**3GPP TSG-SA5 Meeting #156S5-243534**

**19 - 23 August 2024, Maastricht, Netherlands**

**Source: Nokia**

**Title: Rel-19 pCR 28.914 Conclusion on Intent handling capability**

**Document for: Approval**

**Agenda Item: 6.19.3**

# 1 Decision/action requested

***The group is asked to discuss and agree on the proposal.***

# 2 References

[1] 3GPP TR 28.914: " Study on intent driven management service for mobile network phase 3 v0.3.0"

# 3 Rationale

Some intent feasibility has been agreed in R18. However intent feasibility is related to other intent related negotiations. This pCR provides a key issue on intent negotiation with the complete set of negotiations.

# 4 Detailed proposal

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| --- |
| **First Change** |

## 5.11 Use case #11: Extension of Intent handling capability

### 5.11.1 Description

TS28.312 supports intent handling and exposure of handling capability as a list of supported expectationTargets.

The specification does not show the supported value ranges for the targets or the sets of targets that are supported. E.g. for service management intents, the intent handler may want to expose the description of services that they can offer, i,e., to expose that they support intents or intent expectations having a specific set of features and a specific set of values for those features as illustrated by Table 5.11.1-1. The IDMS should support expose of such capabilities.

Table 5.11.1-1: An example of a service offer description indicating the possible characteristics of services that can exposed via an intent handling capability as the service characteristic offered by an intent handler for service management intents.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Object Type** | | | | | **RAN or Core network eervices** | | | | | |
| Feature | Units | Value Options | | | | | | | | |
| End-to-end latency | ms | 0.5 | 1 | 2 | | 5 | 10 | 25 | 50 | 100 |
| Jitter | ms | .001 | 0.01 | 0.1 | | 1 | 2 | 5 | 10 | 20 |
| Survival Time | ms | 0 | 1 | 2 | | 5 | 10 | 25 | 50 | 100 |
| Availability |  | 99% | 99.5%. | 99.9% | | 99.995% | 99.999% | 99.9995% | 99.9999% | .99999% |
| Reliability |  | 99% | 99.5%. | 99.9% | | 99.995% | 99.999% | 99.9995% | 99.9999% | .99999% |
| End user Data rate | ≥ x Mbps | 0.1 | 0.2 | 0.5 | | 1.0 | 2.0 | 5.0 | 10.0 | 20.0 |
| Payload | ≈. x Bytes | 1 | 2 | 5 | | 10 | 20 | 100 | 500 | 1000 |
| Traffic density | Gbps/km2 | 1 | 2 | 5 | | 10 | 20 | 50 | 100 | 1000 |
| Connection density | ‘000/km2 | 0.1 | 0.5 | 1 | | 5 | 10 | 20 | 50 | 100 |
| Service area size | A x B km | 0.1x10 | 0.1x100 | 0.1x500 | | 0.1 x 0.1 | 1 x1 | 10 x10 | 50 x50 | 100x100 |
| **Policies** | **Policy 1** | **Policy 1 value 1** | | **Policy 1 value 2** | | | **…** | | **…** | |
|  | **Policy 2** | **Policy 2 value 1** | | **Policy 2 value 2** | | | **…** | | **…** | |
|  | **:** | : | | : | | | **…** | | **…** | |

#### 5.11.1.1 Intent handling capability exposure

The IDMS may be used by the RAN or Core network service management MnS producer to enable the design of a RAN or Core network service between the MnS producer and the MnS consumer.

The RAN or Core network service MnS consumer generates an artefact, say called a service-offer description that describes the different candidate characteristics of the desired RAN service from the MnS consumer’s point of view.,. The MnS consumer provides service-offer description to the service management MnS producer for validation. The service-offer description may be viewed as a RAN service management intent that contains a list of candidate intent expectations, i.e. the expectations are candidates that may be separately submitted by the MnS consumer for fulfilment.

On receiving the service-offer description. The RAN or Core network service Management MnS producer validates the service-offer description and confirms to what extent the RAN or Core network service intent as described by the service-offer description can be supported. For that, the RAN or Core network service management MnS producer returns the service-offer description but indicating only the supported combinations of RAN or Core network service features and values with contexts (e.g., policies and conditions) under which the service many be offered.

Figure 5.11.2.1-1: Example interaction between an MnS producer and MnS consumer on the exposure of capabilities for service management intents

Intent MnS producerforRAN or Core network service management intents

May iterate

Intent with multiple potential expectations as the RAN or Core network service description of the candidate desired features sets.

Intent handling capability detailing the service description of candidate features that are supported.

intent consumer providing RAN or Core network service management intent

### 5.11.2 Potential requirements

**INT\_NEGOT\_REQ 1:** The MnS producer should support a capability to provide to a intent driven MnS consumer a description of the supported scenario specific intents.

**INT\_NEGOT\_REQ 2:** The MnS producer should support a capability enabling an MnS consumer to provide a listing the set of potential alternative expectations that the MnS consumer would like to be evaluated for whether it is feasible or fulfillable.

### 5.11.3 Potential solutions

#### 5.11.3.1 solution for consumer to indicate alternatives:

* Extend the intent IOC to allow for expectationSelectivity when the intent is being provided for feasibility checking. This enables a consumer to submit a set of candidate expectations to get feedback on which expectations are supported or not. For example, a service management design function can submit the set of potential RAN service descriptions to see which set can be supported by the RAN service intent handler.

#### 5.11.3.2 solution for MnS producer to indicate supported targets:

* Introduce in the IntentHandlingCapability <<dataType>>
  + an attribute (and corresponding data Type) representing the details on information about expectationTargets that are supported by the intent handler. The information indicates the supported expectationTargets as
    - a list of names of supported expectation targets.
    - a list of names of supported expectation targets and the value ranges for which they are supported.
    - a set expressing the combination of expectation targets and value ranges that can be jointly supported.

The respective changes may be as below.

##### 5.11.3.2.1 To be revised: IntentHandlingCapability <<dataType>>

###### a6.2.1.3.11 IntentHandlingCapability <<dataType>>

The IntentHandlingCapability includes the following attributes (new attributes are in bold).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| intentHandlingCapabilityId | M | T | F | F | T |
| supportedExpectationObjectType | M | T | F | F | T |
| **~~supportedExpectationTaregtName~~** | **~~M~~** | **~~T~~** | **~~F~~** | **~~F~~** | **~~T~~** |
| **supportedExpectationTargetInfo** | **M** | **T** | **F** | **F** | **T** |

##### 5.11.3.2.2 To be added: supportedExpectationTargetInfo <<dataType>>

###### a6.2.1.3.x.1 Definition

The supportedExpectationTargetInfo indicates the detailed information about what the intent handler supports for a given supportedExpectationObjectType. It allows the intent handler to indicate the support in any one of the three ways below as illustrated by Figure a6.2.1.3.x.1-1:

1. as a list of names of supported expectation targets
2. as a list of names of supported expectation targets and the value ranges within which they are supported
3. as a set expressing the combination of expectation targets and value ranges that can be jointly supported.

A screenshot of a computer

Description automatically generated

Figure a6.2.1.3.x.1-1: MnS producer can express supported capabilities in any of the 3 possible ways.

###### a6.2.1.3.x.2 Attributes

The supportedExpectationTargetInfo includes the following attributes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute Name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| supportedTargetName | M | T | F | F | T |
| supportedTargetCondition | M | T | F | F | T |
| SupportedTargetValueRange | M | T | F | F | T |

**To be added:** Attribute definitions

|  |  |  |
| --- | --- | --- |
| Name | Description |  |
| supportedExpectationTargetInfo | It describes the supported expectation targets for the supported expectation object type. | type: SupportedExpectationTargetInfo  multiplicity: 1 … \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| supportedExpectationTargetName | It **indicates the name or identifier of** the supported expectation targets for the supported expectation object type.  allowedValues: depends on ExpectationObject in the IntentExpectation | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| supportedTargetCondition | It expresses the limits within which the **supportedExpectationTarget**Name shall be suppoprted.  allowedValues: targetCondition defined in clause 6.2.1.3.3 | type: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: "IS\_EQUAL\_TO"  isNullable: False |
| SupportedTargetValueRange | It describes the range of values that applicable to the **supportedExpectationTarget**Name and the supportedTargetCondition.  allowedValues: targetValueRange defined in clause 6.2.1.3.3 | type: ValueRangeType  multiplicity: 1..\*  isOrdered: False  isUnique: True  defaultValue: None  isNullable: True |
|  |  |  |

### 5.11.43 Evaluation of potential solutions

The potential solution described in clause 5.11.3 is a fully NRM-based approach that extends the existing NRM fragments to support full exposure of Intent handling capability. The solution in clause 5.11.3.2 enables the MnS producer to provide to the MnS consumer a description of the supported scenario specific intents, e.g. a service offer description that indicates the possible characteristics of services that are supported by the RAN services intent handler. The solution in clause 5.11.3.1 enables an MnS consumer to provide a listing the set of potential alternative expectations that the MnS consumer would like to be evaluated for whether it is feasible or fulfillable, e.g. it enables a service designer to express a service description containing the multiple alternative RAN or Core network service features sets that the service designer would want to be considered to be offered. Through a feasibility checking of the intent with those different alternatives, the MnS producer provides information on which alternatives (intent expectation) are feasible and can thus be supported.

The enhancements are small, and their implementation is straightforward. Therefore, the solution described in clause 5.11.3 is a feasible solution for the full exposure of Intent handling capability.

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| **Next Change** |

# 6 Conclusions and recommendations

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

## 6.11 Use case #11: Extension of Intent handling capability

It is recommended to move on to the normative specification development phase for the use case on Extension of Intent handling capability. The normative specification development should a solution that is a combination of the solutions in clauses 5.11.3.1 and 5.13.3.2.