

# 3GPP TS 32.692 V11.0.0 (2012-09)

---

*Technical Specification*

8

**3rd Generation Partnership Project;  
Technical Specification Group Services and System Aspects;  
Telecommunication management;  
Inventory Management (IM) network resources  
Integration Reference Point (IRP);  
Network Resource Model (NRM)  
(Release 11)**

---



The present document has been developed within the 3<sup>rd</sup> Generation Partnership Project (3GPP™) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPP Organizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification. Specifications and reports for implementation of the 3GPP™ system should be obtained via the 3GPP Organizational Partners' Publications Offices.

---

Keywords

---

GSM, UMTS, management

**3GPP**

Postal address

---

3GPP support office address

---

650 Route des Lucioles - Sophia Antipolis  
Valbonne - FRANCE  
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

---

<http://www.3gpp.org>

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© 2012, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TTA, TTC).  
All rights reserved.

UMTS™ is a Trade Mark of ETSI registered for the benefit of its members  
3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  
LTE™ is a Trade Mark of ETSI currently being registered for the benefit of its Members and of the 3GPP Organizational Partners  
GSM® and the GSM logo are registered and owned by the GSM Association

# Contents

Foreword .....	5
Introduction .....	5
1 Scope .....	6
2 References.....	6
3 Definitions and abbreviations .....	7
3.1 Definitions .....	7
3.2 Abbreviations .....	7
4 System overview .....	8
4.1 Void .....	8
4.2 Compliance rules .....	8
5 Modelling approach .....	8
6 Information Object Classes.....	9
6.1 Imported information entities and local labels .....	9
6.2 Class diagram .....	9
6.2.1 Attributes and relationships .....	9
6.2.2 Inheritance .....	12
6.3 Information object class definitions .....	13
6.3.1 InventoryUnit.....	13
6.3.1.1 Definition .....	13
6.3.1.2 Attributes .....	13
6.3.1.3 Attribute constraints .....	13
6.3.1.4 Relationships .....	13
6.3.1.5 State diagram.....	13
6.3.1.6 Notifications .....	13
6.3.2 InventoryUnitNE.....	13
6.3.2.1 Definition .....	13
6.3.2.2 Attributes .....	14
6.3.2.3 Attribute constraints .....	14
6.3.2.4 Relationships .....	14
6.3.2.5 State diagram.....	14
6.3.2.6 Notifications .....	14
6.3.3 InventoryUnitHw .....	14
6.3.3.1 Definition .....	14
6.3.3.2 Attributes .....	14
6.3.3.3 Attribute constraints .....	15
6.3.3.4 Relationships .....	15
6.3.3.5 State diagram.....	15
6.3.3.6 Notifications .....	15
6.3.4 InventoryUnitSw .....	15
6.3.4.1 Definition .....	15
6.3.4.2 Attributes .....	15
6.3.4.3 Attribute constraints .....	15
6.3.4.4 Relationships .....	15
6.3.4.5 State diagram.....	15
6.3.4.6 Notifications .....	15
6.3.5 InventoryUnitLic .....	16
6.3.5.1 Definition .....	16
6.3.5.2 Attributes .....	16
6.3.5.3 Attribute constraints .....	16
6.3.5.4 Relationships .....	16
6.3.5.5 State diagram.....	16
6.3.5.6 Notifications .....	16
6.3.6 TmaInventoryUnit.....	16

6.3.6.1	Definition .....	16
6.3.6.2	Attributes .....	17
6.3.6.3	Attribute constraints .....	17
6.3.6.4	Notifications .....	17
6.3.7	AntennaInventoryUnit.....	17
6.3.7.1	Definition .....	17
6.3.7.2	Attributes.....	18
6.3.7.3	Attribute constraints .....	18
6.3.7.4	Notifications .....	18
6.4	Information relationship definitions .....	18
6.4.1	MFNERelation (O) .....	18
6.4.1.1	Definition .....	18
6.4.1.2	Roles.....	18
6.4.1.3	Constraints .....	18
6.4.2	NESW Relation (O) .....	18
6.4.2.1	Definition .....	18
6.4.2.2	Roles.....	19
6.4.2.3	Constraints .....	19
6.4.3	NEHW Relation (O) .....	19
6.4.3.1	Definition .....	19
6.4.3.2	Roles.....	19
6.4.3.3	Constraints .....	19
6.4.4	NELICRelation (O).....	19
6.4.4.1	Definition .....	19
6.4.4.2	Roles.....	19
6.4.4.3	Constraints .....	19
6.4.5	SWLICRelation (O).....	19
6.4.5.1	Definition .....	19
6.4.5.2	Roles.....	19
6.4.5.3	Constraints .....	19
6.4.6	SWHWRelation (O).....	20
6.4.6.1	Definition .....	20
6.4.6.2	Roles.....	20
6.4.6.3	Constraints .....	20
6.4.7	HWLICRelation (O) .....	20
6.4.7.1	Definition .....	20
6.4.7.2	Roles.....	20
6.4.7.3	Constraints .....	20
6.4.8	MFSWRelation (O).....	20
6.4.8.1	Definition .....	20
6.4.8.2	Roles.....	20
6.4.8.3	Constraints .....	20
6.4.9	MFHWRelation (O).....	20
6.4.9.1	Definition .....	20
6.4.9.2	Roles.....	21
6.4.9.3	Constraints .....	21
6.4.10	MFLICRelation (O) .....	21
6.4.10.1	Definition .....	21
6.4.10.2	Roles.....	21
6.4.10.3	Constraints .....	21
6.4.11	Inventory-Function (M).....	21
6.4.11.1	Definition .....	21
6.4.11.2	Roles.....	21
6.4.11.3	Constraints .....	21
6.5	Information attribute definitions .....	22
6.5.1	Definition and legal values .....	22
6.5.2	Constraints.....	25
6.6	Particular information configurations .....	25
<b>Annex A (informative):</b>	<b>Change history.....</b>	<b>26</b>

---

## Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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 3<sup>rd</sup> Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

- 32.690: "Inventory Management (IM): Requirements".
- 32.691: "Inventory Management (IM) network resources Integration Reference Point (IRP): Requirements".
- 32.692: "Inventory Management (IM) network resources Integration Reference Point (IRP): Network Resource Model (NRM)".**
- 32.696: Inventory Management (IM) network resources Integration Reference Point (IRP): Solution Set (SS) definitions.

Inventory Management (IM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. IM actions have the objective to 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. The final goal of IM is the establishment of an accurate and timely model of the actual inventory in the NEs or NRs.

IM actions may be requested to reflect changes initiated by Configuration Management (CM) actions or to make sure that the inventory model is in synch with the actual inventory. IM actions are initiated either as single actions on single NEs of the 3G network or as part of a complex procedure involving actions on many resources/objects in one or several NEs.

---

# 1 Scope

The present document defines an Integration Reference Point (IRP) through which an 'IRP Agent' (typically an Element Manager or Network Element) can communicate Network Management related information to one or several 'IRP Managers' (typically Network Managers).

The present document specifies an Inventory Management Network Resource Model, NRM (also referred to as a Management Information Model - MIM) with definitions of Information Object Classes.

---

# 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 (IRP): Information Service (IS)".
- [4] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".
- [5] Void.
- [6] 3GPP TS 32.642: "Telecommunication management; Configuration Management (CM): UTRAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".
- [7] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
- [8] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and Definitions".
- [9] 3GPP TS 32.151: "Telecommunication management; Integration Reference Point (IRP) Information Service (IS) template".
- [10] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".
- [11] 3GPP TS 32.690: "Telecommunication management; Inventory Management (IM): Requirements".
- [12] 3GPP TS 25.466: "UTRAN Iuant interface: Application Part".
- [13] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".
- [14] 3GPP TS 32.792: "Telecommunication management; Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP); 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] and 3GPP TS 32.600 [4] and the following apply:

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

- (1) name bindings;
- (2) reference attributes; and
- (3) association objects.

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

**Managed Element (ME):** instance of the Managed Object Class Managed Element defined in [6]

**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 class defined in a MIM/NRM. This class, called **Information Object Class (IOC)** has *attributes* that provide information used to characterize the objects that belong to the class (the term "attribute" is taken from TMN and corresponds to a "property" according to CIM). Further more, the IOC can have *operations* that represent the behaviour relevant for that class (the term "operation" is taken from TMN and corresponds to a "method" according to CIM). The IOC may support the emission of *notifications* that provide information about an event occurrence within a network resource.

**Management Information Model (MIM):** also referred to as NRM (see the NRM definition)

**Network Resource Model (NRM):** model representing the actual managed telecommunications network resources that a System is providing through the subject IRP

An NRM identifies and describes the IOCs, their associations, attributes and operations. The NRM is also referred to as "MIM" (see above), which originates from the ITU-T TMN.

### 3.2 Abbreviations

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

CIM	Common Information Model
DN	Distinguished Name (see 3GPP TS 32.300 [7])
EM	Element Manager
IM	Inventory Management
IOC	Information Managed Object
IRP	Integration Reference Point
ITU-T	International Telecommunication Union, Telecommunication Sector
ME	Managed Element
MIM	Management Information Model
MO	Managed Object
MOC	Managed Object Class
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [7])
TMN	Telecommunications Management Network
UML	Unified Modelling Language

UMTS            Universal Mobile Telecommunications System  
UTRAN         UMTS Terrestrial Radio Access Network

---

## 4 System overview

### 4.1 Void

### 4.2 Compliance rules

The following defines the meaning of Mandatory and Optional IOC attributes and associations between IOCs, in Solution Sets to the IRP defined by the present specification:

- 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 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

See 3GPP TS 32.150 [8].



---

## 6 Information Object Classes

### 6.1 Imported information entities and local labels

Label reference	Local label
32.622 [10], information object class, Top	Top
32.622 [10], information object class, ManagedElement	ManagedElement

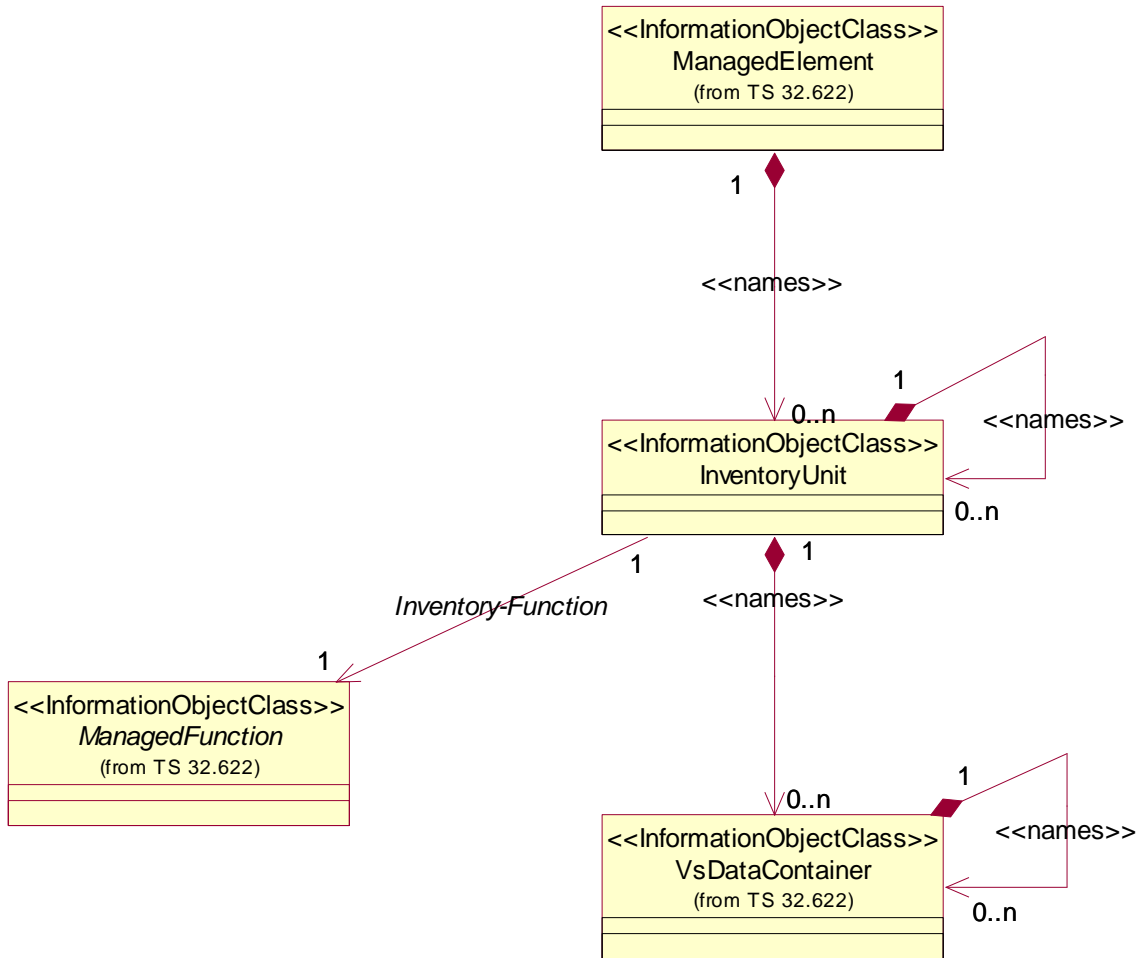
### 6.2 Class diagram

#### 6.2.1 Attributes and relationships

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

The inventory NRM contains two alternatives for inventory data modeling. Alternative 1 is for NE structure and hardware inventory. Alternative 2 is an extended version for inventory information modeling consisting of NE structure, hardware, software and license data inventory.

Alternative 1, hardware inventory model



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

**Figure 6.2.1: Alternative 1 - Inventory Management NRM Containment/Naming and Association diagram**

Each IOC instance is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [7] that expresses its containment hierarchy. As an example, the DN of a IOC representing a InventoryUnit could have a format like:

SubNetwork=Sweden,meContext=MEC-Gbg-1,ManagedElement=RNC-Gbg-1,InventoryUnit=Inv-1.

Alternative 2, extended model for hardware, software and licence inventory:

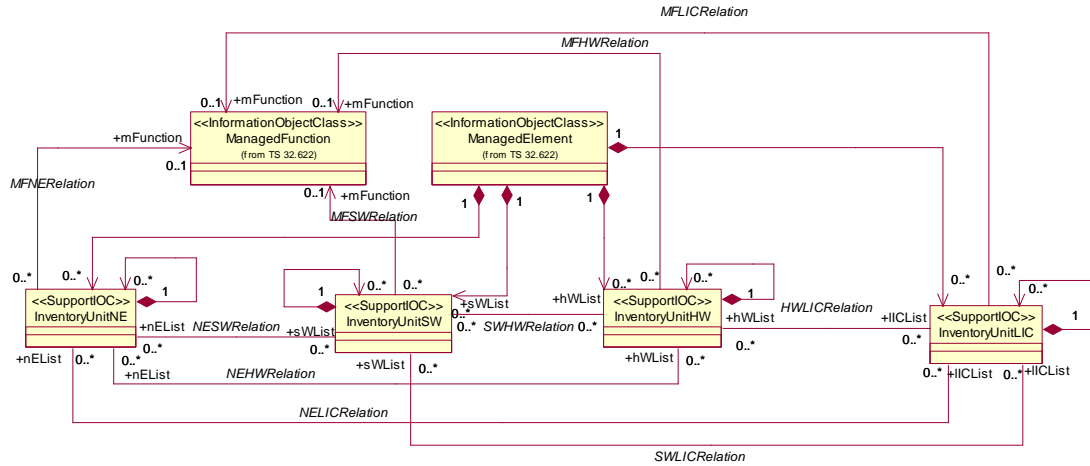


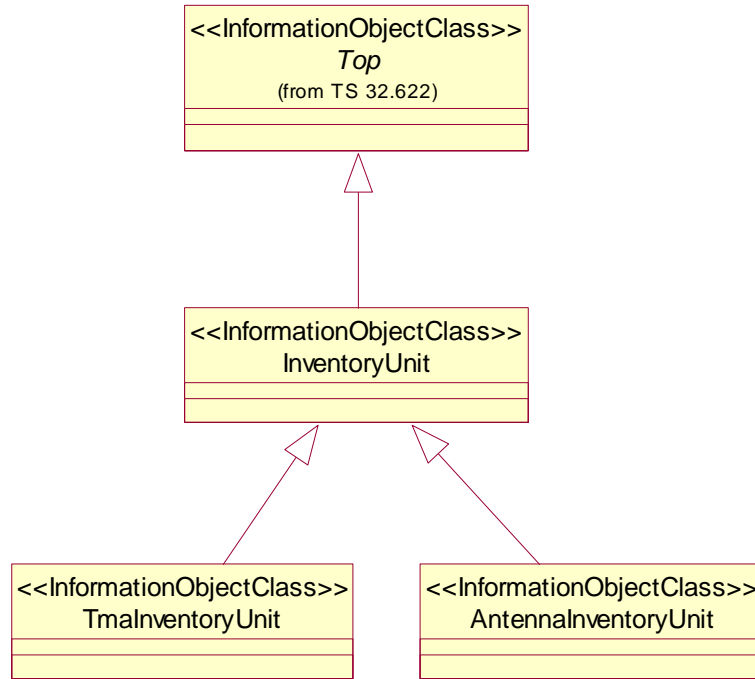
Figure 6.2.1-2: Alternative 2 - Inventory Management NRM Containment/Naming and Association diagram

NOTE: Inventory information upload in alternative 2 is done using the the FT IRP and related FT IRP notification capabilities

## 6.2.2 Inheritance

This subclause depicts the inheritance relationships that exist between IOCs.

Figure 6.2.2 shows the inheritance hierarchy for the IM NRM.



**Figure 6.2.2: Inventory Management NRM Inheritance Hierarchy**

## 6.3 Information object class definitions

### 6.3.1 InventoryUnit

#### 6.3.1.1 Definition

This IOC represents inventory information for an Inventory Unit.

#### 6.3.1.2 Attributes

**Attributes of InventoryUnit**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
inventoryUnitType	M	M	-
vendorUnitFamilyType	CM	M	-
vendorUnitTypeNumber	CM	M	-
versionNumber	O	M	-
vendorName	M	M	-
serialNumber	CM	M	-
dateOfManufacture	O	M	-
dateOfLastService	O	M	-
unitPosition	O	M	-
manufacturerData	O	M	-
relatedFunction	O	M	-

#### 6.3.1.3 Attribute constraints

Name	Definition
vendorUnitFamilyType CM Support Qualifier	The inventory is hardware.
vendorUnitTypeNumber CM Support Qualifier	The inventory is hardware.
serialNumber CM Support Qualifier	The inventory is hardware.

#### 6.3.1.4 Relationships

None.

#### 6.3.1.5 State diagram

None.

#### 6.3.1.6 Notifications

None.

### 6.3.2 InventoryUnitNE

#### 6.3.2.1 Definition

This SupportIOC represents the logical and physical structure of the NE.

### 6.3.2.2 Attributes

**Attributes of InventoryUnitNE**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
neId	M	M	-
customerIdentifier	O	M	-
productName	M	M	-
vendorName	M	M	-
productType	O	M	-
salesUniqueId	O	M	-
operatorUniqueName	O	M	-
siteId	O	M	-
additionalInformation	O	M	-

### 6.3.2.3 Attribute constraints

None.

### 6.3.2.4 Relationships

None.

### 6.3.2.5 State diagram

None.

### 6.3.2.6 Notifications

None.

## 6.3.3 InventoryUnitHw

### 6.3.3.1 Definition

This SupportIOC represents the hardware components.

### 6.3.3.2 Attributes

**Attributes of InventoryUnitHw**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
hwId	M	M	-
hwType	M	M	-
hwName	O	M	-
hwVersion	M	M	-
vendorName	O	M	-
salesUniqueId	O	M	-
hwUnitLocation	M	M	-
model	O	M	-
hwCapability	O	M	-
modificationDate	O	M	-
manualDataEntry	O	M	-
additionalInformation	O	M	-

### 6.3.3.3 Attribute constraints

None.

### 6.3.3.4 Relationships

None.

### 6.3.3.5 State diagram

None.

### 6.3.3.6 Notifications

None.

## 6.3.4 InventoryUnitSw

### 6.3.4.1 Definition

This SupportIOC represents the software components.

### 6.3.4.2 Attributes

**Attributes of InventoryUnitSw**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
swId	M	M	-
swName	O	M	-
swVersion	O	M	-
vendorName	O	M	-
salesUniqueId	O	M	-
classification	M	M	-
swStatus	O	M	-
swInstallationTime	O	M	-
swActivationTime	O	M	-
additionalInformation	O	M	-

### 6.3.4.3 Attribute constraints

None.

### 6.3.4.4 Relationships

None.

### 6.3.4.5 State diagram

None.

### 6.3.4.6 Notifications

None.

## 6.3.5 InventoryUnitLic

### 6.3.5.1 Definition

This SupportIOC represents the licence components.

### 6.3.5.2 Attributes

**Attributes of InventoryUnitLic**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
licId	M	M	-
licType	O	M	-
vendorName	O	M	-
validity	O	M	-
key	O	M	-
licStatus	O	M	-
licActivationTime	O	M	-
salesUniqueId	O	M	-
additionalInformation	O	M	-

### 6.3.5.3 Attribute constraints

None.

### 6.3.5.4 Relationships

None.

### 6.3.5.5 State diagram

None.

### 6.3.5.6 Notifications

None.

## 6.3.6 TmaInventoryUnit

### 6.3.6.1 Definition

This IOC represents inventory information for a Tower Mounted Amplifier Unit.



### 6.3.6.2 Attributes

#### Attributes of TmaInventoryUnit

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
tmaNumberOfNon-LinearGainValues	CM	M	-
tmaNon-LinearGainValue	CM	M	O
tmaAdditionalDataFieldNumber	CO	M	O
tmaAntennaModelNumber	CO	M	O
tmaAntennaOperatingBands	CO	M	O
tmaBeamwidthForEachOpBandInBandOrder	CO	M	O
tmaGainForEachOpBandInBandOrder	CO	M	O
tmaInstallationDate	CO	M	O
tmaInstallersId	CO	M	O
tmaMaxSupportedGain	CO	M	O
tmaMinSupportedGain	CO	M	O

### 6.3.6.3 Attribute constraints

Name	Definition
tmaNumberOfNon-LinearGainValues CM Support Qualifier	It is supported over the luant interface.
tmaNon-LinearGainValue CM Support Qualifier	It is supported over the luant interface.
tmaAdditionalDataFieldNumber CO Support Qualifier	It is supported over the luant interface.
tmaAntennaModelNumber CO Support Qualifier	It is supported over the luant interface.
tmaAntennaOperatingBands CO Support Qualifier	It is supported over the luant interface.
tmaBeamwidthForEachOpBandInBandOrder CO Support Qualifier	It is supported over the luant interface.
tmaGainForEachOpBandInBandOrder CO Support Qualifier	It is supported over the luant interface.
tmaInstallationDate CO Support Qualifier	It is supported over the luant interface.
tmaInstallersId CO Support Qualifier	It is supported over the luant interface.
tmaMaxSupportedGain CO Support Qualifier	It is supported over the luant interface.
tmaMinSupportedGain CO Support Qualifier	It is supported over the luant interface.

### 6.3.6.4 Notifications

None

## 6.3.7 AntennaInventoryUnit

### 6.3.7.1 Definition

This IOC represents inventory information for an Antenna Unit.

### 6.3.7.2 Attributes

#### Attributes of AntennaInventoryUnit

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
maxTiltValue	CO	M	O
minTiltValue	CO	M	O
mechanicalOffset	CO	M	O
baseElevation	CO	M	O
latitude	CO	M	O
longitude	CO	M	O
patternLabel	CO	M	O

### 6.3.7.3 Attribute constraints

Name	Definition
maxTiltValue CO Support Qualifier	It is supported over the luant interface.
minTiltValue CO Support Qualifier	It is supported over the luant interface.
mechanicalOffset CO Support Qualifier	It is supported over the luant interface.
baseElevation CO Support Qualifier	It is supported over the luant interface.
latitude CO Support Qualifier	It is supported over the luant interface.
longitude CO Support Qualifier	It is supported over the luant interface.
patternLabel CO Support Qualifier	It is supported over the luant interface.

### 6.3.7.4 Notifications

None.

## 6.4 Information relationship definitions

### 6.4.1 MFNERelation (O)

#### 6.4.1.1 Definition

This association represents the unidirectional relation between `ManagedFunction` and `InventoryUnitNE`.

#### 6.4.1.2 Roles

Name	Definition
mFunction	This role represents the associated <code>ManagedFunction</code> instances of a <code>InventoryUnitNE</code> instance.

#### 6.4.1.3 Constraints

None.

### 6.4.2 NESWRelation (O)

#### 6.4.2.1 Definition

This association represents the bidirectional relation between `InventoryUnitNE` and `InventoryUnitSW`.

### 6.4.2.2 Roles

Name	Definition
nEList	This role represents the associated <code>InventoryUnitNE</code> instances of a <code>InventoryUnitSW</code> instance.
sWList	This role represents the associated <code>InventoryUnitSW</code> instances of a <code>InventoryUnitNE</code> instance.

### 6.4.2.3 Constraints

None.

## 6.4.3 NEHWRelation (O)

### 6.4.3.1 Definition

This association represents the bidirectional relation between `InventoryUnitNE` and `InventoryUnitHW`.

### 6.4.3.2 Roles

Name	Definition
nEList	This role represents the associated <code>InventoryUnitNE</code> instances of a <code>InventoryUnitHW</code> instance.
hWList	This role represents the associated <code>InventoryUnitHW</code> instances of a <code>InventoryUnitNE</code> instance.

### 6.4.3.3 Constraints

None.

## 6.4.4 NELICRelation (O)

### 6.4.4.1 Definition

This association represents the bidirectional relation between `InventoryUnitNE` and `InventoryUnitLIC`.

### 6.4.4.2 Roles

Name	Definition
nEList	This role represents the associated <code>InventoryUnitNE</code> instances of a <code>InventoryUnitLIC</code> instance.
lICList	This role represents the associated <code>InventoryUnitLIC</code> instances of a <code>InventoryUnitNE</code> instance.

### 6.4.4.3 Constraints

None.

## 6.4.5 SWLICRelation (O)

### 6.4.5.1 Definition

This association represents the bidirectional relation between `InventoryUnitSW` and `InventoryUnitLIC`.

### 6.4.5.2 Roles

Name	Definition
sWList	This role represents the associated <code>InventoryUnitSW</code> instances of a <code>InventoryUnitLIC</code> instance.
lICList	This role represents the associated <code>InventoryUnitLIC</code> instances of a <code>InventoryUnitSW</code> instance.

### 6.4.5.3 Constraints

None.

## 6.4.6 SWHWRelation (O)

### 6.4.6.1 Definition

This association represents the bidirectional relation between `InventoryUnitSW` and `InventoryUnitHW`.

### 6.4.6.2 Roles

Name	Definition
sWList	This role represents the associated <code>InventoryUnitSW</code> instances of a <code>InventoryUnitHW</code> instance.
hWList	This role represents the associated <code>InventoryUnitHW</code> instances of a <code>InventoryUnitSW</code> instance.

### 6.4.6.3 Constraints

None.

## 6.4.7 HWLICRelation (O)

### 6.4.7.1 Definition

This association represents the bidirectional relation between `InventoryUnitHW` and `InventoryUnitLIC`.

### 6.4.7.2 Roles

Name	Definition
hWList	This role represents the associated <code>InventoryUnitHW</code> instances of a <code>InventoryUnitLIC</code> instance.
lICList	This role represents the associated <code>InventoryUnitLIC</code> instances of a <code>InventoryUnitHW</code> instance.

### 6.4.7.3 Constraints

None.

## 6.4.8 MFSWRelation (O)

### 6.4.8.1 Definition

This association represents the unidirectional relation between `ManagedFunction` and `InventoryUnitSW`.

### 6.4.8.2 Roles

Name	Definition
mFunction	This role represents the associated <code>ManagedFunction</code> instances of a <code>InventoryUnitSW</code> instance.

### 6.4.8.3 Constraints

None.

## 6.4.9 MFHWRelation (O)

### 6.4.9.1 Definition

This association represents the unidirectional relation between `ManagedFunction` and `InventoryUnitHW`.

### 6.4.9.2 Roles

Name	Definition
mFunction	This role represents the associated ManagedFunction instances of a InventoryUnitHW instance.

### 6.4.9.3 Constraints

None.

## 6.4.10 MFLICRelation (O)

### 6.4.10.1 Definition

This association represents the unidirectional relation between ManagedFunction and InventoryUnitLIC.

### 6.4.10.2 Roles

Name	Definition
mFunction	This role represents the associated ManagedFunction instances of a InventoryUnitLIC instance.

### 6.4.10.3 Constraints

None.

## 6.4.11 Inventory-Function (M)

### 6.4.11.1 Definition

This association represents the unidirectional association from an InventoryUnit and its related ManagedFunctions.

### 6.4.11.2 Roles

Name	Definition
relatedFunction	This role represents the ManagedFunction that is associated with an InventoryUnit.

### 6.4.11.3 Constraints

None

## 6.5 Information attribute definitions

### 6.5.1 Definition and legal values

Table 6.5.1 defines the attributes that are present in several Information Object Classes of the present document.

**Table 6.5.1: Attributes**

Attribute Name	Definition	Legal Values
baseElevation	The elevation in meters above sea level at the base of the antenna structure. This value, when subtracted from <code>height</code> (see TS 32.792 [14]), provides the height of the antenna above the ground. Note: The value of this attribute has no operational impact on the network, e.g. the NE behavior is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [12].	An integral value representing a number of meters in 0.1 meter increments.
additionalInformation	Supplementary information about inventory data (if any)	
classification	Name of installed SW (e.g. SW release, SW build, SW patches), empty value possible	
customerIdentifier	Unique identification of a vendors' customer	
dateOfManufacture	Date of Manufacture of inventory unit.	
dateOfLastService	Date of last service or repair of inventory unit.	
hwCapability	Hardware capability e.g. capacity, size (empty value is possible)	
hwName	Mnemonic of hw inventory unit family type (e.g. Fan, PSU) assigned by vendor.	
hwType	Type of the HW unit e.g. equipment holder, carriage	
hwUnitLocation	Unique physical / logical location identifier within NE	
hwVersion	Version / revision no. of current unit e.g. firmware version (empty value possible in case no versioning is available)	
id	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.	
inventoryUnitId	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.	
inventoryUnitType	Type of inventory unit (see TS 32.690 [11])	
key	License activation key according to the used licensing system	
licActivationTime	It indicates the date and time when the license was activated.	All values indicating valid time.
licId	Unique identifier of a license (e.g. name, code)	
licStatus	License status – applicable only for managed licenses (e.g. scheduled, valid, expired, invalid, capacity violated)	
licType	Describing type of current license (e.g. capacity, particular feature, no. of subscribers)	
manualDataEntry	Indicates whether unit is passive (manual insertion of inventory data is needed) or	

Attribute Name	Definition	Legal Values
	active (inventory data can be read from the unit)	
latitude	The latitude of the antenna location based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to the northern hemisphere. Note: The value of this attribute has no operational impact on the network, e.g. the NE behavior is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [12].	Valid values described in 3GPP TS 23.032 [13].
longitude	The longitude of the antenna location based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to degrees east of 0 degrees longitude. Note: The value of this attribute has no operational impact on the network, e.g. the NE behavior is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [12].	Valid values described in 3GPP TS 23.032 [13]
manufacturerData	Manufacturer specific data of inventory unit.	
model	Equipment configuration, e.g. standard hw unit or a variant that may contain additional disk capacity (empty value possible)	
modificationDate	Date/time stamp of last change (e.g. repair action)	
neId	vendor defined unique identifier of a logical or physical network element unit	
operatorUniqueName	Unique NE identifier used by operator	
productName	NE name classifying a vendor's product family or function	
productType	Identifier of the e.g. platform, in case the product can be based on different HW/SW platforms (not used for logical NEs)	
salesUniqueId	Unique identifier used by vendor (used e.g. for ordering a new unit)	
hwId	Hardware identifier allocated by the vendor, e.g. the serialnumber	
maxTiltValue	The maximum amount of tilt the RET system can support. "Maximum supported tilt" in Ref. 3GPP TS 25.466 [12].	See "Maximum supported tilt" in Ref. 3GPP TS 25.466 [12].
mechanicalOffset	This is a value representing a non-adjustable tilt value, which is imparted to the antenna due to the physical installation. The actual tilt at any point in time is the summation of <code>mechanicalOffset</code> and <code>retTiltValue</code> . Note: The value of this attribute has no operational impact on the network, e.g. the NE behavior is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [12].	A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees.
minTiltValue	The minimum amount of tilt the RET system can support, "Minimum supported tilt" in Ref. 3GPP TS 25.466 [12].	See "Minimum supported tilt" in Ref. 3GPP TS 25.466 [12].
patternLabel	The pattern name is a textual, alpha-numeric string to allow identification of the antenna	

Attribute Name	Definition	Legal Values
	pattern along with the antenna vendor information such as model number, etc. Note: The value of this attribute has no operational impact on the network, e.g. the NE behavior is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [12].	
relatedFunction	This attribute contains the DN of one ManagedFunction.	
serialNumber	Serial number of inventory unit.	
siteId	NE site in customer network	
swActivationTime	It indicates the date and time when the software was activated.	All values indicating valid time.
swId	Unique identifier of a SW unit	
swName	SW release name used	
swInstallationTime	It indicates the date and time when the software installation process ended and the software was installed.	All values indicating valid time.
swStatus	Status of the SW unit (e.g. installed, archived)	
swVersion	Version identifier of the SW unit	
tmaAdditionalDataFieldNumber	This attribute identifies a standard data field which has no operational impact. Used by the procedures SetDeviceData and GetDevedata. Defined in Table B.3 of 3GPP TS 25.466 [12].	Defined in TS 25.466 [12]
tmaAntennaModelNumber	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaAntennaOperatingBands	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaBeamwidthForEachOpBandInBandOrder	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaGainForEachOpBandInBandOrder	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaInstallationDate	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaInstallersId	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaMaxSupportedGain	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaMinSupportedGain	A data field defined in Table B.3 of 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaNon-LinearGainValue	Defined in 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
tmaNumberOfNon-LinearGainValues	Defined in 3GPP TS 25.466 [12]	Defined in TS 25.466 [12]
unitPosition	Position of inventory unit (e.g. Rack, shelf, slot, etc.).  Depending on the implementation of the inventory unit in the managed system, the value and meaning of this attribute may vary.  For example, if a system has three levels and types of inventory units representing Rack, Shelf and Slot respectively (i.e. the Managed Element contains multiple Rack inventory units, each Rack inventory unit contains multiple Shelf inventory units and each Shelf inventory unit contains multiple Slot inventory units), then for this example: – for the Inventory Unit representing a	



Attribute Name	Definition	Legal Values
	Rack, the Frame Identification code may be used as the value of this attribute; <ul style="list-style-type: none"> <li data-bbox="715 331 1158 409">– for the Inventory Unit representing a Shelf, the Rack Shelf code may be used as the value of this attribute;</li> <li data-bbox="715 409 1158 488">– for the Inventory Unit representing a Slot, the position code may be used as the value of this attribute.</li> </ul>	
validity	License validity which may include one of the elements duration, end (expiration date) or forever	
vendorName	Name of inventory unit vendor (or vendors may provide manufacturer name)	
vendorName	Name of inventory unit vendor.	
vendorUnitFamilyType	Mnemonic of inventory unit family type (e.g. Fan, PSU) assigned by vendor.	
vendorUnitTypeNumber	A vendor/manufacturer defined and assigned number which uniquely identifies the unit type and optionally for backward compatibility reasons only, also version (used for replacing HW units, spares).	
versionNumber	The version information related to vendorUnitTypeNumber.	

## 6.5.2 Constraints

None

## 6.6 Particular information configurations

None

## Annex A (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
Sep 2002	SA_17	SP-020473	--	--	Submitted to TSG SA #17 for Approval	--	1.0.0	5.0.0
Dec 2004	SA_26	SP-040816	0001	--	Align Inventory Management Network Resource Model with the latest template from Rel-6 TS 32.150	F	5.0.0	6.0.0
Jun 2005	SA_28	SP-050301	0002	--	Remove obsolete compliance text in 4.2	F	6.0.0	6.1.0
Dec 2005	SA_30	SP-050714	0003	--	Correct support qualifier - Align IS with requirements in 32.690	F	6.1.0	6.2.0
Jun 2006	SA_32	SP-060257	0004	--	Correction of InventoryUnit missing VsDataContainer and Version Number	F	6.2.0	6.3.0
Jun 2006	SA_32	SP-060257	0005	--	Correct the TS reference number from 32.691 to 32.690	F	6.2.0	6.3.0
Jun 2007	SA_36	SP-070269	0006	--	Delete the duplicated vendorUnitTypeNumber attribute definitions	F	6.3.0	6.4.0
Jun 2007	SA_36	--	--	--	Automatic upgrade to Rel-7 (no CR) at freeze of Rel-7.	--	6.4.0	7.0.0
Dec 2008	SA_42	--	--	--	Upgrade to Release 8	--	7.0.0	8.0.0
Dec 2009	-	-	-	-	Update to Rel-9 version	--	8.0.0	9.0.0
Mar 2011	-	-	-	-	Update to Rel-10 version (MCC)		9.0.0	10.0.0
May 2011	SA_52	SP-110295	0007	1	Add missing common RAT inventory	C	10.0.0	10.1.0
May 2011	SA_52	SP-110290	0008	2	Inventory Model Enhancements - IS	B	10.0.0	10.1.0
Dec 2011	SA_54	SP-110722	0009	1	Correct identifier for InventoryUnitHw	F	10.1.0	10.2.0
Sep-2012	SA_57	SP-120563	0011	1	Addition of sw InstallationTime , sw ActivationTime and licActivationTime	B	10.2.0	11.0.0