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Foreword

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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 9113: "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 9457: "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".

[32] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[33] 3GPP TS 29.594: "5G System; Spending Limit Control Service; 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

Alternative S-NSSAI

Partially Allowed NSSAI

Target NSSAI

Pending 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
CHF	Charging Function
DNN	Data Network Name
EPC	Evolved Packet Core
EPS	Evolved Packet System
E-UTRAN	Evolved Universal Terrestrial Radio-Access Network
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
MME	Mobility Management Entity
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
RA	Registration Area
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.

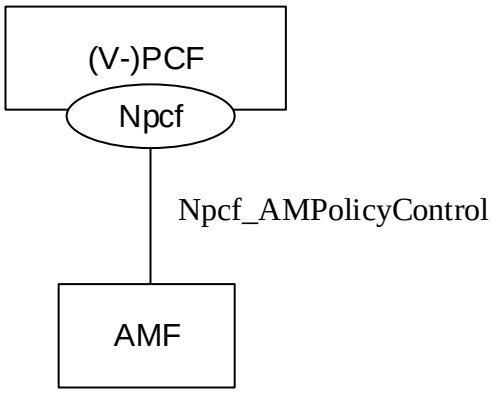

Figure 4.1.2-1: Reference Architecture for the Npcf_AMPolicyControl Service; SBI representation

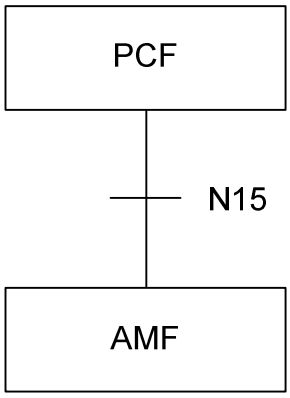

Figure 4.1.2-2: Non-roaming Reference Architecture for the Npcf_AMPolicyControl Service; reference point representation

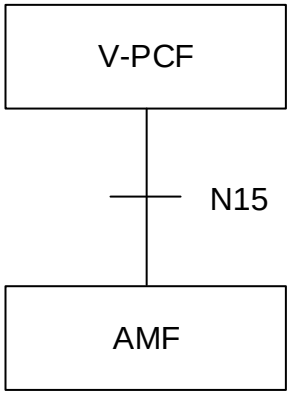

Figure 4.1.3-2: Roaming reference Architecture for the Npcf_AMPolicyControl Service; reference point representation

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.

The policy decisions made by the PCF may be based on one or more of the following:

- Information obtained from the AF/NEF, e.g. high throughput indication;
- Information obtained from the UDR;
- Information obtained from the AMF, e.g. UE related and access related information;
- Information obtained from the NWDAF;
- Information from the CHF about spending limit control;
- Information from the TSCTSF; and

- PCF pre-configured policy context.

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.

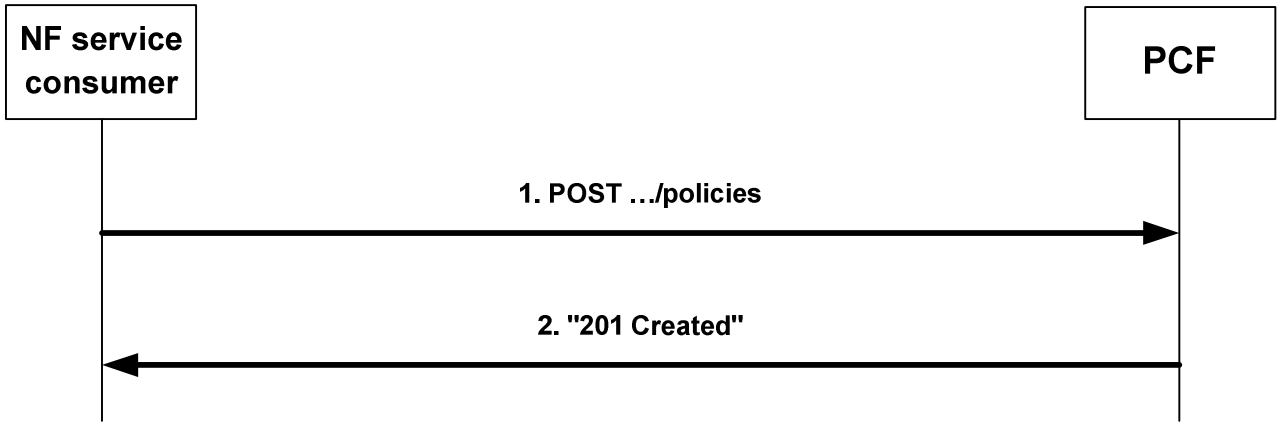

Figure 4.2.2.1-1: Creation of a policy association

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, and the list of NWDAF instance IDs used for the UE and their associated Analytic ID(s) consumed by the AMF, 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;
- if the "SliceSupport" feature, the "DNNReplacementControl" feature and/or the "NetSliceRepl" feature is/are supported in the NF service consumer and the UE is registered via a 3GPP access, the Allowed NSSAI in the 3GPP access within the "allowedSnssais" attribute; and
- if the "PartNetSliceSupport" feature and/or the "NetSliceRepl" feature is/are supported in the NF service consumer and the UE is registered via a 3GPP access, the Partially Allowed NSSAI in the 3GPP access within the "partAllowedNssai" attribute;

and that shall include when available:

- GPSI encoded as "gpsi" attribute;
- if the feature "MultipleAccessTypes" is not supported, the access type encoded as "accessType" attribute;
- Permanent Equipment Identifier (PEI) encoded as "pei" attribute;
- User Location Information encoded as "userLoc" attribute;
- UE Time Zone encoded as "timeZone" attribute;
- the identifier of the serving network (the PLMN Identifier or the SNPN Identifier)encoded as "servingPlmn" attribute;

NOTE 1: 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 "DNNReplacementControl" feature is supported, the mapping of each S-NSSAI of the Allowed NSSAI, and if the "PartNetSliceSupport" feature is supported, the mapping of each S-NSSAI of the Partially Allowed NSSAI to the corresponding S-NSSAI of the HPLMN within the "mappingSnssais" attribute;
- if the "PartNetSliceSupport" feature is supported in the NF service consumer and the UE is registered via a 3GPP access:
  - the list of the S-NSSAI(s) rejected partially in the RA, if available, within the "snssaisPartRejected" attribute;
  - the list of the Rejected S-NSSAI(s) in the RA, if available, within the "rejectedSnssais" attribute; and/or
  - the Pending NSSAI encoded, if available, within the "pendingNssai" 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;
- 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, included 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 and the Partially Allowed NSSAI, Service Area Restrictions, RFSP index, Allowed NSSAI, Partially Allowed NSSAI, list of the S-NSSAI(s) rejected partially in the RA, list of the Rejected S-NSSAI(s) in the RA and/or Pending NSSAI);
- for the successful case, send a HTTP "201 Created" response with the URI for the created resource in the "Location" header field

NOTE 2: 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. If the feature "RFSPValidityTime" is supported and the PCF determines to provide an RFSP index value that indicates EPC/E-UTRAN access is prioritized over 5GS access, the PCF may provide, based on operator policies, a validity time for the RFSP index value within the "rfspValTime" 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;

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; and/or

g) if the "NetSliceUsageCtrl" feature is supported and the PCF determines that one or more S-NSSAI(s) of the UE's Allowed NSSAI is/are on-demand S-NSSAI(s) and subject to network slice usage control, the network slice usage control information (e.g., slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute as specified in clause 4.2.2.3.7;

NOTE 3: In this release of the specification, network slice usage control information provisioning by the PCF is not supported in roaming scenarios.

- 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, the "DNNReplacementControl" feature and/or the "NetSliceRepl" feature is/are 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;

  g) if the "NetSliceRepl" feature is supported, S-NSSAI Replacement;

  h) if the "PartNetSliceSupport" feature and/or the "NetSliceRepl" feature is/are supported, Change of the Partially Allowed NSSAI;

  i) if the "PartNetSliceSupport" feature is supported, Change of the S-NSSAI(s) rejected partially in the RA, Change of the rejected S-NSSAI(s) in the RA and/or Change of the Pending NSSAI;

- 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; and

- if the "SLAMUP" feature is supported, and operator policies indicate the AMF should select same CHF that is selected by the PCF for a UE, the PCF may provide the CHF address and if available, the associated CHF instance ID(s) and/or CHF set ID(s) encoded as "chfInfo" attribute;

and

- 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"; and
  - 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 1: The RFSP index value that will be authorized 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.

The PCF may determine an RFSP Index value that indicates that the EPC/E-UTRAN access is prioritized over 5GS access. In this case, if the feature "RFSPValidityTime" is supported, the PCF may, based on operator policy, send to the AMF a validity time associated to the provided RFSP Index within the "rfspValTime" attribute. When the AMF determines to use the RFSP Index received from the PCF, the AMF provides to the MME the validity time of the RFSP Index, if received. The validity time indicates the time for which the RFSP Index will be used in the MME after 5GS to EPS mobility, as specified in clause 4.11.1.5.8 of 3GPP TS 23.502 [3].

NOTE 2: The RFSP validity time is used by the MME to allow the UE to stay in EPS during the period of time indicated by the "rfspValTime" attribute and avoid the potential ping-pong issue from 5GS and EPS (i.e., 5GS keeps sending the UE to EPS based on authorized RFSP Index from PCF, and the EPS keeps sending the UE back to 5GS immediately based on the subscribed RFSP Index).

Upon reception of the authorized RFSP index, the NF service consumer (e.g. AMF) shall choose the RFSP Index in use as described in 3GPP TS 23.501 [2] clause 5.3.4.3.1.

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 and/or the Partially Allowed NSSAI, if the "PartNetSliceSupport" feature and/or "NetSliceRepl" feature is/are supported, valid in the serving network. The PCF keeps updated information of the Allowed NSSAI and/or the Partially Allowed NSSAI valid in the serving network by subscribing to the policy control request trigger(s) Change of Allowed NSSAI and/or Change of the Partially 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 3: 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;

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

- the clock quality detail level in the "clkQltDetLvl" attribute and optionally the clock quality accpetance criteria in the "clkQltAcptCri" attribute if applicable, if the feature "NetTimeSyncStatus" is supported.

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.

The PCF may receive the modification, or the removal of one or more of the access stratum time distribution parameters only if the access stratum time distribution parameters are provided previously by the AF as defined in 3GPP TS 29.534 [26]. 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.

4.2.2.3.7 Network Slice Usage Control

When the PCF receives a Npcf_AMPolicyControl_Create request and the "NetSliceUsageCtrl" feature is supported, the PCF may check whether any of the UE's S-NSSAI(s) are subject to network slice usage control. If it is the case, the PCF may provision within the Npcf_AMPolicyControl_Create response body the network slice usage control information (e.g., slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute of the PolicyAssociation data structure for each on-demand S-NSSAI of the UE's Allowed NSSAI, as specified in clause 5.15.15.3 of 3GPP TS 23.501 [2].

NOTE: In this release of the specification, network slice usage control information provisioning by the PCF is not supported in roaming scenarios.

4.2.2.3.8 Network Slice Replacement

When the "NetSliceRepl" feature is supported, Network Slice Replacement may take place to enable to replace an S-NSSAI of the Allowed NSSAI and/or the Partially Allowed NSSAI with an Alternative S-NSSAI when this S-NSSAI is not available or congested.

The Alternative S-NSSAI shall be encoded using the SnssaiReplaceInfo data type as defined in 3GPP TS 29.571 [11].

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.

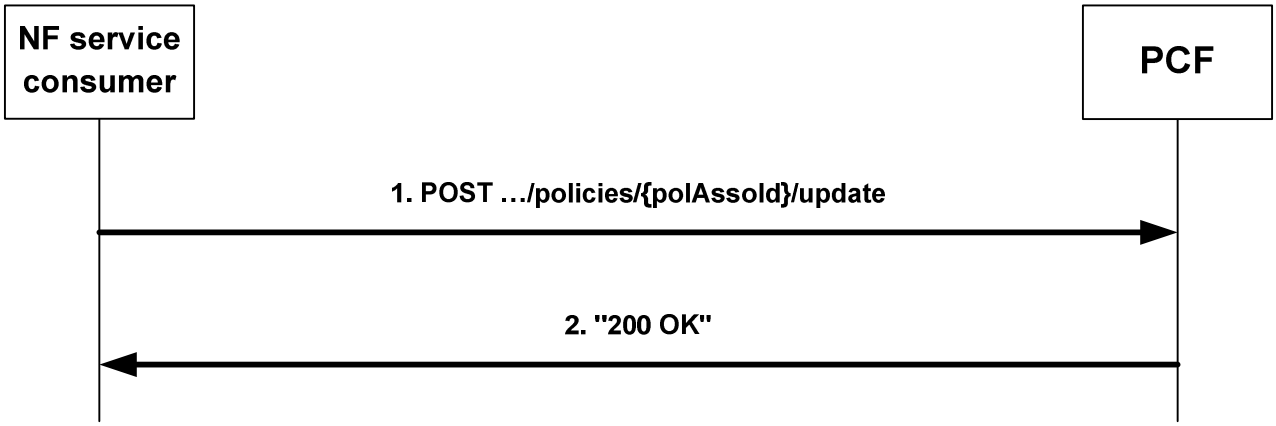

Figure 4.2.3.1-1: Update of a policy association

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. If the feature "FeatureRenegotiation" is supported, the new AMF may perform feature renegotiation, as described in clause 4.2.3.4.

To request policies from the PCF, to update the Notification URI, to renegotiate features, 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, the "DNNReplacementControl" feature and/or the "NetSliceRepl" feature is/are 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 within 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;

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;

20. if the "NetSliceRepl" feature is supported;

    - if the AMF is aware that one or more S-NSSAI(s) become unavailable but cannot determine the corresponding Alternative S-NSSAI(s) and the Policy Control Request Trigger "SLICE_REPLACE_MGMT" was provided, these unavailable S-NSSAI(s) within the "unavailSnssais" attribute;

    - if the AMF decides to proceed with network slice replacement and is aware of the Alternative S-NSSAI(s) corresponding to those initial S-NSSAI(s) or previously replaced S-NSSAI(s) is available and the Policy Control Request Trigger "SLICE_REPLACE_MGMT" was provided, the AMF provides the updated "snssaiReplInfos" with the updated mapping of (replaced) S-NSSAI(s) with the Alternative S-NSSAI(s) in case of network slice replacement or by removing the mapping of the replaced S-NSSAI(s) with the Alternative S-NSSAI(s) if the replaced S-NSSAI(s) is available;

21. if "PartNetSliceSupport" feature and/or "NetSliceRepl" feature is/are supported, the UE is registered via 3GPP access, the Partially Allowed NSSAI changed and the Policy Control Request Trigger "Change of the Partially Allowed NSSAI" was subscribed by the PCF, then the updated Partially Allowed NSSAI within the "partAllowedNssai" attribute;

22. if the "PartNetSliceSupport" feature is supported, the UE is registered via 3GPP access, the Partially Allowed NSSAI changed and/or the mapping of one or more of the S-NSSAI(s) of the Partially Allowed NSSAI to the corresponding HPLMN S-NSSAI(s) changed, and the Policy Control Request Trigger "Change of the Partially Allowed NSSAI" was subscribed by the PCF, then the mapping of each S-NSSAI of the Partially Allowed NSSAI to the corresponding HPLMN S-NSSAI within the "mappingSnssais" attribute;

23. if the "PartNetSliceSupport" feature is supported, the UE is registered via 3GPP access and:

    - if the list of the S-NSSAI(s) rejected partially in the RA changed and the Policy Control Request Trigger "Change of the S-NSSAI(s) rejected partially in the RA" was subscribed by the PCF, then the updated list of the S-NSSAI(s) rejected partially in the RA within the "snssaisPartRejected" attribute;

    - if the list of the Rejected S-NSSAI(s) in the RA changed and the Policy Control Request Trigger "Change of the Rejected S-NSSAI(s)" was subscribed by the PCF, then the updated list of the Rejected S-NSSAI(s) in the RA within the "rejectedSnssais" attribute; and

    - if the Pending NSSAI changed and the Policy Control Request Trigger "Change of the Pending NSSAI" was subscribed by the PCF, then the updated Pending NSSAI within the "pendingNssai" attribute; and

24. if the "RatTypeChange" feature is supported, and the Policy Control Request Trigger "RAT Type Change" was provided, the RAT Type encoded in the "ratTypes" 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. If the feature "RFSPValidityTime" is supported and the PCF determines to provide an RFSP index value that indicates EPC/E-UTRAN access is prioritized over 5GS access, the PCF may provide, based on operator policies, a validity time for the RFSP index value within the "rfspValTime" 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;

  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;

  g) if the "NetSliceUsageCtrl" feature is supported, the updated network slice usage control information (e.g., updated slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute for each on-demand S-NSSAI of the UE's Allowed NSSAI; and/or

NOTE 7: In this release of the specification, network slice usage control information provisioning/update/removal by the PCF is not supported in roaming scenarios.

  h) if the "NetSliceRepl" feature is supported and the PCF received the "unavailSnssais" attribute in the request, the Alternative S-NSSAI(s) associated with the received S-NSSAI(s) within the "snssaiReplInfos" attribute containing these unavailable S-NSSAI(s), and for each unavailable S-NSSAI, the corresponding status information set to "UNAVAILABLE" and the corresponding Alternative S-NSSAI;

- 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 "AMInfluence" feature 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:

- "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, the "DNNReplacementControl" feature and/or "NetSliceRepl" feature is/are 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 for a UE 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;

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.

- "SLICE_REPLACE_MGMT", i.e. Network slice replacement is needed for one or more S-NSSAI(s) and the NF service consumer (i.e., AMF) cannot determine the Alternative S-NSSAI(s) for these S-NSSAI(s) or the NF service consumer (i.e., AMF) determines to proceed with network slice replacement and is aware of the corresponding Alternative S-NSSAI(s); and

NOTE 8: The "SLICE_REPLACE_MGMT" trigger only applies if the "NetSliceRepl" feature is supported.

- "PARTIALLY_ALLOWED_NSSAI_CH", i.e. Change of the Partially Allowed NSSAI of the served UE;

NOTE 9: The "PARTIALLY_ALLOWED_NSSAI_CH" trigger only applies if the "PartNetSliceSupport" feature and/or "NetSliceRepl" feature is/are supported.

- "SNSSAIS_PARTIALLY_REJECTED_CH", i.e. Change of the S-NSSAI(s) rejected partially in the RA for the served UE;

- "REJECTED_SNSSAIS_CH", i.e. Change of the Rejected S-NSSAI(s) in the RA for the served UE;

- "PENDING_NSSAI_CH", i.e. Change of the Pending NSSAI of the served UE;

NOTE 10: The "SNSSAIS_PARTIALLY_REJECTED_CH", "REJECTED_SNSSAIS_CH" and "PENDING_NSSAI_CH" triggers only apply if the "PartNetSliceSupport" feature is supported.

- "RAT_TYPE_CH", i.e. the RAT type change: the AMF notifies that the RAT type within same access type has changed for a UE;

NOTE 11: The "RAT_TYPE_CH" trigger only applies if the "RatTypeChange" feature is supported.

- "FEAT_RENEG", i.e. the target AMF determines feature re-negotiation is required.

NOTE 12: The "FEAT_RENEG" trigger only applies if the "FeatureRenegotiation" feature is supported during AMF relocation.

4.2.3.3 Encoding of updated policy

4.2.3.3.1 General

If no other rule is defined for specific data types within the PolicyUpdate data structure, the encoding of changes of the Access and Mobility policies in the PolicyUpdate data structure shall follow the following principles:

1) To modify an attribute with a value of type map (e.g. the "pras" attribute, the "snssaiReplInfos" attribute, the "sliceUsgCtrlInfoSets" attribute etc.), this attribute shall be provided with a value containing a map with entries according to the following principles:

   - A new entry of the map shall be added by supplying a new identifier as the key and the corresponding structured data type instance (e.g. PresenceInfo, CandidateForReplacement etc.) with the complete content as the value.

- An existing entry of the map shall be modified by supplying the existing identifier as the key and the corresponding structured data type instance as the value, with the same existing identifier, which shall describe the modifications following bullets 1 to 6.
- An existing entry of the map shall be deleted by supplying the existing identifier as the key and "NULL" as the value.
- For an unmodified entry of the map, no entry needs to be provided within the map.

2) To modify an attribute with a structured data type instance as the value, the attribute shall be provided with a value containing a structured data type instance with entries according to bullets 1 to 6.

3) To modify an attribute with another type than map or structured data type as the value, the attribute shall be provided with a complete representation of its value, which shall replace the previous value.

4) To create an attribute of any type, the attribute shall be provided with a complete representation of its value.

5) To delete an attribute of any type, the attribute shall be provided with "NULL" as the value.

NOTE: Attributes that are allowed to be deleted need to be marked as "nullable" within the OpenAPI file in Annex A.

6) Attributes that are not added, modified or deleted do not need to be provided.

4.2.3.3.2 Encoding of updated Access and Mobility 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;
- if the "NetSliceRepl" feature is supported, network slice replacement information within the "snssaiReplInfos" attribute;
- if the "5GAccessStratumTime" feature is supported, 5G Access stratum information (see clause 4.2.2.3) within the "asTimeDisParam" 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);

     b) Change of UE presence in PRA;

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

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

e) if the "NetSliceRepl" feature is supported, network slice replacement information change;

f) if the "PartNetSliceSupport" feature and/or "NetSliceRepl" feature is/are supported, Change of the Partially Allowed NSSAI; and/or

g) if the "PartNetSliceSupport" feature is supported, Change of the S-NSSAI(s) rejected partially in the RA, Change of the Rejected S-NSSAI(s) and/or Change of the Pending NSSAI;

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 defined in clause 4.2.3.3.1.

- 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 defined in clause 4.2.3.3.1.

- 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; and

- if the "NetSliceUsageCtrl" feature is supported, the PCF may check whether any of the S-NSSAI(s) of the UE's Allowed NSSAI are on-demand S-NSSAI(s) and subject to network slice usage control. If it is the case, the PCF may provision/update/remove in the Npcf_SMPolicyControl_Update response the network slice usage control information (e.g., slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute of the PolicyUpdate data structure for one or more of these S-NSSAI(s) as defined in clause 4.2.3.3.1.

4.2.3.4 Feature renegotiation during AMF relocation

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, and the feature "FeatureRenegotiation" is supported, the new AMF shall invoke the update of the AM policy association as described in clause 4.2.3.1 with the following differences:

- The new AMF shall include in the PolicyAssociationUpdateRequest data structure sent in the HTTP POST request:

  a. the "FEAT_RENEG" policy control request trigger within the "triggers" attribute;

  b. the "suppFeat" attribute with the AMF supported features; and

  c. for each supported feature, the required feature information elements as specified in clause 4.2.2.1, if applicable.

NOTE 1: When the new AMF received from the old AMF the subscription to policy control request trigger(s) that depend on feature control, and a policy control request trigger is met, the required feature information included in the update request contains the report of the met policy control request trigger within the "triggers" attribute and the associated information in the corresponding attribute, when applicable.

- Upon reception of the HTTP POST request, the PCF shall update the "Individual AM Policy Association" resource, determine the applicable policy and include in the PolicyUpdate data structure sent in the HTTP POST response:

NOTE 2: The determination of the applicable policy can consider the features supported by the new AMF.

  a. the "suppFeat" attribute with the negotiated features; and

b. the complete "Individual AM Policy Association" resource representation, as specified in clause clause 4.2.2.1.

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.

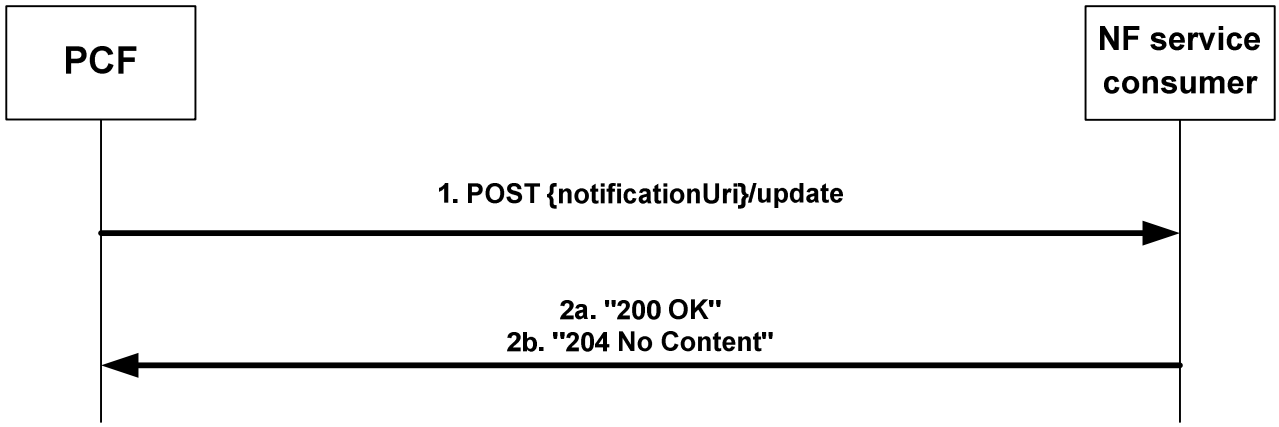

Figure 4.2.4.2-1: policy update notification

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 external interfaces, (e.g., the Npcf_AMPolicyAuthorization service (see 3GPP TS 29.534 [26]), notifications provided by the Npcf_PolicyAuthorization service (see 3GPP TS 29.514 [25]), notifications 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, e.g., the activation of a pending policy counter provided via the Nchf_SpendingLimitControl Service (see 3GPP TS 29.594 [33]). 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 policy control request triggers as defined in Table 5.6.2.9-1, 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 "AMInfluence" feature 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.

NOTE 1: Alternatively, the PCF for the UE can subscribe with the BSF to notifications about the PCF binding information creation and/or termination for the affected PDU session(s) as described in 3GPP TS 29.521 [30].

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.

If the feature "RFSPValidityTime" is supported and the PCF determines to modify the RFSP index value in use to indicate EPC/E-UTRAN access is prioritized over 5GS access, the PCF shall send to the AMF the RFSP Index value within the "rfsp" attribute and may provide, based on operator policies, the validity time for the indicated RFSP Index value within the "rfspValTime" attribute, as defined in clause 4.2.2.3.2.

If the feature "NetTimeSyncStatus" is supported and the PCF receives the clock quality detail level and optionally the clock quality acceptance criteria parameters from the TSCTSF as defined in 3GPP TS 29.534 [26], the PCF may update the clock quality detail level and if applicable the clock quality acceptance criteria parameters by provisioning the "asTimeDisParam" attribute as defined in clause 4.2.2.3.6. The AMF shall provision the clock quality detail level and the clock quality acceptance criteria parameters to the NG-RAN when receiving it from the PCF.

If the "NetSliceUsageCtrl" feature is supported, the PCF may check whether any of the S-NSSAI(s) of the UE's Allowed NSSAI are on-demand S-NSSAI(s) and subject to network slice usage control. If it is the case, the PCF may provision/update/remove via the Npcf_AMPolicyControl_UpdateNotify request the network slice usage control information (e.g., slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute of the PolicyUpdate data structure for one or more of these S-NSSAI(s).

NOTE 2: In this release of the specification, network slice usage control information provisioning/update/removal by the PCF is not supported in roaming scenarios.

If the "NetSliceRepl" feature is supported, then:

- when the PCF detects that one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI become(s) unavailable for a UE based on an OAM trigger, a received NWDAF notification or PCF internal triggers, the PCF may indicate this to the AMF by providing the "snssaiReplInfos" attribute containing these impacted S-NSSAI(s), and for each impacted S-NSSAI, the corresponding status information set to "UNAVAILABLE" and optionally an Alternative S-NSSAI; and

- when the PCF becomes aware that one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI become(s) available again, the PCF may indicate this to the AMF also by providing the "snssaiReplInfos" attribute containing these impacted S-NSSAI(s), and for each impacted S-NSSAI, the corresponding status information set to "AVAILABLE".

NOTE 3: The PCF can provide within the "snssaiReplInfos" attribute both information about S-NSSAI(s) that are currently unavailable and information about S-NSSAI(s) that are available again.

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.

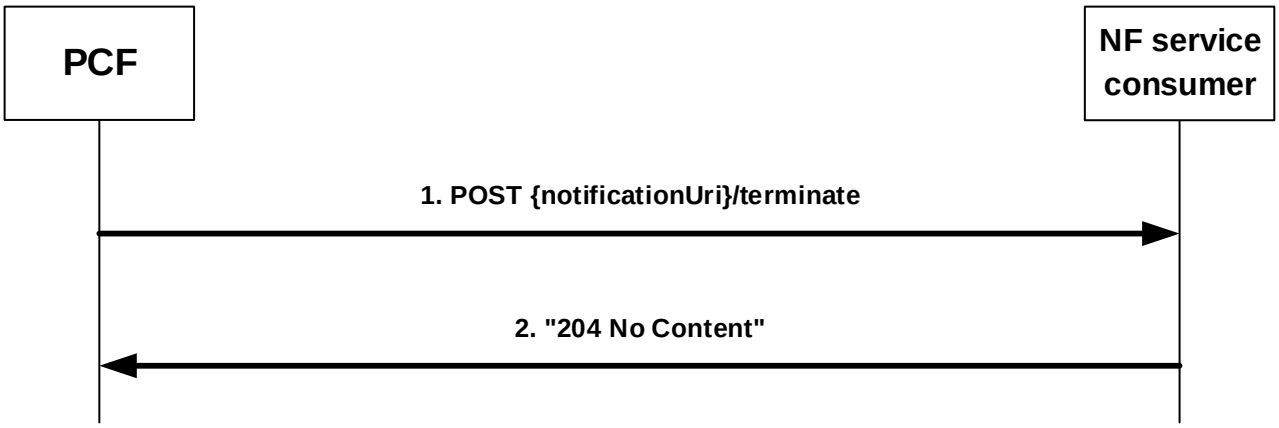

Figure 4.2.4.3-1: request for a termination of the policy association

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.

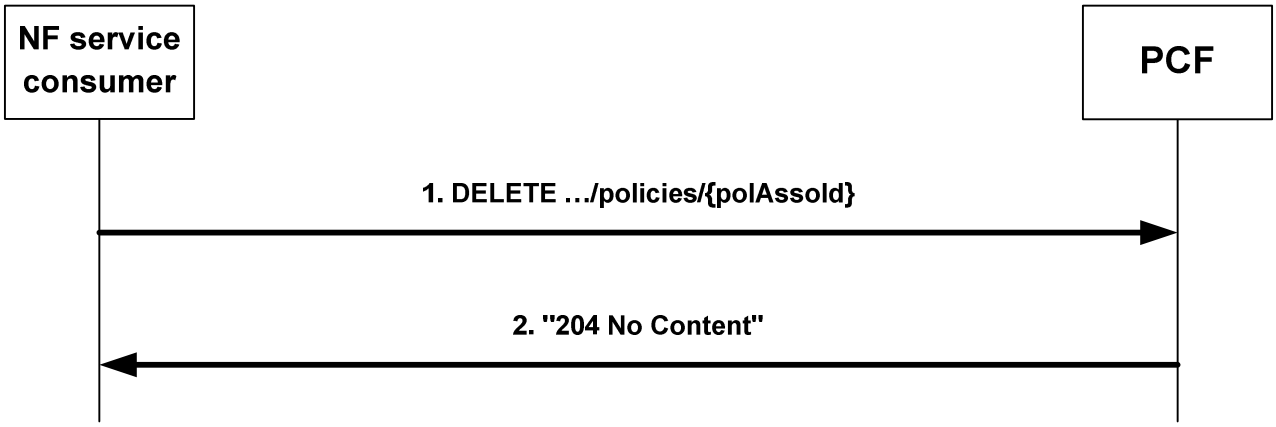

Figure 4.2.5-1: Deletion of a policy association

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 9113 [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 9457 [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

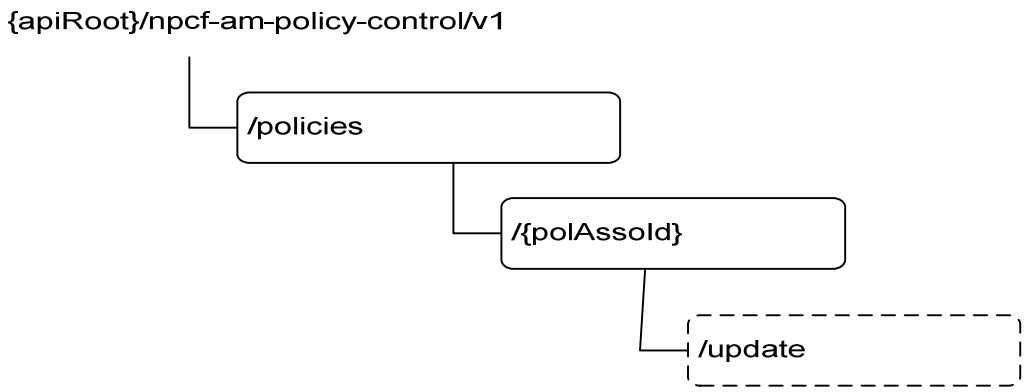

Figure 5.3.1-1: Resource URI structure of the Npcf_AMPolicyControl API

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. 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. Applicable if the feature "ES3XX" is supported. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual AM policy retrieval. Applicable if the feature "ES3XX" is supported. (NOTE 2)
NOTE 1: 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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [5]).				

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	Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target PCF (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	Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target PCF (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. Applicable if the feature "ES3XX" is supported. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual AM policy deletion. Applicable if the feature "ES3XX" is supported. (NOTE 2)
NOTE 1: 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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [5]).				

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	Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target PCF (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	Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target PCF (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. Applicable if the feature "ES3XX" is supported. (NOTE 3)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual AM policy modification. Applicable if the feature "ES3XX" is supported. (NOTE 3)
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. NOTE 2: Failure cases are described in clause 5.7. NOTE 3: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [5]).				

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	Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target PCF (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	Contains an alternative URI of the resource located in an alternative PCF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target PCF (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	M	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. Applicable if the feature "ES3XX" is supported. (NOTE 3)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during AM policy notification. Applicable if the feature "ES3XX" is supported. (NOTE 3)
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.
NOTE 2: Failure cases are described in clause 5.7.
NOTE 3: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [5]).

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	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
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	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
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. Applicable if the feature "ES3XX" is supported. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during AM policy notification. Applicable if the feature "ES3XX" is supported. (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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (refer to clause 6.10.9.1 of 3GPP TS 29.500 [5]).				

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	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
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	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [5].
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
AmRequestedValueRep	5.6.2.9	Contains the current applicable values corresponding to the policy control request triggers.	ImmediateReport
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.	
SliceUsgCtrlInfo	5.6.2.12	Represents network slice usage control related information.	NetSliceUsageCtrl
SmfSelectionData	5.6.2.7	Includes the SMF Selection information that may be replaced by the PCF.	DNNReplacementControl
SnssaiPartRejected	5.6.2.13	Represents a S-NSSAI rejected partially in the RA.	PartNetSliceSupport
TerminationNotification	5.6.2.6	Request to terminate a policy Association that the PCF provides in a notification.	
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]	Represents an access type.	
Ambr	3GPP TS 29.571 [11]	Aggregated Maximum Bit Rate.	UE-AMBR_Authorization
ChargingInformation	3GPP TS 29.512 [27]	The address(es), and if available, the instance ID and the set ID of the Charging Function.	SLAMUP
ClockQualityAcceptanceCriterionRm	3GPP TS 29.571 [11]	Indicates the Clock quality acceptance criteria information.	NetTimeSyncStatus
ClockQualityDetailLevelRm	3GPP TS 29.571 [11]	Contains the clock quality detail level information, that indicates whether it consists of clock quality metrics or acceptance indication.	NetTimeSyncStatus
Dnn	3GPP TS 29.571 [11]	DNN	DNNReplacementControl
DurationSec	3GPP TS 29.571 [11]	Duration in number of seconds.	RFSPValidityTime
DurationSecRm	3GPP TS 29.571 [11]	This data type is defined in the same way as the "DurationSec" data type, but with the OpenAPI "nullable: true" property.	
Fqdn	3GPP TS 29.571 [11]	FQDN	
Gpsi	3GPP TS 29.571 [11]	Generic Public Subscription Identifier	
GroupId	3GPP TS 29.571 [11]	Represents the identifier of a group of UEs.	
Guami	3GPP TS 29.571 [11]	Globally Unique AMF Identifier	
Ipv4Addr	3GPP TS 29.571 [11]	Represents an IPv4 address.	
Ipv6Addr	3GPP TS 29.571 [11]	Represents an IPv6 address.	
MappingOfSnssai	3GPP TS 29.531 [24]	Identifies the mapping of an S-NSSAI of the Allowed NSSAI or the Partially Allowed NSSAI to the corresponding S-NSSAI of the HPLMN.	DNNReplacementControl PartNetSliceSupport
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
PartiallyAllowedSnssai	3GPP TS 29.571 [11]	Represents the S-NSSAI that is partially allowed in the Registration Area,	NetSliceRepl PartNetSliceSupport
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]	Represents error related information.	
RedirectResponse	3GPP TS 29.571 [11]	Contains redirection related information.	ES3XX
Uri	3GPP TS 29.571 [11]	Represents a URI.	
UserLocation	3GPP TS 29.571 [11]	Represents user location information.	
RatType	3GPP TS 29.571 [11]	Represent a RAT type.	
RfspIndex	3GPP TS 29.571 [11]	Represent an RFSP Index.	
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 UE-Slice-MBR_Authorization NetSliceReplPartNetSliceSupport
SnssaiReplaceInfo	3GPP TS 29.571 [11]	Represents the network slice replacement information.	NetSliceRepl
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]	Represents a time zone.	
TraceData	3GPP TS 29.571 [11]	Represents trace data.	
UintegerRm	3GPP TS 29.571 [11]	Indicates Unsigned Integer, but with the OpenAPI "nullable: true" property.	5GAccessStratumTime
WirelineServiceAreaRestriction	3GPP TS 29.571 [11]	Represent wireline service area restriction information.	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. (NOTE 1)	
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.	
rfspValTime	DurationSec	O	0..1	Validity time of the RFSP Index value provided within the "rfsp" attribute. It may be provided when the RFSP Index value within the "rfsp" attribute indicates the EPC/E-UTRAN access is prioritized over 5GS access. It shall be omitted for other RFSP Index values.	RFSPValidityTime
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 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. (NOTE 2)	AMInfluence
asTimeDisParam	AsTimeDistributionParam	O	0..1	Contains the 5G acess stratum time distribution parameters.	5GAccessStratumTime
sliceUsgCtrlInfoSets	map(SliceUsgCtrlInfo)	O	1..N	Represents the network slice usage control information. The key of the map shall be set to the on-demand S-NSSAI (provided within the "snssai" attribute of the corresponding map entry encoded using the SliceUsgCtrlInfo data structure) to which the network slice usage control information is related.	NetSliceUsageCtrl
chfInfo	ChargingInformation	O	0..1	The address(es) and, if available, the CHF instance ID and the CHF set ID of the Charging Function. (NOTE 3)	SLAMUP
suppFeat	SupportedFeatures	M	1	Indicates the negotiated supported features.	

NOTE 1: Only the RequestTrigger enumeration values corresponding to PCRTs that require explicit subscription as defined in clause 5.6.3.3 shall be applicable within the "triggers" attribute.
NOTE 2: The DNN encoded within the PduSessionInfo element(s) of the "matchPdus" array contains a full DNN or only the DNN Network Identifier based on the DNN provided by the AF to the PCF in the AmInfluence API, as specified in 3GPP TS 29.522 [32]. When the DNN contains the Network Identifier only, the AMF shall match a PDU session for the received Network Identifier and for any value of the Operator Identifier.
NOTE 3: This attribute may only be supplied by the PCF in the response to the POST request that requested the creation of an individual AM policy resource.

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 of the network 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 or non-3GPP RAT Type where the served UE is camping. Shall be provided when available.	
ratTypes	array(RatType)	C	1..N	The 3GPP and/or 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.	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", "NetSliceRepl" and/or "DNNReplacementControl" is supported in the AMF.	SliceSupport, DNNReplacementControl, NetSliceRepl
partAllowedNssai	map(PartiallyAllowedSnssai)	O	1..N	Represents the Partially Allowed NSSAI. The key of the map shall be set to the value of the "snssai" attribute of the corresponding map entry (encoded using the PartiallyAllowedSnssai data structure).	PartNetSliceSupport, NetSliceRepl
snssaisPartRejected	map(SnssaiPartRejected)	O	1..N	Represents the set of S-NSSAI(s) rejected partially in the RA. The key of the map shall be set to the value of the "snssai" attribute of the corresponding map entry (encoded using the SnssaiPartRejected data structure).	PartNetSliceSupport
rejectedSnssais	array(Snssai)	O	1..N	Represents the set of Rejected S-NSSAI(s) in the RA.	PartNetSliceSupport
pendingNssai	array(Snssai)	O	1..N	Represents the Pending NSSAI.	PartNetSliceSupport
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	If the "DNNReplacementControl" feature is supported, this attribute shall contain the mapping of each S-NSSAI of the Allowed NSSAI, and if the "PartNetSliceSupport" feature is also supported, the mapping of each S-NSSAI of the Partially Allowed NSSAI to the corresponding S-NSSAI of the HPLMN. This attribute shall be included if available. If the "MultipleAccessTypes" feature 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, PartNetSliceSupport
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. Shall be provided when a policy control request trigger occurs.	
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, NetSliceRepl

partAllowedNssai	map(PartiallyAllowedSnssai)	C	1..N	Represents the updated Partially Allowed NSSAI. It shall be provided for the trigger "PARTIALLY_ALLOWED_NSSAI_CH". The key of the map shall be set to the value of the "snssai" attribute of the corresponding map entry (encoded using the PartiallyAllowedSnssai data structure).	PartNetSliceSupport, NetSliceRepl
snssaisPartRejected	map(SnssaiPartRejected)	C	1..N	Represents the updated set of S-NSSAI(s) rejected partially in the RA. It shall be provided for the trigger "SNSSAIS_PARTIALLY_REJECTED_CH". The key of the map shall be set to the value of the "snssai" attribute of the corresponding map entry (encoded using the SnssaiPartRejected data structure).	PartNetSliceSupport
rejectedSnssais	array(Snssai)	C	1..N	Represents the updated set of Rejected S-NSSAI(s) in the RA. It shall be provided for the trigger "REJECTED_SNSSAIS_CH".	PartNetSliceSupport
pendingNssai	array(Snssai)	C	1..N	Represents the updated Pending NSSAI. It shall be provided for the trigger "PENDING_NSSAI_CH".	PartNetSliceSupport
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 and/or the Partially Allowed NSSAI to the corresponding S-NSSAI of the HPLMN. It shall be provided for the trigger "ALLOWED_NSSAI_CH" and/or "PARTIALLY_ALLOWED_NSSAI_CH", if available. If the "MultipleAccessTypes" feature 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, PartNetSliceSupport
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
unavailSnssais	array(Snssai)	C	1..N	Represents the unavailable S-NSSAI(s) that require network slice replacement. It shall be provided for trigger "SLICE_REPLACE_MGMT" when the "NetSliceRepl" feature is supported.	NetSliceRepl

snssaiReplInfos	array(SnssaiReplaceInfo)	C	1..N	Represents the change or removal of mapping of the (replaced) S-NSSAI(s) with the Alternative S-NSSAI(s) for one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI. It shall be provided for trigger "SLICE_REPLACE_MGMT" and the feature "NetSliceRepl" is supported.	NetSliceRepl
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 Types and/or non-3GPP RAT Types where the served UE is camping. Shall be provided for trigger "ACCESS_TYPE_CH", when the feature "MultipleAccessTypes" is supported, and/or for trigger "RAT_TYPE_CH", when the "RatTypeChange" feature is supported.	MultipleAccessTypes RatTypeChange
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
suppFeat	SupportedFeatures	C	0..1	Indicates the features supported by the NF service consumer. It shall be included by the target AMF in inter-AMF mobility scenarios for trigger "FEAT_RENEG".	FeatureRenegotiation
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. (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.	
rfspValTime	DurationSec	O	0..1	Validity time of the RFSP Index value provided within the "rfsp" attribute. It may be provided when the RFSP Index value within the "rfsp" attribute indicates the EPC/E-UTRAN access is prioritized over 5GS access. It shall be omitted for other RFSP Index values.	RFSPValidityTime
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	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
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 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. It shall be present when the "pcfUeInfo" attribute is present and was not previously provisioned by the PCF for the UE. (NOTE 4)	AMInfluence
asTimeDisParam	AsTimeDistributionParam	O	0..1	Contains the 5G acess stratum time distribution parameters.	5GAccessStratumTime
snssaiReplInfos	map(SnssaiReplaceInfo)	O	1..N	Contains the network slice replacement related Information for one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI. The key of the map shall be set to the concerned unavailable S-NSSAI provided within the "snssai" attribute of the corresponding map entry (encoded using the SnssaiReplaceInfo data structure).	NetSliceRepl
sliceUsgCtrlInfoSets	map(SliceUsgCtrlInfo)	O	1..N	Represents the updated network slice usage control information. The key of the map shall be set to the on-demand S-NSSAI (provided within the "snssai" attribute of the corresponding map entry encoded using the SliceUsgCtrlInfo data structure) to which the network slice usage control information is related.	NetSliceUsageCtrl
suppFeat	SupportedFeatures	C	0..1	Indicates the negotiated supported features. It shall be included in the HTTP POST response when the NF service consumer provided the supported features in the HTTP POST request.	FeatureRenegotiation

NOTE 1: Only the RequestTrigger enumeration values corresponding to PCRTs that require explicit subscription as defined in clause 5.6.3.3 shall be applicable within the "triggers" attribute.

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.

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.

NOTE 4: The DNN encoded within the PduSessionInfo element(s) of the "matchPdus" array contains a full DNN or only the DNN Network Identifier based on the DNN provided by the AF to the PCF in the AmInfluence API, as specified in 3GPP TS 29.522 [32]. When the DNN contains the Network Identifier only, the AMF shall match a PDU session for the received Network Identifier and for any value of the Operator Identifier.

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. 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. It shall be included in AM policy association update response and represents the PCF selected DNN. The DNN shall contain the Network Identifier only. (NOTE 3)	
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. NOTE 3: The AMF shall match a PDU session for the received Network Identifier and replace it by the received selected Network Identifier for any Operator Identifier value.					

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	Contains the S-NSSAI of the serving PLMN. It shall contain either a S-NSSAI from the Allowed NSSAI, or if the "PartNetSliceSupport" feature and/or "NetSliceRepl" feature is/are supported, a S-NSSAI from the Partially 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. The DNN shall contain the Network Identifier only. (NOTE)	
NOTE: The AMF shall match the PDU session that contain a candidate DNN Network Identifier for any Operator Identifier value.					

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	C	0..1	The location of the served UE is camping. It shall be provided for trigger "LOC_CH" if available.	
praStatuses	map(PresenceInfo)	C	1..N	The UE presence statuses for tracking areas. The "praId" attribute within the PresenceInfo data type shall also be the key of the map. It shall be provided for trigger "PRA_CH" if available.	
accessTypes	array(AccessType)	C	1..N	The Access Types where the served UE is camping. It shall be provided for trigger "ACCESS_TYPE_CH" if available.	MultipleAccessTypes
ratTypes	array(RatType)	O	1..N	The 3GPP RAT Types and/or non-3GPP RAT Types where the served UE is camping. It shall be provided for trigger "ACCESS_TYPE_CH" if available, when the feature "MultipleAccessTypes" is supported, and/or for trigger "RAT_TYPE_CH", when the "RatTypeChange" fetaure is supported.	MultipleAccessTypes RatTypeChange
allowedSnssais	array(Snssai)	C	1..N	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" if available.	SliceSupport, DNNReplacementControl, NetSliceRepl
n3gAllowedSnssais	array(Snssai)	C	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. It shall be provided for trigger "ALLOWED_NSSAI_CH" if available.	SliceSupport, MultipleAccessTypes, DNNReplacementControl
partAllowedNssai	map(PartiallyAllowedSnssai)	C	1..N	Represents the updated Partially Allowed NSSAI. It shall be provided for trigger "PARTIALLY_ALLOWED_NSSAI_CH" if available. The key of the map shall be set to the value of the "snssai" attribute of the corresponding map entry (encoded using the PartiallyAllowedSnssai data structure).	PartNetSliceSupport, NetSliceRepl
snssaisPartRejected	map(SnssaiPartRejected)	C	1..N	Represents the updated set of S-NSSAI(s) rejected partially in the RA. It shall be provided for trigger "SNSSAIS_PARTIALLY_REJECTED_CH" if available. The key of the map shall be set to the value of the "snssai" attribute of the corresponding map entry (encoded using the SnssaiPartRejected data structure).	PartNetSliceSupport
rejectedSnssais	array(Snssai)	C	1..N	Represents the updated set of Rejected S-NSSAI(s) in the RA. It shall be provided for trigger "REJECTED_SNSSAIS_CH" if available.	PartNetSliceSupport

pendingNssai	array(Snssai)	C	1..N	Represents the updated Pending NSSAI. It shall be provided for trigger "PENDING_NSSAI_CH" if available.	PartNetSliceSupport

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. When present it shall be set as follows: - true: activated. - false (default): deactivated.	
uuErrorBudget	UintegerRm	O	0..1	Indicates the time synchronization error budget in terms of time units of nanoseconds.	
clkQltDetLvl	ClockQualityDetailLevelRm	O	0..1	Indicates the clock quality detail level.	NetTimeSyncStatus
clkQltAcptCri	ClockQualityAcceptanceCriterionRm	C	0..1	Indicates the clock quality acceptance criteria for the UE, and it is used to determine whether the time synchronization status for the service is acceptable/not acceptable. It shall be present when the "clkQltDetLvl" attribute is present and is set to "ACCEPT_INDICATION".	NetTimeSyncStatus

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.	

5.6.2.12 Type SliceUsgCtrlInfo

Table 5.6.2.12-1: Definition of type SliceUsgCtrlInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
snssai	Snssai	M	1	Contains the on-demand S-NSSAI to which the provided network slice usage control information is related.	
deregInactivTimer	DurationSecRm	O	0..1	Contains the slice deregistration inactivity timer value to be used to support and enforce network slice usage control for the on-demand S-NSSAI. (NOTE)	
NOTE: When the "deregInactivTimer" is not present and it was previously provisioned by the PCF, this means that the network slice deregistration timer previously provisioned for the on-demand S-NSSAI identified by the "snssai" attribute shall no longer apply.					

5.6.2.13 Type SnssaiPartRejected

Table 5.6.2.13-1: Definition of type SnssaiPartRejected

Attribute name	Data type	P	Cardinality	Description	Applicability
snssai	Snssai	M	1	Contains the S-NSSAI that is rejected partially in the RA.	
allowedTaiList	array(Tai)	C	1..N	Contains the list of TAI(s) of the RA within which the S-NSSAI is allowed. (NOTE)	
rejectedTaiList	array(Tai)	C	1..N	Contains the list of TAI(s) of the RA within which the S-NSSAI is rejected. (NOTE)	
NOTE: These attributes are mutually exclusive. Either one of them shall be provided.					

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	Service Area Restriction change: the UDM notifies the NF service consumer that the subscribed service area restriction information has changed. (NOTE 2)	
RFSP_CH	RFSP index change: the UDM notifies the NF service consumer that the subscribed RFSP index has changed. (NOTE 2)	
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, NetSliceRepl
UE_AMBR_CH	UE-AMBR change: the UDM notifies the NF service consumer that the subscribed UE-AMBR has changed. (NOTE 2)	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 for a UE has 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	Indicates that the NWDAF instance IDs used for the UE and/or associated Analytics IDs have changed. (NOTE 2)	EneNA
TARGET_NSSAI	Generation of Target NSSAI: the NF service consumer notifies that the Target NSSAI was generated.	TargetNSSAI
SLICE_REPLACE_MGMT	Indicates that network slice replacement is needed for one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI.	NetSliceRepl
FEAT_RENEG	The NF service consumer notifies that the target AMF is requesting feature re-negotiation. (NOTE 2)	FeatureRenegotation
PARTIALLY_ALLOWED_NSSAI_CH	Change of the Partially Allowed NSSAI: the NF service consumer notifies that the set of Partially Allowed S-NSSAI(s) of the UE has changed. (NOTE 1)	PartNetSliceSupport, NetSliceRepl
SNSSAIS_PARTIALLY_REJECTED_CH	Change of the S-NSSAI(s) rejected partially in the RA: the NF service consumer notifies that the set of S-NSSAI(s) rejected partially in the RA for the UE has changed. (NOTE 1)	PartNetSliceSupport
REJECTED_SNSSAIS_CH	Change of the Rejected S-NSSAI(s) in the RA: the NF service consumer notifies that the set of the Rejected S-NSSAI(s) in the RA for the UE has changed. (NOTE 1)	PartNetSliceSupport

PENDING_NSSAI_CH	Change of the Pending NSSAI: the NF service consumer notifies that the set of Pending S-NSSAI(s) of the UE has changed. (NOTE 1)	PartNetSliceSupport
RAT_TYPE_CH	RAT Type change: the NF service consumer notifies that the RAT type within same Access type for a UE has changed. (NOTE 1)	RatTypeChange
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. 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. 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 (i.e. 3GPP and non-3GPP) access and RAT 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.
14	FeatureRenegotiation	This feature indicates the support of feature renegotiation during the update of a policy association triggered by UE mobility with AMF change.
15	NetSliceRepl	This feature indicates the support of the network slice replacement functionality as part of the enhancements of the network slicing functionality. The following functionalities are supported: - Support the network slice replacement information management.
16	RFSPValidityTime	This feature indicates the support of the provisioning of a validity time for the RFSP Index value that indicates the EPC/E-UTRAN access is prioritized over 5GS access.
17	NetTimeSyncStatus	This feature indicates the support of network timing synchronization status and reporting. This feature requires the support of the 5GAccessStratumTime feature as well.
18	NetSliceUsageCtrl	This feature indicates the support of the network slice usage control functionality as part of the enhancements of the network slicing functionality. The following functionalities are supported: - Support the provisioning by the PCF of the network slice usage control information (e.g., slice deregistration inactivity timer value). This feature requires the support of the "SliceSupport" and/or "DNNReplacementControl" features.

19	PartNetSliceSupport	This feature indicates the partial network slice support in a Registration Area functionality as part of the enhancements of the network slicing functionality. The following functionalities are supported: - Support the reporting of the changes in the Partially Allowed NSSAI, S-NSSAI(s) rejected partially in the RA, Rejected S-NSSAI(s) in the RA and/or the Pending NSSAI to the PCF.
20	SLAMUP	This feature indicates the support of the provisioning to the AMF of the CHF information of the CHF selected by the PCF.
21	RatTypeChange	This feature indicates the support of provisioning the AM policies to the UE for the change in the RAT type within the same Access type.

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: 1.3.1
  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 V18.8.0; 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'
    '502':
      $ref: 'TS29571_CommonData.yaml#/components/responses/502'
    '503':
      $ref: 'TS29571_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  callbacks:
    policyUpdateNotification:
      '{$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'
            '502':
              $ref: 'TS29571_CommonData.yaml#/components/responses/502'
            '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'
              '502':
                $ref: 'TS29571_CommonData.yaml#/components/responses/502'
              '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'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  delete:
    operationId: 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'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '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'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            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'
        rfspValTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
        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.
```

```
      pcfUeInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
      matchPdus:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
        description: >
          Indicates the matched PDU session(s) for which the PCF for the UE information apply.
        nullable: true
      asTimeDisParam:
        $ref: '#/components/schemas/AsTimeDistributionParam'
      sliceUsgCtrlInfoSets:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/SliceUsgCtrlInfo'
        minProperties: 1
        description: >
          Represents the network slice usage control information.
          The key of the map shall be set to the on-demand S-NSSAI (within the "snssai" attribute
          of the corresponding map entry encoded using the SliceUsgCtrlInfo data structure) to
          which the network slice usage control information is related.
      chfInfo:
        $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/ChargingInformation'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    required:
      - suppFeat

  PolicyAssociationRequest:
    description: >
      Information which the NF service consumer provides when requesting the creation of a policy
      association. The serviveName property corresponds to the serviceName in the main body
      of the specification.
    type: object
    properties:
      notificationUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      altNotifIpv4Addrs:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
        minItems: 1
        description: Alternate or backup IPv4 Address(es) where to send Notifications.
      altNotifIpv6Addrs:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
        minItems: 1
        description: Alternate or backup IPv6 Address(es) where to send Notifications.
      altNotifFqdns:
        type: array
        items:
          $ref: '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
  partAllowedNssai:
    type: object
    additionalProperties:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PartiallyAllowedSnssai'
    minProperties: 1
    description: >
      Represents the Partially Allowed NSSAI.
      The key of the map shall be set to the value of the "snssai" attribute of the
      corresponding map entry (encoded using the PartiallyAllowedSnssai data
      structure).
  snssaisPartRejected:
    type: object
    additionalProperties:
      $ref: '#/components/schemas/SnssaiPartRejected'
    minProperties: 1
    description: >
      Represents the set of S-NSSAI(s) rejected partially in the RA.
      The key of the map shall be set to the value of the "snssai" attribute of the
      corresponding map entry (encoded using the SnssaiPartRejected data structure).
  rejectedSnssais:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    minItems: 1
  pendingNssai:
    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
    partAllowedNssai:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PartiallyAllowedSnssai'
      minProperties: 1
      description: >
        Represents the Partially Allowed NSSAI.
        The key of the map shall be set to the value of the "snssai" attribute of the
        corresponding map entry (encoded using the PartiallyAllowedSnssai data
        structure).
    snssaisPartRejected:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/SnssaiPartRejected'
      minProperties: 1
      description: >
        Represents the set of S-NSSAI(s) rejected partially in the RA.
        The key of the map shall be set to the value of the "snssai" attribute of the
        corresponding map entry (encoded using the SnssaiPartRejected data structure).
    rejectedSnssais:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      minItems: 1
    pendingNssai:
      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
    snssaiReplInfos:
      description: >
        Change or removal of Mapping of (replaced) S-NSSAI(s) with Alternative S-NSSAI(s)
        for one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI.
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SnssaiReplaceInfo'
      minItems: 1
      nullable: true
    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
    unavailSnssais:
      description: >
        Represents the unavailable S-NSSAI(s) from the UE's Allowed NSSAI and/or
        Partially Allowed NSSAI that require network slice replacement.
```

```
        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
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

  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'
      rfspValTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
      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'
        description: >
          Indicates the matched PDU session(s) for which the PCF for the UE information apply.
        nullable: true
      asTimeDisParam:
        $ref: '#/components/schemas/AsTimeDistributionParam'
      snssaiReplInfos:
        nullable: true
        type: object
        additionalProperties:
```

```
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SnssaiReplaceInfo'
        minProperties: 1
        description: >
          Contains the network slice replacement information.
          The key of the map shall be set to the concerned unavailable S-NSSAI provided within the
          "snssai" attribute of the corresponding map entry (encoded using the SnssaiReplaceInfo
          data structure) to which the network slice replacement information is related.
      sliceUsgCtrlInfoSets:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/SliceUsgCtrlInfo'
        minProperties: 1
        description: >
          Represents the updated network slice usage control information.
          The key of the map shall be set to the on-demand S-NSSAI (within the "snssai" attribute
          of the corresponding map entry encoded using the SliceUsgCtrlInfo data structure) to
          which the network slice usage control information is related.
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    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
        description: >
          The Access Types where the served UE is camping.
      ratTypes:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
        description: >
          The 3GPP RAT Type and non-3GPP RAT Type where the served UE is camping.
      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'
      partAllowedNssai:
        type: object
        additionalProperties:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PartiallyAllowedSnssai'
        minProperties: 1
        description: >
          Represents the Partially Allowed NSSAI.
          The key of the map shall be set to the value of the "snssai" attribute of the
          corresponding map entry (encoded using the PartiallyAllowedSnssai data
          structure).
      snssaisPartRejected:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/SnssaiPartRejected'
        minProperties: 1
        description: >
          Represents the set of S-NSSAI(s) rejected partially in the RA.
          The key of the map shall be set to the value of the "snssai" attribute of the
          corresponding map entry (encoded using the SnssaiPartRejected data structure).
      rejectedSnssais:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        minItems: 1
      pendingNssai:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        minItems: 1

  AsTimeDistributionParam:
    description: Contains the 5G acess stratum time distribution parameters.
    type: object
    properties:
      asTimeDistInd:
        type: boolean
        description: >
          Indicates the access stratum time distribution via Uu reference point is
          Activated or not.
      uuErrorBudget:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UintegerRm'
      clkQltDetLvl:
```

```
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ClockQualityDetailLevelRm'
      clkQltAcptCri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ClockQualityAcceptanceCriterionRm'
    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

  SliceUsgCtrlInfo:
    description: Represents network slice usage control information.
    type: object
    properties:
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      deregInactivTimer:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSecRm'
    required:
      - snssai

  SnssaiPartRejected:
    description: Represents the list of the S-NSSAI(s) rejected partially in the RA.
    type: object
    properties:
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      allowedTaiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
        minItems: 1
      rejectedTaiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Tai'
        minItems: 1
    required:
      - snssai
    oneOf:
      - required: [ allowedTaiList ]
      - required: [ rejectedTaiList ]

  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
        - SLICE_REPLACE_MGMT
        - FEAT_RENEG
        - PARTIALLY_ALLOWED_NSSAI_CH
        - SNSSAIS_PARTIALLY_REJECTED_CH
        - REJECTED_SNSSAIS_CH
        - PENDING_NSSAI_CH
```

```
        - RAT_TYPE_CH
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: |
      Represents the possible request triggers.
      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 for a UE 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.
      - SLICE_REPLACE_MGMT: Indicates that slice replacement is needed for one or more S-NSSAI(s)
        of the UE's Allowed NSSAI and/or Partially Allowed NSSAI and the AMF cannot determine the
        Alternative S-NSSAI(s) for these S-NSSAI(s).
      - FEAT_RENEG: The NF service consumer notifies that the target AMF is requesting feature
        re-negotiation.
      - PARTIALLY_ALLOWED_NSSAI_CH: Partially Allowed NSSAI change. The NF service consumer
        notifies that the set of Partially Allowed S-NSSAI(s) of the UE has changed.
      - SNSSAIS_PARTIALLY_REJECTED_CH: Change of the S-NSSAI(s) rejected partially in the RA. The
        NF service consumer notifies that the set of S-NSSAI(s) rejected partially in the RA for
        the UE has changed.
      - REJECTED_SNSSAIS_CH: Change of the Rejected S-NSSAI(s) in the RA. The NF service consumer
        notifies that the set of the Rejected S-NSSAI(s) in the RA for the UE has changed.
      - PENDING_NSSAI_CH: Pending NSSAI change. The NF service consumer notifies that the set of
        Pending S-NSSAI(s) of the UE has changed.
      - RAT_TYPE_CH: RAT Type change. The AMF notifies that the RAT type within same Access type
        has changed for the UE.

  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: |
      Represents the cause why the PCF requests the termination of the policy association.
      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 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: If the feature "MultipleAccessTypes" is not supported and 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 for a UE 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
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
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History

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