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SERIES Q: SWITCHING AND SIGNALLING

Specifications of Signalling System No. 7 – Q3 interface

VB5.1 Management

ITU-T Recommendation Q.832.1

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION Q.832.1

VB5.1 MANAGEMENT

Summary

This Recommendation specifies the Q3 interfaces between a Service Node (SN) and the Telecommunications Management Network and between an Access Network (AN) and the TMN for the management associated with VB5.1 interfaces.

Source

ITU-T Recommendation Q.832.1 was prepared by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 26th of June 1998.

FOREWORD

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NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation Q.832.1

VB5.1 MANAGEMENT

(Geneva, 1998)

1 Introduction

1.1 Purpose and scope

This Recommendation specifies the Q3 interfaces between a Service Node (SN) and the Telecommunications Management Network (TMN) and between an Access Network (AN) and the TMN for the management associated with VB5.1 interfaces [3]. 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 Recommendation M.3010 [4].

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 this Recommendation.

Security management is also outside the scope of this Recommendation.

The coordination of the Operation Systems of the Access Network and the Service Node for all VB5 interfaces is given in the VB5.2 management Recommendation Q.832.2 [12].

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Recommendation G.853.1 (1996), *Common elements of the information viewpoint for the management of a transport network.*

[2] ITU-T Recommendation G.902 (1995), *Framework Recommendation on functional access networks – Architecture and functions, access types, management and service node aspects.*

[3] ITU-T Recommendation G.967.1 (1998), *V-interfaces at the Service Node (SN): VB5.1 reference point specification.*

[4] ITU-T Recommendation M.3010 (1996), *Principles for a telecommunications management network.*

[5] ITU-T Recommendation M.3100 (1995), *Generic network information model*.

[6] ITU-T Recommendation Q.2811[1] , *Broadband Q3 and X interfaces – Lower layer protocols.*

[7] ITU-T Recommendation Q.2812[1], *Broadband Q3 and X interfaces – Upper layer protocols.*

[1] Presently at the stage of draft.

[8] ITU-T Recommendation Q.811 (1997), *Lower layer protocol profiles for the Q3 and X interfaces*.

[9] ITU-T Recommendation Q.812 (1997), *Upper layer protocol profiles for the Q3 and X interfaces*.

[10] ITU-T Recommendation Q.824.5 (1997), *Stage 2 and stage 3 description for the Q3 interface – Customer administration: Configuration management of V5 interface*.

[11] ITU-T Recommendation Q.824.6 (1998), *Stage 2 and stage 3 description for the Q3 interface – Customer administration: Broadband switch management*.

[12] ITU-T Recommendation Q.832.2[1], *VB5.2 management*.

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

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

[15] CCITT Recommendation X.731 (1992) | ISO/IEC 10164-2:1992, *Information technology – Open Systems Interconnection – Systems management: State management function*.

[16] CCITT Recommendation X.732 (1992) | ISO/IEC 10164-3:1993, *Information technology – Open Systems Interconnection – Systems management: Attributes for representing relationships*.

[17] ITU-T Recommendation I.751 (1996), *Asynchronous transfer mode management of the network element view*.

3 Definitions, abbreviations and conventions

3.1 Definitions

This Recommendation defines the following terms.

Resources

The management of user port functions and service port functions providing User Network Interface (UNI) and Service Node Interface (SNI) functionality, respectively, are considered in this Recommendation based on the framework defined in Recommendation G.902 [2]. Transmission specific resources lie outside the scope of this term in this Recommendation.

In addition, this Recommendation uses terms defined in Recommendations:

G.902 [2]: Access Network (AN), User port functions, Service Node (SN), Service Node Interface (SNI), Service port functions.

G.967.1 [3]: Logical Service Port (LSP), Logical User Port (LUP), Physical Service Port (PSP), Physical User Port (PUP), Real Time Management Coordination (RTMC), Virtual User Port (VUP).

M.3010 [4]: Message Communication Function (MCF).

3.2 Abbreviations

This Recommendation uses the following abbreviations:

AAL	ATM Adaptation Layer
AEMP	ATM Equipment Management Function
AIS	Alarm Indication Signal
AN	Access Network
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
B-BCC	Broadband Bearer Connection Control
ERD	Entity-Relationship Diagram
GDMO	Guidelines for the Definition of Managed Objects
LME	Layer Management Entry
LSP	Logical Service Port
LUP	Logical User Port
ME	Management Entry
MIB	Management Information Base
MOC	Managed Object Class
OAM	Operations, Administration and Maintenance
OLT	Optical Line Terminal
ONU	Optical Network Unit
OS	Operations System
PON	Passive Optical Network
RDI	Remote Defect Indication
RDN	Relative Distinguished Name
RTMC	Real Time Management Coordination
SAAL	Signalling ATM Adaptation Layer
SDH	Synchronous Digital Hierarchy
SN	Service Node
SNI	Service Node Interface
TMN	Telecommunications Management Network
TTP	Trail Termination Point
UNI	User-Network Interface
VC	Virtual Channel
VDSL	Very high speed Digital Subscriber Line
VP	Virtual Path
VPC	Virtual Path Connection
VPCI	Virtual Path Connection Identifier

3.3 Conventions

Objects and their characteristics and associated ASN.1 defined here are given names with capitals used to indicate the start of the next word, and acronyms are treated as if they were words.

Throughout this Recommendation, all new attributes are named according to the following guidelines:

– The name of an attribute ends in the string "Ptr" if and only the attribute value is intended to identify a single object.

– The name of an attribute ends in the string "PtrList" if and only the attribute value is intended to identify one or more objects.

– The name of an attribute is composed of the name of an object class followed by the string "Ptr" if and only 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 ends in the string "Id" if and only the attribute value is intended to identify the name of an object, in which case this attribute should be the first one listed, should use ASN.1 NameType and should not be used to convey other information.

– 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.

4 General overview

The following information model diagrams have been drawn for the purpose of clarifying the relations between the different object classes of the model.

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).

These diagrams are only for clarification. The formal specification in terms of GDMO templates and ASN.1 type definitions are the relevant information for implementations.

4.1 Entity-relationship models

The following conventions are used in the diagrams (see Figure 1):

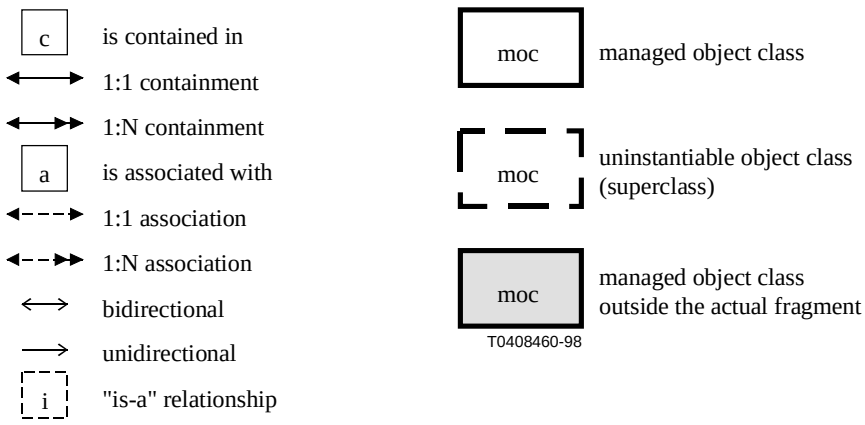
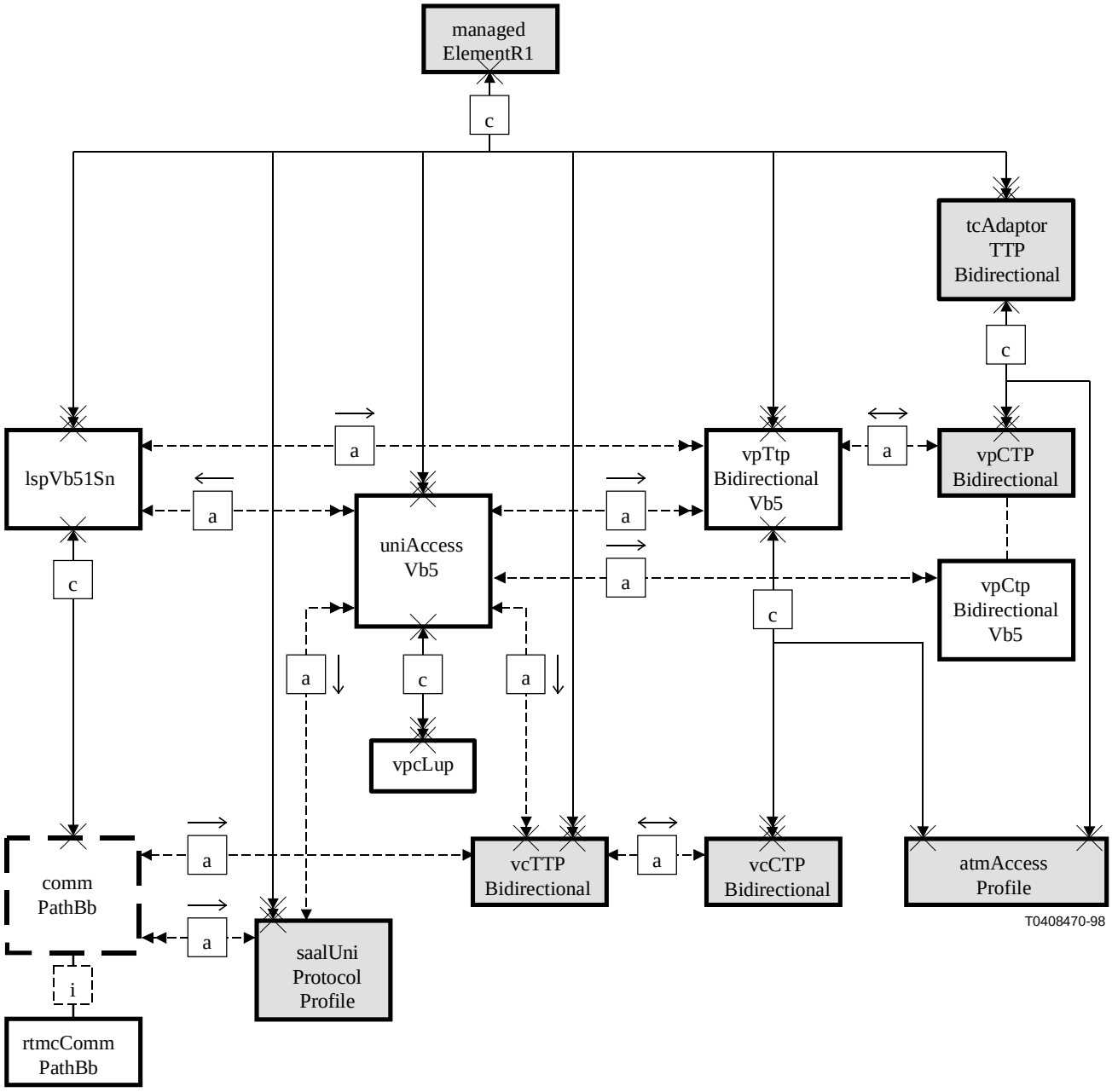


Figure 1/Q.832.1 – Conventions used in diagrams for entity-relationship models

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

4.1.1 Entity-relationship diagram for the service node

See Figure 2.

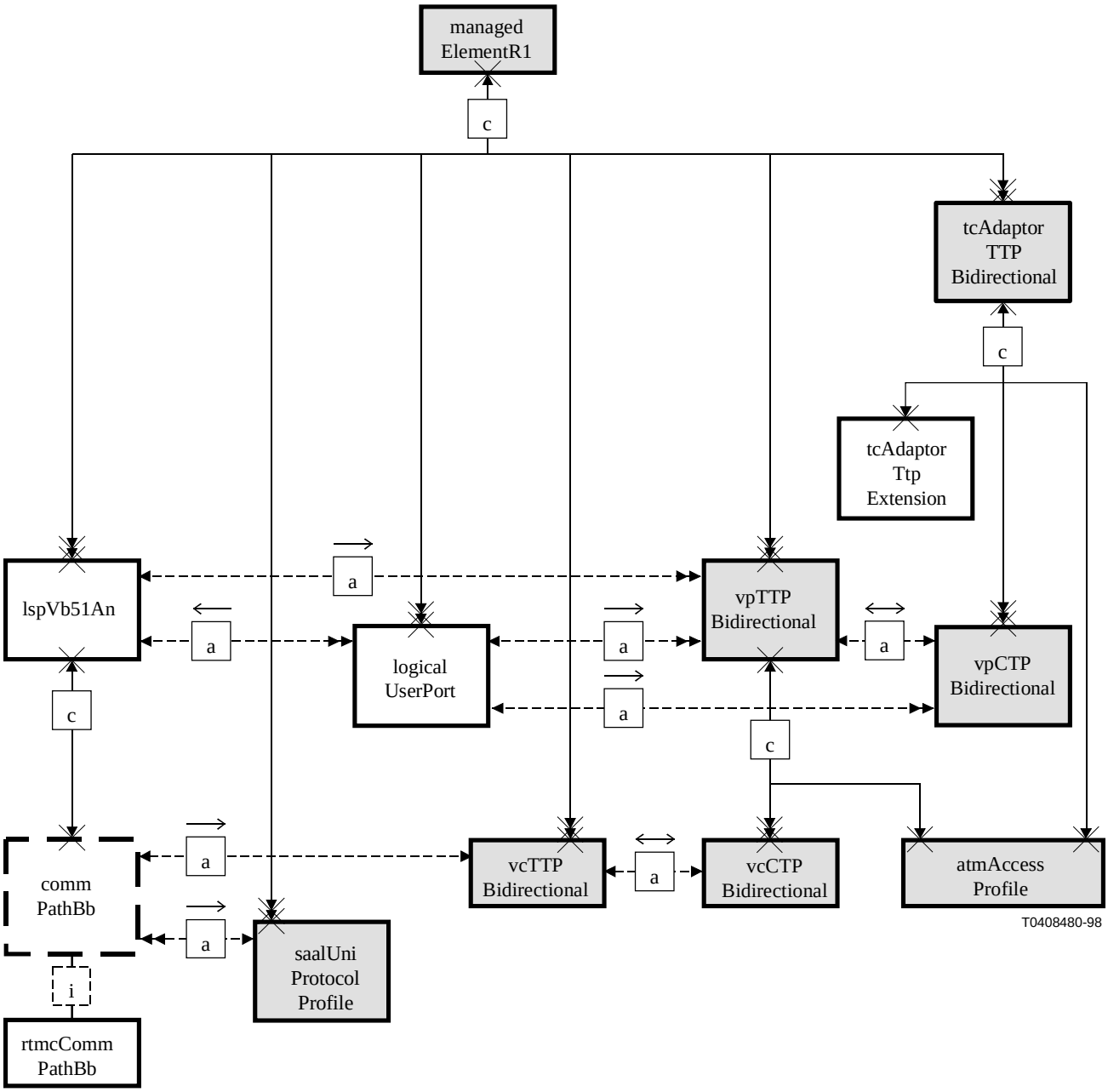


NOTE – Not all object classes are shown in this diagram as some object classes are reused unchanged from Recommendation I.751.

Figure 2/Q.832.1 – Entity-relationship diagram – Service node

4.1.2 Entity-relationship diagram for the access network

See Figure 3.



NOTE – Not all object classes are shown in this diagram as some object classes are reused unchanged from Recommendation I.751.

Figure 3/Q.832.1 – Entity-relationship diagram – Access network

4.2 Inheritance hierarchy

Figure 4 traces the inheritance relationships from the highest level object (Recommendation X.721[14], "top") to the managed objects which are defined in this Recommendation.

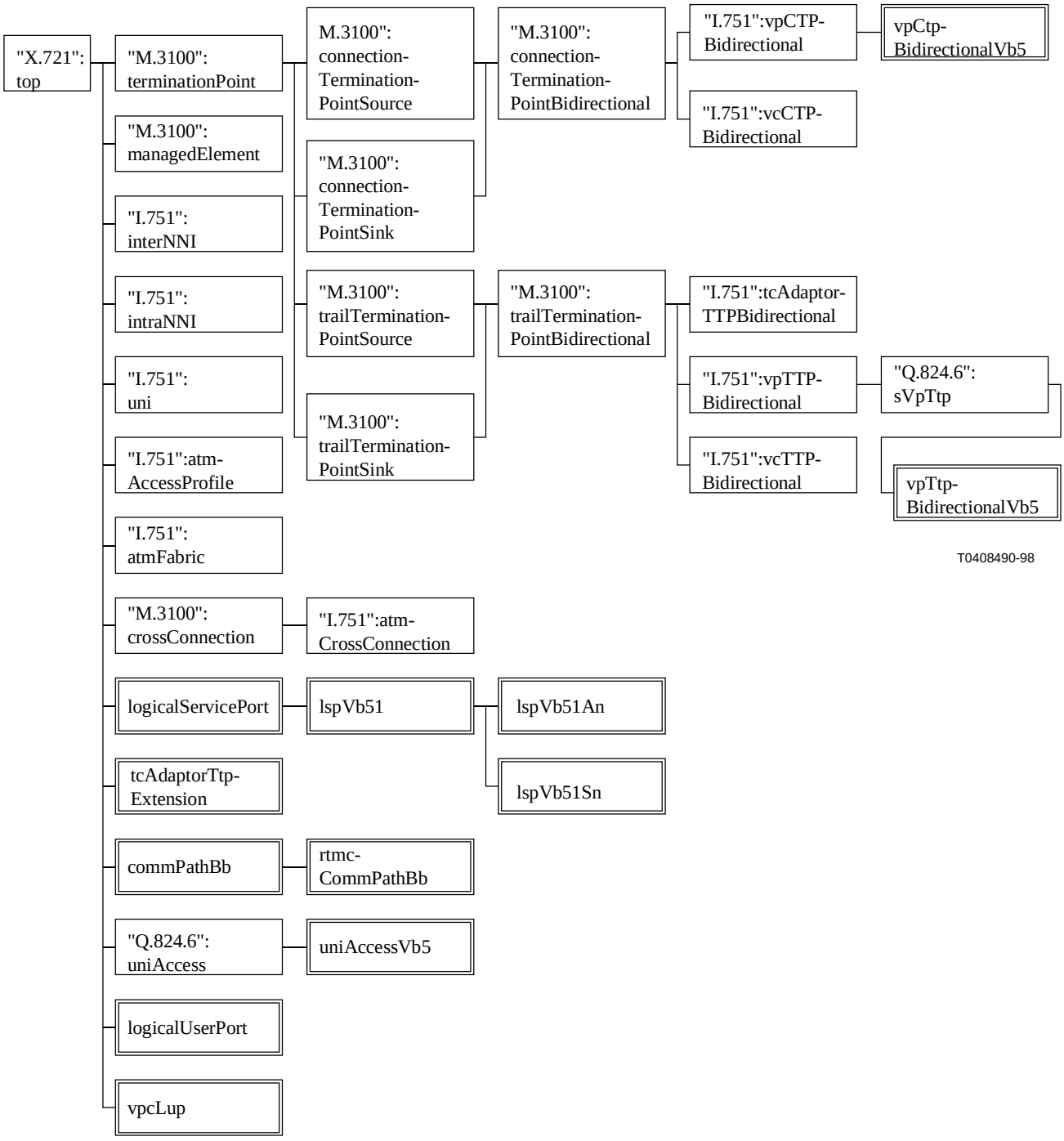


Figure 4/Q.832.1 – Inheritance hierarchy

5 Formal 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 bidirectional objects with the traffic descriptor in the unused direction set to a null value.

Multipoint cross connections are modelled as in Recommendation Q.824.6 [11].

The following class which is defined in Recommendation M.3100 [5] may be instantiated:

– **managedElementR1.**

The following classes which are defined in Recommendation Q.824.6 [11] may be instantiated:

– **aalProfile;**
– **aalProtocolCurrentData;**
– **aalProtocolHistoryData;**
– **cesServiceProfile;**
– **interworkingVcTtpBidirectional;**
– **saalUniProtocolProfile.**

The following class which is defined in Recommendation X.721 [14] may be instantiated:

– **log.**

The following classes which are defined in Recommendation I.751 [17] 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.**

5.1.1 Profiling notes for imported classes

5.1.1.1 atmFabric (ATM fabric)

VCs from a logical user port shall only be cross-connected with VCs on the VB5 interface associated with that logical user port.

5.1.1.2 tcAdaptorTTPBidirectional (TC adapter TTP bidirectional)

In this management model, an instance of tcAdaptorTTPBidirectional together with an instance of the associated transmission TTP represents a Physical User Port or a Physical Service Port.

5.1.2 Definition of classes

5.1.2.1 commPathBb (communications path for broadband)

```
commPathBb MANAGED OBJECT CLASS
        DERIVED FROM "Rec. X.721| ISO/IEC 10165-2":top;
        CHARACTERIZED BY
                commPathBbPkg PACKAGE
                        BEHAVIOUR commPathBbBeh;
                        ATTRIBUTES
                                commPathBbId
                                        GET,
                                "Rec. Q.824.6":aalPtr
                                        GET-REPLACE,
                                "Rec. Q.824.6":signallingChannelPtr
                                        GET,
                                "ITU-T M.3100":supportedByObjectList
                                        GET-REPLACE;
                        NOTIFICATIONS
                        "Rec. X.721 | ISO/IEC 10165-2":objectCreation,
                        "Rec. X.721 | ISO/IEC 10165-2":objectDeletion;;;
REGISTERED AS {managedObjectClass 1};

commPathBbBeh BEHAVIOUR
        DEFINED AS
                "The communication path object class represents a VB5 communication path. While the
                communication path object class is not instantiated, it is a superclass from which specialized
                subclasses are derived and instantiated.";
```

5.1.2.2 logicalServicePort (logical service port)

```
logicalServicePort MANAGED OBJECT CLASS
        DERIVED FROM "Rec. X.721|ISO/IEC 10165-2":top;
        CHARACTERIZED BY
                logicalServicePortPkg PACKAGE
                        BEHAVIOUR logicalServicePortBeh;
                        ATTRIBUTES
                                logicalServicePortId
                                        GET,
                                vpTtpAndVpciPtrList
                                        GET-REPLACE
                                        ADD-REMOVE;;;
                CONDITIONAL PACKAGES
                        "ITU-T M.3100":operationalStatePackage
                                PRESENT IF "supplied by the managing system",
                        "ITU-T M.3100":userLabelPackage
                                PRESENT IF "supplied by the managing system",
```

```
                "ITU-T M.3100":tmnCommunicationsAlarmInformationPackage
                        PRESENT IF "supplied by the managing system",
                "ITU-T M.3100":alarmSeverityAssignmentPointerPackage
                        PRESENT IF "supplied by the managing system",
                "ITU-T M.3100":objectManagementNotificationsPackage
                        PRESENT IF "supplied by the managing system",
                "ITU-T M.3100":stateChangeNotificationPackage
                        PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 2};

logicalServicePortBeh BEHAVIOUR
        DEFINED AS
                "This managed object represents a group of labelled VPs in a Service Node or in an Access Network
                which all go between the same Service Node and the same Access Network.";
```

5.1.2.3 lspVb51 (logical service port for VB5.1)

```
lspVb51 MANAGED OBJECT CLASS
        DERIVED FROM logicalServicePort;
        CHARACTERIZED BY
                lspVb51Pkg PACKAGE
                        BEHAVIOUR lspVb51Beh;
                        ATTRIBUTES
                                logicalServicePortNumber
                                        GET-REPLACE,
                                lspActivationState
                                        INITIAL VALUE   ASN1DefinedTypesModule.lspActivationInitial
                                        GET;
                        NOTIFICATIONS
                                resetRtmcResult,
                                " Rec. X.721 | ISO/IEC 10165-2": attributeValueChange;;;
                CONDITIONAL PACKAGES
                        resetRtmcPkg
                                        PRESENT IF "supplied by the managing system",
                        startupLspPkg
                                        PRESENT IF "supplied by the managing system",
                        checkLspIdentificationPkg
                                PRESENT IF "supported by the managed system and supplied by the
                                        managing system",
                        partialAdministrativeStatePkg
                                PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 3};

lspVb51Beh BEHAVIOUR
        DEFINED AS
                "This managed object represents a group of labelled VPs in a Service Node or in an Access Network
                which all go between the same Service Node and the same Access Network and are controlled by the
                same VB5.1 protocol. The stateChange notification defined in Recommendation X.721 shall be
                emitted if the value of the partial administrative state attribute changes and the state change
                notification package is present. The partial administrative state attribute only supports the
                partialLocked and partialUnlocked values; the partialShuttingDown value is not allowed on
                instances of this managed object class.
                Changes of the lspActivationState attribute are indicated by attributeValueChange notifications.
                VB5.1 specific values for the ProbableCause and SpecificProblems fields of the inherited generic
                TMN communications alarm are given in the ASN.1 definitions.";
```

5.1.2.4 lspVb51An (logical service port for VB5.1 in the access network)

```
lspVb51An MANAGED OBJECT CLASS
        DERIVED FROM lspVb51;
        CHARACTERIZED BY
                lspVb51AnPkg PACKAGE
                        BEHAVIOUR lspVb51AnBeh;;;
REGISTERED AS {managedObjectClass 4};

lspVb51AnBeh BEHAVIOUR
        DEFINED AS
                "This managed object represents a group of VPs coming from the same Service Node and controlled
                by the same VB5.1 protocol.";
```

5.1.2.5 lspVb51Sn (logical service port for VB5.1 in the service node)

```
lspVb51Sn MANAGED OBJECT CLASS
        DERIVED FROM lspVb51;
        CHARACTERIZED BY
                remoteBlockingVb5Pkg,
                lspVb51SnPkg PACKAGE
                        BEHAVIOUR lspVb51SnBeh;;;
                CONDITIONAL PACKAGES
                        automaticVpciConsistencyCheckPkg
                                PRESENT IF "supplied by the managing system",
                        checkVpciConsistencyPkg
                                PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 5};

lspVb51SnBeh BEHAVIOUR
        DEFINED AS
                "This managed object represents a group of VPs coming from the same Access Network and
                controlled by the same VB5.1 protocol.
                The value administrativeReason adminFull for the remoteBlockingReasonVb5 attribute of the
                remoteBlockingVb5Pkg is not supported for this managed object class.";
```

5.1.2.6 logicalUserPort (logical user port)

```
logicalUserPort MANAGED OBJECT CLASS
        DERIVED FROM "Rec. X.721| ISO/IEC 10165-2":top;
        CHARACTERIZED BY
                logicalUserPortPkg PACKAGE
                        BEHAVIOUR logicalUserPortBeh;
                        ATTRIBUTES
                                logicalUserPortId
                                        GET,
                                logicalUserPortNumber
                                        GET-REPLACE,
                                logicalServicePortPtr
                                        GET-REPLACE,
                                vpCtpAndVpciPtrList
                                        GET-REPLACE
                                        ADD-REMOVE,
                                vpTtpAndVpciPtrList
                                        GET-REPLACE
                                        ADD-REMOVE;;;
REGISTERED AS {managedObjectClass 6};
```

```
logicalUserPortBeh BEHAVIOUR
        DEFINED AS
                "The logical user port object class represents the group of VPs at a UNI on an AN associated with
                the same logical service port.";
```

5.1.2.7 rtmcCommPathBb (RTMC communications path for broadband)

```
rtmcCommPathBb MANAGED OBJECT CLASS
        DERIVED FROM commPathBb;
        CHARACTERIZED BY
                rtmcCommPathBbPkg PACKAGE
                        BEHAVIOUR rtmcCommPathBbBeh;;;
REGISTERED AS {managedObjectClass 7};

rtmcCommPathBbBeh BEHAVIOUR
        DEFINED AS
                "The RTMC communication path object class carries the RTMC protocol information. Only one
                object of this class shall be contained within the superior managed object.";
```

5.1.2.8 tcAdaptorTtpExtension (TC adaptor TTP extension)

```
tcAdaptorTtpExtension MANAGED OBJECT CLASS
        DERIVED FROM "Rec. X.721|ISO/IEC 10165-2":top;
        CHARACTERIZED BY
                tcAdaptorTtpExtensionPkg PACKAGE
                        BEHAVIOUR tcAdaptorTtpExtensionBeh;
                        ATTRIBUTES
                                tcAdaptorExtensionId
                                        GET,
                                partialAdministrativeState
                                        GET-REPLACE;;;
                CONDITIONAL PACKAGES
                        "ITU-T M.3100": stateChangeNotificationPackage
                                PRESENT IF "supplied by the managing system",
                        "ITU-T M.3100": createDeleteNotificationsPackage
                                PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 8};

tcAdaptorTtpExtensionBeh BEHAVIOUR
        DEFINED AS
                "An instance of this managed object class models the partial administrative state of a PUP in the
                AN. The stateChange notification defined in Recommendation X.721 shall be emitted if the value of
                the partial administrative state attribute changes and the stateChangeNotificationPackage is
                present.";
```

5.1.2.9 uniAccessVb5 (UNI access VB5)

```
uniAccessVb5 MANAGED OBJECT CLASS
        DERIVED FROM "Rec. Q.824.6":uniAccess;
        CHARACTERIZED BY
                uniAccessVb5Pkg PACKAGE
                        BEHAVIOUR uniAccessVb5Beh;
                        ATTRIBUTES
                                logicalUserPortNumber
                                        GET-REPLACE,
                                logicalServicePortPtr
                                        GET-REPLACE;;;
```

```
        CONDITIONAL PACKAGES
            vpCtpVb5AndVpciPtrListPkg
                PRESENT IF "supported by the managed system and supplied by the managing
                system";
REGISTERED AS {managedObjectClass 9};

uniAccessVb5Beh BEHAVIOUR
    DEFINED AS
        "The UNI access VB5 object class represents a group of VPs in the SN which come from the same
        UNI in the AN over the same VB5 interface and which use the same type of signalling protocol.
        If the "signallingChannelPtrPkg" is not present and the attribute "vpCtpVb5AndVpciPtrList" is
        empty then the value of the attribute "signallingStandard" is ignored.
        If the "vpCtpVb5AndVpciPtrListPkg" is present then the attribute "vpCtpVb5AndVpciPtrlist"
        identifies instances of the "vpCtpBidirectionalVb5" managed object class or its subclasses.";
```

5.1.2.10 vpcLup (VPC at logical user port)

```
vpcLup MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":top;
    CHARACTERIZED BY
        remoteBlockingVb5Pkg,
        vpcLupPkg PACKAGE
            BEHAVIOUR vpcLupBeh;
            ATTRIBUTES
                vpcLupId
                    GET,
                vpcLupNumber
                    GET-REPLACE;
            NOTIFICATIONS
                " Rec. X.721 | ISO/IEC 10165-2": attributeValueChange,
                " Rec. X.721 | ISO/IEC 10165-2": objectCreation,
                " Rec. X.721 | ISO/IEC 10165-2": objectDeletion;;;
REGISTERED AS {managedObjectClass 10};

vpcLupBeh BEHAVIOUR
    DEFINED AS
        "This managed object represents a VPC at a logical user port which is terminated within the AN.";
```

5.1.2.11 vpCtpBidirectionalVb5 (VP CTP bidirectional VB5)

```
vpCtpBidirectionalVb5 MANAGED OBJECT CLASS
    DERIVED FROM "Rec. I.751":vpCTPBidirectional;
    CHARACTERIZED BY
        remoteBlockingVb5Pkg,
        vpCtpBidirectionalVb5Pkg PACKAGE
            BEHAVIOUR vpCtpBidirectionalVb5Beh;;;
REGISTERED AS {managedObjectClass 11};

vpCtpBidirectionalVb5Beh BEHAVIOUR
    DEFINED AS
        "Objects of this class represent VPCs at the VB5 interface which are cross-connected in the SN.";
```

5.1.2.12 vpTtpBidirectionalVb5 (VP TTP bidirectional VB5)

```
vpTtpBidirectionalVb5 MANAGED OBJECT CLASS
    DERIVED FROM "Rec. Q.824.6":sVpTtp;
    CHARACTERIZED BY
        remoteBlockingVb5Pkg,
        vpTtpBidirectionalVb5Pkg PACKAGE
            BEHAVIOUR vpTtpBidirectionalVb5Beh;;;
REGISTERED AS {managedObjectClass 12};
```

vpTtpBidirectionalVb5Beh BEHAVIOUR
DEFINED AS
"Objects of this class represent VPCs at the VB5 interface.
The "blockedForMaintenancePkg" and the "remoteBlockingPkg" derived from the sVpTtp object class are not supported.
If the instance of this class is related to a lspVb51Sn instance to indicate assignement, the vpType value "mixed" is not supported.";

5.2 Name bindings

5.2.1 commPathBb-logicalServicePort

commPathBb-logicalServicePort NAME BINDING
SUBORDINATE OBJECT CLASS commPathBb AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS logicalServicePort AND SUBCLASSES;
WITH ATTRIBUTE commPathBbId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 1};

5.2.2 logicalServicePort-managedElementR1

logicalServicePort-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS logicalServicePort AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE logicalServicePortId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 2};

5.2.3 logicalUserPort-managedElementR1

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

5.2.4 tcAdaptorTtpExtension-tcAdaptorTTPBidirectional

tcAdaptorTtpExtension-tcAdaptorTTPBidirectional NAME BINDING
SUBORDINATE OBJECT CLASS tcAdaptorTtpExtension
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "Rec. I.751":tcAdaptorTTPBidirectional
AND SUBCLASSES;
WITH ATTRIBUTE tcAdaptorExtensionId;
CREATE WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 4};

5.2.5 vpcLup-uniAccessVb5

```
vpcLup-uniAccessVb5 NAME BINDING
        SUBORDINATE OBJECT CLASS vpcLup AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS uniAccessVb5
                AND SUBCLASSES;
        WITH ATTRIBUTE vpcLupId;
        CREATE
                WITH-AUTOMATIC-INSTANCE-NAMING;
        DELETE;
REGISTERED AS {nameBinding 5};
```

5.3 Definition of packages

5.3.1 automaticVpciConsistencyCheckPkg (automatic VPCI consistency check package)

```
automaticVpciConsistencyCheckPkg PACKAGE
        NOTIFICATIONS
                automaticVpciConsistencyCheckInitiated,
                automaticVpciConsistencyCheckResult;
REGISTERED AS {package 1};
```

5.3.2 checkLspIdentificationPkg (check logical service port identification package)

```
checkLspIdentificationPkg PACKAGE
        ACTIONS
                checkLspIdentification;
REGISTERED AS {package 2};
```

5.3.3 checkVpciConsistencyPkg (check VPCI consistency package)

```
checkVpciConsistencyPkg PACKAGE
        ACTIONS
                checkVpciConsistency;
REGISTERED AS {package 3};
```

5.3.4 partialAdministrativeStatePkg (partial administrative state package)

```
partialAdministrativeStatePkg PACKAGE
        ATTRIBUTES
                partialAdministrativeState
                        GET-REPLACE;
REGISTERED AS {package 4};
```

5.3.5 remoteBlockingVb5Pkg (remote blocking VB5 package)

```
remoteBlockingVb5Pkg PACKAGE
        ATTRIBUTES
                remoteBlockingVb5
                        INITIAL VALUE ASN1DefinedTypesModule.remoteBlockingVb5InitialValue
                        GET,
                remoteBlockingReasonVb5
                        INITIAL VALUE ASN1DefinedTypesModule. remoteBlockingReasonVb5InitialValue
                        GET;
REGISTERED AS {package 5};
```

5.3.6 resetRtmcPkg (reset RTMC package)

```
resetRtmcPkg PACKAGE
        ACTIONS
                resetRtmc;
REGISTERED AS {package 6};
```

5.3.7 startupLspPkg (startup logical service port package)

```
startupLspPkg PACKAGE
        ACTIONS
                startupLsp;
REGISTERED AS {package 7};
```

5.3.8 vpCtpVb5AndVpciPtrListPkg (VP CTP VB5 and VPCI pointer list package)

```
vpCtpVb5AndVpciPtrListPkg PACKAGE
        BEHAVIOUR vpCtpVb5AndVpciPtrListBeh;
        ATTRIBUTES
                vpCtpVb5AndVpciPtrList
                        GET-REPLACE
                        ADD-REMOVE;
REGISTERED AS {package 8};

vpCtpVb5AndVpciPtrListBeh BEHAVIOUR
        DEFINED AS
                "This is a set-valued attribute whose value(s) point to instances of the vpCtpBidirectionalVb5
                managed object class or its subclasses. A VPCI value is related to every pointer.";
```

5.4 Definition of attributes

5.4.1 commPathBbId (communications path for broadband identifier)

```
commPathBbId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR commPathBbIdBeh;
REGISTERED AS {attribute 1};

commPathBbIdBeh BEHAVIOUR
        DEFINED AS
                "This attribute is used for naming instances of the managed object class commPathBb and
                subclasses.";
```

5.4.2 logicalServicePortId (logical service port identifier)

```
logicalServicePortId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR logicalServicePortIdBeh;
REGISTERED AS {attribute 2};

logicalServicePortIdBeh BEHAVIOUR
        DEFINED AS
                "This attribute is used for naming instances of the class logicalServicePort and subclasses.";
```

5.4.3 logicalServicePortNumber (logical service port number)

```
logicalServicePortNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
        MATCHES FOR EQUALITY;
        BEHAVIOUR logicalServicePortNumberBeh;
REGISTERED AS {attribute 3};

logicalServicePortNumberBeh BEHAVIOUR
        DEFINED AS
                "This attribute is used to label a logical service port. It has the same format as that used on the VB5
                protocol.";
```

5.4.4 logicalServicePortPtr (logical service port pointer)

```
logicalServicePortPtr ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
        MATCHES FOR EQUALITY;
        BEHAVIOUR logicalServicePortPtrBeh;
REGISTERED AS {attribute 4};

logicalServicePortPtrBeh BEHAVIOUR
        DEFINED AS
                "This attribute is used to reference logical service port objects.";
```

5.4.5 logicalUserPortId (logical user port identifier)

```
logicalUserPortId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR logicalUserPortIdBeh;
REGISTERED AS {attribute 5};

logicalUserPortIdBeh BEHAVIOUR
        DEFINED AS
                "This attribute is used for naming instances of the class logicalUserPort and subclasses.";
```

5.4.6 logicalUserPortNumber (logical user port number)

```
logicalUserPortNumber ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
        MATCHES FOR EQUALITY;
        BEHAVIOUR logicalUserPortNumberBeh;
REGISTERED AS {attribute 6};

logicalUserPortNumberBeh BEHAVIOUR
        DEFINED AS
                "This attribute is a reference to a logical user port which is either local, if the object using the
                attribute is in the AN, or remote if the object using the attribute is in the SN. It has the same format
                as that used on the VB5 interface. Logical user port numbers are unique within an AN, but need not
                be unique within an SN which is connected to more than one AN.";
```

5.4.7 lspActivationState (logical service port activation state)

lspActivationState ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.LspActivationState;
MATCHES FOR EQUALITY;
BEHAVIOUR lspActivationStateBeh;
REGISTERED AS {attribute 7};

lspActivationStateBeh BEHAVIOUR
DEFINED AS
"This attribute indicates the activation state of the LSP. The value "restarting" indicates that the LSP is restarted after the occurence of a persistent SAAL failure.";

5.4.8 partialAdministrativeState (partial administrative state)

partialAdministrativeState ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PartialAdministrativeState;
MATCHES FOR EQUALITY;
BEHAVIOUR partialAdministrativeStateBeh;
REGISTERED AS {attribute 8};

partialAdministrativeStateBeh BEHAVIOUR
DEFINED AS
"This attribute is used to constrain the user information flow on the resource. The semantics of this attribute is specified in the VB5 interface specification [3].";

5.4.9 remoteBlockingReasonVb5 (remote blocking reason VB5)

remoteBlockingReasonVb5 ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RemoteBlockingReasonVb5;
MATCHES FOR EQUALITY;
BEHAVIOUR remoteBlockingReasonVb5Beh;
REGISTERED AS {attribute 9};

remoteBlockingReasonVb5Beh BEHAVIOUR
DEFINED AS
"This attribute indicates the reason for blocking this resource (VPC or LSP) in the AN.";

5.4.10 remoteBlockingVb5 (remote blocking VB5)

remoteBlockingVb5 ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RemoteBlockingVb5;
MATCHES FOR EQUALITY;
BEHAVIOUR remoteBlockingVb5Beh;
REGISTERED AS {attribute 10};

remoteBlockingVb5Beh BEHAVIOUR
DEFINED AS
"This attribute indicates the remote blocking state of this resource (VPC or LSP) in the AN.";

5.4.11 tcAdaptorExtensionId (TC adaptor extension identifier)

tcAdaptorExtensionId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR tcAdaptorExtensionIdBeh;
REGISTERED AS {attribute 11};

tcAdaptorExtensionIdBeh BEHAVIOUR
DEFINED AS
"This attribute is used for naming instances of the managed object class tcAdaptorTtpExtension and subclasses.";

5.4.12 vpcLupId (VPC at logical user port identifier)

vpcLupId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR vpcLupIdBeh;
REGISTERED AS {attribute 12};

vpcLupIdBeh BEHAVIOUR
DEFINED AS
"This attribute is used for naming instances of the vpcLup managed object class and subclasses.";

5.4.13 vpcLupNumber (VPC at logical user port number)

vpcLupNumber ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.VpciValue;
MATCHES FOR EQUALITY;
BEHAVIOUR vpcLupNumberBeh;
REGISTERED AS {attribute 13};

vpcLupNumberBeh BEHAVIOUR
DEFINED AS
"This attribute is the VPCI value of the Virtual Path Connection terminating in the Access Network without reaching the Service Node.";

5.4.14 vpCtpAndVpciPtrList (VP CTP and VPCI pointer list)

vpCtpAndVpciPtrList ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TpAndVpciPtrList;
MATCHES FOR EQUALITY;
BEHAVIOUR vpCtpAndVpciPtrListBeh;
REGISTERED AS {attribute 14};

vpCtpAndVpciPtrListBeh BEHAVIOUR
DEFINED AS
"This attribute is used to reference vpCTPs and to assign VPCI values to these vpCTPs.";

5.4.15 vpCtpVb5AndVpciPtrList (VP CTP VB5 and VPCI pointer list)

vpCtpVb5AndVpciPtrList ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TpAndVpciPtrList;
MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {attribute 15};

5.4.16 vpTtpAndVpciPtrList (VP TTP and VPCI pointer list)

```
vpTtpAndVpciPtrList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TpAndVpciPtrList;
        MATCHES FOR EQUALITY;
        BEHAVIOUR vpTtpAndVpciPtrListBeh;
REGISTERED AS {attribute 16};

vpTtpAndVpciPtrListBeh BEHAVIOUR
        DEFINED AS
                "This attribute is used to reference vpTTPs and to assign VPCI values to these vpTTPs.";
```

5.5 Definition of actions

5.5.1 checkLspIdentification (check logical service port identification)

```
checkLspIdentification ACTION
        BEHAVIOUR checkLspIdentificationBeh;
        MODE CONFIRMED;
        WITH REPLY SYNTAX ASN1DefinedTypesModule.CheckLspIdentificationResult;
REGISTERED AS {action 1};

checkLspIdentificationBeh BEHAVIOUR
        DEFINED AS
                "This action is used to check the consistent use of the LSP Identification label in the AN and in the
                SN. The value TRUE of the result syntax indicates the successful result of the action.";
```

5.5.2 checkVpciConsistency (check VPCI consistency)

```
checkVpciConsistency ACTION
        BEHAVIOUR checkVpciConsistencyBeh;
        MODE CONFIRMED;
        WITH INFORMATION SYNTAX ASN1DefinedTypesModule.CheckVpciConsistencyInformation;
        WITH REPLY SYNTAX ASN1DefinedTypesModule.CheckVpciConsistencyResult;
REGISTERED AS {action 2};

checkVpciConsistencyBeh BEHAVIOUR
        DEFINED AS
                "This action is used to check the consistency of the VPCI values. The value localReason of the result
                syntax indicates that the check was not performed due to local reasons.";
```

5.5.3 resetRTMC (reset RTMC)

```
resetRtmc ACTION
        BEHAVIOUR resetRtmcBeh;
        MODE CONFIRMED;
        WITH REPLY SYNTAX ASN1DefinedTypesModule.ResetRtmcResult;
REGISTERED AS {action 3};

resetRtmcBeh BEHAVIOUR
        DEFINED AS
                "This action is used to start the RTMC reset procedure.";
```

5.5.4 startupLsp (startup logical service port)

startupLsp ACTION
BEHAVIOUR startupLspBeh;
MODE CONFIRMED;
WITH REPLY SYNTAX ASN1DefinedTypesModule.StartupLspResult;
REGISTERED AS {action 4};

startupLspBeh BEHAVIOUR
DEFINED AS
"This action is used by the AN and the SN to start up a LSP.";

5.6 Definition of notifications

5.6.1 automaticVpciConsistencyCheckInitiated (automatic VPCI consistency check initiated)

automaticVpciConsistencyCheckInitiated NOTIFICATION
BEHAVIOUR automaticVpciConsistencyCheckInitiatedBeh;
WITH INFORMATION SYNTAX ASN1DefinedTypesModule.CheckVpciConsistencyInformation;
REGISTERED AS {notification 1};

automaticVpciConsistencyCheckInitiatedBeh BEHAVIOUR
DEFINED AS
"This notification indicates to the operator that a VPCI Consistency Check has been initiated automatically and gives the associated VPCI value.";

5.6.2 automaticVpciConsistencyCheckResult (automatic VPCI consistency check result)

automaticVpciConsistencyCheckResult NOTIFICATION
BEHAVIOUR automaticVpciConsistencyCheckResultBeh;
WITH INFORMATION SYNTAX ASN1DefinedTypesModule.CheckVpciConsistencyResult;
REGISTERED AS {notification 2};

automaticVpciConsistencyCheckResultBeh BEHAVIOUR
DEFINED AS
"This notification indicates to the operator the result of a VPCI Consistency Check which was initiated automatically. The value localReason of the result syntax indicates that the check was not performed due to local reasons.";

5.6.3 resetRtmcResult (reset RTMC Result)

resetRtmcResult NOTIFICATION
BEHAVIOUR resetRtmcResultBeh;
WITH INFORMATION SYNTAX ASN1DefinedTypesModule.ResetRtmcResult;
REGISTERED AS {notification 3};

resetRtmcResultBeh BEHAVIOUR
DEFINED AS
"This notification is sent to the operator when an RTMC reset procedure which has not been initiated by a local Q3 command is finished. It contains the result of the procedure, which may be successfull or not.";

6 Type definitions

```
ASN1DefinedTypesModule {itu-t(0) recommendation (0) q(17) 832(832) dot(127) vb51(1) informationModel(0)
asn1Modules(2) asn1DefinedTypesModule(0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN
-- EXPORTS everything

IMPORTS
        ObjectInstance
        FROM CMIP-1 {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)}

        NameType,
        PointerOrNull
        FROM ASN1DefinedTypesModule {ccitt recommendation m 3100 informationModel(0) asn1Modules(2)
asn1DefinedTypesModule(0)}

        PropableCause, SpecificProblems
        FROM Attribute-ASN1Module
                {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1}

        TpAndVpciPtrList,
        VpciValue
        FROM ASN1DefinedTypesModule {itu-t recommendation q(17) 824(824) dot(127)
bsm(6) informationModel(0) asn1Module(2) asn1TypeModule(0)}
; -- end of imports

-- start of object identifier definitions

informationModel
        OBJECT IDENTIFIER ::= {itu-t(0) recommendation (0) q(17) 832(832) dot(127) vb51(1)
        informationModel(0)}
standardSpecificExtension
        OBJECT IDENTIFIER ::= {informationModel standardSpecificExtension(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)}

vb51ProbableCause
        OBJECT IDENTIFIER ::= {standardSpecificExtension 0}
vb51SpecificProblems
        OBJECT IDENTIFIER ::= {standardSpecificExtension 1}
```

-- end of object identifier definitions

-- The value assignments for the
-- ProbableCause parameter of the
-- VB5.1 specific TMN communications alarm notification
-- are specified below

rtmcProtocolError
ProbableCause ::= globalValue : {vb51ProbableCause 1}
rtmcProtocolSyntaxError
ProbableCause ::= globalValue : {vb51ProbableCause 2}
rtmcProtocolTimeOutError
ProbableCause ::= globalValue : {vb51ProbableCause 3}
nonRecoverableSSCOPError
ProbableCause ::= globalValue : {vb51ProbableCause 4}

-- The value assignments for the
-- SpecificProblems parameter of the
-- VB5.1 specific TMN communications alarm notification
-- are specified below

protocolDiscriminatorError
SpecificProblems ::= {oid : {vb51SpecificProblems 0}}
unrecognizedMessageType
SpecificProblems ::= {oid : {vb51SpecificProblems 1}}
-- UnkMsgType RTMCProtErrCause 1
repeatedInformationElement
SpecificProblems ::= {oid : {vb51SpecificProblems 2}}
-- RepIE RTMCProtErrCause 2
mandatoryInformationElementMissing
SpecificProblems ::= {oid : {vb51SpecificProblems 3}}
-- MandIEMiss RTMCProtErrCause 3
unrecognizedInformationElement
SpecificProblems ::= {oid : {vb51SpecificProblems 4}}
-- UnrecogIE RTMCProtErrCause 4
informationElementContentError
SpecificProblems ::= {oid : {vb51SpecificProblems 5}}
-- IEContErr RTMCProtErrCause 5
informationElementNotAllowed
SpecificProblems ::= {oid : {vb51SpecificProblems 6}}
-- IENotAllowed RTMCProtErrCause 6
messageNotCompatibleProtocolState
SpecificProblems ::= {oid : {vb51SpecificProblems 7}}
-- MsgNotCompatWithProtState RTMCProtErrCause 7

-- other ASN1 definitions in alphabetical order

```
AdministrativeReason ::= INTEGER {
    none            (0),
    adminPartial(1),
    adminFull       (2) }

CheckLspIdentificationResult ::= BOOLEAN

CheckVpciConsistencyInformation ::= INTEGER (0..65535)

CheckVpciConsistencyResult ::= CHOICE {
    localReason     NULL,
    remoteReason    RemoteReason }
```

```
ErrorReason ::= INTEGER {
        none            (0),
        error           (1) }

Integer ::= INTEGER

lspActivationInitial LspActivationState ::=notActivated

LspActivationState::= INTEGER {
        notActivated        (0),
        activated           (1),
        restarting          (2) }

PartialAdministrativeState::= ENUMERATED{
        partialLocked           (0),
        partialUnlocked         (1),
        partialShuttingDown     (2) }

RemoteBlockingReasonVb5 ::= SEQUENCE {
        errorReason             ErrorReason,
        administrativeReason    AdministrativeReason }

remoteBlockingReasonVb5InitialValue
        RemoteBlockingReasonVb5 ::= {
                        errorReason             none,
                        administrativeReason    adminFull }

RemoteBlockingVb5 ::= INTEGER {
        remoteBlocked           (0),
        remoteUnblocked         (1),
        remoteAwaitClear        (2) }

remoteBlockingVb5InitialValue
        RemoteBlockingVb5 ::= remoteBlocked

RemoteReason ::= INTEGER {
        notSuccessful       (0),
        successful          (1),
        notPerformed        (2) }

ResetRtmcResult::= INTEGER {
        notSuccessful       (0),
        successful          (1) }

StartupLspResult::= INTEGER {
        notSuccessful       (0),
        successful          (1),
        activating          (2),
        restarting          (3) }

END -- of ASN1DefinedTypesModule
```

7 Protocol stacks

The protocol stacks specified in Recommendations Q.811, Q.812, G.773 and the SDH digital cross-connect part of Recommendation G.784 can be used as part of the protocol stack for this Recommendation. The following Recommendations should be used to extend these stacks to include ATM:

– Q.2811 Broadband Q3 and X interfaces – Lower Layer Protocols.

– Q.2812 Broadband Q3 and X interfaces – Upper Layer Protocols.

ANNEX A

Management requirements

A.1 General management requirements

A.1.1 General configuration management requirements

a) There is a requirement to assign a VB5 interface identifier, also known as a logical service port identifier, to a VB5 interface.

b) There is a requirement to assign VPCIs to VPCs on a VB5 interface when these VPCs are terminated in the access network.

A.2 Real-time management coordination requirements

A.2.1 Configuration management requirements

A.2.1.1 General configuration management requirement

The general configuration requirements include the general real-time management coordination functions between the access network and the service node.

A.2.1.2 Common configuration management requirement for AN and SN

A.2.1.2.1 Shutting-down of VPs

The model should support the MEE primitives associated with the shutting down of VPs.

A.2.1.2.2 VB5 interface ID checking

The management interfaces must support the verification of logical VB5 interface IDs so that the connection of VB5 interfaces can be checked by the operations systems.

A.2.1.2.3 Handling of VB5 primitives

The operations system must be able to handle the MEE primitives in AN and the SN.

A.2.1.2.4 Coordination of VP and VC resources

There is a requirement for the service node to have knowledge of the state of VP and VC resources used to provide service to the customer.

A.2.1.2.5 Non B-ISDN accesses

There is a requirement to take account of VCs terminated in the access network for non-B-ISDN accesses represented by virtual user ports (whose nature is not explicit) and to allow cross connections for these.

A.2.1.3 Configuration management requirement for AN

A.2.1.4 Configuration management requirement for SN

A.2.1.4.1 Assignment of indirect accesses

There is a requirement to assign indirect UNI accesses in the service node to VB5 interfaces at the service node.

A.2.1.4.2 Coordination of indirect accesses with logical user ports

There is are requirement to relate indirect UNI accesses in the service node to logical user ports in the access network.

A.2.1.4.3 Consistency of configuration

There is a requirement to check the consistency of the configuration VPCIs between the access network and the service node.

A.2.2 Fault management requirements

A.2.2.1 Alarm surveillance requirements

A.2.2.1.1 General alarm surveillance requirements

A.2.2.1.1.1 Coordination of operational states

Where changes of the operational state of ATM entities are communicated between the access network and the service node using ATM OAM cells, it must be possible to inform the operations systems about these communicated changes since higher management functions may be affected. This is dealt with in Recommendation I.751.

A.2.2.2 Test and fault localisation requirements

A.2.2.2.1 General test and fault localisation requirements

A.2.2.2.1.1 Test traffic

There is a requirement to be able to permit only test traffic across a VB5 interface.

A.3 Non-real time management requirements

These requirements are given in Recommendation Q.832.2 [12].

ANNEX B

Functional architecture

B.1 Functional architecture associated with VB5 reference point

The functional architecture associated with the VB5 reference point is given in Figure B.1 for the access network and in Figure B.2 for the service node (VB5 fragment). Each trail of the physical layer can serve a number of trails of the transmission convergence layer, corresponding to the support of a number of logical ports by a single physical port.

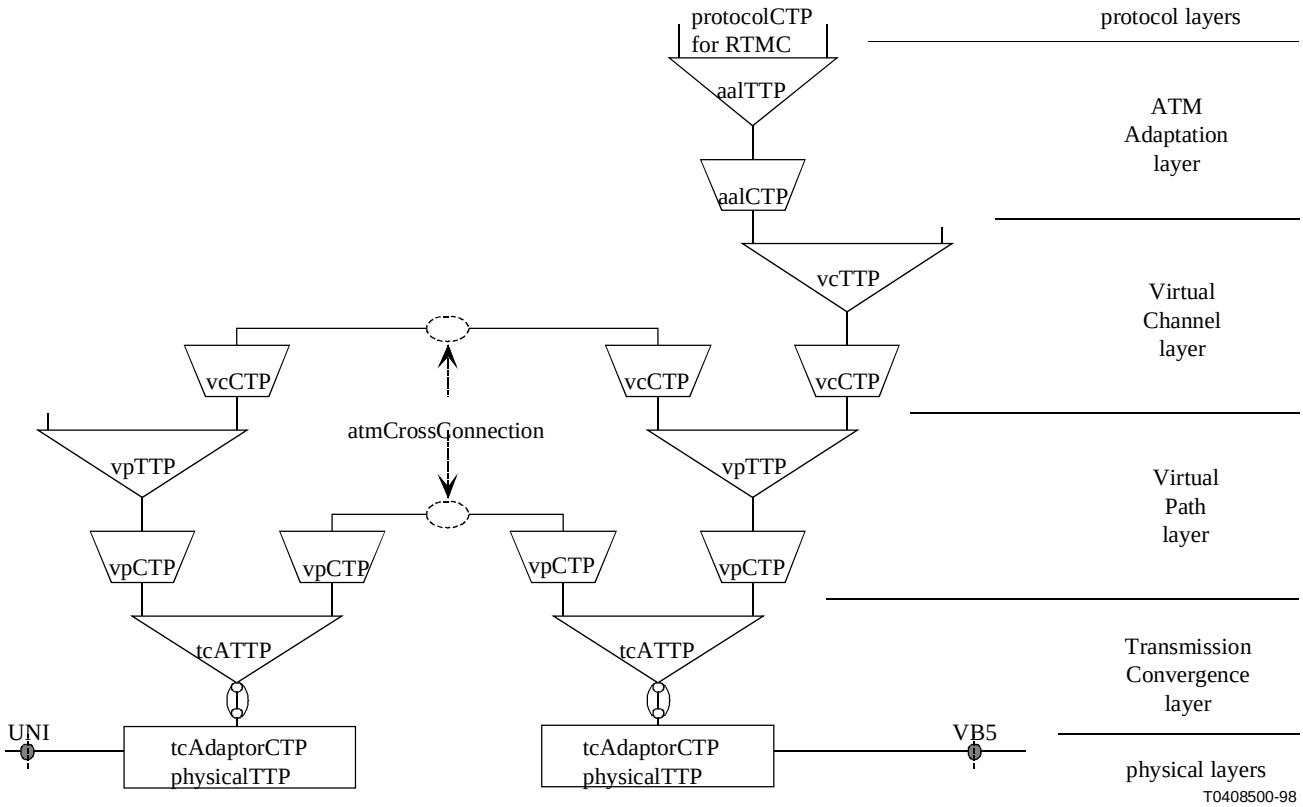


Figure B.1/Q.832.1 – VB5 functional architecture – Access network

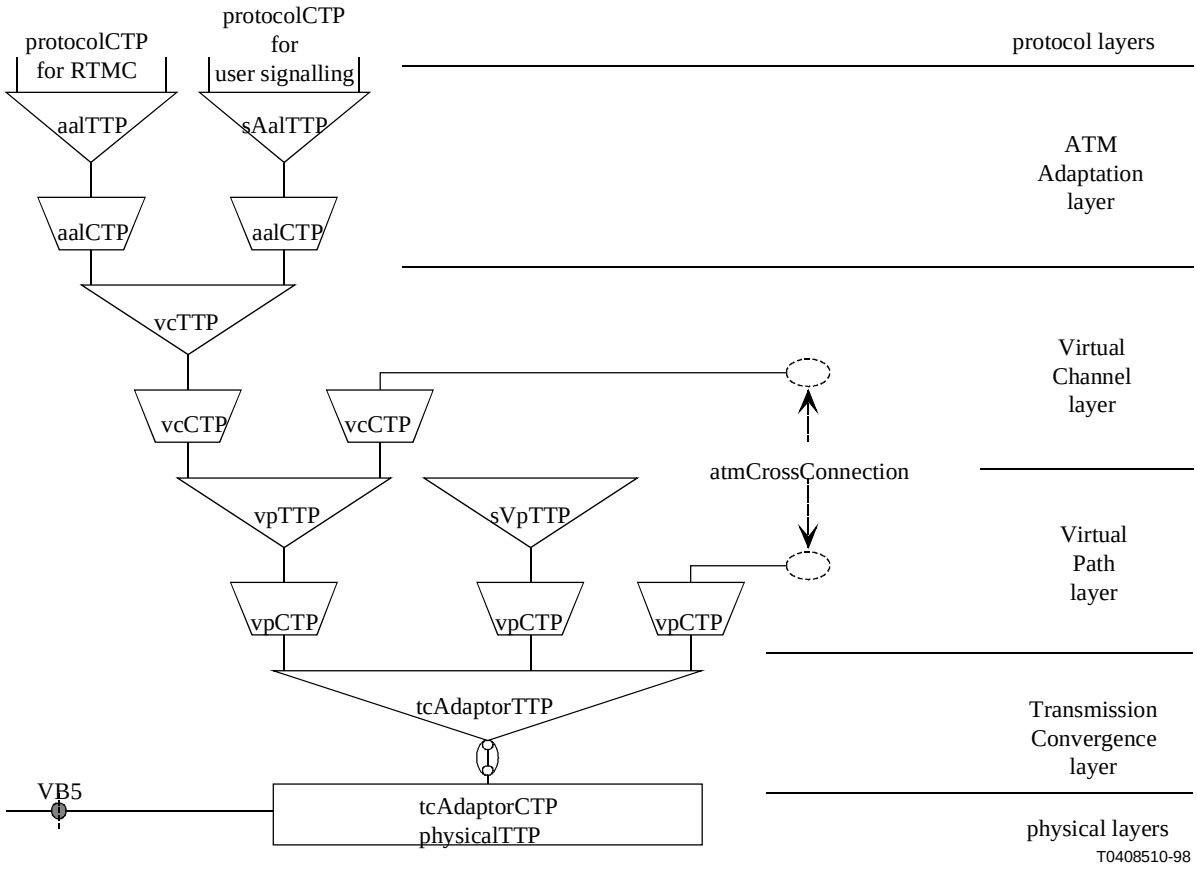


Figure B.2/Q.832.1 –VB5 functional architecture – Service node (VB5 fragment)

Within the ATM service node or broadband access network, each trail of the transmission convergence layer supports a number of trails of the VP layer and these trails correspond to virtual path connections. If only VPs are switched then these trails of the VP layer are re-routed, but not terminated. If VCs are switched, then it terminates the trails of the VP layers and there is adaptation to the VC layer. If a trail at the VC layer carries signalling which is processed by the ATM service node or access network, then the VC trail is terminated at the ATM service node or access network and the information flow passes up to the ATM adaptation layer and to the higher protocol layers. Only VCs carrying VB5 protocols are terminated in the access network.

The adaptation functions between the layers are represented by instances of connection termination point classes and the termination of trails are represented by instances of trail termination point classes.

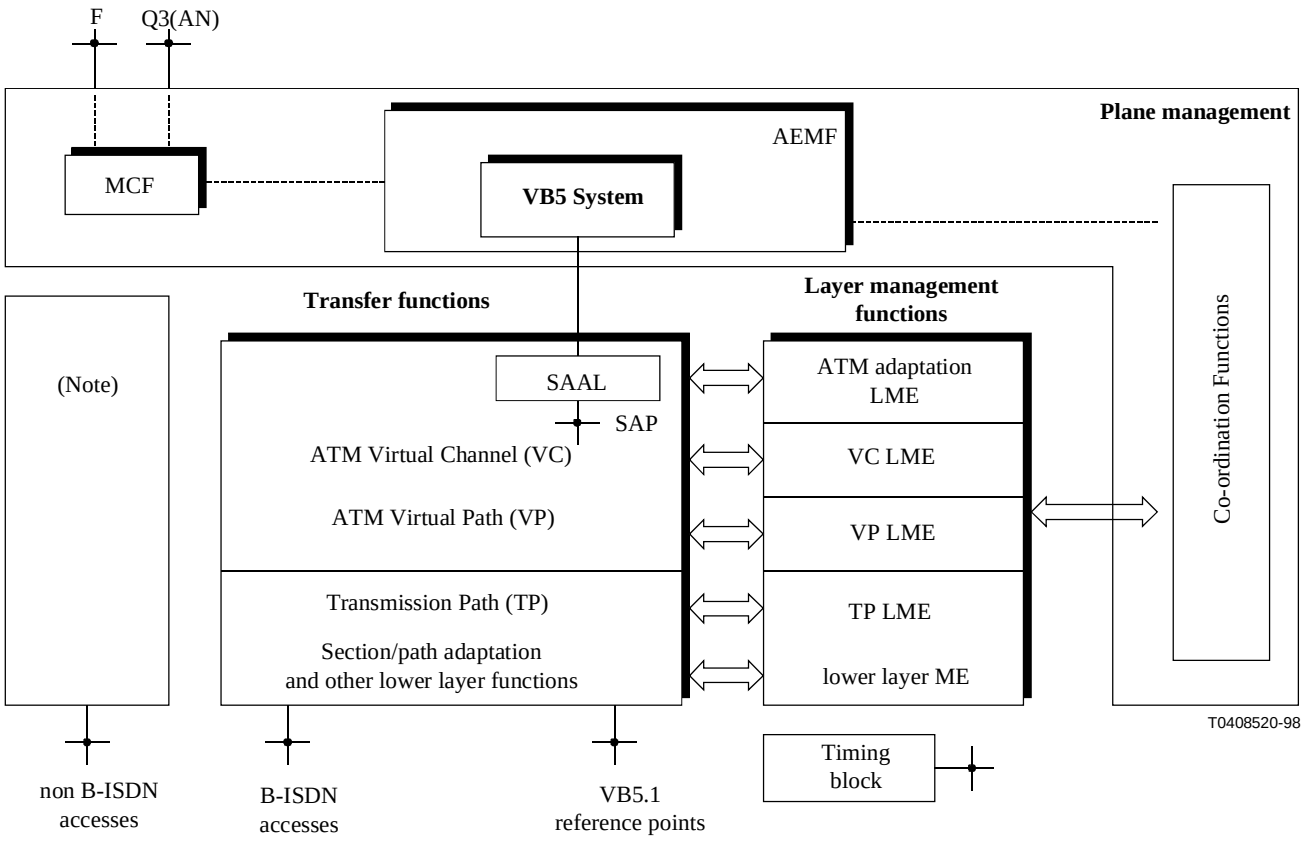
ANNEX C

Relationship between VB5.1 interfaces and the management model

C.1 Introduction

This Annex describes the relationships between VB5.1 interfaces and the management model. In particular it describes when MEE primitives (see "VB5.1 system architecture, structure and procedures" [3]) are created due to messages from the OS and when messages are sent to the OS as a result of primitives generated by the managed system.

Figure C.1 shows the position of the VB5 system in the management plane of an ATM network element [15]. The MCF (Message Communication Function) functional block receives the management commands sent by the OS via Q3 or F interface and forwards them to the AEMF (ATM Equipment Management Functions) functional block in an internal format. The MIB of the equipment and the VB5 system are contained in the AEMF; the message sent by the MCF is received by a managed object of the MIB that will generate an MEE primitive to the VB5 system.



NOTE – Although non-B-ISDN accesses are non excluded, they are not described in this Recommendation

Figure C.1/Q.832.1 – General functional blocks for the AN

In cases where attributes are changed as a result of primitives generated by the managed system, the OS may be informed by change notifications.

The following subclauses within this Annex describe the use of the various VB5 labels, the relationship of shutting-down and blocking to the state attributes, VPCI consistency checking, LSP identity checking, RTMC reset and start-up. The subclauses, one for each of the RTMC procedures, relate the information model of the AN and the SN to the primitives of the VB5 system, whether the procedures are activated by the OS via Q3 interface or by the peer system via RTMC protocol.

C.2 LSP, LUP and VPCI labels

The LSP identifier which is used in VB5 messages corresponds to the logicalServicePortNumber attribute of the logical service port objects. The LUP identifiers which are used in VB5 messages correspond to the logicalUserPort attribute of the VB5 UNI access objects in the SN or of the logical user port objects in the AN.

The VPCI values for LUPs in AN used in VB5 messages correspond to the values associated with the vpCtpAndVpciPtrList attribute of logical user port objects if the VPCs at the LUPs do not terminate in the AN, or to the values associated with the vpTtpAndVpciPtrList attribute of logical user port objects if the VPCs at the LUPs do terminate in the AN.

The VPCI values for LUPs in the SN used in VB5 messages correspond to the values associated with the tpAndVpciPtrList attribute of the VB5 UNI access objects for VPCs which terminate in the SN, or to the values associated with the vpCtpVb5AndVpciPtrList for VPCs which do not terminate in the SN. For VPCs which are associated with VB5 UNI accesses and which terminate in the AN, the

VPCI values used in VB5 messages correspond to the values of the vpcLupNumber attribute of the vpcLup objects in the SN.

The VPCI values for LSPs used in VB5 messages correspond to the values associated with the vpTtpAndVpciPtrList attribute of the logical service port objects.

C.3 Shutting down

Shutting down is initiated by the OS of the AN changing the administrativeState attribute of an object which affects a VP or group of VPs related to the VB5 interface to its shutting-down value, or the partialAdministrativeState attribute to the partial shutting-down value for those objects which support this value. This results in the creation of an MEE_await_clear_req primitive or primitives in the AN.

Following the exchange of VB5 messages, the SN generates an MEE_await_clear_ind primitive or primitives which results in the changing of the remoteBlockingVb5 attribute from remoteUnblocked to remoteAwaitingClear in the relevant VB5 VP CTP or TTP objects or in the relevant vpcLup objects.

The SN responds to the MEE_await_clear primitive or primitives by waiting for calls to clear. When this is complete, the SN generates an MEE_await_clear_res primitive or primitives and sends the appropriate message to the AN, which responds and generates an MEE_await_clear_conf primitive or primitives. This allows the administrativeState or partialAdministrativeState attribute which initiated the process in the AN to change to locked or partially locked respectively.

C.4 Blocking and unblocking

When the relevant administrativeState or partialAdministrativeState attributes in the AN change to locked or partially locked, either as a result of shutting down or due to direct intervention by the OS, an MEE_block_request primitive with an administrative cause is generated and a message is sent to the SN. On receipt of this message, an MEE_block_ind primitive is generated in the SN. In addition, in the relevant VP CTP, TTP, vpcLup or logical service port objects the remoteBlockingVb5 attribute changes to remoteBlocked and the administrative field of the remoteBlockingReasonVb5 attribute changes to administrative cause partial or full, depending on the nature of the blocking.

If there is a fault which affects a VP or group of VPs in the AN, then an MEE_block_request primitive with a fault cause is generated, a message is sent to the SN, and often there will be an operationalState attribute in an object in the AN which changes to disabled. On receipt of the message, an MEE_block_ind primitive is generated in the SN and in the relevant VP CTP, TTP, vpcLup or logical service port objects the remoteBlockingVb5 attribute changes to remoteBlocked and the fault field of the remoteBlockingReasonVb5 attribute changes to error.

When the administrativeState or partialAdministrativeState attribute in the AN is changed to unlocked by the OS or the fault condition is cleared, an MEE_unblock_req primitive is generated in the AN and a message is sent to the SN. On receipt of this message, an MEE_unblock_ind primitive is generated in the SN and in the relevant VP CTP, TTP, vpcLup or logical service port objects the remoteBlockingVb5 attribute changes to remoteUnblocked and the fault or administrative field of the remoteBlockingReasonVb5 attribute changes to none.

The administrative and fault fields in the remoteBlockingVb5 attribute are independent.

C.5 VPCI consistency checking

The CheckVpciConsistency action is initiated by the OS of the SN via Q3 and is only applicable to VPCs on a VB5 interface which terminate in the AN and are associated with an LSP. The SN environment is responsible for ensuring that there is no second CheckVpciConsistency initiated as long the first one is running. The VPC on which the CheckVpciConsistency action is performed has to be in the operational state enabled. When starting the action, the operator has to provide the CheckVpciConsistencyInformation. The environment of the SN creates a MEE_cons_check_req primitive and a VB5 message is sent across the interface to the AN.

On receipt of this VB5 message, the AN generates a MEE_cons_check_ind primitive to activate the loopback monitoring function on the requested VPCI in AN environment. A MEE_cons_check_res primitive generated in the AN environment directed to the system management contains the information whether the activation of the loopback monitoring function was successful or the CheckVpciConsistency was rejected (e.g. if another CheckVpciConsistency started by a different SN is already running).

The appropriate VB5 message carries the result information back to the SN side. A MEE_cons_check_conf primitive is generated which triggers the SN environment to start sending end-to-end loopback cells (successful case) or leads to an action reply which is sent to the operator and terminates the CheckVpciConsistency action with the RemoteReason "notPerformed" (rejected or unknown resource case).

If the CheckVpciConsistency is successful up to this point, the detection by the SN of cells which have been looped back or the termination of the test results in the generation of a MEE_cons_check_end_req primitive followed by a VB5 message across the VB5.1 interface towards the AN.

On receipt of this VB5 message, the AN generates a MEE_cons_check_end_ind primitive which results in the deactivation of the loopback monitoring function. The AN environment generates a MEE_cons_check_end_res primitive and a VB5 message crosses the VB5.1 interface to the SN.

This message confirms the stopping of the VPCI consistency check procedure and carries the information whether the AN monitored the loopback cells or not (successful or failed). In the SN a MEE_cons_check_end_conf primitive is generated which transfers the result (successful, failed at AN) to the SN environment. The action reply CheckVpciConsistencyResult transfers this information via Q3 to the OS which started the action.

C.6 Start-up

The start-up procedure deals with the individual VB5 interface and therefore involves the LSP managed object that models the specific interface. The procedure may be activated by either the AN or the SN, in the following two cases:

1) by the OS, which requests the start-up action to activate the interface;

2) by the system, due to a failure of the SAAL, without start-up action requested.

These two cases are described in the subclauses below; as the same primitives and managed objects are involved in the AN and the SN a generic description has been used; in particular, the managed object modelling the interface is called LSP and the VB5 System Management functional blocks in the AN and SN are called VB5 System Management.

C.6.1 Activation by OS

The start-up procedure is activated by the OS of the AN or the SN, that sends a start-up action request to activate the VB5 interface. The request is addressed to the specific LSP managed object that models the VB5 interface; the LSP identifier is contained in the start-up action request.

The activation state of the interface is modelled by the lspActivationState attribute that is contained in the LSP managed object; this attribute indicates whether the VB5 interface is active, not active or restarting after a failure.

As soon as the LSP receives the message, it activates the start-up action that examines the value of the lspActivationState.

If the interface is already active (lspActivationState = activated) or restarting (lspActivationState = restarting), the start-up action ends, the OS is informed on the interface state by the start-up action reply and no messages are sent to the VB5 System Management block.

If the interface is not active (lspActivationState = notActivated), the LSP activates the start-up process by generating a MEE_startup_req which is sent to the associated VB5 SYSMGT functional block. The nonActivated value indicates that there is a fault condition or some other condition preventing automatic start-up.

The start-up process is activated in the remote system by the primitives concerning the SAAL establishment, after that VB5 messages are sent to perform the RTMC reset and check procedures. If the procedure succeeds the remote LSP managed object receives an MEE_startup_ind; then the lspActivationState is changed to activated, and the attribute value change notification is sent to inform the OS on the interface activation.

At the end of the procedure the initiator LSP receives from the VB5 System Management block an MEE_startup_conf primitive, which contains the result of the procedure; the result is sent to the OS by the start-up action reply.

If the procedure succeeds the lspActivationState attribute changes to activated and an attribute value change notification is sent to the OS; besides the LSP of the AN blocks all VPCs not available for service due to administrative reasons or faults.

Figure C.2 points out the entities of the information model and the VB5 system involved in the start-up procedure and the messages they exchange.

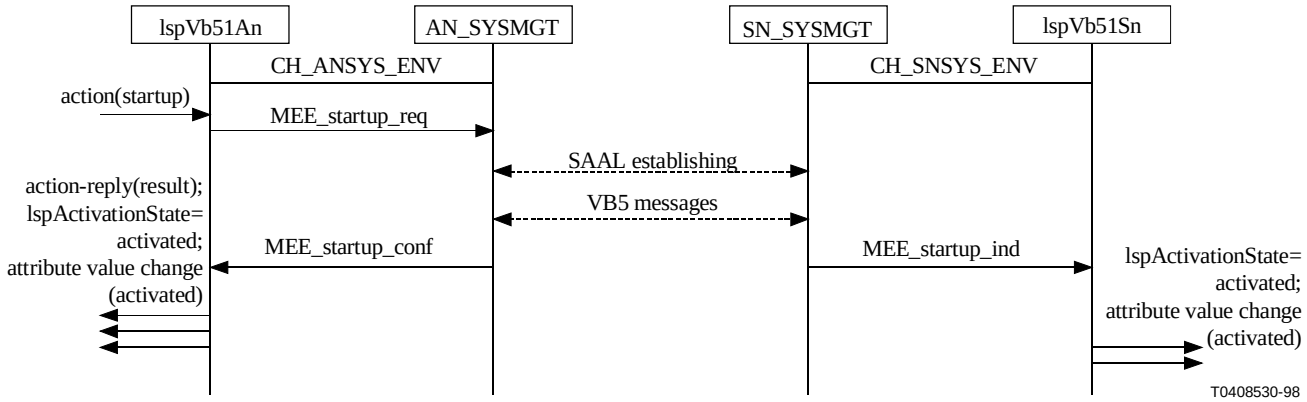


Figure C.2/Q.832.1 – Successful start-up procedure triggered by the AN OS

The start-up procedure fails if any of the SAAL establishment, LSP verification or RTMC reset procedures fail.

If the start-up procedure fails, the lspActivationState attribute does not change its value set to notActivated and the remote VB5 System Management block does not send the remote LSP the MEE_startup_ind message. The failure is reported to the OS by the action reply: if the interface is already in activated state the start-up result will be activated, if the interface is in restarting state the start-up result will be restarting.

Figure C.3 represents the entities and the relationships identified in case of failure.

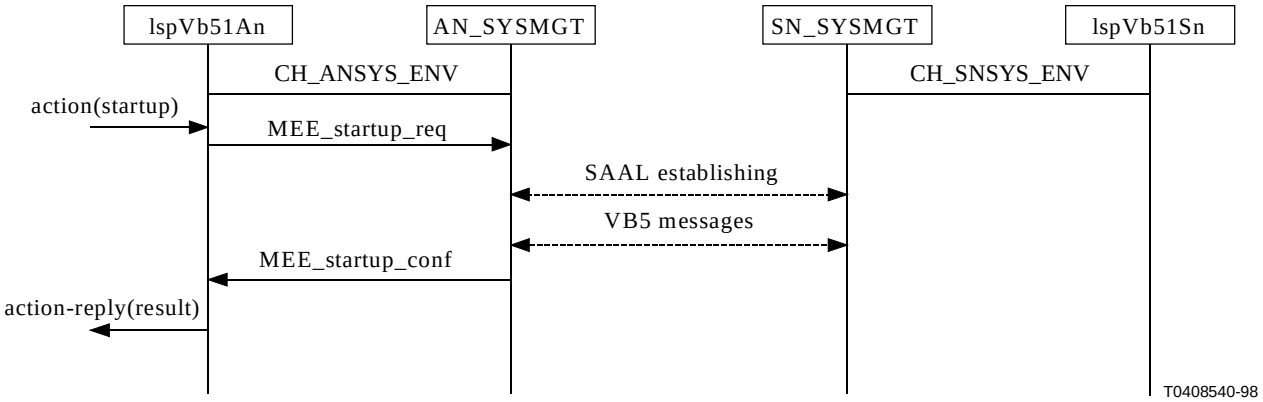


Figure C.3/Q.832.1 – Unsuccessful start-up procedure triggered by the AN OS

C.6.2 Automatic start-up

The start-up procedure is activated by the system when an SAAL failure occurs or when the fault or other condition preventing automatic start-up no longer exists; this event is notified both to the AN and SN LSP managed objects by an MEE_LSP_failure_ind, which changes the lspActivationState attributes to restarting. This change is notified to the OS by an attribute value change notification; actually, this notification informs the OS of the interface failure. After that, both the LSP managed objects in the AN and SN side will try to restart the interface as in the previous case, sending an MEE_startup_req primitive periodically to the system management block, without notifying the OS of any start-up failures. In Figure C.3, the dashed lines mean repeated failed attempts.

If an attempt succeeds the initiating LSP receives a successful MEE_startup_conf, the remote LSP an MEE_startup_ind, the lspActivationState attributes change to activated and an attribute value change notification is sent to each OS (AN side and SN side); besides the LSP of the AN blocks all VPCs not available for service due to administrative reasons or faults.

Figure C.4 represents the case of successful procedure after a number of repeated failed attempts (the dashed lines).

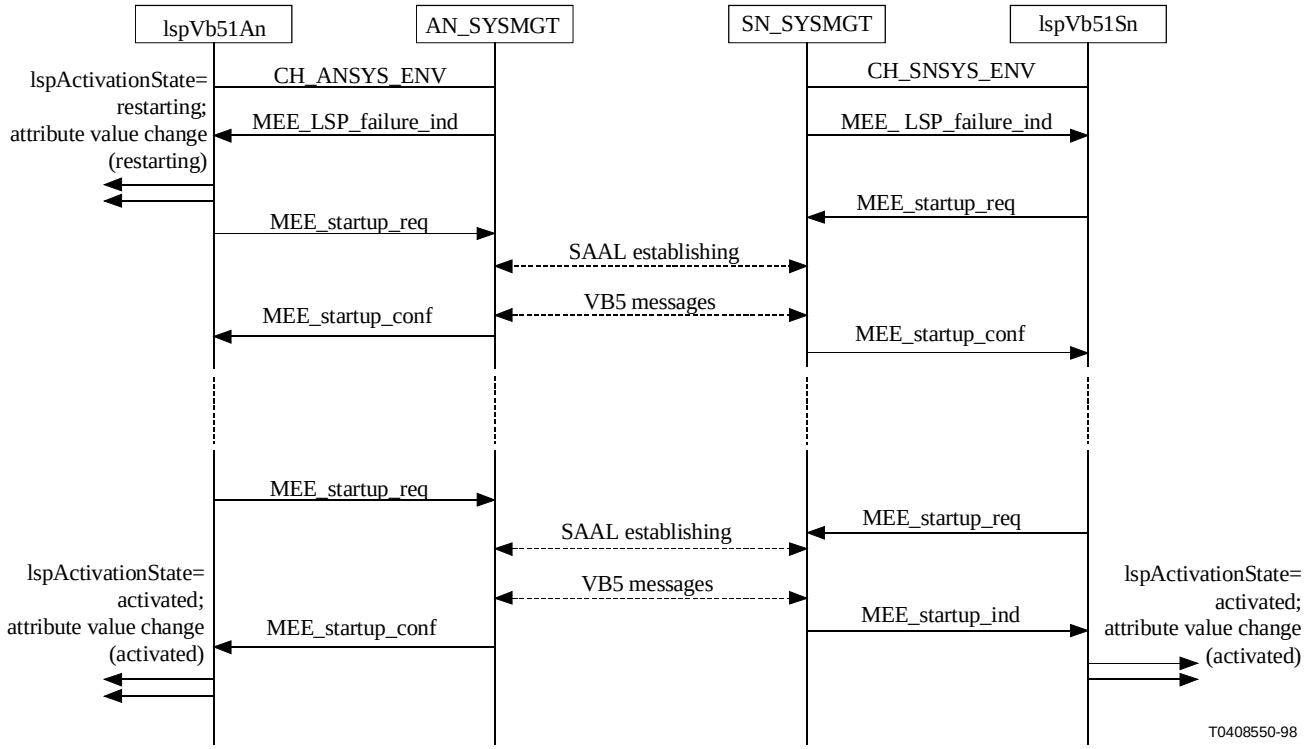


Figure C.4/Q.832.1 – Successful start-up procedure automatically triggered

If the procedure stops, due to a fault or other condition preventing automatic start-up, the attributes lspActivationState on the AN side and the SN side are set to notActivated and the OSs are informed with the relevant attribute value change notifications.

C.7 LSP identity checking

The check logical service port identification can be invoked from either side SN or AN. Due to a checkLspIdentification action initiated by an OS via the Q3 interface, the related environment creates a primitive MEE_verify_LSP_ID_req which results in the appropriate message across the VB5.1 interface.

On the other side, no MEE primitive is created to inform the environment about the procedure. A VB5 message is sent back to the SN containing the requested information about the logical service port identifier. After comparison of the two LSP Id values, a MEE_verify_LSP_ID_conf primitive is created which provides the result (positive result indication for consistency and negative result indication for mismatch) to the environment. The action reply checkLspIdentificationResult transfers the information via Q3 to the OS which started the action.

C.8 RTMC reset

The RTMC Reset procedure is carried out by the Logical Service Port managed object by means of the RTMC reset action. An RTMC reset results in the SN taking appropriate action which can include the release of on-demand connections although the intention is to minimize the interruption of service. Furthermore, the states of all VPCs and the state of the LSP are set to unblocked; VPCs not available for service due to administrative reasons shall be blocked again by the Logical Service Port managed object. Shut-down requests and VPCI consistency checks are aborted as a consequence of an RTMC reset request.

According to the interface specification, this procedure may be initiated both by the AN OS and by the SN OS and involves the peer system as well, where the procedure is activated by RTMC commands.

The case is described below; as the same primitives and managed objects are involved in the AN and the SN a generic description has been used; in particular, the managed object modelling the interface is called LSP and the VB5 System Management functional blocks in the AN and SN are called VB5 System Management.

The command sent by the OS will be carried on the Q3 interface by the RTMC reset action; the parameter specifies the managed object identifier that will carry it out.

The action command is received by MCF that will generate an internal message to the LSP managed object identified by the appropriate parameter; this message activates the RTMC reset action of the LSP that in turn will generate an MEE_reset_req to the VB5 System Management functional block.

The RTMC reset action is activated on the peer system by the RTMC VB5 messages across the VB5 interface; on receipt of the VB5 messages the VB5 System Management block of the remote system carries out the RTMC reset procedure and reports the result to the remote LSP managed object by means of an MEE_reset_ind primitive.

Only if the RTMC reset is triggered by the AN OS then the peer LSP in the SN, as soon as it receives the RTMC reset indication, informs the OS by the resetRtmcResult notification.

At the end of the VB5 messages phase the VB5 System Management block of the initiating system sends the LSP an MEE_reset_conf primitive with the result of the action, which may be successful or unsuccessful. Finally, the LSP managed object reports the result to the OS by the action reply.

The relationships described above are summarised in Figure C.5; in this example, the AN is the initiating system.

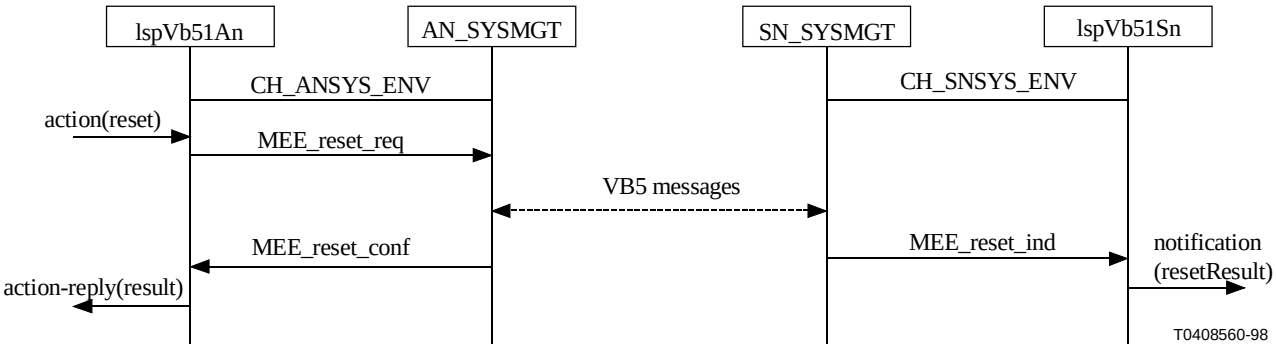


Figure C.5/Q.832.1 – RTMC Reset procedure triggered by the AN OS

ANNEX D

State transitions

D.1 State transition table for AN

Table D.1 maps the transitions of the administrativeState attribute, the partialAdministrativeState attribute and the operationalState attribute on MEE primitives towards the VB5 system in the AN. Table D.2 identifies which state attributes are applicable to which VB5 resources and gives the MOC representation of each resource.

Table D.1/Q.832.1 – Mapping of state transitions on MEE primitives in the AN

admin state	**unlocked**					**shuttingDown**			**locked**			
partadm state	**partialUnlocked**		**partial Shutting Down**	**partialLocked**		**partial Unlocked**	**partial Shutting Down**	**partialLocked**	**partialUnlocked**		**partialLocked**	
operat state	**enabled**	**disabled**	**enabled**	**enabled**	**disabled**	**enabled**			**enabled**	**disabled**	**enabled**	**disabled**
Event (Note 1)	**1.1.1**	**1.1.2**	**1.2**	**1.3.1**	**1.3.2**	**2.1**	**2.2**	**2.3**	**3.1.1**	**3.1.2**	**3.3.1**	**3.3.2**
disabling reason	meeBlock RscReq (E); 1.1.2	-; -	meeBlock RscReq (P, E); 1.3.2	meeBlock RscReq (P, E); 1.3.2	-; -	meeBlock RscReq (F; E); 3.1.2	meeBlock RscReq (F; E); 3.3.2	meeBlock RscReq (F; E); 3.3.2	meeBlock RscReq (F, E); 3.1.2	-; -	meeBlock RscReq (F, E); 3.3.2	-; -
enabling reason	-; -	meeUnblock RscReq; 1.1.1	-; -	-; -	meeBlock RscReq (P); 1.3.1	-; -	-; -	-; -	-; -	meeBlock RscReq (F); 3.1.1	-; -	meeBlock RscReq (F); 3.3.1
LOCK (Note 2)	meeBlock RscReq (F); 3.1.1	meeBlock RscReq (F, E); 3.1.2	meeBlock RscReq (F); 3.3.1	meeBlock RscReq (F); 3.3.1	meeBlock RscReq (F, E); 3.3.2	meeBlock RscReq (F); 3.1.1	meeBlock RscReq (F); 3.3.1	meeBlock RscReq (F); 3.3.1	-; -	-; -	-; -	-; -
SHUTDOWN (Note 2)	meeAwait ClearReq; 2.1	meeBlock RscReq (F, E); 3.1.2	-; 2.2	meeAwait ClearReq; 2.3	meeBlock RscReq (F, E); 3.3.2	-; -	-; -	-; -	/	/	/	/
UNLOCK (Note 2)	-; -	-; -	-; -	-; -	-; -	meeUnblock RscReq; 1.1.1	-; 1.2	meeBlock RscReq (P); 1.3.1	meeUnblock RscReq; 1.1.1	meeBlock RscReq (E); 1.1.2	meeBlock RscReq (P); 1.3.1	meeBlock RscReq (P, E); 1.3.2
PARTIAL LOCK (Note 3)	meeBlock RscReq (P); 1.3.1	meeBlock RscReq (P, E); 1.3.2	meeBlock RscReq (P); 1.3.1	-; -	-; -	-; 2.3	-; 2.3	-; -	-; 3.3.1	-; 3.3.2	-; -	-; -
PARTIAL SHUTDOWN (Note 3)	meeAwait ClearReq; 1.2	meeBlock RscReq (P, E); 1.3.2	-; -	/	/	-; 2.2	-; -	/	-; 3.3.1	-; 3.3.2	/	/
PARTIAL UNLOCK (Note 3)	-; -	-; -	meeUnblock RscReq; 1.1.1	meeUnblock RscReq; 1.1.1	meeBlock RscReq (E); 1.1.2	-; -	-; 2.1	-; 2.1	-; -	-; -	-; 3.1.1	-; 3.1.2

Table D.1/Q.832.1 – Mapping of state transitions on MEE primitives in the AN *(concluded)*

admin state	**unlocked**					**shuttingDown**			**locked**			
partadm state	**partialUnlocked**		**partial Shutting Down**	**partialLocked**		**partial Unlocked**	**partial Shutting Down**	**partialLocked**	**partialUnlocked**		**partialLocked**	
operat state	**enabled**	**disabled**	**enabled**	**enabled**	**disabled**	**enabled**			**enabled**	**disabled**	**enabled**	**disabled**
Event (Note 1)	**1.1.1**	**1.1.2**	**1.2**	**1.3.1**	**1.3.2**	**2.1**	**2.2**	**2.3**	**3.1.1**	**3.1.2**	**3.3.1**	**3.3.2**
meeAwait ClearConf [XC flag FALSE]	-; -	-; -	meeBlock RscReq (P); 1.3.1	-; -	-; -	meeBlock RscReq (F); 3.1.1	meeBlock RscReq (F); 3.3.1	meeBlock RscReq (F); 3.3.1	-; -	-; -	-; -	-; -
meeAwait ClearConf [XC flag TRUE]	-; -	-; -	Q3notif sdcomp; -	-; -	-; -	Q3notif sdcomp; -	Q3notif sdcomp; -	Q3notif sdcomp; -	-; -	-; -	-; -	-; -
meeAwait ClearConf [XC flag TRUE]	-; -	-; -	Q3notif sdcomp; -	-; -	-; -	Q3notif sdcomp; -	Q3notif sdcomp; -	Q3notif sdcomp; -	-; -	-; -	-; -	-; -
meeResetRscInd or meeResetRscConf	-; -	meeBlock RscReq (E); -	meeAwait Clear (P); -	meeBlock RscReq (P); -	meeBlock RscReq (P, E); -	meeAwait ClearReq ; -	meeAwait ClearReq ; -	meeAwait ClearReq ; -	meeBlock RscReq (F); -	meeBlock RscReq (F, E); -	meeBlock RscReq (F); -	meeBlock RscReq (F, E); -

The following conventions are used:

< primitive [(attributes)] | Q3 action > ; < new state >

- no primitive or Q3 action to be generated or no state change

/ event not possible or not allowed for this state

Abbreviations used for reason codes: F = admFull; P = admPart; E = Err

NOTE 1 – Not all of these events are applicable to a particular resource. For details, reference is made to the relevant GDMO definition.

NOTE 2 – Q3 SET request on the administrativeState ATTRIBUTE.

NOTE 3 – Q3 SET request on the partialAdministrativeState ATTRIBUTE.

Table D.2/Q.832.1 – AN resources: Support of state attributes

Resource	MOC representation	administrative State	partial administrative State	operational State
PUP	tcAdaptorTtpBidirectional *plus contained* tcAdaptorTtpExtension	Y	Y	Y
PSP	tcAdaptorTtpBidirectional	Y	N	Y
LUP	logicalUserPort	N	N	N
LSP	lspVb51An	N	Y (Note)	Y
VP	vpCtpBidirectional	Y	N	Y
	vpTtpBidirectional	Y	N	Y
NOTE – Partial shut-down state is not supported.				

D.2 State transition table for SN

Table D.3 presents the transition of the remoteBlockingVb5 attribute on the reception of primitives coming from the VB5 system in the SN. For the event "last user quit", reference should be made to the description of generic states in Recommendation X.731 [15]. Table D.4 identifies for which resources the remoteBlockingVb5 attribute is applicable and gives the MOC representation of each resource.

Table D.3/Q.832.1 – Mapping of MEE primitives on state transitions in the SN

	remoteUnblocked	**remoteAwaitClear**	**remoteBlocked**				
admin	**none**		**adminPartial**		**adminFull**		**none**
error	**none**		**none**	**error**	**none**	**error**	**error**
Event (Note)	**1**	**2**	**3.1.1**	**3.1.2**	**3.2.1**	**3.2.2**	**3.3**
meeUnblockRscInd	-; -	-; 1	-; 1	-; 1	-; 1	-; 1	-; 1
meeAwaitClearInd	-; 2	-; -	meeAwait ClearRes; -	meeAwait ClearRes; -	meeAwait ClearRes; -	meeAwait ClearRes; -	meeAwait ClearRes; -
last user quit	-; -	meeAwaitClearRes; -	-; -	-; -	-; -	-; -	-; -
meeBlockRscInd (P)	-; 3.1.1	-; 3.1.1	-; -	-; 3.1.1	-; 3.1.1	-; 3.1.1	-; 3.1.1
meeBlockRscInd (F)	-; 3.2.1	-; 3.2.1	-; 3.2.1	-; 3.2.1	-; -	-; 3.2.1	-; 3.2.1
meeBlockRscInd (E)	-; 3.3	-; 3.3	-; 3.3	-; 3.3	-; 3.3	-; 3.3	-; -
meeBlockRscInd (P,E)	-; 3.1.2	-; 3.1.2	-; 3.1.2	-; -	-; 3.1.2	-; 3.1.2	-; 3.1.2
meeBlockRscInd (F, E)	-; 3.2.2	-; 3.2.2	-; 3.2.2	-; 3.2.2	-; 3.2.2	-; -	-; 3.2.2
meeResetRscInd or meeResetRscConf	-; -	-; 1	-; 1	-; 1	-; 1	-; 1	-; 1

The following conventions are used:

< primitive [(attributes)] | Q3 action > ; < new state >

- no primitive or Q3 action to be generated or no state change

/ event not possible or not allowed for this state

Abbreviations used for reason codes: F = admFull; P = admPart; E = Err

NOTE – Not all of these events are applicable to a particular resource. For details, reference is made to the relevant GDMO definition.

Table D.4/Q.832.1 – SN resources: Support of remote blocking attributes

Resource	**MOC representation**	**remoteBlockingVb5**
PSP	tcAdaptorTtpBidirectional	N
LUP	uniAccessVb5	N
LSP	lspVb51Sn	Y
VP	vpCtpBidirectionalVb5	Y
	vpTtpBidirectionalVb5	Y
	vpcLup	Y

APPENDIX I

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APPENDIX II

Clarification of the pointer relationships between the instances

The operations systems of the AN and the SN need to coordinate with each other for VB5 management, and they need to manage many object instances, especially termination points and their vpci values, with pointer relationships. Therefore, it is necessary for us to clarify the pointer relationships between the instances contained in the SN and the AN because their relationships are complex but important for VB5 management. Figure II.2 shows an instantiation example based on the conventions shown in Figure II.1. It should be noted that the flexibility in the representation of the managed object instances is to improve visual clarity only.

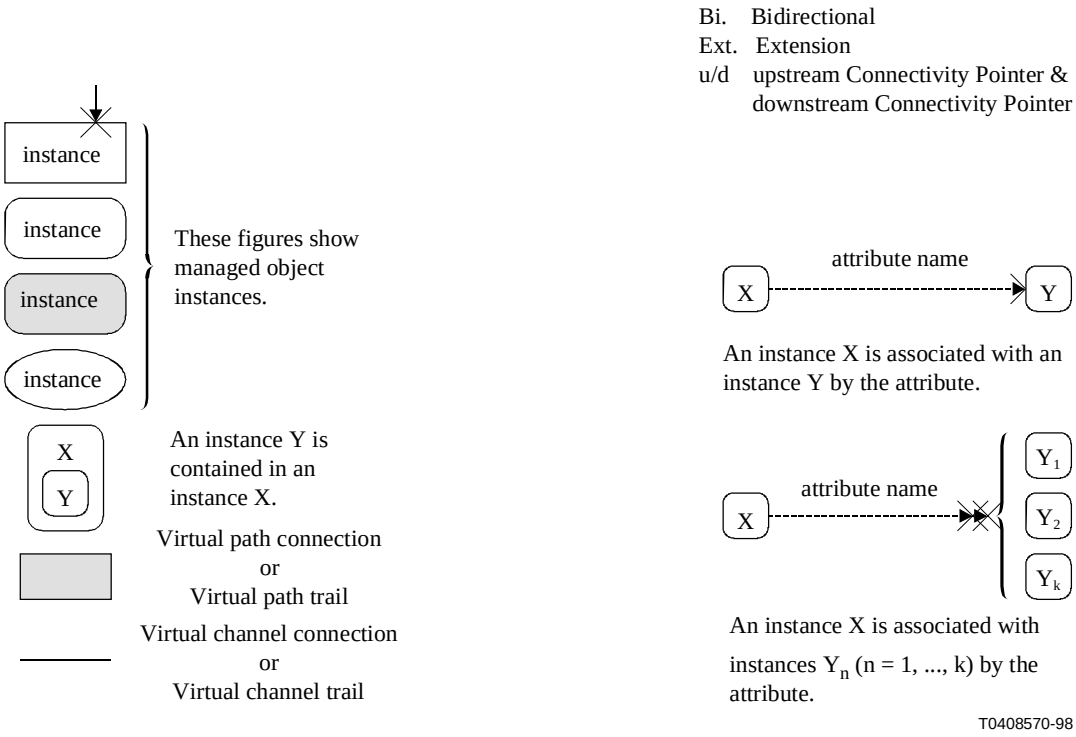
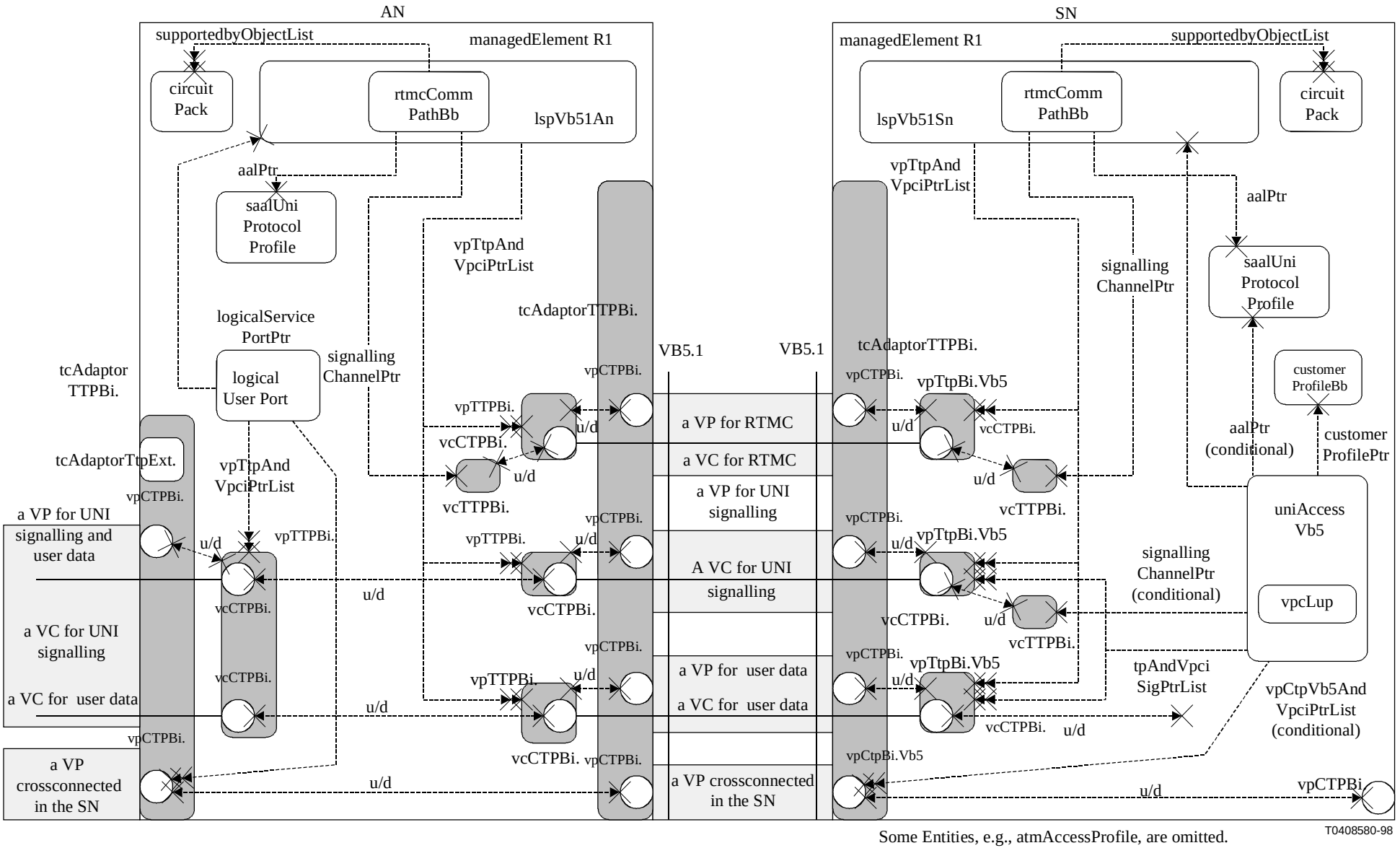


Figure II.1/Q.832.1 – Conventions used for instantiation example



Some Entities, e.g., atmAccessProfile, are omitted.

Figure II.2/Q.832.1 – An instantiation example of the managed objects contained in the SN and AN

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