**3GPP TSG-SA5 Meeting #140-eS5-216351**

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

Source: Ericsson, Huawei

Title: New SID on intent-driven management for network slicing

Document for: Approval

Agenda Item: 6.2

3GPP™ Work Item Description

Title: Study on intent-driven management for network slicing

Acronym: FS\_IDNSMN

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

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

## 2.2 Parent Work Item

## 2.3 Other related Work Items and dependencies

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| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| eNETSLICE\_PRO | Network slice provisioning enhancement | SA5 work item |
| 810027 | Intent driven management service for mobile networks | SA5 work item |
| FS\_eIDMS\_MN | Study on eEnhanced intent driven management services for mobile networks | Rel-18 study for intents |

# 3 Justification

Basic principles and solutions for intent-driven management are currently being specified in TS 28.312 as part of Rel-17 work item. As indicated in this specification, intent-driven management could be used for a wide variety of purposes. Some principles are of specific interest (see clause 4.1.1 and 4.2.2):

* An intent can specify the expectations including requirements, goals and constraints for a specific service.
* An intent focuses on describing “what” needs to be achieved and not on “how” that outcome should be achieved. The intent expresses, for instance, the metrics that need to be achieved and not how to achieve them.
* Area can be included in the expectations expressed by an intent.
* A communication service provider can use intents to express the desired state of the network without knowing how to do the detailed management of the network resources.
* Intent fulfilment can be tied to the operation of the referred service, i. e. continuous assurance of requirements is part of the intent.

It is clear from points above that intent-driven management has many similarities to current network slice management described in TS 28.531 and other related specifications. In particular, the following aspects are common:

* Focus on “what” as expressed by input requirements, instead of “how”. For slice management, requirements are today captured in ServiceProfile and SliceProfile. For intents, requirements are captured by the expectations that are part of an intent.
* Ability to express requirements for a communication service using profile or intent respectively.
* Possibility to specify that service should be available in a specific coverage area.
* The inclusion of assurance part, i. e. need for the same requirements to be met both during initial deployment phase, as well as continuously during subsequent operation.

It is also possible to identify a partial mapping of operations (for intent operations, see TS 28.312 clause 4.2.2). For instance, slicing allocate operations correspond to creation of intents, while deallocate operations correspond to deletion of intents. But there are also some current and proposed slicing operations for which no equivalent intent operation yet has been defined, e g operations related to feasibility check and capabilities. However, these are still general concepts that can be applicable also outside of network slicing.

Thus, the central question for this study is to further explore whether specifying an alternative solution for network slice management fully based on intent-driven management is practically possible and beneficial. Such a layered approach where the slicing solution is built on top of generic intent-driven management could mean:

* Network slicing specification work can focus more on defining area-specific expectations, while no longer needing to specify other aspects such as provisioning use cases and solutions except when gaps are identified.
* Slice management would be able to automatically take advantage of further enhancements done to the generic part of the intent-driven management framework.
* The generic part of the intent-driven management framework itself may benefit from having network slicing as use case defining requirements on needed functionality, e g feasibility check.

Note: Network slicing is already mentioned in TS 28.312 clause 5.1.1.2. However, the assumption in that use case is different because the intent is viewed as an additional abstraction on top of RAN slice subnet provisioning. The purpose of this study is rather to investigate an intent-driven solution that is on the same abstraction level as the current slice provisioning interface, and thus can potentially be used as direct replacement. Due to this the proposed study also has a wider scope covering additional management aspects and use cases for slicing.

# 4 Objective

For the network slicing area, the objective of this study is to investigate whether a complete, alternative network slice management solution built using the intent-driven management framework in TS 28.312 as base is practically feasible and whether this would provide any significant benefits. The study should cover:

1. Potential mapping of slice management concepts, use cases and operations in TS 28.531 and related specifications to corresponding intent-driven management concepts, use cases and operations in TS 28.312. Both deployment and assurance are in scope. Domains include e2e for network slices, and RAN (NR) and CN (5GC) for network slice subnets. Areas where gaps exist, or where for other reason enhancements to the intent-driven framework would be needed should also be identified and potential new requirements and use cases should be proposed
2. Investigation of how input requirements currently captured in service and slice profile attributes could instead be expressed as intent expectations including requirements, goals and constraints.
3. Study of how standardized expectations for slicing can be combined with expectations based on types defined locally by operator or vendor. This is expected to be based on generic extension mechanisms for intents and expectations and should be coordinated with any related work done as part of ongoing work items, e g IDMS\_MN.
4. With intent-driven management, the MnS consumer is providing input mainly via intent expectations and receiving output mainly via intent reports. Thus, the study should consider what parts of existing solution for network slicing might still be applicable and what parts are not. In addition, if still applicable, the study should further describe the possible relationship. This includes the following management components:
	1. NRM entities such as NetworkSlice and NetworkSliceSubnet
	2. Components used for reporting of slicing related data
5. Conclusions and recommendations for further work.

# 5 Expected Output and Time scale

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| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| Internal TR | XXX | Study on intent-driven network slicing management | SA#95 (Mar 2022) | SA#97 (Sep 2022) | Robert Petersen Ericsson as primary rapporteur, items 1, 2, 3 and 5 and Zhu Lei Huawei as rapporteur for item 4 |

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# 6 Work item Rapporteur(s)

Robert Petersen, Ericsson, robert.petersen@ericsson.com for items 1, 2, and 3.

Zhu Lei, Huawei, lei.zhu@huawei.com for item 4 and 5.

# 7 Work item leadership

SA WG5

# 8 Aspects that involve other WGs

None identified yet

# 9 Supporting Individual Members

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