**3GPP TSG-CT WG3 Meeting #135 *C3-243361***

**Hyderabad, IN, 27May – 31 May, 2024**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.565** | **CR** | **0137** | **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** |

|  |
| --- |
|  |
| ***Title:***  | Corrections for the Ntsctsf\_TimeSynchronization |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | IIoT |  | ***Date:*** | 2024-05-20 |
|  |  |  |  |  |
| ***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 canbe 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 TimeSyncExposureConfig data type is specified in TS 29.565, and in TS 29.522. While the TimeSyncExposureConfig defined in TS 29.565 enables to indicate the configuration of the DS-TT ports of the PTP instance using the SUPI, the TimeSynchExposureConfig defined in TS 29.522 only allows to indicate so using the GPSI.This TS, in the OpenAPI file, in the POST and PUT request, indicates, by mistake, that the request body is the TimeSyncExposureConfig defined in TS 29.522, and hence, makes impossible to use the SUPI as identifier of the DS-TT.However, this limitation runs unnoticed through the main body of the specification. In addition, this limitation represents a misalignment with SA2. |
|  |  |
| ***Summary of change:*** | Correct the usage of data type TimeSyncExposureConfig, and via feature control, enable to use in the POST and PUT requests the TimeSyncExposureConfig data defined in TS 29.565. |
|  |  |
| ***Consequences if not approved:*** | Misalignment between the main body and the OpenAPI. The SUPI cannot be used by internal AF. Incorrect data usage and definition leads to implmentation errors. |
|  |  |
| ***Clauses affected:*** | 5.2.2.5.2, 5.2.2.6.2, 6.1.6.2.11, 6.1.8, 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 impacts the OpenAPI description of Ntsctsf\_TimeSynchronization with a backwards compatible correction. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 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. If the feature "TimeSyncExposureConfig\_Corr" is not supported, the (g)PTP ports of the PTP Instance shall be identified only with the GPSI included in the "gpsi" attribute, and, if the feature "TimeSyncExposureConfig\_Corr" is supported, (g)PTP ports of the PTP Instance may be identified either by the GPSI included within the "gpsi" attribute or by the SUPI included in the "supi" attribute;

- the time domain 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;

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

- if the "CoverageAreaSupport" feature is supported, the time synchronization coverage area encoded as "covReq" attribute, that contains a list of Tracking Area codes per serving network where the requested PTP instance applies; and

- if the "NetTimeSyncStatus" feature is supported, the clock quality detail level in the "clkQltDetLvl" attribute and the clock quality acceptance criteria for the PTP instance in the "clkQltAcptCri" attribute if applicable, if the NF service consumer to subscribe to receiving network time synchronization status report(s).

NOTE 1: The AF request for PTP service activation, modification cannot indicate that the clock quality detail level to provide is "metrics", i.e. if the AF includes the clock quality detail level, its value needs to set to "acceptable/not acceptable indication" and accompanied with "clock quality acceptance criteria". The UE/DS-TT retrieves detailed information (timing synchronization metrics) from Announce messages sent for (g)PTP services.

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 authorized 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 the AF session(s) and:

a. if the "CoverageAreaSupport" feature is supported and a time synchronization coverage area is provided within the "covReq" attribute, the TSCTSF perform the following operations:

1. if the UE's Time Synchronization Subscription data from the UDM contains the list of TA(s) that comprise the authorized time synchronization coverage area. If the requested time synchronization coverage area within the "covReq" attribute is within the subscribed time synchronization coverage area, the TSCTSF determines that the time synchronization coverage area is fulfilled, and the UE is authorized for the requested time synchronization service. If the Authorized Time Synchronization Coverage Area is inside of the requested Coverage Area, the TSCTSF uses the Authorized Time Synchronization Coverage Area. If the requested Coverage Area partly overlaps with the Authorized Time Synchronization Coverage Area, the TSCTSF uses the intersection of them. If there is no overlap between them, the TSCTSF shall reject the AF request as described in clause 5.27.1.11 of 3GPP TS 23.501 [2].

2. The TSCTSF discovers the list of AMF(s) serving the list of TA(s) that comprise the authorized time synchronization coverage area using the Nnrf\_NFDiscovery service operation as described in 3GPP TS 29.510 [10], if they are not available, and, for each UE with matched AF-sessions, subscribes with the discovered AMF(s) to receive notifications about presence of the UE in an Area of Interest events using the Namf\_EventExposure service as described in 3GPP TS 29.518 [27], where the Area of Interest is the provided time synchronization coverage area.

3. Based on the outcome provided by the AMF about the UE’s presence in the Area of Interest and the authorized time synchronization coverage area, the TSCTSF determines if the time synchronization service is activated or deactivated:

i. If the UE presence is within any of the TAs from the authorized time synchronization coverage area, the TSCTSF determines that the time synchronization coverage area condition is fulfilled, and the UE is authorized for the activation of the received PTP instance configuration.

ii. If the UE presence is not within any of the TAs from the authorized time synchronization coverage area, the TSCTSF determines that the time synchronization coverage area condition is not fulfilled, and the UE is not authorized for the activation of the received PTP instance configuration;

b If the UE's Time Synchronization Subscription data contains the authorized Uu time synchronization error budget, and the requested time synchronization error budget within the "timeSyncErrBdgt" attribute is within the authorized time synchronization coverage area, the TSCTSF determines that the UE is authorized for the requested time synchronization service.

c. If the UE's Time Synchronization Subscription data contains the periods of authorized start and stop times, and the requested temporal validity condition within the "tempValidity" attribute is within any of the subscribed periods of authorized start and stop times, the TSCTSF determines that the UE is authorized for the requested time synchronization service.

- for each authorized UE and matched AF-session, 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;

- for each authorized UE with matched AF-session(s), calculate the Uu time synchronization error budget as specified in clauses 5.27.1.9 and 5.27.1.11 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 "NetTimeSyncStatus" feature is supported and upon the reception of the clock quality acceptance criteria in the "clkQltAcptCri" attribute, then TSCTSF subscribes to UPF/NW-TT time synchronization status reports via UMIC as described in clause 4.2.2.31 of 3GPP TS 29.514 [20], if the UPF/NW-TT is involved in providing time synchronization information to DS-TT. In case NG-RAN is involved in providing time synchronization status information to DS-TT, then TSCTSF sends the time synchronization status reporting control information to the NG-RAN and then initiates the subscription to the NG-RAN time synchronization status via AMF using Namf\_Communication\_NonUeN2InfoSubscribe service operation, if not previously done for the involved NG-RAN node, as described in 3GPP TS 29.518 [27].

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 UEs and matched AF sessions to the "Individual Time Synchronization Exposure Configuration". When the "CoverageAreaSupport" feature is supported, the TSCTSF also associates whether the UE fulfills the time synchronization coverage area condition, if provided. 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 for all the affected UEs the provided parameters are not allowed by subscription, the TSCTSF shall indicate in an HTTP "403 Forbidden" response message the "cause" attribute set to "UE\_SERVICE\_NOT\_AUTHORIZED".

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].

\*\*\* Second 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. If the feature "TimeSyncExposureConfig\_Corr" is not supported, the (g)PTP ports of the PTP Instance shall be identified only with the GPSI included in the "gpsi" attribute, and, if the feature "TimeSyncExposureConfig\_Corr" is supported, (g)PTP ports of the PTP Instance may be identified either by the GPSI included within the "gpsi" attribute or by the SUPI included in the "supi" 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 3: 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;

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

- if the "CoverageAreaSupport" feature is supported, the spatial validity condition encoded as "covReq" attribute, that contains a list of Tracking Area codes per serving network where the requested PTP instance applies; and

- if the "NetTimeSyncStatus" feature is supported, the clock quality detail level in the "clkQltDetLvl" attribute and the clock quality acceptance criteria for the PTP instance in the "clkQltAcptCri" attribute if applicable.

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:

a. If the "CoverageAreaSupport" feature is supported and a requested coveragea area is provided or updated within the "covReq" attribute, the TSCTSF perform the following operations:

1. the TSCTSF, based on the time synchronization coverage area retrieved from UDM determines whether the UE is authorized for the request again as described in clause 5.2.2.5.2.

2. The TSCTSF discovers the list of AMF(s) serving the list of TA(s) that comprise the authorized time synchronization coverage area using the Nnrf\_NFDiscovery service operation as described in 3GPP TS 29.510 [10], if they are not available, and for each UE with matched AF-sessions, subscribes/updates the subscription, if applicable, with the discovered AMF(s) to receive notifications about presence of the UE in an Area of Interest events using the Namf\_EventExposure service as described in 3GPP TS 29.518 [27], where the Area of Interest is the requested/applicable spatial validity condition.

3. Based on the outcome provided by the AMF or available in the TSCTSF about the UE’s presence in the Area of Interest, the TSCTSF determines if the time synchronization service is activated or deactivated:

i. If the UE presence is within any of the TAs from the authorized time synchronization coverage area, the TSCTSF determines that the spatial validity condition is fulfilled, and the UE is authorized for the activation of the received PTP instance configuration.

- If the UE presence is within any of the TAs from the authorized time synchronization coverage area, the TSCTSF determines that the spatial validity condition is not fulfilled, and the UE is not authorized for the activation of the received PTP instance configuration;

b. If the "CoverageAreaSupport" feature is supported and a requested coverage area previously provided is removed, the TSCTSF perform the following operations:

1. For each UE with matched AF-sessions, the TSCTSF terminates the subscriptions to notifications about presence of the UE in an Area of Interest events using the Namf\_EventExposure service as described in 3GPP TS 29.518 [27].

2. For each UE with matched AF-sessions that did not fulfil the removed spatial validity condition, the TSCTSF determines the UE is authorized for the activation of the received PTP instance configuration

c. If the time synchronization error budget within the "timeSyncErrBdgt" attribute and/or the temporal validity condition within the "tempValidity" attribute from the NF service consumer is provided, updated, or removed, the TSCTSF based on the Time Synchronization Subscription data retrieved from the UDM determines whether the UE is authorized for the request again as described in clause 5.2.2.5.2

- for each authorized UE and matched AF-session, and contact with 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.

- for each authorized UE with matched AF-session(s), 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 "NetTimeSyncStatus" feature is supported and upon the reception of the updated clock quality acceptance criteria within the "clkQltAcptCri" attribute, then TSCTSF determines the clock acceptance criteria results as specified in clause 5.2.2.8.2. In case the updated clock quality acceptance criteria within the "clkQltAcptCri" attribute is received and the clock acceptance criteria results is not available, then TSCTSF subscribes to UPF/NW-TT time synchronization status reports via UMIC as described in clause 4.2.3.34 of 3GPP TS 29.514 [20], if the UPF/NW-TT is involved in provoding time information to DS-TT. In case NG-RAN is involved in providing time synchronization status information to DS-TT, then TSCTSF sends the updated confiugration of time synchronization status reporting to the NG-RAN and then initiates the subscription to the NG-RAN time synchronization status via AMF using Namf\_Communication\_NonUeN2InfoSubscribe service operation, as described in 3GPP TS 29.518 [27]

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 UEs and matched AF session to the "Individual Time Synchronization Exposure Configuration". When the "CoverageAreaSupport" feature is supported, the TSCTSF also associates whether the UE fulfills the spatial validity condition, if provided. 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 for all the affected UEs the provided parameters are not allowed by subscription, the TSCTSF shall indicate in an HTTP "403 Forbidden" response message the "cause" attribute set to "UE\_SERVICE\_NOT\_AUTHORIZED".

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].

\*\*\* Third Change \*\*\*

##### 6.1.6.2.11 Type: ConfigForPort

Table 6.1.6.2.11-1: Definition of type ConfigForPort

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supi | Supi | C | 0..1 | Identifies the UE/DS-TT which the parameters below apply.(NOTE) |  |
| gpsi | Gpsi | C | 0..1 | Identifies the UE/ DS-TT which the parameters below apply (NOTE) |  |
| n6Ind | boolean | C | 0..1 | Indicates the N6 termination which the parameters below apply.(NOTE) |  |
| ptpEnable | boolean | O | 0..1 | This is used to set the portDS.portEnable. If omitted, the default value as described in the PTP Profile is used |  |
| logSyncInter | integer | O | 0..1 | Specifies the mean time interval between successive Sync messages. This is applicable for IEEE Std 1588-2019 [25] Boundary Clock or IEEE Std 802.1AS-2020 [26] operation. If omitted, the default value as described in the PTP Profile is used. |  |
| logSyncInterInd | boolean | O | 0..1 | When set to FALSE, the value of "logSyncInter" attribute is used to set the initialLogSyncInterval as described in IEEE Std 802.1AS-2020 [26]. When set to TRUE, the value of "logSyncInter" attribute is used to set the mgtSettableLogSyncInterval as described in IEEE Std 802.1AS-2020 [26].If omitted, the default value as described in the IEEE Std 802.1AS-2020 [26] is used. |  |
| logAnnouInter | integer | O | 0..1 | Specifies the mean time interval between successive Announce messages. This is applicable for IEEE Std 1588-2019 [25] Boundary Clock or IEEE Std 802.1AS-2020 [26] operation. If omitted, the default value as described in the PTP Profile is used. |  |
| logAnnouInterInd | boolean | O | 0..1 | When set to FALSE, the value of "logAnnouInter" attribute is used to set the initialLogAnnounceInterval as described in IEEE 802.1AS-2020 [26]. When set to TRUE, the value of "logAnnouInter" attribute is used to set the mgtSettableLogAnnounceInterval as described in IEEE Std 802.1AS-2020 [26].If omitted, the default value as described in the IEEE Std 802.1AS-2020 [26] is used. |  |
| NOTE: Only one of "gpsi" or "n6Ind" attribute, and if the feature "TimeSyncExposureConfig\_Corr" is supported, of "supi" shall be included. |

\*\*\* Fourth Change \*\*\*

### 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Ntsctsf\_TimeSynchronization API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | CoverageAreaSupport | Indicates the support of spatial validity conditions for the activation/deactivation of the time synchronization service. |
| 2 | NetTimeSyncStatus | Indicates the time synchronization service status. |
| 3 | TimeSyncExposureConfig\_Corr | Indicates the support of the correction in the OpenAPI to enable the creation of a Time Synch Exposure Configuration using the SUPI as DS-TT identifier. |

\*\*\* Fifth Change \*\*\*

# A.2 Ntsctsf\_TimeSynchronization API

openapi: 3.0.0

info:

 title: Ntsctsf\_TimeSynchronization Service API

 version: 1.1.0-alpha.6

 description: |

 TSCTSF Time Synchronization Service.

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externalDocs:

 description: >

 3GPP TS 29.565 V18.5.0; 5G System; Time Sensitive Communication and Time Synchronization Function

 Services; Stage 3.

 url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.565/'

servers:

 - url: '{apiRoot}/ntsctsf-time-sync/v1'

 variables:

 apiRoot:

 default: https://example.com

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

security:

 - {}

 - oAuth2ClientCredentials:

 - ntsctsf-time-sync

paths:

 /subscriptions:

 post:

 summary: Creates a new subscription to notification of capability of time synchronization service resource

 operationId: TimeSynchronizationExposureSubscriptions

 tags:

 - Time Synchronization Exposure Subscriptions (Collection)

 requestBody:

 description: Contains the information for the creation the resource.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Successful creation of the resource.

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the created individual time synchronization exposure

 subscription resource, according to the structure

 {apiRoot}/ntsctsf-time-sync/{apiVersion}/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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 callbacks:

 subsEventNotification:

 '{$request.body#/subsNotifUri':

 post:

 requestBody:

 description: Notification of an event occurrence in the TSCTSF.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: The receipt of the notification is acknowledged.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /subscriptions/{subscriptionId}:

 get:

 summary: "Reads an existing Individual Time Synchronization Exposure Subscription"

 operationId: GetIndividualTimeSynchronizationExposureSubscription

 tags:

 - Individual Time Synchronization Exposure Subscription (Document)

 parameters:

 - name: subscriptionId

 description: String identifying an Individual Time Synchronization Exposure Subscription

 in: path

 required: true

 schema:

 type: string

 responses:

 '200':

 description: A representation of the resource is returned.

 content:

 application/json:

 schema:

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

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 put:

 operationId: ReplaceIndividualTimeSynchronizationExposureSubscription

 summary: Replace an individual Time Synchronization Exposure Subscription

 tags:

 - IndividualTimeSynchronizationExposureSubscription (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/TimeSyncExposureSubsc'

 parameters:

 - name: subscriptionId

 description: String identifying an Individual Time Synchronization Exposure Subscription.

 in: path

 required: true

 schema:

 type: string

 responses:

 '200':

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

 content:

 application/json:

 schema:

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

 '204':

 description: No Content. Resource was successfully modified.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 delete:

 operationId: DeleteIndividualTimeSynchronizationExposureSubscription

 summary: Delete an Individual TimeSynchronization Exposure Subscription

 tags:

 - Individual Time Synchronization Exposure Subscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: String identifying an Individual Time Synchronization Exposure Subscription.

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No Content. Resource was successfully deleted.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /subscriptions/{subscriptionId}/configurations:

 post:

 summary: "Create a new Individual Time Synchronization Exposure Configuration"

 operationId: CreateIndividualTimeSynchronizationExposureConfiguration

 tags:

 - Individual Time Synchronization Exposure Configuration (Document)

 parameters:

 - name: subscriptionId

 description: String identifying an Individual Time Synchronization Exposure Subscription.

 in: path

 required: true

 schema:

 type: string

 requestBody:

 description: Contains the information for the creation the resource.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Successful creation of the resource.

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the created individual time synchronization exposure

 configuration resource, according to the structure

 {apiRoot}/ntsctsf-time-sync/{apiVersion}/subscriptions/{subscriptionId}

 /configurations/{configurationId}

 required: true

 schema:

 type: string

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 callbacks:

 configEventNotification:

 '{$request.body#/configNotifUri':

 post:

 requestBody:

 description: Notification of an event occurrence in the TSCTSF.

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: The receipt of the notification is acknowledged.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

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

 '401':

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

 '403':

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

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

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 '415':

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

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /subscriptions/{subscriptionId}/configurations/{configurationId}:

 get:

 summary: "Reads an existing Individual Time Synchronization Exposure Configuration"

 operationId: GetIndividualTimeSynchronizationExposureConfiguration

 tags:

 - Individual Time Synchronization Exposure Configuration (Document)

 parameters:

 - name: subscriptionId

 description: String identifying an Individual Time Synchronization Exposure Subscription.

 in: path

 required: true

 schema:

 type: string

 - name: configurationId

 description: String identifying an Individual Time Synchronization Exposure Configuration.

 in: path

 required: true

 schema:

 type: string

 responses:

 '200':

 description: A representation of the resource is returned.

 content:

 application/json:

 schema:

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

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 put:

 operationId: ReplaceIndividualTimeSynchronizationExposureConfiguration

 summary: Replace an individual Time Synchronization Exposure Configuration

 tags:

 - IndividualTimeSynchronizationExposureConfiguration (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: subscriptionId

 description: String identifying an Individual Time Synchronization Exposure Subscription.

 in: path

 required: true

 schema:

 type: string

 - name: configurationId

 description: String identifying an Individual Time Synchronization Exposure Configuration.

 in: path

 required: true

 schema:

 type: string

 responses:

 '200':

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

 content:

 application/json:

 schema:

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

 '204':

 description: No Content. Resource was successfully modified.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 delete:

 operationId: DeleteIndividualTimeSynchronizationExposureConfiguration

 summary: Delete an Individual TimeSynchronization Exposure Configuration

 tags:

 - Individual Time Synchronization Exposure Configuration (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: String identifying an Individual Time Synchronization Exposure Subscription.

 required: true

 schema:

 type: string

 - name: configurationId

 description: String identifying an Individual Time Synchronization Exposure Configuration.

 in: path

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No Content. Resource was successfully deleted

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '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:

 ntsctsf-timesynchronization: Access to the Ntsctsf\_TimeSynchronization API

 schemas:

 TimeSyncExposureSubsc:

 description: >

 Contains the parameters for the subscription to notification of capability of time

 synchronization service.

 type: object

 properties:

 supis:

 type: array

 items:

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

 minItems: 1

 gpsis:

 type: array

 items:

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

 minItems: 1

 interGrpId:

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

 exterGrpId:

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

 anyUeInd:

 type: boolean

 description: >

 Identifies whether the request applies to any UE. This attribute shall set to "true" if

 applicable for any UE, otherwise, set to "false".

 notifMethod:

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

 dnn:

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

 snssai:

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

 subscribedEvents:

 type: array

 items:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/SubscribedEvent'

 minItems: 1

 eventFilters:

 type: array

 items:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/EventFilter'

 minItems: 1

 subsNotifUri:

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

 subsNotifId:

 type: string

 description: Notification Correlation ID assigned by the NF service consumer.

 maxReportNbr:

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

 expiry:

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

 repPeriod:

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

 suppFeat:

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

 required:

 - subsNotifUri

 - subsNotifId

 - dnn

 - snssai

 - subscribedEvents

 oneOf:

 - required: [supis]

 - required: [interGrpId]

 - required: [gpsis]

 - required: [exterGrpId]

 - required: [anyUeInd]

 TimeSyncExposureSubsNotif:

 description: Contains the notification of time synchronization service.

 type: object

 properties:

 subsNotifId:

 type: string

 description: Notification Correlation ID assigned by the NF service consumer.

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 SubsEventNotification:

 description: >

 Contains the notification of capability of time synchronization for a list of UEs.

 type: object

 properties:

 event:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/SubscribedEvent'

 timeSyncCapas:

 type: array

 items:

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

 minItems: 1

 required:

 - event

 TimeSyncCapability:

 description: Contains the capability of time synchronization service.

 type: object

 properties:

 upNodeId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

 gmCapables:

 type: array

 items:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/GmCapable'

 minItems: 1

 asTimeRes:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/AsTimeResource'

 ptpCapForUes:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Contains the PTP capabilities supported by each of the SUPI(s). The key of the map is the

 SUPI.

 ptpCapForGpsis:

 type: object

 additionalProperties:

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

 minProperties: 1

 description: >

 Contains the PTP capabilities supported by each of the GPSI(s). The key of the map is

 the GPSI.

 required:

 - upNodeId

 anyOf:

 - required: [gmCapables]

 - required: [asTimeRes]

 PtpCapabilitiesPerUe:

 description: Contains the supported PTP capabilities per UE.

 type: object

 properties:

 supi:

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

 gpsi:

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

 ptpCaps:

 type: array

 items:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/EventFilter'

 minItems: 1

 required:

 - ptpCaps

 oneOf:

 - required: [supi]

 - required: [gpsi]

 TimeSyncExposureConfigNotif:

 description: Contains the notification of time synchronization service state.

 type: object

 properties:

 configNotifId:

 type: string

 description: Notification Correlation ID assigned by the NF service consumer.

 stateOfConfig:

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

 required:

 - configNotifId

 - stateOfConfig

 StateOfConfiguration:

 description: >

 Contains the state of the time synchronization configuration and the clock quality

 acceptance criteria result.

 type: object

 properties:

 stateNwtt:

 type: boolean

 description: >

 When any of the PTP port state(s)in NW-TT is Leader, Follower or Passive, it is

 included and set to trueto indicate the current state of the time synchronization

 configuration for the NW-TT port(s) of the PTP instance is active; when

 PTP port state isin any other case, it is included and set to false to indicate

 the state ofconfiguration for the NW-TT port(s) of the PTP instance

 is inactive. Default value is false.

 clkQltIndOfNwtt:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/AcceptanceCriteriaResultIndication'

 stateOfDstts:

 description: >

 Contains the PTP port states and the clock quality acceptance criteria result of the

 DS-TT(s).

 type: array

 items:

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

 minItems: 1

 StateOfDstt:

 description: Contains the PTP port state of a DS-TT.

 type: object

 properties:

 supi:

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

 gpsi:

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

 state:

 type: boolean

 description: >

 When the PTP port state is Leader, Follower or Passive, it is included and set to true

 to indicate the state of configuration for DS-TT port is active; when PTP port state is

 in any other case, it is included and set to false to indicate the state of

 configuration for DS-TT port is inactive. Default value is false.

 clkQltIndOfDstt:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/AcceptanceCriteriaResultIndication'

 required:

 - state

 oneOf:

 - required: [supi]

 - required: [gpsi]

 TimeSyncExposureConfig:

 description: Contains the Time Synchronization Configuration parameters.

 type: object

 properties:

 upNodeId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'

 reqPtpIns:

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

 gmEnable:

 type: boolean

 description: >

 Indicates that the AF requests 5GS to act as a grandmaster for PTP or gPTP if it is

 included and set to true.

 gmPrio:

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

 timeDom:

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

 timeSyncErrBdgt:

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

 configNotifId:

 type: string

 description: Notification Correlation ID assigned by the NF service consumer.

 configNotifUri:

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

 tempValidity:

 $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/TemporalValidity'

 covReq:

 type: array

 description: >

 Identifies a list of Tracking Areas per serving network where time

 synchronization service configuration is allowed.

 items:

 $ref: 'TS29534\_Npcf\_AMPolicyAuthorization.yaml#/components/schemas/ServiceAreaCoverageInfo'

 minItems: 1

 clkQltDetLvl:

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

 clkQltAcptCri:

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

 required:

 - upNodeId

 - reqPtpIns

 - timeDom

 - configNotifId

 - configNotifUri

 PtpInstance:

 description: Contains PTP instance configuration and activation requested by the AF.

 type: object

 properties:

 instanceType:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/InstanceType'

 protocol:

 $ref: 'TS29522\_TimeSyncExposure.yaml#/components/schemas/Protocol'

 ptpProfile:

 type: string

 portConfigs:

 type: array

 items:

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

 minItems: 1

 required:

 - instanceType

 - protocol

 - ptpProfile

 ConfigForPort:

 description: Contains configuration for each port.

 type: object

 properties:

 supi:

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

 gpsi:

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

 n6Ind:

 type: boolean

 ptpEnable:

 type: boolean

 logSyncInter:

 type: integer

 logSyncInterInd:

 type: boolean

 logAnnouInter:

 type: integer

 logAnnouInterInd:

 type: boolean

 oneOf:

 - required: [supi]

 - required: [gpsi]

 - required: [n6Ind]

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