



CAPIF

Common API framework

Service Registry & Service Discovery

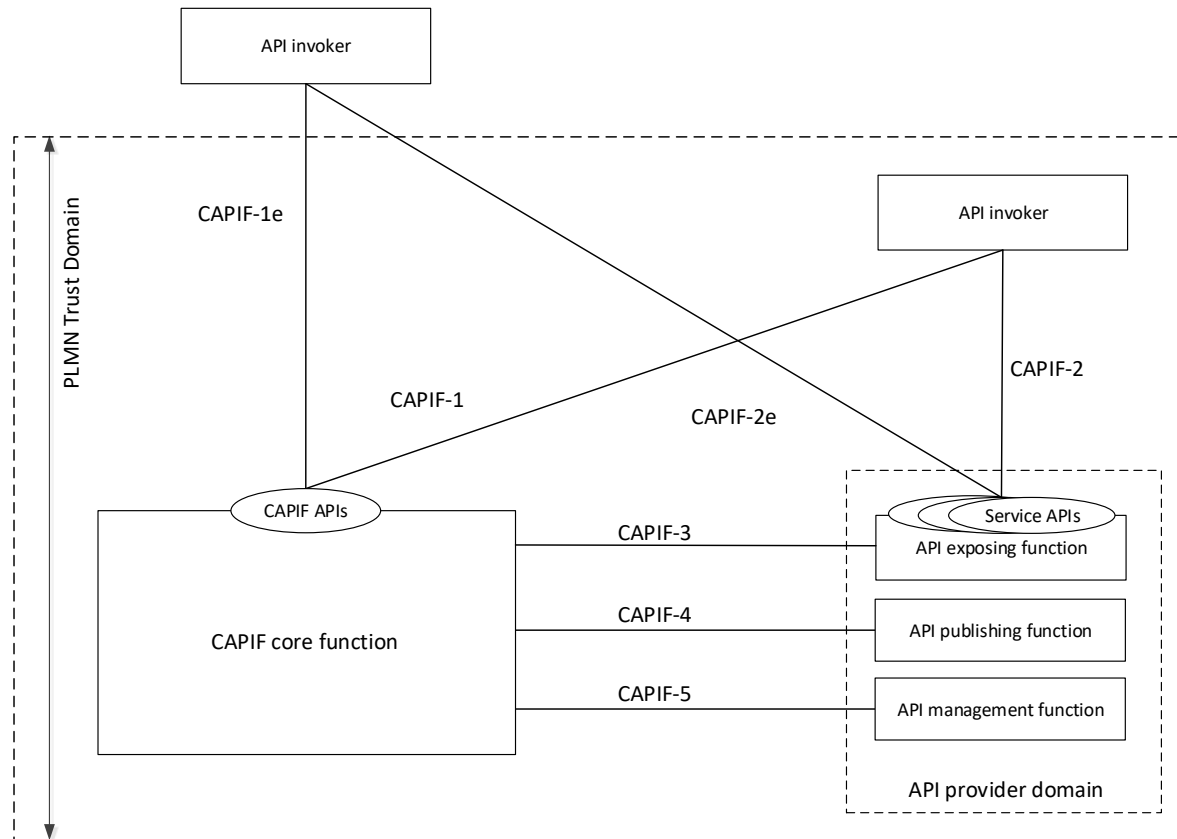
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Demo to OSC RSAC (2023-05-17)

CAPIF

- Common API framework
- Developed by 3GPP to enable a unified Northbound API framework across 3GPP network functions, and to ensure that there is a single and harmonized approach for API development.
- Key features:
 - Onboarding/offboarding API invoker
 - Discovery APIs
 - Register/deregister APIs
 - CAPIF events subscription/notification
 - Entity authentication/authorization
 - Support for 3rd party domains i.e., allow 3rd party API providers to leverage the CAPIF framework
 - Support interconnection between two CAPIF providers

CAPIF Functional entities

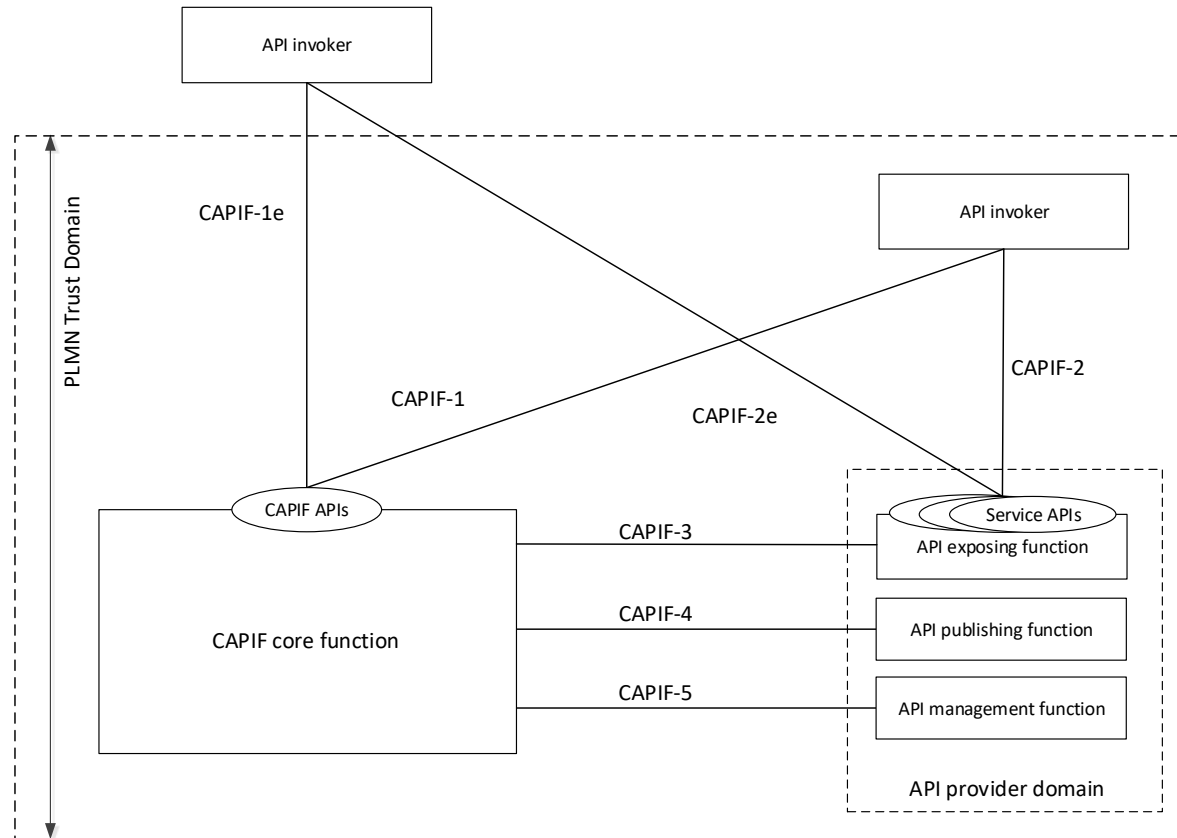


CAPIF core function

The CAPIF core function consists of the following capabilities:

- Authenticating the API invoker based on the identity and other information required for authentication of the API invoker;
- Supporting mutual authentication with the API invoker;
- Providing authorization for the API invoker prior to accessing the service API;
- Publishing, storing and supporting the discovery of service APIs information;
- Monitoring the service API invocations;
- Onboarding a new API invoker and offboarding an API invoker;
- Supports publishing, discovery of service APIs information with another CAPIF core function in CAPIF interconnection.

CAPIF Functional entities



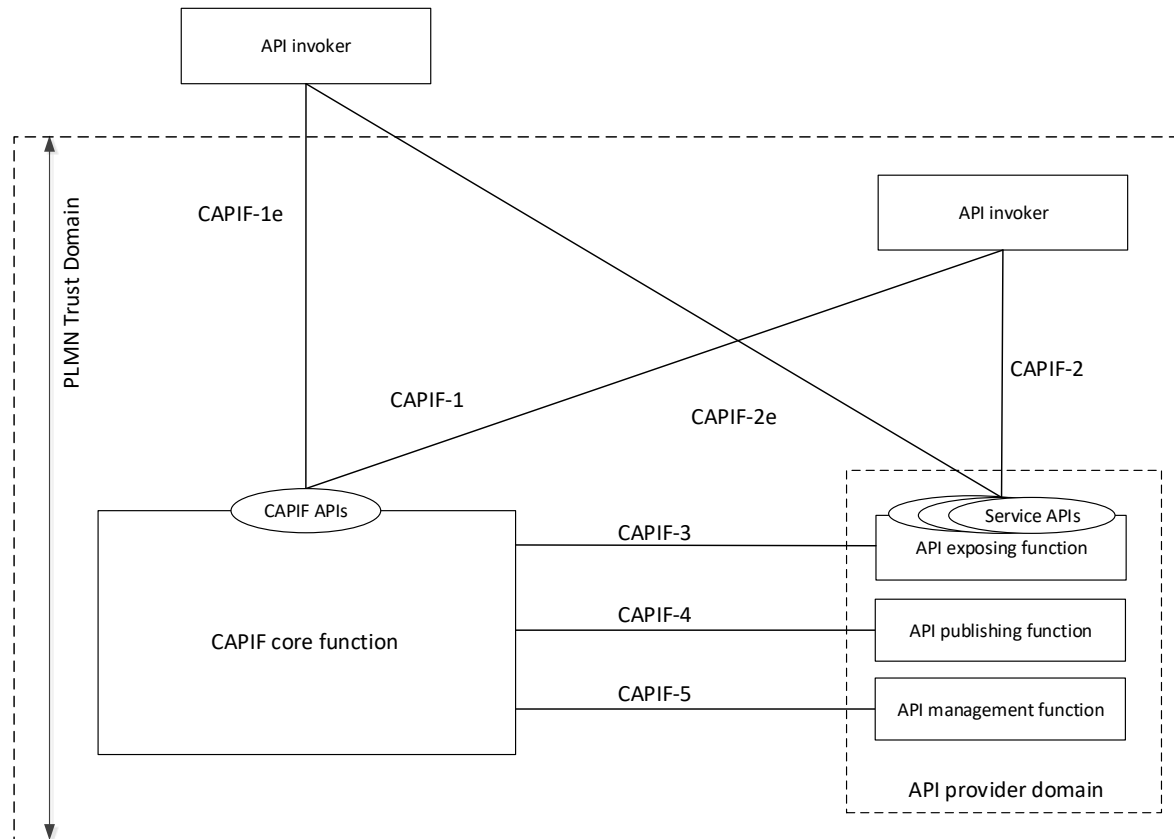
API invoker

The API invoker is the entity which invokes the CAPIF or service APIs, typically provided by a 3rd party application provider who has service agreement with PLMN operator.

The API invoker supports the following capabilities:

- Triggering API invoker onboarding/offboarding;
- Supporting the authentication by providing the API invoker identity and other information required for authentication of the API invoker;
- Supporting mutual authentication with CAPIF;
- Obtaining the authorization prior to accessing the service API;
- Discovering service APIs information; and
- Invoking the service APIs.

CAPIF Functional entities



API provider domain

API exposing function: The entity which provides the service communication entry point for the service APIs. Provides access control, logging, charging, provides authentication and authorization support.

API publishing function: The entity that enables the API provider to publish the Service APIs information in order to enable the discovery of APIs by the API invoker.

API management function: The entity which registers and maintains registration information of the API provider domain functions on the CAPIF core function

Service Name	Service Operations	Operation Semantics	Consumer(s)
CAPIF_Discover_Service_API	Discover_Service_API	GET /allServiceAPIs	API Invoker, CAPIF core function
	Event operations (NOTE)	(NOTE)	API Invoker
CAPIF_Publish_Service_API	Publish_Service_API	POST /{apfId}/service-apis	API Publishing Function, CAPIF core function
	Unpublish_Service_API	DELETE /{apfId}/service-apis/{serviceApId}	API Publishing Function, CAPIF core function
	Update_Service_API	PUT /{apfId}/service-apis/{serviceApId}	API Publishing Function, CAPIF core function
	Get_Service_API	GET /{apfId}/service-apis	API Publishing Function, CAPIF core function
CAPIF_Events_API	Subscribe_Event	Subscribe/Notify	API Invoker, API Publishing Function, API Management Function, API Exposing Function
	Notify_Event	Subscribe/Notify	API Invoker, API Publishing Function, API Management Function, API Exposing Function
	Unsubscribe_Event	Subscribe/Notify	API Invoker, API Publishing Function, API Management Function, API Exposing Function
CAPIF_API_Invoker_Management_API	Onboard_API_Invoker	POST /onboardedInvokers	API Invoker
	Offboard_API_Invoker	DELETE /onboardedInvokers/{onboardingId}	API Invoker
	Notify_Onboarding_Completion	Subscribe/Notify	API Invoker
	Update_API_Invoker_Details	PUT /onboardedInvokers/{onboardingId}	API Invoker
	Notify_Update_Completion	Subscribe/Notify	API Invoker
CAPIF_Security_API	Obtain_Security_Method	PUT /trustedInvokers/{apiInvokerId}	API Invoker
	Obtain_Authorization	POST /securities/{securityId}/token	API Invoker
	Obtain_API_Invoker_Info	GET /trustedInvokers/{apiInvokerId}	API exposing function
	Revoke_Authorization	DELETE /trustedInvokers/{apiInvokerId}	API exposing function
CAPIF_Monitoring_API	Event operations (NOTE)	(NOTE)	API Management Function
CAPIF_Logging_API_Invocation_API	Log_API_Invocation	Request/ Response	API exposing function
CAPIF_Auditing_API	Query_API_Invocation_Log	Request/ Response	API management function
CAPIF_Access_Control_Policy_API	Obtain_Access_Control_Policy	Request/Response	API Exposing Function
CAPIF_API_Provider_Management_API	Register_API_Provider	POST /registrations	API Management Function
	Update_API_Provider	PUT /registrations/{registrationId}	API Management Function
	Deregister_API_Provider	DELETE /registrations/{registrationId}	API Management Function
CAPIF_Routing_Info_API	Obtain_Routing_Info	Request/Response	API exposing function

Provider – new API Provider domain

POST /registrations

Registers a new API Provider domain with API provider domain functions profiles.

Parameters

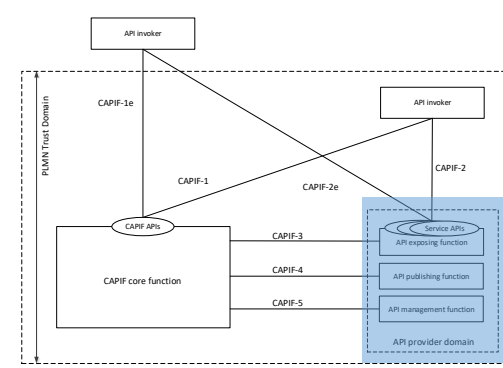
No parameters

Request body required

Example Value | [Schema](#)

APIProviderEnrolmentDetails ▾

```
{
  description: Represents an API provider domain's enrolment details.
  apiProvDomInfo > [...]
  apiProvFuncs > [...]
  failReason > [...]
  regSec* > [...]
  suppFeat > {...}
}
```



```
{
  "apiProvDomInfo": "Provider domain",
  "apiProvFuncs": [
    {
      "apiProvFuncInfo": "rApp as APF",
      "apiProvFuncRole": "APF",
      "regInfo": {
        "apiProvPubKey": "APF-PublicKey"
      }
    },
    {
      "apiProvFuncInfo": "rApp as AEF",
      "apiProvFuncRole": "AEF",
      "regInfo": {
        "apiProvPubKey": "AEF-PublicKey"
      }
    },
    {
      "apiProvFuncInfo": "rApp as AMF",
      "apiProvFuncRole": "AMF",
      "regInfo": {
        "apiProvPubKey": "AMF-PublicKey"
      }
    },
    {
      "apiProvFuncInfo": "Gateway as endpoint AEF",
      "apiProvFuncRole": "AEF",
      "regInfo": {
        "apiProvPubKey": "AEF-Gateway-PublicKey"
      }
    }
  ],
  "regSec": "PSK"
}
```

Publisher – new API

POST `/{apfId}/service-apis`

Publish a new API.

Parameters

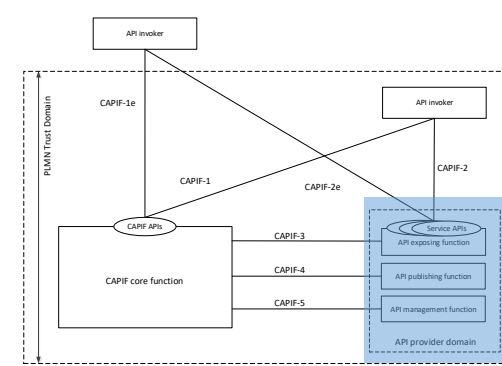
Name	Description
apfld * required string (path)	<input type="text" value="apfld"/>

Request body required

Example Value | Schema

```
ServiceAPIDescription {
  description: Represents the description of a service API as published by the APF.
  aefProfiles > [...]
  apiId > [...]
  apiName* > [...]
  apiSuppFeats > {...}
  ccId > [...]
  description > [...]
  pubApiPath PublishedApiPath > {...}
  serviceAPICategory > [...]
  shareableInfo ShareableInformation > {...}
  supportedFeatures > {...}
}
```

```
{
  "apiName": "example",
  "description": "Example API of rApp B",
  "aefProfiles": [
    {
      "aefId": "AEF_id_rApp_as_AEF",
      "description": "Example rApp B as AEF",
      "versions": [
        {
          "apiVersion": "v1",
          "resources": [
            {
              "resourceName": "example",
              "commType": "REQUEST_RESPONSE",
              "uri": "/example/subscription/subscription_id_1",
              "operations": [
                "GET"
              ]
            }
          ]
        }
      ],
      "protocol": "HTTP_1_1",
      "securityMethods": ["PSK"],
      "interfaceDescriptions": [
        {
          "ipv4Addr": "string",
          "port": 65535,
          "securityMethods": ["PKI"]
        },
        {
          "ipv4Addr": "string",
          "port": 65535,
          "securityMethods": ["PKI"]
        }
      ]
    }
  ]
}
```



Publisher – get APIs

GET `/{apfId}/service-apis`

Retrieve all published APIs.

Parameters

Name	Description
apfId * required string (path)	<input type="text" value="apfId"/>

Responses

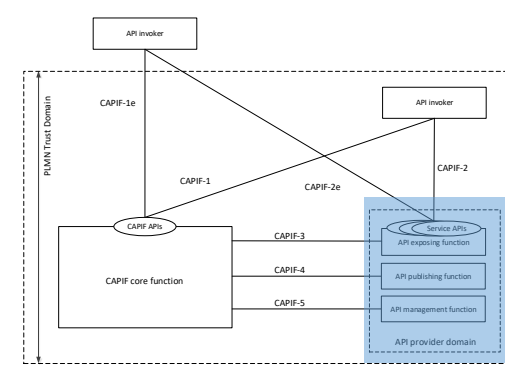
Code	Description
200	Definition of all service API(s) published by the API publishing function.

Media type:

Controls Accept header.

Example Value | [Schema](#)

```
▼ [
  minItems: 0
  ServiceAPIDescription {
    description: Represents the description of a service API as published by the APF.
    aefProfiles > [...]
    apiId > [...]
    apiName* > [...]
    apiSuppFeats > {...}
    ccfId > [...]
    description > [...]
    pubApiPath PublishedApiPath > {...}
    serviceAPICategory > [...]
    shareableInfo ShareableInformation > {...}
    supportedFeatures > {...}
  }
]
```



Invoker – Onboard API invoker

POST /onboardedInvokers

Creates a new individual API Invoker profile.

Parameters

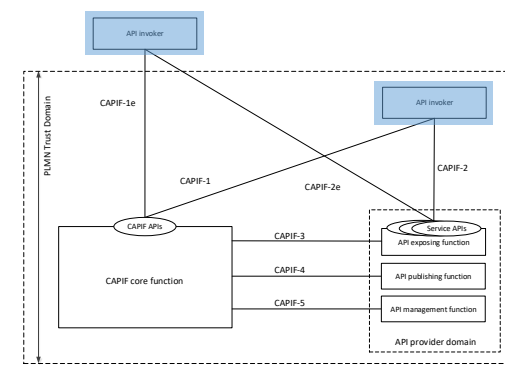
Callbacks

No parameters

Request body required

Example Value | [Schema](#)

```
APIInvokerEnrolmentDetails {
  description: Information about the API Invoker that requested to onboard
  apiInvokerInformation > [...]
  apiList APIList > [...]
  notificationDestination* > {...}
  onboardingInformation* OnboardingInformation > {...}
  requestTestNotification > [...]
  supportedFeatures > {...}
  websocketNotifConfig > {...}
}
```



```
{
  "apiInvokerInformation": "rApp as API invoker",
  "apiList": [
    {}
  ],
  "notificationDestination": "http://invoker-app:8086/callback",
  "onboardingInformation": {
    "apiInvokerPublicKey": "{PUBLIC_KEY_INVOKER}",
    "onboardingSecret": "9bqMStMDsiUhBdVxS5ajg1xSTVLM2JnW",
    "apiInvokerCertificate": "apiInvokerCertificate"
  },
  "requestTestNotification": true
}
```

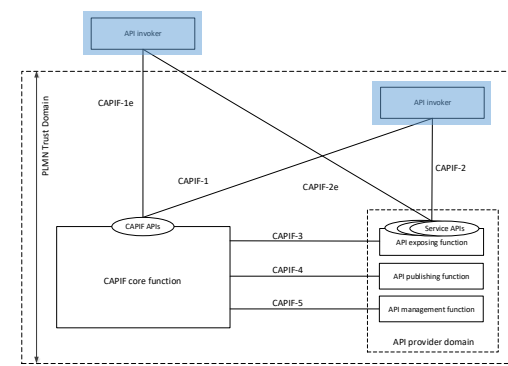
Discover – Get all services

GET /allServiceAPIs

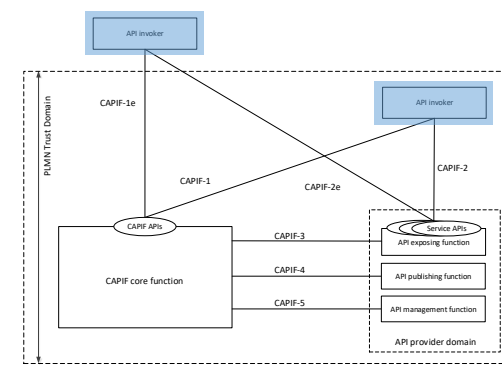
Discover published service APIs and retrieve a collection of APIs according to certain filter criteria.

Parameters

Name	Description
api-invoker-id * required string (query)	String identifying the API invoker assigned by the CAPIF core function. It also represents the CCF identifier in the CAPIF-6/6e interface.
<input type="text" value="api-invoker-id"/>	
api-name string (query)	API name, it is set as {apiName} part of the URI structure as defined in clause 5.2.4 of 3GPP TS 29.122.
<input type="text" value="api-name"/>	
api-version string (query)	API major version the URI (e.g. v1).
<input type="text" value="api-version"/>	
comm-type (query)	Communication type used by the API (e.g. REQUEST_RESPONSE).
<input type="text" value="comm-type"/>	
protocol (query)	Protocol used by the API.
<input type="text" value="protocol"/>	
aef-id string (query)	AEF identifier.
<input type="text" value="aef-id"/>	



Security – Obtain security method



PUT /trustedInvokers/{apiInvokerId}

Parameters	Callbacks						
<table border="1"> <thead> <tr> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>apiInvokerId * required</td> <td>Identifier of an individual API invoker</td> </tr> <tr> <td>string (path)</td> <td></td> </tr> </tbody> </table>	Name	Description	apiInvokerId * required	Identifier of an individual API invoker	string (path)		
Name	Description						
apiInvokerId * required	Identifier of an individual API invoker						
string (path)							
<p>Request body required</p> <p>create a security context for an API invoker</p> <p>Example Value Schema</p> <pre> ServiceSecurity { notificationDestination* > {...} requestTestNotification > [...] securityInfo* > [...] supportedFeatures > {...} websocketNotifConfig > {...} } </pre>							

```

{
  "notificationDestination": "http://invoker-app:8086/callback",
  "supportedFeatures": "fffffff",
  "securityInfo": [
    {
      "aefId": "AEF_id_rApp_as_AEF",
      "apiId": "api_id_example",
      "prefSecurityMethods": [
        "PSK"
      ],
      "selSecurityMethod": "PSK"
    }
  ],
  "requestTestNotification": true
}
    
```

Security – Obtain Authorization

PUT /trustedInvokers/{apiInvokerId}

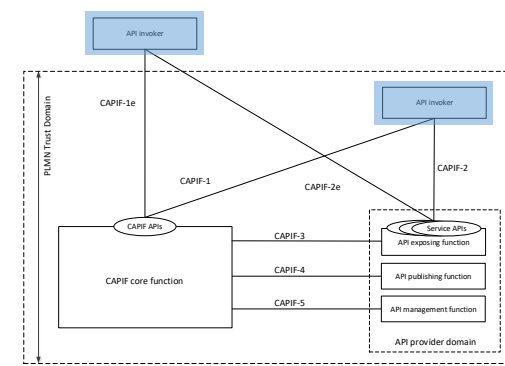
Parameters	Callbacks
Name	Description
apiInvokerId * required string (path)	Identifier of an individual API invoker

Request body required

create a security context for an API invoker

Example Value | [Schema](#)

```
ServiceSecurity {
  notificationDestination* > {...}
  requestTestNotification > [...]
  securityInfo* > [...]
  supportedFeatures > {...}
  websocketNotifConfig > {...}
}
```



```
{
  "notificationDestination": "http://invoker-app:8086/callback",
  "supportedFeatures": "fffffff",
  "securityInfo": [
    {
      "aefId": "AEF_id_rApp_as_AEF",
      "apiId": "api_id_example",
      "prefSecurityMethods": [
        "PSK"
      ],
      "selSecurityMethod": "PSK"
    }
  ],
  "requestTestNotification": true
}
```



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