**3GPP TSG-SA5 Meeting #156 *S5-24xxxx***

Maastricht, The Netherlands, 19 - 23 August 2024

**Source: Ericsson**

**Title: Add comparison between network slice based and intent based solution**

**Document for: Approval, Information, Discussion**

**Agenda Item: 6.19.3**

# 1 Decision/action requested

***In this box give a very clear / short /concise statement of what is wanted.***

# 2 References

[1] 3GPP [TS 28.312](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3554): "Management and orchestration; Intent driven management services for mobile networks"

[2] 3GPP [TS 28.531](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3274): "Management and orchestration; Provisioning"

[3] 3GPP [S5-242612](https://www.3gpp.org/ftp/tsg_sa/WG5_TM/TSGS5_155/Docs/S5-242612.zip): "Discussion paper on network slice and intent"

[4] 3GPP [TR 28.914](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=4272) (draft): "Study on intent driven management service for mobile network phase 3"

# 3 Rationale

During the last meeting (SA5#155) the group discussed that in a scenario where the network slice requirements are handled via a declarative interface, such as described in TS 28.312 [1], that the behaviour of the MnS producer is not functionally equivalent to the behaviour of a network slice management producer using an imperative interface such as TS 28.531 [2].

The group proposed to not endorse the discussion paper [3] but instead to propose that the text is to be included in the TR. This contribution propose to include the text as provided in the detailed proposal in section 4.

# 4 Detailed proposal

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| **1st Change** |

# 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 TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.312: "Management and orchestration; Intent driven management services for mobile networks"

[3] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

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

[5] TM Forum IG1253: "Intent in Autonomous Networks v1.2.0".

[6] ETSI ZSM011: "Intent-driven autonomous networks V2.0.2".

[x] 3GPP TS 28.531: "Management and orchestration; Provisioning"

[y] 3GPP TS 28.532: "Management and orchestration; Generic management services."

[z] 3GPP TR 28.836: "Study on intent-driven management for network slicing"

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| **2nd Change** |

## 5.X Intent driven MnS when offered network slice expectations

### 5.1.1 Description

The network slice provisioning MnS can provide the following capabilities for consumption:

- Request feasibility check for a NetworkSlice/NetworkSliceSubnet

- Resource reservation for a NetworkSlice/NetworkSliceSubnet

- Allocation of a NetworkSlice/NetworkSliceSubnet

- Deallocation of a NetworkSlice/NetworkSliceSubnet

- Modification of a NetworkSlice/NetworkSliceSubnet

- Query of a NetworkSlice/NetworkSliceSubnet

- Subscribe /Unsubscribe to notifications about a NetworkSlice/NetworkSliceSubnet

- Query a NetworkSlice/NetworkSliceSubnet subscription

Before a consumer requests the allocation of a network slice / network slice subnet, the consumer can optionally check if the producer is capable of satisfying the input (service profile / slice profile) and request that resources be reserved to allow the allocation. If the producer can reserve the resources for the specified amount of time the allocation can be performed at a later time.

The intent driven MnS can provide the following capabilities for consumption:

- Create an Intent

- Delete an Intent

- Modify an Intent

- Query an Intent

- Activate/De-activate an Intent

- Query an intent report

- Subscribe/Unsubscribe to an intent report

- Query an intent report subscription

From the overview it can be noted that an intent MnS producer cannot offer the same capabilities as a network slice provisioning MnS producer. There exist two main differences. The first difference is that feasibility check is implicit to the intent procedures for create and modify an intent; upon those requests the producer reports the feasibility of the request in a feasibility check report and conflicts are reported in a conflict report. Another difference between the intent driven solution and that the network slice solution is that the former does not include option for resource reservation.

The following paragraphs provide further details that help understand the differences between both solutions.

Network slice provisioning solution:

- Before a consumer requests the allocation of a network slice / network slice subnet, the consumer can explicitly check if the producer is capable of satisfying the requirements captured in the service profile / slice profile. The producer informs consumer if the request is feasible or not feasible.

a) If feasible, the consumer knows that it can proceed with the actual allocation, right now or later. To secure network slice / network slice subnet allocation at a later time, the consumer can also optionally request to reserve resources for a specific amount of time.

b) If not feasible, the producer provides the reason why. This feedback can be useful for consumer to know whether it should modify the service profile / slice profile (e.g., the requirements are quite demanding or difficult for fulfil them all simultaneously) or it should be wait for later time (e.g., because the network is congested, or there exists multiple slices already running in parallel).

- The optional ability for the consumer to request resource reservation gives the possibility to schedule the allocation of a network slice / slice subnet.

- Upon receiving a network slice / network slice subnet allocation request from the consumer, the producer response is binary: i) successful allocation, i.e., the requirements can be all met; b) unsuccessful allocation, i.e., it is not possible to satisfy all requirement simultaneously. If unsuccessful, the only option for the consumer is to issue a newly created allocation request. This will be repeated until the producer is able to fulfil the allocation.

- The consumer needs to be aware of the underlying provisioning procedures, such as timing and sequencing of CM changes. This introduces complexity on consumer management with regards to workflow management.

a) For example, the consumer needs to issue requests to the MnS producer, monitor the results and issue subsequent requests carefully as the producer will initiate each provisioning procedure upon receiving each request.

Intent based solution:

- Before a consumer requests the creation/modification of an intent, the consumer cannot explicitly check if the producer is able to fulfil the intent expectations. The producer performs an implicit feasibility check upon receiving intent creation/modification request.

- The consumer is not able to schedule the fulfilment of an intent; the producer will decide how and when to fulfil it.

- Upon receiving intent creation/modification request from the consumer, the producer will continuously attempt to fulfil the intent expectations and inform the consumer about their ongoing ability to do so, using intent reporting mechanisms. If the consumer is unsatisfied with the result, it can decide to:

a) Wait for the situation to get improved.

b) Modify the intent, changing the expectations.

c) Negotiate with the producer, exchanging information about how best the producer may be able to fulfil the consumer request.

- The consumer does not need to be aware of the underlying provisioning procedures.

The following can be noted based on the above comparison.

1) That an intent driven solution (TS 28.312 [2]) is not functionally equivalent to the current network slice provisioning solution (TS 28.531 [x], TS 28.541 [y]).

2) There are certain functions in the network slice provisioning solutions such as feasibility check and resource reservation which are not required in the intent based network slice solution, since generic intent-driven MnSs will provide other solutions to ensure that an individual consumer intent is fulfilled. The alternatives in intent-driven MnSs (e.g., negotiation, utility functions) have the benefit:

a) of not limiting the producer’s ability to manage the resources as efficiently (e.g., energy saving) as required to meet all intents in the system.

b) for the consumer to focus on the requirements and their importance (e.g., priority, utility), without worrying about the fulfilment details (e.g., resource allocation, sequencing of CM changes, etc.).

It is proposed to study the impact of continuous fulfilment of intent requirements in context of network slice expectation compared to the provisioning (fulfilment at allocation time), with the aim to identify potential new requirements on intent driven MnS.

### 5.1.2 Potential requirements

**REQ-Intent\_NetworkSlice\_Exp-CON-1** The intent driven MnS shall have capability to enable an authorized MnS consumer to express a network slice intent.

**REQ-Intent\_NetworkSlice\_Exp-CON-2** The intent driven MnS shall have capability enabling MnS consumer to express intent containing an expectation for delivering a NetworkSlice for the specified geographical area and radio spectrum.

**REQ-Intent\_ NetworkSlice\_Exp -CON-3** The intent driven MnS shall have capability enabling MnS consumer to express intent containing an expectation on NetworkSlice performance to be assured.

**REQ-Intent\_ NetworkSlice\_Exp -CON-4** The intent driven MnS shall have capability enabling MnS consumer to obtain intent report information (i.e., fulfilment information, achieved value for corresponding targets, conflict information and fulfilment feasibility check information) of the intent containing an expectation on NetworkSlice performance to be assured.

**REQ-Intent\_NetworkSliceSubnet\_Exp-CON-5** The intent driven MnS shall have capability to enable an authorized MnS consumer to express a network slice subnet intent.

**REQ-Intent\_NetworkSliceSubnet\_Exp-CON-6** The intent driven MnS shall have capability enabling MnS consumer to express intent containing an expectation for delivering a NetworkSliceSubnet for the specified geographical area and radio spectrum.

**REQ-Intent\_ NetworkSliceSubnet\_Exp -CON-7** The intent driven MnS shall have capability enabling MnS consumer to express intent containing an expectation on NetworkSliceSubnet performance to be assured.

**REQ-Intent\_ NetworkSliceSubnet\_Exp -CON-8** The intent driven MnS shall have capability enabling MnS consumer to obtain intent report information (i.e., fulfilment information, achieved value for corresponding targets, conflict information and fulfilment feasibility check information) of the intent containing an expectation on NetworkSliceSubnet performance to be assured.

NOTE: NetworkSlice performance and NetworkSliceSubnet performance attributes are documented in TR 28.836 [z] and includes dLLatency, uLLatency, dLThptPerUE and uLThptPerUe.

### 5.1.3 Potential solutions

Editor’s Note: Potential solutions are FFS

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| **3rd Change** |

# 6 Conclusions and recommendations

Editor's note: this clause will contain conclusions and recommendations for corresponding use cases identified in clause 5.

### 6.1 Network slice intent

The study concludes that the proposed network slice intent expectations will suffice to support an IDMS MnS consumer to request a NetworkSlice.

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| **End of Changes** |