**3GPP TSG-CT3 Meeting #118e C3-215xxx**

**E-Meeting, 11th – 15th October 2021 (rev of C3-215120)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **0181** | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | NWDAF instance provisioning to the PCF | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph2 | | | | |  | ***Date:*** | | | 2021-09-09 |
|  |  | | | |  | |  | | |  |
| ***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 can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | TS 23.503, clause 6.1.1.3, states that the AMF may include in the AM Policy Association establishment or modification procedures, the list of NWDAF instance IDs used for the UE and their associated Analytic ID(s) consumed by the AMF. The PCF may select those NWDAF instances as the ones to subscribe for their associated analytic ID(s) for the UE for which those AM Policy Associations are related to or may perform NWDAF discovery if the NWDAF for an Analytics ID not provided by the AMF is needed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The CR includes the impacts for the reporting the NWDAF instances identities and NWDAF events consumed by the AMF as part of AM Policy Association establishment and AM Policy Association modification procedures. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Misalignment with stage 2. NWDAF discovery based on the info provided by the AMF remains unspecified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2; 3.2; 4.2.2.1; 4.2.3.1; 4.2.3.2; 5.6.1; 5.6.2.3; 5.6.2.4; 5.6.3.3; 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 a backward compatible feature in Npcf\_AMPolicyControl API specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

# 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 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

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

[6] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[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 23.402: "Architecture enhancements for non-3GPP accesses".

[13] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[14] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[15] void.

[16] void.

[17] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Data, Application Data and Structured Data for Exposure; Stage 3".

[18] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[19] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

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

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

[22] 3GPP TR 21.900: "Technical Specification Group working methods".

[23] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[24] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3".

[25] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[26] 3GPP TS 29.534: "5G System; Access and Mobility Policy Authorization Service; Stage 3".

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

\* \* \* Second 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].

5G-BRG 5G Broadband Residential Gateway

5G-RG 5G Residential Gateway

5GC 5G Core Network

5G-CRG 5G Cable Residential Gateway

5GS 5G System

AMBR Aggregated Maximum Bit Rate

AMF Access and Mobility Management Function

BBF Broadband Forum

DNN Data Network Name

EPS Evolved Packet System

FN-BRG Fixed Network Broadband Residential Gateway

FN-CRG Fixed Network Cable Residential Gateway

FN-RG Fixed Network Residential Gateway

FQDN Fully Qualified Domain Name

GBR Guaranteed Bit Rate

GPSI Generic Public Subscription Identifier

GUAMI Globally Unique AMF Identifier

HFC Hybrid Fiber-Coaxial

JSON JavaScript Object Notation

LBO Local Break Out (roaming)

MBR Maximum Bit Rate

NID Network Identifier

NRF Network Repository Function

NSSAI Network Slice Selection Assistance Information

NWDAF Network Data Analytics Function

PCF Policy Control Function

PEI Permanent Equipment Identifier

PRA Presence Reporting Area

QoS Quality of Service

RFSP RAT Frequency Selection Priority

SMF Session Management Function

S-NSSAI Single Network Slice Selection Assistance Information

SNPN Stand-alone Non-Public Network

SUPI Subscription Permanent Identifier

UDM Unified Data Management

V-PCF Visited Policy Control Function

W-5GAN Wireline 5G Access Network

W-5GBAN Wireline BBF Access Network

W-5GCAN Wireline 5G Cable Access Network

W-AGF Wireline Access Gateway Function

\* \* \* Third Change \* \* \* \*

#### 4.2.2.1 General

The procedure in the present subclause is applicable when the NF service consumer (e.g. AMF) creates an AM policy association when the UE registers to the network, and when the AMF is relocated (between the different AMF sets) and the new AMF selects a new PCF. The procedure for the case where the AMF is relocated and the new AMF selects the old PCF is defined in subclause 4.2.3.1.

The creation of an AM policy association only applies for normally registered UEs, i.e., it does not apply for Emergency Registered UEs.

Figure 4.2.2.1-1 illustrates the creation of a policy association.



Figure 4.2.2.1-1: Creation of a policy association

When a UE registers and a UE context is being established, the AMF can obtain Service Area Restrictions, RFSP index, subscribed UE-AMBR, subscribed UE-Slice-MBR(s) and GPSI(s) from the UDM during the Access and Mobility Subscription Data retrieval procedure and the allowed NSSAI from local configuration or from the NSSF during the slice selection procedure and shall decide based on local policies whether to request policies from the PCF.

To request policies from the PCF, the NF service consumer (e.g. AMF) shall send an HTTP POST request with: "{apiRoot}/npcf-am-policy-control/v1/policies" as Resource URI and the PolicyAssociationRequest data structure as request body that shall include:

- Notification URI encoded as "notificationUri" attribute;

- SUPI encoded as "supi" attribute; and

- if the feature "SliceSupport" or the feature "DNNReplacementControl" is supported in the NF service consumer and the UE is registered via a 3GPP access, the allowed NSSAI in the 3GPP access encoded in the "allowedSnssais" attribute;

and that shall include when available:

- GPSI encoded as "gpsi" attribute;

- if the feature "MultipleAccessTypes" is not supported, the access type encoded as "accessType" attribute;

- Permanent Equipment Identifier (PEI) encoded as "pei" attribute;

- User Location Information encoded as "userLoc" attribute;

- UE Time Zone encoded as "timeZone" attribute;

- Serving PLMN Identifier and for SNPN the NID encoded as "servingPlmn" attribute;

- if the feature "MultipleAccessTypes" is not supported, the RAT type encoded as "ratType" attribute;

- Service Area Restrictions (see subclause 4.2.2.3.1) derived from the Service Area Restrictions obtained from the UDM by mapping any service areas denoted by geographical information into Tracking Area Identities (TAIs) and encoded as "servAreaRes" attribute;

- RFSP index (see subclause 4.2.2.3.2) as obtained from the UDM encoded as "rfsp" attribute;

- A list of Internal Group Identifiers encoded as "groupIds" attribute;

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

- if the NF service consumer is an AMF, the name of a service produced by the AMF that expects to receive information within Npcf\_AMPolicyControl\_UpdateNotify service operation encoded as "serviceName" attribute;

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

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

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

- trace control and configuration parameters information encoded as "traceReq" attribute;

- if the feature "UE-AMBR\_Authorization" is supported in the NF service consumer, the subscribed UE-AMBR (see subclause 4.2.2.3.3) in the "ueAmbr" attribute;

- if the feature "DNNReplacementControl" is supported, the mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN encoded in the "mappingSnssais" attribute;

- if the feature "UE-Slice-MBR\_Authorization" is supported in the AMF, the subscribed UE-Slice-MBR(s) for the allowed NSSAI (see subclause 4.2.2.3.5) in the "ueSliceMbrs" attribute; and

- when the "EneNA" feature is supported, the list of NWDAF instance IDs used for the UE within the "nwdafInstanceIds" and their associated Analytic ID(s) within "nwdafEvents" consumed by the NF service consumer, included within the "nwdafDatas" attribute.

Upon the reception of this HTTP POST request, the PCF shall:

- assign a policy association ID;

- determine the applicable policy (taking into consideration and optionally modifying the possibly received UE-AMBR, UE-Slice-MBR(s), Service Area Restrictions and/or RFSP index);

- for the successful case, send a HTTP "201 Created" response with the URI for the created resource in the "Location" header field

NOTE 1: The assigned policy association ID is part of the URI for the created resource and is thus associated with the SUPI.

and the PolicyAssociation data type as response body including:

- conditionally AMF Access and Mobility Policy (see subclause 4.2.2.3), i.e.:

a) if the PCF received the "servAreaRes" attribute in the request, Service Area Restrictions encoded as "servAreaRes" attribute; and/or

b) if the PCF received the "rfsp" attribute in the request, RAT Frequency Selection Priority (RFSP) Index encoded as "rfsp" attribute; and/or

c) if the feature "UE-AMBR\_Authorization" is supported and the PCF received the "ueAmbr" attribute in the request, the authorized UE-AMBR encoded as "ueAmbr" attribute; and/or

d) if the feature "UE-Slice-MBR\_Authorization" is supported and the PCF received the "ueSliceMbrs" attribute in the request, the authorized UE-Slice-MBR(s) for the allowed NSSAI encoded as "ueSliceMbrs" attribute;

- optionally one or several of the following Policy Control Request Trigger(s) encoded as "triggers" attribute (see subclause 4.2.3.2):

a) Location change (tracking area);

b) Change of UE presence in PRA;

c) if the "SliceSupport" feature or the "DNNReplacementControl" feature is supported, change of allowed NSSAI;

d) if the "DNNReplacementControl" feature is supported, change of SMF selection information; and

x) if the "EneNA" feature is supported, change of NWDAF data;

- if the Policy Control Request Trigger "Change of UE presence in PRA" is provided, the presence reporting areas for which reporting is required encoded as "pras" attribute;

NOTE 2: If the PCF uses a Presence Reporting Area identifier referring to a Set of Core Network predefined Presence Reporting Areas as defined in 3GPP TS 23.501 [2], the PCF includes the identifier of this Presence Reporting Area set within the "praId" attribute.

- if the Policy Control Request Trigger "Change of SMF selection information" is provided, the SMF selection information representing the conditions upon which the AMF shall request a DNN replacement (see subclause 4.2.2.3.4) encoded as "smfSelInfo" attribute;

- if errors occur when processing the HTTP POST request, apply error handling procedures as specified in subclause 5.7 and according to the following provisions:

- if the user information received within the "supi" attribute is unknown, the PCF shall reject the request and include in an HTTP "400 Bad Request" response message the "cause" attribute of the ProblemDetails data structure set to "USER\_UNKNOWN";

- if the PCF is, due to incomplete, erroneous or missing information in the request, not able to provision an AM policy decision, the PCF may reject the request and include in an HTTP "400 Bad Request" response message the "cause" attribute of the ProblemDetails data structure set to "ERROR\_REQUEST\_PARAMETERS".

- if the PCF rejects the AM policy association establishment, the NF service consumer shall apply the policy retrieved from the UDM if available; otherwise, the NF service consumer shall apply the operator configured policy.

If the PCF received a GUAMI, the PCF may subscribe to GUAMI changes using the AMFStatusChange service operation of the Namf\_Communication service specified in 3GPP TS 29.518 [14], and it may use the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the obtained GUAMI and possibly service name) to query the other AMFs within the AMF set.

If the PCF received a "traceReq" attribute, it shall perform trace procedures as defined in 3GPP TS 32.422 [18].

If the PCF received the list of NWDAF instance IDs used for the UE in "nwdafInstanceIds" attribute and their associated Analytic IDs in "nwdafEvents" attribute included within the "nwdafDatas" attribute the PCF may select those NWDAF instances as described in 3GPP TS 29.513 [7].

The PCF may retrieve AF requirements on Access and Mobility policies from the UDR as specified in 3GPP TS 29.519 [17] and consider them for determining the Access and Mobility policies to be provisioned.

\* \* \* Fourth Change \* \* \* \*

#### 4.2.3.1 General

The procedure in the present subclause is applicable when the NF service consumer modifies an existing AM policy association (including the case where the AMF is relocated and the new AMF selects the old PCF to maintain the policy association and to update the Notification URI).

Figure 4.2.3.1-1 illustrates the update of a policy association.



Figure 4.2.3.1-1: Update of a policy association

The AMF as NF service consumer invokes this procedure when a policy control request trigger (see subclause 4.2.3.2) occurs. When the Service Area restriction change trigger and/or the RFSP index change trigger occur, and/or the feature "UE-AMBR\_Authorization" is supported and the subscribed UE-AMBR change trigger occurs, and/or the feature "UE-Slice-MBR\_Authorization" is supported and the subscribed UE-Slice-MBR change trigger occurs, the NF service consumer (e.g. AMF) shall always invoke the procedure. When the location change trigger or the change of UE presence in PRA trigger occurs, the NF service consumer shall only invoke the procedure if the PCF has subscribed to that event trigger.

If an AMF knows by implementation specific means that the UE context has been transferred to an AMF with another GUAMI within the AMF set, it may also invoke this procedure to update the Notification URI and the GUAMI.

NOTE 1: Either the old or the new AMF can invoke this procedure.

During the AMF relocation, if the new AMF received the resource URI of the individual AM Policy from the old AMF and selects the old PCF, the new AMF shall also invoke this procedure to update the Notification URI and the GUAMI. The new AMF may also update the alternate or backup IP addresses.

To request policies from the PCF, to update the Notification URI, to update the trace control configuration and/or to request the termination of trace, the NF service consumer (e.g. AMF) shall request the update of the AM Policy Association by providing the relevant parameters about the UE context by sending an HTTP POST request with "{apiRoot}/npcf-am-policy-control/v1/policies/{polAssoId}/update" as Resource URI and the PolicyAssociationUpdateRequest data structure as request body that shall include:

- at least one of the following:

1. a new Notification URI encoded in the "notificationUri" attribute;

2. observed Policy Control Request Trigger(s) (see subclause 4.2.3.2) encoded as "triggers" attribute;

3. if a Service Area restriction change occurred, the Service Area Restrictions (see subclause 4.2.2.3.1) as obtained from the UDM encoded as "servAreaRes" attribute;

4. if a RFSP index change occurred, the RFSP index (see subclause 4.2.2.3.2) as obtained from the UDM encoded as "rfsp" attribute;

5. if a UE location change occurred, the UE location encoded as "userLoc" attribute;

6. if the Policy Control Request Trigger "Change of UE presence in PRA" is provided, the current presence status of the UE for the presence reporting areas for which reporting was requested, if not previously provided, or the presence reporting areas for which reporting was requested and the status has changed encoded as "praStatuses" attribute.

NOTE 2: If the PCF included the identifer of a Core Network predefined Presence Reporting Area Set within the "praId" attribute during the subscription to changes of UE presence in PRA, the AMF only provides the presence reporting area information corresponding to the concerned individual Presence Reporting Area Identifier(s) within the Set. The "praId" attribute within each returned "PresenceInfo" data type hence includes the identifier of the concerned individual Presence Reporting Area.

7. if the trace control configuration needs to be updated, trace control and configuration parameters information encoded as "traceReq" attribute;

8. if trace needs to be terminated, the "traceReq" attribute set to the Null value;

9. if the "SliceSupport" feature or the "DNNReplacementControl" feature is supported, the UE is registered via 3GPP access, the allowed NSSAI changed, and the Policy Control Request Trigger "Change of allowed NSSAI" was provided, then the allowed NSSAI encoded in the "allowedSnssais" attribute;

10. for AMF relocation scenarios, if available, alternate or backup IPv4 Address(es) where to send Notifications encoded as "altNotifIpv4Addrs" attribute;

11. for AMF relocation scenarios, if available, alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addrs" attribute;

12. for AMF relocation scenarios, if available, alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute;

13. for AMF relocation scenarios, if available, the GUAMI encoded as "guami" attribute;

NOTE 3: An alternate NF service consumer than the one that requested the generation of the subscription resource can send the request. For instance, an AMF as service consumer can change.

14. if the feature "UE-AMBR\_Authorization" is supported, and a subscribed UE-AMBR change occurred, the UE-AMBR (see subclause 4.2.2.3.3) as obtained from the UDM encoded as "ueAmbr" attribute;

15. if the feature "DNNReplacementControl" is supported, DNN replacement applies and the Policy Control Request Trigger "Change of SMF selection information" is provided, the "smfSelInfo" attribute including:

- the UE requested DNN in the "dnn" attribute; and

- the UE requested S-NSSAI in the "snssai" attribute and, if available, the corresponding mapped home S-NSSAI in the "mappingSnssai" attribute;

when:

- the UE requested an unsupported DNN and the "unsuppDnn" attribute is set to "true"; or

- the UE requested DNN and S-NSSAI matched one of the S-NSSAI and DNN provided in the "candidates" attribute; and

16. if feature "DNNReplacementControl" is supported, the UE is registered via 3GPP access, the Allowed NSSAI changed and/or the mapping of a S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN changed, and the Policy Control Request Trigger" Change of allowed NSSAI" was provided, then the mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN encoded in the "mappingSnssais" attribute;

NOTE 4: When the feature "DNNReplacementControl" is supported, the AMF applies DNN replacement for non-roaming scenarios and LBO. For a PDU session with home routed roaming, whether to perform DNN replacement is based on operator agreement.

17. if feature "UE-Slice-MBR\_Authorization" is supported, and a subscribed UE-Slice-MBR change occurred, the updated subscribed UE-Slice-MBR(s) (see subclause 4.2.2.3.5) as obtained from the UDM encoded in the "ueSliceMbrs" map attribute as follows:

a) A new entry shall be added by supplying a new S-NSSAI as key and the corresponding SliceMbr data type instance with complete contents as value as an entry within the map.

b) An existing entry shall be modified by supplying the existing S-NSSAI as key and the SliceMbr data type instance with complete contents as value as an entry within the map.

c) An existing entry shall be deleted by supplying the existing S-NSSAI as key and "NULL" as value as an entry within the map.

d) For an unmodified entry, no entry needs to be provided within the map.

18. if the feature "EneNA" is supported and an NWDAF information change occurred, the list of NWDAF instance IDs used for the UE within the "nwdafInstanceIds" and their associated Analytic ID(s) within "nwdafEvents" with the updated values included within the "nwdafDatas" attribute.

NOTE x: The NF service consumer provides the complete updated list of NWDAF instance IDs and associated Analytic ID(s) used for the UE. If all NWDAF data is deleted an empty list is included.

Upon the reception of the HTTP POST request, the PCF shall:

- update the corresponding individual AM Policy resource based on the information provided by the NF service consumer;

- determine the applicable policy based on local policy;

- for the successful case, send a HTTP "200 OK" response with the PolicyUpdate data type as body with possible updates for that applicable policy and Policy Control Request Trigger(s) encoded as described in subclause 4.2.3.3 and according to the following provisions:

a) if the PCF received the "servAreaRes" attribute in the request, Service Area Restrictions encoded as "servAreaRes" attribute;

b) if the PCF received the "rfsp" attribute in the request, RAT Frequency Selection Priority (RFSP) Index encoded as "rfsp" attribute;

c) if the feature "UE-AMBR\_Authorization" is supported and the PCF received the "ueAmbr" attribute in the request, UE-AMBR encoded as "ueAmbr" attribute;

d) if the PCF received the "smfSelInfo" attribute in the request, the "smfSelInfo" attribute encoding the PCF selected DNN in the "dnn" attribute corresponding to the S-NSSAI received in the "snssai" attribute; and/or

NOTE y: A PolicyUpdate data structure with only mandatory attribute(s) is included in the "200 OK" response when the PCF decides not to update the policies.

e) if the feature "UE-Slice-MBR\_Authorization" is supported and the PCF received the "ueSliceMbrs" attribute in the request, the corresponding authorized UE-Slice-MBR(s) encoded as "ueSliceMbrs" attribute;

- if errors occur when processing the HTTP POST request, apply error handling procedures as specified in subclause 5.7 and according to the following provisions:

a) if the PCF is, due to incomplete, erroneous or missing information in the request, not able to provision an AM policy decision, the PCF may reject the request and include in an HTTP "400 Bad Request" response message the "cause" attribute of the ProblemDetails data structure set to "ERROR\_REQUEST\_PARAMETERS".

b) if the "ES3XX" feature is supported and the PCF (service) instance has changed, the PCF may respond with an HTTP 3xx redirect response pointing to a new PCF (service) instance as defined in subclause 6.5.3.3 of 3GPP TS 29.500 [5].

If the PCF received a "traceReq" attribute, it shall perform trace procedures as defined in 3GPP TS 32.422 [18].

If the AMF received the request of removal of Service Area Restrictions and/or RFSP and/or UE-AMBR and/or UE-Slice-MBR(s) from the UDM, the AMF shall remove the authorized Service Area Restrictions and/or RFSP and/or UE-AMBR and/or UE-Slice-MBR(s) provisioned by the PCF and apply the configured Service Area Restrictions and/or RFSP and/or UE-AMBR and/or UE-Slice-MBR(s) at the AMF without interacting with the PCF.

If feature "DNNReplacementControl" is supported and the AMF received the update of the SMF selection information within the "smfSelInfo" attribute in the response, the AMF shall apply the updated SMF selection information to the new PDU Sessions only, i.e. already established PDU Sessions are not affected.

If the PCF received a new GUAMI, the PCF may subscribe to GUAMI changes using the AMFStatusChange service operation of the Namf\_Communication service specified in 3GPP TS 29.518 [14], and it may use the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the obtained GUAMI and possibly service name) to query the other AMFs within the AMF set.

If the PCF received a "servAreaRes" attribute which resulted to a change of the Service Area Restrictions, it shall send notifications to any NF Service Consumer(s) (e.g. AF) that have subscribed to the respective event by using the Npcf\_PolicyAuthorization service (see TS 29.514 [25]).

If the PCF received a new list of NWDAF instance IDs used for the UE in "nwdafInstanceIds" attribute and their associated Analytic IDs in "nwdafEvents" attribute included within the "nwdafDatas" attribute the PCF may select those NWDAF instances based on this new list as described in 3GPP TS 29.513 [7].

\* \* \* Fifth Change \* \* \* \*

#### 4.2.3.2 Policy Control Request Triggers

The following Policy Control Request Triggers are defined (see subclause 6.1.2.5 of 3GPP TS 23.503 [4]):

- "LOC\_CH", i.e. location change (tracking area): the tracking area of the UE has changed;

- "PRA\_CH", i.e. change of UE presence in PRA: the UE is entering/leaving a Presence Reporting Area, this includes reporting the initial status at the time the request for reports is initiated;

- "SERV\_AREA \_CH", i.e. Service Area Restriction change: the UDM notifies the AMF that the subscribed service area restriction information has changed;

- "RFSP\_CH", i.e. RFSP index change: the UDM notifies the AMF that the subscribed RFSP index has changed;

- "ALLOWED\_NSSAI\_CH", i.e. change of allowed NSSAI of the served UE;

NOTE 1: The "ALLOWED\_NSSAI\_CH" trigger only applies if the "SliceSupport" feature or the "DNNReplacementControl" feature is supported.

- "UE\_AMBR\_CH", i.e. UE-AMBR change: the UDM notifies the AMF that the subscribed UE-AMBR has changed;

NOTE 2: The "UE\_AMBR\_CH" trigger only applies if the "UE-AMBR\_Authorization" feature is supported.

- "SMF\_SELECT\_CH", i.e. SMF selection information change: UE request for an unsupported DNN or UE request for a DNN within the list of DNN candidates for replacement per S-NSSAI;

NOTE 3: The "SMF\_SELECT\_CH" trigger only applies if the "DNNReplacementControl" feature is supported and "ALLOWED\_NSSAI\_CH" trigger is also subscribed.

- "ACCESS\_TYPE\_CH", i.e. the access type change: the AMF notifies that the access type and the RAT type combinations available in the AMF for a UE with simultaneous 3GPP and non-3GPP connectivity has changed; and

NOTE 4: The "ACCESS\_TYPE\_CH" trigger only applies if the "MultipleAccessTypes" feature is supported as specified in Annex B.

- "UE\_SLICE\_MBR\_CH", i.e. UE-Slice-MBR change: the UDM notifies the AMF that the subscribed UE-Slice-MBR(s) has changed and the S-NSSAI(s) is within the allowed NSSAI.

NOTE 5: The "UE\_SLICE\_MBR\_CH" trigger only applies if the "UE-Slice-MBR\_Authorization" feature is supported.

- "NWDAF\_DATA\_CH", i.e. NWDAF Data change:the list of NWDAF Instance IDs and/or their associated Analytics IDs consumed by the AMF have changed.

NOTE x: The "NWDAF\_DATA\_CH" trigger only applies if the "EneNA" feature is supported.

\* \* \* Sixth Change \* \* \*

### 5.6.1 General

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

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

Table 5.6.1-1: Npcf\_AMPolicyControl specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| CandidateForReplacement | 5.6.2.8 | Contains the list of candidate DNNs for replacement per S-NSSAI. | DNNReplacementControl |
| PolicyAssociation | 5.6.2.2 | Description of a policy association that is returned by the PCF when a policy Association is created, or read. |  |
| PolicyAssociationReleaseCause | 5.6.3.4 | The cause why the PCF requests the termination of the policy association. |  |
| PolicyAssociationRequest | 5.6.2.3 | Information that NF service consumer provides when requesting the creation of a policy association. |  |
| PolicyAssociationUpdateRequest | 5.6.2.4 | Information that NF service consumer provides when requesting the update of a policy association. |  |
| PolicyUpdate | 5.6.2.5 | Updated policies that the PCF provides in a notification or in the reply to an Update Request. |  |
| RequestTrigger | 5.6.3.3 | Enumeration of possible Request Triggers. |  |
| SmfSelectionData | 5.6.2.7 | Includes the SMF Selection information that may be replaced by the PCF. | DNNReplacementControl |
| TerminationNotification | 5.6.2.6 | Request to terminate a policy Association that the PCF provides in a notification. |  |
| AmRequestedValueRep | 5.6.2.9 | Contains the current applicable values corresponding to the policy control request triggers. | ImmediateReport |

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

Table 5.6.1-2: Npcf\_AMPolicyControl re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| AccessType | 3GPP TS 29.571 [11] |  |  |
| Ambr | 3GPP TS 29.571 [11] | Aggregated Maximum Bit Rate. | UE-AMBR\_Authorization |
| Dnn | 3GPP TS 29.571 [11] | DNN | DNNReplacementControl |
| Fqdn | 3GPP TS 29.510 [13] | FQDN |  |
| Gpsi | 3GPP TS 29.571 [11] | Generic Public Subscription Identifier |  |
| GroupId | 3GPP TS 29.571 [11] |  |  |
| Guami | 3GPP TS 29.571 [11] | Globally Unique AMF Identifier |  |
| Ipv4Addr | 3GPP TS 29.571 [11] |  |  |
| Ipv6Addr | 3GPP TS 29.571 [11] |  |  |
| MappingOfSnssai | 3GPP TS 29.531 [24] | Identifies the mapping of an S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN. | DNNReplacementControl |
| NwdafData | 3GPP TS 29.512 [yy] | Indicates the list of NWDAF instance IDs used for the UE and their associated Analytics ID(s) consumed by the NF service consumer. | EneNA |
| Pei | 3GPP TS 29.571 [11] | Permanent Equipment Identifier |  |
| PlmnIdNid | 3GPP TS 29.571 [11] | PLMN Identifier, and for SNPN NID |  |
| PresenceInfo | 3GPP TS 29.571 [11] | Presence reporting area information |  |
| PresenceInfoRm | 3GPP TS 29.571 [11] | This data type is defined in the same way as the "PresenceInfo" data type, but with the OpenAPI "nullable: true" property. |  |
| ProblemDetails | 3GPP TS 29.571 [11] |  |  |
| RedirectResponse | 3GPP TS 29.571 [11] | Contains redirection related information. | ES3XX |
| Uri | 3GPP TS 29.571 [11] |  |  |
| UserLocation | 3GPP TS 29.571 [11] |  |  |
| RatType | 3GPP TS 29.571 [11] |  |  |
| RfspIndex | 3GPP TS 29.571 [11] |  |  |
| ServiceAreaRestriction | 3GPP TS 29.571 [11] | Within the areas attribute, only tracking area codes shall be included. |  |
| ServiceName | 3GPP TS 29.510 [13] | Name of the service instance. |  |
| SliceMbr | 3GPP TS 29.571 [11] | Per UE per Slice-Maximum Bit Rate. | UE-Slice-MBR\_Authorization |
| Snssai | 3GPP TS 29.571 [11] | Identifies a S-NSSAI included in the Allowed NSSAI. | SliceSupport |
| Supi | 3GPP TS 29.571 [11] | Subscription Permanent Identifier |  |
| SupportedFeatures | 3GPP TS 29.571 [11] | Used to negotiate the applicability of the optional features defined in table 5.8-1. |  |
| TimeZone | 3GPP TS 29.571 [11] |  |  |
| TraceData | 3GPP TS 29.571 [11] |  |  |
| WirelineServiceAreaRestriction | 3GPP TS 29.571 [11] |  | WirelineWirelessConvergence |

\* \* \* Seventh Change \* \* \* \*

#### 5.6.2.3 Type PolicyAssociationRequest

Table 5.6.2.3-1: Definition of type PolicyAssociationRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| notificationUri | Uri | M | 1 | Identifies the recipient of Notifications sent by the PCF. |  |
| altNotifIpv4Addrs | array(Ipv4Addr) | O | 1..N | Alternate or backup IPv4 Address(es) where to send Notifications. |  |
| altNotifIpv6Addrs | array(Ipv6Addr) | O | 1..N | Alternate or backup IPv6 Address(es) where to send Notifications. |  |
| altNotifFqdns | array(Fqdn) | O | 1..N | Alternate or backup FQDN(s) where to send Notifications. |  |
| supi | Supi | M | 1 | Subscription Permanent Identifier. |  |
| gpsi | Gpsi | C | 0..1 | Generic Public Subscription Identifier. Shall be provided when available. |  |
| accessType | AccessType | C | 0..1 | The Access Type where the served UE is camping. Shall be provided when available. |  |
| accessTypes | array(AccessType) | C | 1..N | The Access Types where the served UE is camping. Shall be provided when available. | MultipleAccessTypes |
| pei | Pei | C | 0..1 | The Permanent Equipment Identifier of the served UE. Shall be provided when available. |  |
| userLoc | UserLocation | C | 0..1 | The location of the served UE. Shall be provided when available. |  |
| timeZone | TimeZone | C | 0..1 | The time zone where the served UE is camping. Shall be provided when available. |  |
| servingPlmn | PlmnIdNid | C | 0..1 | The serving PLMN where the served UE is camping. For an SNPN the NID together with the PLMN ID identifies the SNPN. Shall be provided when available. |  |
| ratType | RatType | C | 0..1 | The 3GPP RAT Type where the served UE is camping. Shall be provided when available. |  |
| ratTypes | array(RatType) | C | 1..N | The 3GPP and non-3GPP RAT Types where the served UE is camping. Shall be provided when available. | MultipleAccessTypes |
| groupIds | array(GroupId) | C | 1..N | List of Internal Group Identifiers of the served UE. Shall be provided when available. |  |
| servAreaRes | ServiceAreaRestriction | C | 0..1 | Service Area Restriction as part of the AMF Access and Mobility Policy. Shall be provided when available. |  |
| wlServAreaRes | WirelineServiceAreaRestriction | O | 0..1 | Wireline Service Area Restriction as part of the AMF Access and Mobility Policy as determined by the PCF | WirelineWirelessConvergence |
| rfsp | RfspIndex | C | 0..1 | RFSP Index as part of the AMF Access and Mobility Policy. Shall be provided when available. |  |
| ueAmbr | Ambr | C | 0..1 | UE-AMBR as part of the AMF Access and Mobility Policy. Shall be provided when available. | UE-AMBR\_Authorization |
| ueSliceMbrs | map(SliceMbr) | C | 1..N | One or more subscribed UE-Slice-MBR(s). Shall be provided when available.  The key of the map is the S-NSSAI to which the UE-Slice-MBR belongs. | UE-Slice-MBR\_Authorization |
| allowedSnssais | array(Snssai) | C | 1..N | Represents the Allowed NSSAI in the 3GPP access and includes the S-NSSAIs values the UE can use in the serving PLMN. It shall be included if the feature "SliceSupport" or the feature "DNNReplacementControl" is supported in the AMF. | SliceSupport, DNNReplacementControl |
| mappingSnssais | array(MappingOfSnssai) | C | 1..N | The mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN. It shall be included if available.  If the feature "MultipleAccessTypes" is supported, this attribute contains also the mapping of the Allowed NSSAI in the non-3GPP access to the corresponding S-NSSAI of the HPLMN. | DNNReplacementControl |
| n3gAllowedSnssais | array(Snssai) | C | 1..N | Represents the Allowed NSSAI in the non-3GPP access and includes the S-NSSAIs values the UE can use in the serving PLMN. It shall be included if the feature "MultipleAccessTypes" and, the feature "SliceSupport" or "DNNReplacementControl" are supported in the AMF and the UE is registered in the non-3GPP access. | SliceSupport, MultipleAccessTypes, DNNReplacementControl |
| guami | Guami | C | 0..1 | The Globally Unique AMF Identifier (GUAMI) shall be provided by an AMF as service consumer. |  |
| serviceName | ServiceName | O | 0..1 | If the NF service consumer is an AMF, it should provide the name of a service produced by the AMF that makes use of information received within the Npcf\_AMPolicyControl\_UpdateNotify service operation. |  |
| suppFeat | SupportedFeatures | M | 1 | Indicates the features supported by the service consumer. |  |
| traceReq | TraceData | C | 0..1 | Trace control and configuration parameters information defined in 3GPP TS 32.422 [18] shall be included if trace is required to be activated. |  |
| nwdafDatas | array(NwdafData) | O | 1..N | List of NWDAF Instance IDs and their associated Analytics IDs consumed by the NF service consumer. | EneNA |

\* \* \* Eighth Change \* \* \* \*

#### 5.6.2.4 Type PolicyAssociationUpdateRequest

Table 5.6.2.4-1: Definition of type PolicyAssociationUpdateRequest

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| notificationUri | Uri | O | 0..1 | Identifies the recipient of Notifications sent by the PCF. |  |
| altNotifIpv4Addrs | array(Ipv4Addr) | O | 1..N | Alternate or backup IPv4 Address(es) where to send Notifications. |  |
| altNotifIpv6Addrs | array(Ipv6Addr) | O | 1..N | Alternate or backup IPv6 Address(es) where to send Notifications. |  |
| altNotifFqdns | array(Fqdn) | O | 1..N | Alternate or backup FQDN(s) where to send Notifications. |  |
| triggers | array(RequestTrigger) | C | 1..N | Request Triggers that the NF service consumer observes. |  |
| servAreaRes | ServiceAreaRestriction | C | 0..1 | Service Area Restriction as part of the AMF Access and Mobility Policy. Shall be provided for trigger "SERV\_AREA\_CH". |  |
| wlServAreaRes | WirelineServiceAreaRestriction | C | 0..1 | Wireline Service Area Restriction as part of the AMF Access and Mobility Policy. Shall be provided for trigger "SERV\_AREA\_CH". | WirelineWirelessConvergence |
| rfsp | RfspIndex | C | 0..1 | RFSP Index as part of the AMF Access and Mobility Policy. Shall be provided for trigger "RFSP\_CH". |  |
| smfSelInfo | SmfSelectionData | C | 0..1 | The UE requested S-NSSAI and UE requested DNN. Shall be provided for trigger "SMF\_SELECT\_CH". | DNNReplacementControl |
| ueAmbr | Ambr | C | 0..1 | UE-AMBR as part of the AMF Access and Mobility Policy. Shall be provided for trigger "UE\_AMBR\_CH". | UE-AMBR\_Authorization |
| ueSliceMbrs | map(SliceMbr) | C | 1..N | One or more updated subscribed UE-Slice-MBR(s). Shall be provided for the "UE\_SLICE\_MBR\_CH" policy control request trigger.  The key of the map is the S-NSSAI to which the UE-Slice-MBR belongs. | UE-Slice-MBR\_Authorization |
| praStatuses | map(PresenceInfo) | C | 1..N | If the Trigger "PRA\_CH" is reported, the UE presence status for tracking area for which changes of the UE presence occurred shall be provided. The "praId" attribute within the PresenceInfo data type shall also be the key of the map. The "presenceState" attribute within the PresenceInfo data type shall be supplied. The "additionalPraId" attribute within the PresenceInfo data type shall not be supplied. The "praId" attribute within the PresenceInfo data type shall include the identifier of an individual presence reporting area. |  |
| userLoc | UserLocation | C | 0..1 | The location of the served UE shall be provided for trigger "LOC\_CH". |  |
| allowedSnssais | array(Snssai) | C | 1..N | Represents the Allowed NSSAI in the 3GPP access and includes the S-NSSAIs values the UE can use in the serving PLMN. It shall be provided for trigger "ALLOWED\_NSSAI\_CH". | SliceSupport, DNNReplacementControl |
| mappingSnssais | array(MappingOfSnssai) | O | 1..N | The mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN. It shall be provided for trigger "ALLOWED\_NSSAI\_CH" if available.  If the feature "MultipleAccessTypes" is supported, this attribute contains also the mapping of the Allowed NSSAI in the non-3GPP access to the corresponding S-NSSAI of the HPLMN. | DNNReplacementControl |
| n3gAllowedSnssais | array(Snssai) | C | 1..N | Represents the Allowed NSSAI in the non-3GPP access and includes the S-NSSAIs values the UE can use in the serving PLMN. It shall be provided for trigger "ALLOWED\_NSSAI\_CH" when the feature "MultipleAccessTypes" is supported. | SliceSupport, MultipleAccessTypes, DNNReplacementControl |
| accessTypes | array(AccessType) | C | 1..N | The Access Types where the served UE is camping. Shall be provided for trigger "ACCESS\_TYPE\_CH". | MultipleAccessTypes |
| ratTypes | array(RatType) | C | 1..N | The 3GPP RAT Type and non-3GPP RAT Type where the served UE is camping. Shall be provided for trigger "ACCESS\_TYPE\_CH". | MultipleAccessTypes |
| traceReq | TraceData | C | 0..1 | Trace control and configuration parameters information defined in 3GPP TS 32.422 [18] shall be included if trace is required to be activated, modified or deactivated. For trace modification, it shall contain a complete replacement of trace data. For trace deactivation, it shall contain the Null value. |  |
| guami | Guami | O | 0..1 | The Globally Unique AMF Identifier (GUAMI) shall be provided by an AMF as service consumer. |  |
| nwdafDatas | array(NwdafData) | O | 1..N | List of NWDAF Instance IDs and their associated Analytics IDs consumed by the NF service consumer. | EneNA |

\* \* \* Nineth Change \* \* \* \*

#### 5.6.3.3 Enumeration: RequestTrigger

The enumeration RequestTrigger represents the possible Policy Control Request Triggers. It shall comply with the provisions defined in table 5.6.3.3-1.

Table 5.6.3.3-1: Enumeration RequestTrigger

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| LOC\_CH | Location change (tracking area): the tracking area of the UE has changed. (NOTE) |  |
| PRA\_CH | Change of UE presence in PRA: the NF service consumer reports the current presence status of the UE in a Presence Reporting Area, and notifies that the UE enters/leaves the Presence Reporting Area. |  |
| SERV\_AREA\_CH | Service Area Restriction change: the UDM notifies the NF service consumer that the subscribed service area restriction information has changed. |  |
| RFSP\_CH | RFSP index change: the UDM notifies the NF service consumer that the subscribed RFSP index has changed. |  |
| ALLOWED\_NSSAI\_CH | Allowed NSSAI change: the NF service consumer notifies that the set of UE allowed S-NSSAIs has changed. | SliceSupport, DNNReplacementControl |
| UE\_AMBR\_CH | UE-AMBR change: the UDM notifies the NF service consumer that the subscribed UE-AMBR has changed. | UE-AMBR\_Authorization |
| SMF\_SELECT\_CH | SMF selection information change: UE request for an unsupported DNN or UE request for a DNN within the list of DNN candidates for replacement per S-NSSAI. | DNNReplacementControl |
| ACCESS\_TYPE\_CH | Access Type change: the NF service consumer notifies that the access type and the RAT type combinations available in the NF service consumer for a UE with simultaneous 3GPP and non-3GPP connectivity have changed. (NOTE) | MultipleAccessTypes |
| UE\_SLICE\_MBR\_CH | UE-Slice-MBR change: the UDM notifies the NF service consumer that the subscribed UE-Slice-MBR(s) has changed and the S-NSSAI(s) is within the allowed NSSAI. | UE-Slice-MBR\_Authorization |
| NWDAF\_DATA\_CH | Indicates that the NWDAF instance IDs used for the UE and/or associated Analytics IDs have changed. | EneNA |
| NOTE: This includes reporting the current value at the time the trigger is provisioned during the update or update notification of the policy association. | | |

\* \* \* Tenth Change \* \* \* \*

## 5.8 Feature negotiation

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

Table 5.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | SliceSupport | Indicates the support of AM policies differentiation based on the awareness of the allowed NSSAI. |
| 2 | PendingTransaction | This feature indicates support for the race condition handling as defined in 3GPP TS 29.513 [7]. |
| 3 | UE-AMBR\_Authorization | Indicates the support of UE-AMBR control by the PCF in the serving network. |
| 4 | DNNReplacementControl | Indicates the support of DNN replacement control. |
| 5 | MultipleAccessTypes | Indicates the support of AM policies for the multiple access types where the served UE is camping. |
| 6 | WirelineWirelessConvergence | Indicates the support of Wireline and Wireless access convergence. |
| 7 | ImmediateReport | Indicates the support of the current applicable values report corresponding to the policy control request triggers for policy update notification. |
| 8 | 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 subclauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [5] and according to HTTP redirection principles for indirect communication, as specified in subclause 6.10.9 of 3GPP TS 29.500 [5]. |
| 9 | UE-Slice-MBR\_Authorization | Indicates the support of UE-Slice-MBR control by the PCF in the serving network. It requires the support of SliceSupport feature. |
| XX | EneNA | This feature indicates the support of NWDAF data reporting. |

\* \* \* Eleventh Change \* \* \* \*

# A.2 Npcf\_AMPolicyControl API

openapi: 3.0.0

info:

version: 1.2.0-alpha.5

title: Npcf\_AMPolicyControl

description: |

Access and Mobility Policy Control Service.

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externalDocs:

description: 3GPP TS 29.507 V17.4.0; 5G System; Access and Mobility Policy Control Service.

url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.507/'

servers:

- url: '{apiRoot}/npcf-am-policy-control/v1'

variables:

apiRoot:

default: https://example.com

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

security:

- {}

- oAuth2ClientCredentials:

- npcf-am-policy-control

paths:

/policies:

post:

operationId: CreateIndividualAMPolicyAssociation

summary: Create individual AM policy association.

tags:

- AM Policy Associations (Collection)

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'201':

description: Created

content:

application/json:

schema:

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

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/npcf-am-policy-control/v1/policies/{polAssoId}'

required: true

schema:

type: string

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

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

callbacks:

policyUpdateNotification:

'{$request.body#/notificationUri}/update':

post:

requestBody:

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK. The current applicable values corresponding to the policy control request trigger is reported

content:

application/json:

schema:

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

'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'

'503':

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

default:

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

policyAssocitionTerminationRequestNotification:

'{$request.body#/notificationUri}/terminate':

post:

requestBody:

required: true

content:

application/json:

schema:

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

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'

'503':

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

default:

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

/policies/{polAssoId}:

get:

operationId: ReadIndividualAMPolicyAssociation

summary: Read individual AM policy association.

tags:

- Individual AM Policy Association (Document)

parameters:

- name: polAssoId

in: path

description: Identifier of a policy association

required: true

schema:

type: string

responses:

'200':

description: OK. Resource representation is returned

content:

application/json:

schema:

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

'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'

'503':

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

default:

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

delete:

operationId: DeleteIndividualAMPolicyAssociation

summary: Delete individual AM policy association.

tags:

- Individual AM Policy Association (Document)

parameters:

- name: polAssoId

in: path

description: Identifier of a policy association

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'

'503':

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

default:

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

/policies/{polAssoId}/update:

post:

operationId: ReportObservedEventTriggersForIndividualAMPolicyAssociation

summary: Report observed event triggers and obtain updated policies for an individual AM policy association.

tags:

- Individual AM Policy Association (Document)

requestBody:

required: true

content:

application/json:

schema:

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

parameters:

- name: polAssoId

in: path

description: Identifier of a policy association

required: true

schema:

type: string

responses:

'200':

description: OK. Updated policies are returned

content:

application/json:

schema:

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

'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'

'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:

npcf-am-policy-control: Access to the Npcf\_AMPolicyControl API

schemas:

PolicyAssociation:

description: Represents an individual AM Policy Association resource.

type: object

properties:

request:

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

triggers:

type: array

items:

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

minItems: 1

description: Request Triggers that the PCF subscribes.

servAreaRes:

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

wlServAreaRes:

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

rfsp:

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

smfSelInfo:

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

ueAmbr:

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

ueSliceMbrs:

type: object

additionalProperties:

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

minProperties: 1

description: One or more UE-Slice-MBR(s) as part of the AMF Access and Mobility Policy as determined by the PCF. The key of the map is the S-NSSAI to which the UE-Slice-MBR belongs.

pras:

type: object

additionalProperties:

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

minProperties: 1

description: Contains the presence reporting area(s) for which reporting was requested. The praId attribute within the PresenceInfo data type is the key of the map.

suppFeat:

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

required:

- suppFeat

PolicyAssociationRequest:

description: Information which the NF service consumer provides when requesting the creation of a policy association. The serviveName property corresponds to the serviceName in the main body of the specification.

type: object

properties:

notificationUri:

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

altNotifIpv4Addrs:

type: array

items:

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

minItems: 1

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

altNotifIpv6Addrs:

type: array

items:

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

minItems: 1

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

altNotifFqdns:

type: array

items:

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

minItems: 1

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

supi:

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

gpsi:

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

accessType:

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

accessTypes:

type: array

items:

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

minItems: 1

pei:

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

userLoc:

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

timeZone:

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

servingPlmn:

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

ratType:

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

ratTypes:

type: array

items:

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

minItems: 1

groupIds:

type: array

items:

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

minItems: 1

servAreaRes:

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

wlServAreaRes:

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

rfsp:

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

ueAmbr:

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

ueSliceMbrs:

type: object

additionalProperties:

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

minProperties: 1

description: One or more subscribed UE-Slice-MBR(s). Shall be provided when available. The key of the map is the S-NSSAI to which the UE-Slice-MBR belongs.

allowedSnssais:

description: array of allowed S-NSSAIs for the 3GPP access.

type: array

items:

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

minItems: 1

mappingSnssais:

description: mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN.

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/MappingOfSnssai'

minItems: 1

n3gAllowedSnssais:

description: array of allowed S-NSSAIs for the Non-3GPP access.

type: array

items:

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

minItems: 1

guami:

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

serviveName:

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

traceReq:

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

nwdafDatas:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/NwdafData'

minItems: 1

suppFeat:

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

required:

- notificationUri

- suppFeat

- supi

PolicyAssociationUpdateRequest:

description: Represents information that the NF service consumer provides when requesting the update of a policy association.

type: object

properties:

notificationUri:

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

altNotifIpv4Addrs:

type: array

items:

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

minItems: 1

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

altNotifIpv6Addrs:

type: array

items:

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

minItems: 1

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

altNotifFqdns:

type: array

items:

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

minItems: 1

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

triggers:

type: array

items:

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

minItems: 1

description: Request Triggers that the NF service consumer observes.

servAreaRes:

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

wlServAreaRes:

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

rfsp:

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

smfSelInfo:

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

ueAmbr:

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

ueSliceMbrs:

type: object

additionalProperties:

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

minProperties: 1

description: One or more updated subscribed UE-Slice-MBR(s). Shall be provided for the "UE\_SLICE\_MBR\_CH" policy control request trigger. The key of the map is the S-NSSAI to which the UE-Slice-MBR belongs.

praStatuses:

type: object

additionalProperties:

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

minProperties: 1

description: Contains the UE presence status for tracking area for which changes of the UE presence occurred. The praId attribute within the PresenceInfo data type is the key of the map.

userLoc:

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

allowedSnssais:

description: array of allowed S-NSSAIs for the 3GPP access.

type: array

items:

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

minItems: 1

mappingSnssais:

description: mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN.

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/MappingOfSnssai'

minItems: 1

accessTypes:

type: array

items:

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

minItems: 1

ratTypes:

type: array

items:

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

minItems: 1

n3gAllowedSnssais:

description: array of allowed S-NSSAIs for the Non-3GPP access.

type: array

items:

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

minItems: 1

traceReq:

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

guami:

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

nwdafDatas:

type: array

items:

$ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/NwdafData'

minItems: 1

nullable: true

PolicyUpdate:

description: Represents updated policies that the PCF provides in a notification or in a reply to an Update Request.

type: object

properties:

resourceUri:

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

triggers:

type: array

items:

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

minItems: 1

nullable: true

description: Request Triggers that the PCF subscribes.

servAreaRes:

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

wlServAreaRes:

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

rfsp:

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

smfSelInfo:

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

ueAmbr:

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

ueSliceMbrs:

type: object

additionalProperties:

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

minProperties: 1

description: One or more UE-Slice-MBR(s) as part of the AMF Access and Mobility Policy. The key of the map is the S-NSSAI to which the UE-Slice-MBR belongs.

pras:

type: object

additionalProperties:

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

description: Contains the presence reporting area(s) for which reporting was requested. The praId attribute within the PresenceInfo data type is the key of the map.

minProperties: 1

nullable: true

required:

- resourceUri

TerminationNotification:

description: Represents a request to terminate a policy Association that the PCF provides in a notification.

type: object

properties:

resourceUri:

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

cause:

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

required:

- resourceUri

- cause

SmfSelectionData:

description: Represents the SMF Selection information that may be replaced by the PCF.

type: object

properties:

unsuppDnn:

type: boolean

candidates:

type: object

additionalProperties:

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

minProperties: 1

description: Contains the list of DNNs per S-NSSAI that are candidates for replacement. The snssai attribute within the CandidateForReplacement data type is the key of the map.

nullable: true

snssai:

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

mappingSnssai:

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

dnn:

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

nullable: true

CandidateForReplacement:

description: Represents a list of candidate DNNs for replacement for an S-NSSAI.

type: object

properties:

snssai:

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

dnns:

type: array

items:

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

minItems: 1

nullable: true

required:

- snssai

nullable: true

AmRequestedValueRep:

description: Represents the current applicable values corresponding to the policy control request triggers.

type: object

properties:

userLoc:

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

praStatuses:

type: object

additionalProperties:

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

minProperties: 1

description: Contains the UE presence statuses for tracking areas. The praId attribute within the PresenceInfo data type is the key of the map.

accessTypes:

type: array

items:

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

minItems: 1

ratTypes:

type: array

items:

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

RequestTrigger:

anyOf:

- type: string

enum:

- LOC\_CH

- PRA\_CH

- SERV\_AREA\_CH

- RFSP\_CH

- ALLOWED\_NSSAI\_CH

- UE\_AMBR\_CH

- UE\_SLICE\_MBR\_CH

- SMF\_SELECT\_CH

- ACCESS\_TYPE\_CH

- NWDAF\_DATA\_CH

- 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

- LOC\_CH: Location change (tracking area). The tracking area of the UE has changed.

- PRA\_CH: Change of UE presence in PRA. The AMF reports the current presence status of the UE in a Presence Reporting Area, and notifies that the UE enters/leaves the Presence Reporting Area.

- SERV\_AREA\_CH: Service Area Restriction change. The UDM notifies the AMF that the subscribed service area restriction information has changed.

- RFSP\_CH: RFSP index change. The UDM notifies the AMF that the subscribed RFSP index has changed.

- ALLOWED\_NSSAI\_CH: Allowed NSSAI change. The AMF notifies that the set of UE allowed S-NSSAIs has changed.

- UE\_AMBR\_CH: UE-AMBR change. The UDM notifies the AMF that the subscribed UE-AMBR has changed.

- SMF\_SELECT\_CH: SMF selection information change. The UE requested for an unsupported DNN or UE requested for a DNN within the list of DNN candidates for replacement per S-NSSAI.

- ACCESS\_TYPE\_CH: Access Type change. The AMF notifies that the access type and the RAT type combinations available in the AMF for a UE with simultaneous 3GPP and non-3GPP connectivity has changed.

- UE\_SLICE\_MBR\_CH: UE-AMBR change. UE-Slice-MBR change. The UDM notifies the AMF that the subscribed UE-Slice-MBR(s) has changed and the S-NSSAI(s) is within the allowed NSSAI.

- NWDAF\_DATA\_CH: NDWAF DATA CHANGE. The AMF notifies that the NWDAF instance IDs used for the UE and/or associated Analytics IDs used for the UE and available in the AMF have changed.

PolicyAssociationReleaseCause:

anyOf:

- type: string

enum:

- UNSPECIFIED

- UE\_SUBSCRIPTION

- INSUFFICIENT\_RES

- 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

- UNSPECIFIED: This value is used for unspecified reasons.

- UE\_SUBSCRIPTION: This value is used to indicate that the session needs to be terminated because the subscription of UE has changed (e.g. was removed).

- INSUFFICIENT\_RES: This value is used to indicate that the server is overloaded and needs to abort the session.

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