**3GPP TSG-CT3 Meeting #118-e *C3-215295***

**E-Meeting, 11th Oct 2021 - 15th Oct 2021**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.520** | **CR** | **0341** | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Support of SM congestion control experience analytics by Nnwdaf\_AnalyticsInfo service | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | LG Electronics, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | C3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph2 | | | | |  | ***Date:*** | | | 2021-09-29 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In clause 6.12 of TS 23.288, Session Management Congestion Control Experience analytics is defined as a feature of NWDAF.  Please note that for the Session Management Congestion Control Experience analytics,  - only Nnwdaf\_AnalyticsInfo service is used which means Nnwdaf\_EventsSubscription service is not used.  - only statistics are provided as output which means predictions are not provided. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Enhance the Nnwdaf\_AnalyticsInfo service to support new analytics "SM congestion control experience". | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage 2 requirements not fulfilled. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.2, 4.3.1.1, 4.3.1.3.2, 4.3.2.2.2, 5.2.6.1, 5.2.6.2.2, 5.2.6.2.3, 5.2.6.2.Y (new), 5.2.6.2.Z (new), 5.2.6.3.3, 5.2.8, A.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 introduces backward compatible feature into the OpenAPI file for Nnwdaf\_AnalyticsInfo API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* Start of 1st Change \* \* \* \*

## 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].

5QI 5G QoS Identifier

AF Application Function

AMF Access and Mobility Management Function

API Application Programming Interface

CEF Charging Enablement Function

DCCF Data Collection Coordination Function

DNN Data Network Name

GFBR Guaranteed Flow Bit Rate

HTTP Hypertext Transfer Protocol

JSON JavaScript Object Notation

MFAF Messaging Framework Adaptor Function

ML Machine Learning

MTLF Model Training Logical Function

NEF Network Exposure Function

NF Network Function

NRF Network Repository Function

NSSF Network Slice Selection Function

NWDAF Network Data Analytics Function

OAM Operation, Administration, and Maintenance

PCF Policy Control Function

SUPI Subscription Permanent Identifier

S-NSSAI Single Network Slice Selection Assistance Information

SMCC Session Management Congestion Control

SMCCE Session Management Congestion Control Experience

SMF Session Management Function

UDM Unified Data Management

UPF User Plane Function

URI Uniform Resource Identifier

UTC Universal Time Coordinated

\* \* \* \* Start of Next Change \* \* \* \*

#### 4.3.1.1 Overview

The Nnwdaf\_AnalyticsInfo Service as defined in 3GPP TS 23.501 [2], 3GPP TS 23.288 [17] and 3GPP TS 23.503 [4], is provided by the Network Data Analytics Function (NWDAF).

This service:

- allows NF consumers to request and get different type of analytic event information.

The types of observed events include:

- Slice load level information;

- Network slice instance load level information;

- Service experience;

- NF load;

- Network performance;

- Abnormal behaviour;

- UE mobility;

- UE communication;

- User data congestion;

- QoS sustainability; and

- SM congestion control experience.

\* \* \* \* Start of Next Change \* \* \* \*

##### 4.3.1.3.2 NF Service Consumers

The Policy Control Function (PCF):

- supports taking analytics information for slice load level information from the NWDAF;

- supports taking analytics information for service experience related network data from the NWDAF;

- supports taking analytics information for network performance from the NWDAF;

- supports taking analytics information for abnormal UE behaviour from the NWDAF;

- supports taking one or more above input from NWDAF into consideration for policies on assignment of network resources and/or 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 slice load level information or network slice instance load level information from NWDAF into consideration for slice selection.

- supports taking analytics information for service experience related network data from the NWDAF;

The Access and Mobility Management Function (AMF):

- supports taking SMF load information from NWDAF into consideration for SMF selection;

- supports taking expected UE behaviour information (UE mobility and/or UE communication) from NWDAF into consideration for monitoring UE behaviour;

- supports taking abnormal UE behaviour information from NWDAF into consideration for adjustment of UE mobility related network parameters to solve the abnormal risk.

- supports taking slice load level information or network slice instance load level information from NWDAF into consideration for slice selection.

- supports taking analytics information for service experience related network data from the NWDAF;

The Session Management Function (SMF):

- supports taking UPF load information from NWDAF into consideration for UPF selection;

- supports taking expected UE behaviour information (UE mobility and/or UE communication) from NWDAF into consideration for monitoring UE behaviour;

- supports taking abnormal UE behaviour information from NWDAF into consideration for adjustment of UE mobility related network parameters to solve the abnormal risk;

- supports taking analytics information for SM congestion control experience from the NWDAF into consideration for determining back-off timer provided to UE.

The Network Exposure Function (NEF):

- supports forwarding UE mobility information from NWDAF to the AF when it is untrusted;

- supports forwarding UE communication information from NWDAF to the AF when it is untrusted;

- supports forwarding expected UE behavioural information (UE mobility and/or UE communication) from NWDAF to the AF when it is untrusted;

- supports forwarding abnormal behaviour information from NWDAF to the AF when it is untrusted;

- supports forwarding user data congestion information from NWDAF to the AF when it is untrusted;

- supports forwarding network performance information from NWDAF to the AF when it is untrusted;

- supports forwarding QoS Sustainability information from NWDAF to the AF when it is untrusted.

The Unified Data Management (UDM):

- supports taking expected UE behaviour information (UE mobility and/or UE communication) from NWDAF into consideration for monitoring UE behaviour.

The Application Function (AF):

- supports receiving UE mobility information from NWDAF or via the NEF;

- supports receiving UE communication information from NWDAF or via the NEF;

- supports receiving expected UE behavioural information (UE mobility and/or UE communication) from NWDAF or via the NEF;

- supports receiving abnormal behaviour information from NWDAF or via the NEF;

- supports receiving user data congestion information from NWDAF or via the NEF;

- supports receiving network performance information from NWDAF or via the NEF;

- supports receiving QoS Sustainability information from NWDAF or via the NEF.

The Operation, Administration, and Maintenance (OAM):

- supports receiving observed service experience from NWDAF;

- supports receiving NF load information from NWDAF;

- supports receiving network performance information from NWDAF;

- supports receiving UE mobility information from NWDAF;

- supports receiving UE communication information from NWDAF;

- supports receiving expected UE behaviour information (UE mobility and/or UE communication) from NWDAF;

- supports receiving abnormal UE behaviour information from NWDAF.

The Network Data Analytics Function (NWDAF):

- supports receiving information for all types of network data analytics from NWDAF.

\* \* \* \* Start of Next Change \* \* \* \*

##### 4.3.2.2.2 Request and get from NWDAF Analytics information

Figure 4.3.2.2.2-1 shows a scenario where the NF service consumer (e.g. PCF) sends a request to the NWDAF to request and get from NWDAF analytics information (as shown in 3GPP TS 23.288 [17]).



Figure 4.3.2.2.2-1: Requesting a NWDAF Analytics information

The NF service consumer (e.g. PCF) shall invoke the Nnwdaf\_AnalyticsInfo\_Request service operation when requesting the NWDAF analytics information. The NF service consumer shall send an HTTP GET request on the resource URI "{apiRoot}/nnwdaf-analyticsinfo/v1/analytics" representing the "NWDAF Analytics" (as shown in figure 4.3.2.2.2-1, step 1), to request analytics data according to the query parameter value of the "event-id" attribute. In addition, the following information may be provided:

- common reporting requirement in the "ana-req" attribute as follows:

1) identification of time window for the requested analytics data applies via identification of date-time(s) in the "startTs" and "endTs" attributes;

2) preferred level of accuracy of the analytics in "accuracy" attribute;

3) percentage of sampling among impacted UEs in the "sampRatio" attribute;

4) maximum number of objects in the “maxObjectNbr” attribute;

5) maximum number of SUPIs expected for an analytics report in the "maxSupiNbr" attribute;

6) identification of time when analytics information is needed in the "timeAnaNeeded" attribute;

7) indication of which analytics metadata is requested to be delivered with the response in the "anaMeta" attribute if the feature "Aggregation" is supported; and/or

8) requested values for the analytics metadata information to be used for the generation of the analytics in the "anaMetaInd" attribute if the feature "Aggregation" is supported.

Editor's Note: It is FFS to specify if the "partitionCriteria" attribute of the "ana-req" attribute may be used in this service and to implement all the corresponding changes in the API, the data model etc, as required.

For different event types:

- if the event is "LOAD\_LEVEL\_INFORMATION", it shall provide the event specific filter information within "event-filter" attribute including identification(s) of the network slice via:

1) identification of network slice(s) in the "snssais" attribute; or

2) any slices indication in the "anySlice" attribute.

- if the feature "NsiLoad" is supported and the event is "NSI\_LOAD\_LEVEL", it shall provide the event specific filter information within "event-filter" attribute including identification(s) of the network slice via:

1) identification of network slice(s) and the optionally associated instance(s) if available, in the "nsiIdInfos" attribute; or

NOTE 1: The network slice instance of a PDU session is not available in the PCF.

2) any slices indication in the "anySlice" attribute.

- if the feature "NfLoad" is supported and the event is "NF\_LOAD", it shall provide:

1) identification of target UE(s) to which the subscription applies by "supis" or "anyUe" in the "tgt-ue" attribute; and

the "event-filter" attribute may provide:

a) either list of NF instance IDs in the "nfInstanceIds" attribute or list of NF set IDs in the "nfSetIds" attribute if the identification of target UE(s) applies to all UEs;

b) list of NF instance types in the "nfTypes" attribute; and/or

c) identification of network slice(s) in the "snssais" attribute;

- if the feature "UeMobility" is supported and the event is "UE\_MOBILITY", it shall provide:

1) identification of target UE(s) to which the subscription applies by "supis" or "intGroupIds" attribute in the "tgt-ue" attribute;

and may provide:

1) event specific filter information in the "event-filter" attribute:

a) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute;

- if the feature "UeCommunication" is supported and the event is "UE\_COMM", it shall provide:

1) identification of target UE(s) to which the subscription applies by "supis" or "intGroupIds" attribute in the "tgt-ue" attribute;

and may provide:

1) event specific filter information in the "event-filter" attribute:

a) identification of the application as "appIds" attribute;

b) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute;

c) identification of DNN in the "dnns" attribute; and

d) identification of network slice(s) in the "snssais" attribute;

- if the feature "NetworkPerformance" is supported and the event is "NETWORK\_PERFORMANCE", it shall provide:

1) identification of target UE(s) to which the subscription applies by "supis", "intGroupIds" or "anyUe" attribute in the "tgt-ue" attribute; and

2) event specific filter information in the "event-filter" attribute which shall provide:

a) the network performance types via "nwPerfTypes" attribute; and

the "event-filter" attribute may provide:

a) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute (mandatory if "anyUe" attribute is set to true).

- if the feature "ServiceExperience" is supported and the event is "SERVICE\_EXPERIENCE", it shall provide:

1) identification of target UE(s) to which the subscription applies by "supis", "intGroupIds" or "anyUe" attribute in the "tgt-ue" attribute;

2) event specific filter information in the "event-filter" attribute which shall provide:

a) any slices indication in the "anySlice" attribute or identification of network slice(s) together with the optionally associated network slice instance(s) if available, via the "nsiIdInfos" attribute; and

NOTE 2: The network slice instance of a PDU session is not available in the PCF.

the "event-filter" attribute may provide:

a) identification of application(s) to which the subscription applies via "appIds" attribute;

b) identification of DNN via identification of Dnn(s) by "dnns" attribute;

c) identification of user plane accesses to one or more DN(s) where applications are deployed via "dnais" attribute;

d) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute (mandatory if "anyUe" attribute is set to true);

e) if "appIds" attribute is provided, the bandwidth requirement of each application by "bwRequs" attribute.

- if the feature "QoSSustainability" is supported and the event is "QOS\_SUSTAINABILITY", it shall provide:

1) event specific filter information in the "event-filter" attribute which shall provide:

a) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute;

b) QoS requirements via "qosRequ" attribute; and

2) identification of target UE(s) to which the subscription applies by "anyUe" in the "tgt-ue" attribute;

the "event-filter" attribute may provide:

a) identification of network slice(s) by "snssais" attribute;

- if the feature "AbnormalBehaviour" is supported and the event is "ABNORMAL\_BEHAVIOUR", it shall provide:

1) identification of target UE(s) to which the subscription applies by "supis", "intGroupIds" or "anyUe" attribute in the "tgt-ue" attribute; and

2) event specific filter information in the "event-filter" attribute which shall provide

a) either the expected analytics type via "exptAnaType" attribute or a list of exception Ids via "excepIds" attribute.If the expected analytics type via "exptAnaType" attribute is provided, the NWDAF shall derive the corresponding Exception Ids from the received expected analytics type as follows:

- if "exptAnaType" attribute sets to "MOBILITY", the corresponding list of Exception Ids are "UNEXPECTED\_UE\_LOCATION", "PING\_PONG\_ACROSS\_CELLS", "UNEXPECTED\_WAKEUP" and "UNEXPECTED\_RADIO\_LINK\_FAILURES";

- if "exptAnaType" attribute sets to "COMMUN", the corresponding list of Exception Ids are "UNEXPECTED\_LONG\_LIVE\_FLOW", "UNEXPECTED\_LARGE\_RATE\_FLOW", "SUSPICION\_OF\_DDOS\_ATTACK", "WRONG\_DESTINATION\_ADDRESS" and "TOO\_FREQUENT\_SERVICE\_ACCESS";

- if "exptAnaType" attribute sets to "MOBILITY\_AND\_COMMUN", the corresponding list of Exception Ids includes all above derived exception Ids.

The derived list of Exception Ids are used by the NWDAF to notify the NF service consumer when UE’s behaviour is exceptional based on one or more Exception Ids within the list.

If the "anyUe" attribute in the "tgt-ue" attribute sets to "true",

a) the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepIds" attribute shall not be requested for both mobility and communication related analytics at the same time.

b) if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepIds" attribute is mobility related, at least one of identification of network area by "networkArea" attribute and identification of network slice(s) by "snssais" attribute should be provided;

c) if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepIds" attribute is communication related, at least one of identification of network area by "networkArea" attribute, identification of application(s) by "appIds" attribute, identification of DNN(s) in the "dnns" attribute and identification of network slice(s) by "snssais" attribute should be provided;

the "event-filter" attribute may provide:

1) expected UE behaviour via "exptUeBehav" attribute.

- if the feature "UserDataCongestion" is supported and the event is "USER\_DATA\_CONGESTION", it shall provide one of the following attributes:

1) identification of target UE(s) via "supis" "gpsis" (if feature "UserDataCongestionExt" is supported) or "anyUe" attribute within "tgt-ue" attribute;

and may provide:

1) event specific filter information in the "event-filter" attribute which may provide:

a) identification of network slice(s) by "snssais" attribute;

b) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute (mandatory if "anyUe" attribute is set to true); and/or

c) if the feature "UserDataCongestionExt" is also supported, indications to request a list of top applications that contribute the most to the traffic in uplink and/or downlink directions upon the "topAppListUlInd" attribute and/or the "topAppListDlInd" attribute.

- if the feature "SMCongestion" is supported and the event is "SM\_CONGESTION", it shall provide:

1) event specific filter information in the "event-filter" attribute which shall provide:

a) identification of DNN in the "dnns" attribute; and/or

b) identification of network slice(s) in the "snssais" attribute;

2) identification of target UE(s) via "supis" attribute in the "tgt-ue" attribute where the target UE(s) are one have the PDU Session for the DNN and/or S-NSSAI indicated by the event specific filter information.

Upon the reception of the HTTP GET request, the NWDAF shall:

- analyse the requested analytic data according to the requested event

If the HTTP request message from the NF service consumer is accepted, the NWDAF shall respond with "200 OK" status code with the message body containing the analytics with parameters as relevant for the requesting NF service consumer. The AnalyticsData data structure in the response body shall include:

- analytics with the corresponding information as described in subclause 4.2.2.4.2.

If the request NWDAF Analytics data does not exist, the NWDAF shall respond with "204 No Content".

If the "timeAnaNeeded" attribute within EventReportingRequirement is provided during the request, if the time is reached but the requested analytics information is not ready, the consumer does not need to wait for the analytics information any longer, the NWDAF may send an "500 Internal Server Error" status code to the NF service consumer. In addition, if the EneNA feature is supported, the NWDAF may provide, within the ReqFailureCause data in the response, the corresponding failure reason via a "problemDetails" attribute with the "cause" attribute set to "UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME" and a minimum time interval recommended by the NWDAF via a "rvWaitTime" attribute which is used by the NF service consumer to determine the time when analytics information is needed in similar future analytics requests.

\* \* \* \* Start of Next Change \* \* \* \*

#### 5.2.6.1 General

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

Table 5.2.6.1-1 specifies the data types defined for the Nnwdaf\_AnalyticsInfo service based interface protocol.

Table 5.2.6.1-1: Nnwdaf\_AnalyticsInfo specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| AnalyticsData | 5.2.6.2.2 | Describes analytics with parameters indicated in the request. |  |
| EventFilter | 5.2.6.2.3 | Represents the event filters used to identify the requested analytics. |  |
| EventId | 5.2.6.3.3 | Describes the type of analytics. |  |
| ProblemDetailsAnalyticsInfoRequest | 5.2.6.4.1 | Data type that extends ProblemDetails. | EneNA |
| AdditionInfoAnalyticsInfoRequest | 5.2.6.2.5 | Contains more details (not only the ProblemDetails) in case an Nnwdaf\_AnalyticsInfo request is rejected. | EneNA |
| SmcceInfo | 5.2.6.2.Y | Represent the analytics of Session Management congestion control experience information. | SMCongestion |

Table 5.2.6.1-2 specifies data types re-used by the Nnwdaf\_AnalyticsInfo service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nnwdaf service based interface.

Table 5.2.6.1-2: Nnwdaf\_AnalyticsInfo re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AnalyticsMetadataInfo | 5.1.6.2.37 | Contains analytics metadata information required for analytics aggregation. | Aggregation |
| AnySlice | 5.1.6.3.2 |  |  |
| ApplicationId | 3GPP TS 29.571 [8] | Identifies the application. | ServiceExperience  UeCommunication  AbnormalBehaviour |
| BwRequirement | 5.1.6.2.25 |  | ServiceExperience |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperience  AbnormalBehaviour  UeCommunication  SMCongestion |
| Dnai | 3GPP TS 29.571 [8] | Identifies a user plane access to one or more DN(s). | ServiceExperience |
| EventReportingRequirement | 5.1.6.2.7 |  |  |
| ExceptionId | 5.1.6.3.6 |  | AbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] |  | AbnormalBehaviour |
| ExpectedAnalyticsType | 5.1.6.3.11 |  | AbnormalBehaviour |
| GroupId | 3GPP TS 29.571 [8] | Internal Group Identifier of a group of UEs. | UeMobility  UeCommunication  NetworkPerformance  AbnormalBehaviour  ServiceExperience |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | The network area information. | UeMobility  NetworkPerformance  QoSSustainability  ServiceExperience  UserDataCongestion  AbnormalBehaviour  NsiLoadExt |
| NetworkPerfInfo | 5.1.6.2.23 |  | NetworkPerformance |
| NetworkPerfType | 5.1.6.3.10 | Represents the network performance types. | NetworkPerformance |
| NfLoadLevelInformation | 5.1.6.2.31 | Represents load level information of a given NF instance. | NfLoad |
| NfInstanceId | 3GPP TS 29.571 [8] | Identifies an NF instance | NfLoad |
| NfSetId | 3GPP TS 29.571 [8] | Identifies an NF Set instance. | NfLoad |
| NFType | 3GPP TS 29.510 [12] | Indentifies a type of NF. | NfLoad |
| NsiId | 3GPP TS 29.531 [24] | Identifies a Network Slice Instance. | ServiceExperience  NsiLoad  NsiLoadExt |
| NsiIdInfo | 5.1.6.2.33 | Identify the S-NSSAI and the associated Network Slice Instance(s). | ServiceExperience  NsiLoad  NsiLoadExt |
| NsiLoadLevelInfo | 5.1.6.2.34 | Represents the load level information for an S-NSSAI and the associated network slice instance. | NsiLoad  NsiLoadExt |
| ProblemDetails | 3GPP TS 29.571 [8] | Used in error responses to provide more detailed information about an error. |  |
| QosRequirement | 5.1.6.2.20 |  | QoSSustainability |
| QosSustainabilityInfo | 5.1.6.2.19 |  | QoSSustainability |
| SamplingRatio | 3GPP TS 29.571 [8] |  |  |
| ServiceExperienceInfo | 5.1.6.2.24 |  | ServiceExperience |
| Supi | 3GPP TS 29.571 [8] | Identifies the UE. | ServiceExperience,  NfLoad  NetworkPerformance  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  SMCongestion |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.2.8-1. |  |
| Snssai | 3GPP TS 29.571 [8] |  |  |
| SliceLoadLevelInformation | 5.1.6.2.6 |  |  |
| TargetUeInformation | 5.1.6.2.8 | Identifies the target UE information. | ServiceExperience  NfLoad  NetworkPerformance  UserDataCongestion  UserDataCongestionExt  UeMobility  UeCommunication  AbnormalBehaviour  QoSSustainability |
| UeCommunication | 5.1.6.2.13 |  | UeCommunication |
| UeMobility | 5.1.6.2.10 |  | UeMobility |
| Uinteger | 3GPP TS 29.571 [8] | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible. |  |
| UserDataCongestionInfo | 5.1.6.2.17 |  | UserDataCongestion |
| AbnormalBehaviour | 5.1.6.2.15 | Represents the abnormal behaviour information. | AbnormalBehaviour |

\* \* \* \* Start of Next Change \* \* \* \*

##### 5.2.6.2.2 Type AnalyticsData

Table 5.2.6.2.2-1: Definition of type AnalyticsData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| start | DateTime | O | 0..1 | It defines the start time of which the analytics information will become valid. (NOTE) |  |
| expiry | DateTime | O | 0..1 | It defines the expiration time after which the analytics information will become invalid. (NOTE) |  |
| timeStampGen | DateTime | O | 0..1 | It defines the timestamp of analytics generation. |  |
| anaMetaInfo | AnalyticsMetadataInfo | C | 0..1 | Contains information about analytics metadata required to aggregate the analytics. It shall be present if the "anaMeta" attribute was included in the request, containing the information indicated by the "anaMeta" attribute. | Aggregation |
| sliceLoadLevelInfos | array(SliceLoadLevelInformation) | C | 1..N | The slices and the load level information. Shall be present when the requested event is "LOAD\_LEVEL\_INFORMATION". |  |
| nsiLoadLevelInfos | array(NsiLoadLevelInfo) | C | 1..N | Each element identifies the load level information for an S-NSSAI and the optionally associated network slice instance.  Shall be presented when the requested event is "NSI\_LOAD\_LEVEL" | NsiLoad  NsiLoadExt |
| nwPerfs | array(NetworkPerfInfo) | C | 1..N | The network performance information.  Shall be present when the requested event is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| nfLoadLevelInfos | array(NfLoadLevelInformation) | C | 1..N | The NF load information.  When the requestedevent is "NF\_LOAD", the nfLoadLevelInfos shall be included. | NfLoad |
| qosSustainInfos | array(QosSustainabilityInfo) | C | 1..N | The QoS sustainability informations in the certain geographic areas.  It shall present if the requested eventis "QOS\_SUSTAINABILITY" | QoSSustainability |
| ueMobs | array(UeMobility) | C | 1..N | The UE mobility information.  When the requested event is "UE\_MOBILITY", the "ueMobs" attribute shall be included. | UeMobility |
| ueComms | array(UeCommunication) | C | 1..N | The UE communication information.  When the requested event is "UE\_COMM", the "ueComms" attribute shall be included. | UeCommunication |
| userDataCongInfos | array(UserDataCongestionInfo) | C | 1..N | The user data congestion information.  Shall be present when the requested event is "USER\_DATA\_CONGESTION". | UserDataCongestion |
| suppFeat | SupportedFeatures | C | 0..1 | List of Supported features used as described in subclause 5.2.8.  This parameter shall be supplied by NWDAF in the reply of GET request that request the analytics resource, if the consumer includes "supported-features" in the GET request. |  |
| svcExps | array(ServiceExperienceInfo) | C | 1..N | The service experience information. | ServiceExperience |
| abnorBehavrs | array(AbnormalBehaviour) | C | 1..N | The abnormal behaviour information. | AbnormalBehaviour |
| smccExps | array(SmcceInfo) | C | 1..N | The Session Management congestion control experience information.  Shall be present when the requested event is "SM\_CONGESTION". | SMCongestion |
| NOTE: If the "start" attribute and the "expiry" attribute are both provided, the DateTime of the "expiry" attribute shall not be earlier than the DateTime of the "start" attribute. | | | | | |

\* \* \* \* Start of Next Change \* \* \* \*

##### 5.2.6.2.3 Type EventFilter

Table 5.2.6.2.3-1: Definition of type EventFilter

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| anySlice | AnySlice | C | 0..1 | Default is "FALSE". (NOTE 1) |  |
| appIds | array(ApplicationId) | C | 1..N | Identification(s) of application. The absence of appIds means applicable to all applications. (NOTE 4) | ServiceExperience  UeCommunication AbnormalBehaviour |
| dnns | array(Dnn) | C | 1..N | Identification(s) of DNN. Each DNN is a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. The absence of dnns means applicable to all DNNs. (NOTE 4) | ServiceExperience  UeCommunication  AbnormalBehaviour  SMCongestion |
| dnais | array(Dnai) | C | 1..N | Identification(s) of user plane accesses to DN(s) which the subscription applies. It may be included when event-id is "SERVICE\_EXPERIENCE". | ServiceExperience |
| snssais | array(Snssai) | C | 1..N | Identification(s) of network slice to which the subscription belongs. (NOTE 1), (NOTE 4) |  |
| nfInstanceIds | array(NfInstanceId) | O | 1..N | Identification(s) of NF instances. | NfLoad |
| nfSetIds | array(NfSetId) | O | 1..N | Identification(s) of NF instance sets. | NfLoad |
| nfTypes | array(NFType) | O | 1..N | Identification(s) of NF types. | NfLoad |
| networkArea | NetworkAreaInfo | C | 0..1 | This IE represents the network area where the NF service consumer wants to know the analytics result. (NOTE 2), (NOTE 4) | UeMobility  UeCommunication  NetworkPerformance  QoSSustainability  ServiceExperience  UserDataCongestion  AbnormalBehaviour  NsiLoadExt |
| topAppListUlInd | boolean | O | 0..1 | Indicates that the list of top applications that contribute the most to the traffic in Uplink direction is requested, if it is included and set to "true". Default value is "false". | UserDataCongestionExt |
| topAppListDlInd | boolean | O | 0..1 | Indicates that the list of top applications that contribute the most to the traffic in Downlink direction is requested, if it is included and set to "true". Default value is "false". | UserDataCongestionExt |
| nsiIdInfos | array(NsiIdInfo) | O | 1..N | Each element identifies the S-NSSAI and the optionally associated network slice instance(s).  May be included when subscribed event is "NSI\_LOAD\_LEVEL" or  "SERVICE\_EXPERIENCE".  (NOTE 1) | ServiceExperience  NsiLoad  NsiLoadExt |
| nwPerfTypes | array(NetworkPerfType) | C | 1..N | Represents the network performance types. This attribute shall be included when event-id is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| qosRequ | QoSRequirement | C | 0..1 | Represents the QoS requirements. This attribute shall be included when event-id is "QOS\_SUSTAINABILITY". | QoSSustainability |
| bwRequs | array(BwRequirement) | O | 1..N | Represents the media/application bandwidth requirement for each application.  It may only be present if "appIds" attribute is provided. | ServiceExperience |
| excepIds | array(ExceptionId) | C | 1..N | Represents a list of Exception Ids.  (NOTE 3) | AbnormalBehaviour |
| exptAnaType | ExpectedAnalyticsType | C | 0..1 | Represents expected UE analytics type.  (NOTE 3) | AbnormalBehaviour |
| exptUeBehav | ExpectedUeBehaviourData | O | 0..1 | Represents expected UE behaviour. | AbnormalBehaviour |
| NOTE 1: The "anySlice" attribute is not applicable to features "UeMobility" and "NetworkPerformance". The "snssais" attribute is not applicable to features "ServiceExperience", "NsiLoad", "UeMobility" and "NetworkPerformance". When event-id in the request is "LOAD\_LEVEL\_INFORMATION", the identifications of network slices, either information about slice(s) identified by the "snssais" attribute, or "anySlice" set to "TRUE", shall be included. When subscribed event is "NSI\_LOAD\_LEVEL" or "SERVICE\_EXPERIENCE", either the "nsiIdInfos" attribute or anySlice set to "TRUE" shall be included. When subscribed event is "QOS\_SUSTAINABILITY", "NF\_LOAD", "UE\_COMM", "ABNORMAL\_BEHAVIOUR" or "USER\_DATA\_CONGESTION", the identifications of network slices identified by the "snssais" attribute is optional.  NOTE 2: For "NETWORK\_PERFORMANCE", "SERVICE\_EXPERIENCE" or "USER\_DATA\_CONGESTION" event, this attribute shall be provided if the event applied for all UEs (i.e. "anyUe" attribute set to true). For "QOS\_SUSTAINABILITY", this attribute shall be provided.  NOTE 3: Either "excepIds" or "exptAnaType" shall be provided if event-id in the request is "ABNORMAL\_BEHAVIOUR".  NOTE 4: For "ABNORMAL\_BEHAVIOUR" event with "anyUe" attribute in "tgt-ue" attribute sets to true,  - at least one of the "networkArea" and the "snssais" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepIds" attribute is mobility related;  - at least one of the "networkArea", "appIds", "dnns" and "snssais" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepIds" attribute is communication related;  - the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepIds" attribute shall not be requested for both mobility and communication related analytics at the same time. | | | | | |

Editor’s Note: It’s FFS whether the "nfTypes", "nfSetIds" and "nfInstanceIds" attirbutes are applicable for the NsiLoadExt feature.

\* \* \* \* Start of Next Change \* \* \* \*

##### 5.2.6.2.Y Type SmcceInfo

Table 5.2.6.2.Y-1: Definition of type SmcceInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| dnn | Dnn | C | 0..1 | Identifies DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.  Shall be present if the "dnns" was provided within the "event-filter" attribute during the NWDAF analytics information request procedure. |  |
| snssai | Snssai | C | 0..1 | Identifies the network slice information.  Shall be present if the "snssais" was provided within the "event-filter" attribute during the NWDAF analytics information request procedure. |  |
| smcceUeList | SmcceUeList | M | 1 | Contains the list of UEs classified based on experience level of SM congestion control. |  |

\* \* \* \* Start of Next Change \* \* \* \*

##### 5.2.6.2.Z Type SmcceUeList

Table 5.2.6.2.Z-1: Definition of type SmcceUeList

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| highLevel | array(Supi) | O | 1..N | A list of UEs whose experience level of SMCC for specific DNN and/or S-NSSAI is high. |  |
| mediumLevel | array(Supi) | O | 1..N | A list of UEs whose experience level of SMCC for specific DNN and/or S-NSSAI is medium. |  |
| lowLevel | array(Supi) | O | 1..N | A list of UEs whose experience level of SMCC for specific DNN and/or S-NSSAI is low. |  |
| NOTE: At least one of "highLevel", "mediumLevel" or "lowLevel" shall be provided. | | | | | |

\* \* \* \* Start of Next Change \* \* \* \*

##### 5.2.6.3.3 Enumeration: EventId

Table 5.2.6.3.3-1: Enumeration EventId

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| LOAD\_LEVEL\_INFORMATION | Represents the analytics of load level information of corresponding network slice. |  |
| NETWORK\_PERFORMANCE | Represents the analytics of network performance information | NetworkPerformance |
| NF\_LOAD | Represents the analytics of NF Load information. | NfLoad |
| QOS\_SUSTAINABILITY | Represents the analytics of QoS sustainability in the certain area. | QoSSustainability |
| SERVICE\_EXPERIENCE | Represents the analytics of service experience of corresponding application and/or network slice. | ServiceExperience |
| UE\_MOBILITY | Represents the analytics of UE mobility. | UeMobility |
| UE\_COMM | Represents the analytics of UE communication. | UeCommunication |
| USER\_DATA\_CONGESTION | Represents the analytics of the user data congestion in the certain area. | UserDataCongestion |
| ABNORMAL\_BEHAVIOUR | Represents the analytics of abnormal behaviour information. | AbnormalBehaviour |
| NSI\_LOAD\_LEVEL | Represents the analytics of load level information of Network Slice and the optionally associated Network Slice Instance | NsiLoad |
| SM\_CONGESTION | Represents the analytics of Session Management congestion control experience information for specific DNN and/or S-NSSAI. | SMCongestion |

\* \* \* \* Start of Next Change \* \* \* \*

### 5.2.8 Feature negotiation

The optional features in table 5.2.8-1 are defined for the Nnwdaf\_AnalyticsInfo API. They shall be negotiated using the extensibility mechanism defined in subclause 6.6 of 3GPP TS 29.500 [6].

Table 5.2.8-1: Supported Features

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Feature number | | Feature Name | | Description | |
| 1 | | UeMobility | | This feature indicates the support of analytics based on UE mobility information. | |
| 2 | | UeCommunication | | This feature indicates the support of analytics based on UE communication information. | |
| 3 | | NetworkPerformance | | This feature indicates the support of analytics based on network performance. | |
| 4 | | ServiceExperience | | This feature indicates support for the event related to service experience. | |
| 5 | | QoSSustainability | | This feature indicates support for the event related to QoS sustainability. | |
| 6 | | AbnormalBehaviour | | This feature indicates support for the event related to abnormal behaviour information. | |
| 7 | | UserDataCongestion | | This feature indicates the support of the analytics related on user data congestion. | |
| 8 | | NfLoad | | This feature indicates the support of the analytics related to the load of NF instances. | |
| 9 | | NsiLoad | | This feature indicates the support of the analytics related to the load level of Network Slice and the optionally associated Network Slice Instance. | |
| 10 | | EneNA | | This feature indicates support for the enhancements of network data analytics requirements. | |
| 11 | | UserDataCongestionExt | | This feature indicates support for the extensions to the event related to user data congestion. Supporting this feature also requires the support of feature UserDataCongestion. | |
| 12 | | Aggregation | | This feature indicates support for analytics aggregation. Supporting this feature also requires the support of feature EneNA. | |
| 13 | | NsiLoadExt | | This feature indicates support for the extensions to the event related to the load level of Network Slice and the optionally associated Network Slice Instance. Supporting this feature also requires the support of feature NsiLoad. | |
| X | | SMCongestion | | This feature indicates support for the event related to SM congestion control experience. | |

\* \* \* \* Start of Next Change \* \* \* \*

# A.3 Nnwdaf\_AnalyticsInfo API

openapi: 3.0.0

info:

version: 1.2.0-alpha.4

title: Nnwdaf\_AnalyticsInfo

description: |

Nnwdaf\_AnalyticsInfo Service API.

© 2021, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

All rights reserved.

externalDocs:

description: 3GPP TS 29.520 V17.4.0; 5G System; Network Data Analytics Services.

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.520/'

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-analyticsinfo

servers:

- url: '{apiRoot}/nnwdaf-analyticsinfo/v1'

variables:

apiRoot:

default: https://example.com

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

paths:

/analytics:

get:

summary: Read a NWDAF Analytics

operationId: GetNWDAFAnalytics

tags:

- NWDAF Analytics (Document)

parameters:

- name: event-id

in: query

description: Identify the analytics.

required: true

schema:

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

- name: ana-req

in: query

description: Identifies the analytics reporting requirement information.

required: false

content:

application/json:

schema:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/EventReportingRequirement'

- name: event-filter

in: query

description: Identify the analytics.

required: false

content:

application/json:

schema:

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

- name: supported-features

in: query

description: To filter irrelevant responses related to unsupported features

schema:

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

- name: tgt-ue

in: query

description: Identify the target UE information.

required: false

content:

application/json:

schema:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/TargetUeInformation'

responses:

'200':

description: Containing the analytics with parameters as relevant for the requesting NF service consumer.

content:

application/json:

schema:

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

'204':

description: No Content (The request NWDAF Analytics data does not exist)

'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':

description: Indicates that the NWDAF Analytics resource does not exist.

content:

application/problem+json:

schema:

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

'406':

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

'414':

$ref: 'TS29571\_CommonData.yaml#/components/responses/414'

'429':

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

'500':

description: The request is rejected by the NWDAF and more details (not only the ProblemDetails) are returned.

content:

application/problem+json:

schema:

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

'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:

nnwdaf-analyticsinfo: Access to the Nnwdaf\_AnalyticsInfo API

schemas:

AnalyticsData:

description: Represents the description of analytics with parameters as relevant for the requesting NF service consumer.

type: object

properties:

start:

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

expiry:

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

timeStampGen:

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

anaMetaInfo:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/AnalyticsMetadataInfo'

sliceLoadLevelInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/SliceLoadLevelInformation'

minItems: 1

description: The slices and their load level information.

nsiLoadLevelInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NsiLoadLevelInfo'

minItems: 1

nfLoadLevelInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NfLoadLevelInformation'

minItems: 1

nwPerfs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NetworkPerfInfo'

minItems: 1

svcExps:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/ServiceExperienceInfo'

minItems: 1

qosSustainInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/QosSustainabilityInfo'

minItems: 1

ueMobs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/UeMobility'

minItems: 1

ueComms:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/UeCommunication'

minItems: 1

userDataCongInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/UserDataCongestionInfo'

minItems: 1

abnorBehavrs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/AbnormalBehaviour'

minItems: 1

smccExps:

type: array

items:

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

minItems: 1

suppFeat:

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

EventFilter:

description: Represents the event filters used to identify the requested analytics.

type: object

properties:

anySlice:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/AnySlice'

snssais:

type: array

items:

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

minItems: 1

description: Identification(s) of network slice to which the subscription belongs.

appIds:

type: array

items:

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

minItems: 1

dnns:

type: array

items:

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

minItems: 1

dnais:

type: array

items:

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

minItems: 1

networkArea:

$ref: 'TS29554\_Npcf\_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'

topAppListUlInd:

type: boolean

description: Indicates that the list of top applications that contribute the most to the traffic in Uplink direction is requested, if it is included and set to "true". Default value is "false".

topAppListDlReq:

type: boolean

description: Indicates that the list of top applications that contribute the most to the traffic in Downlink direction is requested, if it is included and set to "true". Default value is "false".

nfInstanceIds:

type: array

items:

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

minItems: 1

nfSetIds:

type: array

items:

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

minItems: 1

nfTypes:

type: array

items:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/NFType'

minItems: 1

nsiIdInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NsiIdInfo'

minItems: 1

qosRequ:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/QosRequirement'

nwPerfTypes:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NetworkPerfType'

minItems: 1

bwRequs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/BwRequirement'

minItems: 1

excepIds:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/ExceptionId'

minItems: 1

exptAnaType:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/ExpectedAnalyticsType'

exptUeBehav:

$ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ExpectedUeBehaviourData'

not:

required: [anySlice, snssais]

ProblemDetailsAnalyticsInfoRequest:

description: Extends ProblemDetails to indicate more details why the analytics request is rejected.

allOf:

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

- $ref: '#/components/schemas/AdditionInfoAnalyticsInfoRequest'

AdditionInfoAnalyticsInfoRequest:

description: Indicates additional information why the analytics request is rejected.

type: object

properties:

rvWaitTime:

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

SmcceInfo:

description: Represents the Session Management congestion control experience information.

type: object

properties:

dnn:

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

snssai:

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

smcceUeList:

type: array

items:

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

minItems: 1

SmcceUeList:

description: Represents the List of UEs classified based on experience level of Session Management congestion control.

type: object

properties:

highLevel:

type: array

items:

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

mediumLevel:

type: array

items:

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

lowLevel:

type: array

items:

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

EventId:

anyOf:

- type: string

enum:

- LOAD\_LEVEL\_INFORMATION

- NETWORK\_PERFORMANCE

- NF\_LOAD

- SERVICE\_EXPERIENCE

- UE\_MOBILITY

- UE\_COMMUNICATION

- QOS\_SUSTAINABILITY

- ABNORMAL\_BEHAVIOUR

- USER\_DATA\_CONGESTION

- NSI\_LOAD\_LEVEL

- SM\_CONGESTION

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: >

Possible values are

- LOAD\_LEVEL\_INFORMATION: Represent the analytics of load level information of corresponding network slice.

- NETWORK\_PERFORMANCE: Represent the analytics of network performance information.

- NF\_LOAD: Indicates that the event subscribed is NF Load.

- SERVICE\_EXPERIENCE: Represent the analytics of service experience information of the specific applications.

- UE\_MOBILITY: Represent the analytics of UE mobility.

- UE\_COMMUNICATION: Represent the analytics of UE communication.

- QOS\_SUSTAINABILITY: Represent the analytics of QoS sustainability information in the certain area.

- ABNORMAL\_BEHAVIOUR: Indicates that the event subscribed is abnormal behaviour information.

- USER\_DATA\_CONGESTION: Represent the analytics of the user data congestion in the certain area.

- NSI\_LOAD\_LEVEL: Represent the analytics of Network Slice and the optionally associated Network Slice Instance.

- SM\_CONGESTION: Represent the analytics of Session Management congestion control experience information for specific DNN and/or S-NSSAI.

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