**3GPP TSG CT WG3 Meeting #137 *C3-245080***

**Hefei, CN, 14 - 18 October, 2024**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **0323** | **rev** | **-** | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** | Adaptive reporting in the SS\_LocationReporting API | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | , Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eLSAPP | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19) Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This CR implements the agreed CR#0304 of TS 23.434 to suppport the adaptive reporting in location management service. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR introduces the adaptive reporting support in Location Management Service | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage 2 requirements are not implemented in Stage 3. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.1, 5.2.1.2.1, 5.2.1.2.7 (new), 7.1.1.3.1, 7.1.1.3.3 (new), 7.1.1.4.1, 7.1.1.4.2.2, 7.1.1.4.3.5 (new), 7.1.1.4.3.6 (new), 7.1.1.6, A.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 provides a backwards compatible feature for the SS\_LocationReporting API. | | | | | | | | |
| ***()*** | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

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

## 5.1 Introduction of SEAL services

The table 5.1-1 lists the SEAL 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 SEAL Service APIs

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | Operation Semantics | Consumer(s) |
| SS\_LocationReporting | Create\_Trigger\_Location\_Reporting | Request/ Response | VAL server |
| Fetch\_Location\_Report\_Trigger | Request/Response | VAL server |
| Update\_Trigger\_Location\_Reporting | Request/ Response | VAL server |
| Cancel\_Trigger\_Location\_Reporting | Request/ Response | VAL server |
| Notify\_Trigger\_Location\_Reporting | Notify | VAL server |
| Notify\_Adaptive\_Configuration | Notify | VAL server |
| SS\_LocationInfoEvent | Subscribe\_Location\_Info | Subscribe/Notify | VAL server |
| Update\_Location\_Info\_Subscription | VAL server |
| Unsubscribe\_Location\_Info | VAL server |
| Notify\_Location\_Info | VAL server |
| SS\_LocationInfoRetrieval | Obtain\_Location\_Info | Request/ Response | VAL server |
| SS\_LocationAreaInfoRetrieval | Obtain\_UEs\_Info | Request/ Response | VAL server |
| SS\_LocationMonitoring | Subscribe\_Location\_Monitoring | Subscribe/Notify | VAL server |
| Update\_Location\_Monitoring\_Subscription |
| Unsubscribe\_Location\_Monitoring |
| Notify\_Location\_Monitoring\_Events |
| SS\_LocationAreaMonitoring | Subscribe\_Location\_Area\_Monitoring | Subscribe/Notify | VAL server |
| Notify\_Location\_Area\_Monitoring\_Events |
| Update\_Location\_Area\_Monitoring\_Subscribe |
| Unsubscribe\_Location\_Area\_Monitoring |
| SS\_VALServiceAreaConfiguration | Configure\_VAL\_Service\_Area | Request/Response | VAL server |
| Obtain\_VAL\_Service\_Area | Request/Response | VAL server |
| Update\_VAL\_Service\_Area | Request/Response | VAL server |
| Delete\_VAL\_Service\_Area | Request/Response | VAL server |
| Subscribe\_VAL\_Service\_Area\_Change\_Event | Subscribe/Notify | SEAL server |
| Update\_Subscription\_VAL\_Service\_Area\_Change\_Event |
| Unsubscribe\_VAL\_Service\_Area\_Change\_Event |
| Notify\_VAL\_Service\_Area\_Change\_Event |
| SS\_GroupManagement | Query\_Group\_Info | Request/ Response | VAL server |
| Update\_Group\_Info | Request/ Response | VAL server |
| Create\_Group | Request/ Response | VAL server |
| Delete\_Group | Request/Response | VAL server |
| SS\_GroupManagementEvent | Subscribe\_Group\_Info\_Modification | Subscribe/Notify | VAL server |
| Notify\_Group\_Info\_Modification | VAL server |
| Notify\_Group\_Creation | VAL server |
| SS\_UserProfileRetrieval | Obtain\_User\_Profile | Request/ Response | VAL server |
| SS\_VALServiceData | Obtain\_VAL\_Service\_Data | Request/Response | SEAL server |
| SS\_UserProfileEvent | Subscribe\_User\_Profile\_Update | Subscribe/Notify | VAL server |
| Notify\_User\_Profile\_Update | VAL server |
| SS\_NetworkResourceAdaptation  (NOTE 3) | Reserve\_Network\_Resource | Request/Response | VAL server |
| Request\_Unicast\_Resource | Request/Response | VAL server |
| Update\_Unicast\_Resource | Request/Response | VAL server |
| Request\_Multicast\_Resource | Request/Response | VAL server |
| Notify\_UP\_Delivery\_Mode | Subscribe/Notify | VAL server |
| Discover\_TSC\_Stream\_Availability | Request/Response | VAL server |
| Create\_TSC\_Stream | Request/Response | VAL server |
| Delete\_TSC\_Stream | Request/Response | VAL server |
| Create\_MBS\_Resource | Request/Response | VAL server |
| Update\_MBS\_Resource | Request/Response | VAL server |
| Delete\_MBS\_Resource | Request/Response | VAL server |
| Activate\_MBS\_Resource | Request/Response | VAL server |
| Deactivate\_MBS\_Resource | Request/Response | VAL server |
| Reliable\_Transmission\_Request | Request/Response | e.g., SEALDD Server, VAL Server |
| Subscribe\_Unified\_Traffic\_Pattern\_and\_Monitoring\_Management | Subscribe/Notify | VAL server |
| Update\_Unified\_Traffic\_Pattern\_and\_Monitoring\_Management\_Subscription |
| Unsubscribe\_Unified\_Traffic\_Pattern\_and\_Monitoring\_Management |
| Notify\_Unified\_Traffic\_Pattern\_Update |
| SS\_EventsMonitoring | Subscribe\_Monitoring\_Events | Subscribe/Notify | VAL server |
| Notify\_Monitoring\_Events |
| SS\_Events | Subscribe\_Event | Subscribe/Notify | VAL server |
| Notify\_Event | VAL server |
| Unsubscribe\_Event | VAL server |
| Update\_Subscription | VAL server |
| SS\_KeyInfoRetrieval | Obtain\_Key\_Info | Request/Response | VAL server |
| SS\_KMParametersProvisioning | Request | Request/Response | VAL server |
| SS\_NetworkResourceMonitoring | Subscribe\_Unicast\_QoS\_Monitoring\_Data | Subscribe/Notify | VAL server |
| Unsubscribe\_Unicast\_QoS\_Monitoring\_Data | VAL server |
| Notify\_Unicast\_QoS\_Monitoring\_Data | VAL server |
| Obtain\_Unicast\_QoS\_Monitoring\_Data | Request/Response | VAL server |
| Update\_Unicast\_QoS\_Monitoring\_Subscription | VAL server |
| SS\_IdmParameterProvisioning | Provide\_Configuration | Request/Response | VAL server |
| Get\_Configuration |
| Update\_Configuration |
| Delete\_Configuration |
| SS\_ADAE\_VALPerformanceAnalytics | Subscribe\_VAL\_Performance\_Analytics | Subscribe/Notify | VAL server |
| Notify\_VAL\_Performance\_Analytics |
| Unsubscribe\_VAL\_Performance\_Analytics |
| SS\_ADAE\_SlicePerformanceAnalytics API | Subscribe\_Slice\_Performance\_Analytics | Subscribe/Notify | VAL server |
| Notify\_Slice\_Performance\_Analytics |
| Unsubscribe\_Slice\_Performance\_Analytics |
| SS\_ADAE\_Ue2UePerformanceAnalytics | UE-to-UE\_Performance\_Analytics\_Subscribe | Subscribe/Notify | VAL server |
| UE-to-UE\_Performance\_Analytics\_Notify |
| UE-to-UE\_Performance\_Analytics\_Unsubscribe |
| SS\_ADAE\_LocationAccuracyAnalytics | Subscribe\_Location\_Accuracy\_Analytics | Subscribe/Notify | VAL server |
| Notify\_Location\_Accuracy\_Analytics |
| Unsubscribe\_Location\_Accuracy\_Analytics |
| SS\_ADAE\_ServiceApiAnalytics | Subscribe\_Service\_API\_Analytics | Subscribe/Notify | VAL server |
| Notify\_Service\_API\_Analytics |
| Unsubscribe\_Service\_API\_Analytics |
| SS\_ADAE\_SliceUsagePatternAnalytics | Subscribe\_Slice\_Usage\_Pattern\_Analytics | Subscribe/Notify | VAL server, NSCE server |
| Notify\_Slice\_Usage\_Pattern\_Analytics |
| Unsubscribe\_Slice\_Usage\_Pattern\_Analytics |
| Get\_Slice\_Usage\_Stats | Request/Response | VAL server, NSCE server |
| SS\_ADAE\_EdgeLoadAnalytics | Subscribe\_Edge\_Load | Subscribe/Notify | VAL server, EAS, EES  VAL server, EAS, EES  VAL server, EAS, EES |
| Notify\_Edge\_Load |
| Unsubscribe\_Edge\_Load |
| Get\_Edge\_Load\_Data | Request/Response | VAL server, EAS, EES |
| SS\_AADRF\_DataManagement | SS\_AADRF\_DataManagement\_Subscribe | Subscribe/Notify | ADAE server |
| SS\_AADRF\_DataManagement\_Unsubscribe |
| SS\_AADRF\_DataManagement\_Notify |
| NOTE 1: The service operations of SS\_Events API are reused by the SS\_LocationInfoEvent, SS\_LocationMonitoring, SS\_LocationAreaMonitoring, SS\_GroupManagementEvent, SS\_UserProfileEvent and SS\_EventsMonitoring for events related services.  NOTE 2: The service APIs exposed by the SEALDD Server and the corresponding service operations, operation semantics and service consumers are specified in clause 5 of 3GPP TS 29.548 [35].  NOTE 3: The "Create\_MBS\_Resource", "Update\_MBS\_Resource", "Delete\_MBS\_Resource", "Activate\_MBS\_Resource" and "Deactivate\_MBS\_Resource" service operations correspond to the stage 2 "Request\_Multicast/Broadcast\_Resource", "Update\_Multicast/Broadcast\_Resource", "Delete\_Multicast/Broadcast\_Resource", "Activate\_Multicast\_Resource" and "Deactivate\_Multicast\_Resource" service operations defined in clause 14.4.2 of 3GPP TS 23.434 [2].  NOTE 4: The service APIs exposed by the NSCE Server and the corresponding service operations, operation semantics and service consumers are specified in clause 5 of 3GPP TS 29.435 [42]. | | | |

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

Table 5.1-2: API Descriptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Service Name** | **Clause** | **Description** | **OpenAPI Specification File** | **apiName** | **Annex** |
| SS\_LocationReporting | 7.1 | Report Location Information Service. | TS29549\_SS\_LocationReporting.yaml | ss-lr | A.2 |
| SS\_GroupManagement | 7.2 | Group Management Service | TS29549\_SS\_GroupManagement.yaml | ss-gm | A.3 |
| SS\_UserProfileRetrieval | 7.3 | User Profile Retrieval Service | TS29549\_SS\_UserProfileRetrieval.yaml | ss-upr | A.4 |
| SS\_NetworkResourceAdaptation | 7.4 | Network Resource Adaptation Service | TS29549\_SS\_NetworkResourceAdaptation.yaml | ss-nra | A.5 |
| SS\_Events | 7.5 | Events Notify Service | TS29549\_SS\_Events.yaml | ss-events | A.6 |
| SS\_KeyInfoRetrieval  (NOTE 2) | 7.6 | Key Information Retrieval Service | TS29549\_SS\_KeyInfoRetrieval.yaml | ss-kir | A.7 |
| SS\_LocationAreaInfoRetrieval | 7.1 | Location Area Info Retrieval Service | TS29549\_SS\_LocationAreaInfoRetrieval.yaml | ss-lair | A.8 |
| SS\_NetworkResourceMonitoring | 7.4 | Network Resource Monitoring | TS29549\_SS\_NetworkResourceMonitoring.yaml | ss-nrm | A.10 |
| SS\_VALServiceData | 7.3 | VAL Service Data Service | TS29549\_SS\_VALServiceData.yaml | ss-vsd | A.11 |
| SS\_VALServiceAreaConfiguration | 7.1 | VAL Service Area Configuration Service | TS29549\_SS\_VALServiceAreaConfiguration.yaml | ss-vsac | A.12 |
| SS\_KMParametersProvisioning  (NOTE 3) | 7.6 | Key Management Parameters Provisioning Service | TS29549\_SS\_KMParametersProvisioning.yaml | ss-kpp | A.14 |
| SS\_ADAE\_VALPerformanceAnalytics | 7.10 | ADAE VAL performance analytics service | TS29549\_SS\_ADAE\_VALPerformanceAnalytics.yaml | ss-adae-pa | A.15 |
| SS\_ADAE\_SlicePerformanceAnalytics | 7.10 | ADAE slice specific application performance analytics service | TS29549\_SS\_ADAE\_SlicePerformanceAnalytics.yaml | ss-adae-sspa | A.16 |
| SS\_ADAE\_Ue2UePerformanceAnalytics | 7.10 | ADAE UE-to-UE PerformanceAnalytics Service | TS29549\_SS\_ADAE\_Ue2UePerformanceAnalytics.yaml | ss-adae-uupa | A.17 |
| SS\_ADAE\_LocationAccuracyAnalytics | 7.10 | ADAE location accuracy performance analytics service | TS29549\_SS\_ADAE\_LocationAccuracyAnalytics.yaml | ss-adae-laa | A.18 |
| SS\_ADAE\_ServiceApiAnalytics | 7.10 | ADAE service API analytics service | TS29549\_SS\_ADAE\_ServiceApiAnalytics.yaml | ss-adae-sa | A.19 |
| SS\_ADAE\_SliceUsagePatternAnalytics | 7.10 | ADAE slice usage pattern analytics service | TS29549\_SS\_ADAE\_SliceUsagePatternAnalytics.yaml | ss-adae-sup | A.20 |
| SS\_ADAE\_EdgeLoadAnalytics | 7.10.7 | Edge load analytics service | TS29549\_SS\_ADAE\_EdgeLoadAnalytics.yaml | ss-adae-el | A.21 |
| SS\_AADRF\_DataManagement | 7.10.8 | A-ADRF Data Management Service | TS29549\_SS\_AADRF\_DataManagement.yaml | ss-aadrf-datamanagement | A.22 |
| NOTE 1: The APIs exposed by the SEALDD Server are specified in clause 5 of 3GPP TS 29.548 [35].  NOTE 2: The stage 2 requirements for this API are defined in clause 5.3 of 3GPP TS 33.434 [26].  NOTE 3: The stage 2 requirements for this API are defined in clause 5.8 of 3GPP TS 33.434 [26].  NOTE 4: The APIs exposed by the NSCE Server are specified in clause 5 of 3GPP TS 29.435 [42]. | | | | | |

\* \* \* Next change \* \* \* \*

##### 5.2.1.2.1 Introduction

The service operation defined for SS\_LocationReporting API is shown in the table 5.2.1.2.1-1.

Table 5.2.1.2.1-1: Operations of the SS\_LocationReporting API

|  |  |  |
| --- | --- | --- |
| Service operation name | Description | Initiated by |
| Create\_Trigger\_Location\_Reporting | This service operation is used by VAL server to create the trigger to report location information. | VAL server |
| Fetch\_Location\_Report\_Trigger | This service operation is used by VAL server to retrieve the location reporting trigger information. | VAL server |
| Update\_Trigger\_Location\_Reporting | This service operation is used by VAL server to update the trigger to report location information. | VAL server |
| Cancel\_Trigger\_Location\_Reporting | This service operation is used by VAL server to cancel the trigger to report location information. | VAL server |
| Notify\_Trigger\_Location\_Reporting | This service operation is used by LM Server to send the notifications to the VAL Server. | LM Server |
| Notify\_Adaptive\_Configuration | This service operation is used by the LM Server to notify of the suggested adaptive location configuration and request feedback from the service consumer. | LM Server |

\* \* \* Next change \* \* \* \*

##### 5.2.1.2.7 Notify\_Adaptive\_Configuration

###### 5.2.1.2.7.1 General

This service operation is used by the LM Server to notify the suggested adaptive location configuration and request feedback.

###### 5.2.1.2.7.2 Adaptive Location Configuration Notification

Editor's note: The procedure is FFS.

\* \* \* Next change \* \* \* \*

##### 7.1.1.3.1 General

Table 7.1.1.3.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| Location Reporting Notification | {notifUri} | POST | Notify on location event. |
| Adaptive Location Configuration Notification | {notifUri}/configure | configure (POST) | Notify the suggested adaptive location configuration and request feedback. |

\* \* \* Next change \* \* \* \*

#### 7.1.1.3.3 Adaptive Location Configuration Notification

##### 7.1.1.3.3.1 Description

The Adaptive Location Configuration Notification is used by the LM Server to notify the suggested adaptive location configuration and request feedback.

##### 7.1.1.3.3.2 Target URI

The Callback URI **"{notifUri}**/**configure"** shall be used with the callback URI variables defined in table 7.1.1.3.3.2-1.

Table 6.1.5.4.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notifUri | Uri | Contains a string formatted as a URI containing the Callback URI. |

##### 7.1.1.3.3.3 Standard Methods

###### 7.1.1.3.3.3.1 POST

This method shall support the request data structures specified in table 7.1.1.3.3.3.1-1 and the response data structures and response codes specified in table 7.1.1.3.3.3.1-2.

Table 7.1.1.3.3.3.1-1: Data structures supported by the POST Request Body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AdaptConfigNotif | M | 1 | Contains the Adaptive Location Configuration Notification. |

Table 7.1.1.3.3.3.1-2: Data structures supported by the POST Response Body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| AdaptConfigNotifResp | M | 1 | 200 OK | Successful case. The Adaptive Location Configuration Notification is successfully received and Adaptive Location Configuration related information is returned in the response body. |
| n/a |  |  | 307 Temporary Redirect | Temporary redirection.  The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3]. |
| n/a |  |  | 308 Permanent Redirect | Permanent redirection.  The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent.  Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3]. |
| NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [3] shall also apply. | | | | |

Table 7.1.1.3.3.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI representing the end point of an alternative VAL Server towards which the notification should be redirected. |

Table 7.1.1.3.3.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI representing the end point of an alternative VAL Server towards which the notification should be redirected. |

\* \* \* Next change \* \* \* \*

##### 7.1.1.4.1 General

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

Table 7.1.1.4.1-1 specifies the data types defined specifically for the SS\_LocationReporting API service.

Table 7.1.1.4.1-1: SS\_LocationReporting API specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| AdaptConfigNotif | 7.1.1.4.2.6 | Represents the adaptive reporting notification. | eLSApp |
| AdaptConfigNotifResp | 7.1.1.4.2.7 | Represents the adaptive reporting notification response. | eLSApp |
| AdaptiveReporting | 7.1.1.4.3.5 | Represents a desired adaptive reporting configuration mode | eLSApp |
| Confirmation | 7.1.1.4.3.6 | Represents a confirmation response | eLSApp |
| InsideOutsideInd | 7.1.1.4.3.3 | Represents a desired condition of the location reporting, e.g., inside or outside the given area. | TriggeringCriteria |
| LocChangeCond | 7.1.1.4.3.4 | Represents a desired condition of the requested location change | TriggeringCriteria |
| LocationReport | 7.1.1.4.2.5 | Represents the location trigger report. | NotifSupport |
| LocationReportConfiguration | 7.1.1.4.2.2 | Represents the location reporting configuration information. |  |
| LocationReportConfigurationPatch | 7.1.1.4.2.3 | Represents the requested modifications to the location reporting configuration information.  Used to partially update Individual SEAL Location Reporting Configuration resource. | PatchUpdate |
| TriggeringCriteria | 7.1.1.4.2.4 | Represents the location reporting triggering criteria. | TriggeringCriteria |

Table 7.1.1.4.1-2 specifies data types re-used by the SS\_LocationReporting API service.

Table 7.1.1.4.1-2: SS\_LocationReporting API Re-used Data Types

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data type | | Reference | | Comments | | Applicability | |
| Accuracy | | 3GPP TS 29.122 [3] | | Used to represent the desired level of accuracy of the requested location information. | |  | |
| DateTime | | 3GPP TS 29.122 [3] | | Used to represent the date and time. | |  | |
| DurationSec | | 3GPP TS 29.571 [21] | | Used to represent the time interval between successive location reports. | |  | |
| LocationInfo | | 3GPP TS 29.122 [3] | | Used to represent the location information. | | NotifSupport | |
| ScheduledCommunicationTime | | 3GPP TS 29.571 [21] | | Used to represent the scheduled location reporting time interval. | | TriggeringCriteria | |
| SupportedFeatures | | 3GPP TS 29.571 [21] | | Used to negotiate the applicability of optional features defined in table 7.1.1.6-1. | |  | |
| ValTargetUe | | Clause 7.3.1.4.2.3 | | Used to indicate either VAL User ID or VAL UE ID, to which location reporting applies. | |  | |
| ValSvcAreaId | | Clause 7.1.3.4.3.2 | | Used to represent the VAL service area identifier. | | ValSrvArea | |
| Uri | | 3GPP TS 29.122 [3] | | Represents a URI. | | NotifSupport | |

\* \* \* Next change \* \* \* \*

###### 7.1.1.4.2.2 Type: LocationReportConfiguration

Table 7.1.1.4.2.2-1: Definition of type LocationReportConfiguration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| valServerId | string | M | 1 | Represents the VAL server identifier. |  |
| valTgtUe | ValTargetUe | M | 1 | Represents the VAL User ID or VAL UE ID to which the location reporting applies. |  |
| immRep | boolean | O | 0..1 | Indication of immediate reporting. If included, when it is set to true it indicates immediate reporting of the subscribed events, if available. Otherwise, reporting will occur when the event is met. |  |
| monDur | DateTime | O | 0..1 | Represents the time at which the subscription ceases to exist (i.e the reporting trigger becomes invalid). If omitted, there is no time limit. |  |
| repPeriod | DurationSec | O | 0..1 | Indicates the minimum time interval between successive location reports. |  |
| notifUri | Uri | C | 0..1 | Represents the notification URI.  This attribute shall be provided when the "NotifSupport" feature is supported. | NotifSupport |
| accuracy | Accuracy | O | 0..1 | Represents the desired level of accuracy of the requested location information. |  |
| triggCriteria | TriggeringCriteria | O | 0..1 | Represents the location report triggering criteria based on the VAL service area information. | TriggeringCriteria |
| adaptRep | AdaptiveReporting | O | 0..1 | Indicates that adaptive location reporting is requested and includes the adaptive location configuration mode. | eLSApp |
| valSvcAreaIds | array(ValSvcAreaId) | O | 1..N | Represents the VAL service area ID(s). | ValSrvArea |
| suppFeat | SupportedFeatures | C | 0..1 | Used to negotiate the applicability of optional features as defined in clause 7.1.1.6.  This attribute shall be provided only if feature negotiation needs to take place. |  |
| report | LocationReport | O | 0..1 | Represents location report.  This attribute may be present only in the response to a Location Trigger creation/update request. | NotifSupport |

\* \* \* Next change \* \* \* \*

###### 7.1.1.4.2.6 Type: AdaptConfigNotif

Table 7.1.1.4.2.6-1: Definition of type AdaptConfigNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| valTgtUe | ValTargetUe | M | 1 | Represents VAL User ID or UE ID. |  |
| triggCriteria | TriggeringCriteria | M | 1 | Represents the suggested location report triggering criteria. |  |

\* \* \* Next change \* \* \* \*

###### 7.1.1.4.2.7 Type: AdaptConfigNotifResp

Table 7.1.1.4.2.7-1: Definition of type AdaptConfigNotifResp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| confirmation | Confirmation | M | 1 | Represents the confirmation of the Adaptive Location Configuration. |  |

\* \* \* Next change \* \* \* \*

###### 7.1.1.4.3.5 Enumeration: AdaptiveReporting

The enumeration AdaptiveReporting represents the adaptive location configuration mode. It shall comply with the provisions defined in table 7.1.1.4.3.5-1.

Table 7.1.1.4.3.5-1: Enumeration AdaptiveReporting

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| DIRECT\_UPDATE | Indicates that the adaptive location configuration mode is to directly update the LM Client once configuration is adjusted without prior validation. |  |
| SUGGESTIVE\_UPDATE | Indicates that the adaptive location configuration mode is to suggest and validate the planned updates with the service consumer prior to applying them to the LM Client. |  |

\* \* \* Next change \* \* \* \*

###### 7.1.1.4.3.6 Enumeration: Confirmation

The enumeration Confirmation represents a confirmation response. It shall comply with the provisions defined in table 7.1.1.4.3.6-1.

Table 7.1.1.4.3.6-1: Enumeration Confirmation

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| ACCEPT | Indicates the acceptance of the proposed action. |  |
| REJECT | Indicates the rejection of the proposed action. |  |

\* \* \* Next change \* \* \* \*

#### 7.1.1.6 Feature negotiation

General feature negotiation procedures are defined in clause 6.8.

Table 7.1.1.6-1: Supported Features

|  |  |  |
| --- | --- | --- |
| **Feature number** | **Feature Name** | **Description** |
| 1 | PatchUpdate | Indicates the support of the PATCH method for updating an Individual SEAL Location Reporting Configuration resource. |
| 2 | ValSrvArea | This feature indicates the support of VAL service area ID functionality as part of phase-3 of the enhancements to the SEAL framework.  The following functionalities are supported:  - Support the usage of the VAL service area identifier to identify a VAL service area. |
| 3 | TriggeringCriteria | Indicates the support of the triggering criteria for the location reporting trigger as a part of the enhancements to the SEAL framework.  The following functionalities are supported:  - Support location reporting based on triggering criteria information. |
| 4 | NotifSupport | Indicates the support of the notification service operation. |
| 5 | eLSApp | This feature indicates the support of the enhancement to enable application layer support for location services.  The following functionalities are supported:  - Support of adaptive location reporting. |

\* \* \* Next change \* \* \* \*

# A.2 SS\_LocationReporting API

openapi: 3.0.0

info:

title: SS\_LocationReporting

description: |

API for SEAL Location Reporting Configuration.

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version: "1.3.0-alpha.1"

externalDocs:

description: >

3GPP TS 29.549 V19.0.0 Service Enabler Architecture Layer for Verticals (SEAL);

Application Programming Interface (API) specification; Stage 3.

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.549/

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/ss-lr/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

paths:

/trigger-configurations:

post:

description: Creates a new location reporting configuration.

operationId: CreateLocReportingConfig

tags:

- SEAL Location Reporting Configurations (Collection)

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReportConfiguration'

responses:

'201':

description: Location reporting configuration resource is created sucessfully.

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReportConfiguration'

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:

NotifyLocationTriggerEvent:

'{$request.body#/notifUri}':

post:

summary: Notify on location event.

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReport'

responses:

'204':

description: The notification is successfully received.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

AdaptiveReportingConfig:

'{$request.body#/notifUri}/configure':

post:

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/AdaptConfigNotif'

responses:

'200':

description: >

OK. The suggested update of the location reporting configuration is

successfully received. The response body shall contain the feedback

of the VAL Server on whether this location reporting configuration

is accepted or not.

content:

application/json:

schema:

$ref: '#/components/schemas/AdaptConfigNotifResp'

'204':

description: >

The suggested update of the location reporting configuration is

successfully received and accepted.

'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'

/trigger-configurations/{configurationId}:

get:

description: Retrieves an individual SEAL location reporting configuration information.

operationId: RetrieveLocReportingConfig

tags:

- Individual SEAL Location Reporting Configuration (Document)

parameters:

- name: configurationId

in: path

description: String identifying an individual configuration resource.

required: true

schema:

type: string

responses:

'200':

description: The location reporting configuration information.

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReportConfiguration'

'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: Updates an individual SEAL location reporting configuration.

operationId: UpdateLocReportingConfig

tags:

- Individual SEAL Location Reporting Configuration (Document)

parameters:

- name: configurationId

in: path

description: String identifying an individual configuration resource.

required: true

schema:

type: string

requestBody:

description: Configuration information to be updated in location management server.

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReportConfiguration'

responses:

'200':

description: The configuration is updated successfully.

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReportConfiguration'

'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: Deletes an individual SEAL location reporting configuration.

operationId: DeleteLocReportingConfig

tags:

- Individual SEAL Location Reporting Configuration (Document)

parameters:

- name: configurationId

in: path

description: String identifying an individual configuration resource.

required: true

schema:

type: string

responses:

'204':

description: The individual configuration matching configurationId is deleted.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

patch:

description: Modify an existing SEAL Location Reporting Configuration.

operationId: ModifyLocReportingConfig

tags:

- Individual SEAL Location Reporting Configuration (Document)

parameters:

- name: configurationId

in: path

description: Identifier of an individual SEAL location reporting configuration.

required: true

schema:

type: string

requestBody:

required: true

content:

application/merge-patch+json:

schema:

$ref: '#/components/schemas/LocationReportConfigurationPatch'

responses:

'200':

description: >

The individual SEAL location reporting configuration is modified successfully and

a representation of the updated SEAL location reporting configuration is returned

in the request body.

content:

application/json:

schema:

$ref: '#/components/schemas/LocationReportConfiguration'

'204':

description: >

No Content. The individual SEAL location reporting configuration is

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'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

LocationReportConfiguration:

description: Represents the location reporting configuration information.

type: object

properties:

valServerId:

type: string

valTgtUe:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

immRep:

type: boolean

monDur:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

repPeriod:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

notifUri:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

accuracy:

$ref: 'TS29122\_MonitoringEvent.yaml#/components/schemas/Accuracy'

valSvcAreaIds:

type: array

minItems: 1

items:

$ref: 'TS29549\_SS\_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'

description: >

Represents the VAL service area ID(s).

triggCriteria:

$ref: '#/components/schemas/TriggeringCriteria'

adaptRep:

$ref: '#/components/schemas/AdaptiveReporting'

suppFeat:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

report:

$ref: '#/components/schemas/LocationReport'

required:

- valServerId

- valTgtUe

LocationReportConfigurationPatch:

description: Represents the location reporting configuration information patch.

type: object

properties:

valTgtUe:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

monDur:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

repPeriod:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

notifUri:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Uri'

accuracy:

$ref: 'TS29122\_MonitoringEvent.yaml#/components/schemas/Accuracy'

valSvcAreaIds:

type: array

minItems: 1

items:

$ref: 'TS29549\_SS\_VALServiceAreaConfiguration.yaml#/components/schemas/ValSvcAreaId'

description: >

Represents the VAL service area ID(s).

triggCriteria:

$ref: '#/components/schemas/TriggeringCriteria'

TriggeringCriteria:

description: Represents the location reporting triggering criteria.

type: object

properties:

reportingMode:

$ref: 'TS29508\_Nsmf\_EventExposure.yaml#/components/schemas/NotificationMethod'

repPer:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'

locChgCond:

$ref: '#/components/schemas/LocChangeCond'

ioInd:

$ref: '#/components/schemas/InsideOutsideInd'

repSchedules:

type: array

minItems: 1

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ScheduledCommunicationTime'

description: >

Indicates the requested reporting schedule, e.g., day(s) of the week

and/or time period(s) for the location reporting.

required:

- reportingMode

LocationReport:

description: Represents the location trigger report.

type: object

properties:

subscriptionId:

type: string

description: >

Represents the identifier of the subscription to which the location

reporting notification is related.

valTgtUe:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

locInfo:

$ref: 'TS29122\_MonitoringEvent.yaml#/components/schemas/LocationInfo'

timeStamp:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/DateTime'

required:

- subscriptionId

- valTgtUe

- locInfo

AdaptConfigNotif:

description: Represents the adaptive reporting notification.

type: object

properties:

valTgtUe:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

triggCriteria:

$ref: '#/components/schemas/TriggeringCriteria'

required:

- valTgtUe

- triggCriteria

AdaptConfigNotifResp:

description: Represents the adaptive reporting notification response.

type: object

properties:

confirmation:

$ref: 'TS29549\_SS\_UserProfileRetrieval.yaml#/components/schemas/Confirmation'

required:

- confirmation

# Simple data types and Enumerations

InsideOutsideInd:

anyOf:

- type: string

enum:

- INSIDE

- OUTSIDE

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration and is not used to encode

content defined in the present version of this API.

description: |

Represents a desired condition of the location reporting,

e.g., inside or outside the given area.

Possible values are:

- INSIDE: Indicates that the reporting shall occur when the UE is inside the given location.

- OUTSIDE: Indicates that the reporting shall occur when the UE is outside the given

location.

LocChangeCond:

anyOf:

- type: string

enum:

- CELL

- NODEB

- TA\_RA

- WLAN\_AN

- CIVIC\_ADDR

- GPS

- SAI

- ECGI

- RAT

- VAL\_SERVICE\_AREA

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration and is not used to encode

content defined in the present version of this API.

description: |

Represents a desired condition of the requested location change.

Possible values are:

- CELL: The condition is cell change.

- NODEB: The condition is eNodeB or gNodeB change.

- TA\_RA: The condition is TA or RA change.

- WLAN\_AN: The condition is WLAN access network change (e.g., SSID or BSSID change).

- CIVIC\_ADDR: The condition is civic address change.

- GPS: The condition is GPS coordinate change.

- SAI: The condition is SAI change..

- ECGI: The condition is ECGI change.

- RAT: The condition is RAT change.

- VAL\_SERVICE\_AREA: The condition is VAL service area change.

AdaptiveReporting:

anyOf:

- type: string

enum:

- DIRECT\_UPDATE

- SUGGESTIVE\_UPDATE

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration and is not used to encode

content defined in the present version of this API.

description: |

Represents a desired adaptive reporting configuration mode.

Possible values are:

- DIRECT\_UPDATE: indicates the SEAL LMS to directly update the SEAL

LM client once configuration is adjusted.

- SUGGESTIVE\_UPDATE: Indicates that the VAL Server subscribes to receive

the suggested configurations from the SEAL LMS. The related notifications

shall be sent by SEAL LMS before updating to the SEAL LM client.

Confirmation:

anyOf:

- type: string

enum:

- ACCEPT

- REJECT

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration and is not used to encode

content defined in the present version of this API.

description: |

Represents a confirmation response.

Possible values are:

- ACCEPT: Indicates the acceptance of the proposed action.

- REJECT: Indicates the rejection of the proposed action.

\* \* \* End of changes \* \* \* \*