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Technical Specification

**Universal Mobile Telecommunications System (UMTS);
Telecommunication management;
Configuration Management (CM);
Signalling Transport Network (STN) interface
Network Resource Model (NRM)
Integration Reference Point (IRP): Information Service (IS)
(3GPP TS 32.742 version 6.1.0 Release 6)**



Reference

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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
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Contents

Intellectual Property Rights	2
Foreword.....	2
Foreword.....	4
Introduction	4
1 Scope	5
2 References	5
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations	7
4 Modelling approach.....	7
5 Information Object Classes	8
5.1 Imported information entities and local labels	8
5.2 Class diagram	8
5.2.1 Attributes and relationships	8
5.2.2 Inheritance	11
5.3 Information object class definitions	11
5.3.1 MtpSignPoint.....	11
5.3.1.1 Definition	11
5.3.1.2 Attributes.....	11
5.3.2 SignLinkSetTp.....	12
5.3.2.1 Definition	12
5.3.2.2 Attributes.....	12
5.3.3 SignLinkTp	12
5.3.3.1 Definition	12
5.3.3.2 Attributes.....	13
5.3.4 SignRouteSetNePart	13
5.3.4.1 Definition	13
5.3.4.2 Attributes.....	13
5.3.5 SignRouteNePart	14
5.3.5.1 Definition	14
5.3.5.2 Attributes.....	14
5.4 Information relationship definitions	14
5.5 Information attribute definitions.....	15
5.5.1 Definition and legal values	15
5.5.2 Constraints	16
Annex A (informative): Change history	17
History	18

Foreword

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where:

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- 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; Configuration Management (CM); Signalling Transport Network (STN) interface Network Resource Model (NRM) Integration Reference Point (IRP), as identified below:

- TS 32.741: "Signalling Transport Network (STN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Requirements".
- TS 32.742: "Signalling Transport Network (STN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".**
- TS 32.743: "Signalling Transport Network (STN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Common Object Request Broker Architecture (CORBA) Solution Set (SS)".
- TS 32.744: "Signalling Transport Network (STN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Common Management Information Protocol (CMIP) Solution Set (SS)".
- TS 32.745: "Signalling Transport Network (STN) 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 "Signalling Transport Network (STN) network resources 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 Signalling Transport resources. The "Signalling Transport Network (STN) network resources IRP" comprises a set of specifications defining Requirements, a protocol neutral Network Resource Model (NRM) and corresponding Solution Set(s).

The present document specifies the protocol neutral STN 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 Signalling 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 (IS).

To summarize, the present document has the following main purpose: to define the applied Signalling Transport Network specific Network Resource Model, based on the generic NRM in 3GPP TS 32.622 [6].

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 NRMs of one release shall support the same State Management IRP version.

This NRM specification is related to 3GPP TS 32.742 V6.0.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 32.672: "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] ITU-T Recommendation Q.700 (03/93): "Introduction to CCITT Signalling System No.7".
- [10] ITU-T Recommendation Q.751.1 (10/95): "Network Element Management Information Model for The Message Transfer Part (MTP)".
- [11] ITU-T Recommendation Q.704 (07/96): "Signalling network functions and messages".
- [12] 3GPP TS 32.111-2: "Telecommunication management; Fault Management (FM); Part 2: Alarm Integration Reference Point (IRP); Information Service (IS)".
- [13] ITU-T Recommendation Q.702 (11/88): "Signalling Data Link".
- [14] 3GPP TS 29.202: "Signalling System No. 7 (SS7) signalling transport in core network; Stage 3".
- [15] 3GPP TS 25.410: "UTRAN Iu Interface: General Aspects and Principles".
- [16] 3GPP TS 25.420: "UTRAN I_{ur} interface general aspects and principles".
- [17] 3GPP TS 25.430: "UTRAN Iub interface: general aspects and principles".
- [18] 3GPP TS 48.018: "Base Station System (BSS)-Serving GPRS Support Node (SGSN);BSS GPRS Protocol (BSSGP)".
- [19] 3GPP TS 48.008: "Mobile Switching Centre-Base Station System (MSC-BSS) interface;Layer 3 specification".
- [20] 3GPP TS 32.632: "Telecommunication management; Configuration Management (CM); Core Network Resources Integration Reference Point (IRP);Network Resource Model (NRM)".
- [21] 3GPP TS 32.642: "Telecommunication management; Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP); Network Resource Model (NRM)".
- [22] 3GPP TS 29.060: "GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".
- [23] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [24] 3GPP TS 29.018: "Serving GPRS Support Node (SGSN)-Visitors Location Register (VLR) Gs interface layer 3 specification".
- [25] 3GPP TS 32.741: "Telecommunication management; Configuration Management (CM); Signalling Transport Network (STN) interface Network Resource Model (NRM) Integration Reference Point (IRP); Requirements".
- [26] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".
- [27] ITU-T Recommendation E.600 (03/93): "Terms and Definitions of traffic engineering".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.600 [5] and 3GPP TS 32.741 [25] 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.

3.2 Abbreviations

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

CIM	Common Information Model
CM	Configuration Management
DN	Distinguished Name
IOC	Information Object Class
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Standardisation Sector
ME	Managed Element
MIM	Management Information Model
MO	Managed Object
MTP	Message Transfer Part
NE	Network Element
NR	Network Resource
NRM	Network Resource Model
OS	Operations System
RDN	Relative Distinguished Name
SLC	Signalling Link Code
SLS	Signalling Link Selection
SP	Signalling Point
STN	Signalling Transport Network
STP	Signalling Transfer Point
TP	Termination Point
UML	Unified Modelling Language

4 Modelling approach

The modelling approach used in this IRP is described in 3GPP TS 32.150 [26] and 32.622 [6] Generic Network Resources IRP; NRM.

This model allows for combined managed element functionality, where more than one "function IOC" (inherited from ManagedFunction) modelling more specific managed element functionality may be contained in the ManagedElement IOC.

5 Information Object Classes

5.1 Imported information entities and local labels

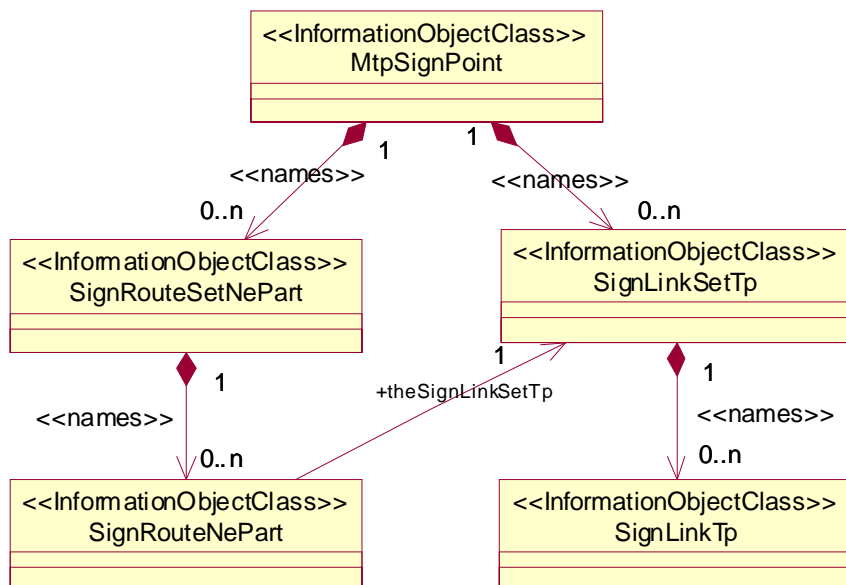
Label reference	Local label
TS 32.622[6], information object class, Top	Top

5.2 Class diagram

5.2.1 Attributes and relationships

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

The following figure shows the name-containment relation and other types of relations of the STN NRM.

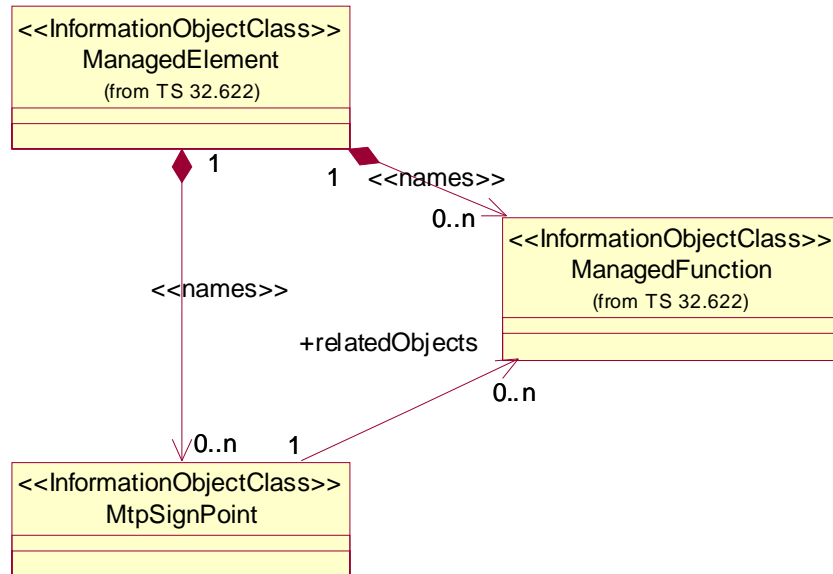


NOTE 1: The name-containment relations between IOCs are indicated by UML "unidirectional aggregation by reference" ("hollow diamonds").

NOTE 2: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.

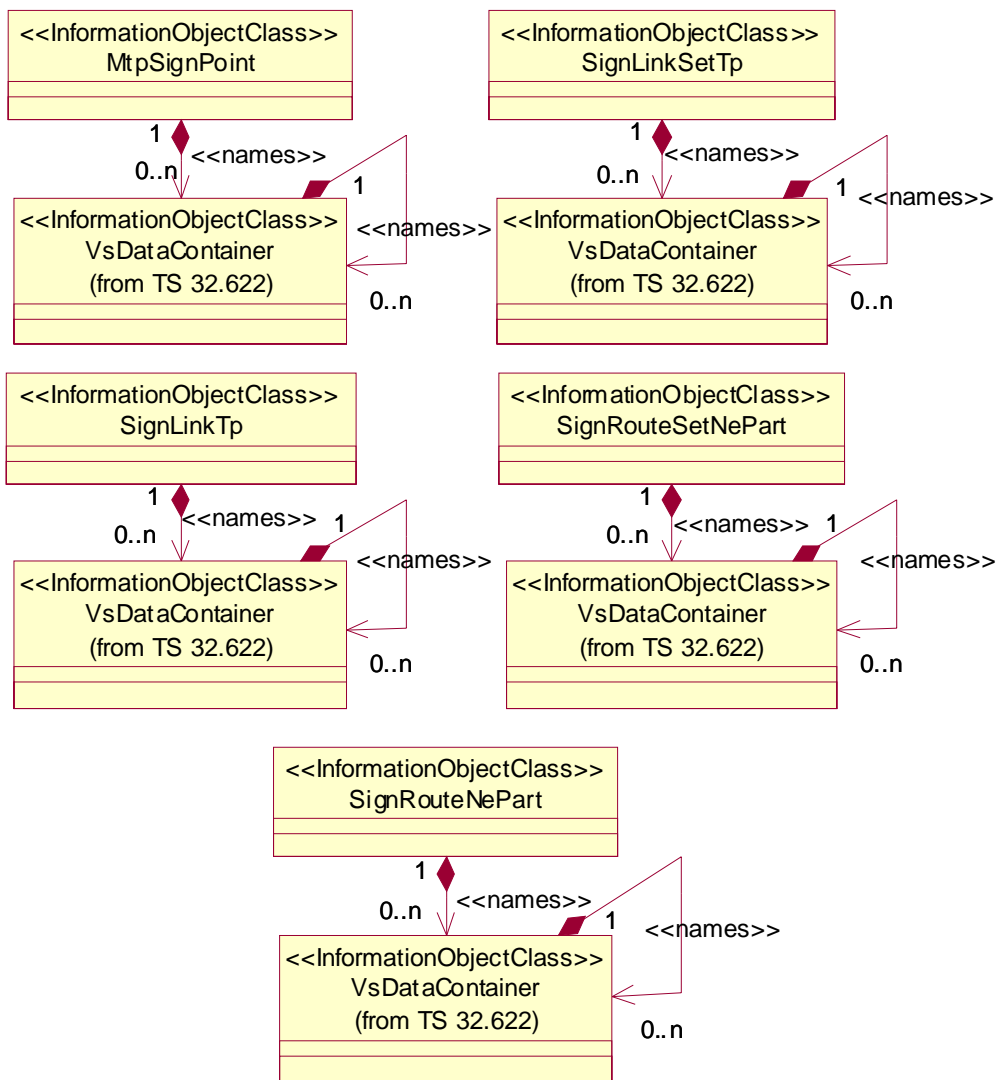
Figure: Signalling Transport Network NRM Containment/Naming and Association diagram 1

Each IOC is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [4] that expresses its containment hierarchy.



NOTE: The relationship between MtpSignPoint and ManagedFunction shall only be supported for a subset of objects inherited from ManagedFunction. i.e. the xxxFunction instances that support the MtpSignPoint.

Figure: Signalling Transport Network NRM Containment/Naming and Association diagram 2



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.

Figure: vsDataContainer Containment/Naming and Association in STN NRM diagram

5.2.2 Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

The following figure shows the inheritance hierarchy for the STN NRM.

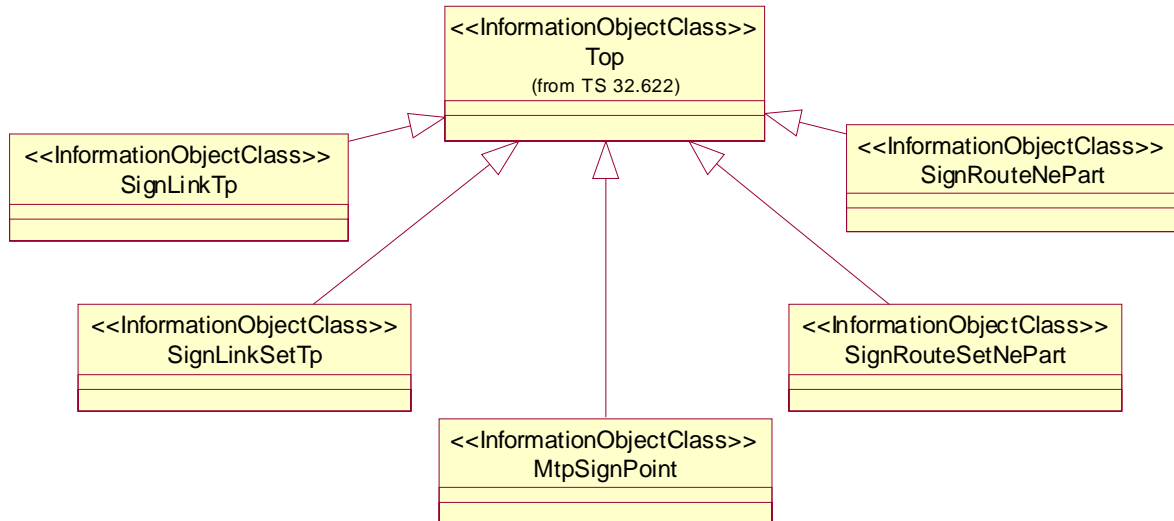


Figure: Signalling Transport Network NRM Inheritance Hierarchy

5.3 Information object class definitions

5.3.1 MtpSignPoint

5.3.1.1 Definition

This IOC represents the Signalling Point functionality. For more information about the Signalling Point, see ITU-T Recommendation Q.700 [9] and ITU-T Recommendation Q751.1 [10].

5.3.1.2 Attributes

Attributes of MtpSignPoint

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
mtpSignPointId	+	M	M	-
pointCode	+	M	M	-
networkIndicator	+	M	M	-
pointCodeLength	+	M	M	-
spType	+	M	M	-
userLabel	+	M	M	M
relatedObjects	+	M	M	-

Notifications of MtpSignPoint

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [12])	

5.3.2 SignLinkSetTp

5.3.2.1 Definition

This IOC represents a bi-directional Signalling Link Set Termination Point functionality. For more information about the Signalling Link Set Termination Point, see [9] and [10].

5.3.2.2 Attributes

Attributes of SignLinkSetTp

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
signLinkSetTpId	+	M	M	-
adjPc	+	M	M	-
userLabel	+	M	M	M
maxCapacityLS	+	M	M	-

Notifications of SignLinkSetTp

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [12])	

5.3.3 SignLinkTp

5.3.3.1 Definition

This IOC represents a bi-directional Signalling Link Termination Point functionality. For more information about the Signalling Link Termination Point, see [9] and [10].

5.3.3.2 Attributes

Attributes of SignLinkTp

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
signLinkTpId	+	M	M	-
slCode	+	M	M	-
slsCodeNormalList	+	O	M	-
slsCodeCurrentList	+	M	M	-
linkTpStatus	+	M	M	-
maxCapacitySL	+	M	M	-
userLabel	+	M	M	M
signLinkType	+	M	M	-

Notifications of SignLinkTp

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [12])	

5.3.4 SignRouteSetNePart

5.3.4.1 Definition

This IOC represents a Signalling Route Set functionality. For more information about the Signalling Route Set Network Element Part, see [9] and [10].

5.3.4.2 Attributes

Attributes of SignRouteSetNePart

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
signRouteSetNePartId	+	M	M	-
destinationPc	+	M	M	-
userLabel	+	M	M	M
loadsharingInformationRouteSetNePart	+	M	M	-

Notifications of SignRouteSetNePart

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [12])	

5.3.5 SignRouteNePart

5.3.5.1 Definition

This IOC represents a Signalling Route functionality. For more information about the Signalling Route Network Element Part, see [9] and [10].

5.3.5.2 Attributes

Attributes of SignRouteNePart

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
signRouteNePartId	+	M	M	-
signLinkSetTpPointer	+	M	M	-
fixedPriority	+	M	M	-
userLabel	+	M	M	M

Notifications of SignRouteNePart

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [12])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [12])	

5.4 Information relationship definitions

None.

5.5 Information attribute definitions

5.5.1 Definition and legal values

The following table defines the attributes that are present in several IOCs of the present document.

Attributes

Attribute Name	Definition	Legal Values
adjPc	The signalling point code information of the signalling point adjacent to the signalling link set. (Ref ITU-T Q.704[11],Ref ITU-T Q.751.1[10])	Type: Integral numeric value
destinationPc	The signalling point code information of the destination signalling point of the signalling route set. (Ref ITU-T Q.704[11], Ref ITU-T Q.751.1[10])	Type: Integral numeric value
fixedPriority	This attribute determines, if the signallingRoute is used as current route. The signallingRoute instances contained in the same signallingRouteSet are chosen in ascending order as current routes (The lower the value, the higher the priority). The priority is defined by means of assigning priorities to all involved route segments. If from a particular SP two or more route segments are used with the same priority, loadsharing between Signalling Routes may occur (Ref ITU-T Q.751.1[10]).	Type: Integral numeric value Range: (0...255) -- maximum value is implementation dependent
linkTpStatus	This is a set-valued attribute. It contains the functional statuses as described in ITU-T Q.704[11]. (Ref ITU-T Q.704[11],Ref ITU-T Q.751.1[10])	Type: a sequence of enumerated types where the legal statuses can be: available, localBlocked, remoteBlocked, localInhibited, remoteInhibited, failed , deactivated.
maxCapacityLS	The maximum capacity of a signalling linkset is the maximum load that should be placed on the linkset, when all links that could be active in the linkset are, and are working in service. Unit: Erlang (Ref ITU-T E.600[27])	Type: Numeric value
maxCapacitySL	This attribute describes the maximum capacity for the signLinkTp. The maximum capacity of a signalling link is the maximum load that should be placed on the signalling link. Unit: Erlang (Ref ITU-T E.600[27])	Type: Numeric value
networkIndicator	The network indicator information of the signalling point, (Ref ITU-T Q.704[11],Ref ITU-T Q.751.1[10])	Type: Enumerated, Range: International, Spare, National, NationalSpare
pointCode	The signalling point code information of the signalling point. (Ref ITU-T Q.704[11],Ref ITU-T Q.751.1[10])	Type: Integral numeric value
pointCodeLength	The signalling point code length information of the signalling point. (Ref ITU-T Q.704[11])	Type: Enumerated, Range: 14, 24
signLinkSetTpPointer	It references the signallingLinkSetTp which is intended to be used as first segment of the succession of linksets, which form the signalling route on the network level.	
signLinkSetTpid	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	
signLinkTpid	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	
mtpSignPointId	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	

Attribute Name	Definition	Legal Values
spType	The type of the signalling point. (Ref ITU-T Q.700[9],Ref ITU-T Q.751.1[10])	Type: Enumerated Range: SEP, STP, STEP
signRouteNePartId	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	
signRouteSetNePartId	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	
slCode	The Signalling Link Code (SLC) is used to distinguish signalling link in the signalling link set. It is the same value (between 0 and 15) at each end of the link, and is different from that of any other link between the same two adjacent signalling points. (Ref ITU-T Q.704[11]),Ref ITU-T Q.751.1[10])	Type: Integral numeric value Range: (0...15)
slsCodeCurrentList	This attribute represents the SLS-Code which is currently used on the signallingLinkTp. It may be different from the slsNormalList, in case some fault has occurred. (Ref ITU-T Q.751.1[10])	SET SIZE (0..16) OF Sls -- Each Sls value can occur at most once in a given SET Sls Type: Integral numeric value Range: (0...15)
slsCodeNormalList	This attribute indicates which SLS-Codes are initially administratively assigned to this signallingLinkTp for the normal operation. (Ref ITU-T Q.751.1[10])	SET SIZE (0..16) OF Sls -- Each Sls value can occur at most once in a given SET Sls Type: Integral numeric value Range: (0...15)
signLinkType	This attribute represents the type of signalling link.	Type: Enumerated Range: 64K, 2M
loadsharingInformationRouteSetNePart	This attribute contains specific information for target specific loadsharing via the current routes working on a routeset basis via the current routes. (Ref ITU-T Q.751.1[10])	
userLabel	A user-friendly name of this object.	
relatedObjects	This attribute indicates list of related xxxFunction object.	

5.5.2 Constraints

None.

Annex A (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
Jun 2004	SA_24	SP-040263	--	--	Submitted to TSG SA#24 for Information	--	1.0.0	
Sep 2004	SA_25	SP-040601	--	--	Submitted to TSG SA#25 for Approval	--	2.0.0	6.0.0
Dec 2005	SA_30	SP-050720	0001	--	Correct definition of linkTpStatus in IS - Align with ITU-T Q.751.1	F	6.0.0	6.1.0

History

Document history		
V6.0.0	January 2005	Publication
V6.1.0	December 2005	Publication