**3GPP TSG-SA5 Meeting #143-eS5-223625**

**e-meeting, 09 - 17 May 2022**

**Source: Ericsson, Deutsche Telekom, Telefónica**

**Title: Add procedure for consumption of exposed MnS after service order completed**

**Document for: Approval**

**Agenda Item: 6.5.22.3**

# 1 Decision/action requested

***The group is asked to agree the detailed proposal.***

# 2 References

[1] 3GPP [TS 28.533](https://www.3gpp.org/DynaReport/28533.htm) Management and orchestration; Architecture framework

[2] 3GPP [TS 23.501](https://www.3gpp.org/DynaReport/23501.htm) System architecture for the 5G System (5GS)

[3] 3GPP [TS 23.502](https://www.3gpp.org/DynaReport/23502.htm) Procedures for the 5G System (5GS)

[4] 3GPP [TS 23.222](https://www.3gpp.org/DynaReport/23222.htm) Common API Framework for 3GPP Northbound APIs

[5] 3GPP [TS 23.434](https://www.3gpp.org/DynaReport/23434.htm) Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows

[6] 3GPP [TS 33.122](https://www.3gpp.org/DynaReport/33122.htm) Security aspects of Common API Framework (CAPIF) for 3GPP northbound APIs

[7] 3GPP [TS 33.501](https://www.3gpp.org/dynareport/33501.htm) Security architecture and procedures for 5G System

[8] 3GPP [TS 28.530](https://www.3gpp.org/DynaReport/28530.htm) Management and orchestration; Concepts, use cases and requirements

# 3 Rationale

The procedures described in clause 4.1.4 show the interaction between an NSC and an NSP when NSC orders a product/service and the NSP accepts and completes the order. After the product order and service order have been completed, the ordered service may be consumed by the NSC using the CAPIF (Common API Framework).

There is no description in the study what happens after the service order is completed nor how CAPIF may be used.

It is proposed to add a concept description in clause 4 and a solution description in clause 7.

# 4 Detailed proposal

***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".

[2] TM Forum TMF622 Product Order API REST Specification

[3] TM Forum TMF641 Service Ordering API

[4] TM Forum TMF652 Resource Order Management API

[5] 3GPP TS 28.531: "Management and orchestration; Concepts, use cases and requirements"

[6] 3GPP TS 28.202: "Charging management; Network slice management charging in the 5G System (5GS); Stage 2"

[7] 3GPP TR23.700-99 “Study on Network Slice Capability Exposure for Application Layer Enablement (NSCALE)”

[8] 3GPP TS23.434 “Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows.”

[9] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3"

[10] 3GPP TS 28.537: "Management and orchestration; Management capabilities"

[11] 3GPP TS 28.533: "Management and orchestration; Architecture framework"

[12] TM Forum TMF633 Service Catalogue Management API

[13] TM Forum TMF620 Product Catalogue Management API

[14] 3GPP TS 23.222: "Functional architecture and information flows to support Common API Framework for 3GPP Northbound APIs; Stage 2"

[15] 3GPP TS 28.532: "Management and orchestration; Generic Management Service"

[16] 3GPP TS 28.623: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions"

[17] 3GPP TS 28.622: " Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP) Information Service (IS)"

[18] 3GPP TS 28.201: "Charging management; Network slice performance and analytics charging in the 5G System (5GS); Stage 2"

[x] CAMARA: <https://github.com/camaraproject>

***2nd Change***

#### 4.1.4.X Procedure for consumption of exposed MnS after service order is completed

The procedure for consumption of an exposed MnS after the product and service order are completed is shown in figure 4.1.4.X.1. The MnS is produced by the MnS producer located in the OSS of the NSP.

An MnS may already be produced before CAPIF 1 service is requested. The CAPIF 2/2e service is a filtered, enriched and/or converted version of the MnS. The transformation, filtering, enrichment, or conversion of MnS APIs into service APIs is optional. The details of how this transformation, filtering and/or enrichment is to be done is out of scope of SA5.

Editor’s Note: There exist initiatives such as CAMARA [x] which are working in this translation.

Filtering is removing of information elements (attributes and classes), enrichment is adding information elements from other MnS or other sources outside OAM, converting is changing information elements through for example combining or mapping information elements. The CAPIF 2/2e service is provided by the API\_Provider\_domain\_function and consumed by the NSC\_Application. The API\_Provider\_domain\_function uses the MnS(s) produced to provide the CAPIF 2/2e service.



Figure 4.1.4.X.1 Procedure for consumption of exposed MnS after service order is completed

NOTE1: For simplicity reasons the CAPIF Core function and API Provider domain function defined in TS 23.222 [14] are combined and any communication between them is also not included.

NOTE2: The procedure is only applicable to “Exposure via CAPIF alternative 1” described in clause 7.9.1.

1) The CAPIF\_Core\_function receives an authenticating and authorization request from the NSC\_Application based on the identity and other information required for authentication and authorization of the NSC\_Application.

2) The CAPIF\_Core\_function processes the authentication and authorization request.

3) The CAPIF\_Core\_function provides the response with the result of the authentication and authorization to the NSC\_Application.

4) The CAPIF\_Core\_function receives a request for the discovery of service APIs information.

5) The CAPIF\_Core\_function processes the discovery request.

6) The CAPIF\_Core\_function provides the appropriate response to the NSC\_Application.

7) The API\_Provider\_domain\_function receives an authentication and authorization request from the NSC\_Application based on the identity and other information required for authorization of the NSC\_Application.

8) The API\_Provider\_domain\_function processes the authorization request.

9) The API\_Provider\_domain\_function provides the response with the result of the authentication and authorization to the NSC\_Application

10) The API\_Provider\_domain\_function receives a request for the invocation of the service API(s) from the NSC\_Application.

11) The API\_Provider\_domain\_function processes (and optionally may enrich and/or convert) the invocation request.

12) The MnS\_Producers receive requests from the API\_Provider\_domain\_function for MnS.

13) The MnS\_Producers provide the appropriate responses to the API\_Provider\_domain\_function.

14) The API\_Provider\_domain\_function processes (and optionally may filter, enrich and/or convert) the response from the OSS

15) The API\_Provider\_domain\_function provides the appropriate response to the NSC\_Application.

NOTE: Each response in the steps does not always need to trigger the next request.

***3rd Change***

## 7.X Potential solution for consumption of exposed MnS after service order completed

This clause describes a solution for the procedure for consumption of exposed MnS after service order completed described which is described in clause 4.1.4.X. For each step in the procedure Table 7.X.1 identifies the following:

- if an interface is:

- Internal to the NSP,

- External between a NSC and NSP,

- None, for internal processes within a function.

- which operation or notification is used by that step, and

- which specification describes the interface (stage 2 and stage 3).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Description in step** | **Interface** | **Reference** | **Description in reference** |
| 1 | Authentication and authorization request | Internal | 3GPP TS 23.222[14], clause 6.4.2 | CAPIF-1 |
| 2 |  | None | - | - |
| 3 | Authentication and authorization response | Internal | 3GPP TS 23.222[14], clause 6.4.2 | CAPIF 1 |
| 4 | Discovery request | Internal | 3GPP TS 23.222[14], clause 6.4.2 | CAPIF-1 |
| 5 |  | None | - | - |
| 6 | Discovery response | Internal | 3GPP TS 23.222[14], clause 6.4.2 | CAPIF-1 |
| 7 | Authentication and authorization request | Internal | 3GPP TS 23.222[14], clause 6.4.4 | CAPIF-2 |
| 8 |  | None |  |  |
| 9 | Authentication and authorization response | Internal | 3GPP TS 23.222[14], clause 6.4.4 | CAPIF-2 |
| 10 | API invocation request | Internal | 3GPP TS 23.222[14], clause 6.4.4 | CAPIF-2 |
| 11 |  | None |  |  |
| 12 | MnS request | Internal | 3GPP TS 28.532 | MnS |
| 13 | MnS response | Internal | 3GPP TS 28.532 | MnS |
| 14 |  | None |  |  |
| 15 | API invocation response | Internal | 3GPP TS 23.222[14], clause 6.4.4 | CAPIF 2 |

Table 7.X.1 Solution for consumption of exposed MnS within the operator trusted domain (NSC\_Application is inside operator trusted domain)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Description in step** | **Interface** | **Reference** | **Description in reference** |
| 1 | Authentication and authgorizationrequest | External | 3GPP TS 23.222[4], clause 6.4.3 | CAPIF-1e |
| 2 |  | None | - | - |
| 3 | Authentication and authorization response | External | 3GPP TS 23.222[4], clause 6.4.3 | CAPIF 1e |
| 4 | Discovery request | External | 3GPP TS 23.222[4], clause 6.4.3 | CAPIF-1e |
| 5 |  | None | - | - |
| 6 | Discovery response | External | 3GPP TS 23.222[4], clause 6.4.3 | CAPIF-1e |
| 7 | Authentication and authorization request | External | 3GPP TS 23.222[14], clause 6.4.5 | CAPIF-2e |
| 8 |  | None |  |  |
| 9 | Authentication and authorization response | External | 3GPP TS 23.222[14], clause 6.4.5 | CAPIF-2e |
| 10 | API invocation request | External | 3GPP TS 23.222[4], clause 6.4.5 | CAPIF-2e |
| 11 |  | None |  |  |
| 12 | MnS request | Internal | 3GPP TS 28.532 | MnS/ |
| 13 | MnS response | Internal | 3GPP TS 28.532 | MnS/ |
| 14 |  | None |  |  |
| 15 | API invocation response | External | 3GPP TS 23.222[4], clause 6.4.5 | CAPIF 2e |

Table 7.X.2 Solution for consumption of exposed MnS outside operator trusted domain (NSC\_Application is outside operator trusted domain)

***4rd Change***

# Annex A UML code of the diagrams

### A.x Figure: Procedure for consumption of exposed MnS after service order is completed

@startuml

skinparam sequence {

ArrowColor Black

ActorBorderColor Black

ActorBackgroundColor White

ParticipantBorderColor Black

ParticipantBackgroundColor White

LifeLineBorderColor Black

}

skinparam NoteBackgroundColor White

skinparam NoteBorderColor White

skinparam NoteColor White

skinparam shadowing false

hide footbox

autonumber

participant NSC\_Application

box "CAPIF core and API provider domain functions" #white

 participant "CAPIF\_Core\_\nfunction" as CAPIF\_Core

 participant "API\_Provider\_\ndomain\_function" as API\_Provider

end box

participant MnS\_Producers

NSC\_Application --> CAPIF\_Core : Authentication and authorization request

CAPIF\_Core -> CAPIF\_Core: process request

NSC\_Application <-- CAPIF\_Core : Authentication and authorization response

NSC\_Application --> CAPIF\_Core : Discovery request

CAPIF\_Core -> CAPIF\_Core: process request

NSC\_Application <-- CAPIF\_Core : Discovery response

NSC\_Application --> API\_Provider : Authentication and authorization request

API\_Provider -> API\_Provider: process request

NSC\_Application <-- API\_Provider : Authentication and authorization response

NSC\_Application --> API\_Provider : API Invocation request

API\_Provider -> API\_Provider: process request

API\_Provider --> MnS\_Producers: MnS request

API\_Provider <-- MnS\_Producers: MnS response

API\_Provider -> API\_Provider: process response

NSC\_Application <-- API\_Provider : API Invocation response

@enduml

***End of Changes***