ETSI TS 129 558 V17.3.0 (2023-04)

5G;
Enabling Edge Applications;
Application Programming Interface (API) specification;
Stage 3
(3GPP TS 29.558 version 17.3.0 Release 17)

Reference
RTS/TSGC-0329558vh30

Keywords
5G

ETSI

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Sous-Préfecture de Grasse (06) N° w061004871

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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

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may indicates permission to do something

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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. 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.

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

[4] 3GPP TR 21.900: "Technical Specification Group working methods".

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

[6] 3GPP TS 29.122: "T8 reference point for Northbound Application Programming Interfaces (APIs)".

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

[8] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[9] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[10] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[11] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[12] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[13] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[14] 3GPP TS 24.558: "Enabling Edge Applications; Protocol specification".

[15] 3GPP TS 29.214: "Policy and charging control over Rx reference point".

[16] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[17] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs".

[18] 3GPP TS 33.122: "Security Aspects of Common API Framework for 3GPP Northbound APIs".

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

[20] 3GPP TS 33.558: "Security aspects of enhancement of support for enabling edge applications; Stage 2".

[21] Void.

[22] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[23] 3GPP TS 23.271: "Functional stage 2 description of Location Services (LCS)".

[24] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

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 its definitions given in 3GPP TS 23.558 [2] shall apply:

Application Context

Application Context Relocation

Application Context Transfer

Application Server

Edge Computing Service Provider

Edge Data Network

EEC Context

Edge Hosting Environment

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
ACID	Application Client Identification
ACR	Application Context Relocation
AF	Application Function
ASP	Application Service Provider
DN	Data Network
DNAI	Data Network Access Identifier
DNN	Data Network Name
EAS	Edge Application Server
EASID	Edge Application Server Identification
ECS	Edge Configuration Server
ECSP	Edge Computing Service Provider
EDN	Edge Data Network
EEC	Edge Enabler Client

EECID	Edge Enabler Client Identification
EEL	Edge Enabler Layer
EES	Edge Enabler Server
EESID	Edge Enabler Server Identification
EHE	Edge Hosting Environment
FQDN	Fully Qualified Domain Name
GPSI	Generic Public Subscription Identifier
LADN	Local Area Data Network
NEF	Network Exposure Function
S-EAS	Source Edge Application Server
S-EES	Source Edge Enabler Server
SCEF	Service Capability Exposure Function
SSID	Service Set Identifier
T-EAS	Target Edge Application Server
T-EES	Target Edge Enabler Server
TAI	Tracking Area Identity

4 Overview

3GPP TS 23.558 [2] has specified the application layer architecture, requirements, procedures, information flows and the APIs, 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 north-bound APIs in detail, needed to support the services offered by EES and ECS over EDGE-3/6/9 interfaces for enabling the edge applications over 3GPP network.

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_EASRegistration	Request	Request/Response	EAS
	Update	Request/Response	EAS
	Deregister	Request/Response	EAS
Eees_UELocation	Get	Request/Response	EAS
	Subscribe	Subscribe/Notify	EAS
	Notify		
	UpdateSubscription		
	Unsubscribe		
Eees_UEIdentifier	Get	Request/Response	EAS
Eees_AppClientInformation	Subscribe	Subscribe/Notify	EAS
	Notify		
	UpdateSubscription		
	Unsubscribe		
Eees_SessionWithQoS	Create	Request/Response	EAS
	Update	Request/Response	EAS
	Revoke	Request/Response	EAS
	Notify	Subscribe/Notify	EAS
Eees_EASDiscovery	TEasDiscRequest	Request/Response	EAS, EES
Eees_ACRManagementEvent	Subscribe	Subscribe/Notify	EAS
	Notify		
	UpdateSubscription		
	Unsubscribe		
Eees_EECContextRelocation	Push	Request/Response	EES
	Pull	Request/Response	EES
Eees_EELManagedACR	Request	Request/Response	EAS
	Subscribe	Subscribe/Notify	EAS
	Notify		
Eees_ACRStatusUpdate	Request	Request/Response	EAS
Eees_AppContextRelocation	ACRDetermination_Request	Request/Response	EAS
	SelectedTargetEAS_Declare	Request/Response	EAS

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_EASRegistration	5.2	EAS registration service	TS29558_Eees_EASRegistration.yaml	eees_easregistration	A.2
Eees_UELocation	5.3	Service for fetching UE location information	TS29558_Eees_UELocation.yaml	eees_uelocation	A.3
Eees_UEIdentifier	5.4	Service for fetching UE identifier.	TS29558_Eees_UEIdentifier.yaml	eees_ueidentifier	A.4
Eees_AppClientInformation	5.5	Service to obtain the capabilities of the ACs.	TS29558_Eees_AppClientInformation.yaml	eees_appclientinformation	A.5
Eees_SessionWithQoS	5.6	Service to setup data session between AC and EAS with specific QoS.	TS29558_Eees_SessionWithQoS.yaml	eees-session-with-qos	A.6
Eees_ACRManagementEvent	5.8	Service to receive notification related to ACR management events.	TS29558_Eees_ACRManagementEvent.yaml	eees-acrmgmtevent	A.7
Eees_EECContextRelocation	5.10	Service to push or pull EEC context information.	TS29558_Eees_EECContextRelocation.yaml	eees-eeccontextreloc	A.8
Eees_EELManagedACR	5.11	Service to request for handling of ACR related operations and receive ACT notifications.	TS29558_Eees_EELManagedACR.yaml	eees-eel-acr	A.9
Eees_ACRStatusUpdate	5.12	Service to update the status of ACR.	TS29558_Eees_ACRStatusUpdate.yaml	eees-acrstatus-update	A.10

5.2 Eees_EASRegistration Service

5.2.1 Service Description

The Eees_EASRegistration API, as defined in 3GPP TS 23.558 [2], allows an Edge Application Server via Eees interface to register, update its registration and deregister at a given Edge Enabler Server.

5.2.2 Service Operations

5.2.2.1 Introduction

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

Table 5.2.2.1-1: Operations of the Eees_EASRegistration API

Service operation name	Description	Initiated by
Eees_EASRegistration_Request	This service operation is used by the EAS to register itself to a given EES.	EAS
Eees_EASRegistration_Update	This service operation is used by the EAS to update its registration information at EES.	EAS
Eees_EASRegistration_Deregister	This service operation is used by the EAS to deregister itself from a given EES.	EAS

5.2.2.2 Eees_EASRegistration_Request

5.2.2.2.1 General

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

5.2.2.2.2 EAS registering to EES using Eees_EASRegistration_Request operation

To register itself as an Edge Application Server at the EES, the EAS shall send an HTTP POST message to the Edge Enabler Server on the "EAS Registrations" collection resource. The body of the HTTP POST message shall include the EAS profile information, may include proposed expiration time for the registration, as specified in clause 8.1.2.2.3.1.

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

1. Process the EAS registration request information;
2. verify the identity of the Edge Application Server and check if the EAS is authorized to register itself at EES ;
3. if the EAS is authorized to register to EES, then the EES shall;
    a. store the EAS profile and create a new resource with the EAS registration information as specified in clause 8.1.2.1;
    b. return the EAS registration information, the resource URI of the EAS registration information, in the "201 Created" response message. The EES shall include a Location HTTP header field. The Location header field shall contain the URI of the created registration i.e. {apiRoot}/eees-easregistration/<apiVersion>/registrations/{registrationId}.

    The response message may include expiration time to indicate when the EAS registration will automatically expire.

    On failure, the EES shall take proper error handling actions, as specified in clause 8.1.6, and respond to the EAS with an appropriate error status code.

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

5.2.2.3 Eees_EASRegistration_Update

5.2.2.3.1 General

This service operation is used by EAS to update its registration information at a given EES.

5.2.2.3.2 EAS updating registration information using Eees_EASRegistration_Update operation

To update the EAS registration information at the EES, the EAS shall send a HTTP PUT or PATCH message to the Edge Enabler Server on resource URI identifying the Individual EAS registration resource representation, as specified in clause 8.1.2.3.3.2 for HTTP PUT message and in clause 8.1.2.3.3.4 for HTTP PATCH message.

The HTTP PUT message shall replace all properties in the existing resource with the EAS registration information in the request. The EASRegistration data type in the request body of the HTTP PUT message shall include the EAS profile information, may include proposed expiration time to update the registration. This request shall not replace the easId property of the existing resource.

The HTTP PATCH message includes parameters (EAS Profile, expiry time) in the EASRegistrationPatch data type that need to modify the existing Individual EAS registration resource. This request shall not replace the easId property of the existing resource.

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

1. check the registration update message from the EAS to see if the EAS is authorized to modify the requested registration resource;

2. if the EAS is authorized to update the registration information, then the EES shall:

   a. update the resource identified by Resource URI of the EAS registration information with the updated EAS registration information received in the HTTP PUT or PATCH request message;

   b. upon successful update of EAS registration information, respond to the EAS with "204 No Content", or "200 OK" along with the updated EAS registration information in the response. In the response message, the EES may provide an updated expiration time to indicate to the EAS when the updated registration will automatically expire.

On failure, the EES shall take proper error handling actions, as specified in clause 8.1.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP PUT or PATCH request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

If the expiration time is provided, then to maintain the registration, the EAS shall send a registration update prior to registration expiry time. If the registration update request is not sent before the expiry time, then the EES shall treat EAS as deregistered and remove the corresponding EAS registration resource.

5.2.2.4 Eees_EASRegistration_Deregister

5.2.2.4.1 General

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

5.2.2.4.2 EAS deregistering from EES using Eees_EASRegistration_Deregister operation

To deregister itself from the EES, the EAS shall send HTTP DELETE message to the EES, on the resource URI identifying the Individual EAS registration resource representation as specified in clause 8.1.2.3.3.3. Upon receiving the HTTP DELETE request, the EES shall:

1. verify the identity of the EAS and check if the EAS is authorized to deregister the EAS registration information;

2. if the EAS is authorized to deregister the EAS registration information, then the EES shall deregister the EAS profile from the EES and delete the resource representing EAS registration information;

3. return the "204 Not Content" message to the EAS, indicating the successful deregistration of the EAS information.

On failure, the EES shall take proper error handling actions, as specified in clause 8.1.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP DELETE request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.3 Eees_UELocation Service

5.3.1 Service Description

The Eees_UELocation API, as defined in 3GPP TS 23.558 [2], allows an Edge Application Server via Eees interface to obtain the UE location information as one time request or subscribe for continuous reporting.

5.3.2 Service Operations

5.3.2.1 Introduction

The service operation defined for Eees_UELocation API is shown in the table 5.3.2.1-1.

Table 5.3.2.1-1: Operations of the Eees_UELocation API

Service operation name	Description	Initiated by
Eees_UELocation_Get	This service operation is used by the EAS to request UE location information from a given EES.	EAS
Eees_UELocation_Subscribe	This service operation is used by the EAS to subscribe to EES, for continuous reporting of UE location information.	EAS
Eees_UELocation_Notify	This service operation is used by the EES to notify the EAS about the UE location information.	EES
Eees_UELocation_UpdateSubscription	This service operation is used by the EAS to update its subscription at EES, for continuous reporting of UE location information.	EAS
Eees_UELocation_Unsubscribe	This service operation is used by the EAS to remove its subscription from EES, for continuous reporting of UE location information.	EAS

5.3.2.2 Eees_UELocation_Get

5.3.2.2.1 General

This service operation is used by EAS to obtain a UE's location information from a given EES.

5.3.2.2.2 EAS obtaining UE location information from EES using Eees_UELocation_Get operation

To obtain an UE's location information from the EES, the EAS shall send an HTTP POST message to the EES on the URI "{apiRoot}/eees-uelocation/<apiVersion>/fetch" as specified in clause 8.2.3.2. The POST request includes:

- the identifier of the UE for which location information is requested;
- the accuracy of the requested location in terms of granularity and location QoS.

Upon reception of the HTTP POST request from the EAS, the EES shall:

1. process the EAS UE location information request;
2. verify the identity of the Edge Application Server and check if the EAS is authorized to obtain UE location information;
3. if the EAS is authorized to obtain the UE's location information, then the EES shall:
    a. consider the location granularity information received in the request message to obtain the UE's location information;
    b. check if a valid locally cached UE location information is available, and if available then the EES shall return the UE location information in the format requested by the EAS along with the location accuracy and its timestamp;
    c. 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. The EES shall return the UE location information to EAS in the format requested by the EAS along with the location accuracy and its timestamp as a 200 OK response.

On failure, the EES shall take proper error handling actions, as specified in clause 8.2.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP POST request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.3.2.2.3 User consent management

Based on local regulations' requirements and/or operator policies, user consent management specified in Annex V of 3GPP TS 33.501 [6] may be required for accessing the Eees_UELocation API. When it is the case and the EES is accessing the 3GPP 5GC network services directly, the EES shall act as the consent enforcement entity, as specified in clause 5.1.3 of 3GPP TS 33.558 [20].

When user consent management and enforcement shall be undertaken for the Eees_UELocation API, then:

- the EES shall check user consent for the targeted UE by retrieving the user consent subscription data via the Nudm_SDM service API of the UDM, as specified in clause 5.2.2.2.24 of 3GPP TS 29.503 [22] and:
  - if user consent is not granted for the targeted UE, the EES shall reject the request and respond to the EAS with an HTTP "403 Forbidden" status code with the response body containing a ProblemDetails data structure with the "cause" attribute including the "USER_CONSENT_NOT_GRANTED" application error; and
  - if user consent is granted for the targeted UE, the EES shall accept the request to retrieve UE location information and process it as specified in clause 5.3.2.2.2.

5.3.2.3 Eees_UELocation_Subscribe

5.3.2.3.1 General

This service operation is used by the EAS to subscribe for continuous UE(s) location reporting.

5.3.2.3.2 EAS subscribing to continuous UE(s) location reporting from EES using Eees_UELocation_Subscribe operation

To subscribe to continuous UE(s) location information reporting at the EES, the EAS shall send a HTTP POST message to the EES on the "Location Information Subscriptions" resource. The body of the POST message shall include EAS identifier, the identifier of the UE or the identifier of the group uniquely identifying a group of UEs, Notification Destination URI and may include location format that is understood by EAS, location QoS, proposed expiry time of the subscription and reporting requirements, as specified in clause 8.2.2.2.3.1.

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

1. Process the EAS UE location information subscription request;
2. verify the identity of the Edge Application Server and check if the EAS is authorized to subscribe for the continuous UE(s) location reporting;
3. if the EAS is authorized to subscribe for the continuous UE(s) location information reporting, then the EES shall;
   a. create a new resource with the Location Information Subscription as specified in clause 8.2.2.1;
   b. return the EAS's location subscription information, the resource URI of the EAS location subscription, in the response message. The response message may include expiration time to indicate when the location information subscription will automatically expire;

   On failure, the EES shall take proper error handling actions, as specified in clause 8.2.6, and respond to the EAS with an appropriate error status code.

EES shall obtain the UE location information by consuming the 3GPP core network capabilities from NEF as specified in 3GPP TS 29.522 [10], from SCEF as specified in 3GPP TS 29.122 [6] or from LMF as specified in 3GPP TS 29.572 [11]. The EES may also consume the UE mobility analytics from NEF as specified in 3GPP TS 29.522 [10] or from NWDAF as specified in 3GPP TS 29.520 [12].

If the expiration time is provided, then to maintain the registration, the EAS shall send a subscription update request (as described in clause 5.3.2.5) prior to the expiration time. If the subscription update request is not sent before the expiry time, then the EES shall treat the subscription as unsubscribed and remove the corresponding EAS's Individual Location Information Subscription resource.

5.3.2.3.3 User consent management

Based on local regulations' requirements and/or operator policies, user consent management specified in Annex V of 3GPP TS 33.501 [6] may be required for accessing the Eees_UELocation API. When it is the case and the EES is accessing the 3GPP 5GC network services directly, the EES shall act as the consent enforcement entity, as specified in clause 5.1.3 of 3GPP TS 33.558 [20].

When user consent management and enforcement shall be undertaken for the Eees_UELocation API, then:

- if the EAS does not support the "UserConsentRevocation" feature or does not indicate its support for this feature in the HTTP POST request to create a new "Individual Location Information Subscription" resource, the EES shall reject the request and respond to the EAS with an HTTP "403 Forbidden" status code with the response body containing a ProblemDetails data structure with the "cause" attribute including the "CONSENT_REVOCATION_NOT_SUPPORTED" application error;

- if the EAS indicates its support for the "UserConsentRevocation" feature in the HTTP POST request to create a new "Individual Location Information Subscription" resource, the EES shall check user consent for the targeted UE(s) by retrieving the user consent subscription data via the Nudm_SDM service API of the UDM as specified in clause 5.2.2.2.24 of 3GPP TS 29.503 [22], subscribe to user consent revocation notifications only for those UE(s) for which user consent is granted also using the Nudm_SDM service API of the UDM and accept the request for the creation of the UE location information subscription only for the UE(s) for which user consent is granted;

- if user consent is not granted for all the targeted UE(s), the EES shall reject the request and respond to the EAS with an HTTP "403 Forbidden" status code with the response body containing a ProblemDetails data structure with the "cause" attribute including the "USER_CONSENT_NOT_GRANTED" application error;

- the EAS shall provide within the payload body of the HTTP POST request to create a new UE location information subscription the URI via which it desires to receive user consent revocation notifications within the "revocationNotifUri" attribute. The EAS may update this URI in subsequent HTTP PUT/PATCH requests to update/modify the corresponding "Individual Location Information Subscription" resource;

- when becoming aware of user consent revocation for one or several UE(s), the EES shall:

  - stop processing the data related to the concerned UE(s);

  - send a user consent revocation notification to the EAS by sending an HTTP POST request with the request body including the ConsentRevocNotif data structure that shall contain the user consent revocation information (e.g. UE(s) for which user consent was revoked, etc.); and

  - remove the concerned UE(s) from the "Individual Location Information Subscription" resource and from the related subscriptions at the 3GPP 5GC network entities, if any;

  - unsubscribe from user consent revocation notifications for the concerned UE(s) at the UDM;

  and

- at the reception of the user consent revocation notification from the EES, the EAS shall take the necessary actions to stop processing the data related to the concerned UE(s); and

- if user consent is revoked for all the UE(s), the EAS shall delete the corresponding "Individual Location Information Subscription" resource, as specified in clause 5.3.2.6.

5.3.2.4 Eees_UELocation_Notify

5.3.2.4.1 General

This service operation is used by the EES to send UE(s) location information notifications or user consent revocation notifications to the EAS.

5.3.2.4.2 EES notifying the UE(s) location reporting to EAS using Eees_UELocation_Notify operation

The EES determines to notify the EAS with the UE location information, when the UE location information is available either locally cached or from the 3GPP core network.

To notify the UE(s) location information events, the EES shall send an HTTP POST message using the Notification Destination URI received in the subscription request. The body of the HTTP POST message shall include LocationNotification. LocationNotification includes location information of each UE with accuracy, timestamp and type. The location information of each UE may be actual location change or predictive location report from the UE mobility analytics report from NEF as specified in 3GPP TS 29.522 [10] , or from SCEF as specified in 3GPP TS 29.122 [6], or from LCS (Location Service) as specified in 3GPP TS 29.271 [23] or 3GPP TS 29.273 [24] or from NWDAF as specified in 3GPP TS 29.520 [12]. The EES may modify the UE location information in the format requested by the EAS in the subscription request.

Upon receiving the HTTP POST message, the EAS shall process the Location Notification.

On failure, the EAS shall take proper error handling actions, as specified in clause 8.2.6, and respond to the EES with an appropriate error status code.

If the EAS determines that the received HTTP POST message needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.3.2.4.3 EES notifying the EAS about user consent revocation using Eees_UELocation_Notify operation

The EES determines to notify the EAS about user consent revocation, when becoming aware of user consent revocation for one or several UE(s) from the UDM as specified in 3GPP TS 29.503 [22].

To notify user consent revocation, the EES shall send an HTTP POST message using the revocation notification URI received from the EAS in the UE location information subscription creation/update/modification request as specified in clause 5.3.2.3.3. The body of the HTTP POST message shall include ConsentRevocNotif data structure.

Upon reception of the HTTP POST request, the EAS shall take the necessary actions to stop processing the data related to the UE(s) for which user consent was revoked.

On failure, the EAS shall take proper error handling actions, as specified in clause 8.2.6, and respond to the EES with an appropriate error status code.

If the EAS determines that the received HTTP POST message needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.3.2.5 Eees_UELocation_UpdateSubscription

5.3.2.5.1 General

This service operation is used by the EAS to update its location information subscription at the EES.

5.3.2.5.2 EAS updating continuous UE(s) location reporting subscription at EES using Eees_UELocation_UpdateSubscribe operation

To update continuous UE(s) location information reporting subscription at the EES, the EAS shall send a HTTP PATCH or PUT message to the EES on resource URI identifying the "Individual Location Information" Subscription resource representation, as specified in clause 8.2.2.3.3.2 for HTTP PATCH message and in clause 8.2.2.3.3.3 for HTTP PUT message.

The PATCH message includes the parameters (location QoS, location granularity, Notification Destination, Reporting requirements and proposed expiry time) that need to be replaced in the existing subscription resource.

The PUT message shall replace all the properties of the existing resource with the location subscription information in the request. The request shall not replace the easId, ueId and groupId properties of the existing resource.

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

1. check the update subscription message from the EAS to see if the EAS is authorized to modify the requested subscription resource;

2. if the EAS is authorized to update the location information subscription, then the EES shall:

   a. update the resource identified by Resource URI of the EAS location information subscription with the updated information received in the HTTP PATCH or PUT request message;

   b. return the updated EAS Location information subscription in the response. In the response message, the EES may provide an updated expiration time to indicate to the EAS when the updated subscription will automatically expire.

On failure, the EES shall take proper error handling actions, as specified in clause 8.2.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP PATCH or PUT request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

If the expiration time is provided, then to maintain the subscription, the EAS shall send a update subscription prior to subscription expiry time. If the update subscription request is not sent before the expiry time, then the EES shall treat EAS subscription as unsubscribed and remove the corresponding EAS location information subscription resource.

5.3.2.5.3 User consent management

Based on local regulations' requirements and/or operator policies, user consent management specified in Annex V of 3GPP TS 33.501 [6] may be required for accessing the Eees_UELocation API. When it is the case and the EES is accessing the 3GPP 5GC network services directly, the EES shall act as the consent enforcement entity, as specified in clause 5.1.3 of 3GPP TS 33.558 [20].

When user consent management and enforcement shall be undertaken for the Eees_UELocation API, then:

- the EAS may update/modify the revocation notification URI when updating/modifying an existing "Individual Location Information Subscription" resource;

- if user consent is still granted for the concerned UE(s), i.e. no user consent revocation notification is received by the EES from the UDM, then the EES shall process the request as specified in clause 5.3.2.5.2;

- if user consent is granted for only a subset of the UE(s), process the request as specified in clause 5.3.2.5.2 only for this subset of UE(s);

- otherwise, if the EES is made aware by the UDM that user consent is not granted for one or several UE(s) at the reception of the Eees_UELocation_UpdateSubscribe request, then the EES shall:

  - stop processing the data related to the concerned UE(s);

  - if user consent is not anymore granted for all the UE(s), reject the request and respond to the EAS with an HTTP "403 Forbidden" status code with the response body containing a ProblemDetails data structure with the "cause" attribute including the "USER_CONSENT_NOT_GRANTED" application error;

  - send a user consent revocation notification to the EAS by sending an HTTP POST request with the request body including the ConsentRevocNotif data structure that shall contain the user consent revocation information (e.g. UE(s) for which user consent was revoked, etc.); and

  - remove the concerned UE(s) from the concerned "Individual Location Information Subscription" resource and from the related subscriptions at the 3GPP 5GC network entities, if any; and

  - unsubscribe from user consent revocation notifications for the concerned UE(s) at the UDM;

  and the EAS shall:

- at the reception of the user consent revocation notification from the EES, take the necessary actions to stop processing the data related to the concerned UE(s); and
- if user consent is revoked for all the UE(s), delete the corresponding "Individual Location Information Subscription" resource, as specified in clause 5.3.2.6.

5.3.2.6 Eees_UELocation_Unsubscribe

5.3.2.6.1 General

This service operation is used by the EAS to unsubscribe from an existing UE(s) location information subscription.

5.3.2.6.2 EAS unsubscribing to continuous UE(s) location reporting from EES using Eees_UELocation_Unsubscribe operation

To unsubscribe its location information subscription from the EES, the EAS shall send HTTP DELETE message to the EES, on the resource URI identifying the "Individual Location Information Subscription" resource representation as specified in clause 8.2.2.3.3.4. Upon receiving the HTTP DELETE request, the EES shall:

1. verify the identity of the EAS and check if the EAS is authorized to unsubscribe the Individual Location Information Subscription resource;
2. if the EAS is authorized to unsubscribe the Individual Location Information Subscription resource, then the EES shall unsubscribe the EAS subscription identified by the subscriptionId from the EES and delete the resource representing Individual Location Information Subscription resource represented by subscriptionId;
3. return the "204 Not Content" message to the EAS, indicating the successful removal of the subscription information and may unsubscribe to the corresponding 3GPP core network service subscriptions.

On failure, the EES shall take proper error handling actions, as specified in clause 8.2.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP DELETE message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.4 Eees_UEIdentifier Service

5.4.1 Service Description

The Eees_UEIdentifier API, as defined in 3GPP TS 23.558 [2], allows an Edge Application Server via Eees interface to obtain an identifier uniquely identifying a UE from the EES.

5.4.2 Service Operations

5.4.2.1 Introduction

The service operation defined for Eees_UEIdentifier API is shown in the table 5.4.2.1-1.

Table 5.4.2.1-1: Operations of the Eees_UEIdentifier API

Service operation name	Description	Initiated by
Eees_UEIdentifier_Get	This service operation is used by the EAS to request UE identifier from a given EES that uses 3GPP CN capability to retrieve UE Identifier which is specific to the EAS.	EAS

5.4.2.2 Eees_UEIdentifier_Get

5.4.2.2.1 General

This service operation is used by EAS to obtain a UE's identifier (UE ID, as specified in 3GPP TS 23.558 [2]) from a given EES that uses 3GPP CN capability to retrieve UE Identifier which is specific to the EAS.

5.4.2.2.2 EAS obtaining UE identifier from EES using Eees_UEIdentifier_Get operation

To obtain an UE's Identifier from the EES, the EAS shall send a HTTP POST message to the EES with the request URI set to "{apiRoot}/eees-ueidentifier/<apiVersion>/fetch" and the request body with the UserInformation data structure including the information about the user or UE available with EAS, for which the UE identifier is requested.

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

1. Process the EAS UE Identifier request;
2. verify the identity of the EAS and check if the EAS is authorized to obtain the UE Identifier;
3. if the EAS is authorized to obtain the UE's Identifier information, then the EES shall;
    a. invoke the Nnef_UEId service as specified in clause 4.4.32 of 3GPP TS 29.522 [10] to obtain the UE identifier based on the user information received, and may derive the corresponding DNN and/or S-NSSAI based on the verified identity of the EAS;
    b. upon successful retrieval of UE identifier, respond with "200 OK" along with the retrieved UE identifier to the EAS. If the UE identifier cannot be successfully retrieved or an internal error or an error in the HTTP POST request, the EES shall send an HTTP error response as specified in clause 7.7.

If the EES determines the received HTTP POST request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.5 Eees_AppClientInformation Service

5.5.1 Service Description

The Eees_AppClientInformation API, as defined in 3GPP TS 23.558 [2], allows an Edge Application Server via Eees interface to obtain the information about the capabilities of the ACs based on certain filter criteria.

5.5.2 Service Operations

5.5.2.1 Introduction

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

Table 5.5.2.1-1: Operations of the Eees_AppClientInformation API

Service operation name	Description	Initiated by
Eees_AppClientInformation_Subscribe	This service operation is used by the EAS to subscribe to EES, for reporting of AC information.	EAS
Eees_AppClientInformation_Notify	This service operation is used by the EES to notify the EAS about the AC information.	EES
Eees_AppClientInformation_UpdateSubscription	This service operation is used by the EAS to update its subscription at EES, for reporting of AC information.	EAS
Eees_AppClientInformation_Unsubscribe	This service operation is used by the EAS to remove its subscription from EES, for reporting of AC information.	EAS

5.5.2.2 Eees_AppClientInformation_Subscribe

5.5.2.2.1 General

This service operation is used by the EAS to subscribe for AC(s) information reporting.

5.5.2.2.2 EAS subscribing to AC information reporting from EES using Eees_AppClientInformation_Subscribe operation

To subscribe to AC information reporting at the EES, the EAS shall send an HTTP POST request to the EES targeting the "Application Client Information Subscriptions" resource, with the request body containing the ACInfoSubscription data structure, as specified in clause 8.4.2.2.3.1.

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

1. Process the EAS AC information subscription request;
2. verify the identity of the Edge Application Server and check if the EAS is authorized to subscribe for the AC information reporting;
3. if the EAS is authorized to subscribe for the AC information reporting, then the EES shall;
   a. create a new resource with the AC Information Subscription as specified in clause 8.4.2.1; and
   b. respond to the EAS with an HTTP "201 Created" status code including an HTTP Location header field containing the URI of the created "Individual Application Client Information Subscription" resource, and the response body containing a representation of the created resource within the ACInfoSubscription data structure.

   On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body. If the EAS is not registered at the EES when sending the AC information reporting subscription creation request, the EES shall respond with an HTTP "403 Forbidden" status code with the response body containing the ProblemDetails data structure with the "cause" attribute set to "REGISTRATION_REQUIRED".

The EES determines the matching AC information corresponding to the filter criteria information in the subscription request to compose the AC information to the EAS.

If the expiration time is provided, then to maintain the registration, the EAS shall send a subscription update request (as described in clause 5.5.2.4) prior to the expiration time. If the subscription update request is not sent before the expiry time, then the EES shall treat the subscription as unsubscribed and remove the corresponding EAS's Individual Application Client Information Subscription resource.

5.5.2.3 Eees_AppClientInformation_Notify

5.5.2.3.1 General

This service operation is used by the EES to send AC information notifications to the EAS.

5.5.2.3.2 EES notifying the AC information to EAS using Eees_AppClientInformation_Notify operation

The EES determines to notify the EAS with the AC information matching the filter criteria, when the AC information updates are available to EES, e.g. EES receives registration request from EEC.

To notify the AC(s) information, the EES shall send an HTTP POST message using the Notification Destination URI received in the subscription request. The body of the HTTP POST message shall include "ACInfoNotification". "ACInfoNotification" includes AC(s) information matching the filter criteria. The AC(s) information consist of AC(s) profiles, UE identifiers hosting the AC(s) and the location information of the UE(s) hosting the AC(s).

Upon receiving the HTTP POST message, the EAS shall process the AC Information Notification and shall respond to the EES with "204 No Content" message.

On failure, the EAS shall take proper error handling actions, as specified in clause 8.4.6, and respond to the EES with an appropriate error status code.

If the EAS determines that the received HTTP POST message needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.5.2.4 Eees_AppClientInformation_UpdateSubscription

5.5.2.4.1 General

This service operation is used by the EAS to update its AC information subscription at the EES.

5.5.2.4.2 EAS updating AC information reporting subscription at EES using Eees_AppClientInformation_UpdateSubscribe operation

To update AC information reporting subscription at the EES, the EAS shall send a HTTP PATCH or PUT message to the EES on resource URI identifying the "Individual Application Client Information" Subscription resource representation, as specified in clause 8.4.2.3.3.2 for HTTP PATCH message and in clause 8.4.2.3.3.3 for HTTP PUT message.

The PATCH message includes the parameters (AC filter criteria, Notification Destination, Reporting requirements and proposed expiry time) that need to be replaced in the existing subscription resource.

The PUT message shall replace all the properties of the existing resource with the AC subscription information in the request. The request shall not replace the "easId" property of the existing resource.

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

1. check the update subscription message from the EAS to see if the EAS is authorized to modify the requested subscription resource;

2. if the EAS is authorized to update the AC information subscription, then the EES shall:

   a. update the resource identified by Resource URI of the EAS AC information subscription with the updated information received in the HTTP PATCH or PUT request message;

   b. return the updated EAS AC information subscription in the "200 OK" response message or respond with the "204 No Content" message indicating to the EAS that the EAS AC information subscription is updated successfully. In the response message, the EES may provide an updated expiration time to indicate to the EAS when the updated subscription will automatically expire.

   On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PATCH or PUT response body. If the EAS is not registered at the EES when sending the AC information reporting subscription update request, the EES shall respond with an HTTP "403 Forbidden" status code with the response body containing the ProblemDetails data structure with the "cause" attribute set to "REGISTRATION_REQUIRED".

If the EES determines that the received HTTP PATCH or PUT message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

If the expiration time is provided, then to maintain the subscription, the EAS shall send an update subscription prior to subscription expiry time. If the update subscription request is not sent before the expiry time, then the EES shall treat EAS subscription as unsubscribed and remove the corresponding EAS AC information subscription resource.

5.5.2.5 Eees_AppClientInformation_Unsubscribe

5.5.2.5.1 General

This service operation is used by the EAS to unsubscribe from an existing AC information subscription.

5.5.2.5.2 EAS unsubscribing to AC information reporting from EES using Eees_AppClientInformation_Unsubscribe operation

To unsubscribe its AC information subscription from the EES, the EAS shall send HTTP DELETE message to the EES, on the resource URI identifying the "Individual Application Client Information Subscription" resource representation as specified in clause 8.4.2.3.3.4. Upon receiving the HTTP DELETE request, the EES shall:

1. verify the identity of the EAS and check if the EAS is authorized to unsubscribe the Individual Application Client Information Subscription resource;

2. if the EAS is authorized to unsubscribe the Individual Application Client Information Subscription resource, then the EES shall unsubscribe the EAS subscription identified by the "subscriptionId" from the EES and delete the resource representing Individual Application Client Information Subscription resource represented by "subscriptionId";

3. return the "204 Not Content" message to the EAS, indicating the successful removal of the subscription information.

   On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body. If the EAS is not registered at the EES when sending the AC information reporting subscription deletion request, the EES shall respond with an HTTP "403 Forbidden" status code with the response body containing the ProblemDetails data structure with the "cause" attribute set to "REGISTRATION_REQUIRED".

   If the EES determines that the received HTTP DELETE request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.6 Eees_SessionWithQoS Service

5.6.1 Service Description

The Eees_SessionWithQoS API, as defined in 3GPP TS 23.558 [2], allows an Edge Application Server via Eees interface to support the setup of a data session between AC and EAS with a specific QoS and the modification of the QoS of this data session.

5.6.2 Service Operations

5.6.2.1 Introduction

The service operation defined for Eees_SessionWithQoS API is shown in the table 5.6.2.1-1.

Table 5.6.2.1-1: Operations of the Eees_SessionWithQoS API

Service operation name	Description	Initiated by
Eees_SessionWithQoS_Create	The service operation is used by the EAS to request reservation of resources for a data session between AC and EAS with a specific QoS and to subscribe to certain session with user plane event notifications.	EAS
Eees_SessionWithQoS_Update	The service operation is used by the EAS to request a modification of the QoS of the data session between AC and EAS.	EAS
Eees_SessionWithQoS_Revoke	The service operation is used by the EAS to revoke the data session between AC and EAS with a specific QoS and to unsubscribe to the related session with user plane event notifications.	EAS
Eees_SessionWithQoS_Notify	The service operation is used by the EES to notify the EAS about a user plane event associated with the established session between an AC and the EAS.	EES

5.6.2.2 Eees_SessionWithQoS_Create

5.6.2.2.1 General

This service operation is used by EAS to request reservation of resources for a data session between AC and EAS with a specific QoS and to subscribe to certain session with user plane event notifications.

5.6.2.2.2 EAS requesting reservation of resources for a data session between AC and EAS with specific QoS using Eees_SessionWithQoS operation

To request establishment of a data session between AC and EAS with a specific QoS, the EAS shall send a HTTP POST message to the Edge Enabler Server on the "Sessions with QoS" resource as specified in clause 8.5.2.2.3.1. The body of POST message shall include the EAS identifier, only one of the UE's IP address or the Identifier of the UE or the identifier of the group uniquely identifying a group of UEs, IP flow description, and at least one of requested QoS reference. The body of POST message may include a list of associated events which the EAS subscribes, and if the event list is included, a Notification Destination URI shall also be provided.

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

1. Process the EAS Session with QoS Create request;
2. verify the identity of the EAS and check if the EAS is authorized to request reservation of resources for a data session between AC and EAS with a specific QoS;
3. if the EAS is authorized, then the EES shall;
    a. create a new resource "Individual Session with QoS";
    b. if the request is for a group of UEs identified by group ID (i.e., via the "intGrpId" or "extGrpId") or for a single UE identified via the "ueId" attribute, interact with the SCEF (as specified in 3GPP TS 29.122 [6]) or the NEF (as specified in 3GPP TS 29.522 [10]) by invoking the MonitroingEvent API with the monitoring type sets to "PDN_CONNECTIVITY_STATUS" to request to be notified when the 3GPP network detects the UE's PDN connection or PDU session is set up or torn down. If the IP address for the single UE or, the IP address(es) for one or more UEs within the group are received from the 3GPP network, then execute step 3c; and
    c. if the request is for a single UE identified by the IP address or the IP address is obtained in step 3b, interact directly with the PCRF (as specified in 3GPP TS 29.214 [15]) or the PCF (as specified in 3GPP TS 29.514 [16]), or via the SCEF (as specified in 3GPP TS 29.122 [6]) or the NEF (as specified in 3GPP TS 29.522 [10]) by invoking the AsSessionWithQoS API, to provide the specific QoS information to the PCF.

4. upon receipt of successful response from 3GPP network, respond to the EAS with "201 Created" and include the session with QoS context information. The new created resource URI shall also be included in the Location header field of the HTTP response message.in the response message.

On failure, the EES shall take proper error handling actions, as specified in clause 8.5.6, and respond to the EAS with an appropriate error status code.

5.6.2.3 Eees_SessionWithQoS_Update

5.6.2.3.1 General

This service operation is used by EAS to request updating QoS of a data session between AC and EAS and to modify the subscription of the session with user plane event notifications.

5.6.2.3.2 EAS updating QoS of a data session between AC and EAS using Eees_SessionWithQoS_Update operation

To request modification of the QoS of the data session between AC and EAS, the EAS shall send a HTTP PATCH or PUT message to the EES on resource URI "Individual Session with QoS" resource as specified in clause 8.5.2.3.3.1 for HTTP PATCH message and in clause 8.5.2.3.3.2 for HTTP PUT message.

The PUT message shall replace all the QoS settings of the data session in the existing context. The request shall not change the values of the "easId", "ueId", "ueIpv4Addr", "ueIpv6Addr", "ipDomain", "intGrpId", "extGrpId", "dnn" and/or "snssai" attributes.

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

1. check the update of the existing Individual Session with QoS from the EAS is authorized or not;
2. if the EAS is authorized, and to update the QoS setting, then the EES shall:
   a. interact with the 3GPP network to update the associated data session; and
   b. upon receipt of successful response from 3GPP network, respond to the EAS with "204 No Content", or "200 OK" with the updated Individual session with QoS context in the response message.

   On failure, the EES shall take proper error handling actions, as specified in clause 8.5.6, and respond to the EAS with an appropriate error status code.

   If the EES determines that the received HTTP PATCH or PUT message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.6.2.4 Eees_SessionWithQoS_Revoke

5.6.2.4.1 General

This service operation is used by EAS to revoke the data session between AC and EAS with a specific QoS and to unsubscribe to the related session with user plane event notifications.

5.6.2.4.2 EAS revoking QoS of a data session between AC and EAS using Eees_SessionWithQoS_Revoke operation

To revoke the data session between AC and EAS with a specific QoS and unsubscribe the user plane event notifications, the EAS shall send a HTTP DELETE message to the EES targeting the Individual Session with QoS resource as specified in clause 8.5.2.3.3.3. Upon receiving the HTTP DELETE request, the EES shall:

1. verify the identity of the EAS and check if the EAS is authorized to revoke the data session between AC and EAS with a specific QoS;

2. if the EAS is authorized and the resource exists, then the EES shall interact with the 3GPP network to delete the associated data session.

3. upon receipt of successful response from 3GPP network, delete the Individual Session with QoS resource corresponding to the individual Session with QoS; and

4. return "204 No Content" message to the EAS, indicating the successful removal.

On failure, the EES shall take proper error handling actions, as specified in clause 8.5.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP DELETE message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.6.2.5 Eees_SessionWithQoS_Notify

5.6.2.5.1 General

This service operation is used by EES to send user plane event notification information of the data session between AC and EAS with a specific QoS to the EAS.

5.6.2.5.2 EES notifying QoS of a data session between AC and EAS using Eees_SessionWithQoS_Notify operation

The EES determines to notify the user plane event notification information to the EAS, when the EES receives the notification of the user plane event information from the 3GPP core network.

To notify the user plane event notification information, the EES shall send an HTTP POST message using the Notification Destination URI received during the creation or modification of resource request. The body of POST message shall include the event report information (e.g., resource allocation outcome or information that the QoS targets can no longer (or can again) be fulfilled).

Upon receiving the HTTP POST message, the EAS shall process the event report information and return "204 No Content" message to the EES.

On failure, the EAS shall take proper error handling actions, as specified in clause 8.5.6, and respond to the EES with an appropriate error status code.

If the EAS determines that the received HTTP POST message needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.7 Eees_EASDiscovery Service

5.7.1 Service Description

The Eees_EASDiscovery service API enables a service consumer (i.e. EAS, EES) to:

- request EAS discovery.

5.7.2 Service Operations

5.7.2.1 Introduction

The service operations defined for Eees_EASDiscovery API are shown in the table 5.7.2.1-1.

Table 5.7.2.1-1: Operations of the Eees_EASDiscovery API

Service operation name	Description	Initiated by
Eees_EASDiscovery_TEasDiscRequest	This service operation is used by the EAS or EES to request EAS discovery information.	EES, EAS

5.7.2.2 Eees_EASDiscovery_TEasDiscRequest

5.7.2.2.1 General

This service operation is used by the S-EES or S-EAS to request for T-EAS discovery information, as specified for the Eees_TargetEASDiscovery API defined in 3GPP TS 23.558 [2].

5.7.2.2.2 EES or EAS requesting T-EAS discovery information using Eees_EASDiscovery_TEasDiscRequest operation

To request for T-EAS discovery, the service consumer (i.e. EAS or EES) shall send an HTTP POST request to the EES as specified in clause 6.3.2.4.4.2 of 3GPP TS 24.558 [14]. The body of the POST message shall include the EasDiscoveryReq data structure as specified in clause 6.3.5.2.2 of 3GPP TS 24.558 [14].

Upon reception of the HTTP POST request from the service consumer (i.e. EAS or EES), the EES shall:

a) process the EAS discovery request information;

b) the EES verifies and checks if the service consumer (i.e. EAS or EES) is authorized to discover the requested EAS(s) from the EES;

c) if the service consumer (i.e. EAS or EES) is authorized to discover the requested EAS(s) from the EES, then upon successful processing of the request, the EES responds with an HTTP "200 OK" status code with the response body including the EasDiscoveryResp data structure as specified in clause 6.3.5.2.3 of 3GPP TS 24.558 [14]. 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 an HTTP "204 No Content" status code.

If the EES determines that the received HTTP POST request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

On failure, the EES shall take proper error handling actions, as specified in clause 6.3.6 of 3GPP TS 24.558 [14], and respond to the EAS or EES with an appropriate error status code.

5.8 Eees_ACRManagementEvent Service

5.8.1 Service Description

The Eees_ACRManagementEvent API, as defined in 3GPP TS 23.558 [2], allows an Edge Application Server via Eees interface to support (un)subscription to the notifications of ACR management events.

5.8.2 Service Operations

5.8.2.1 Introduction

The service operation defined for Eees_ACRManagementEvent API is shown in the table 5.8.2.1-1.

Table 5.8.2.1-1: Operations of the Eees_ACRManagementEvent API

Service operation name	Description	Initiated by
Eees_ACRManagementEvent_Subscribe	The service operation is used by the EAS to subscribe to notifications of ACR management event(s).	EAS
Eees_ACRManagementEvent_UpdateSubscription	The service operation is used by the EAS to request a modification of an existing subscription of notifications of ACR management event(s).	EAS
Eees_ACRManagementEvent_Unsubscribe	The service operation is used by the EAS to unsubscribe to an existing subscription of notifications of ACR management event(s).	EAS
Eees_ACRManagementEvent_Notify	The service operation is used by the EES to notify the EAS about ACR management event(s) if detected.	EES

5.8.2.2 Eees_ACRManagementEvent_Subscribe

5.8.2.2.1 General

This service operation is used by EAS to subscribe to notifications of ACR management events.

5.8.2.2.2 EAS requesting to get notifications of ACR management events using Eees_ACRManagementEvent_Subscribe service operation

In order to subscribe to notifications of ACR management events, the EAS shall send a HTTP POST request message to the EES targeting the "ACR Management Events Subscriptions" resource as specified in clause 8.6.2.2.3.1. The body of the HTTP POST request message shall include the AcrMgntEventsSubscription data type as specified in clause 8.6.5.2.2.

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

1. Process the ACR management events subscription request;
2. verify the identity of the EAS and check if the EAS is authorized to subscribe to notifications of ACR management events;
3. if the EAS is authorized, then if one of the subscribed event(s) is the UP path change event, the EES shall:
   a) if already subscribed to the 3GPP core network (i.e. either directly through the PCF or via the NEF TrafficInfluence API) on UP path management events and there is locally cached UP path change event information, perform step 4, and include the locally cached UP path change event information in the HTTP POST response body; or
   b) if not yet subscribed to the 3GPP core network on UP path management events, interact with the NEF by invoking the TrafficInfluence API as specified in 3GPP TS 29.522 [10] or directly towards the PCF to request to be notified of the UP path change event. Upon receipt of successful response from the NEF, then the EES shall perform step 4.

   The EES may interact with the NEF by invoking the AnalyticsExposure API as specified in 3GPP TS 29.522 [10] to subscribe to notifications of, or retrieve the UE mobility and UE communication events.
4. create a new resource "Individual ACR Management Events Subscription" and respond to the EAS with "201 Created" and include the Individual ACR Management Events Subscription information. The new created resource URI shall also be included in the Location header field of the HTTP response message;
5. If the target UE and the 3GPP network supports mobility between 5GC and EPC, interact with the SCEF+NEF by invoking the MonitroingEvent API as specified in 3GPP TS 29.122 [6] with the monitoring type sets to "API_SUPPORT_CAPABILITY" or interact with the CAPIF core function by invoking the CAPIF_Events_API service as specified in 3GPP TS 29.222 [17] to request to be notified the availability of the TrafficInfluence API.

On failure, the EES shall take proper error handling actions, as specified in clause 8.6.6, and respond to the EAS with an appropriate error status code.

5.8.2.3 Eees_ACRManagementEvent_UpdateSubscription

5.8.2.3.1 General

This service operation is used by EAS to request updating an existing Individual ACR Management Events Subscription.

5.8.2.3.2 EAS updating an existing Individual ACR Management Events Subscription using Eees_ACRManagementEvent_UpdateSubscription service operation

To request modification of an existing Individual ACR Management Events Subscription, the EAS shall send a HTTP PATCH request (for partial modification) or PUT request (for fully replacement) message to the EES on resource URI "Individual ACR Management Events Subscription" resource as specified in clause 8.6.2.3.3.1 for HTTP PATCH message and in clause 8.6.2.3.3.2 for HTTP PUT message. This request shall not replace the easId property of the existing resource.

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

1. check the update of the existing Individual ACR Management Events Subscription from the EAS is authorized or not;
2. if the EAS is authorized, then if one of the subscribed event(s) is UP path change event, the EES shall:
   a) if already successful subscribed to the 3GPP core network and there is local cached UP path change event information, perform step 3, and include the local cached UP path change event information in the HTTP PUT or PATCH response; or
   b) if not subscribed to the 3GPP core network yet, interact with the NEF by invoking the TrafficInfluence API as specified in 3GPP TS 29.522 [10] to request to be notified of the UP path change event. Upon receipt of successful response from the NEF, then the EES shall perform step 3.

   The EES may interact with the NEF by invoking the AnalyticsExposure API as specified in 3GPP TS 29.522 [10] to subscribe to notifications of, or retrieve the UE mobility and UE communication events.
3. update the existing resource "Individual ACR Management Events Subscription", respond to the EAS with "204 No Content", or "200 OK" with the updated Individual ACR Management Events Subscription message.

On failure, the EES shall take proper error handling actions, as specified in clause 8.6.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP PATCH or PUT message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.8.2.4 Eees_ACRManagementEvent_Unsubscribe

5.8.2.4.1 General

This service operation is used by EAS to delete an existing ACR Management Events Subscription.

5.8.2.4.2 EAS deleting an existing Individual ACR Management Events Subscription using Eees_ACRManagementEvent_Unsubscribe service operation

To delete an existing "Individual ACR Management Events Subscription", the EAS shall send a HTTP DELETE request message to the EES targeting the concerned "Individual ACR Management Events Subscription" resource as specified in clause 8.6.2.3.3.3. Upon receiving the HTTP DELETE request:

1. the EES shall verify the identity of the EAS and check if the EAS is authorized to delete the concerned ACR Management Events Subscription;

2. if the EAS is authorized and the resource exists, then the EES may interact with the 3GPP network to delete the associated Subscription(s), if needed; And

NOTE: The EES can keep the existing subscription(s) with the 3GPP network, e.g. if they are useful for other existing ACR Management Events subscriptions from other EASs.

3. upon successful processing of the request and the receipt of a successful response from 3GPP network, if needed as per step 2 above, the EES shall delete the Individual ACR Management Events Subscription; and respond with an HTTP "204 No Content" status code to the EAS, indicating the successful deletion of the concerned "Individual ACR Management Events Subscription" resource.

On failure, the EES shall take proper error handling actions, as specified in clause 8.6.6, and respond to the EAS with an appropriate error status code.

If the EES determines that the received HTTP DELETE message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.8.2.5 Eees_ACRManagementEvent_Notify

5.8.2.5.1 General

This service operation is used by EES to send ACR management event notification information or the availability of user path management events monitoring via the 3GPP 5GC network to the EAS.

5.8.2.5.2 EES notifying ACR management events using Eees_ACRManagementEvent_Notify operation

In order to notify the ACR management event information, the EES shall send an HTTP POST message using the Notification Destination URI received during the creation or modification of subscription. The body of POST message shall include the AcrMgntEventsNotification data type as specified in clause 8.6.5.2.4.

Upon receiving the HTTP POST message, the EAS shall process the event report information and return "204 No Content" message to the EES.

On failure, the EAS shall take proper error handling actions, as specified in clause 8.6.6, and respond to the EES with an appropriate error status code.

If the EAS determines that the received HTTP POST request needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.8.2.5.3 EES notifying the availability of user path management events monitoring via the 3GPP 5GC network using Eees_ACRManagementEvent_Notify operation

In order to notify of the availability of user path management events monitoring via the 3GPP 5GC network, the EES shall send an HTTP POST request message targeting the URI "{notificationDestination}/report-availability", where the Notification Destination URI is the one received during the creation or modification of the ACR management event subscription. The body of HTTP POST request message shall include the AvailabilityNotif data type as specified in clause 8.6.5.2.11.

NOTE: The EAS is subscribed by default to the reception of notifications on the availability of user path management events monitoring via the 3GPP 5GC network.

Upon receiving the HTTP POST request message, the EAS shall process the received information and respond to the EES with an HTTP "204 No Content" status code.

On failure, the EAS shall take proper error handling actions, as specified in clause 8.6.6, and respond to the EES with an appropriate error status code.

If the EAS determines that the received HTTP POST request needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.9 Eees_AppContextRelocation Service

5.9.1 Service Description

The Eees_AppContextRelocation API, allows S-EAS to declare to the S-EES about the T-EAS selected by the S-EAS or allows S-EAS to request ACR determination to the S-EES.

5.9.2 Service Operations

5.9.2.1 Introduction

The service operation defined for Eees_AppContextRelocation API is shown in the table 5.9.2.1-1.

Table 5.9.2.1-1: Operations of the Eees_AppContextRelocation API

Service operation name	Description	Initiated by
Eees_AppContextRelocation_SelectedTargetEAS_Declare	This service operation is used by the S-EAS to inform the S-EES about selection of the T-EAS.	EAS
Eees_AppContextRelocation_ACRDetermination_Request	This service operation is used by the S-EAS to request the S-EES to determine the ACR.	EAS

5.9.2.2 Eees_AppContextRelocation_SelectedTargetEAS_Declare

5.9.2.2.1 General

This service operation is used by S-EAS to declare the selected T-EAS information to the S-EES, as specified in 3GPP TS 23.558 [2].

5.9.2.2.2 S-EAS informing the S-EES about the selected T-EAS using Eees_AppContextRelocation_SelectedTargetEAS_Declare operation

To declare the selected T-EAS information to the S-EES, the S-EAS shall send an HTTP POST request message to the S-EES targeting the URI "{apiRoot}/eees-appctxtreloc/v1/declare" as specified in clause 6.5.3.4 of 3GPP TS 24.558 [14]. The request body of the POST request message (i.e. "Declare" custom operation) includes the AcrDecReq data structure as specified in clause 6.5.5.2.4 of 3GPP TS 24.558 [14].

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

1. Process the EAS request;
2. verify the identity of the EAS and check if the EAS is authorized to declare the T-EAS information;
3. if the EAS is authorized to declare T-EAS information, then the EES shall send successful declaration response message to S-EAS.

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.

If the EES determines that the received HTTP POST message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.9.2.3 Eees_AppContextRelocation_ACRDetermination_Request

5.9.2.3.1 General

This service operation is used by S-EAS to request the S-EES to determine the ACR, as specified in the Eees_AppContextRelocation_Request operation with ACR determination part in 3GPP TS 23.558 [2].

5.9.2.3.2 S-EAS request the S-EES to determine the ACR using Eees_AppContextRelocation_ACRDetermination_Request operation

To request the S-EES to determine the ACR, the S-EAS shall send a HTTP POST message to the S-EES on the custom URI "{apiRoot}/eees-appctxtreloc/v1/determine" as specified in clause 6.5.3.2 of 3GPP TS 24.558 [14]. The request body of the POST message includes the AcrDetermReq data structure with information about the S-EAS end point information and may include other optional information on UE and/or EASID as specified in clause 6.5.5.2.2 of 3GPP TS 24.558 [14].

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

1. process the EAS request;

2. verify the identity of the EAS and check if the EAS is authorized to request ACR determination;

3. if the EAS is authorized to request the ACR , then the EES shall;

   a. send successful ACR determination response to S-EAS with an HTTP "204 No Content" status code;

   b. additionally, 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 as specified in 3GPP TS 24.558 [14];

   c. if the ACR determination handling met with failure case , the S-EES shall send a proper HTTP error status code and may include additional error information in the POST response body.

If the EES determines that the received HTTP POST message needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.10 Eees_EECContextRelocation Service

5.10.1 Service Description

The Eees_EECContextRelocation API enables the EEC context relocation from S-EES to T-EES, as defined in 3GPP TS 23.558 [2]. The Eees_EECContextRelocation_Pull service operation enables EEC context relocation from S-EES to T-EES, upon request from the T-EES to S-EES, as specified by Eees_EECContextPull API in 3GPP TS 23.558 [2]. The Eees_EECContextRelocation_Push service operation enables EEC context relocation from S-EES to T-EES, upon a request from the S-EES to T-EES, as specified by Eees_EECContextPush API in 3GPP TS 23.558 [2].

5.10.2 Service Operations

5.10.2.1 Introduction

The service operation defined for Eees_EECContextRelocation API is shown in the table 5.10.2.1-1.

Table 5.10.2.1-1: Operations of the Eees_EECContextRelocation API

Service operation name	Description	Initiated by
Eees_EECContextRelocation_Pull	This service operation is used by the T-EES to fetch the EEC context information from S-EES to relocate the EEC context information form S-EES to T-EES.	EES
Eees_EECContextRelocation_Push	This service operation is used by the S-EES to push the EEC context information to T-EES to relocate the EEC context information form S-EES to T-EES.	EES

5.10.2.2 Eees_EECContextRelocation_Pull

5.10.2.2.1 General

This service operation is used by T-EES to relocate the EEC context information from the S-EES, as specified in 3GPP TS 23.558 [2].

5.10.2.2.2 T-EES relocating EEC context information from S-EES to T-EES using Eees_EECContextRelocation_Pull operation

To relocate the EEC context information from S-EES to the T-EES, the T-EES shall send HTTP GET message to the S-EES, with the request URI set to "{apiRoot}/eees-eeccontextreloc/v1/eec-contexts" as specified in the clause 8.7.2.2.3.1. The query parameters shall include EEC context identifier, identifier of the requesting T-EES and may include the list of service context information.

Upon receiving the HTTP GET message from the T-EES, the S-EES shall:

1. Validate the request and verifies if the T-EES is authorized to relocate the EEC context;
2. if the T-EES is authorised, then authorizes the EEC context relocation, based on EEC context identifier in the request;
3. respond with HTTP "200 OK" status code, with the response body including the EECContext data type, containing the EEC context information corresponding to the query parameters provided in the HTTP GET message.

On failure, the S-EES shall take proper error handling actions, as specified in clause 8.7.6, and respond to the T-EES with an appropriate error status code.

5.10.2.3 Eees_EECContextRelocation_Push

5.10.2.3.1 General

This service operation is used by S-EES to relocate the EEC context information to the T-EES, as specified in 3GPP TS 23.558 [2].

5.10.2.3.2 S-EES relocating EEC context information from S-EES to T-EES using Eees_EECContextRelocation_Push operation

To transfer the EEC context information from S-EES to the T-EES, the S-EES shall send HTTP POST message to the T-EES, with the request URI set to "{apiRoot}/eees-eeccontextreloc/v1/eec-contexts" as specified in the clause 8.7.2.2.3.2. The request body shall include the EEC Context information and identifier of the S-EES requesting to relocate the EEC Context.

Upon receiving the HTTP POST message from the S-EES, the T-EES shall:

1. Validate the request and verifies if the S-EES is authorized to transfer the EEC context;

2. if the S-EES is authorised, then authorizes the EEC context relocation, based on EEC context identifier in the request;

3. if authorized, the T-EES stores the EEC Context and respond with either:

   - an HTTP "200 OK" status code with the response body including the EECContextPushRes data structure containing the EEC registration identifier, and if available, the associated expiration time, if implicit registration of the EEC at the T-EES is performed, i.e. in the case of S-EAS decided ACR scenario specified in clause 8.8.2.4 of 3GPP TS 23.558 [2] or S-EES executed ACR scenarios specified in clause 8.8.2.5 of 3GPP TS 23.558 [2]; or

   - an HTTP "204 No content" status code, indicating that the EEC Context transfer is successful, if implicit registration of the EEC at the T-EES is not performed.

NOTE: If the EEC, for which the EEC context is pushed by the S-EES, is not registered with the T-EES, then the T-EES determines that the push request is for S-EAS decided ACR or S-EES executed ACR scenarios defined in clauses 8.8.2.4 and 8.8.2.5 of 3GPP TS 23.558 [2].

On failure, the T-EES shall take proper error handling actions, as specified in clause 8.7.6, and respond to the S-EES with an appropriate error status code.

On success, if the EEC registration ID and the associated expiration time are provided by the T-EES in the EEC context push response, then the S-EES stores them, and when required, includes them in the subsequent ACR information notification towards the EEC.

5.11 Eees_EELManagedACR Service

5.11.1 Service Description

The Eees_EELManagedACR service exposed by the EES enables a service consumer (i.e. EAS) to:

- request the EES (i.e. S-EES) to handle all the operations of an ACR;
- subscribe to ACT status reporting during an EEL Managed ACR; and
- receive notifications from the EES (i.e. T-EES) on ACT status during an EEL Managed ACR.

5.11.2 Service Operations

5.11.2.1 Introduction

The service operations defined for Eees_EELManagedACR API are shown in the table 5.11.2.1-1.

Table 5.11.2.1-1: Eees_EELManagedACR Service Operations

Service operation name	Description	Initiated by
Eees_EELManagedACR_Request	This service operation enables a service consumer (i.e. S-EAS) to request the EES (i.e. S-EES) to handle all the operations of an ACR.	EAS
Eees_EELManagedACR_Subscribe	This service operation enables a service consumer (i.e. T-EAS) to subscribe to ACT status reporting during an EEL Managed ACR.	EAS
Eees_EELManagedACR_Notify	This service operation enables a service consumer (i.e. T-EAS) to receive notifications from the EES (i.e. T-EES) on ACT status during an EEL Managed ACR.	EES

5.11.2.2 Eees_EELManagedACR_Request

5.11.2.2.1 General

This service operation is used by a service consumer (i.e. S-EAS) to request the EES (i.e. S-EES) to handle all the operations of an ACR.

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

- EEL Managed ACR Request procedure.

5.11.2.2.2 EEL Managed ACR Request

The EEL Managed ACR Request procedure enables a service consumer (i.e. S-EAS) to request the EES (i.e. S-EES) to handle all the operations of an ACR (see also clause 8.8.3.6 of 3GPP°TS°23.558°[2]).

1. The service consumer (i.e. S-EAS) shall send for this purpose an HTTP POST request (custom operation: "Request") to the EES, with the request URI set to "{apiRoot}/eees-eel-acr/<apiVersion>/request-eelacr" and the request body including the EELACRReq data structure as defined in clause 8.8.6.2.2.

2a. Upon success, the EES shall respond with an HTTP "200 OK" status code with the response body including the feedback from the EES within the EELACRResp data structure as defined in clause 8.8.6.2.3.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.11.2.3 Eees_EELManagedACR_Subscribe

5.11.2.3.1 General

This service operation is used by a service consumer (i.e. T-EAS) to subscribe to ACT status information reporting at the EES (i.e. T-EES).

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

- Subscribe to ACT status information reporting.

5.11.2.3.2 Subscribe to ACT status information reporting

This procedure enables a service consumer (i.e. T-EAS) to request the creation of a subscription to ACT status information reporting (see also clause 8.8.3.6 of 3GPP°TS°23.558°[2]).

1. In order to subscribe to ACT status reporting, the service consumer (i.e. T-EAS) shall send an HTTP POST request to the EES, with the request URI set to "{apiRoot}/eees-eel-acr/<apiVersion>/subscriptions" and the request body including the ACTStatusSubsc data structure as defined in clause 8.8.6.2.4.

2a. Upon success, the EES shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created Individual ACT Status Subscription resource within the ACTStatusSubsc data structure as defined in clause 8.8.6.2.4.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

5.11.2.4 Eees_EELManagedACR_Notify

5.11.2.4.1 General

This service operation is used by an EES (i.e. T-EES) to notify a previously subscribed service consumer (i.e. T-EAS) on ACT status information.

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

- ACT Status Notification.

5.11.2.4.2 ACT Status Notification

The ACT Status Notification procedure enables an EES (i.e. T-EES) to notify a previously subscribed service consumer (i.e. T-EAS) on ACT status information (see also clause 8.8.3.6 of 3GPP°TS°23.558°[2]).

1. The EES (i.e. T-EES) shall send for this purpose an HTTP POST request to the service consumer (i.e. T-EAS) with the request URI set to "{notificationUri}/act-status", where the "notificationUri" is set to the value received from the service consumer (i.e. T-EAS) during the ACT status reporting subscription procedure defined in clause 5.11.2.3, and the request body including the ACTStatusNotif data structure as defined in clause 8.8.6.2.5.

2a. Upon success, the service consumer (i.e. T-EAS) shall respond with an HTTP "204 No Content" status code to acknowledge the reception of the notification to the EES.

If the service consumer (i.e. T-EAS) is not able to handle the notification request, it may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative service consumer (i.e. T-EAS) where the notification should be sent.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

If the EAS determines that the received HTTP POST request needs to be redirected, the EAS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EAS where the notification should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

5.12 Eees_ACRStatusUpdate Service

5.12.1 Service Description

The Eees_ACRStatusUpdate service exposed by the EES enables a service consumer (i.e. S-EAS or T-EAS) to:

- update the information related to ACR (e.g. indicate the status of ACT, update the notification target address); and

- receive from the EES (i.e. T-EES) the status of EDGE-3 subscription relocation, including subscription ID update for EDGE-3 subscriptions.

5.12.2 Service Operations

5.12.2.1 Introduction

The service operations defined for Eees_ACRStatusUpdate API are shown in the table 5.12.2.1-1.

Table 5.12.2.1-1: Eees_ACRStatusUpdate Service Operations

Service operation name	Description	Initiated by
Eees_ACRStatusUpdate_Request	This service operation enables a service consumer (i.e. S-EAS or T-EAS) to update the information related to ACR (e.g. indicate the status of ACT, update the notification target address) at the EES.	EAS

5.12.2.2 Eees_ACRStatusUpdate_Request

5.12.2.2.1 General

This service operation is used by a service consumer (i.e. S-EAS or T-EAS) to update the information related to ACR (e.g. indicate the status of ACT, update the notification target address) at the EES.

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

- ACR Status Update Request procedure.

5.12.2.2.2 ACR Status Update Request

The ACR Status Update Request procedure enables a service consumer (i.e. S-EAS or T-EAS) to request to update the EES to request to update the information related to ACR (see also clause 8.8.3.8 of 3GPP°TS°23.558°[2]).

1. The service consumer (S-EAS or T-EAS) shall send for this purpose an HTTP POST request (custom operation: "Request") to the UAE Server, with the request URI set to "{apiRoot}/eees-acrstatus-update/<apiVersion>/request-acrupdate" and the request body including the ACRUpdateData data structure defined in clause 8.9.6.2.2.

2. Upon receiving the HTTP POST request message from the EAS, the EES shall check whether the EAS is autorized to update the ACR status. Then:

   2a. Upon success, the EES shall respond with an HTTP "200 OK" status code with the response body including the feedback from the EES within the ACRDataStatus data structure defined in clause 8.9.6.2.3, or an HTTP "204 No Content" status code.

   2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body.

If the EES determines that the received HTTP POST request needs to be redirected, the EES may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative EES where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

6 Services offered by Edge Configuration Server

6.1 Introduction

The table 6.1-1 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 6.1-1: List of ECS Service APIs

Service Name	Service Operations	Operation Semantics	Consumer(s)
Eecs_EESRegistration	Request	Request/Response	EES
	Update	Request/Response	EES
	Deregister	Request/Response	EES
Eecs_TargetEESDiscovery	Request	Request/Response	EES

Table 6.1-2 summarizes the corresponding Edge Configuration Server APIs defined in this specification.

Table 6.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex

Eecs_EESRegistration	9.1	EES registration service.	TS29558_Eecs_EESRegistration.yaml	eecs-eesregistration	A.11
Eecs_TargetEESDiscovery	9.2	Service to discover the target EES information.	TS29558_Eecs_TargetEESDiscovery.yaml	eecs-targeteesdiscovery	A.12

6.2 Eecs_EESRegistration Service

6.2.1 Service Description

The Eecs_EESRegistration API, as defined in 3GPP TS 23.558 [2], allows an Edge Enabler Server via Eecs interface to register, update its registration and deregister at a given Edge Configuration Server.

6.2.2 Service Operations

6.2.2.1 Introduction

The service operation defined for Eecs_EESRegistration API is shown in the table 6.2.2.1-1.

Table 6.2.2.1-1: Operations of the Eecs_EESRegistration API

Service operation name	Description	Initiated by
Eecs_EESRegistraiton_Request	This service operation is used by the EES to register itself to a given ECS.	EES
Eecs_EESRegistraiton_Update	This service operation is used by the EES to update its registration information at ECS.	EES
Eecs_EESRegistraiton_Deregister	This service operation is used by the EES to deregister itself from a given ECS.	EES

6.2.2.2 Eecs_EESRegistration_Request

6.2.2.2.1 General

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

6.2.2.2.2 EES registering to ECS using Eecs_EESRegistration_Request operation

To register itself as an Edge Enabler Server at the ECS, the EES shall send an HTTP POST message to the Edge Configuration Server on the "EES Registrations" collection resource. The body of the HTTP POST message shall include the EES profile information, may include proposed expiration time for the registration, as specified in clause 9.1.2.2.3.1.

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

1. Process the EES registration request information;
2. verify the identity of the Edge Enabler Server and check if the EES is authorized to register itself at ECS ;
3. if the EES is authorized to register to ECS, then the ECS shall;
   a. store the EES profile and create a new resource with the EES registration information as specified in clause 9.1.2.1;
   b. return the EES registration information, the resource URI of the EES registration information, in the "201 Created" response message. It shall include a Location HTTP header field. The Location header field shall contain the URI of the created registration i.e. {apiRoot}/eecs-

eesregistration/<apiVersion>/registrations/{registrationId}. The response message may include expiration time to indicate when the EES registration will automatically expire.

On failure, the ECS shall take proper error handling actions, as specified in clause 9.1.6, and respond to the EES with an appropriate error status code.

If the expiration time is provided, then to maintain the registration, the EES shall send a registration update request (as described in clause 6.2.2.3) prior to the expiration time. If the registration update request is not sent before the expiry time, then the ECS shall treat the EES as deregistered and remove the corresponding EES registration resource.

6.2.2.3 Eecs_EESRegistration_Update

6.2.2.3.1 General

This service operation is used by EES to update its registration information at a given ECS.

6.2.2.3.2 EES updating registration information using Eecs_EESRegistration_Update operation

To update the EES registration information at the ECS, the EES shall send a HTTP PUT or PATCH message to the Edge Configuration Server on resource URI identifying the individual EES registration resource representation, as specified in clause 9.1.2.3.3.2 for HTTP PUT message and in clause 9.1.2.3.3.4 for HTTP PATCH message. The HTTP PUT message shall replace all properties in the existing resource with the EES registration information in the request. The body of the HTTP PUT message shall include the EES profile information, may include proposed expiration time to update the registration. This request shall not replace the eesId property of the existing resource.

The HTTP PATCH message includes parameters (EES Profile, expiry time) that need to be replaced in the existing Individual EAS registration resource. This request shall not replace the eesId property of the existing resource.

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

1. check the registration update message from the EES to see if the EES is authorized to modify the requested registration resource;

2. if the EES is authorized to update the registration information and the eesId information in the request and the resource match, then the ECS shall;

   a. update the resource identified by Resource URI of the EES registration information with the updated EES registration information received in the HTTP PUT or PATCH request message;

   b. return the updated EES registration information in the "200 OK" response message or respond with the "204 No Content" message indicating to the EES that the EES registration information is updated successfully. In the response message, the ECS may provide an updated expiration time to indicate to the EES when the updated registration will automatically expire.

On failure, the ECS shall take proper error handling actions, as specified in clause 9.1.6, and respond to the EES with an appropriate error status code.

If the ECS determines that the received HTTP PUT or PATCH request needs to be redirected, the ECS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative ECS where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

If the expiration time is provided, then to maintain the registration, the EES shall send a registration update prior to registration expiry time. If the registration update request is not sent before the expiry time, then the ECS shall treat EES as deregistered and remove the corresponding EES registration resource.

6.2.2.4 Eecs_EESRegistration_Deregister

6.2.2.4.1 General

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

6.2.2.4.2 EES deregistering from ECS using Eecs_EESRegistration_Deregister operation

To deregister itself from the ECS, the EES shall send HTTP DELETE message to the ECS, on the resource URI identifying the individual EES registration resource representation as specified in clause 9.1.2.3.3.3. Upon receiving the HTTP DELETE request, the ECS shall:

1. verify the identity of the EES and check if the EES is authorized to deregister the EES registration information;
2. if the EES is authorized to deregister the EES registration information, then the ECS shall deregister the EES profile from the ECS and delete the resource representing EES registration information.
3. return the "204 Not Content" message to the EES, indicating the successful deregistration of the EES information.

On failure, the ECS shall take proper error handling actions, as specified in clause 9.1.6, and respond to the EES with an appropriate error status code.

If the ECS determines that the received HTTP DELETE request needs to be redirected, the ECS may respond with an HTTP "307 Temporary Redirect" status code or an HTTP "308 Permanent Redirect" status code including an HTTP "Location" header containing an alternative URI representing the end point of an alternative ECS where the message should be redirected. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].

6.3 Eecs_TargetEESDiscovery Service

6.3.1 Service Description

The Eecs_TargetEESDiscovery API, as defined in 3GPP TS 23.558 [2], allows an Edge Enabler Server via Eecs interface to retrieve the target EES (T-EES) information at a given ECS.

6.3.2 Service Operations

6.3.2.1 Introduction

The service operation defined for Eecs_TargetEESDiscovery API is shown in the table 6.3.2.1-1.

Table 6.3.2.1-1: Operations of the Eecs_TargetEESDiscovery API

Service operation name	Description	Initiated by
Eecs_TargetEESDiscovery_Request	This service operation is used by the S-EES to retrieve the T-EES information.	EES

6.3.2.2 Eecs_TargetEESDiscovery_Request

6.3.2.2.1 General

This service operation is used by the S-EES to retrieve the T-EES information from the ECS.

6.3.2.2.2 EES fetching the T-EES information from the ECS using Eecs_TargetEESDiscovery_Request operation

To retrieve the T-EES information from the ECS, the S-EES shall send a HTTP GET message to the Edge Configuration Server on the "EES Profiles" collection resource as specified in clause 9.2.2.2.3.1. The S-EES includes the discovery filter information in the query parameters of the GET message, to assist the ECS to determine the T-EES that has the EAS available to serve the given AC in the UE. The query parameters shall include identifier of the S-EES, identifier of the S-EAS and may include target DNAI, UE location information, and UE identity.

Upon receiving the HTTP GET message from the EES, the ECS shall:

1. Process the EES request information;

2. verify the identity of the Edge Enabler Server and check if the EES is authorized to retrieve the T-EES information;

3. if the EES is authorized to retrieve the T-EES information, then the ECS shall;

   a. determine the T-EES(s) as per UE location information, target DNAI and S-EAS in the request. If UE location information is not included or not known to the ECS, then the ECS may fetch the UE location information from the 3GPP core network as specified in 3GPP TS 29.522 [10];

   b. returns the 200 OK message including the EDN configuration and the list of T-EES(s) information to the S-EES. The list of T-EES(s) includes the endpoint information to reach the T-EES(s).

On failure, the ECS shall take proper error handling actions, as specified in clause 9.2.6, and respond to the EES with an appropriate error status code.

7 Information applicable to several APIs

This clause will provide the design aspects that are common for several APIs.

7.1 General

The EDGEAPP APIs as specified in this document allow secure access to the capabilities provided by the functional entities, Edge Enabler Server and Edge Configuration Server.

This document specifies the procedures triggered at different functional entities as a result of API invocation requests and event notifications. The stage-2 level requirements and signalling flows are defined in 3GPP TS 23.558 [2].

Several design aspects, as mentioned in the following clauses, are specified in 3GPP TS 29.122 [6] and referenced by this specification.

7.2 Data Types

7.2.1 General

This clause defines structured data types, simple data types and enumerations that are applicable to several APIs defined in the present specification and can be referenced from data structures defined in the subsequent clauses.

In addition, data types that are defined in OpenAPI 3.0.0 Specification [3] can also be referenced from data structures defined in the subsequent clauses.

NOTE: As a convention, data type's names in the present specification are with an upper-case letter in the beginning. Parameters are with a lower-case letter in the beginning. As an exception, data types that are also defined in OpenAPI 3.0.0 Specification [3] can use a lower-case case letter in the beginning for consistency.

Table 7.2.1-1 specifies data types re-used by APIs in this specification from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the APIs of this specification.

Table 7.2.1-1: Re-used Data Types

Data type	Reference	Comments
Uri	3GPP TS 29.122 [6]	

7.2.2 Referenced structured data types

Table 7.2.2-1 lists structured data types defined in this specification referenced by multiple services:

Table 7.2.2-1: Referenced Structured Data Types

Data type	Reference	Description

7.2.3 Referenced simple data types and enumerations

Following simple data types defined in Table 7.2.3-1 are applicable to several APIs in this document:

Table 7.2.3-1: Simple data types applicable to several APIs

Type name	Reference	Description

7.3 Usage of HTTP

For all the APIs in this document, the usage of HTTP shall be as specified in clause 5.2.2 of 3GPP TS 29.122 [6], with the clarification that SCA/AS is the functional entity invoking an EDGEAPP API.

For all the APIs, to provide the interface protection over EDGE-3/6/9 interfaces, HTTP over TLS shall be used as specified in 3GPP TS 33.558 [20].

7.4 Content type

The content type for the HTTP messages shall be as specified in clause 5.2.3 of 3GPP TS 29.122 [6].

7.5 URI structure

7.5.1 Resource URI structure

The resource URI structure of all the APIs specified in this document shall be as specified in clause 5.2.4 of 3GPP TS 29.122 [6].

7.5.2 Custom operations URI structure

The custom operation definition is in Annex C of 3GPP TS 29.501 [5].

The URI of a custom operation which is associated with a resource shall have the following structure:

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

Custom operations can also be associated with the service instead of a resource. The URI of a custom operation which is not associated with a resource shall have the following structure:

{apiRoot}/<apiName>/<apiVersion>/<custOpName>

In the above URI structures, "apiRoot", "apiName", "apiVersion" and "apiSpecificResourceUriPart" are as defined in clause 7.5.1 and "custOpName" represents the name of the custom operation as defined in clause 5.1.3.2 of 3GPP TS 29.501 [5].

7.6 Notifications

The functional entities

- shall support the delivery of notifications using a separate HTTP connection towards an address;
- may support testing delivery of notifications; and
- may support the delivery of notification using WebSocket protocol (see IETF RFC 6455 [7]),

as described in 3GPP TS 29.122 [6], with the following clarifications:

- the SCEF is EES for Eees APIs; and
- the SCS/AS is the Subscriber entity invoking an EDGEAPP API.

7.7 Error handling

Response bodies for error handling, as described in clause 5.2.6 of 3GPP TS 29.122 [6], are applicable to all APIs in the present specification unless specified otherwise, with the following clarifications:

- the SCEF is EES for Eees APIs or ECS for Eecs APIs ; and
- the SCS/AS is the functional entity invoking an EDGEAPP API

7.8 Feature negotiation

The functional entity invoking an API (i.e. the EAS server) and the EDGEAPP server use feature negotiation procedures defined in clause 5.2.7 of 3GPP TS 29.122 [6] to negotiate the supported features, with the following clarifications:

- description of the SCEF applies to the EES for Eees APIs or ECS for Eecs APIs; and
- description of the SCS/AS applies to the functional entity invoking an EDGEAPP API.

7.9 HTTP headers

The HTTP headers described in 3GPP TS 29.122 [6] are applicable to all APIs in this document.

7.10 Conventions for Open API specification files

The conventions for Open API specification files as specified in clause 5.2.9 of 3GPP TS 29.122 [6] shall be applicable for all APIs in this document.

8 Edge Enabler Server API Definitions

8.1 Eees_EASRegistration API

8.1.1 Introduction

The Eees_EASRegistration service shall use the Eees_EASRegistration API.

The API URI of the Eees_EASRegistration API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eees-easregistration".
- 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

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.1.2.1-1 depicts the resource URIs structure for the Eees_EASRegistration API.

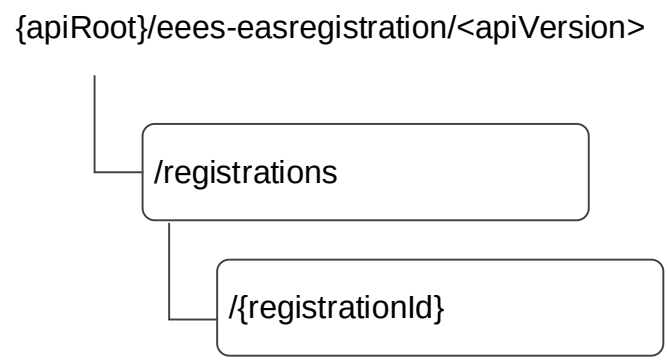

Figure 8.1.2.1-1: Resource URI structure of the Eees_EASRegistration API

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
EAS Registrations	/registrations	POST	Registers a new EAS at the Edge Enabler Server.
Individual EAS Registration	/registrations/{registrationId}	GET	Fetch an individual EAS registration resource.
		PUT	Fully replace an individual EAS registration resource.
		DELETE	Remove an individual EAS registration resource.
		PATCH	Partially update an individual EAS registration resource.

8.1.2.2 Resource: EAS Registrations

8.1.2.2.1 Description

This resource represents all the Edge Application Servers that are registered at a given Edge Enabler Server.

8.1.2.2.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.1.2.2.2-1.

Table 8.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

8.1.2.2.3 Resource Standard Methods

8.1.2.2.3.1 POST

This method shall support the URI query parameters specified in table 8.1.2.2.3.1-1.

Table 8.1.2.2.3.1-1: 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 8.1.2.2.3.1-2 and the response data structures and response codes specified in table 8.1.2.2.3.1-3.

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

Data type	P	Cardinality	Description
EASRegistration	M	1	EAS registration request information.

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

Data type	P	Cardinality	Response codes	Description
EASRegistration	M	1	201 Created	EAS information is registered successfully at EES. EAS 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 mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.1.2.2.3.1-4: 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-easregistration/<apiVersion>/registrations/{registrationId}

8.1.2.2.4 Resource Custom Operations

None.

8.1.2.3 Resource: Individual EAS Registration

8.1.2.3.1 Description

This Individual EAS Registration resource represents an individual EAS registered at a given Edge Enabler Server.

8.1.2.3.2 Resource Definition

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

This resource shall support the resource URI variables defined in the 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
registrationId	string	The EAS registration identifier.

8.1.2.3.3 Resource Standard Methods

8.1.2.3.3.1 GET

This method retrieves the EAS information registered at Edge Enabler Server. 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 GET 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 GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

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

Data type	P	Cardinality	Response codes	Description
EASResgistration	M	1	200 OK	The EAS registration information at the Edge Enabler Server.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.1.2.3.3.1-4: 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 8.1.2.3.3.1-5: 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.

8.1.2.3.3.2 PUT

This method updates the EAS registration information at Edge Enabler Server by completely replacing the existing registration data (except the value of "suppFeat" attribute within the EASRegistration data type, and the value of "easId" attribute within the EASProfile data type). This method shall support the URI query parameters specified in the table 8.1.2.3.3.2-1.

Table 8.1.2.3.3.2-1: 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 8.1.2.3.3.2-2 and the response data structures and response codes specified in table 8.1.2.3.3.2-3.

Table 8.1.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
EASRegistration	M	1	Details of the EAS registration information to be updated

Table 8.1.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EASRegistration	M	1	200 OK	The EAS registration information updated successfully and the updated EAS registration information is returned in the response.
n/a			204 No Content	The EAS registration information was updated successfully.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.1.2.3.3.2-4: 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 8.1.2.3.3.2-5: 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.

8.1.2.3.3 DELETE

This method deregisters an EAS registration from the EES. This method shall support the URI query parameters specified in the table 8.1.2.3.3.3-1.

Table 8.1.2.3.3.3-1: 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 8.1.2.3.3.3-2 and the response data structures and response codes specified in table 8.1.2.3.3.3-3.

Table 8.1.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.1.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual EAS registration information matching the registrationId is 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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.1.2.3.3.3-4: 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 8.1.2.3.3.3-5: 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.

8.1.2.3.3.4 PATCH

This method partially updates the EAS registration information (except the easId) at Edge Enabler Server. This method shall support the URI query parameters specified in the table 8.1.2.3.3.4-1.

Table 8.1.2.3.3.4-1: 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 8.1.2.3.3.4-2 and the response data structures and response codes specified in table 8.1.2.3.3.4-3.

Table 8.1.2.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
EASRegistrationPatch	M	1	Details of the EAS registration information to be updated

Table 8.1.2.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EASRegistration	M	1	200 OK	The Individual EAS registration information was updated successfully and the updated EAS registration information is returned in the response.
n/a			204 No Content	The Individual EAS registration information was updated successfully.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The mandatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.1.2.3.3.4-4: 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 8.1.2.3.3.4-5: 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.

8.1.2.3.4 Resource Custom Operations

None.

8.1.3 Custom Operations without associated resources

None.

8.1.4 Notifications

None.

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 apply to this API

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

Table 8.1.5.1-1: Eees_EASRegistration API specific Data Types

Data type	Section defined	Description	Applicability
EASRegistration	8.1.5.2.2	The EAS registration information on EES.	
EASProfile	8.1.5.2.3	The profile information related to the EAS in the EASRegistration data type.	
EASServiceKPI	8.1.5.2.4	Service characteristics provided by EAS, captured in EAS profile information.	
EndPoint	8.1.5.2.5	The end point information of the Edge Application Server in the EAS profile.	
EASRegistrationPatch	8.1.5.2.6	To partially update the EAS Registration information.	
PermissionLevel	8.1.5.3.3	Used to indicate the level of service permissions supported by the EAS.	
EASCategory	8.1.5.3.4	Used to indicate the category or type of the EAS.	

Table 8.1.5.1-2 specifies data types re-used by the Eees_EASRegistration API service.

Table 8.1.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features defined in table 8.1.7-1.	
DateTime	3GPP TS 29.122 [6]	Used to capture the expiration time of EAS registration.	
DateTimeRm	3GPP TS 29.571 [8]	Used to capture the expiration time EAS registration patch.	
ScheduledCommunicationTime	3GPP TS 29.122 [6]	Used to define the schedule of EAS availability.	
RouteToLocation	3GPP TS 29.571 [8]	Used to define the DNAIs associated with EAS and the corresponding N6 routing information for each EAS DNAI.	
DurationSec	3GPP TS 29.122 [6]	Duration in seconds, used to define the availability reporting period for EES to check EAS availability.	
LocationArea5G	3GPP TS 29.122 [6]	Used to defined the geographic and topological area served by EAS.	
BitRate	3GPP TS 29.571 [8]	Used to express the connection bandwidth of EAS service KPI.	
Ipv4Addr	3GPP TS 29.122 [6]	Identifying the IPv4 address of the Edge Application Server.	
Ipv6Addr	3GPP TS 29.122 [6]	Identifying the IPv6 address of the Edge Application Server.	
ServiceArea	Clause 9.1.5.2.5	Represents the topological and geographical service area information of the EAS.	
Uinteger	3GPP TS 29.571 [8]	Used to express the maximum response time of EAS service KPI.	
Fqdn	3GPP TS 29.571 [8]	Used to express the Fully Qualified Domain Name of EAS end point.	

8.1.5.2 Structured data types

8.1.5.2.1 Introduction

8.1.5.2.2 Type: EASRegistration

Table 8.1.5.2.2-1: Definition of type EASRegistration

Attribute name	Data type	P	Cardinality	Description	Applicability
easProf	EASProfile	M	1	The profile information of the EAS.	
expTime	DateTime	O	0..1	Identifies the expiration time for the EAS registration. If the expiration time is not present, then it indicates that the registration of EAS never expires.	
suppFeat	SupportedFeatures	O	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request and in the response of successful resource creation.	

8.1.5.2.3 Type: EASProfile

Table 8.1.5.2.3-1: Definition of type EASProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. URI, FQDN.	
endPt	EndPoint	M	1	Endpoint information (URI, FQDN, IP address) used to communicate with the EAS. This information maybe discovered by EEC and exposed to ACs so that ACs can establish contact with the EAS.	
acIds	array(string)	O	1..N	Identities of the Application Clients that can be served by the EAS	
provId	string	O	0..1	Identifier of the ASP that provides the EAS.	
type	EASCategory	O	0..1	The EAS type with the 3GPP standardized value set. (NOTE)	
flexEasType	string	O	0..1	The EAS type with the flexible value set. (NOTE)	
scheds	array(ScheduledCommunicationTime)	O	1..N	The availability schedule of the EAS.	
svcArea	ServiceArea	O	0..1	The list of geographical and topological areas that the EAS serves. ACs in the UE that are outside the area shall not be served.	
svcKpi	EASServiceKPI	O	0..1	Service characteristics provided by the EAS.	
permLvl	array(PermissionLevel)	O	1..N	Level of service permissions supported by the EAS.	
easFeats	array(string)	O	1..N	Service specific features supported by the EAS (e.g. single vs multi-player gaming service).	
svcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EAS for service continuity. If this attribute is not present, then the EAS does not support service continuity.	
appLocs	array(RouteToLocation)	O	1..N	List of DNAI(s) and the corresponding N6 traffic routing information/routing profile ID, associated with the EAS. It is a subset of the DNAI(s) associated with the EDN where the EAS resides.	
avlRep	DurationSec	O	0..1	The period indicating to the EES, how often the EES needs to check the EAS's availability after a successful registration.	
status	string	O	0..1	EAS status (e.g. Enabled, Disabled etc.)	
NOTE: The "flexEasType" attribute and the "type" 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).					

8.1.5.2.4 Type: EASServiceKPI

Table 8.1.5.2.4-1: Definition of type EASServiceKPI

Attribute name	Data type	P	Cardinality	Description	Applicability
maxReqRate	Uinteger	O	0..1	Maximum request rate from the Application Client supported by the EAS. The minimum and maximum value shall be 0 and 100 respectively.	
maxRespTime	Uinteger	O	0..1	The maximum response time, in the units of milliseconds, advertised for the AC's service requests. This includes the round trip time of the request and response packet, the processing time at the EAS and time required by EAS to consume any 3GPP core network capabilities.	
avail	Uinteger	O	0..1	Advertised percentage of time the server is available for the AC's use. The minimum and maximum value shall be 0 and 100 respectively.	
avlComp	Uinteger	O	0..1	The maximum compute resource available for the AC.	
avlGraComp	Uinteger	O	0..1	The maximum graphical compute resource available for the AC.	
avlMem	Uinteger	O	0..1	The maximum memory resource available for the AC.	
avlStrg	Uinteger	O	0..1	The maximum storage resource available for the AC.	
connBand	BitRate	O	0..1	The connection bandwidth in Kbit/s advertised for the AC's use.	

8.1.5.2.5 Type: EndPoint

Table 8.1.5.2.5-1: Definition of type EndPoint

Attribute name	Data type	P	Cardinality	Description	Applicability
fqdn	Fqdn	O	0..1	Fully Qualified Domain Name of the Edge server. (NOTE)	
ipv4Addrs	array(Ipv4 Addr)	O	1..N	IPv4 addresses of the Edge server. (NOTE)	
ipv6Addrs	array(Ipv6 Addr)	O	1..N	IPv6 addresses of the Edge server. (NOTE)	
uri	Uri	O	0..1	URI information of the Edge server (NOTE)	
NOTE: At least one of the addressing parameters (fqdn, ipv4Addrs, ipv6Addrs, uri attributes) shall be included.					

8.1.5.2.6 Type: EASRegistrationPatch

Table 8.1.5.2.6-1: Definition of type EASRegistrationPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
easProf	EASProfil e	O	0..1	The profile information of the EAS.	
expTime	DateTime Rm	O	0..1	Identifies the expiration time for the EAS registration. If the expiration time is not present, then it indicates that the registration of EAS never expires.	

8.1.5.3 Simple data types and enumerations

8.1.5.3.1 Introduction

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

8.1.5.3.2 Simple data types

The simple data types defined in table 8.1.5.3.2-1 shall be supported.

Table 8.1.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

8.1.5.3.3 Enumeration: PermissionLevel

Table 8.1.5.3.3-1: Enumeration PermissionLevel

Enumeration value	Description	Applicability
TRIAL	Level of service permission supported is TRIAL.	
GOLD	Level of service permission supported is GOLD.	
SILVER	Level of service permission supported is SILVER.	
OTHER	Any other level of service permissions supported.	

8.1.5.3.4 Enumeration: EASCategory

Table 8.1.5.3.3-1: Enumeration EASCategory

Enumeration value	Description	Applicability
UAS	Category of EAS is for Uncrewed Aerial Services.	
V2X	Category of EAS is for V2X Services.	
OTHER	Any other type of EAS category	

8.1.6 Error Handling

General error responses are defined in clause 7.7.

8.1.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.1.7-1 lists the supported features for Eees_EASRegistration API.

Table 8.1.7-1: Supported Features

Feature number	Feature Name	Description

8.2 Eees_UELocation API

8.2.1 Introduction

The Eees_UELocation service shall use the Eees_UELocation API.

The API URI of the Eees_UELocation API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eees-uelocation".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.2.2.

8.2.2 Resources

8.2.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.2.2.1-1 depicts the resource URIs structure for the Eees_UELocation API.

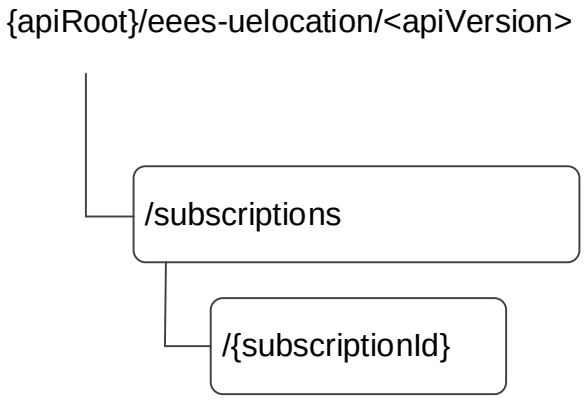

Figure 8.2.2.1-1: Resource URI structure of the Eees_UELocation API

Table 8.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 8.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Location Information Subscriptions	/subscriptions	POST	Creates a subscription for continuous reporting of UE(s) location information to the EAS.
Individual Location Information Subscription	/subscriptions/{subscriptionId}	GET	Retrieves the Individual location information subscription information identified by subscriptionId.
		PATCH	Updates the Individual location information subscription identified by subscriptionId.
		PUT	Updates the Individual location information subscription identified by subscriptionId.
		DELETE	Removes the Individual location information subscription identified by subscriptionId.

8.2.2.2 Resource: Location Information Subscriptions

8.2.2.2.1 Description

This resource represents all location information subscriptions at a given EES.

8.2.2.2.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.2.2.2.2-1.

Table 8.2.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

8.2.2.2.3 Resource Standard Methods

8.2.2.2.3.1 POST

This method creates the location information subscription at the EES for continuous reporting of UE(s) location information. This method shall support the URI query parameters specified in the table 8.2.2.2.3.1-1.

Table 8.2.2.2.3.1-1: 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 8.2.2.2.3.1-2 and the response data structures and response codes specified in table 8.2.2.2.3.1-3.

Table 8.2.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocationSubscription	M	1	Create a new location information subscription.

Table 8.2.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationSubscription	M	1	201 Created	The individual location information subscription resource created successfully. The information about the confirmed subscription at the EES is provided in the response body. The URI of the created resource shall be returned in the "Location" HTTP header.
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply. NOTE 2: Failure cases are described in clause 8.2.6.3.				

Table 8.2.2.2.3.1-4: 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-uelocation/<apiVersion>/subscriptions/{subscriptionId}

8.2.2.2.4 Resource Custom Operations

None.

8.2.2.3 Resource: Individual Location Information Subscription

8.2.2.3.1 Description

This resource represents the individual location information subscription of an EAS at a given EES.

8.2.2.3.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.2.2.3.2-1.

Table 8.2.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5
subscriptionId	string	Identifies an individual location information subscription.

8.2.2.3.3 Resource Standard Methods

8.2.2.3.3.1 GET

This method retrieves the location information subscription information at EES. This method shall support the URI query parameters specified in the table 8.2.2.3.3.1-1.

Table 8.2.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.2.2.3.3.1-2 and the response data structures and response codes specified in table 8.2.2.3.3.1-3.

Table 8.2.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.2.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationSubscription	M	1	200 OK	The location information subscription information is returned by the EES.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.2.2.3.3.1-4: 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 8.2.2.3.3.1-5: 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.

8.2.2.3.3.2 PATCH

This method partially updates the location information subscription information at the EES. This method shall support the URI query parameters specified in the table 8.2.2.3.3.2-1.

Table 8.2.2.3.3.2-1: 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 8.2.2.3.3.2-2 and the response data structures and response codes specified in table 8.2.2.3.3.2-3.

Table 8.2.2.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
LocationSubscriptionPatch	M	1	Request to partially update the individual location information subscription matching the subscriptionId at the EES.

Table 8.2.2.3.3.2-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationSubscription	M	1	200 OK	The individual Location information subscription matching the subscriptionId was modified successfully and the updated Location subscription information is returned in the response.
n/a			204 No Content	The individual Location information subscription matching the subscriptionId was modified successfully.
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 TS 29.122 [6].
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 TS 29.122 [6].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply. NOTE 2: Failure cases are described in clause 8.2.6.3.				

Table 8.2.2.3.3.2-4: 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 8.2.2.3.3.2-5: 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.

8.2.2.3.3.3 PUT

This method updates the location information subscription information at the EES by completely replacing the existing subscription data (except easId, ueId, groupId). This method shall support the URI query parameters specified in the table 8.2.2.3.3.3-1.

Table 8.2.2.3.3.3-1: 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 8.2.2.3.3.3-2 and the response data structures and response codes specified in table 8.2.2.3.3.3-3.

Table 8.2.2.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
LocationSubscription	M	1	Details of individual location information subscription matching the subscriptionId to be updated at the EES.

Table 8.2.2.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationSubscription	M	1	200 OK	The individual Location information subscription matching the subscriptionId was modified successfully and the updated Location subscription information is returned in the response.
n/a			204 No Content	The individual Location information subscription matching the subscriptionId was modified successfully.
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 TS 29.122 [6].
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 TS 29.122 [6].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply. NOTE 2: Failure cases are described in clause 8.2.6.3.				

Table 8.2.2.3.3.3-4: 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 8.2.2.3.3.3-5: 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.

8.2.2.3.3.4 DELETE

This method removes the location information subscription information from the EES. This method shall support the URI query parameters specified in the table 8.2.2.3.3.4-1.

Table 8.2.2.3.3.4-1: 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 8.2.2.3.3.4-2 and the response data structures and response codes specified in table 8.2.2.3.3.4-3.

Table 8.2.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.2.2.3.3.4-3: 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 Location information subscription matching the subscriptionId is 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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.2.2.3.3.4-4: 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 8.2.2.3.3.4-5: 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.

8.2.2.3.4 Resource Custom Operations

None.

8.2.3 Custom Operations without associated resources

8.2.3.1 Overview

The structure of the custom operation URIs of the Eees_UELocation API is shown in Figure 8.2.3.1-1.

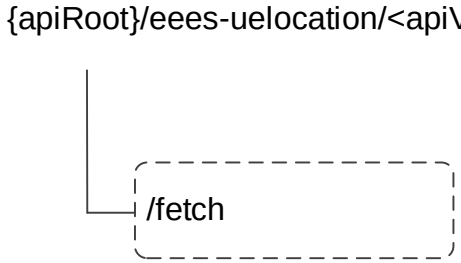

Figure 8.2.3.1-1: Custom operation URI structure of the Eees_UELocation API

Custom operations used for this API are summarized in table 8.2.3.1-1.

Table 8.2.3.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
Fetch	/fetch	POST	Fetch an UE location information.

8.2.3.2 Operation: Fetch

8.2.3.2.1 Description

This custom operation allows the EAS to fetch an UE's location information from the EES.

8.2.3.2.2 Operation Definition

This operation shall support the request data structures and response codes and data structures specified in tables 8.2.3.2.2-1 and 8.2.3.2.2-2.

Table 8.2.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocationRequest	M	1	Parameters to request to fetch the UE location information.

Table 8.2.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
LocationResponse	M	1	200 OK	Upon success, the UE location information returned by the EES.
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 TS 29.122 [6].
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 TS 29.122 [6].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The manadatory HTTP error status code for the POST method listed in the Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply. NOTE 2: Failure cases are described in clause 8.2.6.3.				

Table 8.2.3.2.2-3: Headers supported by the 307 Response Code on this resource

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

Table 8.2.3.2.2-4: Headers supported by the 308 Response Code on this resource

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

8.2.4 Notifications

8.2.4.1 General

Table 8.2.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Location Information Notification	{notificationDestination}	POST	Notifies the subscriber EAS the UE(s) location information.
User Consent Revocation Notification	{revocationNotifUri}	POST	The user consent revocation notification from the EES to the EAS to inform about the revocation of user consent for one or several UE(s).

8.2.4.2 Location Information Notification

8.2.4.2.1 Description

Location Information Notification is used by the EES to notify an EAS with location information of UE(s). The EES shall subscribe to the location information for UE(s) via the Individual Location Information Subscription resource.

8.2.4.2.2 Target URI

The callback URI **{notificationDestination}** shall be used with the callback URI variables defined in table 8.2.4.2.2-1.

Table 8.2.4.2.2-1: Callback URI variables

Name	Data type	Definition
notificationDestination	Uri	Callback reference provided by the EAS during the UE location information subscription creation/update/modification procedure.

8.2.4.2.3 Standard Methods

8.2.4.2.3.1 POST

This method shall support the request data structures specified in table 8.2.4.2.3.1-1 and the response data structures and response codes specified in table 8.2.4.2.3.1-2.

Table 8.2.4.2.3.1-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
LocationNotification	M	1	Notification of UE(s) location information.

Table 8.2.4.2.3.1-2: 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.2.4.2.3.1-3: 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 8.2.4.2.3.1-4: 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.

8.2.4.3 User Consent Revocation Notification

8.2.4.3.1 Description

The User Consent Revocation Notification is used by the EES to report the revocation of user consent for one or several UE(s) to the EAS.

8.2.4.3.2 Target URI

The Callback URI **"{revocationNotifUri}"** shall be used with the callback URI variables defined in table 8.2.4.3.2-1.

Table 8.2.4.3.2-1: Callback URI variables

Name	Data type	Definition
revocationNotifUri	Uri	Callback reference provided by the EAS during the UE location information subscription creation or modification procedure if the UserConsentRevocation feature is supported, within the LocationSubscription data structure as specified in clauses 8.2.2.2.3.1, 8.2.2.3.3.3 and 8.2.5.2.2, or the LocationSubscriptionPatch data structure as specified in clauses 8.2.2.3.3.2, and 8.2.5.2.3.

8.2.4.3.3 Standard Methods

8.2.4.3.3.1 POST

This method shall support the request data structures specified in table 8.2.4.3.3.1-1 and the response data structures and response codes specified in table 8.2.4.3.3.1-2.

Table 8.2.4.3.3.1-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ConsentRevocNotif	M	1	Contains the user consent revocation information.

8.2.4.3.3.1-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The user consent revocation notification is successfully received.
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 EAS 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the HTTP POST method listed in Table 5.2.6-1 of TS 29.122 [6] also apply.				

Table 8.2.4.3.3.1-3: Headers supported by the 307 Response Code on this resource

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

Table 8.2.4.3.3.1-4: Headers supported by the 308 Response Code on this resource

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

8.2.5 Data Model

8.2.5.1 General

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

Table 8.2.5.1-1 specifies the data types defined specifically for the Eees_UELocation API service.

Table 8.2.5.1-1: Eees_UELocation API specific Data Types

Data type	Section defined	Description	Applicability
ConsentRevoked	8.2.5.2.9	Represents the information related to revoked user consent(s).	UserConsentRevocation
ConsentRevocNotif	8.2.5.2.8	Represents the user consent revocation information conveyed in a user consent revocation notification.	UserConsentRevocation
LocationSubscription	8.2.5.2.2	Represents the location information subscription.	
LocationSubscriptionPatch	8.2.5.2.3	Used to request the partial update of location information subscription.	
LocationNotification	8.2.5.2.4	UE location information notification from EES to EAS.	
LocationEvent	8.2.5.2.5	Location information related an Individual UE.	
LocationRequest	8.2.5.2.6	UE location information request	
LocationResponse	8.2.5.2.7	Contains the response to a UE location information retrieval request.	

Table 8.2.5.1-2 specifies data types re-used by the Eees_UELocation API service.

Table 8.2.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Gpsi	3GPP TS 29.571 [8]	Used to identify the UE in the query parameter, for which location information is queried.	
LocationQoS	3GPP TS 29.572 [11]	Used to indicate the location quality of service, of the location information queried.	
LocationInfo	3GPP TS 29.122 [6]	The location information related to the UE .	
DateTime	3GPP TS 29.122 [6]	Used to capture the expiration time of EAS subscription for location information reporting.	
ReportingInformation	3GPP TS 29.523 [13]	Used to indicate the reporting requirement, only the following information are applicable: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features.	
TestNotification	3GPP TS 29.122 [6]	Following differences apply: - The SCEF is the EES; and - The SCS/AS is the subscribing EAS.	
UcPurpose	3GPP TS 29.503 [22]	Represents the purpose of a user consent.	UserConsentRevocation
Uri	3GPP TS 29.122 [6]		
WebsockNotifConfig	3GPP TS 29.122 [6]	Following differences apply: - The SCEF is the EES; and - The SCS/AS is the subscribing EAS.	
UeMobilityExposure	3GPP TS 29.522 [10]	The predictive location information related to the UE,	
GroupId	3GPP TS 29.571 [8]	Used to present the internal group identifier in location subscription.	
ExternalId	TS 29.122 [6]	Represents an external identifier.	
ExternalGroupId	3GPP TS 29.571 [8]	Used to present the external group identifier in location subscription.	
Accuracy	3GPP TS 29.122 [6]	Used by EAS to indicate the desired granularity of the requested location information.	

8.2.5.2 Structured data types

8.2.5.2.1 Introduction

8.2.5.2.2 Type: LocationSubscription

Table 8.2.5.2.2-1: Definition of type LocationSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. URI, FQDN, subscribing for location information report.	
ueId	Gpsi	O	0..1	Identifier of the UE for which the location information reporting is subscribed for. (NOTE)	
intGrpId	GroupId	O	0..1	The internal group identifier, identifying the group of UEs for which the location information reporting is subscribed for. (NOTE)	
extGrpId	ExternalGroupId	O	0..1	The external group identifier, identifying the group of UEs for which the location information reporting is subscribed for. (NOTE)	
expTime	DateTime	O	0..1	Indicates the expiration time of the subscription. If the expiration time is not present, then it indicates that the EAS subscription never expires.	
locGran	Accuracy	O	0..1	Indicates the format of the location information that the EAS supports. EAS wishes to receive the location information report from the EES in the indicated format.	
locQos	LocationQoS	O	0..1	Indicates the location QoS as specified in 3GPP TS 29.572 [11].	
eventReq	ReportingInformation	O	0..1	Represents the reporting requirements of the location information event subscription.	
notificationDestination	Uri	C	0..1	URI where the location information notification should be delivered to. This attribute shall be present in HTTP POST message to EES and shall be present in HTTP PUT request.	
revocationNotifUri	Uri	C	0..1	Contains the URI via which the EAS desires to receive user consent revocation notifications. If the "UserConsentRevocation" feature is supported by the EAS, this attribute shall be present in an HTTP POST request/response, and HTTP PUT request/response, and HTTP PATCH responses, and may be present in an HTTP PATCH request, if the revocation notification needs to be updated.	UserConsentRevocation
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. 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.	Notification_websocket
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request to create a new subscription resource, if at least one feature is supported, and in the HTTP POST response of successful resource creation, if it was present in the associated HTTP POST request.	
NOTE: Only one of UE Identifier (ueId), Internal group identifier (intGrpId), and External group identifier (extGrpId) shall be included.					

NOTE: To protect the privacy of the user, the MSISDN can be used as GPSI only after obtaining user's consent.

8.2.5.2.3 Type: LocationSubscriptionPatch

Table 8.2.5.2.3-1: Definition of type LocationSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
eventReq	ReportingInformation	O	0..1	The reporting requirements of the location information event subscription to be updated.	
expTime	DateTime	O	0..1	Indicates the proposed expiration time of the subscription.	
notificationDestination	Uri	O	0..1	Updated URI where the location information notification should be delivered to.	
revocationNotifUri	Uri	O	0..1	Contains the updated URI via which the EAS desires to receive user consent revocation notifications. This attribute may be present if the "UserConsentRevocation" feature is supported by the EAS.	UserConsentRevocation
locGran	Accuracy	O	0..1	Updated format of the location information that the EAS supports.	
locQos	LocationQoS	O	0..1	Updated location QoS, as specified in 3GPP TS 29.572 [11].	

8.2.5.2.4 Type: LocationNotification

Table 8.2.5.2.4-1: Definition of type LocationNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subId	string	M	1	String identifying the individual Location information subscription for which the location notification is delivered.	
locEvs	array(LocationEvent)	M	1..N	List of notifications that include the location information of the UE(s).	

8.2.5.2.5 Type: LocationEvent

Table 8.2.5.2.5-1: Definition of type LocationEvent

Attribute name	Data type	P	Cardinality	Description	Applicability
ueId	Gpsi	M	1	Identifier of the UE for which the location information is reported.	
locInf	LocationInfo	C	0..1	Actual Location information of the UE. (NOTE)	
locInfPred	UeMobilityExposure	C	0..1	Predictive location information of the UE. (NOTE)	
NOTE: Only one of "locInf" or "locInfPred" shall be included.					

8.2.5.2.6 Type: LocationRequest

Table 8.2.5.2.6-1: Definition of type LocationRequest

Attribute name	Data type	P	Cardinality	Description	Applicability
ueId	Gpsi	M	1	Identifier of the UE for which the location information is requested.	
gran	Accuracy	O	0..1	Format in which the location information is requested by the EAS.	
locQos	LocationQoS	O	0..1	Indicates the location quality of service of the requested location information.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request to retrieve UE location information, if at least one feature is supported.	

8.2.5.2.7 Type: LocationResponse

Table 8.2.5.2.7-1: Definition of type LocationResponse

Attribute name	Data type	P	Cardinality	Description	Applicability
ueLocation	LocationInfo	M	1	Contains the requested UE location information.	
suppFeat	SupportedFeatures	C	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST response for UE location information retrieval, if it was present in the associated HTTP POST request.	

8.2.5.2.8 Type: ConsentRevocNotif

Table 8.2.5.2.8-1: Definition of type ConsentRevocNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the identifier of the subscription to which the notification is related.	
consentsRevoked	array(ConsentRevoked)	M	1..N	Indicates the revoked user consents.	

8.2.5.2.9 Type: ConsentRevoked

Table 8.2.5.2.9-1: Definition of type ConsentRevoked

Attribute name	Data type	P	Cardinality	Description	Applicability
ucPurpose	UcPurpose	M	1	Identifies the purpose of the revoked user consent.	
ueId	Gpsi	C	0..1	Contains the identifiers(s) of the UE(s) for which user consent was revoked. (NOTE)	
externalId	ExternalId	C	0..1	Indicates the user(s) for which user consent was revoked. (NOTE)	
NOTE: One of the "ueId" or "externalId" attributes shall be present.					

8.2.5.3 Simple data types and enumerations

None.

8.2.6 Error Handling

8.2.6.1 General

For the Eees_UELocation API, HTTP error handling shall be supported as specified in clause 7.7. In addition, the requirements in the following clauses are applicable for the Eees_UELocation API.

8.2.6.2 Protocol Errors

No specific protocol errors for the Eees_UELocation API are specified.

8.2.6.3 Application Errors

The application errors defined for the Eees_UELocation API are listed in Table 8.2.6.3-1.

Table 8.2.6.3-1: Application errors

Application Error	HTTP status code	Description
CONSENT_REVOCATION_NOT_SUPPORTED	403 Forbidden	Indicates that the request is rejected because user consent management and enforcement is not supported by the client.
USER_CONSENT_NOT_GRANTED	403 Forbidden	Indicates that the request is rejected because user consent is not granted.

8.2.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.2.7-1 lists the supported features for Eees_UELocation API.

Table 8.2.7-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 7.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 7.6. This feature requires that the Notification_test_event feature is also supported.
3	UserConsentRevocation	This feature indicates the support of user consent revocation management and enforcement (e.g. stop data processing).

8.3 Eees_UEIdentifier API

8.3.1 Introduction

The Eees_UEIdentifier service shall use the Eees_UEIdentifier API.

The API URI of the Eees_UEIdentifier API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eees-ueidentifier".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.3.2.

8.3.2 Resources

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

8.3.3 Custom Operations without associated resources

8.3.3.1 Overview

The structure of the custom operation URIs of the Eees_UEIdentifier API is shown in Figure 8.3.3.1-1.

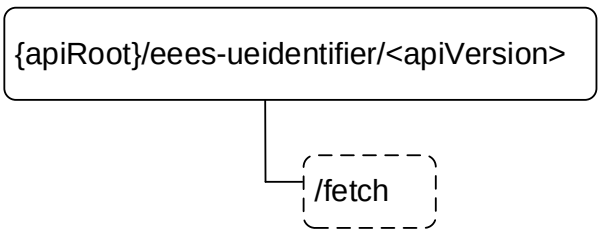

Figure 8.3.3.1-1: Custom operation URI structure of the Eees_UEIdentifier API

Table 8.3.3.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Eees_UEIdentifier API.

Table 8.3.3.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
Fetch	/fetch	POST	Fetch the identifier of a UE.

8.3.3.2 Operation: Fetch

8.3.3.2.1 Description

This custom operation allows the EAS to fetch a UE's identifier, which is UE ID as specified in 3GPP TS 23.558 [2], from the EES for a given UE information.

8.3.3.2.2 Operation Definition

This operation shall support the request data structures and the response data structure and response codes specified in the tables 8.3.3.2.2-1 and 8.3.3.2.2-2.

Table 8.3.3.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UserInformation	M	1	Information about the User or the UE, available at the EAS.

Table 8.3.3.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
Gpsi	M	1	200 OK	The UE Identifier (UE ID), returned by the Edge Enabler Server.
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 [6].
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 [6]
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.3.3.2.2-3: 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 UAE Server.

Table 8.3.3.2.2-4: 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 UAE Server.

8.3.4 Notifications

None.

8.3.5 Data Model

8.3.5.1 General

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

Table 8.3.5.1-1 specifies the data types defined specifically for the Eees_UEIdentifier API service.

Table 8.3.5.1-1: Eees_UEIdentifier API specific Data Types

Data type	Section defined	Description	Applicability
UserInformation	8.3.5.2.2	Information about the User or the UE, that used by EES to use 3GPP CN capability to retrieve the EAS specific UE identifier.	

Table 8.3.5.1-2 specifies data types re-used by the Eees_UEIdentifier API service.

Table 8.3.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Gpsi	3GPP TS 29.571 [8]	Used to identify the UE with GPSI.	
IpvAddr	3GPP TS 29.571 [8]	IP address of the UE.	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features defined in table 8.3.7-1.	

8.3.5.2 Structured data types

8.3.5.2.1 Introduction

8.3.5.2.2 Type: UserInformation

Table 8.3.5.2.2-1: Definition of type UserInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. URI, FQDN, requesting the UE Identifier information.	
easProviderId	string	O	0..1	Identifier of the ASP that provides the EAS.	
ipAddr	IpAddr	M	1	IP address of the UE.	
suppFeat	Supported Features	C	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request and success response.	

8.3.5.3 Simple data types and enumerations

None

8.3.6 Error Handling

General error responses are defined in clause 7.7.

8.3.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.3.7-1 lists the supported features for Eees_UEIdentifier API.

Table 8.3.7-1: Supported Features

Feature number	Feature Name	Description

8.4 Eees_AppClientInformation API

8.4.1 Introduction

The Eees_AppClientInformation service shall use the Eees_AppClientInformation API.

The API URI of the Eees_AppClientInformation API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eees-appclientinformation".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.4.2.

8.4.2 Resources

8.4.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.4.2.1-1 depicts the resource URIs structure for the Eees_AppClientInformation API.

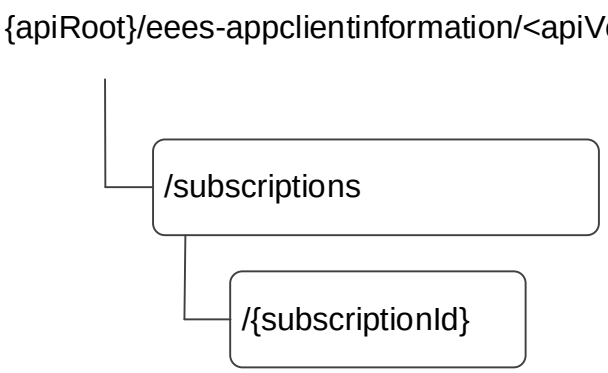

Figure 8.4.2.1-1: Resource URI structure of the Eees_AppClientInformation API

Table 8.4.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 8.4.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Application Client Information Subscriptions	/subscriptions	POST	Creates a subscription for reporting of AC information to the EAS.
Individual Application Client Information Subscription	/subscriptions/{subscriptionId}	GET	Retrieves the Individual AC information subscription information identified by subscriptionId.
		PATCH	Partially updates the Individual AC information subscription identified by subscriptionId.
		PUT	Fully replaces the Individual AC information subscription identified by subscriptionId.
		DELETE	Removes the Individual AC information subscription identified by subscriptionId.

8.4.2.2 Resource: Application Client Information Subscriptions

8.4.2.2.1 Description

This resource represents all AC information subscriptions at a given EES.

8.4.2.2.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.4.2.2.2-1.

Table 8.4.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

8.4.2.2.3 Resource Standard Methods

8.4.2.2.3.1 POST

This method creates the AC information subscription at the EES for reporting of the AC capabilities. This method shall support the URI query parameters specified in the table 8.4.2.2.3.1-1.

Table 8.4.2.2.3.1-1: 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 8.4.2.2.3.1-2 and the response data structures and response codes specified in table 8.4.2.2.3.1-3.

Table 8.4.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ACInfoSubscription	M	1	Create a new AC information subscription.

Table 8.4.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACInfoSubscription	M	1	201 Created	The individual AC information subscription resource created successfully. The information about the confirmed subscription at the EES is provided in the response body. The URI of the created resource shall be retruned 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 [6] also apply.				

Table 8.4.2.2.3.1-4: 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-appclientinformation/<apiVersion>/subscriptions/{subscriptionId}

8.4.2.2.4 Resource Custom Operations

None.

8.4.2.3 Resource: Individual Application Client Information Subscription

8.4.2.3.1 Description

This resource represents the individual application client information subscription of an EAS at a given EES.

8.4.2.3.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.4.2.3.2-1.

Table 8.4.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5
subscriptionId	string	Identifies an individual AC information subscription.

8.4.2.3.3 Resource Standard Methods

8.4.2.3.3.1 GET

This method retrieves the AC information subscription information at EES. This method shall support the URI query parameters specified in the table 8.4.2.3.3.1-1.

Table 8.4.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.4.2.3.3.1-2 and the response data structures and response codes specified in table 8.4.2.3.3.1-3.

Table 8.4.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.4.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACInfoSubscription	M	1	200 OK	The AC information subscription information is returned by the EES.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.4.2.3.3.1-4: 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 8.4.2.3.3.1-5: 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.

8.4.2.3.3.2 PATCH

This method partially updates the individual AC information subscription information at the EES. This method shall support the URI query parameters specified in the table 8.4.2.3.3.2-1.

Table 8.4.2.3.3.2-1: 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 8.4.2.3.3.2-2 and the response data structures and response codes specified in table 8.4.2.3.3.2-3.

Table 8.4.2.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
ACInfoSubscriptionPatch	M	1	Request to partially update the individual AC information subscription matching the subscriptionId at the EES.

Table 8.4.2.3.3.2-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACInfoSubscription	M	1	200 OK	The individual AC information subscription matching the subscriptionId was modified successfully and the updated AC information subscription information is returned in the response.
n/a			204 No Content	The individual AC information subscription matching the subscriptionId was modified successfully.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.4.2.3.3.2-4: 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 8.4.2.3.3.2-5: 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.

8.4.2.3.3.3 PUT

This method updates the AC information subscription information at the EES by completely replacing the existing subscription data (except easId). This method shall support the URI query parameters specified in the table 8.4.2.3.3.3-1.

Table 8.4.2.3.3.3-1: 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 8.4.2.3.3.3-2 and the response data structures and response codes specified in table 8.4.2.3.3.3-3.

Table 8.4.2.3.3.3-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ACInfoSubscription	M	1	Details of individual AC information subscription matching the subscriptionId to be updated at the EES.

Table 8.4.2.3.3.3-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACInfoSubscription	M	1	200 OK	The individual AC information subscription matching the subscriptionId was modified successfully and the updated AC subscription information is returned in the response.
n/a			204 No Content	The individual AC information subscription matching the subscriptionId was modified successfully.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.4.2.3.3.3-4: 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 8.4.2.3.3.3-5: 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.

8.4.2.3.3.4 DELETE

This method removes the AC information subscription information from the EES. This method shall support the URI query parameters specified in the table 8.4.2.3.3.4-1.

Table 8.4.2.3.3.4-1: 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 8.4.2.3.3.4-2 and the response data structures and response codes specified in table 8.4.2.3.3.4-3.

Table 8.4.2.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.4.2.3.3.4-3: 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 AC information subscription matching the subscriptionId is 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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.4.2.3.3.4-4: 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 8.4.2.3.3.4-5: 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.

8.4.2.3.4 Resource Custom Operations

None.

8.4.3 Custom Operations without associated resources

None.

8.4.4 Notifications

8.4.4.1 General

Table 8.4.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
AC Information Notification	{notificationDestination}	POST	Notifies the subscriber EAS the AC information.

8.4.4.2 AC Information Notification

8.4.4.2.1 Description

AC Information Notification is used by the EES to notify an EAS with AC information matching the filter criteria.

8.4.4.2.2 Target URI

The callback URI **{notificationDestination}** shall be used with the callback URI variables defined in table 8.4.4.2.2-1.

Table 8.4.4.2.2-1: Callback URI variables

Name	Data type	Definition
notificationDestination	Uri	Callback reference provided by the EAS during AC information subscription creation/update/modification procedure.

8.4.4.2.3 Standard Methods

8.4.4.2.3.1 POST

This method shall support the request data structures specified in table 8.4.4.2.3.1-1 and the response data structures and response codes specified in table 8.4.4.2.3.1-2.

Table 8.4.4.2.3.1-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ACInfoNotification	M	1	Notification of AC(s) information.

Table 8.4.4.2.3.1-2: 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.2.4.4.3.1-3: 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 8.2.4.4.3.1-4: 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.

8.4.5 Data Model

8.4.5.1 General

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

Table 8.4.5.1-1 specifies the data types defined specifically for the Eees_AppClientInformation API service.

Table 8.4.5.1-1: Eees_AppClientInformation API specific Data Types

Data type	Section defined	Description	Applicability
ACInfoSubscription	8.4.5.2.2	Represents the AC information subscription.	
ACInfoSubscriptionPatch	8.4.5.2.3	Used to request the partial update of AC information subscription.	
ACFilters	8.4.5.2.4	Used to list the set of characteristics to discover the ACs.	
ACInfoNotification	8.4.5.2.5	AC information notification matching the filter criteria.	
ACInformation	8.4.5.2.6	Used to represent the AC information in the AC information notification.	

Table 8.4.5.1-2 specifies data types re-used by the Eees_AppClientInformation API service.

Table 8.4.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
DateTime	3GPP TS 29.122 [6]	Used to capture the expiration time of EAS subscription for application client information reporting.	
ReportingInformation	3GPP TS 29.523 [13]	Used to indicate the reporting requirement, only the following information are applicable: - immRep - notifMethod - maxReportNbr - monDur - repPeriod	
Uri	3GPP TS 29.122 [6]		
WebsockNotifConfig	3GPP TS 29.122 [6]	Following differences apply: - The SCEF is the EES; and - The SCS/AS is the subscribing EAS.	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features.	
TestNotification	3GPP TS 29.122 [6]	Following differences apply: - The SCEF is the EES; and - The SCS/AS is the subscribing EAS.	
LocationArea5G	3GPP TS 29.122 [6]	Used to define the geographic and topological area.	
ScheduledCommunicationTime	3GPP TS 29.122 [6]	Used to define the operation schedule of AC.	
Gpsi	3GPP TS 29.571 [8]	Used to identify the UE in the query parameter, for which location information is queried.	
ACProfile	3GPP TS 24.558 [14]	Used to represent the profile the information of the Application Client.	
ServiceArea	Clause 9.1.5.2.5	Used to represent the EAS service area in ACFilters data type.	
ACServiceKPIs	3GPP TS 24.558 [14]	Used to represent the minimum and maximum AC service KPI information of the Application Client.	

8.4.5.2 Structured data types

8.4.5.2.1 Introduction

8.4.5.2.2 Type: ACInfoSubscription

Table 8.4.5.2.2-1: Definition of type ACInfoSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. URI, FQDN, subscribing for AC information report.	
acFltrs	array(ACFilters)	O	1..N	Filters to retrieve the information about particular ACs.	
expTime	DateTime	O	0..1	Indicates the expiration time of the subscription. If the expiration time is not present, then it indicates that the EAS subscription never expires.	
eventReq	ReportingInformation	O	0..1	Represents the reporting requirements of the AC information subscription. (NOTE)	
notificationDestination	Uri	C	0..1	URI where the notification on information about particular ACs should be delivered to. This attribute shall be present in HTTP POST message to EES and maybe present in HTTP PUT request.	
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. 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.	Notification_websocket
suppFeat	SupportedFeatures	O	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request and in the response of successful resource creation.	
NOTE: The applicable values of the ReportingInformation data type are, "immRep", "notifMethod", "maxReportNbr", "monDur", "repPeriod".					

8.4.5.2.3 Type: ACInfoSubscriptionPatch

Table 8.4.5.2.3-1: Definition of type ACInfoSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
eventReq	ReportingInformation	O	0..1	The reporting requirements of the AC information event subscription to be updated.	
expTime	DateTime	O	0..1	Indicates the proposed expiration time of the subscription.	
notificationDestination	Uri	O	0..1	Updated URI where the AC information notification should be delivered to.	
acFltrs	array(ACFilters)	O	1..N	Filters to retrieve the information about particular ACs.	

8.4.5.2.4 Type: ACFilters

Table 8.4.5.2.4-1: Definition of type ACFilters

Attribute name	Data type	P	Cardinality	Description	Applicability
acTypes	array(string)	O	1..N	List of AC types or categories to be matched.	
ecspIds	array(string)	O	1..N	The list of identifiers of the ECSPs associated with the EEC.	
acIds	array(string)	O	1..N	List of the identifiers of the AC(s) to be matched.	
svcArea	ServiceArea	O	0..1	EAS service area for identifying the UEs with matching expected geographical and topological location(s).	
maxAcKpi	ACServiceKPIs	O	0..1	Maximum value of the AC service KPIs to identify the matched ACs. The service KPI values in this attribute need to be higher than the service KPIs information of the AC profiles provided during registrations and/or discovery need to be lower.	
minAcKpi	ACServiceKPIs	O	0..1	Minimum value of the AC service KPIs to identify the matched ACs. The service KPI values in this attribute need to be lower than the service KPIs information of the AC profiles provided during registrations and/or discovery need to be lower.	
opSchds	array(ScheduledCommunicationTime)	O	1..N	The operation schedule of the EAS to be matched with operation schedule of the AC.	
ueIds	array(Gpsi)	O	1..N	List of UE identifiers hosting the AC.	
locInfs	LocationArea5G	O	0..1	List of location(s) of the UE(s) hosting the AC.	

8.4.5.2.5 Type: ACInfoNotification

Table 8.4.5.2.5-1: Definition of type ACInfoNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subId	string	M	1	String identifying the individual AC information subscription for which the AC information notification is delivered.	
acInfs	array(ACInformation)	M	1..N	List of notifications that include the information of the ACs matching the filter criteria.	

8.4.5.2.6 Type: ACInformation

Table 8.4.5.2.6-1: Definition of type ACInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
acProfs	array(ACProfile)	M	1	List of ACs profile information.	
ueIds	array(Gpsi)	O	1..N	List of UE identifiers hosting the ACs.	
ueLocInfs	LocationArea5G	O	0..1	Location information of the UEs hosting the AC.	

8.4.5.3 Simple data types and enumerations

None.

8.4.6 Error Handling

8.4.6.1 General

For the Eees_AppClientInformation API, HTTP error responses, protocol errors and application errors shall be supported as specified in clause 7.7.

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

8.4.6.2 Protocol Errors

No specific protocol errors for the Eees_AppClientInformation API are specified.

8.4.6.3 Application Errors

The application errors defined for the Eees_AppClientInformation API are listed in Table 8.4.6.3-1.

Table 8.4.6.3-1: Application errors

Application Error	HTTP status code	Description
REGISTRATION_REQUIRED	403 Forbidden	Indicates that registration at the EES is required for the EAS to be authorized to perform the operation.

8.4.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.4.7-1 lists the supported features for Eees_AppClientInformation API.

Table 8.4.7-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 7.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 7.6. This feature requires that the Notification_test_event feature is also supported.

8.5 Eees_SessionWithQoS API

8.5.1 Introduction

The Eees_SessionWithQoS service shall use the Eees_SessionWithQoS API.

The API URI of the Eees_SessionWithQoS API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eees-session-with-qos".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.5.2.

8.5.2 Resources

8.5.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.5.2.1-1 depicts the resource URIs structure for the Eees_SessionWithQoS API.

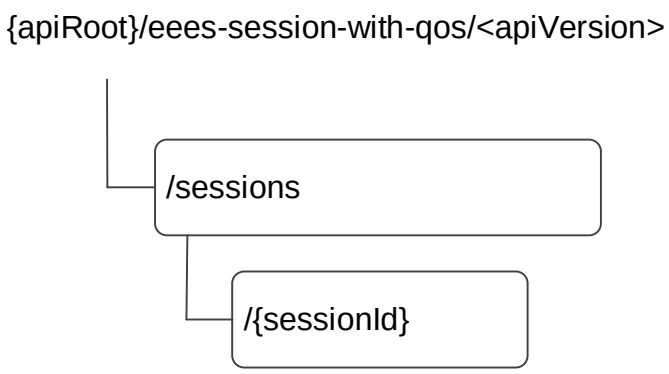

Figure 8.5.2.1-1: Resource URI structure of the Eees_SessionWithQoS API

Table 8.5.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 8.5.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Sessions with QoS	/sessions	POST	Create a new individual Session with QoS
		GET	Read all subscription resources for given EAS.
Individual Session with QoS	/sessions/{sessionId}	PUT	Fully replace an existing Individual Session with QoS resource identified by a sessionId.
		PATCH	Partial update an existing Individual Session with QoS resource identified by a sessionId
		DELETE	Remove an Individual Session with QoS resource identified by a sessionId.
		GET	Read a subscription resource for a sessionId.

8.5.2.2 Resource: Sessions with QoS

8.5.2.2.1 Description

This resource represents session information of all the data sessions with a specific QoS setting at a given Edge Enabler Server.

8.5.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eees-session-with-qos/<apiVersion>/sessions**

This resource shall support the resource URI variables defined in the table 8.5.2.2.2-1.

Table 8.5.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

8.5.2.2.3 Resource Standard Methods

8.5.2.2.3.1 POST

This method requests resources for a data session between AC and EAS with a specific QoS and may create the session information subscription at the Edge Enabler Server for receiving the user plane event notification of the session information. This method shall support the URI query parameters specified in table 8.5.2.2.3.1-1.

Table 8.5.2.2.3.1-1: 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 8.5.2.2.3.1-2 and the response data structures and response codes specified in table 8.5.2.2.3.1-3.

Table 8.5.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SessionWithQoS	M	1	Parameters to create a subscription for a session with required QoS for the service requirement.

Table 8.5.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P		Cardinality	Response codes	Description
SessionWithQoS	M		1	201 Created	The session is successfully set up with requested QoS, and the session information is provided in the response body. 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 [6] also apply.					

Table 8.5.2.2.3.1-4: 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-session-with-qos/<apiVersion>/sessions/{sessionId}

8.5.2.2.3.2 GET

The GET method allows to read all active subscriptions for a given EAS. The EAS shall initiate the HTTP GET request message and the EES shall respond to the message. This method shall support the URI query parameters specified in table 8.5.2.2.3.2-1.

Table 8.5.2.2.3.2-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
eas-id	string	M	1	Represents the application identifier of the EAS , e.g. URI, FQDN, that is querying the status of subscriptions.

This method shall support the request data structures specified in table 8.5.2.2.3.2-2 and the response data structures and response codes specified in table 8.5.2.2.3.2-3.

Table 8.5.2.2.3.2-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.5.2.2.3.2-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(SessionWithQoS)	M	1..N	200 OK	The subscription information related to the request URI is returned.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The mandatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.5.2.2.3.2-4: 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 8.5.2.2.3.2-5: 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.

8.5.2.2.4 Resource Custom Operations

None.

8.5.2.3 Resource: Individual Session with QoS

8.5.2.3.1 Description

This resource represents an individual session information of the data session with a specific QoS setting at a given Edge Enabler Server.

8.5.2.3.2 Resource Definition

Resource URI: **{apiRoot}/eees-session-with-qos/<apiVersion>/sessions/{sessionId}**

This resource shall support the resource URI variables defined in the table 8.5.2.3.2-1.

Table 8.5.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5.
sessionId	string	Contains the identifier of a Session with QoS.

8.5.2.3.3 Resource Standard Methods

8.5.2.3.3.1 PATCH

This method partially updates the QoS of the data session between AC and EAS. This method shall support the URI query parameters specified in the table 8.5.2.3.3.1-1.

Table 8.5.2.3.3.1-1: 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 8.5.2.3.3.1-2 and the response data structures and response codes specified in table 8.5.2.3.3.1-3.

Table 8.5.2.3.3.1-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
SessionWithQoSPatch	M	1	Request to partially update the data session between AC and EAS with a specific QoS

Table 8.5.2.3.3.1-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SessionWithQoS	M	1	200 OK	The individual Session with QoS is successfully modified and the updated session with QoS context information is returned in the response
n/a			204 No Content	The individual Session with QoS is successfully modified.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.5.2.3.3.1-4: 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 8.5.2.3.3.1-5: 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.

8.5.2.3.3.2 PUT

This method requests modification of QoS of the data session between AC and EAS and may modify the subscription of the event monitoring by subscribing to new events or removing subscriptions to existing events at the Edge Enabler Server for receiving the user plane event notification of the session information. This method shall support the URI query parameters specified in the table 8.5.2.3.3.2-1.

Table 8.5.2.3.3.2-1: 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 8.5.2.3.3.2-2 and the response data structures and response codes specified in table 8.5.2.3.3.2-3.

Table 8.5.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
SessionWithQoS	M	1	Parameters to create a subscription for a session with required QoS for the service requirement.

Table 8.5.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SessionWithQoS	M	1	200 OK	The individual Session with QoS is successfully modified and the updated session with QoS context information is returned in the response.
n/a			204 No Content	The individual Session with QoS is successfully modified.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.5.2.3.3.2-4: 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 8.5.2.3.3.2-5: 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.

8.5.2.3.3.3 DELETE

This method revokes the data session between AC and EAS with a specific QoS and unsubscribes to the related session with user plane event notification. This method shall support the URI query parameters specified in table 8.5.2.3.3.3-1.

Table 8.5.2.3.3.3-1: 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 8.5.2.3.3.3-2 and the response data structures and response codes specified in table 8.5.2.3.3.3-3.

Table 8.5.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.5.2.3.3.3-3: 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 Session with QoS resource matching the sessionId is 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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.5.2.3.3.3-4: 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 8.5.2.3.3.3-5: 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.

8.5.2.3.3.4 GET

The GET method allows to read a subscription. The EAS shall initiate the HTTP GET request message and the EES shall respond to the message. This method shall support the URI query parameters specified in table 8.5.2.3.3.4-1.

Table 8.5.2.3.3.4-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 8.5.2.3.3.4-2 and the response data structures and response codes specified in table 8.5.2.3.3.4-3.

Table 8.5.2.3.3.4-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.5.2.3.3.4-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SessionWithQoS	M	1	200 OK	The subscription information related to the request URI is returned.
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 TS 29.122 [6].
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 TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.5.2.3.3.4-4: 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 8.5.2.3.3.4-5: 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.

8.5.2.3.4 Resource Custom Operations

None.

8.5.3 Custom Operations without associated resources

None.

8.5.4 Notifications

8.5.4.1 General

Table 8.5.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
User Plane Event Notification	{notificationDestination}	POST	Notifies the EAS the subscribed user plane event(s).

8.5.4.2 User Plane Event Notification

8.5.4.2.1 Description

8.5.4.2.2 TargetURI

The callback URI **{notificationDestination}** shall be used with the callback URI variables defined in table 8.5.4.2.2-1.

Table 8.5.4.2.2-1: Callback URI variables

Name	Data type	Definition
notificationDestination	Uri	Callback reference provided by the EAS during session with QoS creation/update/modification procedure.

8.5.4.2.3 Standard Methods

8.5.4.2.3.1 POST

This method shall support the request data structures specified in table 8.5.4.2.3.1-1 and the response data structures and response codes specified in table 8.5.4.2.3.1-2.

Table 8.5.4.2.3.1-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
UserPlaneEventNotification	M	1	Notification of the user plane event on the data session.

Table 8.5.4.2.3.1-2: 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of 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 EAS where the notification should be sent. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.5.4.2.3.1-3: 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 8.5.4.2.3.1-4: 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.

8.5.5 Data Model

8.5.5.1 General

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

Table 8.5.5.1-1 specifies the data types defined specifically for the Eees_SessionWithQoS API service.

Table 8.5.5.1-1: Eees_SessionWithQoS API specific Data Types

Data type	Section defined	Description	Applicability
SessionWithQoS	8.5.5.2.2		
SessionWIthQoSPatch	8.5.5.2.3		
UserPlaneEventNotification	8.5.5.2.4		

Table 8.5.5.1-2 specifies data types re-used by the Eees_SessionWithQoS API service.

Table 8.5.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Gpsi	3GPP TS 29.571 [8]	Used to identify the UE, for which the related session with QoS is requested to.	
Ipv4Addr	3GPP TS 29.122 [6]	Identifying the IPv4 address of the UE.	
Ipv6Addr	3GPP TS 29.122 [6]	Identifying the IPv6 address of the UE.	
UserPlaneEvent	3GPP TS 29.122 [6]	Indicates the event reported by the EES.	
SponsorInformation	3GPP TS 29.122 [6]	Indicates a sponsor information	
QosMonitoringInformation	3GPP TS 29.122 [6]	Indicates the Qos Monitoring information	
DurationSecRm	3GPP TS 29.571 [8]	This data type is defined in the same way as the "DurationSec" data type, but with the OpenAPI "nullable: true" property.	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features.	
TestNotification	3GPP TS 29.122 [6]	This type represents a notification that can be sent to test whether a chosen notification mechanism works	
Uri	3GPP TS 29.122 [6]		
WebsockNotifConfig	3GPP TS 29.122 [6]	This type represents configuration for the delivery of notifications over Websockets.	
Dnn	3GPP TS 29.571 [8]	Identifies a DNN.	
GroupId	3GPP TS 29.571 [8]	Used to present the internal group identifier in the AS session with QoS subscription/request.	
ExternalGroupId	3GPP TS 29.571 [8]	Used to present the external group identifier in the AS session with QoS subscription/request.	
Snssai	3GPP TS 29.571 [8]	Identifies a S-NSSAI	
FlowDescription	3GPP TS 29.514 [16]	Identifies an IP flow description.	
BitRateRm	3GPP TS 29.571 [8]	This data type is defined in the same way as the "BitRate" data type, but with the OpenAPI "nullable: true" property.	
UserPlaneEventReport	3GPP TS 29.122 [6]	Represents an event report for user plane.	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features.	

8.5.5.2 Structured data types

8.5.5.2.1 Introduction

8.5.5.2.2 Type: SessionWithQoS

Table 8.5.5.2.2-1: Definition of type SessionWIthQoS

Attribute name	Data type	P	Cardinality	Description	Applicability
self	Uri	C	0..1	Link to the "Individual Session with QoS" resource. Shall only be present in the HTTP GET response on the "Sessions with QoS" resource.	
easId	string	M	1	The application identifier of the EAS, e.g. URI, FQDN.	
ueIpv4Addr	Ipv4Addr	O	0..1	IPv4 address of the UE. (NOTE 1)	
ueIpv6Addr	Ipv6Addr	O	0..1	IPv6 address of the UE. (NOTE 1)	
ipDomain	string	O	0..1	Identifies the IP domain. The attribute may only be provided if the ueIpv4Addr attribute is present.	
ueId	Gpsi	O	0..1	Identifier of the UE for which related session with QoS is requested to. (NOTE 1)	
intGrpId	GroupId	O	0..1	The internal group identifier, identifying the group of UEs for which related session with QoS is requested to. (NOTE 1)	
extGrpId	ExternalGroupId	O	0..1	The external group identifier, identifying the group of UEs for which the related session with QoS is requested to. (NOTE 1)	
ipFlows	array(FlowDescription)	M	1..N	Contains the flow description for the Uplink and/or Downlink IP flows.	
qosReference	string	O	0..1	Identifies a pre-defined QoS information (NOTE 2)	
altQosReference	array(string)	O	1..N	Identifies an ordered list of pre-defined QoS information. The lower the index of the array for a given entry, the higher the priority.	
events	array(UserPlaneEvent)	O	1..N	Indicates the events subscribed by the EAS.	
sponsorInformation	SponsorInformation	O	0..1	Describes the sponsor information.	
qosMonInfo	QosMonitoringInformation	O	0..1	Qos Monitoring information. It may be present when the event "QOS_MONITORING" is subscribed.	
notificationDestination	Uri	C	0..1	URI where the event notification shall be delivered to. This attribute shall be present if the "events" attribute is included.	
dnn	Dnn	O	0..1	Dnn of the PDU session, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.	
snssai	Snssai	O	0..1	S-NSSAI of the PDU session.	
maxbrUl	BitRate	O	0..1	Indicates the (requested) maximum bandwidth in uplink. (NOTE 2)	
maxbrDl	BitRate	O	0..1	Indicates the (requested) maximum bandwidth in downlink. (NOTE 2)	
disUeNotif	boolean	O	0..1	Indicates to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation when it is included and set to "true". The fulfilled situation is either the QoS profile or an Alternative QoS Profile. The default value "false" shall apply, if the attribute is not present and has not been supplied previously.	
requestTestNotification	boolean	O	0..1	Set to true by Subscriber to request the EES to send a test notification as defined in 3GPP TS 29.122 [6]. 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 3GPP TS 29.122 [6].	Notification_websocket
suppFeat	SupportedFeatures	O	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request and in the response of successful resource creation.	
NOTE 1: Only one of UE IP address (ipv4Addr or ipv6Addr), UE Identifier (ueId), Internal group identifier (intGrpId), or External group identifier (extGrpId) shall be included. NOTE 2: Only one of requested QoS (qosReference) or Requested bandwidth (maxbuUl and/or maxbtDl) shall be included.					

8.5.5.2.3 Type: SessionWithQoSPatch

Table 8.5.5.2.3-1: Definition of type SessionWIthQoSPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
ipFlows	array(FlowDescription)	O	1..N	Contains the flow description for the Uplink and/or Downlink IP flows.	
qosReference	string	O	0..1	Identifies a pre-defined QoS information.	
altQosReference	array(string)	O	1..N	Identifies an ordered list of pre-defined QoS information. The lower the index of the array for a given entry, the higher the priority.	
Events	array(UserPlaneEvent)	O	1..N	Indicates the event subscribed by the EAS.	
sponsorInformation	SponsorInformation	O	0..1	Describes the sponsor information such as who is sponsoring the traffic.	
qosMonInfo	QosMonitoringInformationRm	O	0..1	Qos Monitoring information. It can be present when the event "QOS_MONITORING" is subscribed.	
notificationDestination	Uri	O	0..1	URI where the monitoring event notification should be delivered to.	
maxbrUl	BitRateRm	O	0..1	Indicates the (requested) maximum bandwidth in uplink.	
maxbrDl	BitRateRm	O	0..1	Indicates the (requested) maximum bandwidth in downlink.	
disUeNotif	boolean	O	0..1	Indicates to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation when it is included and set to "true". The fulfilled situation is either the QoS profile or an Alternative QoS Profile. The default value "false" shall apply, if the attribute is not present and has not been supplied previously.	

8.5.5.2.4 Type: UserPlaneEventNotification

Table 8.5.5.2.4-1: Definition of type UserPlaneEventNotifiation

Attribute name	Data type	P	Cardinality	Description	Applicability
sessionId	string	M	1	String identifying the individual data session information for which the QoS event notification is delivered.	
eventReports	array(UserPlaneEventReport)	M	1..N	List of user plane event reports and application information that include the QoS event information of the data session.	

8.5.5.3 Simple data types and enumerations

None.

8.5.6 Error Handling

General error responses are defined in clause 7.7.

8.5.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.5.7-1 lists the supported features for Eees_SessionWithQoS API.

Table 8.5.7-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 7.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 7.6. This feature requires that the Notification_test_event feature is also supported.

8.6 Eees_ACRManagementEvent API

8.6.1 Introduction

The Eees_ACRManagementEvent service shall use the Eees_ACRManagementEvent API.

The API URI of the Eees_ACRManagementEvent API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eees-acrmgntevent".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.6.2.

8.6.2 Resources

8.6.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.6.2.1-1 depicts the resource URIs structure for the Eees_ACRManagementEvent API.

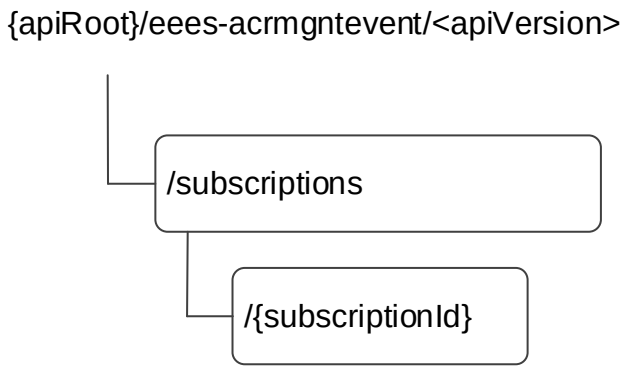

Figure 8.6.2.1-1: Resource URI structure of the Eees_ACRManagementEvent API

Table 8.6.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 8.6.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
ACR Management Events Subscriptions	/subscriptions	GET	Query all the subscriptions.
		POST	Create a new Individual ACR Management Events Subscription resource.
Individual ACR Management Events Subscription	/subscriptions/{subscriptionId}	GET	Query an existing Individual ACR Management Events Subscription resource identified by a subscriptionId.
		PUT	Fully replace an existing Individual ACR Management Events Subscription resource identified by a subscriptionId.
		PATCH	Partial update an existing Individual ACR Management Events Subscription resource identified by a subscriptionId.
		DELETE	Remove an Individual ACR Management Events Subscription resource identified by a subscriptionId.

8.6.2.2 Resource: ACR Management Events Subscriptions

8.6.2.2.1 Description

This resource represents ACR Management Events Subscriptions at a given Edge Enabler Server.

8.6.2.2.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.6.2.2.2-1.

Table 8.6.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

8.6.2.2.3 Resource Standard Methods

8.6.2.2.3.1 POST

This method requests to create an Individual ACR Management Event Subscription resource at the EES for receiving the notifications of ACR management events. This method shall support the URI query parameters specified in table 8.6.2.2.3.1-1.

Table 8.6.2.2.3.1-1: 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 8.6.2.2.3.1-2 and the response data structures and response codes specified in table 8.6.2.2.3.1-3.

Table 8.6.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AcrMgntEventsSubscription	M	1	Parameters to create a subscription for notifications of ACR management events.

Table 8.6.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AcrMgntEventsSubscription	M	1	201 Created	An Individual ACR Management Events Subscription resource is successfully created, and the subscription information is provided in the response body. 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 [6] also apply.				

Table 8.6.2.2.3.1-4: 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-acrmgntevent/<apiVersion>/subscriptions/{subscriptionId}

8.6.2.2.3.2 GET

This method retrieves all the ACR Management Events Subscriptions information at EES. This method shall support the URI query parameters specified in the table 8.6.2.2.3.2-1.

Table 8.6.2.2.3.2-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
supp-feat	SupportedFeatures	O	0..1	The features supported by the EAS.

This method shall support the request data structures specified in table 8.6.2.2.3.2-2 and the response data structures and response codes specified in table 8.6.2.2.3.2-3.

Table 8.6.2.2.3.2-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.6.2.2.3.2-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(AcrMgntEventsSubscription)	M	1..N	200 OK	All the ACR Management Events Subscriptions information is returned by the EES.
n/a			307 Temporary Redirect	Temporary redirection, during subscription retrieval. 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 [6].
n/a			308 Permanent Redirect	Permanent redirection, during subscription retrieval. 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 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.2.2.3.2-4: 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 8.6.2.2.3.2-5: 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.

8.6.2.2.4 Resource Custom Operations

None.

8.6.2.3 Resource: Individual ACR Management Events Subscription

8.6.2.3.1 Description

This resource represents an existing Individual ACR Management Events Subscription at a given EES.

8.6.2.3.2 Resource Definition

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

This resource shall support the resource URI variables defined in the table 8.6.2.3.2-1.

Table 8.6.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5.
subscriptionId	string	Contains the identifier of an ACR Management Events Subscription.

8.6.2.3.3 Resource Standard Methods

8.6.2.3.3.1 PATCH

This method partially updates an existing Individual ACR Management Events Subscription. This method shall support the URI query parameters specified in the table 8.6.2.3.3.1-1.

Table 8.6.2.3.3.1-1: 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 8.6.2.3.3.1-2 and the response data structures and response codes specified in table 8.6.2.3.3.1-3.

Table 8.6.2.3.3.1-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
AcrMgntEventsSubscriptionPatch	M	1	Request to partially update an existing Individual ACR Management Events Subscription.

Table 8.6.2.3.3.1-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AcrMgntEventsSubscription	M	1	200 OK	The Individual ACR Management Events Subscription is successfully modified and the updated subscription information is returned in the response.
n/a			204 No Content	The Individual ACR Management Events Subscription is successfully modified.
n/a			307 Temporary Redirect	Temporary redirection, during subscription 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 [6].
n/a			308 Permanent Redirect	Permanent redirection, during subscription 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 [6].
NOTE: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.2.3.3.1-4: 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 8.6.2.3.3.1-5: 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.

8.6.2.3.3.2 PUT

This method requests fully replacement of an existing Individual ACR Management Events Subscription at the EES. The request shall not change the values of the "easId", "tgtUeId", "requestTestNotification", "websockNotifConfig" and/or "suppFeat" attributes within the AcrMgntEventsSubscription data type. This method shall support the URI query parameters specified in the table 8.6.2.3.3.2-1.

Table 8.6.2.3.3.2-1: 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 8.6.2.3.3.2-2 and the response data structures and response codes specified in table 8.6.2.3.3.2-3.

Table 8.6.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
AcrMgntEventsSubscription	M	1	Parameters to replace an existing Individual ACR Management Events Subscription.

Table 8.6.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AcrMgntEventsSubscription	M	1	200 OK	The existing Individual ACR Management Events Subscription is successfully replaced and the updated subscription information is returned in the response.
n/a			204 No Content	The existing Individual ACR Management Events Subscription is successfully modified.
n/a			307 Temporary Redirect	Temporary redirection, during subscription 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 [6].
n/a			308 Permanent Redirect	Permanent redirection, during subscription 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 [6].
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.2.3.3.2-4: 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 8.6.2.3.3.2-5: 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.

8.6.2.3.3.3 DELETE

This method deletes an existing Individual ACR Management Events Subscription. This method shall support the URI query parameters specified in table 8.6.2.3.3.3-1.

Table 8.6.2.3.3.3-1: 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 8.6.2.3.3.3-2 and the response data structures and response codes specified in table 8.6.2.3.3.3-3.

Table 8.6.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.6.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The existing Individual ACR Management Events Subscription is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection, during subscription 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 [6].
n/a			308 Permanent Redirect	Permanent redirection, during subscription 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 [6].
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.2.3.3.3-4: 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 8.6.2.3.3.3-5: 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.

8.6.2.3.3.4 GET

This method retrieves the location information subscription information at EES. This method shall support the URI query parameters specified in the table 8.6.2.3.3.4-1.

Table 8.6.2.3.3.4-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
supp-feat	SupportedFeatures	O	0..1	The features supported by the EAS.

This method shall support the request data structures specified in table 8.6.2.3.3.4-2 and the response data structures and response codes specified in table 8.6.2.3.3.4-3.

Table 8.6.2.3.3.4-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.6.2.3.3.4-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AcrMgntEventsSubscription	M	1	200 OK	The Individual ACR Management Events Subscription is returned by the EES.
n/a			307 Temporary Redirect	Temporary redirection, during subscription retrieval. 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 [6].
n/a			308 Permanent Redirect	Permanent redirection, during subscription retrieval. 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 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.2.3.3.4-4: 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 8.6.2.3.3.4-5: 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.

8.6.2.3.4 Resource Custom Operations

None.

8.6.3 Custom Operations without associated resources

None.

8.6.4 Notifications

8.6.4.1 General

Table 8.6.4.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
ACR Management Events Notification	{notificationDestination}	POST	Notifies the EAS the subscribed ACR management event(s).
User Plane Path Change Availability Notification	{notificationDestination}/report-availability	report-availability (POST)	Notifies the EAS of the availability of user plane path management events monitoring via the 3GPP 5GC network (e.g. due to UE mobility from 5GC to EPC).

8.6.4.2 ACR Management Events Notification

8.6.4.2.1 Description

8.6.4.2.2 Notification definition

The POST method is used by the EES for the notifications of subscribed ACR management event(s) and the callback URI shall be provided by the EAS during the creation of the Individual ACR Management Events Subscription resource.

Callback URI: **{notificationDestination}**

This method shall support the URI query parameters specified in table 8.6.4.2.2-1.

Table 8.6.4.2.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description

This method shall support the request data structures specified in table 8.6.4.2.2-2 and the response data structures and response codes specified in table 8.6.4.2.2-3.

Table 8.6.4.2.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AcrMgntEventsNotification	M	1	Notification of the ACR management events.

Table 8.6.4.2.2-3: 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, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative EAS 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, during event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative EAS 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 codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.4.2.2-4: 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 EAS towards which the notification should be redirected.

Table 8.6.4.2.2-5: 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 EAS towards which the notification should be redirected.

8.6.4.3 User Plane Path Change Availability Notification

8.6.4.3.1 Description

The User Plane Path Change Availability Notification is used by the EES to notify the EAS of the availability of user plane path management events monitoring via the 3GPP 5GC network (e.g. due to UE mobility from 5GC to EPC).

8.6.4.3.2 Target URI

The Callback URI **"{notificationDestination}/report-availability"** shall be used with the callback URI variables defined in table 8.6.4.3.2-1.

Table 8.6.4.3.2-1: Callback URI variables

Name	Data type	Definition
notificationDestination	Uri	Callback reference provided by the EAS during the ACR Management Event subscription creation/update/modification procedure.

8.6.4.3.3 Standard Methods

8.6.4.3.3.1 POST

This method shall support the request data structures specified in table 8.6.4.3.3.1-1 and the response data structures and response codes specified in table 8.6.4.3.3.1-2.

Table 8.6.4.3.3.1-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AvailabilityNotif	M	1	Notification of the ACR management events.

Table 8.6.4.3.3.1-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The notification is successfully received.
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 EAS 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 EAS 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 codes for the POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.6.4.3.3.1-3: 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 8.6.4.3.3.1-4: 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.

8.6.5 Data Model

8.6.5.1 General

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

Table 8.6.5.1-1 specifies the data types defined specifically for the Eees_ACRManagementEvent API service.

Table 8.6.5.1-1: Eees_ACRManagementEvent API specific Data Types

Data type	Section defined	Description	Applicability
AcrMgntEventFailureCode	8.6.5.3.6	Represents the reason for ACR Management subscription failure for an event.	
AcrMgntEventFilter	8.6.5.3.4	Represents the ACR Management Event filter.	
AcrMgntEventsSubscription	8.6.5.2.2		
AcrMgntEventSubsc	8.6.5.2.3		
AcrMgntEventsSubscriptionPatch	8.6.5.2.4		
AcrMgntEventsNotification	8.65.2.5		
AcrMgntEventReport	8.6.5.2.6		
ActStatus	8.6.5.3.5	Represents ACT status, i.e. ACT start or stop.	
AvailabilityNotif	8.6.5.2.11	Represents the availability information of user plane path management events monitoring via the 3GPP 5GC network.	
AvailabilityStatus	8.6.5.3.7	Represents the availability status.	
FailureAcrMgntEventInfo	8.6.5.2.7		
AcrMgntEvent	8.6.5.3.3		
IndtUeIdentification	8.6.5.2.10	Contains individual UE identification information.	
TargetUeIdentification	8.6.5.2.8	Contains target UE(s) identification information.	
UpPathChangeInfo	8.6.5.2.9	Contains user plane path change information.	

Table 8.6.5.1-2 specifies data types re-used by the Eees_ACRManagementEvent API service.

Table 8.6.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
EasCharacteristics	3GPP TS 24.558 [14]	Represents the EAS characteristics.	
DateTime	3GPP TS 29.122 [6]		
Dnai	3GPP TS 29.571 [8]	Identifies a DNAI.	
DnaiChangeType	3GPP TS 29.571 [8]		
DnaiChangeTypeRm	3GPP TS 29.571 [8]		
Endpoint	Clause 8.1.5.2.5	Represents the endpoint information.	
ExternalGroupId	3GPP TS 29.571 [8]	Represents an external group of UEs.	
ExternalId	3GPP TS 29.122 [6]	Represents an external identifier of a UE.	
Gpsi	3GPP TS 29.571 [8]		
GroupId	3GPP TS 29.571 [8]	Represents an internal group of UEs.	
IpAddr	3GPP TS 29.571 [8]		
Ipv4Addr	3GPP TS 29.122 [6]	Identifying the IPv4 address of the UE.	
Ipv6Prefix	3GPP TS 29.571 [8]	Identifies an IPv6 Prefix.	
ReportingInformation	3GPP TS 29.523 [13]		
RouteToLocation	3GPP TS 29.571 [8]	Describes the traffic routes to the locations of the application.	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features.	
TestNotification	3GPP TS 29.122 [6]	This type represents a notification that can be sent to test whether a chosen notification mechanism works	
Uri	3GPP TS 29.122 [6]		
WebsockNotifConfig	3GPP TS 29.122 [6]	This type represents configuration for the delivery of notifications over Websockets.	

8.6.5.2 Structured data types

8.6.5.2.1 Introduction

8.6.5.2.2 Type: AcrMgntEventsSubscription

Table 8.6.5.2.2-1: Definition of type AcrMgntEventsSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
self	Uri	C	0..1	Link to the "Individual ACR Management Events Subscription" resource. Shall only be present in the HTTP GET response on the "ACR Management Events Subscriptions" resource.	
easId	string	M	1	Contains the application identifier of the EAS, e.g. URI, FQDN.	
eventSubscs	array(AcrMgntEventSubsc)	M	1..N	Indicates the subscribed ACR management events and the related information.	
evtReq	ReportingInformation	O	0..1	Indicates the event reporting information. (NOTE 1, NOTE 2)	
notificationDestination	Uri	M	1	Contains the URI towards which the event notifications shall be delivered.	
eventReports	array(AcrMgntEventReport)	C	1..N	Represents ACR management event report(s). This attribute shall be present in an HTTP POST response if the immediate reporting indication in the "immRep" attribute within the "evtReq" attribute sets to true in the corresponding HTTP POST request, and the report(s) are available. This attribute may be present in an HTTP PUT or PATCH response when the report(s) are available.	
availabilityInfo	AvailabilityNotif	C	0..1	Indicates the availability information of user plane path management events monitoring via the 3GPP 5GC network. This attribute may only be present in an HTTP POST/PUT/PATCH response, if the availability status information is available.	
failEventReports	array(FailureAcrMgntEventInfo)	O	1..N	Represents the event(s) for which the subscription is not successful including the failure reason(s).	
requestTestNotification	boolean	O	0..1	Set to true by the EAS to request the EES to send a test notification as defined in 3GPP TS 29.122 [6]. 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 3GPP TS 29.122 [6].	Notification_websocket
suppFeat	SupportedFeatures	C	0..1	Represents the list of Supported features. This attribute shall be present in the HTTP POST request if at least one feature is supported by the consumer. It shall be present in an HTTP POST response if it was provided in the corresponding HTTP POST request, or in the HTTP GET response if the "supp-feat" attribute query parameter is included in the corresponding HTTP GET request.	

NOTE 1: The "evtReq" of an AcrMgntEventSubsc data structure within the "eventSubscs" attribute takes precedence over the "evtReq" attribute defined in this data structure when both are present.
NOTE 2: When the "evtReq" is not provided in an AcrMgntEventSubsc data structure within the "eventSubscs" attribute, the "evtReq" attribute defined in this data structure applies for the corresponding ACR management event subscription.

8.6.5.2.3 Type: AcrMgntEventSubsc

Table 8.6.5.2.3-1: Definition of type AcrMgntEventSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
event	AcrMgntEvent	M	1	Indicates the subscribed ACR management event.	
eventFilter	AcrMgntEventFilter	O	0..1	Represents the event filter for the subscribed ACR management event. This attribute may be provided only if the "event" attribute is set to "ACR_MONITORING".	
evtReq	ReportingInformation	O	0..1	Indicates the event reporting requirements (e.g. reporting periodicity, immediate reporting indication, etc). (NOTE)	
tgtUeId	TargetUeIdentification	C	0..1	Contains the UE identification information. This attribute shall be provided only if the "event" attribute is set to either "UP_PATH_CHG", "ACR_MONITORING" or "ACR_FACILITATION".	
dnaiChgType	DnaiChangeType	O	0..1	Identifies a type of notification regarding UP path management event. This attribute may be provided only if the "event" attribute is set to "UP_PATH_CHG".	
easAckInd	boolean	O	0..1	Identifies whether EAS acknowledgement of UP path change event notifications is to be expected. Set to "true" if the EAS acknowledgement is expected. Default value is "false". This attribute may be provided only if the "event" attribute is set to "UP_PATH_CHG".	
easChars	array(EasCharacteristics)	O	1..N	Represents a list of EAS characteristics. This attribute may be provided only if the "event" attribute is set to either "ACR_MONITORING" or "ACR_FACILITATION".	
NOTE: The "evtReq" takes precedence over the "evtReq" attribute of the AcrMgntEventsSubscription data structure when both are present.					

8.6.5.2.4 Type: AcrMgntEventsSubscriptionPatch

Table 8.6.5.2.4-1: Definition of type AcrMgntEventsSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
eventSubscs	array(AcrMgntEventSubsc)	O	1..N	Indicates the subscribed ACR management events.	
evtReq	ReportingInformation	O	0..1	Indicates the event reporting information.	
notificationDestination	Uri	O	0..1	URI where the event notification shall be delivered to.	

8.6.5.2.5 Type: AcrMgntEventsNotification

Table 8.6.5.2.5-1: Definition of type AcrMgntEventsNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
subpId	string	M	1	String identifying the Individual ACR Management Events Subscription to which the notification is related.	
eventReports	array(AcrMgntEventReport)	M	1..N	Represents a list of ACR management event `report(s).	

8.6.5.2.6 Type: AcrMgntEventReport

Table 8.6.5.2.6-1: Definition of type AcrMgntEventReport

Attribute name	Data type	P	Cardinality	Description	Applicability
event	AcrMgntEvent	M	1	Indicates the subscribed ACR management event.	
timeStamp	DateTime	O	0..1	Represents the time stamp of the detected event.	
easEndPoint	EndPoint	C	0..1	Represents the endpoint information of the EAS. This attribute shall be provided either: - when the "event" attribute is set to either "ACR_MONITORING" or "ACR_FACILITATION". In such case, it shall contain the endpoint information of the T-EAS; or - when the "event" attribute is set to "ACT_START_STOP". In such case, it shall contain the endpoint information of the EAS towards/from which the ACT needs to be started/stopped.	
actStatus	ActStatus	C	0..1	Represents the reported ACT status, i.e. ACT start or ACT stop. This attribute shall be provided only when the "event" attribute is set to "ACT_START_STOP".	
upPathChgInfo	UpPathChangeInfo	C	0..1	Represents the UP Path change information. This attribute shall be provided when the "event" attribute is set to "UP_PATH_CHG".	

8.6.5.2.7 Type: FailureAcrMgntEventInfo

Table 8.6.5.2.7-1: Definition of type FailureAcrMgntEventInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
event	AcrMgntEvent	M	1	Indicates the subscribed ACR management event.	
failureCode	AcrMgntEventFailureCode	M	1	Identifies the failure reason.	

8.6.5.2.8 Type: TargetUeIdentification

Table 8.6.5.2.8-1: Definition of type TargetUeIdentification

Attribute name	Data type	P	Cardinality	Description	Applicability
gpsi	Gpsi	O	0..1	Represents external UE identifier.	
intGrpId	GroupId	O	0..1	Represents a group of UEs identified by an Internal Group Identifier.	
extGrpId	ExternalGroupId	O	0..1	Represents a group of UEs identified by an External Group Identifier.	
ueIpAddr	IpAddr	O	0..1	Represents the UE IP address.	
NOTE: Only one of the above attributes shall be present.					

8.6.5.2.9 Type: UpPathChangeInfo

Table 8.6.5.2.9-1: Definition of type UpPathChangeInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ueId	IndUeIdentification	M	1	Contains the concerned UE's identification information.	
dnaiChgType	DnaiChangeType	M	1	Identifies the type of notification regarding UP path management event.	
sourceTrafficRoute	RouteToLocation	O	0..1	Identifies the N6 traffic routing information associated to the source DNAI.	
targetTrafficRoute	RouteToLocation	O	0..1	Identifies the N6 traffic routing information associated to the target DNAI.	
sourceDnai	Dnai	O	0..1	Source DN Access Identifier.	
targetDnai	Dnai	O	0..1	Target DN Access Identifier.	
srcUeIpv4Addr	Ipv4Addr	O	0..1	The IPv4 Address of the served UE for the source DNAI.	
srcUeIpv6Prefix	Ipv6Prefix	O	0..1	The Ipv6 Address Prefix of the served UE for the source DNAI.	
tgtUeIpv4Addr	Ipv4Addr	O	0..1	The IPv4 Address of the served UE for the target DNAI.	
tgtUeIpv6Prefix	Ipv6Prefix	O	0..1	The Ipv6 Address Prefix of the served UE for the target DNAI.	

8.6.5.2.10 Type: IndUeIdentification

Table 8.6.5.2.10-1: Definition of type IndUeIdentification

Attribute name	Data type	P	Cardinality	Description	Applicability
gpsi	Gpsi	O	0..1	Represents the GPSI of the UE.	
externalId	ExternalId	O	0..1	Represents the External Identifier of the UE.	
ueIpAddr	IpAddr	O	0..1	Represents the UE IP address.	
NOTE: Only one of the above attributes shall be present.					

8.6.5.2.11 Type: AvailabilityNotif

Table 8.6.5.2.11-1: Definition of type AvailabilityNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
availabilityStatus	AvailabilityStatus	M	1	Indicates the availability information of user plane path management events monitoring via the 3GPP 5GC network.	

8.6.5.3 Simple data types and enumerations

8.6.5.3.1 Introduction

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

8.6.5.3.2 Simple data types

The simple data types defined in table 8.6.5.3.2-1 shall be supported.

Table 8.6.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

8.6.5.3.3 Enumeration: AcrMgntEvent

Table 8.6.5.3.3-1: Enumeration AcrMgntEvent

Enumeration value	Description	Applicability
UP_PATH_CHG	The subscribed ACR Management Event is user plane path change.	
ACR_MONITORING	The subscribed ACR Management Event is ACR monitoring.	
ACR_FACILITATION	The subscribed ACR Management Event is ACR facilitation.	
ACT_START_STOP	The subscribed ACR Management Event is ACT start/stop.	

8.6.5.3.4 Enumeration: AcrMgntEventFilter

Table 8.6.5.3.4-1: Enumeration AcrMgntEventFilter

Enumeration value	Description	Applicability
INTRA_EDN_MOBILITY	Indicates that the ACR Management Event filter is intra-EDN mobility.	
INTER_EDN_MOBILITY	Indicates that the ACR Management Event filter is inter-EDN mobility.	

8.6.5.3.5 Enumeration: ActStatus

Table 8.6.5.3.5-1: Enumeration ActStatus

Enumeration value	Description	Applicability
ACT_START	Indicates ACT start.	
ACT_STOP	Indicates ACT stop.	

8.6.5.3.6 Enumeration: AcrMgntEventFailureCode

Table 8.6.5.3.6-1: Enumeration AcrMgntEventFailureCode

Enumeration value	Description	Applicability
3GPP_UP_PATH_CHANGE_MON_NOT_AVAILABLE	Indicates that the ACR Management Event Subscription failed because user plane path management event notifications from the 3GPP network is NOT available. This value is only applicable for the "UP_PATH_CHG", "ACR_MONITORING" and "ACR_FACILITATION" events.	
OTHER_REASONS	Indicates that the ACR Management Event Subscription failed for other reasons. This value is applicable for all events.	

8.6.5.3.7 Enumeration: AvailabilityStatus

Table 8.6.5.3.7-1: Enumeration AvailabilityStatus

Enumeration value	Description	Applicability
AVAILABLE	Indicates availability.	
NOT_AVAILABLE	Indicates unavailability.	

8.6.6 Error Handling

General error responses are defined in clause 7.7.

8.6.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.6.7-1 lists the supported features for Eees_ACRManagementEvent API.

Table 8.6.7-1: Supported Features

Feature number	Feature Name	Description
1	Notification_test_event	Testing of notification connection is supported according to clause 7.6.
2	Notification_websocket	The delivery of notifications over Websocket is supported according to clause 7.6. This feature requires that the Notification_test_event feature is also supported.

8.7 Eees_EECContextRelocation API

8.7.1 API URI

The Eees_EECContextRelocation service shall use the Eees_EECContextRelocation API.

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5 with the following clarifications:

- The <apiName> shall be "eees-eeccontextreloc".

- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 8.7.2.

8.7.2 Resources

8.7.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.7.2.1-1 depicts the resource URIs structure for the Eees_EECContextRelocation API.

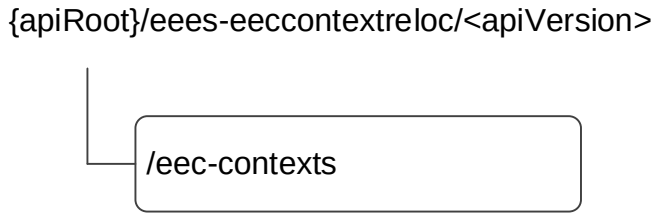

Figure 8.7.2.1-1: Resource URI structure of the Eees_EECContextRelocation API

Table 8.7.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 8.7.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Collection of EEC contexts	/eec-contexts	GET	Retrieve the EEC Context information from S-EES.
		POST	Push the EEC Context information to the T-EES.

8.7.2.2 Resource: Collection of EEC Contexts

8.7.2.2.1 Description

This resource allows to transfer the EEC Context from an S-EES to the T-EES, for EEC context relocation.

8.7.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eees-eeccontextreloc/<apiVersion>/eec-contexts**

This resource shall support the resource URI variables defined in the table 8.7.2.2.2-1.

Table 8.7.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

8.7.2.2.3 Resource Standard Methods

8.7.2.2.3.1 GET

This method allows a T-EES to pull the EEC Context from the S-EES as specified in 3GPP TS 23.558 [2], based on the information in the discovery filters. This method shall support the URI query parameters specified in table 8.7.2.2.3.1-1.

Table 8.7.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
ees-id	string	M	1	The identifier of the requesting EES (T-EES).
eec-cntx-id	string	M	1	Unique identifier of the EEC Context to authorize the transfer.
sess-cntxs	SessionContexts	O	0..1	List of service session context information being requested.

This method shall support the request data structures specified in table 8.7.2.2.3.1-2 and the response data structures and response codes specified in table 8.7.2.2.3.1-3.

Table 8.7.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.7.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EECContext	M	1	200 OK	The EEC context information matching the input parameters in the request is returned by the S-EES.
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

8.7.2.2.3.2 POST

This method allows the S-EES to transfer the EEC Context to T-EES to relocate the EEC Context, as specified in 3GPP TS 23.558 [2]. This method shall support the URI query parameters specified in table 8.7.2.2.3.2-1.

Table 8.7.2.2.3.2-1: 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 8.7.2.2.3.2-2 and the response data structures and response codes specified in table 8.7.2.2.3.2-3.

Table 8.7.2.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EECContextPush	M	1	EEC Context information of an EEC available at the S-EES.

Table 8.7.2.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The EEC context has been successfully transferred to the T-EES.
EECContextPushRes	M	1	200 OK	The EEC context has been successfully transferred to the T-EES and the EEC is implicitly registered.
NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

8.7.2.2.4 Resource Custom Operations

None.

8.7.3 Custom Operations without associated resources

None.

8.7.4 Notifications

None.

8.7.5 Data Model

8.7.5.1 General

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

Table 8.7.5.1-1 specifies the data types defined specifically for the Eees_EECContextRelocation API service.

Table 8.7.5.1-1: Eees_EECContextRelocation API specific Data Types

Data type	Section defined	Description	Applicability
EECContext	8.7.5.2.5	To represent the EEC context information to be relocated.	
EECContextPush	8.7.5.2.4	To represent the EEC context information to be pushed to the T-EES.	
EECContextPushRes	8.7.5.2.6	Represents the EEC context push relocation response.	
ImplicitRegDetails	8.7.5.2.7	Represents the EEC implicit registration information.	
IndividualSessionContext	8.7.5.2.3	To represent single Service session context information.	
SessionContexts	8.7.5.2.2	To represent the Service session contexts information in EEC context pull request.	

Table 8.7.5.1-2 specifies data types re-used by the Eees_EECContextRelocation API service.

Table 8.7.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
EndPoint	8.1.5.2.5	To represent the end point information of the EAS in service session context information.	
ACProfile	3GPP TS 24.558 [14]	Used to represent the application clients profiles in EEC context.	
Gpsi	3GPP TS 29.571 [8]	Used to indicate the identifier of the UE.	
LocationArea5G	3GPP TS 29.122 [6]	Used to indicate the location information of the UE in the EEC context.	
DateTime	3GPP TS 29.122 [6]	To indicate the expiry time of the implicit registration.	

8.7.5.2 Structured data types

8.7.5.2.1 Introduction

The data type for the Eees_EECContextRelocation API are defined in the clauses below.

8.7.5.2.2 Type: SessionContexts

Table 8.7.5.2.2-1: Definition of type SessionContexts

Attribute name	Data type	P	Cardinality	Description	Applicability
sessCntxs	array(IndividualSessionContext)	M	1..N	List of service session context information.	

8.7.5.2.3 Type: IndividualSessionContext

Table 8.7.5.2.3-1: Definition of type IndividualSessionContext

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	The application identifier of the EAS, e.g. URI, FQDN, providing the application services.	
endPt	EndPoint	M	1	End point information of the EAS in easId attribute.	
acId	string	O	0..1	Identifier of the AC for which the service session information is provided.	

8.7.5.2.4 Type: EECContextPush

Table 8.7.5.2.4-1: Definition of type EECContextPush

Attribute name	Data type	P	Cardinality	Description	Applicability
eesId	string	M	1	Identifier of the S-EES pushing the EEC context.	
eecCntx	EECContext	M	1	EEC Context to be relocated to T-EES.	

8.7.5.2.5 Type: EECContext

Table 8.7.5.2.5-1: Definition of type EECContext

Attribute name	Data type	P	Cardinality	Description	Applicability
eecId	string	M	1	Unique identifier of the EEC	
cntxId	string	M	1	Unique identifier assigned to the EEC Context	
ueId	Gpsi	O	0..1	The identifier of the UE hosting the EEC.	
e1Subs	array(string)	O	1..N	List of subscription IDs for the capability exposure for the EEC ID.	
ueLoc	LocationArea5G	O	0..1	Latest location information of the UE hosting the EEC, that is available at the EES.	
acProfs	array(ACProfile)	O	1..N	List of ACs profiles	
sessCntxs	SessionContexts	O	0..1	List of associated Service Session Contexts. Each Service Session Context includes information maintained by the EES for the services (involving UE related resources) received from an EAS registered to the EES.	

8.7.5.2.6 Type: EECContextPushRes

Table 8.7.5.2.6-1: Definition of type EECContextPushRes

Attribute name	Data type	P	Cardinality	Description	Applicability
implReg	ImplicitRegDetails	C	0..1	Provides implicit registration details. (NOTE)	
NOTE: This attribute shall be included if the T-EES has performed implicit registration of the EEC.					

8.7.5.2.7 Type: ImplicitRegDetails

Table 8.7.5.2.7-1: Definition of type ImplicitRegDetails

Attribute name	Data type	P	Cardinality	Description	Applicability
regId	string	M	1	Represents registration ID of the EEC whose EEC context is pushed	
expTime	DateTime	O	0..1	Represents the expiration time of the registration. If absent, then it indicates that the registration of the EEC never expires.	

8.7.5.3 Simple data types and enumerations

None.

8.7.6 Error Handling

General error responses are defined in clause 7.7.

8.7.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 8.7.7-1 lists the supported features for Eees_EECContextRelocation API.

Table 8.7.7-1: Supported Features

Feature number	Feature Name	Description

8.8 Eees_EELManagedACR API

8.8.1 Introduction

The Eees_EELManagedACR service shall use the Eees_ACRStatusUpdate API.

The API URI of the Eees_EELManagedACR API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [6], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [6].
- The <apiName> shall be "eees-eel-acr".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [6].

8.8.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [6] shall apply for the Eees_EELManagedACR API.

8.8.3 Resources

8.8.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 8.8.3.1-1 depicts the resource URIs structure for the Eees_EELManagedACR API.

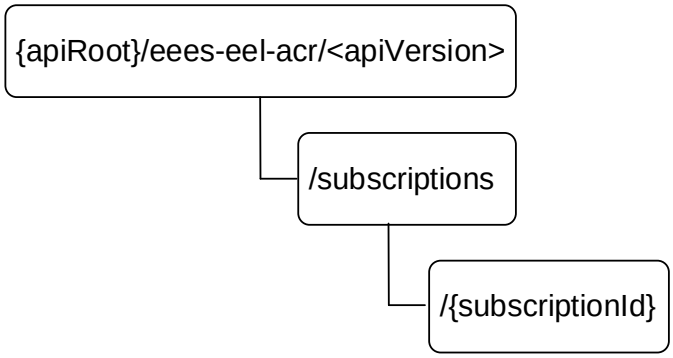

Figure 8.8.3.1-1: Resource URIs structure of the Eees_EELManagedACR API

Table 8.8.3.1-1 provides an overview of the resources and applicable HTTP methods for the Eees_EELManagedACR API.

Table 8.8.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
ACT Status Subscriptions	/subscriptions	GET	Retrieve all the active ACT Status Subscription resources managed by the EES.
		POST	Request the creation of a subscription to ACT status reporting during an EEL Managed ACR.
Individual ACT Status Subscription	/subscriptions/{subscriptionId}	GET	Retrieve an Individual ACT Status Subscription resource identified by the provided subscription identifier.

8.8.3.2 Resource: ACT Status Subscriptions

8.8.3.2.1 Description

This resource represents the collection of ACT Status Subscriptions managed by the EES.

8.8.3.2.2 Resource Definition

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

This resource shall support the resource URI variables defined in table 8.8.3.2.2-1.

Table 8.8.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 5.2.4 of 3GPP TS 29.122 [6].

8.8.3.2.3 Resource Standard Methods

The following clauses specify the standard methods supported by the resource.

8.8.3.2.3.1 GET

The GET method allows a service consumer to retrieve all the active ACT Status Subscriptions managed by the EES.This method shall support the URI query parameters specified in table 8.8.3.2.3.1-1.

Table 8.8.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 8.8.3.2.3.1-2 and the response data structures and response codes specified in table 8.8.3.2.3.1-3.

Table 8.8.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.8.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(ACTStatusSubsc)	M	0..N	200 OK	Successful case. All the active ACT Status Subscriptions managed by the EES are returned.
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 [6].
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 [6].
NOTE: The mandatory HTTP error status code for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.8.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

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

Table 8.8.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

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

8.8.3.2.3.2 POST

The POST method allows a service consumer (i.e. T-EAS) to request the creation of a subscription to ACT status reporting at the EES (i.e. T-EES). This method shall support the URI query parameters specified in table 8.8.3.2.3.2-1.

Table 8.8.3.2.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 8.8.3.2.3.2-2 and the response data structures and response codes specified in table 8.8.3.2.3.2-3.

Table 8.8.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ACTStatusSubsc	M	1	Represents the parameters to request the creation of a subscription to ACT status reporting.

Table 8.8.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACTStatusSubsc	M	1	201 Created	Successful case. The subscription is successfully created and a representation of the created Individual ACT Status Subscription resource is returned. An HTTP "Location" header that contains the resource URI of the created Individual ACT Status Subscription resource shall also be included.
NOTE: The mandatory HTTP error status code for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.8.3.2.3.2-4: 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-eel-act/<apiVersion>/subscriptions/{subscriptionId}

8.8.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

8.8.3.3 Resource: Individual ACT Status Subscription

8.8.3.3.1 Description

This resource represents an Individual ACT Status subscription managed by the EES.

8.8.3.3.2 Resource Definition

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

This resource shall support the resource URI variables defined in table 8.8.3.3.2-1.

Table 8.8.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 5.2.4 of 3GPP TS 29.122 [6].
subscriptionId	string	Represents the subscription identifier.

8.8.3.3.3 Resource Standard Methods

The following clauses specify the standard methods supported by the resource.

8.8.3.3.3.1 GET

The GET method allows a service consumer to retrieve an ACT status subscription identified by the subscription identifier included in the request URI (i.e. within the "/{subscriptionId}" path segment).This method shall support the URI query parameters specified in table 8.8.3.3.3.1-1.

Table 8.8.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 8.8.3.3.3.1-2 and the response data structures and response codes specified in table 8.8.3.3.3.1-3.

Table 8.8.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 8.8.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACTStatusSubsc	M	1	200 OK	Successful case. The requested Individual ACT Status Subscription resource is returned.
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 [6].
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 [6].
NOTE: The manadatory HTTP error status code for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.8.3.3.3.1-4: 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 8.8.3.3.3.1-5: 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.

8.8.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

8.8.4 Custom Operations without associated resources

8.8.4.1 Overview

The structure of the custom operation URIs of the Eees_EELManagedACR API is shown in Figure 8.8.4.1-1.

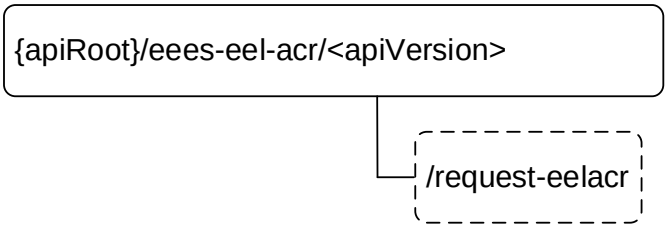

Figure 8.8.4.1-1: Custom operation URI structure of the Eees_EELManagedACR API

Table 8.8.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Eees_EELManagedACR API.

Table 8.8.4.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
RequestEELManagedACR	/request-eelacr	POST	Enables a service consumer (i.e. S-EAS) to request the EES (i.e. S-EES) to handle all the operations of an ACR.

8.8.4.2 Operation: RequestEELManagedACR

8.8.4.2.1 Description

The custom operation enables a service consumer (i.e. S-EAS) to request the EES (i.e. S-EES) to handle all the operations of an ACR.

8.8.4.2.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 8.8.4.2.2-1 and 8.8.4.2.2-2.

Table 8.8.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EELACRReq	M	1	Parameters to request the EES (i.e. S-EES) to handle all the operations of an ACR.

Table 8.8.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EELACRResp	M	1	200 OK	The requested EEL Managed ACR initiation was successfully received and processed. The response body contains the feedback of the EES.
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 [6].
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 [6]
NOTE: The manadatory HTTP error status code for the HTTP POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.8.4.2.2-3: 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 8.8.4.2.2-4: 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.

8.8.5 Notifications

8.8.5.1 General

Notifications shall comply to clause 5.2.5 of 3GPP TS 29.122 [6].

Table 8.8.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
ACT Status Notification	{notificationUri}/act-status	act-status (POST)	This service operation enables an EES to notify a previously subscribed a service consumer (i.e. EAS) on ACT status information.

8.8.5.2 ACT Status Notification

8.8.5.2.1 Description

The ACT Status Notification is used by an EES to notify a previously subscribed service consumer (i.e. EAS) on ACT status information.

8.8.5.2.2 Target URI

The Callback URI **"{notificationUri}/act-status"** shall be used with the callback URI variables defined in table 8.8.5.2.2-1.

Table 8.8.5.2.2-1: Callback URI variables

Name	Data type	Definition
notificationUri	Uri	String formatted as a URI containing the Callback URI.

8.8.5.2.3 Standard Methods

8.8.5.2.3.1 POST

This method shall support the request data structures specified in table 8.8.5.2.3.1-1 and the response data structures and response codes specified in table 8.8.5.2.3.1-2.

Table 8.8.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
ACTStatusNotif	M	1	Represents an ACT status notification.

Table 8.8.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The ACT status notification is successfully received and 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 EAS 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 EAS 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 codes for the POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.8.5.2.3.1-3: 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 8.8.5.2.3.1-4: 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.

8.8.6 Data Model

8.8.6.1 General

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

Table 8.8.6.1-1 specifies the data types defined for the Eees_EELManagedACR API.

Table 8.8.6.1-1: Eees_EELManagedACR API specific Data Types

Data type	Clause defined	Description	Applicability
EELACRReq	8.8.6.2.2	Represents the parameters to request the EES (e.g. S-EES) to handle all the operations of an ACR.	
EELACRResp	8.8.6.2.3	Represents the feedback of the EES on EEL Managed ACR request.	
ACTStatusSubsc	8.8.6.2.4	Represents the parameters to request the creation of a subscription to ACT status reporting.	
ACTStatusNotif	8.8.6.2.5	Represents an ACT status notification.	

Table 8.8.6.1-2 specifies data types re-used by the Eees_EELManagedACR API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Eees_EELManagedACR API.

Table 8.8.6.1-2: Eees_EELManagedACR API re-used Data Types

Data type	Reference	Comments	Applicability
ACTResult	Clause 8.11.6.3.3	Represents the result of ACT.	
EasCharacteristics	3GPP TS 24.558 [14]	Represents the EAS characteristics.	
Gpsi	3GPP TS 29.571 [8]	Represents the identifier of a UE.	
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of the optional features.	
Uri	3GPP TS 29.122 [6]	Represents a URI.	

8.8.6.2 Structured data types

8.8.6.2.1 Introduction

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

8.8.6.2.2 Type: EELACRReq

Table 8.8.6.2.2-1: Definition of type EELACRReq

Attribute name	Data type	P	Cardinality	Description	Applicability
ueId	Gpsi	M	1	Contains the UE identifier in the form of a GPSI.	
easCharacs	array(EasCharacteristics)	M	1	Contains a set of EAS characteristics to be used to determine the required EASs.	
appCtxtStoreAddr	Uri	O	0..1	Contains the URI via which the Application Context can be accessed for ACT.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 8.8.8. This parameter shall be provided if at least one feature is supported by the EAS.	

8.8.6.2.3 Type: EELACRResp

Table 8.8.6.2.3-1: Definition of type EELACRResp

Attribute name	Data type	P	Cardinality	Description	Applicability
appCtxtStoreAddr	Uri	C	0..1	Contains the URI via which the Application Context can be accessed for ACT. This attribute shall be included if it was not received from the EAS in the related EEL Managed ACR request.	
suppFeat	SupportedFeatures	C	0..1	Indicates the list of negotiated supported features. This parameter shall be provided by the EES in the response to a request in which the EAS provided the list of features that it supports.	

8.8.6.2.4 Type: ACTStatusSubsc

Table 8.8.6.2.4-1: Definition of type ACTStatusSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	Contains the application identifier of the EAS, e.g. URI, FQDN.	
notificationUri	Uri	M	1	Contains the URI via which the EAS desires to receive ACT status notifications.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 8.8.8. This parameter shall be provided if at least one feature is supported by the EAS.	

8.8.6.2.5 Type: ACTStatusNotif

Table 8.8.6.2.5-1: Definition of type ACTStatusNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the EAS identifier.	
actStatus	ACTResult	M	1	Contains the reported ACT status.	

8.8.6.3 Simple data types and enumerations

8.8.6.3.1 Introduction

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

8.8.6.3.2 Simple data types

The simple data types defined in table 8.8.6.3.2-1 shall be supported.

Table 8.8.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

8.8.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

8.8.6.5 Binary data

8.8.6.5.1 Binary Data Types

Table 8.8.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

8.8.7 Error Handling

8.8.7.1 General

For the Eees_EELManagedACR API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [6]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [6] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [6].

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

8.8.7.2 Protocol Errors

No specific protocol errors for the Eees_EELManagedACR API are specified.

8.8.7.3 Application Errors

The application errors defined for the Eees_EELManagedACR API are listed in Table 8.8.7.3-1.

Table 8.8.7.3-1: Application errors

Application Error	HTTP status code	Description

8.8.8 Feature negotiation

The optional features in table 8.8.8-1 are defined for the Eees_EELManagedACR API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [6].

Table 8.8.8-1: Supported Features

Feature number	Feature Name	Description

8.9 Eees_ACRStatusUpdate API

8.9.1 Introduction

The Eees_ACRStatusUpdate service shall use the Eees_ACRStatusUpdate API.

The API URI of the Eees_ACRStatusUpdate API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 5.2.4 of 3GPP TS 29.122 [6], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [6].
- The <apiName> shall be "eees-acrstatus-update".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 5.2.4 of 3GPP TS 29.122 [6].

8.9.2 Usage of HTTP

The provisions of clause 5.2.2 of 3GPP TS 29.122 [6] shall apply for the Eees_ACRStatusUpdate API.

8.9.3 Resources

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

8.9.4 Custom Operations without associated resources

8.9.4.1 Overview

The structure of the custom operation URIs of the Eees_ACRStatusUpdate API is shown in Figure 8.9.4.1-1.

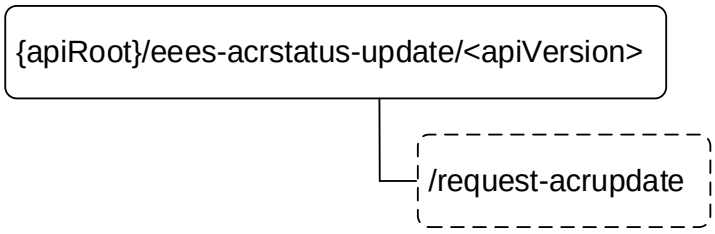

Figure 8.9.4.1-1: Custom operation URI structure of the Eees_ACRStatusUpdate API

Table 8.9.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the Eees_ACRStatusUpdate API.

Table 8.9.4.1-1: Custom operations without associated resources

Operation name	Custom operation URI	Mapped HTTP method	Description
RequestACRUpdate	/request-acrupdate	POST	Enables a service consumer (i.e. S-EAS or T-EAS) to update the information related to ACR (e.g. indicate the status of ACT, update the notification target address) at the EES.

8.9.4.2 Operation: RequestACRUpdate

8.9.4.2.1 Description

The custom operation enables a service consumer (i.e. S-EAS or T-EAS) to update the information related to ACR (e.g. indicate the status of ACT, update the notification target address) at the EES.

8.9.4.2.2 Operation Definition

This operation shall support the request data structures and the response data structures and response codes specified in tables 8.9.4.2.2-1 and 8.9.4.2.2-2.

Table 8.9.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ACRUpdateData	M	1	Parameters to update the information related to ACR (e.g. indicate the status of ACT, update the notification target address).

Table 8.9.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ACRDataStatus	M	1	200 OK	The communicated ACR update information was successfully received. The response body contains the feedback of the EES.
n/a			204 No Content	The communicated ACR update information was 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 [6].
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 [6]
NOTE: The manadatory HTTP error status code for the HTTP POST method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 8.9.4.2.2-3: 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 8.9.4.2.2-4: 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.

8.9.5 Notifications

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

8.9.6 Data Model

8.9.6.1 General

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

Table 8.9.6.1-1 specifies the data types defined for the Eees_ACRStatusUpdate API.

Table 8.9.6.1-1: Eees_ACRStatusUpdate API specific Data Types

Data type	Clause defined	Description	Applicability
ACRUpdateData	8.9.6.2.2	Represents the parameters to update the information related to ACR (e.g. indicate the status of ACT, update the notification target address).	
ACRDataStatus	8.9.6.2.3	Represents the ACR status information.	
ACTFailureCause	8.9.6.3.5	Represents the cause of ACT failure.	
ACTResult	8.9.6.3.3	Represents the result of ACT.	
ACTResultInfo	8.9.6.2.4	Represents the result of ACT and the related information.	
E3SubscsStatus	8.9.6.3.4	Represents the status of the initialization of EDGE-3 subscriptions.	

Table 8.9.6.1-2 specifies data types re-used by the Eees_ACRStatusUpdate API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Eees_ACRStatusUpdate API.

Table 8.9.6.1-2: Eees_ACRStatusUpdate API re-used Data Types

Data type	Reference	Comments	Applicability
EndPoint	Clause 8.1.5.2.5	Represents the endpoint information.	
Gpsi	3GPP TS 29.571 [8]	Represents the identifier of a UE.	
Uri	3GPP TS 29.122 [6]	Represents a URI.	

8.9.6.2 Structured data types

8.9.6.2.1 Introduction

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

8.9.6.2.2 Type: ACRUpdateData

Table 8.9.6.2.2-1: Definition of type ACRUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
easId	string	M	1	Contains the application identifier of the EAS, e.g. URI, FQDN, that is sending the ACR status update request.	
acId	string	O	0..1	Contains the identifier of the concerned AC.	
actResultInfo	ACTResultInfo	O	0..1	Contains the status of ACT, i.e. whether it was successful or failed, and the related information. This attribute may be included if the service consumer is the S-EAS or the T-EAS. In the case of an EEL Managed ACR, this attribute shall not be included by a T-EAS acting as the service consumer. (NOTE)	
e3SubscIds	array(string)	O	1..N	Contains a list of EDGE-3 subscription identifiers. This attribute may be included only if the service consumer sending the request is the T-EAS. (NOTE)	
e3NotificationUri	Uri	O	0..1	Contains the updated notification URI via which the EAS desires to receive notifications (related to EDGE-3 subscriptions) from the EES. This attribute may be included only if the service consumer sending the request is the T-EAS. (NOTE)	
NOTE: At least one of the "actResultInfo", "e3SubscIds" or "e3NotificationUri" attributes shall be present.					

8.9.6.2.3 Type: ACRDataStatus

Table 8.9.6.2.3-1: Definition of type ACRDataStatus

Attribute name	Data type	P	Cardinality	Description	Applicability
e3SubscsStatus	E3SubscsStatus	M	1	Contains the status of the initialization of EDGE-3 subscriptions, i.e. whether it was successful or failed.	
e3SubscIds	array(string)	O	1..N	Contains an updated list of EDGE-3 subscription identifiers. The absence of a subscription identifier implies no change for this subscription identifier. This attribute may be provided if the "e3SubscsStatus" attribute is set to "SUCCESSFUL".	

8.9.6.2.4 Type: ACTResultInfo

Table 8.9.6.2.4-1: Definition of type ACTResultInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
actResult	ACTResult	M	1	Contains the status of ACT, i.e. whether it was successful or failed.	
actFailureCause	ACTFailureCause	C	0..1	Contains the cause of ACT failure. This attribute shall be provided only if the "actResult" attribute is set to "FAILED".	
ueId	Gpsi	M	1	Contains the identifier of the concerned UE.	
easEndPoint	EndPoint	M	1	Contains the endpoint of the other EAS to or from which the ACT was performed.	

8.9.6.3 Simple data types and enumerations

8.9.6.3.1 Introduction

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

8.9.6.3.2 Simple data types

The simple data types defined in table 8.9.6.3.2-1 shall be supported.

Table 8.9.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

8.9.6.3.3 Enumeration: ACTResult

The enumeration ACTResult represents the result of ACT. It shall comply with the provisions defined in table 8.9.6.3.3-1.

Table 8.9.6.3.3-1: Enumeration ACTResult

Enumeration value	Description	Applicability
SUCCESSFUL	Indicates that the ACT was successful.	
FAILED	Indicates that the ACT failed.	

8.9.6.3.4 Enumeration: E3SubscsStatus

The enumeration E3SubscsStatus represents the status of the initialization of EDGE-3 subscriptions. It shall comply with the provisions defined in table 8.9.6.3.4-1.

Table 8.9.6.3.4-1: Enumeration E3SubscsStatus

Enumeration value	Description	Applicability
SUCCESSFUL	Indicates that the initialization of EDGE-3 subscriptions was successful.	
FAILED	Indicates that the initialization of EDGE-3 subscriptions failed.	

8.9.6.3.5 Enumeration: ACTFailureCause

The enumeration ACTFailureCause represents the cause of ACT failure. It shall comply with the provisions defined in table 8.9.6.3.5-1.

Table 8.9.6.3.5-1: Enumeration ACTFailureCause

Enumeration value	Description	Applicability
ACR_CANCELLATION	Indicates that the ACT failed due to the cancellation of the ACR.	
OTHER	Indicates that the ACT failed for other reasons.	

8.9.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

8.9.6.5 Binary data

8.9.6.5.1 Binary Data Types

Table 8.9.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

8.9.7 Error Handling

8.9.7.1 General

For the Eees_ACRStatusUpdate API, HTTP error responses shall be supported as specified in clause 5.2.6 of 3GPP TS 29.122 [6]. Protocol errors and application errors specified in clause 5.2.6 of 3GPP TS 29.122 [6] shall be supported for the HTTP status codes specified in table 5.2.6-1 of 3GPP TS 29.122 [6].

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

8.9.7.2 Protocol Errors

No specific protocol errors for the Eees_ACRStatusUpdate API are specified.

8.9.7.3 Application Errors

The application errors defined for the Eees_ACRStatusUpdate API are listed in Table 8.9.7.3-1.

Table 8.9.7.3-1: Application errors

Application Error	HTTP status code	Description

8.9.8 Feature negotiation

The optional features in table 8.9.8-1 are defined for the Eees_ACRStatusUpdate API. They shall be negotiated using the extensibility mechanism defined in clause 5.2.7 of 3GPP TS 29.122 [6].

Table 8.9.8-1: Supported Features

Feature number	Feature Name	Description

9 Edge Configuration Server API Definitions

9.1 Eecs_EESRegistration API

9.1.1 Introduction

The Eecs_EESRegistration service shall use the Eecs_EESRegistration API.

The API URI of the Eecs_EESRegistration API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eecs-eesregistration".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 9.1.2.

9.1.2 Resources

9.1.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 9.1.2.1-1 depicts the resource URIs structure for the Eecs_EESRegistration API.

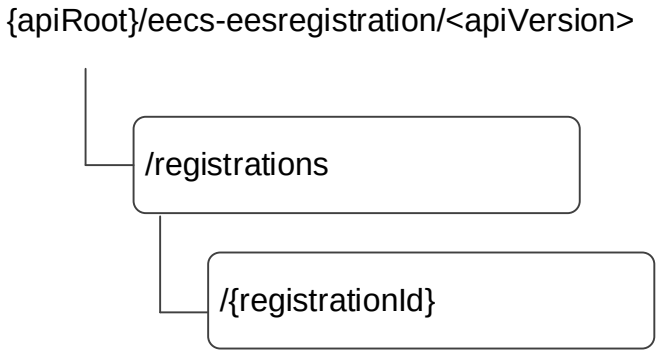

Figure 9.1.2.1-1: Resource URI structure of the Eecs_EESRegistration API

Table 9.1.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 9.1.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
EES Registrations	/registrations	POST	Registers a new EES at the Edge Configuration Server.
Individual EES Registration	/registrations/{registrationId}	GET	Fetch an individual EES registration resource.
		PUT	Fully replace an individual EES registration resource.
		DELETE	Remove an individual EES registration resource.
		PATCH	Partially update an individual EES registration resource.

9.1.2.2 Resource: EES Registrations

9.1.2.2.1 Description

This resource represents all the Edge Enabler Servers that are registered at a given Edge Configuration Server.

9.1.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eecs-eesregistration/<apiVersion>/registrations**

This resource shall support the resource URI variables defined in the table 9.1.2.2.2-1.

Table 9.1.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

9.1.2.2.3 Resource Standard Methods

9.1.2.2.3.1 POST

This method shall support the URI query parameters specified in table 9.1.2.2.3.1-1.

Table 9.1.2.2.3.1-1: 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 9.1.2.2.3.1-2 and the response data structures and response codes specified in table 9.1.2.2.3.1-3.

Table 9.1.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
EESRegistration	M	1	EES registration request information.

Table 9.1.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EESRegistration	M	1	201 Created	EES information is registered successfully at ECS. EES information registered with ECS is provided in the response body. 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 [6] also apply.				

Table 9.1.2.2.3.1-4: 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}/eecs-eesregistration/<apiVersion>/registrations/{registrationId}

9.1.2.2.4 Resource Custom Operations

None.

9.1.2.3 Resource: Individual EES Registration

9.1.2.3.1 Description

This Individual EES Registration resource represents an individual EES registered at a given Edge Configuration Server.

9.1.2.3.2 Resource Definition

Resource URI: **{apiRoot}/eecs-eesregistration/<apiVersion>/registrations/{registrationId}**

This resource shall support the resource URI variables defined in the table 9.1.2.3.2-1.

Table 9.1.2.3.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5
registrationId	string	The EES registration identifier.

9.1.2.3.3 Resource Standard Methods

9.1.2.3.3.1 GET

This method retrieves the EES information registered at Edge Configuration Server. This method shall support the URI query parameters specified in table 9.1.2.3.3.1-1.

Table 9.1.2.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 9.1.2.3.3.1-2 and the response data structures and response codes specified in table 9.1.2.3.3.1-3.

Table 9.1.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 9.1.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EESResgistration	M	1	200 OK	The EES registration information at the Edge Configuration Server.
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 9.1.2.3.3.1-4: 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 ECS.

Table 9.1.2.3.3.1-5: 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 ECS.

9.1.2.3.3.2 PUT

This method updates the EES registration information at Edge Configuration Server by completely replacing the existing registration data (except the value of "eesId" within EESProfile data type and the value of "suppFeat" attribute within the EESRegistration data type). This method shall support the URI query parameters specified in the table 9.1.2.3.3.2-1.

Table 9.1.2.3.3.2-1: 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 9.1.2.3.3.2-2 and the response data structures and response codes specified in table 9.1.2.3.3.2-3.

Table 9.1.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
EESRegistration	M	1	Details of the EES registration information to be updated

Table 9.1.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EESRegistration	M	1	200 OK	The EES registration information updated successfully and the updated EES registration information is returned in the response.
n/a			204 No Content	The EES registration information was updated successfully.
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 9.1.2.3.3.2-4: 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 ECS.

Table 9.1.2.3.3.2-5: 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 ECS.

9.1.2.3.3.3 DELETE

This method deregisters an EES registration from the ECS. This method shall support the URI query parameters specified in the table 9.1.2.3.3.3-1.

Table 9.1.2.3.3.3-1: 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 9.1.2.3.3.3-2 and the response data structures and response codes specified in table 9.1.2.3.3.3-3.

Table 9.1.2.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 9.1.2.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The individual EES registration information matching the registrationId is 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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The manadatory HTTP error status code for the DELETE method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 9.1.2.3.3.3-4: 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 ECS.

Table 9.1.2.3.3.3-5: 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 ECS.

9.1.2.3.3.4 PATCH

This method partially updates the EES registration information at Edge Configuration Server. This method shall support the URI query parameters specified in the table 9.1.2.3.3.4-1.

Table 9.1.2.3.3.4-1: 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 9.1.2.3.3.4-2 and the response data structures and response codes specified in table 9.1.2.3.3.4-3.

Table 9.1.2.3.3.4-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
EESRegistrationPatch	M	1	Details of the EES registration information to be updated

Table 9.1.2.3.3.4-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
EESRegistration	M	1	200 OK	The Individual EES registration information was updated successfully and the updated EES registration information is returned in the response.
n/a			204 No Content	The Individual EES registration information was updated successfully.
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
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 ECS. Redirection handling is described in clause 5.2.10 of TS 29.122 [6].
NOTE: The mandatory HTTP error status code for the PUT method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

Table 9.1.2.3.3.4-4: 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 9.1.2.3.3.4-5: 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.

9.1.2.3.4 Resource Custom Operations

None.

9.1.3 Custom Operations without associated resources

None.

9.1.4 Notifications

None.

9.1.5 Data Model

9.1.5.1 General

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

Table 9.1.5.1-1 specifies the data types defined specifically for the Eecs_EESRegistration API service.

Table 9.1.5.1-1: Eecs_EESRegistration API specific Data Types

Data type	Section defined	Description	Applicability
EESRegistration	9.1.5.2.2	The EES registration information on ECS.	
EESProfile	9.1.5.2.3	The profile information related to the EES in the EESRegistration data type.	
ACRScenario	9.1.5.3.3	The ACR scenarios supported by EES.	
EESRegistrationPatch	9.1.5.2.4	To partially update the EES Registration information.	
ServiceArea	9.1.5.2.5	The topological and geographic areas served by EES.	
TopologicalServiceArea	9.1.5.2.6	The topological areas served by EES.	
GeographicalServiceArea	9.1.5.2.7	The geographic areas served by EES.	

Table 9.1.5.1-2 specifies data types re-used by the Eecs_EESRegistration API service.

Table 9.1.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
SupportedFeatures	3GPP TS 29.571 [8]	Used to negotiate the applicability of optional features defined in table 9.1.7-1.	
DateTime	3GPP TS 29.122 [6]	Used to capture the expiration time of EES registration.	
Ecgi	3GPP TS 29.571 [8]	Represents an EUTRA cell identifier.	
Ncgi	3GPP TS 29.571 [8]	Represents an NR cell identifier.	
Tai	3GPP TS 29.571 [8]	Represents a tracking area identity.	
GeographicArea	3GPP TS 29.572 [11]	Identifies the geographical information of the user(s).	
CivicAddress	3GPP TS 29.572 [11]	Identifies the civic address information of the user(s).	
PlmnId	3GPP TS 29.122 [6]	Used to indicate only the list of PLMN Ids as part of topological service areas.	
Dnai	3GPP TS 29.571 [8]	Used to represent the list of DNAI(s) information associated with EES.	
DateTimeRm	3GPP TS 29.571 [8]	Used to capture the expiration time EES registration patch.	
EndPoint	8.1.5.2.5	The end point information of the Edge Enabler Server in the EES profile.	

9.1.5.2 Structured data types

9.1.5.2.1 Introduction

9.1.5.2.2 Type: EESRegistration

Table 9.1.5.2.2-1: Definition of type EESRegistration

Attribute name	Data type	P	Cardinality	Description	Applicability
eesProf	EESProfile	M	1	The profile information of the EES.	
expTime	DateTime	O	0..1	Identifies the expiration time for the EES registration. If the expiration time is not present, then it indicates that the registration of EES never expires.	
suppFeat	SupportedFeatures	O	0..1	Used to negotiate the supported optional features of the API as described in clause 7.8. This attribute shall be provided in the HTTP POST request and in the response of successful resource creation.	

9.1.5.2.3 Type: EESProfile

Table 9.1.5.2.3-1: Definition of type EESProfile

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 application identities of the Edge Application Servers, e.g. URI, FQDN, registered with the EES.	
provId	string	O	0..1	Identifier of the ECSP that provides the EES provider.	
svcArea	ServiceArea	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.	
appLocs	array(Dnai)	O	1..N	List of DNAI(s) associated with the EES. This is a list of potential locations of the applications. It is a subset of the DNAI(s) associated with the EDN, where the EES resides.	
svcContSupp	array(ACRScenario)	O	1..N	The ACR scenarios supported by the EES for service continuity. If this attribute is not present, then the EES does not support service continuity.	
eecRegConf	boolean	M	1	Set to TRUE if the EEC is required to register on the EES to use edge services. Set to FALSE if EEC is not required to register on the EES to use edge services.	

9.1.5.2.4 Type: EESRegistrationPatch

Table 9.1.5.2.4-1: Definition of type EESRegistrationPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
eesProf	EESProfile	O	0..1	The profile information of the EES.	
expTime	DateTimeRm	O	0..1	Identifies the expiration time for the EES registration. If the expiration time is not present, then it indicates that the registration of EES never expires.	
NOTE: The value of the "eesId" attribute within the EESProfile data type shall be the same as the one within the EES Registration data type during the creation of resource procedure.					

9.1.5.2.5 Type: ServiceArea

Table 9.1.5.2.5-1: Definition of type ServiceArea

Attribute name	Data type	P	Cardinality	Description	Applicability
topServAr	TopologicalServiceArea	O	0..1	The topological service areas. (NOTE)	
geoServAr	GeographicalServiceArea	O	0..1	The geographical service areas.	
NOTE: The "topServAr" attribute is not applicable for untrusted functional elements (EESs and/or EASs deployed outside the MNO trust domain).					

9.1.5.2.6 Type: TopologicalServiceArea

Table 9.1.5.2.6-1: Definition of type TopologicalServiceArea

Attribute name	Data type	P	Cardinality	Description	Applicability
ecgis	array(Ecgi)	O	1..N	This IE contains a list of E-UTRA cell identities.	
ncgis	array(Ncgi)	O	1..N	This IE contains a list of NR cell identities.	
tais	array(Tai)	O	1..N	This IE contains a list of tracking area identities.	
plmnIds	array(PlmnId)	O	1..N	List of PLMN IDs. (NOTE)	
NOTE: A combination of these information elements should not have duplicate or overlapping information for the same topological Service Area.					

9.1.5.2.7 Type: GeographicalServiceArea

Table 9.1.5.2.7-1: Definition of type GeographicalServiceArea

Attribute name	Data type	P	Cardinality	Description	Applicability
geoArs	array(GeographicArea)	O	1..N	Identifies a list of geographic area of the user where the UE is located.	
civicAddrs	array(CivicAddress)	O	1..N	Identifies a list of civic addresses of the user where the UE is located.	

9.1.5.3 Simple data types and enumerations

9.1.5.3.1 Introduction

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

9.1.5.3.2 Simple data types

The simple data types defined in table 9.1.5.3.2-1 shall be supported.

Table 9.1.5.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

9.1.5.3.3 Enumeration: ACRScenario

The enumeration ACRScenario represents the ACR scenarios supported. It shall comply with the provisions defined in table 9.1.5.3.3-1.

Table 9.1.5.3.3-1: Enumeration ACRScenario

Enumeration value	Description	Applicability
EEC_INITIATED	Represents the EEC initiated ACR scenario.	
EEC_EXECUTED_VIA_SOURCE_EES	Represents the EEC ACR scenario executed via the S-EES.	
EEC_EXECUTED_VIA_TARGET_EES	Represents the EEC ACR scenario executed via the T-EES.	
SOURCE_EAS_DECIDED	Represents the EEC ACR scenario where the S-EAS decides to perform ACR.	
SOURCE_EES_EXECUTED	Represents the EEC ACR scenario where S-EES executes the ACR.	
EEL_MANAGED_ACR	Represents the EEC ACR scenario where the ACR is managed by the Edge Enabler Layer.	

9.1.6 Error Handling

General error responses are defined in clause 7.7.

9.1.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8 Table 9.1.7-1 lists the supported features for Eecs_EESRegistration API.

Table 9.1.7-1: Supported Features

Feature number	Feature Name	Description

9.2 Eecs_TargetEESDiscovery API

9.2.1 Introduction

The Eecs_TargetEESDiscovery service shall use the Eecs_TargetEESDiscovery API.

The API URI of the Eecs_TargetEESDiscovery API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 7.5, i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in clause 7.5.
- The <apiName> shall be "eecs-targeteesdiscovery".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 9.2.2.

9.2.2 Resources

9.2.2.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 9.2.2.1-1 depicts the resource URIs structure for the Eecs_TargetEESDiscovery API.

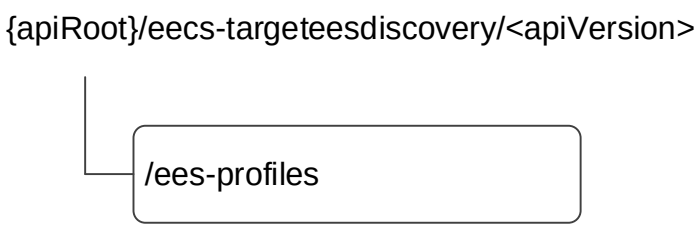

Figure 9.2.2.1-1: Resource URI structure of the Eecs_TargetEESDiscovery API

Table 9.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 9.2.2.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
EES Profiles	/ees-profiles	GET	Retrieve the T-EES information.

9.2.2.2 Resource: EES Profiles

9.2.2.2.1 Description

This resource allows the source EES (S-EES) to retrieve the target (T-EES) information from the ECS.

9.2.2.2.2 Resource Definition

Resource URI: **{apiRoot}/eecs-targeteesdiscovery/<apiVersion>/ees-profiles**

This resource shall support the resource URI variables defined in the table 9.2.2.2.2-1.

Table 9.2.2.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 7.5

9.2.2.2.3 Resource Standard Methods

9.2.2.2.3.1 GET

This method allows the S-EES to fetch the T-EES information as specified in 3GPP TS 23.558 [2], from the ECS with a given discovery filters. This method shall support the URI query parameters specified in table 9.2.2.2.3.1-1.

Table 9.2.2.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
ees-id	string	M	1	Unique identifier of the S-EES.
eas-id	string	M	1	Represents the application identifier of the S-EAS, e.g. URI, FQDN.
target-dnai	Dnai	O	0..1	The DNAI information associated with the potential T-EES(s) and/or T-EAS(s).
ue-id	Gpsi	O	0..1	Identifier of the UE.
ue-location	LocationArea5G	O	0..1	The location information of the UE.

This method shall support the request data structures specified in table 9.2.2.2.3.1-2 and the response data structures and response codes specified in table 9.2.2.2.3.1-3.

Table 9.2.2.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 9.2.2.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ECSServProvResp	M	1	200 OK	The EDN configuration and the T-EES information determined by the ECS based on the query parameters.
NOTE: The mandatory HTTP error status code for the GET method listed in Table 5.2.6-1 of 3GPP TS 29.122 [6] also apply.				

9.2.2.2.4 Resource Custom Operations

None.

9.2.3 Custom Operations without associated resources

None.

9.2.4 Notifications

None.

9.2.5 Data Model

9.2.5.1 General

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

Table 9.2.5.1-1 specifies the data types defined specifically for the Eecs_TargetEESDiscovery API.

Table 9.2.5.1-1: Eecs_TargetEESDiscovery API specific Data Types

Data type	Section defined	Description	Applicability

Table 9.2.5.1-2 specifies data types re-used by the Eecs_TargetEESDiscovery API service.

Table 9.2.5.1-2: Re-used Data Types

Data type	Reference	Comments	Applicability
Dnai	3GPP TS 29.571 [8]	Used to indicate the target DNAI information.	
Gpsi	3GPP TS 29.571 [8]	Used to identify the UE in the query parameter.	
LocationArea5G	3GPP TS 29.122 [6]	Used to indicate the location information of the UE in the query parameter.	
ECSServProvResp	3GPP TS 24.558 [14]	The response to the target EES discovery request, which includes the EDN configuration along with list of EES(s) information.	

9.2.5.2 Structured data types

None.

9.2.5.3 Simple data types and enumerations

None.

9.2.6 Error Handling

General error responses are defined in clause 7.7.

9.2.7 Feature negotiation

General feature negotiation procedures are defined in clause 7.8. Table 9.2.7-1 lists the supported features for Eecs_TargetEESDiscovery API.

Table 9.2.7-1: Supported Features

Feature number	Feature Name	Description

10 Using Common API Framework

10.1 General

EES may expose its services to EAS with support of CAPIF. Also, the EES may also re-expose the network capabilities of the 3GPP core network to the EAS(s) with support of CAPIF architecture, as specified in 3GPP TS 23.558 [2]. When CAPIF is used with EES services, the EES shall support the following as defined in 3GPP TS 29.222 [17]:

- the API exposing function and related APIs over CAPIF-2/2e and CAPIF-3/3e reference points;
- the API publishing function and related APIs over CAPIF-4/4e reference point;
- the API management function and related APIs over CAPIF-5/5e reference point; and
- at least one of the security methods for authentication and authorization, and related security mechanisms.

The EAS supports the role of API Invoker as specified in 3GPP TS 29.222 [17]. In a centralized deployment as defined in 3GPP TS 23.222 [17], where the CAPIF core function and API provider domain functions are co-located, the

interactions between the CAPIF core function and API provider domain functions may be independent of CAPIF-3/3e, CAPIF-4/4e and CAPIF-5/5e reference points.

When CAPIF is used with an EES service, the EES shall register all the features for northbound APIs in the CAPIF Core Function.

10.2 Security

When CAPIF is used for external exposure of EES services to EAS, before invoking the API exposed by the EES, the EAS as API invoker shall negotiate the security method (PKI, TLS-PSK or OAUTH2) with CAPIF core function and ensure the EAS has enough credential to authenticate the EAS (see 3GPP TS 29.222 [17], clause 5.6.2.2 and clause 6.2.2.2).

If PKI or TLS-PSK is used as the selected security method between the EAS and the EES, upon API invocation, the EES shall retrieve the authorization information from the CAPIF core function as described in 3GPP TS 29.222 [17], clause 5.6.2.4.

As indicated in 3GPP TS 33.122 [18], the access to the EES APIs may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [19]), where the CAPIF core function (see 3GPP TS 29.222 [17]) plays the role of the authorization server.

If OAuth2 is used as the selected security method between the EAS and the EES, then the EAS, prior to consuming services offered by the EES APIs, shall obtain a "token" from the authorization server, by invoking the Obtain_Authorization service, as described in 3GPP TS 29.222 [17], clause 5.6.2.3.2.

The EES APIs do not define any scopes for OAuth2 authorization. It is the EES responsibility to check whether the EAS is authorized to use an API based on the "token". Once the EES verifies the "token", it shall check whether the EES identifier in the "token" matches its own published identifier, and whether the API name in the "token" matches its own published API name. If those checks are passed, the EAS has full authority to access any resource or operation for the invoked API

NOTE : For aforementioned security methods, the EES needs to apply admission control according to access control policies after performing the authorization checks.

11 Security

The authentication and authorization between EES and ECS shall be as specified in 3GPP TS 33.558 [20].

The authentication and authorization in EES capability exposure shall be as specified in 3GPP TS 33.558 [20]. When CAPIF is used, the aspects specified in clause 10 shall be used.

The security credentials to be used for verification and authorization of various API requests from EAS and EES shall be as specified in 3GPP TS 33.558 [20].

Annex A (normative): OpenAPI specification

A.1 General

This annex is based on the OpenAPI 3.0.0 specification [3] and provides corresponding representations of all APIs defined in the present specification in YAML format.

This Annex shall take precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API.

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification file contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [4] and clause 5.3.1 of the 3GPP TS 29.501 [5] for further information).

A.2 Eees_EASRegistration API

```
openapi: 3.0.0
info:
  title: EES EAS Registration_API
  description: |
    API for EAS Registration.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: 1.0.1
externalDocs:
  description: >
    3GPP TS 29.558 V17.3.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
servers:
  - url: '{apiRoot}/eees-easregistration/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.
security:
  - {}
  - oAuth2ClientCredentials: []
paths:
  /registrations:
    post:
      description: Registers a new EAS at an EES.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EASRegistration'
      responses:
        '201':
          description: EAS information is registered successfully at EES.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EASRegistration'
          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'

/registrations/{registrationId}:
  get:
    description: Retrieve an Individual EAS registration resource.
    parameters:
      - name: registrationId
        in: path
        description: Registration Id.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: OK (The EAS registration information at the EES).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EASRegistration'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    description: Fully replace an existing EAS Registration resource.
    parameters:
      - name: registrationId
        in: path
        description: EAS registration Id.
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/json:
```

```
            schema:
              $ref: '#/components/schemas/EASRegistration'
      responses:
        '200':
          description: OK (The EAS registration information is updated successfully).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EASRegistration'
        '204':
          description: >
            No Content. The individual EAS registration information is 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'

    patch:
      description: Partially update an existing EAS Registration resource.
      parameters:
        - name: registrationId
          in: path
          description: EAS registration Id.
          required: true
          schema:
            type: string
      requestBody:
        description: Partial update of an existing EAS registration resource.
        required: true
        content:
          application/merge-patch+json:
            schema:
              $ref: '#/components/schemas/EASRegistrationPatch'
      responses:
        '200':
          description: >
            The Individual EAS registration is successfully modified and the updated
            registration information is returned in the response.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EASRegistration'
        '204':
          description: No Content. The individual EAS registration information is 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: Delete an existing EAS registration at EES.
      parameters:
        - name: registrationId
          in: path
          description: EAS registration Id.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: The individual EAS registration is deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    EASRegistration:
      type: object
      description: Represents an EAS registration information.
      properties:
        easProf:
          $ref: '#/components/schemas/EASProfile'
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - easProf

    EASProfile:
      type: object
      description: Represents the EAS profile information.
      properties:
        easId:
          type: string
```

```
        description: Identifier of the EAS.
      endPt:
        $ref: '#/components/schemas/EndPoint'
      acIds:
        type: array
        items:
          type: string
        minItems: 1
        description: Identities of application clients that are served by the EAS.
      provId:
        type: string
        description: Identifier of the ASP that provides the EAS.
      type:
        $ref: '#/components/schemas/EASCategory'
      flexEasType:
        type: string
        description: The EAS type with flexible value set.
      scheds:
        type: array
        items:
          $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
        minItems: 1
        description: The availability schedule of the EAS.
      svcArea:
        $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ServiceArea'
      svcKpi:
        $ref: '#/components/schemas/EASServiceKPI'
      permLvl:
        type: array
        items:
          $ref: '#/components/schemas/PermissionLevel'
        minItems: 1
        description: level of service permissions supported by the EAS.
      easFeats:
        type: array
        items:
          type: string
        minItems: 1
        description: Service specific features supported by EAS.
      appLocs:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
        minItems: 1
        description: List of DNAI(s) and the N6 traffic information associated with the EAS.
      svcContSupp:
        type: array
        items:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ACRScenario'
        minItems: 1
        description: The ACR scenarios supported by the EAS for service continuity.
      avlRep:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
      status:
        type: string
        description: EAS status information.
    required:
      - easId
      - endPt
    not:
      required: [type, flexEasType]

  EASRegistrationPatch:
    type: object
    description: Represents partial update request of individual EAS registration information.
    properties:
      easProf:
        $ref: '#/components/schemas/EASProfile'
      expTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTimeRm'

  EASServiceKPI:
    type: object
    description: Represents the EAS service KPI information.
    properties:
      maxReqRate:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      maxRespTime:
```

```
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      avail:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      avlComp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      avlGraComp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      avlMem:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      avlStrg:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      connBand:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'

  EndPoint:
    type: object
    description: The end point information to reach EAS.
    properties:
      fqdn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
      ipv4Addrs:
        type: array
        items:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
        minItems: 1
        description: IPv4 addresses of the edge server.
      ipv6Addrs:
        type: array
        items:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv6Addr'
        minItems: 1
        description: IPv6 addresses of the edge server.
      uri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    oneOf:
      - required: [uri]
      - required: [fqdn]
      - required: [ipv4Addrs]
      - required: [ipv6Addrs]

  PermissionLevel:
    anyOf:
    - type: string
      enum:
        - TRIAL
        - GOLD
        - SILVER
        - OTHER
    - 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:
      - TRIAL: Level of service permission supported is TRIAL.
      - GOLD: Level of service permission supported is GOLD.
      - SILVER: Level of service permission supported is SILVER.
      - OTHER: Any other level of service permissions supported.

  EASCategory:
    anyOf:
    - type: string
      enum:
        - UAS
        - V2X
        - OTHER
    - 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:
      - UAS: Category of EAS is for Uncrewed Aerial Services.
      - V2X: Category of EAS is for V2X Services.
      - OTHER: Any other type of EAS category.
```

A.3 Eees_UELocation API

```
openapi: 3.0.0
info:
  title: EES UE Location Information_API
  description: |
    API for EES UE Location Information.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: 1.0.0
externalDocs:
  description: >
    3GPP TS 29.558 V17.0.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eees-uelocation/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /fetch:
    post:
      summary: Fetch an UE location information.
      operationId: FetchUELocation
      tags:
        - Fetch an UE location information
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocationRequest'
      responses:
        '200':
          description: OK (The requested location information)
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocationResponse'
        '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:
    post:
      description: >
        Create a Subscription resource for continious reporting of UE location
        information to the EAS.
      requestBody:
```

```
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/LocationSubscription'
  responses:
    '201':
      description: >
        Created (The individual location information subscription resource
        is created successfully)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/LocationSubscription'
      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:
    LocationInformationNotification:
      '{request.body#/notificationDestination}':
        post:
          requestBody:  # contents of the callback message
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/LocationNotification'
          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'
      UserConsentRevocationNotif:
        '{request.body#/revocationNotifUri}':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/ConsentRevocNotif'
            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'

  /subscriptions/{subscriptionId}:
    get:
      description: Retrieve an Individual location information subscription information.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK (Successfully get the location information subscription).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocationSubscription'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
```

```
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    put:
      description: Fully replace an existing Individual location information Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/LocationSubscription'
      responses:
        '200':
          description: OK (The individual location information subscription was modified
successfully).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/LocationSubscription'
        '204':
          description: No Content.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    patch:
      description: Partially update an existing Individual location information Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      requestBody:
        description: Partial update an existing Individual AC information Subscription.
        required: true
        content:
          application/merge-patch+json:
            schema:
              $ref: '#/components/schemas/LocationSubscriptionPatch'
      responses:
        '200':
          description: >
            OK (The Individual location information Subscription is successfully
            modified and the updated subscription information is returned in the response).
          content:
            application/json:
              schema:
```

```
              $ref: '#/components/schemas/LocationSubscription'
        '204':
          description: >
            No Content (The individual location information subscription was modified successfully).
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    delete:
      description: Delete an existing Individual location information Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: The individual subscription is deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

# Components

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    LocationSubscription:
      type: object
      description: Represents an Individual Location Information Subscription.
```

```
    properties:
      easId:
        type: string
        description: Identifier of the EAS subscribing for location information report.
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      intGrpId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
      extGrpId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      locGran:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/Accuracy'
      locQos:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
      eventReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      requestTestNotification:
        type: boolean
        description: >
          Set to true by the EAS to request the EES to send a test notification.
          Set to false or omitted otherwise.
      revocationNotifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      websockNotifConfig:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsockNotifConfig'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    oneOf:
      - required: [ueId]
      - required: [intGrpId]
      - required: [extGrpId]
    required:
      - easId

  LocationSubscriptionPatch:
    type: object
    description: Represents the partial update of Individual AC Information Subscription.
    properties:
      eventReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      expTime:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      revocationNotifUri:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      locGran:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/Accuracy'
      locQos:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'

  LocationNotification:
    type: object
    description: Represents the filters information for AC Information Subscription.
    properties:
      subId:
        type: string
        description: >
          Identifier of the location information subscription for which the
          location information notification is related to.
      locEvs:
        type: array
        items:
          $ref: '#/components/schemas/LocationEvent'
        minItems: 1
        description: List of notifications with location information.
    required:
      - subId
      - locEvs

  LocationEvent:
    type: object
    description: Location Information event notification.
    properties:
```

```
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      locInf:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
      locInfPred:
        $ref: 'TS29522_AnalyticsExposure.yaml#/components/schemas/UeMobilityExposure'
    oneOf:
      - required: [locInf]
      - required: [locInPred]
    required:
      - ueId

  LocationRequest:
    type: object
    description: To request location information request.
    properties:
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      gran:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/Accuracy'
      locQos:
        $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/LocationQoS'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - ueId

  LocationResponse:
    type: object
    description: Contains the response  location information request.
    properties:
      ueLocation:
        $ref: 'TS29122_MonitoringEvent.yaml#/components/schemas/LocationInfo'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - ueLocation

  ConsentRevocNotif:
    description: >
      Represents the user consent revocation information conveyed in a user consent
      revocation notification.
    type: object
    properties:
      subscriptionId:
        type: string
      consentsRevoked:
        type: array
        items:
          $ref: '#/components/schemas/ConsentRevoked'
        minItems: 1
    required:
      - subscriptionId
      - consentsRevoked

  ConsentRevoked:
    description: Represents the information related to a revoked user consent.
    type: object
    properties:
      ucPurpose:
        $ref: 'TS29503_Nudm_SDM.yaml#/components/schemas/UcPurpose'
      externalId:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalId'
      ueId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
    required:
      - ucPurpose
    oneOf:
    - required: [externalId]
    - required: [ueId]
```

A.4 Eees_UEIdentifier API

```
openapi: 3.0.0

info:
  title: EES UE Identifier Service
  version: 1.0.1
  description: |
    EES UE Identifier Service.
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    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.558 V17.2.0; Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/

security:
  - {}
  - oAuth2ClientCredentials: []

servers:
  - url: '{apiRoot}/eees-ueidentifier/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

paths:
  /fetch:
    post:
      summary: Fetch the identifier of an UE.
      operationId: FetchUEId
      tags:
        - Fetch UE Identifier
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/UserInformation'
      responses:
        '200':
          description: >
            The communicated ACR update information was successfully received.
            The response body contains the feedback of the EES.
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        '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:
    UserInformation:
      description: >
        Represents information about the User or the UE, that used by EES to use 3GPP CN capability
        to retrieve the EAS specific UE identifier.
      type: object
      properties:
        easId:
          description: >
            The application identifier of the EAS, e.g. URI, FQDN, requesting the UE Identifier
            information
          type: string
        easProviderId:
          description: Identifier of the ASP that provides the EAS.
          type: string
        ipAddr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - easId
        - ipAddr
```

A.5 Eees_AppClientInformation API

```
openapi: 3.0.0
info:
  title: EES Application Client Information_API
  description: |
    API for EES Application Client Information.
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    All rights reserved.
  version: 1.0.1
externalDocs:
  description: >
    3GPP TS 29.558 V17.2.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eees-appclientinformation/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /subscriptions:
    post:
      description: Create a Subscription resource for reporting of AC information to the EAS.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACInfoSubscription'
      responses:
        '201':
          description: >
            Created (The individual AC information subscription resource is created successfully)
          content:
            application/json:
              schema:
```

```
              $ref: '#/components/schemas/ACInfoSubscription'
        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:
      ACInformationNotification:
        '{request.body#/notificationDestination}':
          post:
            requestBody: # contents of the callback message
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/ACInfoNotification'
            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'

  /subscriptions/{subscriptionId}:
    get:
      description: Retrieve an Individual AC information subscription information.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
```

```
        type: string
    responses:
      '200':
        description: OK (Successfully get the AC information subscription).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACInfoSubscription'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    description: Fully replace an existing Individual AC information Subscription.
    parameters:
      - name: subscriptionId
        in: path
        description: Subscription Id.
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ACInfoSubscription'
    responses:
      '200':
        description: OK (The individual AC information subscription was modified successfully).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACInfoSubscription'
      '204':
        description: No Content.
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
    patch:
      description: Partially update an existing Individual AC information Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      requestBody:
        description: Partial update an existing Individual AC information Subscription.
        required: true
        content:
          application/merge-patch+json:
            schema:
              $ref: '#/components/schemas/ACInfoSubscriptionPatch'
      responses:
        '200':
          description: >
            OK (The Individual AC information Subscription is successfully modified
            and the updated subscription information is returned in the response).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ACInfoSubscription'
        '204':
          description: >
            No Content (The individual AC information subscription was modified successfully).
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

    delete:
      description: Delete an existing Individual AC information Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: The individual subscription is deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
```

```
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

# Components

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    ACInfoSubscription:
      type: object
      description: Represents an Individual AC Information Subscription.
      properties:
        easId:
          type: string
          description: Identifier of the EAS subscribing for AC information report.
        acFltrs:
          type: array
          items:
            $ref: '#/components/schemas/ACFilters'
          minItems: 1
          description: Filters to retrieve the information about specific ACs.
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
        eventReq:
          $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
        notificationDestination:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        requestTestNotification:
          type: boolean
          description: >
            Set to true by the EAS 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'
      required:
        - easId

    ACInfoSubscriptionPatch:
      type: object
      description: Represents the partial update of Individual AC Information Subscription.
      properties:
        acFltrs:
          type: array
          items:
            $ref: '#/components/schemas/ACFilters'
          minItems: 1
          description: Filters to retrieve the information about specific ACs.
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
        eventReq:
          $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
        notificationDestination:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

    ACFilters:
      type: object
      description: Represents the filters information for AC Information Subscription.
      properties:
        acTypes:
          items:
            type: string
          minItems: 1
```

```
          description: List of AC Types or categories.
        ecspIds:
          items:
            type: string
          minItems: 1
          description: The list of identifiers of ECSPs associated with the EEC.
        acIds:
          items:
            type: string
          minItems: 1
          description: List of identifiers of ACs to be matched.
        svcArea:
          $ref: 'TS29558_Eecs_EESRegistration.yaml#/components/schemas/ServiceArea'
        maxAcKpi:
          $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACServiceKPIs'
        minAcKpi:
          $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACServiceKPIs'
        opSchds:
          type: array
          items:
            $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
          minItems: 1
          description: Operation schedule of EAS to be matched with operation schedule of the AC.
        ueIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1
          description: List of UE identifiers hosting the AC.
        locInfs:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'

    ACInfoNotification:
      type: object
      description: AC Information notification.
      properties:
        subId:
          type: string
          description: >
            Identifier of the AC information subscription for which this notification is related to.
        acInfs:
          type: array
          items:
            $ref: '#/components/schemas/ACInformation'
          minItems: 1
          description: Notifications that include the ACs information matching filter criteria.
      required:
        - subId
        - acInfs

    ACInformation:
      type: object
      description: AC Information matching the filter criteria.
      properties:
        acProfs:
          type: array
          items:
            $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
          minItems: 1
          description: List of profile information of ACs.
        ueIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          minItems: 1
          description: List of UE identifiers hosting the AC.
        ueLocInfs:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      required:
        - acProfs
```

A.6 Eees_SessionWithQoS API

```
openapi: 3.0.0
info:
  title: EES Session with QoS API
```

```
  description: |
    API for EES Session with Qos service.
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    All rights reserved.
  version: 1.0.1
externalDocs:
  description: >
    3GPP TS 29.558 V17.2.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eees-session-with-qos/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /sessions:
    post:
      description: Create a new individual Session with QoS resource.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SessionWithQoS'
      responses:
        '201':
          description: Created (Successful creation)
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SessionWithQoS'
          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/UserPlaneEventNotification'
              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'

    get:
      description: Retrieve all the Session With QoS information.
      parameters:
        - name: eas-id
          in: query
          description: Identifier of the EAS which querying the status of subscriptions.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK (Successful get all of the active subscriptions)
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/SessionWithQoS'
                minItems: 1
                description: >
                  All the subscription information related to the request URI is returned
        '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'

  /sessions/{sessionId}:
    put:
      description: >
        Fully replace an existing Individual Session with QoS resource identified by a sessionId.
      parameters:
        - name: sessionId
          in: path
```

```
        description: Session Id.
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/SessionWithQoS'
    responses:
      '200':
        description: >
          The individual Session with QoS is successfully modified and the updated
          session with QoS context information is returned in the response.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SessionWithQoS'
      '204':
        description: No Content
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  patch:
    parameters:
      - name: sessionId
        in: path
        description: session Id.
        required: true
        schema:
          type: string
    requestBody:
      description: >
        Partial update an existing Individual Session with QoS resource identified by a sessionId.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/SessionWithQoSPatch'
    responses:
      '200':
        description: >
          The individual Session with QoS is successfully modified and the updated
          session with QoS context information is returned in the response.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SessionWithQoS'
      '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'
  delete:
    description: Remove an Individual Session with QoS resource identified by a sessionId.
    parameters:
      - name: sessionId
        in: path
        description: session Id.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          The individual Session with QoS resource matching the sessionId is successfully 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'
  get:
    description: Read a subscription resource for a sessionId.
    parameters:
      - name: sessionId
        in: path
        description: Session Id.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: The subscription information related to the request URI is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SessionWithQoS'
      '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

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    SessionWithQoS:
      type: object
      description: Represents an Individual Session with QoS Subscription.
      properties:
        self:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        easId:
          type: string
          description: Identifier of an EAS.
        ueIpv4Addr:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
        ueIpv6Addr:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv6Addr'
        ipDomain:
          type: string
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        intGrpId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
        extGrpId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
        ipFlows:
          type: array
          items:
            $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/FlowDescription'
          minItems: 1
          description: Contains the flow description for the Uplink and/or Downlink IP flows.
        qosReference:
          type: string
          description: Identifies a pre-defined QoS information.
        altQosReference:
          type: array
          items:
            type: string
          description: >
            Identifies an ordered list of pre-defined QoS information.
            The lower the index of the array for a given entry, the higher the priority.
        events:
          type: array
          items:
            $ref: 'TS29122_AsSessionWithQoS.yaml#/components/schemas/UserPlaneEvent'
          description: Indicates the events subscribed by the EAS.
        sponsorInformation:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/SponsorInformation'
        qosMonInfo:
          $ref: 'TS29122_AsSessionWithQoS.yaml#/components/schemas/QosMonitoringInformation'
        notificationDestination:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        dnn:
```

```
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      maxbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      maxbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      disUeNotif:
        type: boolean
      requestTestNotification:
        type: boolean
        description: >
          Set to true by Subscriber to request the EES to send a test notification
          as defined in 3GPP TS 29.122 [6]. Set to false or omitted otherwise.
      websockNotifConfig:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/WebsockNotifConfig'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - easId
      - ipFlows

  SessionWithQoSPatch:
    type: object
    description: Represents a modification request of Individual Session with QoS Subscription.
    properties:
      ipFlows:
        type: array
        items:
          $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/FlowDescription'
        minItems: 1
        description: Contains the flow description for the Uplink and/or Downlink IP flows.
      qosReference:
        type: string
        description: Identifies a pre-defined QoS information.
      altQosReference:
        type: array
        items:
          type: string
        description: >
          Identifies an ordered list of pre-defined QoS information.
          The lower the index of the array for a given entry, the higher the priority.
      events:
        type: array
        items:
          $ref: 'TS29122_AsSessionWithQoS.yaml#/components/schemas/UserPlaneEvent'
        description: Indicates the events subscribed by the EAS.
      sponsorInformation:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/SponsorInformation'
      qosMonInfo:
        $ref: 'TS29122_AsSessionWithQoS.yaml#/components/schemas/QosMonitoringInformationRm'
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      maxbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRateRm'
      maxbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRateRm'
      disUeNotif:
        type: boolean

  UserPlaneEventNotification:
    type: object
    description: Represents the user plane event notification.
    properties:
      sessionId:
        type: string
        description: >
          String identifying the individual data session information for which
          the QoS event notification is delivered.
      eventReports:
        type: array
        items:
          $ref: 'TS29122_AsSessionWithQoS.yaml#/components/schemas/UserPlaneEventReport'
        minItems: 1
        description: >
          Contains the flow description for the Uplink and/or Downlink IP flows.
    required:
      - sessionId
```

```
        - eventReports
```

A.7 Eees_ACRManagementEvent API

```
openapi: 3.0.0
info:
  title: EES ACR Management Event_API
  description: |
    API for EES ACR Management Event.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: 1.0.3
externalDocs:
  description: >
    3GPP TS 29.558 V17.3.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eees-acrmgntevent/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /subscriptions:
    post:
      description: Create an Individual ACR Management Event Subscription resource.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AcrMgntEventsSubscription'
      callbacks:
        ACRManagementEventsNotification:
          '{request.body#/notificationDestination}':
            post:
              requestBody:  # contents of the callback message
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/AcrMgntEventsNotification'
              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'
    UPPathChangeAvailabilityNotif:
      '{request.body#/notificationDestination}/report-availability':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/AvailabilityNotif'
          responses:
            '204':
              description: No Content. The notification is successful 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'
  responses:
    '201':
      description: Created (Successful creation)
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AcrMgntEventsSubscription'
      headers:
        Location:
          description: 'Contains the URI of the newly created resource'
          required: true
          schema:
            type: string
    '204':
      description: >
        Successful case. The resource has been successfully created and no
        additional content is to be sent in the response message.
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

```
    get:
      description: Retrieve all the ACR Management Events Subscriptions information.
      parameters:
        - name: supp-feat
          in: query
          description: Features supported by the EAS.
          required: false
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      responses:
        '200':
          description: OK (Successful get all of the active subscriptions)
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/AcrMgntEventsSubscription'
                minItems: 1
                description: All the active ACR management events subscriptions
        '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'

  /subscriptions/{subscriptionId}:
    get:
      description: Retrieve an Individual ACR Management Events Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
        - name: supp-feat
          in: query
          description: Features supported by the EAS.
          required: false
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      responses:
        '200':
          description: OK (Successful get the active subscription).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AcrMgntEventsSubscription'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
```

```
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  put:
    description: Fully replace an existing Individual ACR Management Events Subscription.
    parameters:
      - name: subscriptionId
        in: path
        description: Subscription Id.
        required: true
        schema:
          type: string
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/AcrMgntEventsSubscription'
    responses:
      '200':
        description: OK (Successful get the active subscription).
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AcrMgntEventsSubscription'
      '204':
        description: No Content
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  patch:
    parameters:
      - name: subscriptionId
        in: path
        description: Subscription Id.
        required: true
        schema:
          type: string
    requestBody:
      description: Partial update an existing Individual ACR Management Events Subscription.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/AcrMgntEventsSubscriptionPatch'
    responses:
      '200':
```

```
          description: >
            The Individual ACR Management Events Subscription is successfully modified
            and the updated subscription information is returned in the response.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AcrMgntEventsSubscription'
        '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'
    delete:
      description: Delete an existing Individual ACR Management Events Subscription.
      parameters:
        - name: subscriptionId
          in: path
          description: Subscription Id.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: The individual subscription is deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

# Components

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}
```

```yaml
schemas:
  AcrMgntEventsSubscription:
    type: object
    description: Represents an Individual ACR Management Events Subscription.
    properties:
      self:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      easId:
        type: string
        description: Identifier of an EAS.
      eventSubscs:
        type: array
        items:
          $ref: '#/components/schemas/AcrMgntEventSubsc'
        minItems: 1
        description: The subscribed ACR management events.
      evtReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      eventReports:
        type: array
        items:
          $ref: '#/components/schemas/AcrMgntEventReport'
        minItems: 1
        description: The ACR management event report(s).
      availabilityInfo:
        $ref: '#/components/schemas/AvailabilityNotif'
      failEventReports:
        type: array
        items:
          $ref: '#/components/schemas/FailureAcrMgntEventInfo'
        minItems: 1
        description: Failure event reports.
      requestTestNotification:
        type: boolean
        description: >
          Set to true by the EAS 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'
    required:
      - easId
      - eventSubscs
      - notificationDestination

  AcrMgntEventSubsc:
    type: object
    description: Represents an ACR Management Event Subscription.
    properties:
      event:
        $ref: '#/components/schemas/AcrMgntEvent'
      eventFilter:
        $ref: '#/components/schemas/AcrMgntEventFilter'
      evtReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      tgtUeId:
        $ref: '#/components/schemas/TargetUeIdentification'
      dnaiChgType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DnaiChangeType'
      easAckInd:
        type: boolean
      easChars:
        type: array
        items:
          $ref: 'TS24558_Eees_EASDiscovery.yaml#/components/schemas/EasCharacteristics'
        minItems: 1
        description: A list of EAS characteristics.
    required:
      - event

  AcrMgntEventsSubscriptionPatch:
    type: object
    description: >
      Represents a modification request of Individual ACR Management Events Subscription.
```

```
    properties:
      eventSubscs:
        type: array
        items:
          $ref: '#/components/schemas/AcrMgntEventSubsc'
        minItems: 1
        description: The subscribed ACR management events.
      evtReq:
        $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/ReportingInformation'
      notificationDestination:
        $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

  AcrMgntEventsNotification:
    type: object
    description: Represents the ACR management events notification.
    properties:
      subpId:
        type: string
        description: >
          String identifying the Individual ACR Management Events Subscription
          for which the notification is delivered.
      eventReports:
        type: array
        items:
          $ref: '#/components/schemas/AcrMgntEventReport'
        minItems: 1
        description: A list of ACR management event reports.
    required:
      - subpId
      - eventReports

  AcrMgntEventReport:
    type: object
    description: Represents an ACR management event report.
    properties:
      event:
        $ref: '#/components/schemas/AcrMgntEvent'
      timeStamp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      upPathChgInfo:
        $ref: '#/components/schemas/UpPathChangeInfo'
      easEndPoint:
        $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      actStatus:
        $ref: '#/components/schemas/ActStatus'
    required:
      - event

  FailureAcrMgntEventInfo:
    type: object
    description: Represents a failure ACR management event.
    properties:
      event:
        $ref: '#/components/schemas/AcrMgntEvent'
      failureCode:
        $ref: '#/components/schemas/AcrMgntEventFailureCode'
    required:
      - event
      - failureCode

  TargetUeIdentification:
    description: Identifies the target UE information.
    type: object
    properties:
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      intGrpId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
      extGrpId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ExternalGroupId'
      ueIpAddr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
    oneOf:
      - required: [gpsi]
      - required: [intGrpId]
      - required: [extGrpId]
      - required: [ueIpAddr]
```

```
    AvailabilityNotif:
      type: object
      description: >
        Represents the availability information of user plane path management events monitoring
        via the 3GPP 5GC network.
      properties:
        availabilityStatus:
          $ref: '#/components/schemas/AvailabilityStatus'
      required:
        - availabilityStatus

    UpPathChangeInfo:
      description: Represents user plane path change information.
      type: object
      properties:
        ueId:
          $ref: '#/components/schemas/IndUeIdentification'
        dnaiChgType:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DnaiChangeType'
        sourceTrafficRoute:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
        targetTrafficRoute:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RouteToLocation'
        sourceDnai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        targetDnai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        srcUeIpv4Addr:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
        srcUeIpv6Prefix:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
        tgtUeIpv4Addr:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Ipv4Addr'
        tgtUeIpv6Prefix:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
      required:
        - ueId
        - dnaiChgType

    IndUeIdentification:
      description: Represents identification information of a UE.
      type: object
      properties:
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        externalId:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/ExternalId'
        ueIpAddr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/IpAddr'
      oneOf:
        - required: [gpsi]
        - required: [externalId]
        - required: [ueIpAddr]

    AcrMgntEvent:
      anyOf:
      - type: string
        enum:
          - UP_PATH_CHG
          - ACR_MONITORING
          - ACR_FACILITATION
          - ACT_START_STOP
      - type: string
        description: >
          This string represents the ACR management.
      description: |
        Possible values are:
        - UP_PATH_CHG: User plane path change event.
        - ACR_MONITORING: ACR monitoring event.
        - ACR_FACILITATION: ACR facilitation event.
        - ACT_START_STOP: ACT start/stop event.

    AcrMgntEventFilter:
      anyOf:
      - type: string
        enum:
          - INTRA_EDN_MOBILITY
          - INTER_EDN_MOBILITY
```

```
      - type: string
        description: >
          This string represents the ACR Management Event filter.
      description: |
        Possible values are:
        - INTRA_EDN_MOBILITY: Indicates that the ACR Management Event filter is intra-EDN mobility.
        - INTER_EDN_MOBILITY: Indicates that the ACR Management Event filter is inter-EDN mobility.
    ActStatus:
      anyOf:
      - type: string
        enum:
          - ACT_START
          - ACT_STOP
      - type: string
        description: >
          This string represents the ACT status, i.e. ACT start or stop.
      description: |
        Possible values are:
        - ACT_START: Indicates ACT start.
        - ACT_STOP: Indicates ACT stop.

    AcrMgntEventFailureCode:
      anyOf:
      - type: string
        enum:
          - 3GPP_UP_PATH_CHANGE_MON_NOT_AVAILABLE
          - OTHER_REASONS
      - type: string
        description: >
          This string represents the reason for ACR Management subscription failure for an event.
      description: |
        Possible values are:
        - 3GPP_UP_PATH_CHANGE_MON_NOT_AVAILABLE: Indicates that the ACR Management Event
          Subscription failed because user plane path management event notifications from the 3GPP
          network is NOT available. This value is only applicable for the "UP_PATH_CHG",
          "ACR_MONITORING" and "ACR_FACILITATION" events.
        - OTHER_REASONS: Indicates that the ACR Management Event Subscription failed for other
          reasons. This value is applicable for all events.

    AvailabilityStatus:
      anyOf:
      - type: string
        enum:
          - AVAILABLE
          - NOT_AVAILABLE
      - type: string
        description: >
          This string represents the availability status.
      description: |
        Possible values are:
        - AVAILABLE: Indicates availability.
        - NOT_AVAILABLE: Indicates unavailability.
```

A.8 Eees_EECContextRelocation API

```
openapi: 3.0.0
info:
  title: EES EEC Context Relocation API
  description: |
    API for EEC Context Relocation.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: 1.0.1
externalDocs:
  description: >
    3GPP TS 29.558 V17.1.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eees-eeccontextreloc/v1'
    variables:
```

```
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /eec-contexts:
    post:
      description: S-EES transfers the EEC context information to T-EES.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EECContextPush'
      responses:
        '200':
          description: >
            OK. The EEC context has been successfully transferred to the T-EES and
            the EEC is implicitly registered.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EECContextPushRes'
        '204':
          description: No Content. The EEC context has been successfully transferred to the T-EES.
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    get:
      description: T-EES pulls an EEC context information from S-EES.
      parameters:
        - name: ees-id
          in: query
          description: Unique identifier of the requesting EES.
          required: true
          schema:
            type: string
        - name: eec-cntx-id
          in: query
          description: Unique identifier of the EEC context.
          required: true
          schema:
            type: string
        - name: sess-cntxs
          in: query
          description: List of service session context information being requested.
          required: false
          schema:
            $ref: '#/components/schemas/SessionContexts'
      responses:
        '200':
          description: >
            OK (The EEC context information matching the input parameters in the request
            is returned by the S-EES).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EECContext'
        '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:
    SessionContexts:
      type: object
      description: Represents the list of service session contexts information.
      properties:
        sessCntxs:
          type: array
          items:
            $ref: '#/components/schemas/IndividualSessionContext'
          minItems: 1
          description: List of service session contexts information.
      required:
        - sessCntxs

    IndividualSessionContext:
      type: object
      description: Represents a single service session context information.
      properties:
        easId:
          type: string
          description: Identifier of the EAS providing the application services.
        endPt:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        acId:
          type: string
          description: Identifier of the AC for which the service session information is provided.
      required:
        - easId
        - endPt

    EECContextPush:
      type: object
      description: Represents the EEC context push request data.
      properties:
        eesId:
          type: string
          description: Identifier of the S-EES pushing the EEC context information.
        eecCntx:
          $ref: '#/components/schemas/EECContext'
      required:
        - eesId
        - eecCntx

    EECContextPushRes:
      type: object
      description: Represents the EEC context push response data.
      properties:
        implReg:
          $ref: '#/components/schemas/ImplicitRegDetails'
```

```
    ImplicitRegDetails:
      type: object
      description: Represents the EEC implicit registration details.
      properties:
        regId:
          type: string
          description: Identifier of the EEC registration.
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      required:
        - regId

    EECContext:
      type: object
      description: Represents the EEC context information.
      properties:
        eecId:
          type: string
          description: Unique idenitfier of the EEC.
        cntxId:
          type: string
          description: Unique idenitfier assigned to the EEC context.
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        e1Subs:
          type: array
          items:
            type: string
          minItems: 1
          description: List of subscription IDs for the capability expsoure for the EEC ID.
        ueLoc:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
        acProfs:
          type: array
          items:
            $ref: 'TS24558_Eees_EECRegistration.yaml#/components/schemas/ACProfile'
          minItems: 1
          description: List AC profiles.
        sessCntxs:
            $ref: '#/components/schemas/SessionContexts'
      required:
        - eecId
        - cntxId
```

A.9 Eees_EELManagedACR API

```
openapi: 3.0.0
info:
  title: EES EEL Managed ACR Service
  version: 1.0.3
  description: |
    EES EEL Managed ACR Service.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.558 V17.3.0; Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eees-eel-acr/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

paths:
  /request-eelacr:
    post:
      summary: Request the EES (e.g. S-EES) to handle all the operations of an ACR.
      operationId: RequestEELManagedACR
```

```
    tags:
      - Request EEL Managed ACR
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/EELACRReq'
    responses:
      '200':
        description: >
          The requested EEL Managed ACR initiation was successfully received and
          processed. The response body contains the feedback of the EES.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EELACRResp'
      '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:
    get:
      summary: Retrieve all the active ACT Status Subscriptions managed by the EES.
      operationId: GetACTStatusSubscriptions
      tags:
        - ACT Status Subscriptions (Collection)
      responses:
        '200':
          description: >
            OK. All the active ACT status subscriptions managed by the EES shall
            be returned.
          content:
            application/json:
              schema:
                type: array
                items:
                  $ref: '#/components/schemas/ACTStatusSubsc'
        '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'

  post:
    summary: Request the creation of a subscription to ACT status reporting.
    operationId: CreateACTStatusSubsc
    tags:
      - ACT Status Subscriptions (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ACTStatusSubsc'
    responses:
      '201':
        description: >
          Created. The subscription is successfully created and a representation of the
          created Individual ACT Status Subscription resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACTStatusSubsc'
        headers:
          Location:
            description: >
              Contains the URI of the created Individual ACT Status Subscription 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:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      ACTStatusNotification:
        '{$request.body#/notificationUri}/act-status':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/ACTStatusNotif'
            responses:
              '204':
                description: >
                  No Content. The ACT status notification is successfully received
                  and 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}:
    get:
      summary: Retrieve an ACT status subscription resource.
      operationId: GetACTStatusSubscription
      tags:
        - Individual ACT Status Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: Individual ACT Status Subscription identifier.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: >
            OK. The requested real-time UAV status subscription resource is returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ACTStatusSubsc'
        '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:
    EELACRReq:
      description: >
        Represents the parameters to request the EES (e.g. S-EES) to handle all the
        operations of an ACR.
      type: object
```

```
      properties:
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        easCharacs:
          type: array
          items:
            $ref: 'TS24558_Eees_EASDiscovery.yaml#/components/schemas/EasCharacteristics'
          minItems: 1
        appCtxtStoreAddr:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - ueId
        - easCharacs

    EELACRResp:
      description: Represents the feedback of the EES on EEL Managed ACR request.
      type: object
      properties:
        appCtxtStoreAddr:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    ACTStatusSubsc:
      description: >
        Represents the parameters to request the creation of a subscription to ACT
        status reporting.
      type: object
      properties:
        easId:
          type: string
        notificationUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - easId
        - notificationUri

    ACTStatusNotif:
      description: Represents an ACT status notification.
      type: object
      properties:
        subscriptionId:
          type: string
        actStatus:
          $ref: 'TS29558_Eees_ACRStatusUpdate.yaml#/components/schemas/ACTResult'
      required:
        - subscriptionId
        - actStatus

# ENUMS:
```

A.10 Eees_ACRStatusUpdate API

```
openapi: 3.0.0
info:
  title: EES ACR Status Update Service
  version: 1.0.1
  description: |
    EES ACR Status Update Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.558 V17.1.0; Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
```

```
servers:
  - url: '{apiRoot}/eees-acrstatus-update/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122

paths:
  /request-acrupdate:
    post:
      summary: Request to update the information related to ACR (e.g. indicate the status of ACT,
update the notification target address).
      operationId: RequestACRUpdate
      tags:
        - Request ACR Update
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ACRUpdateData'
      responses:
        '200':
          description: >
            The communicated ACR update information was successfully received.
            The response body contains the feedback of the EES.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ACRDataStatus'
        '204':
          description: >
            No Content. The communicated ACR update information was 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: '{tokenUrl}'
          scopes: {}

  schemas:
    ACRUpdateData:
      description: >
        Represents the parameters to update the information related to ACR (e.g. indicate
        the status of ACT, update the notification target address).
      type: object
      properties:
        easId:
```

```
          type: string
        acId:
          type: string
        actResultInfo:
          $ref: '#/components/schemas/ACTResultInfo'
        e3SubscIds:
          type: array
          items:
            type: string
          minItems: 1
        e3NotificationUri:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
      required:
        - easId
      anyOf:
        - required: [actResultInfo]
        - required: [e3SubscIds]
        - required: [e3NotificationUri]

    ACRDataStatus:
      description: Represents the ACR status information.
      type: object
      properties:
        e3SubscsStatus:
          $ref: '#/components/schemas/E3SubscsStatus'
        e3SubscIds:
          type: array
          items:
            type: string
          minItems: 1
      required:
        - e3SubscsStatus

    ACTResultInfo:
      description: Represents the result of ACT and the related information.
      type: object
      properties:
        actResult:
          $ref: '#/components/schemas/ACTResult'
        actFailureCause:
          $ref: '#/components/schemas/ACTFailureCause'
        ueId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        easEndPoint:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
      required:
        - actResult
        - ueId
        - easEndPoint

# ENUMS:

    ACTResult:
      anyOf:
        - type: string
          enum:
          - SUCCESSFUL
          - FAILED
        - type: string
          description: >
            This string represents the result of ACT.
      description: |
        Possible values are:
        - SUCCESSFUL: Indicates that the ACT was successful.
        - FAILED: Indicates that the ACT failed.

    E3SubscsStatus:
      anyOf:
      - type: string
        enum:
        - SUCCESSFUL
        - FAILED
      - type: string
        description: >
            This string represents the status of the initialization of EDGE-3 subscriptions.
      description: |
        Possible values are:
        - SUCCESSFUL: Indicates that the initialization of EDGE-3 subscriptions was successful.
```

```
        - FAILED: Indicates that the initialization of EDGE-3 subscriptions failed.

    ACTFailureCause:
      anyOf:
      - type: string
        enum:
        - ACR_CANCELLATION
        - OTHER
      - type: string
        description: This string represents the cause of ACT failure.
      description: |
        Possible values are:
        - ACR_CANCELLATION: Indicates that the ACT failed due to the cancellation of the ACR.
        - OTHER: Indicates that the ACT failed for other reasons.
```

A.11 Eecs_EESRegistration API

```
openapi: 3.0.0
info:
  title: ECS EES Registration_API
  description: |
    API for EES Registration.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: 1.0.1
externalDocs:
  description: >
    3GPP TS 29.558 V17.1.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eecs-eesregistration/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /registrations:
    post:
      description: Registers a new EES at the Edge Configuration Server.
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EESRegistration'
      responses:
        '201':
          description: EES information is registered successfully at ECS.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EESRegistration'
          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'

  /registrations/{registrationId}:
    get:
      description: Retrieve an Individual EES registration resource.
      parameters:
        - name: registrationId
          in: path
          description: Registration Id.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: OK (The EES registration information at the Edge Configuration Server).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EESRegistration'
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29122_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    put:
      description: Fully replace an existing EES Registration resource.
      parameters:
        - name: registrationId
          in: path
          description: EES Registration Id.
          required: true
          schema:
            type: string
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EESRegistration'
      responses:
        '200':
          description: OK (The EES registration information is updated successfully).
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/EESRegistration'
        '204':
          description: >
            No Content. The individual EES registration information is 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'
  patch:
    description: Partially update an existing EES Registration resource.
    parameters:
      - name: registrationId
        in: path
        description: EES registration Id.
        required: true
        schema:
          type: string
    requestBody:
      description: Partial update an existing EES registration resource.
      required: true
      content:
        application/merge-patch+json:
          schema:
            $ref: '#/components/schemas/EESRegistrationPatch'
    responses:
      '200':
        description: >
          The Individual EES registration is successfully modified and
          the updated registration information is returned in the response.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/EESRegistration'
      '204':
        description: >
          No Content. The individual EES registration information is 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: Delete an existing EES registration at ECS.
```

```
      parameters:
        - name: registrationId
          in: path
          description: Registration Id.
          required: true
          schema:
            type: string
      responses:
        '204':
          description: The individual EES registration is deleted.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:
    EESRegistration:
      type: object
      description: Represents an EES registration information.
      properties:
        eesProf:
          $ref: '#/components/schemas/EESProfile'
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - eesProf

    EESProfile:
      type: object
      description: Represents the EES profile information.
      properties:
        eesId:
          type: string
          description: Identifier of the EES.
        endPt:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/EndPoint'
        easIds:
          type: array
          items:
            type: string
          minItems: 1
          description: Application identifiers of EASs that are registered with EES.
        provId:
          type: string
          description: Identifier of the ECSP that provides the EES provider.
        svcArea:
          $ref: '#/components/schemas/ServiceArea'
        appLocs:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
```

```
        minItems: 1
        description: List of DNAI(s) associated with the EES.
      svcContSupp:
        type: array
        items:
          $ref: '#/components/schemas/ACRScenario'
        minItems: 1
        description: The ACR scenarios supported by the EES for service continuity.
      eecRegConf:
        type: boolean
        description: >
          Set to true if the EEC is required to register to the EES to use edge service.
          Set to false if the EEC is not required to register to use edge services.
    required:
      - eesId
      - endPt
      - eecRegConf

  EESRegistrationPatch:
    type: object
    description: Represents partial update request of individual EES registration information.
    properties:
      eesProf:
        $ref: '#/components/schemas/EESProfile'
      expTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTimeRm'

  ServiceArea:
    type: object
    description: Represents a service area information of the EdgeApp entity.
    properties:
      topServAr:
        $ref: '#/components/schemas/TopologicalServiceArea'
      geoServAr:
        $ref: '#/components/schemas/GeographicalServiceArea'

  TopologicalServiceArea:
    type: object
    description: Represents topological service area information.
    properties:
      ecgis:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ecgi'
        minItems: 1
        description: A list of E-UTRA cell identities.
      ncgis:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ncgi'
        minItems: 1
        description: A list of NR cell identities.
      tais:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
        minItems: 1
        description: A list of tracking area identities.
      plmnIds:
        type: array
        items:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/PlmnId'
        minItems: 1
        description: A list of PLMN identities.

  GeographicalServiceArea:
    type: object
    description: Represents geographical service area information.
    properties:
      geoArs:
        type: array
        items:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
        minItems: 1
        description: A list of geographic area information.
      civicAddrs:
        type: array
        items:
```

```
            $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/CivicAddress'
          minItems: 1
          description: A list of civic address information.

    ACRScenario:
      anyOf:
      - type: string
        enum:
          - EEC_INITIATED
          - EEC_EXECUTED_VIA_SOURCE_EES
          - EEC_EXECUTED_VIA_TARGET_EES
          - SOURCE_EAS_DECIDED
          - SOURCE_EES_EXECUTED
          - EEL_MANAGED_ACR
      - 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:
        - EEC_INITIATED: Represents the EEC initiated ACR scenario.
        - EEC_EXECUTED_VIA_SOURCE_EES: Represents the EEC ACR scenario executed via the S-EES.
        - EEC_EXECUTED_VIA_TARGET_EES: Represents the EEC ACR scenario executed via the T-EES.
        - SOURCE_EAS_DECIDED: Represents the EEC ACR scenario where the S-EAS decides to perform
ACR.
        - SOURCE_EES_EXECUTED: Represents the EEC ACR scenario where S-EES executes the ACR.
        - EEL_MANAGED_ACR: Represents the EEC ACR scenario where the ACR is managed by the Edge
Enabler Layer.
```

A.12 Eecs_TargetEESDiscovery API

```
openapi: 3.0.0
info:
  title: ECS Target EES Discovery API
  description: |
    API for Target EES Discovery.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
  version: 1.0.0
externalDocs:
  description: >
    3GPP TS 29.558 V17.0.0 Enabling Edge Applications;
    Application Programming Interface (API) specification; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.558/
security:
  - {}
  - oAuth2ClientCredentials: []
servers:
  - url: '{apiRoot}/eecs-targeteesdiscovery/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 7.5 of 3GPP TS 29.558.

paths:
  /ees-profiles:
    get:
      description: Retrieve the T-EES information.
      parameters:
        - name: ees-id
          in: query
          description: Unique identifier of the S-EES.
          required: true
          schema:
            type: string
        - name: eas-id
          in: query
          description: Unique identifier of the S-EAS.
          required: true
          schema:
            type: string
        - name: target-dnai
          in: query
          description: The DNAI information associated with the potential T-EES(s) and/or T-EAS(s).
```

```
          required: false
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        - name: ue-id
          in: query
          description: Identifier of the UE.
          required: false
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        - name: ue-location
          in: query
          description: The location information of the UE.
          required: false
          schema:
            $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
      responses:
        '200':
          description: The EDN configuration and the T-EES information determined by ECS.
          content:
            application/json:
              schema:
                $ref: 'TS24558_Eecs_ServiceProvisioning.yaml#/components/schemas/ECSServProvResp'
        '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: {}
```

Annex B (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2021-01	CT3#113e	C3-210300				TS skeleton for Enabling Edge Applications, Application Programming Interface (API) specification; Stage 3.	0.0.0
2021-01	CT3#113e	C3-210322				Inclusion of documents agreed in CT3#113e: C3-210182, C3-210301, C3-210321	0.1.0
2021-03	CT3#114e	C3-211508				Inclusion of documents agreed in CT3#114e: C3-211365, C3-211503, C3-211504, C3-211505, C3-211506, C3-211507	0.2.0
2021-04	CT3#115e	C3-212520				Inclusion of documents agreed in CT3#115e: C3-212367, C3-212368, C3-212369, C3-212370	0.3.0
2021-05	CT3#116e	C3-213328				Inclusion of documents agreed in CT3#116e: C3-213324, C3-213325, C3-213326, C3-213327, C3-213547	0.4.0
2021-08	CT3#117e	C3-214571				Inclusion of documents agreed in CT3#117e: C3-214387, C3-214513, C3-214389, C3-214570, C3-214388, C3-214390, C3-214391, C3-214392	0.5.0
2021-09	CT#93e	CP-212164				Version 1.0.0 created for presentation for information.	1.0.0
2021-10	CT3#118e	C3-215471				Inclusion of documents agreed in CT3#118e: C3-215236, C3-215338, C3-215339, C3-215340, C3-215341, C3-215342, C3-215377, C3-215378	1.1.0
2021-11	CT3#119e	C3-216515				Inclusion of documents agreed in CT3#119e: C3-216182, C3-216347, C3-216348, C3-216385, C3-216386, C3-216396	1.2.0
2022-01	CT3#119-Bis-e	C3-220447				Inclusion of documents agreed in CT3#119-Bis-e: C3-220133, C3-220419, C3-220420, C3-220421, C3-220459, C3-220275, C3-220276	1.3.0
2022-02	CT3#120e	C3-221510				Inclusion of documents agreed in CT3#120e: C3-221401, C3-221635, C3-221408, C3-221636, C3-221407, C3-221637, C3-221630, C3-221631, C3-221632, C3-221633, C3-221634, C3-221410, C3-221726, C3-221727, C3-221687	1.4.0
2022-04	CT3#121e	C3-222481				Inclusion of documents agreed in CT3#121e: C3-222136, C3-222137, C3-222139, C3-222141, C3-222143, C3-222362, C3-222363, C3-222364, C3-222409, C3-222410, C3-222411, C3-222449, C3-222508, C3-222576	1.5.0
2022-05	CT3#122e	C3-223504				Inclusion of documents agreed in CT3#122e: C3-223195, C3-223321, C3-223323, C3-223325, C3-223326, C3-223327, C3-223331, C3-223334, C3-223336, C3-223337, C3-223575, C3-223606, C3-223607, C3-223608, C3-223646, C3-223647, C3-223648, C3-223649, C3-223650, C3-223675, C3-223676, C3-223677, C3-223691, C3-223756, C3-223781, C3-223792, C3-223793, C3-223794	1.6.0
2022-06	CT#96	CP-221100				Presentation to TSG CT for approval	2.0.0
2022-06	CT#96	CP-221100				Approved by TSG CT	17.0.0
2022-09	CT#97e	CP-222097	0001	1	F	Corrections to Eees_EASDiscovery_TeasDiscRequest operation	17.1.0
2022-09	CT#97e	CP-222097	0002	1	F	Add failure handling descriptions for EES services	17.1.0
2022-09	CT#97e	CP-222097	0003	1	F	Add failure handling descriptions for ECS services	17.1.0
2022-09	CT#97e	CP-222097	0004	1	F	Add redirect descriptions for EES services	17.1.0
2022-09	CT#97e	CP-222097	0005	1	F	Add redirect descriptions for ECS services	17.1.0
2022-09	CT#97e	CP-222097	0006	1	F	Corrections on ACRDataStatus and ACTResultInfo	17.1.0
2022-09	CT#97e	CP-222097	0007		F	Corrections on HTTP methods in EES services	17.1.0
2022-09	CT#97e	CP-222097	0008		F	Correction on OpenenAPI Eees_ EECContextRelocation	17.1.0
2022-09	CT#97e	CP-222097	0009		F	Corrections on OpenAPI Eees_EELManagedACR	17.1.0
2022-09	CT#97e	CP-222098	0010	1	F	Corrections to EES APIs definition	17.1.0
2022-09	CT#97e	CP-222098	0011	1	F	Corrections to Eees_EELManagedACR API definition	17.1.0
2022-09	CT#97e	CP-222097	0012		F	Remove unused reference to OMA	17.1.0
2022-09	CT#97e	CP-222205	0014	1	F	Correcting the name of the data type related to availability status information	17.1.0
2022-09	CT#97e	CP-222206	0015	2	F	Clarifications to the "easId"	17.1.0
2022-09	CT#97e	CP-222098	0017	1	F	Corrections to user consent revocation management for the Eees_UELocation API	17.1.0
2022-09	CT#97e	CP-222121	0018		F	Update of info and externalDocs fields	17.1.0
2022-12	CT#98e	CP-223170	0020	1	F	Miscellaneous corrections in EES, ECS services	17.2.0
2022-12	CT#98e	CP-223170	0021	1	F	Correction in Eees_EECContextRelocation , Eees_EELManagedACR API	17.2.0
2022-12	CT#98e	CP-223170	0022	1	F	Correction in Eees_UEIdentifier, Eees_ACRManagementEvent API	17.2.0
2022-12	CT#98e	CP-223170	0023	1	F	Corrections on easId verification in update procedures in EES services	17.2.0
2022-12	CT#98e	CP-223170	0027	1	F	Correction on user consent procedure description	17.2.0
2022-12	CT#98e	CP-223170	0033	1	F	Editor's note resolution for Eees_UEIdentifier	17.2.0
2022-12	CT#98e	CP-223170	0034		F	Essential correction to Application Client Information	17.2.0
2022-12	CT#98e	CP-223170	0035		F	Correction on attribute name within EndPoint	17.2.0
2022-12	CT#98e	CP-223170	0036		F	Correction on request URI for Eees_EECContextRelocation_Push	17.2.0

2022-12	CT#98e	CP-223170	0037	1	F	Corrections on Location information report	17.2.0
2022-12	CT#98e	CP-223170	0039	1	F	Corrections on the Notification Destination URI	17.2.0
2022-12	CT#98e	CP-223170	0040	1	F	Corrections on the Revocation Notification URI	17.2.0
2022-12	CT#98e	CP-223170	0041	1	F	Missing supported features for Eees_UEIdentifier API	17.2.0
2022-12	CT#98e	CP-223170	0042	1	F	Corrections for data types of Eees_ACRManagementEvent service	17.2.0
2022-12	CT#98e	CP-223170	0043		F	Corrections for data types of Eees_SessionWithQoS service	17.2.0
2022-12	CT#98e	CP-223170	0044	1	F	Corrections on presence of the attribute in UserInformation data type	17.2.0
2022-12	CT#98e	CP-223188	0050		F	Update of info and externalDocs fields	17.2.0
2023-03	CT#99	CP-230138	0059	1	F	Corrections to the definition of the EAS type	17.3.0
2023-03	CT#99	CP-230160	0062		F	Update of info and externalDocs fields	17.3.0

History

Document history		
V17.0.0	July 2022	Publication
V17.1.0	September 2022	Publication
V17.2.0	January 2023	Publication
V17.3.0	April 2023	Publication