**3GPP TSG- Meeting #**

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

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|  | | | | | | | | | | |
| ***Title:*** | Last known location in UE Mobility exposure | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | , Verizon, Ericsson | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNetAE19 | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | As agreed in S2-2505666, the NF service consumer inputs of the UE Mobility analytics in 23.288 clause 6.7.2.1 now contain also the last known UE location together with the associated timestamp. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added the last known UE location to the UE Mobility analytics inputs. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Not fulfilled stage 2 requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.6.3.2, 5.6.3.3.6, 5.6.3.3.13, 5.6.4, A.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces backward compatible feature to the following APIs:  TS29522\_AnalyticsExposure.yaml  TS29522\_UAVFlightAssistance.yaml | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

5.6.3.2 Reused data types

The data types reused by the AnalyticsExposure API from other specifications are listed in table 5.6.3.2-1.

**Table 5.6.3.2-1: Re-used Data Types**

|  |  |  |  |
| --- | --- | --- | --- |
| **Data type** | **Reference** | **Comments** | **Applicability** |
| AccuracyInfo | 3GPP TS 29.520 [27] | The analytics accuracy information. | AnalyticsAccuracy |
| AccuracyReq | 3GPP TS 29.520 [27] | Represents the analytics accuracy requirement information. | AnalyticsAccuracy |
| AdditionalMeasurement | 3GPP TS 29.520 [27] | Represents additional measurement information. |  |
| AddrFqdn | 3GPP TS 29.517 [58] | Represents an IP address and/or an FQDN. | ServiceExperience  DnPerformance |
| AnalyticsFeedbackInfo | 3GPP TS 29.520 [27] | Represents analytics feedback information. |  |
| AnalyticsSubset | 3GPP TS 29.520 [27] | Represents an analytics Subset used to indicate the content of the analytics. | EneNA |
| ApplicationId | 3GPP TS 29.571 [8] | Contains the application identifier. | Abnormal\_Behavior  Ue\_Communication  Dispersion  DnPerformance  ServiceExperience  E2eDataVolTransTime |
| BitRate | 3GPP TS 29.571 [8] | Represents a bit rate. |  |
| BwRequirement | 3GPP TS 29.520 [27] | Represents bandwidth requirements. | ServiceExperience |
| CongestionType | 3GPP TS 29.520 [27] | Represents a congestion analytics type. |  |
| DateTime | 3GPP TS 29.122 [4] | Represents a date and a time. |  |
| DirectionInfo | 3GPP TS 29.520 [27] | Represents the UE direction information | UeMobilityExt\_AIML |
| DispersionInfo | 3GPP TS 29.520 [27] | Dispersion information. | Dispersion |
| DispersionRequirement | 3GPP TS 29.520 [27] | Dispersion requirement. | Dispersion |
| Dnai | 3GPP TS 29.571 [8] | Identifies a user plane access to one or more DN(s). | DnPerformance  ServiceExperience  E2eDataVolTransTime |
| Dnn | 3GPP TS 29.571 [8] | Represents a DNN. | Ue\_Communication  Abnormal\_Behavior  DnPerformance  ServiceExperience  E2eDataVolTransTime |
| DnPerfInfo | 3GPP TS 29.520 [27] | DN Performance information. | DnPerformance |
| DnPerformanceReq | 3GPP TS 29.520 [27] | DN Performance requirement. | DnPerformance |
| DurationSec | 3GPP TS 29.122 [4] | Seconds of duration. | EneNA  NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  CongestionExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| EventReportingRequirement | 3GPP TS 29.520 [27] | Represents the required type of reporting. |  |
| ExternalGroupId | 3GPP TS 29.122 [4] | External Group Identifier for a user group. | Abnormal\_BehaviorUe\_Mobility  Ue\_Communication  Network\_Performance  Dispersion  DnPerformance  ServiceExperience |
| Exception | 3GPP TS 29.520 [27] | Represents exception information. |  |
| ExceptionId | 3GPP TS 29.520 [27] | Represents the identifier of an exception. | Abnormal\_Behavior |
| ExpectedAnalyticsType | 3GPP TS 29.520 [27] | Represents the exception's trend. | Abnormal\_Behavior |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [17] | Represents the expected UE behaviour data. | Abnormal\_Behavior |
| Float | 3GPP TS 29.571 [8] | Represents a number with the "float" format. |  |
| GeoDistributionInfo | 3GPP TS 29.520 [27] | Represents the geographical distribution of the UEs. | UeMobilityExt\_AIML |
| GeographicalArea | 5.17.3.3.4 | Identifies the geographical information with shapes. | ServiceExperienceExt\_eNA  Ue\_MobilityExt\_eNA  QoS\_SustainabilityExt\_eNA |
| Gpsi | 3GPP TS 29.571 [8] | Identifies a GPSI. | Abnormal\_Behavior  Congestion  Ue\_Mobility  Ue\_Communication  Network\_Performance  Dispersion  DnPerformance  ServiceExperience |
| LocationArea5G | 3GPP TS 29.122 [4] | Represents a user location area when the UE is attached to 5G. | Abnormal\_BehaviorExt\_eNA  DnPerformanceExt\_eNA  ServiceExperienceExt\_eNA  UeCommunicationExt\_eNA  E2eDataVolTransTime  NSLoad  SignallingStorm |
| LocInfoGranularity | 3GPP TS 29.520 [27] | Represents the preferred granularity of location information. | ServiceExperienceExt\_eNA  Ue\_MobilityExt\_eNA  DispersionExt\_eNA |
| MatchingDirection | 3GPP TS 29.520 [27] | Matching direction | QoS\_Sustainability  Congestion,  Network\_Performance  NSLoad |
| MovBehavInfo | 3GPP TS 29.520 [27] | Represents the Movement Behaviour information. | MovementBehaviour |
| MovBehavReq | 3GPP TS 29.520 [27] | Represents the Movement Behaviour analytics requirements. | MovementBehaviour |
| NetworkPerfRequirement | 3GPP TS 29.520 [27] | Represents a network performance requirement. | Network\_Performance |
| NfInstanceId | 3GPP TS 29.571 [8] | Identifies an NF instance | SignallingStorm |
| NfSetId | 3GPP TS 29.571 [8] | Identifies an NF Set instance. | SignallingStorm |
| NsiIdInfo | 3GPP TS 29.520 [27] | Represents the S-NSSAI and the optionally associated Network Slice Instance Identifier(s). | ServiceExperience  DnPerformance  NSLoad |
| NsiLoadLevelInfo | 3GPP TS 29.520 [27] | Represents the network slice load level information. | NSLoad |
| NwdafFailureCode | 3GPP TS 29.520 [27] | Identifies the analytics failure reason. |  |
| PacketDelBudget | 3GPP TS 29.571 [8] | Represents the packet delay budget. | QoSSustainabilityExt2 |
| PduSessionInfo | 3GPP TS 29.520 [27] | Identifies combination of PDU Session parameters information. | ServiceExperienceExt\_eNA |
| ProblemDetails | 3GPP TS 29.122 [4] | Represents error related information. |  |
| ProblemDetailsAnalyticsInfoRequest | 3GPP TS 29.520 [27] | Represents an extension to the ProblemDetails data structure with additional information on why the analytics request is rejected |  |
| QosRequirement | 3GPP TS 29.520 [27] | Represents QoS requirements. | QoS\_Sustainability  E2eDataVolTransTime |
| RatFreqInformation | 3GPP TS 29.520 [27] | Represents the RAT type and/or Frequency information. | ServiceExperience |
| RelProxInfo | 3GPP TS 29.520 [27] | Represents the Relative Proximity information. | RelProxInfo |
| RelProxReq | 3GPP TS 29.520 [27] | Represents the Relative Proximity analytics requirements. | RelProxReq |
| ReportingInformation | 3GPP TS 29.523 [22] | Describes the analytics reporting requirement information. |  |
| ResourceUsageRequirement | 3GPP TS 29.520 [27] |  | NetworkPerformanceExt\_AIML |
| RetainabilityThreshold | 3GPP TS 29.520 [27] | Represents a QoS flow retainability threshold. | QoS\_Sustainability |
| SamplingRatio | 3GPP TS 29.571 [8] | Indicates Sampling Ratio. |  |
| ScheduledCommunicationTime | 3GPP TS 29.122 [4] | Represents an offered scheduled communication time. |  |
| ServiceExperienceInfo | 3GPP TS 29.520 [27] | Represents the service experience information. | ServiceExperience |
| SignalStormInfo | 3GPP TS 29.520 [27] | Represents the signalling storm analytics information. | SignallingStorm |
| SignalStormReq | 3GPP TS 29.520 [27] | Represents the signalling storm analytics requirement information. | SignallingStorm |
| Snssai | 3GPP TS 29.571 [8] | Represents an S-NSSAI. | UeCommunication  QoS\_Sustainability  Abnormal\_Behavior  Congestion  Dispersion  ServiceExperience  DnPerformance  E2eDataVolTransTime  NSLoad  SignallingStorm |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features. |  |
| TermCause | 3GPP TS 29.520 [27] | Cause for requesting the termination of a subscription. | TermRequest |
| ThresholdLevel | 3GPP TS 29.520 [27] | Represents a threshold level. | Congestion |
| TimestampedLocation | 3GPP TS 29.520 [27] | Represents a timestamped UE location. | UeMobilityExt3 |
| TimeWindow | 3GPP TS 29.122 [4] | Represents a time window. | NetworkPerfExt\_eNA |
| TopApplication | 3GPP TS 29.520 [27] | Top application that contributes the most to the traffic. | CongestionExt |
| UeCommunication | 3GPP TS 29.520 [27] | Represents UE communication information. | Ue\_Communication |
| UeCommReq | 3GPP TS 29.520 [27] | UE communication analytics requirement. | UeCommunicationExt\_eNA |
| UeMobilityReq | 3GPP TS 29.520 [27] | UE mobility analytics requirement. | Ue\_MobilityExt\_eNA |
| Uinteger | 3GPP TS 29.571 [8] | Unsigned integer. |  |
| Uri | 3GPP TS 29.122 [4] | Identifies a referenced resource. |  |
| UserDataCongestReq | 3GPP TS 29.520 [27] | The User Data Congestion requirement. | CongestionExt\_eNA |
| UserDataConOrderCrit | 3GPP TS 29.520 [27] | The ordering criterion for the list of User Data Congestion analytics. | CongestionExt\_eNA |
| WlanPerformanceReq | 3GPP TS 29.520 [27] | Represents the WLAN performance analytics requirement. |  |
| WlanPerSsIdPerformanceInfo | 3GPP TS 29.520 [27] | WLAN performance information per SSID of WLAN access points deployed in the Area of Interest. |  |
| WlanPerUeIdPerformanceInfo | 3GPP TS 29.520 [27] | WLAN performance information per UE ID of WLAN access points deployed in the Area of Interest. |  |

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

5.6.3.3.6 Type: AnalyticsEventFilterSubsc

**Table 5.6.3.3.6-1: Definition of type AnalyticsEventFilterSubsc**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| locArea | LocationArea5G | O | 0..1 | Identification of network area to which the subscription applies.  (NOTE 1) (NOTE 7) (NOTE 14) | Abnormal\_Behavior  Congestion  Ue\_Communication  Ue\_Mobility  QoS\_Sustainability  Network\_Performance  Dispersion  DnPerformance  ServiceExperience  E2eDataVolTransTime  MovementBehaviour  RelativeProximity  NSLoad  SignallingStorm |
| fineGranAreas | array(GeographicalArea) | O | 1..N | Indicates the fine granularity areas to which the subscription applies. (i.e. with a finer granularity than cell).  (NOTE 1, NOTE 14) | ServiceExperienceExt\_eNA  Ue\_MobilityExt\_eNA  QoS\_SustainabilityExt\_eNA |
| dnn | Dnn | O | 0..1 | Identifies the DNN. (NOTE 7) | Ue\_Communication  Abnormal\_Behavior  ServiceExperience  DnPerformance  RelativeProximity |
| dnns | array(Dnn) | O | 1..N | Identifies the DNN(s) to which the subscription applies. (NOTE 7) | UeCommunicationExt\_eNA  Abnormal\_BehaviorExt\_eNA  ServiceExperienceExt\_eNA  DnPerformanceExt\_eNA  E2eDataVolTransTime |
| dnais | array(Dnai) | O | 1..N | Identification(s) of user plane access to DN(s) which the subscription applies. | DnPerformance  ServiceExperience  E2eDataVolTransTime |
| appIds | array(ApplicationId) | O | 1..N | Each element identifies an application. (NOTE 7) (NOTE 13) | Abnormal\_Behavior  Ue\_Communication  Dispersion  DnPerformance  ServiceExperience  E2eDataVolTransTime |
| dataVlTrnsTmRqs | array(E2eDataVolTransTimeReq) | O | 1..N | Represents the E2E data volume transfer time requirements | E2eDataVolTransTime |
| excepRequs | array(Exception) | O | 1..N | Represents a list of Exception Ids with associated thresholds.  (NOTE 2, NOTE 3) | Abnormal\_Behavior |
| exptAnaType | ExpectedAnalyticsType | O | 0..1 | Represents expected UE analytics type.  (NOTE 3) | Abnormal\_Behavior |
| exptUeBehav | ExpectedUeBehaviourData | O | 0..1 | Represents expected UE behaviour. | Abnormal\_Behavior |
| matchingDir | MatchingDirection | O | 0..1 | A matching direction may be provided alongside a threshold. If omitted, the default value is CROSSED. | QoS\_Sustainability  Congestion,  Network\_Performance  NSLoad |
| reptThlds | array(ThresholdLevel) | O | 1..N | Represents the levels to be reached in order to be notified by the NEF.  (NOTE 4) | Congestion |
| nwPerfReqs | array(NetworkPerfRequirement) | C | 1..N | Represents the network performance requirements. This attribute shall be included when subscribed event is "NETWORK\_PERFORMANCE". | Network\_Performance |
| snssai | Snssai | O | 0..1 | Identifies the network slice information. (NOTE 7) | UeCommunication  QoS\_Sustainability  Abnormal\_Behavior  Congestion  Dispersion  ServiceExperience  DnPerformance  SignallingStorm |
| snssais | array(Snssai) | O | 1..N | Identifies the network slice information. (NOTE 7) | Ue\_CommunicationExt\_eNA  QoS\_SustainabilityExt\_eNA  Abnormal\_BehaviorExt\_eNA  CongestionExt\_eNA  DispersionExt\_eNA ServiceExperienceExt\_eNA  DnPerformanceExt\_eNA  E2eDataVolTransTime  RelativeProximity |
| 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 "SERVICE\_EXPERIENCE", "DN\_PERFORMANCE" or "NS\_LOAD\_LEVEL".  (NOTE 15) | ServiceExperience  DnPerformance  NSLoad |
| nsLevelThrds | map(Uinteger) | O | 1..N | Contains the network slice load level related thresholds.  The key of the map shall be the value of the S-NSSAI (among the ones provided within the "nsiIdInfos" attribute) to which the provided thresholds within the map value apply.  (NOTE 16)  Each map value shall have a maximum value of 100. | NSLoad |
| qosReq | QosRequirement | C | 0..1 | Represents the QoS requirements. This attribute shall be included when subscribed event is "QOS\_SUSTAINABILITY". | QoS\_Sustainability  E2eDataVolTransTime |
| qosFlowRetThds | array(RetainabilityThreshold) | C | 1..N | Represents the QoS flow retainability thresholds,  Shall be supplied for the 5QI of GBR resource type. (NOTE 5) | QoS\_Sustainability |
| ranUeThrouThds | array(BitRate) | C | 1..N | Represents the RAN UE throughput thresholds.  Shall be supplied for the 5QI of non-GBR resource type. (NOTE 5) | QoS\_Sustainability |
| e2eDelayThds | array(PacketDelBudget) | C | 1..N | Represents the end-to-end delay (i.e., sum of RAN delay and GTP delay) thresholds.  (NOTE 5) | QoSSustainabilityExt2 |
| deviations | array(Uinteger) | O | 1..N | Each element indicates an acceptable deviation from the threshold level included in the "ranUeThrouThds" attribute, the "qosFlowRetThds" attribute or the "e2eDelayThds" attribute.  This attribute may only be present if either the "ranUeThrouThds" attribute, the "qosFlowRetThds" attribute or the "e2eDelayThds" attribute is provided. | QoSSustainabilityExt2 |
| disperReqs | array(DispersionRequirement) | O | 1..N | Represents the dispersion analytics requirements. | Dispersion |
| dnPerfReqs | array(DnPerformanceReq) | O | 1..N | Represents the DN performance analytics requirements. | DnPerformance |
| bwRequs | array(BwRequirement) | O | 1..N | Represents the bandwidth requirement for each application. | ServiceExperience |
| ratFreqs | array(RatFreqInformation) | O | 1..N | Identification(s) of the RAT type and/or frequencies of UE’s serving cell(s) which the subscriptiont applies. (NOTE 8) | ServiceExperience |
| appServerAddrs | array(AddrFqdn) | C | 1..N | Each of the element represents the Application Server Instance (IP address/FQDN of the Application Server) (NOTE 9) | ServiceExperience  DnPerformance |
| wlanReqs | array(WlanPerformanceReq) | O | 1..N | Represents WLAN performance analytics requirements. | WlanPerformance\_AIML |
| listOfAnaSubsets | array(AnalyticsSubset) | O | 1..N | The list of analytics subsets can be used to indicate the content of the analytics. (NOTE 12) | EneNA |
| extraReportReq | EventReportingRequirement | O | 0..1 | The extra event reporting requirement information. (NOTE 6) |  |
| maxNumOfTopAppUl | 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 element in the "listOfAnaSubsets" attribute is set to LIST\_OF\_TOP\_APP\_UL. | CongestionExt |
| maxNumOfTopAppDl | 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 element in the "listOfAnaSubsets" attribute is set to LIST\_OF\_TOP\_APP\_DL. | CongestionExt |
| visitedLocAreas | array(LocationArea5G) | O | 1..N | Identifications of network areas which the UEs had previously been in at least one of the Visited Area(s) of Interest.  (NOTE 10) | Ue\_Mobility |
| ueCommReqs | array(UeCommReq) | O | 1..N | Represents the UE communication requirements. This attribute may be included when the subscribed event is "UE\_COMM". | UeCommunicationExt\_eNA |
| userDataConOrderCri | UserDataConOrderCrit | O | 0..1 | The ordering criterion for the list of User Data Congestion analytics. (NOTE 11) | CongestionExt\_eNA |
| locGranularity | LocInfoGranularity | O | 0..1 | The preferred granularity of UE location information. | ServiceExperienceExt\_eNA  Ue\_MobilityExt\_eNA  DispersionExt\_eNA |
| locOrientation | LocationOrientation | O | 0..1 | Indicates the preferred orientation of location information. | Ue\_MobilityExt\_eNA  MovementBehaviour |
| ueMobilityReqs | array(UeMobilityReq) | O | 1..N | Represents the UE mobility requirements. This attribute may be included when the subscribed event is "UE\_MOBILITY". | Ue\_MobilityExt\_eNA |
| movBehavReqs | array(MovBehavReq) | O | 1..N | Represents the Movement Behaviour analytics requirements. | MovementBehaviour |
| relProxReqs | array(RelProxReq) | O | 1..N | Represents the Relative Proximity analytics requirements. | RelativeProximity |
| pduSesInfos | array(PduSessionInfo) | O | 1..N | Represents combination of PDU Session parameters information. (NOTE 13) | ServiceExperienceExt\_eNA |
| useCaseCxt | string | O | 0..1 | Indicates the context of usage of the analytics.  The value and format of this parameter are not standardized. | ENAExt |
| accuReq | AccuracyReq | O | 0..1 | Represents the analytics accuracy requirement information. | AnalyticsAccuracy |
| pauseFlg | boolean | O | 0..1 | Pause analytics consumption flag and is applicable on analytics ID level. Set to "true" to indicate the NWDAF to stop including analytics of this event type in its notifications (without cancelling the subscription), because the accuracy level needs to be increased.  Default value is "false" if omitted.  This attribute may be present in a update request message if the "pauseInd" attribute was provided in the notification. | AnalyticsAccuracy |
| resumeFlg | boolean | O | 0..1 | Resume analytics consumption flag and is applicable on analytics ID level. Set to "true" to indicate the NWDAF to resume sending the notifications of analytics because the accuracy has been improved.  Default value is "false" if omitted.  This attribute may be present in a update request message if the "resumeInd" attribute was provided in the notification. | AnalyticsAccuracy |
| temporalGranSize | DurationSec | O | 0..1 | Indicates the minimum duration of each time slot for which the analytics are provided. | NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  CongestionExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| spatialGranSizeTa | Uinteger | O | 0..1 | Indicates the maximum number of TAs used to define an area for which the analytics are provided.  May be included when the "locArea" attribute is provided. | NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  UeCommunicationExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| spatialGranSizeCell | Uinteger | O | 0..1 | Indicates the maximum number of cells used to define an area for which the analytics are provided.  May be included when the "locArea" attribute is provided. | NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  UeCommunicationExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| feedback | AnalyticsFeedbackInfo | O | 0..1 | Analytics feedback information. It may only be provided in requests to update an existing analytics subscription for predictions. | AnalyticsAccuracy |
| sigStormReqs | array(SignalStormReq) | O | 1..N | Represents the signalling storm analytics requirements.  (NOTE 17) | SignallingStorm |
| nfInstanceIds | array(NfInstanceId) | O | 1..N | Identification(s) of NF instance(s).  (NOTE 18) | SignallingStorm |
| nfSetIds | array(NfSetId) | O | 1..N | Identification(s) of NF instance set(s).  (NOTE 18) | SignallingStorm |
| lastUeLocs | array(TimestampedLocation) | O | 1..N | Contains the last known location of target UE(s). If provided, it shall contain entries only for UE(s) that are targetted as per the provided "tgtUe" attribute. | UeMobilityExt3 |
| NOTE 1: The NetworkAreaInfo within the "locArea" attribute is not applicable for the untrusted AF. For "NETWORK\_PERFORMANCE" or "CONGESTION" or "E2E\_DATA\_VOL\_TRANS\_TIME" event, the "locArea" attribute shall be provided if the event applied for all UEs (i.e. "anyUeInd" attribute set to true within the TargetUeId data). For "QOS\_SUSTAINABILITY" or "MOVEMENT\_BEHAVIOUR" event, at least one of the "locArea" attribute and "fineGranAreas" attribute shall be provided.  NOTE 2: Only "excepId" and "excepLevel" within the Exception data type apply to the "excepRequs" attribute.  NOTE 3: Either "excepRequs" or "exptAnaType" shall be provided if the subscribed event is "ABNORMAL\_BEHAVIOR".  NOTE 4: If the subscribed event is "CONGESTION" or "DN\_PERFORMANCE", this attribute shall be provided if "notifMethod" within "analyRepInfo" sets to "ON\_EVENT\_DETECTION" or omitted.  NOTE 5: For "QOS\_SUSTAINABILITY", this property is only provided if the "notifMethod" in "analyRepInfo" is set to "ON\_EVENT\_DETECTION" or omitted.  NOTE 6: The "sampRatio" attribute and the "histAnaTimePeriod" attribute within EventReportingRequirement data type is not applicable for the present API. The attributes "accPerSubset", "offsetPeriod", and "timeAnaNeeded" within the EventReportingRequirement data type are applicable only if the "EneNA" feature is supported.  NOTE 7: For "ABNORMAL\_BEHAVIOR" event with "anyUeInd" attribute in "tgtUe" attribute sets to true,  - at least one of the "locArea" and the "snssai" 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 "locArea", "appIds", "dnn", ”dnns”, ”snssai” 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.  - “dnns” and “snssais” is mutually exclusive for “dnn” and “snssai”. “dnn” and “snssai” are available for the backward compatibility to the previous release of this specification.  NOTE 8: If both the "allFreq" attribute and the "allRat" attribute within the "ratFreqs" attribute are present, then the cardinality shall be 1 as the "all" indication for all the RAT type and Frequency value the NWDAF has received for the application.  NOTE 9: This parameter shall be provided when a consumer requires analytics for an edge application over a UP path.  NOTE 10: The NetworkAreaInfo within the "visitedLocAreas" attribute is not applicable for the untrusted AF. If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).  NOTE 11: If the the value of "userDataConOrderCri" attribute is "APPLICABLE\_TIME\_WINDOW", the "ASCENDING" direction indicates that the list of User Data Congestion analytics are in chronological order and the "DESCENDING" direction indicates that the list of User Data Congestion analytics are in reverse chronological order.  NOTE 12: The "AGG\_TRAFFIC\_RATE", "VAR\_TRAFFIC\_RATE", "VAR\_PACKET\_DELAY", "MAX\_PACKET\_LOSS\_RATE" and "VAR\_PACKET\_LOSS\_RATE" enumeration value(s) within the AnalyticsSubset data type is applicable only if the "DnPerformanceExt\_AIML” feature is supported.  NOTE 13: When the "pduSesInfos" attribute is provided, the associated "appIds" attribute shall also be provided for the NWDAF to be able to compute the service experience per application.  NOTE 14: If both "locArea" and "fineGranAreas" attributes are provided, the Area of Interest is interpreted as the intersection area indicated by these two attributes.  NOTE 15: When the "NSLoad" feature is supported, only the "snssai" attribute of the NsiIdInfo data structure is applicable for the "NS\_LOAD\_LEVEL" event within each array element of this attribute.  NOTE 16: When the "NSLoad" fetaure is supported, this attribute shall be present only if the "analyRepInfo" attribute of the parent AnalyticsExposureSubsc data structure indicates that the "ON\_EVENT\_DETECTION" reporting type is to be used.  NOTE 17: The "supis" and "intGroupIds" attributes inside the SignalStormReq data type are not applicable in this release of the specification and only the "gpsis" and "exterGroupIds" attributes can be used.  NOTE 18: When the subscribed event is "SIGNALLING\_STORM", the "nfInstanceIds" and "nfSetIds" attributes indicate the NF instances and NF sets that may cause the signalling storm to the target NF. | | | | | |

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

5.6.3.3.13 Type AnalyticsEventFilter

**Table 5.6.3.3.13-1: Definition of type AnalyticsEventFilter**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Data type** | **P** | **Cardinality** | **Description** | **Applicability** |
| locArea | LocationArea5G | C | 0..1 | Contains the network area where the analytics result is requested.  (NOTE 2, NOTE 3, NOTE 10) | Ue\_Mobility  Ue\_Communication  Network\_Performance  QoS\_Sustainability  Abnormal\_Behavior  Congestion  Dispersion  DnPerformance  ServiceExperience  E2eDataVolTransTime  MovementBehaviour  RelativeProximity  NSLoad  SignallingStorm |
| fineGranAreas | array(GeographicalArea) | O | 1..N | Indicates the fine granularity areas to which the request applies. (i.e. with a finer granularity than cell).  (NOTE 2, NOTE 10) | ServiceExperienceExt\_eNA  Ue\_MobilityExt\_eNA  QoS\_SustainabilityExt\_eNA |
| temporalGranSize | DurationSec | O | 0..1 | Indicates the minimum duration of each time slot for which the analytics are provided. | NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  CongestionExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| spatialGranSizeTa | Uinteger | O | 0..1 | Indicates the maximum number of TAs used to define an area for which the analytics are provided.  May be included when the "locArea" attribute is provided. | NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  UeCommunicationExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| spatialGranSizeCell | Uinteger | O | 0..1 | Indicates the maximum number of cells used to define an area for which the analytics are provided.  May be included when the "locArea" attribute is provided. | NetworkPerfExt\_eNA  Ue\_MobilityExt\_eNA  UeCommunicationExt\_eNA  QoS\_SustainabilityExt\_eNA  DispersionExt\_eNA  DnPerformanceExt\_eNA |
| dnn | Dnn | O | 0..1 | Identifies the DNN. (NOTE 3) | Ue\_Communication  Abnormal\_Behavior  DnPerformance  ServiceExperience |
| dnns | array(Dnn) | O | 1..N | Identifies the DNN. (NOTE 3) | UeCommunicationExt\_eNA  Abnormal\_BehaviorExt\_eNA  DnPerformanceExt\_eNA  ServiceExperienceExt\_eNA  E2eDataVolTransTime  RelativeProximity |
| dnais | array(Dnai) | O | 1..N | Identification(s) of user plane access to DN(s) which the subscription applies. | DnPerformance  ServiceExperience  E2eDataVolTransTime |
| nwPerfTypes | array(NetworkPerfType) | C | 1..N | Represents the network performance requirements. This attribute shall be included when requested event is "NETWORK\_PERFORMANCE". | Network\_Performance |
| dataVlTrnsTmReqs | array(E2eDataVolTransTimeReq) | O | 1..N | Represents the E2E data volume transfer time requirements | E2eDataVolTransTime |
| appIds | array(ApplicationId) | O | 1..N | Each element identifies an application. The absence of appIds means all applications. (NOTE 3) (NOTE 9) | Ue\_Communication Abnormal\_Behavior  DnPerformance  ServiceExperience  Dispersion  E2eDataVolTransTime |
| excepIds | array(ExceptionId) | O | 1..N | Represents a list of Exception Ids. (NOTE 1) | Abnormal\_Behavior |
| exptAnaType | ExpectedAnalyticsType | O | 0..1 | Represents expected UE analytics type. (NOTE 1) | Abnormal\_Behavior |
| exptUeBehav | ExpectedUeBehaviourData | O | 0..1 | Represents expected UE behaviour. | Abnormal\_Behavior |
| snssai | Snssai | O | 0..1 | Identifies the network slice information. (NOTE 3) | Ue\_Communication  QoS\_Sustainability  Abnormal\_Behavior  Congestion  Dispersion  DnPerformance  ServiceExperience  SignallingStorm |
| snssais | array(Snssai) | O | 1..N | Identifies the network slice information. (NOTE 3) | UeCommunicationExt\_eNA  QoS\_SustainabilityExt\_eNA  Abnormal\_BehaviorExt\_eNA  CongestionExt\_eNA  DispersionExt\_eNA  ServiceExperienceExt\_eNA  DnPerformanceExt\_eNA  E2eDataVolTransTime  RelativeProximity |
| nsiIdInfos | array(NsiIdInfo) | O | 1..N | Each element identifies the S-NSSAI and the optionally associated network slice instance(s).  May be included when requested event is "SERVICE\_EXPERIENCE" "DN\_PERFORMANCE" or "NS\_LOAD\_LEVEL".  (NOTE 12) | ServiceExperience  DnPerformance  NSLoad |
| qosReq | QosRequirement | C | 0..1 | Represents the QoS requirements. This attribute shall be included when requested event is "QOS\_SUSTAINABILITY". | QoS\_Sustainability  E2eDataVolTransTime |
| listOfAnaSubsets | array(AnalyticsSubset) | O | 1..N | The list of analytics subsets can be used to indicate the content of the analytics. (NOTE 8) | EneNA |
| dnPerfReqs | array(DnPerformanceReq) | O | 1..N | Represents the DN performance analytics requirements. | DnPerformance |
| bwRequs | array(BwRequirement) | O | 1..N | Represents the media/application bandwidth requirement for each application.  It may only be present if "appIds" attribute is provided. | ServiceExperience |
| ratFreqs | array(RatFreqInformation) | O | 1..N | Identification(s) of the RAT type and/or frequencies of UE’s serving cell(s) which the subscriptiont applies. (NOTE 4) | ServiceExperience |
| appServerAddrs | array(AddrFqdn) | C | 1..N | Each of the element represents the Application Server Instance (IP address/FQDN of the Application Server). (NOTE 5) | ServiceExperience  DnPerformance |
| wlanReqs | array(WlanPerformanceReq) | O | 1..N | Represents other WLAN performance analytics requirements. If the attribute contains no content, may take default handling action. | WlanPerformance\_AIML |
| disperReqs | array(DispersionRequirement) | O | 1..N | Represents the requirements of dispersion analytics. | Dispersion |
| maxNumOfTopAppUl | 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. | CongestionExt |
| maxNumOfTopAppDl | 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. | CongestionExt |
| visitedLocAreas | array(LocationArea5G) | O | 1..N | Identifications of network areas which the UEs had previously been in at least one of the Visited Area(s) of Interest.  (NOTE 6) | Ue\_Mobility |
| ueCommReqs | array(UeCommReq) | O | 1..N | Represents the UE communication requirements. This attribute may be included when the requested event is "UE\_COMM". | UeCommunicationExt\_eNA |
| userDataConReq | UserDataCongestReq | O | 0..1 | The ordering criterion for the list of User Data Congestion analytics. (NOTE 7) | CongestionExt\_eNA |
| locGranularity | LocInfoGranularity | O | 0..1 | The preferred granularity of UE location information. | ServiceExperienceExt\_eNA  Ue\_MobilityExt\_eNA  DispersionExt\_eNA |
| locOrientation | LocationOrientation | O | 0..1 | Indicates the preferred orientation of location information. | Ue\_MobilityExt\_eNA  MovementBehaviour |
| ueMobilityReqs | array(UeMobilityReq) | O | 1..N | Represents the UE mobility requirements. This attribute may be included when the requested event is "UE\_MOBILITY". | Ue\_MobilityExt\_eNA |
| movBehavReqs | array(MovBehavReq) | O | 1..N | Represents the Movement Behaviour analytics requirements. | MovementBehaviour |
| relProxReqs | array(RelProxReq) | O | 1..N | Represents the Relative Proximity analytics requirements. | RelativeProximity |
| pduSesInfos | array(PduSessionInfo) | O | 1..N | Represents combination of PDU Session parameters information. (NOTE 9) | ServiceExperienceExt\_eNA |
| useCaseCxt | string | O | 0..1 | Indicates the context of usage of the analytics.  The value and format of this parameter are not standardized. | ENAExt |
| accuReq | AccuracyReq | O | 0..1 | Represents the analytics accuracy requirement information.  (NOTE 11) | AnalyticsAccuracy |
| sigStormReqs | array(SignalStormReq) | O | 1..N | Represents the signalling storm analytics requirements.  (NOTE 13) | SignallingStorm |
| nfInstanceIds | array(NfInstanceId) | O | 1..N | Identification(s) of NF instance(s).  (NOTE 14) | SignallingStorm |
| nfSetIds | array(NfSetId) | O | 1..N | Identification(s) of NF instance set(s).  (NOTE 14) | SignallingStorm |
| lastUeLocs | array(TimestampedLocation) | O | 1..N | Contains the last known location of target UE(s). If provided, it shall contain entries only for UE(s) that are targetted as per the provided "tgtUe" attribute. | UeMobilityExt3 |
| NOTE 1: Either "excepIds" or "exptAnaType" shall be provided if the requested event is "ABNORMAL\_BEHAVIOR".  NOTE 2: The NetworkAreaInfo within the "locArea" attribute is not applicable for the untrusted AF. For "NETWORK\_PERFORMANCE" or "CONGESTION" event, the "locArea" attribute shall be provided if the event applied for all UEs (i.e. "anyUeInd" attribute set to true within the TargetUeId data). For "QOS\_SUSTAINABILITY" or "MOVEMENT\_BEHAVIOUR" event, at least one of "locArea" attribute and "fineGranAreas" attribute shall be provided.  NOTE 3: For "ABNORMAL\_BEHAVIOR" event with "anyUeInd" attribute in "tgtUe" attribute sets to true,  - at least one of the "locArea" and the "snssai" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepIds" attribute is mobility related;  - at least one of the "locArea", "appIds", "dnn" and "snssai" attribute should be included, if the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via the "excepIds" attribute is communication related;  - the expected analytics type via the"exptAnaType" attribute or the list of Exception Ids via "excepIds" attribute shall not be requested for both mobility and communication related analytics at the same time.  - “dnns” and “snssais” is mutually exclusive for “dnn” and “snssai”. “dnn” and “snssai” are available for the backward compatibility to the previous release of this specification.  NOTE 4: If both the "allFreq" attribute and the "allRat" attribute within the "ratFreqs" attribute are present, then the cardinality shall be 1 as the "all" indication for all the RAT type and Frequency value the NWDAF has received for the application.  NOTE 5: This parameter shall be provided when a consumer requires analytics for an edge application over a UP path.  NOTE 6: The NetworkAreaInfo within the "visitedLocAreas" attribute is not applicable for the untrusted AF. If this attribute is provided, the analytics target period shall be a past time period (i.e. only statistics is supported).  NOTE 7: If the the value of "orderCriterion" attribute contained in "userDataConReq" attribute is "APPLICABLE\_TIME\_WINDOW", the "ASCENDING" direction indicates that the list of User Data Congestion analytics are in chronological order and the "DESCENDING" direction indicates that the list of User Data Congestion analytics are in reverse chronological order.  NOTE 8: The "AGG\_TRAFFIC\_RATE", "VAR\_TRAFFIC\_RATE", "VAR\_PACKET\_DELAY", "MAX\_PACKET\_LOSS\_RATE" and "VAR\_PACKET\_LOSS\_RATE" enumeration value(s) within the AnalyticsSubset data type is applicable only if the "DnPerformanceExt\_AIML” feature is supported.  NOTE 9: When the "pduSesInfos" attribute is provided, the associated "appIds" attribute shall also be provided for the NWDAF to be able to compute the service experience per application.  NOTE 10: If both "locArea" and "fineGranAreas" attributes are provided, the Area of Interest is interpreted as the intersection area indicated by these two attributes.  NOTE 11: Only the "accuTimeWin" and "minNum" attributes within the AccuracyReq data type are applicable.  NOTE 12: When the "NSLoad" feature is supported, only the "snssai" attribute of the NsiIdInfo data structure is applicable for the "NS\_LOAD\_LEVEL" event within each array element of this attribute.  NOTE 13: The "supis" and "intGroupIds" attributes inside the SignalStormReq data type are not applicable in this release of the specification and only the "gpsis" and "exterGroupIds" attributes can be used.  NOTE 14: When the requested event is "SIGNALLING\_STORM", the "nfInstanceIds" and "nfSetIds" attributes indicate the NF instances and NF sets that may cause the signalling storm to the target NF. | | | | | |

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

5.6.4 Used Features

The table below defines the features applicable to the AnalyticsExposure API. Those features are negotiated as described in clause 5.2.7 of 3GPP TS 29.122 [4].

**Table 5.6.4-1: Features used by AnalyticsExposure API**

|  |  |  |
| --- | --- | --- |
| **Feature number** | **Feature Name** | **Description** |
| 1 | Ue\_Mobility | This feature indicates support for the analytics event related to UE mobility. |
| 2 | Ue\_Communication | This feature indicates support for the analytics event related to UE communication information. |
| 3 | Abnormal\_Behavior | This feature indicates support for the analytics event related to UE's abnormal behaviour. |
| 4 | Congestion | This feature indicates support for the analytics event related to UE's user data congestion information. |
| 5 | Network\_Performance | This feature indicates support for the analytics event related to network performance. |
| 6 | QoS\_Sustainability | This feature indicates support for the analytics event related to QoS sustainability. |
| 7 | Notification\_websocket | The delivery of notifications over Websocket is supported as described in 3GPP TS 29.122 [4]. This feature requires that the Notification\_test\_event feature is also supported. |
| 8 | Notification\_test\_event | The testing of notification connection is supported as described in 3GPP TS 29.122 [4]. |
| 9 | Dispersion | This feature indicates support for the analytics event related to Dispersion analytics. |
| 10 | EneNA | This feature indicates support for the enhancements of network data analytics requirements. |
| 11 | DnPerformance | This feature indicates the support of the analytics event related to DN performance. |
| 12 | ServiceExperience | This feature indicates support for the event related to service experience. |
| 13 | CongestionExt | 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 Congestion. |
| 14 | Abnormal\_Behavior\_Ext | This feature indicates support for the extensions to the event related to abnormal behavior, including support of exposing DNN and S-NSSAI information.  Supporting this feature also requires the support of feature Abnormal\_Behavior. |
| 15 | QoS\_Sustainability\_Ext | This feature indicates support for the extensions to the event related to QoS sustainability, including support of exposing S-NSSAI information.  Supporting this feature also requires the support of feature QoS\_Sustainability. |
| 16 | TermRequest | This feature indicates support for Analytics Exposure Subscription termination requests sent by the NEF to the AF. |
| 17 | QoS\_SustainabilityExt\_eNA | This feature indicates support for the extensions to the event related to QoS sustainability, including:  - Support of multiple S-NSSAIs.  - Support of deriving the QoS sustainability analytics in an AoI with fine granularity.  Supporting this feature also requires the support of feature QoS\_Sustainability\_Ext. |
| 18 | ServiceExperienceExt\_eNA | This feature indicates support for the extensions to the event related to service experience supporting eNA, including support for DNN, S-NSSAI, Location Area, PDU Session parameters informationfor service experience analytics. Supporting this feature also requires the support of feature ServiceExperience. |
| 19 | Abnormal\_BehaviorExt\_eNA | This feature indicates support for the extensions to the event related to abnormal behavior related to eNA, including support of exposing DNN and S-NSSAI information.  Supporting this feature also requires the support of feature Abnormal\_Behavior. |
| 20 | CongestionExt\_eNA | This feature indicates support for the extensions to the event related to user data congestion related to eNA, including support of GPSI and/or list of Top applications. Supporting this feature also requires the support of feature Congestion. |
| 21 | DispersionExt\_eNA | This feature indicates support for the extensions associated with analytics event related to Dispersion analytics. Supporting this feature also requires the support of feature Congestion. |
| 22 | DnPerformanceExt\_eNA | This feature indicates the support of the analytics event related to DN performance. Supporting this feature also requires the support of the "Dispersion" feature. |
| 23 | UeCommunicationExt\_eNA | This feature indicates the support of the analytics event related to UE communication related to eNA. Supporting this feature also requires the support of feature Ue\_Communication. |
| 24 | Ue\_MobilityExt\_eNA | This feature indicates the support of the analytics event related to UE Mobility supporting eNA, including ordering criterion and preferred granularity of location. Supporting this feature also requires the support of feature Ue\_Mobility. |
| 25 | DnPerformanceExt\_AIML | This feature indicates support for extensions to the event related to DN Performance supporting AIML, including support of extended DN Performance Analytics for group of UEs. Supporting this feature also requires the support of feature DnPerformance. |
| 26 | UeMobilityExt\_AIML | This feature indicates support for further extensions to the event related to UE mobility supporting AIML, including support of UE’s geographical distribution and direction analytics. Supporting this feature also requires the support of feature "Ue\_Mobility". |
| 27 | NetworkPerformanceExt\_AIML | This feature indicates support of the network performance enhancements for AI/ML-based Services. Within this feature the following enhacements are covered:  - support of providing gNB resource usage for GBR traffic and Delay-critical GBR traffic.  Supporting this feature also requires the support of Network\_Performance feature. |
| 28 | E2eDataVolTransTime | This feature indicates support for E2E data volume transfer time analytics |
| 29 | ENAExt | This feature indicates support for the general enhancements of analytics exposure requirements, including support for use case context sent by the AF to the NEF. |
| 30 | NetworkPerfExt\_eNA | This feature indicates support for the enhancements of network performance. Within this feature the following enhacements are covered:  - support of providing target period subset in the analytics.  Supporting this feature also requires the support of Network\_Performance feature. |
| 31 | MovementBehaviour | This feature indicates support for the Movement Behaviour information. |
| 32 | WlanPerformance\_AIML | This feature indicates support for the WLAN Performance information supporting AIML. |
| 33 | NSLoad | This feature indicates the support of Network Slice load level information reporting subscription/notification functionality as part of the support of network slice capability exposure application layer framework.  The following functionalities are supported:  - support to subscribe and get notified of (or retrieve) Network Slice load level analytics information. |
| 34 | AnalyticsAccuracy | This feature indicates support for the Analytics Accuracy information. |
| 35 | RelativeProximity | This feature indicates support for the Relative Proximity analytics. |
| 36 | StatisticsFailure | This feature indicates support for partial failure report for statistics during event notification.  This feature requires the support of the "EneNA" feature. |
| 37 | RoamingAnalytics | This feature indicates support for forwarding errors related to roaming analytics. |
| 38 | MovementBehaviourExt | This feature indicates support for the enhancement of Movement Behaviour information.  The following functionalities are supported:  - Support targeting list of UEs in Movement Behaviour Analytics.  Supporting this feature also requires the support of MovementBehaviour feature. |
| 39 | QoSSustainabilityExt2 | This feature indicates support for the enhancements of QoS Sustainability Analytics.  The following functionalities are supported:  - Support targeting list of UEs in QoS Sustanability Analytics.  - Providing the end-to-end delay reporting thresholds.  Supporting this feature also requires the support of "QoS\_SustainabilityExt\_eNA" feature. |
| 40 | SignallingStorm | This feature indicates support for the Signalling Storm Analytics. |
| 41 | RelativeProximityExt | This feature indicates support for the enhancements of Relative Proximity Analytics.  The following functionalities are supported:  - Support enhancement of TTC prediction in Relative Proximity Analytics.  Supporting this feature also requires the support of the "RelativeProximity" feature. |
| 42 | ENAExt2 | This feature indicates support for the general enhancements of analytics exposure requirements in Rel-19.  The following functionalities are supported:  - Prediction Error handling. |
| 43 | UeMobilityExt3 | This feature indicates support for the following enhancements of UE mobility analytics:  - Providing last known UE location.  Supporting this feature also requires the support of the Ue\_Mobility feature. |

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

A.4 AnalyticsExposure API

openapi: 3.0.0

info:

title: 3gpp-analyticsexposure

version: 1.3.0-alpha.3

description: |

API for Analytics Exposure.

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externalDocs:

description: >

3GPP TS 29.522 V19.3.0; 5G System; Network Exposure Function Northbound APIs.

url: 'https://www.3gpp.org/ftp/Specs/archive/29\_series/29.522/'

security:

- {}

- oAuth2ClientCredentials: []

servers:

- url: '{apiRoot}/3gpp-analyticsexposure/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 5.2.4 of 3GPP TS 29.122.

paths:

/{afId}/subscriptions:

get:

summary: read all of the active subscriptions for the AF

operationId: ReadAllSubscriptions

tags:

- Analytics Exposure Subscriptions

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

- name: supp-feat

in: query

description: Contains the list of supported features.

required: false

schema:

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

responses:

'200':

description: OK (Successful get all of the active subscriptions for the AF)

content:

application/json:

schema:

type: array

items:

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

minItems: 0

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

post:

summary: Creates a new subscription resource

operationId: CreateNewSubscription

tags:

- Analytics Exposure Subscriptions

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

requestBody:

description: new subscription creation

required: true

content:

application/json:

schema:

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

callbacks:

notification:

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

post:

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content (successful notification)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

responses:

'201':

description: Created (Successful creation)

content:

application/json:

schema:

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

headers:

Location:

description: Contains the URI of the newly created resource.

required: true

schema:

type: string

'204':

description: >

Successful case. The resource has been successfully created and no additional

content is to be sent in the response message.

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{afId}/subscriptions/{subscriptionId}:

get:

summary: read an active subscription for the AF and the subscription Id

operationId: ReadAnSubscription

tags:

- Individual Analytics Exposure Subscription

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

- name: supp-feat

in: query

description: Contains the list of supported features.

required: false

schema:

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

responses:

'200':

description: OK (Successful get the active subscription)

content:

application/json:

schema:

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

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'406':

$ref: 'TS29122\_CommonData.yaml#/components/responses/406'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

put:

summary: Fully updates/replaces an existing subscription resource

operationId: FullyUpdateAnSubscription

tags:

- Individual Analytics Exposure Subscription

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

requestBody:

description: Parameters to update/replace the existing subscription

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK (Successful deletion of the existing subscription)

content:

application/json:

schema:

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

'204':

description: >

Successful case. The resource has been successfully updated and no additional

content is to be sent in the response message.

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

delete:

summary: Deletes an already existing subscription

operationId: DeleteAnSubscription

tags:

- Individual Analytics Exposure Subscription

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

- name: subscriptionId

in: path

description: Identifier of the subscription resource

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of the existing subscription)

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29122\_CommonData.yaml#/components/responses/500'

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

/{afId}/fetch:

post:

summary: Fetch analytics information

operationId: FetchAnalyticsInfo

tags:

- AnalyticsExposure API Fetch analytics information

parameters:

- name: afId

in: path

description: Identifier of the AF

required: true

schema:

type: string

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'200':

description: The requested information was returned successfully.

content:

application/json:

schema:

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

'204':

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

'307':

$ref: 'TS29122\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29122\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29122\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29122\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29122\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29122\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29122\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29122\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29122\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29122\_CommonData.yaml#/components/responses/429'

'500':

description: >

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

are returned.

content:

application/problem+json:

schema:

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

'503':

$ref: 'TS29122\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29122\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{tokenUrl}'

scopes: {}

schemas:

AnalyticsExposureSubsc:

description: Represents an analytics exposure subscription.

type: object

properties:

analyEventsSubs:

type: array

items:

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

minItems: 1

analyRepInfo:

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

notifUri:

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

notifId:

type: string

eventNotifis:

type: array

items:

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

minItems: 1

failEventReports:

type: array

items:

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

minItems: 1

suppFeat:

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

self:

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

requestTestNotification:

type: boolean

description: >

Set to true by the AF to request the NEF to send a test notification

as defined in clause 5.2.5.3 of 3GPP TS 29.122. Set to false or omitted otherwise.

websockNotifConfig:

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

required:

- analyEventsSubs

- notifUri

- notifId

AnalyticsEventNotification:

description: Represents an analytics event(s) notification.

type: object

properties:

notifId:

type: string

analyEventNotifs:

type: array

items:

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

minItems: 1

termCause:

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

required:

- notifId

- analyEventNotifs

AnalyticsEventNotif:

description: Represents an analytics event to be reported.

type: object

properties:

analyEvent:

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

expiry:

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

timeStamp:

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

failNotifyCode:

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

rvWaitTime:

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

ueMobilityInfos:

type: array

items:

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

minItems: 1

ueCommInfos:

type: array

items:

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

minItems: 1

abnormalInfos:

type: array

items:

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

minItems: 1

congestInfos:

type: array

items:

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

minItems: 1

dataVlTrnsTmIfs:

type: array

items:

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

minItems: 1

nwPerfInfos:

type: array

items:

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

minItems: 1

qosSustainInfos:

type: array

items:

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

minItems: 1

disperInfos:

type: array

items:

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

minItems: 1

dnPerfInfos:

type: array

items:

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

minItems: 1

svcExps:

type: array

items:

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

minItems: 1

movBehavInfos:

type: array

items:

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

minItems: 1

wlanInfos:

type: array

items:

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

minItems: 1

relProxInfos:

type: array

items:

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

minItems: 1

start:

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

timeStampGen:

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

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

pauseInd:

type: boolean

description: >

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

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

resumeInd:

type: boolean

description: >

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

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

accuInfo:

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

cancelAccuInd:

type: boolean

description: >

Indicates cancelled subscription of the analytics accuracy information.

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

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

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

nsiLoadLevelData:

type: array

items:

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

minItems: 1

signalStorms:

type: array

items:

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

minItems: 1

required:

- analyEvent

- timeStamp

AnalyticsEventSubsc:

description: Represents a subscribed analytics event.

type: object

properties:

analyEvent:

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

analyEventFilter:

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

tgtUe:

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

required:

- analyEvent

AnalyticsEventFilterSubsc:

description: Represents an analytics event filter.

type: object

properties:

nwPerfReqs:

type: array

items:

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

minItems: 1

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

fineGranAreas:

type: array

items:

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

minItems: 1

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

temporalGranSize:

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

spatialGranSizeTa:

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

spatialGranSizeCell:

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

appIds:

type: array

items:

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

minItems: 1

dnn:

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

dnns:

type: array

items:

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

minItems: 1

dnais:

type: array

items:

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

minItems: 1

dataVlTrnsTmRqs:

type: array

items:

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

minItems: 1

excepRequs:

type: array

items:

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

minItems: 1

exptAnaType:

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

exptUeBehav:

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

matchingDir:

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

reptThlds:

type: array

items:

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

minItems: 1

snssai:

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

snssais:

type: array

items:

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

minItems: 1

nsiIdInfos:

type: array

items:

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

minItems: 1

nsLevelThrds:

type: object

additionalProperties:

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

minProperties: 1

description: >

Contains the network slice load level related thresholds.

The key of the map shall be set to the value of the S-NSSAI (among the ones provided

within the nsiIdInfos attribute to which the provided thresholds within the map value

apply.

Each map value shall have a maximum value of 100.

qosReq:

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

qosFlowRetThds:

type: array

items:

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

minItems: 1

ranUeThrouThds:

type: array

items:

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

minItems: 1

e2eDelayThds:

type: array

items:

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

minItems: 1

deviations:

type: array

items:

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

minItems: 1

disperReqs:

type: array

items:

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

minItems: 1

listOfAnaSubsets:

type: array

items:

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

minItems: 1

dnPerfReqs:

type: array

items:

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

minItems: 1

bwRequs:

type: array

items:

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

minItems: 1

ratFreqs:

type: array

items:

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

minItems: 1

appServerAddrs:

type: array

items:

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

minItems: 1

wlanReqs:

type: array

items:

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

minItems: 1

extraReportReq:

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

maxNumOfTopAppUl:

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

maxNumOfTopAppDl:

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

visitedLocAreas:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

minItems: 1

pduSesInfos:

type: array

items:

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

minItems: 1

ueCommReqs:

type: array

items:

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

minItems: 1

userDataConOrderCri:

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

locGranularity:

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

locOrientation:

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

ueMobilityReqs:

type: array

items:

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

minItems: 1

movBehavReqs:

type: array

items:

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

minItems: 1

relProxReqs:

type: array

items:

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

minItems: 1

useCaseCxt:

type: string

description: >

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

are not standardized.

pauseFlg:

type: boolean

description: >

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

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

resumeFlg:

type: boolean

description: >

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

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

accuReq:

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

feedback:

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

sigStormReqs:

type: array

items:

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

minItems: 1

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

lastUeLocs:

type: array

items:

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

minItems: 1

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

TargetUeId:

description: Represents the target UE(s) information.

type: object

properties:

anyUeInd:

type: boolean

gpsi:

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

exterGroupId:

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

UeMobilityExposure:

description: Represents a UE mobility information.

type: object

properties:

ts:

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

recurringTime:

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

duration:

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

durationVariance:

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

locInfo:

type: array

items:

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

minItems: 1

directionInfos:

type: array

items:

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

minItems: 1

required:

- duration

- locInfo

UeLocationInfo:

description: Represents a UE location information.

type: object

properties:

loc:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

geoLoc:

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

ratio:

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

confidence:

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

geoDistrInfos:

type: array

items:

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

minItems: 1

required:

- loc

AnalyticsRequest:

description: Represents the parameters to request to retrieve analytics information.

type: object

properties:

analyEvent:

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

analyEventFilter:

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

analyRep:

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

tgtUe:

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

suppFeat:

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

required:

- analyEvent

- suppFeat

AnalyticsEventFilter:

description: Represents analytics event filter information.

type: object

properties:

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

fineGranAreas:

type: array

items:

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

minItems: 1

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

temporalGranSize:

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

spatialGranSizeTa:

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

spatialGranSizeCell:

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

dnn:

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

dnns:

type: array

items:

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

minItems: 1

dnais:

type: array

items:

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

minItems: 1

nwPerfTypes:

type: array

items:

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

minItems: 1

appIds:

type: array

items:

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

minItems: 1

excepIds:

type: array

items:

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

minItems: 1

exptAnaType:

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

exptUeBehav:

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

snssai:

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

snssais:

type: array

items:

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

minItems: 1

nsiIdInfos:

type: array

items:

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

minItems: 1

qosReq:

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

listOfAnaSubsets:

type: array

items:

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

minItems: 1

dnPerfReqs:

type: array

items:

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

minItems: 1

dataVlTrnsTmReqs:

type: array

items:

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

minItems: 1

bwRequs:

type: array

items:

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

minItems: 1

ratFreqs:

type: array

items:

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

minItems: 1

appServerAddrs:

type: array

items:

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

minItems: 1

wlanReqs:

type: array

items:

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

minItems: 1

disperReqs:

type: array

items:

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

minItems: 1

maxNumOfTopAppUl:

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

maxNumOfTopAppDl:

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

visitedLocAreas:

type: array

items:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

minItems: 1

pduSesInfos:

type: array

items:

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

minItems: 1

ueCommReqs:

type: array

items:

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

minItems: 1

userDataConReq:

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

locGranularity:

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

locOrientation:

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

ueMobilityReqs:

type: array

items:

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

minItems: 1

movBehavReqs:

type: array

items:

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

minItems: 1

useCaseCxt:

type: string

description: >

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

are not standardized.

accuReq:

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

relProxReqs:

type: array

items:

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

minItems: 1

sigStormReqs:

type: array

items:

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

minItems: 1

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

lastUeLocs:

type: array

items:

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

minItems: 1

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

AnalyticsData:

description: Represents analytics data.

type: object

properties:

start:

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

expiry:

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

timeStampGen:

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

ueMobilityInfos:

type: array

items:

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

minItems: 1

ueCommInfos:

type: array

items:

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

minItems: 1

nwPerfInfos:

type: array

items:

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

minItems: 1

abnormalInfos:

type: array

items:

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

minItems: 1

congestInfos:

type: array

items:

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

minItems: 1

dataVlTrnsTmInfos:

type: array

items:

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

minItems: 1

qosSustainInfos:

type: array

items:

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

minItems: 1

dnPerfInfos:

type: array

items:

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

minItems: 1

svcExps:

type: array

items:

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

minItems: 1

disperReqs:

type: array

items:

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

minItems: 1

movBehavInfos:

type: array

items:

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

minItems: 1

wlanInfos:

type: array

items:

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

minItems: 1

accuInfo:

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

cancelAccuInd:

type: boolean

description: >

Indicates cancelled request of the analytics accuracy information.

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

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

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

relProxInfos:

type: array

items:

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

minItems: 1

nsLoadLevelData:

type: array

items:

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

minItems: 1

signalStorms:

type: array

items:

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

minItems: 1

suppFeat:

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

required:

- suppFeat

NetworkPerfExposure:

description: Represents network performance information.

type: object

properties:

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

anaPeriod:

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

nwPerfType:

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

relativeRatio:

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

absoluteNum:

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

rscUsgReq:

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

confidence:

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

required:

- locArea

- nwPerfType

AbnormalExposure:

description: Represents a user's abnormal behavior information.

type: object

properties:

gpsis:

type: array

items:

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

minItems: 1

appId:

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

dnn:

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

snssai:

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

excep:

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

ratio:

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

confidence:

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

addtMeasInfo:

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

required:

- excep

CongestInfo:

description: Represents a UE's user data congestion information.

type: object

properties:

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

cngAnas:

type: array

items:

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

minItems: 1

required:

- locArea

- cngAnas

CongestionAnalytics:

description: >

Represents data congestion analytics for transfer over the user plane,

control plane or both.

type: object

properties:

cngType:

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

tmWdw:

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

nsi:

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

confidence:

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

topAppListUl:

type: array

items:

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

minItems: 1

topAppListDl:

type: array

items:

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

minItems: 1

required:

- cngType

- tmWdw

- nsi

QosSustainabilityExposure:

description: Represents a QoS sustainability information.

type: object

properties:

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

fineAreaInfos:

type: array

items:

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

minItems: 1

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

startTs:

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

endTs:

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

qosFlowRetThd:

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

ranUeThrouThd:

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

e2eDelayThd:

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

snssai:

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

confidence:

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

required:

- locArea

- startTs

- endTs

WlanPerformInfo:

description: The WLAN performance related information.

type: object

properties:

locArea:

$ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'

wlanPerSsidInfos:

type: array

items:

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

minItems: 1

wlanPerUeIdInfos:

type: array

items:

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

minItems: 1

description: >

WLAN performance information for UE Id(s) of WLAN access points deployed in the Area

of Interest.

required:

- wlanPerSsidInfos

AnalyticsFailureEventInfo:

description: >

Represents an event for which the subscription request was not successful

and including the associated failure reason.

type: object

properties:

event:

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

failureCode:

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

required:

- event

- failureCode

AnalyticsEvent:

anyOf:

- type: string

enum:

- UE\_MOBILITY

- UE\_COMM

- ABNORMAL\_BEHAVIOR

- CONGESTION

- NETWORK\_PERFORMANCE

- QOS\_SUSTAINABILITY

- DISPERSION

- DN\_PERFORMANCE

- SERVICE\_EXPERIENCE

- E2E\_DATA\_VOL\_TRANS\_TIME

- MOVEMENT\_BEHAVIOUR

- RELATIVE\_PROXIMITY

- WLAN\_PERFORMANCE

- NS\_LOAD\_LEVEL

- SIGNALLING\_STORM

- type: string

description: >

This string provides forward-compatibility with future

extensions to the enumeration but is not used to encode

content defined in the present version of this API.

description: |

Represents the analytics event that is subscribed or notified.

Possible values are:

- UE\_MOBILITY: The AF requests to be notified about analytics information of UE mobility.

- UE\_COMM: The AF requests to be notified about analytics information of UE communication.

- ABNORMAL\_BEHAVIOR: The AF requests to be notified about analytics information of UE's

abnormal behavior.

- CONGESTION: The AF requests to be notified about analytics information of user data

congestion information.

- NETWORK\_PERFORMANCE: The AF requests to be notified about analytics information

of network performance.

- QOS\_SUSTAINABILITY: The AF requests to be notified about analytics information

of QoS sustainability.

- DISPERSION: The AF requests to be notified about analytics information of Dispersion

analytics.

- DN\_PERFORMANCE: The AF requests to be notified about analytics information of DN

performance.

- SERVICE\_EXPERIENCE: The AF requests to be notified about analytics information of service

experience.

- E2E\_DATA\_VOL\_TRANS\_TIME: The AF requests to be notified about analytics information of

E2E data volume transfer time.

- MOVEMENT\_BEHAVIOUR: The AF requests to be notified about analytics information of

Movement Behaviour.

- RELATIVE\_PROXIMITY: The AF requests to be notified about analytics information of

Relative Proximity.

- WLAN\_PERFORMANCE: Indicates that the event subscribed is the Wlan Performance

information.

- NS\_LOAD\_LEVEL: Indicates that the event subscribed is load level information of Network

Slice.

- SIGNALLING\_STORM: The AF requests to be notified about analytics information of Signalling

Storm.

AnalyticsFailureCode:

anyOf:

- type: string

enum:

- UNAVAILABLE\_DATA

- BOTH\_STAT\_PRED\_NOT\_ALLOWED

- UNSATISFIED\_REQUESTED\_ANALYTICS\_TIME

- NO\_ROAMING\_SUPPORT

- PREDICTION\_NOT\_ALLOWED

- 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: |

Identifies the failure reason.

Possible values are:

- UNAVAILABLE\_DATA: The event is rejected since necessary data to perform the service

is unavailable.

- BOTH\_STAT\_PRED\_NOT\_ALLOWED: The event is rejected since the start time is in the past

and the end time is in the future, which means the AF 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.

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

or data are required and the NWDAF that was invoked by the NEF neither supported roaming

exchange capabilitiy nor could it forward the request to another NWDAF.

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

event is not allowed.

- OTHER: The event is rejected due to other reasons.

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