



**Universal Mobile Telecommunications System (UMTS);  
LTE;  
Telecommunication management;  
Home Node B (HNB) Subsystem (HNS)  
Network Resource Model (NRM)  
Integration Reference Point (IRP);  
Solution Set (SS) definitions  
(3GPP TS 28.673 version 16.0.0 Release 16)**



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# Foreword

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# Introduction

The present document is part of a TS-family covering the 3<sup>rd</sup> Generation Partnership Project: Technical Specification Group Services and System Aspects; Telecommunication management; Configuration Management (CM); 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 is part of an Integration Reference Point (IRP) named HNS Network Resource Model (NRM) IRP, through which an IRPAgent can communicate configuration management information to one or several IRPManagers concerning HNS resources. The HNS 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 HNS NRM IRP.

This specification is related to 3GPP TS 28.672 V14.0.X [5].

---

# 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 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".
- [5] 3GPP TS 28.672: "Telecommunication management; Home Node B (HNB) Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".
- [6] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Solution Set (SS) definitions".
- [7] 3GPP TS 32.606: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP): Solution Set (SS) definitions".
- [8] W3C REC-xml11-20060816: "Extensible Markup Language (XML) 1.1 (Second Edition)".
- [9] Void
- [10] W3C XML Schema Definition Language (XSD) 1.1 Part 1: Structures.
- [11] W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes.
- [12] W3C REC-xml-names-20060816: "Namespaces in XML 1.1 (Second Edition)".
- [13] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
- [14] 3GPP TS 28.623: "Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

For terms and definitions please refer to 3GPP TS 32.101 [2], 32.102 [3], 32.600 [4] and 32.772 [5].

**XML file:** See definition of [14].

**XML document:** See definition of [14].

**XML declaration:** See definition of [14].

**XML element:** See definition of [14].

**empty XML element:** See definition of [14].

**XML content (of an XML element):** See definition of [14].

**XML start-tag:** See definition of [14].

**XML end-tag:** See definition of [14].

**XML empty-element tag:** See definition of [14].

**XML attribute specification:** See definition of [14].

**DTD:** See definition of [14].

**XML schema:** See definition of [14].

**XML namespace:** See definition of [14].

**XML complex type:** See definition of [14].

**XML element type:** See definition of [14].

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

CM	Configuration Management
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name
DTD	Document Type Definition
HNB	Home Node B
HNS	Home Node B Subsystem
HNB-GW	Home Node B Gateway
IDL	Interface Definition Language
IRP	Integration Reference Point
IS	Information Service
MO	Managed Object
MOC	Managed Object Class
NRM	Network Resource Model
OMG	Object Management Group
SS	Solution Set
XML	eXtensible Markup Language

---

## 4 Solution Set Definitions

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

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



---

# Annex A (normative): CORBA Solution Set

## A.0 General

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in HNS NRM IRP: Information Service (TS 32.772 [5]).

---

## A.1 Architectural features

The overall architectural feature of HNS Network Resources IRP is specified in 3GPP TS 28.672 [5].

This clause specifies features that are specific to the CORBA SS.

### A.1.1 Syntax for Distinguished Names

See clause A.1.1 of [14]

### A.1.2 Rules for NRM extensions

See clause A.1.1 of [14].

## A.2 Mapping

### A.2.1 General mappings

See clause A.2.1 of [14].

### A.2.2 Information Object Class (IOC) mapping

This SS supports reference attributes for relations other than containment relations between objects. Reference attributes are therefore introduced in each MOC where needed.

#### A.2.2.1 IOC HNBGWFunction

IS Attributes	SS Attributes	SS Type
id	hnbgwFunctionId	string
hnbgwId	hnbgwId	string
userLabel	userLabel	string
ipConfigInfo	ipConfigInfo	string
maxNbrHNBRegistered	maxNbrHNBRegistered	Integer
maxPacketCapability	maxPacketCapability	integer

#### A.2.2.2 IOC HNBProfile

IS Attributes	SS Attributes	SS Type
Id	hnbProfileId	string
userLabel	userLabel	string
Configuration	configuration	string
Criterion	criterion	string

#### A.2.2.3 IOC HMSFunction

IS Attributes	SS Attributes	SS Type
userLabel	userLabel	string

#### A.2.2.4 IOC IuhSignLinkTp

IS Attributes	SS Attributes	SS Type
Id	ihSignLinkTpId	string
userLabel	userLabel	string
farEndEntity	farEndEntity	string
sctpAssocLocalAddr	sctpAssocLocalAddr	string
sctpAssocRemoteAddr	sctpAssocRemoteAddr	string

#### A.2.2.5 IOC EP\_Iuh

IS Attributes	SS Attributes	SS Type
Id	epluhId	string
userLabel	userLabel	string
farEndEntity	farEndEntity	string
farEndNEIPAddr	farEndNEIPAddr	string

---

## A.3 Solution Set definitions

### A.3.1 IDL definition structure

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

## A.3.2 IDL specification “HnsNetworkResourcesNRMDefs.idl”

```

//File: HnsNetworkResourcesNRMDefs.idl
#ifndef _HNSNETWORKRESOURCESNRMDDFS_IDL_
#define _HNSNETWORKRESOURCESNRMDDFS_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 HnsNetworkResourcesNRMDefs
{

    /**
     * Definitions for MO class HnbgwFunction
     */
    interface HNBGWFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS = "HNBGWFunction";
        // Attribute Names
        //
        const string hnbgwFunctionId = "hnbgwFunctionId";
        const string hnbgwId = "hnbgwId";
        const string ipConfigInfo = "ipConfigInfo";
        const string maxNbrHNBRRegistered = "maxNbrHNBRRegistered";
        const string maxPacketCapability = "maxPacketCapability";
    };

    /**
     * Definitions for MO class IuhSignLinkTp
     */
    interface IuhSignLinkTp : GenericNetworkResourcesNRMDefs::EP_RP
    {
        const string CLASS = "IuhSignLinkTp";
        // Attribute Names
        //
        const string sctpAssocLocalAddr = "sctpAssocLocalAddr";
        const string sctpAssocRemoteAddr = "sctpAssocRemoteAddr";
    };

    /**
     * Definitions for MO class EP_Iuh
     */
    interface EP_Iuh : GenericNetworkResourcesNRMDefs::EP_RP
    {
        const string CLASS= "EP_Iuh";
        // Attribute Names
        //
        const string farEndNEIPAddr= "farEndNEIPAddr";
    };

    /**
     * Definitions for MO class HNBProfile
     */
    interface HNBProfile : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS= "HNBProfile";
        // Attribute Names
        //
        const string hnbProfileId = "hnbProfileId";
        const string configuration = "configuration";
        const string criterion = "criterion";
    };

    /**
     * Definitions for MO class HMSFunction
     */
    interface HMSFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS= "HMSFunction";
        // Attribute Names
        //

```

```
};  
};  
#endif //_HNSETWORKRESOURCESNRMDEFS_IDL_
```

---

## Annex B (normative): XML Definitions

### B.0 General

This annex contains the XML Definitions for the HNS NRM IRP as it applies to Itf-N, in accordance with HNS NRM IRP Information Service (TS 28.672 [5]).

The XML file formats are based on XML [8], XML Schema [10] [11] and XML Namespace [12] standards.

---

### B.1 Architectural features

#### B.1.0 General

The overall architectural feature of HNS Network Resources IRP is specified in 3GPP TS 28.672 [5]. This clause specifies features that are specific to the Schema definitions.

#### B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [13].

---

### 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

The mapping is not present in the current version of this specification.

---

## B.3 Solution Set definitions

### B.3.1 XML definition structure

Annex B.3.3 of the present document defines the NRM-specific XML schema `hnsNrm.xsd` for the HNS Network Resources IRP NRM defined in 3GPP TS 28.672 [5].

XML schema `hnsNrm.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 [6].

### B.3.2 Graphical Representation

The graphical representation is not present in the current version of this specification.

### B.3.3 XML schema "hnsNrm.xsd"

```

<?xml version="1.1" encoding="UTF-8"?>

<!--
 3GPP TS 28.673 HNS Network Resources IRP
 Bulk CM Configuration data file NRM-specific XML schema
 hnsNrm.xsd
-->

<schema
  targetNamespace=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.676#hnsNrm"
  elementFormDefault="qualified"
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xn=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.623#genericNrm"
  xmlns:un=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.673#hnsNrm"
  xmlns:gn=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.656#geranNrm"
  xmlns:sm=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.626#stateManagementIRP"
>

  <import namespace="http://www.3gpp.org/ftp/specs/archive/28_series/28.623#genericNrm"
schemaLocation="genericNrm.xsd"/>
  <import namespace="http://www.3gpp.org/ftp/specs/archive/28_series/28.656#geranNrm"
schemaLocation="geranNrm.xsd"/>
  <import namespace="http://www.3gpp.org/ftp/specs/archive/28_series/28.626#stateManagementIRP"
schemaLocation="stateManagementIRP.xsd"/>

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

  <!-- HNS network Resources IRP NRM class associated XML elements -->

  <element
    name="HNBGWFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="hnbgwId" type="string"/>
                  <element name="userLabel" type="string"/>
                  <element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>
                  <element name="ipConfigInfo" type="string"/>
                  <element name="maxNbrHNBRRegistered" type="integer"/>
                  <element name="maxPacketCapability" type="integer"/>
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="xn:VsDataContainer"/>
              <element ref="un:IuhSignLinkTp"/>
              <element ref="un:EP_Iuh"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

  <element name="IuhSignLinkTp">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>

```



```

    <all>
      <element name="userLabel" type="string" minOccurs="0"/>
      <element name="farEndEntity" type="string" minOccurs="0"/>
      <element name="sctpAssocLocalAddr" type="string"/>
      <element name="sctpAssocRemoteAddr" type="string"/>
    </all>
  </complexType>
</element>
<choice minOccurs="0" maxOccurs="unbounded">
  <element ref="xn:VsDataContainer"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>

<element name="EP_Iuh">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string" minOccurs="0"/>
                <element name="farEndEntity" type="string" minOccurs="0"/>
                <element name="farEndNEIPAddr" type="string" minOccurs="0"/>
              </all>
            </complexType>
          </element>

          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="HNBProfile">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>
                <element name="configuration" type="string"/>
                <element name="criterion" type="string" minOccurs="0"/>
              </all>
            </complexType>
          </element>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

<element name="HMSFunction">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="userLabel" type="string"/>
                <element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <choice minOccurs="0" maxOccurs="unbounded">
            <element ref="xn:VsDataContainer"/>
          </choice>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>

```

```
        <element ref="un:HNBProfile"/>
      </choice>
    </sequence>
  </extension>
</complexContent>
</complexType>
</element>

</schema>
```

## Annex C (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2014-06	SA#64	SP-140332	0001	-		Upgrade W3C XML Schema version from 1.0 to 1.1	11.1.0
		SP-140360	0002	-		remove the feature support statements	11.1.0
2014-09	SA#65	SP-140560	0003	-		Update the link from Solution Set to Information Service due to the end of Release 12	12.0.0
2016-01	SA#70					Update to Rel-13 (MCC)	13.0.0
2016-06	SA#72	SP-160407	0004			Update the link from IRP Solution Set to IRP Information Service	13.1.0
2017-03	SA#75	-	-	-		Promotion to Release 14 without technical change	14.0.0
2017-06	SA#76	SP-170514	0005	-	F	Update link from IRP SS to IS	14.1.0
2017-06	SA#76	SP-170510	0006	1	B	Update the XML Schema definitions to align with IS to support Configuration Management for mobile networks that include virtualized network functions	14.1.0
2018-06	-	-	-	-	-	Update to Rel-15 version (MCC)	<b>15.0.0</b>
2020-07	-	-	-	-	-	Update to Rel-16 version (MCC)	<b>16.0.0</b>

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# History

<b>Document history</b>		
V16.0.0	August 2020	Publication