**3GPP TSG- WG3 Meeting #C3-23XXXX**

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

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.549** | **CR** | **0191** | **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:*** | Slice Usage Pattern API | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Lenovo | | | | | | | | | |
| ***Source to TSG:*** | C3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ADAES | | | | |  | ***Date:*** | | | 2023-10-30 |
|  |  | | | |  | |  | | |  |
| ***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\_SliceUsagePatternAnalytics, 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.6 (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.6 SS\_ADAE\_SliceUsagePatternAnalytics

#### 7.X.6.1 API URI

The SS\_ADAE\_SliceUsagePatternAnalytics service shall use the SS\_ADAE\_SliceUsagePatternAnalytics 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-sup".

- The <apiVersion> shall be "v1".

- The <apiSpecificSuffixes> shall be set as described in clause 7.X.6.2.

#### 7.X.6.2 Resources

##### 7.X.6.2.1 Overview

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

Figure 7.X.6.2.1-1 depicts the resource URIs structure for the SS\_ADAE\_SliceUsagePatternAnalytics API.



Figure 7.X.6.2.1-1: Resource URI structure of the SS\_ADAE\_SliceUsagePatternAnalytics API

Table 7.X.6.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.X.6.2.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Description |
| Slice usage pattern event subscription | /slice-usage-pattern/ | POST | Subscription to the event of the slice usage pattern analytics |
| Slice usage pattern analytics | /slice-usage-pattern-log | GET | Request for slice historic data or slice usage statistics |

##### 7.X.6.2.2 Resource: Slice usage pattern event subscription

###### 7.X.6.2.2.1 Description

Slice usage pattern event subscription to the event of the slice usage pattern analytics.

###### 7.X.6.2.2.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern**

This resource shall support the resource URI variables defined in the table 7.X.6.2.2.2-1.

Table 7.X.6.2.2.2-1: Resource URI variables for this resource

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

###### 7.X.6.2.2.3 Resource Standard Methods

7.X.6.2.2.3.1 POST

This method to subscribe to the event of the slice usage pattern analytics and shall support the URI query parameters specified in table 7.X.6.2.2.3.1-1.

Table 7.X.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 7.X.6.2.2.3.1-2 and the response data structures and response codes specified in table 7.X.6.2.2.3.1-3.

Table 7.X.6.2.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SUPAnalyticsSubs | M | 1 | Subscription to the slice usage pattern analytics event. |

Table 7.X.6.2.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 201 (Created) | Subscription to the slice usage pattern analytics is created. |
| n/a |  |  | 401 (Unauthorized) | The requester for the subscription to the slice usage pattern analytics has failed the authorization and cannot subscribe to the event. |

###### 7.X.6.2.2.4 Resource Custom Operations

None.

##### 7.X.6.2.3 Resource: Slice usage pattern analytics

###### 7.X.6.2.3.1 Description

Retrieval of the historic slice data and request for slice usage statistics.

###### 7.X.6.2.3.2 Resource Definition

Resource URI: **{apiRoot}/ss-adae-sup/<apiVersion>/slice-usage-pattern-log**

This resource shall support the resource URI variables defined in the table 7.X.6.2.3.2-1.

Table 7.X.6.2.3.2-1: Resource URI variables for this resource

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

###### 7.X.6.2.3.3 Resource Standard Methods

7.X.6.2.3.3.1 GET

This method retrieves the slice historic data or the slice usage statistics data and shall support the URI query parameters specified in table 7.X.6.2.3.3.1-1.

Table 7.X.6.2.3.3.1-1: 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 7.X.6.2.3.3.1-2 and the response data structures and response codes specified in table 7.X.6.2.3.3.1-3.

Table 7.X.6.2.3.3.1-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SLogReq | M | 1 | Retrieval of to the slice data |
| SUSLogReq | M | 1 | Retrieval of to the slice usage statistics data |

Table 7.X.6.2.3.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| SLogResp |  |  | 200 (OK) | The retrieval of the slice data is successful and returned in the response. |
| SUSLogResp |  |  | 200 (OK) | The retrieval of the slice usage statistics data is successful and returned in the response. |
| n/a |  |  | 401 (Unauthorized) | The requester for the slice data or the slice usage statistics data has failed the authorization and cannot subscribe to the event. |
| n/a |  |  | 404 (Not Found) | The slice log data or the slice usage statistics data was not found. |

###### 7.X.6.2.3.4 Resource Custom Operations

None.

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

#### 7.X.6.3 Notifications

7.X.6.3.1 General

Table 7.X.6.3.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Slice usage pattern event notification | {notificationUri} | POST | Notification on the Slice usage pattern analytics |

##### 7.X.6.3.2 Slice usage pattern event notification

###### 7.X.6.3.2.1 Description

Slice usage pattern event notification is to notify on the event of the slice usage pattern analytics.

###### 7.X.6.3.2.2 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.6.3.2.2-1.

Table 7.X.6.3.2.2-1: 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 slice usage pattern analytics, this method shall support the request data structures specified in table 7.X.6.3.2.2-2 and the response data structures and response codes specified in table 7.X.6.3.2.2-3.

Table 7.X.6.3.2.2-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SUPAnalyticsNotif | M | 1 | Notification information of the slice usage pattern analytics |

Table 7.X.6.3.2.2-3: 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 slice usage pattern analytics event is accepted. |
| n/a |  |  | 401 (Unauthorized) | The notifier of the slice usage pattern analytics event has failed the authorization. |

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

#### 7.X.6.4 Data Model

##### 7.X.6.4.1 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.6.4.1-1 specifies the data types defined specifically for the SS\_ADAE\_SliceUsagePatternAnalytics API service.

Table 7.X.6.4.1-1\_SS\_ADAE\_SliceUsagePatternAnalytics API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| SUPAnalyticsSubs | 7.X.6.4.2.2 | Subscription to the slice usage pattern analytics event |  |
| SUPAnalyticsNotif | 7.X.6.4.2.3 | Notification information of the slice usage pattern analytics event. |  |
| SLogReq | 7.X.6.4.2.4 | Retrieval request of the slice log data |  |
| SLogResp | 7.X.6.4.2.5 | Retrieval response of the slice log data |  |
| SUSLogReq | 7.X.6.4.2.6 | Retrieval request of the slice usage statistics data |  |
| SUSLogResp | 7.X.6.4.2.7 | Retrieval response of the slice usage statistics data |  |

Table 7.X.6.4.1-2 specifies data types re-used by the SS\_ADAE\_SliceUsagePatternAnalytics API service:

Table 7.X.6.4.1-2: Re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| Accuracy | 3GPP TS 29.122 [3] | Represent the desired level of accuracy of the requested location information. |  |
| 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 |  |
| DataCollectionRequirements | Clause 7.X.1.4.2.7 | Represents requirements for data collection. |  |
| DataType | Clause 7.X.1.4.3.4 | Type of data for the event of the network slice data retrieval. |  |
| Dnn | 3GPP TS 29.571 [21] | Identifies a DNN. |  |
| DurationSec | 3GPP TS 29.122 [3] | Represents a period of time in units of seconds. |  |
| LocationArea | 3GPP TS 29.122 [3] | Represents location information. |  |
| Snssai | 3GPP TS 29.571 [21] | Identifies the S-NSSAI. |  |
| ValTargetUe | Clause 7.3.1.4.2.3 | Indicate either VAL User ID or VAL UE ID. |  |

##### 7.X.6.4.2 Structured data types

###### 7.X.6.4.2.1 Introduction

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

###### 7.X.6.4.2.2 Type: SUPAnalyticsSubs

Table 7.X.6.4.2.2-1: Definition of type SUPAnalyticsSubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analytics-type | AnalyticsType | M | 1 | Identity of the type of the slice usage pattern analytics |  |
| slice-id | Snssai | M | 1 | Identity of the network slice |  |
| dnn | Dnn | O | 1 | Associated target DNN |  |
| slice-requirement | NetworkSliceType | O | 1 | Identity the the required slice type |  |
| val-ue-list | array(ValTargetUe) | O | 1..N | A list of identities of one or more VAL UEs, whose slice usage patterns are subscribed to. |  |
| val-server-id | string | O | 1 | If the consumer is different from the VAL server, this identifier represents the VAL server, to which the slice usage pattern analytics subscription is applied. |  |
| confidence-level | ConfidenceLevel | O | 1 | Defines the accuracy level for the slice usage pattern analytics if the slice usage pattern analytics is prediction. |  |
| area | LocationArea | O | 1 | The geographical or service area, to which the slice usage pattern analytics subscription is applied. |  |
| time-interval | DurationSec | O | 1 | The time interval as the start and the end time, to which the slice usage pattern analytics subscription is applied. |  |
| historic-time-interval | DurationSec | O | 1 | The historic time interval as the start and the end time, to which the slice usage pattern analytics subscription is applied. |  |

###### 7.X.6.4.2.3 Type: SUPAnalyticsNotif

Table 7.X.6.4.2.3-1: Definition of type SUPAnalyticsNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| analytics-output | array(string) | M | 1..N | Slice usage pattern analytics for prediction or statistics depending on the type. |  |

###### 7.X.6.4.2.4 Type: SLogReq

Table 7.X.6.4.2.4-1: Definition of type SLogReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| slice-id | Snssai | M | 1 | Identity of the network slice |  |
| data-collection-requirements | DataCollectionRequirements | M | 1 | The requirements for data collection |  |
| val-service-id | string | O | 1 | The identifier of the VAL service which is associated with network slice |  |
| analytics-id | string | O | 1 | To identify the requested analytics for the data collection. |  |
| data-producer-id-list | array(string) | O | 1..N | If the request for the data collection is routed via A-DCCF, the list of data producer IDs is needed. |  |
| val-ue-list | array(ValTargetUe) | O | 1..N | A list of identities of one or more VAL UEs, for which the slice data applies. |  |
| val-server-id | string | O | 1 | The identifier represents the VAL server, to which the slice data applies. |  |
| area | LocationArea | O | 1 | The geographical or service area, to which the slice data applies. |  |
| time-interval | DurationSec | O | 1..2 | The time interval as the start and the end time, to which the slice data applies. |  |

###### 7.X.6.4.2.5 Type: SLogResp

Table 7.X.6.4.2.5-1: Definition of type SLogResp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| data-output | array(string) | M | 1..N | Reported data |  |
| slice-id | Snssai | M | 1 | Represents identity of the network slice. |  |
| val-ue-list | array(ValTargetUe) | O | 1..N | A list of identities of one or more VAL UEs, for which the data applies. (NOTE) |  |
| val-server-id | string | O | 1 | This identifier of the target VAL server for which the data applies. (NOTE) |  |
| analytics-id | string | O | 1 | Represents identity of the analytics. |  |
| data-type | DataType | O | 1 | Represents type of the output data, associated with network slice. |  |
| NOTE: One of val-ue-list and val-server-id shall be present based on the data collection event. | | | | | |

###### 7.X.6.4.2.6 Type: SUSLogReq

Table 7.X.6.4.2.6-1: Definition of type SUSLogReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| data-id | string | M | 1 | Identity of the slice usage statistics data which is to be collected. |  |
| val-service-id | string | M | 1 | The identifier of the VAL service, for which the request applies. |  |
| Slice-id | Snssai | M | 1 | Identity of the network slice, for which the slice usage statistics data is collected. |  |
| dnn | Dnn | O | 1 | Associated DNN, for which the request applies. |  |
| val-ue-list | array(ValTargetUe) | O | 1..N | A list of identities of one or more VAL UEs, for which the request applies. |  |
| area | LocationArea | O | 1 | The geographical or service area, to which the slice usage statistics data applies. |  |
| time-interval | DurationSec | M | 1..2 | The time interval as the start and the end time, to which the slice usage statistics data applies. |  |

###### 7.X.6.4.2.7 Type: SLogResp

Table 7.X.6.4.2.7-1: Definition of type SLogResp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| data-output | array(string) | M | 1..N | Reported data |  |
| slice-id | Snssai | M | 1 | Represents identity of the network slice. |  |

##### 7.X.6.4.3 Simple data types and enumerations

###### 7.X.6.4.3.1 Introduction

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

###### 7.X.6.4.3.2 Simple data types

None.

###### 7.X.6.4.3.3 Enumeration: NetworkSliceType

Table 7.X.6.4.3.3-1: Enumeration NetworkSliceType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| NETWORK\_SLICE\_EMBB | Slice suitable for the handling of 5G enhanced Mobile Broadband. |  |
| NETWORK\_SLICE\_URLLC | Slice suitable for the handling of ultra- reliable low latency  communications. |  |
| NETWORK\_SLICE\_MIOT | Slice suitable for the handling of massive IoT. |  |
| NETWORK\_SLICE\_V2X | Slice suitable for the handling of V2X services. |  |
| NETWORK\_SLICE\_HMTC | Slice suitable for the handling of High-Performance Machine-Type  Communications. |  |

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

#### 7.X.6.5 Error Handling

##### 7.X.6.5.1 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.6.5.2 Protocol Errors

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

##### 7.X.6.5.3 Application Errors

The application errors defined for SS\_ADAE\_SliceUsagePatternAnalytics API are listed in table 7.X.6.5.3-1.

Table 7.X.6.5.3-1: Application errors

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

Editor's note: The application errors for the SS\_ADAE\_SliceUsagePatternAnalytics API are FFS.

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

#### 7.X.6.6 Feature Negotiation

General feature negotiation procedures are defined in clause 6.8. Table 7.X.6.6-1 lists the supported features for SS\_ADAE\_SliceUsagePatternAnalytics API.

Table 7.X.6.6-1: Supported Features

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

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