**3GPP TSG-SA5 Meeting #158 *S5-247132d1***

**, , -  *Revision of S5-246517***

**Source: Ericsson España S.A.**

**Title: pCR TR 28.879 Publishing UC - updates**

**Document for: Approval**

**Agenda Item: 6.19.21**

# 1 Decision/action requested

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

# 2 References

[1] 3GPP TR 28.879: " Study on OAM for service management and exposure to external consumers".

# 3 Rationale

This pCR aims to update the publishing use case (use case #2), by:

* Providing further details on the workflow of the use case, clarifying the decision variables on the operator side and the issues that deserve attention.
* Remove references to potential solutions on who is eligible to perform APF functionality; this is now clarified with MSEF definition in clause 5.1.0.
* Re-wording existing requirements.
* Update solutions and their evaluations.

# 4 Detailed proposal

It is proposed to make the following changes in the latest version of TR 28.879 [1].

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| **Begin Change** |

### 5.1.2 Use case #2: Publishing of management services to the CCF

#### 5.1.2.1 Description

Upon registration of the MSEF into the CCF (see clause 5.1.1), then the MSEF can be enabled to decide, on a per MnS basis, what information related to this MnS will be made available for external consumption. This decision is subjected to operator internal policies; for example, the operator might not want that all resources which can be accessed through this MnS are visible to CAPIF, but only a subset of them.

Once this decision is made, then the management service information needs to be published into CCF, so that it can later be used by the external MnS consumers to discover and subsequently invoke the MnS. To publish information into CCF, the Publish\_Service\_API (see clause 5.3.2.2 of TS 29.222 [13]) needs to be invoked over CAPIF-4 interface. To make it happen, the following should occur:

- First, the management service information is mapped into "ServiceAPIDescription" data type (see clause 8.2.4.2.2 in 3GPP TS 29.222 [13]), which represents the information passed over Publish\_Service\_ API. The attributes of the “ServiceAPIDescription” data type describes the information of a service API. The need for this mapping is due to the fact that the CAPIF framework publishes service APIs (and not management services). It is worth noting that an operator can decide to publish one MnS as one or more service APIs.

- Secondly, the service API information resulting from the above mapping gets published into the CCF. The APF sends this information to the CCF when invoking Publish\_Service\_API (see clause 5.3.2.2 of TS 29.222 [13]) over CAPIF-4 interface.

#### 5.1.2.2 Potential requirements

**PREQ-FS\_MExpo-Pub-01:** The 3GPP management system shall have the capability to map management service information into service API information.

**PREQ-FS\_MExpo-Pub-02:** The 3GPP management system shall have the capability to provide the APF functionality.

#### 5.1.2.3 Potential solutions

##### 5.1.2.3.1 Potential solution #1: Mapping of management service information into service API information

5.1.2.3.1.1 Introduction

To publish a service API to the CCF, the APF uses the Publish\_Service\_API. Specifically, the APF sends a HTTP POST message to the CCF, including information of the service API for publishing. This service API information is represented with ServiceAPIDescription data type.

To publish a management service to the CCF, there is a need to map management service information into service API information. This potential solution describes how this mapping can be done, capturing it in Table 5.1.2.3.1.2-1. This solution assumes that the MSEF has an APF.

5.1.2.3.1.2 Description

Table 5.1.2.3.1.2-1 lists the attributes contained in the ServiceAPIDescription data type, and clarifies which attributes can be mapped from management service information. See table 8.2.4.2.2-1 of TS 29.222 [13] for the data type, presence indicator, cardinality, description and applicability information for the attributes of ServiceAPIDescription.

Table 5.1.2.3.1.2-1: Mapping of management service information into
ServiceAPIDescription data type attributes.

| Attribute name | Attribute additional information | Equivalent MnSInfo IOC attribute/comments |
| --- | --- | --- |
| apiName | The data type of this attribute is defined as "string" and presence qualifier is defined as "M" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | Corresponds to the following IOC attribute: mnsType |
| apiId | The data type of this attribute is defined as "string" and presence qualifier is defined as "O" (see table 8.2.4.2.2-1 of TS 29.222 [13]). |  |
| aefProfiles | The data type of this attribute is defined as " array(AefProfile)" and presence qualifier is defined as "C" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | See Table 5.1.2.3.1.2-2 |
| description | The data type of this attribute is defined as "string" and presence qualifier is defined as "O" (see table 8.2.4.2.2-1 of TS 29.222 [13]). |  |
| supportedFeatures | The data type of this attribute is defined as "SupportedFeatures" and presence qualifier is defined as "O" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS. |
| shareableInfo | The data type of this attribute is defined as "ShareableInformation" and presence qualifier is defined as "O" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS. |
| serviceAPICategory | The data type of this attribute is defined as "string" and presence qualifier is defined as "C" (see table 8.2.4.2.2-1 of TS 29.222 [13]). |  |
| ccfId | The data type of this attribute is defined as "string" and presence qualifier is defined as "C" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS. |
| apiSuppFeats | The data type of this attribute is defined as "SupportedFeatures" and presence qualifier is defined as "O" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS. |
| pubApiPath | The data type of this attribute is defined as "PublishedApiPath" and presence qualifier is defined as "C" (see table 8.2.4.2.2-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS. |

Table 5.1.2.3.1.2-2 lists the attributes contained in the AefProfile data type (see clause 8.2.4.2.4 of TS 29.222 [13]) and clarifies which ones can be mapped from management service information. See table 8.2.4.2.4-1 of TS 29.222 [13] for the data type, presence indicator, cardinality, description and applicability information for attributes of AefProfile.

Table 5.1.2.3.1.2-2: Mapping of management service information into AefProfile data type attributes

|  |  |  |
| --- | --- | --- |
| Attribute name | Attribute additional information | Equivalent MnSInfo IOC attribute/comments |
| aefId | The data type of this attribute is defined as "string" and presence qualifier is defined as "M" (see table 8.2.4.2.4-1 of TS 29.222 [13]). | Corresponds to the AEF identifier provided by the CCF upon MSEF registration (see clause 5.1.1). |
| versions | The data type of this attribute is defined as "array(Version)" and presence qualifier is defined as "M" (see table 8.2.4.2.4-1 of TS 29.222 [13]). | See Table 5.1.2.3.1.2-3. |
| protocol | The data type of this attribute is defined as "Protocol" and presence qualifier is defined as "O" (see table 8.2.4.2.4-1 of TS 29.222 [13]). | Only "HTTP\_1\_1" and "HTTP\_1\_2" are applicable in the context of SA5 MnS. |
| dataFormat | The data type of this attribute is defined as "DataFormat" and presence qualifier is defined as "O" (see table 8.2.4.2.4-1 of TS 29.222 [13]). | Only "JSON" value is applicable in the context of SA5 MnS. |
| securityMethods | The data type of this attribute is defined as "array(SecurityMethod)" and presence qualifier is defined as "O" (see table 8.2.4.2.4-1 of TS 29.222 [13]). | Only "OAUTH" value (i.e. TLS with OAuth token) is applicable in the context of SA5 MnS. |
| domainName | The data type of this attribute is defined as "string" and presence qualifier is defined as "O" (see table 8.2.4.2.4-1 of TS 29.222 [13]). |  |
| interfaceDescriptions | The data type of this attribute is defined as "array(InterfaceDescription)" and presence qualifier is defined as "O" (see table 8.2.4.2.4-1 of TS 29.222 [13]). | See Table 5.1.2.3.1.2-5. |
| aefLocation | The data type of this attribute is defined as "AefLocation" and presence qualifier is defined as "O" (see table 8.2.4.2.4-1 of TS 29.222 [13]). |  |

Table 5.1.2.3.1.2-3 lists the attributes of Version data type (see clause 8.2.4.2.5 of TS 29.222 [13]), and clarifies which attributes can be mapped from management service information. See table 8.2.4.2.5-1 of TS 29.222 [13] for the data type, presence indicator, cardinality, description and applicability information for attributes of Version.

Table 5.1.2.3.1.2-3: Mapping of management service information into Version datatype attributes

|  |  |  |
| --- | --- | --- |
| Attribute name | Attribute additional information | Equivalent MnSInfo IOC attribute/comments |
| apiVersion | The data type of this attribute is defined as "string" and presence qualifier is defined as "M" (see table 8.2.4.2.5-1 of TS 29.222 [13]). | Corresponds to the following MnSInfo IOC attribute: mnsVersion |
| expiry | The data type of this attribute is defined as "DateTime" and presence qualifier is defined as "O" (see table 8.2.4.2.5-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS. |
| resources | The data type of this attribute is defined as "array(Resource)" and presence qualifier is defined as "O" (see table 8.2.4.2.5-1 of TS 29.222 [13]). | See Table 5.1.2.3.1.2-4. Each Resource corresponds to an MOI accessed through this MnS.  |
| custOperations | The data type of this attribute is defined as "array(CustomOperation)" and presence qualifier is defined as "O" (see table 8.2.4.2.5-1 of TS 29.222 [13]). |  |

Table 5.1.2.3.1.2-4 lists the attributes of Resource data type (see clause 8.2.4.2.6 of TS 29.222 [13]), and clarifies which attributes can be mapped from management service information. See table 8.2.4.2.6-1 of TS 29.222 [13] for the data type, presence indicator, cardinality, description and applicability information for attributes of Resource.

Table 5.1.2.3.1.2-4: Mapping of management service information into Resource data type attributes

|  |  |  |
| --- | --- | --- |
| Attribute name | Attribute additional information | Equivalent MnSInfo IOC attribute/comments |
| resourceName | The data type of this attribute is defined as "string" and presence qualifier is defined as "M" (see table 8.2.4.2.6-1 of TS 29.222 [13]). | IOC name of the MOI.In the URI structure of the MnS API (see clause 5.1.2.3.2), this attribute corresponds to the variable parameter {className}. |
| commType | The data type of this attribute is defined as "CommunicationType" and presence qualifier is defined as "M" (see table 8.2.4.2.6-1 of TS 29.222 [13]). | Only "REQUEST\_RESPONSE" value is applicable for SA5 MnS of type Provisioning. |
| uri | The data type of this attribute is defined as "string" and presence qualifier is defined as "M" (see table 8.2.4.2.6-1 of TS 29.222 [13]). | In the URI structure of the MnS API (see clause 5.1.2.3.2), this attribute corresponds to: {URI-LDN-first-part}/{className} = {id}.  |
| custOpName | The data type of this attribute is defined as "string" and presence qualifier is defined as "O" (see table 8.2.4.2.6-1 of TS 29.222 [13]). |  |
| custOperations | The data type of this attribute is defined as "array(CustomOperation)" and presence qualifier is defined as "O" (see table 8.2.4.2.6-1 of TS 29.222 [13]). |  |
| operations | The data type of this attribute is defined as "array(Operation)" and presence qualifier is defined as "C" (see table 8.2.4.2.6-1 of TS 29.222 [13]). | In the URI structure of the MnS API (see clause 5.1.2.3.2), this attribute specifies the HTTP methods under {URI-LDN-first-part}/{className} = {id}. |
| description | The data type of this attribute is defined as "string" and presence qualifier is defined as "O" (see table 8.2.4.2.6-1 of TS 29.222 [13]). |  |

Table 5.1.2.3.1.2-3 lists the attributes of InterfaceDescription data type (see clause 8.2.4.2.3 of TS 29.222 [13]), and clarifies which attributes can be mapped from management service information. See table 8.2.4.2.3-1 of TS 29.222 [13] for the data type, presence indicator, cardinality, description and applicability information for attributes of InterfaceDescription.

Table 5.1.2.3.1.2-5: Mapping of management service information into InterfaceDescription datatype attributes.

|  |  |  |
| --- | --- | --- |
| Attribute name | Attribute additional information | Equivalent MnSInfo IOC attribute/comments |
| ipv4Addr | The data type of this attribute is defined as "Ipv4Addr" and presence qualifier is defined as "C" (see table 8.2.4.2.3-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS |
| ipv6Addr | The data type of this attribute is defined as "Ipv6Addr" and presence qualifier is defined as "C" (see table 8.2.4.2.3-1 of TS 29.222 [13]). | Not applicable in the context of SA5 MnS |
| fqdn | The data type of this attribute is defined as "Fqdn" and presence qualifier is defined as "C" (see table 8.2.4.2.3-1 of TS 29.222 [13]). | In the URI structure of the MnS API (see clause 5.1.2.3.2), this attribute corresponds to the following: {URI-DN-prefix}.The FQDN can be constructed from the DN prefix as detailed in clause 4.2.3, 3GPP TS 32.158 [30]. |
| port | The data type of this attribute is defined as "Port" and presence qualifier is defined as "O" (see table 8.2.4.2.3-1 of TS 29.222 [13]). |  |
| apiPrefix | The data type of this attribute is defined as "string" and presence qualifier is defined as "O" (see table 8.2.4.2.3-1 of TS 29.222 [13]). | In the URI structure of the MnS API (see clause 5.1.2.3.2), this attributecorresponds to the following: "/" + {root} |
| securityMethods | The data type of this attribute is defined as "array(SecurityMethod)" and presence qualifier is defined as "O" (see table 8.2.4.2.3-1 of TS 29.222 [13]). | Only "OAUTH" value (i.e. TLS with OAuth token) is applicable in the context of SA5 MnS. |

With this mapping, it is possible to publish management service information into the CCF.

##### 5.1.2.3.2 Potential solution #2: Mapping MnS API URI to Service API URI.

5.1.2.3.2.1 Introduction

When publishing on the CCF, MnS APIs need to be mapped to service APIs, so that the latter can be accessed by external MnS consumers. This potential solution compares the URI structure of a MnS API and a service API, to help understand how this mapping looks like.

5.1.2.3.2.2 Description

The table below compares the URI structure for Service API and MnS API.

Table 5.1.2.3.2.2-1: URI structure for Service API and MnS API

| Service API  | MnS API (see 3GPP TS 32.158) |
| --- | --- |
| URI: = <apiRoot>/<apiName>/<apiVersion>/<APISpecificSuffixes>See NOTE 1 | URI: = {MnSRoot}/{MnSName}/{MnSVersion}/{URI-LDN-first-part}/{className} = {id}See NOTE 2 |
| NOTE 1: <apiRoot>:= https://<authority>/<API-prefix>, with <API-prefix> being optional.NOTE 2: {MnSRoot} = https://{URI-to-DN-prefix}/{root}, with {root} being optional. |

It is needed that the URI structure for MnS APIs follow the same format as defined for service APIs. This means:

- {MnSRoot} corresponds to the <apiRoot>. The {apiRoot} variable of the URI structure for the service API can be constructed by the API invoker based on the "interfaceDescriptions" attribute of the AefProfile data type (Table 5.1.2.3.1.2-2). For further information, see clause 5.2.2.2.2 in 3GPP TS 29.222 [13].

- {URI-to-DN-prefix} corresponds to the <authority> (host and optional TCP port). The host name is constructed from the DN prefix as detailed in clause 4.2.3, 3GPP TS 32.158 [30].

- {root} corresponds to <API-prefix>.

- {MnSName} corresponds to <apiName>. For example, when <MnSName> := ProvMnS, then the apiName in the service API URI shall be ProvMnS.

- {MnSVersion} corresponds to <apiVersion>.

- {URI-LDN-first-part}/{className} = {id} corresponds to <apiSpecificSuffixes>.

##### 5.1.2.3.3 Potential solution #x: MSEF providing APF functionality

5.1.2.3.3.1 Introduction

This potential solution that APF functionality is provided by MSEF.

5.1.2.3.3.2 Description

The MSEF described in clause 5.1.0 is within 3GPP management system. The scope of MSEF is to provide API provider domain functions in the context of CAPIF.

API provider domain functions include APF. Based on this, the MSEF can provide APF functionality.

#### 5.1.2.4 Evaluation of potential solutions

##### 5.1.2.4.1 Evaluation of potential solution #1

The potential solution #1 shows that it is feasible to map management service API information into service API information. Therefore, it fulfils PREQ-FS\_MExpo-Pub-01.

For the cases where the operator decides to publish a MnS as two (or more) service APIs, the mapping proposed in potential solution #1 needs to be done with this in mind, mapping management service information into two (or more) ServiceAPIDescription data type.

The ServiceAPIDescription data type provides valuable information for an external MnS consumer. For example, for discovery purposes, the following attributes are relevant:

- "resources" (see Table 5.1.2.3.1.1-4). This attribute provides information on the scope of a service API, i.e. constituent service API resources. This solution requires that the external MnS consumer understand the NRM tree.

- “ServiceAPICategory” (see Table 5.1.2.3.1.1-1). This attribute provides additional information for a specific API. It complements “resource” attribute.

NOTE: The usage of “ServiceAPICategory” is currently limited to CAPIF-6/6e interface. In the event the usage of this attribute is extended to other CAPIF interfaces, then this attribute could be used to accommodate future optional MnSInfo IOC attributes.

##### 5.1.2.4.2 Evaluation of potential solution #2

The potential solution #2 shows that the URI structure of MnS APIs can be mapped into the URI structure of service APIs. Therefore, it fulfils PREQ-FS\_MExpo-Pub-01.The potential solution identifies that {MnSVersion} in MnS corresponds to <apiVersion> in service API. However, it is worth noting that <apiVersion> represents only the major release, e.g. "v1", while the <MnSVersion> follows "v<major>.<minor>.<patch>" format, e.g. "v15.0.1". It shall be clarified that reconciling the API version mapping between {MnSVersion} and <apiVersion> can be done by the network operator, and it is not subject to standardization;

##### 5.1.2.4.x Evaluation of potential solution #x

The potential solution #x shows that the MSEF provides the APF functionality. The MSEF is defined within the 3GPP management system. Therefore, potential solution #3 fulfils PREQ-FS\_MExpo-Pub-02.

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| **End Change** |