# ETSI TS 129 507 V17.11.0 (2025-03)


**5G;**
**5G System;**
**Access and Mobility Policy Control Service;**
**Stage 3**
**(3GPP TS 29.507 version 17.11.0 Release 17)**

Reference
RTS/TSGC-0329507vhb0

Keywords
5G

***ETSI***

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# Contents

# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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- z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

The present specification provides the stage 3 definition of the Access and Mobility Policy Control Service (Npcf_AMPolicyControl) of the 5G System.

The stage 2 definition and procedures of the Access and Mobility Policy Control Service are contained in 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4]. The 5G System Architecture is defined in 3GPP TS 23.501 [2].

Stage 3 call flows are provided in 3GPP TS 29.513 [7].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition of the 5G System are specified in 3GPP TS 29.500 [5] and 3GPP TS 29.501 [6].

The Access and Mobility Policy Control Service is provided by the Policy Control Function (PCF). This service provides Access and Mobility Policies.

# 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".

[27] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[28] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[29] 3GPP TS 29.525: "UE Policy Control Service; Stage 3".

[30] 3GPP TS 29.521: "5G System; Binding Support Management Service; Stage 3".

[31] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

# 3 Definitions and abbreviations

## 3.1 Definitions

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

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.501 [2], clause 3.1 apply:

**Allowed NSSAI**

**Target NSSAI**

## 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 |
| URSP | UE Route Selection Policy |
| 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 |

# 4 Access and Mobility Policy Control Service

## 4.1 Service Description

### 4.1.1 Overview

The Access and Mobility Policy Control Service, as defined in 3GPP TS 23.502 [3] and 3GPP TS 23.503 [4], is provided by the Policy Control Function (PCF).

This service provides access control and mobility management related policies to the NF service consumer and offers the following functionalities:

- policy creation based on a request from the NF service consumer during UE registration;
- notification of the NF service consumer of the updated policies which are subscribed; and
- deletion of the policy context for a UE.

### 4.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Policy and Charging related 5G architecture is also described in 3GPP TS 29.513 [7].

The Access and Mobility Policy Control Service (Npcf_AMPolicyControl) is part of the Npcf service-based interface exhibited by the Policy Control Function (PCF).

The known NF service consumer of the Npcf_AMPolicyControl service is the Access and Mobility Management Function (AMF).

The AMF accesses the Access and Mobility Policy Control Service at the PCF via the N15 Reference point. In the roaming scenario, the N15 reference point is located between the V-PCF in the visited network and the AMF.

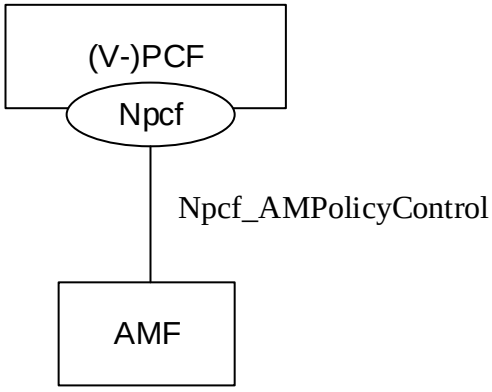


**Figure 4.1.2-1: Reference Architecture for the Npcf_AMPolicyControl Service; SBI representation**

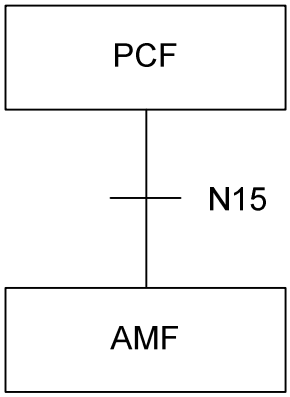


**Figure 4.1.2-2: Non-roaming Reference Architecture for the Npcf_AMPolicyControl Service; reference point representation**

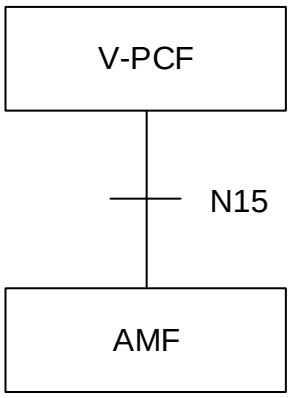


**Figure 4.1.3-2: Roaming reference Architecture for the Npcf_AMPolicyControl Service; reference point representation**

### 4.1.3 Network Functions

#### 4.1.3.1 Policy Control Function (PCF)

The Policy Control Function (PCF):

- Supports unified policy framework to govern network behaviour; and
- Provides Access and Mobility Management related policies to the NF service consumer that enforces them.

In the roaming scenario, the Visited Policy Control Function (V-PCF) provides the functions described in this clause towards the visited network.

#### 4.1.3.2 NF Service Consumers

The Access and Mobility Management function (AMF) provides:

- Registration management;
- Connection management;
- Reachability management; and
- Mobility Management.

## 4.2 Service Operations

### 4.2.1 Introduction

**Table 4.2.1-1: Operations of the Npcf_AMPolicyControl Service**

| Service operation name | Description | Initiated by |
|---|---|---|
| Npcf_AMPolicyControl_Create | Creates an AM Policy Association and provides corresponding policies to the NF service consumer. | NF service consumer (e.g. AMF) |
| Npcf_AMPolicyControl_Update | Updates an AM Policy Association and provides corresponding policies to the NF service consumer when a policy control request trigger is met or the AMF is relocated due to UE mobility and the old PCF is selected. | NF service consumer (e.g. AMF) |
| Npcf_AMPolicyControl_UpdateNotify | Provides updated policies to the NF service consumer. | PCF (V-PCF in roaming case) |
| Npcf_AMPolicyControl_Delete | Provides means for the NF service consumer to delete the AM Policy Association. | NF service consumer (e.g. AMF) |

### 4.2.2 Npcf_AMPolicyControl_Create Service Operation

#### 4.2.2.1 General

The procedure in the present clause 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 clause 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.

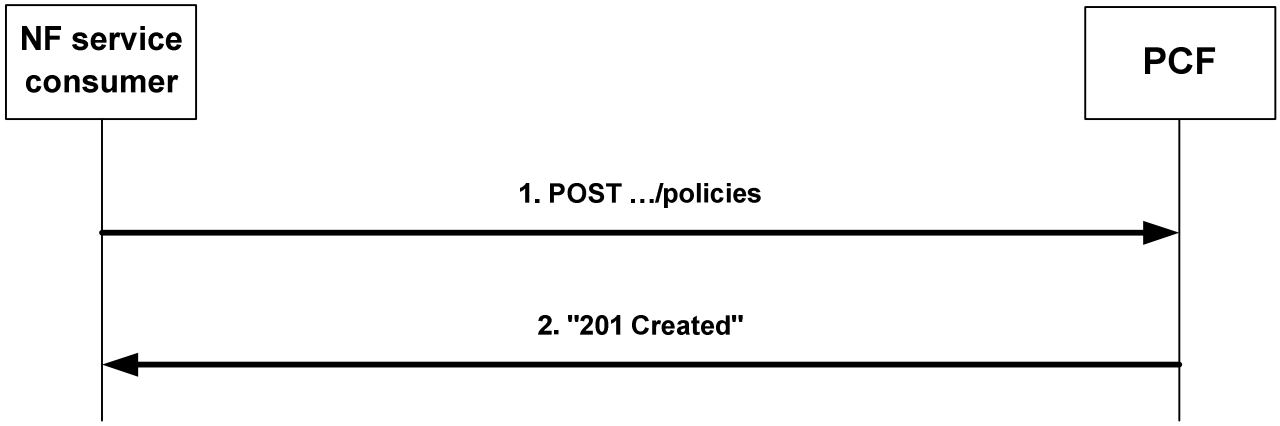


**Figure 4.2.2.1-1: Creation of a policy association**

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, the list of NWDAF instance IDs used for the UE and their associated Analytic ID(s) consumed by the AMF and the allowed NSSAI and the Target 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;

NOTE 1: In this Release, for SNPN-enabled UE registered in the SNPN, direct access to the SNPN is specified for 3GPP access only.

- Permanent Equipment Identifier (PEI) encoded as "pei" attribute;
- User Location Information encoded as "userLoc" attribute;
- UE Time Zone encoded as "timeZone" attribute;
- the identifier of the serving network (the PLMN Identifier or the SNPN Identifier)encoded as "servingPlmn" attribute;

NOTE 2: The SNPN Identifier consists of the PLMN Identifier and the NID.

- if the feature "MultipleAccessTypes" is not supported, the RAT type encoded as "ratType" attribute;
- Service Area Restrictions (see clause 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 clause 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 clause 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 NF service consumer, the subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN if available (see clause 4.2.2.3.5) encoded in the "ueSliceMbrs" attribute; and.
- when the "EneNA" feature is supported, the list of NWDAF instance IDs used for the UE and their associated Analytic IDs consumed by the NF service consumer within the "nwdafDatas" attribute; and
- if the feature "TargetNSSAI" is supported in the NF service consumer, the Target NSSAI generated by the NF service consumer or received from the NSSF encoded in the "targetSnssais" 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) for the allowed NSSAI, 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 3: 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 clause 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;

  d) 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; and/or

  e) if the feature "AMInfluence" is supported, the PCF for the UE determines that the access and mobility policies may be influenced by the traffic of PDU session(s) and local operator policies indicate that the PCF for the UE shall subscribe with the PCF for the PDU session for established/terminated PDU session(s) event notifications via the AMF and the SMF, the PCF for the UE information within the "pcfUeInfo" attribute, and the DNN and S-NSSAI of the concerned PDU session(s) within the "matchPdus" attribute. The "pcfUeInfo" attribute shall include the PCF for the UE callback URI via which the PCF(s) for the PDU session shall send notifications about the related PDU session(s)

established/terminated events within the "callbackUri" attribute, and if available, the associated PCF for the UE instance ID, PCF set ID, and the level of SBA binding within the "bindingInfo" attribute;

f) if the feature "5GAccessStratumTime" is supported and the PCF receives the access stratum time distribution parameters from the TSCTSF as defined in 3GPP TS 29.534 [26], the 5G access stratum time distribution parameters encoded as "asTimeDisParam" attribute as defined in clause 4.2.2.3.6;

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

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

  f) if the "TargetNSSAI" feature is supported, Generation of Target NSSAI; and

- 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 4: 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 clause 4.2.2.3.4) encoded as "smfSelInfo" attribute;

- if the Policy Control Request Trigger "Generation of Target NSSAI" is provided, the RFSP Index associated with the Target NSSAI encoded as "targetRfsp" attribute;

- if errors occur when processing the HTTP POST request, apply error handling procedures as specified in clause 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 and their associated Analytic IDs 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.

#### 4.2.2.2 Void

##### 4.2.2.2.0 Void

##### 4.2.2.2.1 Void

##### 4.2.2.2.2 Void

#### 4.2.2.3 AMF Access and Mobility Policy

##### 4.2.2.3.1 Service Area Restriction

If service area restrictions are enabled, the Service Area Restriction information is encoded using the "ServiceAreaRestriction" data type defined in 3GPP TS 29.571 [11] and consists of:

- a limited allowed area represented as:
  a) the maximum number of allowed TAs that can be traversed encoded as "maxNumOfTAs" attribute; or
  b) both of:
    (i) a list of allowed Tracking Area Identities (TAIs) encoded as "tacs" attributes within the "areas" attribute; and
    (ii) the "restrictionType" attribute set to "ALLOWED_AREAS"; or
  c) both a) and b) above;
- or a limited allowed area represented as:
  a) the maximum number of allowed TAs that can be traversed encoded as "maxNumOfTAsForNotAllowedAreas" attribute; or
  b) all of:
    (i) a list of not allowed Tracking Area Identities (TAIs) encoded as "tacs" attributes within the "areas" attribute; and
    (ii) the "restrictionType" attribute set to "NOT_ALLOWED_AREAS"; and
    (iii) the maximum number of allowed TAs that can be traversed encoded as "maxNumOfTAsForNotAllowedAreas" attribute;
- or a not allowed area represented as:
  a) a list of not allowed Tracking Area Identities (TAIs) encoded as "tacs" attributes within the "areas" attribute; and
  b) the "restrictionType" attribute set to "NOT_ALLOWED_AREAS".

When the "restrictionType" attribute is set to "NOT_ALLOWED_AREAS", the "maxNumOfTAs" attribute shall not be present.

When the "restrictionType" attribute is set to "ALLOWED_AREAS", the "maxNumOfTAsForNotAllowedAreas" attribute shall not be present.

When for a limited allowed area both, "maxNumOfTAs" and "areas" attributes are present, the "maxNumOfTAs" attribute represents the upper limit of the limited allowed area. The AMF may add any not yet visited tracking areas to the allowed area represented by the "areas" attribute until the total number of TAs reaches the "maxNumOfTAs" attribute value.

NOTE 1: The "maxNumOfTAs" attribute value represents the maximum number of TAs of the limited allowed area. When "maxNumOfTAs" attribute value is lower than the number of TAs in the "areas" attribute it represents the maximum number of TAs allowed inside the limited allowed area defined by the TAs contained in the "areas" attribute. When the "maxNumOfTAs" attribute value is higher than the number of TAs in the "areas" attribute it represents that additional TAs up to the "maxNumOfTAs" attribute value can be dynamically added to the area defined by the TAs contained in the "areas" attribute.

When for a limited allowed area the following three attributes are present:

- "maxNumOfTAsForNotAllowedAreas" attribute; and
- the "restrictionType" attribute set to "NOT_ALLOWED_AREAS"; and
- the "areas" attribute,

the "maxNumOfTAsForNotAllowedAreas" attribute represents the maximum number of TAs allowed in a limited allowed area outside the not allowed area represented in the "areas" attribute. The limited allowed area is dynamically calculated by the AMF, and the TAs outside of the dynamically calculated limited allowed area become not allowed TAs.

NOTE 2: Both, the "maxNumOfTAsForNotAllowedAreas" attribute and the "maxNumOfTAs" attribute, when present in a "ServiceAreaRestriction" data type instance that does not include the "areas" attribute and the "restrictionType" attribute, represent a maximum number of allowed TAs in a limited allowed area dynamically calculated by the AMF.

When the authorized service area restrictions result in an unlimited set of allowed tracking areas, the PCF shall include:

- an empty "servAreaRes" attribute; or
- the "restrictionType" attribute set to "NOT_ALLOWED_AREAS" and an empty "areas" attribute.

When the authorized service area restrictions result in an unlimited set of not-allowed tracking areas, the PCF shall include the "restrictionType" attribute set to "ALLOWED_AREAS" and an empty "areas" attribute.

NOTE 3: The "maxNumOfTAs" attribute and the "maxNumOfTAs" attribute are not used when the authorized service area restrictions result in an unlimited set of allowed or an unlimited set of not-allowed tracking areas.

#### 4.2.2.3.2 RFSP Index

The RFSP Index is an index referring to a UE information used locally by the Access Network in order to apply specific radio resource management strategies. It shall be encoded using the RfspIndex data type defined in 3GPP TS 29.571 [11].

If the feature "TargetNSSAI" is supported and when the PCF receives the Target NSSAI from the NF service consumer, the PCF shall, if the Policy Control Request Trigger "Generation of Target NSSAI" is provisioned in the response, additionally provide the RFSP Index associated with the Target NSSAI.

In order for the PCF to determine the RFSP Index value that will be authorized, the PCF shall be configured with a mapping between the RAT Type and/or frequency value and the RFSP Index.

NOTE: The RFSP index value that will be authorized and sent to the RAN is determined based on operator policies that take into consideration e.g. accumulated usage, analytics information related to load level information per network slice instance, UE communication, user data congestion or service experience, etc.

#### 4.2.2.3.3 UE-AMBR

The UE-AMBR limits the aggregate bit rate that can be expected to be provided across all Non-GBR QoS Flows of a UE. It shall be encoded using the Ambr data type defined in 3GPP TS 29.571 [11].

#### 4.2.2.3.4 SMF Selection Management

If the "DNNReplacementControl" feature is supported, when SMF Selection Management is enabled, the SMF selection information is encoded using the "SmfSelectionData" data type, which consists of:

- the conditions upon which the AMF shall request to the PCF the replacement of SMF selection data, which may include:

  a) an indication of whether the AMF shall request DNN replacement when the UE requested an unsupported DNN during PDU session establishment encoded in the "unsuppDnn" attribute; and/or

  b) a list of candidate DNNs for replacement encoded in the "candidates" map, where:

    i) the key of the map is the S-NSSAI; and

    ii) each entry of the map is of "CandidateForReplacement" data type, which:

      - shall include the S-NSSAI encoded in the "snssai" attribute; and

      - may include the list of candidate DNNs for the S-NSSAI encoded in the "dnns" attribute;

NOTE 1: The S-NSSAIs included in the map are S-NSSAIs of the allowed NSSAI valid in the serving network. The PCF keeps updated information of the allowed NSSAI valid in the serving network by subscribing to the policy control request trigger Change of allowed NSSAI of the served UE.

NOTE 2: When the PCF provides URSP rules (see 3GPP TS 29.525 [29]) to the UE with new DNN information and in order to provide uniform service experience for UEs from earlier Releases, the candidate DNNs for replacement will consider those included within the traffic descriptors in addition to those included as part of the Route Selection Descriptor(s) of the URSP rule(s) provided to the UE.

- and,

  a) when included within the Npcf_AMPolicyControl_Update request, the UE requested DNN and S-NSSAI at PDU session establishment that matched an entry of the "candidates" map, encoded in the "dnn" attribute and in the "snssai" attribute respectively, and the mapping to the home S-NSSAI encoded in the "mappingSnssai" attribute if available; and

  b) when included within the Npcf_AMPolicyControl_Update response, the PCF selected DNN encoded in the "dnn" attribute;

NOTE 2: The PCF can select the same DNN and S-NSSAI as the UE requested DNN and S-NSSAI. When the PCF returns an unsupported DNN, the AMF applies internal policies to reject the PDU session establishment.

When the "dnns" attribute is omitted in an entry of the "candidates" map it represents that the AMF shall invoke the procedure for any UE request matching the S-NSSAI value included in the "snssai" attribute.

#### 4.2.2.3.5 UE-Slice-MBR

The UE-Slice-MBR limits the aggregate bit rate that can be expected to be provided across all GBR and Non-GBR QoS Flows of a UE for an S-NSSAI. It shall be encoded using the SliceMbr data type defined in 3GPP TS 29.571 [11].

#### 4.2.2.3.6 5G access stratum time distribution

If the feature "5GAccessStratumTime" is supported and the PCF receives the access stratum time distribution parameters from the TSCTSF as defined in 3GPP TS 29.534 [26], the 5G access stratum time distribution parameters are encoded using the "asTimeDisParam" attribute of the "AsTimeDistributionParam" data type, which consists of:

- an indication of whether the 5G access stratum time distribution is enabled encoded in the "asTimeDistInd" attribute if applicable; and

- the Uu Time synchronization error budget encoded in the "uuErrorBudget" attribute if applicable.

If the PCF receives multiple time synchronization error budgets for a given UE, the PCF shall encode the most stringent error budget within the "uuErrorBudget" attribute.

If the PCF receives the removal of the access stratum time distribution parameters from the TSCTSF as defined in 3GPP TS 29.534 [26] and there are no other access stratum time distribution parameters from other requests for the same UE, the PCF shall provide the "asTimeDisParam" attribute set to NULL.

## 4.2.3 Npcf_AMPolicyControl_Update Service Operation

### 4.2.3.1 General

The procedure in the present clause 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.

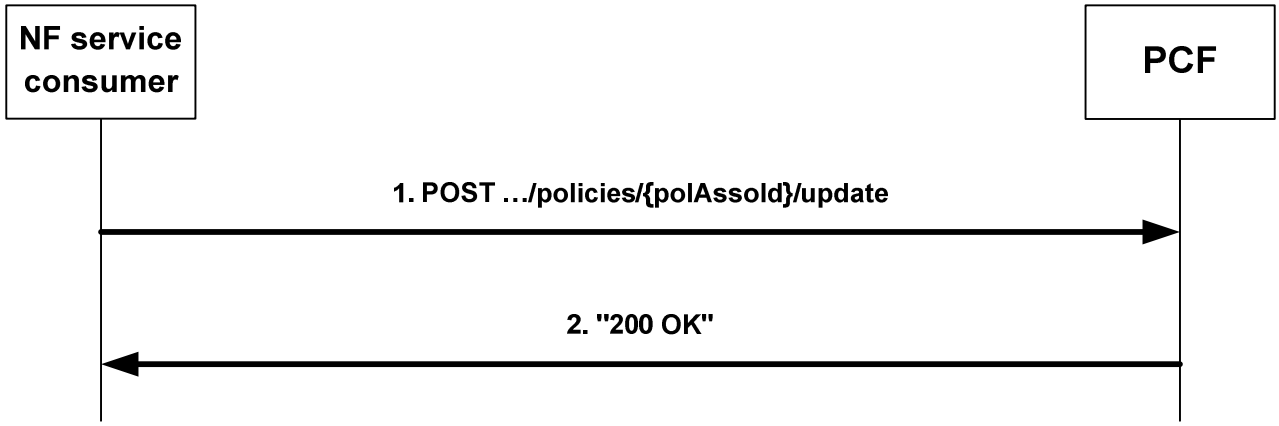


**Figure 4.2.3.1-1: Update of a policy association**

The AMF as NF service consumer invokes this procedure when a policy control request trigger (see clause 4.2.3.2) occurs. When a policy control request trigger that does not require the subscription as defined in table 5.6.3.3-1 (e.g. Service Area Restriction change trigger) occurs, the NF service consumer (e.g. AMF) shall always invoke the procedure. When a policy control request trigger requires the subscription as defined in table 5.6.3.3-1 (e.g. location change 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 clause 4.2.3.2) encoded as "triggers" attribute;
  3. if a Service Area restriction change occurred, the Service Area Restrictions (see clause 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 clause 4.2.2.3.2) as obtained from the UDM encoded as "rfsp" attribute;

5. if a UE location change occurred and the Policy Control Request Trigger "Location change" was provided, the UE location encoded as "userLoc" attribute;

6. if the Policy Control Request Trigger "Change of UE presence in PRA" was 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, 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 clause 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" was 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 subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN (see clause 4.2.2.3.5) encoded in the "ueSliceMbrs" attribute;

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

NOTE 5: 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.

19. if the feature "TargetNSSAI" is supported, a new Target NSSAI is generated and the Policy Control Request Trigger "Generation of Target NSSAI" is provided, the new generated Target NSSAI encoded in the "targetSnssais" attribute.

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 clause 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;

  NOTE 6: 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; and/or

  f) if the feature "TargetNSSAI" is supported and the PCF received the "targetSnssais" attribute in the request, the RFSP Index associated with the Target NSSAI encoded as "targetRfsp" attribute;

- if errors occur when processing the HTTP POST request, apply error handling procedures as specified in clause 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 clause 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 Index 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 Index and/or UE-AMBR and/or UE-Slice-MBR(s) provisioned by the PCF and apply the configured Service Area Restrictions and/or RFSP Index 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 feature "AMInfluence" is supported, the PCF determines that the access and mobility policies may be influenced by the traffic of a PDU session(s), e.g. based on the received policy control request trigger(s), and local operator policies indicate the PCF for the UE shall subscribe with the PCF for the PDU session for established/terminated PDU session(s) event notifications, the PCF shall provision/update the AMF with the PCF for the UE information within the "pcfUeInfo" attribute and the complete list of S-NSSAI and DNN combinations within the "matchPdus" attribute. The AMF shall then update the affected established PDU sesssion(s), by forwarding the received PCF for the UE information for the PDU session(s) matching the new S-NSSAI and DNN combination(s) and removing the previously provided PCF for the UE information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) as defined in 3GPP TS 29.502 [31].

When the feature "AMInfluence" is supported, and the SBA binding indication information for the PCF instance changes, the PCF may update the previously provided information in the AMF. The AMF shall apply the updated PCF callback 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 related event by using the Npcf_AMPolicyAuthorization service (see TS 29.534 [26]) and/or the Npcf_EventExposure service ((see TS 29.523 [28]).

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

#### 4.2.3.2 Policy Control Request Triggers

The following Policy Control Request Triggers are defined (see clause 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;

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 AMF notifies for any changes in the subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN;

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; and

NOTE 6: The "NWDAF_DATA_CH" trigger only applies if the "EneNA" feature is supported.

- "TARGET_NSSAI", i.e. Generation of Target NSSAI: the NF service consumer notifies that the Target NSSAI was generated.

NOTE 7: The "TARGET_NSSAI" trigger only applies if the "TargetNSSAI" feature is supported.

#### 4.2.3.3 Encoding of updated policy

Updated policies shall be encoded within the PolicyUpdate data type that may include:

- AMF Access and Mobility Policy (see clause 4.2.2.3) Service Area Restriction encoded as "servAreaRes" attribute;

- AMF Access and Mobility Policy (see clause 4.2.2.3) RFSP Index encoded as "rfsp" attribute and RFSP Index associated with the Target NSSAI encoded as "targetRfsp" attribute;

- if the "UE-AMBR_Authorization" feature is supported, AMF Access and Mobility Policy (see clause 4.2.2.3) UE-AMBR encoded as "ueAmbr" attribute;

- if the "UE-Slice-MBR_Authorization" feature is supported, AMF Access and Mobility Policy (see clause 4.2.2.3) UE-Slice-MBR(s) encoded as "ueSliceMbrs" attribute;

  NOTE: PCF can stop applying policies to already provided attributes under PolicyUpdate data type. In that case, PCF will modify those attributes by e.g. providing configured values. How the PCF gets those values is out of specification.

- if the "DNNReplacementControl" feature is supported, AMF Access and Mobility Policy (see clause 4.2.2.3) SMF selection information encoded as "smfSelInfo" attribute;

- updated Policy Control Request Trigger(s) (see clause 4.2.3.2) encoded as "triggers" attribute i.e.:

  1) either a new complete list of applicable Policy Control Request Trigger(s) including one or several of the following:

     a) Location change (tracking area); and/or

     b) Change of UE presence in PRA; and/or

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

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

  2) a "NULL" value to request the removal of all previously installed Policy Control Request Trigger(s); and

- if the Policy Control Request Trigger "Change of UE presence in PRA" is provided or if that trigger was already set but the requested presence reporting areas need to be changed, the presence reporting areas for which reporting is required encoded as "pras" attribute encoded as follows:

  a) A new entry shall be added by supplying a new identifier as key and the corresponding PresenceInfo 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 identifier as key and the PresenceInfo 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 identifier 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; and

- if the Policy Control Request Trigger "Change of UE presence in PRA" is removed, the presence reporting areas for which reporting was required shall be removed by providing the "pras" attribute with "NULL" as value.

- if the Policy Control Request Trigger "SMF selection information change" is provided or if that trigger was already set and the indication of DNN replacement when the requested DNN is unknown needs to be set or changed, the "unsuppDnn" attribute within "smfSelInfo" attribute shall be provided including the appropriate value.

- if the Policy Control Request Trigger "SMF selection information change" is provided or if that trigger was already set and the list of candidate DNNs for replacement needs to be set or changed, the "candidates" attribute within the "smfSelInfo" attribute is encoded as follows:

  a) A new entry shall be added by supplying a new S-NSSAI as key and the corresponding CandidateForReplacement 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 CandidateForReplacement 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;

  e) The complete list of candidate DNNs for which reporting is required shall be removed by providing the "candidates" attribute with "NULL" as value.

- if the Policy Control Request Trigger "SMF selection information change" is removed, the candidate DNNs for which reporting was required shall be removed by providing the "smfSelInfo" attribute with "NULL" as value.

## 4.2.4 Npcf_AMPolicyControl_UpdateNotify Service Operation

### 4.2.4.1 General

The PCF may decide to update policies or to request the termination of the policy association and shall then use an Npcf_AMPolicyControl_UpdateNotify service operation.

The following procedures using the Npcf_AMPolicyControl_UpdateNotify service operation are supported:

- policy update notification; and
- request for termination of the policy association.

### 4.2.4.2 Policy update notification

Figure 4.2.4.2-1 illustrates the policy update notification.

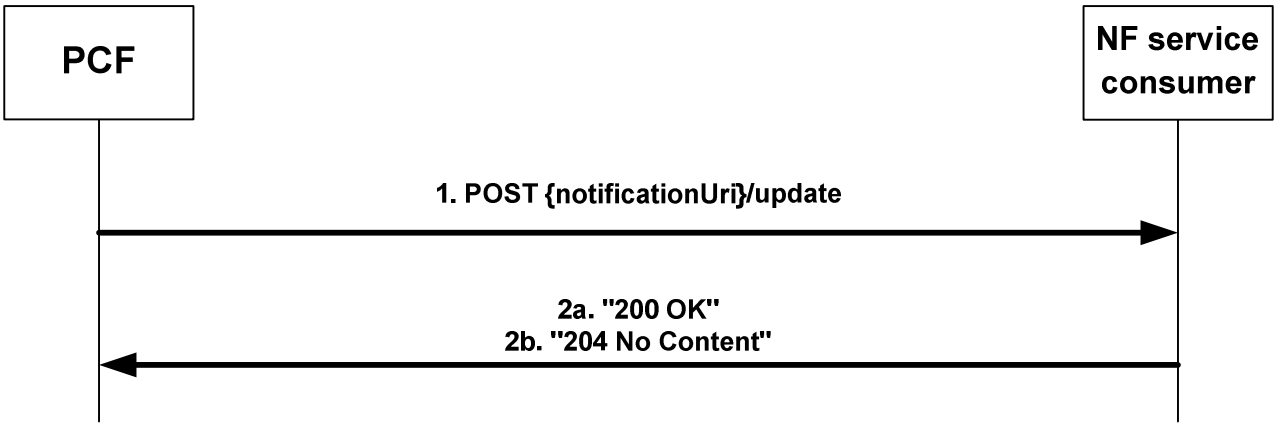


**Figure 4.2.4.2-1: policy update notification**

The PCF may decide to update policy control request trigger(s) and/or Access and Mobility policies related to an Individual AM Policy Association, e.g. in response to information provided to the PCF via the Npcf_AMPolicyAuthorization service (see 3GPP TS 29.534 [26]), to notification provided by the Nbsf_Management Service about the registration/deregistration of the PCF for a PDU session (see 3GPP TS 29.521 [30]) or to notifications provided by the Npcf_PolicyAuthorization service (see 3GPP TS 29.514 [25]), in response to a notification received from UDR about new or updated AF requirements on Access and Mobility polices (see 3GPP TS 29.519 [17]), or in response to an internal trigger within the PCF. The PCF shall send for this purpose an HTTP POST request with "{notificationUri}/update" as URI (where the Notification URI was previously supplied by the NF service consumer) and the PolicyUpdate data structure as request body encoded as described in clause 4.2.3.3.

Upon the reception of the HTTP POST request, the NF service consumer shall enforce the received updated policy.

In case of a successful update notification:

- if the feature "ImmediateReport" is supported and the PCF provisioned the policy control request triggers related to access type change, PRA change, allowed NSSAI change or location change, a "200 OK" response code and a response body with the corresponding available information in the "AmRequestedValueRep" data structure shall be returned in the response;

- otherwise, a "204 No Content" response code shall be returned in the response.

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

If the feature "ES3XX" is supported, and the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5].

If the AMF as NF service consumer is not able to handle the notification but knows by implementation specific means that another AMF is able to handle the notification, it shall reply with an HTTP "307 Temporary redirect" response pointing to the URI of the new AMF. If the AMF is not able to handle the notification but another unknown AMF could possibly handle the notification, it shall reply with an HTTP "404 Not found" error response.

If the PCF receives a "307 Temporary redirect" response, the PCF shall resend the failed policy update notification request using the received URI in the Location header field as Notification URI. Subsequent policy update notifications, triggered after the failed one, shall be sent to the Notification URI provided by the NF service consumer during the corresponding policy association creation/update.

If the PCF becomes aware that a new AMF is requiring notifications (e.g. via the "404 Not found" response, via Namf_Communication service AMFStatusChange Notifications, see 3GPP TS 29.518 [14], or via link level failures), and the PCF knows alternate or backup IPv4, IPv6 Addess(es) or FQDN(s) where to send Notifications (e.g. via "altNotifIpv4Addrs", "altNotifIpv6Addrs" or "altNotifFqdns" attributes received when the policy association was created, via AMFStatusChange Notifications or via the Nnrf_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the service name and GUAMI obtained during the creation of the subscription) to discover the other AMFs within the AMF set), the PCF shall exchange the authority part of the corresponding Notification URI with one of those addresses and shall use that URI in any subsequent communication.

If the PCF received a "404 Not found" response, the PCF should resend the failed policy update notification request to that URI.

If the feature "DNNReplacementControl" is supported and the AMF received the update of the SMF selection information within the "smfSelInfo" attribute in the request, 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 feature "AMInfluence" is supported, the PCF determines that the access and mobility policies may be influenced by the traffic of a PDU session(s) based on an AF request, UDR notification or other internal policies, and local operator policies indicate the PCF for the UE shall subscribe with the PCF for the PDU session for established/terminated PDU session(s) event notifications, the PCF for the UE shall provision/update the AMF with the PCF for the UE information within the "pcfUeInfo" attribute and the complete list of S-NSSAI and DNN combinations within the "matchPdus" attribute. The AMF shall update the affected established PDU sesssions, forwarding the received PCF for the UE information for the PDU session(s) matching the new S-NSSAI and DNN combination(s), and removing the previously provided PCF for the UE information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) as defined in 3GPP TS 29.502 [31].

When the feature "AMInfluence" is supported, and the SBA binding indication information for the PCF instance changes, the PCF may update the previously provided information in the AMF. The AMF shall apply the updated PCF callback information to the new PDU Sessions only, i.e., already established PDU sessions are not affected.

If the PCF changed the Service Area Restrictions as part of the policy update, it shall send notifications to any NF Service Consumer(s) (e.g. AF) that have subscribed to the related event by using the Npcf_AMPolicyAuthorization service (see TS 29.534 [26]) and/or the Npcf_EventExposure service (see TS 29.523 [28]).

If the feature "5GAccessStratumTime" is supported and the PCF receives the access stratum time distribution parameters or removal of the access stratum time distribution parameters from the TSCTSF as defined in 3GPP TS 29.534 [26], the PCF may provision, update or remove the 5G access stratum time distribution parameters by provisioning the "asTimeDisParam" attribute as defined in clause 4.2.2.3.6. The AMF shall provision the 5G access stratum time distribution parameters to the NG-RAN when receiving it from the PCF.

### 4.2.4.3 Request for termination of the policy association

Figure 4.2.4.3-1 illustrates the request for a termination of the policy association.

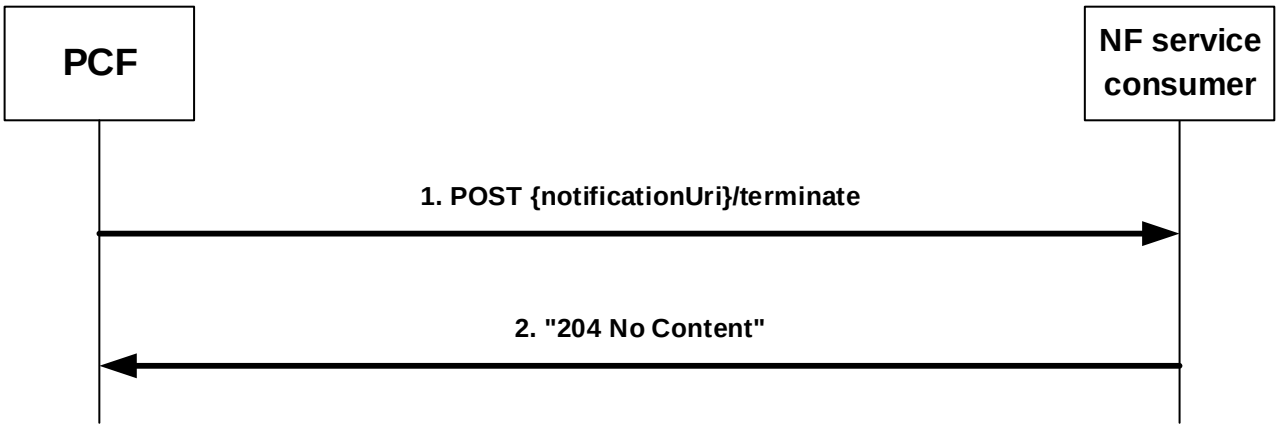


**Figure 4.2.4.3-1: request for a termination of the policy association**

The PCF may request the termination of the policy association and shall then send an HTTP POST request with "{notificationUri}/terminate" as URI (where the Notification URI was previously supplied by the NF service consumer) and the TerminationNotification data structure as request body that shall include:

- the policy association ID encoded as "polAssoId" attribute; and
- the cause why the PCF requests the termination of the policy association encoded as "cause" attribute.

Upon the reception of the HTTP POST request, the NF service consumer shall:

- either send a HTTP "204 No Content" response for the successful processing of the HTTP POST request or an appropriate failure response; and

- if errors occur when processing the HTTP POST request, send an HTTP error response as specified in clause 5.7; or

- if the feature "ES3XX" is supported, and the NF service consumer determines the received HTTP POST request needs to be redirected, send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5].

After the successful processing of the HTTP POST request, the NF service consumer shall remove the context related to the policy association but still apply the provisioned AM policies to the UE and invoke the Npcf_AMPolicyControl_Delete Service Operation defined in clause 4.2.5 to terminate the policy association.

If the AMF as NF service consumer is not able to handle the notification but knows by implementation specific means that another AMF is able to handle the notification, it shall reply with an HTTP "307 Temporary redirect" response pointing to the URI of the new AMF. If the AMF is not able to handle the notification but another unknown AMF could possibly handle the notification, it shall reply with an HTTP "404 Not found" error response.

If the PCF receives a "307 Temporary redirect" response, the PCF shall resend the failed request for termination of the policy association using the received URI in the Location header field as Notification URI.

If the PCF becomes aware that a new AMF is requiring notifications (e.g. via the "404 Not found" response, via Namf_Communication service AMFStatusChange Notifications, see 3GPP TS TS 29.518 [14], or via link level failures), and the PCF knows alternate or backup IPv4, IPv6 Address(es) or FQDN(s) where to send Notifications (e.g. via "altNotifIpv4Addrs", "altNotifIpv6Addrs" or "altNotifFqdns" attributes received when the policy association was created, via AMFStatusChange Notifications or via the Nnrf_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the service name and GUAMI obtained during the creation of the subscription) to discover the other AMFs within the AMF set), the PCF shall exchange the authority part of the corresponding Notification URI with one of those addresses and shall resend the failed request for termination of the policy association to that URI.

If the PCF received a "404 Not found" response, the PCF should resend the failed request for termination of the policy association to that URI.

### 4.2.5 Npcf_AMPolicyControl_Delete Service Operation

Figure 4.2.5-1 illustrates the deletion of a policy association.

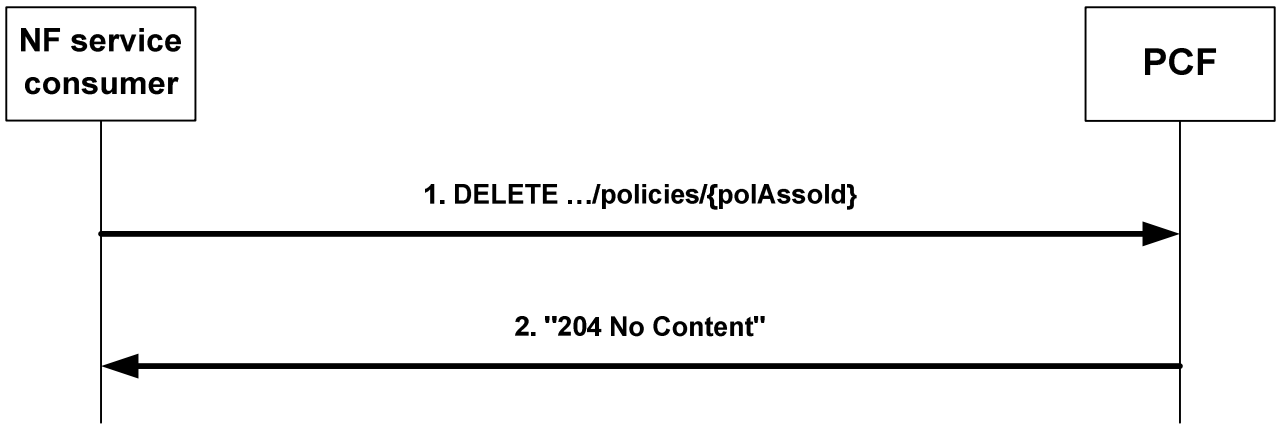


**Figure 4.2.5-1: Deletion of a policy association**

The AMF as NF service consumer requests that the policy association is deleted when the corresponding UE context is terminated, e.g. during UE de-registration from the network, or when the UE moves from 5GS to EPS and the UE is not connected to the 5GC over a non-3GPP access.

During the AMF relocation, the old AMF shall invoke this procedure when:

- the resource URI of the "Individual AM Policy Association" resource is not transferred to the new AMF; or

- the new AMF informs the old AMF that the "Individual AM Policy Association" resource is not being reused (i.e. the old PCF is not being reused).

To request that the policy association is deleted, the NF service consumer (e.g. AMF) shall send an HTTP DELETE request with "{apiRoot}/npcf-am-policy-control/v1/policies/{polAssoId}" as Resource URI.

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

- delete the policy association;
- send either an HTTP "204 No Content" response indicating the success of the deletion or an appropriate failure response; and
- if errors occur when processing the HTTP DELETE request, send an HTTP error response as specified in clause 5.7; or
- if the feature "ES3XX" is supported, and the PCF determines the received HTTP DELETE request needs to be redirected, send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5].

# 5 Npcf_AMPolicyControl API

## 5.1 Introduction

The Access and Mobility Policy Control Service shall use the Npcf_AMPolicyControl API.

The API URI of the Npcf_AMPolicyControl API shall be:

**{apiRoot}/<apiName>/<apiVersion>**

The request URIs used in HTTP requests from the NF service consumer towards the PCF shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [6], i.e.:

**{apiRoot}/<apiName>/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [6].
- The <apiName> shall be "npcf-am-policy-control".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.3.

## 5.2 Usage of HTTP

### 5.2.1 General

HTTP/2, IETF RFC 7540 [8], shall be used as specified in clause 5 of 3GPP TS 29.500 [5].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [5].

The OpenAPI [10] specification of HTTP messages and content bodies for the Npcf_AMPolicyControl is contained in Annex A.

### 5.2.2 HTTP standard headers

#### 5.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [5] for the usage of HTTP standard headers.

#### 5.2.2.2 Content type

JSON, IETF RFC 8259 [9], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [5] The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [21].

### 5.2.3 HTTP custom headers

The Npcf_AMPolicyControl API shall support HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [5] and may support HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [5].

In this Release of the specification, no specific custom headers are defined for the Npcf_AMPolicyControl API.

## 5.3 Resources

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 5.3.1-1 depicts the resource URIs structure for the Npcf_AMPolicyControl API.

### 5.3.1 Resource Structure

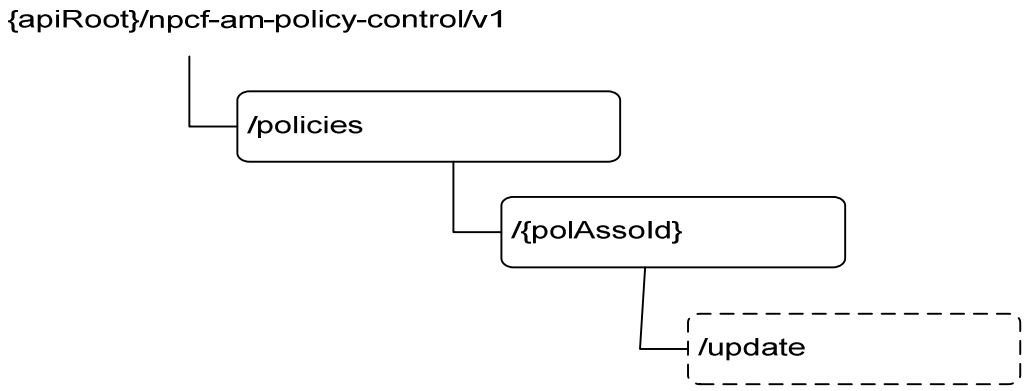


**Figure 5.3.1-1: Resource URI structure of the Npcf_AMPolicyControl API**

Table 5.3.1-1 provides an overview of the resources and applicable HTTP methods.

**Table 5.3.1-1: Resources and methods overview**

| Resource name | Resource URI | HTTP method or custom operation | Description |
|---|---|---|---|
| AM Policy Associations | /policies | POST | Create a new Individual AM Policy Association resource. |
| Individual AM Policy Association | /policies/{polAssoId} | GET | Read the Individual AM Policy Association resource. |
| | | DELETE | Delete the Individual AM Policy Association resource. |
| | /policies/{polAssoId}/update | update (POST) | Report observed event trigger and obtain updated policies. |

## 5.3.2 Resource: AM Policy Associations

### 5.3.2.1 Description

This resource represents a collection of Individual AM policy Associations.

### 5.3.2.2 Resource definition

Resource URI: **{apiRoot}/npcf-am-policy-control/v1/policies**

This resource shall support the resource URI variables defined in table 5.3.2.2-1.

**Table 5.3.2.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|---|---|---|
| apiRoot | string | See clause 5.1 |

### 5.3.2.3 Resource Standard Methods

#### 5.3.2.3.1 POST

This method shall support the URI query parameters specified in table 5.3.2.3.1-1.

**Table 5.3.2.3.1-1: URI query parameters supported by the POST method on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| n/a | | | | |

This method shall support the request data structures specified in table 5.3.2.3.1-2 and the response data structures and response codes specified in table 5.3.2.3.1-3.

**Table 5.3.2.3.1-2: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| PolicyAssociationRequest | M | 1 | Input parameters for the creation of a policy association. |

**Table 5.3.2.3.1-3: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| PolicyAssociation | M | 1 | 201 Created | Policy association was created and policies are being provided. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.<br>NOTE 2: Failure cases are described in clause 5.7. | | | | |

**Table 5.3.2.3.1-4: Headers supported by the 201 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/npcf-am-policy-control/v1/policies/{polAssoId} |

## 5.3.3 Resource: Individual AM Policy Association

### 5.3.3.1 Description

This document resource represents an individual AM policy association.

### 5.3.3.2 Resource definition

Resource URI: **{apiRoot}/npcf-am-policy-control/v1/policies/{polAssoId}**

This resource shall support the resource URI variables defined in table 5.3.2.2-1.

**Table 5.3.2.2-1: Resource URI variables for this resource**

| Name | Data type | Definition |
|---|---|---|
| apiRoot | string | See clause 5.1. |
| polAssoId | string | Identifier of a policy association. |

### 5.3.3.3 Resource Standard Methods

#### 5.3.3.3.1 GET

This method shall support the URI query parameters specified in table 5.3.2.3.1-1.

**Table 5.3.3.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| n/a | | | | |

This method shall support the request data structures specified in table 5.3.2.3.1-2 and the response data structures and response codes specified in table 5.3.2.3.1-3.

**Table 5.3.3.3.1-2: Data structures supported by the GET Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| n/a | | | |

**Table 5.3.3.3.1-3: Data structures supported by the GET Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| PolicyAssociation | M | 1 | 200 OK | |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual AM policy retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance.<br>Applicable if the feature "ES3XX" is supported. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual AM policy retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance.<br>Applicable if the feature "ES3XX" is supported. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply. | | | | |

**Table 5.3.3.3.1-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative PCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

**Table 5.3.3.3.1-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative PCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

### 5.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 5.3.3.3.2-1.

**Table 5.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| n/a | | | | |

This method shall support the request data structures specified in table 5.3.3.3.2-2 and the response data structures and response codes specified in table 5.3.3.3.2-3.

**Table 5.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| n/a | | | |

**Table 5.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| n/a | | | 204 No Content | The policy association was successfully deleted. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual AM policy deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance. Applicable if the feature "ES3XX" is supported. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual AM policy deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance. Applicable if the feature "ES3XX" is supported. |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply. | | | | |

**Table 5.3.3.3.2-4: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative PCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

**Table 5.3.3.3.2-5: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative PCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

## 5.3.3.4 Resource Custom Operations

### 5.3.3.4.1 Overview

**Table 5.3.3.4.1-1: Custom operations**

| Operation Name | Custom operation URI | Mapped HTTP method | Description |
|---|---|---|---|
| Update | /policies/{polAssoId}/update | POST | Report observed event trigger and obtain updated policies. |

### 5.3.3.4.2 Operation: Update

#### 5.3.3.4.2.1 Description

The update custom operation allows an NF service consumer to report the occurrence of one or more policy control request trigger(s) and to obtain related updated policies.

#### 5.3.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 5.3.3.4.2.2-1 and the response data structure and response codes specified in table 5.3.3.4.2.2-2.

**Table 5.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| PolicyAssociationUpdateRequest | M | 1 | Describes the observed policy control request trigger(s). |

**Table 5.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| PolicyUpdate | M | 1 | 200 OK | Describes updated policies. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual AM policy modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance.<br>Applicable if the feature "ES3XX" is supported. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual AM policy modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance.<br>Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.<br>NOTE 2: Failure cases are described in clause 5.7. | | | | |

**Table 5.3.3.4.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative PCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

**Table 5.3.3.4.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative PCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |

# 5.4 Custom Operations without associated resources

None.

# 5.5 Notifications

## 5.5.1 General

**Table 5.5.1-1: Notifications overview**

| Notification | Callback URI | HTTP method or custom operation | Description (service operation) |
|---|---|---|---|
| Policy Update Notification | {notificationUri}/update | update (POST) | Policy Update Notification. |
| Request for termination of the policy association | {notificationUri}/terminate | terminate (POST) | Request for termination of the policy association. |

## 5.5.2 Policy Update Notification

### 5.5.2.1 Description

This notification is used by the PCF to provide updates of access and mobility policies to the NF service consumer.

### 5.5.2.2 Operation Definition

This operation shall support the request data structures specified in table 5.5.2.2-1 and the response data structure and response codes specified in table 5.5.2.2-2.

**Table 5.5.2.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| PolicyUpdate | M | 1 | Updated policies. |

**Table 5.5.2.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| n/a | | | 204 No Content | The policies were successfully updated. |
| AmRequestedValueRep | O | 0..1 | 200 OK | The current applicable values corresponding to the policy control request trigger are reported. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during AM policy notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.<br>Applicable if the feature "ES3XX" is supported. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during AM policy notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent as defined in clause 6.5.3.2 of 3GPP TS 29.500 [5].<br>Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |
| ProblemDetails | O | 0..1 | 404 Not Found | The NF service consumer can use this response when the notification can be sent to another unknown host. |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.<br>NOTE 2: Failure cases are described in clause 5.7. | | | | |

**Table 5.5.2.2-3: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF consumer (service) instance towards which the notification request is redirected. May be included if the feature "ES3XX" is supported. |

**Table 5.5.2.2-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | String | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected |

## 5.5.3 Request for termination of the policy association

### 5.5.3.1 Description

This notification is used by the PCF to request the termination of a policy association.

### 5.5.3.2 Operation Definition

This operation shall support the request data structures specified in table 5.5.3.2-1 and the response data structure and response codes specified in table 5.5.3.2-2.

**Table 5.5.3.2-1: Data structures supported by the POST Request Body on this resource**

| Data type | P | Cardinality | Description |
|---|---|---|---|
| TerminationNotification | M | 1 | Request to terminate the policy association. |

**Table 5.5.3.2-2: Data structures supported by the POST Response Body on this resource**

| Data type | P | Cardinality | Response codes | Description |
|---|---|---|---|---|
| n/a | | | 204 No Content | The request for policy association termination was received. |
| RedirectResponse | O | 0..1 | 307 temporary redirect | Temporary redirection, during AM policy notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.<br>Applicable if the feature "ES3XX" is supported. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during AM policy notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent.<br>Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | The NF service consumer can use this response when the notification can be sent to another unknown host. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply. | | | | |

**Table 5.5.3.2-3: Headers supported by the 307 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF consumer (service) instance towards which the notification request is redirected. May be included if the feature "ES3XX" is supported. |

**Table 5.5.3.2-4: Headers supported by the 308 Response Code on this resource**

| Name | Data type | P | Cardinality | Description |
|---|---|---|---|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF consumer (service) instance towards which the notification request is redirected |

# 5.6 Data Model

## 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 Npcf_AMPolicyControl service based interface protocol.

**Table 5.6.1-1: Npcf_AMPolicyControl specific Data Types**

| Data type | Section defined | Description | Applicability |
|---|---|---|---|
| AsTimeDistributionParam | 5.6.2.10 | Contains the 5G access stratum time distribution parameters. | 5GAccessStratumTime |
| 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 |
| UeSliceMbr | 5.6.2.11 | Contains a UE-Slice-MBR and the related information. | UE-Slice-MBR_Authorization |

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 29.571 [11] | 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 [27] | Indicates an NWDAF instance ID used for the UE and its associated Analytics ID(s) consumed by the NF service consumer. | EneNA |
| PcfUeCallbackInfo | 3GPP TS 29.571 [11] | Contains the PCF for the UE information necessary for the PCF for the PDU session to send Establishment and Termination event. | AMInfluence |
| PduSessionInfo | 3GPP TS 29.571 [11] | Contains information related to a PDU session. | AMInfluence |
| Pei | 3GPP TS 29.571 [11] | Permanent Equipment Identifier | |
| PlmnIdNid | 3GPP TS 29.571 [11] | Identifies the network: PLMN Identifier or the SNPN Identifier (the PLMN Identifier and the 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] | Contains the slice Maximum Bit Rate including UL and DL. | UE-Slice-MBR_Authorization |
| Snssai | 3GPP TS 29.571 [11] | Identifies an S-NSSAI. | SliceSupport, TargetNSSAI, DNNReplacementControl |
| 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] | | |
| UintegerRm | 3GPP TS 29.571 [11] | Indicates Unsigned Integer, but with the OpenAPI "nullable: true" property. | 5GAccessStratumTime |
| WirelineServiceAreaRestriction | 3GPP TS 29.571 [11] | | WirelineWirelessConvergence |

## 5.6.2 Structured data types

### 5.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

### 5.6.2.2 Type PolicyAssociation

**Table 5.6.2.2-1: Definition of type PolicyAssociation**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| request | PolicyAssociationRequest | O | 0..1 | The information provided by the NF service consumer when requesting the creation of a policy association | |
| triggers | array(RequestTrigger) | O | 1..N | Request Triggers that the PCF subscribes. Only values "LOC_CH", "ALLOWED_NSSAI_CH", "TARGET_NSSAI", "SMF_SELECT_CH", "PRA_CH" and "ACCESS_TYPE_CH" are permitted. | (NOTE ) |
| servAreaRes | ServiceAreaRestriction | O | 0..1 | Service Area Restriction as part of the AMF Access and Mobility Policy as determined by the PCF | |
| 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 | O | 0..1 | RFSP Index as part of the AMF Access and Mobility Policy as determined by the PCF. | |
| targetRfsp | RfspIndex | C | 0..1 | RFSP Index associated with the Target NSSAI. It shall be present if the Target NSSAI was received in the request and the trigger "TARGET_NSSAI" is provided. | TargetNSSAI |
| pras | map(PresenceInfo) | C | 1..N | If the Trigger "PRA_CH" is provided, the presence reporting area(s) for which reporting is requested shall be provided. The "praId" attribute within the PresenceInfo data type shall also be the key of the map. The "presenceState" and the "additionalPraId" attributes within the PresenceInfo data type shall not be supplied. The "praId" attribute within the PresenceInfo data type shall include the identifier of either a presence reporting area or a presence reporting area set. | |
| smfSelInfo | SmfSelectionData | O | 0..1 | If the trigger "SMF_SELECT_CH" is provided, the conditions for SMF selection information replacement, as determined by the PCF shall be provided. | DNNReplacementControl |
| ueAmbr | Ambr | O | 0..1 | UE-AMBR as part of the AMF Access and Mobility Policy as determined by the PCF. | UE-AMBR_Authorization |
| ueSliceMbrs | array(UeSliceMbr) | O | 1..N | One or more UE-Slice-MBR(s) for S-NSSAI(s) of serving PLMN as part of the AMF Access and Mobility Policy as determined by the PCF. | UE-Slice-MBR_Authorization |
| pcfUeInfo | PcfUeCallbackInfo | O | 0..1 | Contains the PCF for the UE information necessary for the PCF for the PDU session to send established/terminated events notifications to the PCF for the UE. | AMInfluence |
| matchPdus | array(PduSessionInfo) | C | 1..N | Indicates the matched PDU session(s) for which the PCF for the UE information in the "pcfUeInfo" attribute shall be forwarded to the SMF. It shall be present when the "pcfUeInfo" attribute is present. | AMInfluence |
| asTimeDisParam | AsTimeDistributionParam | O | 0..1 | Contains the 5G acess stratum time distribution parameters. | 5GAccessStratumTime |
| suppFeat | SupportedFeatures | M | 1 | Indicates the negotiated supported features. | |

NOTE: The "ALLOWED_NSSAI_CH", "TARGET_NSSAI", "SMF_SELECT_CH" and "ACCESS_TYPE_CH" values in the "triggers" attribute apply under feature control as described in clause 4.2.3.2.

### 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 network (a PLMN or an SNPN) where the served UE is camping. For the 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 | array(UeSliceMbr) | C | 1..N | The subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN. Shall be provided when available. (NOTE) | 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 |
| targetSnssais | array(Snssai) | C | 1..N | Represents the Target NSSAI. It shall be included if available and the feature "TargetNSSAI" is supported. | TargetNSSAI |
| 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.<br>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 |
| NOTE: If the serving PLMN is not the HPLMN, then within the "ueSliceMbrs" attribute, there shall not be more than one array item with the same "servingSnssai" attribute's value in this release of the specification. | | | | | |

### 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 | array(UeSliceMbr) | C | 1..N | The subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN. Shall be provided for the "UE_SLICE_MBR_CH" policy control request trigger. (NOTE) | 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 |
| targetSnssais | array(Snssai) | C | 1..N | Represents the Target NSSAI. It shall be provided for the trigger "TARGET_NSSAI". | TargetNSSAI |

| | | | | | |
|---|---|---|---|---|---|
| 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 | C | 0..1 | The Globally Unique AMF Identifier (GUAMI) shall be provided by an AMF as service consumer during the AMF relocation. | |
| nwdafDatas | array(NwdafData) | O | 1..N | List of NWDAF Instance IDs and their associated Analytics IDs consumed by the NF service consumer. | EneNA |
| NOTE: If the serving PLMN is not the HPLMN, then within the "ueSliceMbrs" attribute, there shall not be more than one array item with the same "servingSnssai" attribute's value in this release of the specification. | | | | | |

### 5.6.2.5 Type PolicyUpdate

**Table 5.6.2.5-1: Definition of type PolicyUpdate**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| resourceUri | Uri | M | 1 | The resource URI of the individual AM policy related to the notification. (NOTE 3) | |
| triggers | array(RequestTrigger) | O | 1..N | Request Triggers that the PCF subscribes. Only values "LOC_CH", "ALLOWED_NSSAI_CH", "TARGET_NSSAI", "SMF_SELECT_CH", "PRA_CH" and "ACCESS_TYPE_CH" are permitted. | (NOTE 1) (NOTE 2) |
| servAreaRes | ServiceAreaRestriction | O | 0..1 | Service Area Restriction as part of the AMF Access and Mobility Policy as determined by the PCF. | |
| 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 | O | 0..1 | RFSP Index as part of the AMF Access and Mobility Policy as determined by the PCF. | |
| targetRfsp | RfspIndex | C | 0..1 | RFSP Index associated with the Target NSSAI. It shall be present when the Target NSSAI was received in the request. | TargetNSSAI |
| smfSelInfo | SmfSelectionData | C | 0..1 | It may include updated conditions for SMF Selection information replacement. It shall include the PCF decision of the selected DNN when the "smfSelInfo" attribute containing the UE requested S-NSSAI and DNN was sent in the request. | DNNReplacementControl |
| ueAmbr | Ambr | C | 0..1 | UE-AMBR as part of the AMF Access and Mobility Policy. | UE-AMBR_Authorization |
| ueSliceMbrs | array(UeSliceMbr) | O | 0..1 | One or more UE-Slice-MBR(s) for S-NSSAI(s) of serving PLMN as part of the AMF Access and Mobility Policy as determined by the PCF. | UE-Slice-MBR_Authorization |
| pras | map(PresenceInfoRm) | C | 1..N | If the Trigger "PRA_CH" is provided or if that trigger was already set but the requested presence reporting areas need to be changed, the presence reporting area(s) for which reporting is requested 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 not be supplied. The "praId" attribute within the PresenceInfo data type shall include the identifier of either a presence reporting area or a presence reporting area set. | |
| pcfUeInfo | PcfUeCallbackInfo | O | 0..1 | Contains the PCF for the UE information necessary for the PCF for the PDU session to send established/terminated event notifications to the PCF for the UE. | AMInfluence |
| matchPdus | array(PduSessionInfo) | C | 1..N | Indicates the matched PDU session(s) for which the PCF for the UE information in the "pcfUeInfo" attribute shall be forwarded to the SMF.<br>It shall be present when the "pcfUeInfo" attribute is present and was not previously provisioned by the PCF for the UE. | AMInfluence |

| | | | | | |
|---|---|---|---|---|---|
| asTimeDisParam | AsTimeDistributionParam | O | 0..1 | Contains the 5G acess stratum time distribution parameters. | 5GAccessStratumTime |
| NOTE 1: The "ALLOWED_NSSAI_CH", "TARGET_NSSAI", "SMF_SELECT_CH" and "ACCESS_TYPE_CH" values in the "triggers" attribute apply under feature control as described in clause 4.2.3.2.<br>NOTE 2: The "SMF_SELECT_CH" trigger may be met only for new PDU sessions, i.e. it shall not apply to ongoing PDU sessions.<br>NOTE 3: When the PolicyUpdate data type is used in a policy update notify service operation, either the complete resource URI included in the "resourceUri" attribute or the "apiSpecificResourceUriPart" component (see clause 5.1) of the resource URI included in the "resourceUri" attribute may be used by the NF service consumer (e.g. AMF) for the identification of the Individual AM Policy Association resource related to the notification. | | | | | |

### 5.6.2.6 Type TerminationNotification

**Table 5.6.2.6-1: Definition of type TerminationNotification**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| resourceUri | Uri | M | 1 | The resource URI of the individual AM policy related to the notification. (NOTE) | |
| cause | PolicyAssociationReleaseCause | M | 1 | The cause why the PCF requests the termination of the policy association. | |
| NOTE: Either the complete resource URI included in the "resourceUri" attribute or the "apiSpecificResourceUriPart" component (see clause 5.1) of the resource URI included in the "resourceUri" attribute may be used by the NF service consumer (e.g. AMF) for the identification of the Individual AM Policy Association resource related to the notification. | | | | | |

### 5.6.2.7 Type SmfSelectionData

**Table 5.6.2.7-1: Definition of type SmfSelectionData**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| unsuppDnn | boolean | O | 0..1 | When it is set to "true", the NF service consumer shall request DNN replacement when the UE requested an unsupported DNN at PDU session establishment request. The default value is "false". | |
| candidates | map(CandidateForReplacement) | O | 1..N | Contains the list of DNNs per S-NSSAI that are candidate for replacement.<br>The "snssai" attribute within the CandidateForReplacement data type shall also be the key of the map. (NOTE 2) | |
| snssai | Snssai | C | 0..1 | It shall be included in AM policy association update requests and represents the allowed S-NSSAI the UE includes in the PDU session establishment request. | |
| mappingSnssai | Snssai | O | 0..1 | It may be included in AM policy association update requests and represents the home mapping of the allowed S-NSSAI the UE includes in the PDU session establishment request. | |
| dnn | Dnn | C | 0..1 | It shall be included in AM policy association update requests and represents the UE requested DNN.<br>It shall be included in AM policy association update response and represents the PCF selected DNN. | |

NOTE 1: Either one of the "unsuppDnn" attribute and "candidates" attribute, or both attributes shall be present when the "smfSelInfo" attribute is included in the PolicyAssociation type or PolicyUpdate type when included in the Npcf_AMPolicyControl_UpdateNotify request.
NOTE 2: The S-NSSAI value used as key of the map is encoded as a string as defined in 3GPP TS 29.571[11], clause 5.4.4.2.

### 5.6.2.8 Type CandidateForReplacement

**Table 5.6.2.8-1: Definition of type CandidateForReplacement**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| snssai | Snssai | M | 1 | The S-NSSAI in the serving PLMN. It shall contain a S-NSSAI within the Allowed NSSAI. | |
| dnns | array(Dnn) | O | 1..N | List of candidate DNNs for replacement for the S-NSSAI included in the "snssai" attribute. If omitted, any DNN for the provided S-NSSAI is candidate for replacement. | |

### 5.6.2.9 Type AmRequestedValueRep

**Table 5.6.2.9-1: Definition of type AmRequestedValueRep**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| userLoc | UserLocation | O | 0..1 | The location of the served UE is camping. | |
| praStatuses | map(PresenceInfo) | O | 1..N | The UE presence statuses for tracking areas.<br>The "praId" attribute within the PresenceInfo data type shall also be the key of the map. | |
| accessTypes | array(AccessType) | O | 1..N | The Access Types where the served UE is camping. | MultipleAccessTypes |
| ratTypes | array(RatType) | O | 1..N | The 3GPP RAT Type and non-3GPP RAT Type where the served UE is camping. | MultipleAccessTypes |
| allowedSnssais | array(Snssai) | O | 1..N | The Allowed NSSAI in the 3GPP access and includes the S-NSSAIs values the UE can use in the serving PLMN. | SliceSupport, DNNReplacementControl |
| n3gAllowedSnssais | array(Snssai) | O | 1..N | The Allowed NSSAI in the non-3GPP access and includes the S-NSSAIs values the UE can use in the serving PLMN when the UE is registered in the non-3GPP access. | SliceSupport, MultipleAccessTypes, DNNReplacementControl |

### 5.6.2.10 Type: AsTimeDistributionParam

**Table 5.6.2.10-1: Definition of type AsTimeDistributionParam**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| asTimeDistInd | boolean | O | 0..1 | When this attribute is included and set to true, it indicates that the access stratum time distribution via Uu reference point is activated.<br>When present it shall be set as follows:<br>- true: activated.<br>- false (default): deactivated. | |
| uuErrorBudget | UintegerRm | O | 0..1 | Indicates the time synchronization error budget in terms of time units of nanoseconds. | |

### 5.6.2.11 Type UeSliceMbr

**Table 5.6.2.11-1: Definition of type UeSliceMbr**

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|---|---|---|---|---|
| sliceMbr | SliceMbr | M | 1 | Contains the MBR for uplink and the MBR for downlink. | |
| servingSnssai | Snssai | M | 1 | Indicates the S-NSSAI of serving PLMN. | |
| mappedHomeSnssai | Snssai | C | 0..1 | Indicates the mapped S-NSSAI of home PLMN. Shall only be provided in the request towards the PCF when serving PLMN is not the HPLMN. | |

## 5.6.3 Simple data types and enumerations

### 5.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous sclauses.

### 5.6.3.2 Simple data types

The simple data types defined in table 5.6.3.2-1 shall be supported.

**Table 5.6.3.2-1: Simple data types**

| Type Name | Type Definition | Description | Applicability |
|---|---|---|---|
| n/a | | | |

### 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 1) | |
| 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 (NOTE 2) | Service Area Restriction change: the UDM notifies the NF service consumer that the subscribed service area restriction information has changed. | |
| RFSP_CH (NOTE 2) | 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. (NOTE 1) | SliceSupport, DNNReplacementControl |
| UE_AMBR_CH (NOTE 2) | 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 1) | MultipleAccessTypes |
| UE_SLICE_MBR_CH | UE-Slice-MBR change: the NF service consumer notifies any changes in the subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN. | UE-Slice-MBR_Authorization |
| NWDAF_DATA_CH (NOTE 2) | Indicates that the NWDAF instance IDs used for the UE and/or associated Analytics IDs have changed. | EneNA |
| TARGET_NSSAI | Generation of Target NSSAI: the NF service consumer notifies that the Target NSSAI was generated. | TargetNSSAI |
| NOTE 1: This includes reporting the current value at the time the trigger is provisioned during the update or update notification of the policy association.<br>NOTE 2: The NF service consumer always reports to the PCF. | | |

### 5.6.3.4 Enumeration: PolicyAssociationReleaseCause

The enumeration PolicyAssociationReleaseCause represents the cause why the PCF requests the termination of the policy association. It shall comply with the provisions defined in table 5.6.3.4-1.

**Table 5.6.3.4-1: Enumeration PolicyAssociationReleaseCause**

| Enumeration value | Description | Applicability |
|---|---|---|
| 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. | |

## 5.7 Error handling

### 5.7.1 General

For the Npcf_AMPolicyControl API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [6]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [5] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [5].

In addition, the requirements in the following clauses are applicable for the Npcf_AMPolicyControl API.

### 5.7.2 Protocol Errors

No specific protocol errors for the Npcf_AMPolicyControl API service are specified.

### 5.7.3 Application Errors

The application errors defined for the Npcf_AMPolicyControl service are listed in Table 5.7.3-1 and Table 5.7.3-2.

**Table 5.7.3-1: Application errors**

| Application Error | HTTP status code | Description |
|---|---|---|
| USER_UNKNOWN | 400 Bad Request | The HTTP request is rejected because the end user specified in the request is unknown to the PCF. |
| ERROR_REQUEST_PARAMETERS | 400 Bad Request | The HTTP request is rejected because the set of information needed by the PCF for AM Policy selection is incomplete or erroneous or not available for the decision to be made. |
| PENDING_TRANSACTION | 400 Bad Request | This error shall be used when the PendingTransaction feature is supported and the PCF receives an incoming request on a policy association while it has an ongoing transaction on the same policy association and cannot handle the request as described in clause 9.2 of 3GPP TS 29.513 [7]. |
| POLICY_ASSOCIATION_NOT_FOUND | 404 Not Found | The HTTP request is rejected because no policy association corresponding to the request exists in the PCF. |
| NOTE: Including a "ProblemDetails" data structure with the "cause" attribute in the HTTP response is optional unless explicitly mandated in the service operation clauses. | | |

**Table 5.7.3-2: Application errors when NF service consumer acts as a server to receive a notification**

| Application Error | HTTP status code | Description |
|---|---|---|
| PENDING_TRANSACTION | 400 Bad Request | This error shall be used when the PendingTransaction feature is supported and the NF service consumer receives an incoming request on a policy association while it has an ongoing transaction on the same policy association and cannot handle the request as described in clause 9.2 of 3GPP TS 29.513 [7]. (NOTE 1) |
| NOTE 1: This application error is included in the response to the Policy Update Notification HTTP POST request.<br>NOTE 2: Including a "ProblemDetails" data structure with the "cause" attribute in the HTTP response is optional unless explicitly mandated in the service operation clauses. | | |

# 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 clause 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 clauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [5] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [5]. |
| 9 | UE-Slice-MBR_Authorization | Indicates the support of UE-Slice-MBR control by the PCF in the serving network. |
| 10 | AMInfluence | Indicates the support of the alternative mechanism to support informing the PCF for the UE of PDU session(s) established/terminated events via the delivery of the PCF for the UE information necessary for the PCF for the PDU session to send notifications on PDU session(s) established/terminated events through the AMF and the SMF. |
| 11 | EneNA | This feature indicates the support of NWDAF data reporting. |
| 12 | TargetNSSAI | Indicates the support for RFSP Index associated with the Target NSSAI. |
| 13 | 5GAccessStratumTime | This feature indicates the support of 5G acess stratum time distribution parameters provisioning. |

# 5.9 Security

As indicated in 3GPP TS 33.501 [19] and 3GPP TS 29.500 [5], the access to the Npcf_AMPolicyControl API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [20]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [13]) plays the role of the authorization server.

If OAuth2 is used, an NF service sonsumer, prior to consuming services offered by the Npcf_AMPolicyControl API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [13], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF service consumer used for discovering the Npcf_AMPolicyControl service.

The Npcf_AMPolicyControl API defines a single scope "npcf-am-policy-control" for the entire service, and it does not define any additional scopes at resource or operation level.

# Annex A (normative): OpenAPI specification

## A.1 General

The present Annex contains an OpenAPI [10] specification of HTTP messages and content bodies used by the Npcf_AMPolicyControl API.

This Annex shall take precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API.

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification file contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5B of the 3GPP TR 21.900 [22] and clause 5.3.1 of the 3GPP TS 29.501 [6] for further information).

## A.2 Npcf_AMPolicyControl API

```
openapi: 3.0.0
info:
  version: 1.2.2
  title: Npcf_AMPolicyControl
  description: |
    Access and Mobility Policy Control Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.507 V17.11.0; 5G System; Access and Mobility Policy Control Service.
  url: 'https://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 clause 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'
        targetRfsp:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RfspIndex'
        smfSelInfo:
          $ref: '#/components/schemas/SmfSelectionData'
        ueAmbr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
        ueSliceMbrs:
          type: array
          items:
            $ref: '#/components/schemas/UeSliceMbr'
          minItems: 1
          description: >
            One or more UE-Slice-MBR(s) for S-NSSAI(s) of serving PLMN as part of the AMF Access and
            Mobility Policy as determined by the PCF.
        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'
        pcfUeInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
        matchPdus:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
          nullable: true
        asTimeDisParam:
          $ref: '#/components/schemas/AsTimeDistributionParam'
      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: 'TS29571_CommonData.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: array
      items:
        $ref: '#/components/schemas/UeSliceMbr'
      minItems: 1
      description: >
        The subscribed UE Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping  to
        a S-NSSAI of the serving PLMN Shall be provided when available.
    allowedSnssais:
      description: array of allowed S-NSSAIs for the 3GPP access.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      minItems: 1
    targetSnssais:
      description: array of target S-NSSAIs.
      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: 'TS29571_CommonData.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: array
        items:
          $ref: '#/components/schemas/UeSliceMbr'
        minItems: 1
        description: >
```

```
          The subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping
          to a S-NSSAI of the serving PLMN Shall be provided for the "UE_SLICE_MBR_CH"
          policy control request trigger.
      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
      targetSnssais:
        description: array of target S-NSSAIs.
        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'
      targetRfsp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RfspIndex'
      smfSelInfo:
        $ref: '#/components/schemas/SmfSelectionData'
      ueAmbr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
      ueSliceMbrs:
        type: array
        items:
          $ref: '#/components/schemas/UeSliceMbr'
        minItems: 1
        description: >
          One or more UE-Slice-MBR(s) for S-NSSAI(s) of serving PLMN the allowed NSSAI as
          part of the AMF Access and Mobility Policy as determined by the PCF.
      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
      pcfUeInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
      matchPdus:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
        nullable: true
      asTimeDisParam:
        $ref: '#/components/schemas/AsTimeDistributionParam'
    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'
    allowedSnssais:
      description: array of allowed S-NSSAIs for the 3GPP access.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    n3gAllowedSnssais:
      description: array of allowed S-NSSAIs for the Non-3GPP access.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
AsTimeDistributionParam:
  description: Contains the 5G acess stratum time distribution parameters.
  type: object
  properties:
    asTimeDistInd:
      type: boolean
    uuErrorBudget:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UintegerRm'
  nullable: true
UeSliceMbr:
  description: Contains a UE-Slice-MBR and the related information.
  type: object
  properties:
    sliceMbr:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SliceMbr'
      minProperties: 1
      description: Contains the MBR for uplink and the MBR for downlink.
    servingSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    mappedHomeSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
  required:
    - sliceMbr
    - servingSnssai
  nullable: true

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
        - TARGET_NSSAI
    - 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-Slice-MBR change. The NF service consumer notifies any changes
        in the subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping
        to a S-NSSAI of the serving PLMN.
      - 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.
      - TARGET_NSSAI: Generation of Target NSSAI. The NF service consumer notifies that the
        Target NSSAI was generated.
  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.
```

# Annex B (normative): Wireless and wireline convergence access support

## B.1 Scope

This annex defines procedures for wireless and wireline convergence access support for 5GS. The stage 2 definition and procedures are contained in 3GPP TS 23.316 [23]. The System Architecture for wireless and wireline convergence access is defined in 3GPP TS 23.501 [2].

## B.2 Npcf_AMPolicyControl Service

### B.2.1 Service Description

#### B.2.1.1 Overview

Clause 4.1.1 applies with the modification that the UE is replaced by the 5G-RG and the W-AGF, which is acting as a UE towards the 5GC on behalf of the FN-RG.

#### B.2.1.2 Service Architecture

Clause 4.1.2 applies with the exception that roaming functionality shall not apply in this Release of the specification for access and mobility policy control for 5G-RG connecting via W-5GAN and FN-RG. Roaming architecture is only applicable to a 5G-RG connecting to the 5GC via NG RAN.

#### B.2.1.3 Network Functions

##### B.2.1.3.1 Policy Control Function (PCF)

The PCF functionality defined in clause 4.1.3.1 shall apply with the following modifications for wireline access:

- The UE-AMBR control by the serving network does not apply.
- The Service Area Restrictions for a FN-BRG do not apply.
- The PCF provides access and mobility related policy control as described in this Annex.

##### B.2.1.3.2 NF Service Consumers

The NF service consumer functionality defined in clause 4.1.3.2 shall apply with the following exceptions:

- The UE-AMBR control by the visited network is only applicable for a 5G-RG registered over 3GPP access.
- The NF service consumer enforces access and mobility related policy control as described in this Annex.

## B.3 Service Operation

### B.3.1 Introduction

The descriptions in clause 4.2.1 are applied with the following differences:

- UE is replaced by the 5G-RG.

## B.3.2 Npcf_AMPolicyControl_Create Service Operation

### B.3.2.1 General

The procedure defined in clause 4.2.2.1 is applied with following differences:

- UE is replaced by the 5G-RG or FN-RG if applicable.
- Handling of RFSP information is not applicable if the 5G-RG or FN-RG connects the 5GC via wireline access.
- When the 5G-BRG or FN-BRG connects the 5GC via W-5BBAN, the "n3gaLocation" attribute shall be included in the "ueLoc" attribute and:
    - Global Line ID including the line Id and either PLMN Id or operator Id shall be encoded within the "gli" attribute; and
    - the "w5gbanLineType" attribute to indicate whether the W-5GBAN access is DSL or PON may be included.
- The HFC Node Identifier in the "hfcNodeId" attribute of the "n3gaLocation" attribute included in the "userLoc" attribute within the PolicyAssociationRequest data structure when the 5G-CRG or FN-CRG connects to the 5GC via W-5GCAN.
- Only the policy control request triggers defined in clause B.3.4.2 are provided by the PCF when the 5G-RG or FN-RG connects the 5GC via wireline access.
- The PolicyAssociationRequest data structure shall include, if available, and if the feature "WirelineWirelessConvergence" is supported, wireline access Service Area Restrictions (see clause B.3.2.2.2) derived from the wireline access Service Area Restrictions obtained from the UDM by mapping any service areas denoted by geographical information into Line IDs (for a 5G-BRG) or HFC Node IDs (for a 5G-CRG and FN-CRG) encoded as "wlServAreaRes" attribute.
- The PolicyAssociation data type returned as body of the HTTP "201 Created" response shall include if the feature "WirelineWirelessConvergence" is supported, and if the PCF received the "wlServAreaRes" in the request, wireline Service Area Restrictions encoded as "wlServAreaRes" attribute.
- If the feature "MultipleAccessTypes" is supported, the NF service consumer (e.g. AMF) shall include:
    a) the RAT type entry corresponding to non-3GPP wireline access and/or the RAT type entry corresponding to the 3GPP access encoded in the "ratTypes" attribute, if available; and
    b) the "accessTypes" attribute indicating registration in the 3GPP access, or registration in the non-3GPP access, or registration in both 3GPP and non-3GPP access, if available.

NOTE: When both, 3GPP access and non-3GPP accesses are available, the "accessType" attribute and the "ratType" attribute within the PolicyAssociationRequest type contain the access type and RAT type corresponding to the 3GPP access.

- If the feature "SliceSupport" or the feature "DNNReplacementControl" is supported in the AMF, the UE is registered in the non-3GPP access, and the feature "MultipleAccessTypes" is supported, the NF service consumer (e.g. AMF) shall include the Allowed NSSAI in the non-3GPP access encoded in the "n3gAllowedSnssais" attribute.
- If the feature "DNNReplacementControl" is supported, the UE is registered in the non-3GPP access, and the feature "MultipleAccessTypes" is supported, the NF service consumer (e.g. AMF) may include the mapping of each S-NSSAI of the Allowed NSSAI in the non-3GPP access to the corresponding S-NSSAI of the HPLMN encoded in the "mappingSnssais" attribute.
- The PEI that may be included within the "pei" attribute shall have one of the following representations:
    a) If the 5G-BRG supports only wireline access, the PEI shall be the 5G-BRG MAC address.

b) If the 5G-CRG supports only wireline access, the PEI shall be the cable modem MAC address.

c) If the 5G-RG supports at least one 3GPP access technology, the PEI shall be the allocated IMEI or IMEISV.

d) For the FN-BRG and FN-CRG, the PEI shall be the FN-RG MAC address.

NOTE: When the PEI includes an indication that the MAC address cannot be used as Equipment identifier of the FN-RG, the PEI cannot be trusted for regulatory purposes and cannot be used for equipment based policy evaluation.

### B.3.2.2 AMF Access and Mobility Policy

#### B.3.2.2.1 General

The functionality defined in clause 4.2.2.3 shall apply with the following modifications:

- UE-AMBR defined in clause 4.2.2.3.3 shall not apply for wireline access.
- RFSP Index defined in clause 4.2.2.3.2 shall not apply for wireline access.
- Service Area Restriction defined in clause 4.2.2.3.1 is only applicable for a 5G-RG connected via NG-RAN. The wireline access Service Area Restriction defined in clause B.3.2.2.2 shall apply for a FN-CRG and/or a 5G-RG (5G-BRG and 5G-CRG) connected via wireline access.

#### B.3.2.2.2 Wireline Service Area Restriction

If service area restrictions are enabled, and if the feature "WirelineWirelessConvergence" is supported, the Service Area Restriction information is encoded using the "WirelineServiceAreaRestriction" data type defined in 3GPP TS 29.571 [11] and consists of:

- either a limited allowed area represented as both of:

  (i) a list of either Line IDs encoded as "globLineIds" (for a 5G-BRG) or HFC-Node IDs (for 5G-CRG and FN-CRG) encoded as "hfcNIds" attribute within the "areas" attribute; and

  (ii) the "restrictionType" attribute set to "ALLOWED_AREAS";

- or a limited not allowed area represented as both of:

  (i) a list of either Line IDs encoded as "globLineIds" (for a 5G-BRG) or HFC-Node IDs (for 5G-CRG and FN-CRG) encoded as "hfcNIds" attribute within the "areas" attribute; and

  (ii) the "restrictionType" attribute set to "NOT_ALLOWED_AREAS";

When the authorized wireline service area restrictions result in an unlimited set of allowed HFC-Node IDs or Line IDs, the PCF shall include:

- an empty "wlServAreaRes" attribute; or
- the "restrictionType" attribute set to "NOT_ALLOWED_AREAS" and an empty "areas" attribute.

When the authorized wireline service area restrictions result in an unlimited set of not-allowed HFC-Node IDs or Line IDs, the PCF shall include the "restrictionType" attribute set to "ALLOWED_AREAS" and an empty "areas" attribute.

#### B.3.2.2.3 Void

## B.3.3 Npcf_AMPolicyControl_UpdateNotify Service Operation

### B.3.3.1 General

The functionality defined in clause 4.2.4.2 and 4.2.4.3 shall apply.

# B.3.4 Npcf_AMPolicyControl_Update Service Operation

## B.3.4.1 General

The general procedure specified in clause 4.2.3.2 to modify an existing AM policy association shall apply with the exception that for a FN-RG or a 5G-RG registering via wireline access only, the existing AM policy association shall not be updated due to location change (tracking area), change of UE presence in PRA, or RFSP index change.

If the feature "MultipleAccessTypes" is supported, the NF service consumer may include in the PolicyAssociationUpdateRequest data structure:

- if the Access Type and/or the RAT type changed and the access type change Policy Control Request Trigger was previously provisioned (see clause B.3.4.2), the list of Access Type and RAT Type combinations available encoded in the "accessTypes" attribute, "ratTypes" attribute.

When the feature "MultipleAccessTypes" is supported the PCF may include in the PolicyUpdate data type the access type change Policy Control Request Trigger (see clause B.3.4.2) encoded within the "triggers" attribute.

If the feature "SliceSupport" or the feature "DNNReplacementControl" is supported in the AMF, the UE is registered in the non-3GPP access, and the feature "MultipleAccessTypes" is supported, the NF service consumer (e.g. AMF) shall include the Allowed NSSAI in the non-3GPP access encoded in the "n3gAllowedSnssais" attribute together with the "ALLOWED_NSSAI_CH" policy control request trigger when a change of the Allowed NSSAI for the non-3GPP access occurred.

If the feature "DNNReplacementControl" is supported, the UE is registered in the non-3GPP access, and the feature "MultipleAccessTypes" is supported, 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 NF service consumer (e.g. AMF) may include the mapping of each S-NSSAI of the Allowed NSSAI in the non-3GPP access to the corresponding S-NSSAI of the HPLMN encoded in the "mappingSnssais" attribute.

In addition, if the feature "WirelineWirelessConvergence" is supported:

- the PolicyAssociationUpdateRequest data structure shall include if a wireline access Service Area restriction change occurred, the wireline access Service Area Restrictions (see clause B.3.2.2.2) derived from the ones obtained from the UDM encoded as "wlServAreaRes" attribute;

- the PolicyUpdate data returned in the response, if the PCF received the " wlServAreaRes" attribute in the request, wireline access Service Area Restrictions encoded as "wlServAreaRes" attribute.

## B.3.4.2 Policy Control Request Triggers

For a 5G-RG registering via NG-RAN, the Policy Control Request Triggers defined in clause 4.2.3.2 shall apply.

For a FN-RG or a 5G-RG registering via wireline access, only the following Policy Control Request Triggers defined in clause 4.2.3.2 shall apply:

- "SERV_AREA _CH", i.e. Service Area Restriction change: the UDM notifies the NF service consumer that the subscribed service area restriction information 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 feature "SliceSupport" or the feature "DNNReplacementControl" is supported.

NOTE 2: The "SERV_AREA_CH" trigger is also used to notify that the subscribed wireline access service area restriction information has changed.

- "ACCESS_TYPE_CH", i.e. the 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 has changed; and

NOTE 3: The "ACCESS_TYPE_CH" trigger only applies if the "MultipleAccessTypes" feature is supported.

- "SMF_SELECT_CH", i.e. SMF selection information change.

NOTE 4: The "SMF_SELECT_CH" trigger only applies if the "DNNReplacementControl" feature is supported.

### B.3.4.3 Encoding of updated policy

Updated policies shall be encoded within the PolicyUpdate as specified in clause 4.2.3.3 with the modifications listed in clauses B.3.4.1, B.3.4.2, and this clause.

- AMF Access and Mobility Policy (see clause B.3.2.2.2) Service Area Restriction for wireline access is encoded as "wlServAreaRes" attribute.

## B.3.5 Npcf_AMPolicyControl_Delete Service Operation

### B.3.5.1 General

The functionality defined in clause 4.2.5 shall apply.

# Annex C (informative): Change history

| Change history | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-10 | | | | | | TS skeleton of Access and Mobility Policy Control Service specification | 0.0.0 |
| 2017-10 | CT3#92 | | | | | C3-175324, C3-175338 and C3-17525 | 0.1.0 |
| 2017-12 | CT3#93 | | | | | C3-176355, C3-176354, C3-176237, C3-176238 and C3-176239 | 0.2.0 |
| 2018-01 | CT3#94 | | | | | C3-180033, C3-180195 C3-182307, C3-182308, C3-182309, C3-182442, C3-182311, C3-182312, C3-182313 and C3-182314. | 0.3.0 |
| 2018-05 | CT3#97 | | | | | C3-183447, C3-183803, C3-183449, C3-183804, C3-183805, C3-183806, C3-183807, C3-183844, C3-183650 and C3-183650 | 0.5.0 |
| 2018-06 | CT#80 | CP-181025 | | | | TS sent to plenary for approval | 1.0.0 |
| 2018-06 | CT#80 | CP-181025 | | | | TS approved by plenary | 15.0.0 |
| 2018-09 | CT#81 | CP-182023 | 0002 | 1 | B | Trace activation | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0003 | 3 | F | AM Policy Association management during the AMF relocation | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0004 | 4 | F | Completion of Error Codes in OpenAPI file | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0005 | 1 | F | Stateless AMF support updates | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0006 | 7 | F | Removal of editor´s note about additional parameters to further qualify event triggers | 15.1.0 |
| 2018-09 | CT#81 | CP-182029 | 0007 | 3 | F | Service Area Restrictions | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0008 | 3 | F | UE Policies | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0009 | 1 | F | V-PCF procedures | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0010 | | F | Alignment of resource URIs to resource URI structure | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0011 | 1 | F | Including location information when a location change event is met | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0012 | 1 | F | Description of Structured data types | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0014 | 1 | F | Update of notification | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0015 | | F | Update the consumer of Npcf_AMPolicyControl service | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0016 | 1 | F | Type of Rfsp attribute in PolicyAssociation data type | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0017 | 3 | F | Encoding to provide only updated parts of policies | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0018 | 1 | F | Termination Causes | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0019 | 1 | F | Update of resource figure | 15.1.0 |
| 2018-09 | CT#81 | CP-182015 | 0020 | | F | Correction of cardinality of arrays | 15.1.0 |
| 2018-12 | CT#82 | CP-183205 | 0021 | 1 | F | Cleanup of UE policy | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0022 | 2 | F | AM Policy association handling during the AMF relocation | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0023 | 1 | F | Removal of unused abbreviations | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0024 | 1 | F | Correction of HTTP header field with URL of created resource | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0025 | | F | Type of servAreaRes attribute within Type PolicyAssociation | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0026 | | F | HTTP Error responses for Notifications | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0028 | 2 | F | Individual AM policy deletion at AMF relocation | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0029 | 1 | F | Correction of the update of Policy Control Request triggers | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0030 | | F | Default value for apiRoot | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0031 | | F | API version | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0032 | | F | ExternalDocs OpenAPI field | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0033 | | F | Location header field in OpenAPI | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0034 | 1 | F | Security | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0035 | | F | supported content types | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0036 | 2 | F | HTTP Error responses | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0037 | 1 | F | Correction to the PolicyAssociation data type | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0039 | | F | Re-use PresenceInfoRm data type | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0040 | | F | Correction to the PresenceInfo data type | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0041 | 1 | F | Alternate IP address in Npcf_AMPolicyControl_Update | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0042 | 2 | F | Corrections on authorized service area restrictions and RFSP index | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0043 | 2 | F | Corrections on encoding of Service Area Restrictions | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0044 | 1 | F | AM Policy Control support for Emergency Registration | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0045 | 1 | F | Multiple Internal Group identifiers | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0046 | 2 | F | Corrections on Protocol and Application errors | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0047 | 1 | F | Correction of Resource name | 15.2.0 |
| 2018-12 | CT#82 | CP-183205 | 0048 | 1 | F | Removal of pras attribute | 15.2.0 |
| 2018-12 | CT#82 | CP-183176 | 0049 | | F | Corrections of Cardinality in OpenAPI | 15.2.0 |
| 2019-03 | CT#83 | CP-190114 | 0050 | 2 | F | Correction on PCF-initiated AM Policy association termination | 15.3.0 |
| 2019-06 | CT#84 | CP-191187 | 0053 | 1 | F | Precedence of OpenAPI file | 15.4.0 |
| 2019-06 | CT#84 | CP-191187 | 0057 | 1 | F | Correction to Service Area Restriction and RFSP | 15.4.0 |
| 2019-06 | CT#84 | CP-191187 | 0059 | 1 | F | Copyright Note in YAML file | 15.4.0 |
| 2019-06 | CT#84 | CP-191089 | 0051 | 3 | F | Support of Allowed NSSAI | 16.0.0 |
| 2019-06 | CT#84 | CP-191089 | 0054 | 1 | F | Correction on Policy Association termination | 16.0.0 |
| 2019-06 | CT#84 | CP-191101 | 0055 | 2 | F | API version Update | 16.0.0 |
| 2019-06 | CT#84 | CP-191096 | 0056 | 1 | F | Adding tags to OpenAPI File | 16.0.0 |
| 2019-06 | CT#84 | CP-191089 | 0058 | 1 | F | Race Condition handling | 16.0.0 |
| 2019-09 | CT#85 | CP-192178 | 0061 | | B | Adding NID as input for policy decisions | 16.1.0 |
| 2019-09 | CT#85 | CP-192156 | 0062 | | B | Serving PLMN UE AMBR control | 16.1.0 |

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|---|---|---|---|---|---|---|---|
| 2019-09 | CT#85 | CP-192140 | 0065 | 1 | A | Correcting the resource URI of AM Policy Associations | 16.1.0 |
| 2019-09 | CT#85 | CP-192176 | 0066 | 1 | B | Support of wireline and wireless access convergence, NFs | 16.1.0 |
| 2019-09 | CT#85 | CP-192152 | 0067 | 2 | B | Support of 5WWC, Policy Control Request Triggers | 16.1.0 |
| 2019-09 | CT#85 | CP-192152 | 0068 | | B | Annex of wireless and wireline convergence access support | 16.1.0 |
| 2019-09 | CT#85 | CP-192152 | 0070 | | B | Npcf_AMPolicyControl_Create Service Operation of annex | 16.1.0 |
| 2019-09 | CT#85 | CP-192140 | 0074 | 2 | A | GUAMI included in the Update operation | 16.1.0 |
| 2019-09 | CT#85 | CP-192173 | 0076 | | F | OpenAPI version update for TS 29.507 Rel-16 | 16.1.0 |
| 2019-12 | CT#86 | CP-193197 | 0078 | 1 | F | Data type of the "serviceName" attribute | 16.2.0 |
| 2019-12 | CT#86 | CP-193182 | 0080 | | A | Correction to PolicyUpdate | 16.2.0 |
| 2019-12 | CT#86 | CP-193197 | 0081 | 2 | B | DNN replacement | 16.2.0 |
| 2019-12 | CT#86 | CP-193237 | 0084 | 2 | B | Line Identifier | 16.2.0 |
| 2019-12 | CT#86 | CP-193197 | 0086 | 1 | B | AM Policy association establishment rejection | 16.2.0 |
| 2019-12 | CT#86 | CP-193182 | 0088 | 1 | A | Correction to Service Area Restrictions description | 16.2.0 |
| 2019-12 | CT#86 | CP-193182 | 0090 | 1 | A | Correction on 307 error, 29.507 | 16.2.0 |
| 2019-12 | CT#86 | CP-193232 | 0091 | 1 | B | Support of simultaneous registration in multiple accesses | 16.2.0 |
| 2019-12 | CT#86 | CP-193232 | 0092 | 2 | B | Support of S-NSSAI for non-3GPP access | 16.2.0 |
| 2019-12 | CT#86 | CP-193191 | 0093 | 1 | B | Support of 5WWC, Service Area Restrictions | 16.2.0 |
| 2019-12 | CT#86 | CP-193191 | 0094 | 1 | B | Clarification of PEI format, 29.507 | 16.2.0 |
| 2019-12 | CT#86 | CP-193226 | 0095 | 2 | B | HFC node Id in Location information | 16.2.0 |
| 2019-12 | CT#86 | CP-193212 | 0096 | | F | Update of API version and TS version in OpenAPI file | 16.2.0 |
| 2020-03 | CT#87e | CP-200203 | 0097 | 1 | B | Policy Control Request Triggers for wireline access | 16.3.0 |
| 2020-03 | CT#87e | CP-200203 | 0098 | 1 | B | The data type of GlobalLineId | 16.3.0 |
| 2020-03 | CT#87e | CP-200207 | 0099 | | F | Corrections related to DNN replacement | 16.3.0 |
| 2020-03 | CT#87e | CP-200207 | 0100 | | F | Remove the possibility of SNSSAI change for DNN replacement | 16.3.0 |
| 2020-03 | CT#87e | CP-200207 | 0101 | | B | Mapping Of Allowed NSSAI | 16.3.0 |
| 2020-03 | CT#87e | CP-200207 | 0102 | | B | Completion of DNN replacement functionality | 16.3.0 |
| 2020-03 | CT#87e | CP-200207 | 0103 | 1 | B | Completing the description of triggers values applicability in PolicyAssociation and PolicyUpdate types. | 16.3.0 |
| 2020-03 | CT#87e | CP-200216 | 0105 | 1 | B | Update of OpenAPI version and TS version in externalDocs field | 16.3.0 |
| 2020-06 | CT#88e | CP-201215 | 0107 | 1 | A | Corrections on Service Area Restriction | 16.4.0 |
| 2020-06 | CT#88e | CP-201215 | 0109 | 1 | A | Location Header of 307 status code | 16.4.0 |
| 2020-06 | CT#88e | CP-201215 | 0111 | 1 | A | Notification URI | 16.4.0 |
| 2020-06 | CT#88e | CP-201233 | 0112 | 3 | B | Correction to the DNN replacement | 16.4.0 |
| 2020-06 | CT#88e | CP-201233 | 0113 | 1 | B | Enable removing the policy decision | 16.4.0 |
| 2020-06 | CT#88e | CP-201233 | 0114 | 1 | B | FQDN of alternative AMF | 16.4.0 |
| 2020-06 | CT#88e | CP-201228 | 0115 | | F | Removal of MAC address | 16.4.0 |
| 2020-06 | CT#88e | CP-201233 | 0116 | 3 | D | OpenAPI: Removal of values from description of "triggers" property | 16.4.0 |
| 2020-06 | CT#88e | CP-201228 | 0117 | 1 | F | Corrections on Annex B | 16.4.0 |
| 2020-06 | CT#88e | CP-201228 | 0118 | 1 | B | Untrusted FN-RG PEI | 16.4.0 |
| 2020-06 | CT#88e | CP-201244 | 0119 | 1 | F | Storage of YAML files in ETSI Forge | 16.4.0 |
| 2020-06 | CT#88e | CP-201256 | 0121 | 1 | F | URI of the Npcf_AMPolicyControl service | 16.4.0 |
| 2020-06 | CT#88e | CP-201261 | 0122 | 1 | F | Removal of RG_TMBR trigger | 16.4.0 |
| 2020-06 | CT#88e | CP-201228 | 0123 | | F | Correction to wireline service area restriction | 16.4.0 |
| 2020-06 | CT#88e | CP-201244 | 0125 | | F | Optionality of ProblemDetails | 16.4.0 |
| 2020-06 | CT#88e | CP-201244 | 0126 | 1 | F | Supported headers, Resource Data type, Operation Name | 16.4.0 |
| 2020-06 | CT#88e | CP-201255 | 0128 | | F | Update of OpenAPI version and TS version in externalDocs field | 16.4.0 |
| 2020-09 | CT#89e | CP-202059 | 0129 | 1 | F | correction to ACCESS_TYPE_CH trigger | 16.5.0 |
| 2020-09 | CT#89e | CP-202079 | 0130 | 1 | F | report initial presence status for PRA | 17.0.0 |
| 2020-09 | CT#89e | CP-202073 | 0131 | 1 | B | Successful Response | 17.0.0 |
| 2020-09 | CT#89e | CP-202073 | 0132 | | B | Error status code | 17.0.0 |
| 2020-09 | CT#89e | CP-202085 | 0134 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.0.0 |
| 2020-12 | CT#90e | CP-203074 | 0137 | 2 | A | Essential corrections and alignments | 17.1.0 |
| 2020-12 | CT#90e | CP-203139 | 0139 | 1 | A | Storage of YAML files in 3GPP Forge | 17.1.0 |
| 2020-12 | CT#90e | CP-203143 | 0141 | 1 | A | Correction to PRA | 17.1.0 |
| 2020-12 | CT#90e | CP-203148 | 0142 | 1 | F | Report current value in Update for location and accessType related triggers | 17.1.0 |
| 2020-12 | CT#90e | CP-203148 | 0143 | 1 | B | Adding 200OK response for UpdateNotify | 17.1.0 |
| 2020-12 | CT#90e | CP-203147 | 0144 | | F | PolicyAssociationReleaseCause enumeration name | 17.1.0 |
| 2020-12 | CT#90e | CP-203148 | 0145 | | F | "400 Bad Request" response on notification | 17.1.0 |
| 2020-12 | CT#90e | CP-203153 | 0148 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.1.0 |
| 2021-03 | CT#91e | CP-210191 | 0152 | 1 | A | Support of stateless NFs | 17.2.0 |
| 2021-03 | CT#91e | CP-210218 | 0153 | | F | Adding "description" field for map data types | 17.2.0 |
| 2021-03 | CT#91e | CP-210218 | 0154 | | F | OpenAPI reference | 17.2.0 |
| 2021-03 | CT#91e | CP-210226 | 0155 | | F | Encoding of Snssai as key of a map | 17.2.0 |
| 2021-03 | CT#91e | CP-210219 | 0156 | | F | Clarification on optional HTTP custom headers | 17.2.0 |
| 2021-03 | CT#91e | CP-210227 | 0158 | 1 | F | Clarification of update operation | 17.2.0 |
| 2021-03 | CT#91e | CP-210221 | 0159 | 1 | F | Ambiguous concept of NF service consumer terminology | 17.2.0 |
| 2021-03 | CT#91e | CP-210221 | 0160 | 1 | F | Adding some missing description fields to data type definitions in OpenAPI specification files | 17.2.0 |
| 2021-03 | CT#91e | CP-210191 | 0162 | | A | Correction to resource identifiers descriptions used in notifications | 17.2.0 |
| 2021-03 | CT#91e | CP-210227 | 0163 | 1 | F | Correction to Service Area Restrictions | 17.2.0 |

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|---|---|---|---|---|---|---|---|
| 2021-03 | CT#91e | CP-210240 | 0165 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.2.0 |
| 2021-06 | CT#92e | CP-211257 | 0166 | 2 | B | Enabling Dynamic Changes of AM Policies in AMPolicyControl | 17.3.0 |
| 2021-06 | CT#92e | CP-211245 | 0168 | 1 | B | GLI report | 17.3.0 |
| 2021-06 | CT#92e | CP-211200 | 0170 | 1 | A | Temporary and Permanent Redirection | 17.3.0 |
| 2021-06 | CT#92e | CP-211104 | 0171 | 2 | B | Serving PLMN UE Slice-MBR control | 17.3.0 |
| 2021-06 | CT#92e | CP-211265 | 0173 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.3.0 |
| 2021-09 | CT#93e | CP-212220 | 0174 | | F | Correction of URI structure | 17.4.0 |
| 2021-09 | CT#93e | CP-212225 | 0175 | 1 | B | Add retrieval of and subscription to AM Influence requests for DCAMP | 17.4.0 |
| 2021-09 | CT#93e | CP-212223 | 0177 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.4.0 |
| 2021-12 | CT#94e | CP-213194 | 0179 | 1 | B | Request of notification of PDU session established/terminated | 17.5.0 |
| 2021-12 | CT#94e | CP-213229 | 0180 | | F | Direct access to SNPN | 17.5.0 |
| 2021-12 | CT#94e | CP-213228 | 0181 | 3 | B | NWDAF instance provisioning to the PCF | 17.5.0 |
| 2021-12 | CT#94e | CP-213194 | 0182 | | F | Miscellaneous corrections | 17.5.0 |
| 2021-12 | CT#94e | CP-213243 | 0183 | | F | Correction to Update procedure | 17.5.0 |
| 2021-12 | CT#94e | CP-213230 | 0184 | 1 | F | Some updates to UE-Slice-MBR | 17.5.0 |
| 2021-12 | CT#94e | CP-213230 | 0185 | | F | Corrections to UE-Slice-MBR | 17.5.0 |
| 2021-12 | CT#94e | CP-213230 | 0186 | 1 | B | RFSP Index associated with the Target NSSAI | 17.5.0 |
| 2021-12 | CT#94e | CP-213244 | 0187 | | F | Correction of the applicability feature for data type Snssai | 17.5.0 |
| 2021-12 | CT#94e | CP-213244 | 0188 | | F | Correction on the condition for location change reporting | 17.5.0 |
| 2021-12 | CT#94e | CP-213244 | 0190 | 1 | A | Correction to PCF-provisioned triggers | 17.5.0 |
| 2021-12 | CT#94e | CP-213244 | 0191 | | B | DNN Replacement implications when URSP rules are provided | 17.5.0 |
| 2021-12 | CT#94e | CP-213244 | 0192 | 1 | F | Error handling when no AM Policy Association exists | 17.5.0 |
| 2021-12 | CT#94e | CP-213246 | 0193 | | F | Update of OpenAPI version and TS version in externalDocs field | 17.5.0 |
| 2022-03 | CT#95e | CP-220197 | 0194 | 1 | B | Clarification of the dynamic AM policy decision | 17.6.0 |
| 2022-03 | CT#95e | CP-220183 | 0195 | 3 | B | 5G access stratum time distribution support | 17.6.0 |
| 2022-03 | CT#95e | CP-220176 | 0197 | 1 | A | Alignment of "Application Errors" clause with SBI TS template | 17.6.0 |
| 2022-03 | CT#95e | CP-220196 | 0198 | | F | Clarification to Policy Update Notification | 17.6.0 |
| 2022-03 | CT#95e | CP-220195 | 0199 | | F | Reporting available allowed NSSAI when ImmediateReport applies | 17.6.0 |
| 2022-03 | CT#95e | CP-220167 | 0204 | 1 | A | Handling of error responses | 17.6.0 |
| 2022-03 | CT#95e | CP-220197 | 0206 | 1 | F | Removal of Editor's Notes | 17.6.0 |
| 2022-03 | CT#95e | CP-220194 | 0207 | | F | Update of info and externalDocs fields | 17.6.0 |
| 2022-06 | CT#96 | CP-221155 | 0210 | 3 | F | Formatting of description fields | 17.7.0 |
| 2022-06 | CT#96 | CP-221154 | 0211 | | F | Using the common data type for FQDN | 17.7.0 |
| 2022-06 | CT#96 | CP-221144 | 0212 | | F | Determination of error budgets for a given UE | 17.7.0 |
| 2022-06 | CT#96 | CP-221145 | 0213 | 4 | F | Correction to access stratum time distribution | 17.7.0 |
| 2022-06 | CT#96 | CP-221139 | 0214 | 1 | F | remove EN related to Target NSSAI | 17.7.0 |
| 2022-06 | CT#96 | CP-221139 | 0215 | 2 | F | decouple UE-Slice-MBR from Allowed_NSSAI | 17.7.0 |
| 2022-06 | CT#96 | CP-221139 | 0216 | | F | missing TARGET_NSSAI trigger from the triggers provisioned by PCF | 17.7.0 |
| 2022-06 | CT#96 | CP-221129 | 0217 | | F | Correction to NWDAF_DATA_CH trigger | 17.7.0 |
| 2022-06 | CT#96 | CP-221130 | 0219 | 1 | F | Mapping between RAT type and frequency and the RFSP Index | 17.7.0 |
| 2022-06 | CT#96 | CP-221144 | 0220 | 1 | F | Correction to AS Time Distribution | 17.7.0 |
| 2022-06 | CT#96 | CP-221154 | 0221 | | F | Removal of sibling element | 17.7.0 |
| 2022-06 | CT#96 | CP-221159 | 0223 | 1 | F | Correction to the notification of PCF for a PDU session | 17.7.0 |
| 2022-06 | CT#96 | CP-221151 | 0224 | | F | Update of info and externalDocs fields | 17.7.0 |
| 2022-09 | CT#97e | CP-222123 | 0225 | 1 | F | Alignment with the SBI template | 17.8.0 |
| 2022-09 | CT#97e | CP-222107 | 0227 | 1 | F | Correction to UE-Slice-MBR handling for VPLMN S-NSSAI to HPLMN S-NSSAI mapping | 17.8.0 |
| 2023-03 | CT#99 | CP-230151 | 0235 | 1 | F | Correction of an openAPI error | 17.9.0 |
| 2023-03 | CT#99 | CP-230160 | 0238 | | F | Update of info and externalDocs fields | 17.9.0 |
| 2023-09 | CT#101 | CP-232107 | 0264 | | F | Incorrect description of NWDAF data | 17.10.0 |
| 2025-03 | CT#107 | CP-250127 | 0323 | | F | Update of info and externalDocs fields | 17.11.0 |

# History

| Document history | | |
|---|---|---|
| V17.6.0 | May 2022 | Publication |
| V17.7.0 | June 2022 | Publication |
| V17.8.0 | September 2022 | Publication |
| V17.9.0 | April 2023 | Publication |
| V17.10.0 | September 2023 | Publication |
| V17.11.0 | March 2025 | Publication |