**3GPP TSG- Meeting #**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** |  | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | C3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The agreed SA2 CR S2-2209569 corrects the way in which the error budget is calculated during PTP instance configuration and ASTI procedures.  According to it, the port states and the requested budget are not the only possible criteria. Further criteria are specified in the referenced clause 5.27.1.9 of 23.501.  Further, the budget calculation takes place during ASTI services even if the AF does not provide a requested error budget. | | | | | | | | |
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| ***Summary of change:*** | | Corrected the PTP instance configuration and ASTI procedures to reference the proper stage 2 clause for error budget calculation and indicate that budget calculation takes place during ASTI services even if the AF does not provide a requested error budget. | | | | | | | | |
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| ***Consequences if not approved:*** | | Wrong specification, not aligned with stage 2 requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.5.2, 5.2.2.6.2, 5.4.2.2.2, 5.4.2.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not impact any OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* First change \* \* \* \*

##### 5.2.2.5.2 Creating a new configuration

Figure 5.2.2.5.2-1 illustrates the creation of a configuration.



Figure 5.2.2.5.2-1: Creation of a configuration

To create a configuration, the NF service consumer shall send an HTTP POST message to the TSCTSF to the URI "{apiRoot}/ntsctsf-time-sync/<apiVersion>/subscriptions/{subscriptionId}/configurations". The HTTP POST message shall include the TimeSyncExposureConfig data structure as request body, as shown in figure 5.2.2.5.2-1, step 1. The TimeSyncExposureConfig data structure shall include:

- the user plane node Id within the "upNodeId" attribute;

- the requested PTP instance within the "reqPtpIns" attribute;

- the time domian within the "timeDom" attribute;

- the notification URI within the "configNotifUri" attribute;

- the notification correlation Id within the "configNotifId" attribute;

and may include:

- the "gmEnable" attribute set to true if the AF requests 5GS to act as a grandmaster for PTP or gPTP;

- the time synchronization error budget within the "timeSyncErrBdgt" attribute;

- the gandmaster priority with the "gmPrio" attribute; and

- the temporal validity condition within the "tempValidity" attribute.

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

- create a new resource, which represents a new "Individual Time Synchronization Exposure Configuration" instance, addressed by a URI as defined in clause 6.1.3.5 and containing a TSCTSF created resource identifier;

- send an HTTP "201 Created" response with TimeSyncExposureConfig data structure as response body and a Location header field containing the URI of the created Individual Time Synchronization Exposure Configuration resource, i.e. "{apiRoot}/ntsctsf-time-sync/<apiVersion>/subscriptions/{subcriptionId}/configuration/{configurationId}", as shown in figure 5.2.2.5.2-1, step 2;

- use the {subscriptionId} within the requested URI and user plane node ID within the "upNodeId" attribute in the request to determine the target UEs and corresponding AF sessions, then use the parameters (e.g. requested PTP instance type, transport protocol, and PTP profile) in the request to determine suitable DS-TT(s) and AF session(s) among all AF session and contact with the each corresponding PCF for the PDU session to configure and initialize the PTP instance in the DS-TT(s) and NW-TT as defined in 3GPP TS 23.502 [3], clause 4.15.9.3.2, step 5-6;

- calculate the Uu time synchronization error budget as specified in clause 5.27.1.9 of 3GPP TS 23.501 [2], subscribe to event notifications of newly registered PCF for the UE for the affected UEs by invoking Nbsf\_Management\_Subscribe Service Operation as defined in clause 4.2.6 of 3GPP TS 29.521 [23] if not yet done, and send a request to the PCF for the UE for AM policy authorization by invoking Npcf\_AMPolicyAuthorization\_Create service operation as defined in clause 4.2.2 of 3GPP TS 29.534 [14] providing the appropriate values in the "asTimeDisParam" attribute in order to activate the access stratum time distribution and provide the calculated Uu time synchronization error budget.

If the temporal validity condition is provided and if the start-time is in the future, the TSCTSF shall maintain the time synchronization configuration and then proceed as described above when the start-time is reached; otherwise, if the start-time is in the past, the TSCTSF shall proceed as described above immediately. When the stop-time is reached for active time synchronization service configuration, the TSCTSF shall proceed as Ntsctsf\_TimeSynchronization\_ConfigDelete was received as described in clause 5.2.2.7.2 without interacting with the AF.

The TSCTSF shall associate the affected AF session to the "Individual Time Synchronization Exposure Configuration". When receiving the Npcf\_PolicyAuthorization\_Notify service operation indicating the termination of an existing PDU session and the corresponding AF session is associated with the "Individual Time Synchronization Exposure Configuration" resource, the TSCTSF shall remove the AF session from the list of AF sessions associated with the "Individual Time Synchronization Exposure Configuration" resource and invoke Npcf\_AMPolicyAuthorization\_Delete service operation as defined in clause 4.2.4 of 3GPP TS 29.534 [14] to remove the access stratum time distribution parameters for the UE if they were provided.

If the HTTP POST request from the NF service consumer is not accepted, the TSCTSF shall indicate in the response to HTTP POST request the cause for the rejection as specified in clause 6.1.7.

If the TSCTSF determines the received HTTP POST request needs to be redirected, the TSCTSF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

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

##### 5.2.2.6.2 Updating an existing configuration

Figure 5.2.2.6.2-1 illustrates the updating of an existing configuration.



Figure 5.2.2.6.2-1: Update of a configuration

To update a configuration, the NF service consumer shall send an HTTP PUT request to the resource "{apiRoot}/ntsctsf-time-sync/<apiVersion>/subscriptions/{subscriptionId}/configurations/{configurationId}" representing an existing "Individual Time Synchronization Exposure Configuration" resource, as shown in figure 5.2.2.6.2-1, step 1, to modify the configuration.

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

- the user plane node Id within the "upNodeId" attribute;

NOTE 1: The user plane node Id cannot be changed during the modification.

- the requested PTP instance within the "reqPtpIns" attribute;

- the time domain within the "timeDom" attribute;

NOTE 2: The user plane node Id, the requested PTP instance and the time domain cannot be changed during the modification.

- the notification URI within the "configNotifUri" attribute;

- the notification correlation Id within the "configNotifId" attribute;

NOTE 2: If the notification URI or notification correlation Id is not changed the previously value is included.

and may include:

- the "gmEnable" attribute set to true if the AF requests 5GS to act as a grandmaster for PTP or gPTP;

- the time synchronization error budget within the "timeSyncErrBdgt" attribute;

- the gandmaster priority with the "gmPrio" attribute; and

- the temporal validity condition within the "tempValidity" attribute.

Upon receipt of the corresponding HTTP PUT message, if the request is authorized, theTSCTSF shall:

- update the existing "Individual Time Synchronization Exposure Configuration" resource;

- send a HTTP response including "200 OK" status code with TimeSyncExposureConfig data structure or "204 No Content" status code, as shown in figure 5.2.2.6.2-1, step 2;

- use the {subscriptionId} within the requested URI and user plane node ID within the "upNodeId" attribute in the request to determine the target UEs and corresponding AF-sessions, then use the updated parameters (e.g. requested PTP instance type, transport protocol, and PTP profile) in the request to determine suitable DS-TT(s) and AF session(s) among all AF session and contact with the each correspondingPCF for the PDU session to configure and initialize the PTP instance in the DS-TT(s) and NW-TT as defined in 3GPP TS 23.502 [3], clause 4.15.9.3.3, step 5-6. The TSCTSF associates the new affected AF session(s) with the "Individual Time Synchronization Exposure Configuration" resource.

- If the time synchronization error budget is provided, updated, or removed, calculate the Uu time synchronization error budget as specified in clause 5.27.1.9 of 3GPP TS 23.501 [2] and send a request to the PCF for the UE for AM policy authorization by invoking Npcf\_AMPolicyAuthorization\_Update service operation as defined in clause 4.2.3 of 3GPP TS 29.534 [14] in order to update the Uu time synchronization error budget.

If the temporal validity condition was provided but it is removed during the update of time synchronization configuration, the TSCTSF shall perform the time synchronization configuration as described above without considering the temporal validity condition.

If the temporal validity condition was not provided and the temporal validity condition is provided during the update of configuration, the TSCTSF shall perform as follows:

- if the start-time is in the future, the TSCTSF shall maintain the time synchronization configuration and then proceeds as described above when the start-time is reached; otherwise, if the start-time is in the past, the TSCTSF shall proceed as described above immediately;

- When the stop-time is reached for active time synchronization service configuration, the TSCTSF shall proceed as Ntsctsf\_TimeSynchronization\_ConfigDelete was received as described in clause 5.2.2.7.2 without interacting with the AF.

If the temporal validity condition was provided and the temporal validity condition is updated during the update of configuration, the TSCTSF shall perform as follows:

- if the previously provided time configuration is being applied but the new start-time is in the future, the TSCTSF shall proceed as Ntsctsf\_TimeSynchronization\_ConfigDelete was received as described in clause 5.2.2.7.2 without interacting with the AF firstly and then proceeds as described above when the new start-time is reached; otherwise if the time synchronization configuration has been created but the new start-time is in the past, the TSCTSF keep the existing configuration;

- when the new stop-time is reached for active time synchronization service configuration, the TSCTSF shall proceed as Ntsctsf\_TimeSynchronization\_ConfigDelete was received as described in clause 5.2.2.7.2 without interacting with the AF;

- if the previously provided time configuration is not being applied because the previously provided start-time is in the future, the TSCTSF shall perform as the case that the temporal validity condition was not provided previously.

The TSCTSF shall associate the affected AF session to the "Individual Time Synchronization Exposure Configuration". When receiving the Npcf\_PolicyAuthorization\_Notify service operation indicating the termination of an existing PDU session and the corresponding AF session is associated with the "Individual Time Synchronization Exposure Configuration" resource, the TSCTSF shall remove the AF session from the list of AF sessions associated with the "Individual Time Synchronization Exposure Configuration" resource and invoke Npcf\_AMPolicyAuthorization\_Delete service operation as defined in clause 4.2.4 of 3GPP TS 29.534 [14] to remove the access stratum time distribution parameters for the UE if they were provided.

If the HTTP PUT request from the NF service consumer is not accepted, the TSCTSF shall indicate in the response to HTTP PUT request the cause for the rejection as specified in clause 6.1.7.

If the TSCTSF determines the received HTTP PUT request needs to be redirected, the TSCTSF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

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

##### 5.4.2.2.2 Creating a new configuration

Figure 5.4.2.2.2-1 illustrates the creation of a configuration.



Figure 5.4.2.2.2-1: Creation of a configuration

To create a configuration, the NF service consumer shall send an HTTP POST message to the TSCTSF to the URI "{apiRoot}/ntsctsf-asti/<apiVersion>/configurations". The HTTP POST message shall include the AccessTimeDistributionData data structure as request body, as shown in figure 5.4.2.2.2-1, step 1. The AccessTimeDistributionData data structure shall include:

- one of the indication of the UEs to which the 5G access stratum time distribution configuration is requested via:

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

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

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

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

- 5G access stratum time distribution parameters within the "asTimeDisParam" attribute;

Within the "asTimeDisParam" attribute inside the AccessTimeDistributionData data structure, the NF service consumer:

- shall include the "asTimeDisEnabled" attribute set to true if the access stratum time distribution via Uu reference point should be activated (otherwise, if the access stratum time distribution via Uu reference point should be inactive, the "asTimeDisEnabled" attribute may either be omitted or included and set to "false");

- may include the time synchronization error budget within the "timeSyncErrBdgt" attribute;

- may include the temporal validity condition within the "tempValidity" attribute.

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

- if the 5G access stratum time distribution configuration applies to an internal group of UEs indicated in the "interGrpId" attribute or to an external group of UEs indicated in the "exterGrpId" attribute, interact with the UDM to retrieve the list of individual UEs that belong to the group using the Nudm\_SDM service as defined in 3GPP TS 29.503 [24];

- if the 5G access stratum time distribution configuration applies to a list of individual UEs within the "gpsis" attribute, interact with the UDM to retrieve the SUPI(s) that corresponds to each of the GPSI(s) using the Nudm\_SDM service as defined in 3GPP TS 29.503 [24];

- subscribe to event notifications of newly registered PCF for the UE by invoking Nbsf\_Management\_Subscribe Service Operation as defined in 3GPP TS 29.521 [23], if not yet subscribed;

- If the access stratum time distribution via Uu reference point is being activated (i.e. the "asTimeDisEnabled" attribute within the "asTimeDisParam" attribute was received and set to true), calculate the Uu time synchronization error budget as specified in clause 5.27.1.9 of 3GPP TS 23.501 [2];

- interact with the PCF for a UE to provide the configuration information for each target UE using the Npcf\_AMPolicyAuthorization\_Create service operation as defined in 3GPP TS 29.534 [14];

- create a new resource, which represents a new "Individual ASTI Configuration" instance, addressed by a URI as defined in clause 6.1.3.7 and containing a TSCTSF created resource identifier; and

- send an HTTP "201 Created" response with AccessTimeDistributionData data structure as response body and a Location header field containing the URI of the created Individual ASTI Configuration resource, i.e. "{apiRoot}/ntsctsf-asti/<apiVersion>/configurations/{configId}", as shown in figure 5.4.2.2.2-1, step 2.

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 6.3.7.

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

##### 5.4.2.3.2 Updating an existing configuration

Figure 5.4.2.3.2-1 illustrates the updating of an existing configuration.



Figure 5.4.2.3.2-1: Update of a configuration

To update a configuration, the NF service consumer shall send an HTTP PUT request to the resource "{apiRoot}/ntsctsf-asti/<apiVersion>/configurations/{configId}" representing an existing "Individual ASTI Configuration" resource, as shown in figure 5.4.2.3.2-1, step 1, to modify the configuration.

The AccessTimeDistributionData data structure provided in the request body shall include an updated representation of the "Individual ASTI Configuration" resource with the updated 5G access stratum time distribution configuration information as defined in clause 5.4.2.2.2.

Upon receipt of the corresponding HTTP PUT message, if the request is authorized, theTSCTSF shall:

- if the access stratum time distribution via Uu reference point is being activated (i.e. the "asTimeDisEnabled" attribute within the "asTimeDisParam" attribute was received and set to true) or a time synchronization error budget for an active access stratum time distribution is provided or updated by the AF, calculate the Uu time synchronization error budget as specified in clause 5.27.1.9 of 3GPP TS 23.501 [2];

- interact with the PCF for a UE to provide the updated configuration information using the Npcf\_AMPolicyAuthorization\_Update service operation as defined in 3GPP TS 29.534 [14]; and

- update the existing "Individual ASTI Configuration" resource. Then the TSCTSF shall send a HTTP response including "200 OK" status code with AccessTimeDistributionData data structure or "204 No Content" status code, as shown in figure 5.4.2.3.2-1, step 2.

If the TSCTSF cannot successfully fulfil the received HTTP PUT request due to the internal TSCTSF error or due to the error in the HTTP PUT request, the TSCTSF shall send the HTTP error response as specified in clause 6.3.7.

If the TSCTSF determines the received HTTP PUT request needs to be redirected, the TSCTSF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

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