Release 15, 3GPP SA5 Overview

Specifications, network resource model, operations and notifications

Ericsson

Content

- Management aspects

- Set of specifications

- Network Resource Model (NRM)

- Network slice

- Fault supervision

- Provisioning

- Performance assurance

Management, General aspects

- Management services (MnS)

- Interface between MnS consumer and producer is standardized

- Operations and notifications for:
  - Provisioning;
  - Fault supervision;
  - Performance assurance.

- 5G Network Resource Models

- Performance measurements

- E2e KPI's

- Stage 3 Solution Set for HTTP/REST (OpenAPI)

- Stage 3 Yang specification for 5G NRM
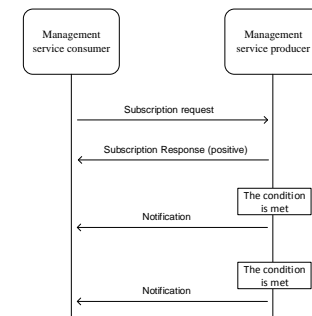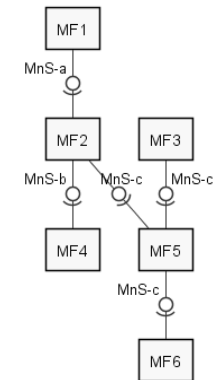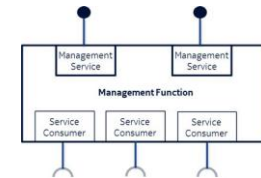
O&M specification set

Work item	Specification number and title
Concepts, use cases requirements and architecture	TS 28.530 Management and orchestration; Concepts, use cases and requirements TS 28.533 Management and orchestration; Architecture framework
Generic specification	TS 28.532 Management and orchestration; Generic management services
Provisioning	TS 28.531 Management and orchestration; Provisioning
Fault supervision	TS 28.545 Management and orchestration; Fault supervision
Performance assurance	TS 28.550 Management and orchestration; Performance assurance
Assurance data and Performance Management	TS 28.552 Management and orchestration; 5G performance measurements and assurance data TS 28.554 Management and orchestration; 5G end to end Key Performance Indicators (KPI)
Network resource models	TS 28.540 Management and orchestration; 5G Network Resource Model (NRM); Stage 1 TS 28.541 Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3

Specifications are for approval at 3GPP SA September 2018

Network Resource model (NRM)

Network slice (inherit from `Subnetwork` class)

Network slice subnet (Inherit from `Subnetwork` class)

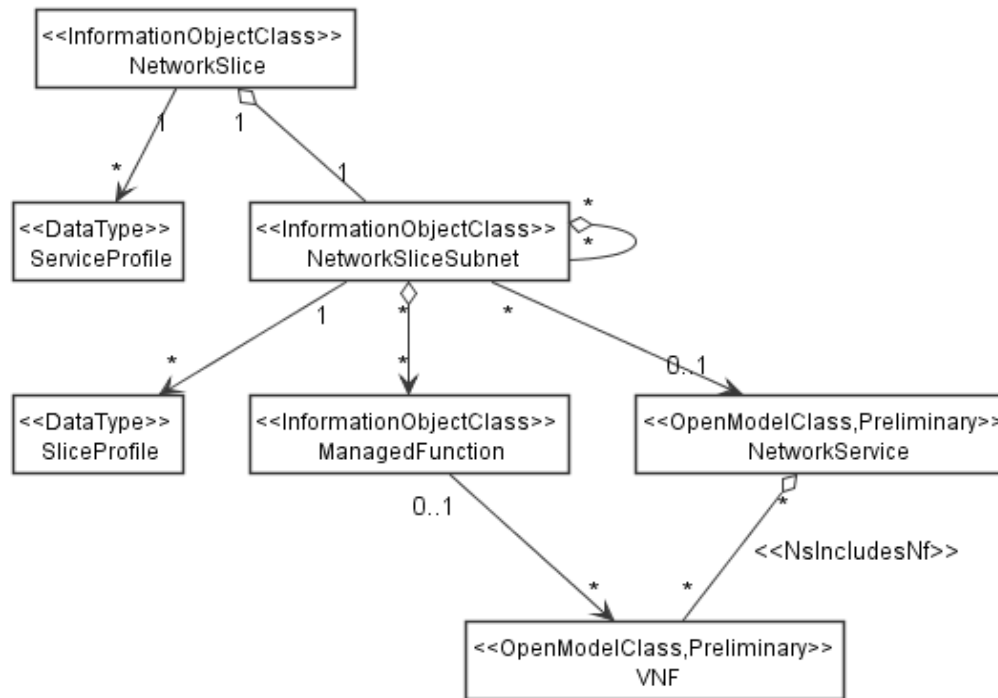5GC node function (inherit from `ManagedFunction` class)

NR node function (inherit from `ManagedFunction` class)

Rel-15 NRM work complete (inclusive of YANG solution).

Rel-15 TS 28.540 Management & orchestration of 5G networks; NRM; stage 1.

Rel-15 TS 28.541 Management & orchestration of 5G networks; NRM; stage 2 & stage 3.

Network slice model

NOTE 1: The <<OpenModelClass>> NetworkService and <<OpenModelClass>> VNF are defined in [12].
NOTE 2: The target Network Service (NS) instance represents a group of VNFs and PNFs that are supporting the source network slice subnet instance.

Rel-15 TS 28.541 Management & orchestration of 5G networks; NRM; stage 2 & stage 3.

Network slice attributes

- Network slice attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
nSSIId	M	T	F	F	T
operationalState	M	T	F	F	T
administrativeState	M	T	T	F	T
serviceProfileList	M	T	T	F	T
sST	M	T	T	F	T

- Network slice subnet attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
mFIdList	M	T	F	F	T
constituentNSSIIdList	M	T	F	F	T
operationalState	M	T	F	F	T
administrativeState	M	T	T	F	T
nsInfo	CM	T	F	F	T
sliceProfileList	M	T	T	F	T
sST	M	T	T	F	T

nsInfo: shall be supported if the NSS instance is realized in the virtualized environment. Otherwise this attribute shall be absent.

Rel-15 TS 28.541 Management & orchestration of 5G networks; NRM; stage 2 & stage 3.

Network slice profiles

- Service profile

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
serviceProfileId	M	T	F	T	T
sNSSAIList	M	T	T	F	T
pLMNIdList	M	T	T	F	T
perfReq	M	T	T	F	T
maxNumberofUEs	O	T	T	F	T
coverageAreaTAList	O	T	T	F	T
latency	O	T	T	F	T
uEMobilityLevel	O	T	T	F	T
resourceSharingLevel	O	T	T	F	T

- Slice profile

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
sliceProfileId	M	T	F	T	T
sNSSAIList	M	T	T	F	T
pLMNIdList	M	T	T	F	T
perfReq	M	T	T	F	T
maxNumberofUEs	O	T	T	F	T
coverageAreaTAList	O	T	T	F	T
latency	O	T	T	F	T
uEMobilityLevel	O	T	T	F	T
resourceSharingLevel	O	T	T	F	T

Rel-15 TS 28.541 Management & orchestration of 5G networks; NRM; stage 2 & stage 3.

Provisioning

MS Name	Operations and notifications	Information model	Note
Provisioning for Subnetwork/NSI/NSSI/NF	Operations defined in TS 28.532 - createMOI - deleteMOI - getMOIAttributes - modifyMOIAttributes - allocateNssi - allocateNsi - allocateNetwork - deAllocateNssi - deAllocateNsi	NSI/NSSI/NF information model defined in TS 28.541	This management service enables it's consumer to request allocating, deallocating, or modifying an NSI. The typical service consumers are operators. The typical scenario is "Network Slices as NOP internals" model.
Provisioning data report for Subnetwork/NSI/NSSI/NF	Notification defined of TS 28.532: - notifyProvisioning (notifyMOICreation; notifyMOIDeletion; notifyMOIAttributeValueChange)	NSI/NSSI/NF information model defined TS 28.541	This management service enables it's consumer to obtain notifications about NSI Information model data. The typical service consumers are operators. The typical scenario is "Network Slices as NOP internals" model
Provisioning exposure for NSI	Operations defined in TS 28.532: - createMOI operation - deleteMOI operation - getMOIAttributes operation - modifyMOIAttributes operation - allocateNsi operation - deAllocateNsi operation	NSI information model defined in TS 28.541	This management service enables it's consumer to request allocating, deallocating or modifying an NSI. The typical service consumers are vertical industry. The typical scenario is NSaaS model.
Provisioning data report exposure for NSI	Notifications defined TS 28.532: - notifyProvisioning (notifyMOICreation; notifyMOIDeletion; notifyMOIAttributeValueChange)	NSI information model defined in TS 28.541	This management service enables it's consumer to obtain notifications about NSI Information model data. The typical service consumers are vertical industry. The typical scenario is NSaaS model.

Rel-15 TS 28.531 Management & orchestration; Provisioning

Rel-15 TS 28.532 Management & orchestration; Generic management services

Fault supervision

Management service	Operations and notifications	Information model	Alarm information	Note
FS Data Report for NSI(s)/NSSI(s)/NF(s)/ME(s)	Following operations and notifications defined in TS 28.532: - getAlarmList - subscribe - unsubscribe - notifyNewAlarm - notifyAlarmListRebuilt - notifyChangedAlarm	NSI(s)/NSSI(s)/NF(s)/ME(s) information model defined in TS 28.541	Alarm information defined in TS 28.532	This management service enables it's consumer to get NF alarm data.
FS Control for NSI(s)/NSSI(s)/NF(s)/ME(s)	Following operations and notifications defined in TS 28.532: - acknowledgeAlarms - clearAlarms - notifyAckStateChanged - notifyClearedAlarm - unacknowledgeAlarms	NSI(s)/NSSI(s)/NF(s)/ME(s) information model defined in TS 28.541	Alarm information defined in TS 28.532	This management service enables it's consumer to control NF alarm data.

Rel-15 TS 28.545 Management & orchestration; Fault supervision

Rel-15 TS 28.532 Management & orchestration; Generic management services

Performance Assurance
Operations & Notifications

Management service	Operations and notifications	Information model	Performance data
Measurement job control services for Sub-networks/NSIs/NSSIs/NFs	createMeasurementJob stopMeasurementJob listMeasurementJobs	IOCs for 5G NFs, as defined in TS 28.541	Performance measurements and assurance data, as defined in TS 28.552.
Performance data file reporting services for sub-networks	notifyFileReady notifyFilePreparationError listAvailableFiles	IOC(s) for sub-network, as defined in TS 28.541	Performance measurements and assurance data for sub-network, as defined in TS 28.552

IOC: Information Object Class

Rel-15 TS 28.550 Management & orchestration; Performance assurance

Rel-15 TS 28.532 Management & orchestration; Generic management services

Performance Assurance
End to end KPIs

- Accessibility KPI
  - Registered Subscribers of Network and Network Slice Instance through AMF
  - Registered Subscribers of Network and Network Slice Instance through UDM
  - Registration success rate of one single network slice instance

- Integrity KPI
  - End-to-end Latency of 5G Network
  - Upstream Throughput for Network and Network Slice Instance
  - Downstream Throughput for Single Network Slice Instance
  - Upstream Throughput at N3 interface
  - Downstream Throughput at N3 interface
  - RAN UE Throughput

- Utilization KPI
  - Mean number of PDU sessions of network and network Slice Instance
  - Virtualised Resource Utilization of Network Slice Instance

Rel-15 TS 28.554 Management & orchestration; 5G end to end Key Performance Indicators (KPI)

Performance Assurance
Performance measurements

- Performance measurements and assurance data for 5G Network Functions:
  - Performance measurements and assurance data for gNB
  - Performance measurements and assurance data for 5GC NF (e.g. AMF, SMF, UDM, …..)

- Measurements related to end-to-end 5G network and network slicing

Rel-15 TS 28.552 Management & orchestration; 5G performance measurements and assurance data