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Foreword

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

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- x the first digit:
 - 1 presented to TSG for information;
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 - 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.
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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);

32.696: Inventory Management (IM) network resources Integration Reference Point (IRP); Solution Set (SS) definitions.

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 control and monitor the actual equipment configuration on the Network Elements (NEs) and network resources, and they may be initiated by the operator or by functions in the Operations Systems (OSs) or NEs.

IM 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 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, in addition to the requirements defined in 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.600 [3], the requirements for the present IRP: Inventory Management IRP.

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 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[4] 3GPP TS 32.692: "Telecommunication management; Inventory Management (IM) network resources Integration Reference Point (IRP); Network Resource Model (NRM)".

[5] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[6] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [6], and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [6].

Element Manager (EM): provides a package of end-user functions for management of a set of closely related types of Network Elements (NEs).

NOTE 1: These functions can be divided into two main categories:

- *Element Management Functions* for management of NEs on an individual basis. These are basically the same functions as supported by the corresponding local terminals.
- *Sub-Network Management Functions* that are related to a network model for a set of NEs constituting a clearly defined sub-network, which may include relations between the NEs. This model enables additional functions on the sub-network level (typically in the areas of network topology presentation, alarm correlation, service impact analysis and circuit provisioning).

Field Replaceable Unit (FRU): a spare part or component that can be substituted / supplanted or be used to substitute / supplant an existing part or component in order to rectify a fault or any other issue which is identified by the user or technician or a diagnostic program.

IRP: see 3GPP TS 32.101 [1].

IRP Information Model: see 3GPP TS 32.101 [1].

IRP Information Service: see 3GPP TS 32.101 [1].

IRP Solution Set: see 3GPP TS 32.101 [1].

Information Object Class (IOC): Within the context of all IRP IS specifications, IOC is the term used instead of MOC for a managed object class. MOC is used on the SS level. See also the definition of **Managed Object**.

Managed Object (MO): software object that encapsulates the manageable characteristics and behaviour of a particular Network Resource.

NOTE 2: See also the def. of MO in TS 32.101 [1]. The MO is instance of a MO class (MOC) defined in a MIM/NRM. This class, within the context of this Information Service specification 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, an MO class 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). An MO class may support notifications that provide information about an event occurrence within a network resource.

Management Information Base (MIB): the set of existing managed objects in a management domain, together with their attributes, constitutes that management domain's MIB. The MIB may be distributed over several OS/NEs.

Management Information Model (MIM): also referred to as NRM - see the definition below.

NOTE 3: There is a slight difference between the meaning of MIM and NRM - the term MIM is generic and can be used to denote any type of management model, while NRM denotes the model of the actual managed telecommunications Network Resources (NRs).

Network resource: See definition in 3GPP TS 28.622 [5].

Network Resource Model (NRM): See definition in 3GPP TS 28.622 [5].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [6] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [6]

CM	Configuration Management
IOC	Information Object Class
MOC	Managed Object Class
MOI	Managed Object Instance

4 Inventory Management (IM) concepts

The main task of the 3G network inventory management is to manage network inventory information about the various static resources of a 3G mobile telecommunication network. It provides support to network planning, to network operation and maintenance and to working craft management. Inventory management functions are distributed over different layers of a Telecommunications Management Network (TMN). The main task of the inventory management

function at Itf-N is to provide an efficient access for network management systems to the static inventory data of all related managed network elements.

The basic tasks of the Inventory Management IRP of this release is:

to provide an efficient mechanism enabling IRPManagers to upload inventory data as follows:

- request an IRPAgent to prepare inventory data of a certain part of the current network for uploading;
- to check the status of data preparation in the IRPAgent;
- to request the IRPAgent to alert the IRPManager when the data preparation is completed; and to
- upload the prepared inventory data;

to provide a standard data format so that all IRPManagers and IRPAgents involved have a common understanding of the uploaded inventory data.

The inventory data:

is static data about the hardware equipment and firmware units (e.g. line cards, processing units, power supplies) constructing the network elements managed by the concerned element manager. Static data is the data which:

- is usually provided by vendors and is basically vendor-specific;
- is basically independent of the operation status of the related equipment/units;
- is not changed frequently during the normal operation;
- cannot be changed through Itf-N interface; and is
- basically independent of configuration management;

may either be integrated in the related equipment/units or be assigned to the related equipment/units during the installation or during operation;

may include data showing static physical relations between equipment or units, e.g. card A is in slot B.

5 Requirements

5.1 General requirements

The present document defines requirements for the IS for this IRP. As such, capabilities specified here as being required in the IS are not necessarily required in the product implementation. That which is required in the product implementation will be specified in the IS itself.

The following general and high-level requirements apply for the present IRP:

- A. IRP-related requirements in 3GPP TS 32.101 [1];
- B. IRP-related requirements in 3GPP TS 32.102 [2];
- C. IRP-related requirements in 3GPP TS 32.600 [3].

5.2 Inventory Management (IM) requirements

The following requirements shall apply for Inventory Management over Itf-N.

1. Inventory data is defined as information pertaining to Field Replaceable Unit (FRU) hardware, firmware and optionally software units and license units of 3G Networks, and shall be manageable. The management of software unit information should be similar to the management of hardware and firmware information. Examples of inventory data and attributes are described in Annex A and Annex B and standardised inventory data for Itf-N is defined in 3GPP TS 32.692 [4]. Examples of inventory hardware units may be rack, shelf, slot, circuit pack and physical port, as long as they are FRUs.
2. The Inventory hardware information can be captured as a hierarchy or a flat model. In a hierarchical model, an inventory unit is contained by another inventory unit, thereby creating a containment relationship.
3. It shall be possible for the IRPManager to initiate the upload (IRPAgent to IRPManager) of inventory data over Itf-N.
4. It shall be possible to scope the inventory data to be uploaded from the IRPAgent, e.g. inventory data for a NodeB, an RNC, or all the NEs managed by the IRPAgent.
5. It shall be possible to filter the inventory data to be uploaded from the IRPAgent, e.g. HW units of a certain type in the network.
6. It shall be possible to check the status of an Inventory Management operation.
7. Interface-N shall support a file-based mechanism for transferring inventory data.
8. The file format used for transferring of bulk inventory data shall include a standard part and shall also allow for vendor specific representation of inventory data. The meaning, syntax, units, etc. of the standard part of inventory information will be specified, e.g. standard fields for HW board identity (including version number of HW/SW/FW), board type and serial number.
9. A Network Resource Model shall be defined for the standard part of inventory data.
10. As the files are transferred via a machine-machine interface, the file format shall be machine-readable using industry standard tools, e.g. XML or ASN.1 parsers.
11. The file format shall be specified by using a standardised language, e.g. the Extensible Mark-up Language (XML).
12. The file format shall be independent of the data transfer protocol used to carry the file from one system to another.
13. The file transfer facility shall be implemented using a file transfer protocol as defined in 3GPP TS 32.101 [1].
14. The identification of IOC instances shall be consistent with Alarm Reporting and the Network Resource Models used for Configuration Management.
15. All inventory units shall be uniquely identifiable.