**3GPP TSG-CT3 Meeting #112e C3-205039\_r1**

**E-Meeting, 04th – 13th November 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.122** | **CR** | **0291** | **rev** | **1** | **Current version:** | **16.7.0** |  |
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| *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:*** | Essential corrections and alignments | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SBIProtoc16 | | | | |  | ***Date:*** | | | 2020-10-?? |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The following corrections and alignments are necessary:   * The "Resource URI" column of Tables 5.x.3.1-1 of some APIs defined in this specification should contain a relative URI below root instead of a full resource URI, as per the statements in the associated clauses 5.x.3.1: "All resource URIs in the subclauses below are defined relative to the above root API URI", i.e. "{apiRoot}/<apiName>/<apiVersion>/". * Some necessary editorial corrections across the specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Update the "Resource URI" column of Tables 5.x.3.1-1 by replacing the full resource URI with the associated relative URI below root, i.e. by removing the part "{apiRoot}/<apiName>/<apiVersion>". * Some additional editorial corrections and improvements. | | | | | | | | |
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| ***Consequences if not approved:*** | | Necessary corrections are not applied. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2, 4.3.1, 4.3.2, 4.4.2.1, 4.4.2.2.1, 4.4.2.2.2.1, 4.4.2.2.2.2, 4.4.2.2.2.3, 4.4.2.2.3, 4.4.2.2.4.2, 4.4.2.2.4.3, 4.4.2.3, 4.4.2.5, 4.4.4, 5.2.5.1, 5.2.5.4, 5.3.1, 5.3.2.1.2, 5.3.3.1, 5.3.4, 5.4.3.1, 5.5.3.1, 5.6.3.1, 5.7.3.1, 5.8.2.2.1, 5.8.3.2.1, 5.9.3.1, 5.10.3.1, 5.11.3.1, 5.12.3.1, 5.13.3.1, 5.14.3.1, 5.16.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not impact OpenAPI specification files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev 1: The following changes have been done:   * Keep only "HTTP response" instead of "PUT/POST/DELETE HTTP response". * Correct table content style to "TAL". * Add similar changes to clause 5.12.3.1. | | | | | | | | |

\* \* \* Start of changes \* \* \* \*

4.2 Reference model

The T8 reference point resides between the SCEF and the SCS/AS as depicted in figure 4.2.1. The overall SCEF architecture is depicted in subclause 4.2 of 3GPP TS 23.682 [2].

NOTE: The SCS/AS can be provided by a third party.

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**Figure 4.2.1: T8 reference model**

\* \* \* Next changes \* \* \* \*

4.3.1 SCEF

The SCEF is a functional element which provides means to securely expose the services and capabilities provided by 3GPP network interfaces. The SCEF provides access to network capabilities through homogenous application programming interfaces.

Individual instances of SCEF may vary depending on what service capabilities are exposed and what API features are supported.

The SCEF shall protect the other PLMN entities (e.g. HSS, MME) from requests exceeding the permission arranged in the SLA with the third-party service provider.

When needed, the SCEF supports mapping between information exchanged with SCS/AS (e.g. geographical identifiers) and information exchanged with internal PLMN functions (e.g. cell-Id, eNB-Id, TAI, MBMS SAI, etc.). This mapping is assumed to be provided by the SCEF based on local configuration data.

\* \* \* Next changes \* \* \* \*

4.3.2 SCS/AS

The SCS is the entity which connects MTC application servers to the 3GPP network to enable them to communicate through specific 3GPP defined services with UEs used for MTC and with the SCEF in the HPLMN. The SCS offers capabilities for use by one or multiple MTC application servers. The MTC applications in the external network are hosted on one or more ASs.

An SCS/AS can get services from multiple SCEFs, and an SCEF can provide services to multiple SCS/ASs.

The SCS is controlled by the operator of the HPLMN or by a MTC Service Provider.

The AS can be controlled by a 3rd party.

\* \* \* Next changes \* \* \* \*

4.4.2.1 General

These procedures are used to perform event monitoring functions via the T8 interface, which include:

- Monitoring event configuration, as specified in subclause 4.4.2.2;

- Reporting of monitoring event, as specified in subclause 4.4.2.3;

- Network initiated notifications of monitoring event cancellation, as specified in subclause 4.4.2.4 ; and

- Network initiated notifications of applied parameter configuration, as specified in subclause 4.4.2.5.

\* \* \* Next changes \* \* \* \*

4.4.2.2.1 General

In order to subscribe to a new monitoring event configuration, the SCS/AS shall send an HTTP POST message to the SCEF targeting the resource "Monitoring Event Subscriptions". The body of the HTTP POST message shall include:

- SCS/AS Identifier;

- Monitoring Type;

- Notification Destination Address; and

- One of External Identifier, MSISDN or External Group Identifier. The External Identifier or the MSISDN identifies the subscription of an individual UE and the External Group Identifier points to a group of UEs.

- In addition, the HTTP POST request may include:

- Maximum Number of Reports;

- Monitoring Duration indicated by the property "monitorExpireTime";

- Group Reporting Guard Time.

If the Subscription\_modification feature is supported, the SCS/AS may send an HTTP PUT message in order to update an existing monitoring event subscription. The HTTP PUT request targets the resource "Individual Monitoring Event Subscription" replacing all properties in the existing configuration.

For one-time monitoring type of requests, the SCS/AS shall include the Maximum Number of Reports with a value set to 1 and not include the Monitoring Duration in the HTTP request message sent to the SCEF.

Upon receipt of the HTTP POST or PUT request message, if the SCS/AS is authorized to perform such request, the SCEF shall check whether the parameters (e.g. Maximum Number of Reports, Monitoring Duration, Maximum Latency, Maximum Response Time, Suggested number of downlink packets) in the HTTP request body are within the range defined by operator policies. If one or more of these parameters are not within the range, the SCEF shall:

- either reject the request message by sending an HTTP response to the SCS/AS with a status code set to 403 Forbidden and may include the "PARAMETER\_OUT\_OF\_RANGE" error in the "cause" attribute of the "ProblemDetails" structure and indicate which parameters are out of the range in the "invalidParams" attribute of the "ProblemDetails" structure; or

- modify the parameters which are not within the range by selecting different values which are in the range.

For individual UE configuration requests, the SCEF shall also check whether the Idle Status Indication is included for UE reachability event. If the Idle Status Indication is received in the request but not supported by the network, the SCEF may reject the request message by sending an HTTP response to the SCS/AS with a status code set to 403 Forbidden and may include the "IDLE\_STATUS\_UNSUPPORTED" error in the "cause" attribute of the "ProblemDetails" structure.

If the SCEF receives an HTTP POST request to create a subscription resource for a monitoring event, but without an indication of the support for the feature corresponding to the requested monitoring event, the SCEF shall reject the request by sending a "400 Bad Request" HTTP error response with the application error "EVENT\_FEATURE\_MISMATCH".

If the SCEF receives an HTTP POST request to create a subscription resource for a monitoring event that it does not support, the SCEF shall reject the request by sending a "500 Internal Server Error" HTTP error response with the application error "EVENT\_UNSUPPORTED".

After validation, the SCEF shall store the parameters and

- may assign an SCEF Reference ID related to the created monitoring event subscription resource; and based on operator policies, shall

- map the accuracy into permissible granularity for location reporting event;

- map the location area into a list of cells, eNodeB(s) and/or RAI(s)/TAI(s) and derive the corresponding MME(s)/SGSN(s), for number of UEs present in a geographic area event.

In order to delete a previous active configured monitoring event subscription at the SCEF, the SCS/AS shall send an HTTP DELETE message to the SCEF targeting the resource "Individual Monitoring Event Subscription" which is previously received in the response to the request that has created the monitoring events subscription resource. The SCEF shall detemine the SCEF Reference ID related to the active monitoring subscription resource.

\* \* \* Next changes \* \* \* \*

4.4.2.2.2.1 General

The following monitoring events are applicable for the monitoring event configuration via HSS for an individual UE or a group of UEs:

- Loss of connectivity;

- UE reachability;

- Location Reporting;

- Change of IMSI-IMEI(SV) Association;

- Roaming Status;

- Communication Failure;

- PDN connectivity status;

- Availability after DNN Failure; and

- API support capability.

Only one-time reporting is supported if the "reachabilityType" attribute sets to "SMS" for the event "UE reachability" or if the "locationType" attribute sets to "LAST\_KNOWN\_LOCATION" for the event "Location Reporting" in the monitoring event request.

\* \* \* Next changes \* \* \* \*

4.4.2.2.2.2 Configuration Request for an individual UE

Upon receipt of a configuration request from the SCS/AS for an individual UE, the SCEF shall interact with the HSS via S6t, as specified in 3GPP TS 29.336 [11].

Upon receipt of a successful response from the HSS,

- if it is a one-time monitoring request and the monitoring event report is received, the SCEF shall delete the associated configuration, send an HTTP response message to the SCS/AS with a "200 OK" status code and including the received monitoring event report.

- otherwise, the SCEF shall,

- for an HTTP POST request, create a new "Individual Monitoring Event Subscription" resource addressed by the URI that contains the SCS/AS identifier and an SCEF-created subscription identifier, and send an HTTP response to the SCS/AS with a "201 Created" status code, containing the final suggested configuration parameter(s) (if modified), indication(s) of the discarded parameter(s) (if discarded), the monitoring event report, if received, and a location header field containing the URI of the created resource.

- for an HTTP PUT request, update the active "Individual Monitoring Event Subscription" resource addressed by the request URI and send an HTTP response to the SCS/AS with a "200 OK" status code, containing the final suggested configuration parameter(s) (if modified), indication(s) of the discarded parameter(s) (if discarded) and the monitoring event report, if received.

- for an HTTP DELETE request, delete the active "Individual Monitoring Event Subscription" resource addressed by the request URI and send an HTTP response to the SCS/AS with a "204 No Content" status code, or a "200 OK" status code and including the monitoring event report, if received.

If the SCEF receives a response with an error code from the HSS, the SCEF shall not create, update nor delete the concerned resource and respond to the SCS/AS with a status code set to "500 Internal Server Error".

\* \* \* Next changes \* \* \* \*

4.4.2.2.2.3 Configuration Request for a group of UEs

Upon receipt of a request from the SCS/AS including an External Group Identifier, then the monitoring configuration is for a group of UEs. The SCEF shall interact with the HSS via S6t as specified in 3GPP TS 29.336 [11].

Upon receipt of a successful response from the HSS indicating that group processing is in progress and before beginning the processing of individual UEs, the SCEF shall,

- for an HTTP POST request, create a new "Individual Monitoring Event Subscription" resource addressed by a URI that contains the SCS/AS identity and an SCEF-created subscription identifier, store the number of UEs received in the response message from the HSS within the resource and send an HTTP response to the SCS/AS with "201 Created" status code and a location header field containing the URI of the created resource, in order to acknowledge the SCS/AS of the successful group processing request.

- for an HTTP PUT request, update the active "Individual Monitoring Event Subscription" resource addressed by the request URL and send an HTTP response with "200 OK" status code to acknowledge the SCS/AS of the successful group processing request.

- for an HTTP DELETE request, delete the active "Individual Monitoring Event Subscription" resource addressed by the request URI and send an HTTP response to the SCS/AS with "204 No Content" status code.

If the SCEF receives a response with an error code from the HSS, the SCEF shall not create, update nor delete the concerned resource and respond to the SCS/AS with a status code set to "500 Internal Server Error".

Upon receipt of the processing result of the individual UEs from the HSS, the SCEF shall behave as follows:

- if no Group Reporting Guard Time is received, the SCEF shall send an HTTP POST request message to the SCS/AS including a reference to the related monitoring subscription, a list of configuration failure result if received for the group members, and the "monitoringEventReports" attribute including a list of monitoring event reports if received for the group members;

- otherwise, the SCEF shall accumulate all of the configuration results and/or monitoring event reports received from the HSS for the group members until the Group Reporting Guard Time expires. Then the SCEF shall send an HTTP POST request message to the SCS/AS including a reference to the related monitoring subscription, and a list of configuration failure result if received for the group members, and the "monitoringEventReports" attribute including a list of monitoring event reports at the Group Reporting Guard Time.

The SCS/AS shall send an HTTP response to acknowledge the SCEF about the handling result of the received HTTP POST request.

\* \* \* Next changes \* \* \* \*

4.4.2.2.3 Monitoring Events Configuration directly via MME/SGSN

The monitoring event "Number of UEs in a geographic area" is applicable for the monitoring event configuration via MME/SGSN. Only one-time reporting is supported for this event with the value of Maximum Number of Reports indicated by "maximumNumberOfReports" set to 1.

Upon receipt of an HTTP POST request from the SCS/AS, the SCEF shall

- resolve the location area to the involved SGSN(s)/MME(s) by local configuration;

- interact with the HSS via the S6t interface as specified in 3GPP TS 29.336 [11] if the External Group ID(s) is included; and

- interact with the SGSN(s)/MME(s) via the T6a/b inteface as specified in 3GPP TS 29.128 [12].

NOTE: The SCEF uses local configuration to resolve the involved SGSN(s)/MME(s) if the location area is not received.

After collecting responses from the SGSN(s)/MME(s), if the SCEF does not receive any successful response from the involved SGSN(s)/MME(s), the SCEF shall respond to the SCS/AS with a status code set to 500 Internal Server Error; otherwise the SCEF should send a response with 200 OK status code to acknowledge the SCS/AS with one aggregated report in the requested area by including the total count of the number of UEs in the "ueCount" attribute and the External Identifier(s) (if available) or the MSISDN(s) (if available) associated with the External Group ID.

NOTE: It is possible that the number of UEs does not reflect the actual number of UEs in the designated area (e.g. some SGSN(s)/MME(s) do not respond successfully). The SCEF still provides the result to the SCS/AS if at least one SGSN/MME returns a successful response.

\* \* \* Next changes \* \* \* \*

4.4.2.2.4.2 Configuration Request for an individual UE

Upon receipt of an HTTP POST request from the SCS/AS for an individual UE, the SCEF shall:

- interact with the PCRF via the Rx inteface by using an existing AF session or establishing a new AF session as specified in 3GPP TS 29.214 [10];

NOTE 1: The SCEF can derive the service information over the Rx interface based on SCS/AS ID for communication failure event.

- after receiving the AAA message from the PCRF, create a resource which represents the monitoring event configuration addressed by a URI that contains the SCS/AS identifier and an SCEF-created subscription identifier; and

- send a corresponding status code to acknowledge the SCS/AS of the successful processing of the request in the HTTP response message.

Then the SCEF shall wait for the reporting from the PCRF as specified in 3GPP TS 29.214 [10].

NOTE 2: Different events can be reported in different messages according to 3GPP TS 29.214 [10], e.g. STR/RAR for communication failure.

During configuration resource deletion, the SCEF shall also terminate the AF session if it was established and used only for event monitoring.

\* \* \* Next changes \* \* \* \*

4.4.2.2.4.3 Configuration Request for a group of UEs

Upon receipt of an HTTP POST request from the SCS/AS for a group of UEs, the SCEF shall:

- interact with all PCRFs in the same PLMN via Nta application of Nt interface as specified in 3GPP TS 29.154 [9];

- after collecting ECA message from all PCRFs, create a resource which represents the monitoring event configuration addressed by a URI that contains the SCS/AS identifier and an SCEF-created subscription identifier; and

- send a corresponding status code to acknowledge the SCS/AS of the successful processing of the request in the HTTP response message.

Then the SCEF shall wait for the reporting from the PCRF(s) as specified in 3GPP TS 29.154 [9].

\* \* \* Next changes \* \* \* \*

#### 4.4.2.3 Reporting of Monitoring Event Procedure

Upon receipt of a Monitoring Event Report from the HSS or the MME/SGSN as defined in subclause 5.6.3 or subclause 5.6.8 of 3GPP TS 23.682 [2], from the PCRF as defined in subclause 5.6.5 or from the IWK-SCEF as defined in subclause 5.6.8 of 3GPP TS 23.682 [2], the SCEF shall determine the monitoring event subscription associated with the corresponding Monitoring Event Report.

If the monitoring event subscription refers to a Monitoring Event Configuration for a single UE or to a group-based Monitoring Event configuration, and no Group Reporting Guard Time was set, then the SCEF shall send an HTTP POST message including a link to the SCEF-created subscription resource and the received Monitoring Event Report to the identified destination. If the monitoring event subscription refers to a group-based Monitoring Event Configuration and Group Reporting Guard Time was provided during the Monitoring Event configuration procedure, then the SCEF shall accumulate all of the received Monitoring Event reports for the group of UEs until the Group Reporting Guard Time expires or the monitoring duration indicated by the property "monitorExpireTime" is reached.

Upon expiration of Group Reporting Guard Time or expiration of the monitoring duration, the SCEF shall send an HTTP POST message to the identified destination including a link to the SCEF-created subscription resource and the list of accumulated Monitoring Event Reports for each UE identified by either its External Identifier or MSISDN. The destination URL of the HTTP POST message is provided by the SCS/AS during the Monitoring Event Configuration procedure.

If the monitoring event subscription refers to a one-time monitoring request or a continuous monitoring request, but the maximum number of reports is reached, the SCEF shall consider the reporting as completed and delete the corresponding "Individual Monitoring Event Subscription" resource. In addition, the SCEF shall interact with the HSS to delete the event configuration if the latter was performed via the HSS whereas event reports were performed via the SGSN/MME. The SCEF determines that the reporting for a group is completed by comparing the total number of received reports with the number of UEs of the group (received from the HSS during event configuration for a group of UEs) multiplied by the maximum number of reports.

When the monitoring duration indicated by the property "monitorExpireTime" is reached, the SCEF shall delete the related event subscription and event configuration locally. The SCS/AS shall no longer address the corresponding "Individual Monitoring Event Subscription" resource.

\* \* \* Next changes \* \* \* \*

4.4.2.5 Network initiated notification of applied parameter configuration

For "LOSS\_OF\_CONNECTIVITY" and "UE\_REACHABILITY" events, if the "Enhanced\_param\_config" feature is supported and the SCEF receives the currently applied parameter configuration from the HSS, the SCEF shall notify the SCS/AS via an HTTP POST message including the parameter changes in the "appliedParam" attribute.

\* \* \* Next changes \* \* \* \*

4.4.4 Procedures for changing the chargeable party at session set up or during the session

This procedure is used by an SCS/AS to either request to sponsor the traffic from the beginning or to request becoming the chargeable party at a later point in time via the T8 interface.

When setting up the connection between the AS and the UE via the SCEF, the SCS/AS shall send an HTTP POST request to the SCEF, targeting the "Chargeable Party Transactions" resource, to become the chargeable party for the session to be set up. The body of the HTTP POST message shall include the SCS/AS Identifier, UE IP address, IP Flow description, Sponsor ID, ASP ID, Sponsoring Status, notification destination URI identifying the recipient of notifications within the "notificationDestination" attribute and may include the time period and/or traffic volume used for sponsoring. The SCS/AS may also request to activate a previously selected policy of background data transfer by including the associated Reference ID in the body of the HTTP POST message.

After receiving the HTTP POST request, if the authorization performed by the SCEF is successful, the SCEF shall act as an AF and interact with the PCRF via the Rx interface, as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13], to trigger a PCRF initiated IP-CAN Session Modification. The SCEF may map the SCS/AS Identifier to AF Application Identifier and may request to be notified about the traffic plane status. If the time period and/or traffic volume are received from the AF, the SCEF should subscribe with the PCRF to the USAGE\_REPORT event.

After receiving a successful response from the PCRF, the SCEF shall create a new "Individual Chargeable Party Transaction" resource, which represents the chargeable party transaction, addressed by a URI that contains the SCS/AS identity and an SCEF-created transaction identifier, and shall respond to the SCS/AS with a 201 Created status code, including a Location header field containing the URI of the created resource. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this chargeable party transaction. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not create a resource and respond to the SCS/AS with a status code set to 500 Internal Server Error.

In order to update the sponsoring status of an established AS session, the SCS/AS shall send an HTTP PATCH message to the SCEF targeting the associated "Individual Chargeable Party Transaction" resource requesting to change the Sponsoring Status. When receiving the HTTP PATCH message, the SCEF shall make the change and interact with the PCRF to modify the Rx session as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]. After receiving a response with successful result code from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a 200 OK status code and the result in the body of the HTTP response. The accumulated usage received from the PCRF shall be included if the SCS/AS requested to disable the sponsoring. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not update the resource and respond to the SCS/AS with a status code set to 500 Internal Server Error.

If the SCEF receives a traffic plane notification (e.g. the usage threshold is reached or transmission resource lost) or gets informed that the Rx session is terminated (e.g. due to the release of PDN connection), the SCEF shall send an HTTP POST message including the notified event (e.g. session terminated) and the accumulated usage to the SCS/AS identified by the notification destination URI received during session setup. The SCS/AS shall respond with an HTTP response to confirm the received notification.

In order to remove an established AS session, the SCS/AS shall send an HTTP DELETE message to the SCEF targeting the associated "Individual Chargeable Party Transaction" resource. After receiving the HTTP DELETE message, the SCEF shall remove all properties of the resource and interact with the PCRF to terminate the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and the accumulated usage (if received from the PCRF).

\* \* \* Next changes \* \* \* \*

5.2.5.1 General

The SCEF and SCS/AS shall support the delivery of Notifications using a separate HTTP connection towards an address assigned by the SCS/AS, as described in subclause 5.2.5.2.

An SCEF and SCS/AS may support testing a notification connection as described in subclause 5.2.5.3. An SCEF and SCS/AS may support the delivery of Notification using Websocket (IETF RFC 6455 [32]) as described in subclause 5.2.5.4.

\* \* \* Next changes \* \* \* \*

5.2.5.4 Notification Delivery using Websocket

The procedures in the present subclause only apply if SCS/AS and SCEF support the "Notification\_websocket" feature. If the feature "Notification\_websocket" is supported, then the feature "Notification\_test\_event" shall also be supported.

If a delivery of notifications is required for an API and the SCS/AS does not know from previous interactions with the SCEF whether delivery of notifications over a separate HTTP connection works, the SCS/AS should initially request the SCEF to try to establish a separate HTTP connection for notification delivery according to subclause 5.2.5.2 by providing a URI to the SCEF designating where to send HTTP Notifications, and shall also subscribe to the notification of a test event as in subclause 5.2.5.3.

If the SCS/AS does not receive the requested notification of the test event during a configured period after the subscription, the SCS/AS may configure the subscription to request the SCEF to provide a URI for an HTTP connection to upgrade to Websocket, setting the "requestWebsocketUri" attribute to "true" as specified in subclause 5.2.1.2.13. The SCS/AS may also request the SCEF to provide a URI in a new subscription creation request, and should in this case terminate the original subscription.

NOTE 1: If the SCS/AS has requested the delivery of notifications to a separate entity, it needs to be informed by that separate entity about the receipt of the test notification. That communication between the separate entity and the SCS/AS is out of scope of the present document.

When the SCEF receives a subscription creation or update request to use Websockets to deliver notifications (i.e. with the "requestWebsocketUri" attribute set to "true"), it shall assign a Websocket URI where to receive a Websocket connection establishment and provide this URI in the "websocketUri" attribute in the response, as defined in subclause 5.1.2.1.13. Once such Websocket URI has been assigned for a particular subscription resource, subsequent update requests to this resource that ask for the assignment of a new Websocket URI for that subscription shall be rejected by the SCEF.

Upon the reception of the Websocket URI from the SCEF in the "websocketUri" attribute, as specified in subclause 5.2.1.2.13-1, in the subscription creation or subscription update response, the SCS/AS or a separate entity that is intended to receive the notification shall establish an HTTP connection towards that URI and shall upgrade that connection to the Websocket protocol (IETF RFC 6455 [32]) using the HTTP upgrade mechanism defined in IETF RFC 7230 [16].

NOTE 2: For delivery of Notifications to a separate entity, the SCS/AS needs to provide the Websocket URI to that separate entity. That communication between the SCS/AS and the separate entity is out of scope of the present document.

The following framing of the request and response shall be used when delivering a notification or acknowledging its delivery through Websockets.

NOTE 3: The framing is aligned as much as possible with HTTP delivery in order to simplify implementations.

To deliver a notification towards the SCS/AS, the SCEF shall embed the following structure in a separate Websocket data frame with 0x2 (Binary) opcode in the following order:

1) The string "3GPP-WS-Notif-Seq:", followed by a blank, followed by a four-byte sequence number, encoded as decimal number in ASCII, followed by CRLF

2) The following HTTP headers in any order, with the syntax and semantics as defined in IETF RFC 7230 [16] and IETF RFC 7231 [17]: Content-Type (mandatory), Content-Encoding (optional), Content-Length (mandatory). Every HTTP header line shall be ended by CRLF.

3) CRLF to end the headers section.

4) The payload body of the notification, as defined in the individual APIs.

NOTE 4: The payload body is the same as the one that would be used if delivering the notification as defined in subclause 5.2.5.3.

To acknowledge the reception of a notification message towards the SCEF, the SCS/AS shall embed the following structure in a separate Websocket data frame with 0x2 (Binary) opcode in the following order:

1) The string "3GPP-WS-Notif-Seq:", followed by a blank, followed by the four-byte sequence number of the notification to be confirmed, encoded as decimal number in ASCII, followed by CRLF.

2) The HTTP status code (e.g. 204) and status message (e.g. No Content) as defined for HTTP delivery of the notification in the individual APIs, separated by a single blank character, and ended by CRLF.

3) Conditionally, as defined in IETF RFC 7230 [16] and IETF RFC 7231 [17], the following HTTP headers in any order: Content-Type, Content-Encoding, and Content-Length. Every HTTP header line shall be ended by CRLF.

4) CRLF to end the headers section.

5) The payload body of the response, if applicable based on the status code and the HTTP headers, as defined in IETF RFC 7230 [16] and IETF RFC 7231 [17].

NOTE 5: The status code, the status message and the payload body (if applicable), are the same as if delivering the notification as defined in subclause 5.2.5.3.

Use of CRLF is defined in IETF RFC 7230 [16].

The SCEF need not wait for the confirmation of each notification before delivering the next notification. The SCEF shall determine whether a notification has been delivered successfully by correlating the sent notification with the received acknowledgement by checking the sequence numbers of both for equality. The SCEF may re-send a notification, using the same sequence number, if it has not received an acknowledgement with a matching sequence number after a configurable time-out. The SCS/AS shall consider notifications with the same sequence number that arrive within a configurable time interval as duplicates.

The SCS/AS should send periodic Websocket "PING" frames to keep the connection alive.

NOTE 6: the TCP layer will handle a possible fragmentation and reassembly of large messages.

The security related clause 6 shall also apply for the HTTP connection that is upgraded to Websocket.

\* \* \* Next changes \* \* \* \*

5.3.1 Overview

The MonitoringEvent API is a RESTful API that allows the SCS/AS to subscribe to notifications about specific events in 3GPP networks. It also allows the SCEF to report the event by sending notifications to the authorised users when the corresponding event is detected. The API also allows the SCEF to indicate the removal of a previously configured monitoring request. The MonitoringEvent API defines a set of data models, resources and the related procedures for the creation and management of monitoring event subscriptions. The corresponding JSON schema for the representation of the resources and operations defined by the MonitoringEvent API is provided in its complete form in Annex A.3.

\* \* \* Next changes \* \* \* \*

5.3.2.1.2 Type: MonitoringEventSubscription

This type represents a subscription to monitoring an event. The same structure is used in the subscription request and subscription response.

**Table 5.3.2.1.2-1: Definition of type MonitoringEventSubscription**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** | **Applicability (NOTE 3)** |
| self | Link | 0..1 | Link to the resource "Individual Monitoring Event Subscription". This parameter shall be supplied by the SCEF in HTTP responses. |  |
| supportedFeatures | SupportedFeatures | 0..1 | Used to negotiate the supported optional features of the API as described in subclause 5.2.7.  This attribute shall be provided in the POST request and in the response of successful resource creation. |  |
| mtcProviderId | string | 0..1 | Identifies the MTC Service Provider and/or MTC Application. (NOTE 7) |  |
| externalId | ExternalId | 0..1 | Identifies a user as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) | (NOTE 5) |
| msisdn | Msisdn | 0..1 | Identifies the MS internal PSTN/ISDN number allocated for a UE.  (NOTE 1) | (NOTE 5) |
| externalGroupId | ExternalGroupId | 0..1 | Identifies a user group as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) (NOTE 6) |  |
| addExtGroupIds | array(ExternalGroupId) | 0..N | Identifies user groups as defined in Clause 4.6.2 of 3GPP TS 23.682 [2].  (NOTE 1) (NOTE 6) | Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| ipv4Addr | Ipv4Addr | 0..1 | Identifies the Ipv4 address.  (NOTE 1) | Location\_notification,  Communication\_failure\_notification |
| ipv6Addr | Ipv6Addr | 0..1 | Identifies the Ipv6 address.  (NOTE 1) | Location\_notification,  Communication\_failure\_notification |
| notificationDestination | Link | 1 | An URI of a notification destination that T8 message shall be delivered to. |  |
| requestTestNotification | boolean | 0..1 | Set to true by the SCS/AS to request the SCEF to send a test notification as defined in subclause 5.2.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in subclause 5.2.5.4. | Notification\_websocket |
| monitoringType | MonitoringType | 1 | Enumeration of monitoring type. Refer to clause 5.3.2.4.3. |  |
| maximumNumberOfReports | integer | 0..1 | Identifies the maximum number of event reports to be generated by the HSS, MME/SGSN as specified in subclause 5.6.0 of 3GPP TS 23.682 [2].  (NOTE 2, NOTE 9) |  |
| monitorExpireTime | DateTime | 0..1 | Identifies the absolute time at which the related monitoring event request is considered to expire, as specified in subclause 5.6.0 of 3GPP TS 23.682 [2].  (NOTE 2) |  |
| repPeriod | DurationSec | 0..1 | Identifies the periodic time for the event reports. (NOTE 8, NOTE 9) |  |
| groupReportGuardTime | DurationSec | 0..1 | Identifies the time for which the SCEF can aggregate the monitoring event reports detected by the UEs in a group and report them together to the SCS/AS, as specified in subclause 5.6.0 of 3GPP TS 23.682 [2]. |  |
| maximumDetectionTime | DurationSec | 0..1 | If "monitoringType" is "LOSS\_OF\_CONNECTIVITY", this parameter may be included to identify the maximum period of time after which the UE is considered to be unreachable. | Loss\_of\_connectivity\_notification |
| reachabilityType | ReachabilityType | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter shall be included to identify whether the request is for "Reachability for SMS" or "Reachability for Data". | Ue-reachability\_notification |
| maximumLatency | DurationSec | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the maximum delay acceptable for downlink data transfers. | Ue-reachability\_notification |
| maximumResponseTime | DurationSec | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the length of time for which the UE stays reachable to allow the SCS/AS to reliably deliver the required downlink data. | Ue-reachability\_notification |
| suggestedNumberOfDlPackets | integer | 0..1 | If "monitoringType" is "UE\_REACHABILITY", this parameter may be included to identify the number of packets that the serving gateway shall buffer in case that the UE is not reachable. | Ue-reachability-notification |
| idleStatusIndication | boolean | 0..1 | If "monitoringType" is set to "UE\_REACHABILITY" or "AVAILABILITY\_AFTER\_DDN\_FAILURE", this parameter may be included to indicate the notification of when a UE, for which PSM is enabled, transitions into idle mode.  - "true": indicate enabling of notification  - "false": indicate no need to notify  Default: "false". | Ue-reachability\_notification,  Availability\_after\_DDN\_failure\_notification,  Availability\_after\_DDN\_failure\_notification\_enhancement |
| locationType | LocationType | 0..1 | If "monitoringType" is "LOCATION\_REPORTING" or "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter shall be included to identify whether the request is for Current Location, Initial Location or Last known Location.  (NOTE 4) | Location\_notification, Number\_of\_UEs\_in\_an\_area\_notification, Number\_of\_UEs\_in\_an\_area\_notification\_5G,  eLCS |
| accuracy | Accuracy | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify the desired level of accuracy of the requested location information, as described in subclause 4.9.2 of 3GPP TS 23.682 [2]. (NOTE 10) | Location\_notification,  eLCS |
| minimumReportInterval | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify a minimum time interval between Location Reporting notifications. | Location\_notification,  eLCS |
| maxRptExpireIntvl | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify a maximum time interval between Location Reporting notifications. | eLCS |
| samplingInterval | DurationSec | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to identify the maximum time interval between consecutive evaluations by a UE of a trigger event. | eLCS |
| reportingLocEstInd | boolean | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate whether event reporting requires the location information. If set to true, the location estimation information shall be included in event reporting.  Default: "false" if omitted. | eLCS |
| linearDistance | LinearDistance | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the linear(straight line) distance threshold for motion event reporting. | eLCS |
| locQoS | LocationQoS | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the expected location QoS requirement for an immediate MT-LR or deferred MT-LR.  (NOTE 10) | eLCS |
| svcId | ServiceIdentity | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the service identity of AF. | eLCS |
| ldrType | LdrType | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the event type for a deferred MT-LR. | eLCS |
| velocityRequested | VelocityRequested | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate if the velocity of the target UE is requested or not. | eLCS |
| maxAgeOfLocEst | AgeOfLocationEstimate | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate acceptable maximum age of location estimate. | eLCS |
| locTimeWindow | TimeWindow | 0..1 | If "monitoringType" is "LOCATION\_REPORTING", this parameter may be included to indicate the starting time and ending time for a deferred MT-LR. | eLCS |
| associationType | AssociationType | 0..1 | If "monitoringType" is "CHANGE\_OF\_IMSI\_IMEI\_ASSOCIATION", this parameter shall be included to identify whether the change of IMSI-IMEI or IMSI-IMEISV association shall be detected. | Change\_of\_IMSI\_IMEI\_association\_notification |
| plmnIndication | boolean | 0..1 | If "monitoringType" is "ROAMING\_STATUS", this parameter may be included to indicate the notification of UE's Serving PLMN ID.  - "true": The value shall be used to indicate enabling of notification;  - "false": The value shall be used to indicate disabling of notification.  Default: "false". | Roaming\_status\_notification |
| locationArea | LocationArea | 0..1 | If "monitoringType" is "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the area within which the SCS/AS requests the number of UEs. | Number\_of\_UEs\_in\_an\_area\_notification |
| locationArea5G | LocationArea5G | 0..1 | If "monitoringType" is "NUMBER\_OF\_UES\_IN\_AN\_AREA", this parameter may be included to indicate the area within which the AF requests the number of UEs. | Number\_of\_UEs\_in\_an\_area\_notification\_5G |
| dddTraDescriptors | array(DddTrafficDescriptor) | 0..N | The traffic descriptor(s) of the downlink data source. May be included for event "DOWNLINK\_DATA\_DELIVERY\_STATUS" or "AVAILABILITY\_AFTER\_DDN\_FAILURE". | Downlink\_data\_delivery\_status\_5G,  Availability\_after\_DDN\_failure\_notification\_enhancement |
| dddStati | array(DlDataDeliveryStatus) | 0..N | May be included for event "DOWNLINK\_DATA\_DELIVERY\_STATUS". The subscribed stati (delivered, transmitted, buffered) for the event. If omitted all stati are subscribed. | Downlink\_data\_delivery\_status\_5G |
| monitoringEventReport | MonitoringEventReport | 0..1 | Identifies a monitoring event report which is sent from the SCEF to the SCS/AS. |  |
| apiNames | array(string) | 0..N | If "monitoringType" is "API\_SUPPORT\_CAPABILITY", this parameter may be included. Each element identifies the name of an API.  It shall set as {apiName} part of the URI structure for each T8 or N33 API as defined in the present specification or 3GPP TS 29.522 [62], respectively.  This allows the SCS/AS to request the capability change for its interested APIs. If it is omitted, the SCS/AS requests to be notified for capability change for all APIs the SCEF+NEF supports. | API\_support\_capability\_notification |
| NOTE 1: One of the properties "externalId", "msisdn", "ipv4Addr", "ipv6Addr" or "externalGroupId" shall be included for features "Location\_notification" and "Communication\_failure\_notification";. One of the properties "externalId", "msisdn" or "externalGroupId" shall be included for feature "eLCS". "ipv4Addr" or "ipv6Addr" is required for monitoring via the PCRF for an individual UE. One of the properties "externalId", "msisdn" or "externalGroupId" shall be included for features "Pdn\_connectivity\_status", "Loss\_of\_connectivity\_notification", "Ue-reachability\_notification", "Change\_of\_IMSI\_IMEI\_association\_notification", "Roaming\_status\_notification", "Availability\_after\_DDN\_failure\_notification" and "Availability\_after\_DDN\_failure\_notification\_enhancement";;  NOTE 2: Inclusion of either "maximumNumberOfReports" (with a value higher than 1) or "monitorExpireTime" makes the Monitoring Request a Continuous Monitoring Request, where the SCEF sends Notifications until either the maximum number of reports or the monitoring duration indicated by the property "monitorExpireTime" is exceeded. The "maximumNumberOfReports" with a value 1 makes the Monitoring Request a One-time Monitoring Request. At least one of "maximumNumberOfReports" or "monitorExpireTime" shall be provided.  NOTE 3: Properties marked with a feature as defined in subclause 5.3.4 are applicable as described in subclause 5.2.7. If no features are indicated, the related property applies for all the features.  NOTE 4: In this release, for features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G", locationType shall be set to "LAST\_KNOWN\_LOCATION".  NOTE 5: The property does not apply for the features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G".  NOTE 6: For the features "Number\_of\_UEs\_in\_an\_area\_notification" and "Number\_of\_UEs\_in\_an\_area\_notification\_5G", the property "externalGroupId" may be included for single group and "addExtGroupIds" may be included for multiple groups but not both.  NOTE 7: The SCEF should check received MTC provider identifier and then the SCEF may:  - override it with local configured value and send it to HSS; - send it directly to the HSS; or - reject the monitoring configuration request.  NOTE 8: This property is only applicable for the NEF.  NOTE 9: The value of "maximumNumberOfReports" attribute sets to 1 and the "repPeriod" attribute are mutually exclusive.  NOTE 10: For the eLCS feature, the "accurancy" attribute and "locQoS" attribute are mutually exclusive. | | | | |

\* \* \* Next changes \* \* \* \*

5.3.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-monitoring-event/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp-monitoring-event" and "apiVersion" shall be set to "v1" for the current version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.3.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| Monitoring Event Subscriptions | /{scsAsId}/subscriptions/ | GET | Read all subscriptions for a given SCS/AS |
| POST | Create a new subscription of monitoring event |
| Individual Monitoring Event Subscription | /{scsAsId}/subscriptions/{subscriptionId} | PUT | Modify an existing subscription of monitoring event |
| GET | Read a subscription of monitoring event |
| DELETE | Delete a subscription of monitoring event |
| Monitoring Notification | {notificationDestination} | POST | Sent from the SCEF to the SCS/AS about the notification of grouping configuration result, detected monitoring event report(s) or notify the SCS/AS to cancel a monitoring subscription |

\* \* \* Next changes \* \* \* \*

5.3.4 Used Features

The table below defines the features applicable to the MonitoringEvent API. Those features are negotiated as described in subclause 5.2.7.

**Table 5.3.4-1: Features used by MonitoringEvent API**

|  |  |  |
| --- | --- | --- |
| **Feature Number** | **Feature** | **Description** |
| 1 | Loss\_of\_connectivity\_notification | The SCS/AS is notified when the 3GPP network detects that the UE is no longer reachable for signalling or user plane communication |
| 2 | Ue-reachability\_notification | The SCS/AS is notified when the UE becomes reachable for sending either SMS or downlink data to the UE |
| 3 | Location\_notification | The SCS/AS is notified of the current location or the last known location of the UE |
| 4 | Change\_of\_IMSI\_IMEI\_association\_notification | The SCS/AS is notified when the association of an ME (IMEI(SV)) that uses a specific subscription (IMSI) is changed |
| 5 | Roaming\_status\_notification | The SCS/AS is notified when the UE's roaming status changes |
| 6 | Communication\_failure\_notification | The SCS/AS is notified of communication failure events |
| 7 | Availability\_after\_DDN\_failure\_notification | The SCS/AS is notified when the UE has become available after a DDN failure |
| 8 | Number\_of\_UEs\_in\_an\_area\_notification | The SCS/AS is notified the number of UEs present in a given geographic area  The feature supports the pre-5G (e.g. 4G) requirement. |
| 9 | Notification\_websocket | The delivery of notifications over Websocket is supported according to subclause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 10 | Notification\_test\_event | The testing of notification connection is supported according to subclause 5.2.5.3. |
| 11 | Subscription\_modification | Modifications of an individual subscription resource. |
| 12 | Number\_of\_UEs\_in\_an\_area\_notification\_5G | The AF is notified the number of UEs present in a given geographic area.  The feature supports the 5G requirement. This feature may only be supported in 5G. |
| 13 | Pdn\_connectivity\_status | The SCS/AS requests to be notified when the 3GPP network detects that the UE’s PDN connection is set up or torn down. |
| 14 | Downlink\_data\_delivery\_status\_5G | The AF requests to be notified when the 3GPP network detects that the downlink data delivery status is changed. The feature is not applicable to the pre-5G. |
| 15 | Availability\_after\_DDN\_failure\_notification\_enhancement | The AF is notified when the UE has become available after a DDN failure and the traffic matches the packet filter provided by the AF. The feature is not applicable to the pre-5G. |
| 16 | Enhanced\_param\_config | This feature supports the co-existence of multiple event configurations for target UE(s) if there are parameters affecting periodic RAU/TAU timer and/or Active Time. Supporting this feature also requires the support of feature number 1 or 2. |
| 17 | API\_support\_capability\_notification | The SCS/AS is notified of the availability of support of service APIs. This feature is only applicable in interworking SCEF+NEF scenario. |
| 18 | eLCS | This feature supports the enhanced location exposure service (e.g. location information preciser than cell level). |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

\* \* \* Next changes \* \* \* \*

#### 5.4.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-bdt/v1/**

"apiRoot" is set as described in subclause 5.2.4. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.4.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| BDT Subscription | /{scsAsId}/subscriptions | GET | Read all active background data transfer subscription resources for a given SCS/AS |
| POST | Create a new background data transfer subscription resource |
| Individual BDT Subscription | /{scsAsId}/subscriptions/{subscriptionId} | PATCH | Modify a background data transfer subscription resource to select one of the transfer policies offered by the SCEF |
| PUT | Update a background data transfer subscription resource for negotiation of background data transfer policy |
| GET | Read a background data transfer subscription resource |
| DELETE | Delete a background data transfer resources |
| BDT Warning Notification | {notificationDestination} | POST | Notify the BDT warning from the NEF to the AF identified by the notification destination URI (NOTE) |
| NOTE: This resource may only be supported in 5G. | | | |

\* \* \* Next changes \* \* \* \*

5.5.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-chargeable-party/v1/**

"apiRoot" is set as described in subclause 5.2.4. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.5.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| Chargeable Party Transactions | /{scsAsId}/transactions | GET | Read all chargeable party transaction resources for a given SCS/AS |
| POST | Create a new chargeable party transaction resource |
| Individual Chargeable Party Transaction | /{scsAsId}/transactions/{transactionId} | GET | Read a chargeable party transaction resource |
| PATCH | Activate or Deactivate sponsoring by a chargeable party. |
| DELETE | Delete an existing chargeable party transaction resource |
| Event Notification | {notificationDestination} | POST | Notify the bearer level event(s) from the SCEF to the SCS/AS identified by the notification destination URI |

\* \* \* Next changes \* \* \* \*

5.6.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-nidd/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp-nidd" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.6.3.1-1: Resources and methods overview**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **HTTP initiator** | **Meaning** |
| NIDD configurations | /{scsAsId}/configurations | GET | SCS/AS | Read all NIDD configuration resources for a given SCS/AS |
| POST | SCS/AS | Create a new NIDD configuration resource. |
| Individual NIDD configuration | /{scsAsId}/configurations/{configurationId} | PATCH | SCS/AS | Modify an existing NIDD configuration resource |
| GET | SCS/AS | Read an NIDD configuration resource |
| DELETE | SCS/AS | Delete an existing NIDD configuration resource |
| NIDD downlink data deliveries | /{scsAsId}/configurations/{configurationId}/downlink-data-deliveries | GET | SCS/AS | Read all pending NIDD downlink data delivery resources related to a particular NIDD configuration resource. |
| POST | SCS/AS | Create an NIDD downlink data delivery resource related to a particular NIDD configuration resource. |
| Individual NIDD downlink data delivery | /{scsAsId}/configurations/{configurationId}/downlink-data-deliveries/{downlinkDataDeliveryId} | PUT | SCS/AS | Replace an NIDD downlink data delivery resource. |
| DELETE | SCS/AS | Delete an NIDD downlink data delivery resource. |
| GET | SCS/AS | Read pending NIDD downlink data delivery resource |
| NIDD Configuration Update Notification | {notification\_uri} | POST | SCEF | Send notifications about the status of an NIDD configuration to the SCS/AS. |
| NIDD Downlink Data Delivery Status Notification | {notification\_uri} | POST | SCEF | Report a specific NIDD downlink data delivery result to the SCS/AS. |
| NIDD Uplink Data Notification | {notification\_uri} | POST | SCEF | Send an uplink non-IP data notification from the SCEF to the SCS/AS. |
| ManagePort Configurations | /{scsAsId}/configurations/{configurationId}/rds-ports | GET | SCS/AS | Read all RDS ManagePort Configurations. |
| Individual ManagePort Configuration | /{scsAsId}/configurations/{configurationId}/rds-ports/{portId} | PUT | SCS/AS | Create a new Individual ManagePort Configuration resource to reserve port numbers |
| DELETE | SCS/AS | Delete an Individual ManagePort Configuration resource to release port numbers |
| GET | SCS/AS | Read an Individual ManagePort Configuration resource resource to query port numbers |
| ManagePort Notification | {notification\_uri} | POST | SCEF | Send notifications about the port numbers that are reserved. |

\* \* \* Next changes \* \* \* \*

5.7.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-device-triggering/v1/**

"apiRoot" is set as described in subclause 5.2.4. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.7.3.1-1: Resources and methods overview**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **HTTP initiator** | **Meaning** |
| Device Triggering Transactions | /{scsAsId}/transactions | GET | SCS/AS | Read all active device triggering transaction resources for a given SCS/AS |
| POST | SCS/AS | Create a new device triggering transaction resource |
| Individual Device Triggering Transaction | /{scsAsId}/transactions/{transactionId} | PUT | SCS/AS | Replace an existing device triggering transaction resource and the corresponding device trigger request |
| GET | SCS/AS | Read a device triggering transaction resource |
| DELETE | SCS/AS | Delete an existing device triggering transaction resource and cancel the device triggering |
| Device Triggering Delivery Report Notification | {notification\_uri} | POST | SCEF | Report a device triggering delivery report to SCS/AS. |

\* \* \* Next changes \* \* \* \*

5.8.2.2.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-group-message-delivery-mb2/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp**-**group**-**message**-**delivery**-**mb2" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.8.2.2.1-1: Resources and methods overview**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **HTTP initiator** | **Meaning** |
| TMGI Allocation | /{scsAsId}  /tmgi-allocation | GET | SCS/AS | Read all active TMGI resources for a given SCS/AS |
| POST | SCS/AS | Create a new TMGI resource for a given SCS/AS |
| Individual TMGI Allocation | /{scsAsId}  /tmgi-allocation/{tmgi} | PUT | SCS/AS | Replace an existing TMGI resource for a given SCS/AS and TMGI |
| PATCH | SCS/AS | Modify an existing TMGI resource for a given SCS/AS and TMGI |
| GET | SCS/AS | Read a TMGI allocation resource for a given SCS/AS and a TMGI |
| DELETE | SCS/AS | Deallocate an existing TMGI resource for agiven SCS/AS and TMGI |
| GMD via MBMS by MB2 | /{scsAsId}  /tmgi-allocation/{tmgi}/delivery-via-mbms | GET | SCS/AS | Read all group message delivery resources for a given SCS/AS and TMGI. |
| POST | SCS/AS | Create a group message delivery resource for given SCS/AS and TMGI selected by the SCS/AS when MB2 is used as a southbound interface. |
| Individual GMD via MBMS by MB2 | /{scsAsId}  /tmgi-allocation/{tmgi}/delivery-via-mbms/  {transactionId} | PUT | SCS/AS | Replace a group message delivery resource |
| PATCH | SCS/AS | Modify a group message delivery resource. |
| GET | SCS/AS | Read a group message delivery resource. |
| DELETE | SCS/AS | Delete a group message delivery resource. |
| GMD via MBMS by MB2 Notification | {notificationDestination} | POST | SCEF | Report a specific group message delivery result to the SCS/AS for a given transaction Id selected by the SCEF. |

\* \* \* Next changes \* \* \* \*

5.8.3.2.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-group-message-delivery-xmb/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp-group-message-delivery-xmb" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.8.3.2.1-1: Resources and methods overview**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **HTTP initiator** | **Meaning** |
| xMB Services | /{scsAsId}  /services/ | POST | SCS/AS | Create a service when xMB is used as a southbound interface. |
| GET | SCS/AS | Read all active service resources for a given SCS/AS. |
| Individual xMB Service | /{scsAsId}  /services/{serviceId} | GET | SCS/AS | Read an active service resource for a given SCS/AS and Service Id. |
| DELETE | SCS/AS | Delete an existing service resource for a given SCS/AS and Service Id. |
| GMD via MBMS by xMB | /{scsAsId}  /services/{serviceId}/delivery-via-mbms | GET | SCS/AS | Read all group message delivery resources for a given SCS/AS and Service Id. |
| POST | SCS/AS | Create a group message delivery resource for a given SCS/AS and Service Id when xMB is used as a southbound interface. |
| Individual GMD via MBMS by xMB | /{scsAsId}  /services/{serviceId}/delivery-via-mbms/{transactionId} | PUT | SCS/AS | Replace a group message delivery resource |
| PATCH | SCS/AS | Modify a group message delivery resource. |
| GET | SCS/AS | Read a group message delivery resource. |
| DELETE | SCS/AS | Delete a group message delivery resource. |
| GMD via MBMS by xMB Notification | {notificationDestination} | POST | SCEF | Report a specific group message delivery result to the SCS/AS for a given Transaction Id selected by the SCEF. |

\* \* \* Next changes \* \* \* \*

5.9.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-net-stat-report/v1/**

"apiRoot" is set as described in subclause 5.2.4. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.9.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| Network Status  Reporting Subscriptions | /{scsAsId}/subscriptions | GET | Read all network status reporting subscription resources for a given SCS/AS. |
| POST | Create a new network status reporting subscription resource. |
| Individual Network Status  Reporting subscription | /{scsAsId}/subscriptions/{subscriptionId} | GET | Read a network status reporting subscription resource. |
| PUT | Modify an existing continuous network status reporting subscription resource. |
| DELETE | Delete an existing continuous network status reporting subscription resource. |
| Network Status Reporting Notification | {notificationDestination} | POST | Report a detected network status for a subscription from the SCEF to the SCS/AS |

\* \* \* Next changes \* \* \* \*

5.10.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-cp-parameter-provisioning/v1/**

"apiRoot" is set as described in subclause 5.2.4. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.10.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| CP provisioning Subscriptions | /{scsAsId}/subscriptions | GET | Read all active CP parameter provisioning subscription resources for a given SCS/AS |
| POST | Create a new subscription resource of provisioning CP parameter set(s) |
| Individual CP Provisioning Subscription | /{scsAsId}/subscriptions/{subscriptionId} | GET | Read a CP parameter provisioning subscription resource |
| PUT | Modify a CP parameter provisioning subscription resource |
| DELETE | Delete a CP parameter provisioning subscription resource |
| Individual CP set Provisioning | /{scsAsId}/subscriptions/{subscriptionId}/cpSets/{setId}  (NOTE) | PUT | Update CP at individual CP set(s) level associated with a CP parameter set Id. |
| GET | Read CP at individual CP set(s) level associated with a CP parameter set Id. |
| DELETE | Delete CP at individual CP set(s) level associated with a CP parameter set Id. |
| NOTE: This setId as a resource identifier is not necessarily identical as the CP parameter set Id received from the SCS/AS. | | | |

\* \* \* Next changes \* \* \* \*

5.11.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-pfd-management/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp-pfd-management" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.11.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| PFD Management Transactions | /{scsAsId}/transactions/ | GET | Read all PFDs for a given SCS/AS |
| POST | Create PFDs for a given SCS/AS and one or more external Application Identifier(s) |
| Individual PFD Management Transaction | /{scsAsId}/transactions/{transactionId} | GET | Read all PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s) |
| PUT | Update PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s) |
| DELETE | Delete PFDs for a given SCS/AS and a transaction for one or more external Application Identifier(s) |
| Individual Application PFD Management | /{scsAsId}/transactions/{transactionId}/applications/{appId}  (NOTE) | PUT | Update PFDs at individual application level |
| PATCH | Update PFDs at individual application level |
| GET | Read PFDs at individual application level |
| DELETE | Delete PFDs at individual application level |
| PFD Management Notification | {notificationDestination} | POST | Send asynchronous PFD management result. |
| NOTE: The appId as the resource identifier is not necessarily identical as the external application identifier received from the SCS/AS. | | | |

\* \* \* Next changes \* \* \* \*

#### 5.12.3.1 Overview

Custom operations used for this API are summarized in table 5.12.3.1-1. "apiRoot" is set as described in subclause 5.2.4.

Table 5.12.3.1-1: Custom operations without associated resources

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operation URI | Mapped HTTP method | Description |
| query | /query | POST | Query the status of enhanced converage restriction for a UE |
| configure | /configure | POST | Configure the enhanced converage restriction for a UE |

\* \* \* Next changes \* \* \* \*

5.13.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-network-parameter-configuration/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp-network-parameter-configuration" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.13.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| NP Configurations | /{scsAsId}/configurations/ | GET | Read all NP configurations for a given SCS/AS |
| POST | Create a new NP configuration |
| Individual NP Configuration | /{scsAsId}/configurations/{configurationId} | PUT | Replace all of the properties in an existing NP configuration |
| PATCH | Modify some properties in an existing NP configuration |
| GET | Read an existing NP configuration |
| DELETE | Delete a NP configuration |
| Configuration Notification | {notificationDestination} | POST | Report a grouping configuration result from the SCEF to the SCS/AS |

\* \* \* Next changes \* \* \* \*

5.14.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-as-session-with-qos/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp**-**as**-**session**-**with**-**qos" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

**Table 5.14.3.1-1: Resources and methods overview**

|  |  |  |  |
| --- | --- | --- | --- |
| **Resource name** | **Resource URI** | **HTTP method** | **Meaning** |
| AS Session with Required QoS Subscriptions | /{scsAsId}/subscriptions/ | GET | Get all subscription resources for a given SCS/AS. |
| POST | Create a new AS session. |
| Individual AS Session with Required QoS Subscription | /{scsAsId}/subscriptions/{subscriptionId} | GET | Read a subscription resource for a given SCS/AS and a subscription Id. |
| PUT | Modify a subscription resource for a given SCS/AS and a subscription Id. |
| PATCH | Modify a subscription resource for a given SCS/AS and a subscription Id. |
| DELETE | Delete a subscription resource for a given SCS/AS and a subscription Id. |
| Event Notification | {notificationUri} | POST | Notify the bearer level event(s) from the SCEF to the SCS/AS |

\* \* \* Next changes \* \* \* \*

#### 5.16.3.1 General

All resource URIs of this API should have the following root:

**{apiRoot}/3gpp-racs-pp/v1/**

"apiRoot" is set as described in subclause 5.2.4. "apiName" shall be set to "3gpp-racs-pp" and "apiVersion" shall be set to "v1" for the version defined in the present document. All resource URIs in the subclauses below are defined relative to the above root URI.

The following resources and HTTP methods are supported for this API:

Table 5.16.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| RACS Parameter Provisionings | /{scsAsId}/provisionings/ | GET | Read all RACS parameter provisionings for a given AF |
| POST | Create a new RACS parameter provisioning |
| Individual RACS Parameter Provisioning | /{scsAsId}/provisionings/{provisioningId} | PUT | Modify all properties in an existing RACS parameter provisioning |
| PATCH | Modify some properties in an existing RACS parameter provisioning |
| GET | Read an existing RACS parameter provisioning |
| DELETE | Delete a RACS parameter provisioning |

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