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Contents

Foreword

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Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

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

28.701: "Core Network (CN) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements".

28.702: "Core Network (CN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

28.703: "Core Network (CN) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".

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 NRM 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 NRM IRP; Information Service. It reuses relevant parts of the generic NRM in 3GPP TS 28.622 [9], 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 32.602 [10]. 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]ITU-T Recommendation X.710 (1991): "Common management information service definition for CCITT applications".

[5] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point: Information Service (IS)".

[6] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[7] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[8] 3GPP TS 23.002: "Network architecture".

[9] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[10] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic Configuration Management Integration Reference Point (IRP): Information Service (IS)".

[11] 3GPP TS 23.060: "General Packet Radio Service (GPRS) service description; Stage 2".

[12] 3GPP TS 23.003: "Numbering, addressing and identification".

[13] 3GPP TS 28.625: "Telecommunication Management; State Management Data Definition Integration Reference Point (IRP): Information Service (IS)".

[14] 3GPP TS 28.652: "Telecommunication management; UTRAN Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[15] 3GPP TS 28.655: "Telecommunication management; GERAN Network Resource Model (NRM)Integration Reference Point (IRP); Information Service (IS)".

[16] ITU-T Rec. M.3100: "Generic Network Information Model" (7/95).

[17] 3GPP TS 28.672: "Telecommunication management; Home Node B Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[18] 3GPP TS 23.236: "Technical Specification Group Services and System Aspects; Intra-domain connection of Radio Access Network (RAN) nodes to multiple Core Network (CN) nodes".

[19] 3GPP TS 32.662: "Telecommunication management; Configuration Management (CM); Kernel CM; Information service (IS)".

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 [7] and the following apply:

Association: See definition in TS 28.622 [9].

Managed Element (ME): See definition in TS 28.622 [9].

Managed Object (MO): See definition in TS 28.622 [9].

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

Network Resource Model (NRM): See definition in TS 28.622 [9].

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 [6])
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
HNB GW	Home NodeB Gateway
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 [6])
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 Model

4.1 Imported information entities and local labels

Label reference	Local label
TS 28.622 [9], information object class, `Link`	`Link`
TS 28.622 [9], information object class, `ManagedElement`	`ManagedElement`
TS 28.622 [9], information object class, `ManagedFunction`	`ManagedFunction`
TS 28.622 [9], information object class, `VsDataContainer`	`VsDataContainer`
TS 28.652 [14], information object class, `RncFunction`	`RncFunction`
TS 28.655 [15], information object class, `BssFunction`	`BssFunction`
TS 28.655 [15], information object class, `ExternalBssFunction`	`ExternalBssFunction`
TS 28.655 [15], information object class, `ExternalGsmCell`	`ExternalGsmCell`
TS 28.655 [15], information object class, `GsmCell`	`GsmCell`
TS 28.625 [13], attribute, `proceduralStatus`	`proceduralStatus`

4.2 Class diagram

4.2.1 Relationships

This clause depicts the set of classes (e.g. IOCs) that encapsulates the information relevant for this IRP. This clause provides an overview of the relationships between relevant classes in UML. Subsequent clauses provide more detailed specification of various aspects of these classes.

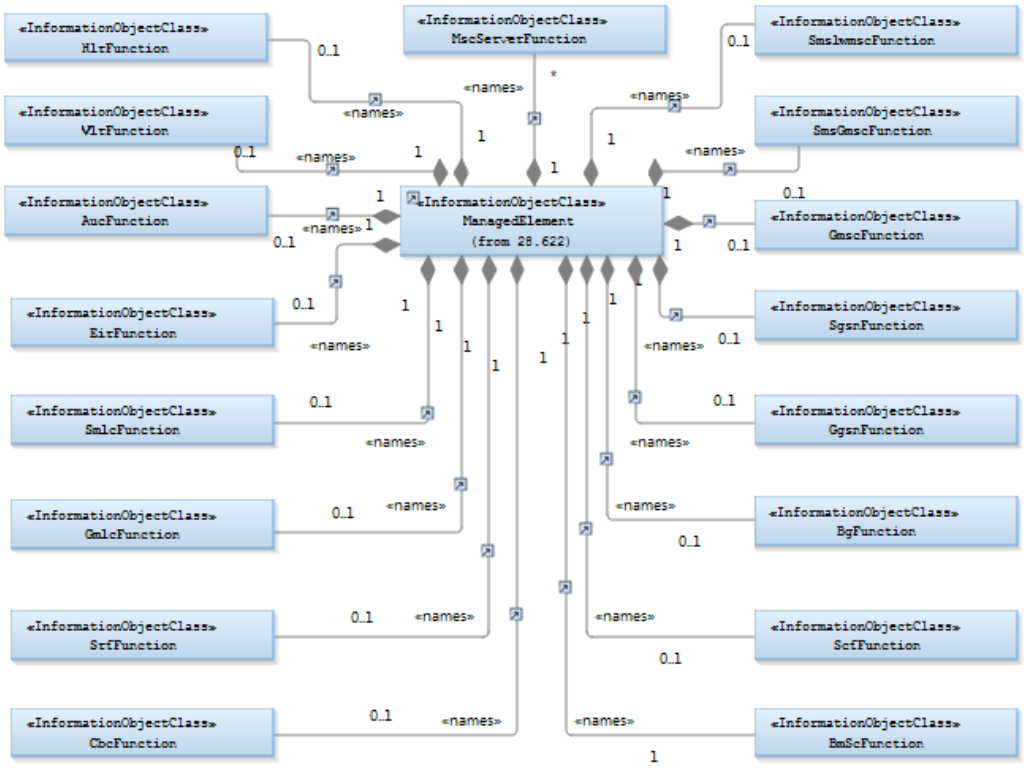


Figure 4.2.1.1: CN NRM Containment/Naming relationships 1

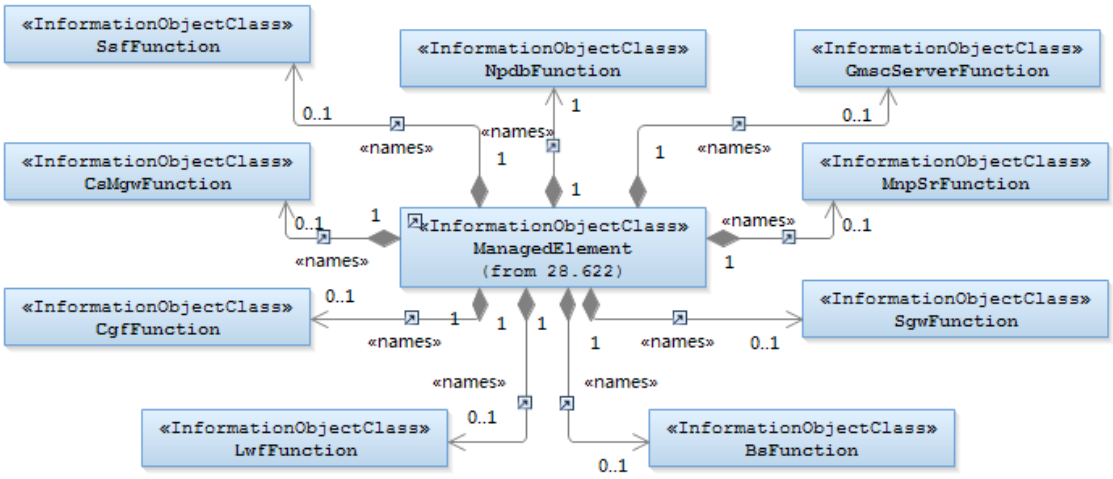
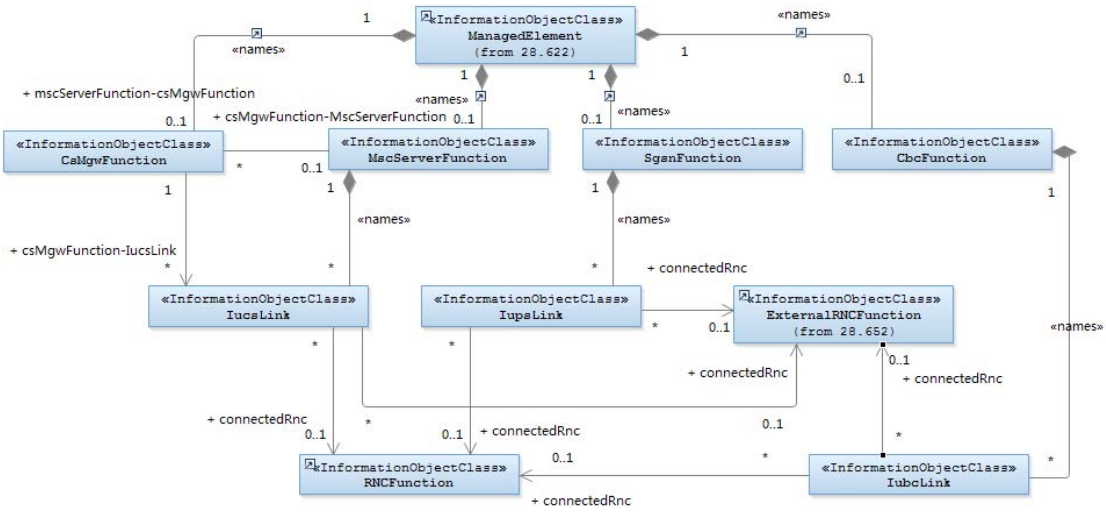
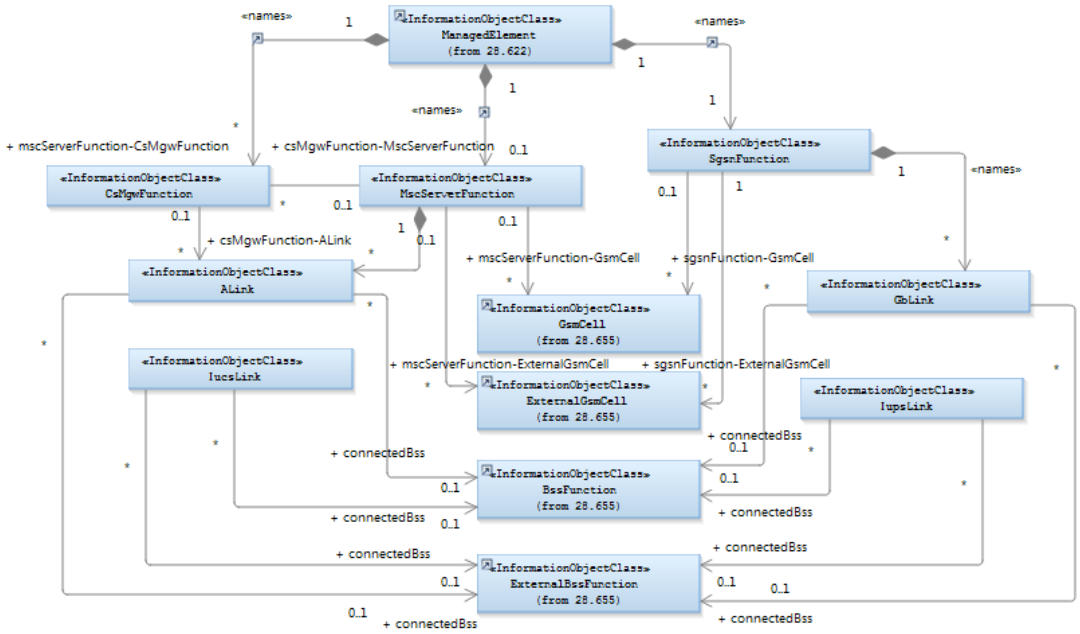


Figure 4.2.1.2: CN NRM Containment/Naming relationships 2



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

Figure 4.2.1.3: 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 4.2.1.4: CN GERAN NRM Containment/Naming and Association

Each IOC is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [6] 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`.

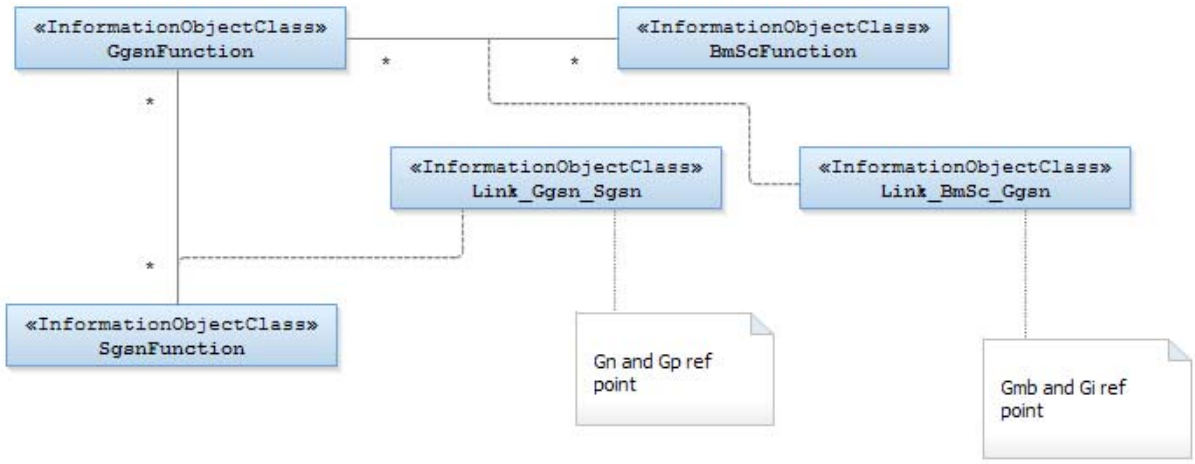


Figure 4.2.1.5: CN MBMS NRM Containment/Naming and Association

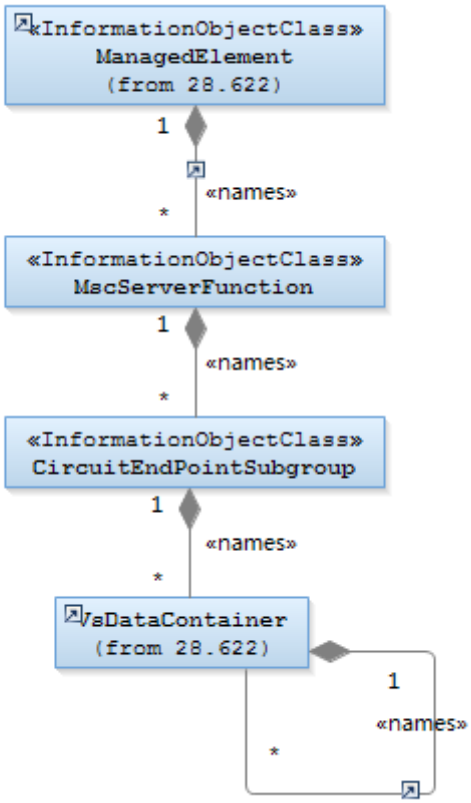


Figure 4.2.1.6: CN `CircuitEndPointSubgroup` related NRM Containment/Naming and Association

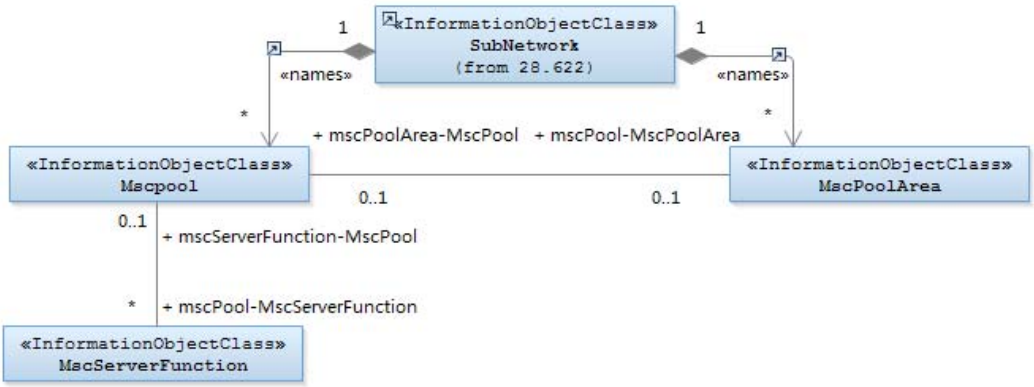


Figure 4.2.1.7: CN `MscPool` related NRM Containment/Naming and Association

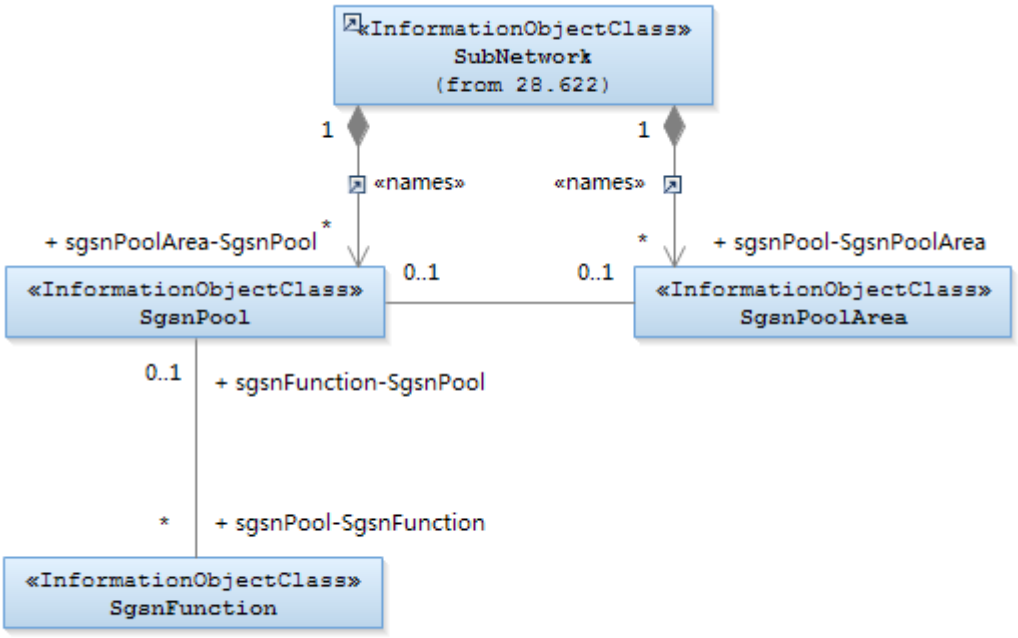


Figure 4.2.1.8: CN SgsnPool related NRM Containment/Naming and Association

4.2.2 Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

The figures below show the inheritance hierarchy for the CN NRM.

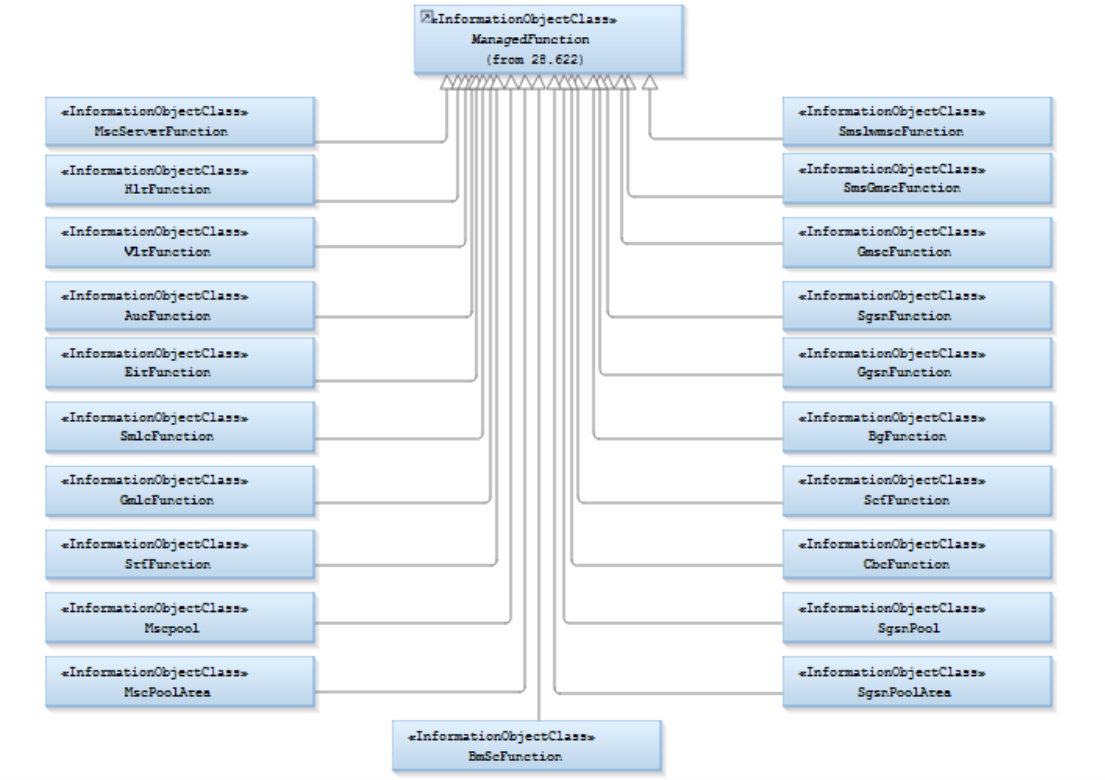


Figure 4.2.2.1: CN NRM Inheritance Hierarchy 1

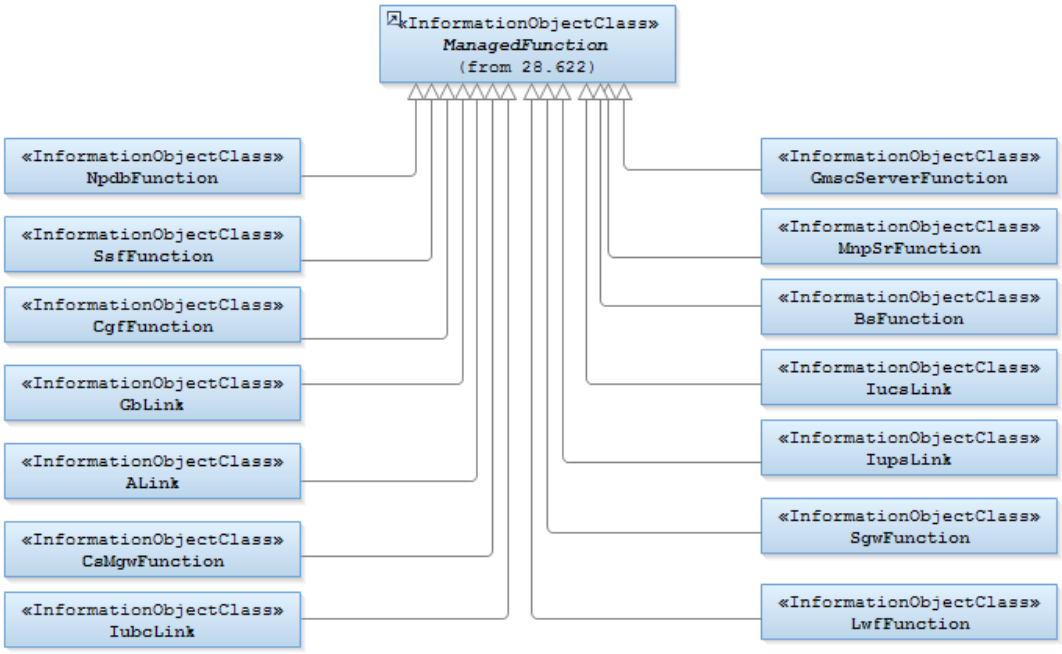


Figure 4.2.2.2: CN NRM Inheritance Hierarchy 2

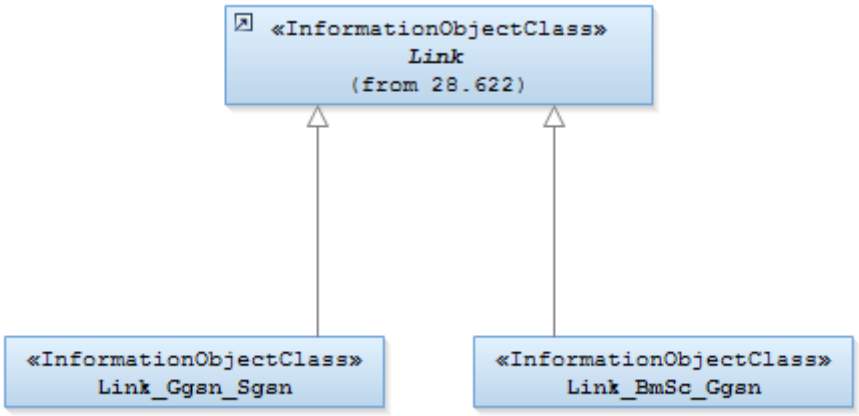


Figure 4.2.2.3: CN NRM Inheritance Hierarchy 3

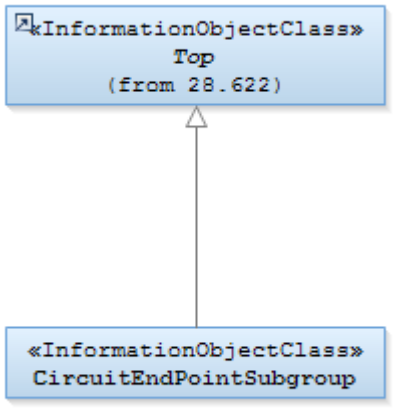


Figure 4.2.2.4: CN NRM Inheritance Hierarchy 4

4.3 Class definitions

4.3.1 MscServerFunction

4.3.1.1 Definitions

This IOC represents MSCserver functionality. For more information about the MSC, see 3GPP TS 23.002 [8].

4.3.1.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
mccList	M	M	M	-	M
mncList	M	M	M	-	M
lacList	M	M	M	-	M
sacList	M	M	M	-	M
gcaList	O	M	M	-	M
mscId	M	M	M	-	M
nriList	M	M	-	-	M
defaultMsc	O	M	-	-	M
Attribute related to role					
mscServerFunction-GsmCell	M	M	-	-	M
mscServerFunction-ExternalGsmCell	M	M	-	-	M
mscServerFunction-CsMgwFunction	M	M	-	-	M
mscServerFunction-MscPool	O	M	-	-	M

4.3.1.3 Attribute constraints

None.

4.3.1.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.2 HlrFunction

4.3.2.1 Definitions

This IOC represents HLR functionality. For more information about the HLR, see 3GPP TS 23.002 [8].

4.3.2.2 Attributes

None.

4.3.2.3 Attribute constraints

None.

4.3.2.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.3 VlrFunction

4.3.3.1 Definitions

This IOC represents VLR functionality. For more information about the VLR, see 3GPP TS 23.002 [8].

4.3.3.2 Attributes

None.

4.3.3.3 Attribute constraints

None.

4.3.3.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.4 AucFunction

4.3.4.1 Definitions

This IOC represents AUC functionality. For more information about the AUC, see 3GPP TS 23.002 [8].

4.3.4.2 Attributes

None.

4.3.4.3 Attribute constraints

None.

4.3.4.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.5 EirFunction

4.3.5.1 Definitions

This IOC represents EIR functionality. For more information about the EIR, see 3GPP TS 23.002 [8].

4.3.5.2 Attributes

None.

4.3.5.3 Attribute constraints

None.

4.3.5.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.6 SmsIwmscFunction

4.3.6.1 Definitions

This IOC represents SMS-IWMSC functionality. For more information about the SMS-IWMSC, see 3GPP TS 23.002 [8].

4.3.6.2 Attributes

None.

4.3.6.3 Attribute constraints

None.

4.3.1.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.7 SmsGmscFunction

4.3.7.1 Definitions

This IOC represents SMS-GMSC functionality. For more information about the SMS-GMSC, see 3GPP TS 23.002 [8].

4.3.7.2 Attributes

None.

4.3.7.3 Attribute constraints

None.

4.3.7.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.8 GmscFunction

4.3.8.1 Definitions

This IOC represents GMSC functionality. For more information about the GMSC, see 3GPP TS 23.002 [8].

4.3.8.2 Attributes

None.

4.3.8.3 Attribute constraints

None.

4.3.8.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.9 SgsnFunction

4.3.9.1 Definitions

This IOC represents SGSN functionality. For more information about the SGSN, see 3GPP TS 23.002 [8].

4.3.9.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
mccList	M	M	M	-	M
mncList	M	M	M	-	M
lacList	M	M	M	-	M
racList	M	M	M	-	M
sacList	M	M	M	-	M
sgsnId	M	M	M	-	M
proceduralStatus (see Note 1)	O	-	-	-	M (see Note 2)
nriList	M	M	-	-	M
Attribute related to role					
sgsnFunction-GsmCell	M	M	-	-	M
sgsnFunction-ExternalGsmCell	M	M	-	-	M
sgsnFunction-SgsnPool	O	M	-	-	M

Note 1: No state propagation shall be implied.
Note 2: The attribute value change is conveyed by the notifyStateChange notification.

4.3.9.3 Attribute constraints

None.

4.3.9.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC. In addition, the following set of notification, defined in 3GPP TS 32.662 [19], is also valid.

Name	Qualifier	Notes
notifyStateChange	O	

4.3.10 GgsnFunction

4.3.10.1 Definitions

This IOC represents GGSN functionality. For more information about the GGSN, see 3GPP TS 23.002 [8].

4.3.10.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
proceduralStatus (see Note 1)	O	-	-	-	M (see Note 2)

Note 1: No state propagation shall be implied.
Note 2: The attribute value change is conveyed by the notifyStateChange notification.

4.3.10.3 Attribute constraints

None.

4.3.10.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC. In addition, the following set of notification, defined in 3GPP TS 32.662 [19], is also valid.

Name	Qualifier	Notes
notifyStateChange	O	

4.3.11 BgFunction

4.3.11.1 Definitions

This IOC represents BG functionality. For more information about the BG, see 3GPP TS 23.002 [8].

4.3.11.2 Attributes

None.

4.3.11.3 Attribute constraints

None.

4.3.11.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.12 SmlcFunction

4.3.12.1 Definitions

This IOC represents SMLC functionality. For more information about the SMLC, see 3GPP TS 23.002 [8].

4.3.12.2 Attributes

None.

4.3.12.3 Attribute constraints

None.

4.3.12.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.13 GmlcFunction

4.3.13.1 Definitions

This IOC represents GMLC functionality. For more information about the GMLC, see 3GPP TS 23.002 [8].

4.3.13.2 Attributes

None.

4.3.13.3 Attribute constraints

None.

4.3.13.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.14 ScfFunction

4.3.14.1 Definitions

This IOC represents SCF functionality (also referred to as gsmSCF). For more information about the SCF, see 3GPP TS 23.002 [8].

4.3.14.2 Attributes

None.

4.3.14.3 Attribute constraints

None.

4.3.14.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.15 SrfFunction

4.3.15.1 Definitions

This IOC represents SRF functionality (also referred to as gsmSRF). For more information about the SRF, see 3GPP TS 23.002 [8].

4.3.15.2 Attributes

None.

4.3.15.3 Attribute constraints

None.

4.3.15.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.16 CbcFunction

4.3.16.1 Definitions

This IOC represents CBC functionality. For more information about the CBC, see 3GPP TS 23.002 [8].

4.3.16.2 Attributes

None.

4.3.16.3 Attribute constraints

None.

4.3.16.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.17 CgfFunction

4.3.17.1 Definitions

This IOC represents CGF functionality. For more information about the CGF, see 3GPP TS 23.060 [11].

4.3.17.2 Attributes

None.

4.3.17.3 Attribute constraints

None.

4.3.17.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.18 GmscServerFunction

4.3.18.1 Definitions

This IOC represents GMSCServer functionality. For more information about GMSCServer, see 3GPP TS 23.002 [8].

4.3.18.2 Attributes

None.

4.3.18.3 Attribute constraints

None.

4.3.18.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.19 IwfFunction

4.3.19.1 Definitions

This IOC represents IWF functionality. For more information about IWF, see 3GPP TS 23.002 [8].

4.3.19.2 Attributes

None.

4.3.19.3 Attribute constraints

None.

4.3.19.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.20 MnpSrfFunction

4.3.20.1 Definitions

This IOC represents MNP-SRF functionality (also known as FNR). For more information about MNP-SRF, see 3GPP TS 23.002 [8].

4.3.20.2 Attributes

None.

4.3.20.3 Attribute constraints

None.

4.3.20.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.21 NpdbFunction

4.3.21.1 Definitions

This IOC represents NPDB functionality. For more information about NPDB, see 3GPP TS 23.002 [8].

4.3.21.2 Attributes

None.

4.3.21.3 Attribute constraints

None.

4.3.21.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.22 SgwFunction

4.3.22.1 Definitions

This IOC represents SGW functionality. For more information about SGW, see 3GPP TS 23.002 [8].

4.3.22.2 Attributes

None.

4.3.22.3 Attribute constraints

None.

4.3.22.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.23 SsfFunction

4.3.23.1 Definitions

This IOC represents SSF functionality. For more information about SSF, see 3GPP TS 23.002 [8].

4.3.23.2 Attributes

None.

4.3.23.3 Attribute constraints

None.

4.3.23.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.24 BsFunction

4.3.24.1 Definitions

This IOC represents BS functionality. For more information about BS, see 3GPP TS 23.060 [11].

4.3.24.2 Attributes

None.

4.3.24.3 Attribute constraints

None.

4.3.24.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.25 IucsLink

4.3.25.1 Definitions

This IOC represents an Iu-cs interface link connecting an MSCserver to the RNC, BSC and HNB GW. For more information about the Iu interface, see 3GPP TS 23.002 [8].

4.3.25.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
connectedRnc	O	M	-	-	M
connectedBss	O	M	-	-	M
connectedHNBGW	O	M	-	-	M

4.3.25.3 Attribute constraints

Name	Definition
connectedRnc	shall be supported when the Iucs interface is between the MSCServer node and an RNC node
connectedBss	shall be supported when the Iucs interface is between the MSCServer node and a BSC node
connectedHNBGW	shall be supported when the Iucs interface is between the MSCServer node and a HNB GW node [17]

Note: The attributes connectedRnc, connectedBss and connectedHNBGW are mutually exclusive.

4.3.25.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.26 IupsLink

4.3.26.1 Definitions

This IOC represents an Iu-ps interface link connecting a SGSN to the RNC, BSC and HNB GW. For more information about the Iu interface, see 3GPP TS 23.002 [8].

4.3.26.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
connectedRnc	O	M	-	-	M
connectedBss	O	M	-	-	M
connectedHNBGW	O	M	-	-	M

4.3.26.3 Attribute constraints

Name	Definition
connectedRnc	shall be supported when the Iups interface is between the SGSN node and an RNC node
connectedBss	shall be supported when the Iups interface is between the SGSN node and a BSC node
connectedHNBGW	shall be supported when the Iups interface is between the SGSN node and a HNB GW node [17]

Note: The attributes connectedRnc, connectedBss and connectedHNBGW are mutually exclusive.

4.3.26.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.27 IubcLink

4.3.27.1 Definitions

This IOC represents an Iu-bc interface link connecting a CBC to the RNC and HNB GW. For more information about the Iu interface, see 3GPP TS 23.002 [8].

4.3.27.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
connectedRnc	O	M	-	-	M
connectedHNBGW	O	M	-	-	M

4.3.27.3 Attribute constraints

None.

4.3.27.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.28 ALink

4.3.28.1 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 [8].

4.3.28.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
connectedBss	O	M	-	-	M

4.3.28.3 Attribute constraints

None.

4.3.28.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.29 GbLink

4.3.29.1 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 [8].

4.3.29.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
connectedBss	O	M	-	-	M

4.3.29.3 Attribute constraints

None.

4.3.29.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.30 CsMgwFunction

4.3.30.1 Definitions

This IOC represents CS-MGW functionality. For more information about CS-MGW, see 3GPP TS 23.002 [8].

4.3.30.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
csMgwFunction-MscServerFunction	M	M	-	-	M
csMgwFunction-IucsLink	M	M	-	-	M
csMgwFunction-ALink	M	M	-	-	M

4.3.30.3 Attribute constraints

None.

4.3.30.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.31 BmScFunction

4.3.31.1 Definitions

This IOC represents BM-SC functionality. For more information about BM-SC see 3GPP TS 23.002 [8].

4.3.31.2 Attributes

None.

4.3.31.3 Attribute constraints

None.

4.3.31.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.32 Link_BmSc_Ggsn

4.3.32.1 Definitions

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

4.3.32.2 Attributes

None.

4.3.32.3 Attribute constraints

None.

4.3.32.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.33 Link_Ggsn_Sgsn

4.3.33.1 Definitions

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

4.3.33.2 Attributes

None.

4.3.33.3 Attribute constraints

None.

4.3.33.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.34 CircuitEndPointSubgroup

4.3.34.1 Definitions

This IOC represents the Circuit End Point Subgroup, relating to definitions in ITU-T M.3100 (see [16]). A Circuit End Point Subgroup is a set of circuit end points that directly interconnect one network element with another (e.g. MSC, BSC). It is derived from Top.

4.3.34.2 Attributes

None.

4.3.34.3 Attribute constraints

None.

4.3.34.4 Notifications

This IOC would not emit notification.

4.3.35 MscPool

4.3.35.1 Definitions

This IOC represents the MSC server pool. For more information about the MSC server pool, see 3GPP TS 23.002 [8]

4.3.35.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
mscPool-MscServerFunction	M	M	-	-	M
mscPool-MscPoolArea	M	M	-	-	M

4.3.35.3 Attribute constraints

None.

4.3.35.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.36 MscPoolArea

4.3.36.1 Definitions

concepts related to MSC Pool Area are:

- An MSC Pool Area is defined as an area within which an UE may be served without the need to change the serving MSC. It is a collection of complete Location Areas (LAs).
- A particular LA can be a member of one or more MSC Pool Areas. In the latter case, the MSC Pool Areas involved are called " overlapping MSC Pool Areas".

4.3.36.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
lacList	M	M	-	-	M
pLMNIdList	O	M	-	-	M
Attribute related to role					
mscPoolArea-MscPool	M	M	-	-	M

4.3.36.3 Attribute constraints

None.

4.3.36.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.37 SgsnPool

4.3.37.1 Definitions

This IOC represents the SGSN pool. For more information about the SGSN pool, see 3GPP TS 23.002 [8]

4.3.37.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
Attribute related to role					
sgsnPool-SgsnFunction	M	M	-	-	M
sgsnPool-SgsnPoolArea	M	M	-	-	M

4.3.37.3 Attribute constraints

None.

4.3.37.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.38 SgsnPoolArea

4.3.38.1 Definitions

This IOC represents SGSN Pool Area. For more information about the SGSN Pool Area, see 3GPP TS 23.002 [8]. Key concept related to SGSN Pool Area is:

An SGSN Pool Area is defined as an area within which an UE may be served without the need to change the serving SGSN. It is a collection of complete Routing Areas (RAs).

4.3.38.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
racList	M	M	-	-	M
pLMNIdList	O	M	-	-	M
Attribute related to role					
sgsnPoolArea-SgsnPool	M	M	-	-	M

4.3.38.3 Attribute constraints

None.

4.3.38.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.4 Attribute definitions

4.4.1 Attribute properties

The following table defines the properties of attributes that are specified in the present document.

Table 4.4.1: Attributes

Attribute Name	Documentation and Allowed Values	Properties
defaultMsc	Whether this MSC Server is default CN node in MscPool or not (Ref. 3GPP TS 23.236 [18]). A value of 0 represents that this MSC Server is not default CN node and a value of 1 represents that it is default CN node. allowedValues: 0..1	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
gcaList	List of Group Call Area (Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
lacList	List of Location Area Codes (Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
mccList	List of Mobile Country Codes, MCC (part of the PLMN Id, Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
mncList	List of Mobile Network Codes, MNC (part of the PLMN Id, Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
mscId	Unique MSC ID (Ref. 3GPP TS 23.002 [8]). allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
nriList	NRI shall be part of the TMSI. The NRI has a configurable length of 0 to 10 bits. (Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
pLMNIdList	It is a list of PLMN-Id, PLMN-Id= Mobile Country Codes (MCC)|| Mobile Network Codes(MNC) (Ref. 3GPP TS 23.003[12]) The MscPoolArea.pLMNIdList purpose is to identify the PLMNs (related to MscFunction) the Msc Pool is serving. The MscEunction.pLMNIdList purpose is as following. One operator may have several PLMN Ids and accordingly RAN broadcasts these Ids to enable UEs of different PLMN (i.e, UEs with different MNC in their IMSIs) to access its network. If CN node does not know this PLMN list, UEs of different PLMN than the one combined in Msc might be treated as UEs from other operators. This will affect Location Update and Inter-Msc handover procedures, and also the changing rate. allowedValues: A list of at most six entries of PLMN Identifiers. The PLMN Identifier is composed of a Mobile Country Code (MCC) and a Mobile Network Code (MNC).	type: Integer multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None allowedValues: N/A isNullable: True

proceduralStatus	See definition in 3GPP TS 28.625 [13] (State Management Data Definition IRP IS). 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 == "Not Initialized" and new state == "Initializing". • Case 2: A notification shall be generated to indicate that a restart procedure has completed successfully - the value for this attribute indicates original state == "Initializing" to new state == NULL (see [13]).	See 3GPP TS 28.625 [13].
racList	List of Routeing Area Codes covered by MSC (Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
sacList	List of Service Area Codes covered by MSC (Ref. 3GPP TS 23.003 [12]). allowedValues: N/A	type: String multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None allowedValues: N/A isNullable: True
sgsnId	Unique SGSN ID (Ref. 3GPP TS 23.002 [8]). allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
Attribute related to role		
mscServerFunction-GsmCell	This holds a set of DNs of GSMCell . allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
gsmCell-MscServerFunction	This holds the DN of an MscServerFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
mscServerFunction-ExternalGsmCell	This holds a set of DNs of ExternalGsmCell. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
externalGsmCell-MscServerFunction	This holds the DN of an MscServerFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
mscServerFunction-CsMgwFunction	This holds a set of DNs of CsMgwFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
csMgwFunction-MscServerFunction	This holds the DN of an MscServerFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

sgsnFunction-GsmCell	This holds a set of DNs of GSMCell . allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
gsmCell-SgsnFunction	This holds the DN of an SgsnFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
sgsnFunction-ExternalGsmCell	This holds a set of DNs of ExternalGsmCell. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
externalGsmCell-SgsnFunction	This holds the DN of an SgsnFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
csMgwFunction-IucsLink	This holds a set of DNs of IucsLink. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
connectedRnc	This holds the DN of an RncFunction or an ExternalRncFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
csMgwFunction-ALink	This holds a set of DNs of ALink. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
connectedBss	This holds the DN of an BssFunction or an ExternalBssFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
mscPool-MscServerFunction	This holds a set of DNs of MscServerFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
mscServerFunction-MscPool	This holds a set of DNs of MscPool. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
mscPool-MscPoolArea	This holds the DN of an MscPoolArea. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
mscPoolArea-MscPool	This holds the DN of an MscPool. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

sgsnPool-SgsnFunction	This holds the DN of an SgsnFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
sgsnFunction-SgsnPool	This holds the DN of an SgsnPool. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
sgsnPool-sgsnPoolArea	This holds the DN of an SgsnPoolArea. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
sgsnPoolArea-SgsnPool	This holds the DN of an SgsnPool. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

4.4.2 Constraints

None.

4.5 Common notifications

4.5.1 Alarm notifications

This clause presents a list of notifications, defined in [5], that IRPManager can receive. The notification header attribute `objectClass/objectInstance`, defined in [3], would capture the DN of an instance of an IOC defined in this IRP specification.

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])	

4.5.2 Configuration notifications

This clause presents a list of notifications, defined in [19], that IRPManager can receive. The notification header attribute `objectClass/objectInstance`, defined in [3], would capture the DN of an instance of an IOC defined in this IRP specification.

Name	Qualifier	Notes
`notifyAttributeValueChange`	See Kernel CM IRP (3GPP TS 32.662 [19])	
`notifyObjectCreation`	See Kernel CM IRP (3GPP TS 32.662 [19])	
`notifyObjectDeletion`	See Kernel CM IRP (3GPP TS 32.662 [19])	

Annex A (informative): Change history

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Cat**	**Old**	**New**
2013-03	SA#63	SP-140031	002	1	Correction of reference and attribute properties	F	11.0.0	11.1.0
2014-06	SA#64	SP-140360	003	-	remove the feature support statements	F	11.1.0	11.2.0
2014-09	SA#65	SP-140558	004	-	Correction of proceduralStatus attribute definitions	F	11.2.0	11.3.0
2014-10	-	-	-	-	Update to Rel-12 version (MCC)		11.3.0	**12.0.0**
2014-12	SA#66	SP-140797	006	2	Correct proceduralStatus definition	A	12.0.0	**12.1.0**
2016-01	-	-	-	-	Update to Rel-13 version (MCC)		12.1.0	**13.0.0**
2017-03	SA#75	-	-	-	Promotion to Release 14 without technical change		13.0.0	**14.0.0**

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2018-06						Update to Rel-15 version (MCC)	15.0.0

History

Document history		
V15.0.0	July 2018	Publication