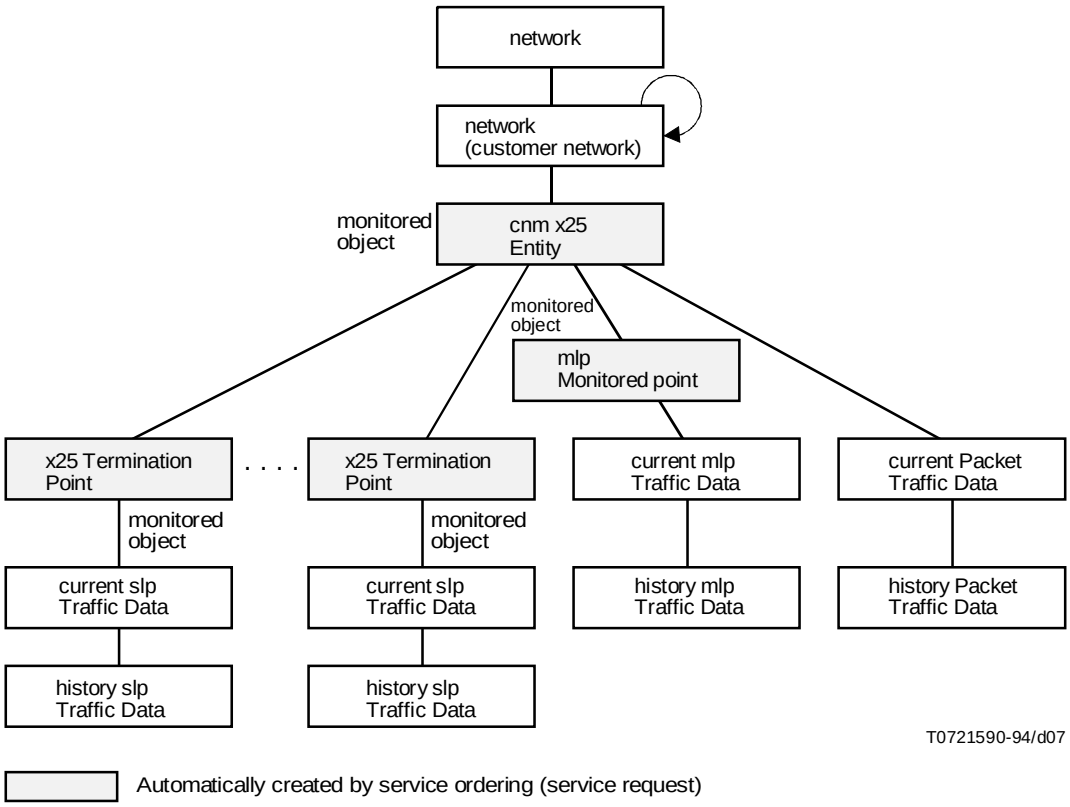


FIGURE 7/X.162

Traffic Information Structure

6.3.4.2 Quality of Service information service model

This service is for further study.

6.3.4.3 Network statistic service model

This service is for further study.

6.3.5 Security Management

6.3.5.1 Password change service model

This service is for further study.

6.3.5.2 Access rights definition service model

This service is for further study.

6.3.6 CNM Services Supporting Service

The service request function is required when the provision of a service is not automated but necessitates a human intervention on a piece of equipment or a specific human procedure. Thus, the service is not provided in real time but on a delayed basis. Since CMIP is really oriented towards real time operations, a new mechanism is required.

The mechanism is based on the instantiation of an object class which models the service requested and provides information on the different phases of the request processing. For this purpose, the Service Request object is used. The basic idea is to provide the manager with the capability to request a list of CMIP operations on designated managed objects. These operations are authorized through the parameterization of a serviceRequest managed object.

Specific properties of this MO class is as follows: the dateRequest attribute is used to specify the date at which the service must be provided. The possible values are: dontCare, now, or a precise date. The default value is dontCare.

The operationList attribute is used to specify the CMIP requested operations. The syntax used is the syntax of the CMIP operations themselves.

The processingMode attribute allows the managing system to specify if the operations must be processed in an orderly manner or if it does not matter. In the case where the order is not relevant, the action to be taken after a failure of an operation is to be specified (either abort or continue).

The operations are processed by the service provider but the results are not sent to the customer. In some cases, creation, deletion and attribute value change notifications are used to give information on the service provision. Nevertheless, the resultList attribute gives information on the result. It is a read only attribute whose value is an empty list until the object status is set to endOfProcessing. When the service has been delivered, this attribute specifies a diagnostic for each operation: success, failure or not attempted (i.e. abort after a previous failure and application of the stopAfterFailure policy).

Conditional Packages allow the specification of contacts at the manager and agent side. The choice between an existing contact instance or an attribute with a PersonReach syntax is possible. A dialogue attribute is also imported from the telecommunicationsTroubleReport managed object class defined in Recommendation X.790. It is used for the exchange of certain information during the negotiation phase.

The new serviceRequest MO class proposed hereafter is instantiable. The Name Binding does not allow the deletion of a serviceRequest object by the manager.

7 Definition of Managed Object Classes

7.1 Managed Objects for Fault Management

7.1.1 Managed Objects for Alarm Notification Service

7.1.1.1 Referenced managed objects

1) This Recommendation references the following support MO classes for which the abstract syntax is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

   a) top;

   b) event forwarding discriminator.

2) This Recommendation references the following support MO classes for which the abstract syntax is specified in Recommendation M.3100:

a) network;

NOTE 1 – This object is the superior object for all the CNM objects.

b) termination point;

c) managed element;

NOTE 2 – This object is used for containing the objects that provide general functions irrespective of the types of network service. The Event Forwarding Discriminator or the Log object is contained by this object.

d) equipment.

7.1.1.2 Defined managed objects

7.1.1.2.1 CNM X.25 Entity

```
cnmX25Entity MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY cnmX25Entity-P PACKAGE
        BEHAVIOUR cnmX25Entity-B BEHAVIOUR
        DEFINED AS This object represents the entity that is related to a DTE address and for which traffic data are
        measured as a monitored object. It is used to contain one or more X.25 Termination Points. It is also used to
        suspend or resume the X.25 packet level communication. This object is created at the time of subscription.;;
        ATTRIBUTES
        cnmX25EntityId GET,
        "DMI": administrativeState GET-REPLACE;;;
REGISTERED AS {cnmObjectClass cnmX25Entity(1)};
```

7.1.1.2.2 X.25 Termination Point

```
x25TerminationPoint MANAGED OBJECT CLASS
DERIVED FROM "GMN": terminationPoint;
CHARACTERIZED BY x25TerminationPoint-P PACKAGE
        BEHAVIOUR x25TerminationPoint-B BEHAVIOUR
        DEFINED AS This MO represents the termination point of the access line, on which one data link is overridden. It
        emits alarms related to the access line and the data link. It also represents the monitored resource for which data-
        link-traffic-data are measured.;;
        ATTRIBUTES
        x25TerminationPointId GET,
        "DMI": administrativeState GET-REPLACE;
        NOTIFICATIONS
        "DMI": objectCreation,
        "DMI": objectDeletion,
        "DMI": attributeValueChange,
        "DMI": communicationsAlarm,
        "DMI": qualityofServiceAlarm,
        "DMI": processingErrorAlarm,
        "DMI": equipmentAlarm,
        "DMI": environmentalAlarm
;;;
REGISTERED AS {cnmObjectClass x25TerminationPoint(2)};
```

7.1.2 Managed Objects for Fault History Service

7.1.2.1 Referenced managed objects

This service is for further study.

7.1.2.2 Defined managed objects

This service is for further study.

7.1.3 Managed Objects for Trouble Report Service

7.1.3.1 Referenced managed objects

1) This Recommendation references the following support MO classes for which the abstract syntax is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

   a) top;

   b) log.

2) This Recommendation references the following support MO class for which the abstract syntax is specified in Recommendation M.3100:

   – network.

     NOTE – This object is the superior object for all the CNM objects.

3) This Recommendation references the following support MO classes for which the abstract syntax is specified in Recommendation X.790:

   a) telecommunicationsTroubleReport;

   b) providerTroubleReport;

   c) contact;

   d) repairActivity;

   e) troubleHistoryRecord;

   f) troubleReportFormatDefinition.

7.1.3.2 Defined managed objects

This Recommendation defines the following MO classes by inheriting the telecommunicationsTroubleReport and troubleHistory MO classes.

7.1.3.2.1 PDN Telecommunications Trouble Report

```
pdnTelecommunicationsTroubleReport MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation X.790": telecommunicationsTroubleReport;
CHARACTERIZED BY pdnTTR-P PACKAGE
        BEHAVIOUR pdnTTR-B BEHAVIOUR
        DEFINED AS "This object has trouble types specific to packet communication. The trouble type attribute defined
        in the super class is not used for the trouble management of PDN";;
        ATTRIBUTES
        troubleTypePspdn            GET;;;
REGISTERED AS {cnmObjectClass  pdnTelecommunicationsTroubleReport(3)};
```

7.1.3.2.2 PDN Trouble History Record

```
pdnTroubleHistoryRecord  MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation X.790": troubleHistory;
        CONDITIONAL PACKAGES
        troubleTypePspdnPkg PACKAGE
        ATTRIBUTES
        troubleTypePspdn  GET;
REGISTERED AS {cnmObjectClass  pdnTroubleHistoryRecord(4)};
```

7.1.4 Managed Objects for Loop Set-up Service

This service is for further study.

7.1.5 Managed Objects for Test Host Service

This service is for further study.

7.1.6 Managed Objects for Protocol Monitoring Service

This service is for further study.

7.2 Managed Objects for Configuration Management

7.2.1 Managed Objects for Configuration Inquiry Service

7.2.1.1 Referenced managed objects

1) This Recommendation references the following support MO class for which the abstract syntax is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:
   - top.
2) This Recommendation references the following support MO classes for which the abstract syntax is specified in Recommendation M.3100:
   a) network;
   b) termination point;
   c) managed element;
   d) equipment.
3) This Recommendation references the following support MO class for which the abstract syntax is specified in Recommendation X.790:
   - contact.

7.2.1.2 Defined managed objects

7.2.1.2.1 CNM X.25 Entity

This object class is defined in 7.1.1.2.1.

7.2.1.2.2 X.25 Termination Point

This object class is defined in 7.1.1.2.2.

7.2.1.2.3 X.25 Service Profile

```
x25ServiceProfile MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY
        x25ServiceProfile-P,
        pleProfile-P;
        CONDITIONAL PACKAGES
        slpTimersProfile-P
        PRESENT IF the timers may be specified by customers;
REGISTERED AS {cnmObjectClass x25BasicServiceProfile(5)};
```

7.2.1.2.4 MLP Profile

```
mlpProfile MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY
        mlpProfile-P PACKAGE
        BEHAVIOUR mlpProfile-B BEHAVIOUR
        DEFINED AS "This object is used to represent the service profile necessary for providing the MLP. Creation,
        modification and deletion of this object are controlled by the Service Request object".;;
        ATTRIBUTES
        mlpProfileId GET,
        "DLMO": mW GET,
        "DLMO": mX GET;;;
        CONDITIONAL PACKAGES
        mlpTimer-PACKAGE
        ATTRIBUTES
        "NLMO": localDTEAddress GET,
        "DLMO": mT1Timer GET,
        "DLMO": mT3Timer GET,
        "DLMO": mT2 GET;;
        PRESENT IF "The provider allows customers to set and modify these attributes.";
REGISTERED AS {cnmObjectClass mlpProfile(6)};
```

7.2.1.2.5 SLP Profile

```
slpProfile MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY
        slpProfile-P;
        CONDITIONAL PACKAGES
        slpTimersProfile-P
        PRESENT IF the timers may be specified by customers;
REGISTERED AS {cnmObjectClass slpProfile(7)};
```

7.2.1.2.6 X.25 PVC Profile

```
x25PvcProfile MANAGED OBJECT CLASS
DERIVED FROM  "DMI": top;
        CHARACTERIZED BY x25PvcProfile-P PACKAGE
        BEHAVIOUR x25PvcProfile-B BEHAVIOUR
        DEFINED AS This MO class represents subscription data, i.e. the service profile of each PVC. Necessary PVC
        parameters are included in this MO. Creation, modification and deletion of this object are controlled by the Service
        Request object.;;
        ATTRIBUTES
        x25PvcProfileId GET,
        "NLMO": chargingDirection GET,
        "NLMO": localDTEAddress GET,
        "NLMO": logicalChannel GET,
        "DMI"    : operationalState GET,
        "NLMO": packetSize  GET,
        "NLMO": remoteDTEAddress GET,
        "NLMO": remoteLogicalChannel  GET,
        "NLMO": throughputClasses GET,
        "NLMO": virtualCircuitId GET,
        "NLMO": windowSize GET;
        NOTIFICATIONS
        "DMI"    : objectCreation,
        "DMI"    : objectDeletion;;;
REGISTERED AS {cnmObjectClass x25PvcProfile(8)};
```

7.2.1.2.7 Closed User Group Profile

```
cugProfile  MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY cugProfile-P PACKAGE
        BEHAVIOUR cugProfile-B BEHAVIOUR
        DEFINED AS "This MO class is used for managing the subscription of each CUG. The attributes represent the list
        of DTE addresses that belong to the same CUG. Creation, modification and deletion of this object are controlled by
        the Service Request object.";;
        ATTRIBUTES
        cugProfileId GET,
        "NLMO": cUGWithIncomingAccess GET,
        "NLMO": cUGWithOutgoingAccess GET,
        "NLMO": bilateralCUG GET,
        "NLMO": bilateralCUGWithOutgoingAccess GET,
        dTEAddressList        GET;;;
        NOTIFICATIONS
        "DMI"   : objectCreation,
        "DMI"   : objectDeletion;;;
        CONDITIONAL PACKAGES
        interlockCodePkg PACKAGE
        ATTRIBUTES
        interlockCode GET;;
        PRESENT IF "The service provider allows customers to use the international CUG service and to handle the
        interlock code value.",
        cugIndexPkg PACKAGE
        ATTRIBUTES
        cugIndex GET;;
        PRESENT IF "The service provider offers multiple CUGs and a customer subscribes to more than one CUG.";
REGISTERED AS {cnmObjectClass cugProfile(9)};
```

7.2.1.2.8 Hunt Group Profile

```
hgProfile  MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY hgProfile-P PACKAGE
        BEHAVIOUR hgProfile-B BEHAVIOUR
        DEFINED AS "This MO class is used for managing the subscription of each HG. The attributes represents the list
        of DTE addresses that belong to the same HG. Creation, modification and deletion of this object are controlled by
        the Service Request object.";;
        ATTRIBUTES
        hgProfileId GET,
        hgAddress     GET,
        dTEAddressList       GET;;;
        NOTIFICATIONS
        "DMI": objectCreation,
        "DMI": objectDeletion;;;
REGISTERED AS {cnmObjectClass hgProfile(10)};
```

7.2.1.2.9 CNM User

```
cnmUser MANAGED OBJECT CLASS
DERIVED FROM "DMI": customer;
CHARACTERIZED BY cnmUser-P PACKAGE
        BEHAVIOUR cnmUser-B BEHAVIOUR
        DEFINED AS This MO represents a customer's sub-organization and/or access line group. The
        suborganizationObjectList points all the relevant objects that belong to that sub-organization.;;
        ATTRIBUTES
        cnmUserId GET,
        suborganizationObjectList GET-REPLACE;;;
REGISTERED AS {cnmObjectClass cnmUser(11)};
```

7.2.1.2.10 Customer

```
customer MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY
        customerPkg,
        "GNM": attributeValueChangeNotificationPackage,
        contactListPkg,
        "GNM": createDeleteNotificationsPackage;

        CONDITIONAL PACKAGES
        customerTypesPkg
        PRESENT IF "an instance supports it.",
        opNetworkListPkg
        PRESENT IF "an instance supports it.",
        serviceListPkg
        PRESENT IF "an instance supports it.",
        typeTextPkg
        PRESENT IF "an instance supports it.",
        "GNM": userLabelPackage
        PRESENT IF "an instance supports it.",
;
REGISTERED AS {cnmObjectClass customer(12)};
```

7.2.1.2.11 Location

```
location MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY
        locationPkg,
        "GNM": attributeValueChangeNotificationPackage,
        "GNM": createDeleteNotificationsPackage;
```

```
CONDITIONAL PACKAGES
contactListPkg
PRESENT IF "an instance support it.",
typeTextPkg
PRESENT IF "an instance support it.",
"GNM": userLabelPackage
PRESENT IF "an instance support it.";

REGISTERED AS {cnmObjectClass location(13)};
```

7.2.2 Managed Objects for CNM Reconfiguration Service

7.2.2.1 Referenced managed objects

– This Recommendation references the following support MO class for which the abstract syntax is specified by Recommendation M.3100:

  – equipment.

7.2.2.2 Defined managed objects

7.2.2.2.1 CNM X.25 Entity

This object class is defined in 7.1.1.2.1.

7.2.2.2.2 X.25 Termination Point

This object class is defined in 7.1.1.2.2.

7.2.2.2.3 CNM User

This object class is defined in 7.2.1.2.9.

7.2.2.2.4 Customer

This object class is defined in 7.2.1.2.10.

7.2.2.2.5 Location

This object class is defined in 7.2.1.2.11.

7.2.3 Managed Objects for Ordering Service

7.2.3.1 Referenced managed objects

– This Recommendation references the following support managed object for which the abstract syntax is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

  – top.

7.2.3.2 Defined managed objects

7.2.3.2.1 X.25 Service Profile

This object class is defined in 7.2.1.2.3.

7.2.3.2.2 MLP Profile

This object class is defined in 7.2.1.2.4.

7.2.3.2.3 SLP Profile

This object class is defined in 7.2.1.2.5.

7.2.3.2.4 X.25 PVC Profile

This object class is defined in 7.2.1.2.6.

7.2.3.2.5 Closed User Group Profile

This object class is defined in 7.2.1.2.7.

7.2.3.2.6 Hunt Group Profile

This object class is defined in 7.2.1.2.8.

7.2.4 Managed Objects for Systematic Call Redirection Service

7.2.4.1 Referenced managed objects

This service is for further study.

7.2.4.2 Defined managed objects

This service is for further study.

7.3 Managed Objects for Accounting Management

7.3.1 Managed Objects for Periodic Billing Service

7.3.1.1 Referenced managed objects

This service is for further study.

7.3.1.2 Defined managed objects

This service is for further study.

7.3.2 Managed Objects for Detailed Accounting Service

7.3.2.1 Referenced managed objects

This service is for further study.

7.3.2.2 Defined managed objects

This service is for further study.

7.4 Managed Objects for Performance Management

7.4.1 Managed Objects for Traffic Information Service

7.4.1.1 Referenced managed objects

– This Recommendation references the following support MO classes for which the abstract syntax is specified in Recommendation Q.822:

  a) currentData;

  b) historyData.

7.4.1.2 Defined managed objects

7.4.1.2.1 CNM X.25 Entity

The cnmX25Entity object defined in 7.1.1.2.1 is used as the monitored MO for the measurement of packet layer counters of the currentPacketTrafficData object.

7.4.1.2.2 Current Packet Traffic Data

```
currentPacketTrafficData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822": currentData;
CHARACTERIZED BY currentPacketTrafficData-P PACKAGE
        BEHAVIOUR currentPacketTrafficData-B BEHAVIOUR
        DEFINED AS This MO is a sub-class of the currentData object that has a scanning function to monitor a specified
        Monitored Object. The traffic measurement parameters shall be explicitly defined as attributes of this MO, not as
        measurementListPkg.;;
        ATTRIBUTES
        "NLMO": callAttempts GET,
        "NLMO": callsConnected GET,
        "NLMO": callTimeouts GET,
        "NLMO": clearTimeouts GET,
        "NLMO": dataPacketsReceived GET,
```

"NLMO": dataPacketsSent GET,
"NLMO": octetsReceivedCounter GET,
"NLMO": octetsSentCounter GET,
"NLMO": protocolErrorsAccusedOf GET,
"NLMO": protocolErrorsDetectedLocally GET,
"NLMO": providerInitiatedDisconnects GET,
"NLMO": providerInitiatedResets GET,
"NLMO": resetTimeouts GET,
"NLMO": remotelyInitiatedResets GET,
"NLMO": remotelyInitiatedRestarts GET,
"NLMO": segmentsReceived GET,
"NLMO": segmentsSent GET;;;
REGISTERED AS {cnmObjectClass currentPacketTrafficData(14)};

NOTES

1 This MO intends to be used by many CNM service providers. However, based on the agreement between the provider and its customers, traffic items may be added by sub-classing. If a provider does not collect some of the counters above, another object may be defined by directly inheriting the Recommendation Q.822: currentData object.

2 This MO shall be created on demand before the traffic data collection. The maximum number of observation is determined by the service provider in consideration of the processing load and the capacity.

7.4.1.2.3 History Packet Traffic Data

historyPacketTrafficData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822": historyData;
CHARACTERIZED BY historyPacketTrafficData-P PACKAGE
BEHAVIOUR historyPacketTrafficData-B BEHAVIOUR
DEFINED AS This MO is a sub-class of the historyData object that has a function for storing monitored measurements of the currentPacketTrafficData object for a specified time interval. The measurement attributes in this object shall be an exact copy of the attributes in the currentPacketTrafficData object at the end of the interval. The traffic parameters shall be explicitly defined as attributes of this object, not as historyDataMeasurementListPkg of the super class.;;
ATTRIBUTES
"NLMO": callAttempts GET,
"NLMO": callsConnected GET,
"NLMO": callTimeouts GET,
"NLMO": clearTimeouts GET,
"NLMO": dataPacketsReceived GET,
"NLMO": dataPacketsSent GET,
"NLMO": octetsReceivedCounter GET,
"NLMO": octetsSentCounter GET,
"NLMO": protocolErrorsAccusedOf GET,
"NLMO": protocolErrorsDetectedLocally GET,
"NLMO": providerInitiatedDisconnects GET,
"NLMO": providerInitiatedResets GET,
"NLMO": resetTimeouts GET,
"NLMO": remotelyInitiatedResets GET,
"NLMO": remotelyInitiatedRestarts GET,
"NLMO": segmentsReceived GET,
"NLMO": segmentsSent GET;;;
REGISTERED AS {cnmObjectClass historyPacketTrafficData(15)};

7.4.1.2.4 MLP Monitored Point

mlpMonitoredPoint MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY mlpMonitoredPoint-P PACKAGE
BEHAVIOUR mlpMonitoredPoint-B BEHAVIOUR
DEFINED AS This object represents the monitored resource for which MLP-traffic-data are measured.;;
ATTRIBUTES
mlpMonitoredPointId GET;;;
REGISTERED AS {cnmObjectClass mlpMonitoredPoint(16)};

7.4.1.2.5 Current MLP Traffic Data

```
currentMlpTrafficData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822": currentData;
CHARACTERIZED BY currentMlpTrafficData-P PACKAGE
        BEHAVIOUR currentMlpTrafficData-B BEHAVIOUR
        DEFINED AS This MO is a sub-class of the currentData object that has a scanning function to monitor MLP
        communication. The traffic measurement parameters shall be explicitly defined as attributes of this MO, not as
        measurementListPkg.;;
        ATTRIBUTES
        "DLMO": receivedMlpInGuardRegion        GET,
        "DLMO": receivedMlpResets               GET,
        mlpFramesReceived                       GET,
        mlpFramesSent                           GET,
        mlpFramesOutsideWindowGuard             GET;;;
REGISTERED AS {cnmObjectClass currentMlpTrafficData(17)};
```

7.4.1.2.6 History MLP Traffic Data

```
historyMlpTrafficData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822": historyData;
CHARACTERIZED BY historyMlpTrafficData-P PACKAGE
        BEHAVIOUR historyMlpTrafficData-B BEHAVIOUR
        DEFINED AS This MO is a sub-class of the historyData object that has a function for storing monitored
        measurements of the currentMlpTrafficData object for a specified time interval. The measurement attributes in this
        object shall be an exact copy of the attributes in the currentMlpTrafficData object at the end of the interval. The
        traffic parameters shall be explicitly defined as attributes of this object, not as historyDataMeasurementListPkg of
        the super class.;;
        ATTRIBUTES
        "DLMO": receivedMlpInGuardRegion        GET,
        "DLMO": receivedMlpResets               GET,
        mlpFramesReceived                       GET,
        mlpFramesSent                           GET,
        mlpFramesOutsideWindowGuard             GET;;;
REGISTERED AS {cnmObjectClass historyMlpTrafficData(18)};
```

7.4.1.2.7 X.25 Termination Point

This object is also used for the monitored resource for the measurement of an SLP. This object class is defined in 7.1.1.2.2.

7.4.1.2.8 Current SLP TrafficData

```
currentSlpTrafficData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822": currentData;
CHARACTERIZED BY currentSlpTrafficData-P PACKAGE
        BEHAVIOUR currentSlpTrafficData-B BEHAVIOUR
        DEFINED AS This MO is a sub-class of the currentData object that has a scanning function to monitor a specified
        Monitored Object. The traffic measurement parameters shall be explicitly defined as attributes of this MO, not as
        measurementListPkg.;;
        ATTRIBUTES
        "DLMO": fCSErrorReceived GET,
        "DLMO": fRMRsReceived GET,
        "DLMO": fRMRsSent GET,
        "DLMO": iFrameDataOctetsReceived GET,
        "DLMO": iFrameDataOctetsSent GET,
        "DLMO": iFramesReceived GET,
        "DLMO": iFramesSent GET,
        "DLMO": pollsReceived GET,
        "DLMO": rEJsReceived GET,
        "DLMO": rEJsSent GET,
        "DLMO": rNRsReceived GET,
        "DLMO": rNRssent GET,
        "DLMO": sABMsReceived GET,
        "DLMO": sABMsSent GET,
        "DLMO": timesT1Expired GET;;;
REGISTERED AS {cnmObjectClass currentSlpTrafficData(19)};
```

7.4.1.2.9 History SLP Traffic Data

historySlpTrafficData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822": historyData;
CHARACTERIZED BY historySlpTrafficData-P PACKAGE
BEHAVIOUR historySlpTrafficData-B BEHAVIOUR
DEFINED AS This MO is a sub-class of the historyData object that has a function for storing monitored measurements of the currentSlpTrafficData object for a specified time interval. The measurement attributes in this object shall be an exact copy of the attributes in the currentSlpTrafficData object at the end of the interval. The traffic parameters shall be explicitly defined as attributes of this object, not as historyDataMeasurementListPkg of the super class.;;
ATTRIBUTES
"DLMO": fCSErrorReceived GET,
"DLMO": fRMRsReceived GET,
"DLMO": fRMRsSent GET,
"DLMO": iFrameDataOctetsReceived GET,
"DLMO": iFrameDataOctetsSent GET,
"DLMO": iFramesReceived GET,
"DLMO": iFramesSent GET,
"DLMO": pollsReceived GET,
"DLMO": rEJsReceived GET,
"DLMO": rEJsSent GET,
"DLMO": rNRsReceived GET,
"DLMO": rNRssent GET,
"DLMO": sABMsReceived GET,
"DLMO": sABMsSent GET,
"DLMO": timesT1Expired GET;;;
REGISTERED AS {cnmObjectClass historySlpTrafficData(20)};

7.4.2 Managed Objects for Quality of Service Information Service

This service is for further study.

7.5 Managed Objects for Security Management

7.5.1 Managed Objects for Password Change Service

This service is for further study.

7.5.2 Managed Objects for Access Rights Definition Service

This service is for further study.

7.6 Managed Objects for CNM Supporting Service

7.6.1 Managed Objects for Generic CNM Service Request Service

7.6.1.1 Referenced managed objects

– This Recommendation references the following support managed object for which the abstract syntax is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

  – top.

7.6.1.2 Defined managed objects

7.6.1.2.1 Service Request

serviceRequest MANAGED OBJECT CLASS
DERIVED FROM "DMI": top;
CHARACTERIZED BY serviceRequestPkg;
CONDITIONAL PACKAGES
"ITU-T Recommendation X.790": trAgentContactPersonAttributePkg
PRESENT IF "an instance supports it and the trAgentContactPersonObjectPkg is not present",

"ITU-T Recommendation X.790": trAgentContactPersonObjectPkg
PRESENT IF "an instance supports it and the trAgentContactPersonAttributePkg is not present",

```
        "ITU-T Recommendation X.790": trAlternateManagerContactPersonAttributePkg
        PRESENT IF "an instance supports it and the trAlternateManagerContactPersonObjectPkg",

        "ITU-T Recommendation X.790": trAlternateManagerContactPersonObjectPkg
        PRESENT  IF "an instance supports it and the trAlternateManagerContactPersonAttributePkg is not present",

        "ITU-T Recommendation X.790": trDialogPkg
        PRESENT IF "an instance supports it",

        "ITU-T Recommendation X.790": trManagerContactPersonAttributePkg
        PRESENT IF "an instance supports it and the trManagerContactPersonObjectPkg is not present",

        "ITU-T Recommendation X.790": trManagerContactPersonObjectPkg
        PRESENT IF "an instance supports it and the trManagerContactPersonAttributePkg is not present",

        negotiationPkg PACKAGE
        PRESENT IF "an instance supports it";

REGISTERED AS   {cnmObjectClass serviceRequest(21)};
```

8 Name Binding for Object Classes

8.1 Name Binding for Fault Management

8.1.1 Name Binding for Alarm reporting service

8.1.1.1 Network

The network object may contain recursively other sub-divided networks. The sub-divided network represents the part owned by the customer, i.e. the customer network. Also this network is sub-divided moreover in accordance with a customer's management policy. The following name binding may be applied.

```
network-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS network;
        NAMED BY
        SUPERIOR OBJECT CLASS network;
        WITH ATTRIBUTE network-MO-Name;
REGISTERED AS { cnmNameBinding cnmsNetwork-network-NB(1)};
```

8.1.1.2 CNM X.25 Entity

This object shall be contained by the Network (customer network) object.

```
cnmX25Entity-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS cnmX25Entity;
        NAMED BY
        SUPERIOR OBJECT CLASS network;
        WITH ATTRIBUTE cnmX25Entity-MO-Name;
REGISTERED AS { cnmNameBinding cnmX25Entity-network-NB(2)};
```

8.1.1.3 X.25 Termination Point

This object shall be contained by the Network (customer network) object.

```
x25TerminationPoint-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS x25TerminationPoint;
        NAMED BY
        SUPERIOR OBJECT CLASS cnmX25Entity ;
        WITH ATTRIBUTE x25TerminationPoint-MO-Name;
REGISTERED AS { cnmNameBinding x25TerminationPoint-network-NB(3)};
```

8.1.1.4 Equipment

This object shall be contained by the X.25 Termination Point object.

```
equipment-x25TerminationPoint-NB NAME BINDING
        SUBORDINATE OBJECT CLASS equipment;
        NAMED BY
        SUPERIOR OBJECT CLASS x25TerminationPoint ;
        WITH ATTRIBUTE equipment-MO-Name;
REGISTERED AS { cnmNameBinding equipment-x25TerminationPoint-NB(4)};
```

8.1.1.5 Managed Element

This object shall be contained by the Network (customer network) object.

```
managedElement-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS managedElement;
        NAMED BY
        SUPERIOR OBJECT CLASS network ;
        WITH ATTRIBUTE managedElement-MO-Name;
REGISTERED AS { cnmNameBinding managedElement-network-NB(5)};
```

8.1.1.6 Event Forwarding Discriminator

The Event Forwarding Discriminator object shall be contained by the Managed Element object.

```
eventForwardingDiscriminator-managedElement-NB NAME BINDING
        SUBORDINATE OBJECT CLASS eventForwardingDiscriminator;
        NAMED BY
        SUPERIOR OBJECT CLASS managedElement;
        WITH ATTRIBUTE eventForwardingDiscriminator-MO-Name;
REGISTERED AS { cnmNameBinding eventForwardingDiscriminator-managedElement-NB(6)};
```

8.1.2 Name Binding for Fault history service

This service is for further study.

8.1.3 Name Binding for Trouble report service

8.1.3.1 PDN Telecommunications Trouble Report

This object shall be contained by the network (customer network) object.

```
pdnTelecommunicationsTroubleReport-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS pdnTelecommunicationsTroubleReport;
        NAMED BY
        SUPERIOR OBJECT CLASS network;
        WITH ATTRIBUTE pdnTelecommunicationsTroubleReport-MO-Name;
REGISTERED AS { cnmNameBinding pdnTelecommunicationsTroubleReport-network-NB(7)};
```

8.1.3.2 Provider Trouble Report

This object shall be contained by the Network (customer Network) object. The name binding definition between the provider Trouble Report and network objects is imported from Recommendation X.790.

8.1.3.3 Trouble Report Format Definition

This object shall be contained by the network (customer Network) object. The name binding definition between the Trouble Report Format Definition and Network objects is imported from Recommendation X.790.

8.1.3.4 Repair Activity

This object shall be contained by the pdnTelecommunicationTroubleReport object.

```
repairActivity-pdnTelecommunicationTroubleReport-NB NAME BINDING
        SUBORDINATE OBJECT CLASS repairActivity;
        NAMED BY SUPERIOR OBJECT CLASS
                                pdnTelecommunicationTroubleReport;
        WITH ATTRIBUTE
                        repairActivity-pdnTelecommunicationTroubleReport-MO-Name;
REGISTERED AS { cnmNameBinding repairActivity-NB(8)};
```

8.1.3.5 PDN Trouble History Record

This object shall be contained by the log object.

```
pdnTroubleHistoryRecord-log-NB NAME BINDING
        SUBORDINATE OBJECT CLASS pdnTroubleHistoryRecord;
        NAMED BY
        SUPERIOR OBJECT CLASS log;
        WITH ATTRIBUTE pdnTroubleHistoryRecord-MO-Name;
REGISTERED AS { cnmNameBinding pdnTroubleHistoryRecord-log-NB(9)};
```

8.1.3.6 Contact

This object shall be contained by the network (customer network) object.

```
contact-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS contact;
        NAMED BY
        SUPERIOR OBJECT CLASS network;
        WITH ATTRIBUTE contact-MO-Name;
REGISTERED AS { cnmNameBinding contact-network-NB(10)};
```

8.1.3.7 Log

This object shall be contained by the managedElement object.

```
log-managedElement-NB NAME BINDING
        SUBORDINATE OBJECT CLASS log;
        NAMED BY
        SUPERIOR OBJECT CLASS managedElement;
        WITH ATTRIBUTE log-managedElement-MO-Name;
REGISTERED AS { cnmNameBinding log-managedElement-NB(11)};
```

8.1.4 Name Binding for Loop set-up service

This service is for further study.

8.1.5 Name Binding for Test host service

This service is for further study.

8.1.6 Name Binding for Protocol monitoring service

This service is for further study.

8.2 Name Binding for Configuration Management

8.2.1 Name Binding for Configuration Inquiry service

8.2.1.1 Network

The name binding for this service is the same as defined in 8.1.1.1.

8.2.1.2 CNM X.25 Entity

The name binding for this service is the same as defined in 8.1.1.2.

8.2.1.3 X.25 Termination Point

The name binding for this service is the same as defined in 8.1.1.3.

8.2.1.4 Equipment

The name binding for this service is the same as defined in 8.1.1.4.

8.2.1.5 X.25 Service Profile

This object shall be contained by the network (customer network) object.

```
x25ServiceProfile-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS x25ServiceProfile;
        NAMED BY
```

SUPERIOR OBJECT CLASS network;
WITH ATTRIBUTE x25ServiceProfile-MO-Name;
REGISTERED AS { cnmNameBinding x25ServiceProfile-network-NB(12)};

8.2.1.6 MLP Profile

This object shall be contained by the X.25 Service Profile object.

mlpProfile-x25ServiceProfile-NB NAME BINDING
SUBORDINATE OBJECT CLASS mlpProfile;
NAMED BY
SUPERIOR OBJECT CLASS x25ServiceProfile;
WITH ATTRIBUTE mlpProfile-MO-Name;
REGISTERED AS { cnmNameBinding mlpProfile-x25ServiceProfile-NB(13)};

8.2.1.7 SLP Profile

This object shall be contained by the X.25 Service Profile object.

slpProfile-x25ServiceProfile-NB NAME BINDING
SUBORDINATE OBJECT CLASS slpProfile;
NAMED BY
SUPERIOR OBJECT CLASS x25ServiceProfile;
WITH ATTRIBUTE slpProfile-MO-Name;
REGISTERED AS { cnmNameBinding slpProfile-x25ServiceProfile-NB(14)};

8.2.1.8 X.25 PVC Profile

This object shall be contained by the X.25 Service Profile object.

x25PvcProfile-x25ServiceProfile-NB NAME BINDING
SUBORDINATE OBJECT CLASS x25PvcProfile;
NAMED BY
SUPERIOR OBJECT CLASS x25ServiceProfile;
WITH ATTRIBUTE x25PvcProfile-MO-Name;
REGISTERED AS { cnmNameBinding x25PvcProfile-x25ServiceProfile-NB(15)};

8.2.1.9 CUG Profile

This object shall be contained by the Network (customer network) object.

cugProfile-network-NB NAME BINDING
SUBORDINATE OBJECT CLASS cugProfile;
NAMED BY
SUPERIOR OBJECT CLASS network;
WITH ATTRIBUTE cugProfile-MO-Name;
REGISTERED AS { cnmNameBinding cugProfile-network-NB(16)};

8.2.1.10 Hunt Group Profile

This object shall be contained by the Network (customer network) object.

hgProfile-network-NB NAME BINDING
SUBORDINATE OBJECT CLASS hgProfile;
NAMED BY
SUPERIOR OBJECT CLASS network;
WITH ATTRIBUTE hgProfile-MO-Name;
REGISTERED AS { cnmNameBinding hgProfile-network-NB(17)};

8.2.1.11 Customer

This object shall be contained by the Network (customer network) object.

customer-network-NB NAME BINDING
SUBORDINATE OBJECT CLASS customer;
NAMED BY
SUPERIOR OBJECT CLASS network;
WITH ATTRIBUTE customer-MO-Name;
REGISTERED AS { cnmNameBinding customer-network-NB(18)};

8.2.1.12 CNM User

This object shall be contained by the Customer object.

```
cnmUser-customer-NB NAME BINDING
        SUBORDINATE OBJECT CLASS cnmUser;
        NAMED BY
        SUPERIOR OBJECT CLASS customer;
        WITH ATTRIBUTE cnmUser-MO-Name;
REGISTERED AS { cnmNameBinding cnmUser-customer-NB(19)};
```

8.2.1.13 Contact

The name binding is defined in 8.1.3.6.

8.2.1.14 Location

This object shall be contained by the Network (customer network) object.

```
location-network-NB NAME BINDING
        SUBORDINATE OBJECT CLASS location;
        NAMED BY
        SUPERIOR OBJECT CLASS network;
        WITH ATTRIBUTE location-MO-Name;
REGISTERED AS { cnmNameBinding location-network-NB(20)};
```

8.2.2 Name Binding for CNM Reconfiguration service

All the name binding for this service is the same as defined in 8.2.1.

8.2.3 Name Binding for Ordering service

8.2.3.1 X.25 Service Profile

The name binding for this object is the same as defined in 8.2.1.5.

8.2.3.2 MLP Profile

The name binding for this object is the same as defined in 8.2.1.6.

8.2.3.3 SLP Profile

The name binding for this object is the same as defined in 8.2.1.7.

8.2.3.4 X.25 PVC Profile

The name binding for this object is the same as defined in 8.2.1.8.

8.2.3.5 CUG Profile

The name binding for this object is the same as defined in 8.2.1.9.

8.2.3.6 Hunt Group Profile

The name binding for this object is the same as defined in 8.2.1.10.

8.2.4 Name Binding for Systematic call redirection service

This service is for further study.

8.3 Name Binding for Accounting Management

8.3.1 Name Binding for Periodic billing service

This service is for further study.

8.3.2 Name Binding for Detailed accounting

This service is for further study.

8.4 Name Binding for Performance Management

8.4.1 Name Binding for Traffic information service

8.4.1.1 CNM X.25 Entity

The relationship between the CNM X.25 Entity object and the Network (customer network) object is defined in 8.1.1.2.

8.4.1.2 Current Packet Traffic Data

This object shall be contained by the CNM X.25 Entity object.

```
currentPacketTrafficData-cnmX25Entity-NB NAME BINDING
        SUBORDINATE OBJECT CLASS currentPacketTrafficData;
        NAMED BY
        SUPERIOR OBJECT CLASS cnmX25Entity;
        WITH ATTRIBUTE currentPacketTrafficData-MO-Name;
        CREATE;
        DELETE;
REGISTERED AS { cnmNameBinding currentPacketTrafficData-cnmX25Entity-NB(21)};
```

8.4.1.3 History Packet Traffic Data

This object shall be contained by the Current Packet Traffic Data object.

```
historyPacketTrafficData-currentPacketTrafficData-NB NAME BINDING
        SUBORDINATE OBJECT CLASS historyPacketTrafficData;
        NAMED BY
        SUPERIOR OBJECT CLASS currentPacketTrafficData;
        WITH ATTRIBUTE historyPacketTrafficData-MO-Name;
        CREATE;
        DELETE;
REGISTERED AS { cnmNameBinding historyPacketTrafficData-currentPacketTrafficData-NB(22)};
```

8.4.1.4 MLP Monitored Point

This object shall be contained by the CNM X.25 Entity object.

```
mlpMonitoredPoint-cnmX25Entity-NB NAME BINDING
        SUBORDINATE OBJECT CLASS mlpMonitoredPoint;
        NAMED BY
        SUPERIOR OBJECT CLASS cnmX25Entity;
        WITH ATTRIBUTE  mlpMonitoredPoint-MO-Name;
REGISTERED AS { cnmNameBinding mlpMonitoredPoint-cnmX25Entity-NB(23)};
```

8.4.1.5 Current MLP Traffic Data

This object shall be contained by the MLP Monitored Point object.

```
currentMlpTrafficData-mlpMonitoredPoint-NB NAME BINDING
        SUBORDINATE OBJECT CLASS currentMlpTrafficData;
        NAMED BY
        SUPERIOR OBJECT CLASS mlpMonitoredPoint;
        WITH ATTRIBUTE currentMlpTrafficData-MO-Name;
        CREATE;
        DELETE;
REGISTERED AS { cnmNameBinding currentMlpTrafficData-mlpMonitoredPoint-NB(24)};
```

8.4.1.6 History MLP Traffic Data

This object shall be contained by the Current MLP Traffic Data object.

```
historyMlpTrafficData-currentMlpTrafficData-NB NAME BINDING
        SUBORDINATE OBJECT CLASS historyMlpTrafficData;
        NAMED BY
        SUPERIOR OBJECT CLASS currentMlpTrafficData;
        WITH ATTRIBUTE historyMlpTrafficData-MO-Name;
        CREATE;
        DELETE;
REGISTERED AS { cnmNameBinding historyMlpTrafficData-currentMlpTrafficData-NB(25)};
```

8.4.1.7 X.25 Termination Point

The name binding for this object is defined in 8.1.1.3.

8.4.1.8 Current SLP Traffic Data

This object shall be contained by the X.25 Termination Point object.

```
currentSlpTrafficData-cnmX25Entity-NB NAME BINDING
        SUBORDINATE OBJECT CLASS currentSlpTrafficData;
        NAMED BY
        SUPERIOR OBJECT CLASS x25TerminationPoint;
        WITH ATTRIBUTE currentSlpTrafficData-MO-Name ;
        CREATE;
        DELETE;
REGISTERED AS { cnmNameBinding mlpMonitoredPoint-cnmX25Entity-NB(26)};
```

8.4.1.9 History SLP Traffic Data

This object shall be contained by the Current SLP Traffic Data object.

```
historyMlpTrafficData-currentMlpTrafficData-NB NAME BINDING
        SUBORDINATE OBJECT CLASS historySlpTrafficData;
        NAMED BY
        SUPERIOR OBJECT CLASS currentSlpTrafficData;
        WITH ATTRIBUTE historySlpTrafficData-MO-Name;
        CREATE;
        DELETE;
REGISTERED AS { cnmNameBinding historySlpTrafficData-currentSlpTrafficData-NB(27)};
```

8.4.2 Name Binding for Quality of Service information service

This service is for further study.

8.5 Name Binding for Security Management

8.5.1 Name Binding for Password change service

This service is for further study.

8.5.2 Name Binding for Access rights definition service

This service is for further study.

8.6 Name Binding for CNM Service Supporting Service

8.6.1 Service Request

The Service Request object shall be contained by the Managed Element object.

```
serviceRequest-managedElement NAME BINDING
        SUBORDINATE OBJECT CLASS  serviceRequest AND SUB-CLASSES;
        NAMED BY SUPERIOR OBJECT CLASS  "GMN": managedElement;
        WITH ATTRIBUTE serviceRequestId;
        CREATE
        WITH-REFERENCE-OBJECT,
        WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE sRChangeDenied;
REGISTERED AS   {cnmNameBinding serviceRequest-managedElement-NB(28)};
```

9 Definition of Packages

9.1 Packages for Fault Management

9.1.1 Packages for Alarm reporting service

There is no package definition specific for this service.

9.1.2 Packages for Fault history service

This service is for further study.

9.1.3 Packages for Trouble report service

There is no package definition specific for this service.

9.1.4 Packages for Loop set-up service

This service is for further study.

9.1.5 Packages for Test host service

This service is for further study.

9.1.6 Packages for Protocol monitoring service

This service is for further study.

9.2 Packages for Configuration Management

9.2.1 Packages for Configuration Inquiry service

9.2.1.1 X.25 Service Profile

```
x25ServiceProfile-P PACKAGE
        BEHAVIOUR x25ServiceProfile-B BEHAVIOUR
        DEFINED AS The service profile object represents the X.25 packet layer parameters (i.e. service profile) for each
        interface (DTE address). This object is created through the Service Request MO, by which subscription data are set
        to this object. Also replacement, addition and removal of service parameters or deletion are done through the
        Service Request MO. ;;
        ATTRIBUTES
        x25ServiceProfileId;
REGISTERED AS {cnmPackage x25ServiceProfile-P(1)};
```

9.2.1.2 PLE Profile

```
pleProfile-P PACKAGE
        BEHAVIOUR pleProfile-B BEHAVIOUR
        DEFINED AS This package represents the service profile of the X.25 packet layer protocol. Only GET operation is
        allowed.;,
        "NLMO": logicalChannelAssignmentsX25PLE-P-B;
        ATTRIBUTES
        "NLMO": localDTEAddress GET,
        "NLMO": protocolVersionSupported GET,
        mlpSubscription GET,
        "NLMO": cUG GET,
        "NLMO": incomingCallsBarredWithinCUG GET,
        "NLMO": outgoingCallsBarredWithinCUG GET,
        "NLMO": bilateralCUG GET,
        "NLMO": bilateralCUGwithOutgoingAccess GET,
        "NLMO": fastSelectAcceptance GET,
        "NLMO": flowControlnegotiationPermitted GET,
        "NLMO": flowControlParameterNegotiation GET,
        "NLMO": incomingCallBarred GET,
        "NLMO": interfaceMode GET,
        "NLMO": logicalChannelAssignments GET,
        "NLMO": outgoingCallsBarred GET,
        "NLMO": oneWayLogicalChannelIncoming GET,
        "NLMO": oneWayLogicalChannelOutgoing GET,
        "NLMO": throughputClassNegotiation GET,

        "NLMO": callDeflectionSubscription GET,
        "NLMO": chargingInformation GET,
        "NLMO": nonStandardDefaultPacketSizes GET,
        "NLMO": defaultThroughputClassAssignment GET,
        "NLMO": defaultThroughputClass GET,
        "NLMO": defaultWindowSize GET,
        "NLMO": defaultPacketSize GET,
```

"NLMO": nonStandardDefaultWindowSizes GET,
"NLMO": nUISubscription GET,
"NLMO": onlineFacilityRegistration GET,
"NLMO": packetRetransmission GET,
"NLMO": extendedPacketSequencing GET,
"NLMO": rPOASubscription GET,

"NLMO": callRedirection GET,
"NLMO": dBitModification GET,
"NLMO": huntGroup GET,
"NLMO": localChargingPrevention GET,
"NLMO": nUIOverride GET,
"NLMO": reverseChargingAcceptance GET;

NOTIFICATIONS
"DMI": objectCreation,
"DMI": objectDeletion,
"DMI": attributeValueChange;

REGISTERED AS {cnmPackage pleProfile-P(2)};

9.2.1.3 SLP Profile

slpProfile-P PACKAGE
BEHAVIOUR slpProfile-B BEHAVIOUR
DEFINED AS This package represents subscription data, i.e. the service profile of the SLP that supports the packet layer entity. The linkage between the slp and x25ServiceProfile objects are done by the dTEAddress attribute. This package includes also the profile of physical properties related to the access line.;;
ATTRIBUTES
slpProfileId GET,
"NLMO": localDTEAddress GET,
"ITU-T Rec. X.281 | ISO/IEC 13642": transmissionRate GET,
"DLMO": sequenceModulus GET;
REGISTERED AS {cnmPackage slpProfile-P(3)};

9.2.1.4 SLP Timers

slpTimersProfile-P PACKAGE
BEHAVIOUR slpTimersProfile-B BEHAVIOUR
DEFINED AS provides the set of optional timers used for slp communication;;
ATTRIBUTES
"DLMO": k GET,
"DLMO": n1 GET,
"DLMO": n2 GET,
"DLMO": t1Timer GET,
"DLMO": t2Timer GET,
"DLMO": t4Timer GET;
REGISTERED AS {cnmPackage slpTimersProfile-P(4)};

9.2.1.5 Customer

customerPkg PACKAGE
BEHAVIOUR
customerPkgDefinition BEHAVIOUR
DEFINED AS "The Customer managed object class refers to a corporation, organization or individual with telecommunication needs to be satisfied via a private network, provider services, or a combination of a private network and provider services",
customerPkg-B BEHAVIOUR
DEFINED AS "Attributes whose values are names of other managed object instances (e.g. opNetworkList) must have names of managed objects which already exist or a value of null, if permitted for that attribute.
Conditions under which an attributeValueChange notification is emitted are stated in the behaviour of the appropriate package or attribute. In absence of such a statement in the behaviour, the attribute does not cause an attributeValueChange notification to be emitted. All attributeValueChange notifications shall include the Attribute Identifier List parameter.
A value for the customerID attribute can only be provided when the object is created. Furthermore, once the object is created, the value of customerID may not be modified (i.e. the instance cannot be rename). When customerTitle is used for naming, the customerID attribute has a NULL value.",

```
        commonCreation-B BEHAVIOUR
        DEFINED AS "Unless otherwise specified, all attributes can be set by an M-CREATE";
        ATTRIBUTES
        customerID
            PERMITTED VALUES cnmAsn1Module.SystemIdRange
            GET,
        customerTitle GET;
REGISTERED AS {cnmPackage customerPkg(5)};
```

9.2.1.6 Contact List

```
contactList-P PACKAGE
        BEHAVIOUR
        contactListPkgDefinition BEHAVIOUR
            DEFINED AS "The Contact List Attribute identifies who (person or organization) should be contacted about
            the resource.",
        contactListPkgBehaviour BEHAVIOUR
            DEFINED AS "If the AttributeValueChange notification is defined for the managed object class using this
            package, this notification is emitted when the contactList attribute change value.";
        ATTRIBUTES
        contactList
            PERMITTED VALUES cnmAsn1Module.AnyNamesRange
            GET-REPLACE     ADD-REMOVE;
REGISTERED AS {cnmPackage customer-P(6)};
```

9.2.1.7 Location

```
locationPkg PACKAGE
        BEHAVIOUR
        locationPkgDefinition,
        locationPkgBehaviour,
        commonCreateBehaviour;
        ATTRIBUTES
        geographicCoordinates
            PERMITTED VALUES cnmAsn1Module.GeographicCoordinatesRange
            GET-REPLACE,
        locationID
            PERMITTED VALUES cnmAsn1Module.SystemIdRange
            GET,
        locationDetails
            PERMITTED VALUES cnmAsn1Module.LocationDetailesRange
            GET-REPLACE,
        locationTitle GET,
        locationType GET-REPLACE,
        postalAddress
            PERMITTED VALUES cnmAsn1Module.PostalAddressRange
            GET-REPLACE;
REGISTERED AS {cnmPackage locationPkg(7)};
```

9.2.1.8 Type Text

```
typeTextPkg PACKAGE
        BEHAVIOUR
        typeTextPkgDefiniton BEHAVIOUR
            DEFINED AS "This package serves to supplement and refine individual manages object class attribute.";,
        typeTextPkgBehaviour BEHAVIOUR
        DEFINED AS "If the attributeValueChange notification is defined for the managed object class using this package,
        this notification is emitted when the typeText attribute change value.";
        ATTRIBUTES
        typeText
            PERMITTED VALUES cnmAsn1Module.GraphicString32
            GET-REPLACE;

REGISTERED AS {cnmPackage typeTextPkg(8)};
```

9.2.1.9 Customer Types

```
customerTypesPkg PACKAGE
        BEHAVIOUR
        customerTypesPkgDefinition BEHAVIOUR
            DEFINED AS "This Package contains one attribute that provides information about the types of customer. ";,
                customerTypesPkg-B BEHAVIOUR
            DEFINED AS "If the attributeValueChange notification is defined for the managed object class using this
                package, this notification is emitted when the customerTypes attribute changes value. ";
        ;
        ATTRIBUTES
        customerTypes GET-REPLACE ADD-REMOVE;
REGISTERED AS {cnmPackage customerTypesPkg(9) };
```

9.2.1.10 OP Network List

```
opNetworkListPkg PACKAGE
        BEHAVIOUR
        opNetworkListPkgDefinition BEHAVIOUR
            DEFINED AS "The opNetworkList attribute indicates what networks use or are dependent on the resource.
                ";,
        opNetworkListPkg-B BEHAVIOUR
            DEFINED AS "If the attributeValueChange notification is defined for the managed object class using this
                package, this notification is emitted when the opNetworkList attribute change value. ";;
        ATTRIBUTES
        opNetworkList
            PERMITTED VALUES cnmAsn1Module.AnyNamesRange
            GET-REPLACE
            ADD-REMOVE;
REGISTERED AS {cnmPackage opNetworkListPkg(10) };
```

9.2.1.11 Service List

```
serviceListPkg PACKAGE
        BEHAVIOUR
        serviceListPkgDefinition BEHAVIOUR
            DEFINED AS "ServiceList attribute identifies any services that are supported by the resource. ";,
                serviceListPkg-B BEHAVIOUR
            DEFINED AS "If the attributeValueChange notification is defined for the managed object class using this
                package, this notification is emitted when the serviceList attribute changes value. ";;
        ATTRIBUTES
        serviceList
            PERMITTED VALUES cnmAsn1Module.AnyNamesRange
            GET-REPLACE ADD-REMOVE;
REGISTERED AS {cnmPackage serviceListPkg(11)};
```

9.2.2 Packages for CNM Reconfiguration service

The same packages as defined in 9.2.1 for service profiles are also used for the CNM Reconfiguration service.

9.2.3 Packages for Systematic call redirection service

This service is for further study.

9.3 Packages for Accounting Management

9.3.1 Packages for Periodic billing service

This service is for further study.

9.3.2 Packages for Detailed accounting

This service is for further study.

9.4 Packages for Performance Management

9.4.1 Packages for Traffic information service

There is no package definition specific for this service.

9.4.2 Packages for Quality of Service information service

This service is for further study.

9.5 Packages for Security Management

9.5.1 Packages for Password change service

This service is for further study.

9.5.2 Packages for Access rights definition service

This service is for further study.

9.6 Packages for CNM Service Usage Management

9.6.1 Negotiation

```
negotiationPkg PACKAGE
        BEHAVIOUR negotiationBehaviour BEHAVIOUR
        DEFINED AS
        "The negotiationPkg provides the means for the manager and the agent to negotiate the parameters of the request";
        ATTRIBUTES
        limitValidityDate     GET-REPLACE;
REGISTERED AS   {cnmPackage     negotiationPkg(12)};
```

9.6.2 Service Request

```
serviceRequestPkg PACKAGE
        BEHAVIOUR

        serviceRequestBehaviour BEHAVIOUR
        DEFINED AS "When an instance of the serviceRequest MO class is created, all mandatory attributes must be
        supplied. The attribute value change notification is emitted when any of the attributes is changed either by the
        manager or the agent. The object creation notification is generated when an instance of the serviceRequest is
        deleted.",

        serviceRequestDefinition BEHAVIOUR
        DEFINED AS "The serviceRequest provides the means for a manager to ask for operations on objects of the
        interoperable interface that are not directly accessible. It contains the basic attributes that allow a manager to ask
        for an operation at a given date. It allows an agent to negotiate with the manager the appropriate conditions or the
        date using the negotiationPkg and the status attribute. When needed, the dialogue attribute is needed in the same
        way as in the ITU-T Recommendation X.790: telecommunicationsTroubleReport. The dateRequest attribute is used
        by the manager to indicate when he wants the service to be provided (dontCare, now, at a precise date). The
        operationList attribute allows the manager to specify in details the CMISE operations he wants to be performed. ";
        serviceRequestDefinition;
        ATTRIBUTES
        serviceRequestId    GET,
        status              INITIAL VALUE    cnmAsn1Module.initialStatus
                            GET-REPLACE,
        dateRequest         DEFAULT VALUE cnmAsn1Module.defaultDateRequest
                            GET-REPLACE,
        operationList       DEFAULT VALUE cnmAsn1Module.defaultOperationList
                            GET-REPLACE,
        resultList          INITIAL VALUE    cnmAsn1Module.initialResultList
                            GET,
        processingMode      DEFAULT VALUE
                            cnmAsn1Module.defaultProcessingMode
                            GET-REPLACE;
        NOTIFICATIONS
        "DMI": attributeValueChange,
        "DMI": objectCreation,
        "DMI": objectDeletion;
REGISTERED AS {cnmPackage serviceRequestPkg(13)};
```

10 Definition of Attributes

10.1 Attributes for Name Binding

10.1.1 CNM User MO Name

```
cnmUser-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR cnmUser-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the cnmUser-MO;;
REGISTERED AS{ cnmAttribute cnmUser-MO-Name(1)};
```

10.1.2 CNM X.25 Entity MO Name

```
cnmX25Entity-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR cnmX25Entity-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the cnmX25Entity-MO;;
REGISTERED AS{ cnmAttribute cnmX25Entity-MO-Name(2)};
```

10.1.3 Contact MO Name

```
contact-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR contact-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the contact-MO;;
REGISTERED AS{ cnmAttribute contact-MO-Name(68)};
```

10.1.4 CUG Profile MO Name

```
cugProfile-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR cugProfile-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the cugProfile-MO;;
REGISTERED AS{ cnmAttribute cugProfile-MO-Name(3)};
```

10.1.5 Current MLP Traffic Data MO Name

```
currentMlpTrafficData-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR currentMlpTrafficData-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the currentMlpTrafficData-MO;;
REGISTERED AS{ cnmAttribute currentMlpTrafficData-MO-Name(4)};
```

10.1.6 Current Packet Traffic Data MO Name

```
currentPacketTrafficData-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR currentPacketTrafficData-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the currentPacketTrafficData-MO;;
REGISTERED AS{ cnmAttribute currentPacketTrafficData-MO-Name(5)};
```

10.1.7 Current SLP Traffic Data MO Name

```
currentSlpTrafficData-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR currentSlpTrafficData-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the currentSlpTrafficData-MO;;
REGISTERED AS{ cnmAttribute currentSlpTrafficData-MO-Name(6)};
```

10.1.8 Customer MO Name

```
customer-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR customer-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the customer-MO;;
REGISTERED AS{ cnmAttribute customer-MO-Name(7)};
```

10.1.9 Equipment MO Name

```
equipment-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR equipment-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the equipment-MO;;
REGISTERED AS{ cnmAttribute equipment-MO-Name(8)};
```

10.1.10 Event Forwarding Discriminator MO Name

The Event Forwarding Discriminator MO name is imported from CCITT Rec. X.721 | ISO/IEC 10165-2.

10.1.11 History MLP Traffic Data MO Name

```
historyMlpTrafficData-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR historyMlpTrafficData-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the historyMlpTrafficData-MO;;
REGISTERED AS{ cnmAttribute historyMlpTrafficData-MO-Name(9)};
```

10.1.12 History Packet Traffic Data MO Name

```
historyPacketTrafficData-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR historyPacketTrafficData-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the historyPacketTrafficData-MO;;
REGISTERED AS{ cnmAttribute historyPacketTrafficData-MO-Name(10)};
```

10.1.13 History SLP Traffic Data MO Name

```
historySlpTrafficData-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR historySlpTrafficData-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the historySlpTrafficData-MO;;
REGISTERED AS{ cnmAttribute historySlpTrafficData-MO-Name(11)};
```

10.1.14 Hunt Group Profile MO Name

```
hgProfile-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR hgProfile-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the hgProfile-MO;;
REGISTERED AS{ cnmAttribute hgProfile-MO-Name(12)};
```

10.1.15 Location MO Name

```
location-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR location-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the location-MO;;
REGISTERED AS{ cnmAttribute location-MO-Name(13)};
```

10.1.16 Log MO Name

```
log-managedElement-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR log-managedElement-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the log-MO;;
REGISTERED AS{ cnmAttribute log-managedElement-MO-Name(14)};
```

10.1.17 MLP Profile MO Name

```
mlpProfile-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR mlpProfile-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the mlpProfile-MO;;
REGISTERED AS{ cnmAttribute mlpProfile-MO-Name(15)};
```

10.1.18 MLP Monitored Point MO Name

```
mlpMonitoredPoint-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR mlpMonitoredPonit-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the MlpMonitoredPoint-MO;;
REGISTERED AS{ cnmAttribute MlpMonitoredPoint-MO-Name(16)};
```

10.1.19 Managed Element MO Name

```
managedElement-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR managedElement-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the managedElement-MO;;
REGISTERED AS{ cnmAttribute managedElement-MO-Name(17)};
```

10.1.20 Network MO Name

The Network MO name is imported from Recommendation M.3100.

10.1.21 PDN Trouble History Record MO Name

```
pdnTroubleHistoryRecord-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR pdnTroubleHistoryRecord-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the pdnTroubleHistoryRecord-MO;;
REGISTERED AS{ cnmAttribute pdnTroubleHistoryRecord-MO-Name(18)};
```

10.1.22 SLP Profile MO Name

```
slpProfile-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR slpProfile-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the slpProfile-MO;;
REGISTERED AS{ cnmAttribute slpProfile-MO-Name(19)};
```

10.1.23 PDN Telecommunication Trouble Report MO Name

```
pdnTelecommunicationsTroubleReport-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR pdnTelecommunicationsTroubleReport-MO-Name-B BEHAVIOUR
        DEFINED AS "The naming attribute for the pdnTelecommunicationsTroubleReport-MO";;
REGISTERED AS{ cnmAttribute pdnTelecommunicationsTroubleReport-MO-Name(20)};
```

10.1.24 X.25 Termination MO Name

```
x25TerminationPoint-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR x25TerminationPoint-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the x25TerminationPoint-MO;;
REGISTERED AS{ cnmAttribute x25TerminationPoint-MO-Name(21)};
```

10.1.25 X.25 Service Profile MO Name

```
x25ServiceProfile-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR x25ServiceProfile-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the x25ServiceProfile-MO;;
REGISTERED AS{ cnmAttribute x25ServiceProfile-MO-Name(22)};
```

10.1.26 X.25 PVC Profile MO Name

```
x25PvcProfile-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR x25PvcProfile-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the x25PvcProfile-MO;;
REGISTERED AS{ cnmAttribute x25PvcProfile-MO-Name(23)};
```

10.1.27 Repair Activity MO Name

```
repairActivity-pdnTelecommunicationTroubleReport-MO-Name ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR repairActivity-pdnTelecommunicationTroubleReport-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the repairActivity-pdnTelecommunicationTroubleReport-MO;;
REGISTERED AS{cnmAttribute repairActivity-pdnTelecommunicationTroubleReport-MO-Name(67)};
```

10.2 Attributes for Objects Identifier

10.2.1 CNM User Identifier

```
cnmUserId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR cnmUserId-B BEHAVIOUR
        DEFINED AS The naming this instance of cnmUser object or sub-class;;
REGISTERED AS{ cnmAttribute cnmUserId(24)};
```

10.2.2 CNM X.25 Entity Identifier

```
cnmX25EntityId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR cnmX25EntityId-B BEHAVIOUR
        DEFINED AS The naming this instance of cnmX25Entity object or sub-class;;
REGISTERED AS{ cnmAttribute cnmX25EntityId(25)};
```

10.2.3 CUG Profile Identifier

```
cugProfileId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR cugServiceProfileId-B BEHAVIOUR
        DEFINED AS The naming this instance of cugProfile MO or sub-class;;
REGISTERED AS{ cnmAttribute cugServiceProfileId(26)};
```

10.2.4 Customer Identifier

```
customerID ATTRIBUTE
        DERIVED FROM "CCITT Rec. X.721 | ISO/IEC 10165-2:1992 " : systemId;
        MATCHES FOR EQUALITY;
        BEHAVIOUR customerID-B BEHAVIOUR
        DEFINED AS "The customer attribute is one of the distinguishing attributes in the customer managed
            object class .";;
REGISTERED AS {cnmAttribute customerId(27)};
```

10.2.5 Hunt Group Profile Identifier

```
hgProfileId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR hgProfileId-B BEHAVIOUR
        DEFINED AS The naming this instance of hgProfile MO or sub-class;;
REGISTERED AS{ cnmAttribute hgServiceProfileId(28)};
```

10.2.6 MLP Monitored Point Identifier

```
mlpMonitoredPointId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR mlpMonitoredPointId-B BEHAVIOUR
        DEFINED AS The naming this instance of mlpMonitoredPoint object or sub-class;;
REGISTERED AS{ cnmAttribute mlpMonitoredPointId(29)};
```

10.2.7 MLP Profile Identifier

```
mlpProfileId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR mlpProfileId-B BEHAVIOUR
        DEFINED AS The naming this instance of mlpProfile object or sub-class;;
REGISTERED AS{ cnmAttribute mlpProfileId(30)};
```

10.2.8 Service Request Id

```
serviceRequestId ATTRIBUTE
        DERIVED FROM "CCITT Recommendation M.3100": NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR serviceRequestIdBehaviour BEHAVIOUR
        DEFINED AS "The serviceRequestId is an attribute type whose distinguished value can be used as an RDN when
        naming an instance of the serviceRequest object class";
REGISTERED AS   {cnmAttribute serviceRequest(31)};
```

10.2.9 SLP Profile Identifier

```
slpProfileId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR slpProfileId-B BEHAVIOUR
        DEFINED AS The naming this instance of slpProfile object or sub-class;;
REGISTERED AS{ cnmAttribute slpProfileId(32)};
```

10.2.10 X.25 PVC Profile Identifier

```
x25PvcProfileId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR x25PvcProfileId-B BEHAVIOUR
        DEFINED AS The naming this instance of x25PvcProfile object or sub-class;;
REGISTERED AS{ cnmAttribute x25PvcProfileId(33)};
```

10.2.11 X.25 Termination Point Identifier

```
x25TerminationPointId  ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR x25TerminationPointId-B BEHAVIOUR
        DEFINED AS The naming this instance of TerminationPoint object or sub-class;;
REGISTERED AS{ cnmAttribute x25TerminationPointId(34)};
```

10.2.12 X.25 Service Profile Identifier

```
x25ServiceProfileId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicString;
        MATCHES FOR Equality, Substrings;
        BEHAVIOUR x25ServiceProfileId-B BEHAVIOUR
        DEFINED AS The naming this instance of x25ServiceProfile object or sub-class;;
REGISTERED AS{ cnmAttribute x25ServiceProfileId(35)};
```

10.3 Other Attributes

10.3.1 Contact List

```
contactList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX      cnmAsn1Module.AnyNamesBase;
        MATCH FOR SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR
        contactList-B BEHAVIOUR
            DEFINED AS "The contactList attribute provides managed object instance information for one or more
            contacts. The following object classes (or any their sub-classes or allomorphic classes) are valid as contacts:
            "Recommendation X.790": Contact. The SET-COMPARISON and / or SET-INTERSECTION matching rules
            may not be supported by some managed object instances which include this attribute.";
REGISTERED AS {cnmAttribute contactList(36)};
```

10.3.2 Interlock Code

```
interlockCode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.InterlockCode;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        interlockCode-B BEHAVIOUR
            DEFINED AS "This attribute represents the interlock code of a CUG.";
REGISTERED AS {cnmAttribute interlockCode(65) };
```

10.3.3 CUG Index

```
cugIndex ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.Integer;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        cugIndex-B BEHAVIOUR
            DEFINED AS "The cugIndex attribute identifies each closed user group when a customer subscribes to
            multiple CUGs.";
REGISTERED AS {cnmAttribute cugIndex(66)};
```

10.3.4 Customer Title

```
customerTitle ATTRIBUTE
        DERIVED FROM "DMI": systemTitle;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        customerTitle-B BEHAVIOUR
            DEFINED AS "The customerTitle attribute is one of the distinguishing attributes in the Customer Managed
            object class for use as described in 6.3 of CCITT Rec. X.720 | ISO/IEC 10165-1.";
REGISTERED AS {cnmAttribute customerTitle(37)};
```

10.3.5 Customer Types

```
customerTypes ATTRIBUTES
        WITH ATTRIBUTES SYNTAX cnmAsn1Module.Customertypes;
        MATCHES FOR EQUALITY,
        SET-COMPARISON,
        SET-INTERSECTION;
        BEHAVIOUR  customerTypes-B BEHAVIOUR
            DEFINED AS "The customerType attribute identifies the types of customer. ";;
REGISTERED AS {cnmAttribute customerTypes(38)};
```

10.3.6 Date Request

```
dateRequest ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.DateRequest;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        dateRequestBehaviour BEHAVIOUR
        DEFINED AS "The dateRequest attribute provides the means for the manager to ask for a special date, when he
        wants the service to be provided, and for the agent to inform the manager that this date is not acceptable, giving
        another date";
REGISTERED AS   {cnmAttribute dateRequest(39)};
```

10.3.7 DTE Address List

```
dTEAddressList
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.DTEAddressList;
        MATCHES FOR EQUALITY;
        BEHAVIOUR dTEAddressList-B BEHAVIOUR
        DEFINED AS "A set of DTE addresses that belong to the same HG.";;
REGISTERED AS {cnmAttribute dTEAddressList(40)}
```

10.3.8 Geographic Coordinates

```
geographicCoordinates ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GeographicCoordinates;
        MATCHES FOR EQUALITY;
        BEHAVIOUR geographicCoosinates-B BEHAVIOUR
        DEFINED AS "The geographicCoordinates attribute identifies the type of geographic coordinates and the
        geographic coordinates. Four types of geographic coordinates are defined.
            The latitude-longitude coordinates type refers to position on the earth's surface as measured in angular
        distance from the equator and the meridian which runs between the north and south pole through Greenwich,
        England.
            The npa-nxx coordinates types refers to a telephone number npa identifies the North America numbering plan
        area (i.e. area code), and nxx identifiers the exchange or central office cite.
            The v-h coordinates type refers to a vertical and horizontal coordinate system used and originated by the bell
        System in north America to identify the location of central offices and equipment.
            The country-city type refers to the international country and city dialing codes.";;
REGISTERED AS{cnmAttribute geographicCoordinates(41)};
```

10.3.9 Hunt Group Address

```
hgAddress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX NLM.DTEAddress;
        MATCHES FOR EQUALITY;
        BEHAVIOUR hgAddress-B BEHAVIOUR
        DEFINED AS "The DTE address of the main member of a hunt group expressed as
        Recommendations X.121, E.164, etc.address.";;
REGISTERED AS {cnmAttribute hgAddress(42)}
```

10.3.10 Limit Validity Date

```
limitValidityDate ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.Date;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        limitValidityDateBehaviour BEHAVIOUR
```

```
        DEFINED AS "This date indicates the date when the proposed attributes will not be valid anymore",
        negotiationBehaviour BEHAVIOUR
        DEFINED AS
        "The negotiationPkg provides the means for the manager and the agent to negotiate the parameters of the request";
REGISTERED AS   {cnmAttribute limitValidityDate(43)};
```

10.3.11 Location Detail

```
locationDetails ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.LocationDetails;
        MATCHES FOR EQUALITY, SUBSTRINGS;
        BEHAVIOUR locationDetails-B BEHAVIOUR
        DEFINED AS "The locationDetails attribute provides additional information regarding the location.";;
REGISTERED AS {cnmAttribute locationID(44)};
```

10.3.12 Location ID

```
locationID ATTRIBUTE
        DERIVED FROM "CCITT Rec. X.721 | ISO/IEC 10165-2": systemID;
        MATCHES FOR EQUALITY;
        BEHAVIOUR locationID-B BEHAVIOUR
        DEFINED AS "The locationID attribute is one of the distinguishing attributes of the location managed object
            class.";;
REGISTERED AS {cnmAttribute locationID(45)};
```

10.3.13 Location Title

```
locationTitle ATTRIBUTE
        DERIVED FROM "CCITT Rec. X.721 | ISO/IEC 10165-2": systemTitle;
        BEHAVIOUR locationTitle-B BEHAVIOUR
        DEFINED AS "The locationTitle attribute is one of the distinguishing attributes in the Location managed object
            class for use as described in 6.3 of CCITT Rec. X.720 | ISO/IEC 10165-1.";;
REGISTERED AS {cnmAttribute locationTitle(46)};
```

10.3.14 Location Type

```
locationType ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.LocationType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR locationType-B BEHAVIOUR
        DEFINED AS "The locationType attribute shall indicate the type of location.";;
REGISTERED AS {cnmAttribute locationType(47)};
```

10.3.15 MLP Frames Outside Window Guard

```
mlpFramesOutsideWindowGuard ATTRIBUTE
        DERIVED FROM "GMI": nonwrapping64bitCounter;
        BEHAVIOUR mlpFramesOutsideWindowGuard-B BEHAVIOUR
        DEFINED AS "Counter: Total number of MLP frames outside the window guard that have been received";
REGISTERED AS {cnmAttribute mlpFramesOutsideWindowGuard(48)};
```

10.3.16 MLP Frames Received

```
mlpFramesReceived ATTRIBUTE
        DERIVED FROM "GMI": nonwrapping64bitCounter;
        BEHAVIOUR mlpFramesReceived-B BEHAVIOUR
        DEFINED AS "Counter: Total number of MLP frames received.";
REGISTERED AS {cnmAttribute mlpFramesReceived(49)};
```

10.3.17 MLP Frames Sent

```
mlpFramesSent  ATTRIBUTE
        DERIVED FROM "GMI": nonwrapping64bitCounter;
        BEHAVIOUR mlpFramesSent-B BEHAVIOUR
        DEFINED AS "Counter: Total number of MLP frames sent";
REGISTERED AS {cnmAttribute mlpFramesSent (50)};
```

10.3.18 MLP Subscription

```
mlpSubscription ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.Boolean:
        MATCHES FOR EQUALITY;
        BEHAVIOUR mlpSubscription-B BEHAVIOUR
        DEFINED AS This attribute identifies whether or not the MLP service is  subscribed to. Expressed as a boolean
        where value of 'True' indicates subscription;;
REGISTERED AS {cnmAttribute mlpSubscription(51)};
```

10.3.19 Operation List

```
operationList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.OperationList;
        MATCHES FOR EQUALITY;
REGISTERED AS   {cnmAttribute operationList(55)};
```

10.3.20 Postal Address

```
postalAddress ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.PostalAddress;
        MATCHES FOR EQUALITY;
        BEHAVIOUR postalAddress-B BEHAVIOUR
            DEFINED AS "The postalAddress attribute specifies the address information required for the physical
            delivery of postal messages by the postal authority to the named object. The postal address is limited to six(6)
            lines of thirty(30) characters each, including a Postal Country Name. Normally the information contained in
            such an address could include an addressee's name, street address, city, state or province, postal code and
            possibly a post office box number depending on the specific requirements of the named object. Only the
            GraphicString choice defined in the selectedAttributesType module defined in Recommendation X.520 must be
            supported.";;
REGISTERED AS {cnmAttribute postalAddress(56)};
```

10.3.21 OP Network List

```
opNetworkList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.AnyNamesBase;
        MATCHES FOR SET-COMPARISON,
        SET-INTERSECTION;
        BEHAVIOUR opNetworkList-B BEHAVIOUR
            DEFINED AS "The opNetworkList attribute shall provide managed object instance information about a set of
            networks. The following object class (or any of their sub-classes or allomorphic classes) are valid as networks.
            The SET-COMPARISON and/or SET-INTERSECTION matching rules may not be supported by some
            managed object instances see 10.3.24 which include this attribute.";;
REGISTERED AS { cnmAttribute opNetworkList(57)};
```

10.3.22 Processing Mode

```
processingMode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.ProcessingMode;
        MATCHES FOR EQUALITY;
REGISTERED AS   {cnmAttribute processingMode(58)};
```

10.3.23 Result List

```
resultList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.ResultList;
        MATCHES FOR EQUALITY;
REGISTERED AS   {cnmAttribute resultList(59)};
```

10.3.24 Service List

```
serviceList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.AnyNamesBase;
        MATCHES FOR SET-COMPARISON;
        BEHAVIOUR service-B BEHAVIOUR
            DEFINED AS "The ServiceList attribute provides managed object instance information about one or more
                services. The following object classes (or any of their sub-classes or allomorphic classes) are valid as
                services. The SET-COMPARISON and/or SET-INTERSECTION matching rules may not be supported
                by some managed object instances which include this attribute. ";;
REGISTERED AS {cnmAttribute serviceList(60)};
```

10.3.25 Sub-Organization Object List

```
suborganizationObjectList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.SuborganizationObjectList;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        suborganizationObjectList-B BEHAVIOUR
        DEFINED AS "This attribute indicates objects that belong to a customer’s suborganization";
REGISTERED AS   {cnmAttribute suborganizationObjectList(61)};
```

10.3.26 Status

```
status ATTRIBUTE
        WITH ATTRIBUTE SYNTAX   cnmAsn1Module.Status;
        MATCHES FOR EQUALITY;
        BEHAVIOUR
        statusBehaviour BEHAVIOUR
        DEFINED AS "This attribute indicates the status or phase of the request";
REGISTERED AS   {cnmAttribute status(62)};
```

10.3.27 Trouble Type PSPDN

```
troubleTypePspdn ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.TroubleTypePspdn;
        MATCHES FOR EQUALITY;
        BEHAVIOUR troubleTypePspdn-B BEHAVIOUR
        DEFINED AS "This attribute represents types of trouble for PDNs. It may or may not supersede the trouble type
        attribute of Recommendation X.790."
REGISTERED AS { cnmAttribute troubleTypePspdn (63)}
```

10.3.28 Type Text

```
typeText ATTRIBUTE
        WITH ATTRIBUTE SYNTAX cnmAsn1Module.GraphicStringBase;
        MATCH FOR EQUALITY, SUBSTRINGS;
        BEHAVIOUR
        typeTextBehaviour BEHAVIOUR
            DEFINED AS "The typeText attribute serves to supplement and refine individual managed object class
            attributes. If none of the named items defined for the ’type’ attribute are appropriate, or the ’type’ attribute
            requires refinement, the typeText attribute contains supplemental information. ";
REGISTERED AS {cnmAttribute typeText(64)};
```

10.4 Attributes for further studying services

The following services are for further study. The attributes for them have not yet been defined:

- Access rights definition service;
- Cancellation service;
- Detailed accounting service;
- Fault history service;
- Inventory inquiry service;
- Loop set-up service;
- Network statistic service;
- Password change service;
- Periodic billing service;
- Protocol monitoring service;
- Quality of Service information service;
- Quota control service;
- Real time changing information service;
- Systematic call redirection service;
- Test host service.

10.5 Services that define no attribute on this Recommendation

No attributes are defined for the following services. Several attributes defined in other clauses are referenced for these services:

- CNM Reconfiguration service;
- Service ordering service.

11 Definition of Notifications

Currently, no Notifications are defined in this Recommendation.

Notifications defined in CCITT Rec. X.721 | ISO/IEC 10165-2 are derived and incorporated into managed object classes that emit alarms. They are:

- Attribute Value Change;
- Communication Alarm;
- Equipment Alarm;
- Environmental Alarm;
- Object Creation;
- Object Deletion;
- Quality of Service Alarm; and
- Processing Error Alarm.

12 Definition of Parameters

12.1 Service Request Change Denied

```
sRChangeDenied PARAMETER
        CONTEXT SPECIFIC-ERROR;
        WITH SYNTAX cnmAsn1Module.SRChangeDenied;
        BEHAVIOUR sRChangeDenied-B BEHAVIOUR
            DEFINED AS "This error message is sent to the manager when the manager attempts to change a service
            request which is not in an appropriate state to accept the change.";;
REGISTERED AS {cnmParameter sRChangeDenied(1) };
```

13 Definitions of Action Types

Currently, no Action Types are imported or defined for the use of this Recommendation.

14 ASN.1 Production Definitions

```
cnmAsn1Module {itu-t(0) recommendation(0) x(24) 162 cnmAsn1Module(2) version1(1) };

DEFINITIONS IMPLICIT TAGS ::= BEGIN

EXPORTS everything

IMPORTS
GroupObjects, ObservedValue, PerceivedSeverity
FROM Attribute-ASN1 Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1}
SetInfoStatus, AttributeId, ObjectInstance, ActionArgument, CreateArgument, DeleteArgument, GetArgument, SetArgument
FROM CMIP-1 Module {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)}
NameType
FROM ASN1DefinedTypesModule { ccitt (0) recommendation (0) m (13) gnm
(3100) informationModel (0) asn1Modules (2) asn1DefinedTypesModule (0) }
dTEAddress
FROM NLM {joint-iso-ccitt network-layer(15) management(0) nLM(20)
asn1Module(2) 0} ;
```

```
cnmObjectClass          OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmObjectClass(3)}

cnmPackage              OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmPackage(4)}

cnmParameter            OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmParameter(5)}

cnmNameBinding          OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmNameBinding(6)}

cnmAttribute            OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmAttribute(7)}

cnmAttributeGroup       OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmAttributeGroup(8)}

cnmAction               OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmAction(9)}

cnmNotification         OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmNotification(10)}

cnmFunctionalUnit       OBJECT IDENTIFIER ::= {itu-t(0) recommendation(0) x(24) 162  cnmFunctionalUnit(11)
version1(1)}
```

-- *default value definition*

```
defaultDateRequest          DateRequest        ::= dontCare : NULL
defaultInitialResultList    initialResultList  ::={}
defaultOperationList        OperationList      := {}
defaultProcessingMode       ProcessingMode     ::= sequential : NULL
```

-- *initial value definition*

```
InitialResultList ResultList                   ::= {}
```

-- *supporting production*

```
AnyNamesBase                    ::= SET OF ObjectInstance
AnyNamesRange                   ::= SET SIZE(0..64) OF ObjectInstance
Boolean                         ::= BOOLEAN
CustomerTypes                   ::= SET OF INTEGER (0..255)
Date                            ::= SEQUENCE {
                                hour      INTEGER ( 0 .. 23 ) ,
                                day       INTEGER ( 1 .. 31 ) ,
                                month     INTEGER ( 1 .. 12 ) ,
                                year      INTEGER ( 0 .. 99 ) }
DateRequest                     ::= CHOICE {
                                dontCare      NULL ,
                                request                RequestedTime }
DTEAddressList                  ::= SET OF DTEAddress
GeographicCoordinates           ::= INTEGER{
                                      v-h-Coordinates    (0),
                                      latitude-longitude (1),
                                      npa-nxx            (2),
                                      country-city       (3) }
GraphicString                   ::= GRAPHICSTRING
GraphicString64                 ::= GraphicString(SIZE(0..64))
GraphicStringBase               ::= GraphicString
Integer                         := INTEGER
LocationDetails                 ::= CHOICE{
                                      unknown      NULL,
                                      details    GraphicString }
LocationType                    ::= INTEGER {
                                      other              (0),
                                      customer           (1),
                                      provider           (2)
                                      } (0..255)
OperationArgument               ::= CHOICE {
                                actionArgument [0] ActionArgument ,
                                createArgument [1] CreateArgument ,
                                deleteArgument [2] DeleteArgument ,
                                getArgument [3] GetArgument ,
                                setArgument [4] SetArgument }
OperationList                   ::= SEQUENCE OF OperationArgument
ProcessingMode                  ::= CHOICE {
                                sequential Sequential ,
                                independent NULL}
```

```
RequestedTime                   ::= CHOICE {
                                now [0] NULL ,
                                scheduled [1] Date }
Result                          ::= INTEGER {
                                fullySuccessed (0) ,
                                failed (1) ,
                                cancelled (2) }
ResultList                      ::= SEQUENCE OF Result
Sequential                      ::= CHOICE {
                                stopAfterFailure        [0] NULL ,
                                bestEffort              [1] NULL}
sRChangeDenied                  ::= INTEGER {negotiationAlreadyEnded(0)}
Status                          ::= INTEGER {
                                customerAgreement (0) ,
                                providerAgreement (1) ,
                                serviceBeingProcessed (2) ,
                                endOfProcessing (3) }
suborganizationObjectList       ::=  SEQUENCE OF
                                SEQUENCE{
                                     managedObjectClass        ObjectClass,
                                     managedObjectInstance   ObjectInstance}
SystemIdRange                   ::= CHOICE{
                                name        GraphicString64,
                                number      Integer,
                                nothing     NULL }
InitialStatus                   ::=  0
InterlockCode                   ::= GraphicString
TroubleTypePspdn                ::= CHOICE {
          INTEGER {
          unknown                                (0),

          physicalLayerGroup                     (1),
          disconnect                             (2),
          tooManyBitErrors                       (3),
          lossOfSyncFpattern                     (4),

          datalinkLayerGroup                     (30),

          canNotSetUpDataLink                    (31),
          noResponse                             (32),
          dataLinkProtocolError                  (33),
          frameReject                            (34),
          undefinedFrame                         (35),
          overSizeIFrame                         (36),
          unpermittedFrameWithInformation        (37),
          abnormalNumber                         (38),
          n2TimerExpiration                      (39),

          packetLayerGroup                       (60),

          errorSequence                          (61),

-- Items from 70 to 192 correspond to the X.25 diagonistics.
-- Trouble type value = X.25 diagonistic code + 70

          invalidPS                              (71),
          invalidPR                              (72),

          packetTypeInvalid                      (86),
          pTypeInvalidForStateR1                 (87),
          pTypeInvalidForStateR2                 (88),
          pTypeInvalidForStateR3                 (89),
          pTypeInvalidForStateP1                 (90),
          pTypeInvalidForStateP2                 (91),
          pTypeInvalidForStateP3                 (92),
          pTypeInvalidForStateP4                 (93),
          pTypeInvalidForStateP5                 (94),
```

```
pTypeInvalidForStateP6                  (95),
pTypeInvalidForStateP7                  (96),
pTypeInvalidForStateD1                  (97),
pTypeInvalidForStateD2                  (98),
pTypeInvalidForStateD3                  (99),

packetNotAllowed                        (102),
unidentifiablePacket                    (103),
callOnOnewayLC                          (104),
invalidPTypeOnPVC                       (105),
packetOnUnassignedLC                    (106),
rejectNotSubscribedTo                   (107),
packetTooShort                          (108),
packetTooLong                           (109),
invalidGFI                              (110),
restartRegistrationPacketWithNonzero    (111),
pTypeNotCompatibleWithFacility          (112),
unauthorizedInterruptConf               (113),
unauthorizedInterrupt                   (114),
unauthorizedReject                      (115),

timeExpired                             (118),
tOForIncomingCall                       (119),
tOForClearIndication                    (120),
tOForResetIndication                    (121),
tOForRestartIndication                  (122),
tOForCallDeflection                     (123),

callSetupClearingRegistrationProblem    (134),
facilityRegistrationCodeNotAllowed      (135),
invalidCalledDTEAddress                 (136),
invalidCallingDTEAddress                (137),
invalidSendAddress                      (138),
invalidFacilityRegistrationLength       (139),
incomingCallBarred                      (140),
noLogicalChannelAvailable               (141),
callCollision                           (142),
duplicateFacilityRequested              (143),
nonZeroAddressLength                    (144),
nonZeroFacilityLength                   (145),
facilityNotProvidedWhenExpected         (146),
invalidDTEFacility                      (147),
maxNumberRedirectionDeflectionExceed    (148),

miscellaneous                           (150),
improperCauseCodeFromDTE                (151),
notAlignedOctet                         (152),
inconsistentQbitSetting                 (153),
nUIProblem                              (154),
iCRDProblem                             (155),

internationalProblem                    (182),
remoteNetworkProblem                    (183),
internationalProtocolProblem            (184),
internationalLinkOutOfOrder             (185),
internationalLinkBusy                   (186),
transitNetworkFacilityProblem           (187),
remoteNetworkFacilityProblem            (188),
internationalRoutingProblem             (189),
temporaryRoutingProblem                 (190),
unknownCalledDNIC                       (191),
maintenanceAction                       (192),

-- unexpected call disconnection during ordinary communication
clearIndicationCause                    (200),
remoteProcedureError                    (201),
localProcedureError                     (202),
```

```
        restartIndicationCause          (205),
        remoteProcedureError            (206),
        localProcedureError             (207)},
        OBJECT IDENTIFIER}
END
```

15 Negotiation of Functional Unit

This Recommendation assigns the following object identifier values {itu-t(0) recommendation(0) x(24) 162 cnmFunctionalUnit(11) version1(1) }; as a value of the ASN.1 type FunctionalUnitPackageId defined in CCITT Rec. X.701 | ISO/IEC 10040 to use for negotiating the following Functional Units:

- 0 Basic report control
  -- *The basic report control Functional Unit contains the Suspended alarm reporting service and the resume alarm reporting service.*
- Enhanced report control
  -- *The enhanced report control Functional Unit contains the initiate and terminate alarm and change reporting and set EFD attributes services.*
- 2 Monitor Reconfiguration;
- 3 Interval assignment and traffic retrieval;
- 4 Basic traffic data collection control;
- 5 Extended traffic data collection control;
- 6 History duration assignment;
- 7 Traffic history retrieval;
- 8 Suppress all zero;
- 9 Service request,

where the number identifies the bit positions in BIT STRING assigned to the Functional units, and the names referencing the Functional Units are as defined in Recommendation X.161.

16 Conformance for the CNMc Interface

If a service defined in Recommendation X.161 or a service set in Annex B/X.161 is implemented, then at least the mandatory parts of that service shall be implemented.

NOTE – Detailed conformance to ICS specified in Recommendation X.724 is for further study.

Annex A

Index of defined information elements

(This annex does not form an integral part of this Recommendation)

A.1 List of Defined Information Elements

A.1.1 Object Classes

Items	*Subclause No.*
cnmUser	7.2.1.2.9
	7.2.2.2.3
cnmX25Entity	7.1.1.2.1
	7.2.1.2.1
	7.2.2.2.1
	7.4.1.2.1
cugProfile	7.2.1.2.7
	7.2.3.2.5

currentMlpTrafficData	7.4.1.2.5
currentPacketTraffic Data	7.4.1.2.2
currentSlpTrafficData	7.4.1.2.8
customer	7.2.1.2.10
	7.2.2.2.4
historyMlpTraffic Data	7.4.1.2.6
historySlpTraffic Data	7.4.1.2.9
hgProfile	7.2.1.2.8
	7.2.3.2.6
location	7.2.1.2.11
	7.2.2.2.5
mlpMonitoredPoint	7.4.1.2.4
mlpProfile	7.2.3.2.2
	7.2.1.2.4
pdnTelecommunicationsTroubleReport	7.1.3.2.1
pdnTroubleHistoryRecord	7.1.3.2.2
serviceRequest	7.6.1.2.1
slpProfile	7.2.3.2.3
	7.2.1.2.5
x25PvcProfile	7.2.3.2.4
	7.2.1.2.6
x25ServiceProfile	7.2.1.2.3
	7.2.3.2.1
x25TerminationPoint	7.1.1.2.2
	7.2.1.2.2
	7.2.2.2.2
	7.4.1.2.7

A.1.2 Name Binding for Object Classes

Items	*Subclause No.*
cnmUser	8.2.1.12
cnmX25Entity	8.1.1.2
	8.2.1.2
	8.4.1.1
contact	8.1.3.6
	8.2.1.13
cugProfile	8.2.1.9
	8.2.3.5
currentMlpTrafficData	8.4.1.5
currentPacketTrafficData	8.4.1.2
currentSlpTrafficData	8.4.1.8
customer	8.2.1.11
equipment	8.1.1.4
	8.2.1.4
eventForwardingDiscriminator	8.1.1.6
historyMlpTrafficData	8.4.1.6
historyPacketTrafficData	8.4.1.3
historySlpTrafficData	8.4.1.9
hgProfile	8.2.1.10
	8.2.3.6
Location	8.2.1.14

Log	8.1.3.7
managedElement	8.1.1.5
mlpMonitoredPoint	8.4.1.4
mlpProfile	8.2.1.6
	8.2.3.2
network	8.1.1.1
	8.2.1.1
pdnTelecommunicationsTroubleReport	8.1.3.1
pdnTroubleHistoryRecord	8.1.3.5
providerTroubleReport	8.1.3.2
repairActivity	8.1.3.4
serviceRequest	8.6.1
slpProfile	8.2.1.7
	8.2.3.3
troubleReportFormatDefinition	8.1.3.3
x25PvcProfile	8.2.1.8
	8.2.3.4
x25ServiceProfile	8.2.1.5
	8.2.3.1
x25TerminationPoint	8.1.1.3
	8.2.1.3
	8.4.1.7

A.1.3 Definition of Packages

Items	*Subclause No.*
contactList	9.2.1.6
customer	9.2.1.5
customerType	9.2.1.9
location	9.2.1.7
negotiation	9.6.1
oPNetworkList	9.2.1.10
pleProfile	9.2.1.2
serviceList	9.2.1.11
serviceRequest	9.6.2
slpProfile-P	9.2.1.3
slpTimersProfile-P	9.2.1.4
typeText	9.2.1.8
x25ServiceProfile	9.2.1.1

A.1.4 Definition of Attributes

Items	*Subclause No.*
cnmUserIdentifier	10.2.1
cnmUser-MO-Name	10.1.1
cnmX25Entity Identifier	10.2.2
cnmX25Entity-MO-Name	10.1.2
contactList	10.3.1
contact-MO-Name	10.1.3
cugIndex	10.3.3
cugProfileIdentifier	10.2.3
cugProfile-MO-Name	10.1.4

x25PvcProfile-MO-Name	10.1.26
x25ServiceProfileIdentifier	10.2.12
x25ServiceProfile-MO-Name	10.1.25
x25Termination-MO-Name	10.1.24
x25TerminationPointIdentifier	10.2.11

A.1.5 Definition of Notifications

There is no notification defined in this Recommendation.

A.1.6 Definition of Parameters

Items	*Subclause No.*
serviceRequestChangeDenied	12.1

A.1.7 Definitions of Action Types

There is no notification defined in this Recommendation.

A.2 List of Imported Information Elements

A.2.1 Imported Object Classes

Items	*Subclause No.*	*Rec. No.*
contact	7.1.3	X.790
	7.2.1	X.790
currentData	7.4.1	X.721
equipment	7.1.1	M.3100
	7.2.1	M.3100
	7.2.2	M.3100
event forwarding discriminator	7.1.1	X.721
historyData	7.4.1	X.721
log	7.1.3	X.721
managed element	7.1.1	M.3100
	7.2.1	M.3100
network	7.1.1	M.3100
	7.1.3	M.3100
	7.2.1	M.3100
providerTroubleReport	7.1.3	X.790
repairActivity	7.1.3	X.790
telecommunicationsTroubleReport	7.1.3	X.790
termination point	7.2.1	M.3100
top	7.1.1	X.721
	7.1.3	X.721
	7.2.1	X.721
	7.2.3	X.721
	7.6.1	X.721
troubleHistoryRecord	7.1.3	X.790
troubleReportFormatDefinition	7.1.3	X.790

A.2.2 Imported Name Binding

Items	*Subclause No.*	*Rec. No.*
providerTroubleReport-network	8.1.3.2	X.790
repairActivity-telecommunicationsTroubleReport	8.1.3.3	X.790
troubleReportFormatDefiniton-network	8.1.3.3	X.790

A.2.3 Imported Packages

Items	*Subclause No.*	*MO or Pkg*	*Rec. No.*
attributeValueChangeNotificationPackage	7.2.1.2.11	location	M.3100
createDeleteNotificationsPackage	7.2.1.2.11	location	M.3100
trAgentContactPersonAttributePkg	7.6.1.2.1	serviceRequest	X.790
trAgentContactPersonObjectPkg	7.6.1.2.1	serviceRequest	X.790
trAlternateManagerContactPersonAttributePkg	7.6.1.2.1	serviceRequest	X.790
trAlternateManagerContactPersonObjectPkg	7.6.1.2.1	serviceRequest	X.790
trDialogPkg	7.6.1.2.1	serviceRequest	X.790
trManagerContactPersonAttributePkg	7.6.1.2.1	serviceRequest	X.790
trManagerContactPersonObjectPkg	7.6.1.2.1	serviceRequest	X.790
userLabelPackage	7.2.1.2.11	location	M.3100

A.2.4 Imported Notifications

Items	*Subclause No.*	*MO or Pkg*	*Rec. No.*
attributeValueChange	7.1.1.2.2	x25TerminationPoint	X.721
attributeValueChange	9.2.1.2	pleProfile-P	X.721
attributeValueChange	9.6.2	serviceProfilePkg	X.721
communicationsAlarm	7.1.1.2.2	x25TerminationPoint	X.721
environmentalAlarm	7.1.1.2.2	x25TerminationPoint	X.721
equipmentAlarm	7.1.1.2.2	x25TerminationPoint	X.721
objectCreation	7.2.1.2.6	pvcProfile	X.721
	7.2.1.2.7	cugProfile	X.721
	7.2.1.2.8	hgProfile	X.721
	9.2.1.2	pleProfile-P	X.721
	9.6.2	serviceProfilePkg	X.721
	7.1.1.2.2	x25TerminationPoint	X.721
	7.2.1.2.6	pvcProfile	X.721
ObjectDeletion	7.2.1.2.7	cugProfile	X.721
	7.2.1.2.8	hgProfile	X.721
	9.2.1.2	pleProfile-P	X.721
	9.6.2	serviceProfilePkg	X.721
	7.1.1.2.2	x25TerminationPoint	X.721
processingErrorAlarm	7.1.1.2.2	x25TerminationPoint	X.721
qualityofServiceAlarm	7.1.1.2.2	x25TerminationPoint	X.721

A.2.5 Imported Attributes

Items	*Subclause No.*	*MO or Pkg*	*Rec. No.*
administrativeState	7.1.1.2.1	cnmX25Entity	X.721
	7.1.1.2.2	x25TerminationPoint	X.721
bilateralCUG	9.2.1.2	pleProfile-P	X.283
	7.2.1.2.6	mlpProfile	X.283
bilateralCUGwithOutgoingAccess	9.2.1.2	pleProfile-P	X.283
	7.2.1.2.6	mlpProfile	X.283
callAttempts	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
callDeflectionSubscription	9.2.1.2	pleProfile-P	X.283
callRedirection	9.2.1.2	pleProfile-P	X.283
callsConnected	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283

callTimeouts	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
chargingDirection	7.2.1.2.6	mlpProfile	X.283
chargingInformation	9.2.1.2	pleProfile-P	X.283
clearTimeouts	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
cUG	9.2.1.2	pleProfile-P	X.283
cugWithIncomingAccess	7.2.1.2.6	mlpProfile	X.283
cugWithOutgoingAccess	7.2.1.2.6	mlpProfile	X.283
dataPacketsReceived	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
dataPacketsSent	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
dBitModification	9.2.1.2	pleProfile-P	X.283
defaultPacketSize	9.2.1.2	pleProfile-P	X.283
defaultThroughputClass	9.2.1.2	pleProfile-P	X.283
defaultThroughputClassAssignment	9.2.1.2	pleProfile-P	X.283
defaultWindowSize	9.2.1.2	pleProfile-P	X.283
extendedPacketSequencing	9.2.1.2	pleProfile-P	X.283
fastSelectAcceptance	9.2.1.2	pleProfile-P	X.283
fCSErrorReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.8	currentSlpTrafficData	X.282
flowControlnegotiationPermitted	9.2.1.2	pleProfile-P	X.283
flowControlParameterNegotiation	9.2.1.2	pleProfile-P	X.283
fRMRsReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
fRMRsSent	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
huntGroup	9.2.1.2	pleProfile-P	X.283
iFrameDataOctetsReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
iFrameDataOctetsSent	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
iFramesReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
iFramesSent	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
incomingCallBarred	9.2.1.2	pleProfile-P	X.283
incomingCallsBarredWithinCug	9.2.1.2	pleProfile-P	X.283
interfaceMode	9.2.1.2	pleProfile-P	X.283
k	9.2.1.4	slpTimersProfile-P	X.282
localChargingPrevention	9.2.1.2	pleProfile-P	X.283
localDTEAddress	7.2.1.2.6	mlpProfile	X.283
	9.2.1.2	pleProfile-P	X.283
	9.2.1.3	slpProfile-P	X.283
logicalChannel	7.2.1.2.6	mlpProfile	X.283
logicalChannelAssignments	9.2.1.2	pleProfile-P	X.283
mT1Timer	7.2.1.2.4	mlpProfile	X.282
mT2	7.2.1.2.4	mlpProfile	X.282
mT3Timer	7.2.1.2.4	mlpProfile	X.282
mW	7.2.1.2.4	mlpProfile	X.282
mX	7.2.1.2.4	mlpProfile	X.282
n1	9.2.1.4	slpTimersProfile-P	X.282

n2	9.2.1.4	slpTimersProfile-P	X.282
nonStandardDefaultPacketSizes	9.2.1.2	pleProfile-P	X.283
nonStandardDefaultWindowSizes	9.2.1.2	pleProfile-P	X.283
nUIOverride	9.2.1.2	pleProfile-P	X.283
nUISubscription	9.2.1.2	pleProfile-P	X.283
octetsReceivedCounter	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
octetsSentCounter	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
oneWayLogicalChannelIncoming	9.2.1.2	pleProfile-P	X.283
oneWayLogicalChannelOutgoing	9.2.1.2	pleProfile-P	X.283
onlineFacilityRegistration	9.2.1.2	pleProfile-P	X.283
operationalState	7.2.1.2.6	mlpProfile	X.283
outgoingCallsBarred	9.2.1.2	pleProfile-P	X.283
outgoingCallsBarredWithinCug	9.2.1.2	pleProfile-P	X.283
packetRetransmission	9.2.1.2	pleProfile-P	X.283
packetSize	7.2.1.2.6	mlpProfile	X.283
pollsReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
protocolErrorsAccusedOf	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
protocolErrorsDetectedLocally	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
protocolVersionSupported	9.2.1.2	pleProfile-P	X.283
providerInitiatedDisconnects	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
providerInitiatedResets	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
receivedMlpInGuardRegion	7.4.1.2.5	currentMlpTrafficData	X.282
	7.4.1.2.6	historyMlpTrafficData	X.282
receivedMlpResets	7.4.1.2.5	currentMlpTrafficData	X.282
	7.4.1.2.6	historyMlpTrafficData	X.282
rEJsReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
rEJsSent	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
remoteDTEAddress	7.2.1.2.6	mlpProfile	X.283
remoteLogicalChannel	7.2.1.2.6	mlpProfile	X.283
remotelyInitiatedResets	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
remotelyInitiatedRestarts	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
resetTimeouts	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
reverseChargingAcceptance	9.2.1.2	pleProfile-P	X.283
rNRsReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
rPOASubscription	9.2.1.2	pleProfile-P	X.283
sABMsReceived	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
sABMsSent	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
segmentsReceived	7.4.1.2.2	currentPacketTrafficData	X.283

	7.4.1.2.3	historyPacketTrafficData	X.283
segmentsSent	7.4.1.2.2	currentPacketTrafficData	X.283
	7.4.1.2.3	historyPacketTrafficData	X.283
sequenceModulus	9.2.1.3	slpProfile-P	X.282
t1Timer	9.2.1.4	slpTimersProfile-P	X.282
t2Timer	9.2.1.4	slpTimersProfile-P	X.282
t4Timer	9.2.1.4	slpTimersProfile-P	X.282
throughputClasses	7.2.1.2.6	mlpProfile	X.283
throughputClassNegotiation	9.2.1.2	pleProfile-P	X.283
timesT1Expired	7.4.1.2.8	currentSlpTrafficData	X.282
	7.4.1.2.9	historySlpTrafficData	X.282
transmissionRate	9.2.1.3	slpProfile-P	X.281
virtualCircuitId	7.2.1.2.6	mlpProfile	X.283
windowSize	7.2.1.2.6	mlpProfile	X.283