ETSI TS 132 712 V9.0.0 (2010-02)

Technical Specification

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Configuration Management (CM);
Transport Network (TN) Network Resource Model (NRM)
Integration Reference Point (IRP);
Information Service (IS)
(3GPP TS 32.712 version 9.0.0 Release 9)

Reference
RTS/TSGS-0532712v900

Keywords
GSM, LTE, UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://webapp.etsi.org/IPR/home.asp).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

32.711: Configuration Management (CM); Transport Network (TN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Requirements

32.712: Configuration Management (CM); Transport Network (TN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)

32.713: Configuration Management (CM); Transport Network (TN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Common Object Request Broker Architecture (CORBA) Solution Set (SS)

32.715 Configuration Management (CM); Transport Network (TN) interface Network Resource Model (NRM) Integration Reference Point (IRP); eXtensible Markup Language (XML) file format definition

Configuration Management (CM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. CM actions have the objective to control and monitor the actual configuration on the Network Elements (NEs) and Network Resources (NRs), and they may be initiated by the operator or by functions in the Operations Systems (OSs) or NEs.

CM actions may be requested as part of an implementation programme (e.g. additions and deletions), as part of an optimisation programme (e.g. modifications), and to maintain the overall Quality of Service (QoS). The CM actions are initiated either as single actions on single NEs of the 3G network, or as part of a complex procedure involving actions on many resources/objects in one or several NEs.

1 Scope

The present document is part of an Integration Reference Point (IRP) named "Transport Network (TN) Interface Network Resource Model (NRM) IRP ", through which an "IRPAgent" (typically an Element Manager or Network Element) can communicate Configuration Management information to one or several "IRPManagers" (typically Network Managers) concerning Transport resources. The "Transport Network (TN) Interface Network Resource Model (NRM) IRP" comprises a set of specifications defining Requirements, a protocol neutral Network Resource Model (NRM) and corresponding Solution Set(s).

The present document:

1. specifies the protocol neutral Transport Network Interface Resources IRP: Network Resource Model. It reuses relevant parts of the generic NRM in TS 32.622 [6], either by direct reuse or sub-classing, and in addition to that defines Transport specific Managed Object Classes.

The Configuration Management (CM) area is very large. The intention is to split the specification of the related interfaces in several IRPs - as described in the Introduction clause above. An important aspect of such a split is that the Network Resource Models (NRMs) defined in different IRPs containing NRMs are consistent, and that NRMs supported by an IRPAgent implementation can be accessed as one coherent model through one IRP Information Service.

In order to access the information defined by this NRM, an IRP Information Service (IS) is needed, such as the Basic CM IRP: IS (TS 32.602 [7]) or the Bulk CM IRP: IS (TS 32.612 [8]). However, which Information Service that is applicable is outside the scope of this document.

Finally, regarding the support of the State Management IRP: IS (TS 32.672 [3]), all NRM's of one release shall support the same State Management IRP version.

This specification is related to 3GPP TS 32.672.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 32.101: "Telecommunication Management, Principles and high level requirements".

[2] 3GPP TS 32.102: "Telecommunication management; Architecture".

[3] 3GPP TS 32.672: "Telecommunication management; Configuration Management (CM); State Management Integration Reference Point (IRP): Information Service (IS)".

[4] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[5] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[6] 3GPP TS 32.622: " Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[7] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP) Information Service (IS)".

[8] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Information Service (IS)".

[9] 3GPP TS 25.430: "UTRAN Iub interface:general aspects and principles".

[10] 3GPP TS 25.431: "UTRAN Iub interface Layer 1".

[11] 3GPP TS 25.411: "UTRAN Iu interface Layer 1".

[12] ITU-T Recommendation I.361 (11/95):"B-ISDN ATM Layer Specification".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.150 [3] and the following apply:

Association: in general it is used to model relationships between Managed Objects. Associations can be implemented in several ways, such as:

1. name bindings;
2. reference attributes; and
3. association objects.

This IRP stipulates that containment associations shall be expressed through name bindings, but it does not stipulate the implementation for other types of associations as a general rule. These are specified as separate entities in the object models (UML diagrams)

Managed Element (ME): an instance of the Managed Object Class ManagedElement defined in 3GPP TS 32.622 [6].

Managed Object (MO): in the context of the present document, a Managed Object (MO) is a software object that encapsulates the manageable characteristics and behaviour of a particular Network Resource. The MO is instance of a MO class defined in a MIM/NRM. This class, called **Information Object Class (IOC)** has **attributes** that provide information used to characterize the objects that belong to the class (the term "attribute" is taken from TMN and corresponds to a "property" according to CIM). Furthermore, the IOC can have **operations** that represent the behaviour relevant for that class (the term "operation" is taken from TMN and corresponds to a "method" according to CIM). The IOC may support the emission of **notifications** that provide information about an event occurrence within a network resource

Management Information Model (MIM): also referred to as NRM - see the definition below

Network Resource Model (NRM): A model representing the actual managed telecommunications network resources that a System is providing through the subject IRP. An NRM identifies and describes the IOCs, their associations, attributes and operations. The NRM is also referred to as "MIM" (see above), which originates from the ITU-T TMN

Node B: A logical node responsible for radio transmission/reception in one or more cells to/from the User Equipment. It terminates the Iub interface towards the RNC

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.150 [3] and the following apply:

CIM	Common Information Model
DN	Distinguished Name (see 3GPP TS 32.300 [4])

EM	Element Manager
FM	Fault Management
IOC	Information Object Class
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Sector
Iub	Interface between RNC and Node B
ME	Managed Element
MIM	Management Information Model
MO	Managed Object
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
PM	Performance Management
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [4])
RNC	Radio Network Controller
TMN	Telecommunications Management Network
UML	Unified Modelling Language
UMTS	Universal Mobile Telecommunications System

4 Information Object Classes

4.1 Imported information entities and local labels

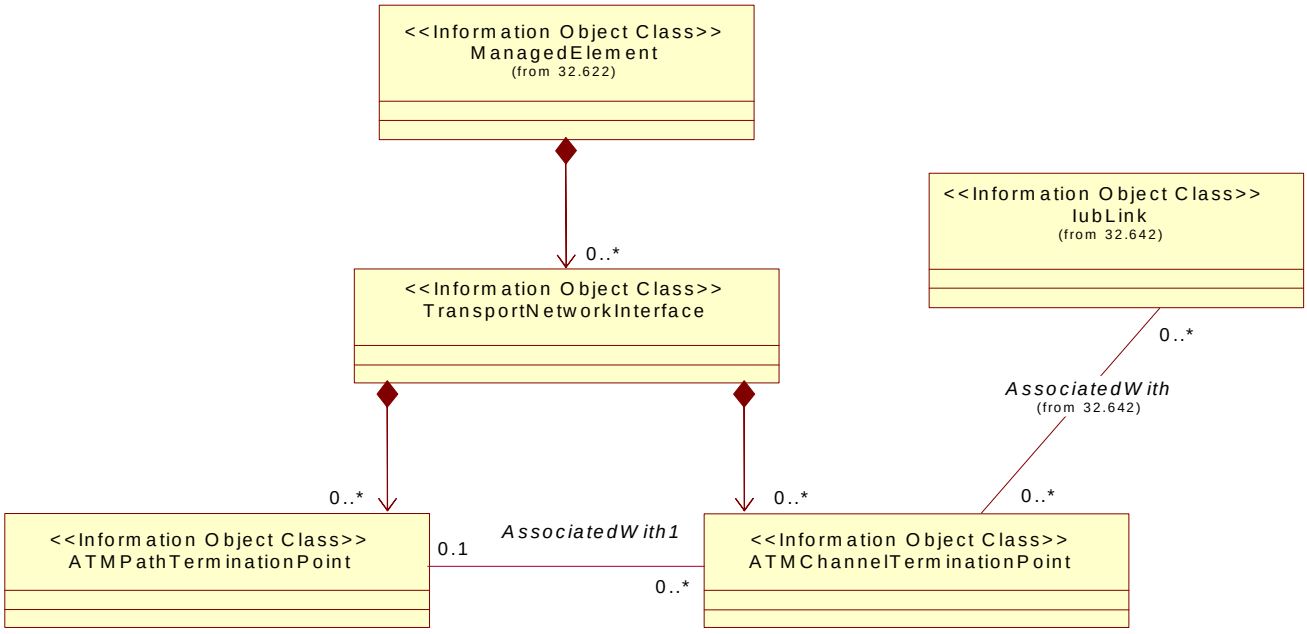
IOCs ManagedElement, IubLink, and vsDataComtainer are imported.

4.2 Class diagram

4.2.1 Attributes and relationships

This sub clause depicts the set of IOCs that encapsulate information relevant for this service. This sub clause provides the overview of all information object classes in UML. Subsequent subclasses provide more detailed specification of various aspects of these information object classes.

Figure 4.2.1.1 shows the name-containment relation and other types of relations of the Transport Network NRM.

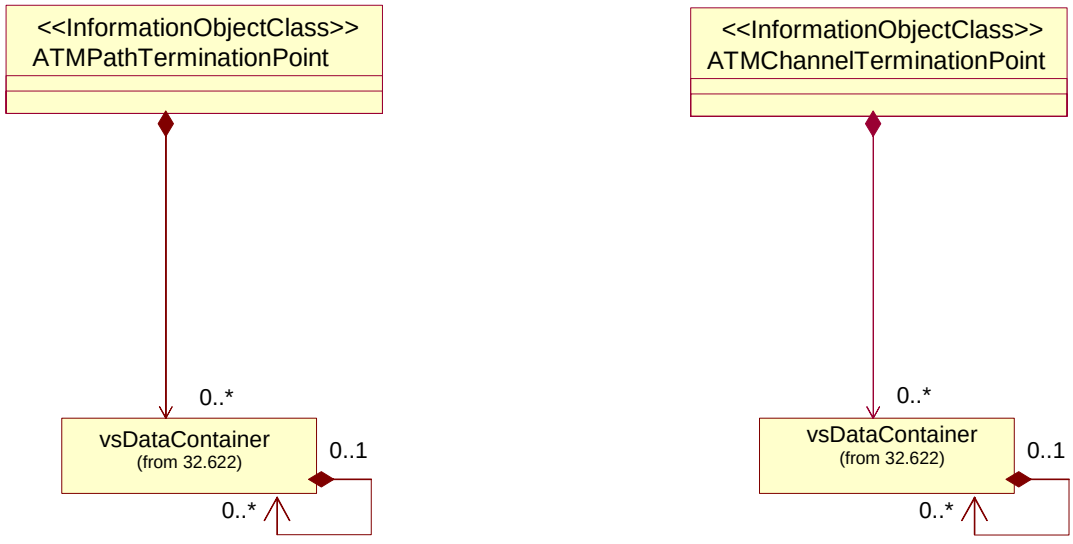


NOTE: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.

Figure 4.2.1.1: Transport Network NRM Containment/Naming and Association diagram

Each IOC is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [4] that expresses its containment hierarchy. As an example, the DN of a IOC representing a ATMPathTerminationPoint could have a format like:

SubNetwork=Sweden,meContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1, TransportNetworkInterface=ATM-1, ATMPathTerminationPoint=Gbg-1.



NOTE 1: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.
NOTE 2: Each instance of the vsDataContainer shall only be contained under one IOC. The vsDataContainer can be contained under IOCs defined in other NRMs.

Figure 4.2.1.2: vsDataContainer in Transport Network Containment/Naming and Association diagram

The vsDataContainer is only used for the Bulk CM IRP.

4.2.2 Inheritance

This sub-clause depicts the inheritance relationships that exist between IOCs.

Figure 4.2.2.1 shows the inheritance hierarchy for the Transport Network NRM.

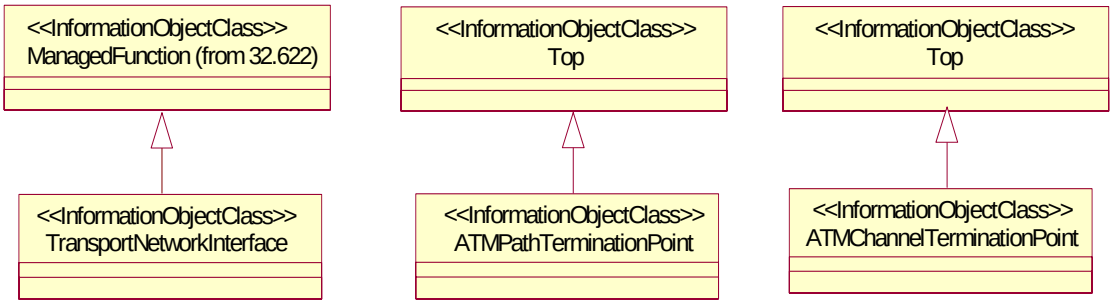


Figure 4.2.2.1: Transport Network NRM Inheritance Hierarchy

4.3 Information object class definitions

4.3.1 TransportNetworkInterface

4.3.1.1 Definition

This IOC represents the Transport Network Interface technology (e.g. ATM, IP).

4.3.1.2 Attributes

Table 4.3.1: Attributes of TransportNetworkInterface

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
transportNetworkInterfaceId	+	M	M	-
userLabel	+	M	M	M
transportNetworkType	+	M	M	-

4.3.2 ATMChannelTerminationPoint

4.3.2.1 Definition

This IOC represents a bi-directional ATM Virtual Channel Connection Termination Point.

4.3.2.2 Attributes

Table 4.3.2: Attributes of ATMChannelTerminationPoint

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
aTMChannelTerminationPointid	+	M	M	-
usageChannel	+	M	M	-
virtualPathId	+	M	M	O
virtualChannelId	+	M	M	O
physicalPortId	+	M	M	O
physicalInterfaceType	+	M	M	O
serviceCategoryIn	+	M	M	O
ServiceCategoryEg	+	M	M	O
usedAAL	+	M	M	O
peakCellRateIn	+	M	M	O
peakCellRateEg	+	M	M	O
sustainableCellRateIn	+	O	M	O
sustainableCellRateEg	+	O	M	O
maximumBurstSizeIn	+	M	M	O
maximumBurstSizeEg	+	M	M	O
minimumDesiredCellRateIn	+	O	M	O
minimumDesiredCellRateEg	+	O	M	O
minimumCellRateIn	+	O	M	O
minimumCellRateEg	+	O	M	O
aTMChannelTerminationPoint-ATMPathTerminationPoint	+	M	M	-
aTMChannelTerminationPoint- IubLink	+	M	M	-

Table 4.3.2: Attributes of ATMChannelTerminationPoint

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
aTMChannelTerminationPointid	+	M	M	-
usageChannel	+	M	M	-
virtualPathId	+	M	M	O
virtualChannelId	+	M	M	O
physicalPortId	+	M	M	O
physicalInterfaceType	+	M	M	O
serviceCategoryIn	+	M	M	O
serviceCategoryEg	+	M	M	O
usedAAL	+	M	M	O
peakCellRateIn	+	M	M	O
peakCellRateEg	+	M	M	O
sustainableCellRateIn	+	O	M	O
sustainableCellRateEg	+	O	M	O
maximumBurstSizeIn	+	M	M	O
maximumBurstSizeEg	+	M	M	O
minimumDesiredCellRateIn	+	O	M	O
minimumDesiredCellRateEg	+	O	M	O
minimumCellRateIn	+	O	M	O
minimumCellRateEg	+	O	M	O
aTMChannelTerminationPoint-ATMPathTerminationPoint	+	M	M	-
aTMChannelTerminationPoint-IubLink	+	M	M	-

4.3.2.3 Attribute constraints

The Write Qualifier for attributes virtualPathId, virtualChannelId, physicalPortId, physicalInterfaceType, serviceCategoryIn/Eg, usedAAL, peakCellRateIn/Eg, sustainableCellRateIn/Eg, and maximumBurstSizeIn/Eg shall be Mandatory if these attributes can be set over Itf-N.

The attributes sustainableCellRateIn/Eg and maximumBurstSizeIn/Eg are only applicable for ServiceCategory values RT-VBR, NRT-VBR.

The attributes minimumDesiredCellRateIn/Eg is only applicable for Service Category UBR.

The attributes minimumCellRateIn/Eg is only applicable for Service Category values ABR, GFR.

4.3.3 ATMPathTerminationPoint

4.3.3.1 Definition

This IOC represents a bi-directional ATM Virtual Path Connection Termination Point.

4.3.3.2 Attributes

Table 4.3.3: Attributes of ATMPathTerminationPoint

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
aTMPathTerminationPointid	+	M	M	-
virtualPathId	+	M	M	O
physicalPortIdList	+	M	M	O
peakCellRateIn	+	M	M	O
peakCellRateEg	+	M	M	O
aTMPathTerminationPoint-ATMChannelTerminationPoint	+	M	M	-

NOTE: The attribute peakCellRateIn/Eg of ATM Path is the maximum Peak Cell Rate of its channels.

4.3.3.3 Attribute constraints

The Write Qualifier for attributes virtualPathId, physicalPortIdList, peakCellRateIn/Eg shall be Mandatory if these attributes can be set over Itf-N.

4.4 Information relationship definitions

4.4.1 AssociatedWith1 (M)

4.4.1.1 Definition

This represents a bi-directional relation between the ATMPathTerminationPoint and ATMChannelTerminationPoint. The roles of the relation shall be mapped to a reference attribute of the IOCs. The name of the reference attribute shall be the role name.

4.4.1.2 Roles

Table 4.4.1: Roles of the relation AssociatedWith1

Name	Definition
aTMPathTerminationPoint-ATMChannelTerminationPoint	This role (when present) represents aTMPathTerminationPoint capability to identify the set of related ATMChannelTerminationPoint. ATMPathTerminationPoint-ATMChannelTerminationPoint shall carry the set of ATMChannelTerminationPoint DN(s).
aTMChannelTerminationPoint-ATMPathTerminationPoint	This role (when present) represents ATMChannelTerminationPoint capability to identify one related ATMPathTerminationPoint. When the role is absent, the ATMChannelTerminationPoint-ATMPathTerminationPoint shall contain no information. When it is present, it shall contain one ATMPathTerminationPoint DN.

4.4.1.3 Constraints

None.

4.5 Information attributes definition

4.5.1 Definition and legal values

Table 4.5.1 defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

Table 4.5.1: Attributes

Attribute Name	Definition	Legal Values
transportNetwork InterfaceId	An attribute whose "name+value" can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance	
transportNetwork Type	The type of underlying transport network, i.e. ATM, IP	Type: Enumerated Range: ATM, IP
aTMChannelTermin ationPointId	An attribute whose "name+value" can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance	
aTMPathTerminati onPointId	An attribute whose "name+value" can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance	
UsageChannel	The logical channel using the transport network connection. Ref. 3GPP TS 25.430 [9]	Type: String e.g. Iub-NBAP, Iub-ALCAP
virtualPathId	The ATM Virtual Path Identifier (VPI). Ref. ITU-T Recommendation I.361[12]	Type: Integral numeric value
virtualChannelId	The ATM Virtual Channel Identifier (VCI). Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value
physicalPortidLi st	The list of identifiers of the ATM physical port containing termination points	Type: String
physicalPortid	The identifier of the ATM physical port containing termination points	Type: String
physicalInterfac eType	The ATM physical interface type. Ref. 3GPP TS 25.431[10], 3GPP TS 25.411[11]	Type: String e.g. E1, STM1
serviceCategoryI n	The ATM Service Category used for the virtual connection Ingress (incoming) traffic. Ref. ITU-T Recommendation I.361[12]	Type: Enumerated Range: CBR, RT-VBR, NRT-VBR, ABR, UBR, GFR
serviceCategoryE g	The ATM Service Category used for the virtual connection Egress (outgoing) traffic. Ref. ITU-T Recommendation I.361[12]	Type: Enumerated Range: CBR, RT-VBR, NRT-VBR, ABR, UBR, GFR
usedAAL	The ATM Adaptation Layer (AAL) used for the virtual connection. Ref. ITU-T Recommendation I.361[12]	Type: Enumerated Range: Null, AAL1,..... AAL5
peakCellRateIn	Peak Cell Rate (PCR) in kbits/sec for Ingress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value
peakCellRateEg	Peak Cell Rate (PCR) in kbits/sec for Egress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value
sustainableCellR ateIn	Sustainable Cell Rate (SCR) in kbits/sec for Ingress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
sustainableCellR ateEg	Sustainable Cell Rate (SCR) in kbits/sec for Egress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
maximumBurstSize In	Maximum Burst Size (MBS) for VBR Service Categories for Ingress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
maximumBurstSize Eg	Maximum Burst Size (MBS) for VBR Service Categories for Egress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
minimumCellRateI n	Minimum Cell Rate (MCR) in kbits/sec for ABR, GFR Service Categories for Ingress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
minimumCellRateE g	Minimum Cell Rate (MCR) in kbits/sec for ABR, GFR Service Categories for Egress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
minimumDesiredCe llRateIn	Minimum Desired Cell Rate (MDCR) in kbits/sec for UBR Service Category for Ingress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
minimumDesiredCe llRateEg	Minimum Desired Cell Rate (MDCR) in kbits/sec for UBR Service Category for Egress traffic. Ref. ITU-T Recommendation I.361 [12]	Type: Integral numeric value Range: 1 .....n, Null
userLabel	A user-friendly (and user assigned) name of the associated object	

4.5.2 Constraints

None.

4.6 Particular information configurations

Not applicable.

Annex A (informative): Example Configuration of ATM Transport Network in UTRAN

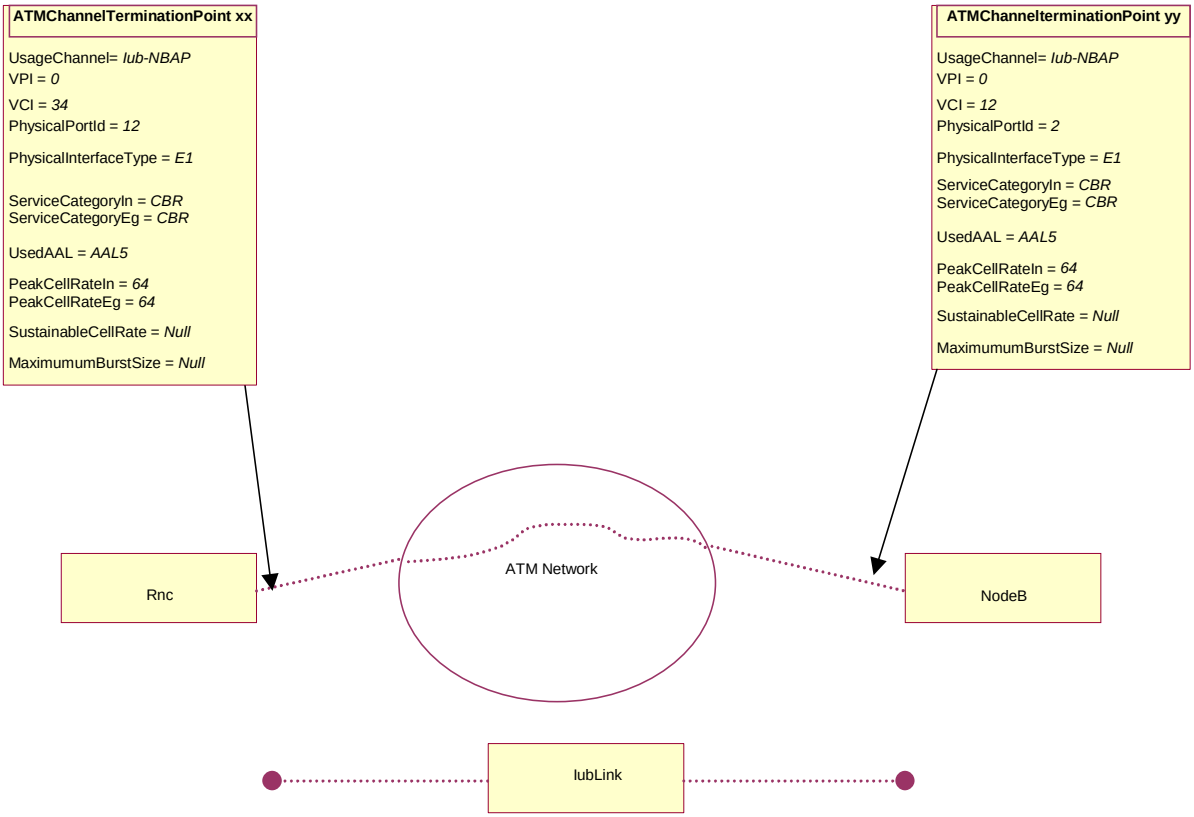


Figure A.1: Virtual connection of a logical Iub interface channel over ATM network

Annex B (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Sep 2003	SA_21	SP-030429	--	--	Submitted to TSG SA#21 for Information	1.0.0	
Sep 2004	SA_25	SP-040597	--	--	Submitted to TSG SA#25 for Approval	2.0.0	6.0.0
Jun 2007	SA_36	--	--	--	Automatic upgrade to Rel-7 (no CR) at freeze of Rel-7. Deleted reference to CMIP SS, discontinued from R7 onwards.	6.0.0	7.0.0
Sep 2007	SA_37	SP-070612	0001	--	Correct IS Attribute Tables	7.0.0	7.1.0
Dec 2008	SA_42	--	--	--	Upgrade to Release 8	7.1.0	8.0.0
Dec 2009	-	-	-	-	Update to Rel-9 version	8.0.0	9.0.0

History

Document history		
V9.0.0	February 2010	Publication