**3GPP TSG CT WG3 Meeting #130C3-234082**

**Xiamen, China, 9 - 13 October, 2023 *(revision of C3-23xxxx)***

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.520** | **CR** | **0789** | **rev** | **-** | **Current version:** | **18.3.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Relative Proximity analytics for Nnwdaf\_EventsSubscription API | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | KDDI, Nokia, Nokia Shanghai Bell, Huawei, Toyota, Ericsson, Samsung | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph3 | | | | |  | ***Date:*** | | | 2023-09-29 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Relative Proximity analytics was implemented in clause 6.19 of TS 23.288, hence need to be implemented in this specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR proposes to add new feature, event, data types and procedures to Nnwdaf\_EventsSubscription API for supporting Relative Proximity analytics. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The stage 2 requirement is not implemented. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.1.1, 4.2.1.3.2, 4.2.2.2.2, 4.2.2.4.2, 5.1.6.1, 5.1.6.2.3, 5.1.6.2.5, 5.1.6.2.8, 5.1.6.2.99, 5.1.6.2.100, 5.1.6.2.101, 5.1.6.2.102, 5.1.6.2.103, 5.1.6.2.104, 5.1.6.3.4, 5.1.6.3.18, 5.1.8, A.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces a backwards compatible feature in the OpenAPI file of the Nnwdaf\_EventsSubscription API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\* 1st Changes \*\*\*

#### 4.2.1.1 Overview

The Nnwdaf\_EventsSubscription service corresponding to Nnwdaf\_AnalyticsSubscription 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 service consumers to subscribe to and unsubscribe from different analytics events;

- notifies NF service consumers with a corresponding subscription about observed events. and

- allows NF service consumers to request the transfer of subscriptions for analytics events.

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;

- Dispersion;

- Redundant transmission experience;

- SM congestion control experience;

- WLAN performance;

- DN performance;

- PFD determination;

- PDU Session traffic.

- Movement Behaviour;

- Location Accuracy.

- Relative Proximity

\*\*\* 2nd Changes \*\*\*

##### 4.2.1.3.2 NF Service Consumers

The Policy Control Function (PCF):

- supports (un)subscription to the notification of analytics information for slice load level information from the NWDAF;

- supports (un)subscription to the notification of analytics information for service experience related network data from the NWDAF;

- supports (un)subscription to the notification of analytics information for network performance from the NWDAF;

- supports (un)subscription to the notification of analytics information for abnormal UE behaviour from the NWDAF;

- supports (un)subscription to the notification of analytics information for UE mobility from the NWDAF;

- supports (un)subscription to the notification of analytics information for UE communication from the NWDAF;

- supports (un)subscription to the notification of analytics information for user data congestion from the NWDAF;

- supports (un)subscription to the notification of analytics information for dispersion from the NWDAF;

- supports (un)subscription to the notification of analytics information for session management congestion control experience from the NWDAF;

- supports (un)subscription to the notification of analytics information for redundant transmission experience from the NWDAF;

- supports (un)subscription to the notification of analytics information for DN performance from the NWDAF;

- supports (un)subscription to the notification of analytics information for WLAN performance from the NWDAF;

- supports (un)subscription to the notification of analytics information for PDU Session traffic from the NWDAF; and

- supports taking one or more above input from the 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 specification.

The Network Slice Selection Function (NSSF):

- supports (un)subscription to the notification of analytics information for slice load level information or network slice instance load level information from the NWDAF to determine slice selection;

- supports (un)subscription to the notification of analytics information for service experience related network data from the NWDAF; and

- supports (un)subscription to the notification of analytics information for dispersion at the slice from the NWDAF.

The Access and Mobility Management Function (AMF):

- supports (un)subscription to the notification of analytics information for slice load level information from the NWDAF;

- supports (un)subscription to the notification of analytics information for service experience related network data from the NWDAF;

- supports (un)subscription to the notification of analytics information for SMF load information from the NWDAF to determine SMF selection;- supports (un)subscription to the notification of analytics information for expected UE behavioural information (UE mobility and/or UE communication) from the NWDAF to monitor UE behaviour;

- supports (un)subscription to the notification of analytics information for abnormal UE behaviour information from the NWDAF to determine adjustment of UE mobility related network parameters to solve the abnormal risk; and

- supports (un)subscription to the notification of analytics information for dispersion at the slice from the NWDAF.

The Session Management Function (SMF):

- supports (un)subscription to the notification of analytics information for UPF load information from the NWDAF to determine UPF selection;

- supports (un)subscription to the notification of analytics information for UE mobility information from the NWDAF to determine UPF selection;

- supports (un)subscription to the notification of analytics information for Session Management Congestion Control Experience from the NWDAF;- supports (un)subscription to the notification of analytics information for expected UE behavioural information (UE mobility and/or UE communication) from the NWDAF to monitor UE behaviour;

- supports (un)subscription to the notification of analytics information for abnormal UE behaviour information from the NWDAF to determine adjustment of UE communication related network parameters to solve the abnormal risk;

- supports (un)subscription to the notification of analytics information for slice load level information or network slice instance load level information from the NWDAF to determine slice selection.

- supports (un)subscription to the notification of analytics information for service experience related network data from the NWDAF;

- supports (un)subscription to the notification of analytics information for redundant transmission experience from the NWDAF to consider whether redundant transmission shall be performed, or (if it had been activated) shall be stopped; and

- supports (un)subscription to the notification of analytics information for DN performance from the NWDAF.

The Network Exposure Function (NEF):

- supports (un)subscription to the notification of analytics information for UE mobility from the NWDAF;

- supports (un)subscription to the notification of analytics information for UE communication from the NWDAF;

- supports (un)subscription to the notification of analytics information for expected UE behavioural (UE mobility and/or UE communication) from the NWDAF;

- supports (un)subscription to the notification of analytics information for abnormal behaviour from the NWDAF;

- supports (un)subscription to the notification of analytics information for user data congestion from the NWDAF;

- supports (un)subscription to the notification of analytics information for network performance from the NWDAF;

- supports (un)subscription to the notification of analytics information for QoS Sustainability from the NWDAF;

- supports (un)subscription to the notification of analytics information for Dispersion from the NWDAF;

- supports (un)subscription to the notification of analytics information for DN performance from NWDAF;

- supports (un)subscription to the notification of analytics information for Observed Service Experience from NWDAF;

- with PFDF function supports (un)subscription to the notification of analytics information for NWDAF assisted PFD Determination from the NWDAF;

- supports (un)subscription to the notification of analytics information for E2E data volume transfer time from NWDAF;

- supports (un)subscription to the notification of analytics information for Relative Proximity from NWDAF; and

- supports (un)subscription to the notification of analytics information for movement behaviour from NWDAF.

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 the NWDAF or via the NEF;

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

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

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

- supports receiving Dispersion information from the NWDAF or via the NEF;

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

- supports receiving Observed Service Experience information from NWDAF or via the NEF;

- supports receiving E2E data volume transfer time from NWDAF or via the NEF;

- supports receiving Movement Behaviour information from NWDAF or via the NEF; and

- supports receiving Relative Proximity information from NWDAF or via the NEF.

The Operation, Administration, and Maintenance (OAM):

- supports receiving slice load level information from the NWDAF;

- supports receiving observed service experience from the NWDAF;

- supports receiving NF load information from the NWDAF;

- supports receiving network performance information from the NWDAF;

- supports receiving UE mobility information from the NWDAF;

- supports receiving UE communication information from the NWDAF;

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

- supports receiving abnormal UE behaviour information from the NWDAF.

The Charging Enablement Function (CEF):

- supports (un)subscription to the notification of analytics information for slice load level information from the NWDAF; and

- supports (un)subscription to the notification of analytics information for service experience statistics information from the NWDAF.

The Location Management Function (LMF):

- supports (un)subscription to the notification of analytics information for location accuracy analytics from the NWDAF.

The Network Data Analytics Function (NWDAF):

- supports (un)subscription to the notification of analytics information for all types of network analytics from the NWDAF; and

- supports requesting the transfer of subscriptions to another NWDAF.

The Data Collection Coordination Function (DCCF):

- supports (un)subscription to the notification of analytics information for all types of network analytics from the NWDAF.

\*\*\* 3rd Changes \*\*\*

##### 4.2.2.2.2 Subscription for event notifications

Figure 4.2.2.2.2-1 shows a scenario where the NF service consumer sends a request to the NWDAF to subscribe for event notification(s) (as shown in 3GPP TS 23.288 [17]).



Figure 4.2.2.2.2-1: 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}/nnwdaf-eventssubscription/<apiVersion>/subscriptions" as Resource URI representing the "NWDAF Events Subscriptions", as shown in figure 4.2.2.2.2-1, 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:

- an URI where to receive the requested notifications as "notificationURI" attribute; and

- a description of the subscribed events as "eventSubscriptions" attribute that, for each event, the EventSubscription data type shall include:

1) an event identifier as "event" attribute; and

2) if the event notification method "PERIODIC" is selected via the "notificationMethod" attribute, repetition period as "repetitionPeriod" attribute;

and the EventSubscription data type may include the "extraReportReq" attribute with the following attributes:

1) maximum number of objects in the "maxObjectNbr" attribute;

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

3) identification of time window to which the subscription applies via identification of date-time(s) in the "startTs" and "endTs" attributes;

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

5) identification of time when analytics information is needed in the "timeAnaNeeded" atribute if the feature "EneNA" is supported;

6) indication of which analytics metadata is requested to be delivered with the notification in the "anaMeta" attribute if the feature "Aggregation" is supported;

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

8) offset period to the periodic reporting in the "offsetPeriod" attribute if the feature "EneNA" is supported. It may be present if the "repPeriod" attribute within the "evtReq" attribute or the "repetitionPeriod" attribute within the EventSubscription data type is included;

9) preferred accuracy level per analytics subset in the "accPerSubset" attribute if the "listOfAnaSubsets" attribute is present and the "EneNA" feature is supported; and/or

10) the time period of historical analytics in the "histAnaTimePeriod" attribute, if the "EneNA" feature is supported.

The NnwdafEventsSubscription data structure provided in the request body may include:

- event reporting information as the "evtReq" attribute, which applies for each event and may contain the following attributes:

1) event notification method (periodic, one time, on event detection) in the "notifMethod" attribute;

2) maximum Number of Reports in the "maxReportNbr" attribute;

3) monitoring duration in the "monDur" attribute;

4) repetition period for periodic reporting in the "repPeriod" attribute;

5) immediate reporting indication in the "immRep" attribute;

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

7) partitioning criteria for partitioning the impacted UEs before performing sampling as "partitionCriteria" attribute if the "EneNA" feature is supported;

8) group reporting guard time for aggregating the reports for a group of UEs in the "grpRepTime" attribute; and/or

9) a notification flag (used for muting and retrieving notifications) as "notifFlag" attribute if the "EneNA" feature is supported

10) notification muting exception instructions within the "notifFlagInstruct" attribute, if the EnhDataMgmt feature is supported and the "notifFlag" attribute is provided and set to "DEACTIVATE";

NOTE 1: The notification method indicated as the "notifMethod" attribute and the periodic reporting time indicated as the "repPeriod" attributes within the event reporting information as the "evtReq" attribute provided in NnwdafEventsSubscription data type, if present, supersedes the event notification method as the "notificationMethod" attribute and repetition period as the "repetitionPeriod" attribute respectively in the EventSubscription data type.

- information of previous analytics subscription in the "prevSub" attribute if the "AnaCtxTransfer" feature is supported;

- the notification correlation identifier in the "notifCorrId" attribute, if the "EneNA" feature is supported; and/or

- analytics consumer information as "consNfInfo" attribute, if the "AnaSubTransfer" feature is supported;

NOTE 2: The "consNfInfo" attribute enables the NWDAF to determine whether an analytics subscription transfer procedure is applicable. Otherwise, if the "consNfInfo" attribute is not provided in a subscription and the NWDAF cannot serve anymore or transfer this subscription, the NWDAF can notify the analytics consumer with a Termination Request so that the analytics consumer can select a new target NWDAF.

For all the event types, the "eventSubscriptions" attribute may include:

- the analytics accuracy requirement information in "accuReq" attribute as indication to the NWDAF to activate checking the analytics accuracy information of the subscribed event, if the "AnalyticsAccuracy" feature is supported and the NF service consumer discovered or local configured the NWDAF containing an AnLF supporting accuracy checking capability.

- the pause analytics consumption flag in "pauseFlg" attribute if the "AnalyticsAccuracy" feature is supported.

- the resume analytics consumption flag in "resumeFlg" attribute if the "AnalyticsAccuracy" feature is supported.

- use case context as "useCaseCxt" attribute, if the "ENAExt" feature is supported.

NOTE 3: The NWDAF can use the parameter "Use case context" to select the most relevant ML model, when several ML models are available for the requested Analytics ID(s). The NWDAF containing AnLF can additionally provide the parameter "Use case context" when requesting an ML model from an NWDAF containing MTLF. The values of this parameter are not standardized.

NOTE 4: The subscription for analytics accuracy information independently from subscription of the analytics event output is not supported in this release.

For different event types, the "eventSubscriptions" attribute:

- if the event is "SLICE\_LOAD\_LEVEL", shall provide:

1) network slice level load level threshold in the "loadLevelThreshold" attribute if the "notifMethod" attribute in "evtReq" attribute is set to "ON\_EVENT\_DETECTION" or the "notificationMethod" attribute in "eventSubscriptions" attribute is set to "THRESHOLD" or omitted; and

2) identification of network slice(s) to which the subscription applies via identification of network slice(s) in the "snssais" attribute or any slices indication in the "anySlice" attribute;

- if the feature "NsiLoad" is supported and the event is "NSI\_LOAD\_LEVEL", shall provide:

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

NOTE 5: The network slice instance of a PDU session is not available in the PCF.

2) the network slice or network slice instance load level thresholds in the "nsiLevelThrds" attribute if the "notifMethod" attribute in "evtReq" attribute is set to "ON\_EVENT\_DETECTION" or the "notificationMethod" attribute in "eventSubscriptions" attribute is set to "THRESHOLD" or omitted;

and may include:

1) a list of analytics subsets carried by "listOfAnaSubsets" attribute with value(s) only applicable to "NSI\_LOAD\_LEVEL" event, if the "EneNA" feature is supported;

2) identification of network area to which the subscription applies via identification of network area(s) by "networkArea" attribute, if the "NsiLoadExt" feature is supported;

3) a matching direction in the "matchingDir" attribute if the "nsiLevelThrds" attribute is provided and the "NsiLoadExt" feature is supported; and/or

4) list of NF instance types in the "nfTypes" attribute, if the "NsiLoadExt" feature is supported.

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

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

NOTE 6: Only NF instances of type AMF and SMF which are serving the UE can be determined using a SUPI in "supis" attribute.

NOTE 7: If a list of the NF Instance IDs (or respectively of NF Set IDs) is provided, the NWDAF needs to provide the analytics for each designated NF instance (or respectively for each NF instance belonging to each designated NF Set). In such case the target UE(s) of the Analytics Reporting need be ignored.

2) NF load level thresholds in the "nfLoadLvlThds" attribute if the "notifMethod" attribute in "evtReq" attribute is set to "ON\_EVENT\_DETECTION" or the "notificationMethod" attribute in "eventSubscriptions" attribute is set to "THRESHOLD" or omitted;

and may include:

1) 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;

2) list of NF instance types in the "nfTypes" attribute;

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

4) a matching direction in the "matchingDir" attribute if the "nfLoadLvlThds" attribute is provided;

5) optional area of interest by "networkArea" attribute, if the "NfLoadExt" feature is supported; and/or

6) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to NF\_LOAD event, if the "EneNA" feature is supported;

- 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 "tgtUe" attribute; and

2) the network performance requirements via "nwPerfRequs" attribute;

and may provide:

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

2) a matching direction in the "matchingDir" attribute if the "nwPerfRequs" attribute is provided;

3) the spatial granularity size of TA in the "spatialGranSizeTa" attribute if the "NetworkPerformanceExt\_eNA" feature is supported;

4) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "NetworkPerformanceExt\_eNA" feature is supported; and/or

5) the temporal granularity size in the "temporalGranSize" attribute if the "NetworkPerformanceExt\_eNA" feature is supported.

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

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

2) 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;

NOTE 8: The network slice instance of a PDU session is not available in the PCF.

and may provide:

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

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

3) identification of DNN to which the subscription applies via identification of application(s) by "dnns" attribute;

4) identification of user plane access to DN(s) which the subscription applies as the "dnais" attribute;

5) identification of a user plane access to one or more DN(s) where applications are deployed by "dnais" attribute;

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

7) indication of all the RAT types and/or all the frequencies that the NWDAF received for the application or specific RAT type(s) and/or frequency(ies) and the service experience threshold value(s) for the RAT Type(s) and/or Frequency value(s) where the UE camps on by "ratFreqs" attribute if the feature "ServiceExperienceExt" is also supported;

8) a list of analytics subsets carried by "listOfAnaSubsets" attribute with value(s) only applicable to "SERVICE\_EXPERIENCE" event, if the "EneNA" feature is supported;

9) the identification of the UPF as the "upfInfo" attribute if the feature "ServiceExperienceExt" is also supported;

10) IP address(s)/FQDN(s) of the Application Server(s) as the "appServerAddrs" attribute if the feature "ServiceExperienceExt" is also supported;

11) combination of PDU Session parameters as the "pduSesInfos" attribute if the feature "ServiceExperienceExt2\_eNA" is also supported; and/or

12) preferred granularity of location information as the "locGranularity" attribute if the feature "ServiceExperienceExt2\_eNA" is supported; and/or

13) the fine granularity areas as the "fineGranAreas" attribute if the feature "ServiceExperienceExt2\_eNA" is supported.

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

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

NOTE 9: For LADN service, the consumer (e.g. SMF) provides the LADN DNN to refer the LADN service area as the AOI.

and may provide:

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

2) preferred granularity of location information as the "locGranularity" attribute if the feature "UeMobilityExt2\_eNA" is supported.

3) identification of the preferred orientation of location information by " locOrientation" attribute if the feature "UeMobilityExt2\_eNA" is supported.

4) if the feature "UeMobilityExt" is supported,

i) identification of LADN DNN in the "ladnDnns" attribute;

ii) Visited Area(s) of Interest as the "visitedAreas" attirbute;

5) other UE mobility analytics requirements in "ueMobilityReqs" attribute, which may include ordering criterion and ordering direction, if the "UeMobilityExt2\_eNA" feature is supported;

6) an optional list of analytics subsets carried by "listOfAnaSubsets" attribute with value(s) only applicable to "UE\_MOBILITY" event, if the "UeMobilityExt2\_eNA" and "EneNA" features are supported;

7) the spatial granularity size of TA in the "spatialGranSizeTa" attribute if the "UeMobilityExt2\_eNA" feature is supported;

8) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "UeMobilityExt2\_eNA" feature is supported;

9) the fine granularity areas as the "fineGranAreas" attribute if the feature "UeMobilityExt2\_eNA" is supported.

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

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

and may include:

1) identification of the application in the "appIds" attribute;

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

3) an identification of DNN in the "dnns" attribute;

4) identification of network slice in the "snssais" attribute;

5) a list of analytics subsets carried by "listOfAnaSubsets" attribute with value(s) only applicable to "UE\_COMM" event, if the "EneNA" feature is supported;

6) other UE communication analytics requirements in "ueCommReqs" attribute, which may include ordering criterion and ordering direction, if the "EnUeCommunication" feature is supported;

7) the spatial granularity size of TA in the "spatialGranSizeTa" attribute if the "UeCommunicationExt\_eNA" feature is supported;

8) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "UeCommunicationExt\_eNA" feature is supported.

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

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

2) the QoS requirements via "qosRequ" attribute;

3) QoS flow retainability threshold(s) by the "qosFlowRetThds" attribute for the 5QI of GBR resource type or RAN UE throughout threshold(s) by the "ranUeThrouThds" attribute for the 5QI of non-GBR resource type, if the "notifMethod" attribute in "evtReq" attribute is set to "ON\_EVENT\_DETECTION" or the "notificationMethod" attribute in "eventSubscriptions" attribute is set to "THRESHOLD" or omitted; and

4) identification of target UE(s) to which the subscription applies by "anyUe" in the "tgtUe" attribute;

and may include:

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

2) a matching direction in the "matchingDir" attribute if the "qosFlowRetThds" attribute or the "ranUeThrouThds" attribute is provided;

3) acceptable deviations from the threshold levels in the "deviations" attribute, if the "EnQoSSustainability" feature is supported;

4) the spatial granularity size of TA in the "spatialGranSizeTa" attribute if the "QoSSustainabilityExt\_eNA" feature is supported;

5) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "QoSSustainabilityExt\_eNA" feature is supported;

6) the temporal granularity size in the "temporalGranSize" attribute if the "QoSSustainabilityExt\_eNA" feature is supported; and/or

7) the fine granularity areas as the "fineGranAreas" attribute if the feature "QoSSustainabilityExt\_eNA" is supported.

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

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

2) either the expected analytics type via "exptAnaType" attribute or a list of exception Ids with the associated thresholds via "excepRequs" 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:

a) 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";

b) 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"; and

c) 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 is 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 "tgtUe" attribute sets to "true":

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

c) if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepRequs" attribute is communication related, at least one of identification of network area(s) 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;

and may provide:

1) expected UE behaviour via "exptUeBehav" attribute.

- if the feature "UserDataCongestion" is supported and the event is "USER\_DATA\_CONGESTION", shall provide:

1) identification of target UE(s) to which the subscription applies by "supis", "gpsis" (if feature "UserDataCongestionExt" is supported) or "anyUe" attribute;

and may include:

1) congestion threshold by the "congThresholds" attribute if the "notifMethod" attribute in "evtReq" attribute is set to "ON\_EVENT\_DETECTION" or the "notificationMethod" attribute in "eventSubscriptions" attribute is set to "THRESHOLD" or omitted;

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

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

4) a matching direction in the "matchingDir" attribute if the "congThresholds" attribute is provided;

5) if the feature "UserDataCongestionExt" is also supported, request a list of top applications with maximum number that contribute the most to the traffic in uplink and/or downlink directions by the "maxTopAppUlNbr" attribute and/or the "maxTopAppDlNbr" attribute;

6) a list of analytics subsets carried by "listOfAnaSubsets" attribute with value(s) only applicable to "USER\_DATA\_CONGESTION" event, if the "EneNA" feature is supported; and/or

7) the ordering criterion for the list of User Data Congestion analytics in "userDataConOrderCri" attribute, if the "UserDataCongestionExt2\_eNA" feature is supported;

8) the temporal granularity size in the "temporalGranSize" attribute if the "UserDataCongestionExt2\_eNA" feature is supported.

- if the feature "Dispersion" is supported and the event is "DISPERSION", shall provide:

1) identification of target UE(s) to which the subscription applies by "supis", "intGroupIds" or "anyUe" attribute in the "tgtUe" attribute, "anyUe" attribute is only supported in combination with "snssais" attribute, "networkArea" attribute and/or "disperClass" attribute;

and may include:

1) identification of network area to which the subscription applies via identification of network area by "networkArea" attribute, if the "supis" attribute or "intGroupIds" attribute is included in the "tgtUe" attribute;

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

3) application identifier(s) in "appIds" attribute;

4) dispersion analytics requirements in "disperReqs" attribute, which for the requested dispersion type may include dispersion class, preferred ordering requirements;

5) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to DISPERSION event, if the "EneNA" feature is supported; and/or

6) preferred granularity of location information as the "locGranularity" attribute if the feature "DispersionExt\_eNA" is supported;

7) the spatial granularity size of TA in the "spatialGranSizeTa" attribute if the "DispersionExt\_eNA" feature is supported;

8) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "DispersionExt\_eNA" feature is supported; and/or

9) the temporal granularity size in the "temporalGranSize" attribute if the "DispersionExt\_eNA" feature is supported.

- if the feature "RedundantTransmissionExp" is supported and the event is "RED\_TRANS\_EXP", shall provide:

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

- and may include:

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

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

3) identification of DNN in the "dnns" attribute;

4) other redundant transmission experience analysis requirements in "redTransReqs" attribute, which may include preferred order of results for the list of Redundant Transmission Experience; and/or

5) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to RED\_TRANS\_EXP event, if the "EneNA" feature is supported;

6) the temporal granularity size in the "temporalGranSize" attribute if the "RedundantTransExpExt\_eNA" feature is supported.

- if the feature "WlanPerformance" is supported and the event is "WLAN\_PERFORMANCE", shall provide:

1) identification of target UE(s) to which the subscription applies by "supis", "intGroupIds" or "anyUe" attribute in the "tgtUe" attribute. If "anyUe" attribute is included in the "tgtUe" attribute, then any of "networkArea" attribute, "ssIds" or "bssIds" attribute within "wlanReqs" attribute shall be present;

and may include:

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

2) other WLAN performance analytics requirements in "wlanReqs" attribute, which may include SSID(s), BSSID(s), preferred order of results for the list of WLAN performance information and/or accuracy per analytics subset; and/or

3) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to WLAN\_PERFORMANCE event, if the "EneNA" feature is supported;

4) the temporal granularity size in the "temporalGranSize" attribute if the "WlanPerfExt\_eNA" feature is supported.

- if the feature "DnPerformance" is supported and the event is "DN\_PERFORMANCE", shall provide:

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

and may include:

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

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

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

4) application identifier(s) in "appIds" attribute;

5) an identification of DNN in the "dnns" attribute;

6) identification of a user plane access to one or more DN(s) where applications are deployed by "dnais" attribute;

7) the identification of the UPF as the "upfInfo" attribute;

8) IP address(s)/FQDN(s) of the Application Server(s) as the "appServerAddrs" attribute;

9) other DN performance analytics requirements in "dnPerfReqs" attribute, which may include the preferred order of results for the list of DN performance information and/or the reporting threshold of each applicable analytics subset; and/or

10) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "DN\_PERFORMANCE" event, if the "EneNA" feature is supported and may include the attribute with value(s) only applicable to "DN\_PERFORMANCE" event and the "DnPerformanceExt\_AIML" feature if supported;

11) the spatial granularity size of TA in the "spatialGranSizeTa" attribute if the "DnPerformanceExt\_eNA" feature is supported;

12) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "DnPerformanceExt\_eNA" feature is supported; and/or

13) the temporal granularity size in the "temporalGranSize" attribute if the "DnPerformanceExt\_eNA" feature is supported.

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

1) an identification of DNN in the "dnns" attribute;

2) identification of network slice in the "snssais" attribute; and/or

3) identification of target UE(s) via "supis" attribute in the "tgtUe" attribute where the target UE(s) are one have the PDU Session for the DNN and/or S-NSSAI;

and may include:

1) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "SM\_CONGESTION" event, if the "EneNA" feature is supported.

NOTE 10: The predictions are not applicable for Session Management Congestion Control Experience analytics.

- if the feature "PfdDetermination" is supported and the event is "PFD\_DETERMINATION", it shall provide:

1) a list of application identifier(s) in the "appIds" attribute.

and may provide:

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

2) identification of network slice in the "snssais" attribute.

NOTE 11: PFD Determination analytics do not have a target UE, they are always for any UE.

- if the feature "E2eDataVolTransTime" is supported and the event is "E2E\_DATA\_VOL\_TRANS\_TIME", shall provide:

1) identification of target UE(s) to which the subscription applies by "supis" or "gpsis" attribute in the "tgtUe" attribute.

and may include:

1) an identification of DNN in the "dnns" attribute;

2) identification of network slice in the "snssais" attribute;

3) application identifier(s) in "appIds" attribute;

4) area of interest of the UEs by "networkArea" attribute; restricts the scope of the E2E data volume transfer time analytics to the provided area;

5) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "E2E\_DATA\_VOL\_TRANS\_TIME" event, if the "EneNA" feature is supported;

6) the QoS requirements via "qosRequ" attribute;

7) a request for geographical distribution of the UEs (i.e., the AoIs) by "networkAreaInfo" attribute; and/or

8) E2E data volume transfer time requirements in the "dataVlTrnsTmRqs" attribute;

- if the feature "PduSesTraffic" is supported and the event is "PDU\_SESSION\_TRAFFIC", shall provide:

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

2) PDU Session traffic analytics requirements in "pduSesTrafReqs" attribute, which includes the known Application Identifier, IP Descriptions or Domain Descriptors; and

3) DNN and/or S-NSSAI for the PDU Session(s) in the "dnns" and/or "snssais" attributes.

and may include:

1) identification of network area to which the subscription applies by "networkArea" attribute and/or

2) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "PDU\_SESSION\_TRAFFIC" event, if the "EneNA" features is supported.

- if the feature "MovementBehaviour" is supported and the event is "MOVEMENT\_BEHAVIOUR", shall provide:

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

- and may include:

1) identification of the preferred orientation of location information by " locOrientation" attribute;

2) Movement Behaviour analytics requirements in "movBehavReqs" attribute, which includes preferred granularity of location information or preferred orientation of location information; and/or

3) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "MOVEMENT\_BEHAVIOUR" event, if the "EneNA" features is supported.

NOTE 12: The predictions are not applicable for PDU Session traffic analytics.

- if the feature "LocAccuracy" is supported and the event is "LOC\_ACCURACY", it shall provide:

1) either a network area to which the subscription applies within the "networkArea" attribute or an exact location to which the subscription applies within the "location" attribute;

- and may include:

1) Location accuracy analytics requirements within the "locAccReqs" attribute; and/or

2) an optional list of analytics subsets within the "listOfAnaSubsets" attribute with value(s) only applicable to the "LOC\_ACCURACY" event, if the "EneNA" features is supported.

NOTE 13: Location accuracy analytics do not have a target UE, they are always for any UE.

- if the feature "RelativeProximity" is supported and the event is " RELATIVE\_PROXIMITY", shall provide:

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

- and may include:

1) identification of DNN in the "dnns" attribute;

2) identification of network slice in the "snssais" attribute;

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

4) Relative Proximity analytics requirements in "relProxReqs" attribute; and/or

5) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "RELATIVE\_PROXIMITY" event prediction, if the "EneNA" features is supported.

Upon the reception of an HTTP POST request with: "{apiRoot}/nnwdaf-eventssubscription/<apiVersion>/subscriptions" as Resource URI and NnwdafEventsSubscription data structure as request body, if no errors occur, the NWDAF shall:

- create a new subscription;

- assign an event subscriptionId; and

- store the subscription.

If the NWDAF created an "Individual NWDAF Event Subscription" resource, the NWDAF shall respond with "201 Created" status code with the message body containing a representation of the created subscription, as shown in figure 4.2.2.2.2-1, step 2. If not all the requested analytics events in the subscription are accepted, then the NWDAF may include the "failEventReports" attribute indicating the event(s) for which the subscription failed and the associated reason(s). The NWDAF shall include a Location HTTP header field. The Location header field shall contain the URI of the created subscription i.e. "{apiRoot}/nnwdaf-eventssubscription/<apiVersion>/subscriptions/{subscriptionId}". If the immediate reporting indication in the "immRep" attribute within the "evtReq" attribute sets to true in the event subscription, the NWDAF shall include the reports of the events subscribed, if available, in the HTTP POST response.

When the "notifFlag" attribute is included and set to "DEACTIVATE" in the request, the NWDAF shall mute the event notification and store the available events until the NF service consumer requests to retrieve them by setting the "notifFlag" attribute to "RETRIEVAL" or until a muting exception occurs (e.g. full buffer). When a muting exception occurs, the NWDAF may consider the contents of the "notifFlagInstruct" attribute (if provided) and/or local configuration to determine its actions.

If the EnhDataMgmt feature is supported and the NWDAF accepts the muting instructions provided in the "notifFlag" and/or the "notifFlagInstruct" attributes, it may indicate the applied muting notification settings within the "mutingSetting" attribute in the response. If the NWDAF does not accept the muting instructions provided in the "notifFlag" and/or the "notifFlagInstruct" attributes, it shall send an HTTP "403 Forbidden" error response including the "cause" attribute set to "MUTING\_INSTR\_NOT\_ACCEPTED".

If the analytics target period provided in the body of the HTTP POST request includes the start time in the past and the end time in the future, the NWDAF shall reject the request with an HTTP "400 Bad Request" response including the "cause" attribute set to "BOTH\_STAT\_PRED\_NOT\_ALLOWED".

If the statistics in the past are requested but the necessary data to perform the service is unavailable, the NWDAF shall reject the request with an HTTP "500 Internal Server Error" response including the "cause" attribute set to "UNAVAILABLE\_DATA".

If the user consent has not been checked by the NF service consumer and is required for the requested analytics collection depending on local policy and regulations, then the NWDAF shall check user consent for the targeted UE(s) by retrieving the user consent subscription data via the Nudm\_SDM service API of the UDM as described in clause 5.2.2 of 3GPP TS 29.503 [23]. If the NWDAF receive the response from the UDM that it is not granted for the impacted user(s), then the NWDAF shall send an HTTP "403 Forbidden" error response including the "cause" attribute set to "USER\_CONSENT\_NOT\_GRANTED".

NOTE 14: When the target of reporting is a SUPI or a GPSI then the subscription can be rejected, e.g. because user consent is not granted, and the error is sent to the consumer. When the target of reporting is an Internal Group Id, or a list of SUPIs/GPSI(s) or any UE, and the user consent is not granted for a subset of the impacted users, then no error is sent, but a subset of the SUPIs/GPSIs is skipped if user consent is not granted.

If an error occurs when processing the HTTP POST request, the NWDAF shall send an HTTP error response as specified in clause 5.1.7.

\*\*\* 4th Changes \*\*\*

##### 4.2.2.4.2 Notification about subscribed event

Figure 4.2.2.4.2-1 shows a scenario where the NWDAF sends a request to the NF service consumer to notify for event notifications or notify for the successful analytics subscription transfer (see also 3GPP TS 23.288 [17]).



Figure 4.2.2.4.2-1: NWDAF notifies the subscribed event

The NWDAF shall invoke the Nnwdaf\_EventsSubscription\_Notify service operation to notify the subscribed event or the successful analytics subscription transfer. The NWDAF shall send an HTTP POST request with "{notificationURI}" received in the Nnwdaf\_EventsSubscription\_Subscribe service operation as Resource URI, as shown in figure 4.2.2.4.2-1, step 1.

If both the repetition period ("repPeriod" or "repetitionPeriod") attribute and the "offsetPeriod" attribute are present in the subscription request for periodical notification, the NWDAF shall produce a notification in every repetition period seconds, including the statistics in the past offset period if the "offsetPeriod" attribute value is negative, or including the prediction for the future offset period if the "offsetPeriod" attribute value is positive.

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

- If the notification is for notifying about subscribed events, a description of the notified event as "eventNotifications" attribute that for each event shall include:

a) an event identifier as "event" attribute;

b) network slice load level information in the "sliceLoadLevelInfo" attribute when subscribed event is "SLICE\_LOAD\_LEVEL";

c) service experience information as "svcExps" attribute when subscribed event is "SERVICE\_EXPERIENCE";

d) UE mobility information in the "ueMobs" attribute when subscribed event is "UE\_MOBILITY";

e) UE communication information in the "ueComms" attribute when subscribed event is "UE\_COMM";

f) abnormal behaviour information in the "abnorBehavrs" attribute when subscribed event is "ABNORMAL\_BEHAVIOUR";

g) user data congestion information in the "userDataCongInfos" attribute when subscribed event is "USER\_DATA\_CONGESTION";

h) QoS sustainability information in the "qosSustainInfos" attribute when subscribed event is "QOS\_SUSTAINABILITY";

i) NF load information in "nfLoadLevelInfos" attribute when subscribed event is "NF\_LOAD";

j) network performance information in the "nwPerfs" attribute when subscribed event is "NETWORK\_PERFORMANCE";

k) Load level information for the network slice(s) and the optionally associated network slice instance(s) in "nsiLoadLevelInfos" attribute when subscribed event is "NSI\_LOAD\_LEVEL";

l) Dispersion information in the "disperInfos" attribute when subscribed event is "DISPERSION";

m) Redundant transmission experience information in the "redTransInfos" attribute when subscribed event is "RED\_TRANS\_EXP";

n) WLAN performance information in the "wlanInfos" attribute when subscribed event is "WLAN\_PERFORMANCE";

o) DN performance information in the "DnPerformance" attribute when subscribed event is "DN\_PERFORMANCE";

p) SMCCE performance information in the "smccExps" attribute when subscribed event is "SM\_CONGESTION";

q) PFD Determination information for known application identifier(s) in the "pfdDetermInfos" attribute when subscribed event is "PFD\_DETERMINATION";

r) PDU Session traffic information in the "pduSesTrafInfos" attribute when subscribed event is "PDU\_SESSION\_TRAFFIC";

s) E2E data volume transfer time in the "dataVlTrnsTmInfos" attribute when subscribed event is "E2E\_DATA\_VOL\_TRANS\_TIME";

t) Movement Behaviour information in the "movBehavInfos" attribute when subscribed event is "MOVEMENT\_BEHAVIOUR";

u) Location Accuracy information in the "locAccInfos" attribute when the subscribed event is "LOC\_ACCURACY"; and

v) Relative Proximity information in the " relProxInfos" attribute when subscribed event is "RELATIVE\_PROXIMITY";

and may include:

a) information about analytics metadata required for aggregation of the analytics in the "anaMetaInfo" attribute if the feature "Aggregation" is supported;

b) the start time of which the analytics information will become valid in the "start" attribute, if the "EneNA" feature is supported;

c) the expiration time after which the analytics information will become invalid in the "expiry" attribute.

d) the analytics accuracy information in "accuInfo" attribute, if the feature "AnalyticsAccuracy" is supported and the analytics accuracy requirement was subscribed in the "accuReq" attribute.

e) the pause analytics consumption indication in "pauseInd" attribute, if the feature "AnalyticsAccuracy" is supported.

f) the resume analytics consumption indication in "resumeInd" attribute, if the feature "AnalyticsAccuracy" is supported.

NOTE 1: In this version of the specification, the NWDAF containing AnLF can provide the accuracy information to an NF consumer that subscribes to the analytics.

NOTE 2: When receiving a subscription from an NF service consumer that includes the request for accuracy information, the analytics and/or the accuracy information can be provided by NWDAF containing AnLF in one notification or via different notifications.

NOTE 3: In this version of the specification, only subscribing or requesting accuracy information without requesting analytics is not supported.

- If the "EneNA" feature is supported and the target NWDAF notifies a successful analytics subscription transfer, the old subscription ID which had been allocated by the source NWDAF within the "oldSubscriptionId" attribute and the resource URI of the Individual NWDAF Event Subscription resource created by the target NWDAF within "resourceUri" attribute, and if the "PartialAnalyticsSubTransfer" feature is supported and not all the analytics events in the subscription transfer are accepted, the successful transferred subscription event(s) within the "transEvents" attribute; and

- an event subscription Id as "subscriptionId" attribute;

and may include:

a) the notification correlation identifier in the "notifCorrId" attribute, if the "EneNA" feature is supported.

b) a cause for termination in the "termCause" attribute, if the "TermRequest" feature is supported and the NWDAF wants to request the termination of this subscription, i.e. to indicate that it will send no further notifications for it.

If the feature "EneNA" is supported and the time when analytics information is needed has been provided (via the "timeAnaNeeded" attribute within the "extraReportReq" attribute) during the subscription for an event (via the "event" attribute within the EventSubscription data type), if the time when analytics information is needed is reached but the subscribed analytics information is not ready, the consumer does not need to wait for the analytics information any longer. In this case, the NWDAF may send an HTTP POST request as shown in step 1 of figure 4.2.2.4.2-1, which shall only provide (within the EventNotification data type in the NnwdafEventsSubscriptionNotification data type) an indication of the failure event via the "event" attribute and the corresponding failure reason via a "failNotifyCode" attribute, and may also provide a minimum time interval recommended by the NWDAF for the event via a "rvWaitTime" attribute which will be used by the NF service consumer to determine the time when analytics information is needed in similar future analytics subscriptions.

Upon the reception of an HTTP POST request with: "{notificationURI}" as Resource URI and NnwdafEventsSubscriptionNotification data structure as request body, if the NF service consumer successfully processed and accepted the received HTTP POST request, the NF service consumer shall:

- store the notification; and

- respond with HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.1.7.

If the feature "ES3XX" is supported, and the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [6].

After the successful processing of the HTTP POST request, if the NWDAF requests the NF service consumer to retrieve the data or analytics with the "fetchInstruct" attribute, the NF service consumer may invoke the Nnwdaf\_DataManagement\_Fetch service operation to retrieve the notified data or analytics as defined in clause 4.4.2.5.

\*\*\* 5th Changes \*\*\*

#### 5.1.6.1 General

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

Table 5.1.6.1-1 specifies the data types defined for the Nnwdaf\_EventsSubscription service based interface protocol.

Table 5.1.6.1-1: Nnwdaf\_EventsSubscription specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| AbnormalBehaviour | 5.1.6.2.15 | Represents the abnormal behaviour information. | AbnormalBehaviour |
| Accuracy | 5.1.6.3.5 | Represents the preferred level of accuracy of the analytics. |  |
| AccuracyInfo | 5.1.6.2.89 | The analytics accuracy information. | AnalyticsAccuracy |
| AccuracyReq | 5.1.6.3.88 | Represents the analytics accuracy requirement information. | AnalyticsAccuracy |
| AdditionalMeasurement | 5.1.6.2.26 | Represents additional measurement information. | AbnormalBehaviour |
| AddressList | 5.1.6.2.28 | Represents a list of IPv4 and/or IPv6 addresses. | AbnormalBehaviour |
| AnalyticsContextIdentifier | 5.1.6.2.43 | Contains information about available analytics contexts. | AnaSubTransfer |
| AnalyticsAccuracyIndication | 5.1.6.3.37 | Represents the analytics accuracy indication. | AnalyticsAccuracy |
| AnalyticsMetadata | 5.1.6.3.14 | Represents the types of analytics metadata information that can be requested. | Aggregation |
| AnalyticsMetadataIndication | 5.1.6.2.36 | Contains analytics metadata values indicated to be used during analytics generation. | Aggregation |
| AnalyticsMetadataInfo | 5.1.6.2.37 | Contains analytics metadata information required for analytics aggregation. | Aggregation |
| AnalyticsSubscriptionsTransfer | 5.1.6.2.40 | Contains information about a request to transfer analytics subscriptions. | AnaSubTransfer |
| AnalyticsSubset | 5.1.6.3.18 | Analytics subset used to indicate the content of the analytics. | EneNA |
| AnySlice | 5.1.6.3.2 | Represents the any slices. |  |
| ApplicationVolume | 5.1.6.2.55 | Application data volume per application Id. | Dispersion |
| AppListForUeComm | 5.1.6.2.64 | Represents the analytics of the application list used by UE. | UeCommunicationExt |
| BwRequirement | 5.1.6.2.25 | Represents bandwidth requirement. | ServiceExperience |
| ClassCriterion | 5.1.6.2.51 | Disperion class criterion. | Dispersion |
| CircumstanceDescription | 5.1.6.2.29 | Contains the description of a circumstance. | AbnormalBehaviour |
| CongestionInfo | 5.1.6.2.18 | Represents the congestion information | UserDataCongestion |
| CongestionType | 5.1.6.3.8 | Identification congestion analytics type. | UserDataCongestion |
| ConsumerNfInformation | 5.1.6.2.49 | Represents the analytics consumer NF Information. | AnaSubTransfer |
| DatasetStatisticalProperty | 5.1.6.3.15 | Dataset statistical properties of the data used to generate the analytics. | Aggregation |
| DataVolume | 5.1.6.2.85 | Indicates a specific data volume transmitted once from UE to AF and/or from AF to UE | E2eDataVolTransTime |
| DataVolumeTransferTime | 5.1.6.2.90 | Indicates the E2E data volume transfer time and the data volume used to derive the transfer time. | E2eDataVolTransTime |
| DeviceType | 5.1.6.3.31 | The type of device. | QoSSustainabilityExt\_eNA |
| Direction | 5.1.6.3.39 | Heading directions of the UE flow in the target area. | MovementBehaviour |
| DirectionInfo | 5.1.6.2.75 | Represents the UE direction information. | UeMobilityExt2\_eNA  MovementBehaviour |
| DispersionClass | 5.1.6.3.20 | Dispersion class. | Dispersion |
| DispersionCollection | 5.1.6.2.54 | Dispersion collections per UE location or or per slice. | Dispersion |
| DispersionInfo | 5.1.6.2.53 | Dispersion analytics information. | Dispersion |
| DispersionRequirement | 5.1.6.2.50 | Dispersion analytics requirement. | Dispersion |
| DispersionType | 5.1.6.3.19 | Dispersion type. | Dispersion |
| DispersionOrderingCriterion | 5.1.6.3.21 | Ordering criterion for the list of Dispersion. | Dispersion |
| DnPerf | 5.1.6.2.46 | Represents DN performance information. | DnPerformance |
| DnPerfInfo | 5.1.6.2.45 | Represents DN performances for the application. | DnPerformance |
| DnPerfOrderingCriterion | 5.1.6.3.25 | Ordering criterion for the list of DN performance analytics. | DnPerformance |
| DnPerformanceReq | 5.1.6.2.66 | Represents DN performance analytics requirement. | DnPerformance |
| E2eDataVolTransTimeCriterion | 5.1.6.3.35 | Ordering criterion for the list of E2E data volume transfer time | E2eDataVolTransTime |
| E2eDataVolTransTimeInfo | 5.1.6.2.83 | Represents the E2E data volume transfer time Information | E2eDataVolTransTime |
| E2eDataVolTransTimeReq | 5.1.6.2.82 | Represents the E2E data volume transfer time requirement | E2eDataVolTransTime |
| E2eDataVolTransTimePerTS | 5.1.6.2.84 | Represents the E2E data volume transfer time requirement per Time slot | E2eDataVolTransTime |
| E2eDataVolTransTimePerUe | 5.1.6.2.86 | Represents the E2E data volume transfer time per UE | E2eDataVolTransTime |
| E2eDataVolTransTimeUeList | 5.1.6.2.87 | Represents the E2E data volume transfer time per UE list | E2eDataVolTransTime |
| EventNotification | 5.1.6.2.5 | Describes Notifications about events that occurred. |  |
| EventReportingRequirement | 5.1.6.2.7 | Represents the type of reporting the subscription requires. |  |
| EventSubscription | 5.1.6.2.3 | Represents the subscription to a single event. |  |
| Exception | 5.1.6.2.16 | Describes the Exception information. | AbnormalBehaviour |
| ExceptionId | 5.1.6.3.6 | Describes the Exception Id. | AbnormalBehaviour |
| ExceptionTrend | 5.1.6.3.7 | Describes the Exception Trend. | AbnormalBehaviour |
| ExpectedAnalyticsType | 5.1.6.3.11 | Represents expected UE analytics type. | AbnormalBehaviour |
| FailureEventInfo | 5.1.6.2.35 | Contains information on the event for which the subscription is not successful. |  |
| GeoDistributionInfo | 5.1.6.2.76 | Represents the geographical distribution of the UEs. | UeMobilityExt\_AIML |
| GeoLocation | 5.1.6.2.95 | Represents a geographic location, using either standard or local coordinates and optionally including the altitude. | LocAccuracy |
| IpEthFlowDescription | 5.1.6.2.27 | Contains the description of an Uplink and/or Downlink Ethernet flow. | AbnormalBehaviour |
| LoadLevelInformation | 5.1.6.3.2 | Represents load level information of the network slice and the optionally associated network slice instance. |  |
| LocAccuracyInfo | 5.1.6.2.97 | Contains Location Accuracy information. | LocAccuracy |
| LocAccuracyPerMethod | 5.1.6.2.98 | Contains Location Accuracy information per Positioning Method. | LocAccuracy |
| LocAccuracyReq | 5.1.6.2.96 | Contains Location Accuracy analytics requirements. | LocAccuracy |
| LocationGranularity | 5.1.6.3.36 | Indicates the location granularity | UeMobilityExt2\_eNA |
| LocationInfo | 5.1.6.2.11 | Represents UE location information. | UeMobility |
| LocInfoGranularity | 5.1.6.3.32 | Represents the preferred granularity of location information. | ServiceExperienceExt2\_eNA  UeMobilityExt2\_eNA  DispersionExt\_eNA  MovementBehaviour |
| LocationOrientation | 5.1.6.3.38 | Represent preferred orientation of location information | MovementBehaviour |
| MatchingDirection | 5.1.6.3.12 | Defines the matching direction when crossing a threshold. | NfLoad, QoSSustainability, UserDataCongestion, NetworkPerformance  Dispersion  RedundantTransmissionExp  WlanPerformance  ServiceExperienceExt  NsiLoadExt  LocAccuracy |
| MLModelInfo | 5.1.6.2.69 | The information of the ML model. | AnaSubTransfer |
| ModelInfo | 5.1.6.2.42 | Contains information about an ML model. | AnaSubTransfer |
| MovBehav | 5.1.6.2.93 | Represents the Movement Behaviour information per time slot. | MovementBehaviour |
| MovBehavInfo | 5.1.6.2.92 | Represents the Movement Behaviour information. | MovementBehaviour |
| MovBehavReq | 5.1.6.2.91 | Represents the Movement Behaviour analytics requirements | MovementBehaviour |
| NetworkPerfInfo | 5.1.6.2.23 | Represents the network performance information. | NetworkPerformance |
| NetworkPerfOrderCriterion | 5.1.6.3.30 | The ordering criterion for the list of network performance analytics. | NetworkPerformanceExt\_eNA |
| NetworkPerfRequirement | 5.1.6.2.22 | Represents a network performance requirement. | 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 |
| NfStatus | 5.1.6.2.32 | Provides the percentage of time spent on various NF states. | NfLoad |
| NnwdafEventsSubscription | 5.1.6.2.2 | Represents an Individual NWDAF Event Subscription resource. |  |
| NnwdafEventsSubscriptionNotification | 5.1.6.2.4 | Represents an Individual NWDAF Event Subscription Notification resource. |  |
| NumberAverage | 5.1.6.2.38 | Represents average and variance information. | NsiLoadExt |
| NwdafEvent | 5.1.6.3.4 | Describes the NWDAF Events. |  |
| NwdafFailureCode | 5.1.6.3.13 | Identifies the failure reason. |  |
| NotificationMethod | 5.1.6.3.3 | Represents the notification methods that can be subscribed. |  |
| NsiIdInfo | 5.1.6.2.33 | Represents the S-NSSAI and the optionally associated Network Slice Instance Identifier(s). | ServiceExperience  NsiLoad  DnPerformance |
| NsiLoadLevelInfo | 5.1.6.2.34 | Represents the load level information for an S-NSSAI and the optionally associated network slice instance. | NsiLoad |
| ObservedRedundantTransExp | 5.1.6.2.70 | Represents the observed Redundant Transmission Experience. | RedundantTransmissionExp |
| OutputStrategy | 5.1.6.3.16 | Represents the output strategy used for the reporting of the analytics. | Aggregation |
| PerfData | 5.1.6.2.47 | Represents DN performance information. | DnPerformance |
| PfdDeterminationInfo | 5.1.6.2.73 | Represents the PFD Determination information. | PfdDetermination |
| PrevSubInfo | 5.1.6.2.68 | Information of the previous subscription. | AnaCtxTransfer |
| QosRequirement | 5.1.6.2.20 | Represents the QoS requirements. | QoSSustainability |
| QosSustainabilityInfo | 5.1.6.2.19 | Represents the QoS Sustainability information. | QoSSustainability |
| RankingCriterion | 5.1.6.2.52 | Ranking criterion. | Dispersion |
| RatFreqInformation | 5.1.6.2.67 | Represents the RAT type and/or Frequency information. | ServiceExperienceExt |
| RedTransExpOrderingCriterion | 5.1.6.3.22 | Ordering criterion for the list of Redundant Transmission Experience. | RedundantTransmissionExp |
| RedundantTransmissionExpInfo | 5.1.6.2.57 | Redundant transmission experience analytics information. | RedundantTransmissionExp |
| RedundantTransmissionExpPerTS | 5.1.6.2.58 | Redundant Transmission Experience per Time Slot. | RedundantTransmissionExp |
| RedundantTransmissionExpReq | 5.1.6.2.56 | Redundant transmission experience analytics requirement. | RedundantTransmissionExp |
| RelProxInfo | 5.1.6.2.100 | Relative Proximity analytics information. | RelativeProximity |
| RelProxReq | 5.1.6.2.99 | Relative Proximity analytics requirements. | RelativeProximity |
| ResourceUsage | 5.1.6.2.48 | The current usage of the virtual resources assigned to the NF instances belonging to a particular network slice instance. | NsiLoadExt |
| ResourceUsageRequirement | 5.1.6.2.81 | ndicates more requirements when providing resource usage information for network performance. | NetworkPerformanceExt\_AIML |
| RetainabilityThreshold | 5.1.6.2.21 | Represents a QoS flow retainability threshold. | QoSSustainability |
| PduSessionInfo | 5.1.6.2.71 | Represents combination of PDU Session parameters. | ServiceExperienceExt2\_eNA |
| ServiceExperienceInfo | 5.1.6.2.24 | Represents the service experience information. | ServiceExperience |
| ServiceExperienceType | 5.1.6.3.24 | Represents the type of Service Experience Analytics. | ServiceExperienceExt |
| SessInactTimerForUeComm | 5.1.6.2.65 | Represents the N4 Session inactivity timer. | UeCommunicationExt |
| SliceLoadLevelInformation | 5.1.6.2.6 | Represents the slices and their load level information. |  |
| SpeedThresholdInfo | 5.1.6.2.94 | UEs information whose speed is faster than the speed threshold. | MovementBehaviour |
| SubscriptionTransferInfo | 5.1.6.2.41 | Contains information about subscriptions that are requested to be transferred. | AnaSubTransfer |
| TargetUeInformation | 5.1.6.2.8 | Identifies the target UE information. | ServiceExperience  NfLoad  NetworkPerformance  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  QoSSustainability  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance  PduSesTraffic  E2eDataVolTransTime |
| TdTraffic | 5.1.6.2.78 | Represents traffic that matches or unmatches Traffic Descriptor over the established PDU Session(s). | PduSesTraffic |
| TermCause | 5.1.6.3.26 | Represents a cause for requesting to terminate an analytics subscription. | TermRequest |
| ThresholdLevel | 5.1.6.2.30 | Describe a threshold level. | UserDataCongestion  NfLoad  DnPerformance  ServiceExperienceExt  MovementBehaviour |
| TimestampedLocation | 5.1.6.2.103 | The timestamped locations of the trajectory of the UE. | RelativeProximity |
| TimeToCollisionInfo | 5.1.6.2.104 | Time To Collision (TTC) information. | RelativeProximity |
| TimeUnit | 5.1.6.3.9 | Represents the unit for the session active time. | QoSSustainability |
| TopApplication | 5.1.6.2.39 | Top application that contributes the most to the traffic. | UserDataCongestionExt |
| TrafficCharacterization | 5.1.6.2.14 | Identifies the detailed traffic characterization. | UeCommunication |
| TrafficDirection | 5.1.6.3.33 | The traffic direction for the resource usage information. | NetworkPerformanceExt\_AIML |
| TrafficInformation | 5.1.6.2.63 | Traffic information including UL/DL data rate and/or Traffic volume. | WlanPerformance |
| TransferRequestType | 5.1.6.3.17 | Represents the type of a request for analytics subscription transfer. | AnaSubTransfer |
| UeAnalyticsContextDescriptor | 5.1.6.2.44 | Contains information about available UE related analytics contexts. | AnaSubTransfer |
| UeCommunication | 5.1.6.2.13 | Represents UE communication information. | UeCommunication |
| UeCommOrderCriterion | 5.1.6.3.29 | The ordering criterion for the list of UE communication analytics. | UeCommunicationExt\_eNA |
| UeCommReq | 5.1.6.2.72 | UE communication analytics requirement. | UeCommunicationExt\_eNA |
| UeMobilityOrderCriterion | 5.1.6.3.28 | The ordering criterion for the list of UE mobility analytics. | UeMobilityExt2\_eNA |
| UeMobilityReq | 5.1.6.2.71 | UE mobility analytics requirement. | UeMobilityExt2\_eNA |
| UeMobility | 5.1.6.2.10 | Represents UE mobility information. | UeMobility |
| UeProximity | 5.1.6.2.101 | Observed or Predicted proximity information. | RelativeProximity |
| UeTrajectory | 5.1.6.2.102 | Relative timestamped UE positions. | RelativeProximity |
| PduSesTrafficInfo | 5.1.6.2.77 | Represents PDU Session traffic analytics information. | PduSesTraffic |
| PduSesTrafficReq | 5.1.6.2.79 | Represents PDU Session traffic analytics requirement. | PduSesTraffic |
| UserDataConOrderCrit | 5.1.6.3.27 | The ordering criterion for the list of User Data Congestion analytics. | UserDataCongestionExt2\_eNA |
| UserDataCongestionInfo | 5.1.6.2.17 | Represents the user data congestion information. | UserDataCongestion |
| ValueExpression | 5.1.6.3.34 | Indicates average or peak value of the resource usage for the network performance type | NetworkPerformanceExt\_AIML |
| WlanOrderingCriterion | 5.1.6.3.23 | Ordering criterion for the list of WLAN performance information. | WlanPerformance |
| WlanPerformanceReq | 5.1.6.2.59 | WLAN performance analytics requirement. | WlanPerformance |
| WlanPerformanceInfo | 5.1.6.2.60 | WLAN performance analytics information. | WlanPerformance |
| WlanPerSsIdPerformanceInfo | 5.1.6.2.61 | WLAN performance information per SSID of WLAN access points deployed in the Area of Interest. | WlanPerformance |
| WlanPerTsPerformanceInfo | 5.1.6.2.62 | WLAN performance information per Time Slot during the analytics target period. | WlanPerformance |
| WlanPerUeIdPerformanceInfo | 5.1.6.2.80 | WLAN performance information per UE ID of WLAN access points deployed in the Area of Interest. | WlanPerformanceExt\_AIML |

Table 5.1.6.1-2 specifies data types re-used by the Nnwdaf\_EventsSubscription 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 5.1.6.1-2: Nnwdaf\_EventsSubscription re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| 5Qi | 3GPP TS 29.571 [8] | Identifies the 5G QoS identifier | QoSSustainability  E2eDataVolTransTime |
| AccessType | 3GPP TS 29.571 [8] | Identifies the access type. | ServiceExperienceExt2\_eNA |
| AddrFqdn | 3GPP TS 29.517 [22] | Represents the IP address or FQDN of the Application Server. | DnPerformance  ServiceExperienceExt |
| ApplicationId | 3GPP TS 29.571 [8] | Identifies the application identifier. | ServiceExperience  UeCommunication  AbnormalBehaviour  Dispersion  DnPerformance  PduSesTraffic |
| ArfcnValueNR | 3GPP TS 29.571 [8] | Integer value indicating the ARFCN applicable for a downlink, uplink or bi-directional (TDD) NR global frequency raster.  Minimum = 0. Maximum = 3279165. | ServiceExperienceExt |
| BitRate | 3GPP TS 29.571 [8] | String representing a bit rate that shall be formatted as follows:  pattern: "^\d+(\.\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$"  Examples:  "125 Mbps", "0.125 Gbps", "125000 Kbps". | ServiceExperience  QoSSustainability  WlanPerformance  DnPerformance  E2eDataVolTransTime |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| Dnai | 3GPP TS 29.571 [8] | Identifies a user plane access to one or more DN(s). | ServiceExperience  DnPerformance |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperience  AbnormalBehaviour  UeCommunication  DnPerformance  SMCCE  PduSesTraffic  E2eDataVolTransTime  RelativeProximity |
| DomainNameProtocol | 3GPP TS 29.122 [19] | Indicates the additional protocol and protocol field for domain names to be matched. | PfdDetermination |
| DurationSec | 3GPP TS 29.571 [8] |  |  |
| EthFlowDescription | 3GPP TS 29.514 [21] |  | UeCommunication  AbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] |  | AbnormalBehaviour |
| Float | 3GPP TS 29.571 [8] |  |  |
| FlowDescription | 3GPP TS 29.514 [21] |  | UeCommunication  AbnormalBehaviour  PduSesTraffic |
| FlowInfo | 3GPP TS 29.122 [19] |  | UserDataCongestionExt |
| GeographicalArea | 3GPP TS 29.522 [32] | Identifies the geographical location (longitude and latitude level). | UeMobilityExt2\_eNA  ServiceExperienceExt2\_eNA  QoSSustainabilityExt\_eNA  MovementBehaviour |
| Gpsi | 3GPP TS 29.571 [8] | The GPSI for an UE. | UserDataCongestionExt  UeMobilityExt\_AIML  RelativeProximity |
| GroupId | 3GPP TS 29.571 [8] | Identifies a group of UEs. | UeMobility  UeCommunication NetworkPerformance  AbnormalBehaviour  ServiceExperience  Dispersion  RedundantTransmissionExp  WlanPerformance  PduSesTraffic  RelativeProximity |
| Ipv4Addr | 3GPP TS 29.571 [8] |  |  |
| Ipv6Addr | 3GPP TS 29.571 [8] |  |  |
| LocalOrigin | 3GPP TS 29.572 [30] | Represents a reference point for modelling locations in relation to it. | LocAccuracy |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | Identifies the network area. | ServiceExperience  QoSSustainability  AbnormalBehaviour  UeMobility  UserDataCongestion  NetworkPerformance  NsiLoadExt  NfLoadExt  Dispersion  RedundantTransmissionExp  WlanPerformance  UeCommunication  DnPerformance  PduSesTraffic  E2eDataVolTransTime  MovementBehaviour |
| 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  DnPerformance |
| PacketDelBudget | 3GPP TS 29.571 [8] |  | QoSSustainability  DnPerformance  RedundantTransExpExt\_eNA |
| PacketErrRate | 3GPP TS 29.571 [8] |  | QoSSustainability |
| PacketLossRate | 3GPP TS 29.517 [22] | Indicates Packet Loss Rate. | DnPerformance  RedundantTransExpExt\_eNA |
| PduSessionId | 3GPP TS 29.571 [8] | Indentifies PDU Session |  |
| PduSessionType | 3GPP TS 29.571 [8] | Identifies the PDU Session Type. | ServiceExperienceExt2\_eNA |
| Point | 3GPP TS 29.572 [30] | Represents a location in geographical co-ordinates. | LocAccuracy |
| PointAltitude | 3GPP TS 29.572 [30] | Represents a location including an altitude in geographical co-ordinates. | LocAccuracy |
| PositioningMethod | 3GPP TS 29.572 [30] | Represents a positioning method. | LocAccuracy |
| ProblemDetails | 3GPP TS 29.571 [8] | Used in error responses to provide more detailed information about an error. |  |
| QosResourceType | 3GPP TS 29.571 [8] | Identifies the resource type in QoS characteristics. | QoSSustainability |
| RatType | 3GPP TS 29.571 [8] | Identifies the RAT type. | ServiceExperienceExt |
| RedirectResponse | 3GPP TS 29.571 [8] | Contains redirection related information. | ES3XX |
| RelativeCartesianLocation | 3GPP TS 29.572 [30] | Represents distances from a reference point. | LocAccuracy |
| ReportingInformation | 3GPP TS 29.523 [20] | Represents the type of reporting the subscription requires. |  |
| SamplingRatio | 3GPP TS 29.571 [8] |  |  |
| ScheduledCommunicationTime | 3GPP TS 29.122 [19] |  | UeMobility UeCommunication |
| SmcceInfo | 5.2.6.2.12 | Represents the analytics of Session Management Congestion Control Experience information. | SMCCE |
| Snssai | 3GPP TS 29.571 [8] | Identifies the S-NSSAI (Single Network Slice Selection Assistance Information). |  |
| SscMode | 3GPP TS 29.571 [8] | Identifies te SSC Mode of the PDU Session. | ServiceExperienceExt2\_eNA |
| Supi | 3GPP TS 29.571 [8] | The SUPI for an UE. | ServiceExperience,  NfLoad  NetworkPerformance,  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  Dispersion  RedundantTransmissionExp  WlanPerformance  PduSesTraffic  RelativeProximity |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.1.8-1. |  |
| SvcExperience | 3GPP TS 29.517 [22] |  | ServiceExperience |
| Tai | 3GPP TS 29.571 [8] | Tracking Area Information. | AnaSubTransfer |
| TimeWindow | 3GPP TS 29.122 [19] |  |  |
| Uinteger | 3GPP TS 29.571 [8] | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible. |  |
| UpfInformation | 3GPP TS 29.508 [29] | The information of the UPF serving the UE. | ServiceExperienceExt  DnPerformance |
| Uri | 3GPP TS 29.571 [8] |  |  |
| UserLocation | 3GPP TS 29.571 [8] |  | UeMobility  Dispersion |
| VelocityEstimate | 3GPP TS 29.572 [30] | Velocity estimate | QoSSustainabilityExt\_eNA  RelativeProximity |
| Volume | 3GPP TS 29.122 [19] |  | UeCommunication  AbnormalBehaviour  Dispersion  WlanPerformance  PduSesTraffic |

\*\*\* 6th Changes \*\*\*

##### 5.1.6.2.3 Type EventSubscription

Table 5.1.6.2.3-1: Definition of type EventSubscription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| anySlice | AnySlice | C | 0..1 | Default is "false". (NOTE 1) |  |
| appIds | array(ApplicationId) | C | 1..N | Represents the Application Identifier(s) to which the subscription applies.  The absence of appIds means subscription to all applications. (NOTE 8) (NOTE 15) (NOTE 16) | ServiceExperience  UeCommunication  AbnormalBehaviour  Dispersion  DnPerformance  PfdDetermination  E2eDataVolTransTime |
| deviations | array(Uinteger) | O | 1..N | Each element indicates an acceptable deviation from the threshold level included in "ranUeThrouThds" attribute or "qosFlowRetThds" attribute. This attribute may only be present if either the "ranUeThrouThds" attribute or "qosFlowRetThds" attribute is provided. | EnQoSSustainability |
| dnns | array(Dnn) | C | 1..N | Represents the DNN(s) to which the subscription applies. 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 subscription to all DNNs. (NOTE 8) (NOTE 17) | ServiceExperience, AbnormalBehaviour  UeCommunication  RedundantTransmissionExp  DnPerformance  SMCCE  PfdDetermination  PduSesTraffic  E2eDataVolTransTime  RelativeProximity |
| dnais | array(Dnai) | C | 1..N | Represents the Data Network Access Identifier(s) of user plane access to DN(s) which the subscription applies. | ServiceExperience  DnPerformance  E2eDataVolTransTime |
| dataVlTrnsTmRqs | array(E2eDataVolTransTimeReq) | O | 1..N | Represents the E2E data volume transfer time requirements | E2eDataVolTransTime |
| event | NwdafEvent | M | 1 | Event that is subscribed. |  |
| extraReportReq | EventReportingRequirement | O | 0..1 | The extra event reporting requirement information. |  |
| ladnDnns | array(Dnn) | O | 1..N | LADN DNN(s) to indicate the LADN service area(s) as the AoI(s). | UeMobilityExt |
| loadLevelThreshold | integer | C | 0..1 | Indicates that the NWDAF shall report the corresponding network slice load level to the NF service consumer where the load level of the network slice identified by snssais is reached. (NOTE 4)  May be included when subscribed event is "SLICE\_LOAD\_LEVEL".  Minimum = 0. Maximum = 100. |  |
| matchingDir | MatchingDirection | O | 0..1 | A matching direction may be provided alongside a threshold. If omitted, the default value is CROSSED. | NfLoad, QoSSustainability, UserDataCongestion, NetworkPerformance, NsiLoadExt |
| nfLoadLvlThds | array(ThresholdLevel) | C | 1..N | Shall be supplied in order to start reporting when an average load level is reached. (NOTE 4) | NfLoad |
| networkArea | NetworkAreaInfo | C | 0..1 | Identification of network area to which the subscription applies.  The absence of "networkArea" and "fineGranAreas" means subscription to all network areas. (NOTE 7, NOTE 8, NOTE 20 , NOTE 22) | ServiceExperience  UeMobility  UeCommunication  QoSSustainability  AbnormalBehaviour  UserDataCongestion  NetworkPerformance  NsiLoadExt  NfLoadExt  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance  PduSesTraffic  E2eDataVolTransTime  MovementBehaviour  LocAccuracy  RelativeProximity |
| location | GeoLocation | C | 0..1 | A location (i.e. geographical location or location in local coordinates) to which the subscription applies. (NOTE 22) | LocAccuracy |
| temporalGranSize | DurationSec | O | 0..1 | Indicates the minimum duration of each time slot for which the analytics are provided.  (NOTE 18) | NetworkPerformanceExt\_eNA  UeMobilityExt2\_eNA  UserDataCongestionExt2\_eNA  QoSSustainabilityExt\_eNA  DispersionExt\_eNA  WlanPerfExt\_eNA  RedundantTransExpExt\_eNA  DnPerformanceExt\_eNA |
| spatialGranSizeTa | Uinteger | O | 0..1 | Indicates the maximum number of TAs used to define an area for which the analytics are provided.  May be included when the "networkArea" attribute in the EventSubscription data type is provided.  (NOTE 19) | NetworkPerformanceExt\_eNA  UeMobilityExt2\_eNA  UeCommunicationExt\_eNA  QoSSustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| spatialGranSizeCell | Uinteger | O | 0..1 | Indicates the maximum number of cells used to define an area for which the analytics are provided.  May be included when the "networkArea" attribute in the EventSubscription data type is provided.  (NOTE 19) | NetworkPerformanceExt\_eNA  UeMobilityExt2\_eNA  UeCommunicationExt\_eNA  QoSSustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| fineGranAreas | array(GeographicalArea) | O | 1..N | Indicates the fine granularity areas to which the subscription applies. (i.e. with a finer granularity than cell).  (NOTE 7, NOTE 20) | ServiceExperienceExt2\_eNA  UeMobilityExt2\_eNA  QoSSustainabilityExt\_eNA |
| visitedAreas | array(NetworkAreaInfo) | O | 1..N | Indicates the visited network area(s) which the UEs had previously been in at least one of the Visited Area(s) of Interest.  (NOTE 10) | UeMobilityExt |
| maxTopAppUlNbr | Uinteger | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Uplink direction. Minimum = 1.  May be included when one of the elements in the "listOfAnaSubsets" attribute is set to LIST\_OF\_TOP\_APP\_UL. | UserDataCongestionExt |
| maxTopAppDlNbr | Uinteger | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Downlink direction. Minimum = 1.  May be included when one of the elements in the "listOfAnaSubsets" attribute is set to LIST\_OF\_TOP\_APP\_DL. | UserDataCongestionExt |
| nfInstanceIds | array(NfInstanceId) | O | 1..N | Identification(s) of NF instance(s). | NfLoad |
| nfSetIds | array(NfSetId) | O | 1..N | Identification(s) of NF instance set(s). | NfLoad |
| nfTypes | array(NFType) | O | 1..N | Identification(s) of NF type(s). (NOTE 13) | NfLoad  NsiLoadExt |
| notificationMethod | NotificationMethod | O | 0..1 | Indicate the notification method. (NOTE 2) |  |
| 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",  "SERVICE\_EXPERIENCE" or "DN\_PERFORMANCE".  (NOTE 1) | ServiceExperience  NsiLoad  DnPerformance |
| nsiLevelThrds | array(Uinteger) | O | 1..N | Identifies the load threshold for each S-NSSAI or S-NSSAI and the optionally associated network slice instance identified by the "nsiIds" attribute within the "nsiIdInfos" attribute.  (NOTE 4)  Minimum = 0. Maximum = 100. | NsiLoad |
| qosRequ | QosRequirement | C | 0..1 | Indicates the QoS requirements. It shall be included when subscribed event is "QOS\_SUSTAINABILITY" or "E2E\_DATA\_VOL\_TRANS\_TIME". | QoSSustainability  E2eDataVolTransTime |
| qosFlowRetThds | array(RetainabilityThreshold) | C | 1..N | Represents the QoS flow retainability thresholds. Shall be supplied for the 5QI ("5qi" in "qosRequ") or resource type ("resType" in "qosRequ") of GBR resource type. (NOTE 4) | QoSSustainability  E2eDataVolTransTime |
| ranUeThrouThds | array(BitRate) | C | 1..N | Represents the RAN UE throughput thresholds.  Shall be supplied for the 5QI ("5qi" in "qosRequ") or resource type ("resType" in "qosRequ") of non-GBR resource type. (NOTE 4) | QoSSustainability |
| repetitionPeriod | DurationSec | C | 0..1 | Shall be supplied for notification method "PERIODIC" by the "notificationMethod" attribute. |  |
| snssais | array(Snssai) | C | 1..N | Identification(s) of network slice(s) to which the subscription applies. (NOTE 1, NOTE 8) (NOTE 17) |  |
| tgtUe | TargetUeInformation | O | 0..1 | Identifies target UE information.  (NOTE 3) |  |
| congThresholds | array(ThresholdLevel) | C | 1..N | Represents the congestion threshold levels. (NOTE 4) | UserDataCongestion |
| nwPerfRequs | array(NetworkPerfRequirement) | C | 1..N | Represents the network performance requirements. This attribute shall be included when subscribed event is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| bwRequs | array(BwRequirement) | O | 1..N | Represents the bandwidth requirement for each application.  It may only be present if "appIds" attribute is provided. | ServiceExperience |
| excepRequs | array(Exception) | C | 1..N | Represents a list of Exception Ids with associated thresholds. May only be present when subscribed event is "ABNORMAL\_BEHAVIOUR".  (NOTE 5, NOTE 6, NOTE 8) | AbnormalBehaviour |
| exptAnaType | ExpectedAnalyticsType | C | 0..1 | Represents expected UE analytics type.  It shall not be present if the "excepRequs" attribute is provided. (NOTE 6, NOTE 8) | AbnormalBehaviour |
| exptUeBehav | ExpectedUeBehaviourData | O | 0..1 | Represents expected UE behaviour. | AbnormalBehaviour |
| ratFreqs | array(RatFreqInformation) | O | 1..N | Identification(s) of the RAT type(s) and/or frequency(ies) of UE's serving cell(s) which the subscription applies. (NOTE 9) | ServiceExperienceExt |
| listOfAnaSubsets | array(AnalyticsSubset) | O | 1..N | The list of analytics subsets can be used to indicate the content of the analytics. | EneNA |
| disperReqs | array(DispersionRequirement) | O | 1..N | Represents the dispersion analytics requirements. | Dispersion |
| redTransReqs | array(RedundantTransmissionExpReq) | O | 1..N | Represents the redundant transmission experience analytics requirements. | RedundantTransmissionExp |
| wlanReqs | array(WlanPerformanceReq) | O | 1..N | Represents other WLAN performance analytics requirements. If the attribute contains no content, may take default handling action. | WlanPerformance |
| ueCommReqs | array(UeCommReq) | O | 1..N | Represents the UE communication requirements. This attribute may be included when the subscribed event is "UE\_COMM". | UeCommunicationExt\_eNA |
| ueMobilityReqs | array(UeMobilityReq) | O | 1..N | Represents the UE mobility requirements. This attribute may be included when the subscribed event is "UE\_MOBILITY". | UeMobilityExt2\_eNA |
| upfInfo | UpfInformation | O | 0..1 | Identifies the UPF. (NOTE 12) | ServiceExperienceExt  DnPerformance |
| userDataConOrderCri | UserDataConOrderCrit | O | 0..1 | The ordering criterion for the list of User Data Congestion analytics. (NOTE 14) | userDataConOrderCri |
| appServerAddrs | array(AddrFqdn) | C | 1..N | Each element represents the Application Server Instance (IP address/FQDN of the Application Server). (NOTE 11) | ServiceExperienceExt  DnPerformance |
| dnPerfReqs | array(DnPerformanceReq) | O | 1..N | Represents the DN performance analytics requirements. | DnPerformance |
| pduSesInfos | array(PduSessionInfo) | C | 1..N | Represents combination of PDU Session parameter(s). (NOTE 15) | ServiceExperienceExt2\_eNA |
| useCaseCxt | string | O | 0..1 | Indicates the context of usage of the analytics.  The value and format of this parameter are not standardized. | ENAExt |
| pduSesTrafReqs | array(PduSesTrafficReq) | C | 1..N | Represents the PDU Session traffic analytics requirements. This attribute shall be included when subscribed event is "PDU\_SESSION\_TRAFFIC". | PduSesTraffic |
| locAccReqs | array(LocAccuracyReq) | O | 1..N | Represents the Location Accuracy analytics requirements. This attribute may only be included when the subscribed event is "LOC\_ACCURACY". | LocAccuracy |
| locGranularity | LocInfoGranularity | O | 0..1 | The preferred granularity of UE location information.  (NOTE 21) | ServiceExperienceExt2\_eNA  UeMobilityExt2\_eNA  DispersionExt\_eNA |
| locOrientation | LocationOrientation | O | 0..1 | Indicates the preferred orientation of location information. | MovementBehaviour  UeMobilityExt2\_eNA |
| accuReq | AccuracyReq | O | 0..1 | Represents the analytics accuracy requirement information.  May be included as indication to the NWDAF (containing an AnLF supporting Accuracy checking capability) to activate checking the analytics accuracy information of the event. | AnalyticsAccuracy |
| movBehavReqs | array(MovBehavReq) | O | 1..N | Represents the Movement Behaviour analytics requirements. | MovementBehaviour |
| relProxReqs | array(RelProxReq) | O | 1..N | Represents the Relative Proximity analytics requirements. | RelativeProximity |
| pauseFlg | boolean | O | 0..1 | Pause analytics consumption flag applicable on analytics ID level. Set to "true" to indicate the NWDAF to stop including analytics of this event type in its notifications (without cancelling the subscription), because the accuracy level needs to be increased.  Default value is "false" if omitted.  This attribute may be present in a update request message if the "pauseInd" attribute was provided in the notification. | AnalyticsAccuracy |
| resumeFlg | boolean | O | 0..1 | Resume analytics consumption flag applicable on analytics ID level. Set to "true" to indicate the NWDAF to resume sending the notifications of analytics because the accuracy has been improved.  Default value is "false" if omitted.  This attribute may be present in a update request message if the "resumeInd" attribute was provided in the notification. | AnalyticsAccuracy |
| 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 subscribed event is "SLICE\_LOAD\_LEVEL", the identifications of network slices, either information about slice(s) identified by "snssais", or "anySlice" set to "true" shall be included. When subscribed event is "QOS\_SUSTAINABILITY", "NF\_LOAD", "UE\_COMM", "ABNORMAL\_BEHAVIOUR", "USER\_DATA\_CONGESTION", "DISPERSION", "RED\_TRANS\_EXP", "PDU\_SESSION\_TRAFFIC", "PFD\_DETERMINATION" or "RELATIVE\_PROXIMITY", the identifications of network slices identified by "snssais" is optional. When subscribed event is "NSI\_LOAD\_LEVEL", "SERVICE\_EXPERIENCE" or "DN\_PERFORMANCE", either the "nsiIdInfos" attribute or "anySlice" set to "true" shall be included.  NOTE 2: When notificationMethod is not supplied, the default value is "THRESHOLD".  NOTE 3: Applicability is further described in the corresponding data type.  NOTE 4: This property shall be provided if the "notifMethod" in "evtReq" is set to "ON\_EVENT\_DETECTION" or "notificationMethod" in "eventSubscriptions" is set to "THRESHOLD" or omitted.  NOTE 5: Only "excepId" and "excepLevel" within the Exception data type apply to the "excepRequs" attribute within EventSubscription data type.  NOTE 6: Either "excepRequs" or "exptAnaType" shall be provided if subscribed event is "ABNORMAL\_BEHAVIOUR".  NOTE 7: For different events, the following rules apply:  - For "NETWORK\_PERFORMANCE", "USER\_DATA\_CONGESTION" or "DN\_PERFORMANCE" event, the "networkArea" attribute shall be provided if the event applied for all UEs (i.e. "anyUe" attribute set to true within the "tgtUe" attribute).  - For "QOS\_SUSTAINABILITY", at least one of "networkArea" and "fineGranAreas" attributes shall be provided.  - For "E2E\_DATA\_VOL\_TRANS\_TIME" event, this attribute shall be provided if the event applied for single UE or group of UEs.  - For "SERVICE\_EXPERIENCE" event, if the event applied for all UEs (i.e. "anyUe" attribute set to true within the "tgtUe" attribute): at lease one of "networkArea" or "fineGranAreas" attributes shall be provided.  - For "MOVEMENT\_BEHAVIOUR" event, at lease one of "networkArea" or "fineGranAreas" attributes shall be provided.  NOTE 8: For "ABNORMAL\_BEHAVIOUR" event with "anyUe" attribute in "tgtUe" 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 "excepRequs" 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 "excepRequs" attribute is communication related;  - the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepRequs" attribute shall not be requested for both mobility and communication related analytics at the same time.  NOTE 9: If both the "allFreq" attribute and the "allRat" attribute are present within the RatFreqInformation data type, then only one instance of the RatFreqInformation data typeshall be present to indicate for all the RAT type and all the Frequency values the NWDAF has received for the application.  NOTE 10: If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).  NOTE 11: For service experience analytics, this parameter shall be provided when a consumer requires analytics for an edge application over a UP path.  NOTE 12: For service experience analytics, this parameter may be provided when a consumer requires analytics for an edge application over a UP path, and it is only needed when the target of the service experience analytics is a specific UPF included in this UP path.  NOTE 13: When subscribed event is "NSI\_LOAD\_LEVEL" and the NsiLoadExt feature is supported, and the NF service consumer provides the "nfTypes" attribute, then the NWDAF accounts only for the resource usage of the NF types included in "nfTypes" to derive the output analytics. If the "nfTypes" attribute is not provided, then NWDAF accounts for the resource usage of all NF types.  NOTE 14: If the the value of "userDataConOrderCri" attribute is "APPLICABLE\_TIME\_WINDOW", the "ASCENDING" direction indicates that the list of User Data Congestion analytics are in chronological order and the "DESCENDING" direction indicates that the list of User Data Congestion analytics are in reverse chronological order.  NOTE 15: When the "pduSesInfos" attribute is provided, the associated "appIds" attribute shall also be provided for the NWDAF to be able to compute the service experience per application.  NOTE 16: When subscribed event is "PFD\_DETERMINATION" and the PfdDetermination feature is supported, the "appIds" attribute shall be included.  NOTE 17: When the subscribed event is "PDU\_SESSION\_TRAFFIC" and the PduSesTraffic feature is supported, at least one of the "dnns” and/or "snssais” attributes as the route selection descriptor(s) for the URSP rule shall be included.  NOTE 18: When this attribute is provided, the NWDAF shall provide the analytics per elementary time slot accordingly.  NOTE 19: When this attribute is provided, the NWDAF shall provide the analytics per group of TAs or cells accordingly.  NOTE 20: If both "networkArea" and "fineGranAreas" attributes are provided, the Area of Interest is interpreted as the intersection area indicated by these two attributes.  NOTE 21: The "LON\_AND\_LAT\_LEVEL" value of "locGranularity" attribute is not applicable to features "ServiceExperienceExt2\_eNA" and "DispersionExt\_eNA".  NOTE 22: When the subscribed event is "LOC\_ACCURACY", only one of the "networkArea” attribute or "location” attribute shall be included. | | | | | |

NOTE: Care needs to be taken to avoid excessive signalling.

\*\*\* 7th Changes \*\*\*

##### 5.1.6.2.5 Type EventNotification

Table 5.1.6.2.5-1: Definition of type EventNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | NwdafEvent | M | 1 | Event that is notified. |  |
| start | DateTime | O | 0..1 | It defines the start time of which the statistics analytics information is applicable or predictions analytics information is valid. (NOTE 1) (NOTE 4) |  |
| dataVlTrnsTmInfos | array(E2eDataVolTransTimeInfo) | C | 1..N | E2E data volume transfer time information.  Shall be present if the subscribed event is "E2E\_DATA\_VOL\_TRANS\_TIME". | E2eDataVolTransTime |
| expiry | DateTime | O | 0..1 | It defines the expiration time after which the statistics analytics information is applicable or predictions analytics information is invalid. (NOTE 1) (NOTE 4) |  |
| timeStampGen | DateTime | C | 0..1 | It defines the timestamp of analytics generation. (NOTE 3) |  |
| failNotifyCode | NwdafFailureCode | C | 0..1 | Identifies the failure reason for the event notification.  It shall only be included if the event notification is failed or the analytics information is not ready. (NOTE 2) | EneNA |
| rvWaitTime | DurationSec | O | 0..1 | Indicate a recommended time interval (in seconds) which is used to determine the time when analytics information is needed in similar future event subscriptions. It may only be included if the "failNotifyCode" attribute sets to "UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME". | EneNA |
| 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 subscription, containing the information indicated by the "anaMeta" attribute. | Aggregation |
| nwPerfs | array(NetworkPerfInfo) | C | 1..N | The network performance information.  Shall be present when subscribed even is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| nfLoadLevelInfos | array(NfLoadLevelInformation) | C | 1..N | The NF load level information. When subscribed event is "NF\_LOAD", the nfLoadLevelInfos shall be included. | NfLoad |
| nsiLoadLevelInfos | array(NsiLoadLevelInfo) | C | 1..N | Each element identifies the load level information for each S-NSSAI and the optionally associated network slice instance.  Shall be included when subscribed event is "NSI\_LOAD\_LEVEL". | NsiLoad |
| pfdDetermInfos | array(PfdDeterminationInfo) | C | 1..N | Represents the PFD Determination information for a known application identifier.  Shall be included when subscribed event is "PFD\_DETERMINATION". | PfdDetermination |
| qosSustainInfos | array(QosSustainabilityInfo) | C | 1..N | The QoS sustainability information.  When subscribed event is "QOS\_SUSTAINABILITY", the qosSustainInfos shall be included. | QoSSustainability |
| sliceLoadLevelInfo | SliceLoadLevelInformation | C | 0..1 | The slices and the load level information.  When subscribed event is "SLICE\_LOAD\_LEVEL", the sliceLoadLevelInfo shall be included. |  |
| svcExps | array(ServiceExperienceInfo) | C | 1..N | The service experience information.  When subscribed event is "SERVICE\_EXPERIENCE", the svcExps shall be included. | ServiceExperience |
| ueComms | array(UeCommunication) | C | 1..N | The UE communication information.  When subscribed event is "UE\_COMM", the ueComms shall be included. | UeCommunication |
| ueMobs | array(UeMobility) | C | 1..N | The UE mobility information.  When subscribed event is "UE\_MOBILITY", the ueMobs shall be included. | UeMobility |
| abnorBehavrs | array(AbnormalBehaviour) | C | 1..N | The Abnormal Behaviour information.  When subscribed event is "ABNORMAL\_BEHAVIOUR", the abnorBehavrs shall be included. | AbnormalBehaviour |
| userDataCongInfos | array(UserDataCongestionInfo) | C | 1..N | The location and user data congestion information.  Shall be present if the subscribed event is "USER\_DATA\_CONGESTION". | UserDataCongestion |
| dnPerfInfos | array(DnPerfInfo) | C | 1..N | The DN performance information.  Shall be present if the subscribed event is "DN\_PERFORMANCE". | DnPerformance |
| disperInfos | array(DispersionInfo) | C | 1..N | The Dispersion information.  When subscribed event is "DISPERSION", the "disperInfos" attribute shall be included. | Dispersion |
| redTransInfos | array(RedundantTransmissionExpInfo) | C | 1..N | The redundant transmission experience related information.  When subscribed event is "RED\_TRANS\_EXP", the "redTransInfos" attribute shall be included. | RedundantTransmissionExp |
| wlanInfos | array(WlanPerformanceInfo) | C | 1..N | The WLAN performance related information.  When subscribed event is "WLAN\_PERFORMANCE", the "wlanInfos" attribute shall be included. | WlanPerformance |
| smccExps | array(SmcceInfo) | C | 1..N | The Session Management Congestion Control Experience information.  Shall be present when the requested event is "SM\_CONGESTION". | SMCCE |
| pduSesTrafInfos | array(PduSesTrafficInfo) | C | 1..N | The PDU Session traffic related information.  When subscribed event is "PDU\_SESSION\_TRAFFIC", the "pduSesTrafInfos" attribute shall be included. | PduSesTraffic |
| accuInfo | AccuracyInfo | C | 0..1 | The analytics accuracy information.  Shall be provided if the analytics accuracy requirement was subscribed in the "accuReq" attribute and the "cancelAccuInd" attribute is set to "false" or omitted. | AnalyticsAccuracy |
| cancelAccuInd | boolean | O | 0..1 | Indicates cancelled subscription of the analytics accuracy information.  Set to "true" indicates the NWDAF cancelled subscription of analytics accuracy information as the NWDAF does not support the accuracy checking capability.  Otherwise set to "false". Default value is "false" if omitted. | AnalyticsAccuracy |
| pauseInd | boolean | O | 0..1 | Pause analytics consumption indication applicable on analytics ID level. Set to "true" to indicate the consumer to stop the consumption of the analytics because the accuracy level needs to be increased.  Default value is "false" if omitted. | AnalyticsAccuracy |
| resumeInd | boolean | O | 0..1 | Resume analytics consumption indication applicable on analytics ID level. Set to "true" to indicate the consumer to resume the consumption of the analytics because the accuracy has been improved.  Default value is "false" if omitted. | AnalyticsAccuracy |
| movBehavInfos | array(MovBehavInfo) | C | 1..N | The Movement Behaviour information.  When subscribed event is "MOVEMENT\_BEHAVIOUR", the "movBehavInfo" attribute shall be included. | MovementBehaviour |
| relProxInfos | array(RelProximityInfo) | C | 1..N | The Relative Proximity information.  When subscribed event is "RELATIVE\_PROXIMITY", the "relProxInfos" attribute shall be included. | RelativeProximity |
| NOTE 1: 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.  NOTE 2: The values of "UNAVAILABLE\_DATA" and "BOTH\_STAT\_PRED\_NOT\_ALLOWED" of the NwdafFailureCode data type are not applicable for the "failNotifyCode" attribute.  NOTE 3: This attribute shall be included when ADRF is deployed.  NOTE 4: The validity period specified by "start" and "expiry" attributes is determined by NWDAF internal logic, and is a subset of the analytics target period indicated by "startTs" and "endTs", or "offsetPeriod" attributes contained in "extraReportReq" attribute of the subscription. If the analytics target period refers to the past, the period specified by these two attributes indicate the time period over which the statistics are applicable. If the analytics target period refers to the future, the period specified by these two attributes indicate the time period over which the predictions are valid. | | | | | |

\*\*\* 8th Changes \*\*\*

##### 5.1.6.2.8 Type TargetUeInformation

Table 5.1.6.2.8-1: Definition of type TargetUeInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| anyUe | boolean | O | 0..1 | Identifies any UE when setting to "true".  Default value is "false" if omitted. (NOTE 3) | ServiceExperience  NetworkPerformance  NfLoad  UserDataCongestion  AbnormalBehaviour  QoSSustainability  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance  PduSesTraffic |
| supis | array(Supi) | O | 1..N | Each element represents a SUPI for a UE.  (NOTE 2) | UeMobility  UeCommunication  NetworkPerformance  AbnormalBehaviour  UserDataCongestion  NfLoad  ServiceExperience  Dispersion  RedundantTransmissionExp  WlanPerformance  SMCCE  DnPerformance  PduSesTraffic  RelativeProximity |
| gpsis | array(Gpsi) | O | 1..N | Each element represents a GPSI for a UE.  (NOTE 2) | UserDataCongestionExt  DnPerformance |
| intGroupIds | array(GroupId) | O | 1..N | Each element represents an internal group identifier and identifies a group of UEs.  (NOTE 2) | UeMobility  UeCommunication  NetworkPerformance  AbnormalBehaviour  ServiceExperience  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance  PduSesTraffic  RelativeProximity |
| NOTE 1: For an applicable feature or UserDataCongestion and UserDataCongestionExt features are both applicable, only one attribute identifying the target UE shall be provided.  NOTE 2: Only one element in the attribute shall be provided for the applicable events except the "SERVICE\_EXPERIENCE" event, the "DISPERSION" event and/or the "SMCCE" event.  NOTE 3: For feature "Dispersion", any UE is only supported in combination with S-NSSAI, Area of Interest and/or Dispersion Class. | | | | | |

\*\*\* 9th Changes \*\*\*

##### 5.1.6.2.99 Type RelProxReq

Table 5.1.6.2.99-1: Definition of type RelProxReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| direction | array(Direction) | O | 1..N | Indicates individual or set of direction(s) of interest. |  |
| numOfUe | Uinteger | O | 0..1 | Indicates the number of UEs for which one UE may report proximity information. |  |
| proximityCrits | array(ProximityCriterion) | O | 1..N | One or several criteria to be considered when computing the relative proximity. |  |

\*\*\* 10th Changes \*\*\*

##### 5.1.6.2.100 Type RelProxInfo

Table 5.1.6.2.100-1: Definition of type RelProxInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tsStart | DateTime | M | 1 | Indicates the timestamp when the time slot starts during the Analytics target period. |  |
| tsDuration | DurationSec | M | 1 | Indicates the time slot duration. |  |
| supis | array(Supi) | C | 1..N | Identifies the UE(s) to which the proximity information applies. If omitted, the information applies to all the target UE(s) that were indicated in the subscription/request. If provided, it shall be a subset of the target UE(s) that were indicated in the subscription/request. |  |
| gpsis | array(Gpsi) | C | 1..N | Identifies the UE(s) to which the proximity information applies. If omitted, the information applies to all the target UE(s) that were indicated in the subscription/request. If provided, it shall be a subset of the target UE(s) that were indicated in the subscription/request. Not applicable for this API. |  |
| ueProximities | array(UeProximity) | M | 1..N | Observed or Predicted proximity information. |  |
| ttcInfo | TimeToCollisionInfo | C | 0..1 | Time To Collision (TTC) information.  Shall be present if one of the elements in the "listOfAnaSubsets" attribute was set with value as "TIME\_TO\_COLLISION" and the analytics result is a prediction. |  |

\*\*\* 11th Changes \*\*\*

##### 5.1.6.2.101 Type UeProximity

Table 5.1.6.2.101-1: Definition of type UeProximity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ueDistance | integer | O | 0..1 | Distance between two UEs, in centimeters. |  |
| ueVelocity | VelocityEstimate | O | 0..1 | UE velocity.  May be present if one of the elements in the "proximityCrits" attribute was set to VELOCITY. |  |
| avrSpeed | Float | O | 0..1 | Average speed of the users which this proximity information applies to, expressed in kilometres per hour.  May be present if one of the elements in the "proximityCrits" attribute was set to AVG\_SPD. |  |
| locOrientation | LocationOrientation | O | 0..1 | Indicates the preferred orientation of location information.  May be present if one of the elements in the "proximityCrits" attribute was set to ORIENTATION. |  |
| ueTrajectories | array(UeTrajectory) | O | 1..N | Indicates timestamped UE positions.  May be present if one of the elements in the "proximityCrits" attribute was set to TRAJECTORY. |  |
| ratio | SamplingRatio | O | 0..1 | Indicate ratio of UEs accounted based on proximity criteria. |  |

\*\*\* 12th Changes \*\*\*

##### 5.1.6.2.102 Type UeTrajectory

Table 5.1.6.2.102-1: Definition of type UeTrajectory

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| supi | Supi | C | 0..1 | Identifies a SUPI of a UE for which this trajectory applies. (NOTE) |  |
| gpsi | Gpsi | C | 0..1 | Identifies a GPSI of a UE for which this trajectory applies.  Not applicable for this API.  (NOTE) |  |
| timestampedLocs | array(TimestampedLoc) | M | 1..N | The timestamped locations of the trajectory of the UE. |  |
| NOTE: One of "supi" or "gpsi" attributes shall be provided. | | | | | |

\*\*\* 13th Changes \*\*\*

##### 5.1.6.2.103 Type TimestampedLocation

Table 5.1.6.2.103-1: Definition of type TimestampedLocation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ts | DateTime | M | 1 | Time stamp for the UE location. |  |
| locInfo | LocationInfo | M | 1 | This attribute includes the UE location information at the time indicated by "ts" attribute. |  |

\*\*\* 14th Changes \*\*\*

##### 5.1.6.2.104 Type TimeToCollisionInfo

Table 5.1.6.2.104-1: Definition of type TimeToCollisionInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ttc | DateTime | O | 0..1 | Time until the predicted collision between UEs to which the proximity information applies. |  |
| accuracy | Uinteger | O | 0..1 | Accuracy of TTC (dependent on both the UE location accuracy and confidence of the prediction).  Minimum = 0. Maximum = 100. |  |
| confidence | Uinteger | O | 0..1 | Indicates the confidence of the prediction. (NOTE)  Minimum = 0. Maximum = 100. |  |
| NOTE: If the requested period identified by the "startTs" and "endTs" attributes in the "EventReportingRequirement" type is a future time period, then the analytics result is a prediction. If no sufficient data is collected to provide the confidence of the prediction before the time deadline, the NWDAF shall return a zero confidence. | | | | | |

\*\*\* 15th Changes \*\*\*

##### 5.1.6.3.4 Enumeration: NwdafEvent

Table 5.1.6.3.4-1: Enumeration NwdafEvent

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| NF\_LOAD | Indicates that the event subscribed is NF Load. | NfLoad |
| QOS\_SUSTAINABILITY | Indicates that the event subscribed is QoS sustainability. | QoSSustainability |
| SLICE\_LOAD\_LEVEL | Indicates that the event subscribed is load level information of Network Slice |  |
| SERVICE\_EXPERIENCE | Indicates that the event subscribed is service experience. | ServiceExperience |
| UE\_MOBILITY | Indicates that the event subscribed is UE mobility information. | UeMobility |
| UE\_COMM | Indicates that the event subscribed is UE communication information. | UeCommunication |
| ABNORMAL\_BEHAVIOUR | Indicates that the event subscribed is abnormal behaviour information. | AbnormalBehaviour |
| USER\_DATA\_CONGESTION | Indicates that the event subscribed is user data congestion information | UserDataCongestion |
| NETWORK\_PERFORMANCE | Indicates that the event subscribed is network performance information | NetworkPerformance |
| NSI\_LOAD\_LEVEL | Indicates that the event subscribed is load level information of Network Slice and the optionally associated Network Slice Instance | NsiLoad |
| DISPERSION | Indicates that the event subscribed is dispersion information. | Dispersion |
| RED\_TRANS\_EXP | Indicates that the event subscribed is redundant transmission experience. | RedundantTransmissionExp |
| WLAN\_PERFORMANCE | Indicates that the event subscribed is WLAN performance. | WlanPerformance |
| DN\_PERFORMANCE | Indicates that the event subscribed is DN performance information. | DnPerformance |
| E2E\_DATA\_VOL\_TRANS\_TIME | Indicates that the event subscribed is E2E data volume transfer time | E2eDataVolTransTime |
| SM\_CONGESTION | Indicates that the event subscribed is the Session Management Congestion Control Experience information for specific DNN and/or S-NSSAI. | SMCCE |
| PFD\_DETERMINATION | Indicates that the event subscribed is the PFD Determination information for known application identifier(s). | PfdDetermination |
| PDU\_SESSION\_TRAFFIC | Indicates that the event subscribed is the PDU Session traffic information. | PduSesTraffic |
| MOVEMENT\_BEHAVIOUR | Indicates that the event subscribed is the Movement Behaviour information. | MovementBehaviour |
| LOC\_ACCURACY | Indicates that the event subscribed is the Location Accuracy information. | LocAccuracy |
| RELATIVE\_PROXIMITY | Indicates that the event subscribed is the Relative Proximity information. | RelativeProximity |

\*\*\* 16th Changes \*\*\*

##### 5.1.6.3.18 Enumeration: AnalyticsSubset

Table 5.1.6.3.18-1: AnalyticsSubset

|  |  |  |  |
| --- | --- | --- | --- |
| Enumeration value | Description | | Applicability |
| NUM\_OF\_UE\_REG | The number of UE registered. This value is only applicable to NSI\_LOAD\_LEVEL event. | |  |
| NUM\_OF\_PDU\_SESS\_ESTBL | The number of PDU sessions established. This value is only applicable to NSI\_LOAD\_LEVEL event. | |  |
| RES\_USAGE | The current usage of the virtual resources assigned to the NF instances belonging to a particular network slice instance. This value is only applicable to NSI\_LOAD\_LEVEL event. | |  |
| NUM\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR | The number of times the resource usage threshold of the network slice instance is reached or exceeded if a threshold value is provided by the consumer. This value is only applicable to NSI\_LOAD\_LEVEL event. | |  |
| PERIOD\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR | The time interval between each time the threshold being met or exceeded on the network slice (instance). This value is only applicable to NSI\_LOAD\_LEVEL event. | |  |
| EXCEED\_LOAD\_LEVEL\_THR\_IND | Whether the Load Level Threshold is met or exceeded by the statistics value. This value is only applicable to NSI\_LOAD\_LEVEL event. | |  |
| LIST\_OF\_TOP\_APP\_UL | The list of applications that contribute the most to the traffic in the UL direction. This value is only applicable to USER\_DATA\_CONGESTION event. | |  |
| LIST\_OF\_TOP\_APP\_DL | The list of applications that contribute the most to the traffic in the DL direction. This value is only applicable to USER\_DATA\_CONGESTION event. | |  |
| NF\_STATUS | The availability status of the NF on the Analytics target period, expressed as a percentage of time per status value (registered, suspended, undiscoverable). This value is only applicable to NF\_LOAD event. | |  |
| NF\_RESOURCE\_USAGE | The average usage of assigned resources (CPU, memory, storage). This value is only applicable to NF\_LOAD event. | |  |
| NF\_LOAD | The average load of the NF instance over the Analytics target period. This value is only applicable to NF\_LOAD event. | |  |
| NF\_PEAK\_LOAD | The maximum load of the NF instance over the Analytics target period. This value is only applicable to NF\_LOAD event. | |  |
| NF\_LOAD\_AVG\_IN\_AOI | The average load of the NF instances over the area of interest. This value is only applicable to NF\_LOAD event. | |  |
| DISPER\_AMOUNT | Indicates the dispersion amount of the reported data volume or transaction dispersion type. This value is only applicable to DISPERSION event. | |  |
| DISPER\_CLASS | Indicates the dispersion mobility class (fixed, camper or traveller) upon set its usage threshold, and/or the top-heavy class upon set its percentile rating threshold. This value is only applicable to DISPERSION event. | |  |
| RANKING | Data/transaction usage ranked high (i.e.value 1), medium (2) or low (3). This value is only applicable to DISPERSION event. | |  |
| PERCENTILE\_RANKING | Percentile ranking of the target UE in the Cumulative Distribution Function of data usage for the population of all UEs. This value is only applicable to DISPERSION event. | |  |
| RSSI | Indicated the RSSI in the unit of dBm. This value is only applicable to WLAN\_PERFORMANCE event. | |  |
| RTT | Indicates the RTT in the unit of millisecond. This value is only applicable to WLAN\_PERFORMANCE event. | |  |
| TRAFFIC\_INFO | Traffic information including UL/DL data rate and/or Traffic volume. This value is only applicable to WLAN\_PERFORMANCE event. | |  |
| NUMBER\_OF\_UES | Number of UEs observed for the SSID. This value is only applicable to WLAN\_PERFORMANCE event. | |  |
| APP\_LIST\_FOR\_UE\_COMM | The analytics of the application list used by UE. This value is only applicable to UE\_COMM event. | |  |
| N4\_SESS\_INACT\_TIMER\_FOR\_UE\_COMM | The N4 Session inactivity timer. This value is only applicable to UE\_COMM event. | |  |
| AVG\_TRAFFIC\_RATE | Indicates average traffic rate. This value is only applicable to DN\_PERFORMANCE event. | |  |
| MAX\_TRAFFIC\_RATE | Indicates maximum traffic rate. This value is only applicable to DN\_PERFORMANCE event. | |  |
| AGG\_TRAFFIC\_RATE | Indicates aggregated traffic rate. This value is only applicable to DN\_PERFORMANCE event. | | DnPerformanceExt\_AIML |
| VAR\_TRAFFIC\_RATE | Indicates variance of traffic rate. This value is only applicable to DN\_PERFORMANCE event. | | DnPerformanceExt\_AIML |
| AVG\_PACKET\_DELAY | Indicates average Packet Delay. This value is only applicable to DN\_PERFORMANCE event. | |  |
| MAX\_PACKET\_DELAY | Indicates maximum Packet Delay. This value is only applicable to DN\_PERFORMANCE event. | |  |
| VAR\_PACKET\_DELAY | Indicates variance of Packet Delay. This value is only applicable to DN\_PERFORMANCE event. | | DnPerformanceExt\_AIML |
| AVG\_PACKET\_LOSS\_RATE | Indicates average Packet Loss Rate. This value is only applicable to DN\_PERFORMANCE event. | |  |
| MAX\_PACKET\_LOSS\_RATE | Indicates maximum Packet Loss Rate. This value is only applicable to DN\_PERFORMANCE event. | | DnPerformanceExt\_AIML |
| VAR\_PACKET\_LOSS\_RATE | Indicates variance of Packet Loss Rate. This value is only applicable to DN\_PERFORMANCE event. | | DnPerformanceExt\_AIML |
| UE\_LOCATION | Indicates UE location information. This value is only applicable to SERVICE\_EXPERIENCE event. | |  |
| LIST\_OF\_HIGH\_EXP\_UE | Indicates list of high experienced UE. This value is only applicable to SM\_CONGESTION event. | |  |
| LIST\_OF\_MEDIUM\_EXP\_UE | Indicates list of medium experienced UE. This value is only applicable to SM\_CONGESTION event. | |  |
| LIST\_OF\_LOW\_EXP\_UE | Indicates list of low experienced UE. This value is only applicable to SM\_CONGESTION event. | |  |
| AVG\_UL\_PKT\_DROP\_RATE | Indicates average uplink packet drop rate on GTP-U path on N3. This value is only applicable to RED\_TRANS\_EXP event. | |  |
| VAR\_UL\_PKT\_DROP\_RATE | Indicates variance of uplink packet drop rate on GTP-U path on N3. This value is only applicable to RED\_TRANS\_EXP event. | |  |
| AVG\_DL\_PKT\_DROP\_RATE | Indicates average downlink packet drop rate on GTP-U path on N3. This value is only applicable to RED\_TRANS\_EXP event. | |  |
| VAR\_DL\_PKT\_DROP\_RATE | Indicates variance of downlink packet drop rate on GTP-U path on N3. This value is only applicable to RED\_TRANS\_EXP event. | |  |
| TRAFFIC\_MATCH\_TD | Identifies traffic that matches Traffic Descriptor provided by the consumer. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | | PduSesTraffic |
| TRAFFIC\_UNMATCH\_TD | Identifies traffic that does not match Traffic Descriptor provided by the consumer. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | | PduSesTraffic |
| NUMBER\_OF\_UE | Indicates the number of UEs. This value is only applicable to DN\_PERFORMANCE event. | | DnPerformanceExt\_eNA |
| USER\_LOCATION | Indicates the user location. This value is only applicable to UE\_MOBILITY event. | | UeMobilityExt2\_eNA |
| UE\_GEOG\_DIST | Indicates the geographical distribution of the UEs that can be selected by the AF for application service. This value is only applicable to UE\_MOBILITY event. | | UeMobilityExt2\_eNA |
| UE\_DIRECTION | Indicates the direction of the UEs. This value is only applicable to UE\_MOBILITY event. | | UeMobilityExt2\_eNA |
| AVG\_E2E\_UL\_PKT\_DELAY | Indicates average End-to-End (between UE and UPF) uplink packet delay. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| VAR\_E2E\_UL\_PKT\_DELAY | Indicates the variance of End-to-End (between UE and UPF) uplink packet delay. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| AVG\_E2E\_DL\_PKT\_DELAY | Indicates average End-to-End (between UE and UPF) downlink packet delay. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| VAR\_E2E\_DL\_PKT\_DELAY | Indicates the variance of End-to-End (between UE and UPF) downlink packet delay. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| AVG\_E2E\_UL\_PKT\_LOSS\_RATE | Indicates average End-to-End (between UE and UPF) uplink packet loss rate. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| VAR\_E2E\_UL\_PKT\_LOSS\_RATE | Indicates the variance of End-to-End (between UE and UPF) uplink packet loss rate. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| AVG\_E2E\_DL\_PKT\_LOSS\_RATE | Indicates average End-to-End (between UE and UPF) downlink packet loss rate. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| VAR\_E2E\_DL\_PKT\_LOSS\_RATE | Indicates the variance of End-to-End (between UE and UPF) downlink packet loss rate. This value is only applicable to RED\_TRANS\_EXP event. | | RedundantTransExpExt\_eNA |
| E2E\_DATA\_VOL\_TRANS\_TIME\_FOR\_UE\_LIST | Indicates the classified E2E data volume transfer time statistics or predictions for multiple UEs with respect to one or more reporting thresholds. | | E2eDataVolTransTime |
| NUM\_OF\_UE | Indicates the total number of UEs in the area of interest. This value is only applicable to MOVEMENT\_BEHAVIOUR event. | | MovementBehaviour |
| MOV\_UE\_RATIO | Indicates the Ratio of moving UEs in the area of interest. This value is only applicable to MOVEMENT\_BEHAVIOUR event. | | MovementBehaviour |
| AVR\_SPEED | Indicates the average speed of all UEs in the area of interest. This value is only applicable to MOVEMENT\_BEHAVIOUR event. | | MovementBehaviour |
| SPEED\_THRESHOLD | Indicates the information on UEs in the area of interest whose speed is faster than the speed threshold. This value is only applicable to MOVEMENT\_BEHAVIOUR event. | | MovementBehaviour |
| MOV\_UE\_DIRECTION | Indicates the heading directions of the UE flow in the target area. This value is only applicable to MOVEMENT\_BEHAVIOUR event. | | MovementBehaviour |
| IN\_OUT\_PERCENT | Indicates the percentage of UEs that are indoors/outdoors. This value is only applicable to LOC\_ACCURACY event. | | LocAccuracy |
| TIME\_TO\_COLLISION | Indicates the time until for a collision with another UE happens. This value is only applicable to RELATIVE\_PROXIMITY event prediction. | | RelativeProximity |

Editor's Note: USER\_LOCATION, UE\_GEOG\_DIST and UE\_DIRECTION need to be refered by the corresponding attributes.

\*\*\* 17th Changes \*\*\*

5.1.6.3.40 Enumeration: ProximityCriterion

**Table 5.1.6.3.40-1: Enumeration ProximityCriterion**

|  |  |  |
| --- | --- | --- |
| **Enumeration value** | **Description** | **Applicability** |
| VELOCITY | Velocity. |  |
| AVG\_SPD | Average speed. |  |
| ORIENTATION | Orientation. |  |
| TRAJECTORY | Mobility trajectory. |  |

\*\*\* 18th Changes \*\*\*

### 5.1.8 Feature negotiation

The optional features in table 5.1.8-1 are defined for the Nnwdaf\_EventsSubscription API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [6].

Table 5.1.8-1: Supported Features

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Feature number | | Feature Name | | Description | |
| 1 | | ServiceExperience | | This feature indicates support for the event related to service experience. | |
| 2 | | UeMobility | | This feature indicates the support of analytics based on UE mobility information. | |
| 3 | | UeCommunication | | This feature indicates the support of analytics based on UE communication information. | |
| 4 | | QoSSustainability | | This feature indicates support for the event related to QoS sustainability. | |
| 5 | | AbnormalBehaviour | | This feature indicates support for the event related to abnormal behaviour information. | |
| 6 | | UserDataCongestion | | This feature indicates support for the event related to user data congestion. | |
| 7 | | NfLoad | | This feature indicates the support of the analytics related to the load of NF instances. | |
| 8 | | NetworkPerformance | | This feature indicates the support of analytics based on network performance. | |
| 9 | | NsiLoad | | This feature indicates the support of the event related to the load level of Network Slice and the optionally associated Network Slice Instance. | |
| 10 | | ES3XX | | Extended Support for 3xx redirections. This feature indicates the support of redirection for any service operation, according to Stateless NF procedures as specified in clauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [6] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [6]. | |
| 11 | | EneNA | | This feature indicates support for the enhancements of network data analytics requirements. | |
| 12 | | UserDataCongestionExt | | This feature indicates support for the extensions to the event related to user data congestion, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature UserDataCongestion. | |
| 13 | | Aggregation | | This feature indicates support for analytics aggregation. | |
| 14 | | 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, including support of area of interest, NF load information and number of UE or number of PDU Session. Supporting this feature also requires the support of feature NsiLoad. | |
| 15 | | ServiceExperienceExt | | This feature indicates support for the extensions to the event related to service experience, including support of RAT type and/or Frequency. Supporting this feature also requires the support of feature ServiceExperience. | |
| 16 | | DnPerformance | | This feature indicates the support of the analytics related to DN performance. | |
| 17 | | NfLoadExt | | This feature indicates support for the extensions to the event related to the load of NF instances, including NF load over area of interest. Supporting this feature also requires the support of feature NfLoad. | |
| 18 | | Dispersion | | This feature indicates support of the analytics related to dispersion analytics information. | |
| 19 | | RedundantTransmissionExp | | This feature indicates support of the analytics related to redundant transmission experience analytics information. | |
| 20 | | WlanPerformance | | This feature indicates support of the analytics related to WLAN performance information. | |
| 21 | | UeCommunicationExt | | This feature indicates the support for the extensions to the event related to UE communication, including support of reporting the analytics of the application list used by UE, N4 Session inactivity timer, and whether the UE communicates periodically or not.  Supporting this feature also requires the support of UeCommunication feature. | |
| 22 | | UeMobilityExt | | This feature indicates support for extensions to the event related to UE mobility, including support of LADN DNN to refer the LADN service area as the AOI. Supporting this feature also requires the support of feature UeMobility. | |
| 23 | | AnaCtxTransfer | | This feature indicates support for functionality related to Analytics Context Transfer. | |
| 24 | | AnaSubTransfer | | This feature indicates support for Analytics Subscription Transfer initiated by the source NWDAF. | |
| 25 | | UserConsent | | Indicates the support of detailed handling of user consent, e.g. error responses related to the lack of user consent. | |
| 26 | | TermRequest | | This feature indicates support for Analytics Subscription termination requests sent by the NWDAF to the NF service consumer. | |
| 27 | | ENAExt | | This feature indicates support for the general enhancements of network data analytics requirements, including support more level of accuracy and support for use case context sent by the NF service consumer to the NWDAF. | |
| 28 | | EnAbnormalBehaviour | | This feature indicates support for the enhancements of UE Abnormal Behaviour.  Supporting this feature also requires the support of AbnormalBehaviour feature. | |
| 29 | | EnQoSSustainability | | This feature indicates support for the enhancements of QoS Sustainability.  Supporting this feature also requires the support of QoSSustainability feature. | |
| 30 | | UserDataCongestionExt2\_eNA | | This feature indicates support for the enhancements of user data congestion, including support of ordering criterion. Supporting this feature also requires the support of UserDataCongestion and UserDataCongestionExt features. | |
| 31 | | UeMobilityExt2\_eNA | | This feature indicates support for the enhancements of UE mobility, including support of ordering criterion. Supporting this feature also requires the support of UeMobility and UeMobilityExt features. | |
| 32 | | UeCommunicationExt\_eNA | | This feature indicates support for the enhancements of UE Communication, including to indicate the ordering criterion for the list of analytics. Supporting this feature also requires the support of UeCommunication feature. | |
| 33 | | NetworkPerformanceExt\_eNA | | This feature indicates support for the enhancements of Network Performance, including support of ordering criterion for the list of analytics and analytics target period subset. Supporting this feature also requires the support of NetworkPerformance feature. | |
| 34 | | QoSSustainabilityExt\_eNA | | This feature indicates support for the enhancements of QoS Sustainability, including enhancements of filter information. Supporting this feature also requires the support of QoSSustainability feature. | |
| 35 | | PartialAnalyticsSubTransfer | | This feature indicates support for partial successful analytics subscription transfer. | |
| 36 | | Void | | Void | |
| 37 | | PfdDetermination | | This feature indicates support for functionality related to NWDAF assisted PFD Determination information for known application identifier(s). | |
| 38 | | ServiceExperienceExt2\_eNA | | This feature indicates support for the extensions to the event related to service experience supporting eNA, including support for PDU Session parameters information for service experience analytics. Supporting this feature also requires the support of feature ServiceExperience. | |
| 39 | | DnPerformanceExt\_AIML | | This feature indicates support for extensions to the event related to DN Performance supporting AIML, including support of extended DN Performance Analytics for group of UEs. Supporting this feature also requires the support of feature DnPerformance. | |
| 40 | | UeMobilityExt\_AIML | | This feature indicates support for further extensions to the event related to UE mobility supporting AIML, including UE’s geographical distribution and direction analytics. Supporting this feature also requires the support of feature UeMobility. | |
| 41 | | EnhDataMgmt | | Indicates the support of enhanced data management mechanisms. Supporting this feature also requires the support of feature EneNA. | |
| 42 | | PduSesTraffic | | This feature indicates support of the analytics related to PDU Session traffic information. | |
| 43 | | E2eDataVolTransTi  me | | This feature indicates support for E2E data volume transfer time analytics | |
| 44 | | DispersionExt\_eNA | | This feature indicates support for the enhancements of Dispersion, including the support of preferred granularity of UE location. Supporting this feature also requires the support of Dispersion feature. | |
| 45 | | WlanPerformanceExt\_AIML | | This feature indicates support for the enhancements of WLAN performance supporting AIML, including support of analytics per UE granularity. Supporting this feature also requires the support of feature WlanPerformance. | |
| 46 | | NetworkPerformanceExt\_AIML | | This feature indicates support of the network performance enhancements for AI/ML-based Services. Within this feature the following enhacements are covered:  - support of providing gNB resource usage for GBR traffic and Delay-critical GBR traffic.  Supporting this feature also requires the support of NetworkPerformance feature. | |
| 47 | | DnPerformanceExt\_eNA | | This feature indicates support for extensions to the event related to DN Performance, including support of number of UEs. Supporting this feature also requires the support of feature DnPerformance. | |
| 48 | | AnalyticsAccuracy | | This feature indicates support for the Analytics Accuracy information. | |
| 49 | | RedundantTransExpExt\_eNA | | This feature indicates support extensions to the event related to redundant transmission experience analytics information including:   * support of providing the E2E UL/DL packet loss rate (average, variance), E2E UL/DL packet delay (average, variance) in the analytics. * support of spatial and temporal granularity size.   Supporting this feature also requires the support of feature RedundantTransmissionExp. | |
| 50 | | WlanPerfExt\_eNA | | This feature indicates support for the enhancements of WLAN performance supporting AIML, including support of temporal granularity size. Supporting this feature also requires the support of feature WlanPerformance. | |
| 51 | | MovementBehaviour | | This feature indicates support for the Movement Behaviour information. | |
| 52 | | LocAccuracy | | This feature indicates support for the Location Accuracy analytics. | |
| 53 | | RelativeProximity | | This feature indicates support for the Relative Proximity analytics. | |

\*\*\* 19th Changes \*\*\*

# A.2 Nnwdaf\_EventsSubscription API

openapi: 3.0.0

info:

version: 1.3.0-alpha.4

title: Nnwdaf\_EventsSubscription

description: |

Nnwdaf\_EventsSubscription Service API.

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externalDocs:

description: 3GPP TS 29.520 V18.3.0; 5G System; Network Data Analytics Services.

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

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

servers:

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

variables:

apiRoot:

default: https://example.com

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

paths:

/subscriptions:

post:

summary: Create a new Individual NWDAF Events Subscription

operationId: CreateNWDAFEventsSubscription

tags:

- NWDAF Events Subscriptions (Collection)

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'201':

description: Create a new Individual NWDAF Event Subscription resource.

headers:

Location:

description: >

Contains the URI of the newly created resource, according to the structure

{apiRoot}/nnwdaf-eventssubscription/<apiVersion>/subscriptions/{subscriptionId}

required: true

schema:

type: string

content:

application/json:

schema:

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

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

'429':

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

'500':

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

'502':

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

'503':

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

default:

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

callbacks:

myNotification:

'{$request.body#/notificationURI}':

post:

requestBody:

required: true

content:

application/json:

schema:

type: array

items:

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

minItems: 1

responses:

'204':

description: The receipt of the Notification is acknowledged.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

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

'429':

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

'500':

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

'502':

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

'503':

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

default:

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

/subscriptions/{subscriptionId}:

delete:

summary: Delete an existing Individual NWDAF Events Subscription

operationId: DeleteNWDAFEventsSubscription

tags:

- Individual NWDAF Events Subscription (Document)

parameters:

- name: subscriptionId

in: path

description: String identifying a subscription to the Nnwdaf\_EventsSubscription Service

required: true

schema:

type: string

responses:

'204':

description: >

No Content. The Individual NWDAF Event Subscription resource matching the subscriptionId

was deleted.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'429':

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

'500':

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

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'502':

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

'503':

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

default:

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

put:

summary: Update an existing Individual NWDAF Events Subscription

operationId: UpdateNWDAFEventsSubscription

tags:

- Individual NWDAF Events Subscription (Document)

requestBody:

required: true

content:

application/json:

schema:

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

parameters:

- name: subscriptionId

in: path

description: String identifying a subscription to the Nnwdaf\_EventsSubscription Service.

required: true

schema:

type: string

responses:

'200':

description: >

The Individual NWDAF Event Subscription resource was modified successfully and a

representation of that resource is returned.

content:

application/json:

schema:

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

'204':

description: The Individual NWDAF Event Subscription resource was modified successfully.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

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

'429':

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

'500':

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

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'502':

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

'503':

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

default:

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

/transfers:

post:

summary: Provide information about requested analytics subscriptions transfer and potentially create a new Individual NWDAF Event Subscription Transfer resource.

operationId: CreateNWDAFEventSubscriptionTransfer

tags:

- NWDAF Event Subscription Transfers (Collection)

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

- nnwdaf-eventssubscription:transfer

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'201':

description: Create a new Individual NWDAF Event Subscription Transfer resource.

headers:

Location:

description: >

Contains the URI of the newly created resource, according to the structure

{apiRoot}/nnwdaf-eventssubscription/<apiVersion>/transfers/{transferId}

required: true

schema:

type: string

'204':

description: >

No Content. The receipt of the information about analytics subscription(s) that are

requested to be transferred and the ability to handle this information (e.g. execute the

steps required to transfer an analytics subscription directly) is confirmed.

'400':

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

'401':

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

'403':

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

'404':

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

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

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

'429':

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

'500':

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

'502':

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

'503':

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

default:

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

/transfers/{transferId}:

delete:

summary: Delete an existing Individual NWDAF Event Subscription Transfer

operationId: DeleteNWDAFEventSubscriptionTransfer

tags:

- Individual NWDAF Event Subscription Transfer (Document)

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

- nnwdaf-eventssubscription:transfer

parameters:

- name: transferId

in: path

description: >

String identifying a request for an analytics subscription transfer to the

Nnwdaf\_EventsSubscription Service.

required: true

schema:

type: string

responses:

'204':

description: >

No Content. The Individual NWDAF Event Subscription Transfer resource matching the

transferId was deleted.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'429':

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

'500':

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

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'502':

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

'503':

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

default:

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

put:

summary: Update an existing Individual NWDAF Event Subscription Transfer

operationId: UpdateNWDAFEventSubscriptionTransfer

tags:

- Individual NWDAF Event Subscription Transfer (Document)

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

- oAuth2ClientCredentials:

- nnwdaf-eventssubscription

- nnwdaf-eventssubscription:transfer

requestBody:

required: true

content:

application/json:

schema:

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

parameters:

- name: transferId

in: path

description: >

String identifying a request for an analytics subscription transfer to the

Nnwdaf\_EventsSubscription Service

required: true

schema:

type: string

responses:

'204':

description: >

The Individual NWDAF Event Subscription Transfer resource was modified successfully.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

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

'429':

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

'500':

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

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'502':

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

'503':

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

default:

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

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nnwdaf-eventssubscription: Access to the Nnwdaf\_EventsSubscription API

nnwdaf-eventssubscription:transfer: >

Access to service operations applying to NWDAF event subscription transfer.

schemas:

NnwdafEventsSubscription:

description: Represents an Individual NWDAF Event Subscription resource.

type: object

properties:

eventSubscriptions:

type: array

items:

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

minItems: 1

description: Subscribed events

evtReq:

$ref: 'TS29523\_Npcf\_EventExposure.yaml#/components/schemas/ReportingInformation'

notificationURI:

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

notifCorrId:

type: string

description: Notification correlation identifier.

supportedFeatures:

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

eventNotifications:

type: array

items:

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

minItems: 1

failEventReports:

type: array

items:

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

minItems: 1

prevSub:

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

consNfInfo:

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

required:

- eventSubscriptions

EventSubscription:

description: Represents a subscription to a single event.

type: object

properties:

anySlice:

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

appIds:

type: array

items:

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

minItems: 1

description: Identification(s) of application to which the subscription applies.

deviations:

type: array

items:

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

minItems: 1

dnns:

type: array

items:

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

minItems: 1

description: Identification(s) of DNN to which the subscription applies.

dnais:

type: array

items:

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

minItems: 1

event:

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

extraReportReq:

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

ladnDnns:

type: array

items:

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

minItems: 1

description: Identification(s) of LADN DNN to indicate the LADN service area as the AOI.

loadLevelThreshold:

type: integer

description: >

Indicates that the NWDAF shall report the corresponding network slice load level to the

NF service consumer where the load level of the network slice identified by snssais is

reached.

notificationMethod:

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

matchingDir:

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

nfLoadLvlThds:

type: array

items:

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

minItems: 1

description: >

Shall be supplied in order to start reporting when an average load level is reached.

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

networkArea:

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

location:

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

temporalGranSize:

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

spatialGranSizeTa:

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

spatialGranSizeCell:

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

fineGranAreas:

type: array

items:

$ref: 'TS29522\_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'

minItems: 1

description: Indicates the fine granularity areas to which the subscription applies.

visitedAreas:

type: array

items:

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

minItems: 1

maxTopAppUlNbr:

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

maxTopAppDlNbr:

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

nsiIdInfos:

type: array

items:

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

minItems: 1

nsiLevelThrds:

type: array

items:

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

minItems: 1

qosRequ:

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

qosFlowRetThds:

type: array

items:

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

minItems: 1

ranUeThrouThds:

type: array

items:

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

minItems: 1

repetitionPeriod:

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

snssaia:

type: array

items:

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

minItems: 1

description: >

Identification(s) of network slice to which the subscription applies. It corresponds to

snssais in the data model definition of 3GPP TS 29.520.

tgtUe:

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

congThresholds:

type: array

items:

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

minItems: 1

nwPerfRequs:

type: array

items:

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

minItems: 1

ueCommReqs:

type: array

items:

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

minItems: 1

ueMobilityReqs:

type: array

items:

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

minItems: 1

userDataConOrderCri:

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

bwRequs:

type: array

items:

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

minItems: 1

excepRequs:

type: array

items:

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

minItems: 1

exptAnaType:

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

exptUeBehav:

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

ratFreqs:

type: array

items:

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

minItems: 1

listOfAnaSubsets:

type: array

items:

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

minItems: 1

disperReqs:

type: array

items:

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

minItems: 1

redTransReqs:

type: array

items:

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

minItems: 1

wlanReqs:

type: array

items:

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

minItems: 1

upfInfo:

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

appServerAddrs:

type: array

items:

$ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AddrFqdn'

minItems: 1

dnPerfReqs:

type: array

items:

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

minItems: 1

pduSesInfos:

type: array

items:

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

minItems: 1

useCaseCxt:

type: string

description: >

Indicates the context of usage of the analytics. The value and format of this parameter

are not standardized.

pduSesTrafReqs:

type: array

items:

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

minItems: 1

locAccReqs:

type: array

items:

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

minItems: 1

locGranularity:

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

locOrientation:

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

dataVlTrnsTmRqs:

type: array

items:

$ref: '#/components/schemas/E2eDataVolTransTimeReq'

minItems: 1

accuReq:

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

pauseFlg:

type: boolean

description: >

Pause analytics consumption flag. Set to "true" to indicate the NWDAF to stop sending

the notifications of analytics. Default value is "false" if omitted.

resumeFlg:

type: boolean

description: >

Resume analytics consumption flag. Set to "true" to indicate the NWDAF to resume sending

the notifications of analytics. Default value is "false" if omitted.

movBehavReqs:

type: array

items:

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

minItems: 1

relProxReqs:

type: array

items:

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

minItems: 1

required:

- event

not:

required: [excepRequs, exptAnaType]

NnwdafEventsSubscriptionNotification:

description: Represents an Individual NWDAF Event Subscription Notification resource.

type: object

properties:

eventNotifications:

type: array

items:

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

minItems: 1

description: Notifications about Individual Events

subscriptionId:

type: string

description: String identifying a subscription to the Nnwdaf\_EventsSubscription Service

notifCorrId:

type: string

description: Notification correlation identifier.

oldSubscriptionId:

type: string

description: >

Subscription ID which was allocated by the source NWDAF. This parameter shall be present

if the notification is for informing the assignment of a new Subscription Id by the

target NWDAF.

resourceUri:

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

termCause:

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

transEvents:

type: array

items:

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

minItems: 1

required:

- subscriptionId

oneOf:

- required: [eventNotifications]

- allOf:

- required: [resourceUri]

- required: [oldSubscriptionId]

EventNotification:

description: Represents a notification on events that occurred.

type: object

properties:

event:

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

start:

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

expiry:

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

timeStampGen:

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

failNotifyCode:

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

rvWaitTime:

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

anaMetaInfo:

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

nfLoadLevelInfos:

type: array

items:

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

minItems: 1

nsiLoadLevelInfos:

type: array

items:

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

minItems: 1

pfdDetermInfos:

type: array

items:

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

minItems: 1

sliceLoadLevelInfo:

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

svcExps:

type: array

items:

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

minItems: 1

qosSustainInfos:

type: array

items:

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

minItems: 1

ueComms:

type: array

items:

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

minItems: 1

ueMobs:

type: array

items:

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

minItems: 1

userDataCongInfos:

type: array

items:

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

minItems: 1

abnorBehavrs:

type: array

items:

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

minItems: 1

nwPerfs:

type: array

items:

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

minItems: 1

dnPerfInfos:

type: array

items:

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

minItems: 1

disperInfos:

type: array

items:

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

minItems: 1

redTransInfos:

type: array

items:

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

minItems: 1

wlanInfos:

type: array

items:

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

minItems: 1

smccExps:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_AnalyticsInfo.yaml#/components/schemas/SmcceInfo'

minItems: 1

pduSesTrafInfos:

type: array

items:

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

minItems: 1

dataVlTrnsTmInfos:

type: array

items:

$ref: '#/components/schemas/E2eDataVolTransTimeInfo'

minItems: 1

accuInfo:

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

cancelAccuInd:

type: boolean

description: >

Indicates cancelled subscription of the analytics accuracy information.

Set to "true" indicates the NWDAF cancelled subscription of analytics accuracy

information as the NWDAF does not support the accuracy checking capability.

Otherwise set to "false". Default value is "false" if omitted.

pauseInd:

type: boolean

description: >

Pause analytics consumption indication. Set to "true" to indicate the consumer to stop

the consumption of the analytics. Default value is "false" if omitted.

resumeInd:

type: boolean

description: >

Resume analytics consumption indication. Set to "true" to indicate the consumer to

resume the consumption of the analytics. Default value is "false" if omitted.

movBehavInfos:

type: array

items:

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

minItems: 1

locAccInfos:

type: array

items:

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

minItems: 1

relProxInfos:

type: array

items:

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

minItems: 1

required:

- event

ServiceExperienceInfo:

description: Represents service experience information.

type: object

properties:

svcExprc:

$ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/SvcExperience'

svcExprcVariance:

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

supis:

type: array

items:

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

minItems: 1

snssai:

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

appId:

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

srvExpcType:

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

ueLocs:

type: array

items:

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

minItems: 1

upfInfo:

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

dnai:

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

appServerInst:

$ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AddrFqdn'

confidence:

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

dnn:

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

networkArea:

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

nsiId:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsiId'

ratio:

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

ratFreq:

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

pduSesInfo:

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

required:

- svcExprc

BwRequirement:

description: Represents bandwidth requirements.

type: object

properties:

appId:

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

marBwDl:

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

marBwUl:

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

mirBwDl:

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

mirBwUl:

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

required:

- appId

SliceLoadLevelInformation:

description: Contains load level information applicable for one or several slices.

type: object

properties:

loadLevelInformation:

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

snssais:

type: array

items:

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

minItems: 1

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

required:

- loadLevelInformation

- snssais

NsiLoadLevelInfo:

description: >

Represents the network slice and optionally the associated network slice instance and the

load level information.

type: object

properties:

loadLevelInformation:

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

snssai:

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

nsiId:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsiId'

resUsage:

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

numOfExceedLoadLevelThr:

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

exceedLoadLevelThrInd:

type: boolean

description: >

Indicates whether the Load Level Threshold is met or exceeded by the statistics value.

Set to "true" if the Load Level Threshold is met or exceeded, otherwise set to "false".

Shall be present if one of the element in the "listOfAnaSubsets" attribute was set to

EXCEED\_LOAD\_LEVEL\_THR\_IND.

networkArea:

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

timePeriod:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

resUsgThrCrossTimePeriod:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

minItems: 1

description: >

Each element indicates the time elapsed between times each threshold is met or exceeded

or crossed. The start time and end time are the exact time stamps of the resource usage

threshold is reached or exceeded. May be present if the "listOfAnaSubsets" attribute is

provided and the maximum number of instances shall not exceed the value provided in the

"numOfExceedLoadLevelThr" attribute.

numOfUes:

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

numOfPduSess:

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

confidence:

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

required:

- loadLevelInformation

- snssai

NsiIdInfo:

description: Represents the S-NSSAI and the optionally associated Network Slice Instance(s).

type: object

properties:

snssai:

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

nsiIds:

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsiId'

minItems: 1

required:

- snssai

EventReportingRequirement:

description: Represents the type of reporting that the subscription requires.

type: object

properties:

accuracy:

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

accPerSubset:

type: array

items:

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

minItems: 1

description: >

Each element indicates the preferred accuracy level per analytics subset. It may be

present if the "listOfAnaSubsets" attribute is present in the subscription request when

the subscription event is NF\_LOAD, UE\_COMM, DISPERSION, NETWORK\_PERFORMANCE,

WLAN\_PERFORMANCE, DN\_PERFORMANCE, SERVICE\_EXPERIENCE or E2E\_DATA\_VOL\_TRANS\_TIME,

UE\_MOBILITY, PDU\_SESSION\_TRAFFIC or MOVEMENT\_BEHAVIOUR.

startTs:

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

endTs:

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

offsetPeriod:

type: integer

description: >

Offset period in units of seconds to the reporting time, if the value is negative means

statistics in the past offset period, otherwise a positive value means prediction in the

future offset period. May be present if the "repPeriod" attribute is included within the

"evtReq" attribute or the "repetitionPeriod" attribute is included within the

EventSubscription type.

sampRatio:

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

maxObjectNbr:

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

maxSupiNbr:

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

timeAnaNeeded:

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

anaMeta:

type: array

items:

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

minItems: 1

anaMetaInd:

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

histAnaTimePeriod:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

TargetUeInformation:

description: Identifies the target UE information.

type: object

properties:

anyUe:

type: boolean

description: >

Identifies any UE when setting to "true". Default value is "false" if omitted.

supis:

type: array

items:

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

minItems: 1

gpsis:

type: array

items:

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

minItems: 1

intGroupIds:

type: array

items:

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

minItems: 1

UeMobility:

description: Represents UE mobility information.

type: object

properties:

ts:

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

recurringTime:

$ref: 'TS29122\_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'

duration:

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

durationVariance:

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

locInfos:

type: array

items:

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

minItems: 1

directionInfos:

type: array

items:

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

minItems: 1

allOf:

- required: [duration]

- required: [locInfos]

- oneOf:

- required: [ts]

- required: [recurringTime]

LocationInfo:

description: Represents UE location information.

type: object

properties:

loc:

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

geoLoc:

$ref: 'TS29522\_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'

ratio:

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

confidence:

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

geoDistrInfos:

type: array

items:

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

minItems: 1

required:

- loc

DirectionInfo:

description: Represents the UE direction information.

type: object

properties:

supi:

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

gpsi:

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

direction:

type: string

description: String identifying the moving direction of the UE.

required:

- direction

oneOf:

- required: [supi]

- required: [gpsi]

GeoDistributionInfo:

description: Represents the geographical distribution of the UEs.

type: object

properties:

loc:

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

supis:

type: array

items:

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

minItems: 1

gpsis:

type: array

items:

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

minItems: 1

required:

- loc

oneOf:

- required: [supis]

- required: [gpsis]

UeCommunication:

description: Represents UE communication information.

type: object

properties:

commDur:

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

commDurVariance:

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

perioTime:

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

perioTimeVariance:

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

ts:

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

tsVariance:

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

recurringTime:

$ref: 'TS29122\_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'

trafChar:

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

ratio:

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

perioCommInd:

type: boolean

description: >

This attribute indicates whether the UE communicates periodically or not. Set to "true"

to indicate the UE communicates periodically, otherwise set to "false" or omitted.

confidence:

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

anaOfAppList:

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

sessInactTimer:

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

allOf:

- required: [commDur]

- required: [trafChar]

- oneOf:

- required: [ts]

- required: [recurringTime]

TrafficCharacterization:

description: Identifies the detailed traffic characterization.

type: object

properties:

dnn:

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

snssai:

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

appId:

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

fDescs:

type: array

items:

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

minItems: 1

maxItems: 2

ulVol:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

ulVolVariance:

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

dlVol:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

dlVolVariance:

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

anyOf:

- required: [ulVol]

- required: [dlVol]

UserDataCongestionInfo:

description: Represents the user data congestion information.

type: object

properties:

networkArea:

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

congestionInfo:

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

snssai:

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

required:

- networkArea

- congestionInfo

CongestionInfo:

description: Represents the congestion information.

type: object

properties:

congType:

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

timeIntev:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

nsi:

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

confidence:

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

topAppListUl:

type: array

items:

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

minItems: 1

topAppListDl:

type: array

items:

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

minItems: 1

required:

- congType

- timeIntev

- nsi

TopApplication:

description: Top application that contributes the most to the traffic.

type: object

properties:

appId:

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

ipTrafficFilter:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/FlowInfo'

ratio:

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

oneOf:

- required: [appId]

- required: [ipTrafficFilter]

QosSustainabilityInfo:

description: Represents the QoS Sustainability information.

type: object

properties:

areaInfo:

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

fineAreaInfos:

type: array

items:

$ref: 'TS29522\_AMPolicyAuthorization.yaml#/components/schemas/GeographicalArea'

minItems: 1

description: >

This attribute contains the geographical locations in a fine granularity. startTs:

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

endTs:

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

qosFlowRetThd:

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

ranUeThrouThd:

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

snssai:

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

confidence:

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

oneOf:

- required: [qosFlowRetThd]

- required: [ranUeThrouThd]

QosRequirement:

description: Represents the QoS requirements.

type: object

properties:

5qi:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/5Qi'

gfbrUl:

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

gfbrDl:

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

resType:

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

pdb:

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

per:

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

deviceSpeed:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/VelocityEstimate'

deviceType:

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

oneOf:

- required: [5qi]

- required: [resType]

ThresholdLevel:

description: Represents a threshold level.

type: object

properties:

congLevel:

type: integer

nfLoadLevel:

type: integer

nfCpuUsage:

type: integer

nfMemoryUsage:

type: integer

nfStorageUsage:

type: integer

avgTrafficRate:

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

maxTrafficRate:

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

minTrafficRate:

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

aggTrafficRate:

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

varTrafficRate:

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

avgPacketDelay:

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

maxPacketDelay:

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

varPacketDelay:

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

avgPacketLossRate:

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

maxPacketLossRate:

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

varPacketLossRate:

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

svcExpLevel:

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

speed:

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

NfLoadLevelInformation:

description: Represents load level information of a given NF instance.

type: object

properties:

nfType:

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

nfInstanceId:

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

nfSetId:

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

nfStatus:

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

nfCpuUsage:

type: integer

nfMemoryUsage:

type: integer

nfStorageUsage:

type: integer

nfLoadLevelAverage:

type: integer

nfLoadLevelpeak:

type: integer

nfLoadAvgInAoi:

type: integer

snssai:

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

confidence:

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

allOf:

- required: [nfType]

- required: [nfInstanceId]

- anyOf:

- required: [nfStatus]

- required: [nfCpuUsage]

- required: [nfMemoryUsage]

- required: [nfStorageUsage]

- required: [nfLoadLevelAverage]

- required: [nfLoadLevelPeak]

NfStatus:

description: Contains the percentage of time spent on various NF states.

type: object

properties:

statusRegistered:

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

statusUnregistered:

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

statusUndiscoverable:

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

anyOf:

- required: [statusRegistered]

- required: [statusUnregistered]

- required: [statusUndiscoverable]

AnySlice:

type: boolean

description: >

"false" represents not applicable for all slices. "true" represents applicable for all slices.

LoadLevelInformation:

type: integer

description: >

Load level information of the network slice and the optionally associated network slice

instance.

AbnormalBehaviour:

description: Represents the abnormal behaviour information.

type: object

properties:

supis:

type: array

items:

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

minItems: 1

excep:

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

dnn:

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

snssai:

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

ratio:

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

confidence:

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

addtMeasInfo:

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

required:

- excep

Exception:

description: Represents the Exception information.

type: object

properties:

excepId:

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

excepLevel:

type: integer

excepTrend:

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

required:

- excepId

AdditionalMeasurement:

description: Represents additional measurement information.

type: object

properties:

unexpLoc:

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

unexpFlowTeps:

type: array

items:

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

minItems: 1

unexpWakes:

type: array

items:

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

minItems: 1

ddosAttack:

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

wrgDest:

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

circums:

type: array

items:

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

minItems: 1

IpEthFlowDescription:

description: Contains the description of an Uplink and/or Downlink Ethernet flow.

type: object

properties:

ipTrafficFilter:

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

ethTrafficFilter:

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

oneOf:

- required: [ipTrafficFilter]

- required: [ethTrafficFilter]

AddressList:

description: Represents a list of IPv4 and/or IPv6 addresses.

type: object

properties:

ipv4Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

minItems: 1

ipv6Addrs:

type: array

items:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

minItems: 1

CircumstanceDescription:

description: Contains the description of a circumstance.

type: object

properties:

freq:

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

tm:

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

locArea:

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

vol:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

RetainabilityThreshold:

description: Represents a QoS flow retainability threshold.

type: object

properties:

relFlowNum:

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

relTimeUnit:

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

relFlowRatio:

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

oneOf:

- allOf:

- required: [relFlowNum]

- required: [relTimeUnit]

- required: [relFlowRatio]

NetworkPerfRequirement:

description: Represents a network performance requirement.

type: object

properties:

nwPerfType:

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

relativeRatio:

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

absoluteNum:

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

orderCriterion:

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

rscUsgReq:

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

required:

- nwPerfType

not:

required: [relativeRatio, absoluteNum]

NetworkPerfInfo:

description: Represents the network performance information.

type: object

properties:

networkArea:

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

nwPerfType:

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

anaPeriod:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

relativeRatio:

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

absoluteNum:

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

rscUsgReq:

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

confidence:

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

allOf:

- required: [networkArea]

- required: [nwPerfType]

- oneOf:

- required: [relativeRatio]

- required: [absoluteNum]

FailureEventInfo:

description: Contains information on the event for which the subscription is not successful.

type: object

properties:

event:

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

failureCode:

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

required:

- event

- failureCode

AnalyticsMetadataIndication:

description: >

Contains analytics metadata information requested to be used during analytics generation.

type: object

properties:

dataWindow:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

dataStatProps:

type: array

items:

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

minItems: 1

strategy:

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

aggrNwdafIds:

type: array

items:

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

minItems: 1

AnalyticsMetadataInfo:

description: Contains analytics metadata information required for analytics aggregation.

type: object

properties:

numSamples:

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

dataWindow:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

dataStatProps:

type: array

items:

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

minItems: 1

strategy:

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

accuracy:

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

NumberAverage:

description: Represents average and variance information.

type: object

properties:

number:

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

variance:

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

skewness:

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

required:

- number

- variance

AnalyticsSubscriptionsTransfer:

description: Contains information about a request to transfer analytics subscriptions.

type: object

properties:

subsTransInfos:

type: array

items:

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

minItems: 1

failTransEventReports:

type: array

items:

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

minItems: 1

required:

- subsTransInfos

SubscriptionTransferInfo:

description: Contains information about subscriptions that are requested to be transferred.

type: object

properties:

transReqType:

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

nwdafEvSub:

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

consumerId:

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

contextId:

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

sourceNfIds:

type: array

items:

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

minItems: 1

sourceSetIds:

type: array

items:

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

minItems: 1

modelInfo:

type: array

items:

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

minItems: 1

required:

- transReqType

- nwdafEvSub

- consumerId

ModelInfo:

description: Contains information about an ML model.

type: object

properties:

analyticsId:

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

mlModelInfos:

type: array

items:

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

minItems: 1

required:

- analyticsId

- mlModelInfos

MLModelInfo:

description: Contains information about an ML models.

type: object

properties:

mlFileAddrs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_MLModelProvision.yaml#/components/schemas/MLModelAddr'

minItems: 1

modelProvId:

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

modelProvSetId:

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

oneOf:

- required: [modelProvId]

- required: [modelProvSetId]

AnalyticsContextIdentifier:

description: Contains information about available analytics contexts.

type: object

properties:

subscriptionId:

type: string

description: The identifier of a subscription.

nfAnaCtxts:

type: array

items:

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

minItems: 1

description: >

List of analytics types for which NF related analytics contexts can be retrieved.

ueAnaCtxts:

type: array

items:

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

minItems: 1

description: >

List of objects that indicate for which SUPI and analytics types combinations analytics

context can be retrieved.

allOf:

- anyOf:

- required: [nfAnaCtxts]

- required: [ueAnaCtxts]

- required: [subscriptionId]

UeAnalyticsContextDescriptor:

description: Contains information about available UE related analytics contexts.

type: object

properties:

supi:

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

anaTypes:

type: array

items:

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

minItems: 1

description: >

List of analytics types for which UE related analytics contexts can be retrieved.

required:

- supi

- anaTypes

DnPerfInfo:

description: Represents DN performance information.

type: object

properties:

appId:

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

dnn:

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

snssai:

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

dnPerf:

type: array

items:

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

minItems: 1

confidence:

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

required:

- dnPerf

DnPerf:

description: Represents DN performance for the application.

type: object

properties:

appServerInsAddr:

$ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AddrFqdn'

upfInfo:

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

dnai:

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

perfData:

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

spatialValidCon:

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

temporalValidCon:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

required:

- perfData

PerfData:

description: Represents DN performance data.

type: object

properties:

avgTrafficRate:

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

maxTrafficRate:

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

minTrafficRate:

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

aggTrafficRate:

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

varTrafficRate:

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

trafRateUeIds:

type: array

items:

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

minItems: 1

avePacketDelay:

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

maxPacketDelay:

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

varPacketDelay:

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

packDelayUeIds:

type: array

items:

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

minItems: 1

avgPacketLossRate:

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

maxPacketLossRate:

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

varPacketLossRate:

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

packLossUeIds:

type: array

items:

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

minItems: 1

numOfUe:

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

DispersionRequirement:

description: Represents the dispersion analytics requirements.

type: object

properties:

disperType:

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

classCriters:

type: array

items:

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

minItems: 1

rankCriters:

type: array

items:

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

minItems: 1

dispOrderCriter:

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

order:

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

required:

- disperType

ClassCriterion:

description: >

Indicates the dispersion class criterion for fixed, camper and/or traveller UE, and/or the

top-heavy UE dispersion class criterion.

type: object

properties:

disperClass:

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

classThreshold:

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

thresMatch:

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

required:

- disperClass

- classThreshold

- thresMatch

RankingCriterion:

description: Indicates the usage ranking criterion between the high, medium and low usage UE.

type: object

properties:

highBase:

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

lowBase:

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

required:

- highBase

- lowBase

DispersionInfo:

description: >

Represents the Dispersion information. When subscribed event is "DISPERSION", the

"disperInfos" attribute shall be included.

type: object

properties:

tsStart:

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

tsDuration:

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

disperCollects:

type: array

items:

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

minItems: 1

disperType:

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

required:

- tsStart

- tsDuration

- disperCollects

- disperType

DispersionCollection:

description: Dispersion collection per UE location or per slice.

type: object

properties:

ueLoc:

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

snssai:

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

supis:

type: array

items:

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

minItems: 1

gpsis:

type: array

items:

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

minItems: 1

appVolumes:

type: array

items:

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

minItems: 1

disperAmount:

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

disperClass:

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

usageRank:

type: integer

description: Integer where the allowed values correspond to 1, 2, 3 only.

minimum: 1

maximum: 3

percentileRank:

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

ueRatio:

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

confidence:

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

allOf:

- oneOf:

- required: [ueLoc]

- required: [snssai]

- anyOf:

- required: [disperAmount]

- required: [disperClass]

- required: [usageRank]

- required: [percentileRank]

ApplicationVolume:

description: Application data volume per Application Id.

type: object

properties:

appId:

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

appVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

required:

- appId

- appVolume

RedundantTransmissionExpReq:

description: Represents other redundant transmission experience analytics requirements.

type: object

properties:

redTOrderCriter:

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

order:

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

RedundantTransmissionExpInfo:

description: >

The redundant transmission experience related information. When subscribed event is

"RED\_TRANS\_EXP", the "redTransInfos" attribute shall be included.

type: object

properties:

spatialValidCon:

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

dnn:

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

redTransExps:

type: array

items:

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

minItems: 1

required:

- redTransExps

RedundantTransmissionExpPerTS:

description: The redundant transmission experience per Time Slot.

type: object

properties:

tsStart:

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

tsDuration:

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

obsvRedTransExp:

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

redTransStatus:

type: boolean

description: >

Redundant Transmission Status. Set to "true" if redundant transmission was activated,

otherwise set to "false". Default value is "false" if omitted.

ueRatio:

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

confidence:

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

required:

- tsStart

- tsDuration

- obsvRedTransExp

ObservedRedundantTransExp:

description: Represents the observed redundant transmission experience related information.

type: object

properties:

avgPktDropRateUl:

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

varPktDropRateUl:

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

avgPktDropRateDl:

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

varPktDropRateDl:

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

avgPktDelayUl:

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

varPktDelayUl:

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

avgPktDelayDl:

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

varPktDelayDl:

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

avgE2ePktDelayUl:

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

varE2ePktDelayUl:

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

avgE2ePktDelayDl:

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

varE2ePktDelayDl:

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

avgE2ePktLossRateUl:

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

varE2ePktLossRateUl:

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

avgE2ePktLossRateDl:

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

varE2ePktLossRateDl:

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

WlanPerformanceReq:

description: Represents other WLAN performance analytics requirements.

type: object

properties:

ssIds:

type: array

items:

type: string

minItems: 1

bssIds:

type: array

items:

type: string

minItems: 1

wlanOrderCriter:

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

order:

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

WlanPerformanceInfo:

description: The WLAN performance related information.

type: object

properties:

networkArea:

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

wlanPerSsidInfos:

type: array

items:

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

minItems: 1

wlanPerUeIdInfos:

type: array

items:

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

minItems: 1

description: >

WLAN performance information for UE Id(s) of WLAN access points deployed in the Area

of Interest.

required:

- wlanPerSsidInfos

WlanPerSsIdPerformanceInfo:

description: The WLAN performance per SSID.

type: object

properties:

ssId:

type: string

wlanPerTsInfos:

type: array

items:

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

minItems: 1

required:

- ssId

- wlanPerTsInfos

WlanPerUeIdPerformanceInfo:

description: The WLAN performance per UE ID.

type: object

properties:

supi:

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

wlanPerTsInfos:

type: array

items:

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

minItems: 1

description: >

WLAN performance information per Time Slot during the analytics target period.

required:

- supi

- wlanPerTsInfos

WlanPerTsPerformanceInfo:

description: WLAN performance information per Time Slot during the analytics target period.

type: object

properties:

tsStart:

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

tsDuration:

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

rssi:

type: integer

rtt:

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

trafficInfo:

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

numberOfUes:

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

confidence:

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

required:

- tsStart

- tsDuration

anyOf:

- required: [rssi]

- required: [rtt]

- required: [trafficInfo]

- required: [numberOfUes]

TrafficInformation:

description: Traffic information including UL/DL data rate and/or Traffic volume.

type: object

properties:

uplinkRate:

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

downlinkRate:

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

uplinkVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

downlinkVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

totalVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

anyOf:

- required: [uplinkRate]

- required: [downlinkRate]

- required: [uplinkVolume]

- required: [downlinkVolume]

- required: [totalVolume]

AppListForUeComm:

description: Represents the analytics of the application list used by UE.

type: object

properties:

appId:

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

startTime:

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

appDur:

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

occurRatio:

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

spatialValidity:

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

required:

- appId

SessInactTimerForUeComm:

description: Represents the N4 Session inactivity timer.

type: object

properties:

n4SessId:

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

sessInactiveTimer:

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

required:

- n4SessId

- sessInactiveTimer

DnPerformanceReq:

description: Represents other DN performance analytics requirements.

type: object

properties:

dnPerfOrderCriter:

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

order:

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

reportThresholds:

type: array

items:

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

minItems: 1

RatFreqInformation:

description: Represents the RAT type and/or Frequency information.

type: object

properties:

allFreq:

type: boolean

description: >

Set to "true" to indicate to handle all the frequencies the NWDAF received, otherwise

set to "false" or omit. The "allFreq" attribute and the "freq" attribute are mutually

exclusive.

allRat:

type: boolean

description: >

Set to "true" to indicate to handle all the RAT Types the NWDAF received, otherwise

set to "false" or omit. The "allRat" attribute and the "ratType" attribute are mutually

exclusive.

freq:

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

ratType:

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

svcExpThreshold:

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

matchingDir:

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

PrevSubInfo:

description: Information of the previous subscription.

type: object

properties:

producerId:

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

producerSetId:

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

subscriptionId:

type: string

description: The identifier of a subscription.

nfAnaEvents:

type: array

items:

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

minItems: 1

ueAnaEvents:

type: array

items:

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

minItems: 1

required:

- subscriptionId

oneOf:

- required: [producerId]

- required: [producerSetId]

ResourceUsage:

description: >

The current usage of the virtual resources assigned to the NF instances belonging to a

particular network slice instance.

type: object

properties:

cpuUsage:

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

memoryUsage:

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

storageUsage:

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

ConsumerNfInformation:

description: Represents the analytics consumer NF Information.

type: object

properties:

nfId:

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

nfSetId:

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

taiList:

type: array

items:

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

minItems: 1

oneOf:

- oneOf:

- required: [nfId]

- required: [nfSetId]

- required: [taiList]

UeCommReq:

description: UE communication analytics requirement.

type: object

properties:

orderCriterion:

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

orderDirection:

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

UeMobilityReq:

description: UE mobility analytics requirement.

type: object

properties:

orderCriterion:

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

orderDirection:

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

ueLocOrderInd:

type: boolean

description: >

UE Location order indication. Set to "true" to indicate the NWDAF to provide the UE

Mobility analytics in a UE Location order, otherwise set to "false" or omit.

PduSessionInfo:

description: Represents combination of PDU Session parameter(s) information.

type: object

properties:

pduSessType:

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

sscMode:

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

accessType:

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

PfdDeterminationInfo:

description: Represents the PFD Determination information for a known application identifier.

type: object

properties:

appId:

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

snssai:

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

dnn:

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

flowDescriptions:

type: array

items:

type: string

minItems: 1

description: >

Represents a 3-tuple with protocol, server ip and server port for UL/DL

application traffic. The content of the string has the same encoding as the IPFilterRule

AVP value as defined in IETF RFC 6733.

urls:

type: array

items:

type: string

minItems: 1

description: Represents the significant parts of the URL to be matched, e.g. host name.

domainNames:

type: array

items:

type: string

minItems: 1

description: Represents Domain name matching criteria.

dnProtocol:

$ref: 'TS29122\_PfdManagement.yaml#/components/schemas/DomainNameProtocol'

required:

- appId

PduSesTrafficInfo:

description: Represents the PDU Set traffic analytics information.

type: object

properties:

supis:

type: array

items:

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

minItems: 1

dnn:

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

snssai:

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

tdMatchTrafs:

type: array

items:

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

minItems: 1

tdUnmatchTrafs:

type: array

items:

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

minItems: 1

allOf:

- anyOf:

- required: [dnn]

- required: [snssai]

- anyOf:

- required: [tdMatchTrafs]

- required: [tdUnmatchTrafs]

TdTraffic:

description: Represents traffic that matches or unmatches Traffic Descriptor of URSP rule.

type: object

properties:

pduSesTrafReqs:

type: array

items:

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

minItems: 1

ulVol:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

dlVol:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

allVol:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

ulNumOfPkt:

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

dlNumOfPkt:

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

allNumOfPkt:

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

PduSesTrafficReq:

description: Represents the PDU Session traffic analytics requirements.

type: object

properties:

flowDescs:

type: array

items:

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

minItems: 1

description: >

Indicates traffic flow filtering description(s) for IP flow(s).

appId:

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

domainDescs:

type: array

items:

type: string

minItems: 1

description: >

FQDN(s) or a regular expression which are used as a domain name matching criteria.

oneOf:

- required: [flowDescs]

- required: [appId]

- required: [domainDescs]

ResourceUsageRequirement:

description: resource usage requirement.

type: object

properties:

tfcDirc:

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

valExp:

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

E2eDataVolTransTimeReq:

description: Represents other E2E data volume transfer time analytics requirements.

type: object

properties:

criterion:

$ref: '#/components/schemas/E2eDataVolTransTimeCriterion'

order:

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

reportThresholds:

type: array

items:

type: string

minItems: 1

repeatDataTrans:

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

tsIntervalDataTrans:

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

dataVolume:

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

maxNumberUes:

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

DataVolume:

description: Data Volume including UL/DL.

type: object

properties:

uplinkVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

downlinkVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

anyOf:

- required: [uplinkVolume]

- required: [downlinkVolume]

E2eDataVolTransTimeInfo:

description: >

Represents the E2E data volume transfer time analytics information when subscribed event is

"E2E\_DATA\_VOL\_TRANS\_TIME", the "dataVlTrnsTmInfos" attribute shall be included.

type: object

properties:

e2eDataVolTransTimes:

type: array

items:

$ref: '#/components/schemas/E2eDataVolTransTimePerTS'

minItems: 1

e2eDataVolTransTimeUeLists:

type: array

items:

$ref: '#/components/schemas/E2eDataVolTransTimeUeList'

minItems: 1

geoDistrInfos:

type: array

items:

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

minItems: 1

required:

- e2eDataVolTransTimes

E2eDataVolTransTimePerTS:

description: Represents the E2E data volume transfer time analytics per Time Slot.

type: object

properties:

tsStart:

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

tsDuration:

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

e2eDataVolTransTimePerUe:

type: array

items:

$ref: '#/components/schemas/E2eDataVolTransTimePerUe'

minItems: 1

repeatDataTrans:

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

tsIntervalDataTrans:

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

required:

- tsStart

- tsDuration

- e2eDataVolTransTimePerUe

E2eDataVolTransTimePerUe:

description: Represents the E2E data volume transfer time per UE.

type: object

properties:

supis:

type: array

items:

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

minItems: 1

gpsis:

type: array

items:

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

snssai:

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

appId:

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

ueLoc:

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

dnai:

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

dnn:

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

spatialValidity:

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

validityPeriod:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

dataVolTransTime:

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

oneOf:

- required: [ueLoc]

- required: [snssai]

E2eDataVolTransTimeUeList:

description: >

Contains the list of UEs classified based on experience level of E2E Data Volume Transfer

Time

properties:

highLevel:

type: array

items:

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

minItems: 1

mediumLevel:

type: array

items:

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

minItems: 1

lowLevel:

type: array

items:

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

minItems: 1

lowRatio:

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

mediumRatio:

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

highRatio:

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

spatialValidity:

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

validityPeriod:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

anyOf:

- required: [highLevel]

- required: [mediumLevel]

- required: [lowLevel]

DataVolumeTransferTime:

description: >

Indicates the E2E data volume transfer time and the data volume used to derive the transfer

time.

properties:

uplinkVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

avgTransTimeUl:

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

varTransTimeUl:

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

downlinkVolume:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'

avgTransTimeDl:

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

varTransTimeDl:

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

GeoLocation:

description: >

Represents a horizontal and optionally vertical location using either geographic

or local coordinates.

type: object

properties:

point:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/Point'

pointAlt:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/PointAltitude'

refPoint:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LocalOrigin'

localCoords:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/RelativeCartesianLocation'

anyOf:

- required: [point]

- required: [pointAlt]

- allOf:

- required: [refPoint]

- required: [localCoords]

LocAccuracyReq:

description: >

Contains location accuracy analytics requirements.

type: object

properties:

accThres:

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

accThresMatchDir:

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

inOutThres:

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

inOutThresMatchDir:

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

posMethod:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/PositioningMethod'

LocAccuracyInfo:

description: >

Contains location accuracy analytics.

type: object

properties:

locAccPerMeths:

type: array

items:

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

minItems: 1

description: Location accuracy information per positioning method.

inOutUePct:

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

inOutInd:

type: boolean

description: Indicates if the target location is indoors or outdoors.

required:

- locAccPerMeths

not:

required: [inOutUePct, inOutInd]

LocAccuracyPerMethod:

description: >

Contains location accuracy analytics per positioning method.

type: object

properties:

posMethod:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/PositioningMethod'

locAcc:

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

losNlosPercent:

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

required:

- posMethod

- locAcc

AccuracyReq:

description: Represents the analytics accuracy requirement information.

type: object

properties:

accuTimeWin:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'

accuPeriod:

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

accuDevThr:

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

minNum:

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

updatedAnaFlg:

type: boolean

description: >

Indicates the updated Analytics flag. Set to "true" indicates that the NWDAF can provide

the updated analytics if the analytics can be generated within the analytics accuracy

information time window, which is specified by "accuTimeWin" attribute.

Otherwise set to “false”. Default value is “false” if omitted.

correctionInterval:

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

AccuracyInfo:

description: The analytics accuracy information.

type: object

properties:

accuracyVal:

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

accuSampleNbr:

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

anaAccuInd:

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

MovBehavReq:

description: Represents the Movement Behaviour analytics requirements.

properties:

locationGranReq:

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

reportThresholds:

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

MovBehavInfo:

description: Represents the Movement Behaviour information.

properties:

geoLoc:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicalCoordinates'

movBehavs:

type: array

items:

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

minItems: 1

confidence:

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

MovBehav:

description: Represents the Movement Behaviour information per time slot.

properties:

tsStart:

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

tsDuration:

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

numOfUe:

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

ratio:

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

avrSpeed:

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

speedThresdInfos:

type: array

items:

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

minItems: 1

directionUeInfos:

type: array

items:

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

minItems: 1

required:

- tsStart

- tsDuration

SpeedThresholdInfo:

description: UEs information whose speed is faster than the speed threshold.

properties:

numOfUe:

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

ratio:

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

DirectionUeInfo:

description: Heading directions information of the UE flow in the target area.

properties:

direction:

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

numOfUe:

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

avrSpeed:

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

ratio:

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

required:

- direction

RelProxReq:

description: Represents the Relative Proximity analytics requirements.

properties:

direction:

type: array

items:

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

minItems: 1

numOfUe:

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

proximityCrits:

type: array

items:

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

minItems: 1

RelProxInfo:

description: Represents the Relative Proximity information.

properties:

tsStart:

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

tsDuration:

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

supis:

type: array

items:

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

minItems: 1

gpsis:

type: array

items:

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

minItems: 1

ueProximities:

type: array

items:

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

minItems: 1

ttcInfo:

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

required:

- tsStart

- tsDuration

- ueProximities

UeProximity:

description: Represents the Observed or Predicted proximity information.

properties:

ueDistance:

type: integer

ueVelocity:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/VelocityEstimate'

avrSpeed:

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

locOrientation:

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

ueTrajectories:

type: array

items:

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

minItems: 1

ratio:

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

UeTrajectory:

description: Represents timestamped UE positions.

properties:

supi:

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

gpsi:

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

timestampedLocs:

type: array

items:

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

minItems: 1

required:

- timestampedLocs

oneOf:

- required: [supi]

- required: [gpsi]

TimestampedLocation:

description: The timestamped locations of the trajectory of the UE.

properties:

ts:

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

locInfo:

items:

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

required:

- ts

- locInfo

TimeToCollisionInfo:

description: Represents Time To Collision (TTC) information.

properties:

ttc:

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

accuracy:

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

confidence:

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

#

# ENUMERATIONS DATA TYPES

#

NotificationMethod:

anyOf:

- type: string

enum:

- PERIODIC

- THRESHOLD

- 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: |

Represents the notification methods for the subscribed events.

Possible values are:

- PERIODIC: The notification of the subscribed NWDAF Event is periodical. The period

between the notifications is identified by repetitionPeriod and represents time in

seconds.

- THRESHOLD: The subscribe of NWDAF Event is upon threshold exceeded.

NwdafEvent:

anyOf:

- type: string

enum:

- SLICE\_LOAD\_LEVEL

- NETWORK\_PERFORMANCE

- NF\_LOAD

- SERVICE\_EXPERIENCE

- UE\_MOBILITY

- UE\_COMMUNICATION

- QOS\_SUSTAINABILITY

- ABNORMAL\_BEHAVIOUR

- USER\_DATA\_CONGESTION

- NSI\_LOAD\_LEVEL

- DN\_PERFORMANCE

- DISPERSION

- RED\_TRANS\_EXP

- WLAN\_PERFORMANCE

- SM\_CONGESTION

- PFD\_DETERMINATION

- PDU\_SESSION\_TRAFFIC

- E2E\_DATA\_VOL\_TRANS\_TIME

- MOVEMENT\_BEHAVIOUR

- NUM\_OF\_UE

- MOV\_UE\_RATIO

- AVR\_SPEED

- SPEED\_THRESHOLD

- MOV\_UE\_DIRECTION

- LOC\_ACCURACY

- RELATIVE\_PROXIMITY

- 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: |

Describes the NWDAF Events.

Possible values are:

- SLICE\_LOAD\_LEVEL: Indicates that the event subscribed is load level information of Network

Slice.

- NETWORK\_PERFORMANCE: Indicates that the event subscribed is network performance

information.

- NF\_LOAD: Indicates that the event subscribed is load level and status of one or several

Network Functions.

- SERVICE\_EXPERIENCE: Indicates that the event subscribed is service experience.

- UE\_MOBILITY: Indicates that the event subscribed is UE mobility information.

- UE\_COMMUNICATION: Indicates that the event subscribed is UE communication information.

- QOS\_SUSTAINABILITY: Indicates that the event subscribed is QoS sustainability.

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

- USER\_DATA\_CONGESTION: Indicates that the event subscribed is user data congestion

information.

- NSI\_LOAD\_LEVEL: Indicates that the event subscribed is load level information of Network

Slice and the optionally associated Network Slice Instance.

- DN\_PERFORMANCE: Indicates that the event subscribed is DN performance information.

- DISPERSION: Indicates that the event subscribed is dispersion information.

- RED\_TRANS\_EXP: Indicates that the event subscribed is redundant transmission experience.

- WLAN\_PERFORMANCE: Indicates that the event subscribed is WLAN performance.

- SM\_CONGESTION: Indicates the Session Management Congestion Control Experience information

for specific DNN and/or S-NSSAI.

- PFD\_DETERMINATION: Indicates that the event subscribed is the PFD Determination nformation

for known application identifier(s).

- PDU\_SESSION\_TRAFFIC: Indicates that the event subscribed is the PDU Session traffic

information.

- E2E\_DATA\_VOL\_TRANS\_TIME: Indicates that the event subscribed is of E2E data volume

transfer time.

- MOVEMENT\_BEHAVIOUR: Indicates that the event subscribed is the Movement Behaviour

information.

- LOC\_ACCURACY: Indicates that the event subscribed is of location accuracy.

- RELATIVE\_PROXIMITY: Indicates that the event subscribed is the Relative Proximity

information.

Accuracy:

anyOf:

- type: string

enum:

- LOW

- MEDIUM

- HIGH

- HIGHEST

- 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: |

Represents the preferred level of accuracy of the analytics.

Possible values are:

- LOW: Low accuracy.

- MEDIUM: Medium accuracy.

- HIGH: High accuracy.

- HIGHEST: Highest accuracy.

CongestionType:

anyOf:

- type: string

enum:

- USER\_PLANE

- CONTROL\_PLANE

- USER\_AND\_CONTROL\_PLANE

- 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: |

Indicates the congestion analytics type.

Possible values are:

- USER\_PLANE: The congestion analytics type is User Plane.

- CONTROL\_PLANE: The congestion analytics type is Control Plane.

- USER\_AND\_CONTROL\_PLANE: The congestion analytics type is User Plane and Control Plane.

ExceptionId:

anyOf:

- type: string

enum:

- UNEXPECTED\_UE\_LOCATION

- UNEXPECTED\_LONG\_LIVE\_FLOW

- UNEXPECTED\_LARGE\_RATE\_FLOW

- UNEXPECTED\_WAKEUP

- SUSPICION\_OF\_DDOS\_ATTACK

- WRONG\_DESTINATION\_ADDRESS

- TOO\_FREQUENT\_SERVICE\_ACCESS

- UNEXPECTED\_RADIO\_LINK\_FAILURES

- PING\_PONG\_ACROSS\_CELLS

- 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: |

Describes the Exception Id.

Possible values are:

- UNEXPECTED\_UE\_LOCATION: Unexpected UE location.

- UNEXPECTED\_LONG\_LIVE\_FLOW: Unexpected long-live rate flows.

- UNEXPECTED\_LARGE\_RATE\_FLOW: Unexpected large rate flows.

- UNEXPECTED\_WAKEUP: Unexpected wakeup.

- SUSPICION\_OF\_DDOS\_ATTACK: Suspicion of DDoS attack.

- WRONG\_DESTINATION\_ADDRESS: Wrong destination address.

- TOO\_FREQUENT\_SERVICE\_ACCESS: Too frequent Service Access.

- UNEXPECTED\_RADIO\_LINK\_FAILURES: Unexpected radio link failures.

- PING\_PONG\_ACROSS\_CELLS: Ping-ponging across neighbouring cells.

ExceptionTrend:

anyOf:

- type: string

enum:

- UP

- DOWN

- UNKNOW

- STABLE

- 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: |

Represents the Exception Trend.

Possible values are:

- UP: Up trend of the exception level.

- DOWN: Down trend of the exception level.

- UNKNOW: Unknown trend of the exception level.

- STABLE: Stable trend of the exception level.

TimeUnit:

anyOf:

- type: string

enum:

- MINUTE

- HOUR

- DAY

- 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: |

Represents the unit for the session active time.

Possible values are:

- MINUTE: Time unit is per minute.

- HOUR: Time unit is per hour.

- DAY: Time unit is per day.

NetworkPerfType:

anyOf:

- type: string

enum:

- GNB\_ACTIVE\_RATIO

- GNB\_COMPUTING\_USAGE

- GNB\_MEMORY\_USAGE

- GNB\_DISK\_USAGE

- GNB\_RSC\_USAGE\_OVERALL\_TRAFFIC

- GNB\_RSC\_USAGE\_GBR\_TRAFFIC

- GNB\_RSC\_USAGE\_DELAY\_CRIT\_GBR\_TRAFFIC

- NUM\_OF\_UE

- SESS\_SUCC\_RATIO

- HO\_SUCC\_RATIO

- 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: |

Represents the network performance types.

Possible values are:

- GNB\_ACTIVE\_RATIO: Indicates that the network performance requirement is gNodeB active

(i.e. up and running) rate. Indicates the ratio of gNB active (i.e. up and running) number

to the total number of gNB.

- GNB\_COMPUTING\_USAGE: Indicates gNodeB computing resource usage.

- GNB\_MEMORY\_USAGE: Indicates gNodeB memory usage.

- GNB\_DISK\_USAGE: Indicates gNodeB disk usage.

- GNB\_RSC\_USAGE\_OVERALL\_TRAFFIC: The gNB resource usage.

- GNB\_RSC\_USAGE\_GBR\_TRAFFIC: The gNB resource usage for GBR traffic.

- GNB\_RSC\_USAGE\_DELAY\_CRIT\_GBR\_TRAFFIC: The gNB resource usage for Delay-critical GBR

traffic.

- NUM\_OF\_UE: Indicates number of UEs.

- SESS\_SUCC\_RATIO: Indicates ratio of successful setup of PDU sessions to total PDU

session setup attempts.

- HO\_SUCC\_RATIO: Indicates Ratio of successful handovers to the total handover attempts.

ExpectedAnalyticsType:

anyOf:

- type: string

enum:

- MOBILITY

- COMMUN

- MOBILITY\_AND\_COMMUN

- 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: |

Represents the expected UE analytics type.

Possible values are:

- MOBILITY: Mobility related abnormal behaviour analytics is expected by the consumer.

- COMMUN: Communication related abnormal behaviour analytics is expected by the consumer.

- MOBILITY\_AND\_COMMUN: Both mobility and communication related abnormal behaviour analytics

is expected by the consumer.

MatchingDirection:

anyOf:

- type: string

enum:

- ASCENDING

- DESCENDING

- CROSSED

- 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: |

Represents the matching direction when crossing a threshold.

Possible values are:

- ASCENDING: Threshold is crossed in ascending direction.

- DESCENDING: Threshold is crossed in descending direction.

- CROSSED: Threshold is crossed either in ascending or descending direction.

NwdafFailureCode:

anyOf:

- type: string

enum:

- UNAVAILABLE\_DATA

- BOTH\_STAT\_PRED\_NOT\_ALLOWED

- UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME

- OTHER

- 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: |

Represents the failure reason.

Possible values are:

- UNAVAILABLE\_DATA: Indicates the requested statistics information for the event is rejected

since necessary data to perform the service is unavailable.

- BOTH\_STAT\_PRED\_NOT\_ALLOWED: Indicates the requested analysis information for the event is

rejected since the start time is in the past and the end time is in the future, which

means the NF service consumer requested both statistics and prediction for the analytics.

- UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME: Indicates that the requested event is rejected since

the analytics information is not ready when the time indicated by the "timeAnaNeeded"

attribute (as provided during the creation or modification of subscription) is reached.

- OTHER: Indicates the requested analysis information for the event is rejected due to other

reasons.

AnalyticsMetadata:

anyOf:

- type: string

enum:

- NUM\_OF\_SAMPLES

- DATA\_WINDOW

- DATA\_STAT\_PROPS

- STRATEGY

- ACCURACY

- 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: |

Represents the types of analytics metadata information that can be requested.

Possible values are:

- NUM\_OF\_SAMPLES: Number of data samples used for the generation of the output analytics.

- DATA\_WINDOW: Data time window of the data samples.

- DATA\_STAT\_PROPS: Dataset statistical properties of the data used to generate the

analytics.

- STRATEGY: Output strategy used for the reporting of the analytics.

- ACCURACY: Level of accuracy reached for the analytics.

DatasetStatisticalProperty:

anyOf:

- type: string

enum:

- UNIFORM\_DIST\_DATA

- NO\_OUTLIERS

- 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: |

Represents the dataset statistical properties.

Possible values are:

- UNIFORM\_DIST\_DATA: Indicates the use of data samples that are uniformly distributed

according to the different aspects of the requested analytics.

- NO\_OUTLIERS: Indicates that the data samples shall disregard data samples that are at

the extreme boundaries of the value range.

OutputStrategy:

anyOf:

- type: string

enum:

- BINARY

- GRADIENT

- 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: |

Represents the output strategy used for the analytics reporting.

Possible values are:

- BINARY: Indicates that the analytics shall only be reported when the requested level

of accuracy is reached within a cycle of periodic notification.

- GRADIENT: Indicates that the analytics shall be reported according with the periodicity

irrespective of whether the requested level of accuracy has been reached or not.

TransferRequestType:

anyOf:

- type: string

enum:

- PREPARE

- TRANSFER

- 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: |

Represents the request type for the analytics subscription transfer.

Possible values are:

- PREPARE: Indicates that the request is for analytics subscription transfer preparation.

- TRANSFER: Indicates that the request is for analytics subscription transfer execution.

AnalyticsSubset:

anyOf:

- type: string

enum:

- NUM\_OF\_UE\_REG

- NUM\_OF\_PDU\_SESS\_ESTBL

- RES\_USAGE

- NUM\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR

- PERIOD\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR

- EXCEED\_LOAD\_LEVEL\_THR\_IND

- LIST\_OF\_TOP\_APP\_UL

- LIST\_OF\_TOP\_APP\_DL

- NF\_STATUS

- NF\_RESOURCE\_USAGE

- NF\_LOAD

- NF\_PEAK\_LOAD

- NF\_LOAD\_AVG\_IN\_AOI

- DISPER\_AMOUNT

- DISPER\_CLASS

- RANKING

- PERCENTILE\_RANKING

- RSSI

- RTT

- TRAFFIC\_INFO

- NUMBER\_OF\_UES

- APP\_LIST\_FOR\_UE\_COMM

- N4\_SESS\_INACT\_TIMER\_FOR\_UE\_COMM

- AVG\_TRAFFIC\_RATE

- MAX\_TRAFFIC\_RATE

- AGG\_TRAFFIC\_RATE

- VAR\_TRAFFIC\_RATE

- AVG\_PACKET\_DELAY

- MAX\_PACKET\_DELAY

- VAR\_PACKET\_DELAY

- AVG\_PACKET\_LOSS\_RATE

- MAX\_PACKET\_LOSS\_RATE

- VAR\_PACKET\_LOSS\_RATE

- UE\_LOCATION

- LIST\_OF\_HIGH\_EXP\_UE

- LIST\_OF\_MEDIUM\_EXP\_UE

- LIST\_OF\_LOW\_EXP\_UE

- AVG\_UL\_PKT\_DROP\_RATE

- VAR\_UL\_PKT\_DROP\_RATE

- AVG\_DL\_PKT\_DROP\_RATE

- VAR\_DL\_PKT\_DROP\_RATE

- AVG\_UL\_PKT\_DELAY

- VAR\_UL\_PKT\_DELAY

- AVG\_DL\_PKT\_DELAY

- VAR\_DL\_PKT\_DELAY

- TRAFFIC\_MATCH\_TD

- TRAFFIC\_UNMATCH\_TD

- NUMBER\_OF\_UE

- UE\_GEOG\_DIST

- UE\_DIRECTION

- USER\_LOCATION

- AVG\_E2E\_UL\_PKT\_DELAY

- VAR\_E2E\_UL\_PKT\_DELAY

- AVG\_E2E\_DL\_PKT\_DELAY

- VAR\_E2E\_DL\_PKT\_DELAY

- AVG\_E2E\_UL\_PKT\_LOSS\_RATE

- VAR\_E2E\_UL\_PKT\_LOSS\_RATE

- AVG\_E2E\_DL\_PKT\_LOSS\_RATE

- VAR\_E2E\_DL\_PKT\_LOSS\_RATE

- E2E\_DATA\_VOL\_TRANS\_TIME\_FOR\_UE\_LIST

- IN\_OUT\_PERCENT

- TIME\_TO\_COLLISION

- 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: |

Represents the analytics subset.

Possible values are:

- NUM\_OF\_UE\_REG: The number of UE registered. This value is only applicable to

NSI\_LOAD\_LEVEL event.

- NUM\_OF\_PDU\_SESS\_ESTBL: The number of PDU sessions established. This value is only

applicable to NSI\_LOAD\_LEVEL event.

- RES\_USAGE: The current usage of the virtual resources assigned to the NF instances

belonging to a particular network slice instance. This value is only applicable to

NSI\_LOAD\_LEVEL event.

- NUM\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR: The number of times the resource usage threshold

of the network slice instance is reached or exceeded if a threshold value is provided by

the consumer. This value is only applicable to NSI\_LOAD\_LEVEL event.

- PERIOD\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR: The time interval between each time the

threshold being met or exceeded on the network slice (instance). This value is only

applicable to NSI\_LOAD\_LEVEL event.

- EXCEED\_LOAD\_LEVEL\_THR\_IND: Whether the Load Level Threshold is met or exceeded by the

statistics value. This value is only applicable to NSI\_LOAD\_LEVEL event.

- LIST\_OF\_TOP\_APP\_UL: The list of applications that contribute the most to the traffic in

the UL direction. This value is only applicable to USER\_DATA\_CONGESTION event.

- LIST\_OF\_TOP\_APP\_DL: The list of applications that contribute the most to the traffic in

the DL direction. This value is only applicable to USER\_DATA\_CONGESTION event.

- NF\_STATUS: The availability status of the NF on the Analytics target period, expressed

as a percentage of time per status value (registered, suspended, undiscoverable). This

value is only applicable to NF\_LOAD event.

- NF\_RESOURCE\_USAGE: The average usage of assigned resources (CPU, memory, storage). This

value is only applicable to NF\_LOAD event.

- NF\_LOAD: The average load of the NF instance over the Analytics target period. This value

is only applicable to NF\_LOAD event.

- NF\_PEAK\_LOAD: The maximum load of the NF instance over the Analytics target period. This

value is only applicable to NF\_LOAD event.

- NF\_LOAD\_AVG\_IN\_AOI: The average load of the NF instances over the area of interest. This

value is only applicable to NF\_LOAD event.

- DISPER\_AMOUNT: Indicates the dispersion amount of the reported data volume or transaction

dispersion type. This value is only applicable to DISPERSION event.

- DISPER\_CLASS: Indicates the dispersion mobility class: fixed, camper, traveller upon set

its usage threshold, and/or the top-heavy class upon set its percentile rating threshold.

This value is only applicable to DISPERSION event.

- RANKING: Data/transaction usage ranking high (i.e.value 1), medium (2) or low (3). This

value is only applicable to DISPERSION event.

- PERCENTILE\_RANKING: Percentile ranking of the target UE in the Cumulative Distribution

Function of data usage for the population of all UEs. This value is only applicable to

DISPERSION event.

- RSSI: Indicated the RSSI in the unit of dBm. This value is only applicable to

WLAN\_PERFORMANCE event.

- RTT: Indicates the RTT in the unit of millisecond. This value is only applicable to

WLAN\_PERFORMANCE event.

- TRAFFIC\_INFO: Traffic information including UL/DL data rate and/or Traffic volume. This

value is only applicable to WLAN\_PERFORMANCE event.

- NUMBER\_OF\_UES: Number of UEs observed for the SSID. This value is only applicable to

WLAN\_PERFORMANCE event.

- APP\_LIST\_FOR\_UE\_COMM: The analytics of the application list used by UE. This value is only

applicable to UE\_COMM event.

- N4\_SESS\_INACT\_TIMER\_FOR\_UE\_COMM: The N4 Session inactivity timer. This value is only

applicable to UE\_COMM event.

- AVG\_TRAFFIC\_RATE: Indicates average traffic rate. This value is only applicable to

DN\_PERFORMANCE event.

- MAX\_TRAFFIC\_RATE: Indicates maximum traffic rate. This value is only applicable to

DN\_PERFORMANCE event.

- AGG\_TRAFFIC\_RATE: Indicates aggregated traffic rate. This value is only applicable to

DN\_PERFORMANCE event.

- VAR\_TRAFFIC\_RATE: Indicates variance traffic rate. This value is only applicable to

DN\_PERFORMANCE event.

- AVG\_PACKET\_DELAY: Indicates average Packet Delay. This value is only applicable to

DN\_PERFORMANCE event.

- MAX\_PACKET\_DELAY: Indicates maximum Packet Delay. This value is only applicable to

DN\_PERFORMANCE event.

- VAR\_PACKET\_DELAY: Indicates variance Packet Delay. This value is only applicable to

DN\_PERFORMANCE event.

- AVG\_PACKET\_LOSS\_RATE: Indicates average Loss Rate. This value is only applicable to

DN\_PERFORMANCE event.

- MAX\_PACKET\_LOSS\_RATE: Indicates maximum Packet Loss Rate. This value is only applicable to

DN\_PERFORMANCE event.

- VAR\_PACKET\_LOSS\_RATE: Indicates variance Packet Loss Rate. This value is only applicable

to DN\_PERFORMANCE event.

- UE\_LOCATION: Indicates UE location information. This value is only applicable to

SERVICE\_EXPERIENCE event.

- LIST\_OF\_HIGH\_EXP\_UE: Indicates list of high experienced UE. This value is only applicable

to SM\_CONGESTION event.

- LIST\_OF\_MEDIUM\_EXP\_UE: Indicates list of medium experienced UE. This value is only

applicable to SM\_CONGESTION event.

- LIST\_OF\_LOW\_EXP\_UE: Indicates list of low experienced UE. This value is only applicable to

SM\_CONGESTION event.

- AVG\_UL\_PKT\_DROP\_RATE: Indicates average uplink packet drop rate on GTP-U path on N3. This

value is only applicable to RED\_TRANS\_EXP event.

- VAR\_UL\_PKT\_DROP\_RATE: Indicates variance of uplink packet drop rate on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- AVG\_DL\_PKT\_DROP\_RATE: Indicates average downlink packet drop rate on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_DL\_PKT\_DROP\_RATE: Indicates variance of downlink packet drop rate on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- AVG\_UL\_PKT\_DELAY: Indicates average uplink packet delay round trip on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_UL\_PKT\_DELAY: Indicates variance uplink packet delay round trip on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- AVG\_DL\_PKT\_DELAY: Indicates average downlink packet delay round trip on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_DL\_PKT\_DELAY: Indicates variance downlink packet delay round trip on GTP-U path on N3.

This value is only applicable to RED\_TRANS\_EXP event.

- TRAFFIC\_MATCH\_TD: Identifies traffic that matches Traffic Descriptor provided by

the consumer.

- TRAFFIC\_UNMATCH\_TD: Identifies traffic that does not match Traffic Descriptor

provided by the consumer.

- NUMBER\_OF\_UE: Indicates the number of UEs. This value is only applicable to

DN\_PERFORMANCE event.

- UE\_GEOG\_DIST: Indicates the geographical distribution of the UEs that can be selected by

the AF for application service. This value is only applicable to UE\_MOBILITY event.

- UE\_DIRECTION: Indicates the direction of the UEs. This value is only applicable to

UE\_MOBILITY event.

- USER\_LOCATION: Indicates the user location. This value is only applicable to UE\_MOBILITY

event.

- AVG\_E2E\_UL\_PKT\_DELAY: Indicates average End-to-End (between UE and UPF) uplink packet

delay. This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_E2E\_UL\_PKT\_DELAY: Indicates the variance of End-to-End (between UE and UPF) uplink

packet delay. This value is only applicable to RED\_TRANS\_EXP event.

- AVG\_E2E\_DL\_PKT\_DELAY: Indicates average End-to-End (between UE and UPF) downlink packet

delay. This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_E2E\_DL\_PKT\_DELAY: Indicates the variance of End-to-End (between UE and UPF) downlink

packet delay. This value is only applicable to RED\_TRANS\_EXP event.

- AVG\_E2E\_UL\_PKT\_LOSS\_RATE: Indicates average End-to-End (between UE and UPF) uplink packet

loss rate. This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_E2E\_UL\_PKT\_LOSS\_RATE: Indicates the variance of End-to-End (between UE and UPF) uplink

packet loss rate. This value is only applicable to RED\_TRANS\_EXP event.

- AVG\_E2E\_DL\_PKT\_LOSS\_RATE: Indicates average End-to-End (between UE and UPF) downlink

packet loss rate. This value is only applicable to RED\_TRANS\_EXP event.

- VAR\_E2E\_DL\_PKT\_LOSS\_RATE: Indicates the variance of End-to-End (between UE and UPF)

downlink packet loss rate. This value is only applicable to RED\_TRANS\_EXP event.

- E2E\_DATA\_VOL\_TRANS\_TIME\_FOR\_UE\_LIST: Indicates the classified E2E data volume transfer

time statistics or predictions for multiple UEs with respect to one or more reporting

thresholds.

- NUM\_OF\_UE: Indicates the total number of users in the area of interest. This

value is only applicable to MOVEMENT\_BEHAVIOUR event.

- MOV\_UE\_RATIO: Indicates the Ratio of moving UEs in the area of interest. This value

is only applicable to MOVEMENT\_BEHAVIOUR event.

- AVR\_SPEED: Indicates the average speed of all UEs in the area of interest. This value

is only applicable to MOVEMENT\_BEHAVIOUR event.

- SPEED\_THRESHOLD: Indicates the information on UEs in the area of interest whose speed

is faster than the speed threshold. This value is only applicable to MOVEMENT\_BEHAVIOUR

event.

- MOV\_UE\_DIRECTION: Indicates the heading directions of the UE flow in the target area.

This value is only applicable to MOVEMENT\_BEHAVIOUR event.

- IN\_OUT\_PERCENT: Indicates the percentage of indoor/outdoor UEs at a location.

The value is only applicable to the LOC\_ACCURACY event.

- TIME\_TO\_COLLISION: Indicates the time until for a collision with another UE happens.

This value is only applicable to RELATIVE\_PROXIMITY event prediction.

DispersionType:

oneOf:

- type: string

enum:

- DVDA

- TDA

- DVDA\_AND\_TDA

- 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: |

Represents the dispersion type.

Possible values are:

- DVDA: Data Volume Dispersion Analytics.

- TDA: Transactions Dispersion Analytics.

- DVDA\_AND\_TDA: Data Volume Dispersion Analytics and Transactions Dispersion Analytics.

DispersionClass:

oneOf:

- type: string

enum:

- FIXED

- CAMPER

- TRAVELLER

- TOP\_HEAVY

- 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: |

Represents the dispersion class.

Possible values are:

- FIXED: Dispersion class as fixed UE its data or transaction usage at a location or

a slice, is higher than its class threshold set for its all data or transaction usage.

- CAMPER: Dispersion class as camper UE, its data or transaction usage at a location or

a slice, is higher than its class threshold and lower than the fixed class threshold set

for its all data or transaction usage.

- TRAVELLER: Dispersion class as traveller UE, its data or transaction usage at a location

or a slice, is lower than the camper class threshold set for its all data or transaction

usage.

- TOP\_HEAVY: Dispersion class as Top\_Heavy UE, who's dispersion percentile rating at a

location or a slice, is higher than its class threshold.

DispersionOrderingCriterion:

anyOf:

- type: string

enum:

- TIME\_SLOT\_START

- DISPERSION

- CLASSIFICATION

- RANKING

- PERCENTILE\_RANKING

- 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: |

Represents the order criterion for the list of dispersion.

Possible values are:

- TIME\_SLOT\_START: Indicates the order of time slot start.

- DISPERSION: Indicates the order of data/transaction dispersion.

- CLASSIFICATION: Indicates the order of data/transaction classification.

- RANKING: Indicates the order of data/transaction ranking.

- PERCENTILE\_RANKING: Indicates the order of data/transaction percentile ranking.

DeviceType:

anyOf:

- type: string

enum:

- MOBILE\_PHONE

- SMART\_PHONE

- TABLET

- DONGLE

- MODEM

- WLAN\_ROUTER

- IOT\_DEVICE

- WEARABLE

- MOBILE\_TEST\_PLATFORM

- UNDEFINED

- 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: |

Represents the device type.

Possible values are:

- MOBILE\_PHONE: Mobile Phone.

- SMART\_PHONE: Smartphone.

- TABLET: Tablet.

- DONGLE: Dongle.

- MODEM: Modem.

- WLAN\_ROUTER: WLAN Router.

- IOT\_DEVICE: IoT Device.

- WEARABLE: Wearable.

- MOBILE\_TEST\_PLATFORM: Mobile Test Platform.

- UNDEFINED: Undefined.

RedTransExpOrderingCriterion:

anyOf:

- type: string

enum:

- TIME\_SLOT\_START

- RED\_TRANS\_EXP

- 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: |

Represents the order criterion for the list of Redundant Transmission Experience.

Possible values are:

- TIME\_SLOT\_START: Indicates the order of time slot start.

- RED\_TRANS\_EXP: Indicates the order of Redundant Transmission Experience.

WlanOrderingCriterion:

anyOf:

- type: string

enum:

- TIME\_SLOT\_START

- NUMBER\_OF\_UES

- RSSI

- RTT

- TRAFFIC\_INFO

- 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: |

Represents the order criterion for the list of WLAN performance information.

Possible values are:

- TIME\_SLOT\_START: Indicates the order of time slot start.

- NUMBER\_OF\_UES: Indicates the order of number of UEs.

- RSSI: Indicates the order of RSSI.

- RTT: Indicates the order of RTT.

- TRAFFIC\_INFO: Indicates the order of Traffic information.

ServiceExperienceType:

anyOf:

- type: string

enum:

- VOICE

- VIDEO

- OTHER

- 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: |

Represents the type of the service experience analytics.

Possible values are:

- VOICE: Indicates that the service experience analytics is for voice service.

- VIDEO: Indicates that the service experience analytics is for video service.

- OTHER: Indicates that the service experience analytics is for other service.

DnPerfOrderingCriterion:

anyOf:

- type: string

enum:

- AVERAGE\_TRAFFIC\_RATE

- MAXIMUM\_TRAFFIC\_RATE

- AVERAGE\_PACKET\_DELAY

- MAXIMUM\_PACKET\_DELAY

- AVERAGE\_PACKET\_LOSS\_RATE

- 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: |

Represents the order criterion for the list of DN performance analytics.

Possible values are:

- AVERAGE\_TRAFFIC\_RATE: Indicates the average traffic rate.

- MAXIMUM\_TRAFFIC\_RATE: Indicates the maximum traffic rate.

- AVERAGE\_PACKET\_DELAY: Indicates the average packet delay.

- MAXIMUM\_PACKET\_DELAY: Indicates the maximum packet delay.

- AVERAGE\_PACKET\_LOSS\_RATE: Indicates the average packet loss rate.

TermCause:

anyOf:

- type: string

enum:

- USER\_CONSENT\_REVOKED

- NWDAF\_OVERLOAD

- UE\_LEFT\_AREA

- 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: |

Represents the cause for the analytics subscription termination request.

Possible values are:

- USER\_CONSENT\_REVOKED: The user consent has been revoked.

- NWDAF\_OVERLOAD: The NWDAF is overloaded.

- UE\_LEFT\_AREA: The UE has moved out of the NWDAF serving area.

UserDataConOrderCrit:

anyOf:

- type: string

enum:

- APPLICABLE\_TIME\_WINDOW

- NETWORK\_STATUS\_INDICATION

- 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: |

Represents the cause for requesting to terminate an analytics subscription.

Possible values are:

- APPLICABLE\_TIME\_WINDOW: The ordering criterion is the Applicable Time Window.

- NETWORK\_STATUS\_INDICATION: The ordering criterion is the network status indication.

UeMobilityOrderCriterion:

anyOf:

- type: string

enum:

- TIME\_SLOT

- 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: |

Represents the ordering criterion for the list of UE mobility analytics.

Possible values are:

- TIME\_SLOT: The ordering criterion is the time slot.

UeCommOrderCriterion:

anyOf:

- type: string

enum:

- START\_TIME

- DURATION

- 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: |

Represents the ordering criterion for the list of UE communication analytics.

Possible values are:

- START\_TIME: The ordering criterion of the analytics is the start time.

- DURATION: The ordering criterion of the analytics is the duration of the communication.

NetworkPerfOrderCriterion:

anyOf:

- type: string

enum:

- NUMBER\_OF\_UES

- COMMUNICATION\_PERF

- MOBILITY\_PERF

- 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: |

Represents the ordering criterion for the list of network performance analytics.

Possible values are:

- NUMBER\_OF\_UES: The ordering criterion of the analytics is the number of UEs.

- COMMUNICATION\_PERF: The ordering criterion of the analytics is the communication performance.

- MOBILITY\_PERF: The ordering criterion of the analytics is themobility performance.

LocInfoGranularity:

anyOf:

- type: string

enum:

- TA\_LEVEL

- CELL\_LEVEL

- LON\_AND\_LAT\_LEVEL

- 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: |

Represents the preferred granularity of location information.

Possible values are:

- TA\_LEVEL: Indicates location granularity of TA level.

- CELL\_LEVEL: Indicates location granularity of Cell level.

- LON\_AND\_LAT\_LEVEL: Indicates location granularity of longitude and latitude level.

TrafficDirection:

anyOf:

- type: string

enum:

- UL\_AND\_DL

- UL

- DL

- 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: |

Represents the traffic direction for the resource usage information.

Possible values are:

- UL\_AND\_DL: Uplink and downlink traffic.

- UL: Uplink traffic.

- DL: Downlink traffic.

ValueExpression:

anyOf:

- type: string

enum:

- AVERAGE

- PEAK

- 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: |

Represents the average or peak value of the resource usage for the network performance type.

Possible values are:

- AVERAGE: Resource usage information in average value.

- PEAK: Resource usage information in peak value.

E2eDataVolTransTimeCriterion:

anyOf:

- type: string

enum:

- TIME\_SLOT\_START

- E2E\_DATA\_VOL\_TRANS\_TIME

- 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: |

Represents the ordering criterion for the list of E2E data volume transfer time.

Possible values are:

- TIME\_SLOT\_START: Indicates the order of time slot start.

- E2E\_DATA\_VOL\_TRANS\_TIME: The ordering criterion is the E2E data volume transfer time.

AnalyticsAccuracyIndication:

anyOf:

- type: string

enum:

- MEET

- NOT\_MEET

- 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: |

Represents the notification methods for the subscribed events.

Possible values are:

- MEET: Indicates meet the analytics accuracy requirement.

- NOT\_MEET: Indicates not meet the analytics accuracy requirement.

LocationOrientation:

anyOf:

- type: string

enum:

- HORIZONTAL

- VERTICAL

- HOR\_AND\_VER

- 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:

- HORIZONTAL: Indicates horizontal orientation.

- VERTICAL: Indicates vertical orientation.

- HOR\_AND\_VER: Indicates both horizontal and vertical orientation.

Direction:

anyOf:

- type: string

enum:

- NORTH

- SOUTH

- EAST

- WEST

- 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:

- NORTH: North direction.

- SOUTH: South direction.

- EAST: EAST direction.

- WEST: WEST direction.

ProximityCriterion:

anyOf:

- type: string

enum:

- VELOCITY

- AVG\_SPD

- ORIENTATION

- TRAJECTORY

- 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:

- VELOCITY: Velocity.

- AVG\_SPD: Average speed.

- ORIENTATION: Orientation.

- TRAJECTORY: Mobility trajectory.

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