**3GPP TSG-SA5 Meeting #131e *S5-203458***

**e-meeting 25th May-3rd June 2020**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | S5-203421 / S5-203275 changed the stage 2 of the FM fragment. This is the corresponding YANG definition change | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Mismatch between Stage 2 and stage 3 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | D.2.1, D.2.2, D.2.3, D.2.4, D.2.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | YANG checked locally with pyang --strict | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

|  |
| --- |
| **First modification** |

## D.2.1 module \_3gpp-common-ep-rp.yang

module \_3gpp-common-ep-rp {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-common-ep-rp";

prefix "eprp3gpp";

import \_3gpp-common-yang-types { prefix types3gpp ; }

import ietf-inet-types { prefix inet; }

import \_3gpp-common-measurements { prefix meas3gpp; }

organization "3GPP SA5";

contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

description "Common/basic class/grouping to be inherited/reused.

This IOC represents an end point of a link used across a reference

point between two network entities.";

reference

"3GPP TS 28.622

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Information Service (IS)

3GPP TS 28.620

Umbrella Information Model (UIM)";

revision 2020-06-08 { reference "CR-00XX S5-203458"; }

// TODO When the CR number is known include that and remove the S5-203458

revision 2019-06-17 {

description "Initial revision";

}

grouping EP\_RPGrp {

description "Abstract class, represents an end point of a link used

across a reference point between two network entities.

For naming the subclasses of EP\_RP, the following rules shall apply:

- The name of the subclassed IOC shall have the form ’EP\_<rp>’,

where <rp> is a string that represents the name of the reference point.

Thus, two valid examples of EP\_RP subclassed IOC names would be:

EP\_S1 and EP\_X2.";

leaf userLabel {

type string;

description "A user-friendly (and user assignable) name of this object.";

}

leaf farEndEntity {

config false;

type types3gpp:DistinguishedName;

}

}

grouping EP\_Common {

uses EP\_RPGrp;

uses meas3gpp:SupportedPerfMetricGroupGrp;

list localAddress {

description "Local IP address and VLAN ID.";

key "ipAddress vlanId";

min-elements 1;

max-elements 1;

uses types3gpp:AddressWithVlan;

}

leaf remoteAddress {

description "Remote IP address.";

mandatory true;

type inet:ip-address;

}

}

}

## D.2.2 module \_3gpp-common-managed-element.yang

module \_3gpp-common-managed-element {

yang-version 1.1;

namespace urn:3gpp:sa5:\_3gpp-common-managed-element;

prefix "me3gpp";

import \_3gpp-common-yang-types { prefix types3gpp ; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-common-measurements { prefix meas3gpp; }

import \_3gpp-common-fm { prefix fm3gpp; }

organization "3GPP SA5";

contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

description "Defines ManagedElement which will be augmented

by other IOCs";

reference "3GPP TS 28.623

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

3GPP TS 28.622

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Information Service (IS)

3GPP TS 28.620

Umbrella Information Model (UIM)";

revision 2020-06-08 { reference "CR-00XX S5-203458"; }

// TODO When the CR number is known include that and remove the S5-203458

revision 2020-02-24 {

reference "S5-201365";

}

revision 2019-06-17 {

description "Initial revision";

}

feature MeasurementsUnderManagedElement {

description "The MeasurementSubtree shall be contained under ManageElement";

}

feature FmUnderManagedElement {

description "The FmSubtree shall be contained under ManageElement";

}

grouping ManagedElement\_Grp {

description "Abstract class representing telecommunications resources.

An ME communicates with a manager (directly or indirectly) for the

purpose of being monitored and/or controlled. MEs may perform element

management functionality.

An ME (and its contained Function\_(s)) may or may not be geographically

distributed. An ME (and its contained Function\_(s)) is often referred

to as a Network Element";

leaf dnPrefix {

description "Provides naming context that allows the Managed

Elements to be partitioned into logical domains.

A Distingushed Name(DN) is defined by 3GPP TS 32.300,

which splits the DN into a DN Prefix and Local DN";

type types3gpp:DistinguishedName;

}

leaf userLabel {

description "A user-friendly (and user assignable) name of this object.";

type string;

}

leaf locationName {

description "The physical location (e.g. an address) of an entity

represented by a (derivative of) ManagedElement\_. It may contain no

information to support the case where the derivative of

ManagedElement\_ needs to represent a distributed multi-location NE.";

config false;

type string;

}

leaf-list managedBy {

description "Relates to the role played by ManagementSystem\_ in the

between ManagedSystem\_ and ManagedElement\_. This attribute contains

a list of the DN(s) of the related subclasses of

ManagementSystem\_ instance(s).";

config false;

type types3gpp:DistinguishedName;

}

leaf-list managedElementTypeList {

description "The type of functionality provided by the ManagedElement.

It may represent one ME functionality or a combination of

more than one functionality.

1) The allowed values of this attribute are the names of the IOC(s)

that are (a) derived/subclassed from ManagedFunction and (b) directly

name-contained by ManagedElement IOC (on the first level below

ManagedElement), but with the string ’Function’ excluded.

2) If a ManagedElement contains multiple instances of a ManagedFunction

this attribute will not contain repeated values.

3) The capitalisation (usage of upper/lower case) of characters in this

attribute is insignificant. Thus, the NodeB should be case insensitive

when reading these values.

4) Two examples of allowed values are:

- NodeB;

- HLR, VLR.";

config false;

min-elements 1;

type string;

}

}

grouping ManagedElementGrp {

description "Represents telecommunications equipment or

TMN entities within the telecommunications network providing support

and/or service to the subscriber.";

uses ManagedElement\_Grp;

uses meas3gpp:SupportedPerfMetricGroupGrp {

if-feature MeasurementsUnderManagedElement ;

}

leaf vendorName {

config false;

type string;

}

leaf userDefinedState {

type string;

description "An operator defined state for operator specific usage";

}

leaf swVersion {

config false;

type string;

}

leaf priorityLabel {

type uint32;

mandatory true;

}

}

list ManagedElement {

description "Represents telecommunications equipment or

TMN entities within the telecommunications network providing support

and/or service to the subscriber.

An ME communicates with a manager (directly or indirectly) over one or

more management interfaces for the purpose of being monitored and/or

controlled. MEs may or may not additionally perform element management

functionality.

An ME contains equipment that may or may not be geographically

distributed. An ME is often referred to as a Network Element.

A telecommunication equipment has software and hardware components.

The IOC described above represents the case when the software component

is designed to run on dedicated hardware component. In the case when the

software is designed to run on ETSI NFV defined NFVI [15], the IOC

description would exclude the NFVI component supporting the above

mentioned subject software. A ManagedElement may be contained in either

a SubNetwork or in a MeContext instance. A single ManagedElement may also

exist stand-alone with no parent at all.

The ManagedElement IOC may be used to represent combined ME functionalit

y (as indicated by the managedElementType attribute and the contained

instances of different functional IOCs).";

key id; // TODO: should this have a min-element/max-elements?

uses top3gpp:Top\_Grp;

container attributes {

uses ManagedElementGrp;

}

uses meas3gpp:MeasurementSubtree {

if-feature MeasurementsUnderManagedElement ;

}

uses fm3gpp:FmSubtree {

if-feature FmUnderManagedElement ;

}

}

}

## D.2.3 module \_3gpp-common-managed-function.yang

module \_3gpp-common-managed-function {

yang-version 1.1;

namespace urn:3gpp:sa5:\_3gpp-common-managed-function;

prefix mf3gpp;

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-common-measurements { prefix meas3gpp; }

organization "3GPP SA5";

contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

description "The module defines a base class/grouping for major 3GPP functions.";

reference

"3GPP TS 28.622

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Information Service (IS)

3GPP TS 28.620

Umbrella Information Model (UIM)";

revision 2020-06-08 { reference "CR-00XX S5-203458"; }

// TODO When the CR number is known include that and remove the S5-203458

revision 2019-11-21 {

reference "S5-197275, S5-197735";

}

revision 2019-10-28 {

reference S5-193518 ;

}

revision 2019-06-18 {

description "Initial revision";

}

grouping Operation {

reference "3gpp TS 28.622";

leaf name {

type string;

mandatory true;

}

leaf-list allowedNFTypes {

type string;

min-elements 1;

description "The type of the managed NF service instance

The specifc values allowed are described in TS 23.501";

}

leaf operationSemantics {

type enumeration {

enum REQUEST\_RESPONSE;

enum SUBSCRIBE\_NOTIFY;

}

config false;

mandatory true;

description "Semantics type of the operation.";

reference "3GPP TS 23.502";

}

}

grouping ManagedNFServiceGrp {

description "A ManagedNFService represents a Network Function (NF) service.";

reference "Clause 7 of 3GPP TS 23.501.";

leaf userLabel {

type string;

description "A user-friendly (and user assignable) name of this object.";

}

leaf nFServiceType {

config false;

mandatory true;

type string;

description "The type of the managed NF service instance

The specifc values allowed are described in clause 7.2 of TS 23.501";

}

list sAP {

key "host port";

min-elements 1;

max-elements 1;

description "The service access point of the managed NF service instance";

uses types3gpp:SAP;

}

list operations {

key name;

min-elements 1;

uses Operation ;

description "Set of operations supported by the managed NF

service instance";

}

leaf administrativeState {

type types3gpp:AdministrativeState;

mandatory true;

description "Permission to use or prohibition against using the instance";

}

leaf operationalState {

type types3gpp:OperationalState;

config false;

mandatory true;

description "Describes whether the resource is installed and working";

}

leaf usageState {

type types3gpp:usageState ;

config false;

mandatory true;

description "Describes whether the resource is actively in use at a

specific instant, and if so, whether or not it has spare

capacity for additional users.";

}

leaf registrationState {

type enumeration {

enum REGISTERED;

enum DEREGISTERED;

}

config false;

}

}

grouping Function\_Grp {

description "A base grouping for 3GPP functions.";

leaf userLabel {

type string;

description "A user-friendly (and user assignable) name of this object.";

}

}

grouping ManagedFunctionGrp {

description "Abstract root class to be inherited/reused by classes

representing 3GPP functions.

Anywhere this grouping is used by classes inheriting from ManagedFunction

the list representing the inheriting class needs to include all

contained classes of ManagedFunction too. Contained classes are

either

- augmented into the Function class or

- shall be included in the list representing the inheriting clas

using the grouping ManagedFunctionContainedClasses:

1) EP\_RP solved using augment

2) uses mf3gpp:ManagedFunctionContainedClasses;

";

uses Function\_Grp;

container vnfParametersList {

description "Contains the parameter set of the VNF

instance(s) corresponding to an NE.";

presence "The presence of this container indicates that the ManagedFunction

represented is realized by one or more VNF instance(s). Otherwise it

shall be absent.";

leaf vnfInstanceId {

type string ;

mandatory true;

description "VNF instance identifier";

reference "ETSI GS NFV-IFA 008 v2.1.1:

Network Functions Virtualisation (NFV); Management and Orchestration;

Ve-Vnfm reference point - Interface and Information Model Specification

section 9.4.2

ETSI GS NFV-IFA 015 v2.1.2: Network Functions Virtualisation (NFV);

Management and Orchestration; Report on NFV Information Model

section B2.4.2.1.2.3";

}

leaf vnfdId {

type string ;

description "Identifier of the VNFD on which the VNF instance is based.

The absence of the leaf or a string length of zero for vnfInstanceId

means the VNF instance(s) does not exist (e.g. has not been

instantiated yet, has already been terminated).";

reference "ETSI GS NFV-IFA 008 v2.1.1:

Network Functions Virtualisation (NFV); Management and Orchestration;

Ve-Vnfm reference point - Interface and Information Model Specification

section 9.4.2";

}

leaf flavourId {

type string ;

description "Identifier of the VNF Deployment Flavour applied to this

VNF instance.";

reference "ETSI GS NFV-IFA 008 v2.1.1:

Network Functions Virtualisation (NFV); Management and Orchestration;

Ve-Vnfm reference point - Interface and Information Model Specification

section 9.4.3";

}

leaf autoScalable {

type boolean ;

mandatory true;

description "Indicator of whether the auto-scaling of this

VNF instance is enabled or disabled.";

}

}

container peeParametersList {

description "Contains the parameter set for the control

and monitoring of power, energy and environmental parameters of

ManagedFunction instance(s).";

presence "Present supported if the control and monitoring of PEE

parameters is supported by the ManagedFunction or sub-class instance.";

leaf siteIdentification {

type string;

mandatory true;

description "The identification of the site where the

ManagedFunction resides.";

}

leaf siteLatitude {

type decimal64 {

fraction-digits 4;

range "-90.0000..+90.0000";

}

description "The latitude of the site where the ManagedFunction

instance resides, based on World Geodetic System (1984 version)

global reference frame (WGS 84). Positive values correspond to

the northern hemisphere. This attribute is optional in case of

BTSFunction and RNCFunction instance(s).";

}

leaf siteLongitude {

type decimal64 {

fraction-digits 4;

range "-180.0000..+180.0000";

}

description "The longitude of the site where the ManagedFunction

instance resides, based on World Geodetic System (1984 version)

global reference frame (WGS 84). Positive values correspond to

degrees east of 0 degrees longitude. This attribute is optional in

case of BTSFunction and RNCFunction instance(s).";

}

leaf siteDescription {

type string;

mandatory true;

description "An operator defined description of the site where

the ManagedFunction instance resides.";

}

leaf equipmentType {

type string;

mandatory true;

description "The type of equipment where the managedFunction

instance resides.";

reference "clause 4.4.1 of ETSI ES 202 336-12";

}

leaf environmentType {

type string;

mandatory true;

description "The type of environment where the managedFunction

instance resides.";

reference "clause 4.4.1 of ETSI ES 202 336-12";

}

leaf powerInterface {

type string;

mandatory true;

description "The type of power.";

reference "clause 4.4.1 of ETSI ES 202 336-12";

}

}

leaf priorityLabel {

mandatory true;

type uint32;

}

uses meas3gpp:SupportedPerfMetricGroupGrp;

}

grouping ManagedFunctionContainedClasses {

list ManagedNFService {

description "Represents a Network Function (NF)";

reference "3GPP TS 23.501";

key id;

uses top3gpp:Top\_Grp;

container attributes {

uses ManagedNFServiceGrp;

}

}

}

}

## D.2.4 module \_3gpp-common-measurements.yang

module \_3gpp-common-measurements {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-common-measurements";

prefix "meas3gpp";

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-common-yang-types { prefix types3gpp; }

organization "3GPP SA5";

contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

description "Defines Measurement and KPI related groupings

Any list/class intending to use this should include 2 or 3 uses statements

controlled by a feature:

A)

+++ feature MeasurementsUnderMyClass {

+++ description 'Indicates whether measurements and/or KPIs are supported

+++ for this class.';

+++ }

B) include the attribute measurementsList and/or kPIsList indicating the

supported measurment and KPI types and GPs. Note that for classes

inheriting from ManagedFunction, EP\_RP or SubNetwork these attributes are

already inherited, so there is no need to include them once more. E.g.

+++ grouping MyClassGrp {

+++ uses meas3gpp:SupportedPerfMetricGroup;

+++ }

C) include the class PerfmetricJob to control the measurements/KPIs. E.g.

list MyClass {

container attributes {

uses MyClassGrp;

}

+++ uses meas3gpp:MeasurementSubtree {

+++ if-feature MeasurementsUnderMyClass ;

+++ }

}

Measurements can be contained under ManagedElement, SubNetwork, or

any list representing a class inheriting from Subnetwork or

ManagedFunction. Note: KPIs will only be supported under SubNetwork";

reference "3GPP TS 28.623

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

3GPP TS 28.622

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Information Service (IS)";

revision 2020-06-08 { reference "CR-00XX S5-203458"; }

// TODO When the CR number is known include that and remove the S5-203458

revision 2020-05-31 { reference "CR-0084"; }

revision 2020-03-11 { reference "S5-201581, SP-200229"; }

revision 2019-11-21 {

reference "S5-197275, S5-197735";

}

revision 2019-10-28 {

reference "S5-193516";

}

revision 2019-06-17 {

}

grouping SupportedPerfMetricGroupGrp {

list SupportedPerfMetricGroup {

config false;

description "Captures a group of supported performance metrics and

associated parameters related to their production and reporting.

A SupportedPerfMetricGroup attribute which is part of an MOI may

define performanceMetrics for any MOI under the subtree contained

under that MOI, e.g. SupportedPerfMetricGroup on a ManagedElement

can specify supported metrics for contained ManagedFunctions

like a GNBDUFunction.";

leaf-list performanceMetrics {

type string;

min-elements 1;

description "Performance metrics include measurements defined in

TS 28.552 and KPIs defined in TS 28.554. Performance metrics can

also be those specified by other SDOs or vendor specific metrics.

Performance metrics are identfied with their names. A name can also

identify a vendor specific group of performance metrics.

For measurements defined in TS 28.552 the name is constructed as

follows:

- 'family.measurementName.subcounter' for measurement types with

subcounters

- 'family.measurementName' for measurement types without subcounters

- 'family' for measurement families

For KPIs defined in TS 28.554 the name is defined in the KPI

definitions template as the component designated with e).";

}

leaf-list granularityPeriods {

type uint32 {

range 1..max ;

}

units seconds;

min-elements 1;

}

leaf-list reportingMethods {

type enumeration {

enum FILE\_BASED\_LOC\_SET\_BY\_PRODUCER;

enum FILE\_BASED\_LOC\_SET\_BY\_CONSUMER;

enum STREAM\_BASED;

}

min-elements 1;

}

}

}

grouping PerfMetricJobGrp {

description "Represents the attributtes of the IOC PerfMetricJob";

leaf administrativeState {

default UNLOCKED;

type types3gpp:AdministrativeState ;

description "Enable or disables production of the metrics";

}

leaf operationalState {

config false;

mandatory true;

type types3gpp:OperationalState ;

description "Indicates whether the PerfMetricJob is working.";

}

leaf perfMetricJobGroupId {

type string;

description "Identifies members of a PerfMetricJob group. For the

stream based reporting method this reference shall be present.";

}

leaf-list performanceMetrics {

type string;

min-elements 1;

description "Performance metrics include measurements defined in

TS 28.552 and KPIs defined in TS 28.554. Performance metrics can

also be those specified by other SDOs or vendor specific metrics.

Performance metrics are identfied with their names. A name can also

identify a vendor specific group of performance metrics.

For measurements defined in TS 28.552 the name is constructed as

follows:

- 'family.measurementName.subcounter' for measurement types with

subcounters

- 'family.measurementName' for measurement types without subcounters

- 'family' for measurement families

For KPIs defined in TS 28.554 the name is defined in the KPI

definitions template as the component designated with e).";

}

leaf granularityPeriod {

type uint32 {

range 1..max ;

}

units seconds;

mandatory true;

description "Granularity period used to produce measurements. The value

must be one of the supported granularity periods for the metric.

For measurements of type counter this is the period at which samples

of the internal counter value, that is incremented with every event

occurance, are taken.

For measurements of type gauge, this is period, over which the mean

value of the measured variable is calculated. The mean value is

then taken as sample.";

}

leaf-list objectInstances {

type types3gpp:DistinguishedName;

}

leaf-list rootObjectInstances {

type types3gpp:DistinguishedName;

description "Each object instance designates the root of a subtree that

contains the root object and all descendant objects.";

}

choice reportingCtrl {

mandatory true;

description "This choice defines the method for reporting collected

performance metrics to MnS consumers as well as the parameters for

configuring the reporting function. It is a choice between the control

parameter required for the reporting methods, whose presence selects

the reporting method as follows:

- When only the fileReportingPeriod attribute is present, the MnS

producer shall store files on the MnS producer at a location selected

by the MnS producer and inform the MnS consumer about the availability

of new files and the file location using the notifyFileReady

notification.

- When only the fileReportingPeriod and fileLocation attributes are

present, the MnS producer shall store the files on the MnS consumer at

the location specified by fileLocation. No notification is emitted by

the MnS producer.

- When only the streamTarget attribute is present, the MnS producer

shall stream the data to the location specified by streamTarget.

For the file-based reporting methods the fileReportingPeriod attribute

specifies the time window during which collected measurements are stored

into the same file before the file is closed and a new file is opened.";

case file-based-reporting {

leaf fileReportingPeriod {

type uint32 {

range 1..max;

}

units minutes";

must '(number(.)\*"60") mod number(../granularityPeriod) = "0"' {

error-message

"The time-period must be a multiple of the granularityPeriod.";

}

mandatory true;

description "For the file-based reporting method this is the time

window during which collected measurements are stored into the same

file before the file is closed and a new file is opened.

The time-period must be a multiple of the granularityPeriod.

Applicable when the file-based reporting method is supported";

}

leaf fileLocation {

type string ;

description "Applicable and must be present when the file-based

reporting method is supported, and the files are stored on the MnS

consumer.";

}

}

case stream-based-reporting {

leaf streamTarget {

type string;

mandatory true;

description "Applicable when stream-based reporting method is

supported.";

}

}

}

}

grouping ThresholdMonitoringCapabilityGrp {

description "Represents the capability of threshold monitoring(s)

allowed to be created by ThresholdMonitor to monitor some or all

of the measurements identified by SupportedPerfMetricGroup.";

leaf-list supportedMonitoringGPs {

type uint32;

units second;

config false;

min-elements 1;

description "The monitoring granularity periods supported by the

producer for the monitored entities.";

}

}

grouping ThresholdMonitorGrp {

description "A threshold monitor that is created by the consumer for

the monitored entities whose measurements are required by consumer

to monitor.";

list thresholdInfoList {

key idx;

leaf idx { type uint32 ; }

leaf measurementType {

type string;

mandatory true;

description "Shall be in one of the following form:

- 'family.measurementName.subcounter' for monitoring the

measurement types with subcounters defined.

- 'family.measurementName' for monitoring the measurement

types without subcounters defined.";

}

leaf direction {

type enumeration {

enum INCREASING;

enum DECREASING;

}

mandatory true;

description "

- If it is 'INCREASING', the threshold crossing

notification is triggered when the measurement value

equals or exceeds a thresholdValue.

- If it is 'DECREASING', the threshold crossing notification is

triggered when the measurement value equals or below a

thresholdValue.";

}

list thresholdPack {

key idx;

min-elements 1;

leaf idx { type uint32 ; }

leaf thresholdLevel {

type int64;

mandatory true;

description "";

}

leaf thresholdValue {

type int64;

mandatory true;

description "";

}

leaf threshold-low {

type int64;

description "The values threshold-low and threshold-high must

be present or absent together.

The measurementType value is allowed to oscillate between

threshold-low and threshold-highwithout triggering the

threshold crossing notification.";

}

leaf threshold-high {

when '../threshold-low';

type int64;

mandatory true;

description "The values threshold-low and threshold-high must

be present or absent together.

The measurementType value is allowed to oscillate between

threshold-low and threshold-highwithout triggering the

threshold crossing notification.";

}

}

}

leaf monitoringGP {

type uint32;

units second;

mandatory true;

description "Monitoring granularity period";

}

leaf monitoringNotifTarget {

type string;

description "Identifies the target of the notifications when the

monitored measurement crosses or reaches the threshold set by the

subject threshold monitor.";

}

leaf monitoredIOCName {

type string;

mandatory true;

description "Specifies the name of list(s) representing one object

class for which the threshold monitor is created.

When this attribute is effective, the threshold monitor is created

for all list nodes/entries with the specified name in the containment

tree whose top (tree) node is the list entry containing the subject

ThresholdMonitor list-entry containing this leaf.

This leaf is effective when the monitoredObjectDNs contained by

the same ThresholdMonitor list entry is empty.

AllowedValues: The IOC names defined in the NRMs specifications.";

}

leaf-list monitoredObjectDNs {

type types3gpp:DistinguishedName;

description "Specifies the object instance(s) for threshold monitoring.

The attribute monitoredIOCName contained by the same

ThresholdMonitor entry has no effect unless this leaf-list empty.";

}

}

grouping MeasurementSubtree {

description "Contains classes that define measurements.

Should be used in all classes (or classes inheriting from)

- SubNnetwork

- ManagedElement

- ManagedFunction

If a YANG module wants to augment these classes/list/groupings they must

augment all user classes!

If a class uses this grouping in its list it shall also use the

grouping SupportedPerfMetricGroupGrp to add SupportedPerfMetricGroup as

an attribute to its grouping";

list PerfMetricJob {

description "This IOC represents a performance metric production job. It

can be name-contained by SubNetwork, ManagedElement, or ManagedFunction.

To activate the production of the specified performance metrics, a MnS

consumer needs to create a PerfMetricJob instance on the MnS producer

and ensure that the adminState is sUNLOCKED>.

For ultimate deactivation of metric production, the MnS consumer should

delete the job to free up resources on the MnS producer.

For temporary suspension of metric production, the MnS consumer can

manipulate the value of the administrative state attribute. The MnS

producer may disable metric production as well, for example in overload

situations. This situation is indicated by the MnS producer with setting

the operational state attribute to disabled. When production is resumed

the operational state is set again to enabled.

The perfMetricJobGroupId is a common reference across all members of a

PerfMetricJob group. A group contains related PerfMetricJob instances.

The attribute performanceMetrics defines the performance metrics to be

produced and the attribute granularityPeriod defines the granularity

period to be applied.

All object instances below and including the instance name-containing

the PerfMetricJob (base object instance) are scoped for performance

metric production. Performance metrics are produced only on those object

instances whose object class matches the object class associated to the

performance metrics to be produced.

The attributes objectInstances and rootObjectInstances allow to restrict

the scope. When the attribute objectInstances is present, only the object

instances identified by this attribute are scoped. When the attribute

rootObjectInstances is present, then the subtrees whose root objects are

identified by this attribute are scoped. Both attributes may be present

at the same time meaning the total scope is equal to the sum of both

scopes. Object instances may be scoped by both the objectInstances and

rootObjectInstances attributes. This shall not be considered as an error

by the MnS producer.

When the performance metric requires performance metric production on

multiple managed objects, which is for example the case for KPIs, the

MnS consumer needs to ensure all required objects are scoped. Otherwise

a PerfMetricJob creation request shall fail.

The attribute reportingCtrl specifies the method and associated control

parameters for reporting the produced measurements to MnS consumers.

Three methods are available: file-based reporting with selection of the

file location by the MnS producer, file-based reporting with selection

of the file location by the MnS consumer and stream-based reporting.

A PerfMetricJob creation request shall fail, when the requested

performance metrics, the requested granularity period, the requested

repoting method, or the requested combination thereof is not supported

by the MnS producer.

Creation and deletion of PerfMetricJob instances by MnS consumers is

optional; when not supported, PerfMetricJob instances may be created and

deleted by the system or be pre-installed.";

key id;

uses top3gpp:Top\_Grp ;

container attributes {

uses PerfMetricJobGrp ;

}

}

list ThresholdMonitoringCapability {

key id;

max-elements 1;

description "Represents the capability of threshold monitoring(s)

allowed to be created by ThresholdMonitor to monitor some or all

of the measurements identified by supportedMeasurementsGPs.

This list entry instance represents the capability of the

threshold monitor(s) allowed to be created for the measurements of

the (tree) nodes of a containment tree whose top (tree) node is

the list-entry instance containing the ThresholdMonitoringCapability

instance.

In case one entry (say A) is contained by a tree node (say X), and

a similar list entry named ThresholdMonitoringCapability (say B) is

contained by a subordinate tree node (of tree node X), the entry

(B) contained by the subordinate tree node (Y) prevail.";

uses top3gpp:Top\_Grp ;

container attributes {

uses ThresholdMonitoringCapabilityGrp ;

}

}

list ThresholdMonitor {

key id;

description "A threshold monitor that is created by the consumer for

the monitored entities whose measurements are required by consumer

to monitor. The monitored entities are identified by the attribute

monitoredObjectDNs.

The creation request for this list entry may be rejected, if

the measurements to be monitered are being collected

(e.g., by a measurement job or NRM configurations) with a GP different

from the monitoringGP; or the measurements to be monitered are not

being collected.

In case one entry (say A) is contained by a tree node (say X), and

a similar list entry named ThresholdMonitor (say B) is

contained by a subordinate tree node (of tree node X),

when these two instances have overlaps the entry (B)

contained by the subordinate tree node (Y) will prevail for the

overlapped parts.";

uses top3gpp:Top\_Grp ;

container attributes {

uses ThresholdMonitorGrp ;

}

}

}

}

D.2.5 module \_3gpp-common-subnetwork.yang

module \_3gpp-common-subnetwork {

yang-version 1.1;

namespace "urn:3gpp:sa5:\_3gpp-common-subnetwork";

prefix "subnet3gpp";

import \_3gpp-common-yang-types { prefix types3gpp; }

import \_3gpp-common-top { prefix top3gpp; }

import \_3gpp-common-measurements { prefix meas3gpp; }

import \_3gpp-common-fm { prefix fm3gpp; }

import ietf-yang-schema-mount { prefix yangmnt; }

organization "3GPP SA5";

contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

description "Defines basic SubNetwork which will be augmented by other IOCs";

reference "3GPP TS 28.623

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

3GPP TS 28.622

Generic Network Resource Model (NRM)

Integration Reference Point (IRP);

Information Service (IS)

3GPP TS 28.620

Umbrella Information Model (UIM)";

revision 2020-06-08 { reference "CR-00XX S5-203458"; }

// TODO When the CR number is known include that and remove the S5-203458

revision 2020-03-11 {

description "Added KPIs and corrections";

reference "S5-201365, S5-201581, SP-200229";

}

revision 2020-02-24 {

reference "S5-201365";

}

revision 2019-06-17 {

description "Initial revision";

}

feature ExternalsUnderSubNetwork {

description "Classes representing external entities like EUtranFrequency,

ExternalGNBCUCPFunction, ExternalENBFunction

are contained under a Subnetwork list/class.";

}

feature MeasurementsUnderSubNetwork {

description "The MeasurementSubtree shall be contained under SubNetwork

indicating the support of Measurements and/or KPIs";

}

feature FmUnderSubNetwork {

description "The FmSubtree shall be contained under SubNetwork";

}

grouping Domain\_Grp {

description "A domain is a partition of instances of managed entities

such that :

- the group represents a topological structure which describes the

potential for connectivity

- Subject to common administration

- With common characteristics";

leaf dnPrefix {

type types3gpp:DistinguishedName;

reference "Annex C of 32.300 ";

}

leaf userLabel {

type string;

description "A user-friendly (and user assignable) name of this object.";

}

leaf userDefinedNetworkType {

type string;

description "Textual information indicating network type, e.g. 'UTRAN'.";

}

}

grouping SubNetworkGrp {

uses Domain\_Grp;

uses meas3gpp:SupportedPerfMetricGroupGrp;

leaf-list setOfMcc {

description "Set of Mobile Country Code (MCC).

The MCC uniquely identifies the country of domicile

of the mobile subscriber. MCC is part of the IMSI (3GPP TS 23.003)

This list contains all the MCC values in subordinate object

instances to this SubNetwork instance.

See clause 2.3 of 3GPP TS 23.003 for MCC allocation principles.

It shall be supported if there is more than one value in setOfMcc

of the SubNetwork. Otherwise the support is optional.";

type types3gpp:Mcc;

}

leaf priorityLabel {

mandatory true;

type uint32;

}

}

list SubNetwork {

key id;

description "Represents a set of managed entities";

uses top3gpp:Top\_Grp;

container attributes {

uses SubNetworkGrp;

leaf-list parents {

description "Reference to all containg SubNetwork instances

in strict order from the root subnetwork down to the immediate

parent subnetwork.

If subnetworks form a containment hierarchy this is

modeled using references between the child SubNetwork and the parent

SubNetworks.

This reference MUST NOT be present for the top level SubNetwork and

MUST be present for other SubNetworks.";

type leafref {

path "../../../SubNetwork/id";

}

}

leaf-list containedChildren{

description "Reference to all directly contained SubNetwork instances.

If subnetworks form a containment hierarchy this is

modeled using references between the child SubNetwork and the parent

SubNetwork.";

type leafref {

path "../../../SubNetwork/id";

}

}

}

uses meas3gpp:MeasurementSubtree {

if-feature MeasurementsUnderSubNetwork ;

}

uses fm3gpp:FmSubtree {

if-feature FmUnderSubNetwork ;

}

yangmnt:mount-point children-of-SubNetwork {

description "Mountpoint for ManagedElement";

reference "RFC8528 YANG Schema Mount";

}

// augment external parts here

}

}

|  |
| --- |
| **End of modification** |