**3GPP TSG-CT3 Meeting #118-e *C3-215174***

**Online, , 11th Oct 2021 - 15th Oct 2021**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **29.520** | **CR** | **0328** | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Analytics info context transfer operation data model and OpenAPI |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Ericsson |
| ***Source to TSG:*** | C3 |
|  |  |
| ***Work item code:*** | eNA\_Ph2 |  | ***Date:*** | 2021-09-30 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | TS 23.288 clause 6.1B has specified how to perform transfer of context related to analytics subscriptions, with the respective functionality added via a new service operation (Nnwdaf\_AnalyticsInfo\_ContextTransfer, see TS 23.288 clause 7.3.3). This needs to be implemented by extending the Nnwdaf\_AnalyticsInfo API accordingly. |
|  |  |
| ***Summary of change:*** | Implemented the required data models and OpenAPI to enable the transfer of context of analytics subscriptions. |
|  |  |
| ***Consequences if not approved:*** | Stage 2 requirements not fulfilled. |
|  |  |
| ***Clauses affected:*** | 3.2, 5.2.6.1, 5.2.6.2.Z (new subclause), 5.2.6.2.N (new subclause), 5.2.6.2.M (new subclause), 5.2.6.2.P (new subclause), 5.2.6.2.Q (new subclause), 5.2.6.2.R (new subclause), 5.2.6.3.L (new subclause), 5.2.6.3.S (new subclause), A.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR introduces a backwards compatible feature in the OpenAPI file of the Nnwdaf\_AnalyticsInfo API. |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5QI 5G QoS Identifier

ADRF Analytics Data Repository Function

AF Application Function

AMF Access and Mobility Management Function

API Application Programming Interface

CEF Charging Enablement Function

DCCF Data Collection Coordination Function

DNN Data Network Name

GFBR Guaranteed Flow Bit Rate

HTTP Hypertext Transfer Protocol

JSON JavaScript Object Notation

MFAF Messaging Framework Adaptor Function

ML Machine Learning

MTLF Model Training Logical Function

NEF Network Exposure Function

NF Network Function

NRF Network Repository Function

NSSF Network Slice Selection Function

NWDAF Network Data Analytics Function

OAM Operation, Administration, and Maintenance

PCF Policy Control Function

SUPI Subscription Permanent Identifier

S-NSSAI Single Network Slice Selection Assistance Information

SMF Session Management Function

UDM Unified Data Management

UPF User Plane Function

URI Uniform Resource Identifier

UTC Universal Time Coordinated

\* \* \* \* Next change \* \* \* \*

#### 5.2.6.1 General

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

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

Table 5.2.6.1-1: Nnwdaf\_AnalyticsInfo specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| AdditionInfoAnalyticsInfoRequest | 5.2.6.2.5 | Contains more details (not only the ProblemDetails) in case an Nnwdaf\_AnalyticsInfo request is rejected. | EneNA |
| AdrfDataType | 5.2.6.3.S | Represents a type of data that is stored in the ADRF. | EneNA |
| AnalyticsData | 5.2.6.2.2 | Describes analytics with parameters indicated in the request. |  |
| ContextData | 5.2.6.2.Z | Contains context information related to analytics subscriptions corresponding with one or more context identifiers. | EneNA |
| ContextElement | 5.2.6.2.N | Contains context information corresponding with a specific context identifier. | EneNA |
| ContextIdList | 5.2.6.2.M | Contains list of context identifiers of context information of analytics subscriptions. | EneNA |
| ContextType | 5.2.6.3.L | Identfies the type of analytics context information. | EneNA |
| EventFilter | 5.2.6.2.3 | Represents the event filters used to identify the requested analytics. |  |
| EventId | 5.2.6.3.3 | Describes the type of analytics. |  |
| HistoricalData | 5.2.6.2.P | Contains historical data related to an analytics subscription. | EneNA |
| ProblemDetailsAnalyticsInfoRequest | 5.2.6.4.1 | Data type that extends ProblemDetails. | EneNA |
| RequestedContext | 5.2.6.2.R | Contains types of analytics context information. | EneNA |
| SpecificAnalyticsSubscription | 5.2.6.2.Q | Represents an existing subscription for a specific type of analytics to a specific NWDAF. | EneNA |
|  |  |  |  |

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

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

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AnalyticsContextIdentifier | 5.1.6.2.PP | Contains information about the available analytics contexts. | EneNA |
| AnalyticsMetadataInfo | 5.1.6.2.37 | Contains analytics metadata information required for analytics aggregation. | Aggregation |
| AnySlice | 5.1.6.3.2 |  |  |
| ApplicationId | 3GPP TS 29.571 [8] | Identifies the application. | ServiceExperience UeCommunicationAbnormalBehaviour |
| BwRequirement | 5.1.6.2.25 |  | ServiceExperience |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperience AbnormalBehaviourUeCommunication |
| Dnai | 3GPP TS 29.571 [8] | Identifies a user plane access to one or more DN(s). | ServiceExperience |
| EventNotification | 5.1.6.2.5 | Describes Notifications about events that occurred. | EneNA |
| EventReportingRequirement | 5.1.6.2.7 |  |  |
| ExceptionId | 5.1.6.3.6 |  | AbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [23] |  | AbnormalBehaviour |
| ExpectedAnalyticsType | 5.1.6.3.11 |  | AbnormalBehaviour |
| GroupId | 3GPP TS 29.571 [8] | Internal Group Identifier of a group of UEs. | UeMobilityUeCommunicationNetworkPerformance AbnormalBehaviourServiceExperience |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | The network area information. | UeMobilityNetworkPerformanceQoSSustainabilityServiceExperienceUserDataCongestionAbnormalBehaviour NsiLoadExt |
| NetworkPerfInfo | 5.1.6.2.23 |  | NetworkPerformance |
| NetworkPerfType | 5.1.6.3.10 | Represents the network performance types. | NetworkPerformance |
| NfLoadLevelInformation | 5.1.6.2.31  | Represents load level information of a given NF instance.  | NfLoad |
| NfInstanceId | 3GPP TS 29.571 [8] | Identifies an NF instance | NfLoad |
| NfSetId | 3GPP TS 29.571 [8] | Identifies an NF Set instance. | NfLoad |
| NFType | 3GPP TS 29.510 [12] | Indentifies a type of NF. | NfLoad |
| NsiId | 3GPP TS 29.531 [24] | Identifies a Network Slice Instance. | ServiceExperienceNsiLoad NsiLoadExt |
| NsiIdInfo | 5.1.6.2.33 | Identify the S-NSSAI and the associated Network Slice Instance(s). | ServiceExperienceNsiLoad NsiLoadExt |
| NsiLoadLevelInfo | 5.1.6.2.34 | Represents the load level information for an S-NSSAI and the associated network slice instance. | NsiLoad NsiLoadExt |
| NwdafEvent | 5.1.6.3.4 | Describes the NWDAF Events. | EneNA |
| NwdafEventsSubscription | 5.1.6.2.2 | Represents an Individual NWDAF Event Subscription resource. | EneNA |
| ProblemDetails | 3GPP TS 29.571 [8] | Used in error responses to provide more detailed information about an error. |  |
| QosRequirement | 5.1.6.2.20 |  | QoSSustainability |
| QosSustainabilityInfo | 5.1.6.2.19 |  | QoSSustainability |
| SamplingRatio | 3GPP TS 29.571 [8] |  |  |
| ServiceExperienceInfo | 5.1.6.2.24 |  | ServiceExperience |
| Supi | 3GPP TS 29.571 [8] | Identifies the UE. | ServiceExperience,NfLoadNetworkPerformanceUserDataCongestionUeMobilityUeCommunicationAbnormalBehaviour |
| SupportedFeatures | 3GPP TS 29.571 [8] | Used to negotiate the applicability of the optional features defined in table 5.2.8-1. |  |
| Snssai | 3GPP TS 29.571 [8] |  |  |
| SliceLoadLevelInformation | 5.1.6.2.6 |  |  |
| TargetUeInformation | 5.1.6.2.8 | Identifies the target UE information. | ServiceExperienceNfLoadNetworkPerformanceUserDataCongestionUserDataCongestionExtUeMobilityUeCommunicationAbnormalBehaviourQoSSustainability |
| UeCommunication | 5.1.6.2.13 |  | UeCommunication |
| UeMobility | 5.1.6.2.10 |  | UeMobility |
| Uinteger | 3GPP TS 29.571 [8] | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible. |  |
| UserDataCongestionInfo | 5.1.6.2.17 |  | UserDataCongestion |
| AbnormalBehaviour | 5.1.6.2.15 | Represents the abnormal behaviour information. | AbnormalBehaviour |

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.2.Z Type ContextData

Table 5.2.6.2.Z-1: Definition of type ContextData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| contextElems | array(ContextElement) | M | 1..N | List of items that contain context information corresponding with a context identifier. |  |

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.2.N Type ContextElement

Table 5.2.6.2.N-1: Definition of type ContextElement

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| contextId | AnalyticsContextIdentifier | M | 1 | Context identifier of the context information contained in the rest of the attributes. |  |
| pendAnalytics | array(EventNotification) | C | 1..N | Contains output analytics for the analytics subscription this context element is associated with, which have not yet been sent to the analytics consumer. It shall be provided if such analytics are available and the NF service consumer has requested the "PENDING\_ANALYTICS" context type. |  |
| histAnalytics | array(EventNotification) | C | 1..N | Contains historical output analytics for the analytics subscription this context element is associated with. It shall be provided if such analytics are available and the NF service consumer has requested the "HISTORICAL\_ANALYTICS" context type. |  |
| lastOutputTime | DateTime | C | 0..1 | Timestamp of the last output analytics provided to the analytics consumer. It shall be provided if output analytics had been provided and the NF service consumer has requested the "PENDING\_ANALYTICS" and/or "HISTORICAL\_ANALYTICS" context type. Absence of this attribute means that no output analytics had been sent. |  |
| aggrSubs | array(SpecificAnalyticsSubscription) | C | 1..N | Contains analytics subscription aggregation information, i.e. information about analytics subscriptions that the NWDAF has with other NWDAFs that collectively serve an analytics subscription. It shall be provided if such subscriptions exist and the NF service consumer has requested the "AGGR\_SUBS" context type. |  |
| histData | array(HistoricalData) | C | 1..N | Contains historical data related to the analytics subscription this context element is associated with. It shall be provided if such data exists and the NF service consumer has requested the "DATA" context type. |  |
| adrfId | NfInstanceId | O | 0..1 | Identifier of the ADRF in which the NWDAF stores analytics context information. |  |
| adrfDataTypes | array(AdrfDataType) | C | 1..N | Type(s) of data stored in the ADRF by the NWDAF. It shall be provided if the attribute "adrfId" is provided. |  |
| aggrNwdafIds | array(NfInstanceId) | C | 1..N | NWDAF identifiers of NWDAF instances used by the NWDAF service consumer when aggregating multiple analytics subscriptions. It shall be provided if such information is available and the NF service consumer has requested the "AGGR\_INFO" context type. |  |
| modelProvIds | array(NfInstanceId) | C | 1..N | Instance ID(s) of the ML model provider NWDAF(s) from which the consumer NWDAF currently subscribes to the ML model information used for the analytics. It shall be provided if such information is available and the NF service consumer has requested the "ML\_MODELS" context type. |  |

Editor's Note: It is FFS to add the information about subscriptions with the data sources that are related to the analytics.

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.2.M Type ContextIdList

Table 5.2.6.2.M-1: Definition of type ContextIdList

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| contextIds | array(AnalyticsContextIdentifier) | M | 1..N | List of context identifiers of context information of analytics subscriptions. |  |

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.2.P Type HistoricalData

Table 5.2.6.2.P-1: Definition of type HistoricalData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| startTime | DateTime | O | 0..1 | Start of the time period during which the data was collected. |  |
| endTime | DateTime | O | 0..1 | End of the time period during which the data was collected. |  |
| sources | array(NfInstanceId) | O | 1..N | Identifier(s) of the data source(s). |  |
| subsWithSources | string | O | 1..N | Information about subscriptions with the data sources. |  |
| data | array(string) | M | 1..N | Historical data related to the analytics. |  |

Editor’s Note: The data type and the details of "data" are FFS, to be designed in line with the relevant parts of the DCCF and ADRF APIs.

Editor’s Note: The data type and the details of "subsWithSources" are FFS, pending clarification of the intended content and scope.

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.2.Q Type SpecificAnalyticsSubscription

Table 5.2.6.2.Q-1: Definition of type SpecificAnalyticsSubscription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| subscriptionId | string | M | 1 | The identifier of the specific analytics subscription. |  |
| producerId | NfInstanceId | O | 0..1 | NWDAF instance identifier to which the NF service consumer has established this subscription. (NOTE) |  |
| producerSetId | NfSetId | O | 0..1 | NWDAF set identifier to which the NF service consumer has established this subscription. (NOTE) |  |
| nwdafEvSub | NwdafEventsSubscription | M | 1 | Contains information about the analytics subscription. |  |
| NOTE: One of "producerId" and "producerSetId" shall be included. |

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.2.R Type RequestedContext

Table 5.2.6.2.R-1: Definition of type RequestedContext

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| contexts | array(ContextType) | M | 1..N | Contains the types of the analytics context information the consumer wishes to receive. |  |

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.3.L Enumeration: ContextType

Table 5.2.6.3.L-1: Enumeration ContextType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| PENDING\_ANALYTICS | Represents context information that relates to pending output analytics. |  |
| HISTORICAL\_ANALYTICS | Represents context information that relates to historical output analytics. |  |
| AGGR\_SUBS | Represents context information about the analytics subscriptions that an NWDAF has with other NWDAFs that collectively serve an analytics subscription. |  |
| DATA | Represents context information about historical data that is available.  |  |
| AGGR\_INFO | Represents context information that is related to aggregation of analytics from multiple NWDAF subscriptions. |  |
| ML\_MODELS | Represents context information about used ML models. |  |

\* \* \* \* Next change \* \* \* \*

##### 5.2.6.3.S Enumeration: AdrfDataType

Table 5.2.6.3.S-1: Enumeration AdrfDataType

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| HISTORICAL\_ANALYTICS | Indicates that historical analytics are stored in the ARDF. |  |
| HISTORICAL\_DATA | Indicates that historical data are stored in the ARDF. |  |

\* \* \* \* Next change \* \* \* \*

# A.3 Nnwdaf\_AnalyticsInfo API

openapi: 3.0.0

info:

 version: 1.2.0-alpha.4

 title: Nnwdaf\_AnalyticsInfo

 description: |

 Nnwdaf\_AnalyticsInfo Service API.

 © 2021, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

 All rights reserved.

externalDocs:

 description: 3GPP TS 29.520 V17.4.0; 5G System; Network Data Analytics Services.

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

security:

 - {}

 - oAuth2ClientCredentials:

 - nnwdaf-analyticsinfo

servers:

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

 variables:

 apiRoot:

 default: https://example.com

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

paths:

 /analytics:

 get:

 summary: Read a NWDAF Analytics

 operationId: GetNWDAFAnalytics

 tags:

 - NWDAF Analytics (Document)

 parameters:

 - name: event-id

 in: query

 description: Identify the analytics.

 required: true

 schema:

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

 - name: ana-req

 in: query

 description: Identifies the analytics reporting requirement information.

 required: false

 content:

 application/json:

 schema:

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

 - name: event-filter

 in: query

 description: Identify the analytics.

 required: false

 content:

 application/json:

 schema:

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

 - name: supported-features

 in: query

 description: To filter irrelevant responses related to unsupported features

 schema:

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

 - name: tgt-ue

 in: query

 description: Identify the target UE information.

 required: false

 content:

 application/json:

 schema:

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

 responses:

 '200':

 description: Containing the analytics with parameters as relevant for the requesting NF service consumer.

 content:

 application/json:

 schema:

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

 '204':

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

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 content:

 application/problem+json:

 schema:

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

 '406':

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

 '414':

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

 '429':

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

 '500':

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

 content:

 application/problem+json:

 schema:

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

 '503':

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

 default:

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

 /context:

 get:

 summary: Get context information related to analytics subscriptions.

 operationId: GetNwdafContext

 tags:

 - NWDAF Context (Document)

 parameters:

 - name: context-ids

 in: query

 description: Identifies specific context information related to analytics subscriptions.

 required: true

 content:

 application/json:

 schema:

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

 - name: req-context

 in: query

 description: Identfies the type(s) of the analytics context information the consumer wishes to receive.

 required: false

 content:

 application/json:

 schema:

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

 responses:

 '200':

 description: Contains context information related to analytics subscriptions corresponding with one or more context identifiers.

 content:

 application/json:

 schema:

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

 '204':

 description: No Content (No context information could be retrieved for the requested context identifiers).

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 '406':

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

 '414':

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

 '429':

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

 '500':

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

 '503':

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

 default:

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

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 nnwdaf-analyticsinfo: Access to the Nnwdaf\_AnalyticsInfo API

 schemas:

 AnalyticsData:

 description: Represents the description of analytics with parameters as relevant for the requesting NF service consumer.

 type: object

 properties:

 start:

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

 expiry:

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

 timeStampGen:

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

 anaMetaInfo:

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

 sliceLoadLevelInfos:

 type: array

 items:

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

 minItems: 1

 description: The slices and their load level information.

 nsiLoadLevelInfos:

 type: array

 items:

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

 minItems: 1

 nfLoadLevelInfos:

 type: array

 items:

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

 minItems: 1

 nwPerfs:

 type: array

 items:

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

 minItems: 1

 svcExps:

 type: array

 items:

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

 minItems: 1

 qosSustainInfos:

 type: array

 items:

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

 minItems: 1

 ueMobs:

 type: array

 items:

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

 minItems: 1

 ueComms:

 type: array

 items:

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

 minItems: 1

 userDataCongInfos:

 type: array

 items:

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

 minItems: 1

 abnorBehavrs:

 type: array

 items:

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

 minItems: 1

 suppFeat:

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

 EventFilter:

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

 type: object

 properties:

 anySlice:

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

 snssais:

 type: array

 items:

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

 minItems: 1

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

 appIds:

 type: array

 items:

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

 minItems: 1

 dnns:

 type: array

 items:

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

 minItems: 1

 dnais:

 type: array

 items:

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

 minItems: 1

 networkArea:

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

 topAppListUlInd:

 type: boolean

 description: Indicates that the list of top applications that contribute the most to the traffic in Uplink direction is requested, if it is included and set to "true". Default value is "false".

 topAppListDlReq:

 type: boolean

 description: Indicates that the list of top applications that contribute the most to the traffic in Downlink direction is requested, if it is included and set to "true". Default value is "false".

 nfInstanceIds:

 type: array

 items:

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

 minItems: 1

 nfSetIds:

 type: array

 items:

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

 minItems: 1

 nfTypes:

 type: array

 items:

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

 minItems: 1

 nsiIdInfos:

 type: array

 items:

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

 minItems: 1

 qosRequ:

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

 nwPerfTypes:

 type: array

 items:

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

 minItems: 1

 bwRequs:

 type: array

 items:

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

 minItems: 1

 excepIds:

 type: array

 items:

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

 minItems: 1

 exptAnaType:

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

 exptUeBehav:

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

 not:

 required: [anySlice, snssais]

 ProblemDetailsAnalyticsInfoRequest:

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

 allOf:

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

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

 AdditionInfoAnalyticsInfoRequest:

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

 type: object

 properties:

 rvWaitTime:

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

 ContextData:

 description: Contains context information related to analytics subscriptions corresponding with one or more context identifiers.

 type: object

 properties:

 contextElems:

 type: array

 items:

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

 minItems: 1

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

 required:

 - contextElems

 ContextElement:

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

 type: object

 properties:

 contextId:

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

 pendAnalytics:

 type: array

 items:

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

 minItems: 1

 description: Output analytics for the analytics subscription which have not yet been sent to the analytics consumer.

 histAnalytics:

 type: array

 items:

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

 minItems: 1

 description: Historical output analytics.

 lastOutputTime:

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

 aggrSubs:

 type: array

 items:

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

 minItems: 1

 description: Information about analytics subscriptions that the NWDAF has with other NWDAFs to perform aggregation.

 histData:

 type: array

 items:

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

 minItems: 1

 description: Historical data related to the analytics subscription.

 adrfId:

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

 adrfDataTypes:

 type: array

 items:

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

 minItems: 1

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

 aggrNwdafIds:

 type: array

 items:

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

 minItems: 1

 description: NWDAF identifiers of NWDAF instances used by the NWDAF service consumer when aggregating multiple analytics subscriptions.

 modelProvIds:

 type: array

 items:

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

 minItems: 1

 description: Identifiers of NWDAFs that provide ML models used by the NF service consumer.

 required:

 - contextId

 ContextIdList:

 description: Contains a list of context identifiers of context information of analytics subscriptions.

 type: object

 properties:

 contextIds:

 type: array

 items:

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

 minItems: 1

 required:

 - contextIds

 HistoricalData:

 description: Contains historical data related to an analytics subscription.

 type: object

 properties:

 startTime:

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

 endTime:

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

 subsWithSources:

 type: array

 items:

 type: string

 minItems: 1

 description: Information about subscriptions with the data sources.

 data:

 type: array

 items:

 type: string

 minItems: 1

 description: Historical data related to the analytics.

 required:

 - data

 SpecificAnalyticsSubscription:

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

 type: object

 properties:

 subscriptionId:

 type: string

 producerId:

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

 producerSetId:

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

 nwdafEvSub:

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

 allOf:

 - anyOf:

 - required: [producerId]

 - required: [producerSetId] - required: [subscriptionId]

 - required: [nwdafEvSub]

 RequestedContext:

 description: Contains types of analytics context information.

 type: object

 properties:

 contexts:

 type: array

 items:

 '#/components/schemas/ContextType'

 minItems: 1

 description: List of analytics context types.

 required:

 - contexts

 EventId:

 anyOf:

 - type: string

 enum:

 - LOAD\_LEVEL\_INFORMATION

 - NETWORK\_PERFORMANCE

 - NF\_LOAD

 - SERVICE\_EXPERIENCE

 - UE\_MOBILITY

 - UE\_COMMUNICATION

 - QOS\_SUSTAINABILITY

 - ABNORMAL\_BEHAVIOUR

 - USER\_DATA\_CONGESTION

 - NSI\_LOAD\_LEVEL

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: >

 Possible values are

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

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

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

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

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

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

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

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

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

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

 ContextType:

 anyOf:

 - type: string

 enum:

 - PENDING\_ANALYTICS

 - HISTORICAL\_ANALYTICS

 - AGGR\_SUBS

 - DATA

 - AGGR\_INFO

 - ML\_MODELS

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: >

 Possible values are

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

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

 - AGGR\_SUBS: Represents context information about the analytics subscriptions that an NWDAF has with other NWDAFs that collectively serve an analytics subscription.

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

 - AGGR\_INFO: Represents context information that is related to aggregation of analytics from multiple NWDAF subscriptions.

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

 AdrfDataType:

 anyOf:

 - type: string

 enum:

 - HISTORICAL\_ANALYTICS

 - HISTORICAL\_DATA

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: >

 Possible values are

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

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

\* \* \* \* End of changes \* \* \* \*