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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Telecommunication management;
Configuration Management (CM);
Core Network Resources Integration Reference Point (IRP):
Network Resource Model (NRM)
(3GPP TS 32.632 version 7.2.0 Release 7)**

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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:

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1   presented to TSG for information;

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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:

32.631:   "Configuration Management (CM); Core network resources Integration Reference Point (IRP): Requirements".

32.632:   "Configuration Management (CM); Core network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

32.633:   "Configuration Management (CM); Core network resources Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)".

32.635:   "Configuration Management (CM); Core network resources Integration Reference Point (IRP): Bulk CM eXtensible Markup Language (XML) file format definition".

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 optimization 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.

1 Scope

The present document is part of an Integration Reference Point (IRP) named "Core Network Resources IRP", through which an 'IRPAgent' (typically an Element Manager or Network Element) can communicate Configuration Management information to one or several 'IRPManagers' (typically Network Managers) concerning CN resources.

The present document specifies the protocol neutral Core Network Resources IRP: Network Resource Model. It reuses relevant parts of the generic NRM in 3GPP TS 32.622 [16], either by direct reuse or sub-classing, and in addition to that defines CN specific Information Object Classes.

Finally, in order to access the information defined by this NRM, an Interface IRP is needed, such as the Basic CM IRP 3GPP TS 32.60x [17]. However, which Interface IRP that is applicable is outside the scope of the present document.

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; Information Service (IS)".

[4] - [6]   Void.

[7]   ITU-T Recommendation X.710 (1991): "Common management information service definition for CCITT applications".

[8] - [10]   Void.

[11]   3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point: Information Service (IS)".

[12]   Void.

[13]   3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[14]   3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[15]   3GPP TS 23.002: "Network architecture".

[16]   3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[17]   3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic Configuration Management Integration Reference Point (IRP): Information Service (IS)".

[18]   3GPP TS 23.060: "General Packet Radio Service (GPRS) service description; Stage 2".

[19]   3GPP TS 23.003: "Numbering, addressing and identification".

[20]   3GPP TS 32.672: "Telecommunication Management; Configuration Management (CM); State Management Integration Reference Point (IRP): Information Service (IS)".

[21]   Void.

[22]   3GPP TS 32.642: "Telecommunication management; Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[23]   3GPP TS 32.652: "Telecommunication management; Configuration Management (CM); GERAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

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], 3GPP TS 32.600 [14] 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).

Managed Element (ME): an instance of the Information Object Class `ManagedElement` defined in 3GPP TS 32.622 [16].

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 MO 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 definition below.

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

Node B: a logical node responsible for radio transmission/reception in one or more cells to/from the User Equipment
It terminates the Iub interface towards the RNC.

3.2   Abbreviations

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

    AUC   AUthentication Centre
    AS   Application Server

BG	Border Gateway
BGCF	Breakout Gateway Control Function
BS	Billing System
CBC	Cell Broadcast Center
CGF	Charging Gateway Functionality
CN	Core Network
DN	Distinguished Name (see 3GPP TS 32.300 [13])
EIR	Equipment Identity Register
EM	Element Manager
FM	Fault Management
FNR	Flexible Number Register
GDMO	Guidelines for the Definition of Managed Objects
GGSN	Gateway GPRS Support Node
GMLC	Gateway Mobile Location Center
GMSC Server	Gateway MSC Server
GMSC	Gateway MSC
GPRS	General Packet Radio System
ICSCF	Interrogating Call Session Control Function
IDL	Interface Definition Language
IMS	IP Multimedia Subsystem
IOC	Information Object Class
IRP	Integration Reference Point
ISO	International Standards Organization
IWF	InterWorking Function
ME	Managed Element
MGCF	Media Gateway Control Function
MGW	Media GateWay
MIM	Management Information Model
MNP-SRF	Mobile Number Portability-Signalling Relay Function
MO	Managed Object
MOI	Managed Object Instance
MRFC	Multimedia Resource Function Controller
MRFP	Call Session Control Function Processor
MSC Server	Mobile Services Switching Centre Server
MSC	Mobile Services Switching Centre
NE	Network Element
NM	Network Manager
NPDB	Number Portability DataBase
NR	Network Resource
NRM	Network Resource Model
OSI	Open Systems Interconnection
PCSCF	Proxy Call Session Control Function
PM	Performance Management
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [13])
SCF	Service Control Function
SCSCF	Serving Call Session Control Function
SGSN	Serving GPRS Support Node
SGW	Signalling GateWay
SLF	Subscription Locator Function
SMLC	Serving Mobile Location Center
SMS	Short Message Service
SMS-GMSC	SMS Gateway MSC
SMS-IWMSC	SMS InterWorking MSC
SRF	Specialized Resource Function
SSF	Service Switching Function
TMN	Telecommunications Management Network
UML	Unified Modelling Language
UMTS	Universal Mobile Telecommunications System
UTRAN	Universal Terrestrial Radio Access Network
VLR	Visitor Location Register

4   System overview

4.1   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 document:

- 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 information object classes, attributes and associations 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 recognized 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

The modelling approach is described in the Generic Network Resources IRP: NRM (3GPP TS 32.622 [16]).

It should be noted that this model allows for combined managed element functionality, where more than one 'function IOCs' (inherited from `ManagedFunction`) modelling more specific managed element functionality may be contained in the `ManagedElement` IOC.

6   Information Object Classes

6.1   Imported information entities and local labels

Label reference	Local label
TS 32.622 [16], information object class, `Link`	`Link`
TS 32.622 [16], information object class, `ManagedElement`	`ManagedElement`
TS 32.642 [22], information object class, `RncFunction`	`RncFunction`
TS 32.652 [23], information object class, `BssFunction`	`BssFunction`
TS 32.652 [23], information object class, `ExternalBssFunction`	`ExternalBssFunction`
TS 32.652 [23], information object class, `ExternalGsmCell`	`ExternalGsmCell`
TS 32.652 [23], information object class, `GsmCell`	`GsmCell`

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.

The figures below show the containment/naming hierarchy and the associations of the information object classes defined in the present document.

NOTE: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios in all figures.
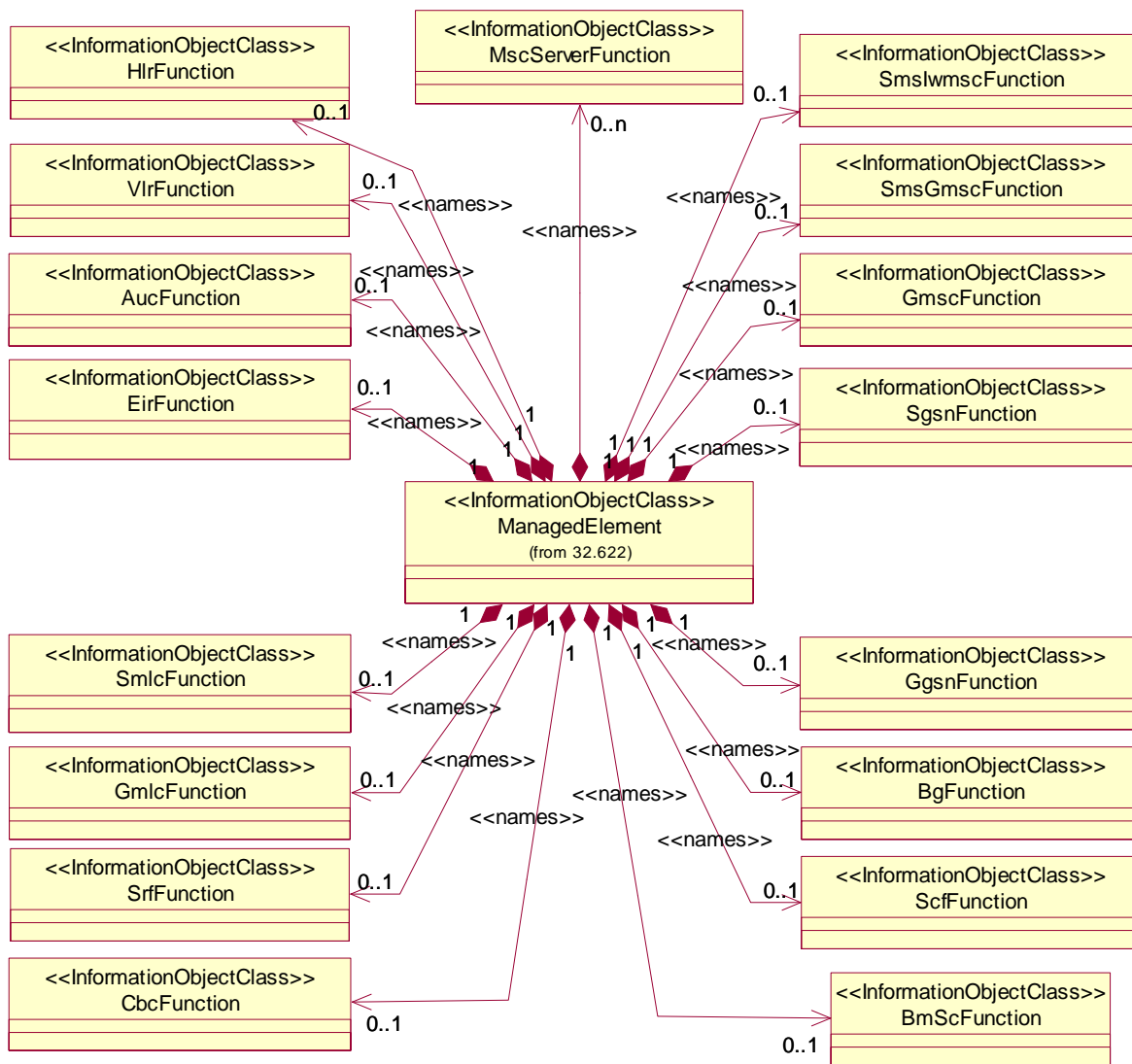
Figure 6.2.1.1: CN NRM Containment/Naming relationships 1
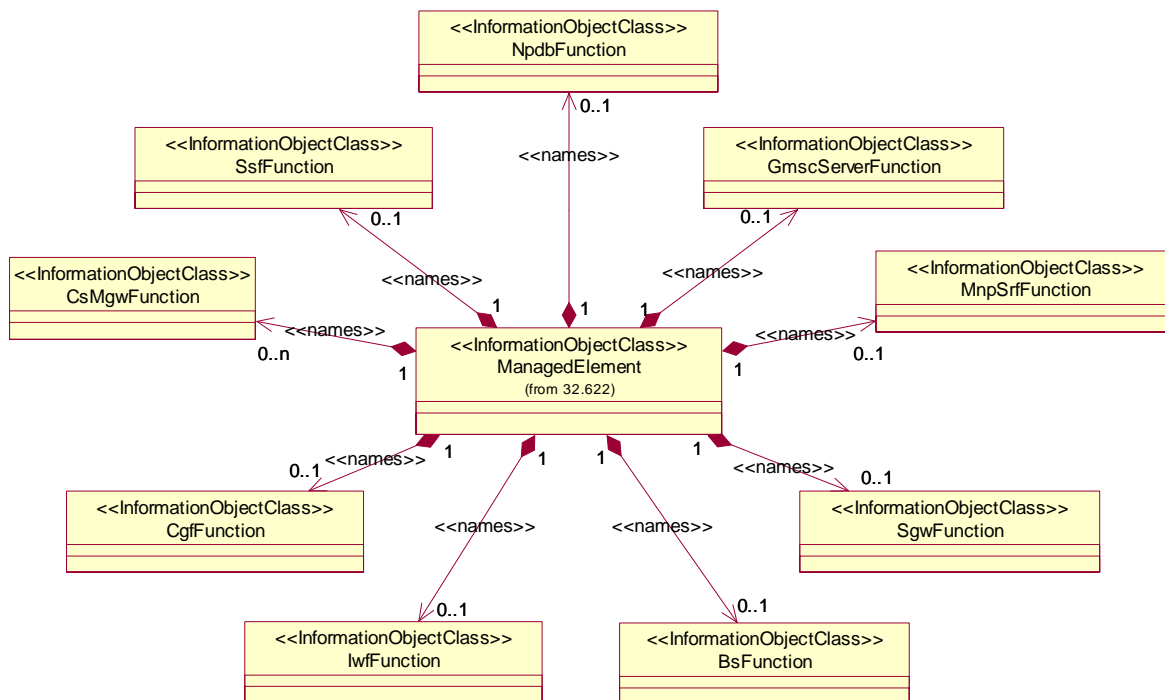
Figure 6.2.1.2: CN NRM Containment/Naming relationships 2

Figure 6.2.1.3: Void
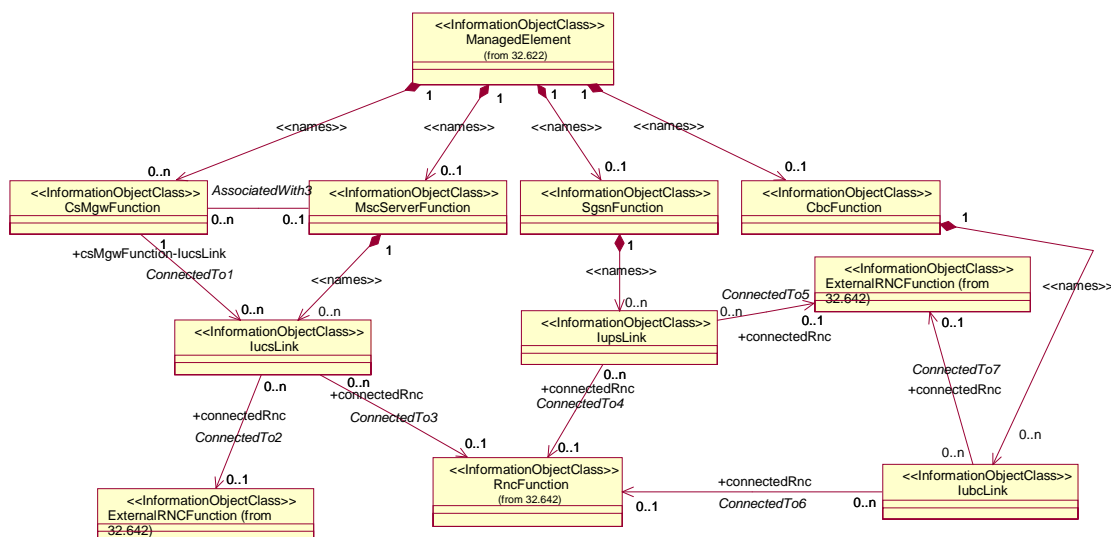
NOTE: The association between `MscServerFunction` and `CsMgwFunction` is optional and is only mandatory when they belong to different `ManagedElements`.

Figure 6.2.1.4: CN UTRAN NRM Containment/Naming and Association
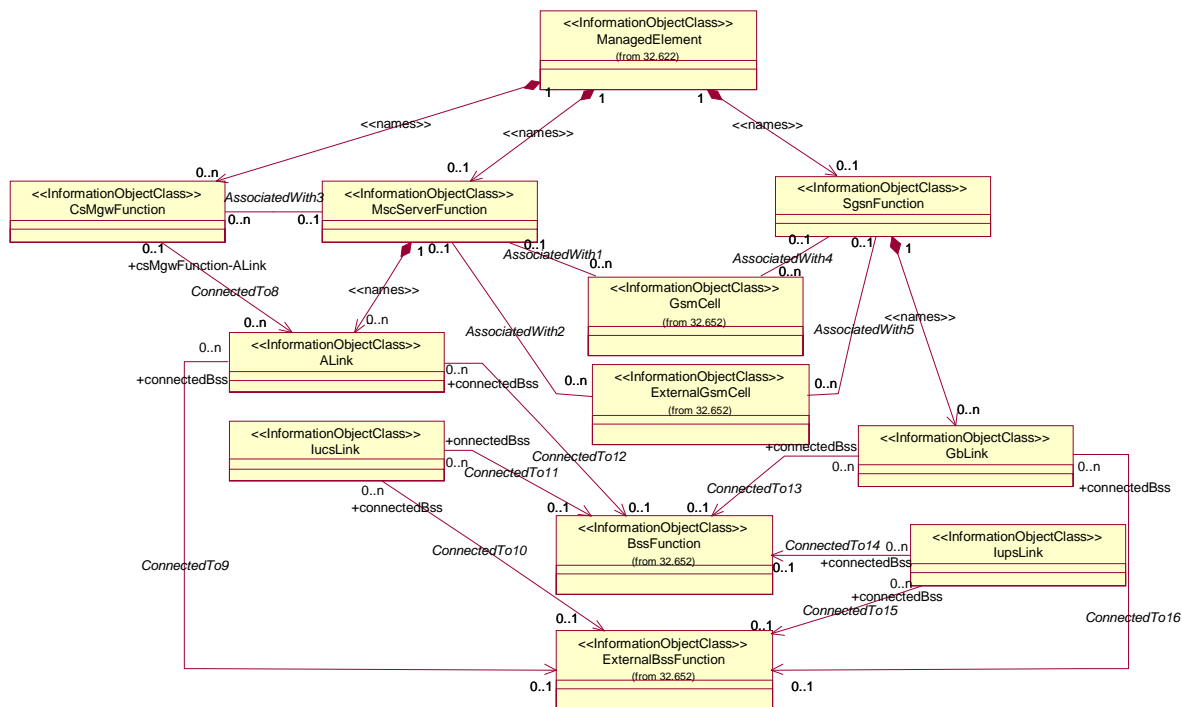
NOTE 1: The association between `MscServerFunction` and `CsMgwFunction` is optional and is only mandatory when they belong to different `ManagedElements`.

NOTE 2: The association between `MscServerFunction` and `GsmCell`, and `SgsnFunction` and `GsmCell` are optional. It may be valid if both the `MscServerFunction` and `GsmCell`, or `SgsnFunction` and `GsmCell` are managed by the same management node.

Figure 6.2.1.5: CN GERAN NRM Containment/Naming and Association

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 an IOC representing a cell could have a format like:

SubNetwork=Sweden, MeContext =MEC-Gbg-1, ManagedElement =MSC-Gbg-1,
  MscServerFunction=MSC-1.
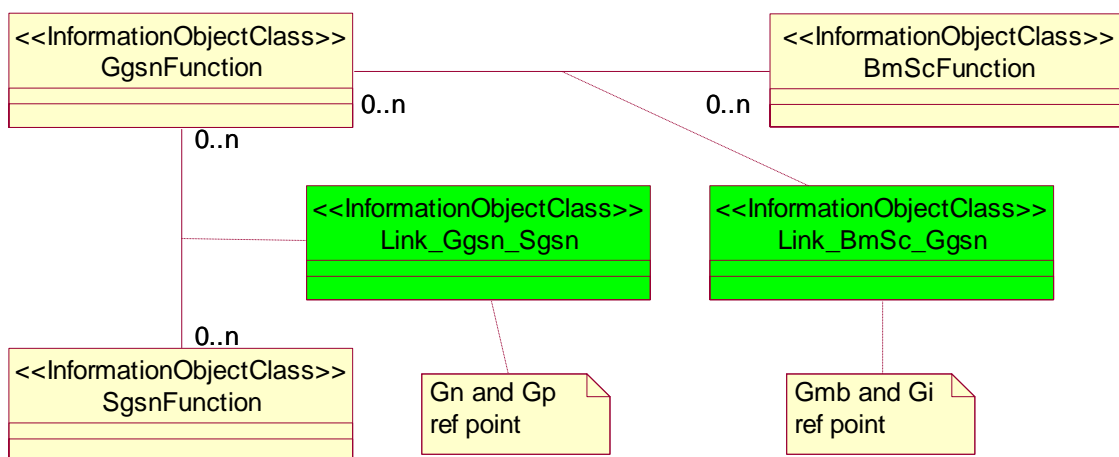
Figure 6.2.1.6: CN MBMS NRM Containment/Naming and Association

6.2.2   Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

The figures below show the inheritance hierarchy for the CN NRM.
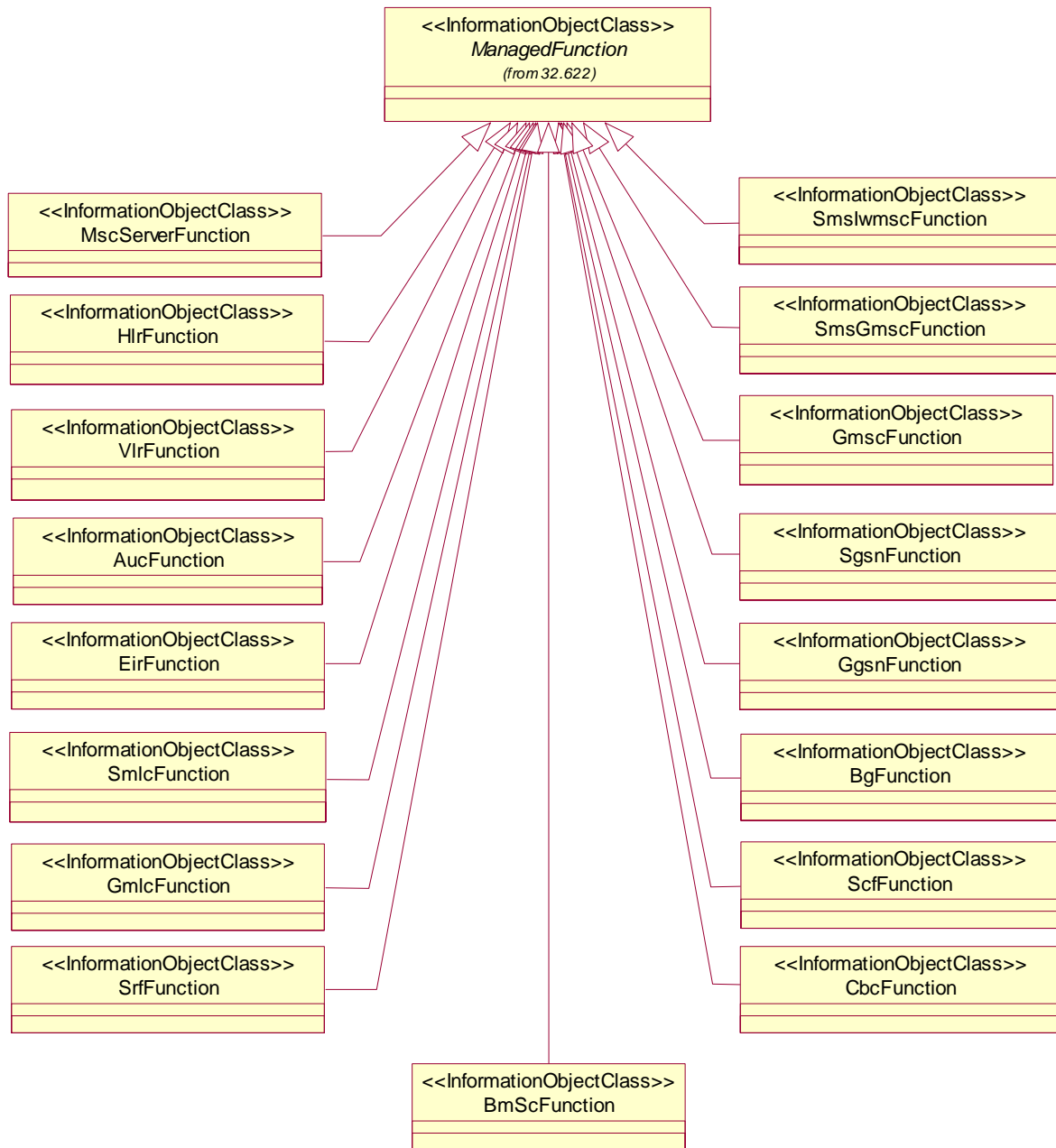
Figure 6.2.2.1: CN NRM Inheritance Hierarchy 1
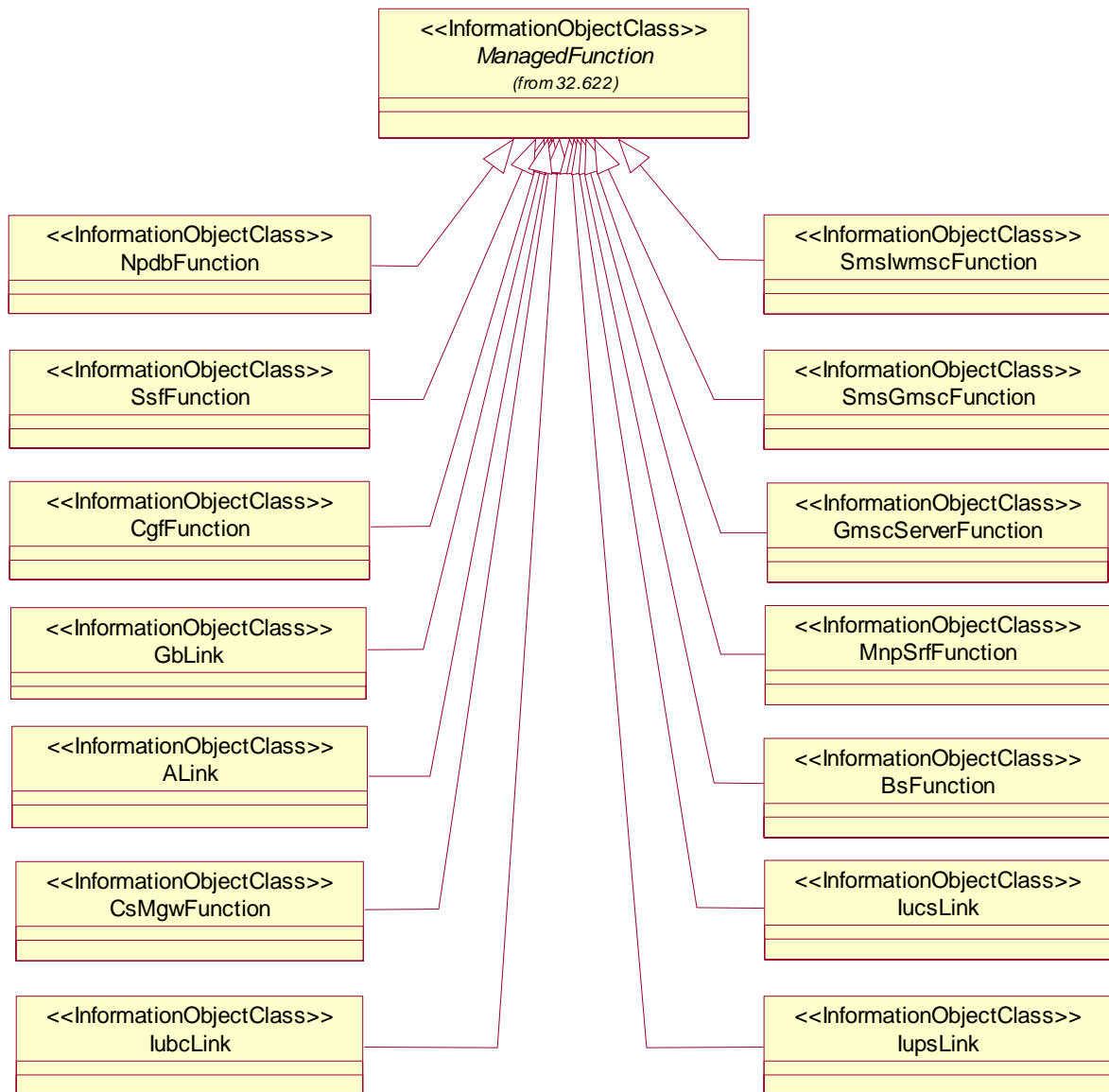
Figure 6.2.2.2: CN NRM Inheritance Hierarchy 2
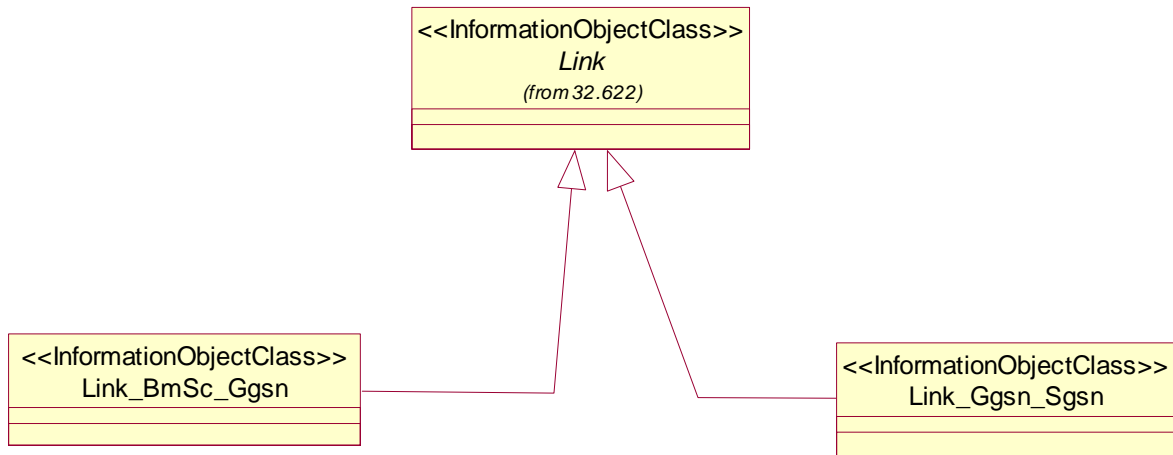
Figure 6.2.2.3: CN NRM Inheritance Hierarchy 3

6.3 Information object class definitions

6.3.1 `MscServerFunction`

6.3.1.1 Definition

This IOC represents MSCserver functionality. For more information about the MSC, see 3GPP TS 23.002 [15].

6.3.1.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
mscServerFunctionId	+	M	M	-
userLabel	+	M	M	M
mccList	+	M	M	M
mncList	+	M	M	M
lacList	+	M	M	M
sacList	+	M	M	M
gcaList	+	O	M	M
mscId	+	M	M	M
mscServerFunction-GsmCell	+	M	M	-
mscServerFunction-ExternalGsmCell	+	M	M	-
mscServerFunction-CsMgwFunction	+	M	M	-

6.3.2 `HlrFunction`

6.3.2.1 Definition

This IOC represents HLR functionality. For more information about the HLR, see 3GPP TS 23.002 [15].

6.3.2.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
hlrFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.3 `VlrFunction`

6.3.3.1 Definition

This IOC represents VLR functionality. For more information about the VLR, see 3GPP TS 23.002 [15].

6.3.3.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
vlrFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.4 `AucFunction`

6.3.4.1 Definition

This IOC represents AUC functionality. For more information about the AUC, see 3GPP TS 23.002 [15].

6.3.4.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
aucFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.5 EirFunction

6.3.5.1 Definition

This IOC represents EIR functionality. For more information about the EIR, see 3GPP TS 23.002 [15].

6.3.5.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
eirFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.6 SmsIwmscFunction

6.3.6.1 Definition

This IOC represents SMS-IWMSC functionality. For more information about the SMS-IWMSC, see 3GPP TS 23.002 [15].

6.3.6.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
smsIwmscFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.7 SmsGmscFunction

6.3.7.1 Definition

This IOC represents SMS-GMSC functionality. For more information about the SMS-GMSC, see 3GPP TS 23.002 [15].

6.3.7.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
smsGmscFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.8 GmscFunction

6.3.8.1 Definition

This IOC represents GMSC functionality. For more information about the GMSC, see 3GPP TS 23.002 [15].

6.3.8.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
gmscFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.9 SgsnFunction

6.3.9.1 Definitions

This IOC represents SGSN functionality. For more information about the SGSN, see 3GPP TS 23.002 [15].

6.3.9.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
sgsnFunctionId	+	M	M	-
userLabel	+	M	M	M
mccList	+	M	M	M
mncList	+	M	M	M
lacList	+	M	M	M
racList	+	M	M	M
sacList	+	M	M	M
sgsnId	+	M	M	M
sgsnFunction-GsmCell	+	M	M	-
sgsnFunction-ExternalGsmCell	+	M	M	-
proceduralStatus (Note)	%	O	-	-
Note: This proceduralStatus is not settable or readable via any Interface IRP except conveyed by notifyStateChange notifications.				

6.3.10 GgsnFunction

6.3.10.1 Definitions

This IOC represents GGSN functionality. For more information about the GGSN, see 3GPP TS 23.002 [15].

6.3.10.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
ggsnFunctionId	+	M	M	-
userLabel	+	M	M	M
proceduralStatus (Note)	%	O	-	-
Note: This proceduralStatus is not settable or readable via any Interface IRP except conveyed by notifyStateChange notifications.				

6.3.11 BgFunction

6.3.11.1 Definitions

This IOC represents BG functionality. For more information about the BG, see 3GPP TS 23.002 [15].

6.3.11.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
bgFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.12 SmlcFunction

6.3.12.1 Definitions

This IOC represents SMLC functionality. For more information about the SMLC, see 3GPP TS 23.002 [15].

6.3.12.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
smlcFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.13 GmlcFunction

6.3.13.1 Definitions

This IOC represents GMLC functionality. For more information about the GMLC, see 3GPP TS 23.002 [15].

6.3.13.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
gmlcFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.14 ScfFunction

6.3.14.1 Definitions

This IOC represents SCF functionality (also referred to as gsmSCF). For more information about the SCF, see 3GPP TS 23.002 [15].

6.3.14.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
scfFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.15 SrfFunction

6.3.15.1 Definitions

This IOC represents SRF functionality (also referred to as gsmSRF). For more information about the SRF, see 3GPP TS 23.002 [15].

6.3.15.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
srfFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.16 CbcFunction

6.3.16.1 Definitions

This IOC represents CBC functionality. For more information about the CBC, see 3GPP TS 23.002 [15].

6.3.16.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
cbcFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.17 CgfFunction

6.3.17.1 Definitions

This IOC represents CGF functionality. For more information about the CGF, see 3GPP TS 23.060 [18].

6.3.17.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
cgfFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.18 GmscServerFunction

6.3.18.1 Definitions

This IOC represents GMSCServer functionality. For more information about GMSCServer, see 3GPP TS 23.002 [15].

6.3.18.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
gmscServerFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.19 IwfFunction

6.3.19.1 Attributes

This IOC represents IWF functionality. For more information about IWF, see 3GPP TS 23.002 [15].

6.3.19.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
iwfFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.20 MnpSrfFunction

6.3.20.1 Definitions

This IOC represents MNP-SRF functionality (also known as FNR). For more information about MNP-SRF, see 3GPP TS 23.002 [15].

6.3.20.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
mnpSrfFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.21 NpdbFunction

6.3.21.1 Definitions

This IOC represents NPDB functionality. For more information about NPDB, see 3GPP TS 23.002 [15].

6.3.21.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
npdbFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.22 SgwFunction

6.3.22.1 Definitions

This IOC represents SGW functionality. For more information about SGW, see 3GPP TS 23.002 [15].

6.3.22.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
sgwFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.23 SsfFunction

6.3.23.1 Definitions

This IOC represents SSF functionality. For more information about SSF, see 3GPP TS 23.002 [15].

6.3.23.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
ssfFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.24 BsFunction

6.3.24.1 Definitions

This IOC represents BS functionality. For more information about BS, see 3GPP TS 23.060 [18].

6.3.24.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
bsFunctionId	+	M	M	-
userLabel	+	M	M	M

6.3.25 IucsLink

6.3.25.1 Definitions

This IOC represents an Iu-cs interface link connecting an MSCserver to the RNC or BSC. For more information about the Iu interface, see 3GPP TS 23.002 [15].

6.3.25.2 Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
iucslinkId	+	M	M	-
userLabel	+	M	M	M
connectedRnc	+	O	M	-
connectedBss	+	O	M	-

6.3.26.3 Attribute constraints

The optional attribute connectedRnc shall be supported when the Iucs interface is between the MSCServer node and an RNC node.

The optional attribute connectedBss shall be supported when the Iucs interface is between the MSCServer node and a BSC node.

The attributes connectedRnc and connectedBss are mutually exclusive.

6.3.26 IupsLink

6.3.26.1 Definitions

This IOC represents an Iu-ps interface link connecting a SGSN to the RNC or BSC. For more information about the Iu interface, see 3GPP TS 23.002 [15].

6.3.26.2   Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
iupslinkId	+	M	M	-
userLabel	+	M	M	M
connectedRnc	+	O	M	-
connectedBss	+	O	M	-

6.3.26.3   Attribute constraints

The optional attribute connectedRnc shall be supported when the Iups interface is between the SGSN node and an RNC node.

The optional attribute connectedBss shall be supported when the Iups interface is between the SGSN node and a BSC node.

The attributes connectedRnc and connectedBss are mutually exclusive.

6.3.27   IubcLink

6.3.27.1   Definitions

This IOC represents an Iu-bc interface link connecting a CBC to the RNC. For more information about the Iu interface, see 3GPP TS 23.002 [15].

6.3.27.2   Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
iubclinkId	+	M	M	-
userLabel	+	M	M	M
connectedRnc	+	M	M	-

6.3.28   ALink

6.3.28.1   Definitions

This IOC represents the A interface link connecting a MSC to the GERAN. For more information about the GERAN, see 3GPP TS 23.002 [15].

6.3.28.2   Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
aLinkId	+	M	M	-
userLabel	+	M	M	M
connectedBss	+	M	M	-

6.3.29   GbLink

6.3.29.1   Definitions

This IOC represents the Gb interface link connecting a SGSN to the GERAN. For more information about the GERAN, see 3GPP TS 23.002 [15].

6.3.29.2   Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
gbLinkId	+	M	M	-
userLabel	+	M	M	M
connectedBss	+	M	M	-

6.3.30   CsMgwFunction

6.3.30.1   Definitions

This IOC represents CS-MGW functionality. For more information about CS-MGW, see 3GPP TS 23.002 [15].

6.3.30.2   Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
csMgwFunctionId	+	M	M	-
userLabel	+	M	M	M
csMgwFunction-MscServerFunction	+	M	M	-
csMgwFunction-IucsLink	+	M	M	-
csMgwFunction-ALink	+	M	M	-

6.3.31   Void

6.3.32   Void

6.3.33   Void

6.3.34   Void

6.3.35   BmScFunction

6.3.30.1   Definitions

This IOC represents BM-SC functionality. For more information about BM-SC see 3GPP TS 23.002 [15].

6.3.30.2   Attributes

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
bmScFunctionId	+	M	M	-

6.3.36   Link_BmSc_Ggsn

6.3.36.1   Definition

This IOC models the Gmb and Gi reference points as defined in TS 23.002 [8].

6.3.37   Link_Ggsn_Sgsn

6.3.37.1   Definition

This IOC models the Gn and Gp reference points as defined in TS 23.002 [8].

6.4 Information relationship definitions

6.4.1 `AssociatedWith1` (M)

6.4.1.1 Definition

This represents a bi-directional relation between the `MscServerFunction` and `GsmCell`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

6.4.1.2 Roles

Table 6.4.1: Roles of the relation `AssociatedWith1`

Name	Definition
`mscServerFunction-GsmCell`	This role (when present) represents `MscServerFunction` capability to identify the set of related `GsmCell`. The `mscServerFunction-GsmCell` shall carry the set of `GsmCell` DN(s).
`gsmCell-MscServerFunction`	This role (when present) represents `GsmCell` capability to identify one related `MscServerFunction`. When the role is absent, the `gsmCell-MscServerFunction` shall contain no information. When it is present, it shall contain one `MscServerFunction` DN.

6.4.1.3 Constraints

Name	Definition
–	-

6.4.2 `AssociatedWith2` (M)

6.4.2.1 Definition

This represents a bi-directional relation between the `MscServerFunction` and `ExternalGsmCell`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

6.4.2.2 Roles

Table 6.4.2: Roles of the relation `AssociatedWith2`

Name	Definition
`mscServerFunction-ExternalGsmCell`	This role (when present) represents `MscServerFunction` capability to identify the set of related `ExternalGsmCell`. The `mscServerFunction-ExternalGsmCell` shall carry the set of `ExternalGsmCell` DN(s).
`externalGsmCell-MscServerFunction`	This role (when present) represents `ExternalGsmCell` capability to identify one related `MscServerFunction`. When the role is absent, the `externalGsmCell-MscServerFunction` shall contain no information. When it is present, it shall contain one `MscServerFunction` DN.

6.4.2.3 Constraints

Name	Definition
-	-

6.4.3 `AssociatedWith3` (M)

6.4.3.1 Definition

This represents a bi-directional relation between the `MscServerFunction` and `CsMgwFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

6.4.3.2 Roles

Table 6.4.3: Roles of the relation `AssociatedWith3`

Name	Definition
`mscServerFunction-CsMgwFunction`	This role (when present) represents `MscServerFunction` capability to identify the related `CsMgwFunction`(s). The `mscServerFunction-CsMgwFunction` shall carry the `CsMgwFunction` DN(s).
`csMgwFunction-MscServerFunction`	This role (when present) represents `CsMgwFunction` capability to identify one related `MscServerFunction`. When the role is absent, the `csMgwFunction-MscServerFunction` shall contain no information. When it is present, it shall contain one `MscServerFunction` DN.

6.4.3.3 Constraints

Name	Definition
-	-

6.4.4 `AssociatedWith4` (M)

6.4.4.1 Definition

This represents a bi-directional relation between the `SgsnFunction` and `GsmCell`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

6.4.4.2 Roles

Table 6.4.4: Roles of the relation `AssociatedWith4`

Name	Definition
`sgsnFunction-GsmCell`	This role (when present) represents `SgsnFunction` capability to identify the set of related `GsmCells`. The `sgsnFunction-GsmCell` shall carry the set of `GsmCell` DN(s).
`gsmCell-SgsnFunction`	This role (when present) represents `GsmCell` capability to identify one related `SgsnFunction`. When the role is absent, the `gsmCell-SgsnFunction` shall contain no information. When it is present, it shall contain one `SgsnFunction` DN.

6.4.4.3 Constraints

Name	Definition
-	-

6.4.5 `AssociatedWith5` (M)

6.4.5.1 Definition

This represents a bi-directional relation between the `SgsnFunction` and `ExternalGsmCell`.

The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

6.4.5.2 Roles

Table 6.4.5: Roles of the relation `AssociatedWith5`

Name	Definition
sgsnFunction-ExternalGsmCell	This role (when present) represents `SgsnFunction` capability to identify the set of related `ExternalGsmCell`. The sgsnFunction-ExternalGsmCell shall carry the set of `ExternalGsmCell` DN(s).
externalGsmCell-SgsnFunction	This role (when present) represents `ExternalGsmCell` capability to identify one related `SgsnFunction`. When the role is absent, the externalGsmCell-SgsnFunction shall contain no information. When it is present, it shall contain one `SgsnFunction` DN.

6.4.5.3 Constraints

Name	Definition
-	-

6.4.6 `ConnectedTo1` (M)

6.4.6.1 Definition

This represents a uni-directional relation between the `CsMgwFunction` and `IucsLink`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.6.2 Roles

Table 6.4.6: Roles of the relation `ConnectedTo1`

Name	Definition
csMgwFunction-IucsLink	This role (when present) represents `CsMgwFunction` capability to identify the set of connected `IucsLinks`. When the role is present, the csMgwFunction-IucsLink shall carry the set of `IucsLink` DN(s).

6.4.6.3 Constraints

Name	Definition
-	-

6.4.7 `ConnectedTo2` (M)

6.4.7.1 Definition

This represents a uni-directional relation between the `IucsLink` and `ExternalRncFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.7.2 Roles

Table 6.4.7: Roles of the relation `ConnectedTo2`

Name	Definition
connectedRnc	This role (when present) represents IOC `IucsLink` capability to identify one connected `ExternalRncFunction`. When present, it shall contain one `ExternalRncFunction` DN.

6.4.7.3 Constraints

Name	Definition
–	-

6.4.8 `ConnectedTo3` (M)

6.4.8.1 Definition

This represents a uni-directional relation between the `IucsLink` and `RncFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.8.2 Roles

Table 6.4.8: Roles of the relation `ConnectedTo3`

Name	Definition
connectedRnc	This role (when present) represents IOC `IucsLink` capability to identify one connected `RncFunction`. When present, it shall contain one `RncFunction` DN.

6.4.8.3 Constraints

Name	Definition
–	-

6.4.9 `ConnectedTo4` (M)

6.4.9.1 Definition

This represents a uni-directional relation between the `IupsLink` and `RncFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.9.2 Roles

Table 6.4.9: Roles of the relation `ConnectedTo4`

Name	Definition
connectedRnc	This role (when present) represents IOC `IupsLink` capability to identify one connected `RncFunction`. When present, it shall contain one `RncFunction` DN.

6.4.9.3 Constraints

Name	Definition
-	-

6.4.10 `ConnectedTo5` (M)

6.4.10.1 Definition

This represents a uni-directional relation between the `IupsLink` and `ExternalRncFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.10.2 Roles

Table 6.4.10: Roles of the relation `ConnectedTo5`

Name	Definition
connectedRnc	This role (when present) represents IOC `IupsLink` capability to identify one connected `ExternalRncFunction`. When present, it shall contain one `ExternalRncFunction` DN.

6.4.10.3 Constraints

Name	Definition
-	-

6.4.11 `ConnectedTo6` (M)

6.4.11.1 Definition

This represents a uni-directional relation between the `IubcLink` and `RncFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.11.2 Roles

Table 6.4.11: Roles of the relation `ConnectedTo6`

Name	Definition
connectedRnc	This role (when present) represents IOC `IubcLink` capability to identify one connected `RncFunction`. When present, it shall contain one `RncFunction` DN.

6.4.11.3 Constraints

Name	Definition
-	-

6.4.12 `ConnectedTo7` (M)

6.4.12.1 Definition

This represents a uni-directional relation between the `IubcLink` and `ExternalRncFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.12.2 Roles

Table 6.4.12: Roles of the relation `ConnectedTo7`

Name	Definition
connectedRnc	This role (when present) represents IOC `IubcLink` capability to identify one connected `ExternalRncFunction`. When present, it shall contain one `ExternalRncFunction` DN.

6.4.12.3 Constraints

Name	Definition
-	-

6.4.13 `ConnectedTo8` (M)

6.4.13.1 Definition

This represents a uni-directional relation between the `CsMgwFunction` and `ALink`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.13.2 Roles

Table 6.4.13: Roles of the relation `ConnectedTo8`

Name	Definition
csMgwFunction -ALink	This role (when present) represents `CsMgwFunction` capability to identify the set of connected `ALinks`. When the role is present, the `csMgwFunction-ALink` shall carry the set of `ALink` DN(s).

6.4.13.3 Constraints

Name	Definition
-	-

6.4.14 `ConnectedTo9` (M)

6.4.14.1 Definition

This represents a uni-directional relation between the `ALink` and `ExternalBssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.14.2 Roles

Table 6.4.14: Roles of the relation `ConnectedTo9`

Name	Definition
connectedBss	This role (when present) represents IOC `ALink` capability to identify one connected `ExternalBssFunction`. When present, it shall contain one `ExternalBssFunction` DN.

6.4.14.3 Constraints

Name	Definition
-	-

6.4.15 `ConnectedTo10` (M)

6.4.15.1 Definition

This represents a uni-directional relation between the `Iucslink` and `ExternalBssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.15.2 Roles

Table 6.4.15: Roles of the relation `ConnectedTo10`

Name	Definition
connectedBss	This role (when present) represents IOC `Iucslink` capability to identify one connected `ExternalBssFunction`. When present, it shall contain one `ExternalBssFunction` DN.

6.4.15.3 Constraints

Name	Definition
-	-

6.4.16 `ConnectedTo11` (M)

6.4.16.1 Definition

This represents a uni-directional relation between the `Iucslink` and `BssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.16.2 Roles

Table 6.4.16: Roles of the relation `ConnectedTo11`

Name	Definition
connectedBss	This role (when present) represents IOC `Iucslink` capability to identify one connected `BssFunction`. When present, it shall contain one `BssFunction` DN.

6.4.16.3 Constraints

Name	Definition
-	-

6.4.17 `ConnectedTo12` (M)

6.4.17.1 Definition

This represents a uni-directional relation between the `ALink` and `BssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.17.2 Roles

Table 6.4.17: Roles of the relation `ConnectedTo12`

Name	Definition
`connectedBss`	This role (when present) represents IOC `ALink` capability to identify one connected `BssFunction`. When present, it shall contain one `BssFunction` DN.

6.4.17.3 Constraints

Name	Definition
-	-

6.4.18 `ConnectedTo13` (M)

6.4.18.1 Definition

This represents a uni-directional relation between the `GbLink` and `BssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.18.2 Roles

Table 6.4.18: Roles of the relation `ConnectedTo13`

Name	Definition
`connectedBss`	This role (when present) represents IOC `GbLink` capability to identify one connected `BssFunction`. When present, it shall contain one `BssFunction` DN.

6.4.18.3 Constraints

Name	Definition
-	-

6.4.19 `ConnectedTo14` (M)

6.4.19.1 Definition

This represents a uni-directional relation between the `IupsLink` and `BssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.19.2   Roles

Table 6.4.19: Roles of the relation `ConnectedTo14`

Name	Definition
connectedBss	This role (when present) represents IOC `IupsLink` capability to identify one connected `BssFunction`. When present, it shall contain one `BssFunction` DN.

6.4.19.3   Constraints

Name	Definition
–	-

6.4.20   `ConnectedTo15` (M)

6.4.20.1   Definition

This represents a uni-directional relation between the `IupsLink` and `ExternalBssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.20.2   Roles

Table 6.4.20: Roles of the relation `ConnectedTo15`

Name	Definition
connectedBss	This role (when present) represents IOC `IupsLink` capability to identify one connected `ExternalBssFunction`. When present, it shall contain one `ExternalBssFunction` DN.

6.4.20.3   Constraints

Name	Definition
–	-

6.4.21   `ConnectedTo16` (M)

6.4.21.1   Definition

This represents a uni-directional relation between the `GbLink` and `ExternalBssFunction`.

The role of the relation shall be mapped to a reference attribute of the IOC.

6.4.21.2   Roles

Table 6.4.21: Roles of the relation `ConnectedTo16`

Name	Definition
connectedBss	This role (when present) represents IOC `GbLink` capability to identify one connected `ExternalBssFunction`. When present, it shall contain one `ExternalBssFunction` DN.

6.4.21.3 Constraints

Name	Definition
–	-

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
aucFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
bgFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
bmScFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
bsFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
cbcFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
cgfFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
csMgwFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
eirFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
gbLinkId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
gcaList	List of Group Call Area (Ref. 3GPP TS 23.003 [19]).	
ggsnFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
gmlcFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	

gmscFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
gmscServerFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
hlrFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
iubclinkId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
iucslinkId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
iupslinkId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
iwfFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
lacList	List of Location Area Codes (Ref. 3GPP TS 23.003 [19]).	
mccList	List of Mobile Country Codes, MCC (part of the PLMN Id, Ref. 3GPP TS 23.003 [19]).	
mncList	List of Mobile Network Codes, MNC (part of the PLMN Id, Ref. 3GPP TS 23.003 [19]).	
mnpSrfFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
mscId	Unique MSC ID (Ref. 3GPP TS 23.002 [15]).	
mscServerFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
npdbFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
objectClass	An attribute inherited from generic NRM link [16]	
objectInstance	An attribute inherited from generic NRM link [16]	
proceduralStatus	It indicates the procedural status of the object instance. This attribute provides a subset of capabilities of procedural status defined in [20]. There are two cases resulting in a status change to be reported: • Case 1: A notification may be generated to indicate that restart procedure is about to begin or has just begun but has not finished. - the value for this attribute indicates original state == "notInitialized" and new state == "initializing". • Case 2: A notification shall be generated to indicate that restart procedure has completed successfully - the value for this attribute indicates original state == "initializing" to new state == "" (empty set).	Subset of definitions from [20]: "notInitialized", "initializing", "" (empty set)
racList	List of Routeing Area Codes covered by MSC (Ref. 3GPP TS 23.003 [19]).	

sacList	List of Service Area Codes covered by MSC (Ref. 3GPP TS 23.003 [19]).	
scfFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
sgsnFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
sgsnId	Unique SGSN ID (Ref. 3GPP TS 23.002 [15]).	
sgwFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
smlcFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
smsGmscFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
smsIwmscFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
srfFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
ssfFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
userLabel	A user-friendly (and user assigned) name of the associated IOC. Inherited from ManagedFunction.	
vlrFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of the IOC. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	

6.5.2 Constraints

Name	Definition
–	-

6.6 Particular information configurations

Not applicable.

6.7 Common notifications

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [5])	
notifyAttributeValueChange	See Kernel CM IRP (3GPP TS 32.662 [3])	
notifyObjectCreation	See Kernel CM IRP (3GPP TS 32.662 [3])	
notifyObjectDeletion	See Kernel CM IRP (3GPP TS 32.662 [3])	

The notifications provided in the above table do not apply to the following IOCs*:* Link_Cscf_Hlr, Link_Hlr_Scscf etc. – i.e. all subclasses of Link.

Annex A (informative):
Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
Dec 2006	SA_34	SP-060731	0026	--	Move IMS part to new IMS NRM (32.732)	C	6.6.0	7.0.0
Jan 2007	--	--	--	--	Editorial: Re-inserted deleted Figure 6.2.1.3: Void to keep original numbering	--	7.0.0	7.0.1
Mar 2007	SA_35	SP-070047	0027	--	Removing links to IMS NRM	F	7.0.1	7.1.0
Jun 2007	SA_36	SP-070277	0029	--	Add the BmScFunction to the CN NRM - Needed for the TraceIRP	B	7.1.0	7.2.0

History

Document history		
V7.0.1	January 2007	Publication
V7.1.0	March 2007	Publication
V7.2.0	June 2007	Publication