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**Information technology —  
Telecommunications and information  
exchange between systems — Elements  
of management information related to OSI  
Network Layer standards**

*Technologies de l'information — Télécommunications et échange  
d'informations entre systèmes — Éléments d'information de gestion  
relatifs à la structure de la couche OSI réseau*



Reference number  
ISO/IEC 10733:1993(E)

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 10733 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Sub-Committee SC 6, *Telecommunications and information exchange between systems*.

Annex A forms an integral part of this International Standard. Annexes B and C are for information only.

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## Introduction

This document is one of a set of International Standards produced to facilitate the interconnection of open systems. The set of International Standards covers the services, protocols and management information required to achieve such interconnection.

This International Standard is positioned with respect to other related International Standards by the layers defined in the *Reference Model for Open System Interconnection* (ISO 7498). In particular, it is concerned with the definition of Network Layer management information.

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# Information technology — Telecommunications and information exchange between systems — Elements of management information related to OSI Network Layer standards

## 1 Scope

This International Standard provides the specification of management information within an Open System related to those operations of the OSI Network Layer specified by CCITT Recommendations and International Standards. Specifics on how Network layer management is accomplished is beyond the scope of this document. Network Layer management information is defined by specifying:

- the managed object class definition of Network Layer Managed Objects following guidelines put forth by the *Structure of Management Information* (ISO/IEC 10165 and CCITT Recommendations X.720 - X.723),
- the relationship of the Managed Objects and attributes to both the operation of the layer and to other objects and attributes of the layer, and
- the action type operations on the attributes of Network Layer Managed Objects that are available to OSI Systems Management.

## 2 Normative references

The following CCITT Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The CCITT Secretariat maintains a list of the currently valid CCITT Recommendations.

### 2.1 Identical CCITT Recommendations | International Standards

CCITT Recommendation X.213 (1992) | ISO/IEC 8348 : 1993, *Information technology — Open Systems Interconnection — Network Service Definition.*

CCITT Recommendation X.701 (1992) | ISO/IEC 10040 : 1992, *Information technology — Open Systems Interconnection — Systems management overview.*

CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1 : 1993, *Information technology — Open Systems Interconnection — Structure of management information : Management information model.*

CCITT Recommendation X.721 (1992) | ISO/IEC 10165-2 : 1992, *Information technology — Open Systems Interconnection — Structure of management information : Definition of management information.*

CCITT Recommendation X.722 (1992) | ISO/IEC 10165-4 : 1992, *Information technology — Open Systems Interconnection — Structure of management information : Guidelines for the definition of managed objects.*

CCITT Recommendation X.723 (1992) | ISO/IEC 10165-5 : 1993, *Information technology — Open Systems Interconnection — Structure of management information : Generic management information.*

CCITT Recommendation X.730 (1992) | ISO/IEC 10164-1 : 1993, *Information technology — Open Systems Interconnection — Systems Management : Object management function.*

CCITT Recommendation X.731 (1992) | ISO/IEC 10164-2 : 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.*

## 2.2 Paired CCITT Recommendations | International Standards equivalent in technical content

CCITT Recommendation X.25 (1988), *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit.*

ISO/IEC 8208 : 1990, *Information technology — Data communications — X.25 Packet Layer Protocol for Data Terminal Equipment.*

CCITT Recommendation X.200 (1988), *Reference Model of Open Systems Interconnection for CCITT Applications.*

ISO 7498 : 1984, *Information processing systems — Open Systems Interconnection — Basic Reference Model.*

CCITT Recommendation X.208 (1988), *Specification of abstract syntax notation one (ASN.1).*

ISO/IEC 8824 : 1990, *Information technology — Open Systems Interconnection — Specification of the Abstract Syntax Notation One (ASN.1).*

CCITT Recommendation X.223 (1988), *Use of X.25 to Provide the OSI Connection-mode Network Service for CCITT Applications.*

ISO/IEC 8878 : 1991, *Information technology — Telecommunications and information exchange between systems — Use of X.25 to provide the OSI Connection-mode Network Service.*

CCITT Recommendation X.700<sup>1</sup>, *Management Framework for Open Systems Interconnection for CCITT Applications.*

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

ISO 8473 : 1988, *Information processing systems — Data communications — Protocol for providing the Connectionless-mode network service.*

ISO 8648 : 1988, *Information processing systems — Open Systems Interconnection — Internal organization of the Network Layer.*

<sup>1</sup>Presently at the state of draft Recommendation

ISO/IEC 8880-1 : 1990, *Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service — Part 1: General principles.*

ISO/IEC 8880-2 : 1990, *Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service — Part 2: Provision and support of the connection-mode Network Service.*

ISO/IEC 8880-3 : 1990, *Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service — Part 3: Provision and support of the connectionless-mode Network Service.*

ISO/IEC 8881 : 1989, *Information processing systems — Data communications — Use of the X.25 packet level protocol in Local Area Networks.*

ISO 9542 : 1988, *Information processing systems — Telecommunications and information exchange between systems — End system to Intermediate system routeing exchange protocol for use in conjunction with the protocol for providing the connectionless-mode Network Service (ISO 8473).*

ISO/TR 9577 : 1990, *Information technology — Telecommunications and information exchange between systems — Protocol identification in the Network Layer.*

ISO/IEC 10030 : 1990, *Information technology — Telecommunications and information exchange between systems — End system routeing information exchange protocol for use in conjunction with ISO 8878.*

ISO/IEC 10177 : 1993, *Information technology — Data communications — Intermediate system support of the OSI connection-mode network service using ISO/IEC 8208 in accordance with ISO/IEC 10028.*

ISO/IEC 10589 : 1992, *Information technology — Telecommunications and information exchange between systems — Intermediate system to intermediate system intra-domain routeing information exchange protocol for use in conjunction with the protocol for providing the connectionless-mode Network Service (ISO 8473).*

CCITT Recommendation D.10, *General tariff principles for international public data networks.*

CCITT Recommendation D.11, *Special tariff principles for international packet-switched public data communication services by means of the virtual call facility.*

CCITT Recommendation D.12, *Measurement unit for charging by volume in the international packet-switched data communication service.*

CCITT Recommendation E.164, *The numbering plan for the ISDN era.*

CCITT Recommendation X.2 (1988), *International data transmission services and optional user facilities in public data networks and ISDNs.*

CCITT Recommendation X.121 (1988), *International numbering plan for public data networks.*

### 3 Definitions

#### 3.1 Basic reference model

This International Standard makes use of the following terms defined in ISO 7498.

- a) Open System
- b) (N)-Service Access Point
- c) Network Layer
- d) Network Protocol
- e) Layer Management

- f) Systems Management

### 3.2 Information model

This International Standard makes use of the following terms defined in ISO/IEC 10165-1.

- a) Attributes
- b) Attribute Type
- c) Containment
- d) Distinguished Name
- e) Inheritance
- f) Managed Object
- g) Management Operations
- h) Notifications
- i) Object Class
- j) Relative Distinguished Name
- k) Subclass
- l) Superclass

### 3.3 GDMO

This International Standard makes use of the following terms defined in ISO/IEC 10165-4.

- a) Managed Object Class Definition
- b) Template
- c) Parameter

### 3.4 Management framework

This International Standard makes use of the following terms defined in ISO/IEC 7498-4.

- a) Management Information

## 4 Symbols and abbreviations

Within the Managed Object definitions and GDMO templates the following abbreviations are used in the standard-name element of a document-identifier when making references to other documents.

DMI	CCITT Rec. X.721 (1992)   ISO/IEC 10165-2 : 1992
GMI	CCITT Rec. X.723   ISO/IEC 10165-5

This International Standard makes use of the following symbols and abbreviations.

BCUG	Bilateral Closed User Group
CLNP	Connectionless-mode Network Protocol
CLNS	Connectionless-mode Network Service
CMIP	Common Management Information Protocol
CMIS	Common management Information Service Definition

CONS	Connection-mode Network Service
CUG	Closed user Group
ES	End System
ESH	End System Hello
ER PDU	Error Report Protocol Data Unit
IS	Intermediate System
ISH	Intermediate System Hello
IVMO	Initial Values Managed Object
LCN	Logical Channel Number
MO	Managed Object
NSAP	Network Service Access Point
NSE	Network Service Element
NUI	Network User Identification
PLE	Packet Layer Entity
PVC	Permanent Virtual Circuit
RD PDU	Redirect Protocol Data Unit
RDN	Relative Distinguished Name
SNDCF	Subnetwork Dependent Convergence Function
SNPA	Subnetwork Point of Attachment
VC	Virtual Call

## 5 Elements of network layer management information

### 5.1 Managed object hierarchy

#### 5.1.1 Summary of managed objects

The following set of managed object classes are defined for the OSI Network Layer:

- a) The network subsystem managed object (see 5.3).
- b) The network entity managed object (see 5.4).
- c) The NSAP managed object (see 5.5).
- d) The connectionless-mode network service managed object (see 5.6).
- e) The linkage managed object (see 5.7).
- f) The connection-mode network service managed object (see 5.8).
- g) The network connection managed object (see 5.9).
- h) The X25 PLE DTE managed object (see 5.10.3).
- i) The X.25 PLE DCE managed object (see 5.10.4).
- j) The X.25 PLE DTE initial values managed object (see 5.10.5).
- k) The X.25 PLE DCE initial values managed object (see 5.10.6).
- l) The permanent virtual circuit DTE managed object (see 5.11.4).
- m) The permanent virtual circuit DCE managed object (see 5.11.5).
- n) The virtual call initial values managed object (see 5.11.6).
- o) The virtual call DTE managed object (see 5.11.7).
- p) The virtual call DCE managed object (see 5.11.8).

- q) The recommendation D series counts managed object (see 5.11.9).

The following Managed Object classes are never instantiated, but exist only for the purposes of deriving subclasses.

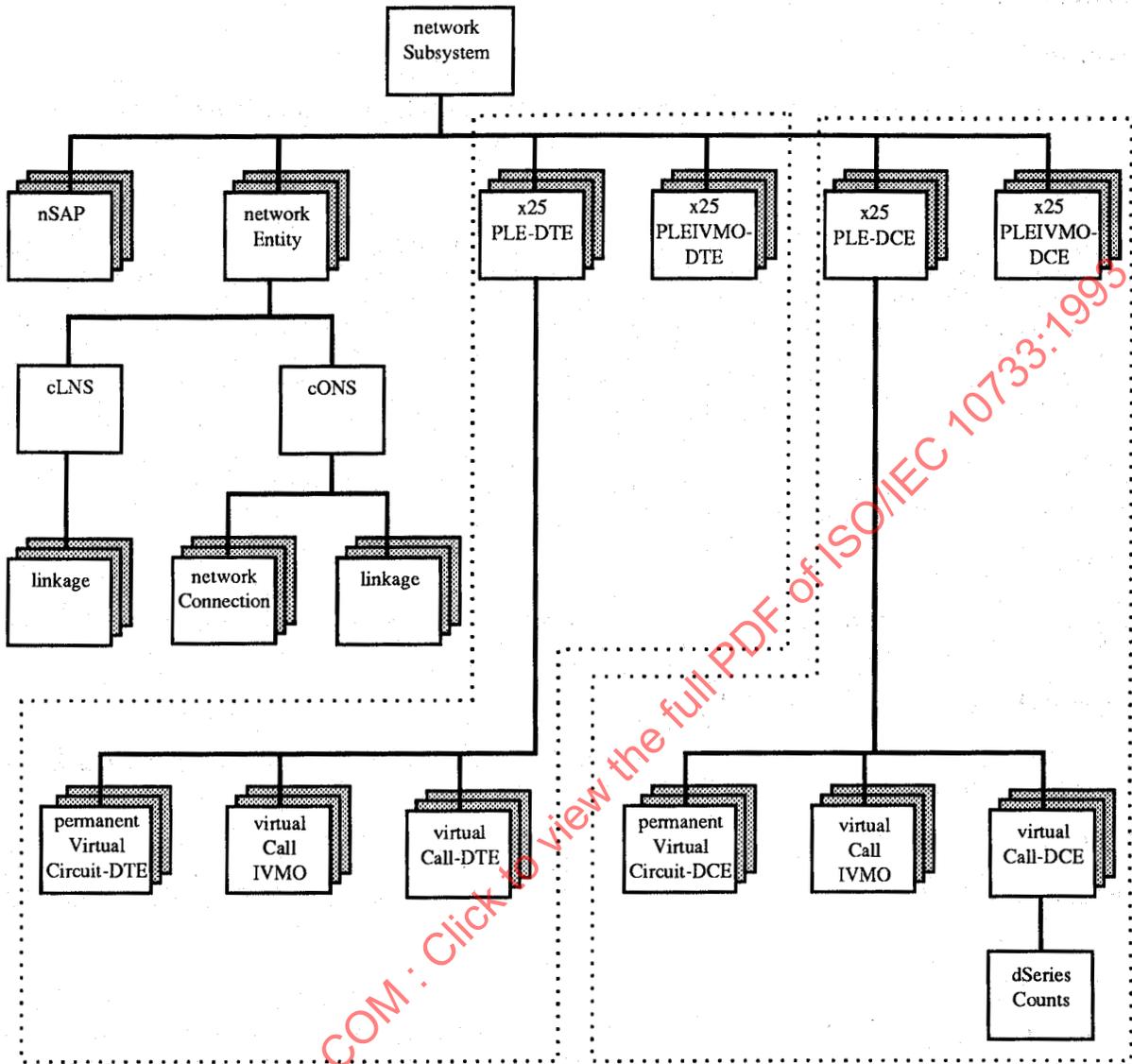
- a) The X.25 PLE managed object (see 5.10.1).
- b) The X.25 PLE initial values managed object (see 5.10.2).
- c) The virtual circuit managed object (see 5.11.1).
- d) The virtual circuit DTE managed object (see 5.11.2).
- e) The virtual circuit DCE managed object (see 5.11.3).

These Managed Objects represent OSI Management's view of those elements of an Open System which support the OSI Network Service subject to OSI management operations.

### 5.1.2 Containment hierarchy

The containment hierarchy is illustrated in figure 1. Managed Objects which can have multiple instances are illustrated by shadowed (multiple) boxes. These objects are defined in detail in the following clauses of this International Standard.

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**Figure 1 - Network Layer Containment Hierarchy**

The networkSubsystem MO is subordinate to the system MO. The x25PLE MO and IVMOs are examples of what are termed 'SNPA' MOs. The 'SNPA' MOs are subnetwork specific MOs. It is expected that there will in future be a number of additional 'SNPA' MOs, for example for ISDN.

The 'SNPA' MO is concerned with the protocol used to access a subnetwork. For example, there is an 'SNPA' MO corresponding to each X.25 Packet layer entity. The cLNS MO is concerned with the functions of the CLNS protocols (ISO 8473, ISO 9542 and ISO/IEC 10589) which apply to the general operation of the protocol as a whole rather than being specifically related to individual points of attachment, whereas the linkage MO applies to the subnetwork dependent convergence functions. The cONS MO and its associated linkage MOs apply similarly to protocols associated with CONS (ISO/IEC 8878, ISO/IEC 9574, ISO 10030, ISO/IEC 10177 etc.)

For the requirements regarding which MOs in the containment tree shall be instantiated for a conforming implementation see the applicable clauses of the conformance statement.

### 5.1.3 Relationships

#### 5.1.3.1 General

The following clauses describe the individual relationships. The use of relationship attributes is illustrated by examples in Annex C.

#### 5.1.3.2 Linkage

There is a relationship (sN-ServiceProvider and sN-SAP both pointing to the same MO) between linkage MOs and 'SNPA' MOs. For example, a linkage concerned with the operation of the ISO 8473 SNDCF for X.25 has a relationship with an x25PLE-DTE MO. A linkage has a relationship identifying only one 'SNPA', so in the case of a network entity containing one ISO 8473 protocol machine operating over a number of X.25 Packet Layer Entities, there would be a number of linkage MOs, each related to a different x25PLE-DTE MO. But although one linkage is related to only one 'SNPA', it is possible for a number of other linkages to be related to the same 'SNPA'; for example, there could be cONS Linkages and cLNS linkages both using the same x25PLE-DTE and therefore the same 'SNPA' MO.

In some cases of network layer operation there is no specific access protocol; for example, ISO 8473 contains an SNDCF for use over the data link service directly. In such cases, the linkage has relationships (sN-ServiceProvider and sN-SAP pointing to different MOs), not to an 'SNPA', but to appropriate MOs in the Data Link Layer.

#### 5.1.3.3 NSAPs

There is a relationship (localSAPNames) between a networkEntity MO and an nSAP MO. Each nSAP MO is related to only one networkEntity, although one networkEntity may be related to several nSAP MOs.

#### 5.1.3.4 Layer n+1 clients

The nSAP MO has a set of relationships (userEntityName) to Layer n+1 clients (typically the Transport Layer Entity). The Transport Layer Entity has a relationship (actualNSAP) to the nSAP MO.

#### 5.1.3.5 Layer n-1 services

Both the linkage and x25PLE MOs have relationships (sN-ServiceProvider and sN-SAP) to the appropriate Data Link Layer MOs.

#### 5.1.3.6 Connections

There is a relationship (underlyingConnectionNames) between a transportConnection MO and its underlying networkConnection MO (if one exists), and between the networkConnection MO and the underlying virtualCall-DTE MO. The relationship between the virtualCall-DTE MO and any underlying Datalink Layer MO is implicitly available as a result of the parent x25PLE-DTE or x25PLE-DCE MOs relationships to the Data Link Layer, as described above.

In addition there is a relationship (localNSAPMO) from the networkConnection MO to the corresponding nSAP MO.

### 5.1.4 Minimum event filtering capabilities

The network layer management definitions embodied in this International Standard imply the frequent, and possibly excessive, generation of notifications during regular layer operation. These notifications are especially useful for effective fault management, where they facilitate the tracing and pinpointing of error situations. To avoid the excessive dissemination of these event reports under normal operating conditions, it is advisable for a managed system to have, as a minimum, the capability to perform discrimination based upon:

- a) The source managed object class
- b) The object identifier values in the probable cause and specific problems field of communication alarms, and the communication type field communication informations.

### 5.1.5 Use of optional fields

Where reference is made in this International Standard to ASN.1 syntax defined in Rec. X.723 | ISO/IEC 10165-5 or Rec. X.721 | ISO/IEC 10165-2, only the following fields shall be employed:

- a) those which are not OPTIONAL in the ASN.1 syntax;
- b) those which are OPTIONAL, but whose use is explicitly required by this International Standard;
- c) those which are OPTIONAL, but whose ASN.1 type is SET OF ManagementExtension.

The use of any other fields is prohibited.

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## 5.2 Common behaviour templates

### commonCreationDeletion-B BEHAVIOUR

#### DEFINED AS

!Managed object class imports the ISO/IEC 10165-2 objectCreation and objectDeletion notifications. Used as follows:

**objectCreation** - Generated whenever an instance of the managed object class is created. Implementations may optionally include the sourceIndicator parameter in the notification. If creation occurred as a result of internal operation of the resource, the value 'resourceOperation' is used. If creation occurred in response to a management operation, the value 'managementOperation' is used. A value of 'unknown' may be returned if it is not possible to determine the source of the operation. None of the other optional parameters are used.

**objectDeletion** - Generated whenever an instance of the managed object class is deleted. Implementations may optionally include the sourceIndicator parameter in the notification. If deletion occurred as a result of internal operation of the resource, the value 'resourceOperation' is used. If deletion occurred in response to a management operation, the value 'managementOperation' is used. A value of 'unknown' may be returned if it is not possible to determine the source of the operation. None of the other optional parameters are used.!

### commonStateChange-B BEHAVIOUR

#### DEFINED AS

!Managed object class imports the ISO/IEC 10165-2 stateChange notification. Used to report the changes to the operationalState attribute, and where present, the administrativeState attribute. A single parameter set is included in the State change definition field. Only the (mandatory) attributeId and (optional) newAttributeValue parameters are used.!

### octetsSentReceivedCounter-B BEHAVIOUR

#### DEFINED AS

The octetsSentCounter and octetsReceivedCounter shall count only user data octets in valid data packets. They shall not count user data octets in data packets which are rejected for any reason, nor user data octets in non data packets;

### successfulConnectionEstablishment-B BEHAVIOUR

#### DEFINED AS

This Package imports the communicationsInformation notification from "GMI".

It is used to report the following events.

**successfulConnectionEstablishment**: Generated when a connection is successfully established. However, the precise synchronization between the notification and the corresponding protocol and service interface interactions is not defined by this Specification.

The value NLM.successfulConnectionEstablishment shall be reported in the informationType field.;

## deactivateConnection-B BEHAVIOUR

## DEFINED AS

The Deactivate action causes the connection to be terminated. The termination should occur as rapidly as practical, but no particular time constraints are implied. Typically, this action simulates a disconnect request received across the service interface. If a more rapid means for terminating the connection exists, then this should be used. The termination shall occur in conformance to the protocol standard. The Managed Object remains in existence after completion of the Deactivate action. It is subsequently deleted when the connection is terminated, in the same way as if the connection has been terminated by other means. A deactivate action may fail (with the ProcessingError response) if it is temporarily not possible to terminate the connection.;

## resettingTimer-B BEHAVIOUR

## DEFINED AS

This attribute specifies the interval between certain events in the operation of the protocol state machine. If the value of this attribute is changed to a new value while the protocol state machine is in operation, the implementation shall take the necessary steps to ensure that for any time interval which was in progress when the corresponding attribute was changed, the next expiration of that interval takes place no later than the expiration of the interval in progress or the specified interval whichever is the sooner. The precision with which this time shall be implemented shall be the same as that associated with the basic operation of the timer attribute;

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### 5.3 The network subsystem managed object

- Managed Object for Network Layer Subsystem
- 
- There is exactly one of these MOs within a system. It exists to provide a container for the
- Network Entity MOs, nSAP MOs and the 'SNPA' MOs.
- 
- 
- The networkSubsystem managed object can not be created or deleted
- explicitly by management operation. It exists inherently in a system;
- created and deleted as part of system operation.
- 

```
networkSubsystem MANAGED OBJECT CLASS
  DERIVED FROM "GMI":subsystem;
  CHARACTERIZED BY networkSubsystem-P PACKAGE
  ATTRIBUTES
    "GMI":subsystemId
      INITIAL VALUE NLM.networkSubsystemId-Value
      GET;
  ;;
REGISTERED AS {NLM.moi networkSubsystem (1)};
```

#### -- Name Bindings

```
networkSubsystem-system NAME BINDING
  SUBORDINATE OBJECT CLASS networkSubsystem AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS "DMI":system AND SUBCLASSES;
    WITH ATTRIBUTE "GMI":subsystemId;
REGISTERED AS {NLM.nboi networkSubsystem-system (1)};
```

## 5.4 The network entity managed object

- There may be multiple instances of these MOs within a system.
- Its definition permits it to be deleted and created explicitly by management operation, or to be created and deleted automatically as part of system operation.

```
networkEntity MANAGED OBJECT CLASS
DERIVED FROM "GMI":communicationsEntity;
CHARACTERIZED BY networkEntity-P PACKAGE
  BEHAVIOUR commonCreationDeletion-B;
  ATTRIBUTES
    networkEntityTitles
      GET-REPLACE
      ADD-REMOVE,
    systemTypes GET;
  NOTIFICATIONS
    "DMI":objectDeletion,
    "DMI":objectCreation;
;;
```

REGISTERED AS {NLM.moi networkEntity (22)};

### -- Name Bindings

```
networkEntity-networkSubsystem-Automatic NAME BINDING
SUBORDINATE OBJECT CLASS networkEntity AND SUBCLASSES;
NAMED BY
  SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;
  WITH ATTRIBUTE "GMI":communicationsEntityId;
BEHAVIOUR networkEntity-networkSubsystem-Automatic-B BEHAVIOUR
  DEFINED AS This name binding shall be used when the
    networkEntity MO is created automatically by the operation
    of the system. The details of these operations are outside
    the scope of this Specification.;;
```

REGISTERED AS {NLM.nboi networkEntity-networkSubsystem-Automatic (27)};

```
networkEntity-networkSubsystem-Management NAME BINDING
SUBORDINATE OBJECT CLASS networkEntity AND SUBCLASSES;
NAMED BY
  SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;
  WITH ATTRIBUTE "GMI":communicationsEntityId;
BEHAVIOUR networkEntity-networkSubsystem-Management-B BEHAVIOUR
  DEFINED AS This name binding shall be used when the
    networkEntity MO is created automatically by system management.
  ;;
CREATE;
DELETE;
REGISTERED AS {NLM.nboi networkEntity-networkSubsystem-Management (28)};
```

**-- Attributes****networkEntityTitles ATTRIBUTE****WITH ATTRIBUTE SYNTAX NLM.NAddresses;****MATCHES FOR EQUALITY;****BEHAVIOUR networkEntityTitles-B BEHAVIOUR****DEFINED AS** The set of Network Entity Titles

(having the same abstract syntax as an NSAP address),

which unambiguously identify the Network Entity in

an End or Intermediate System. The value may be entered by a system

management operation or it may be derived by some local means, for example

by autoconfiguration.;;

**REGISTERED AS {NLM.aoi networkEntityTitles (3)};****systemTypes ATTRIBUTE****WITH ATTRIBUTE SYNTAX NLM.SystemTypes;****MATCHES FOR EQUALITY;****BEHAVIOUR systemTypes-B BEHAVIOUR****DEFINED AS** The set of system roles supported by this Network Entity.

This may be End System, Intermediate System or both. The actual

role in which a particular instance of the protocol machine

is operating is determined by the operationalSystemType attribute

of the cLNS or cONS MO.;;

**REGISTERED AS {NLM.aoi systemTypes (108)};**

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## 5.5 The NSAP managed object

- There is one nSAP MO for each set of NSAPs supported by the Network Subsystem associated with a single Transport layer client.
- Each NSAP MO corresponds to a set of one or more NSAPs supported by the Network Subsystem.
- There is not more than one Transport layer client associated with a single nSAP MO, but there may be more than one nSAP MO, and corresponding sets of NSAPs, associated with a single Transport layer client.
- Its definition permits it to be created and deleted explicitly by management operation or to be created and deleted automatically as part of system operation.

### nSAP MANAGED OBJECT CLASS

DERIVED FROM "GMI":sap2;  
 CHARACTERIZED BY nSAP-P PACKAGE  
 BEHAVIOUR commonCreationDeletion-B;

#### ATTRIBUTES

"GMI":sap2Address

INITIAL VALUE DERIVATION RULE nAddressesIV-B

GET;

#### NOTIFICATIONS

"DMI":objectDeletion,

"DMI":objectCreation;

::

REGISTERED AS {NLM.moi nSAP (4)};

### -- Behaviours

#### nAddressesIV-B BEHAVIOUR

DEFINED AS If the package is created using the nSAP-networkSubsystem-Automatic name binding the initial value of this attribute is not constrained by this Specification. However, if the package is created using the nSAP-networkSubsystem-Management name binding the initial value shall be specified in the CMIP create;

### -- Name Bindings

#### nSAP-networkSubsystem-Automatic NAME BINDING

SUBORDINATE OBJECT CLASS nSAP AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;

WITH ATTRIBUTE "GMI":sapId;

BEHAVIOUR nSAP-networkSubsystem-Automatic-B BEHAVIOUR

DEFINED AS This name binding shall be used when the nSAP MO is created automatically by the operation of the network entity. For example, by the use of autoconfiguration or dynamic NSAP Address assignment techniques. The details of the operation of these techniques are outside the scope of this Specification.;;

REGISTERED AS {NLM.nboi nSAP-networkSubsystem-Automatic (4)};

nSAP-networkSubsystem-Management NAME BINDING  
SUBORDINATE OBJECT CLASS nSAP AND SUBCLASSES;  
NAMED BY  
SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;  
WITH ATTRIBUTE "GMI":sapId;  
BEHAVIOUR nSAP-networkSubsystem-Management-B BEHAVIOUR  
DEFINED AS This name binding shall be used when the nSAP MO is created by system management.  
The value of the sap2Address attribute shall be specified in the CMIP create;;  
CREATE;  
DELETE;  
REGISTERED AS {NLM.nboi nSAP-networkSubsystem-Management (5)};

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## 5.6 The connectionless-mode network service managed object

There is no more than one of these MOs per network entity. Its definition permits it to be created and deleted explicitly by management operation, but in some systems it will exist inherently and neither creation nor deletion by management operation will be possible. Name bindings are defined for both cases.

When the protocol machine is operable, the operationalState shall have the value 'enabled'; otherwise it shall have the value 'disabled'. Transitions of operationalState shall be reported using the stateChange notification. A cLNS MO may be created in the 'enabled' operational state.

### cLNS MANAGED OBJECT CLASS

DERIVED FROM "GMI":clProtocolMachine;

CHARACTERIZED BY cLNS-P PACKAGE

BEHAVIOUR commonStateChange-B,

commonCreationDeletion-B;

#### ATTRIBUTES

"DMI":administrativeState GET-REPLACE,

"GMI":clProtocolMachineId

INITIAL VALUE NLM.cLNSId-Value

GET,

supportedProtocols GET,

operationalSystemType

INITIAL VALUE DERIVATION RULE operationalSystemTypeIV-B

GET;

#### ATTRIBUTE GROUPS

"DMI":state

"DMI":administrativeState

"DMI":operationalState;

#### ACTIONS

"GMI":activate,

"GMI":deactivate;

#### NOTIFICATIONS

"DMI":objectCreation,

"DMI":objectDeletion,

"DMI":stateChange;

::

#### CONDITIONAL PACKAGES

cLNS8473-P

PRESENT IF The protocol defined in ISO 8473 is used to implement the CLNS,

cLNSChecksum-P

PRESENT IF The ISO 8473 Generate Checksum option is implemented,

-- The following packages are associated with ISO/IEC 10589

"ISO/IEC 10589":cLNSISISBasic-P  
 PRESENT IF The system is an ISO/IEC 10589 IS,

"ISO/IEC 10589":cLNSISISAuthentication-P  
 PRESENT IF The system is an ISO/IEC 10589 IS  
 and the authentication procedures are implemented,

"ISO/IEC 10589":cLNSISISPartitionRepair-P  
 PRESENT IF The system is an ISO/IEC 10589 Level 2 IS  
 and the partition repair procedures are implemented,

"ISO/IEC 10589":cLNSISISLevel2-P  
 PRESENT IF The system is an ISO/IEC 10589 Level 2 IS,  
 "ISO/IEC 10589":cLNSISISLevel2Authentication-P  
 PRESENT IF The system is an ISO/IEC 10589 Level 2 IS  
 and the authentication procedures are implemented;

REGISTERED AS {NLM.moi cLNS (21)};

## -- Packages

### cLNS8473-P PACKAGE

#### BEHAVIOUR cLNS8473-P-B BEHAVIOUR

DEFINED AS Present when ISO 8473 is used to provide the CLNS;,  
 cLNS8473PImportedNotifications-B,  
 cLNS8473PImportedCounters-B;

#### ATTRIBUTES

"DMI":octetsSentCounter GET,  
 "DMI":octetsReceivedCounter GET,  
 segmentsReceived GET,  
 segmentsSent GET,  
 segmentsDiscarded GET,  
 assemblingSegmentsDiscarded GET,  
 errorReportsReceived GET,  
 pDUDiscards GET,  
 congestionDiscards GET,  
 maximumLifetime GET-REPLACE;

#### ATTRIBUTE GROUPS

"GMI":counters  
 "DMI":octetsSentCounter  
 "DMI":octetsReceivedCounter  
 segmentsReceived  
 segmentsDiscarded  
 assemblingSegmentsDiscarded  
 errorReportsReceived  
 pDUDiscards  
 congestionDiscards;

#### NOTIFICATIONS

"DMI":communicationsAlarm  
 notificationPDUHeader;

REGISTERED AS {NLM.poi cLNS8473-P (20)};

**cLNSChecksum-P PACKAGE****BEHAVIOUR cLNSChecksum-P-B BEHAVIOUR**

DEFINED AS When present checksum generation is controlled by the enableChecksum attribute;;

**ATTRIBUTES**

enableChecksum REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.false

GET-REPLACE;

REGISTERED AS {NLM.poi cLNSChecksum-P (1)};

**-- Behaviours****cLNS8473PImportedCounters-B BEHAVIOUR**

DEFINED AS The cLNS8473-P package imports octetsSentCounter and octetsReceivedCounter from ISO/IEC 10165-2. They are used to count the number of octets of data transmitted or received by the local network entity in ISO 8473 Data PDUs. (i.e. those which have a source or destination N-Address, respectively, which corresponds to that one of those of the local network entity.)

**cLNS8473PImportedNotifications-B BEHAVIOUR**

DEFINED AS The cLNS8473-P package imports the communicationsAlarm notification from Rec. 721 | ISO/IEC 10165-2.

It is used to report the following cLNS managed object events.

**pDUDiscard:**

Generated when a data NPDU is discarded due to any of the reasons specified in ISO 8473 Table 7, with the exception of 'PDU Discarded due to Congestion'. The header of the PDU in error shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationPDUHeader parameters. The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it. The value NLM.pDUDiscard and that corresponding to the Reason For Discard shall both be reported in the specificProblems parameter. The probableCause shall be set to NLM.communicationsProtocolError. The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated. No other fields or parameters shall be used, with the exception of further parameters in the AdditionalInformation field.

A PDU which does not contain one of the protocol identifiers defined in ISO 8473 shall not cause this event.

A PDU with a protocol ID 1000 0001 shall not cause this event if it does not also contain the Version/Protocol Identifier extension defined in 7.2.4 of ISO 8473.

If an error report PDU is generated, the PDU header and Discard Reason in the error report shall be the same as those in the corresponding notification.

**operationalSystemTypeIV-B BEHAVIOUR**

DEFINED AS If the MO is created by management operation (using the cLNS-networkEntity-Management or cONS-networkEntity-Management name binding), the initial value of the operationalSystemType attribute shall be specified in the CMIP create. Otherwise, the value shall be determined in an implementation specific manner. The value shall be one of those present in the systemTypes attribute of the superior Network Entity MO.

**-- Name Bindings****cLNS-networkEntity-Management NAME BINDING**

SUBORDINATE OBJECT CLASS cLNS AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS networkEntity AND SUBCLASSES;  
WITH ATTRIBUTE "GMI":clProtocolMachineId;

BEHAVIOUR cLNS-networkEntity-Management-B BEHAVIOUR

DEFINED AS The name binding that applies when the cLNS managed object can be created and deleted by management;;

CREATE;

DELETE ONLY-IF-NO-CONTAINED-OBJECTS;

REGISTERED AS {NLM.nboi cLNS-networkEntity-Management (3)};

**cLNS-networkEntity-Automatic NAME BINDING**

SUBORDINATE OBJECT CLASS cLNS AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS networkEntity AND SUBCLASSES;  
WITH ATTRIBUTE "GMI":clProtocolMachineId;

BEHAVIOUR cLNS-networkEntity-Automatic-B BEHAVIOUR

DEFINED AS The name binding that applies when the cLNS managed object cannot be created or deleted by management;;

REGISTERED AS {NLM.nboi cLNS-networkEntity-Automatic (16)};

**-- Attributes****assemblingSegmentsDiscarded ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR assemblingSegmentsDiscarded-B BEHAVIOUR

DEFINED AS Counter of segments discarded due to reassembly time expiry.

This is the number of data and error report NPDUs discarded due to reassembly time expiry;;

REGISTERED AS {NLM.aoi assemblingSegmentsDiscarded (8)};

**congestionDiscards ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR congestionDiscards-B BEHAVIOUR

DEFINED AS Counter of PDUs discarded due to congestion.

This is the number of data or error report PDUs discarded due to congestion.

This counter is incremented irrespective of the setting of the Error Report bit in the received PDU;;

REGISTERED AS {NLM.aoi congestionDiscards (11)};

**enableChecksum ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;  
 MATCHES FOR EQUALITY;  
 BEHAVIOUR enableChecksum-B BEHAVIOUR  
 DEFINED AS When True, the generation of checksums is enabled.;;  
 REGISTERED AS {NLM.aoi enableChecksum (4)};

**errorReportsReceived ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;  
 BEHAVIOUR errorReportsReceived-B BEHAVIOUR  
 DEFINED AS Counter of received error reports.  
 This is the number of error report NPDUs received which were addressed to the local network entity;;  
 REGISTERED AS {NLM.aoi errorReportsReceived (9)};

**maximumLifetime ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Lifetime;  
 MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR maximumLifetime-B BEHAVIOUR  
 DEFINED AS Maximum PDU lifetime (in half seconds).  
 This attribute controls the maximum value (in half seconds) which may be placed in the lifetime field of any ISO 8473 data or error report PDU generated by the local network entity. It does not affect the lifetime field of any PDUs not generated by this network entity, for example those relayed by this system acting as an Intermediate System. PDUs generated by the local network entity are permitted to have a lower value of lifetime field than this attribute, but shall not have a larger value. The means by which the value of the lifetime field is determined for an individual PDU is outside the scope of this Specification, provided that it meets the above constraints.;;  
 REGISTERED AS {NLM.aoi maximumLifetime (102)};

**operationalSystemType ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.SystemType;  
 MATCHES FOR EQUALITY;  
 BEHAVIOUR operationalSystemType-B BEHAVIOUR  
 DEFINED AS The system role in which this instance is operating.  
 A value of ES indicates that the system shall perform no forwarding operations upon non-local PDUs.  
 A value of IS indicates that the system is permitted to perform forwarding operations, but the decision to forward individual PDUs, or not to forward them, shall be taken on the basis of the available routing information.;;  
 REGISTERED AS {NLM.aoi operationalSystemType (109)};

**pDUDiscards ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR pDUDiscards-B BEHAVIOUR

DEFINED AS Counter of PDUs discarded (except for congestion).

This is the number of data or error report PDUs discarded for any of the reasons specified in ISO 8473 Table 7 with the exception of 'PDU discarded due to congestion'. This counter is incremented irrespective of the setting of the Error Report bit in the received PDU;;

- Note: this counter is therefore a count of the number of
- communicationsAlarm notifications with a specificProblem value of
- pDUDiscard generated (as opposed to CMIP events,
- may be suppressed) as required by GDMO 9.8.5.

REGISTERED AS {NLM.aoi pDUDiscards (10)};

**segmentsDiscarded ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR segmentsDiscarded-B BEHAVIOUR

DEFINED AS Counter of segments discarded.

This is the number of data and error report NPDUs discarded without being delivered to a Network Service user or forwarded. This includes segments discarded for any reason except reassembly time expiry;;

REGISTERED AS {NLM.aoi segmentsDiscarded (7)};

**segmentsReceived ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR segmentsReceived-B BEHAVIOUR

DEFINED AS Counter of segments received.

This is the number of data and error report NPDUs received prior to reassembly, including those which may subsequently be discarded;;

REGISTERED AS {NLM.aoi segmentsReceived (6)};

**segmentsSent ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR segmentsSent-B BEHAVIOUR

DEFINED AS Counter of segments Sent.

This is the number of data and error report NPDUs sent after segmentation processing occurs;;

REGISTERED AS {NLM.aoi segmentsSent (118)};

**supportedProtocols ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.SupportedProtocols;

MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;

BEHAVIOUR supportedProtocols-B BEHAVIOUR

DEFINED AS The set of Connectionless Network protocols supported by this instance of the cLNS protocol machine, expressed except where otherwise indicated (for example because there are more than one protocol described in a single International Standard) as the registered object identifiers of the relevant International Standard. The operation of a particular protocol over a particular linkage is determined by the linkage operationalProtocols attribute. The value of the supportedProtocols attribute is determined by the implementation.;;

REGISTERED AS {NLM.aoi supportedProtocols (110)};

-- Parameters

notificationPDUHeader PARAMETER

CONTEXT EVENT-INFO;

WITH SYNTAX NLM.OctetString;

BEHAVIOUR notificationPDUHeader-B BEHAVIOUR

DEFINED AS The header of the data NPDU header which caused this event;;

REGISTERED AS {NLM.proi notificationPDUHeader (1)};

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## 5.7 The linkage managed object

- Linkage Managed Object
- 
- There is one of these MOs associated with each separate provision of the underlying service to the superior protocol machine.
- Its definition permits it to be created and deleted explicitly by management operation, but in some systems it will exist inherently and neither creation nor deletion by management operation will be possible. Name bindings are defined for both cases.
- 
- When the linkage is operable, the operationalState shall have the value 'enabled'; otherwise it shall have the value 'disabled'.
- Transitions of operationalState shall be reported using the stateChange notification. An linkage MO may be created in the 'enabled' operational state.
- 

### linkage MANAGED OBJECT CLASS

DERIVED FROM "DMI":top;

CHARACTERIZED BY linkage-P PACKAGE

BEHAVIOUR commonCreationDeletion-B,  
commonStateChange-B;

#### ATTRIBUTES

linkageId GET,

"DMI":operationalState GET,

"DMI":administrativeState GET-REPLACE,

sN-ServiceProvider

INITIAL VALUE DERIVATION RULE sN-ServiceProviderIV-B  
GET,

sN-SAP GET,

operationalProtocols

INITIAL VALUE DERIVATION RULE operationalProtocolIV-B  
GET;

#### ATTRIBUTE GROUPS

"DMI":state

"DMI":administrativeState

"DMI":operationalState;

#### ACTIONS

"GMI":activate,

"GMI":deactivate;

#### NOTIFICATIONS

"DMI":stateChange,

"DMI":objectCreation,

"DMI":objectDeletion;

::

#### CONDITIONAL PACKAGES

linkage-ISO9542IS-P

PRESENT IF support for ISO 9542 operating as an IS,

linkage-ISO9542ES-P

PRESENT IF support for ISO 9542 operating as an ES,

linkage-ISO9542Checksum-P

PRESENT IF support for ISO 9542 PDU Header Checksum Generation function,

linkageInitialMinimumTimer-P

PRESENT IF support for the initial minimum timer attribute of the ISO 8473  
 SNDCF when operating ISO 8473 over an ISO/IEC 8208 or  
 CO Datalink Service,  
 linkageReserveTimer-P  
 PRESENT IF support for the reserve timer attribute of the ISO 8473 SNDCF  
 when operating ISO 8473 over an ISO/IEC 8208 or  
 CO Datalink Service,  
 linkageIdleTimer-P  
 PRESENT IF support for the idle timer attribute of the ISO 8473 SNDCF  
 when operating ISO 8473 over an ISO/IEC 8208 or  
 CO Datalink Service,  
 linkage-ISO8473-ISO8208SND CF-P  
 PRESENT IF operating ISO 8473 over ISO/IEC 8208 ,  
 linkageCODLService-P  
 PRESENT IF operating ISO 8473 over the CO Datalink Service,

-- The following packages are associated with ISO/IEC 10589

"ISO/IEC 10589":linkageISISBasic-P  
 PRESENT IF the system is an ISO/IEC 10589 IS,  
 "ISO/IEC 10589":linkageISISAuthentication-P  
 PRESENT IF the authentication procedures are implemented  
 on an ISO/IEC 10589 IS,  
 "ISO/IEC 10589":linkageISISBroadcast-P  
 PRESENT IF the linkage is a broadcast circuit  
 on an ISO/IEC 10589 IS,  
 "ISO/IEC 10589":linkageISISDACallEstablishmentMetricIncrement-P  
 PRESENT IF the linkage is a DA Circuit and support is implemented for  
 call establishment metric increment values greater than zero on an  
 ISO/IEC 10589 IS,  
 "ISO/IEC 10589":linkageISISPtToPt-P  
 PRESENT IF the linkage is a point to point circuit  
 on an ISO/IEC 10589 IS,  
 "ISO/IEC 10589":linkageISISStatic-P  
 PRESENT IF the linkage is an X.25 static circuit (IN or OUT)  
 on an ISO/IEC 10589 IS,  
 "ISO/IEC 10589":linkageISISLevel2-P  
 PRESENT IF the system is an ISO/IEC 10589 level 2 IS,  
 "ISO/IEC 10589":linkageISISlevel2Broadcast-P  
 PRESENT IF the linkage is a broadcast circuit on an ISO/IEC 10589 level 2 IS;  
 REGISTERED AS {NLM.moi linkage (23)};

-- Packages

linkageCODLService-P PACKAGE

BEHAVIOUR linkageCODLService-P-B BEHAVIOUR

DEFINED AS Controls the operation of CO Datalink as an SND CF for ISO 8473;;

ATTRIBUTES

callsPlaced GET,

callsFailed GET;

ATTRIBUTE GROUPS

"GMI":counters

callsPlaced

callsFailed;

REGISTERED AS {NLM.poi linkageCODLService-P (9)};

**linkageIdleTimer-P PACKAGE****BEHAVIOUR linkageIdleTimer-P-B BEHAVIOUR**

DEFINED AS Controls the ability, when implemented, of an ISO/IEC 8208 or CO Datalink SNDCF for ISO 8473 to close an established Virtual Call when it is idle. ;;

**ATTRIBUTES**

idleTimer REPLACE-WITH-DEFAULT

GET-REPLACE;

REGISTERED AS {NLM.poi linkageIdleTimer-P (5)};

**linkageInitialMinimumTimer-P PACKAGE****BEHAVIOUR linkageInitialMinimumTimer-P-B BEHAVIOUR**

DEFINED AS Controls the ability, when implemented, of an ISO/IEC 8208 or CO Datalink SNDCF for ISO 8473 to close an established Virtual Call when it is idle, but only after a minimum time after its establishment;;

**ATTRIBUTES**

initialMinimumTimer REPLACE-WITH-DEFAULT

GET-REPLACE;

REGISTERED AS {NLM.poi linkageInitialMinimumTimer-P (7)};

**linkage-ISO8473-ISO8208SNDCF-P PACKAGE****BEHAVIOUR linkage-ISO8473-ISO8208SNDCF-P-B BEHAVIOUR**

DEFINED AS Controls the operation of ISO/IEC 8208 as an SNDCF for ISO 8473;;

**ATTRIBUTES**

callsPlaced GET,

callsFailed GET;

**ATTRIBUTE GROUPS**

"GMI":counters

callsPlaced

callsFailed;

REGISTERED AS {NLM.poi linkage-ISO8473-ISO8208SNDCF-P (4)};

**linkage-ISO9542Checksum-P PACKAGE****BEHAVIOUR linkage-ISO9542Checksum-P-B BEHAVIOUR**

DEFINED AS When present, checksum generation is controlled by the enableChecksum attribute;;

**ATTRIBUTES**

enableChecksum REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.false

GET-REPLACE;

REGISTERED AS {NLM.poi linkage-ISO9542Checksum-P(17)};

**linkage-ISO9542ES-P PACKAGE****BEHAVIOUR****linkage-ISO9542ES-P-B BEHAVIOUR**

DEFINED AS Controls the operation of ISO 9542 on an End System,;

linkage-ISO9542ImportedAlarmNotifications-B,

linkage-ISO9542ISReachabilityChange-B,

linkage-ISO9542ESReachabilityChange-B;

**ATTRIBUTES**

iSO9542OperationalSubsets GET-REPLACE,

holdingTimerMultiplier

REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.holdingTimerMultiplierDefault

PERMITTED VALUES NLM.HoldingTimerMultiplierPermitted  
 REQUIRED VALUES NLM.HoldingTimerMultiplierRequired  
 GET-REPLACE,

manualISSNPAAddress REPLACE-WITH-DEFAULT  
 GET-REPLACE ADD-REMOVE,

defaultESConfigTimer REPLACE-WITH-DEFAULT  
 GET-REPLACE,

activeESConfigTimer GET,  
 iSReachabilityChanges GET,  
 invalid9542PDUs GET;

#### ATTRIBUTE GROUPS

"GMI":counters  
 iSReachabilityChanges  
 invalid9542PDUs;

#### NOTIFICATIONS

"DMI":communicationsAlarm,  
 "GMI":communicationsInformation  
 reachabilityChange;

REGISTERED AS {NLM.poi linkage-ISO9542ES-P (21)};

#### linkage-ISO9542IS-P PACKAGE

BEHAVIOUR linkage-ISO9542IS-P-B BEHAVIOUR

DEFINED AS Controls the operation of ISO 9542 on an Intermediate System,;

linkage-ISO9542ImportedAlarmNotifications-B,

linkage-ISO9542ISReachabilityChange-B,

linkage-ISO9542ESReachabilityChange-B;

#### ATTRIBUTES

iSO9542OperationalSubsets GET-REPLACE,  
 holdingTimerMultiplier

REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.holdingTimerMultiplierDefault

PERMITTED VALUES NLM.HoldingTimerMultiplierPermitted

REQUIRED VALUES NLM.HoldingTimerMultiplierRequired  
 GET-REPLACE,

iSConfigurationTimer REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.iSConfigurationTimerDefault

GET-REPLACE,

suggestedESConfigurationTimer REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.suggestedESConfigurationTimerDefault

GET-REPLACE,

redirectHoldingTime

REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.redirectHoldingTime-Default

PERMITTED VALUES NLM.RedirectHoldingTime-Permitted

GET-REPLACE,

eSReachabilityChanges GET,  
invalid9542PDUs GET;

**ATTRIBUTE GROUPS**

"GMI":counters  
eSReachabilityChanges  
invalid9542PDUs;

**NOTIFICATIONS**

"DMI":communicationsAlarm,  
"GMI":communicationsInformation  
reachabilityChange;

REGISTERED AS {NLM.poi linkage-ISO9542IS-P (22)};

**linkageReserveTimer-P PACKAGE**

**BEHAVIOUR linkageReserveTimer-P-B BEHAVIOUR**

DEFINED AS Controls the ability, when implemented, of an ISO/IEC 8208 or CO Datalink SND CF for ISO 8473 to close an established Virtual Call when it is idle, but retain resources for its re-establishment ;;

**ATTRIBUTES**

reserveTimer REPLACE-WITH-DEFAULT  
GET-REPLACE;

REGISTERED AS {NLM.poi linkageReserveTimer-P (6)};

**-- Behaviours**

**linkage-ISO9542ISReachabilityChange-B BEHAVIOUR**

DEFINED AS

This package imports the communicationsInformation notification from Rec. X.723 | ISO/IEC 10165-5.  
It is used to report the following events.

iSReachabilityChange:

Generated when an ES or IS detects a change in the reachability of a neighboring IS.  
The value NLM.iSReachabilityChange shall be reported in the informationType field.  
The new State, NET of the IS concerned, snpaAddress (where available) and the reason for the change shall be reported in the informationData field using the reachabilityChange PARAMETER.

**linkage-ISO9542ESReachabilityChange-B BEHAVIOUR**

DEFINED AS

This package imports the communicationsInformation notification from Rec. X.723 | ISO/IEC 10165-5.  
It is used to report the following events.

**eSReachabilityChange:**

Generated when an ES or IS detects a change in the reachability of a neighboring ES. The value NLM.eSReachabilityChange shall be reported in the informationType field. The new State, set of NSAPAddresses of the IS concerned, the snpaAddress (where available) and the reason for the change shall be reported in the informationData field using the reachabilityChange PARAMETER.

;

**linkage-ISO9542ImportedAlarmNotifications-B BEHAVIOUR**

DEFINED AS This package imports the communicationsAlarm notification from Rec. X.721 (1992) | ISO/IEC 10165-2. It is used to report the following events.

**invalid9542PDU:**

Generated when an ISO 9542 PDU is received which is discarded as result of the PDU Header Error Detection or Protocol Error Processing Functions specified in ISO 9542. The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it. The value NLM.iSO9542PDUDiscard shall be reported in the specificProblems parameter. The probableCause shall be set to NLM.communicationsProtocolError. The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated. No other fields or parameters shall be used, with the exception of further parameters in the AdditionalInformation field.

**operationalProtocolIV-B BEHAVIOUR**

DEFINED AS If the linkage MO is created by management operation (using the linkage-cLNS-Management name binding), the initial value of the operationalProtocols attribute shall be specified in the CMIP create. Otherwise, the value shall be determined in an implementation specific manner;

**sN-ServiceProviderIV-B BEHAVIOUR**

DEFINED AS If the linkage MO is created by management operation (using the linkage-cONS-Management or linkage-cONS-Management name bindings), the initial value of the sN-ServiceProvider attribute shall be specified in the CMIP create. Otherwise, the value shall be determined in an implementation specific manner;

**-- Name Bindings****linkage-cLNS-Management NAME BINDING**

SUBORDINATE OBJECT CLASS linkage AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS cLNS AND SUBCLASSES;  
WITH ATTRIBUTE linkageId;

BEHAVIOUR sN-ServiceProviderIV-B, operationalProtocolIV-B,  
linkage-cLNS-Management-B BEHAVIOUR

DEFINED AS The name binding which applies when the linkage managed object  
can be created and deleted by management as a subordinate object of the cLNS  
managed object class;;

CREATE WITH-REFERENCE-OBJECT;  
DELETE;

REGISTERED AS {NLM.nboi linkage-cLNS-Management (20)};

**linkage-cONS-Management NAME BINDING**

SUBORDINATE OBJECT CLASS linkage AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS cONS AND SUBCLASSES;  
WITH ATTRIBUTE linkageId;

BEHAVIOUR sN-ServiceProviderIV-B,  
linkage-cONS-Management-B BEHAVIOUR

DEFINED AS The name binding which applies when the linkage managed object  
can be created and deleted by management as a subordinate object of the cONS  
managed object class;;

CREATE WITH-REFERENCE-OBJECT;  
DELETE;

REGISTERED AS {NLM.nboi linkage-cONS-Management (21)};

**linkage-cLNS-Automatic NAME BINDING**

SUBORDINATE OBJECT CLASS linkage AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS cLNS AND SUBCLASSES;  
WITH ATTRIBUTE linkageId;

BEHAVIOUR sN-ServiceProviderIV-B, operationalProtocolIV-B,  
linkage-cLNS-Automatic-B BEHAVIOUR

DEFINED AS The name binding which applies when the linkage managed object  
can not be created and deleted by management as a subordinate object of the cLNS  
managed object class;;

REGISTERED AS {NLM.nboi linkage-cLNS-Automatic (22)};

**linkage-cONS-Automatic NAME BINDING**

SUBORDINATE OBJECT CLASS linkage AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS cONS AND SUBCLASSES;  
WITH ATTRIBUTE linkageId;

BEHAVIOUR sN-ServiceProviderIV-B,  
linkage-cONS-Automatic-B BEHAVIOUR

DEFINED AS The name binding which applies when the linkage managed object  
can not be created and deleted by management as a subordinate object of the cONS  
managed object class;;

REGISTERED AS {NLM.nboi linkage-cONS-Automatic (23)};

**-- Attributes****activeESConfigTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR activeESConfigTimer-B BEHAVIOUR

DEFINED AS Currently active value for the ISO 9542 ES configuration timer  
in seconds.;;

REGISTERED AS {NLM.aoi activeESConfigTimer (22)};

**callsFailed ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR callsFailed-B BEHAVIOUR

DEFINED AS Counter of the number of X.25 call failures  
while attempting establishment by the SNDCF;;

REGISTERED AS {NLM.aoi callsFailed (30)};

**callsPlaced ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR callsPlaced-B BEHAVIOUR

DEFINED AS Counter of the number of X.25 VCs successfully established  
by the SNDCF;;

REGISTERED AS {NLM.aoi callsPlaced (29)};

**defaultESConfigTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR resettingTimer-B, defaultESConfigTimer-B BEHAVIOUR

DEFINED AS Default value for the ISO 9542 ES configuration timer  
in seconds. This value is used when the ES has not received,  
or has not chosen to accept, a suggested configuration timer  
value from an Intermediate System;;

REGISTERED AS {NLM.aoi defaultESConfigTimer (21)};

**eSReachabilityChanges ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR eSReachabilityChanges-B BEHAVIOUR

DEFINED AS Count of the number of changes in reachability of End Systems  
from this system;;

REGISTERED AS {NLM.aoi eSReachabilityChanges (27)};

**holdingTimerMultiplier ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

BEHAVIOUR holdingTimerMultiplier-B BEHAVIOUR

DEFINED AS The factor to derive holding timer from configuration timer.

This value, when multiplied by a configuration timer yields the value of  
the holding timer parameter issued with configuration information. The semantics of  
this parameter are such that it is permissible to also add a delta value to the result to  
compensate for possible delays and imprecision of timers. The result of the calculation  
is truncated, upon overflow, to the maximum value for the parameter permitted by the  
protocol (65535);;

REGISTERED AS {NLM.aoi holdingTimerMultiplier (20)};

**idleTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR idleTimer-B BEHAVIOUR

DEFINED AS Time in seconds before release of an idle call.

This timer determines the interval (in seconds) for which a call is permitted to remain idle (i.e. no data traffic in either direction) before being released by the SNDCF;;

REGISTERED AS {NLM.aoi idleTimer (31)};

**initialMinimumTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR initialMinimumTimer-B BEHAVIOUR

DEFINED AS Minimum time in seconds to retain call after establishment.

This timer determines the interval (in seconds) that a call shall remain connected after being established, irrespective of traffic. (Note. This should be set small enough so that the call is cleared before the start of the next charging interval.);;

REGISTERED AS {NLM.aoi initialMinimumTimer (33)};

**invalid9542PDUs ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR invalid9542PDUs-B BEHAVIOUR

DEFINED AS Counter of invalid 9542 PDUs received.

This is the number of ISO 9542 PDUs received which are discarded as result of the PDU Header Error Detection or Protocol Error Processing Functions specified in ISO 9542;;

-- Note: this counter is therefore a count of the number of

-- communicationsAlarm notifications with a specificProblem value of

-- NLM.iSO9542PDUDiscard generated.

REGISTERED AS {NLM.aoi invalid9542PDUs (101)};

**iSConfigurationTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR resettingTimer-B, iSConfigurationTimer-B BEHAVIOUR

DEFINED AS Value in seconds for the ISO 9542 IS configuration timer.

It is used to determine how often an IS reports configuration information to ESs;;

REGISTERED AS {NLM.aoi iSConfigurationTimer (24)};

**iSO9542OperationalSubsets ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.ISO9542Subsets;

MATCHES FOR EQUALITY;

BEHAVIOUR iSO9542OperationalSubsets-B BEHAVIOUR

DEFINED AS The set of ISO 9542 subsets operational on this linkage;;

REGISTERED AS {NLM.aoi iSO9542OperationalSubsets (115)};

**iSReachabilityChanges ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR iSReachabilityChanges-B BEHAVIOUR

DEFINED AS Counter of the number of changes in reachability of Intermediate Systems from this system;;

REGISTERED AS {NLM.aoi iSReachabilityChanges (23)};

**linkageId ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.GraphicString;

MATCHES FOR EQUALITY, SUBSTRINGS;

BEHAVIOUR linkageId-B BEHAVIOUR

DEFINED AS The naming attribute of the linkage MO instance;;

REGISTERED AS {NLM.aoi linkageId (17)};

**manualISSNPAAddress ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.ManualISSNPAAddress;

MATCHES FOR SET-COMPARISON, SET-INTERSECTION;

BEHAVIOUR manualISSNPAAddress-B BEHAVIOUR

DEFINED AS The set of SNPA Addresses to which calls associated with the SND CF are to established in the absence of any other information. The maximum set cardinality shall be implementation specific. An attempt to set the value of an element of this set to a type of SNPAAddress which is not supported by this linkage shall result in a failure of the SET operation.;;

REGISTERED AS {NLM.aoi manualISSNPAAddress (28)};

**operationalProtocols ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.SupportedProtocols;

MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;

BEHAVIOUR operationalProtocols-B BEHAVIOUR

DEFINED AS The set of network layer protocols supported by this instance of the linkage MO, expressed as the registered object identifiers of the relevant International Standard.;;

REGISTERED AS {NLM.aoi operationalProtocols (111)};

**redirectHoldingTime ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.RedirectHoldingTime;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR redirectHoldingTime-B BEHAVIOUR

DEFINED AS The holding time (in seconds) to be specified in Redirect PDUs generated by this system.;;

REGISTERED AS {NLM.aoi redirectHoldingTime (26)};

**reserveTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR reserveTimer-B BEHAVIOUR

DEFINED AS Time in seconds to reserve resources for call re-establishment.

This timer determines the interval (in seconds) for which an attempt

shall be made to retain those resources, as determined by the implementation,

whose retention will increase the probability of successful re-establishment of an idled VC.;;

REGISTERED AS {NLM.aoi reserveTimer (32)};

**sN-SAP ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.LocalDistinguishedName;

MATCHES FOR EQUALITY;

BEHAVIOUR sN-SAP-B BEHAVIOUR

DEFINED AS Distinguished name of the service provider SAP MO  
(if present).

This is obtained via an internal interface when the linkage is enabled. The sN-SAP may be a relationship to a SAP MO in the Datalink Layer, or it may be a relationship to another Managed Object within the Network Layer which is not a SAP MO.

For example, when operating ISO 8473 over the ISO/IEC 8208 Sndcf, it is a relationship to the same x25PLE-DTE MO which is pointed to by the sN-ServiceProvider Attribute. ;;

REGISTERED AS {NLM.aoi sN-SAP (18)};

**sN-ServiceProvider ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.LocalDistinguishedName;

MATCHES FOR EQUALITY;

BEHAVIOUR sN-ServiceProvider-B BEHAVIOUR

DEFINED AS Distinguished name of the SN service provider MO.

This attribute identifies the subnetwork entity to be used to support the linkage, when enabled. The subnetwork service provider may be in the Datalink Layer, or it may be in the Network Layer

(for example when operating ISO 8473 over the ISO/IEC 8208 Sndcf).;;

REGISTERED AS {NLM.aoi sN-ServiceProvider (19)};

**suggestedESConfigurationTimer ATTRIBUTE**

DERIVED FROM "GMI":timer;

BEHAVIOUR resettingTimer-B, suggestedESConfigurationTimer-B BEHAVIOUR

DEFINED AS Value to be used for the ISO 9542 suggested ES configuration timer value (in seconds),

advertised in IS hellos generated by this network entity;;

REGISTERED AS {NLM.aoi suggestedESConfigurationTimer (25)};

**-- Parameters****reachabilityChange PARAMETER**

CONTEXT EVENT-INFO;

WITH SYNTAX NLM.ReachabilityChangeSyntax;

REGISTERED AS {NLM.proi reachabilityChange (12)};

## 5.8 The connection-mode network service managed object

-- There is no more than one of these MOs per network entity.  
 -- Its definition permits it to be created and deleted explicitly by  
 -- management operation, but in some systems it will exist inherently  
 -- and neither creation nor deletion by management operation will be  
 -- possible. Name bindings are defined for both cases.

-- When the protocol machine is operable, the operationalState shall  
 -- have the value 'enabled'; otherwise it shall have the value 'disabled'.  
 -- Transitions of operationalState shall be reported using the  
 -- stateChange notification. A cONS MO may be created in the  
 -- 'enabled' operational state.

### cONS MANAGED OBJECT CLASS

DERIVED FROM "GMI":coProtocolMachine;

CHARACTERIZED BY cONS-P PACKAGE

BEHAVIOUR commonStateChange-B,

commonCreationDeletion-B;

#### ATTRIBUTES

"DMI":administrativeState GET-REPLACE,

"GMI":coProtocolMachineId

INITIAL VALUE NLM.cONSId-Value

GET,

operationalSystemType

INITIAL VALUE DERIVATION RULE operationalSystemTypeIV-B

GET;

#### ATTRIBUTE GROUPS

"DMI":state

"DMI":administrativeState

"DMI":operationalState;

#### ACTIONS

"GMI":activate,

"GMI":deactivate,

"GMI":deactivateWhenNoUsers;

#### NOTIFICATIONS

"DMI":objectCreation,

"DMI":objectDeletion,

"DMI":stateChange;

::

REGISTERED AS {NLM.moi cONS (24)};

**-- Name Bindings****cONS-networkEntity-Management NAME BINDING**

SUBORDINATE OBJECT CLASS cONS AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS networkEntity AND SUBCLASSES;

WITH ATTRIBUTE "GMI":coProtocolMachineId;

BEHAVIOUR cONS-networkEntity-Management-B BEHAVIOUR

DEFINED AS The name binding that applies when the cONS managed object  
can be created and deleted by management;;

CREATE;

DELETE ONLY-IF-NO-CONTAINED-OBJECTS;

REGISTERED AS {NLM.nboi cONS-networkEntity-Management (8)};

**cONS-networkEntity-Automatic NAME BINDING**

SUBORDINATE OBJECT CLASS cONS AND SUBCLASSES;

NAMED BY

SUPERIOR OBJECT CLASS networkEntity AND SUBCLASSES;

WITH ATTRIBUTE "GMI":coProtocolMachineId;

BEHAVIOUR cONS-networkEntity-Automatic-B BEHAVIOUR

DEFINED AS The name binding that applies when the cONS managed object  
cannot be created or deleted by management;;

REGISTERED AS {NLM.nboi cONS-networkEntity-Automatic (17)};

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## 5.9 The network connection managed object

There is one instance of this MO corresponding to each network connection. It is created and deleted by the operation of the protocol machine.

In some configurations the underlyingConnectionNames attribute may contain more than one distinguished name. In this case, the type of the underlying MO (and hence the particular underlying resource) can only be determined by inspection of the MO pointed to by this distinguished name.

networkConnection MANAGED OBJECT CLASS  
 DERIVED FROM "GMI":singlePeerConnection;  
 CHARACTERIZED BY networkConnection-P PACKAGE  
 BEHAVIOUR  
 commonCreationDeletion-B,  
 successfulConnectionEstablishment-B,  
 deactivateConnection-B,  
 networkConnection-P-B BEHAVIOUR  
 DEFINED AS The "GMI":underlyingConnectionNames  
 attribute shall contain the distinguished name(s) of the  
 other MO(s) which represent the resources used to support  
 this connection. In the case of the CONS operating  
 directly over X.25, this shall be the single distinguished  
 name of the underlying virtual call or permanent  
 virtual circuit MO;;  
 ATTRIBUTES  
 localNSAPMO GET,  
 remoteNSAPAddress GET;  
 ACTIONS  
 "GMI":deactivate;  
 NOTIFICATIONS  
 "DMI":objectCreation,  
 "DMI":objectDeletion,  
 "GMI":communicationsInformation;  
 ;;  
 REGISTERED AS {NLM.moi networkConnection (13)};

### -- Name Bindings

networkConnection-cONS NAME BINDING  
 SUBORDINATE OBJECT CLASS networkConnection AND SUBCLASSES;  
 NAMED BY  
 SUPERIOR OBJECT CLASS cONS AND SUBCLASSES;  
 WITH ATTRIBUTE "GMI":connectionId;  
 DELETE;  
 REGISTERED AS {NLM.nboi networkConnection-cONS (19)};

**-- Attributes****localNSAPMO ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.LocalDistinguishedName;

MATCHES FOR EQUALITY;

BEHAVIOUR localNSAPMO-B BEHAVIOUR

DEFINED AS Pointer to local nSAP MO.

This is a relationship attribute which points to the

local nSAP MO which is associated with the connection;;

REGISTERED AS {NLM.aoi localNSAPMO (106)};

**remoteNSAPAddress ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.NAddress;

MATCHES FOR EQUALITY;

BEHAVIOUR remoteNSAPAddress-B BEHAVIOUR

DEFINED AS The remote NSAP Address

associated with the connection;;

REGISTERED AS {NLM.aoi remoteNSAPAddress (107)};

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## 5.10 The X.25 PLE and related managed objects

### 5.10.1 The X.25 PLE managed object

-- This MO class is never instantiated. It serves as a generic  
 -- x25PLE MO from which both the x25PLE-DTE and x25PLE-DCE MO  
 -- classes are derived.

-- Note that the values of the x25PLEId naming attribute are  
 -- required to be unique across all instances of MOs derived from  
 -- this, which have a common superior.

#### x25PLE MANAGED OBJECT CLASS

DERIVED FROM "DMI":top;

CHARACTERIZED BY x25PLE-P PACKAGE

BEHAVIOUR commonStateChange-B,

commonCreationDeletion-B,

logicalChannelAssignmentsX25PLE-P-B BEHAVIOUR

DEFINED AS The logicalChannelAssignments attribute shall not be replaceable  
 when the value of the operationalState attribute is 'enabled';;

#### ATTRIBUTES

x25PLEId GET,

"DMI":operationalState GET,

"DMI":administrativeState GET-REPLACE,

protocolVersionSupported GET,

localDTEAddress GET-REPLACE,

x25PLEMode GET-REPLACE,

defaultThroughputClasses REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.nullBidirectionalValues

GET-REPLACE,

flowControlParameterNegotiation REPLACE-WITH-DEFAULT

GET-REPLACE,

defaultPacketSizes REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.nullBidirectionalValues

GET-REPLACE,

defaultWindowSizees REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.nullBidirectionalValues

GET-REPLACE,

throughputClassNegotiation REPLACE-WITH-DEFAULT

GET-REPLACE,

sN-ServiceProvider REPLACE-WITH-DEFAULT

GET-REPLACE,

sN-SAP GET,

logicalChannelAssignments GET-REPLACE;

#### ATTRIBUTE GROUPS

"DMI":state

"DMI":administrativeState

"DMI":operationalState;

ACTIONS

"GMI":activate,

"GMI":deactivate;

NOTIFICATIONS

"DMI":stateChange,

"DMI":objectCreation,

"DMI":objectDeletion;

::

REGISTERED AS{NLM.moi x25PLE (25)};

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### 5.10.2 The X.25 PLE initial values managed object

-- This MO class is never instantiated. It serves as a generic  
 -- x25PLE IVMO from which both the x25PLEIVMO-DTE and x25PLEIVMO-DCE  
 -- MO classes are derived.

-- Note that the values of the x25PLEIVMOId naming attribute are  
 -- required to be unique across all instances of MOs derived from  
 -- this, which have a common superior.

#### x25PLEIVMO MANAGED OBJECT CLASS

DERIVED FROM "DMI":top;

CHARACTERIZED BY x25PLEIVMO-P PACKAGE

BEHAVIOUR commonCreationDeletion-B;

#### ATTRIBUTES

defaultPacketSizes REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.nullBidirectionalValues

GET-REPLACE,

defaultThroughputClasses REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.nullBidirectionalValues

GET-REPLACE,

defaultWindowSizes REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.nullBidirectionalValues

GET-REPLACE,

flowControlParameterNegotiation REPLACE-WITH-DEFAULT

GET-REPLACE,

localDTEAddress GET-REPLACE,

logicalChannelAssignments GET-REPLACE,

sN-ServiceProvider GET-REPLACE,

throughputClassNegotiation REPLACE-WITH-DEFAULT

GET-REPLACE,

x25PLEIVMOId GET,

x25PLEMode GET-REPLACE;

#### NOTIFICATIONS

"DMI":objectCreation,

"DMI":objectDeletion;

::

REGISTERED AS(NLM.moi x25PLEIVMO (26));

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### 5.10.3 The X25 PLE DTE managed object

- There may be multiple instances of these MOs within a system,  
-- corresponding to Multiple X.25 PLEs.
- 
- The definition of this MO  
-- permits it to be created and deleted explicitly by  
-- management operation or to be created and deleted automatically as  
-- part of system operation. When an instance of this MO  
-- is created automatically, an instance of the  
-- x25PLEIVMO-DTE may be used as the source  
-- of the initial values for attributes of this MO.
- 
- When the x25 PLE is operable, the operationalState shall  
-- have the value 'enabled'; otherwise it shall have the value 'disabled'.
- Transitions of operationalState shall be reported using the  
-- stateChange notification.

#### x25PLE-DTE MANAGED OBJECT CLASS

DERIVED FROM x25PLE;

CHARACTERIZED BY x25PLE-DTE-P PACKAGE

BEHAVIOUR

x25PLEImportedNotifications-B;

ATTRIBUTES

callDeflectionSubscription REPLACE-WITH-DEFAULT  
GET-REPLACE,

callRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.callRequestResponseTimerDefault  
GET-REPLACE,

extendedPacketSequenceNumbering REPLACE-WITH-DEFAULT  
GET-REPLACE,

maxActiveCircuits REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.nullChoiceInteger  
GET-REPLACE,

minimumRecallTimer REPLACE-WITH-DEFAULT  
GET-REPLACE,

resetRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.resetRequestResponseTimerDefault  
GET-REPLACE,

restartRequestRetransmissionCount REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.restartRequestRetransmissionCountDefault  
GET-REPLACE,

restartRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.restartRequestResponseTimerDefault  
GET-REPLACE,

clearRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.clearRequestResponseTimerDefault  
GET-REPLACE,

interruptResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.interruptResponseTimerDefault  
GET-REPLACE,

resetRequestRetransmissionCount REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.resetRequestRetransmissionCountDefault  
GET-REPLACE,

clearRequestRetransmissionCount REPLACE-WITH-DEFAULT  
 DEFAULT VALUE NLM.clearRequestRetransmissionCountDefault  
 GET-REPLACE,

callAttempts GET,  
 protocolErrorsDetectedLocally GET,  
 protocolErrorsAccusedOf GET,  
 callEstablishmentRetryCountsExceeded GET;

#### ATTRIBUTE GROUPS

"GMI":counters  
 callAttempts  
 protocolErrorsDetectedLocally  
 protocolErrorsAccusedOf  
 callEstablishmentRetryCountsExceeded;

#### NOTIFICATIONS

"DMI":communicationsAlarm  
 notificationData;

::

#### CONDITIONAL PACKAGES

dTEX25PLECounters-P

PRESENT IF the instance supports the dTEX25PLECounters-P  
 capabilities,

receivingWindowRotationRecoveryProcedures-P

PRESENT IF The optional window rotation recovery procedures  
 are implemented at a receiving DTE,

transmittingWindowRotationRecoveryProcedures-P

PRESENT IF The optional window rotation recovery procedures  
 are implemented at a transmitting DTE,

packetRetransmissionProcedures-P

PRESENT IF The optional packet retransmission procedures  
 are implemented,

onlineRegistration-P

PRESENT IF The optional online registration facility  
 is implemented;

REGISTERED AS {NLM.moi x25PLE-DTE (17)};

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### 5.10.4 The X.25 PLE DCE managed object

- There may be multiple instances of these MOs within a system,
- corresponding to Multiple X.25 PLEs.
- 
- The definition of this MO
- permits it to be created and deleted explicitly by
- management operation or to be created and deleted automatically as
- part of system operation. When an instance of this MO
- is created automatically, an instance of the
- x25PLEIVMO-DCE may be used as the source
- of the initial values for attributes of this MO.
- 
- When the x25 PLE is operable, the operationalState shall
- have the value 'enabled'; otherwise it shall have the value 'disabled'.
- Transitions of operationalState shall be reported using the
- stateChange notification.

#### x25PLE-DCE MANAGED OBJECT CLASS

DERIVED FROM x25PLE;

CHARACTERIZED BY x25PLE-DCE-P PACKAGE

##### ATTRIBUTES

callAttempts GET,  
 callsConnected GET,  
 cUG REPLACE-WITH-DEFAULT  
 GET-REPLACE,  
 fastSelectAcceptance REPLACE-WITH-DEFAULT  
 GET-REPLACE,  
 incomingCallsBarred REPLACE-WITH-DEFAULT  
 GET-REPLACE,  
 oneWayLogicalChannelOutgoing REPLACE-WITH-DEFAULT  
 GET-REPLACE,  
 outgoingCallsBarred REPLACE-WITH-DEFAULT  
 GET-REPLACE;

##### ATTRIBUTE GROUPS

"GMI":counters  
 callAttempts  
 callsConnected;

::

##### CONDITIONAL PACKAGES

dCECommonVirtualCircuitCounters-P

PRESENT IF the instance supports the dCECommonVirtualCircuitCounters capabilities,

dCEX25PLEFacilities-P

PRESENT IF the instance supports the dCEX25PLEFacilities capabilities,

dCEX25PLETimers-P

PRESENT IF the instance supports the dCEX25PLETimers capabilities;

REGISTERED AS {NLM.moi x25PLE-DCE (27)};

### 5.10.5 The X.25 PLE DTE initial values managed object

- There may be multiple instances of the x25PLEIVMO-DTE in a system.
- An x25PLEIVMO-DTE may be used to supply initial values for the attributes of the x25PLE-DTE MO.
- Different instances of x25PLEIVMO-DTE may contain different initial values.
- Its definition permits it to be created and deleted explicitly by management operation.

#### x25PLEIVMO-DTE MANAGED OBJECT CLASS

DERIVED FROM x25PLEIVMO;

CHARACTERIZED BY x25PLEIVMO-DTE-P PACKAGE

##### ATTRIBUTES

callDeflectionSubscription REPLACE-WITH-DEFAULT  
GET-REPLACE,

callRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.callRequestResponseTimerDefault  
GET-REPLACE,

clearRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.clearRequestResponseTimerDefault  
GET-REPLACE,

clearRequestRetransmissionCount REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.clearRequestRetransmissionCountDefault  
GET-REPLACE,

extendedPacketSequenceNumbering REPLACE-WITH-DEFAULT  
GET-REPLACE,

interruptResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.interruptResponseTimerDefault  
GET-REPLACE,

maxActiveCircuits REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.nullChoiceInteger  
GET-REPLACE,

minimumRecallTimer REPLACE-WITH-DEFAULT  
GET-REPLACE,

resetRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.resetRequestResponseTimerDefault  
GET-REPLACE,

resetRequestRetransmissionCount REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.resetRequestRetransmissionCountDefault  
GET-REPLACE,

restartRequestResponseTimer REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.restartRequestResponseTimerDefault  
GET-REPLACE,

restartRequestRetransmissionCount REPLACE-WITH-DEFAULT  
DEFAULT VALUE NLM.restartRequestRetransmissionCountDefault  
GET-REPLACE;

::

CONDITIONAL PACKAGES

receivingWindowRotationRecoveryProcedures-P

PRESENT IF The optional window rotation recovery procedures are implemented at a receiving DTE,

transmittingWindowRotationRecoveryProcedures-P

PRESENT IF The optional window rotation recovery procedures are implemented at a transmitting DTE,

packetRetransmissionProcedures-P

PRESENT IF The optional packet retransmission procedures are implemented,

onlineRegistration-P

PRESENT IF The optional online registration facility is implemented;

REGISTERED AS {NLM.moi x25PLEIVMO-DTE (20)};

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### 5.10.6 The X.25 PLE DCE initial values managed object

- There may be multiple instances of the x25PLEIVMO-DCE in a system.
- An x25PLEIVMO-DCE may be used to supply initial values for the attributes of the x25PLE-DCE MO.
- Different instances of x25PLEIVMO-DCE may contain different initial values.
- 
- Its definition permits it to be created and deleted explicitly by management operation.
- 

x25PLEIVMO-DCE MANAGED OBJECT CLASS  
 DERIVED FROM x25PLEIVMO;  
 REGISTERED AS {NLM.moi x25PLEIVMO-DCE (28)};

#### -- Packages

dCECommonVirtualCircuitCounters-P PACKAGE

BEHAVIOUR dCECommonVirtualCircuitCounters-P-B BEHAVIOUR

DEFINED AS provides the set of common counters used in the normal operation of a DCE environment, as defined in the appropriate clauses,;

octetsSentReceivedCounter-B;

ATTRIBUTES

dataPacketsReceived GET,  
 dataPacketsSent GET,  
 interruptPacketsReceived GET,  
 interruptPacketsSent GET,  
 interruptTimerExpiries GET,  
 "DMI":octetsReceivedCounter GET,  
 "DMI":octetsSentCounter GET,  
 providerInitiatedDisconnects GET,  
 providerInitiatedResets GET,  
 remotelyInitiatedRestarts GET,  
 remotelyInitiatedResets GET,  
 resetTimeouts GET,  
 x25SegmentsReceived GET,  
 x25SegmentsSent GET;

ATTRIBUTE GROUPS

"GMI":counters  
 dataPacketsReceived  
 dataPacketsSent  
 interruptPacketsReceived  
 interruptPacketsSent  
 interruptTimerExpiries  
 "DMI":octetsReceivedCounter  
 "DMI":octetsSentCounter  
 providerInitiatedDisconnects  
 providerInitiatedResets  
 remotelyInitiatedRestarts  
 remotelyInitiatedResets  
 resetTimeouts  
 x25SegmentsReceived  
 x25SegmentsSent;

REGISTERED AS {NLM.poi dCECommonVirtualCircuitCounters-P (23)};

## dCEX25PLEFacilities-P PACKAGE

## BEHAVIOUR dCEX25PLEFacilities-P-B BEHAVIOUR

DEFINED AS provides the set of Facilities which are optional, and may be implemented in a DCE environment, as defined in the appropriate clauses;;

## ATTRIBUTES

bilateralCUG REPLACE-WITH-DEFAULT

GET-REPLACE,

bilateralCUGWithOutgoingAccess REPLACE-WITH-DEFAULT

GET-REPLACE,

callDeflectionSubscription REPLACE-WITH-DEFAULT

GET-REPLACE,

callRedirection REPLACE-WITH-DEFAULT

GET-REPLACE,

chargingInformation REPLACE-WITH-DEFAULT

GET-REPLACE,

cUGWithIncomingAccess REPLACE-WITH-DEFAULT

GET-REPLACE,

cUGWithOutgoingAccess REPLACE-WITH-DEFAULT

GET-REPLACE,

dBitModification REPLACE-WITH-DEFAULT

GET-REPLACE,

defaultThroughputClassesAssignment REPLACE-WITH-DEFAULT

GET-REPLACE,

extendedPacketSequenceNumbering REPLACE-WITH-DEFAULT

GET-REPLACE,

huntGroup REPLACE-WITH-DEFAULT

GET-REPLACE,

incomingCallBarredWithinCUG REPLACE-WITH-DEFAULT

GET-REPLACE,

localChargingPrevention REPLACE-WITH-DEFAULT

GET-REPLACE,

nonStandardDefaultPacketSizes REPLACE-WITH-DEFAULT

GET-REPLACE,

nonStandardDefaultWindowSizees REPLACE-WITH-DEFAULT

GET-REPLACE,

nUIOverride REPLACE-WITH-DEFAULT

GET-REPLACE,

nUISubscription REPLACE-WITH-DEFAULT

GET-REPLACE,

oneWayLogicalChannelIncoming REPLACE-WITH-DEFAULT

GET-REPLACE,

onlineFacilityRegistration REPLACE-WITH-DEFAULT

GET-REPLACE,

outgoingCallBarredWithinCUG REPLACE-WITH-DEFAULT

GET-REPLACE,

packetRetransmission REPLACE-WITH-DEFAULT

GET-REPLACE,

reverseChargingAcceptance REPLACE-WITH-DEFAULT

GET-REPLACE,

rPOASubscription REPLACE-WITH-DEFAULT

GET-REPLACE;

REGISTERED AS {NLM.poi dCEX25PLEFacilities-P (26)};

## dCEX25PLETimers-P PACKAGE

## BEHAVIOUR dCEX25PLETimers-P-B BEHAVIOUR

DEFINED AS provides the set of timers used during the normal operation in a DCE environment, as defined in the appropriate clauses ;;

## ATTRIBUTES

clearIndication GET-REPLACE,  
 -- T13 timer.  
 incomingCall GET-REPLACE,  
 -- T11 timer.  
 resetIndication GET-REPLACE,  
 -- T12 timer.  
 restartIndication GET-REPLACE;  
 -- T10 timer.

REGISTERED AS {NLM.poi dCEX25PLETimers-P (25)};

## dTEX25PLECounters-P PACKAGE

## BEHAVIOUR dTEX25PLECounters-P-B BEHAVIOUR

DEFINED AS Provides the set of counters which may be associated with the x25PLE-DTE MO.;;  
 octetsSentReceivedCounter-B;

## ATTRIBUTES

"DMI":octetsReceivedCounter GET,  
 -- Note that the DMI definition is in terms of user data octets.  
 "DMI":octetsSentCounter GET,  
 -- Note that the DMI definition is in terms of user data octets.  
 callTimeouts GET,  
 callsConnected GET,  
 clearCountsExceeded GET,  
 clearTimeouts GET,  
 dataPacketsReceived GET,  
 dataPacketsSent GET,  
 -- Note that the "DMI":PDUssentCounter  
 -- cannot be used here since it is defined as total number of PDUs sent,  
 -- not just data PDUs.  
 dataRetransmissionTimerExpires GET,  
 providerInitiatedResets GET,  
 providerInitiatedDisconnects GET,  
 remotelyInitiatedResets GET,  
 remotelyInitiatedRestarts GET,  
 resetTimeouts GET,  
 restartCountsExceeded GET;

## ATTRIBUTE GROUPS

"GMI":counters  
 "DMI":octetsSentCounter  
 "DMI":octetsReceivedCounter  
 callTimeouts  
 callsConnected  
 clearCountsExceeded

clearTimeouts  
 dataPacketsReceived  
 dataPacketsSent  
 dataRetransmissionTimerExpiries  
 providerInitiatedDisconnects  
 providerInitiatedResets  
 remotelyInitiatedResets  
 remotelyInitiatedRestarts  
 resetTimeouts  
 restartCountsExceeded;

REGISTERED AS {NLM.poi dTEX25PLECounters-P (18)};

packetRetransmissionProcedures-P PACKAGE

BEHAVIOUR packetRetransmissionProcedures-P-B BEHAVIOUR

DEFINED AS Controls the operation of the optional packet retransmission procedures as described in 13.4 of ISO/IEC 8208 (2nd Edition);;

ATTRIBUTES

rejectResponseTimer REPLACE-WITH-DEFAULT  
 DEFAULT VALUE NLM.rejectResponseTimerDefault  
 GET-REPLACE,  
 rejectRetransmissionCount REPLACE-WITH-DEFAULT  
 DEFAULT VALUE NLM.rejectRetransmissionCountDefault  
 GET-REPLACE;

REGISTERED AS {NLM.poi packetRetransmissionProcedures-P (14)};

receivingWindowRotationRecoveryProcedures-P PACKAGE

BEHAVIOUR

receivingWindowRotationRecoveryProcedures-P-B BEHAVIOUR

DEFINED AS Controls the operation of the optional window rotation recovery procedures at a receiving DTE as described in 11.2.2 of ISO/IEC 8208 (2nd Edition);;

ATTRIBUTES

windowStatusTransmissionTimer REPLACE-WITH-DEFAULT  
 DEFAULT VALUE NLM.windowStatusTransmissionTimerDefault  
 GET-REPLACE;

REGISTERED AS {NLM.poi receivingWindowRotationRecoveryProcedures-P (12)};

transmittingWindowRotationRecoveryProcedures-P PACKAGE

BEHAVIOUR

transmittingWindowRotationRecoveryProcedures-P-B BEHAVIOUR

DEFINED AS Controls the operation of the optional window rotation recovery procedures at a transmitting DTE as described in 11.2.1 of ISO/IEC 8208 (2nd Edition);;

ATTRIBUTES

windowRotationTimer REPLACE-WITH-DEFAULT  
 DEFAULT VALUE  
 NLM.windowRotationTimerDefault  
 GET-REPLACE,  
 dataPacketRetransmissionCount REPLACE-WITH-DEFAULT  
 DEFAULT VALUE NLM.dataPacketRetransmissionCountDefault  
 GET-REPLACE;

REGISTERED AS {NLM.poi transmittingWindowRotationRecoveryProcedures-P (13)};

**onlineRegistration-P PACKAGE****BEHAVIOUR onlineRegistration-P-B BEHAVIOUR**

DEFINED AS Controls the operation of the optional online registration facility as described in 13.1 of ISO/IEC 8208 (2nd Edition);;

**ATTRIBUTES**

registrationRequestResponseTimer REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.registrationRequestResponseTimerDefault

GET-REPLACE,

registrationRequestRetransmissionCount REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.registrationRequestRetransmissionCountDefault

GET-REPLACE,

registrationPermitted REPLACE-WITH-DEFAULT

DEFAULT VALUE NLM.registrationPermittedDefault

GET-REPLACE;

REGISTERED AS {NLM.poi onlineRegistration-P (11)};

**-- Behaviours****x25PLEPImportedNotifications-B BEHAVIOUR**

DEFINED AS The x25PLE-P package imports the communicationsAlarm notification from Rec. X.721 (1992) | ISO/IEC 10165-2.

It is used to report the following x25PLE managed object events.

**providerInitiatedDisconnect:**

Issued upon receipt of a clear packet with a cause code other than 'DTE originated'.

The information relating to the packet shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER.

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.providerInitiatedDisconnect shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**remotelyInitiatedReset:**

Issued upon occurrence of a remotely initiated reset.

This event is issued in lieu of a 'providerInitiatedReset' when operating in a DTE-DXE environment.

The information relating to the packet shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.remotelyInitiatedDisconnect shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**providerInitiatedReset:**

Issued upon occurrence of a provider initiated reset.

This event is issued when operating in a DTE-DCE environment.

The information relating to the packet shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.providerInitiatedReset shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**remotelyInitiatedRestart:**

Issued upon receipt of a remotely (including provider) initiated restart.

The information relating to the packet shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.remotelyInitiatedRestart shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**restartCountExceeded:**

Issued on restart failure due to restart count (R20) exceeded.

The information relating to the packet shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.restartCountExceeded shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**protocolErrorDetectedLocally:**

Issued upon receipt of a packet which causes the "A=Error" action in the ISO/IEC 8208 state tables to be taken.

The information relating to the packet shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER. The values of cause and diagnostic codes shall be those which would have been placed in a diagnostic packet had one been generated by the DTE (i.e. as if it were a DTE). The actual generation of such a packet is not required.

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.communicationsProtocolErrorDetectedLocally shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**accusedOfProtocolError:**

Issued upon receipt of a diagnostic packet or a clear, reset or restart packet with a cause code equal to one of the following:

- Remote Procedure Error,
- Incompatible Destination,
- Invalid Facility Request,
- Local Procedure Error.

No other x25PLE communication alarm shall be generated as a result of this particular instance of packet.

The information relating to the packet shall be reported as a

parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.accusedOfProtocolError shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

#### callEstablishmentRetryCountExceeded:

Issued on retry failure during call establishment due to retry limit exceeded.

The information relating to the call shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.callEstablishmentRetryCountExceeded shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

#### clearCountExceeded:

Issued on retry failure due to clear limit (R23) exceeded.

The information relating to the call shall be reported as a parameter in the additionalInformation field of the communicationsAlarm, using the notificationData PARAMETER

The significance sub-parameter of each item of additionalInformation shall be set to the value 'False' (i.e. not significant) so that a managing system receiving the event report will be less likely to reject it.

The value NLM.clearCountExceeded shall be reported in the specificProblems parameter.

The probableCause shall be set to NLM.communicationsProtocolError.

The perceivedSeverity shall be set to 'Minor'. A subsequent communicationsAlarm with a perceivedSeverity value of 'Cleared' shall not be generated.

No other fields or parameters shall be used, with the exception of further parameters in the additionalInformation field.

**-- Name Bindings**

x25PLEIVMO-networkSubsystem NAME BINDING  
 SUBORDINATE OBJECT CLASS x25PLEIVMO AND SUBCLASSES;  
 NAMED BY  
 SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;  
 WITH ATTRIBUTE x25PLEIVMOId;  
 CREATE WITH-REFERENCE-OBJECT;  
 DELETE;  
 REGISTERED AS {NLM.nboi x25PLEIVMO-networkSubsystem (10)};

x25PLE-networkSubsystem-Management NAME BINDING  
 SUBORDINATE OBJECT CLASS x25PLE AND SUBCLASSES;  
 NAMED BY  
 SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;  
 WITH ATTRIBUTE x25PLEId;  
 BEHAVIOUR x25PLE-networkSubsystem-Management-B BEHAVIOUR  
 DEFINED AS The name binding that applies when the x25PLE Managed Object  
 or its subclasses are created by management operation.;;  
 CREATE WITH-REFERENCE-OBJECT;  
 DELETE ONLY-IF-NO-CONTAINED-OBJECTS;  
 REGISTERED AS {NLM.nboi x25PLE-networkSubsystem-Management (9)};

x25PLE-networkSubsystem-Automatic NAME BINDING  
 SUBORDINATE OBJECT CLASS x25PLE AND SUBCLASSES;  
 NAMED BY  
 SUPERIOR OBJECT CLASS networkSubsystem AND SUBCLASSES;  
 WITH ATTRIBUTE x25PLEId;  
 BEHAVIOUR x25PLE-networkSubsystem-Automatic-B BEHAVIOUR  
 DEFINED AS The name binding that applies when the x25PLE Managed Object  
 or its subclasses are created by automatic operation of the system.  
 The creation of an instance of the x25PLE MO or its subclass  
 using this name binding may reference an instance of the x25PLEIVMO  
 (or of its subclass). The means by which such an instance (if any)  
 of the x25PLEIVMO (or its subclass) is identified a local matter.  
 When this occurs,  
 some of the initial values of the attributes of the instance  
 of the x25PLE MO (or its subclass) may be supplied by the values of the  
 attributes in the specified instance of the x25PLEIVMO. However any  
 such value may be overridden by a value supplied by local means (for  
 example across an internal interface). Where values are supplied by the  
 IVMO, the initial value of an attribute of the x25PLE MO (or its subclass)  
 shall be the value of the corresponding attribute in the x25PLEIVMO  
 (that is, which has the same attribute template label). The naming  
 attribute of the x25PLE MO (or its subclass) is assigned a value  
 according to local mechanisms;;  
 DELETE;  
 REGISTERED AS {NLM.nboi x25PLE-networkSubsystem-Automatic (18)};

**-- Attributes****bilateralCUG ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR bilateralCUG-B BEHAVIOUR

DEFINED AS The subscription of the bilateral closed user group facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi bilateralCUG (125)};

**bilateralCUGWithOutgoingAccess ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR bilateralCUGWithOutgoingAccess-B BEHAVIOUR

DEFINED AS The subscription of the bilateral CUG with outgoing access facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi bilateralCUGWithOutgoingAccess (127)};

**callAttempts ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR callAttempts-B BEHAVIOUR

DEFINED AS Counter of the total number of calls attempted;;

REGISTERED AS { NLM.aoi callAttempts (52)};

**callDeflectionSubscription ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR callDeflectionSubscription-B BEHAVIOUR

DEFINED AS The subscription of the call deflection facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of "False" indicates non-subscription;;

REGISTERED AS { NLM.aoi callDeflectionSubscription (114)};

**callEstablishmentRetryCountsExceeded ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR callEstablishmentRetryCountsExceeded-B BEHAVIOUR

DEFINED AS Counter associated with the callEstablishmentRetryCountExceeded event which generates a communications alarm notification.;;

REGISTERED AS { NLM.aoi callEstablishmentRetryCountsExceeded (65)};

**callRedirection ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR callRedirection-B BEHAVIOUR

DEFINED AS The subscription of the call redirection facility  
as described in Recommendation X.2 Expressed as a boolean  
where a value of 'True' indicates subscription and a value  
of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi callRedirection (129)};

**callRequestResponseTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR callRequestResponseTimer-B BEHAVIOUR

DEFINED AS Value for Timer T21 (Call Request Response Timer)  
in seconds;;

REGISTERED AS {NLM.aoi callRequestResponseTimer (77)};

**callTimeouts ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR callTimeouts-B BEHAVIOUR

DEFINED AS Counter of the number of times timer T21 expiry is experienced  
by the PLE;;

REGISTERED AS {NLM.aoi callTimeouts (55)};

**callsConnected ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR callsConnected-B BEHAVIOUR

DEFINED AS Counter of the total number of calls which have reached the open state;;

REGISTERED AS {NLM.aoi callsConnected (53)};

**chargingInformation ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR chargingInformation-B BEHAVIOUR

DEFINED AS The subscription of the charging information facility  
as described in Recommendation X.2.Expressed as a boolean where a value of 'True' indicates  
subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi chargingInformation (132)};

**clearCountsExceeded ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR clearCountsExceeded-B BEHAVIOUR

DEFINED AS Counter associated with the clearCountExceeded event  
which generates a communications alarm notification.;;

REGISTERED AS {NLM.aoi clearCountsExceeded (66)};

**clearIndication ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;  
MATCHES FOR EQUALITY, ORDERING;  
BEHAVIOUR clearIndication-B BEHAVIOUR  
DEFINED AS Value for the Clear Indication, T13 timer, in seconds.;;  
REGISTERED AS { NLM.aoi clearIndication (133)};

**clearRequestResponseTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;  
MATCHES FOR EQUALITY, ORDERING;  
BEHAVIOUR clearRequestResponseTimer-B BEHAVIOUR  
DEFINED AS Value for Timer T23 (Clear Request Response Timer)  
in seconds;;  
REGISTERED AS { NLM.aoi clearRequestResponseTimer (79)};

**clearRequestRetransmissionCount ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;  
MATCHES FOR EQUALITY, ORDERING;  
BEHAVIOUR clearRequestRetransmissionCount-B BEHAVIOUR  
DEFINED AS Value for count R23 (Clear Request Retransmission Count).;;  
REGISTERED AS { NLM.aoi clearRequestRetransmissionCount (81)};

**clearTimeouts ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;  
BEHAVIOUR clearTimeouts-B BEHAVIOUR  
DEFINED AS Counter of the number of times timer T23 expiry is experienced  
by the PLE.;;  
REGISTERED AS { NLM.aoi clearTimeouts (56)};

**cUG ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR cUG-B BEHAVIOUR  
DEFINED AS The subscription of the closed user group facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription and a value  
of 'False' indicates non-subscription.;;  
REGISTERED AS { NLM.aoi cUG (134)};

**cUGWithIncomingAccess ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR cUGWithIncomingAccess-B BEHAVIOUR  
DEFINED AS The subscription of the closed user group with incoming access facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription  
and a value of 'False' indicates non-subscription.;;  
REGISTERED AS { NLM.aoi cUGWithIncomingAccess (136)};

**cUGWithOutgoingAccess ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR cUGWithOutgoingAccess-B BEHAVIOUR

DEFINED AS The subscription of the CUG with outgoing access facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi cUGWithOutgoingAccess (137)};

**dBitModification ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR dBitModification-B BEHAVIOUR

DEFINED AS The subscription of the D bit modification facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi dBitModification (139)};

**dataPacketRetransmissionCount ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR dataPacketRetransmissionCount-B BEHAVIOUR

DEFINED AS Value for count R25 (Data Packet Retransmission Count);;

REGISTERED AS {NLM.aoi dataPacketRetransmissionCount (85)};

**dataPacketsReceived ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR dataPacketsReceived-B BEHAVIOUR

DEFINED AS Counter of the total number of data packets received;;

REGISTERED AS {NLM.aoi dataPacketsReceived (51)};

**dataPacketsSent ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR dataPacketsSent-B BEHAVIOUR

DEFINED AS Counter of the total number of data packets sent;;

REGISTERED AS {NLM.aoi dataPacketsSent (50)};

**dataRetransmissionTimerExpiries ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR dataRetransmissionTimerExpiries-B BEHAVIOUR

DEFINED AS Counter of the number of expiries of timer T25.

Returns zero if the option is not implemented;;

REGISTERED AS {NLM.aoi dataRetransmissionTimerExpiries (58)};

**defaultPacketSizes ATTRIBUTE**WITH ATTRIBUTE SYNTAX **NLM.BidirectionalValues;**

MATCHES FOR EQUALITY;

BEHAVIOUR **defaultPacketSizes-B BEHAVIOUR**

DEFINED AS The default value of the packet sizes.

A value of NULL indicates the ISO/IEC 8208 default value of 128. Any other value indicates the value agreed by the nonstandard default packet sizes facility.;;

REGISTERED AS {NLM.aoi defaultPacketSizes (103)};

**defaultThroughputClasses ATTRIBUTE**WITH ATTRIBUTE SYNTAX **NLM.BidirectionalValues;**

MATCHES FOR EQUALITY;

BEHAVIOUR **defaultThroughputClasses-B BEHAVIOUR**

DEFINED AS The default throughput class values.

A value of NULL indicates the normal default.

Any other value indicates the value agreed by the defaultThroughputClassesAssignment facility.;;

REGISTERED AS {NLM.aoi defaultThroughputClasses (112)};

**defaultThroughputClassesAssignment ATTRIBUTE**WITH ATTRIBUTE SYNTAX **NLM.DefaultTCA;**

MATCHES FOR EQUALITY;

BEHAVIOUR **defaultThroughputClassesAssignment-B BEHAVIOUR**

DEFINED AS The subscription of the default throughput classes assignment facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription.;;

REGISTERED AS { NLM.aoi defaultThroughputClassesAssignment (144)};

**defaultWindowSizes ATTRIBUTE**WITH ATTRIBUTE SYNTAX **NLM.BidirectionalValues;**

MATCHES FOR EQUALITY;

BEHAVIOUR **defaultWindowSizes-B BEHAVIOUR**

DEFINED AS The default value of the window sizes.

A value of NULL indicates the Recommendation | International Standard default value of 2. Any other value indicates

the value agreed by the nonstandard default window sizes facility.;;

REGISTERED AS {NLM.aoi defaultWindowSizes (104)};

**extendedPacketSequenceNumbering ATTRIBUTE**WITH ATTRIBUTE SYNTAX **NLM.PacketSequencing;**

MATCHES FOR EQUALITY;

BEHAVIOUR **extendedPacketSequenceNumbering-B BEHAVIOUR**

DEFINED AS The modulo of the packet sequence number space.

Expressed as an integer. The Recommendation | International Standard only requires support for at least one of the two values 8 and 128, but it is possible that some future revision may extend the range. A system is only required to support the setting of values which are also required by the protocol standard. A system shall return an error when an attempt is made to set the value to a value which is not supported by that system.;;

REGISTERED AS {NLM.aoi extendedPacketSequenceNumbering (49)};

**fastSelectAcceptance ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR fastSelectAcceptance-B BEHAVIOUR

DEFINED AS The subscription of the fast select acceptance as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi fastSelectAcceptance (145)};

**flowControlParameterNegotiation ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR flowControlParameterNegotiation-B BEHAVIOUR

DEFINED AS The subscription of the flow control parameter negotiation facility as described in Recommendation X.2.

When this has the value 'true', the use of flow control parameter negotiation (by specifying values for the window and packet size in call request and accept packets) is permitted. When it has the value 'false', no such values shall be specified in call request and accept packets, and any values specified in an IVMO or via an internal interface shall be ignored.;;

REGISTERED AS { NLM.aoi flowControlParameterNegotiation (119)};

**huntGroup ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR huntGroup-B BEHAVIOUR

DEFINED AS The subscription of the hunt group facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi huntGroup (146)};

**incomingCall ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR incomingCall-B BEHAVIOUR

DEFINED AS Value for the Incoming Call, T11 timer, in seconds.;;

REGISTERED AS { NLM.aoi incomingCall (147)};

**incomingCallBarredWithinCUG ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR incomingCallBarredWithinCUG-B BEHAVIOUR

DEFINED AS The subscription of the incoming call barred within a CUG facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi incomingCallBarredWithinCUG (149)};

**incomingCallsBarred ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR incomingCallsBarred-B BEHAVIOUR

DEFINED AS The subscription of the incoming calls barred facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi incomingCallsBarred (148)};

**interruptPacketsReceived ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR interruptPacketsReceived-B BEHAVIOUR

DEFINED AS Counter of the number of interrupt packets received by the PLE or over the PVC/VC;;

REGISTERED AS {NLM.aoi interruptPacketsReceived (68)};

**interruptPacketsSent ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR interruptPacketsSent-B BEHAVIOUR

DEFINED AS Counter of the number of interrupt packets sent by the PLE or over the PVC/VC;;

REGISTERED AS {NLM.aoi interruptPacketsSent (67)};

**interruptResponseTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR interruptResponseTimer-B BEHAVIOUR

DEFINED AS Value for Timer T26 (Interrupt Response Timer) in seconds;;

REGISTERED AS {NLM.aoi interruptResponseTimer (82)};

**interruptTimerExpiries ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR interruptTimerExpiries-B BEHAVIOUR

DEFINED AS Counter of the number of expiries of timer T26 experienced by the PLE or over the PVC/VC;;

REGISTERED AS {NLM.aoi interruptTimerExpiries (69)};

**localChargingPrevention ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR localChargingPrevention-B BEHAVIOUR

DEFINED AS The subscription of the local charging prevention facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi localChargingPrevention (150)};

**localDTEAddress ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.DTEAddress;

MATCHES FOR EQUALITY;

BEHAVIOUR localDTEAddress-B BEHAVIOUR

DEFINED AS The full DTE address of this PLE

expressed as an X.121, E.164, etc. address;;

REGISTERED AS {NLM.aoi localDTEAddress (39)};

**logicalChannelAssignments ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.LogicalChannelAssignments;

MATCHES FOR EQUALITY;

BEHAVIOUR logicalChannelAssignments-B BEHAVIOUR

DEFINED AS Represents the logical channel assignments of this PLE,

expressed as a four-tuple where the values represent

the set (with maximum permitted cardinality (LIC - 1), minimum required

cardinality of zero) of PVC channels (with maximum value (LIC -1),

and minimum value 1) assigned,

the incoming channel range,

the two-way channel range,

the outgoing channel range,

respectively.

The presence of each of the ranges shall be optional. Absence of a particular range

shall signify that there are no channels of that type assigned. Within each range, the

low value shall be less than or equal to the high value, and there shall be no value in any

set or range which is greater than or equal to a value in a subsequent range when ordered

as above.

This attribute is subject to the rules for logical assignments described in

ISO/IEC 8208 3.7.;;

REGISTERED AS {NLM.aoi logicalChannelAssignments (48)};

**maxActiveCircuits ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.MaxActiveCircuits;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR maxActiveCircuits-B BEHAVIOUR

DEFINED AS The maximum number of active circuits permitted on this PLE.

When the NULL value is specified, the maximum number of active circuits

shall be limited only by the resources available to the entity;;

REGISTERED AS {NLM.aoi maxActiveCircuits (41)};

**minimumRecallTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR minimumRecallTimer-B BEHAVIOUR

DEFINED AS Minimum time in seconds before recall permitted.

This timer determines the minimum interval (in seconds) which shall elapse

following an unsuccessful first call attempt before a subsequent call attempt is

permitted;;

REGISTERED AS {NLM.aoi minimumRecallTimer (43)};

**nonStandardDefaultPacketSizes ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.NonStandardDPS;

MATCHES FOR EQUALITY;

BEHAVIOUR nonStandardDefaultPacketSizes-B BEHAVIOUR

DEFINED AS The subscription of the non standard default packet sizes facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi nonStandardDefaultPacketSizes (151)};

**nonStandardDefaultWindowSizes ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.NonStandardDWS;

MATCHES FOR EQUALITY;

BEHAVIOUR nonStandardDefaultWindowSizes-B BEHAVIOUR

DEFINED AS The subscription of the non standard default window sizes facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi nonStandardDefaultWindowSizes (152)};

**nUIOverride ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR nUIOverride-B BEHAVIOUR

DEFINED AS The subscription of the NUI override facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi nUIOverride (154)};

**nUISubscription ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR nUISubscription-B BEHAVIOUR

DEFINED AS The subscription of the NUI subscription facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi nUISubscription (153)};

**oneWayLogicalChannelIncoming ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR oneWayLogicalChannelIncoming-B BEHAVIOUR

DEFINED AS The subscription of the one way logical channel incoming facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi oneWayLogicalChannelIncoming (156)};

**oneWayLogicalChannelOutgoing ATTRIBUTE**  
WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR oneWayLogicalChannelOutgoing-B BEHAVIOUR  
DEFINED AS The subscription of the one way logical channel outgoing facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription  
and a value of 'False' indicates non-subscription;;  
REGISTERED AS { NLM.aoi oneWayLogicalChannelOutgoing (157)};

**onlineFacilityRegistration ATTRIBUTE**  
WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR onlineFacilityRegistration-B BEHAVIOUR  
DEFINED AS The subscription of the on-line facility registration facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription  
and a value of 'False' indicates non subscription;;  
REGISTERED AS { NLM.aoi onlineFacilityRegistration (158)};

**outgoingCallBarredWithinCUG ATTRIBUTE**  
WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR outgoingCallBarredWithinCUG-B BEHAVIOUR  
DEFINED AS The subscription of the outgoing call barred within a CUG facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription  
and a value of 'False' indicates non-subscription;;  
REGISTERED AS { NLM.aoi outgoingCallBarredWithinCUG (160)};

**outgoingCallsBarred ATTRIBUTE**  
WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR outgoingCallsBarred-B BEHAVIOUR  
DEFINED AS The subscription of the outgoing calls barred facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription and a value  
of 'False' indicates non-subscription;;  
REGISTERED AS { NLM.aoi outgoingCallsBarred (159)};

**packetRetransmission ATTRIBUTE**  
WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR packetRetransmission-B BEHAVIOUR  
DEFINED AS The subscription of the packet retransmissions facility  
as described in Recommendation X.2. Expressed as a boolean  
where a value of 'True' indicates subscription and a value  
of 'False' indicates non-subscription. If non-subscription,  
then the attributes for rejectTimer and rejectCount  
will have NULL values.;;  
REGISTERED AS { NLM.aoi packetRetransmission (161)};

**protocolErrorsAccusedOf ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR protocolErrorsAccusedOf-B BEHAVIOUR

DEFINED AS Counter associated with the accusedOfProtocolError event which generates a communications alarm notification.;;

REGISTERED AS {NLM.aoi protocolErrorsAccusedOf (64)};

**protocolErrorsDetectedLocally ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR protocolErrorsDetectedLocally-B BEHAVIOUR

DEFINED AS Counter associated with the protocolErrorDetectedLocally event which generates a communications alarm notification.;;

REGISTERED AS {NLM.aoi protocolErrorsDetectedLocally (63)};

**protocolVersionSupported ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.ProtocolVersion;

MATCHES FOR EQUALITY;

BEHAVIOUR protocolVersionSupported-B BEHAVIOUR

DEFINED AS The supported Recommendation | International Standard protocol version available on the PLE interface.;;

REGISTERED AS {NLM.aoi protocolVersionSupported (38)};

**providerInitiatedDisconnects ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR providerInitiatedDisconnects-B BEHAVIOUR

DEFINED AS Counter for the providerInitiatedDisconnect events which generate communication alarm notifications.;;

REGISTERED AS {NLM.aoi providerInitiatedDisconnects (54)};

**providerInitiatedResets ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR providerInitiatedResets-B BEHAVIOUR

DEFINED AS Counter associated with the providerInitiatedReset event which generates a communication alarm notification.;;

REGISTERED AS {NLM.aoi providerInitiatedResets (59)};

**rPOASubscription ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR rPOASubscription-B BEHAVIOUR

DEFINED AS The subscription of the RPOA Subscription facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription.;;

REGISTERED AS { NLM.aoi rPOASubscription (167)};

**registrationPermitted ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR registrationPermitted-B BEHAVIOUR

DEFINED AS When true, the use of online facility registration is permitted.;;

REGISTERED AS {NLM.aoi registrationPermitted (105)};

registrationRequestResponseTimer ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Integer;  
 MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR registrationRequestResponseTimer-B BEHAVIOUR  
 DEFINED AS Value for Timer T28 (Registration Request Response Timer) in seconds;;  
 REGISTERED AS {NLM.aoi registrationRequestResponseTimer (44)};

registrationRequestRetransmissionCount ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Integer;  
 MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR registrationRequestRetransmissionCount-B BEHAVIOUR  
 DEFINED AS Value for count R28 (Registration Request Retransmission Count);;  
 REGISTERED AS {NLM.aoi registrationRequestRetransmissionCount (46)};

rejectResponseTimer ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Integer;  
 MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR rejectResponseTimer-B BEHAVIOUR  
 DEFINED AS Value for Timer T27 (Reject Response Timer) in seconds;;  
 REGISTERED AS {NLM.aoi rejectResponseTimer (86)};

rejectRetransmissionCount ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Integer;  
 MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR rejectRetransmissionCount-B BEHAVIOUR  
 DEFINED AS Value for count R27 (Reject Retransmission Count);;  
 REGISTERED AS {NLM.aoi rejectRetransmissionCount (87)};

remotelyInitiatedResets ATTRIBUTE  
 DERIVED FROM "GMI":nonWrapping64BitCounter;  
 BEHAVIOUR remotelyInitiatedResets-B BEHAVIOUR  
 DEFINED AS Counter associated with the remotelyInitiatedReset event  
 which generates a communication alarm notification.;;  
 REGISTERED AS {NLM.aoi remotelyInitiatedResets (57)};

remotelyInitiatedRestarts ATTRIBUTE  
 DERIVED FROM "GMI":nonWrapping64BitCounter;  
 BEHAVIOUR remotelyInitiatedRestarts-B BEHAVIOUR  
 DEFINED AS Counter of the number of remotely initiated restarts.  
 This is the total number of remotely initiated (including provider initiated) restarts  
 experienced by the PLE, excluding the  
 restart associated with bringing up the PLE interface;;  
 REGISTERED AS {NLM.aoi remotelyInitiatedRestarts (61)};

resetIndication ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Integer;  
 MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR resetIndication-B BEHAVIOUR  
 DEFINED AS Value for the Reset Indication, T12 timer, in seconds.;;  
 REGISTERED AS { NLM.aoi resetIndication (163)};

**resetRequestResponseTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR resetRequestResponseTimer-B BEHAVIOUR

DEFINED AS Value for Timer T22 (Reset Request Response Timer) in seconds;;

REGISTERED AS {NLM.aoi resetRequestResponseTimer (78)};

**resetRequestRetransmissionCount ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR resetRequestRetransmissionCount-B BEHAVIOUR

DEFINED AS Value for count R22 (Reset Request Retransmission Count);;

REGISTERED AS {NLM.aoi resetRequestRetransmissionCount (80)};

**resetTimeouts ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR resetTimeouts-B BEHAVIOUR

DEFINED AS Counter of the number of timer T22 expiries experienced  
by the PLE;;

REGISTERED AS {NLM.aoi resetTimeouts (60)};

**restartCountsExceeded ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

BEHAVIOUR restartCountsExceeded-B BEHAVIOUR

DEFINED AS Counter associated with the restartCountExceeded event  
which generates a communication alarm notification.;;

REGISTERED AS {NLM.aoi restartCountsExceeded (62)};

**restartIndication ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR restartIndication-B BEHAVIOUR

DEFINED AS Value for the Restart Indication, T10 timer, in seconds.;;

REGISTERED AS {NLM.aoi restartIndication (164)};

**restartRequestResponseTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR restartRequestResponseTimer-B BEHAVIOUR

DEFINED AS Value for Timer T20 (Restart Request Response Timer) in seconds;;

REGISTERED AS {NLM.aoi restartRequestResponseTimer (42)};

**restartRequestRetransmissionCount ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR restartRequestRetransmissionCount-B BEHAVIOUR

DEFINED AS Value for count R20 (Restart Request Retransmission Count);;

REGISTERED AS {NLM.aoi restartRequestRetransmissionCount (45)};

**reverseChargingAcceptance ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR reverseChargingAcceptance-B BEHAVIOUR

DEFINED AS The subscription of the reverse charging acceptance facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi reverseChargingAcceptance (165)};

**throughputClassNegotiation ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR throughputClassNegotiation-B BEHAVIOUR

DEFINED AS The subscription of the throughput class negotiation facility as described in Recommendation X.2. Expressed as a boolean where a value of 'True' indicates subscription and a value of 'False' indicates non-subscription;;

REGISTERED AS { NLM.aoi throughputClassNegotiation (168)};

**windowRotationTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR windowRotationTimer-B BEHAVIOUR

DEFINED AS Default for Timer T25 (Window Rotation Timer) in seconds;;

REGISTERED AS {NLM.aoi windowRotationTimer (84)};

**windowStatusTransmissionTimer ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Integer;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR windowStatusTransmissionTimer-B BEHAVIOUR

DEFINED AS Value for Timer T24 (Window Status Transmission Timer) in seconds;;

REGISTERED AS {NLM.aoi windowStatusTransmissionTimer (83)};

**x25PLEId ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.GraphicString;

MATCHES FOR EQUALITY, SUBSTRINGS;

BEHAVIOUR x25PLEId-B BEHAVIOUR

DEFINED AS The name of this instance of x25PLE MO;;

REGISTERED AS {NLM.aoi x25PLEId (36)};

**x25PLEMode ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.X25PLEMode;

MATCHES FOR EQUALITY;

BEHAVIOUR x25PLEMode-B BEHAVIOUR

DEFINED AS The DCE/DTE mode in which the X.25 PLE is currently operating.

One of the following modes of operation may be indicated.

(0) DTE mode applying to both CCITT Rec. X.25 and ISO/IEC 8208 operation,

(1) DCE mode applying to CCITT Rec. X.25 operation only, and

(2) DTE acting as a DCE applying to ISO/IEC 8208 operation only.;;

REGISTERED AS {NLM.aoi x25PLEMode (120)};

**x25PLEIVMOId ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.GraphicString;  
MATCHES FOR EQUALITY, SUBSTRINGS;  
BEHAVIOUR x25PLEIVMOId-B BEHAVIOUR  
DEFINED AS The name of this instance of x25PLE IVMO;;  
REGISTERED AS {NLM.aoi x25PLEIVMOId (37)};

**x25SegmentsReceived ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;  
MATCHES FOR EQUALITY, ORDERING;  
BEHAVIOUR x25SegmentsReceived-B BEHAVIOUR  
DEFINED AS Value for count of X.25 Segments Received.;;  
REGISTERED AS {NLM.aoi x25SegmentsReceived (171)};

**x25SegmentsSent ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;  
MATCHES FOR EQUALITY, ORDERING;  
BEHAVIOUR x25SegmentsSent-B BEHAVIOUR  
DEFINED AS Value for count of X.25 Segments Sent.;;  
REGISTERED AS {NLM.aoi x25SegmentsSent (170)};

**-- Parameters****notificationData PARAMETER**

CONTEXT EVENT-INFO;  
WITH SYNTAX NLM.NotificationDataSyntax;  
BEHAVIOUR notificationData-B BEHAVIOUR  
DEFINED AS Information relating to the call  
which resulted in the notification;;  
REGISTERED AS {NLM.proi notificationData (7)};

## 5.11 The virtual circuit and related managed objects

### 5.11.1 The virtual circuit managed object

- This MO Class is never instantiated. It serves as a generic Virtual Circuit MO from which both the
- Virtual Circuit DTE and Virtual Circuit DCE MOs are derived.
- Note that the values of the virtualCircuitId naming attribute are
- required to be unique across all instances of MOs derived from this
- which have a common superior.
- 

```
virtualCircuit MANAGED OBJECT CLASS
DERIVED FROM "DMI":top;
CHARACTERIZED BY virtualCircuit-P PACKAGE
BEHAVIOUR
    commonCreationDeletion-B,
    virtualCircuitNaming-B;
ATTRIBUTES
    virtualCircuitId GET,
    logicalChannel GET,
    packetSizes GET,
    throughputClasses GET,
    windowSizes GET;
NOTIFICATIONS
    "DMI":objectCreation,
    "DMI":objectDeletion;
;;
REGISTERED AS {NLM.moi virtualCircuit (14)};
```

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### 5.11.2 The virtual circuit DTE managed object

- This MO Class is never instantiated. It serves as a generic Virtual Circuit DTE MO from which both the
- Virtual Call DTE and the Permanent Virtual Circuit DTE MOs are derived.
- Note that the values of the virtualCircuitId naming attribute are
- required to be unique across all instances of MOs derived from this
- which have a common superior.
- 

#### virtualCircuit-DTE MANAGED OBJECT CLASS

DERIVED FROM virtualCircuit;

CONDITIONAL PACKAGES

dTEVirtualCircuitCounters-P

PRESENT IF the instance supports the dTEVirtualCircuitCounters capabilities;

REGISTERED AS {NLM.moi virtualCircuit-DTE (18)};

### 5.11.3 The virtual circuit DCE managed object

- This MO Class is never instantiated. It serves as a generic Virtual Circuit DCE MO from which both the
- Virtual Call DCE and the Permanent Virtual Circuit DCE MOs are derived.
- Note that the values of the virtualCircuitId naming attribute are
- required to be unique across all instances of MOs derived from this
- which have a common superior.
- 

#### virtualCircuit-DCE MANAGED OBJECT CLASS

DERIVED FROM virtualCircuit;

CONDITIONAL PACKAGES

dCECommonVirtualCircuitCounters-P

PRESENT IF the instance supports the dCECommonVirtualCircuitCounters capabilities

; REGISTERED AS {NLM.moi virtualCircuit-DCE (29)};

### 5.11.4 The permanent virtual circuit DTE managed object

- An instance of this MO exists for each Permanent Virtual Circuit.
- It may be both created and deleted by management.

permanentVirtualCircuit-DTE MANAGED OBJECT CLASS

DERIVED FROM virtualCircuit-DTE;

CHARACTERIZED BY permanentVirtualCircuit-DTE-P PACKAGE

BEHAVIOUR permanentVirtualCircuit-DTE-P-B BEHAVIOUR

DEFINED AS When the MO is created, the protocol machine shall be reinitialized and a reset PDU with a cause code of DTE originated (encoded as 00000000) and a diagnostic code of DTE operational (161) shall be transmitted. When the MO is deleted, the protocol machine shall be reinitialized and a reset PDU with a cause code of DTE originated (encoded as 00000000) and a diagnostic code of DTE not operational (162) shall be transmitted.;;

ATTRIBUTES

logicalChannel INITIAL VALUE DERIVATION RULE logicalChannelIV-B,  
 packetSizes INITIAL VALUE DERIVATION RULE optionalCMPIV-B,  
 throughputClasses INITIAL VALUE DERIVATION RULE optionalCMPIV-B,  
 windowSizes INITIAL VALUE DERIVATION RULE optionalCMPIV-B;

;;

REGISTERED AS {NLM.moi permanentVirtualCircuit-DTE (19)};

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### 5.11.5 The permanent virtual circuit DCE managed object

- An instance of this MO exists for each Permanent Virtual Circuit. It may be both created and
- deleted by management.
- 

permanentVirtualCircuit-DCE MANAGED OBJECT CLASS

DERIVED FROM virtualCircuit-DCE;

CHARACTERIZED BY permanentVirtualCircuit-DCE-P PACKAGE

BEHAVIOUR permanentVirtualCircuit-DCE-P-B BEHAVIOUR

DEFINED AS When the MO is created, the protocol machine shall be re-initialized and a reset PDU shall be transmitted. A cause code of remote DTE Operational (encoded as X000 1001) or Network Operational (encoded as X000 1111) may, for example, be included. When the MO is deleted the protocol machine shall be reinitialized and a reset PDU shall be transmitted. A cause code of Out of Order (encoded as X000 0001) or Network Out of Order (encoded as X001 1101) may, for example, be included.;

commonStateChange-B;

ATTRIBUTES

chargingDirection GET,

logicalChannel INITIAL VALUE DERIVATION RULE logicalChannelIV-B,

packetSizes INITIAL VALUE DERIVATION RULE optionalCMIPIV-B,

throughputClasses INITIAL VALUE DERIVATION RULE optionalCMIPIV-B,

windowSizes INITIAL VALUE DERIVATION RULE optionalCMIPIV-B,

"DMI":operationalState GET,

remoteDTEAddress GET,

remoteLogicalChannel GET;

ATTRIBUTE GROUPS

"DMI":state

"DMI":operationalState;

NOTIFICATIONS

"DMI":stateChange;

;;

REGISTERED AS {NLM.moi permanentVirtualCircuit-DCE (30)};

### 5.11.6 The virtual call initial values managed object

- 
- There may be multiple instances of the virtualCallIVMO in a system.
- A virtualCallIVMO may be used to supply initial
- values for the attributes of the virtualCall-DTE or virtualCall-DCE MO.
- Different instances of virtualCallIVMO may contain different initial values.
- 
- Its definition permits it to be created and deleted explicitly by
- management operation.

```

virtualCallIVMO MANAGED OBJECT CLASS
  DERIVED FROM "DMI":top;
  CHARACTERIZED BY virtualCallIVMO-P PACKAGE
  BEHAVIOUR commonCreationDeletion-B;
  ATTRIBUTES
    virtualCallIVMOId GET,
    fastSelect REPLACE-WITH-DEFAULT
      GET-REPLACE,
    packetSizes REPLACE-WITH-DEFAULT
      GET-REPLACE,
    reverseCharging REPLACE-WITH-DEFAULT
      GET-REPLACE,
    throughputClasses REPLACE-WITH-DEFAULT
      GET-REPLACE,
    windowSizes REPLACE-WITH-DEFAULT
      GET-REPLACE;
  NOTIFICATIONS
    "DMI":objectCreation,
    "DMI":objectDeletion;
  ;;
REGISTERED AS {NLM.moi virtualCallIVMO (15)};

```

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### 5.11.7 The virtual call DTE managed object

- An instance of this MO exists for each Virtual Call. It is not created by management, but by the operation of the protocol state machine.
- An existing instance may, however, be deactivated by management action, which will cause the associated VC to be cleared.
- 
- An instance of this MO is created and exists as long as real resources are consumed by the existence of the virtual call. It is an implementation matter to determine the point during call establishment when real resources are consumed, and conversely, when during call clearing, when they are released.

#### virtualCall-DTE MANAGED OBJECT CLASS

DERIVED FROM virtualCircuit-DTE;

CHARACTERIZED BY virtualCall-DTE-P PACKAGE

#### BEHAVIOUR

deactivateConnection-B,  
successfulConnectionEstablishment-B;

#### ATTRIBUTES

callingAddressExtension GET,  
calledAddressExtension GET,  
direction GET,  
fastSelect GET,  
originallyCalledAddress GET,  
redirectReason GET,  
remoteDTEAddress GET,  
reverseCharging GET;

#### ACTIONS

"GMI":deactivate;

#### NOTIFICATIONS

"GMI":communicationsInformation;

::

REGISTERED AS {NLM.moi virtualCall-DTE (16)};

### 5.11.8 The virtual call DCE managed object

- An instance of this MO is created and exists as long as real resources are consumed by the existence
- of the Virtual Call. It is an implementation matter to determine the point during a call establishment
- when real resources are consumed, and conversely, when during call clearing, when they are released.

#### virtualCall-DCE MANAGED OBJECT CLASS

DERIVED FROM virtualCircuit-DCE;

CHARACTERIZED BY virtualCall-DCE-P PACKAGE

##### BEHAVIOUR

deactivateConnection-B,  
successfulConnectionEstablishment-B;

##### ATTRIBUTES

chargingDirection GET,  
cUGSelection GET,  
direction GET,  
fastSelect GET,  
remoteDTEAddress GET,  
transitDelaySelectionAndIndication GET;

##### ACTIONS

"GMI":deactivate;

##### NOTIFICATIONS

"GMI":communicationsInformation;

;;

##### CONDITIONAL PACKAGES

dCEVirtualCallFacilities-P

PRESENT IF the instance supports the dCEVirtualCallFacilities capabilities;

REGISTERED AS {NLM.moi virtualCall-DCE (31)};

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### 5.11.9 The recommendation D series counts managed object

- There is one instance of this MO created by management action or
- automatically for each instance of a virtual call where the Tariff
- Principles applying to Data Communications Services over dedicated
- Public Data Networks are applicable. The provisions of the tariff
- principles are defined in Recommendations D.10, D.11 and D.12.

#### dSeriesCounts MANAGED OBJECT CLASS

DERIVED FROM "DMI":top;

CHARACTERIZED BY dSeriesCounts-P PACKAGE

BEHAVIOUR dSeriesCounts-P-B BEHAVIOUR

DEFINED AS provides the set of packet and segment counts required to collect the charges levied according to the tariff principles contained in Recommendations D.10, D.11 and D.12 for international packet switched public data communications services. The values collected are reported at object deletion.;

ATTRIBUTES

dSeriesId GET,  
dSeriesResetRequestIndicationPackets GET,  
dSeriesSegmentsSent GET,  
dSeriesSegmentsReceived GET;

ATTRIBUTE GROUPS

"GMI":counters  
dSeriesResetRequestIndicationPackets  
dSeriesSegmentsSent  
dSeriesSegmentsReceived;

NOTIFICATIONS

"DMI":objectCreation,  
"DMI":objectDeletion;

::

REGISTERED AS {NLM.moi dSeriesCounts (32)};

#### -- Packages

#### dTEVirtualCircuitCounters-P PACKAGE

BEHAVIOUR

octetsSentReceivedCounter-B;

ATTRIBUTES

"DMI":octetsSentCounter GET,  
-- Note that the DMI definition is in terms of user data octets.

"DMI":octetsReceivedCounter GET,  
-- Note that the DMI definition is in terms of user data octets.

dataPacketsReceived GET,

dataPacketsSent GET,

-- Note the "DMI":PDUsSentCounter  
-- cannot be used here since it is defined as total number of PDUs sent,  
-- not just data PDUs.

dataRetransmissionTimerExpiries GET,

interruptPacketsReceived GET,

interruptPacketsSent GET,

interruptTimerExpiries GET,

providerInitiatedResets GET,

remotelyInitiatedResets GET,

resetTimeouts GET;

**ATTRIBUTE GROUPS**

"GMI":counters

"DMI":octetsReceivedCounter

"DMI":octetsSentCounter

dataPacketsReceived

dataPacketsSent

dataRetransmissionTimerExpiries

interruptPacketsReceived

interruptPacketsSent

interruptTimerExpiries

providerInitiatedResets

remotelyInitiatedResets

resetTimeouts;

REGISTERED AS {NLM.poi dTEVirtualCircuitCounters-P (19)};

**dCEVirtualCallFacilities-P PACKAGE**

**BEHAVIOUR dCEVirtualCallFacilities-P-B BEHAVIOUR**

DEFINED AS provides the set of optional facilities used during the normal operation of a DCE, as defined in the appropriate clauses ;;

**ATTRIBUTES**

bilateralCUGSelection GET,

callRedirectionDeflectionNotification GET,

calledLineAddressModifiedNotification GET,

cUGWithOutgoingAccessSelection GET,

nUISelection GET,

reverseCharging GET,

rPOASelection GET;

REGISTERED AS {NLM.poi dCEVirtualCallFacilities-P (24)};

**-- Behaviours**

**logicalChannelIV-B BEHAVIOUR**

DEFINED AS The initial value of the logical channel attribute shall be specified in the CMIP create;

**optionalCMIPV-B BEHAVIOUR**

DEFINED AS The initial value of this attribute may be supplied in the CMIP create. When not so supplied, the default value shall be used;

**virtualCircuitNaming-B BEHAVIOUR**

DEFINED AS A system shall ensure that all instances of MOs derived from the virtualCircuit MO which have a common x25PLE or subclass as their superior MO, shall have unique values for the virtualCircuitId attribute. This applies to both automatically generated names and those supplied by means of a CMIP create.;

**-- Name Bindings**

permanentVirtualCircuit-DTE-x25PLE-DTE NAME BINDING

SUBORDINATE OBJECT CLASS permanentVirtualCircuit-DTE AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS x25PLE-DTE AND SUBCLASSES;

WITH ATTRIBUTE virtualCircuitId;

BEHAVIOUR logicalChannelIV-B;

CREATE WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE;

REGISTERED AS {NLM.nboi permanentVirtualCircuit-DTE-x25PLE-DTE (26)};

permanentVirtualCircuit-DCE-x25PLE-DCE NAME BINDING

SUBORDINATE OBJECT CLASS permanentVirtualCircuit-DCE AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS x25PLE-DCE AND SUBCLASSES;

WITH ATTRIBUTE virtualCircuitId;

BEHAVIOUR logicalChannelIV-B;

CREATE WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE;

REGISTERED AS {NLM.nboi permanentVirtualCircuit-DCE-x25PLE-DCE (29)};

virtualCall-DTE-x25PLE-DTE NAME BINDING

SUBORDINATE OBJECT CLASS virtualCall-DTE AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS x25PLE-DTE AND SUBCLASSES;

WITH ATTRIBUTE virtualCircuitId;

BEHAVIOUR virtualCall-DTE-x25PLE-DTE-B BEHAVIOUR

DEFINED AS Created only by the operation of the protocol or local interface. The instance name is derived automatically (as for CREATE WITH-AUTOMATIC-INSTANCE-NAMING).

The creation of an instance of the virtualCall-DTE MO using this name binding may reference an instance of the virtualCallIVMO. The means by which such an instance (if any) of the virtualCallIVMO is identified is a local matter.

When this occurs,

some of the initial values of the attributes of the instance of the virtualCall-DTE MO may be supplied by the values of the attributes in the specified instance of the virtualCallIVMO. However any such value may be overridden by a value supplied by local means (for example, across an internal interface). Where values are supplied by the IVMO, the initial value of an attribute of the virtualCall-DTE MO shall be the value of the corresponding attribute in the virtualCallIVMO (that is, which has the same attribute template label). The naming attribute of the virtualCall-DTE is assigned a value according to local mechanisms.;

REGISTERED AS {NLM.nboi virtualCall-DTE-x25PLE-DTE (24)};

**virtualCall-DCE-x25PLE-DCE-Automatic NAME BINDING**

SUBORDINATE OBJECT CLASS virtualCall-DCE AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS x25PLE-DCE AND SUBCLASSES;

WITH ATTRIBUTE virtualCircuitId;

BEHAVIOUR virtualCall-DCE-x25PLE-DCE-Automatic-B BEHAVIOUR

DEFINED AS The name binding that applies when the virtualCall-DCE

Managed Object is created automatically by the operation of the

system. The instance name is derived automatically

(as for CREATE WITH-AUTOMATIC-INSTANCE-NAMING).

The creation of an instance of the virtualCall-DCE MO

using this name binding may reference an instance of the

virtualCallIVMO. The means by which such an instance (if any)

of the virtualCallIVMO is identified is a local matter.

When this occurs,

some of the initial values of the attributes of the instance

of the virtualCall-DCE MO may be supplied by the values of the

attributes in the specified instance of the virtualCallIVMO. However any

such value may be overridden by a value supplied by local means (for

example, across an internal interface). Where values are supplied by the

IVMO, the initial value of an attribute of the virtualCall-DCE MO

shall be the value of the corresponding attribute in the virtualCallIVMO

(that is, which has the same attribute template label). The naming

attribute of the virtualCall-DCE is assigned a value

according to local mechanisms.;

DELETE;

REGISTERED AS {NLM.nboi virtualCall-DCE-x25PLE-DCE-Automatic (30)};

**virtualCall-DCE-x25PLE-DCE-Management NAME BINDING**

SUBORDINATE OBJECT CLASS virtualCall-DCE AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS x25PLE-DCE AND SUBCLASSES;

WITH ATTRIBUTE virtualCircuitId;

BEHAVIOUR virtualCall-DCE-x25PLE-DCE-Management-B BEHAVIOUR

DEFINED AS The name binding that applies when the virtualCall-DCE Managed Object

is created by management operation.;

CREATE WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE;

REGISTERED AS {NLM.nboi virtualCall-DCE-x25PLE-DCE-Management (31)};

**virtualCallIVMO-x25PLE NAME BINDING**

SUBORDINATE OBJECT CLASS virtualCallIVMO AND SUBCLASSES;  
NAMED BY

SUPERIOR OBJECT CLASS x25PLE AND SUBCLASSES;

WITH ATTRIBUTE virtualCallIVMOId;

CREATE;

DELETE;

REGISTERED AS {NLM.nboi virtualCallIVMO-x25PLE (25)};

dSeriesCounts-virtualCall-DCE-Automatic NAME BINDING  
 SUBORDINATE OBJECT CLASS dSeriesCounts AND SUBCLASSES;  
 NAMED BY  
 SUPERIOR OBJECT CLASS virtualCall-DCE AND SUBCLASSES;  
 WITH ATTRIBUTE dSeriesId;  
 BEHAVIOUR dSeriesCounts-virtualCall-DCE-Automatic-B BEHAVIOUR  
 DEFINED AS Created only by the operation of the protocol or local interface. The instance  
 name is derived automatically (as for CREATE WITH-AUTOMATIC-INSTANCE-NAMING);;  
 DELETE;  
 REGISTERED AS {NLM.nboi dSeriesCounts-virtualCall-DCE-Automatic (32)};

dSeriesCounts-virtualCall-DCE-Management NAME BINDING  
 SUBORDINATE OBJECT CLASS dSeriesCounts AND SUBCLASSES;  
 NAMED BY  
 SUPERIOR OBJECT CLASS virtualCall-DCE AND SUBCLASSES;  
 WITH ATTRIBUTE dSeriesId;  
 BEHAVIOUR dSeriesCounts-virtualCall-DCE-Management-B BEHAVIOUR  
 DEFINED AS The name binding that applies when the dSeriesCounts Managed Object  
 is created by management operation.;;  
 DELETE;  
 REGISTERED AS {NLM.nboi dSeriesCounts-virtualCall-DCE-Management (33)};

#### -- Attributes

bilateralCUGSelection ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Boolean;  
 MATCHES FOR EQUALITY;  
 BEHAVIOUR bilateralCUGSelection-B BEHAVIOUR  
 DEFINED AS Indicates the use of the bilateral closed user group selection facility  
 for that call.;;  
 REGISTERED AS { NLM.aoi bilateralCUGSelection (126)};

calledAddressExtension ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.NAddress;  
 -- In the OSI context this will always be an NSAP address but in other uses  
 -- it may not. In any case it may be null, for example, when used by ISO 8473.  
 MATCHES FOR EQUALITY, SUBSTRINGS;  
 BEHAVIOUR calledAddressExtension-B BEHAVIOUR  
 DEFINED AS The contents of the called address extension field.;;  
 REGISTERED AS {NLM.aoi calledAddressExtension (100)};

calledLineAddressModifiedNotification ATTRIBUTE  
 WITH ATTRIBUTE SYNTAX NLM.Boolean;  
 MATCHES FOR EQUALITY;  
 BEHAVIOUR calledLineAddressModifiedNotification-B BEHAVIOUR  
 DEFINED AS Indicates the use of the called line address modified notification facility  
 for that call.;;  
 REGISTERED AS { NLM.aoi calledLineAddressModifiedNotification (128)};

**callingAddressExtension ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.NAddress;

- In the OSI context this will always be an NSAP address but in other uses
- it may not. In any case it may be null, for example, when used by ISO 8473.

MATCHES FOR EQUALITY, SUBSTRINGS;

BEHAVIOUR callingAddressExtension-B BEHAVIOUR

DEFINED AS The contents of the calling address extension field.;;

REGISTERED AS { NLM.aoi callingAddressExtension (99)};

**callRedirectionDeflectionNotification ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR callRedirectionDeflectionNotification-B BEHAVIOUR

DEFINED AS Indicates the use of the call redirection deflection notification facility for that call.;;

REGISTERED AS { NLM.aoi callRedirectionDeflectionNotification (130)};

**chargingDirection ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR chargingDirection-B BEHAVIOUR

DEFINED AS Indicates the use of the charging direction facility for that call.;;

REGISTERED AS { NLM.aoi chargingDirection (131)};

**cUGSelection ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR cUGSelection-B BEHAVIOUR

DEFINED AS Indicates the use of the closed user group selection facility for that call.;;

REGISTERED AS { NLM.aoi cUGSelection (135)};

**cUGWithOutgoingAccessSelection ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR cUGWithOutgoingAccessSelection-B BEHAVIOUR

DEFINED AS Indicates the use of the Closed User Group With Outgoing Access Selection facility for that call. It may only take the value 'True' if the DTE does not have a preferential closed user group, as described in Recommendation X.25 and ISO/IEC 8208.;;

REGISTERED AS { NLM.aoi cUGWithOutgoingAccessSelection (138)};

**dSeriesId ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.GraphicString;

MATCHES FOR EQUALITY, SUBSTRINGS;

BEHAVIOUR dSeriesId-B BEHAVIOUR

DEFINED AS The name of this instance of the dSeriesCounts MO.;;

REGISTERED AS { NLM.aoi dSeriesId (140)};

**dSeriesResetRequestIndicationPackets ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR dSeriesResetRequestIndicationPackets-B BEHAVIOUR

DEFINED AS Value for count of Reset Request or Indication Packets  
with restrictions defined in Recommendation D.11 ;;

REGISTERED AS {NLM.aoi dSeriesResetRequestIndicationPackets (141)};

**dSeriesSegmentsReceived ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR dSeriesSegmentsReceived-B BEHAVIOUR

DEFINED AS Value for count of Segments Received, in 64 octets,  
as per Recommendation D.12;;

REGISTERED AS {NLM.aoi dSeriesSegmentsReceived (143)};

**dSeriesSegmentsSent ATTRIBUTE**

DERIVED FROM "GMI":nonWrapping64BitCounter;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR dSeriesSegmentsSent-B BEHAVIOUR

DEFINED AS Value for count of Segments Sent, in 64 octets,  
as per Recommendation D.12;;

REGISTERED AS {NLM.aoi dSeriesSegmentsSent (142)};

**direction ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Direction;

-- Enumerated( Incoming, Outgoing)

MATCHES FOR EQUALITY;

BEHAVIOUR direction-B BEHAVIOUR

DEFINED AS The direction (incoming or outgoing) of the call;;

REGISTERED AS {NLM.aoi direction (92)};

**fastSelect ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.FastSelect;

-- Enumerated( Not Specified, Fast Select, Fast Select With Restricted Response, No Fast Select)

MATCHES FOR EQUALITY;

BEHAVIOUR fastSelect-B BEHAVIOUR

DEFINED AS Type of fast select used or to be used for call.

In the case of an IVMO, this specifies that one of 'fast select',

'fast select with restricted response', or no fast select

facility is to be used for the call. It includes a value

'not specified' which indicates that no preference is expressed

in the IVMO. In the case of a non-IVMO MO, this specifies that one

of 'fast select' or 'no fast select' was used for the call.;;

REGISTERED AS {NLM.aoi fastSelect (76)};

**logicalChannel ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.LogicalChannelId;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR logicalChannel-B BEHAVIOUR

DEFINED AS The actual Logical Channel ID used for the call.;;

REGISTERED AS {NLM.aoi logicalChannel (89)};

**nUISelection ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;

MATCHES FOR EQUALITY;

BEHAVIOUR nUISelection-B BEHAVIOUR

DEFINED AS Indicates the use of the network user identification selection facility for that call.;

REGISTERED AS { NLM.aoi nUISelection (155)};

**originallyCalledAddress ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.DTEAddress;

MATCHES FOR EQUALITY, SUBSTRINGS;

BEHAVIOUR originallyCalledAddress-B BEHAVIOUR

DEFINED AS The originally called address.;

REGISTERED AS {NLM.aoi originallyCalledAddress (98)};

**packetSizes ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.BidirectionalValues;

MATCHES FOR EQUALITY;

BEHAVIOUR packetSizes-B BEHAVIOUR

DEFINED AS The packet sizes for this VC.

In the case of an IVMO MO it is the proposed value of the packet sizes (incoming and outgoing) to be used when establishing the virtual call, expressed in octets. The value of NULL indicates that the default packet size for that direction (as indicated by the defaultPacketSizes attribute of the containing X.25 PLE MO), is to be used.

In the case of a non-IVMO MO it is the actual packet sizes in use for this VC.;

REGISTERED AS {NLM.aoi packetSizes (121)};

**redirectReason ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.RedirectReason;

MATCHES FOR EQUALITY;

BEHAVIOUR redirectReason-B BEHAVIOUR

DEFINED AS The reason why the call has been redirected.

This is the reason why the call has been offered or has been connected to an address different from the originally called address.

That is, the value of the first octet of the Facility Parameter Field of the CRCDN or CLAMN facility, indicating the reason for call redirection or call deflection.

The zero value indicates that the call was not redirected.;

REGISTERED AS {NLM.aoi redirectReason (97)};

**remoteDTEAddress ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.DTEAddress;  
 MATCHES FOR EQUALITY, SUBSTRINGS;  
 BEHAVIOUR remoteDTEAddress-B BEHAVIOUR

DEFINED AS The DTE Address of the remote DTE.

In the case of an outgoing call, this is the remote DTE address from the called address of the transmitted call request packet.

In the case of an incoming call, it is the calling address from the received call request packet.;

REGISTERED AS {NLM.aoi remoteDTEAddress (93)};

**remoteLogicalChannel ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.LogicalChannelId;  
 -- 12 bit Channel ID

MATCHES FOR EQUALITY, ORDERING;  
 BEHAVIOUR remoteLogicalChannel-B BEHAVIOUR

DEFINED AS The Remote Logical Channel ID for the Permanent Virtual Circuit.;

REGISTERED AS { NLM.aoi remoteLogicalChannel (162)};

**reverseCharging ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;  
 MATCHES FOR EQUALITY;

BEHAVIOUR reverseCharging-B BEHAVIOUR

DEFINED AS Use of reverse charging.

When 'True' for an outgoing call, it shall be (for an IVMO), or was (for a non-IVMO), initiated requesting reverse charging. When

'True' for an incoming call associated with a virtualCall MO, it indicates that reverse charging was accepted.;

REGISTERED AS {NLM.aoi reverseCharging (75)};

**rPOASelection ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.Boolean;  
 MATCHES FOR EQUALITY;

BEHAVIOUR rPOASelection-B BEHAVIOUR

DEFINED AS Indicates the use of the registered private operating agency selection facility for that call.;

REGISTERED AS { NLM.aoi rPOASelection (166)};

**throughputClasses ATTRIBUTE**

WITH ATTRIBUTE SYNTAX NLM.BidirectionalValues;  
 MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR throughputClasses-B BEHAVIOUR

DEFINED AS The throughput classes in use or to be used.

For an IVMO, this is the throughput classes to be proposed.

For a non-IVMO it is the actual throughput classes in use.

For Virtual Calls this is the result of negotiation.;

REGISTERED AS {NLM.aoi throughputClasses (96)};

**transitDelaySelectionAndIndication** ATTRIBUTE  
WITH ATTRIBUTE SYNTAX NLM.Boolean;  
MATCHES FOR EQUALITY;  
BEHAVIOUR transitDelaySelectionAndIndication-B BEHAVIOUR  
DEFINED AS Indicates the use of the transit delay selection and  
indication facility for that call.;;  
REGISTERED AS { NLM.aoi transitDelaySelectionAndIndication (169)};

**virtualCallIVMOId** ATTRIBUTE  
WITH ATTRIBUTE SYNTAX NLM.GraphicString;  
MATCHES FOR EQUALITY, SUBSTRINGS;  
BEHAVIOUR virtualCallIVMOId-B BEHAVIOUR  
DEFINED AS The name of this instance of virtualCallIVMO;;  
REGISTERED AS {NLM.aoi virtualCallIVMOId (117)};

**virtualCircuitId** ATTRIBUTE  
WITH ATTRIBUTE SYNTAX NLM.GraphicString;  
MATCHES FOR EQUALITY, SUBSTRINGS;  
BEHAVIOUR virtualCircuitId-B BEHAVIOUR  
DEFINED AS The name of this instance of virtualCircuit MO or subclass;;  
REGISTERED AS {NLM.aoi virtualCircuitId (116)};

**windowSizes** ATTRIBUTE  
WITH ATTRIBUTE SYNTAX NLM.BidirectionalValues;  
MATCHES FOR EQUALITY;  
BEHAVIOUR windowSizes-B BEHAVIOUR  
DEFINED AS The actual window sizes in use for this VC;;  
REGISTERED AS {NLM.aoi windowSizes (124)};

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## 6 ASN.1 modules

```
NLM {joint-iso-ccitt network-layer (13) management (0) nLM(2) asn1Module (2) 0}
DEFINITIONS IMPLICIT TAGS ::= BEGIN
EXPORTS ; -- everything
IMPORTS communicationsProtocolError
FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1};
```

### 6.1 Object identifier definitions

#### 6.1.1 Abbreviations

```
network-layer OBJECT IDENTIFIER ::= {joint-iso-ccitt network-layer (13)}
nl OBJECT IDENTIFIER ::= {network-layer management (0)}
nloi OBJECT IDENTIFIER ::= {nl nLM(2)}
sseoi OBJECT IDENTIFIER ::= {nloi standardSpecificExtensions (0)}
moi OBJECT IDENTIFIER ::= {nloi managedObjectClass (3)}
poi OBJECT IDENTIFIER ::= {nloi package (4)}
proi OBJECT IDENTIFIER ::= {nloi parameter (5)}
nboi OBJECT IDENTIFIER ::= {nloi nameBinding (6)}
aoi OBJECT IDENTIFIER ::= {nloi attribute (7)}
agoi OBJECT IDENTIFIER ::= {nloi attributeGroup (8)}
acoi OBJECT IDENTIFIER ::= {nloi action (9)}
noi OBJECT IDENTIFIER ::= {nloi notification (10)}
```

#### 6.1.2 Others

-- value assignments for specificProblems

```
pDUDiscard OBJECT IDENTIFIER ::= {sseoi specificProblems(3) pDUDiscard(1)}
pDUDiscardReasonNotSpecified OBJECT IDENTIFIER ::= {pDUDiscard
  reasonNotSpecified(0)}
pDUDiscardProtocolProcedureError OBJECT IDENTIFIER ::= {pDUDiscard
  protocolProcedureError(1)}
pDUDiscardIncorrectChecksum OBJECT IDENTIFIER ::= {pDUDiscard
  incorrectChecksum(2)}
pDUDiscardHeaderSyntaxError OBJECT IDENTIFIER ::= {pDUDiscard
  headerSyntaxError(4)}
pDUDiscardSegmentationNeededButNotPermitted OBJECT IDENTIFIER ::= {pDUDiscard
  segmentationNeededButNotPermitted(5)}
pDUDiscardIncompletePDUReceived OBJECT IDENTIFIER ::= {pDUDiscard
  incompletePDUReceived(6)}
pDUDiscardDuplicateOption OBJECT IDENTIFIER ::= {pDUDiscard
  duplicateOption(7)}
pDUDiscardDestinationAddressUnreachable OBJECT IDENTIFIER ::= {pDUDiscard
  destinationAddressUnreachable(128)}
pDUDiscardDestinationaAddressUnknown OBJECT IDENTIFIER ::= {pDUDiscard
  destinationAddressUnknown(129)}
pDUDiscardUnspecifiedSourceRouteingError OBJECT IDENTIFIER ::= {pDUDiscard
  unspecifiedSourceRouteingError(144)}
pDUDiscardSyntaxErrorInSourceRouteingField OBJECT IDENTIFIER ::= {pDUDiscard
  syntaxErrorInSourceRouteingField(145)}
```

pDUDiscardUnknownAddressInSourceRouteingField OBJECT IDENTIFIER ::= { pDUDiscard  
   unknownAddressInSourceRouteingField(146)}  
 pDUDiscardPathNotAcceptable OBJECT IDENTIFIER ::= { pDUDiscard  
   pathNotAcceptable(147)}  
 pDUDiscardLifetimeExpiredWhileDataUnitInTransit OBJECT IDENTIFIER ::= { pDUDiscard  
   lifetimeExpiredWhileDataUnitInTransit(160)}  
 pDUDiscardLifetimeExpiredDuringReassembly OBJECT IDENTIFIER ::= { pDUDiscard  
   lifetimeExpiredDuringReassembly(161)}  
 pDUDiscardUnsupportedOptionNotSpecified OBJECT IDENTIFIER ::= { pDUDiscard  
   unsupportedOptionNotSpecified(176)}  
 pDUDiscardUnsupportedProtocolVersion OBJECT IDENTIFIER ::= { pDUDiscard  
   unsupportedProtocolVersion(177)}  
 pDUDiscardUnsupportedSecurityOption OBJECT IDENTIFIER ::= { pDUDiscard  
   unsupportedSecurityOption(178)}  
 pDUDiscardUnsupportedSourceRouteingOption OBJECT IDENTIFIER ::= { pDUDiscard  
   unsupportedSourceRouteingOption(179)}  
 pDUDiscardUnsupportedRecordingOfRouteOption OBJECT IDENTIFIER ::= { pDUDiscard  
   unsupportedRecordingOfRouteOption(180)}  
 pDUDiscardReassemblyInterference OBJECT IDENTIFIER ::= { pDUDiscard  
   reassemblyInterference(181)}  
 iSO9542PDUDiscard OBJECT IDENTIFIER ::= { ssei informationtype(3) iSO9542PDUDiscard(2)}

-- for communication information notification

iSReachabilityChange OBJECT IDENTIFIER ::= {  
   ssei informationtype(4) iSReachabilityChange(1)}  
 eSReachabilityChange OBJECT IDENTIFIER ::= {  
   ssei informationtype(4) eSReachabilityChange(2)}  
 successfulConnectionEstablishment OBJECT IDENTIFIER ::= {  
   ssei informationtype(4) successfulConnectionEstablishment (3)}

-- for SNPAAddress type

sNPADTEAddress OBJECT IDENTIFIER ::= {  
   ssei sNPAAAddressType(5) dTEAddress(1)}  
 sNPAMACAddress OBJECT IDENTIFIER ::= {  
   ssei sNPAAAddressType(5) mACAddress(2)}

## 6.2 Other definitions

BidirectionalValues ::= SEQUENCE {  
   incoming [0] ChoiceInteger,  
   outgoing [1] ChoiceInteger}  
 Boolean ::= BOOLEAN  
 callRequestResponseTimerDefault INTEGER ::= 200  
 ChoiceInteger ::= CHOICE {  
   [0] IMPLICIT NULL, -- The 'I don't care' value  
   [1] IMPLICIT INTEGER}  
 clearRequestRetransmissionCountDefault INTEGER ::= 1  
 clearRequestResponseTimerDefault INTEGER ::= 180  
 cLNSId-Value GRAPHIC STRING ::= "CLNS"  
 cONSId-Value GRAPHIC STRING ::= "CONS"

DefaultTCA ::= SEQUENCE {  
     subscription [0] BOOLEAN,  
     supportedThroughClasses [1] SET OF INTEGER OPTIONAL,  
     selectedThroughputClasses [2] BidirectionalValues OPTIONAL}  
 dataPacketRetransmissionCountDefault INTEGER ::= 0  
 windowRotationTimerDefault INTEGER ::= 200  
 DTEAddress ::= SEQUENCE {  
     numberingPlanId [0] ENUMERATED {unknown(0), x121(1), e164(2)},  
     addressDigits [1] OCTET STRING}  
 NUMERICSTRING(FROM("0"|"1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"))(SIZE(0..15))  
     -- Up to 15 Digits 0..9  
 Direction ::= ENUMERATED {  
     incoming(0),  
     outgoing(1)}  
 DiscardReason ::= INTEGER(0..255)  
 EndToEndDelay ::= INTEGER(0..65535)  
     -- Note that according to ISO/IEC 8208 a value of 65535 indicates that the delay is unknown  
     -- or exceeds 65534 milliseconds.  
 false BOOLEAN ::= FALSE  
 False ::= BOOLEAN (FALSE)  
 FastSelect ::= ENUMERATED {  
     notSpecified(0),  
     fastSelect(1),  
     fastSelectWithRestrictedResponse(2),  
     noFastSelect(3)}  
 GraphicString ::= GRAPHICSTRING  
 holdingTimerMultiplierDefault INTEGER ::= 3  
 HoldingTimerMultiplierPermitted ::= INTEGER(2..63)  
 HoldingTimerMultiplierRequired ::= INTEGER(3)  
 Integer ::= INTEGER  
 interruptResponseTimerDefault INTEGER ::= 180  
 iSConfigurationTimerDefault INTEGER ::= 10  
 ISO9542Subsets ::= BITSTRING {configuration(0), redirection(1)}  
 Lifetime ::= INTEGER(1..255)  
 LocalDistinguishedName ::= DMI.ObjectInstance  
 LocalDistinguishedNames ::= DMI.GroupObjects  
 LogicalChannelAssignments ::= SEQUENCE {  
     pVC [0] SET OF LogicalChannelId,  
     incoming [1] LogicalChannelRange OPTIONAL,  
     twoWay [2] LogicalChannelRange OPTIONAL,  
     outgoing [3] LogicalChannelRange OPTIONAL}  
 LogicalChannelId ::= INTEGER (1..4095)  
 LogicalChannelRange ::= SEQUENCE {  
     low [1] LogicalChannelId,  
     high [2] LogicalChannelId}  
 ManualISSNPAAddress ::= SET OF SNPAAddress  
 MaxActiveCircuits ::= ChoiceInteger  
 NotificationDataSyntax ::= SEQUENCE {  
     channel [1] LogicalChannelId OPTIONAL,  
     packetHeader [2] OCTET STRING,  
     diagnosticCode [3] OCTET  
     causeCode [4] OCTET}  
 NAddress ::= OCTETSTRING(SIZE(0..20))  
     --up to 20 octets  
 NAddresses ::= SET OF NAddress  
 networkSubsystemId-Value GRAPHIC STRING ::= "NetworkSubsystem"

```

NonStandardDPS ::= SEQUENCE {
    subscription          [0] BOOLEAN,
    supportedPacketSizes  [1] SET OF INTEGER OPTIONAL,
    selectedPacketSizes   [2] BidirectionalValues OPTIONAL}
NonStandardDWS ::= SEQUENCE {
    subscription          [0] BOOLEAN,
    supportedWindowSizes  [1] SET OF INTEGER OPTIONAL,
    selectedWindowSizes   [2] BidirectionalValues OPTIONAL}
NUI ::= OctetString(SIZE(0..255))
nullBidirectionalValues BidirectionalValues ::= {NULL, NULL}
nullChoiceInteger ChoiceInteger ::= NULL
OctetString ::= OCTETSTRING
PacketSequencing ::= INTEGER
PDUFormatErrorSyntax ::= PDUHeader
PDUHeader ::= OCTETSTRING(SIZE(1..255))
PDUOtherErrorSyntax ::= SEQUENCE {
    errorCode [1] INTEGER(0..255),
    header    [2] PDUHeader}
ProtocolVersion ::= ENUMERATED {
    ISO8208V1 (0),
    ISO8208V2 (1),
    x2584 (2),
    x2588 (3)}
ReachabilityChangeSyntax ::= SEQUENCE {
    newState      [1] ENUMERATED { down(0), up(1)},
    nAddresses    [2] SET OF NAddress,
    snPAAddress  [3] SNPAAddress OPTIONAL,
    reason        [4] ENUMERATED
        {holdingTimerExpired(0),
         circuitDisabled(1)} OPTIONAL} -- Down only
RedirectHoldingTime ::= INTEGER(1..65535)
redirectHoldingTime-Default INTEGER ::= 600
RedirectHoldingTime-Permitted ::= INTEGER(1..65535)
RedirectReason ::= INTEGER(0..127)
registrationRequestRetransmissionCountDefault INTEGER ::= 1
registrationRequestResponseTimerDefault INTEGER ::= 300
registrationPermittedDefault BOOLEAN ::= FALSE
rejectRetransmissionCountDefault INTEGER ::= 0
rejectResponseTimerDefault INTEGER ::= 60
resetRequestRetransmissionCountDefault INTEGER ::= 1
resetRequestResponseTimerDefault INTEGER ::= 180
restartRequestRetransmissionCountDefault INTEGER ::= 1
restartRequestResponseTimerDefault INTEGER ::= 180
RPOASequence ::= SEQUENCE OF NUMERICSTRING(SIZE(0..4))
-- each numeric string limited to 4 decimal digits
-- an empty sequence is permitted
SDUSize ::= INTEGER (0..65535)
SNPAAddress ::= SEQUENCE {
    type      [1] OBJECT IDENTIFIER,
    address   [2] OCTET STRING}
suggestedESConfigurationTimerDefault INTEGER ::= 600
SupportedProtocol ::= SEQUENCE {
    protocol  [1] OBJECT IDENTIFIER,

```

```

versions          [2] SET OF ProtocolVersion;
defectsRepaired  [3] SET OF OBJECT IDENTIFIER OPTIONAL
SupportedProtocols ::= SET OF SupportedProtocol
SystemType ::= ENUMERATED {eS(1), iS(2)}
SystemTypes ::= SET OF SystemType
windowStatusTransmissionTimerDefault INTEGER ::= 60
X25PLEMode ::= ENUMERATED{
    dTE(0),
    dCE(1),
    dTEasDCE(2)}
END

```

## 7 Conformance

### 7.1 Conformance requirements to ISO/IEC 10733

An implementation for which conformance to this International Standard as a managed implementation is claimed shall:

- a) support the networkSubsystem MO,
- b) for each supported MO, support at least one name binding defined in this International Standard, for which the MO is the subordinate.

### 7.2 Protocol specific conformance requirements

An implementation claiming conformance to the management operation of CLNS as a managed implementation shall:

- a) conform to ISO/IEC 10733 as defined in 7.1,
- b) support the networkEntity MO, the CLNS MO, the NSAP MO and the linkage MO.

An implementation claiming conformance to the management operation of CONS as a managed implementation shall:

- a) conform to ISO/IEC 10733 as defined in 7.1,
- b) support the networkEntity MO, the CONS MO, the NSAP MO, the Connection MO and the linkage MO.

An implementation claiming conformance to the management operation of X.25 DTE as a managed implementation shall:

- a) conform to ISO/IEC 10733 as defined in 7.1,
- b) support the x25PLE-DTE MO and at least one class derived from virtualCircuit-DTE.

An implementation claiming conformance to the management operation of X.25-DCE as a managed implementation shall:

- a) conform to ISO/IEC 10733 as defined in 7.1,
- b) support the x25PLE-DCE MO and at least one class derived from virtualCircuit-DCE.

NOTE - Behaviour clauses defined in this standard may not always be testable. Care should be exercised when defining behaviour test suites in order not to impose additional constraints to those defined in this standard for implementations.

## Annex A

# Allocation of Object Identifiers

(normative)

NOTE - The following Object Identifiers have been allocated by the body of this International Standard. Object Identifiers which had been allocated when this International Standard was at the Draft International Standard stage have not been re-allocated. If any modification, other than a change to the behaviour clause, has been made to any template which had been allocated an object identifier, the new template has been allocated a new Object Identifier and the old Object Identifier (identified thus: *obsolete (1)*) should not be re-used.

### joint-iso-ccitt

ms (9)

smi (3)

part2 (2)

asn1Module (2)

(1)

network-layer (13)

management (0)

nLM (2)

standardSpecificExtensions (0)

specificProblems (3)

pDUDiscard (1)

reasonNotSpecified (0)

protocolProcedureError (1)

incorrectChecksum (2)

headerSyntaxError (4)

segmentationNeededButNotPermitted (5)

incompletePDUReceived (6)

duplicateOption (7)

destinationAddressUnreachable (128)

destinationAddressUnknown (129)

unspecifiedSourceRoutingError (144)

syntaxErrorInSourceRoutingField (145)

unknownAddressInSourceRoutingField (146)

pathNotAcceptable (147)

lifetimeExpiredWhileDataUnitInTransit (160)

lifetimeExpiredDuringReassembly (161)

unsupportedOptionNotSpecified (176)

unsupportedProtocolVersion (177)

unsupportedSecurityOption (178)

unsupportedSourceRoutingOption (179)

unsupportedRecordingOfRouteOption (180)

reassemblyInterference (181)  
 ISO9542PDUDiscard (2)  
 informationtype (4)  
   iSReachabilityChange (1)  
   eSReachabilityChange (2)  
   successfulConnectionEstablishment (3)  
 sNPAAAddressType (5)  
   dTEAddress (1)  
   mACAddress (2)  
 asn1Module (2)  
   (0)  
 managedObjectClass (3)  
   networkSubsystem (1)  
     *obsolete (2)*  
     *obsolete (3)*  
   nSAP (4)  
     *obsolete (5)*  
     *obsolete (6)*  
     *obsolete (7)*  
     *obsolete (8)*  
     *obsolete (9)*  
     *obsolete (10)*  
     *obsolete (11)*  
     *obsolete (12)*  
   networkConnection (13)  
     virtualCircuit (14)  
     virtualCallIVMO (15)  
     virtualCall-DTE (16)  
     x25PLE-DTE (17)  
     virtualCircuit-DTE (18)  
     permanentVirtualCircuit-DTE (19)  
     x25PLEIVMO-DTE (20)  
     cLNS (21)  
     networkEntity (22)  
     linkage (23)  
     cONS (24)  
     x25PLE (25)  
     x25PLEIVMO (26)  
     x25PLE-DCE (27)  
     x25PLEIVMO-DCE (28)  
     virtualCircuit-DCE (29)  
     permanentVirtualCircuit-DCE (30)  
     virtualCall-DCE (31)  
     dSeriesCounts (32)  
   package (4)  
     cLNSChecksum-P (1)  
       *obsolete (2)*  
       *obsolete (3)*  
     linkage-ISO8473-ISO8208SNDCE-P (4)  
     linkageIdleTimer-P (5)  
     linkageReserveTimer-P (6)  
     linkageInitialMinimumTimer-P (7)  
       *obsolete (8)*  
     linkageCODLService-P (9)  
       *obsolete (10)*  
     onlineRegistration-P (11)

receivingWindowRotationRecoveryProcedures-P (12)  
 transmittingWindowRotationRecoveryProcedures-P (13)  
 packetRetransmissionProcedures-P (14)  
*obsolete (15)*  
*obsolete (16)*  
 linkage-ISO9542Checksum-P (17)  
 dTEX25PLECounters-P (18)  
 dTEVirtualCircuitCounters-P (19)  
 cLNS8473-P (20)  
 linkage-ISO9542ES-P (21)  
 linkage-ISO9542IS-P (22)  
 dCECommonVirtualCircuitCounters-P (23)  
 dCEVirtualCallFacilities-P (24)  
 dCEX25PLETimers-P (25)  
 dCEX25PLEFacilities-P (26)  
 parameter (5)  
 notificationPDUHeader (1)  
*obsolete (2)*  
*obsolete (3)*  
*obsolete (4)*  
*obsolete (5)*  
*obsolete (6)*  
 notificationData (7)  
*obsolete (8)*  
*obsolete (9)*  
*obsolete (10)*  
*obsolete (11)*  
 reachabilityChange (12)  
 nameBinding (6)  
 networkSubsystem-system (1)  
*obsolete (2)*  
 cLNS-networkEntity-Management (3)  
 nSAP-networkSubsystem-Automatic (4)  
 nSAP-networkSubsystem-Management (5)  
*obsolete (6)*  
*obsolete (7)*  
 cONS-networkEntity-Management (8)  
 x25PLE-networkSubsystem-Management (9)  
 x25PLEIVMO-networkSubsystem (10)  
*obsolete (11)*  
*obsolete (12)*  
*obsolete (13)*  
*obsolete (14)*  
*obsolete (15)*  
 cLNS-networkEntity-Automatic (16)  
 cONS-networkEntity-Automatic (17)  
 x25PLE-networkSubsystem-Automatic (18)  
 networkConnection-cONS (19)  
 linkage-cLNS-Management (20)  
 linkage-cONS-Management (21)  
 linkage-cLNS-Automatic (22)  
 linkage-cONS-Automatic (23)  
 virtualCall-DTE-x25PLE-DTE (24)  
 virtualCallIVMO-x25PLE (25)  
 permanentVirtualCircuit-DTE-x25PLE-DTE (26)  
 networkEntity-networkSubsystem-Automatic (27)

networkEntity-networkSubsystem-Management (28)  
 permanentVirtualCircuit-DCE-x25PLE-DCE (29)  
 virtualCall-DCE-x25PLE-DCE-Automatic (30)  
 virtualCall-DCE-x25PLE-DCE-Management (31)  
 dSeriesCounts-virtualCall-DCE-Automatic (32)  
 dSeriesCounts-virtualCall-DCE-Management (33)  
 attribute (7)  
   *obsolete (1)*  
   *obsolete (2)*  
   networkEntityTitles (3)  
   enableChecksum (4)  
   *obsolete (5)*  
   segmentsReceived (6)  
   segmentsDiscarded (7)  
   assemblingSegmentsDiscarded (8)  
   errorReportsReceived (9)  
   pDUDiscards (10)  
   congestionDiscards (11)  
   *obsolete (12)*  
   *obsolete (13)*  
   *obsolete (14)*  
   *obsolete (15)*  
   *obsolete (16)*  
   linkageId (17)  
   sN-SAP (18)  
   sN-ServiceProvider (19)  
   holdingTimerMultiplier (20)  
   defaultESConfigTimer (21)  
   activeESConfigTimer (22)  
   iSReachabilityChanges (23)  
   iSConfigurationTimer (24)  
   suggestedESConfigurationTimer (25)  
   redirectHoldingTime (26)  
   eSReachabilityChanges (27)  
   manualISSNPAAddress (28)  
   callsPlaced (29)  
   callsFailed (30)  
   idleTimer (31)  
   reserveTimer (32)  
   initialMinimumTimer (33)  
   *obsolete (34)*  
   *obsolete (35)*  
   x25PLEId (36)  
   x25PLEIVMOId (37)  
   protocolVersionSupported (38)  
   localDTEAddress (39)  
   *obsolete (40)*  
   maxActiveCircuits (41)  
   restartRequestResponseTimer (42)  
   minimumRecallTimer (43)  
   registrationRequestResponseTimer (44)  
   restartRequestRetransmissionCount (45)  
   registrationRequestRetransmissionCount (46)  
   *obsolete (47)*  
   logicalChannelAssignments (48)  
   extendedPacketSequenceNumbering (49)

dataPacketsSent (50)  
dataPacketsReceived (51)  
callAttempts (52)  
callsConnected (53)  
providerInitiatedDisconnects (54)  
callTimeouts (55)  
clearTimeouts (56)  
remotelyInitiatedResets (57)  
dataRetransmissionTimerExpiries (58)  
providerInitiatedResets (59)  
resetTimeouts (60)  
remotelyInitiatedRestarts (61)  
restartCountsExceeded (62)  
protocolErrorsDetectedLocally (63)  
protocolErrorsAccusedOf (64)  
callEstablishmentRetryCountsExceeded (65)  
clearCountsExceeded (66)  
interruptPacketsSent (67)  
interruptPacketsReceived (68)  
interruptTimerExpiries (69)  
*obsolete (70)*  
*obsolete (71)*  
*obsolete (72)*  
*obsolete (73)*  
*obsolete (74)*  
reverseCharging (75)  
fastSelect (76)  
callRequestResponseTimer (77)  
resetRequestResponseTimer (78)  
clearRequestResponseTimer (79)  
resetRequestRetransmissionCount (80)  
clearRequestRetransmissionCount (81)  
interruptResponseTimer (82)  
windowStatusTransmissionTimer (83)  
windowRotationTimer (84)  
dataPacketRetransmissionCount (85)  
rejectResponseTimer (86)  
rejectRetransmissionCount (87)  
*obsolete (88)*  
logicalChannel (89)  
*obsolete (90)*  
*obsolete (91)*  
direction (92)  
remoteDTEAddress (93)  
*obsolete (94)*  
*obsolete (95)*  
throughputClasses (96)  
redirectReason (97)  
originallyCalledAddress (98)  
callingAddressExtension (99)  
calledAddressExtension (100)  
invalid9542PDUs (101)  
maximumLifetime (102)  
defaultPacketSizes (103)  
defaultWindowSizes (104)  
registrationPermitted (105)

localNSAPMO (106)  
remoteNSAPAddress (107)  
systemTypes (108)  
operationalSystemType (109)  
supportedProtocols (110)  
operationalProtocols (111)  
defaultThroughputClasses (112)  
*obsolete (113)*  
callDeflectionSubscription (114)  
ISO9542OperationalSubsets (115)  
virtualCircuitId (116)  
virtualCallIVMOId (117)  
segmentsSent (118)  
flowControlParameterNegotiation (119)  
x25PLEMode (120)  
packetSizes (121)  
*obsolete (122)*  
*obsolete (123)*  
windowSizes (124)  
bilateralCUG (125)  
bilateralCUGSelection (126)  
bilateralCUGWithOutgoingAccess (127)  
calledLineAddressModifiedNotification (128)  
callRedirection (129)  
callRedirectionDeflectionNotification (130)  
chargingDirection (131)  
chargingInformation (132)  
clearIndication (133)  
cUG (134)  
cUGSelection (135)  
cUGWithIncomingAccess (136)  
cUGWithOutgoingAccess (137)  
cUGWithOutgoingAccessSelection (138)  
dBitModification (139)  
dSeriesId (140)  
dSeriesResetRequestIndicationPackets (141)  
dSeriesSegmentsSent (142)  
dSeriesSegmentsReceived (143)  
defaultThroughputClassesAssignment (144)  
fastSelectAcceptance (145)  
huntGroup (146)  
incomingCall (147)  
incomingCallsBarred (148)  
incomingCallBarredWithinCUG (149)  
localChargingPrevention (150)  
nonStandardDefaultPacketSizes (151)  
nonStandardDefaultWindowSizes (152)  
nUISubscription (153)  
nUIOverride (154)  
nUISelection (155)  
oneWayLogicalChannelIncoming (156)  
oneWayLogicalChannelOutgoing (157)  
onlineFacilityRegistration (158)  
outgoingCallsBarred (159)  
outgoingCallBarredWithinCUG (160)  
packetRetransmission (161)

remoteLogicalChannel (162)  
resetIndication (163)  
restartIndication (164)  
reverseChargingAcceptance (165)  
rPOASelection (166)  
rPOASubscription (167)  
throughputClassNegotiation (168)  
transitDelaySelectionAndIndication (169)  
x25SegmentsSent (170)  
x25SegmentsReceived (171)  
attributeGroup (8)  
action (9)  
notification (10)

END

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## Annex B Shorthand Description of Managed Objects

(informative)

The information in this Annex is intended only to give a broad outline of the Network Layer Management Specification. While the information contained herein has been derived from the normative GDMO text in the body of this Specification, it should be treated with caution, as there may be errors.

The following abbreviations are used to describe the property lists of attributes.

G	Get
R	Replace
RWD	Replace With Default
A	Add
RM	Remove

The following abbreviations are used for external label references

DMI:	"CCITT Rec. X.721 (1992)   ISO/IEC 10165-2 : 1992":
GMI:	"CCITT Rec. X.723   ISO/IEC 10165-5"

Template types with a '\*' suffix (for example ATTRIBUTE\*) refer to template types defined in conditional packages. All inherited templates, except those inherited from 'top', are included in each Managed Object Class.

The inheritance hierarchy is illustrated in figure B.1.

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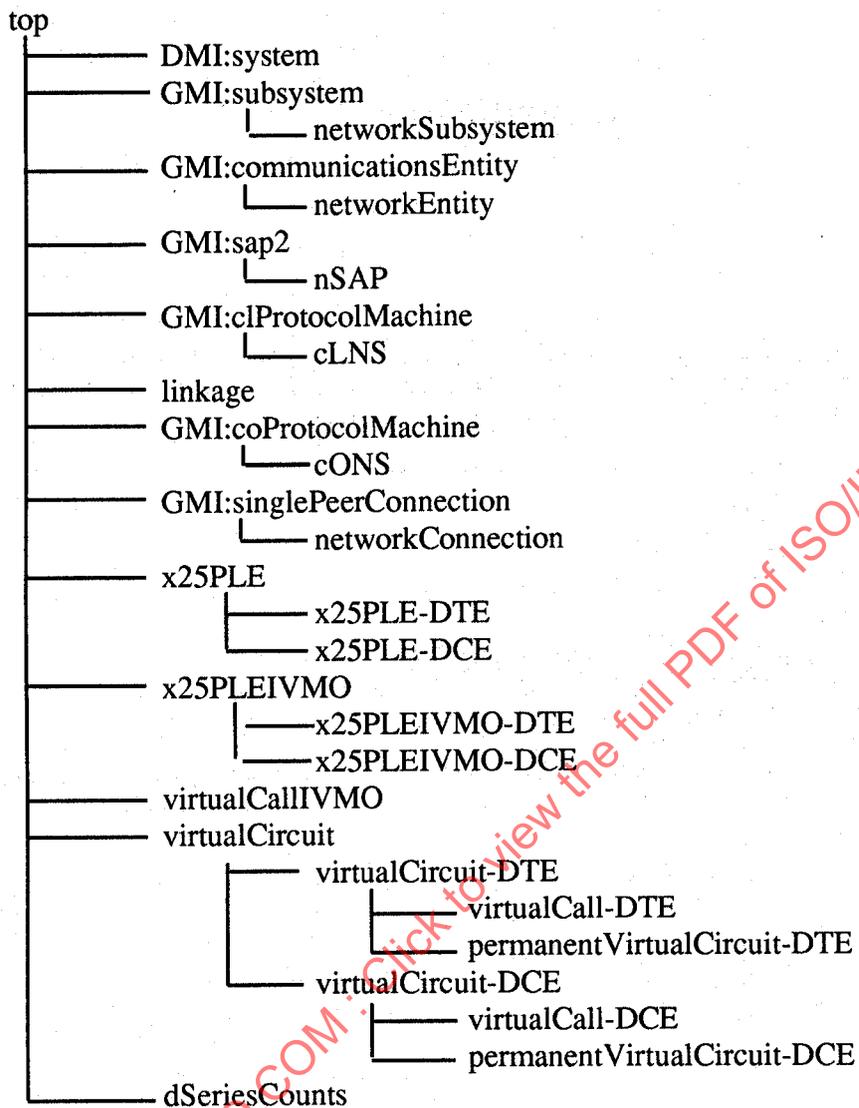


Figure B.1 - Network Layer Inheritance Hierarchy

MANAGED OBJECT CLASS networkSubsystem DERIVED FROM (GMI:subsystem) CONTAINED IN (DMI:system)  
 GMI:subsystemId ATTRIBUTE (G)  
 END MANAGED OBJECT CLASS networkSubsystem

MANAGED OBJECT CLASS networkEntity DERIVED FROM (GMI:communicationsEntity) CONTAINED IN (networkSubsystem)

DMI:objectCreation NOTIFICATION

DMI:objectDeletion NOTIFICATION

networkEntityTitles ATTRIBUTE (G, R, A, RM)

The set of Network Entity Titles

systemTypes ATTRIBUTE (G)

The set of system roles supported by this Network Entity.

END MANAGED OBJECT CLASS networkEntity

MANAGED OBJECT CLASS nSAP DERIVED FROM (GMI:sap2) CONTAINED IN (networkSubsystem)

DMI:objectCreation NOTIFICATION

DMI:objectDeletion NOTIFICATION

GMI:sap2Address ATTRIBUTE (G)

END MANAGED OBJECT CLASS nSAP

MANAGED OBJECT CLASS cLNS DERIVED FROM (GMI:clProtocolMachine) CONTAINED IN (networkEntity)

DMI:administrativeState ATTRIBUTE (G, R)

DMI:communicationsAlarm NOTIFICATION\*

DMI:objectCreation NOTIFICATION

DMI:objectDeletion NOTIFICATION

DMI:octetsReceivedCounter ATTRIBUTE\* (G)

DMI:octetsSentCounter ATTRIBUTE\* (G)

DMI:stateChange NOTIFICATION

GMI:activate ACTION

GMI:clProtocolMachinelid ATTRIBUTE (G)

GMI:deactivate ACTION

assemblingSegmentsDiscarded ATTRIBUTE\* (G)

Counter of segments discarded due to reassembly time expiry.

congestionDiscards ATTRIBUTE\* (G)

Counter of PDUs discarded due to congestion.

enableChecksum ATTRIBUTE\* (G, R, RWD)

When True, the generation of checksums is enabled.

errorReportsReceived ATTRIBUTE\* (G)

Counter of received error reports.

maximumLifetime ATTRIBUTE\* (G, R)

Maximum PDU lifetime (in half seconds).

operationalSystemType ATTRIBUTE (G)

The system role in which this instance is operating.

pDUDiscards ATTRIBUTE\* (G)

Counter of PDUs discarded (except for congestion).

segmentsDiscarded ATTRIBUTE\* (G)

Counter of segments discarded.

segmentsReceived ATTRIBUTE\* (G)

Counter of segments received.

segmentsSent ATTRIBUTE\* (G)

Counter of segments Sent.

supportedProtocols ATTRIBUTE (G)

The set of Connectionless Network protocols supported

END MANAGED OBJECT CLASS cLNS

## MANAGED OBJECT CLASS linkage DERIVED FROM (DMI:top) CONTAINED IN (cONS, cLNS)

DMI:administrativeState ATTRIBUTE (G, R)  
 DMI:communicationsAlarm NOTIFICATION\*  
 DMI:objectCreation NOTIFICATION  
 DMI:objectDeletion NOTIFICATION  
 DMI:operationalState ATTRIBUTE (G)  
 DMI:stateChange NOTIFICATION  
 GMI:activate ACTION  
 GMI:communicationsInformation NOTIFICATION\*  
 GMI:deactivate ACTION  
 activeESConfigTimer ATTRIBUTE\* (G)  
     Currently active value for the ISO 9542 ES configuration timer  
 callsFailed ATTRIBUTE\* (G)  
     Counter of the number of X.25 call failures  
 callsPlaced ATTRIBUTE\* (G)  
     Counter of the number of X.25 VCs successfully established  
 defaultESConfigTimer ATTRIBUTE\* (G, R, RWD)  
     Default value for the ISO 9542 ES configuration timer  
 eSReachabilityChanges ATTRIBUTE\* (G)  
     Count of the number of changes in reachability of End Systems  
 enableChecksum ATTRIBUTE\* (G, R, RWD)  
     When True, the generation of checksums is enabled.  
 holdingTimerMultiplier ATTRIBUTE\* (G, R, RWD)  
     The factor to derive holding timer from configuration timer.  
 iSConfigurationTimer ATTRIBUTE\* (G, R, RWD)  
     Value in seconds for the ISO 9542 IS configuration timer.  
 ISO9542OperationalSubsets ATTRIBUTE\* (G, R)  
     The set of ISO 9542 subsets operational on this linkage.  
 iSReachabilityChanges ATTRIBUTE\* (G)  
     Counter of the number of changes in reachability of Intermediate Systems  
 idleTimer ATTRIBUTE\* (G, R, RWD)  
     Time in seconds before release of an idle call.  
 initialMinimumTimer ATTRIBUTE\* (G, R, RWD)  
     Minimum time in seconds to retain call after establishment.  
 invalid9542PDUs ATTRIBUTE\* (G)  
     Counter of invalid 9542 PDUs received.  
 linkageId ATTRIBUTE (G)  
     The naming attribute of the linkage MO instance  
 manualISSNPAAddress ATTRIBUTE\* (G, R, RWD, A, RM)  
     The set of SNPA Addresses to which calls associated with the SND CF are to be established  
 operationalProtocols ATTRIBUTE (G)  
     The set of network layer protocols supported  
 redirectHoldingTime ATTRIBUTE\* (G, R, RWD)  
     The holding time (in seconds) to be specified in Redirect PDUs  
 reserveTimer ATTRIBUTE\* (G, R, RWD)  
     Time in seconds to reserve resources for call re-establishment.  
 sN-SAP ATTRIBUTE (G)  
     Distinguished name of the service provider SAP MO  
 sN-ServiceProvider ATTRIBUTE (G)  
     Distinguished name of the SN service provider MO.  
 suggestedESConfigurationTimer ATTRIBUTE\* (G, R, RWD)  
     Value to be used for the ISO 9542 suggested ES configuration timer  
 END MANAGED OBJECT CLASS linkage