

# ETSI TS 129 520 V15.4.0 (2019-10)



**5G;  
5G System;  
Network Data Analytics Services;  
Stage 3  
(3GPP TS 29.520 version 15.4.0 Release 15)**

PRE-STANDARD FOR REVIEW  
<https://standards.iteh.ai/catalog/standards/sist/d2f62ecb-6a24-40a3-a1ea-d437ac8f5bc0/sist-t129-520-v15-4-0-2019-10>



---

**Reference**RTS/TSGC-0329520vf40

---

**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 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

---

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

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 at [www.etsi.org/deliver](http://www.etsi.org/deliver).

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

---

**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 2019.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

**3GPP™** and **LTE™** 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.

---

## Intellectual Property Rights

### Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is 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 Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, 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.

---

## 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 under <http://webapp.etsi.org/key/queryform.asp>.

---

## 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.....	6
1 Scope .....	7
2 References .....	7
3 Definitions and abbreviations.....	8
3.1 Definitions .....	8
3.2 Abbreviations .....	8
4 Services offered by the NWDAF .....	8
4.1 Introduction .....	8
4.2 Nnwdaf_EventsSubscription Service .....	9
4.2.1 Service Description.....	9
4.2.1.1 Overview.....	9
4.2.1.2 Service Architecture.....	9
4.2.1.3 Network Functions.....	10
4.2.1.3.1 Network Data Analytics Function (NWDAF).....	10
4.2.1.3.2 NF Service Consumers .....	10
4.2.2 Service Operations .....	10
4.2.2.1 Introduction.....	10
4.2.2.2 Nnwdaf_EventsSubscription_Subscribe service operation.....	11
4.2.2.2.1 General .....	11
4.2.2.2.2 Subscription for event notifications.....	11
4.2.2.2.3 Update subscription for event notifications.....	12
4.2.2.3 Nnwdaf_EventsSubscription_Unsubscribe service operation.....	12
4.2.2.3.1 General .....	12
4.2.2.3.2 Unsubscribe from event notifications.....	12
4.2.2.4 Nnwdaf_EventsSubscription_Notify service operation .....	13
4.2.2.4.1 General .....	13
4.2.2.4.2 Notification about subscribed event .....	13
4.3 Nnwdaf_AnalyticsInfo Service.....	14
4.3.1 Service Description.....	14
4.3.1.1 Overview.....	14
4.3.1.2 Service Architecture.....	14
4.3.1.3 Network Functions.....	15
4.3.1.3.1 Network Data Analytics Function (NWDAF).....	15
4.3.1.3.2 NF Service Consumers .....	15
4.3.2 Service Operations .....	15
4.3.2.1 Introduction.....	15
4.3.2.2 Nnwdaf_AnalyticsInfo_Request service operation.....	15
4.3.2.2.1 General .....	15
4.3.2.2.2 Request and get from NWDAF Analytics information .....	16
5 API Definitions .....	16
5.1 Nnwdaf_EventsSubscription Service API.....	16
5.1.1 Introduction.....	16
5.1.2 Usage of HTTP.....	17
5.1.2.1 General .....	17
5.1.2.2 HTTP standard headers .....	17
5.1.2.2.1 General .....	17
5.1.2.2.2 Content type .....	17
5.1.2.3 HTTP custom headers .....	17
5.1.3 Resources.....	18
5.1.3.1 Resource Structure .....	18

5.1.3.2	Resource: NWDAF Events Subscriptions.....	18
5.1.3.2.1	Description .....	18
5.1.3.2.2	Resource definition.....	18
5.1.3.2.3	Resource Standard Methods .....	19
5.1.3.2.3.1	POST.....	19
5.1.3.2.4	Resource Custom Operations .....	19
5.1.3.3	Resource: Individual NWDAF Event Subscription .....	19
5.1.4	Custom Operations without associated resources .....	21
5.1.5	Notifications .....	21
5.1.5.1	General .....	21
5.1.5.2	Event Notification.....	21
5.1.6	Data Model .....	22
5.1.6.1	General .....	22
5.1.6.2	Structured data types .....	22
5.1.6.2.1	Introduction .....	22
5.1.6.2.2	Type NnwdafeventsSubscription .....	23
5.1.6.2.3	Type EventSubscription .....	23
5.1.6.2.4	Type NnwdafeventsSubscriptionNotification .....	23
5.1.6.2.5	Type EventNotification .....	24
5.1.6.2.6	Type SliceLoadLevelInformation.....	24
5.1.6.3	Simple data types and enumerations .....	24
5.1.6.3.1	Introduction .....	24
5.1.6.3.2	Simple data types.....	24
5.1.6.3.3	Enumeration: NotificationMethod.....	24
5.1.6.3.4	Enumeration: NwdafEvent .....	25
5.1.7	Error handling .....	25
5.1.8	Feature negotiation .....	25
5.1.9	Security .....	25
5.2	NnwdafeventsAnalyticsInfo Service API.....	26
5.2.1	Introduction.....	26
5.2.2	Usage of HTTP.....	26
5.2.2.1	General .....	26
5.2.2.2	HTTP standard headers.....	26
5.2.2.2.1	General .....	26
5.2.2.2.2	Content type .....	26
5.2.2.3	HTTP custom headers .....	27
5.2.3	Resources.....	27
5.2.3.1	Resource Structure .....	27
5.2.3.2	Resource: NWDAF Analytics.....	27
5.2.3.2.1	Description .....	27
5.2.3.2.2	Resource definition.....	27
5.2.3.2.3	Resource Standard Methods .....	27
5.2.3.2.3.1	GET.....	27
5.2.3.2.4	Resource Custom Operations .....	28
5.2.4	Custom Operations without associated resources .....	28
5.2.5	Notifications .....	28
5.2.6	Data Model .....	28
5.2.6.1	General .....	28
5.2.6.2	Structured data types .....	29
5.2.6.2.1	Introduction .....	29
5.2.6.2.2	Type AnalyticsData .....	29
5.2.6.2.3	Type EventFilter .....	29
5.2.6.3	Simple data types and enumerations .....	29
5.2.6.3.1	Introduction .....	29
5.2.6.3.2	Simple data types.....	29
5.2.6.3.3	Enumeration: EventId.....	30
5.2.7	Error handling.....	30
5.2.8	Feature negotiation .....	30
5.2.9	Security .....	31
<b>Annex A (normative):</b>	<b>OpenAPI specification.....</b>	<b>32</b>

A.1 General .....32

A.2 Nnwdaf\_EventsSubscription API.....32

A.3 Nnwdaf\_AnalyticsInfo API.....36

**Annex B (informative): Change history .....39**

History .....40

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/d2f62ecb-6a24-40a3-a1ea-d437ac8f5bce/etsi-ts-129-520-v15.4.0-2019-10>

---

# Foreword

This Technical Specification has been produced by the 3<sup>rd</sup> 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.

**PREVIEW**  
**STANDARD**  
**ETSI**  
**(standards.iteh.ai)**  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/d2f62ecb-6a24-40a3-a1ea-d437ac8f5bce/etsi-ts-129-520-v15.4.0-2019-10>

---

# 1 Scope

The present specification provides the stage 3 definition of the Network Data Analytics Function Services of the 5G System.

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The stage 2 definition and related procedures for Network Data Analytics Function Services are specified in 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4].

The 5G System stage 3 call flows are provided in 3GPP TS 29.513 [5].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [6] and 3GPP TS 29.501 [7].

The Network Data Analytics Function Services are provided by the Network Data Analytics Function (NWDAF). These services provide NWDAF slice congestion events notification and NWDAF specific analytics.

---

# 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 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".
- [5] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".
- [6] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [7] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [8] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [9] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [10] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [11] OpenAPI, "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.
- [12] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [13] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [14] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [15] IETF RFC 7807: "Problem Details for HTTP APIs".
- [16] 3GPP TR 21.900: "Technical Specification Group working methods".



## 3 Definitions 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].

### 3.2 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].

API	Application Programming Interface
JSON	JavaScript Object Notation
HTTP	Hypertext Transfer Protocol
NF	Network Function
NRF	Network Repository Function
NWDAF	Network Data Analytics Function
NSSF	Network Slice Selection Function
PCF	Policy Control Function

## 4 Services offered by the NWDAF

### 4.1 Introduction

The Nnwdaf services are used for the NWDAF to provide network data analytics (i.e. load level information). These services provide NWDAF slice congestion events notification and NWDAF specific analytics.

The following services are specified for NWDAF:

**Table 4.1-1: Services provided by NWDAF**

Service Name	Description	Service Operations	Operation Semantics	Example Consumer(s)
Nnwdaf_EventsSubscription	This service enables the NF service consumers to subscribe/unsubscribe for network slice specific congestion events notification from the NWDAF.	Subscribe	Subscribe / Notify	PCF, NSSF
		Unsubscribe		
		Notify		
Nnwdaf_AnalyticsInfo	This service enables the NF service consumers to request and get specific analytics from NWDAF.	Request	Request / Response	PCF, NSSF

## 4.2 Nnwdaf\_EventsSubscription Service

### 4.2.1 Service Description

#### 4.2.1.1 Overview

The Nnwdaf\_EventsSubscription Service as defined in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4], is provided by the Network Data Analytics Function (NWDAF).

This service:

- allows NF consumers to subscribe to and unsubscribe from load events of network slice instance; and
- notifies NF consumers with a corresponding subscription about observed events.

The types of observed events include:

- Load level of network slice instance.

#### 4.2.1.2 Service Architecture

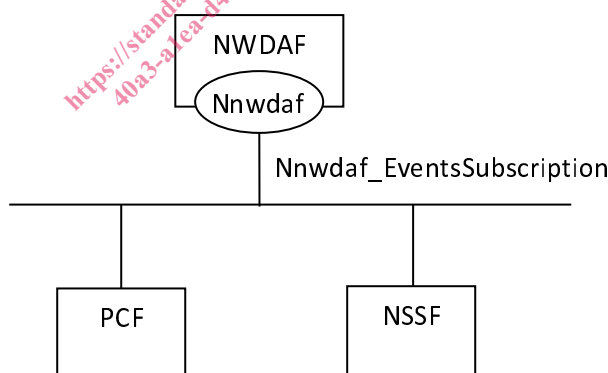
The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Policy and Charging related 5G architecture is also described in 3GPP TS 23.503 [4] and 3GPP TS 29.513 [5].

The Nnwdaf\_EventsSubscription service is part of the Nnwdaf service-based interface exhibited by the Network Data Analytics Function (NWDAF).

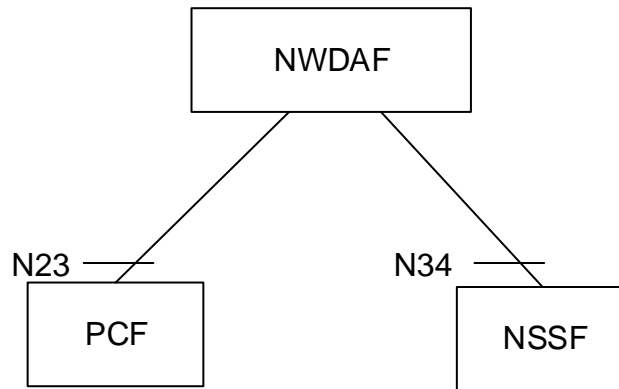
Known consumers of the Nnwdaf\_EventsSubscription service are:

- Policy Control Function (PCF)
- Network Slice Selection Function (NSSF)

The PCF accesses the Nnwdaf\_EventsSubscription service at the NWDAF via the N23 Reference point. The NSSF accesses the Nnwdaf\_EventsSubscription service at the NWDAF via the N34 Reference point.



**Figure 4.2.1.2-1: Reference Architecture for the Nnwdaf\_EventsSubscription Service; SBI representation**



**Figure 4.2.1.2-2: Reference Architecture for the Nnwdaf\_EventsSubscription Service: reference point representation**

### 4.2.1.3 Network Functions

#### 4.2.1.3.1 Network Data Analytics Function (NWDAF)

The Network Data Analytics Function (NWDAF) provides:

- Identifier of network slice instance; and
- load level information for that network slice instance.

The Network Data Analytics Function (NWDAF) allows NF consumers to subscribe to and unsubscribe from periodic notification and/or notification when a threshold is exceeded.

#### 4.2.1.3.2 NF Service Consumers

The Policy Control Function (PCF):

- Supports taking input from Network Data Analytics Function (NWDAF) into consideration for policies on assignment of network resources and for traffic steering policies.

NOTE: How this information is used by the PCF is not standardized in this release of the specification.

The Network Slice Selection Function (NSSF):

- supports taking load level information from Network Data Analytics Function (NWDAF) into consideration for slice selection.

## 4.2.2 Service Operations

### 4.2.2.1 Introduction

**Table 4.2.2.1-1: Operations of the Nnwdaf\_EventsSubscription Service**

Service operation name	Description	Initiated by
Nnwdaf_EventsSubscription_Subscribe	This service operation is used by an NF to subscribe or update subscription for event notifications for a specified network slice instance. Periodic notification and notification upon threshold exceeded can be subscribed.	NF consumer (PCF, NSSF)
Nnwdaf_EventsSubscription_UnSubscribe	This service operation is used by an NF to unsubscribe from event notifications.	NF consumer (PCF, NSSF)
Nnwdaf_EventsSubscription_Notify	This service operation is used by an NWDAF to notify NF consumers about subscribed events.	NWDAF

## 4.2.2.2 Nnwdaf\_EventsSubscription\_Subscribe service operation

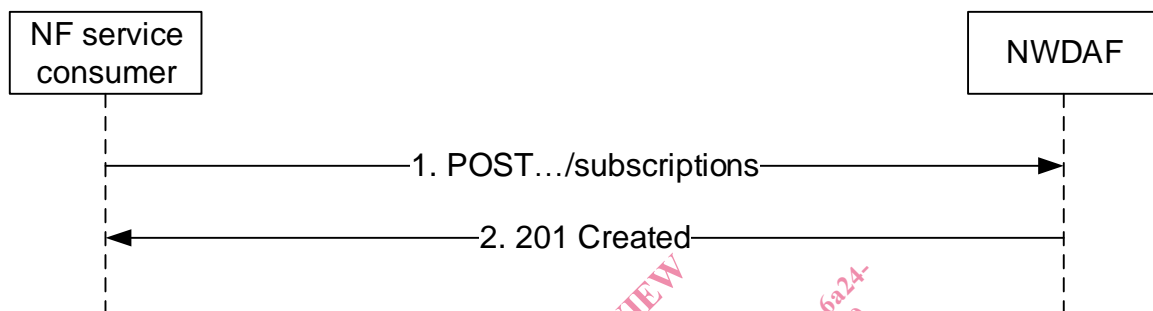
### 4.2.2.2.1 General

The Nnwdaf\_EventsSubscription\_Subscribe service operation is used by an NF service consumer to subscribe or update subscription for event notifications. The following are the types of events for which a subscription may be made:

- Load level of network slice instance.

### 4.2.2.2.2 Subscription for event notifications

Figure 4.2.2.2-1 shows a scenario where the NF service consumer sends a request to the NWDAF to subscribe for event notifications (see also 3GPP TS 23.502 [3] figure 4.19.1-1 step 1).



**Figure 4.2.2.2-1: NF service consumer subscribes to notifications**

The NF service consumer shall invoke the Nnwdaf\_EventsSubscription\_Subscribe service operation to subscribe to event notification(s). The NF service consumer shall send an HTTP POST request with "{apiRoot}/nwdaf-eventssubscription/v1/subscriptions" as Resource URI representing the "NWDAF Events Subscriptions", as shown in figure 4.2.2.2-1, step 1, to create a subscription for an "Individual NWDAF Event Subscription" according to the information in message body. The NnwdafEventsSubscription data structure provided in the request body shall include:

- a description of the subscribed events as "eventSubscriptions" attribute that for each event shall include
  - a) an event identifier as "event" attribute;
  - b) identification of network slice(s) to which the subscription applies via:
    - 1) identification of network slice(s) by "snsais" attribute; or
    - 2) any slices indication via the "anySlice" attribute;

and that may include:

- a) event notification method (periodic, upon threshold exceeded) as "notificationMethod" attribute;

**NOTE:** If the event notification method is not supplied, the default value "upon threshold exceed" applies.

- an URI where to receive the requested notifications as "notificationURI" attribute; and
- a list of supported features by the service consumer as "supportedFeatures" attribute.

Upon the reception of an HTTP POST request with: "{apiRoot}/nwdaf-eventssubscription/v1/subscriptions" as Resource URI and NnwdafEventsSubscription data structure as request body, the NWDAF shall:

- create a new subscription;
- assign an event subscriptionId;
- store the subscription.

If the NWDAF created an "Individual NWDAF Event Subscription" resource, the NWDAF shall respond with "201 Created" with the message body containing a representation of the created subscription, as shown in figure 4.2.2.2-1,