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IRP: Network Resource Model)
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Presentation of Technical Specification to TSG SA

Presentation to: TSG SA Meeting #17
Document for presentation: TS 32.692, Version 1.0.0
Inventory Management Network Resources IRP: Network
Resource Model
Presented for: Approval

Abstract of document:

This Specification defines the NRM for the Inventory Management Network Resources IRP.
Work done against the WID contained in SP-010461 (Work Item ID: OAM-NIM).

Purpose of These Specifications:

This Network Resource Model Specification is intended for Release 5 and is part of the Inventory Management IRP (32.69x), which consists of this Requirements Specification (32.691) and the Network Resource Model Specification (32.692).

The purpose of this set of specifications is to provide an Inventory Management functionality for Release 5 that is basic and minimal.

Status of these Specifications:

The Network Resource Model Specification (32.692) is now submitted for the first time to SA but it is ready for Rel-5 approval.

Outstanding Issues:

None.

Contentious Issues:

None.

3GPP TS 32.692 V1.0.0 (2002-09)

Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Telecommunication management;
Inventory Management Network Resources IRP: Network
Resource Model;
(Release 5)**



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Keywords

3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

<http://www.3gpp.org>

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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

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: "3G Telecom Management principles and high level requirements".
- [2] 3GPP TS 32.102: "3G Telecom Management Architecture".
- [3] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information service version 1".
- [4] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and main requirements".
- [5] 3GPP TS 23.002: "Network Architecture".
- [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".

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 (in Release 1999) 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 System context

Figure 4.1 and figure 4.2 identify system contexts of the IRP defined by the present specification in terms of its implementation called IRPAgent and the user of the IRPAgent, called IRPManager. For a definition of IRPManager and IRPAgent, see 3GPP TS 32.102 [2].

The IRPAgent implements and supports this IRP. The IRPAgent can reside in an Element Manager (EM, for definition see 3GPP TS 32.101 [1]) or a Network Element (NE) (see also 3GPP TS 32.102 [2] clause 8). In the former case, the interfaces (represented by a thick dotted line) between the EM and the NEs is not the subject of this IRP.

An IRPManager using this IRP shall choose one of the two System Contexts defined here, for each NE. For instance, if an EM is responsible for managing a number of NEs, the NM shall access this IRP through the EM and not directly to those NEs. For another IRP though, the System Context may be different.

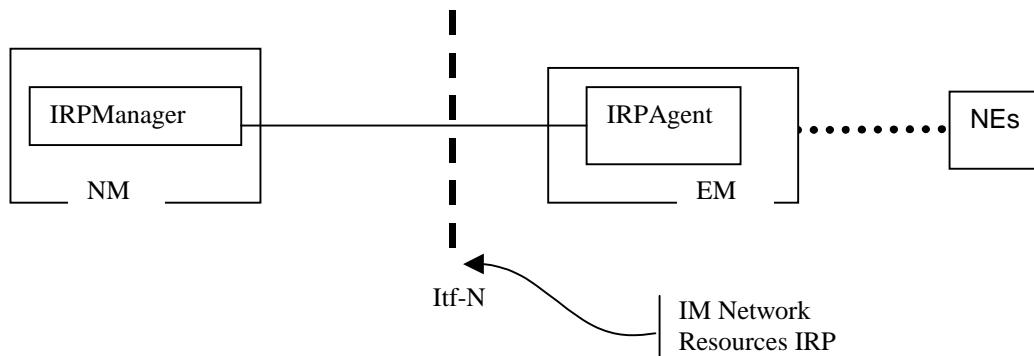


Figure 4.1: System Context A

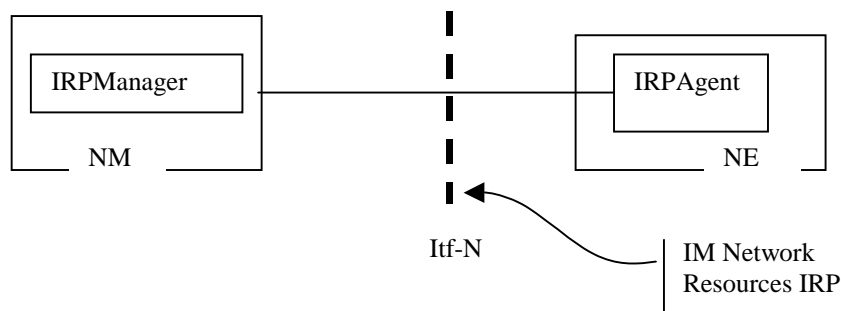


Figure 4.2: System Context B

4.2 Compliance rules

For general definitions of compliance rules related to qualifiers (Mandatory/Optional/Conditional) for *operations*, *notifications* and *parameters* (of operations and notifications) please refer to 3GPP TS 32.102 [2].

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 in Release 4/5 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

The modelling approach adopted and used in this IRP is described in the Generic Network Resources IRP: NRM.

6 IRP Information Model

6.1 Information entities imported and local labels

None.

6.2 Class diagram

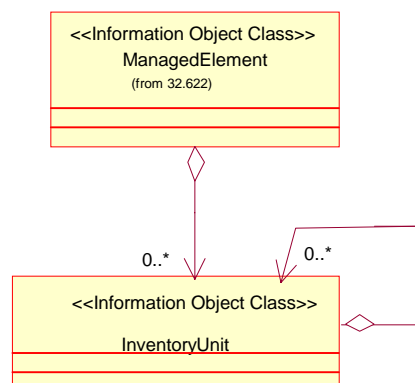
6.2.1 Attributes and relationships

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

NOTE 1: For Release 5, the data in this NRM shall be accessed by a vendor specific file transfer mechanism.

Figure 6.2.1 show the name-containment relation and other types of relations of the Inventory Management NRM.

NOTE 2: The name-containment relations between IOCs are indicated by UML "unidirectional aggregation by reference" ("hollow diamonds").



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 is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [13] that expresses its containment hierarchy. As an example, the DN of a IOC representing a InventoryDataContainer 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.

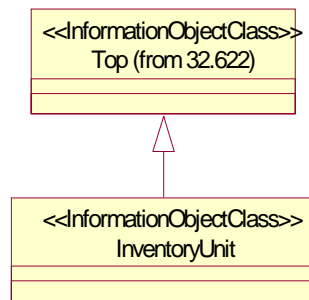


Figure 6.2.2: Inventory Management NRM Inheritance Hierarchy

6.3 Information object classes definition

6.3.1 InventoryUnit

6.3.1.1 Definition

This IOC represents inventory information for a Inventory Unit.

6.3.1.2 Attributes

Table 1: Attributes of InventoryUnit

Attribute Name	Support Qualifier	READ	WRITE
inventoryUnitId	M	M	-
inventoryUnitType	M	M	-
vendorUnitFamilyType	M	M	-
vendorUnitTypeNumber	M	M	-
vendorName	M	M	-
serialNumber	M	M	-
dateOfManufacture	O	M	-
dateOfLastService	O	M	-
unitPosition	O	M	-
manufacturerData	O	M	-

6.4 Information relationships definition

Not applicable.

6.5 Information attributes definition

6.5.1 Definition and legal values

Table 2 defines the attributes that are present in several Information Object Classes of the present document.

Table 2: Attributes

Attribute Name	Definition	Legal Values
dateOfManufacture	Date of Manufacture of inventory unit.	String
dateOfLastService	Date of last service or repair of inventory unit.	String
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.	String
inventoryUnitType	Type of inventory unit (HW, FW).	String
manufacturerData	Manufacturer specific data of inventory unit.	String
serialNumber	Serial number of inventory unit.	String
unitPosition	Position of inventory unit (Rack, shelf, slot).	String
vendorName	Name of inventory unit vendor.	String
vendorUnitFamilyType	Mnemonic of inventory unit family type (e.g. Fan, PSU) assigned by vendor.	String
vendorUnitTypeNumber	A vendor/manufacturer defined and assigned number which uniquely identifies the unit type and version (used for replacing HW units, spares).	String

Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Sep 2002	S_17	SP-020473	--	--	Submitted to TSG SA #17 for Approval	1.0.0	