

# ETSI TS 128 633 V15.0.0 (2018-07)



**Universal Mobile Telecommunications System (UMTS);  
LTE;  
Telecommunication management;  
Inventory Management (IM) Network Resource Model (NRM)  
Integration Reference Point (IRP);  
Solution Set (SS) definitions  
(3GPP TS 28.633 version 15.0.0 Release 15)**



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**Reference**

RTS/TSGS-0528633vf00

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**Keywords**

LTE,UMTS

**ETSI**

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# 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.

28.631: Inventory Management (IM) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements.

28.632: Inventory Management (IM) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS).

**28.633: Inventory Management (IM) Network Resource Model (NRM) 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.

The present document covers the Inventory Management (IM) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions.

---

# 1 Scope

The present document provides the NRM-specific part related to the Inventory Management NRM IRP IS in 3GPP TS 28.632 [1] of solution set definitions.

This Solution Set definitions specification is related to 3GPP TS 28.632 V 14.0.X [1].

---

# 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 28.632: "Telecommunication management; Inventory Management (IM) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".
  - [2] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Information Service (IS)".
  - [3] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Solution Set (SS) definitions".
  - [4] W3C REC-xml11-20060816: "Extensible Markup Language (XML) 1.1 (Second Edition)".
  - [5] Void
  - [6] W3C XML Schema Definition Language (XSD) 1.1 Part 1: Structures.
  - [7] W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes.
  - [8] W3C REC-xml-names-20060816: "Namespaces in XML 1.1 (Second Edition)".
  - [9] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
  - [10] 3GPP TS 32.342: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP); Information Service (IS)".
  - [11] 3GPP TS 28.623: "Generic network resources Integration Reference Point (IRP); Solution Set (SS) definition".
- 

# 3 Definitions and abbreviations

## 3.1 Definitions

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

**XML file:** See definition of [11].

**XML document:** See definition of [11].

**XML declaration:** See definition of [11].

**XML element:** See definition of [11].

**empty XML element:** See definition of [11].

**XML content (of an XML element):** See definition of [13].

**XML start-tag:** See definition of [11].

**XML end-tag:** See definition of [11].

**XML empty-element tag:** See definition of [11].

**XML attribute specification:** See definition of [11].

**DTD:** See definition of [11].

**XML schema:** See definition of [11].

**XML namespace:** See definition of [11].

**XML complex type:** See definition of [11].

**XML element type:** See definition of [11].

## 3.2 Abbreviations

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

CORBA	Common Object Request Broker Architecture
DTD	Document Type Definition
IM	Inventory Management
IRP	Integration Reference Point
IS	Information Service
NRM	Network Resource Model
XML	eXtensible Markup Language
XSD	XML Schema Definition

---

## 4 Solution Set definitions

This specification defines the following 3GPP Inventory Management (IM) Network Resource Model (NRM) IRP Solution Set (SS) definitions:

- 3GPP Inventory Management (IM) Network Resource Model (NRM) IRP XML definitions (Annex A)

CORBA Solution Set is not present in the current version of this specification.

---

# Annex A (normative): XML definitions

## A.0 General

This annex provides the NRM-specific part related to the Inventory Management NRM IRP IS in 3GPP TS 28.632 [1] of the XML file format definition for the Bulk Configuration Management IRP IS in 3GPP TS 32.612 [2] as well as for use with File Transfer IRP [10].

The XML file formats are based on XML [4], XML Schema [6] [7] and XML Namespace [8] standards.

---

## A.1 Architectural features

### A.1.0 Introduction

The overall architectural feature of Inventory Management NRM IRP IS is specified in 3GPP TS 28.632 [1].

This clause specifies features that are specific to the XML Schema definitions.

### A.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [9].

---

## A.2 Mapping

The mapping is not present in the current version of this specification.

---

## A.3 Solution Set definitions

### A.3.1 XML definition structure

The overall description of the file format of inventory data XML files is provided by 3GPP TS 32.616 [3].

A.3.2 defines the NRM-specific XML schema `inventoryNrm.xsd` for the Inventory Management NRM IRP IS alternative 1 defined in 3GPP TS 28.632 [1].

A.3.3 defines the NRM-specific XML schema `inventoryNrmAlt2.xsd` for the Inventory Management NRM IRP IS alternative 2 as defined in 3GPP TS 28.632 [1].

XML schema `inventoryNrmAlt1.xsd` and `inventoryNrmAlt2.xsd` explicitly declare NRM-specific XML element types for the related NRM.

The definition of those NRM-specific XML element types complies with the generic mapping rules defined in 3GPP TS 32.616 [3].

### A.3.2 XML schema "inventoryNrm.xsd"

The following XML schema `inventoryNrm.xsd` is the NRM-specific schema for the Inventory Management NRM IRP IS alternative 1 defined in 3GPP TS 28.632 [1].

```
<?xml version="1.1" encoding="UTF-8"?>
```

```
<!--  
  3GPP TS 28.633 Inventory Management NRM IRP  
  Inventory data file NRM-specific XML schema  
  inventoryNrm.xsd  
-->
```



```

<schema
  targetNamespace=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.633#inventoryNrm"
  elementFormDefault="qualified"
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xn=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.623#genericNrm"
  xmlns:in=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.633#inventoryNrm"
>

  <import
    namespace=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.623#genericNrm"
  />

  <!-- Inventory Management Alternative 1 NRM IRP NRM class associated XML elements -->
  <simpleType name="eightOctetsType">
    <restriction base="hexBinary">
      <length value="8"/>
    </restriction>
  </simpleType>
  <simpleType name="fourOctetsType">
    <restriction base="hexBinary">
      <length value="4"/>
    </restriction>
  </simpleType>
  <simpleType name="angleValueType">
    <restriction base="short">
      <minInclusive value="0"/>
      <maxInclusive value="3600"/>
    </restriction>
  </simpleType>

  <element
    name="InventoryUnit"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"
  >
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element
              name="attributes"
              minOccurs="0">
              <complexType>
                <all>
                  <element
                    name="inventoryUnitType"
                    type="string"
                  />
                  <element
                    name="vendorUnitFamilyType"
                    type="string"
                    minOccurs="0"
                  />
                  <element
                    name="vendorUnitTypeNumber"
                    type="string"
                    minOccurs="0"
                  />
                  <element
                    name="vendorName"
                    type="string"/>
                  <element
                    name="serialNumber"
                    type="string"
                    minOccurs="0"/>
                  <element
                    name="dateOfManufacture"
                    type="date"
                    minOccurs="0"/>
                  <element
                    name="dateOfLastService"
                    type="date"
                    minOccurs="0"/>
                </all>
              </complexType>
            </element>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

```

```

        name="unitPosition"
        type="string"
        minOccurs="0"/>
    <element
        name="manufacturerData"
        type="string"
        minOccurs="0"/>
    <element
        name="versionNumber"
        type="string"
        minOccurs="0"/>
    <element name="relatedFunction" type="xn:dn" minOccurs="0"/>
    </all>
    </complexType>
</element>
<choice minOccurs="0" maxOccurs="unbounded">
    <element ref="in:InventoryUnit"/>
    <element ref="xn:VsDataContainer"/>
    <element ref="in:TmaInventoryUnit"/>
    <element ref="in:AntennaInventoryUnit"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>
<element name="TmaInventoryUnit" substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
        <complexContent>
            <extension base="xn:NrmClass">
                <sequence>
                    <element name="attributes" minOccurs="0">
                        <complexType>
                            <all>
                                <!-- Inherited attributes from InventoryUnit-->
                                <element name="inventoryUnitType" type="string"/>
                                <element name="vendorUnitFamilyType" type="string" minOccurs="0"/>
                                <element name="vendorUnitTypeNumber" type="string" minOccurs="0"/>
                                <element name="vendorName" type="string"/>
                                <element name="serialNumber" type="string" minOccurs="0"/>
                                <element name="dateOfManufacture" type="date" minOccurs="0"/>
                                <element name="dateOfLastService" type="date" minOccurs="0"/>
                                <element name="unitPosition" type="string" minOccurs="0"/>
                                <element name="manufacturerData" type="string" minOccurs="0"/>
                                <element name="versionNumber" type="string" minOccurs="0"/>
                                <element name="relatedFunction" type="xn:dn" minOccurs="0"/>
                                <!-- End of inherited attributes from InventoryUnit -->
                                <element name="tmaNumberOfNonLinearGainValues" type="short" minOccurs="0"/>
                                <element name="tmaNonLinearGainValue" type="short" minOccurs="0"/>
                                <element name="tmaAdditionalDataFieldNumber" type="short" minOccurs="0"/>
                                <element name="tmaAntennaModelNumber" type="string" minOccurs="0"/>
                                <element name="tmaAntennaOperatingBands" type="short" minOccurs="0"/>
                                <element name="tmaBeamwidthForEachOpBandInBandOrder" type="in:eightOctetsType"
minOccurs="0"/>
                                <element name="tmaGainForEachOpBandInBandOrder" type="in:fourOctetsType"
minOccurs="0"/>
                                <element name="tmaInstallationDate" type="string" minOccurs="0"/>
                                <element name="tmaInstallersId" type="string" minOccurs="0"/>
                                <element name="tmaMaxSupportedGain" type="short" minOccurs="0"/>
                                <element name="tmaMinSupportedGain" type="short" minOccurs="0"/>
                            </all>
                        </complexType>
                    </element>
                    <choice minOccurs="0" maxOccurs="unbounded">
                        <element ref="in:InventoryUnit"/>
                        <element ref="xn:VsDataContainer"/>
                    </choice>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
</element>
<element name="AntennaInventoryUnit"
substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
        <complexContent>
            <extension base="xn:NrmClass">
                <sequence>

```

```

<element name="attributes" minOccurs="0">
  <complexType>
    <all>
      <!-- Inherited attributes from InventoryUnit-->
      <element name="inventoryUnitType" type="string"/>
      <element name="vendorUnitFamilyType" type="string" minOccurs="0"/>
      <element name="vendorUnitTypeNumber" type="string" minOccurs="0"/>
      <element name="vendorName" type="string"/>
      <element name="serialNumber" type="string" minOccurs="0"/>
      <element name="dateOfManufacture" type="date" minOccurs="0"/>
      <element name="dateOfLastService" type="date" minOccurs="0"/>
      <element name="unitPosition" type="string" minOccurs="0"/>
      <element name="manufacturerData" type="string" minOccurs="0"/>
      <element name="versionNumber" type="string" minOccurs="0"/>
      <element name="relatedFunction" type="xn:dn" minOccurs="0"/>
      <!-- End of inherited attributes from InventoryUnit-->
      <element name="maxTiltValue" type="in:angleValueType" minOccurs="0"/>
      <element name="minTiltValue" type="in:angleValueType" minOccurs="0"/>
      <element name="mechanicalOffset" type="in:angleValueType" minOccurs="0"/>
      <element name="baseElevation" type="integer" minOccurs="0"/>
      <element name="latitude" type="decimal" minOccurs="0"/>
      <element name="longitude" type="decimal" minOccurs="0"/>
      <element name="patternLabel" type="string" minOccurs="0"/>
    </all>
  </complexType>
</element>
<choice minOccurs="0" maxOccurs="unbounded">
  <element ref="in:InventoryUnit"/>
  <element ref="xn:VsDataContainer"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>
</schema>

```

### A.3.3 XML schema "inventoryNrmAlt2.xsd"

The following XML schema `inventoryNrmAlt2.xsd` is the NRM-specific schema for the Inventory Management NRM IRP IS alternative 2 defined in 3GPP TS 28.632 [1].

```

<?xml version="1.1" encoding="UTF-8"?>
<!--
  3GPP TS 28.633 Inventory Management NRM IRP
  Inventory data file NRM-specific XML schema
  inventoryNrmAlt2.xsd
-->
<schema xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xn="http://www.3gpp.org/ftp/specs/archive/28_series/28.623#genericNrm"
  xmlns:in="http://www.3gpp.org/ftp/specs/archive/28_series/28.633#inventoryNrmAlt2"
  targetNamespace="http://www.3gpp.org/ftp/specs/archive/28_series/28.633#inventoryNrmAlt2"
  elementFormDefault="qualified">
  <import namespace="http://www.3gpp.org/ftp/specs/archive/28_series/28.623#genericNrm"/>
  <!-- Inventory Management Alternative 2 NRM IRP NRM class associated XML elements -->
  <element name="InventoryUnitNE"
  substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="neId" type="string"/>
                  <element name="customerIdentifier" type="string" minOccurs="0"/>
                  <element name="productName" type="string"/>
                  <element name="vendorName" type="string"/>
                  <element name="productType" type="string" minOccurs="0"/>
                  <element name="salesUniqueId" type="string" minOccurs="0"/>
                  <element name="operatorUniqueName" type="string" minOccurs="0"/>
                  <element name="siteId" type="integer" minOccurs="0"/>
                  <element name="additionalInformation" type="string"
minOccurs="0"/>
                  <element name="hwList" type="xn:dnList" minOccurs="0"/>
                  <element name="swList" type="xn:dnList" minOccurs="0"/>
                  <element name="lICList" type="xn:dnList" minOccurs="0"/>
                </all>
              </complexType>
            </element>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

```

```

        <element name="mFunction" type="xn:dn" minOccurs="0"/>
      </all>
    </complexType>
  </element>
  <element ref="in:InventoryUnitNE" minOccurs="0" maxOccurs="unbounded"/>
</sequence>
</extension>
</complexContent>
</complexType>
</element>
<element name="InventoryUnitHw"
substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="hwId" type="string"/>
                <element name="hwType" type="string"/>
                <element name="hwName" type="string" minOccurs="0"/>
                <element name="vendorName" type="string" minOccurs="0"/>
                <element name="hwVersion" type="string"/>
                <element name="salesUniqueId" type="string" minOccurs="0"/>
                <element name="hwUnitLocation" type="string"/>
                <element name="model" type="string" minOccurs="0"/>
                <element name="hwCapability" type="string" minOccurs="0"/>
                <element name="modificationDate" type="string" minOccurs="0"/>
                <element name="manualDataEntry" type="string" minOccurs="0"/>
                <element name="additionalInformation" type="string"
minOccurs="0"/>
                <element name="nEList" type="xn:dnList" minOccurs="0"/>
                <element name="swList" type="xn:dnList" minOccurs="0"/>
                <element name="lICList" type="xn:dnList" minOccurs="0"/>
                <element name="mFunction" type="xn:dn" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <element ref="in:InventoryUnitHw" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
      </extension>
    </complexContent>
  </complexType>
</element>
<element name="InventoryUnitSw"
substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
  <complexType>
    <complexContent>
      <extension base="xn:NrmClass">
        <sequence>
          <element name="attributes" minOccurs="0">
            <complexType>
              <all>
                <element name="swId" type="string"/>
                <element name="swName" type="string" minOccurs="0"/>
                <element name="vendorName" type="string" minOccurs="0"/>
                <element name="swVersion" type="string" minOccurs="0"/>
                <element name="salesUniqueId" type="string" minOccurs="0"/>
                <element name="classification" type="string"/>
                <element name="swInstallationTime" type="dateTime"
minOccurs="0"/>
                <element name="swActivationTime" type="dateTime" minOccurs="0"/>
                <element name="swStatus" type="string" minOccurs="0"/>
                <element name="additionalInformation" type="string"
minOccurs="0"/>
                <element name="nEList" type="xn:dnList" minOccurs="0"/>
                <element name="hwList" type="xn:dnList" minOccurs="0"/>
                <element name="lICList" type="xn:dnList" minOccurs="0"/>
                <element name="mFunction" type="xn:dn" minOccurs="0"/>
              </all>
            </complexType>
          </element>
          <element ref="in:InventoryUnitSw" minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
      </extension>
    </complexContent>
  </complexType>

```

```

    </element>
    <element name="InventoryUnitLic"
substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
    <complexContent>
    <extension base="xn:NrmClass">
    <sequence>
    <element name="attributes" minOccurs="0">
    <complexType>
    <all>
    <element name="licId" type="string"/>
    <element name="licType" type="string" minOccurs="0"/>
    <element name="vendorName" type="string" minOccurs="0"/>
    <element name="validity" type="string" minOccurs="0"/>
    <element name="key" type="string" minOccurs="0"/>
    <element name="licActivationTime" type="dateTime"
minOccurs="0"/>
    <element name="licStatus" type="string" minOccurs="0"/>
    <element name="salesUniqueId" type="string" minOccurs="0"/>
    <element name="additionalInformation" type="string"
minOccurs="0"/>
    <element name="nEList" type="xn:dnList" minOccurs="0"/>
    <element name="hWList" type="xn:dnList" minOccurs="0"/>
    <element name="sWList" type="xn:dnList" minOccurs="0"/>
    <element name="mFunction" type="xn:dn" minOccurs="0"/>
    </all>
    </complexType>
    </element>
    <element ref="in:InventoryUnitLic" minOccurs="0" maxOccurs="unbounded"/>
    </sequence>
    </extension>
    </complexContent>
    </complexType>
  </element>
</schema>

```

## Annex B (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2014-06	SA#64	SP-140332	001	-	upgrade XSD	11.0.0	11.1.0
		SP-140358	002	-	remove the feature support statements		
2014-09	SA#65	SP-140560	003	-	Update the link from Solution Set to Information Service due to the end of Release 12	11.1.0	12.0.0
2016-01	SA#70				Upgrade to Rel-13 (MCC)	12.0.0	13.0.0
2016-03	SA#71	SP-160031	006	-	Make the XML schema well formed	13.0.0	13.1.0

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2016-06	SA#72	SP-160407	0007	-	F	Update the link from IRP Solution Set to IRP Information Service	13.2.0
2017-03	SA#75	-	-	-	-	Promotion to Release 14 without technical change	14.0.0
2017-06	SA#76	SP-170514	0008	-	F	Update link from IRP SS to IS	14.1.0
2018-06	-	-	-	-	-	Update to Rel-15 version (MCC)	<b>15.0.0</b>

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# History

<b>Document history</b>		
V15.0.0	July 2018	Publication