**3GPP TSG- Meeting #**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** | Last known location in UE Mobility | | | | | | | | | |
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| ***Source to WG:*** | , Verizon, Ericsson | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNetAE19 | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | As agreed in S2-2505666, the NF service consumer inputs of the UE Mobility analytics in 23.288 clause 6.7.2.1 now contain also the last known UE location together with the associated timestamp. | | | | | | | | |
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| ***Summary of change:*** | | Added the last known UE location to the UE Mobility analytics inputs. | | | | | | | | |
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| ***Consequences if not approved:*** | | Not fulfilled stage 2 requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.2.2.2, 4.3.2.2.2, 5.1.6.1, 5.1.6.2.3, 5.1.6.2.103, 5.1.8, 5.2.6.1, 5.2.6.2.3, 5.2.8, A.2, A.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces backward compatible feature to the following APIs:  TS29518\_Namf\_Communication.yaml  TS29520\_Nnwdaf\_AnalyticsInfo.yaml  TS29520\_Nnwdaf\_DataManagement.yaml  TS29520\_Nnwdaf\_EventsSubscription.yaml  TS29520\_Nnwdaf\_RoamingAnalytics.yaml  TS29520\_Nnwdaf\_RoamingData.yaml  TS29574\_Ndccf\_ContextManagement.yaml  TS29574\_Ndccf\_DataManagement.yaml  TS29575\_Nadrf\_DataManagement.yaml  TS29522\_AnalyticsExposure.yaml  TS29576\_Nmfaf\_3caDataManagement.yaml  TS29576\_Nmfaf\_ContextManagement.yaml  TS29520\_Nnwdaf\_MLModelMonitor.yaml  TS29520\_Nnwdaf\_MLModelProvision.yaml  TS29520\_Nnwdaf\_MLModelTraining.yaml  TS29520\_Nnwdaf\_VFLInference.yaml  TS29520\_Nnwdaf\_VFLTraining.yaml | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\* First Change \*\*\*

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]).

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**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) values for analytics metadata information 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

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.

- information related to roaming within the "roamingInfo" attribute if the "RoamingAnalytics" feature is supported;

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" attribute set to "true" 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 set to "true" 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 set to "true" 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 and/or, if the ServiceExperienceExt2\_eNA feature is supported, "fineGranAreas" attribute. If the "anyUe" attribute is set to "true", then the identification of the network area to which the subscription applies is required (see also clause 5.1.6.2.3);

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

- 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 and/or, if the "UeMobilityExt2\_eNA" feature is supported, the "fineGranAreas" 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 last known UE location information in the "lastUeLocs" attribute if the "UeMobilityExt3" feature is supported.

NOTE 10: Since the last known UE location information is provided at the time of subscription, it can happen that the information becomes outdated during the lifetime of the subscription.

- if the feature "UeCommunication" is supported and the event is "UE\_COMMUNICATION", 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\_COMMUNICATION" 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 "UeCommunicationExt\_eNA" 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 the "networkArea" attribute and/or, if the "QoSSustainabilityExt\_eNA" feature is supported, the "fineGranAreas" 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 or, if the "QoSSustainabilityExt2" feature is supported, end-to-end delay threshold(s) by the "e2eDelayThds" 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

4) identification of target UE(s) to which the subscription applies by "anyUe" attribute set to "true" 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, the "ranUeThrouThds" attribute, or the "e2eDelayThds" 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

- 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 set to "true" 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 set to "true";

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 set to "true" in the "tgtUe" attribute, "anyUe" attribute set to "true" 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 set to "true" 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 set to "true" in the "tgtUe" attribute. If "anyUe" attribute set to "true" 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 set to "true" 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 11: 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 12: PFD Determination analytics do not have a target UE, they are always for any UE. The predictions are not applicable for PFD Determination analytics.

- 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;

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

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) 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;

5) the QoS requirements via "qosRequ" attribute; and/or

6) 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 set to "true" 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.

NOTE 13: The predictions are not applicable for PDU Session traffic analytics.

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

1) identification of network area to which the subscription applies to restricts the scope of the movement behaviour analytics to the provided area by the "networkArea" attribute and/or the "fineGranAreas" attribute;

- and may include:

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

2) Movement Behaviour analytics requirements in the "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 the "listOfAnaSubsets" attribute with value(s) only applicable to the "MOVEMENT\_BEHAVIOUR" event, if the "EneNA" features is supported.

- 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 14: 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.

- if the feature "SignallingStorm" is supported and the event is "SIGNALLING\_STORM", may provide:

1) the Target of analytics: a list of NF(s) in the "nfInstanceIds" attribute or list of NF set ID(s) in the "nfSetIds" attribute;

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

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

4) signalling storm analytics requirements in "sigStormReqs" attribute.

- if the feature "QoSPolicyAssist" is supported and the event is "QOS\_POLICY\_ASSIST", shall provide:

1) identification of target UE(s) to which the subscription applies in the "supis" attribute, "intGroupIds" attribute or "anyUe" attribute set to "true" value within the "tgtUe" attribute

2) identification the QoS and Policy Assistance requirements in the "qosPolAssistReqs" attribute; and

3) application identifier(s) in the "appIds" attribute or SDF template in the "fDescs" attribute;

and may include:

1) identification of the area to which the subscription applies in the "networkArea" attribute or "fineGranAreas" attribute;

2) preferred granularity of location information as the "locGranularity" attribute;

3) identification of DNN to which the subscription applies in the "dnns" attribute;

4) identification of network slice and optionally associated network slice instance if available, via the "nsiIdInfos" attribute; and/or

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

NOTE 15: Only the predictions are applicable for QoS and Policy Assistance analytics.

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).

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".

When the "PredictionError" feature is supported, if the analytics target period provided in the body of the HTTP POST request includes the prediction time period in the future and the event is "SM\_CONGESTION", "PFD\_DETERMINATION" and/or "PDU\_SESSION\_TRAFFIC", the NWDAF shall reject the request with an HTTP "400 Bad Request" response including the "cause" attribute set to "PREDICTION\_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) based on the user consent subscription data that is retrieved via the Nudm\_SDM service API of the UDM as described in clause 5.2.2.24 and clause 6.1.3.32 of 3GPP TS 29.503 [23]. If the user consent subscription data retrieved from the UDM indicate that the user consent 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 16: 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.

Otherwise, if the user consent subscription data retrieved from the UDM indicate that the user consent is granted for the impacted user(s), the NWDAF shall subscribe to notification of changes of the user consent (unless it is already subscribed) by invoking the Nudm\_SDM\_Subscribe service operation by sending an HTTP POST request targeting the resource "SdmSubscriptions" to the UDM as described in clause 5.2.2.3 of 3GPP TS 29.503 [23].

If the RoamingAnalytics feature is supported and the NWDAF determines based on operator configuration and the requested analytics that analytics or input data from the VPLMN are required, and the NWDAF does not support roaming exchange and it cannot forward the request to another NWDAF, then the NWDAF shall reject the request with an HTTP "403 Forbidden" response including the "cause" attribute set to "NO\_ROAMING\_SUPPORT".

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.

\*\*\* Next Change \*\*\*

4.3.2.2.2 Request and get from NWDAF Analytics information

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

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**Figure 4.3.2.2.2-1: Requesting a NWDAF Analytics information**

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

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

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

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

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

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

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

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

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

8) values for the analytics metadata information in the "anaMetaInd" attribute if the feature "Aggregation" is supported;

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;

NOTE 1: The NWDAF can use the 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 use case context when requesting an ML model from an NWDAF containing MTLF. The values of this parameter are not standardized.

For all the event types, the "event-filter" 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 requested event, if the "AnalyticsAccuracy" feature is supported and the NF service consumer discovered or local configured the NWDAF containing an AnLF supporting the accuracy checking capability.

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

- information related to roaming within the "roamingInfo" attribute if the "RoamingAnalytics" feature is supported;

NOTE 2: The request for analytics accuracy information independently from request of the analytics event output is not supported in this release.

For different event types:

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

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

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

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

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

NOTE 3: The network slice instance of a PDU session is not available in the PCF.

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

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

a) list of NF instance types in the "nfTypes" attribute, if the "NsiLoadExt" feature is supported; and/or

b) identification of network area to which the request applies via identification of network area by "networkArea" attribute, if the "NsiLoadExt" feature is supported.

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

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

NOTE 4: Only NF instances of type AMF and SMF which are serving the UE can be determined using a SUPI in "supis" attribute.

NOTE 5: 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.

- the "event-filter" attribute may provide:

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

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

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

d) optional area of interest by "networkArea" attribute; and/or

e) 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 "UeMobility" is supported and the event is "UE\_MOBILITY", it shall provide:

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

and may include:

a) identification of network area to which the request applies via the "networkArea" attribute and/or, if the "UeMobilityExt2\_eNA" feature is supported, the "fineGranAreas" attribute;

b) 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;

c) other UE mobility requirements in "ueMobilityReqs" attribute, if the "UeMobilityExt2\_eNA" feature is supported;

d) preferred granularity of location information as the "locGranularity" attribute if the feature "UeMobilityExt2\_eNA" is also supported;

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

f) a 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;

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

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

i) the temporal granularity size in the "temporalGranSize" attribute if the "UeMobilityExt2\_eNA" feature is supported; and/or

j) the last known UE location information in the "lastUeLocs" attribute if the "UeMobilityExt3" feature is supported.

NOTE 6: For LADN service, the consumer (e.g. SMF) provides the LADN DNN to refer the LADN service area as the AOI.

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

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

and may include:

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

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

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

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

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

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

f) other UE communication requirements in "ueCommReqs" attribute, if the "UeCommunicationExt\_eNA" feature is supported; and/or

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

h) the spatial granularity size of cell in the "spatialGranSizeCell" attribute if the "UeCommunicationExt\_eNA" 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 request applies by "supis", "intGroupIds" or "anyUe" attribute set to "true"in the "tgt-ue" attribute;

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

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

b) the network performance requirements via "nwPerfReqs" attribute, if the feature "NetworkPerformanceExt\_eNA" is supported;

the "event-filter" attribute may provide:

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

b) for each network performance type identified by "nwPerfTypes" attribute, the additional requirement by "addNwPerfReqs" attribute if the "NetworkPerformanceExt\_AIML" feature is supported; and/or

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

d) the spatial granularity size of TA in the "spatialGranSizeCell" attribute if the "DnPerfExt\_eNA" feature is supported; and/or

e) the temporal granularity size of cell in the "temporalGranSize" attribute if the "DnPerfExt\_eNA" feature is supported.- if the feature "ServiceExperience" is supported and the event is "SERVICE\_EXPERIENCE", it shall provide:

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

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

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

NOTE 7: The network slice instance of a PDU session is not available in the PCF.

the "event-filter" attribute may provide:

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

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

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

d) identification of network area to which the request applies via the "networkArea" attribute and/or, if the "ServiceExperienceExt2\_eNA" feature is supported, the "fineGranAreas" attribute. If the "anyUe" attribute is set to "true" the identification of the network area to which the request applies is required (see also clause 5.2.6.2.3);

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

f) identification 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) by "ratFreqs" attribute if the feature

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

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

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

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

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

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

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

a) identification of network area to which the request applies via identification of network area by "networkArea" attribute and/or, if the "QoSSustainExt\_eNA" feature is supported, the "fineGranAreas" attribute; and

b) QoS requirements via "qosRequ" attribute;

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

the "event-filter" attribute may provide:

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

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

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

d) the temporal granularity size in the "temporalGranSize" attribute if the "QoSSustainExt\_eNA" feature is supported;

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

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

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

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

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

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

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

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

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

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

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

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

the "event-filter" attribute may provide:

a) expected UE behaviour via "exptUeBehav" attribute;

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

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

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

a) the user data congestion requirements via "userDataConReqs" attribute, if the feature "UserDataCongestionExt2\_eNA" is supported;

and may provide:

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

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

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

c) 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 bythe "maxTopAppUlNbr" attribute and/or the "maxTopAppDlNbr" attribute; and/or

d) 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;

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

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

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

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

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

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

and may include:

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

NOTE 8: The predictions are not applicable for Session Management Congestion Control Experience analytics.

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

1) identification of target UE(s) applies by "supis", "intGroupIds" or "anyUe" attribute set to "true" within "tgt-ue" attribute, "anyUe" attribute set to "true" is only supported in combination with "snssais" attribute, "networkArea" attribute and/or "disperClass" attribute;

and may include:

1) identification of network area applies via identification of network area by "networkArea" 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, ranking, ordering and/or accuracy requirments;

5) an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "DISPERSION" event;

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;

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

8) 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) applies by "supis", "intGroupIds" or "anyUe" attribute set to "true" within "tgt-ue" attribute;

and may include:

1) identification of network area applies via identification of network area by "networkArea" attribute, if the "supis" attribute or "intGroupIds" attribute is included in the "tgt-ue" 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;

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; and/or

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) by "supis", "intGroupIds" or "anyUe" attribute set to "true" in the "tgt-ue" attribute. If "anyUe" attribute set to "true" is included in the "tgt-ue" attribute, then any of "networkArea" attribute, "ssIds" or "bssIds" attribute shall be present in the "wlanReqs" attribute;

and may include:

1) identification of network area to which the request 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;

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; and/or

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 request applies by "supis", "intGroupIds" or "anyUe" attribute set to "true" in the "tgt-ue" attribute;

and may include:

1) identification of network area to which the request 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) 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 "DnPerformanceExt\_AIML" feature if supported.

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

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

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

- 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 request applies by "supis" or "gpsis" attribute in the "tgt-ue" attribute;

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

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) 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;

5) the QoS requirements via "qosRequ" attribute; and

6) 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 request applies by "supis", "intGroupIds" or "anyUe" attribute set to "true" in the "tgt-ue" attribute;

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

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 request applies via identification of network area 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" feature is supported.

NOTE 10: The predictions are not applicable for PDU Session traffic analytics.

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

1) identification of network area to which the request applies to restrict the scope of the movement behaviour analytics to the provided area by the "networkArea" attribute and/or the "fineGranAreas" attribute;

- and may include:

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

2) Movement Behaviour analytics requirements in the "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 the "listOfAnaSubsets" attribute with value(s) only applicable to the "MOVEMENT\_BEHAVIOUR" event, if the "EneNA" features is supported.

- if the feature "LocAccuracy" is supported and the event is "LOC\_ACCURACY", the "event-filter" attribute shall include:

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

- and the "event-filter" attribute 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 11: 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 request applies by "supis"or "intGroupIds" attribute in the "tgt-ue" attribute;

- and may include in the "event-filter" attribute:

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 request applies via identification of network area 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.

- if the feature "SignallingStorm" is supported and the event is "SIGNALLING\_STORM", may provide:

1) the Target of analytics: list of NF instance ID(s) in the "nfInstanceIds" attribute or list of NF set ID(s) in the "nfSetIds" attribute;

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

3) identification of network area to which the request applies by "networkArea" attribute; and/or

4) signalling storm analytics requirements in "sigStormReqs" attribute.

- if the feature "QoSPolicyAssist" is supported and the event is "QOS\_POLICY\_ASSIST", shall provide:

1) identification of target UE(s) to which the request applies in the "supis" attribute, "intGroupIds" attribute or "anyUe" attribute set to "true" value within the "tgt-ue" attribute;

2) application identifier(s) in the "appIds" attribute or SDF template in the "fDescs" attribute;

3) the QoS and Policy Assistance requirements in the "qosPlyAssistReqs" attribute;

and may provide:

2) identification of network area to which the request applies in the "networkArea" attribute or "fineGranAreas" attribute;

3) preferred granularity of location information as the "locGranularity" attribute;

4) identification of DNN to which the request applies in the "dnns" attribute;

5) identification of network slice and the optionally associated network slice instance if available, via the "nsiIdInfos" attribute or any slices indication in the "anySlice" attribute.

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

NOTE 12: Only the predictions are applicable for QoS and Policy Assistance analytics.

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

- analyse the requested analytic data according to the requested event.

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

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

- the analytics accuracy information in the "accuInfo" attribute, if the feature "AnalyticsAccuracy" is supported, the analytics accuracy requirement was requested in the "accuReq" attribute, and the "cancelAccuInd" attribute is either absent in the response or provided with the value "false".

NOTE 13: In this version of the specification, NWDAF containing AnLF can provide accuracy information to an NF consumer that requests both the analytics and the accuracy information.

NOTE 14: When receiving a request from an NF consumer that includes a request for accuracy information, the analytics and the accuracy information can be provided by NWDAF containing AnLF within the single response.

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

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

If the analytics target period provided in the body of the HTTP GET 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".

When the "PredictionError" feature is supported, if the analytics target period provided in the body of the HTTP GET request includes the prediction time period in the future and the event is "SM\_CONGESTION" and/or "PDU\_SESSION\_TRAFFIC", the NWDAF shall reject the request with an HTTP "400 Bad Request" response including the "cause" attribute set to "PREDICTION\_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 15: 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 the RoamingAnalytics feature is supported and the NWDAF determines based on operator configuration and the requested analytics that analytics or input data from the VPLMN are required, and the NWDAF does not support roaming exchange and it cannot forward the request to another NWDAF, then the NWDAF shall reject the request with an HTTP "403 Forbidden" response including the "cause" attribute set to "NO\_ROAMING\_SUPPORT".

If an error occurs when processing the HTTP GET request, the NWDAF shall send an HTTP error response as specified in clause 5.2.7.

\*\*\* Next Change \*\*\*

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 | |
| AnalyticsFeedbackInfo | | 5.1.6.2.105 | | Contains analytics feedback information. | | 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 values for analytics metadata information. | | 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 | | Dispersion 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  RelativeProximity | |
| 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  E2eDataVolTransTime | |
| GeoLocation | | 5.1.6.2.95 | | Represents a geographic location, using either standard or local coordinates and optionally including the altitude. | | LocAccuracy | |
| TargetCauseId | | 5.1.6.3.41 | | Contains the target cause ID(s). | | SignallingStorm | |
| IpEthFlowDescription | | 5.1.6.2.27 | | Contains the description of an Uplink and/or Downlink Ethernet flow. | | AbnormalBehaviour  QoSPolicyAssist | |
| 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 | |
| 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 | | Represents 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  E2eDataVolTransTime  QoSPolicyAssist | |
| 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 | |
| ProximityCriterion | | 5.1.6.2.99 | | Relative proximity criteria. | | RelativeProximity | |
| QoSPara | | 5.1.6.2.117 | | Represents the QoS parameter set. | | QoSPolicyAssist | |
| QosPolicyAssistInfo | | 5.1.6.2.114 | | Represents the QoS and policy assistance information. | | QosPolicyAssist | |
| QosPolicyAssistReq | | 5.1.6.2.113 | | Represents the QoS and policy assistance requirements. | | QosPolicyAssist | |
| QosPolicyAssistSet | | 5.1.6.2.115 | | Represents the QoS and policy assistance parameter set. | | QosPolicyAssist | |
| QosPolicyAssistSetsPerTS | | 5.1.6.2.116 | | Represents the QoS and policy assistance parameter sets per Time Slot. | | QosPolicyAssist | |
| QosPolOrderCriterion | | 5.1.6.3.43 | | Represents the QoS and policy assistance order criterion. | | QosPolicyAssist | |
| QosRequirement | | 5.1.6.2.20 | | Represents the QoS requirements. | | QoSSustainability  E2eDataVolTransTime | |
| 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 | | Indicates 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 | |
| RoamingInfo | | 5.1.6.2.106 | | Contains information related to roaming analytics. | | RoamingAnalytics | |
| PduSessionInfo | | 5.1.6.2.74 | | 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 | |
| SignalAnalytics | | 5.1.6.2.111 | | Represents the received signalling analytics. | | SignallingStorm | |
| SignalInfo | | 5.1.6.2.110 | | Represents the signalling information. | | SignallingStorm | |
| SignalStormInfo | | 5.1.6.2.109 | | Represents the signalling storm analytics information. | | SignallingStorm | |
| SignalStormReq | | 5.1.6.2.108 | | Represents the signalling storm analytics requirement information. | | SignallingStorm | |
| 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 | |
| SuggestedPfdInfo | | 5.1.6.2.107 | | Represents the suggested PFD information for the application identifier. | | PfdDetermination | |
| 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  MovementBehaviour  SMCCE  RelativeProximity  QoSPolicyAssist | |
| 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 | | Describes a threshold level. | | UserDataCongestion  NfLoad  DnPerformance  ServiceExperienceExt  MovementBehaviour  QoSPolicyAssist | |
| TimerInfo | | 5.1.6.2.110 | | Represents the timer information. | | SignallingStorm | |
| TimerType | | 5.1.6.3.42 | | Represents the type of timer. | | SignallingStorm | |
| TimestampedLocation | | 5.1.6.2.103 | | Represents a timestamped UE location. | | RelativeProximity  UeMobilityExt3 | |
| 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  QoSPolicyAssist |
| AccessType | 3GPP TS 29.571 [8] | Identifies the access type. | ServiceExperienceExt2\_eNA  E2eDataVolTransTime |
| 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  E2eDataVolTransTime  QoSPolicyAssist |
| 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  QoSPolicyAssist |
| 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  QoSPolicyAssist |
| 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  QoSPolicyAssist |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperience  AbnormalBehaviour  UeCommunication  DnPerformance  SMCCE  PduSesTraffic  E2eDataVolTransTime  RelativeProximity  QoSPolicyAssist |
| 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] | Represents a time duration expressed in units of seconds. |  |
| EthFlowDescription | 3GPP TS 29.514 [21] | Represents an ethernet flow description. | UeCommunication  AbnormalBehaviour  QoSPolicyAssist |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] | Represents expected UE behaviour data. | AbnormalBehaviour |
| Float | 3GPP TS 29.571 [8] | Represents a float. |  |
| FlowDescription | 3GPP TS 29.514 [21] | Represents an IP flow description. | UeCommunication  AbnormalBehaviour  PduSesTraffic  QoSPolicyAssist |
| FlowInfo | 3GPP TS 29.122 [19] | Represents IP flow information. | UserDataCongestionExt |
| GeographicalArea | 3GPP TS 29.522 [32] | Identifies the geographical location. | UeMobilityExt2\_eNA  ServiceExperienceExt2\_eNA  QoSSustainabilityExt\_eNA  MovementBehaviour  QoSPolicyAssist |
| GeographicalCoordinates | 3GPP TS 29.572 [30] | Represents the geographical coordinates. | MovementBehaviour |
| Gpsi | 3GPP TS 29.571 [8] | The GPSI for an UE. | UserDataCongestionExt  UeMobilityExt\_AIML  E2eDataVolTransTime  RelativeProximity |
| GroupId | 3GPP TS 29.571 [8] | Identifies a group of UEs. | UeMobility  UeCommunication NetworkPerformance  AbnormalBehaviour  ServiceExperience  Dispersion  RedundantTransmissionExp  WlanPerformance  PduSesTraffic  RelativeProximity  SignallingStorm |
| Ipv4Addr | 3GPP TS 29.571 [8] | Represents an IPv4 address. |  |
| Ipv6Addr | 3GPP TS 29.571 [8] | Represents an IPv6 address. |  |
| LocalOrigin | 3GPP TS 29.572 [30] | Represents a reference point for modelling locations in relation to it. | LocAccuracy |
| MLModelAddr | 5.4.6.2.8 | Represents the address of the ML Model file. | AnaSubTransfer |
| 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  RelativeProximity  SignallingStorm  QoSPolicyAssist |
| NfInstanceId | 3GPP TS 29.571 [8] | Identifies an NF instance. | NfLoad  Aggregation  SignallingStorm |
| NfSetId | 3GPP TS 29.571 [8] | Identifies an NF Set instance. | NfLoad  SignallingStorm |
| 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  QoSPolicyAssist |
| PacketDelBudget | 3GPP TS 29.571 [8] | Represents the packet delay budget. | QoSSustainability  DnPerformance  RedundantTransExpExt\_eNA  QoSPolicyAssist |
| PacketErrRate | 3GPP TS 29.571 [8] | Represents the packet error rate. | QoSSustainability  QoSPolicyAssist |
| PacketLossRate | 3GPP TS 29.517 [22] | Indicates Packet Loss Rate. | DnPerformance  RedundantTransExpExt\_eNA  QoSPolicyAssist |
| PduSessionId | 3GPP TS 29.571 [8] | Identifies PDU Session |  |
| PduSessionType | 3GPP TS 29.571 [8] | Identifies the PDU Session Type. | ServiceExperienceExt2\_eNA |
| PlmnIdNid | 3GPP TS 29.571 [8] | PLMN identifier. | RoamingAnalytics |
| 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 |
| PointAltitudeUncertainty | 3GPP TS 29.572 [30] | Ellipsoid point with altitude and uncertainty ellipsoid. | RelativeProximityExt |
| 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. |  |
| ProcessingInstruction | 3GPP TS 29.574 [26] | Processing Instruction. | EnAggregation |
| QosResourceType | 3GPP TS 29.571 [8] | Identifies the resource type in QoS characteristics. | QoSSustainability |
| RangeDirection | 3GPP TS 29.572 [30] | Represents the distance and direction between two points. | RelativeProximityExt |
| RatType | 3GPP TS 29.571 [8] | Identifies the RAT type. | ServiceExperienceExt  E2eDataVolTransTime  QoSPolicyAssist |
| 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] | Represents the sampling ratio. |  |
| ScheduledCommunicationTime | 3GPP TS 29.122 [19] | Represents the scheduled communication time information. | 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] | Represents the service experience information. | ServiceExperience |
| Tai | 3GPP TS 29.571 [8] | Tracking Area Information. | AnaSubTransfer |
| TimeWindow | 3GPP TS 29.122 [19] | Represents a time window. |  |
| 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] | Represents a URI. |  |
| UserLocation | 3GPP TS 29.571 [8] | Represents user location information. | UeMobility  Dispersion  E2eDataVolTransTime |
| VelocityEstimate | 3GPP TS 29.572 [30] | Velocity estimate | QoSSustainabilityExt\_eNA  RelativeProximity |
| Volume | 3GPP TS 29.122 [19] | Represents a data volume. | UeCommunication  AbnormalBehaviour  Dispersion  WlanPerformance  PduSesTraffic  E2eDataVolTransTime |

\*\*\* Next Change \*\*\*

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) (NOTE 24) | | ServiceExperience  UeCommunication  AbnormalBehaviour  Dispersion  DnPerformance  PfdDetermination  E2eDataVolTransTime  QoSPolicyAssist | |
| deviations | | array(Uinteger) | | O | | 1..N | | Each element indicates an acceptable deviation from the threshold level included in "ranUeThrouThds" attribute, the "qosFlowRetThds" attribute, or, if the "QoSSustainabilityExt2" feature is supported, the "e2eDelayThds" attribute. This attribute may only be present if either the "ranUeThrouThds" attribute or the "qosFlowRetThds" attribute or, if the "QoSSustainabilityExt2" feature is supported, the "e2eDelayThds" 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  QoSPolicyAssist | |
| dnais | | array(Dnai) | | O | | 1..N | | Represents the Data Network Access Identifier(s) of user plane access to DN(s) which the subscription applies. | | ServiceExperience  DnPerformance  QoSPolicyAssist | |
| dataVlTrnsTmRqs | | array(E2eDataVolTransTimeReq) | | O | | 1..N | | Represents the E2E data volume transfer time requirements | | E2eDataVolTransTime | |
| e2eDelayThds | | array(PacketDelBudget) | | C | | 1..N | | Represents the end-to-end delay (i.e. sum of RAN delay and GTP delay) thresholds.  (NOTE 4) | | QoSSustainabilityExt2 | |
| event | | NwdafEvent | | M | | 1 | | Event that is subscribed. | |  | |
| extraReportReq | | EventReportingRequirement | | O | | 0..1 | | The extra event reporting requirement information. | |  | |
| fDescs | | array(IpEthFlowDescription) | | C | | 1..N | | Contains the flow description for IP and/or Ethernet flows. (NOTE 24) | | QoSPolicyAssist | |
| 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  SignallingStorm  QoSPolicyAssist | |
| 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  QoSPolicyAssist | |
| spatialGranSizeTa | | Uinteger | | O | | 0..1 | | Indicates the maximum number of TAs used to define an area for which the analytics are requested.  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 requested.  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  MovementBehaviour  QoSPolicyAssist | |
| 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  SignallingStorm | | |
| nfSetIds | | array(NfSetId) | | O | | 1..N | | Identification(s) of NF instance set(s). | | NfLoad  SignallingStorm | | |
| 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", "DN\_PERFORMANCE" or "QOS\_POLICY\_ASSIST".  (NOTE 1) | | ServiceExperience  NsiLoad  DnPerformance  QoSPolicyAssist | |
| 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 | | |
| 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) | |  | | |
| roamingInfo | | RoamingInfo | | O | | 0..1 | | Information about roaming analytics. When this attribute is provided, the request should contain only attributes that are applicable also in the Nnwdaf\_RoamingAnalytics service. | | RoamingAnalytics | | |
| 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\_COMMUNICATION". | | 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  MovementBehaviour  QoSPolicyAssist | | |
| 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 | |
| feedback | | AnalyticsFeedbackInfo | | O | | 0..1 | | Analytics feedback information. It may only be provided in requests to update an existing analytics subscription for predictions. | | AnalyticsAccuracy | |
| sigStormReqs | | array(SignalStormReq) | | O | | 1..N | | Represents the signalling storm analytics requirements. This attribute may be included when the subscribed event is "SIGNALLING\_STORM". | | SignallingStorm | |
| qosPolAssistReqs | | array(QosPolicyAssistReq) | | C | | 1..N | | Represents the QoS and policy assistance analytics requirements.  Shall only be present when the subscribed event is "QOS\_POLICY\_ASSIST". | | QoSPolicyAssist | |
| lastUeLocs | | array(TimestampedLocation) | | O | | 1..N | | Contains the last known location of target UE(s). If provided, it shall contain entries only for UE(s) that are targetted as per the provided "tgtUe" attribute. | | UeMobilityExt3 | |
| NOTE 1: The "anySlice" attribute is not applicable to features "UeMobility" and "NetworkPerformance". The "snssais" attribute is not applicable to features "ServiceExperience", "NsiLoad", "UeMobility", "NetworkPerformance" and "QosPolicyAssist". 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\_COMMUNICATION", "ABNORMAL\_BEHAVIOUR", "USER\_DATA\_CONGESTION", "DISPERSION", "RED\_TRANS\_EXP", "PDU\_SESSION\_TRAFFIC", "PFD\_DETERMINATION", "RELATIVE\_PROXIMITY" or "SIGNALLING\_STORM", 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. All target UE(s) indicated by this attribute shall belong to the same PLMN. When the "RoamingAnalytics" feature is supported and the target UE(s) indicated by this attribute belong to a PLMN different than the PLMN of the NF service consumer, the request should contain only attributes that are applicable also in the Nnwdaf\_RoamingAnalytics service.  NOTE 4: This property is only 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, the "networkArea" 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 least one of "networkArea" or "fineGranAreas" attributes shall be provided.  - For "MOVEMENT\_BEHAVIOUR" event, at least one of the "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 type shall 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 "DispersionExt\_eNA". The "TA\_LEVEL" or "CELL\_LEVEL" value of "locGranularity" attribute is not applicable to feature "MovementBehaviour".  NOTE 22: When the subscribed event is "LOC\_ACCURACY", only one of the "networkArea" attribute or "location" attribute shall be included.  NOTE 23: When the subscribed event is "SIGNALLING\_STORM", the "nfInstanceIds" or "nfSetIds" attribute may be included to indicate the NF instances or NF sets that may cause the signalling storm to the target NF.  NOTE 24: When subscribed event is "QOS\_POLICY\_ASSIST" and the "QoSPolicyAssist" feature is supported, one of the associated "appIds" attribute or "fDescs" attribute containing the SDF template shall also be provided for the NWDAF to be able to compute the service experience per application. | | | | | | | | | | | | |

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

\*\*\* Next Change \*\*\*

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. | RelativeProximity  UeMobilityExt3 |
| locInfo | LocationInfo | M | 1 | This attribute includes the UE location information at the time indicated by "ts" attribute. | RelativeProximity  UeMobilityExt3 |
| supi | Supi | C | 0..1 | Contains the UE identifier.  It shall be provided when the recipient of the information is not able to derive the UE identifier otherwise (e.g. in subscriptions/requests that target multiple UEs and do not indicate elsewhere which UE this location information applies to).  (NOTE) | UeMobilityExt3 |
| gpsi | Gpsi | C | 0..1 | Contains the UE identifier.  It shall be provided when the recipient of the information is not able to derive the UE identifier otherwise (e.g. in subscriptions/requests that target multiple UEs and do not indicate elsewhere which UE this location information applies to).  (NOTE) | UeMobilityExt3 |
| NOTE: The attributes "supi" and "gpsi" are mutually exclusive. | | | | | |

\*\*\* Next Change \*\*\*

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 and linear distance threshold. 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 | | | PduSesTraffic | | | This feature indicates support of the analytics related to PDU Session traffic information. | | |
| 42 | | | E2eDataVolTransTime | | | This feature indicates support for E2E data volume transfer time analytics | | |
| 43 | | | 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. | | |
| 44 | | | 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. | | |
| 45 | | | 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. | | |
| 46 | | | 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. | | |
| 47 | | | AnalyticsAccuracy | | | This feature indicates support for the Analytics Accuracy information. | | |
| 48 | | | 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. | | |
| 49 | | | 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. | | |
| 50 | | | MovementBehaviour | | | This feature indicates support for the Movement Behaviour information. | | |
| 51 | | | LocAccuracy | | | This feature indicates support for the Location Accuracy analytics. | | |
| 52 | | | RelativeProximity | | | This feature indicates support for the Relative Proximity analytics. | | |
| 53 | | | StatisticsFailure | | | This feature indicates support for partial failure report for statistics during event notification.  Supporting this feature also requires the support of EneNA feature. | | |
| 54 | | | RoamingAnalytics | | | This feature indicates support for the Roaming analytics. | | |
| 55 | | | PredictionError | | | This feature indicates support for Prediction Error handling. | | |
| 56 | | | EnAggregation | | | This feature indicates the enhancements on the analytics aggregation.  Supporting this feature also requires the support of Aggregation feature. | | |
| 57 | | | QoSSustainabilityExt2 | | | This feature indicates support for the enhancements of QoS Sustainability Analytics in Rel-19.  The following functionalities are supported:  - Support targeting list of UEs in QoS Sustanability Analytics.  - Providing end-to-end delay reporting thresholds.  Supporting this feature also requires the support of QoSSustainability feature. | | |
| 58 | | | EnMovementBehaviour | | | This feature indicates support for the Movement Behaviour enhancements.  Supporting this feature also requires the support of feature MovementBehaviour. | | |
| 59 | | | SignallingStorm | | | This feature indicates support for the Signalling Storm Analytics. | | |
| 60 | | | RelativeProximityExt | | | This feature indicates support for the enhancements of Relative Proximity Analytics in Rel-19.  The following functionalities are supported:  - Support enhancement of TTC prediction in Relative Proximity Analytics.  Supporting this feature also requires the support of RelativeProximity feature. | | |
| 61 | | | EnRelativeProximity | | | This feature indicates the enhancements on the support for the Relative Proximity analytics.  Supporting this feature also requires the support of feature RelativeProximity. | | |
| 62 | | | QoSPolicyAssist | | | This feature indicates support for the QoS and Policy Assistance Analytics. | | |
| 63 | | | UeMobilityExt3 | | | This feature indicates support for the following enhancements of UE mobility analytics:  - Providing last known UE location.  Supporting this feature also requires the support of the UeMobility feature. | | |

\*\*\* Next Change \*\*\*

5.2.6.1 General

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

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

**Table 5.2.6.1-1: Nnwdaf\_AnalyticsInfo specific Data Types**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Data type** | | **Section defined** | **Description** | | **Applicability** | |
| AdditionInfoAnalyticsInfoRequest | 5.2.6.2.5 | | Contains more details (not only the ProblemDetails) in case an Nnwdaf\_AnalyticsInfo request is rejected. | | EneNA | |
| AdrfDataType | 5.2.6.3.5 | | Represents a type of data that is stored in the ADRF. | | AnaCtxTransfer | |
| AnalyticsAccuracyInfo | 5.2.6.2.18 | | Analytics Accuracy related information needs to be transferred. | | EnAnaCtxTransfer | |
| AnalyticsData | 5.2.6.2.2 | | Describes analytics with parameters indicated in the request. | |  | |
| ContextData | 5.2.6.2.6 | | Contains context information related to analytics subscriptions corresponding with one or more context identifiers. | | AnaCtxTransfer | |
| ContextElement | 5.2.6.2.7 | | Contains context information corresponding with a specific context identifier. | | AnaCtxTransfer | |
| ContextIdList | 5.2.6.2.8 | | Contains list of context identifiers of context information of analytics subscriptions. | | AnaCtxTransfer | |
| ContextType | 5.2.6.3.4 | | Identifies the type of analytics context information. | | AnaCtxTransfer | |
| EventFilter | 5.2.6.2.3 | | Represents the event filters used to identify the requested analytics. | |  | |
| EventId | 5.2.6.3.3 | | Describes the type of analytics. | |  | |
| GroundTruthInfo | 5.2.6.2.19 | | The ground truth information used for the accuracy information computation. | | EnAnaCtxTransfer | |
| HistoricalData | 5.2.6.2.9 | | Contains historical data related to an analytics subscription. | | AnaCtxTransfer | |
| MlModelAccuracyInfo | 5.2.6.2.20 | | The ML Model Accuracy Subscription Information needs to be transferred. | | EnAnaCtxTransfer | |
| NetworkPerfReq | 5.2.6.2.16 | | Represents a network performance requirement. | | NetworkPerformanceExt\_eNA | |
| ProblemDetailsAnalyticsInfoRequest | 5.2.6.4.1 | | Data type that extends ProblemDetails. | | EneNA | |
| RequestedContext | 5.2.6.2.11 | | Contains types of analytics context information. | | AnaCtxTransfer | |
| ResourceUsageRequPerNwPerfType | 5.2.6.2.17 | | Indicates more requirements per network performance type when providing resource usage information for network performance. | | NetworkPerformanceExt\_AIML | |
| SmcceInfo | 5.2.6.2.12 | | Represents the analytics of Session Management congestion control experience information. | | SMCCE | |
| SmcceUeList | 5.2.6.2.13 | | Represents the List of UEs classified based on experience level of Session Management congestion control. | | SMCCE | |
| SpecificAnalyticsSubscription | 5.2.6.2.10 | | Represents an existing subscription for a specific type of analytics to a specific NWDAF. | | AnaCtxTransfer | |
| SpecificDataSubscription | 5.2.6.2.14 | | Represents an existing data collection subscription to a specific data source NF. | | AnaCtxTransfer | |
| UserDataCongestReq | 5.2.6.2.15 | | Represents the user data congestion requirements. | | UserDataCongestionExt2\_eNA | |

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

Re-used data types of clause 5.1.6 refer here to requests instead of subscriptions.

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Data type** | **Reference** | **Comments** | **Applicability** |
| AbnormalBehaviour | 5.1.6.2.15 | Represents the abnormal behaviour information. | AbnormalBehaviour |
| AccuracyInfo | 5.1.6.2.89 | The analytics accuracy information. | AnalyticsAccuracy |
| AccuracyReq | 5.1.6.2.88 | Represents the analytics accuracy requirement information. | AnalyticsAccuracy |
| AddrFqdn | 3GPP TS 29.517 [22] | Represents the IP address or FQDN of the Application Server. | ServiceExperienceExt  DnPerformance |
| AnalyticsContextIdentifier | 5.1.6.2.43 | Contains information about the available analytics contexts. | AnaCtxTransfer |
| AnalyticsMetadataInfo | 5.1.6.2.37 | Contains analytics metadata information required for analytics aggregation. | Aggregation |
| AnalyticsSubset | 5.1.6.3.18 | Contains information about the analytics subsets provided in the subscription request. | EneNA |
| AnySlice | 5.1.6.3.2 |  |  |
| ApplicationId | 3GPP TS 29.571 [8] | Identifies the application. | ServiceExperience  UeCommunication  AbnormalBehaviour  DnPerformance  E2eDataVolTransTime |
| BwRequirement | 5.1.6.2.25 | Represents bandwidth requirements. | ServiceExperience |
| DataNotification | 3GPP TS 29.575 [27] | Describes Notifications about data collection events that occurred. | EneNA |
| DataSubscription | 3GPP TS 29.575 [27] | Represents data subscription from data source (e.g. AMF, SMF, UDM, NEF, AF). | EneNA  EnAnaCtxTransfer |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| DispersionRequirement | 5.1.6.2.50 | Dispersion analytics requirement. | Dispersion |
| DispersionInfo | 5.1.6.2.53 | Dispersion analytics information. | Dispersion |
| 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  SMCCE  DnPerformance  PduSesTraffic  E2eDataVolTransTime |
| DnPerfInfo | 5.1.6.2.45 | Represents DN performance information | DnPerformance |
| DnPerformanceReq | 5.1.6.2.66 | Represents the DN performance requirements. | DnPerformance |
| DurationSec | 3GPP TS 29.571 [8] | Represents a time duration expressed in units of seconds. |  |
| EventNotification | 5.1.6.2.5 | Describes Notifications about analytics events that occurred. | AnaCtxTransfer |
| EventReportingRequirement | 5.1.6.2.7 | Represents event reporting requirements. |  |
| ExceptionId | 5.1.6.3.6 | Represents the identifier of an exception. | AbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] | Represents the expected UE behaviour data. | AbnormalBehaviour |
| ExpectedAnalyticsType | 5.1.6.3.11 | Represents the expected analytics type. | AbnormalBehaviour |
| GeographicalArea | 3GPP TS 29.522 [32] | Identifies the geographical location. | UeMobilityExt2\_eNA  ServiceExperienceExt2\_eNA  QoSSustainExt\_eNA  MovementBehaviour |
| GeoLocation | 5.1.6.2.95 | Represents a geographic location, potentially using local coordinates and optionally including the altitude. | LocAccuracy |
| LocAccuracyInfo | 5.1.6.2.97 | Contains Location Accuracy information. | LocAccuracy |
| LocAccuracyReq | 5.1.6.2.96 | Contains Location Accuracy analytics requirements. | LocAccuracy |
| 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 | The matching direction. | UserDataCongestionExt2\_eNA  NetworkPerformanceExt |
| MLModelAccuracyInfo | 5.6.6.2.5 | Represents the subscription information for ML model accuracy information. | EnAnaCtxTransfer |
| ModelInfo | 5.1.6.2.42 | The information of the ML models. | AnaCtxTransfer |
| MovBehavInfo | 5.1.6.2.91 | Represents the Movement Behaviour information. | MovementBehaviour |
| MovBehavReq | 5.1.6.2.90 | Represents the Movement Behaviour analytics requirements | MovementBehaviour |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | The network area information. | UeMobility  UeCommunication  NetworkPerformance  QoSSustainability  ServiceExperience  UserDataCongestion  AbnormalBehaviour  NsiLoadExt  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance  NfLoadExt  E2eDataVolTransTime  MovementBehaviour  SignallingStorm |
| NetworkPerfInfo | 5.1.6.2.23 | Represents network performance information. | NetworkPerformance |
| NetworkPerfOrderCriterion | 5.1.6.3.30 | Represents a network performance requirement. | NetworkPerformanceExt\_eNA |
| NetworkPerfType | 5.1.6.3.10 | Represents the network performance types. | NetworkPerformance |
| NfLoadLevelInformation | 5.1.6.2.31 | Represents load level information of a given NF instance. | NfLoad |
| NfInstanceId | 3GPP TS 29.571 [8] | Identifies an NF instance | NfLoad  SignallingStorm |
| NfSetId | 3GPP TS 29.571 [8] | Identifies an NF Set instance. | NfLoad  SignallingStorm |
| NFType | 3GPP TS 29.510 [12] | Indentifies a type of NF. | NfLoad |
| NsiIdInfo | 5.1.6.2.33 | Identify the S-NSSAI and the associated Network Slice Instance(s). | ServiceExperience  NsiLoad  DnPerformance |
| NsiLoadLevelInfo | 5.1.6.2.34 | Represents the load level information for an S-NSSAI and the associated network slice instance. | NsiLoad |
| NnwdafEventsSubscription | 5.1.6.2.2 | Represents an Individual NWDAF Event Subscription resource. | AnaCtxTransfer |
| ProblemDetails | 3GPP TS 29.571 [8] | Used in error responses to provide more detailed information about an error. |  |
| QosPolicyAssistInfo | 5.1.6.2.114 | Represents the QoS and Policy Assistance Analytics. | QoSPolicyAssist |
| QosPolicyAssistReq | 5.1.6.2.113 | Represents the QoS and Policy Assistance requirement. | QoSPolicyAssist |
| QosRequirement | 5.1.6.2.20 | Represents QoS requirements. | QoSSustainability  E2eDataVolTransTime |
| QosSustainabilityInfo | 5.1.6.2.19 | Represents QoS sustainability information. | QoSSustainability |
| RatFreqInformation | 5.1.6.2.67 | Represents the RAT type and/or Frequency information | ServiceExperienceExt |
| RedundantTransmissionExpInfo | 5.1.6.2.57 | Redundant transmission experience analytics information. | RedundantTransmissionExp |
| RedundantTransmissionExpReq | 5.1.6.2.56 | Redundant transmission experience analytics requirement. | RedundantTransmissionExp |
| PduSessionInfo | 5.1.6.2.74 | Represents combination of PDU Session parameters. | ServiceExperienceExt2\_eNA |
| RedirectResponse | 3GPP TS 29.571 [8] | Represents redirection related information. |  |
| RelProxInfo | 5.1.6.2.100 | Relative Proximity analytics information. | RelativeProximity |
| RelProxReq | 5.1.6.2.99 | Relative Proximity analytics requirements. | RelativeProximity |
| ResourceUsageRequirement | 5.1.6.2.81 | Indicates more requirements per network performance type when providing resource usage information for network performance. | NetworkPerformanceExt\_AIML |
| RoamingInfo | 5.1.6.2.106 | Contains information related to roaming analytics. | RoamingAnalytics |
| ServiceExperienceInfo | 5.1.6.2.24 | Represents service experience information. | ServiceExperience |
| SignalStormInfo | 5.1.6.2.109 | Represents the signalling storm analytics information. | SignallingStorm |
| SignalStormReq | 5.1.6.2.108 | Represents the signalling storm analytics requirement information. | SignallingStorm |
| Supi | 3GPP TS 29.571 [8] | Identifies the UE. | ServiceExperience,  NfLoad  NetworkPerformance  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  SMCCE  Dispersion  RedundantTransmissionExp  WlanPerformance  E2eDataVolTransTime |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.2.8-1. |  |
| Snssai | 3GPP TS 29.571 [8] | Represents an S-NSSAI. |  |
| SliceLoadLevelInformation | 5.1.6.2.6 | Represents slice load level information. |  |
| TargetUeInformation | 5.1.6.2.8 | Identifies the target UE information. | ServiceExperience  NfLoad  NetworkPerformance  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  QoSSustainability  Dispersion  RedundantTransmissionExp  WlanPerformance  SMCCE  DnPerformance  E2eDataVolTransTime  MovementBehaviour  PduSesTraffic  RelativeProximity  QoSPolicyAssist |
| TimestampedLocation | 5.1.6.2.103 | Represents a timestamped UE location. | UeMobilityExt3 |
| UeCommunication | 5.1.6.2.13 | Represents UE communication data. | UeCommunication |
| UeCommReq | 5.1.6.2.72 | UE communication analytics requirement. | UeCommunicationExt\_eNA |
| UeMobility | 5.1.6.2.10 | Represents UE mobility data. | UeMobility |
| UeMobilityReq | 5.1.6.2.71 | UE mobility analytics requirement. | UeMobilityExt2\_eNA |
| 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 |
| 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 |
| UserDataCongestionInfo | 5.1.6.2.17 | Represents user data congestion information. | UserDataCongestion |
| UserDataConOrderCrit | 5.1.6.2.15 | The ordering criterion for the list of User Data Congestion analytics. | UserDataCongestionExt2\_eNA |
| VendorId | 3GPP TS 29.510 [12] | Represents the Vendor ID. | EnAnaCtxTransfer |
| WlanPerformanceInfo | 5.1.6.2.60 | WLAN performance analytics information. | WlanPerformance |
| WlanPerformanceReq | 5.1.6.2.59 | WLAN performance analytics requirement. | WlanPerformance |
| E2eDataVolTransTimeInfo | 5.1.6.2.82 | E2E data volume transfer time | E2eDataVolTransTime |
| E2eDataVolTransTimeReq | 5.1.6.2.83 | E2E data volume transfer time requirement | E2eDataVolTransTime |

\*\*\* Next Change \*\*\*

5.2.6.2.3 Type EventFilter

**Table 5.2.6.2.3-1: Definition of type EventFilter**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Attribute name** | | | **Data type** | | **P** | | **Cardinality** | | **Description** | | **Applicability** | | |
| anySlice | | | AnySlice | | C | | 0..1 | | Default is "false". (NOTE 1) | |  | | |
| appIds | | | array(ApplicationId) | | C | | 1..N | | Represents the Application Identifier(s). The absence of appIds means applicable to all applications. (NOTE 4) (NOTE 12) (NOTE 22) | | ServiceExperience  UeCommunication AbnormalBehaviour  Dispersion  DnPerformance  E2eDataVolTransTime  QoSPolicyAssist | | |
| fDescs | | | array(IpEthFlowDescription) | | C | | 1..N | | Contains the flow description for IP and/or Ethernet flows. (NOTE 22) | | QoSPolicyAssist | | |
| dnns | | | array(Dnn) | | C | | 1..N | | Represents the DNN(s). Each DNN is a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only. The absence of dnns means applicable to all DNNs. (NOTE 4) (NOTE 13) | | ServiceExperience  UeCommunication  AbnormalBehaviour  SMCCE  DnPerformance  RedundantTransmissionExp  PduSesTraffic  E2eDataVolTransTime  RelativeProximity  QoSPolicyAssist | | |
| dnais | | | array(Dnai) | | O | | 1..N | | Represents the Data Network Access Identifier(s) of user plane accesses to DN(s) where applications are deployed. | | ServiceExperience  DnPerformance  QoSPolicyAssist | | |
| ladnDnns | | | array(Dnn) | | O | | 1..N | | Represents the LADN DNN(s) to indicate the LADN service area(s) as the AoI(s). | | UeMobilityExt | | |
| snssais | | | array(Snssai) | | C | | 1..N | | Identification(s) of network slice(s). (NOTE 1), (NOTE 4) (NOTE 13) (NOTE 20) | |  | | |
| roamingInfo | | | RoamingInfo | | O | | 0..1 | | Information about roaming analytics. When this attribute is provided, the request should contain only attributes that are applicable also in the Nnwdaf\_RoamingAnalytics service. | | RoamingAnalytics | | |
| nfInstanceIds | | | array(NfInstanceId) | | O | | 1..N | | Identification(s) of NF instance(s).  (NOTE 22) | | NfLoad  SignallingStorm | | |
| nfSetIds | | | array(NfSetId) | | O | | 1..N | | Identification(s) of NF instance set(s).  (NOTE 22) | | NfLoad  SignallingStorm | | |
| nfTypes | | | array(NFType) | | O | | 1..N | | Identification(s) of NF type(s). (NOTE 8) | | NfLoad  NsiLoadExt | | |
| networkArea | | | NetworkAreaInfo | | C | | 0..1 | | This IE represents the network area where the NF service consumer wants to know the analytics result. (NOTE 2), (NOTE 4) (NOTE 17) (NOTE 18) | | UeMobility  UeCommunication  NetworkPerformance  QoSSustainability  ServiceExperience  UserDataCongestion  AbnormalBehaviour  NsiLoadExt  NfLoadExt  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance  PduSesTraffic  E2eDataVolTransTime  MovementBehaviour  LocAccuracy  RelativeProximity  SignallingStorm  QoSPolicyAssist | | |
| location | | | GeoLocation | | C | | 0..1 | | A location (i.e. geographical location or location in local coordinates) to which the request applies. (NOTE 18) | | LocAccuracy | | |
| temporalGranSize | | | DurationSec | | O | | 0..1 | | Indicates the minimum duration of each time slot for which the analytics are provided.  (NOTE 15) | | NetworkPerformanceExt\_eNA  UeMobilityExt2\_eNA  UserDataCongestionExt2\_eNA  QoSSustainExt\_eNA  DispersionExt\_eNA  WlanPerfExt\_eNA  RedundantTransExpExt\_eNA  DnPerfExt\_eNA | | |
| spatialGranSizeTa | | | Uinteger | | O | | 0..1 | | Indicates the maximum number of TAs used to define an area for which the analytics are requested.  May be included when the "networkArea" attribute in the EventSubscription data type is provided.  (NOTE 16) | | NetworkPerformanceExt\_eNA  UeMobilityExt2\_eNA  UeCommunicationExt\_eNA  QoSSustainExt\_eNA  DispersionExt\_eNA  DnPerfExt\_eNA | | |
| spatialGranSizeCell | | | Uinteger | | O | | 0..1 | | Indicates the maximum number of cells used to define an area for which the analytics are requested.  May be included when the "networkArea" attribute is provided.  (NOTE 16) | | NetworkPerformanceExt\_eNA  UeMobilityExt2\_eNA  UeCommunicationExt\_eNA  QoSSustainExt\_eNA  DispersionExt\_eNA  DnPerfExt\_eNA | | |
| fineGranAreas | | | array(GeographicalArea) | | O | | 1..N | | Indicates the fine granularity areas to which the request applies. (i.e. with a finer granularity than cell).  (NOTE 2) (NOTE 17) | | ServiceExperienceExt2\_eNA  UeMobilityExt2\_eNA  QoSSustainExt\_eNA  MovementBehaviour  QoSPolicyAssist | | |
| visitedAreas | | | array(NetworkAreaInfo) | | O | | 1..N | | Identification(s) of network area(s) which the UEs had previously been in at least one of the Visited Area(s) of Interest. (NOTE 9) | | 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 | | |
| nsiIdInfos | | | array(NsiIdInfo) | | O | | 1..N | | Each element identifies the S-NSSAI and the optionally associated network slice instance(s).  May be included when the event-id is "NSI\_LOAD\_LEVEL",  "SERVICE\_EXPERIENCE", "DN\_PERFORMANCE" or  "QOS\_POLICY\_ASSIST".  (NOTE 1) | | ServiceExperience  NsiLoad  DnPerformance  QoSPolicyAssist | | |
| nwPerfReqs | | | array(NetworkPerfReq) | | O | | 1..N | | Represents the network performance requirements. This attribute may be included when the event-id is "NETWORK\_PERFORMANCE". | | NetworkPerformanceExt\_eNA | | |
| nwPerfTypes | | | array(NetworkPerfType) | | C | | 1..N | | Represents the network performance types. This attribute shall be included when event-id is "NETWORK\_PERFORMANCE". | | NetworkPerformance | | |
| addNwPerfReqs | | | array(ResourceUsageRequPerNwPerfType) | | O | | 1..N | | Each element indicates more requirement for each network performance type (by each element in the "nwPerfTypes" attribute) when providing resource usage information for the network performance type. | | NetworkPerformanceExt\_AIML | | |
| userDataConReqs | | | array(UserDataCongestReq) | | O | | 1..N | | Represents the network performance requirements. This attribute may be included when the event-id is "NETWORK\_PERFORMANCE". | | UserDataCongestionExt2\_eNA | | |
| qosRequ | | | QoSRequirement | | C | | 0..1 | | Represents the QoS requirements. This attribute shall be included when event-id is "QOS\_SUSTAINABILITY" or E2E\_DATA\_VOL\_TRANS\_TIME. | | QoSSustainability  E2eDataVolTransTime | | |
| bwRequs | | | array(BwRequirement) | | O | | 1..N | | Represents the media/application bandwidth requirement for each application.  It may only be present if "appIds" attribute is provided. | | ServiceExperience | | |
| excepIds | | | array(ExceptionId) | | C | | 1..N | | Represents a list of Exception Ids.  (NOTE 3), (NOTE 4) | | AbnormalBehaviour | | |
| exptAnaType | | | ExpectedAnalyticsType | | C | | 0..1 | | Represents expected UE analytics type.  (NOTE 3), (NOTE 4) | | 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 request applies. (NOTE 5) | | ServiceExperienceExt | | |
| 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 | | |
| listOfAnaSubsets | | | array(AnalyticsSubset) | | O | | 1..N | | The list of analytics subsets used to indicate the content of the analytics. | | EneNA | | |
| upfInfo | | | UpfInformation | | O | | 0..1 | | Identifies the UPF. (NOTE 7) | | ServiceExperienceExt  DnPerformance | | |
| appServerAddrs | | | array(AddrFqdn) | | C | | 1..N | | Each element represents the Application Server Instance (IP address/FQDN of the Application Server). (NOTE 6) | | ServiceExperienceExt  DnPerformance | | |
| dnPerfReqs | | | array(DnPerformanceReq) | | O | | 1..N | | Represents the DN performance requirements. This attribute shall be included when event-id is "DN\_PERFORMANCE". | | DnPerformance | | |
| dataVlTrnsTmRqs | | | array(E2eDataVolTransTimeReq) | | O | | 1..N | | Represents the list of E2E data volume transfer time requirement. This attribute may be included when event-id is "E2E\_DATA\_VOL\_TRANS\_TIME". | | E2eDataVolTransTime | | |
| ueMobilityReqs | | | array(UeMobilityReq) | | O | | 1..N | | Represents the UE mobility requirements. This attribute may be included when the event-id is "UE\_MOBILITY". | | UeMobilityExt2\_eNA | | |
| ueCommReqs | | | array(UeCommReq) | | O | | 1..N | | Represents the UE communication requirements. This attribute may be included when the event-id is "UE\_MOBILITY". | | UeCommunicationExt\_eNA | | |
| pduSesInfos | | | array(PduSessionInfo) | | O | | 1..N | | Represents combination of PDU Session parameters. (NOTE 12) | | ServiceExperienceExt2\_eNA | | |
| pduSesTrafReqs | | | array(PduSesTrafficReq) | | C | | 1..N | | Represents the PDU Session traffic analytics requirements. This attribute shall be included when the requested event is "PDU\_SESSION\_TRAFFIC". (NOTE 13) | | PduSesTraffic | | |
| locAccReqs | | | array(LocAccuracyReq) | | O | | 1..N | | Represents the Location Accuracy analytics requirements. This attribute may only be included when the requested event is "LOC\_ACCURACY" and the attribues "accThres", "accThresMatchDir", "inOutThres", and "inOutThresMatchDir" inside it are not applicable for analytics requests. | | LocAccuracy | | |
| locGranularity | | | LocInfoGranularity | | O | | 0..1 | | The preferred granularity of UE location information.(NOTE 19) | | ServiceExperienceExt2\_eNA  UeMobilityExt2\_eNA  DispersionExt\_eNA  MovementBehaviour  QoSPolicyAssist | | |
| locOrientation | | | LocationOrientation | | O | | 0..1 | | Indicates the preferred orientation of location information. | | MovementBehaviour  UeMobilityExt2\_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 | | |
| 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.  (NOTE 21) | | 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 | | |
| sigStormReqs | | array(SignalStormReq) | | O | | 1..N | | Represents the signalling storm analytics requirements. This attribute may be included when the "event-id" is "SIGNALLING\_STORM". | | | SignallingStorm | | |
| qosPlyAssistReqs | | array(QosPolicyAssistReq) | | C | | 1..N | | Represents the QoS and Policy Assistance analytics requirements. This attribute shall be included when the "event-id" is "QOS\_POLICY\_ASSISTANCE". | | | QoSPolicyAssist | | |
| lastUeLocs | | array(TimestampedLocation) | | O | | 1..N | | Contains the last known location of target UE(s). If provided, it shall contain entries only for UE(s) that are targetted as per the provided "tgt-ue" attribute. | | | UeMobilityExt3 | | |
| NOTE 1: The "anySlice" attribute is not applicable to features "UeMobility" and "NetworkPerformance". The "snssais" attribute is not applicable to features "ServiceExperience", "NsiLoad", "UeMobility" and "NetworkPerformance". When event-id in the request is "LOAD\_LEVEL\_INFORMATION", the identifications of network slices, either information about slice(s) identified by the "snssais" attribute, or "anySlice" set to "true", shall be included. When the requested event-id is "NSI\_LOAD\_LEVEL" or "SERVICE\_EXPERIENCE", either the "nsiIdInfos" attribute or anySlice set to "true" shall be included. When the requested event-id is "QOS\_SUSTAINABILITY", "NF\_LOAD", "UE\_COMM", "ABNORMAL\_BEHAVIOUR", "USER\_DATA\_CONGESTION", "DISPERSION" "RED\_TRANS\_EXP", "PDU\_SESSION\_TRAFFIC", "RELATIVE\_PROXIMITY" or "SIGNALLING\_STORM", the identifications of network slices identified by the "snssais" attribute is optional.  NOTE 2: For different events, the following rules apply:  - For "NETWORK\_PERFORMANCE" or "USER\_DATA\_CONGESTION" event, the "networkArea"attribute shall be provided if the event applied for all UEs (i.e. "anyUe" attribute set to true).  - For "QOS\_SUSTAINABILITY", at least one of "networkArea" and "fineGranAreas" attributes shall be provided.  - For "E2E\_DATA\_VOL\_TRANS\_TIME", the "networkArea"attribute shall be provided.  - For "MOVEMENT\_BEHAVIOUR", at least one of the "networkArea" or "fineGranAreas" attributes shall be provided.  - For "SERVICE\_EXPERIENCE" event, if the event applied for all UEs (i.e. "anyUe" attribute set to "true"): at least one of the "networkArea" and "fineGranAreas" attributes shall be provided.  NOTE 3: Either "excepIds" or "exptAnaType" shall be provided if event-id in the request is "ABNORMAL\_BEHAVIOUR".  NOTE 4: For "ABNORMAL\_BEHAVIOUR" event with "anyUe" attribute in "tgt-ue" attribute sets to true,  - at least one of the "networkArea" and the "snssais" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepIds" attribute is mobility related;  - at least one of the "networkArea", "appIds", "dnns" and "snssais" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepIds" attribute is communication related;  - the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepIds" attribute shall not be requested for both mobility and communication related analytics at the same time.  NOTE 5: If both the "allFreq" attribute and the "allRat" attributes in RatFreqInformation data type are present, then the only one instance of the RatFreqInformation data type shall be present to indicate for all the RAT type and Frequency value the NWDAF has received for the application.  NOTE 6: For service experience analytics, this parameter shall be provided when a consumer requires analytics for an edge application over a UP path.  NOTE 7: 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 8: When event-id in the request 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.  NOTE 9: If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).  NOTE 10: Void.  NOTE 11: Void.  NOTE 12: When the "pduSesInfos" attribute is provided, the associated "appIds" attribute shall be provided for the NWDAF to be able to compute the service experience per application.  NOTE 13: 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 14: Void.  NOTE 15: When this attribute is provided, the NWDAF shall provide the analytics per elementary time slot accordingly.  NOTE 16: When this attribute is provided, the NWDAF shall provide the analytics per group of TAs or cells accordingly.  NOTE 17: If both "networkArea" and "fineGranAreas" attributes are provided, the Area of Interest is interpreted as the intersection area indicated by these two attributes.  NOTE 18: When the subscribed event is "LOC\_ACCURACY", only one of the "networkArea" or "location" attribute shall be included.  NOTE 19: The "LON\_AND\_LAT\_LEVEL" value of "locGranularity" attribute is not applicable to features "DispersionExt\_eNA". The "TA\_LEVEL" or "CELL\_LEVEL" value of "locGranularity" attribute is not applicable to features "MovementBehaviour".  NOTE 20: When the RoamingAnalytics feature is supported, the NF service consumer is in the VPLMN, and the NWDAF determines that the request is for roaming analytics in the HPLMN, this attribute may contain the mapped S-NSSAI(s) of the HPLMN.  NOTE 21: Only the "accuTimeWin" and "minNum" attributes contained in AccuracyReq data type are applicable.  NOTE 22: When the requested event is "SIGNALLING\_STORM", the "nfInstanceIds" and "nfSetIds" attributes indicate the NF instances and NF sets that may cause the signalling storm to the target NF. | | | | | | | | | | | | | |

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

\*\*\* Next Change \*\*\*

5.2.8 Feature negotiation

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

**Table 5.2.8-1: Supported Features**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature number** | | **Feature Name** | | **Description** | |
| 1 | | UeMobility | | This feature indicates the support of analytics based on UE mobility information. | |
| 2 | | UeCommunication | | This feature indicates the support of analytics based on UE communication information. | |
| 3 | | NetworkPerformance | | This feature indicates the support of analytics based on network performance. | |
| 4 | | ServiceExperience | | This feature indicates support for the event related to service experience. | |
| 5 | | QoSSustainability | | This feature indicates support for the event related to QoS sustainability. | |
| 6 | | AbnormalBehaviour | | This feature indicates support for the event related to abnormal behaviour information. | |
| 7 | | UserDataCongestion | | This feature indicates the support of the analytics related on user data congestion. | |
| 8 | | NfLoad | | This feature indicates the support of the analytics related to the load of NF instances. | |
| 9 | | NsiLoad | | This feature indicates the support of the analytics related to the load level of Network Slice and the optionally associated Network Slice Instance. | |
| 10 | | EneNA | | This feature indicates support for the enhancements of network data analytics requirements. | |
| 11 | | UserDataCongestionExt | | This feature indicates support for the extensions to the event related to user data congestion, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature UserDataCongestion. | |
| 12 | | Aggregation | | This feature indicates support for analytics aggregation. | |
| 13 | | NsiLoadExt | | This feature indicates support for the extensions to the event related to the load level of Network Slice and the optionally associated Network Slice Instance, 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. | |
| 14 | | 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. | |
| 15 | | SMCCE | | This feature indicates support for the event related to SM congestion control experience. | |
| 16 | | 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 required the support of feature NfLoad. | |
| 17 | | Dispersion | | This feature indicates support for the event related to dispersion analytics information. | |
| 18 | | RedundantTransmissionExp | | This feature indicates support for the event related to redundant transmission experience analytics information. | |
| 19 | | WlanPerformance | | This feature indicates support of the event related to WLAN performance analytics information. | |
| 20 | | 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. | |
| 21 | | DnPerformance | | This feature indicates the support of the analytics related to DN performance. | |
| 22 | | AnaCtxTransfer | | This feature indicates the support of analytics context transfer. | |
| 23 | | UserConsent | | Indicates the support of detailed handling of user consent, e.g. error responses related to the lack of user consent. | |
| 24 | | 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. | |
| 25 | | 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. | |
| 26 | | UeCommunicationExt\_eNA | | This feature indicates support for the enhancements of UE Communication, including support of ordering criterion. Supporting this feature also requires the support of UeCommunication feature. | |
| 27 | | 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. | |
| 28 | | ServiceExperienceExt2\_eNA | | This feature indicates 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. | |
| 29 | | 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. | |
| 30 | | UeMobilityExt\_AIML | | This feature indicates support for further extensions to the event related to UE mobility supporting AIML, including support of UE’s geographical distribution and direction analytics. Supporting this feature also requires the support of feature UeMobility. | |
| 31 | | PduSesTraffic | | This feature indicates support of the analytics related to PDU Session traffic information. | |
| 32 | | 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. | |
| 33 | | 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. | |
| 34 | | 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. | |
| 35 | | E2eDataVolTransTime | | This feature indicates support for E2E data volume transfer time analytics | |
| 36 | | AnalyticsAccuracy | | This feature indicates support for the Analytics Accuracy information. | |
| 37 | | EnAbnormalBehaviour | | This feature indicates support for the enhancements of UE Abnormal Behaviour.  Supporting this feature also requires the support of AbnormalBehaviour feature. | |
| 38 | | 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. | |
| 39 | | QoSSustainExt\_eNA | | This feature indicates support for the enhancements of QoS Sustainability, including:  - support of temporal and spatial granularity size.  Supporting this feature also requires the support of QoSSustainability feature. | |
| 40 | | WlanPerfExt\_eNA | | This feature indicates support for the enhancements of WLAN performance, including:  - support of temporal granularity size.  Supporting this feature also requires the support of feature WlanPerformance. | |
| 41 | | DnPerfExt\_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. | |
| 42 | | QoSSustainExt\_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. | |
| 43 | | MovementBehaviour | | This feature indicates support for the Movement Behaviour information. | |
| 44 | | LocAccuracy | | This feature indicates support for the Location Accuracy analytics. | |
| 45 | | RelativeProximity | | This feature indicates support for the Relative Proximity analytics. | |
| 46 | | 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. | |
| 47 | | RoamingAnalytics | | This feature indicates support for the Roaming analytics. | |
| 48 | | PredictionError | | This feature indicates support for Prediction Error handling. | |
| 49 | | EnAnaCtxTransfer | | This feature indicates the enhancement for the analytics context transfer, including the support of transferring the Analytics Accuracy and ML Model accuracy context types.  Supporting this feature also requires the support of feature "AnaCtxTransfer". | |
| 50 | | SignallingStorm | | This feature indicates support for the Signalling Storm Analytics. | |
| 51 | | RelativeProximityExt | | This feature indicates support for the enhancements of Relative Proximity Analytics.  The following functionalities are supported:  - Support enhancement of TTC prediction in Relative Proximity Analytics.  Supporting this feature also requires the support of RelativeProximity feature. | |
| 52 | | EnAggregation | | This feature indicates the enhancements on the analytics aggregation.  Supporting this feature also requires the support of Aggregation feature. | |
| 53 | | QoSPolicyAssist | | This feature indicates support for the QoS and Policy Assistance Analytics. | |
| 54 | | UeMobilityExt3 | | This feature indicates support for the following enhancements of UE mobility analytics:  - Providing last known UE location.  Supporting this feature also requires the support of the UeMobility feature. | |

\*\*\* Next Change \*\*\*

A.2 Nnwdaf\_EventsSubscription API

openapi: 3.0.0

info:

version: 1.4.0-alpha.3

title: Nnwdaf\_EventsSubscription

description: |

Nnwdaf\_EventsSubscription Service API.

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externalDocs:

description: 3GPP TS 29.520 V19.3.0; 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

e2eDelayThds:

type: array

items:

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

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'

roamingInfo:

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

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

feedback:

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

sigStormReqs:

type: array

items:

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

minItems: 1

description: Represents the signalling storm analytics requirements.

qosPolAssistReqs:

type: array

items:

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

minItems: 1

description: Represents the QoS and policy assistance analytics requirements.

lastUeLocs:

type: array

items:

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

minItems: 1

description: Contains the last known location of target UE(s).

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

signalStormInfos:

type: array

items:

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

minItems: 1

description: The signalling storm information.

qosPolAssistInfos:

type: array

items:

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

minItems: 1

description: The QoS and policy assistance information.

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.

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

distThreshold:

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

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'

numOfUe:

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

avrSpeed:

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

ratio:

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

direction:

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

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'

e2eDelayThd:

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

snssai:

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

confidence:

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

oneOf:

- required: [qosFlowRetThd]

- required: [ranUeThrouThd]

- required: [e2eDelayThd]

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'

nfIds:

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

procInstructs:

type: array

items:

$ref: 'TS29574\_Ndccf\_DataManagement.yaml#/components/schemas/ProcessingInstruction'

minItems: 1

description: >

Processing instructions applied on the data collected for the generation of the output

analytics.

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'

gpsi:

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

wlanPerTsInfos:

type: array

items:

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

minItems: 1

description: >

WLAN performance information per Time Slot during the analytics target period.

required:

- wlanPerTsInfos

oneOf:

- required: [supi]

- required: [gpsi]

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 UE

locations in the UE Mobility analytics in time order, otherwise set to "false" or

omitted.

distThresholds:

type: array

items:

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

minItems: 1

description: Indicates the linear distance threshold.

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'

accessTypes:

type: array

items:

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

minItems: 1

PfdDeterminationInfo:

description: Represents the PFD Determination information for a known application identifier.

type: object

properties:

appId:

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

suggPfdInfoList:

type: array

items:

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

minItems: 1

required:

- appId

- suggPfdInfoList

SuggestedPfdInfo:

description: Represents the suggested PFD information for the application identifier.

type: object

properties:

pfdId:

type: string

description: >

Identifier of the PFD (i.e. new PFD ID assigned by NWDAF or existing PFD ID retrieved

from UDR which was generated by NWDAF).

ip3TupleList:

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'

pfdConfidence:

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

required:

- pfdId

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'

highTransTmThr:

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

lowTransTmThr:

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

repeatDataTrans:

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

tsIntervalDataTrans:

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

dataVolume:

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

maxNumberUes:

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

oneOf:

- required: [repeatDataTrans]

- required: [tsIntervalDataTrans]

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

confidence:

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

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

required:

- tsStart

- tsDuration

- e2eDataVolTransTimePerUe

E2eDataVolTransTimePerUe:

description: Represents the E2E data volume transfer time per UE.

type: object

properties:

supi:

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

gpsi:

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

snssai:

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

accessType:

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

ratTypes:

type: array

items:

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

minItems: 1

description: The RAT types.

appId:

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

ueLoc:

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

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

type: object

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.

type: object

properties:

uplinkVolume:

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

avgTransTimeUl:

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

varTransTimeUl:

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

downlinkVolume:

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

avgTransTimeDl:

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

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.

confidence:

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

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'

losNlosPct:

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

losNlosInd:

type: boolean

description: Indicates whether the target location is measured with LOS or NLOS.

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'

required:

- accuracyVal

MovBehavReq:

description: Represents the Movement Behaviour analytics requirements.

type: object

properties:

locationGranReq:

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

reportThresholds:

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

MovBehavInfo:

description: Represents the Movement Behaviour information.

type: object

properties:

geoLoc:

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

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

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.

type: object

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.

type: object

properties:

speedThr:

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

numOfUe:

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

ratio:

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

RelProxReq:

description: Represents the Relative Proximity analytics requirements.

type: object

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.

type: object

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'

intGroupIds:

type: array

items:

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

minItems: 1

exterGroupIds:

type: array

items:

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

minItems: 1

required:

- tsStart

- tsDuration

- ueProximities

UeProximity:

description: Represents the Observed or Predicted proximity information.

type: object

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'

confidence:

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

UeTrajectory:

description: Represents timestamped UE positions.

type: object

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: Timestamped location of the UE.

type: object

properties:

ts:

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

locInfo:

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

supi:

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

gpsi:

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

required:

- ts

- locInfo

TimeToCollisionInfo:

description: Represents Time To Collision (TTC) information.

type: object

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'

collisionSpace:

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

colSpcConfidence:

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

colliDirection:

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

colDirConfidence:

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

colDirAccuracy:

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

AnalyticsFeedbackInfo:

description: Analytics feedback information.

type: object

properties:

actionTimes:

type: array

items:

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

minItems: 1

description: The times at which an action was taken.

usedAnaTypes:

type: array

items:

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

minItems: 1

description: The analytics types that were used to take the action.

impactInd:

type: boolean

description: Indication about the impact of an action on the ground truth data.

required:

- actionTimes

RoamingInfo:

description: Information related to roaming analytics.

type: object

properties:

plmnId:

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

aois:

type: array

items:

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

minItems: 1

description: Areas of Interest in the HPLMN or the VPLMN.

servingNfIds:

type: array

items:

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

minItems: 1

description: NF ID(s) of the NF(s) serving the roaming UE(s) in the VPLMN.

servingNfSetIds:

type: array

items:

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

minItems: 1

description: NF Set ID(s) of the NF Set(s) serving the roaming UE(s) in the VPLMN.

SignalStormReq:

description: The signalling storm analytics requirement information.

type: object

properties:

tgtNfInstanceIds:

type: array

items:

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

minItems: 1

tgtNfSetIds:

type: array

items:

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

minItems: 1

intGroupIds:

type: array

items:

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

minItems: 1

exterGroupIds:

type: array

items:

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

minItems: 1

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

tgtCauseIds:

type: array

items:

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

minItems: 1

description: Indicates the target cause ID(s).

thrPeriod:

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

sigFreqThr:

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

ueReqThr:

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

ueNumThr:

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

SignalStormInfo:

description: The signalling storm analytics information.

type: object

properties:

tgtNfInstanceIds:

type: array

items:

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

minItems: 1

description: The NF instance ID(s) of the target NFs impacted by the signalling storm.

tgtNfSetIds:

type: array

items:

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

minItems: 1

description: The NF set ID(s) of the target NFs impacted by the signalling storm.

srcIntGroupIds:

type: array

items:

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

minItems: 1

srcExterGroupIds:

type: array

items:

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

minItems: 1

srcSupis:

type: array

items:

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

minItems: 1

srcGpsis:

type: array

items:

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

minItems: 1

sigStormCauses:

type: array

items:

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

minItems: 1

description: Represents the potential causes of the signalling storm.

srcNfInstanceIds:

type: array

items:

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

minItems: 1

description: The NF instance ID(s) of the source NFs which cause the signalling storm.

srcNfSetIds:

type: array

items:

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

minItems: 1

description: The NF set ID(s) of the source NFs which cause the signalling storm.

sigInfo:

type: array

items:

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

minItems: 1

description: Represents the signalling information.

timerInfo:

type: array

items:

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

minItems: 1

description: Represents the timer information.

priority:

type: integer

capacity:

type: integer

confidence:

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

required:

- sigStormCauses

oneOf:

- required: [tgtNfInstanceIds]

- required: [tgtNfSetIds]

SignalInfo:

description: Represents the signalling information..

type: object

properties:

impactRefPoints:

type: array

items:

type: string

minItems: 1

description: The impacted reference point(s).

impactSrvOps:

type: array

items:

type: string

minItems: 1

description: The impacted service operation(s).

sigAnalytics:

type: array

items:

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

minItems: 1

description: Indicates the received signalling analytics.

SignalAnalytics:

description: The signalling storm analytics requirement information.

type: object

properties:

recvSigNum:

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

sigGrowthRate:

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

recvSigNumFromUe:

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

TimerInfo:

description: The signalling storm analytics requirement information.

type: object

properties:

timerType:

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

timerDur:

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

QosPolicyAssistReq:

description: The QoS and policy assistance analytics requirement information.

type: object

properties:

orderCriterion:

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

orderDirection:

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

freqs:

type: array

items:

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

minItems: 1

ratTypes:

type: array

items:

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

minItems: 1

qosParamSets:

type: array

items:

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

minItems: 1

requestedQoe:

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

required:

- qosParamSets

QosPolicyAssistInfo:

description: The QoS and policy assistance analytics information.

type: object

properties:

qosPolAssistInfo:

type: array

items:

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

minItems: 1

description: The QoS and policy assistance information.

QosPolicyAssistSet:

description: The QoS and policy assistance parameter set.

type: object

properties:

qosParamSet:

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

dnn:

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

appId:

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

fDescs:

type: array

items:

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

minItems: 1

appDuration:

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

predictedAvgQoe:

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

predictedMaxQoe:

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

predictedMinQoe:

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

predQoeVariance:

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

qosPolTimeWin:

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

freqs:

type: array

items:

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

minItems: 1

ratTypes:

type: array

items:

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

minItems: 1

validityPeriod:

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

spatialValidity:

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

maxQoSFlowUsgDur:

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

minQoSFlowUsgDur:

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

avgQoSFlowUsgDur:

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

qosFlowUsgNumber:

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

anyOf:

- required: [predictedAvgQoe]

- required: [predictedMaxQoe]

- required: [predictedMinQoe]

- required: [predQoeVariance]

oneOf:

- required: [appId]

- required: [fDescs]

QosPolicyAssistSetsPerTS:

description: The QoS and policy assistance parameter sets per Time Slot.

type: object

properties:

tsStart:

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

tsDuration:

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

qosPolAssistSets:

type: array

items:

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

minItems: 1

confidence:

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

required:

- tsStart

- tsDuration

- qosPolAssistSets

QosPara:

description: The values of the QoS parameters.

type: object

properties:

qosParamSetId:

type: string

description: Identifies the QoS parameter set.

5qi:

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

priorityLvl:

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

rscType:

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

pdb:

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

per:

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

gbrUl:

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

gbrDl:

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

mbrUl:

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

mbrDl:

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

maxPlrUl:

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

maxPlrDl:

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

avgWin:

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

maxDataBurstVol:

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

#

# 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

- LOC\_ACCURACY

- RELATIVE\_PROXIMITY

- SIGNALLING\_STORM

- QOS\_POLICY\_ASSIST

- 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.

- SIGNALLING\_STORM: Indicates that the event subscribed is the Signalling Storm information.

- QOS\_POLICY\_ASSIST: Indicates that the event subscribed is the QoS and Policy

Assistance 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

- PREDICTION\_NOT\_ALLOWED

- UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME

- NO\_ROAMING\_SUPPORT

- 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.

- PREDICTION\_NOT\_ALLOWED: Indicates that the request for the prediction of the analytics

event is not allowed.

- 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.

- NO\_ROAMING\_SUPPORT: Indicates that the request shall be rejected because roaming analytics

or data are required and the NWDAF neither supports roaming exchange capabilitiy nor can

it forward the request to another NWDAF.

- 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

- DATA\_SOURCES

- USED\_PROC\_INSTRUCT

- 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.

- DATA\_SOURCES: Data sources of the data used for the generation of the output analytics.

- USED\_PROC\_INSTRUCT: Processing instructions used when collecting data for the

generation of the output 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

- 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

- NUM\_OF\_UE

- MOV\_UE\_RATIO

- AVR\_SPEED

- SPEED\_THRESHOLD

- MOV\_UE\_DIRECTION

- 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\_COMMUNICATION event.

- N4\_SESS\_INACT\_TIMER\_FOR\_UE\_COMM: The N4 Session inactivity timer. This value is only

applicable to UE\_COMMUNICATION 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.

- 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:

anyOf:

- 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:

anyOf:

- 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:

- 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:

- 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

- NORTHWEST

- NORTHEAST

- SOUTHWEST

- SOUTHEAST

- 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.

- NORTHWEST: Northwest direction.

- NORTHEAST: Northeast direction.

- SOUTHWEST: Southwest direction.

- SOUTHEAST: Southeast 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.

TargetCauseId:

anyOf:

- type: string

enum:

- SIGNALLING\_STORM\_CAUSED\_BY\_UE

- SIGNALLING\_STORM\_CAUSED\_BY\_NF

- 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:

- SIGNALLING\_STORM\_CAUSED\_BY\_UE: The signalling storm is caused by UEs.

- SIGNALLING\_STORM\_CAUSED\_BY\_NF: The signalling storm is caused by NF.

TimerType:

anyOf:

- type: string

enum:

- PERIODICITY\_TIMER

- BACKOFF\_TIMER

- 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:

- PERIODICITY\_TIMER: The type of the timer is periodicity.

- BACKOFF\_TIMER: The type of the timer is back-off.

QosPolOrderCriterion:

anyOf:

- type: string

enum:

- QOE

- USAGE\_DURATION

- NUMBER\_OF\_USAGES

- 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:

- QOE: Indicates the order is the QoE.

- USAGE\_DURATION: Indicates the order is the QoS Flow Usage Duration.

- NUMBER\_OF\_USAGES: Indicates the order is the number of usages of the QoS Flow.

\*\*\* Next Change \*\*\*

A.3 Nnwdaf\_AnalyticsInfo API

openapi: 3.0.0

info:

version: 1.4.0-alpha.3

title: Nnwdaf\_AnalyticsInfo

description: |

Nnwdaf\_AnalyticsInfo Service API.

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externalDocs:

description: 3GPP TS 29.520 V19.3.0; 5G System; Network Data Analytics Services.

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

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-analyticsinfo

servers:

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

variables:

apiRoot:

default: https://example.com

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

paths:

/analytics:

get:

summary: Read a NWDAF Analytics

operationId: GetNWDAFAnalytics

tags:

- NWDAF Analytics (Document)

parameters:

- name: event-id

in: query

description: Identify the analytics.

required: true

schema:

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

- name: ana-req

in: query

description: Identifies the analytics reporting requirement information.

required: false

content:

application/json:

schema:

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

- name: event-filter

in: query

description: Identify the analytics.

required: false

content:

application/json:

schema:

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

- name: supported-features

in: query

description: To filter irrelevant responses related to unsupported features.

schema:

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

- name: tgt-ue

in: query

description: Identify the target UE information.

required: false

content:

application/json:

schema:

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

responses:

'200':

description: >

Containing the analytics with parameters as relevant for the requesting NF service

consumer.

content:

application/json:

schema:

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

'204':

description: No Content. The requested NWDAF Analytics data does not exist.

'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':

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

content:

application/problem+json:

schema:

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

'406':

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

'414':

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

'429':

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

'500':

description: >

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

returned.

content:

application/problem+json:

schema:

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

'502':

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

'503':

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

default:

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

/context:

get:

summary: Get context information related to analytics subscriptions.

operationId: GetNwdafContext

tags:

- NWDAF Context (Document)

security:

- {}

- oAuth2ClientCredentials:

- nnwdaf-analyticsinfo

- oAuth2ClientCredentials:

- nnwdaf-analyticsinfo

- nnwdaf-analyticsinfo:contexttransfer

parameters:

- name: context-ids

in: query

description: Identifies specific context information related to analytics subscriptions.

required: true

content:

application/json:

schema:

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

- name: req-context

in: query

description: >

Identfies the type(s) of the analytics context information the consumer wishes

to receive.

required: false

content:

application/json:

schema:

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

- name: supported-features

in: query

description: The features supported by the NF service consumer.

schema:

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

required: false

responses:

'200':

description: >

Contains context information related to analytics subscriptions corresponding with

one or more context identifiers.

content:

application/json:

schema:

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

'204':

description: >

No Content. No context information could be retrieved for the requested context

Identifiers.

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'406':

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

'414':

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

'429':

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

'500':

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

'502':

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

'503':

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

default:

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

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nnwdaf-analyticsinfo: Access to the Nnwdaf\_AnalyticsInfo API

nnwdaf-analyticsinfo:contexttransfer: >

Access to service operations applying to NWDAF context transfer related service

operations, i.e. ContextTransfer.

schemas:

AnalyticsData:

description: >

Represents the description of analytics with parameters as relevant for the requesting NF

service consumer.

type: object

properties:

start:

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

expiry:

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

timeStampGen:

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

anaMetaInfo:

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

sliceLoadLevelInfos:

type: array

items:

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

minItems: 1

description: The slices and their load level information.

nsiLoadLevelInfos:

type: array

items:

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

minItems: 1

nfLoadLevelInfos:

type: array

items:

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

minItems: 1

nwPerfs:

type: array

items:

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

minItems: 1

svcExps:

type: array

items:

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

minItems: 1

qosSustainInfos:

type: array

items:

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

minItems: 1

ueMobs:

type: array

items:

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

minItems: 1

ueComms:

type: array

items:

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

minItems: 1

userDataCongInfos:

type: array

items:

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

minItems: 1

abnorBehavrs:

type: array

items:

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

minItems: 1

smccExps:

type: array

items:

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

minItems: 1

disperInfos:

type: array

items:

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

minItems: 1

redTransInfos:

type: array

items:

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

minItems: 1

wlanInfos:

type: array

items:

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

minItems: 1

dnPerfInfos:

type: array

items:

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

minItems: 1

pduSesTrafInfos:

type: array

items:

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

minItems: 1

dataVlTrnsTmInfos:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/E2eDataVolTransTimeInfo'

minItems: 1

locAccInfos:

type: array

items:

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

minItems: 1

accuInfo:

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

cancelAccuInd:

type: boolean

description: >

Indicates cancelled request of the analytics accuracy information.

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

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

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

movBehavInfos:

type: array

items:

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

minItems: 1

relProxInfos:

type: array

items:

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

minItems: 1

signalStormInfos:

type: array

items:

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

minItems: 1

qosPlyAsstInfos:

type: array

items:

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

minItems: 1

suppFeat:

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

EventFilter:

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

type: object

properties:

anySlice:

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

snssais:

type: array

items:

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

minItems: 1

description: Identification(s) of network slice.

roamingInfo:

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

appIds:

type: array

items:

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

minItems: 1

dnns:

type: array

items:

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

minItems: 1

dnais:

type: array

items:

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

minItems: 1

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.

location:

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

networkArea:

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

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 request 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'

nfInstanceIds:

type: array

items:

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

minItems: 1

nfSetIds:

type: array

items:

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

minItems: 1

nfTypes:

type: array

items:

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

minItems: 1

nsiIdInfos:

type: array

items:

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

minItems: 1

qosRequ:

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

nwPerfReqs:

type: array

items:

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

minItems: 1

nwPerfTypes:

type: array

items:

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

minItems: 1

addNwPerfReqs:

type: array

items:

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

minItems: 1

userDataConReqs:

type: array

items:

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

minItems: 1

bwRequs:

type: array

items:

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

minItems: 1

excepIds:

type: array

items:

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

minItems: 1

exptAnaType:

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

exptUeBehav:

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

ratFreqs:

type: array

items:

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

minItems: 1

disperReqs:

type: array

items:

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

minItems: 1

redTransReqs:

type: array

items:

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

minItems: 1

wlanReqs:

type: array

items:

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

minItems: 1

listOfAnaSubsets:

type: array

items:

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

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: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/DnPerformanceReq'

minItems: 1

ueMobilityReqs:

type: array

items:

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

minItems: 1

ueCommReqs:

type: array

items:

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

minItems: 1

pduSesInfos:

type: array

items:

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

minItems: 1

pduSesTrafReqs:

type: array

items:

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

minItems: 1

locAccReqs:

type: array

items:

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

minItems: 1

locGranularity:

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

locOrientation:

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

useCaseCxt:

type: string

description: >

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

are not standardized.

dataVlTrnsTmRqs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/E2eDataVolTransTimeReq'

minItems: 1

accuReq:

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

movBehavReqs:

type: array

items:

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

minItems: 1

relProxReqs:

type: array

items:

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

minItems: 1

sigStormReqs:

type: array

items:

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

minItems: 1

qosPlyAssistReqs:

type: array

items:

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

minItems: 1

lastUeLocs:

type: array

items:

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

minItems: 1

description: Contains the last known location of target UE(s).

not:

required: [anySlice, snssais]

ProblemDetailsAnalyticsInfoRequest:

description: >

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

allOf:

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

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

AdditionInfoAnalyticsInfoRequest:

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

type: object

properties:

rvWaitTime:

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

ContextData:

description: >

Contains context information related to analytics subscriptions corresponding with one or

more context identifiers.

type: object

properties:

contextElems:

type: array

items:

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

minItems: 1

description: >

List of items that contain context information corresponding with a context identifier.

suppFeat:

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

required:

- contextElems

ContextElement:

description: Contains context information corresponding with a specific context identifier.

type: object

properties:

contextId:

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

pendAnalytics:

type: array

items:

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

minItems: 1

description: >

Output analytics for the analytics subscription which have not yet been sent to the

analytics consumer.

histAnalytics:

type: array

items:

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

minItems: 1

description: Historical output analytics.

lastOutputTime:

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

aggrSubs:

type: array

items:

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

minItems: 1

description: >

Information about analytics subscriptions that the NWDAF has with other NWDAFs to

perform aggregation.

histData:

type: array

items:

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

minItems: 1

description: Historical data related to the analytics subscription.

adrfId:

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

adrfDataTypes:

type: array

items:

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

minItems: 1

description: Type(s) of data stored in the ADRF by the NWDAF.

aggrNwdafIds:

type: array

items:

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

minItems: 1

description: >

NWDAF identifiers of NWDAF instances used by the NWDAF service consumer when aggregating

multiple analytics subscriptions.

modelInfo:

type: array

items:

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

minItems: 1

description: >

Contains information identifying the ML model(s) that the consumer NWDAF is currently

subscribing for the analytics.

anaAccuInfos:

type: array

items:

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

minItems: 1

description: The Analytics Accuracy related information.

modelAccuInfos:

type: array

items:

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

minItems: 1

description: The ML Model accuracy related information.

required:

- contextId

ContextIdList:

description: >

Contains a list of context identifiers of context information of analytics

subscriptions.

type: object

properties:

contextIds:

type: array

items:

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

minItems: 1

required:

- contextIds

HistoricalData:

description: Contains historical data related to an analytics subscription.

type: object

properties:

startTime:

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

endTime:

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

subsWithSources:

type: array

items:

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

minItems: 1

description: Information about subscriptions with the data sources.

data:

type: array

items:

$ref: 'TS29575\_Nadrf\_DataManagement.yaml#/components/schemas/DataNotification'

minItems: 1

description: Historical data related to the analytics.

required:

- data

NetworkPerfReq:

description: Represents a network performance requirement.

type: object

properties:

orderCriterion:

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

orderDirection:

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

SpecificAnalyticsSubscription:

description: >

Represents an existing subscription for a specific type of analytics to a specific NWDAF.

type: object

properties:

subscriptionId:

type: string

producerId:

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

producerSetId:

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

nwdafEvSub:

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

allOf:

- oneOf:

- required: [producerId]

- required: [producerSetId]

- required: [subscriptionId]

- required: [nwdafEvSub]

RequestedContext:

description: Contains types of analytics context information.

type: object

properties:

contexts:

type: array

items:

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

minItems: 1

description: List of analytics context types.

nfConsumerInfo:

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

required:

- contexts

SmcceInfo:

description: Represents the Session Management congestion control experience information.

type: object

properties:

dnn:

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

snssai:

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

smcceUeList:

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

required:

- smcceUeList

SmcceUeList:

description: >

Represents the List of UEs classified based on experience level of Session Management

congestion control.

type: object

properties:

highLevel:

type: array

items:

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

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

anyOf:

- required: [highLevel]

- required: [mediumLevel]

- required: [lowLevel]

SpecificDataSubscription:

description: >

Represents an existing subscription for data collection to a specific data source NF.

type: object

properties:

subscriptionId:

type: string

producerId:

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

producerSetId:

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

dataSub:

$ref: 'TS29575\_Nadrf\_DataManagement.yaml#/components/schemas/DataSubscription'

allOf:

- oneOf:

- required: [producerId]

- required: [producerSetId]

- required: [subscriptionId]

- required: [dataSub]

UserDataCongestReq:

description: >

Represents a user data congesion requirement.

type: object

properties:

orderCriterion:

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

orderDirection:

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

ResourceUsageRequPerNwPerfType:

description: More requirement for each network performance type.

type: object

properties:

nwPerfType:

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

rscUsgReq:

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

required:

- nwPerfType

AnalyticsAccuracyInfo:

description: Analytics Accuracy related information needs to be transferred.

type: object

properties:

reportTime:

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

pauseInd:

type: boolean

description: >

Indicates whether the analytics subscription has been paused. Set to "true" if it has

been paused, otherwise set to "false".

remainTimeWin:

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

groundTruthInfo:

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

GroundTruthInfo:

description: The ground truth information used for the accuracy information computation.

type: object

properties:

analyticsId:

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

dataSourceIds:

type: array

items:

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

minItems: 1

description: The NF instance ID(s) of the data source for ground truth data.

dataSourceSetIds:

type: array

items:

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

minItems: 1

description: The NF Set ID(s) of the data source for ground truth data.

dataSubs:

type: array

items:

$ref: 'TS29575\_Nadrf\_DataManagement.yaml#/components/schemas/DataSubscription'

minItems: 1

groundTruthDatas:

type: array

items:

$ref: 'TS29575\_Nadrf\_DataManagement.yaml#/components/schemas/DataNotification'

minItems: 1

required:

- analyticsId

- groundTruthDatas

MlModelAccuracyInfo:

description: The ML Model Accuracy Subscription Information needs to be transferred.

type: object

properties:

subscriptionId:

type: string

description: The identifier of the subscription for the ML Model accuracy information.

sourceId:

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

sourceSetId:

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

accuSubInfo:

$ref: 'TS29520\_Nnwdaf\_MLModelMonitor.yaml#/components/schemas/MLModelAccuracyInfo'

required:

- subscriptionId

#

# ENUMERATIONS DATA TYPES

#

EventId:

anyOf:

- type: string

enum:

- LOAD\_LEVEL\_INFORMATION

- NETWORK\_PERFORMANCE

- NF\_LOAD

- SERVICE\_EXPERIENCE

- UE\_MOBILITY

- UE\_COMMUNICATION

- QOS\_SUSTAINABILITY

- ABNORMAL\_BEHAVIOUR

- USER\_DATA\_CONGESTION

- NSI\_LOAD\_LEVEL

- SM\_CONGESTION

- DISPERSION

- RED\_TRANS\_EXP

- WLAN\_PERFORMANCE

- DN\_PERFORMANCE

- PDU\_SESSION\_TRAFFIC

- E2E\_DATA\_VOL\_TRANS\_TIME

- MOVEMENT\_BEHAVIOUR

- LOC\_ACCURACY

- RELATIVE\_PROXIMITY

- SIGNALLING\_STORM

- 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 type.

Possible values are:

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

network slice.

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

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

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

specific applications.

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

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

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

certain area.

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

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

area.

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

Network Slice Instance.

- SM\_CONGESTION: Represent the analytics of Session Management congestion control experience

information for specific DNN and/or S-NSSAI.

- DISPERSION: Represents the analytics of dispersion.

- RED\_TRANS\_EXP: Represents the analytics of Redundant Transmission Experience.

- WLAN\_PERFORMANCE: Represents the analytics of WLAN performance.

- DN\_PERFORMANCE: Represents the analytics of DN performance.

- PDU\_SESSION\_TRAFFIC: Represents the analytics of PDU Session traffic.

- E2E\_DATA\_VOL\_TRANS\_TIME: Represents the analytics of E2E data volume transfer time.

- MOVEMENT\_BEHAVIOUR: Represents the analytics of the Movement Behaviour information.

- LOC\_ACCURACY: Represents the analytics of location accuracy.

- RELATIVE\_PROXIMITY: Represents the analytics of Relative Proximity information.

- SIGNALLING\_STORM: Represents the analytics of Signalling Storm information.

ContextType:

anyOf:

- type: string

enum:

- PENDING\_ANALYTICS

- HISTORICAL\_ANALYTICS

- AGGR\_SUBS

- DATA

- AGGR\_INFO

- ML\_MODELS

- ANALYTICS\_ACCU\_INFO

- ML\_MODEL\_ACCU\_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 analytics context information type.

Possible values are:

- PENDING\_ANALYTICS: Represents context information that relates to pending output

analytics.

- HISTORICAL\_ANALYTICS: Represents context information that relates to historical output

analytics.

- AGGR\_SUBS: Represents context information about the analytics subscriptions that an NWDAF

has with other NWDAFs that collectively serve an analytics subscription.

- DATA: Represents context information about historical data that is available.

- AGGR\_INFO: Represents context information that is related to aggregation of analytics

from multiple NWDAF subscriptions.

- ML\_MODELS: Represents context information about used ML models.

- ANALYTICS\_ACCU\_INFO: Represents the Analytics Accuracy related information.

- ML\_MODEL\_ACCU\_INFO: Represents the ML Model accuracy related information.

AdrfDataType:

anyOf:

- type: string

enum:

- HISTORICAL\_ANALYTICS

- HISTORICAL\_DATA

- 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 a type of data that is stored in the ADRF.

Possible values are:

- HISTORICAL\_ANALYTICS: Indicates that historical analytics are stored in the ADRF.

- HISTORICAL\_DATA: Indicates that historical data are stored in the ADRF.

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