**3GPP TSG-CT WG3 Meeting #142 *C3-253229***

**Goteborg, SE, 25 - 29 August 2025**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **0394** | **rev** | **1** | **Current version:** |  |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | EN resolution on Resources and Service operation provisioning |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | CAPIF\_Ph3 |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** |  |
|  | *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 canbe 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:*** | This CR is resolving ENs related to the Resources and Service Operations encoding in API discovery and API publishing CAPIF functionality.It is proposed to provide the following mapping:* Service API operation is represented as HTTP method supported at REST resource;
* API resource is mapped to the REST resource and provided in Service API operation description.

In CAPIF\_Publish\_Service\_API, it is proposed to provision the resources and service operations via representation of the services operations, i.e., the description of service operations conains the list of HTTP methods and related resource; thus, it is sufficient for provisioning of the available API resources. |
|  |  |
| ***Summary of change:*** | This CR resolving the ENs related to the Resources and Service Operations encoding in API discovery and API publishing CAPIF functionality. |
|  |  |
| ***Consequences if not approved:*** | The definition of the CAPIF\_Ph3 functionality cannot be completed in the stage 3. |
|  |  |
| ***Clauses affected:*** | 8.1.2.2.3.1, 8.1.4.1, 8.1.4.2.5 (new), 8.2.4.2.2, 8.2.6, A.2 |
|  |  |
|  | **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 backward compatible feature for the following APIs:* TS29222\_CAPIF\_Discover\_Service\_API.yaml
 |
| ***()*** |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\* \* \* First 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 |
| 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 | array(NetSliceId) | O | 1..N | Contains the identifier(s) of the network slice(s) within which the API shall be available. | SliceBasedAPIExposure |
| grant-types | array(OAuthGrantType) | O | 1..N | Contains the OAuth grant types that need to be supported.This query parameter may be present only in case of RNAA, as defined in clause 6.5.3 of TS 33.122 [16]. Otherwise, it is not applicable and shall not be present. | RNAA |
| api-ids | array(string) | C | 1..N | Contains the identifier(s) of the targeted service APIs.(NOTE 3) | MultiStepDiscovery |
| supported-features | SupportedFeatures | O | 0..1 | Contains the list of supported features among the ones defined in clause 8.1.6.This attribute shall be present only when feature negotiation needs to take place. |  |
| resources-operations | array(ResOperInfo) | O | 1..N | Contains the list of supported API resource(s) and service operation(s).This query parameter may only be present if the "api-name" query parameter is present. | CAPIF\_Ext1 |
|  |  |  |  |  |  |
| 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.NOTE 3: When the "MultiStepDiscovery" feature is supported and this query parameter is present, then all the other query parameters in this table shall be absent except the "supported-features" and "api-invoker-id" query parameters. |

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 | Responsecodes | 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 |
| ResOperInfo | Clause 8.1.4.2.5 | Represents the resourse and/or service operation. | CAPIF\_Ext1 |

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 |
| OAuthGrantType | Clause 8.5.4.3.4 | Represents the OAuth grant type. | RNAA |
| Operation | Clause 8.2.4.3.7 | Indicates an HTTP method. | CAPIF\_Ext1 |
| 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] | Represents the list of supported feature(s) and used to negotiate the applicability of the optional features. |  |

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

##### 8.1.4.2.5 Type: ResOperInfo

Table 8.1.4.2.5-1: Definition of type ResOperInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| resource | Uri | C | 0..1 | Represents the resource in the form of the resource relative URI path after the API URI as defined in clause 5.2.4 of 3GPP TS 29.122 [14].This attribute shall not be present for custom operations without associated resource, i.e., custom operations defined directly on the API URI. |  |
| operations | array(Operation) | O | 1..N | Represents the API service operation (i.e., HTTP method) supported on the resource provided within the "path" attribute.This attribute may be present only if the "resource" attribute is also present. |  |
| customServOpers | array(string) | O | 1..N | Represents the custom service operation name supported either on the resource provided within the "path" attribute or on the API URI. |  |

\* \* \* 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 | Contains the API name set to the value of the "<apiName>" placeholder of the API URI 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 (i.e., the list of AEF ID(s) where the API is active).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.(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.- provisioning of the supported OAuth grant type(s) during the API publishing. |
| 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 \* \* \* \*

# 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: "1.4.0-alpha.2"

externalDocs:

 description: 3GPP TS 29.222 V19.2.0 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: 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.

 content:

 application/json:

 schema:

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

 - name: service-kpis

 in: query

 description: >

 Contains iInformation about service characteristics provided by the targeted

 service API(s).

 content:

 application/json:

 schema:

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

 - name: net-slice-info

 in: query

 description: >

 Contains the identifier(s) of the network slice(s) within which the API

 shall be available.

 content:

 application/json:

 schema:

 type: array

 items:

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

 minItems: 1

 - name: grant-types

 in: query

 description: Contains the OAuth grant types that need to be supported.

 required: false

 content:

 application/json:

 schema:

 type: array

 items:

 $ref: 'TS29222\_CAPIF\_Security\_API.yaml#/components/schemas/OAuthGrantType'

 minItems: 1

 - name: api-ids

 in: query

 description: >

 Contains the identifier(s) of the targeted service APIs.

 When this query parameter is present, then all the other query parameters shall be

 absent except the supported-features and api-invoker-id query parameters.

 required: false

 style: form

 explode: false

 schema:

 type: array

 items:

 type: string

 minItems: 1

 - name: resources-operations

 in: query

 description: >

 Contains the list of supported API resource(s) and service operation(s).

 required: false

 style: form

 explode: false

 schema:

 type: array

 items:

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

 minItems: 1

 - 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'

 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.

 suppFeat:

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

 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]

 ResOperInfo:

 type: object

 description: >

 Represents the resourse and/or service operation.

 properties:

 resource:

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

 operations:

 type: array

 items:

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

 minItems: 1

 customServOpers:

 type: array

 items:

 type: string

 minItems: 1

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