ETSI TS 124 558 V18.5.1 (2024-08)

5G;
Enabling Edge Applications;
Protocol specification
(3GPP TS 24.558 version 18.5.1 Release 18)

Reference
RTS/TSGC-0124558vi51

Keywords
5G

ETSI

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the APIs for enabling the edge applications over 3GPP networks for EDGE-1 and EDGE-4 reference points. The application layer architecture, functional requirements, procedures and information flows necessary for enabling edge applications over 3GPP networks are specified in 3GPP TS 23.558 [2]. The APIs are specified as RESTful APIs except for custom operations wherever required.

The present document defines the usage and interactions of the EEL layer with SEAL services.

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 23.558: "Architecture for enabling Edge Applications;"

[3] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[4] 3GPP TS 29.558: "Enabling Edge Applications; Application Programming Interface (API) specification; Stage 3".

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

[6] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[7] 3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications; Stage 2".

[8] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[9] 3GPP TS 23.436: "Functional architecture and information flows for Application Data Analytics Enablement Service".

[10] 3GPP TS 24.542: "Notification Management - Service Enabler Architecture Layer for Verticals (SEAL); Protocol specification".

[11] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.558 [2] apply:

Application Context
Application Context Relocation
EEC Context
Instantiable EAS

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.434 [11] apply:

SEAL service

3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

AC	Application Client
ACR	Application Context Relocation
ADAES	Application Data Analytics Enabler Server
API	Application Programming Interface
EAS	Edge Application Server
ECS	Edge Configuration Server
ECSP	Edge Computing Service Provider
EEC	Edge Enabler Client
EES	Edge Enabler Server
NAS	Non Access Stratum
NID	Network Identifier
SNPN	Stand-alone Non-Public Network
URI	Uniform Resource Locator
SEAL	Service Enabler Architecture Layer for verticals
SNM-C	SEAL Notification Management Client

4 Overview

4.0 General

In order to support the edge applications over the 3GPP systems, various features are defined to ensure the efficient use and deployment of edge applications, some of which include, registration, discovery, service provisioning, capability exposure and support for service continuity.

The present document specifies the APIs in detail, needed to support the services offered by the EES over EDGE-1 interface and offered by the ECS over EDGE-4 interface for enabling the edge applications over 3GPP network.

The EEL layer can utilize SEAL services provided by SEAL, which may include notification management (see 3GPP TS 24.542 [10]).

4.1 Information applicable to APIs over EDGE-1 and EDGE-4

The APIs as specified in this document allow secure access to the capabilities provided by the EES and ECS functional entity.

The stage-2 level requirements and signalling flows are defined in 3GPP TS 23.558 [2].

The usage of HTTP, content type, URI structure definition, notifications, error handling, feature negotiation, HTTP headers and Conventions for Open API specification files, as specified in clauses 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9 and 7.10 of 3GPP TS 29.558 [4] respectively, shall be applicable for the APIs in the current specification.

5 Services offered by Edge Enabler Server

5.1 Introduction

The table 5.1-1 lists the Edge Enabler Server APIs below the service name. A service description clause for each API gives a general description of the related API.

Table 5.1-1: List of EES Service APIs

Service Name	Service Operations	Operation Semantics	Consumer(s)
Eees_EECRegistration	Request	Request/Response	EEC
	Update	Request/Response	EEC
	Deregister	Request/Response	EEC
Eees_EASDiscovery	EasDiscRequest	Request/Response	EEC
	Subscribe	Subscribe/Notify	EEC
	Notify		EEC
	UpdateSubscription	Subscribe/Notify	EEC
	Unsubscribe	Subscribe/Notify	EEC
Eees_ACREvents	Notify	Subscribe/Notify	EEC
	UpdateSubscription	Subscribe/Notify	EEC
	Unsubscribe	Subscribe/Notify	EEC
Eees_AppContextRelocation	Determine	Request/Response	EEC, EAS
	Initiate	Request/Response	EEC, EES, EAS
Eees_EASInformationProvisioning	Declare	Request/Response	EEC
Eees_UEIdentifier	Get	Request/Response	EEC

Table 5.1-2 summarizes the corresponding Edge Enabler Server APIs defined in this specification.

Table 5.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Eees_EECRegistration	6.2	Eees EEC Registration	TS24558_Eees_EECRegistration.yaml	eees-eecregistration	A.2
Eees_EASDiscovery	6.3	Eees EAS Discovery	TS24558_ Eees_EASDiscovery.yaml	eees-easdiscovery	A.3
Eees_AppContextRelocation	6.5	Eees Application Context Relocation	TS24558_Eees_AppContextRelocation.yaml	Eees-appctxtreloc	A.5
Eees_EASInformationProvisioning	6.y	Eees EAS Information Provisioning		eees-easinfoprov	

5.2 Eees_EECRegistration Service

5.2.1 Service Description

The Eees_EECRegistration API, as defined in 3GPP TS 23.558 [2], allows an EEC via Eees interface to register, update its registration and deregister at a given EES.

5.2.2 Service Operations

5.2.2.1 Introduction

The service operation defined for Eees_EECRegistration API is shown in the table 5.2.2.1-1.

Table 5.2.2.1-1: Operations of the Eees_EECRegistration API

Service operation name	Description	Initiated by
Eees_EECRegistration_Request	This service operation is used by the EEC to register itself to a given EES.	EEC
Eees_EECRegistration_Update	This service operation is used by the EEC to update its registration information at EES.	EEC
Eees_EECRegistration_Deregister	This service operation is used by the EEC to deregister itself from a given EES.	EEC

5.2.2.2 Eees_EECRegistration_Request

5.2.2.2.1 General

This service operation is used by EEC to register itself with a given EES.

5.2.2.2.2 EEC registering to EES using Eees_EECRegistration_Request operation

For an EEC to register at the EES, the EEC shall send an HTTP POST message to the EES on the "EEC Registrations" collection resource to create the resource associated to or representing the EEC. The body of the HTTP POST message shall include the EEC ID, may include UE identifier, AC Profile(s), proposed expiration time for the registration, EEC context ID obtained from a previous registration, the ACR scenario(s) supported by the EEC for service continuity, as specified in clause 6.2.2.2.3.1. If EEC context ID is included in the body of the HTTP POST message, it shall also include Source EES ID and Source EES Endpoint of the EES that provided EEC context ID. If the EdgeApp_2 feature is supported, the EEC may include indication for UE mobility support requirement and UE type to the EES.

Upon receiving the HTTP POST message from the EEC, the EES shall:

a) Process the EEC registration request information;

b) verify if the EEC is authorized to register itself at EES; and

c) if the EEC is authorized to register with EES, then;

1) if the AC Profile(s) is included in the HTTP POST message, the EES further determines whether the registered EAS(s) fulfils the requirements that were indicated in the AC Profile(s):

i) if acSvcContSupp information is included in the AC Profile, the EEC, EES, and the matching EAS have to support ACRScenario indicated in the acSvcContSupp information; and

ii) For each AC Profile, if eass information is included in the AC Profile, the EES identifies the matching EAS such that the matching EAS shall:

A) be identified by the easId information; and

B) suffice all information included in the minimumReqSvcKPIs information.

NOTE 1: With respect to expectedSvcKPIs information, it is up to the EES implementation on how to identifies the matching EAS.

iii) if the EdgeApp_2 feature is supported:

A) for each AC Profile, if the "easBundleInfos" attribute is included in the AC Profile, the EES identifies the matching list of EAS bundle to which the EAS identified by the easId information belongs; and

B) if the EEC includes EAS selection request indication, the EES shall select EASs from the list of matching EASs based on EES local policies and provide the information to the EEC in the registration response as part of "discoveredEas" attribute. If the "easBundleInfos" attribute is included, then the EES determines whether all or a subset of the EAS(s) in the bundle are registered and instantiated. If only a subset of bundle EASs is found, the EES may determine whether instantiable but not yet instantiated EASs match the subset of remaining (i.e. not yet found) bundle EASs and the EES may trigger the ECSP management system to instantiate the EAS.

When a matching EAS is identified, the EES determines that the corresponding requirements are fulfilled and are supported for the new resource.

When a matching EAS is not identified for even one AC profile, the EES shall reject the request message by sending an HTTP response to the EEC with a status code set to 404 Not Found and indicate the "RESOURCE_NOT_FOUND" error in the "cause" attribute of the "ProblemDetails" structure.

2) if the received EEC registration request contains an EEC context ID, a source EES endpoint, the EES retrieves the EEC's context from the source EES according to the procedures specified in clause 5.10 of 3GPP TS 29.558 [4];

3) the EES creates a new resource with the EEC registration information as specified in clause 6.2.2.1, and assigns and stores new EEC context ID;

i) if the EES cannot reserve the necessary resources while meeting the capability requirements of the existing registered EECs, the EES shall determine the EEC Context information stale and send a failure response with a corresponding cause as specified in clause 6.2.2.2.3.1; and

ii) Otherwise the EES shall return the EEC registration information in the response message. The response message may include expiration time to indicate when the EEC registration will automatically expire. The response message may include a newly assigned EEC context ID. The URI of the created resource shall be returned in the "Location" HTTP header. If the EEC registration request contains AC Profile(s), and the EES determines that the requirements indicated in the AC profile(s) cannot be fulfilled for some of the AC profile(s), the EES shall include "unfulfillAcProfs" or "unfulfilledAcProfs" attribute containing the list of ACIDs of such AC Profile(s) and appropriate reasons as specified in clause 6.2.5.2.2; and

4) if the EdgeApp_2 feature is supported;

i) if the received EEC registration request contains an UE mobility support requirement information to the EES, the EES shall store the same in the EEC context. If UE mobility support requirement is set to true, the EES shall subscribe to UE’s location or analytics information using 3GPP core network capabilities and in case of false the EES as per ECSP policy and EAS requirements may decide to fetch one time UE location or subscribe to NEF or NWDAF for UE location information or its analytics; and

ii) if the received EEC registration request contains an UE type information, the EES shall check if the UE is a constrained device and shall store the received UE type information in the EEC context. The EES may use this information to apply UE-type-specific local policies.

NOTE 2: The "unfulfilledAcProfs" attribute can only be provided if there is only a single unfulfilled AC profile.

The EEC stores the new EEC context ID and uses it when it registers with another EES.

If the expiration time is provided, then to maintain the registration, the EEC shall send a registration update request (as described in clause 5.2.2.3) prior to the expiration time. If a succesful registration update request is not received prior to the expiration time, then the EES shall treat the EEC as implicitly deregistered and remove the corresponding EEC registration resource.

5.2.2.3 Eees_EECRegistration_Update

5.2.2.3.1 General

This service operation is used by the EEC to update its registration information at the EES.

5.2.2.3.2 EEC updating registration information using Eees_EECRegistration_Update operation

To update the EEC registration information at the EES, the EEC shall send an HTTP PATCH request (for partial update) or HTTP PUT message (for fully replacement) to the EES on resource URI identifying the Individual EEC registration resource representation as specified in clause 6.2.2.3.3.3 for an HTTP PATCH message or in clause 6.2.2.3.3.1 for an HTTP PUT message.

The PATCH message includes the parameters (AC profiles or proposed expiry time) that need to be replaced in the existing registration information.

The PUT message shall replace all properties of the existing resource with the EEC registration information in the request. The value of the eecId provided during the EEC registration shall not be changed.

Upon receiving the HTTP PATCH or PUT message from the EEC, if the resource URI does not exist, the EES shall respond 404 Not Found error to the EEC. Otherwise, the EES shall:

a) check the registration update message from the EEC to see if the EEC is authorized to modify the requested registration resource; and

b) if the EEC is authorized to update the registration information and the eecId information in the request and the resource match, then the EES shall;

1) if the AC Profile(s) is included in the HTTP PATCH or PUT message, the EES further determines whether the registered EAS(s) fulfils the requirements that were indicated in the AC Profile(s):

i) if acSvcContSupp information is included in the AC Profile, the EEC, EES and the matching EAS have to support ACRScenario indicated in the acSvcContSupp information; and

ii) For each AC Profile, if EAS(s) information is included in the AC Profile, the EES identifies the matching EAS such that the matching EAS shall:

A) be identified by the easId information; and

B) suffice all information included in the minimumReqSvcKPIs information.

NOTE 1: With respect to expectedSvcKPIs information, it is up to the EES implementation on how to identifies the matching EAS.

iii) if the EdgeApp_2 feature is supported:

A) for each AC Profile, if the "easBundleInfos" attribute is included in the AC Profile, the EES identifies the matching list of EAS bundle to which the EAS identified by the easId information belongs; and

B) if the EEC includes EAS selection request indication, the EES shall select EASs from list of matching EASs based on EES local policies and provide the information to the EEC in the registration modification response as part of "discoveredEas" attribute. If "easBundleInfos" attribute is included, then the EES determines whether all or a subset of the EAS(s) in the bundle are registered and instantiated. If only a subset of bundle EASs is found, the EES may determine whether instantiable but not yet instantiated EASs match the subset of remaining (i.e. not yet found) bundle EASs and the EES may trigger the ECSP management system to instantiate the EAS.

When a matching EAS is identified for atleast one AC profile, the EES determines that the corresponding requirements are fulfilled and are supported and shall update the resource identified by Resource URI of the EEC registration information with the updated EEC registration information received in the HTTP PATCH or PUT request message.

2) return the updated EEC registration information in the response. In the response message, the EES may send "200 OK" response code to provide an updated expiration time to indicate to the EEC when the updated registration will automatically expire. Otherwise, the EES sends "204 No Content" response code. If the EEC registration request contains AC Profile(s), and the EES determines that the requirements indicated in the AC profile(s) cannot be fulfilled for some of the AC profile(s), the EES shall include "unfulfillAcProfs" or "unfulfilledAcProfs" attribute containing the list of ACIDs of such AC Profile(s) and appropriate reasons as specified in clause 6.2.5.2.2.

3) if the EdgeApp_2 feature is supported;

i) if the received EEC registration update request contains an UE mobility support requirement information to the EES, the EES shall update the same in the EEC context. If UE mobility support requirement is set to true, the EES shall subscribe to UE's location or analytics information using 3GPP core network capabilities and in case of false the EES as per ECSP policy and EAS requirements may decide to fetch one time UE location or subscribe to NEF or NWDAF for UE location information or its analytics; and

ii) if the received EEC registration update request contains an UE type information, the EES shall check if the UE is a constrained device and shall store the received UE type information in the EEC context. The EES may use this information to apply UE-type-specific local policies.

NOTE 2: The "unfulfilledAcProfs" attribute can only be provided if there is only a single unfulfilled AC profile.

If the expiration time is provided, the EEC shall send a registration update request prior to the expiration time if the EEC wants to maintain the registration. If a successful registration update request is not received prior to the expiration time, the EES shall treat the EEC as implicitly de-registered and remove the corresponding EEC registration resource.

5.2.2.4 Eees_EECRegistration_Deregister

5.2.2.4.1 General

This service operation is used by EEC to deregister itself from a given EES.

5.2.2.4.2 EEC deregistering from EES using Eees_EECRegistration_Deregister operation

To deregister itself from the EES, the EEC shall send HTTP DELETE message to the EES, on the resource URI identifying the Individual EEC registration resource representation as specified in clause 6.2.2.3.3.3. Upon receiving the HTTP DELETE request, the EES shall:

a) verify the identity of the EEC and check if the EEC is authorized to deregister the EEC registration information;

b) if the EEC is authorized to deregister the EEC registration information, then the EES shall

1) if the resource identified by registrationId is not found, return "404 Not Found" error message to the EEC;

2) otherwise, deregister the EEC profile from the EES and delete the resource representing EEC registration information; and

3) return the "204 No Content" message to the EEC, indicating the successful deregistration of the EEC information.

5.3 Eees_EASDiscovery service

5.3.1 Service Description

The Eees_EASDiscovery service enables a service consumer (e.g. EEC) to:

- request EAS discovery;
- request to subscribe to EAS discovery information reporting at the EES;
- request to update/modify/delete an existing subscription to EAS discovery information reporting; and
- receive notifications from the EES on EAS discovery information.

5.3.2 Service Operations

5.3.2.1 Introduction

The service operations defined for Eees_EASDiscovery API are shown in the table 5.3.2.1-1.

Table 5.3.2.1-1: Operations of the Eees_EASDiscovery API

Service operation name	Description	Initiated by
Eees_EASDiscovery_EasDiscRequest	This service operation is used by the EEC to request for one-time EAS discovery information.	EEC
Eees_EASDiscovery_Subscribe	This service operation is used by the EEC to request to subscribe to EAS discovery information reporting.	EEC
Eees_EASDiscovery_Notify	This service operation is used by the EES to notify a previously subscribed EEC on EAS discovery information.	EES
Eees_EASDiscovery_UpdateSubscription	This service operation is used by the EEC to update an existing subscription to EAS discovery information reporting.	EEC
Eees_EASDiscovery_Unsubscribe	This service operation is used by the EEC to delete an existing subscription to EAS discovery information reporting.	EEC

5.3.2.2 Eees_EASDiscovery_EasDiscRequest

5.3.2.2.1 General

This service operation is used by the EEC to request for one-time EAS discovery information.

5.3.2.2.2 EEC requesting EAS discovery information using Eees_EASDiscovery_EasDiscRequest operation

To request for one-time EAS discovery, the EEC shall send an HTTP POST request to the EES as specified in clause 6.3.2.4.4. The body of the POST message shall include the EasDiscoveryReq data structure as specified in clause 6.3.5.2.2.

Upon reception of the HTTP POST message from the EEC, the EES shall:

a) process the EAS discovery request information;

b) the EES verifies and checks if the EEC is authorized to discover the requested EAS(s) from EES;

c) if EEC is authorized to discover the requested EAS(s) from EES, the EEC is not registered with the EES, and the ECSP policy requires the EEC to perform EEC registration prior to EAS discovery, the EES shall reject the request by sending an HTTP "403 Forbidden" status code to the EEC including the ProblemDetails data structure with the "cause" attribute containing the "REGISTRATION_REQUIRED" application error;

d) if the EEC is authorized to discover the requested EAS(s) from EES and the EEC is registered as required by the ECSP policy, then the EES;

   1) may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3];

   2) if EAS discovery filters are provided by the EEC without the "appGroupProfile" attribute, the EES identifies the EAS(s) based on the provided EAS discovery filters and the UE location, and if the enNB1 feature is supported, the "userLocation" attribute may be provided in the "locInf" attribute within the EasDiscoveryReq data type;

   3) if the EEC indicates that service continuity support is required, the EES shall take the indication which ACR scenarios are supported by the AC and the EEC and which of these are preferred by the AC into consideration. The EES identifies the EAS(s) who supports at least one of the ACR scenarios as indicated by EEC; and

      i. the EES may select one EAS and determine to perform application traffic influence for this AC based on AC's service KPI or EAS(s) service KPI in desired response time, when the EES does not perform traffic influence in advance;

   4) if EAS discovery filters are not provided:

i. if available, the EES identifies the EAS(s) based on the UE-specific service information at the EES and the UE location; and

ii. EES identifies the EAS(s) by applying the ECSP policy (e.g. based only on the UE location);

5) if the EdgeApp_2 feature is supported and if the "appGroupProfile" attribute is provided within the EasDiscoveryFilter data type, the EES determines the availability of common EAS corresponding to the "appGrpId" attribute. If the common EAS is:

i) not available, then based on the policy if the EES needs to select the common EAS, the EES shall identify an EAS matching the received "appGrpId" attribute based on the EAS discovery filters or the ECSP policy. The EES shall store the common EAS information and related "appGrpId" attribute by triggering the Eecs_EASInfoManagement API as specified in clause A.16 of 3GPP TS 29.558 [4] and EES shall trigger common EAS announcement procedure as specified in clause 5.14 of 3GPP TS 29.558 [4]; or

ii) available at the EES, then the EES provides information of that EAS as part for EAS discovery response;

NOTE 1: The EES could have previously determined and stored the common EAS for application group ID, or the EES may have received the common EAS selection information for application group ID during the common EAS announcement procedure as specified in clause 5.14 of 3GPP TS 29.558 [4].

6) the EES may trigger the EAS management system to instantiate the EAS that matches with EAS discovery filter IEs; and

7) if the EdgeApp_2 feature is supported and the EEC indicates the EAS selection support within the "easSelSupInd" attribute, the EES shall select one matching EAS that fulfils the EEC requirements as described in bullets 2), 3) and 4), and the EES shall provide the selected EAS information to the EEC within the "discoveredEas" attribute;

e) if the EdgeApp_2 feature is supported, and:

1) if the EEC indicates EAS Instantiation Triggering using "easIntTrigSup" attribute with the value set to true in the EAS discovery request, the EES may trigger the ECSP to instantiate the EAS that matches with EAS discovery filter IEs (e.g. ACID) and the EES supports such capability. If the "easIntTrigSup" attribute is omitted or set to value false the EES shall not trigger the ECSP to instantiate the EAS and the EES may determine instantiable EAS information using "easInstInfos" attribute, which is provided in the EAS discovery response, for EAS(s) that are instantiable but not yet instantiated and match the EAS discovery filter IEs; and

2) if the EEC indicates the predicted expiration time by which the UE reaches location using the "predictExpTime" attribute, the EES may also collect edge load analytics from the ADAES (as specified in clause 8.8.2 of 3GPP TS 23.436 [9]) or performance data from the OAM to find whether the EAS(s) satisfies the expected AC service KPIs or the minimum required AC service KPIs; and

NOTE 2: How EEC uses the analytics information is implementation specific.

3) if the EEC indicates the UEs serving MNO information as part of the "servingPLMNInfo" attribute, the EES identifies the EAS(s) that matches the allowed MNO information in their EAS profiles and UE's serving MNO information as specified in clause 6.3.5.2.3; and

f) if the processing of the request was successful, the EES sends an EAS discovery response to the EEC as specified in clause 6.3.2.4.4.2.2, which includes information about the discovered EASs. The response shall include endpoint information for discovered EASs. Depending on the EAS discovery filters received in the EAS discovery request, the response may include additional information regarding matched capabilities, e.g. service permissions levels, KPIs, AC locations(s) that the EASs can support, ACR scenarios supported by the EAS, etc. The EAS discovery response may contain a list of EASs. This list may be based on EAS discovery filters containing a Geographical or Topological Service Area, e.g. a route, included in the EAS discovery request by the EEC. If the discovered EAS is registered to another EES, then the endpoint information of the EAS shall be included in the "eesEndPt" attribute within the DiscoveredEas data type.

If the successful processing of the request does not result in finding a matching EAS (i.e. there is no client side error), the EES responds with "204 No Content" HTTP status code. Otherwise, the EES shall reject the EAS discovery request and respond with an appropriate failure HTTP status code.

The EEC may cache the EAS information (e.g. EAS endpoint) for subsequent use and avoid the need to repeat this procedure. If the EEC selects an EAS which is instantiable but not yet instantiated (i.e. an EAS profile is not provided), the EEC shall send the EAS information provisioning request for EAS selection indicating the selected EAS ID. If the "lifeTime" attribute is included in the response, the EEC may cache the EAS information only for the duration specified by the Lifetime IE.

If the failure response is received for the EAS discovery request, the EEC may resend the EAS discovery request, taking into account the received failure cause. If the failure cause indicated "REGISTRATION_REQUIRED" error in the "cause" attribute of the "ProblemDetails" structure, the EEC shall perform an EEC registration as specified in clause 5.2.2.2.2 before resending the EAS discovery request.

5.3.2.3 Eees_EASDiscovery_Subscribe

5.3.2.3.1 General

This service operation is used by the EEC to subscribe to EES for reporting of EAS discovery information.

5.3.2.3.2 EEC subscribing to EAS discovery information from EES using Eees_EASDiscovery_Subscribe operation

To subscribe to changes of EAS discovery information at the EES, the EEC shall send an HTTP POST message to the EES on the "EAS Discovery Subscriptions" resource. The body of the POST message shall include the EASDiscoverySubscription data structure as specified in clause 6.3.2.2.3.1.

Upon receiving the HTTP POST message from the EEC, the EES:

a) shall process the EAS discovery subscription request;

b) if the EEC is not registered with the EES, and if ECSP policy requires the EEC to perform EEC registration prior to EAS discovery, the EES shall reject the request message by sending an HTTP response to the EEC with a status code set to 403 Forbidden and may indicate the "REGISTRATION_REQUIRED" error in the "cause" attribute of the "ProblemDetails" structure;

b) if the EEC is registered, the EES shall verify and check if the EEC is authorized to subscribe for information of the requested EAS(s) from EES;

c) if the EEC is authorized to discover the requested EAS(s) from EES, then the EES;

   1) may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3];

   2) shall create a new Individual EAS Discovery Subscription resource as specified in clause 6.3.2.2.3.1; and

d) if EdgeApp_2 feature is supported;

   1) if the EEC indicates EAS Instantiation Triggering using "easIntTrigSup" attribute set to true in the EAS discovery subscription request and the EAS instantiation is not in progress for the requested EASID, the EES may trigger dynamic instantiation of the EAS; and

   2) if the EEC indicates EEC Trigger Request using "eecTriggerRequest" attribute set to true, then application triggering is supported and required by the EEC and the EES may send trigger towards the EEC to perform EAS discovery; and

e) if the processing of the request was successful, the EES shall send an EAS discovery subscription response to the EEC as specified in clause 6.3.2.2.3.1, which includes the subscription identifier and shall include the expiration time, indicating when the subscription will automatically expire.

   If the EES is unable to process the request (e.g. was not able to determine the EAS using the input information in the request or using the locally available information), the EES shall reject the request with a with appropriate response code as specified in Table 5.2.6-1 of TS 29.122 [3].

If the expiration time is provided, the EEC shall send an EAS discovery subscription update request prior to the expiration time if the EEC wants to maintain the subscription. If an EAS discovery subscription update request is not received prior to the expiration time, the EES shall treat the EEC as implicitly unsubscribed.

If the failure response is received for the EAS discovery request, the EEC may resend the EAS discovery subscription request, taking into account the received failure cause. If the failure cause indicated "REGISTRATION_REQUIRED" error in the "cause" attribute of the "ProblemDetails" structure, the EEC shall perform an EEC registration as specified in clause 5.2.2.2.2 before resending the EAS discovery request.

5.3.2.4 Eees_EASDiscovery_Notify

5.3.2.4.1 General

This service operation is used by the EES to notify the EEC about the EAS discovery information.

5.3.2.4.2 EES notifying the EAS discovery information to EEC using Eees_EASDiscovery_Notify operation

The EES determines to notify the EEC with the EAS discovery information, when an event occurs at the EES that satisfies trigger conditions for updating EAS discovery information of a subscribed EEC. The EES may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3].

If EAS discovery filters are provided by the EEC, the EES identifies the EAS(s) based on the provided EAS discovery filters and the UE location.

If EAS discovery filters are not provided, the EES identifies the EAS(s), if available, based on the UE-specific service information at the EES and the UE location; and by applying the ECSP policy (e.g. based only on the UE location).

If valid UE location information is not available in local cache, then the EES shall obtain the UE location information by consuming the 3GPP core network capabilities. If obtaining UE location information from the 3GPP core network capabilities fails, then the EES may retry to obtain UE location information. If EES is unable to obtain UE location, then the EES fails to discover the EAS and the notification will not be sent.

If UE location is available and EES determines that the UE location is outside the Geographical or Topological Service Area of an EAS, then the EES shall not include this EAS in the EAS discovery notification.

If the EdgeApp_2 feature is supported, the EES, based on local policy, may use the EAS endpoints received from the EEC or all registered EAS endpoints to get edge load analytics information from the ADAES services (e.g. as specified in clause 8.8.2 of 3GPP TS 23.436 [9]) to monitor EAS service status like EAS status and EAS schedule if the EEC subscribed to the "EAS_DYNAMIC_INFO_CHANGE" event.

NOTE 1: How EEC uses the analytics information is implementation specific.

If the EES identifies the EAS(s) then to notify the EAS discovery information events, the EES shall either send an HTTP POST message using the Notification Destination URI received in the subscription request, as specified in clause 6.3.4.2.

The EEC may cache the EAS information (e.g. EAS endpoint) for subsequent use. If the "lifeTime" attribute is included in the notification, the EEC may cache the EAS information only for the duration specified by the Lifetime IE.

NOTE 2: If the EEC provided an indication to support application triggering in "eecTriggerRequest" attribute of the EAS Discovery Subscription request, then the ECS sends the trigger message towards the EEC by invoking application triggering services or DeviceTrigerring API using the 3GPP core network capabilities in order to avoid sending the EAS Discovery notify.

5.3.2.5 Eees_EASDiscovery_UpdateSubscription

5.3.2.5.1 General

This service operation is used by the EEC to update its subscription at the EES for reporting of EAS discovery information.

5.3.2.5.2 EEC updating EAS discovery information subscription at EES using Eees_EASDiscovery_UpdateSubscription operation

To request modification of an existing Individual EAS Discovery Subscription, the EEC shall send an HTTP PATCH request (for partial modification) or PUT request (for fully replacement) message to the EES using the resource URI identifying the concerned "Individual EAS Discovery Subscription" resource as specified in clause 6.3.2.3.3.3 for an HTTP PATCH message and in clause 6.3.2.3.3.1 for an HTTP PUT message.

The PATCH message includes the parameters (EAS discovery filters, EAS dynamic information filters, Service continuity support, or proposed expiry time) that need to be replaced in the existing subscription resource.

The PUT message shall replace all properties of the existing resource with the EAS Discovery subscription information in the request. The values of the easId and ueId provided during the subscription creation shall not be changed.

Upon receiving the HTTP PATCH or PUT message from the EEC, the EES:

a) shall check the update subscription message from the EEC to see if the EEC is authorized to update the requested subscription resource;

b) if the EEC is authorized to update the EAS discovery subscription and if the eecId and the ueId of the request match the eecId and the ueId in the resource, then the EES;

   1) shall update the resource identified by Resource URI of the EAS discovery subscription with the updated information received in the HTTP PATCH or PUT request message;

   2) on success, shall either return an HTTP "200 OK" response with the payload body of the HTTP PATCH or PUT response containing the representation of the replaced resource or an HTTP "204 No Content" response.

c) if the EAS discovery subscription update operation is unsuccessful, shall return an appropriate error response as specified in Table 5.2.6-1 of 3GPP TS 29.122 [3];

d) may include an expiration time.

If the expiration time is provided, the EEC shall send the EAS discovery subscription update request prior to the expiration time if the EEC wants to maintain the subscription. If the EAS discovery subscription update request is not received prior to the expiration time, the EES shall treat the EEC as implicitly unsubscribed and remove the corresponding EAS discovery subscription resource.

5.3.2.6 Eees_EASDiscovery_Unsubscribe

5.3.2.6.1 General

This service operation is used by the EEC to unsubscribe from EAS discovery notification at the EES.

5.3.2.6.2 EEC unsubscribing to EAS discovery subscription from EES using Eees_EASDiscovery_Unsubscribe operation

To unsubscribe from EAS discovery notification at the EES, the EEC shall send an HTTP DELETE request to the EES using the resource URI identifying the concerned Individual EAS Discovery Subscription resource as specified in clause 6.3.2.3.3.2. Upon receiving the HTTP DELETE request, the EES:

a) shall verify and check if the EEC is authorized to delete the Individual EAS Discovery Subscription resource;

b) if the EEC is authorized to perform the operation, then the EES shall delete the individual EAS Discovery subscription resource identified by the "subscriptionId" provided within the request URI;

c) on success, shall return a "204 No Content" message to the EEC, indicating the successful removal of the subscription resource.

d) if the operation fails, shall return an appropriate HTTP error response as specified in Table 5.2.6-1 of 3GPP TS 29.122 [3].

5.4 Eees_ACREvents Service

5.4.1 Service Description

The Eees_ACREvents API, as defined in 3GPP TS 23.558 [2], allows the EES to notify the EEC of the target information during the ACR procedures or the ACR complete events.

5.4.2 Service Operations

5.4.2.1 Introduction

The service operations defined for Eees_ACREvents API are shown in the table 5.4.2.1-1.

Table 5.4.2.1-1: Operations of the Eees_ACREvents API

Service operation name	Description	Initiated by
Eees_ACREvents_Subscribe	This service operation is used by the EEC to subscribe to EES for ACR related events.	EEC
Eees_ACREvents_Notify	This service operation is used by the EES to notify the EEC about ACR related events.	EES
Eees_ACREvents_UpdateSubscription	This service operation is used by the EEC to update existing subscription for ACR related events.	EEC
Eees_ACREvents_Unsubscribe	This service operation is used by the EEC to unsubscribe for the previously subscribed ACR related events.	EEC

5.4.2.2 Eees_ACREvents_Subscribe

5.4.2.2.1 General

This service operation is used by the EEC to subscribe to EES, for reporting following ACR information:

- target information, i.e. the details of the selected T-EAS and, if required, the selected T-EES, during the ACR procedures;
- ACR complete events.

5.4.2.2.2 EEC subscribing to ACR information from EES using Eees_ACREvents_Subscribe operation

To subscribe to ACR information reporting at the EES, the EEC shall send an HTTP POST message to the EES on the "ACR events subscriptions" resource. The body of the POST message shall include "ACREventsSubscription" as specified in clause 6.4.5.2.2.

Upon receiving the HTTP POST message from the EEC, the EES shall:

a) process the EEC ACR information subscription request;

b) verify and check if the EEC is authorized to subscribe ACR information about the requested EAS(s); and

c) if the EEC is authorized to subscribe for the ACR information notification, then the EES;

   1) shall create a new resource with the Individual ACR events subscription resource as specified in clause 6.4.2.3;

   2) if a list of identifier of ACs is provided by the EEC, the EES shall use it during ACR information notification as specified in clause 5.4.2.3; and

3) shall send an ACR information subscription response to the EEC. The URI of the created resource (including the subscription identifier) shall be returned in the "Location" HTTP header. The response may include the expiration time, indicating when the subscription will automatically expire.

If the expiration time is provided, then to maintain the subscription information, the EEC shall send an ACR information subscription update request (as described in clause 5.3.2.4) prior to the expiration time. If the ACR information subscription update request is not sent prior to the expiration time, the EES shall treat the EEC as implicitly unsubscribed and remove the corresponding Individual ACR information subscription resource.

5.4.2.3 Eees_ACREvents_Notify

5.4.2.3.1 General

This service operation is used by the EES to notify the EEC about the ACR information notification.

5.4.2.3.2 EES notifying the ACR information to EEC using Eees_ACREvents_Notify operation

The EES determines to notify the EEC with the ACR information on following events:

- For EEC executed ACR via S-EES scenario, when S-EAS sends the ACR Complete message to the S-EES to confirm that the ACR has completed;
- For S-EAS decided ACR scenario, when T-EAS selection information received from the S-EAS or when S-EAS informs the S-EES of the complete of ACT;
- For S-EES executed ACR scenario, when S-EES determines T-EES and T-EAS via the Discover T-EAS procedure or when S-EAS informs the S-EES of the complete of ACT; and
- For EEC executed ACR via T-EES scenario, when T-EAS sends the ACR Complete message to the T-EES to confirm that the ACR has completed.

To notify the ACR information events, the EES shall:

a) identify ACs that satisfies trigger conditions for providing ACR information notification if a list of identifier of ACs was provided by the EEC when subscribing to ACR information; and

b) if the EdgeApp_2 feature is supported and:

   1) if the "expectedLocArea" attribute was provided in the service continuity request, then the S-EES shall detect if the UE has moved to the expected location or geographical service area; and

   2) if the EES received the successful EEC Context Push response from the T-EES that includes T-EES selected ACR scenario list, the same shall be included in the "acrScenarioList" attribute of ACRInfoNotification data type sent towards the EEC.

c) send an HTTP POST message using the Notification Destination URI received in the subscription request, as specified in clause 6.4.4. The EES shall include "eecCtxtReloc" attribute containing the registration ID and registration expiration time as specified in clause 6.4.5.2.3.

Upon receiving the HTTP POST message, the EEC shall process the ACR information Notification, in case of "acrRes" attribute with in the "ACRCompleteEventInfo" indicates the ACR is successful and:

a) if the "acrScenarioList" attribute is not included, the EEC may either select ACR scenario considering the supported ACR scenarios of AC, EEC, T-EES and T-EAS or request T-EES to select list of ACR scenarios by triggering EAS Information provisioning procedure as specified in clause 6.6;

b) if the "eecCtxtReloc" attribute is included that indicates EEC context relocation has failed the EEC can trigger EAS Information provisioning procedure specified in clause 6.6 to perform re-selection of the ACR scenarios.

5.4.2.4 Eees_ACREvents_UpdateSubscription

5.4.2.4.1 General

This service operation is used by the EEC to update its subscription at EES, for reporting of ACR information notification.

5.4.2.4.3 EEC updating ACR information subscription at EES using Eees_ACREvents_UpdateSubscription operation

To update ACR information subscription at the EES, the EEC shall send an HTTP PATCH message (for partial modification) or HTTP PUT message (for fully replacement) to the EES on resource URI identifying the Individual ACR events subscription resource representation, as specified in clause 6.4.2.3.3.3 for an HTTP PATCH message and in clause 6.4.2.3.3.1 for an HTTP PUT message.

The PATCH message includes the parameters (EASID, Event ID, Notification Destination and proposed expiry time) that need to be replaced in the existing subscription resource.

The PUT message shall replace all properties of the existing resource with the ACR information in the request. The values of the eecId and ueId provided during the subscription creation shall not be changed.

Upon receiving the HTTP PATCH or PUT message from the EEC, the EES:

a) shall check the update subscription message from the EEC to see if the EEC is authorized to modify the requested subscription resource;

b) if the EEC is authorized to update the ACR information subscription and the eecId of the requesting EEC and the eecId in the resource match, then the EES;

   1) shall update the resource identified by Resource URI of the ACR information subscription with the updated information received in the HTTP PATCH or PUT request message;

   3) shall return the ACR information subscription response. The EES may send "200 OK" response code which includes the subscription identifier and the expiration time, indicating when the subscription will automatically expire. Otherwise, the EES sends "204 No Content" response code.

If the expiration time is provided, the EEC shall send an ACR information subscription update request prior to the expiration time if the EEC wants to maintain the subscription. If the ACR information subscription update request is not received prior to the expiration time, the EES shall treat the EEC as implicitly unsubscribed and remove the corresponding ACR information subscription resource.

5.4.2.5 Eees_ACREvents_Unsubscribe

5.4.2.5.1 General

This service operation is used by the EEC to remove its subscription from the EES for reporting of ACR information.

5.4.2.5.2 EEC unsubscribing to service provisioning subscription from EES using Eees_ACREvents_Unsubscribe operation

To unsubscribe ACR information subscription from the EES, the EEC shall send an HTTP DELETE message to the EES, on the resource URI identifying the Individual ACR events subscription resource representation as specified in clause 6.4.2.3.3.2. Upon receiving the HTTP DELETE request, the EES:

a) shall verify and check if the EEC is authorized to unsubscribe the Individual ACR events subscription resource;

b) if the EEC is authorized to delete the Individual ACR events subscription resource, then the EES shall unsubscribe the EEC for the ACR information subscription identified by the subscriptionId;

c) shall return the "204 Not Content" message to the EEC, indicating the successful removal of the subscription information.

5.5 Eees_AppContextRelocation Service

5.5.1 Service Description

The Eees_AppContextRelocation API, as defined in 3GPP TS 23.558 [2], allows an EEC to request to launch Application Context Relocation towards a given EES via the Eees interface.

5.5.2 Service Operations

5.5.2.1 Introduction

The service operation defined for Eees_AppContextRelocation API is shown in the table 5.5.2.1-1.

Table 5.5.2.1-1: Operations of the Eees_AppContextRelocation API

Service operation name	Description	Initiated by
Eees_AppContextRelocation_Determine	This service operation enables to request ACR determination.	EEC
Eees_AppContextRelocation_Initiate	This service operation enables to request ACR initiation.	EEC, EES, EAS

5.5.2.2 Eees_AppContextRelocation_Determine

5.5.2.2.1 General

This service operation is used by an EEC to request ACR determination to the EES.

The following procedures are supported by the "Eees_AppContextRelocation_Determine" service operation:

- ACR Determination.

5.5.2.2.2 ACR Determination

In order to request ACR determination, the EEC shall send an HTTP POST request to the EES, with the request URI set to "{apiRoot}/eees-appctxtreloc/<apiVersion>/determine" and the request body including the ACRDetermReq data structure that shall contain the necessary information to enable the EES to carry out ACR determination as described in clause 6.5.5.2.2.

Upon receiving the HTTP POST message from the EEC, the EES shall:

a) process the ACR determination request;

b) verify if the EEC is authorized to request ACR determination at the EES; and

c) if the EEC is authorized to request ACR determination with the EES, then:

   1) the S-EES determines the T-EES via the Discover T-EAS procedure and may notify the EEC with target information and/or ACR result notification; and

   2) if the EdgeApp_2 feature is supported and if the "expectedLocArea" attribute was provided, then the EES shall monitor the UE location or geographical service area.

Upon success, the EES responds with an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the POST response body.

5.5.2.3 Eees_AppContextRelocation_Initiate

5.5.2.3.1 General

This service operation is used by an EEC to request ACR initiation to the EES.

The following procedures are supported by the "Eees_AppContextRelocation_Initiate" service operation:

- ACR Initiation.

5.5.2.3.2 ACR Initiation

In order to request ACR initiation, the EEC shall send an HTTP POST request to the EES, with the request URI set to "{apiRoot}/eees-appctxtreloc/<apiVersion>/initiate" and the request body including the ACRInitReq data structure that shall contain the necessary information to enable the EES to carry out ACR initiation as described in clause 6.5.5.2.3.

Upon receiving the HTTP POST message from the EEC, the EES shall:

a) process the ACR initiation request information;

b) verify if the EEC is authorized to request ACR initiation at the EES and;

c) if the EEC is authorized to request ACR initiation or ACR modification with the EES, then;

1) if T-EAS routing information (i.e. N6 routing information) as specified in table 6.5.5.2.3-1 is included in HTTP POST message:

i) the EES may apply AF traffic influence with the N6 routing information in the 3GPP Core Network as specified in clause 4.4.7 of 3GPP TS 29.522 [8];

1A) if the "simInactTime" attribute indicating the simultaneous EAS connectivity in service continuity is required and the inactive time guidance for keeping connectivity towards the S-EAS as specified in table 6.5.5.2.3-1 are included in HTTP POST message:

i) the EES may apply AF traffic influence with the indication of simultaneous connectivity in the 3GPP Core Network as specified in clause 4.4.7 of 3GPP TS 29.522 [8];

2) if EAS notification indication as specified in table 6.5.5.2.3-1 is included in the HTTP POST message, the EES shall notify the EAS to start the ACR towards the T-EAS;

3) if EEC context relocation details as specified in table 6.5.5.2.3-1 is included in HTTP POST message, then

i) if the T-EES is different than the current EES, then the EES shall initiate EEC Context Push towards the T-EES as specified in clause 5.11 of 3GPP TS 29.558 [4]; or

ii) if the EEC context ID and the S-EES Endpoint are included, then EES shall initiate EEC Context Pull (using EEC Context ID) towards the S-EES as specified in clause 5.10 of 3GPP TS 29.558 [4];

iii) if Previous T-EAS Endpoint is included in HTTP POST message, then:

A) if the previous EAS notification indication is included in the HTTP POST message, the EES shall notify the cancellation of the ACR to the EAS;

4) if the EdgeApp_2 feature is supported and:

i) if the "acrParams" attribute along with the predicted expiration time by which the UE reaches location as specified in table 6.5.5.2.3-1 is included in HTTP POST message, the S-EES provides prediction expiration time to the T-EES and via the T-EES to the T-EAS; and

ii) if the "expectedLocArea" attribute was provided, then the EES shall monitor the UE location or geographical service area; and

iii) if the ACR request is for modifying the existing ACR identified by the "acid" attribute and if the EES:

A) is S-EES, it shall initiate the ACR parameter information procedure as specified in clause 5.8 of 3GPP TS 29.558 [4]; and

B) is T-EES, the T-EES shall notify the T-EAS by initiating the ACR management notification if the T-EAS had subscribed for ACR notifications as specified in clause 5.8.2.5 of 3GPP TS 29.558 [4]; and

6) the EES shall return the response message.

Upon success, the EES responds with an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the POST response body.

5.6 Eees_UEIdentifier Service

5.6.1 Service Description

The Eees_UEIdentifier API, as defined in 3GPP TS 23.558 [2], allows the EEC to obtain an identifier of a UE from the EES.

5.6.2 Service Operations

5.6.2.1 Introduction

The service operations defined for the Eees_UEIdentifier API are shown in the table 5.6.2.1-1.

Table 5.6.2.1-1: Operations of the Eees_UEIdentifier API

Service operation name	Description	Initiated by
Eees_UEIdentifier_Get	This service operation is used by the EEC to request the UE identifier from the EES. (NOTE)	EEC
NOTE: The Get custom operation specified in clause 8.3.3 of 3GPP TS 29.558 [4] is used by the EEC.		

5.6.2.2 Eees_UEIdentifier_Get

5.6.2.2.1 General

This service operation is used by the EEC to obtain an identifier of a UE from the EES. The EEC is using the Get custom operation specified in clause 8.3.3 of 3GPP TS 29.558 [4].

The following procedures are supported by the "Eees_UEIdentifier_Get" service operation:

- Retrieve UE identifier.

5.6.2.2.2 Retrieve UE identifier

In order to obtain an identifier of a UE from the EES, the EEC shall send an HTTP POST request to the EES, with the request URI set to "{apiRoot}/eees-ueidentifier/<apiVersion>/get" as specified in clause 8.3.3 of 3GPP TS 29.558 [4]. In the content of the request the EEC shall include the UserInfo data structure containing the information about the user or UE available at the EEC for which the UE identifier is requested as specified in clause 8.3.5.2.3 of 3GPP TS 29.558 [4].

Upon receiving the HTTP POST request from the EEC, the EES shall:

a) verify the identity of the EEC and check if the EEC is authorized to obtain the UE identifier; and

b) if the EEC is authorized to obtain the UE's identifier information, then the EES shall:

1) invoke the Nnef_UEId Retrieve service operation as specified in clause 4.4.32 of 3GPP TS 29.522 [8] to obtain the UE identifier based on the received user information, except if the UE ID was included in the request then the invocation of the Nnef_UEId service operation shall be skipped; and

2) respond to the EEC with a "200 OK" response and include in content of the response the UeIdInfo data type as specified in clause 8.3.5.2.5 of 3GPP TS 29.558 [4].

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the content of the HTTP response.

5.7 Eees_EASInformationProvisioning Service

5.7.1 Service Description

The Eees_EASInformationProvisioning API, as defined in 3GPP TS 23.558 [2], allows an EEC to invoke via the Eees interface EAS information provisioning service operation with the EES.

5.7.2 Service Operations

5.7.2.1 Introduction

The service operation defined for Eees_EASInformationProvisioning API is shown in the table 5.7.2.1-1.

Table 5.7.2.1-1: Operations of the Eees_EASInformationProvisioning API

Service operation name	Description	Initiated by
Eees_EASInformationProvisioning_Declare	This service operation enables to declare EAS information.	EEC

5.7.2.2 Eees_EASInformationProvisioning_Declare

5.7.2.2.1 General

This service operation is used by an EEC to declare EAS information to the EES.

5.7.2.2.2 EEC exchanging EAS information in EES using Eees_EASInformationProvisioning_Declare operation

To declare information about selected EAS or ACR scenario selection or both, the EEC shall send an HTTP POST request to the EES, with the request URI set to "{apiRoot}/eees-easinfoprov/<apiVersion>/ declare" and the request body including the "EASInfoProvReq" data strcutre as described in the clause 6.6.3.2.2. The "EASInfoProvReq" shall include EECID and ACID, and may include request type, selected EASID, selected EAS endpoint, list of DNAIs, service area, CAS information, list of EES that are associated with a direct EAS bundle, and EEC security credentials.

If the request type is for:

a) ACR scenario announcement by the EEC, the request includes "selAcrScenarios" attribute to indicate the ACR scenario list supported by the EEC;

b) ACR scenario selection by the EES, the request may include the "acProf" attribute for which the selected EAS provides a service, and the "selAcrScenarios" attribute to indicate the ACR scenario list supported by the EEC; or

c) EAS selection, the request may include the "appGrpId" attribute of a common EAS, and "eesList" attribute to indicate the list of EES that supports announcement of a common EAS.

If the EEC has selected an EAS that is instantiable but not yet instantiated, the EEC includes the"selEasIds" attribute to indicate the selected EASID without including the selected EAS endpoint in the request.

Upon receiving the HTTP POST message from the EEC, the EES shall:

a) process the EAS information declaration request;

b) verify if the EEC is authorized to declare EAS information to the EES;

c) if the EEC is authorized to declare EAS information, then if the request is for:

1) ACR scenario selection by the EES, the EES selects the ACR scenario list based on the AC/EEC/EES(s)/EAS(s) service continuity support;

2) ACR scenario announcement by the EEC or selection by the EES, the EES may send the ACR Selection notification to the selected EAS or the selected bundled EAS(s) that have subscribed. Additionally for the EAS bundles scenario, if the "selAcrScenarios" attribute includes the "EAS executed ACR scenario", the EES includes "dnais" and "svcArea" attribute of the selected EAS(s) in the ACR selection notification;

A) if the request contains the "selEasIds" attribute to indicate the selected EASID and the "selEasEndPoints" attribute to indicate the selected EAS endpoint is not included, the EES verifies if instantiation of EAS is needed and may trigger the ECSP management system to instantiate the EAS;

B) if the request contains "selEasIds" attribute to indicate the selected EAS ID and "selEasEndPoints" attribute to indicate the selected EAS Endpoint, the EES may apply the EAS traffic influence with the N6 routing information of the EAS in the 3GPP Core Network, based on application KPIs and if the EAS traffic influence was not done before.

NOTE 1: EES can also influence the EAS traffic in advance.

NOTE 2: The common supported ACR scenarios is decided as part of the EAS discovery and selection procedure.

3) if the request contains " eecSvcContSupp" attribute to indicate service continuity and the EEC context has been established, the EES includes this information into the EEC context.

4) if "appGrpId" attribute is included in the request, the EES considers the provided EAS as Common EAS for the Application Group; and

5) for the common EAS scenario, if the request contains the"appGrpId" attribute, then the application group related information may be used for further common EAS announcement(s) between EES(s). In case of ECS that plays the role of center of information is:

A) not available and the request message does not contain the "eesList" attribute of EESs for a certain Application Group ID, then the EES determines the other EESs to which common EAS announce request needs to be sent as specific in clause 6.3.2.2.2 of 3GPP TS 29.558[4]; or

B) available, then EEC selected EAS is used in interaction between the EES and ECS, to determine the common EAS as specified in clause 6.4 of 3GPP TS 29.558 [4]. If a different EAS is determined as the common EAS, then it shall be shared in the EAS information provisioning response. If the common EAS is registered to another EES, then the EES endpoint of the EES where the common EAS is registered is also included in the EAS information provisioning response.

Upon success, the EES shall send response:

a) with an HTTP "200 OK" status code and the POST response body including the "EasInfoProvResp" data structure as described in the clause 6.6.5.2.3 if the EEC context is established and skip the below procedure; and

b) with an HTTP "204 No Content" status code.

On failure, the appropriate HTTP status code indicating the error shall be returned with additional error information in the POST response body.

NOTE 3: The common supported ACR scenarios is decided as part of the EAS discovery and selection procedure.

6 Edge Enabler Server API Definitions

6.1 Void

6.2 Eees_EECRegistration API

6.2.1 API URI

The request URI used in each HTTP request from the EEC towards the EES shall have the structure as defined in clause 7.5 of 3GPP TS 29.558 [4] with the following clarifications:

- The {apiRoot} shall be set as described in clause 7.5 of 3GPP TS 29.558 [4].
- The <apiName> shall be "eees-eecregistration".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.2.2.

6.2.2 Resources

6.2.2.1 Overview

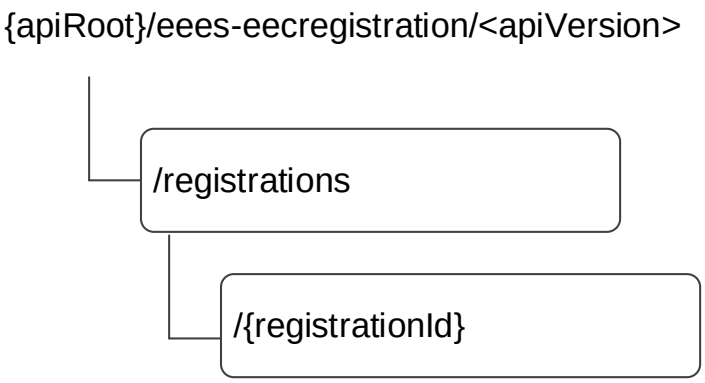

Figure 6.2.2.1-1: Resource URI structure of the Eees_EECRegistration API

Table 6.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
EEC Registrations	/registrations	POST	Create a new EEC registration at the EES
Individual EEC registration	/registrations/{registrationId}	PUT	Update an existing EEC registration a the EES
		DELETE	Remove an existing ECC registration at EES
		PATCH	Partially update an existing EEC registration a the EES

6.2.2.2 Resource: EEC Registrations

6.2.2.2.1 Description

This resource represents a collection of EEC registrations with an EES.

6.2.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eees-eecregistration/<apiVersion>/registrations**

This resource shall support the resource URI variables defined in table 6.2.2.2.2-1.

Table 6.2.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].

6.2.2.2.3 Resource Standard Methods

6.2.2.2.3.1 POST

This method creates a new registration. This method shall support the URI query parameters specified in table 6.22.2.3.1-

Table 6.2.2.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.2.2.3.1-2 and the response data structures and response codes specified in table 6.2.2.2.3.1-3

Table 6.2.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EECRegistration	M	1	EEC registration request information

Table 6.2.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EECRegistration	M	1	201 Created	EEC information is registered successfully at EES. EEC information registered with EES is provided in the response body. The URI of the created resource shall be returned in the "Location" HTTP header
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.2.2.2.3.1-4: Headers supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.2.3.1-5: Headers supported by the 201 response code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/eees-eecregistration/<apiVersion>/registrations/{registrationId}

6.2.2.2.4 Resource Custom Operations

None.

6.2.2.3 Resource: Individual EEC registration

6.2.2.3.1 Description

This resource represents an individual registration of an EEC.

6.2.2.3.2 Resource Definition

Resource URI: **{apiRoot}/eees-eecregistration//<apiVersion>/registrations/{registrationId}**

This resource shall support the resource URI variables defined in table 6.2.2.3.2-1.

Table 6.2.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].
registrationId	string	The Identifier of a specific EEC registration.

6.2.2.3.3 Resource Standard Methods

6.2.2.3.3.1 PUT

This method updates the EEC registration data by completely replacing the existing registration data. This method shall support the URI query parameters specified in table 6.2.2.3.3.1-1.

Table 6.2.2.3.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.2.3.3.1-2 and the response data structures and response codes specified in table 6.2.2.3.3.1-3.

Table 6.2.2.3.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
EECRegistration	M	1	An Individual registration resource to be updated.

Table 6.2.2.3.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EECRegistration	M	1	200 OK	An individual EEC registration resource updated successfully and the EECRegistration data shall be included in the response.
n/a			204 No Content	An individual EEC registration resource updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.2.2.3.3.1-4: Headers supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.3.3.1-5: Headers supported by the 200 response code on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.3.3.1-6: Links supported by the 200 Response Code on this endpoint

Name	Resource name	HTTP method or custom operation	Link parameter(s)	Description
n/a				

Table 6.2.2.3.3.1-7: 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 EES.

Table 6.2.2.3.3.1-8: 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 EES.

6.2.2.3.3.2 DELETE

This method deregisters (removes) an existing EEC registration. This method shall support the URI query parameters specified in table 6.2.2.3.3.2-1.

Table 6.2.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.2.3.3.2-2 and the response data structures and response codes specified in table 6.2.2.3.3.2-3.

Table 6.2.2.3.3.1-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.2.3.3.1-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	An individual EEC registration resource deleted successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.2.2.3.3.3-4: Headers supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.3.3.3-5: Headers supported by the 204 response code on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.3.3.3-6: Links supported by the 200 Response Code on this endpoint

Name	Resource name	HTTP method or custom operation	Link parameter(s)	Description
n/a				

Table 6.2.2.3.3.3-7: 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 EES.

Table 6.2.2.3.3.3-8: 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 EES.

6.2.2.3.3.3 PATCH

This method partially updates the EEC registration at EES. This method shall support the URI query parameters specified in table 6.2.2.3.3.3-1.

Table 6.2.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.2.3.3.3-2 and the response data structures and response codes specified in table 6.2.2.3.3.3-3.

Table 6.2.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
EECRegistrationPatch	M	1	An Individual registration resource to be updated.

Table 6.2.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EECRegistration	M	1	200 OK	An individual EEC registration resource updated successfully and the EECRegistration data shall be included in the response.
n/a			204 No Content	An individual EEC registration resource updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.2.2.3.3.3-4: Headers supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.3.3.3-5: Headers supported by the 200 response code on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.2.2.3.3.3-6: Links supported by the 200 Response Code on this endpoint

Name	Resource name	HTTP method or custom operation	Link parameter(s)	Description
n/a				

Table 6.2.2.3.3.3-7: 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 EES.

Table 6.2.2.3.3.3-8: 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 EES.

6.2.2.3.4 Resource Custom Operations

None.

6.2.3 Custom Operations without associated resources

None.

6.2.4 Notifications

None.

6.2.5 Data Model

6.2.5.1 General

This clause specifies the application data model supported by the Eees_EECRegistration API.

Table 6.2.5.1-1 specifies the data types defined specifically for the Eees_EECRegistration API service.

Table 6.2.5.1-1: Eees_EECRegistration API specific Data Types

Data type	Section defined	Description	Applicability
ACProfile	6.2.5.2.3	Describes information about AC used to determine services and service characteristics required	
ACServiceKPIs	6.2.5.2.5	Describes the KPIs required by the AC in order to receive required services	
DeviceType	6.2.5.3.4	Indicates devices characteristics of UE.	
EASDetail	6.2.5.2.4	Describes EAS along with service KPIs that serves the AC.	
EecRegistration	6.2.5.2.2	Describes the parameters to perform EEC Registration related operations.	
EecRegistrationPatch	6.2.5.2.6	Represents modifications of an Individual EEC registration resource.	
UnfulfillACProfRsn	6.2.5.3.3	Represents the reasons for AC profile failure during EEC Registration.	
UnfulfilledAcProfile	6.2.5.2.7	Contains AC Profile ID and reason why requirements indicated in the AC profile cannot be fulfilled.	

Table 6.2.5.1-2 specifies data types re-used by the Eees_EECRegistration API service.

Table 6.2.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ACRScenario	3GPP TS 29.558 [4]		
BitRate	3GPP TS 29.571 [5]		
DateTime	3GPP TS 29.122 [3]		
DiscoveredEas	Clause 6.3.5.2.8		
DurationSec	3GPP TS 29.122 [3]		
EASBundleInfo	3GPP TS 29.558 [4]		
EndPoint	3GPP TS 29.558 [4]		
Gpsi	3GPP TS 29.571 [5]		
LocationArea5G	3GPP TS 29.122 [3]		
ScheduledCommunicationTime	3GPP TS 29.122 [3]		
SupportedFeatures	3GPP TS 29.571 [5]		
Uinteger	3GPP TS 29.571 [5]		

6.2.5.2 Structured data types

6.2.5.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.2.5.2.2 Type: EecRegistration

Table 6.2.5.2.2-1: Definition of type EecRegistration

Attribute name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	0..1	Represents a unique identifier of the EEC.	
ueId	Gpsi	O	0..1	Represents the identifier of the UE.	
acProfs	array(ACProfile)	O	1..N	Profiles of ACs for which the EEC provides edge enabling services.	
eecSvcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EEC for service continuity. If this attribute is not present, then the EEC does not support service continuity.	
expTime	DateTime	O	0..1	Represents an expiration time for the registration. This attribute shall be present in the response of the HTTP POST message from EEC to create a new registration or in the response of the HTTP PUT message from EEC to update a specific registration. If abesent, then it indicates that the registration of EEC never expires.	
eecCntxId	string	O	0..1	Identifier of the EEC context obtained from a previous registration.	
srcEesId	string	O	0..1	Identifier of the EES that provided EEC context ID.	
endPt	EndPoint	O	0..1	The endpoint address of the EES that provided EEC context ID.	
ueMobilityReq	boolean	O	0..1	Contains the UE Mobility Support indication. When set to "true", this attribute indicates that UE Mobility support is required. When set to "false" or omitted, this attribute indicates that UE Mobility support is not required. The default value when omitted is "false".	EdgeApp_2
easSelReqInd	boolean	O	0..1	Indicates the EAS selection requirement to EES. When set to "true", this attribute indicates the EES support for EAS selection. When set to "false" or omitted, this attribute indicates the EES shall not select the EAS.	EdgeApp_2
discoveredEas	array(DiscoveredEas)	O	0..1	List of discovered EAS(s) information.	EdgeApp_2
unfulfilledAcProfs	UnfulfilledAcProfile	O	0..1	Represents the ACID of the AC Profile sent from EES, for which the requirements indicated in the AC profile cannot be fulfilled as shared in reason (NOTE)	
ueType	DeviceType	O	0..1	Indicates the device type (e.g. constrained device).	EdgeApp_2
unfulfillAcProfs	array(UnfulfilledAcProfile)	O	1..N	Represents the list of ACIDs of the AC Profile(s) sent from EES, for which the requirements indicated in the AC profile(s) cannot be fulfilled as shared in reason. (NOTE)	
NOTE: The attributes "unfulfilledAcProfs" and "unfulfillAcProfs" are mutually exclusive. The "unfulfilledAcProfs" may only be provided if there is only a single unfulfilled AC profile.					

6.2.5.2.3 Type: ACProfile

Table 6.2.5.2.3-1: Definition of type ACProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
acId	string	M	1	Identity of the AC.	
acType	string	O	0..1	The category or type of AC.	
prefEcsps	array(string)	O	1..N	Indicates to the ECS which ECSPs are preferred for the AC. The ECS may use this information in the selection of EESs.	
acSchedule	ScheduledCommunicationTime	O	0..1	Indicates the expected operation schedule of the AC (e.g. time windows)	
expAcGeoServArea	LocationArea5G	O	0..1	Indicates the expected location(s) (e.g. route) of the hosting UE during the AC's operation schedule.	
acSvcContSupp	array(ACRScenario)	O	1..N	Indicates if service continuity support is required or not for the application. The ACR scenarios supported by the AC for service continuity. If this attribute is not present, then the AC does not support service continuity.	
simInactTime	DurationSec	O	0..1	Indicates whether a simultaneous EAS connectivity in service continuity is required and the inactive time guidance for keeping connectivity towards the S-EAS.	
eass	array(EasDetail)	O	1..N	Provides the list of EAS that serve the AC along with the service KPIs required by the AC	
easBundleInfos	array(EASBundleInfo)	O	1..N	Represents a list of EAS bundles to which the EAS (identified via the "easId" attribute) belongs.	EdgeApp_2

6.2.5.2.4 Type: EasDetail

Table 6.2.5.2.4-1: Definition of type EasDetail

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. FQDN, URI.	
expectedSvcKPIs	ACServiceKPIs	O	0..1	Describes the KPIs expected in order for ACs to receive currently required services from the EAS	
minimumReqSvcKPIs	ACServiceKPIs	O	0..1	Describes the minimum KPIs required in order for ACs to receive meaningful services from the EAS	

6.2.5.2.5 Type: ACServiceKPIs

Table 6.2.5.2.5-1: Definition of type ACServiceKPIs

Attribute name	Data type	P	Cardinality	Description	Applicability
connBand	BitRate	O	0..1	The required connection bandwidth in Kbit/s for the application.	
reqRate	Uinteger	O	0..1	The request rate to be generated by the AC.	
respTime	DurationSec	O	0..1	Response time required for the server servicing the requests.	
avail	Uinteger	O	0..1	Percentage of time the server is required to be available for the AC's use.	
reqComp	string	O	0..1	The compute resources required by the AC.	
reqGrapComp	string	O	0..1	The graphical compute resources required by the AC.	
reqMem	string	O	0..1	The memory resources required by the AC.	
reqStrg	string	O	0..1	The storage resources required by the AC.	

6.2.5.2.6 Type: EecRegistrationPatch

Table 6.2.5.2.6-1: Definition of type EecRegistrationPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
acProfs	array(ACProfile)	O	1..N	Profiles of ACs for which the EEC provides edge enabling services.	
expTime	DateTime	O	0..1	Represents an expiration time for the registration.	
ueMobilityReq	boolean	O	0..1	Contains the UE Mobility Support indication. When set to "true", this attribute indicates that UE Mobility support is required. When set to "false" this attribute indicates that UE Mobility support is not required.	EdgeApp_2
easSelReqInd	boolean	O	0..1	Indicates the EAS selection requirement to EES. When set to "true", this attribute indicates the EES shall select the EAS. When set to "false", this attribute indicates the EES shall not select the EAS.	EdgeApp_2
ueType	DeviceType	O	0..1	Indicates the device type (e.g. constrained device).	EdgeApp_2

6.2.5.2.7 Type: UnfulfilledAcProfile

Table 6.2.5.2.7-1: Definition of type UnfulfilledAcProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
acId	string	M	0..1	The list of identifier of the AC profile	
reason	UnfulfillACProfRsn	O	0..1	Reason indicating the cause (e.g. EAS not available, requirements cannot be fulfilled)	

6.2.5.3 Simple data types and enumerations

6.2.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.2.5.3.2 Simple data types

The simple data types defined in table 6.2.5.3.2-1 shall be supported.

Table 6.2.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.2.5.3.3 Enumeration: UnfulfillACProfRsn

The enumeration UnfulfillACProfRsn represents the reasons for AC profile failure during EEC Registration. It shall comply with the provisions defined in table 6.2.5.3.3-1.

Table 6.2.5.3.3-1: Enumeration UnfulfillACProfRsn

Enumeration value	Description	Applicability
EAS_NOT_AVAILABLE	EAS not available	
REQ_UNFULFILLED	Requirements cannot be fulfilled	

6.2.5.3.4 Enumeration: DeviceType

The enumeration DeviceType indicates the devices characteristics of UE (e.g. constrained device). It shall comply with the provisions defined in table 6.2.5.3.4-1.

Table 6.2.5.3.4-1: Enumeration DeviceType

Enumeration value	Description	Applicability
CONSTRAINED_UE	UE is constrained with resources.	
NORMAL_UE	UE is not constrained.	

6.2.6 Error Handling

6.2.6.0 General

General error handling are described in clause 7.7 of 3GPP TS 29.558 [4].

6.2.6.1 Application Errors

The application errors defined for the Eees_EECRegistration service are listed in Table 6.2.6.1-1. The EES shall include in the HTTP status code a "ProblemDetails" data structure with the "cause" attribute indicating the application error as listed in table 6.2.6.1-1.

Table 6.2.6.1-1: Application errors

Application Error	HTTP status code	Description
RESOURCE_NOT_FOUND	404 Not Found	Indicates that the requirements included in the EEC registration request e.g., the AC Profile(s) cannot be fulfilled.

6.2.7 Feature negotiation

General feature negotiation procedures are described in clause 7.8 of 3GPP TS 29.558 [4]. Table 6.2.7-1 lists the supported features for Eees_EECRegistration API.

Table 6.2.7-1: Supported Features

Feature number	Feature Name	Description
1	EdgeApp_2	This feature indicates support of the enhancements for the Enabling Edge Applications. Within this feature the following enhancements are covered: - support of EAS bundle information; - sharing EAS selection indication; - UE Mobility Support; and - the EEC support of application triggering to perform EAS discovery.

6.3 Eees_EASDiscovery API

6.3.1 API URI

The Eees_EASDiscovery service shall use the Eees_EASDiscovery API.

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 7.5 of 3GPP TS 29.558 [4] with the following clarifications:

- The {apiRoot} shall be set as described in clause 7.5 of 3GPP TS 29.558 [4].
- The <apiName> shall be "eees-easdiscovery".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.3.2.

6.3.2 Resources

6.3.2.1 Overview

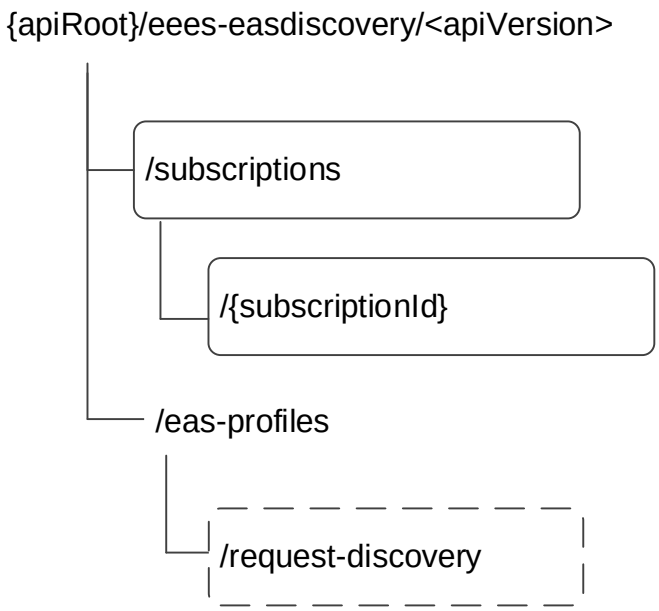

Figure 6.3.2.1-1: Resource URI structure of the Eees_EASDiscovery API

Table 6.3.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.3.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
EAS Discovery Subscriptions	/subscriptions	POST	Creates a new individual EAS discovery subscription.
Individual EAS Discovery Subscription	/subscriptions/{subscriptionId}	PUT	Updates an existing individual EAS discovery subscription identified by the subscriptionId.
		DELETE	Deletes an existing individual EAS discovery subscription identified by the subscriptionId.
		PATCH	Partial update an existing EAS Discovery Subscription resource identified by a subscriptionId.
EAS Profiles	/eas-profiles/request-discovery	request-discovery (POST)	Request EAS discovery.

NOTE 1: Based on SA3 specified security mechanisms for EDGE-1, EDGE-3 and EDGE-9 interfaces, the EES can identify the initiator of the API (i.e. EEC, EAS or EES) and apply the appropriate security procedures as specified in 3GPP TS 33.558 [20].

NOTE 2: The same service API can be implemented on different interfaces, i.e. EDGE-1, EDGE-3 and EDGE-9, which are for separate endpoints, i.e. EEC, EAS and EES.

6.3.2.2 Resource: EAS Discovery Subscriptions

6.3.2.2.1 Description

This resource represents the collection of EAS Discovery Subscriptions managed by the EES.

6.3.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eees-easdiscovery/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.3.2.2.2-1.

Table 6.3.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].

6.3.2.2.3 Resource Standard Methods

6.3.2.2.3.1 POST

This method shall support the URI query parameters specified in table 6.3.2.2.3.1-1.

Table 6.3.2.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.3.2.2.3.1-2 and the response data structures and response codes specified in table 6.3.2.2.3.1-3.

Table 6.3.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EASDiscoverySubscription	M	1	Create an Individual EAS Discovery Subscription resource.

Table 6.3.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EASDiscoverySubscription	M	1	201 Created	Successful case. An Individual EAS Discovery Subscription resource was successfully created and a representation of the created resource is returned in the response body. The URI of the created resource shall be returned in an HTTP "Location" header
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.3.2.2.3.1-4: Headers supported by the 201 response code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/eees-easdiscovery/<apiVersion>/subscriptions/{subscriptionId}

6.3.2.2.4 Resource Custom Operations

None.

6.3.2.3 Resource: Individual EAS Discovery Subscription

6.3.2.3.1 Description

This resource represents of an Individual EAS Discovery Subscription resource managed by the EES.

6.3.2.3.2 Resource Definition

Resource URI: **{apiRoot}/eees-easdiscovery/<apiVersion>/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 6.3.2.3.2-1.

Table 6.3.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].
subscriptionId	string	The identifier of the individual EAS discovery subscription.

6.3.2.3.3 Resource Standard Methods

6.3.2.3.3.1 PUT

This method shall support the URI query parameters specified in table 6.3.2.3.3.1-1.

Table 6.3.2.3.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.3.2.3.3.1-2 and the response data structures and response codes specified in table 6.3.2.3.3.1-3.

Table 6.3.2.3.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
EASDiscoverySubscription	M	1	An individual EAS discovery subscription resource to be updated.

Table 6.3.2.3.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EASDiscoverySubscription	M	1	200 OK	The Individual EAS Discovery Subscription resource was successfully updated and a representation of the updated resource is returned in the response body.
n/a			204 No Content	The Individual EAS Discovery Subscription resource was successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The mandatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.3.2.3.3.1-4: 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 EES.

Table 6.3.2.3.3.1-5: 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 EES.

6.3.2.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.3.2.3.3.2-1.

Table 6.3.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.3.2.3.3.2-2 and the response data structures and response codes specified in table 6.3.2.3.3.2-3.

Table 6.3.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.3.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The targeted Individual EAS Discovery Subscription resource was successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.3.2.3.3.2-4: 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 EES.

Table 6.3.2.3.3.2-5: 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 EES.

6.3.2.3.3.3 PATCH

This method shall support the URI query parameters specified in the table 6.3.2.3.3.3-1.

Table 6.3.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.3.2.3.3.3-2 and the response data structures and response codes specified in table 6.3.2.3.3.3-3.

Table 6.3.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
EasDiscoverySubscriptionPatch	M	1	Contains the parameters to request the modification of an existing Individual EAS Discovery Subscription resource.

Table 6.3.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EasDiscoverySubscription	M	1	200 OK	The Individual EAS Discovery Subscription resource was successfully modified and a representation of the modified resource is returned in the response body.
n/a			204 No Content	The Individual EAS Discovery Subscription resource was successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The mandatory HTTP error status code for the PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.3.2.3.3.3-4: 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 EES.

Table 6.3.2.3.3.3-5: 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 EES.

6.3.2.3.4 Resource Custom Operations

None.

6.3.2.4 Resource: EAS Profiles

6.3.2.4.1 Description

This resource represents the collection of EAS Profiles managed by the EES.

6.3.2.4.2 Resource Definition

Resource URI: **{apiRoot}/eees-easdiscovery/<apiVersion>/eas-profiles**

This resource shall support the resource URI variables defined in table 6.3.2.2.2-1.

Table 6.3.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].

6.3.2.4.3 Resource Standard Methods

None.

6.3.2.4.4 Resource Custom Operations

6.3.2.4.4.1 Overview

Resource custom operations defined for this resource are summarized in table 6.3.2.4.4.1-1.

Table 6.3.2.4.4.1-1: Custom operations

Operation name	Custom operaration URI	Mapped HTTP method	Description
Request-Discovery	eees-easdiscovery/<apiVersion>/ eas-profile /request-discovery	POST	Request EAS discovery information

6.3.2.4.4.2 Operation: RequestDiscovery

6.3.2.4.4.2.1 Description

The custom operation allows a service consumer (e.g. EEC, EAS, EES) to request EAS discovery, as specified in 3GPP TS 23.558 [2], from the EES.

6.3.2.4.4.2.2 Operation Definition

This operation shall support the request of data structures specified in table 6.3.2.4.4.2.2-1 and the response data structure and response codes specified in table 6.3.2.4.4.2.2-2.

Table 6.3.2.4.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EASDiscoveryReq	M	1	Contains the necessary information to request EAS discovery.

Table 6.3.2.4.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EASDiscoveryResp	M	1	200 OK	The requested EAS discovery information was successfully returned.
n/a			204 No Content	The processing of the request is successful but no matching EAS was found.
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

6.3.3 Custom operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

6.3.4 Notifications

6.3.4.1 General

Table 6.3.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
EAS Discovery Notification	{notificationDestination}	POST	Notifies a subscribed EEC about EAS discovery information.

6.3.4.2 EAS Discovery Notification

6.3.4.2.1 Description

EAS Discovery notification is used by the EES to notify an EEC on EAS discovery information. The EEC may subscribe to the EAS discovery information as a pre-condition for receiving notification.

6.3.4.2.2 Target URI

The Callback URI **"{notificationDestination}"** shall be used with the callback URI variables defined in table 8.6.4.2.2-1.

Table 6.3.4.2.2-1: Callback URI variables

Name	Definition
notificationDestination	String formatted as URI with the Callback Uri.

6.3.4.2.3 Standard Methods

6.3.4.2.3.1 POST

This method shall support the request data structures specified in table 6.3.4.2.3.1-1 and the response data structures and response codes specified in table 6.3.4.2.3.1-2.

Table 6.3.4.2.3.1-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EasDiscoveryNotification	M	1	Notification of EAS discovery information.

Table 6.3.4.2.3.1-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative EEC where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative EEC where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.3.4.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative EAS towards which the notification should be redirected.

Table 6.3.4.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative EAS towards which the notification should be redirected.

6.3.5 Data Model

6.3.5.1 General

This clause specifies the application data model supported by the Eees_EASDiscovery API.

Table 6.3.5.1-1 specifies the data types defined specifically for the Eees_EASDiscovery API service.

Table 6.3.5.1-1: Eees_EASDiscovery API specific Data Types

Data type	Section defined	Description	Applicability
ACCharacteristics	6.3.5.2.11		
DiscoveredEas	6.3.5.2.8		
EasCharacteristics	6.3.5.2.7		
EASDiscEventIDs	6.3.5.3.3		
EasDiscoveryFilter	6.3.5.2.6		
EasDiscoveryNotification	6.3.5.2.5		
EasDiscoveryReq	6.3.5.2.2		
EasDiscoveryResp	6.3.5.2.3		
EasDiscoverySubscription	6.3.5.2.4		
EasDiscoverySubscriptionPatch	6.3.5.2.12		
EasDynamicInfoFilter	6.3.5.2.9		
EasDynamicInfoFilterData	6.3.5.2.10		
EdgeLoadAnalytic	6.3.5.2.14	Contains the statistical analytics data and predictive analytics data.	
PredictiveData	6.3.5.2.15	Contains the predictive analytics data for each discovered EAS service change.	
RequestorId	6.3.5.2.13		
StatisticalData	6.3.5.2.16	Contains the statistical analytics data,	

Table 6.3.5.1-2 specifies data types re-used by the Eees_EASDiscovery API service.

Table 6.3.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ACProfile	clause 6.2.5.2.3		
ACRScenario	3GPP TS 29.558 [4]		
AppGroupProfile	clause 8.1.5.2.13	Represents the application group profile used for Common EAS.	EdgeApp_2
DateTime	3GPP TS 29.122 [3]		
Dnai	3GPP TS 29.571 [5]		
DurationSec	3GPP TS 29.122 [3]		
EASBundleInfo	3GPP TS 29.558 [4]	Represents EAS bundle information.	EdgeApp_2
EASCategory	3GPP TS 29.558 [4]	Represents the EAS type.	
EASInstantiationInfo	3GPP TS 29.558 [4]		EdgeApp_2
EASProfile	3GPP TS 29.558 [4]		
EndPoint	3GPP TS 29.558 [4]		
Gpsi	3GPP TS 29.571 [5]	Used to identify a UE.	
LocationArea5G	3GPP TS 29.122 [3]		
LocationInfo	3GPP TS 29.122 [3]		
PlmnIdNid	3GPP TS 29.571 [5]	Identifies the network: PLMN Identifier or the SNPN Identifier (the PLMN Identifier and the NID).	EdgeApp_2
RouteToLocation	3GPP TS 29.571 [5]		
ScheduledCommunicationTime	3GPP TS 29.122 [3]	Represents the scheduled communication time.	EdgeApp_2
SupportedFeatures	3GPP TS 29.571 [5]		
TimeWindow	3GPP TS 29.122 [3]		
Uinteger	3GPP TS 29.571 [5]	Unsigned Integer, i.e. only value 0 and integers above 0 are permissible.	EdgeApp_2
Uri	3GPP TS 29.122 [3]		
WebsockNotifConfig	3GPP TS 29.122 [3]		

6.3.5.2 Structured data types

6.3.5.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.3.5.2.2 Type: EasDiscoveryReq

Table 6.3.5.2.2-1: Definition of type EasDiscoveryReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	RequestorId	M	1	Represents a unique identifier of the requestor (e.g. EEC, EAS, EES).	
ueId	Gpsi	O	0..1	Represents the identifier of the UE.	
easDiscoveryFilter	EasDiscoveryFilter	O	0..1	Contains EAS characteristics	
eecSvcContinuity	array(ACRScenario)	O	1..N	Contains service continuity support; indicates EEC supported ACR scenarios. If this attribute is not present, then the EEC does not support service continuity.	
eesSvcContinuity	array(ACRScenario)	O	1..N	Contains service continuity support; indicates EES supported ACR scenarios. If this attribute is not present, then the EES does not support service continuity.	
easSvcContinuity	array(ACRScenario)	O	1..N	Contains service continuity support; indicates EAS supported ACR scenarios. If this attribute is not present, then the EAS does not support service continuity.	
locInf	LocationInfo	O	0..1	Represents location information of the UE.	
easTDnai	Dnai	O	0..1	Contains the target DNAI information which can be associated with potential target-EAS(s)	
easSelSupInd	boolean	O	0..1	Indicates if the EEC requires the EAS selection support from the EES (e.g., for constrained device). "true": the EAS selection is required from the EES. "false" (default): the EAS selection is not required from the EES.	EdgeApp_2
suppFeat	SupportedFeatures	C	0..1	Represents a list of Supported features used as described in clause 6.3.7. Shall be present in the HTTP POST request/response.	
easIntTrigSup	boolean	O	0..1	Indicates to the EES whether the EAS instantiation triggering should be performed for the current request. "false" (default): the EAS instantiation triggering should not be performed. "true": the EAS instantiation triggering should be performed. If the attribute is omitted, then it default value is "false".	EdgeApp_2
predictExpTime	DateTime	O	0..1	Represents the predicted expiration time by which the UE reaches location. It is used by the EES as analytics input to get edge load analytics information from the ADAES service as described in clause 8.8.2 of 3GPP TS 23.436 [9].	EdgeApp_2
servingPLMNInfo	PlmnIdNid	O	0..1	Represents the serving PLMN information (e.g. PLMN ID) which is serving the subscriber. (NOTE 1)	EdgeApp_2
svcContinuityPlanInd	boolean	O	0..1	Indicates to the EES whether the EAS discovery request is triggered as part of service continuity planning. "true": this request is part of service continuity planning. "false" (default): this request is not of part service continuity planning. (NOTE 2)	EdgeApp_2
NOTE 1: This IE shall be included if edge node sharing is used. NOTE 2: This attribute is used by EAS when invoking T-EAS discovery procedure.					

Editor's Note: Representing the MNO name in "EasDiscoveryReq" type needs to be clarified by stage-2.

6.3.5.2.3 Type: EasDiscoveryResp

Table 6.3.5.2.3-1: Definition of type EasDiscoveryResp

Attribute name	Data type	P	Cardinality	Description	Applicability
discoveredEas	array(DiscoveredEas)	M	1..N	List of EAS discovery information. (NOTE)	
easInstInfos	map(EASInstantiationInfo)	O	1..N	Contains the EAS instantiation information for each EAS identified by the "discoveredEas" attribute. The key of the map shall be the EAS ID to which the provided instantiation information within the map value relates.	EdgeApp_2
edgeLoadAnalytics	map(EdgeLoadAnalytic)	O	1..N	Contains the statistical analytics data and predictive analytics data for each discovered application server. The key of the map shall be the EAS ID to which the provided analytics data within the map value relates.	EdgeApp_2
NOTE: If EAS discovery is used for ENS scenario, discovered EAS list contains only those EAS(s) which are allowed to be used by the subscribers of the serving MNO.					

6.3.5.2.4 Type: EasDiscoverySubscription

Table 6.3.5.2.4-1: Definition of type EasDiscoverySubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	1	Represents a unique identifier of the EEC.	
ueId	Gpsi	O	0..1	Represents the identifier of the UE.	
easEventType	EASDiscEventIDs	M	1	Event type for which the EEC should be notified;	
easDiscoveryFilter	EasDiscoveryFilter	O	0..1	EAS characteristics filter; Applicable when easEventType is set to "EAS_AVAILABILITY_CHANGE" event	
easDynInfoFilter	EasDynamicInfoFilter	O	0..1	EAS dynamic information changes filter; Applicable when easEventType is set to "EAS_DYNAMIC_INFO_CHANGE" event	
easSvcContinuity	array(ACRScenario)	O	1..N	Service continuity support; indicates EEC supported ACR scenarios. (NOTE 1)	
notificationDestination	Uri	O	0..1	URI where the EAS discovery notification should be delivered to. This attribute may be present in HTTP POST message to EES. (NOTE 2, NOTE 3)	
expTime	DateTime	O	0..1	Expiration time of the subscription. If the expiration time is not present, then it indicates that the EEC subscription never expires.	
requestTestNotification	boolean	O	0..1	Set to true by Subscriber to request the EES to send a test notification as defined in clause 7.6 of 3GPP TS 29.558 [4]. Set to false or omitted otherwise.	Notification_test_event
websockNotifConfig	WebsockNotifConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 7.6 of 3GPP TS 29.558 [4].	Notification_websocket
suppFeat	SupportedFeatures	C	0..1	Represents a list of Supported features used as described in clause 6.3.7. Shall be present in the HTTP POST request/response.	
easIntTrigSup	boolean	O	0..1	Indicates to the EES whether the EAS instantiation triggering should be performed for the current request. "false" (default): the EAS instantiation triggering should not be performed. "true": the EAS instantiation triggering should be performed. If the attribute is omitted, then it default value is "false".	EdgeApp_2
eecTriggerRequest	boolean	O	0..1	Indicates to the EES, whether the application triggering is required by the EEC "false" (default): the EEC doesn't not require triggers. "true": the EEC requires triggers. (NOTE 2)	EdgeApp_2

NOTE 1: In the OpenAPI file this attribute is named as "easSvcContinuity", and for backward compatibility considerations kept as currently defined although it indicates the EEC supported ACR scenarios.
NOTE 2: Either notificationDestination or eecTriggerRequest may be included in the EAS discovery subscription request.
NOTE 3: The notificationDestination attribute may contain Notification Target Address URL received from the SNM-C as defined in clause 10.

6.3.5.2.5 Type: EasDiscoveryNotification

Table 6.3.5.2.5-1: Definition of type EasDiscoveryNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subId	string	M	1	String identifying the individual subscription for which the service provisioning notification is delivered.	
eventType	EASDiscEventIDs	M	1	Event type for which the notification is delivered;	
discoveredEas	array(DiscoveredEas)	M	1..N	List of EAS discovery information	
easInstInfos	map(EASInstantiationInfo)	O	1..N	Contains the EAS instantiation information for each EAS identified by the "discoveredEas" attribute. The key of the map shall be the EAS ID to which the provided instantiation information within the map value relates.	EdgeApp_2
edgeLoadAnalytics	map(EdgeLoadAnalytic)	O	1..N	Contains the statistical analytics data and predictive analytics data for each discovered application server. The key of the map shall be the EAS ID to which the provided analytics data within the map value relates.	EdgeApp_2

6.3.5.2.6 Type: EasDiscoveryFilter

Table 6.3.5.2.6-1: Definition of type EasDiscoveryFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
acChars	array(ACCharacteristics)	O	1..N	AC description for which an EAS is needed	
appGroupProfile	AppGroupProfile	O	0..1	Application group profile associated with the AC Profile.	EdgeApp_2
easChars	array(EasCharacteristics)	O	1..N	Required EAS characteristics	
NOTE 1: Either acChars or easChars shall be present. NOTE 2: prefEcsps from the ACProfile shall not be present.					

6.3.5.2.7 Type: EasCharacteristics

Table 6.3.5.2.7-1: Definition of type EasCharacteristics

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	O	0..1	The application identifier of the EAS, e.g. FQDN, URI.	
easProvId	string	O	0..1	EAS provider identifier	
appGrpId	string	O	0..1	The application group identifier, identifying a group of UEs using the same application service.	EdgeApp_2
easSyncInd	boolean	O	0..1	Indicates whether the synchronization between the EASs is required. "true": the EAS synchronization is required. "false" (default): the EAS synchronization is not required.	EdgeApp_2
stdEasType	EASCategory	O	0..1	The EAS type with the 3GPP standardized value set. (NOTE 2)	
easType	string	O	0..1	The EAS type with flexible value set between the EEC and the EAS.	
easSched	TimeWindow	O	0..1	EAS availability schedule	
svcArea	LocationArea5G	O	0..1	Service availability area (geographical and topological)	
easSvcContinuity	array(ACRScenario)	O	1..N	The ACR scenarios required by the EAS for service continuity. If this attribute is not present, then the EAS does not require to support service continuity.	
svcPermLevel	string	O	0..1	Service permissions level	
svcFeats	array(string)	O	1..N	Service features	
easBundleInfo	EASBundleInfo	O	0..1	Represents the EAS bundle information.	EdgeApp_2

NOTE 1: Must include at least one optional IE.
NOTE 2: The "stdEasType" attribute and the "easType" attribute are mutually exclusive. Either one of them may be provided. The same attribute should be used when this data type is conveyed over the EDGE-1 and EDGE-3 interfaces (i.e. for the Eees_EASRegistration and the Eees_EASDiscovery APIs).

6.3.5.2.8 Type: DiscoveredEas

Table 6.3.5.2.8-1: Definition of type DiscoveredEas

Attribute name	Data type	P	Cardinality	Description	Applicability
eas	EASProfile	M	1	Contains an EAS matching the discovery request filters	
eesEndPt	EndPoint	O	0..1	Endpoint information (e.g. URI, FQDN, IP address) used to communicate with the EES. This information is provided to the EEC to connect to the EES.	EdgeApp_2
lifeTime	DateTime	O	0..1	Indicates the time duration for which the EAS information is valid and supposed to be cached in the EEC.	

6.3.5.2.9 Type: EasDynamicInfoFilter

Table 6.3.5.2.9-1: Definition of type EasDynamicInfoFilter

Attribute name	Data type	P	Cardinality	Description	Applicability
dynInfoFilter	array(EasDynamicInfoFilterData)	M	1..N	List of EAS dynamic information required by the EEC per EAS	

6.3.5.2.10 Type: EasDynamicInfoFilterData

Table 6.3.5.2.10-1: Definition of type EasDynamicInfoFilterData

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. FQDN, URI.	
easStatus	boolean	O	0..1	Notify if EAS status changed	
easAcIds	boolean	O	0..1	Notify if list of AC identifiers changed	
easDesc	boolean	O	0..1	Notify if EAS description changed	
easPt	boolean	O	0..1	Notify if EAS endpoint changed	
easEndPoint	EndPoint	O	0..1	Contains the EAS endpoint to be monitored by the EES.	EdgeApp_2
easFeature	boolean	O	0..1	Notify if EAS feature changed	
easSchedule	boolean	O	0..1	Notify if EAS schedule changed	
svcArea	boolean	O	0..1	Notify if EAS service area changed	
svcKpi	boolean	O	0..1	Notify if EAS KPIs changed	
svcCont	boolean	O	0..1	Notify if EAS supported ACR changed	

6.3.5.2.11 Type: ACCharacteristics

Table 6.3.5.2.11-1: Definition of type ACCharacteristics

Attribute name	Data type	P	Cardinality	Description	Applicability
acProf	ACProfile	M	1	Profiles of ACs for which the EEC provides edge enabling services.	

6.3.5.2.12 Type: EasDiscoverySubscriptionPatch

Table 6.3.5.2.12-1: Definition of type EasDiscoverySubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
easDiscoveryFilter	EasDiscoveryFilter	O	0..1	EAS characteristics filter; Applicable when easEventType is set to "EAS_AVAILABILITY_CHANGE" event.	
easDynInfoFilter	EasDynamicInfoFilter	O	0..1	EAS dynamic information changes filter; Applicable when easEventType is set to "EAS_DYNAMIC_INFO_CHANGE" event.	
easSvcContinuity	array(ACRScenario)	O	1..N	Service continuity support; indicates EEC supported ACR scenarios. (NOTE)	
expTime	DateTime	O	0..1	Expiration time of the subscription.	
easEventType	EASDiscEventIDs	O	0..1	Event type for which the EEC should be notified.	
NOTE: In the OpenAPI file this attribute is named as "easSvcContinuity", and for backward compatibility considerations kept as currently defined although it indicates the EEC supported ACR scenarios.					

6.3.5.2.13 Type: RequestorId

Table 6.3.5.2.13-1: Definition of type RequestorId

Attribute name	Data type	P	Cardinality	Description	Applicability
eesId	string	C	0..1	The identifier of the EES (e.g. S-EES).	
easId	string	C	0..1	The application identifier of the EAS (e.g. S-EAS), e.g. FQDN, URI.	
eecId	string	C	0..1	The identifier of the EEC.	
NOTE: Either the "eecId" attribute, the "eesId" attribute or the "easId" attribute shall be provided, they are mutually exclusive.					

6.3.5.2.14 Type: EdgeLoadAnalytic

Table 6.3.5.2.14-1: Definition of type EdgeLoadAnalytic

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. FQDN, URI.	
predictData	PredictiveData	O	0..1	Contains the predictive analytics data for each discovered EAS service status (e.g. EAS schedule, EAS status) change. (NOTE 1)	
statisticData	StatisticalData	O	0..1	Contains the statistical analytics data (e.g. number of times the client received expected performance from the EAS). (NOTE 2)	
NOTE 1: The EES may provide the "predictData" attribute within the EAS discovery response and if the eventType is set to the "EAS_DYNAMIC_INFO_CHANGE" event within the EAS discovery notification request. NOTE 2: The EES may provide the "statisticData" attribute within the EAS discovery response and if the eventType is set to the "EAS_AVAILABILITY_CHANGE" event within the EAS discovery notification request.					

6.3.5.2.15 Type: PredictiveData

Table 6.3.5.2.15-1: Definition of type PredictiveData

Attribute name	Data type	P	Cardinality	Description	Applicability
scheds	array(ScheduledCommunicationTime)	O	1..N	Indicates the availability schedule of the EAS.	
status	string	O	0..1	Indicates the EAS status (e.g. Enabled, Disabled etc.).	

6.3.5.2.16 Type: StatisticalData

Table 6.3.5.2.16-1: Definition of type StatisticalData

Attribute name	Data type	P	Cardinality	Description	Applicability
numRecPerf	Uinteger	O	0..1	Indicates a number of times the client received expected performance from the EAS.	

6.3.5.3 Simple data types and enumerations

6.3.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.3.5.3.2 Simple data types

The simple data types defined in table 6.3.5.3.2-1 shall be supported.

Table 6.3.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.3.5.3.3 Enumeration: EASDiscEventIDs

The enumeration EASDiscEventIDs represents the ACR events supported. It shall comply with the provisions defined in table 6.3.5.3.3-1.

Table 6.3.5.3.3-1: Enumeration EASDiscEventIDs

Enumeration value	Description	Applicability
EAS_AVAILABILITY_CHANGE	Represents the EAS availability change event	
EAS_DYNAMIC_INFO_CHANGE	Represents the EAS dynamic information change event	

6.3.6 Error Handling

6.3.6.1 General

For the Eees_EASDiscovery API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [3]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [3] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [3].

In addition, the requirements in the following clauses are applicable for the Eees_EASDiscovery API.

6.3.6.2 Protocol Errors

No specific protocol errors for the Eees_EASDiscovery API are specified.

6.3.6.3 Application Errors

The application errors defined for the Eees_EASDiscovery service are listed in Table 6.3.6.3-1.

Table 6.3.6.1-1: Application errors

Application Error	HTTP status code	Description
REGISTRATION_REQUIRED	403 Forbidden	Indicates that the registration is required for the EEC to perform the operation.

6.3.7 Feature negotiation

General feature negotiation procedures are described in clause 7.8 of 3GPP TS 29.558 [4]. Table 6.3.7-1 lists the supported features for Eees_EASDiscovery API.

Table 6.3.7-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 7.6 of 3GPP TS 29.558 [4].
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 7.6 of 3GPP TS 29.558 [4]. This feature requires that the Notification_test_event feature is also supported.
3	enNB1	This feature indicates the support of the support of enhancements to this northbound API in Rel-18.
4	EdgeApp_2	This feature indicates support of the enhancements for the Enabling Edge Applications. Within this feature the following enhancements are covered: - support of constrained devices for Edge (e.g. support of the EEC with Reduced Capabilities); - support of the EAS instantiation triggering; - support of the EAS synchronization; - support of EAS bundle information; - support for predicted/expected UE location or Geographical service area during service continuity; - support for common EAS enhancement; and - obtaining edge load analytics information.

6.4 Eees_ACREvents API

6.4.1 API URI

The request URI used in each HTTP request from the EEC towards the EES shall have the structure as defined in clause 7.5 of 3GPP TS 29.558 [4] with the following clarifications:

- The {apiRoot} shall be set as described in clause 7.5 of 3GPP TS 29.558 [4].
- The <apiName> shall be "eees-acrevents".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.4.2.

6.4.2 Resources

6.4.2.1 Overview

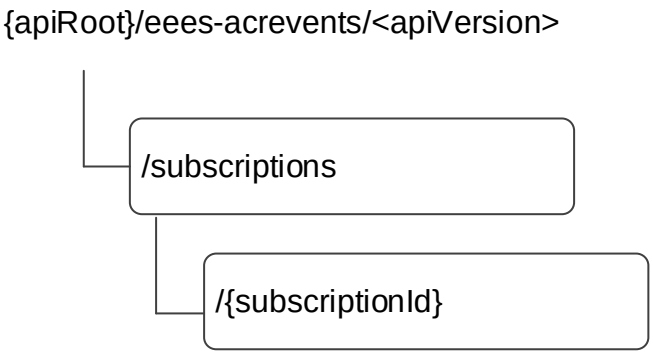

Figure 6.4.2.1-1: Resource URI structure of the Eees_ACREvents API

Table 6.4.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.4.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
ACR events subscriptions	/subscriptions	POST	Creates a new individual ACR events subscription.
Individual ACR events subscription	/subscriptions/{subscriptionId}	PUT	Updates an existing individual ACR events subscription identified by the subscriptionId.
		DELETE	Deletes an existing individual ACR events subscription identified by the subscriptionId.
		PATCH	Partially updates an existing individual ACR events subscription identified by the subscriptionId.

6.4.2.2 Resource: ACR events subscriptions

6.4.2.2.1 Description

This resource represents a collection of ACR related events subscriptions with an EES.

6.4.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eees-acrevents/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.4.2.2.2-1.

Table 6.4.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].

6.4.2.2.3 Resource Standard Methods

6.4.2.2.3.1 POST

This method creates a new subscription. This method shall support the URI query parameters specified in table 6.4.2.2.3.1-1.

Table 6.4.2.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.4.2.2.3.1-2 and the response data structures and response codes specified in table 6.4.2.2.3.1-3.

Table 6.4.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ACREventsSubscription	M	1	Create an Individual ACR events subscription resource.

Table 6.4.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACREventsSubscription	M	1	201 Created	Individual ACR events subscription resource created successfully. The URI of the created resource shall be returned in the "Location" HTTP header
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.4.2.2.3.1-4: Headers supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.2.3.1-5: Headers supported by the 201 response code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/eees-acrevents/<apiVersion>/subscriptions/{subscriptionId}

6.4.2.2.4 Resource Custom Operations

None.

6.4.2.3 Resource: Individual ACR events subscription

6.4.2.3.1 Description

This resource represents modification or deletion of an Individual ACR events subscription resource.

6.4.2.3.2 Resource Definition

Resource URI: **{apiRoot}/eees-acrevents/<apiVersion>/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 6.4.2.3.2-1.

Table 6.4.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4].
subscriptionId	string	The identifier of a specific individual ACR events subscription.

6.4.2.3.3 Resource Standard Methods

6.4.2.3.3.1 PUT

This method updates the individual ACR events subscription resource by completely replacing the existing subscription data (except subscriptionId). This method shall support the URI query parameters specified in table 6.4.2.3.3.1-1.

Table 6.4.2.3.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.4.2.3.3.1-2 and the response data structures and response codes specified in table 6.4.2.3.3.1-3.

Table 6.4.2.3.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ACREventsSubscription	M	1	An individual ACR events subscription resource to be updated.

Table 6.4.2.3.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACREventsSubscription	M	1	200 OK	An individual ACR events subscription resource updated successfully and the ACREventsSubscription data shall be included in the response.
n/a			204 No Content	An individual ACE events subscription resource updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.4.2.3.3.1-4: Headers supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.3.3.1-5: Headers supported by the 200 response code on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.3.3.1-6: Links supported by the 200 Response Code on this endpoint

Name	Resource name	HTTP method or custom operation	Link parameter(s)	Description
n/a				

Table 6.4.2.3.3.1-7: 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 EES.

Table 6.4.2.3.3.1-8: 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 EES.

6.4.2.3.3.2 DELETE

This method terminates an existing individual ACR events subscription. This method shall support the URI query parameters specified in table 6.4.2.3.3.2-1.

Table 6.4.2.3.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.4.2.3.3.2-2 and the response data structures and response codes specified in table 6.4.2.3.3.2-3.

Table 6.4.2.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.2.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	An individual individual ACR events subscription resource deleted successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.4.2.3.3.2-4: Headers supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.3.3.2-5: Headers supported by the 204 response code on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.3.3.2-6: 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 EES.

Table 6.4.2.3.3.2-7: 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 EES.

6.4.2.3.3.3 PATCH

This method partially updates the individual ACR events subscription resource. This method shall support the URI query parameters specified in table 6.4.2.3.3.3-1.

Table 6.4.2.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.4.2.3.3.3-2 and the response data structures and response codes specified in table 6.4.2.3.3.3-3.

Table 6.4.2.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
ACREventsSubscriptionPatch	M	1	An individual ACR events subscription resource to be updated.

Table 6.4.2.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACREventsSubscription	M	1	200 OK	An individual ACR events subscription resource updated successfully and the ACREventsSubscription data shall be included in the response.
n/a			204 No Content	An individual ACE events subscription resource updated successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3] with the difference that the SCEF is replaced by the EES and the SCS/AS is replaced by the EEC.
NOTE: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.4.2.3.3.3-4: Headers supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.3.3.3-5: Headers supported by the 200 response code on this resource

Name	Data type	P	Cardinality	Description
n/a				

Table 6.4.2.3.3.3-6: Links supported by the 200 Response Code on this endpoint

Name	Resource name	HTTP method or custom operation	Link parameter(s)	Description
n/a				

Table 6.4.2.3.3.3-7: 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 EES.

Table 6.4.2.3.3.3-8: 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 EES.

6.4.2.3.4 Resource Custom Operations

None.

6.4.3 Custom operations without associated resources

None.

6.4.4 Notifications

6.4.4.1 General

Table 6.4.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
ACR Information Notification	{notificationDestination}	POST	Notifies EEC for the ACR information notification.

6.4.4.2 ACR Information Notification

6.4.4.2.1 Description

ACR Information Notification is used by the EES to notify an EEC for the following ACR information:

- target information, i.e. the details of the selected T-EAS, if required, the selected T-EES, during the ACR procedures and, if required, the identifier of the AC;

- ACR complete events.

6.4.4.2.2 Notification definition

The POST method shall be used by the EES for sending notifications and the notification destination shall be the callback URI as provided by the EEC during the ACR events subscription.

Callback URI: **{notificationDestination}**

This method shall support the URI query parameters specified in table 6.4.4.2.2-1.

Table 6.4.4.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.4.4.2.2-2 and the response data structures and response codes specified in table 6.4.4.2.2-3.

Table 6.4.4.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ACRInfoNotification	M	1	Notification of ACR information.

Table 6.4.4.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

6.4.5 Data Model

6.4.5.1 General

This clause specifies the application data model supported by the Eees_ACREvents API.

Table 6.4.5.1-1 specifies the data types defined specifically for the Eees_ACREvents API service.

Table 6.4.5.1-1: Eees_ACREvents API specific Data Types

Data type	Section defined	Description	Applicability
ACRCompleteEventInfo	6.4.5.2.7		
ACREventIDs	6.4.5.3.3		
ACREventsSubscription	6.4.5.2.2		
ACREventsSubscriptionPatch	6.4.5.2.5		
ACRInfoNotification	6.4.5.2.3		
EecCtxtRelocStatus	6.4.5.2.6		
TargetInfo	6.4.5.2.4		

Table 6.4.5.1-2 specifies data types re-used by the Eees_ACREvents API service.

Table 6.4.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ACRScenario	3GPP TS 29.558 [4]		EdgeApp_2
DateTime	3GPP TS 29.122 [3]		
DiscoveredEas	Clause 6.3.5.2.8		
EASBundleInfo	3GPP TS 29.558 [4]	Represents EAS bundle information.	EdgeApp_2
EDNConfigInfo	Clause 8.1.5.2.7		
EndPoint	3GPP TS 29.558 [4]		
Gpsi	3GPP TS 29.571 [5]		
ImplicitRegDetails	3GPP TS 29.558 [4]		
SupportedFeatures	3GPP TS 29.571 [5]		
Uri	3GPP TS 29.122 [3]		
WebsockNotifConfig	3GPP TS 29.122 [3]		

6.4.5.2 Structured data types

6.4.5.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.4.5.2.2 Type: ACREventsSubscription

Table 6.4.5.2.2-1: ACREventsSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	0..1	Represents a unique identifier of the EEC.	
ueId	Gpsi	O	0..1	Represents the identifier of the UE.	
expTime	DateTime	O	0..1	Indicates the expiration time of the subscription. If the expiration time is not present, then it indicates that the EEC subscription never expires.	
easIds	array(string)	M	1..N	The list of application identifiers of the EASs, e.g. FQDN, URI.	
acIds	array(string)	O	1..N	The list of identifier of the AC(s) (NOTE 1)	
eventIds	ACREventIDs	M	1	Specifies the events for which EEC is subscribing.	
notificationDestination	Uri	M	1	URI where the ACR Information Notification should be delivered to. (NOTE 2)	
requestTestNotification	boolean	O	0..1	Set to true by Subscriber to request the ECS to send a test notification as defined in clause 7.6 of 3GPP TS 29.558 [4]. Set to false or omitted otherwise.	Notification_test_event
websockNotifConfig	WebsockNotifConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 7.6 of 3GPP TS 29.558 [4].	Notification_websocket
suppFeat	SupportedFeatures	O	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8 of 3GPP TS 29.558 [4]. This attribute shall be provided in the HTTP POST request and in the response of successful resource creation.	

NOTE 1: If acIds attribute is not included, it implies that the subscription corresponds to all ACs that can be served by the EAS(s) included this message.
NOTE 2: The notificationDestination attribute may contain Notification Target Address URL received from the SNM-C as defined in clause 10.

6.4.5.2.3 Type: ACRInfoNotification

Table 6.4.5.2.3-1: ACRInfoNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subId	string	M	1	String identifying the Individual ACR events subscription for which the ACT Information notification is delivered.	
easId	string	M	1	The application identifier of the EAS, e.g. FQDN, URI.	
eventId	ACREventIDs	M	1	Specifies the events for which notification is sent	
acId	string	O	0..1	Contains the identifier of the AC.	
trgtInfo	TargetInfo	O	0..1	Details of the selected T-EAS and the T-EES. (NOTE 1)	
acrStatus	ACRCompleteEventInfo	C	0..1	Details of a completed ACR and its result. This attribute shall be included when Event ID indicates 'ACR_COMPLETE' event	
eecCtxtReloc	EecCtxtRelocStatus	O	0..1	Specifies the registration id and expiry time of the registration. (NOTE 2)	
acrScenarioList	array(ACRScenario)	O	1..N	Specifies the list of selected ACR scenarios.	EdgeApp_2
easBundleInfo	EASBundleInfo	O	0..1	Represents the EAS bundle information. (NOTE 3)	EdgeApp_2
tEasEndPointBundleList	array(EndPoint)	O	1..N	Contains the list of T-EAS endpoint information associated with the EAS bundle.	EdgeApp_2

NOTE 1: This attribute shall be included when Event ID indicates 'TARGET_INFORMATION' event
NOTE 2: This attribute shall be included when eventId indicates 'ACR_COMPLETE' event and EEC context relocation was attempted.
NOTE 3: Only the "bdlId" and "easIdsList" attributes from the EASBundleInfo data type are provided as part of the ACR for EAS Bundle.

6.4.5.2.4 Type: TargetInfo

Table 6.4.5.2.4-1: TargetInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
trgetEASInfo	DiscoveredEas	M	1	EAS discovery information.	
trgetEESInfo	EDNConfigInfo	O	0..1	Provides EDN configuration information. This attribute shall be included only if the selected T-EES is different from the S-EES.	

6.4.5.2.5 Type: ACREventsSubscriptionPatch

Table 6.4.5.2.5-1: ACREventsSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
expTime	DateTime	O	0..1	Indicates the expiration time of the subscription.	
easIds	array(string)	O	1..N	The list of application identifiers of the EASs, e.g. FQDN, URI.	
eventIds	ACREventIDs	O	0..1	Specifies the events for which EEC is subscribing.	
notificationDestination	Uri	O	0..1	URI where the ACR Information Notification should be delivered to. (NOTE)	
NOTE: The notificationDestination attribute may contain with Notification Target Address URL received from the SNM-C as defined in clause 10.					

6.4.5.2.6 Type: EecCtxtRelocStatus

Table 6.4.5.2.6-1: EecCtxtRelocStatus

Attribute name	Data type	P	Cardinality	Description	Applicability
implReg	ImplicitRegDetails	O	0..1	Provides implicit registration details (NOTE)	
NOTE 1: This attribute shall be included when the S-EES has received it in EEC Context Push response.					

6.4.5.2.7 Type: ACRCompleteEventInfo

Table 6.4.5.2.7-1: ACRCompleteEventInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
acrRes	boolean	M	1	Indicates whether the ACR is successful or failure	
tEasEndpoint	EndPoint	M	1	Contains the endpoint address of the T-EAS to which an ACR has been performed.	
failReason	string	C	0..1	Indicates the cause information for the failure This attribute shall be included when the acrRes attribute indicates failure	

6.4.5.3 Simple data types and enumerations

6.4.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.4.5.3.2 Simple data types

The simple data types defined in table 6.4.5.3.2-1 shall be supported.

Table 6.4.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.4.5.3.3 Enumeration: ACREventIDs

The enumeration ACREventIDs represents the ACR events supported. It shall comply with the provisions defined in table 6.4.5.3.3-1.

Table 6.4.5.3.3-1: Enumeration ACREventIDs

Enumeration value	Description	Applicability
TARGET_INFORMATION		
ACR_COMPLETE		

6.4.6 Error Handling

General error handling are described in clause 7.7 of 3GPP TS 29.558 [4].

6.4.7 Feature negotiation

General feature negotiation procedures are described in clause 7.8 of 3GPP TS 29.558 [4]. Table 6.4.7-1 lists the supported features for Eees_ACREvents API.

Table 6.4.7-1: Supported Features

Feature number	Feature Name	Description
1	EdgeApp_2	This feature indicates support of the enhancements for the Enabling Edge Applications. Within this feature the following enhancements are covered: - support for ACR scenario re-selection on receiving successful ACR notification; and - support of ACR for EAS bundle.

6.5 Eees_AppContextRelocation API

6.5.1 Introduction

The Eees_AppContextRelocation service shall use the Eees_AppContextRelocation API.

The API URI of the Eees_AppContextRelocation API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URI used in HTTP requests shall have the Resource URI structure defined in clause 7.5 of 3GPP TS 29.558 [4], i.e:

apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>

with the following components:

- The {apiRoot} shall be set as described in clause 7.5 of 3GPP TS 29.558 [4].
- The <apiName> shall be "eees-appctxtreloc".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.5.2.

6.5.2 Resources

There are no resources defined for this API in this release of the specification.

6.5.3 Custom Operations without associated resources

6.5.3.1 Overview

The structure of the custom operation URIs of the Eees_AppContextRelocation API is shown in Figure 6.5.3.1-1.

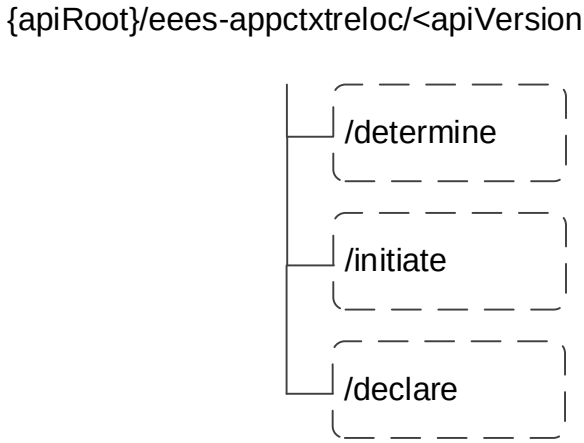

Figure 6.5.3.1-1: Resource URI structure of the Eees_AppContextRelocation API

Table 6.5.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Eees_AppContextRelocation API.

Table 6.5.3.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
Determine	/determine	POST	EES or EAS determines if ACR is needed and may initiate the procedure
Initiate	/initiate	POST	EEC or EES or EAS initiates the requested ACR procedure
Declare	/declare	POST	EAS declares the selected target EAS and the associated information.

NOTE 1: Based on SA3 specified security mechanisms for EDGE-1 and EDGE-3 interfaces, the EES can identify the initiator of the API (EEC or EAS) and apply the appropriate security procedures as specified in 3GPP TS 33.558 [7].

NOTE 2: The same service API can be implemented on two different interfaces, i.e. EDGE-1 and EDGE-3, which are for separate endpoints, i.e. EEC and EAS.

6.5.3.2 Operation: Determine

6.5.3.2.1 Description

This custom operation allows the EEC or the EAS to request that the EES evaluates if ACR is needed and subsequently initiate the ACR procedure if required.

6.5.3.2.2 Operation Definition

This operation shall support the request data structures, the response data structures and response codes specified in tables 6.5.3.2.2-1 and 6.5.3.2.2-2.

Table 6.5.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AcrDeterReq	M	1	Information about the requestor and requested ACR operation

Table 6.5.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The ACR request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.5.3.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

Table 6.5.3.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

6.5.3.3 Operation: Initiate

6.5.3.3.1 Description

This custom operation allows the EEC to request initiation of an ACR procedure and the EES to request initiation of an ACR procedure for EAS bundle.

6.5.3.3.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 6.5.3.3.2-1 and 6.5.3.3.2-2.

Table 6.5.3.3.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AcrInitReq	M	1	Information about the requestor and requested ACR operation

Table 6.5.3.3.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The ACR request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.5.3.3.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

Table 6.5.3.3.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

6.5.3.4 Operation: Declare

6.5.3.4.1 Description

This custom operation allows an S-EAS to declare the selected target EAS and the associated information.

6.5.3.4.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 6.5.3.4.2-1 and 6.5.3.4.2-2.

Table 6.5.3.4.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AcrDecReq	M	1	Contains the selected target EAS information.

Table 6.5.3.4.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The selected target EAS information is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.5.3.4.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

Table 6.5.3.4.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

6.5.4 Notifications

None

6.5.5 Data Model

6.5.5.1 General

This clause specifies the application data model supported by the Eees_AppContextRelocation API.

Table 6.5.5.1-1 specifies the data types defined specifically for the Eees_AppContextRelocation API service.

Table 6.5.5.1-1: Eees_AppContextRelocation API specific Data Types

Data type	Section defined	Description	Applicability
AcrDecReq	6.5.5.2.4		
AcrDetermReq	6.5.5.2.2		
AcrInitReq	6.5.5.2.3		
AcrModificationParams	6.5.5.2.8		EdgeApp_2
AcrParameters	6.5.5.2.7		EdgeApp_2
EecCtxtReloc	6.5.5.2.5		
ExpectedLocationArea	6.5.5.2.6	Represents the predicted/expected location information of the UE or the geographical service area	EdgeApp_2

Table 6.5.5.1-2 specifies data types re-used by the Eees_AppContextRelocation API service from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Eees_AppContextRelocation.

Table 6.5.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [3]	Represents the predicted expiration time by which the UE reaches location.	
DurationSec	3GPP TS 29.122 [3]	Unsigned integer identifying a period of time in units of seconds.	
EASBundleInfo	3GPP TS 29.558 [4]	Represents EAS bundle information.	EdgeApp_2
EndPoint	3GPP TS 29.558 [4]	Represents the endpoint information of an EAS.	
Gpsi	3GPP TS 29.571 [5]	Represents a GPSI.	
LocationArea5G	3GPP TS 29.122 [3]	Represents the service area of the UE.	EdgeApp_2
LocationInfo	3GPP TS 29.122 [3]	Represents the location information of the UE.	EdgeApp_2
RouteToLocation	3GPP TS 29.571 [5]	Represent the N6 traffic routing information and/or routing profile ID for a DNAI.	

6.5.5.2 Structured data types

6.5.5.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.5.5.2.2 Type: AcrDetermReq

Table 6.5.5.2.2-1: Definition of type AcrDetermReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	string	M	1	Contains the identifier of the EEC or the EAS that is sending the request.	
easId	string	O	0..1	Contains the application identifier of the EAS, e.g. FQDN, URI..	
sEasEndpoint	EndPoint	M	1	Contains the endpoint information of the selected S-EAS.	
ueId	Gpsi	M	1	Contains the identifier of the concerned UE.	
acId	string	O	0..1	Contains the identifier of the AC.	
expectedLocArea	ExpectedLocationArea	O	0..1	Represents the predicted/expected location information of the UE or the geographical service area.	EdgeApp_2

6.5.5.2.3 Type: AcrInitReq

Table 6.5.5.2.3-1: Definition of type AcrInitReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	string	M	1	Contains the identifier of the EEC that is sending the request.	
easId	string	O	0..1	Contains the application identifier of the EAS, e.g. FQDN, URI.	
ueId	Gpsi	M	1	Contains the identifier of the concerned UE.	
acId	string	O	0..1	Contains the identifier of the AC. (NOTE 2)	
tEasEndpoint	EndPoint	M	1	Contains the endpoint information of the T-EAS.	
sEasEndpoint	EndPoint	C	0..1	Contains the endpoint information of the S-EAS. This attribute shall be provided when the "easNotifInd" attribute is set to "true" or when the "prevEasNotifInd" attribute is present and set to "true".	
prevTEasEndpoint	EndPoint	C	0..1	Contains the endpoint information of the previous T-EAS. This attribute shall be provided when the EEC re-sends the ACR request to indicate that a previous ACR is to be cancelled.	
routeReq	RouteToLocation	O	0..1	Contains the T-EAS's DNAI information and the corresponding N6 traffic routing information and/or routing profile ID.	
simInactTime	DurationSec	O	0..1	Indicates whether a simultaneous EAS connectivity in service continuity is required and the inactive time guidance for keeping connectivity towards the S-EAS.	
easNotifInd	boolean	M	1	Indicates whether the EAS should be notified about the need for ACR or ACR cancellation. "true": Notification required. "false" (default): Notification not required.	
prevEasNotifInd	boolean	C	0..1	Indicates whether the EAS should be notified about ACR cancellation. "true": Notification required. "false" (default): Notification not required. This attribute shall be provided when the EEC re-sends the ACR request to indicate that a previous ACR is to be cancelled.	
eecCtxtReloc	EecCtxtReloc	O	0..1	Contains EEC context relocation information.	
acrParams	AcrParameters	O	0..1	Represents the parameters specific to the ACR request. (NOTE 1)	EdgeApp_2
acrModificationParams	AcrModificationParams	O	0..1	Indicates the parameters to be considered during ACR modification procedure. (NOTE 3)	EdgeApp_2
expectedLocArea	ExpectedLocationArea	O	0..1	Represents the predicted/expected location information of the UE or the geographical service area.	EdgeApp_2
easBundleInfo	EASBundleInfo	O	0..1	Represents the EAS bundle information. (NOTE 4)	EdgeApp_2
tEasEndPointBundleList	array(EndPoint)	O	1..N	Contains the list of T-EAS endpoint information associated with the EAS bundle.	EdgeApp_2

NOTE 1: The attribute may be present when ACR request is initiated for service continuity planning.
NOTE 2: The attribute may be present in case of ACR modification procedure to identiy the ACR to be modified.
NOTE 3: The attribute may be present when the ACR request is made for ACR modification.
NOTE 4: Only the "bdlId" and "easIdsList" attributes from the EASBundleInfo data type are provided as part of the ACR for EAS Bundle.

6.5.5.2.4 Type: AcrDecReq

Table 6.5.5.2.4-1: Definition of type AcrDecReq

Attribute name	Data type	P	Cardinality	Description	Applicability
requestorId	string	M	1	Contains the identifier of the EAS that is sending the request.	
ueId	Gpsi	M	1	Contains the identifier of the concerned UE.	
acId	string	O	0..1	Contains the identifier of the AC.	
tEasId	string	M	1	Contains the application identifier of the selected target EAS, e.g. FQDN, URI.	
tEasEndpoint	EndPoint	M	1	Contains the endpoint information of the selected target EAS.	
expectedLocArea	ExpectedLocationArea	O	0..1	Represents the predicted/expected location information of the UE or the geographical service area.	EdgeApp_2
easBundleInfo	EASBundleInfo	O	0..1	Represents the EAS bundle information. (NOTE)	EdgeApp_2
tEasEndPointBundleList	array(EndPoint)	O	1..N	Contains the list of T-EAS endpoint information associated with the EAS bundle.	EdgeApp_2
NOTE: Only the "bdlId" and "easIdsList" attributes from the EASBundleInfo data type are provided as part of the ACR for EAS Bundle.					

6.5.5.2.5 Type: EecCtxtReloc

Table 6.5.5.2.5-1: Definition of type EecCtxtReloc

Attribute name	Data type	P	Cardinality	Description	Applicability
eecCtxtId	string	M	1	Contains the identifier of the concerned EEC context.	
sEesId	string	O	0..1	Contains the identifier of the S-EES. This attribute may be provided only if the ACR request is from the EEC to the T-EES.	
sEesEndpoint	EndPoint	O	0..1	Contains the endpoint information of the selected S-EES. This attribute may be provided only if the ACR request is from the EEC to the T-EES.	
tEesId	string	O	0..1	Contains the identifier of the T-EES. This attribute may be provided only if the ACR request is from the EEC to the S-EES.	
tEesEndpoint	EndPoint	O	0..1	Contains the endpoint information of the selected T-EES. This attribute may be provided only if the ACR request is from the EEC to the S-EES.	

6.5.5.2.6 Type: ExpectedLocationArea

Table 6.5.5.2.6-1: Definition of type ExpectedLocationArea

Attribute name	Data type	P	Cardinality	Description	Applicability
locInfo	LocationInfo	O	0..1	Represents location information of the UE.	
svcArea	LocationArea5G	O	0..1	The list of geographical and topological areas that the EES serves.	
NOTE: Either location information or service area will be provided during service continuity.					

6.5.5.2.7 Type: AcrParameters

Table 6.5.5.2.7-1: AcrParameters

Attribute name	Data type	P	Cardinality	Description	Applicability
predictExpTime	DateTime	O	0..1	Represents the predicted expiration time by which the UE reaches location.	

6.5.5.2.8 Type: AcrModificationParams

Table 6.5.5.2.8-1: AcrModificationParams

Attribute name	Data type	P	Cardinality	Description	Applicability
sEasEndpoint	EndPoint	M	1	Contains the endpoint information of the S-EAS.	
tEasEndpoint	EndPoint	M	1	Contains the endpoint information of the T-EAS.	
acrParams	AcrParameters	M	1	Represents the paramters specific to the ACR request.	

6.5.5.3 Simple data types and enumerations

6.5.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.5.5.3.2 Simple data types

The simple data types defined in table 6.5.5.3.2-1 shall be supported.

Table 6.5.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.5.6 Error Handling

General error handling are described in clause 7.7 of 3GPP TS 29.558 [4].

6.5.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8 of 3GPP TS 29.558 [4]. Table 6.5.7-1 lists the supported features for Eees_AppContextRelocation API.

Table 6.5.7-1: Supported Features

Feature number	Feature Name	Description
1	EdgeApp_2	This feature indicates support of the enhancements for the Enabling Edge Applications. Within this feature the following enhacements are covered: - support of prediction expiration time in the ACR request; - support for ACR modification procedure; and - support of ACR for EAS bundle.

6.6 Eees_EASInformationProvisioning API

6.6.1 API URI

The Eees_EASInformationProvisioning service shall use the Eees_EASInformationProvisioning API.

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.1 with the following clarifications:

- The {apiRoot} shall be set as described in clause 7.5 of 3GPP TS 29.558 [4].
- The <apiName> shall be "eees-easinfoprov".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.6.3.1.

6.6.2 Resources

There are no resources defined for this API in this release of the specification.

6.6.3 Custom operations without associated resources

6.6.3.1 Overview

The structure of the custom operation URIs of the Eees_EASInformationProvisioning API is shown in figure 6.6.3.1-1.

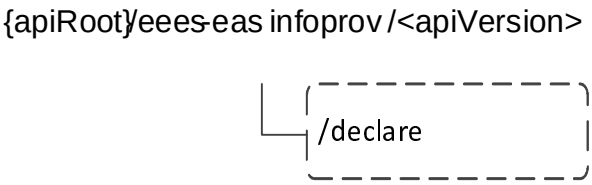

Figure 6.6.3.1-1: Resource URI structure of the Eees_EASInformationProvisioning API

Table 6.6.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Eees_EASInformationProvisioning API.

Table 6.6.3.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
Declare	/declare	POST	EEC exchanging information about selected EAS or ACR scenario selection or both

6.6.3.2 Operation: Declare

6.6.3.2.1 Description

This custom operation allows the EEC to send the EAS information provisioning request to the EES to declare EAS information.

6.6.3.2.2 Operation Definition

This operation shall support the request data structures, the response data structures and response codes specified in tables 6.6.3.2.2-1 and 6.6.3.2.2-2.

Table 6.6.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EASInfoProvReq	M	1	Information about the EAS information provisioning request.

Table 6.6.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EASInfoProvResp	M	1	200 OK	Information about the EAS information provisioning response.
n/a			204 No Content	The EAS information request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative EES. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The manadatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 6.6.3.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

Table 6.6.3.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative EES.

6.6.3.3 Void

6.6.3.4 Void

6.6.4 Notifications

None.

6.6.5 Data Model

6.6.5.1 General

This clause specifies the application data model supported by the Eees_EASInformationProvisioning API.

Table 6.6.5.1-1 specifies the data types defined specifically for the Eees_EASInformationProvisioning API service.

Table 6.6.5.1-1: Eees_EASInformationProvisioning API specific Data Types

Data type	Section defined	Description	Applicability
EasInfoProvReq	6.6.5.2.2		
EasInfoProvReqType	6.6.5.3.3		
EasInfoProvResp	6.6.5.2.3		
InstantiatedEASInfo	6.6.5.2.4		

Table 6.6.5.1-2 specifies data types re-used by the Eees_EASInformationProvisioning API service from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Eees_EASInformationProvisioning.

Table 6.6.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ACRScenario	3GPP TS 29.558 [4]	To represent the selected ACR scenarios in ACR_SELECTION event.	
Dnai	3GPP TS 29.571 [5]	Identifies a DNAI.	
EndPoint	3GPP TS 29.558 [4]	Represents the endpoint information of an EAS.	
LocationArea5G	3GPP TS 29.122 [3]	Used to define the geographic and topological area served by EAS.	

6.6.5.2 Structured data types

6.6.5.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.6.5.2.2 Type: EasInfoProvReq

Table 6.6.5.2.2-1: Definition of type EasInfoProvReq

Name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	1	Represents a unique identifier of the EEC.	
acId	string	M	1	Identity of the AC.	
selEasIds	array(string)	O	0..N	The identifier(s) (e.g., FQDN, URI) of the selected EAS (or the selected EAS(s) for EAS bundles) which is either instantiated or instantiable.	
appGrpId	string	O	0..1	The application group identifier, identifying a group of UEs using the same EAS. (NOTE 4)	
eesList	array(EESInfo)	O	0..N	Contains the list of EESs which support the application group identifier used for common EAS announcement. (NOTE 4)	
reqType	EasInfoProvReqType	O	0..1	Indicates the type of the EAS Information Provisioning Request.	
selAcrScenarios	array(ACRScenario)	O	0..N	The list of ACR scenarios (or the list of ACR scenarios for EAS bundles) selected by the EEC. (NOTE 1)	
selEasEndPoints	array(EndPoint)	O	0..1	The endpoint(s) of the selected EAS (or the selected EAS(s) for EAS bundles).	
dnais	array(Dnai)	O	0..1	Represents list of Data network access identifier for each selected EAS identifier.	
svcArea	array(LocationArea5G)	O	0..N	Service availability area (geographical and topological) for each selected EAS identifier	
assEesEndPoints	array(EndPoint)	O	0..1	EES information of the other EES(s) which support the direct bundled EAS, within the same EDN, and associated with the EASID list.	
casInfo	EndPoint	O	0..1	Target cloud application server information provided by the AC.	
acProf	ACProfile	O	0..1	Profile of AC for which the EEC provides edge enabling services. (NOTE 2, NOTE 3)	
eecSvcContSupp	array(ACRScenario)	O	0..N	The ACR scenarios supported by the EEC for service continuity. If this attribute is not present, then the EEC does not support service continuity. (NOTE 2, NOTE 5)	
NOTE 1: The attribute may be present only if Selected EASID(s) and Selected EAS Endpoint(s) are present and “reqType” attribute is "ACR_SCENARIO_SELECTION_ANNOUNCEMENT" NOTE 2: The attributes are present only if the “reqType” attribute is “ACR_SCENARIO_SELECTION_REQUEST” NOTE 3: The attribute is present if AC Profile is not shared to EES previously NOTE 4: This attribute may be present only if the “reqType” attribute is "EAS_SELECTION". NOTE 5: The EAS bundle information is not applicable for proxy type of EAS bundle.					

6.6.5.2.3 Type: EasInfoProvResp

Table 6.6.5.2.3-1: Definition of type EasInfoProvResp

Name	Data type	P	Cardinality	Description	Applicability
selAcrScenarioList	array(ACRScenario)	O	0..N	The list of ACR scenarios (or the list of ACR scenarios for EAS bundles) selected by the EES. (NOTE 1)	
instEasInfo	InstantiatedEASInfo	O	0..1	The instantiated EAS information. (NOTE 2)	
comEasEndpoint	EndPoint	O	0..1	The common EAS endpoint provided if the EES has determined a different common EAS. (NOTE 3)	
comEesEndpoint	EndPoint	O	0..1	The common EES endpoint of the common EAS provided if the common EAS is registered to a different EES. (NOTE 3)	
NOTE 1: Only if the “reqType” attribute of the request is “ACR_SCENARIO_SELECTION_REQUEST”. NOTE 2: Only if request does not include selected EAS endpoint. NOTE 3: Only if the “reqType” attribute of the request is "EAS_SELECTION".					

6.6.5.2.4 Type: InstantiatedEASInfo

Table 6.6.5.2.4-1: Definition of type InstantiatedEASInfo

Name	Data type	P	Cardinality	Description	Applicability
eas	EASProfile	M	1	The profile of the instantiated EAS.	
lifeTime	DateTime	O	0..1	Indicates the time duration for which the EAS information is valid and supposed to be cached in the EEC.	
eesEndpoint	EndPoint	O	0..1	The endpoint address (e.g. URI, IP address) of the EES where the instantiated EAS is registered.	

6.6.5.2.5 Void

6.6.5.2.6 Void

6.6.5.2.7 Void

6.6.5.3 Simple data types and enumerations

6.6.5.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.6.5.3.2 Simple data types

The simple data types defined in table 6.6.5.3.2-1 shall be supported.

Table 6.6.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.6.5.3.3 Enumeration: EasInfoProvReqType

Table 6.6.5.3.3-1: Enumeration EasInfoProvReqType

Enumeration value	Description	Applicability
ACR_SCENARIO_SELECTION_ANNOUNCEMENT	The EAS information provisioning request types is ACR scenario selection announcement.	
ACR_SCENARIO_SELECTION_REQUEST	The EAS information provisioning request types is ACR scenario selection request.	
EAS_SELECTION	The EAS information provisioning request types is EAS selection.	

6.6.6 Error Handling

General error handling is described in clause 7.7 of 3GPP TS 29.558 [4].

6.6.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8 of 3GPP TS 29.558 [4]. Table 6.6.7-1 lists the supported features for the Eees_EASInformationProvisioning API.

Table 6.6.7-1: Supported Features

Feature number	Feature Name	Description

7 Services offered by Edge Configuration Server

7.1 Introduction

The table 7.1-1 lists the Edge Configuration Server APIs below the service name. A service description clause for each API gives a general description of the related API.

Table 7.1-1: List of ECS Service APIs

Service Name	Service Operations	Operation Semantics	Consumer(s)
Eecs_ServiceProvisioning	Request	Request/Response	EEC
	Subscribe	Subscribe/Notify	EEC
	Notify		
	UpdateSubscription		
	Unsubscribe		

Table 7.1-2 summarizes the corresponding Edge Configuration Server APIs defined in this specification.

Table 7.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Eecs_ServiceProvisioning	7.2	Eecs Service Provisioning	TS24558_Eecs_ServiceProvisioning.yaml	eecs-serviceprovisioning	B.1

7.2 Eecs_ServiceProvisioning Service

7.2.1 Service Description

The Eecs_ServiceProvisioning API, as defined in 3GPP TS 23.558 [2], allows an EEC via the Eecs interface to obtain service provisioning information as a one-time request or to subscribe for reporting from the ECS.

7.2.2 Service Operations

7.2.2.1 Introduction

The service operation defined for Eecs_ServiceProvisioning API is shown in the table 7.2.2.1-1.

Table 7.2.2.1-1: Operations of the Eecs_ServiceProvisioning API

Service operation name	Description	Initiated by
Eecs_ServiceProvisioning_Request	This service operation is used by the EEC to request for one-time service provisioning information.	EEC
Eecs_ServiceProvisioning_Subscribe	This service operation is used by the EEC to subscribe to ECS for reporting of service provisioning information.	EEC
Eecs_ServiceProvisioning_Notify	This service operation is used by the ECS to notify the EEC about the service provisioning information.	ECS
Eecs_ServiceProvisioning_UpdateSubscription	This service operation is used by the EEC to update its subscription at ECS for reporting of service provisioning information.	EEC
Eecs_ServiceProvisioning_Unsubscribe	This service operation is used by the EEC to remove its subscription from ECS for reporting of service provisioning information.	EEC

7.2.2.2 Eecs_ServiceProvisioning_Request

7.2.2.2.1 General

This service operation is used by the EEC to request for one-time service provisioning information.

7.2.2.2.2 EEC requesting service provisioning information using Eecs_ServiceProvisioning_Request operation

To request for the one-time service provisioning information, the EEC shall send an HTTP POST request (custom operation: "Request") to the ECS with the request URI set to"{apiRoot}/eecs-serviceprovisioning/<apiVersion>/request". And the body including the ECSServProvReq data structure, as specified in clause 8.1.5.2.2.

Upon receiving the HTTP POST message from the EEC, the ECS shall:

a) process the EEC service provisioning request information;

b) verify and check if the EEC is authorized to request service provisioning information from ECS;

c) if the EEC is authorized to request service provisioning information from ECS, then the ECS:

   1) may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3];

   2) if the EdgeApp_2 feature is supported and if "plmnId" attribute is not provided within the "connInfo" attribute, the ECS may obtain the UE roaming status and serving PLMN identifier by invoking NEF monitoring API using the 3GPP core network capabilities. In case of UE is roaming, the ECS may use the serving PLMN identifier to identify the partner ECS information like ECS end point, DNN and S-NSSAI to update the "redirectedECS" attribute of the ECSServProvResp data type;

3) if the "acProfs" attribute is provided by the EEC without the "appGroupProfile" attribute in the "appInfo" attribute, the ECS identifies the EES(s) based on the provided "acProfs" attribute and the UE location, and if the enNB1 feature is supported, the "userLocation" attribute may be provided in the "locInf" attribute within the ECSServProvReq data type;

   i) if acSvcContSupp information is included in the AC Profile, the matching EES has to support ACRScenario indicated in the acSvcContSupp information; and

   ii) for each AC Profile, if eass information is included in the AC Profile, the ECS identifies the matching EES such that the EES profile matches easId information. ECS may also include EAS instantiation information using "easInstInfos" attribute in eass information;

4) if the EdgeApp_2 feature is supported and the EEC provided the "appGroupProfile" attribute in the "appInfo" attribute;

   i) then the ECS identifies the matching EES(s) based on the application group identity shared in "appGrpId" attribute and may also utilize the location information in the "expectedSvcArea" attribute if provided; or

   ii) the ECS retrieves the EES(s) information corresponding to the application group ID as specified in clause 6.4 of 3GPP TS 29.558 [4];

NOTE 1: How the EES determines the validity of the application group is implementation specific.

5) if neither application group profile nor AC profiles(s) are provided:

   i. if available, the ECS identifies the EES(s) based on the UE-specific service information at the ECS and the UE location; and

   ii. ECS identifies the EES(s) by applying the ECSP policy (e.g. based on the UE location);

6) if the EdgeApp_2 feature is supported:

   i. the ECS may identify the EES based on the EEC service continuity support information and EES service continuity support information; and

   ii. if the EEC provided the list of desired ECSP identifiers within the "ecspIds" attribute, the ECS shall identify the matching EES(s) based on the registered ECSP identifier in EES profile and the received list of desired ECSP identifiers; and

   iii) in case of no matching EES(s), the ECS identifies those partner ECS that satisfies the requirements. If required by the ECSP policies, the ECS may:

      A) trigger ECS discovery procedure as specified in clause 6.6 of 3GPP TS 29.558 [4] to discover the partner ECS(s); and

      B) trigger service provisioning information retrieval procedure as specified in clause 6.5 of 3GPP TS 29.558 [4] to obtain service provisioning information from the partner ECS; and

   iv) if the ECS is provisioned with authentication methods supported by matching EES(s) as specified in clause 6.3 of 3GPP TS 33.558 [7], then the ECS may include the "eesAuthMethods" attribute for each candidate EES(s) as specified in clause 8.1.5.2.9 in the ECSServProvResp and if multiple authentication methods are supported by the EES, then it is left to the EEC implementation to choose any method it supports when it communicates with the EES; and

7) the ECS also determines other information that needs to be provisioned, e.g. identification of the EDN, EDN service area, EES endpoints; and

d) if the ECS is able to determine service provisioning information using the inputs in service provisioning request, UE-specific service information at the ECS or the ECSP's policy, then the ECS returns an HTTP "200 OK" status code response with the response body including the ECSServProvResp data structure which may include the lifetime of the provided EDN configuration information.

   If the EdgeApp_2 feature is supported and in case of roaming, if the partner ECS(s) information has been identified in step c.2), the ECS sends a successful response including the "redirectedECS" attribute containing the list of ECS(s) configuration information to which the EEC shall redirect the service provisioning request.

If the inputs in service provisioning request do not match any EDN configuration information (i.e. there is no client side error), the ECS sends an HTTP "204 No Content" status code response code.

Otherwise, the ECS shall reject the service provisioning request and respond with an appropriate failure cause.

The EEC may cache the service provisioning information (e.g. EES endpoint). If the lifeTime attribute is included in the service provisioning response, then the EEC may cache and reuse the service provisioning information only for the duration specified by the lifeTime attribute.

The EEC may initiate service provisioning procedure with ECS(s) provided in the "redirectedECS" attribute of the "ECSServProvResp" data type. If the UE is roaming to a V-PLMN, then EEC may establish a connection with the partner ECS that can be a HR-SBO PDU session or an LBO PDU session.

The EEC may select one or more EES to perform EAS discovery, for multiple EES(s) case, if instantiable EAS information using "easInstInfos" attribute for an EAS is not available, or the instantiable EAS information using "easInstInfos" attribute is set to instantiated or instantiable.

The EEC may consider the instantiable EAS information using "easInstInfos" attribute and the associated instantiation criteria to mitigate the waste of EDN resources for EAS discovery. The EEC selects one EES, if the EAS instantiation status corresponding to the EASID requested by AC/EEC is instantiable but not yet instantiated (i.e., no instantiated EAS).

NOTE 2: If the EAS instantiation fails based on the selected EES, the EEC retries the EAS discovery request to another EES ((e.g. selecting another one EES based on the instantiable EAS information).

NOTE 3: How EEC maintains the service provisioning information is implementation specific.

7.2.2.3 Eecs_ServiceProvisioning_Subscribe

7.2.2.3.1 General

This service operation is used by the EEC to subscribe to ECS, for reporting of service provisioning information when changes to provisioning information occur which are of interest to EEC.

7.2.2.3.2 EEC subscribing to service provisioning information from ECS using Eecs_ServiceProvisioning_Subscribe operation

To subscribe to changes to service provisioning information at the ECS, the EEC shall send an HTTP POST message to the ECS on the Service Provisioning Subscriptions resource. The body of the POST message may include Notification Target Address (e.g. URL, provided with in "notificationDestination" attribute), the UE identifier (e.g. GPSI), connectivity information, proposed expiration time, AC Profile information and if the EdgeApp_2 feature is supported the list of desired ECSP identifiers and indication whether the application triggering is required with in "eecTriggerRequest" attribute, as specified in clause 8.1.2.3.3.1.

If the "eecTriggerRequest" attribute is included then the "notificationDestination" attribute shall not be included.

Upon receiving the HTTP POST message from the EEC, the ECS shall:

a) process the EEC service provisioning subscription request;

b) verify and check if the EEC is authorized to subscribe for the service provisioning information; and

c) if the EEC is authorized to subscribe for the service provisioning information, then the ECS;

   1) may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3];

   2) shall create a new resource with the Service Provisioning Subscriptions resource as specified in clause 8.1.2.3;

   3) if the ECS determines the EES information using the inputs in service provisioning subscription request, UE-specific service information at the ECS or the ECSP policy, then the ECS returns the service provisioning subscription response, which includes the subscription identifier and may include the expiration time, indicating when the subscription will automatically expire. Otherwise, the ECS shall reject the service provisioning subscription request and respond with an appropriate failure cause and

4) if EdgeApp_2 feature is supported and the EEC required EEC Trigger Request by setting the "eecTriggerRequest" attribute to true, then ECS may send trigger towards the EEC to perform service provisioning.

If the expiration time is provided, then to maintain the subscription, the EEC shall send a Service provisioning subscription update request (as described in clause 7.2.2.5) prior to the expiration time. If a Service provisioning subscription update request is not received prior to the expiration time, the ECS shall treat the EEC as implicitly unsubscribed and remove the corresponding service provisioning subscription resource.

7.2.2.4 Eecs_ServiceProvisioning_Notify

7.2.2.4.1 General

This service operation is used by the ECS to notify the EEC about the service provisioning information.

7.2.2.4.2 ECS notifying the service provisioning information to EEC using Eecs_ServiceProvisioning_Notify operation

The ECS determines to notify the EEC with the service provisioning information, when an event occurs at the ECS that satisfies trigger conditions for updating service provisioning of a subscribed EEC.

The ECS may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3]. If the EdgeApp_2 feature is supported and if "plmnId" attribute is not provided within the "connInfo" attribute of the "ECSServProvSubscription" data type, the ECS may obtain the UE roaming status and serving PLMN identifier by invoking NEF monitoring API using the 3GPP core network capabilities. In case of UE is roaming, the ECS may use the serving PLMN identifier to identify the partner ECS information like ECS end point, DNN and S-NSSAI to update the "redirectedECS" attribute of the ECSServProvResp data type. If AC profile(s) were provided by the EEC during subscription creation, the ECS identifies the EES(s) based on the provided AC profile(s) and the UE location.

NOTE 1: How the ECS identifies the EES(s) based on the provided AC profile(s) and the UE location is implementation specific.

If AC profiles(s) were not provided, then if available, the ECS identifies the EES(s) based on the UE-specific service information at the ECS and the UE location. The ECS may also identify the EES(s) by applying the ECSP policy (e.g. based only on the UE location). If the EdgeApp_2 feature is supported and the ECS received the list of desired ECSP identifiers, the ECS identifies the EES(s) based on the registered ECSP identifier in EES profile and the received list of desired ECSP identifiers.

The ECS also determines other information that needs to be provisioned, e.g. identification of the EDN, EDN service area, EES endpoints.

If the EdgeApp_2 feature is supported and in case of no matching EES(s), the ECS identifies those partner ECS that satisfies the requirements. If required by the ECSP policies, the ECS may:

A) trigger ECS discovery procedure as specified in clause 6.6 of 3GPP TS 29.558 [4] to discover the partner ECS(s); and

B) trigger service provisioning information retrieval procedure as specified in clause 6.5 of 3GPP TS 29.558 [4] to obtain service provisioning information from the partner ECS.

To notify the service provisioning information events, the ECS shall send an HTTP POST message using the Notification Destination URI received in the subscription request, as specified in clause 8.1.4.2. If the EdgeApp_2 feature is supported and in case of roaming, if the partner ECS(s) information has been identified, the ECS sends a notification including the "redirectedECS" attribute containing the list of ECS(s) configuration information to which the EEC shall redirect the service provisioning request.

Upon receiving the HTTP POST message, the EEC shall process the service provisioning information. The EEC may cache the service provisioning information (e.g. EES endpoint). If the lifeTime attribute is included in the service provisioning response, then the EEC may cache and reuse the service provisioning information only for the duration specified by the lifeTime attribute. The EEC may initiate service provisioning procedure with ECS(s) provided in the "redirectedECS" attribute of the "ECSServProvResp" data type. If the UE is roaming to a V-PLMN, the EEC may establish a connection with the partner ECS that can be a HR-SBO PDU session or an LBO PDU session. If the ECS

provided information regarding the service continuity support of individual EESs, the EEC may take this information into account when selecting an EES for EEC registration, EAS discovery or T-EAS discovery, respectively.

NOTE 2: How the EEC maintains the service provisioning information is implementation specific.

NOTE 3: If the EEC provided an indication to support application triggering in "eecTriggerRequest" attribute of the Service Provisioning subscription request, then the ECS sends the trigger message towards the EEC by invoking application triggering services or DeviceTrigerring API using 3GPP core network capabilities in order to avoid sending the service provisioning notify.

7.2.2.5 Eecs_ServiceProvisioning_UpdateSubscription

7.2.2.5.1 General

This service operation is used by the EEC to update its subscription at the ECS, for reporting of service provisioning information.

7.2.2.5.2 EEC updating service provisioning information subscription at ECS using Eecs_ServiceProvisioning_UpdateSubscription operation

To update service provisioning information subscription at the ECS, the EEC shall send an HTTP PATCH message (for partial modification) or HTTP PUT message (for fully replacement) to the ECS on resource URI identifying the Individual Service Provisioning Subscription resource representation, as specified in clause 8.1.2.4.3.3 for an HTTP PATCH message and in clause 8.1.2.4.3.1 for an HTTP PUT message.

The PATCH message includes the parameters (AC Profiles, proposed expiry time, service continuity support or list of connectivity information) that need to be replaced in the existing subscription resource.

The PUT message shall replace all properties of the existing resource with the service provisioning information in the request. The values of the eecId and ueId provided during the subscription creation shall not be changed.

Upon receiving the HTTP PATCH or PUT message from the EEC, the ECS:

a) shall check the update subscription message from the EEC to see if the EEC is authorized to modify the requested subscription resource;

b) if the EEC is authorized to update the service provisioning subscription and the eecId of the requesting EEC and the eecId in the resource match, then the ECS;

   1) may obtain the UE's location as specified in clause 5.3 of 3GPP TS 29.122 [3];

   2) shall update the resource identified by Resource URI of the service provisioning subscription with the updated information received in the HTTP PATCH or PUT request message;

   3) shall return the service provisioning subscription response. The ECS may send "200 OK" response code which includes the subscription identifier and the expiration time, indicating when the subscription will automatically expire. Otherwise, the EES sends "204 No Content" response code.

If the expiration time is provided, the EEC shall send a service provisioning subscription update request prior to the expiration time if the EEC wants to maintain the subscription. If a service provisioning subscription update request is not received prior to the expiration time, the ECS shall treat the EEC as implicitly unsubscribed and remove the corresponding service provisioning subscription resource.

7.2.2.6 Eecs_ServiceProvisioning_Unsubscribe

7.2.2.6.1 General

This service operation is used by the EEC to remove its subscription from the ECS for reporting of service provisioning information.

7.2.2.6.2 EEC unsubscribing to service provisioning subscription from ECS using Eecs_ServiceProvisioning_Unsubscribe operation

To unsubscribe service provisioning subscription from the ECS, the EEC shall send an HTTP DELETE message to the ECS, on the resource URI identifying the individual service provisioning subscription resource representation as specified in clause 8.1.2.4.3.2. Upon receiving the HTTP DELETE request, the ECS:

a) shall verify and check if the EEC is authorized to unsubscribe the Individual Service Provisioning Subscription resource;

b) if the EEC is authorized to delete the Individual Service Provisioning Subscription resource, then the ECS shall unsubscribe the EEC service provisioning subscription identified by the subscriptionId;

c) shall return the "204 Not Content" message to the EEC, indicating the successful removal of the subscription information.

8 Edge Configuration Server API Definitions

8.1 Eecs_ServiceProvisioning API

8.1.1 API URI

The Eecs_ServiceProvisioning service shall use the Eecs_ServiceProvisioning API.

The request URI used in each HTTP request from the EEC towards the ECS shall have the structure as defined in clause 7.5 of 3GPP TS 29.558 [4] with the following clarifications:

- The {apiRoot} shall be set as described in clause 7.5 of 3GPP TS 29.558 [4].
- The <apiName> shall be "eecs-serviceprovisioning".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.1.2.

8.1.2 Resources

8.1.2.1 Overview

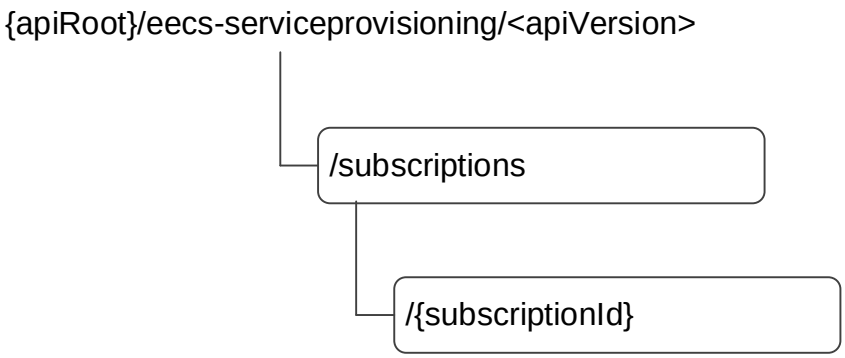

Figure 8.1.2.1-1: Resource URI structure of the Eecs_ServiceProvisioning API

Table 8.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 8.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Service Provisioning Subscriptions	/subscriptions	POST	Creates a new subscription in ECS in order to be notified of provisioning data changes of interest.
Individual Service Provisioning Subscription	/subscriptions/{subscriptionId}	PUT	Updates an existing individual service provisioning subscription identified by the subscriptionId
		DELETE	Deletes an existing individual service provisioning subscription identified by the subscriptionId.
		PATCH	Partial update an existing individual service provisioning subscription identified by the subscriptionId.

8.1.2.3 Resource: Service Provisioning Subscriptions

8.1.2.3.1 Description

This resource represents a collection of service provisioning subscriptions of EECs interested in receiving provisioning data related notifications from ECS.

8.1.2.3.2 Resource Definition

Resource URI: **{apiRoot}/eecs-serviceprovisioning/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 8.1.2.3.2-1.

Table 8.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	String	See clause 7.5 of 3GPP TS 29.558 [4]

8.1.2.3.3 Resource Standard Methods

8.1.2.3.3.1 POST

This method creates a new subscription. This method shall support the URI query parameters specified in table 8.1.2.3.3.1-1.

Table 8.1.2.3.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.1.2.3.3.1-2 and the response data structures and response codes specified in table 8.1.2.3.3.1-3.

Table 8.1.2.3.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ECSServProvSubscription	M	1	Create a new service provisioning subscription.

Table 8.1.2.3.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ECSServProvSubscription	M	1	201 Created	Individual ECS Service Provisioning Subscription resource created successfully. The URI of the created resource shall be returned in the "Location" HTTP header
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 8.1.2.3.3.1-4: Headers supported by the 201 response code on this resource

Name	Data type	P	Cardinality	Description
Location	String	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/eecs-serviceprovisioning/<apiVersion>/subscriptions/{subscriptionId}

8.1.2.3.4 Resource Custom Operations

None.

8.1.2.4 Resource: Individual Service Provisioning Subscription

8.1.2.4.1 Description

This resource represents the individual service provisioning subscription of an EEC at a given ECS.

8.1.2.4.2 Resource Definition

Resource URI: **{apiRoot}/eecs-serviceprovisioning/<apiVersion>/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in the table 8.1.2.4.2-1.

Table 8.1.2.4.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5 of 3GPP TS 29.558 [4]
subscriptionId	string	Identifies an individual service provisioning subscription.

8.1.2.4.3 Resource Standard Methods

8.1.2.4.3.1 PUT

This method updates the individual service provisioning subscription information at the ECS by completely replacing the existing subscription data (except eecId, suppFeat, requestTestNotification and websockNotifConfig). This method shall support the URI query parameters specified in the table 8.1.2.4.3.1-1.

Table 8.1.2.4.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.1.2.4.3.1-2 and the response data structures and response codes specified in table 8.1.2.4.3.1-3.

Table 8.1.2.4.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ECSServProvSubscription	M	1	Details of individual service provisioning subscription matching the subscriptionId to be updated at the ECS.

Table 8.1.2.4.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ECSServProvSubscription	M	1	200 OK	The individual service provisioning subscription matching the subscriptionId was modified successfully and the updated information is returned in the response.
n/a			204 No Content	The individual service provisioning subscription matching the subscriptionId was modified successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 8.1.2.4.3.1-4: 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 ECS.

Table 8.1.2.4.3.1-5: 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 ECS.

8.1.2.4.3.2 DELETE

This method removes the subscription information from the ECS. This method shall support the URI query parameters specified in the table 8.1.2.4.3.2-1.

Table 8.1.2.4.3.2-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.1.2.4.3.2-2 and the response data structures and response codes specified in table 8.1.2.4.3.2-3.

Table 8.1.2.4.3.2-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.1.2.4.3.2-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a	M	1	204 No Content	The individual service provisioning subscription matching the subscriptionId is deleted.
n/a			307 Temporary Redirect	Temporary redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource termination. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 8.1.2.4.3.2-4: 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 ECS.

Table 8.1.2.4.3.2-5: 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 ECS.

8.1.2.4.3.3 PATCH

This method partially updates the individual service provisioning subscription. This method shall support the URI query parameters specified in the table 8.1.2.4.3.3-1.

Table 8.1.2.4.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.1.2.4.3.3-2 and the response data structures and response codes specified in table 8.1.2.4.3.3-3.

Table 8.1.2.4.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
ECSServProvSubscriptionPatch	M	1	Details of individual service provisioning subscription matching the subscriptionId to be updated at the ECS.

Table 8.1.2.4.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ECSServProvSubscription	M	1	200 OK	The individual service provisioning subscription matching the subscriptionId was modified successfully and the updated information is returned in the response.
n/a			204 No Content	The individual service provisioning subscription matching the subscriptionId was modified successfully.
n/a			307 Temporary Redirect	Temporary redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection, during resource modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 8.1.2.4.3.3-7: 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 ECS.

Table 8.1.2.4.3.3-8: 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 ECS.

8.1.3 Custom Operations without associated resources

8.1.3.1 Overview

The structure of the custom operation URIs of the Eecs_ServiceProvisioning API is shown in Figure 8.1.3.1-1.

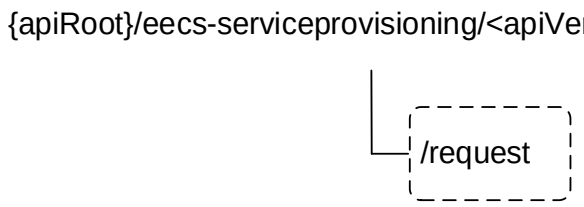

Figure 8.1.3.1-1: Custom operation URI structure of the Eecs_ServiceProvisioning API

Table 8.1.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Eecs_ServiceProvisioning API.

Table 8.1.3.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
Request	/request	POST	Enables an EEC to request service provisioning information to the ECS.

8.1.3.2 Operation: Request

8.1.3.2.1 Description

The custom operation enables an EEC to request service provisioning information to the ECS.

8.1.3.2.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 8.1.3.2.2-1 and 8.1.3.2.2-2.

Table 8.1.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ECSServProvReq	M	1	Contains the parameters to request service provisioning information.

Table 8.1.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ECSServProvResp	M	1	200 OK	The requested service provisioning information is returned successfully.
n/a			204 No Content	The requested service provisioning information does not exist.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative ECS. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3]
NOTE: The manadatory HTTP error status code for the HTTP POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 8.1.3.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative ECS.

Table 8.1.3.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative target URI located in an alternative ECS.

8.1.4 Notifications

8.1.4.1 General

Table 8.1.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Service Provisioning Notification	{notificationDestination}	POST	Notifies EEC of the service provisioning information of interest.

8.1.4.2 Service Provisioning Notification

8.1.4.2.1 Description

Service Provisioning Notification is used by the ECS to notify an EEC with service provisioning information.

8.1.4.2.2 Notification definition

The POST method shall be used by the ECS for sending notifications and the notification destination shall be the callback URI as provided by the EEC during the service provisioning subscription.

Callback URI: **{notificationDestination}**

This method shall support the URI query parameters specified in table 8.1.4.2.2-1.

Table 8.1.4.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.1.4.2.2-2 and the response data structures and response codes specified in table 8.1.4.2.2-3.

Table 8.1.4.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ServProvNotification	M	1	Notification of service provisioning information.

Table 8.1.4.2.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The receipt of the Notification is acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative EEC where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative EEC where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [3] also apply.				

Table 8.1.4.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative EEC towards which the notification should be redirected.

Table 8.1.4.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI representing the end point of an alternative EEC towards which the notification should be redirected.

8.1.5 Data Model

8.1.5.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 7.2 of 3GPP TS 29.558 [4] apply to this API.

Table 8.1.5.1-1 specifies the data types defined specifically for the Eecs_ServiceProvisioning API service.

Table 8.1.5.1-1: Eecs_ServiceProvisioning API specific Data Types

Data type	Section defined	Description	Applicability
AppGroupProfile	8.1.5.2.13	Represents the application group profile used for Common EAS.	EdgeApp_2
ApplicationInfo	8.1.5.2.14	Represents the list of application services used for Common EAS.	EdgeApp_2
ConnectivityInfo	8.1.5.2.5		
EASBundleDetail	8.1.5.2.15	Represents a combination of application identifiers with associated EAS bundle information.	EdgeApp_2
ECSRedirectInfo	8.1.5.2.12	Represents the ECS Information where ECS service provisioning request to be redirected.	
ECSServProvReq	8.1.5.2.2		
ECSServProvResp	8.1.5.2.3		
ECSServProvSubscription	8.1.5.2.4	Represents the service provisioning subscription.	
ECSServProvSubscriptionPatch	8.1.5.2.10		
EDNConfigInfo	8.1.5.2.7		
EDNConInfo	8.1.5.2.8		
EESInfo	8.1.5.2.9		
ServProvNotification	8.1.5.2.6	Service provisioning information notification from ECS to EEC.	

Table 8.1.5.1-2 specifies data types re-used by the Eecs_ServiceProvisioning API service.

Table 8.1.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
ACProfile	clause 6.2.5.2.3		
ACRScenario	3GPP TS 29.558 [4]		
DateTime	3GPP TS 29.122 [3]		
Dnai	3GPP TS 29.571 [5]		
Dnn	3GPP TS 29.571 [5]		
EASBundleInfo	3GPP TS 29.558 [4]	Represents EAS bundle information.	EdgeApp_2
EASInstantiationInfo	3GPP TS 29.558 [4]		
EndPoint	3GPP TS 29.558 [4]		
Gpsi	3GPP TS 29.571 [5]	Used to identify the UE.	
LocationArea5G	3GPP TS 29.122 [3]		
LocationInfo	3GPP TS 29.122 [3]	The location information related to the UE.	
PlmnIdNid	3GPP TS 29.571 [5]	Identifies the network: PLMN Identifier or the SNPN Identifier (the PLMN Identifier and the NID).	
Snssai	3GPP TS 29.571 [5]		
SupportedFeatures	3GPP TS 29.571 [5]	Used to negotiate the applicability of optional features.	
Uri	3GPP TS 29.122 [3]		
WebsockNotifConfig	3GPP TS 29.122 [3]		

8.1.5.2 Structured data types

8.1.5.2.1 Introduction

This clause defines the data structures to be used in resource representations.

8.1.5.2.2 Type: ECSServProvReq

Table 8.1.5.2.2-1: Definition of type ECSServProvReq

Attribute name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	0..1	Represents a unique identifier of the EEC.	
ueId	Gpsi	O	0..1	Represents the identifier of the UE.	
acProfs	array(ACProfile)	O	1..N	Information about services the EEC wants to connect to. (NOTE 2)	
appInfo	array(ApplicationInfo)	O	1..N	Represents the list of services the EEC wants to connect. (NOTE 2)	EdgeApp_2
eecSvcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EEC for service continuity. If this attribute is not present, then the EEC does not support service continuity. (NOTE 1)	
connInfo	array(ConnectivityInfo)	O	0..N	List of connectivity information for the UE.	
locInf	LocationInfo	O	0..1	Represents location information of the UE. If the UserLocation feature is supported, the "userLocation" attribute shall be provided in the LocationInfo data type.	
ecspIds	array(string)	O	1..N	Indicates to the ECS which EES providers are preferred by the EEC.	EdgeApp_2
suppFeat	SupportedFeatures	C	0..1	Represents a list of Supported features used as described in clause 6.3.7. Shall be present in the HTTP POST request/response.	

NOTE 1: If the EEC is requesting service provisioning for T-EES discovery and requires those T-EES that support "EEC excuted ACR via T-EES" scenario, then EEC shall set eecSvcContSupp with only "EEC excuted ACR via T-EES".
NOTE 2: Either "acProfs" or "appInfo" attribute shall be provided.

8.1.5.2.3 Type: ECSServProvResp

Table 8.1.5.2.3-1: Definition of type ECSServProvResp

Attribute name	Data type	P	Cardinality	Description	Applicability
ednCnfgInfo	array(EDNConfigInfo)	M	1..N	List of EDN configuration information.	
redirectedECS	array(ECSRedirectInfo)	O	1..N	Indicates the ECS(s) where the EEC shall redirect the ECS service provisioning request.	EdgeApp_2

8.1.5.2.4 Type: ECSServProvSubscription

Table 8.1.5.2.4-1: Definition of type ECSServProvSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	0..1	Represents a unique identifier of the EEC.	
ueId	Gpsi	O	0..1	Represents the identifier of the UE.	
acProfs	array(ACProfile)	O	1..N	Information about services the EEC wants to connect to.	
expTime	DateTime	O	0..1	Indicates the expiration time of the subscription. If the expiration time is not present, then it indicates that the EEC subscription never expires.	
eecSvcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EEC for service continuity. If this attribute is not present, then the EEC does not support service continuity.	
connInfo	array(ConnectivityInfo)	O	0..N	List of connectivity information for the UE.	
notificationDestination	Uri	O	0..1	The notification target address containing the URI where the service provisioning notification should be delivered to. This attribute may be present in HTTP POST message to ECS. (NOTE 1) (NOTE 2, NOTE 3).	
requestTestNotification	boolean	O	0..1	Set to true by Subscriber to request the ECS to send a test notification as defined in clause 7.6 of 3GPP TS 29.558 [4]. Set to false or omitted otherwise.	Notification_test_event
websockNotifConfig	WebsockNotifConfig	O	0..1	Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 7.6 of 3GPP TS 29.558 [4].	Notification_websocket
ecspIds	array(string)	O	1..N	Indicates to the ECS which EES providers are preferred by the EEC.	EdgeApp_2
eecTriggerRequest	boolean	O	0..1	Indicates to the ECS, whether the application triggering is required by the EEC. "false" (default): the EEC doesn't not require triggers. "true": the EEC requires triggers. (NOTE 2)	EdgeApp_2
suppFeat	SupportedFeatures	O	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8 of 3GPP TS 29.558 [4]. This attribute shall be provided in the HTTP POST request and in the response of successful resource creation. This attribute also shall be provided in the HTTP PUT request and in the response of successful resource modification.	

NOTE 1: The notification target address can terminate at the EEC (e.g. in an IoT device) if the deployment supports EEC reachability, or it can terminate at a push notification service. Details of the push notification service are out of scope of this release.
NOTE 2: Either notificationDestination or eecTriggerRequest may be included in the service provisioning subscription request.
NOTE 3: The notificationDestination attribute may contain Notification Target Address URL received from the SNM-C as defined in clause 10.

8.1.5.2.5 Type: ConnectivityInfo

Table 8.1.5.2.5-1: Definition of type ConnectivityInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
plmnId	PlmnIdNid	O	0..1	Represents the serving network (a PLMN or an SNPN) identity. For the SNPN the NID together with the PLMN ID identifies the SNPN.	
ssId	string	O	0..1	This IE shall be present if the UE is accessing the 5GC via a trusted WLAN access network. When present, it shall contain the SSID of the access point to which the UE is attached.	

8.1.5.2.6 Type: ServProvNotification

Table 8.1.5.2.6-1: Definition of type ServProvNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subId	string	M	1	String identifying the individual service provisioning subscription for which the service provisioning notification is delivered.	
ednCnfgInfo	array(EDNConfigInfo)	M	1..N	List of EDN configuration information.	
redirectedECS	array(ECSRedirectInfo)	O	1..N	Indicates the ECS(s) where the EEC shall redirect the ECS service provisioning request.	EdgeApp_2

8.1.5.2.7 Type: EDNConfigInfo

Table 8.1.5.2.7-1: Definition of type EDNConfigInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ednConInfo	EDNConInfo	M	1	Contains EDN connection information required by the UE to establish connection with the EDN	
eess	array(EESInfo)	M	1..N	Contains the list of EESs of the EDN	
lifeTime	DateTime	O	0..1	Indicates the time duration for which the EDN configuration information is valid and supposed to be cached in the EEC.	

8.1.5.2.8 Type: EDNConInfo

Table 8.1.5.2.8-1: Definition of type EDNConInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
dnn	Dnn	O	0..1	String representing a Data Network or an APN	
snssai	Snssai	O	0..1	Represents network slice information	
ednTopoSrvArea	LocationArea5G	O	0..1	The list of geographical and topological areas that the ECS serves. ACs in the UE that are outside the area shall not be served.	

8.1.5.2.9 Type: EESInfo

Table 8.1.5.2.9-1: Definition of type EESInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
eesId	string	M	1	The identifier of the EES	
endPt	EndPoint	M	1	Endpoint information (e.g. URI, FQDN, IP address) used to communicate with the EES. This information is provided to the EEC to connect to the EES.	
easIds	array(string)	O	1..N	The list of application identifiers of the Edge Application Servers registered or expected to be registered with the EES, e.g. FQDN, URI.	
appGroupIdList	array(string)	O	1..N	List of Application Group IDs associated with EAS.	EdgeApp_2
ecspInfo	string	O	0..1	String representing the EES Provider (such as ECSP Information)	
svcArea	LocationArea5G	O	0..1	The list of geographical and topological areas that the EES serves. EECs in the UE that are outside the area shall not be served.	
dnais	array(Dnai)	O	1..N	Represents list of Data network access identifier	
eesSvcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EES for service continuity. If this attribute is not present, then the EEC does not support service continuity.	
eecRegConf	boolean	M	1	Indicates whether the EEC is required to register on the EES to use edge services or not	
easInstInfos	array(EASInstantiationInfo)	O	1..N	The EAS instantiation status per EASID (e.g. instantiated, instantiable but not be instantiated yet)	EdgeApp_2
eesAuthMethods	array(EesAuthMethod)	O	1..N	Indicates the authentication method supported by the EES to be used by EEC before communicating with the EES as specified in clause 8.1.5.2.11.	EdgeApp_2
easBundleInfos	array(EASBundleInfo)	O	1..N	Represents a list of EAS bundles to which the EAS belongs.(NOTE)	EdgeApp_2
easBundleDetails	array(EASBundleDetail)	O	1..N	Represents a combination of application identifiers with associated EAS bundle information.	EdgeApp_2

8.1.5.2.10 Type: ECSServProvSubscriptionPatch

Table 8.1.5.2.10-1: Definition of type ECSServProvSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
acProfs	array(ACProfile)	O	1..N	Information about services the EEC wants to connect to.	
expTime	DateTime	O	0..1	Indicates the expiration time of the subscription.	
eecSvcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EEC for service continuity.	
connInfo	array(ConnectivityInfo)	O	0..N	List of connectivity information for the UE.	

8.1.5.2.11 Enumeration: EesAuthMethod

The enumeration EesAuthMethod represents the authentication methods supported by the EES. It shall comply with the provisions defined in clause 6.3 of 3GPP TS 33.558 [7].

Table 8.1.5.2.11-1: Enumeration EesAuthMethod

Enumeration value	Description	Applicability
TLS_CLIENT_SERVER_CERTIFICATE	Represents authentication through certficates over TLS.	
TLS_WITH_AKMA	Represents AKMA based authentication over TLS.	
TLS_WITH_GBA	Represent GBA authentication over TLS.	
SERVER_SIDE_CERTIFICATE_BASED	Represents the Server side certificate. (NOTE)	
NOTE: If only server side certificate-based TLS authentication is performed, it is left to implementation on which information within a service procedure and services will be provided by the EES as specified in clause 6.2 of 3GPP TS 33.558 [7].		

8.1.5.2.12 Type: ECSRedirectInfo

Table 8.1.5.2.12-1: Definition of type ECSRedirectInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ecsEndPt	EndPoint	M	1	Endpoint information (e.g. URI, FQDN, IP address) of the redirected ECS, to which the EEC shall send the ECS service provisioning request.	
dnn	Dnn	O	0..1	String representing a data network or an APN, required for establishing a PDU session to the redirected ECS.	
snssai	Snssai	O	0..1	Represents network slice information, required for establishing a PDU session to the redirected ECS.	

8.1.5.2.13 Type: AppGroupProfile

Table 8.1.5.2.13-1: Definition of type AppGroupProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
appGrpId	string	M	1	Contains the identifier of the application group that uniquely identifies the group of UEs using the same application.	
easId	string	M	1	Contains the application identifier of the EAS, e.g. FQDN, URI.	
expectedSvcArea	LocationArea5G	O	0..1	Service availability area (geographical and topological) for each selected EAS identifier.	

8.1.5.2.14 Type: ApplicationInfo

Table 8.1.5.2.14-1: Definition of type ApplicationInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
acProf	ACProfile	M	1	Information about services the EEC wants to connect.	
appGroupProfile	AppGroupProfile	O	0..1	Application group profile associated with the AC Profile.	

8.1.5.2.15 Type: EASBundleDetail

Table 8.1.5.2.15-1: Definition of type EASBundleDetail

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the Edge Application Server registered or expected to be registered with the EES, e.g. FQDN, URI.	
easBundleInfos	array(EASBundleInfo)	M	1..N	Represents a list of EAS bundles to which the EAS belongs.(NOTE)	
NOTE: In case of ECS Service Provisioning response, the "easBdlReqs" and "mainEasId" attributes shall not be present within the "easBundleInfo" attribute.					

8.1.5.3 Simple data types and enumerations

None.

8.1.6 Error Handling

General error handling are described in clause 7.7 of 3GPP TS 29.558 [4].

8.1.7 Feature negotiation

General feature negotiation procedures are described in clause 7.8 of 3GPP TS 29.558 [4]. Table 8.1.7-1 lists the supported features for Eecs_ServiceProvisioning API.

Table 8.1.7-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 7.6 of 3GPP TS 29.558 [4].
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 7.6 of 3GPP TS 29.558 [4]. This feature requires that the Notification_test_event feature is also supported.
3	enNB1	This feature indicates the support of enhancements to this northbound API in Rel-18.
4	EdgeApp_2	This feature indicates support of the enhancements for the Enabling Edge Applications. Within this feature the following enhancements are covered: - support of enhanced EES service differentiation; - support of Edge computing in SNPN; - support of EAS bundle information; - support of EAS instantiation; - support for common EAS enhancement; - support for roaming and federation; and - the EEC support of application triggering to perform ECS service provisioning.

9 Security

The authentication and authorization between EEC and ECS shall be as specified in 3GPP TS 33.558 [7].

The authentication and authorization between EEC and EES shall be as specified in 3GPP TS 33.558 [7].

The security credentials to be used for verification and authorization of various API requests from EEC shall be as specified in 3GPP TS 33.558 [7].

The EEC, prior to consuming services offered by the EES APIs, may obtain the "access tokens" from the ECS, by invoking the Eecs_ServiceProvisioning service, as described in 3GPP TS 33.558 [7].

10 SEAL services

The EEL can utilize following SEAL services to support EEL services:

a) notification management as specified in 3GPP TS 24.542 [10] to receive notifications; and the EEC shall:

   1) initiate the notification channel creation procedures on SNM-C as specified in clause 6.2.2.1 in 3GPP TS 24.542 [10] to obtain the Notification Target Address (e.g. URL) and use it in the subscribe methods shared to EES and ECS;

   2) handle the notification messages received from SNM-C as specified in clause 6.2.3 in 3GPP TS 24.542 [10]; and

   3) initiate the notification channel deletion procedures on SNM-C as specified in clause 6.2.4.1 in 3GPP TS 24.542 [10].

Annex A (normative): Edge Enabler Server OpenAPI specification

A.1 General

A.2 Eees_EECRegistration API

```
openapi: 3.0.0

info:
  title: Eees_EECRegistration
  version: "1.1.0"
  description: |
    API for EEC registration.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 24.558 V18.5.1 Enabling Edge Applications; Protocol specification.
  url: 'https://www.3gpp.org/ftp/Specs/archive/24_series/24.558/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/eees-eecregistration/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:

  /registrations:
    post:
      operationId: CreateEECReg
      tags:
        - EEC Registrations (Collection)
      description: Create a new EEC registration at the EES.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EECRegistration'
      responses:
        '201':
          description: Created (EEC information is registered successfully at EES).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EECRegistration'
        '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'

/registrations/{registrationId}:
  put:
    operationId: UpdateIndEECReg
    tags:
      - Individual EEC registration (Document)
    description: Update an existing EEC registration a the EES.
    parameters:
      - name: registrationId
        in: path
        description: Identifies an individual EEC registration.
        required: true
        schema:
          type: string
    requestBody:
      description: Parameters to replace the existing registration.
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EECRegistration'
    responses:
      '200':
        description: OK (An individual EEC registration resource updated successfully).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EECRegistration'
      '204':
        description: >
          No Content (An individual EEC registration resource updated 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:
    operationId: DeleteIndEECReg
    tags:
      - Individual EEC registration (Document)
    description: Remove an existing EEC registration at EES.
    parameters:
      - name: registrationId
        in: path
        description: Identifies an individual EEC registration.
        required: true
```

```
        schema:
          type: string
    responses:
      '204':
        description: >
          No Content (An individual EEC registration resource deleted 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'
      '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:
    operationId: ModifyIndEECReg
    tags:
      - Individual EEC registration (Document)
    description: Partially update an existing EEC registration a the EES.
    parameters:
      - name: registrationId
        in: path
        description: Identifies an individual EEC registration.
        required: true
        schema:
          type: string
    requestBody:
      description: Parameters to replace the existing registration.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/EECRegistrationPatch'
    responses:
      '200':
        description: OK (An individual EEC registration resource updated successfully).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EECRegistration'
      '204':
        description: >
          No Content (An individual EEC registration resource updated 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'

components:

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

    EECRegistration:
      description: Describes the parameters to perform EEC Registration related operations.
      type: object
      properties:
        eecId:
          type: string
          description: Represents a unique identifier of the EEC.
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        acProfs:
          type: array
          items:
            $ref: '#/components/schemas/ACProfile'
          description: Profiles of ACs for which the EEC provides edge enabling services.
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
        eecSvcContSupp:
          type: array
          items:
            $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
          description: Profiles of ACs for which the EEC provides edge enabling services.
        eecCntxId:
          type: string
          description: Identifier of the EEC context obtained from a previous registration.
        srcEesId:
          type: string
          description: Identifier of the EES that provided EEC context ID.
        endPt:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        ueMobilityReq:
          type: boolean
          description: >
            Set to true to indicate that UE Mobility support is required.
            Set to false to indicate that UE mobility support is not required.
            The default value when omitted is false.
        easSelReqInd:
          type: boolean
          description: >
            Set to true to indicate the EES support for EAS selection.
            Set to false to indicate the EES shall not select the EAS.
            The default value when omitted is false.
        ueType:
          $ref: '#/components/schemas/DeviceType'
        discoveredEas:
          type: array
          items:
            $ref: 'TS24558_Eees_EASDiscovery.yaml#/components/schemas/DiscoveredEas'
          minItems: 1
        unfulfillAcProfs:
          type: array
          items:
            $ref: '#/components/schemas/UnfulfilledAcProfile'
          minItems: 1
          description: >
            A list of ACIDs of the AC Profile(s) sent from EES, for which the requirements
            indicated in the AC profile(s) cannot be fulfilled.
        unfulfilledAcProfs:
          $ref: '#/components/schemas/UnfulfilledAcProfile'
      not:
        required: [ unfulfilledAcProfs, unfulfillAcProfs ]
      required:
```

```
      - eecId

    ACProfile:
      description: AC information indicating required services and service characteristics.
      type: object
      properties:
        acId:
          type: string
          description: Identity of the AC.
        acType:
          type: string
          description: The category or type of AC.
        prefEcsps:
          type: array
          items:
            type: string
          description: Indicates to the ECS which ECSPs are preferred for the AC.
        acSchedule:
          $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
        expAcGeoServArea:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
        acSvcContSupp:
          type: array
          items:
            $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
          description: The ACR scenarios supported by the AC for service continuity.
        simInactTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
        eass:
          type: array
          items:
            $ref: '#/components/schemas/EasDetail'
          minItems: 1
          description: List of EAS information.
        easBundleInfos:
          type: array
          items:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASBundleInfo'
          minItems: 1
          description: >
            List of EAS bundles to which the EAS (identified via the "easId" attribute) belongs.
      required:
        - acId

    EasDetail:
      description: EAS details.
      type: object
      properties:
        easId:
          type: string
          description: Application identifier of the EAS.
        expectedSvcKPIs:
          $ref: '#/components/schemas/ACServiceKPIs'
        minimumReqSvcKPIs:
          $ref: '#/components/schemas/ACServiceKPIs'
      required:
        - easId

    ACServiceKPIs:
      description: Describes the KPIs required by the AC in order to receive required services.
      type: object
      properties:
        connBand:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
        reqRate:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
        respTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
        avail:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
        reqComp:
          type: string
          description: The compute resources required by the AC.
        reqGrapComp:
          type: string
          description: The graphical compute resources required by the AC.
        reqMem:
          type: string
```

```
        description: The memory resources required by the AC.
      reqStrg:
        type: string
        description: The storage resources required by the AC.

  EECRegistrationPatch:
    description: Describes the parameters to perform EEC Registration update.
    type: object
    properties:
      acProfs:
        type: array
        items:
          $ref: '#/components/schemas/ACProfile'
        description: Profiles of ACs for which the EEC provides edge enabling services.
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      ueMobilityReq:
        type: boolean
        description: Indicates whether UE requires mobility support or not.
      easSelReqInd:
        type: boolean
        description: Indicates whether EES support for EAS selection is required or not.
      ueType:
        $ref: '#/components/schemas/DeviceType'

  UnfulfilledAcProfile:
    description: Describes AC Profile ID and reason sent by EES in EEC Register response.
    type: object
    properties:
      acId:
        type: string
        description: The AC ID of a AC profile.
      reason:
        $ref: '#/components/schemas/UnfulfillACProfRsn'

  UnfulfillACProfRsn:
    anyOf:
      - type: string
        enum:
          - EAS_NOT_AVAILABLE
          - REQ_UNFULFILLED
      - type: string
        description: >
          This string provides forward-compatibility with future extensions to the
          enumeration and is not used to encode content defined in the present version
          of this API.
    description: |
      Represents reason for unfulfilled AC profile requirements.
      Possible values are:
      - EAS_NOT_AVAILABLE: EAS is not available.
      - REQ_UNFULFILLED: Requirements cannot be fulfilled.

  DeviceType:
    anyOf:
    - type: string
      enum:
        - CONSTRAINED_UE
        - NORMAL_UE
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
    description: >
      Represents the UE type.
      Possible values are:
      - CONSTRAINED_UE: Indicates UE is constrained with resources like power, processor etc.
      - NORMAL_UE: Indicates UE is not constrained with resources.
```

A.3 Eees_EASDiscovery API

```
openapi: 3.0.0

info:
  title: Eees_EASDiscovery
```

```
  description: |
    API for EAS Discovery.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: "1.1.0"

externalDocs:
  description: >
    3GPP TS 24.558 V18.5.1 Enabling Edge Applications; Protocol specification.
  url: https://www.3gpp.org/ftp/Specs/archive/24_series/24.558/

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/eees-easdiscovery/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:

  /subscriptions:
    post:
      description: Creates a new individual EAS discovery subscription.
      operationId: CreateEASDiscSub
      tags:
        - EAS Discovery Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EasDiscoverySubscription'
      responses:
        '201':
          description: >
            Created. A new Individual EAS Discovery Subscription resource was successfully
            created.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EasDiscoverySubscription'
          headers:
            Location:
              description: Contains the URI of the newly created resource.
              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'
      callbacks:
        notificationDestination:
          '{request.body#/notificationDestination}':
            post:
              requestBody:
```

```
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/EasDiscoveryNotification'
            responses:
              '204':
                description: No Content (The receipt of the Notification is acknowledged).
              '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'

  /subscriptions/{subscriptionId}:
    put:
      description: >
        Updates an existing individual EAS discovery subscription identified by the subscriptionId.
      operationId: UpdateIndEASDiscSub
      tags:
        - Individual EAS Discovery Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: Identifies an individual EAS discovery subscription resource.
          required: true
          schema:
            type: string
      requestBody:
        description: Parameters to replace the existing subscription.
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EasDiscoverySubscription'
      responses:
        '200':
          description: >
            OK. The individual EAS discovery subscription resource was updated successfully.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EasDiscoverySubscription'
        '204':
          description: No Content (updated successfully).
        '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: >
      Deletes an existing individual EAS discovery subscription identified by the subscriptionId.
    operationId: DeleteIndEASDiscSub
    tags:
      - Individual EAS Discovery Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: Identifies an individual EAS discovery subscription resource.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          An individual EAS discovery subscription resource deleted 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'
      '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: >
      Partial update an existing EAS Discovery Subscription resource identified by a
      subscriptionId.
    operationId: ModifyIndEASDiscSub
    tags:
      - Individual EAS Discovery Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: Identifies an individual EAS discovery subscription resource.
        required: true
        schema:
          type: string
    requestBody:
      description: Parameters to replace the existing subscription.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/EasDiscoverySubscriptionPatch'
    responses:
      '200':
        description: >
          OK (An individual EAS discovery subscription resource updated successfully).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EasDiscoverySubscription'
```

```
        '204':
          description: No Content (modified successfully).
        '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'

  /eas-profiles/request-discovery:
    post:
      description: >
        Provides EAS information requested by the service consumer (i.e. EEC, EAS or EES).
      operationId: GetEASDiscInfo
      tags:
        - EAS Profiles (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EasDiscoveryReq'
      responses:
        '200':
          description: >
            OK (The requested EAS discovery information was returned successfully).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EasDiscoveryResp'
        '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'

components:

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```
schemas:

  EasDiscoveryReq:
    description: EAS discovery request information.
    type: object
    properties:
      requestorId:
        $ref: '#/components/schemas/RequestorId'
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      easDiscoveryFilter:
        $ref: '#/components/schemas/EasDiscoveryFilter'
      eecSvcContinuity:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EEC supports service continuity or not, also indicates which ACR
          scenarios are supported by the EEC.
      eesSvcContinuity:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EES supports service continuity or not, also indicates which ACR
          scenarios are supported by the EES.
      easSvcContinuity:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EAS supports service continuity or not, also indicates which ACR
          scenarios are supported by the EAS.
      locInf:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
      easTDnai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      easSelSupInd:
        type: boolean
        description: >
          Indicates if the EEC requires the EAS selection support from the EES (e.g., for
          constrained device). The default value false indicates the EAS selection is not
          required from the EES.
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      easIntTrigSup:
        type: boolean
        description: >
          Indicates to the EES whether the EAS instantiation triggering should be performed for
          the current request. The default value false indicates the EAS instantiation triggering
          should not be performed. The true value indicate the EAS instantiation triggering should
          be performed.
      predictExpTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      servingPLMNInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
      svcContinuityPlanInd:
        type: boolean
        description: >
          Indicates to the EES whether the EAS discovery request is triggered as part of service
          continuity planning. The default value false indicates this request is not part of
          service continuity planning. The true value indicate this request is part of
          service continuity planning.
    required:
      - requestorId

  EasDiscoveryResp:
    description: EAS discovery response.
    type: object
    properties:
      discoveredEas:
        type: array
        items:
          $ref: '#/components/schemas/DiscoveredEas'
        description: List of EAS discovery information.
      easInstInfos:
        type: object
```

```
      additionalProperties:
        $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/EASInstantiationInfo'
      minProperties: 1
      description: >
        Contains the EAS instantiation information for each discovered EAS returned within
        the discoveredEas attribute.
    edgeLoadAnalytics:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/EdgeLoadAnalytic'
      minProperties: 1
      description: >
        Contains the statistical analytics data and predictive analytics data for each
        discovered application server. The key of the map shall be the EAS ID to which
        the provided analytics data within the map value relates.
  required:
    - discoveredEas

EasDiscoverySubscription:
  description: Represents an Individual EAS Discovery Subscription resource.
  type: object
  properties:
    eecId:
      type: string
      description: Represents a unique identifier of the EEC.
    ueId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    easEventType:
      $ref: '#/components/schemas/EASDiscEventIDs'
    easDiscoveryFilter:
      $ref: '#/components/schemas/EasDiscoveryFilter'
    easDynInfoFilter:
      $ref: '#/components/schemas/EasDynamicInfoFilter'
    easSvcContinuity:
      type: array
      items:
        $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
      description: >
        Indicates if the EEC supports service continuity or not, also indicates which ACR
        scenarios are supported by the EEC.
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    notificationDestination:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    requestTestNotification:
      type: boolean
      description: >
        Set to true by Subscriber to request the EES to send a test notification. Set to false
        or omitted otherwise.
    websockNotifConfig:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsockNotifConfig'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    easIntTrigSup:
      type: boolean
      description: >
        Indicates to the EES whether the EAS instantiation triggering should be performed for
        the current request. The default value false indicates the EAS instantiation triggering
        should not be performed. The true value indicate the EAS instantiation triggering should
        be performed.
    eecTriggerRequest:
      type: boolean
      description: >
        Indicates to the EES whether the application triggering is required by the EEC.
        Default value false indicates the application triggering is not required.
  required:
    - eecId
    - easEventType

EasDiscoveryNotification:
  description: Notification of EAS discovery information.
  type: object
  properties:
    subId:
      type: string
      description: >
        Identifier of the individual service provisioning subscription for which the service
        provisioning notification is delivered.
```

```
      eventType:
        $ref: '#/components/schemas/EASDiscEventIDs'
      discoveredEas:
        type: array
        items:
          $ref: '#/components/schemas/DiscoveredEas'
        minItems: 1
        description: List of EAS discovery information.
      easInstInfos:
        type: object
        additionalProperties:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/EASInstantiationInfo'
        minProperties: 1
        description: >
          Contains the EAS instantiation information for each discovered EAS returned within
          the "discoveredEas" attribute.
      edgeLoadAnalytics:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/EdgeLoadAnalytic'
        minProperties: 1
        description: >
          Contains the statistical analytics data and predictive analytics data for each
          discovered application server. The key of the map shall be the EAS ID to which
          the provided analytics data within the map value relates.
    required:
      - subId
      - eventType
      - discoveredEas

  EasDiscoveryFilter:
    description: Represents the EAS characteristics.
    type: object
    properties:
      acChars:
        type: array
        items:
          $ref: '#/components/schemas/ACCharacteristics'
        minItems: 1
        description: AC description for which an EAS is needed.
      appGroupProfile:
          $ref: 'TS24558_Eecs_ServiceProvisioning.yaml#/components/schemas/AppGroupProfile'
      easChars:
        type: array
        items:
          $ref: '#/components/schemas/EasCharacteristics'
        minItems: 1
        description: Required EAS chararcteristics.

  EasCharacteristics:
    description: Represents the EAS chararcteristics.
    type: object
    properties:
      easId:
        type: string
        description: EAS application identifier.
      appGrpId:
        type: string
        description: >
          Application group identifier, identifying a group of UEs using the same
          application service.
      easSyncInd:
        type: boolean
        description: >
          Indicates whether the synchronization between the EASs is required. The
          default value false indicates the EAS synchronization is not required.
      easProvId:
        type: string
        description: EAS provider identifier.
      stdEasType:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASCategory'
      easType:
        type: string
        description: EAS type with the flexible value set.
      easSched:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
      svcArea:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
```

```
      easSvcContinuity:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EEC supports service continuity or not, also indicates which ACR
          scenarios are supported by the EEC.
      svcPermLevel:
        type: string
        description: Service permissions level.
      svcFeats:
        type: array
        items:
          type: string
        minItems: 1
        description: Service features.
      easBundleInfo:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASBundleInfo'
    not:
      required: [stdEasType, easType]

  DiscoveredEas:
    description: Represents an EAS discovery information.
    type: object
    properties:
      eas:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASProfile'
      eesEndPt:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      lifeTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    required:
      - eas

  EasDynamicInfoFilter:
    description: Represents EAS dynamic information changes filter.
    type: object
    properties:
      dynInfoFilter:
        type: array
        items:
          $ref: '#/components/schemas/EasDynamicInfoFilterData'
        minItems: 1
        description: List of EAS dynamic information required by the EEC per EAS.
    required:
      - dynInfoFilter

  EasDynamicInfoFilterData:
    description: Represents an EAS dynamic information.
    type: object
    properties:
      eecId:
        type: string
        description: The application identifier of the EAS, e.g. FQDN, URI.
      easStatus:
        type: boolean
        description: Notify if EAS status changed.
      easAcIds:
        type: boolean
        description: Notify if list of AC identifiers changed.
      easDesc:
        type: boolean
        description: Notify if EAS description changed.
      easPt:
        type: boolean
        description: Notify if EAS endpoint changed.
      easEndPoint:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      easFeature:
        type: boolean
        description: Notify if EAS feature changed.
      easSchedule:
        type: boolean
        description: Notify if EAS schedule changed.
      svcArea:
        type: boolean
        description: Notify if EAS service area changed.
      svcKpi:
```

```
        type: boolean
        description: Notify if EAS KPIs changed.
      svcCont:
        type: boolean
        description: Notify if EAS supported ACR changed.
    required:
      - eecId

  ACCharacteristics:
    description: Represents EAS dynamic information changes filter.
    type: object
    properties:
      acProf:
        $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
    required:
      - acProf

  EASDiscEventIDs:
    anyOf:
    - type: string
      enum:
        - EAS_AVAILABILITY_CHANGE
        - EAS_DYNAMIC_INFO_CHANGE
    - 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: >
      Possible values are
      - EAS_AVAILABILITY_CHANGE: Represents the EAS availability change event.
      - EAS_DYNAMIC_INFO_CHANGE: Represents the EAS dynamic information change event.

  EasDiscoverySubscriptionPatch:
    description: Represents an Individual EAS Discovery Subscription resource.
    type: object
    properties:
      easDiscoveryFilter:
        $ref: '#/components/schemas/EasDiscoveryFilter'
      easDynInfoFilter:
        $ref: '#/components/schemas/EasDynamicInfoFilter'
      easSvcContinuity:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EEC supports service continuity or not, also indicates which ACR
          scenarios are supported by the EEC.
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      easEventType:
        $ref: '#/components/schemas/EASDiscEventIDs'

  RequestorId:
    description: Represents identifier of the requestor.
    type: object
    properties:
      eesId:
        type: string
        description: The identifier of the EES (e.g. S-EES).
      easId:
        type: string
        description: The application identifier of the EAS (e.g. S-EAS), e.g. FQDN, URI.
      eecId:
        type: string
        description: The identifier of the EEC.
    oneOf:
      - required: [eesId]
      - required: [easId]
      - required: [eecId]

  EdgeLoadAnalytic:
    description: >
      Contains the statistical analytics data and predictive analytics data for each
      discovered application server.
    type: object
    properties:
      easId:
```

```
          type: string
          description: The application identifier of the EAS, e.g. FQDN, URI.
        predictData:
          $ref: '#/components/schemas/PredictiveData'
        statisticData:
          $ref: '#/components/schemas/StatisticalData'
      required:
        - easId

    PredictiveData:
      description: >
        Contains the predictive analytics data for each discovered EAS service status
         (e.g. EAS schedule, EAS status) change.
      type: object
      properties:
        scheds:
          type: array
          items:
            $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
          minItems: 1
        status:
          type: string
          description: Indicates the EAS status (e.g. Enabled, Disabled etc.).

    StatisticalData:
      description: >
        Contains the statistical analytics data (e.g. number of times the client received
        expected performance from the EAS).
      type: object
      properties:
        numRecPerf:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
```

A.4 Eees_ACREvents API

```
openapi: 3.0.0

info:
  title: Eees_ACREvents
  version: "1.1.0"
  description: |
    API for ACR events subscription and notification.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 24.558 V18.5.1 Enabling Edge Applications; Protocol specification.
  url: 'https://www.3gpp.org/ftp/Specs/archive/24_series/24.558/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/eees-acrevents/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558

paths:

  /subscriptions:
    post:
      description: Creates a new individual ACR events subscription.
      operationId: CreateACREventsSubscripton
      tags:
        - ACR events subscription (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACREventsSubscription'
```

```
    responses:
      '201':
        description: Individual ACR events subscription resource created successfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACREventsSubscription'
        headers:
          Location:
            description: Contains the URI of the newly created resource.
            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'
    callbacks:
      notificationDestination:
        '{request.body#/notificationDestination}':
          post:
            requestBody:  # Contents of the callback message.
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/ACRInfoNotification'
            responses:
              '204':
                description: No Content (The receipt of the Notification is acknowledged).
              '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'

  /subscriptions/{subscriptionId}:
    put:
      description: >
```

```
      Updates an existing individual ACR events subscription identified by the subscriptionId.
    operationId: UpdateACREventsSubscription
    tags:
      - Individual ACR Events Subscription
    parameters:
      - name: subscriptionId
        in: path
        description: Identifies an individual ACR Events subscription resource.
        required: true
        schema:
          type: string
    requestBody:
      description: Parameters to replace the existing subscription.
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ACREventsSubscription'
    responses:
      '200':
        description: >
          OK (An individual ACR Events subscription resource updated successfully).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACREventsSubscription'
      '204':
        description: No Content (updated 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: >
      Deletes an existing individual ACR events subscription identified by the subscriptionId.
    operationId: DeleteACREventsSubscription
    tags:
      - Individual ACR Events Subscription
    parameters:
      - name: subscriptionId
        in: path
        description: Identifies an individual ACR Events subscription resource.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: An individual ACR Events subscription resource deleted 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'
        '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: >
        Partially modifies an existing individual ACR events subscription identified by
        the subscriptionId.
      operationId: ModifyACREventsSubscription
      tags:
        - Individual ACR Events Subscription
      parameters:
        - name: subscriptionId
          in: path
          description: Identifies an individual ACR Events subscription resource.
          required: true
          schema:
            type: string
      requestBody:
        description: Parameters to replace the existing subscription.
        required: true
        content:
          application/merge-patch+json:
            schema:
              $ref: '#/components/schemas/ACREventsSubscriptionPatch'
      responses:
        '200':
          description: >
            OK (An individual ACR Events subscription resource updated successfully).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ACREventsSubscription'
        '204':
          description: No Content (successful notification).
        '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'

components:

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
```

```
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

schemas:

  ACREventsSubscription:
    description: ACE Events subscription request.
    type: object
    properties:
      eecId:
        type: string
        description: Represents a unique identifier of the EEC.
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      easIds:
        type: array
        items:
          type: string
        minItems: 1
        description: The list of application identifiers of the EASs.
      acIds:
        type: array
        items:
          type: string
        description: List of AC identities.
      eventIds:
        $ref: '#/components/schemas/ACREventIDs'
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      requestTestNotification:
        type: boolean
        description: >
          Set to true by Subscriber to request the ECS to send a test notification. Set to
          false or omitted otherwise.
      websockNotifConfig:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsockNotifConfig'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - eecId
      - easIds
      - eventIds
      - notificationDestination

  ACRInfoNotification:
    description: Notification of ACR events information.
    type: object
    properties:
      subId:
        type: string
        description: >
          String identifying the Individual ACR events subscription for which the ACT
          Information notification is delivered.
      easId:
        type: string
        description: Application identifier of the EAS.
      acId:
        type: string
        description: Identity of the AC.
      eventId:
        $ref: '#/components/schemas/ACREventIDs'
      trgtInfo:
        $ref: '#/components/schemas/TargetInfo'
      acrStatus:
        $ref: '#/components/schemas/ACRCompleteEventInfo'
      eecCtxtReloc:
        $ref: '#/components/schemas/EecCtxtRelocStatus'
      acrScenarioList:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
      easBundleInfo:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASBundleInfo'
      tEasEndPointBundleList:
        type: array
```

```
      items:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      minItems: 1
  required:
    - subId
    - easId
    - eventId

TargetInfo:
  description: Details of the selected T-EAS and the T-EES.
  type: object
  properties:
    trgetEASInfo:
      $ref: 'TS24558_Eees_EASDiscovery.yaml#/components/schemas/DiscoveredEas'
    trgetEESInfo:
      $ref: 'TS24558_Eecs_ServiceProvisioning.yaml#/components/schemas/EDNConfigInfo'

ACREventsSubscriptionPatch:
  description: An individual ACR events subscription resource to be updated.
  type: object
  properties:
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    easIds:
      type: array
      items:
        type: string
      minItems: 1
      description: The list of application identifiers of the EASs.
    eventIds:
      $ref: '#/components/schemas/ACREventIDs'
    notificationDestination:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

ACREventIDs:
  anyOf:
  - type: string
    enum:
      - TARGET_INFORMATION
      - ACR_COMPLETE
  - type: string
    description: >
      This string provides forward-compatibility with future
      extensions to the enumeration and is not used to encode
      content defined in the present version of this API.
  description: |
    Represents the ACR events.
    Possible values are:
    - TARGET_INFORMATION: Represents the target information event.
    - ACR_COMPLETE: Represents the ACR complete event.

EecCtxtRelocStatus:
  description: Indicates the registration id and expiry time of the registration.
  type: object
  properties:
    implReg:
      $ref: 'TS29558_Eees_EECContextRelocation.yaml#/components/schemas/ImplicitRegDetails'

ACRCompleteEventInfo:
  description: Indicates the completed ACR result and target EAS endpoint info.
  type: object
  properties:
    acrRes:
      type: boolean
      description: Indicates whether the ACR is successful or failure.
    tEasEndpoint:
      $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
    failReason:
      type: string
      description: Indicates the cause information for the failure.
  required:
    - acrRes
    - tEasEndpoint
```

A.5 Eees_AppContextRelocation API

```
openapi: 3.0.0
info:
  title: Eees Application Context Relocation Service
  version: "1.1.0"
  description: |
    Eees Application Context Relocation Service.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 24.558 V18.5.1; Enabling Edge Applications; Protocol specification; Stage 3.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/24.558/'

servers:
  - url: '{apiRoot}/eees-appctxtreloc/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

security:
  - {}
  - oAuth2ClientCredentials:
    - eees-appctxtreloc

paths:
  /determine:
    post:
      summary: Request ACR determination.
      operationId: Determine
      tags:
        - Determine ACR
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AcrDetermReq'
      responses:
        '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'

  /initiate:
    post:
      summary: Request the initiation of ACR.
      operationId: Initiate
      tags:
        - Initiate ACR
```

```
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AcrInitReq'
    responses:
      '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'

  /declare:
    post:
      summary: Informs about the selected target EAS and provides the associated information.
      operationId: Declare
      tags:
        - Declare selected target EAS
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AcrDecReq'
      responses:
        '204':
          description: >
            No Content. The selected target EAS information is successfully received.
        '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'
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            eees-appctxtreloc: Access to the Eees_AppContextRelocation API

  schemas:
    AcrDetermReq:
      description: Represents the parameters to request ACR with action determination.
      type: object
      properties:
        requestorId:
          type: string
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        acId:
          type: string
        easId:
          type: string
        sEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        expectedLocArea:
          $ref: '#/components/schemas/ExpectedLocationArea'
      required:
        - requestorId
        - sEasEndpoint

    AcrInitReq:
      description: Represents the parameters to request ACR with action initiation.
      type: object
      properties:
        requestorId:
          type: string
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        acId:
          type: string
        easId:
          type: string
        tEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        sEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        prevTEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        routeReq:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
        simInactTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
        easNotifInd:
          type: boolean
          default: false
        prevEasNotifInd:
          type: boolean
          default: false
        eecCtxtReloc:
          $ref: '#/components/schemas/EecCtxtReloc'
        expectedLocArea:
          $ref: '#/components/schemas/ExpectedLocationArea'
        acrParams:
          $ref: '#/components/schemas/AcrParameters'
        acrModificationParams:
          $ref: '#/components/schemas/AcrModificationParams'
        easBundleInfo:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASBundleInfo'
        tEasEndPointBundleList:
          type: array
          items:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
          minItems: 1
      required:
        - requestorId
        - tEasEndpoint
```

```
      - easNotifInd

    AcrDecReq:
      description: >
        Represents the parameters to inform about the selected target EAS and provide the
        associated information.
      type: object
      properties:
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        acId:
          type: string
        tEasId:
          type: string
        tEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        expectedLocArea:
          $ref: '#/components/schemas/ExpectedLocationArea'
        easBundleInfo:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASBundleInfo'
        tEasEndPointBundleList:
          type: array
          items:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
          minItems: 1
      required:
        - ueId
        - tEasId
        - tEasEndpoint

    EecCtxtReloc:
      description: Represents EEC Context relocation information.
      type: object
      properties:
        eecCtxtId:
          type: string
        sEesId:
          type: string
        sEecEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        tEesId:
          type: string
        tEecEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      required:
        - eecCtxtId

    ExpectedLocationArea:
      description: >
        Represents the expected location or service are of UE.
      type: object
      properties:
        locInfo:
          $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
        svcArea:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'

    AcrParameters:
      description: >
        Represents ACR parameters specific to ACR request initiated for Service continuity planning.
      type: object
      properties:
        predictExpTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'

    AcrModificationParams:
      description: >
        Represents ACR parameters specific to ACR modification request.
      type: object
      properties:
        sEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        tEasEndpoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        acrParams:
          $ref: '#/components/schemas/AcrParameters'
```

A.6 Eees_EASInformationProvisioning API

```
openapi: 3.0.0

info:
  title: Eees_EASInformationProvisioning
  version: "1.0.0"
  description: |
    API for EAS Information Provisioning.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 24.558 V18.5.1 Enabling Edge Applications; Protocol specification.
  url: 'https://www.3gpp.org/ftp/Specs/archive/24_series/24.558/'

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/eees-easinfoprov/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:

  /declare:
    post:
      operationId: declare
      tags:
        - EAS Information Provision
      description: Declare EAS information provisioning to the EES.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EASInfoProvReq'
      responses:
        '200':
          description: Information about the successful EAS information provisioning response.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EASInfoProvResp'
        '204':
          description: No Content (EAS information request is processed and successful)
        '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'
```

```
components:

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

    EASInfoProvReq:
      description: Describes the parameters shared to perform EAS Information Provision related
operations.
      type: object
      properties:
        eecId:
          type: string
          description: Represents a unique identifier of the EEC.
        acId:
          type: string
          description: Identity of the AC.
        selEasIds:
          type: array
          items:
            type: string
          minItems: 1
          description: Indicates the identifier(s) of the selected EAS(s) for EAS bundles, which is
either instantiated or instantiable..
        appGrpId:
          type: string
          description: >
            Application group identifier, identifying a group of UEs using the same
            application service.
        eesList:
          type: array
          items:
            $ref: 'TS24558_Eecs_ServiceProvisioning.yaml#/components/schemas/EESInfo'
          minItems: 1
          description: Contains the list of EES which supports the application group identifier.
        reqType:
          $ref: '#/components/schemas/EasInfoProvReqType'
        selAcrScenarios:
          type: array
          items:
            $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
          minItems: 1
          description: >
            Indicates if the list of ACR scenarios are selected by the EEC.
        selEasEndPoints:
          type: array
          items:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
          minItems: 1
          description: >
            Indicates the endpoints of the selected EAS(s) for EAS bundles.
        dnais:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
          minItems: 1
          description: Represents list of Data network access identifiers for each selected EAS
indetifier.
        svcArea:
          type: array
          items:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
          minItems: 1
          description: Represents list of service are for each selected EAS indetifier.
        assEesEndPoints:
          type: array
          items:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
          minItems: 1
          description: >
```

```
            Indicates the endpoints of the selected EES(s) of other EES which support the direct
bundled EAS within the same EDN and associated with the EASID list for EAS bundles.
        casInfo:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        acProf:
          $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
        eecSvcContSupp:
          type: array
          items:
            $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
          minItems: 1
          description: >
            Indicates which ACR scenarios are supported by the EEC, if this attribute is not
present, then the EEC does not support service continuity.
      required:
        - eecId
        - acId
        - selEasIds

    EASInfoProvResp:
      description: Information about the EAS information provisioning response.
      type: object
      properties:
        selAcrScenarioList:
          type: array
          items:
            $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
          minItems: 1
          description: >
            Indicates the list of ACR scenarios are selected by the EES.
        instEasInfo:
            $ref: '#/components/schemas/InstantiatedEASInfo'
        comEasEndpoint:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        comEesEndpoint:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'

    InstantiatedEASInfo:
      description: EAS details.
      type: object
      properties:
        eas:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASProfile'
        lifeTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
        eesEndpoint:
            $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      required:
        - eas

    EasInfoProvReqType:
      anyOf:
      - type: string
        enum:
          - ACR_SCENARIO_SELECTION_ANNOUNCEMENT
          - ACR_SCENARIO_SELECTION_REQUEST
          - EAS_SELECTION
      - type: string
        description: >
          This string provides forward-compatibility with future
          extensions to the enumeration and is not used to encode
          content defined in the present version of this API.
      description: >
        Represents the type of EAS Information Provisioning Request.
        Possible values are:
        - ACR_SCENARIO_SELECTION_ANNOUNCEMENT: Indicates EAS information provisioning request type
is ACR scenario selection announcement.
        - ACR_SCENARIO_SELECTION_REQUEST: Indicates EAS information provisioning request type is ACR
scenario selection request.
        - EAS_SELECTION: Indicates EAS information provisioning request type is EAS selection.
```

Annex B (normative): Edge Configuration Server OpenAPI specification

B.1 Eecs_ServiceProvisioning

```
openapi: 3.0.0

info:
  title: Eecs_ServiceProvisioning
  version: "1.1.0"
  description: |
    API for ECS Service Provisioning.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 24.558 V18.5.1 Enabling Edge Applications; Protocol specification.
  url: https://www.3gpp.org/ftp/Specs/archive/24_series/24.558/

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/eecs-serviceprovisioning/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558

paths:

  /subscriptions:
    post:
      description: >
        Creates a new subscription in ECS in order to be notified of provisioning data
        changes of interest.
      operationId: CreateServProvSub
      tags:
        - Service Provisioning Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ECSServProvSubscription'
      callbacks:
        notificationDestination:
          '{request.body#/notificationDestination}':
            post:
              requestBody:  # contents of the callback message
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/ServProvNotification'
              responses:
                '204':
                  description: No Content (successful notification)
                '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'
    responses:
      '201':
        description: >
          Individual ECS Service Provisioning Subscription resource created successfully.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ECSServProvSubscription'
        headers:
          Location:
            description: 'Contains the URI of the newly created resource'
            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'

  /subscriptions/{subscriptionId}:
    put:
      description: >
        Updates an existing individual service provisioning subscription identified
        by the subscriptionId.
      operationId: UpdateIndServProvSub
      tags:
        - Individual Service Provisioning Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: Identifies an individual service provisioning subscription.
          required: true
          schema:
            type: string
      requestBody:
        description: Parameters to replace the existing subscription.
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ECSServProvSubscription'
      responses:
        '200':
          description: >
            OK (The individual service provisioning subscription matching the subscriptionId
            was modified successfully).
          content:
            application/json:
```

```
            schema:
              $ref: '#/components/schemas/ECSServProvSubscription'
      '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: >
      Deletes an existing individual service provisioning subscription identified by
      the subscriptionId.
    operationId: DeleteIndServProvSub
    tags:
      - Individual Service Provisioning Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: Identifies an individual service provisioning subscription.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          The individual service provisioning subscription matching the subscriptionId 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'

  patch:
    description: >
      Partially updates an existing individual service provisioning subscription identified
      by the subscriptionId.
    operationId: ModifyIndServProvSub
    tags:
      - Individual Service Provisioning Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        description: Identifies an individual service provisioning subscription.
        required: true
        schema:
```

```
        type: string
    requestBody:
      description: Parameters to replace the existing subscription.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/ECSServProvSubscriptionPatch'
    responses:
      '200':
        description: >
          OK (The individual service provisioning subscription matching the subscriptionId
          was modified successfully).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ECSServProvSubscription'
      '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'

  /request:
    post:
      summary: Request service provisioning information.
      operationId: RequestServProv
      tags:
        - Request Service Provisioning
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ECSServProvReq'
      responses:
        '200':
          description: >
            OK (The requested service provisioning information was returned successfully).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ECSServProvResp'
        '204':
          description: >
            No Content (The requested service provisioning information does not exist).
        '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'

components:

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

    ECSServProvReq:
      description: ECS service provisioning request information.
      type: object
      properties:
        eecId:
          type: string
          description: Represents a unique identifier of the EEC.
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        acProfs:
          type: array
          items:
            $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
          description: Information about services the EEC wants to connect to.
        appInfo:
          type: array
          items:
            $ref: '#/components/schemas/ApplicationInfo'
          minItems: 1
          description: Information about the list of services the EEC wants to connect.
        eecSvcContSupp:
          type: array
          items:
            $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
          description: >
            Indicates if the EEC supports service continuity or not, also indicates which
            ACR scenarios are supported by the EEC.
        connInfo:
          type: array
          items:
            $ref: '#/components/schemas/ConnectivityInfo'
          description: List of connectivity information for the UE.
        locInf:
          $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
        ecspIds:
          type: array
          items:
            type: string
          minItems: 1
          description: Indicates to the ECS which EES providers are preferred by the EEC.
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - eecId

    ECSServProvResp:
      description: ECS service provisioning response information.
      type: object
      properties:
        ednCnfgInfo:
          type: array
          items:
            $ref: '#/components/schemas/EDNConfigInfo'
          minItems: 1
          description: List of EDN configuration information.
        redirectedECS:
          type: array
          items:
```

```
          $ref: '#/components/schemas/ECSRedirectInfo'
        minItems: 1
        description: List of redirected ECS information.
    required:
      - ednCnfgInfo

  ECSServProvSubscription:
    description: Represents an individual service provisioning subscription resource.
    type: object
    properties:
      eecId:
        type: string
        description: Represents a unique identifier of the EEC.
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      acProfs:
        type: array
        items:
          $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
        description: Information about services the EEC wants to connect to.
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      eecSvcContSupp:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EEC supports service continuity or not, also indicates which
          ACR scenarios are supported by the EEC.
      connInfo:
        type: array
        items:
          $ref: '#/components/schemas/ConnectivityInfo'
        description: List of connectivity information for the UE.
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      requestTestNotification:
        type: boolean
        description: >
          Set to true by Subscriber to request the ECS to send a test notification. Set to
          false or omitted otherwise.
      websockNotifConfig:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsockNotifConfig'
      ecspIds:
        type: array
        items:
          type: string
        minItems: 1
        description: Indicates to the ECS which EES providers are preferred by the EEC.
      eecTriggerRequest:
        type: boolean
        description: >
          Indicates to the ECS, whether the application triggering is required by the EEC.
          Default value false indicates the application triggering is not required.
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - eecId

  ServProvNotification:
    description: Represents notification information of a service provisioning Event.
    type: object
    properties:
      subId:
        type: string
        description: >
          Identifier of the individual service provisioning subscription for which the service
          provisioning notification is delivered.
      ednCnfgInfo:
        type: array
        items:
          $ref: '#/components/schemas/EDNConfigInfo'
        minItems: 1
        description: List of EDN configuration information.
      redirectedECS:
        type: array
        items:
          $ref: '#/components/schemas/ECSRedirectInfo'
```

```
      minItems: 1
      description: List of redirected ECS information.
  required:
    - subId
    - ednCnfgInfo

ConnectivityInfo:
  description: Represents the connectivity information for the UE.
  type: object
  properties:
    plmnId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
    ssId:
      type: string
      description: Identifies the SSID of the access point to which the UE is attached.

ApplicationInfo:
  description: Represents the services the EEC wants to connect.
  type: object
  properties:
    acProf:
        $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
    appGroupProfile:
        $ref: '#/components/schemas/AppGroupProfile'
  required:
    - acProf

AppGroupProfile:
  description: Represents the application group profile for common EAS.
  type: object
  properties:
    appGrpId:
      type: string
      description: Represents the application group that uniquely identifies
        the group of UEs using the same application.
    easId:
      type: string
      description: Represents the application identifier of the EAS.
    expectedSvcArea:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
  required:
    - appGrpId
    - easId

EDNConfigInfo:
  description: Represents the EDN configuration information.
  type: object
  properties:
    ednConInfo:
      $ref: '#/components/schemas/EDNConInfo'
    eess:
      type: array
      items:
        $ref: '#/components/schemas/EESInfo'
      minItems: 1
      description: Contains the list of EESs of the EDN.
    lifeTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - ednConInfo
    - eess

ECSRedirectInfo:
  description: >
    Represents ECS information where the EEC shall redirect the ECS Service
    Provisioning request.
  type: object
  properties:
    ecsEndPt:
      $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
    dnn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
    snssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  required:
    - ecsEndPt

EDNConInfo:
```

```
    description: Represents an EDN connection information.
    type: object
    properties:
      dnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      ednTopoSrvArea:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'

  EESInfo:
    description: Represents EES information.
    type: object
    properties:
      eesId:
        type: string
        description: Identity of the EES.
      endPt:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      easIds:
        type: array
        items:
          type: string
        description: >
          Application identities of the Edge Application Servers registered
          with the EES.
      appGroupIdList:
        type: array
        items:
          type: string
        description: List of Application Group IDs associated with EAS.
      ecspInfo:
        type: string
        description: Represents an ECSP Information.
      svcArea:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      dnais:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        description: Represents list of Data network access identifiers.
      eesSvcContSupp:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates if the EES supports service continuity or not, also indicates which ACR
          scenarios are supported by the EES.
      eecRegConf:
        type: boolean
        description: >
          Indicates whether the EEC is required to register on the EES to use edge services
          or not.
      easInstInfos:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/EASInstantiationInfo'
        minItems: 1
        description: >
          The EAS instantiation status per EASID (e.g. instantiated, instantiable but not be
          instantiated yet).
      eesAuthMethods:
        type: array
        items:
          $ref: '#/components/schemas/EesAuthMethod'
        minItems: 1
        description: >
          Indicates the authentication methods supported by the EES.
      easBundleDetails:
        type: array
        items:
          $ref: '#/components/schemas/EASBundleDetail'
        minItems: 1
    required:
      - eesId
      - eecRegConf

  EASBundleDetail:
```

```
    description: Represents details of EAS Bundle.
    type: object
    properties:
      easId:
        type: string
        description: >
          Application identity of the Edge Application Servers registered with the EES.
      easBundleInfos:
        type: array
        items:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EASBundleInfo'
        minItems: 1
        description: List of EAS bundles to which the EAS belongs.
    required:
      - easId
      - easBundleInfos
  EesAuthMethod:
    anyOf:
    - type: string
      enum:
        - TLS_CLIENT_SERVER_CERTIFICATE
        - TLS_WITH_AKMA
        - TLS_WITH_GBA
        - SERVER_SIDE_CERTIFICATE_BASED
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration and is not used to encode
        content defined in the present version of this API.
    description: |
      Represents the Authentication methods supported by EES.
      Possible values are:
      - TLS_CLIENT_SERVER_CERTIFICATE: Represents TLS with client server certificate
        authentication.
      - TLS_WITH_AKMA: Represents TLS with AKMA authentication.
      - TLS_WITH_GBA: Represents TLS with GBA authentication.
      - SERVER_SIDE_CERTIFICATE_BASED: Represents server side certification only.

  ECSServProvSubscriptionPatch:
    description: >
          Represents modifications to an individual service provisioning subscription resource.
    type: object
    properties:
      acProfs:
        type: array
        items:
          $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
        description: Information about services the EEC wants to connect to.
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      eecSvcContSupp:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        description: >
          Indicates which ACR scenarios are supported by the EEC.
      connInfo:
        type: array
        items:
          $ref: '#/components/schemas/ConnectivityInfo'
        description: List of connectivity information for the UE.
```

Annex C (informative): Protocol options considered for EDGE-4 reference point

CT1 considered two possible protocol options for the EDGE-4 reference point: an API-based option and an NAS signalling-based option. CT1 decided to have only the API-based option in this release of the specification.

Annex D(informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2021-01	CT1#128e	C1-211421				TS skeleton for Enabling Edge Applications; Protocol specification	0.0.0
						Implementing agreed pCRs in CT1#128-e (C1-211423)	0.1.0
2021-04	CT1#129-e					Implementing agreed pCRs in CT1#129-e (C1-212155, C1-212454, C1-212464, C1-212546, C1-212547)	0.2.0
2021-06	CT1#130-e					Implementing agreed pCRs in CT1#130-e (C1-213293, C1-213701, C1-213702, C1-213705, C1-213708, C1-213759 C1-213838, C1-213900, C1-213901)	0.3.0
2021-09	CT1#131-e	C1-214500				OpenAPI specification for Eees_EECRegistration API	0.4.0
2021-09	CT1#131-e	C1-214502				Notify operation for Eees_ACREvents API	0.4.0
2021-09	CT1#131-e	C1-214503				Update subscription operation for Eees_ACREvents API	0.4.0
2021-09	CT1#131-e	C1-214504				Unsubscribe operation for Eees_ACREvents API	0.4.0
2021-09	CT1#131-e	C1-214505				Eees_EECRegistration_Request Service Operation	0.4.0
2021-09	CT1#131-e	C1-214506				Eees_EECRegistration_Update Service Operation	0.4.0
2021-09	CT1#131-e	C1-214593				Data model and Notification for Eees_ACREvents API	0.4.0
2021-09	CT1#131-e	C1-215059				General on EAS Discovery API Definition	0.4.0
2021-09	CT1#131-e	C1-215176				Pseudo-CR on Support of redirection for the Eees_ACREvents API	0.4.0
2021-10	CT1#132-e	C1-216089				Eees_AppContextRelocation API	0.5.0
2021-10	CT1#133-e	C1-217109				Service description and request operation for Eees_EASDiscovery service	0.6.0
2021-10	CT1#133-e	C1-217151				Service offered by ECS and service provisioning API	0.6.0
2021-10	CT1#133-e	C1-217366				Pseudo-CR on EEC registration abnormal case	0.6.0
2021-12	CT#94e					Version 1.0.0 created for CT Plenary for information	1.0.0
2022-01	CT1#133e-Bis	C1-220725				Eees_EASDiscovery_UpdateSubscription operation for Eees_EASDiscovery API	1.1.0
2022-01	CT1#133e-Bis	C1-220727				EAS Discovery data model fixes	1.1.0
2022-01	CT1#133e-Bis	C1-220729				Clarification for Eecs_ServiceProvisioning_Request operation	1.1.0
2022-01	CT1#133e-Bis	C1-220730				EAS Discovery partial update with HTTP PATCH	1.1.0
2022-01	CT1#133e-Bis	C1-220732				EEC Registration partial update with HTTP PATCH	1.1.0
2022-01	CT1#133e-Bis	C1-220733				Service provisioning information subscription - Partial update with HTTP PATCH	1.1.0
2022-01	CT1#133e-Bis	C1-220735				ACR information subscription partial update with HTTP PATCH	1.1.0
2022-01	CT1#133e-Bis	C1-220736				Definitions of terms	1.1.0
2022-01	CT1#133e-Bis	C1-220838				Eees_EASDiscovery_Unsubscribe operation for Eees_EASDiscovery API	1.1.0
2022-02	CT1#134-e	C1-221598				Corrections in specification	1.2.0
2022-02	CT1#134-e	C1-221619				Update list of EES Service APIs	1.2.0
2022-02	CT1#134-e	C1-221622				Removing Editor Notes for EDNConfigInfo	1.2.0
2022-02	CT1#134-e	C1-221812				Resolution of editor's note under clause 6.3.5.2.4	1.2.0
2022-02	CT1#134-e	C1-221830				Resolving EN on EEC Context Transfer	1.2.0
2022-02	CT1#134-e	C1-222047				Removing Editor Notes in Eees_EECRegistration_Update and Eecs_ServiceProvisioning_Request	1.2.0
2022-02	CT1#134-e	C1-222094				Pseudo CR on updating the design of the Eecs_ServiceProvisioning_Request service operation	1.2.0
2022-02	CT1#134-e	C1-222099				Pseudo-CR on Eees_EASDiscovery API request, subscribe and notify service operations	1.2.0
2022-04	CT1#135-e	C1-222821				Pseudo-CR to update list of EES Service APIs	1.3.0

2022-04	CT1#135-e	C1-222827				Pseudo-CR to add reference in EEC Registration Open API	1.3.0
2022-04	CT1#135-e	C1-222831				Pseudo-CR to add reference in ECS Service Provisioning Open API	1.3.0
2022-04	CT1#135-e	C1-222836				Pseudo-CR to update Ecs Service Provisioning API description	1.3.0
2022-04	CT1#135-e	C1-222862				Pseudo CR on resolution of editor's note under clause 8.1.3.2	1.3.0
2022-04	CT1#135-e	C1-223026				Pseudo CR on resolution of editor's note under clause 8.1.4.2.2	1.3.0
2022-04	CT1#135-e	C1-223166				Pseudo-CR on removing Editor Notes specific to security	1.3.0
2022-04	CT1#135-e	C1-223171				Pseudo-CR to detail easEventType in EasDiscoverySubscriptionPatch	1.3.0
2022-04	CT1#135-e	C1-223187				Service description and Subscribe operation for Eees_ACREvents API	1.3.0
2022-04	CT1#135-e	C1-223191				Open API specification for Eees_ACREvents API	1.3.0
2022-04	CT1#135-e	C1-223210				removing templates from the specification	1.3.0
2022-04	CT1#135-e	C1-223216				Unifying the Eees_AppContextRelocation and the and Eees_SelectedTargetEAS APIs; compromised solution	1.3.0
2022-05	CT1#136-e	C1-223567				Pseudo-CR Checking ACR Scenario Support During a Registration and a Registration Update	1.4.0
2022-05	CT1#136-e	C1-223715				Pseudo CR on adding missing TS 29.522	1.4.0
2022-05	CT1#136-e	C1-223722				Pseudo CR on editorial corrections	1.4.0
2022-05	CT1#136-e	C1-223727				Pseudo CR on ACR Information Notification	1.4.0
2022-05	CT1#136-e	C1-223792				Pseudo-CR on correcting the ACREventsSubscriptionPatch data type	1.4.0
2022-05	CT1#136-e	C1-223794				Pseudo-CR on correcting formatting issues	1.4.0
2022-05	CT1#136-e	C1-223899				Pseudo-CR on removing the apiVersion placeholder from the resource URI variables table	1.4.0
2022-05	CT1#136-e	C1-223981				Pseudo CR on correction to scope	1.4.0
2022-05	CT1#136-e	C1-223982				Pseudo CR on ACR Information Subscription	1.4.0
2022-05	CT1#136-e	C1-223983				Pseudo CR on correction to the Eees_AppContextRelocation service	1.4.0
2022-05	CT1#136-e	C1-224076				Pseudo-CR on unifying the Eees_EASDiscovery and Eees_TargetEASDiscovery APIs	1.4.0
2022-05	CT1#136-e	C1-224141				specification cleanup	1.4.0
2022-05	CT1#136-e	C1-224174				Removal of content of Annex B	1.4.0
2022-05	CT1#136-e	C1-224187				Pseudo-CR to update ACR request	1.4.0
2022-05	CT1#136-e	C1-224189				Pseudo-CR to remove Editor's notes	1.4.0
2022-05	CT1#136-e	C1-224190				Pseudo-CR to update ACR information notification	1.4.0
2022-05	CT1#136-e	C1-224191				Pseudo-CR to provide partial EEC REGISTER Update failure status	1.4.0
2022-06	CT#96	CP-221192				Version 2.0.0 created for CT Plenary for approval	2.0.0
2022-06	CT#96					Version 17.0.0 created after CT#96	17.0.0
2022-09	CT1#137-e	C1-225152	0010	1	F	Correction to the ACR request message	17.1.0
2022-09	CT1#137-e	C1-225224	0005	1	F	EDGE-4 and the overview	17.1.0
2022-09	CT1#137-e	C1-225270	0006	1	F	ACR information subscription field missing in YAML file	17.1.0
2022-09	CT1#137-e	C1-225272	0007	1	F	Correction to the Definition of type DiscoveredEas	17.1.0
2022-09	CT1#137-e	C1-225372	0002	1	F	Unique identification in ACR procedures	17.1.0
2022-09	CT1#137-e	C1-225441	0009	2	F	Correction to the "easId"	17.1.0
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2022-11	CT1#139	C1-226700	0004	3	F	Add security info in service provisioning response	17.2.0
2023-03	CT1#140	C1-230821	0024	1	F	Corrections to the definition of the EAS type	17.3.0
2023-03	CT1#140	C1-231231	0025		F	Update of info and externalDocs fields	17.3.0
2023-03	CT1#140	C1-231018	0016	2	B	Support of simultaneous EAS connectivity information in ACR	18.0.0
2023-03	CT1#140	C1-231019	0017	3	B	Eees_EASDiscovery API: request for EAS selection support	18.0.0
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2023-05	CT1#141-e	C1-232803	0036	1	F	Eees_EECRegistration: "operationId" and "tags" fields	18.1.0
2023-05	CT1#141-e	C1-232804:	0037	1	F	Eees_EASDiscovery API: "operationId" fields and formatting of description fields	18.1.0
2023-05	CT1#141-e	C1-232805:	0039	1	F	Eecs_ServiceProvisioning API: "operationId" fields	18.1.0
2023-05	CT1#141-e	C1-232806	0040	1	F	Eees_EECRegistration API: enumeration definition	18.1.0
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2023-09	CT#101	C1-236085	0056	1	B	EEC Trigger to support Service Provisioning	18.2.0
2023-09	CT#102	CP-233297	0064		F	Update of info and externalDocs fields	18.2.0
2023-12	CT#102	CP-233152	0065		F	Update table with API specific data types and descriptions of EdgeApp_2 feature	18.3.0
2023-12	CT#102	CP-233152	0066		F	Handling of desired ECSP identifier(s)	18.3.0
2023-12	CT#102	CP-233152	0069	2	B	Eees_EASInformationProvisioning API definition	18.3.0
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2023-12	CT#102	CP-233152	0079		F	Replacing references to clause 6.1	18.3.0
2023-12	CT#102	CP-233152	0080		F	Eecs_ServiceProvisioning API: supported ACR scenarios	18.3.0
2023-12	CT#102	CP-233152	0081		F	Description of the expTime attribute	18.3.0
2023-12	CT#102	CP-233152	0073	1	F	Sharing EEC triggers in Notification procedures	18.3.0
2023-12	CT#102	CP-233152	0075	1	F	EAS instantiation alignment in EAS Discovery procedure	18.3.0
2023-12	CT#102	CP-233152	0078	1	B	EES monitoring the UE mobility for service continuity planning	18.3.0
2023-12	CT#102	CP-233315	0072	4	B	Handling EAS Bundle in EAS Discovery service	18.3.0
2023-12	CT#102	CP-233316	0071	4	B	Handling EAS Bundle in ECS Service Provisioning	18.3.0
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2024-03	CT#103	CP-240100	0083	3	F	Eees_EASInformationProvisioning API definition	18.4.0
2024-03	CT#103	CP-240100	0084	1	B	Common EAS enhancements in ECS Service Provisioning and EAS Discovery procedures without ECS-ER.	18.4.0
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2024-06	CT#104	CP-241172	0094	1	F	Update to Service Provisioning Request with App Info.	18.5.0
2024-06	CT#104	CP-241172	0095	3	F	Updates to federation and roaming.	18.5.0
2024-06	CT#104	CP-241172	0096	3	F	Updates to Common EAS enhancements.	18.5.0
2024-06	CT#104	CP-241172	0097	1	F	Correction of ACR Initiate consumer and handling notes, editor notes.	18.5.0
2024-06	CT#104	CP-241172	0098	-	F	EasInfoProvReqType enumeration and applicability column in data model	18.5.0
2024-06	CT#104	CP-241172	0099	-	F	Update of empty clauses	18.5.0
2024-06	CT#104	CP-241172	0100	2	F	Correction for bundle in EDN configuration information	18.5.0
2024-06	CT#104	CP-241172	0101	1	F	Correction to ECS interactions in EAS Information provisioning.	18.5.0
2024-07						Updated to correct the versions of the OpenAPI files.	18.5.1

History

Document history		
V18.4.0	May 2024	Publication
V18.5.1	August 2024	Publication