

3GPP TS 32.716 V11.0.0 (2012-09)

Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Telecommunication management;
Configuration Management (CM);
Transport Network (TN) interface
Network Resource Model (NRM)
Integration Reference Point (IRP);
Solution Set (SS) definitions
(Release 11)**



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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)
- 32.716: Configuration Management (CM); Transport Network (TN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions**

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 NEs and NRs, and they may be initiated by the operator or functions in the 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 a single action on a Network Element (NE) of the 3G-network or as part of a complex procedure involving actions on many NEs.

The Itf-N interface for Configuration Management is built up by a number of Integration Reference Points (IRPs) and a related Name Convention, which realise the functional capabilities over this interface. The basic structure of the IRPs is defined in 3GPP TS 32.101 [1] and 3GPP TS 32.102 [2]. For CM, a number of IRPs (and the Name Convention) are defined herein, used by this as well as other technical specifications for telecom management produced by 3GPP.

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 can communicate configuration management information to one or several IRPManagers concerning TN resources. The TN NRM IRP comprises a set of specifications defining Requirements, a protocol neutral Information Service and one or more Solution Set(s).

The present document specifies the Solution Sets for the TN NRM IRP.

This specification is related to 3GPP TS 32.712 [4] V11.0.X.

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 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".
- [4] 3GPP TS 32.712: "Telecommunication management; Configuration Management (CM); Transport Network (TN) interface Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".
- [5] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
- [6] OMG Notification Service, Version 1.0.
- [7] OMG CORBA services: Common Object Services Specification, Update: November 22, 1996.
- [8] The Common Object Request Broker: Architecture and Specification (for specification of valid version, see [1]).
- [9] 3GPP TS 32.306: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Solution Set (SS) definitions".
- [10] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Information Service (IS)".
- [11] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Solution Set (SS) definitions".
- [12] W3C REC-xml-20001006: "Extensible Markup Language (XML) 1.0 (Second Edition)".
- [13] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".
- [14] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".
- [15] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".

[16] W3C REC-xml-names-19990114: "Namespaces in XML".

3 Definitions and abbreviations

3.1 Definitions

For terms and definitions please refer to 3GPP TS 32.101 [1], TS 32.102 [2], TS 32.600 [3] and TS 32.712 [4] and the following apply.

XML file: file containing an XML document

XML document: composed of the succession of an optional XML declaration followed by a root XML element

NOTE: See [12]; in the scope of the present document.

XML declaration: it specifies the version of XML being used

NOTE: See [12].

XML element: has a type, is identified by a name, may have a set of XML attribute specifications and is either composed of the succession of an XML start-tag followed by the XML content of the XML element followed by an XML end-tag, or composed simply of an XML empty-element tag; each XML element may contain other XML elements

NOTE: See [12].

empty XML element: having an empty XML content; an empty XML element still possibly has a set of XML attribute specifications; an empty XML element is either composed of the succession of an XML start-tag directly followed by an XML end-tag, or composed simply of an XML empty-element tag

NOTE: See [12].

XML content (of an XML element): empty if the XML element is simply composed of an XML empty-element tag; otherwise the part, possibly empty, of the XML element between its XML start-tag and its XML end-tag

XML start-tag: the beginning of a non-empty XML element is marked by an XML start-tag containing the name and the set of XML attribute specifications of the XML element

NOTE: See [12].

XML end-tag: the end of a non-empty XML element is marked by an XML end-tag containing the name of the XML element

NOTE: See [12].

XML empty-element tag: composed simply of an empty-element tag containing the name and the set of XML attribute specifications of the XML element

NOTE: See [12].

XML attribute specification: has a name and a value

NOTE: See [12].

DTD: defines structure and content constraints to be respected by an XML document to be valid with regard to this DTD

NOTE: See [12].

XML schema: more powerful than a DTD, an XML schema defines structure and content constraints to be respected by an XML document to conform with this XML schema; through the use of XML namespaces several XML schemas

can be used together by a single XML document; an XML schema is itself also an XML document that shall conform with the XML schema for XML schemas

NOTE: See [13], [14] and [15].

XML namespace: enables qualifying element and attribute names used in XML documents by associating them with namespaces identified by different XML schemas

NOTE: See [16], in the scope of the present document.

XML complex type: defined in an XML schema; cannot be directly used in an XML document; can be the concrete type or the derivation base type for an XML element type or for another XML complex type; ultimately defines constraints for an XML element on its XML attribute specifications and/or its XML content

NOTE: See [13], [14] and [15].

XML element type: declared by an XML schema; can be directly used in an XML document; as the concrete type of an XML element, directly or indirectly defines constraints on its XML attribute specifications and/or its XML content; can also be the concrete type or the derivation base type for another XML element type

NOTE: See [13], [14] and [15].

3.2 Abbreviations

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

CM	Configuration Management
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name
DTD	Document Type Definition
EDGE	Enhanced Data for GSM Evolution
GERAN	GSM/EDGE Radio Access Network
GSM	Global System for Mobile communication
IS	Information Service
IDL	Interface Definition Language (OMG)
IOC	Information Object Class
IRP	Integration Reference Point
MO	Managed Object
MOC	Managed Object Class
NRM	Network Resource Model
OMG	Object Management Group
SS	Solution Set
TN	Transport Network
UMTS	Universal Mobile Telecommunications System
UTRAN	Universal Terrestrial Radio Access Network
XML	eXtensible Markup Language

4 Solution Set Definitions

This specification defines the following 3GPP TN NRM IRP Solution Set Definitions:

- 3GPP TN NRM IRP CORBA SS (Annex A)
- 3GPP TN NRM IRP XML Definitions (Annex B)

Annex A (normative): CORBA Solution Set

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in TN NRM IRP: Information Service (TS 32.712 [4]).

A.1 Architectural features

The overall architectural feature of Transport Network Resources IRP is specified in 3GPP TS 32.712 [4]. This clause specifies features that are specific to the CORBA SS.

A.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [5].

A.1.2 Rules for NRM extensions

This clause discusses how the models and IDL definitions provided in the present document can be extended for a particular implementation and still remain compliant with 3GPP SA 5's specifications.

A.1.2.1 Allowed extensions

Vendor-specific MOCs may be supported. The vendor-specific MOCs may support new types of attributes. The 3GPP SA5-specified notifications may be issued referring to the vendor-specific MOCs and vendor-specific attributes. New MOCs shall be distinguishable from 3GPP SA5 MOCs by name. 3GPP SA5-specified and vendor-specific attributes may be used in vendor-specific MOCs. Vendor-specific attribute names shall be distinguishable from existing attribute names.

NRM MOCs may be subclassed. Subclassed MOCs shall maintain the specified behaviour of the 3GPP SA 5's superior classes. They may add vendor-specific behaviour with vendor-specific attributes. When subclassing, naming attributes cannot be changed. The subclassed MOC shall support all attributes of its superior class. Vendor-specific attributes cannot be added to 3GPP SA5 NRM MOCs without subclassing.

When subclassing, the 3GPP SA5-specified containment rules and their specified cardinality shall still be followed. As an example, ManagementNode (or its subclasses) shall be contained under SubNetwork (or its subclasses).

Managed Object Instances may be instantiated as CORBA objects. This requires that the MOCs be represented in IDL. 3GPP SA5's NRM MOCs are not currently specified in IDL, but may be specified in IDL for instantiation or subclassing purposes. However, management information models should not require that IRPManagers access the instantiated managed objects other than through supported methods in the present document.

Extension rules related to notifications (Notification categories, Event Types, Extended Event Types etc.) are for further study.

A.1.2.2 Extensions not allowed

The IDL specifications in the present document cannot be edited or altered. Any additional IDL specifications shall be specified in separate IDL files.

IDL interfaces (note: not MOCs) specified in the present document may not be subclassed or extended. New interfaces may be defined with vendor-specific methods.

A.2 Mapping

A.2.1 General mappings

The IS parameter name `managedObjectInstance` is mapped into DN.

Attributes modelling associations as defined in the NRM (here also called “reference attributes”) are in this SS mapped to attributes. The names of the reference attributes in the NRM are mapped to the corresponding attribute names in the MOC. When the cardinality for an association is 0..1 or 1..1 the datatype for the reference attribute is defined as an MOReference. The value of an MO reference contains the distinguished name of the associated MO. When the cardinality for an association allows more than one referred MO, the reference attribute will be of type MOReferenceSet, which contains a sequence of MO references.

If a reference attribute is changed, an AttributeValueChange notification is emitted.

A.2.2 Information Object Class (IOC) mapping

A.2.2.1 IOC TransportNetworkInterface

Table A.2.2.1: Mapping from NRM IOC TransportNetworkInterface attributes to SS equivalent MOC TransportNetworkInterface attributes

NRM Attributes of IOC TransportNetworkInterface in 3GPP TS 32.712 [4]	SS Attributes	SS Type	Support Qualifier	Read	Write
<code>transportNetworkInterfaceId</code>	<code>transportNetworkInterfaceId</code>	string	M	M	-
<code>userLabel</code>	<code>userLabel</code>	string	M	M	M
<code>transportNetworkType</code>	<code>transportNetworkType</code>	string	M	M	-

A.2.2.2 IOC ATMChannelTerminationPoint

Table A.2.2.2: Mapping from NRM IOC ATMChannelTerminationPoint attributes and associations to SS equivalent MOC ATMTerminationPoint attributes

NRM Associations/Attributes of IOC ATMChannelTerminationPoint in 3GPP TS 32.712 [4]	SS Attributes	SS Type	Support Qualifier	Read	Write
aTMChannelTerminationPointId	aTMChannelTerminationPointId	string	M	M	–
usageChannel	usageChannel	string	M	M	–
virtualPathId	virtualPathId	long	M	M	○
virtualChannelId	virtualChannelId	long	M	M	○
physicalPortId	physicalPortId	string	M	M	○
physicalInterfaceType	physicalLinkType	string	M	M	○
serviceCategoryIn	serviceCategoryIn	long	M	M	○
serviceCategoryEg	serviceCategoryEg	long	M	M	○
usedAAL	usedAAL	long	M	M	○
peakCellRateIn	peakCellRateIn	long	M	M	○
peakCellRateEg	peakCellRateEg	long	M	M	○
sustainableCellRateIn	sustainableCellRateIn	long	○	M	○
sustainableCellRateEg	sustainableCellRateEg	long	○	M	○
maximumBurstSizeIn	maximumBurstSizeIn	long	M	M	○
maximumBurstSizeEg	maximumBurstSizeEg	long	M	M	○
minimumDesiredCellRateIn	minimumDesiredCellRateIn	long	○	M	○
minimumDesiredCellRateEg	minimumDesiredCellRateEg	long	○	M	○
minimumCellRateIn	minimumCellRateIn	long	○	M	○
minimumCellRateEg	minimumCellRateEg	long	○	M	○
aTMChannelTerminationPoint-ATMPATHTerminationPoint	aTMChannelTerminationPointATMPATHTerminationPoint	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference	M	M	-
aTMChannelTerminationPoint-lubLink	aTMChannelTerminationPointlubLink	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-

A.2.2.3 IOC ATMPATHTerminationPoint

Table A.2.2.3: Mapping from NRM IOC ATMPATHTerminationPoint attributes and associations to SS equivalent MOC ATMTerminationPoint attributes

NRM Associations/Attributes of IOC ATMPATHTerminationPoint in 3GPP TS 32.712 [4]	SS Attributes	SS Type	Support Qualifier	Read	Write
aTMPATHTerminationPointId	aTMPATHTerminationPointId	string	M	M	–
virtualPathId	virtualPathId	long	M	M	○
physicalPortIdList	physicalPortIdList	string	M	M	○
peakCellRateIn	peakCellRateIn	long	M	M	○
peakCellRateEg	peakCellRateEg	long	M	M	○
aTMPATHTerminationPoint-ATMChannelTerminationPoint	aTMPATHTerminationPointATMChannelTerminationPoint	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-

A.3 Solution Set definitions

A.3.1 IDL definition structure

Clause A.3.2 defines the MO classes for the TN NRM IRP.

A.3.2 IDL specification

“TransportNetworkResourcesNRMDefs.idl”

```
//File: TransportNetworkResourcesNRMDefs.idl
#ifndef _TRANSPORT_NETWORK_RESOURCES_NRM_DEFS_IDL_
#define _TRANSPORT_NETWORK_RESOURCES_NRM_DEFS_IDL_
#include "GenericNetworkResourcesNRMDefs.idl"
#pragma prefix "3gppsa5.org"
/**
 * This module defines constants for each MO class name and
 * the attribute names for each defined MO class.
 */
module TransportNetworkResourcesNRMDefs
{
    /**
     * Definitions for MO class TransportNetworkInterface
     */
    interface TransportNetworkInterface : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS = "TransportNetworkInterface";
        // Attribute Names
        //
        const string transportNetworkInterfaceId = "transportNetworkInterfaceId";
        const string transportNetworkType = "transportNetworkType";
    };
    /**
     * Definitions for MO class ATMChannelTerminationPoint
     */
    interface ATMChannelTerminationPoint
    {
        const string CLASS = "ATMChannelTerminationPoint";
        // Attribute Names
        //
        const string atmChannelTerminationPointId = "atmChannelTerminationPointId";
        const string usageChannel = "usageChannel";
        const string virtualPathId = "virtualPathId";
        const string virtualChannelId = "virtualChannelId";
        const string physicalPortId = "physicalPortId";
        const string physicalLinkType = "physicalLinkType";
        const string serviceCategoryIn = "serviceCategoryIn";
        const string serviceCategoryEg = "serviceCategoryEg";
        const string usedAAL = "usedAAL";
        const string peakCellRateIn = "peakCellRateIn";
        const string peakCellRateEg = "peakCellRateEg";
        const string sustainableCellRateIn = "sustainableCellRateIn";
        const string sustainableCellRateEg = "sustainableCellRateEg";
        const string maximumBurstSizeIn = "maximumBurstSizeIn";
        const string maximumBurstSizeEg = "maximumBurstSizeEg";
        const string minimumDesiredCellRateIn = "minimumDesiredCellRateIn";
        const string minimumDesiredCellRateEg = "minimumDesiredCellRateEg";
        const string minimumCellRateIn = "minimumCellRateIn";
        const string minimumCellRateEg = "minimumCellRateEg";
        const string atmChannelTerminationPointATMPATHTerminationPoint =
"atmChannelTerminationPointATMPATHTerminationPoint";
        const string atmChannelTerminationPointIubLink = "atmChannelTerminationPointIubLink";
    };
    /**
     * Definitions for MO class ATMPATHTerminationPoint
     */
    interface ATMPATHTerminationPoint
    {
        const string CLASS = "ATMPATHTerminationPoint";
        // Attribute Names
        //
        const string atmpathTerminationPointId = "atmpathTerminationPoint";
        const string virtualPathId = "virtualPathId";
        const string physicalPortIdList = "physicalPortIdList";
        const string peakCellRateIn = "peakCellRateIn";
        const string peakCellRateEg = "peakCellRateEg";
        const string atmpathTerminationPointATMChannelTerminationPoint =
"atmpathTerminationPointATMChannelTerminationPoint";
    };
};
#endif // _TRANSPORT_NETWORK_RESOURCES_NRM_DEFS_IDL_
```

Annex B (normative): XML Definitions

This annex contains the XML Definitions for the TN NRM IRP as it applies to Itf-N, in accordance with TN NRM IRP Information Service (TS 32.712 [4]).

B.1 Architectural features

The overall architectural feature of Transport Network Resources IRP is specified in 3GPP TS 32.712 [4]. This clause specifies features that are specific to the XML Definitions.

B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [5].

B.2 Mapping

B.2.1 General mapping

An IOC maps to an XML element of the same name as the IOC's name in the IS. An IOC attribute maps to a sub-element of the corresponding IOC's XML element, and the name of this sub-element is the same as the attribute's name in the IS.

B.2.2 Information Object Class (IOC) mapping

Not present in the current version of this specification.

B.3 Solution Set definitions

B.3.1 XML definition structure

The overall description of the file format of configuration data XML files is provided by 3GPP TS 32.616 [11].

Annex B.3.3 of the present document defines the NRM-specific XML schema `transportNrm.xsd` for the Transport interface Network Resources IRP NRM defined in 3GPP TS 32.712 [4].

XML schema `transportNrm.xsd` explicitly declares NRM-specific XML element types for the related NRM.

The definition of those NRM-specific XML element types complies with the generic mapping rules defined in 3GPP TS 32.616 [11].

B.3.2 Graphical Representation

Not present in the current version of this specification.

B.3.3 XML Schema "transportNrm.xsd"

```

<?xml version="1.0" encoding="UTF-8"?>

<!--
  3GPP TS 32.716 Transport Network Interface NRM IRP
  Bulk CM Configuration data file NRM-specific XML schema
  transportNrm.xsd
-->

<schema
  targetNamespace=
"http://www.3gpp.org/ftp/specs/archive/32_series/32.716#transportNrm"
  elementFormDefault="qualified"
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xn=
"http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNrm"
  xmlns:tn=
"http://www.3gpp.org/ftp/specs/archive/32_series/32.716#transportNrm"
>

  <import
    namespace=
"http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNrm"
  />

<!--Transport Network Interface Resources IRP NRM attribute related XML types -->

<simpleType name="transportNetworkType">
  <restriction base="string">
    <enumeration value="ATM"/>
    <enumeration value="IP"/>
  </restriction>
</simpleType>

<simpleType name="serviceCategoryIn">
  <restriction base="string">
    <enumeration value="CBR"/>
    <enumeration value="RT-VBR"/>
    <enumeration value="NRT-VBR"/>
    <enumeration value="ABR"/>
    <enumeration value="UBR"/>
    <enumeration value="GFR"/>
  </restriction>
</simpleType>

<simpleType name="serviceCategoryEg">
  <restriction base="string">
    <enumeration value="CBR"/>
    <enumeration value="RT-VBR"/>
    <enumeration value="NRT-VBR"/>
    <enumeration value="ABR"/>
    <enumeration value="UBR"/>
    <enumeration value="GFR"/>
  </restriction>
</simpleType>

<simpleType name="usedAAL">
  <restriction base="string">
    <enumeration value="Null"/>
    <enumeration value="AAL1"/>
    <enumeration value="AAL2"/>
    <enumeration value="AAL3"/>
    <enumeration value="AAL4"/>
    <enumeration value="AAL5"/>
  </restriction>
</simpleType>

<simpleType name="virtualPathId">
  <restriction base="integer">
    <minInclusive value="0"/>
  </restriction>
</simpleType>

<simpleType name="virtualChannelId">
  <restriction base="integer">

```

```

    <minInclusive value="0"/>
  </restriction>
</simpleType>

<complexType name="physicalPortIdList">
  <sequence>
    <element name="physicalPortId" type="string" minOccurs="1" maxOccurs="unbounded">
    </element>
  </sequence>
</complexType>

<simpleType name="peakCellRateIn">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="peakCellRateEg">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="sustainableCellRateIn">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="sustainableCellRateEg">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="maximumBurstSizeIn">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="maximumBurstSizeEg">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="minimumCellRateIn">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="minimumCellRateEg">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="minimumDesiredCellRateIn">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<simpleType name="minimumDesiredCellRateEg">
  <restriction base="integer">
    <minInclusive value="1"/>
  </restriction>
</simpleType>

<!-- Transport Network Interface Resources IRP NRM class associated XML elements -->

<element
  name="TransportNetworkInterface"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
>
  <complexType>

```

```

<complexContent>
  <extension base="xn:NrmClass">
    <sequence>
      <element name="attributes" minOccurs="0">
        <complexType>
          <all>
            <element name="userLabel" type="string"/>
            <element
              name="transportNetworkType"
              type="tn:transportNetworkType"
            />
          </all>
        </complexType>
      </element>
      <choice minOccurs="0" maxOccurs="unbounded">
        <element ref="tn:ATMPATHTerminationPoint"/>
        <element ref="tn:ATMChannelTerminationPoint"/>
        <element ref="xn:VsDataContainer"/>
      </choice>
    </sequence>
  </extension>
</complexContent>
</complexType>
</element>

<element name="ATMChannelTerminationPoint">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="usageChannel" type="string"/>
                <element
                  name="virtualPathId"
                  type="tn:virtualPathId"
                />
                <element
                  name="virtualChannelId"
                  type="tn:virtualChannelId"
                />
                <element
                  name="physicalPortId"
                  type="string"
                />
                <element name="physicalInterfaceType" type="string" minOccurs="0"/>
                <element
                  name="serviceCategoryIn"
                  type="tn:serviceCategoryIn"
                />
                <element
                  name="serviceCategoryEg"
                  type="tn:serviceCategoryEg"
                />
                <element
                  name="usedAAL"
                  type="tn:usedAAL"
                />
                <element
                  name="peakCellRateIn"
                  type="tn:peakCellRateIn"
                />
                <element
                  name="peakCellRateEg"
                  type="tn:peakCellRateEg"
                />
                <element
                  name="sustainableCellRateIn"
                  type="tn:sustainableCellRateIn"
                  minOccurs="0"
                />
                <element
                  name="sustainableCellRateEg"
                  type="tn:sustainableCellRateEg"
                  minOccurs="0"
                />
              </all>
            </complexType>
          </element>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

```



```

        name="maximumBurstSizeIn"
        type="tn:maximumBurstSizeIn"
    />
    <element
        name="maximumBurstSizeEg"
        type="tn:maximumBurstSizeEg"
    />
    <element
        name="minimumDesiredCellRateIn"
        type="tn:minimumDesiredCellRateIn"
        minOccurs="0"
    />
    <element
        name="minimumDesiredCellRateEg"
        type="tn:minimumDesiredCellRateEg"
        minOccurs="0"
    />
    <element
        name="minimumCellRateIn"
        type="tn:minimumCellRateIn"
        minOccurs="0"
    />
    <element
        name="minimumCellRateEg"
        type="tn:minimumCellRateEg"
        minOccurs="0"
    />
    <element name="aTMChannelTerminationPointATMPATHTerminationPoint" type="xn:dn"/>
    <element name="aTMChannelTerminationPointIubLink" type="xn:dnList"/>
</all>
</complexType>
</element>
<choice>
    <element ref="xn:VsDataContainer" minOccurs="0" maxOccurs="unbounded"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>

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    <complexType>
        <complexContent>
            <extension base="xn:NrmClass">
                <sequence>
                    <element name="attributes" minOccurs="0">
                        <complexType>
                            <all>
                                <element
                                    name="virtualPathId"
                                    type="tn:virtualPathId"
                                />
                                <element
                                    name="physicalPortIdList"
                                    type="tn:physicalPortIdList"
                                />
                                <element
                                    name="peakCellRateIn"
                                    type="tn:peakCellRateIn"
                                />
                                <element
                                    name="peakCellRateEg"
                                    type="tn:peakCellRateEg"
                                />
                                <element name="aTMPathTerminationPointATMChannelTerminationPoint"
type="xn:dnList"/>
                            </all>
                        </complexType>
                    </element>
                </choice minOccurs="0" maxOccurs="unbounded">
                    <element ref="xn:VsDataContainer"/>
                </choice>
            </sequence>
        </extension>
    </complexContent>
</complexType>
</element>

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</schema>

Annex C (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
05-2010	SA-48	SP-100278	--	--	Presentation to SA for information and approval	--	--	1.0.0
06-2010	SA-48	--	--	--	Publication	--	1.0.0	10.0.0
10-2010	SA-49	SP-100489	001	--	Correct attribute physicalLinkType to be aligned with IS	F	10.0.0	10.1.0
12-2010	SA-50	SP-100833	002	2	Correcting the attribute type and schema definition - Align with 32.712 IS	F	10.1.0	10.2.0
09-2012	SA-57	-	-	-	Automatic upgrade from previous Release version 10.2.0	-	10.2.0	11.0.0