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Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
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Network Resource Model (NRM)
Integration Reference Point (IRP);
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Contents

Foreword

This Technical Report 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.

Ready for Converged Management

This specification is part of a set that has been developed for converged management solutions.

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:

28.671: Telecommunication management; Home Node B Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP): Requirements

28.672: Telecommunication management; Home Node B Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)

28.673: Telecommunication management; Home Node B (HNB) Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions

1 Scope

The present document specifies the Home Node B Subsystem (HNS) Network Resource Model (NRM) IRP (that can be communicated between an IRPAgent and an IRPManager for telecommunication network management purposes, including management of converged networks.

This document specifies the semantics and behaviour of information object class attributes and relations visible across the reference point in a protocol and technology neutral way. It does not define their syntax and encoding.

In order to access the information defined by this NRM, an IRP IS is needed, such as the Basic CM IRP IS (3GPP TS 32.602 [7]) or the Bulk CM IRP IS (3GPP TS 32.612 [8]). However, which IS that is applicable is outside the scope of the present document.

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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".

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

[4] 3GPP TS 25.467: " Technical Specification Group Radio Access Network (UTRAN); UTRAN Architecture for 3G HNB".

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

[6] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRMs) Integration Reference Point (IRP):Information Service (IS)".

[7] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic Configuration Management 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] TR-196, "Femto Access Point Device Data Model", Broadband Forum, 2009, http://broadband-forum.org/technical/download/TR-196.pdf.

[10] 3GPP TS 28.702: "Telecommunication management; Core Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)"

[11] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects"

[12] 3GPP TS 23.002: "Network Architecture".

[13] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

[14] IETF RFC 4293: "SNMPv2 Management Information Base for the Internet Protocol using SMIv2".

[15] IETF RFC3873: "Stream Control Transmission Protocol (SCTP) Management Information Base (MIB)".

[16] 3GPP TS 32.583: "Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Procedure flows for Type 1 Interface HNB to HNB Management System (HMS)"

[17] 3GPP TS 23.002: "Technical Specification Group Services and Systems Aspects; Network architecture"

[18] 3GPP TS 22.220: "Service requirements for Home Node B (HNB) and Home eNode B (HeNB)"

[19] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[20] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description;Stage 2".

[21] 3GPP TS 23.401 "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[22] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions and abbreviations apply. For definitions and abbreviations not found here, please refer to 3GPP TS 32.101 [2], 3GPP TS 32.102 [3] and 3GPP TS 32.600 [5].

Association: See definition in TS 28.622 [6].

Network Resource Model (NRM): See definition in TS 28.622 [6].

Home Node B Management System (HMS): See TS 32.583 [16].

HNB GW: See TS 25.467 [4].

Home Node B Subsystem (HNS): See TS 23.002 [17].

3.2 Abbreviations

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

DN	Distinguished Name
GW	Gateway
HNB	Home Node B
HNS	Home Node B Subsystem
IOCs	Information Object Classes
IRP	Integration Reference Point
NRM	Network Resource Model
UTRAN	Universal Terrestrial Radio Access Network

4 Model

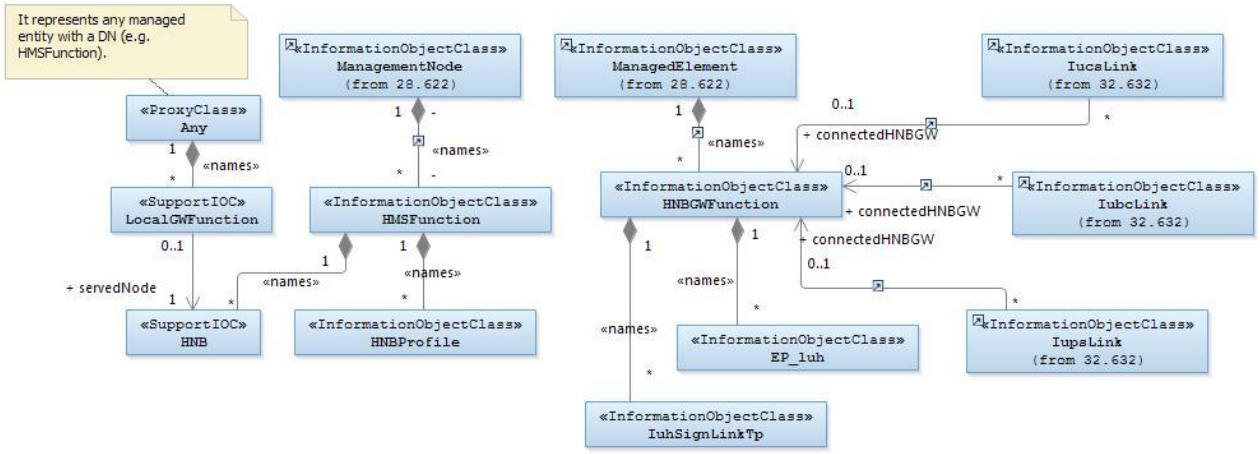
4.1 Imported information entities and local labels

Label reference	Local label
3GPP TS 28.622 [6], IOC, ManagedElement	ManagedElement
3GPP TS 28.622 [6], IOC, ManagedFunction	ManagedFunction
3GPP TS 28.622 [6], IOC, ManagementNode	ManagementNode
3GPP TS 28.622 [6], IOC, Subnetwork	Subnetwork
3GPP TS 28.622 [6], IOC, Top	Top
3GPP TS 28.622 [6], IOC, VsDataContainer	VsDataContainer
3GPP TS 28.702 [10], IOC, IupsLink	IupsLink
3GPP TS 28.702 [10], IOC, IucsLink	IucsLink
3GPP TS 28.702 [10], IOC, IubcLink	IubcLink

4.2 Class diagram

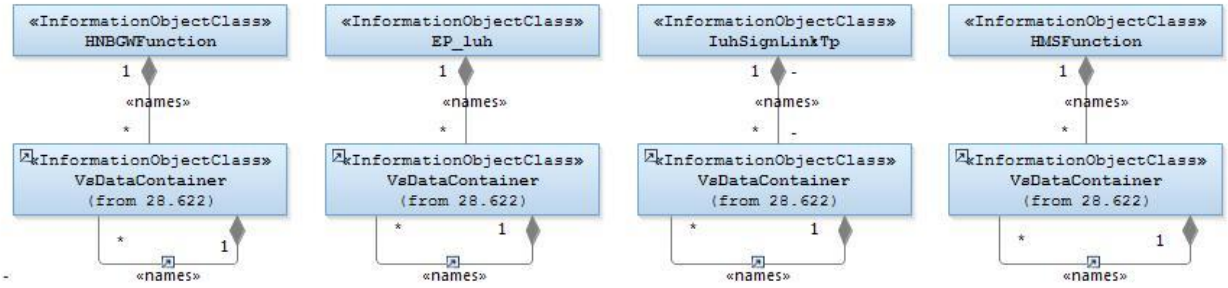
4.2.1 Relationships

This clause depicts the set of classes (e.g. IOCs) that encapsulates the information relevant for this IRP. This clause provides an overview of the relationships between relevant classes in UML. Subsequent clauses provide more detailed specification of various aspects of these classes.



NOTE 1: The listed cardinality numbers, in particular the use of cardinality number zero, do not represent transient states. The transient state is considered an inherent property of all IOC instances and therefore there is no need to represent them by individual IOC cardinality numbers.

Figure 4.2.1-1 Containment/Naming



NOTE 1: The listed cardinality numbers, in particular the use of cardinality number zero, do not represent transient states. The transient state is considered an inherent property of all IOC instances and therefore there is no need to represent them by individual IOC cardinality numbers.

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 Containment/Naming

The `VsDataContainer` is only used for the Bulk CM IRP.

Each IOC instance is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [11] that expresses its containment

4.2.2 Inheritance

This clause depicts the inheritance relationships that exist between classes.

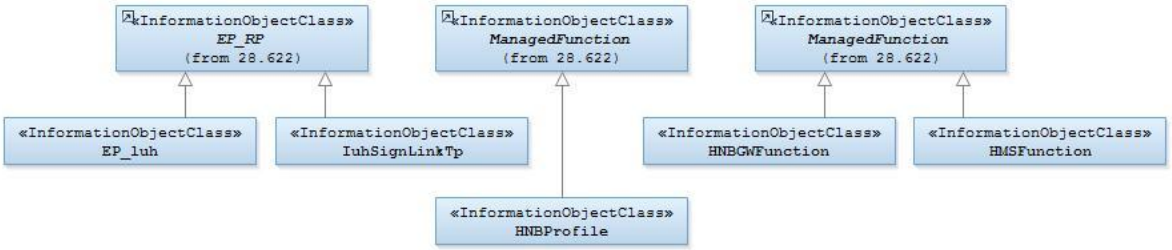


Figure 4.2.2-1 Inheritance Hierarchy

NOTE: IuhSignLinkTp is a special definition for the signalling of the EP-Iuh, and these two IOC inherit from EP-RP.

4.3 Class definitions

4.3.1 HNBGWFunction

4.3.1.1 Definition

This IOC represents HNB GW functionality. For more information about the HNB GW, see 3GPP TS 25.467[4].

4.3.1.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
hnbGwId	M	M	-	-	M
iPConfigInfo	M	M	-	-	M
maxNbrHNBRegistered	M	M	-	-	M
maxPacketCapability	M	M	-	-	M

4.3.1.3 Notifications

The common notifications defined in clause 4.5 are valid for this class, without exceptions or additions.

4.3.2 IuhSignLinkTp

4.3.2.1 Definition

This IOC represents a signaling link on the Iuh interface and inherits from EP-RP.

4.3.2.2 Attributes

Attribute name	Support Qualifier	isReadable	is writable	isInvariant	isNotifyable
sctpAssocLocalAddr	M	M	-	-	M
sctpAssocRemoteAddr	M	M	-	-	M

4.3.2.3 Notifications

The common notifications defined in clause 4.5 are valid for this class, without exceptions or additions.

4.3.3 EP_Iuh

4.3.3.1 Definition

This IOC represents an end point of the Iuh interface. It inherits from EP-RP. For more information Iu-h interface, see 3GPP TS 25.467[4].

4.3.3.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
farEndNEIPAddr	O	M	CM	-	M

4.3.3.3 Attribute constraints

Name	Definition
Condition for farEndNEIPAddr's write qualifier	The EP_Iuh object belongs to the different Domain Manager as the NE pointed by the farEndNeIpAddr attribute.

4.3.3.4 Notifications

The common notifications defined in clause 4.5 are valid for this class, without exceptions or additions.

4.3.4 HMSFunction

4.3.4.1 Definition

This IOC represents HMS functionality. For more information about HMS, see 3GPP TS 32.583 [16].

4.3.4.2 Attributes

None.

4.3.4.3 Notifications

There are no Notifications defined.

4.3.5 HNB

4.3.5.1 Definition

This class represents HNB functionality. For more information about the HNB, see 3GPP TS 25.467 [4]. For definition of HNB, see 3GPP TS 22.220 [18].

The Home NodeB, represented by the <<SupportIOC>> HNB, has registered itself with one node represented by HMSFunction.

4.3.5.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
id	M	--	-	-	-

4.3.5.3 Notifications

The common notifications defined in clause 4.5 are not valid for this class. The set of notifications defined in the following table is valid.

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	

4.3.6 HNBProfile

4.3.6.1 Definition

The HNBProfile is a representation of information that a) identifies a specific set of HNB devices and b) the related configuration parameters (and their values) that are required to be configured in those identified HNB devices during HNB registration procedure.

It contains userLabel, an attribute inherited from ManagedFunction. This is a user friendly label assigned by operator. Examples can be "VIP configuration", "Gold Tier configuration", "device vendor XYZ software version 3.4", "camel", etc

Editor Note: The userLabel is called configurationKind in previous documents such as in S5-093276 EpCR H(e)NB Profile handling.)

4.3.6.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
configuration	M	M	-	-	M
criterion	O	M	-	-	M

4.3.7 LocalGWFunction

4.3.7.1 Definition

This class represents local Gateway functionality. For more information about the local gateway, see 3GPP TS 23.060 [20] and 3GPP TS 23.401[21].

The Local Gateway, represented by the <<SupportIOC>> LocalGWFunction, has registered itself with one node represented by HMSFunction.

4.3.7.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
iPAddr	M	-	-	-	-
collocationFlag	M	-	-	-	-
servedNode	M	-	-	-	-

4.3.7.3 Notifications

The common notifications defined in clause 4.5 are not valid for this class. The set of notifications defined in the following table is valid.

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	

4.4 Attribute definitions

4.4.1 Attribute Properties

The following table defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

Attribute Name	Documentation and Allowed Values	Properties
id	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance. allowedValues: format of allowed values to be conformant with TS 32.300[11]	type: String multiplicity: 1 isOrdered: False isUnique: True defaultValue: None isNullable: False
hnbGwId	Unique HNB GW ID. Ref. 3GPP TS 25.467 [4] specifies that HNB GW acts as a RNC to the existing core network using existing Iu interface. See "RNC-ID" in Ref. 3GPP TS 23.002 [12] and 3GPP TS 25.413 [13] allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
iPConfigInfo	The IP address, subnetwork mask, default gateway for HNB GW (Ref. IETF RFC 4293 [14]). allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
maxNbrHNBRegistered	Maximum number of registered HNB means maximum number of HNB allowed to be registered. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
maxPacketCapability	The HNB GW's ability of forwarding packets, such as maximum number of forwarded packets per second. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
sCTPAssocLocalAddr	The local port and IP address of SCTP association (See RFC3873 [15]). allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
sCTPAssocRemoteAddr	The remote port and IP address of SCTP association (See RFC3873 [15]). allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]

farEndEntity	The value of this attribute shall be the Distinguished Name of the far end network entity to which the reference point is related. As an example, with EP_Iucs, if the instance of EP_Iucs is contained by one RncFunction instance, the farEndEntity is the Distinguished Name of the MscServerFunction instance to which this Iucs reference point is related. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
farEndNeIpAddr	The IP address(s) of the far end network entity to which the reference point is related. This is an IPv4 or an IPv6 address. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
configuration	It is a location of a data set. The data set is a set of HNB attributes (with values) needed to be loaded into the HNB. The data set does not contain all configuration data needed for a device to operate. Some configuration parameters are autonomously and dynamically calculated by the serving HMS. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
criterion	It is a criterion that determines if a HNB should or should not be loaded with a particular configuration. The syntax and semantics of criterion is vendor-specific. Example 1: The syntax and semantics can be "If the HNB ID range is between ABC and DEF then APPLY the related configuration ". Example 2: The syntax is a list of strings where each string is an "attribute == value" pair. An attribute represents a TR-196 parameter. Its value is the corresponding attribute value. The semantics is "if all pairs found in criterion are also found in the home devices, then the determination is positive in that the home device should be loaded with information of the data set identified by configuration; else not". allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]

iPAddr	The IP address(s) assigned for the Local Gateway. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
collocationFlag	This attribute indicates whether the local gateway is collocated with the HNB or HeNB that it serves (see ServedNode relation in 6.2.1 UML class diagram) or not. allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]
servedNode	This attribute contains the DN of a HNB or HeNB that is being served (see ServedNode relation in 6.2.1 UML class diagram). allowedValues: see [9]	type: see [9] multiplicity: see [9] isOrdered: see [9] isUnique: see [9] defaultValue: see [9] isNullable: see [9]

4.4.2 Constraints

None.

4.5 Common notifications

4.5.1 Alarm notifications

This subclause presents a list of notifications, defined in [19], that IRPManager can receive. The notification header attribute objectClass/objectInstance, defined in [22], would capture the DN of an instance of an IOC defined in this IRP specification.

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [19])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [19])	

4.5.2 Configuration notifications

None.

Annex A (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
2012-10					First draft			0.1.0
2012-12	SA#58				Presented for information and approval		0.1.0	1.0.0
2012-12					New version after approval		1.0.0	11.0.0