Technical Specification Group Services and System Aspects   **TSGS#16(02)0295**
Meeting #16, Marco Island, Florida, 10-13 June 2002

Source:	**SA5 (Telecom Management)**
Title:	**Rel-5 CR 32.611 (3G configuration management: Bulk CM IRP requirements): Adding Bulk CM IRP requirements for Rel-5**
Document for:	**Approval**
Agenda Item:	**7.5.3**

Doc-1st-Level	Spec	CR	R	Phase	Subject	Cat	Ver Cur	Ver New	Doc-2nd-Level	Workitem
SP-020295	32.611	001	-	Rel-5	Adding Bulk CM IRP requirements for Rel-5	C	4.0.0	4.1.0	S5-026139	OAM-NIM

CR-Form-v5

CHANGE REQUEST

| ⌘ | **32.611** CR **001** | ⌘ **rev** | **-** | ⌘ | Current version: | **4.0.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Adding Bulk CM IRP requirements for Rel-5	
Source: ⌘	SA5	
Work item code: ⌘	OAM-NIM	***Date:*** ⌘ 24/05/2002
Category: ⌘ **C**		***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:	Use <u>one</u> of the following releases:
F (correction)	2 (GSM Phase 2)
A (corresponds to a correction in an earlier release)	R96 (Release 1996)
B (addition of feature),	R97 (Release 1997)
C (functional modification of feature)	R98 (Release 1998)
D (editorial modification)	R99 (Release 1999)
Detailed explanations of the above categories can	REL-4 (Release 4)
be found in 3GPP <u>TR 21.900</u>.	REL-5 (Release 5)

Reason for change: ⌘	Addition of requirements for Bulk CM activation modes and checking. Inclusion of Core Network in Bulk CM requirements.
Summary of change: ⌘	The requirements for Bulk CM activation modes and checking, and for the Core Network have been added to sub-clause 4.3.
Consequences if not approved: ⌘	Bulk CM for Release 5 will omit specifying important aspects regarding activation and checking functions, and will not include the Core Network.

Clauses affected: ⌘	Introduction, 3.1, 4.3.

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	X O&M Specifications	CRs to follow on 32.612, 32.613, 32.614.

Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Introduction

Configuration Management (CM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. CM actions have the objective to control and 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.

CM 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 CM 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.

Due to the growing number of specifications to model new services and Resource Models for Configuration Management (CM), as well as the expected growth in size of each of them from 3GPP Release 4 onwards, a new structure of the specifications is already needed in Release 4. This structure is needed for several reasons, but mainly to enable more independent development and release for each part, as well as a simpler document identification and version handling. Another benefit would be that it becomes easier for bodies outside 3GPP, such as the ITU-T, to refer to telecom management specifications from 3GPP. The new structure of the specifications does not lose any information or functionality supported by the Release 1999.

In addition to the restructuring, the need to define some new IRPs for CM, compared to Release 1999, has also been identified. Firstly, a new IRP for the Bulk CM, and secondly, one for each of the NRM parts (Generic, Core Network, UTRAN and GERAN NRM).

Finally, the Notification IRP (in Release 1999: 32.106-1 to -4) and the Name convention for Managed Objects (in Release 1999: 32.106-8) have been moved to a separate number series used for specifications common between several management areas (e.g. CM, FM, PM).

Table 1: Mapping between Release '99 and the new specification numbering scheme

R99 Old no.	Old (R99) specification title	Rel-4 New no.	New (Rel-4) specification title
32.106-1	3G Configuration Management: Concept and Requirements	32.600	**3G Configuration Management: Concept and High-level Requirements**
32.106-1	<Notification IRP requirements from 32.106-1 and 32.106-2>	32.301	**Notification IRP**: Requirements
32.106-2	Notification IRP: IS	32.302	Notification IRP: Information Service
32.106-3	Notification IRP: CORBA SS	32.303	Notification IRP: CORBA SS
32.106-4	Notification IRP: CMIP SS	32.304	Notification IRP: CMIP SS
32.106-8	Name convention for Managed Objects	32.300	**Name Convention for Managed Objects**
32.106-1	<Basic CM IRP IS requirements from 32.106-1 and 32.106-5>	32.601	**Basic CM IRP**: Requirements
32.106-5	Basic CM IRP IM (Intro & IS part)	32.602	Basic CM IRP: Information Service
32.106-6	Basic CM IRP CORBA SS (IS related part)	32.603	Basic CM IRP: CORBA SS
32.106-7	Basic CM IRP CMIP SS (IS related part)	32.604	Basic CM IRP: CMIP SS
32.106-8	Name convention for Managed Objects	32.300	**Name Convention for Managed Objects**
-	-	32.611	**Bulk CM IRP**: Requirements
-	-	32.612	Bulk CM IRP: Information Service
-	-	32.613	Bulk CM IRP: CORBA SS
-	-	32.614	Bulk CM IRP: CMIP SS
		32.615	Bulk CM IRP: XML file format definition
32.106-1	<Basic CM IRP Generic NRM requirements from 32.106-1 and 32.106-5>	32.621	**Generic Network Resources IRP**: Requirements
32.106-5	Basic CM IRP IM (Generic NRM part)	32.622	Generic Network Resources IRP: NRM
32.106-6	Basic CM IRP CORBA SS (Generic NRM related part)	32.623	Generic Network Resources IRP: CORBA SS
32.106-7	Basic CM IRP CMIP SS (Generic NRM related part)	32.624	Generic Network Resources IRP: CMIP SS
32.106-1	<Basic CM IRP CN NRM requirements from 32.106-1 and 32.106-5>	32.631	**Core Network Resources IRP**: Requirements
32.106-5	Basic CM IRP IM (CN NRM part)	32.632	Core Network Resources IRP: NRM
32.106-6	Basic CM IRP CORBA SS (CN NRM related part)	32.633	Core Network Resources IRP: CORBA SS
32.106-7	Basic CM IRP CMIP SS (CN NRM related part)	32.634	Core Network Resources IRP: CMIP SS
32.106-1	<Basic CM IRP UTRAN NRM requirements from 32.106-1 and 32.106-5>	32.641	**UTRAN Network Resources IRP**: Requirements
32.106-5	Basic CM IRP IM (UTRAN NRM part)	32.642	UTRAN Network Resources IRP: NRM
32.106-6	Basic CM IRP CORBA SS (UTRAN NRM related part)	32.643	UTRAN Network Resources IRP: CORBA SS
32.106-7	Basic CM IRP CMIP SS (UTRAN NRM related part)	32.644	UTRAN Network Resources IRP: CMIP SS
		32.651	**GERAN Network Resources IRP**: Requirements
		32.652	GERAN Network Resources IRP: NRM
		32.653	GERAN Network Resources IRP: CORBA SS
		32.654	GERAN Network Resources IRP: CMIP SS

1   Scope

The present document describes the Bulk Configuration Management (CM) requirements for managing a 3G network. This is described from the management perspective in 3G TS 32.101 [1] and 3G TS 32.102 [2].

The Itf-N for CM is built up by a number of Integration Reference Points (IRPs) and a related Name Convention 3G TS 32.300 [3], which realise the functional capabilities over this interface. The basic structure of the IRPs is defined in 3G TS 32.101 [1] and 3G TS 32.102 [2]. For CM, a number of IRPs (and a Name Convention) are defined, used by this as well as by other specifications for Telecom Management produced by 3GPP. These IRPs are defined in separate 3GPP specifications, and listed in the table in the Introduction clause above. This document defines the requirements for the Bulk CM 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]   3G TS 32.101: "3G Telecom Management principles and high level requirements".

[2]   3G TS 32.102: "3G Telecom Management architecture".

[3]   3G TS 32.300: "Name Convention for Managed Objects".

[4]   3G TS 32.600: "3G Configuration Management: Concept and High Level Requirements".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply.

Data: is any information or set of information required to give software or equipment or combinations thereof a specific state of functionality.

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

Firmware: is a term used in contrast to software to identify the hard-coded program, which is not downloadable on the system.

Hardware: is each and every tangible item.

IRP Information Model: See 3G TS 32.101 [1].

IRP Information Service: See 3G TS 32.101 [1].

IRP Solution Set: See 3G TS 32.101 [1].

Managed Object (MO): an abstract entity, which may be accessed through an open interface between two or more systems, and representing a Network Resource (NR) for the purpose of management. The Managed Object (MO) is an instance of a Managed Object Class (MOC) as defined in a Management Information Model (MIM). The MIM does not define how the MO or NR is implemented; only what can be seen in the interface.

~~**Managed Object Class (MOC):** a description of all the common characteristics for a number of MOs, such as their attributes, operations, notifications and behaviour.~~

~~**Managed Object Instance (MOI):** an instance of a MOC, which is the same as a MO as described above.~~

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. 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 Element (NE): is a discrete telecommunications entity, which can be, managed over a specific interface e.g. the RNC.

Network Manager (NM): provides a package of end-user functions with the responsibility for the management of a network, mainly as supported by the EM(s) but it may also involve direct access to the NEs. All communication with the network is based on open and well-standardised interfaces supporting management of multi-vendor and multi-technology NEs.

Network Resource (NR): is a component of a NE, which can be identified as a discrete separate entity and is in an object oriented environment for the purpose of management represented by an abstract entity called Managed Object (MO).

Network Resource Model (NRM): a model representing the actual managed telecommunications Network Resources (NRs) that a System is providing through the subject IRP. An NRM describes Managed Object Classes (MOC), their associations, attributes and operations. The NRM is also referred to as "MIM" (see above) which originates from the ITU-T TMN.

Object Management Group (OMG): see http://www.omg.org.

Operations System (OS): indicates a generic management system, independent of its location level within the management hierarchy.

Operator: is either

- a human being controlling and managing the network; or

- a company running a network (the 3G network operator).

Optimisation: of the network is each up-date or modification to improve the network handling and/or to enhance subscriber satisfaction. The aim is to maximise the performance of the system.

Re-configuration: is the re-arrangement of the parts, hardware and/or software that make up the 3G network. A re-configuration can be of the parts of a single NE or can be the re-arrangement of the NEs themselves, as the parts of the 3G network. A re-configuration may be triggered by a human operator or by the system itself.

Reversion: is a procedure by which a configuration, which existed before changes were made, is restored.

Software: is a term used in contrast to firmware to refer to all programs which can be loaded to and used in a particular system.

Up-Dates: generally consist of software, firmware, equipment and hardware, designed only to consolidate one or more modifications to counter-act errors. As such, they do not offer new facilities or features and only apply to existing NEs.

Up-Grades: can be of the following types:

- enhancement - the addition of new features or facilities to the 3G network;

- extension - the addition of replicas of existing entities.

3.2 Abbreviations

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

CM	Configuration Management
CMIP	Common Management Information Protocol
CORBA	Common Object Request Broker Architecture
EM	Element Manager
FM	Fault Management
FW	Firmware
HW	Hardware
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Standardisation Sector
MIB	Management Information Base
MIM	Management Information Model
MOC	Managed Object Class
MOI	Managed Object Instance
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
OMG	Object Management Group
OS	Operations System
OSF	Operations System Function
PM	Performance Management
RNC	Radio Network Controller
SW	Software
TM	Telecom Management
TRX	Transceiver
UML	Unified Modelling Language (OMG)
UMTS	Universal Mobile Telecommunications System

4 Bulk CM and Itf-N Interface

4.1 Bulk CM principles

The Itf-N (see ref. 3G TS 32.102 [2]) is an object oriented interface, i.e. all resources of the 3G network (functional and physical resources) whose management is standardised by the present document are represented as Managed Object Instances (MOI) of a Network Resource Model (NRM).

The NRM shall be highly simplified for the purpose of the NM, based on the assumption that all of the detailed CM actions are performed by an Element Manager (EM), which knows the vendor-specific NRM and configuration.

There are two types of CM functions - *Passive* CM and *Active* CM (see 3G TS 32.600 [4] for definitions).

There are also at least two approaches to CM - *Basic CM* and *Bulk CM*. Refer to 3G TS 32.600 [4] for Basic CM.

Bulk CM is characterised by

- Bulk (file-oriented) data retrieval (configuration parameters) over Interface-N from single NEs, a collection of NEs or the whole network. (The passive aspect of Bulk CM.)

- Bulk (file-oriented) data download of configuration parameters to EM/NEs over Interface-N. (An active aspect of Bulk CM.)

- The network-wide activation of those parameters through a single operation. (An active aspect of Bulk CM.)

- The ability to fallback to a previous stable configuration through a single operation. (An active aspect of Bulk CM.)

This document describes the specific functional requirements related to Bulk CM of Network Resources (NRs) on the Itf-N.

4.2　　　Overview of IRPs related to Bulk CM

The Itf-N for CM is built up by a number of Integration Reference Points (IRPs) and a related Name Convention, which realise the functional capabilities over this interface. The basic structure of the IRPs is defined in 3G TS 32.101 [1] and 3G TS 32.102 [2]. For CM, a number of IRPs (and a Name Convention) are defined, used by this as well as other specifications For Telecom Management (TM) produced by 3GPP. All these IRPs are defined in separate 3GPP specifications, and listed in the Introduction clause.

4.3　　　Bulk CM Requirements

Interface-N shall provide efficient mechanisms to upload current CM data from the IRP Agent and download new CM data to the IRP Agent.
It shall be possible to transfer a CM file containing ~~radio network~~ parameters <u>for any specified Network Resource Model (e.g. radio network, Core Network)</u> from the NM to the IRP Agent using a standardised file format and transfer mechanism. The IRP Agent shall also be capable of making the necessary configuration changes in its managed NEs, using the parameters and information contained in the transferred CM file.
The following requirements have been identified regarding the file format and transfer control mechanism over Interface-N.

1. It shall be possible to initiate the upload (IRP Agent to NM) of CM data over Interface-N.

2. It shall be possible to scope the Objects to be uploaded from the IRP Agent, e.g. parameters for a Cell, an RNC, or all the NEs managed by the IRP Agent.

3. It shall be possible to initiate the download (NM to IRP Agent) of CM data over Interface-N.

4. The parameters in the file for downloading to the IRP Agent may relate to creating Managed Objects, deleting Managed Objects or changing some or all modifiable attributes of existing Managed Objects. These parameters may be applicable to some or all the Managed Objects controlled by the IRP Agent, e.g. a Cell, an RNC, or all NEs managed by the IRP Agent.

5. <u>The IRP Agent ~~shall~~should check the consistency, syntax and semantic of the downloaded file to ensure that the configuration changes contained in the file can be implemented in the network.</u>

~~5.~~6. It shall be possible to activate a previously downloaded configuration file in the EM/NE via a control facility.

7. <u>Two activation modes ~~shall~~may be defined for this IRP, distinguishable by their impact on network services in a live network. In the first activation mode the IRP Agent shall attempt to keep impact on service to a minimum, e.g. by the IRP Agent executing only one command or configuration change at a time in a NE. In the second activation mode all configuration changes contained in the file shall be implemented in the network in the minimum possible time, regardless of impact on service.</u> ~~This requirement may be fulfilled, for example, by the IRP Agent preparing the configuration changes offline in a database (pre-activation) and on receiving the activation command switching NEs over to the new configuration in the minimum possible time.~~

8. Activation shall employ a best effort mechanism, i.e. if parts of the activation cannot be successfully completed, the remainder shall still be attempted, where possible. Optionally, other activation strategies may also be supported.

6.9. The activation of the new configuration in the NEs shall be logged, the objective being to enable an operator (if necessary) to analyse the log (e.g. analyse failed commands) and to subsequently achieve a full activation. Note that "activation" means execution of each command in the downloaded file, and the result of each command execution shall be logged, whether successful or unsuccessful.

7.10. It shall be possible to selectively retrieve the information contained in the log, e.g. only unsuccessful operations.

8.11. It shall be possible to check the status of a configuration file operation.

9.12. It shall be possible for the IRP Agent to fallback to a previously known working configuration, initiated by the IRP Manager.

10.13. Interface-N shall support notifications, e.g. to indicate completion of an operation, error cases.

11.14. The file format shall be flexible enough to include all possible CM parameter types, i.e. standard parameters as well as vendor specific parameters. The meaning, syntax, units, etc. of standard parameters shall be specified. The representation of vendor specific parameters will be proprietary. A uniform mechanism for handling vendor specific parameters shall be specified.

12.15. Since the files are transferred via a machine-machine interface, the file format shall be machine readable using industry standard tools, e.g. XML parser.

13.16. Moreover, the files shall be formatted in a human readable way, e.g. to allow manual editing of its contents.

14.17. The file format shall be specified by using a standardised language, e.g. the Extensible Mark-up Language (XML), in order to provide the possibility of visualisation in a web browser.

15.18. The same file format shall be used for the upload and download to the IRP Agent.

16.19. The file format shall be independent of the data transfer protocol used to carry the file from one system to another.

17.20. The file transfer facility shall be implemented using a commonly available protocol, e.g. FTP.

18.21. The Managed Object Class identifiers used in the file shall be the same as those used for Basic CM, Fault Management and Performance Management.

19.22. Bulk CM IRP shall be sufficient to configure a complete radio network, including vendor specific parameters of the UTRAN.

Annex A (informative):
Change history

<table>
<tr><th colspan="8">Change history</th></tr>
<tr><th>Date</th><th>TSG #</th><th>TSG Doc.</th><th>CR</th><th>Rev</th><th>Subject/Comment</th><th>Old</th><th>New</th></tr>
<tr><td>Jun 2001</td><td>S_12</td><td>SP-010283</td><td>--</td><td>--</td><td>Approved at TSG SA #12 and placed under Change Control</td><td>2.0.0</td><td>4.0.0</td></tr>
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