**3GPP TSG-SA5 Meeting #146 *S5-22xxxx***

Toulouse, France, 14 -18 November 2022

**Source: Nokia, Nokia Shanghai Bell**

**Title: Add a new key issue to Add mechanism to advertise supported NRM capabilities by the MnS Producer**

**Document for: Approval**

**Agenda Item: 6.8.2.3**

1 Decision/action requested

***The group is requested to discuss and approve the pCR below***

2 References

[1] 3GPP TS 28.831: " Management and orchestration; Study on basic Service-Based Management Architecture (SBMA) enabler enhancements"

3 Rationale

SA5 defines NRMs with IOCs with attributes along with constraints. Different MnS Producers implementing the NRM might have different levels of support for the IOCs defined in SA5. A mechanism for the MnS Consumer to be aware of such conditions, constraints and the attributes supported by the MnS Producer is necessary. MnS producer using YANG-Netconf solution set uses the ietf-yang-library (RFC8525: YANG Library) to advertise supported IOCs, attributes, conditions and constrains to the MnS consumers, whereas MnS producer using OpenAPI such mechanism is currently missing.

This contribution proposes to add a new key issue to study potential solutions for the described problem, for the following objective as described in FS\_eSBMAe SID.

* Investigate if new capabilities should be added to the Provisioning MnS, for example the concept of creating and removing attributes of managed object instances, or filter profiles.

Note: This is a revision of pCR with tDoc number S5-224280 from #144e meeting.

4 Detailed proposal

The following changes are proposed for TR 28.831[1].

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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".

[a] 3GPP TS 28.537: “Management and orchestration; Management capabilities”.[z]

[b] 3GPP TS 28.662: "Telecommunication management; Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS) ".

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

[d] 3GPP TS 28.533: “Management and orchestration; Architecture framework”.

[e] RFC8525: YANG Library

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| **2nd Change** |

## 4.x Key Issue #x: Add mechanism to advertise supported NRM capabilities by the MnS producer

### 4.x.1 Issue description

SA5 Provisioning MnS defines NRMs with IOCs with attributes along with attribute properties. Different MnS producers implementing the NRM might have different levels of support for the IOCs and attributes defined in SA5. This key issue is to study the current situation and propose solution to provide a mechanism for MnS producer to advertise its capabilities to the MnS consumers.

The following aspects of the MnS producer capabilities are analysed as part of this key issue:

- A MnS producer might not support an IOC since the underlying functionality is not supported. For example, a MnS producer that does not have the capability to support performance metrics collection and reporting would not support PerfMetricJob IOC (defined in clause 4.3.31 of TS 28.622[b]). In another example a MnS producer supporting a non-split NG-RAN deployment will not support the IOCs relevant only for a 3-split NG-RAN deployment. The MnS producer supporting a non-split NG-RAN deployment would not support the E1 and F1 endpoint interfaces represented by IOCs EP\_F1C, EP\_F1U and EP\_E1 (refer to clauses 4.3.1.1, 4.3.1.1 and 4.3.1.1 of TS 28.541 [c].

- For the IOCs defined without an upper boundary for the cardinality relationship (defined with a “\*”), the MnS producer would not support an infinite number of instances of an IOC to be created. The MnS producer would have an upper limit defined on the multiplicity of the IOCs that it supports. For example, the maximum number of instances of object PerfMetricJob that can be created would be limited to a finite number.

- For the IOCs defined with a maximum value for the cardinality relationship, the MnS producer might extend the limit for the maximum number of object instances supported for the IOCs. For example, the number of AlarmList object instances supported by the MnS producer could be more than 1.

- For the IOCs with name-containment relationship with ProxyClass representing different IOCs, the MnS producer may support all or only a subset of name-containment for the IOCs that can exist at different levels in the containment tree. A mechanism for the MnS consumer to be aware of which name-containment relationships are supported by the MnS producer is to be analysed. For example, the PerfMetricJob IOC can be name-contained by SubNetwork, ManagedElement, or ManagedFunction, but the MnS producer may support the name containment under SubNetwork only, and not support name-containment under ManagedElement, or ManagedFunction.

- For a MnS producer that supports vendor specific IOC, a mechanism for the MnS consumer to retrieve the information on the vendor specific IOCs supported is to be analysed.

- A MnS producer might not support all attributes (i.e., the attributes with the support qualifier defined as optional or conditional mandatory or conditional optional) of an IOC.

- A MnS producer might not support all values of an attribute due to certain constraints since the underlying functionality is not supported. A mechanism for the MnS consumer to be aware of all the attribute properties (that includes the isReadable, isWritable, isInvariant, isNotifyable, type, multiplicity, isOrdered, isUnique, defaultValue, isNullable and allowed values) for each attribute supported by the MnS producer is to be analysed. For example, a MnS producer that does not support file retrieval NRM fragment will not support the attribute \_linkToFiles of the PerfMetricJob IOC. In another example the MnS producer that is not supporting Energy Saving Function or ANR Function or file-based reporting functionality will not support the attributes dependant on supported the function. Another example of this constraint is when the MnS producer supports only a subset of the attribute values.

- For the list attributes defined without an upper boundary for multiplicity (defined with a “\*”), the MnS producer would not support an infinite number of elements for attribute. The MnS producer would have an upper limit defined on the multiplicity for the attribute that it supports.

- The MnS producer might support all or a subset or none of the defined notifications. The MnS producer might support the notification only for a subset of IOCs and attributes. This is applicable for alarm notifications and the configuration notifications (notifyMOICreation and notifyMOIDeletion notification that are applicable at IOCs and notifyMOIAttributeValueChanges, notifyMOIChanges notifications that are applicable at attribute level). A mechanism for the MnS consumer be aware of the supported notifications and the IOCs for which the notifications are supported is to be analysed.

This clause analyses the current situation and proposes a solution.

In addition, the mechanism for the MnS producer to advertise the supported capabilities of the CRUD operations that are defined as part of the Provisioning MnS. This aspect is not covered by this key issue.

### 4.x.2 Current situation

Discovery of Management Services use cases and procedures are defined in clause 5 of TS 28.537[a]. It has been defined that MnS producers need to register themselves with their management capabilities in the 3GPP management system. The data describing a MnS producer, and their capabilities is called MnS information or MnS profile.

The related NRMs MnSRegistry and MnsInfo is defined in clause 4.3.42 and 4.3.41 of TS 28.622[b] respectively. MnSInfo hold the information related to the MnS label (attribute mnsLabel), type (attribute mnsType), version (attribute mnsVersion), address (attribute mnsAddress) and scope (attribute mnsScope).

The MnS producer profile is defined in clause 4.2.4 of TS 28.533[d]. This is described as a set of meta data that describes the MnS Producer. The profile holds information about the supported MnS components and their version numbers. This may include also information about support of optional features.

This however does not define a mechanism for the MnS consumer to be aware of the MnS producer capabilities described in clause 4.x.1, and hence a mechanism to advertise such capabilities and procedures needs to be studied and specified.

Further, MnS producer using YANG-Netconf solution set uses the ietf-yang-library (reference [e]) to advertise supported IOCs, attributes, conditions and constrains to the MnS consumers.

However, MnS producer based on OpenAPI solution set does not advertise the supported IOCs, attributes, conditions and constrains to the MnS consumers. The MnS consumers may expect that the complete NRM defined in SA5 is supported by the MnS producer. There is no mechanism currently defined where the MnS consumer can get this information. Hence, a mechanism to advertise such capabilities and procedures in OpenAPI needs to be studied and specified.

### 4.x.3 Analysis

### 4.x.4 Potential requirements

Potential requirements to address the issue are:

[Req-1] MnS producer shall be able to advertise supported IOCs and the IOCs that are accessible by the MnS Consumers with the CRUD operations defined as part of the Provisioning MnS.

[Req-2] MnS producer shall be able to advertise the supported cardinality for each IOC.

[Req-3] MnS producer shall be able to advertise supported name-containment relationships for the IOCs.

[Req-4] MnS producer shall be able to advertise the supported vendor specific IOCs.

[Req-5] MnS producer shall be able to advertise supported attributes for the supported IOCs

[Req-6] MnS producer shall be able to advertise the supported attribute properties for each of the attributes that are supported.

[Req-7] MnS producer shall be able to advertise the supported upper boundary for the list attributes.

[Req-8] MnS producer shall be able to advertise the supported notification for each IOC and attributes.

### 4.x.5 Potential solution

### 4.x.6 CR proposal

### 4.x.7 Conclusion

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| **End of change** |