**3GPP TSG-SA5 Meeting #****140e *S5-216042***

**e-meeting 15th - 24th November 2021**

**Source: Nokia, Nokia Shanghai Bell, Huawei**

**Title: Description of Information Elements of an Intent**

**Document for: Approval**

**Agenda Item: 6.4.10**

# 1 Decision/action requested

***The group is asked to discuss and approve.***

# 2 References

[1] 3GPP draft TS 28.312: “Management and orchestration; Intent driven management services for mobile networks v0.5.0”.

# 3 Rationale

This contribution proposes to Describe Information Elements of an Intent

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# 4 Detailed proposal

It proposes to make the following changes to TS 28.312[1].

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| **1st Change** |

## 4.n General concept of Intent Content

### 4.n.1 Intent Expectation

In the most basic form, a consumer may use an intent to express to the producer to:

"ensure that an ApplicableObject O is in a specific state S".

Where the S is the list of requirements, goals and contexts for the object and the object may be a 3GPP managed object like slice, subnetwork (e.g. radio network) or other objects like a service or some business objects. The consumer may desire the same requirements, goals and contexts for multiple objects of the same object type, in which case the intent may be stated for a list of objects as

"ensure that ApplicableObjects {O1,O2, …ON} are in a specific state S"

However, the consumer may wish to state different requirements, goal and contexts for different types of objects. It is in that case necessary to distinguish the requirements, goal and contexts to be achieved for each type of ApplicableObject. Correspondingly, the combination of requirements, goals and constraints for each type of object may be termed as the IntentExpectation. Also the consumer may wish to distinguish the requirements, goal and context for different ApplicableObjects of the same ApplicableObject type, in this case, the combination of requirements, goals and constraints for each instance may be contained in a separate IntentExpectations or requirements, goals and constraints for the multiple instances may be combined in a single IntentExpectation.

### 4.n.2 Desired outcomes as Intent Targets

For a given intent expectation, the state may be expressed in terms of desired outcomes of the ApplicableObject(s), the desired outcomes can be treated as intent targets (includes the metrics that characterize the performance of the object(s) or some abstract index that expresses the behavior of the object(s)). A given intent expectation may include multiple intent targets on the same object or object type. A consumer may for example require for the Slice object(s) that User throughput > 5Mbps and latency < 1ms.The intent target may also be context specific, i.e. the intent may require a specific state given a specific context. As such with the state as a combination of intent targets and contexts, the intent expectation may be stated as

"ensure that for

ApplicableObject O,

Target\_1 is T\_1, Conext\_1 is C\_1

 ….,

Target\_m is T\_m, Context\_k is C\_k;

Each Target expresses an aspect of the state of the ApplicableObject under consideration, i.e. it expresses a desired outcome on a specific ObjectStateAttribute. Each of the Object State Attributes may be set to be equivalent to a specific value or constrained to a value or a range of values, e.g. as listed in Table 1. The combination of state attribute, the condition constraining the attribute and the value or value range for the attribute is the target, i.e. the target is the tuple

target = [ ObjectStateAttribute, condition, value range ]

Table 1: Example intent targets for different Objects

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| **example of target** | **ApplicableObject**  | **Object State attribute** | **Condition** | **Value range** |
| example 1 | Slice | Coverage area | Is at least | 40km radius |
| example 2 | Communication Service | User throughput | Is greater than | 2Mbps |
|  |  |  |  |  |

### 4.n.3 IntentObjects

The ApplcableObject (s) for which a given expectation is addressed can be expressed with object identifier. This may, however, not always be adequate or may be cumbersome for some intents. For example, it may be easier to state "all cells in city ABC" as opposed to listing the individual cells. As such it may be easier to identify the ApplicableObjects by stating the "type of ApplicableObject" together with the ApplicableObject context information that filters and identifies the desired objects. The ApplicableObjectContext is in form of a context list whose entries are each a tuple (attribute, condition, value range). For example, in the case of "all cells in a city" there is a single ApplicableObject context, which is the tuple "location, =, city\_ABC" to be applied to "objectType=cell". The ApplicableObjectContext may also be used to select a specific instance of Object, i.e., given the type of object in "ObjectType", the object instance is identified using the identifier of the object instance under Object context e.g. to refer to cell instance number 234, we state the Object context as {cell\_id, "=", 234}. The object identifier is in that case the context

### 4.n.4 Context

Each target may be constrained to only be achieved for a very specific set of constraints. For example, the consumer may state that: *"ensure that handoverFailureRate < 2% if Load > 80%"*, where the target *"HandoverFailureRate < 2%"* is only to be achieved only in the context *"Load > 80%"*.

Similar to the target, the context is also a tuple of < attribute, condition, value range > but which the values having a different semantics.

Although contexts and targets have the same structure, to distinguish between what must be achieved and the context which is only to be considered as required conditions, the Context has to be explicitly stated separate from the target. For example, if the consumer may wish that the Radio Link Failure rate (RLF) is less than 2% when the load is more than 50%. If the context (i.e. load > 50%) is not explicitly stated/modelled as context, the producer could interpret the request to mean (RLF<2% and load > 50%).

For a given expectation, the specific list of targets may be desired to be achieved for given combined contexts, i.e., besides the Target, an expectation may state a list of contexts which apply to all targets within the intent expectation. Similarly, there may be contexts that apply to all expectations within a given intent. Correspondingly, both Intent expectations and intents should be modelled to contain aggregate contexts that apply to all the contained sub elements.

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| **End of changes** |