**3GPP TSG CT WG3 Meeting #113eC3-210077**

**E-Meeting, 25th – 29th January 2021 *(revision of C3-21xxxx)***

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.594** | **CR** | 0070 | **rev** | **-** | **Current version:** | **16.6.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Support of stateless NFs | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_eSBA | | | | |  | ***Date:*** | | | 2021-01-29 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | To support Stateless NF, it was agreed in TS 29.500, 6.5.3.2 and 6.5.3.3 during the last CT4 and CT3 e-meetings (cf. reply LS in C3-205495):   * Stateless NF as service consumer:   + When the NF service consumer is changed, and if the new NF service consumer does not support handling notifications as specified in the above bullet 5, the new NF service consumer should update the NF service producers with the new Notification URI. For explicit subscriptions, this is achieved by updating the existing subscription or creating a new subscription, depending on the NF service producer's API. For implicit subscriptions, this is carried out via a service update request message   + Each NF service consumer within the NF (service) set shall be prepared to receive notifications from the NF service producer, either by handling the notifications to the Notification URI constructed according to the above bullet 5 with its own address as authority part, by handling the notifications to the Notification URI notified in the above bullet 6, or by replying with an HTTP 3xx redirect pointing to a new NF service consumer or with another HTTP error. * Stateless NF as service producer:   + When the NF service producer changes, the new NF service producer may include an updated binding indication in a notification/callback request sent to the NF service consumer. The new NF service producer may also generate a new resource URI and return it to the NF service consumer upon reception of a service request related to the resource from that NF service consumer, e.g. the new NF service producer may reply with an HTTP 3xx redirect status code pointing to the new location of the resource. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | OpenAPI file is updated with the support of 307 and 308 responses for the PUT and DELETE methods of Individual Spending Limit Retrieval Subscription, custom methods and methods of callback URIs.  The support of the redirection is specified in the concerned service procedures. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Lack of full support of the functionality required to become stateless NFs | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.2.3, 4.2.3.2, 4.2.4.2, 4.2.4.3, 5.3.3.3.1, 5.3.3.3.2, 5.5.2.3.1, 5.5.3.3.1, 5.7.1, 5.8, 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 introduces a backwards compatible correction to the OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**…**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

#### 4.2.2.3 Intermediate spending limit report retrieval

Figure 4.2.2.3-1 shows the scenario where the NF service consumer sends a request to the CHF to modify the existing subscription to the retrieval of spending limit reports (see also 3GPP TS 23.502 [3], figure 4.16.8.3.1). The NF service consumer can add or remove policy counters to retrieve the status of the counters.



Figure 4.2.2.3-1: NF service consumer modifies the subscription to retrieve policy counter status and spending limit reporting

The NF service consumer shall send an HTTP PUT request to the resource "{apiRoot}/nchf-spendinglimitcontrol/v1/subscriptions/{subscriptionId}" representing an existing "Individual Spending Limit Subscription" resource, as shown in figure 4.2.2.3-1, step 1, to modify the subscription for retrieval of the policy counter status and spending limit reporting.

The "SpendingLimitContext" data structure provided in the request body:

- shall include the Subscription Permanent Identifier (SUPI) encoded in the "supi" attribute;

- shall include the notification correlation target address encoded in the "notifUri" attribute;

NOTE 1: If the notification correlation target address is not changed the previously provided notification correlation target address is included in the "notifUri" attribute.

- if the General Public Subscription Identifier (GPSI) was provided within the initial spending limit retrieval procedure, described in subclause 4.2.2.2, shall include the GPSI encoded in the "gpsi" attribute; and

- may include Event Filter information as a "list of policy counter identifier(s)" encoded in the "policyCounterIds" attribute. The "policyCounterIds" attribute shall contain the updated list of policy counter identifiers to be subscribed to. If the "policyCounterIds" attribute is omitted, the subscription is updated to all available policy counters; and

- when the feature "SubscriptionExpirationTimeControl" is supported, may include an expiry time encoded in the "expiry" attribute to update the duration of the subscription, representing the updated time up to which the subscription is desired to be kept active. When the "expiry" attribute is omitted in the request, the subscription shall be considered valid without an expiry time.

NOTE x1: The "notifUri" attribute within the SpendingLimitContext data structure can be modified to request that subsequent notifications are sent to a new NF service consumer.

When the "policyCounterIds" attribute is present in the subscription request, this list of policy counters overrides a previously provisioned list.

After the CHF modified an "Individual Spending Limit Retrieval Subscription" resource, the CHF shall respond with "200 OK" response with the message body containing a representation of the modified subscription, as shown in figure 4.2.2.3-1, step 2.

The SpendingLimitStatus data structure provided in the response body, when the feature "SubscriptionExpirationTimeControl" is not supported, shall include the status of the requested subscribed policy counters in the "statusInfos" map, where every PolicyCounterInfo entry shall contain:

- the policy counter identifier in the "policyCounterId" attribute; and

- the policy counter status in the "currentStatus" attribute.

When a requested policy counter identifier is known by the CHF, but it is not applicable to the subscriber (e.g. not provisioned), the CHF may include it in the "statusInfos" map, and set the "currentStatus" attribute to an operator configured policy counter status to indicate this to the NF service consumer.

When one or more policy counters specified in the request in the "policyCounterIds" attribute are unknown to the CHF, and the CHF is configured to accept the request, the CHF may include the unknown policy counters in the "statusInfos" map, and set the "currentStatus" attribute to an operator configured policy counter status to indicate this to the NF service consumer.

A PolicyCounterInfo data structure may include the list of the pending policy counter statuses and their activation times within the attribute "penPolCounterStatuses".

When the feature "SubscriptionExpirationTimeControl" is supported, the CHF may include the "expiry" attribute, representing the time up to which the subscription shall be kept active. If an expiry time was included in the subscription update request, then the expiry time shall be returned in the response, and the value returned should be less than or equal to the value in the request. When the "expiry" attribute is omitted in the request and in the response, it represents that the previously agreed duration of the subscription remains valid.

NOTE x2: When the NF service consumer does not include a expiry time in the request, the CHF can include a expiry time in the response that represents an update of the previously provided duration of the subscription.

NOTE x3: Once the subscription expires, if the NF service consumer wants to keep receiving notifications, it needs to create a new subscription in the CHF, as specified in subclause 4.2.2.2.

If the HTTP PUT request is not accepted by the CHF, it shall indicate the appropriate cause for the rejection in the HTTP response code or, if the feature "ES3XX" is supported, an HTTP redirect response to the NF service consumer as specified in subclause 5.7.

If the CHF has no available policy counters specified for the subscriber, the CHF shall indicate in an HTTP "400 Bad Request" response the cause for the rejection with the "cause" attribute set to "NO\_AVAILABLE\_POLICY\_COUNTERS ".

If one or more policy counters specified in the PUT request in the "policyCounterIds" attribute are unknown to the CHF, and the CHF is configured to reject request, the CHF shall indicate in an HTTP "400 Bad Request" response the cause for the rejection with the "cause" attribute set to "UNKNOWN\_POLICY\_COUNTERS" and the unknown policy counter identifiers within the "invalidParams" attribute. The PUT request shall not take effect, and the CHF shall maintain the Individual Spending Limit Retrieval resource.

NOTE x4: In order to avoid misbehaviors due to the policy counters status maintained in the CHF and the NF service consumer, the NF service consumer can terminate the subscription invoking the Nchf\_SpendingLimitControl\_Unsubscribe service operation in subclause 4.2.3.2.

NOTE x5: The NF service consumer can terminate the subscription invoking the Nchf\_SpendingLimitControl\_Unsubscribe service operation in subclause 4.2.3.2, or maintain subscription assuming that further available policy counters will be notified.

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

#### 4.2.3.2 Unsubscribe from spending limit reporting

Figure 4.2.3.2-1 shows the scenario where the NF service consumer sends a request to the CHF to unsubscribe from spending limit reporting (see also 3GPP TS 23.502 [3] figure 4.16.8.4.1).



Figure 4.2.3.2-1: NF service consumer unsubscribes from spending limit reporting

The NF service consumer shall invoke the Nchf\_SpendingLimitControl\_Unsubscribe service operation to unsubscribe from the spending limit reporting (status change for all policy counters available is no more required). The NF service consumer shall send an HTTP DELETE request to the resource "{apiRoot}/nchf-spendinglimitcontrol/v1/subscriptions /{subscriptionId}", whereby the "{subscriptionId}" is the identification of the existing subscription to be deleted. Upon the reception of an HTTP DELETE request the CHF removes the corresponding subscription.

If the HTTP DELETE request is accepted by the CHF, it shall respond with "204 No Content" as shown in figure 4.2.3.2-1, step 2.

If the HTTP DELETE request is not accepted by the CHF (e.g. the HTTP DELETE request is for a non-existent subscription), it shall indicate the appropriate cause for the rejection in the HTTP response code or, if the feature "ES3XX" is supported, an HTTP redirect response to the NF service consumer.

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

#### 4.2.4.2 Spending limit report

Figure 4.2.4.2-1 shows the scenario where the CHF sends a notification to the NF service consumer, when it detects that the status of a policy counter(s) has changed and the NF service consumer has subscribed to notifications of changes in the status of this policy counter(s). The CHF can also notify the NF service consumer that the status for one or multiple subscribed policy counter will change and indicate this by providing the time when this change shall be applied (see also 3GPP TS 23.502 [3], figure 4.16.8.5.1).



Figure 4.2.4.2-1: Spending limit reporting

The CHF shall send an HTTP POST request to the resource notification target address (notifUri) of the NF service consumer received in the subscription creation or modification, and shall append the "notify" segment path at the end of the URI, to indicate the NF service consumer the notification of a policy counter status change.

The SpendingLimitStatus data structure provided in the request body shall include:

- Subscriber Identity in the "supi" attribute;

- if the feature "NotificationCorrelation" is supported, the notification correlation ID in the "notifId" attribute if received in the SpendingLimitContext data structure provided in the creation of the subscription; and

- when the feature "SubscriptionExpirationTimeControl" is not supported, Policy counters status in the "statusInfos" map, where every PolicyCounterInfo entry shall include:

a. the "policyCounterId" attribute with the policy counter identifier; and

b. the "currentStatus" attribute with the new policy counter status when the notification is triggered by a change in the policy counter status, or the current policy counter status when the notification is triggered by a change in the pending policy counter status(es).

NOTE 1: When the feature "SubscriptionExpirationTimeControl" is supported, the CHF may include the update of the expiry time, and if at this time there is no change of policy counter status, the CHF may not include the "statusInfos" attribute.

When a policy counter identifier is no longer applicable to the subscriber (e.g. becomes not provisioned), but still exists in the Individual Spending Control Retrieval resource, the CHF may include it in the "statusInfos" map, and set the "currentStatus" attribute to an operator configured policy counter status to indicate this to the NF service consumer.

A PolicyCounterInfo data structure may include the list of pending policy counter statuses and their activation times within the attribute "penPolCounterStatuses.

When the feature "SubscriptionExpirationTimeControl" is supported, the CHF may include the "expiry" attribute, representing an update in the time up to which the subscription shall be kept active. When the "expiry" attribute is omitted, it represents that the previously agreed duration of the subscription remains valid.

NOTE 2: Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it needs to create a new subscription in the CHF, as specified in subclause 4.2.2.2.

The CHF shall not send the policy counter status for the same policy counter until it received the response of the previous status report of the policy counter.

If the HTTP POST notification request message is accepted by the NF service consumer, it shall acknowledge the receipt of the event notification with a "204 No Content" response, as shown in figure 4.2.4.2-1, step 2.

If the HTTP POST request is not accepted and the information received is not considered by the NF service consumer, the NF service consumer shall indicate the appropriate cause for the rejection in the HTTP response code or, if the feature "ES3XX" is supported, an HTTP redirect response to the CHF as specified in subclause 5.7.

If the NF service consumer receives an HTTP POST notification request message for an intermediate spending limit report transaction from the CHF in which no pending policy counter statuses and their activation times are included for a policy counter, i.e., the "penPolCounterStatuses" attribute is not included, the NF service consumer shall cancel all previously provided pending policy counter statuses and their activation times for this policy counter. If the NF service consumer receives an HTTP POST notification request message for an intermediate spending limit report transaction from the CHF containing pending policy counter statuses and their activation times for a previously provided policy counter, the NF service consumer shall replace the existing pending policy counter statuses and their activation times if any.

If the NF service consumer receives an HTTP POST request for spending limit report initiated by the CHF while it has an ongoing intermediate spending limit report retrieval transaction with the CHF, the NF service consumer shall update the policy counter information based on the HTTP POST request for spending limit report. When the corresponding response for the ongoing intermediate spending limit report retrieval transaction is eventually received, the NF service consumer shall only update policy counter information for counters that were not provided in the previously received HTTP POST request for spending limit report.

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

#### 4.2.4.3 Subscription termination request by CHF

Figure 4.2.4.3-1 shows the scenario where the CHF sends a notification to the NF service consumer, when it requests the termination of the subscription of status changes for all policy counters for a subscriber.



Figure 4.2.4.3-1: Subscription termination request by CHF

The CHF shall send an HTTP POST request to the resource notification target address (notifUri) of the NF service consumer received in the subscription creation or modification and shall append the "terminate" segment path at the end of the URI, to indicate the subscription termination and the removal of the Individual Spending Limit Retrieval Subscription resource to the NF service consumer.

The SubscriptionTerminationInfo data structure provided in the request body shall include the subscriber identification encoded in the "supi" attribute and may include subscription termination information in the "termCause" attribute.

When the termination request is because the subscriber identified by the SUPI has been removed from the CHF, the CHF shall set the "termCause" attribute to "REMOVED\_SUBSCRIBER".

If the HTTP POST notification request message is accepted by the NF service consumer, it shall remove the subscription to notifications of all policy counters for a subscriber and shall acknowledge the receipt of the event notification with a "204 No Content" response, as shown in figure 4.2.4.3-1, step 2.

If the HTTP POST request is not accepted and the information received is not considered by the NF service consumer, the NF service consumer shall indicate the appropriate cause for the rejection in the HTTP response code or, if the feature "ES3XX" is supported, an HTTP redirect response to the CHF as specified in subclause 5.7.

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

##### 5.3.3.3.1 PUT

This method shall support the URI query parameters specified in table 5.3.3.3.1-1.

Table 5.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

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

This method shall support the request data structures specified in table 5.3.3.3.1-2 and the response data structures and response codes specified in table 5.3.3.3.1-3.

Table 5.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SpendingLimitContext | M | 1 | Modifies the existing individual spending limit retrieval subscription. |

Table 5.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| SpendingLimitStatus | M | 1 | 200 OK | Successful case: The individual spending limit subscription was modified and spending limit reports are provided. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual Spending Limit Retrieval Subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CHF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual Spending Limit Retrieval Subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CHF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |
| NOTE 1: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [4] for the PUT method shall also apply.  NOTE 2: In addition to protocol and application errors which are specified in subclause 5.2.7.2 of 3GPP TS 29.500 [4], specific errors are described in subclause 5.7. | | | | |

Table 5.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

Table 5.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

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

##### 5.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 5.3.3.3.2-1.

Table 5.3.3.3.3-1: URI query parameters supported by the DELETE method on this resource

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

This method shall support the request data structures specified in table 5.3.3.3.2-2 and the response data structures and response codes specified in table 5.3.3.3.2-3.

Table 5.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

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

Table 5.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | Successful case: The individual spending limit subscription matching the subscriptionId was deleted. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual Spending Limit Retrieval Subscription deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CHF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual Spending Limit Retrieval Subscription deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative CHF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| NOTE: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [4] for the DELETE method shall also apply. | | | | |

Table 5.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

Table 5.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located in an alternative CHF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

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

##### 5.5.2.3.1 POST

This method shall support the URI query parameters specified in table 5.5.2.3.1-1.

Table 5.5.2.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 5.5.2.3.1-2 and the response data structures and response codes specified in table 5.5.2.3.1-3.

Table 5.5.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SpendingLimitStatus | M | 1 | Provides information about the statuses of policy counters. |

Table 5.5.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | The receipt of the notification is acknowledged. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Spending limit report. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Spending limit report. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.  Applicable if the feature "ES3XX" is supported. |
| NOTE: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [4] for the POST method shall also apply. | | | | |

Table 5.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected |

Table 5.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected |

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

##### 5.5.3.3.1 POST

This method shall support the URI query parameters specified in table 5.5.3.3.1-1.

Table 5.5.3.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 5.5.3.3.1-2 and the response data structures and response codes specified in table 5.5.3.3.1-3.

Table 5.5.3.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| SubscriptionTerminationInfo | M | 1 | Provides information about the deletion of the resource. |

Table 5.5.3.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | The receipt of the Notification is acknowledged. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during subscription termination. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during subscription termination. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.  Applicable if the feature "ES3XX" is supported. |
| NOTE: In addition, the HTTP status codes which are specified as mandatory in table 5.2.7.1-1 of 3GPP TS 29.500 [4] for the POST method shall also apply. | | | | |

Table 5.5.3.3.1-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected |

Table 5.5.3.3.1-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected |

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

### 5.7.1 General

HTTP error handling shall be supported as specified in subclause 5.2.4 of 3GPP TS 29.500 [4].

For the Nchf\_SpendingLimitControl service API, HTTP error responses shall be supported as specified in subclause 4.8 of 3GPP TS 29.501 [5].

Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] for HTTP redirections shall be supported if the feature "ES3XX" is supported.

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

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

## 5.8 Feature negotiation

The optional features in table 5.8-1 are defined for the Nchf\_SpendingLimitControl Service API. They shall be negotiated using the extensibility mechanism defined in subclause 6.6.2 of 3GPP TS 29.500 [4].

Table 5.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | SubscriptionExpirationTimeControl | Indicates the support of a expiry time to control the time duration of the subscription to changes of policy counters status. |
| 2 | NotifiationCorrelation | Indicates the support of the explicit indication of the notification correlation id |
| x1 | ES3XX | Extended Support for 3xx redirections. This feature indicates the support of redirection for any service operation, according to Stateless NF procedures as specified in subclauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [4] and according to HTTP redirection principles for indirect communication, as specified in subclause 6.10.9 of 3GPP TS 29.500 [4]. |

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

# A.2 Nchf\_SpendingLimitControl Service API

openapi: 3.0.0

info:

version: 1.1.1

title: Nchf\_SpendingLimitControl

description: |

Nchf Spending Limit Control Service.

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externalDocs:

description: 3GPP TS 29.594 V16.4.0; 5G System; Spending Limit Control Service.

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.594/'

servers:

- url: '{apiRoot}/nchf-spendinglimitcontrol/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in subclause subclause 4.4 of 3GPP TS 29.501

security:

- {}

- oAuth2ClientCredentials:

- nchf-spendinglimitcontrol

paths:

/subscriptions:

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'201':

description: Success

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the created individual spending limit resource, according to the structure: {apiRoot}/nchf-spendinglimitcontrol/v1/subscriptions/{subscriptionId}'

required: true

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

callbacks:

statusNotification:

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

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content, Notification was succesfull

'307':

description: Temporary Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

required: true

description: 'A URI pointing to the endpoint of an alternative NF consumer (service) instance towards which the notification should be redirected.'

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the notification request is redirected'

schema:

type: string

'308':

description: Permanent Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

required: true

description: 'A URI pointing to the endpoint of an alternative NF consumer (service) instance towards which the notification should be redirected.'

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the notification request is redirected'

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

subscriptionTermination:

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

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content, Notification was succesfull

'307':

description: Temporary Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

required: true

description: 'A URI pointing to the endpoint of an alternative NF consumer (service) instance towards which the notification should be redirected.'

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the notification request is redirected'

schema:

type: string

'308':

description: Permanent Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

required: true

description: 'A URI pointing to the endpoint of an alternative NF consumer (service) instance towards which the notification should be redirected.'

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the notification request is redirected'

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:

parameters:

- in: path

name: subscriptionId

description: Identifies an individual spending limit retrieval subscription.

required: true

schema:

type: string

put:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK. Resource was succesfully modified and representation is returned

content:

application/json:

schema:

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

'307':

description: Temporary Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

description: 'An alternative URI of the resource located on an alternative CHF (service) instance.'

required: true

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the request is redirected'

schema:

type: string

'308':

description: Permanent Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

description: 'An alternative URI of the resource located on an alternative CHF (service) instance.'

required: true

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the request is redirected'

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

delete:

responses:

'204':

description: No Content. Resource was succesfully deleted

'307':

description: Temporary Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

description: 'An alternative URI of the resource located on an alternative CHF (service) instance.'

required: true

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the request is redirected'

schema:

type: string

'308':

description: Permanent Redirect

content:

application/problem+json:

schema:

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

headers:

Location:

description: 'An alternative URI of the resource located on an alternative CHF (service) instance.'

required: true

schema:

type: string

3gpp-Sbi-Target-Nf-Id:

description: 'Identifier of the target NF (service) instance towards which the request is redirected'

schema:

type: string

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nchf-spendinglimitcontrol: Access to the Nchf\_SpendingLimitControl API

schemas:

SpendingLimitContext:

type: object

properties:

supi:

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

gpsi:

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

policyCounterIds:

type: array

items:

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

minItems: 1

description: This is a list of policy counter identifier(s), which identifies policy counters maintained per subscriber within the CHF.

notifUri:

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

expiry:

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

supportedFeatures:

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

notifId:

type: string

SpendingLimitStatus:

type: object

properties:

supi:

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

notifId:

type: string

statusInfos:

type: object

additionalProperties:

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

minProperties: 1

description: Status of the requested policy counters. The key of the map is the attribute "policyCounterId".

expiry:

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

supportedFeatures:

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

PolicyCounterInfo:

type: object

properties:

policyCounterId:

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

currentStatus:

type: string

description: Identifies the policy counter status applicable for a specific policy counter identified by the policyCounterId. The values (e.g. valid, invalid or any other status) are not specified. The interpretation and actions related to the defined values are out of scope of 3GPP.

penPolCounterStatuses:

type: array

items:

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

minItems: 1

description: Provides the pending policy counter status.

required:

- policyCounterId

- currentStatus

PendingPolicyCounterStatus:

type: object

properties:

policyCounterStatus:

type: string

description: Identifies the policy counter status applicable for a specific policy counter identified by the policyCounterId. The values (e.g. valid, invalid or any other status) are not specified. The interpretation and actions related to the defined values are out of scope of 3GPP.

activationTime:

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

required:

- policyCounterStatus

- activationTime

PolicyCounterId:

type: string

description: Identifies a policy counter.

SubscriptionTerminationInfo:

type: object

properties:

supi:

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

termCause:

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

required:

- supi

TerminationCause:

anyOf:

- type: string

enum:

- REMOVED\_SUBSCRIBER

- type: string

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