**3GPP TSG-SA5 Meeting #140-eS5-216349**

e-meeting, 15 - 24 November 2021 (revision of xx-yyxxxx)

Source: Ericsson

Title: New WID on network slicing provisioning rules

Document for: Approval

Agenda Item: 6.2

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>   
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Network slicing provisioning rules

Acronym: NSRULE

Unique identifier:

{A number to be provided by MCC at the plenary}

Potential target Release: Rel-18

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  | X | X |  |
| No |  | X |  |  |  |
| Don't know | X |  |  |  | X |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a

|  |  |
| --- | --- |
| X | Feature |
|  | Building Block |
|  | Work Task |
|  | Study Item |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  | N/A |  |  |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| 760065 | NETSLICE | The related slicing management solution which need improvements |
| eNETSLICE\_PRO | Network slice provisioning enhancement |  |
| FS\_NSMEN | Study on network slice management enhancement |  |

# 3 Justification

## 3.1 Background

TS 28.531 clause 7 defines procedures for allocation as well as modification of network slices and network slice subnets. As part of these procedures the provisioning MnS producer must make several different decisions such as:

* Selection of NetworkSlice or NetworkSliceSubnet instance. Assuming it is feasible to support the input requirements from the consumer, the outcome of this step is decision to either create a new instance or reuse and possibly modify a specific existing instance.
* Selection of NetworkSlice or NetworkSliceSubnet instance constituent resources. This can be needed both for new instances as well as when an existing instance is modified.

To make these decisions, the MnS producer will need to consider both the requested capabilities from the consumer as expressed by profile attributes in the input, as well as capabilities of existing instances and capabilities of producers providing the constituent resources. While this could in some cases be done without further input, there can be technical, operational or business reasons why the provisioning MnS consumer would need to provide additional guidance to influence producer decisions, e g in selection steps. Examples include:

* A UE may want to use multiple slices simultaneously, but this is not possible unless the slices share the same control plane, including RAN as well as AMF in CN. Thus, when allocating network slices, it must be possible for the MnS consumer to express constraints relating to a shared control plane.
* Another reason can be that the MnS consumer needs to ensure a certain level of isolation between services allocated to different network slice instances. For additional background on isolation use cases, see TR 28.811.

## 3.2 Current Issues and Limitations

The profile datatypes in the slice NRM today only provide very limited ways for the consumer to provide further guidance to the producer to control e g selection and sharing of instances and resources. The ServiceProfile includes the attribute *networkSliceSharingIndicator*, while the Top, RAN and CN slice profiles include the *resourceSharingLevel* attribute.

**ServiceProfile**

The attribute *networkSliceSharingIndicator* defined in ServiceProfile can contain the values *shared* and *non-shared*. Some observations:

* The *networkSliceSharingIndicator* attribute controls sharing of NetworkSlice instances. The ServiceProfile doesn’t contain any attribute to control sharing of resources. In fact, even when allocation results in separate NetworkSlice instances, these could in principle share every resource in RAN/TN/CN domains.
* The meaning of *shared* is that sharing is allowed, not that it is required. It is currently not possible to indicate via profile attributes that sharing of any kind is required. But this is needed e g to ensure a shared control plane for the scenario described in clause 3.1.
* Additionally, to support scenarios such as those mentioned in 3.1, some kind of group concept is needed:
  + For shared control plane, this would be requirement for some, but not necessarily allallocated service profiles. There could also be multiple groups.
  + For isolation requirements, these may apply between groups of service profiles, while being relaxed within a group.
  + It may also be needed to specify multiple groups for different purposes for a single service profile.

**SliceProfile**

The attribute *resourceSharingLevel* defined in Top, RAN and CN slice profiles can contain the values *shared* and *non-shared*. Some observations:

* The attribute *resourceSharingLevel* controls the sharing of resources used by a NetworkSliceSubnet instance, not sharing of the instance itself. Thus, on subnet level, there is no equivalent to the *networkSliceSharingIndicator* attribute on network slice level.
* *resourceSharingLevel* applies to all resources, it is not possible to specify a particular type of resource.
* Similar to observations for ServiceProfile, it is currently not possible to specify mandatory sharing, nor specify any groups.

# 4 Objective

Specify use cases, requirements and solutions (procedures/operations/NRM) allowing the network slice or network slice subnet MnS consumer to specify additional requirements influencing certain MnS producer decisions. The detailed objectives include:

* Extend allocation and modification use cases and procedures to allow the MnS consumer to provide a list of additional rules as part of the requirements to be fulfilled in request towards network slice or network slice subnet provisioning MnS producer.
* The list of rules provided by the consumer should be able to include different kinds of rules to guide MnS producer decisions, supporting:
  + Ability to control NetworkSlice or NetworkSliceSubnet instance sharing
  + Ability to control sharing/isolation of resources based on different types and granularities
  + Ability to express that sharing is required in addition to allowed or not allowed
  + Ability to indicate a group, restricting mandatory or optional sharing expressed in the rule to set of profiles for which the same group was indicated in the allocation or modification request.

# 5 Expected Output and Time scale

|  |  |  |  |
| --- | --- | --- | --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
| 28.531 | Documentation of use case and requirements and solutions | Sep 2022 (SA#97) |  |
| 28.541 | Documentation of model solutions | Sep 2022 (SA#97) |  |

# 6 Work item Rapporteur(s)

Robert Petersen, Ericsson, [robert.petersen@ericsson.com](mailto:robert.petersen@ericsson.com)

# 7 Work item leadership

SA WG5

# 8 Aspects that involve other WGs

A sharing attribute is included in included in NG.116 from GSMA.

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Ericsson |
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