**3GPP TSG CT WG3 Meeting #135 *C3-243216***

**Hyderabad, IN, 27 - 31 May, 2024 *(Revision of C3-243xxx)***

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.565** | **CR** | **0128** | **rev** | **-** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *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:*** | Corrections on Ntsctsf\_TimeSynchronization and Annex number | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, Nokia | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | IIoT | | | | |  | ***Date:*** | | | 2024-04-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The following issues have been identified in the current specification:   1. In clause 5.2.2.2.2, the "interGroupId" and "exterGroupId" attributes name are misalign with the OpenAPI file. 2. The resource URI in 6.1.3.2.3.1 and 6.1.3.4.3.1 are incorrect and misalign with the OpenAPI file 3. Additional editorial and format issues. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Fix the above issues. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Incorrect specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.2.2, 6.1.2.1, 6.1.3.2.3.1, 6.1.3.4.3.1, 6.1.6.1, 6.2.2.1, 6.3.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 on the OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

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

##### 5.2.2.2.2 Creating a new subscription

Figure 5.2.2.2.2-1 illustrates the creation of a subscription.



Figure 5.2.2.2.2-1: Creation of a subscription

To subscribe the notification of the capability of time synchronization service, the NF service consumer shall send an HTTP POST message to the TSCTSF to the URI "{apiRoot}/ntsctsf-time-sync/<apiVersion>/subscriptions". The HTTP POST message shall include the TimeSyncExposureSubsc data structure as request body. The TimeSyncExposureSubsc data structure shall include:

- the indication of the UEs to which the time synchronization capabilities is requested via:

- identification of a list of individual UEs within a "supis" attribute; or

- identification of a list of individual UEs within a "gpsis" attribute; or

- indication of any UE within the "anyUeInd" attribute; or

- identification of a group of UE(s) within the "interGrpId" attribute; or

- identification of a group of UE(s) within the "exterGrpId" attribute.

- subscription to event(s) notification as "subscribedEvents" attribute;

- notification URI within the "subsNotifUri" attribute;

- notification correlation Id within the "subsNotifId" attribute;

- DNN with the "dnn" attribute; and

- S-NSSAI with the "snssai" attribute;

and may include:

- the conditions to match for notifying the event within the "eventFilters" attribute;

- notification method within the "notifMethod" attribute

- maximum number of reports within the "maxReportNbr" attribute;

- expiry time within the "expiry" attribute; and

- report period within the "repPeriod" attribute.

Upon receipt of the HTTP request from the NF service consumer, if the request is authorized, the TSCTSF shall:

- create a new subscription;

- assign a subscription correlation ID;

- select an expiry time that is equal to or less than the expiry time potentially received in the request;

- store the subscription;

- if the "interGrpId" attribute or "exterGrpId" attribute is received from the NF service consumer, interact with the UDM to retrieve the SUPI list that belong to the group using the Nudm\_SDM service as defined in 3GPP TS 29.503 [24];

- if the "gpsis" attribute is received from the NF service consumer, interact with the UDM to retrieve the SUPI(s) that correspond to the GPSI(s) using the Nudm\_SDM service as defined in 3GPP TS 29.503 [24];

- use the parameters received from the NF service consumer (i.e. DNN, S-NSSAI and, if available, the list of UEs or UEs that belong to the group of UEs) and the time synchronization subscription data retrieved from UDM to determine the matching AF-session(s) that are authorized by subscription, and for any such AF-session for which the SUPI interact with the PCF by triggering Npcf\_PolicyAuthorization\_Create/Update request message as defined in 3GPP TS 29.514 [20].

NOTE 1: If the PCF determines an existing PDU Session is potentially impacted by time synchronization service (based on local configuration or SM Policy Association), the PCF invokes Npcf\_PolicyAuthorization\_Notify service operation to the TSCTSF as defined in clause 4.2.5.16 of 3GPP TS 29.514 [20] to send the received TSC User Plane Node information. At that time, the TSCTSF retrieves from the BSF the PCF binding information (including the UE Identities as SUPI and if available, GPSI for the notified PDU session), as specified in 3GPP TS 29.521 [23], and can create the AF-session by sending to the PCF the Npcf\_PolicyAuthorization\_Create service operation.

- send an HTTP "201 Created" response with TimeSyncExposureSubsc data structure as response body and a Location header field containing the URI of the created individual subscription resource, i.e. "{apiRoot}/ntsctsf-time-sync/<apiVersion>/subscriptions/{subscriptionId}".

The TSCTSF shall handle the AF session(s) associated with the "Individual Time Synchronization Exposure Subscription" resource as follows:

- For the association of AF sessions to "Individual Time Synchronization Exposure Subscription" resources:

- Upon PDU Session establishment, i.e. when the TSCTSF receives the Npcf\_PolicyAuthorization\_Notify service operation for the establishment of a new PDU session, the TSCTSF shall retrieve from the BSF, as specified in 3GPP TS 29.521 [23], the PCF binding information to complete the necessary AF-Session information and triggers the Npcf\_PolicyAuthorization\_Create request message to the PCF to create an AF-session to subscribe to TSC user plane node related events. The TSCTSF, shall use the parameters of existing "Individual Time Synchronization Exposure Subscription" resources to determine whether they shall be associated to this newly created AF sessionThe TSCTSF associates the new AF session to the "Individual Time Synchronization Exposure Subscription" resources for which these parameters match. The TSCTSF shall read time synchronization capabilities from the DS-TT and NW-TT, if not available in the AF session, from the PCF by triggering Npcf\_PolicyAuthorization\_Update request message as defined in 3GPP TS 29.514 [20] and determine the (g)PTP capabilities from the DS-TT and the NW-TT as described in clause K.2.1 of 3GPP TS 23.501 [2]. The TSCTSF shall update the time synchronization service capability for this new DS-TT as defined in clause 5.2.2.4.2.

- Upon AF sessions establishment, i.e. when the TSCTSF receives the AF request for the time synchronization service, the TSCTSF shall retrieve Time Synchronization Subscription data from UDM. The TSCTSF, shall use the parameters of existing "Individual Time Synchronization Exposure Subscription" resources to determine whether they shall be associated to this newly created AF session. The TSCTSF associates the new AF session to the "Individual Time Synchronization Exposure Subscription" resources for which these parameters match if the AF-session (i.e., the SUPI) is authorized by UDM subscription, otherwise the AF-session is excluded.

- Upon "Individual Time Synchronization Exposure Subscription" resource creation, the TSCTSF uses the parameters of the created resource to determine which existing and authorized AF sessions it matches. The TSCTSF associates the new "Individual Time Synchronization Exposure Subscription" resource to the authorized AF sessionsfor which these parameters match.

- To remove an AF session from the associated ones to the "Individual Time Synchronization Exposure Subscription" resource, when the TSCTSF receives the Npcf\_PolicyAuthorization\_Notify service operation indicating the termination of an existing PDU session, the TSCTSF triggers the Npcf\_PolicyAuthorization\_Delete request message to the PCF and determines if the corresponding AF session is associated with the "Individual Time Synchronization Exposure Subscription" resource. If it is so, the TSCTSF shall remove the AF session from the list of AF session(s) associated with the "Individual Time Synchronization Exposure Subscription" resource. The TSCTSF shall update the time synchronization service capability for this removed DS-TT as defined in clause 5.2.2.4.2.

NOTE 2: After the TSCTSF retrieves from the BSF the PCF binding information (including the UE Identities for the notified PDU session), as specified in 3GPP TS 29.521 [23], the TSCTSF can store internally the information required to invoke Npcf\_PolicyAuthorization\_Create service operation and delay the Npcf\_PolicyAuthorization\_Create service operation (the creation of the AF session) till the subscription to notification of the capability of time synchronization service is received for the concerned UE. In this case, when the TSCTSF receives the subscription request, the TSCTSF interacts with the PCF by triggering Npcf\_PolicyAuthorization\_Create message as defined in 3GPP TS 29.514 [20].

NOTE 3: When the TSCTSF receives the Npcf\_PolicyAuthorization\_Notify service operation indicating the termination of an existing PDU session associated to an AF session that it is not associated with any "Individual Time Synchronization Exposure Subscription" resource, the TSCTSF removes the AF-session and triggers the Npcf\_PolicyAuthorization\_Delete request message to the PCF.

If the TSCTSF cannot successfully fulfil the received HTTP POST request due to the internal TSCTSF error or due to the error in the HTTP POST request, the TSCTSF shall send the HTTP error response as specified in clause 6.1.7.

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

#### 6.1.2.1 General

HTTP/2, IETF RFC 9113 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Ntsctsf\_TimeSynchronization API is contained in Annex A.2.

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

###### 6.1.3.2.3.1 POST

The POST method creates a new subscription resource to time synchronization exposure subscription. The NF service consumer shall initiate the HTTP POST request message and the TSCTSF shall respond to the message. The TSCTSF shall construct the URI of the created resource.

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| TimeSyncExposureSubsc | M | 1 | Parameters to request a subscription to notification of the capability for time synchronization service. |

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| TimeSyncExposureSubsc | M | 1 | 201 Created | The subscription was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| NOTE: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 6.1.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/ntsctsf-time-sync/{apiVersion}/subscriptions/{subscriptionId} |

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

###### 6.1.3.4.3.1 POST

The POST method creates a new configuration resource to activate time synchronization service. The NF service consumer shall initiate the HTTP POST request message and the TSCTSF shall respond to the message. The TSCTSF shall construct the URI of the created resource.

This method shall support the URI query parameters specified in table 6.1.3.4.3.1-1.

Table 6.1.3.4.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 6.1.3.4.3.1-2 and the response data structures and response codes specified in table 6.1.3.4.3.1-3.

Table 6.1.3.4.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| TimeSyncExposureConfig | M | 1 | Parameters to create a configuration to activate time synchronization service. |

Table 6.1.3.4.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| TimeSyncExposureConfig | M | 1 | 201 Created | The configuration was created successfully.  The URI of the created resource shall be returned in the "Location" HTTP header. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual Time Synchronization Exposure Configuration resource creation.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual Time Synchronization Exposure Configuration resource creation.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | (NOTE 3) |
| NOTE 1: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).  NOTE 3: Failure cases are described in clause 6.1.7. | | | | |

Table 6.1.3.4.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/ntsctsf-time-sync/{apiVersion}/subscriptions/{subscriptionId}/configuration/{configurationId} |

Table 6.1.3.4.3.1-5: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative TSCTSF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target TSCTSF (service) instance towards which the request is redirected. |

Table 6.1.3.4.3.1-6: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative TSCTSF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target TSCTSF (service) instance towards which the request is redirected. |

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

#### 6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the Ntsctsf\_TimeSynchronization service based interface protocol.

Table 6.1.6.1-1: Ntsctsf\_TimeSynchronization specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| ConfigForPort | 6.1.6.2.11 | Contains the configuration for a port. |  |
| PtpCapabilitiesPerUe | 6.1.6.2.6 | Contains the PTP capabilities supported by a UE. |  |
| PtpInstance | 6.1.6.2.10 | Contains the PTP Instance. |  |
| StateOfConfiguration | 6.1.6.2.8 | Indicates the PTP port states for a NW-TT and DS-TTs. |  |
| StateOfDstt | 6.1.6.2.12 | Contains the PTP port state of a DS-TT |  |
| SubsEventNotification | 6.1.6.2.4 | Contains the notification of capability of time synchronization for a list of UEs. |  |
| TimeSyncCapability | 6.1.6.2.5 | Contains the capability of time synchronization service |  |
| TimeSyncExposureConfig | 6.1.6.2.9 | Contains the configuration of time synchronization service |  |
| TimeSyncExposureConfigNotif | 6.1.6.2.7 | Contains the notification of configuration of time synchronization service. |  |
| TimeSyncExposureSubsc | 6.1.6.2.2 | Contains the parameters for the subscription to notification of capability of time synchronization service |  |
| TimeSyncExposureSubsNotif | 6.1.6.2.3 | Contains the notification of time synchronization service. |  |

Table 6.1.6.1-2 specifies data types re-used by the Ntsctsf\_TimeSynchronization service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Ntsctsf\_TimeSynchronization service based interface.

Table 6.1.6.1-2: Ntsctsf\_TimeSynchronization re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AcceptanceCriteriaResultIndication | 3GPP TS 29.522 [17] | Contains the acceptable/not acceptable indication of the clock quality acceptance criteria result information. | NetTimeSyncStatus |
| AsTimeResource | 3GPP TS 29.522 [17] | Indicates the supported 5G clock quality. |  |
| ClockQualityAcceptanceCriterion | 3GPP TS 29.571 [15] | Identifies clock quality acceptance criteria information. | NetTimeSyncStatus |
| ClockQualityDetailLevel | 3GPP TS 29.571 [15] | Identifies clock quality detail level information. | NetTimeSyncStatus |
| DateTime | 3GPP TS 29.571 [15] | String with format "date-time" as defined in OpenAPI Specification [6]. |  |
| Dnn | 3GPP TS 29.571 [15] | The DNN the user is connected to. |  |
| DurationSec | 3GPP TS 29.571 [15] | Identifies a period of time in units of seconds. |  |
| EventFilter | 3GPP TS 29.522 [17] | Contains the conditions to match for notifying the event(s) of time synchronization capabilities. |  |
| ExternalGroupId | 3GPP TS 29.571 [15] | Identifies a External Group. |  |
| GmCapable | 3GPP TS 29.522 [17] | Indicates separately whether 5GS supports acting as a gPTP or PTP grandmaster. |  |
| Gpsi | 3GPP TS 29.571 [15] | The external identification of the user (i.e., an External Id or an MSISDN). |  |
| GroupId | 3GPP TS 29.571 [15] | Identifies a group of internal globally unique ID. |  |
| NotificationMethod | 3GPP TS 29.508 [16] | Identifies the notification method. |  |
| InstanceType | 3GPP TS 29.522 [17] | Identifies supported PTP instance type. |  |
| ProblemDetails | 3GPP TS 29.571 [15] | Problem Details when returning an error response. |  |
| Protocol | 3GPP TS 29.522 [17] | Identifies the supported protocol in a PTP instance. |  |
| RedirectResponse | 3GPP TS 29.571 [15] | Contains redirection related information. |  |
| ServiceAreaCoverageInfo | 3GPP TS 29.534 [14] | It represents a list of Tracking Areas within a serving network. | CoverageAreaSupport |
| Snssai | 3GPP TS 29.571 [15] | Identifies the S-NSSAI. |  |
| SubscribedEvent | 3GPP TS 29.522 [17] | Indicates the subscribed event. |  |
| Supi | 3GPP TS 29.571 [15] | The identification of the user (i.e. IMSI, NAI). |  |
| SupportedFeatures | 3GPP TS 29.571 [15] | Used to negotiate the applicability of the optional features defined in table 5.8-1. |  |
| TimeSyncExposureConfig | 3GPP TS 29.522 [17] | Contains the parameters of time synchronization configuration. |  |
| Uinteger | 3GPP TS 29.571 [15] | Unsigned integer. |  |
| Uint64 | 3GPP TS 29.571 [15] |  |  |
| Uri | 3GPP TS 29.571 [15] | Identifies a referenced resource. |  |

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

#### 6.2.2.1 General

HTTP/2, IETF RFC 9113 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Ntsctsf\_QoSandTSCAssistance API is contained in Annex A.3.

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

#### 6.3.2.1 General

HTTP/2, IETF RFC 9113 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Ntsctsf\_ASTI API is contained in Annex A.4.

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