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European Standard (Telecommunications series)

**Telecommunications Management Network (TMN);
Information models and protocols
for the management and control of the
Asynchronous Transfer Mode (ATM)
switching network element;
Part 1: Q3 interface specification**



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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document is part 1 of a multi-part EN covering Telecommunications Management Network (TMN); Information models and protocols for the management and control of the Asynchronous Transfer Mode (ATM) switching network element, as identified below:

Part 1: "Q3 interface specification";

NOTE: Other parts will be defined later.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document specifies the Q3 interface between an Asynchronous Transfer Mode (ATM) switch and the Telecommunications Management Network (TMN) for the support of configuration, fault and performance management functions. The interface specified is that between TMN network elements or Q-adapters which interface to TMN Operations Systems (OSs) without mediation and between OSs and mediation devices, as defined in ITU-T Recommendation M.3010 [5]. Fault and performance management together include both passive monitoring of reports and active fault isolation.

The configuration by management of channels for signalling, including those for B-ISDN signalling, is within the scope of the present document. The management of broadband customer administration and the configuration for call routing including that for interworking with narrowband switches for both incoming and outgoing interfaces is also within the scope of the present document.

An ATM switch may include ATM crossconnect functionality, but this is specified by reference to ETS 300 820-1 [21] or the ITU-T Recommendation I.751 [4] and by importing the relevant classes of managed objects where appropriate.

Existing protocols are used where possible, and the focus of the work is on defining the object model. The definition of the functionality of TMN operations systems is outside the scope of the present document.

The management of ATM Adaptation Layers (AALs) which are only used in the user plane is outside the scope of the present document since the broadband switch management has no visibility of ATM adaptation for the user plane. Management of AAL5 and the Signalling ATM Adaptation Layer (SAAL) is within the scope since these are used in the control plane.

Security management is outside the scope of the present document.

2 References

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

2.1 Normative references

- [1] ITU-T Recommendation I.311: "B-ISDN general network aspects".
- [2] ITU-T Recommendation I.363.5: "B-ISDN ATM Adaptation Layer specification: Type 5 AAL".
- [3] ITU-T Recommendation I.610: "B-ISDN operation and maintenance principles and functions".
- [4] ITU-T Recommendation I.751: "Asynchronous transfer mode management of the network element view".
- [5] ITU-T Recommendation M.3010 (1992): "Principles for a Telecommunications management network".
- [6] ITU-T Recommendation M.3100 (1992): "Generic network information model".

- [7] ITU-T Recommendation Q.2110: "B-ISDN ATM adaptation layer - service specific connection oriented protocol (SSCOP)".
- [8] ITU-T Recommendation Q.2130: "B-ISDN signalling ATM adaptation layer - service specific coordination function for support of signalling at the user network interface (SSFC At UNI)".
- [9] ITU-T Recommendation Q.2140: "B-ISDN ATM Adaptation Layer - Service Specific Coordination Function for the Support of Signalling at the Network Node Interface (SSFC at NNI)".
- [10] ITU-T Recommendation Q.2761: "Broadband integrated services digital network (B-ISDN) - Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7".
- [11] ITU-T Recommendation Q.2762: "Broadband integrated services digital network (B-ISDN) - General functions of messages and signals of the B-ISDN user part (B-ISUP) of Signalling System No. 7".
- [12] ITU-T Recommendation Q.2763: "Broadband Integrated Services Digital Network (B-ISDN) - Signaling System No. 7 B-ISDN user part (B-ISUP) - formats and codes".
- [13] ITU-T Recommendation Q.2764: "Broadband Integrated Services Digital Network (B-ISDN) - Signalling system no. 7 B-ISDN user part (B-ISUP) - Basic call procedures".
- [14] ITU-T Recommendation Q.2931: "Broadband Integrated Services Digital Network (B-ISDN) - Digital subscriber signalling system no. 2 (DSS 2) - User-network interface (UNI) - Layer 3 specification for basic call/connection control".
- [15] ITU-T Recommendation X.720 | ISO/IEC 10165-1 (1992): "Information technology - Open systems interconnection - Structure of management information: Management information model".
- [16] ITU-T Recommendation X.721 | ISO/IEC 10165-2 (1992): "Information technology - Open systems interconnection - Structure of management information: Definition of management information".
- [17] ITU-T Recommendation X.731 | ISO/IEC 10164-2 (1992): "Information technology - Open Systems Interconnection - Systems management: State management function".
- [18] ITU-T Recommendation X.732 | ISO/IEC 10164-3 (1992): "Information technology - Open Systems Interconnection - Systems management: Attributes for representing relationships".
- [19] ITU-T Recommendation Q.821 (1992): "Stage 2 and Stage 3 description for the Q3 interface - Alarm surveillance".
- [20] ETS 300 469: "Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Management of the network element view [ITU-T Recommendation I.751 (1996)]".
- [21] ETS 300 820-1: "Asynchronous Transfer Mode (ATM); Configuration management information model for the X-type interface between Operation Systems (OSs) of a Virtual Path (VP)/Virtual Channel (VC) cross connected network; Part 1: Configuration management aspects".

2.2 Informative references

- [22] ITU-T Recommendation Q.811: "Lower layer protocol profiles for the Q3 X interfaces".
- [23] ITU-T Recommendation Q.812: "Upper layer protocol profiles for the Q3 and X interfaces".
- [24] ITU-T Recommendation G.773: "Protocol suites for Q-interfaces for management of transmission systems".
- [25] ITU-T Recommendation G.784: "Synchronous digital hierarchy (SDH) management".
- [26] ITU-T Recommendation Q.822 (1993): "Stage 1, stage 2 and stage 3 description for the Q3 interface - Performance Management".

[27] ITU-T Recommendation I.361: "B-ISDN ATM layer specification".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply:

permanent VCC: A VCC which is established by configuration management, not by on-demand call control.

virtual channel trail: Standard ATM terminology for VCC.

virtual channel trail termination point: The end point of a VCC, marking the extremity of an end-to-end F5 OAM flow.

virtual channel connection termination point: An intermediate point of a VCC, possibly marking the extremity of a segment F5 OAM flow.

virtual path trail: Standard ATM terminology for VPC.

virtual path trail termination point: Tnd point of a VPC, marking the extremity of an end-to-end F4 OAM flow.

virtual path connection termination point: An intermediate point of a VPC, possibly marking the extremity of a segment F4 OAM flow.

In addition, the terms below apply as defined in ITU-T Recommendations as follows:

F4 OAM flow: See ITU-T Recommendation I.610 [3].

F5 OAM flow: See ITU-T Recommendation I.610 [3].

trail termination point: See ITU-T Recommendation M.3100 [6].

virtual channel: See ITU-T Recommendation I.311 [1].

virtual channel connection: See ITU-T Recommendation I.311 [1].

virtual path: See ITU-T Recommendation I.311 [1].

virtual path connection: See ITU-T Recommendation I.311 [1].

3.2 Abbreviations

For the purpose of the present document the following abbreviations are used:

AAL	ATM Adaptation Layer
AIS	Alarm Indication Signal
ASN.1	Abstract Syntax Notation 1
ATM	Asynchronous Transfer Mode
CMIP	Common Management Information Protocol
CRC	Cyclic Redundancy Check
GDMO	Guidelines for the Definition of Managed Objects
LOF	Loss of Frame
LOS	Loss Of Signal
OAM	Operations, Administration and Maintenance
OS	Operating System
NE	Network Element
NNI	Network Node Interface
PDU	Protocol Data Unit
PL	Physical Layer

SAAL	Signalling AAL
SDH	Synchronous Digital Hierarchy
SSCF	Service Specific Coordination Function
SSCOP	Service Specific Connection-Oriented Protocol
SSCS	Service Specific Convergence Sublayer
TMN	Telecommunications Management Network
UNI	User-Network Interface
VC	Virtual Channel
VCC	Virtual Channel Connection
VCI	VC Identifier
VP	Virtual Path
VPC	Virtual Path Connection
VPCI	VPCI Identifier

4 Information model diagrams

The following information model diagrams have been drawn for the purpose of clarifying the relations between the different object classes of the model. There are three different types of diagrams:

- 1) entity relationship models showing the relations of the different managed objects;
- 2) inheritance hierarchy showing how managed objects are derived from each other (i.e. the different paths of inherited characteristics of the different managed objects);
- 3) naming hierarchy showing the derivation of names for managed objects (i.e. the different naming paths for instances of managed objects).

These three different types of diagram are only for clarification. The formal specification in terms of Guidelines for the Definition of Managed Objects (GDMO) templates and ASN.1 type definitions is the relevant information for the implementation of the present document.

4.1 Entity-relationship models

The following conventions are used in the diagrams:

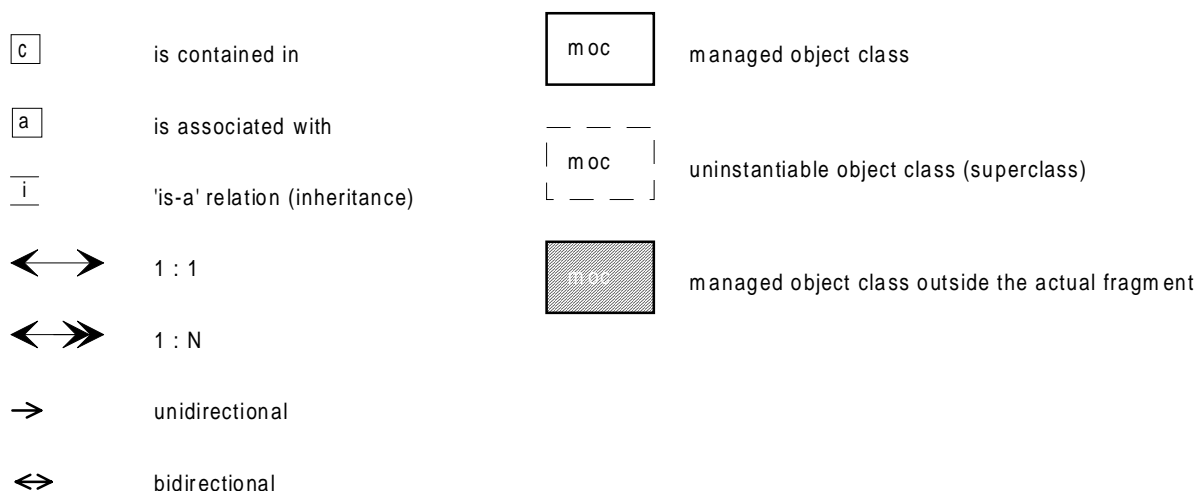


Figure 1: Conventions used in diagrams for entity relationship models

Where the directionality of containment is not clear it can be identified by implication since the root class is unique.

4.1.1 ATM generic modelling

Modelling of ATM is restricted to bi-directional trails so that there is always a backwards channel for Operations and Maintenance (OAM) purposes.

The interfaces to the ATM switching network element are labelled by instances of the interface** set of classes. These interfaces consist of User-Network Interfaces (UNIs), which are labelled by instances of the class uni, and of Network Node Interfaces (NNIs) which are labelled by instances of the class intraNNI if the interface is to the same network as the network element, or by instances of the class interNNI if the interface is to a different network. The managed objects which label the interfaces are contained in the instance of atmSwitch and point to an instance of tcAdaptorTTPBidirectional class which represents the adaptation of the ATM layer to the underlying physical infrastructure.

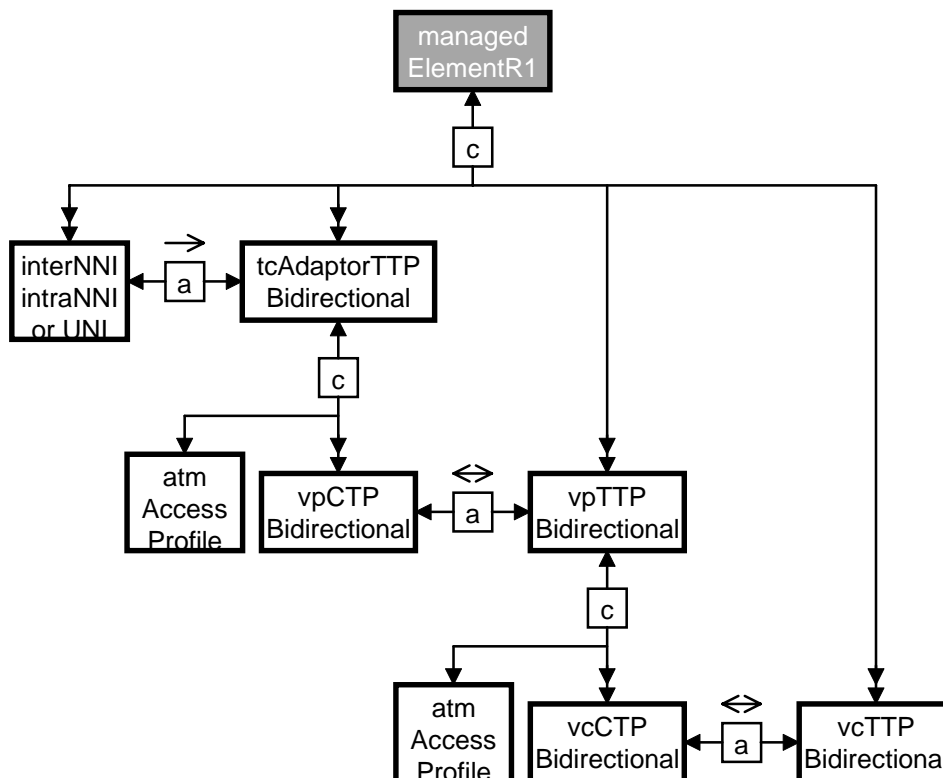


Figure 2: Entity relationship model - ATM interfaces

Instances of tcAdaptorTTPBidirectional are contained in the instance of atmSwitch. The adaptation to a physical infrastructure, represented by an instance of tcAdaptorTTPBidirectional, serves a number of virtual path trails which pass through the associated interface. The intermediate points on these trails which are served by the adaptation are represented by instances of vpCTPBidirectional class which are contained in the instance of tcAdaptorTTPBidirectional. The instance of tcAdaptorTTPBidirectional may also contain an instance of atmAccessProfile which characterizes the virtual paths.

An instance of atmAccessProfile may also be contained in an instance of vpTTPBidirectional, which represents the end point of virtual path trail, to characterize the virtual channels served by the virtual path trail. The intermediate points of the virtual channel trails are represented by instances of vcCTPBidirectional which are contained in the instance of vpTTPBidirectional. The end points of the virtual channel trails are represented by instances of vcTTPBidirectional. Instances of vpTTPBidirectional and of vcTTPBidirectional are contained in the instance of atmSwitch.

End points of virtual path trails (vpTTPBidirectional) shall be directly associated with intermediate points (vpCTPBidirectional) using reciprocal upstream and downstream pointers. These pointers shall also be used to associate the end points of virtual connections trails (vcTTPBidirectional) with their intermediate points (vcCTPBidirectional). A flexible cross-connection of two intermediate points at the same virtual level (either path or channel) is represented by an instance of atmCrossConnection. These instances are contained in an instance of atmFabric which represents the management of the cross-connection functionality and which is contained in the instance of atmSwitch. The upstream

and downstream pointers may be used to associate a CTP object with a TTP object, or to associate CTP objects in a cross-connection, but not both simultaneously.

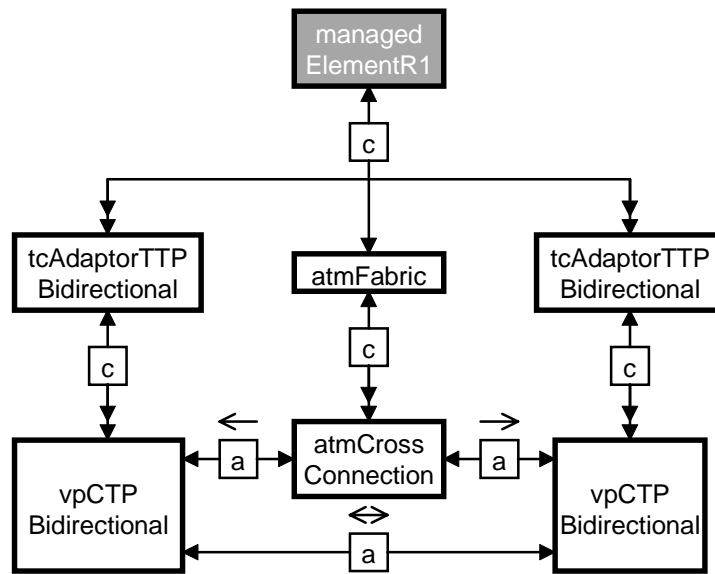


Figure 3: Instantiation example - VP cross-connection

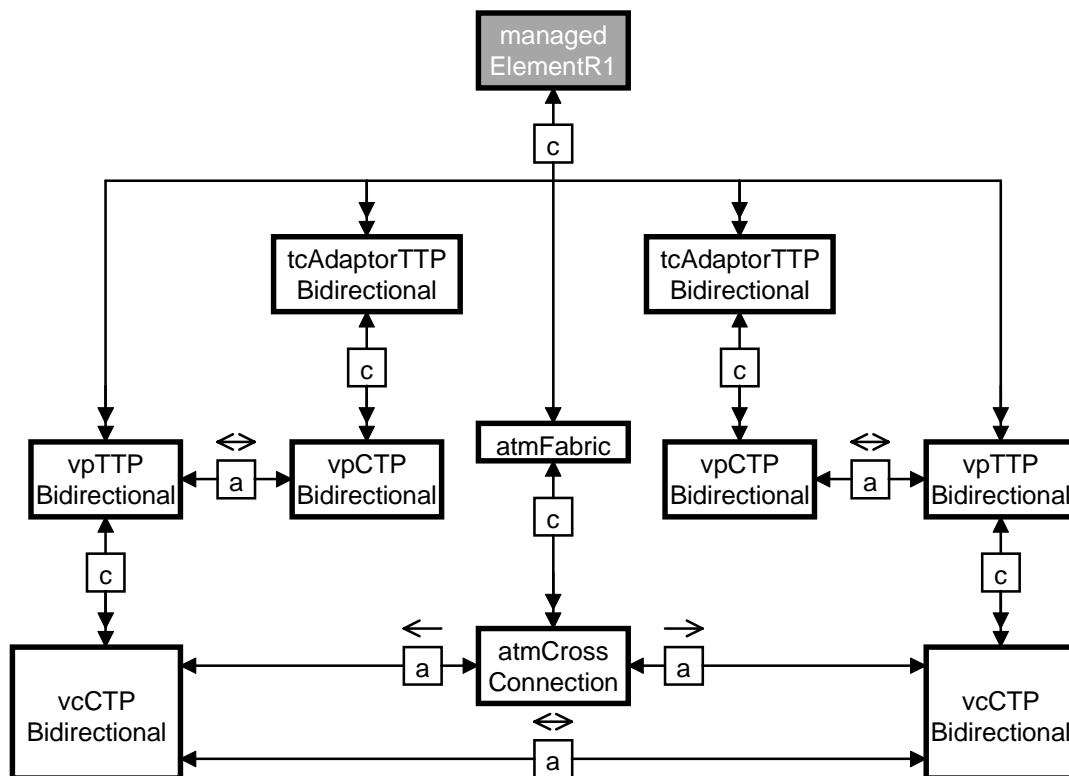


Figure 4: Instantiation example - VC cross-connection

Performance monitoring and continuity monitoring using OAM flows is modelled by instances of `bidirectionalPerformanceMonitor` and `bidirectionalContinuityMonitor` which are contained within the appropriate end points or intermediate points of the virtual path trails or virtual connection trails (`vpTTPBidirectional`, `vpCTPBidirectional`, `vcTTPBidirectional` or `vcCTPBidirectional`). Loopback and alarm OAM flows are handled directly by the instances which represent the end points or intermediate points. ATM cell header abnormalities are recorded as instances of `cellHeaderAbnormalityLogRecord` which are contained in an instance of `log` which is contained in the instance of `atmSwitch`.

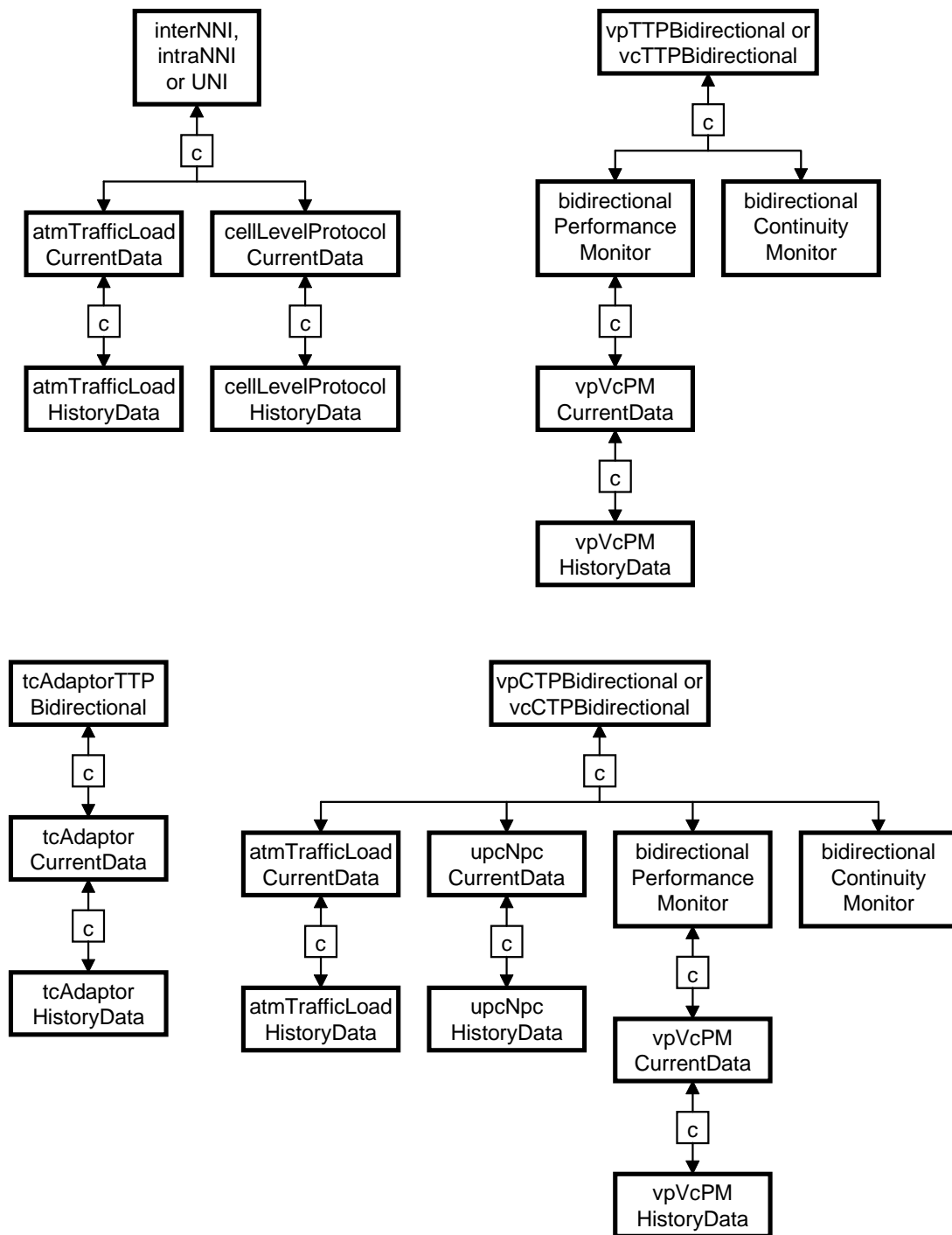


Figure 5: Entity relationship diagram - ATM fault and performance management

Statistical information which is currently being gathered is represented by currentData** objects and that which has been previously gathered is represented by historyData** objects. The historyData** objects are contained in the currentData** objects which are contained in the managed object which represents the source of the statistical information. The statistics for the number of incoming and outgoing cells is represented by instances of atmTrafficLoadCurrentData and atmTrafficLoadHistoryData contained (directly or indirectly) in the managed objects which represent the interfaces or represent intermediate points on trails. Statistics on discarded cells are represented by instances of cellLevelProtocolCurrentData and cellLevelProtocolHistoryData contained (directly or indirectly) in the managed objects which represent the interfaces. Statistics on header errors are represented by instances of tcAdaptorCurrentData and tcAdaptorHistoryData contained (directly or indirectly) in tcAdaptorTTP which represents the adaptation function. Statistics on the policing of traffic in accordance with traffic descriptors are represented by instances of upcNpcCurrentData and upcNpcHistoryData contained (directly or indirectly) in the managed objects which represent the interfaces or represent intermediate points on trails. Statistics collected through F4 and F5

performance monitoring flows are represented by instances of `vpVcPMCurrentData` and `vpVcPMHistoryData` which are contained (directly or indirectly) in the managed objects which represent the modelling of performance monitoring by OAM flows.

4.1.2 ATM interworking and adaptation layer modelling

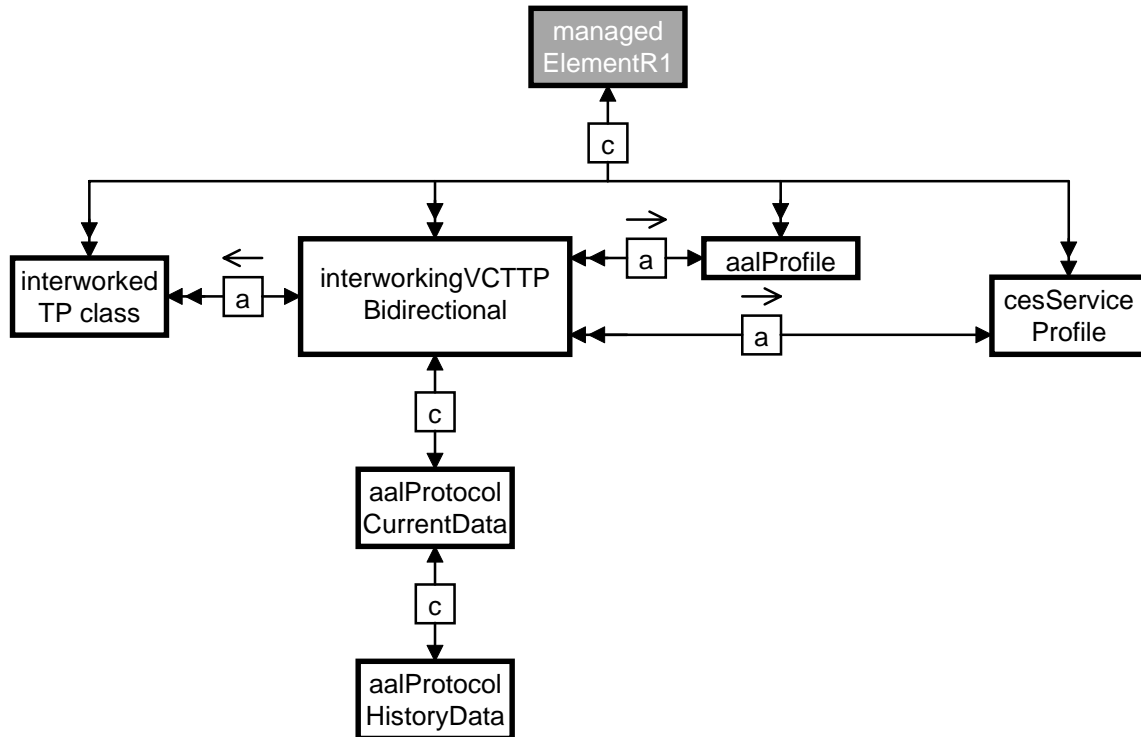


Figure 6: Entity relationship diagram - ATM interworking and adaptation layer modelling

4.1.4 Broadband routing modelling

all object classes beside virtualPathGroup, crCircuitEndPointSubgroup and crCircuitEndPoint are contained in managedElementR1

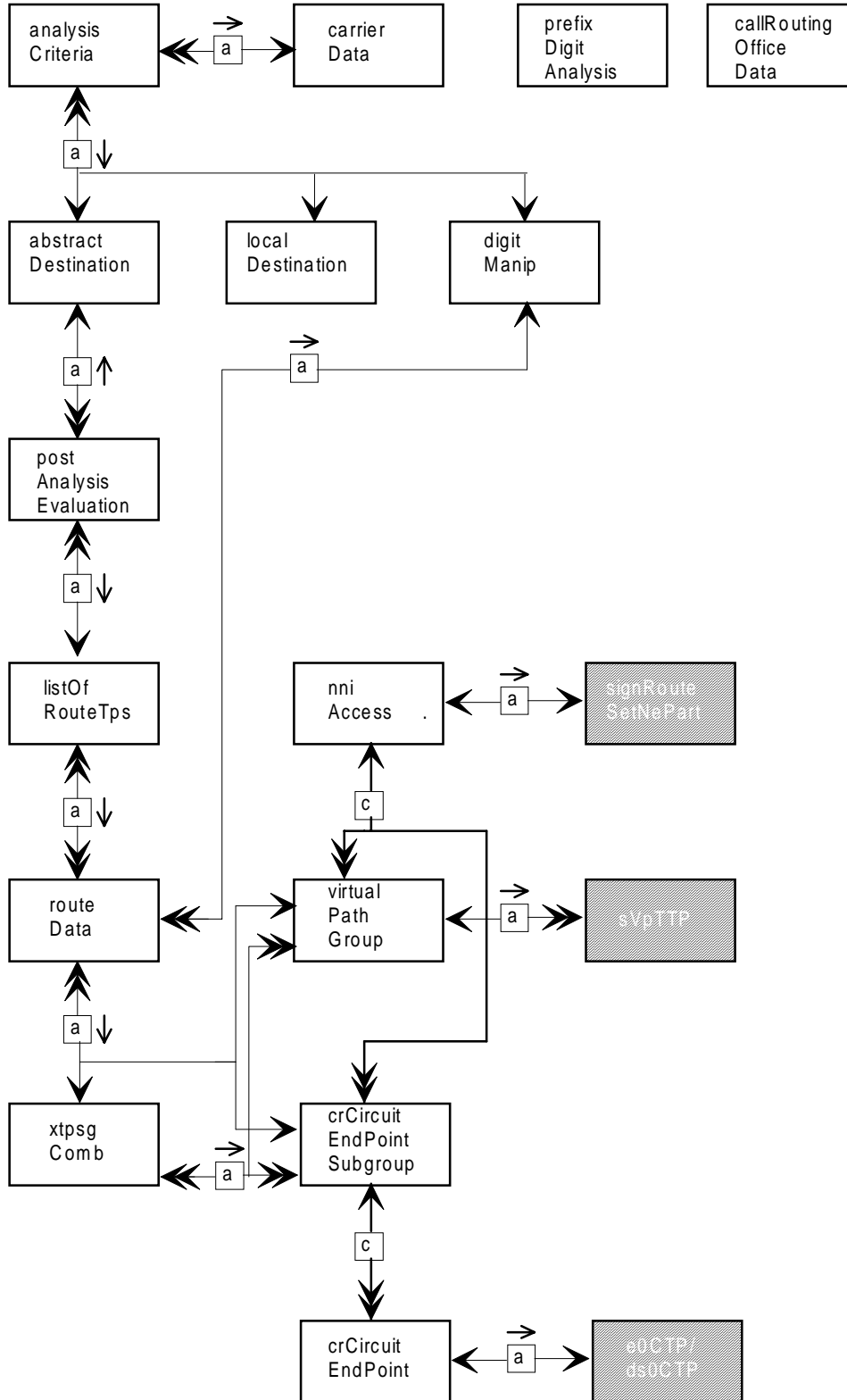


Figure 8: Entity relationship diagram - broadband call routing management

4.2 Inheritance hierarchy

4.3 Managed object naming and attribute syntax

Throughout the present document, all attributes are named according to the following guidelines:

- the name of an attribute is composed of the name of an object class followed by the string "Ptr" if and only if the attribute value is intended to identify a specific object class;
- if an attribute is intended to identify different object classes, a descriptive name is given to that attribute and a description is provided in the attribute behaviour;
- the name of an attribute is composed of the name of an object class followed by the string "Id" if and only the attribute value is intended to identify the name of the object class holding that attribute.

5 Formal object class definitions

This clause gives the formal definitions of the managed object classes, name bindings, general packages, behaviours, attributes, actions and notifications.

5.1 Object classes

This subclause specifies the object classes for all of the managed objects used in the management information model. These object classes are either defined here or by reference to other specifications. Classes of managed objects which are defined elsewhere and which are only used for containment are not included, but are identified by the name bindings for the classes specified here.

Unidirectional trails are modelled by bi-directional objects with the traffic descriptor in the unused direction set to a null value.

5.1.1 ATM generic fragment

The following classes which are defined in ITU-T Recommendation I.751 [4] may be instantiated:

- "I.751":atmAccessProfile;
- "I.751":atmCrossConnection;
- "I.751":atmCurrentData;
- "I.751":atmFabric;
- "I.751":atmTrafficLoadCurrentData;
- "I.751":atmTrafficLoadHistoryData;
- "I.751":bidirectionalContinuityMonitor;
- "I.751":bidirectionalPerformanceMonitor;
- "I.751":cellHeaderAbnormalityLogRecord;
- "I.751":cellLevelProtocolCurrentData;
- "I.751":cellLevelProtocolHistoryData;
- "I.751":interNNI;
- "I.751":intraNNI;

- "I.751":tcAdaptorCurrentData;
- "I.751":tcAdaptorHistoryData;
- "I.751":tcAdaptorTTPBidirectional;
- "I.751":uni;
- "I.751":upcNpcCurrentData;
- "I.751":upcNpcHistoryData;
- "I.751":vcCTPBidirectional;
- "I.751":vcTTPBidirectional;
- "I.751":vpCTPBidirectional;
- "I.751":vpTTPBidirectional;
- "I.751":vpVcPMCurrentData;
- "I.751":vpVcPMHistoryData.

The following class which is defined in ITU-T Recommendation X.721 [16] may be instantiated:

- log.

5.1.1.1 Switch virtual path TTP (sVpTTP)

```
sVpTTP MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation I.751":vpTTPBidirectional;
  CHARACTERIZED BY
    sVpTTPkg PACKAGE
      BEHAVIOUR sVpTTPBeh;
      ATTRIBUTES
        vpType
          GET-REPLACE;
    CONDITIONAL PACKAGES
      blockedForMaintenancePkg
        PRESENT IF "requested by the managing system",
      maintenanceSignallingRunningPkg
        PRESENT IF "requested by the managing system.",
      propagationDelayPkg
        PRESENT IF "supported by the managing system",
      remoteBlockingPkg
        PRESENT IF "requested by the managing system.";
  REGISTERED AS {managedObjectClass 1};

sVpTTPBeh BEHAVIOUR
  DEFINED AS
    "A switch virtual path TTP is an object class representing the end-point of an ATM VPC at a
    switching network element.".
```

5.1.2 ATM adaptation layer fragment

5.1.2.1 AAL profile (aalProfile)

```
aalProfile MANAGED OBJECT CLASS
  DERIVED FROM "ITU-T Recommendation X.721 | ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    aalProfilePkg PACKAGE
      BEHAVIOUR aalProfileBeh;
      ATTRIBUTES
        aalProfileId
          GET,
        aalType
          GET;
    CONDITIONAL PACKAGES
      aalTypeOneProfilePkg
        PRESENT IF "the aalType attribute is set to aal1",
      aalTypeThreeFourProfilePkg
        PRESENT IF "the aalType attribute is set to aal34",
```

```

    aalTypeFiveProfilePkg
    PRESENT IF"the aalType attribute is set to aal5";
REGISTERED AS {managedObjectClass 2};

```

```

aalProfileBeh BEHAVIOUR
    DEFINED AS

```

"The aalProfile object class is a managed support object used to organize data that describes the AAL processing functions of the ATM NE. The attribute aalType identifies the type of AAL processing (i.e., AAL1, AAL3/4, or AAL5). The AAL profiling information is contained in packages which are present based on the value of the aalType attribute".

5.1.2.2 AAL protocol current data (aalProtocolCurrentData)

```

aalProtocolCurrentData MANAGED OBJECT CLASS
    DERIVED FROM"ITU-T Recommendation Q.822: 1993": currentData;
    CHARACTERIZED BY
        aalProtocolCurrentDataPkg PACKAGE
            BEHAVIOUR aalProtocolCurrentDataBeh;
    CONDITIONAL PACKAGES
        aalTypeOnePerformanceParameterPkg
            PRESENT IF"AAL Type 1 processing is being performed",
        aalTypeThreeFourPerformanceParameterPkg
            PRESENT IF"AAL Type 3/4 processing is being performed",
        aalTypeFivePerformanceParameterPkg
            PRESENT IF"AAL Type 5 processing is being performed";
REGISTERED AS {managedObjectClass 3};

```

```

aalProtocolCurrentDataBeh BEHAVIOUR
    DEFINED AS

```

"The aalProtocolCurrentData object is a managed support object that contains the current performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR) Level and Convergence Sublayer (CS) protocol monitoring. The granularityPeriod attribute inherited from the scanner object class shall be set to 15-minutes. Instances of this object class shall be inherently created by the managed system whenever an instance of the Interworking VCC Termination Point object class is created that represents AAL functions.".

5.1.2.3 AAL protocol history data (aalProtocolHistoryData)

```

aalProtocolHistoryData MANAGED OBJECT CLASS
    DERIVED FROM"ITU-T Recommendation Q.822: 1993": historyData;
    CHARACTERIZED BY
        aalProtocolHistoryDataPkg PACKAGE
            BEHAVIOUR aalProtocolHistoryDataBeh;
    CONDITIONAL PACKAGES
        aalTypeOnePerformanceParameterHistoryDataPkg
            PRESENT IF"AAL Type 1 processing is being performed",
        aalTypeThreeFourPerformanceParameterHistoryDataPkg
            PRESENT IF"AAL Type 3/4 processing is being performed",
        aalTypeFivePerformanceParameterHistoryDataPkg
            PRESENT IF"AAL Type 5 processing is being performed";
REGISTERED AS {managedObjectClass 4};

```

```

aalProtocolHistoryDataBeh BEHAVIOUR
    DEFINED AS

```

"The aalProtocolHistoryData object is a managed support object that contains the past performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR) Level and Convergence Sublayer (CS) protocol monitoring. Instances of this object class can only be created locally by an agent (managed system) according to the value of the historyRetention attribute specified in the aalProtocolCurrentData object.";

5.1.3 Signalling fragment

5.1.3.1 SAAL UNI protocol profile (saalUniProtocolProfile)

```

saalUniProtocolProfile MANAGED OBJECT CLASS
    DERIVED FROM"ITU-T Recommendation X.721 (1992) | ISO/IEC 10165-2: 1992": top;
    CHARACTERIZED BY
        saalUniProtocolProfilePkg PACKAGE
            BEHAVIOUR saalUniProtocolProfileBeh;
            ATTRIBUTES
                saalUniProtocolProfileId
                    GET SET-BY-CREATE,
                bufferRelease
                    DEFAULT VALUE bufferReleaseDefault
                    GET SET-BY-CREATE,
                maxCc
                    DEFAULT VALUE maxCcDefault
                    GET SET-BY-CREATE,

```

```

maxInformationFieldLength
    DEFAULT VALUE maxInformationFieldLengthDefault
    GET SET-BY-CREATE,
maxLengthSscopUuField
    DEFAULT VALUE maxLengthSscopUuFieldDefault
    GET SET-BY-CREATE,
maxPd
    DEFAULT VALUE maxPdDefault
    GET SET-BY-CREATE,
maxSscopCreditToPeer
    DEFAULT VALUE maxSscopCreditToPeerDefault
    GET SET-BY-CREATE,
maxStat
    DEFAULT VALUE maxStatDefault
    GET SET-BY-CREATE,
sscopTimerCc
    DEFAULT VALUE sscopTimerCcDefault
    GET SET-BY-CREATE,
sscopTimerIdle
    DEFAULT VALUE sscopTimerIdleDefault
    GET SET-BY-CREATE,
sscopTimerKeepAlive
    DEFAULT VALUE sscopTimerKeepAliveDefault
    GET SET-BY-CREATE,
sscopTimerNoResponse
    DEFAULT VALUE sscopTimerNoResponseDefault
    GET SET-BY-CREATE,
sscopTimerPoll
    DEFAULT VALUE sscopTimerPollDefault
    GET SET-BY-CREATE;
CONDITIONAL PACKAGES
    "ITU-T Recommendation M.3100 (,1992)":createDeleteNotificationsPackage
        PRESENT IF"supported by an instance of this class",
    pollAfterRetransmissionPackage
        PRESENT IF"an instance supports this national option",
REGISTERED AS {managedObjectClass 5};

saalUniProtocolProfileBeh BEHAVIOUR
    DEFINED AS
        "The saalUniProtocolProfile is a broadband-specific object class which comprises attributes
        required for SSCOP, SSCF-UNI and Layer Management for UNI.";

```

5.1.4 Broadband customer administration fragment

5.1.4.1 Available bit rate (abr)

```

abr MANAGED OBJECT CLASS
    DERIVED FROM bearerServiceBb;
    CHARACTERIZED BY
        abrPkg PACKAGE
            BEHAVIOUR abrBeh;
REGISTERED AS {managedObjectClass 6};

abrBeh BEHAVIOUR
    DEFINED AS
        "This subclass of 'bearer service' represents the adaptation of connection-oriented data
        with available bit rate".

```

5.1.4.2 ATM block transfer with delayed transmission (abtDt)

```

abtDt MANAGED OBJECT CLASS
    DERIVED FROM bearerServiceBb;
    CHARACTERIZED BY
        abtDtPkg PACKAGE
            BEHAVIOUR abtDtBeh;
REGISTERED AS {managedObjectClass 7};

abtDtBeh BEHAVIOUR
    DEFINED AS
        "This subclass of 'bearer service' represents the adaptation of connection-oriented data
        with ATM block transfer with delayed transmission".

```

5.1.4.3 ATM block transfer with immediate transmission (abtIt)

```

abtIt MANAGED OBJECT CLASS
    DERIVED FROM bearerServiceBb;
    CHARACTERIZED BY
        abtItPkg PACKAGE

```



```

        BEHAVIOUR abtItBeh;
REGISTERED AS {managedObjectClass 8};

abtItBeh BEHAVIOUR
  DEFINED AS
    "This subclass of 'bearer service' represents the adaptation of connection-oriented data
with ATM block transfer with immediate transmission".

```

5.1.4.4 Bearer service for broadband (bearerServiceBb)

```

bearerServiceBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
  CHARACTERIZED BY
    bearerServiceBbPkg PACKAGE
      BEHAVIOUR bearerServiceBbBeh;
      ATTRIBUTES
        "ITU-T Q.824.0":bearerServiceId
          GET SET-BY-CREATE,
        "Recommendation X.721 | ISO/IEC 10165-2": administrativeState
          GET-REPLACE,
        "ITU-T Q.824.0":customizedResourcePtrList
          DEFAULT VALUE ASN1DefinedTypesModule.emptySet
          GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721 | ISO/IEC 10165-2":stateChange,
        "Recommendation X.721 | ISO/IEC 10165-2":attributeValueChange;
REGISTERED AS {managedObjectClass 9};

```

```

bearerServiceBbBeh BEHAVIOUR
  DEFINED AS
    "The Bearer Service object class represents the common aspects of the bearer services. While
the Bearer Service object class is not instantiated, it is a superclass from which specialized
subclasses are derived and instantiated.
    The attribute customizedResourcePtrList is synchronized with bearerServicePtrList in the
customizedResource managed object class. That is, when bearerServicePtrList in the associated
instance of the customizedResource object class or a subclass is updated, the
customizedResourcePtrList is updated accordingly".

```

5.1.4.5 Calling line identification presentation dependent for broadband (cLIPDepBb)

```

cLIPDepBb MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceDependentBb;
  CHARACTERIZED BY
    cLIPBbPkg;
    CONDITIONAL PACKAGES
      twoCallingPartyNumberDeliveryPkg
        PRESENT IF"supplied by the managing system";
REGISTERED AS {managedObjectClass 10};

```

5.1.4.6 Calling line identification presentation independent for broadband (cLIPIndBb)

```

cLIPIndBb MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    cLIPBbPkg,
    cLIPIndBbPkg PACKAGE
      BEHAVIOUR cLIPIndBbBeh;
    CONDITIONAL PACKAGES
      twoCallingPartyNumberDeliveryPkg
        PRESENT IF"supplied by the managing system";
REGISTERED AS {managedObjectClass 11};

```

```

cLIPIndBbBeh BEHAVIOUR
  DEFINED AS
    "The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

```

5.1.4.7 Calling line identification restriction dependent for broadband (cLIRDepBb)

```

cLIRBb MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceDependentBb;
  CHARACTERIZED BY
    cLIRBbPkg;
REGISTERED AS {managedObjectClass 12};

```

5.1.4.8 Calling line identification restriction independent for broadband (cLIRIndBb)

```
cLIRIndBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    cLIRBbPkg,
    cLIRIndBbPkg PACKAGE
    BEHAVIOUR cLIRIndBbBeh;
REGISTERED AS {managedObjectClass 13};

cLIRIndBbBeh BEHAVIOUR
  DEFINED AS
    "The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".
```

5.1.4.9 Closed user group for broadband (cUGBb)

```
cUGBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    cUGBbPkg PACKAGE
    BEHAVIOUR cUGBbBeh;
  ATTRIBUTES
    cUGIndex      GET,
    cUGInterlockCode  GET,
    cUGDataNetworkIdentification  GET,
    cUGBarring    GET-REPLACE;
REGISTERED AS {managedObjectClass 14};

cUGBbBeh BEHAVIOUR
  DEFINED AS
    "This managed object class is used to store the closed user group general subscription
options specified by ITU-T Recommendation Q.2955.1. This package is instantiated by for each Closed
User Group. When the value of cUGBarring is outgoingCallsBarred, this CUG must not be a preferential
Closed User Group (denoted by preferredCUGIndex in CUGSubscriptionOption managed object). An object
of this class can only deleted, if it is not referenced by a cugSubscriptionOption(Independent)
object.

The "customizedResourcePtrList" and the "servicePtrList" can only be used mutually
exclusive. This means that one of them has to be empty".
```

5.1.4.10 Closed user group subscription option dependent for broadband (cUGSubscriptionOptionDependentBb)

```
cUGSubscriptionOptionDependentBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceDependentBb;
  CHARACTERIZED BY
    cUGSubscriptionOptionBbPkg;
REGISTERED AS {managedObjectClass 15};
```

5.1.4.11 Closed user group subscription option independent for broadband (cUGSubscriptionOptionIndependentBb)

```
cUGSubscriptionOptionIndependentBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    cUGSubscriptionOptionBbPkg,
    cUGSubscriptionOptionIndependentBbPkg PACKAGE
    BEHAVIOUR cUGSubscriptionOptionIndependentBbBeh;
REGISTERED AS {managedObjectClass 16};

cUGSubscriptionOptionIndependentBbBeh BEHAVIOUR
  DEFINED AS
    "The servicePtrList derived from the supplementaryServiceIndependent shall be empty".
```

5.1.4.12 Connected line identification presentation dependent for broadband (cOLPDepBb)

```
cOLPDepBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceDependentBb;
  CHARACTERIZED BY
    cOLPBbPkg;
REGISTERED AS {managedObjectClass 17};
```

5.1.4.13 Connected line identification presentation independent for broadband (cOLPIndBb)

```
cOLPIndBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    cOLPBbPkg,
    cOLPIndBbPkg PACKAGE
      BEHAVIOUR cOLPIndBbBeh;
REGISTERED AS {managedObjectClass 18};

cOLPIndBbBeh BEHAVIOUR
  DEFINED AS
    "The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".
```

5.1.4.14 Connected line identification restriction dependent for broadband (cOLRDepBb)

```
cOLRDepBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceDependentBb;
  CHARACTERIZED BY
    cOLRBbPkg;
REGISTERED AS {managedObjectClass 19};
```

5.1.4.15 Connected line identification restriction independent for broadband (cOLRIndBb)

```
cOLRIndBb    MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    cOLRBbPkg,
    cOLRIndBbPkg PACKAGE
      BEHAVIOUR cOLRIndBbBeh;
REGISTERED AS {managedObjectClass 20};

cOLRIndBbBehv BEHAVIOUR
  DEFINED AS
    "The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".
```

5.1.4.16 Customer profile for broadband (customerProfileBb)

```
customerProfileBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    customerProfileBbPkg PACKAGE
      BEHAVIOUR customerProfileBbBeh;
  ATTRIBUTES
    "ITU-T Q.824.0":customerProfileId
      GET SET-BY-CREATE,
    accessPtrList
      GET-REPLACE ADD-REMOVE,
    "ITU-T Q.824.0":directoryNumberPtrList
      GET-REPLACE ADD-REMOVE;
REGISTERED AS {managedObjectClass 21};

customerProfileBbBeh BEHAVIOUR
  DEFINED AS
    "The Customer Profile represents a single point of reference used to bind together a range
of services and resources for customer administration purposes. It is a class of managed objects
representing the characteristics of the Directory Number(s) (DN) assigned to an individual
subscriber, independent of the access type and bearer service. Each instance of the customer profile
object class includes a Directory Number Pointer List attribute that represents the Directory
Number(s) assigned to the customer profile object and an Access Pointer List attribute that
represents Access (es) also assigned to the customer profile object.
Objects which are related through direct or indirect containment or by a direct pointer
relationship with a customerProfileBb object can not be related in the same way to a different
customerProfileBb object.
More than one entry in the "directoryNumberPtrList" are allowed only if a
"multipleSubscriberNumberIndBb" object is contained in this "customerProfileBb" object".
```

5.1.4.17 Customized resource for broadband (customizedResourceBb)

```
customizedResourceBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
  CHARACTERIZED BY
```

```

customizedResourceBbPkg PACKAGE
  BEHAVIOUR customizedResourceBbBeh;
  ATTRIBUTES
    "ITU-T Q.824.0":customizedResourceId
      GET SET-BY-CREATE,
    "ITU-T Q.824.0":bearerServicePtrList
      GET-REPLACE ADD-REMOVE,
    "ITU-T Q.824.0":directoryNumberPtrList
      GET-REPLACE ADD-REMOVE,
    "ITU-T Q.824.0":teleServicePtrList
      GET-REPLACE ADD-REMOVE,
    supplementaryServicePtrList
      GET-REPLACE ADD-REMOVE,
    userDataPtr
      GET-REPLACE;
REGISTERED AS {managedObjectClass 22};

customizedResourceBbBeh BEHAVIOUR
  DEFINED AS
    "The Customized Resource object is a class of managed objects that represents the service
    provisioning for a subscriber. It allows association of a set of services and/or one userData object
    to one or more Directory Numbers. The pointer list attributes: bearerServicePtrList,
    directoryNumberPtrList, teleServicePtrList, supplementaryServiceIndependentPtrList and userDataPtr
    should be maintained synchronized with their corresponding pointing attribute in the objects they
    point out to. For example, the attribute directoryNumberPtrList is synchronized with
    customizedResourcePtrList in a subclass of the directoryNumber managed object class. That is, when a
    reference to an instance of the subclass of the directoryNumber object class is added to (or deleted
    from) the attribute directoryNumberPtrList, customizedResourcePtrList attribute in the corresponding
    directoryNumber subclass is updated accordingly.
    When no customized resource objects are contained in a customer profile object, then all
    services/userData contained in this customer profile object are applicable to all directory numbers
    associated with this customer profile object.
    If one or more customized resource objects are contained in a customer profile object, then
    only these services/userData (contained in this customer profile object) are applicable to a certain
    directory number (associated with the customer profile object) which are explicitly associated to
    this directory number object using a customized resource object.
    Only one entry shall be contained in the directoryNumberPtrList".

```

5.1.4.18 Deterministic bit rate (dbr)

```

dbr MANAGED OBJECT CLASS
  DERIVED FROM bearerServiceBb;
  CHARACTERIZED BY
    dbrPkg PACKAGE
      BEHAVIOUR dbrBeh;
REGISTERED AS {managedObjectClass 23};

dbrBeh BEHAVIOUR
  DEFINED AS
    "This subclass of 'bearer service' represents the adaptation of connection-oriented data
    with deterministic (constant) bit rate and timing relation between sender and receiver".

```

5.1.4.19 Direct dialling in independent for broadband (directDiallingInIndBb)

```

directDiallingInIndBb MANAGED OBJECT CLASS
  DERIVED FROM supplementaryServiceIndependentBb;
  CHARACTERIZED BY
    directDiallingInIndBbPkg PACKAGE
      BEHAVIOUR directDiallingInBeh;
  CONDITIONAL PACKAGES
    "ITU-T Q.824.2":digitsOptionPkg
      PRESENT IF "if supported by administration";
REGISTERED AS {managedObjectClass 24};

directDiallingInIndBbBeh BEHAVIOUR
  DEFINED AS
    "This Supplementary Service enables a user to call directly via a public ISDN to a user on a
    private ISDN by use of the public ISDN numbering plan as described in ITU Recommendation Q.2951.1.
    Only one object of this class shall be contained within the superior managed object. The
    servicePtrList and the customizedResourcePtrList derived from the supplementaryServiceIndependentBb
    shall be empty".

```

5.1.4.20 Directory number E164 (directoryNumberE164)

```

directoryNumberE164 MANAGED OBJECT CLASS
  DERIVED FROM "ITU-T Q.824.0":directoryNumber;
  CHARACTERIZED BY
    directoryNumberE164Pkg PACKAGE
      BEHAVIOUR directoryNumberE164Beh;

```

```

ATTRIBUTES
    "ITU-T Q.824.0":e164DirectoryNumber
        GET SET-BY-CREATE,
        localDestinationPtr
        GET;

```

```
REGISTERED AS {managedObjectClass 25};
```

```
directoryNumberE164Beh BEHAVIOUR
```

```
DEFINED AS
```

"The E.164 Directory Number object class represents directory numbers belonging to the numbering plan of the ISDN era as defined in CCITT E.164. The E.164 Directory Number is a single-valued, read-only attribute, set only at creation time. The E.164 Directory Number is updated implicitly if the attribute values of the referenced localDestination object are modified. The routingBlockPtrPkg inherited from the directoryNumber object class shall not be present.

Only one entry shall be contained in the customizedResourcePtrList".

5.1.4.21 Multiple subscriber number independent for broadband (multipleSubscriberNumberIndBb)

```
multipleSubscriberNumberIndBb MANAGED OBJECT CLASS
```

```
DERIVED FROM supplementaryServiceIndependentBb;
```

```
CHARACTERIZED BY
```

```
multipleSubscriberNumberIndBbPkg PACKAGE
```

```
BEHAVIOUR multipleSubscriberNumberIndBbBeh;
```

```
ATTRIBUTES
```

```
"ITU-T Q.824.2": assocDefaultDN
```

```
GET-REPLACE;
```

```
CONDITIONAL PACKAGES
```

```
"ITU-T Q.824.2": networkOptionsPkg
```

```
PRESENT IF "if supported by administration";
```

```
REGISTERED AS {managedObjectClass 26};
```

```
multipleSubscriberNumberBehIndBb BEHAVIOUR
```

```
DEFINED AS
```

"The MSN supplementary service provides the possibility for assigning multiple numbers (not necessarily consecutive) to a single public or private interface as described in ITU Recommendation Q.2951.2. This enables the selection of multiple distinct terminals attached to the same interface.

The service provider shall fix the length of the numbers to be transmitted to the user's installation. They may comprise the least significant digit up to the full ISDN number as defined in CCITT Recommendation E.164. The digit(s) significant for terminal differentiation shall be an integral part of the ISDN numbering scheme.

Only one object of this class shall be contained within the superior managed object. The servicePtrList and the customizedResourcePtrList derived from the supplementaryServiceIndependentBb shall be empty".

5.1.4.22 Statistical bit rate 1 (sbr1)

```
sbr1 MANAGED OBJECT CLASS
```

```
DERIVED FROM bearerServiceBb;
```

```
CHARACTERIZED BY
```

```
sbr1Pkg PACKAGE
```

```
BEHAVIOUR sbr1Beh;
```

```
ATTRIBUTES
```

```
timingRelation
```

```
GET-REPLACE;
```

```
REGISTERED AS {managedObjectClass 27};
```

```
sbr1Beh BEHAVIOUR
```

```
DEFINED AS
```

"This subclass of 'bearer service' represents the adaptation of connection-oriented data with statistical (variable) bit rate".

5.1.4.23 Sub-addressing dependent for broadband (sUBDepBb)

```
sUBDepBb MANAGED OBJECT CLASS
```

```
DERIVED FROM supplementaryServiceDependentBb;
```

```
CHARACTERIZED BY
```

```
sUBBbPkg;
```

```
REGISTERED AS {managedObjectClass 28};
```

5.1.4.24 Sub-addressing independent for broadband (sUBIndBb)

```
sUBIndBb MANAGED OBJECT CLASS
```

```
DERIVED FROM supplementaryServiceDependentBb;
```

```
CHARACTERIZED BY
```

```
sUBBbPkg,
```

```
sUBIndBbPkg PACKAGE
```

```
BEHAVIOUR sUBIndBbBeh;
```

```
REGISTERED AS {managedObjectClass 29};

sUBIndBbBeh BEHAVIOUR
  DEFINED AS
    "The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".
```

5.1.4.25 Supplementary service dependent for broadband (supplementaryServiceDependentBb)

```
supplementaryServiceDependentBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": top;
  CHARACTERIZED BY
    supplementaryServiceDependentBbPkg PACKAGE
      BEHAVIOUR
        supplementaryServiceDependentBbBeh BEHAVIOUR;
      ATTRIBUTES
        "ITU-T Q.824.0":supplementaryServiceId
          GET SET-BY-CREATE,
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721":
administrativeState
          GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": stateChange;
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721":
attributeValueChange;
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": objectCreation;
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": objectDeletion;
REGISTERED AS {managedObjectClass 30};

supplementaryServiceDependentBbBeh BEHAVIOUR
  DEFINED AS
    "This object class is defined to allow the creation of specific supplementary service
subclasses for those supplementary services that are defined by ITU-T to be configurable on a per
bearer or teleservice basis.. Supplementary services, as defined in I.210, are services that can
only be used in conjunction with another bearer service or another teleservice.
    While the supplementaryServiceDependentBb object class is not instantiated, it is a
superclass from which specialized subclasses are derived and instantiated".
```

5.1.4.26 Supplementary service independent for broadband (supplementaryServiceIndependentBb)

```
supplementaryServiceIndependentBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": top;
  CHARACTERIZED BY
    supplementaryServiceIndependentBbPkg PACKAGE
      BEHAVIOUR supplementaryServiceIndependentBbBeh;
      ATTRIBUTES
        "ITU-T Q.824.0":supplementaryServiceId
          GET SET-BY-CREATE,
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721":
administrativeState
          GET-REPLACE,
          customizedResourcePtrList
            GET-REPLACE ADD-REMOVE,
        "ITU-T Q.824.0":servicePtrList
          DEFAULT VALUE ASN1DefinedTypesModule.emptySet
          GET-REPLACE ADD-REMOVE;
      NOTIFICATIONS
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": stateChange;
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721":
attributeValueChange;
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": objectCreation;
        "Recommendation X.721 | ISO/IEC 10165-2CCITT Recommendation X.721": objectDeletion;
REGISTERED AS {managedObjectClass 31};

supplementaryServiceIndependentBbBeh BEHAVIOUR
  DEFINED AS
    "This object class is defined to allow the creation of specific supplementary service
subclasses for those supplementary services that are defined by ITU-T to be independent of any
particular bearer/teleservice. Supplementary services, as defined in I.210, are services that can
only be used in conjunction with another bearer service or another teleservice.
    While the supplementaryServiceIndependentBb object class is not instantiated, it is a
superclass from which specialized subclasses are derived and instantiated";
```

5.1.4.27 Teleservice for broadband (teleserviceBb)

```
teleserviceBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
```

```

CHARACTERIZED BY
  teleserviceBbPkg PACKAGE
  BEHAVIOUR teleserviceBbBeh;
  ATTRIBUTES
    "ITU-T Q.824.0":teleserviceId
      GET SET-BY-CREATE,
    "ITU-T Q.824.0":bearerServicePtr
      GET-REPLACE,
    "Recommendation X.721 | ISO/IEC 10165-2": administrativeState
      GET-REPLACE,
    "ITU-T Q.824.0":customizedResourcePtrList
      DEFAULT VALUE ASN1DefinedTypesModule.emptySet
      GET-REPLACE ADD-REMOVE;
  NOTIFICATIONS
    "Recommendation X.721 | ISO/IEC 10165-2": stateChange;
REGISTERED AS {managedObjectClass 32};

teleserviceBbBeh BEHAVIOUR
  DEFINED AS
    "The teleservices managed object class defines a communication service that makes available
    layer 1 - layer 7 capabilities.
    While the teleserviceBb object class is not instantiated, it is a superclass from which
    specialized subclasses are derived and instantiated".

```

5.1.4.28 Uni access (uniAccess)

```

uniAccess MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721 | ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    "Recommendation X.721|ISO/IEC 10165-2":administrativeStatePackage,
  uniAccessPkg PACKAGE
  BEHAVIOUR uniAccessBeh;
  ATTRIBUTES
    uniAccessId
      GET;
    signallingStandard
      GET-REPLACE;
    customerProfilePtr
      GET-REPLACE;
    assocTPandVPCI
      GET-REPLACE
      ADD-REMOVE;
    connectionIdOffering
      DEFAULT VALUE connectionIdOfferingDefault
      GET-REPLACE;
  CONDITIONAL PACKAGES
    maintenanceSignallingRunningPkg
      PRESENT IF"requested by the managing system";
    searchMethodPkg
      PRESENT IF"supplied by the managing system";
    signallingChannelPtrPkg
      PRESENT IF"nonassociated signalling is used for this object instance";
    signallingTypePkg
      PRESENT IF"the managed system supports associated signalling";
REGISTERED AS {managedObjectClass 33};

uniAccessBeh BEHAVIOUR
  DEFINED AS
    "This managed object represents a group of VP's coming from the same User Network Interface
    (UNI). The VP's can be distributed over one or more physical interfaces. One physical interface can
    contain VP's of several object instances of the object class uniAccess.
    In the case of nonassociated signalling, all VP's of one uniAccess object instance are
    controlled by the same signalling channel and there is only one signalling channel for the group. In
    the case of associated signalling there is one signalling channel, typically VCI=5, for each VP in
    the group.
    Nonassociated signalling is assumed if the signallingTypePkg is not present in an uniAccess
    object instance.
    If the administrativeState attribute is set to locked, all signalled virtual connections
    shall be released. PVC's are not influenced by this attribute.
    It is not requested (but allowed) that the VPC which contains the signalling VCC is
    contained in the assocVPandVPCI list. If this VPC is contained in the list then it can be used for
    on-demand connections controlled by this signalling VCC. If the VPC is not in the list then it
    cannot be used for on-demand connections controlled by the identified signalling VC".

```

5.1.4.29 Unspecified bit rate (ubr)

```

ubr MANAGED OBJECT CLASS
  DERIVED FROM bearerServiceBb;
  CHARACTERIZED BY
    ubrPkg PACKAGE
    BEHAVIOUR ubrBeh;

```

REGISTERED AS {managedObjectClass 34};

ubrBeh BEHAVIOUR

DEFINED AS

"This subclass of 'bearer service' represents the adaptation of connection-oriented data with unspecified bit rate";

5.1.4.30 User data (userData)

userData MANAGED OBJECT CLASS

DERIVED FROM"Recommendation X.721 | ISO/IEC 10165-2": top;

CHARACTERIZED BY

userDataPkg PACKAGE

BEHAVIOUR userDataBeh;

ATTRIBUTES

userDataId

GET,

"ITU-T Q.824.0":customizedResourcePtrList

DEFAULT VALUE ASN1DefinedTypesModule.emptySet

GET-REPLACE ADD-REMOVE ,

subscriberCategory

DEFAULT VALUE ASN1DefinedTypesModule.subscriberCategoryDefault

GET-REPLACE;

NOTIFICATIONS

"Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;

"Recommendation X.721 | ISO/IEC 10165-2": objectCreation;

"Recommendation X.721 | ISO/IEC 10165-2": objectDeletion;

CONDITIONAL PACKAGES

originMarkPkg

PRESENT IF"supplied by the managing system";

preferredCarrierPkg

PRESENT IF"carrier specific routing is supplied";

REGISTERED AS {managedObjectClass 35};

userDataBeh BEHAVIOUR

DEFINED AS

"This entity describes the properties of a certain subscriber (user). The properties may be either valid for the whole superior customerProfile or for a certain directory number only, depending from the use of customizedResource objects.

The attribute 'customizedResourcePtrList' is synchronized with 'userDataPt' in 'customizedResourceBb'. That is, when 'userDataPtr' in the associated instance of 'customizedResource' or a subclass is updated, the 'customizedResourcePtrList' is updated accordingly.

Only one 'userData' object with an empty 'customizedResourcePtrList' shall be contained in a customerProfile object".

5.1.4.31 User to user signalling dependent for broadband (userToUserSignallingDepBb)

userToUserSignallingDepBb MANAGED OBJECT CLASS

DERIVED FROM supplementaryServiceDependentBb;

CHARACTERIZED BY

userToUserSignallingBbPkg;

REGISTERED AS {managedObjectClass 36};

5.1.4.32 User to user signalling independent for broadband (userToUserSignallingIndBb)

userToUserSignallingIndBb MANAGED OBJECT CLASS

DERIVED FROM supplementaryServiceDependentBb;

CHARACTERIZED BY

userToUserSignallingBbPkg,

userToUserSignallingIndBbPkg PACKAGE

BEHAVIOUR userToUserSignallingIndBbBeh;

REGISTERED AS {managedObjectClass 37};

userToUserSignallingIndBbBeh BEHAVIOUR

DEFINED AS

"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

5.1.5 Broadband and interworking call routing fragment

5.1.5.1 Abstract destination (abstractDestination)

abstractDestination MANAGED OBJECT CLASS


```

DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
  abstractDestinationPkg PACKAGE
    BEHAVIOUR abstractDestinationBeh;
    ATTRIBUTES
      abstractDestinationId
        GET;
    NOTIFICATIONS
      "Recommendation X.721|ISO/IEC 10165-2":objectCreation;
      "Recommendation X.721|ISO/IEC 10165-2":objectDeletion;
      "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
  CONDITIONAL PACKAGES
    maxDigitsPkg
      PRESENT IF"supplied by managing system";
    ringTimeLimitPkg
      PRESENT IF"supplied by managing system";
REGISTERED AS {managedObjectClass 38};

abstractDestinationBeh BEHAVIOUR
  DEFINED AS
    "This entity is a result of digit processing in the originating, transit or gateway
exchange";

```

5.1.5.2 Analysis criteria (analysisCriteria)

```

analysisCriteria MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    analysisCriteriaPkg PACKAGE
      BEHAVIOUR analysisCriteriaBeh;
      ATTRIBUTES
        analysisCriteriaId
          GET;
        activeTarget
          GET-REPLACE;
        callingPartyCategory
          GET-REPLACE;
        origin
          GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
        "Recommendation X.721|ISO/IEC 10165-2":objectDeletion;
        "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
    CONDITIONAL PACKAGES
      carrierDataPtrPkg
        PRESENT IF "the target is carrier dependent";
      destinationCodePkg
        PRESENT IF "in any case with exception of the case of one Point of Presence of the
carrier";
      destinationTypePkg
        PRESENT IF "destinationCodePkg is present";
REGISTERED AS {managedObjectClass 39};

analysisCriteriaBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the management information needed to manage the internal digit
trees".

```

5.1.5.3 Call routing circuit end point for Broadband (crCircuitEndPointBb)

```

crCircuitEndPointBb MANAGED OBJECT CLASS
  DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    "Recommendation X.721|ISO/IEC 10165-2":administrativeStatePackage;
  crCircuitEndPointBbPkg PACKAGE
    BEHAVIOUR crCircuitEndPointBbBeh;
    ATTRIBUTES
      crCircuitEndPointId
        GET;
      cic
        GET;
      propagationDelay
        GET-REPLACE;
      timeslotPtr
        GET;
    CONDITIONAL PACKAGES
      blockedForMaintenancePkg
        PRESENT IF "supplied by the managing system";
      remoteBlockingNBPkg
        PRESENT IF "supplied by the managing system";
      maintenanceSignallingRunningPkg

```

```
PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 40};
```

```
crCircuitEndPointBbBeh BEHAVIOUR
DEFINED AS
```

```
"This object class represents a termination point of an individual circuit. The CIC value
has to be unique within the NNI access".
```

5.1.5.4 Call routing circuit end point subgroup for broadband (crCircuitEndPointSubgroupBb)

```
crCircuitEndPointSubgroupBb MANAGED OBJECT CLASS
DERIVED FROM"Recommendation X.721 | ISO/IEC 10165-2":top;
CHARACTERIZED BY
```

```
crCircuitEndPointSubgroupBbPkg PACKAGE
BEHAVIOUR crCircuitEndPointSubgroupBbBeh;
ATTRIBUTES
crCircuitEndPointSubgroupId
GET,
"ITU-T M.3100": userLabel
GET-REPLACE;
searchMethod
GET-REPLACE;
```

```
REGISTERED AS {managedObjectClass 41};
```

```
crCircuitEndPointSubgroupBbBeh BEHAVIOUR
DEFINED AS
```

```
"This object class represents a set of circuit end points with similar characteristics. The
value of the signallingType attribute of the superior nniAccess object shall be equal "nisup".
```

5.1.5.5 Call routing office data (callRoutingOfficeData)

```
callRoutingOfficeData MANAGED OBJECT CLASS
DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2": top;
CHARACTERIZED BY
```

```
callRoutingOfficeDataPkg PACKAGE
BEHAVIOUR callRoutingOfficeDataBeh;
ATTRIBUTES
callRoutingOfficeDataId
GET;
ownInternationalCode
GET-REPLACE;
NOTIFICATIONS
```

```
"Recommendation X.721|ISO/IEC 10165-2": attributeValueChange;
```

```
REGISTERED AS {managedObjectClass 42};
```

```
callRoutingOfficeDataBeh BEHAVIOUR
DEFINED AS
```

```
"This entity describes the office data concerning the call routing application. One instance
of this object class shall be automatically created by the managed system upon completion of system
initialization".
```

5.1.5.6 Carrier data (carrierData)

```
carrierData MANAGED OBJECT CLASS
DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2": top;
CHARACTERIZED BY
```

```
carrierDataPkg PACKAGE
BEHAVIOUR carrierDataBeh;
ATTRIBUTES
carrierDataId
GET,
carrierCode
GET;
NOTIFICATIONS
"Recommendation X.721|ISO/IEC 10165-2":objectCreation,
"Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
"Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
```

```
CONDITIONAL PACKAGES
```

```
carrierParameterRequiredPkg
PRESENT IF"supplied by the managing system";
```

```
REGISTERED AS {managedObjectClass 43};
```

```
carrierDataBeh BEHAVIOUR
DEFINED AS
```

```
"This entity describes the necessary information concerning carrier available within one
exchange.;
```

5.1.5.7 Digit manipulation (digitManip)

```
digitManip MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    digitManipPkg PACKAGE
      BEHAVIOUR digitManipBeh;
      ATTRIBUTES
        digitManipId
          GET;
      NOTIFICATIONS
        "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
        "Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
        "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
    CONDITIONAL PACKAGES
      destinationTypePkg
        PRESENT IF"modification of digits effects a change of the type of number" ,
      digitCombInsertPkg
        PRESENT IF"supplied by managing system" ,
      digitCombReplacePkg
        PRESENT IF"supplied by managing system" ,
      digitSuppressPkg
        PRESENT IF"supplied by managing system";
REGISTERED AS {managedObjectClass 44};

digitManipBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the possibility to manipulate the called number (sequence of digits)
and / or the destination type. Parts of the sequence or the whole number including the destination
type may be changed. It is also used for signalling purposes, i.e. it can be referenced from
'routeData'. It is possible either to insert, to replace or to suppress digits. Reference for all
changes is the original string, start position is the first digit.";
```

5.1.5.8 List of route termination points (listOfRouteTps)

```
listOfRouteTps MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    listOfRouteTpsPkg PACKAGE
      BEHAVIOUR listOfRouteTpsBeh;
      ATTRIBUTES
        listOfRouteTpsId
          GET,
        listOfRoutes
          GET-REPLACE ,
        usedAlgorithm
          GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
        "Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
        "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
REGISTERED AS {managedObjectClass 45};

listOfRouteTpsBeh BEHAVIOUR
  DEFINED AS
    "This entity describes a set of routes for a 'postAnalysisEvaluation' object. With it an
ordered list of possible routes (instance 'routeData') exists meeting the quality parameters
required by attributes of 'postAnalysisEvaluation'. Additional, it describes the traffic
distribution about the set of routes.";
```

5.1.5.9 Local destination (localDestination)

```
localDestination MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    localDestinationPkg PACKAGE
      BEHAVIOUR localDestinationBeh;
      ATTRIBUTES
        localDestinationId
          GET,
        excludedSubscriberCodes
          GET-REPLACE ADD-REMOVE,
        initialSubscriberCodes
          GET-REPLACE,
        localAreaCode
          GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
        "Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
        "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
```

```

CONDITIONAL PACKAGES
    ringTimeLimitPkg
        PRESENT IF "supplied by managing system";
REGISTERED AS {managedObjectClass 46};

localDestinationBeh BEHAVIOUR
    DEFINED AS
        "This entity describes a set of terminating points within the exchange as the result of the
digit analysis.";

```

5.1.5.10 NNI access (nniAccess)

```

nniAccess MANAGED OBJECT CLASS
    DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        nniAccessPkg PACKAGE
            BEHAVIOUR nniAccessBeh;
            ATTRIBUTES
                nniAccessId
                    GET,
                signallingProtocol
                    GET,
                networkBorder
                    GET-REPLACE,
                linkType
                    GET-REPLACE,
                originForRouting
                    GET-REPLACE,
                assocSignRouteSetNePart
                    GET;
            CONDITIONAL PACKAGES
                networkTypePkg
                    PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 47};

nniAccessBeh BEHAVIOUR
    DEFINED AS
        "This object class is used to group the VPC"s in broadband NNIs or equivalent narrowband
links between two signalling points which are controlled by the same signalling protocol.";

```

5.1.5.11 Prefix digit analysis (prefixDigitAnalysis)

```

prefixDigitAnalysis MANAGED OBJECT CLASS
    DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        prefixDigitAnalysisPkg PACKAGE
            BEHAVIOUR prefixDigitAnalysisBeh;
            ATTRIBUTES
                prefixDigitAnalysisId
                    GET,
                code
                    GET-REPLACE ADD-REMOVE,
                natureOfAddress
                    GET;
            NOTIFICATIONS
                "Recommendation X.721 | ISO/IEC 10165-2":objectCreation,
                "Recommendation X.721 | ISO/IEC 10165-2":objectDeletion,
                "Recommendation X.721 | ISO/IEC 10165-2":attributeValueChange;
REGISTERED AS {managedObjectClass 48};

prefixDigitAnalysisBeh BEHAVIOUR
    DEFINED AS
        "This entity describes the digits used as prefix dependent of the nature of the address.";

```

5.1.5.12 Post analysis evaluation (postAnalysisEvaluation)

```

postAnalysisEvaluation MANAGED OBJECT CLASS
    DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        postAnalysisEvaluationPkg PACKAGE
            BEHAVIOUR postAnalysisEvaluationBeh;
            ATTRIBUTES
                postAnalysisEvaluationId
                    GET,
                activeListOfRouteTps
                    GET-REPLACE,
                reqBandwidthEgress
                    GET-REPLACE,
                reqBandwidthIngress

```

```

        GET-REPLACE,
    reqBearerCapab
        GET-REPLACE ADD-REMOVE,
    abstractDestinationInstance
        GET-REPLACE,
    transitDelayLimit
        GET-REPLACE;
    NOTIFICATIONS
        "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
        "Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
        "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
    CONDITIONAL PACKAGES
        reqNBTransferCapabilityPkg
            PRESENT IF"narrowband transfer capability dependent routing required";
    REGISTERED AS {managedObjectClass 49};

postAnalysisEvaluationBeh BEHAVIOUR
    DEFINED AS
        "This entity describes a set of information like abstractDestination and different quality
        parameters. The required quality parameter of a certain call is compared with the defined value. For
        a certain call only one instance has to match the required parameters. The network operator is
        responsible to define a set of route selection criterias without gaps or overlapping parts.";

```

5.1.5.13 Route data (routeData)

```

routeData MANAGED OBJECT CLASS
    DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        routeDataPkg PACKAGE
            BEHAVIOUR routeDataBeh;
            ATTRIBUTES
                routeDataId
                    GET,
                assocLinkGroup
                    GET-REPLACE;
            NOTIFICATIONS
                "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
                "Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
                "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
            CONDITIONAL PACKAGES
                digitManipPtrPkg
                    PRESENT IF"digit manipulation is required" ,
                minDigitsPkg
                    PRESENT IF"minimum number of digits for seizing required" ,
                sendTNSPkg
                    PRESENT IF"TNS has to be signalled";
    REGISTERED AS {managedObjectClass 50};

routeDataBeh BEHAVIOUR
    DEFINED AS
        "This entity describes one element of the ordered list of routes ('listOfRouteTps').";

```

5.1.5.14 Virtual path group (virtualPathGroup)

```

virtualPathGroup MANAGED OBJECT CLASS
    DERIVED FROM"Recommendation X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        virtualPathGroupPkg PACKAGE
            BEHAVIOUR virtualPathGroupBeh;
            ATTRIBUTES
                virtualPathGroupId
                    GET,
                "ITU-T M.3100":userLabel
                    GET-REPLACE,
                assignNonAssign
                    GET,
                assocvpTTPandVPCIList
                    GET-REPLACE,
                    ADD-REMOVE;
            CONDITIONAL PACKAGES
                searchMethodPkg
                    PRESENT IF"object instance is of type assign";
    REGISTERED AS {managedObjectClass 51};

virtualPathGroupBeh BEHAVIOUR
    DEFINED AS
        " This object class represents a set of end points of VPC"s with similar characteristics.
        The VPC"s can be distributed over one or more physical interfaces. One physical interface can
        contain VPC"s of several object instances of the object class virtualPathGroup.
        All vpTTPBidirectional referenced by the assocvpTTPandVPCIList shall be administratively
        locked before the virtualPathGroup can be deleted.";

```

5.1.5.15 XTPSG comb (xTPSGComb)

```
xTPSGComb MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    xTPSGCombPkg PACKAGE
      BEHAVIOUR xTPSGCombBeh;
      ATTRIBUTES
        xtpsgCombId
          GET,
        listOfLinkGroups
          GET-REPLACE ,
        usedAlgorithm
          GET-REPLACE;
      NOTIFICATIONS
        "Recommendation X.721|ISO/IEC 10165-2":objectCreation,
        "Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
        "Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
  REGISTERED AS {managedObjectClass 52};

xTPSGCombBeh BEHAVIOUR
  DEFINED AS
    "This entity describes an ordered list of virtual path groups (vpg) or CEPSGs.";
```

5.1.6 Circuit emulation service interworking fragment

5.1.6.1 CES service profile (cesServiceProfile)

```
cesServiceProfile MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation X.721 | ISO/IEC 10165-2":top;
  CHARACTERIZED BY
    cesServiceProfilePkg PACKAGE
      BEHAVIOUR cesServiceProfileBeh;
      ATTRIBUTES
        cesServiceProfileId
          GET,
        cesBufferedCDVtolerance
          GET-REPLACE,
        channelAssociatedSignalling
          GET-REPLACE;
  REGISTERED AS {managedObjectClass 53};

cesServiceProfileBeh BEHAVIOUR
  DEFINED AS
    "This managed object is used to organize data that describes the circuit emulation service
interworking functions of the ATM NE.
    The cesBufferedCDVtolerance attribute specifies the duration of user data that must be buffered
by the interworkingVCTTPBidirectional managed object to offset Cell Delay variation. The recommended
default value for DS1 CES is 750 micro seconds and 1000 micro seconds for DS3 CES.
    The channelAssociatedSignalling attribute identifies which AAL1 format should be used. It
applies only to structured format. For unstructured format this attribute must be set to the default
value of basic.
    Instances of this object class shall be explicitly created and deleted by the managing system.
An instance of this object class shall not be deleted if it is in use by any
interworkingVCTTPBidirectional object instance.";
```

5.1.6.2 Interworking VC TTP Bi-directional (interworkingVCTTPBidirectional)

```
interworkingVCTTPBidirectional MANAGED OBJECT CLASS
  DERIVED FROM"Recommendation I.751":vcTTPBidirectional;
  CHARACTERIZED BY
    interworkingVCTTPBidirectionalPkg PACKAGE
      BEHAVIOUR interworkingVCTTPBidirectionalBeh;
      ATTRIBUTES
        serviceProfilePointer
          GET-REPLACE,
        aalProfilePointer
          GET-REPLACE,
        terminationPointList
          GET;
    CONDITIONAL PACKAGES
      modifyTerminationPointListPkg
        PRESENT IF"an instance supports addition and removal of interworked termination
points.";
  REGISTERED AS {managedObjectClass 54};

interworkingVCTTPBidirectionalBeh BEHAVIOUR
```

DEFINED AS

"This managed object represents a point in the managed system where the interworking of a service (e.g., frame relay or SMDS) or an underlying physical infrastructure (e.g. nDS0/DS1/DS3/E3/J2) takes place. At this point ATM cells are generated from the service or physical bit stream or vice versa.

An instance of this object class shall point (via the upstreamConnectivityPointer and downstreamConnectivityPointer attributes) to a vcCTPBidirectional managed object (if already created) and that instance of vcCTPBidirectional object class shall point back (via supportedByObjectList) to this instance of interworkingVCTTPBidirectional object class.

For the conditional package oamCellLoopbackPkg inherited from vcTTPBidirectional object, the loopback cell shall be inserted at the interworkingVCTTPBidirectional side of the network element and the direction of the cell shall be into the switch. Thus the connection matrix of the interworking NE is included by the Loopback.

This managed object shall send a communicationsAlarm notification to the managing system, when the cellLossIntegrationPeriod (identified by aalProfile) expires.

Instances of this object class may be explicitly created and deleted by the managing system. Instances of this managed object class may also be automatically created by the managed system.";

5.2 Name bindings

5.2.1 aalProfile-managedElementR1

```
aalProfile-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS aalProfile AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElementR1 AND SUBCLASSES;
  WITH ATTRIBUTE aalProfileId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 1};
```

5.2.2 aalProtocolCurrentData-interworkingVCTTPBidirectional

```
aalProtocolCurrentData-interworkingVCTTPBidirectional NAME BINDING
  SUBORDINATE OBJECT CLASS aalProtocolCurrentData AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS interworkingVCTTPBidirectional AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Recommendation X.739":scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 2};
```

5.2.3 abstractDestination-managedElementR1

```
abstractDestination-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS abstractDestination
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
  WITH ATTRIBUTE abstractDestinationId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
REGISTERED AS {nameBinding 3};
```

5.2.4 analysisCriteria-managedElementR1

```
analysisCriteria-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS analysisCriteria
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
  WITH ATTRIBUTE analysisCriteriaId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
REGISTERED AS {nameBinding 4};
```

5.2.5 bearerServiceBb-customerProfileBb

```

bearerServiceBb-customerProfileBb NAME BINDING
  SUBORDINATE OBJECT CLASS bearerServiceBb
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS customerProfileBb
    AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Q.824.0":bearerServiceId;
  CREATE;
  DELETE;
REGISTERED AS {nameBinding 5};

```

5.2.6 callRoutingOfficeData-managedElementR1

```

callRoutingOfficeData-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS callRoutingOfficeData
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
  WITH ATTRIBUTE callRoutingOfficeDataId;
REGISTERED AS {nameBinding 6};

```

5.2.7 carrierData-managedElementR1

```

carrierData-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS carrierData
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
  WITH ATTRIBUTE carrierDataId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
REGISTERED AS {nameBinding 7};

```

5.2.8 cesServiceProfile-managedElementR1

```

cesServiceProfile-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS cesServiceProfile
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
  WITH ATTRIBUTE cesServiceProfileId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 8};

```

5.2.9 crCircuitEndPoint-crCircuitEndPointSubgroup

```

crCircuitEndPoint-crCircuitEndPointSubgroup NAME BINDING
  SUBORDINATE OBJECT CLASS crCircuitEndPoint
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS crCircuitEndPointSubgroup
    AND SUBCLASSES;
  WITH ATTRIBUTE crCircuitEndPointId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
REGISTERED AS {nameBinding 9};

```

5.2.10 crCircuitEndPointSubgroup-nniAccess

```

crCircuitEndPointSubgroup-nniAccess NAME BINDING
  SUBORDINATE OBJECT CLASS crCircuitEndPointSubgroup
    AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS nniAccess
    AND SUBCLASSES;
  WITH ATTRIBUTE crCircuitEndPointSubgroupId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 10};

```


5.2.11 customerProfileBb-managedElementR1

```
customerProfileBb-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS customerProfileBb
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Q.824.0":customerProfileId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 11};
```

5.2.12 customizedResourceBb-customerProfileBb

```
customizedResourceBb-customerProfileBb NAME BINDING
  SUBORDINATE OBJECT CLASS customizedResourceBb
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS customerProfileBb
  AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Q.824.0":customizedResourceId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 12};
```

5.2.13 digitManip-managedElementR1

```
digitManip-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS digitManip
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE digitManipId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 13};
```

5.2.14 directoryNumberE164-managedElementR1

```
directoryNumberE164-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS directoryNumberE164
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE directoryNumberId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 14};
```

5.2.15 listOfRouteTps-managedElementR1

```
listOfRouteTps-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS listOfRouteTps
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE listOfRouteTpsId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 15};
```

5.2.16 localDestination-managedElementR1

```
localDestination-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS localDestination
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
```

```

WITH ATTRIBUTE localDestinationId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 16};

```

5.2.17 nniAccess-managedElementR1

```

nniAccess-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS nniAccess AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
WITH ATTRIBUTE nniAccessId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 17};

```

5.2.18 postAnalysisEvaluation-managedElementR1

```

postAnalysisEvaluation-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS postAnalysisEvaluation
    AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
WITH ATTRIBUTE postAnalysisEvaluationId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 18};

```

5.2.19 prefixDigitAnalysis-managedElementR1

```

prefixDigitAnalysis-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS prefixDigitAnalysis
    AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
WITH ATTRIBUTE prefixDigitAnalysisId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 19};

```

5.2.20 routeData-managedElementR1

```

routeData-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS routeData
    AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
    AND SUBCLASSES;
WITH ATTRIBUTE routeDataId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 20};

```

5.2.21 saalUniProtocolProfile-managedElementR1

```

saalUniProtocolProfile-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS saalUniProtocolProfile
    AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElementR1
    AND SUBCLASSES;
WITH ATTRIBUTE saalUniProtocolProfileId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 21};

```

5.2.22 supplementaryServiceDependentBb-bearerServiceBb

```

supplementaryServiceDependentBb-bearerServiceBb NAME BINDING
SUBORDINATE OBJECT CLASS supplementaryServiceDependentBb
    AND SUBCLASSES;

```

```

NAMED BY SUPERIOR OBJECT CLASS bearerServiceBb
AND SUBCLASSES;
WITH ATTRIBUTE "ITU-T Q.824.0":supplementaryServiceId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 22};

```

5.2.23 supplementaryServiceDependentBb-teleserviceBb

```

supplementaryServiceDependentBb-teleserviceBb NAME BINDING
SUBORDINATE OBJECT CLASS supplementaryServiceDependentBb
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS teleserviceBb
AND SUBCLASSES;
WITH ATTRIBUTE "ITU-T Q.824.0":supplementaryServiceId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 23};

```

5.2.24 supplementaryServiceIndependentBb-customerProfileBb

```

supplementaryServiceIndependentBb-customerProfileBb NAME BINDING
SUBORDINATE OBJECT CLASS supplementaryServiceIndependentBb
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS customerProfileBb
AND SUBCLASSES;
WITH ATTRIBUTE "ITU-T Q.824.0":supplementaryServiceId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 24};

```

5.2.25 sVpTTP-managedElementR1

The name binding to managedElementR1 and subclasses as defined in I.751 [4] for subclasses of vpTTPBidirectional is used.

5.2.26 teleserviceBb-customerProfileBb

```

teleserviceBb-customerProfileBb NAME BINDING
SUBORDINATE OBJECT CLASS teleserviceBb
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS customerProfileBb
AND SUBCLASSES;
WITH ATTRIBUTE "ITU-T Q.824.0":teleserviceId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 25};

```

5.2.27 userData-customerProfileBb

```

userData-customerProfileBb NAME BINDING
SUBORDINATE OBJECT CLASS userData
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS customerProfileBb
AND SUBCLASSES;
WITH ATTRIBUTE userDataId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 26};

```

5.2.28 uniAccess-managedElementR1

```

uniAccess-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS uniAccess AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE uniAccessId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;

```

```

DELETE
  ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 27};

```

5.2.29 vcCTPBidirectional-managedElementR1

```

vcCTPBidirectional-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS vcCTPBidirectional AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1 AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T M.3100":cTpid;
  BEHAVIOUR
    vcCTPBidirectional-managedElementR1Behaviour BEHAVIOUR
  DEFINED AS
    "The value of vcCTpid attribute (VCI value) in the vcCTPBidirectional object is used
internal to the ATM Network Element and the value it is given is a local matter."
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 28};

```

5.2.30 virtualPathGroup-nniAccess

```

virtualPathGroup-nniAccess NAME BINDING
  SUBORDINATE OBJECT CLASS virtualPathGroup AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS nniAccess
  AND SUBCLASSES;
  WITH ATTRIBUTE virtualPathGroupId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
REGISTERED AS {nameBinding 29};

```

5.2.31 xTPSGComb-managedElementR1

```

xTPSGComb-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS xTPSGComb
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE xtpsgCombId;
  CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
REGISTERED AS {nameBinding 30};

```

5.3 Definition of packages

5.3.1 AAL type 1 performance parameter package (aalTypeOnePerformanceParameterPkg)

```

aalTypeOnePerformanceParameterPkg PACKAGE
  ATTRIBUTES
    sequenceViolations
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    cellLoss
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    cellMisinsertion
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    bufferUnderflows
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    bufferOverflows
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    headerErrors
      REPLACE-WITH-DEFAULT

```

```

        DEFAULT VALUE ATMMIBMod.integerZero
    GET,
stdPointerReframes
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
stdPointerParityFailures
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET;
REGISTERED AS {package 1};

```

5.3.2 AAL type 1 performance parameter history data package (aalTypeOnePerformanceParameterHistoryDataPkg)

```

aalTypeOnePerformanceParameterHistoryDataPkg PACKAGE
    ATTRIBUTES
        sequenceViolations
            GET,
        cellLoss
            GET,
        cellMisinsertion
            GET,
        bufferUnderflows
            GET,
        bufferOverflows
            GET,
        headerErrors
            GET,
        stdPointerReframes
            GET,
        stdPointerParityFailures
            GET;
REGISTERED AS {package 2};

```

5.3.3 AAL type 1 profile package (aalTypeOneProfilePkg)

```

aalTypeOneProfilePkg PACKAGE
    ATTRIBUTES
        cbrRate
            GET,
        cellLossIntegrationPeriod,
            GET,
        clockRecoveryType
            GET,
        forwardErrorCorrectionMethod
            GET,
        partiallyFilledCells
            GET,
        structuredDataTransfer
            GET,
        subType
            GET;
REGISTERED AS {package 3};

```

5.3.4 AAL type 3/4 performance parameter package (aalTypeThreeFourPerformanceParameterPkg)

```

aalTypeThreeFourPerformanceParameterPkg PACKAGE
    ATTRIBUTES
        sumOfInvalidSARFieldErrors
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ATMMIBMod.integerZero
            GET,
        sumOfIncorrectSARFieldErrors
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ATMMIBMod.integerZero
            GET,
        sarCrcViolations
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ATMMIBMod.integerZero
            GET,
        comsEomsUnexpectedSN
            REPLACE-WITH-DEFAULT
            DEFAULT VALUE ATMMIBMod.integerZero
            GET,
        bomsEomsUnexpectedMID

```

```

    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
sriTimeOuts
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
numberOfAborts
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
sumOfInvalidCSFieldErrors
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
sumOfIncorrectCSFieldErrors
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
bETagMismatch
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
lengthBASizeMismatch
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET,
lengthMismatch
    REPLACE-WITH-DEFAULT
    DEFAULT VALUE ATMMIBMod.integerZero
    GET;
REGISTERED AS {package 4};

```

5.3.5 AAL type 3/4 performance parameter history data package (aalTypeThreeFourPerformanceParameterHistoryDataPkg)

```

aalTypeThreeFourPerformanceParameterHistoryDataPkg PACKAGE
  ATTRIBUTES
    sumOfInvalidSARFieldErrors
      GET,
    sumOfIncorrectSARFieldErrors
      GET,
    sarCrcViolations
      GET,
    comsEomsUnexpectedSN
      GET,
    bomsEomsUnexpectedMID
      GET,
    sriTimeOuts
      GET,
    numberOfAborts
      GET,
    sumOfInvalidCSFieldErrors
      GET,
    sumOfIncorrectCSFieldErrors
      GET,
    bETagMismatch
      GET,
    lengthBASizeMismatch
      GET,
    lengthMismatch
      GET;
REGISTERED AS {package 5};

```

5.3.6 AAL type 3/4 profile package (aalTypeThreeFourProfilePkg)

```

aalTypeThreeFourProfilePkg PACKAGE
  ATTRIBUTES
    maxCpcsPduSize
      GET,
    midRange
      GET,
    aal Mode
      GET,
    sscsType
      GET;
REGISTERED AS {package 6};

```

5.3.7 AAL type 5 performance parameter package (aalTypeFivePerformanceParameterPkg)

```
aalTypeFivePerformanceParameterPkg PACKAGE
  ATTRIBUTES
    sumOfInvalidCSFieldErrors
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    crcViolations
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET,
    reassemblyTimerExpirationss
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE ATMMIBMod.integerZero
      GET;
REGISTERED AS {package 7};
```

5.3.8 AAL type 5 performance parameter history data package (aalTypeFivePerformanceParameterHistoryDataPkg)

```
aalTypeFivePerformanceParameterHistoryDataPkg PACKAGE
  ATTRIBUTES
    sumOfInvalidCSFieldErrors
      GET,
    crcViolations
      GET,
    reassemblyTimerExpirations
      GET;
REGISTERED AS {package 8};
```

5.3.9 AAL type 5 profile package (aalTypeFiveProfilePkg)

```
aalTypeFiveProfilePkg PACKAGE
  ATTRIBUTES
    maxCpcsPduSize
      GET,
    aal Mode
      GET,
    sscsType
      GET;
REGISTERED AS {package 9};
```

5.3.10 Blocked for maintenance package (blockedForMaintenancePkg)

```
blockedForMaintenancePkg PACKAGE
  ATTRIBUTES
    blockedForMaintenance
      DEFAULT VALUE ASN1DefinedTypesModule.defaultBlockedForMaintenance
      GET-REPLACE;
REGISTERED AS {package 10};
```

5.3.11 Calling line identification presentation for broadband package (cLIPBbPkg)

```
cLIPBbPkg PACKAGE
  BEHAVIOUR cLIPBbBeh;
  ATTRIBUTES
    "ITU-T Q.824.2": noRestrictionsAllowed
      GET-REPLACE;
REGISTERED AS {package 11};
```

```
cLIPBbBeh BEHAVIOUR
  DEFINED AS
```

"This Supplementary Service (described in Q.2951.3) provides the called party with the possibility of receiving identification of the calling party. In addition to the ISDN number, the calling line identity may include a subaddress generated by the calling user and transparently transported by the network. The network shall deliver the calling line identity to the called party during call establishment, regardless of the terminal capability to handle the information.";

5.3.12 Calling line identification restriction for broadband package (cLIRBbPkg)

```
cLIRBbPkg PACKAGE
  BEHAVIOUR cLIRBbBeh;
  ATTRIBUTES
    "ITU-T Q.824.2": callIdRestrictionOptions
      GET-REPLACE;
REGISTERED AS {package 12};
```

```
cLIRBbBeh BEHAVIOUR
  DEFINED AS
    "This Supplementary Service (described in Q.2951.4) provides the calling party with the
    possibility to prevent presentation of the calling party's ISDN number, and subaddress information
    (if any) to the called party. If the called party subscribes to the CLIP Supplementary Service then
    the called party shall receive an indication that the calling party information is not available due
    to restriction.";
```

5.3.13 Carrier data pointer package (carrierDataPtrPkg)

```
carrierDataPtrPkg PACKAGE
  ATTRIBUTES
    carrierDataPtr
      GET;
REGISTERED AS {package 13};
```

5.3.14 Carrier parameter required package (carrierParameterRequiredPkg)

```
carrierParameterRequiredPkg PACKAGE
  ATTRIBUTES
    cSPRequired
      GET-REPLACE,
    cIPRequired
      GET-REPLACE;
REGISTERED AS {package 14};
```

5.3.15 Closed user group subscription option package for broadband (cUGSubscriptionOptionBbPkg)

```
cUGSubscriptionOptionBbPkg PACKAGE
  BEHAVIOUR cUGSubscriptionOptionBbBeh;
  ATTRIBUTES
    preferredCUGIndex GET-REPLACE,
    interCUGaccess GET-REPLACE;
REGISTERED AS {package 15};
```

```
cUGSubscriptionOptionBbBeh BEHAVIOUR
  DEFINED AS
    "The CUG subscription options object may only be instantiated if either attribute
    preferredCUGIndex is assigned a non-NULL value or attribute interCUGaccess is not empty. M_SET
    operations which would result in preferredCUGIndex value NULL and interCUGaccess value empty set are
    not allowed. The value of attribute preferredCUGIndex should not be NULL when interCUGvalue is
    "none" or "incomingaccess".";
```

5.3.16 Connected line identification presentation for broadband package (cOLPBbPkg)

```
cOLPBbPkg PACKAGE
  BEHAVIOUR cOLPBbBeh;
  ATTRIBUTES
    noColpRestrictionsAllowed
      GET-REPLACE;
REGISTERED AS {package 16};
```

```
cOLPBbBeh BEHAVIOUR
  DEFINED AS
    "This Supplementary Service (described in Q.2951.5) provides the calling party with the
    possibility of receiving identification of the connected party.";
```


5.3.17 Connected line identification restriction for broadband package (cOLRBbPkg)

```
cOLRBbPkg PACKAGE
  BEHAVIOUR cOLRBbBeh;
  ATTRIBUTES
    connIdRestrictionOptions
      GET-REPLACE;
REGISTERED AS {package 17};

cOLRBbBeh BEHAVIOUR
  DEFINED AS
    "This Supplementary Service (described in Q.2951.6) provides the called party with the
  possibility to prevent presentation of the connected party's ISDN number, and subaddress information
  (if any) to the calling party.";
```

5.3.18 Destination code package (destinationCodePkg)

```
destinationCodePkg PACKAGE
  ATTRIBUTES
    destinationCode
      GET;
REGISTERED AS {package 18};
```

5.3.19 Destination type package (destinationTypePkg)

```
destinationTypePkg PACKAGE
  ATTRIBUTES
    destinationType
      GET;
REGISTERED AS {package 19};
```

5.3.20 Digit comb insertion package (digitCombInsertPkg)

```
digitCombInsertPkg PACKAGE
  ATTRIBUTES
    digitCombInsert
      GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 20};
```

5.3.21 Digit comb replace package (digitCombReplacePkg)

```
digitCombReplacePkg PACKAGE
  ATTRIBUTES
    digitCombReplace
      GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 21};
```

5.3.22 Digit manipulation pointer package (digitManipPtrPkg)

```
digitManipPtrPkg PACKAGE
  ATTRIBUTES
    digitManipPtr
      GET-REPLACE;
REGISTERED AS {package 22};
```

5.3.23 Digit suppression package (digitSuppressPkg)

```
digitSuppressPkg PACKAGE
  ATTRIBUTES
    digitSuppress
      GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 23};
```

5.3.24 Maintenance signalling running package (maintenanceSignallingRunningPkg)

```
maintenanceSignallingRunningPkg PACKAGE
  ATTRIBUTES
```

```

    maintenanceSignallingRunning
        INITIAL VALUE DERIVATION RULE"value is set by the managed system"
        GET;
REGISTERED AS {package 24};

```

5.3.25 Maximum digits package (maxDigitsPkg)

```

maxDigitsPkg PACKAGE
    ATTRIBUTES
        maxDigits
            GET-REPLACE;
REGISTERED AS {package 25};

```

5.3.26 Minimum digits package (minDigitsPkg)

```

minDigitsPkg PACKAGE
    ATTRIBUTES
        minDigits
            GET-REPLACE;
REGISTERED AS {package 26};

```

5.3.27 Modify termination point list package (modifyTerminationPointListPkg)

```

modifyTerminationPointListPkg PACKAGE
    ACTIONS
        addTerminationPoint,
        removeTerminationPoint;
REGISTERED AS {package 27};

```

5.3.28 Network type package (networkTypePkg)

```

networkTypePkg PACKAGE
    ATTRIBUTES
        networkType
            GET;
REGISTERED AS {package 28};

```

5.3.29 Origin mark package (originMarkPkg)

```

originMarkPkg PACKAGE
    ATTRIBUTES
        originMark
            GET-REPLACE;
REGISTERED AS {package 29};

```

5.3.30 Poll after retransmission package (pollAfterRetransmissionPkg)

```

pollAfterRetransmissionPkg PACKAGE
    BEHAVIOUR pollAfterRetransmissionPkgBeh
    ATTRIBUTES
        pollAfterRetransmission
            GET SET-BY-CREATE;
REGISTERED AS {package 30};

```

```

pollAfterRetransmissionPkgBeh BEHAVIOUR
    DEFINED AS
        "This package should be used, if the poll after retransmission can be selected at creation
time of a saalUniProtocolProfile.";

```

5.3.31 Preferred carrier package (preferredCarrierPkg)

```

preferredCarrierPkg PACKAGE
    ATTRIBUTES
        preferredCarrier
            GET-REPLACE;
REGISTERED AS {package 31};

```

5.3.32 Propagation delay package (propagationDelayPkg)

```
propagationDelayPkg PACKAGE
  ATTRIBUTES
    propagationDelay
      GET-REPLACE;
REGISTERED AS {package 32};
```

5.3.33 Remote blocking package (remoteBlockingPkg)

```
remoteBlockingPkg PACKAGE
  ATTRIBUTES
    remoteBlocking
      INITIAL VALUE DERIVATION RULE"value is set by the managed system"
      GET;
REGISTERED AS {package 33};
```

5.3.34 Remote blocking NB package (remoteBlockingNBPkg)

```
remoteBlockingNBPkg PACKAGE
  ATTRIBUTES
    remoteBlocking
      INITIAL VALUE DERIVATION RULE"value is set by the managed system"
      GET,
    remoteBlockingReason
      INITIAL VALUE DERIVATION RULE"value is set by the managed system"
      GET;
REGISTERED AS {package 34};
```

5.3.35 Required NB transfer capability package (reqNBTransferCapabilityPkg)

```
reqNBTransferCapabilityPkg PACKAGE
  ATTRIBUTES
    reqNBTransferCapability
      GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 35};
```

5.3.36 Ring time limit package (ringTimeLimitPkg)

```
ringTimeLimitPkg PACKAGE
  ATTRIBUTES
    ringTimeLimit
      GET-REPLACE;
REGISTERED AS {package 36};
```

5.3.37 Search method package (searchMethodPkg)

```
searchMethodPkg PACKAGE
  ATTRIBUTES
    searchMethod
      GET-REPLACE;
REGISTERED AS {package 37};
```

5.3.38 Send TNS package (sendTNSPkg)

```
sendTNSPkg PACKAGE
  ATTRIBUTES
    sendTNS
      GET-REPLACE;
REGISTERED AS {package 38};
```

5.3.39 Signalling channel pointer package (signallingChannelPtrPkg)

```
signallingChannelPtrPkg PACKAGE
  ATTRIBUTES
    aalPointer
      GET-REPLACE,
    signallingChannelPtr
      GET;
```

REGISTERED AS {package 39};

5.3.40 Signalling type package (signallingTypePkg)

```
signallingTypePkg PACKAGE
  ATTRIBUTES
    signallingType
      DEFAULT VALUE ASN1DefinedTypesModule.defaultSignallingType
      GET;
REGISTERED AS {package 40};
```

5.3.41 Sub-addressing for broadband package (sUBBbPkg)

```
sUBBbPkg PACKAGE
  BEHAVIOUR sUBBbBeh;
REGISTERED AS {package 41};
```

```
sUBBbBeh BEHAVIOUR
  DEFINED AS
    "This Supplementary Service (described in Q.2951.8) provides the called user to expand his
    addressing capacity beyond the one given by the ISDN number.";
```

5.3.42 Two calling party number delivery package (twoCallingPartyNumberDeliveryPkg)

```
twoCallingPartyNumberDeliveryPkg PACKAGE
  ATTRIBUTES
    twoCallingPartyNumberDelivery
      DEFAULT VALUE ASN1DefinedTypesModule.defaultTwoCallingPartyNumberDelivery
      GET-REPLACE;
REGISTERED AS {package 42};
```

5.3.43 User to user signalling for broadband package (userToUserSignallingBbPkg)

```
userToUserSignallingBbPkg PACKAGE
  BEHAVIOUR userToUserSignallingBbBeh;
REGISTERED AS {package 43};
```

```
userToUserSignallingBbBeh BEHAVIOUR
  DEFINED AS
    "This service allows an ISDN subscriber to send/receive a limited amount of information
    to/from another ISDN subscriber over the signalling channel associated with their call according to
    Q.2957.";
```

5.4 Definition of attributes

5.4.1 AAL mode (aalMode)

```
aalMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AalMode;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR aalModeBeh;
REGISTERED AS {attribute 1};
```

```
aalModeBeh BEHAVIOUR
  DEFINED AS
    " This attribute indicates whether the AAL for the supporting VCC is operating in message
    mode or streaming mode, assured or unassured.";
```

5.4.2 AAL pointer (aalPointer)

```
aalPointer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR aalPointerBeh;
REGISTERED AS {attribute 2};
```

```
aalPointerBeh BEHAVIOUR
```

```

DEFINED AS
    "This attribute identifies the associated object which represents the functions performed at
the ATM adaptation layer.";

```

5.4.3 AAL profile identifier (aalProfileId)

```

aalProfileId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR aalProfileIdBeh;
REGISTERED AS {attribute 3};

```

```

aalProfileIdBeh BEHAVIOUR
    DEFINED AS
        "This attribute can be used as an RDN when naming an instance of the aalProfile managed
object class.";

```

5.4.4 AAL profile pointer (aalProfilePointer)

```

aalProfilePointer ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
    MATCHES FOR EQUALITY;
    BEHAVIOUR aalProfilePointerBeh;
REGISTERED AS {attribute 4};

```

```

aalProfilePointerBeh BEHAVIOUR
    DEFINED AS
        "This attribute provides a pointer to an aalProfile managed object instance that defines the
common ATM Adaptation Layer processing needed.";

```

5.4.5 AAL type (aalType)

```

aalType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AalType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR aalTypeBeh;
REGISTERED AS {attribute 5};

```

```

aalTypeBeh BEHAVIOUR
    DEFINED AS
        "This attribute identifies the AAL Type. Valid types are AAL1, AAL3/4, and AAL5.";

```

5.4.6 Abstract destination identifier (abstractDestinationId)

```

abstractDestinationId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR abstractDestinationIdBeh;
REGISTERED AS {attribute 6};

```

```

abstractDestinationIdBeh BEHAVIOUR
    DEFINED AS
        "This entity describes the object identifier attribute of the object class
'abstractDestination'.";

```

5.4.7 Abstract destination instance (abstractDestinationInstance)

```

abstractDestinationInstance ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AbstractDestinationInstance;
    MATCHES FOR EQUALITY;
    BEHAVIOUR abstractDestinationInstanceBeh;
REGISTERED AS {attribute 7};

```

```

abstractDestinationInstanceBeh BEHAVIOUR
    DEFINED AS
        "This entity describes the pointer to the instance of 'abstractDestination'.";

```

5.4.8 Access pointer list (accessPtrList)

```

accessPtrList ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SetOfInstances;
    MATCHES FOR EQUALITY;
    BEHAVIOUR accessPtrListBeh;

```

```
REGISTERED AS {attribute 8};
```

```
accessPtrListBeh BEHAVIOUR
  DEFINED AS
```

```
  "This is a set-valued attribute whose value(s) points to instances of the Access object
  class or its subclasses.";
```

5.4.9 Active list of route termination points (activeListOfRouteTps)

```
activeListOfRouteTps ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ActiveListOfRouteTps;
  MATCHES FOR EQUALITY;
  BEHAVIOUR activeListOfRouteTpsBeh;
REGISTERED AS {attribute 9};
```

```
activeListOfRouteTpsBeh BEHAVIOUR
  DEFINED AS
```

```
  "This entity describes the pointer to the selected 'ListOfRouteTps' object, which contains
  an ordered list of instances of 'routeData' matching the selection criteria. .";
```

5.4.10 Active target (activeTarget)

```
activeTarget ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ActiveTarget;
  MATCHES FOR EQUALITY;
  BEHAVIOUR activeTargetBeh;
REGISTERED AS {attribute 10};
```

```
activeTargetBeh BEHAVIOUR
  DEFINED AS
```

```
  "This entity describes the target which is currently addressed by the 'analysisCriteria'
  instance.";
```

5.4.11 Analysis criteria identifier (analysisCriteriaId)

```
analysisCriteriaId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR analysisCriteriaIdBeh;
REGISTERED AS {attribute 11};
```

```
analysisCriteriaIdBeh BEHAVIOUR
  DEFINED AS
```

```
  "This entity describes the object identifier attribute of the object class
  'analysisCriteria'.";
```

5.4.12 Assign non-assign (assignNonAssign)

```
assignNonAssign ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssignNonAssign;
  MATCHES FOR EQUALITY;
  BEHAVIOUR assignNonAssignBeh;
REGISTERED AS {attribute 12};
```

```
assignNonAssignBeh BEHAVIOUR
  DEFINED AS
```

```
  "Indicates whether the exchange is for the VPC"s of this object instance the assigning or
  the nonassigning exchange.";
```

5.4.13 Associated signalling route set NE part (assocSignRouteSetNePart)

```
assocSignRouteSetNePart ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR assocSignRouteSetNePartBeh;
REGISTERED AS {attribute 13};
```

```
assocSignRouteSetNePartBeh BEHAVIOUR
  DEFINED AS
```

```
  "Identifies the CCS7 signalling resource (Q.2751:signRouteSetNePart).";
```

5.4.14 Associated termination point and VPCI (assocTPandVPCI)

```
assocTPandVPCI ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssocTPandVPCI;
  MATCHES FOR EQUALITY;
  BEHAVIOUR assocTPandVPCIBeh;
REGISTERED AS {attribute 14};
```

```
assocTPandVPCIBeh BEHAVIOUR
  DEFINED AS
```

"This is a set-valued attribute whose value(s) point to instances of the vpTTPBidirectional managed object class or its subclasses. This vpTTPBidirectional object instances terminate the VPC's managed by this uni access. A VPCI value is related to every pointer, corresponding to the two octets defined for ITU-T UNI signalling. In the case of associated signalling, additionally a signalling channel pointer is related to every pointer. The optional signChannel in the associated ASN.1 definition which identifies the signalling channel for associated signalling is omitted for nonassociated signalling.";

5.4.15 Associated VP TTP and VPCI list (assocTTPandVPCIList)

```
assocvpTTPandVPCIList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssocvpTTPandVPCIList;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR assocvpTTPandVPCIList;
REGISTERED AS {attribute 15};
```

```
assocvpTTPandVPCIListBeh BEHAVIOUR
  DEFINED AS
```

"This is a set-valued attribute whose value(s) point to instances of the vpTTPBidirectional managed object class or its subclasses. These vpTTPBidirectional object instances terminate the VPCs managed by this nni access. A VPCI value is related to every pointer.
A vpTTPBidirectional shall be administratively locked before it can be removed from this list.";

5.4.16 Associated link groupComb or VP group (assocLinkGroup)

```
assocLinkGroup ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssocLinkGroup;
  MATCHES FOR EQUALITY;
  BEHAVIOUR assocLinkGroupBeh;
REGISTERED AS {attribute 16};
```

```
assocLinkGroupBeh BEHAVIOUR
  DEFINED AS
```

"This entity describes the result pointer to an instance of 'xTPSGComb', 'crCircuitEndPointSubgroup' or 'virtualPathGroup'.";

5.4.17 B/E tag mismatch (bETagMismatch)

```
bETagMismatch ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR bETagMismatchBeh;
REGISTERED AS {attribute 17};
```

```
bETagMismatchBeh BEHAVIOUR
  DEFINED AS
```

" This attribute represents the number of times an incoming CS_PDU had a BTag field value that did not equal the ETag field value.";

5.4.18 Blocked for maintenance (blockedForMaintenance)

```
blockedForMaintenance ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.BlockedForMaintenance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR blockedForMaintenanceBeh;
REGISTERED AS {attribute 18};
```

```
blockedForMaintenanceBeh BEHAVIOUR
  DEFINED AS
```

"This attribute indicates the blocking state of the virtual path and is typically used when creating new VPs. A blocked virtual path cannot be selected for new non-test traffic, however it can be used for test calls. The blocking of a virtual path has no influence on existing calls (non-test calls and test calls).";

5.4.19 BOM/EOM unexpected MID (bomsEomsUnexpectedMID)

```
bomsEomsUnexpectedMID ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR bomsEomsUnexpectedMIDBeh;
REGISTERED AS {attribute 19};
```

```
bomsEomsUnexpectedMIDBeh BEHAVIOUR
  DEFINED AS
```

" This attribute represents the number of BOM/EOM segments with an unexpected MID value. This attribute will be incremented by one each time a BOM is received with a currently active MID (a MID for which an EOM has not yet been received), or when an EOM is received for which a MID is NOT currently active.";

5.4.20 Buffer overflows (bufferOverflows)

```
bufferOverflows ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR bufferOverflowsBeh;
REGISTERED AS {attribute 20};
```

```
bufferOverflowsBeh BEHAVIOUR
  DEFINED AS
```

" This attribute represents a count of the number of times the reassembly buffer overflows. If the interworking function is implemented with multiple buffers, such as a cell level buffer and a bit level buffer, then either buffer overflow will cause this count to be incremented.";

5.4.21 Buffer release (bufferRelease)

```
bufferRelease ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.BufferRelease;
  BEHAVIOUR bufferReleaseBeh;
REGISTERED AS {attribute 21};
```

```
bufferReleaseBeh BEHAVIOUR
  DEFINED AS
```

"This attribute determines whether SSCOP can release its transmission buffer and transmission queue on connection release and can selectively release messages from the transmission buffer when older messages are still outstanding.";

5.4.22 Buffer underflows (bufferUnderflows)

```
bufferUnderflows ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR bufferUnderflowsBeh;
REGISTERED AS {attribute 22};
```

```
bufferUnderflowsBeh BEHAVIOUR
  DEFINED AS
```

" This attribute represents a count the number of times the reassembly buffer underflows. In the case of a continuous underflow caused by a loss of ATM cell flow, a single buffer underflow should be counted. If the interworking function is implemented with multiple buffers, such as a cell level buffer and a bit level buffer, then either buffer underflow will cause this count to be incremented.";

5.4.23 Calling party category (callingPartyCategory)

```
callingPartyCategory ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CallingPartyCategory;
  MATCHES FOR EQUALITY;
  BEHAVIOUR callingPartyCategoryBeh;
REGISTERED AS {attribute 23};
```

```
callingPartyCategoryBeh BEHAVIOUR
  DEFINED AS
```

"This entity describes the category as the type of calling subscriber considered for the routing process.";

5.4.24 Call routing circuit endpoint identifier (crCircuitEndPointId)

```
crCircuitEndPointId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR crCircuitEndPointIdBeh;
```



```
REGISTERED AS {attribute 24};

crCircuitEndPointIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to name instances of the crCircuitEndPoint managed object class.";
```

5.4.25 Call routing circuit endpoint subgroup identifier (crCircuitEndPointSubgroupId)

```
crCircuitEndPointSubgroupId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR crCircuitEndPointSubgroupIdBeh;
REGISTERED AS {attribute 25};

crCircuitEndPointSubgroupIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to name instances of the crCircuitEndPointSubgroup managed object class.";
```

5.4.26 Call routing office data identifier (callRoutingOfficeDataId)

```
callRoutingOfficeDataId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR callRoutingOfficeDataIdBeh;
REGISTERED AS {attribute 26};

callRoutingOfficeDataIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class 'callRoutingOfficeData'.";
```

5.4.27 Carrier code (carrierCode)

```
carrierCode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CarrierCode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR carrierCodeBeh;
REGISTERED AS {attribute 27};

carrierCodeBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the unambiguous carrier specific code used to distinguish from other carrier concerning the exchange. It can be dialled by the customer or supplied by the originating exchange.";
```

5.4.28 Carrier data identifier (carrierDataId)

```
carrierDataId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR carrierDataIdBeh;
REGISTERED AS {attribute 28};

carrierDataIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class 'carrierData'.";
```

5.4.29 Carrier data pointer (carrierDataPtr)

```
carrierDataPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CarrierDataPtr;
  MATCHES FOR EQUALITY;
  BEHAVIOUR carrierDataPtrBeh;
REGISTERED AS {attribute 29};

carrierDataPtrBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the pointer to an instance of 'carrierData'.";
```

5.4.30 CBR rate (cbrRate)

```
cbrRate ATTRIBUTE
```

```

WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR cbrRateBeh;
REGISTERED AS {attribute 30};

```

```

cbrRateBeh BEHAVIOUR
  DEFINED AS
    " This attribute represents the rate of the CBR service supported by the AAL.";

```

5.4.31 Cell loss (cellLoss)

```

cellLoss ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR cellLossBeh;
REGISTERED AS {attribute 31};

```

```

cellLossBeh BEHAVIOUR
  DEFINED AS
    "This attribute represents a count the number of lost cells, as detected by the AAL1
sequence number processing, for example. This count records the number of cells detected as lost in
the network prior to the destination interworking function AAL1 layer processing. A negative value
indicates that this attribute is not supported."

```

5.4.32 Cell loss integration period (cellLossIntegrationPeriod)

```

cellLossIntegrationPeriod ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR cellLossIntegrationPeriodBeh;
REGISTERED AS {attribute 32};

```

```

cellLossIntegrationPeriodBeh BEHAVIOUR
  DEFINED AS
    "This attribute identifies the time in milliseconds for the cell loss integration period. If
cells are lost for this period of time, the containing interworkingVCTTPBidirectional object will
generate a communications alarm."

```

5.4.33 Cell misinsertion (cellMisinsertion)

```

cellMisinsertion ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR cellMisinsertionBeh;
REGISTERED AS {attribute 33};

```

```

cellMisinsertionBeh BEHAVIOUR
  DEFINED AS
    "This attribute represents a count of sequence violation events which the AAL CS interprets
as misinserted of cells as defined by ITU-T Recommendation I.363.1.A negative value indicates that
this attribute is not supported."

```

5.4.34 CES buffered CDV tolerance (cesBufferedCDVtolerance)

```

cesBufferedCDVtolerance ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cesBufferedCDVtoleranceBeh;
REGISTERED AS {attribute 34};

```

```

cesBufferedCDVtoleranceBeh BEHAVIOUR
  DEFINED AS
    "This attribute identifies the duration of user data that must be buffered by the
InterworkingVCTTPBidirectional managed object to offset Cell Delay variation. The timing is in
increment of 10 micro seconds. The recommended default value for DS1 CES is 750 micro seconds
and 1000 micro seconds for DS3 CES. The use of this attribute is for further study.";

```

5.4.35 CES service profile identifier (cesServiceProfileId)

```

cesServiceProfileId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cesServiceProfileIdBeh;
REGISTERED AS {attribute 35};

```

```

cesServiceProfileIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used for naming instances of cesServiceProfile managed object class.";

```

5.4.36 Channel associated signalling (channelAssociatedSignalling)

```
channelAssociatedSignalling ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ChannelAssociatedSignalling;
  MATCHES FOR EQUALITY;
  BEHAVIOUR channelAssociatedSignallingBeh;
REGISTERED AS {attribute 36};
```

```
channelAssociatedSignallingBeh BEHAVIOUR
  DEFINED AS
    "This attribute identifies which AAL1 format should be used. This attribute applies only to
    structured format. The default value Basic does not carry channel associated signalling (CAS) bits
    and uses a single 125 usec frame. elCas, dslsfCas, and dslEsfcas carry CAS bits in a multiframe
    structure for E1, DS1 SF, and DS1 ESF respectively.";
```

5.4.37 CIP required (cIPRequired)

```
cIPRequired ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CIPRequired;
  BEHAVIOUR cIPRequiredBeh;
REGISTERED AS {attribute 37};
```

```
cIPRequiredBeh BEHAVIOUR
  DEFINED AS
    "This entity indicates if the CIP (carrier identification parameter) has to be signalled
    further.";
```

5.4.38 Circuit identification code (cic)

```
cic ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Cic;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cicBeh;
REGISTERED AS {attribute 38};
```

```
cicBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the Circuit Identification Code (CIC) of the circuit which is
    terminated by the circuit end point. The value of the CIC is identical in the two circuit end points
    which terminate the circuit.";
```

5.4.39 Clock recovery type (clockRecoveryType)

```
clockRecoveryType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ClockRecoveryType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR clockRecoveryTypeBeh;
REGISTERED AS {attribute 39};
```

```
clockRecoveryTypeBeh BEHAVIOUR
  DEFINED AS
    " This attribute indicates whether the clock recovery type is Synchronous, SRTS (Synchronous
    Residual Time Stamp), or Adaptive Clock Recovery.";
```

5.4.40 Closed user group barring (cugBarring)

```
cUGBarring ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGBarring;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cUGBarringBeh;
REGISTERED AS {attribute 40};
```

```
cUGBarringBeh BEHAVIOUR
  DEFINED AS
    "This attribute maintains the Intra-CUG restriction of the General subscription option in
    ITU-T Recommendation Q.2955.1.";
```

5.4.41 Closed user group data network identification (cUGDataNetworkIdentification)

```
cUGDataNetworkIdentification ATTRIBUTE
```

```

WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGDataNetworkIdentification;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGDataNetworkIdentificationBeh;
REGISTERED AS {attribute 41};

```

```

cUGDataNetworkIdentificationBeh BEHAVIOUR
DEFINED AS

```

"This information is signalled during setup of a CUG call and serves (in conjunction with the closed user groupInterlockCode) to uniquely identify the CUG in the international network. It can be thought of as the area code of the CUG.";

5.4.42 Closed user group index (cUGIndex)

```

cUGIndex ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGIndex;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGIndexBeh;
REGISTERED AS {attribute 42};

```

```

cUGIndexBeh BEHAVIOUR
DEFINED AS

```

"cUGIndex of General subscription option in ITU-T Recommendation Q.2955.1 must be explicitly assigned upon object creation. No two instances of the closed user group object class contained within a single object may have identical values for attribute cUGIndex.";

5.4.43 Closed user group interlock code (cUGInterlockCode)

```

cUGInterlockCode ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGInterlockCode;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGInterlockCodeBeh;
REGISTERED AS {attribute 43};

```

```

cUGInterlockCodeBeh BEHAVIOUR
DEFINED AS

```

"The attribute cUGInterlockCode must be assigned explicitly upon object creation. No multiple instances of the closed user group object class contained within a single object are allowed to have identical combinations of attribute cUGInterlockCode and cUGDataNetworkIdentification.";

5.4.44 Code (code)

```

code ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Code;
BEHAVIOUR codeBeh;
REGISTERED AS {attribute 44};

```

```

codeBeh BEHAVIOUR
DEFINED AS

```

"This entity describes the prefix digits.";

5.4.45 COM/EOM unexpected SN (comsEomsUnexpectedSN)

```

comsEomsUnexpectedSN ATTRIBUTE
DERIVED FROM "ITU-T Recommendation X.721":counter;
BEHAVIOUR comsEomsUnexpectedSNBeh;
REGISTERED AS {attribute 45};

```

```

comsEomsUnexpectedSNBeh BEHAVIOUR
DEFINED AS

```

"This attribute represents the number of COM and EOM segments received with an unexpected Sequence Number (SN). For a particular message (i.e., MID) transported over a VPC or VCC, this attribute is incremented by one each time a COM or EOM is received with a SAR Sequence Number (SN) that is not correct relative to the SN in the previous (non-EOM) segment.";

5.4.46 Connected line identification restriction options (connIdRestrictionOptions)

```

connIdRestrictionOptions ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ConnIdRestrictionOptions;
MATCHES FOR EQUALITY;
BEHAVIOUR connIdRestrictionOptionsBeh;
REGISTERED AS {attribute 46};

```

```
connIdRestrictionOptionsBeh BEHAVIOUR
  DEFINED AS
```

```
"This attribute of the COLRBB supplementary Service allows the subscriber to select the mode
in which the connected line identification restriction is applied. Valid options for the mode are:
Permanent to have the service active for all calls, or Temporary to have the service requested by
the user per call.";
```

5.4.47 Connection identification offering (connectionIdOffering)

```
connectionIdOffering ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ConnectionIdOffering;
  MATCHES FOR EQUALITY;
  BEHAVIOUR connectionIdOfferingBeh;
REGISTERED AS {attribute 47};
```

```
connectionIdOfferingBeh BEHAVIOUR
  DEFINED AS
```

```
"This attribute indicates which procedure is used for the selection of VPCI and VCI.";
```

5.4.48 CRC violations (crcViolations)

```
crcViolations ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR crcViolationsBeh;
REGISTERED AS {attribute 48};
```

```
crcViolationsBeh BEHAVIOUR
  DEFINED AS
```

```
"This attribute represents the number of CRC violations that were detected for the incoming
AAL PDUs.";
```

5.4.49 CSP Required (cSPRequired)

```
cSPRequired ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CSPRequired;
  MATCHES FOR EQUALITY;
  BEHAVIOUR cSPRequiredBeh;
REGISTERED AS {attribute 49};
```

```
cSPRequiredBeh BEHAVIOUR
  DEFINED AS
```

```
"This entity indicates if the CSP (carrier selection parameter) has to be signalled
further.";
```

5.4.50 Customer profile pointer (catmCustomerProfilePtr)

```
customerProfilePtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
  MATCHES FOR EQUALITY;
  BEHAVIOUR customerProfilePtrBeh;
REGISTERED AS {attribute 50};
```

```
customerProfilePtrBeh BEHAVIOUR
  DEFINED AS
```

```
"This attribute is used as a pointer to an instance of the customerProfile managed object
class.";
```

5.4.51 Customized resource pointer list (customizedResourcePtrList)

```
customizedResourcePtrList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SetOfInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR customizedResourcePtrListBeh;
REGISTERED AS {attribute 51};
```

```
customizedResourcePtrListBeh BEHAVIOUR
  DEFINED AS
```

```
"This is a set-valued attribute whose value(s) points to instances of subclasses of the
customizedResource object class.";
```

5.4.52 Destination code (destinationCode)

```
destinationCode ATTRIBUTE
```

```

WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DestinationCode;
MATCHES FOR EQUALITY;
BEHAVIOUR destinationCodeBeh;
REGISTERED AS {attribute 52};

destinationCodeBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the digit string including the local area code.";

```

5.4.53 Destination type (destinationType)

```

destinationType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DestinationType;
MATCHES FOR EQUALITY;
BEHAVIOUR destinationTypeBeh;
REGISTERED AS {attribute 53};

destinationTypeBeh BEHAVIOUR
  DEFINED AS
    "This entity describes unambiguously the type of destination like international, national or
local.";

```

5.4.54 Digit comb insertion (digitCombInsert)

```

digitCombInsert ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitCombInsert;
MATCHES FOR EQUALITY;
BEHAVIOUR digitCombInsertBeh;
REGISTERED AS {attribute 54};

digitCombInsertBeh BEHAVIOUR
  DEFINED AS
    "This entity describes which sequence of digits is to be inserted and where.";

```

5.4.55 Digit comb replace (digitCombReplace)

```

digitCombReplace ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitCombReplace;
MATCHES FOR EQUALITY;
BEHAVIOUR digitCombReplaceBeh;
REGISTERED AS {attribute 55};

digitCombReplaceBeh BEHAVIOUR
  DEFINED AS
    "This entity describes which sequence of digits is to be replaced and through which.";

```

5.4.56 Digit manipulation identifier (digitManipId)

```

digitManipId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR digitManipIdBeh;
REGISTERED AS {attribute 56};

digitManipIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class 'digitManip'.";

```

5.4.57 Digit manipulation pointer (digitManipPtr)

```

digitManipPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitManipPtr;
MATCHES FOR EQUALITY;
BEHAVIOUR digitManipPtrBeh;
REGISTERED AS {attribute 57};

digitManipPtrBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the pointer to 'digitManip'.";

```

5.4.58 Digit suppression (digitSuppress)

```

digitSuppress ATTRIBUTE

```

```

    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitSuppress;
    MATCHES FOR EQUALITY;
    BEHAVIOUR digitSuppressBeh;
REGISTERED AS {attribute 58};

digitSuppressBeh BEHAVIOUR
    DEFINED AS
        "This entity describes which sequence of digits is to be suppressed.";

```

5.4.59 Excluded subscriber codes (excludedSubscriberCodes)

```

excludedSubscriberCodes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ExcludedSubscriberCodes;
    MATCHES FOR EQUALITY;
    BEHAVIOUR excludedSubscriberCodesBeh;
REGISTERED AS {attribute 59};

excludedSubscriberCodesBeh BEHAVIOUR
    DEFINED AS
        "This entity describes a set of directory numbers excluded from this local destination.";

```

5.4.60 Forward error correction method (forwardErrorCorrectionMethod)

```

forwardErrorCorrectionMethod ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.FecMethod;
    MATCHES FOR EQUALITY;
    BEHAVIOUR errorCorrectionTypeBeh;
REGISTERED AS {attribute 60};

forwardErrorCorrectionMethodBeh BEHAVIOUR
    DEFINED AS
        " This attribute indicates the FEC method: no FEC, FEC for Loss Sensitive Signal Transport,
or FEC for Delay Sensitive Signal Transport.";

```

5.4.61 Header errors (headerErrors)

```

headerErrors ATTRIBUTE
    DERIVED FROM "ITU-T Recommendation X.721":counter;
    BEHAVIOUR crcViolationsBeh;
REGISTERED AS {attribute 61};

headerErrorsBeh BEHAVIOUR
    DEFINED AS
        " This attribute represents a count of the number of AAL1 header errors detected, including
those
corrected. Header errors include correctable and uncorrectable CRC plus bad parity."

```

5.4.62 Initial subscriber codes (initialSubscriberCodes)

```

initialSubscriberCodes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.InitialSubscriberCodes;
    MATCHES FOR EQUALITY;
    BEHAVIOUR initialSubscriberCodesBeh;
REGISTERED AS {attribute 62};

initialSubscriberCodesBeh BEHAVIOUR
    DEFINED AS
        "This entity describes the upper bound for the scope of the possible directory numbers which
can belong to this local destination.";

```

5.4.63 Inter closed user group access (interCUGaccess)

```

interCUGaccess ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.InterCUGaccess;
    MATCHES FOR EQUALITY;
    BEHAVIOUR interCUGaccessBeh;
REGISTERED AS {attribute 63};

interCUGaccessBeh BEHAVIOUR
    DEFINED AS
        "Inter-CUG access of per service subscription option in ITU-T Recommendation Q.2955.1.";

```

5.4.64 Length BA size mismatch (lengthBASizeMismatch)

```
lengthBASizeMismatch ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR lengthBASizeMismatchBeh;
REGISTERED AS {attribute 64};
```

```
lengthBASizeMismatchBeh BEHAVIOUR
  DEFINED AS
    " This attribute represents the number of CS_PDUs in which the Length field value was not
    consistent with the BASize field value. The definition of consistent depends on the mode in which
    CS_PDU fragments are being processed. In the message-mode, the BASize field must equal the Length
    field. In the streaming mode, the BASize field must be less than the Length field.";
```

5.4.65 Length mismatch (lengthMismatch)

```
lengthMismatch ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR lengthMismatchBeh;
REGISTERED AS {attribute 65};
```

```
lengthMismatchBeh BEHAVIOUR
  DEFINED AS
    " This attribute represents the number of CS_PDUs received with a Length field value that
    does not represent the actual length of the CS_PDU payload.";
```

5.4.66 Link type (linkType)

```
linkType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.LinkType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR linkTypeBeh;
REGISTERED AS {attribute 66};
```

```
linkTypeBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to indicate whether the NNI is an international interface or not.";
```

5.4.67 List of routes (listOfRoutes)

```
listOfRoutes ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ListOfRoutes;
  MATCHES FOR EQUALITY;
  BEHAVIOUR listOfRoutesBeh;
REGISTERED AS {attribute 67};
```

```
listOfRoutesBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the sequence of the selected routes ('routeData').";
```

5.4.68 List of route termination points identifier (listOfRouteTpsId)

```
listOfRouteTpsId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR listOfRouteTpsIdBeh;
REGISTERED AS {attribute 68};
```

```
listOfRouteTpsIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class
    'listOfRouteTps'.";
```

5.4.69 List of link groups (listOfLinkGroups)

```
listOfLinkGroups ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ListOfLinkGroups;
  MATCHES FOR EQUALITY;
  BEHAVIOUR listOfLinkGroupsBeh;
REGISTERED AS {attribute 69};
```

```
listOfLinkGroupsBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the sequence of instances of 'virtualPathGroup' or
    'crCircuitEndPointSubgroup'.";
```


5.4.70 Local area code (localAreaCode)

```
localAreaCode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.LocalAreaCode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR localAreaCodeBeh;
REGISTERED AS {attribute 70};
```

```
localAreaCodeBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the local area code of the subscribers which belong to this local
  destination. The local area code is used without any prefix.";
```

5.4.71 Local destination identifier (localDestinationId)

```
localDestinationId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR localDestinationIdBeh;
REGISTERED AS {attribute 71};
```

```
localDestinationIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class
  'localDestination'.";
```

5.4.72 Local destination pointer (localDestinationPtr)

```
localDestinationPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR localDestinationPtrBeh;
REGISTERED AS {attribute 72};
```

```
localDestinationPtrBeh BEHAVIOUR
  DEFINED AS
    "This attribute describes the pointer to localDestination. The directoryNumberE164 shall be
  member of the local area defined by the localAreaCode and the initial digit string part of the SN
  part of the directoryNumberE164 shall match with one of the initialSubscriberCodes of the referenced
  object. The directoryNumberE164 shall not be excluded by one of the excludedSubscriberCodes from the
  referenced object.";
```

5.4.73 Maintenance signalling running (maintenanceSignallingRunning)

```
maintenanceSignallingRunning ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaintenanceSignallingRunning;
  MATCHES FOR EQUALITY;
  BEHAVIOUR maintenanceSignallingRunningBeh;
REGISTERED AS {attribute 73};
```

```
maintenanceSignallingRunningBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates that a maintenance signalling procedure (e.g. reset, restart,
  blocking, unblocking) is running.";
```

5.4.74 Maximum CC (maxCc)

```
maxCc ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxCc;
  BEHAVIOUR maxCcBeh;
REGISTERED AS {attribute 74};
```

```
maxCcBeh BEHAVIOUR
  DEFINED AS
    "This attribute defines the maximum value [PDUs] of the state variable VT(CC), corresponding
  to the maximum number of transmissions of BGN, END, ER or RS PDUs.";
```

5.4.75 Maximum CPCS_PDU size (maxCpcsPduSize)

```
maxCpcsPduSize ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxCpcsPduSize;
  MATCHES FOR EQUALITY;
```

```

    BEHAVIOUR maxCpcsPduSizeBeh;
REGISTERED AS {attribute 75};

```

```

maxCpcsPduSizeBeh BEHAVIOUR
  DEFINED AS
    " This multi-valued attribute represents the maximum CPCS_PDU size that will be transmitted
over the connection in both the incoming (forward) and outgoing (backward) direction of
transmission.";

```

5.4.76 Maximum digits (maxDigits)

```

maxDigits ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxDigits;
  MATCHES FOR EQUALITY;
  BEHAVIOUR maxDigitsBeh;
REGISTERED AS {attribute 76};

```

```

maxDigitsBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the maximum number of digits required by the destination exchange.
Further digits will be ignored.";

```

5.4.77 Maximum information field length (maxInformationFieldLength)

```

maxInformationFieldLength ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxInformationFieldLength;
  BEHAVIOUR maxInformationFieldLengthBeh;
REGISTERED AS {attribute 77};

```

```

maxInformationFieldLengthBeh BEHAVIOUR
  DEFINED AS
    "This attribute defines the maximum length of the information field in SD PDUs, UD PDUs and
MD PDUs "k". The unit of the INTEGER value is octets.";

```

5.4.78 Maximum length of SSCOP user to user field (maxLengthSscopUuField)

```

maxLengthSscopUuField ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxLengthSscopUuField;
  BEHAVIOUR maxLengthSscopUuFieldBeh;
REGISTERED AS {attribute 78};

```

```

maxLengthSscopUuFieldBeh BEHAVIOUR
  DEFINED AS
    "This attribute defines the maximum length of a variable length SSCOP UU field "j". The SSCOP UU
is an optional field of BGN PDUs, BGAK PDUs, BGREJ PDUs, END PDUs and RS PDUs. The unit of the
INTEGER value is octets";

```

5.4.79 Maximum PD (maxPd)

```

maxPd ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxPd;
  BEHAVIOUR maxPdBeh;
REGISTERED AS {attribute 79};

```

```

maxPdBeh BEHAVIOUR
  DEFINED AS
    "This attribute defines the maximum acceptable value [PDUs] of the state variable VT(PD)
before sending a POLL PDU and resetting VT(PD) to zero. The VT(PD) is incremented each time an SD
PDU is transmitted.";

```

5.4.80 Maximum SSCOP credit to peer (maxSscopCreditToPeer)

```

maxSscopCreditToPeer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxSscopCreditToPeer;
  BEHAVIOUR maxSscopCreditToPeerBeh;
REGISTERED AS {attribute 80};

```

```

maxSscopCreditToPeerBeh BEHAVIOUR
  DEFINED AS
    "This attribute defines the absolute value [PDUs] of the size of the receive window given to
the peer. This value is added to VR(R) to generate VR(MR). VR(MR) is mapped to N(MR) by transmission
of STAT, USTAT, RS RSAK, ER, ERAK, BGN or BGAK PDUs.";

```

5.4.81 Maximum STAT (maxStat)

```
maxStat ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxStat;
  BEHAVIOUR maxStatBeh;
REGISTERED AS {attribute 81};

maxStatBeh BEHAVIOUR
  DEFINED AS
    "This attribute defines the maximum number of list elements placed in a STAT PDU.";
```

5.4.82 MID range (midRange)

```
midRange ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MidRange;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR midRangeBeh;
REGISTERED AS {attribute 82};

midRangeBeh BEHAVIOUR
  DEFINED AS
    " This attribute represents the range of MID values supported at the AAL for the supporting
VCC.";
```

5.4.83 Minimum digits (minDigits)

```
minDigits ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MinDigits;
  MATCHES FOR EQUALITY;
  BEHAVIOUR minDigitsBeh;
REGISTERED AS {attribute 83};

minDigitsBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the minimum number of digits required before the outgoing termination
point can be seized. It is only needed in case of overlapped dialling.";
```

5.4.84 Nature of address (natureOfAddress)

```
natureOfAddress ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NatureOfAddress;
  MATCHES FOR EQUALITY;
  BEHAVIOUR natureOfAddressBeh;
REGISTERED AS {attribute 84};

natureOfAddressBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the destination type of the prefix.";
```

5.4.85 Network border (networkBorder)

```
networkBorder ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NetworkBorder;
  MATCHES FOR EQUALITY;
  BEHAVIOUR networkBorderBeh;
REGISTERED AS {attribute 85};

networkBorderBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to indicate whether the NNI is an operator network border or not.";
```

5.4.86 Network type (networkType)

```
networkType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NetworkType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR networkTypeBeh;
REGISTERED AS {attribute 86};

networkTypeBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to indicate, if an access belongs to a national transit network. It
is used together with the linkType and the signallingType to generate the setting of the location
field according to Q.850.";
```

5.4.87 NNI access identifier (nniAccessId)

```
nniAccessId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR nniAccessIdBeh;
REGISTERED AS {attribute 87};

nniAccessIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to name instances of the nniAccess managed object class.";
```

5.4.88 No connected line identification presentation restrictions allowed (noColpRestrictionsAllowed)

```
noColpRestrictionsAllowed ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR noColpRestrictionsAllowedBeh;
REGISTERED AS {attribute 88};

noColpRestrictionsAllowedBeh BEHAVIOUR
  DEFINED AS
    "This attribute of COLP is where the calling party continues to have the capability to
  override the COLR restriction and have the connected party number presented as described in the COLP
  supplementary service. A TRUE value of this attribute permits the called party COLP supplementary
  service to override the calling party COLR supplementary service.";
```

5.4.89 Number of aborts (numberOfAborts)

```
numberOfAborts ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR numberOfAbortsBeh;
REGISTERED AS {attribute 89};

numberOfAbortsBeh BEHAVIOUR
  DEFINED AS
    " This attribute provides a count of the number aborts (i.e., EOM with SAR_PDU Length
  Indication = 63) that are received for the underlying VPC or VCC.";
```

5.4.90 Origin (origin)

```
origin ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Origin;
  MATCHES FOR EQUALITY;
  BEHAVIOUR originBeh;
REGISTERED AS {attribute 90};

originBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the origin of the calling subscriber considered for the routing
  process.";
```

5.4.91 Origin for routing (originForRouting)

```
originForRouting ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY;
  BEHAVIOUR originForRoutingBeh;
REGISTERED AS {attribute 91};

originForRoutingBeh BEHAVIOUR
  DEFINED AS
    "This attribute determines the origin assigned to the NNI access for call routing purpose.";
```

5.4.92 Origin mark (originMark)

```
originMark ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY;
  BEHAVIOUR originMarkBeh;
```

```
REGISTERED AS {attribute 92};

originMarkBeh BEHAVIOUR
  DEFINED AS
    "This attribute determines the origination of the calling subscriber.";
```

5.4.93 Own international code (ownInternationalCode)

```
ownInternationalCode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.OwnInternationalCode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR ownInternationalCodeBeh;
REGISTERED AS {attribute 93};

ownInternationalCodeBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the country code of the calling party. The own international code is
  used without any prefix.";
```

5.4.94 Partially filled cells (partiallyFilledCells)

```
partiallyFilledCells ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR partiallyFilledCellsBeh;
REGISTERED AS {attribute 94};

partiallyFilledCellsBeh BEHAVIOUR
  DEFINED AS
    " This attribute identifies the number of leading octets in use.";
```

5.4.95 Poll after retransmission (pollAfterRetransmission)

```
pollAfterRetransmission ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PollAfterRetransmission;
  BEHAVIOUR pollAfterRetransmissionBeh;
REGISTERED AS {attribute 95};

pollAfterRetransmissionBeh BEHAVIOUR
  DEFINED AS
    "This attribute specifies if a POLL is transmitted each time the retransmission queue is
  emptied";
```

5.4.96 Post analysis evaluation identifier (postAnalysisEvaluationId)

```
postAnalysisEvaluationId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR postAnalysisEvaluationIdBeh;
REGISTERED AS {attribute 96};

postAnalysisEvaluationIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class
  'postAnalysisEvaluation'.";
```

5.4.97 Preferred carrier (preferredCarrier)

```
preferredCarrier ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PreferredCarrier;
  MATCHES FOR EQUALITY;
  BEHAVIOUR preferredCarrierBeh;
REGISTERED AS {attribute 97};

preferredCarrierBeh BEHAVIOUR
  DEFINED AS
    "This attribute identifies the default carrier to use when one is not explicitly identified
  in the call setup message received and processed by the managed system.";
```

5.4.98 Preferred closed user group index (preferredCUGIndex)

```
preferredCUGIndex ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PreferredCUGIndex;
```

```

MATCHES FOR EQUALITY;
BEHAVIOUR preferredCUGIndexBeh;
REGISTERED AS {attribute 98};

```

```

preferredCUGIndexBeh BEHAVIOUR
DEFINED AS
    "This attribute indicates the index of the preferred CUG.";

```

5.4.99 Prefix digit analysis identifier (prefixDigitAnalysisId)

```

prefixDigitAnalysisId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR prefixDigitAnalysisIdBeh;
REGISTERED AS {attribute 99};

```

```

prefixDigitAnalysisIdBeh BEHAVIOUR
DEFINED AS
    "This entity describes the object identifier attribute of the object class '
prefixDigitAnalysis'.";

```

5.4.100 Propagation delay (propagationDelay)

```

propagationDelay ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PropagationDelay;
MATCHES FOR EQUALITY;
BEHAVIOUR propagationDelayBeh;
REGISTERED AS {attribute 100};

```

```

propagationDelayBeh BEHAVIOUR
DEFINED AS
    "Indicates the expected propagation delay.";

```

5.4.101 Reassembly timer expirations (reassemblyTimerExpiratons)

```

reassemblyTimerExpiratons ATTRIBUTE
DERIVED FROM "ITU-T Recommendation X.721":counter;
BEHAVIOUR reassemblyTimerExpirationsBeh;
REGISTERED AS {attribute 101};

```

```

reassemblyTimerExpirationsBeh BEHAVIOUR
DEFINED AS
    " This attribute provides a count of reassembly timer expirations. A negative value
indicates that this attribute is not supported..";

```

5.4.102 Remote blocking (remoteBlocking)

```

remoteBlocking ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RemoteBlocking;
MATCHES FOR EQUALITY;
BEHAVIOUR remoteBlockingBeh;
REGISTERED AS {attribute 102};

```

```

remoteBlockingBeh BEHAVIOUR
DEFINED AS
    "This attribute indicates the remote blocking state of the virtual path. A blocked virtual
path cannot be selected for new non-test traffic, however it can be used for test calls. The
blocking of a virtual path has no influence to existing calls (non-test calls and test calls).";

```

5.4.103 Remote blocking reason (remoteBlockingReason)

```

remoteBlockingReason ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RemoteBlockingReason;
MATCHES FOR EQUALITY;
BEHAVIOUR remoteBlockingReasonBeh;
REGISTERED AS {attribute 103};

```

```

remoteBlockingReasonBeh BEHAVIOUR
DEFINED AS
    "Indicates the reason when the circuit was remotely blocked.";

```

5.4.104 Required bandwidth egress (reqBandwidthEgress)

```
reqBandwidthEgress ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule ReqBandwidthEgress;
  MATCHES FOR EQUALITY;
  BEHAVIOUR reqBandwidthEgressBeh;
REGISTERED AS {attribute 104};
```

```
reqBandwidthEgressBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the range of supported bandwidth";
```

5.4.105 Required bandwidth ingress (reqBandwidthIngress)

```
reqBandwidthIngress ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule ReqBandwidthIngress;
  MATCHES FOR EQUALITY;
  BEHAVIOUR reqBandwidthIngressBeh;
REGISTERED AS {attribute 105};
```

```
reqBandwidthIngressBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the range of supported bandwidth";
```

5.4.106 Required bearer capability (reqBearerCapab)

```
reqBearerCapab ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule ReqBearerCapab;
  MATCHES FOR EQUALITY;
  BEHAVIOUR reqBearerCapabBeh;
REGISTERED AS {attribute 106};
```

```
reqBearerCapabBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the supported bearer capabilities.";
```

5.4.107 Required NB transfer capability (reqNBTransferCapability)

```
reqNBTransferCapability ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule ReqNBTransferCapability;
  MATCHES FOR EQUALITY;
  BEHAVIOUR reqNBTransferCapabilityBeh;
REGISTERED AS {attribute 107};
```

```
reqNBTransferCapabilityBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the N-ISDN bearer capability of the underlying routes.";
```

5.4.108 Ring time limit (ringTimeLimit)

```
ringTimeLimit ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule RingTimeLimit;
  MATCHES FOR EQUALITY;
  BEHAVIOUR ringTimeLimitBeh;
REGISTERED AS {attribute 108};
```

```
ringTimeLimitBeh BEHAVIOUR
  DEFINED AS
    "This attribute limits the ring time.";
```

5.4.109 Route data identifier (routeDataId)

```
routeDataId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR routeDataIdBeh;
REGISTERED AS {attribute 109};
```

```
routeDataIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class 'routeData'.";
```

5.4.110 SAAL UNI protocol profile identifier (saalUniProtocolProfileId)

```
saalUniProtocolProfileId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR saalUniProtocolProfileIdBeh;
REGISTERED AS {attribute 110};

saalUniProtocolProfileIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used for naming instances of the object class saalUniProtocolProfile.";
```

5.4.111 SAR CRC violations (sarCrcViolations)

```
sarCrcViolations ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR sarCrcViolationsBeh;
REGISTERED AS {attribute 111};

sarCrcViolationsBeh BEHAVIOUR
  DEFINED AS
    "This attribute represents the number of CRC violations that were detected for the incoming SAR PDUs.";
```

5.4.112 Search method (searchMethod)

```
searchMethod ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SearchMethod;
  MATCHES FOR EQUALITY;
  BEHAVIOUR searchMethodBeh;
REGISTERED AS {attribute 112};

searchMethodBeh BEHAVIOUR
  DEFINED AS
    "This attribute describes the method how to select a VPC with sufficient free bandwidth or an idle circuit within this object instance. The following algorithms are defined for that purpose:
    - forwardSequential: This algorithm selects the VPC with the lowest VPCI value, which has sufficient free bandwidth in the broadband case. This algorithm selects the idle circuit with the lowest CIC number in the narrowband case.
    - backwardSequential: This algorithm selects the VPC with the highest VPCI value, which has sufficient free bandwidth in the broadband case. This algorithm selects the idle circuit with the highest CIC number in the narrowband case.
    - forwardCyclic: In the broadband case this algorithm selects the VPC with sufficient free bandwidth with the lowest VPCI value that is larger than the VPCI value of the previously selected VPC. If no such VPC exists, it selects the VPC with sufficient bandwidth with the lowest VPCI value that is less than the VPCI value of the previously selected VPC.
    In the narrowband case this algorithm selects the idle circuit with the lowest CIC number that is larger than the CIC number of the previously selected circuit. If no such idle circuit exists, it selects the idle CIC with the lowest CIC number that is less than the CIC number of the previously selected circuit.
    - backwardCyclic: In the broadband case this algorithm selects the VPC with sufficient bandwidth with the highest VPCI value that is less than the VPCI value of the previously selected VPC. If no such VPC exists, it selects the VPC with sufficient bandwidth with the highest VPCI value that is larger than the VPCI value number of the previously selected circuit.
    In the narrowbandcase this algorithm selects the idle circuit with the highest CIC number that is less than the CIC number of the previously selected circuit. If no such idle circuit exists, it selects the idle CIC with the highest CIC number that is larger than the CIC number of the previously selected circuit.";
```

5.4.113 Sends TNS (sendTNS)

```
sendTNS ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SendTNS;
  MATCHES FOR EQUALITY;
  BEHAVIOUR sendTNSBeh;
REGISTERED AS {attribute 113};

sendTNSBeh BEHAVIOUR
  DEFINED AS
    "This entity describes whether for this instance of 'routeData' the TNS is to be signalled to the next node.";
```

5.4.114 Sequence violations (sequenceViolations)

```
sequenceViolations ATTRIBUTE
```



```

    DERIVED FROM "ITU-T Recommendation X.721":counter;
    BEHAVIOUR sequenceViolationsBeh;
REGISTERED AS {attribute 114};

```

```

sequenceViolationsBeh BEHAVIOUR
    DEFINED AS

```

```

    " This attribute represents a count incoming AAL Type 1 SAR-PDUs where the sequence count in
the PDU header causes a transition from the SYNC state to the OUT OF SEQUENCE state as defined by
ITU-T Recommendation I.363.1. A negative value indicates that this attribute is not supported.";

```

5.4.115 Service profile pointer (serviceProfilePointer)

```

serviceProfilePointer ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
    MATCHES FOR EQUALITY;
    BEHAVIOUR serviceProfilePointerBeh;
REGISTERED AS {attribute 115};

```

```

serviceProfilePointerBeh BEHAVIOUR
    DEFINED AS

```

```

    "This attribute provides a pointer to a managed object instance that provides information
used to control service interworking (e.g., a cesServiceProfile object).";

```

5.4.116 Signalling channel pointer (signallingChannelPtr)

```

signallingChannelPtr ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
    MATCHES FOR EQUALITY;
    BEHAVIOUR signallingChannelPtrBeh;
REGISTERED AS {attribute 116};

```

```

signallingChannelPtrBeh BEHAVIOUR
    DEFINED AS

```

```

    "This attribute is used as a pointer to an instance of the vcTTPBidirectional managed object
class. The referenced vcTTPBidirectional instance terminates the signalling virtual channel.";

```

5.4.117 Signalling protocol (signallingProtocol)

```

signallingProtocol ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SignallingProtocol;
    MATCHES FOR EQUALITY;
    BEHAVIOUR signallingProtocolBeh;
REGISTERED AS {attribute 117};

```

```

signallingProtocolBeh BEHAVIOUR
    DEFINED AS

```

```

    "This attribute indicates which type of signalling protocol is used.";

```

5.4.118 Signalling standard (signallingStandard)

```

signallingStandard ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SignallingStandard;
    MATCHES FOR EQUALITY;
    BEHAVIOUR signallingStandardBeh;
REGISTERED AS {attribute 118};

```

```

signallingStandardBeh BEHAVIOUR
    DEFINED AS

```

```

    "This attribute is used to indicate the type of signalling used by instances of this
class.";

```

5.4.119 Signalling type (signallingType)

```

signallingType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SignallingType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR signallingTypeBeh;
REGISTERED AS {attribute 119};

```

```

signallingTypeBeh BEHAVIOUR
    DEFINED AS

```

```

    "This attribute is used to indicate whether associated or nonassociated signalling is used
at the instance of this class.";

```

5.4.120 SRI timeouts (sriTimeOuts)

```
sriTimeOuts ATTRIBUTE
    DERIVED FROM "ITU-T Recommendation X.721":counter;
    BEHAVIOUR sriTimeOutsBeh;
REGISTERED AS {attribute 120};

sriTimeOutsBeh BEHAVIOUR
    DEFINED AS
        " This attribute represents a count of the number of SRI time-outs that occurred on an ATM
connection.";
```

5.4.121 SSCOP timer CC (sscopTimerCc)

```
sscopTimerCc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerCc;
    BEHAVIOUR sscopTimerCcBeh;
REGISTERED AS {attribute 121};

sscopTimerCcBeh BEHAVIOUR
    DEFINED AS
        "This attribute defines the time interval between transmissions of BGN, END, RS and ER PDUs
when an acknowledge to these PDUs has not been received. The unit for the INTEGER value is
milliseconds.";
```

5.4.122 SSCOP timer idle (sscopTimerIdle)

```
sscopTimerIdle ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerIdle;
    BEHAVIOUR sscopTimerIdleBeh;
REGISTERED AS {attribute 122};

sscopTimerIdleBeh BEHAVIOUR
    DEFINED AS
        "This attribute defines the SSCOP timer IDLE. The SSCOP connection is partitioned into
phases. The SSCOP timer IDLE supervises the idle phase. In this phase the timer NO_RESPONSE is not
running and no POLL PDUs are transmitted. The unit for the INTEGER value is milliseconds.";
```

5.4.123 SSCOP timer keep alive (sscopTimerKeepAlive)

```
sscopTimerKeepAlive ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerKeepAlive;
    BEHAVIOUR sscopTimerKeepAliveBeh;
REGISTERED AS {attribute 123};

sscopTimerKeepAliveBeh BEHAVIOUR
    DEFINED AS
        "This attribute defines the SSCOP timer KEEP_ALIVE. The SSCOP connection is partitioned into
phases. The SSCOP timer KEEP_ALIVE supervises the transient phase. In this phase there are no
outstanding acknowledgements or new data pending transmission. The unit for the INTEGER value is
milliseconds.";
```

5.4.124 SSCOP timer no response (sscopTimerNoResponse)

```
sscopTimerNoResponse ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerNoResponse;
    BEHAVIOUR sscopTimerNoResponseBeh;
REGISTERED AS {attribute 124};

sscopTimerNoResponseBeh BEHAVIOUR
    DEFINED AS
        "This attribute defines the SSCOP timer NO_RESPONSE. This timer is used to detect a faulty
connection. The timer runs with either the timer POLL or KEEP_ALIVE simultaneously. The unit for the
INTEGER value is milliseconds.";
```

5.4.125 SSCOP timer poll (sscopTimerPoll)

```
sscopTimerPoll ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerPoll;
    BEHAVIOUR sscopTimerPollBeh;
REGISTERED AS {attribute 125};

sscopTimerPollBeh BEHAVIOUR
    DEFINED AS
```

"This attribute defines the SSCOP timer POLL. The SSCOP connection is partitioned into phases. The SSCOP timer POLL supervises the active phase. In this new data is pending, transmission or acknowledgements are outstanding. The unit for the INTEGER value is milliseconds.";

5.4.126 SSCS type (sscsType)

```
sscsType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscsType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR sscsTypeBeh;
REGISTERED AS {attribute 126};
```

```
sscsTypeBeh BEHAVIOUR
  DEFINED AS
    " This attribute identifies the SSCS type for the AAL. Valid values are NULL, Data SSCS
    based on SSCOP (assured operation), Data SSCS based on SSCOP (non-assured operation), or Frame Relay
    SSCS.";
```

5.4.127 STD pointer parity failures (stdPointerParityFailures)

```
stdPointerParityFailures ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR stdPointerParityFailuresBeh;
REGISTERED AS {attribute 127};
```

```
stdPointerParityFailuresBeh BEHAVIOUR
  DEFINED AS
    " This attribute represents a count of the number of times the AAL reassembler detects a
    parity check failure at the point where a structured data pointer is expected. This count is only
    meaningful for structured data transfer modes as unstructured modes do not use pointers. A negative
    value indicates that this attribute is not supported.";
```

5.4.128 STD pointer reframes (stdPointerReframes)

```
stdPointerReframes ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR stdPointerReframesBeh;
REGISTERED AS {attribute 128};
```

```
stdPointerReframesBeh BEHAVIOUR
  DEFINED AS
    " This attribute represents a count of the number of events in which the AAL1 reassembler
    found that a structured data pointer is not where it is expected, and the pointer must be
    reacquired. This count is only meaningful for structured data transfer modes as unstructured modes
    do not use pointers. A negative value indicates that this attribute is not supported, however it
    must be supported when pointers are used.";
```

5.4.129 Structured data transfer (structuredDataTransfer)

```
structuredDataTransfer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR structuredDataTransferBeh;
REGISTERED AS {attribute 129};
```

```
structuredDataTransferBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates whether Structured Data Transfer (SDT) has been configured at the
    AAL. A value of TRUE means SDT has been selected. This attribute value cannot be set to TRUE when
    the errorCorrectionType attribute equals TRUE.";
```

5.4.130 Subscriber category (subscriberCategory)

```
subscriberCategory ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SubscriberCategory;
  MATCHES FOR EQUALITY;
  BEHAVIOUR subscriberCategoryBeh;
REGISTERED AS {attribute 130};
```

```
subscriberCategoryBeh BEHAVIOUR
  DEFINED AS
    "This attribute determines the category of the calling subscriber.";
```

5.4.131 Subtype (subType)

```
subType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SubType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR subTypeBeh;
REGISTERED AS {attribute 131};
```

```
subTypeBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to identify the AAL subtype. Valid values for this attribute are
  NULL, Voice-band based on 64 Kbps, Circuit Emulation (synchronous), Circuit Emulation
  (asynchronous), High-quality Audio, and Video.";
```

5.4.132 Sum of incorrect CS field errors (sumOfIncorrectCSFieldErrors)

```
sumOfIncorrectCSFieldErrors ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR sumOfIncorrectCSFieldErrorsBeh;
REGISTERED AS {attribute 132};
```

```
sumOfIncorrectCSFieldErrorsBeh BEHAVIOUR
  DEFINED AS
    " This attribute provides a sum-of-errors count for incorrect Convergence Sublayer (CS)
  field errors. For AAL Type 3/4, this attribute provides a single count of CS_PDUs discarded due to
  one of the following error conditions: BEMTag mismatch, BEMSize field value not consistent with Length
  field value, or Length field value not consistent with CS_PDU length.";
```

5.4.133 Sum of incorrect SAR field errors (sumOfIncorrectSARFieldErrors)

```
sumOfIncorrectSARFieldErrors ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR sumOfIncorrectSARFieldErrorsBeh;
REGISTERED AS {attribute 133};
```

```
sumOfIncorrectSARFieldErrorsBeh BEHAVIOUR
  DEFINED AS
    " This attribute provides a sum-of-errors count for incorrect Segmentation And Reassembly
  (SAR) field errors. For AAL Type 3/4, this attribute provides a single count of SAR_PDUs discarded
  due to one of the following errors: CRC violation, unexpected Sequence Number (SN) field value, or
  unexpected MID field value";
```

5.4.134 Sum of invalid CS field errors (sumOfInvalidCSFieldErrors)

```
sumOfInvalidCSFieldErrors ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR sumOfInvalidCSFieldErrorsBeh;
REGISTERED AS {attribute 134};
```

```
sumOfInvalidCSFieldErrorsBeh BEHAVIOUR
  DEFINED AS
    " This attribute provides a sum-of-errors count for invalid Convergence Sublayer (CS) field
  errors. For AAL Type 3/4, this attribute provides a single count of the number of CS_PDUs discarded
  due to one of the following error conditions: Common Part Indicator (CPI) field not equal to 0,
  Alignment field value not equal to 0, or BEMSize field value < 37 octets for multi-segment messages.
  For AAL Type 5, this attribute provides a single count of the number of CS_PDUs discarded due to one
  of the following error conditions: Invalid Common Part Indicator (CPI), oversized received SDU, or
  length violation.";
```

5.4.135 Sum of invalid SAR field errors (sumOfInvalidSARFieldErrors)

```
sumOfInvalidSARFieldErrors ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR sumOfInvalidSARFieldErrorsBeh;
REGISTERED AS {attribute 135};
```

```
sumOfInvalidSARFieldErrorsBeh BEHAVIOUR
  DEFINED AS
    " This attribute provides a sum-of-errors count for invalid Segmentation And Reassembly
  (SAR) field errors. For AAL Type 3/4, this attribute provides a single count of the number of
  SAR_PDUs discarded due to one of the following error conditions: MID=0 when there is multiplexing,
  MID not equal to 0 when there is no multiplexing, Length field not equal to 44 octets for a BOM or
  COM, Length field not in the set [4, 8, ..., 44] octets or 63 octets for an EOM, or Length field not
  in the set [8, 12, ..., 44] octets for an SSM";
```

5.4.136 Supplementary service pointer list (supplementaryServicePtrList)

```
supplementaryServicePtrList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SetOfInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR supplementaryServicePtrListBeh;
REGISTERED AS {attribute 136};

supplementaryServicePtrListBeh BEHAVIOUR
  DEFINED AS
    "This is a set-valued attribute whose value(s) points to instances of subclasses of the
supplementaryServiceIndependentBb object class.";
```

5.4.137 Termination point list (terminationPointList)

```
terminationPointList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectList;
  MATCHES FOR EQUALITY;
  BEHAVIOUR terminationPointListBeh;
REGISTERED AS {attribute 137};

terminationPointListBeh BEHAVIOUR
  DEFINED AS
    "This attribute provides an ordered list of the termination points (e.g.
nDS0/DS1/DS3/E3/J2/Frame Relay) that are interworked. The traffic characteristics of the interworked
ATM VC termination point must be able to accommodate the combination of traffic characteristics of
all the termination points in this list.";
```

5.4.138 Timeslot pointer (timeslotPtr)

```
timeslotPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR timeslotPtrBeh;
REGISTERED AS {attribute 138};

timeslotPtrBeh BEHAVIOUR
  DEFINED AS
    "Pointer to the terminated timeslot (e.g. eOCTP, dsOCTP).";
```

5.4.139 Timing relation (timingRelation)

```
timingRelation ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TimingRelation;
  MATCHES FOR EQUALITY;
  BEHAVIOUR timingRelationBeh;
REGISTERED AS {attribute 139};

timingRelationBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the timing relation between sender and receiver (end-to-end).";
```

5.4.140 Transit delay limit (transitDelayLimit)

```
transitDelayLimit ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TransitDelayLimit;
  MATCHES FOR EQUALITY;
  BEHAVIOUR transitDelayLimitBeh;
REGISTERED AS {attribute 140};

transitDelayLimitBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the range of transit delay value for the underlying routes. The
propagation delay (delay already encountered as signalled) plus the transit delay (for this route)
have to be less than the end to end transit delay required by the user.";
```

5.4.141 Two calling party number delivery (twoCallingPartyNumberDelivery)

```
twoCallingPartyNumberDelivery ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR twoCallingPartyNumberDeliveryBeh;
REGISTERED AS {attribute 141};
```

```
twoCallingPartyNumberDeliveryBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates whether two calling party numbers have to be sent to the called
    party if two were received.";
```

5.4.142 UNI access identifier (uniAccessId)

```
uniAccessId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR uniAccessIdBeh;
REGISTERED AS {attribute 142};
```

```
uniAccessIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to name instances of the uniAccess managed object class.";
```

5.4.143 Used algorithm (usedAlgorithm)

```
usedAlgorithm ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.UsedAlgorithm;
  MATCHES FOR EQUALITY;
  BEHAVIOUR usedAlgorithmBeh;
REGISTERED AS {attribute 143};
```

```
usedAlgorithmBeh BEHAVIOUR
  DEFINED AS
    "This attribute describes the method how to select a resource from the pointer list.";
```

5.4.144 User data identifier (userDataId)

```
userDataId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR userDataIdBeh;
REGISTERED AS {attribute 144};
```

```
userDataIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to name objects of the userData managed object class.";
```

5.4.145 User data pointer (userDataPtr)

```
userDataPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
  MATCHES FOR EQUALITY;
  BEHAVIOUR userDataPtrBeh;
REGISTERED AS {attribute 145};
```

```
userDataPtrBeh BEHAVIOUR
  DEFINED AS
    "This attribute describes a single pointer to an object of the userData object class or its
    subclasses.";
```

5.4.146 Virtual path group identifier (virtualPathGroupId)

```
virtualPathGroupId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR virtualPathGroupIdBeh;
REGISTERED AS {attribute 146};
```

```
virtualPathGroupIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is used to name instances of the virtualPathGroup managed object class.";
```

5.4.147 Virtual path type (vpType)

```
vpType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.VpType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR vpTypeBeh;
REGISTERED AS {attribute 147};
```

```
vpTypeBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates whether a virtual path can be used for permanent, for on-demand or
for both types of virtual channels.";
```

5.4.148 XTPSG comb identifier (xtpsgCombId)

```
xtpsgCombId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR xtpsgCombIdBeh;
REGISTERED AS {attribute 148};

xtpsgCombIdBeh BEHAVIOUR
  DEFINED AS
    "This entity describes the object identifier attribute of the object class 'xtpsgCombId'.";
```

5.5 Definition of actions

5.5.1 Add termination point (addTerminationPoint)

```
addTerminationPoint ACTION
  BEHAVIOUR addTerminationPointBeh;
  MODE CONFIRMED;
  WITH INFORMATION SYNTAX ASN1DefinedTypesModule.AddTerminationPointInfo;
  WITH REPLY SYNTAX ASN1DefinedTypesModule.AddTerminationPointReply;
REGISTERED AS {action 1};

addTerminationPointBeh BEHAVIOUR
  DEFINED AS
    "This action is used to add one or more termination point objects to the identified
interworkingVCTTPBidirectional. The traffic characteristics of the interworked ATM VC termination
point must be able to accommodate the additional termination point.
    Supplied with this action is the following information:
    New TPs - This parameter identifies the additional Termination Points to be added to the existing
terminationPointList attribute of the identified interworkingVCTTPBidirectional object.
    InterworkingVCTTPBidirectional - This parameter identifies the instance of the
interworkingVCTTPBidirectional object class to which the additional termination point to be
interworked.
    If the request is granted, the terminationPointList attribute, in the
interworkingVCTTPBidirectional object, shall be reset to reflect the new termination point added.";
```

5.5.2 Remove termination point (removeTerminationPoint)

```
removeTerminationPoint ACTION
  BEHAVIOUR removeTerminationPointBeh;
  MODE CONFIRMED;
  WITH INFORMATION SYNTAX ASN1DefinedTypesModule.RemoveTerminationPointInfo;
  WITH REPLY SYNTAX ASN1DefinedTypesModule.RemoveTerminationPointReply;
REGISTERED AS {action 2};

removeTerminationPointBeh BEHAVIOUR
  DEFINED AS
    "This action is used to remove one or more termination point objects from the identified
interworkingVCTTPBidirectional.
    Supplied with this action is the following information:
    Existing TPs - This parameter identifies the existing Termination Points to be removed from the
identified interworkingVCTTPBidirectional object.
    InterworkingVCTTPBidirectional - This parameter identifies the instance of the
interworkingVCTTPBidirectional object class from which the identified termination points should be
removed.
    If the request is granted, the terminationPointList attribute, in the
interworkingVCTTPBidirectional object, shall be reset to reflect the remaining termination points.";
```

6 Type definitions

```
ASN1DefinedTypesModule {to be assigned}
```

```
DEFINITIONS IMPLICIT TAGS ::=
```

```
BEGIN
-- EXPORTS everything
```

```

IMPORTS
  Attribute,
  ObjectClass,
  ObjectInstance
  FROM CIMP-1 {joint-iso-ccitt ms(9) cmip(1) version1(1) protocol(3)}

  Failed
  ObjectList
  PointerOrNull
  ProblemCause
  FROM ASN1DefinedTypesModule {ccitt recommendation m 3100
                               informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)}

  ElapsedTime
  FROM
  BCRTR836Iss1Mod {1 3 17 104 module(9) tr836(3) bCRTR836Iss1Mod(1)}

-- additional value definitions to probableCause production
cellStarvation ProbableCause ::= globalValue: {atmProbableCause 4}
activeDefault ActiveInactive ::= active
offDefault OnOff ::= off
recDurDefault INTEGER ::= 4

informationModel      OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0) 376
                               informationModel(0)}
standardSpecificationExtension OBJECT IDENTIFIER ::= {informationModel
standardSpecificationExtension(0)}
managedObjectClass   OBJECT IDENTIFIER ::= {informationModel managedObjectClass(3)}
package              OBJECT IDENTIFIER ::= {informationModel package(4)}
nameBinding          OBJECT IDENTIFIER ::= {informationModel nameBinding(6)}
attribute            OBJECT IDENTIFIER ::= {informationModel attribute (7)}
action               OBJECT IDENTIFIER ::= {informationModel action(9)}
notification         OBJECT IDENTIFIER ::= {informationModel notification(10)}

AalMode ::= ENUMERATED {
  message_assured (0),
  message_unassured (1),
  streaming_assured (2)
  streaming_unassured (3)}

AalType ::= ENUMERATED {
  aal1 (0),
  aal2 (1), -- encoded for future use
  aal34 (2),
  aal5 (3)}
AbstractDestinationInstance ::= ObjectInstance
ActiveListOfRouteTps ::= ObjectInstance
ActiveTarget ::= CHOICE {
  pointer      ObjectInstance,
  carrierRequired NULL }
AddTerminationPointInfo ::= SEQUENCE {
  newTPs      NewTPs,
  interworkingVCTTPBidirectionalInstance ObjectInstance}
AddTerminationPointReply ::= SEQUENCE OF SEQUENCE {
  tpAdded      ObjectInstance,
  tpNotAdded   ProblemCause OPTIONAL}
AssignNonAssign ::= ENUMERATED {
  assign      (0),
  nonAssign   (1) }
AssocTPandVPCI ::= SET OF SEQUENCE {
  tp          ObjectInstance,
  vpci       Integer(0..65535),
  signChannel ObjectInstance OPTIONAL}
AssocvpTTPandVPCIList ::= SET OF SEQUENCE {
  tp          ObjectInstance,
  vpci       Integer }

```



```

AssocLinkGroup ::= ObjectInstance

BearerCapab ::= INTEGER {
    dbr (0),
    sbrRt (1),
    sbrNrt (2),
    abr (3),
    ubr (4),
    abtDt (5),
    abtIt (6) }

BlockedForMaintenance ::= ENUMERATED {
    blocked (0),
    unblocked (1) }

BufferRelease ::= BOOLEAN
bufferReleaseDefault BufferRelease ::= FALSE

CallingPartyCategory ::= CHOICE {
    unused NULL,
    category Category }

Category ::= BIT STRING (SIZE (8)) -- acc. Q.2763

CarrierCode ::= NetworkIdentification

CarrierDataPtr ::= ObjectInstance

CCITTNetworkPlanIndicator ::= INTEGER

ChannelAssociatedSignalling ::= ENUMERATED
{
    basic (0),
    elCas (1),
    ds1SfCas (2),
    ds1Esfcas (3),
    j2Cas (4)
}

Cic ::= INTEGER (0..65335)

CIPRequired ::= Boolean

ClockRecoveryType ::= ENUMERATED {
    synchronous (0),
    srts (1),
    adaptive (2)}

Code ::= SET OF DigitString4

CSPRequired ::= Boolean

ConnIdRestrictionOptions ::= SEQUENCE {
    mode ENUMERATED {permanent(1), temporary(2)},
    default ENUMERATED {restricted(1),
        notRestr(2)} OPTIONAL -- for temporary mode only --
}

ConnectionIdOffering ::= INTEGER {
    exclusiveVpciExclusiveVci (0),
    exclusiveVpciAnyVci (1),
    noIndication (8) }

connectionIdOfferingDefault ConnectionIdOffering ::= exclusiveVpciExclusiveVci

CUGBarring ::= ENUMERATED {
    none (1),
    incomingCallsBarred (2),
    outgoingCallsBarred (3)}

CUGDataNetworkIdentification ::= NumericString (SIZE(4)) -- Q.2763

CUGIndex ::= INTEGER (0..65535) -- Q.2955

CUGInterlockCode ::= INTEGER (0..65535) -- Q.2763

DestinationCode ::= DigitString15

DestinationType ::= INTEGER {
    international (1),
    national (2),
    local (3) }

```

```

defaultBlockedForMaintenance ::= blocked

defaultSignallingType SignallingType ::= nonassociated

defaultTwoCallingPartyNumberDelivery ::= TRUE

DigitComb ::= SEQUENCE OF DigitElement

DigitCombInsert ::= SET OF SEQUENCE {
    startPosition    [0] INTEGER ,
    combination      [1] DigitComb }

DigitCombReplace ::= SET OF SEQUENCE {
    startPosition    [0] INTEGER ,
    endPosition      [1] INTEGER ,
    combination      [2] DigitComb }

DigitElement ::= PrintableString
    (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
    (SIZE (1))

DigitManipPtr ::= ObjectInstance

DigitString4 ::= PrintableString
    (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
    (SIZE (1..4))

DigitString8 ::= PrintableString
    (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
    (SIZE (1..8))

DigitString15 ::= PrintableString
    (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
    (SIZE (1..15))

DigitSuppress ::= SET OF SEQUENCE {
    startPosition    [0] INTEGER ,
    endPosition      [1] INTEGER }

emptySet SetOfInstances ::= { }

ExcludedSubscriberCodes ::= SET OF PrintableString
    (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
    (SIZE (1..8))

ExistingTPs ::= SEQUENCE OF ObjectInstance

FecMethod ::= ENUMERATED{
    noFEC (0),
    lossSensitiveSignalFEC (1),
    delaySensitiveSignalFEC (2)}

InitialSubscriberCodes ::= SET OF PrintableString
    (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
    (SIZE (1..8))

Integer ::= INTEGER

InterCUGaccess ::= ENUMERATED
    {none (1),
    outgoingPermanentAccess (2),
    outgoingPerCallAccess (3),
    incomingAccess (4),
    outgoingPermanentAndIncomingAccess (5),
    outgoingPerCallAndIncomingAccess (6) }

LinkType ::= ENUMERATED {
    national (0),
    international (1) }

ListOfRoutes ::= SEQUENCE OF ObjectInstance

ListOfLinkGroups ::= SEQUENCE OF ObjectInstance

LocalAreaCode ::=
    NumericString (FROM ("0"|"1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"))

MaintenanceSignallingRunning ::= BOOLEAN

MaxCc ::= INTEGER
maxCcDefault MaxCc ::= 4

MaxCpcsPduSize ::= SEQUENCE {

```

```

forward [0] INTEGER (1..65535) OPTIONAL,
backward [1] INTEGER (1..65535) OPTIONAL}

MaxDigits ::= INTEGER

MaxInformationFieldLength ::= INTEGER
maxInformationFieldLengthDefault MaxInformationFieldLength ::= 4096

MaxLengthSscopUuField ::= INTEGER
maxLengthSscopUuFieldDefault MaxLengthSscopUuField ::= 4096

MaxPd ::= INTEGER
maxPdDefault MaxPd ::= 25

MaxSscopCreditToPeer ::= INTEGER
maxSscopCreditToPeerDefault MaxSscopCreditToPeer ::= 16

MaxStat ::= INTEGER
maxStatDefault MaxStat ::= 67

MidRange ::= SEQUENCE {
  lowvalue [0] INTEGER (1..66536)
  highvalue [1] INTEGER (1..66536)}

MinDigits ::= INTEGER

NationalNetworkIdenPlanIdenticator ::= INTEGER

NatureOfAddress ::= DestinationType

NBTransferCapability ::= INTEGER {
  speech (0),
  r64kbitUnrestricted (1),
  r56kbitDigitalRestricted (2),
  r3point1khzAudio (3),
  r7khzAudio (4),
  video (5) }

NBTransferCapabilitySet ::= SET OF NBTransferCapability

NetworkBorder ::= ENUMERATED {
  intraNetwork (0),
  interNetwork (1) }

NetworkIdentification ::= DigitString8

NetworkIdentificationPlan ::= CHOICE
{
  cCITTNetworkPlanIndicator [0] CCITTNetworkPlanIndicator,
  nationalNetworkIdenPlanIdenticator [1] NationalNetworkIdenPlanIdenticator }

NetworkType ::= ENUMERATED {
  transit (0),
  nonTransit (1) }

NewTPs ::= SEQUENCE OF ObjectInstance

Origin ::= CHOICE {
  unused NULL,
  origin INTEGER }

OwnInternationalCode ::= NumericString
(FROM ("0"|"1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"))

PollAfterRetransmission ::= BOOLEAN

PreferredCarrier ::= SEQUENCE {
  networkIdentificationPlan NetworkIdentificationPlan,
  typesOfNetworkIdentification TypesOfNetworkIdentification,
  networkIdentification NetworkIdentification }

PreferredCUGIndex ::= CHOICE{
  notDefined [0] NULL,
  defined [1] CUGIndex}

PropagationDelay ::= INTEGER (0..65535)

RemoteBlocking ::= ENUMERATED {
  remoteBlocked (0),
  remoteUnblocked (1) }

```

```

RemoteBlockingReason ::= INTEGER {
    none          (0),
    mob           (1),
    hob           (2),
    mobAndHob     (3) }

RemoveTerminationPointInfo ::= SEQUENCE {
    existingTPs          ExistingTPs,
    interworkingVCTTPBidirectionalInstance ObjectInstance}

RemoveTerminationPointReply ::= SEQUENCE OF SEQUENCE {
    tpInstance          ObjectInstance,
    tpRemovalProblem   ProblemCause OPTIONAL
    -- absent if tpInstance is removed
    }

ReqBandwidthEgress ::= SEQUENCE {
    lowerLimit INTEGER,
    upperLimit INTEGER }

ReqBandwidthIngress ::= SEQUENCE {
    lowerLimit INTEGER,
    upperLimit INTEGER }

ReqBearerCapab ::= SET OF BearerCapab

ReqNBTransferCapability ::= CHOICE {
    withoutNBCapab NULL,
    withNBCapab    NBTransferCapabilitySet }

RingTimeLimit ::= INTEGER

SearchMethod ::= INTEGER {
    forwardSequential (0),
    backwardSequential (1),
    forwardCyclic     (2),
    backwardCyclic    (3) }

SendTNS ::= BOOLEAN

SetOfInstances ::= SET OF ObjectInstance

SignallingStandard ::= INTEGER {
    iTU (0),
    aTMF (1) }

SignallingProtocol ::= ENUMERATED {
    nisup (0),
    bisup (1) }

SignallingType ::= ENUMERATED {
    nonassociated (0),
    associated (1) }

SscopTimerCc ::= INTEGER
sscopTimerCcDefault SscopTimerCc ::= 1000

SscopTimerIdle ::= INTEGER
sscopTimerIdleDefault SscopTimerIdle ::= 15000

SscopTimerKeepAlive ::= INTEGER
sscopTimerKeepAliveDefault SscopTimerKeepAlive ::= 2000

SscopTimerNoResponse ::= INTEGER
sscopTimerNoResponseDefault SscopTimerNoResponse ::= 7000

SscopTimerPoll ::= INTEGER
sscopTimerPollDefault SscopTimerPoll ::= 750

SscsType ::= ENUMERATED {
    null (0),
    dataAssured (1),
    dataNonAssured (2),
    frameRelay (3)}

SubscriberCategory ::= INTEGER {
    unknownAtThisMoment (0), -- acc. Q.2763
    operatorLanguageFrench (1), -- for national use
    operatorLanguageEnglish (2),
    operatorLanguageGerman (3),

```

```

operatorLanguageRussian      (4),
operatorLanguageSpanish      (5),
nationalOperator             (9),      -- for national use
ordinaryCallingSubscriber     (10),
callingSubscriberWithPriority (11),
dataCall                     (12),
testCall                     (13),
payPhone                     (15) } (0..255)

SubType ::= ENUMERATED {
  null (0),
  voiceBand (1),
  circuitEmulationSynchronous (2),
  circuitEmulationAsynchronous (3),
  highQualityAudio (4),
  video (5)}

TimingRelation ::= INTEGER {
  timingNotRequired (0),
  timingRequired (1) }

TransitDelayLimit ::= SEQUENCE {
  lowerLimit INTEGER,
  upperLimit UpLimit }

TypesOfNetworkIdentification ::= INTEGER

UpLimit ::= CHOICE {
  noLimit NULL,
  limit INTEGER }

UsedAlgorithm ::= INTEGER {
  sequential (0),
  cyclic (1) }

VpType ::= ENUMERATED {
  on-demand (0),
  permanent (1),
  mixed (2)}

END -- of ASN1DefinedTypesModule

```

7 Protocol stacks

The protocol stacks specified in ITU-T Recommendations Q.811 [22], Q.812 [23], G.773 [24] and the SDH digital cross-connect part of G.784 [25] can be used as part of the present document.

Annex A (normative): ATM switch management requirements

This clause uses as a reference ITU-T Recommendation I.751 [4] about the management of the ATM cross-connects, and describes or enhances management requirements for those aspects present only in the ATM switch.

The complete set of management requirements for ATM switching network elements has to be composed from the present and the above mentioned documents.

ATM adaptation layer 5 is specified in ITU-T Recommendation I.363.5 [2]

The signalling ATM adaptation layer is split into the Service Specific Connection-Oriented Protocol (SSCOP) defined in ITU-T Recommendation Q.2110 [7] and the Service Specific Coordination Function (SSCF) defined for the UNI in ITU-T Recommendation Q.2130 [8] and for the NNI in ITU-T Recommendation Q.2140 [9].

DSS2 user signalling is defined in ITU-T Recommendation Q.2931 [14] and B-ISUP network signalling is defined in ITU-T Recommendations Q.2761 to Q.2764 [10] to [13].

A.1 Configuration management functions

Configuration management provides functions to exercise control over, identify, collect data from and provide data to NEs.

On one side, in an ATM cross-connect VP/VC connections are set up, modified and released via configuration management functions. On the other side, in an ATM switch, connections are set up, modified and released by signalling procedures, and configuration management is concerned mainly with managing control entities.

A.1.1 General NE configuration functions

This group of functions includes the set of procedures needed to bring the Network Element (NE) into service and to take care of hardware and software modifications and upgrades. It also includes the requirements for customer administration and call routing.

A.1.2 ATM transport layer configuration functions

A.1.2.1 VPC/VCC configuration functions

The capability of setting a VP/VC connection in an unlocked administrative state (traffic flow is enabled), or in a locked state (traffic flow is suspended) has to be provided.

This capability will be used by system management to take corrective actions in response to performance degradation or fault of the virtual connection.

A.1.3 ATM adaptation layer configuration functions

The various ATM adaptation layers generate requirements for configuration management and these requirements which are listed here. Each trail on the virtual channel layer supports a single ATM adaptation layer, which may either be configured or defined by call control. Unless otherwise stated, changes to the ATM adaptation layer may be requested, but such a request may be rejected if the change is not supported by the implementation. Likewise, unless otherwise stated, it shall always be possible to read the details of the actual configuration of the ATM adaptation layers.

A.1.3.1 Configuration management requirements for ATM adaptation layer 5

The following items may be read and changes may be requested:

- the maximum number of octets in CPCS-PDU payload which is supported by ATM adaptation layer 5 both for transmit and for receive directions;

- the form of data encapsulation used over the ATM adaptation layer 5 Service Specific Convergence Sublayer (SSCS).

A.1.3.2 Configuration management requirements for the signalling ATM adaptation layer

The type of SSCS used may be read and changes may be requested.

It should be possible to configure timer values for the SAAL.

A.1.4 Broadband signalling configuration functions

A.1.4.1 Co-ordination of VPCI values

There is a requirement for management co-ordination between interconnected switches so that the switch which handles the signalling is aware of how the VPCI mappings differ from those of directly connected accesses when the access is connected indirectly via another switch with cross-connect functionality.

A.2 Performance management functions

Performance management provides functions to evaluate and report upon the behaviour of telecommunications equipment and the effectiveness of the network element.

Performance management functions will be based on ITU-T Recommendation Q.822 [26]; the set of monitored parameters is detailed in the following subclauses.

The identified functions for the ATM switches are concerned with performance and error measurements to report the general behaviour of the network element and can be useful to detect situations of degraded performance and identify possible causes of the abnormal situation.

A.2.1 General NE performance functions

A.2.2 ATM transport layer performance functions

Three main sets of parameters need to be monitored; the first one is related to the OAM F4 and F5 flows mechanism, the second one deals with load and traffic related parameters, while the third one relies on system-dependent techniques.

A.2.2.1 F4 / F5 OAM flows related parameters

Performance monitoring is based on the use of OAM flows, both segment and end-to-end (ITU-T Recommendation I.610 [3]). At the ATM layer the F4 and F5 flows are considered.

Each trail termination point must have the capability to generate the F4 / F5 flows on the outgoing link and/or to process the incoming F4 / F5 flows.

These flows can be used to monitor the following parameters, at VP and VC layer, respectively:

- Bit error rate;
- Cell loss / insertion;
- Cell transfer delay;
- Cell delay variation.

Suitable mechanisms are present in the flow, to support these functions, such as the block error detection code (BIP-X - I.610).

When the measured values of these parameters exceed a preassigned threshold, an alarm is generated and sent to the TMN and to the control plane functions.

A.2.2.2 Load and traffic related parameters

The following parameters related to load and traffic need to be monitored; various methods can be used not included in the OAM flow mechanism.

- internal overload / congestion;
- external congestion;
- blocking at virtual connection level.

Functions responsible for the supervision of the overload and congestion state of the node (internal congestion) and of the network (external congestion) are examined below.

Possible causes of overload can be faults inside the switching fabric, lack of internal capacity due to a poor system engineering that is unable to deal with traffic bursts, or malfunctioning of the UPC/NPC functions.

Overload conditions can be indicated by overflow of the buffers located at the input and/or output of the switching fabric. In this case the automatic reaction to the condition is to discard cells, possibly in a selective way if a priority mechanism has been adopted.

If the overload condition persists, the switch can enter into a congestion state. This status is also shown by a permanent buffer overflow condition.

When a network element enters a congestion state, the system has to inform all the downstream nodes about its condition; a notification of this state is inserted in all the cells leaving the node through a particular code on the PTI field of the ATM cell header (see ITU-T Recommendation I.361 [27]).

The congestion indication is therefore propagated forward in the network.

Monitoring of congested cells on a VP/VC basis can be used to prevent the congestion of the whole network.

At virtual connection level, the switch can experience a connection blocking state when it is impossible to connect an allocatable VP/VC connection on an input interface with an equivalent allocatable VP/VC connection on the corresponding output interface. The connection control cannot accept the new VP/VC connection, although the interfaces have enough capacity available.

Causes of this event can be internal blocking inside the switching fabric, due to implementation of the switching fabric itself with a blocking architecture, or use of resources management policies to guarantee the requested quality of service.

A.2.2.3 Additional parameters

The following parameters need also to be monitored.

- HEC error check;
- cell multiplexing error check;
- UPC/NPC intervention.

The HEC and the cell multiplexing error checking functions are performed at the lower layers of the B-ISDN protocol reference model (at physical layer and ATM layer, respectively). In the first case indications are provided about cells affected by multiple errors on the header, so that correction procedures cannot be applied; in the second case cells come in with an apparently correct cell header, but the internal VCI/VPI translation table does not contain any valid entry for that VCI/VPI. This means that a VCI/VPI multiplexing error has occurred.

It is assumed that in both cases cells are discarded.

The UPC and NPC functions mark or discard cells when they exceed the agreed service parameters. The number of tagged cells need to be counted on a VP and/or VC basis.

A.2.3 ATM adaptation layer performance functions

Sets of parameters need to be monitored for the various ATM adaptation layers.

A.2.3.1 Performance management requirements for ATM adaptation layer 5

Performance monitoring of ATM adaptation layer 5 is concerned with the use of the payload type field in the ATM cell header and the use of the last 8 octets of the CPCS-PDU (see ITU-T Recommendation I.363.5 [2]). In particular, the following should be monitored:

- undelineated ATM cell sequences which are longer than the maximum number of cells in a CPCS-PDU;
- inconsistencies between the number of ATM cells in a CPCS-PDU as indicated by the coding in the cells' payload type field and the length of the CPCS as indicated in the length field of the CPCS-PDU trailer;
- the error rate as detected by the CRC field in the CPCS-PDU.

In addition, the following performance statistics should be available:

- number of received and transmitted PDUs;
- PDUs discarded due to CRC errors;
- PDUs discarded due to reassembly time out;
- PDUs discarded due to overlarge size;
- PDUs discarded due to protocol errors.

A.3 Fault management functions

Fault management is a set of functions which enables the detection, isolation and correction of abnormal operation of the ATM switch.

A.3.1 Alarm surveillance

A.3.1.1 General NE alarm surveillance functions

A.3.1.2 ATM transport layer alarm surveillance functions

When a fault or a condition of severely degraded performance situation is detected, a connection termination point shall be able to send a VP-AIS alarm on the OAM F4 / F5 flow, and to send an alarm to the TMN and to the control plane functions.

A.3.1.3 ATM adaptation layer alarm surveillance functions

A.3.1.4 Alarm surveillance requirements for ATM adaptation layers

Detected problems in the ATM adaptation layers will generate various alarms.

A.3.1.4.1 Alarm surveillance management requirements for ATM adaptation layer 5

Alarms are generated under the following conditions:

- when the payload type field in the ATM cell header fails to indicate the last ATM cell of a CPCS-PDU for more than the maximum number of cells in a CPCS-PDU;
- when the number of ATM cells in a CPCS-PDU is not consistent with the length of the CPCS as indicated in the length field of the CPCS-PDU trailer;

- when the error rate as detected by the CRC field in the CPCS-PDU becomes too high.

A.3.2 Test and fault localization

A.3.2.1 General NE test and fault localization functions

A.3.2.2 ATM transport layer test and fault localization functions

The mechanism of continuity check, performed using OAM F4 / F5 flows, is used for testing the integrity of the translation and routing tables of the NE. When a connection termination point does not transmit user cells and there is no failure indication through the VP-AIS and VP-FERF signals, then it must be able to send a continuity check signal. If the receiving termination point receives no OAM cells, it will generate a VP-FERF signal. This mechanism is useful for localization of the termination points that has experienced a failure.

A.3.2.3 ATM adaptation layer test and fault localization functions

When a fault is suspected in the ATM adaptation layers, or an alarm has been generated, it may be necessary to perform activities to check the correct operation of the ATM adaptation layers and to identify the origin of a confirmed ATM adaptation layer fault.

A.3.2.3.1 Testing and fault localization requirements for ATM adaptation layer 5

Non-intrusive testing of ATM adaptation layer 5 shall be carried out by generating and detecting patterns on the CPCS-UU octet of the CPCS-PDU trailer and/or on the padding octets. Intrusive testing of ATM adaptation layer 5 shall be carried out by generating and detecting patterns on the CPCS-PDU payload. These patterns may either be looped back to their source or sent in a single direction.

A.3.3 Fault correction

A.3.3.1 General NE fault correction functions

A.3.3.2 ATM transport layer fault correction functions

When a failure in a VP/VC connection occurs, it is possible to perform fault correction by protection switching.

The mechanism of protection switching is based on the use of a spare VP/VC connection, shared among a group of active virtual connections and it is directed by Layer Management.

A.4 Modelling specific requirements

The ITU-T Recommendation Q.2764 [13] describes a parameter transit network selection for the setup messages. This parameter may be "included in the setup message from the calling party or provided on a subscription basis". This information "is used for routing the call/connection, e.g. to a specific B-ISDN".

To support this parameter, it should be possible to assign a preferred carrier (transit network) value either to the whole customer or to an individual directory number.

The ITU-T Recommendation Q.2764 [13] describes a parameter Calling Party Category for the setup messages.

To support this parameter, it should be possible to assign a category value either to the whole customer or to an individual directory number.

The call routing management allows to mark an NNI with an origination mark, to support the origination dependent routing of incoming calls. Origination dependent routing should also be possible for calls coming from a UNI.

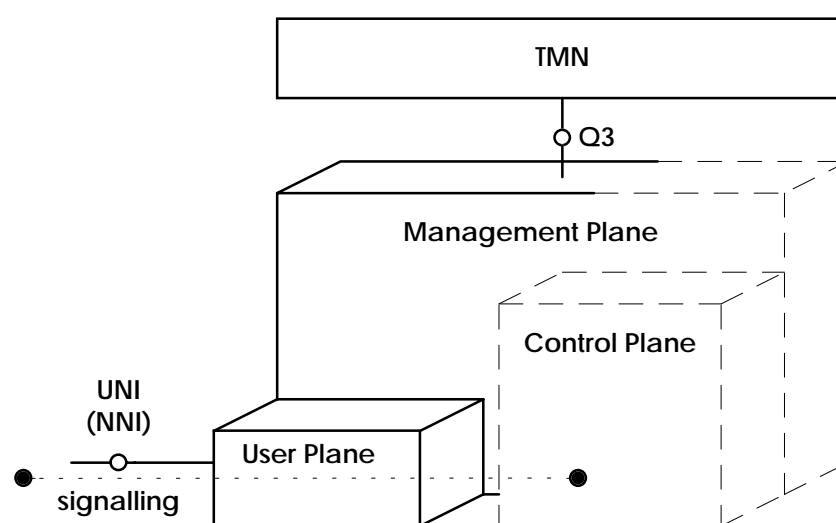
It should be possible to mark either the whole customer or an individual directory number with an origination mark, which can be used e.g. for the origination dependent routing.

Annex B (normative): Reference scenario for the management of the ATM switching network element

The definition of the reference configuration for B-ISDN management is based on ITU-T Recommendations. I.311 [1], I.610 [3], I.751 [4] and ETS 300 469 [20].

ITU-T Recommendation I.311 [1] is mainly concerned with the communication scenario between user and network elements to provide control and management information exchange. ITU-T Recommendation I.610 [3] deals with the TMN architecture for the B-ISDN customer access. ITU-T Recommendation I.751 [4] and ETS 300 469 [20] propose a TMN architecture specialized for a VP cross-connect network, subdivided into an upper level (network OS) and a lower level (NE OS).

The reference scenario for the ATM switch management is shown in figure B.1.



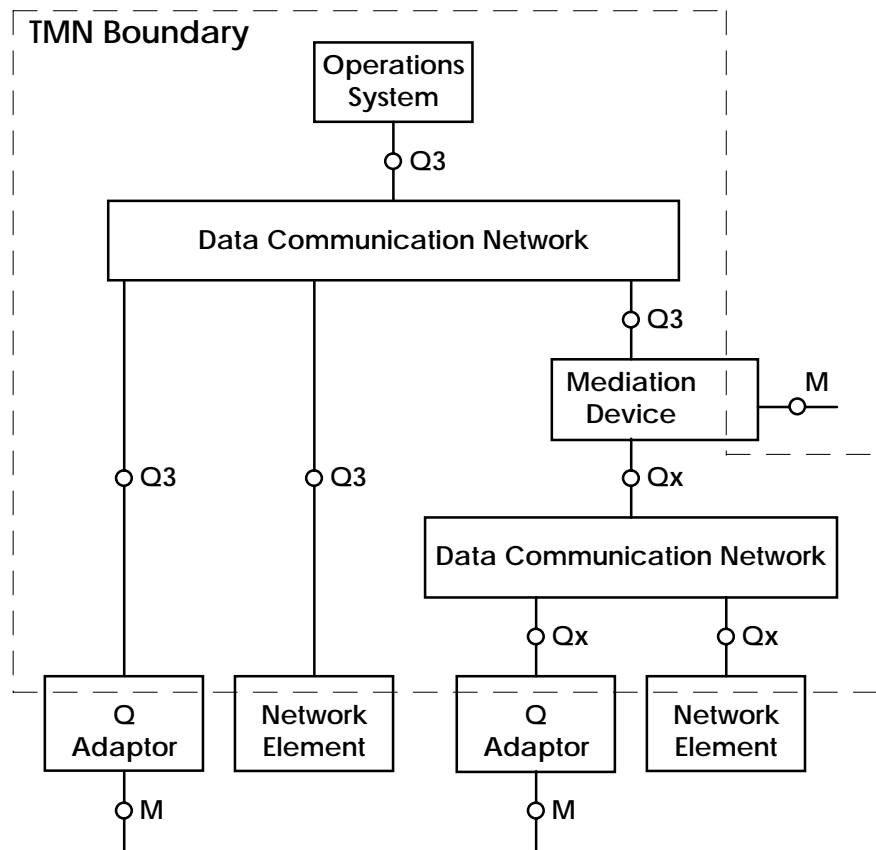
NOTE: Solid line - illustrates the application for ATM Cross Connect.
Dashed line - illustrates the extensions for an ATM Switch

Figure B.1: ATM cross connect / ATM switch model

The present document focuses on the Q3 interface between the NE OS and the ATM switch, describing an object model for the management of control plane functions for the ATM switch. For example, it will address management of routing, customer administration, and management of the virtual channels for signalling information transfer.

The location of the Q3 interface is illustrated in figure B.2 and the protocol stacks used at this point are specified in clause 7 of the present document.

The Q3 interface is the TMN interface between network elements or Q-adaptors which interface to operations systems without mediation and between operations systems and mediation devices. The use of standard at these points is mandatory. The specification of Q_x interfaces and proprietary interfaces is outside the scope of the present document.



NOTE 1: Q_x and M (proprietary) interfaces are outside the scope of this EN.

NOTE 2: A mediation device can only have a M interface if it contains Q-adaptor functionality.

Figure B.2: Location of the Q3 interface

Protocols on the Q3 interface between the management plane and TMN will be considered at a later stage. Work will be concentrated on two items, namely mapping the information model onto CMIP and mapping CMIP onto the ATM protocol stack.

Annex C (informative): Functional architecture

C.1 Lower layers: SDH based interfaces

The functional architecture for SDH based interfaces is shown in figure C.1. The lowest layer of the functional architecture is the physical media layer. At the sink terminations of this layer, the incoming interface signal (which may be optical or electrical) is converted into an internal logic level and timing is recovered. A loss of incoming signal will typically result in a LOS (Loss Of Signal) alarm being raised. At the source terminations of this layer the internal logic level signals are converted into outgoing interface signals. An alarm may be raised if a transmit component such as a transmit laser fails. Alarms raised at the physical media layer may result in F1 OAM layer flows in the client layer.

The SDH regenerator section layer is the client layer which is served by the physical media layer. The sink terminations of this layer perform the descrambling of the incoming signal and the processing and removal of the regenerator section layer. A loss of framing will typically result in a Loss of Frame (LOF) alarm being raised and may result in an F1 OAM layer flow. The source terminations of this layer generate the regenerator section overhead and scramble the signal. The monitoring of the regenerator section layer error rate which is part of the regenerator section overhead may result in warnings or alarms being raised and may result in F2 OAM layer flows in the client layer.

The SDH multiplexer section layer is the client layer which is served by the regenerator section layer. The sink terminations of this layer perform the processing and the removal of the section overhead, whereas the source terminations generate and add this overhead. The loss of the pointer in the section overhead and the monitoring of the error rate for the multiplex section overhead may result in F3 OAM layer flows in the client layer.

The higher order SDH path layer is the client layer which is served by the SDH multiplexer layer. The sink terminations of this layer perform the processing and removal of the path overhead, whereas the source terminations generate and add this overhead. Monitoring of path error rate may result in alarms being raised and in F3 OAM flows, as may errors in the path ID label or the path signal label.

For ATM applications, the SDH transmission convergence layer replaces the lower order SDH path layer as the client layer which is served by the higher order SDH path layer. The sink terminations of this layer perform the adaptation to the higher ATM layers from the SDH path layer, whereas the source terminations perform the adaptation to the SDH path layer from the higher ATM layers. The loss of cell delineation, uncorrectable header errors, degraded header error performance and the detection of too many IDLE ATM cells can give rise to warnings, alarms, and F3 OAM flows. The terminations of this layer ensure that no IDLE cells are passed to its client layer.

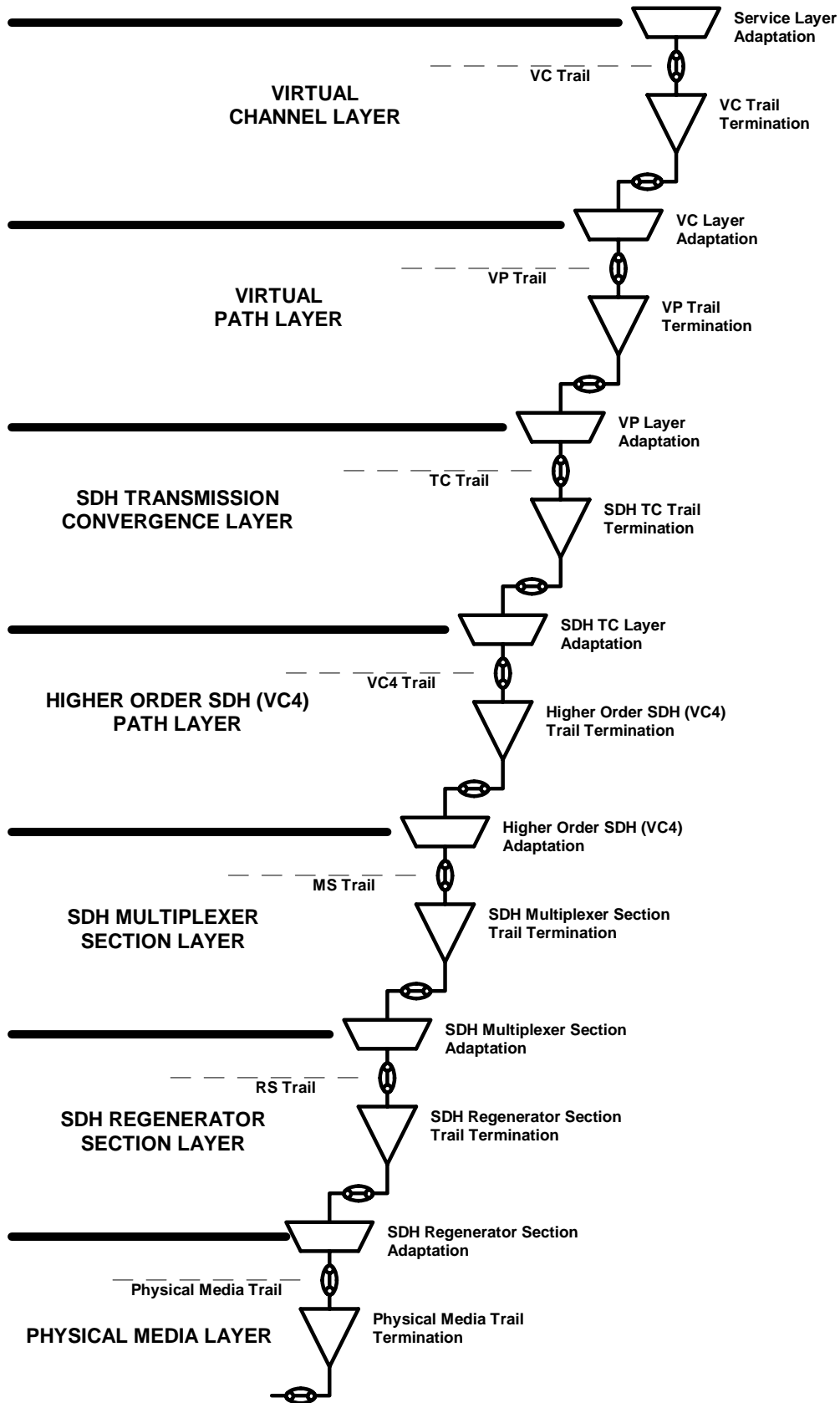


Figure C.1: Functional architecture for ATM on a SDH based Interface

C.2 Lower layers: cell based interfaces

The functional architecture for cell based interfaces is shown in figure C.2.

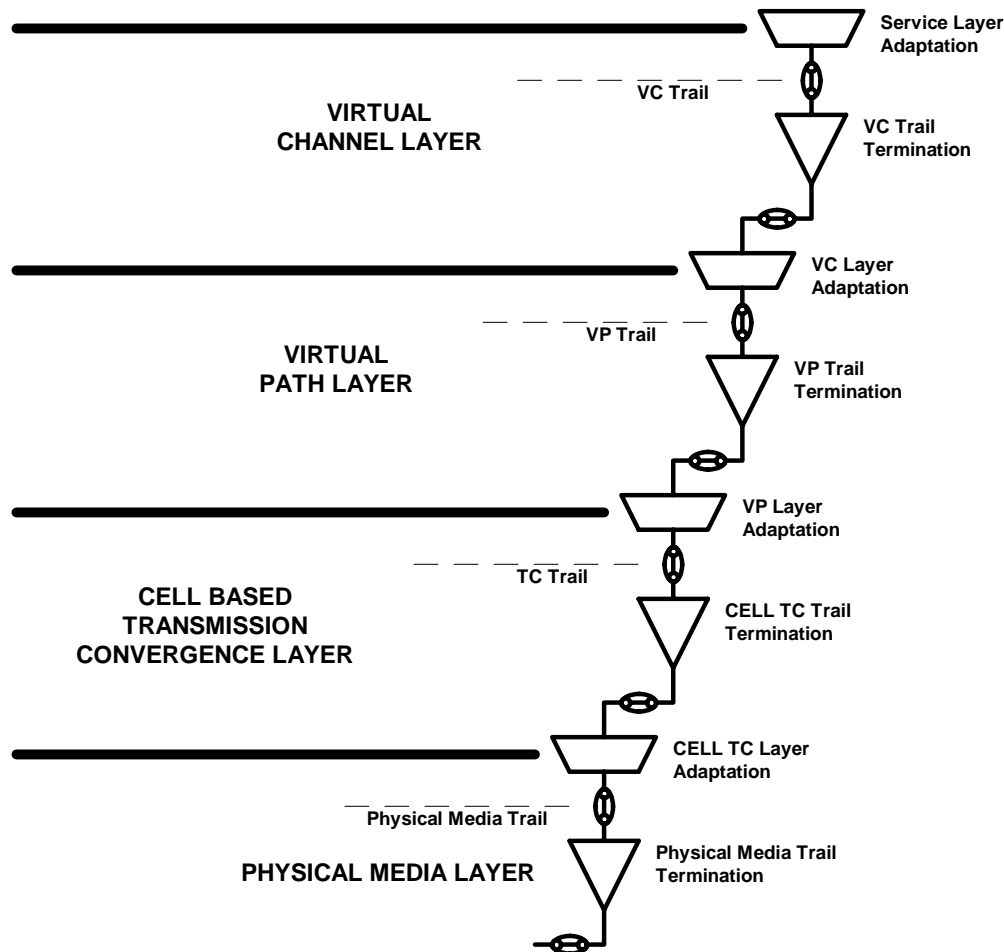


Figure C.2: Functional architecture for ATM on a cell based Interface

As for the SDH case, the lowest layer of the functional architecture is the physical media layer. At the sink terminations of this layer the incoming interface signal (which may be optical or electrical) is converted into an internal logic level and timing is recovered. A loss of incoming signal will typically result in a LOS alarm being raised. At the source terminations of this layer the internal logic level signals are converted into outgoing interface signals. An alarm may be raised if a transmit component such as a transmit laser fails. Alarms raised at the physical media layer may result in F1 OAM layer flows in the client layer.

The cell based transmission convergence layer is the client layer which is served by the physical media layer. The sink terminations of this layer perform the adaptation to the higher ATM layers from the media layer, whereas the source terminations perform the adaptation to the media layer from the higher ATM layers. Loss of F1 PL-OAM cells and degraded performance can give rise to alarms, warnings and F1 OAM flows. The loss of F3 PL-OAM cells, loss of cell delineation, uncorrectable header errors, degraded header error performance and the detection of too many IDLE ATM cells can give rise to warnings, alarms, and F3 OAM flows. The terminations of this layer ensure that no IDLE cells, F1 PL-OAM cells or F3 PL-OAM cells are passed to its client layer.

C.3 Higher ATM layers

The higher ATM layers are common to both SDH based interfaces and cell based interfaces. The virtual path layer is the client which is served by the appropriate transmission convergence layer. The sink terminations of this layer ensure that none of the VP overhead (VCI=3 and VCI=4) which supports the F4 layer OAM flows are passed onto its client layer. The terminations at this layer correspond to the endpoints of ATM VPCs.

The virtual channel layer is the client which is served by the virtual path layer. The sink terminations of this layer ensure that none of the VC overhead (PTI=4 and PTI=5) which supports the F5 layer OAM flows are passed onto its client layer. The terminations at this layer correspond to the endpoints of ATM VCCs.

Annex D (informative): Bibliography

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History

Document history		
V1.1.1	February 1998	Public Enquiry PE 9824: 1998-02-13 to 1998-06-12