**3GPP TSG-CT WG3 Meeting #128 *C3-232216***

**Bratislava, Slovakia, 22nd - 26th May, 2023 (revision of C3-232abc)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.520** | **CR** | **0725** | **rev** |  | **Current version:** | **18.1.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Support of analytics accuracy information for Nnwdaf\_EventsSubscription API | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph3 | | | | |  | ***Date:*** | | | 2023-05-04 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | As indicated in 0 and clause 6.1.3 of 23.288, the analytics accuracy information can be requested by the consumer in the request and the NWDAF can provide the accuracy information in the notification. This stage 2 requirement needs to be defined in stage 3. | | | | | | | | |
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| ***Summary of change:*** | | * Define the new AccuracyReq data type to include the accuracy requirement information. * Define the new AccuracyInfo data type to include the accuracy information. * Update the EventSubscription and EventNotification data types to support the request and report of the accuracy information. * Update the service descriptions and OpenAPI file. | | | | | | | | |
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| ***Consequences if not approved:*** | | Misalignment between stage 2 and stage 3. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.2.2.2, 4.2.2.4.2, 5.1.6.1, 5.1.6.2.3, 5.1.6.2.5, 5.1.6.2.82(new), 5.1.6.2.83(new), A.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR 23.288 CR 0763 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | The CR introduces backward compatible feature to the OpenAPI file for Nnwdaf\_EventsSubscription API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st 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]).



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 may include:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3) monitoring duration in the "monDur" attribute;

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

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

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

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

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

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

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 if the "AnalyticsAccuracy" 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 3: 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; and/or

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

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

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

NOTE 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.

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

- and may include:

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

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

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

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

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

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

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

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

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

and may provide:

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

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

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

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

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

NOTE 6: The network slice instance of a PDU session is not available in the PCF.

- and may provide:

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

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

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

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

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

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

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

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; and/or

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

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

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

2) 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;

NOTE 7: 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;

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

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

- and may provide:

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; and/or

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

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

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

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

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

2) the QoS requirements via "qosRequ" attribute;

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

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

- and may include:

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

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

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

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

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

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

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

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

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

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

If the "anyUe" attribute in the "tgtUe" attribute sets to "true":

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

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

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

- and may provide:

1) expected UE behaviour via "exptUeBehav" attribute; and

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

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

- and may include:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- and may include:

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

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

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

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

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

- and may include:

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

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

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

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

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

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

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

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

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

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

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

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

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

NOTE 9: When the target of reporting is a SUPI or a GPSI then the subscription can be rejected, e.g. because user consent is not granted, and the error is sent to the consumer. When the target of reporting is an Internal Group Id, or a list of SUPIs/GPSI(s) or any UE, and the user consent is not granted for a subset of the impacted users, then no error is sent, but a subset of the SUPIs/GPSIs is skipped if user consent is not granted.

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

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

##### 4.2.2.4.2 Notification about subscribed event

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



Figure 4.2.2.4.2-1: NWDAF notifies the subscribed event

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

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

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

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

a) an event identifier as "event" attribute;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

and may include:

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

b) the analytics accuracy information in "accuInfo" attribute, if the feature "AnalyticsAccuracy" is supported.

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

NOTE 2: When receiving a subscription from an NF consumer, the analytics and/or the accuracy information can be provided by NWDAF containing AnLF at the one notification or via a different notification.

NOTE 3: When receiving a request from an NF consumer, the analytics and the accuracy information can be provided by NWDAF containing AnLF at the one notification.

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

- an event subscription Id as "subscriptionId" attribute;

and may include:

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

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

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

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

- store the notification; and

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

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

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

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

\*\*\* 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 | 5.1.6.2.83 | The analytics accuracy information. | AnalyticsAccuracy |
| AccuracyReq | 5.1.6.3.82 | 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 |
| AnalyticsMetadata | 5.1.6.3.14 | Represents the types of analytics metadata information that can be requested. | Aggregation |
| AnalyticsMetadataIndication | 5.1.6.2.36 | Contains analytics metadata values indicated to be used during analytics generation. | Aggregation |
| AnalyticsMetadataInfo | 5.1.6.2.37 | Contains analytics metadata information required for analytics aggregation. | Aggregation |
| AnalyticsSubscriptionsTransfer | 5.1.6.2.40 | Contains information about a request to transfer analytics subscriptions. | AnaSubTransfer |
| AnalyticsSubset | 5.1.6.3.18 | Analytics subset used to indicate the content of the analytics. | EneNA |
| AnySlice | 5.1.6.3.2 | Represents the any slices. |  |
| ApplicationVolume | 5.1.6.2.55 | Application data volume per application Id. | Dispersion |
| AppListForUeComm | 5.1.6.2.64 | Represents the analytics of the application list used by UE. | UeCommunicationExt |
| BwRequirement | 5.1.6.2.25 | Represents bandwidth requirement. | ServiceExperience |
| ClassCriterion | 5.1.6.2.51 | Disperion class criterion. | Dispersion |
| CircumstanceDescription | 5.1.6.2.29 | Contains the description of a circumstance. | AbnormalBehaviour |
| CongestionInfo | 5.1.6.2.18 | Represents the congestion information | UserDataCongestion |
| CongestionType | 5.1.6.3.8 | Identification congestion analytics type. | UserDataCongestion |
| ConsumerNfInformation | 5.1.6.2.49 | Represents the analytics consumer NF Information. | AnaSubTransfer |
| DatasetStatisticalProperty | 5.1.6.3.15 | Dataset statistical properties of the data used to generate the analytics. | Aggregation |
| DeviceType | 5.1.6.3.31 | The type of device. | QoSSustainabilityExt\_eNA |
| 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 |
| 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 |
| 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. |  |
| IpEthFlowDescription | 5.1.6.2.27 | Contains the description of an Uplink and/or Downlink Ethernet flow. | AbnormalBehaviour |
| LoadLevelInformation | 5.1.6.3.2 | Represents load level information of the network slice and the optionally associated network slice instance. |  |
| LocationInfo | 5.1.6.2.11 | Represents UE location information. | UeMobility |
| MatchingDirection | 5.1.6.3.12 | Defines the matching direction when crossing a threshold. | NfLoad, QoSSustainability, UserDataCongestion, NetworkPerformance  Dispersion  RedundantTransmissionExp  WlanPerformance  ServiceExperienceExt  NsiLoadExt |
| 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 |
| 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. | EnNetworkPerformance |
| 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 |
| PrevSubInfo | 5.1.6.2.68 | Information of the previous subscription. | AnaCtxTransfer |
| QosRequirement | 5.1.6.2.20 | Represents the QoS requirements. | QoSSustainability |
| QosSustainabilityInfo | 5.1.6.2.19 | Represents the QoS Sustainability information. | QoSSustainability |
| RankingCriterion | 5.1.6.2.52 | Ranking criterion. | Dispersion |
| RatFreqInformation | 5.1.6.2.67 | Represents the RAT type and/or Frequency information. | ServiceExperienceExt |
| RedTransExpOrderingCriterion | 5.1.6.3.22 | Ordering criterion for the list of Redundant Transmission Experience. | RedundantTransmissionExp |
| RedundantTransmissionExpInfo | 5.1.6.2.57 | Redundant transmission experience analytics information. | RedundantTransmissionExp |
| RedundantTransmissionExpPerTS | 5.1.6.2.58 | Redundant Transmission Experience per Time Slot. | RedundantTransmissionExp |
| RedundantTransmissionExpReq | 5.1.6.2.56 | Redundant transmission experience analytics requirement. | RedundantTransmissionExp |
| 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 |
| RetainabilityThreshold | 5.1.6.2.21 | Represents a QoS flow retainability threshold. | QoSSustainability |
| ServiceExperienceInfo | 5.1.6.2.24 | Represents the service experience information. | ServiceExperience |
| ServiceExperienceType | 5.1.6.3.24 | Represents the type of Service Experience Analytics. | ServiceExperienceExt |
| SessInactTimerForUeComm | 5.1.6.2.65 | Represents the N4 Session inactivity timer. | UeCommunicationExt |
| SliceLoadLevelInformation | 5.1.6.2.6 | Represents the slices and their load level information. |  |
| SubscriptionTransferInfo | 5.1.6.2.41 | Contains information about subscriptions that are requested to be transferred. | AnaSubTransfer |
| TargetUeInformation | 5.1.6.2.8 | Identifies the target UE information. | ServiceExperience  NfLoad  NetworkPerformance  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  QoSSustainability  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance |
| TermCause | 5.1.6.3.26 | Represents a cause for requesting to terminate an analytics subscription. | TermRequest |
| ThresholdLevel | 5.1.6.2.30 | Describe a threshold level. | UserDataCongestion  NfLoad  DnPerformance  ServiceExperienceExt |
| 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 |
| 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. | EnUeCommunication |
| UeCommReq | 5.1.6.2.72 | UE communication analytics requirement. | EnUeCommunication |
| 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 |
| 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 |
| 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 |

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 |
| 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 |
| ArfcnValueNR | 3GPP TS 29.571 [8] | Integer value indicating the ARFCN applicable for a downlink, uplink or bi-directional (TDD) NR global frequency raster.  Minimum = 0. Maximum = 3279165. | ServiceExperienceExt |
| BitRate | 3GPP TS 29.571 [8] | String representing a bit rate that shall be formatted as follows:  pattern: "^\d+(\.\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$"  Examples:  "125 Mbps", "0.125 Gbps", "125000 Kbps". | ServiceExperience  QoSSustainability  WlanPerformance  DnPerformance |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| Dnai | 3GPP TS 29.571 [8] | Identifies a user plane access to one or more DN(s). | ServiceExperience  DnPerformance |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperience  AbnormalBehaviour  UeCommunication  DnPerformance  SMCCE |
| DurationSec | 3GPP TS 29.571 [8] |  |  |
| EthFlowDescription | 3GPP TS 29.514 [21] |  | UeCommunication  AbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] |  | AbnormalBehaviour |
| Float | 3GPP TS 29.571 [8] |  |  |
| FlowDescription | 3GPP TS 29.514 [21] |  | UeCommunication  AbnormalBehaviour |
| FlowInfo | 3GPP TS 29.122 [19] |  | UserDataCongestionExt |
| Gpsi | 3GPP TS 29.571 [8] | The GPSI for an UE. | UserDataCongestionExt |
| GroupId | 3GPP TS 29.571 [8] | Identifies a group of UEs. | UeMobility  UeCommunication NetworkPerformance  AbnormalBehaviour  ServiceExperience  Dispersion  RedundantTransmissionExp  WlanPerformance |
| Ipv4Addr | 3GPP TS 29.571 [8] |  |  |
| Ipv6Addr | 3GPP TS 29.571 [8] |  |  |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | Identifies the network area. | ServiceExperience  QoSSustainability  AbnormalBehaviour  UeMobility  UserDataCongestion  NetworkPerformance  NsiLoadExt  NfLoadExt  Dispersion  RedundantTransmissionExp  WlanPerformance  UeCommunication  DnPerformance |
| NfInstanceId | 3GPP TS 29.571 [8] | Identifies an NF instance. | NfLoad |
| NfSetId | 3GPP TS 29.571 [8] | Identifies an NF Set instance. | NfLoad |
| NFType | 3GPP TS 29.510 [12] | Indentifies a type of NF. | NfLoad |
| NsiId | 3GPP TS 29.531 [24] | Identifies a Network Slice Instance. | ServiceExperience  NsiLoad  DnPerformance |
| PacketDelBudget | 3GPP TS 29.571 [8] |  | QoSSustainability  DnPerformance |
| PacketErrRate | 3GPP TS 29.571 [8] |  | QoSSustainability |
| PacketLossRate | 3GPP TS 29.517 [22] | Indicates Packet Loss Rate. | DnPerformance |
| PduSessionId | 3GPP TS 29.571 [8] | Indentifies PDU Session |  |
| ProblemDetails | 3GPP TS 29.571 [8] | Used in error responses to provide more detailed information about an error. |  |
| QosResourceType | 3GPP TS 29.571 [8] | Identifies the resource type in QoS characteristics. | QoSSustainability |
| RatType | 3GPP TS 29.571 [8] | Identifies the RAT type. | ServiceExperienceExt |
| RedirectResponse | 3GPP TS 29.571 [8] | Contains redirection related information. | ES3XX |
| ReportingInformation | 3GPP TS 29.523 [20] | Represents the type of reporting the subscription requires. |  |
| SamplingRatio | 3GPP TS 29.571 [8] |  |  |
| ScheduledCommunicationTime | 3GPP TS 29.122 [19] |  | UeMobility UeCommunication |
| SmcceInfo | 5.2.6.2.12 | Represents the analytics of Session Management Congestion Control Experience information. | SMCCE |
| Snssai | 3GPP TS 29.571 [8] | Identifies the S-NSSAI (Single Network Slice Selection Assistance Information). |  |
| Supi | 3GPP TS 29.571 [8] | The SUPI for an UE. | ServiceExperience,  NfLoad  NetworkPerformance,  UserDataCongestion  UeMobility  UeCommunication  AbnormalBehaviour  Dispersion  RedundantTransmissionExp  WlanPerformance |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.1.8-1. |  |
| SvcExperience | 3GPP TS 29.517 [22] |  | ServiceExperience |
| Tai | 3GPP TS 29.571 [8] | Tracking Area Information. | AnaSubTransfer |
| TimeWindow | 3GPP TS 29.122 [19] |  |  |
| Uinteger | 3GPP TS 29.571 [8] | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible. |  |
| UpfInformation | 3GPP TS 29.508 [29] | The information of the UPF serving the UE. | ServiceExperienceExt  DnPerformance |
| Uri | 3GPP TS 29.571 [8] |  |  |
| UserLocation | 3GPP TS 29.571 [8] |  | UeMobility  Dispersion |
| VelocityEstimate | 3GPP TS 29.572 [30] | Velocity estimate | QoSSustainabilityExt\_eNA |
| Volume | 3GPP TS 29.122 [19] |  | UeCommunication  AbnormalBehaviour  Dispersion  WlanPerformance |

\*\*\* 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) | ServiceExperience  UeCommunication  AbnormalBehaviour  Dispersion  DnPerformance |
| deviations | array(Uinteger) | O | 1..N | Each element indicates an acceptable deviation from the threshold level included in "ranUeThrouThds" attribute or "qosFlowRetThds" attribute. This attribute may only be present if either the "ranUeThrouThds" attribute or "qosFlowRetThds" attribute is provided. | EnQoSSustainability |
| dnns | array(Dnn) | C | 1..N | Represents the DNN(s) to which the subscription applies. Each DNN is a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.  The absence of dnns means subscription to all DNNs. (NOTE 8) | ServiceExperience, AbnormalBehaviour  UeCommunication  RedundantTransmissionExp  DnPerformance  SMCCE |
| dnais | array(Dnai) | C | 1..N | Represents the Data Network Access Identifier(s) of user plane access to DN(s) which the subscription applies. | ServiceExperience  DnPerformance |
| event | NwdafEvent | M | 1 | Event that is subscribed. |  |
| extraReportReq | EventReportingRequirement | O | 0..1 | The extra event reporting requirement information. |  |
| ladnDnns | array(Dnn) | O | 1..N | LADN DNN(s) to indicate the LADN service area(s) as the AoI(s). | UeMobilityExt |
| loadLevelThreshold | integer | C | 0..1 | Indicates that the NWDAF shall report the corresponding network slice load level to the NF service consumer where the load level of the network slice identified by snssais is reached. (NOTE 4)  May be included when subscribed event is "SLICE\_LOAD\_LEVEL".  Minimum = 0. Maximum = 100. |  |
| matchingDir | MatchingDirection | O | 0..1 | A matching direction may be provided alongside a threshold. If omitted, the default value is CROSSED. | NfLoad, QoSSustainability, UserDataCongestion, NetworkPerformance, NsiLoadExt |
| nfLoadLvlThds | array(ThresholdLevel) | C | 1..N | Shall be supplied in order to start reporting when an average load level is reached. (NOTE 4) | NfLoad |
| networkArea | NetworkAreaInfo | C | 0..1 | Identification of network area to which the subscription applies.  The absence of networkArea means subscription to all network areas. (NOTE 7, NOTE 8) | ServiceExperience  UeMobility  UeCommunication  QoSSustainability  AbnormalBehaviour  UserDataCongestion  NetworkPerformance  NsiLoadExt  NfLoadExt  Dispersion  RedundantTransmissionExp  WlanPerformance  DnPerformance |
| visitedAreas | array(NetworkAreaInfo) | O | 1..N | Indicates the visited network area(s) which the UEs had previously been in at least one of the Visited Area(s) of Interest.  (NOTE 10) | UeMobilityExt |
| maxTopAppUlNbr | Uinteger | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Uplink direction. Minimum = 1.  May be included when one of the elements in the "listOfAnaSubsets" attribute is set to LIST\_OF\_TOP\_APP\_UL. | UserDataCongestionExt |
| maxTopAppDlNbr | Uinteger | O | 0..1 | Indicates the requested maximum number of top applications that contribute the most to the traffic in Downlink direction. Minimum = 1.  May be included when one of the elements in the "listOfAnaSubsets" attribute is set to LIST\_OF\_TOP\_APP\_DL. | UserDataCongestionExt |
| nfInstanceIds | array(NfInstanceId) | O | 1..N | Identification(s) of NF instance(s). | NfLoad |
| nfSetIds | array(NfSetId) | O | 1..N | Identification(s) of NF instance set(s). | NfLoad |
| nfTypes | array(NFType) | O | 1..N | Identification(s) of NF type(s). (NOTE 13) | NfLoad  NsiLoadExt |
| notificationMethod | NotificationMethod | O | 0..1 | Indicate the notification method. (NOTE 2) |  |
| nsiIdInfos | array(NsiIdInfo) | O | 1..N | Each element identifies the S-NSSAI and the optionally associated network slice instance(s).  May be included when subscribed event is "NSI\_LOAD\_LEVEL",  "SERVICE\_EXPERIENCE" or "DN\_PERFORMANCE".  (NOTE 1) | ServiceExperience  NsiLoad  DnPerformance |
| nsiLevelThrds | array(Uinteger) | O | 1..N | Identifies the load threshold for each S-NSSAI or S-NSSAI and the optionally associated network slice instance identified by the "nsiIds" attribute within the "nsiIdInfos" attribute.  (NOTE 4)  Minimum = 0. Maximum = 100. | NsiLoad |
| qosRequ | QosRequirement | C | 0..1 | Indicates the QoS requirements. It shall be included when subscribed event is "QOS\_SUSTAINABILITY". | QoSSustainability |
| 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) |  |
| tgtUe | TargetUeInformation | O | 0..1 | Identifies target UE information.  (NOTE 3) |  |
| congThresholds | array(ThresholdLevel) | C | 1..N | Represents the congestion threshold levels. (NOTE 4) | UserDataCongestion |
| nwPerfRequs | array(NetworkPerfRequirement) | C | 1..N | Represents the network performance requirements. This attribute shall be included when subscribed event is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| bwRequs | array(BwRequirement) | O | 1..N | Represents the bandwidth requirement for each application.  It may only be present if "appIds" attribute is provided. | ServiceExperience |
| excepRequs | array(Exception) | C | 1..N | Represents a list of Exception Ids with associated thresholds. May only be present when subscribed event is "ABNORMAL\_BEHAVIOUR".  (NOTE 5, NOTE 6, NOTE 8) | AbnormalBehaviour |
| exptAnaType | ExpectedAnalyticsType | C | 0..1 | Represents expected UE analytics type.  It shall not be present if the "excepRequs" attribute is provided. (NOTE 6, NOTE 8) | AbnormalBehaviour |
| exptUeBehav | ExpectedUeBehaviourData | O | 0..1 | Represents expected UE behaviour. | AbnormalBehaviour |
| ratFreqs | array(RatFreqInformation) | O | 1..N | Identification(s) of the RAT type(s) and/or frequency(ies) of UE's serving cell(s) which the subscription applies. (NOTE 9) | ServiceExperienceExt |
| listOfAnaSubsets | array(AnalyticsSubset) | O | 1..N | The list of analytics subsets can be used to indicate the content of the analytics. | EneNA |
| disperReqs | array(DispersionRequirement) | O | 1..N | Represents the dispersion analytics requirements. | Dispersion |
| redTransReqs | array(RedundantTransmissionExpReq) | O | 1..N | Represents the redundant transmission experience analytics requirements. | RedundantTransmissionExp |
| wlanReqs | array(WlanPerformanceReq) | O | 1..N | Represents other WLAN performance analytics requirements. If the attribute contains no content, may take default handling action. | WlanPerformance |
| ueCommReqs | array(UeCommReq) | O | 1..N | Represents the UE communication requirements. This attribute may be included when the subscribed event is "UE\_COMM". | EnUeCommunication |
| 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 |
| accuReq | AccuracyReq | O | 0..1 | Represents the analytics accuracy requirement information. | AnalyticsAccuracy |
| NOTE 1: The "anySlice" attribute is not applicable to features "UeMobility" and "NetworkPerformance". The "snssais" attribute is not applicable to features "ServiceExperience", "NsiLoad", "UeMobility" and "NetworkPerformance". When subscribed event is "SLICE\_LOAD\_LEVEL", the identifications of network slices, either information about slice(s) identified by "snssais", or "anySlice" set to "true" shall be included. When subscribed event is "QOS\_SUSTAINABILITY", "NF\_LOAD", "UE\_COMM", "ABNORMAL\_BEHAVIOUR", "USER\_DATA\_CONGESTION", "DISPERSION" or "RED\_TRANS\_EXP", the identifications of network slices identified by "snssais" is optional. When subscribed event is "NSI\_LOAD\_LEVEL", "SERVICE\_EXPERIENCE" or "DN\_PERFORMANCE", either the "nsiIdInfos" attribute or "anySlice" set to "true" shall be included.  NOTE 2: When notificationMethod is not supplied, the default value is "THRESHOLD".  NOTE 3: Applicability is further described in the corresponding data type.  NOTE 4: This property shall be provided if the "notifMethod" in "evtReq" is set to "ON\_EVENT\_DETECTION" or "notificationMethod" in "eventSubscriptions" is set to "THRESHOLD" or omitted.  NOTE 5: Only "excepId" and "excepLevel" within the Exception data type apply to the "excepRequs" attribute within EventSubscription data type.  NOTE 6: Either "excepRequs" or "exptAnaType" shall be provided if subscribed event is "ABNORMAL\_BEHAVIOUR".  NOTE 7: For "NETWORK\_PERFORMANCE", "SERVICE\_EXPERIENCE", "USER\_DATA\_CONGESTION" or "DN\_PERFORMANCE" event, this 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", this attribute shall be provided.  NOTE 8: For "ABNORMAL\_BEHAVIOUR" event with "anyUe" attribute in "tgtUe" attribute sets to true,  - at least one of the "networkArea" and the "snssais" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepRequs" attribute is mobility related;  - at least one of the "networkArea", "appIds", "dnns" and "snssais" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepRequs" attribute is communication related;  - the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepRequs" attribute shall not be requested for both mobility and communication related analytics at the same time.  NOTE 9: If both the "allFreq" attribute and the "allRat" attribute are present within the RatFreqInformation data type, then only one instance of the RatFreqInformation data typeshall be present to indicate for all the RAT type and all the Frequency values the NWDAF has received for the application.  NOTE 10: If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).  NOTE 11: This parameter shall be provided when a consumer requires analytics for an edge application over a UP path.  NOTE 12: This parameter may be provided when a consumer requires analytics for an edge application over a 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: Care needs to be taken to avoid excessive signalling.

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

##### 5.1.6.2.5 Type EventNotification

Table 5.1.6.2.5-1: Definition of type EventNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | NwdafEvent | M | 1 | Event that is notified. |  |
| start | DateTime | O | 0..1 | It defines the start time of which the analytics information will become valid. (NOTE 1) |  |
| expiry | DateTime | O | 0..1 | It defines the expiration time after which the analytics information will become invalid. (NOTE 1) |  |
| timeStampGen | DateTime | C | 0..1 | It defines the timestamp of analytics generation. (NOTE 3) |  |
| failNotifyCode | NwdafFailureCode | C | 0..1 | Identifies the failure reason for the event notification.  It shall only be included if the event notification is failed or the analytics information is not ready. (NOTE 2) | EneNA |
| rvWaitTime | DurationSec | O | 0..1 | Indicate a recommended time interval (in seconds) which is used to determine the time when analytics information is needed in similar future event subscriptions. It may only be included if the "failNotifyCode" attribute sets to "UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME". | EneNA |
| anaMetaInfo | AnalyticsMetadataInfo | C | 0..1 | Contains information about analytics metadata required to aggregate the analytics. It shall be present if the "anaMeta" attribute was included in the subscription, containing the information indicated by the "anaMeta" attribute. | Aggregation |
| nwPerfs | array(NetworkPerfInfo) | C | 1..N | The network performance information.  Shall be present when subscribed even is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| nfLoadLevelInfos | array(NfLoadLevelInformation) | C | 1..N | The NF load level information. When subscribed event is "NF\_LOAD", the nfLoadLevelInfos shall be included. | NfLoad |
| nsiLoadLevelInfos | array(NsiLoadLevelInfo) | C | 1..N | Each element identifies the load level information for each S-NSSAI and the optionally associated network slice instance.  Shall be included when subscribed event is "NSI\_LOAD\_LEVEL". | NsiLoad |
| qosSustainInfos | array(QosSustainabilityInfo) | C | 1..N | The QoS sustainability information.  When subscribed event is "QOS\_SUSTAINABILITY", the qosSustainInfos shall be included. | QoSSustainability |
| sliceLoadLevelInfo | SliceLoadLevelInformation | C | 0..1 | The slices and the load level information.  When subscribed event is "SLICE\_LOAD\_LEVEL", the sliceLoadLevelInfo shall be included. |  |
| svcExps | array(ServiceExperienceInfo) | C | 1..N | The service experience information.  When subscribed event is "SERVICE\_EXPERIENCE", the svcExps shall be included. | ServiceExperience |
| ueComms | array(UeCommunication) | C | 1..N | The UE communication information.  When subscribed event is "UE\_COMM", the ueComms shall be included. | UeCommunication |
| ueMobs | array(UeMobility) | C | 1..N | The UE mobility information.  When subscribed event is "UE\_MOBILITY", the ueMobs shall be included. | UeMobility |
| abnorBehavrs | array(AbnormalBehaviour) | C | 1..N | The Abnormal Behaviour information.  When subscribed event is "ABNORMAL\_BEHAVIOUR", the abnorBehavrs shall be included. | AbnormalBehaviour |
| userDataCongInfos | array(UserDataCongestionInfo) | C | 1..N | The location and user data congestion information.  Shall be present if the subscribed event is "USER\_DATA\_CONGESTION". | UserDataCongestion |
| dnPerfInfos | array(DnPerfInfo) | C | 1..N | The DN performance information.  Shall be present if the subscribed event is "DN\_PERFORMANCE". | DnPerformance |
| disperInfos | array(DispersionInfo) | C | 1..N | The Dispersion information.  When subscribed event is "DISPERSION", the "disperInfos" attribute shall be included. | Dispersion |
| redTransInfos | array(RedundantTransmissionExpInfo) | C | 1..N | The redundant transmission experience related information.  When subscribed event is "RED\_TRANS\_EXP", the "redTransInfos" attribute shall be included. | RedundantTransmissionExp |
| wlanInfos | array(WlanPerformanceInfo) | C | 1..N | The WLAN performance related information.  When subscribed event is "WLAN\_PERFORMANCE", the "wlanInfos" attribute shall be included. | WlanPerformance |
| smccExps | array(SmcceInfo) | C | 1..N | The Session Management Congestion Control Experience information.  Shall be present when the requested event is "SM\_CONGESTION". | SMCCE |
| accuInfo | AccuracyInfo | O | 0..1 | The analytics accuracy information. | AnalyticsAccuracy |
| NOTE 1: If the "start" attribute and the "expiry" attribute are both provided, the DateTime of the "expiry" attribute shall not be earlier than the DateTime of the "start" attribute.  NOTE 2: The values of "UNAVAILABLE\_DATA" and "BOTH\_STAT\_PRED\_NOT\_ALLOWED" of the NwdafFailureCode data type are not applicable for the "failNotifyCode" attribute.  NOTE 3: This attribute shall be included when ADRF is deployed. | | | | | |

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

##### 5.1.6.2.82 Type AccuracyReq

Table 5.1.6.2.82-1: Definition of type AccuracyReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| accuTimeWin | TimeWindow | O | 0..1 | Indicates the time interval. Only the accuracy information which is generated within this time interval will be considered by the consumer. |  |
| accuPeriod | DurationSec | O | 0..1 | The time period for reporting the accuracy information. |  |
| accuDevThr | Uinteger | O | 0..1 | The reporting threshold of deviation value. |  |
| minNum | Uinteger | O | 0..1 | The minimal number of analytics output provided by NWDAF that have to be considered in the determination of the accuracy information. |  |
| updatedAnaFlg | boolean | O | 0..1 | 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. |  |
| correctionInterval | DurationSec | O | 0..1 | The relative time interval with respect to the time when the analytics is provided. It indicates the time interval during which the updated analytics can be accepted by the analytics consumer. |  |

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

##### 5.1.6.2.83 Type AccuracyInfo

Table 5.1.6.2.83-1: Definition of type AccuracyInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| accuracyVal | Uinteger | C | 0..1 | The accuracy value. Shall be present if "accuracyReq" attribute is included in the request. |  |
| meetAccuReqInd | boolean | O | 0..1 | Set to "true" if the accuracy value meets the requested preferred level of accuracy.  Otherwise set to "false" or omitted. |  |

Editor's note: It is FFS to determine if the "accuracyVal" attribute may be provided if the deviation between predictions and its corresponding ground truth is above specified accuracy deviation threshold.

Editor's note: It is FFS to determine how an accuracy value relates to the preferred level of accuracy requested for the analytics ID.

\*\*\* 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 of the analytics related to UE communication. | |
| 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. | |
| 28 | | EnAbnormalBehaviour | | This feature indicates support for the enhancements of UE Abnormal Behaviour. | |
| 29 | | EnQoSSustainability | | This feature indicates support for the enhancements of QoS Sustainability. | |
| 30 | | UserDataCongestionExt2\_eNA | | This feature indicates support for the enhancements of user data congestion, including support of ordering criterion. Supporting this feature also requires the support of UserDataCongestion and UserDataCongestionExt features. | |
| 31 | | UeMobilityExt2\_eNA | | This feature indicates support for the enhancements of UE mobility, including support of ordering criterion. Supporting this feature also requires the support of UeMobility and UeMobilityExt features. | |
| 32 | | EnUeCommunication | | This feature indicates support for the enhancements of UE Communication. | |
| 33 | | EnNetworkPerformance | | This feature indicates support for the enhancements of Network Performance | |
| 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 | | NetworkPerformanceExt\_eNA | | This feature indicates the support for extensions to the analytics event related to network performance, including support of analytics target period subset. | |
| 37 | | AnalyticsAccuracy | | This feature indicates support for the Analytics Accuracy information. | |

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

# A.2 Nnwdaf\_EventsSubscription API

openapi: 3.0.0

info:

version: 1.3.0-alpha.2

title: Nnwdaf\_EventsSubscription

description: |

Nnwdaf\_EventsSubscription Service API.

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externalDocs:

description: 3GPP TS 29.520 V18.1.0; 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'

visitedAreas:

type: array

items:

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

minItems: 1

maxTopAppUlNbr:

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

maxTopAppDlNbr:

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

nsiIdInfos:

type: array

items:

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

minItems: 1

nsiLevelThrds:

type: array

items:

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

minItems: 1

qosRequ:

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

qosFlowRetThds:

type: array

items:

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

minItems: 1

ranUeThrouThds:

type: array

items:

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

minItems: 1

repetitionPeriod:

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

snssaia:

type: array

items:

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

minItems: 1

description: >

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

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

tgtUe:

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

congThresholds:

type: array

items:

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

minItems: 1

nwPerfRequs:

type: array

items:

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

minItems: 1

ueCommReqs:

type: array

items:

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

minItems: 1

ueMobilityReqs:

type: array

items:

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

minItems: 1

userDataConOrderCri:

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

bwRequs:

type: array

items:

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

minItems: 1

excepRequs:

type: array

items:

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

minItems: 1

exptAnaType:

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

exptUeBehav:

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

ratFreqs:

type: array

items:

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

minItems: 1

listOfAnaSubsets:

type: array

items:

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

minItems: 1

disperReqs:

type: array

items:

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

minItems: 1

redTransReqs:

type: array

items:

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

minItems: 1

wlanReqs:

type: array

items:

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

minItems: 1

upfInfo:

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

appServerAddrs:

type: array

items:

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

minItems: 1

dnPerfReqs:

type: array

items:

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

minItems: 1

accuReq:

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

required:

- event

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

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

accuInfo:

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

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'

required:

- svcExprc

BwRequirement:

description: Represents bandwidth requirements.

type: object

properties:

appId:

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

marBwDl:

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

marBwUl:

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

mirBwDl:

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

mirBwUl:

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

required:

- appId

SliceLoadLevelInformation:

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

type: object

properties:

loadLevelInformation:

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

snssais:

type: array

items:

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

minItems: 1

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

required:

- loadLevelInformation

- snssais

NsiLoadLevelInfo:

description: >

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

load level information.

type: object

properties:

loadLevelInformation:

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

snssai:

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

nsiId:

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

resUsage:

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

numOfExceedLoadLevelThr:

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

exceedLoadLevelThrInd:

type: boolean

description: >

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

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

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

EXCEED\_LOAD\_LEVEL\_THR\_IND.

networkArea:

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

timePeriod:

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

resUsgThrCrossTimePeriod:

type: array

items:

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

minItems: 1

description: >

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

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

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

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

"numOfExceedLoadLevelThr" attribute.

numOfUes:

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

numOfPduSess:

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

confidence:

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

required:

- loadLevelInformation

- snssai

NsiIdInfo:

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

type: object

properties:

snssai:

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

nsiIds:

type: array

items:

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

minItems: 1

required:

- snssai

EventReportingRequirement:

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

type: object

properties:

accuracy:

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

accPerSubset:

type: array

items:

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

minItems: 1

description: >

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

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

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

WLAN\_PERFORMANCE, DN\_PERFORMANCE or SERVICE\_EXPERIENCE.

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

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'

ratio:

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

confidence:

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

required:

- loc

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'

startTs:

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

endTs:

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

qosFlowRetThd:

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

ranUeThrouThd:

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

snssai:

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

confidence:

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

oneOf:

- required: [qosFlowRetThd]

- required: [ranUeThrouThd]

QosRequirement:

description: Represents the QoS requirements.

type: object

properties:

5qi:

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

gfbrUl:

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

gfbrDl:

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

resType:

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

pdb:

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

per:

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

deviceSpeed:

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

deviceType:

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

oneOf:

- required: [5qi]

- required: [resType]

ThresholdLevel:

description: Represents a threshold level.

type: object

properties:

congLevel:

type: integer

nfLoadLevel:

type: integer

nfCpuUsage:

type: integer

nfMemoryUsage:

type: integer

nfStorageUsage:

type: integer

avgTrafficRate:

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

maxTrafficRate:

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

avgPacketDelay:

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

maxPacketDelay:

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

avgPacketLossRate:

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

svcExpLevel:

$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'

amount:

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

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'

required:

- nwPerfType

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'

confidence:

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

allOf:

- required: [networkArea]

- required: [nwPerfType]

- oneOf:

- required: [relativeRatio]

- required: [absoluteNum]

FailureEventInfo:

description: Contains information on the event for which the subscription is not successful.

type: object

properties:

event:

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

failureCode:

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

required:

- event

- failureCode

AnalyticsMetadataIndication:

description: >

Contains analytics metadata information requested to be used during analytics generation.

type: object

properties:

dataWindow:

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

dataStatProps:

type: array

items:

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

minItems: 1

strategy:

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

aggrNwdafIds:

type: array

items:

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

minItems: 1

AnalyticsMetadataInfo:

description: Contains analytics metadata information required for analytics aggregation.

type: object

properties:

numSamples:

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

dataWindow:

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

dataStatProps:

type: array

items:

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

minItems: 1

strategy:

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

accuracy:

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

NumberAverage:

description: Represents average and variance information.

type: object

properties:

number:

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

variance:

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

skewness:

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

required:

- number

- variance

AnalyticsSubscriptionsTransfer:

description: Contains information about a request to transfer analytics subscriptions.

type: object

properties:

subsTransInfos:

type: array

items:

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

minItems: 1

failTransEventReports:

type: array

items:

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

minItems: 1

required:

- subsTransInfos

SubscriptionTransferInfo:

description: Contains information about subscriptions that are requested to be transferred.

type: object

properties:

transReqType:

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

nwdafEvSub:

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

consumerId:

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

contextId:

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

sourceNfIds:

type: array

items:

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

minItems: 1

sourceSetIds:

type: array

items:

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

minItems: 1

modelInfo:

type: array

items:

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

minItems: 1

required:

- transReqType

- nwdafEvSub

- consumerId

ModelInfo:

description: Contains information about an ML model.

type: object

properties:

analyticsId:

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

mlModelInfos:

type: array

items:

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

minItems: 1

required:

- analyticsId

- mlModelInfos

MLModelInfo:

description: Contains information about an ML models.

type: object

properties:

mlFileAddrs:

type: array

items:

$ref: 'TS29520\_Nnwdaf\_MLModelProvision.yaml#/components/schemas/MLModelAddr'

minItems: 1

modelProvId:

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

modelProvSetId:

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

oneOf:

- required: [modelProvId]

- required: [modelProvSetId]

AnalyticsContextIdentifier:

description: Contains information about available analytics contexts.

type: object

properties:

subscriptionId:

type: string

description: The identifier of a subscription.

nfAnaCtxts:

type: array

items:

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

minItems: 1

description: >

List of analytics types for which NF related analytics contexts can be retrieved.

ueAnaCtxts:

type: array

items:

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

minItems: 1

description: >

List of objects that indicate for which SUPI and analytics types combinations analytics

context can be retrieved.

allOf:

- anyOf:

- required: [nfAnaCtxts]

- required: [ueAnaCtxts]

- required: [subscriptionId]

UeAnalyticsContextDescriptor:

description: Contains information about available UE related analytics contexts.

type: object

properties:

supi:

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

anaTypes:

type: array

items:

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

minItems: 1

description: >

List of analytics types for which UE related analytics contexts can be retrieved.

required:

- supi

- anaTypes

DnPerfInfo:

description: Represents DN performance information.

type: object

properties:

appId:

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

dnn:

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

snssai:

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

dnPerf:

type: array

items:

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

minItems: 1

confidence:

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

required:

- dnPerf

DnPerf:

description: Represents DN performance for the application.

type: object

properties:

appServerInsAddr:

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

upfInfo:

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

dnai:

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

perfData:

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

spatialValidCon:

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

temporalValidCon:

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

required:

- perfData

PerfData:

description: Represents DN performance data.

type: object

properties:

avgTrafficRate:

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

maxTrafficRate:

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

avePacketDelay:

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

maxPacketDelay:

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

avgPacketLossRate:

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

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'

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

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

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'

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.

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'

meetAccuReqInd:

type: boolean

description: >

Set to "true" if the accuracy value meets the requested preferred level of accuracy.

Otherwise set to "false" or omitted.

#

# 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

- 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.

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

- 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.

- NUM\_OF\_UE: Indicates number of UEs.

- SESS\_SUCC\_RATIO: Indicates ratio of successful setup of PDU sessions to total PDU

session setup attempts.

- HO\_SUCC\_RATIO: Indicates Ratio of successful handovers to the total handover attempts.

ExpectedAnalyticsType:

anyOf:

- type: string

enum:

- MOBILITY

- COMMUN

- MOBILITY\_AND\_COMMUN

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the expected UE analytics type.

Possible values are:

- MOBILITY: Mobility related abnormal behaviour analytics is expected by the consumer.

- COMMUN: Communication related abnormal behaviour analytics is expected by the consumer.

- MOBILITY\_AND\_COMMUN: Both mobility and communication related abnormal behaviour analytics

is expected by the consumer.

MatchingDirection:

anyOf:

- type: string

enum:

- ASCENDING

- DESCENDING

- CROSSED

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the matching direction when crossing a threshold.

Possible values are:

- ASCENDING: Threshold is crossed in ascending direction.

- DESCENDING: Threshold is crossed in descending direction.

- CROSSED: Threshold is crossed either in ascending or descending direction.

NwdafFailureCode:

anyOf:

- type: string

enum:

- UNAVAILABLE\_DATA

- BOTH\_STAT\_PRED\_NOT\_ALLOWED

- UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME

- OTHER

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the failure reason.

Possible values are:

- UNAVAILABLE\_DATA: Indicates the requested statistics information for the event is rejected

since necessary data to perform the service is unavailable.

- BOTH\_STAT\_PRED\_NOT\_ALLOWED: Indicates the requested analysis information for the event is

rejected since the start time is in the past and the end time is in the future, which

means the NF service consumer requested both statistics and prediction for the analytics.

- UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME: Indicates that the requested event is rejected since

the analytics information is not ready when the time indicated by the "timeAnaNeeded"

attribute (as provided during the creation or modification of subscription) is reached.

- OTHER: Indicates the requested analysis information for the event is rejected due to other

reasons.

AnalyticsMetadata:

anyOf:

- type: string

enum:

- NUM\_OF\_SAMPLES

- DATA\_WINDOW

- DATA\_STAT\_PROPS

- STRATEGY

- ACCURACY

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the types of analytics metadata information that can be requested.

Possible values are:

- NUM\_OF\_SAMPLES: Number of data samples used for the generation of the output analytics.

- DATA\_WINDOW: Data time window of the data samples.

- DATA\_STAT\_PROPS: Dataset statistical properties of the data used to generate the

analytics.

- STRATEGY: Output strategy used for the reporting of the analytics.

- ACCURACY: Level of accuracy reached for the analytics.

DatasetStatisticalProperty:

anyOf:

- type: string

enum:

- UNIFORM\_DIST\_DATA

- NO\_OUTLIERS

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the dataset statistical properties.

Possible values are:

- UNIFORM\_DIST\_DATA: Indicates the use of data samples that are uniformly distributed

according to the different aspects of the requested analytics.

- NO\_OUTLIERS: Indicates that the data samples shall disregard data samples that are at

the extreme boundaries of the value range.

OutputStrategy:

anyOf:

- type: string

enum:

- BINARY

- GRADIENT

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the output strategy used for the analytics reporting.

Possible values are:

- BINARY: Indicates that the analytics shall only be reported when the requested level

of accuracy is reached within a cycle of periodic notification.

- GRADIENT: Indicates that the analytics shall be reported according with the periodicity

irrespective of whether the requested level of accuracy has been reached or not.

TransferRequestType:

anyOf:

- type: string

enum:

- PREPARE

- TRANSFER

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the request type for the analytics subscription transfer.

Possible values are:

- PREPARE: Indicates that the request is for analytics subscription transfer preparation.

- TRANSFER: Indicates that the request is for analytics subscription transfer execution.

AnalyticsSubset:

anyOf:

- type: string

enum:

- NUM\_OF\_UE\_REG

- NUM\_OF\_PDU\_SESS\_ESTBL

- RES\_USAGE

- NUM\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR

- PERIOD\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR

- EXCEED\_LOAD\_LEVEL\_THR\_IND

- LIST\_OF\_TOP\_APP\_UL

- LIST\_OF\_TOP\_APP\_DL

- NF\_STATUS

- NF\_RESOURCE\_USAGE

- NF\_LOAD

- NF\_PEAK\_LOAD

- NF\_LOAD\_AVG\_IN\_AOI

- DISPER\_AMOUNT

- DISPER\_CLASS

- RANKING

- PERCENTILE\_RANKING

- RSSI

- RTT

- TRAFFIC\_INFO

- NUMBER\_OF\_UES

- APP\_LIST\_FOR\_UE\_COMM

- N4\_SESS\_INACT\_TIMER\_FOR\_UE\_COMM

- AVG\_TRAFFIC\_RATE

- MAX\_TRAFFIC\_RATE

- AVG\_PACKET\_DELAY

- MAX\_PACKET\_DELAY

- AVG\_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

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the analytics subset.

Possible values are:

- NUM\_OF\_UE\_REG: The number of UE registered. This value is only applicable to

NSI\_LOAD\_LEVEL event.

- NUM\_OF\_PDU\_SESS\_ESTBL: The number of PDU sessions established. This value is only

applicable to NSI\_LOAD\_LEVEL event.

- RES\_USAGE: The current usage of the virtual resources assigned to the NF instances

belonging to a particular network slice instance. This value is only applicable to

NSI\_LOAD\_LEVEL event.

- NUM\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR: The number of times the resource usage threshold

of the network slice instance is reached or exceeded if a threshold value is provided by

the consumer. This value is only applicable to NSI\_LOAD\_LEVEL event.

- PERIOD\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR: The time interval between each time the

threshold being met or exceeded on the network slice (instance). This value is only

applicable to NSI\_LOAD\_LEVEL event.

- EXCEED\_LOAD\_LEVEL\_THR\_IND: Whether the Load Level Threshold is met or exceeded by the

statistics value. This value is only applicable to NSI\_LOAD\_LEVEL event.

- LIST\_OF\_TOP\_APP\_UL: The list of applications that contribute the most to the traffic in

the UL direction. This value is only applicable to USER\_DATA\_CONGESTION event.

- LIST\_OF\_TOP\_APP\_DL: The list of applications that contribute the most to the traffic in

the DL direction. This value is only applicable to USER\_DATA\_CONGESTION event.

- NF\_STATUS: The availability status of the NF on the Analytics target period, expressed

as a percentage of time per status value (registered, suspended, undiscoverable). This

value is only applicable to NF\_LOAD event.

- NF\_RESOURCE\_USAGE: The average usage of assigned resources (CPU, memory, storage). This

value is only applicable to NF\_LOAD event.

- NF\_LOAD: The average load of the NF instance over the Analytics target period. This value

is only applicable to NF\_LOAD event.

- NF\_PEAK\_LOAD: The maximum load of the NF instance over the Analytics target period. This

value is only applicable to NF\_LOAD event.

- NF\_LOAD\_AVG\_IN\_AOI: The average load of the NF instances over the area of interest. This

value is only applicable to NF\_LOAD event.

- DISPER\_AMOUNT: Indicates the dispersion amount of the reported data volume or transaction

dispersion type. This value is only applicable to DISPERSION event.

- DISPER\_CLASS: Indicates the dispersion mobility class: fixed, camper, traveller upon set

its usage threshold, and/or the top-heavy class upon set its percentile rating threshold.

This value is only applicable to DISPERSION event.

- RANKING: Data/transaction usage ranking high (i.e.value 1), medium (2) or low (3). This

value is only applicable to DISPERSION event.

- PERCENTILE\_RANKING: Percentile ranking of the target UE in the Cumulative Distribution

Function of data usage for the population of all UEs. This value is only applicable to

DISPERSION event.

- RSSI: Indicated the RSSI in the unit of dBm. This value is only applicable to

WLAN\_PERFORMANCE event.

- RTT: Indicates the RTT in the unit of millisecond. This value is only applicable to

WLAN\_PERFORMANCE event.

- TRAFFIC\_INFO: Traffic information including UL/DL data rate and/or Traffic volume. This

value is only applicable to WLAN\_PERFORMANCE event.

- NUMBER\_OF\_UES: Number of UEs observed for the SSID. This value is only applicable to

WLAN\_PERFORMANCE event.

- APP\_LIST\_FOR\_UE\_COMM: The analytics of the application list used by UE. This value is only

applicable to UE\_COMM event.

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

applicable to UE\_COMM event.

- AVG\_TRAFFIC\_RATE: Indicates average traffic rate. This value is only applicable to

DN\_PERFORMANCE event.

- MAX\_TRAFFIC\_RATE: Indicates maximum traffic rate. This value is only applicable to

DN\_PERFORMANCE event.

- 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.

- AVG\_PACKET\_LOSS\_RATE: Indicates average 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.

DispersionType:

oneOf:

- type: string

enum:

- DVDA

- TDA

- DVDA\_AND\_TDA

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the dispersion type.

Possible values are:

- DVDA: Data Volume Dispersion Analytics.

- TDA: Transactions Dispersion Analytics.

- DVDA\_AND\_TDA: Data Volume Dispersion Analytics and Transactions Dispersion Analytics.

DispersionClass:

oneOf:

- type: string

enum:

- FIXED

- CAMPER

- TRAVELLER

- TOP\_HEAVY

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the dispersion class.

Possible values are:

- FIXED: Dispersion class as fixed UE its data or transaction usage at a location or

a slice, is higher than its class threshold set for its all data or transaction usage.

- CAMPER: Dispersion class as camper UE, its data or transaction usage at a location or

a slice, is higher than its class threshold and lower than the fixed class threshold set

for its all data or transaction usage.

- TRAVELLER: Dispersion class as traveller UE, its data or transaction usage at a location

or a slice, is lower than the camper class threshold set for its all data or transaction

usage.

- TOP\_HEAVY: Dispersion class as Top\_Heavy UE, who's dispersion percentile rating at a

location or a slice, is higher than its class threshold.

DispersionOrderingCriterion:

anyOf:

- type: string

enum:

- TIME\_SLOT\_START

- DISPERSION

- CLASSIFICATION

- RANKING

- PERCENTILE\_RANKING

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the order criterion for the list of dispersion.

Possible values are:

- TIME\_SLOT\_START: Indicates the order of time slot start.

- DISPERSION: Indicates the order of data/transaction dispersion.

- CLASSIFICATION: Indicates the order of data/transaction classification.

- RANKING: Indicates the order of data/transaction ranking.

- PERCENTILE\_RANKING: Indicates the order of data/transaction percentile ranking.

DeviceType:

anyOf:

- type: string

enum:

- MOBILE\_PHONE

- SMART\_PHONE

- TABLET

- DONGLE

- MODEM

- WLAN\_ROUTER

- IOT\_DEVICE

- WEARABLE

- MOBILE\_TEST\_PLATFORM

- UNDEFINED

- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration but

is not used to encode content defined in the present version of this API.

description: |

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: |

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: |

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: |

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: |

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.

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