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1 Introduction

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

This proposed standard is positioned with respect to other related 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.

2 Scope and Field of Application

This proposed International Standard provides the specification of management information related to the operation of the OSI Network Layer. Specifics on how Network layer management is accomplished is beyond the scope of this document. Network Layer management information is defined by specifying:

- the definition of Network Layer managed Objects and their attributes following guidelines put forth by the *Structure of Management Information* (ISO 10165),
- 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.

3 References

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

ISO 7498/Add.4:[1], *Information Processing Systems — Open Systems Interconnection — Basic Reference Model — Addendum 4: Management Framework.*

ISO 8208:1984, *Information Processing Systems — Data Communications — X.25 packet level protocol for Data terminal equipment.*

ISO 8348:1987, *Information Processing Systems - Data Communications - Network Service Definition.*

ISO 8348/Add.1:1987, *Information Processing Systems - Data Communications - Network Service Definition — Addendum 1: Connectionless-mode transmission.*

ISO 8348/Add.2:1988, *Information Processing Systems - Data Communications - Network Service Definition — Addendum 2: Network Layer Addressing*

ISO 8473:1988, *Information Processing Systems - Telecommunications and Information Exchange Between Systems - Protocol for providing the Connectionless-mode network service.*

ISO 8648:1988, *Information Processing Systems — Open Systems Interconnection — Internal Organization of the Network Layer*

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[1] to be published.

ISO 8824:1990, *Information Processing Systems — Open Systems Interconnection — Specification of the Abstract Syntax Notation One.*

ISO 8878:,, *Information Processing Systems - Data Communications - Systems — Use of X.25 to Provide the OSI Connection-mode Network Service.*

ISO 8880-1, *Information Processing Systems - Data Communications - Specification of the Protocols to Provide and Support the OSI Network Service — Part 1: General.*

ISO 8880-2, *Information Processing Systems - Data Communications - Specification of the Protocols to Provide and Support the OSI Network Service — Part 2: Provision and Support of the Connection-mode Network Service.*

ISO 8881, *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 9595/2:, *Information Processing Systems — Open Systems Interconnection — Management Information Service Definition — Pert 2: Common Management Information Service Definition.*

ISO 9596/2:, *Information Processing Systems — Open Systems Interconnection — Management Information Service Definition — Pert 2: Common Management Information Service Protocol Specification.*

ISO/TR 9577:[1], *Information Processing Systems - Telecommunications and Information Exchange Between Systems - Protocol Identification in the Network Layer.*

ISO/IEC JTC1/10040:[1], *Information Processing Systems — Open Systems Interconnection — Systems Management Overview.*

ISO/IEC JTC1/10165/1:[1], *Information Processing Systems — Open Systems Interconnection — Management Information Services — The structure of Management Information, Part 1: The Management Information Model..*

ISO/IEC JTC1/10165/2:[1], *Information Processing Systems — Open Systems Interconnection — Management Information Services — The structure of Management Information, Part 2: Definition of Management Information.*

ISO/IEC JTC1/10165/4:[1], *Information Processing Systems — Open Systems Interconnection — Management Information Services — The structure of Management Information, Part 4: Guidelines for the Definition of Managed Objects.*

Definitions

This International Standard makes use of the following definitions from *The Structure of Management Information , Part 1.*

a) Attributes

b) Containment

c) Inheritance

d) Managed Object

e) Management Operations

f) Notifications

g) Object Class

h) Allomorphism

i) Subclass

j) Superclass

4 Symbols and Abbreviations

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

BCUG	Bilateral Closed User Group
CMIP	Common Management Information Protocol
CMIS	Common management Information Service Definition
CUG	Closed user Group
DT PDU	Data Protocol Data Unit
ESH	End System Hello
ER PDU	Error Report Protocol Data Unit
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
PLE	Packet Level Entity
PVC	Permanent Virtual Circuit
RD PDU	Redirect Protocol Data Unit
RDN	Relative Distinguished Name
SVC	Switched Virtual Call
VC	Virtual Call

5 Elements of Network Layer Management Information

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

a) CLNS Managed Object

    1) Subnetwork Point of Attachment Managed Object

b) NSAP Managed Object

c) CONS Managed Object

d) ISO 8208 Managed Object

    1) X.25 PLE Managed Object

        (i) SVC Managed Object

        (ii) PVC Managed Object

e) ISO 8208 Initial Values Managed Object

f) ISO 8878 Initial Values Managed Object

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

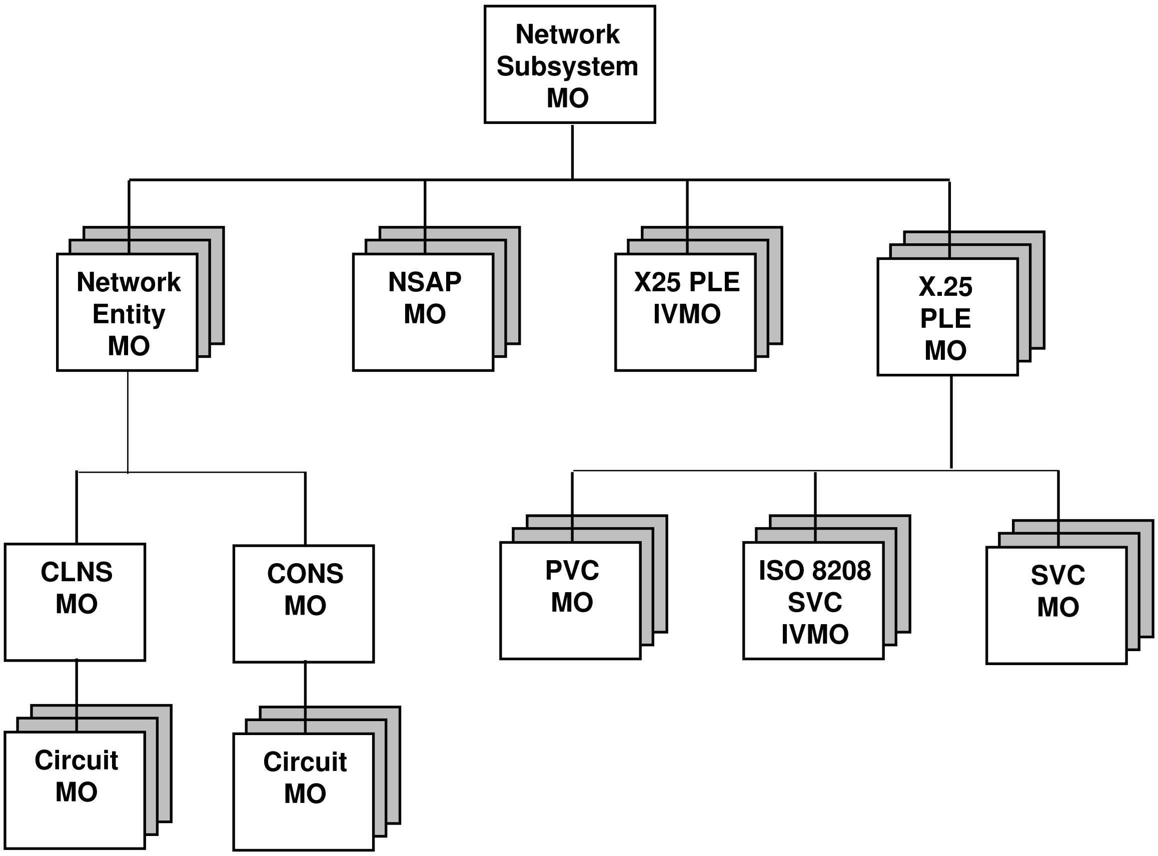


Figure 1 - Network Layer Containment Hierarchy

5.1 Management Behaviour of Logical Channel Assignments

Logical Channels are grouped into four basic types:

1) permanent virtual circuits,

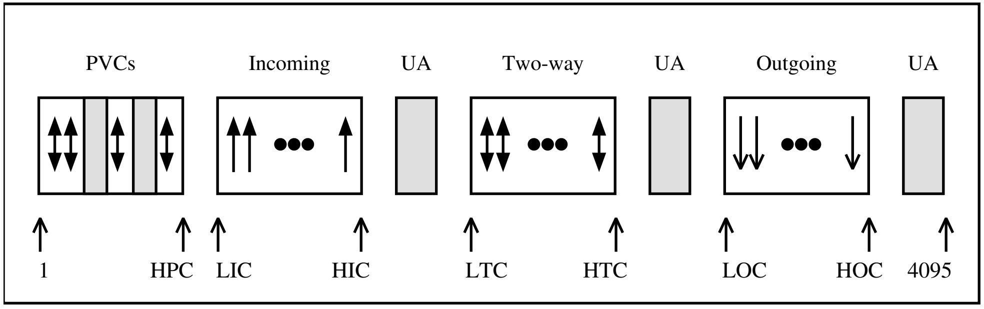
2) incoming,

3) outgoing, and

4) two-way virtual calls.

The ordering of different types of logical channels is important from the point of view of Systems Management. For example, the first group always consists of permanent virtual circuits, the second of incoming virtual calls, the third of two way, and the fourth of outgoing. For incoming, outgoing and two-way groups, the channels are assigned contiguously from the lowest to the highest channel of the group. These assignments are therfore represented by ranges specified by the upper and lower bounds of the range (for example LOC - HOC). Any channels between the highest channel of one group and the lowest of the next are considerd to be unassigned. PVC channels, however, may be assigned in a sparse manner, and are therefore represented as the set of assigned values. Any values in the range from 1 to HPC which are not in this set are considered to be unassigned. The value of

HPC is not specified explicitly. It is assumed to be the value (LIC -1). The organization of logical channels in an X.25 PLE is illustrated in Figure 2.



Key:				
	UA	Unassigned Channels	LTC	Lowest Two-way Channel
	HPC	Highest Permanent Channel	HTC	Highest Two-way Channel
	LIC	Lowest Incoming Channel	LOC	Lowest Outgoing Channel
	HIC	Highest Incoming Channel	HOC	Highest Outgoing Channel

Figure 2 - X.25Packet Level Environment

While it is correct to state that the range of all logical channels is 1..4095, there are additional criteria which influence the range which virtual call types may occupy. Increasing the number of logical channels available for a specific type of call, may require a decrease in an adjacent group if enough unassigned channels are not available. This problem may occur when adjusting the high, low, or both ends of a range of channels. In addition, the effect upon existing calls must be considered when reassigning channel allocations, as calls may be supported by logical channels which are affected by a reassignment.

5.2 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
--  layer entity MOs. Its definition permits it to be created and deleted by  management, but in
--  many systems it will exist inherently in the system and neither creation  nor deletion will
--  be possible.
--

networkSubsystem MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY nlPackage PACKAGE
          ATTRIBUTES
               networkSubsystem-MO-Name
                    DEFAULT VALUE ISO10733-NLMN.null-MO-Name-Value
                    PERMITTED VALUES ISO10733-NLMN.Null-MO-Name-Syntax
                    REQUIRED VALUES ISO10733-NLMN.Null-MO-Name-Syntax
                    GET;
    ;;
REGISTERED AS {ISO10733-NLMN.moi networkSubsystem (1)};

networkSubsystem-NB NAME BINDING
    SUBORDINATE OBJECT CLASS networkSubsystem;
    NAMED BY
          SUPERIOR OBJECT CLASS system;
          WITH ATTRIBUTE networkSubsystem-MO-Name;
    CREATE;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi networkSubsystem-NB (1)};
```

```
networkSubsystem-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR networkSubsystem-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the networkSubsystem MO;;
            --Note: The value of this attribute is always null.
REGISTERED AS {ISO10733-NLMN.aoi networkSubsystem-MO-Name  (1)};
```

5.3 The Network Entity Managed Object

```
--  Managed Object for Network Layer Entity
--
--  There may be multiple instances of these MOs within a system.
--  Its definition permits it to be created and deleted by management, but in
--  many systems it will exist inherently in the system and neither creation  nor deletion will
--  be possible.
--

networkEntity MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY networkEntityPackage PACKAGE
        ATTRIBUTES
            networkEntity-MO-Name GET,
            networkEntityTitles
                GET-REPLACE
                ADD-REMOVE;
    ;;
REGISTERED AS {ISO10733-NLMN.moi networkEntity (2)};

networkEntity-NB NAME BINDING
    SUBORDINATE OBJECT CLASS networkEntity;
    NAMED BY
        SUPERIOR OBJECT CLASS networkSubsystem;
        WITH ATTRIBUTE networkEntity-MO-Name;
    CREATE;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi networkEntity-NB (2)};

networkEntity-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR networkEntity-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the networkSubsystem MO;;
REGISTERED AS {ISO10733-NLMN.aoi networkEntity-MO-Name (2)};

networkEntityTitles  ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.NSAPAddresses;
    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 {ISO10733-NLMN.aoi networkEntityTitles  (3)};
```

5.4 The NSAP Managed Object

```
--  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.
--


nSAP MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY nSAPPackage PACKAGE
        ATTRIBUTES
            nSAP-MO-Name  GET,
            nSAPs GET,
            networkEntityRelationship GET,
            transportClientRelationship GET;
    ;;
REGISTERED AS {ISO10733-NLMN.moi nSAP (4)};


nSAP-NB-Automatic NAME BINDING
    SUBORDINATE OBJECT CLASS nSAP;
    NAMED BY
        SUPERIOR OBJECT CLASS networkSubsystem;
        WITH ATTRIBUTE nSAP-MO-Name;
REGISTERED AS {ISO10733-NLMN.nboi nSAP-NB-Automatic (4)};


nSAP-NB-Manual NAME BINDING
    SUBORDINATE OBJECT CLASS nSAP;
    NAMED BY
        SUPERIOR OBJECT CLASS networkSubsystem;
        WITH ATTRIBUTE nSAP-MO-Name;
    CREATE nSAP-NB-p1;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi nSAP-NB-Manual (5)};


nSAP-NB-p1 PARAMETER
    CONTEXT CREATE-INFO;
    WITH SYNTAX ISO10733-NLMN.NSAPAddresses;
    BEHAVIOUR nSAP-NB-p1-B BEHAVIOUR
        DEFINED AS The value to be given to the nSAPs attribute on MO creation.  This parameter
            is mandatory in this name binding;;
REGISTERED AS {ISO10733-NLMN.proi nSAP-NB-p1 (6)};


nSAP-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR nSAP-MO-Name-B BEHAVIOUR
        DEFINED AS The name of the NSAP MO.;;
REGISTERED AS {ISO10733-NLMN.aoi nSAP-MO-Name (13)};


nSAPs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.NSAPAddresses;
    BEHAVIOUR nSAPs-B BEHAVIOUR
        DEFINED AS The set of Network Addresses associated with this NSAP.  Note  that it
            is possible for some Network Address values to appear in more than one  NSAP
            Managed Object;;
REGISTERED AS {ISO10733-NLMN.aoi nSAPs (14)};
```

```
transportClientRelationship ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.LocalDistinguishedNames;
    MATCHES FOR Equality;
-- Editor's note: This attribute was previously    DERIVED FROM "ISO/IEC 10165-2":userEntityName;
-- However, that attribute is no longer defined in 10165-2,  therefore the above syntax has been substituted.
    BEHAVIOUR transportClientRelationship-B BEHAVIOUR
         DEFINED AS The set of Distinguished names of the Transport Layer client MO  within
              the local system supported by the NSAP. This attribute is included to  represent
              protocol usage relationships;;
REGISTERED AS {ISO10733-NLMN.aoi transportClientRelationship (15)};

networkEntityRelationship ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.LocalDistinguishedName;
    MATCHES FOR Equality;
    BEHAVIOUR networkEntityRelationship-B BEHAVIOUR
         DEFINED AS The Distinguished name of the network entity within
              the local system with which this set of NSAP Addresses is associated.;;
REGISTERED AS {ISO10733-NLMN.aoi networkEntityRelationship (16)};
```

5.5 The Connectionless-mode Network Service Managed Object

```
--   Connectionless Mode Network Entity
--
--   There is exactly one of these MOs per network entity. Its definition  permits it to be created
--    and deleted by management, but in many systems it will exist inherently  in the system and neither
--   creation nor deletion will be possible.  Similarly, although the activate  and deactivate actions are
--   defined here, a system may always exist in the 'On' operational state.

cLNS MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY cLNSPackage PACKAGE
         ATTRIBUTES
              "ISO/IEC 10165-2":operationalState GET,
              cLNS-MO-Name DEFAULT VALUE  ISO10733-NLMN.null-MO-Name-Value
                   PERMITTED VALUES ISO10733-NLMN.Null-MO-Name-Syntax
                   REQUIRED VALUES ISO10733-NLMN.Null-MO-Name-Syntax
                   GET,
              segmentsReceived GET,
              segmentsDiscarded GET,
              expiredSegmentsDiscarded GET,
              errorReportsReceived GET,  -- see note on attribute definition
              pDUFormatErrors GET,
              unsupportedOptions GET,
              otherErrors GET; -- see note before attribute definition
         ATTRIBUTE GROUPS
              counters
                   segmentsReceived
                   segmentsDiscarded
                   expiredSegmentsDiscarded
                   errorReportsReceived
                   pDUFormatErrors
                   unsupportedOptions
                   otherErrors;
```

```
        ACTIONS
            activate,
            deactivate;
        NOTIFICATIONS
            pDUFormatError,
            unsupportedOption,
            otherError;    -- see note before notification definition
        ;;
    CONDITIONAL PACKAGES cLNSChecksumPackage
        PRESENT IF The 8473 Generate Checksum option is implemented;
REGISTERED AS {ISO10733-NLMN.moi cLNS (3)};

cLNS-NB NAME BINDING
    SUBORDINATE OBJECT CLASS cLNS;
    NAMED BY
        SUPERIOR OBJECT CLASS networkEntity;
        WITH ATTRIBUTE cLNS-MO-Name;
    CREATE;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi cLNS-NB (3)};

cLNS-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR cLNS-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute for the CLNS MO;;
            --Note: The value of this attribute is always null.
REGISTERED AS {ISO10733-NLMN.aoi cLNS-MO-Name (5)};

segmentsReceived ATTRIBUTE
    DERIVED FROM  nonWrappingCounter;
    BEHAVIOUR segmentsReceived-B BEHAVIOUR
        DEFINED AS Counter of the number of data and error report NPDUs received
            prior to reassembly, including those which may subsequently be  discarded;;
REGISTERED AS {ISO10733-NLMN.aoi segmentsReceived (6)};

segmentsDiscarded ATTRIBUTE
    DERIVED FROM  nonWrappingCounter;
    BEHAVIOUR segmentsDiscarded-B BEHAVIOUR
        DEFINED AS Counter of the number of data and error report NPDUs discarded
            without delivery to a transport entity. This includes segments discarded
            for any reason except lifetime expiry during reassembly;;
REGISTERED AS {ISO10733-NLMN.aoi segmentsDiscarded (7)};

expiredSegmentsDiscarded ATTRIBUTE
    DERIVED FROM  nonWrappingCounter;
    BEHAVIOUR expiredSegmentsDiscarded-B BEHAVIOUR
        DEFINED AS Counter of the number of data and error report NPDUs discarded
            due to PDU lifetime expiry during reassembly;;
REGISTERED AS {ISO10733-NLMN.aoi expiredSegmentsDiscarded (8)};

errorReportsReceived ATTRIBUTE
    DERIVED FROM  nonWrappingCounter;
    BEHAVIOUR errorReportsReceived-B BEHAVIOUR
        DEFINED AS Counter of the number of error report NPDUs received;;
REGISTERED AS {ISO10733-NLMN.aoi errorReportsReceived (9)};
```

```
pDUFormatErrors ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR pDUFormatErrors-B BEHAVIOUR
        DEFINED AS Counter of the number of data or error report PDUs discarded  due
            to the presence of a format error. 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
            -- pDUFormatError notifications generated (as opposed to CMIP  events,
            -- may be suppressed) as required by GDMO clause 9.8.5 (SC21  N4852).
REGISTERED AS {ISO10733-NLMN.aoi pDUFormatErrors (10)};

pDUFormatError NOTIFICATION
    BEHAVIOUR pDUFormatError-B BEHAVIOUR
        DEFINED AS The PDU Format Error Event is generated when a data NPDU is  discarded due
            to a format error.  The occurance of this event is counted by the  pduFormatErrors counter.;;
    MODE NON-CONFIRMED;
    PARAMETERS
        notificationPDUHeader,
        notificationDiscardReason;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi pDUFormatError (1)};

notificationPDUHeader PARAMETER
    CONTEXT EVENT-INFO;
    WITH SYNTAX ISO10733-NLMN.OctetString;
    BEHAVIOUR notificationPDUHeader-B BEHAVIOUR
        DEFINED AS The header of the data NPDU header which caused this event;;
REGISTERED AS {ISO10733-NLMN.proi notificationPDUHeader (1)};

notificationDiscardReason PARAMETER
    CONTEXT EVENT-INFO;
    WITH SYNTAX ISO10733-NLMN.DiscardReason;
    BEHAVIOUR notificationDiscardReason-B BEHAVIOUR
        DEFINED AS The value of the reason for discard parameter which wouldbe  placed in an
            Error Report NPDU resulting from the discard of this data NPDU. The event  is generated
            and the Discard Reason ascertained, whether or not an Error Report NPDU  was sent or
            requested;;
REGISTERED AS {ISO10733-NLMN.proi notificationDiscardReason (2)};

unsupportedOptions ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR unsupportedOptions-B BEHAVIOUR
        DEFINED AS Counter of the number of data or error report PDUs discarded  due
            to the presence of an unsupported option. This counter is incremented  irrespective
            of the setting of the Error Report bit in the received PDU;;
REGISTERED AS {ISO10733-NLMN.aoi unsupportedOptions (11)};

unsupportedOption NOTIFICATION
    BEHAVIOUR unsupportedOption-B BEHAVIOUR
        DEFINED AS Notification issued when a data or error report PDU is  discarded due
            to the presence of an unsupported option. The notification includes the  header
            of the invalid PDU;;
    MODE NON-CONFIRMED;
    PARAMETERS
        notificationPDUHeader;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi unsupportedOption (2)};
```

```
-- Editor's note: Although not reflected in 2N349 there was  agreement at the Paris meeting that a third type of
-- notification and counter should be defined to cover the cases not  dealt with by the existing two. The following
-- counter and event are place-holders for this. National Body  comment is solicited on the suitability of these
-- three classifications and the division of the protocol errors  among them.

otherErrors ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR otherErrors-B BEHAVIOUR
        DEFINED AS Counter of the number of data or error report PDUs discarded  due
            to the presence of an error other than a format error or unsupported  option.
            This counter is incremented irrespective of the setting of the Error  Report
            bit in the received PDU;;
REGISTERED AS {ISO10733-NLMN.aoi otherErrors (12)};

otherError NOTIFICATION
    BEHAVIOUR otherError-B BEHAVIOUR
        DEFINED AS Notification issued when a data or error report PDU is  discarded due
            to the presence of an error other than a format error or unsupported  option.
            The notification includes the header of the invalid PDU;;
MODE NON-CONFIRMED;
    PARAMETERS
        notificationPDUHeader;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi otherError (3)};

activate ACTION
    BEHAVIOUR activate-B BEHAVIOUR
        DEFINED AS Sets OperationalState to 'enabled' and commences operation.  Note that it is
            permissible for a system to be initially in an enabled state. Note also  that an
            activate while in Operational State 'On' has no effect and does not return  an error;;
    MODE CONFIRMED;
    PARAMETERS successResponse, failureResponse, failureReason;
    WITH REPLY SYNTAX ISO10733-NLMN.ActionReply;
REGISTERED AS {ISO10733-NLMN.acoi activate (1)};

deactivate ACTION
    BEHAVIOUR deactivate-B BEHAVIOUR
        DEFINED AS Sets OperationalState to 'disabled' and ceases operation.  Note  that it is
            permissible for this action to always fail in a given implementation  (i.e. that
            implementation is not capable of shutting down). Note also that a  deactivate
            while in Operational State 'Off' has no effect and does not return an  error;;
    MODE CONFIRMED;
    PARAMETERS successResponse, failureResponse, failureReason;
    WITH REPLY SYNTAX ISO10733-NLMN.ActionReply;
REGISTERED AS {ISO10733-NLMN.acoi deactivate (2)};

successResponse PARAMETER
    CONTEXT ACTION-REPLY;
    WITH SYNTAX ISO10733-NLMN.ResponseCode;
    BEHAVIOUR successResponse-B BEHAVIOUR
        DEFINED AS Returned in the responseCode field of an ActionReply when the  action has
            completed successfully.;;
REGISTERED AS {ISO10733-NLMN.proi successResponse (3)};
```

```
failureResponse PARAMETER
    CONTEXT ACTION-REPLY;
    WITH SYNTAX ISO10733-NLMN.ResponseCode;
    BEHAVIOUR failureResponse-B BEHAVIOUR
         DEFINED AS Returned in the responseCode field of an ActionReply when the  action failed to
              complete. The failureReason parameter is returned with this responseCode,  giving
              additional information;;
REGISTERED AS {ISO10733-NLMN.proi failureResponse (4)};

failureReason PARAMETER
    CONTEXT ACTION-REPLY;
    WITH SYNTAX ISO10733-NLMN.ActionFailureReason;
    BEHAVIOUR failureReason-B BEHAVIOUR
         DEFINED AS Gives the reason why an entity failed to activate or  deactivate.;;
REGISTERED AS {ISO10733-NLMN.proi failureReason (5)};

counters ATTRIBUTE GROUP
    -- No GROUP elements so far. They are all added in the package  definitions.
    DESCRIPTION The group of all counter attributes;
REGISTERED AS {ISO10733-NLMN.agoi counters (1)};

nonWrappingCounter ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.NonWrappingCounter;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR nonWrappingCounter-B BEHAVIOUR
         DEFINED AS Non-wrapping counter.  The value of this attribute
              shall be incremented by a value as specified in the behaviour of an  attribute
              refined from this attribute, and shall increase monotonically.  It shall  be implemented
              in such a way that under all foreseable circumstances the upper bound on  its
              value shall not be limited to a value less than 2^64-1;;
;    -- Note: since this attribute is never instantiated, no object ID is  required

timer ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Timer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR timer-B BEHAVIOUR
         DEFINED AS A timer, whose value may be set and read to the precision  implied by the
              syntax definition, but whose effect on the precision with which the  protocol events
              events controlled by this timer are generated is determined by the  implementation.
              The details of this precision shall be stated in the MOCS.  The exponent  of the timer
              value shall be encoded as a decimal exponent in the exponent field of the  syntax.
              i.e. the value of the timer shall be mantissa * 10^exponent;;
;    -- Note, since this attribute is never instantiated, no object ID is  required
```

5.5.1 The cLNSChecksum Package

```
cLNSChecksumPackage PACKAGE
    BEHAVIOUR DEFINITIONS cLNSChecksumPackage-B BEHAVIOUR
         DEFINED AS When present checksum generation is controlled by the  8473EnableChecksum
              attribute;;
    ATTRIBUTES
         enableChecksum REPLACE-WITH-DEFAULT
              DEFAULT VALUE ISO10733-NLMN.false
              GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi cLNSChecksumPackage (1)};
```

```
enableChecksum ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.Boolean;
    MATCHES FOR Equality;
    BEHAVIOUR enableChecksum-B BEHAVIOUR
        DEFINED AS When True, the generation of checksums is enabled;;
REGISTERED AS {ISO10733-NLMN.aoi enableChecksum (4)};
```

5.6 The Circuit Managed Object

```
--  Circuit Managed Object
--
--  One such MO exists for each CIRCUIT of the local system over which the  CLNS or CONS is supported.
--

circuit MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY circuitPackage PACKAGE
        ATTRIBUTES
            circuit-MO-Name GET,
            "ISO/IEC 10165-2":operationalState GET,
            "ISO/IEC 10165-2":administrativeState GET-REPLACE,
            sN-SAP GET,
            sN-ServiceProvider GET-REPLACE;
        ACTIONS
            activate,
            deactivate;
        ;;
    CONDITIONAL PACKAGES
        circuit-ISO9542ESPackage
            PRESENT IF support for ISO 9542 operating as an ES,
        circuit-ISO9542ISPackage
            PRESENT IF support for ISO 9542 operating as an IS,
        circuit-ISO8473-ISO8208SNDCFPackage
            PRESENT IF support for ISO 8208 as a subnetwork over which the system
                is running ISO 8473. That is these definitions represent management of
                the ISO8208 SNDCF for ISO 8473,
        circuitInitialMinimumTimerPackage
            PRESENT IF support for the initial minimum timer attribute of an ISO 8208  or
                CO Datalink Service SNDCF for ISO 8473,
        circuitReserveTimerPackage
            PRESENT IF support for the reserve timer attribute of an ISO 8208 or
                CO Datalink Service SNDCF for ISO 8473,
        circuitIdleTimerPackage
            PRESENT IF support for the idle timer attribute of an ISO 8208 or
                CO Datalink Service SNDCF for ISO 8473,
        circuit-ISO8473-ISO8802SNDCFPackage
            PRESENT IF support for an ISO 8802 SNDCF for ISO 8473,
        circuitCODLServicePackage
            PRESENT IF support for a CO Datalink SNDCF for ISO8473/Add.3.,
        circuitCLDLServicePackage
            PRESENT IF support for a CL Datalink SNDCF for ISO8473/Add.3. ;
REGISTERED AS {ISO10733-NLMN.moi circuit (5)};
```

```
circuit-CLNS-NB NAME BINDING
    SUBORDINATE OBJECT CLASS circuit;
    NAMED BY
        SUPERIOR OBJECT CLASS cLNS;
        WITH ATTRIBUTE circuit-MO-Name;
    CREATE with-reference-object;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi circuit-CLNS-NB (6)};

circuit-CONS-NB NAME BINDING
    SUBORDINATE OBJECT CLASS circuit;
    NAMED BY
        SUPERIOR OBJECT CLASS cONS;
        WITH ATTRIBUTE circuit-MO-Name;
    CREATE with-reference-object;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi circuit-CONS-NB (7)};

circuit-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR circuit-MO-Name-B BEHAVIOUR
        DEFINED AS The naming attribute of the CIRCUIT MO instance;;
REGISTERED AS {ISO10733-NLMN.aoi circuit-MO-Name (17)};

sN-SAP ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.LocalDistinguishedName;
    MATCHES FOR Equality;
    BEHAVIOUR sN-SAP-B BEHAVIOUR
        DEFINED AS Distinguished name of the subnetwork SAP MO.  This is obtained  via
            an internal interface when the CIRCUIT is enabled.  The subnetwork SAP
            may be in the Datalink Layer, or it may be in the Network Layer (for  example
            when operating ISO 8473 over the ISO 8208 SNDCF;;
REGISTERED AS {ISO10733-NLMN.aoi sN-SAP (18)};

sN-ServiceProvider ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.LocalDistinguishedName;
    MATCHES FOR Equality;
    BEHAVIOUR sN-ServiceProvider-B BEHAVIOUR
        DEFINED AS Distinguished name of the SN service provider MO.  Identifies  the
            subnetwork entity to be used to support the CIRCUIT, when enabled.   The  subnetwork SAP
            may be in the Datalink Layer, or it may be in the Network Layer (for  example
            when operating ISO 8473 over the ISO 8208 SNDCF;;
REGISTERED AS {ISO10733-NLMN.aoi sN-ServiceProvider (19)};
```

5.6.1 The circuit-ISO9542ESPackage Package

```
circuit-ISO9542ESPackage PACKAGE
    BEHAVIOUR DEFINITIONS circuit-ISO9542ESPackage-B BEHAVIOUR
        DEFINED AS Controls the operation of ISO 9542 on an EndSystem;;
    ATTRIBUTES
        holdingTimerMultiplier
            DEFAULT VALUE ISO10733-NLMN.holdingTimerMultiplierDefault
                -- 3
            PERMITTED VALUES ISO10733-NLMN.HoldingTimerMultiplierPermitted
                -- 2-63
            REQUIRED VALUES ISO10733-NLMN.HoldingTimerMultiplierRequired
                -- 2
            GET-REPLACE,
            -- Editor’s note: The actual values quoted here for the default,  required and permitted values
            -- are subject to NB agreement.  They are presented here as a  place-holder for the
```

```
            -- finally agreed values.
        defaultESConfigTimer REPLACE-WITH-DEFAULT
            GET-REPLACE,
        activeESConfigTimer GET,
        iSReachabilityChanges GET;
    ATTRIBUTE GROUPS
        counters
            iSReachabilityChanges;
    NOTIFICATIONS
        iSReachabilityChange;
REGISTERED AS {ISO10733-NLMN.poi circuit-ISO9542ESPackage (2)};

holdingTimerMultiplier ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.Integer;
    BEHAVIOUR holdingTimerMultiplier-B BEHAVIOUR
        DEFINED AS Parameter which, 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 imprecision in delay estimates. That is, local  overestimation is
            permitted.  The result of the calculation is truncated, upon overflow, to  the maximum
            value for the parameter permitted by the protocol (65535);;
REGISTERED AS {ISO10733-NLMN.aoi holdingTimerMultiplier (20)};

defaultESConfigTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR defaultESConfigTimer-B BEHAVIOUR
        DEFINED AS Default value for the ISO 9542 configuration timer, used when  the ES has not
            received, or has not chosen to accept, a suggested configuration timer  value from an
            Intermediate System;;
REGISTERED AS {ISO10733-NLMN.aoi defaultESConfigTimer (21)};

activeESConfigTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR activeESConfigTimer-B BEHAVIOUR
        DEFINED AS Currently active value for the ISO 9542 configuration timer;;
            -- Editor's note: National Body comment is solicited as to the need  for this attribute;
REGISTERED AS {ISO10733-NLMN.aoi activeESConfigTimer (22)};

iSReachabilityChanges ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR iSReachabilityChanges-B BEHAVIOUR
        DEFINED AS Counter associated with the iSReachabilityChange  notification;;
REGISTERED AS {ISO10733-NLMN.aoi iSReachabilityChanges (23)};

iSReachabilityChange NOTIFICATION
    BEHAVIOUR iSReachabilityChange-B BEHAVIOUR
        DEFINED AS Notification generated when an ES detects a change in the  reachability of a
            neighboring IS;;
            -- Editor's note: This is not strictly reachability information. It  is more akin to an adjacency
            -- in DIS 10589.
    MODE NON-CONFIRMED;
    WITH INFORMATION SYNTAX ISO10733-NLMN.ISReachabilityChangeSyntax;
REGISTERED AS {ISO10733-NLMN.noi iSReachabilityChange (4)};
```

5.6.2 The circuit-ISO9542ISPackage Package

```
circuit-ISO9542ISPackage PACKAGE
    BEHAVIOUR DEFINITIONS circuit-ISO9542ISPackage-B BEHAVIOUR
        DEFINED AS Controls the operation of ISO 9542 on an Intermediate System;;
    ATTRIBUTES
        holdingTimerMultiplier
            DEFAULT VALUE ISO10733-NLMN.holdingTimerMultiplierDefault
                -- 3
            PERMITTED VALUES ISO10733-NLMN.HoldingTimerMultiplierPermitted
                -- 2-63
            REQUIRED VALUES ISO10733-NLMN.HoldingTimerMultiplierRequired
                -- 2
            GET-REPLACE,
            -- Editor's Note: The actual values quoted here for the default,  required and permitted values
            -- are subject to NB agreement.  They are presented here as a  place-holder for the
            -- finally agreed values.
        iSConfigurationTimer REPLACE-WITH-DEFAULT
            GET-REPLACE,
        suggestedESConfigurationTimer REPLACE-WITH-DEFAULT
            GET-REPLACE,
        redirectHoldingTime
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ISO10733-NLMN.redirectHoldingTime-Default
            PERMITTED VALUES ISO10733-NLMN.RedirectHoldingTime-Permitted
            GET-REPLACE,
            -- Editor's note: The above attribute is not strictly necessary if  all we have are Pt-Pt Circuits.
            -- Editor's note: The following attribute was moved here from ISO  10589
        eSReachabilityChanges GET;
    ATTRIBUTE GROUPS
        counters
            eSReachabilityChanges;
    NOTIFICATIONS
        eSReachabilityChange;
REGISTERED AS {ISO10733-NLMN.poi circuit-ISO9542ISPackage (3)};

iSConfigurationTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR iSConfigurationTimer-B BEHAVIOUR
        DEFINED AS Value for the ISO 9542 configuration timer, used to determine  how
            often an IS reports configuration information to ESs;;
REGISTERED AS {ISO10733-NLMN.aoi iSConfigurationTimer (24)};

suggestedESConfigurationTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR suggestedESConfigurationTimer-B BEHAVIOUR
        DEFINED AS Value to be used for the ISO 9542 suggested ES configuration  timer value,
            advertised in IS hellos generated by this network entity;;
            -- Editor's note: It is far from clear that this attribute would be  able to be set to a specific
            -- value in all implementations. For example, the DIS 10589 ES poll  protocol relies
            -- on the IS being able to set this to different values in different  circumstances.
            -- it may be useful to be able to GET the current value.
REGISTERED AS {ISO10733-NLMN.aoi suggestedESConfigurationTimer  (25)};

redirectHoldingTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.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 {ISO10733-NLMN.aoi redirectHoldingTime (26)};
```

```
eSReachabilityChanges ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR eSReachabilityChanges-B BEHAVIOUR
       DEFINED AS Counter associated with the eSReachabilityChange  notification;;
REGISTERED AS {ISO10733-NLMN.aoi eSReachabilityChanges (27)};

eSReachabilityChange NOTIFICATION
   BEHAVIOUR eSReachabilityChange-B BEHAVIOUR
       DEFINED AS Notification generated when an IS detects a change in the  reachability of a
           neighboring ES;;
   MODE NON-CONFIRMED;
   WITH INFORMATION SYNTAX ISO10733-NLMN.ESReachabilityChangeSyntax;
REGISTERED AS {ISO10733-NLMN.noi eSReachabilityChange (5)};
```

5.6.3 The circuit-ISO8473-ISO8208SNDCFPackage Package

```
circuit-ISO8473-ISO8208SNDCFPackage PACKAGE
   BEHAVIOUR DEFINITIONS circuit-ISO8473-ISO8208SNDCFPackage-B  BEHAVIOUR
       DEFINED AS Controls the operation of ISO 8208 as an SNDCF for ISO 8473;;
   ATTRIBUTES
       manualISDTEAddress GET-REPLACE,
       callsPlaced GET,
       callsFailed GET;
   ATTRIBUTE GROUPS
       counters
           callsPlaced
           callsFailed;
REGISTERED AS {ISO10733-NLMN.poi  circuit-ISO8473-ISO8208SNDCFPackage (4)};

manualISDTEAddress ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ISO10733-NLMN.DTEAddress;
   MATCHES FOR Equality;
   BEHAVIOUR dTEAddres-B BEHAVIOUR
       DEFINED AS The DTEAdress to which calls associated with the SNDCF are to  established
           in the absence of any other information;;
REGISTERED AS {ISO10733-NLMN.aoi manualISDTEAddress (28)};

callsPlaced ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR callsPlaced-B BEHAVIOUR
       DEFINED AS The number of X.25 VCs successfully established by the SNDCF;;
REGISTERED AS {ISO10733-NLMN.aoi callsPlaced (29)};

callsFailed ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR callsFailed-B BEHAVIOUR
       DEFINED AS The number of X.25 call failures while attempting establishment  by the
           SNDCF;;
REGISTERED AS {ISO10733-NLMN.aoi callsFailed (30)};
```

5.6.4 The circuitIdleTimerPackage Package

```
circuitIdleTimerPackage PACKAGE
   BEHAVIOUR DEFINITIONS circuitIdleTimerPackage-B BEHAVIOUR
       DEFINED AS Controls the ability, when implemented, of an ISO 8208 SNDCF  for ISO 8473
           to close an established SVC when it is idle. ;;
   ATTRIBUTES
       idleTimer REPLACE-WITH-DEFAULT
           GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi circuitIdleTimerPackage (5)};
```

```
idleTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR idleTimer-B BEHAVIOUR
        DEFINED AS The timer which 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 {ISO10733-NLMN.aoi idleTimer (31)};
```

5.6.5 The circuitReserveTimerPackage Package

```
circuitReserveTimerPackage PACKAGE
    BEHAVIOUR DEFINITIONS circuitReserveTimerPackage-B BEHAVIOUR
        DEFINED AS Controls the ability, when implemented, of an ISO 8208 SNDCF  for ISO 8473
            to close an established SVC when it is idle, but retain resources for its  re-establishment ;;
    ATTRIBUTES
        reserveTimer REPLACE-WITH-DEFAULT
            GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi circuitReserveTimerPackage (6)};
```

```
reserveTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR reserveTimer-B BEHAVIOUR
        DEFINED AS The timer which 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 {ISO10733-NLMN.aoi reserveTimer (32)};
```

5.6.6 The circuitInitialMinimumTimerPackage Package

```
circuitInitialMinimumTimerPackage PACKAGE
    BEHAVIOUR DEFINITIONS circuitInitialMinimumTimerPackage-B BEHAVIOUR
        DEFINED AS Controls the ability, when implemented, of an ISO 8208 SNDCF  for ISO 8473
        to close an established SVC when it is idle, but only after a minimum time  after its establishment;;
    ATTRIBUTES
        initialMinimumTimer REPLACE-WITH-DEFAULT
            GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi circuitInitialMinimumTimerPackage  (7)};
```

```
initialMinimumTimer ATTRIBUTE
    DERIVED FROM timer;
    BEHAVIOUR initialMinimumTimer-B BEHAVIOUR
        DEFINED AS The timer which 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 {ISO10733-NLMN.aoi initialMinimumTimer (33)};
```

5.6.7 The circuit-ISO8473-ISO8802SNDCFPackage Package

```
circuit-ISO8473-ISO8802SNDCFPackage PACKAGE
    BEHAVIOUR DEFINITIONS circuit-ISO8473-ISO8802SNDCFPackage-B  BEHAVIOUR
        DEFINED AS Controls the operation of the ISO 8802 SNDCF for ISO 8473;;
    ATTRIBUTES
        manualISAddress GET
            ADD-REMOVE ;
REGISTERED AS {ISO10733-NLMN.poi  circuit-ISO8473-ISO8802SNDCFPackage (8)};
```

```
manualISAddress ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.ManualISAddress;
         -- Set of MACAddreses
    MATCHES FOR Set Comparison, Set Intersection;
    BEHAVIOUR manualISAddres-B BEHAVIOUR
         DEFINED AS The set of MAC addresses of ISs on the subnetwork which do not  implement
              the configuration subset of ISO 9542. A minimum set cardinality of 1 shall  be
              supported.  The maximum set cardinality shall be implementation  specific.;;
REGISTERED AS {ISO10733-NLMN.aoi manualISAddress (34)};
```

5.6.8 The circuitCODLServicePackage Package

```
circuitCODLServicePackage PACKAGE
    BEHAVIOUR DEFINITIONS circuitCODLServicePackage-B BEHAVIOUR
         DEFINED AS Controls the operation of CO Datalink as an SNDCF for ISO  8473;;
    ATTRIBUTES
         manualISDTEAddress GET-REPLACE,
         callsPlaced GET,
         callsFailed GET;
    ATTRIBUTE GROUPS
         counters
              callsPlaced
              callsFailed;
REGISTERED AS {ISO10733-NLMN.poi circuitCODLServicePackage (9)};
```

5.6.9 The circuitCLDLServicePackage Package

```
circuitCLDLServicePackage PACKAGE
    BEHAVIOUR DEFINITIONS circuitCLDLServicePackage-B BEHAVIOUR
         DEFINED AS Controls the operation of CL Datalink as an SNDCF for ISO  8473;;
    ATTRIBUTES
         manualISDTEAddress GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi circuitCLDLServicePackage (10)};
```

5.7 The Connection-mode Network Service Managed Object

```
--  Connection Mode Network Entity
--
--  There is exactly one of these MOs per Network Entity MO. Its definition  permits it to be created
--   and deleted by management, but in many systems it will exist inherently  in the system and neither
--  creation nor deletion will be possible.

cONS MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY cONSPackage PACKAGE
         ATTRIBUTES
              cONS-MO-Name DEFAULT VALUE  ISO10733-NLMN.null-MO-Name-Value
                   PERMITTED VALUES ISO10733-NLMN.Null-MO-Name-Syntax
                   REQUIRED VALUES ISO10733-NLMN.Null-MO-Name-Syntax
                   GET,
              "ISO/IEC 10165-2":operationalState GET,
              "ISO/IEC 10165-2":administrativeState GET;
         ACTIONS
              activate,
              deactivate;
    -- Note: Currently there are no conditional packages, but these will  be added as necessary
    -- for example for ISO 9574, ISO 10030, etc. Since there are no  attributes currently defined
    -- for the ISO 8878 package it is omitted from this definition
    ;;
REGISTERED AS{ISO10733-NLMN.moi cONS (6)};
```

```
cONS-NB NAME BINDING
    SUBORDINATE OBJECT CLASS cONS;
    NAMED BY
        SUPERIOR OBJECT CLASS networkEntity;
        WITH ATTRIBUTE cONS-MO-Name;
    CREATE;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi cONS-NB (8)};

cONS-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR cONS-MO-Name-B BEHAVIOUR
        DEFINED AS The name of the CONS MO;;
            -- Note: The value of this attribute is always null.
REGISTERED AS {ISO10733-NLMN.aoi cONS-MO-Name (35)};
```

5.8 The X.25 PLE Managed Object

```
--  X25 PLE Managed Object
--
--  There may be multiple instances of these MOs within a system,  corresponding to Multiple X.25 PLEs.
-- Editor's note: The default values for many of these attributes  have not been defined even though a
-- REPLACE-WITH-DEFAULT clause exists.  NB comment is  solicited as to what values would be appropriate.
-- Where ISO 8208 specifies specific default values, these have been  used.

x25PLE MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY x25PLEPackage PACKAGE
        BEHAVIOUR DEFINITIONS logicalChannelAssignmentsX25PLEPacakge-B  BEHAVIOUR
            DEFINED AS The logicalChannelAssigments attribute shall not be  replaceable
                when the value of the operationalstate attribute is enabled;;
        ATTRIBUTES
            x25PLE-MO-Name GET,
            "ISO/IEC 10165-2":operationalState GET,
            "ISO/IEC 10165-2":administrativeState GET-REPLACE,
            protocolVersionSupported GET,
            localDTEAddress GET-REPLACE,
            interfaceMode GET-REPLACE,
            maxActiveCircuits REPLACE-WITH-DEFAULT
                GET-REPLACE,
            restartTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.restartTimeDefault
                GET-REPLACE,
            minimumRecallTimer REPLACE-WITH-DEFAULT
                GET-REPLACE,
            restartCount REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.restartCountDefault
                GET-REPLACE,
            dataLinkID REPLACE-WITH-DEFAULT
                GET-REPLACE,
            logicalChannelAssignments REPLACE-WITH-DEFAULT
                GET-REPLACE,
            extendedPacketSequencing REPLACE-WITH-DEFAULT
                GET-REPLACE,
            "ISO/IEC 10165-2":octetsSentCounter GET,
                -- This corresponds to the ISO8208OctetsSent attribute. Note that  the DMI
                -- definition is in terms of user data octets.
            "ISO/IEC 10165-2":octetsReceivedCounter GET,
                -- This corresponds to the ISO8208OctetsReceived attribute. Note  that the
```

```
        -- DMI definition is in terms of user data octets.
    dataPacketsSent GET,
        -- Note the "ISO/IEC 10165-2":PDUsSentCounter cannot be used  here
        -- since it is defined as total number of PDUs sent, not just data  PDUs.
    dataPacketsReceived GET,
    callAttempts GET,
    callsConnected GET,
    providerInitiatedDisconnects GET,
    callTimeouts GET,
    clearTimeouts GET,
    remotelyInitiatedResets GET,
    dataRetransmissionTimerExpiries GET,
    providerInitiatedResets GET,
    resetTimeouts GET,
    remotelyInitiatedRestarts GET,
    restartTimeouts GET,
    protocolErrorsDetectedLocally GET,
    protocolErrorsAccusedOf GET,
    retryCountsExceeded GET,
    clearCountsExceeded GET,
    interruptPacketsSent GET,
    interruptPacketsReceived GET,
    interruptTimerExpiries GET,
    pLEClientMOName GET;
ATTRIBUTE GROUPS
    counters
        "ISO/IEC 10165-2":octetsSentCounter
        "ISO/IEC 10165-2":octetsReceivedCounter
        dataPacketsSent
        dataPacketsReceived
        callAttempts
        callsConnected
        providerInitiatedDisconnects
        callTimeouts
        clearTimeouts
        remotelyInitiatedResets
        dataRetransmissionTimerExpiries
        providerInitiatedResets
        resetTimeouts
        remotelyInitiatedRestarts
        restartTimeouts
        protocolErrorsDetectedLocally
        protocolErrorsAccusedOf
        retryCountsExceeded
        clearCountsExceeded
        interruptPacketsSent
        interruptPacketsReceived
        interruptTimerExpiries;
ACTIONS
    activate,
    deactivate;
NOTIFICATIONS
    providerInitiatedDisconnect,
    remotelyInitiatedReset,
    providerInitiatedReset,
```

```
            remotelyInitiatedRestart,
            restartTimeout,
            protocolErrorDetectedLocally,
            accusedOfProtocolError,
            retryCountExceeded,
            clearCountExceeded;
        ;;
    CONDITIONAL PACKAGES
        iSO8208OnlineRegistrationPackage
            PRESENT IF The optional online registration facility is implemented;
REGISTERED AS{ISO10733-NLMN.moi x25PLE (7)};

x25PLE-NB NAME BINDING
    SUBORDINATE OBJECT CLASS x25PLE;
    NAMED BY
        SUPERIOR OBJECT CLASS networkEntity;
        WITH ATTRIBUTE x25PLE-MO-Name;
    CREATE with-reference-object;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi x25PLE-NB (9)};

x25PLE-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR x25PLE-MO-Name-B BEHAVIOUR
        DEFINED AS The name of this instance of x25PLE MO;;
REGISTERED AS {ISO10733-NLMN.aoi x25PLE-MO-Name (36)};
```

5.8.1 The iSO8208OnlineRegistrationPackage Package

```
iSO8208OnlineRegistrationPackage PACKAGE
    BEHAVIOUR DEFINITIONS iSO8208OnlineRegistrationPackage-B BEHAVIOUR
        DEFINED AS Controls the operation of the optional online registration  facility as described
            in Clause 13.1 of ISO 8208 (2nd Edition);;
    ATTRIBUTES
        registrationRequestTime REPLACE-WITH-DEFAULT
            DEFAULT VALUE ISO10733-NLMN.registrationRequestTimeDefault
            GET-REPLACE,
        registrationRequestCount REPLACE-WITH-DEFAULT
            DEFAULT VALUE ISO10733-NLMN.registrationRequestCountDefault
            GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi iSO8208OnlineRegistrationPackage  (11)};
```

5.9 The X.25 PLE Initial Values Managed Object Class

```
x25PLEIVMO MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY x25PLEIVMOPackage PACKAGE
        ATTRIBUTES
            x25PLE-IVMO-Name GET,
            localDTEAddress GET-REPLACE,
            interfaceMode GET-REPLACE,
            maxActiveCircuits REPLACE-WITH-DEFAULT
                GET-REPLACE,
            restartTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.restartTimeDefault
                GET-REPLACE,
            registrationRequestTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE
                    ISO10733-NLMN.registrationRequestTimeDefault
```

```
                    GET-REPLACE,
               minimumRecallTimer REPLACE-WITH-DEFAULT
                    GET-REPLACE,
               restartCount REPLACE-WITH-DEFAULT
                    DEFAULT VALUE ISO10733-NLMN.restartCountDefault
                    GET-REPLACE,
               registrationRequestCount REPLACE-WITH-DEFAULT
                    DEFAULT VALUE
                         ISO10733-NLMN.registrationRequestCountDefault
                    GET-REPLACE,
               dataLinkID REPLACE-WITH-DEFAULT
                    GET-REPLACE,
               logicalChannelAssignments REPLACE-WITH-DEFAULT
                    GET-REPLACE,
               extendedPacketSequencing REPLACE-WITH-DEFAULT
                    GET-REPLACE;
          ;;
REGISTERED AS{ISO10733-NLMN.moi x25PLEIVMO (8)};

x25PLEIVMO-NB NAME BINDING
    SUBORDINATE OBJECT CLASS x25PLEIVMO;
    NAMED BY
         SUPERIOR OBJECT CLASS networkEntity;
         WITH ATTRIBUTE x25PLE-IVMO-Name;
    CREATE with-reference-object;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi x25PLEIVMO-NB (10)};

x25PLE-IVMO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR x25PLE-IVMO-Name-B BEHAVIOUR
         DEFINED AS The name of this instance of x25PLE IVMO;;
REGISTERED AS {ISO10733-NLMN.aoi x25PLE-IVMO-Name (37)};

protocolVersionSupported ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.ProtocolVersion;
    MATCHES FOR Equality;
    BEHAVIOUR protocolVersionSupportedB  BEHAVIOUR
         DEFINED AS The supported versions of ISO8208 available on the PLE  interface;;
REGISTERED AS {ISO10733-NLMN.aoi protocolVersionSupported (38)};

localDTEAddress ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.DTEAddress;
    MATCHES FOR Equality;
    BEHAVIOUR localDTEAddress-B BEHAVIOUR
         DEFINED AS The full DTE address of this PLE expressed as an X.121, X.31,  etc. address;;
REGISTERED AS {ISO10733-NLMN.aoi localDTEAddress (39)};

interfaceMode ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.InterfaceMode;
    MATCHES FOR Equality;
    BEHAVIOUR interfaceMode-B BEHAVIOUR
         DEFINED AS the DCE/DTE mode in which the interface is currently  operating;;
REGISTERED AS {ISO10733-NLMN.aoi interfaceMode (40)};
```

```
maxActiveCircuits ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.MaxActiveCircuits;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR maxActiveCircuits-B BEHAVIOUR
         DEFINED AS The maximum number of active circuits
              permitted on this PLE;;
REGISTERED AS {ISO10733-NLMN.aoi maxActiveCircuits (41)};

restartTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR restartTime-B BEHAVIOUR
         DEFINED AS Value for Timer T20 (Restart Request Response Timer) in  seconds;;
REGISTERED AS {ISO10733-NLMN.aoi restartTime (42)};

minimumRecallTimer ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR minimumRecallTimer-B BEHAVIOUR
         DEFINED AS The timer which determines the minimum interval (in seconds)  which shall elapse
              following an unsuccessful first call attempt before a subsequent call  attempt is
              permitted;;
REGISTERED AS {ISO10733-NLMN.aoi minimumRecallTimer (43)};

registrationRequestTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR registrationRequestTime-B BEHAVIOUR
         DEFINED AS Value for Timer T28 (Registration Request Timer) in  seconds;;
REGISTERED AS {ISO10733-NLMN.aoi registrationRequestTime (44)};

restartCount ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR restartCount-B BEHAVIOUR
         DEFINED AS Value for count R20 (Restart Request Retransmission Count);;
REGISTERED AS {ISO10733-NLMN.aoi restartCount (45)};

registrationRequestCount ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR registrationRequestCount-B BEHAVIOUR
         DEFINED AS Value for count R28 (Registration Request Retransmission  Count);;
REGISTERED AS {ISO10733-NLMN.aoi registrationRequestCount (46)};

dataLinkID ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.LocalDistinguishedName;
    MATCHES FOR Equality;
    BEHAVIOUR dataLinkID-B BEHAVIOUR
         DEFINED AS Distinguished name of the Data Link Layer MO representing the  Logical Link
              used by the PLE;;
              -- Editor’s note: It is not clear whether this is the value to  control which Data Link Layer MO
              -- the PLE is to use, or whether it represents the one which the PLE  is in fact using.
              -- If the latter, shouldn’t it be the Distinguished name of a DLSAP  MO?
              -- Note also: The present definition may need amendment to deal with  the case of
              -- multi-link operation. NB comment is solicited.
REGISTERED AS {ISO10733-NLMN.aoi dataLinkID (47)};
```

```
logicalChannelAssignments ATTRIBUTE
   WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.LogicalChannelAssignments;
   MATCHES FOR Equality;
   BEHAVIOUR logicalChannelAssignments-B BEHAVIOUR
       DEFINED AS Represents the logical channel assignments of this PLE,  expressed as
           a seven-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 lowest incoming channel,
               the highest incoming channel,
               the lowest two-way channel,
               the highest two-way channel,
               the lowest outgoing channel
               and the highest outgoing channel, respectively.
           This attribute is subject to the rules for logical assignments described  in
           clause 5.1.  It is understood that the Highest Permanent Channel (HPC) is
           defined by the Lowest Incoming Channel (LPC) value minus one.;;
REGISTERED AS {ISO10733-NLMN.aoi logicalChannelAssignments (48)};

extendedPacketSequencing ATTRIBUTE
   WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Boolean;
   MATCHES FOR Equality;
   BEHAVIOUR moduloNumbering-B BEHAVIOUR
       DEFINED AS The modulo of the packet sequence number space.  Expressed as a  boolean
           where a value of ‘True’ indicates 128 and a value of false indicates 8;;
REGISTERED AS {ISO10733-NLMN.aoi extendedPacketSequencing (49)};

dataPacketsSent ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR dataPacketsSent-B BEHAVIOUR
       DEFINED AS The total number of data packets sent;;
REGISTERED AS {ISO10733-NLMN.aoi dataPacketsSent (50)};

dataPacketsReceived ATTRIBUTE
   DERIVED FROM  nonWrappingCounter;
   BEHAVIOUR dataPacketsReceived-B BEHAVIOUR
       DEFINED AS The total number of data packets received;;
REGISTERED AS {ISO10733-NLMN.aoi dataPacketsReceived (51)};

callAttempts ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR callAttempts-B BEHAVIOUR
       DEFINED AS The total number of calls attempted;;
           -- Editor’s note: It is not clear whether or not the
           -- "ISO/IEC 10165-2":OutgoingConnectionRequestsCounter
           -- could be used for this attribute, since that counts CR PDUs while  this counts the
           -- rather vague ‘attempts’.
REGISTERED AS {ISO10733-NLMN.aoi callAttempts (52)};

callsConnected ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR callsConnected-B BEHAVIOUR
       DEFINED AS The total number of calls which have reached the open state;;
REGISTERED AS {ISO10733-NLMN.aoi callsConnected (53)};
```

```
providerInitiatedDisconnect NOTIFICATION
    BEHAVIOUR providerInitiatedDisconnect-B BEHAVIOUR
         DEFINED AS Notification issued upon receipt of a clear packet with a cause  code other than
         ‘DTE initiated’;;
    MODE NON-CONFIRMED;
    PARAMETERS
         notificationCallData;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi providerInitiatedDisconnect (6)};

notificationCallData PARAMETER
    CONTEXT EVENT-INFO;
    WITH SYNTAX ISO10733-NLMN.NotificationCallDataSyntax;
    BEHAVIOUR notificationCallData-B BEHAVIOUR
         DEFINED AS Information relating to the call which resulted in the  notification;;
REGISTERED AS {ISO10733-NLMN.proi notificationCallData (7)};

providerInitiatedDisconnects ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR providerInitiatedDisconnects-B BEHAVIOUR
         DEFINED AS Counter for the providerInitiatedDisconnect notifications;;
REGISTERED AS {ISO10733-NLMN.aoi providerInitiatedDisconnects (54)};

callTimeouts ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR callTimeouts-B BEHAVIOUR
         DEFINED AS The number of times timer T21 expiry is experienced by the  PLE;;
REGISTERED AS {ISO10733-NLMN.aoi callTimeouts (55)};

clearTimeouts ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR clearTimeouts-B BEHAVIOUR
         DEFINED AS The number of times timer T23 expiry is experienced by the  PLE;;
REGISTERED AS {ISO10733-NLMN.aoi clearTimeouts (56)};

remotelyInitiatedReset NOTIFICATION
    BEHAVIOUR remotelyInitiatedReset-B BEHAVIOUR
         DEFINED AS Notification issued upon occurance of a remotely initiated  reset. This
              notification is issued in lieu of an ‘providerInitiatedReset’  notification
              when operating in a DTE-DXE environment;;
    MODE NON-CONFIRMED;
    PARAMETERS
         notificationCallData;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi remotelyInitiatedReset (7)};

remotelyInitiatedResets ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR remotelyInitiatedResets-B BEHAVIOUR
         DEFINED AS Counter associated with the remotelyInitiatedReset  notification;;
REGISTERED AS {ISO10733-NLMN.aoi remotelyInitiatedResets (57)};

dataRetransmissionTimerExpiries ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR dataRetransmissionTimerExpiries-B BEHAVIOUR
         DEFINED AS Count of the number of expiries of timer T25. Returns zero if  the option is
              not implemented;;
REGISTERED AS {ISO10733-NLMN.aoi dataRetransmissionTimerExpiries  (58)};
```

```
providerInitiatedReset NOTIFICATION
   BEHAVIOUR providerInitiatedReset-B BEHAVIOUR
       DEFINED AS Notification issued upon occurrence of a provider initiated  reset.
           This notification is issued when operating in a DTE-DCE environment;;
   MODE NON-CONFIRMED;
   PARAMETERS
       notificationCallData;
   WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi providerInitiatedReset (8)};

providerInitiatedResets ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR providerInitiatedResets-B BEHAVIOUR
       DEFINED AS Counter associated with the providerInitiatedReset  notification;;
REGISTERED AS {ISO10733-NLMN.aoi providerInitiatedResets (59)};

resetTimeouts ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR resetTimeouts-B BEHAVIOUR
       DEFINED AS The number of timer T22 expiries experienced by the PLE;;
REGISTERED AS {ISO10733-NLMN.aoi resetTimeouts (60)};

remotelyInitiatedRestarts ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR remotelyInitiatedestarts-B BEHAVIOUR
       DEFINED AS The total number of remotely initiated (inluding provider  initiated) restarts
           experienced by the PLE, excluding the
           restart associated with bringing up the PLE interface;;
REGISTERED AS {ISO10733-NLMN.aoi remotelyInitiatedRestarts (61)};

restartTimeout NOTIFICATION
   BEHAVIOUR restartTimeout-B BEHAVIOUR
       DEFINED AS Notification issued upon expiry of timer T20;;
   MODE NON-CONFIRMED;
   PARAMETERS
       notificationCallData;
   WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi restartTimeout (9)};

remotelyInitiatedRestart NOTIFICATION
   BEHAVIOUR remotelyInitiatedRestart-B BEHAVIOUR
       DEFINED AS Notification issued upon receipt of a remotely (including  provider) initiated
           resart;;
   MODE NON-CONFIRMED;
   PARAMETERS
       notificationCallData;
   WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi remotelyInitiatedRestart (10)};

restartTimeouts ATTRIBUTE
   DERIVED FROM nonWrappingCounter;
   BEHAVIOUR restartTimeouts-B BEHAVIOUR
       DEFINED AS Counter associated with the restartTimeout notification;;
REGISTERED AS {ISO10733-NLMN.aoi restartTimeouts (62)};
```

```
protocolErrorDetectedLocally NOTIFICATION
    BEHAVIOUR protocolErrorDetectedLocally-B BEHAVIOUR
        DEFINED AS Notification issued upon receipt of a packet in which a  protocol error
            was detected;;
            -- Note: includes header of packet in notification format
    MODE NON-CONFIRMED;
    PARAMETERS
        notificationCallData;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi protocolErrorDetectedLocally (11)};

protocolErrorsDetectedLocally ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR protocolErrorsDetectedLocally-B BEHAVIOUR
        DEFINED AS Counter associated with the protocolErrorDetectedLocally
            notification;;
            -- Editor's note: should this use the "ISO/IEC  10165-2":IncomingProtocolErrorCounter?
REGISTERED AS {ISO10733-NLMN.aoi protocolErrorsDetectedLocally  (63)};

accusedOfProtocolError NOTIFICATION
    BEHAVIOUR accusedOfProtocolError-B BEHAVIOUR
        DEFINED AS Notification issued upon receipt of a diagnostic packet or a
            clear, reset or restart packet with a cause code equal to 'protocol  error';;
    MODE NON-CONFIRMED;
    PARAMETERS
        notificationCallData;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi accusedOfProtocolError (12)};

protocolErrorsAccusedOf ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR protocolErrorsAccusedOf-B BEHAVIOUR
        DEFINED AS Counter associated with the accusedOfProtocolError
            notification;;
REGISTERED AS {ISO10733-NLMN.aoi protocolErrorsAccusedOf (64)};

retryCountExceeded NOTIFICATION
    BEHAVIOUR retryCountExceeded-B BEHAVIOUR
        DEFINED AS Notification issued on retry failure due to retry limit  exceeded;;
    MODE NON-CONFIRMED;
    PARAMETERS
        notificationCallData;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi retryCountExceeded (13)};

retryCountsExceeded ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR retryCountsExceeded-B BEHAVIOUR
        DEFINED AS Counter associated with the retryCountExceeded notification;;
REGISTERED AS {ISO10733-NLMN.aoi retryCountsExceeded (65)};

clearCountExceeded NOTIFICATION
    BEHAVIOUR clearCountExceeded-B BEHAVIOUR
        DEFINED AS Notification issued on retry failure due to clear limit (R23)  exceeded;;
    MODE NON-CONFIRMED;
    PARAMETERS
        notificationCallData;
    WITH INFORMATION SYNTAX ISO10733-NLMN.NotificationInfo;
REGISTERED AS {ISO10733-NLMN.noi clearCountExceeded (14)};
```

```
clearCountsExceeded ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR clearCountsExceeded-B BEHAVIOUR
        DEFINED AS Counter associated with the clearCountExceeded notification;;
REGISTERED AS {ISO10733-NLMN.aoi clearCountsExceeded (66)};

interruptPacketsSent ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR interruptPacketsSent-B BEHAVIOUR
        DEFINED AS The total number of interrupt packets sent by the PLE or over  the PVC/VC;;
REGISTERED AS {ISO10733-NLMN.aoi interruptPacketsSent (67)};

interruptPacketsReceived ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR interruptPacketsReceived-B BEHAVIOUR
        DEFINED AS The total number of interrupt packets received by the PLE or  over the PVC/VC;;
REGISTERED AS {ISO10733-NLMN.aoi interruptPacketsReceived (68)};

interruptTimerExpiries ATTRIBUTE
    DERIVED FROM nonWrappingCounter;
    BEHAVIOUR interruptTimerExpiries-B BEHAVIOUR
        DEFINED AS The total number of expiries of of timer T26 experienced by the  PLE or
            over the PVC/VC;;
REGISTERED AS {ISO10733-NLMN.aoi interruptTimerExpiries (69)};

pLEClientMOName ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.LocalDistinguishedName;
        -- Editor's note: Not a set?
        -- Do we really intend to associate a client with the PLE rather  than a particular VC?
    MATCHES FOR Equality;
    BEHAVIOUR pLEClientMOName-B BEHAVIOUR
        DEFINED AS The Distinguished name of the client MO;;
            -- Note this will either be a Transport Layer MO or a CLNS MO
REGISTERED AS {ISO10733-NLMN.aoi pLEClientMOName (70)};
```

5.10 The ISO 8208 Virtual Call Initial Values Managed Object

```
--
-- Virtual Call Initial Values Managed Object
--
-- This managed object exists in order to permit the values of  various parameters of a virtual call to
-- be specified in advance by management. When a virtual call is to  be established, the values of all the
-- parameters to be used can be identified by specifying an instance  of this MO.
--

iSO8208VirtualCallIVMO MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY iSO8208IVMOPackage PACKAGE
        ATTRIBUTES
            iSO8208VirtualCall-IVMO-Name GET,
            proposedPacketSize REPLACE-WITH-DEFAULT
                GET-REPLACE,
            proposedWindowSize REPLACE-WITH-DEFAULT
                GET-REPLACE,
            acceptReverseCharging REPLACE-WITH-DEFAULT
                GET-REPLACE,
            proposeReverseCharging REPLACE-WITH-DEFAULT
                GET-REPLACE,
            fastSelect  REPLACE-WITH-DEFAULT
                GET-REPLACE,
            callTime REPLACE-WITH-DEFAULT
```

```
                DEFAULT VALUE ISO10733-NLMN.callTimeDefault
                GET-REPLACE,
            resetTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.resetTimeDefault
                GET-REPLACE,
            clearTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.clearTimeDefault
                GET-REPLACE,
            interruptTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.interruptTimeDefault
                GET-REPLACE,
            resetCount REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.resetCountDefault
                GET-REPLACE,
            clearCount REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.clearCountDefault
                GET-REPLACE,
            logicalChannelAssignments REPLACE-WITH-DEFAULT
                GET-REPLACE;
        ;;
    CONDITIONAL PACKAGES
        iSO8208ReceivingWindowRotationRecoveryProceduresPackage
        PRESENT IF The optional window rotation recovery procedures are  implemented
            at a recieving DTE,
        iSO8208TransmittingWindowRotationRecoveryProceduresPackage
        PRESENT IF The optional window rotation recovery procedures are  implemented
            at a transmitting DTE,
        iSO8208PacketRetransmissionProceduresPackage
        PRESENT IF The optional packet retransmission procedures are implemented;
REGISTERED AS {ISO10733-NLMN.moi iSO8208VirtualCallIVMO (9)};

iSO8208VirtualCallIVMO-NB NAME BINDING
    SUBORDINATE OBJECT CLASS iSO8208VirtualCallIVMO;
    NAMED BY
        SUPERIOR OBJECT CLASS x25PLE;
        WITH ATTRIBUTE iSO8208VirtualCall-IVMO-Name;
    CREATE;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi iSO8208VirtualCallIVMO-NB  (11)};

iSO8208VirtualCall-IVMO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR iSO8208VirtualCall-IVMO-Name-B BEHAVIOUR
        DEFINED AS The name of this instance of ISO8208VirtualCallIVMO;;
REGISTERED AS {ISO10733-NLMN.aoi iSO8208VirtualCall-IVMO-Name  (71)};

proposedPacketSize ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.ChoiceInteger;
        -- Includes a choice of a 'don't care' value.
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR proposedPacketSize-B BEHAVIOUR
        DEFINED AS The proposed value of the packet size parameter to be used when  establishing
            the virtual call, expressed in octets;;
REGISTERED AS {ISO10733-NLMN.aoi proposedPacketSize (72)};
```

```
proposedWindowSize ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.ChoiceInteger;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR proposedWindowSize-B BEHAVIOUR
         DEFINED AS The proposed value of the window size parameter to be used when  establishing
              the virtual call;;
REGISTERED AS {ISO10733-NLMN.aoi proposedWindowSize (73)};

acceptReverseCharging ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Boolean;
    MATCHES FOR Equality;
    BEHAVIOUR acceptReverseCharging-B BEHAVIOUR
         DEFINED AS When this has the value ‘False’ an incoming call requesting  reverse charging
              shall not be accepted;;
REGISTERED AS {ISO10733-NLMN.aoi acceptReverseCharging (74)};

proposeReverseCharging ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Boolean;
    MATCHES FOR Equality;
    BEHAVIOUR proposeReverseCharging-B BEHAVIOUR
         DEFINED AS When this has the value ‘True’ an outgoing call shall be  initiated requesting
              reverse charging;;
REGISTERED AS {ISO10733-NLMN.aoi proposeReverseCharging (75)};

fastSelect ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.FastSelect;
         -- Enumerated( Not Specified, Fast Select, Fast Select With  Restricted Response, No Fast Select)
    MATCHES FOR Equality;
    BEHAVIOUR fastSelect-B BEHAVIOUR
         DEFINED AS Request for fast select, fast select with retricted response,  or no fast select facility for
              the call. Includes a value ‘not specified’ which indicates that no  preference is
              expressed;;
REGISTERED AS {ISO10733-NLMN.aoi fastSelect (76)};

callTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR callTime-B BEHAVIOUR
         DEFINED AS Value for Timer T21 (Call Request Response Timer) in  seconds;;
REGISTERED AS {ISO10733-NLMN.aoi callTime (77)};

resetTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR resetTime-B BEHAVIOUR
         DEFINED AS Value for Timer T22 (Reset Request Response Timer) in  seconds;;
REGISTERED AS {ISO10733-NLMN.aoi resetTime (78)};

clearTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR clearTime-B BEHAVIOUR
         DEFINED AS Value for Timer T23 (Clear Request Response Timer) in  seconds;;
REGISTERED AS {ISO10733-NLMN.aoi clearTime (79)};

resetCount ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR resetCount-B BEHAVIOUR
         DEFINED AS Value for count R22 (Reset Request Retransmission Count);;
REGISTERED AS {ISO10733-NLMN.aoi resetCount (80)};
```

```
clearCount ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR clearCount-B BEHAVIOUR
          DEFINED AS Value for count R23 (Clear Request Retransmission Count);;
REGISTERED AS {ISO10733-NLMN.aoi clearCount (81)};

interruptTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR interruptTime-B BEHAVIOUR
          DEFINED AS Value for Timer T26 (Interrupt Response Timer) in seconds;;
REGISTERED AS {ISO10733-NLMN.aoi interruptTime (82)};
```

5.10.1 The iSO8208ReceivingWindowRotationRecoveryProceduresPackage Package

```
iSO8208ReceivingWindowRotationRecoveryProceduresPackage PACKAGE
    BEHAVIOUR DEFINITIONS
          iSO8208ReceivingWindowRotationRecoveryProceduresPackage-B BEHAVIOUR
          DEFINED AS Controls the operation of the optional window rotation recovery  procedures
                at a receiving DTE as described in Clause 11.2.2 of ISO 8208 (2nd  Edition);;
    ATTRIBUTES
          windowTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.windowTimeDefault
                GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi  iSO8208ReceivingWindowRotationRecoveryProceduresPackage
(12)};

windowTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR windowTime-B BEHAVIOUR
          DEFINED AS Value for Timer T24 (Window Status Transmission Timer) in  seconds;;
REGISTERED AS {ISO10733-NLMN.aoi windowTime (83)};
```

5.10.2 The iSO8208TransmittingWindowRotationRecoveryProceduresPackage Package

```
iSO8208TransmittingWindowRotationRecoveryProceduresPackage PACKAGE
    BEHAVIOUR DEFINITIONS
          iSO8208TransmittingWindowRotationRecoveryProceduresPackage-B BEHAVIOUR
          DEFINED AS Controls the operation of the optional window rotation recovery  procedures
                at a transmitting DTE as described in Clause 11.2.1 of ISO 8208 (2nd  Edition);;
    ATTRIBUTES
          dataRetransmissionTime REPLACE-WITH-DEFAULT
                DEFAULT VALUE
                      ISO10733-NLMN.dataRetransmissionTimeDefault
                GET-REPLACE,
          dataRetransmissionCount REPLACE-WITH-DEFAULT
                DEFAULT VALUE ISO10733-NLMN.dataRetransmissionCountDefault
                GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi  iSO8208TransmittingWindowRotationRecoveryProceduresPackage
(13)};

dataRetransmissionTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR dataRetransmissionTime-B BEHAVIOUR
          DEFINED AS Default for Timer T25 (Window Rotation Timer) in seconds;;
REGISTERED AS {ISO10733-NLMN.aoi dataRetransmissionTime (84)};
```

```
dataRetransmissionCount ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR dataRetransmissionCount-B BEHAVIOUR
         DEFINED AS Value for count R25 (Data Packet Retransmission Count);;
REGISTERED AS {ISO10733-NLMN.aoi dataRetransmissionCount (85)};
```

5.10.3 The iSO8208PacketRetransmissionProceduresPackage Package

```
iSO8208PacketRetransmissionProceduresPackage PACKAGE
    BEHAVIOUR DEFINITIONS iSO8208PacketRetransmissionProceduresPackage-B  BEHAVIOUR
         DEFINED AS Controls the operation of the optional packet retransmission  procedures
              as described in Clause 13.4 of ISO 8208 (2nd Edition);;
    ATTRIBUTES
         rejectTime REPLACE-WITH-DEFAULT
              DEFAULT VALUE ISO10733-NLMN.rejectTimeDefault
              GET-REPLACE,
         rejectCount REPLACE-WITH-DEFAULT
              DEFAULT VALUE ISO10733-NLMN.rejectCountDefault
              GET-REPLACE;
REGISTERED AS {ISO10733-NLMN.poi  iSO8208PacketRetransmissionProceduresPackage (14)};

rejectTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR rejectTime-B BEHAVIOUR
         DEFINED AS Value for Timer T27 (Reject Response Timer) in seconds;;
REGISTERED AS {ISO10733-NLMN.aoi rejectTime (86)};

rejectCount ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Integer;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR rejectCount-B BEHAVIOUR
         DEFINED AS Value for count R27 (Reject Retransmission Count);;
REGISTERED AS {ISO10733-NLMN.aoi rejectCount (87)};
```

5.11 The Virtual Call Managed Object

```
-- Virtual Call Managed Object
--
-- This MO Class is never instantiated. It serves as a generic  Virtual Call MO from which both the
-- Switched Virtual Call and the Permanent Virtual Circuit MOs are  derived.
--

virtualCall MANAGED OBJECT CLASS
    DERIVED FROM "ISO/IEC 10165-2":top;
    CHARACTERIZED BY vCMOPackage PACKAGE
         ATTRIBUTES
              virtualCall-MO-Name GET,
              channel GET,
              packetSize GET,
              windowSize GET,
              -- The following two attributes  may be required
              --    remoteDTEAddress
              --    vCState
              "ISO/IEC 10165-2":octetsSentCounter GET,
                   -- This corresponds to the ISO8208OctetsSent attribute. Note that  the DMI
                   -- definition is in terms of user data octets.
              "ISO/IEC 10165-2":octetsReceivedCounter GET,
                   -- This corresponds to the ISO8208OctetsReceived attribute. Note  that the
```

```
                --DMI definition is in terms of user data octets.
            dataPacketsSent GET,
                -- Note the "ISO/IEC 10165-2":PDUsSentCounter cannot be used  here
                -- since it is defined as total number of PDUs sent, not just data  PDUs.
            dataPacketsReceived GET,
            remotelyInitiatedResets GET,
            dataRetransmissionTimerExpiries GET,
            providerInitiatedResets GET,
            resetTimeouts GET,
            interruptPacketsSent GET,
            interruptPacketsReceived GET,
            interruptTimerExpiries GET;
        ATTRIBUTE GROUPS
            counters
                "ISO/IEC 10165-2":octetsSentCounter
                "ISO/IEC 10165-2":octetsReceivedCounter
                dataPacketsSent
                dataPacketsReceived
                remotelyInitiatedResets
                dataRetransmissionTimerExpiries
                providerInitiatedResets
                resetTimeouts
                interruptPacketsSent
                interruptPacketsReceived
                interruptTimerExpiries;
        ;;
REGISTERED AS {ISO10733-NLMN.moi virtualCall (10)};
```

5.12 The Switched Virtual Call Managed Object

```
--
--  Switched Virtual Call 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 deleted 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 establishement when reall
-- resources are consumed, and conversly, when during call clearing,  when they are released.

switchedVirtualCall MANAGED OBJECT CLASS
    DERIVED FROM virtualCall;
    CHARACTERIZED BY sVCMOPackage PACKAGE
        ATTRIBUTES
            direction GET,
            calledDTEAddress GET,
            callingDTEAddress GET,
            callData GET,
            throughputClass GET,
            redirectReason GET,
            originallyCalledAddress GET,
            callingAddressExtension GET,
            targetAddressExtension GET;
    ;;
REGISTERED AS {ISO10733-NLMN.moi switchedVirtualCall (11)};
```

```
sVCMO-NB NAME BINDING
    SUBORDINATE OBJECT CLASS switchedVirtualCall;
    NAMED BY
         SUPERIOR OBJECT CLASS x25PLE;
         WITH ATTRIBUTE virtualCall-MO-Name;
    BEHAVIOUR sVCMO-NB-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 only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi sVCMO-NB (12)};

virtualCall-MO-Name ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.GraphicString;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR virtualCall-MO-Name-B BEHAVIOUR
         DEFINED AS The name of this instance of virtualCall MO;;
REGISTERED AS {ISO10733-NLMN.aoi virtualCall-MO-Name (88)};

channel ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.ChannelID;
         -- 12 bit channel ID
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR channel-B BEHAVIOUR
         DEFINED AS The actual Channel ID used for the call;;
REGISTERED AS {ISO10733-NLMN.aoi channel (89)};

packetSize ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.PacketSize;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR packetSize-B BEHAVIOUR
         DEFINED AS The actual packet size in use for this VC;;
REGISTERED AS {ISO10733-NLMN.aoi packetSize (90)};

windowSize ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.WindowSize;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR windowSize-B BEHAVIOUR
         DEFINED AS The actual window size in use for this VC;;
REGISTERED AS {ISO10733-NLMN.aoi windowSize (91)};

direction ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.Direction;
         -- Enumerated( Incoming, Outgoing)
    MATCHES FOR Equality;
    BEHAVIOUR direction-B BEHAVIOUR
         DEFINED AS The direction (incoming or outgoing) of the call;;
REGISTERED AS {ISO10733-NLMN.aoi direction (92)};

calledDTEAddress ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.DTEAddress;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR calledDTEAddress-B BEHAVIOUR
         DEFINED AS The destination DTE address used when the call was placed;;
REGISTERED AS {ISO10733-NLMN.aoi calledDTEAddress (93)};
```

```
callingDTEAddress ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.DTEAddress;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR callingDTEAddress-B BEHAVIOUR
         DEFINED AS The calling DTE address from the call request packet. In the  case of an outgoing
              call this will be the address of the local DTE from which the call was  placed;;
REGISTERED AS {ISO10733-NLMN.aoi callingDTEAddress (94)};

callData ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.CallData;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR callData-B BEHAVIOUR
         DEFINED AS The first 16 octets of call user data associated with the  call;;
REGISTERED AS {ISO10733-NLMN.aoi callData (95)};

throughputClass ATTRIBUTE
    WITH ATTRIBUTE SYNTAX  ISO10733-NLMN.Throughput;
    MATCHES FOR Equality, Ordering;
    BEHAVIOUR throughputClass-B BEHAVIOUR
         DEFINED AS The actual throughput class in use for the call. For SVCs this  is the result of
              negotiation;;
REGISTERED AS {ISO10733-NLMN.aoi throughputClass (96)};

redirectReason ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.RedirectReason;
         -- Must include a ‘nil’ value
    MATCHES FOR Equality;
    BEHAVIOUR redirectReason-B BEHAVIOUR
         DEFINED AS The reason for call redirect. The zero value indicates that the  call was not
              redirected;;
              -- Editor’s note: Is this information available for an outgoing  call?
REGISTERED AS {ISO10733-NLMN.aoi redirectReason (97)};

originallyCalledAddress ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.DTEAddress;
    MATCHES FOR Equality, Substrings;
    BEHAVIOUR originallyCalledAddress-B BEHAVIOUR
         DEFINED AS The originally called address;;
REGISTERED AS {ISO10733-NLMN.aoi originallyCalledAddress (98)};

callingAddressExtension ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.NSAPAddress;
         -- 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 calling NSAP Address;;
              -- Editor’s note: Shouldn’t it just be the contents of the calling  address extension field?
REGISTERED AS {ISO10733-NLMN.aoi callingAddressExtension (99)};

targetAddressExtension ATTRIBUTE
    -- Why ‘Target’ not ‘called’ as in ISO 8208?
    WITH ATTRIBUTE SYNTAX ISO10733-NLMN.NSAPAddress;
         -- 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 targetAddressExtension-B BEHAVIOUR
         DEFINED AS The Target NSAP Address which was carried in the call packet;;
              -- Editor’s note: Shouldn’t it just be the contents of the called  address extension field?
REGISTERED AS {ISO10733-NLMN.aoi targetAddressExtension (100)};
```

5.13 The Permanent Virtual Circuit Managed Object

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


permanentVirtualCircuit MANAGED OBJECT CLASS
    DERIVED FROM virtualCall;
    CHARACTERIZED BY pVCMOPackage PACKAGE
--              Note: currently no additional attributes are defined for this package
    ;;
REGISTERED AS {ISO10733-NLMN.moi permanentVirtualCircuit (12)};


pVCMO-NB NAME BINDING
    SUBORDINATE OBJECT CLASS permanentVirtualCircuit;
    NAMED BY
          SUPERIOR OBJECT CLASS x25PLE;
          WITH ATTRIBUTE virtualCall-MO-Name;
    BEHAVIOUR pVCMO-NB-B BEHAVIOUR
          DEFINED AS The following attributes may (shall?) have their initial  values set by
                parameters of the create operation.
                      channel,              -- mandatory
                      packetSize,           -- optional
                      windowSize;;          -- optional
    CREATE with-automatic-instance-naming
                pVC-P1
                pVC-P2
                pVC-P3;
    DELETE only-if-no-contained-objects;
REGISTERED AS {ISO10733-NLMN.nboi pVCMO-NB (13)};


pVC-P1 PARAMETER
    CONTEXT CREATE-INFO;
    WITH SYNTAX ISO10733-NLMN.ChannelID;
    BEHAVIOUR pVC-P1-B BEHAVIOUR
          DEFINED AS The value to be given to the channel attribute on MO  creation;;
REGISTERED AS {ISO10733-NLMN.proi pVC-P1 (8)};


pVC-P2 PARAMETER
    CONTEXT CREATE-INFO;
    WITH SYNTAX ISO10733-NLMN.PacketSize;
    BEHAVIOUR pVC-P2-B BEHAVIOUR
          DEFINED AS The value to be given to the packetSize attribute on MO  creation;;
REGISTERED AS {ISO10733-NLMN.proi pVC-P2 (9)};


pVC-P3 PARAMETER
    CONTEXT CREATE-INFO;
    WITH SYNTAX ISO10733-NLMN.WindowSize;
    BEHAVIOUR pVC-P3-B BEHAVIOUR
          DEFINED AS The value to be given to the windowSize attribute on MO  creation;;
REGISTERED AS {ISO10733-NLMN.proi pVC-P3 (10)};
```

5.14 ASN.1 modules

```
ISO10733-NLMN {joint-iso-ccitt network-layer (13) management  (0) nlAsn1Module (2) 0}
DEFINITIONS ::= BEGIN

-- object identifier definitions

network-layer OBJECT IDENTIFIER ::= {joint-iso-ccitt  network-layer (13)}

nloi OBJECT IDENTIFIER ::= {network-layer management (0)}

moi OBJECT IDENTIFIER ::= {nloi nlManagedObjectClass (3)}
poi OBJECT IDENTIFIER ::= {nloi nlPackage (4)}
proi OBJECT IDENTIFIER ::= {nloi nlParameter (5)}
nboi OBJECT IDENTIFIER ::= {nloi nlNameBinding (6)}
aoi OBJECT IDENTIFIER ::= {nloi nlAttribute (7)}
agoi OBJECT IDENTIFIER ::= {nloi nlAttributeGroup (8)}
acoi OBJECT IDENTIFIER ::= {nloi nlAction (9)}
noi OBJECT IDENTIFIER ::= {nloi nlNotification (10)}

ActionFailureReason ::= ENUMERATED{
        reason1(0),
        reason2(1)}
   -- Editor’s note: actual reasons TBS

ActionInfo ::= SET OF Parameter

ActionReply ::= SEQUENCE{
        responseCode OBJECT IDENTIFIER,
        responseArgs SET OF Parameter OPTIONAL}

Boolean ::= BOOLEAN

CallData ::= OCTETSTRING(SIZE (0..16))
   -- limited to 16 octets

callTimeDefault INTEGER ::= 200

ChannelID ::= INTEGER (1..4095)

ChoiceInteger ::= CHOICE {
        [0] IMPLICIT NULL,-- The ‘I don’t care’ value
        [1]  IMPLICIT INTEGER}
   -- Editor’s note: Another way of achieving this would be to use a  specific object ID to mean ‘I don’t care’

clearCountDefault INTEGER ::= 1

clearTimeDefault INTEGER ::= 180

dataRetransmissionCountDefault INTEGER ::= 0

dataRetransmissionTimeDefault INTEGER ::= 200

DTEAddress ::=  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 ISO8208 a value of 65535 indicates that  the delay is unknown
    -- or exceeds 65534 milliseconds.

-- Editor's note: The following  definition (and that for  ISREachability) are suggestions only. Careful review
-- is required. In particular, exactly when do the notifications get  generated when an ES has multiple NSAPs
-- or if a single IS has multiple NETs?
ESReachabilityChangeSyntax ::= SEQUENCE{
        newState      [1]  ENUMERATED { down(0), up(1)},
        nSAPs         [2]  SET OF NSAPAddress,
        reason        [3]  ENUMERATED {holdingTimerExpired(0),
                           circuitDisabled(1)} OPTIONAL} -- Down only

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(2)

InterfaceMode ::= ENUMERATED{
            dTE(0),
            dCE(1)}

Integer ::= INTEGER

interruptTimeDefault INTEGER ::= 180

ISO8208-MO-Name-Value ::= "ISO8208"

ISReachabilityChangeSyntax ::= SEQUENCE{
        newState      [1]  ENUMERATED { Down(0), Up(1)},
        nET      [2]  NSAPAddress,
        reason        [3]  ENUMERATED {holdingTimerExpired(0),
                           circuitDisabled(1)} OPTIONAL} -- Down only

LocalDistinguishedName ::= CMIP-1.ObjectInstance
    -- Editor's note: This includes localDistinguishedName as one of its  choices.  There doesn't seem to be
    -- a free-standing definition of localDistinguishedName

LocalDistinguishedNames ::= SET OF LocalDistinguishedName

LogicalChannelAssignments ::= SEQUENCE {
    pVC      [0]  SET OF INTEGER(1..4095),
    lIC  [1]  INTEGER(1..4095),
    hIC  [2]  INTEGER(1..4095),
    lTC  [3]  INTEGER(1..4095),
    hTC [4]  INTEGER(1..4095),
    lOC [5]  INTEGER(1..4095),
    hOC      [6]  INTEGER(1..4095)}
```

```
MACAddress ::= OCTETSTRING(SIZE(6))
    -- exactly 6 octets in length

ManualISAddress ::= SET OF MACAddress

MaxActiveCircuits ::= INTEGER

NonWrappingCounter ::= INTEGER(0..18446744073709551616) -- (0..  2^64-1)

NotificationInfo ::= SET OF Parameter

NotificationCallDataSyntax ::= SEQUENCE {
    channel         [1]  ChannelID,
    sequenceNumber [2]   INTEGER(0..127) OPTIONAL,
    dbit        [3]  BOOLEAN,
    mbit        [4]  BOOLEAN,
    qbit        [5]  BOOLEAN,
    callData        [6]  CallData}

NSAPAddress ::= OCTETSTRING(SIZE(0..20))
    --up to 20 octets

NSAPAddresses ::= SET OF NSAPAddress

NUI ::= OctetString(SIZE(0..255))
    -- Editor's note: Can they really be this long?

null-MO-Name-Value OCTETSTRING ::= "" -- i.e. the null  string

Null-MO-Name-Syntax ::= OCTETSTRING(SIZE(0)) -- i.e. it  can only hold a null string

OctetString ::= OCTETSTRING

PacketSize ::= INTEGER(1..65535)

Parameter ::= SEQUENCE{
    paramId OBJECT IDENTIFIER,
    paramInfo     ANY DEFINED BY paramID}

PDUFormatErrorSyntax ::= PDUHeader

PDUHeader ::= OCTETSTRING(SIZE(1..255))

PDUOtherErrorSyntax ::= SEQUENCE{
          errorCode     [1]   INTEGER(0..255),
          header           [2]   PDUHeader}

ProtocolVersion ::= ???
    --Editor's Note: NB comment is solicited as to what a suitable type  would be

ProtocolVersions ::= SET OF ProtocolVersion

RedirectHoldingTime ::= INTEGER(1..65535)

redirectHoldingTime-Default INTEGER ::= 600

RedirectHoldingTime-Permitted ::= INTEGER(1..65535)

RedirectReason ::= INTEGER(0..127)
    -- Editor's note: Note an alternative more explicit encoding could  be an enumerated type of all the possible
    -- redirect reasons currently defined, but this would have the  disadvantage of not being extensible.
    -- Will zero do for the 'NIL' value to indicate no redirection?
```

```
registrationRequestCountDefault INTEGER ::= 1

registrationRequestTimeDefault INTEGER ::= 300

rejectCountDefault INTEGER ::= 0

rejectTimeDefault INTEGER ::= 60

ResponseCode ::= OBJECT IDENTIFIER

resetCountDefault INTEGER ::= 1

resetTimeDefault INTEGER ::= 180

restartCountDefault INTEGER ::= 1

restartTimeDefault 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)

Throughput ::=INTEGER (0..15)

Timer ::= SEQUENCE{
    exponent     [1]  INTEGER(-62..63),
    mantissa     [2]  INTEGER(0..65535)}

WindowSize ::= INTEGER(1..127)

windowTimeDefault INTEGER ::= 60

END
```

Annex A
Syntax Imported from ISO 10165-2

The following Definitions are imported from SMI Part 2: Definition of Management Information (ISO 10165-2).

```
top MANAGED OBJECT CLASS
CHARACTERIZED BY
topPackage PACKAGE
      BEHAVIOUR DEFINITIONS
      topBehaviour;
      ATTRIBUTES
      objectClass GET,
      packages GET,
      nameBindings GET,
      allomorphs GET,
      name GET;;;
REGISTERED AS {MObjectClass-ASN1Module.smi2MObjectClass 15};
-- Editor's note: There does not appear to be a definition of  smi2MObjectClass in 10165-2
-- It has therefore been defined for the purposes of this standard  in the ASN1 Module
-- MObjectClass-ASN1Module. (See below)

topBehaviour BEHAVIOUR
      DEFINED AS This is the top level of managed object class hierarchy and  every other managed object
             class is a specialization of either this generic class (top) or a  specialization of a subclass of top;

objectClass ATTRIBUTE
      WITH ATTRIBUTE SYNTAX CMIP-1.ObjectClass;
      MATCHES FOR Equality, Ordering;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 100};

packages ATTRIBUTE
      WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.Packages;
      MATCHES FOR Set Comparison, Set Intersection;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 101};

nameBindings ATTRIBUTE
      WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.NameBindings;
      MATCHES FOR Set Comparison, Set Intersection;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 98};

allomorphs ATTRIBUTE
      WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.Allomorphs;
      MATCHES FOR Set Comparison, Set Intersection;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 84};


name ATTRIBUTE
      WITH ATTRIBUTE SYNTAX Directory.RelativeDistinguishedName;
-- Defined in Directory Standards
-- Editor's Note: 10165-2 says this is  InformationFramework.RelativeDistinguishedName
      MATCHES FOR Equality;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 97};

operationalState ATTRIBUTE
      WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.OperationalState;
      MATCHES FOR Equality;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 71};
```

```
administrativeState ATTRIBUTE
        WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.AdministrativeState;
        MATCHES FOR Equality;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 66};

octetsSentCounter ATTRIBUTE
        DERIVED FROM counter;
-- Editor's note: The definition here of 'counter' from which this  attribute is derived is not identical with
-- the definition of 'nonWrappingCounter' from which the definitions  of the counters defined in the body of
-- this document (i.e ISO 10733) are derived.  It is therfore  questionable, for consistency reasons, whether the
-- SMI defined counters should be used.
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 114};

octetsReceivedCounter ATTRIBUTE
        DERIVED FROM counter;
REGISTERED AS {Attribute-ASN1Module.smi2AttributeID 112};

counter ATTRIBUTE
        WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.Count;
        MATCHES FOR Equality, Ordering;


REGISTERED AS {MObjectClass-ASN1Module.smi2MObjectClass 15};

-- Editor's note: There does not appear to be a definition of  smi2MObjectClass in 10165-2
-- It has therefore been defined for the purposes of this standard  in the ASN1 Module
-- MObjectClass-ASN1Module. (See below)

MObjectClass-ASN1Module
DEFINITIONS IMPLICIT TAGS ::=
BEGIN

smi2MObjectClass OBJECT IDENTIFIER ::= { joint-iso-ccitt ms (9)  smi(3) part2(2) object-class(?)}
-- Editor's note:  The value of the final arc is unknown

END

-- The following definitions are defined by 10165-2 as being  imported from CMIP

CMIP-1
DEFINITIONS IMPLICIT TAGS ::=
BEGIN

ObjectInstance ::= CHOICE{
                distinguishedName           [2] IMPLICIT DistinguishedName,
                nonSpecificForm             [3] IMPLICIT OCTET STRING,
                localDistinguishedName   [4] IMPLICIT RDNSequence}

ObjectClass ::= CHOICE{
                globalForm   [0] OBJECT IDENTIFIER,
                localFOrm     [1] INTEGER}

END

-- The following definitions are defined by 10165-2 as being  imported from Directory

Directory
DEFINITIONS ::=
BEGIN

DistinguishedName ::= RDNSequence
```

```
RDNSequence ::= SEQUENCE OF RelativeDistinguishedName

RelativeDistinguishedName ::= SET of AttributeValueAssertion

AttributeValueAssertion ::= SEQUENCE OF{
            AttributeType,
            AttributeValue}

AttributeType ::= OBJECT IDENTIFIER

AttributeValue ::= ANY

END



Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2)  asn1Module(2) 1}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN

smi2AttributeID OBJECT IDENTIFIER ::= { joint-iso-ccitt ms (9)  smi(3) part2(2) attribute(7)}

Count ::= INTEGER

AdministrativeState ::=  ENUMERATED{
            locked(0),
            unlocked(1),
            shuttingDown(2)}


OperationalState ::= ENUMERATED{
            disabled(0),
            enabled(1)}

Allomorphs ::= SET OF OBJECT IDENTIFIER

NameBindings ::= SET OF OBJECT IDENTIFIER

Packages ::= SET OF OBJECT IDENTIFIER

END
```

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