**3GPP TSG-SA5 Meeting #143-eS5-223622d3**

**e-meeting, 9 - 17 May 2022**

**Source: Alibaba group, AsiaInfo**

**Title: pCR 28.824 Update to solution regarding CAPIF based management capability exposure**

**Document for: Approval**

**Agenda Item: 6.5.22**

# 1 Decision/action requested

***For approval***

# 2 References

[1] 3GPP TR 28.824 V0.5.0 Study on network slice management capability exposure

# 3 Rationale

This contribution proposes the enhancement of CAPIF interface considering network slice management capability exposure.

# 4 Detailed proposal

This contribution proposes to make the following changes in [1].

|  |
| --- |
| **1st change** |

## 7.9 Potential solutions for network slice management capability exposure via CAPIF

### 7.9.1 Exposure via CAPIF alternative 1

This clause describes a potential solution where network slice management capability is exposed via the Common API Framework for 3GPP Northbound APIs, see TS 23.222 [14].



Figure 7.9.1-1: Exposure via CAPIF alternative 1

In this alternative, network slice management capability exposure provides faultMnS, fileDataReportingMnS, heartbeatNtf, perfMnS, provMnS, and streamingDataMnS as specified in in TS 28.532 [15].

Editor’s note: Whether network slice management capability exposure is affected by transforming the management service API to another service API is FFS.

### 7.9.2 Exposure via CAPIF alternative 2

This clause describes a potential solution where network slice management capability exposure is used in conjunction with a CAPIF core function (see TS 23.222 [14]) to expose management services to MnS consumers.



Figure 7.9.2-1: Exposure via CAPIF alternative 2

In this alternative, network slice management capability exposure consumes the interfaces at reference points CAPIF-3, CAPIF-4, and CAPIF-5 as defined in TS 23.222 [14]. It may be necessary to extend CAPIF-3/4/5 as defined in TS 23.222 [14] to support exposure of network slice management services.

Editor’s note: Whether it is necessary to extend CAPIF-3/4/5 for alternative 2 is FFS.

In this alternative, network slice management capability exposure provides the interfaces at reference point CAPIF-2/2e. It may be necessary to extend CAPIF-2/2e as defined in TS 23.222 [14] to support network slice management capability exposure and authentication of MnS consumers.

In this alternative, MnS Consumers utilize the interfaces at reference point CAPIF-1/1e. It may be necessary to extend CAPIF-1/1e as defined in TS 23.222 [14] to support network slice management capability exposure and authorization/authentication of MnS consumers.

Editor’s note: Whether network slice management capability exposure is affected by transforming the management service API to another service API is FFS.

Table7.9.2-1 shows the CAPIF interface and the potential MnS that can be implemented within the interface for alternative 2. In addition, extension of CAPIF interface may be needed to achieve certain functionalities in the context of network slice management capability expousre.

**Table 7.9.2-1 Interface description**

|  |  |  |
| --- | --- | --- |
| **Interface** | **Related MnS** | **Gap analysis** |
| CAPIF 1/1e | - Discovery of MnS(s) from MnS registry using ProvMnS Specified in TS 28.622 [17], TS 28.623 [16], and TS 28.532 [15] | - The ServiceAPIDescription for CAPIF\_Discover\_Service\_API needs to be extended in the context of network slice management capability exposure. The MnS address within the MnS data can indicate a dedicated producer for exposing exposed MnS after authentication and authorization. The mnsAddress within MnS is specified in table 7.9.2-3.  - Management of MnS consumers includes the the management of MnS consumer type and identity. The management of MnS consumer type and identity is for differentiating different access permission for different MnS consumer. The MnS consumer management information is specified in table 7.9.2-4. |
| CAPIF 2/2e | - Authentication and authorization of MnS consumers is specified in TS 28.533 [11] clause 4.9.  - Service APIs (MnS): faultMnS, fileDataReportingMnS, heartbeatNtf, perfMnS, provMnS, and streamingDataMnS Specified in in TS 28.532 [15] |  |
| CAPIF 3 | - Nchf\_ConvergedCharging Specified in TS 28.201 [18] and TS 28.202 [6] | Editor’s note: Access control for an MnS consumer, which is enforced by MnS producers is FFS.  - Routing information in CAPIF needs to be extended in the context of network slice management capability exposure. A dedicated producer obtains all the routing information of MnS producers, the routing information contains the address of MnS producers that produce the proper MnS (e.g. faultMnS, PerfMnS, etc). Detailed routing information is specified in table 7.9.2-2. |
| CAPIF 4 | - MnS Registry Specified in TS 28.622 [17] and TS 28.623 [16]. | - The ServiceAPIDescription for CAPIF\_Publish\_Service\_API needs to be extended in the context of network slice management capability exposure. The MnS address within the MnS data can indicate a dedicated producer for exposing exposed MnS after authentication and authorization. The mnsAddress within MnS is specified in table 7.9.2-3. |
| CAPIF 5 | - Auditing of the MnS producer is not specified |  |

The routing information for CAPIF-3 can be extended as below:

**Table 7.9.2-2 routing information**

|  |  |  |  |
| --- | --- | --- | --- |
| Attributes | Support | Cardinality | Description |
| Exposure routing information | O | 1…N | The routing information contains the address of MnS producers that produce the proper MnS (e.g. faultMnS, PerfMnS, etc). |

The mnsAddress of MnsInfo within CAPIF-1e and 4 can be extended as below:

**Table 7.9.2-3 mnsaddress information within MnsInfo**

|  |  |  |  |
| --- | --- | --- | --- |
| Attributes | Support | Cardinality | Description |
| mnsAddress | M | 1 | The MnS address for external MnS consumer indicates a dedicated producer for exposing exposed MnS after authentication and authorization. The dedicated producer obtains the MnS from corresponding MnS producer based on the routing information and exposes the MnS to the MnS consumer. |

The MnS consumer management information within CAPIF-1e can be extended as below:

**Table 7.9.2-4 MnS consumer management information**

|  |  |  |  |
| --- | --- | --- | --- |
| Attributes | Support | Cardinality | Description |
| MnSConsumerType | O | 1…N | It indicates the type of MnS consumer that requests for the exposure of the MnSs provided by MnS producer. The type of MnS consumer is external if the MnS consumer is outside the PLMN trust domain. The type of MnS consumer is internal if the MnS consumer is inside the PLMN trust domain.  allowedValue: EXTERNAL,  INTERNAL |
| MnSConsumerID | O | 1…N | It indicates the Identifier of the MnS consumer that requests MnSs from the MnS producer.  The identifier of the MnS consumer can be associated to its access token. The access token can represents a set of MnSs that are allowed to be exposed to MnS consumer.  The format of the MnS consumer ID can use FQDN (See TS 21.003 clause 19.4.2.1). |

### 7.9.3 Exposure via CAPIF alternative 3

This clause describes a potential solution where network slice management capability exposure implements a Common API Framework for 3GPP Northbound APIs (see TS 23.222 [14]) to expose management services to MnS consumers.

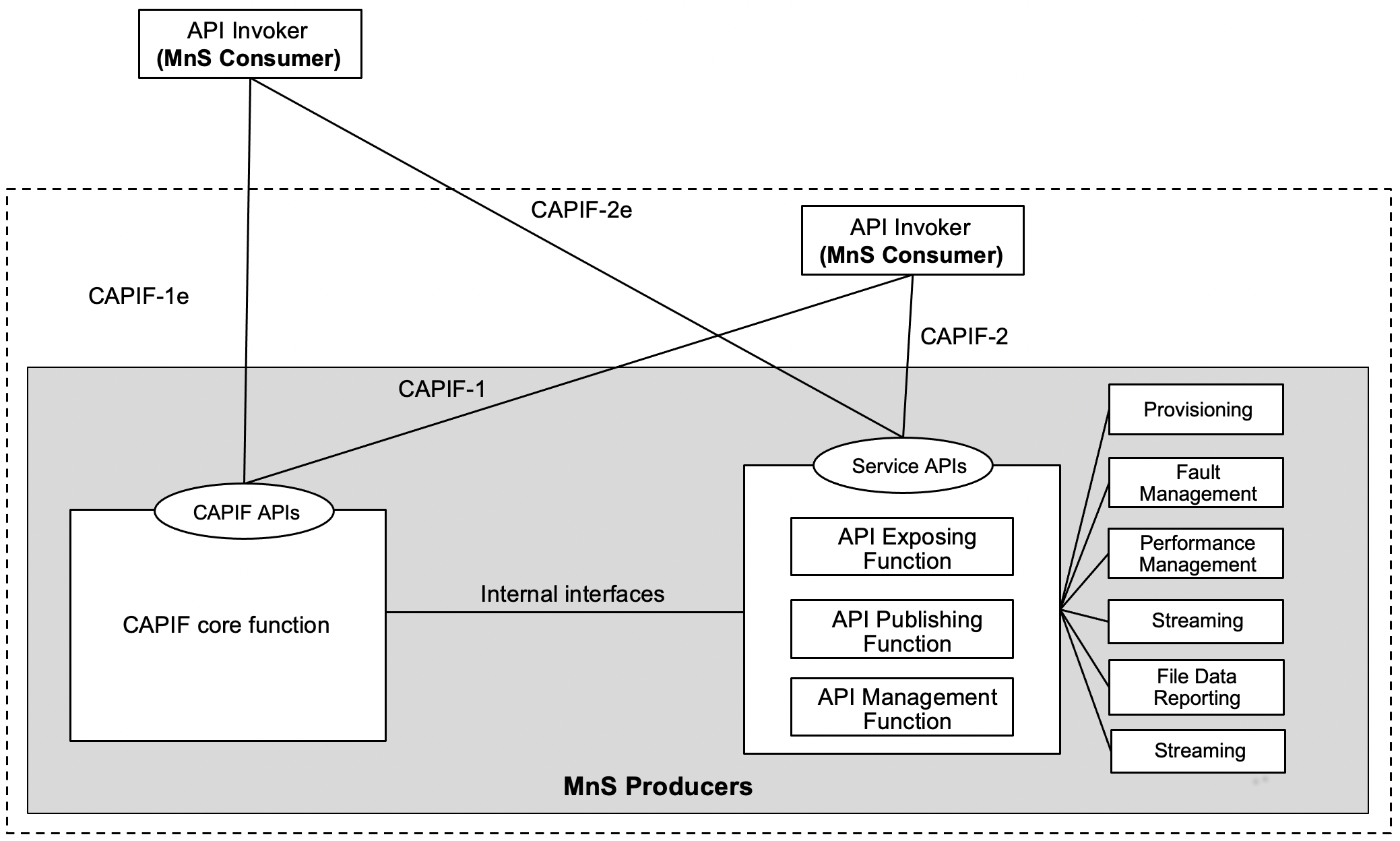


Figure 7.9.3-1: Exposure via CAPIF alternative 3

In this alternative, network slice management capability exposure may internally implement the internal interfaces using reference points CAPIF-3, CAPIF-4, and CAPIF-5 as defined in TS 23.222 [14] or may use non-standardized interfaces.

Editor’s note: Whether it is necessary to extend CAPIF-3/4/5 for alternative 3 is FFS.

In this alternative, network slice management capability exposure provides the interfaces at reference point CAPIF-1/1e. It may be necessary to extend CAPIF-1/1e as defined in TS 23.222 [14] to support authorization/authentication of MnS consumers and discovery of MnS producers.

In this alternative, network slice management capability exposure provides the interfaces at reference point CAPIF-2/2e. It may be necessary to extend CAPIF-2/2e as defined in TS 23.222 [14] to support network slice management capability exposure and authentication of MnS consumers.

Editor’s note: Whether network slice management capability exposure is affected by transforming the management service API to another service API is FFS.

Table7.9.3-1 shows the CAPIF interface and the potential MnS that can be implemented within the interface for alternative 2. In addition, extension of CAPIF interface may be needed to achieve certain functionalities in the context of network slice management capability exposure. Note that in CAPF alternative 3, 4, 5 in alternative 3 are internal interface. However, since external interface may bring impacts on the internal interface. The gap analysis for these interfaces is needed.

**Table 7.9.3-1 Interface description**

|  |  |  |
| --- | --- | --- |
| **Interface** | **Related MnS** | **Gap analysis** |
| CAPIF 1/1e | - Discovery of MnS(s) from MnS registry using ProvMnS Specified in TS 28.622 [17], TS 28.623 [16], and TS 28.532 [15] | - The ServiceAPIDescription for CAPIF\_Discover\_Service\_API needs to be extended in the context of network slice management capability exposure. The MnS address within the MnS data can indicate a dedicated producer for exposing exposed MnS after authentication and authorization. The mnsAddress within MnS is specified in table 7.9.1-3.  - Management of MnS consumers includes the the management of MnS consumer type and identity. The management of MnS consumer type and identity is for differentiating different access permission for different MnS consumer. The MnS consumer management information is specified in table 7.9.3-2. |
| CAPIF 2/2e | - Authentication and authorization of MnS consumers is specified in TS 28.533 [11] clause 4.9  - Service APIs (MnS): faultMnS, fileDataReportingMnS, heartbeatNtf, perfMnS, provMnS, and streamingDataMnS Specified in in TS 28.532 [15] |  |
| CAPIF 3 | - Nchf\_ConvergedCharging Specified in TS 28.201 [18] and TS 28.202 [6] | Editor’s note: Access control for an MnS consumer, which is enforced by MnS producers is FFS.  - Routing information in CAPIF needs to be extended in the context of network slice management capability exposure. A dedicated producer obtains all the routing information of MnS producers, the routing information contains the address of MnS producers that produce the proper MnS (e.g. faultMnS, PerfMnS, etc). Detailed routing information is specified in table 7.9.3-3. |
| CAPIF 4 | - MnS Registry Specified in TS 28.622 [17] and TS 28.623 [16] | - The ServiceAPIDescription for CAPIF\_Publish\_Service\_API in CAPIF-4 needs to be extended in the context of network slice management capability exposure. The MnS address within the MnS data can indicate a dedicated producer for exposing exposed MnS after authentication and authorization. The mnsAddress within MnS is specified in table 7.9.1-3. |
| CAPIF 5 | - Auditing of the MnS producer is not specified |  |

The routing information within CAPIF-7 can be extended as below:

**Table 7.9.3-1 routing information**

|  |  |  |  |
| --- | --- | --- | --- |
| Attributes | Support | Cardinality | Description |
| Exposure routing information | O | 1…N | The routing information contains the address of MnS producers that produce the proper MnS (e.g. faultMnS, PerfMnS, etc). |

The mnsAddress within MnsInfo can be described as below:

**Table 7.9.3-2 mnsaddress information within MnsInfo**

|  |  |  |  |
| --- | --- | --- | --- |
| Attributes | Support | Cardinality | Description |
| mnsAddress | M | 1 | The MnS address for external MnS consumer indicates a dedicated producer for exposing exposed MnS after authentication and authorization. The dedicated producer obtains the MnS from corresponding MnS producer based on the routing information and exposes the MnS to the MnS consumer. |

The MnS consumer management information can be described as below:

**Table 7.9.3-3 MnS consumer management information**

|  |  |  |  |
| --- | --- | --- | --- |
| Attributes | Support | Cardinality | Description |
| MnSConsumerType | O | 1…N | It indicates the type of MnS consumer that requests for the exposure of the MnSs provided by MnS producer. The type of MnS consumer is external if the MnS consumer is outside the PLMN trust domain. The type of MnS consumer is internal if the MnS consumer is inside the PLMN trust domain.  allowedValue: EXTERNAL,  INTERNAL |
| MnSConsumerID | O | 1…N | It indicates the identifier of the MnS consumer that requests MnSs from the MnS producer. The identifier of the MnS consumer can be associated to its access token. The access token can represents a set of MnSs that are allowed to be exposed to MnS consumer.  The format of the MnS consumer ID can use FQDN (See TS 21.003 clause 19.4.2.1). |



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| --- |
| **End of changes** |