**3GPP TSG CT WG3 Meeting #128C3-232130r2**

**Bratislava, Slovakia, May 22 – 26, 2023 (revision of C3-231452)**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.520** | **CR** | **0693** | **rev** | **2** | **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:***  | PDU Session traffic analytics for Nnwdaf\_EventsSubscription API |
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| ***Source to WG:*** | KDDI, Huawei, Ericsson, Intel |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eUEPO |  | ***Date:*** | 2023-05-15 |
|  |  |  |  |  |
| ***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 canbe 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)* |
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| ***Reason for change:*** | PDU Session traffic analytics was implemented in clause 6.20 of TS 23.288 and updated by SA2#156e agreed TS 23.288 CR 0728 (S2-2305485) and CR 0817 (S2-2306078), hence need to be implemented in this specification. |
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| ***Summary of change:*** | This CR proposes to add new feature, event, data types and procedures for Nnwdaf\_EventsSubscription API.  |
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| ***Consequences if not approved:*** | The stage 2 requirement is not implemented. |
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| ***Clauses affected:*** | 4.2.1.1, 4.2.1.3.2, 4.2.2.2.2, 4.2.2.4.2, 5.1.6.1, 5.1.6.2.3, 5.1.6.2.5, 5.1.6.2.7, 5.1.6.2.8, 5.1.6.2.73(new), 5.1.6.2.74(new), 5.1.6.2.75(new), 5.1.6.3.4, 5.1.6.3.18, 5.1.8, A.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **Y** |  |  Other core specifications  | TS 23.288 CR 0728TS 23.288 CR 0817 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR introduces a backwards compatible feature in the OpenAPI file of the Nnwdaf\_EventsSubscription API. |
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| ***This CR's revision history:*** | Rev 2 provides additional updates based on CR0728 and CR0817:* Rename the event id and the feature.
* Add application ID and domain descriptors to the PduSesTrafficReq data type.
* Change the flowDescs attribute into the pduSesTrafReqs attribute in TdTraffic data type.
* Add list of SUPIs to PduSesTrafficInfo data type.
* Remove Editor’s notes from PduSesTrafficInfo and PduSesTrafficReq data type.
* Update a conditional description to accPerSubset attribute.
* Add the list of analytics subsets with an Editor’s note.
* Update the Open API file according to the revisions above.
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\*\*\* 1st Change \*\*\*

#### 4.2.1.1 Overview

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

This service:

- allows NF service consumers to subscribe to and unsubscribe from different analytics events;

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

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

The types of observed events include:

- Slice load level information;

- Network slice instance load level information;

- Service experience;

- NF load;

- Network performance;

- Abnormal behaviour;

- UE mobility;

- UE communication;

- User data congestion;

- QoS sustainability;

- Dispersion;

- Redundant transmission experience;

- SM congestion control experience;

- WLAN performance;

- DN performence; and

- PDU Session traffic.

\*\*\* 2nd Change \*\*\*

##### 4.2.1.3.2 NF Service Consumers

The Policy Control Function (PCF):

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

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

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

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

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

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

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

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

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

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

- supports taking one or more above input from the NWDAF into consideration for policies on assignment of network resources and/or for traffic steering policies.

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

The Network Slice Selection Function (NSSF):

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

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

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

The Access and Mobility Management Function (AMF):

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

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

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

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

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

The Session Management Function (SMF):

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

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

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

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

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

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

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

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

The Network Exposure Function (NEF):

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

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

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

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

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

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

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

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

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

- supports forwarding Observed Service Experience information from NWDAF to the AF when it is untrusted.

The Application Function (AF):

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

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

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

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

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

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

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

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

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

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

The Operation, Administration, and Maintenance (OAM):

- supports receiving slice load level information from the NWDAF;

- supports receiving observed service experience from the NWDAF;

- supports receiving NF load information from the NWDAF;

- supports receiving network performance information from the NWDAF;

- supports receiving UE mobility information from the NWDAF;

- supports receiving UE communication information from the NWDAF;

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

- supports receiving abnormal UE behaviour information from the NWDAF.

The Charging Enablement Function (CEF):

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

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

The Network Data Analytics Function (NWDAF):

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

- supports requesting the transfer of subscriptions to another NWDAF.

The Data Collection Coordination Function (DCCF):

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

\*\*\* 3rd 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 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.

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

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

2) PDU Session traffic analytics requirements in "pduSesTrafReqs" attribute, which includes Application Id, IP Descriptions or Domain Descriptors for the requested URSP; and

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

- and may include:

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

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

NOTE 9: The predictions are not applicable for PDU Session traffic 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.

\*\*\* 4th 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";

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

and may include:

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

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

\*\*\* 5th 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. |  |
| 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, NetworkPerformanceDispersionRedundantTransmissionExpWlanPerformanceServiceExperienceExtNsiLoadExt |
| 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). | ServiceExperienceNsiLoadDnPerformance |
| 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. | ServiceExperienceNfLoadNetworkPerformanceUserDataCongestionUeMobilityUeCommunicationAbnormalBehaviourQoSSustainabilityDispersionRedundantTransmissionExpWlanPerformanceDnPerformancePduSesTraffic |
| TdTraffic | 5.1.6.2.74 | Represents traffic that matches or unmatches Traffic Descriptor over the established PDU Session(s). | PduSesTraffic |
| TermCause | 5.1.6.3.26 | Represents a cause for requesting to terminate an analytics subscription. | TermRequest |
| ThresholdLevel | 5.1.6.2.30 | Describe a threshold level. | UserDataCongestionNfLoadDnPerformanceServiceExperienceExt |
| 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 |
| PduSesTrafficInfo | 5.1.6.2.73 | Represents PDU Session traffic analytics information. | PduSesTraffic |
| PduSesTrafficReq | 5.1.6.2.75 | Represents PDU Session traffic analytics requirement. | PduSesTraffic |
| UserDataConOrderCrit | 5.1.6.3.27 | The ordering criterion for the list of User Data Congestion analytics. | UserDataCongestionExt2\_eNA |
| UserDataCongestionInfo | 5.1.6.2.17 | Represents the user data congestion information. | UserDataCongestion |
| 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. | DnPerformanceServiceExperienceExt |
| ApplicationId | 3GPP TS 29.571 [8] | Identifies the application identifier. | ServiceExperience UeCommunicationAbnormalBehaviourDispersionDnPerformancePduSesTraffic |
| 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". | ServiceExperienceQoSSustainabilityWlanPerformanceDnPerformance |
| 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). | ServiceExperienceDnPerformance |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperienceAbnormalBehaviourUeCommunicationDnPerformanceSMCCEPduSesTraffic |
| DurationSec | 3GPP TS 29.571 [8] |  |  |
| EthFlowDescription | 3GPP TS 29.514 [21] |  | UeCommunicationAbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] |  | AbnormalBehaviour |
| Float | 3GPP TS 29.571 [8] |  |  |
| FlowDescription | 3GPP TS 29.514 [21] |  | UeCommunicationAbnormalBehaviourPduSesTraffic |
| 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. | UeMobilityUeCommunication NetworkPerformance AbnormalBehaviourServiceExperienceDispersionRedundantTransmissionExpWlanPerformancePduSesTraffic |
| Ipv4Addr | 3GPP TS 29.571 [8] |  |  |
| Ipv6Addr | 3GPP TS 29.571 [8] |  |  |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | Identifies the network area. | ServiceExperienceQoSSustainabilityAbnormalBehaviourUeMobilityUserDataCongestionNetworkPerformance NsiLoadExtNfLoadExtDispersionRedundantTransmissionExpWlanPerformanceUeCommunicationDnPerformancePduSesTraffic |
| 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. | ServiceExperienceNsiLoadDnPerformance |
| PacketDelBudget | 3GPP TS 29.571 [8] |  | QoSSustainabilityDnPerformance |
| 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,NfLoadNetworkPerformance,UserDataCongestionUeMobilityUeCommunicationAbnormalBehaviourDispersionRedundantTransmissionExpWlanPerformancePduSesTraffic |
| 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. | ServiceExperienceExtDnPerformance |
| 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] |  | UeCommunicationAbnormalBehaviourDispersionWlanPerformancePduSesTraffic |

\*\*\* 6th 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) | ServiceExperienceUeCommunication AbnormalBehaviourDispersionDnPerformance |
| deviations | array(Uinteger) | O | 1..N | Each element indicates an acceptable deviation from the threshold level included in "ranUeThrouThds" attribute or "qosFlowRetThds" attribute. This attribute may only be present if either the "ranUeThrouThds" attribute or "qosFlowRetThds" attribute is provided. | EnQoSSustainability |
| dnns | array(Dnn) | C | 1..N | Represents the DNN(s) to which the subscription applies. Each DNN is a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only.The absence of dnns means subscription to all DNNs. (NOTE 8) (NOTE 15) | ServiceExperience, AbnormalBehaviourUeCommunicationRedundantTransmissionExpDnPerformanceSMCCEPduSesTraffic |
| dnais | array(Dnai) | C | 1..N | Represents the Data Network Access Identifier(s) of user plane access to DN(s) which the subscription applies. | ServiceExperienceDnPerformance |
| 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) | ServiceExperienceUeMobilityUeCommunicationQoSSustainabilityAbnormalBehaviourUserDataCongestionNetworkPerformance NsiLoadExtNfLoadExtDispersionRedundantTransmissionExpWlanPerformanceDnPerformancePduSesTraffic |
| 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) | NfLoadNsiLoadExt |
| 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 NsiLoadDnPerformance |
| 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) (NOTE 15) |  |
| 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) | ServiceExperienceExtDnPerformance |
| 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) | ServiceExperienceExtDnPerformance |
| dnPerfReqs | array(DnPerformanceReq) | O | 1..N | Represents the DN performance analytics requirements. | DnPerformance |
| pduSesTrafReqs | array(PduSesTrafficReq) | C | 1..N | Represents the PDU Session traffic analytics requirements. This attribute shall be included when subscribed event is "PDU\_SESSION\_TRAFFIC". | PduSesTraffic |
| NOTE 1: The "anySlice" attribute is not applicable to features "UeMobility" and "NetworkPerformance". The "snssais" attribute is not applicable to features "ServiceExperience", "NsiLoad", "UeMobility" and "NetworkPerformance". When subscribed event is "SLICE\_LOAD\_LEVEL", the identifications of network slices, either information about slice(s) identified by "snssais", or "anySlice" set to "true" shall be included. When subscribed event is "QOS\_SUSTAINABILITY", "NF\_LOAD", "UE\_COMM", "ABNORMAL\_BEHAVIOUR", "USER\_DATA\_CONGESTION", "DISPERSION", "RED\_TRANS\_EXP" or "PDU\_SESSION\_TRAFFIC", 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 orderNOTE 15: When the subscribed event is "PDU\_SESSION\_TRAFFIC" and the PduSesTraffic feature is supported, at least one of the "dnns” and/or "snssais” attributes as the route selection descriptor(s) for the URSP rule shall be included. |

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

\*\*\* 7th 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 |
| pduSesTrafInfos | array(PduSesTrafficInfo) | C | 1..N | The PDU Session traffic related information.When subscribed event is "PDU\_SESSION\_TRAFFIC", the "pduSesTrafInfos" attribute shall be included. | PduSesTraffic |
| 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. |

\*\*\* 8th Change \*\*\*

##### 5.1.6.2.7 Type EventReportingRequirement

Table 5.1.6.2.7-1: Definition of type EventReportingRequirement

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| accuracy | Accuracy | O | 0..1 | Preferred level of accuracy of the analytics. (NOTE 5) |  |
| accPerSubset | array(Accuracy) | O | 1..N | Each element indicates the preferred accuracy level per analytics subset. It may be present if the "listOfAnaSubsets" attribute is present in the subscription request when the subscription event is NF\_LOAD, UE\_COMM, DISPERSION, NETWORK\_PERFORMANCE, WLAN\_PERFORMANCE, DN\_PERFORMANCE, SERVICE\_EXPERIENCE or PDU\_SESSION\_TRAFFIC. (NOTE 4, NOTE 5) | EneNA |
| startTs | DateTime | O | 0..1 | UTC time indicating the start time of the observation period.The absence of this attribute means subscription at the present time unless the "offsetPeriod" attribute is included. (NOTE 3) |  |
| endTs | DateTime | O | 0..1 | UTC time indicating the end time of the observation period.If the start time is in the past, then the absence of this attribute means that the end time of the subscription is at the present time, unless the "offsetPeriod" attribute is included.If provided, it shall not be less than the start time. (NOTE 3) |  |
| offsetPeriod | integer | O | 0..1 | 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. (NOTE 3) | EneNA |
| sampRatio | SamplingRatio | O | 0..1 | Percentage of sampling (1%...100%) among impacted UEs.Applicable to event targeting a group of UEs or any UE.(NOTE 1) |  |
| maxSupiNbr | Uinteger | O | 0..1 | Represents the maximum number of SUPIs expected in an object. Applicable for the event(s) providing a list of SUPIs during the analytics response. |  |
| maxObjectNbr | Uinteger | O | 0..1 | Maximum number of objects expected for an analytics report. It's only applicable for the event(s) which may provide more than one entries or objects during event notification. |  |
| timeAnaNeeded | DateTime | O | 0..1 | UTC time indicating the time when analytcs information is needed. | EneNA |
| anaMeta | array(AnalyticsMetadata) | O | 1..N | List of analytics metadata that are requested to be included. | Aggregation |
| anaMetaInd | AnalyticsMetadataIndication | O | 0..1 | Contains values for the analytics metadata that the NF service consumer wants to be used for generating the analytics. | Aggregation |
| histAnaTimePeriod | TimeWindow | O | 0..1 | The time period of historical analytics indicates the start time and end time during which the historical analytics was generated. If this attribute is included, the NWDAF only needs to provide the existing analytics, and does not need to generate new analytics. | EneNA |
| NOTE 1: The "sampRatio" attribute within EventReportingRequirement data type is not applicable for the Nnwdaf\_EventsSubscription API.NOTE 2: Void.NOTE 3: When the "offsetPeriod" attribute is included, the "startTs" and "endTs" attributes shall not be included. If the analytics target period is indicated either by providing a "startTs" attribute and an "endTs" attribute that are equal, or by providing an "offsetPeriod" attribute equal to zero (which means there is no offset to the periodic reporting time indicated by the "repPeriod" attribute or "repetitionPeriod" attribute), then this is a request for analytics for a specific time of the same "startTs" attribute and "endTs" attribute or each specific time periodically indicated by the "repPeriod" attribute , rather than for a time interval. If none of the attributes "startTs", "endTs" and "offsetPeriod" is provided, the analytics target period starts at the present time and there is no specified end time.NOTE 4: If multiple accuracy entries are included, the order of the entries of the "accPerSubset" attribute corresponds with the order of the entries of the "listOfAnaSubsets" attribute, i.e. the first entry of the "accPerSubset" attribute holds the requested accuracy for the analytics subset that is indicated by the first entry of the "listOfAnaSubsets" attribute, and so on.NOTE 5: If both the "accuracy" attribute and "accPerSubset" attribute were provided in the request, the "accPerSubset" attribute takes precedence over the "accuracy" attribute. |

\*\*\* 9th Change \*\*\*

##### 5.1.6.2.8 Type TargetUeInformation

Table 5.1.6.2.8-1: Definition of type TargetUeInformation

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

\*\*\* 10th Change \*\*\*

##### 5.1.6.2.73 Type PduSesTrafficInfo

Table 5.1.6.2.73-1: Definition of type PduSesTrafficInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| supis | array(Supi) | C | 1..N | Each element identifies a UE.May only be present if the subscription request applies to one or more UE(s). (NOTE 3) |  |
| dnn | array(Dnn) | C | 1..N | Identifies DNN, a full DNN with both the Network Identifier and Operator Identifier, or a DNN with the Network Identifier only, for which analytics information is provided.Shall be present if the DNN was provided in the request or subscription.(NOTE 1) |  |
| snssai | array(Snssai) | C | 1..N | Identifies the network slice information for which analytics information is provided.Shall be present if the S-NSSAI was provided in the request or subscription.(NOTE 1) |  |
| tdMatchTrafs | array(TdTraffic) | C | 1..N | Identifies traffic that matches Traffic Descriptor provided by the consumer in those PDU Sessions identified by the S-NSSAI and DNN above and the volume.(NOTE 2) |  |
| tdUnmatchTrafs | array(TdTraffic) | C | 1..N | Identifies traffic that does not match Traffic Descriptor provided by the consumer in those PDU Sessions identified by the S-NSSAI and DNN above and the volume.(NOTE 2) |  |
| NOTE 1: At least one of the "dnn" and "snssai" attributes shall be provided for the PDU Session traffic statistics of the specific DNN and/or S-NSSAI.NOTE 2: At least one of the "tdMatchTrafs” and "tdUnmatchTrafs" attributes shall be provided.NOTE 3: When Target of Analytics Reporting is a UE group ID, or "Any UE" in the subscription, the NWDAF shall include the list of UEs matching the filter. |

\*\*\* 11th Change \*\*\*

##### 5.1.6.2.74 Type TdTraffic

Table 5.1.6.2.74-1: Definition of type TdTraffic

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| pduSesTrafReqs | array(PduSesTrafficReq) | C | 1..N | Indicates the PDU Session traffic analytics requirements. Shall be present if the "pduSesTrafReqs" attribute was provided in the request or subscription. |  |
| ulVol | Volume | O | 0..1 | Indicates the UL data volume exchanged. |  |
| dlVol | Volume | O | 0..1 | Indicates the DL data volume exchanged. |  |
| allVol | Volume | O | 0..1 | Indicates the overall data volume exchanged. |  |
| ulNumOfPkt | Uinteger | O | 0..1 | Indicates the number of UL packets exchanged. |  |
| dlNumOfPkt | Uinteger | O | 0..1 | Indicates the number of DL packets exchanged. |  |
| allNumOfPkt | Uinteger | O | 0..1 | Indicates the number of overall packets exchanged. |  |

\*\*\* 12th Change \*\*\*

##### 5.1.6.2.75 Type PduSesTrafficReq

Table 5.1.6.2.75-1: Definition of type PduSesTrafficReq

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| flowDescs | array(FlowDescription) | C | 1..N | Indicates traffic flow filtering description(s) for IP flow(s). |  |
| appId | ApplicationId | C | 0..1 | Indicates an application identifier. |  |
| domainDescs | array(string) | C | 1..N | FQDN(s) or a regular expression which are used as a domain name matching criteria. |  |
| NOTE: One of "flowDescs" attribute, "appId" attribute or "domainDescs" attribute shall be provided. |

\*\*\* 13th Change \*\*\*

##### 5.1.6.3.4 Enumeration: NwdafEvent

Table 5.1.6.3.4-1: Enumeration NwdafEvent

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| NF\_LOAD | Indicates that the event subscribed is NF Load. | NfLoad |
| QOS\_SUSTAINABILITY | Indicates that the event subscribed is QoS sustainability. | QoSSustainability |
| SLICE\_LOAD\_LEVEL | Indicates that the event subscribed is load level information of Network Slice  |  |
| SERVICE\_EXPERIENCE | Indicates that the event subscribed is service experience. | ServiceExperience |
| UE\_MOBILITY | Indicates that the event subscribed is UE mobility information. | UeMobility |
| UE\_COMM | Indicates that the event subscribed is UE communication information. | UeCommunication |
| ABNORMAL\_BEHAVIOUR | Indicates that the event subscribed is abnormal behaviour information. | AbnormalBehaviour |
| USER\_DATA\_CONGESTION | Indicates that the event subscribed is user data congestion information | UserDataCongestion |
| NETWORK\_PERFORMANCE | Indicates that the event subscribed is network performance information | NetworkPerformance |
| NSI\_LOAD\_LEVEL | Indicates that the event subscribed is load level information of Network Slice and the optionally associated Network Slice Instance | NsiLoad |
| DISPERSION | Indicates that the event subscribed is dispersion information. | Dispersion |
| RED\_TRANS\_EXP | Indicates that the event subscribed is redundant transmission experience. | RedundantTransmissionExp |
| WLAN\_PERFORMANCE | Indicates that the event subscribed is WLAN performance. | WlanPerformance |
| DN\_PERFORMANCE | Indicates that the event subscribed is DN performance information. | DnPerformance |
| SM\_CONGESTION | Indicates the Session Management Congestion Control Experience information for specific DNN and/or S-NSSAI. | SMCCE |
| PDU\_SESSION\_TRAFFIC | Indicates that the event subscribed is the PDU Session traffic information. | PduSesTraffic |

\*\*\* 14th Change \*\*\*

##### 5.1.6.3.18 Enumeration: AnalyticsSubset

Table 5.1.6.3.18-1: AnalyticsSubset

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| NUM\_OF\_UE\_REG | The number of UE registered. This value is only applicable to NSI\_LOAD\_LEVEL event. |  |
| NUM\_OF\_PDU\_SESS\_ESTBL | The number of PDU sessions established. This value is only applicable to NSI\_LOAD\_LEVEL event. |  |
| RES\_USAGE | The current usage of the virtual resources assigned to the NF instances belonging to a particular network slice instance. This value is only applicable to NSI\_LOAD\_LEVEL event. |  |
| NUM\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR | The number of times the resource usage threshold of the network slice instance is reached or exceeded if a threshold value is provided by the consumer. This value is only applicable to NSI\_LOAD\_LEVEL event. |  |
| PERIOD\_OF\_EXCEED\_RES\_USAGE\_LOAD\_LEVEL\_THR | The time interval between each time the threshold being met or exceeded on the network slice (instance). This value is only applicable to NSI\_LOAD\_LEVEL event. |  |
| EXCEED\_LOAD\_LEVEL\_THR\_IND | Whether the Load Level Threshold is met or exceeded by the statistics value. This value is only applicable to NSI\_LOAD\_LEVEL event. |  |
| LIST\_OF\_TOP\_APP\_UL | The list of applications that contribute the most to the traffic in the UL direction. This value is only applicable to USER\_DATA\_CONGESTION event. |  |
| LIST\_OF\_TOP\_APP\_DL | The list of applications that contribute the most to the traffic in the DL direction. This value is only applicable to USER\_DATA\_CONGESTION event. |  |
| NF\_STATUS | The availability status of the NF on the Analytics target period, expressed as a percentage of time per status value (registered, suspended, undiscoverable). This value is only applicable to NF\_LOAD event. |  |
| NF\_RESOURCE\_USAGE | The average usage of assigned resources (CPU, memory, storage). This value is only applicable to NF\_LOAD event. |  |
| NF\_LOAD | The average load of the NF instance over the Analytics target period. This value is only applicable to NF\_LOAD event. |  |
| NF\_PEAK\_LOAD | The maximum load of the NF instance over the Analytics target period. This value is only applicable to NF\_LOAD event. |  |
| NF\_LOAD\_AVG\_IN\_AOI | The average load of the NF instances over the area of interest. This value is only applicable to NF\_LOAD event. |  |
| DISPER\_AMOUNT | Indicates the dispersion amount of the reported data volume or transaction dispersion type. This value is only applicable to DISPERSION event. |  |
| DISPER\_CLASS | Indicates the dispersion mobility class (fixed, camper or traveller) upon set its usage threshold, and/or the top-heavy class upon set its percentile rating threshold. This value is only applicable to DISPERSION event. |  |
| RANKING | Data/transaction usage ranked high (i.e.value 1), medium (2) or low (3). This value is only applicable to DISPERSION event. |  |
| PERCENTILE\_RANKING | Percentile ranking of the target UE in the Cumulative Distribution Function of data usage for the population of all Ues. This value is only applicable to DISPERSION event. |  |
| RSSI | Indicated the RSSI in the unit of dBm. This value is only applicable to WLAN\_PERFORMANCE event. |  |
| RTT | Indicates the RTT in the unit of millisecond. This value is only applicable to WLAN\_PERFORMANCE event. |  |
| TRAFFIC\_INFO | Traffic information including UL/DL data rate and/or Traffic volume. This value is only applicable to WLAN\_PERFORMANCE event. |  |
| NUMBER\_OF\_UES | Number of Ues observed for the SSID. This value is only applicable to WLAN\_PERFORMANCE event. |  |
| APP\_LIST\_FOR\_UE\_COMM | The analytics of the application list used by UE. This value is only applicable to UE\_COMM event. |  |
| N4\_SESS\_INACT\_TIMER\_FOR\_UE\_COMM | The N4 Session inactivity timer. This value is only applicable to UE\_COMM event. |  |
| AVG\_TRAFFIC\_RATE | Indicates average traffic rate. This value is only applicable to DN\_PERFORMANCE event. |  |
| MAX\_TRAFFIC\_RATE | Indicates maximum traffic rate. This value is only applicable to DN\_PERFORMANCE event. |  |
| 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. |  |
| FLOW\_DESC\_MATCH\_TD | Indicates IP Flow descriptor containing 3-tuple, server side (destination address, port in the traffic that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| FLOW\_DESC\_UNMATCH\_TD | Indicates IP Flow descriptor containing 3-tuple, server side (destination address, port in the traffic that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| APP\_ID\_MATCH\_TD | Indicates Application ID that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| APP\_ID\_UNMATCH\_TD | Indicates Application ID that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| DOMAIN\_DESC\_MATCH\_TD | Indicates Domain descriptor that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| DOMAIN\_DESC\_UNMATCH\_TD | Indicates Domain descriptor that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| UL\_VOL\_MATCH\_TD | Indicates UL data volume exchanged that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| UL\_VOL\_UNMATCH\_TD | Indicates UL data volume exchanged that that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| DL\_VOL\_MATCH\_TD | Indicates DL data volume exchanged that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| DL\_VOL\_UNMATCH\_TD | Indicates DL data volume exchanged that that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| ALL\_VOL\_MATCH\_TD | Indicates overall data volume exchanged that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| ALL\_VOL\_UNMATCH\_TD | Indicates overall data volume exchanged that that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| NUM\_OF\_UL\_PACK\_MATCH\_TD | Indicates the number of UL packets exchanged that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| NUM\_OF\_UL\_PACK\_UNMATCH\_TD | Indicates the number of UL packets exchanged that that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| NUM\_OF\_DL\_PACK\_MATCH\_TD | Indicates the number of DL packets exchanged that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| NUM\_OF\_DL\_PACK\_UNMATCH\_TD | Indicates the number of DL packets exchanged that that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| NUM\_OF\_ALL\_PACK\_MATCH\_TD | Indicates the number of ALL packets exchanged that matches Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |
| NUM\_OF\_ALL\_PACK\_UNMATCH\_TD | Indicates the number of ALL packets exchanged that that does not match Traffic Descriptor within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event. | PduSesTraffic |

Editor's note: Whether the enumeration from UL\_VOL\_MATCH\_TD to NUM\_OF\_ALL\_PACK\_UNMATCH\_TD are needed is FFS.

\*\*\* 15th 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 | PduSesTraffic | This feature indicates support of the analytics related to PDU Session traffic information. |

\*\*\* 16th 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

 pduSesTrafReqs:

 type: array

 items:

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

 minItems: 1

 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

 pduSesTrafInfos:

 type: array

 items:

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

 minItems: 1

 required:

 - event

 ServiceExperienceInfo:

 description: Represents service experience information.

 type: object

 properties:

 svcExprc:

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

 svcExprcVariance:

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

 supis:

 type: array

 items:

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

 minItems: 1

 snssai:

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

 appId:

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

 srvExpcType:

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

 ueLocs:

 type: array

 items:

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

 minItems: 1

 upfInfo:

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

 dnai:

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

 appServerInst:

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

 confidence:

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

 dnn:

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

 networkArea:

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

 nsiId:

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

 ratio:

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

 ratFreq:

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

 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'

 PduSesTrafficInfo:

 description: Represents the PDU Set traffic analytics information.

 type: object

 properties:

 supis:

 type: array

 items:

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

 dnn:

 type: array

 items:

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

 snssai:

 type: array

 items:

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

 tdMatchTrafs:

 type: array

 items:

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

 minItems: 1

 tdUnmatchTrafs:

 type: array

 items:

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

 minItems: 1

 allOf:

 - anyOf:

 - required: [dnn]

 - required: [snssai]

 - anyOf:

 - required: [tdMatchTrafs]

 - required: [tdUnmatchTrafs]

 TdTraffic:

 description: Represents traffic that matches or unmatches Traffic Descriptor of URSP rule.

 type: object

 properties:

 pduSesTrafReqs:

 type: array

 items:

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

 minItems: 1

 ulVol:

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

 dlVol:

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

 allVol:

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

 ulNumOfPkt:

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

 dlNumOfPkt:

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

 allNumOfPkt:

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

 PduSesTrafficReq:

 description: Represents the PDU Session traffic analytics requirements.

 type: object

 properties:

 flowDescs:

 type: array

 items:

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

 minItems: 1

 description: >

 Indicates traffic flow filtering description(s) for IP flow(s).

 appId:

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

 domainDescs:

 type: array

 items:

 type: string

 minItems: 1

 description: >

 FQDN(s) or a regular expression which are used as a domain name matching criteria.

 oneOf:

 - required: [flowDescs]

 - required: [appId]

 - required: [domainDescs]

#

# 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

 - PDU\_SESSION\_TRAFFIC

 - 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.

 - PDU\_SESSION\_TRAFFIC: Indicates that the event subscribed is the PDU Session traffic

 information.

 Accuracy:

 anyOf:

 - type: string

 enum:

 - LOW

 - MEDIUM

 - HIGH

 - HIGHEST

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the preferred level of accuracy of the analytics.

 Possible values are:

 - LOW: Low accuracy.

 - MEDIUM: Medium accuracy.

 - HIGH: High accuracy.

 - HIGHEST: Highest accuracy.

 CongestionType:

 anyOf:

 - type: string

 enum:

 - USER\_PLANE

 - CONTROL\_PLANE

 - USER\_AND\_CONTROL\_PLANE

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Indicates the congestion analytics type.

 Possible values are:

 - USER\_PLANE: The congestion analytics type is User Plane.

 - CONTROL\_PLANE: The congestion analytics type is Control Plane.

 - USER\_AND\_CONTROL\_PLANE: The congestion analytics type is User Plane and Control Plane.

 ExceptionId:

 anyOf:

 - type: string

 enum:

 - UNEXPECTED\_UE\_LOCATION

 - UNEXPECTED\_LONG\_LIVE\_FLOW

 - UNEXPECTED\_LARGE\_RATE\_FLOW

 - UNEXPECTED\_WAKEUP

 - SUSPICION\_OF\_DDOS\_ATTACK

 - WRONG\_DESTINATION\_ADDRESS

 - TOO\_FREQUENT\_SERVICE\_ACCESS

 - UNEXPECTED\_RADIO\_LINK\_FAILURES

 - PING\_PONG\_ACROSS\_CELLS

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Describes the Exception Id.

 Possible values are:

 - UNEXPECTED\_UE\_LOCATION: Unexpected UE location.

 - UNEXPECTED\_LONG\_LIVE\_FLOW: Unexpected long-live rate flows.

 - UNEXPECTED\_LARGE\_RATE\_FLOW: Unexpected large rate flows.

 - UNEXPECTED\_WAKEUP: Unexpected wakeup.

 - SUSPICION\_OF\_DDOS\_ATTACK: Suspicion of DDoS attack.

 - WRONG\_DESTINATION\_ADDRESS: Wrong destination address.

 - TOO\_FREQUENT\_SERVICE\_ACCESS: Too frequent Service Access.

 - UNEXPECTED\_RADIO\_LINK\_FAILURES: Unexpected radio link failures.

 - PING\_PONG\_ACROSS\_CELLS: Ping-ponging across neighbouring cells.

 ExceptionTrend:

 anyOf:

 - type: string

 enum:

 - UP

 - DOWN

 - UNKNOW

 - STABLE

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the Exception Trend.

 Possible values are:

 - UP: Up trend of the exception level.

 - DOWN: Down trend of the exception level.

 - UNKNOW: Unknown trend of the exception level.

 - STABLE: Stable trend of the exception level.

 TimeUnit:

 anyOf:

 - type: string

 enum:

 - MINUTE

 - HOUR

 - DAY

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the unit for the session active time.

 Possible values are:

 - MINUTE: Time unit is per minute.

 - HOUR: Time unit is per hour.

 - DAY: Time unit is per day.

 NetworkPerfType:

 anyOf:

 - type: string

 enum:

 - GNB\_ACTIVE\_RATIO

 - GNB\_COMPUTING\_USAGE

 - GNB\_MEMORY\_USAGE

 - GNB\_DISK\_USAGE

 - 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

 - FLOW\_DESC\_MATCH\_TD

 - FLOW\_DESC\_UNMATCH\_TD

 - APP\_ID\_MATCH\_TD

 - APP\_ID\_UNMATCH\_TD

 - DOMAIN\_DESC\_MATCH\_TD

 - DOMAIN\_DESC\_UNMATCH\_TD

 - UL\_VOL\_MATCH\_TD

 - UL\_VOL\_UNMATCH\_TD

 - DL\_VOL\_MATCH\_TD

 - DL\_VOL\_UNMATCH\_TD

 - ALL\_VOL\_MATCH\_TD

 - ALL\_VOL\_UNMATCH\_TD

 - NUM\_OF\_UL\_PACK\_MATCH\_TD

 - NUM\_OF\_UL\_PACK\_UNMATCH\_TD

 - NUM\_OF\_DL\_PACK\_MATCH\_TD

 - NUM\_OF\_DL\_PACK\_UNMATCH\_TD

 - NUM\_OF\_ALL\_PACK\_MATCH\_TD

 - NUM\_OF\_ALL\_PACK\_UNMATCH\_TD

 - type: string

 description: >

 This string provides forward-compatibility with future

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 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.

 - FLOW\_DESC\_MATCH\_TD: Indicates IP Flow descriptor containing 3-tuple, server side

 (destination address, port, and protocol) in the traffic that matches Traffic Descriptor

 within the PDU Sessions.

 - FLOW\_DESC\_UNMATCH\_TD: Indicates IP Flow descriptor containing 3-tuple, server side

 (destination address, port, and protocol) in the traffic that does not match Traffic

 Descriptor within the PDU Sessions.

 - APP\_ID\_MATCH\_TD: Indicates Application ID that matches Traffic Descriptor within the PDU

 Sessions.

 - APP\_ID\_UNMATCH\_TD: Indicates Application ID that does not match Traffic Descriptor within

 the PDU Sessions.

 - DOMAIN\_DESC\_MATCH\_TD: Indicates Domain descriptor that matches Traffic Descriptor within

 the PDU Sessions.

 - DOMAIN\_DESC\_UNMATCH\_TD: Indicates UL data volume exchanged that matches Traffic Descriptor

 within the PDU Sessions. This value is only applicable to PDU\_SESSION\_TRAFFIC event.

 - UL\_VOL\_MATCH\_TD: Indicates UL data volume exchanged that matches Traffic Descriptor within

 the PDU Sessions.

 - UL\_VOL\_UNMATCH\_TD: Indicates UL data volume exchanged that does not match Traffic

 Descriptor within the PDU Sessions.

 - DL\_VOL\_MATCH\_TD: Indicates DL data volume exchanged that matches Traffic Descriptor within

 the PDU Sessions.

 - DL\_VOL\_UNMATCH\_TD: Indicates DL data volume exchanged that does not match Traffic

 Descriptor within the PDU Sessions.

 - ALL\_VOL\_MATCH\_TD: Indicates overall data volume exchanged that matches Traffic Descriptor

 within the PDU Sessions.

 - ALL\_VOL\_UNMATCH\_TD: Indicates overall data volume exchanged that does not match Traffic

 Descriptor within the PDU Sessions.

 - NUM\_OF\_UL\_PACK\_MATCH\_TD: Indicates the number of UL packets exchanged that matches Traffic

 Descriptor within the PDU Sessions.

 - NUM\_OF\_UL\_PACK\_UNMATCH\_TD: Indicates the number of UL packets exchanged that does not

 match Traffic Descriptor within the PDU Sessions.

 - NUM\_OF\_DL\_PACK\_MATCH\_TD: Indicates the number of DL packets exchanged that matches Traffic

 Descriptor within the PDU Sessions.

 - NUM\_OF\_DL\_PACK\_UNMATCH\_TD: Indicates the number of DL packets exchanged that does not

 match Traffic Descriptor within the PDU Sessions.

 - NUM\_OF\_ALL\_PACK\_MATCH\_TD: Indicates the number of overall packets exchanged that matches

 Traffic Descriptor within the PDU Sessions.

 - NUM\_OF\_ALL\_PACK\_UNMATCH\_TD: Indicates the number of overall packets exchanged that does

 not match Traffic Descriptor within the PDU Sessions.

 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 \*\*\*