**3GPP TSG CT WG3 Meeting #136 *C3-244164\_R2***

**Maastricht, NL, 19 - 23 August, 2024**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.222** | **CR** | **0354** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Network Slice Information in the CAPIF APIs | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Nokia | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI19, NSCALE, CAPIF | | | | |  | ***Date:*** | | | 2024-07-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19) Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 3GPP TS 23.222 intoroduces the network slice information support (see clause 8.3.2.1 and 8.7.1) in CAPIF APIs under TEI19 WI in SA6. Thus, the related functionality shall be intoroduced in 29.222. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR introduces the network slice information support in the CAPIF APIs. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Misalignment with stage 2 requirements | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 8.1.2.2.3.1, 8.1.4.1, 8.1.6, 8.2.4.1, 8.2.4.2.2, 8.2.6, A.2, A.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | * This CR provides a backward compatible feature for the CAPIF\_Discover\_Service\_API and CAPIF\_Publish\_Service\_API | | | | | | | | |
| ***()*** | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

\* \* \* First 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] 3GPP TS 23.222: "Functional architecture and information flows to support Common API Framework for 3GPP Northbound APIs; Stage 2".

[3] Open API: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[4] IETF RFC 9112: "HTTP/1.1".

[5] IETF RFC 9110: "HTTP Semantics".

[6] Void.

[7] Void.

[8] IETF RFC 9111: "HTTP Caching".

[9] Void.

[10] IETF RFC 9113: "HTTP/2".

[11] Void.

[12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[13] IETF RFC 6455: "The Websocket Protocol".

[14] 3GPP TS 29.122: "T8 reference point for northbound Application Programming Interfaces (APIs)".

[15] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[16] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".

[17] Void.

[18] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[19] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[20] IETF RFC 7239: "Forwarded HTTP Extension".

[21] Void.

[22] W3C HTML 4.01 Specification, <https://www.w3.org/TR/2018/SPSD-html401-20180327/>.

[23] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[24] IETF RFC 7519: "JSON Web Token (JWT)".

[25] IETF RFC 7515: "JSON Web Signature (JWS)".

[26] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[27] 3GPP TR 21.900: "Technical Specification Group working methods".

[28] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3"

[29] IETF RFC 5280: "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile".

[30] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[31] 3GPP TS 29.435: "Service Enabler Architecture Layer for Verticals (SEAL); Network Slice Capability Enablement (NSCE) Server Services".

\* \* \* Next change \* \* \* \*

###### 8.1.2.2.3.1 GET

The HTTP GET method enables to retrieve a list of APIs currently registered at the CCF and satisfying a number of filter criteria.

Table 8.1.2.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| api-invoker-id | string | M | 1 | It represents the identifier (assigned by the CCF) ofthe API invoker that is sending the request. It may also represent the identifier of the CCF that is sending the request if the request is sent over the CAPIF-6/6e reference point. (NOTE 1) |  |
| api-name | string | O | 0..1 | Contains the API name as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122 [14]. |  |
| api-version | string | O | 0..1 | Contains the API major version conveyed in the URI (e.g. v1). |  |
| comm-type | CommunicationType | O | 0..1 | Communication type used by the API (e.g. REQUEST\_RESPONSE). |  |
| protocol | Protocol | O | 0..1 | Protocol used by the API. |  |
| aef-id | string | O | 0..1 | AEF identifier. |  |
| data-format | DataFormat | O | 0..1 | Data format used by the API (e.g. serialization protocol JSON). |  |
| api-cat | string | O | 0..1 | The service API category to which the service API belongs. |  |
| preferred-aef-loc | AefLocation | O | 0..1 | The preferred AEF location. If this parameter is present, the CCF shall try to discover a matched AEF location the service API supports. This parameter is ignored by the CCF if there is no matching record found. |  |
| req-api-prov-name | string | O | 0..1 | Represents the required API provider name. | RNAA |
| supported-features | SupportedFeatures | O | 0..1 | To filter irrelevant responses related to unsupported features. |  |
| api-supported-features | SupportedFeatures | C | 0..1 | Features supported by the discovered service API indicated by api-name parameter. This may only be present if the api-name query parameter is present. | ApiSupportedFeatureQuery |
| ue-ip-addr | IpAddrInfo | O | 0..1 | Represents the UE IP address information. | RNAA |
| service-kpis | ServiceKpis | O | 0..1 | Contains information about service characteristics provided by the targeted service API(s). | EdgeApp\_2 |
| net-slice-info | NetSliceId | O | 0..1 | Represents the network slice information. | SliceBasedAPIExposure |
| NOTE 1: This parameter is not part of the API filter criteria so that it is not used in matching APIs published in the CCF.  NOTE 2: In addition to the above standardized query parameters, the service consumer may also provide vendor-specific query parameter(s) as specified in clause 5.2.13.3 of 3GPP TS 29.122 [14]. The CCF shall use any received vendor-specific query parameters in the filtering process of the results to be returned in the response in a similar way and in addition to the standardized query parameters defined in this table. This capability may be signalled using the "VendSpecQueryParams" feature. | | | | | |

This method shall support the request data structures specified in table 8.1.2.2.3.1-2 and the response data structures and response codes specified in table 8.1.2.2.3.1-3.

Table 8.1.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 8.1.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| DiscoveredAPIs | M | 1 | 200 OK | The response body contains the result of the search over the list of registered APIs. |
| n/a |  |  | 307 Temporary Redirect | Temporary redirection.  The response shall include a Location header field containing an alternative target URI of the resource located in an alternative CCF.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [14]. |
| n/a |  |  | 308 Permanent Redirect | Permanent redirection.  The response shall include a Location header field containing an alternative target URI of the resource located in an alternative CCF.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [14]. |
| ProblemDetails | O | 0..1 | 414 URI Too Long | Indicates that the server refuses to process the request because the request-target is too long. |
| NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [14] shall also apply. | | | | |

Table 8.1.2.2.3.1-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative CCF. |

Table 8.1.2.2.3.1-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative target URI of the resource located in an alternative CCF. |

\* \* \* Next change \* \* \* \*

#### 8.1.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 7.2 also apply to this API.

Table 8.1.4.1-1 specifies the data types defined specifically for the CAPIF\_Discover\_Service\_API.

Table 8.1.4.1-1: CAPIF\_Discover\_Service\_API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| DiscoveredAPIs | Clause 8.1.4.2.2 | Represents a list of APIs currently registered at the CCF  and satisfying a number of filter criteria provided by the service consumer. |  |
| IpAddrInfo | Clause 8.1.4.2.4 | Represents the UE IP address information. | RNAA |

Table 8.1.4.1-2 specifies data types re-used by the CAPIF\_Discover\_Service\_API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the CAPIF\_Discover\_Service\_API.

Table 8.1.4.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AefLocation | Clause 8.2.4.2.10 | Used to indicate the AEF location. |  |
| CommunicationType | Clause 8.2.4.3.5 | Used to indicate the communication type used by the API. |  |
| Ipv4Addr | 3GPP TS 29.122 [14] | Used to indicate an IPv4 address. | RNAA |
| Ipv6Addr | 3GPP TS 29.122 [14] | Used to indicate an IPv6 address. | RNAA |
| NetSliceId | 3GPP TS 29.435 [31] | Represents the identification information of a network slice. | SliceBasedAPIExposure |
| ProblemDetails | 3GPP TS 29.122 [14] | Used to represent additional information and details on an error response. |  |
| ServiceKpis | Clause 8.2.4.2.13 | Represents information about the service characteristics provided by a service API. | EdgeApp\_2 |
| SupportedFeatures | 3GPP TS 29.571 [19] | Used to negotiate the applicability of optional features defined in table 8.1.6-1. |  |

\* \* \* Next change \* \* \* \*

### 8.1.6 Feature negotiation

The optional features in table 8.1.6-1 are defined for the the CAPIF\_Discover\_Service\_API. General feature negotiation procedures are defined in clause 7.8.

Table 8.1.6-1: Supported Features

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature number** | | **Feature Name** | | **Description** | |
| 1 | | ApiSupportedFeatureQuery | | Indicates the support of the query filter indicating the supported feature(s) of a service API. | |
| 2 | | VendSpecQueryParams | | Indicates the support of vendor specific API discovery query filter parameters. | |
| 3 | | RNAA | | Indicates the support of the RNAA functionality.  This feature enables the following functionalities:  - provisioning the API provider name and the related filtering criteria enhancement.  - provisioning the UE IP address information and the related filtering criteria enhancement. | |
| 4 | | SliceBasedAPIExposure | | Indicates the support of the network slice-based API exposure functionality.  Within this feature, the following enhancements are covered:  - Support service API discovery based on the supported network slice. | |

\* \* \* Next change \* \* \* \*

#### 8.2.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 7.2 also apply to this API.

Table 8.2.4.1-1 specifies the data types defined specifically for the CAPIF\_Publish\_Service\_API service.

Table 8.2.4.1-1: CAPIF\_Publish\_Service\_API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| ApiStatus | Clause 8.2.4.2.12 | Represents the API status. | ApiStatusMonitoring |
| AefLocation | Clause 8.2.4.2.10 | Represents the location information (e.g. civic address, GPS coordinates, data center ID) where the AEF providing the service API is located. |  |
| AefProfile | Clause 8.2.4.2.4 | Represents the AEF profile data. |  |
| CommunicationType | Clause 8.2.4.3.5 | Indicates a communication type of the resource or a custom operation. |  |
| CustomOperation | Clause 8.2.4.2.7 | Represents the description of a custom operation. |  |
| DataFormat | Clause 8.2.4.3.4 | Indicates a data format, e.g., JSON. |  |
| InterfaceDescription | Clause 8.2.4.2.3 | Represents the description of the API interface. |  |
| IpAddrRange | Clause 8.2.4.2.14 | Represents the list of IP address ranges information. |  |
| Operation | Clause 8.2.4.3.7 | Indicates an HTTP method (e.g. PUT). |  |
| Protocol | Clause 8.2.4.3.3 | Indicates a protocol and protocol version used by the API. |  |
| PublishedApiPath | Clause 8.2.4.2.9 | Represents the published API path within the same CAPIF provider domain. |  |
| Resource | Clause 8.2.4.2.6 | Represents the API resource data. |  |
| SecurityMethod | Clause 8.2.4.3.6 | Indicates the security method (e.g. PKI). |  |
| ServiceAPIDescription | Clause 8.2.4.2.2 | Represents the description of a service API as published by the APF. |  |
| ServiceAPIDescriptionPatch | Clause 8.2.4.2.11 | Represents the parameters to request the modification of an APF published API resource. | PatchUpdate |
| ServiceKpis | Clause 8.2.4.2.13 | Represents information about the service characteristics provided by a service API. | EdgeApp\_2 |
| ShareableInformation | Clause 8.2.4.2.8 | Indicates whether the service API and/or the service API category can be shared to the list of CAPIF provider domains. |  |
| Version | Clause 8.2.4.2.5 | Represents the API version information |  |

Table 8.2.4.1-2 specifies data types re-used by the CAPIF\_Publish\_Service\_API service:

Table 8.2.4.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| CivicAddress | 3GPP TS 29.572 [30] | Used to indicate a civic address. |  |
| DateTime | 3GPP TS 29.122 [14] | Used to indicate an expiration timer. |  |
| DurationSec | 3GPP TS 29.122 [14] | Indicates the duration in seconds. |  |
| Fqdn | 3GPP TS 29.571 [19] | Used to indicate a FQDN. |  |
| GeographicArea | 3GPP TS 29.572 [30] | Used to indicate a geographic area. |  |
| Ipv4Addr | 3GPP TS 29.122 [14] | Used to indicate an IPv4 address. |  |
| Ipv6Addr | 3GPP TS 29.122 [14] | Used to indicate an IPv6 address. |  |
| Ipv4AddressRange | 3GPP TS 29.571 [19] | Used to indicate the IPv4 address range. | RNAA |
| Ipv6AddressRange | 3GPP TS 29.571 [19] | Used to indicate the IPv6 address range. | RNAA |
| NetSliceId | 3GPP TS 29.435 [31] | Represents the identification information of a network slice. | NetworkSliceInfo |
| Port | 3GPP TS 29.122 [14] | Used to indicate a port. |  |
| SupportedFeatures | 3GPP TS 29.571 [19] | Used to negotiate the applicability of optional features defined in table 8.2.6-1. | ApiSupportedFeaturePublishing |
| Uinteger | 3GPP TS 29.571 [19] | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible.  Minimum = 0. |  |

\* \* \* Next change \* \* \* \*

##### 8.2.4.2.2 Type: ServiceAPIDescription

Table 8.2.4.2.2-1: Definition of type ServiceAPIDescription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| apiName | string | M | 1 | API name, it is set as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122 [14]. |  |
| apiId | string | O | 0..1 | API identifier assigned by the CCF to the published service API. Shall not be present in the HTTP POST request from the API publishing function to the CCF. Shall be present in the HTTP POST response from the CCF to the API publishing function and in the HTTP GET response from the CCF to the API invoker (discovery API). |  |
| apiStatus | ApiStatus | O | 0..1 | Indicates the API status.  If this attribute is omitted, the Service API is active at all AEF(s) present in the "aefProfiles" attribute. | ApiStatusMonitoring |
| aefProfiles | array(AefProfile) | C | 1..N | AEF profile information, which includes the exposed API details (e.g. protocol). For CAPIF-4/4e interface, API publishing function shall provide this attribute to the CCF in service API publishing. For CAPIF-1/1e interface, the CCF shall provide this attribute to the API Invoker during service API discovery. (NOTE 2) |  |
| description | string | O | 0..1 | Text description of the API. |  |
| supportedFeatures | SupportedFeatures | O | 0..1 | The supported optional features of the CAPIF API.  (NOTE 1) |  |
| shareableInfo | ShareableInformation | O | 0..1 | Represents whether the service API and/or the service API category can be published to other CCFs. |  |
| serviceAPICategory | string | C | 0..1 | The service API category to which the service API belongs to. This attribute is only applicable for CAPIF-6/6e interface.  (NOTE 2) |  |
| ccfId | string | C | 0..1 | CCF identifier which can be contacted further for discovering the details of service API information. This attribute is only applicable for CAPIF-6/6e interface and shall be provided with serviceAPICategory.  (NOTE 2) |  |
| apiSuppFeats | SupportedFeatures | O | 0..1 | Provided by the consumer to indicate the features supported by the service API. | ApiSupportedFeaturePublishing |
| pubApiPath | PublishedApiPath | C | 0..1 | It contains the published API path within the same CAPIF provider domain. it shall be provided by the CCF when publishing the service API to other CCF via the CAPIF-6 reference point. |  |
| apiProvName | string | O | 0..1 | Represents the API provider name. | RNAA |
| netSliceInfo | array(NetSliceId) | O | 1..N | Represents the applicable network slice identifiers. | SliceBasedAPIExposure |
| NOTE 1: For the CAPIF\_Publish\_Service\_API, the "supportedFeatures" attribute shall be provided in the HTTP POST request and in the response of successful resource creation. In addition, the "supportedFeatures" attribute may include one or more of the supported features as defined in clause 8.2.6.  NOTE 2: When this data type is used over the CAPIF-6/6e interface, at least one of the "aefProfiles" attribute or the "serviceAPICategory" attribute (together with the corresponding "ccfId" attribute) shall be present. | | | | | |

\* \* \* Next change \* \* \* \*

### 8.2.6 Feature negotiation

The optional features in table 8.1.6-1 are defined for the the CAPIF\_Publish\_Service\_API. General feature negotiation procedures are defined in clause 7.8.

Table 8.2.6-1: Supported Features

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature number** | | **Feature Name** | | **Description** | |
| 1 | | ApiSupportedFeaturePublishing | | Indicates the support of publishing with supported feature for a service API. | |
| 2 | | PatchUpdate | | Indicates the support of the PATCH method for updating an APF published API resource. | |
| 3 | | ExtendedIntfDesc | | Indicates the support of extended interface descriptions. | |
| 4 | | MultipleCustomOperations | | Indicates the support of modelling multiple custom operations associated with a resource. | |
| 5 | | ProtocDataFormats\_Ext1 | | Indicates the support of additional protocols and data formats with standardized values.  (NOTE) | |
| 6 | | ApiStatusMonitoring | | Indicates the support of the API status monitoring in CAPIF layer as a part of enhancement of SEAL framework.  This feature enables the following functionality:  - support API status information management. | |
| 7 | | EdgeApp\_2 | | This feature indicates the support of the enhancements to the Edge Applications. Within this feature, the following enhancements are covered:  - support of Service KPI. | |
| 8 | | RNAA | | Indicates the support of the RNAA functionality.  This feature enables the following functionality:  - provisioning of the API provider name and the related filtering criteria.  - provisioning of the list of public IP ranges of UEs for service API publish and update enhancements. | |
| 9 | | VendorExt | | Indicates the support for CAPIF vendor specific extensions.  (NOTE) | |
| 10 | | SliceBasedAPIExposure | | Indicates the support of the network slice-based API exposure functionality.  Within this feature, the following enhancements are covered:  - Support the provisioning and management of the applicable network slice(s) for a published API. | |
| NOTE: In this release of the specification, this feature is only applicable for AEFs defined outside 3GPP (e.g. by other SDOs). It does not apply to AEFs defined by 3GPP (e.g. SCEF, NEF). | | | | | |

\* \* \* Next change \* \* \* \*

#### 8.7.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 7.2 also apply to this API.

Table 8.7.4.1-1 specifies the data types defined specifically for the CAPIF\_Logging\_API\_Invocation\_API service.

Table 8.7.4.1-1: CAPIF\_Logging\_API\_Invocation\_API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| DurationMs | Clause 8.7.4.3.2 | Represents the period of time in units of milliseconds. |  |
| InvocationLog | Clause 8.7.4.2.2 | Represents the set of Service API invocation logs to be stored on CAPIF core function. |  |
| Log | Clause 8.7.4.2.3 | Represents the individual service API invocation log entry. |  |

Table 8.7.4.1-2 specifies data types re-used by the CAPIF\_Logging\_API\_Invocation\_API service.

Table 8.7.4.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| DateTime | 3GPP TS 29.122 [14] | Used to indicate the invocation time. |  |
| NetSliceId | 3GPP TS 29.435 [31] | Represents the identification information of a network slice. | NetworkSliceInfo |
| Operation | Clause 8.2.4.3.7 | Used to indicate the HTTP operation |  |
| SupportedFeatures | 3GPP TS 29.571 [19] | Used to negotiate the applicability of optional features defined in table 8.7.6-1. |  |

\* \* \* Next change \* \* \* \*

##### 8.7.4.2.3 Type: Log

Table 8.7.4.2.3-1: Definition of type Log

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| apiId | string | M | 1 | String identifying the API invoked. |  |
| apiName | string | M | 1 | Name of the API which was invoked, it is set as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122 [14]. |  |
| apiVersion | string | M | 1 | Version of the API which was invoked |  |
| resourceName | String | M | 1 | Name of the specific resource invoked |  |
| uri | Uri | O | 0..1 | Full URI of the API resource as defined in clause 5.2.4 of 3GPP TS 29.122 [14]. |  |
| protocol | Protocol | M | 1 | Protocol invoked. |  |
| operation | Operation | C | 0..1 | Operation that was invoked on the API, only applicable for HTTP protocol. |  |
| result | string | M | 1 | For HTTP protocol, it contains HTTP status code of the invocation |  |
| invocationTime | DateTime | O | 0..1 | Date on which it was invoked |  |
| invocationLatency | DurationMs | O | 0..1 | Latency for the API invocation. |  |
| inputParameters | ANY TYPE  (NOTE) | O | 0..1 | List of input parameters |  |
| OutputParameters | ANY TYPE  (NOTE) | O | 0..1 | List of output parameters |  |
| srcInterface | InterfaceDescription | O | 0..1 | Interface description of the API invoker. |  |
| destInterface | InterfaceDescription | O | 0..1 | Interface description of the API invoked. |  |
| fwdInterface | string | O | 0..1 | It includes the node identifier (as defined in IETF RFC 7239 [20] of all forwarding entities between the API invoker and the AEF, concatenated with comma and space, e.g. 192.0.2.43:80, unknown:\_OBFport, 203.0.113.60 |  |
| netSliceInfo | NetSliceId | O | 0..1 | Represents the network slice identifier. | SliceBasedAPIExposure |
| NOTE: Any basic data type defined in OpenAPI Specification [3] may be used. | | | | | |

\* \* \* Next change \* \* \* \*

### 8.7.6 Feature negotiation

Table 8.7.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| **Feature number** | **Feature Name** | **Description** |
| 1 | SliceBasedAPIExposure | Indicates the support of the network slice-based API exposure functionality.  Within this feature, the following enhancements are covered:  - Support the provisioning of the network slice information in the API log. |

\* \* \* Next change \* \* \* \*

###### 8.8.2.2.3.1 GET

This method shall support the URI query parameters specified in table 8.8.2.2.3.1-1.

Table 8.8.2.2.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| aef-id | string | O | 0..1 | String identifying the API exposing function |
| api-invoker-id | string | O | 0..1 | String identifying the API invoker which invoked the service API |
| time-range-start | DateTime | O | 0..1 | Start time of the invocation time range |
| time-range-end | DateTime | O | 0..1 | End time of the invocation time range |
| api-id | string | O | 0..1 | String identifying the API invoked. |
| api-name | string | O | 0..1 | API name, it is set as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122 [14]. |
| api-version | string | O | 0..1 | Version of the API which was invoked |
| protocol | Protocol | O | 0..1 | Protocol invoked |
| operation | Operation | O | 0..1 | Operation that was invoked on the API |
| result | string | O | 0..1 | HTTP status code of the invocation |
| resource-name | string | O | 0..1 | Name of the specific resource invoked |
| src-interface | InterfaceDescription | O | 0..1 | Interface description of the API invoker. |
| dest-interface | InterfaceDescription | O | 0..1 | Interface description of the API invoked. |
| net-slice-info | NetSliceId | O | 0..1 | Represents the network slice information. |
| supported-features | SupportedFeatures | O | 0..1 | To filter irrelevant responses related to unsupported features. |

This method shall support the request data structures specified in table 8.8.2.2.3.1-2 and the response data structures and response codes specified in table 8.8.2.2.3.1-3.

Table 8.8.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 8.8.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| InvocationLogsRetrieveRes | O | 0..1 | 200 OK | Result of the query operation along with fetched service API invocation log data. |
| n/a |  |  | 307 Temporary Redirect | Temporary redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CAPIF core function.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [14]. |
| n/a |  |  | 308 Permanent Redirect | Permanent redirection, during resource retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CAPIF core function.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [14]. |
| ProblemDetails | O | 0..1 | 414 URI Too Long | Indicates that the server is refusing to service the request because the request-target is too long. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [14] also apply. | | | | |

Table 8.8.2.2.3.1-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CAPIF core function. |

Table 8.8.2.2.3.1-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CAPIF core function. |

\* \* \* Next change \* \* \* \*

#### 8.8.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 7.2 also apply to this API.

Table 8.8.4.1-1 specifies the data types defined specifically for the CAPIF\_Auditing\_API service.

Table 8.8.4.1-1: CAPIF\_Auditing\_API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| InvocationLogs | 8.8.4.2.2 | Contains multiple invocation logs. | EnQueryInvokeLog |
| InvocationLogsRetrieveRes | 8.8.4.2.3 | Contains the result of an invocation logs retrieval request. |  |

Table 8.8.4.1-2 specifies data types re-used by the CAPIF\_Auditing\_API service:

Table 8.8.4.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| DateTime | 3GPP TS 29.122 [14] | Used to indicate the start and end times. |  |
| InvocationLog | Clause 8.7.4.2.2 | Used to represent logs of service API invocations stored on the CAPIF core function. |  |
| NetSliceId | 3GPP TS 29.435 [31] | Represents the identification information of a network slice. | NetworkSliceInfo |
| Operation | Clause 8.2.4.3.7 | Used to indicate the HTTP operation. |  |
| ProblemDetails | 3GPP TS 29.122 [14] | Used to represent the problem details in an error message. |  |
| SupportedFeatures | 3GPP TS 29.571 [19] | Used to negotiate the applicability of optional features defined in table 8.8.6-1. |  |

\* \* \* Next change \* \* \* \*

### 8.8.6 Feature negotiation

General feature negotiation procedures are defined in clause 7.8.

Table 8.8.6-1: Supported Features

|  |  |  |
| --- | --- | --- |
| **Feature number** | **Feature Name** | **Description** |
| 1 | EnQueryInvokeLog | This feature indicates support for the enhancements of query invocation log. |
| 2 | SliceBasedAPIExposure | Indicates the support of the network slice-based API exposure functionality.  Within this feature, the following enhancements are covered:  - Support the filtering based on the network slice information. |

\* \* \* Next change \* \* \* \*

# A.2 CAPIF\_Discover\_Service\_API

openapi: 3.0.0

info:

title: CAPIF\_Discover\_Service\_API

description: |

API for discovering service APIs.

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version: "1.3.0"

externalDocs:

description: 3GPP TS 29.222 V18.6.0 Common API Framework for 3GPP Northbound APIs

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.222/

servers:

- url: '{apiRoot}/service-apis/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 7.5 of 3GPP TS 29.222.

paths:

/allServiceAPIs:

get:

description: >

Discover published service APIs and retrieve a collection of APIs according

to certain filter criteria.

parameters:

- name: api-invoker-id

in: query

description: >

String identifying the API invoker assigned by the CAPIF core function.

It also represents the CCF identifier in the CAPIF-6/6e interface.

required: true

schema:

type: string

- name: api-name

in: query

description: >

API name, it is set as {apiName} part of the URI structure as defined

in clause 5.2.4 of 3GPP TS 29.122.

schema:

type: string

- name: api-version

in: query

description: API major version the URI (e.g. v1).

schema:

type: string

- name: comm-type

in: query

description: Communication type used by the API (e.g. REQUEST\_RESPONSE).

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/CommunicationType'

- name: protocol

in: query

description: Protocol used by the API.

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/Protocol'

- name: aef-id

in: query

description: AEF identifer.

schema:

type: string

- name: data-format

in: query

description: Data formats used by the API (e.g. serialization protocol JSON used).

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/DataFormat'

- name: api-cat

in: query

description: The service API category to which the service API belongs to.

schema:

type: string

- name: preferred-aef-loc

in: query

description: The preferred AEF location.

content:

application/json:

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/AefLocation'

- name: req-api-prov-name

in: query

description: Represents the required API provider name.

schema:

type: string

- name: supported-features

in: query

description: Features supported by the NF consumer for the CAPIF Discover Service API.

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

- name: api-supported-features

in: query

description: >

Features supported by the discovered service API indicated by api-name parameter.

This may only be present if api-name query parameter is present.

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

- name: ue-ip-addr

in: query

description: Represents the UE IP address information.

schema:

$ref: '#/components/schemas/IpAddrInfo'

- name: service-kpis

in: query

description: >

Contains information about service characteristics provided by the targeted

service API(s).

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/ServiceKpis'

- name: net-slice-info

in: query

description: Represents the network slice information.

schema:

$ref: 'TS29435\_NSCE\_PolicyManagement.yaml#/components/schemas/NetSliceId'

responses:

'200':

description: >

The response body contains the result of the search over the list of registered APIs.

content:

application/json:

schema:

$ref: '#/components/schemas/DiscoveredAPIs'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'414':

$ref: 'TS29122\_CommonData.yaml#/components/responses/414'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

schemas:

DiscoveredAPIs:

type: object

description: >

Represents a list of APIs currently registered in the CAPIF core function

and satisfying a number of filter criteria provided by the API consumer.

properties:

serviceAPIDescriptions:

type: array

items:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/ServiceAPIDescription'

minItems: 1

description: >

Description of the service API as published by the service. Each service

API information shall include AEF profiles matching the filter criteria.

IpAddrInfo:

type: object

description: Represents the UE IP address information.

properties:

ipv4Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipv6Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

oneOf:

- required: [ipv4Addr]

- required: [ipv6Addr]

\* \* \* Next change \* \* \* \*

# A.3 CAPIF\_Publish\_Service\_API

openapi: 3.0.0

info:

title: CAPIF\_Publish\_Service\_API

description: |

API for publishing service APIs.

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version: "1.3.0"

externalDocs:

description: 3GPP TS 29.222 V18.6.0 Common API Framework for 3GPP Northbound APIs

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.222/

servers:

- url: '{apiRoot}/published-apis/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 7.5 of 3GPP TS 29.222.

paths:

# APF published API

/{apfId}/service-apis:

post:

description: Publish a new API.

parameters:

- name: apfId

in: path

required: true

schema:

type: string

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceAPIDescription'

responses:

'201':

description: >

Service API published successfully The URI of the created resource

shall be returned in the "Location" HTTP header.

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceAPIDescription'

headers:

Location:

description: >

Contains the URI of the newly created resource, according to the structure

{apiRoot}/published-apis/v1/{apfId}/service-apis/{serviceApiId}

required: true

schema:

type: string

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

get:

description: Retrieve all published APIs.

parameters:

- name: apfId

in: path

required: true

schema:

type: string

responses:

'200':

description: Definition of all service API(s) published by the API publishing function.

content:

application/json:

schema:

type: array

items:

$ref: '#/components/schemas/ServiceAPIDescription'

minItems: 0

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

# Individual APF published API

/{apfId}/service-apis/{serviceApiId}:

get:

description: Retrieve a published service API.

parameters:

- name: serviceApiId

in: path

required: true

schema:

type: string

- name: apfId

in: path

required: true

schema:

type: string

responses:

'200':

description: >

Definition of individual service API published by the API publishing function.

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceAPIDescription'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

put:

description: Update a published service API.

parameters:

- name: serviceApiId

in: path

required: true

schema:

type: string

- name: apfId

in: path

required: true

schema:

type: string

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceAPIDescription'

responses:

'200':

description: Definition of service API updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceAPIDescription'

'204':

description: No Content

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

description: Modify an existing published service API.

operationId: ModifyIndAPFPubAPI

tags:

- Individual APF published API

parameters:

- name: serviceApiId

in: path

required: true

schema:

type: string

- name: apfId

in: path

required: true

schema:

type: string

requestBody:

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/ServiceAPIDescriptionPatch'

responses:

'200':

description: >

The definition of the service API is modified successfully and a

representation of the updated service API is returned in the request body.

content:

application/json:

schema:

$ref: '#/components/schemas/ServiceAPIDescription'

'204':

description: No Content. The definition of the service API is modified successfully.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

description: Unpublish a published service API.

parameters:

- name: serviceApiId

in: path

required: true

schema:

type: string

- name: apfId

in: path

required: true

schema:

type: string

responses:

'204':

description: The individual published service API matching the serviceAPiId is deleted.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

# Components

components:

schemas:

# Data Type for representations

ServiceAPIDescription:

type: object

description: Represents the description of a service API as published by the APF.

properties:

apiName:

type: string

description: >

API name, it is set as {apiName} part of the URI structure as defined in

clause 5.2.4 of 3GPP TS 29.122.

apiId:

type: string

description: >

API identifier assigned by the CAPIF core function to the published service API.

Shall not be present in the HTTP POST request from the API publishing function

to the CAPIF core function. Shall be present in the HTTP POST response from the

CAPIF core function to the API publishing function and in the HTTP GET response

from the CAPIF core function to the API invoker (discovery API).

apiStatus:

$ref: '#/components/schemas/ApiStatus'

aefProfiles:

type: array

items:

$ref: '#/components/schemas/AefProfile'

minItems: 1

description: >

AEF profile information, which includes the exposed API details (e.g. protocol).

description:

type: string

description: Text description of the API

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

shareableInfo:

$ref: '#/components/schemas/ShareableInformation'

serviceAPICategory:

type: string

description: The service API category to which the service API belongs to.

apiSuppFeats:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

pubApiPath:

$ref: '#/components/schemas/PublishedApiPath'

ccfId:

type: string

description: CAPIF core function identifier.

apiProvName:

type: string

description: Represents the API provider name.

netSliceInfo:

type: array

items:

$ref: 'TS29435\_NSCE\_PolicyManagement.yaml#/components/schemas/NetSliceId'

minItems: 1

description: Represents the applicable network slice identifiers.

required:

- apiName

InterfaceDescription:

type: object

description: Represents the description of an API's interface.

properties:

ipv4Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv4Addr'

ipv6Addr:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Ipv6Addr'

fqdn:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Fqdn'

port:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Port'

apiPrefix:

type: string

description: >

A string representing a sequence of path segments that starts with the slash character.

securityMethods:

type: array

items:

$ref: '#/components/schemas/SecurityMethod'

minItems: 1

description: >

Security methods supported by the interface, it take precedence over

the security methods provided in AefProfile, for this specific interface.

oneOf:

- required: [ipv4Addr]

- required: [ipv6Addr]

- required: [fqdn]

AefProfile:

type: object

description: Represents the AEF profile data.

properties:

aefId:

type: string

description: Identifier of the API exposing function

versions:

type: array

items:

$ref: '#/components/schemas/Version'

minItems: 1

description: API version

protocol:

$ref: '#/components/schemas/Protocol'

dataFormat:

$ref: '#/components/schemas/DataFormat'

securityMethods:

type: array

items:

$ref: '#/components/schemas/SecurityMethod'

minItems: 1

description: Security methods supported by the AEF

domainName:

type: string

description: Domain to which API belongs to

interfaceDescriptions:

type: array

items:

$ref: '#/components/schemas/InterfaceDescription'

minItems: 1

description: Interface details

aefLocation:

$ref: '#/components/schemas/AefLocation'

serviceKpis:

$ref: '#/components/schemas/ServiceKpis'

ueIpRange:

$ref: '#/components/schemas/IpAddrRange'

required:

- aefId

- versions

oneOf:

- required: [domainName]

- required: [interfaceDescriptions]

Resource:

type: object

description: Represents the API resource data.

properties:

resourceName:

type: string

description: Resource name

commType:

$ref: '#/components/schemas/CommunicationType'

uri:

type: string

description: >

Relative URI of the API resource, it is set as {apiSpecificSuffixes} part

of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122.

custOpName:

type: string

description: >

it is set as {custOpName} part of the URI structure for a custom operation

associated with a resource as defined in clause 5.2.4 of 3GPP TS 29.122.

custOperations:

type: array

items:

$ref: '#/components/schemas/CustomOperation'

minItems: 1

description: >

Custom operations associated with this resource.

operations:

type: array

items:

$ref: '#/components/schemas/Operation'

minItems: 1

description: >

Supported HTTP methods for the API resource. Only applicable when the

protocol in AefProfile indicates HTTP.

description:

type: string

description: Text description of the API resource

required:

- resourceName

- commType

- uri

CustomOperation:

type: object

description: Represents the description of a custom operation.

properties:

commType:

$ref: '#/components/schemas/CommunicationType'

custOpName:

type: string

description: >

it is set as {custOpName} part of the URI structure for a custom operation

without resource association as defined in clause 5.2.4 of 3GPP TS 29.122.

operations:

type: array

items:

$ref: '#/components/schemas/Operation'

minItems: 1

description: >

Supported HTTP methods for the API resource. Only applicable when the

protocol in AefProfile indicates HTTP.

description:

type: string

description: Text description of the custom operation

required:

- commType

- custOpName

Version:

type: object

description: Represents the API version information.

properties:

apiVersion:

type: string

description: API major version in URI (e.g. v1)

expiry:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

resources:

type: array

items:

$ref: '#/components/schemas/Resource'

minItems: 1

description: Resources supported by the API.

custOperations:

type: array

items:

$ref: '#/components/schemas/CustomOperation'

minItems: 1

description: Custom operations without resource association.

required:

- apiVersion

ShareableInformation:

type: object

description: >

Indicates whether the service API and/or the service API category can be shared

to the list of CAPIF provider domains.

properties:

isShareable:

type: boolean

description: >

Set to "true" indicates that the service API and/or the service API

category can be shared to the list of CAPIF provider domain information.

Otherwise set to "false".

capifProvDoms:

type: array

items:

type: string

minItems: 1

description: >

List of CAPIF provider domains to which the service API information to be shared.

required:

- isShareable

PublishedApiPath:

type: object

description: Represents the published API path within the same CAPIF provider domain.

properties:

ccfIds:

type: array

items:

type: string

minItems: 1

description: A list of CCF identifiers where the service API is already published.

AefLocation:

description: >

Represents the location information (e.g. civic address, GPS coordinates, data center ID)

where the AEF providing the service API is located.

type: object

properties:

civicAddr:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/CivicAddress'

geoArea:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

dcId:

type: string

description: >

Identifies the data center where the AEF providing the service API is located.

ServiceAPIDescriptionPatch:

type: object

description: >

Represents the parameters to request the modification of an APF published API resource.

properties:

apiStatus:

$ref: '#/components/schemas/ApiStatus'

aefProfiles:

type: array

items:

$ref: '#/components/schemas/AefProfile'

description: AEF profile information, which includes the exposed API details.

minItems: 1

description:

type: string

description: Text description of the API

shareableInfo:

$ref: '#/components/schemas/ShareableInformation'

serviceAPICategory:

type: string

description: The service API category to which the service API belongs to.

apiSuppFeats:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

pubApiPath:

$ref: '#/components/schemas/PublishedApiPath'

ccfId:

type: string

description: CAPIF core function identifier.

ApiStatus:

type: object

description: >

Represents the API status.

properties:

aefIds:

type: array

items:

type: string

description: >

Indicates the list of AEF ID(s) where the API is active.

If this attribute is omitted, the API is inactive at all AEF(s)

defined in the "aefProfiles" attribute within

the ServiceAPIDescription data structure.

required:

- aefIds

ServiceKpis:

type: object

description: >

Represents information about the service characteristics provided by a service API.

properties:

maxReqRate:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

maxRestime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DurationSec'

availability:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

avalComp:

type: string

pattern: '^\d+(\.\d+)? (kFLOPS|MFLOPS|GFLOPS|TFLOPS|PFLOPS|EFLOPS|ZFLOPS)$'

description: >

The maximum compute resource available in FLOPS for the API Invoker.

avalGraComp:

type: string

pattern: '^\d+(\.\d+)? (kFLOPS|MFLOPS|GFLOPS|TFLOPS|PFLOPS|EFLOPS|ZFLOPS)$'

description: >

The maximum graphical compute resource in FLOPS available for the API Invoker.

avalMem:

type: string

pattern: '^\d+(\.\d+)? (KB|MB|GB|TB|PB|EB|ZB|YB)$'

description: >

The maximum memory resource available for the API Invoker.

avalStor:

type: string

pattern: '^\d+(\.\d+)? (KB|MB|GB|TB|PB|EB|ZB|YB)$'

description: >

The maximum storage resource available for the API Invoker.

conBand:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

IpAddrRange:

description: Represents the list of public IP ranges

type: object

properties:

ueIpv4AddrRanges:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4AddressRange'

description: Represents the IPv4 Address ranges of the UE(s).

minItems: 1

ueIpv6AddrRanges:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6AddressRange'

description: Represents the Ipv6 Address ranges of the UE(s).

minItems: 1

anyOf:

- required: [ueIpv4AddrRanges]

- required: [ueIpv6AddrRanges]

Protocol:

anyOf:

- type: string

enum:

- HTTP\_1\_1

- HTTP\_2

- MQTT

- WEBSOCKET

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Indicates a protocol and protocol version used by the API.

Possible values are:

- HTTP\_1\_1: Indicates that the protocol is HTTP version 1.1.

- HTTP\_2: Indicates that the protocol is HTTP version 2.

- MQTT: Indicates that the protocol is Message Queuing Telemetry Transport.

- WEBSOCKET: Indicates that the protocol is Websocket.

CommunicationType:

anyOf:

- type: string

enum:

- REQUEST\_RESPONSE

- SUBSCRIBE\_NOTIFY

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Indicates a communication type of the resource or the custom operation.

Possible values are:

- REQUEST\_RESPONSE: The communication is of the type request-response.

- SUBSCRIBE\_NOTIFY: The communication is of the type subscribe-notify.

DataFormat:

anyOf:

- type: string

enum:

- JSON

- XML

- PROTOBUF3

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Indicates a data format.

Possible values are:

- JSON: Indicates that the data format is JSON.

- XML: Indicates that the data format is Extensible Markup Language.

- PROTOBUF3: Indicates that the data format is Protocol buffers version 3.

SecurityMethod:

anyOf:

- type: string

enum:

- PSK

- PKI

- OAUTH

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Indicates the security method.

Possible values are:

- PSK: Security method 1 (Using TLS-PSK) as described in 3GPP TS 33.122.

- PKI: Security method 2 (Using PKI) as described in 3GPP TS 33.122.

- OAUTH: Security method 3 (TLS with OAuth token) as described in 3GPP TS 33.122.

Operation:

anyOf:

- type: string

enum:

- GET

- POST

- PUT

- PATCH

- DELETE

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Indicates an HTTP method.

Possible values are:

- GET: HTTP GET method.

- POST: HTTP POST method.

- PUT: HTTP PUT method.

- PATCH: HTTP PATCH method.

- DELETE: HTTP DELETE method.

\* \* \* Next change \* \* \* \*

# A.8 CAPIF\_Logging\_API\_Invocation\_API

openapi: 3.0.0

info:

title: CAPIF\_Logging\_API\_Invocation\_API

description: |

API for invocation logs.

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version: "1.3.0"

externalDocs:

description: 3GPP TS 29.222 V18.6.0 Common API Framework for 3GPP Northbound APIs

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.222/

servers:

- url: '{apiRoot}/api-invocation-logs/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 7.5 of 3GPP TS 29.222

paths:

/{aefId}/logs:

post:

description: Creates a new log entry for service API invocations.

parameters:

- name: aefId

in: path

description: Identifier of the API exposing function

required: true

schema:

type: string

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/InvocationLog'

responses:

'201':

description: >

Log of service API invocations provided by API exposing function successfully

stored on the CAPIF core function.

content:

application/json:

schema:

$ref: '#/components/schemas/InvocationLog'

headers:

Location:

description: >

Contains the URI of the newly created resource, according to the structure

{apiRoot}/api-invocation-logs/v1/{aefId}/logs/{logId}

required: true

schema:

type: string

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{aefId}/logs/{logId}:

description: Creates a new log entry for service API invocations.

parameters:

- name: aefId

in: path

description: Identifier of the API exposing function

required: true

schema:

type: string

- name: logId

in: path

description: Identifier of individual log entry

required: true

schema:

type: string

components:

schemas:

InvocationLog:

type: object

description: >

Represents a set of Service API invocation logs to be stored in a CAPIF core function.

properties:

aefId:

type: string

description: >

Identity information of the API exposing function requesting logging of

service API invocations

apiInvokerId:

type: string

description: Identity of the API invoker which invoked the service API

logs:

type: array

items:

$ref: '#/components/schemas/Log'

minItems: 1

description: Service API invocation log

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- aefId

- apiInvokerId

- logs

Log:

type: object

description: Represents an individual service API invocation log entry.

properties:

apiId:

type: string

description: String identifying the API invoked.

apiName:

type: string

description: >

Name of the API which was invoked, it is set as {apiName} part of the URI

structure as defined in clause 5.2.4 of 3GPP TS 29.122.

apiVersion:

type: string

description: Version of the API which was invoked

resourceName:

type: string

description: Name of the specific resource invoked

uri:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

protocol:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/Protocol'

operation:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/Operation'

result:

type: string

description: For HTTP protocol, it contains HTTP status code of the invocation

invocationTime:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

invocationLatency:

$ref: '#/components/schemas/DurationMs'

inputParameters:

description: >

List of input parameters. Can be any value - string, number, boolean, array or object.

outputParameters:

description: >

List of output parameters. Can be any value - string, number, boolean, array or object.

srcInterface:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/InterfaceDescription'

destInterface:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/InterfaceDescription'

fwdInterface:

type: string

description: >

It includes the node identifier (as defined in IETF RFC 7239 of all forwarding

entities between the API invoker and the AEF, concatenated with comma and space,

e.g. 192.0.2.43:80, unknown:\_OBFport, 203.0.113.60

netSliceInfo:

$ref: 'TS29435\_NSCE\_PolicyManagement.yaml#/components/schemas/NetSliceId'

required:

- apiId

- apiName

- apiVersion

- resourceName

- protocol

- result

DurationMs:

type: integer

description: Represents a period of time in units of milliseconds.

minimum: 0

\* \* \* Next change \* \* \* \*

# A.9 CAPIF\_Auditing\_API

openapi: 3.0.0

info:

title: CAPIF\_Auditing\_API

description: |

API for auditing.

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version: "1.3.0"

externalDocs:

description: 3GPP TS 29.222 V18.6.0 Common API Framework for 3GPP Northbound APIs

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.222/

servers:

- url: '{apiRoot}/logs/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 7.5 of 3GPP TS 29.222.

paths:

/apiInvocationLogs:

get:

description: Query and retrieve service API invocation logs stored on the CAPIF core function.

parameters:

- name: aef-id

in: query

description: String identifying the API exposing function.

schema:

type: string

- name: api-invoker-id

in: query

description: String identifying the API invoker which invoked the service API.

schema:

type: string

- name: time-range-start

in: query

description: Start time of the invocation time range.

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

- name: time-range-end

in: query

description: End time of the invocation time range.

schema:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

- name: api-id

in: query

description: String identifying the API invoked.

schema:

type: string

- name: api-name

in: query

description: >

API name, it is set as {apiName} part of the URI structure as defined in

clause 5.2.4 of 3GPP TS 29.122.

schema:

type: string

- name: api-version

in: query

description: Version of the API which was invoked.

schema:

type: string

- name: protocol

in: query

description: Protocol invoked.

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/Protocol'

- name: operation

in: query

description: Operation that was invoked on the API.

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/Operation'

- name: result

in: query

description: Result or output of the invocation.

schema:

type: string

- name: resource-name

in: query

description: Name of the specific resource invoked.

schema:

type: string

- name: src-interface

in: query

description: Interface description of the API invoker.

content:

application/json:

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/InterfaceDescription'

- name: dest-interface

in: query

description: Interface description of the API invoked.

content:

application/json:

schema:

$ref: 'TS29222\_CAPIF\_Publish\_Service\_API.yaml#/components/schemas/InterfaceDescription'

- name: net-slice-info

in: query

description: Represents the network slice information.

schema:

$ref: 'TS29435\_NSCE\_PolicyManagement.yaml#/components/schemas/NetSliceId'

- name: supported-features

in: query

description: To filter irrelevant responses related to unsupported features

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

responses:

'200':

description: >

Result of the query operation along with fetched service API invocation log data.

content:

application/json:

schema:

$ref: '#/components/schemas/InvocationLogsRetrieveRes'

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'414':

$ref: 'TS29122\_CommonData.yaml#/components/responses/414'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

schemas:

InvocationLogs:

type: object

description: >

Represents several (more than one) invocation logs.

properties:

multipleInvocationLogs:

type: array

items:

$ref: 'TS29222\_CAPIF\_Logging\_API\_Invocation\_API.yaml#/components/schemas/InvocationLog'

minItems: 1

supportedFeatures:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

required:

- multipleInvocationLogs

InvocationLogsRetrieveRes:

description: >

Represents the result of an invocation logs retrieval request.

oneOf:

- $ref: 'TS29222\_CAPIF\_Logging\_API\_Invocation\_API.yaml#/components/schemas/InvocationLog'

- $ref: '#/components/schemas/InvocationLogs'

\* \* \* End of changes \* \* \* \*