Technical Specification Group Services and System Aspects
Meeting #17, Biarritz, France, 9-12 September 2002

TSGS#17(02)0496

Source: **SA5 (Telecom Management)**

Title: **Rel-5 CRs 32.652 (GERAN network resources Integration Reference Point (IRP): Network Resource Model)**

Document for: **Approval**

Agenda Item: **7.5.3**

Doc-1st-	Spec	CR	Rev	Phase	Subject	Cat	Version-	Doc-2nd-	Workitem
SP-020496	32.652	007	-	Rel-5	**Add State Management**	B	4.3.0	S5-026697	OAM-NIM
SP-020496	32.652	008	-	Rel-5	**Add new IRP IS methodology defined in 32.102.**	F	4.3.0	S5-026718	OAM-NIM

3GPP TSG-SA5 (Telecom Management) **S5-026697**
Meeting #30, Tampere, Finland, 19 – 23 August 2002

CR-Form-v5

CHANGE REQUEST

⌘ **32.652** **CR** **007** ⌘ **rev** **-** ⌘ Current version: 4.3.0 ⌘

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

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

Title:	⌘	Add State Management
Source:	⌘	S5
Work item code:	⌘	OAM-NIM
Date:	⌘	23/08/2002
Category:	⌘	**B**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	State Management shall be modelled within the Geran NRM.
Summary of change:	⌘	The operationalState attribute is added to the BtsSiteMgr.
Consequences if not approved:	⌘	State Management will not be modelled within the Geran NRM.

Clauses affected:	⌘	1, 2, 6.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

1 Scope

The present document is part of an Integration Reference Point (IRP) named “GERAN 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 GERAN resources. The “GERAN Network Resources IRP” comprises a set of specifications defining Requirements, a protocol neutral Network Resource Model (NRM) and corresponding Solution Set(s).

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

The Configuration Management (CM) area is very large. The intention is to split the specification of the related interfaces in several IRPs – as described in the Introduction clause above. An important aspect of such a split is that the Network Resource Models (NRMs) defined in different IRPs containing NRMs are consistent, and that NRMs supported by an IRPAgent implementation can be accessed as one coherent model through one IRP Information Service.

To summarize, the present document has following main purpose: to define the applied GERAN specific Network Resource Model, based on the generic NRM in [16].

~~Finally, i~~In order to access the information defined by this NRM, an IRP Information Service (IS) is needed, such as the Basic CM IRP: IS [17] or the Bulk CM IRP: IS [18]. However, which Information Service that is applicable is outside the scope of this document.

Finally, regarding the support of the State Management IRP: IS [19], all NRM’s of one release shall support the same State Management IRP version. This NRM specification is related to 3G TS 32.672 V5.0.X.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 32.101: "3G Telecom Management principles and high level requirements".

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

[3] 3GPP TS 24.008: "Core Network Protocols – Stage 3".

[4] 3GPP TS 44.018: "Radio Resource Control Protocol".

[5] 3GPP TS 45.008: "Radio subsystem link control".

[6] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".

[7] ITU-T Recommendation X.710 (1991): "Common Management Information Service Definition for CCITT Applications".

[8] 3GPP TS 23.003: "Numbering, addressing and identification".

[9] - [10] Void

[11] 3GPP TS 32.111-2: "Telecommunication Management; Fault Management; Part 2: Alarm Integration Reference Point; Information Service Version 1".

[12] Void

[13] 3GPP TS 32.300: "Name Convention for Managed Objects".

[14] 3GPP TS 32.600: "3G Configuration Management: Concepts and requirements".

[15] Void.

[16] 3GPP TS 32.622: "Generic Network Resources IRP: NRM".

[17] 3GPP TS 32.602: "Basic CM IRP: Information Service".

[18] 3GPP TS 32.612: "Bulk CM IRP: Information Service".

[19] 3GPP TS 32.672: “State Management IRP: Information Service”.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply. For terms and definitions not found here, please refer to 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.600 [14].

Association: In general it is used to model relationships between Managed Objects. Associations can be implemented in several ways, such as:

(1) name bindings,

(2) reference attributes, and

(3) association objects.

This IRP stipulates that containment associations shall be expressed through name bindings, but it does not stipulate the implementation for other types of associations as a general rule. These are specified as separate entities in the object models (UML diagrams). Currently (in Release 99) however, all (non-containment) associations are modelled by means of reference attributes of the participating MOs.

Managed Element (ME): An instance of the Managed Object Class ManagedElement, defined in [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. An MO class has attributes that provide information used to characterize the objects that belong to the class (the term “attribute” is taken from TMN and corresponds to a “property” according to CIM). Furthermore, an MO class can have operations that represent the behaviour relevant for that class (the term “operation” is taken from TMN and corresponds to a “method” according to CIM). An MO class may support notifications that provide information about an event occurrence within a network resource.

Management Information Base (MIB): A MIB is an instance of an NRM and has some values on the defined attributes and associations specific for that instance. In the context of the present document, an MIB consists of:

(1) a Name space (describing the MO containment hierarchy in the MIB through Distinguished Names),
(2) a number of Managed Objects with their attributes and
(3) a number of Associations between these MOs. Also note that TMN (ITU-T Recommendation X.710 [7]) defines a concept of a Management Information Tree (also known as a Naming Tree) that corresponds to the name space (containment hierarchy) portion of this MIB definition. Figure 3.1 depicts the relationships between a Name space and a number of participating MOs (the shown association is of a non-containment type)

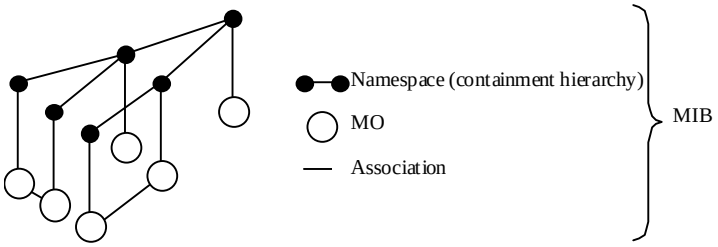


Figure 3.1: Relationships between a Name space and a number of participating MOs

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

Name space: A name space is a collection of names. The IRP name convention (see 3GPP TS 32.300 [13]) restricts the name space to a hierarchical containment structure, including its simplest form - the one-level, flat name space.
All Managed Objects in a MIB shall be included in the corresponding name space and the MIB/name space shall only support a strict hierarchical containment structure (with one root object). A Managed Object that contains another is said to be the superior (parent); the contained Managed Object is referred to as the subordinate (child). The parent of all MOs in a single name space is called a Local Root. The ultimate parent of all MOs of all managed systems is called the Global Root.

Network Resource Model (NRM): A model representing the actual managed telecommunications network resources that a System is providing through the subject IRP. An NRM describes Managed Object Classes, 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:

CIM	Common Information Model
CMIP	Common Management Information Protocol
CN	Core Network
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name (see 3GPP TS 32.300 [13])
EM	Element Manager
FM	Fault Management
GERAN	GSM-EDGE Radio Access Network
GPRS	General Packet Radio System
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Sector
Iub	Interface between RNC and Node B
ME	Managed Element
MIB	Management Information Base
MIM	Management Information Model
MO	Managed Object
MOC	Managed Object Class
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
PM	Performance Management
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [13])
RNC	Radio Network Controller
SS	Solution Set
TMN	Telecommunications Management Network
UML	Unified Modelling Language
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial Radio Access Network
XML	eXtensible Mark-up Language

4 System overview

4.1 System context

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

The IRPAgent implements and supports the Basic CM IRP. The IRPAgent can be an Element Manager (EM) or a mediator that interfaces one or more NEs (see Figure 4.1), or it can be a Network Element (NE) (see Figure 4.2). In the former case, the interfaces (represented by a thick dotted line) between the EM and the NEs are not subject of this IRP.

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

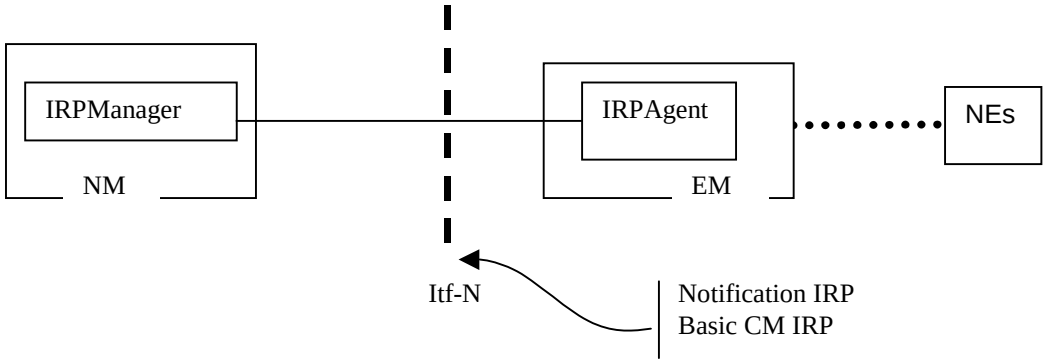


Figure 4.1: System Context A

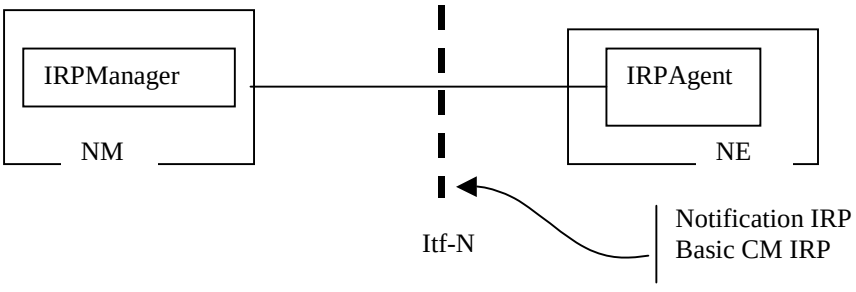


Figure 4.2: System Context B

4.2 Compliance rules

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

The following defines the meaning of Mandatory and Optional MOC attributes and associations between MOCs, in Solution Sets to the Basic CM IRP:

- The IRPManager shall support all mandatory attributes/associations. The IRPManager shall be prepared to receive information related to mandatory as well as optional attributes/associations without failure; however the IRPManager does not have to support handling of the optional attributes/associations.

- The IRPAgent shall support all mandatory attributes/associations. It may support optional attributes/associations.

An IRPAgent that incorporates vendor-specific extensions shall support normal communication with a 3GPP SA5-compliant IRPManager with respect to all Mandatory and Optional managed object classes, attributes, associations, operations, parameters and notifications without requiring the IRPManager to have any knowledge of the extensions.

Given that

- rules for vendor-specific extensions remain to be fully specified, and

- many scenarios under which IRPManager and IRPAgent interwork may exist,

it is recognised that in Release 4/5 the IRPManager, even though it is not required to have knowledge of vendor-specific extensions, may be required to be implemented with an awareness that extensions can exist and behave accordingly.

5 Modelling approach

The modelling approach adopted and used in this IRP is described in clause 5 of Generic Network Resources IRP: NRM [16].

6 IRP Information Model

6.1 Introduction

As already introduced in the previous clause, the present clause defines the GERAN Network Resources IRP: Network Resource Model That is, this model defines GERAN specific MOCs that shall be contained under the generic MOCs defined in [16].

The managed object classes in this NRM are protocol environment neutral and the model does not define the syntax or encoding of the operations and parameters.

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

The Information Service(s) to access managed objects of this NRM is defined elsewhere.

The corresponding Solution Set specifications provide protocol dependent definitions. They provide the actual realization of the operations and notifications defined in this subclause in each protocol environment. One may find that the class/attribute definitions in the protocol-neutral model differ from those defined in the Solution Sets (e.g. due to mappings to existing standard models that are applicable for a specific Solution Set).

6.2 Managed Object Class (MOC) diagrams

A general note regarding all the notification tables defined for each MOC below: Each MOC may potentially send the notifications listed in the notification table for the MOC. The notifications with qualifier (M) shall be supported by the MOC, and the notifications with qualifier (O) may be supported by the MOC.

For example: If Notification notifyObjectCreation defined in Basic CM IRP has the qualifier (M), then if a MOC is defined such that it emits such a notification, this notification shall be emitted when appropriate (i.e. when a new object is created). If Notification notifyChangedAlarm has the qualifier (O) in Alarm IRP (see 3GPP TS 32.111-2 [11]), then if a MOC is defined such that it emits such a notification, this notification may or may not be emitted when appropriate. Further, if a notification in the qualifier column (of the MOC notification tables) has a reference to another specification, it means that the qualifier for the notification is specified in the referred specification.

6.2.1 Inheritance hierarchy

Figure 6.1 shows the inheritance hierarchy for the GERAN NRM.

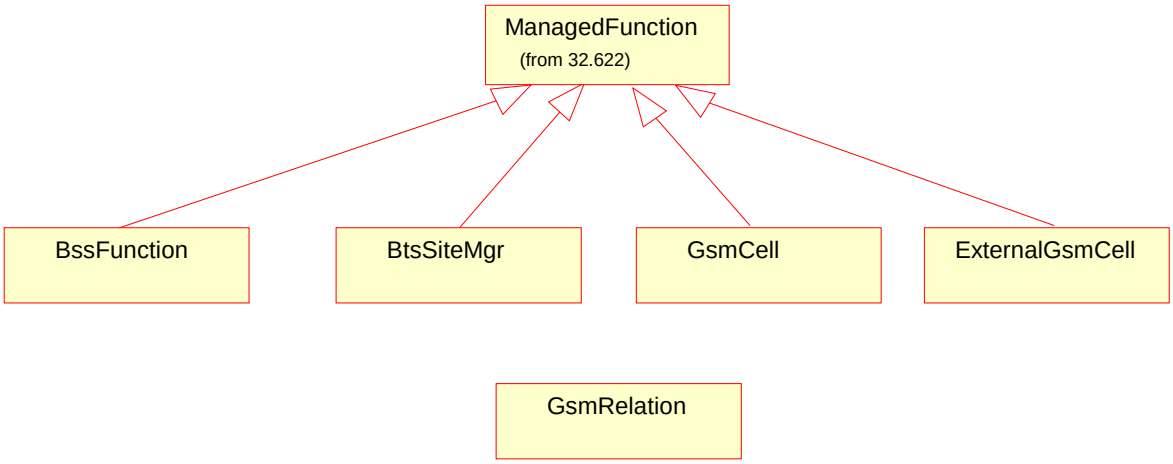
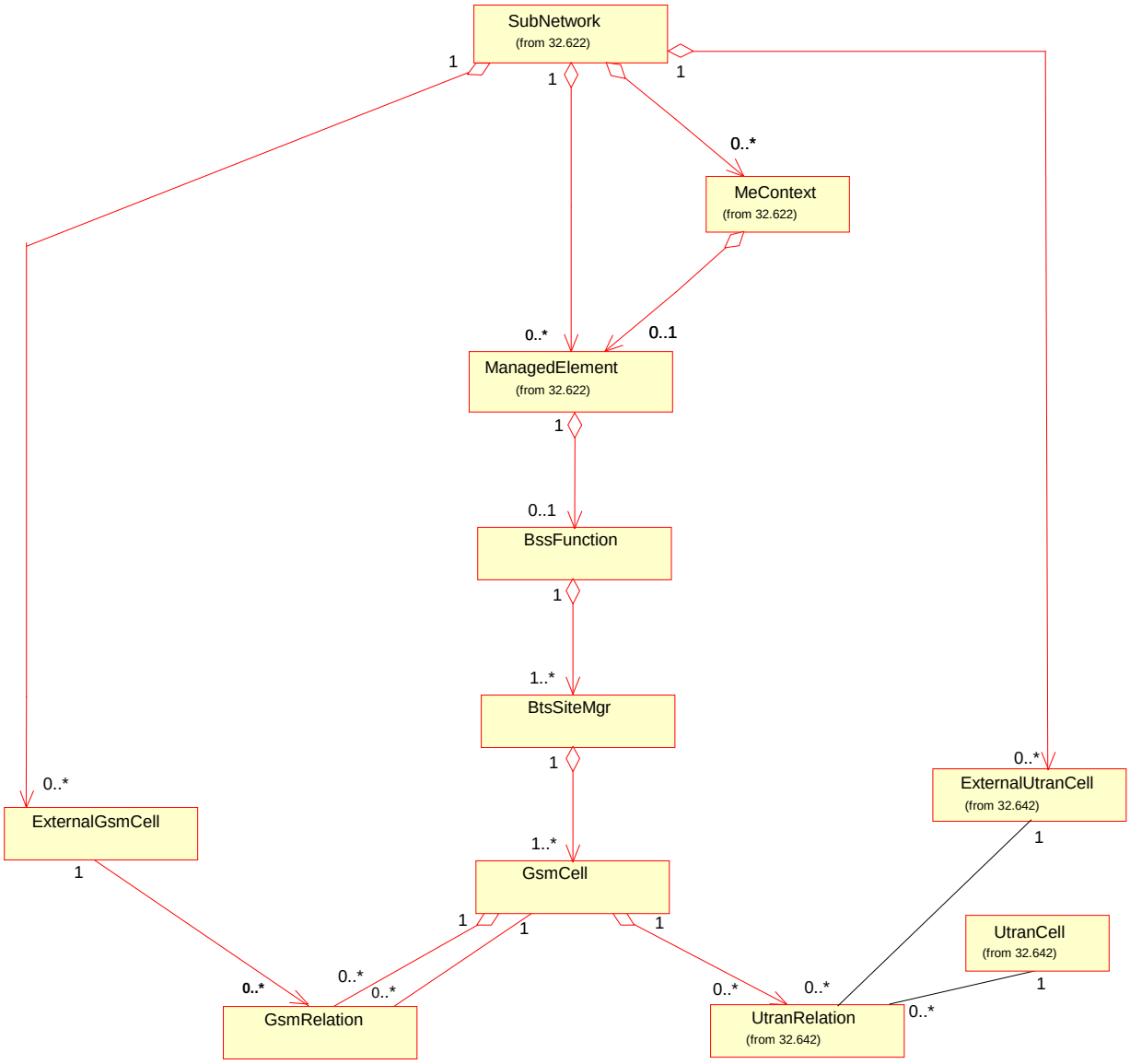


Figure 6.1: GERAN NRM Inheritance Hierarchy

6.2.2 Containment/Naming and Association diagrams

Figure 6.2 show the containment/naming hierarchy and the associations of the GERAN NRM.

NOTE: The Managed Object containment/naming relationships are in the diagram(s) below indicated by UML “Aggregation by reference” (“hollow diamonds”).



NOTE 1: ManagedElement may be contained in either a SubNetwork or an MeContext instance, or have no parent instance at all. See also [16].

NOTE 2: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.

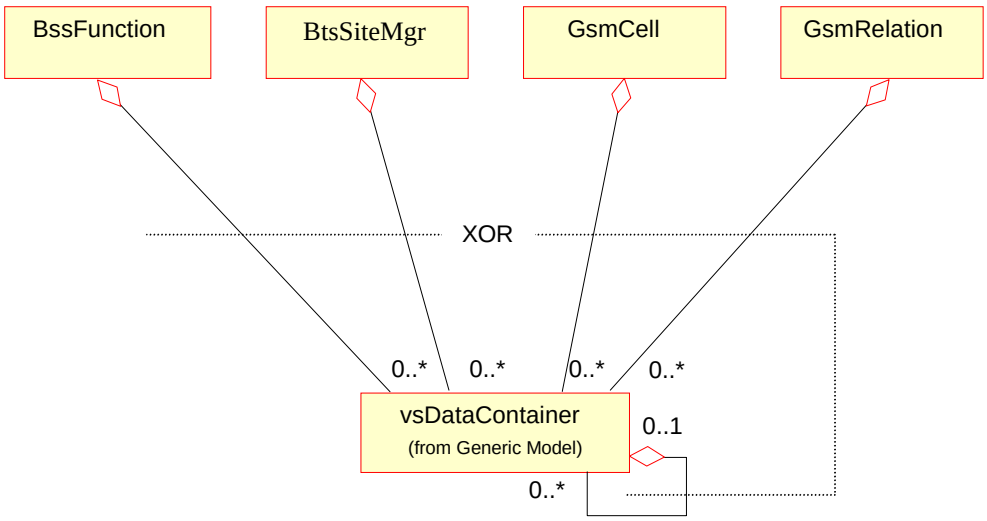
NOTE 3: The association between UtranRelation and UranCell is optional. It may be valid if both the UtranCell and the GsmCell are managed by the same management node.

NOTE 4: The GeranRelation and UtranRelation can be contained under MOCs defined in other NRMs.

Figure 6.2: GERAN NRM Containment/Naming and Association diagram

Each Managed Object is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [13] that expresses its containment hierarchy. As an example, the DN of a Managed Object representing a cell could have a format like:

```
SubNetwork=Sweden,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1,
BssFunction=BSS1.
```



NOTE 1: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.

NOTE 2: Each instance of the vsDataContainer shall only be contained under one MOC. The vsDataContainer can be contained under MOCs defined in other NRMs.

Figure 6: GERAN NRM Containment/Naming and Association diagram

The vsDataContainer is only used for the Bulk CM IRP.

6.3 Managed Object Class (MOC) definitions

6.3.1 MOC BssFunction

This Managed Object Class represents BSS functionality. For more information about the BSS, see GSM 03.02 [16]. It inherits from ManagedFunction.

Table 2: Attributes of `BssFunction`

Name	Qualifier	Description
bssFunctionId	READ-ONLY, M	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.
userLabel	READ-WRITE, M	A user-friendly (and user assigned) name of the associated object. Inherited from ManagedFunction.

Table 3: Notifications of `BssFunction`

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyObjectCreation	O	
notifyObjectDeletion	O	

6.3.2 MOC `BtsSiteMgr`

The 'BtsSiteMgr' managed object contains site specific information for a BTS site.

Table 4: Attributes of `BtsSiteMgr`

Name	Qualifier	Description
btsSiteMgrId	READ-ONLY, M	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.
userLabel	READ-WRITE, M	A user friendly (and user assigned) name of the associated object.
latitude	READ-WRITE,O	Used for geographical positioning of the sitemanager
longitude	READ-WRITE,O	Used for geographical positioning of the sitemanager

Table 4a: Additional attributes of BtsSiteMgr for the support of the State Management IRP

Attribute Name	Support Qualifier	READ	WRITE
`operationalState`	O	M	—

Note: No state propagation shall be implied.

Table 5: Notifications of `BtsSiteMgr`

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyObjectCreation	O	
notifyObjectDeletion	O	

6.3.3 MOC GsmCell

This managed object class represents the GSM radio cell. The applicability of instantiation of this class is depending on the ME type. It may only be instantiated under ME of type BSC.

Table 6: Attributes of GsmCell

Name	Qualifier	Description
gsmCellId	READ-ONLY, M	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.
userLabel	READ-WRITE, M	A user friendly (and user assigned) name of the associated object.
cellIdentity	READ-WRITE,M	Cell Identity (Ref 3GPP TS 24.008 [3]).
cellAllocation	READ-WRITE,M	This attribute defines the set of radio frequencies allocated and available to a cell, the first element sets the BCCH frequency, Ref 3GPP TS 44.018 [4].
ncc	READ-WRITE,M	Network Colour Code, NCC (part of BSIC). Ref 3GPP TS 44.018 [4].
bcc	READ-WRITE,M	Base station colour code, BCC (part of BSIC). Ref 3GPP TS 44.018 [4].
lac	READ-WRITE,M	Location Area Code, LAC . Ref 3GPP TS 24.008 [3].
mcc	READ-WRITE,M	Mobile Country Code (Ref 3GPP TS 23.003 [8])
mnc	READ-WRITE,M	Mobile Network Code (Ref 3GPP TS 23.003 [8])
rac	READ-WRITE,O	Routing Area Code, RAC. Ref 3GPP TS 44.018 [4]. See Note for the optional condition.
racc	READ-WRITE,O	Routing Area Colour Code, RACC. Ref 3GPP TS 44.018 [4]. See Note for the optional condition.
tsc	READ-WRITE,M	Training Sequence Code, an attribute of the class channel in Ref 3GPP TS 44.018 [4]
rxLevAccessMin	READ-WRITE,M	Minimum Access Level. Attribute description Ref 3GPP TS 45.008 [5] (RXLEV_ACCESS_MIN)
msTxPwrMaxCCH	READ-WRITE,M	Maximum Transmission Power for a Mobile Station on a CCH. Attribute description Ref 3GPP TS 45.008 [5] (MS_TXPWR_MAX_CCH)
hoppingSequenceNumber	READ-WRITE,M	HoppingSequenceNumber. Attribute description reference 3GPP TS 45.002 [6] (HSN)
plmnPermitted	READ-WRITE,M	Network Colour Code Permitted. Attribute description reference 3GPP TS 45.008 [5] (NCC_PERMITTED)
NOTE: This attribute shall be included if the cell is a GPRS cell.		

Table 7: Notifications of GsmCell

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyObjectCreation	O	
notifyObjectDeletion	O	

3GPP TSG- SA5 (Telecom Management) Meeting #30 ***Tdoc ⌘S5-026718***
Tampere, FINLAND, 19 – 23 Aug. 2002

CR-Form-v7

CHANGE REQUEST

⌘ **32.652** **CR** **008** ⌘ **rev** **-** ⌘ Current version: **4.3.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Add new IRP IS methodology defined in 32.102.
Source:	⌘	S5
Work item code:	⌘	OAM-NIM
Date:	⌘	23/08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The specification is not following the new methodology.
Summary of change:	⌘	The structure of the specification is changed in accordance with 32.102.
Consequences if not approved:	⌘	The specification will not be in the format of the new methodology.

Clauses affected:	⌘	Introduction, 3.1, 3.2, 4.2, 6.1, 6.2, 6.2.1, 6.2.2, 6.3, 6.3.1, 6.3.1.1, 6.3.1.2, 6.3.2, 6.3.2.1, 6.3.2.2, 6.3.3, 6.3.3.1, 6.3.3.2, 6.3.3.3, 6.3.4, 6.3.4.1, 6.3.4.2, 6.3.4.3, 6.3.5, 6.3.5.1, 6.3.5.2, 6.3.5.3, 6.4, 6.4.1, 6.4.1.1, 6.4.1.2, 6.4.1.3, 6.4.2, 6.4.2.1, 6.4.2.2, 6.4.2.3, 6.5, 6.5.1, 6.5.2 and 6.6.

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

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

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

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

Introduction

Configuration Management (CM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. CM actions have the objective to control and monitor the actual configuration on the Network Elements (NEs) and Network Resources (NRs), and they may be initiated by the operator or by functions in the Operations Systems (OSs) or NEs.

CM actions may be requested as part of an implementation programme (e.g. additions and deletions), as part of an optimisation programme (e.g. modifications), and to maintain the overall Quality of Service (QOS). The CM actions are initiated either as single actions on single NEs of the 3G network, or as part of a complex procedure involving actions on many resources/objects in one or several NEs.

~~Due to the growing number of specifications to model new services and Resource Models for Configuration Management (CM), as well as the expected growth in size of each of them from 3GPP Release 4 onwards, a new structure of the specifications is already needed in Release 4. This structure is needed for several reasons, but mainly to enable more independent development and release for each part, as well as a simpler document identification and version handling. Another benefit would be that it becomes easier for bodies outside 3GPP, such as the ITU-T, to refer to telecom management specifications from 3GPP. The new structure of the specifications does not lose any information or functionality supported by the Release 1999. The restructuring also includes defining new IRPs for the Network Resource Model (NRM) parts of R99 Basic CM IRP (Generic, Core Network and UTRAN NRM). These IRPs are named "Network Resources IRP".~~

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

~~Finally, in addition to the restructuring mentioned above, the need to define some new functionality and IRPs for CM compared to Release 1999, has also been identified. Firstly, a new Bulk CM IRP, and secondly an a GERAN Network Resources IRP, have been created. Thirdly, the Generic, UTRAN and GERAN Network Resources IRPs have been extended with support for GSM-UMTS Inter-system handover (ISH), and the 32.600 (Concept and High-level Requirements) has been modified to cover the high-level Bulk CM and ISH requirements.~~

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

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

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply. For terms and definitions not found here, please refer to 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.600 [14].

Association: In general it is used to model relationships between Managed Objects. Associations can be implemented in several ways, such as:

(1) name bindings,

(2) reference attributes, and

(3) association objects.

This IRP stipulates that containment associations shall be expressed through name bindings, but it does not stipulate the implementation for other types of associations as a general rule. These are specified as separate entities in the object models (UML diagrams). ~~Currently (in Release 99) however, all (non-containment) associations are modelled by means of reference attributes of the participating MOs.~~

Managed Element (ME): An instance of the ~~Managed Object Class~~IOC ManagedElement, defined in [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)** ~~An MO class~~ has attributes that provide information used to characterize the objects that belong to the class (the term “attribute” is taken from TMN and corresponds to a “property” according to CIM). Furthermore, ~~an MO class~~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). ~~An MO class~~The IOC may support the emission of notifications that provide information about an event occurrence within a network resource.

Management Information Base (MIB): A MIB is an instance of an NRM and has some values on the defined attributes and associations specific for that instance. In the context of the present document, an MIB consists of:

(1) a Name space (describing the MO containment hierarchy in the MIB through Distinguished Names),

(2) a number of ~~Managed Objects~~IOCs with their attributes and

(3) a number of Associations between these IOCs~~MOs~~. Also note that TMN (ITU-T Recommendation X.710 [7]) defines a concept of a Management Information Tree (also known as a Naming Tree) that corresponds to the name space (containment hierarchy) portion of this MIB definition. Figure 3.1 depicts the relationships between a Name space and a number of participating MOs (the shown association is of a non-containment type)

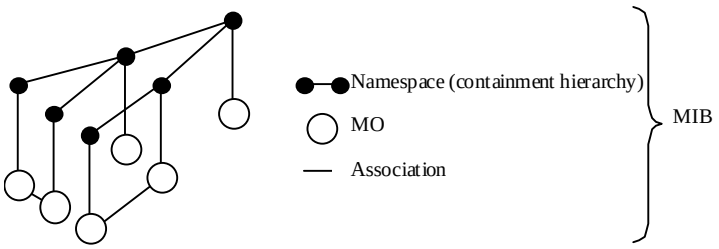


Figure 3.1: Relationships between a Name space and a number of participating MOs

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

Name space: A name space is a collection of names. The IRP name convention (see 3GPP TS 32.300 [13]) restricts the name space to a hierarchical containment structure, including its simplest form - the one-level, flat name space.

All Managed Objects in a MIB shall be included in the corresponding name space and the MIB/name space shall only support a strict hierarchical containment structure (with one root object). A Managed Object that contains another is said to be the superior (parent); the contained Managed Object is referred to as the subordinate (child). The parent of all MOs in a single name space is called a Local Root. The ultimate parent of all MOs of all managed systems is called the Global Root.

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 the IOCs~~Managed Object Classes~~, 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:

CIM	Common Information Model
CMIP	Common Management Information Protocol
CN	Core Network
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name (see 3GPP TS 32.300 [13])
EM	Element Manager
FM	Fault Management
GERAN	GSM-EDGE Radio Access Network
GPRS	General Packet Radio System
IOC	Information Object Class
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Sector
Iub	Interface between RNC and Node B
ME	Managed Element
MIB	Management Information Base
MIM	Management Information Model
MO	Managed Object
~~MOC~~	~~Managed Object Class~~
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
PM	Performance Management
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [13])
RNC	Radio Network Controller
SS	Solution Set
TMN	Telecommunications Management Network
UML	Unified Modelling Language
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial Radio Access Network
XML	eXtensible Mark-up Language

4.2 Compliance rules

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

The following defines the meaning of Mandatory and Optional ~~MOC~~ IOC attributes and associations between ~~MOCs~~IOCs, in Solution Sets to the IRP defined by the present ~~specification~~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 ~~managed~~ information object classes, attributes, associations, operations, parameters and notifications without requiring the IRPManager to have any knowledge of the extensions.

Given that

- rules for vendor-specific extensions remain to be fully specified, and
- many scenarios under which IRPManager and IRPAgent interwork may exist,

it is recognised that in Release 4/5 the IRPManager, even though it is not required to have knowledge of vendor-specific extensions, may be required to be implemented with an awareness that extensions can exist and behave accordingly.

6 IRP Information Model

6.1 Information entities imported and local labelsIntroduction

None.

~~As already introduced in the previous clause, the present clause defines the GERAN Network Resources IRP: Network Resource Model That is, this model defines GERAN specific MOCs that shall be contained under the generic MOCs defined in [16].~~

~~The managed object classes in this NRM are protocol environment neutral and the model does not define the syntax or encoding of the operations and parameters.~~

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

~~The Information Service(s) to access managed objects of this NRM is defined elsewhere.~~

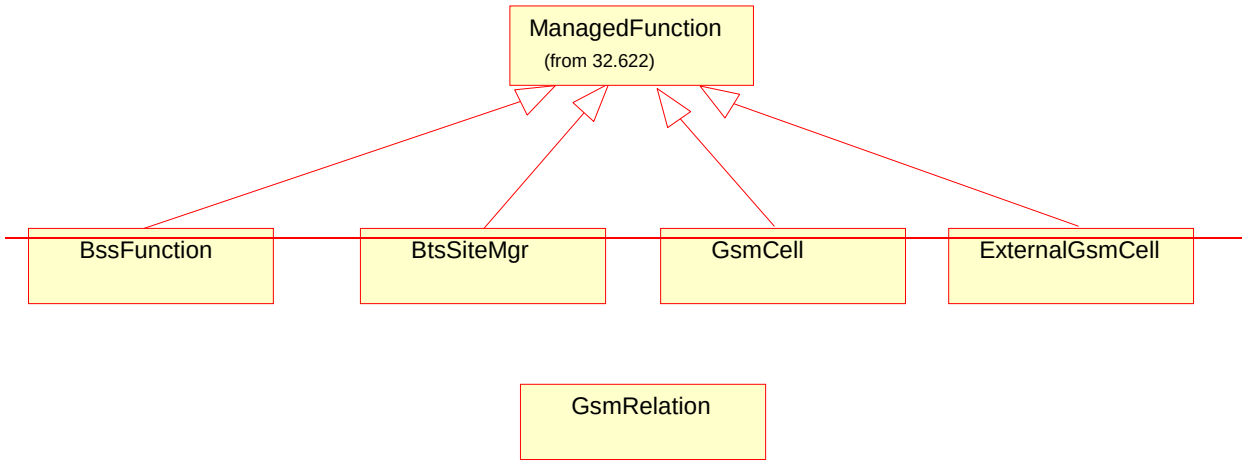
~~The corresponding Solution Set specifications provide protocol dependent definitions. They provide the actual realization of the operations and notifications defined in this subclause in each protocol environment. One may find that the class/attribute definitions in the protocol neutral model differ from those defined in the Solution Sets (e.g. due to mappings to existing standard models that are applicable for a specific Solution Set).~~

6.2 Class diagramManaged Object Class (MOC) diagrams

~~A general note regarding all the notification tables defined for each MOC below: Each MOC may potentially send the notifications listed in the notification table for the MOC. The notifications with qualifier (M) shall be supported by the MOC, and the notifications with qualifier (O) may be supported by the MOC.~~
~~For example: If Notification notifyObjectCreation defined in Basic CM IRP has the qualifier (M), then if a MOC is defined such that it emits such a notification, this notification shall be emitted when appropriate (i.e. when a new object is created). If Notification notifyChangedAlarm has the qualifier (O) in Alarm IRP (see 3GPP TS 32.111-2 [11]), then if a MOC is defined such that it emits such a notification, this notification may or may not be emitted when appropriate. Further, if a notification in the qualifier column (of the MOC notification tables) has a reference to another specification, it means that the qualifier for the notification is specified in the referred specification.~~

6.2.1 Attributes and relationshipsInheritance hierarchy

~~Figure 6.1 shows the inheritance hierarchy for the GERAN NRM.~~



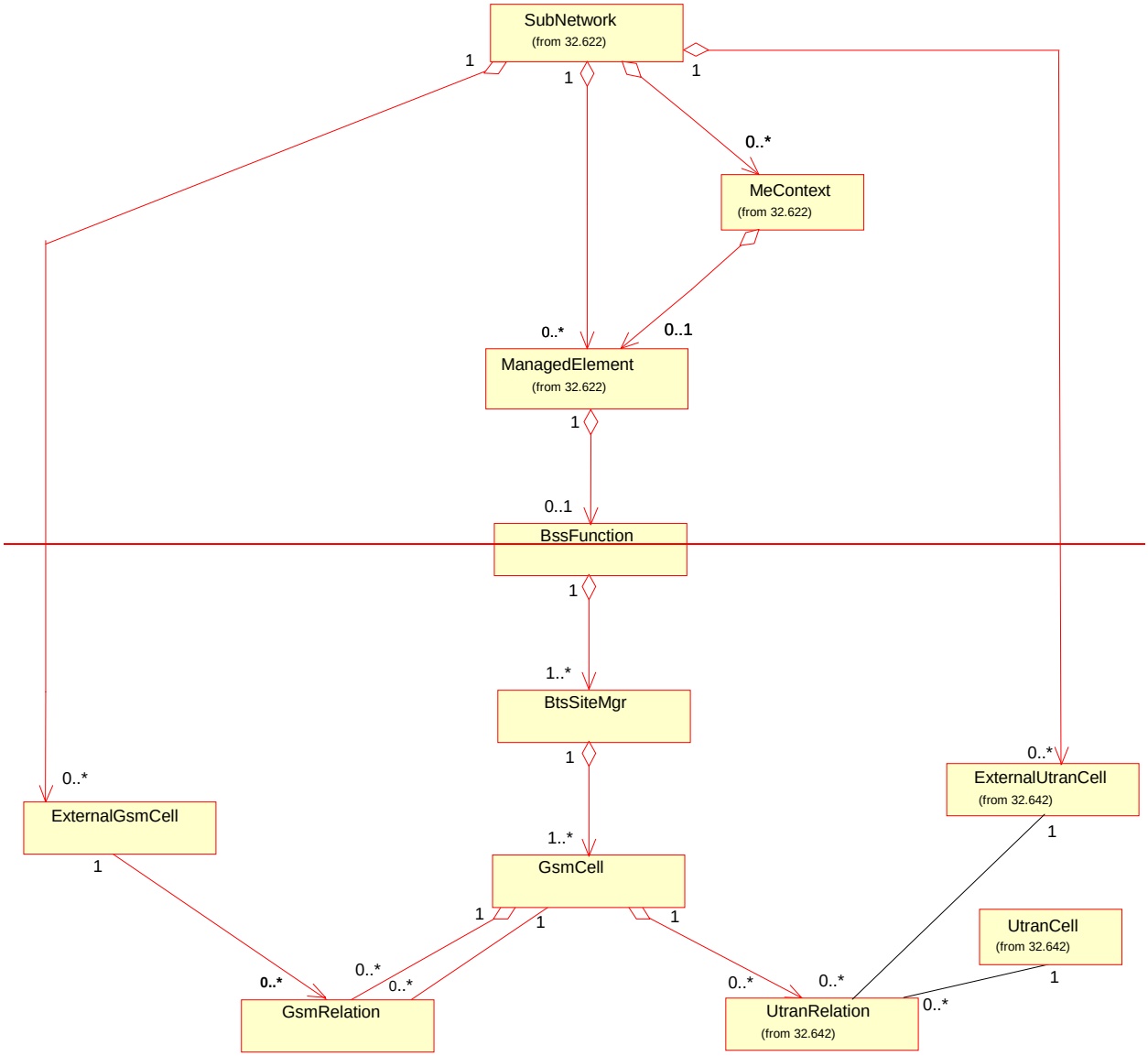
~~Figure 6.1: GERAN NRM Inheritance Hierarchy~~

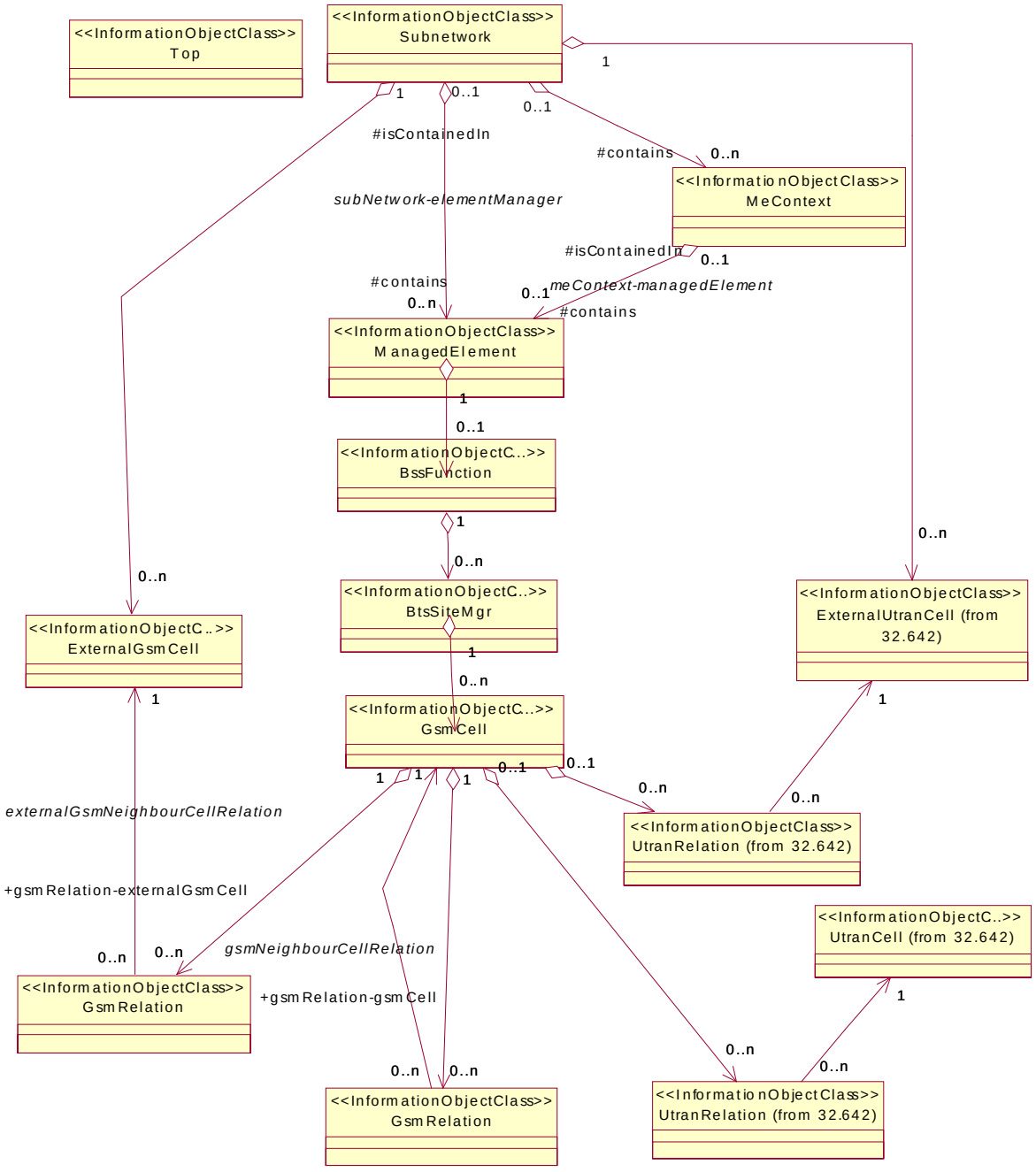
~~6.2.2 Containment/Naming and Association diagrams~~

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

Figure 6.2.1-1 show the containment/naming hierarchy and the associations of the GERAN NRM.

NOTE: The name-containment relations between IOCs ~~Managed Object containment/naming relationships~~ are in the diagram(s) below indicated by UML “Aggregation by reference” (“hollow diamonds”).


SubNetwork
(from 32.622)
MeContext
(from 32.622)
ManagedElement
(from 32.622)
BssFunction
BtsSiteMgr
ExternalGsmCell
GsmCell
ExternalUtranCell
(from 32.642)
UtranCell
(from 32.642)
GsmRelation
UtranRelation
(from 32.642)
1
0..*
0..1
1..*



NOTE 1: ManagedElement may be contained in either a SubNetwork or an MeContext instance, or have no parent instance at all. See also [16].

NOTE 2: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.

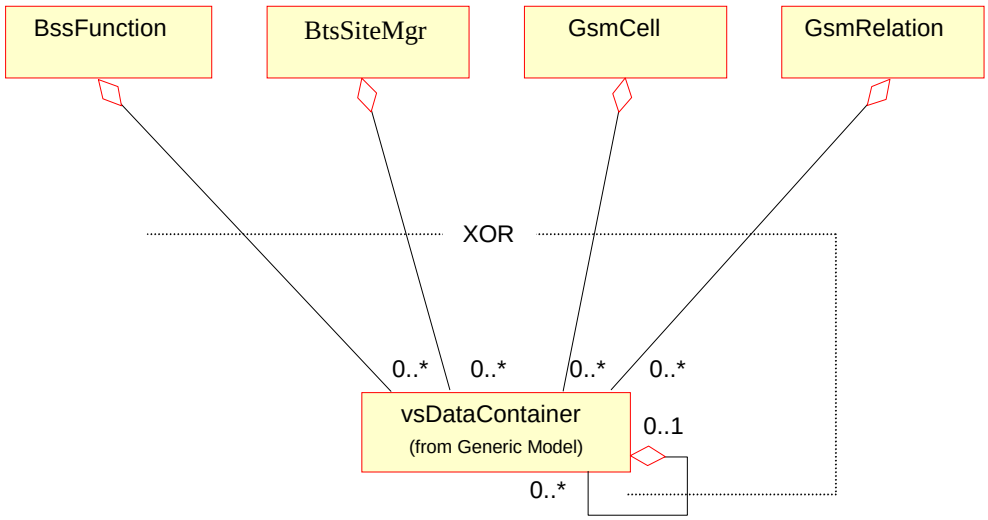
NOTE 3: The relation ~~association~~ between UtranRelation and UranCell is optional. It may be present ~~valid~~ if both the UtranCell and the GsmCell are managed by the same management node.

NOTE 4: The GeranRelation and UtranRelation can be contained under ~~MOCs~~ IOCs defined in other NRMs.

Figure 6.2.1-1: GERAN NRM Containment/Naming and Association diagram

Each Managed Object 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 ~~Managed Object~~IOC representing a cell could have a format like:

```
SubNetwork=Sweden,MeContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1,
BssFunction=BSS1.
```



NOTE 1: The listed cardinality numbers represent transient as well as steady-state numbers, and reflect all managed object creation and deletion scenarios.

NOTE 2: Each instance of the vsDataContainer shall only be contained under one MOC. The vsDataContainer can be contained under MOCs defined in other NRMs.

Figure 6.2.1-2: GERAN NRM Containment/Naming and Association diagram

The vsDataContainer is only used for the Bulk CM IRP.

6.2.2 Inheritance

This sub-clause depicts the inheritance relationships that exists between IOCs.

Figure 6.2.2 shows the inheritance hierarchy for the GERAN NRM.

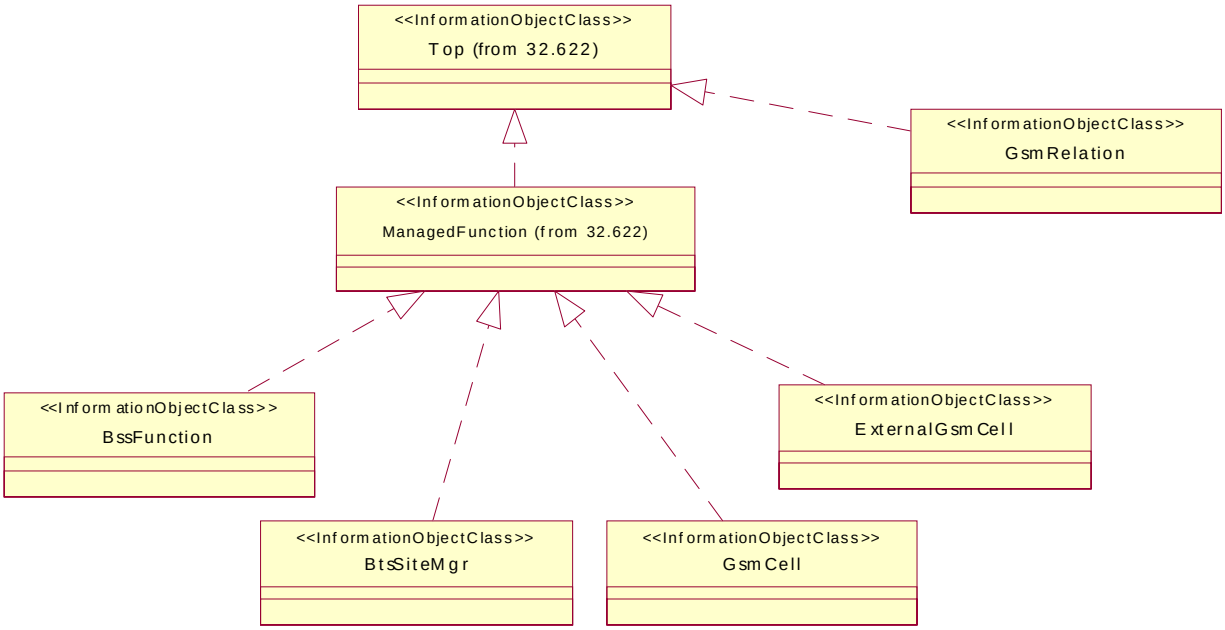


Figure 6.2.2: GERAN NRM Inheritance Hierarchy

6.3 Information object classes definition~~Managed Object Class (MOC) definitions~~

6.3.1 ~~MOC~~ BssFunction

6.3.1.1 Definition

This ~~Managed Object Class~~IOC represents BSS functionality. For more information about the BSS, see GSM 03.02 [16].

~~It inherits from ManagedFunction.~~

6.3.1.2 Attributes

Table ~~2~~1: Attributes of `BssFunction`

Attribute name	Visibility	Support Qualifier	Read Qualifer	Write Qualifier
bssFunctionId	+	M	M	-
userLabel	+	M	M	M

~~Name~~	~~Qualifier~~	~~Description~~
~~bssFunctionId~~	~~READ-ONLY, M~~	~~An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.~~
~~userLabel~~	~~READ-WRITE, M~~	~~A user-friendly (and user-assigned) name of the associated object. Inherited from ManagedFunction.~~

~~Table 3: Notifications of `BssFunction`~~

~~Name~~	~~Qualifier~~	~~Notes~~
~~notifyAckStateChanged~~	~~See Alarm IRP (3GPP TS 32.111-2 [11])~~	
~~notifyAttributeValueChange~~	~~O~~	
~~notifyChangedAlarm~~	~~See Alarm IRP (3GPP TS 32.111-2 [11])~~	
~~notifyClearedAlarm~~	~~See Alarm IRP (3GPP TS 32.111-2 [11])~~	
~~notifyNewAlarm~~	~~See Alarm IRP (3GPP TS 32.111-2 [11])~~	
~~notifyObjectCreation~~	~~O~~	
~~notifyObjectDeletion~~	~~O~~	

6.3.2 ~~MOC~~ BtsSiteMgr

6.3.2.1 Definition

The 'BtsSiteMgr' ~~managed object~~IOC contains site specific information for a BTS site.

6.3.2.2 Attributes

Table 4~~2~~: Attributes of `BtsSiteMgr`

Attribute name	Visibility	Support Qualifier	Read Qualifer	Write Qualifier
btsSiteMgrId	+	M	M	-
userLabel	+	M	M	M
latitude	+	O	M	M
longitude	+	O	M	M

Name	Qualifier	Description
btsSiteMgrId	READ-ONLY, M	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.
userLabel	READ-WRITE, M	A user friendly (and user assigned) name of the associated object.
latitude	READ-WRITE, O	Used for geographical positioning of the sitemanager
longitude	READ-WRITE, O	Used for geographical positioning of the sitemanager

Table 5: Notifications of `BtsSiteMgr`

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyObjectCreation	O	
notifyObjectDeletion	O	

6.3.3 ~~MOC~~ GsmCell

6.3.3.1 Definition

This ~~managed object class~~IOC represents the GSM radio cell. The applicability of instantiation of this class is depending on the ME type. It may only be instantiated under ME of type BSC.

6.3.3.2 Attributes

Table ~~6~~3: Attributes of `GsmCell`

Attribute name	Visibility	Support Qualifier	Read Qualifer	Write Qualifier
gsmCellId	+	M	M	-
userLabel	+	M	M	M
cellIdentity	+	M	M	M
cellAllocation	+	M	M	M
ncc	+	M	M	M
bcc	+	M	M	M
lac	+	M	M	M
mcc	+	M	M	M
mnc	+	M	M	M
rac	+	O	M	M
racc	+	O	M	M
tsc	+	M	M	M
rxLevAccessMin	+	M	M	M
msTxPwrMaxCCH	+	M	M	M
hoppingSequenceNumber	+	M	M	M
plmnPermitted	+	M	M	M

Name	Qualifier	Description
gsmCellId	READ-ONLY, M	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.
userLabel	READ-WRITE, M	A user friendly (and user assigned) name of the associated object.
cellIdentity	READ-WRITE, M	Cell Identity (Ref 3GPP TS 24.008 [3]).
cellAllocation	READ-WRITE, M	This attribute defines the set of radio frequencies allocated and available to a cell, the first element sets the BCCH frequency, Ref 3GPP TS 44.018 [4].
ncc	READ-WRITE, M	Network Colour Code, NCC (part of BSIC). Ref 3GPP TS 44.018 [4].
bcc	READ-WRITE, M	Base station colour code, BCC (part of BSIC). Ref 3GPP TS 44.018 [4].
lac	READ-WRITE, M	Location Area Code, LAC . Ref 3GPP TS 24.008 [3].
mcc	READ-WRITE, M	Mobile Country Code (Ref 3GPP TS 23.003 [8])
mnc	READ-WRITE, M	Mobile Network Code (Ref 3GPP TS 23.003 [8])
rac	READ-WRITE, O	Routing Area Code, RAC. Ref 3GPP TS 44.018 [4]. See Note for the optional condition.
racc	READ-WRITE, O	Routing Area Colour Code, RACC. Ref 3GPP TS 44.018 [4]. See Note for the optional condition.
tsc	READ-WRITE, M	Training Sequence Code, an attribute of the class channel in Ref 3GPP TS 44.018 [4]
rxLevAccessMin	READ-WRITE, M	Minimum Access Level. Attribute description Ref 3GPP TS 45.008 [5] (RXLEV_ACCESS_MIN)
msTxPwrMaxCCH	READ-WRITE, M	Maximum Transmission Power for a Mobile Station on a CCH. Attribute description Ref 3GPP TS 45.008 [5] (MS_TXPWR_MAX_CCH)
hoppingSequenceNumber	READ-WRITE, M	HoppingSequenceNumber. Attribute description reference 3GPP TS 45.002 [6] (HSN)
plmnPermitted	READ-WRITE, M	Network Colour Code Permitted. Attribute description reference 3GPP TS 45.008 [5] (NCC_PERMITTED)
NOTE: This attribute shall be included if the cell is a GPRS cell.		

Table 7: Notifications of GsmCell

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyObjectCreation	O	
notifyObjectDeletion	O	

6.3.3.3 Attribute constraints

The optionally attributes rac and racc shall be included if the cell is a GPRS cell. Otherwise they shall not be included.

6.3.4 ~~MOC~~ GsmRelation

6.3.4.1 Definition

The 'GsmRelation' ~~managed object~~IOC contains radio network related parameters for the relation to the 'GsmCell' or 'ExternalGsmCell' managed object. Note: In handover relation terms, the cell containing the GSM Relation object is the source cell for the handover. The cell referred to in the GSM relation object is the target cell ~~-~~for the handover. This defines a one-way handover relation where the direction is *from* source cell *to* target cell.

6.3.4.2 Attributes

Table ~~8~~4: Attributes of `GsmRelation`

Attribute name	Visibility	Support Qualifier	Read Qualifer	Write Qualifier
gsmRelationId	+	M	M	-
relationType	+	M	M	M
adjacentCell	+	M	M	M
bcchFrequency	+	O	M	-
ncc	+	O	M	-
bcc	+	O	M	-
lac	+	O	M	-

~~Name~~	~~Qualifier~~	~~Description~~
~~gsmRelationId~~	~~READ-ONLY, M~~	~~An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.~~
~~relationType~~	~~READ-WRITE, M~~	~~Type of relation: e.g. Intersystem relation, intra system relation.~~
~~adjacentCell~~	~~READ-WRITE, M~~	~~Pointer to GSM cell or external GSM cell. Distinguished Name of the corresponding object..~~
~~bcchFrequency~~	~~READ-ONLY, O~~	~~This attribute contains the absolute radio frequency channel number of the BCCH channel of another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.~~ ~~See Note for the optional condition.~~
~~ncc~~	~~READ-ONLY, O~~	~~Network Colour Code, NCC (part of BSIC; Ref 3GPP TS 44.018 [4]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.~~ ~~See Note for the optional condition.~~
~~bcc~~	~~READ-ONLY, O~~	~~Base station colour code, BCC (part of BSIC; Ref 3GPP TS 44.018 [4]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.~~ ~~See Note for the optional condition.~~
~~lac~~	~~READ-ONLY, O~~	~~Location Area Code, LAC (Ref 3GPP TS 24.008 [3]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.~~ ~~See Note for the optional condition.~~
~~NOTE: This attribute shall be included if the EM does not guarantee consistency between the cell definition and what is broadcasted on system information.~~		

~~**Table 9: Notifications of GsmRelation**~~

~~Name~~	~~Qualifier~~	~~Notes~~
~~notifyAttributeValueChange~~	~~O~~	
~~notifyObjectCreation~~	~~O~~	
~~notifyObjectDeletion~~	~~O~~	

6.3.4.3 Attribute constraints

The optionally attributes bcchFrequency, ncc, bcc and lac shall be included if the EM does not guarantee consistency between the cell definition and what is broadcasted on system information. Otherwise they shall not be included.

6.3.5 ~~MOC~~ ExternalGsmCell

6.3.5.1 Definition

This ~~Managed Object Class~~IOC represents a radio cell controlled by another IRPAgent. This ~~MOC~~ IOC has necessary attributes for inter-system handover. It contains a subset of the attributes of related ~~MOCs~~ IOCs controlled by another IRPAgent. To maintain the consistency between the attribute values of these two ~~MOCs~~ IOCs is outside the scope of this document.

6.3.5.2 Attributes

Table ~~10~~5: Attributes of `ExternalGsmCell`

Attribute name	Visibility	Support Qualifier	Read Qualifer	Write Qualifier
externalGsmCellId	+	M	M	-
userLabel	+	M	M	M
cellIdentity	+	M	M	M
bcchFrequency	+	M	M	M
ncc	+	M	M	M
bcc	+	M	M	M
lac	+	M	M	M
mcc	+	M	M	M
mnc	+	M	M	M
rac	+	O	M	M
racc	+	O	M	M

~~Name~~	~~Qualifier~~	~~Description~~
~~externalGsmCellId~~	~~READ-ONLY, M~~	~~An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.~~
~~userLabel~~	~~READ-WRITE, M~~	~~A user friendly (and user assigned) name of the associated object.~~
~~cellIdentity~~	~~READ-WRITE, M~~	~~Cell identity, (3GPP TS 24.008 [3])~~
~~bcchFrequency~~	~~READ-WRITE, M~~	~~This attribute contains the absolute radio frequency channel number of the BCCH channel of the GSM cell.~~
~~ncc~~	~~READ-WRITE, M~~	~~Network Colour Code, NCC (part of BSIC. Ref 3GPP TS 44.018 [4]).~~
~~bcc~~	~~READ-WRITE, M~~	~~Base station colour code, BCC (part of BSIC. Ref 3GPP TS 44.018 [4]).~~
~~lac~~	~~READ-WRITE, M~~	~~Location Area Code, LAC (Ref 3GPP TS 24.008 [3]).~~
~~mcc~~	~~READ-WRITE, M~~	~~Mobile Country Code (Ref 3GPP TS 23.003 [8])~~
~~mnc~~	~~READ-WRITE, M~~	~~Mobile Network Code (Ref 3GPP TS 23.003 [8])~~
~~rac~~	~~READ-WRITE, O~~	~~Routing Area Code, RAC (Ref 3GPP TS 44.018 [4]). See Note for the optional condition.~~
~~racc~~	~~READ-WRITE, O~~	~~Routing Area Colour Code, RACC (Ref 3GPP TS 44.018 [4]). See Note for the optional condition.~~
~~NOTE: This attribute shall be included if the cell is a GPRS cell.~~		

~~Table11: Notifications of `ExternalGsmCell`~~

~~Name~~	~~Qualifier~~	~~Notes~~
~~notifyAttributeValueChange~~	~~O~~	
~~notifyObjectCreation~~	~~O~~	
~~notifyObjectDeletion~~	~~O~~	

6.3.5.3 Attribute constraints

The optionally attributes rac and racc shall be included if the cell is a GPRS cell. Otherwise they shall not be included.

6.4 Information relationships definition

6.4.1 ExternalGsmNeighbourCellRelation (M)

6.4.1.1 Definition

This represents a unidirectional relation from GsmRelation to the ExternalGsmCell. The role of the IOC shall be mapped to a reference attribute, named adjacentCell, of the IOC.

6.4.1.2 Roles

Table 6: Roles of the relation ExternalGsmNeighbourCellRelation

Name	Definition
gsmRelation-externalGsmNeighbourCell	This role (when present) represents GsmRelation capability to identify one ExternalGsmCell. When this role is present, the GsmRelation.adjacentCell shall contain one ExternalGsmNeighbourCell DN.

6.4.1.3 Constraints

This role (for a particular GsmRelation) shall be present if the GsmNeighbourCellRelation of this particular GsmRelation is absent. This role shall be absent if the GsmNeighbourCellRelation of this particular GsmRelation is present.

6.4.2 GsmNeighbourCellRelation (M)

6.4.2.1 Definition

This represents the unidirectional relation from the GsmRelation to GsmCell. The role of the IOC shall be mapped to a reference attribute, named adjacentCell, of the IOC.

6.4.2.2 Roles

Table 7: Roles of the relation GsmNeighbourCellRelation

Name	Definition
gsmRelation-gsmNeighbourCell	This role (when present) represents GsmRelation capability to identify one GsmCell. When this role is present, the GsmRelation.adjacentCell shall contain one GsmCell DN.

6.4.2.3 Constraints

This role (for a particular GsmRelation) shall be present if the ExternalGsmNeighbourCellRelation of this particular GsmRelation is absent. This role shall be absent if the ExternalGsmNeighbourCellRelation of this particular GsmRelation is present.

6.5 Information attributes definition

6.5.1 Definition and legal values

The table below defines the attributes that are present in several information object classes of this TS.

Table 6: Attributes

Attribute Name	Definition	Legal Values
adjacentCell	Pointer to GSM cell or external GSM cell. Distinguished Name of the corresponding object.	
bcc	IOCs **GsmCell** and **ExternalGsmCell**: Base station colour code, BCC (part of BSIC). Ref 3GPP TS 44.018 [4]. IOC **GsmRelation**: Base station colour code, BCC (part of BSIC. Ref 3GPP TS 44.018 [4]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	
bcchFrequency	IOCs **ExternalGsmCell**: This attribute contains the absolute radio frequency channel number of the BCCH channel of the GSM cell. IOC **GsmRelation**: This attribute contains the absolute radio frequency channel number of the BCCH channel of another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	
bssFunctionId	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
btsSiteMgrId	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
cellAllocation	This attribute defines the set of radio frequencies allocated and available to a cell, the first element sets the BCCH frequency, Ref 3GPP TS 44.018 [4].	
cellIdentity	Cell Identity (Ref 3GPP TS 24.008 [3]).	
externalGsmCellId	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
gsmCellId	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
gsmRelationId	An attribute whose 'name+value' can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
hoppingSequenceNumber	HoppingSequenceNumber. Attribute description reference 3GPP TS 45.002 [6] (HSN)	
lac	IOCs **GsmCell** and **ExternalGsmCell**: Location Area Code, LAC . Ref 3GPP TS 24.008 [3]. IOC **GsmRelation**: Location Area Code, LAC (Ref 3GPP TS 24.008 [3]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	
latitude	Used for geographical positioning of the sitemanager	
longitude	Used for geographical positioning of the sitemanager	
mcc	Mobile Country Code, MCC (part of the PLMN Id, Ref. 3 GPP TS 23.003 [8]).	

Attribute Name	Definition	Legal Values
mnc	Mobile Network Code, MNC (part of the PLMN Id, Ref. 3 GPP TS 23.003 [8]).	
msTxPwrMaxCCH	Maximum Transmission Power for a Mobile Station on a CCH. Attribute description Ref 3GPP TS 45.008 [5] (MS_TXPWR_MAX_CCH)	
ncc	IOCs **GsmCell** and **ExternalGsmCell**: Network Colour Code, NCC (part of BSIC). Ref 3GPP TS 44.018 [4]. IOC **GsmRelation**: Network Colour Code, NCC (part of BSIC. Ref 3GPP TS 44.018 [4]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	
plmnPermitted	Network Colour Code Permitted. Attribute description reference 3GPP TS 45.008 [5] (NCC_PERMITTED)	
rac	Routing Area Code, RAC. Ref 3GPP TS 44.018 [4].	
racc	Routing Area Colour Code, RACC. Ref 3GPP TS 44.018 [4].	
relationType	Type of relation: e.g. Intersystem relation, intra system relation.	
rxLevAccessMin	Minimum Access Level. Attribute description Ref 3GPP TS 45.008 [5] (RXLEV_ACCESS_MIN)	
tsc	Training Sequence Code, an attribute of the class channel in Ref 3GPP TS 44.018 [4]	
userLabel	IOC **BssFunction**: A user-friendly (and user assigned) name of the associated object. Inherited from ManagedFunction. **Other IOCs**: A user-friendly (and user assigned) name of the associated object.	

6.5.2 Constraints

None.

6.6 Particular information configurations

Not applicable.