**3GPP TSG CT WG3 Meeting #138 C3-246151**

**Orlando, US, 18 – 22 November, 2024 (revision of C3-246abc)**

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| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.517** | **CR** | **0147** | **rev** | **-** | **Current version:** | **19.0.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| --- |
|  |
| ***Title:***  | Support of activation time information collection |
|  |  |
| ***Source to WG:*** | Huawei, Ericsson, Nokia |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | AIML\_CN |  | ***Date:*** | 2024-10-25 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-19 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | As agreed in S2-2410976, the activation time information may be collected from the AF for signalling storm analytics. This new data collection functionality needs to be supported in stage 3. |
|  |  |
| ***Summary of change:*** | * Define new data types, feature and event to support the activation time information collection.
* Enhance the service descriptions, data types and the OpenAPI file accordingly.
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|  |  |
| ***Consequences if not approved:*** | The stage 2 requirement is not implemented. |
|  |  |
| ***Clauses affected:*** | 4.2.2.1, 4.2.2.2, 4.2.4.2, 5.6.1, 5.6.2.5, 5.6.2.6, 5.6.2.29, 5.6.2.30, 5.6.3.3, 5.8, A.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS/TR 23.288 CR 1104  |
| ***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 to the OpenAPI of Naf\_EventExposure API. |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* 1st Change \*\*\*

### 4.1.1 Overview

The Application Function Exposure Service, as defined in 3GPP TS 23.502 [3] and 3GPP TS 23.288 [4], is provided by the Application Function (AF). When the UE Application data is collected via the Data Collection AF, the Application Function Exposure Service, as defined in 3GPP TS 26.531 [28], 3GPP TS 26.501 [29], and 3GPP TS 26.512 [30], is provided by the Data Collection AF instantiated in 5GMS AF for the Event Consumer AF instantiated in 5GMS ASP.

This service:

- allows NF service consumers to subscribe, modify and unsubscribe for application events; and

- notifies NF service consumers with a corresponding subscription about observed events on the AF.

The types of observed events include:

AF application events exposed by AF:

- Service Experience information for an application;

- UE mobility information;

- UE communication information;

- Exceptions information;

- User Data Congestion information;

- Collective Behaviour information;

- Dispersion information;

- Performance Data information;

- GNSS Assistance Data information; and

- Application activation information.

UE application events exposed via Data Collection AF:

- Media Streaming QoE metrics;

- Media Streaming Consumption reports;

- Media Streaming Network Assistance invocation;

- Media Streaming Dynamic Policy invocation; and

- Media Streaming access activity.

When the event to which the NF service consumer has subscribed occurs, the AF reports the requested information to the NF service consumer based on the event reporting information definition requested by the NF service consumer (see 3GPP TS 23.502 [3]).

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

#### 4.2.2.1 General

This service operation is used by an NF service consumer to subscribe for event notifications on specific event(s), or to modify an existing subscription.

The following are the types of events for which a subscription can be made by the NWDAF, DCCF, MFAF, or NEF as the NF service consumer:

- Service Experience information for an application;

- UE mobility information;

- UE communication information;

- Exceptions information;

- User Data Congestion information;

- Collective Behaviour information;

- Dispersion information;

- Performance Data information;

- End-to-end data volume transfer time information; and

- activation time information of the application(s).

The following are the types of events for which a subscription can be made by the NWDAF, DCCF, MFAF, Event Consumer AF, or NEF as the NF service consumer:

- Media Streaming QoE metrics.

The following are the types of events for which a subscription can be made by the Event Consumer AF or NEF as the NF service consumer:

- Media Streaming Consumption reports;

- Media Streaming Network Assistance invocation;

- Media Streaming Dynamic Policy invocation; and

- Media Streaming access activity.

The following are the types of events for which a subscription can be made by the LMF or NEF as the NF service consumer:

- GNSS Assistance Data information

The following procedures using the Naf\_EventExposure\_Subscribe service operation are supported:

- creating a new subscription; and

- modifying an existing subscription.

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

#### 4.2.2.2 Creating a new subscription

Figure 4.2.2.2-1 illustrates the creation of a subscription.



Figure 4.2.2.2-1: Creation of a subscription

To subscribe to event notifications, the NF service consumer shall send an HTTP POST request to the AF with: "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions" as request URI as shown in step 1 of figure 4.2.2.2-1, and the "AfEventExposureSubsc" data structure as request body.

The "AfEventExposureSubsc" data structure shall include:

- description of subscribed event information as "eventsSubs" attribute by using one or more "EventsSubs" data;

- description of the event reporting information as "eventsRepInfo" attribute;

- a URI where to receive the requested notifications as "notifUri" attribute;

- a Notification Correlation Identifier assigned by the NF service consumer for the requested notifications as "notifId" attribute.

The "AfEventExposureSubsc" data may include:

- a specific Authorization AS provisioned Data Access Profile Identifier as "dataAccProfId" attribute, if the feature "DataAccProfileId" is supported and the subscribed events including "MS\_QOE\_METRICS", "MS\_CONSUMPTION", "MS\_NET\_ASSIST\_INVOCATION", "MS\_DYN\_POLICY\_INVOCATION", and/or "MS\_ACCESS\_ACTIVITY".

NOTE 1: The optional Data Access Profile Identifier provisioned by the Authorization AS procedures are specified in clause 5.8 of 3GPP TS 26.531 [28].

The "EventsSubs" data shall include:

- a event to subscribe as a "event" attribute; and

- event filter information as "eventFilter" attribute associated with the event;

and may include:

- event-specific reporting information, within the "eventRepInfo" attribute, if the "PerEventRepReq" feature is supported.

The "eventsRepInfo" attribute may include:

- event notification method (periodic, one time, on event detection) as "notifMethod" attribute;

- Maximum Number of Reports as "maxReportNbr" attribute;

- Monitoring Duration as "monDur" attribute;

- repetition period for periodic reporting as "repPeriod" attribute;

- immediate reporting indication as "immRep" attribute;

- sampling ratio as "sampRatio" attribute;

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

- group reporting guard time as "grpRepTime" attribute;

- a notification flag as "notifFlag" attribute if the EneNA feature is supported; and/or

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

When the "PerEventRepReq" feature is supported, the common events reporting requirements provided within the "eventsRepInfo" attribute shall apply to a subscribed event only when no event-specific reporting requirements are provided within the "eventsSubs" attribute via the "eventRepInfo" attribute of the EventsSubs data structure for this subscribed event, as specified above.

The "eventFilter" shall include:

- identification of target UE(s) to which the subscription applies via :

1) identification of individual UE(s) via "gpsis" attribute or "supis" attribute; or

2) identification of group(s) of UE(s) via "exterGroupIds" attribute or "interGroupIds" attribute; or

3) identification of any UE via "anyUeInd" attribute; or

4) identification of a UE with a specific IP address via the "ueIpAddr" attribute;

NOTE 2: It is assumed that the AF is provisioned with the list of UE IDs (GPSIs or SUPIs) belonging to an External or Internal Group ID.

Depending on the event type:

- if the feature "ServiceExperience" is supported and the event is "SVC\_EXPERIENCE", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "Exceptions" is supported and the event is "EXCEPTIONS", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute;

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

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

2) an area of interest via "locArea" attribute.

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

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

2) an area of interest via "locArea" attribute.

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

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

2) an area of interest via "locArea" attribute.

- if the feature "PerformanceData" is supported and the event is "PERF\_DATA", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "CollectiveBehaviour" is supported and the event is "COLLECTIVE\_BEHAVIOUR", the "eventFilter" attribute may provide:

1) collective attributes information via "collAttrs" attribute;

2) an area of interest via "locArea" attribute

3) identification of application to which the subscription applies via "appIds" attribute.

- if the feature "Dispersion" is supported and the event is "DISPERSION", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "MSQoeMetrics" is supported and the event is "MS\_QOE\_METRICS", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "MSConsumption" is supported and the event is "MS\_CONSUMPTION", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "MSNetAssInvocation" is supported and the event is "MS\_NET\_ASSIST\_INVOCATION", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "MSDynPolicyInvocation" is supported and the event is "MS\_DYN\_POLICY\_INVOCATION", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "MSAccessActivity" is supported and the event is "MS\_ACCESS\_ACTIVITY", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "DataVolTransferTime" is supported and the event is "E2E\_DATA\_VOL\_TRANS\_TIME", the "eventFilter" attribute may provide:

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

2) an area of interest via "locArea" attribute.

- if the feature "AppActiveTime" is supported and the event is "APP\_ACTIVE\_TIME", the "eventFilter" attribute may provide:

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

If the AF cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the AF shall send the HTTP error response as specified in clause 5.7.

Upon successful reception of the HTTP POST request with "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions" as request URI and "AfEventExposureSubsc" data structure as request body, the AF shall create a new "Individual Application Event Subscription" resource, store the subscription and send an HTTP "201 Created" response as shown in step 2 of figure 4.2.2.2-1, containing:

- a Location header field; and

- an "AfEventExposureSubsc" data type in the content.

The Location header field shall contain the URI of the created individual application session context resource i.e. "{apiRoot}/naf-eventexposure/<apiVersion>/subscriptions/{subscriptionId}".

The "AfEventExposureSubsc" data type content shall contain the representation of the created "Individual Application Event Subscription".

When the "monDur" attribute is included in the response by the AF, it represents AF selected expiry time that is equal or less than the expiry time received in the request.

When the "immRep" attribute is included and sets to "true" in the subscription and the subscribed events are available, the AF shall include the reports of the events subscribed, if available, in the HTTP POST response.

When the sampling ratio as, "sampRatio" attribute, is included in the subscription without a "partitionCriteria" attribute, the AF shall select a random subset of UEs among the target UEs according to the sampling ratio and only report the event(s) related to the selected subset of UEs. If the "partitionCriteria" attribute is additionally included, then the AF shall first partition the UEs according to the value of the "partitionCriteria" attribute and then select a random subset of UEs from each partition according to the sampling ratio and only report the event(s) related to the selected subsets of UEs.

When the group reporting guard time as the "grpRepTime" attribute is included in the subscription, the AF shall accumulate all the event reports for the target UEs until the group reporting guard time expires. Then the AF shall notify the NF service consumer using the Naf\_EventExposure\_Notify service operation, as described in clause 4.2.4.2.

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

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

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

#### 4.2.4.2 Notification about subscribed events

Figure 4.2.4.2-1 illustrates the notification about subscribed events.



Figure 4.2.4.2-1: Notification about subscribed events

If the AF observes application related event(s) for which an NF service consumer has subscribed, the AF shall send an HTTP POST request as shown in step 1 of figure 4.2.4.2-1, with the "{notifUri}" as request URI containing the value previously provided by the NF service consumer within the corresponding subscription, and the "AfEventExposureNotif" data structure.

The "AfEventExposureNotif" data structure shall include:

a) the notification correlation ID provided by the NF service consumer during the subscription as "notifId" attribute; and

b) information about the observed event(s) within the "eventNotifs" attribute that shall contain for each observed event an "AfEventNotification" data structure that shall include:

1) the application related event as "event" attribute;

2) the time at which the event was observed encoded as "timeStamp" attribute;

3) if the "event" attribute is "SVC\_EXPERIENCE":

- service experience information about the application involved in the reported event in the "svcExprcInfos" attribute;

4) if the "event" attribute is "UE\_MOBILITY":

- UE mobility information associated with the application as "ueMobilityInfos" attribute;

5) if the "event" attribute is "UE\_COMM":

- application communication information associated with the application as "ueCommInfos" attribute;

6) if the "event" attribute is "EXCEPTIONS":

- exceptions information associated with a service flow as "excepInfos" attribute;

7) if the "event" attribute is "COLLECTIVE\_BEHAVIOUR":

- collective beahviour information associated with the UEs and its applications as "collBhvrInfs" attribute;

8) if the "event" attribute is "PERF\_DATA":

- performance data information associated with the application as "perfDataInfos" attribute;

9) if the "event" attribute is "USER\_DATA\_CONGESTION":

- user data congestion information collected for an AF application as "congestionInfos" attribute; and

10) if the "event" attribute is "DISPERSION":

- UE dispersion information collected for an AF application as "dispersionInfos" attribute.

11) if the "event" attribute is "MS\_QOE\_METRICS":

- Media Streaming QoE metrics information collected for an UE application via the Data Collection AF as "msQoeMetrInfos" attribute. This attribute is deprecated; the attribute "msQoeMetrics" should be used instead.

- if the "MSEventExposure" feature is supported, the Media Streaming QoE metrics information collected for an UE application via the Data Collection AF as "msQoeMetrics" attribute.

12) if the "event" attribute is "MS\_CONSUMPTION":

- Media Streaming Consumption reports collected for an UE application via the Data Collection AF as "msConsumpInfos" attribute. This attribute is deprecated; the attribute "msConsumpRpts" should be used instead.

- if the "MSEventExposure" feature is supported, the Media Streaming Consumption reports collected for an UE application via the Data Collection AF as "msConsumpRpts" attribute.

13) if the "event" attribute is "MS\_NET\_ASSIST\_INVOCATION":

- Media Streaming Network Assistance invocation collected for an UE application via the Data Collection AF as "msNetAssInvInfos" attribute. This attribute is deprecated; the attribute "msNetAssistInvs" should be used instead.

- if the "MSEventExposure" feature is supported, the Media Streaming Network Assistance invocation collected for an UE application via the Data Collection AF as "msNetAssistInvs" attribute.

14) if the "event" attribute is "MS\_DYN\_POLICY\_INVOCATION":

- Media Streaming Dynamic Policy invocation collected for an UE application via the Data Collection AF as "msDynPlyInvInfos" attribute. This attribute is deprecated; the attribute "msDynPlyInvs" should be used instead.

- if the "MSEventExposure" feature is supported, the Media Streaming Dynamic Policy invocation collected for an UE application via the Data Collection AF as "msDynPlyInvs" attribute.

15) if the "event" attribute is "MS\_ACCESS\_ACTIVITY":

- Media Streaming access activity collected for an UE application via the Data Collection AF as "msAccActInfos" attribute. This attribute is deprecated; the attribute "msAccesses" should be used instead.

- if the "MSEventExposure" feature is supported, the Media Streaming access activity collected for an UE application via the Data Collection AF as "msAccesses" attribute.

16) if the "event" attribute is "GNSS\_ASSISTANCE\_DATA":

- GNSS Assistance Data information within the "gnssAssistDataInfo" attribute;

17) if the "event" attribute is "E2E\_DATA\_VOL\_TRANS\_TIME":

- data volume transfer information associated with the application as "datVolTransTimeInfos" attribute.

18) if the "event" attribute is "APP\_ACTIVE\_TIME":

- activation time information of the application(s) as "appActiveTimeInfos" attribute.

If the NF service consumer cannot successfully fulfil the received HTTP POST request due to an internal error or an error in the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.7.

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 [5].

Upon successful reception of the HTTP POST request with "{notifUri}" as request URI and "AfEventExposureNotif" data structure as request body, the NF service consumer shall send a "204 No Content" HTTP response, as shown in step 2 of figure 4.2.4.2-1.

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

### 5.6.1 General

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

Table 5.6.1-1 specifies the data types defined for the Naf\_EventExposure service based interface protocol.

Table 5.6.1-1: Naf\_EventExposure specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| ActiveTimeInfo | 5.6.2.30 | Contains the activation time information. | AppActiveTime |
| AddrFqdn | 5.6.2.18 | IP address and/or FQDN. | PerformanceDataServiceExperienceExtDataVolTransferTime |
| AfEvent | 5.6.3.3 | Represents Application Events. |  |
| AfEventExposureSubsc | 5.6.2.2 | Represents an Individual Application Event Subscription resource. |  |
| AfEventExposureNotif | 5.6.2.3 | Describes notifications about application event that occurred in an Individual Application Event Subscription resource. |  |
| AfEventNotification | 5.6.2.6 | Represents information related to an event to be reported. |  |
| AppActiveTimeInfo | 5.6.2.29 | Contains the activation time information of the application(s). | AppActiveTime |
| CollectiveBehaviourFilter | 5.6.2.19 | Contains the parameter type and value pair to express the collective behaviour event filters. | CollectiveBehaviour |
| CollectiveBehaviourFilterType | 5.6.3.4 |  | CollectiveBehaviour |
| CollectiveBehaviourInfo | 5.6.2.20 | Contains the collective behaviour analytics information. | CollectiveBehaviour |
| CommunicationCollection | 5.6.2.13 | Contains communication information. | UeCommunication |
| DataProcessingType | 5.6.3.5 | Represents a type of data processing. | ExtEventFilters |
| DatVolTransTimeCollection | 5.6.2.28 | Contains data volume transfer time information. | DataVolTransferTime |
| DispersionCollection | 5.6.2.21 | Contains Dispersion information collected. | Dispersion |
| EventFilter | 5.6.2.5 | Represents event filter information. |  |
| EventsSubs | 5.6.2.4 | Represents an event to be subscribed and the related event filter information. |  |
| ExceptionInfo | 5.6.2.14 | Describes the exceptions information provided by AF. | Exceptions |
| MSAccessActivityCollection | 5.6.2.27 | Represents the Media Streaming access activities of UE Application collected via Data Collection AF. | MSAccessActivity |
| MsConsumptionCollection | 5.6.2.24 | Represents the Media Streaming Consumption reports of UE Application collected via Data Collection AF. | MSConsumption |
| MsDynPolicyInvocationCollection | 5.6.2.26 | Represents the Media Streaming Dynamic Policy invocation of UE Application collected via Data Collection AF. | MSDynPolicyInvocation |
| MsQoeMetricsCollection | 5.6.2.23 | Represents the Media Streaming QoE Metrics of UE Application collected via Data Collection AF. | MSQoeMetrics |
| MsNetAssInvocationCollection | 5.6.2.25 | Represents the Media Streaming Network Assistance invocation of UE Application collected via Data Collection AF. | MSNetAssInvocation |
| PerformanceData | 5.6.2.17 | Indicates the performance data. | PerformanceData |
| PerformanceDataCollection | 5.6.2.16 | Represents the performance data information collected for an AF application. | PerformanceData |
| PerUeAttribute | 5.6.2.22 | UE application data collected per UE. | CollectiveBehaviour |
| RelativeDirection | 5.6.3.6 | Contains the heading of the UE movement with respect to another UE. | RelativeProximity |
| ServiceExperienceInfoPerApp | 5.6.2.7 | Contains service experience associated with the application. | ServiceExperience |
| ServiceExperienceInfoPerFlow | 5.6.2.8 | Contains service experience associated with the service flow. | ServiceExperience |
| SvcExperience | 5.6.2.9 | Contains a mean opinion score with the customized range. | ServiceExperience |
| UeCommunicationCollection | 5.6.2.11 | Contains UE communication information associated with the application. | UeCommunication |
| UeMobilityCollection | 5.6.2.10 | Contains UE mobility information associated with the application. | UeMobility |
| UeTrajectoryCollection | 5.6.2.12 | Contains UE trajectory information associated with the application. | UeMobility |
| UserDataCongestionCollection | 5.6.2.15 | Contains User Data Congestion Analytics related information collected. | UserDataCongestion |

Table 5.6.1-2 specifies data types re-used by the Naf\_EventExposure 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 Naf\_EventExposure service based interface.

Table 5.6.1-2: Naf\_EventExposure re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| ApplicationId | 3GPP TS 29.571 [13] | Application Identifier. |  |
| BitRate | 3GPP TS 29.571 [13] | 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". | UserDataCongestionCollectiveBehaviour |
| ConsumptionReportingUnitsCollection | 3GPP TS 26.512 [30] | Represents the collection of Media Streaming Consumption event records. | MSEventExposure |
| CpParameterSet | 3GPP TS 29.122 [17] | The Expected UE Behaviour parameters. | UeCommunicationExt\_eNA |
| DateTime | 3GPP TS 29.571 [13] | Contains a date and a time. |  |
| Dnai | 3GPP TS 29.571 [13] | Identifies a DNAI. |  |
| Direction | 3GPP TS 29.520 [19] | Heading directions of the UE flow in the target area. | RelativeProximity |
| DurationSec | 3GPP TS 29.571 [13] | Indicates a period of time in units of seconds. | Dispersion |
| DynamicPolicy | 3GPP TS 26.512 [30] | Represents the Media Streaming Dynamic Policy. | MSDynPolicyInvocation |
| DynamicPolicyInvocationsCollection | 3GPP TS 26.512 [30] | Represents the collection of Media Streaming Dynamic Policy invocation event records. | MSEventExposure |
| EthFlowDescription | 3GPP TS 29.514 [18] | Defines a packet filter for an Ethernet flow. |  |
| Exception | 3GPP TS 29.520 [19] | Describes the Exception information. |  |
| ExtGroupId | 3GPP TS 29.503 [27] | External Group Identifier for a user group. |  |
| Float | 3GPP TS 29.571 [13] | Number with format "float" as defined in OpenAPI Specification [8]. |  |
| FlowDescription | 3GPP TS 29.514 [18] | Only IP 5-tuple (protocol, source and destination IP address, Source and destination port) is applicable. | Dispersion |
| FlowInfo | 3GPP TS 29.122 [17] | Represents flow information. |  |
| GNSSAssistDataInfo | 3GPP TS 29.591 [31] | Represents GNSS Assistance Data information. | GNSSAssistData |
| Gpsi | 3GPP TS 29.571 [13] | Identifies a GPSI. |  |
| GroupId | 3GPP TS 29.571 [13] | Contains a Group identifier. |  |
| IpAddr | 3GPP TS 29.571 [13] | Identifies IP address. | DispersionEnPerformanceData |
| LocationArea5G | 3GPP TS 29.122 [17] | Represents a user location area when the UE is attached to 5G. |  |
| MediaStreamingAccessesCollection | 3GPP TS 26.512 [30] | Represents the collection of Media Streaming access event records. | MSEventExposure |
| MediaStreamingAccessRecord | 3GPP TS 26.512 [30] | Represents the Media Streaming Access activity record. | MSAccessActivity |
| NetworkAssistanceInvocationsCollection | 3GPP TS 26.512 [30] | Represents the collection of Media Streaming Network Assistance invocation event records. | MSEventExposure |
| NetworkAssistanceSession | 3GPP TS 26.512 [30] | Represents the Media Streaming Network Assistance Session Recommendation. | MSNetAssInvocation |
| PacketDelBudget | 3GPP TS 29.571 [13] | Indicates average Packet Delay. | PerformanceData |
| PacketLossRate | 3GPP TS 29.571 [13] | Indicates average Loss Rate. | PerformanceData |
| QoEMetricsCollection | 3GPP TS 26.512 [30] | Represents the collection of Media Streaming QoE metrics event records. | MSEventExposure |
| RedirectResponse | 3GPP TS 29.571 [13] | Contains redirection related information. | ES3XX |
| ReportingInformation | 3GPP TS 29.523 [12] | Represents the requirements of reporting the subscription. |  |
| Supi | 3GPP TS 29.571 [13] | Contains a SUPI. |  |
| SupportedFeatures | 3GPP TS 29.571 [13] | Indicates the features supported. |  |
| TimeWindow | 3GPP TS 29.122 [17] | Represents a time window identified by a start time and a stop time. |  |
| Uinteger | 3GPP TS 29.571 [13] | Unsigned integer. | ServiceExperienceExt2\_eNARelativeProximityAppActiveTime |
| Uri | 3GPP TS 29.571 [13] | Contains a URI. |  |
| UsageThreshold | 3GPP TS 29.122 [17] | data volume during the period | Dispersion |
| Volume | 3GPP TS 29.122 [17] | Unsigned integer identifying a volume in units of bytes. |  |

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

#### 5.6.2.5 Type EventFilter

Table 5.6.2.5-1: Definition of type EventFilter

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability(NOTE 4) |
| gpsis | array(Gpsi) | O | 1..N | Each element represents external UE identifier.(NOTE 1, NOTE 2) |  |
| supis | array(Supi) | O | 1..N | Each element represents a SUPI identifying a UE (NOTE 1, NOTE 2) |  |
| exterGroupIds | array(ExtGroupId) | O | 1..N | Each element represents a group of UEs identified by an External Group Identifier.(NOTE 1, NOTE 2) |  |
| interGroupIds | array(GroupId) | O | 1..N | Each element represents a group of UEs identified by an Internal Group Identifier. (NOTE 1, NOTE 2) |  |
| anyUeInd | boolean | O | 0..1 | Identifies whether the request applies to any UE. This attribute shall set to "true" if applicable for any UE, otherwise, set to "false".May only be present and sets to "true" if "AfEvent" sets to "SVC\_EXPERIENCE", "EXCEPTIONS", "GNSS\_ASSISTANCE\_DATA", or "USER\_DATA\_CONGESTION".(NOTE 2) | ServiceExperienceExceptionsUserDataCongestionGNSSAssistData |
| ueIpAddr | IpAddr | O | 0..1 | Identifies the UE IP address. (NOTE 2) | EnPerformanceData |
| appIds | array(ApplicationId) | O | 1..N | Each element indicates an application identifier.If absent, the EventFilter data applies to any application (i.e. all applications).(NOTE 3) | ServiceExperienceUeMobilityUeCommunicationExceptionsUserDataCongestionPerformanceDataDispersionCollectiveBehaviourMSQoeMetricsMSConsumptionMSNetAssInvocationMSDynPolicyInvocationMSAccessActivityDataVolTransferTimeAppActiveTime |
| locArea | LocationArea5G | O | 0..1 | Represents area of interest. (NOTE 5) | ServiceExperienceUeMobilityUeCommunicationExceptionsUserDataCongestionPerformanceDataDispersionCollectiveBehaviourMSQoeMetricsMSConsumptionMSNetAssInvocationMSDynPolicyInvocationMSAccessActivityDataVolTransferTime |
| collAttrs | array(CollectiveBehaviourFilter) | O | 1..N | Each element indicates a collective attribute parameter type and value.This attribute may be included when the subscribed event is "COLLECTIVE\_BEHAVIOUR". | CollectiveBehaviour |
| exceptionReqs | array(Exception) | O | 1..N | Each element indicates an Exception Id with associated threshold. This attribute may be included when the subscribed event is "EXCEPTIONS".(NOTE 6) | EnPerformanceData |
| NOTE 1: For untrusted AF, only gpsis and exterGroupIds are applicable. For trusted AF, only supis and interGroupIds are applicable.NOTE 2: For an applicable feature, only one attribute identifying the target UE shall be provided.NOTE 3: For event "UE\_COMM", "UE\_MOBILITY", "EXCEPTIONS" and "PERF\_DATA", the "appIds" attribute, if present, shall include only one element. NOTE 4: Properties marked with a feature as defined in clause 5.8 are applicable as described in clause 6.6 of 3GPP TS 29.500 [5]. If no features are indicated, the related property applies for all the features.NOTE 5: The NetworkAreaInfo data within the LocationArea5G data is only applicable for trusted AF. In addition, for event "SVC\_EXPERIENCE", only the "tais" attribute within the NetworkAreaInfo data is applicable for the trusted AF.NOTE 6: Only "excepId" and "excepLevel" attributes within the Exception data type are applicable to this attribute. |

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

#### 5.6.2.6 Type AfEventNotification

Table 5.6.2.6-1: Definition of type AfEventNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | AfEvent | M | 1 | Represents the reported application related event. |  |
| timeStamp | DateTime | M | 1 | Time at which the event is observed. |  |
| svcExprcInfos | array(ServiceExperienceInfoPerApp) | C | 1..N | Contains the service experience information.Shall be present if the "event" attribute sets to "SVC\_EXPERIENCE". | ServiceExperience |
| ueMobilityInfos | array(UeMobilityCollection) | C | 1..N | Contains the UE mobility information.Shall be present if the "event" attribute sets to "UE\_MOBILITY". | UeMobility |
| ueCommInfos | array(UeCommunicationCollection) | C | 1..N | Contains the application communication information.Shall be present if the "event" attribute sets to "UE\_COMM". | UeCommunication |
| excepInfos | array(ExceptionInfo) | C | 1..N | Each element represents the exception information for a service flow. Shall be present if the "event" attribute sets to "EXCEPTIONS". | Exceptions |
| congestionInfos | array(UserDataCongestionCollection) | C | 1..N | Each element represents the user data congestion information collected for an AF application. Shall be present if the "event" attribute sets to "USER\_DATA\_CONGESTION". | UserDataCongestion |
| perfDataInfos | array(PerformanceDataCollection) | C | 1..N | Each element represents the performance data information collected for an AF application. Shall be present if the "event" attribute sets to "PERF\_DATA". | PerformanceData |
| collBhvrInfs | array(CollectiveBehaviourInfo) | C | 1..N | Each element represents the collective behaviour information related to a set of UEs, applications. Shall be present if the "event" attribute sets to "COLLECTIVE\_BEHAVIOUR". | CollectiveBehaviour |
| dispersionInfos | array(DispersionCollection) | C | 1..N | Each element represents the UE dispersion information collected for an AF application.Shall be present if the "event" attribute sets to "DISPERSION". | Dispersion |
| msQoeMetrInfos | array(MsQoeMetricsCollection) | C | 1..N | Each element represents the Media Streaming QoE metrics information collected for an UE application via the Data Collection AF.Shall be present if the "event" attribute sets to "MS\_QOE\_METRICS".This attribute is deprecated; the attribute "msQoeMetrics" should be used instead. | MSQoeMetrics |
| msQoeMetrics | array(QoEMetricsCollection) | C | 1..N | Each element represents the Media Streaming QoE metrics event record.Shall be present if the "event" attribute sets to "MS\_QOE\_METRICS".This attribute deprecates "msQoeMetrInfos" attribute. | MSEventExposure |
| msConsumpInfos | array(MsConsumptionCollection) | C | 1..N | Each element represents the Media Streaming Consumption information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_CONSUMPTION".This attribute is deprecated; the attribute "msConsumpRpts" should be used instead. | MSConsumption |
| msConsumpRpts | array(ConsumptionReportingUnitsCollection) | C | 1..N | Each element represents the Media Streaming Consumption event record.Shall be present if the "event" attribute sets to "MS\_CONSUMPTION".This attribute deprecates "msConsumpInfos" attribute. | MSEventExposure |
| msNetAssInvInfos | array(MsNetAssInvocationCollection) | C | 1..N | Each element represents the Media Streaming Network Assistance invocation information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "NET\_ASSIST\_INVOCATION".This attribute is deprecated; the attribute "msNetAssistInvs" should be used instead. | MSNetAssInvocation |
| msNetAssistInvs | array(NetworkAssistanceInvocationsCollection) | C | 1..N | Each element represents the Media Streaming Network Assistance invocation event record.Shall be present if the "event" attribute sets to "NET\_ASSIST\_INVOCATION".This attribute deprecates "msNetAssInvInfos" attribute. | MSEventExposure |
| msDynPlyInvInfos | array(MsDynPolicyInvocationCollection) | C | 1..N | Each element represents the Media Streaming Dynamic Policy invocation information collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_DYN\_POLICY\_INVOCATION".This attribute is deprecated; the attribute "msDynPlyInvs" should be used instead. | MSDynPolicyInvocation |
| msDynPlyInvs | array(DynamicPolicyInvocationsCollection) | C | 1..N | Each element represents the Media Streaming Dynamic Policy invocation event record.Shall be present if the "event" attribute sets to "MS\_DYN\_POLICY\_INVOCATION".This attribute deprecates "msDynPlyInvInfos" attribute. | MSEventExposure |
| msAccActInfos | array(MSAccessActivityCollection) | C | 1..N | Each element represents the Media Streaming access activity collected for an UE application via the Data Collection AF. Shall be present if the "event" attribute sets to "MS\_ACCESS\_ACTIVITY".This attribute is deprecated; the attribute "msAccesses" should be used instead. | MSAccessActivity |
| msAccesses | array(MediaStreamingAccessesCollection) | C | 1..N | Each element represents the Media Streaming access event record.Shall be present if the "event" attribute sets to "MS\_ACCESS\_ACTIVITY".This attribute deprecates "msAccActInfos" attribute. | MSEventExposure |
| gnssAssistDataInfo | GNSSAssistDataInfo | C | 0..1 | Represents the GNSS Assistance data information.This attribute shall be present only if the "event" attribute is set to "GNSS\_ASSISTANCE\_DATA". | GNSSAssistData |
| datVolTransTimeInfos | array(DatVolTransTimeCollection) | C | 1..N | Each element represents the data volume transfer time information related to a UE. Shall be present if the "event" attribute sets to "DATA\_VOLUME\_TRANSFER\_TIME". | DataVolTransferTime |
| appActiveTimeInfos | map(AppActiveTimeInfo) | C | 1..N | Each entry represents activation time information of the application. The key of the map is the “appId” attribute of the AppActiveTimeInfo data type. Shall be present if the "event" attribute sets to "APP\_ACTIVE\_TIME". | AppActiveTime |

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

#### 5.6.2.29 Type AppActiveTimeInfo

Table 5.6.2.29-1: Definition of type AppActiveTimeInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| appId | ApplicationId | M | 1 | Identifier of the application at the AF. |  |
| activeTimeInfos | array(ActiveTimeInfo) | M | 1..N | Indicates the activation time information of the application. |  |

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

#### 5.6.2.30 Type ActiveTimeInfo

Table 5.6.2.30-1: Definition of type ActiveTimeInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ueNum | Uinteger | O | 0..1 | Indicates the total number of UEs. |  |
| gpsis | array(Gpsi) | O | 1..N | Each element represents external UE identifier.(NOTE 1) |  |
| supis | array(Supi) | O | 1..N | Each element represents a SUPI for a UE.(NOTE 1) |  |
| exterGroupIds | array(ExtGroupId) | O | 1..N | Each element represents a group of UEs identified by an External Group Identifier.(NOTE 1) |  |
| interGroupIds | array(GroupId) | O | 1..N | Each element represents a group of UEs identified by an Internal Group Identifier.(NOTE 1) |  |
| activeTime | array(TimeWindow) | C | 1..N | Each element indicates the timestamp at which the users switch to active, or the start and end time when the users are active for the application.(NOTE 2) |  |
| inactiveTime | array(TimeWindow) | C | 1..N | Each element indicates the timestamp at which the users switch to inactive, or the start and end time when the users are inactive for the application.(NOTE 2) |  |
| NOTE 1: For untrusted AF, only "gpsis" and "exterGroupIds" are applicable. For trusted AF, only "supis" and "interGroupIds" are applicable.NOTE 2: At least one of "activeTime" and "inactiveTime" attributes shall be present. If these two attributes are used to indicate the timestamps at which the users switch to active or inactive without an end time, the "startTime" and "stopTime" shall be set to the same value. |

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

#### 5.6.3.3 Enumeration: AfEvent

The enumeration AfEvent represents the application events that can be subscribed/notified. It shall comply with the provisions defined in table 5.6.3.3-1.

Table 5.6.3.3-1: Enumeration AfEvent

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| SVC\_EXPERIENCE | Indicates that the event subscribed/notified is service experience information for an application. | ServiceExperience |
| UE\_MOBILITY | Indicates that the event subscribed/notified is UE mobility information. | UeMobility |
| UE\_COMM | Indicates that the event subscribed/notified is UE communication information. | UeCommunication |
| EXCEPTIONS | Indicates that the event subscribed/notified is exceptions information. | Exceptions |
| USER\_DATA\_CONGESTION | Indicates that the event subscribed/notified is user data congestion analytics related information. | UserDataCongestion |
| PERF\_DATA | Indicates that the event subscribed/notified is performance data information. | PerformanceData |
| COLLECTIVE\_BEHAVIOUR | Indicates that the event subscribed/notified is collective behaviour information.If the "RelativeProximity" feature is supported, this event is also applicable for relative proximity data collection. | CollectiveBehaviourRelativeProximity |
| DISPERSION | Indicates that the event subscribed/notified is dispersion information. | Dispersion |
| MS\_QOE\_METRICS | Indicates that the event subscribed/notified is Media Streaming QoE metrics. | MSQoeMetrics |
| MS\_CONSUMPTION | Indicates that the event subscribed/notified is Media Streaming Consumption reports. | MSConsumption |
| MS\_NET\_ASSIST\_INVOCATION | Indicates that the event subscribed/notified is Media Streaming Network Assistance invocation. | MSNetAssInvocation |
| MS\_DYN\_POLICY\_INVOCATION | Indicates that the event subscribed/notified is Media Streaming Dynamic Policy invocation. | MSDynPolicyInvocation |
| MS\_ACCESS\_ACTIVITY | Indicates that the event subscribed/notified is Media Streaming access activity. | MSAccessActivity |
| GNSS\_ASSISTANCE\_DATA | Indicates that the subscribed/notified event is GNSS Assistance Data Collection. | GNSSAssistData |
| DATA\_VOLUME\_TRANSFER\_TIME | Indicates that the event subscribed is data volume transfer time information. | DataVolTransferTime |
| APP\_ACTIVE\_TIME | Indicates that the event subscribed is application activation time information. | AppActiveTime |

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

## 5.8 Feature negotiation

The optional features in table 5.8-1 are defined for the Naf\_EventExposure API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [5].

Table 5.8-1: 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 support for the event related to UE mobility. |
| 3 | UeCommunication | This feature indicates support for the event related to UE communication information. |
| 4 | Exceptions | This feature indicates support for the event related to exception information. |
| 5 | 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 [5] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [5]. |
| 6 | EneNA | This feature indicates support for the enhancements of network data analytics requirements. |
| 7 | UserDataCongestion | This feature indicates support for the event related to User Data Congestion Analytics related information. |
| 8 | PerformanceData | This feature indicates support for the event related to performance data information. |
| 9 | Dispersion | This feature indicates support for the event related to Dispersion Analytics related information. |
| 10 | CollectiveBehaviour | This feature indicates support for the event related to collective behaviour information. |
| 11 | ServiceExperienceExt | This feature indicates support for the extensions to the event related to service experience, including reporting Application Server Instance. Supporting this feature also requires the support of feature ServiceExperience. |
| 12 | MSQoeMetrics | This feature indicates support for the event related to Media Streaming QoE metrics for UE Application collected via the Data Collection AF. |
| 13 | MSConsumption | This feature indicates support for the event related to Media Streaming Consumption reports for UE Application collected via the Data Collection AF. |
| 14 | MSNetAssInvocation | This feature indicates support for the event related to Media Streaming Network Assistance invocation for UE Application collected via the Data Collection AF. |
| 15 | MSDynPolicyInvocation | This feature indicates support for the event related to Media Streaming Dynamic Policy invocation for UE Application collected via the Data Collection AF. |
| 16 | MSAccessActivity | This feature indicates support for the event related to Media Streaming access activity for UE Application collected via the Data Collection AF. |
| 17 | DataAccProfileId | This feature indicates support for Data Access Profile Identifier. |
| 18 | AllApplications | This feature indicates applicable to all the applications. |
| 19 | GNSSAssistData | This feature indicates the support of the GNSS Assistance Data Collection functionality as part of the enhancements to the 5G LCS functionality.The following functionalities are supported:- GNSS Assistance Data Collection. |
| 20 | PerformanceDataExt\_AIML | This feature indicates the support for the extensions of the analytics related to DN performance supporting AIML, including support of Max/Min UL/DL data collection on packet delay, pack loss and throughput. Supporting this feature also requires the support of feature PerformanceData. |
| 21 | UeMobilityExt\_AIML | This feature indicates support for further extensions to the event related to UE mobility supporting AIML including support of list of application service area collection. Supporting this feature also requires the support of feature UeMobility. |
| 22 | EnPerformanceData | This feature indicates support for the enhancements of performance data. This feature requires the support of the PerformanceData feature. |
| 23 | UeCommunicationExt\_eNA | This feature indicates support for the enhancements of UE Communication, including support of ordering criterion. Supporting this feature also requires the support of UeCommunication feature. |
| 24 | ServiceExperienceExt2\_eNA | This feature indicates support for the extensions to the event related to service experience supporting eNA, including Service Experience Contribution Weights. Supporting this feature also requires the support of feature ServiceExperience. |
| 25 | EnhDataMgmt | Indicates the support of enhanced data management mechanisms. Supporting this feature also requires the support of feature EneNA. |
| 26 | ExtEventFilters | Indicates support of extended AF event filters. |
| 27 | DataVolTransferTime | This feature indicates support for the event related to data volume transfer time. |
| 28 | MSEventExposure | This feature indicates the support for Media Streaming event exposure.This feature is recommended to be implemented to avoid the usage of the deprecated attributes. |
| 29 | PerEventRepReq | This feature indicates the support of the per-event reporting requirements management functionality.The following functionalities are supported:- Provisioning/updating the reporting requirements on a per subscribed event granularity. |
| 30 | RelativeProximity | This feature indicates the support of providing confidence information of the relative proximity data. Supporting this feature requires the support of the CollectiveBehaviour feature. |
| 31 | AppActiveTime | This feature indicates the support for the application activation time data collection functionality. |

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

# A.2 Naf\_EventExposure API

openapi: 3.0.0

info:

 version: 1.4.0-alpha.1

 title: Naf\_EventExposure

 description: |

 AF Event Exposure Service.

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externalDocs:

 description: >

 3GPP TS 29.517 V19.0.0; 5G System; Application Function Event Exposure Service; Stage 3.

 url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.517/

servers:

 - url: '{apiRoot}/naf-eventexposure/v1'

 variables:

 apiRoot:

 default: https://example.com

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

security:

 - {}

 - oAuth2ClientCredentials: []

paths:

 /subscriptions:

 post:

 summary: Creates a new Individual Application Event Exposure Subscription resource

 operationId: PostAfEventExposureSubsc

 tags:

 - Application Event Subscription (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Success

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the created individual application event subscription resource

 required: true

 schema:

 type: string

 '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:

 AfEventExposureNotif:

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

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: No Content, Notification was successful

 '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}:

 get:

 summary: "Reads an existing Individual Application Event Subscription"

 operationId: GetAfEventExposureSubsc

 tags:

 - Individual Application Event Subscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: Application Event Subscription ID

 required: true

 schema:

 type: string

 - name: supp-feat

 in: query

 description: Features supported by the NF service consumer

 required: false

 schema:

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

 responses:

 '200':

 description: OK. Resource representation is returned

 content:

 application/json:

 schema:

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

 '307':

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

 '308':

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

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 '406':

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

 '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'

 put:

 summary: "Modifies an existing Individual Application Event Subscription "

 operationId: PutAfEventExposureSubsc

 tags:

 - Individual Application Event Subscription (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: subscriptionId

 in: path

 description: Application Event Subscription ID

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Resource was successfully modified and representation is returned

 content:

 application/json:

 schema:

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

 '204':

 description: No Content. Resource was successfully modified

 '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'

 delete:

 summary: "Cancels an existing Individual Application Event Subscription "

 operationId: DeleteAfEventExposureSubsc

 tags:

 - Individual Application Event Subscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: Application Event Subscription ID

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No Content. Resource was successfully 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'

 '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: '{tokenUri}'

 scopes: {}

 description: >

 For trusted AF, the 'naf-eventexposure' shall be used as 'scopes' and

 '{nrfApiRoot}/oauth2/token' shall be used as 'tokenUri'.

 schemas:

 AfEventExposureNotif:

 description: >

 Represents notifications on application event(s) that occurred for an Individual Application

 Event Subscription resource.

 type: object

 properties:

 notifId:

 type: string

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 required:

 - notifId

 - eventNotifs

 AfEventExposureSubsc:

 description: Represents an Individual Application Event Subscription resource.

 type: object

 properties:

 dataAccProfId:

 type: string

 eventsSubs:

 type: array

 items:

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

 minItems: 1

 eventsRepInfo:

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

 notifUri:

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

 notifId:

 type: string

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 suppFeat:

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

 required:

 - eventsSubs

 - eventsRepInfo

 - notifId

 - notifUri

 AfEventNotification:

 description: Represents information related to an event to be reported.

 type: object

 properties:

 event:

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

 timeStamp:

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

 svcExprcInfos:

 type: array

 items:

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

 minItems: 1

 ueMobilityInfos:

 type: array

 items:

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

 minItems: 1

 ueCommInfos:

 type: array

 items:

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

 minItems: 1

 excepInfos:

 type: array

 items:

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

 minItems: 1

 congestionInfos:

 type: array

 items:

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

 minItems: 1

 perfDataInfos:

 type: array

 items:

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

 minItems: 1

 dispersionInfos:

 type: array

 items:

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

 minItems: 1

 collBhvrInfs:

 type: array

 items:

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

 minItems: 1

 msQoeMetrInfos:

 type: array

 items:

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

 minItems: 1

 deprecated: true

 msQoeMetrics:

 type: array

 items:

 $ref: 'TS26512\_EventExposure.yaml#/components/schemas/QoEMetricsCollection'

 minItems: 1

 description: Represents the Media Streaming QoE metrics event records.

 msConsumpInfos:

 type: array

 items:

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

 minItems: 1

 deprecated: true

 msConsumpRpts:

 type: array

 items:

 $ref: 'TS26512\_EventExposure.yaml#/components/schemas/ConsumptionReportingUnitsCollection'

 minItems: 1

 description: Represents the Media Streaming Consumption event records.

 msNetAssInvInfos:

 type: array

 items:

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

 minItems: 1

 deprecated: true

 msNetAssistInvs:

 type: array

 items:

 $ref: 'TS26512\_EventExposure.yaml#/components/schemas/NetworkAssistanceInvocationsCollection'

 minItems: 1

 description: >

 Represents the Media Streaming Network Assistance Invocations event records.

 msDynPlyInvInfos:

 type: array

 items:

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

 minItems: 1

 deprecated: true

 msDynPlyInvs:

 type: array

 items:

 $ref: 'TS26512\_EventExposure.yaml#/components/schemas/DynamicPolicyInvocationsCollection'

 minItems: 1

 description: Represents the Media Streaming Dynamic Policy Invocations event records.

 msAccActInfos:

 type: array

 items:

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

 minItems: 1

 deprecated: true

 msAccesses:

 type: array

 items:

 $ref: 'TS26512\_EventExposure.yaml#/components/schemas/MediaStreamingAccessesCollection'

 minItems: 1

 description: Represents the Media Streaming access event records.

 gnssAssistDataInfo:

 $ref: 'TS29591\_Nnef\_EventExposure.yaml#/components/schemas/GNSSAssistDataInfo'

 datVolTransTimeInfos:

 type: array

 items:

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

 minItems: 1

 appActiveTimeInfos:

 type: object

 additionalProperties:

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

 minProperties: 1

 required:

 - event

 - timeStamp

 EventsSubs:

 description: Represents an event to be subscribed and the related event filter information.

 type: object

 properties:

 event:

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

 eventFilter:

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

 eventRepInfo:

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

 required:

 - event

 - eventFilter

 EventFilter:

 description: Represents event filter information for an event.

 type: object

 properties:

 gpsis:

 type: array

 items:

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

 minItems: 1

 supis:

 type: array

 items:

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

 minItems: 1

 exterGroupIds:

 type: array

 items:

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

 minItems: 1

 interGroupIds:

 type: array

 items:

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

 anyUeInd:

 type: boolean

 ueIpAddr:

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

 appIds:

 type: array

 items:

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

 minItems: 1

 locArea:

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

 collAttrs:

 type: array

 items:

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

 minItems: 1

 exceptionReqs:

 type: array

 items:

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

 minItems: 1

 oneOf:

 - required: [gpsis]

 - required: [supis]

 - required: [exterGroupIds]

 - required: [interGroupIds]

 - required: [anyUeInd]

 - required: [ueIpAddr]

 ServiceExperienceInfoPerApp:

 description: Contains service experience information associated with an application.

 type: object

 properties:

 appId:

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

 appServerIns:

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

 svcExpPerFlows:

 type: array

 items:

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

 minItems: 1

 gpsis:

 type: array

 items:

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

 minItems: 1

 supis:

 type: array

 items:

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

 minItems: 1

 contrWeights:

 type: array

 items:

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

 minItems: 1

 required:

 - svcExpPerFlows

 ServiceExperienceInfoPerFlow:

 description: Contains service experience information associated with a service flow.

 type: object

 properties:

 svcExprc:

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

 timeIntev:

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

 dnai:

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

 ipTrafficFilter:

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

 ethTrafficFilter:

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

 SvcExperience:

 description: Contains a mean opinion score with the customized range.

 type: object

 properties:

 mos:

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

 upperRange:

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

 lowerRange:

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

 UeMobilityCollection:

 description: >

 Contains UE mobility information associated with an application. If the allAppInd attribute

 is present and set to true, then the value in the appId shall be ignored, which indicates

 the collected UE mobility information is applicable to all the applications for the UE.

 type: object

 properties:

 gpsi:

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

 supi:

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

 appId:

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

 allAppInd:

 type: boolean

 description: >

 Indicates applicable to all applications if set to true, otherwise set to false.

 Default value is false if omitted.

 ueTrajs:

 type: array

 items:

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

 minItems: 1

 areas:

 type: array

 items:

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

 minItems: 1

 required:

 - appId

 - ueTrajs

 UeCommunicationCollection:

 description: Contains UE communication information associated with an application.

 type: object

 properties:

 gpsi:

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

 supi:

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

 exterGroupId:

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

 interGroupId:

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

 appId:

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

 expectedUeBehavePara:

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

 comms:

 type: array

 items:

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

 minItems: 1

 required:

 - appId

 - comms

 UeTrajectoryCollection:

 description: Contains UE trajectory information associated with an application.

 type: object

 properties:

 ts:

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

 locArea:

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

 required:

 - ts

 - locArea

 CommunicationCollection:

 description: Contains communication information.

 type: object

 properties:

 startTime:

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

 endTime:

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

 ulVol:

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

 dlVol:

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

 required:

 - startTime

 - endTime

 - ulVol

 - dlVol

 ExceptionInfo:

 description: Represents the exceptions information provided by the AF.

 type: object

 properties:

 ipTrafficFilter:

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

 ethTrafficFilter:

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

 exceps:

 type: array

 items:

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

 minItems: 1

 required:

 - exceps

 oneOf:

 - required: [ipTrafficFilter]

 - required: [ethTrafficFilter]

 UserDataCongestionCollection:

 description: Contains User Data Congestion Analytics related information collection.

 type: object

 properties:

 appId:

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

 ipTrafficFilter:

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

 timeInterv:

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

 thrputUl:

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

 thrputDl:

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

 thrputPkUl:

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

 thrputPkDl:

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

 oneOf:

 - required: [appId]

 - required: [ipTrafficFilter]

 PerformanceDataCollection:

 description: Contains Performance Data Analytics related information collection.

 type: object

 properties:

 appId:

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

 ueIpAddr:

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

 ipTrafficFilter:

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

 ueLoc:

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

 appLocs:

 type: array

 items:

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

 minItems: 1

 asAddr:

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

 perfData:

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

 timeStamp:

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

 required:

 - perfData

 - timeStamp

 PerformanceData:

 description: Contains Performance Data.

 type: object

 properties:

 pdb:

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

 pdbDl:

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

 maxPdbUl:

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

 maxPdbDl:

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

 plr:

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

 plrDl:

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

 maxPlrUl:

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

 maxPlrDl:

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

 thrputUl:

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

 maxThrputUl:

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

 minThrputUl:

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

 thrputDl:

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

 maxThrputDl:

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

 minThrputDl:

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

 AddrFqdn:

 description: IP address and/or FQDN.

 type: object

 properties:

 ipAddr:

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

 fqdn:

 type: string

 description: Indicates an FQDN.

 DispersionCollection:

 description: Contains the dispersion information collected for an AF.

 type: object

 properties:

 gpsi:

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

 supi:

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

 ueAddr:

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

 timeStamp:

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

 dataUsage:

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

 flowDesp:

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

 appId:

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

 dnais:

 type: array

 items:

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

 minItems: 1

 appDur:

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

 required:

 - dataUsage

 oneOf:

 - required: [gpsi]

 - required: [supi]

 - required: [ueAddr]

 CollectiveBehaviourFilter:

 description: Contains the collective behaviour filter information to be collected from UE.

 type: object

 properties:

 type:

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

 value:

 type: string

 description: Value of the parameter type as in the type attribute.

 collBehAttr:

 type: array

 items:

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

 minItems: 1

 description: >

 Contains the values of collective behaviour attributes at least one of which shall

 match for an AF event to be sent.

 dataProcType:

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

 listOfUeInd:

 type: boolean

 description: >

 Indicates whether request list of UE IDs that fulfill a collective behaviour within the

 area of interest. This attribute shall set to "true" if request the list of UE IDs,

 otherwise, set to "false". May only be present and sets to "true" if "AfEvent" sets to

 "COLLECTIVE\_BEHAVIOUR".

 required:

 - type

 - value

 CollectiveBehaviourInfo:

 description: Contains the collective behaviour information to be reported to the subscriber.

 type: object

 properties:

 colAttrib:

 type: array

 items:

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

 minItems: 1

 noOfUes:

 type: integer

 description: Total number of UEs that fulfil a collective within the area of interest.

 appIds:

 type: array

 items:

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

 minItems: 1

 extUeIds:

 type: array

 items:

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

 minItems: 1

 ueIds:

 type: array

 items:

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

 minItems: 1

 collisionDist:

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

 absDirs:

 type: array

 items:

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

 minItems: 1

 relDirs:

 type: array

 items:

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

 minItems: 1

 ueTrajectory:

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

 confidence:

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

 oneOf:

 - required: [extUeIds]

 - required: [ueIds]

 PerUeAttribute:

 description: UE application data collected per UE.

 type: object

 properties:

 ueDest:

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

 route:

 type: string

 avgSpeed:

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

 timeOfArrival:

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

 MsQoeMetricsCollection:

 description: >

 Contains the Media Streaming QoE metrics information collected for an UE Application via AF.

 type: object

 properties:

 msQoeMetrics:

 type: array

 items:

 type: string

 minItems: 1

 required:

 - msQoeMetrics

 MsConsumptionCollection:

 description: >

 Contains the Media Streaming Consumption information collected for an UE Application via AF.

 type: object

 properties:

 msConsumps:

 type: array

 items:

 type: string

 description: >

 Represents the Media Streaming Consumption reports with formatting as specified in

 clause 11.3.3 of 3GPP TS 26.512 [30], if required for Media Streaming UE Application.

 minItems: 1

 required:

 - msConsumps

 MsNetAssInvocationCollection:

 description: >

 Contains the Media Streaming Network Assistance invocation collected for an UE Application

 via AF.

 type: object

 properties:

 msNetAssInvocs:

 type: array

 items:

 $ref: 'TS26512\_M5\_NetworkAssistance.yaml#/components/schemas/NetworkAssistanceSession'

 minItems: 1

 required:

 - msNetAssInvocs

 MsDynPolicyInvocationCollection:

 description: >

 Contains the Media Streaming Dynamic Policy invocation collected for an UE

 Application via AF.

 type: object

 properties:

 msDynPlyInvocs:

 type: array

 items:

 $ref: 'TS26512\_M5\_DynamicPolicies.yaml#/components/schemas/DynamicPolicy'

 minItems: 1

 required:

 - msDynPlyInvocs

 MSAccessActivityCollection:

 description: Contains Media Streaming access activity collected for an UE Application via AF.

 type: object

 properties:

 msAccActs:

 type: array

 items:

 $ref: 'TS26512\_R4\_DataReporting.yaml#/components/schemas/MediaStreamingAccessRecord'

 minItems: 1

 required:

 - msAccActs

 DatVolTransTimeCollection:

 description: Contains the collective data volume transfer time information to be reported to the subscriber.

 type: object

 properties:

 appId:

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

 appServerInst:

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

 gpsi:

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

 supi:

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

 ulTransVol:

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

 dlTransVol:

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

 ulTransTimeDur:

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

 dlTransTimeDur:

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

 anyOf:

 - anyOf:

 - required: [ulTransVol]

 - required: [dlTransVol]

 - anyOf:

 - required: [ulTransTimeDur]

 - required: [dlTransTimeDur]

 AppActiveTimeInfo:

 description: Contains the activation time information of the application.

 type: object

 properties:

 appId:

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

 activeTimeInfos:

 type: array

 items:

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

 minItems: 1

 required:

 - appId

 - activeTimeInfos

 ActiveTimeInfo:

 description: Contains the activation time information.

 type: object

 properties:

 ueNum:

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

 gpsis:

 type: array

 items:

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

 minItems: 1

 supis:

 type: array

 items:

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

 minItems: 1

 exterGroupIds:

 type: array

 items:

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

 minItems: 1

 interGroupIds:

 type: array

 items:

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

 minItems: 1

 activeTime:

 type: array

 items:

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

 minItems: 1

 inactiveTime:

 type: array

 items:

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

 minItems: 1

 anyOf:

 - required: [activeTime]

 - required: [inactiveTime]

# Simple data types and Enumerations

 AfEvent:

 anyOf:

 - type: string

 enum:

 - SVC\_EXPERIENCE

 - UE\_MOBILITY

 - UE\_COMM

 - EXCEPTIONS

 - USER\_DATA\_CONGESTION

 - PERF\_DATA

 - DISPERSION

 - COLLECTIVE\_BEHAVIOUR

 - MS\_QOE\_METRICS

 - MS\_CONSUMPTION

 - MS\_NET\_ASSIST\_INVOCATION

 - MS\_DYN\_POLICY\_INVOCATION

 - MS\_ACCESS\_ACTIVITY

 - GNSS\_ASSISTANCE\_DATA

 - DATA\_VOLUME\_TRANSFER\_TIME

 - APP\_ACTIVE\_TIME

 - type: string

 description: >

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

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

 description: |

 Represents an application's event.

 Possible values are:

 - SVC\_EXPERIENCE: Indicates that the subscribed/notified event is service experience

 information for an application.

 - UE\_MOBILITY: Indicates that the subscribed/notified event is UE mobility information.

 - UE\_COMM: Indicates that the subscribed/notified event is UE communication information.

 - EXCEPTIONS: Indicates that the subscribed/notified event is exceptions information.

 - USER\_DATA\_CONGESTION: Indicates that the subscribed/notified event is user data congestion

 analytics related information.

 - PERF\_DATA: Indicates that the subscribed/notified event is performance data information.

 - DISPERSION: Indicates that the subscribed/notified event is dispersion information.

 - COLLECTIVE\_BEHAVIOUR: Indicates that the subscribed/notified event is collective behaviour

 information.

 - MS\_QOE\_METRICS: Indicates that the subscribed/notified event is Media Streaming QoE

 metrics.

 - MS\_CONSUMPTION: Indicates that the subscribed/notified event is Media Streaming

 consumption reports.

 - MS\_NET\_ASSIST\_INVOCATION: Indicates that the subscribed/notified event is Media Streaming

 network assistance invocation.

 - MS\_DYN\_POLICY\_INVOCATION: Indicates that the subscribed/notified event is Media Streaming

 dynamic policy invocation.

 - MS\_ACCESS\_ACTIVITY: Indicates that the subscribed/notified event is Media Streaming access

 activity.

 - GNSS\_ASSISTANCE\_DATA: Indicates that the subscribed/notified event is GNSS Assistance Data

 Collection.

 - DATA\_VOLUME\_TRANSFER\_TIME: Indicates that the event subscribed is data volume transfer

 time information.

 - APP\_ACTIVE\_TIME: Indicates that the event subscribed is application activation time

 information.

 CollectiveBehaviourFilterType:

 anyOf:

 - type: string

 enum:

 - COLLECTIVE\_ATTRIBUTE

 - DATA\_PROCESSING

 - 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 parameter type for collective behaviour information filtering.

 Possible values are:

 - COLLECTIVE\_ATTRIBUTE: Indicates that the parameter type is collective attributes.

 - DATA\_PROCESSING: Indicates that the parameter type is data processing.

 DataProcessingType:

 description: Represents a type of data processing.

 anyOf:

 - type: string

 enum:

 - AGGREGATION

 - NORMALIZATION

 - ANONYMIZATION

 - 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.

 RelativeDirection:

 anyOf:

 - type: string

 enum:

 - ABOVE

 - BELOW

 - LEFT

 - RIGHT

 - BEFORE

 - AFTER

 - 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 an application's event.

 Possible values are:

 - ABOVE: Indicates that UE movement with respect to another UE is above.

 - BELOW: Indicates that UE movement with respect to another UE is below.

 - LEFT: Indicates that UE movement with respect to another UE is left.

 - RIGHT: Indicates that UE movement with respect to another UE is right.

 - BEFORE: Indicates that UE movement with respect to another UE is before.

 - AFTER: Indicates that UE movement with respect to another UE is after.

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