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Technical Specification

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Telecommunication management;
Inventory Management (IM) network resources
Integration Reference Point (IRP):
Network Resource Model (NRM)
(3GPP TS 32.692 version 6.3.0 Release 6)

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Foreword

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Contents

Foreword

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

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

Version x.y.z

where:

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

Introduction

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

32.690: "Inventory Management (IM): Requirements".

32.691: "Inventory Management (IM) network resources Integration Reference Point (IRP): Requirements".

32.692: "Inventory Management (IM) network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

32.695: "Inventory Management (IM) network resources Integration Reference Point (IRP): eXtensible Markup Language (XML) file format definition".

Inventory Management (IM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. IM actions have the objective to 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. The final goal of IM is the establishment of an accurate and timely model of the actual inventory in the NEs or NRs.

IM actions may be requested to reflect changes initiated by Configuration Management (CM) actions or to make sure that the inventory model is in synch with the actual inventory. IM 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 defines an Integration Reference Point (IRP) through which an 'IRPAgent' (typically an Element Manager or Network Element) can communicate Network Management related information to one or several 'IRPManagers' (typically Network Managers).

The present document specifies an Inventory Management Network Resource Model, NRM (also referred to as a Management Information Model - MIM) with definitions of Information Object Classes.

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 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS)".

[4] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[5] Void.

[6] 3GPP TS 32.642: "Telecommunication management; Configuration Management (CM): UTRAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[7] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[8] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and Definitions".

[9] 3GPP TS 32.151: "Telecommunication management; Integration Reference Point (IRP) Information Service (IS) template.

[10] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[11] 3GPP TS 32.690: "Telecommunication management; Inventory Management (IM): Requirements".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.600 [4] 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). Currently however, all (non-containment) associations are modelled by means of reference attributes of the participating MOs.

Managed Element (ME): instance of the Managed Object Class Managed Element defined in [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 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 NRM definition)

Network Resource Model (NRM): 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
DN	Distinguished Name (see 3GPP TS 32.300 [7])
EM	Element Manager
IM	Inventory Management
IOC	Information Managed Object
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Sector
ME	Managed Element
MIM	Management Information Model
MO	Managed Object
MOC	Managed Object Class
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [7])
TMN	Telecommunications Management Network
UML	Unified Modelling Language

UMTS Universal Mobile Telecommunications System
UTRAN UMTS Terrestrial Radio Access Network

4 System overview

4.1 Void

4.2 Compliance rules

The following defines the meaning of Mandatory and Optional IOC attributes and associations between IOCs, in Solution Sets to the IRP defined by the present specification:

- The IRPManager shall support all mandatory attributes/associations. The IRPManager shall be prepared to receive information related to mandatory as well as optional attributes/associations without failure; however the IRPManager does not have to support handling of the optional attributes/associations.
- The IRPAgent shall support all mandatory attributes/associations. It may support optional attributes/associations.

An IRPAgent that incorporates vendor-specific extensions shall support normal communication with a 3GPP SA5-compliant IRPManager with respect to all Mandatory and Optional managed object classes, attributes, associations, operations, parameters and notifications without requiring the IRPManager to have any knowledge of the extensions.

Given that:

- rules for vendor-specific extensions remain to be fully specified; and
- many scenarios under which IRPManager and IRPAgent interwork may exist;

it is recognised that the IRPManager, even though it is not required to have knowledge of vendor-specific extensions, may be required to be implemented with an awareness that extensions can exist and behave accordingly.

5 Modelling approach

See 3GPP TS 32.150 [8].

6 Information Object Classes

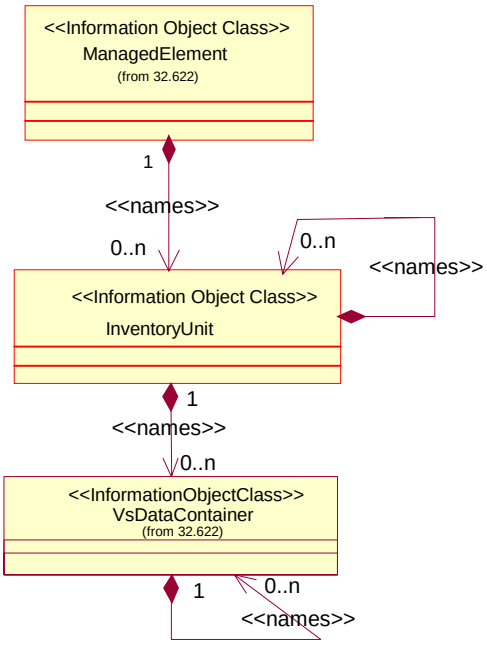
6.1 Imported information entities and local labels

Label reference	Local label
32.622 [10], information object class, Top	Top
32.622 [10], information object class, ManagedElement	ManagedElement

6.2 Class diagram

6.2.1 Attributes and relationships

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



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

Figure 6.2.1: Inventory Management NRM Containment/Naming and Association diagram

Each IOC instance is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [7] that expresses its containment hierarchy. As an example, the DN of a IOC representing a InventoryUnit could have a format like:

`SubNetwork=Sweden,meContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1,InventoryUnit=Inv-1.`

6.2.2 Inheritance

This subclause depicts the inheritance relationships that exist between IOCs.

Figure 6.2.2 shows the inheritance hierarchy for the IM NRM.

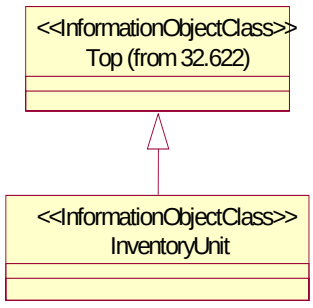


Figure 6.2.2: Inventory Management NRM Inheritance Hierarchy

6.3 Information object class definitions

6.3.1 InventoryUnit

6.3.1.1 Definition

This IOC represents inventory information for an Inventory Unit.

6.3.1.2 Attributes

Attributes of `InventoryUnit`

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
inventoryUnitId	+	M	M	-
inventoryUnitType	+	M	M	-
vendorUnitFamilyType	+	O	M	-
vendorUnitTypeNumber	+	O	M	-
versionNumber	+	O	M	-
vendorName	+	M	M	-
serialNumber	+	O	M	-
dateOfManufacture	+	O	M	-
dateOfLastService	+	O	M	-
unitPosition	+	O	M	-
manufacturerData	+	O	M	-

6.3.1.3 Attribute constraints

Optional attributes vendorUnitFamilyType, vendorUnitTypeNumber and serialNumber shall be mandatory for hardware.

6.3.1.4 Relationships

None.

6.3.1.5 State diagram

None.

6.3.1.6 Notifications

None.

6.4 Information relationship definitions

Not applicable.

6.5 Information attribute definitions

6.5.1 Definition and legal values

Table 6.5.1 defines the attributes that are present in several Information Object Classes of the present document.

Table 6.5.1: Attributes

Attribute Name	Definition	Legal Values
dateOfManufacture	Date of Manufacture of inventory unit.	
dateOfLastService	Date of last service or repair of inventory unit.	
inventoryUnitId	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.	
inventoryUnitType	Type of inventory unit (see TS 32.690 [11])	
manufacturerData	Manufacturer specific data of inventory unit.	
serialNumber	Serial number of inventory unit.	
unitPosition	Position of inventory unit (e.g. Rack, shelf, slot, etc.). Depending on the implementation of the inventory unit in the managed system, the value and meaning of this attribute may vary. For example, if a system has three levels and types of inventory units representing Rack, Shelf and Slot respectively (i.e. the Managed Element contains multiple Rack inventory units, each Rack inventory unit contains multiple Shelf inventory units and each Shelf inventory unit contains multiple Slot inventory units), then for this example: – for the Inventory Unit representing a Rack, the Frame Identification code may be used as the value of this attribute; – for the Inventory Unit representing a Shelf, the Rack Shelf code may be used as the value of this attribute; – for the Inventory Unit representing a Slot, the position code may be used as the value of this attribute.	
vendorName	Name of inventory unit vendor.	
vendorUnitFamilyType	Mnemonic of inventory unit family type (e.g. Fan, PSU) assigned by vendor.	
vendorUnitTypeNumber	A vendor/manufacturer defined and assigned number which uniquely identifies the unit type and version (used for replacing HW units, spares).	
vendorUnitTypeNumber	A vendor/manufacturer defined and assigned number which uniquely identifies the unit type and optionally for backward compatibility reasons only, also version (used for replacing HW units, spares).	
versionNumber	The version information related to vendorUnitTypeNumber.	

6.5.2 Constraints

None.

6.6 Particular information configurations

None.

Annex A (informative): Change history

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Cat**	**Old**	**New**
Sep 2002	SA_17	SP-020473	--	--	Submitted to TSG SA #17 for Approval	--	1.0.0	5.0.0
Dec 2004	SA_26	SP-040816	0001	--	Align Inventory Management Network Resource Model with the latest template from Rel-6 TS 32.150	F	5.0.0	6.0.0
Jun 2005	SA_28	SP-050301	0002	--	Remove obsolete compliance text in 4.2	F	6.0.0	6.1.0
Dec 2005	SA_30	SP-050714	0003	--	Correct support qualifier - Align IS with requirements in 32.690	F	6.1.0	6.2.0
Jun 2006	SA_32	SP-060257	0004	--	Correction of InventoryUnit missing VsDataContainer and Version Number	F	6.2.0	6.3.0
Jun 2006	SA_32	SP-060257	0005	--	Correct the TS reference number from 32.691 to 32.690	F	6.2.0	6.3.0

History

Document history		
V6.0.0	December 2004	Publication
V6.1.0	June 2005	Publication
V6.2.0	December 2005	Publication
V6.3.0	June 2006	Publication