**TSG-CT WG3 Meeting #108-e *C3-201396***

**E-Meeting, 19th – 28th February 2020 (Revision of C3-201283)**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **29.520** | **CR** | **0132** | **rev** | **1** | **Current version:** | **16.2.0** |  |
|  |
| *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:***  | Nnwdaf\_AnalyticsInfo API, Support of abnormal behaviour |
|  |  |
| ***Source to WG:*** | Huawei, Orange |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNA |  | ***Date:*** | 2020-02-17 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | The abnormal behaviour analytics type is incompleted defined for Nnwdaf\_AnalyticsInfo API. |
|  |  |
| ***Summary of change:*** | Define abnormal behaviour analytics type according to TS 23.288 subclause 6.7.5. |
|  |  |
| ***Consequences if not approved:*** | Unsupported abnormal behaviour analytics type. |
|  |  |
| ***Clauses affected:*** | 4.3.2.2.2; 5.2.6.1; 5.2.6.2.2; 5.2.6.2.3; A.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS/TR 23.288 CR 0126 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR intriduces backward compatible feature to the OpenAPI file for Nnwdaf\_AnalyticsInfo API. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**…**

**Proposed changes:**

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

##### 4.3.2.2.2 Request and get from NWDAF Analytics information

Figure 4.3.2.2.2-1 shows a scenario where the NF service consumer (e.g. PCF) sends a request to the NWDAF to request and get from NWDAF analytics information (as shown in 3GPP TS 23.288 [17]).



Figure 4.3.2.2.2-1: Requesting a NWDAF Analytics information

The NF service consumer (e.g. PCF) shall invoke the Nnwdaf\_AnalyticsInfo\_Request service operation when requesting the NWDAF analytics information. The NF service consumer shall send an HTTP GET request on the resource URI "{apiRoot}/nnwdaf-analyticsinfo/v1/analytics" representing the "NWDAF Analytics" (as shown in figure 4.3.2.2.2-1, step 1), to request analytics data according to the query parameter value of the "event-id" attribute. In addition, the following information may be provided:

- common reporting requirement in the "ana-req" attribute as follows:

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

2) preferred level of accuracy of the analytics in "accuracy" attribute; and/or

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

For different event types:

- if the event is "LOAD\_LEVEL\_INFORMATION", it shall provide the event specific filter information including identification(s) of the network slice via:

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

2) any slices indication in the "anySlice" attribute.

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

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

2) identification of network slice(s) to which the subscription applies via identification of network slice(s) in the "snssais" attribute or any slices indication in the "anySlice" attribute;

and may provide:

1) event specific filter information in the "event-filter" attribute:

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

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

c) maximum number of analytics entries expected for an analytics report in the "maxAnaEntry" attribute;

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

1) identification of target UE(s) to which the subscription applies by "supi" or "intGroupId" attribute in the "tgt-ue" attribute;

 and may provide:

1) event specific filter information in the "event-filter" attribute:

a) maximum number of analytics entries expected for an analytics report in the "maxAnaEntry" attribute; and

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

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

1) identification of the application as "applicationIds" attribute; and

2) identification of target UE(s) to which the subscription applies by "supi" or "intGroupId" attribute in the "tgt-ue" attribute;

 and may provide:

1) event specific filter information in the "event-filter" attribute:

a) maximum number of analytics entries expected for an analytics report in the "maxAnaEntry" attribute;

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

1) identification of target UE(s) to which the subscription applies by "supi", "intGroupId" or "anyUe" attribute in the "tgt-ue" attribute;

 and may provide:

1) event specific filter information in the "event-filter" attribute:

a) maximum number of analytics entries expected for an analytics report in the "maxAnaEntry" attribute; and

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

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

1) identification of application via identification of application(s) by "appIds" attribute;

2) identification of target UE(s) to which the subscription applies by "supi", "intGroupId" or "anyUeInd" attribute in the "tgt-ue" attribute;

and may provide:

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

2) identification of DNN via identification of Dnn(s) by "dnns" attribute;

3) identification of user plane accesses to one or more DN(s) where applications are deployed via "dnais" attribute;

4) event specific filter information in the "event-filter" attribute:

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

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

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

2) QoS requirements via "qosRequ" attribute;

3) QoS flow retainability threshold by the "qosFlowRetainThresholds" attribute for the 5QI of GBR resource type or RAN UE throughout threshold by the "ranUeThroughputThresholds" attribute for the 5QI of non-GBR resource type.

 and may provide:

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

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

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

2) either the expected analytics type via "exptAnaType" attribute or a list of exception Ids via "exptIds" attribute.

 and may provide:

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

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

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

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

5) expected UE behaviour via "exptUeBehav" attribute.

- if the feature "UserDataCongestion" is supported and the event is "USER\_DATA\_CONGESTION", it shall provide one of the following attributes:

1) identification of network area to which the subscription applies by "networkArea" attribute within the "event-filter" attribute; or

2) identification of UE via "supi" attribute within "tgt-ue" attribute.

Upon the reception of the HTTP GET request, the NWDAF shall:

- analyse the requested analytic data according to the requested event

If the HTTP request message from the NF service consumer is accepted, the NWDAF shall respond with "200 OK" status code with the message body containing the analytics with parameters as relevant for the requesting NF service consumer. The AnalyticsData data structure in the response body shall include:

- analytics with the corresponding information as described in subclause 4.2.2.4.2.

If the request NWDAF Analytics data does not exist, the NWDAF shall respond with "204 No Content".

If the feature "AbnormalBehaviour" is supported and the expected analytics type via "exptAnaType" attribute is received in figure 4.3.2.2.2-1, step 1, the NWDAF shall derive the corresponding Exception Ids from the expected analytics type as follows:

- if "exptAnaType" attribute sets to "MOBILITY", the corresponding list of Exception Ids are "UNEXPECTED\_UE\_LOCATION" and "PING\_PONG\_ACROSS\_CELLS";

- if "exptAnaType" attribute sets to "COMMUN", the corresponding list of Exception Ids are "UNEXPECTED\_LONG\_LIVE\_FLOW", "UNEXPECTED\_LARGE\_RATE\_FLOW", "UNEXPECTED\_WAKEUP", "SUSPICION\_OF\_DDOS\_ATTACK", "WRONG\_DESTINATION\_ADDRESS", "TOO\_FREQUENT\_SERVICE\_ACCESS", "ABNORMAL\_TRAFFIC\_VOLUME" and "UNEXPECTED\_RADIO\_LINK\_FAILURES";

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

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

\*\*\* 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 |
| AnalyticsData | 5.2.6.2.2 | Describes analytics with parameters indicated in the request |  |
| AnalyticsReportingRequirement | 5.2.6.2.4 | Describes the analytics reporting requirement information. |  |
| EventFilter | 5.2.6.2.3 | Also missing in release 15. |  |
| EventId | 5.2.6.3.3 | Describes the type of analytics. |  |

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 |
| Accuracy | 5.1.6.3.5 | Represents the preferred level of accuracy of the analytics. |  |
| AnySlice | 5.1.6.3.2 |  |  |
| ApplicationId | 3GPP TS 29.571 [8] | Identifies the application. | ServiceExperience |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| Dnn | 3GPP TS 29.571 [8] | Identifies the DNN. | ServiceExperience |
| Dnai | 3GPP TS 29.571 [8] | Identifies a user plane access to one or more DN(s) | ServiceExperience |
| ExceptionId | 5.1.6.3.6 |  | AbnormalBehaviour |
| ExpectedUeBehaviourData | 3GPP TS 29.503 [TS29503] |  | AbnormalBehaviour |
| ExpectedAnalyticsType | 5.1.6.3.x |  | AbnormalBehaviour |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | The network area information. | UeMobilityNetworkPerformanceQosSustainabilityServiceExperienceUserDataCongestion |
| NfLoadLevelInformation | FFS | Represents the NFs and their load level information. | NfLoad |
| ProblemDetails | 3GPP TS 29.571 [8] | Used in error responses to provide more detailed information about an error. |  |
| QosRequirement | 5.1.6.2.20 |  |  |
| QosSustainabilityInfo | 5.1.6.2.19 |  |  |
| Supi | 3GPP TS 29.571 [8] | Identifies the UE. |  |
| 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] |  | ServiceExperienceSliceLoadLevel |
| SliceLoadLevelInformation | 5.1.6.2.6 |  |  |
| TargetUeInformation | 5.1.6.2.8 | Identifies the target UE information. |  |
| UeCommunication | 5.1.6.2.12 |  |  |
| UeMobility | 5.1.6.2.9 |  |  |
| UserDataCongestionInfo | 5.1.6.2.17 |  |  |
| AbnormalBehaviour | 5.1.6.2.15 | Represents the abnormal behaviour information. |  |
| Exception | 5.1.6.2.16 | Describes the Exception information. |  |

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

##### 5.2.6.2.2 Type AnalyticsData

Table 5.2.6.2.2-1: Definition of type AnalyticsData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| sliceLoadLevelInfos | array(SliceLoadLevelInformation) | C | 1..N | The slices and the load level information. Shall be present when the requested event is "LOAD\_LEVEL\_INFORMATION". |  |
| networkPerfs | array(NetworkPerformanceInfo) | C | 1..N | The network performance information.Shall be present when the requested event is "NETWORK\_PERFORMANCE". | NetworkPerformance |
| nfLoadLevelInfo | array(NfLoadLevelInformation) | C | 1..N | The NF load information.When subscribed event is "NF\_LOAD", the nfLoadLevelInfo shall be included. | NfLoad |
| qosSustainInfos | array(QosSustainabilityInfo) | C | 1..N | The QoS sustainability informations in the certain geographic areas. It shall present if eventId is "QOS\_SUSTAINABILITY" | QoSSustainability |
| ueMobs | array(UeMobility) | C | 1..N | The UE mobility information.When subscribed event is "UE\_MOBILITY", the "ueMobs" attribute shall be included. | UeMobility |
| ueComms | array(UeCommunication) | C | 1..N | The UE communication information.When subscribed event is "UE\_COMM", the "ueComms" attribute shall be included. | UeCommunication |
| userDataCongInfos | array(UserDataCongestionInfo) | C | 1..N | The user data congestion information.Shall be present when the requested event is "USER\_DATA\_CONGESTION". | UserDataCongestion |
| supportedFeatures | SupportedFeatures | M | 1 | List of Supported features used as described in subclause 5.1.8.This parameter shall be supplied by NWDAF in the reply of GET request that request the analytics resource. |  |
| svcExpInfo | ServiceExperienceInfo(FFS) | C | 1..N | The service experience information.  | ServiceExperience |
| abnorBehavrs | array(AbnormalBehaviour) | C | 1..N | The abnormal behaviour information.  | AbnormalBehaviour |

Editor's note: The data type definition for NetworkPerformanceInfo is FFS.

Editor's note: The data type definition for NfLoadLevelInformation is FFS.

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

##### 5.2.6.2.3 Type EventFilter

Table 5.2.6.2.3-1: Definition of type EventFilter

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| anySlice | AnySlice | C | 0..1 | Default is "FALSE". (NOTE 1) |  |
| appIds | array(ApplicationId) | C | 1..N | Identification(s) of application. It shall be included when eventId is "SERVICE\_EXPERIENCE".  | ServiceExperienceAbnormalBehaviour |
| dnns | array(Dnn) | C | 1..N | Identification(s) of DNN. It may be included when eventId is "SERVICE\_EXPERIENCE". | ServiceExperienceAbnormalBehaviour |
| dnais | array(Dnai) | C | 1..N | Identification(s) of user plane accesses to DN(s) which the subscription applies. It may be included when eventId is "SERVICE\_EXPERIENCE". | ServiceExperience |
| snssais | array(Snssai) | C | 1..N | Identification(s) of network slice to which the subscription belongs. (NOTE 1) |  |
| nfInstanceIds | FFS | O | 1..N | Identification(s) of NF instances. | NfLoad |
| nfSetIds | FFS | O | 1..N | Identification(s) of NF instance sets. | NfLoad |
| nfTypes | FFS | O | 1..N | Identification(s) of NF types. | NfLoad |
| networkArea | NetworkAreaInfo | C | 0..1 | This IE represents the network area where the NF service consumer wants to know the analytics result. (NOTE 2) | UeMobilityNetworkPerformanceQosSustainabilityServiceExperienceUserDataCongestionAbnormalBehaviour |
| maxAnaEntry | Uinteger | O | 0..1 | Maximum number of analytics entries expected for an analytics report. | UeMobilityUeCommunicationNetworkPerformance |
| qosRequ | QoSRequirement | C | 0..1 | Represents the QoS requirements. This attribute shall be included when eventId is "QOS\_SUSTAINABILITY". | QoSSustainability |
| qosFlowRetainThresholds | array(ThresholdLevel) | C | 1..N | Shall be supplied for the 5QI of GBR resource type.  | QoSSustainablity |
| ranUeThroughputThresholds | array(Threshold) | C | 1..N | Shall be supplied for the 5Qi of non-GBR resource type. | QoSSustainability |
| excepIds | array(ExceptionId) | C | 1..N | Represents a list of Exception Ids.(NOTE x) | AbnormalBehaviour |
| exptAnaType | ExpectedAnalyticsType | C | 0..1 | Represents expected UE analytics type.(NOTE x) | AbnormalBehaviour |
| exptUeBehav | ExpectedUeBehaviourData | O | 0..1 | Represents expected UE behaviour. | AbnormalBehaviour |
| NOTE 1: When event-id in the request is "LOAD\_LEVEL\_INFORMATION" or "NF\_LOAD", either information about slice(s) identified by snssais, or anySlice set to "TRUE" shall be included.NOTE 2: For "NETWORK\_PERFORMANCE", this attribute shall be provided if the event applied for all UEs (i.e. "anyUe" attribute set to true).NOTE x: Either "excepIds" or "exptAnaType" shall be provided if subscribed event is "ABNORMAL\_BEHAVIOUR". |

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

# A.3 Nnwdaf\_AnalyticsInfo API

openapi: 3.0.0

info:

 version: 1.1.0.alpha-2

 title: Nnwdaf\_AnalyticsInfo

 description: |

 Nnwdaf\_AnalyticsInfo Service API.

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externalDocs:

 description: 3GPP TS 29.520 V16.2.0; 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:

 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: '#/components/schemas/AnalyticsReportingRequirement'

 - 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':

 $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:

 type: object

 properties:

 sliceLoadLevelInfos:

 type: array

 items:

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

 minItems: 1

 description: The slices and their load level information.

 networkPerfs:

 type: array

 items:

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

 minItems: 1

 svcExpInfo:

 type: string

 qosSustainInfo:

 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

 EventFilter:

 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'

 maxAnaEntry:

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

 qosRequ:

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

 qosFlowRetainThresholds:

 type: array

 items:

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

 minItems: 1

 ranUeThroughputThresholds:

 type: array

 items:

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

 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]

 AnalyticsReportingRequirement:

 type: object

 properties:

 accuracy:

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

 startTs:

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

 endTs:

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

 sampRatio:

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

 NetworkPerformanceInfo:

 type: string

# Editor's note: The data type NetworkPerformanceInfo is FFS.

 EventId:

 anyOf:

 - type: string

 enum:

 - LOAD\_LEVEL\_INFORMATION

 - SERVICE\_EXPERIENCE

 - QOS\_SUSTAINABILITY

 - ABNORMAL\_BEHAVIOUR

 - USER\_DATA\_CONGESTION

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: >

 Possible values are

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

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

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

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