3GPP TS 28.709 V19.0.0 (2025-06)

Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

Evolved Packet Core (EPC)

Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

(Release 19)

**



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

Keywords

EPC, NRM, IRP, Converged 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.

© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, 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 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 4

Introduction 4

1 Scope 5

2 References 5

3 Definitions and abbreviations 6

3.1 Definitions 6

3.2 Abbreviations 6

4 Solution Set definitions 7

Annex A (normative): CORBA Solution Set 8

A.0 General 8

A.1 Architectural features 8

A.1.0 Introduction 8

A.1.1 Syntax for Distinguished Names 8

A.1.2 Rules for NRM extensions 8

A.2 Mapping 8

A.2.1 General mapping 8

A.2.2 Information Object Class (IOC) mapping 8

A.2.2.1 IOC MMEFunction 8

A.2.2.2 IOC MMEPool 9

A.2.2.3 IOC MMEPoolArea 9

A.2.2.4 IOC EP\_RP\_EPS 9

A.2.2.5 IOC ExternalMMEFunction 9

A.2.2.6 IOC ServingGWFunction 9

A.2.2.7 IOC ExternalServingGWFunction 9

A.2.2.8 IOC QCISet 10

A.2.2.9 IOC MBMSGWFunction 10

A.2.2.10 IOC ServingGwCFunction 10

A.2.2.11 IOC ExternalServingGwCFunction 10

A.3 Solution Set definitions 11

A.3.1 IDL definition structure 11

A.3.2 IDL specification "EPCResourcesNRMDefs.idl" 11

Annex B (normative): XML definitions 17

B.0 General 17

B.1 Architectural features 17

B.1.0 Introduction 17

B.1.1 Syntax for Distinguished Names 17

B.2 Mapping 17

B.2.1 General mapping 17

B.2.2 Information Object Class (IOC) mapping 17

B.3 Solution Set definitions 17

B.3.1 XML definition structure 17

B.3.2 XML schema “epcNrm.xsd” 18

Annex C (informative): Change history 32

# Foreword

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

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

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

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

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

# Introduction

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

28.707: Evolved Packet Core (EPC) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements

28.708: Evolved Packet Core (EPC) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)

**28.709: Evolved Packet Core (EPC) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions**

# 1 Scope

The present document specifies the Solution Sets for the EPC NRM IRP.

The Solution Set definition is related to 3GPP TS 28.708 [3].

# 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 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.708: "Telecommunication management; Evolved Packet Core (EPC) Network Resource Model (NRM) 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] 3GPP TS 32.606: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP); Solution Set (SS) definitions".

[5] W3C REC-xml-names-20060816: "Namespaces in XML 1.1 (Second Edition)".

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

[7] W3C REC-xml11-20060816: "Extensible Markup Language (XML) 1.1 (Second Edition)".

[8] Void

[9] W3C XML Schema Definition Language (XSD) 1.1 Part 1: Structures.

[10] W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes.

[11] 3GPP TS 28.623: "Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definition".

[12] Void.

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**XML file:** See definition of [3].

**XML document:** See definition of [3].

**XML declaration:** See definition of [3].

**XML element:** See definition of [3].

**empty XML element:** See definition of [3].

**XML content (of an XML element):** See definition of [3].

**XML start-tag:** See definition of [3].

**XML end-tag:** See definition of [3].

**XML empty-element tag:** See definition of [3].

**XML attribute specification:** See definition of [3].

**DTD:** See definition of [3].

**XML schema:** See definition of [3].

**XML namespace:** See definition of [3].

**XML complex type:** See definition of [3].

**XML element type:** See definition of [3].

## 3.2 Abbreviations

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

CM Configuration Management

CORBA Common Object Request Broker Architecture

DN Distinguished Name

DTD Document Type Definition

eNodeB evolved NodeB

EPC Evolved Packet Core

EPDG Evolved Packet Data Gateway

E-UTRAN Evolved Universal Terrestrial Radio Access Network

GPRS General Packet Radio System

IS Information Service

IDL Interface Definition Language (OMG)

IOC Information Object Class

IRP Integration Reference Point

IS Information Service

MME Mobility Management Entity

MO Managed Object

MOC Managed Object Class

NRM Network Resource Model

OMG Object Management Group

PCRF Policy and Charging Rules Function

P‑GW PDN Gateway

S‑GW Serving Gateway

SS Solution Set

XML eXtensible Markup Language

# 4 Solution Set definitions

This specifications defines the following 3GPP EPC NRM IRP Solution Set definitions:

- 3GPP EPC NRM IRP CORBA SS (Annex A)

- 3GPP EPC NRM IRP XML definitions (Annex B)

Annex A (normative):  
CORBA Solution Set

# A.0 General

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in EPC Network Resource Model (NRM) IRP: Information Service (TS 28.708 [2]).

# A.1 Architectural features

## A.1.0 Introduction

The overall architectural feature of EPC NRM IRP is specified in 3GPP TS 28.708 [2].

This clause specifies features that are specific to the CORBA SS.

## A.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [6].

## A.1.2 Rules for NRM extensions

See clause A.1.2 of 3GPP TS 28.623 [11].

# A.2 Mapping

## A.2.1 General mapping

See clause A.1.2.1 of [11].

## A.2.2 Information Object Class (IOC) mapping

### A.2.2.1 IOC MMEFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes::plmnIdListType |
| mMEC | mMEC | long |
| mMEPool | mMEPool | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| isOnboardSatellite | isOnboardSatellite | boolean |
| onboardSatelliteId | onboardSatelliteId | string |
| storeAndForwardSupportInd | storeAndForwardSupportInd | boolean |
| snFConfigInfo | snFConfigInfo | string |

### A.2.2.2 IOC MMEPool

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| mMEGI | mMEGI | long |
| mMEPoolMemberList | mMEPoolMemberList | GenericNetworkResourcesIRPSystem::AttributeTypes:: MOReferenceSet |
| mMEPoolArea | mMEPoolArea | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |

### A.2.2.3 IOC MMEPoolArea

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| mMEPool | mMEPool | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| tACList | tACList | GenericNetworkResourcesIRPSystem::AttributeTypes::LongSet |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes::plmnIdListType |

### A.2.2.4 IOC EP\_RP\_EPS

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| farEndNeIpAddr | farEndNeIpAddr | string |

### A.2.2.5 IOC ExternalMMEFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes:: plmnIdListType |
| mMEC | mMEC | long |
| mMEPool | mMEPool | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| isOnboardSatellite | isOnboardSatellite | boolean |
| onboardSatelliteId | onboardSatelliteId | string |
| storeAndForwardSupportInd | storeAndForwardSupportInd | boolean |
| snFConfigInfo | snFConfigInfo | string |

### A.2.2.6 IOC ServingGWFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes:: plmnIdListType |
| tACList | tACList | GenericNetworkResourcesIRPSystem::AttributeTypes::LongSet |

### A.2.2.7 IOC ExternalServingGWFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes::plmnIdListType |
| tACList | tACList | GenericNetworkResourcesIRPSystem::AttributeTypes::LongSet |

### A.2.2.8 IOC QCISet

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| qCIList | qCIList | genericEPCNRMAttributeTypes::AttributeTypes:: qciListType |

### A.2.2.9 IOC MBMSGWFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |

### A.2.2.10 IOC ServingGwCFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes::plmnIdListType |
| tACList | tACList | GenericNetworkResourcesIRPSystem::AttributeTypes::LongSet |

### A.2.2.11 IOC ExternalServingGwCFunction

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| pLMNIdList | pLMNIdList | genericEPCNRMAttributeTypes::AttributeTypes::plmnIdListType |
| tACList | tACList | GenericNetworkResourcesIRPSystem::AttributeTypes::LongSet |

# A.3 Solution Set definitions

## A.3.1 IDL definition structure

Clause A.3.2 defines the types and constants which are used by the EPC NRM IRP.

## A.3.2 IDL specification "EPCResourcesNRMDefs.idl"

//File:EPCResourcesNRMDefs.idl

#ifndef \_EPC*NETWORKRESOURCESNRMDEFS\_*IDL\_

#define \_E*PCNETWORKRESOURCESNRMDEFS\_*IDL\_

#include "GenericNetworkResourcesNRMDefs.idl"

#pragma prefix "3gppsa5.org"

/\*\*

\* This module defines constants for each MO class name and

\* the attribute names for each defined MO class.

\*/

module EPCNetworkResourcesNRMDefs

{

/\*\*

\* Definitions for MO class EPDGFunction

\*/

interface EPDGFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "EPDGFunction";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class MMEFunction

\*/

interface MMEFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "MMEFunction";

// Attribute Names

//

const string id = "id";

const string pLMNIdList = "pLMNIdList";

const string mMEC = "mMEC";

const string mMEPool = "mMEPool";

const string isOnboardSatellite = "isOnboardSatellite";

const string onboardSatelliteId = "onboardSatelliteId";

const string storeAndForwardSupportInd = "storeAndForwardSupportInd";

const string snFConfigInfo = "snFConfigInfo";

};

/\*\*

\* Definitions for MO class PCRFFunction

\*/

interface PCRFFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "PCRFFunction";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class PGWFunction

\*/

interface PGWFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "PGWFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class PGWCFunction

\*/

interface PGWCFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "PGWCFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class PGWUFunction

\*/

interface PGWUFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "PGWUFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class ServingGWFunction

\*/

interface ServingGWFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ServingGWFunction";

// Attribute Names

const string id = "id";

const string pLMNIdList = "pLMNIdList";

const string tACList = "tACList";

//

};

/\*\*

\* Definitions for MO class ServingGWCFunction

\*/

interface ServingGWCFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ServingGWCFunction";

// Attribute Names

const string id = "id";

const string pLMNIdList = "pLMNIdList";

const string tACList = "tACList";

//

};

/\*\*

\* Definitions for MO class ServingGWUFunction

\*/

interface ServingGWUFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ServingGWUFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class MMEPool

\*/

interface MMEPool : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "MMEPool";

// Attribute Names

//

const string id = "id";

const string mMEGI = "mMEGI";

const string mMEPoolMemberList = "mMEPoolMemberList";

const string mMEPoolArea = "mMEPoolArea";

};

/\*\*

\* Definitions for MO class MMEPoolArea

\*/

interface MMEPoolArea : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "MMEPoolArea";

// Attribute Names

//

const string id = "id";

const string mMEPool = "mMEPool";

const string tACList = "tACList";

const string sGWAddress = "sGWAddress";

const string pLMNIdList = "pLMNIdList";

};

/\*\*

\* Definitions for MO class EP\_RP\_EPS

\*/

interface EP\_RP\_EPS : GenericNetworkResourcesNRMDefs::EP\_RP

{

const string CLASS = "EP\_RP\_EPS";

// Attribute Names

const string farEndNeIpAddr = "farEndNeIpAddr";

};

/\*\*

\* Definitions for MO class Link\_ENB\_MME

\*/

interface Link\_ENB\_MME : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_ENB\_MME";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_ENB\_ServingGW

\*/

interface Link\_ENB\_ServingGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_ENB\_ServingGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_EPDG\_PCRF

\*/

interface Link\_EPDG\_PCRF : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_EPDG\_PCRF";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_EPDG\_PGW

\*/

interface Link\_EPDG\_PGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_EPDG\_PGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_HSS\_MME

\*/

interface Link\_HSS\_MME : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_HSS\_MME";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_MME\_MME

\*/

interface Link\_MME\_MME : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_MME\_MME";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_MME\_SGSN

\*/

interface Link\_MME\_SGSN : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_MME\_SGSN";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_MME\_ServingGW

\*/

interface Link\_MME\_ServingGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_MME\_ServingGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_PCRF\_ServingGW

\*/

interface Link\_PCRF\_ServingGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_PCRF\_ServingGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_PCRF\_PGW

\*/

interface Link\_PCRF\_PGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_PCRF\_PGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_PGW\_ServingGW

\*/

interface Link\_PGW\_ServingGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_PGW\_ServingGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class Link\_SGSN\_ServingGW

\*/

interface Link\_SGSN\_ServingGW : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_SGSN\_ServingGW";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class ExternalMMEFunction

\*/

interface ExternalMMEFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalMMEFunction";

// Attribute Names

//

const string id = "id";

const string pLMNIdList = "pLMNIdList";

const string mMEC = "mMEC";

const string mMEPool = "mMEPool";

const string isOnboardSatellite = "isOnboardSatellite";

const string onboardSatelliteId = "onboardSatelliteId";

const string storeAndForwardSupportInd = "storeAndForwardSupportInd";

const string snFConfigInfo = "snFConfigInfo";

};

/\*\*

\* Definitions for MO class ExternalServingGWFunction

\*/

interface ExternalServingGWFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalServingGWFunction";

// Attribute Names

//

const string id = "id";

const string pLMNIdList = "pLMNIdList";

const string tACList = "tACList";

};

/\*\*

\* Definitions for MO class ExternalServingGWCFunction

\*/

interface ExternalServingGWCFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalServingGWCFunction";

// Attribute Names

//

const string id = "id";

const string pLMNIdList = "pLMNIdList";

const string tACList = "tACList";

};

/\*\*

\* Definitions for MO class ExternalServingGWUFunction

\*/

interface ExternalServingGWUFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalServingGWUFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class ExternalPGWCFunction

\*/

interface ExternalPGWCFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalPGWCFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class ExternalPGWUFunction

\*/

interface ExternalPGWUFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalPGWUFunction";

// No New Attribute Names

//

//

};

/\*\*

\* Definitions for MO class QCISet

\*/

interface QCISet: GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "QCISet";

// Attribute Names

//

const string id = "id";

const string qCIList = "qCIList";

};

/\*\*

\* Definitions for MO class Link\_MBMSGW\_ENB

\*/

interface Link\_MBMSGW\_ENB : GenericNetworkResourcesNRMDefs::Link

{

const string CLASS = "Link\_MBMSGW\_ENB";

// No New Attribute Names

//

};

/\*\*

\* Definitions for MO class MBMSGWFunction

\*/

interface MBMSGWFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "MBMSGWFunction";

// Attribute Names

//

const string id = "id";

};

}

module genericEPCNRMAttributeTypes

{

/\*\*

\* Definitions for struct PlmnIdType

\*/

struct PlmnIdType

{

short mcc;

short mnc;

};

typedef sequence<PlmnIdType> plmnIdListType;

/\*\*

\* Definitions for struct QciType

\*/

struct QciType

{

short qci;

boolean resourceType;

// True is GBR, False is Non-GBR

short priority;

short packetDelayBudget;

float packetErrorLossRate;

};

typedef sequence<QciType> qciListType;

};

#endif // \_EPC*NETWORKRESOURCESNRMDEFS\_*IDL\_

Annex B (normative):  
XML definitions

# B.0 General

This annex contains the XML definitions for the EPC NRM IRP as it applies to Itf-N, in accordance with EPC NRM IRP IS definitions [2].

The XML file formats are based on XML [7], XML Schema [9] [10] and XML Namespace [5] standards.

# B.1 Architectural features

## B.1.0 Introduction

The overall architectural feature of EPC Network Resource Model IRP is specified in 3GPP TS 28.708 [2]. This clause specifies features that are specific to the XML definitions SS.

## B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [6].

# B.2 Mapping

## B.2.1 General mapping

An IOC maps to an XML element of the same name as the IOC's name in the IS. An IOC attribute maps to a sub-element of the corresponding IOC's XML element, and the name of this sub-element is the same as the attribute's name in the IS.

## B.2.2 Information Object Class (IOC) mapping

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

B.3.2 defines the NRM-specific XML schema epcNrm.xsd for the EPC NRM IRP IS defined in 3GPP TS 28.708 [2].

XML schema epcNrm.xsd explicitly declares 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].

# B.3 Solution Set definitions

## B.3.1 XML definition structure

The XML definitions of this document specify the schema for configuration content.

When using the XML definitions for a configuration file transfer with the Bulk CM IRP, using either CORBA Solution Set of 3GPP TS 32.616 [3] or SOAP Solution Set of 3GPP TS 32.616 [3], the basic part of the XML file format definition is provided by 3GPP TS 32.616 [3]. The XML definitions of this document provide the schema for the configuration content to be included in such a configuration file.

When using the XML definitions with a SOAP solution set of any interface IRP that perform operations on managed objects, for example the Basic CM IRP SOAP SS of 3GPP TS 32.606 [4], the XML definitions of this document provides the schema for the configuration content operated on by the interface IRP. Such configuration content can be name of managed object and, if applicable, IOC attributes.

## B.3.2 XML schema “epcNrm.xsd”

<?xml version="1.1" encoding="UTF-8"?>  
  
<!--  
 3GPP TS 28.709 EPC Network Resource Model IRP  
 XML schema definition  
 epcNrm.xsd  
-->  
  
<schema

targetNamespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.709#epcNrm"

elementFormDefault="qualified"

attributeFormDefault="unqualified"

xmlns="http://www.w3.org/2001/XMLSchema"

xmlns:xn="http://www.3gpp.org/ftp/specs/archive/28\_series/28.623#genericNrm"

xmlns:epc="http://www.3gpp.org/ftp/specs/archive/28\_series/28.709#epcNrm"

xmlns:ngc="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#ngcNrm"

>

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

<!--EPC NRM IRP IS class associated XML elements -->

<complexType name="PLMNId">

<sequence>

<element name="mcc" type="short" minOccurs="0"/>

<element name="mNc" type="short" minOccurs="0"/>

</sequence>

</complexType>

<complexType name="PLMNIdList">

<sequence>

<element name="pLMNId" type="epc:PLMNId" minOccurs="0" />

</sequence>

</complexType>

<complexType name="TACList">

<sequence>

<element name="tAC" type="long" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="QCIType">

<sequence>

<element name="qci" type="short" minOccurs="0"/>

<element name="resourceType" type="boolean" minOccurs="0"/>

<!-- True is GBR, and False is Non-GBR -->

<element name="priority" type="short" minOccurs="0"/>

<element name="packetDelayBudget" type="short" minOccurs="0"/>

<element name="packetErrorLossRate" type="decimal" minOccurs="0"/>

</sequence>

</complexType>

<complexType name="QCIListType">

<sequence>

<element name="qCIInfo" type="epc:QCIType" minOccurs="0"/>

</sequence>

</complexType>

<complexType name="SnFConfigInfo ">

<sequence>

<element name="retentionPeriod" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="uEStorageQuota" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="aFStorageQuota" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="mOEstimateDeliveryTime" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="mTEstimateDeliveryTime" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="mOAckAvailable" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="mTAckAvailable" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<element name="forwardingPriorities" type="integer" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<element

name="EPDGFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="linkList" type="xn:linkListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:EPDGFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="MMEFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

<element name="mMEC" type="long" minOccurs="0"/>

<element name="mMEPool" type="xn:dn" minOccurs="0"/>

<element name="isOnboardSatellite" type="boolean" minOccurs="0"/>

<element name="onboardSatelliteId" type="string" minOccurs="0"/>

<element name="storeAndForwardSupportInd" type="boolean" minOccurs="0"/>

<element name="snFConfigInfo" type="epc:SnFConfigInfo" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:MMEFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="ngc:EP\_N26"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="PCRFFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="linkList" type="xn:linkListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:PCRFFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="PGWFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:PGWFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="PGWCFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:PGWCFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="PGWUFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:PGWUFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ExternalPGWCFunction"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ExternalPGWUFunction"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ServingGWFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

<element name="tACList" type="epc:TACList" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:ServingGWFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ServingGwCFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

<element name="tACList" type="epc:TACList" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:ServingGwCFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ServingGwUFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:ServingGwUFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ExternalServingGWFunction"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

<element name="tACList" type="epc:TACList" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ExternalServingGwCFunction"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

<element name="tACList" type="epc:TACList" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ExternalServingGwUFunction"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="ExternalMMEFunction"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

<element name="mMEC" type="long" minOccurs="0"/>

<element name="mMEPool" type="xn:dn" minOccurs="0"/>

<element name="isOnboardSatellite" type="boolean" minOccurs="0"/>

<element name="onboardSatelliteId" type="string" minOccurs="0"/>

<element name="storeAndForwardSupportInd" type="boolean" minOccurs="0"/>

<element name="snFConfigInfo" type="epc:SnFConfigInfo" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="MMEPool"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="mMEGI" type="long" minOccurs="0"/>

<element name="mMEPoolMemberList" type="xn:dnList" minOccurs="0"/>

<element name="mMEPoolArea" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:MMEPoolOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element

name="MMEPoolArea"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="mMEPool" type="xn:dn" minOccurs="0"/>

<element name="tACList" type="epc:TACList" minOccurs="0"/>

<element name="pLMNIdList" type="epc:PLMNIdList" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:MMEPoolAreaOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_ENB\_MME"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_ENB\_MMEOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_ENB\_ServingGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_ENB\_ServingGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_EPDG\_PCRF"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_EPDG\_PCRFOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_EPDG\_PGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_EPDG\_PGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_HSS\_MME"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_HSS\_MMEOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_MME\_MME"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_MME\_MMEOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_MME\_SGSN"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_MME\_SGSNOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_MME\_ServingGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_MME\_ServingGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_PCRF\_ServingGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_PCRF\_ServingGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_PCRF\_PGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_PCRF\_PGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_PGW\_ServingGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_PGW\_ServingGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_SGSN\_ServingGW"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_SGSN\_ServingGWOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="EP\_RP\_EPS">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<!-- Inherited attributes from EP\_RP -->

<element name="farEndEntity" type="xn:dn" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<!-- End of inherited attributes from EP\_RP -->

<element name="farEndNeIpAddr" type="string" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:EP\_RP\_EPSOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="QCISet"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

<element name="qCIList" type="epc:QCIListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:QCISetOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="MBMSGWFunction"

substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:MBMSGWFunctionOptionallyContainedNrmClass"/>

<element ref="epc:EP\_RP\_EPS"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="Link\_MBMSGW\_ENB"

substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"

>

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

<element name="attributes" minOccurs="0">

<complexType>

<all>

<element name="aEnd" type="xn:dn" minOccurs="0"/>

<element name="linkType" type="xn:linkType" minOccurs="0"/>

<element name="protocolName" type="string" minOccurs="0"/>

<element name="protocolVersion" type="string" minOccurs="0"/>

<element name="userLabel" type="string" minOccurs="0"/>

<element name="zEnd" type="xn:dn" minOccurs="0"/>

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="unbounded">

<element ref="epc:Link\_MBMSGW\_ENBOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="EPDGFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="MMEFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="PCRFFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="PGWFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="PGWCFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="PGWUFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ExternalPGWCFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ExternalPGWUFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ServingGWFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ServingGwCFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ServingGwUFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ExternalServingGwCFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="ExternalServingGwUFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="MMEPoolOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="MMEPoolAreaOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_ENB\_MMEOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_ENB\_ServingGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_EPDG\_PCRFOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_EPDG\_PGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_HSS\_MMEOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_MME\_MMEOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_MME\_SGSNOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_MME\_ServingGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_PCRF\_ServingGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_PCRF\_PGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_PGW\_ServingGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_SGSN\_ServingGWOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="EP\_RP\_EPSOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="QCISetOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="MBMSGWFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

<element name="Link\_MBMSGW\_ENBOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

</schema>

Annex C (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2014-06 | SA#64 | SP-140332 | 0001 | - | F | Upgrade W3C XML Schema version from 1.0 to 1.1 | 11.1.0 |
|  |  | SP-140358 | 0002 | - | F | remove the feature support statements | 11.1.0 |
| 2014-09 | SA#65 | SP-140560 | 0003 | - | C | Update the link from Solution Set to Information Service due to the end of Release 12 | 12.0.0 |
| 2016-01 |  |  |  |  |  | Update to Rel-13 (MCC) | 13.0.0 |
| 2016-06 | SA#72 | SP-160407 | 0004 | - | F | Update the link from IRP Solution Set to IRP Information Service | 13.1.0 |
| 2017-03 | SA#75 | - | - | - |  | Promotion to Release 14 without technical change | 14.0.0 |
| 2017-06 | SA#76 | SP-170514 | 0005 | - | F | Update the link from IRP Solution Set to IRP Information Service | 14.1.0 |
| 2017-06 | SA#76 | SP-170510 | 0006 | 1 | B | Update the XML Schema definitions to align with IS to support Configuration Management for mobile networks that include virtualized network functions | 14.1.0 |
| 2018-06 | SA#80 | SP--180424 | 0007 | 1 | B | Add EPC CUPS for CORBA SS | 15.0.0 |
| 2018-06 | SA#80 | SP--180424 | 0008 | 1 | B | Add EPC CUPS for CORBA solution set | 15.0.0 |
| 2018-09 | SA#81 | SP-180828 | 0010 | - | B | Update EPC SS definitions to support management of EN-DC and 4G/5G interworking | 15.1.0 |
| 2018-09 | SA#81 | SP-180829 | 0011 | 1 | B | Add EPC CUPS for XML solution set | 15.1.0 |
| 2018-12 | SA#82 | SP-181050 | 0012 | 1 | F | CUPS XML schema alignment | 15.2.0 |
| 2018-12 | SA#82 | SP-181050 | 0013 | 1 | F | CUPS CORBA IDL update | 15.2.0 |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | 16.0.0 |
| 2022-03 | - | - | - | - | - | Update to Rel-17 version (MCC) | 17.0.0 |
| 2024-04 | - | - | - | - | - | Update to Rel-18 version (MCC) | 18.0.0 |
| 2024-09 | SA#105 | SP-241165 | 0015 | 1 | A | Rel-18 CR TS 28.709 Correction of XML references | 18.1.0 |
| 2025-06 | SA#108 | SP-250546 | 0016 | 3 | B | Rel-19 CR TS 28.708 Add attributes to support Store and Forward Satellite operation for EPC | 19.0.0 |