**3GPP TSG- WG3 Meeting #C3-235520**

**Chicago, United States, 13 - 17 November, 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.549** | **CR** | **0192** | **rev** | **1** | **Current version:** | **18.3.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Edge Load API | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Lenovo | | | | | | | | | |
| ***Source to TSG:*** | C3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ADAES | | | | |  | ***Date:*** | | | 2023-11-1 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Stage 2 has created a new feature i.e. application data analytics enablement (ADAE) service with a new interface towards the SEAL server. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR defines a new API, SS\_ADAE\_EdgeLoadAnalytics, for the reference point with the new ADAE service. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | An API for service API analytics service for the new reference point with the ADAE service does not exist. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.X.7 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

### 7.X.7 SS\_ADAE\_EdgeLoadAnalytics

#### 7.X.7.1 API URI

The SS\_ADAE\_EdgeLoadAnalytics service shall use the SS\_ADAE\_EdgeLoadAnalytics API.

The request URIs used in HTTP requests from the VAL server towards the ADAE server shall have the Resource URI structure as defined in clause 6.5 with the following clarifications:

- The <apiName>shall be "ss-adae-el".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.X.7.2.

Editor's Note: Definitions of service operations descriptions for this API is FFS.

Editor's Note: The OpenAPI for this API is FFS.

#### 7.X.7.2 Resources

##### 7.X.7.2.1 Overview

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

Figure 7.X.7.2.1-1 depicts the resource URIs structure for the SS\_ADAE\_EdgeLoadAnalytics API.



Figure 7.X.7.2.1-1: Resource URI structure of the SS\_ADAE\_EdgeLoadAnalytics API

Table 7.X.7.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.X.7.2.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Description |
| Edge load event subscription | /edge-load/ | POST | Subscription to the event of the edge load analytics and the edge load historic data collection |
| Individual edge load event subscription | /edge-load/{edgeLdId} | GET | Request the retrieval of an existing "Individual subscription to the event of the edge load analytics" resource. |
| PUT | Request the update of an existing "Individual subscription to the event of the edge load analytics" resource. |
| PATCH | Request the modification of an existing "Individual subscription to the event of the edge load analytics" resource. |
| DELETE | Request the deletion of an existing "Individual subscription to the event of the edge load analytics" resource. |

Editor's Note: Detailed definitions for data types are FFS.

##### 7.X.7.2.2 Resource: Edge load event subscription

###### 7.X.7.2.2.1 Description

Edge load event subscription to the event of the slice usage pattern analytics.

###### 7.X.7.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-el/<apiVersion>/edge-load**

This resource shall support the resource URI variables defined in the table 7.X.7.2.2.2-1.

Table 7.X.7.2.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data Type | Definition |
| apiRoot | string | See clause 6.5 |

###### 7.X.7.2.2.3 Resource Standard Methods

7.X.7.2.2.3.1 POST

This method to subscribe to the event of the edge load analytics or the edge load historic data collection and shall support the URI query parameters specified in table 7.X.7.2.2.3.1-1.

Table 7.X.7.2.2.3.1-1: 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 7.X.7.2.2.3.1-2 and the response data structures and response codes specified in table 7.X.7.2.2.3.1-3.

Table 7.X.7.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| EdgeSubs | M | 1 | Subscription to the event of:  - edge load analytics; or  - edge load historic data collection. |

Table 7.X.7.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| EdgeSubs |  |  | 201 (Created) | Subscription to the edge load analytics or to the edge load historic data collection is created. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

Table 7.X.7.2.2.3.1-4: 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}/ss-adae-pa/<apiVersion>/application-performance |

###### 7.X.7.2.2.4 Resource Custom Operations

7.X.7.2.2.4.1 Overview

Table 7.X.7.2.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operation URI | Mapped HTTP method | Description |
| GetLog | /edge-load/GetLog | POST | Retrieves the edge load analytics data |

7.X.7.2.2.4.2 Operation: POST

This method retrieves the edge load analytics data and shall support the URI query parameters specified in table 7.X.7.2.2.4.2-1.

Table 7.X.7.2.2.4.2-1: 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 7.X.7.2.2.4.2-2 and the response data structures and response codes specified in table 7.X.7.2.2.4.2-3.

Table 7.X.7.2.2.4.2-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| EdgeLogReq | M | 1 | Retrieval of to the edge load analytics data |

Table 7.X.7.2.2.4.2-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| EdgeLogResp |  |  | 200 (OK) | The retrieval of the edge load analytics data is successful and returned in the response. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

\* \* \* Next Change \* \* \* \*

#### 7.X.7.3 Notifications

7.X.7.3.1 General

Table 7.X.7.3.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Edge load event notification | {notificationUri} | POST | Notification on the event of the edge load analytics or the edge load historic data collection |

##### 7.X.7.3.2 Edge load event notification

###### 7.X.7.3.2.1 Description

Edge load event notification is to notify on the event of the edge load analytics or the edge load historic data collection.

###### 7.X.7.3.2.2 Notification definition

The POST method shall be used for the event notification and the callback URI shall be the one provided by the consumer during the subscription to the event.

Callback URI: **{notificationUri}**

This method shall support the URI query parameters specified in table 7.X.7.3.2.2-1.

Table 7.X.7.3.2.2-1: URI query parameters supported by the POST method on this resource

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

If the notification is on the edge load analytics and the edge load historic data collection, this method shall support the request data structures specified in table 7.X.7.3.2.2-2 and the response data structures and response codes specified in table 7.X.7.3.2.2-3.

Table 7.X.7.3.2.2-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| EdgeNotif | M | 1 | Notification on:  - edge load analytics; or  - edge load historic data collection. |

Table 7.X.7.3.2.2-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 (No Content) | Notification for the edge load analytics event or the edge load historic data collection is accepted. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [22] shall also apply. | | | | |

\* \* \* Next Change \* \* \* \*

#### 7.X.7.4 Data Model

##### 7.X.7.4.1 General

This clause specifies the application data model supported by the API. Data types listed in clause 6.2 apply to this API.

Table 7.X.7.4.1-1 specifies the data types defined specifically for the SS\_ADAE\_EdgeLoadAnalytics API service.

Table 7.X.7.4.1-1\_SS\_ADAE\_EdgeLoadAnalytics API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| EdgeSubs | 7.X.7.4.2.2 | Subscription to the edge load analytics event |  |
| EdgeNotif | 7.X.7.4.2.3 | Notification information of the edge load analytics event. |  |
| EdgeLogReq | 7.X.7.4.2.4 | Retrieval request of the edge load analytics data |  |
| EdgeLogResp | 7.X.7.4.2.5 | Retrieval response of the edge load analytics data |  |

Table 7.X.7.4.1-2 specifies data types re-used by the SS\_ADAE\_EdgeLoadAnalytics API service:

Table 7.X.7.4.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AnalyticsType | Clause 7.X.1.4.3.3 | Type of analytics for the event of the VAL application performance analytics. |  |
| ConfidenceLevel | 3GPP TS 29.122 [3] | Presents confidence level |  |
| DataCollectReqs | Clause 7.X.1.4.2.7 | Represents requirements for data collection. |  |
| DataProdProfileInfo | Clause 7.X.1.4.2.6 | Presents characteristics of the data producer. |  |
| Dnn | 3GPP TS 29.571 [21] | Identifies a DNN. |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |

##### 7.X.7.4.2 Structured data types

###### 7.X.7.4.2.1 Introduction

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

###### 7.X.7.4.2.2 Type: EdgeSubs

Table 7.X.7.4.2.2-1: Definition of type EdgeSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | C | 0..1 | Identity of the type of the edge load analytics (NOTE 1) |  |
| dataCollectionReq | DataCollectReqs | C | 0..1 | The requirements for edge load data collection subscription (NOTE 2) |  |
| destinationEasId | string | O | 0..1 | Identifier for the destination EAS, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE 3) |  |
| destinationEesId | string | O | 0..1 | Identifier for the destination EES, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE 3) |  |
| dnn | Dnn | O | 0..1 | Target DNN, for which the edge load analytics subscription or the edge load data collection subscription, is requested. (NOTE 3) |  |
| dataProdIds | array(string) | O | 1..N | In case of or the edge load data collection subscription if the request for the data collection is routed via A-DCCF, the list of data producer IDs is needed. |  |
| dataProdProfile | DataProdProfileInfo | O | 0..1 | Characteristics of the data producer to be used when subscribing to edge load analytics or the edge load data collection. |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the edge load analytics if the edge load analytics or the edge load data collection, is prediction. |  |
| area | LocationArea | O | 0..1 | The geographical or service area, to which the edge load analytics subscription or the edge load data collection subscription, is applied. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the edge load analytics subscription or the edge load data collection, applies. |  |
| NOTE 1: This attribute is mandatory if the subscription is to the event of the edge load analytics. This attribute is not used if the subscription is to the event of the edge load data collection. | | | | | |
|  | | | | | |
| NOTE 2: This attribute is mandatory if the subscription is to the event of the edge load data collection. This attribute is not used if the subscription is to the event of the edge load analytics. | | | | | |
|  | | | | | |
| NOTE 3: At least one of these attributes shall be present. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.X.7.4.2.3 Type: EdgeNotif

Table 7.X.7.4.2.3-1: Definition of type EdgeNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsOutputs | array(string) | M | 1..N | Edge load analytics or edge load data collection for prediction or statistics depending on the type. |  |
| analyticsType | AnalyticsType | C | 0..1 | Identity of the type of the edge load analytics or the type of the edge load data collection. (NOTE 1) |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | In case of notification on the edge load analytics, it provides accuracy level if the edge load analytics is prediction. |  |
| destinationEasId | string | O | 0..1 | Identifier for the destination EAS, for which the edge load data collection applies. (NOTE 2) |  |
| destinationEesId | string | O | 0..1 | Identifier for the destination EES, for which the edge load data collection applies. (NOTE 2) |  |
| dnn | Dnn | O | 0..1 | Target DNN for for which the edge load data collection applies. (NOTE 2) |  |
| NOTE 1: This attribute is optional if the notification is on the event of the edge load analytics and is optional if notitfication is on the event of the edge load data collection. | | | | | |
|  | | | | | |
| NOTE 2: At least one of these attributes shall be present. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.X.7.4.2.4 Type: EdgeLogReq

Table 7.X.7.4.2.6-1: Definition of type EdgeLogReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsType | AnalyticsType | M | 1 | Identity of the type of the edge load analytics |  |
| destinationEasId | string | O | 0..1 | Identifier for the destination EAS, for which the edge load data analytics is requested. (NOTE) |  |
| destinationEesId | string | O | 0..1 | Identifier for the destination EES, for which the edge load data analytics is requested. (NOTE) |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Defines the accuracy level for the edge load data analytics if the edge load data analytics is prediction. |  |
| timeInterval | DurationSec | O | 0..1 | The time interval as the start and the end time, to which the edge load data analytics applies. |  |
| NOTE: At least one of these attributes shall be present. | | | | | |
|  | | | | | |

Editor's Note: Detailed definitions for data types are FFS.

###### 7.X.7.4.2.5 Type: EdgeLogResp

Table 7.X.7.4.2.7-1: Definition of type EdgeLogResp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analyticsOutput | array(string) | M | 1..N | Edge load data analytics for prediction or statistics depending on the type. |  |
| analyticsType | AnalyticsType | O | 0..1 | Identity of the type of the edge load data analytics |  |
| confidenceLevel | ConfidenceLevel | O | 0..1 | Provides accuracy level if the edge load analytics is prediction. |  |

Editor's Note: Detailed definitions for data types are FFS.

\* \* \* Next Change \* \* \* \*

#### 7.X.7.5 Error Handling

##### 7.X.7.5.1 General

HTTP error handling shall be supported as specified in clause 6.7.

In addition, the requirements in the following clauses shall apply.

##### 7.X.7.5.2 Protocol Errors

In this release of the specification, there are no additional protocol errors applicable for the SS\_ADAE\_EdgeLoadAnalytics API.

##### 7.X.7.5.3 Application Errors

The application errors defined for SS\_ADAE\_EdgeLoadAnalytics API are listed in table 7.X.7.5.3-1.

Table 7.X.7.5.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
|  |  |  |  |

\* \* \* Next Change \* \* \* \*

#### 7.X.7.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.X.7.6-1 lists the supported features for SS\_ADAE\_EdgeLoadPatternAnalytics API.

Table 7.X.7.6-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
|  |  |  |

\* \* \* End of Changes \* \* \* \*