3GPP TS 28.623 V18.5.1 (2023-12)

Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

(Release 18)

|  |  |
| --- | --- |
|  |  |

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

Generic, 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.

© 2023 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 5

Introduction 5

1 Scope 6

2 References 6

3 Definitions and abbreviations 7

3.1 Definitions 7

3.2 Abbreviations 7

4 Solution Set (SS) definitions 7

4.1 CORBA Definitions 7

4.2 XML Definitions 7

4.3 OpenAPI Definitions 7

4.4 YANG Definitions 7

Annex A (normative): CORBA Solution Set 9

A.0 General 9

A.1 Architectural features 9

A.1.1 Syntax for Distinguished Names 9

A.1.2 Rules for NRM extensions 9

A.1.2.0 Introduction 9

A.1.2.1 Allowed extensions 9

A.1.2.2 Extensions not allowed 9

A.2 Mapping 11

A.2.1 General mapping 11

A.2.2 Information Object Class (IOC) mapping 11

A.2.2.1 IOC SubNetwork 11

A.2.2.2 IOC ManagedElement 11

A.2.2.3 IOC MeContext 11

A.2.2.4 IOC ManagementNode 12

A.2.2.5 IOC VsDataContainer 12

A.2.2.6 IOC ManagedFunction 12

A.2.2.7 IOC IRPAgent 12

A.2.2.8 IOC Top 12

A.2.2.9 IOC Link 13

A.2.2.10 IOC EP\_RP 13

A.2.2.11 IOC ThresholdMonitoringCapability 13

A.2.2.12 IOC ThresholdMonitor 13

A.2.2.13 IOC TraceJob 14

A.3 Solution Set (SS) definitions 15

A.3.1 IDL definition structure 15

A.3.2 IDL specification "GenericNetworkResourcesIRPSystem.idl" 15

A.3.3 IDL specification "GenericNetworkResourcesNRMDefs.idl" 18

Annex B (normative): XML Definitions 21

B.0 General 21

B.1 Architectural features 21

B.1.0 Introduction 21

B.1.1 Syntax for Distinguished Names 21

B.2 Mapping 21

B.2.1 General mapping 21

B.2.2 Information Object Class (IOC) mapping 21

B.3 Solution Set (SS) definitions 22

B.3.1 XML definition structure 22

B.3.2 Graphical Representation 22

B.3.3 XML schema "genericNrm.xsd" 23

Annex C (normative):Void 32

Annex D (normative):Void 33

Annex E (informative): Change history 33

# 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:

28.621 Generic Network Resource Model (NRM) Integration Reference Point (IRP); Requirements.

28.622 Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS).

**28.623 Generic Network Resource Model (NRM)** **Integration Reference Point (IRP); Solution Set (SS) definitions.**

# 1 Scope

This TS-family specifies a generic Network Resource Model, NRM (also referred to as a Management Information Model - MIM) with definitions of Information Object Classes (IOCs) and Managed Object Classes (MOCs).

The present document specifies the Solution Set definition for the Generic NRM IRP.

The Solution Set definition is related to 3GPP TS 28.622 V16.4.X [4].

Note that the present document is applicable to deployment scenarios using the Service Based Management Architecture (SBMA) as defined in TS 28.533 [32].

# 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 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[4] 3GPP TS 28.622: “Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)”.

[5] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[6] Void

[7] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Solution Set (SS) definitions".

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

[9] Void.

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

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

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

[13] Void

[14] 3GPP TS 32.160: "Management and orchestration; Management Service Template".

[15] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[16] IETF RFC 8528: "YANG Schema Mount".

[17] Management and Orchestration APIs Stage 3 Repository <https://forge.3gpp.org/rep/sa5/MnS/-/tree/Tag_Rel18_SA102/>

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [15], 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.600 [3], 3GPP TS 28.622 [4] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [15] and 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.600 [3] and 3GPP TS 28.622 [4].

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [15], 3GPP TS 32.600 [3] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [15] and 3GPP TS 32.600 [3].

JSON JavaScript Object Notation

SS Solution Set

# 4 Solution Set (SS) definitions

## 4.1 CORBA Definitions

CORBA definitions are specified in Annex A (normative): CORBA Solution Set.

## 4.2 XML Definitions

XML definitions are specified in Annex B (normative): XML Definitions.

## 4.3 OpenAPI Definitions

The present clause contains the OpenAPI definitions of the Generic NRM in YAML format.

The Information Service (IS) of the Generic NRM is defined in 3GPP TS 28.622 [4].

Mapping rules to produce the OpenAPI definition based on the IS are defined in 3GPP TS 32.160 [14].

OpenAPI/YAML definitions are specified in 3GPP Forge [17].

Directory: OpenAPI

Files:

TS28623\_ComDefs.yaml

TS28623\_GenericNrm.yaml

## 4.4 YANG Definitions

The present clause contains the YANG definitions for the Generic NRM.

The Information Service (IS) of the Generic NRM is defined in 3GPP TS 28.622 [4].

Mapping rules to produce the YANG definition based on the IS are defined in 3GPP TS 32.160 [14].

YANG definitions are specified in 3GPP Forge [17].

Directory: yang-models

Files:

\_3gpp-common-ep-rp.yang

\_3gpp-common-filemanagement.yang

\_3gpp-common-files.yang

\_3gpp-common-fm.yang

\_3gpp-common-managed-element.yang

\_3gpp-common-managed-function.yang

\_3gpp-common-managementdatacollection.yang

\_3gpp-common-management-node.yang

\_3gpp-common-measurements.yang

\_3gpp-common-mnsagent.yang

\_3gpp-common-mnsregistry.yang

\_3gpp-common-qmcjob.yang

\_3gpp-common-subnetwork.yang

\_3gpp-common-subscription-control.yang

\_3gpp-common-top.yang

\_3gpp-common-trace.yang

\_3gpp-common-yang-extensions.yang

\_3gpp-common-yang-types.yang

Mount information

If the class ManagedElement and the underlying hierarchy is contained under a SubNetwork all YANG modules containing IOCs that can be contained under the ManagedElement directly or under other IOCs contained by the ManagedElement and the YANG module for ManagedElement itself shall be mounted at the mountpoint "children-of-SubNetwork" in the YANG module \_3gpp-common-subnetwork.

See IETF RFC 8528 [16] that describes the mechanism that adds the schema trees defined by a set of YANG modules onto a mount point defined in the schema tree in another YANG module.

Annex A (normative):  
CORBA Solution Set

# A.0 General

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in Generic NRM IRP: Information Service (3GPP TS 28.622 [4]).

# A.1 Architectural features

The overall architectural feature of Generic Network Resources IRP is specified in 3GPP TS 28.622 [4].   
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 [5].

## A.1.2 Rules for NRM extensions

### A.1.2.0 Introduction

This clause discusses how the models and IDL definitions provided in the present document can be extended for a particular implementation and still remain compliant with 3GPP SA5's specifications.

### A.1.2.1 Allowed extensions

Vendor-specific MOCs may be supported. The vendor-specific MOCs may support new types of attributes.   
The 3GPP SA5-specified notifications may be issued referring to the vendor-specific MOCs and vendor-specific attributes. New MOCs shall be distinguishable from 3GPP SA5 MOCs by name. 3GPP SA5-specified and vendor-specific attributes may be used in vendor-specific MOCs. Vendor-specific attribute names shall be distinguishable from existing attribute names.

NRM MOCs may be subclassed. Subclassed MOCs shall maintain the specified behaviour of the 3GPP SA5's superior classes. They may add vendor-specific behaviour with vendor-specific attributes. When subclassing, naming attributes cannot be changed. The subclassed MOC shall support all attributes of its superior class. Vendor-specific attributes cannot be added to 3GPP SA5 NRM MOCs without subclassing.

When subclassing, the 3GPP SA5-specified containment rules and their specified cardinality shall still be followed.   
As an example, ManagementNode (or its subclasses) shall be contained under SubNetwork (or its subclasses).

Managed Object Instances may be instantiated as CORBA objects. This requires that the MOCs be represented in IDL. 3GPP SA5's NRM MOCs are not currently specified in IDL, but may be specified in IDL for instantiation or subclassing purposes. However, management information models should not require that IRPManagers access the instantiated managed objects other than through supported methods in the present document.

Extension rules related to notifications (Notification categories, Event Types, Extended Event Types etc.) are for further study.

### A.1.2.2 Extensions not allowed

The IDL specifications in the present document cannot be edited or altered. Any additional IDL specifications shall be specified in separate IDL files.

IDL interfaces (note: not MOCs) specified in the present document may not be subclassed or extended. New interfaces may be defined with vendor-specific methods.

# A.2 Mapping

## A.2.1 General mapping

Attributes modelling associations as defined in the NRM (here also called "reference attributes") are in this SS mapped to attributes. The names of the reference attributes in the NRM are mapped to the corresponding attribute names in the MOC. When the cardinality for an association is 0..1 or 1..1 the datatype for the reference attribute is defined as an MOReference. The value of an MO reference contains the distinguished name of the associated MO. When the cardinality for an association allows more than one referred MO, the reference attribute will be of type MOReferenceSet, which contains a sequence of MO references.

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

This Solution Set supports reference attributes for relations other than containment relations between objects. Reference attributes are therefore introduced in each MOC where needed.

### A.2.2.1 IOC SubNetwork

Mapping from NRM IOC SubNetwork attributes to SS equivalent MOC SubNetwork attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| dnPrefix | dnPrefix | string |
| userLabel | userLabel | string |
| userDefinedNetworkType | userDefinedNetworkType | string |
| setOfMcc | setOfMcc | GenericNetworkResourcesIRPSystem::AttributeTypes::StringSet |

### A.2.2.2 IOC ManagedElement

Mapping from NRM IOC ManagedElement attributes and association roles to SS equivalent MOC ManagedElement attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| dnPrefix | dnPrefix | string |
| userLabel | userLabel | string |
| locationName | locationName | string |
| vendorName | vendorName | string |
| userDefinedState | userDefinedState | string |
| managedElementType | managedElementType | GenericNetworkResourcesIRPSystem::AttributeTypes::StringSet |
| managedBy | managedBy | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| swVersion | swVersion | string |

### A.2.2.3 IOC MeContext

Mapping from NRM IOC MeContext attributes to SS equivalent MOC MeContext attributes

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

### A.2.2.4 IOC ManagementNode

Mapping from NRM IOC ManagementNode attributes and association roles to SS equivalent MOC ManagementNode attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| userLabel | userLabel | string |
| locationName | locationName | string |
| vendorName | vendorName | string |
| userDefinedState | userDefinedState | string |
| managedElements | managedElements | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| swVersion | swVersion | string |

### A.2.2.5 IOC VsDataContainer

Mapping from NRM IOC VsDataContainer attributes and association roles to SS equivalent MOC VsDataContainer attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| vsDataType | vsDataType | string |
| vsData | vsData | any |
| vsDataFormatVersion | vsDataFormatVersion | string |

### A.2.2.6 IOC ManagedFunction

Mapping from NRM IOC ManagedFunction attributes and association roles to SS equivalent MOC ManagedFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| peeParametersList | peeParametersList | GenericNetworkResourcesIRPSystem::AttributeTypes:: PEEParametersListType |
| userLabel | userLabel | string |
| vnfParametersList | vnfParametersList | GenericNetworkResourcesIRPSystem::AttributeTypes:: VNFParametersListType |

### A.2.2.7 IOC IRPAgent

Mapping from NRM IOC IRPAgent attributes to SS equivalent MOC IRPAgent attributes

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

### A.2.2.8 IOC Top

Mapping from NRM IOC Top attributes to SS equivalent attributes in all MOCs

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| objectClass | CLASS | string |
| objectInstance | No direct mapping |  |

### A.2.2.9 IOC Link

Mapping from NRM IOC Link attributes to SS equivalent MOC IRPAgent attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| userLabel (see note 2) | userLabel | string |
| aEnd | aEnd | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| zEnd | zEnd | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| linkType | linkType | LinkTypeType |
| protocolName | protocolName | string |
| protocolVersion | protocolVersion | string |

NOTE 1: Void.

NOTE 2: Void.

### A.2.2.10 IOC EP\_RP

Mapping from NRM IOC EP\_RP attributes to SS equivalent MOC EP\_RP attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| userLabel | userLabel | string |
| farEndEntity | farEndEntity | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |

### A.2.2.11 IOC ThresholdMonitoringCapability

Mapping from NRM IOC ThresholdMonitoringCapability attributes to SS equivalent MOC ThresholdMonitoringCapability attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| supportedMonitoringGPs | supportedMonitoringGPs | GenericNetworkResourcesIRPSystem::AttributeTypes::LongSet |

### A.2.2.12 IOC ThresholdMonitor

Mapping from NRM IOC ThresholdMonitor attributes to SS equivalent MOC ThresholdMonitor attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| thresholdInfoList | thresholdInfoList | GenericNetworkResourcesIRPSystem::AttributeTypes::ThresholdInfoListType |
| monitoringGP | monitoringGP | long |
| monitoringNotifTarget | monitoringNotifTarget | string |
| monitoredIOCName | monitoredIOCName | string |
| monitoredObjectDNs | monitoredObjectDNs | GenericNetworkResourcesIRPSystem::AttributeTypes::DNListType |

### A.2.2.13 IOC TraceJob

Mapping from NRM IOC TraceJob attributes to SS equivalent MOC TraceJob attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| tjJobType | tjJobType | tjJobType-Type |
| tjListOfInterfaces | tjListOfInterfaces | tjListOfInterfaces-Type |
| tjListOfNeTypes | tjListOfNeTypes | tjListOfNeTypes-Type |
| tjPLMNTarget | tjPLMNTarget | tjPLMNTarget-Type |
| tjStreamingTraceConsumerURI | tjTraceConsumer | StreamingTraceConsumerURI-Type |
| tjTraceCollectionEntityAddress | tjTraceConsumer | TraceCollectionEntityAddress-Type |
| tjTraceDepth | tjTraceDepth | tjTraceDepth-Type |
| tjTraceReference | tjTraceReference | tjTraceReference-Type |
| tjTraceReportingFormat | tjTraceReportingFormat | tjTraceReportingFormat-Type |
| tjTraceTarget | tjTraceTarget | tjTraceTarget-Type |
| tjTriggeringEvent | tjTriggeringEvent | tjTriggeringEvent-Type |
| tjMDTAnonymizationOfData | tjMDTAnonymizationOfData | tjMDTAnonymizationOfData-Type |
| tjMDTAreaConfigurationForNeighCell | tjMDTAreaConfigurationForNeighCell | tjMDTAreaConfigurationForNeighCell-Type |
| tjMDTAreaScope | tjMDTAreaScope | tjMDTAreaScope-Type |
| tjMDTCollectionPeriodRrmLte | tjMDTCollectionPeriodRrmLte | tjMDTCollectionPeriodRrmLte-Type |
| tjMDTCollectionPeriodRrmUmts | tjMDTCollectionPeriodRrmUmts | tjMDTCollectionPeriodRrmUmts-Type |
| tjMDTCollectionPeriodRrmNR | tjMDTCollectionPeriodRrmNR | tjMDTCollectionPeriodRrmNR-Type |
| tjMDTEventListForTriggeredMeasurement | tjMDTEventListForTriggeredMeasurement | tjMDTEventListForTriggeredMeasurement-Type |
| tjMDTEventThreshold | tjMDTEventThreshold | tjMDTEventThreshold-Type |
| tjMDTListOfMeasurements | tjMDTListOfMeasurements | tjMDTListOfMeasurements-Type |
| tjMDTLoggingDuration | tjMDTLoggingDuration | tjMDTLoggingDuration-Type |
| tjMDTLoggingInterval | tjMDTLoggingInterval | tjMDTLoggingInterval-Type |
| tjMDTMBSFNAreaList | tjMDTMBSFNAreaList | tjMDTMBSFNAreaList-Type |
| tjMDTMeasurementPeriodLTE | tjMDTMeasurementPeriodLTE | tjMDTMeasurementPeriodLTE-Type |
| tjMDTMeasurementPeriodUMTS | tjMDTMeasurementPeriodUMTS | tjMDTMeasurementPeriodUMTS-Type |
| tjMDTMeasurementQuantity | tjMDTMeasurementQuantity | tjMDTMeasurementQuantity-Type |
| tjMDTPLMList | tjMDTPLMList | tjMDTPLMList-Type |
| tjMDTPositioningMethod | tjMDTPositioningMethod | tjMDTPositioningMethod-Type |
| tjMDTReportAmount | tjMDTReportAmount | tjMDTReportAmount-Type |
| tjMDTReportingTrigger | tjMDTReportingTrigger | tjMDTReportingTrigger-Type |
| tjMDTReportInterval | tjMDTReportInterval | tjMDTReportInterval-Type |
| tjMDTReportType | tjMDTReportType | tjMDTReportType-Type |
| tjMDTSensorInformation | tjMDTSensorInformation | tjMDTSensorInformation-Type |
| tjMDTTraceCollectionEntityID | tjMDTTraceCollectionEntityID | tjMDTTraceCollectionEntityID-Type |
| excessPacketDelayThresholds | excessPacketDelayThresholds | excessPacketDelayThresholds-Type |

# A.3 Solution Set (SS) definitions

## A.3.1 IDL definition structure

Clause A.3.2 defines the types which are used by the Generic NRM IRP.

Clause A.3.3 defines the MO classes for the Generic NRM IRP.

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

//File: GenericNetworkResourcesIRPSystem.idl

#ifndef \_GENERIC\_NETWORK\_RESOURCES\_IRP\_SYSTEM\_IDL\_

#define \_GENERIC\_NETWORK\_RESOURCES\_IRP\_SYSTEM\_IDL\_

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

module GenericNetworkResourcesIRPSystem

{

/\*\*

\* The format of Distinguished Name (DN) is specified in "Name Convention

\* for Managed Objects (3GPP TS 32.300 [5])".

\*/

typedef string DN;

/\*\*

\* This module adds datatype definitions for types

\* used in the NRM which are not basic datatypes defined

\* already in CORBA.

\*/

module AttributeTypes

{

/\*\*

\* An MO reference refers to an MO instance.

\* "otherMO" contains the distinguished name of the referred MO.

\* A conceptual "null" reference (meaning no MO is referenced)

\* is represented as an empty string ("").

\*

\*/

struct MOReference

{

DN otherMO;

};

/\*\*

\* MOReferenceSet represents a set of MO references.

\* This type is used to hold 0..n MO references.

\* A referred MO is not allowed to be repeated (therefore

\* it is denoted as a "Set")

\*/

typedef sequence<MOReference> MOReferenceSet;

/\*\*

\* A set of strings.

\*/

typedef sequence<string> StringSet;

/\*\*

\* A set of long.

\*/

typedef sequence<long> LongSet;

/\*

\* The LinkListSet represents the Link\_X\_Y objects (or subclasses of

\* Link\_X\_Y objects) that have a relationship with this object instance.

\* Each Link\_X\_Y object models interface(s) between objects of class X and

\* Y. The object containing this attribute must either be a class of type X,

\* Y, XFunction, YFunction or a subclass of one of those classes. The

\* LinkListSet may be empty, or there may be no instances for a particular

\* Link\_X\_Y class name.

\*/

typedef MOReferenceSet LinkListSet;

/\*\*

\* VNFParameters includes several attributes of a VNF instance.

\* The detailed definition of the attributes, see clause 4.4.1 of [4].

\*/

struct VNFParameters

{

string vnfInstanceId;

string vnfdId;

string flavourId;

boolean autoScalable;

};

/\*\*

\* VNFParametersListType represents a list of VNFParameters.

\* The detailed definition of vnfParametersListType, see clause 4.4.1 of [4].

\*/

typedef sequence<VNFParameters> VNFParametersListType;

struct PEEParameters

{

string siteIdentification;

float siteLatitude;

float siteLongitude;

string siteDescription;

string equipmentType;

string environmentType;

string powerInterface;

};

/\*\*

\* PEEParametersListType represents a list of PEEParameters.

\* The detailed definition of PEEParametersListType, see clause 4.4.1 of [4].

\*/

typedef sequence<PEEParameters> PEEParametersListType;

typedef any ThresholdValueType;

enum Direction {INCREASING, DECREASING};

union HysteresisType switch(boolean)

{

case TRUE: long long\_value;

case FALSE: float float\_value;

};

struct ThresholdPackElement

{

ThresholdValueType thresholdValue;

short thresholdLevel;

HysteresisType hysteresis;

};

typedef sequence<ThresholdPackElement> ThresholdPackType;

struct ThresholdInfo

{

string measurementType;

Direction direction\_;

ThresholdPackType thresholdPack;

};

typedef sequence<ThresholdInfo> ThresholdInfoListType;

};

/\*\*

\* This module adds datatype definitions for PM Control

\*/

module PMControlTypes

{

Struct Measurements

{

measurementTypes StringSet,

gPs LongSet

};

typedef sequence <Measurements> Measurements;

enum PMAdministrativeStateType

{

LOCKED,

SHUTTINGDOWN,

UNLOCKED

};

enum PMOperationalStateType

{

ENABLED,

DISABLED

};

typedef MOReferenceSet ManagedObjectDNsType;

typedef MOReferenceSet ManagedObjectDNsBasicType;

typedef integer DefaultFileBasedGPType;

typedef integer DefaultFileReportPeriodType;

typedef string DefaultFileLocationType;

typedef integer DefaultStreamBasedGPType;

typedef string DefaultStreamTargetType;

typedef integer FileBasedGPType;

typedef integer FileReportingPeriodType;

typedef string FileLocationType;

typedef integer StreamBasedGPType;

typedef string StreamTargetType;

};

};

#endif // \_GENERIC\_NETWORK\_RESOURCES\_IRP\_SYSTEM\_IDL\_

## A.3.3 IDL specification "GenericNetworkResourcesNRMDefs.idl"

//File: GenericNetworkResourcesNRMDefs.idl

#ifndef \_GENERIC\_NETWORK\_RESOURCES\_NRM\_DEFS\_IDL\_

#define \_GENERIC\_NETWORK\_RESOURCES\_NRM\_DEFS\_IDL\_

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\*\*

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

\* the attribute names for each defined MO class.

\*/

module GenericNetworkResourcesNRMDefs

{

/\*\*

\* Definitions for MO class Top

\*/

interface Top

{

// Attribute Names

//

const string CLASS = "Top";

};

/\*\*

\* Definitions for MO class SubNetwork

\*/

interface SubNetwork : Top

{

const string CLASS = "SubNetwork";

// Attribute Names

//

const string id = "id";

const string dnPrefix = "dnPrefix";

const string userLabel = "userLabel";

const string userDefinedNetworkType = "userDefinedNetworkType";

const string setOfMcc = "setOfMcc";

};

/\*\*

\* Definitions for MO class ManagedElement

\*/

interface ManagedElement : Top

{

const string CLASS = "ManagedElement";

// Attribute Names

//

const string id = "id";

const string dnPrefix = "dnPrefix";

const string managedElementType = "managedElementType";

const string userLabel = "userLabel";

const string vendorName = "vendorName";

const string userDefinedState ="userDefinedState";

const string locationName ="locationName";

const string managedBy = "managedBy";

const string swVersion = "swVersion";

};

/\*\*

\* Definitions for MO class MeContext

\*/

interface MeContext : Top

{

const string CLASS = "MeContext";

// Attribute Names

//

const string id = "id";

const string dnPrefix = "dnPrefix";

};

/\*\*

\* Definitions for MO class ManagementNode

\*/

interface ManagementNode : Top

{

const string CLASS = "ManagementNode";

// Attribute Names

//

const string id = "id";

const string userLabel = "userLabel";

const string vendorName = "vendorName";

const string userDefinedState = "userDefinedState";

const string locationName = "locationName";

const string managedElements = "managedElements";

const string swVersion = "swVersion";

};

/\*\*

\* Definitions for abstract MO class ManagedFunction

\*

\*/

interface ManagedFunction : Top

{

const string CLASS = "ManagedFunction";

// Attribute Names

//

const string id = "id";

const string peeParametersList = "peeParametersList";

const string userLabel = "userLabel";

const string vnfParametersList = "vnfParametersList";

};

/\*\*

\* Definitions for MO class IRPAgent

\*/

interface IRPAgent : Top

{

const string CLASS = "IRPAgent";

// Attribute Names

//

const string id = "id";

const string systemDN = "systemDN";

};

/\*\*

\* Definitions for abstract MO class Link

\* This inherits from ManagedFunction

\* The attributes aEnd and zEnd are populated with the DNs  
 \* of the entities associated via the link class.  
 \* The aEnd takes the DN of the 1st entity in alphabetical order,

\* the zEnd takes the 2nd entity in alphabetical order of the class

\* names.

\*/

interface Link : ManagedFunction

{

const string CLASS = "Link";

// Attribute Names

//

const string aEnd = "aEnd";

const string zEnd = "zEnd";

const string linkType = "linkType";

const string protocolName = "protocolName";

const string protocolVersion = "protocolVersion";

};

/\*\*

\* Definitions for MO class VsDataContainer

\*/

interface VsDataContainer : Top

{

const string CLASS = "VsDataContainer";

// Attribute Names

//

const string id = "id";

const string vsDataType = "vsDataType";

const string vsData = "vsData";

const string vsDataFormatVersion = "vsDataFormatVersion";

};

/\*\*

\* Definitions for abstract MO class EP\_RP

\*/

interface EP\_RP : Top

{

const string CLASS = "EP\_RP";

// Attribute Names

//

const string farEndEntity = "farEndEntity";

const string id = "id";

const string userLabel = "userLabel";

};

/\*\*

\* Definitions for MO class ThresholdMonitoringCapability

\*/

interface ThresholdMonitoringCapability : Top

{

const string CLASS = "ThresholdMonitoringCapability";

// Attribute Names

//

const string supportedMonitoringGPs = "supportedMonitoringGPs";

};

/\*\*

\* Definitions for MO class ThresholdMonitor

\*/

interface ThresholdMonitor : Top

{

const string CLASS = "ThresholdMonitor";

// Attribute Names

//

const string thresholdInfoList = "thresholdInfoList";

const string monitoringGP = "monitoringGP";

const string monitoringNotifTarget = "monitoringNotifTarget";

const string monitoredIOCName = "monitoredIOCName";

const string monitoredObjectDNs = "monitoredObjectDNs";

};

/\*\*

\* This module adds datatypes definitions for the Link Class

\* These attributes are not the basic datatypes already defined

\*/

module LinkAttributeTypes

{

enum LinkType

{

SIGNALLING,

BEARER,

OAM\_AND\_P,

OTHER

};

typedef sequence <LinkType> LinkTypeType;

};

};

#endif // \_GENERIC\_NETWORK\_RESOURCES\_NRM\_DEFS\_IDL\_

Annex B (normative):  
XML Definitions

# B.0 General

This annex contains the XML Definitions for the Generic NRM IRP as it applies to Itf-N, in accordance with Generic NRM IRP IS definitions TS 28.622 [4].

The XML file formats are based on XML W3C REC-xml11-20060816 [8], W3C XML Schema Definition Language (XSD) 1.1 Part 1: Structures [10] W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes [11] and W3C REC-xml-names-20060816 [12] standards.

# B.1 Architectural features

## B.1.0 Introduction

The overall architectural feature of Generic Network Resources IRP is specified in 3GPP TS 28.622 [4].

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

## B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [5].

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

# B.3 Solution Set (SS) definitions

## B.3.1 XML definition structure

The overall description of the file format of configuration data XML files is provided by 3GPP TS 28.616 [7].

Annex B.3.3 of the present document defines the NRM-specific XML schema genericNrm.xsd for the Generic Network Resources IRP NRM defined in 3GPP TS 28.622 [4].

XML schema genericNrm.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 28.616 [7], with the following exception: as defined in 3GPP TS 28.616 [7], the vsData XML element type has an empty XML content.

Additionally, XML schema genericNrm.xsd also provides the following global XML declarations and definitions:

- XML complex type NrmClass: derivation base type (see [8], [10] and [11]) for all NRM class associated XML element types (see 3GPP TS 28.616 [7]);

- XML element type vsData: derivation base type (see [8], [10] and [11]) for all vendor-specific XML element types (see 3GPP TS 28.616 [7]);

- XML element type SubNetworkOptionallyContainedNrmClass: substitution group head (see [8], [10] and [11]) for all XML element types associated to further NRM classes optionally contained under SubNetwork NRM class;

- XML element type ManagedElementOptionallyContainedNrmClass: substitution group head (see [8], [10] and [11]) for all XML element types associated to further NRM classes optionally contained under ManagedElement NRM class.

## B.3.2 Graphical Representation

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

## B.3.3 XML schema "genericNrm.xsd"

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

<!--

3GPP TS 28.623 Generic Network Resources IRP

Bulk CM Configuration data file NRM-specific XML schema

genericNrm.xsd

-->

<schema

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

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:sp="http://www.3gpp.org/ftp/specs/archive/28\_series/28.629#sonPolicyNrm"

>

<import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.629#sonPolicyNrm"/>

<!-- Base XML type for all NRM class associated XML elements -->

<complexType name="NrmClass">

<attribute name="id" type="string" use="required"/>

<attribute name="modifier" use="optional">

<simpleType>

<restriction base="string">

<enumeration value="create"/>

<enumeration value="delete"/>

<enumeration value="update"/>

</restriction>

</simpleType>

</attribute>

</complexType>

<!-- Generic Network Resources IRP NRM attribute related XML types -->

<simpleType name="dn">

<restriction base="string">

<maxLength value="400"/>

</restriction>

</simpleType>

<complexType name="dnList">

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

<element name="dn" type="xn:dn"/>

</sequence>

</complexType>

<simpleType name="linkType">

<list>

<simpleType>

<restriction base="string">

<enumeration value="Signalling"/>

<enumeration value="Bearer"/>

<enumeration value="OAM\_AND\_P"/>

<enumeration value="Other"/>

</restriction>

</simpleType>

</list>

</simpleType>

<complexType name="linkListType">

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

<element name="dn" type="xn:dn"/>

</sequence>

</complexType>

<complexType name="managedElementTypeListType">

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

<element name="managedElementType" type="string"/>

</sequence>

</complexType>

<complexType name="vnfParametersListType">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="vnfInstanceId" type="string"/>

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

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

<element name="autoScalable" type="boolean"/>

</sequence>

</complexType>

<simpleType name="latitude">

<restriction base="decimal">

<fractionDigits value="4"/>

<minInclusive value="-90.0000"/>

<maxInclusive value="90.0000"/>

</restriction>

</simpleType>

<simpleType name="longitude">

<restriction base="decimal">

<fractionDigits value="4"/>

<minInclusive value="-180.0000"/>

<maxInclusive value="180.0000"/>

</restriction>

</simpleType>

<complexType name="peeParametersListType">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="siteIdentification" type="string"/>

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

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

<element name="siteDescription" type="string"/>

<element name="equipmentType" type="string"/>

<element name="environmentType" type="string"/>

<element name="powerInterface" type="string"/>

</sequence>

</complexType>

<simpleType name="pMAdministrativeStateType">

<restriction base="string">

<enumeration value="LOCKED"/>

<enumeration value="SHUTTINGDOWN"/>

<enumeration value="UNLOCKED"/>

</restriction>

</simpleType>

<simpleType name="pMOperationalStateType">

<restriction base="string">

<enumeration value="ENABLED"/>

<enumeration value="DISABLED"/>

</restriction>

</simpleType>

<simpleType name="nFServiceType">

<restriction base="string">

<enumeration value="Namf\_Communication"/>

<enumeration value="Namf\_EventExposure"/>

<enumeration value="Namf\_MT"/>

<enumeration value="Namf\_Location"/>

<enumeration value="Nsmf\_PDUSession"/>

<enumeration value="Nsmf\_EventExposure"/>

<enumeration value="others"/>

</restriction>

</simpleType>

<simpleType name="usageStateType">

<restriction base="string">

<enumeration value="IDEL"/>

<enumeration value="ACTIVE"/>

<enumeration value="BUSY"/>

</restriction>

</simpleType>

<simpleType name="registrationStateType">

<restriction base="string">

<enumeration value="LOCKED"/>

<enumeration value="SHUTTING\_DOWN"/>

<enumeration value="UNLOCKED"/>

</restriction>

</simpleType>

<simpleType name="NFType">

<restriction base="string">

<enumeration value="NRF"/>

<enumeration value="UDM"/>

<enumeration value="AMF"/>

<enumeration value="SMF"/>

<enumeration value="AUSF"/>

<enumeration value="NEF"/>

<enumeration value="PCF"/>

<enumeration value="SMSF"/>

<enumeration value="NSSF"/>

<enumeration value="UDR"/>

<enumeration value="GMLC"/>

<enumeration value="5G EIR"/>

<enumeration value="SEPP"/>

<enumeration value="UPF"/>

<enumeration value="N3IWF"/>

<enumeration value="AF"/>

<enumeration value="UDSF"/>

<enumeration value="DN"/>

</restriction>

</simpleType>

<simpleType name="operationSemanticsType">

<restriction base="string">

<enumeration value="REQUEST\_RESPONSE"/>

<enumeration value="SUBSCRIBE\_NOTIFY"/>

</restriction>

</simpleType>

<complexType name="SAP">

<sequence>

<element name="host" type="xn:hostType"/>

<element name="port" type="integer"/>

</sequence>

</complexType>

<complexType name="hostType">

<sequence>

<element name="ipv4Address" type="string"/>

<element name="ipv6Address" type="string"/>

<element name="fqdn" type="string"/>

</sequence>

</complexType>

<complexType name="operationsList">

<sequence>

<element name="operation" type="xn:operationType" minOccurs="1" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="operationType">

<sequence>

<element name="name" type="string"/>

<element name="allowedNFTypes" type="xn:NFType"/>

<element name="operationSemantics" type="xn:operationSemanticsType"/>

</sequence>

</complexType>

<complexType name="MeasurementTypeList">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="measurementType" type="string"/>

</sequence>

</complexType>

<complexType name="GPList">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="gP" type="integer"/>

</sequence>

</complexType>

<complexType name="Measurements">

<sequence>

<element name="measurementTypes" type="xn:MeasurementTypeList"/>

<element name="GPs" type="xn:GPList"/>

</sequence>

</complexType>

<complexType name="MeasurementsList">

<sequence>

<element name="measurements" type="xn:Measurements" minOccurs="1" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="GPListType">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="GP" type="integer"/>

</sequence>

</complexType>

<complexType name="KPINameList">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="kPIName" type="string"/>

</sequence>

</complexType>

<complexType name="KPIs">

<sequence>

<element name="kPITypes" type="xn:KPINameList"/>

<element name="GPs" type="xn:GPList"/>

</sequence>

</complexType>

<complexType name="KPIsList">

<sequence>

<element name="kPIs" type="xn:KPIs" minOccurs="1" maxOccurs="unbounded"/>

</sequence>

</complexType>

<simpleType name="directionType">

<list>

<simpleType>

<restriction base="string">

<enumeration value="increasing"/>

<enumeration value="decreasing"/>

</restriction>

</simpleType>

</list>

</simpleType>

<complexType name="thrsholdPackType">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="thresholdPackElement" type="xn:thresholdPackElementType"/>

</sequence>

</complexType>

<complexType name="thresholdPackElementType">

<all>

<element name="thresholdValue" type="string"/>

<element name="thresholdLevel" type="integer"/>

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

</all>

</complexType>

<complexType name="thresholdInfoType">

<all>

<element name="measurementType" type="string"/>

<element name="direction" type=" xn:directionType"/>

<element name="thresholdPack" type=" xn:thrsholdPackType"/>

</all>

</complexType>

<complexType name="thresholdInfoListType">

<sequence minOccurs="1" maxOccurs="unbounded">

<element name="ThresholdInfoElement" type="xn:thresholdInfoType"/>

</sequence>

</complexType>

<simpleType name="ScopeType">

<restriction base="string">

<enumeration value="BASE\_ONLY"/>

<enumeration value="BASE\_ALL"/>

<enumeration value="BASE\_NTH\_LEVEL"/>

<enumeration value="BASE\_SUBTREE"/>

</restriction>

</simpleType>

<complexType name="Scope">

<sequence>

<element name="scopeType" type="xn:ScopeType"/>

<element name="scopeLevel" type="integer" minOccurs="0"/>

</sequence>

</complexType>

<!-- Generic Network Resources IRP NRM class associated XML elements -->

<element name="SubNetwork">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="dnPrefix" minOccurs="0"/>

<element name="userLabel"/>

<element name="userDefinedNetworkType"/>

<element name="setOfMcc" minOccurs="0"/>

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

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

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

</all>

</complexType>

</element>

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

<element ref="xn:SubNetwork"/>

<element ref="xn:ManagedElement"/>

<element ref="xn:MeContext"/>

<element ref="xn:ManagementNode"/>

<element ref="xn:IRPAgent"/>

<element ref="xn:SubNetworkOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

<element ref="xn:ThresholdMonitoringCapability"/>

<element ref="xn:ThresholdMonitor"/>

<element ref="xn:MeasurementControl"/>

<element ref="xn:NtfSubscriptionControl"/>

</choice>

<choice minOccurs="0" maxOccurs="1">

<element ref="sp:ESPolicies"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="ManagedElement">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="dnPrefix"/>

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

<element name="userLabel"/>

<element name="vendorName"/>

<element name="userDefinedState"/>

<element name="locationName"/>

<element name="swVersion"/>

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

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

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

</all>

</complexType>

</element>

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

<element ref="xn:IRPAgent"/>

<element ref="xn:ManagedElementOptionallyContainedNrmClass"/>

<element ref="xn:VsDataContainer"/>

<element ref="xn:ThresholdMonitoringCapability"/>

<element ref="xn:ThresholdMonitor"/>

<element ref="xn:MeasurementControl"/>

<element ref="xn:NtfSubscriptionControl"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="ManagedFunction">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

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

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

<element name="peeParametersList" type="xn:peeParametersListType"/>

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

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

</all>

</complexType>

</element>

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

<element ref="xn:VsDataContainer"/>

<element ref="xn:EP\_RP"/>

<element ref="xn:ThresholdMonitoringCapability"/>

<element ref="xn:ThresholdMonitor"/>

<element ref="xn:MeasurementControl"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="ManagedNFService">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

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

<element name="nFServiceType" type="xn:nFServiceType"/>

<element name="AdministrativeState" type="xn:pMAdministrativeStateType"/>

<element name="OperationalState" type="xn:pMOperationalStateType"/>

<element name="usageState" type="xn:usageStateType"/>

<element name="registrationState" type="xn:registrationStateType"/>

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

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

</all>

</complexType>

</element>

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

<element ref="xn:VsDataContainer"/>

<element ref="xn:ThresholdMonitoringCapability"/>

<element ref="xn:ThresholdMonitor"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="MeContext">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="dnPrefix" minOccurs="0"/>

</all>

</complexType>

</element>

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

<element ref="xn:ManagedElement"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="ManagementNode">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="userLabel"/>

<element name="vendorName"/>

<element name="locationName"/>

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

<element name="swVersion"/>

<element name="userDefinedState"/>

</all>

</complexType>

</element>

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

<element ref="xn:IRPAgent"/>

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="MeasurementControl">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="pMAdministrativeState" type="xn:pMAdministrativeStateType"/>

<element name="pMOperationalState" type="xn:pMOperationalStateType"/>

<element name="defaultFileBasedGP" type="integer"/>

<element name="defaultFileReportingPeriod" type="integer"/>

<element name="defaultFileLocation" type="string"/>

<element name="defaultStreamBasedGP" type="integer"/>

<element name="defaultStreamTarget" type="string"/>

</all>

</complexType>

</element>

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

<element ref="xn:MeasurementReader"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="MeasurementReader">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="measurementTypes"/>

<element name="fileBasedGP" type="integer" minOccurs="0"/>

<element name="fileReportingPeriod" type="integer" minOccurs="0"/>

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

<element name="streamBasedGP" type="integer" minOccurs="0"/>

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

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

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

</all>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="IRPAgent">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element ref="xn:systemDN" minOccurs="0"/>

</all>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="EP\_RP">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

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

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

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

</all>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="VsDataContainer">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="vsDataType"/>

<element name="vsDataFormatVersion"/>

<element ref="xn:vsData"/>

</all>

</complexType>

</element>

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

<element ref="xn:VsDataContainer"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="ThresholdMonitoringCapability">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="supportedMonitoringGPs" type="xn:GPListType"/>

</all>

</complexType>

</element>

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

<element ref="xn:ThresholdMonitoringCapabilityOptionallyContainedNrmClass"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="HeartbeatControl">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="heartbeatNtfPeriod" type="integer"/>

<element name="triggerHeartbeatNtf" type="boolean"/>

</all>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="ThresholdMonitor">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="thresholdInfoList" type="xn:thresholdInfoListType"/>

<element name="monitoringGP" type="integer"/>

<element name="monitoringNotifTarget" type="string"/>

<element name="monitoredIOCName" type="string"/>

<element name="monitoredObjectDNs" type="xn:dnList"/>

</all>

</complexType>

</element>

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

<element ref="xn:ThresholdMonitorOptionallyContainedNrmClass"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<element name="NtfSubscriptionControl">

<complexType>

<complexContent>

<extension base="xn:NrmClass">

<sequence>

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

<complexType>

<all>

<element name="notificationRecipientAddress" type="string"/>

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

<element name="scope" type="xn:Scope"/>

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

</all>

</complexType>

</element>

<choice minOccurs="0" maxOccurs="1">

<element ref="xn:HeartbeatControl"/>

</choice>

</sequence>

</extension>

</complexContent>

</complexType>

</element>

<!--

IRPAgent IOC attributes

-->

<element name="systemDN" type="xn:dn"/>

<!--

VsDataContainer NRM class vsData attribute associated empty XML element

-->

<complexType name="vsData"/>

<element name="vsData" type="xn:vsData"/>

<!--

Abstract head XML element for all XML elements associated to further

NRM classes optionally contained under SubNetwork NRM class

-->

<element

name="SubNetworkOptionallyContainedNrmClass"

type="xn:NrmClass"

abstract="true"

/>

<!--

Abstract head XML element for all XML elements associated to further

NRM classes optionally contained under ManagedElement NRM class

-->

<element

name="ManagedElementOptionallyContainedNrmClass"

type="xn:NrmClass"

abstract="true"

/>

<!--

Abstract head XML element for all XML elements associated to further

NRM classes optionally contained under ThresholdMonitoringCapability NRM class

-->

<element

name="ThresholdMonitoringCapabilityOptionallyContainedNrmClass"

type="xn:NrmClass"

abstract="true"

/>

<!--

Abstract head XML element for all XML elements associated to further

NRM classes optionally contained under ThresholdMonitor NRM class

-->

<element

name="ThresholdMonitorOptionallyContainedNrmClass"

type="xn:NrmClass"

abstract="true"

/>

</schema>

Annex C (normative):Void

Annex D (normative):Void

Annex E (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Change history | | | | | | | |
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | Old | New |
| 2012-12 |  |  |  |  | New version after approval | 2.0.0 | 11.0.0 |
| 2013-06 | SA#60 | SP-130304 | 002 | 2 | Correction of XML schema | 11.0.0 | 11.1.0 |
| 2014-06 | SA#64 | SP-140332 | 003 | 1 | upgrade XSD | 11.1.0 | 11.2.0 |
| SP-140358 | 004 | - | remove the feature support statements |
| 2014-09 | SA#65 | SP-140560 | 005 | - | Update the link from Solution Set to Information Service due to the end of Release 12 | 11.2.0 | 12.0.0 |
| 2015-12 | SA#70 | SP-150691 | 006 | 1 | Add missing id attribute | 12.0.0 | 12.1.0 |
| 2016-01 |  |  |  |  | Upgrade to Rel-13 (MCC) | 12.1.0 | 13.0.0 |
| 2016-03 | SA#71 | SP-160031 | 010 | 1 | 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 | 0011 | - | 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-170510 | 0015 | 2 | B | Modifications to align with IS to support Configuration Management for mobile networks that include virtualized network functions | 14.1.0 |
| 2018-03 | SA#79 | SP-180060 | 0016 | 1 | B | Add attribute peeParametersList to Solution Set definitions | 15.0.0 |
| 2018-12 | SA#82 | SP-181042 | 0018 | 1 | F | Update NRM root IOCs Solution Set to support priority | 15.1.0 |
| 2019-03 | SA#83 | SP-190121 | 0020 | 1 | F | Update Generic NRM Solution Set to support JSON | 15.2.0 |
| 2019-06 | SA#84 | SP-190371 | 0021 | - | B | Add IOCs for threshold monitoring control | 16.0.0 |
| 2019-09 | SA#85 | SP-190745 | 0026 | 1 | F | generate JSON definition for generic NRM based on new style guideline | 16.1.0 |
| 2019-09 | SA#85 | SP-190744 | 0027 | - | A | Add IDL XML YANG solutions | 16.1.0 |
| 2019-09 | SA#85 | SP-190751 | 0029 | - | A | Correct references and remove not need abbreviations | 16.1.0 |
| 2019-12 | SA#86 | SP-191166 | 0031 | 1 | F | Correct XML solution set for generic NRM | 16.2.0 |
| 2019-12 | SA#86 | SP-191166 | 0035 | - | B | Updates to YANG SS | 16.2.0 |
| 2019-12 | SA#86 | SP-191173 | 0037 | 1 | A | Add the definition of attribute measurementsList | 16.2.0 |
| 2019-12 | SA#86 | SP-191166 | 0039 | - | B | Add heartbeat control NRM fragment - Stage 3 | 16.2.0 |
| 2019-12 | SA#86 | SP-191166 | 0040 | - | B | Add notification subscription control NRM fragment - Stage 3 | 16.2.0 |
| 2020-03 | SA#87E | SP-200163 | 0041 | 2 | B | Add configurable KPI control NRM | 16.3.0 |
| 2020-03 | SA#87E | SP-200163 | 0042 | - | B | Add configurable FM - YANG Solution | 16.3.0 |
| 2020-03 | SA#87E | SP-200230 | 0043 | 1 | F | Add OpenAPI definitions required by the ProvMnS | 16.3.0 |
| 2020-03 | SA#87E | SP-200169 | 0045 |  | F | Correct errors in yang solution set | 16.3.0 |
| 2020-03 | SA#87E |  |  |  |  | Correction in the implementation of CR0041 | 16.3.1 |
| 2020-03 | SA#87E |  |  |  |  | Correction of implementation | 16.3.2 |
| 2020-07 | SA#88E | SP-200490 | 0046 | 2 | B | Add OpenAPI definitions for the FM control fragment | 16.4.0 |
| 2020-07 | SA#88E | SP-200489 | 0047 | - | F | Correct OpenAPI definition for notificationTypes | 16.4.0 |
| 2020-07 | SA#88E | SP-200483 | 0079 | 2 | B | Add trace control NRM fragment stage 3 | 16.4.0 |
| 2020-07 | SA#88E | SP-200484 | 0080 | - | D | Fix inconsistent formatting | 16.4.0 |
| 2020-07 | SA#88E | SP-200493 | 0081 | - | B | Stage3 add the NRM fragment for SON management | 16.4.0 |
| 2020-07 | SA#88E | SP-200485 | 0082 | - | F | Update the definition of SNssai | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0084 | - | F | Update ManagedElement YANG moduel | 16.4.0 |
| 2020-07 | SA#88E | SP-200596 | 0085 | 1 | F | Update Nrm YANG | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0087 | 2 | F | Update PM control fragment (OpenAPI definitions) | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0088 | - | F | Clarify usage of the VsDataContainer (OpenAPI definitions) | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0089 | - | F | Add common data definitions (OpenAPI definitions) | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0091 | - | F | Update FM control fragment (YANG definitions) | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0092 | - | F | Update PM Control fragment (YANG definitions) | 16.4.0 |
| 2020-07 | SA#88E | SP-200490 | 0093 | 1 | F | Correct genericNRM definition in XML solution | 16.4.0 |
| 2020-09 | SA#89e | SP-200729 | 0095 | - | F | Correction of YANG errors | 16.5.0 |
| 2020-09 | SA#89e | SP-200727 | 0101 | 1 | A | Clean-up definitions and references | 16.5.0 |
| 2020-09 | SA#89e | SP-200729 | 0102 | - | B | YANG SS for Trace Control | 16.5.0 |
| 2020-09 | SA#89e | SP-200724 | 0103 | - | F | Add missing definitions to comDefs.yaml (OpenAPI definitions) | 16.5.0 |
| 2020-09 | SA#89e | SP-200724 | 0104 | - | F | Correct various smaller errors (e.g. validation errors) in genericNRM.yaml (OpenAPI definitions) | 16.5.0 |
| 2020-09 | SA#89e | SP-200729 | 0105 | 1 | F | Correct ThresholdMonitor definition (OpenAPI definitions) | 16.5.0 |
| 2020-09 | SA#89e | SP-200729 | 0106 | - | F | Update HeartbeatControl YANG definition | 16.5.0 |
| 2020-09 | SA#89e | SP-200729 | 0107 | - | F | Update ThresholdMonitor YANG definition | 16.5.0 |
| 2020-12 | SA#90e | SP-201057 | 0108 | - | F | Correction of NRM YANG errors | 16.6.0 |
| 2020-12 | SA#90e | SP-201063 | 0109 | 1 | F | Add new MDT specific parameter collection period for NR aligning with 28.622 for stage 3 | 16.6.0 |
| 2020-12 | SA#90e | SP-201057 | 0110 | - | F | Remove thresholdLevel attribute from ThresholdMonitor (OpenAPI definition) | 16.6.0 |
| 2020-12 | SA#90e | SP-201050 | 0111 | 1 | F | Correct and add types in comDefs.yaml (OpenAPI definition) | 16.6.0 |
| 2020-12 | SA#90e | SP-201050 | 0112 | 1 | F | Use comDefs.yaml instead of local definitions in genericNrm.yaml (OpenAPI definition) | 16.6.0 |
| 2020-12 | SA#90e | SP-201057 | 0113 | 1 | F | Update attribute perfMetricJobGroupId. | 16.6.0 |
| 2020-12 | SA#90e | SP-201057 | 0114 | - | F | Remove value handling from the granularityPeriod description | 16.6.0 |
| 2020-12 | SA#90e | SP-201088 | 0115 | - | F | Correct and add types in comDefs.yaml (OpenAPI definition) | 16.6.0 |
| 2020-12 | SA#90e | SP-201063 | 0117 |  | F | Correct trace target parameter for trace control in stage 3 | 16.6.0 |
| 2020-12 | SA#90e | SP-201089 | 0118 | 1 | F | Remove incorrect S-NSSAI definition from YANG SS | 16.6.0 |
| 2021-03 | SA#91e | SP-210146 | 0121 | - | F | Fix compilation errors | 16.7.0 |
| 2021-03 | SA#91e | SP-210153 | 0125 | - | F | YANG compilation error and missing stage 2 corrections | 16.7.0 |
| 2021-06 | SA#92e | SP-210406 | 0119 | 2 | F | Replace legacy IRPAgent with MnsAgent (OpenAPI definition) | 16.8.0 |
| 2021-06 | SA#92e | SP-210397 | 0127 | 1 | F | Correction of Trace/MDT related parameters (OpenAPI definition) | 16.8.0 |
| 2021-06 | SA#92e | SP-210397 | 0128 | 1 | F | Align Trace/MDT related parameters to TS 32.422 (OpenAPI definition) | 16.8.0 |
| 2021-06 | SA#92e | SP-210406 | 0129 | 1 | F | Clean up regarding common data types (OpenAPI definition) | 16.8.0 |
| 2021-06 | SA#92e | SP-210411 | 0130 | - | F | Correct definition of additionalInformation (YANG) | 16.8.0 |
| 2021-09 | SA#93e | SP-210886 | 0131 | 1 | F | Replace local data type definition for notificationFilter by common filter definition | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0132 | 1 | F | Correct data type of notificationId (YANG definitions) | 16.9.0 |
| 2021-09 | SA#93e | SP-210886 | 0133 | 1 | F | Clarify resource id is required and nullable (OpenAPI definitions) | 16.9.0 |
| 2021-09 | SA#93e | SP-210865 | 0134 | - | F | Correction and clarification of reporting in TraceJob (stage3) | 16.9.0 |
| 2021-09 | SA#93e | SP-210865 | 0135 | - | F | Adaptation and cleanup of Trace/MDT related parameters (stage3) | 16.9.0 |
| 2021-09 | SA#93e | SP-210871 | 0136 | - | F | YANG updates to correct YANG merging problems | 16.9.0 |
| 2021-09 | SA#93e | SP-210867 | 0137 | 1 | F | Correction of YANG Solution set | 16.9.0 |
| 2021-12 | SA#94e | SP-211475 | 0139 | 1 | F | Correction of YANG Solution set | 16.10.0 |
| 2021-12 | SA#94e | SP-211458 | 0142 | - | F | Introduce missing IEs for HSS and UDM Trace Record | 16.10.0 |
| 2021-12 | SA#94e | SP-211465 | 0138 | 1 | B | Add new common types for YANG | 17.0.0 |
| 2021-12 | SA#94e | SP-211467 | 0140 | - | B | Add support for MnS Discovery | 17.0.0 |
| 2021-12 | SA#94e | SP-211473 | 0141 | - | B | Add new common types for YANG | 17.0.0 |
| 2022-03 | SA#95e | SP-220168 | 0144 | 1 | C | Asynchronous operation NRM additions - YANG Stage-3 | 17.1.0 |
| 2022-03 | SA#95e | SP-220177 | 0146 | 1 | B | Enhance NRM with geographical information supporting MDA | 17.1.0 |
| 2022-03 | SA#95e | SP-220163 | 0147 | 1 | B | Add support for discovery of managed entities | 17.1.0 |
| 2022-03 | SA#95e | SP-220183 | 0148 | - | B | Add file retrieval NRM fragment (OpenAPI definitions) | 17.1.0 |
| 2022-03 | SA#95e | SP-220183 | 0149 | 1 | B | Add file download NRM fragment (OpenAPI definitions) | 17.1.0 |
| 2022-03 | SA#95e | SP-220171 | 0153 | - | B | Add parameter to configure beam level measurements in NR MDT | 17.1.0 |
| 2022-03 | SA#95e | SP-220183 | 0154 | - | B | Add attribute to configure an identifier of a TraceJob | 17.1.0 |
| 2022-03 | SA#95e | SP-220187 | 0156 |  | B | Add file download NRM fragment (YANG) | 17.1.0 |
| 2022-06 | SA#96 | SP-220498 | 0159 | - | A | Stage 3 Yang fix for 3GPP Common Trace | 17.2.0 |
| 2022-06 | SA#96 | SP-220498 | 0162 | 1 | A | OpenAPI file name and dependence change for comDefs.yaml | 17.2.0 |
| 2022-06 | SA#96 | SP-220498 | 0163 | 1 | A | OpenAPI file name and dependence change for genericNrm.yaml | 17.2.0 |
| 2022-06 | SA#96 | SP-220498 | 0166 | - | A | yaml indentation correction for comDefs.yaml | 17.2.0 |
| 2022-06 | SA#96 | SP-220516 | 0168 | - | A | Alignment of attribute names of TraceJob IOC to TS 32.422 (stage 3) | 17.2.0 |
| 2022-06 | SA#96 | SP-220496 | 0169 | - | F | Fix description of attribute mnsScope | 17.2.0 |
| 2022-06 | SA#96 | SP-220516 | 0174 | - | A | Alignment of attribute values of attribute tjMDTReportInterval to TS 32.422, TS 38.413 and TS 38.423 | 17.2.0 |
| 2022-06 | SA#96 | SP-220505 | 0175 | - | B | Add stage 3 for management data collection and discovery (OpenAPI definitions) | 17.2.0 |
| 2022-06 | SA#96 |  |  |  |  | Correction of implementation in D.2.10 | 17.2.1 |
| 2022-06 | SA#96 |  |  |  |  | Further corrections on the changes in the code from the annexes | 17.2.2 |
| 2022-09 | SA#97e | SP-220853 | 0180 | - | A | YANG Corrections | 17.3.0 |
| 2022-09 | SA#97e | SP-220859 | 0182 | 1 | A | Adding missing interface for SMF | 17.3.0 |
| 2022-09 | SA#97e | SP-220863 | 0186 | - | F | Correction of file names in OpenAPI Solution Set | 17.3.0 |
| 2022-09 | SA#97e | SP-220864 | 0188 | - | A | Correction of attribute names according to Upper Camel Case Convention and WKA | 17.3.0 |
| 2022-09 | SA#97e | SP-220855 | 0185 | 1 | B | Add QMC job (stage 3 YANG) | 18.0.0 |
| 2022-09 | SA#97e |  |  |  |  | Alignment with content in FORGE | 18.0.1 |
| 2022-09 | SA#97e |  |  |  |  | Alignment with content in FORGE (Yang) | 18.0.2 |
| 2023-01 | SA#98e | SP-221172 | 0189 | - | F | YANG Corrections in Word TS | 18.1.0 |
| 2023-01 | SA#98e | SP-221188 | 0191 | 1 | B | FIles and File IOCs YANG | 18.1.0 |
| 2023-01 | SA#98e | SP-221186 | 0194 | - | A | Add YANG for ManagementDataCollection | 18.1.0 |
| 2023-01 | SA#98e | SP-221188 | 0197 | - | B | NRM enhancements for NF List | 18.1.0 |
| 2023-01 | SA#98e | SP-221173 | 0202 | 1 | A | Adding YANG begin and End markers | 18.1.0 |
| 2023-01 | SA#98e | SP-221186 | 0204 | 1 | A | Correct yaml definition for ManagementDataCollection IOC | 18.1.0 |
| 2023-01 | SA#98e | SP-221187 | 0206 | - | A | Adding a new data type only to represent GeoArea via convex polygon - Stage 3 | 18.1.0 |
| 2023-01 | SA#98e | SP-221172 | 0212 | - | F | YANG Corrections | 18.1.0 |
| 2023-01 | SA#98e | SP-221176 | 0215 |  | B | Definition of parameters MDT Alignment Information and Available RAN Visible QoE Metrics (stage3, YANG) | 18.1.0 |
| 2023-01 | SA#98e | SP-221170 | 0218 | - | A | Add missing attribute properties to YANG | 18.1.0 |
| 2023-01 | SA#98e | SP-221197 | 0219 | 1 | A | Correct M6 Delay Threshold to align with TS 38.314 and TS 38.413 | 18.1.0 |
| 2023-01 | SA#98e |  |  |  |  | Fixing minor implementation mistakes | 18.1.1 |
| 2023-03 | SA#99 | SP-230199 | 0223 | 1 | A | Fix IpAddr stage 3 definition | 18.2.0 |
| 2023-03 | SA#99 | SP-230207 | 0226 | - | A | Adding altitude to GeoArea datatype - Stage 3 | 18.2.0 |
| 2023-03 | SA#99 | SP-230200 | 0230 | - | A | Missing Mount information | 18.2.0 |
| 2023-03 | SA#99 | SP-230210 | 0233 | 1 | A | Correcting traceRecordingSessionReference property (stage3) | 18.2.0 |
| 2023-03 | SA#99 | SP-230204 | 0234 | 1 | F | YANG Corrections | 18.2.0 |
| 2023-03 | SA#99 | SP-230208 | 0240 | 1 | A | Clarify reporting and monitoring period usage in SupportedPerfMetricGroup datatype. (stage3) | 18.2.0 |
| 2023-03 | SA#99 | SP-230211 | 0241 | - | F | Correct YANG for ReportingCtrl | 18.2.0 |
| 2023-03 | SA#99 |  |  |  |  | Correction of annexes for alignment with FORGE | 18.2.1 |
| 2023-06 | SA#100 | SP-230653 | 0214 | 3 | B | Add stage 3 for data type AvailabilityStatus | 18.3.0 |
| 2023-06 | SA#100 | SP-230651 | 0244 | 1 | F | Correcting the min and max Items possible for fiveQIValue attribute in Stage 3 | 18.3.0 |
| 2023-06 | SA#100 | SP-230649 | 0246 | - | A | correction to stage 3 implementation for MnSInfo and MnsRegistry | 18.3.0 |
| 2023-06 | SA#100 | SP-230651 | 0250 | - | F | YANG Corrections | 18.3.0 |
| 2023-06 | SA#100 |  |  |  |  | CR implementation corrections | 18.3.1 |
| 2023-09 | SA#101 | SP-230944 | 0243 | 4 | A | Clarify MnsRegistry handling, YANG SS R18 | 18.4.0 |
| 2023-09 | SA#101 | SP-230938 | 0255 | - | B | Rel18 CR TS 28.623 Stage 3 Re-structuring Trace job | 18.4.0 |
| 2023-09 | SA#101 | SP-230938 | 0256 | - | C | Rel-18 CR TS 28.623 Report Amount for M4, M5, M6 and M7 measurements in LTE | 18.4.0 |
| 2023-09 | SA#101 | SP-230960 | 0257 | - | C | Introduce MnS Producer Notification Capabilility | 18.4.0 |
| 2023-09 | SA#101 | SP-230942 | 0260 | 1 | A | Rel-18 CR 28.623 Clarify HeartbeatControl IOC definition (stage3, yang) | 18.4.0 |
| 2023-09 | SA#101 | SP-230938 | 0261 |  | B | Rel-18 CR TS 28.623 Stage 3 Re-structuring Trace job (yang) | 18.4.0 |
| 2023-09 | SA#101 | SP-230944 | 0266 | - | A | Improve DistinguishedName pattern in YANG - R18 | 18.4.0 |
| 2023-12 | SA#102 | SP-231458 | 0267 | - | B | TS28.623 Rel18 OpenAPI SS for QMCJob | 18.5.0 |
| 2023-12 | SA#102 | SP-231472 | 0268 | - | B | TS28.623 Rel18 OpenAPI SS for SupportedNotifications | 18.5.0 |
| 2023-12 | SA#102 | SP-231458 | 0269 | 1 | C | Rel-18 CR 28.623 Move normative YANG and YAML code to Forge | 18.5.0 |
| 2023-12 | SA#102 | SP-231492 | 0271 | 1 | A | Rel-18 CR 28.623 YANG Corrections and inVariant | 18.5.0 |
| 2023-12 | SA#102 | SP-231453 | 0272 | - | B | Rel-18 CR TS 28.623 Stage 3 Report Amount parameter in NR | 18.5.0 |
| 2023-12 | SA#102 | SP-231492 | 0274 |  | A | Rel-18 CR TS 28.623 Stage 3 Correction of ExcessPacketDelayThreshold definition | 18.5.0 |
| 2023-12 | SA#102 | SP-231458 | 0276 | 1 | B | Rel18 TS28.623 Add NRM fragments for scheduler and condition monitor (OpenAPI definition) | 18.5.0 |
| 2023-12 | SA#102 | SP-231452 | 0278 |  | A | Rel-18 CR 28.623 Clarify MnS scope value for Managed Elements (stage3, yang) | 18.5.0 |
| 2023-12 | SA#102 | SP-231457 | 0287 | 1 | A | Rel-18 CR TS28.623 Correct the yaml definition for ThresholdMonitor IOC to align with stage2 definition | 18.5.0 |
| 2023-12 | SA#102 | SP-231458 | 0288 | 1 | F | Rel-18 CR TS28.623 Separate yaml file for trace control NRM fragment | 18.5.0 |
| 2023-12 | SA#102 | SP-231477 | 0289 |  | B | Rel-18 CR TS 28.623 Enhance the ManagementDataCollection to support request management data per PLMN | 18.5.0 |
| 2023-12 | SA#102 | SP-231453 | 0290 | 1 | B | Rel-18 CR TS28.623 Adding NPN Area Scope of MDT | 18.5.0 |
| 2023-12 | SA#102 | SP-231494 | 0291 | - | F | Rel-18 CR TS 28.623 Solution Sets clarifications | 18.5.0 |
| 2023-12 | SA#102 | SP-231488 | 0294 | 3 | A | Rel-18 CR TS 28.623 Align N38 in SMF with TS23.501 | 18.5.0 |
| 2023-12 | SA#102 | SP-231453 | 0295 | 1 | B | Rel-18 CR TS 28.623 MDT support for NPN | 18.5.0 |
| 2023-12 | SA#102 | SP-231471 | 0299 | 1 | A | Rel-18 CR 28.623 Add measurement bin support to NRM (stage3, yang) | 18.5.0 |
| 2023-12 | SA#102 | SP-231488 | 0302 |  | A | Rel-18 CR TS28.623 Adding N16 and N16a into module\_3gpp-common-trace.yang | 18.5.0 |
| 2023-12 | SA#102 | SP-231494 | 0305 | 1 | F | Rel-18 TS 28.623 YANG Correction of GeoAreaGrp and GeoCoordinateGrp | 18.5.0 |
| 2023-12 | SA#102 |  |  |  |  | Add code files in zip | 18.5.1 |