



TECHNICAL SPECIFICATION

**5G;
5G System;
Time Sensitive Communication and Time Synchronization
Function Services;
Stage 3
(3GPP TS 29.565 version 19.6.0 Release 19)**



Reference

RTS/TSGC-0329565vj60

Keywords

5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
[ETSI Search & Browse Standards](#) application.

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format on [ETSI deliver](#) repository.

Users should be aware that the present document may be revised or have its status changed, this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our [Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2026.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the [ETSI IPR online database](#).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found at [3GPP to ETSI numbering cross-referencing](#).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	9
1 Scope	11
2 References	11
3 Definitions, symbols and abbreviations	12
3.1 Definitions	12
3.2 Symbols.....	12
3.3 Abbreviations	12
4 Overview	13
4.1 Introduction	13
4.2 Service Architecture	13
5 Services offered by the TSCTSF.....	14
5.1 Introduction	14
5.2 Ntsctsf_TimeSynchronization Service	15
5.2.1 Service Description.....	15
5.2.1.1 Overview.....	15
5.2.1.2 Network Functions.....	15
5.2.1.2.1 TSCTSF.....	15
5.2.1.2.2 NF Service Consumers.....	16
5.2.2 Service Operations.....	16
5.2.2.1 Introduction.....	16
5.2.2.2 Ntsctsf_TimeSynchronization_CapsSubscribe	16
5.2.2.2.1 General	16
5.2.2.2.2 Creating a new subscription	17
5.2.2.2.3 Modifying an existing subscription	19
5.2.2.3 Ntsctsf_TimeSynchronization_CapsUnsubscribe	20
5.2.2.3.1 General	20
5.2.2.3.2 Unsubscription from capability notifications	20
5.2.2.4 Ntsctsf_TimeSynchronization_CapsNotify.....	21
5.2.2.4.1 General	21
5.2.2.4.2 Notification about the capability of time synchronization service	21
5.2.2.5 Ntsctsf_TimeSynchronization_ConfigCreate	23
5.2.2.5.1 General	23
5.2.2.5.2 Creating a new configuration	23
5.2.2.6 Ntsctsf_TimeSynchronization_ConfigUpdate	26
5.2.2.6.1 General	26
5.2.2.6.2 Updating an existing configuration	26
5.2.2.7 Ntsctsf_TimeSynchronization_ConfigDelete	29
5.2.2.7.1 General	29
5.2.2.7.2 Deleting an existing configuration.....	29
5.2.2.8 Ntsctsf_TimeSynchronization_ConfigUpdateNotify.....	30
5.2.2.8.1 General	30
5.2.2.8.2 Notifying the current state of an existing configuration	30
5.3 Ntsctsf_QoSandTSCAssistance Service.....	32
5.3.1 Service Description.....	32
5.3.1.1 Overview.....	32
5.3.1.2 Network Functions.....	32
5.3.1.2.1 TSCTSF.....	32
5.3.1.2.2 NF Service Consumers.....	32
5.3.2 Service Operations.....	32
5.3.2.1 Introduction.....	32

5.3.2.2	Ntsctsf_QoSandTSCAssistance_Create.....	33
5.3.2.2.1	General	33
5.3.2.2.2	Initial provisioning of TSC related service information	33
5.3.2.2.3	Subscriptions to Service Data Flow QoS notification control	37
5.3.2.2.4	Subscription to Service Data Flow Deactivation	37
5.3.2.2.5	Subscription to resources allocation outcome	37
5.3.2.2.6	Subscriptions to Service Data Flow QoS Monitoring Information.....	37
5.3.2.2.7	Initial provisioning of sponsored connectivity information.....	38
5.3.2.2.8	Initial provisioning of AF requested QoS for a UE or group of UE(s) not identified by UE address(es).....	38
5.3.2.2.9	Subscription to BAT offset notification	40
5.3.2.2.10	Subscription to report of network support for QoS Monitoring	40
5.3.2.3	Ntsctsf_QoSandTSCAssistance_Update.....	40
5.3.2.3.1	General	40
5.3.2.3.2	Modification of TSC related service information.....	40
5.3.2.3.3	Modification of Subscription to Service Data Flow QoS notification control.....	43
5.3.2.3.4	Modification of Subscription to Service Data Flow Deactivation.....	43
5.3.2.3.5	Modification of subscription to resources allocation outcome	43
5.3.2.3.6	Modification of Subscription to Service Data Flow QoS Monitoring Information	44
5.3.2.3.7	Modification of sponsored connectivity information	44
5.3.2.3.8	Modification of AF requested QoS for a UE or group of UE(s) not identified by UE address(es).....	44
5.3.2.3.9	Modification of Subscription to BAT offset notification	45
5.3.2.3.10	Modification of subscription to report of network support for QoS Monitoring.....	45
5.3.2.4	Ntsctsf_QoSandTSCAssistance_Delete.....	46
5.3.2.4.1	General	46
5.3.2.4.2	TSC AF application session context termination	46
5.3.2.4.3	Reporting usage for sponsored data connectivity	47
5.3.2.4.4	Termination of AF requested QoS for a UE or group of UE(s) not identified by UE address(es).....	47
5.3.2.5	Ntsctsf_QoSandTSCAssistance_Notify.....	47
5.3.2.5.1	General	47
5.3.2.5.2	Notification about TSC application session context event	48
5.3.2.5.3	Notification about TSC application session context termination.....	49
5.3.2.5.4	Notification about Service Data Flow QoS notification control.....	49
5.3.2.5.5	Notification about Service Data Flow Deactivation	50
5.3.2.5.6	Notification about resources allocation outcome.....	50
5.3.2.5.7	Notification about Service Data Flow QoS Monitoring control.....	50
5.3.2.5.8	Reporting usage for sponsored data connectivity	51
5.3.2.5.9	Notification about AF requested QoS for a UE or group of UE(s) not identified by UE address(es).....	51
5.3.2.5.10	Notification about BAT offset.....	52
5.3.2.5.11	Notification about network support of QoS Monitoring.....	52
5.3.2.6	Ntsctsf_QoSandTSCAssistance_Subscribe.....	52
5.3.2.6.1	General	52
5.3.2.6.2	Handling of subscription to events for the existing TSC application session context	53
5.3.2.6.3	Subscription to Service Data Flow QoS Monitoring Information	54
5.3.2.6.4	Subscription to Usage Monitoring of Sponsored Data Connectivity.....	54
5.3.2.6.5	Subscription to report of network support for QoS Monitoring	55
5.3.2.7	Ntsctsf_QoSandTSCAssistance_Unsubscribe	55
5.3.2.7.1	General	55
5.3.2.7.2	Unsubscription to events	56
5.4	Ntsctsf_ASTI Service.....	56
5.4.1	Service Description.....	56
5.4.1.1	Overview.....	56
5.4.1.2	Network Functions	57
5.4.1.2.1	TSCTSF.....	57
5.4.1.2.2	NF Service Consumers	57
5.4.2	Service Operations	57
5.4.2.1	Introduction.....	57
5.4.2.2	Ntsctsf_ASTI_Create	58
5.4.2.2.1	General	58

5.4.2.2.2	Creating a new configuration	58
5.4.2.3	Ntsctsf_ASTI_Update	61
5.4.2.3.1	General	61
5.4.2.3.2	Updating an existing configuration	61
5.4.2.4	Ntsctsf_ASTI_Delete	63
5.4.2.4.1	General	63
5.4.2.4.2	Delete an existing configuration	63
5.4.2.5	Ntsctsf_ASTI_Get	64
5.4.2.5.1	General	64
5.4.2.5.2	Retrieve the status of access stratum time distribution	64
5.4.2.6	Ntsctsf_ASTI_UpdateNotify	65
5.4.2.6.1	General	65
5.4.2.6.2	Notification about the 5G access stratum time distribution events	65
5.4.2.6.3	Notification about ASTI configuration changes due to UE presence in time synchronization coverage area	66
5.4.2.6.4	Notification about the 5G access stratum time distribution status information	66
6	API Definitions	67
6.1	Ntsctsf_TimeSynchronization Service API	67
6.1.1	Introduction	67
6.1.2	Usage of HTTP	67
6.1.2.1	General	67
6.1.2.2	HTTP standard headers	67
6.1.2.2.1	General	67
6.1.2.2.2	Content type	67
6.1.2.3	HTTP custom headers	67
6.1.3	Resources	68
6.1.3.1	Overview	68
6.1.3.2	Resource: Time Synchronization Exposure Subscriptions	69
6.1.3.2.1	Description	69
6.1.3.2.2	Resource Definition	69
6.1.3.2.3	Resource Standard Methods	69
6.1.3.2.4	Resource Custom Operations	70
6.1.3.3	Resource: Individual Time Synchronization Exposure Subscription	70
6.1.3.3.1	Description	70
6.1.3.3.2	Resource Definition	70
6.1.3.3.3	Resource Standard Methods	71
6.1.3.3.4	Resource Custom Operations	74
6.1.3.4	Resource: Time Synchronization Exposure Configurations	74
6.1.3.4.1	Description	74
6.1.3.4.2	Resource Definition	75
6.1.3.4.3	Resource Standard Methods	75
6.1.3.4.4	Resource Custom Operations	76
6.1.3.5	Resource: Individual Time Synchronization Exposure Configuration	76
6.1.3.5.1	Description	76
6.1.3.5.2	Resource Definition	76
6.1.3.5.3	Resource Standard Methods	77
6.1.3.5.4	Resource Custom Operations	80
6.1.4	Custom Operations without associated resources	80
6.1.5	Notifications	80
6.1.5.1	General	80
6.1.5.2	Time Synchronization Capability Notification	81
6.1.5.2.1	Description	81
6.1.5.2.2	Target URI	81
6.1.5.2.3	Standard Methods	81
6.1.5.3	Time Synchronization Configuration Notification	82
6.1.5.3.1	Description	82
6.1.5.3.2	Target URI	82
6.1.5.3.3	Standard Methods	83
6.1.6	Data Model	83
6.1.6.1	General	83
6.1.6.2	Structured data types	85

6.1.6.2.1	Introduction	85
6.1.6.2.2	Type: TimeSyncExposureSubsc	86
6.1.6.2.3	Type: TimeSyncExposureSubsNotif	88
6.1.6.2.4	Type SubsEventNotification	88
6.1.6.2.5	Type: TimeSyncCapability	89
6.1.6.2.6	Type: PtpCapabilitiesPerUe	89
6.1.6.2.7	Type: TimeSyncExposureConfigNotif	90
6.1.6.2.8	Type: StateOfConfiguration	90
6.1.6.2.9	Type: TimeSyncExposureConfig	91
6.1.6.2.10	Type: PtpInstance	92
6.1.6.2.11	Type: ConfigForPort	93
6.1.6.2.12	Type: StateOfDstt	96
6.1.6.3	Simple data types and enumerations	96
6.1.6.3.1	Introduction	96
6.1.6.3.2	Simple data types	96
6.1.7	Error Handling	96
6.1.7.1	General	96
6.1.7.2	Protocol Errors	97
6.1.7.3	Application Errors	97
6.1.8	Feature negotiation	97
6.1.9	Security	97
6.2	Ntsctsf_QoSandTSCAssistance Service API	97
6.2.1	Introduction	97
6.2.2	Usage of HTTP	98
6.2.2.1	General	98
6.2.2.2	HTTP standard headers	98
6.2.2.2.1	General	98
6.2.2.2.2	Content type	98
6.2.2.3	HTTP custom headers	98
6.2.3	Resources	98
6.2.3.1	Overview	98
6.2.3.2	Resource: TSC Application Sessions	99
6.2.3.2.1	Description	99
6.2.3.2.2	Resource Definition	100
6.2.3.2.3	Resource Standard Methods	100
6.2.3.2.4	Resource Custom Operations	101
6.2.3.3	Resource: Individual TSC Application Session Context	101
6.2.3.3.1	Description	101
6.2.3.3.2	Resource Definition	101
6.2.3.3.3	Resource Standard Methods	101
6.2.3.3.4	Resource Custom Operations	104
6.2.3.4	Resource: Events Subscription (Document)	105
6.2.3.4.1	Description	105
6.2.3.4.2	Resource Definition	106
6.2.3.4.3	Resource Standard Methods	106
6.2.3.4.4	Resource Custom Operations	108
6.2.4	Custom Operations without associated resources	108
6.2.5	Notifications	108
6.2.5.1	General	108
6.2.5.2	Event Notification	109
6.2.5.2.1	Description	109
6.2.5.2.2	Target URI	109
6.2.5.2.3	Standard Methods	109
6.2.5.3	Termination Request	110
6.2.5.3.1	Description	110
6.2.5.3.2	Target URI	110
6.2.5.3.3	Standard Methods	110
6.2.6	Data Model	111
6.2.6.1	General	111
6.2.6.2	Structured data types	115
6.2.6.2.1	Introduction	115
6.2.6.2.2	Type TscAppSessionContextData	116

6.2.6.2.3	Type EventsSubscReqData.....	118
6.2.6.2.4	Type TscAppSessionContextUpdateData	119
6.2.6.2.5	Type EventsSubscReqDataRm.....	119
6.2.6.2.6	Type EventsNotification.....	120
6.2.6.2.7	Type EventNotification	121
6.2.6.2.8	Type AdditionalInfoTscsfQosTscac.....	121
6.2.6.2.9	Type TemporalInValidity	122
6.2.6.3	Simple data types and enumerations	122
6.2.6.3.1	Introduction	122
6.2.6.3.2	Simple data types.....	122
6.2.6.3.3	Enumeration: TscEvent	122
6.2.6.4	Data types describing alternative data types or combinations of data types	123
6.2.6.4.1	Type: ProblemDetailsTscsfQosTscac.....	123
6.2.7	Error Handling.....	123
6.2.7.1	General.....	123
6.2.7.2	Protocol Errors	123
6.2.7.3	Application Errors.....	123
6.2.8	Feature negotiation	123
6.2.9	Security.....	124
6.3	Ntsctsf_ASTI Service API	124
6.3.1	Introduction.....	124
6.3.2	Usage of HTTP	125
6.3.2.1	General	125
6.3.2.2	HTTP standard headers	125
6.3.2.2.1	General	125
6.3.2.2.2	Content type	125
6.3.2.3	HTTP custom headers	125
6.3.3	Resources.....	125
6.3.3.1	Overview.....	125
6.3.3.2	Resource: ASTI Configurations	126
6.3.3.2.1	Description	126
6.3.3.2.2	Resource Definition.....	126
6.3.3.2.3	Resource Standard Methods	127
6.3.3.2.4	Resource Custom Operations	127
6.3.3.3	Resource: Individual ASTI Configuration	129
6.3.3.3.1	Description	129
6.3.3.3.2	Resource Definition.....	129
6.3.3.3.3	Resource Standard Methods	129
6.3.3.3.4	Resource Custom Operations	131
6.3.4	Custom Operations without associated resources	131
6.3.5	Notifications	132
6.3.5.1	General.....	132
6.3.5.2	ASTI Notification	132
6.3.5.2.1	Description	132
6.3.5.2.2	Target URI.....	132
6.3.5.2.3	Standard Methods.....	132
6.3.6	Data Model	133
6.3.6.1	General.....	133
6.3.6.2	Structured data types	135
6.3.6.2.1	Introduction	135
6.3.6.2.2	Type: AccessTimeDistributionData	135
6.3.6.2.3	Type: AfAsTimeDistributionParam	136
6.3.6.2.4	Type: StatusRequestData.....	136
6.3.6.2.5	Type: StatusResponseData	137
6.3.6.2.6	Type: ActiveUe	137
6.3.6.2.7	Type AstiConfigNotification	137
6.3.6.2.8	Type AstiConfigStateNotification.....	138
6.3.6.3	Simple data types and enumerations	138
6.3.6.3.1	Introduction	138
6.3.6.3.2	Simple data types.....	138
6.3.6.3.3	Enumeration: AstiEvent	138
6.3.7	Error Handling.....	138

6.3.7.1	General	138
6.3.7.2	Protocol Errors	139
6.3.7.3	Application Errors	139
6.3.8	Feature negotiation	139
6.3.9	Security	139
Annex A (normative): OpenAPI specification		140
A.1	General	140
A.2	Ntsctsf_TimeSynchronization API.....	140
A.3	Ntsctsf_QoSandTSCAssistance API.....	151
A.4	Ntsctsf_ASTI API	162
Annex B (normative): 3GPP extensions for DetNet integration with 5GS.....		169
B.1	3GPP extensions for DetNet integration with 5GS	169
B.1.1	Introduction	169
B.1.2	3GPP Extension _3gpp-5gs-detnet-node	169
B.1.2.1	Description.....	169
B.1.2.2	Provisioning of 5GS specific traffic characteristics and requirements	170
B.1.2.3	Report of 5GS DetNet flow(s) status	170
B.1.2.4	Exposure of 5GS DetNet Node Identification	171
B.2	YANG Module Definitions	171
B.2.1	Introduction	171
B.2.1.1	General.....	171
B.2.1.2	Module name	172
B.2.1.3	Header information	172
B.2.1.3.1	<yang-version statement>	172
B.2.1.3.2	<namespace statement>	172
B.2.1.3.3	<prefix statement>	172
B.2.1.4	Meta-information	172
B.2.1.4.1	<organization statement>	172
B.2.1.4.2	<contact statement>	172
B.2.1.4.3	<description statement>	172
B.2.1.4.4	<reference statement>	173
B.2.1.4.5	<revision statement>	173
B.2.1.2	Formatting rules	174
B.2.2	_3gpp-5gs-detnet-node Module definition	174
B.2.2.1	Introduction.....	174
B.2.2.2	Data Model	174
B.2.2.2.1	General	174
B.2.2.2.2	Structured data types	175
B.2.2.2.2.1	Introduction	175
B.2.2.2.2.2	Type: _3gpp-5gs-node-requirements.....	175
B.2.2.2.2.3	Type: _3gpp-5gs-node-configuration-outcome	176
B.2.2.2.2.4	Type: _3gpp-5gs-node-identity	176
B.2.2.2.3	Simple data types and enumerations	177
B.2.2.2.3.1	Introduction	177
B.2.2.2.3.2	Simple data types.....	177
B.2.2.2.3.3	Enumeration: _3gpp-5gs-node-configuration-status	177
Annex C (normative): YANG module specification		178
C.1	General	178
C.2	YANG module _3gpp-5gs-detnet-node	178
Annex D (informative): Change history		180
History		183

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

Sample Document

get full document from standards.iteh.ai

1 Scope

The present document specifies the stage 3 protocol and data model for the Ntsctsf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the TSCTSF.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [19].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [7] 3GPP TR 21.900: "Technical Specification Group working methods".
- [8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [9] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [11] IETF RFC 9113: "HTTP/2".
- [12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [13] IETF RFC 9457: "Problem Details for HTTP APIs".
- [14] 3GPP TS 29.534: "5G System; Access and Mobility Policy Authorization Service; Stage 3".
- [15] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".
- [16] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".
- [17] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".
- [18] IEEE Std 802.1Q-2018: "IEEE Standard for Local and metropolitan area networks--Bridges and Bridged Networks".
- [19] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System".

- [20] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".
- [21] 3GPP TS 29.122: "T8 reference point for northbound Application Programming Interfaces (APIs)".
- [22] IETF RFC 7396: "JSON Merge Patch".
- [23] 3GPP TS 29.521: "5G System; Binding Support Management Service; Stage 3".
- [24] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".
- [25] IEEE Std 1588-2019: "IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control".
- [26] IEEE Std 802.1AS-2020: "IEEE Standard for Local and metropolitan area networks--Timing and Synchronization for Time-Sensitive Applications".
- [27] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".
- [28] IETF RFC 9633: "Deterministic Networking (DetNet) YANG Data Model".
- [29] IETF RFC 6241: "Network Configuration Protocol (NETCONF)".
- [30] IETF RFC 8040: "RESTCONF Protocol".
- [31] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".
- [32] IETF RFC 8939: "Deterministic Networking (DetNet) Data Plane: IP".
- [33] IETF RFC 7950: "The YANG 1.1 Data Modeling Language".
- [34] IETF RFC 8407: "Guidelines for Authors and Reviewers of Documents Containing YANG Data Models".
- [35] IETF RFC 6020: "YANG – A Data Modeling Language for the Network Configuration Protocol (NETCONF)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

Void

3.2 Symbols

For the purposes of the present document, the following symbols apply:

Void

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ASTI	Access Stratum Time distribution
------	----------------------------------

BAT	Burst Arrival Time
DetNet	Deterministic Networking
DS-TT	Device-side TSN translator
NW-TT	Network-side TSN translator
PTP	Precision Time Protocol
TA	Tracking Area
TSC	Time Sensitive Communication
TSCAI	TSC Assistance Information
TSCTSF	Time Sensitive Communication and Time Synchronization function

4 Overview

4.1 Introduction

The Ntsctsf services are offered by the TSCTSF to support the Time Sensitive Communications and Time Synchronization.

The following Ntsctsf services are specified:

- Ntsctsf_TimeSynchronization service;
- Ntsctsf_QoSandTSCAssistance service.
- Ntsctsf_ASTI service.

To enable the reporting of 5GS DetNet node configuration and the provisioning and configuration data for DetNet flows, the TSCTSF offers RESTCONF (IETF RFC 8040 [30]) and/or NETCONF (IETF RFC 6241 [29]) interfaces to the DetNet controller to access the 3GPP extended Deterministic Networking (DetNet) YANG Model as specified in Annex B.

4.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2].

The known NF service consumers of the Ntsctsf services are the Application Function (AF) within the operator's trust domain and the Network Exposure Function (NEF).

The Ntsctsf services are provided by the TSCTSF and consumed by the NF service consumers (e.g. AF, NEF), as shown in figure 4.2-1 for the SBI representation model and in figure 4.2-2 for the reference point representation model.

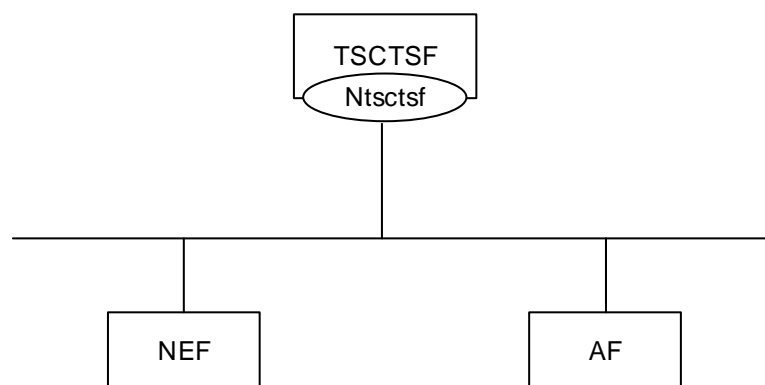


Figure 4.2-1: Ntsctsf services architecture, SBI representation

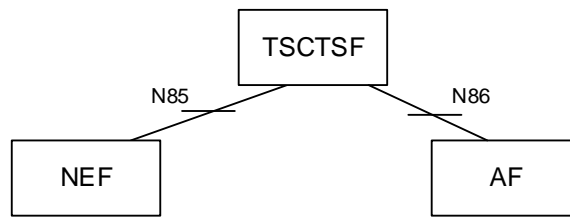


Figure 4.2-2: Ntsctsf services architecture, reference point representation

The DetNet controller, as specified in clause 4.4.8.4 of 3GPP TS 23.501 [2], is the TSCTSF's consumer that accesses the 3GPP extended DetNet YANG model, as specified in Annex B, clause B.1.1.

5 Services offered by the TSCTSF

5.1 Introduction

Table 5.1-1 summarizes the corresponding APIs defined for this specification.

Table 5.1-1: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Ntsctsf_TimeSynchronization	6.1	Provides the support to subscribe/unsubscribe to the notification about time synchronization capabilities or changes in time synchronization status information. Also allows to activate and deactivate the time synchronization configuration.	TS29565_Ntsctsf_TimeSynchronization.yaml	ntsctsf-time-sync	A.2
Ntsctsf_QoSandTSCAssistance	6.2	Provides the support to request specific QoS and provide assistance for handling traffic characterized by TSC QoS parameters.	TS29565_Ntsctsf_QoSandTSCAssistance.yaml	ntsctsf-qos-tscai	A.3
Ntsctsf_ASTI	6.3	Provides support for time synchronization service based on 5G access stratum time distribution method. Allows the NF consumer to configure the 5GC and RAN for 5G access stratum based time synchronization service for the UEs and subscribe to get informed about changes in time synchronization status information.	TS29565_Ntsctsf_ASTI.yaml	ntsctsf-asti	A.4