**3GPP TSG-CT3 Meeting #130C3-234691**

**Xiamen, China, 9 - 13 October, 2023 (Revision of C3-234279)**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.508** | **CR** | **0232** | **rev** | **2** | **Current version:** | **18.3.0** |  |
|  |
| *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** |

|  |
| --- |
|  |
| ***Title:***  | Supporting data collection for PDU Session Traffic Analytics |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNA\_Ph3, eUEPO |  | ***Date:*** | 2023-07-31 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | TS 23.288 clause 6.20.2 described utilization of some event filters (e.g. Area of Interest), a specific DNN, S-NSSAI or sampling ratio as part of Event Reporting Information caring SMF load and signalling for Any UE, while AoI is not yet supported in this TS. |
|  |  |
| ***Summary of change:*** | Adding AoI network area information as optional event filtering supporting caring SMF load and signaling to avoid overload for Any UE PDU Session Traffic data collections. |
|  |  |
| ***Consequences if not approved:*** | Not aligned with stage 2 requirement on overload protection for any UE of AoI with other loaded not interested areas data collection. |
|  |  |
| ***Clauses affected:*** | 2, 4.2.3, 5.6.1, 5.6.2.4, 5.8, A.2 |
|  |  |
|  | **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 backwards compatiable feature to the OpenAPI file of Nsmf\_ExventExposure API. |
|  |  |
| ***This CR's revision history:*** | Revision to C3-233436:Adding network area as filter in subscription of PDU Session Traffic collection to care for SMF load and signalling for any UE, aligned with stage 2. Removed the concerned domain description. |

\*\*\* 1st Changes \*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[7] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".

[8] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[9] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[10] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[11] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[12] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[13] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[14] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[15] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[16] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[18] IETF RFC 7807: "Problem Details for HTTP APIs".

[19] 3GPP TR 21.900: "Technical Specification Group working methods".

[20] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[21] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[22] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[23] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane of EPC Nodes".

[24] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[25] 3GPP TS 29.591: "5G System; Network Exposure Function Southbound Services; Stage 3".

[26] 3GPP TS 29.564: "5G System; User Plane Function Services; Stage 3".

[27] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

\*\*\* 2nd Changes \*\*\*

### 4.2.3 Nsmf\_EventExposure\_Subscribe Service Operation

#### 4.2.3.1 General

This service operation is used by an NF service consumer to subscribe to event notifications on a specific PDU Session, or for all PDU Sessions of one UE, group of UE(s) or any UE, or to modify an existing subscription.

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

- creating a new subscription;

- modifying an existing subscription.

#### 4.2.3.2 Creating a new subscription

Figure 4.2.3.2-1 illustrates the creation of a subscription.



Figure 4.2.3.2-1: Creation of a subscription

To subscribe to event notifications, the NF service consumer shall send an HTTP POST request with: "{apiRoot}/nsmf-event-exposure/v1/subscriptions" as Resource URI and the NsmfEventExposure data structure as request body that shall include:

- if the subscription applies to events related to a single PDU session for a UE, the PDU Session ID of that PDU session as "pduSeId" attribute and the UE identification as "supi" or "gpsi" attribute;

- if the subscription applies to events not related to a single PDU session, the Network Function instance identity if "UPEAS" feature is supported and identification of UEs to which the subscription applies via:

a) identification of a single UE by SUPI as "supi" attribute or GPSI as "gpsi" attribute;

b) identification of a group of UE(s) via a "groupId" attribute; or

c) identification of any UE via the "anyUeInd" attribute set to true;

NOTE 1: The identification of any UE does not apply for local breakout roaming scenarios where the SMF is located in the VPLMN and the NF service consumer is located in the HPLMN.

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

- a Notification Correlation Identifier provided by the NF service consumer for the requested notifications as "notifId" attribute; and

- if the NF service consumer is an AMF, the GUAMI encoded as "guami" attribute:

- a description of the subscribed events as "eventSubs" attribute that for each event shall include:

a) an event identifier as "event" attribute; and

b) for event "UP\_PATH\_CH", whether the subscription is for early, late, or early and late notifications of UP path reconfiguration in the "dnaiChgType" attribute;

c) for event "DDDS", the traffic descriptor(s) of the downlink data source in the "dddTraDescriptors" attribute;

and that may include:

a) for event "DDDS", the subscribed delivery statuses in the "dddStati" attribute;

b) for event "QFI\_ALLOC" or "DISPERSION", the application identifiers in the "appIds" attribute;

c) for event "SMCC\_EXP", the data collection target period in the "targetPeriod" attribute;

d) for event "DISPERSION", the UE IP Address in the "ueIpAddr" attribute, the indication of transaction dispersion collection in the "transacDispInd" attribute and the requested transaction metrics in the "transacMetrics" attribute;

e) for event "WLAN\_INFO", the data collection target period in the "targetPeriod" attribute;

f) for event "RED\_TRANS\_EXP", the data collection target period in the "targetPeriod" attribute; and/or

g) for event "UPF\_EVENT", the UPF event exposure information in the "upfEvents".

The NsmfEventExposure data structure as request body may also include:

- if the NF service consumer is an AMF:

a) the name of a service produced by the AMF that expects to receive the notifications about subscribed events encoded as "serviceName" attribute;

b) Alternate or backup IPv4 Address(es) where to send Notifications encoded as "altNotifIpv4Addrs" attribute;

c) Alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addrs" attribute;

d) Alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute;

- a Data Network Name as "dnn" attribute;

- a single Network Slice Selection Assistance Information as "snssai" attribute;

- an identification of network area by "networkArea" attribute, if the feature PduSesTraffic is supported and the "anyUeInd" attribute is provided;

NOTE: Care needs to be taken with regards to load and major signalling caused when requesting Any UE. This could be achieved via utilization of some event filters (e.g. Area of Interest), a specific DNN, S-NSSAI or sampling ratio as part of Event Reporting Information.

- a Data Network Identifier as "dnai" attribute, if the feature UPEAS is supported;

- the SSID that the PDU session is related to as "ssid" attribute, if the feature UPEAS is supported;

- the BSSID that the PDU session is related to as "bssid" attribute, if the feature UPEAS is supported;

- the UPF identifier as "upfId" attribute, if the feature UPEAS is supported;

- immediate reporting flag as "ImmeRep" attribute;

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

- maximum Number of Reports as "maxReportNbr" attribute;

- monitoring Duration as "expiry" attribute;

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

- sampling ratio as "sampRatio" attribute;

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

- 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".

NOTE 2: For the "PDU\_SES\_EST" event subscription, the "ImmeRep" attribute needs to be included to enable the SMF to report the current available "PDU\_SES\_EST" event information for the subscribed PDU Session which is already established.

Upon the reception of an HTTP POST request with: "{apiRoot}/nsmf-event-exposure/v1/subscriptions" as Resource URI and NsmfEventExposure data structure as request body, the SMF shall:

- create a new subscription;

- assign a subscription correlation ID;

- select an expiry time that is equal to or less than the expiry time potentially received in the request;

- store the subscription;

- send an HTTP "201 Created" response with NsmfEventExposure data structure as response body and a Location header field containing the URI of the created individual subscription resource, i.e. "{apiRoot}/nsmf-event-exposure/v1/subscriptions/{subId}";

- if the feature "ERIR" is not supported, and if the "ImmeRep" attribute is included and set to true in the request, the SMF shall immediately notify the recipient of notification(s) subscribed in the "notifUri" attribute of the current available value(s) using the Nsmf\_EventExposure\_Notify service operation, as defined in clause 4.2.2.1;

- if the feature "ERIR" is supported, and if the "ImmeRep" attribute is included and set to true, the SMF may immediately notify the NF service consumer with the current available value(s) for the subscribed event(s) within the HTTP "201 Created" response as shown in figure 4.2.3.2-1, step 2. The "NsmfEventExposure" data type in the response may include the corresponding event(s) notification within the "eventNotifs" attribute.

- if the sampling ratio attribute, as "sampRatio", is included in the subscription without a "partitionCriteria" attribute, the SMF 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 SMF 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 attribute, as "grpRepTime", is included in the subscription, the SMF shall accumulate all the event reports for the target UEs until the group reporting guard time expires. Then the SMF shall notify the NF service consumer using the Nsmf\_EventExposure\_Notify service operation, as described in clause 4.2.2.2; and

- if the "notifFlag" attribute is included and set to "DEACTIVATE" in the request, the SMF 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 SMF 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 SMF 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 SMF 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".

If the SMF received an GUAMI, the SMF may subscribe to GUAMI changes using the AMFStatusChange service operation of the Namf\_Communication service specified in 3GPP TS 29.518 [13], and it may use the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [12] (using the obtained GUAMI and possibly service name) to query the other AMFs within the AMF set.

If errors occur when processing the HTTP POST request, the SMF shall send an HTTP error response as specified in clause 5.7.

\*\*\* 3rd Changes \*\*\*

### 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 Nsmf\_EventExposure service based interface protocol.

Table 5.6.1-1: Nsmf\_EventExposure specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| AckOfNotify | 5.6.2.7 | Acknowledgement information of event notification |  |
| AppliedSmccType | 5.6.3.6 | The type of applied SM congestion control. | SMCCE |
| EventNotification | 5.6.2.5 | Describes notifications about a single event that occurred. |  |
| EventSubscription | 5.6.2.4 | Represents the subscription to a single event |  |
| NotificationMethod | 5.6.3.4 | Represents the notification methods that can be subscribed |  |
| NsmfEventExposure | 5.6.2.2 | Represents an Individual SMF Notification Subscription resource |  |
| NsmfEventExposureNotification | 5.6.2.3 | Describes Notifications about events that occurred. |  |
| PduSessionInfo | 5.6.2.12 | Represents session information. | UeCommunication |
| PduSessionInformation | 5.6.2.11 | Represents the PDU session related information. | UeCommunication |
| PduSessionStatus | 5.6.3.8 | Status of the PDU Session. | UeCommunication |
| SmfEvent | 5.6.3.3 | Represents the types of events that can be subscribed |  |
| SubId | 5.6.3.2 | Identifies an Individual SMF Notification Subscription. |  |
| SmNasFromSmf | 5.6.2.9 | Describes the information of the SM NAS messages from SMF with backoff timer | SMCCE |
| SmNasFromUe | 5.6.2.8 | Describes the information of the SM NAS requests from UE | SMCCE |
| TransactionInfo | 5.6.2.10 | UE Session Management transaction information. | Dispersion |
| TransactionMetric | 5.6.3.7 | Metric on UE Session Management transactions. | Dispersion |
| UpfInformation | 5.6.2.13 | The information of the UPF serving the UE. | ServiceExperienceDnPerformance |

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

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

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AccessType | 3GPP TS 29.571 [11] |  |  |
| AfResultInfo | 3GPP TS 29.522 [20] | Represents application handling information. |  |
| ApplicationId | 3GPP TS 29.571 [11] | The application identifier. | QfiAllocationPduSessionInfo |
| CommunicationFailure | 3GPP TS 29.518 [13] | Represents the communication failure information. | CommunicationFailure |
| DateTime | 3GPP TS 29.571 [11] |  |  |
| DlDataDeliveryStatus | 3GPP TS 29.571 [11] | Status of downlink data delivery | DownlinkDataDeliveryStatus |
| DddTrafficDescriptor | 3GPP TS 29.571 [11] | Traffic descriptor of source of downlink data  | DownlinkDataDeliveryStatus  |
| Dnai | 3GPP TS 29.571 [11] |  |  |
| DnaiChangeType | 3GPP TS 29.571 [11] | Describes the types of DNAI change. |  |
| Dnn | 3GPP TS 29.571 [11] |  | QfiAllocation, PduSessionStatus |
| DurationSec | 3GPP TS 29.571 [11] |  |  |
| EthFlowDescription | 3GPP TS 29.514 [22] | Ethernet flow description | QfiAllocation |
| FlowDescription | 3GPP TS 29.514 [22] | IP flow description | QfiAllocation |
| Fqdn | 3GPP TS 29.571 [11] | FQDN |  |
| Gpsi | 3GPP TS 29.571 [11] |  |  |
| GroupId | 3GPP TS 29.571 [11] |  |  |
| Guami | 3GPP TS 29.571 [11] | Globally Unique AMF Identifier |  |
| IpAddr | 3GPP TS 29.571 [11] | UE IP address. | Dispersion |
| Ipv4Addr | 3GPP TS 29.571 [11] |  |  |
| Ipv6Addr | 3GPP TS 29.571 [11] |  |  |
| Ipv6Prefix | 3GPP TS 29.571 [11] |  |  |
| MacAddr48 | 3GPP TS 29.571 [11] | MAC Address. |  |
| MutingExceptionInstructions | 3GPP TS 29.571 [11] | Contains instructions to be executed upon the occurrence of an event muting exception (e.g. full buffer). | EnhDataMgmt |
| MutingNotificationsSettings | 3GPP TS 29.571 [11] | Contains setting related to the muting of notifications. | EnhDataMgmt |
| NetworkAreaInfo | 3GPP TS 29.554 [27] | Identifies the network area. | PduSesTraffic |
| NfInstanceId | 3GPP TS 29.571 [11] | Instance identity of the Network Function | UPEAS |
| NotificationFlag | 3GPP TS 29.571 [11] | Notification flag. | EneNA |
| PartitioningCriteria | 3GPP TS 29.571 [11] | Used to partition UEs before applying sampling. | EneNA |
| PduSessionId | 3GPP TS 29.571 [11] |  |  |
| PduSessionType | 3GPP TS 29.571 [11] | PDU session type. | PduSessionStatusPduSessionInfo |
| PlmnIdNid | 3GPP TS 29.571 [11] | Identification of a network: the PLMN Identifier or the SNPN Identifier (the PLMN Identifier and the NID). |  |
| ProblemDetails | 3GPP TS 29.571 [11] |  |  |
| Qfi | 3GPP TS 29.571 [11] | QoS flow identifier. | QfiAllocation |
| RatType | 3GPP TS 29.571 [11] |  |  |
| RedirectResponse | 3GPP TS 29.571 [11] | Contains redirection related information. | ES3XX |
| RouteToLocation | 3GPP TS 29.571 [11] | A traffic route to/from an DNAI |  |
| SamplingRatio | 3GPP TS 29.571 [11] | Sampling Ratio. |  |
| SatelliteBackhaulCategory | 3GPP TS 29.571 [11] | Indicates the satellite backhaul category or non-satellite backhaul. | EnSatBackhaulCategoryChg |
| ServiceName | 3GPP TS 29.510 [12] | Name of the service instance. |  |
| Snssai | 3GPP TS 29.571 [11] | S-NSSAI | QfiAllocation |
| SscMode | 3GPP TS 29.571 [11] | SSC Mode selected for the PDU Session. | PduSessionInfo |
| Supi | 3GPP TS 29.571 [11] |  |  |
| SupportedFeatures | 3GPP TS 29.571 [11] | Used to negotiate the applicability of the optional features defined in table 5.8-1. |  |
| TimeWindow | 3GPP TS 29.122 [24] | A start time and a stop time of a time window. | SMCCE |
| Uinteger | 3GPP TS 29.571 [11] |  |  |
| UpfEvent | 3GPP TS 29.564 [26] | Contains UPF event information. | UPEAS |
| Uri | 3GPP TS 29.571 [11] |  |  |

\*\*\* 4th Changes \*\*\*

#### 5.6.2.4 Type EventSubscription

Table 5.6.2.4-1: Definition of type EventSubscription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | SmfEvent | M | 1 | Subscribed events |  |
| dnaiChgType | DnaiChangeType | C | 0..1 | For event UP path change, this attribute indicates whether the subscription is for early, late, or early and late DNAI change notification shall be supplied. |  |
| dddTraDescriptors | array(DddTrafficDescriptor) | C | 1..N | The traffic descriptor(s) of the downlink data source. Shall be included for event "DDDS". | DownlinkDataDeliveryStatus |
| dddStati | array(DlDataDeliveryStatus) | O | 1..N | May be included for event "DDDS". The subscribed statuses (discarded, transmitted, buffered) for the event. If omitted all statuses are subscribed. | DownlinkDataDeliveryStatus |
| appIds | array(ApplicationId) | O | 1..N | May be included for event "QFI\_ALLOC" or "DISPERSION". | QfiAllocationDispersionPduSessionInfo |
| networkArea | NetworkAreaInfo | O | 0..1 | Identification of network area to which the subscription applies. | PduSesTraffic |
| targetPeriod | TimeWindow | O | 0..1 | Indicates the data collection target period.May be included for event "SMCC\_EXP", "RED\_TRANS\_EXP" or "WLAN\_INFO". | SMCCERedundantTransmissionExpWlanPerformance |
| transacDispInd | boolean | O | 0..1 | Indicates the subscription for UE transaction dispersion collection, if it is included and set to "true". Default value is "false".May be included for event "DISPERSION". | Dispersion |
| transacMetrics | array(TransactionMetric) | O | 1..N | Requested transaction metrics.May be included for event "DISPERSION". | Dispersion |
| ueIpAddr | IpAddr | O | 0..1 | Indicates the UE IP address. May be included for event "DISPERSION". | Dispersion |
| upfEvents | array(UpfEvent) | O | 1..N | Indicates the exposure information related to UPF events. May be included for event "UPF\_EVENT".  | UPEAS |

\*\*\* 5th Changes \*\*\*

## 5.8 Feature negotiation

The optional features in table 5.8-1 are defined for the Nsmf\_EventExposure API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 5.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | DownlinkDataDeliveryStatus | This feature indicates support for the "Downlink data delivery status" event. |
| 2 | CommunicationFailure | This feature indicates support for the "communication failure" event. |
| 3 | PduSessionStatus | This feature indicates support for the PDU session establishment event and enhancement (PDU session type, IP address) for the PDU session release event. |
| 4 | QfiAllocation | This feature indicates support for the "QFI allocation" event. |
| 5 | QosMonitoring | This feature indicates support for the "QoS Monitoring" event. (NOTE 1) |
| 6 | 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 [4] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [4].  |
| 7 | EneNA | This feature indicates support for the enhancements of network data analytics requirements. |
| 8 | ULBuffering | This feature indicates support for Uplink buffering indication. (See NOTE 2) |
| 9 | SMCCE | This feature indicates support for Session Management Congestion Control Experience for PDU Session. |
| 10 | Dispersion | This feature indicates support for Session Management transactions dispersion. |
| 11 | ERIR | Indicates the support of immediate report of the available subscribed event(s) within the subscription response to the NF service consumer. |
| 12 | RedundantTransmissionExp | This feature indicates support for Redundant Transmission Experience. |
| 13 | WlanPerformance | This feature indicates support for WLAN information on PDU Session for which Access Type is NON\_3GPP\_ACCESS and RAT Type is TRUSTED\_WLAN, to support WLAN performance analytics. |
| 14 | EASIPreplacement | This feature indicates the support of provisioning of EAS IP replacement info (See NOTE 2). |
| 15 | BIUMR | This feature bit indicates whether the NF Service Consumer (e.g. SMF) and PCF supports Binding Indication Update for multiple resource contexts specified in clauses 6.12.1 and 5.2.3.2.6 of 3GPP TS 29.500 [4]. |
| 16 | UeCommunication | This feature indicates the support of UE communication analytics. |
| 17 | ServiceExperience | This feature indicates support for service experience analytics. |
| 18 | DnPerformance | This feature indicates support for DN performance analytics. |
| 19 | MultipleFlowDescriptions | This feature indicates the support of the report of multiple UL and/or DL flows. |
| 20 | PacketDelayFailureReport | This feature indicates the support of packet delay failure report as part of QoS Monitoring procedures. This feature requires that QosMonitoring feature is supported. |
| 21 | CommonEASDNAI | This feature indicates support of enhancements of UP path change event notification. (NOTE 1) |
| 22 | PduSessionInfo | This feature indicates support for PDU Session parameters information. |
| 23 | EnhDataMgmt | Indicates the support of enhanced data management mechanisms. Supporting this feature also requires the support of feature EneNA. |
| 24 | WlanPerformanceExt\_AIML | This feature indicates support for the enhancements of WLAN performance supporting AIML, including support of analytics per UE granularity. Supporting this feature also requires the support of feature WlanPerformance. |
| 25 | EasRelocationEnh | This feature indicates enhanced support of EAS relocation procedures via additional information about the AFs that are responsible for certain EAS. |
| 26 | UPEAS | This feature indicates the support of UPF enhancements for exposure. |
| 27 | EnSatBackhaulCategoryChg | This feature indicates the support of notification of a change between different satellite backhaul categories, or dynamic satellite backhaul categories, or between satellite backhaul and non-satellite backhaul. |
| 28 | E2eDataVolTransTime | This feature indicates support for E2E data volume transfer time analytics. |
| 29 | XRM\_5G | This feature indicates the support of multi-modal communication service for extended reality (XR) and interactive media services. |
| 30 | PduSesTraffic | This feature indicates support data collection for PDU Session Traffic analytics. Supporting this feature also requires the support of feature UPEAS. |
| NOTE 1: SMF determines the support of this feature by the NF service consumer as part of the implicit subscription information provided by the PCF as described in 3GPP TS 29.512 [14].NOTE 2: NF service consumers determine the support of this feature as part of the notification of the implicitly subscribed events as described in clause 4.2.2.2. |

Editor's Note: It is FFS of XRM\_5G feature name and feature granularity.

\*\*\* 6th Changes \*\*\*

# A.2 Nsmf\_EventExposure API

openapi: 3.0.0

info:

 version: 1.3.0-alpha.4

 title: Nsmf\_EventExposure

 description: |

 Session Management Event Exposure Service.

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externalDocs:

 description: 3GPP TS 29.508 V18.3.0; 5G System; Session Management Event Exposure Service.

 url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.508/

servers:

 - url: '{apiRoot}/nsmf-event-exposure/v1'

 variables:

 apiRoot:

 default: https://example.com

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

security:

 - {}

 - oAuth2ClientCredentials:

 - nsmf-event-exposure

paths:

 /subscriptions:

 post:

 operationId: CreateIndividualSubcription

 summary: Create an individual subscription for event notifications from the SMF

 tags:

 - Subscriptions (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Created.

 headers:

 Location:

 description: >

 Contains the URI of the newly created resource, according to the structure

 {apiRoot}/nsmf-event-exposure/v1/subscriptions/{subId}

 required: true

 schema:

 type: string

 content:

 application/json:

 schema:

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

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 callbacks:

 myNotification:

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

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 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'

 callbacks:

 afAcknowledgement:

 '{request.body#/ackUri}':

 post:

 requestBody: # contents of the callback message

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '204':

 description: No Content (successful acknowledgement)

 '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/{subId}:

 get:

 operationId: GetIndividualSubcription

 summary: Read an individual subscription for event notifications from the SMF

 tags:

 - IndividualSubscription (Document)

 parameters:

 - name: subId

 in: path

 description: Event Subscription ID

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Resource representation is returned

 content:

 application/json:

 schema:

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

 '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:

 operationId: ReplaceIndividualSubcription

 summary: Replace an individual subscription for event notifications from the SMF

 tags:

 - IndividualSubscription (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: subId

 in: path

 description: 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/NsmfEventExposure'

 '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:

 operationId: DeleteIndividualSubcription

 summary: Delete an individual subscription for event notifications from the SMF

 tags:

 - IndividualSubscription (Document)

 parameters:

 - name: subId

 in: path

 description: 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: '{nrfApiRoot}/oauth2/token'

 scopes:

 nsmf-event-exposure: Access to the Nsmf\_EventExposure API

 schemas:

 NsmfEventExposure:

 description: >

 Represents an Individual SMF Notification Subscription resource. The serviveName property

 corresponds to the serviceName in the main body of the specification.

 type: object

 properties:

 supi:

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

 gpsi:

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

 anyUeInd:

 type: boolean

 description: >

 Any UE indication. This IE shall be present if the event subscription is applicable to

 any UE. Default value "false" is used, if not present.

 groupId:

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

 pduSeId:

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

 dnn:

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

 snssai:

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

 dnai:

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

 ssId:

 type: string

 description: SSID that the PDU session is related to.

 bssId:

 type: string

 description: BSSID that the PDU session is related to.

 upfId:

 type: string

 description: UPF identity.

 nfId:

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

 subId:

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

 notifId:

 type: string

 description: Notification Correlation ID assigned by the NF service consumer.

 notifUri:

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

 altNotifIpv4Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 description: Alternate or backup IPv4 address(es) where to send Notifications.

 minItems: 1

 altNotifIpv6Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 description: Alternate or backup IPv6 address(es) where to send Notifications.

 minItems: 1

 altNotifFqdns:

 type: array

 items:

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

 minItems: 1

 description: Alternate or backup FQDN(s) where to send Notifications.

 eventSubs:

 type: array

 items:

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

 minItems: 1

 description: Subscribed events

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 ImmeRep:

 type: boolean

 notifMethod:

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

 maxReportNbr:

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

 expiry:

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

 repPeriod:

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

 guami:

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

 serviveName:

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

 supportedFeatures:

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

 sampRatio:

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

 partitionCriteria:

 type: array

 items:

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

 minItems: 1

 description: Criteria for partitioning the UEs before applying the sampling ratio.

 grpRepTime:

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

 notifFlag:

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

 notifFlagInstruct:

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

 mutingSetting:

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

 required:

 - notifId

 - notifUri

 - eventSubs

 NsmfEventExposureNotification:

 description: Represents notifications on events that occurred.

 type: object

 properties:

 notifId:

 type: string

 description: Notification correlation ID

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 description: Notifications about Individual Events

 ackUri:

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

 required:

 - notifId

 - eventNotifs

 EventSubscription:

 description: Represents a subscription to a single event.

 type: object

 properties:

 event:

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

 dnaiChgType:

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

 dddTraDescriptors:

 type: array

 items:

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

 minItems: 1

 dddStati:

 type: array

 items:

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

 minItems: 1

 appIds:

 type: array

 items:

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

 minItems: 1

 networkArea:

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

 targetPeriod:

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

 transacDispInd:

 type: boolean

 description: >

 Indicates the subscription for UE transaction dispersion collectionon, if it is included

 and set to "true". Default value is "false".

 transacMetrics:

 type: array

 items:

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

 description: Indicates Session Management Transaction metrics.

 minItems: 1

 ueIpAddr:

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

 upfEvents:

 type: array

 items:

 $ref: 'TS29564\_Nupf\_EventExposure.yaml#/components/schemas/UpfEvent'

 description: Indicates UPF event exposure information.

 minItems: 1

 required:

 - event

 EventNotification:

 description: Represents a notification related to a single event that occurred.

 type: object

 properties:

 event:

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

 timeStamp:

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

 supi:

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

 gpsi:

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

 ueIpAddr:

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

 transacInfos:

 type: array

 items:

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

 description: Transaction Information.

 minItems: 1

 sourceDnai:

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

 targetDnai:

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

 dnaiChgType:

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

 candidateDnais:

 type: array

 items:

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

 minItems: 1

 description: The candidate DNAI(s) for the PDU Session.

 candDnaisPrioInd:

 type: boolean

 description: >

 If provided and set to true, it indicates that the candidate DNAIs provided

 in the candidateDnais attribute are in descending priority order, i.e.,

 the lower the array index the higher the priority of the respective DNAI.

 If omitted, the default value is false.

 easRediscoverInd:

 type: boolean

 description: >

 Indication of EAS re-discovery. If present and set to "true", it indicates the EAS

 re-discovery is performed, e.g. due to change of common EAS. Default value is "false" if

 omitted.

 sourceUeIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 sourceUeIpv6Prefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 targetUeIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 targetUeIpv6Prefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 sourceTraRouting:

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

 targetTraRouting:

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

 ueMac:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/MacAddr48'

 adIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 adIpv6Prefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 reIpv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 reIpv6Prefix:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 plmnId:

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

 accType:

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

 pduSeId:

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

 ratType:

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

 dddStatus:

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

 dddTraDescriptor:

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

 maxWaitTime:

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

 commFailure:

 $ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/CommunicationFailure'

 ipv4Addr:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 ipv6Prefixes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Prefix'

 minItems: 1

 ipv6Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 minItems: 1

 pduSessType:

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

 sscMode:

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

 qfi:

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

 appId:

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

 ethFlowDescs:

 type: array

 items:

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

 minItems: 1

 description: >

 Descriptor(s) for non-IP traffic. It allows the encoding of multiple UL and/or DL flows.

 Each entry of the array describes a single Ethernet flow.

 ethfDescs:

 type: array

 items:

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

 minItems: 1

 maxItems: 2

 description: >

 Contains the UL and/or DL Ethernet flows. Each entry of the array describes a single

 Ethernet flow.

 flowDescs:

 type: array

 items:

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

 minItems: 1

 description: >

 Descriptor(s) for IP traffic. It allows the encoding of multiple UL and/or DL flows.

 Each entry of the array describes a single IP flow.

 fDescs:

 type: array

 items:

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

 minItems: 1

 maxItems: 2

 description: >

 Contains the UL and/or DL IP flows. Each entry of the array describes a single

 IP flow.

 dnn:

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

 snssai:

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

 ulDelays:

 type: array

 items:

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

 minItems: 1

 dlDelays:

 type: array

 items:

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

 minItems: 1

 rtDelays:

 type: array

 items:

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

 minItems: 1

 ulConInfo:

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

 dlConInfo:

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

 cimf:

 type: boolean

 description: Represents the congestion information measurement failure indicator.

 timeWindow:

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

 smNasFromUe:

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

 smNasFromSmf:

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

 upRedTrans:

 type: boolean

 description: >

 Indicates whether the redundant transmission is setup or terminated. Set to "true" if

 the redundant transmission is setup, otherwise set to "false" if the redundant

 transmission is terminated. Default value is set to "false".

 ssId:

 type: string

 bssId:

 type: string

 startWlan:

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

 endWlan:

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

 pduSessInfos:

 type: array

 items:

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

 minItems: 1

 upfInfo:

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

 pdmf:

 type: boolean

 description: Represents the packet delay measurement failure indicator.

 satBackhaulCat:

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

 supportedFeatures:

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

 targetAfId:

 type: string

 description: Identifier of the Application Function responsible for the target DNAI.

 required:

 - event

 - timeStamp

 not:

 required: [ipv6Prefixes,ipv6Addrs]

 SubId:

 type: string

 format: SubId

 description: >

 Identifies an Individual SMF Notification Subscription. To enable that the value is used as

 part of a URI, the string shall only contain characters allowed according to the

 "lower-with-hyphen" naming convention defined in 3GPP TS 29.501. In an OpenAPI schema, the

 format shall be designated as "SubId".

 AckOfNotify:

 description: Represents an acknowledgement information of an event notification.

 type: object

 properties:

 notifId:

 type: string

 ackResult:

 $ref: 'TS29522\_TrafficInfluence.yaml#/components/schemas/AfResultInfo'

 supi:

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

 gpsi:

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

 required:

 - notifId

 - ackResult

 SmNasFromUe:

 description: >

 Represents information on the SM NAS messages that SMF receives from UE for PDU Session.

 type: object

 properties:

 smNasType:

 type: string

 timeStamp:

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

 required:

 - smNasType

 - timeStamp

 SmNasFromSmf:

 description: >

 Represents information on the SM congestion control applied SM NAS messages that SMF sends

 to UE for PDU Session.

 type: object

 properties:

 smNasType:

 type: string

 timeStamp:

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

 backoffTimer:

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

 appliedSmccType:

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

 required:

 - smNasType

 - timeStamp

 - backoffTimer

 - appliedSmccType

 TransactionInfo:

 description: Represents SMF Transaction Information.

 type: object

 properties:

 transaction:

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

 snssai:

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

 appIds:

 type: array

 items:

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

 minItems: 1

 transacMetrics:

 type: array

 items:

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

 minItems: 1

 required:

 - transaction

 PduSessionInformation:

 description: Represents the PDU session related information.

 type: object

 properties:

 pduSessId:

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

 sessInfo:

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

 PduSessionInfo:

 description: Represents session information.

 type: object

 properties:

 n4SessId:

 type: string

 description: The identifier of the N4 session for the reported PDU Session.

 sessInactiveTimer:

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

 pduSessStatus:

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

 UpfInformation:

 description: Represents the ID/address/FQDN of the UPF.

 type: object

 properties:

 upfId:

 type: string

 upfAddr:

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

 SmfEvent:

 anyOf:

 - type: string

 enum:

 - AC\_TY\_CH

 - UP\_PATH\_CH

 - PDU\_SES\_REL

 - PLMN\_CH

 - UE\_IP\_CH

 - RAT\_TY\_CH

 - DDDS

 - COMM\_FAIL

 - PDU\_SES\_EST

 - QFI\_ALLOC

 - QOS\_MON

 - SMCC\_EXP

 - DISPERSION

 - RED\_TRANS\_EXP

 - WLAN\_INFO

 - UPF\_INFO

 - UP\_STATUS\_INFO

 - SATB\_CH

 - 5QI\_INFO

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the types of events that can be subscribed.

 Possible values are:

 - AC\_TY\_CH: Access Type Change.

 - UP\_PATH\_CH: UP Path Change.

 - PDU\_SES\_REL: PDU Session Release.

 - PLMN\_CH: PLMN Change.

 - UE\_IP\_CH: UE IP address change.

 - RAT\_TY\_CH: RAT Type Change.

 - DDDS: Downlink data delivery status.

 - COMM\_FAIL: Communication Failure.

 - PDU\_SES\_EST: PDU Session Establishment.

 - QFI\_ALLOC: QFI allocation.

 - QOS\_MON: QoS Monitoring.

 - SMCC\_EXP: SM congestion control experience for PDU Session.

 - DISPERSION: Session Management transaction dispersion.

 - RED\_TRANS\_EXP: Redundant transmission experience for PDU Session.

 - WLAN\_INFO: WLAN information on PDU session for which Access Type is NON\_3GPP\_ACCESS and

 RAT Type is TRUSTED\_WLAN.

 - UPF\_INFO: The UPF information, including the UPF ID/address/FQDN information.

 - UP\_STATUS\_INFO: The User Plane status information.

 - SATB\_CH: Satellite backhaul category change.

 - 5QI\_INFO: Indicates that the event subscribed is related to 5QI.

 NotificationMethod:

 anyOf:

 - type: string

 enum:

 - PERIODIC

 - ONE\_TIME

 - ON\_EVENT\_DETECTION

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the notification methods that can be subscribed.

 Possible values are:

 - PERIODIC

 - ONE\_TIME

 - ON\_EVENT\_DETECTION

 AppliedSmccType:

 anyOf:

 - type: string

 enum:

 - DNN\_CC

 - SNSSAI\_CC

 description: >

 This string indicates the type of applied SM congestion control.

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration and is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the type of applied SM congestion control.

 Possible values are:

 - DNN\_CC: Indicates the DNN based congestion control.

 - SNSSAI\_CC: Indicates the S-NSSAI based congestion control.

 TransactionMetric:

 anyOf:

 - type: string

 enum:

 - PDU\_SES\_EST

 - PDU\_SES\_AUTH

 - PDU\_SES\_MODIF

 - PDU\_SES\_REL

 - type: string

 description: >

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

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

 description: |

 Represents the metric on UE Session Management transactions.

 Possible values are:

 - PDU\_SES\_EST: PDU Session Establishment

 - PDU\_SES\_AUTH: PDU Session Authentication

 - PDU\_SES\_MODIF: PDU Session Modification

 - PDU\_SES\_REL: PDU Session Release

 PduSessionStatus:

 anyOf:

 - type: string

 enum:

 - ACTIVATED

 - DEACTIVATED

 - type: string

 description: >

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

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

 description: |

 Represents the status of the PDU Session.

 Possible values are:

 - ACTIVATED: PDU Session status is activated.

 - DEACTIVATED: PDU Session status is deactivated.

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