ETSI TS 129 525 V19.7.0 (2026-07)

TECHNICAL SPECIFICATION

5G;
5G System;
UE Policy Control Service;
Stage 3
(3GPP TS 29.525 version 19.7.0 Release 19)

Reference
RTS/TSGC-0329525vj70

Keywords
5G

ETSI

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Contents

Foreword

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

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1 Scope

The present specification provides the stage 3 definition of the UE Policy Control Service (Npcf_UEPolicyControl) of the 5G System.

The stage 2 definition and procedures of UE 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 UE Policy Control Service is provided by the Policy Control Function (PCF). This service provides UE policies and N2 PC5 policy.

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] void.

[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] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[16] 3GPP TS 24.526: "UE policies for 5G System (5GS); Stage 3".

[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] void.

[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 24.587: "Vehicle-to-Everything (V2X) services in 5G System (5GS); Stage 3".

[25] 3GPP TS 24.588: "Vehicle-to-Everything (V2X) services in 5G System (5GS); User Equipment (UE) policies; Stage 3".

[26] 3GPP TS 29.505: "5G System; Usage of the Unified Data Repository service for Subscription Data; Stage 3".

[27] 3GPP TS 29.504:"5G System; Unified Data Repository Services; Stage 3".

[28] 3GPP TS 24.554: "Proximity based services (ProSe) in 5G system (5GS) protocol aspects; Stage 3".

[29] 3GPP TS 24.555: "Proximity based services (ProSe) in 5G system (5GS); User Equipment (UE) policies; Stage 3".

[30] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[31] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[32] 3GPP TS 24.577: "Aircraft-to-Everything (A2X) services in 5G System (5GS) protocol aspects; Stage 3".

[33] 3GPP TS 24.578: "Aircraft-to-Everything (A2X) services in 5G System (5GS); UE policies".

[34] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3"

[35] 3GPP TS 29.521: "5G System; Binding Support Management Service; Stage 3".

[36] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[37] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[38] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[39] 3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".

[40] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[41] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[42] 3GPP TS 24.514: "Ranging based services and sidelink positioning in 5G system(5GS); Stage 3".

[43] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[44] 3GPP TS 32.256: "Charging management; 5G connection and mobility domain charging; stage 2".

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 23.503 [4], clause 3.1 and 3GPP TS 23.501 [2], clause 3.1 apply:

VPLMN specific URSP rules

Configured 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-CRG	5G Cable Residential Gateway
5G-RG	5G Residential Gateway
5G-VN	5G Virtual Network
A2X	Aircraft-to-Everything
A2XP	Aircraft-to-Everything Policy
AMF	Access and Mobility Management Function
ANDSP	Access Network Discovery and Selection Policy
API	Application Programming Interface
CHF	Charging Function
DNN	Data Network Name
EPS	Evolved Packet Core System
FN-RG	Fixed Network Residential Gateway
FN-BRG	Fixed Network Broadband Residential Gateway
FN-CRG	Fixed Network Cable Residential Gateway
FQDN	Fully Qualified Domain Name
GPSI	Generic Public Subscription Identifier
GUAMI	Globally Unique AMF Identifier
HFC	Hybrid Fiber-Coaxial
HTTP	Hypertext Transfer Protocol
H-PCF	Home Policy Control Function
JSON	JavaScript Object Notation
N3AN	Non-3GPP access network
N3IWF	Non-3GPP InterWorking Function
NID	Network Identifier
NF	Network Function
NRF	Network Repository Function
NSWO	Non-Seamless WLAN Offload
OS	Operating System
OSId	Operating System Identity
PCF	Policy Control Function
PDU	Packet Data Unit
PEI	Permanent Equipment Identifier
PIN	Personal IoT Network
PRA	Presence Reporting Area
ProSeP	5G ProSe Policy
PTI	Procedure Transaction Identity
RSLPP	Ranging and Sidelink Positioning Policy

RSN	Redundancy Sequence Number
SL	Sidelink
SMF	Session Management Function
SNPN	Stand-alone Non-Public Network
SSC	Service and Session Continuity
SUPI	Subscription Permanent Identifier
TNGF	Trusted Non-3GPP Gateway Function
UDM	Unified Data Management
UDR	Unified Data Repository
UPSC	UE policy section code
UPSI	UE policy section identifier
URSP	UE Route Selection Policy
V2X	Vehicle-to-Everything
V2XP	Vehicle-to-Everything Policy
V-PCF	Visited Policy Control Function
VPS	VPLMN Specific
W-5GAN	Wireline 5G Access Network
W-5GCAN	Wireline 5G Cable Access Network
W-AGF	Wireline Access Gateway Function

4 UE Policy Control Service

4.1 Service Description

4.1.1 Overview

The UE 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 is used as part of the provisioning of UE policies (e.g. ANDSP, URSP, V2XP, A2XP, ProSeP, RSLPP) determined by the PCF to the UE via the AMF and as part of the provisioning of N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL determined by the PCF to the NG-RAN via the AMF. In case of URSP provisioning in EPS this service may be used as part of the provisioning of URSP determined by the PCF to the UE via a PCF for a PDU session. This service hence offers the following functionalities:

- creation of a UE Policy Association as requested by the NF service consumer (e.g. AMF);
- provisioning of policy control request trigger(s) to the NF service consumer (e.g. AMF);
- provisioning of the UE policy (e.g. ANDSP, URSP, V2XP, A2XP,ProSeP, RSLPP) to the V-PCF by the H-PCF in the roaming case;
- provisioning of the N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL to the V-PCF by the H-PCF in the roaming case;
- update of a UE Policy Association as requested by the NF service consumer (e.g. AMF);
- reporting of the met policy control request trigger(s) by the NF service consumer;
- update of policy control request trigger(s) by the PCF to the NF service consumer (e.g. AMF);
- deletion of a UE Policy Association as requested by the NF service consumer (e.g. AMF);
- enable the PCF to request the termination of a UE Policy Association to the NF service consumer (e.g. AMF);
- provisioning of the URSP to a PCF for a PDU session in case of URSP provisioning in EPS; and
- provisioning of slice-based N3IWF/TNGF selection policies based on the UE subscribed/configured S-NSSAI(s).

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 UE Policy Control Service (Npcf_UEPolicyControl) is part of the Npcf service-based interface exhibited by the Policy Control Function (PCF).

The known NF service consumers of the Npcf_UEPolicyControl service are the Access and Mobility Management Function (AMF) and the Visited Policy Control Function (V-PCF).

The AMF accesses the UE Policy Control Service at the PCF via the N15 reference point. In case of URSP delivery in EPS, when the PCF for the PDU session and the PCF for the UE are different, the PCF for the PDU session accesses the UE Policy Control Service at the PCF via the N43 reference point,

In the roaming scenario, the N15 reference point is located between the V-PCF in the visited network and the AMF. The V-PCF accesses the UE Policy Control Service at the Home Policy Control Function (H-PCF) via the N24 Reference point.

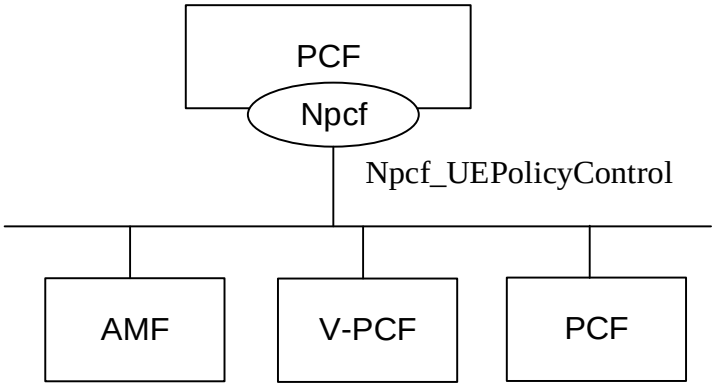

Figure 4.1.2-1: Reference Architecture for the Npcf_UEPolicyControl Service; SBI representation

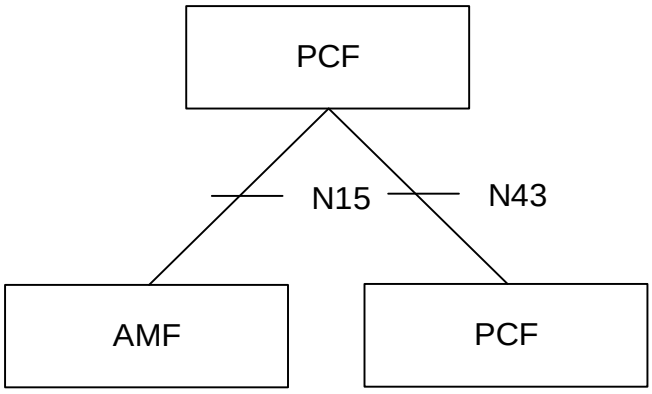

Figure 4.1.2-2: Non-roaming Reference Architecture for the Npcf_UEPolicyControlService; reference point representation

NOTE 1: When the N43 reference point exists, i.e. when the PCF is a NF service consumer of the Npcf_UEPolicyControl service, the PCF for the PDU session interacts with the PCF for the UE, and the non-roaming and home routed roaming architecture are the same.

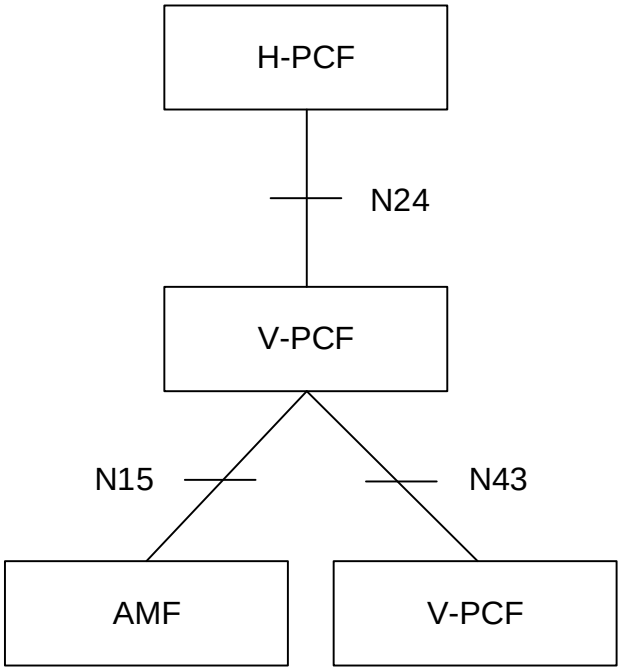

Figure 4.1.3-2: Roaming reference Architecture for the Npcf_UEPolicyControlService; reference point representation

NOTE 2: In LBO roaming scenarios, the V-PCF for the PDU session interacts with the V-PCF for the UE (i.e., the V-PCF for the PDU session is a NF service consumer of the Npcf_UEPolicyControl service offered by the V-PCF of the UE).

4.1.3 Network Functions

4.1.3.1 Policy Control Function (PCF)

For non-roaming scenarios, the Policy Control Function (PCF):

- supports unified policy framework to govern network behaviour;
- provides UE policy, including Access Network Discovery and Selection Policy (ANDSP), UE Route Selection Policy (URSP), Vehicle-to-Everything Policy (V2XP), Aircraft-to-Everything Policy (A2XP), 5G ProSe Policy (ProSeP) and/or Ranging and Sidelink Positioning Policy (RSLPP) via the AMF transparently to the UE;
- provides policy control request trigger(s) to the AMF;

NOTE 1: The PCF invokes the Namf_Communication service specified in 3GPP TS 29.518 [14] to provide the UE Policy.

- provides N2 PC5 policy, containing the PC5 QoS parameters used by NG-RAN for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL via the AMF to the NG-RAN;

NOTE 2: The PCF invokes the Namf_Communication service specified in 3GPP TS 29.518 [14] to provide the N2 PC5 Policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL.

- provides URSP via a PCF for a PDU session transparently to the UE in case of URSP provisioning in EPS;
- provides policy control request trigger(s) to a PCF for a PDU session in case of URSP provisioning in EPS; and
- provides slice-based N3IWF/TNGF selection policies based on the UE subscribed S-NSSAI(s).

For roaming scenarios, the Visited Policy Control Function (V-PCF):

- provides policy control request trigger(s) to the AMF;

- provides the ANDSP of the VPLMN via the AMF transparently to the UE;
- forwards the ANDSP, URSP, V2XP, A2XP, ProSeP and/or RSLPP received from the H-PCF via the AMF to the UE;

NOTE 3: The V-PCF invokes the Namf_Communication service specified in 3GPP TS 29.518 [14] to provide the UE Policy.

- forwards the N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL received from the H-PCF via the AMF to the NG-RAN;

NOTE 4: The V-PCF invokes the Namf_Communication service specified in 3GPP TS 29.518 [14] to provide the N2 PC5 Policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL.

- in case of AF guidance of VPLMN-specific URSP rules for inbound roamers:
  a. provides the AF guidance for VPLMN-specific URSP rules to the H-PCF; and
  b. if requested by the AF, notifies the NEF in the VPLMN about the outcome of the delivery of VPLMN-specific URSP rules;
- provides slice-based N3IWF/TNGF selection policies based on the UE Configured NSSAI; and
- for the LBO roaming scenarios, and in case of URSP provisioning in EPS:
  a. provides policy control request trigger(s) received from the H-PCF to a V-PCF for a PDU session; and
  b. forwards to the UE the URSP received from the H-PCF using a V-PCF for a PDU session.

For roaming scenarios, the Home Policy Control Function (H-PCF):

- provides policy control request trigger(s) to the V-PCF;
- provides the UE policy (e.g. ANDSP, URSP, V2XP, A2XP, ProSeP or RSLPP) of the HPLMN to the V-PCF for forwarding to the UE via the the AMF;
- provides the N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL to the V-PCF for forwarding to the NG-RAN via the AMF;
- in case of AF guidance of VPLMN-Specific URSP rules:
  a. provides VPLMN-specific URSP rules to capable UE(s) using AF guidance for VPLMN-specific URSP rules retrieved from the HPLMN UDR and/or received from the V-PCF; and
  b. notifies the NEF in the HPLMN and the V-PCF about the outcome of the VPLMN-specific URSP rules delivery to the UE;
- in case of URSP provisioning in EPS:
  a. for the LBO roaming scenarios, provides URSP to the V-PCF for forwarding to the UE via a V-PCF for a PDU session.
  b. for the Home Routed scenarios, provides URSP to the PCF for the PDU session in the HPLMN, for forwarding to the UE via the H-SMF.

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

- Information obtained from the UDR (e.g., UE Policy Subscription data and/or Service Parameter Data provided by the AF/NEF via 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 limits control, e.g., status of each relevant policy counter and optional pending policy counter statuses; and

NOTE 5: In this release of the specification, policy decisions based on spending limits control apply to URSP only.

- PCF pre-configured policy context.

4.1.3.2 NF Service Consumers

The known NF service consumers of the Npcf_UEPolicyControl are the AMF, the V-PCF in the roaming case, and a PCF for a PDU session in case of URSP provisioning in EPS.

The Access and Mobility Management function (AMF) performs:

- registration management;
- connection management;
- reachability management;
- mobility Management;
- control of UE Policy Association creation and termination based on enable/disable UE Policy Association Indicator received from UDM;
- forwarding of UE Policy towards the served UE;
- reporting of the UE state to the (V-)PCF;
- forwarding of the UE policy enforcement result received from the UE to the (V-)PCF; and

NOTE: The AMF invokes the Namf_Communication service specified in 3GPP TS 29.518 [14] to report the UE policy enforcement result.

- forwarding of the N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL towards the NG-RAN.

The Visited Policy Control Function (V-PCF) provides the functions described in clause 4.1.3.1 towards the visited network as NF service producer and acts as NF Service consumer toward the H-PCF, performing the following functions:

- receiving policy control request trigger(s) and/or UE policy (e.g. ANDSP, URSP, V2XP, A2XP, ProSeP, RSLPP) from the H-PCF;
- receiving the N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL from the H-PCF; and
- reporting of the UE state and UE policy enforcement result to the H-PCF.
- providing the URSP rule enforcement information received from the UE to the H-PCF, if requested by the H-PCF as described in clause 4.2.2.2.3.

The PCF for a PDU session in case of URSP provisioning in EPS performs:

- forwarding of URSP towards the served UE and the URSP rule provisioning outcome from the UE; and
- forwarding towards/from the selected PDN connection the provisioning/report of the policy control request trigger(s).

4.2 Service Operations

4.2.1 Introduction

Table 4.2.1-1: Operations of the Npcf_UEPolicyControl Service

Service operation name	Description	Initiated by
Npcf_UEPolicyControl_Create	Creates a UE Policy Association.	NF service consumer (e.g. AMF, V-PCF in roaming case)
Npcf_UEPolicyControl_Update	Updates a UE Policy Association and provides the corresponding policies to the NF service consumer when policy control request trigger(s) is/are met or the AMF is relocated due to the UE mobility and the old PCF is selected.	NF service consumer (e.g. AMF, V-PCF in roaming case)
Npcf_UEPolicyControl_UpdateNotify	- Provides the updated policy control request trigger(s) and/or applicable indications to the AMF by the (V-)PCF in the non-roaming or roaming case; - Provides the updated UE policy, applicable indications, and/or policy control request trigger(s) to the V-PCF by the H-PCF; or - Initiates the UE Policy association termination towards the NF service consumer by the NF service producer.	PCF (H-PCF and V-PCF in roaming case)
Npcf_UEPolicyControl_Delete	Provides means for the NF service consumer to delete a UE Policy Association.	NF service consumer (e.g. AMF, V-PCF in roaming case)

4.2.2 Npcf_UEPolicyControl_Create Service Operation

4.2.2.1 General

The procedure in the present clause is applicable in the following cases:

- UE performs initial registration to the network, as defined in clause 5.5.1.2.2 of 3GPP TS 24.501 [15];
- UE performs a mobility registration, if the UE operating in single-registration mode performs inter-system change from S1 mode to N1 mode, as defined in clause 5.5.1.3.2 of 3GPP TS 24.501 [15], and there is no existing UE Policy Association between AMF and PCF for this UE;
- 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; and
- when the UE Policy Association establishment is controled by the UE Policy Association Indicator provided by the UDM, when the indicator is set to enabled.

To support the delivery of URSP in EPS, the procedure in the present clause is also applicable when:

- When the UE triggers a BEARER RESOURCE MODIFICATION REQUEST message with a UE policy container IE after the UE performs ePCO capability negotiation during PDN connection establishment procedure (during the Initial Attach with default PDN connection establishment or during the first PDN connection establishment or during PDN connection modification with or without QoS update or during new PDN connection establishment when no other existing PDN connection indicates support of URPS provisioning in EPS) as defined in 3GPP TS 24.301 [36], and both, the UE and the network support URSP provisioning in EPS PCO; and
- 5GS to EPS handover or 5GS to EPS Idle Mode mobility (both referred as 5GS to EPS mobility in the present document) as defined in 3GPP TS 24.501 [15] and if the UE and at least one of the PDN connection(s) supports URSP delivery in EPS as specified in 3GPP TS 29.512 [31].

The creation of a UE 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 procedure used for the creation of a policy association.

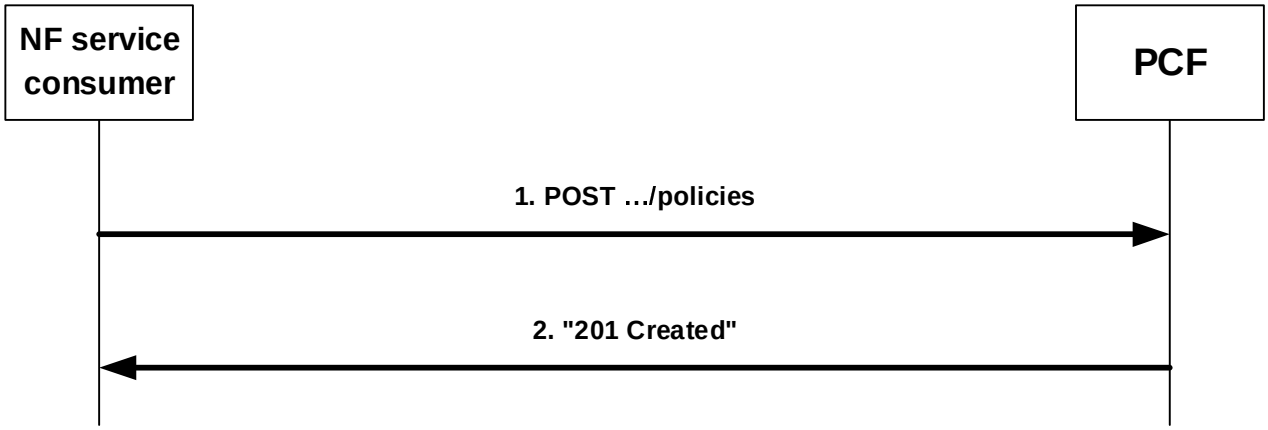

Figure 4.2.2.1-1: Creation of a UE policy association

NOTE 1: For the roaming scenario, the PCF represents the V-PCF, if the NF service consumer is an AMF, and the PCF represents the H-PCF, if the NF service consumer is a V-PCF.

During UE registration or AMF reallocation with a new selected PCF, the AMF triggers the establishment of the UE Policy Association as follows:

i. if the AMF received from the UDM the UE Policy Association Indicator set to enabled, the AMF shall establish a UE policy association with the (V-)PCF, in case there is no existing UE policy association for the UE;

ii. if the AMF received from the UDM the UE Policy Association Indicator set to disabled, the AMF shall not establish the UE policy association with the (V-)PCF;

iii. if the AMF does not receive from the UDM the UE Policy Association Indicator:

- if the AMF obtains from the UE a UE policy delivery protocol message as defined in Annex D of 3GPP TS 24.501 [15] and/or the authorized PC5 capability for 5G ProSe, and/or the authorized PC5 capability for V2X communications and/or A2X communications, and/or the authorized PC5 capability for Ranging/SL, the AMF shall establish the UE Policy Association with the (V-)PCF, in case there is no existing UE policy association for the UE; otherwise the AMF may establish a UE Policy Association with the (V-)PCF based on AMF local configuration.

NOTE 2: The indication of whether the UE Policy Association is allowed by UDM subscription is delivered by the UDM to the NF service consumer within the Access and Mobility Subscription Data Retrieval service operation as described in 3GPP TS 29.503 [43].

NOTE 3: In the roaming scenario, the visited AMF's local configuration can indicate whether UE Policy delivery is needed based on the roaming agreement with the home PLMN of the UE. The AMF's local configuration takes precedence over the UE Policy Association Indicator, if received from the HPLMN.

If the AMF receives from the UDM the UE Policy Association Indicator, the AMF shall store the UE policy container received from the UE in the UE context, if received.

If the UE Policy Association Indicator changes from disabled to enabled and the PCF has not previously rejected or terminated the UE Policy Association, the AMF shall immediately establish the UE Policy Association and shall use the UE policy container stored in the UE context, if available. The (H-)(V-)PCF provides to the UE all the applicable UE Policies.

NOTE 4: The AMF can still decide to initiate the establishment of the UE Policy Association based on local policies, even if the PCF had previously rejected or terminated the UE Policy Association.

NOTE 5: The UE applies the received UE Policies for the PDU session(s) that were established before the enablement of the UE Policy Association as specified in 3GPP TS 24.526 [16].

During UE Initial Attach with default PDN connection or the establishment of the first PDN connection in EPS or a new PDN connection when no other existing PDN connection indicates the support of URSP provisioning in EPS, if the UE and the SMF+PGW support URSP provisioning in EPS PCO, the PCF for the PDU session supports the URSP provisioning in EPS as defined in 3GPP TS 29.512 [31], the PCF for a PDU session associated with the SMF+PGW-C serving the PDN connection obtains from the UE a UE policy container in a Npcf_SMPolicyControl_Update procedure triggered by a bearer resource modification procedure as described in 3GPP TS 29.512 [31]. Then, if the "EpsUrsp" feature described in clause 5.8 is supported, the PCF for a PDU session shall establish a UE policy association with the (V-)PCF for the UE for the delivery of URSP only.

During 5GS to EPS mobility with N26, and if the "EpsUrsp" feature described in clause 5.8 is supported, the PCF for the PDU session determines whether 5GS to EPS mobility applies based on the received RAT and/or Access-Type change event as described in 3GPP TS 29.512 [31]. Then, for non-roaming and Home Routed roaming scenarios, the PCF for a PDU session shall determine whether the UE supports URSP provisioning in EPS as described in 3GPP TS 29.512 [31], and if supported, shall establish a UE policy association with the PCF for the UE that is handling the UE policy association with the source AMF. For LBO roaming scenarios, the V-PCF for the PDU session determines based on local configuration whether to establish a UE Policy Association towards the V-PCF for the UE.

NOTE 6: The PCF for the PDU session discovers the address of the PCF for the UE handling the UE policy association with the source AMF by querying the BSF as described in 3GPP TS 29.521 [35].

NOTE 7: If during the 5GS to EPS mobility there are more than one PCF for the PDU session maintaining PDN connections for the UE, every PCF for the PDU session establishes a UE Policy Association towards the PCF for the UE. In LBO scenarios, the V-PCF for the UE will handle only one UE Policy Association towards the H-PCF for the UE.

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

- the Notification URI encoded as "notificationUri" attribute;
- the SUPI encoded as "supi" attribute; and
- the features supported by the NF service consumer encoded as "suppFeat" attribute,

shall also include, when available:

- the GPSI encoded as "gpsi" attribute;
- the Access type encoded as "accessType" attribute;
- the Permanent Equipment Identifier (PEI) encoded as "pei" attribute;
- the User Location Information encoded as "userLoc" attribute;
- the 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 8: The SNPN Identifier consists of the PLMN Identifier and the NID.

NOTE 9: For Indirect Network Sharing and the interaction between the hosting operator network and the participating operator network case, the identifier of the serving network is set to the selected PLMN ID during the UE Policy Association establishment procedure, as specified in clause 5.18.1 of 3GPP TS 23.501 [2].

- the RAT type encoded as "ratType" attribute;
- the received UE policy delivery protocol message defined in Annex D of 3GPP TS 24.501 [15] encoded as "uePolReq" attribute;

- for the roaming scenario, if the NF service consumer is an AMF, the H-PCF ID encoded as "hPcfId" attribute, and if the "EnhEstRoaming" feature is supported, the H-PCF URI encoded as the "hPcfUri" attribute and the H-PCF Set ID encoded as "hPcfSetId" attribute;

- the Internal Group Identifier(s) encoded as "groupIds" attribute;

- the PC5 capability for V2X encoded as "pc5Capab" attribute if the "V2X" feature defined in clause 5.8 is supported;

- the 5G ProSe capability within the "proSeCapab" attribute, if the "ProSe" feature defined in clause 5.8 is supported;

- the Ranging/SL capability within the "rangSlCapab" attribute, if the "Ranging_SL" feature defined in clause 5.8 is supported;

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

- if the NF service consumer is an AMF, the serving AMF Id encoded as "servingNfId" attribute;

NOTE 10: If the PCF received the "servingNfId" attribute, the PCF can use the Nnrf_NFDiscovery Service specified in 3GPP TS 29.510 [13] to retrieve the NF profile of the Namf_Communication service available in the indicated AMF instance Id.

- if the NF service consumer is an AMF and the "SliceAwareANDSP" feature is supported:

  - if the UE indicated the support of slice-based N3IWF and/or TNGF selection as specified in 3GPP TS 24.501 [15], the AMF may provide information about these UE indications within the "sliceN3gNodeSelCap" attribute;

  - if the AMF has determined that the UE has selected a non-3gpp access node (i.e. TNGF or N3IWF) that is not compatible with the allowed S-NSSAI(s), and the UE indicated the support of slice-based N3IWF and/or TNGF selection as specified in 3GPP TS 24.501 [15], the wrongly selected type of non-3gpp access node encoded as "n3gNodeReSel" attribute, and, in the roaming case, also the Configured NSSAI for the serving PLMN encoded as "confSnssais" attribute;

- if the NF service consumer is an AMF, the Satellite Backhaul Category encoded as "satBackhaulCategory" attribute, if the "EnSatBackhaulCategoryChg" feature defined in clause 5.8 is supported;

- if the NF service consumer is the PCF for the PDU session, and the "EpsUrsp" feature defined in clause 5.8 is supported, the indication that the trigger for the UE Policy Association Establishment is the 5GS to EPS mobility scenario encoded as the "5gsToEpsMob" attribute;

- for the roaming scenario, if the NF service consumer is an AMF and the "NssaiChange" feature is supported, the Configured NSSAI for the serving PLMN encoded as "confSnssais" attribute and optionally the mapped each S-NSSAI value of home network corresponding to the configured S-NSSAI values in the serving PLMN encoded as "mappedHomeSnssai" attribute within the "confSnssais" attribute;

- the A2X capability encoded as "a2xCapab" attribute if the "A2X" feature defined in clause 5.8 is supported;

- if the feature "AccessChange" is supported, the NF service consumer shall include:

  a) the "accessTypes" attribute indicating registration in the 3GPP access, in the non-3GPP access, or in both 3GPP and non-3GPP access, if available; and

  b) the RAT type entry corresponding to the 3GPP access and/or the RAT type entry corresponding to the non-3GPP access encoded in the "ratTypes" attribute, if available.

NOTE 11: If the feature "AccessChange" is not supported or it is not known yet whether it is supported in the PCF, the NF service consumer can also provide the "accessType" attribute and the "ratType" attribute, if available, with one available access type and RAT type.

NOTE 12: When the UE is simultaneously connected to the 5G Core Network of a PLMN/SNPN over a 3GPP access and a non-3GPP access, the UE is served by the same AMF, as specified in 3GPP TS 23.501 [2]. In this case, the UE Policy Association contains both, 3GPP and non-3GPP accesses.
When the UE is simultaneously connected to 5G Core Network over 3GPP access and non-3GPP access in different PLMN(s)/SNPN(s), the UE is served by different AMFs. In this case, there can be two UE Policy Associations, each with the corresponding access type.

- for the roaming scenario, if the NF service consumer is a V-PCF and the "VPLMNSpecificURSP" feature is supported, the AF guidance on VPLMN-specific URSP rules related information, if applicable, within the "vpsUePolGuidance" attribute, that shall contain for each related AF:

  a. the AF guidance on VPLMN-Specific URSP rules within the "urspGuidance" attribute; and

  b. if the AF requested to the VPLMN notifications about the delivery of UE Policies, the "deliveryEvents" attribute including the "SUCCESS_UE_POL_DEL_SP" and/or "UNSUCCESS_UE_POL_DEL_SP" and/or if feature "ExtDeliveryOutcome" is supported, "PARTLY_UNSUCC_UE_POL_DEL_SP" and/or "UNSUCCESS_PCF_SERVICE_AUTHORIZATION" events; and

- for the roaming scenario, if the NF service consumer is an AMF, and the "VPLMNSpecificURSP" feature is supported, LBO information within the "lboRoamInfo" attribute.

and may include:

- if the NF service consumer is an AMF, the name of a service produced by the AMF that expects to receive information via the Npcf_UEPolicyControl_UpdateNotify service operation encoded as "serviceName" attribute;

- if the NF service consumer is an AMF, the alternate or backup IPv4 Address(es) where to send Notifications encoded as "altNotifIpv4Addrs" attribute;

- if the NF service consumer is an AMF, the alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addrs" attribute;

- if the NF service consumer is an AMF, the alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute;

- if the NF service consumer is an AMF, the alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute.

Upon the reception of the HTTP POST request,

- the (V-)(H-)PCF shall assign a UE policy association ID;

- for the roaming scenario and based on operator policy, the V-PCF (as the NF service consumer) should send to the H-PCF a request for the Creation of a UE policy association as described in the present clause;

- the (V-)(H-)PCF shall determine the applicable UE policy as detailed in clause 4.2.2.2. For the V-PCF, any policy received from the H-PCF in the reply to the possible request for the Creation of a policy association should be taken into consideration;

- if the (V-)PCF determines that UE policy needs to be provisioned, it shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the UE policy according to clause 4.2.2.2 and as follows:

  (i) the (V-)PCF shall subscribe to the AMF to notifications on N1 messages for UE Policy Delivery Results using the Namf_Communication_N1N2MessageSubscribe service operation;

  (ii) the (V-)PCF shall send the determined UE policy (e.g. ANDSP, URSP, V2XP, A2XP, ProSeP, RSLPP) using Namf_Communication_N1N2MessageTransfer service operation(s); and

  (iii) the (V-)PCF shall be prepared to receive UE Policy Delivery Results from the AMF and/or subsequent UE policy requests (e.g. for V2XP and/or A2XP and/or ProSeP and/or RSLPP) within the Namf_Communication_N1MessageNotify service operation. For the V-PCF, if the received UE Policy Delivery results relate to UE policy sections provided by the H-PCF, the V-PCF shall use the Npcf_UEPolicyControl_Update Service Operation defined in clause 4.2.3 to send those UE Policy Delivery results to the H-PCF;

- if the UE indicates the support of V2X communications over PC5 reference point and the "V2X" feature is supported, the (H-)PCF shall determine the applicable V2XP, as detailed in clause 4.2.2.2.1.2, and V2X N2 PC5 policy, as detailed in clause 4.2.2.3 and based on the operator's policy;

- if the UE indicates the support of 5G ProSe and the "ProSe" feature is supported, the (H-)PCF shall determine the applicable ProSeP, as detailed in clause 4.2.2.2.1.3, and 5G ProSe N2 PC5 policy, as detailed in clause 4.2.2.4 and based on the operator's policy;

- if the UE indicates the support of Ranging/SL and the "Ranging_SL" feature is supported, the (H-)PCF shall determine the applicable RSLPP, as detailed in clause 4.2.2.2.1.5, and Ranging/SL N2 PC5 policy, as detailed in clause 4.2.2.7, and based on the operator's policy;

- if the PCF determines that N2 PC5 policy (e.g., for V2X communications, for 5G ProSe, for Ranging/SL) needs to be provisioned, including the case of the V-PCF when receiving the N2 PC5 policy from the H-PCF, the PCF shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the N2 PC5 policy according to clause 4.2.2.3 and/or clause 4.2.2.4;

- if the UE indicates support for URSP provisionng in EPS, the "EpsUrsp" feature is supported, and the (V-)PCF determines that UE policy needs to be provisioned via a PCF for a PDU session, the (V-)PCF shall select a UE Policy Association and shall provision the UE policy according to clause 4.2.2.2 and as follows:

  (i) the (V-)PCF shall send a UE policy container with the determined URSP using Npcf_UEPolicyControl_Create response service operation(s); and

  (ii) the (V-)PCF shall be prepared to receive UE Policy Delivery Results from the PCF for a PDU session. The PCF for a PDU session shall use the Npcf_UEPolicyControl_Update service operation defined in clause 4.2.3 to send those UE Policy Delivery results to the (V-)PCF;

- if the UE indicates the support of A2X communications over PC5 reference point and the "A2X" feature is supported, the (H-)PCF shall determine the applicable A2XP, as detailed in clause 4.2.2.2.1.4, and A2X N2 PC5 policy, as detailed in clause 4.2.2.5 and based on the operator's policy;

  for the successful case, the (V-)(H-)PCF shall send a HTTP "201 Created" response with the URI for the created resource in the "Location" header field.

NOTE 13: 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:

- mandatorily, the negotiated supported features encoded as "suppFeat" attribute;

- optionally, the information provided by the NF service consumer when requesting the creation of this policy association encoded as "request" attribute;

- optionally, for the H-PCF as service producer communicating with the V-PCF, UE policy (see clause 4.2.2.2) encoded as "uePolicy" attribute;

- optionally, for the H-PCF as service producer communicating with the V-PCF, N2 PC5 policy (see clause 4.2.2.3 and/or clause 4.2.2.4 and/or clause 4.2.2.5 and/or clause 4.2.2.6) encoded as "n2Pc5Pol" attribute (for V2X communications) and/or "n2Pc5PolA2x" attribute (for A2X communications) and/or "n2Pc5ProSePol" attribute (for 5G ProSe) and/or "n2Pc5RsppPol" attribute (for Ranging/SL);

- optionally, for the H-PCF as service producer communicating with the V-PCF, and when the feature "UECapabilityIndication" is supported, if the H-PCF did not receive from the UE information about ANDSP support and the information is available and reliable in the UDR (see clause 4.2.2.2.1.1), the ANDSP support indication retrieved from UDR encoded as "andspInd" attribute;

- optionally, for the (V-)PCF communicating with the AMF, and if the "URSPEnforcement" feature is supported, the request to the AMF to be notified about the PDU session established/terminated events by providing the PCF for the UE callback information within the "pcfUeInfo" attribute, and the DNN and S-NSSAI combination of the concerned PDU session(s) within the "matchPdus" attribute.

- 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) Change of PLMN, if the "PlmnChange" feature is supported;

d) Change of UE connectivity state, if the "ConnectivityStateChange" feature is supported;

e) URSP rule enforcement information, if the "URSPEnforcement" feature is supported;

f) Change of Satellite Backhaul Category, if the "EnSatBackhaulCategoryChg" feature is supported;

g) Change of Access Type and RAT Type, if the "AccessChange" feature is supported;

h) LBO information change, applicable to roaming scenarios, if the "VPLMNSpecificURSP" feature is supported and the NF service consumer is an AMF; and

i) Change of Configured NSSAI, in roaming scenarios, if the "NssaiChange" feature is supported and the NF service consumer is the AMF;

- 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;

- if the Policy Control Request Trigger "LBO information change" is provided, optionally, the DNNs(s) and S-NSSAI(s) for which LBO information is required encoded as "pduSessions" attribute;

- if the NF service consumer is an AMF and the "SLAMUP" feature is supported, based on the operator policies the H-PCF indicates that the AMF should select the same CHF that is selected by the H-PCF for a UE, the charging address(es) information encoded in the "chfInfo" attribute;

- if the NF service consumer is an AMF and the "CHFGroup" feature is supported, the PCF may also provide the CHF Group ID encoded as "chfGroupId" attribute;

- for the roaming scenario, if the NF service consumer is a V-PCF and the "SLAMUP" feature is supported, based on the operator policies the H-PCF interacts with V-PCF to indicate that the AMF should select the same H-CHF that is selected by the H-PCF for a UE, the charging address(es) information encoded in the "chfInfo" attribute.

NOTE 14: 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 "SliceAwareANDSP" feature is supported, the PCF received the "n3gNodeReSel" attribute and the PCF has successfully delivered to the UE the ANDSP/WLANSP with the slice selection information for the corresponding non-3gpp node, the indication of the successful UE configuration by providing the "andspDelInd" attribute with the value "CONFIGURED". The PCF may delay the indication of the configuration result to a subsequent Npcf_UEPolicyControl_UpdateNotify request, as described in clause 4.2.4.2.

- if errors occur when processing the HTTP POST request, the (V-)(H-)PCF shall 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 (V-)(H-)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"; and

  - if the (V-)(H-)PCF is, due to incomplete, erroneous or missing information in the request, not able to provision a UE policy decision, the (V-)(H-)PCF may reject the request and include in an HTTP "400 Bad Request" response message the "cause" attribute of the ProblemDetails data structure set to "ERROR_REQUEST_PARAMETERS".

If the (V-)PCF received a GUAMI, the (V-)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 (service) set.

When the "SliceAwareANDSP" feature is supported, and the AMF receives the "andspDelInd" attribute, the AMF, based on operator's policies, may reject the UE Registration request, and may provide a valid target N3IWF/TNGF within the Registration Reject message as specified in clause 5.5.1.3.5 of 3GPP TS 24.501 [15]. In this case, the AMF terminates the UE Policy Association as described in clause 4.2.5 (if the UE is not registered over 3GPP access).

4.2.2.2 UE Policy

4.2.2.2.1 Overview

4.2.2.2.1.0 General

The UE policy consists of

- UE Access Network discovery and selection policies (ANDSP). It is used by the UE for selecting non-3GPP accesses networks. The encoding of ANDSP is defined in 3GPP TS 24.526 [16];
- UE Route Selection Policy (URSP). This UE policy is used by the UE to determine how to route outgoing traffic. Traffic can be routed to an established PDU Session, offloaded to non-3GPP access outside a PDU Session, can be routed via a ProSe Layer-3 UE-to-Network Relay outside a PDU session or trigger the establishment of a new PDU Session. The encoding of URSP is defined in 3GPP TS 24.526 [16];
- UE Vehicle-to-Everything Policy (V2XP). This UE policy provides configuration information to the UE for V2X communications over PC5 reference point or over Uu reference point or both. The encoding of V2XP is defined in 3GPP TS 24.588 [25];
- UE 5G Proximity based Services Policy (ProSeP). This UE policy provides configuration information to the UE for 5G ProSe direct discovery, 5G ProSe direct communications, 5G ProSe UE-to-network relay, 5G ProSe usage reporting configuration and rules, 5G ProSe UE-to-UE relay, 5G ProSe multi-hop UE-to-Network Relay, and/or 5G ProSe Layer-3 multi-hop UE-to-UE Relay;
- UE Aircraft-to-Everything Policy (A2XP). This UE policy provides configuration information to the UE for A2X communications over PC5 reference point or A2X communications over Uu reference point or both. The encoding of A2XP is defined in 3GPP TS 24.578 [33]; and
- UE Ranging and Sidelink Positioning Policy (RSLPP). The UE policy provides configuration information to the UE for Ranging/SL over PC5 reference point. The encoding of RSLPP is defined in 3GPP TS 24.514 [42];

The (V-)(H-)PCF determines the UE Policies that apply to the UE based on the received information from the UE about the list of UE Policies stored in the UE and UE policy classmark information as described in Annex D of 3GPP TS 24.501 [15], the information available in UDR as described in 3GPP TS 29.519 [17], inputs received from the NF service consumer and local policies as described in clause 4.2.2.2.

NOTE 1: There is a possibility of misalignment between the UE Policies determined by the PCF and the UE Policies stored at the UE (which can be caused e.g. in AMF relocation with PCF reselection scenario). When the PCF, based on configuration and implementation specific means, detects this possibility, the PCF can avoid it if the PCF first removes all the UE Policies in the UE as per the list of UPSI(s) stored in UDR/PCF and then provides to the UE all determined UE Policies as per currently specified procedures.

The UE Policy is transferred to the UE using the UE policy delivery protocol defined in Annex D of 3GPP TS 24.501 [15]. The (V-)(H-)PCF shall send UE policy using the "MANAGE UE POLICY COMMAND" message and will receive the "MANAGE UE POLICY COMPLETE"or the "MANAGE UE POLICY COMMAND REJECT" messages in the response. Those messages are transparently forwarded by the AMF.

The (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send "MANAGE UE POLICY COMMAND" messages to the UE and use the Namf_Communication_N1MessageNotify service operation defined in clause 5.2.2.3.5 of 3GPP TS 29.518 [14] to receive "MANAGE UE POLICY COMPLETE" and "MANAGE UE POLICY COMMAND REJECT" messages from the UE. The (V-)PCF shall only send "MANAGE UE POLICY COMMAND" messages below a predefined size limit.

The H-PCF shall use service operations as defined in the present specification to receive "MANAGE UE POLICY COMPLETE" and "MANAGE UE POLICY COMMAND REJECT" messages from the V-PCF and to send MANAGE UE POLICY COMMAND" messages to the V-PCF. The H-PCF shall encode the "MANAGE UE POLICY

COMMAND" message in a "uePolicy" attribute. The H-PCF shall only send "MANAGE UE POLICY COMMAND" messages below a predefined size limit.

The (V-)(H-)PCF may deliver the UE policy to the UE in several "MANAGE UE POLICY COMMAND" messages.

For the purpose of such fragmented delivery and subsequent partial updates of UE policies, the UE policy is divided into policy sections. Such policy sections may be predefined in the (V-)(H-)PCF, may be retrieved by the (V-)(H-)PCF from the UDR as specified in 3GPP TS 29.519 [17], or may be dynamically generated by the (V-)(H-)PCF, but shall comply to the rules detailed below. The (V-)(H-)PCF may combine several policy sections into one "MANAGE UE POLICY COMMAND" message, if the predefined size limit is observed.

The following rules apply to policy sections:

- The size shall be below the predefined size limit.
- The policy section shall only contain complete URSP rule(s), WLANSP rule(s), N3AN node configuration information, V2XP, A2XP, ProSeP and/or RSLPP info content, but no fractions of such rules, configuration information, or info contents.
- To ease a subsequent partial update of UE policies, policy sections should only contain a small number of policies, e.g. URSP rule(s), and/or WLANSP rule(s).
- The entire content of a policy section shall be provided by a single PLMN.

A PCF shall only determine policy sections of its own PLMN(s). However, a V-PCF may forward UE policy sections received from the H-PCF to the UE.

Each UE policy section is identified by a UE policy section identifier (UPSI). The UPSI is composed of two parts:

a) a PLMN ID part containing the PLMN ID of the PLMN or SNPN of the PCF which provides the UE policies (i.e, the PLMN ID derived from the SUPI); and

b) a UE policy section code (UPSC) containing a unique value within the PLMN or SNPN selected by the PCF.

NOTE 2: When the UE is operating in SNPN access operation mode, the UE associates the PLMN ID with the NID of the SNPN to differentiate between PLMN UPSI(s) and SNPN UPSI(s).

The (V-)(H-)PCF provides an UPSI when providing a new UE policy section and may then identify that policy section using that UPSI when requesting that that UE policy section is modified or deleted, as specified in Annex D of 3GPP TS 24.501 [15].

If the (V-)(H-)PCF determines that changes are required and/or the V-PCF receives possible new or modified policy sections determined by the H-PCF in the roaming case, it shall send the determined new, updated or deleted policy sections using one or several "MANAGE UE POLICY COMMAND" messages towards the NF service consumer. In the roaming case, the V-PCF may either combine policy sections received from the H-PCF and policy sections the V-PCF selected in the same "MANAGE UE POLICY COMMAND" (as long as the predefined size limit is observed), or use separate "MANAGE UE POLICY COMMAND" messages; however, the V-PCF shall not distribute the policy sections received in one "MANAGE UE POLICY COMMAND" from the H-PCF into several "MANAGE UE POLICY COMMAND" messages as long as the predefined size limit is observed for the policy sections received from the H-PCF. The V-PCF shall allocate a new PTI for the "MANAGE UE POLICY COMMAND" sent by the V-PCF and store the mapping between the new PTI and the PTI within the "MANAGE UE POLICY COMMAND" received from the H-PCF.

After sending a "MANAGE UE POLICY COMMAND" messages, the (V-)(H-)PCF shall wait for a related confirmation in a "MANAGE UE POLICY COMPLETE" messages or failure indication in a "MANAGE UE POLICY COMMAND REJECT" message. When receiving no such message until the expiry of a supervision timer specified in Annex D of 3GPP TS 24.501 [15], or when receiving a failure indication, the PCF should re-send related instructions for the policy sections. In the roaming case, the H-PCF and the V-PCF shall each be responsible for resending those policy sections that it originally supplied. In the case that the V-PCF combined policy sections received from the H-PCF and policy sections the V-PCF selected in the same "MANAGE UE POLICY COMMAND" described below, the V-PCF shall wait for the H-PCF to resend the policy sections of HPLMN, and then resend the combined policy sections. The (V-)(H-)PCF shall always include the initially supplied policy sections when resending the UE policy.

The (V-)(H-)PCF shall determine that a received "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message is related to the result of a "MANAGE UE POLICY COMMAND" based on

the PTI within that message. In the roaming case, the V-PCF shall determine that the received message is related to the result of the UE policy provided by the H-PCF if the PTI within the message belongs to one of the stored PTI mapping(s).

If the V-PCF combined policy sections received from the H-PCF and policy sections the V-PCF selected in the same "MANAGE UE POLICY COMMAND", upon reception of a "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message the V-PCF shall:

- forward the corresponding "MANAGE UE POLICY COMPLETE" message to the H-PCF;
- if a "MANAGE UE POLICY COMMAND REJECT" message with UPSI(s) of the HPLMN is received, forward the parts of the "MANAGE UE POLICY COMMAND REJECT" message that relate to the UPSI(s) of the HPLMN to the H-PCF;
- if a "MANAGE UE POLICY COMMAND REJECT" message without UPSI(s) of the HPLMN is received, send a "MANAGE UE POLICY COMPLETE" message to the H-PCF; and
- provide the stored PTI received from the HPLMN in the corresponding "MANAGE UE POLICY COMMAND" within the "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message towards the H-PCF.

If the V-PCF sent a separate "MANAGE UE POLICY COMMAND" containing only the policy sections received from the H-PCF, the V-PCF shall forward the corresponding "MANAGE UE POLICY COMPLETE" or "MANAGE UE POLICY COMMAND REJECT" message to the H-PCF and provide the stored PTI received from the HPLMN in the corresponding "MANAGE UE POLICY COMMAND" within the "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message towards the H-PCF.If the V-PCF distributed the policy sections received in one "MANAGE UE POLICY COMMAND" from the H-PCF into several "MANAGE UE POLICY COMMAND" messages to the UE (because the predefined size limit of the VPLMN was exceeded), the V-PCF shall aggregate all corresponding "MANAGE UE POLICY COMPLETE" or "MANAGE UE POLICY COMMAND REJECT" messages received from the UE into one "MANAGE UE POLICY COMPLETE" or "MANAGE UE POLICY COMMAND REJECT" message towards the H-PCF.

When the (V-)PCF receives an Namf_Communication_N1N2MessageTransfer failure response as defined in clause 5.2.2.3.1.2 of 3GPP TS 29.518 [14], or an N1N2 Transfer Failure Notification as defined in clause 5.2.2.3.2 of 3GPP TS 29.518 [14], the (V-)PCF shall stop the supervision timer specified in Annex D of 3GPP TS 24.501 [15] corresponding to the affected PTIs. If the "retryAfter" attribute is received, the (V-)PCF should not initiate new UE Policy Delivery request until the timer expires. For the N1N2 Transfer Failure Notification case, the (V-)PCF determines the affected PTIs allocated by the V-PCF based on the resource URI within the "n1n2MsgDataUri" attribute of the N1N2MsgTxfrFailureNotification data structure as defined in clause 6.1.6.2.30 of 3GPP TS 29.518 [14].

NOTE 3: The (V-)PCF correlates the Namf_Communication_N1N2MessageTransfer request and the corresponding N1N2 Transfer Failure Notification based on the resource URI within the "Location" header included in the response HTTP status code "202 Accepted" of the Namf_Communication_N1N2MessageTransfer response and the resource URI within the "n1n2MsgDataUri" attribute of and N1N2 Transfer Failure Notification. And then the V-PCF determines the affected PTIs related with the resource URI.

For the non-roaming case or the roaming case when the V-PCF determines that the affected UE Policy is related to the V-PLMN, the (V-)PCF may provision the policy control request trigger "CON_STATE_CH" if not provisioned yet. Upon receiving the notification of UE connectivity state change indicating that the UE enters the CM-Connected state, the (V-)PCF may retry to deliver the UE Policy.

For the roaming case and if the V-PCF determines that the affected UE policy is related with the UE policy delivered by the H-PCF, the V-PCF shall send a POST message as defined in clause 4.2.3.1 to notify the H-PCF of the failure of UE policy transfer by including the "uePolTransFailNotif" attribute within the PolicyAssociationUpdateRequest data structure. Within the UePolicyTransferFailureNotification data structure, the V-PCF shall include the cause of the UE Policy Transfer Failure within the "cause" attribute and the PTI(s) allocated by the H-PCF corresponding to the PTI(s) allocated by the V-PCF within the "ptis" attribute. The H-PCF shall stop the supervision timer corresponding to the affected PTIs. In this case, the H-PCF may provision the policy control request trigger "CON_STATE_CH" if not provisioned yet. Upon receiving the notification of UE connectivity state change indicating that the UE enters the CM-Connected state, the H-PCF may retry to deliver the UE Policy. If the feature "EnErrorHandling" is supported and the "retryAfter" attribute is received, the H-PCF should not initiate new UE Policy Delivery request until the timer expires.

When the (H-)PCF receives the "MANAGE UE POLICY COMPLETE" or the "MANAGE UE POLICY COMMAND REJECT" message and determines that this message indicates a UE Policy Delivery outcome to which an NF service

consumer has subscribed via a request for service specific parameters, the (H-)PCF shall invoke the Npcf_EventExposure_Notify service operation as defined in clause 4.2.4.2 of 3GPP TS 29.523 [30].

4.2.2.2.1.1 Provisioning of the UE Access Network discovery and selection policies and UE Route Selection Policy

During Initial Registration and 5GS Registration during UE mobility from EPS to 5GS, and when:

a) the UE has one or more stored UE policy sections corresponding to the serving PLMN/SNPN or HPLMN;or

b) the UE does not have any stored UE policy section corresponding to the serving PLMN/SNPN or HPLMN and the UE needs to send a UE policy container to the network;

Then the UE includes the "UE STATE INDICATION" message as defined in clause D.5.4.1 of 3GPP TS 24.501 [15], which is transferred transparently by the AMF within the "uePolReq" attribute during the creation of a policy association, as described in clause 4.2.2.1.

The (H-)PCF, or the PCF of the SNPN for the UEs subscribed to the SNPN, may store in the UDR, as specified in 3GPP TS 29.519 [17]:

a) UPSCs and related UE policy sections of the own PLMN or SNPN it provided to a UE;

b) the PEI received from the NF service consumer (e.g. AMF), if available;

c) the OSId(s) received from the UE within the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available;

d) the indication of UE's support for ANDSP included in the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available;

e) if the "EpsUrsp" feature defined in 3GPP TS 29.519 [17] is supported, the indication of UE's support for URSP provisioning in EPS included in the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available;

f) if the "URSPEnforcement" feature defined in 3GPP TS 29.519 [17] is supported, the indication of UE's support for reporting URSP rule enforcement included in the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available; and

g) if the "VPLMNSpecificURSP" feature defined 3GPP TS 29.519 [17] is supported, the indication of UE's support for VPLMN-Specific URSP included in the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available.

The PCF shall retrieve from UDR the information previously stored in UDR, if not locally available, for URSP/ANDSP rule determination as specified in 3GPP TS 29.519 [17].

The V-PCF may retrieve UPSCs and related UE policy sections applicable for all UEs from a HPLMN from the V-UDR, using the HPLMN ID as key as specified in 3GPP TS 29.519 [17]. The PCF of the serving SNPN has locally configured the UPSCs and related UE policy sections applicable for all UEs other than the UEs subscribed to the SNPN.

When receiving the "UE STATE INDICATION" message, the (V-)(H-)PCF or the PCF of the serving SNPN, shall determine, based on the UPSIs indicated in that message, if available, the ANDSP support indication and the OSId(s) indicated in that message, if available, the reporting URSP rule enforcement support in that message, if available, the UE Policy Sections and UPSCs stored in the UDR, if available, the policy subscription data, if available, application data, if available, inputs received from the NF service consumer,and local policy, as specified in clauses 4.2.2.2.2 and 4.2.2.2.3, whether any new UE policy section(s) need to be installed and whether any existing UE policy section(s) need to be updated or deleted. Based on local configuration, the (H-)PCF or the PCF of the serving SNPN (for the SNPN-subscribed UEs), may indicate to the UE to accept/not accept URSP rules signalled by non-subscribed SNPNs within the UE policy network classmark IE in a MANAGE UE POLICY COMMAND message as described in Annex D of 3GPP TS 24.501 [15].

NOTE 1: When an SNPN-enabled UE registers in a SNPN using credentials from a Credentials Holder (CH) but the UE is not subscribed in that SNPN, the PCF of the non-subscribed SNPN, based on local policies, can provision the UE with URSP rules and/or ANDSP rules for the SNPN. For the provisioned ANDSP rules, the UE gives priority to the valid ANDSP rules from the registered SNPN.

NOTE 2: When an SNPN-enabled UE registers in a SNPN using credentials from a Credentials Holder (CH) but the UE is not subscribed in that registered SNPN, the UE selects the URSP rules provisioned by the PCF from the PLMN or SNPN, during its registration with the PLMN or SNPN of which the CH was part of.

When the received "UE STATE INDICATION" message indicated that the UE supports VPLMN-specific URSP rules as specified in Annex D of 3GPP TS 24.501 [15], the (H-)PCF may determine URSP rules specific per VPLMN as specified in clause 4.2.2.2.3.2. In this case, the (H-)PCF shall provide to the UE within the "MANAGE UE POLICY COMMAND" the URSP rules to be applied in VPLMN(s) in specific UE policy section(s) and the VPS URSP configuration IE as specified in clause D.6.8 of 3GPP TS 24.501 [15].

NOTE 2: The VPS URSP configuration IE includes zero or more tuples, each tuple containing a tuple Id, VPLMN ID(s) and a list of UPSC(s) (of HPLMN's UE policy sections) with UE policies with URSP rules applicable to the VPLMN(s) and its equivalent PLMN(s).

4.2.2.2.1.1a Provisioning of URSP in EPS

When the UE initially attaches in EPS and establishes the default PDN connection or establishes the first PDN connection in EPS or when the UE establishes a new PDN connection and no other existing PDN connection indicates the support of URSP provisioning in EPS, if the "EpsUrsp" feature is supported as described in 3GPP TS 29.512 [31], and both the UE and the network support URSP provisioning in EPS PCO, the UE includes the UE policy container IE with the "UE STATE INDICATION" message as defined in clause D.5.4.1 of 3GPP TS 24.501 [15] in the BEARER RESOURCE MODIFICATION REQUEST message as defined in 3GPP TS 24.301 [36]. The UE policy container is then transferred transparently by the PCF for the PDU session within the "uePolReq" attribute during the creation of a UE policy association, as described in clause 4.2.2.1.

The (H-)PCF for the UE, may store in the UDR, as specified in 3GPP TS 29.519 [17]:

a) UPSCs and related URSP sections of the own PLMN it provided to a UE;

b) the PEI received from the NF service consumer, if available;

c) the OSId(s) received from the UE within the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available;

d) if the "EpsUrsp" feature defined in 3GPP TS 29.519 [17] is supported, the indication of UE's support for URSP provisioning in EPS included in the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available; and

f) if the "URSPEnforcement" feature defined in 3GPP TS 29.519 [17] is supported, the indication of UE's support for reporting URSP rule enforcement included in the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available.

The (H-)PCF shall retrieve from UDR the information previously stored in UDR, if not locally available, for URSP rule determination as specified in 3GPP TS 29.519 [17].

NOTE 1: URSP provisioning in EPS is supported in Home Routed roaming scenarios as it is supported in non-roaming scenarios. In Home Routed roaming scenarios the H-PCF corresponds with the PCF.

When receiving the "UE STATE INDICATION" message, the (H-)PCF, shall determine, based on the UPSIs indicated in that message, if available, the OSId(s) indicated in that message, if available, the reporting URSP rule enforcement support in that message, if available, the UE Policy Sections and UPSCs stored in the UDR, if available, the policy subscription data, if available, application data, if available, and local policy, as specified in clauses 4.2.2.2.2 and 4.2.2.2.3, whether any new URSP section(s) need to be installed and whether any existing URSP section(s) need to be updated or deleted.

During 5GS to EPS mobility with N26, when the "EpsUrsp" feature is supported and PCF for the PDU session establishes a UE Policy Association with the PCF for the UE as described in clause 4.2.2.1, the PCF for the UE shall determine whether the 5GS to EPS mobility with N26 scenario applies based on the "5gsToEpsMob" attribute. If it applies, the PCF for the UE shall recover from the UE Policy Association previously established with the AMF:

- UE Policy Section related information, i.e.:

  a) UPSCs and related URSP sections of the own PLMN it provided to the UE;

b) if the "URSPEnforcement" feature defined in 3GPP TS 29.519 [17] is supported, the indication of UE's support for reporting URSP rule enforcement received from the UE within the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available; and

c) the OSId(s) received from the UE within the "UE STATE INDICATION" message as described in the Annex D of 3GPP TS 24.501 [15], if available; and

- the subscribed Policy Control Triggers with the AMF, if available.

NOTE 2: At 5GS to EPS mobility with N26, the guard timer in the AMF (as specified in clause 4.11.1.2.1 and clause 4.11.1.3.2 of TS 23.502 [3]) ensures that the UE Policy Association remains until the PCF for the UE detects that a UE Policy Association establishment is received from a PCF for the PDU Session indicating 5GS to EPS mobility.

When receiving the 5GS to EPS mobility indication, the PCF for the UE, shall determine, based on the UE Policy Sections and the OSId(s) recovered from the former UE Policy Association in 5GS, if available, the policy subscription data, if available, application data, if available, and local policy, as specified in clauses 4.2.2.2.2 and 4.2.2.2.3, whether any new UE Policy section(s) with URSP need to be installed and whether any existing UE Policy section(s) with URSP need to be updated or deleted.

In the scenarios above, initial attach and/or first PDN connection establishment in EPS and/or new PDN connection establishment in EPS when no other existing PDN connection indicates the support of URSP provisioning in EPS scenarios, and 5GS to EPS mobility scenario, the determined URSP is transferred to the UE as specified in 4.2.2.2.1.0 with the following differences:

- the messages of the UE policy delivery protocol defined in Annex D of 3GPP TS 24.501 [15] are transparently forwarded to the UE by a PCF for a PDU session;

- the (V-)(H-)PCF shall use the Npcf_UEPolicyControl_Create/Update response and the Npcf_UEPolicyControl_UpdateNotify request to send "MANAGE UE POLICY COMMAND" messages to the UE in a "uePolicy" attribute and use the Npcf_UEPolicyControl_Update service operation to receive "MANAGE UE POLICY COMPLETE" and "MANAGE UE POLICY COMMAND REJECT" messages from the UE via a PCF for a PDU session in a "uePolDelResult" attribute; and

- in the 5GS to EPS mobility scenario, the (V-)PCF selects one of the UE Policy Association(s) with the (V-)PCF for the PDU session to send "MANAGE UE POLICY COMMAND" message (and receive the "MANAGE UE POLICY COMPLETE" and "MANAGE UE POLICY COMMAND REJECT" messages from the UE) and to provision the applicable policy control request triggers.

4.2.2.2.1.2 Provisioning of Vehicle-to-Everything Policy

When the UE registers to the network, if the AMF receives from the UE the PC5 capability for V2X communications in the Registration Request message, the UE is authorized to use V2X service based on the UE's subscription information and the "V2X" feature is supported, the AMF further reports to the PCF the PC5 capability for V2X communications within the "pc5Capab" attribute as defined in clause 4.2.2.1. The PCF may determine the V2XP over PC5 interface based on the received UE's PC5 capability for V2X, the Service specific parameter information retrieved from UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

After UE registration, if the UE supports V2X communication and it does not have valid V2XP, the UE includes the "UE POLICY PROVISIONING REQUEST" message as defined in 3GPP TS 24.587 [24] during the NAS transport procedure. The PCF may reject the request by sending back a "UE POLICY PROVISIONING REJECT" message as defined in clause 7.2.2 of 3GPP TS 24.587 [24] or provision the policy, as defined in clause 4.2.2.2.1, based on the service specific parameter information retrieved from UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

For both scenarios mentioned above, in the roaming case, the H-PCF may include the V2XP within the "uePolicy" attribute in the policy association create or update response to the V-PCF and in the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send the V2XP to the UE.

4.2.2.2.1.3 Provisioning of ProSe Policy

When the UE registers to the network and the UE supports 5G ProSe, if the AMF receives from the UE the 5G ProSe Capability in the Registration Request message, the UE is authorized to use 5G ProSe service based on the UE's subscription information and the "ProSe" feature defined in clause 5.8 is supported, the AMF further reports to the PCF this 5G ProSe Capability of the UE within the "proSeCapab" attribute, as per the procedures defined in clause 4.2.2.1. When the UE disables/enables a 5G ProSe capability, the AMF further reports to the PCF the updated 5G ProSe capabilities of the UE within the "proSeCapab" attribute, as per the procedures defined in clause 4.2.3.1. The PCF may determine the support of 5G ProSe based on the received UE's 5G ProSe Capability, the service specific parameter information retrieved from the UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

After UE registration, if the UE does not have valid ProSeP, the UE includes a "UE POLICY PROVISIONING REQUEST" message defined in clause 7.2.1.1 of 3GPP TS 24.554 [28] during theNAS transport procedure. The PCF may either reject the request by sending back a "UE POLICY PROVISIONING REJECT" message defined in clause 7.2.2.1 of 3GPP TS 24.587 [24] or provision the policy, as defined in clause 4.2.2.2.1, based on the service specific parameter information retrieved from the UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

For both scenarios mentioned above, in the roaming case, the H-PCF may include the ProSeP within the "uePolicy" attribute in the policy association create and update response to the V-PCF and in the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send the ProSeP to the UE.

NOTE: In this release of the specification, for SNPN scenarios, 5G ProSeP management does not support inter-SNPN operation and ProSeP can only be derived and provisioned by the PCF of the subscribed SNPN.

4.2.2.2.1.4 Provisioning of Aircraft-to-Everything Policy

When the UE registers to the network, if the AMF receives from the UE the capability for A2X communications in the Registration Request message, the UE is authorized to use A2X service based on the UE's subscription information and the "A2X" feature is supported, the AMF further reports to the PCF the UEcapability for A2X communications within the "a2xCapab" attribute as defined in clause 4.2.2.1. The PCF may determine the A2XP based on the received UE's capability for A2X, the Service specific parameter information retrieved from UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

After UE registration, if the UE supports A2X communication and it does not have valid A2XP, the UE includes the "UE POLICY PROVISIONING REQUEST" message as defined in 3GPP TS 24.577 [32] during the NAS transport procedure. The PCF may reject the request by sending back a "UE POLICY PROVISIONING REJECT" message as defined in 3GPP TS 24.577 [32] or provision the policy, as defined in clause 4.2.2.2.1, based on the service specific parameter information retrieved from UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

For both scenarios mentioned above, in the roaming case, the H-PCF may include the A2XP within the "uePolicy" attribute in the policy association create or update response to the V-PCF and in the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send the A2XP to the UE.

4.2.2.2.1.5 Provisioning of Ranging and Sidelink Positioning Policy

When the UE registers to the network and the UE supports Ranging/SL, if the AMF receives from the UE the Ranging/SL Capability in the Registration Request message, the UE is authorized to use Ranging/SL service based on the UE's subscription information and the "Ranging_SL" feature defined in clause 5.8 is supported, the AMF further reports to the PCF this Ranging/SL Capability of the UE within the "rangSlCapab" attribute, as per the procedures defined in clause 4.2.2.1. The PCF may determine the RSLPP over PC5 interface based on the received UE's PC5 capability for Ranging/SL, the service specific parameter information retrieved from UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

After UE registration, if the UE does not have valid RSLPP, the UE includes a "UE POLICY PROVISIONING REQUEST" message defined in 3GPP TS 24.514 [42] during the NAS transport procedure. The PCF may either reject the request by sending back a "UE POLICY PROVISIONING REJECT" message defined in 3GPP TS 24.514 [42] or provision the policy, as defined in clause 4.2.2.2.1, based on the service specific parameter information retrieved from the UE's Application Data in the UDR as defined in clause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

For both scenarios mentioned above, in the roaming case, the H-PCF may include the RSLPP within the "uePolicy" attribute in the policy association create and update response to the V-PCF and in the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send the RSLPP to the UE.

4.2.2.2.2 UE Access Network discovery and selection policies (ANDSP)

UE Access Network discovery and selection policies are used by the UE to select non-3GPP accesses and to decide how to route traffic between the selected 3GPP and non 3GPP accesses.

In this release of the specification, the Access Network Discovery & Selection policy shall contain only rules that aid the UE in selecting a WLAN access network. Rules for selecting other types of non-3GPP access networks are not specified.

The WLAN access network selected by the UE with the use of Access Network Discovery & Selection policy may be used for direct traffic offload (i.e. sending traffic to the WLAN outside of a PDU Session) and for registering to 5GC using the non-3GPP access network selection information.

The Access Network Discovery & Selection policy shall contain one or more WLAN Selection Policy (WLANSP) rules and and may contain Non-3GPP access network (N3AN) node selection information and configuration information.

N3AN node selection information and configuration information is used to control UE behaviour related to selection of N3IWF, or ePDG for accessing 5GC via untrusted non-3GPP access.

To support N3IWF selection based on the S-NSSAI(s) allowed for the UE, the ANDSP contains the S-NSSAIs supported by the N3IWF(s) and slice-specific configuration, as described in 3GPP TS 24.526 [16]. To support TNGF selection based on the S-NSSAI(s) allowed for the UE, the extended WLANSP information contains the association of the S-NNSAI(s) and SSID(s) supported by the TNGF(s) as described in TS 3GPP TS 24.526 [16]. The (H-)PCF takes into account the UE's subscribed S-NSSAIs and the V-PCF the UE's Configured NSSAI, in both cases together with the UE indication of support of slice-based N3IWF and/or TNGF selection, to provide the ANDSP/WLANSP with slice specific information.

UE Access Network discovery and selection policies are encoded as defined in 3GPP TS 24.526 [16].

UE Access Network discovery and selection policies may be provided by a V-PCF and/or a H-PCF.

If the UE has indicated in the "UE STATE INDICATION" message it does not support ANDSP, or, when the feature "UECapabilityIndication" is supported, the V-PCF receives from the H-PCF the "andspInd" attribute to false, i.e. the UE does not support non-3GPP access, the (V-)(H-)PCF shall not send any Access Network discovery and selection policies to the UE.

4.2.2.2.3 UE Route Selection Policy (URSP)

4.2.2.2.3.1 General

The UE Route Selection Policy is used by the UE to determine how to route outgoing traffic.

The UE Route Selection Policy shall consist of one or several URSP rules. The PCF determines whether URSP rule(s) have to be provisioned based on input parameters received from the NF service consumer, the received list of UPSIs from the UE, if available, the UE Policy Sections stored in the UDR, if available, other received UE parameters, if available, the policy subscription and application data retrieved from UDR, if available, analytics information received from NWDAF, if available, and local policies.

URSP rules are encoded as defined in 3GPP TS 24.526 [16].

UE Route Selection Policy may only be provided by a H-PCF or the PCF of the SNPN, but shall not be provided by a V-PCF. However, UE Route Selection Policy determined and provided by the H-PCF may be retrieved by a V-PCF from the H-PCF and forwarded to a UE.

The (H-)PCF shall use the UE policy subscription data stored in UDR as specified in 3GPP TS 29.519 [17] to ensure the values included in the Route Selection Descriptor of the generated URSP rules are always supported by subscription.

For the received list of internal group Ids, the (H-)PCF retrieves the corresponding 5G VN group configuration data stored from the UDR as specified in 3GPP TS 29.504[27] and 3GPP TS 29.505 [26], if available. For each available 5G VN group, the (H-)PCF may use the retrieved 5G VN group configuration values to encode the values for the Route Selection Descriptor and the values for the Traffic Descriptor of the generated URSP rules.

If the "EnhancedBackgroundDataTransfer" feature is supported, the (H-)PCF may retrieve the Background Data Transfer Reference ID(s) by retrieving the UE's Application Data from the UDR as defined in clause 6.2.9 of 3GPP TS 29.519 [17]. In this case, the PCF shall retrieve the transfer policy corresponding to the Background Data Transfer Reference ID(s) as defined in clause 5.2.8 of 3GPP TS 29.519 [17] and then may create the URSP rules, which shall include the Traffic Descriptor based on the retrieved application traffic descriptor and the Route Selection Description based on the retrieved DNN and S-NSSAI. The (H-)PCF may include the corresponding network area information and time window, if available, within the Route Selection Validation Criteria for the UE as defined in clause 6.6.2.1 of 3GPP TS 23.503 [4]. The (H-)PCF shall use the associated S-NSSAI and DNN to store in the UDR the Background Data Transfer Reference ID(s) in the UE's session management policy data as specified in 3GPP TS 29.519 [17].

NOTE 1: If the derived URSP rule(s) include Route Selection Validation criteria the (H-)PCF, based on local policies, can postpone the provisioning of the URSP rules as described in clause 4.2.4.4.

If the (H-)PCF retrieves the BDT policy and corresponding related information (e.g. network area information, the volume of data to be transferred per UE, etc.) within the BdtData data type, and the "bdtpStatus" attribute within the BdtData data type is set to value "INVALID" (i.e. BDT policy re-negotiation is ongoing), the (H-)PCF shall not provision the URSP rules based on the invalid BDT policy. When the BDT policy re-negotiation is completed the PCF may:

- if the new BDT Policy is determined, create or update the applicable URSP rules based on the new BDT policy; or
- if the invalid BDT policy is removed, remove applicable URSP rules.

If the "AfGuideURSP" feature is supported by the Nudr_DataRepository service, the (H-)PCF may receive Service specific parameter information that contains data for AF guidance information on the URSP determination as defined in clause 6.4.2.15 of 3GPP TS 29.519 [17]. In this case, the (H-)PCF may also use this AF guidance information as input to determine the URSP that will be provisioned to the UE. If the received AF guidance information is not consistent with the UE subscription data, or the local operator policy does not allow the specific S-NSSAI and DNN provided by the AF guidance information, the corresponding AF guidance information shall not be used to determine the URSP rules. The PCF may also determine not to use AF guidance based on the analytics info received from the NWDAF.

When the (H-)PCF decides to provide URSP rules based on the AF guidance information, it shall derive the information as follows:

- Application traffic descriptor within the "trafficDesc" attribute is used to set the Traffic Descriptor of URSP rule (defined in Figure 5.2.2 of 3GPP TS 24.526 [16]).
- Each route selection parameter set within the "routeSelParamSets" attribute of the UrspRuleRequest data type is used to determine a Route selection descriptor (defined in Figure 5.2.2 of 3GPP TS 24.526 [16]) as follows:
  - DNN (within the "dnn" attribute of the RouteSelectionParameterSet data type) and S-NSSAI (within the "snssai" attribute of the RouteSelectionParameterSet data type) from the route selection parameter set are used to set the Route selection descriptor contents (defined in Figure 5.2.4 of 3GPP TS 24.526 [16]);
  - Route selection precedence (within the "precedence" attribute of the RouteSelectionParameterSet data type) is used to set the Precedence value of route selection descriptor (defined in Figure 5.2.4 of 3GPP TS 24.526 [16]); and

- the spatial validity condition (within the "spatialValidityTais" attribute of the RouteSelectionParameterSet data type) is used to set the Location criteria of the route selection descriptor (defined in Figure 5.2.5 of 3GPP TS 24.526 [16]).

- The PCF may use the requested PDU Session type provided within the "pduSessType" attribute of the RouteSelectionParameterSet data structure to derive the PDU Session type of the route selection descriptors of the URSP rule.

- The precedence for the generated URSP rule is determined by the (H-)PCF. The (H-)PCF may use the "relatPrecedence" attribute within the "UrspRuleRequest" data type to derive the relative precedence of the URSP rule for a request coming from the same AF.

URSP rules based on AF guidance should not be set as the URSP rules with the "match all" application traffic descriptor.

The (H-)PCF may obtain the information about the UE's OS from the UE as described in the Annex D of 3GPP TS 24.501 [15] or it may derive the information about the UE's OS from the PEI provided by the NF service consumer (e.g. AMF).

If the (H-)PCF is required to provide UE policies to the UE that includes application descriptors then:

a) If the (H-)PCF has been provided with one UE's OS Id by the UE, the (H-)PCF shall use either the traffic descriptor "OS App Id type" or the traffic descriptor "OS Id + OS App Id type" as defined in 3GPP TS 24.526 [16].

NOTE 2: The (H-)PCF uses the traffic descriptor "OS Id + OS App Id type" when the (H-)PCF does not take the received UE's OS Id into account.

b) If the (H-)PCF has been provided with more than one UE's OS Id by the UE,

- the (H-)PCF shall use the traffic descriptor "OS Id + OS App Id type" for the UE's OS Id provided by the UE as defined in 3GPP TS 24.526 [16]; and

- the (H-)PCF shall not use the traffic descriptor "OS App Id type" as defined in 3GPP TS 24.526 [16].

c) If the (H-)PCF has not been provided with the UE's OS Id by the UE,

- the (H-)PCF shall use the traffic descriptor "OS Id + OS App Id type" as defined in 3GPP TS 24.526 [16]; and

- the (H-)PCF shall not use the traffic descriptor "OS App Id type" as defined in 3GPP TS 24.526 [16].

d) If the (H-)PCF has been provided with the UE's OS Id by the UE and the (H-)PCF has derived the UE's OS Id from the PEI and if there is an inconsistency between the OS Id provided by the UE and the OS Id derived from the PEI, the (H-)PCF shall use the OS Id provided by the UE for providing UE policies to the UE that include application descriptors.

URSP rules may be used to support end to end redundant user plane paths by establishing two redundant PDU sessions. PCF configuration based on e.g. deployment, terminal implementation or policies per group of UE(s) may be used by the PCF to determine whether the URSP Rules shall include PDU Session Pair ID and RSN to indicate that they refer to redundant PDU sessions or whether the UE will determine these values instead. The PCF shall not use URSP rules related to PIN scenarios (i.e. when the PIN ID is used as traffic descriptor component) for the establishment of two redundant PDU sessions.

NOTE 3: When the "EnSatBackhaulCategoryChg" feature defined in clause 5.8 is supported, the received satellite or non-satellite backhaul category can be used as input to provision or update URSP rules to enable appropriate PDU session capabilities. E.g., when satellite backhaul category is indicated by the AMF, the (H-)PCF can take it into account to determine, based on operator policies, an appropriate Route Selection Descriptor for the URSP rule and the services deployed on the satellite, (e.g., the provisioning or update of URSP rules to indicate the specific DNN for services deployed on-board satellites).

If the AF provided the (H-)PCF with Personal IoT Network identifier (PIN ID) associated with a DNN and S-NSSAI, and the received DNN and S-NSSAI corresponds to a subscribed DNN and S-NSSAI combination in the UE Policy Context as described in 3GPP TS 29.519 [17], the (H-)PCF shall include the PIN ID within the traffic descriptor of the

URSP Rule attribute as defined in 3GPP TS 24.526 [16] for UE to choose an appropriate PIN to establish the PDU session.

NOTE 4: The PCF can provide two distinct URSP rules to support end to end redundant user plane paths using Dual Connectivity for the duplicated traffic of an application. Duplicated traffic from the UE application is differentiated by two distinct traffic descriptors (different DNNs, and for IP traffic, different IP descriptors or non-IP descriptors), each one defined in a different URSP rule, so that the two redundant PDU sessions are matched to the specific Route Selection Descriptors of distinct URSP rules. These Route Selection Descriptors of distinct URSP rules may include corresponding RSNs and PDU Session Pair IDs as defined in 3GPP TS 24.526 [16]. The Route Selection Descriptors share the same PDU Session Pair ID, if included, to denote the two traffic are redundant with each other.

NOTE 5: For backward compatibility, PCF can provide a Route Selection Descriptor with PDU Session Pair ID and RSN and a Route Selection Descriptor without PDU Session Pair ID and RSN in the URSP rule. In this case, the Route Selection Descriptor with PDU Session Pair ID and RSN has a lower precedence value (i.e. higher prioritised) than the one without PDU Session Pair ID. It allows that if a non-supporting UE receives the Route Selection Descriptor containing PDU Session Pair ID, it ignores this Route Selection Descriptor.

NOTE 6: PIN ID and other traffic descriptor components are mutually exclusive, i.e., if PIN ID is included in a URSP rule, then no other traffic descriptor components are supported in the same URSP rule. PIN ID as traffic descriptor and the PDU Session Pair ID and RSN in the URSP rule are mutually exclusive.

The PCF may adjust the URSP rules when needed, based on awareness of URSP rule enforcement for an application by using the following mechanisms:

A. Awareness of URSP rule enforcement with UE assistance:

- Based on operator policies, and if the UE included in the UE STATE INDICATION message the indication of UE's support of reporting URSP rule enforcement as specified in the Annex D of 3GPP TS 24.501 [15], the PCF may indicate in a URSP rule sent to the UE to send reporting of URSP rule enforcement, as specified in 3GPP TS 24.526 [16]. For this URSP rule, the UE reports URSP rule enforcement information to the SMF if Connection Capabilities are included in the traffic descriptor, as specified in the Annex D of 3GPP TS 24.501 [15] and in 3GPP TS 24.526 [16]. When several URSP rules for multiple applications associated to a PDU session are enforced, several URSP rule enforcement reports are included within the URSP rule enforcement information. The SMF reports URSP rule enforcement information received from the UE and its PDU session parameters (e.g. requested DNN, SSC mode, S-NSSAI of the HPLMN, PDU Session Type) to the PCF for the PDU session as specified in 3GPP TS 29.512 [31].

- For LBO roaming session case, if the feature "URSPEnforcement" is supported, the H-PCF for the UE may send the "URSP_ENF_INFO" Policy Control Request Trigger to the V-PCF for the UE during the UE Policy Association Establishment or Modification procedures. When the V-PCF receives URSP rule enforcement information and the PDU session parameters as described above, the V-PCF shall invoke the UE Policy Association Update Modification procedure as described in clause 4.2.3.1.

- If the (V-)(H-)PCF for a UE and the PCF for a PDU session are different, then the (V-)(H-)PCF for a UE may subscribe to the PCF for a PDU session to receive the reporting of URSP rule enforcement information as defined in 3GPP TS 29.514 [37] and the (V-)(H-)PCF for a UE may obtain UE reporting of URSP rule enforcement information and the PDU session parameters from the PCF for a PDU session as defined in 3GPP TS 29.514 [37], where the V-PCF for a UE interacts with the PCF for a PDU session in the VPLMN and the H-PCF for a UE interacts with the PCF for a PDU session in the HPLMN. The (V-)(H-)PCF for the UE discovers the PCF for the PDU session via subscription with the BSF as specified in 3GPP TS 29.521 [35] or, when the feature "URSPEnforcement" is supported, via the request to the AMF to be notified about whether the PCF for the PDU session is available as specified in clauses 4.2.2.1, 4.2.3.1 and 4.2.4.2.

- Based on the received URSP rule enforcement information and the PDU session parameters, the (H-)PCF may adjust the URSP rules e.g. when the (H-)PCF determines that the UE does not have up-to-date URSP rules. To identify the enforced URSP rule, the PCF may compare the reported Connection Capabilities with the Connection Capabilities of the URSP rules with the indication of "reporting of URSP rule enforcement" and, to identify the Route Selection Descriptor of the enforced URSP rule, the PCF may compare the received PDU session parameters with the parameters in the Route Selection Descriptor components. If there are more than one URSP rule(s) that match the reported Connection Capabilities, the PCF may identify the enforced URSP rule(s) based on implementation specific means. If there are inconsistencies between the

received PDU session parameters and the parameters in the Route Selection Descriptor components of the enforced URSP rule, the PCF may perform appropriate actions (e.g. if the S-NSSAI does not match, the PCF may initiate slice replacement procedure).

- In this release of the specification, the received URSP rule enforcement information shall contain for each URSP rule enforcement report, the one or more Connection Capabilities contained in the traffic descriptor of the concerned URSP rule. If the URSP rule enforcement report does not include connection capabilities, based on local policies, the (H-)PCF for the UE may ignore the received URSP rule enforcement report.

NOTE 7: A UE supporting the report of URSP rule enforcement reports URSP rule enforcement when the UE (based on the application information matching the traffic descriptor of the URSP rule) associates a newly detected application to a new PDU session or to an existing PDU session and when based on URSP re-evaluation the UE changes the association of an existing application to a PDU session. The UE does not report URSP rule enforcement while the UE is in EPS, delaying the report to when the UE moves from EPS to 5GS.

B. Awareness of URSP rule enforcement without UE assistance: The PCF may subscribe to or request the PDU Session Traffic analytics using the Nnwdaf_EventsSubscription_Subscribe service operation or Nnwdaf_AnalyticsInfo_Request service operation including the "PDU_SESSION_TRAFFIC" event for traffic monitoring of known traffic according to provisioned PDU Session Traffic requirements of the corresponding URSP rule(s) at the NWDAF as defined in 3GPP TS 29.520 [38]. If the PCF is notified with Nnwdaf_EventsSubscription_Notify service operation or responded to Nnwdaf_AnalyticsInfo_Request service operation with traffic information that does not match Traffic Descriptor(s) provided in the request according to the URSP rule(s), the PCF may adjust the URSP rule(s) when such unmatched application traffic is detected.

NOTE 8: The PCF can combine the UE reporting of URSP rule enforcement with the analytics information together to adjust the URSP rules.

4.2.2.2.3.2 Provisioning of VPLMN-specific URSP Rules

When the UE supports VPLMN-specific URSP rules, the H-PCF may provision VPLMN-specific URSP rules to the UE as described in clause 4.2.2.2.1.1 for the purpose to route traffic to the VPLMN or to route traffic to the Home PLMN based on the VPLMN. The H-PCF provides VPLMN specific URSP rules that contains HPLMN values; but the RSD(s) may contain values based on agreements with the VPLMN or parameters received from the VPLMN (e.g., Location Criteria).

NOTE 1: For network slice information, the VPLMN-specific URSP rule contains HPLMN NSSAI values. For DNN information, the VPLMN-specific URSP rule contains DNN values according to the subscribed DNNs for which LBO roaming is allowed, as specified in 3GPP TS 29.519 [17].

The (H-)PCF may use AF guidance on URSP determination as input for VPLMN-specific URSP rule determination as specified in clause 4.2.2.2.3.1. The (H-)PCF retrieves from the UDR at the HPLMN the AF guidance for the VPLMN-specific URSP rules for a UE, group of UEs or any UE as specified in 3GPP TS 29.519 [17]. The H-PCF may provide the VPLMN-specific URSP rules to the UE before the UE roams into the VPLMN.

In case of roaming and if the feature "VPLMNSpecificURSP" is supported, the H-PCF may receive from the V-PCF the AF-guidance on VPLMN specific URSP rules within the "vpsUePolGuidance" attribute as specified in clauses 4.2.2.1, and 4.2.3.1. The V-PCF receives from the UDR at the VPLMN the V-AF guidance for the VPLMN specific URSP rules for all roaming UEs of a HPLMN as specified in 3GPP TS 29.519 [17]. The V-PCF determines based on LBO information received from the AMF whether the received V-AF-guidance on VPLMN specific URSP rules may apply for this UE, and if it is so, the V-PCF forwards the related information to the H-PCF within the "vpsUePolGuidance" attribute as specified in clause 4.2.2.1.

For a UE for which AF guidance on VPLMN specific URSP rules is forwarded to the H-PCF within the "vpsUePolGuidance" attribute, the V-PCF:

- maps the S-NSSAI of the VPLMN (indicated by the AF and retrieved from the UDR, if available) into the S-NSSAI of the HPLMN. The V-PCF uses the Configured NSSAI for the Serving PLMN and mapping of each S-NSSAI of the Configured NSSAI to corresponding HPLMN S-NSSAI values provided by the AMF within the "confSnssais" attribute as specified in clauses 4.2.2.1, and 4.2.3.1. The V-PCF shall subscribe to the "CONF_NSSAI_CH" policy control request trigger. Then, for each URSP rule included within the "urspGuidance" attribute, the V-PCF sends the mapped application guidance on URSP determination including

the HPLMN S-NSSAI values to the H-PCF within the "snssai" attribute included within the corresponding "routeSelParamSets" entry; and

- indicates to the H-PCF to notify about the result of the delivery of UE policies (if it was requested by the AF to the VPLMN) using the "deliveryEvents" attribute as specified in clauses 4.2.2.1, and 4.2.3.1. The H-PCF notifies about the result of the delivery of UE policies using the "delivReport" attribute as specified in clauses 4.2.4.2 and 4.2.4.7.

The H-PCF generates new or updated VPLMN-specific URSP rules using the received application guidance on the URSP rule determination, where the VPLMN ID(s) included in the (H-)AF and/or V-PCF request is used to indicate to the UE that this URSP rule applies when the UE is registered in the VPLMN ID. The H-PCF provides URSP rules for the received AF-guidance parameter values that are within the subscribed values defined in the UE Policy Data Set, as specified in 3GPP TS 29.519 [17]. The VPLMN ID(s) received in the (H-)(V-)AF request, as specified in 3GPP TS 29.522 [41], and/or received in the V-PCF request, and provided by the H-PCF within the VPLMN-specific URSP rule, as specified in 3GPP TS 24.501 [15], may contain one or more specific values for the MCC and MNC and/or may indicate any MNC for a MCC.

The H-PCF, based on operator policies, should set the precedence in the VPLMN-specific URSP Rules to ensure that the UE checks the VPLMN-specific URSP rules that contain one or more specific VPLMN-ID(s)before any VPLMN-specific URSP Rule related to one or more MCCs or to anyVPLMN ID as defined in 3GPP TS 24.526 [16].. The H-PCF should also set the precedence in the URSP rules to ensure that the UE checks any VPLMN-specific URSP rule related to the serving PLMN before any non-VPLMN specific URSP rules.

If the UE does not indicate the support for VPLMN specific URSP rules, the H-PCF generates new or updated URSP rules using the VPLMN ID related information retrieved from the UDR and/or received from the V-PCF, upon receiving a notification that the UE has registered in the VPLMN.

NOTE 2: To avoid the UE stores obsolete information about VPLMN-specific URSP rules, the H-PCF could delete those determined based on V-AF guidance and once the UE has left the VPLMN.

4.2.2.2.4 Vehicle-to-Everything Policy (V2XP)

V2XP includes the V2XP over PC5 and over Uu interfaces.

The V2XP over PC5 are defined in clause 5.2.3 of 3GPP TS 24.587 [24] and the corresponding encoding is defined in clause 5.3.1 of 3GPP TS 24.588 [25].

The V2XP over Uu are defined in clause 5.2.4 of 3GPP TS 24.587 [24] and the corresponding encoding is defined in clause 5.3.2 of 3GPP TS 24.588 [25].

4.2.2.2.5 Proximity based Services Policy (ProSeP)

The ProSeP includes:

- ProSeP for 5G ProSe direct discovery defined in clause 5.3 of 3GPP TS 24.555 [29];
- ProSeP for 5G ProSe direct communications defined in clause 5.4 of 3GPP TS 24.555 [29];
- ProSeP for 5G ProSe UE-to-network relay, including:
  - ProSeP for 5G ProSe UE-to-network relay UE defined in clause 5.5 of 3GPP TS 24.555 [29]; and/or
  - ProSeP for 5G ProSe Remote UE defined in clause 5.6 of 3GPP TS 24.555 [29];
- ProSeP for 5G ProSe usage reporting configuration and rules defined in clause 5.7 of 3GPP TS 24.555 [29];
- when the "ProSe_Ph2" feature is supported:
  - ProSeP for 5G ProSe UE-to-UE relay UE defined in clause 5.8 of 3GPP TS 24.555 [29]; and/or
  - ProSeP for 5G ProSe End UE defined in clause 5.9 of 3GPP TS 24.555 [29];
- when the "ProSe_Ph3" feature is supported:
  - ProSeP for 5G ProSe multi-hop UE-to-Network Relay, including:

- ProSeP for 5G ProSe UE-to-Network relay UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay, as defined in clause 5.10 of 3GPP TS 24.555 [29];
- ProSeP for 5G ProSe Remote UE supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay, as defined in clause 5.12 of 3GPP TS 24.555 [29]; and/or
- ProSeP for 5G ProSe Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 and/or Layer-3 multi-hop UE-to-Network Relay, as defined in clause 5.11 of 3GPP TS 24.555 [29].

and/or

- when the "ProSe_Ph3" feature is supported:
  - ProSeP for 5G ProSe Layer-3 multi-hop UE-to-UE Relay, including:
    - ProSeP for 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay, as defined in clause 5.13 of 3GPP TS 24.555 [29]; and/or
    - ProSeP for 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay, as defined in clause 5.14 of 3GPP TS 24.555 [29].

4.2.2.2.6 Aircraft-to-Everything Policy (A2XP)

A2XP includes the A2X Policy over PC5 interface or A2X Policy over Uu reference point or both.

The A2XP over PC5 or A2XP over Uu reference point or both are defined in 3GPP TS 24.577 [32] and the corresponding encoding is defined in 3GPP TS 24.578 [33].

4.2.2.2.7 Ranging and Sidelink Positioning Policy (RSLPP)

RSLPP includes the Ranging/SL Policy over the PC5 interface. The RSLPP over the PC5 interface is defined in clause 12 of 3GPP TS 24.514 [42].

4.2.2.3 V2X N2 PC5 Policy

The V2X N2 PC5 policy consists of V2X PC5 QoS parameters used by the NG-RAN.

When the (H-)PCF derives the UE policy for V2X communications over PC5 reference point as defined in clause 4.2.2.2.4, the (H-)PCF shall derive the corresponding V2X PC5 QoS parameters used by the NG-RAN.

In the roaming case, the H-PCF:

- if PC5 UE capabilities and UE Policy Provisioning request messages are received, and V2X policies are derived, shall include the V2X N2 PC5 Policy within the "n2Pc5Pol" attribute in the policy association creation response towards the V-PCF; or
- shall include the V2X N2 PC5 Policy within the "n2Pc5Pol" attribute, if changes apply, in the policy association update response towards the V-PCF; or
- may include the V2X N2 PC5 Policy within the "n2Pc5Pol" attribute in the the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send V2X N2 PC5 policy to the NG-RAN.

4.2.2.4 5G ProSe N2 PC5 Policy

The 5G ProSe N2 PC5 policy consists of 5G ProSe PC5 QoS parameters used by the NG-RAN.

When the (H-)PCF derives the UE policy for 5G ProSe as defined in clause 4.2.2.2.5, the (H-)PCF shall derive the corresponding 5G ProSe N2 PC5 QoS parameters used by the NG-RAN.

In the roaming case, the H-PCF:

- if the 5G ProSe capabilities and the UE Policy Provisioning request message are received, and 5G ProSe policies are derived, shall include the N2 PC5 Policy for 5G ProSe within the "n2Pc5ProSePol" attribute in the of policy association creation response towards the V-PCF; or

- shall include the N2 PC5 Policy for 5G ProSe within the "n2Pc5ProSePol" attribute, if changes apply, in the response of the policy association update response towards the V-PCF; or

- may include the N2 PC5 Policy for 5G ProSe within the "n2Pc5ProSePol" attribute in the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send 5G ProSe N2 PC5 policy to the NG-RAN.

4.2.2.5 A2X N2 PC5 Policy

The A2X N2 PC5 policy consists of A2X PC5 QoS parameters used by the NG-RAN.

When the (H-)PCF derives the UE policy for A2X communications over PC5 reference point as defined in clause 4.2.2.2.6, the (H-)PCF shall derive the corresponding A2X PC5 QoS parameters used by the NG-RAN.

In the roaming case, the H-PCF:

- if PC5 UE capabilities and UE Policy Provisioning request messages are received, and A2X policies are derived, shall include the A2X N2 PC5 Policy within the "n2Pc5PolA2x" attribute in the policy association creation response towards the V-PCF; or

- shall include the A2X N2 PC5 Policy within the "n2Pc5PolA2x" attribute, if changes apply, in the policy association update response towards the V-PCF; or

- may include the A2X N2 PC5 Policy within the "n2Pc5PolA2x" attribute in the the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send A2X N2 PC5 policy to the NG-RAN.

4.2.2.6 Ranging/SL N2 PC5 Policy

The Ranging/SL N2 PC5 policy consists of Ranging/SL PC5 QoS parameters used by the NG-RAN.

When the (H-)PCF derives the UE policy for Ranging/SL over the PC5 reference point as defined in clause 4.2.2.2.7, the (H-)PCF shall derive the corresponding Ranging/SL PC5 QoS parameters used by the NG-RAN.

In the roaming case, the H-PCF:

- if the PC5 UE capabilities and UE Policy Provisioning request messages are received, and Ranging/SL policies are derived, shall include the Ranging/SL N2 PC5 Policy within the "n2Pc5RsppPol" attribute in the policy association creation response towards the V-PCF;

- shall include the Ranging/SL N2 PC5 Policy within the "n2Pc5RsppPol" attribute, if changes apply, in the policy association update response towards the V-PCF; or

- may include the Ranging/SL N2 PC5 Policy within the "n2Pc5RsppPol" attribute in the the policy association update request initiated by the H-PCF.

In the roaming or non-roaming case, the (V-)PCF shall use the Namf_Communication_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send Ranging/SL N2 PC5 policy to the NG-RAN.

4.2.2.7 Provisioning of charging related information

This functionality applies to non-roaming and roaming scenarios. In non-roaming scenarios the NF service consumer corresponds to the AMF, and in the roaming scenario the NF service consumer corresponds to the V-PCF or the AMF.

When the "SLAMUP" feature is supported, the PCF may provide the NF service consumer with the charging address information for the UE, i.e. the CHF address(es), and if available, the associated CHF instance ID(s) and CHF set ID(s), during the UE Policy Association establishment based on the operator policy.

When the "CHFGroup" feature is supported, the PCF may provide the CHF Group ID of the (H-)CHF(s) that manage charging for the UE, encoded within the "chfGroupId".

The (H-)PCF may retrieve the charging address information, and if the "CHFGroup" feature is supported, the (H-)PCF may also retrieve the CHF Group ID as described in 3GPP TS 29.512 [31], clause 4.2.2.3.1.

In order to provision the (H-)CHF address information to the NF service consumer, the (H-)(V-)PCF shall include within the PolicyAssociation data structure the "chfInfo" attribute containing the charging address information. When the "SLAMUP" feature is supported, the "ChargingInformation" data type shall include the primary (H-)CHF address, within the "primaryChfAddress" attribute and, if available, the secondary (H-)CHF address, within the "secondaryChfAddress" attribute.

When the PCF is aware that the (H-)CHF supports redundancy based on NF Set concepts as described in 3GPP TS 29.500 [5] (e.g. based on configuration), the "chfInfo" attribute shall include the (H-)CHF address, encoded within the"primaryChfAddress" attribute and the (H-)CHF instance, encoded within the "primaryChfInstanceId" attribute, and primary (H-)CHF set id, encoded within the "primaryChfSetId". The primary (H-)CHF information may be also complemented by secondary (H-)CHF information, if available.

When the "CHFGroup" feature is supported:

- in order to provision the (H-)CHF Group ID of the (H-)CHF(s) that manage charging for the UE to the NF service consumer, the PCF shall include the "chfGroupId" attribute of the PolicyAssociation data structure, containing the (H-)CHF Group ID of the (H-)CHF(s) that manage charging for the PDU Session.

- when the (H-)CHF Group ID of the (H-)CHF(s) that manage charging for the UE is provisioned by the PCF, it may be used by the NF service consumer to discover the (H-)CHF instance at the NRF.

The (V-)PCF provided (H-)CHF charging related information shall overwrite any predefined (H-)CHF charging related information configured at the AMF.

If there is no home operator policy indicating that the same (H-)CHF shall be selected by the (H-)PCF for the UE and by the AMF, then no charging information is provisioned by the (H-)PCF, and the AMF shall select the charging information as follows:

1. In non-roaming scenarios, the charging related information is selected as specified in 3GPP TS 32.256 [44], clause 5.1.3.

2. In roaming scenarios, the charging related information is selected as specified in 3GPP TS 32.256 [44], clause 5.1.5.2.

4.2.3 Npcf_UEPolicyControl_Update Service Operation

4.2.3.1 General

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

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

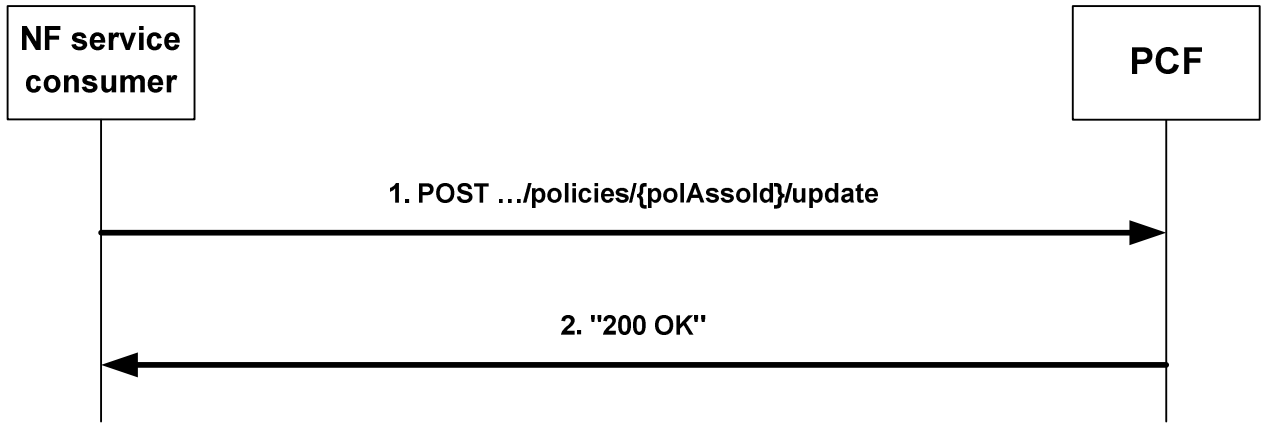

Figure 4.2.3.1-1: Update of a UE policy association

NOTE 1: For the roaming case, the PCF represents the V-PCF if the NF service consumer is an AMF and the PCF represents the H-PCF if the NF service consumer is a V-PCF.

The AMF, as NF service consumer, invokes this procedure when a subscribed policy control request trigger (see clause 4.2.3.2) occurs. When a policy control request trigger that requires the subscription as defined in table 5.6.3.3-1 (e.g. LOC_CH trigger) occurs, the NF service consumer (AMF) shall only invoke this procedure if the PCF has explicitly subscribed to that event trigger. When a policy control request trigger that does not require the subscription as defined in table 5.6.3.3-1 (e.g. GROUP_ID_LIST_CHG trigger) occurs, the NF service consumer (AMF) shall always invoke the procedure.

NOTE 2: The AMF uses the Namf_Communication_N1MessageNotify service operation specified in 3GPP TS 29.518 [14] to send to the V-PCF a "MANAGE UE POLICY COMPLETE" message or a "MANAGE UE POLICY COMMAND REJECT" message, as defined in Annex D.5 of 3GPP TS 24.501 [15] or a "UE POLICY PROVISIONING REQUEST" message as defined in clause 7.2.1.1 of 3GPP TS 24.587 [24].

If an AMF as NF service consumer 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.

NOTE 3: 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 UE Policy from the old AMF and selects the old PCF, the new AMF shall also invoke this procedure to update the Notification URI. The new AMF may also update the alternate or backup IP addresses, and if service discovery via NRF applies, the AMF Id. If the feature "FeatureRenegotiation" is supported, the new AMF may perform feature renegotiation, as described in clause 4.2.3.4.

NOTE 4: During inter-AMF mobility, the N1N2 Individual Subscription context is transferred from the source AMF to the target AMF as specified in 3GPP TS 29.518 [14]. When the target AMF determines to reuse the UE Policy Association indicated by the source AMF, the PCF can keep the N1N2 Individual Subscription context and, for subsequent interactions, replace in the request URI the {apiRoot} of the N1N2 Individual Subscription resource with the one of the target AMF.

The V-PCF, 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. UE_POLICY trigger) occurs, the V-PCF shall always invoke the procedure. When a policy control request trigger that requires the subscription as defined in table 5.6.3.3-1 (e.g. LOC_CH trigger) occurs, the V-PCF shall only invoke this procedure if the H-PCF has subscribed to that event trigger.

To request policies (e.g. policy control request trigger(s) is/are met) from the PCF, to update the Notification URI, to renegotiate features, to update the trace control configuration or to request the termination of trace, the NF Service Consumer shall request the update of the associated UE Policy Association by providing the relevant parameters about the UE context in an HTTP POST request with "{apiRoot}/npcf-ue-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 UE location change occurred, the UE location encoded as "userLoc" attribute;
4. if a "MANAGE UE POLICY COMPLETE" message or a "MANAGE UE POLICY COMMAND REJECT" message of the UE policy delivery protocol defined in Annex D of 3GPP TS 24.501 [15] has been received by the V-PCF as NF service consumer, and at least parts of the contents relate to UPSIs of the HPLMN, the parts of that message that relate to UPSIs of the HPLMN encoded as "uePolDelResult" attribute;
5. if the Policy Control Request Trigger "Change of UE presence in PRA" is provided, the current presence status of the UE for the presence reporting areas for which reporting was requested, if not previously provided, or the presence reporting areas for which reporting was requested and the status has changed encoded as "praStatuses" attribute;

NOTE 5: 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.

6. if the NF service consumer is an AMF, for AMF relocation scenarios, if available, alternate or backup IPv4 Address(es) where to send Notifications encoded as "altNotifIpv4Addrs" attribute;
7. if the NF service consumer is an AMF, for AMF relocation scenarios, if available, alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addrs" attribute;
8. if the NF service consumer is an AMF, for AMF relocation scenarios, if available, alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute;
9. for AMF relocation scenarios, the GUAMI encoded as "guami" attribute;

NOTE 6: 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;

10. if the NF service consumer is an AMF, for AMF relocation scenarios, the new serving AMF Id encoded in the "servingNfId" attribute;

NOTE 7: If the PCF received the "servingNfId" attribute, the PCF can use the Nnrf_NFDiscovery Service specified in 3GPP TS 29.510 [13] to retrieve the NF profile of the Namf_Communication service available in the indicated AMF instance Id.

11. if a UE PLMN change occurred and the "PlmnChange" feature defined in clause 5.8 is supported, the PLMN Identifier or the SNPN Identifier of the new serving network encoded as "plmnId" attribute;

NOTE 8: The SNPN Identifier consists of the PLMN Identifier and the NID.

NOTE 9: When the UE moves between PLMNs, the trigger reports changes of equivalent PLMNs.

NOTE 10: Mobility between non-equivalent SNPNs, and between SNPN and PLMN is not supported. When the UE is operating in SNPN access mode, the trigger reports changes of equivalent SNPNs.

12. if a "UE POLICY PROVISIONING REQUEST" message defined in clause 7.2.1.1 of 3GPP TS 24.587 [24] has been received by the V-PCF as NF service consumer and respectively the "V2X" feature and/or the "A2X" feature and/or the "ProSe" feature and/or the "Ranging_SL" feature defined in clause 5.8 is/are supported, the message encoded as "uePolReq" attribute;
13. if a UE Internal Group Identifier(s) change occurred and the "GroupIdListChange" feature defined in clause 5.8 is supported, the Internal Group Identifier(s) of the served UE encoded as "groupIds" attribute;
14. if a change of PC5 capablity for 5G ProSe occurred and the "ProSe" feature defined in clause 5.8 is supported, the PC5 capability for 5G ProSe encoded as "proSeCapab" attribute;

14a. if a change of the Ranging/SL Capability occurred and the "Ranging_SL" feature defined in clause 5.8 is supported, the Ranging/SL Capability encoded as "rangSlCapab" attribute; and/or

15. if a change of the connectivity state of the UE occurred and the "ConnectivityStateChange" feature defined in clause 5.8 is supported, the connectivity state of the served UE encoded as "connectState" attribute;

16. when a response with HTTP status code 4xx or 5xx as defined in clause 5.2.2.3.1.2 of 3GPP TS 29.518 [14] or a N1N2 Transfer Failure Notification as defined in clause 5.2.2.3.2 of 3GPP TS 29.518 [14] is received by the V-PCF after provisioning the UE policy by invoking the Namf_Communication_N1N2MessageTransfer service operation to the AMF, this UE policy transfer failure notification encoded as "uePolTransFailNotif" attribute;

17. if the NF service consumer is an AMF, the "SliceAwareANDSP" feature is supported, and the "NON_3GPP_NODE_RESELECTION" trigger is reported within the "triggers" attribute, the wrongly selected type of non-3gpp access node encoded as "n3gNodeReSel" attribute, and, in the roaming case, also the Configured NSSAI for the serving PLMN encoded as "confSnssais" attribute;

18. if satellite backhaul category change occurred and the "EnSatBackhaulCategoryChg" feature defined in clause 5.8 is supported, the satellite backhaul category or non-satellite backhaul encoded as "satBackhaulCategory" attribute;

19. for the roaming scenario, if the NF service consumer is an AMF, Configured NSSAI change occurred and the "NssaiChange" feature is supported, the Configured NSSAI for the serving PLMN encoded as "confSnssais" attribute and optionally the mapped each S-NSSAI value of home network corresponding to the configured S-NSSAI values in the serving PLMN encoded as "mappedHomeSnssai" attribute within the "confSnssais" attribute;

20 for the roaming scenario, if the NF service consumer is a V-PCF, the "URSPEnforcement" feature is supported, and the "URSP_ENF_INFO" policy control request trigger is met, the URSP rule enforcement information within the "urspEnfRep" attribute;

21. for the roaming scenario, if the NF service consumer is a V-PCF the "VPLMNSpecificURSP" feature is supported, the new/modified/deleted AF guidance on VPLMN-specific URSP rules related information within the "vpsUePolGuidance" attribute, that shall contain for each related AF:

a. the AF guidance on VPLMN-Specific URSP rules within the "urspGuidance" attribute, if the AF updated/provided this information; and/or

b. if the AF requested to the VPLMN notifications about the delivery of UE Policies or the update of the subscription to notification information previously provided, the "deliveryEvents" attribute including the"SUCCESS_UE_POL_DEL_SP" and/or "UNSUCCESS_UE_POL_DEL_SP" and/or if feature "ExtDeliveryOutcome" is supported, "PARTLY_UNSUCC_UE_POL_DEL_SP" and/or "UNSUCCESS_PCF_SERVICE_AUTHORIZATION" events;

22. for the roaming scenario, if the NF service consumer is an AMF, the "VPLMNSpecificURSP" feature is supported and the "LBO_INFO_CH" policy control request trigger is met, the LBO roaming information within the "lboRoamInfo" attribute; and/or

23. if an access type change occurred and the "AccessChange" feature defined in clause 5.8 is supported, the access type(s) where the UE is registered encoded within the "accessTypes" attribute and the corresponding RAT Type(s), if available, in the "ratTypes" attribute.

Upon the reception of the HTTP POST request:

- if the PCF is a V-PCF and the V-PCF has an established policy association with the H-PCF, the V-PCF shall determine based on the contents of a potentially received "uePolDelResult" attribute to be sent to the H-PCF (see above) and requested event triggers of the H-PCF whether to send as the NF service consumer towards the H-PCF a request for the update of the policy association as described in the present clause;

- the (V-)(H-)PCF shall determine the applicable UE policy based on the contents of the received HTTP POST request, the UE Policy Sections stored in UDR, local policy and, for the H-PCF, taking into consideration the information received within the UE policy delivery protocol encoded in the "uePolReq" attribute, if available, and for the V-PCF, taking into consideration any policy received from the H-PCF encoded in the "uePolicy" attribute in the reply to the possible request for the update of the associated policy association. When the "ProSe" feature is supported, the H-PCF shall determine the applicable ProSeP based on the received PC5 capability for 5G ProSe. When the UE disables a 5G ProSe capability the PCF may stop updating the corresponding ProSeP, and when the UE enables a 5G ProSe capability the PCF may update the corresponding ProSeP;

- if the UE indicated the support of A2X communications over PC5 reference point, "A2X" feature is supported, and for the H-PCF, if the UE POLICY PROVISIONING REQUEST message was included in the "uePolReq" attribute, the (H-)PCF shall determine the applicable A2XP and A2X N2 PC5 policy as detailed in clauses 4.2.2.2.1.4 and 4.2.2.5, based on the operator's policy;

- if the UE indicates the support of 5G ProSe communications over PC5 reference point, the "ProSe" feature is supported, and for the H-PCF, if the UE POLICY PROVISIONING REQUEST message with the requested 5G ProSe policies was included in the "uePolReq" attribute, the (H-)PCF shall determine the applicable ProSeP and 5G ProSe N2 PC5 policy, as detailed in clauses 4.2.2.2.1.3 and 4.2.2.4, based on the operator's policy;

- if the UE indicated the support of V2X communications over PC5 reference point, "V2X" feature is supported, and for the H-PCF, if the UE POLICY PROVISIONING REQUEST message was included in the "uePolReq" attribute, the (H-)PCF shall determine the applicable V2XP and V2X N2 PC5 policy as detailed in clauses 4.2.2.2.1.2 and 4.2.2.3, based on the operator's policy;

- if the UE indicated the support of Ranging/SL over the PC5 reference point, the "Ranging_SL" feature is supported, and for the H-PCF, if the UE POLICY PROVISIONING REQUEST message was included in the "uePolReq" attribute, the (H-)PCF shall determine the applicable RSLPP and Ranging/SL N2 PC5 policy as detailed in clauses 4.2.2.2.1.5 and 4.2.2.6 based on the operator's policy;

- for the succesfull case, the (V-)(H-)PCF shall send a HTTP "200 OK" response with the PolicyUpdate data type as response body with the possibly updated of UE policy (for the H-PCF), and/or ProSe N2 PC5 policy (for the H-PCF) as specified in clause 4.2.2.4, N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe (for the H-PCF), as specified in clause 4.2.2.3, and/or the Ranging/SL N2 PC5 policy (for the H-PCF), as specified in clause 4.2.2.6, and/or Policy Control Request Trigger(s) encoded as described in clause 4.2.3.3;

- if the (V-)PCF determines that UE policy needs to be updated, it shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the UE policy according to clause 4.2.2.2 and as follows:

  (i) the (V-)PCF shall send the determined UE policy using Namf_Communication_N1N2MessageTransfer service operation(s); and

  (ii) the (V-)PCF shall be prepared to receive UE Policy Delivery Results from the AMF within the Namf_Communication_N1MessageNotify service operation, and for the V-PCF, if the received UE Policy Delivery results relate to UE policy sections provided by the H-PCF, the V-PCF shall use the Npcf_UEPolicyControl_Update Service Operation to send those UE Policy Delivery results to the H-PCF; and

  NOTE 11: 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.

- if the PCF determines that the V2XP and N2 PC5 policy (e.g. for V2X communications, for 5G ProSe) for V2X communications need to be updated, and for the V-PCF when receiving the updated V2XP and N2 PC5 policy for V2X communications from the H-PCF, it shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the V2XP to the UE and the V2X N2 PC5 policy to NG-RAN according to clauses 4.2.2.2.1.2 and 4.2.2.3;

- if the PCF determines that the A2XP (e.g. for A2X communications) for A2X communications need to be updated, and for the V-PCF when receiving the updated A2XP and N2 PC5 policy for A2X communications from the H-PCF, it shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the A2XP to the UE and the A2X N2 PC5 policy to NG-RAN according to clauses 4.2.2.2.1.4 and 4.2.2.5;

- if the PCF determines that ProSeP and 5G ProSe N2 PC5 policy needs to be updated, and for the V-PCF when receiving the updated ProSeP and 5G ProSe N2 PC5 policy from the H-PCF, it shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the ProSeP to the UE and 5G ProSe N2 PC5 policy to NG-RAN according to clauses 4.2.2.2.1.3 and 4.2.2.4;

- if the PCF determines that RSLPP and Ranging/SL N2 PC5 policy needs to be updated, and for the V-PCF when receiving the updated RSLPP and Ranging/SL N2 PC5 policy from the H-PCF, it shall use the Namf_Communication service specified in 3GPP TS 29.518 [14] to provision the RSLPP to the UE and Ranging/SL N2 PC5 policy to NG-RAN according to clauses 4.2.2.2.1.5 and 4.2.2.6;

- if the "SliceAwareANDSP" feature is supported, the PCF received the "NON_3GPP_NODE_RESELECTION" trigger, and the PCF has successfully delivered to the UE the ANDSP/WLANSP with the slice selection information for the corresponding non-3gpp node, the indication of the successful UE configuration by providing the "andspDelInd" attribute with the value "CONFIGURED". The PCF may delay the indication of the configuration result to a subsequent Npcf_UEPolicyControl_UpdateNotify request as described in clause 4.2.4.2; and

- optionally, for the (V-)PCF communicating with the AMF, if the "URSPEnforcement" feature is supported, and if not previously provided, the request to the AMF to be notified about the PDU session established/terminated events by providing the PCF for the UE callback information within the "pcfUeInfo" attribute, and the DNN and S-NSSAI of the concerned PDU session(s) within the "matchPdus" attribute. If previously provided, the (V-)PCF may update the complete list of DNN and S-NSSAI combination(s) of the concerned PDU session(s) within the "matchPdus" attribute and/or update the PCF for the UE callback information within the "pcfUeInfo" attribute.

- if errors occur when processing the HTTP POST request, the (V-)(H-)PCF shall:

  - send an HTTP error response as specified in clause 5.7; or

  - if the feature "ES3XX" is supported, and the (V-)(H-)PCF 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];

  according to the following provisions:

  - if the (V-)(H-)PCF is, due to incomplete, erroneous or missing information in the request not able to provision a UE policy decision, the PCF may reject the request and include in an HTTP "400 Bad Request" response message the "cause" attribute of the ProblemDetails data structure set to "ERROR_REQUEST_PARAMETERS".

If the PCF 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.

When the "SliceAwareANDSP" feature is supported, and the AMF receives the "andspDelInd" attribute with the outcome of the UE configuration with slice aware ANDSP/WLANSP, the AMF proceeds as described in clause 4.2.2.1.

When the "URSPEnforcement" feature is supported and the AMF receives the "matchPdus" attribute, the AMF shall update the affected established PDU session(s), by forwarding the received PCF for the UE callback information for the PDU session(s) matching the new S-NSSAI and DNN combination(s) to the SMF, and removing the previously provided PCF for the UE information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) from the SMF as defined in 3GPP TS 29.502 [40]. When the AMF receives the "pcfUeInfo" attribute with updated SBA binding indication, the AMF shall apply the updated PCF for the UE callback information to the new PDU sessions only, i.e., already established PDU sessions are not affected.

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 this reporting is initiated;

- "UE_POLICY", i.e. a "MANAGE UE POLICY COMPLETE" message or a "MANAGE UE POLICY COMMAND REJECT" message, as defined in Annex D.5 of 3GPP TS 24.501 [15] has been received by the V-PCF and is being forwarded to the H-PCF, or has been received by a PCF for a PDU session (in case for URSP provisioning in EPS) and is being forwarded to the (V-)PCF, or a "UE POLICY PROVISIONING REQUEST" message, as defined in clause 7.2.1.1 of 3GPP TS 24.587 [24] has been received by the V-PCF and is being forwarded to the H-PCF;

- "PLMN_CH", i.e. PLMN change: the serving network (PLMN or SNPN) of the UE has changed;

NOTE 1: The "PLMN_CH" trigger only applies if the "PlmnChange" feature is supported.

NOTE 2: When the UE is moving between PLMNs, the trigger reports changes of equivalent PLMNs.

NOTE 3: Mobility between non-equivalent SNPNs, and between SNPN and PLMN is not supported. When the UE is operating in SNPN access mode, the trigger reports changes of equivalent SNPNs.

- "CON_STATE_CH", i.e. connectivity state change: the connectivity state of the UE has changed;

NOTE 4: The "CON_STATE_CH" trigger only applies if the "ConnectivityStateChange" feature is supported.

- "GROUP_ID_LIST_CHG", i.e. UE Internal Group Identifier(s) change: the UDM provided list of group Ids has changed;

NOTE 5: The "GROUP_ID_LIST_CHG" trigger only applies if the "GroupIdListChange" feature is supported. This Policy Control Request Trigger does not require an explicit subscription from the PCF.

- "UE_CAP_CH", i.e. UE Capabilities change: the UE provided 5G ProSe capabilities have changed;

NOTE 6: The "UE_CAP_CH" trigger only applies if the "ProSe" feature is supported. This Policy Control Request Trigger does not require a subscription.

- "SAT_CATEGORY_CHG", i.e. Satellite Backhaul Category change: the AMF has detected a change between different satellite category, or non-satellite backhaul;

NOTE 7: The "SAT_CATEGORY_CHG" trigger only applies if the "EnSatBackhaulCategoryChg" feature is supported.

- "NON_3GPP_NODE_RESELECTION", i.e. wrong TNGF or N3IWF: the UE indicated to the AMF the support of slice-based N3IWF and/or TNGF selection as specified in 3GPP TS 24.501 [15] and the AMF determined that the UE has connected to a non-3GPP access node that is not compatible with the allowed S-NSSAI(s);

NOTE 8: The "NON_3GPP_NODE_RESELECTION" trigger only applies if the "SliceAwareANDSP" feature is supported. This Policy Control Request Trigger does not require expilict subscription by the PCF.

- "CONF_NSSAI_CH", i.e. Configured NSSAI change: the Configured NSSAI has changed;

NOTE 9: The "CONF_NSSAI_CH" trigger only applies if the "NssaiChange" feature is supported.

- "URSP_ENF_INFO", i.e. URSP rule enforcement Information: The V-PCF has received URSP rule enforcement information about the enforced URSP rule(s) in one or more PDU sessions;

NOTE 10: The "URSP_ENF_INFO" trigger only applies to the V-PCF in LBO roaming scenarios and if the "URSPEnforcement" feature is supported.

- "LBO_INFO_CH", i.e. LBO information change: The AMF reports LBO roaming allowed or not allowed for the requested DNN(s) and S-NSSAI(s);

NOTE 11: The "LBO_INFO_CH" trigger only applies to the AMF and when the "VPLMNSpecificURSP" feature is supported.

- "ACCESS_TYPE_CH", i.e. access type change: The registered access type and RAT type has changed, an access type and RAT type is added or removed; and

NOTE 12: The "ACCESS_TYPE_CH" trigger only applies when the "AccessChange" feature is supported.

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

NOTE 13: The "FEAT_RENEG" trigger only applies if the "FeatureRenegotiation" feature is supported during AMF relocation.

4.2.3.3 Encoding of updated policy

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

- only when the updated policy is supplied by the H-PCF in the roaming scenario, UE policy (see clause 4.2.2.2) encoded as "uePolicy" attribute, and N2 PC5 policy for V2X communications (see clause 4.2.2.3) encoded as "n2Pc5Pol" attribute and/or the N2 PC5 policy for A2X communications (see clause 4.2.2.5) encoded as

"n2Pc5PolA2x" attribute and/or the N2 PC5 policy for 5G ProSe (see clause 4.2.2.4) encoded as "n2Pc5ProSePol" attribute and/or the N2 PC5 policy for Ranging/SL (see clause 4.2.2.6) encoded using the "n2Pc5RsppPol" attribute;

- when the updated policy is supplied via PCF of a PDU session by the (V-)PCF in case of URSP provisioning in EPS, UE policy (see clause 4.2.2.2) encoded as "uePolicy" 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) Change of PLMN, if the "PlmnChange" feature is supported;

     d) Change of UE connectivity state, if the "ConnectivityStateChange" feature is supported;

     e) Change of Satellite Backhaul Category, if the "EnSatBackhaulCategoryChg" feature is supported;

     f) Change of Configured NSSAI, in roaming scenarios, if the "NssaiChange" feature is supported and the NF service consumer is the AMF;

     g) LBO information change, applicable to roaming scenarios, if the "VPLMNSpecificURSP" feature is supported and the NF service consumer is an AMF; or

     h) Change of Access type and RAT type, if the "AccessChange" feature is supported;

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

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

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

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

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

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

- if the Policy Control Request Trigger "LBO information change" is provided or if that trigger was already set but the requested LBO information needs to be changed, the requested LBO information encoded in the "pduSessions" attribute, a list of DNN and S-NSSAI combinations previously provided is updated by providing either a new complete list within the"pduSessions" attribute or by setting it to "NULL". If the "pduSessions" attribute is not provided or the previously provided "pduSessions" attribute is deleted, the LBO information change policy control request trigger applies to any S-NSSAI and DNN combination.

4.2.3.4 Feature renegotiation during AMF relocation

During the AMF relocation, if the new AMF received the resource URI of the individual UE Policy from the old AMF and selects the old (V-)PCF, and the feature "FeatureRenegotiation" is supported, the new AMF shall invoke the update of the UE 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 clauses 4.2.2.1 and 4.2.3.1, if applicable.

NOTE 1: When the new AMF received from the old AMF the subscribedpolicy 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 as described in clause 4.2.3.1, when applicable. If the new AMF supports features not previously supported by the old AMF, the new AMF will include the available information associated to the supported features, if applicable, as described in clause 4.2.2.1.

- Upon reception of the HTTP POST request, the (V-)PCF shall update the "Individual UE 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 supported features; and

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

4.2.4 Npcf_UEPolicyControl_UpdateNotify Service Operation

4.2.4.1 General

The (V-)(H)-PCF may decide to update policy control request triggers, and in the roaming case, the H-PCF may decide to update the UE Policy, the V2X N2 PC5 policy, if the "V2X" feature is supported, and/or the A2X N2 PC5 policy, if the "A2X" feature is supported, and/or the 5G ProSe N2 PC5 policy, if the "ProSe" feature is supported, and/or the Ranging/SL N2 PC5 policy, if the "Ranging_SL" feature is supported. The PCF (H-PCF in the roaming case) may decide to request the termination of the policy association.

If the "EpsUrsp" feature is supported, and the NF consumer is a PCF for a PDU session the PCF (H-PCF in the LBO roaming scenario) may decide to update policy control request triggers and/or to update the URSP. The PCF (H-PCF in the LBO roaming scenario) may decide to request the termination of the policy association.

The(V-)(H-)PCF shall then use an Npcf_UEPolicyControl_UpdateNotify service operation.

The following procedures using the Npcf_UEPolicyControl_UpdateNotify service operation are supported:

- Policy update notification.
- Request the termination of the UE policy association.
- URSP provisioning for background Data Transfer policy.
- UE policy provisioning for V2X communications over PC5 and Uu reference points.
- UE policy provisioning for 5G ProSe.
- UE policy provisioning for Ranging/SL.
- N2 PC5 Policy (e.g. for V2X communications, for A2X communications, for 5G ProSe, for Ranging/SL) provisioning.
- UE policy provisioning for A2X communications over PC5 reference point or A2X communications over Uu reference point or both.

NOTE: The PCF derives the UE policy information and invokes the Namf_Communication_N1N2MessageTransfer service operation to provision it to the UE.

- URSP provisioning in EPS.

4.2.4.2 Policy update notification

Figure 4.2.4.2-1 illustrates the policy update notification.

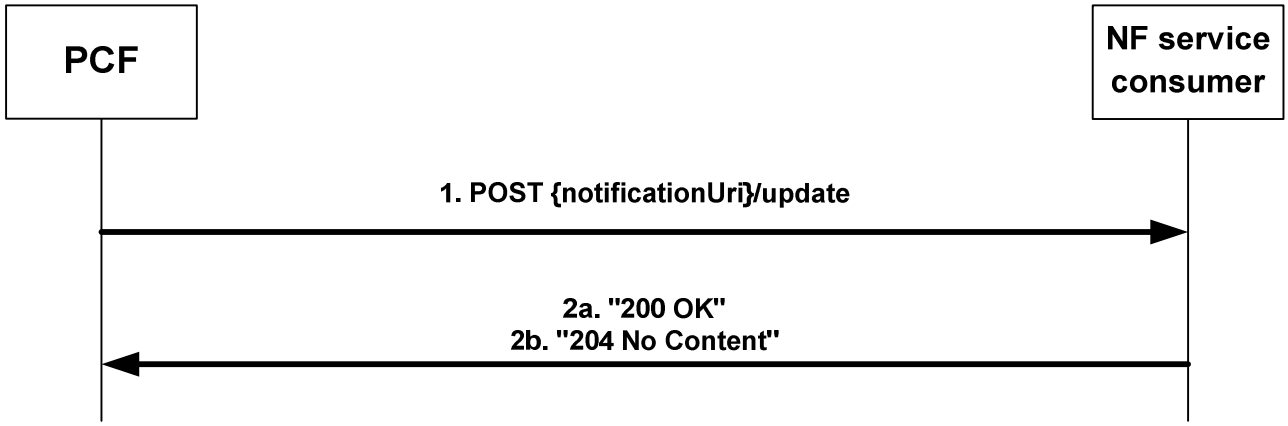

Figure 4.2.4.2-1: policy update notification

NOTE: For the roaming case, the PCF represents the V-PCF if the NF service consumer is an AMF and the PCF represents the H-PCF if the NF service consumer is a V-PCF.

The (V-)(H)-PCF may decide to update, based on external triggers (e.g. notifications received from UDR about new or updated service parameter data as described in 3GPP TS 29.519 [17]) or internal triggers (e.g., the activation of a pending policy counter provided via the Nchf_SpendingLimitControl Service as described in 3GPP TS 29.594 [39]) policy control request trigger(s) and in the roaming case, the H-PCF may also decide to update the UE Policy, the N2 PC5 policy for V2X communications if the "V2X" feature is supported and/or the N2 PC5 policy for A2X communications if the "A2X" feature is supported and/or the N2 PC5 policy for 5G ProSe if the "ProSe" feature is supported and/or the N2 PC5 policy for Ranging/SL if the "Ranging_SL" feature is supported.

NOTE: In this release of the specification, policy decisions based on policy counters provided via Nchf_SpendingLimitControl service apply to URSP only.

If the "EpsUrsp" feature is supported and the NF consumer is a PCF for a PDU session the PCF (H-PCF in the LBO roaming scenario) may decide to update policy control request triggers and/or to update the URSP.

If the "SliceAwareANDSP" feature is supported, the PCF received the indication of wrong NI3WF or TNGF selection during UE Policy Association creation as described in clause 4.2.2.1 or during UE Policy Association modification as described in clause 4.2.3.1, and the PCF determines that the UE needs to be configured with ANDSP/WLANSP with slice selection information and the configuration result is to be indicated within a Npcf_UEPolicyControl_UpdateNotify request then:

- when the PCF has successfully delivered to the UE the updated ANDSP/WLANSP with the slice selection information for the corresponding type of non-3gpp node, the PCF notifies to the NF service consumer about the successful delivery providing the "andspDelInd" attribute set to value "CONFIGURED".

- if the UE update with the ANDSP/WLANSP with the slice selection information for the corresponding type of non-3GPP node fails, the PCF provides the "andspDelInd" attribute set to value "NOT_CONFIGURED".

If the "VPLMNSpecificURSP" feature is supported, the NF consumer is the V-PCF and the H-PCF received the subscription to notification about the delivery outcome of VPLMN-specific URSP rules within the "deliveryEvents" attribute as specified in clauses 4.2.2.1, and 4.2.3.1, the H-PCF notifies about the result of the delivery of UE policies using the "delivReport" attribute as described in clause 4.2.4.7.

For the (V-)PCF communicating with the AMF, if the "URSPEnforcement" feature is supported, and if not previously provided, the (V-)PCF may decide to request to the AMF to be notified about the PDU session established/terminated events by providing the PCF for the UE callback information within the "pcfUeInfo" attribute, and the DNN and S-NSSAI of the concerned PDU session(s) within the "matchPdus" attribute. Alternatively, the (V-)PCF may provide the updated complete list of DNN and S-NSSAI combination(s) of the concerned PDU sessions within the "matchPdus" attribute and/or updated PCF for the UE callback information within the "pcfUeInfo" attribute.

The (V-)(H-)PCF shall then send an HTTP POST request with "{notificationUri}/update" as URI (where the Notification URI was previously supplied by the NF service consumer) to 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:

- if the V-PCF is the NF service consumer, shall use the Namf_Communication Service defined in 3GPP TS 29.518 [14] to send "MANAGE UE POLICY COMMAND" message(s) with the received UE policy to the UE via the AMF and/or with the received N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe to the NG-RAN via the AMF;

- if the V-PCF is the NF service consumer, shall provision the received policy control requested trigger(s) to the AMF, if applicable, using the Npcf_UEPolicyControl_UpdateNotify service operation according to the present clause;

- if the AMF is the NF service consumer, shall enforce the received policy control request trigger(s);

- if the "EpsUrsp" feature is supported and a PCF for a PDU session is the NF service consumer, shall behave as specified in clause 4.2.4.9;

- if the "VPLMNSpecificURSP" feature is supported, and the V-PCF is the NF service consumer, may trigger the notification(s) about the result of the delivery of UE policies as specified in clause 4.2.4.7;

- shall either send a successful response indicating the success of the enforcement or an appropriate failure response, for the V-PCF as the NF service consumer taking into consideration a reply received from the possible Namf_Communication Service service operation and from the possible Npcf_UEPolicyControl_UpdateNotify service operation according to the previous bullets. In case of a successful response:

  a. if the feature "ImmediateReport" is supported and the PCF provisioned policy control request triggers (applicable triggers are as defined in Table 5.6.2.8-1), a "200 OK" response code and a response body with the corresponding available information in the "UeRequestedValueRep" data structure shall be returned in the response;

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

- if errors occur when processing the HTTP POST request, shall 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, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5].

When the "URSPEnforcement" feature is supported and the AMF receives the "matchPdus" attribute, the AMF shall update the affected established PDU sesssion(s), by forwarding the received PCF for the UE callback information for the PDU session(s) matching the new S-NSSAI and DNN combination(s) to the SMF, and removing the previously provided PCF for the UE callback information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) from the SMF as defined in 3GPP TS 29.502 [40]. When the AMF receives "pcfUeInfo" attribute with updated SBA binding indication, the AMF shall apply the updated PCF for the UE callback information to the new PDU sessions only, i.e., already established PDU sessions are not affected.

If the feature "ErrorResponse" is supported and if the AMF as NF service consumer 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 (V-)PCF receives a "307 Temporary Redirect" response, the (V-)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 (V-)PCF becomes aware that a new AMF is requiring notifications (e.g. via the "404 Not found" response or via Namf_Communication service AMFStatusChange Notifications, see 3GPP TS 29.518 [14], or via link level failures), and the (V-)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 or 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 query the other AMFs within

the AMF set), the (V-)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 (V-)PCF received a "404 Not found" response, the (V-)PCF should resend the failed policy update notification request to that URI.

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.

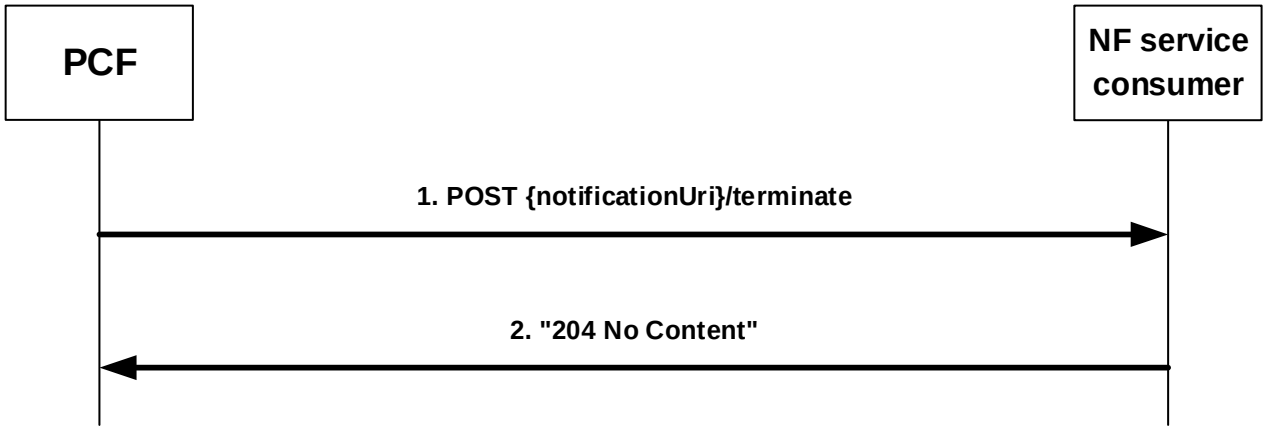

Figure 4.2.4.3-1: request for a termination of the UE policy association

NOTE: For the roaming case, the PCF represents the V-PCF if the NF service consumer is an AMF and the PCF represents the H-PCF if the NF service consumer is a V-PCF.

The (V-)(H-)PCF may request the termination of the UE 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 resource URI of the concerned individual UE policy association (including the policy association ID) encoded as "resourceUri" attribute; and
- the cause why the (V-)(H-)PCF requests the termination of the policy association encoded as "cause" attribute.

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

- if the V-PCF is the NF service consumer, shall send as NF service producer for the corresponding policy association (towards the AMF as NF service consumer) a request for a termination of the policy association according to the present clause;
- shall either send an HTTP "204 No Content" response for the succesfull processing of the HTTP POST request or an appropriate failure response, for the V-PCF as the NF service consumer taking into consideration a reply received for the possible corresponding policy association termination request according to the previous bullet; and
- if errors occur when processing the HTTP POST request, shall send an HTTP error response as specified in clause 5.7; or
- if the feature "ES3XX" is supported, and the NF service consumer determines that 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].

After the succesfull processing of the HTTP POST request, any NF service consumer except for the V-PCF shall invoke the Npcf_UEPolicyControl_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 as NF service consumer 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 (V-)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 (V-)PCF becomes aware that a new NF service consumer (AMF) is requiring notifications (e.g. via the "404 Not found" response or via Namf_Communication service AMFStatusChange Notifications, see 3GPP TS TS 29.518 [14], or via link level failures), and the (V-)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 or 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 query the other AMFs within the AMF set), the (V-)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 (V-)PCF received a "404 Not found" response, the (V-)PCF should resend the failed request for termination of the policy association to that URI.

4.2.4.4 URSP provisioning for Background Data Transfer policy

If the "EnhancedBackgroundDataTransfer" feature is supported, after the UE policy association establishment, the (H-)PCF may receive the Background Data Transfer Reference ID(s) notified by the UDR for the change of UE's Application Data as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case, the (H-)PCF shall retrieve the transfer policy corresponding to the Background Data Transfer Reference ID(s) as defined in clause 5.2.8 of 3GPP TS 29.519 [17] and derive the URSP including the Route Selection Validation Criteria for the UE as defined in clause 6.2.2.1 of 3GPP TS 23.503 [4]. Based on the Route Selection Validation Criteria, the (H-)PCF may control the provisioning of the URSP considering the derived temporal and spatial conditions (e.g. the (H-)PCF may wait until the AMF indicates that the UE has entered in the Tracking Area or Presence Area where the BDT policy applies or may wait until the time window when the BDT policy applies).

The H-PCF shall provision the URSP to the V-PCF as defined in clause 4.2.4.2 and then the V-PCF shall invoke the Namf_Communication_N1N2MessageTransfer service operation to provision it to the UE. The (H-)PCF shall use the associated S-NSSAI and DNN to store in the UDR the Background Data Transfer Reference ID(s) in the UE's session management policy data as specified in 3GPP TS 29.519 [17].

4.2.4.5 UE policy provisioning for V2X communication over PC5 and Uu reference points

After the UE policy association establishment and if the "V2X" feature is supported, the (H-)PCF may receive the service specific parameter information notified by the UDR for the change of UE's Application Data as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case:

- for the roaming case, the H-PCF shall derive the V2XP and provision it to the V-PCF as defined in clause 4.2.4.2; and/or

- for the roaming and non-roaming case, the (H-)PCF shall derive the V2XP and the (V-)PCF shall use the Namf_Communication Service defined in 3GPP TS 29.518 [14] to send "MANAGE UE POLICY COMMAND" message(s) with the V2XP to the UE via the AMF.

4.2.4.6 UE policy provisioning for 5G ProSe

After the UE policy association establishment and if the "ProSe" feature is supported, the (H-)PCF may receive the service specific parameter information via a notification on the change of UE's Application Data from the UDR, as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case:

- for the roaming case, the H-PCF shall derive the ProSeP and provision it to the V-PCF as defined in clause 4.2.4.2; and/or

- for the roaming and non-roaming case, the (H-)PCF shall derive the ProSeP and the (V-)PCF shall use the Namf_Communication Service defined in 3GPP TS 29.518 [14] to convey it to the UE via the AMF by sending "MANAGE UE POLICY COMMAND" message(s) as defined in 3GPP TS 24.554 [28].

4.2.4.7 UE policy provisioning for AF-influenced URSP

If the "AfGuideURSP" feature is supported by the Nudr_DataRepository service, after the UE policy association establishment, the (H-)PCF may be informed that service specific parameter information that contains data for AF guidance on the URSP determination has been created, modified or removed via a notification by the UDR for the change or removal of UE's Application Data as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case, the H-PCF may derive new URSP(s), modify existing URSP(s) or remove existing URSP(s) by using the information received from the UDR (see clause 4.2.2.2.1.1 and 4.2.2.2.3 for the description of how the (H-)PCF may use this information, stored UPSC(s), policy subscription information, analytics information received from NWDAF and local operator policy to determine the URSP that will be provisioned to the UE).

If the "VPLMNSpecificURSP" feature is supported by the Nudr_DataRepository service, the (H-)PCF may be informed about changes on service parameter data in the HPLMN that contain AF guidance on VPLMN-specific URSP rule determination as defined in 3GPP TS 29.519 [17]. For the roaming case and when the feature "VPLMNSpecificURSP" is supported, the H-PCF may be informed about changes on VPLMN-specific URSP from the V-PCF as defined in clause 4.2.3.1. Based on the received information, the (H-)PCF determines the VPLMN-specific URSP rules as specified in clause 4.2.2.2.3.2 and the new UE Policy Sections and VPS Configuration as defined in clause 4.2.2.2.1.1. If the feature "ExtDeliveryOutcome" is supported, when the (H-)PCF does not authorize the VPLMN-specific URSP rule provided by the V-PCF and the V-PCF has subscribed with the H-PCF as specified in clauses 4.2.2.1 and/or 4.2.3.1 because an AF has subscribed via a request for service parameters to the VPLMN, the (H-)PCF shall invoke the Npcf_EventExposure_Notify service operation as defined in clause 4.2.4.2 of 3GPP TS 29.523 [30] with the key of the map represents the related AF; and the "eventNotifs" entry shall contain the reported event "UNSUCCESS_PCF_SERVICE_AUTHORIZATION" within the "event" attribute and in case of delivery failure, the "delivFailure" attribute with the corresponding failure reason;

The (H-)PCF shall:

- for the roaming case, provision the derived new UE Policy Sections, and/or update and/or remove existing UE Policy Sections to the V-PCF as defined in clause 4.2.4.2 and then the V-PCF shall invoke the Namf_Communication_N1N2MessageTransfer service operation to provision the received UE Policy Sections to the UE; or

- for the non-roaming case, use the Namf_Communication Service defined in 3GPP TS 29.518 [14] to convey the derived new UE Policy Sections and/or to update and/or remove existing UE Policy Sections to the UE via the AMF within "MANAGE UE POLICY COMMAND" message(s).

In the roaming case, when the AMF informs the V-PCF that the UE is temporarily unreachable (see 3GPP TS 29.518 [14]), the V-PCF notifies the H-PCF accordingly (including the "uePolTransFailNotif" attribute within the PolicyAssociationUpdateRequest data structure, as described in clause 4.2.2.2.1.0).

When the (H-)PCF receives the "MANAGE UE POLICY COMPLETE" or the "MANAGE UE POLICY COMMAND REJECT" message and/or the PCF deducts that the UE is temporarily unreachable, and the PCF determines that the received message or the internal deduction indicates a UE Policy Delivery outcome event is matched:

- if an NF service consumer has subscribed via a request for service specific parameters to the HPLMN, the (H-)PCF shall invoke the Npcf_EventExposure_Notify service operation as defined in clause 4.2.4.2 of 3GPP TS 29.523 [30]; or

- if the "VPLMNSpecificURSP" is supported and the V-PCF has subscribed with the H-PCF as specified in clauses 4.2.2.1 and/or 4.2.3.1 because an AF has subscribed via a request for service parameters to the VPLMN, the H-PCF shall invoke the Npcf_UEPolicyControl_UpdateNotify as specified in this clause to notify about the result of the delivery of UE policies using the "delivReport" attribute. The "delivReport" attribute is a map of "eventNotifs" attributes, where:

  a. the key of the map represents the related AF; and

  b. each "eventNotifs" entry shall contain the reported event(s) ("SUCCESS_UE_POL_DEL_SP", "UNSUCCESS_UE_POL_DEL_SP", or if feature "ExtDeliveryOutcome" is supported, "PARTLY_UNSUCC_UE_POL_DEL_SP") within the "event" attribute and in case of delivery failure, the "delivFailure" attribute with the corresponding failure reason;

  the V-PCF, based on the information received in the "delivReport" attribute and the notification information retrieved from the UDR in the VPLMN, shall invoke the Npcf_EventExposure_Notify service operation as defined in clause 4.2.4.2 of 3GPP TS 29.523 [30].

When the AMF (non roaming case) or the V-PCF (roaming case) informs the (H-)PCF that the UE is temporarily unreachable (see 3GPP TS 29.518 [14]), the (H-) PCF may subscribe to "CON_STATE_CH" trigger if not done before and reattempt the provisioning of URSP(s) when the UE becomes reachable.

4.2.4.8 UE policy provisioning for A2X communication over PC5 and A2X communication over Uu reference point

After the UE policy association establishment and if the "A2X" feature is supported, the (H-)PCF may receive the service specific parameter information notified by the UDR for the change of UE's Application Data as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case:

- for the roaming case, the H-PCF shall derive the A2XP and provision it to the V-PCF as defined in clause 4.2.4.2; and/or
- for the roaming and non-roaming case, the (H-)PCF shall derive the A2XP and the (V-)PCF shall use the Namf_Communication Service defined in 3GPP TS 29.518 [14] to send "MANAGE UE POLICY COMMAND" message(s) with the A2XP to the UE via the AMF.

4.2.4.9 URSP provisioning in EPS

When the "EpsUrsp" feature is supported and a PCF for a PDU session is the NF service consumer, the PCF for the UE may provide a UE Policy Container (with a "MANAGE UE POLICY COMMAND" message(s) with the UE policy to send to the UE via the PCF for the PDU session) and/or an update in the Policy Control Request Triggers applicable to the UE as described in clause 4.2.4.2 using the selected UE Policy Association.

1) When the PCF for the PDU session receives a UE Policy Container from the PCF for the UE, the PCF for the PDU session first shall select one of the ongoing PDN connections for the related UE in EPC and forward the UE Policy Container to the UE as follows:
   - if the PCF for the PDU session has previously received a UE Policy Container from the UE over an ongoing PDN connection, the PCF for the PDU session shall select that PDN connection; or
   - otherwise when 5GS to EPS mobility applies, the PCF for the PDU session shall select an ongoing PDN connection that supports URSP provisioning in EPS as described in 3GPP TS 29.512 [31]. If there are multiple ongoing PDN connections that support URSP provisioning in EPS the PCF for the PDU session shall select one of those based on operator policy or implementation specific means; and
   - the PCF for the PDU session shall use the Npcf_SMPolicyControl_UpdateNotify service operation defined in 3GPP TS 29.512 [31] to forward to the UE via SMF+PGW-C the UE Policy Container with the "MANAGE UE POLICY COMMAND" message(s) with the received UE policy.
2) When the PCF for the PDU session receives an update in the Policy Control Request Triggers applicable to the UE, the PCF for the PDU session shall determine whether an update on the current Policy Control Triggers need to be sent to the SMF+PGW-C. In that case, the PCF for the PDU session shall select one of the ongoing PDN connection(s) for the related UE in EPC, and shall provision the received policy control requested trigger(s) to the SMF+PGW-C as follows:
   - if the PCF for the PDU session has previously received a UE Policy Container from the UE over an ongoing PDN connection, the PCF for the PDU session shall select that PDN connection; or
   - otherwise when 5GS to EPS mobility applies, the PCF for the PDU session shall select the PDN connection that supports URSP provisioning in EPS as described in bullet 1) if there is no PDN connection selected yet; otherwise, it uses the PDN connection selected to transfer UE Policy Containers to the UE; and
   - the PCF for the PDU session shall use the Npcf_SMPolicyControl_UpdateNotify service operation to provision the received policy control requested trigger(s) according to 3GPP TS 29.512 [31].

When there are multiple ongoing UE Policy Associations that enable the URSP provisioning in EPS, the PCF for the UE shall select one of those for both, URSP and/or Policy Control Request Trigger provisioning, based on operator policy or implementation specific means.

4.2.4.10 UE policy provisioning for Ranging/SL

After the UE policy association establishment and if the "Ranging_SL" feature is supported, the (H-)PCF may receive the service specific parameter information via a notification on the change of UE's Application Data from the UDR, as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case:

- for the roaming case, the H-PCF shall derive the RSLPP and provision it to the V-PCF as defined in clause 4.2.4.2; and/or
- for the roaming and non-roaming case, the (H-)PCF shall derive the RSLPP and the (V-)PCF shall use the Namf_Communication Service defined in 3GPP TS 29.518 [14] to convey it to the UE via the AMF by sending "MANAGE UE POLICY COMMAND" message(s).

4.2.5 Npcf_UEPolicyControl_Delete Service Operation

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

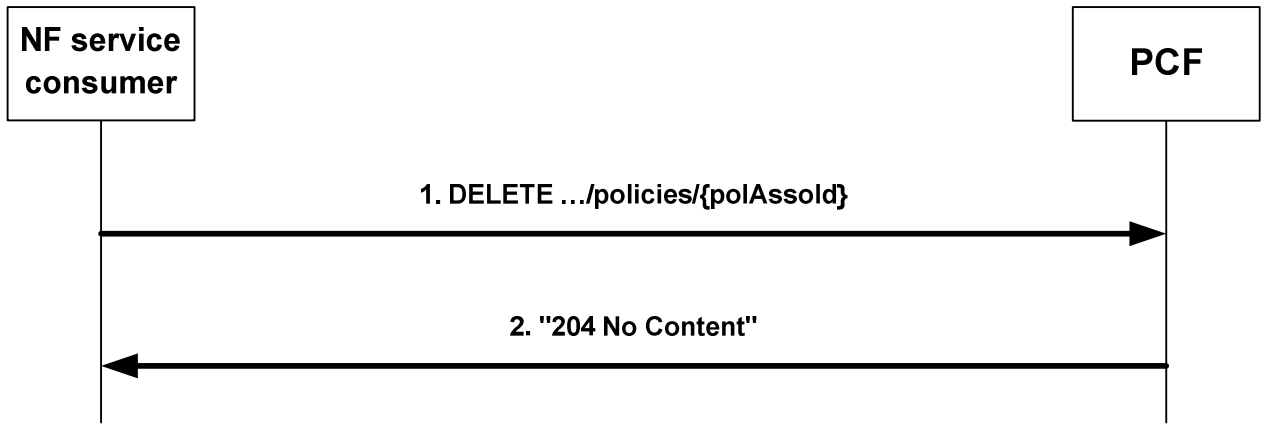

Figure 4.2.5-1: Deletion of a policy association

NOTE: For the roaming case, the PCF represents the V-PCF if the NF service consumer is an AMF and the PCF represents the H-PCF if the NF service consumer is a V-PCF.

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 AMF, in the non-roaming case, receives from the UDM the UE Policy Association Indicator set to disabled. In roaming scenarios, the V-PCF requests to the H-PCF the deletion of the UE policy association when the V-PCF determines that the UE context is terminated in the AMF, e.g., with the reception of the policy association deletion request, or the reception of UE context not found reply to the UE Policy delivery request. In roaming scenarios, based on local policies, the AMF may request the deletion of the policy association when the AMF receives UE Policy Association Indicator set to disabled.

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

- the resource URI of the individual UE Policy Association resource is not transferred to the new AMF; or
- the new AMF informs the old AMF that the individual UE Policy Association resource is not being reused.

When the UE Policy Association is terminated because the AMF receives from the UDM the UE Policy Association Indicator set to disabled, the AMF shall invoke the procedure as described in this clause and shall keep in the UE context the UE policy container, if previously received, to enable the establishment of the UE Policy Association on UE Policy Association Indicator change from disabled to enabled as described in clause 4.2.2.1.

The PCF for the PDU session as NF service consumer requests that the UE policy association is deleted when:

- all the PDU sessions related with the UE policy association are terminated; or
- the PCF for the PDU session receives an indication of RAT type change from the SMF+PGW-C (from any of the related PDU sessions) and determines the EPS to 5GS mobility scenario applies.

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

Upon the reception of the HTTP DELETE request,

- the (V-)(H-)PCF shall delete the policy association;
- if the PCF is a V-PCF and has an established corresponding policy association towards the H-PCF, the V-PCF shall send as the NF service consumer towards the H-PCF a request for the deletion of that policy association as described in the present clause;
- the (V-)(H-)PCF shall send either an HTTP "204 No Content" response indicating the success of the deletion or an appropriate failure response, for the V-PCF as PCF taking into consideration a reply received for the possible policy association deletion request according to the previous bullet; and
- the (V-)(H-)PCF shall 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 (V-)(H-)PCF determines the received HTTP DELETE request needs to be redirected, the (V-)(H-)PCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5].

Once the UE policy association is deleted, to unsubscribe to notifications of N1 message for UE Policy Delivery Result, the (V-)PCF shall trigger the Namf_Communication_N1N2MessageUnsubscribe service operation towards the N1N2 Individual Subscription resource as specified in 3GPP TS 29.518 [14].

5 Npcf_UEPolicyControl API

5.1 Introduction

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

The API URI of the Npcf_UEPolicyControl 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-ue-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_UEPolicyControl 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_UEPolicyControl 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_UEPolicyControl API.

5.3 Resources

5.3.1 Resource Structure

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_UEPolicyControl API.

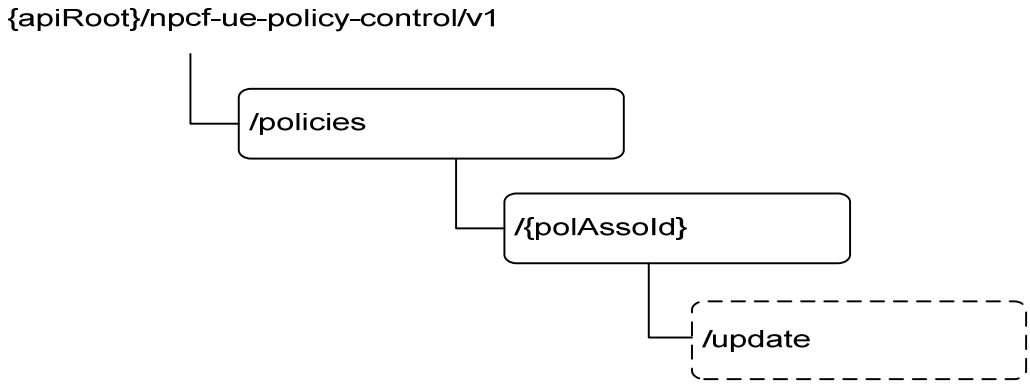

Figure 5.3.1-1: Resource URI structure of the Npcf_UEPolicyControl API

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
UE Policy Associations	/policies	POST	Create a new Individual UE policy association resource.
Individual UE Policy Association	/policies/{polAssoId}	GET	Read an Individual UE Policy Association resource.
		DELETE	Delete an Individual UE Policy Association resource.
	/policies/{polAssoId}/update	update (POST)	Report observed event trigger and obtain updated UE policies.

5.3.2 Resource: UE Policy Associations

5.3.2.1 Description

This resource represents a collection of UE policy associations.

5.3.2.2 Resource definition

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

5.3.3 Resource: Individual UE Policy Association

5.3.3.1 Description

This resource represents an individual UE policy association.

5.3.3.2 Resource definition

Resource URI: **{apiRoot}/npcf-ue-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 UE policy retrieval. Applicable if the feature "ES3XX" is supported. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual UE 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/SEPP (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/SEPP, 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/SEPP, 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 UE policy deletion. Applicable if the feature "ES3XX" is supported. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual UE 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/SEPP (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/SEPP, 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/SEPP, 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 on one or more policy 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 UE policy modification. Applicable if the feature "ES3XX" is supported. (NOTE 3)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual UE 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/SEPP (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/SEPP, 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/SEPP, 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 UE 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 H-PCF to provide updates of UE policies to the V-PCF as NF service consumer, and used by the V-PCF to provide updates of policy control request triggers to the AMF as 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
UeRequestedValueRep	M	1	200 OK	The current applicable values corresponding to the policy control request trigger are reported.
n/a			204 No Content	The policies were successfully updated.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during UE policy notification. Applicable if the feature "ES3XX" is supported. (NOTE 3)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during UE policy notification. Applicable if the feature "ES3XX" is supported. (NOTE 3)
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. Applicable if the feature "ErrorResponse" is supported.
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.
NOTE 3: The RedirectResponse data structure may be provided by an SCP/SEPP (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 of the resource located in an alternative NF service 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/SEPP, 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. 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 of the resource located in 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/SEPP, 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 UE policy association

5.5.3.1 Description

This notification is used by the PCF to request the termination of a UE 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 UE policy notification. Applicable if the feature "ES3XX" is supported. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during UE 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/SEPP (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 of the resource located in 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/SEPP, 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. It 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 of the resources located in 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/SEPP, 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.

5.6 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_UEPolicyControl service based interface protocol.

Table 5.6.1-1: Npcf_UEPolicyControl specific Data Types

Data type	Section defined	Description	Applicability
A2xCapability	5.6.3.12	Indicates the A2X capabilities	A2X
LboRoamingInformation	5.6.2.10	LBO roaming information for a DNN and S-NSSAI	VPLMNSpecificURSP
N1N2MessTransferErrorReply	5.6.3.8	Error the V-PCF may send to the H-PCF when the V-PCF receives from the AMF an error to the N1N2MessageTransfer request.	EnErrorHandling
Non3gppAccess	5.6.3.7	Represents a Non-3gpp access node.	SliceAwareANDSP
Pc5Capability	5.6.3.5	Indicates the specific PC5 RAT(s) which the UE supports for V2X communications over PC5 reference point.	V2X
ProSeCapability	5.6.3.6	Indicates the 5G ProSe capabilities.	ProSe
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.	
PolicyStatus	5.6.3.10	Represents the configuration status of a UE Policy in the UE.	SliceAwareANDSP
PolicyUpdate	5.6.2.5	Updated policies that the PCF provides in a notification or in the reply to an Update Request.	
RangSLCapability	5.6.3.10	Represents the Ranging/SL capabilities.	Ranging_SL
RequestTrigger	5.6.3.3	Enumeration of possible Request Triggers.	
SliceSpecificN3gNodeSelectionCapability	5.6.3.13	Represents the UE capabilities with regard to slice-specific non-3gpp node selection.	SliceAwareANDSP
TerminationNotification	5.6.2.6	Request to terminate a policy Association that the PCF provides in a notification.	
UePolicy	5.6.3.2	UE Policies	
UePolicyDeliveryResult	5.6.3.2	UE Policy delivery Result	
UePolicyNotification	5.6.2.12	Contains the delivery outcome of VPLMN-Specific URSP rules	VPLMNSpecificURSP
UePolicyParameters	5.6.2.9	Contains the service parameters used to guide the VPLMN-specific URSP rule determination.	VPLMNSpecificURSP
UePolicyRequest	5.6.3.2	Request for UE Policies	
UePolicyTransferFailureCause	5.6.4.1	UE Policy Transfer Failure Cause	EnErrorHandling
UePolicyTransferFailureNotification	5.6.2.7	Information that the UE policy is failure to be transferred to the UE.	
UrspEnforcementPduSession	5.6.2.11	Represents URSP rule enforcement information for a PDU session.	URSPEnforcement
UeRequestedValueRep	5.6.2.8	Contains the current applicable values corresponding to the policy control request triggers.	ImmediateReport

Table 5.6.1-2 specifies data types re-used by the Npcf_UEPolicyControl 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_UEPolicyControl service based interface.

Table 5.6.1-2: Npcf_UEPolicyControl re-used Data Types

Data type	Reference	Comments	Applicability
AccessType	3GPP TS 29.571 [11]	Represents an Access Type.	
Bytes	3GPP TS 29.571 [11]	String with format "byte".	
ChargingInformation	3GPP TS 29.512 [31]	Represents the address(es), and if available, the instance ID and the set ID of the Charging Function.	SLAMUP
ConfiguredSnssai	3GPP TS 29.531 [34]	Contains the configured S-NSSAI and optionally mapped home S-NSSA.	SliceAwareANDSP, NssaiChange
CmState	3GPP TS 29.518 [14]	Connectivity state of UE	ConnectivityStateChange
Dnn	3GPP TS 29.571 [11]	Represents a DNN.	VPLMNSpecificURSP, URSPEnforcement
Event	3GPP TS 29.522 [41]	Subscription to notification about delivery of VPLMN specific URSP rule.	VPLMNSpecificURSP
Fqdn	3GPP TS 29.571 [11]	FQDN	
Gpsi	3GPP TS 29.571 [11]	Generic Public Subscription Identifier	
GroupId	3GPP TS 29.571 [11]	Represents a UE Group Identifier	
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.	
N1N2MessageTransferCause	3GPP TS 29.518 [14]	Contains an error cause for an N1 or N2 message transfer.	
N2InfoContent	3GPP TS 29.518 [14]	Represents a transparent N2 information content to be relayed by AMF.	V2X, A2X, ProSe, Ranging_SL
NfGroupId	3GPP TS 29.571 [11]	The NF group identifier.	CHFGroup
NfInstanceId	3GPP TS 29.571 [11]	Represents an NF instance identifier	
NfSetId	3GPP TS 29.571 [11]	Represents an NF set identifier	EnhEstRoaming
PcEventNotification	3GPP TS 29.523 [30]	Represents notification about UE Policy Delivery outcome	VPLMNSpecificURSP
PcfUeCallbackInfo	3GPP TS 29.571 [11]	Contains the PCF for the UE callback information necessary for the PCF for the PDU session to send Establishment and Termination event.	URSPEnforcement
PduSessionInfo	3GPP TS 29.571 [11]	Contains a DNN and SNSSAI combination	VPLMNSpecificURSP URSPEnforcement
PduSessionType	3GPP TS 29.571 [11]	Contains the PDU Session Type	URSPEnforcement
Pei	3GPP TS 29.571 [11]	Permanent Equipment Identifier	
PlmnId	3GPP TS 29.571 [11]	Represents a PLMN 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.	PresenceInfo
ProblemDetails	3GPP TS 29.571 [11]	Contains detailed information about an error response.	
RatType	3GPP TS 29.571 [11]	Represents a RAT type.	
RedirectResponse	3GPP TS 29.571 [11]	Contains redirection related information.	ES3XX
ServiceName	3GPP TS 29.510 [13]	Name of the service instance.	
SatelliteBackhaulCategory	3GPP TS 29.571 [11]	Indicates the satellite backhaul category or non-satellite backhaul.	EnSatBackhaulCategoryChg
Snssai	3GPP TS 29.571 [11]	Represents an S-NSSAI	SliceAwareANDSP
SscMode	3GPP TS 29.571 [11]	Service and session continuity mode.	URSPEnforcement
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.	
Uinteger	3GPP TS 29.571 [11]	Unsigned integer.	
Uri	3GPP TS 29.571 [11]	Represents a URI.	
UrspEnforcementInfo	3GPP TS 29.512 [31]	URSP rule enforcement information as received from the UE.	URSPEnforcement
UrspRuleRequest	3GPP TS 29.522 [41]	URSP rule guidance information	VPLMNSpecificURSP
UserLocation	3GPP TS 29.571 [11]	Contains User Location information.	

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	
uePolicy	UePolicy	O	0..1	The UE policy as determined by the H-PCF (for the H-PCF as NF service producer).	
n2Pc5Pol	N2InfoContent	O	0..1	The N2 PC5 policy for V2X communications as determined by the H-PCF.	V2X
n2Pc5PolA2x	N2InfoContent	O	0..1	The N2 PC5 policy for A2X communications as determined by the H-PCF.	A2X
n2Pc5ProSePol	N2InfoContent	O	0..1	The N2 PC5 policy for 5G ProSe as determined by the PCF.	ProSe
triggers	array(RequestTrigger)	O	1..N	Request Triggers to which the PCF subscribes. (NOTE 1)	
pras	map(PresenceInfo)	C	1..N	If the Request 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.	
andspDelInd	PolicyStatus	O	0..1	Information about whether the updated ANDSP/WLANSP has been successfully delivered to the UE.	SliceAwareANDSP
andspInd	boolean	O	0..1	Indication of UE support of ANDSP. True: The UE supports ANDSP; False: The UE does not support ANDSP.	UECapabilityIndication
pduSessions	array(PduSessionInfo)	O	1..N	Contains the DNNs and S-NSSAIs for which LBO information is being requested. It may be provided when the "LBO_INFO_CH" request trigger is provided.	VPLMNSpecificURSP
chfInfo	ChargingInformation	O	0..1	Contains the charging address information to support CHF discovery. (NOTE 3)	SLAMUP
chfGroupId	NfGroupId	O	0..1	Contains the identity of the (H-)CHF Group to support CHF discovery. (NOTE 3)	CHFGroup
suppFeat	SupportedFeatures	M	1	Contains the list of supported features among the ones defined in clause 5.8.	
n2Pc5RsppPol	N2InfoContent	O	0..1	The N2 PC5 policy for Ranging/SL as determined by the H-PCF.	Ranging_SL
pcfUeInfo	PcfUeCallbackInfo	O	0..1	Contains the PCF for the UE information necessary for the PCF for the PDU session to send established/terminated events notifications to the PCF for the UE.	URSPEnforcement

matchPdus	array(PduSessionInfo)	C	1..N	Indicates the matched PDU session(s) for which the AMF shall forward the PCF for the UE callback information in the "pcfUeInfo" attribute to the SMF. It shall be present when the "pcfUeInfo" attribute is present. (NOTE 2)	URSPEnforcement
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 may contain a full DNN or only the DNN Network Identifier. 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 initial POST request that requested the creation of an individual UE policy resource.					

NOTE: When feature negotiation does not need to take place, the "suppFeat" attribute can be set to "0".

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 Addess(es) where to send Notifications.	
altNotifIpv6Addrs	array(Ipv6Addr)	O	1..N	Alternate or backup IPv6 Addess(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 Type(s) where the served UE is camping. Shall be provided when available.	AccessChange
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. For Indirect Network Sharing and the interaction between the hosting operator network and the participating operator network case, the identifier of the serving network is set to the selected PLMN ID. Shall be provided when available.	
ratType	RatType	C	0..1	The RAT Type where the served UE is camping. Shall be provided when available.	
ratTypes	array(RatType)	C	1..N	The RAT Type(s) where the served UE is camping. Shall be provided when available.	AccessChange
groupIds	array(GroupId)	C	1..N	Internal Group Identifier(s) of the served UE. Shall be provided when available.	
hPcfId	NfInstanceId	C	0..1	H-PCF Identifier. Shall be provided by the AMF in roaming scenarios when available.	
hPcfUri	Uri	C	0..1	H-PCF URI. It shall be provided by the AMF in roaming scenarios, if available. When present, it shall contain the API URI of the Npcf_UEPolicyControl service of the H-PCF ID indicated in the "hPcfId" attribute. The API URI shall take the form specified in clause 5.1.	EnhEstRoaming

hPcfSetId	NfSetId	C	0..1	H-PCF Set Identifier of the H-PCF instance indicated in the "hPcfId" attribute. It shall be provided by the AMF in roaming scenarios, if available.	EnhEstRoaming
uePolReq	UePolicyRequest	C	0..1	A request for UE Policies. Shall be provided when the AMF receives an "UE STATE INDICATION" message, as defined in Annex D.5.4 of 3GPP TS 24.501 [15].	
guami	Guami	C	0..1	The Globally Unique AMF Identifier (GUAMI) shall be provided by an AMF as NF 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_UEPolicyControl_UpdateNotify service operation.	
servingNfId	NfInstanceId	C	0..1	If the NF service consumer is an AMF, it shall contain the identifier of the serving AMF.	
pc5Capab	Pc5Capability	C	0..1	Indicates the PC5 Capability for V2X communications supported by the UE. It shall be provided when available at the NF service consumer.	V2X
a2xCapab	array(A2xCapability)	C	1..N	Indicates the A2X Capabilities for A2X communications supported by the UE. It shall be provided when available at the NF service consumer.	A2X
proSeCapab	array(ProSeCapability)	C	1..N	Indicates whether the UE is capable of one or more of the the 5G ProSe Capabilities. This attribute shall be provided when available at the NF service consumer.	ProSe
confSnssais	array(ConfiguredSnssai)	C	1..N	The Configured NSSAI for the serving PLMN, and optionally the mapped S-NSSAI value of home network corresponding to the configured S-NSSAI in the serving PLMN. When the feature SliceAwareANDSP is supported, it shall be provided in the roaming case when available at the NF service consumer and the "n3gNodeReSel" attribute is present. If the feature NssaiChange is supported, it shall be provided in the roaming case. (NOTE 1)	SliceAwareANDSP, NssaiChange
n3gNodeReSel	Non3gppAccess	C	0..1	A wrongly selected non-3gpp access node. It shall be provided when the UE has selected a non-3gpp access node that is not compatible with the Allowed NSSAI.	SliceAwareANDSP
sliceN3gNodeSelCap	SliceSpecificN3gNodeSelectionCapability	O	0..1	Indicates whether the UE supports N3IWF/TNGF selection based on the slices the UE wishes to use over untrusted/trusted non-3GPP access.	SliceAwareANDSP

satBackhaulCategory	SatelliteBackhaulCategory	O	0..1	Indicates types of the satellite backhaul based on satellite types (when satellite backhaul is used) or non-satellite backhaul (when satellite backhaul is not used). The default value "NON_SATELLITE" shall apply if the attribute is not present.	EnSatBackhaulCategoryChg
vpsUePolGuidance	map(UePolicyParameters)	O	1..N	Contains the service parameter used to guide the VPLMN-specific URSP and may contain the subscription to VPLMN-specific URSP delivery outcome. The key of the map represents the AF request to guide the VPLMN-specific URSP rules. This attribute only applies in roaming and when the V-PCF is the NF service consumer.	VPLMNSpecificURSP
lboRoamInfo	array(LboRoamingInformation)	O	1..N	Contains LBO roaming information for DNN and S-NSSAI combination(s). This attribute only applies in roaming and when the AMF is the NF service consumer.	VPLMNSpecificURSP
5gsToEpsMob	boolean	O	0..1	When it is set to true, it indicates the UE Policy Association creation is triggered by a 5GS to EPS mobility scenario. Default value is false.	EpsUrsp
suppFeat	SupportedFeatures	M	1	Contains the list of supported features among the ones defined in clause 5.8.	
rangSlCapab	array(RangSLCapability)	C	1..N	Contains the Ranging/SL related UE capabilities. It shall be provided when available at the NF service consumer.	Ranging_SL
NOTE 1: The "mappedHomeSnssai" attribute within the ConfiguredSnssai data type may only be provided if the "NssaiChange" feature is supported.					

NOTE: When feature negotiation does not need to take place, the "suppFeat" attribute can be set to "0".

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.	
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".	
uePolDelResult	UePolicyDeliveryResult	C	0..1	UE Policy Delivery Result. Shall be provided together with trigger "UE_POLICY" when a "MANAGE UE POLICY COMPLETE" message or a "MANAGE UE POLICY COMMAND REJECT" message, as defined in Annex D.5 of 3GPP TS 24.501 [15], has been received by the V-PCF and is being forwarded to the H-PCF.	
uePolTransFailNotif	UePolicyTransferFailureNotification	C	0..1	The UE policy transfer failure notification. Shall be the provided together with trigger "UE_POLICY" when a response with HTTP status code 4xx or 5xx as defined in clause 5.2.2.3.1.2 of 3GPP TS 29.518 [14] or a N1N2 Transfer Failure Notification as defined in clause 5.2.2.3.2 of 3GPP TS 29.518 [14] is received after the V-PCF provisioned the UE policy by invoking the Namf_Communication_N1N2MessageTransfer service operation to the AMF and is notifying the H-PCF.	

uePolReq	UePolicyRequest	C	0..1	A request for UE Policies. Shall be provided together with trigger "UE_POLICY" when the V-PCF receives an "UE POLICY PROVISIONING REQUEST" message, as defined in clause 7.2.1.1 of 3GPP TS 24.587 [24], if the "V2X" feature is supported, and/or when the V-PCF receives an "UE POLICY PROVISIONING REQUEST" message for 5G ProSe, as defined in clause 10.4.1 of 3GPP TS 24.554 [28], if the "ProSe" feature is supported and/or when the V-PCF receives an "UE POLICY PROVISIONING REQUEST" message for A2X, as defined 3GPP TS 24.577 [32], if the "A2X" feature is supported and/or when the V-PCF receives an "UE POLICY PROVISIONING REQUEST" message for Ranging/SL, as defined 3GPP TS 24.514 [42], if the "Ranging_SL" feature is supported..	V2X, A2X, ProSe, Ranging_SL
guami	Guami	C	0..1	The Globally Unique AMF Identifier (GUAMI) shall be provided by an AMF as NF service consumer during the AMF relocation.	
servingNfId	NfInstanceId	C	0..1	It shall contain the identifier of the new AMF during the AMF relocation.	
plmnId	PlmnIdNid	C	0..1	The serving network identity (a PLMN or an SNPN) of the served UE shall be provided for trigger "PLMN_CH".	PlmnChange
connectState	CmState	C	0..1	The connectivity state of the served UE shall be provided for trigger "CON_STATE_CH".	ConnectivityStateChange
groupIds	array(GroupId)	C	1..N	Internal Group Identifier(s) of the served UE. Shall be provided for trigger "GROUP_ID_LIST_CHG".	GroupIdListChange
pc5Capab	Pc5Capability	C	0..1	Indicates the PC5 Capability for V2X communications supported by the UE. It shall be provided when available at the NF service consumer. It shall be included by the target AMF only in inter-AMF mobility scenarios and for trigger "FEAT_RENEG". It requires that the "V2X" feature is supported.	FeatureRenegotiation
a2xCapab	array(A2xCapability)	C	1..N	Indicates the A2X capabilities supported by the UE. It shall be provided when available at the NF service consumer. It shall be included by the target AMF only in inter-AMF mobility scenarios and for trigger "FEAT_RENEG". It requires that the "A2X" feature is supported.	FeatureRenegotiation
proSeCapab	array(ProSeCapability)	O	1..N	Indicates whether the UE is capable of one or more of the 5G ProSe Capabilities.	ProSe

confSnssais	array(ConfiguredSnssai)	C	1..N	The Configured NSSAI for the serving PLMN, and optionally the mapped S-NSSAI value of home network corresponding to the configured S-NSSAI in the serving PLMN. It shall be provided in case of roaming for trigger "CONF_NSSAI_CH" or for trigger "NON_3GPP_NODE_RESELECTION". (NOTE)	SliceAwareANDSP, NssaiChange
n3gNodeReSel	Non3gppAccess	C	0..1	A wrongly selected non-3gpp access node. It shall be provided when available at the NF service consumer and the "NON_3GPP_NODE_RESELECTION" trigger is reported within the "triggers" attribute.	SliceAwareANDSP
sliceN3gNodeSelCap	SliceSpecificN3gNodeSelectionCapability	O	0..1	Indicates whether the UE supports N3IWF/TNGF selection based on the slices the UE wishes to use over untrusted/trusted non-3GPP access. It may be included by the target AMF only in inter-AMF mobility scenarios and for trigger "FEAT_RENEG". It requires that the "SliceAwareANDSP" feature is supported.	FeatureRenegotiation
satBackhaulCategory	SatelliteBackhaulCategory	C	0..1	Indicates types of the satellite backhaul based on satellite types (when satellite backhaul is used) or non-satellite backhaul (when satellite backhaul is not used). It shall be provided for trigger "SAT_CATEGORY_CHG".	EnSatBackhaulCategoryChg
urspEnfRep	map(UrspEnforcementPduSession)	C	1..N	Represents information about the enforced URSP rule(s) in one or more PDU sessions for the affected UE. The key of the map is a character string that represents an integer value (it may correspond with a PDU session identifier). It shall be present when the notified policy control request trigger is "URSP_ENF_INFO".	URSPEnforcement
vpsUePolGuidance	map(UePolicyParameters)	O	1..N	Contains the service parameter used to guide the VPLMN-specific URSP rule determination and may contain the subscription to VPLMN-specific URSP delivery outcome. The key of the map represents the AF request to guide VPLMN-specific URSP rules. This attribute only applies in roaming and when the V-PCF is the NF service consumer.	VPLMNSpecificURSP
lboRoamInfo	array(LboRoamingInformation)	O	1..N	Contains LBO roaming information for a DNN and S-NSSAI combination(s). This attribute only applies in roaming and when the AMF is the NF service consumer.	VPLMNSpecificURSP

accessTypes	array(AccessType)	C	1..N	The Access Type(s) where the served UE is camping. It shall be provided for trigger "ACCESS_TYPE_CH" when the access type(s) changes or when the access type(s) is initially reported as consequence of the provisioning of the trigger.	AccessChange
ratTypes	array(RatType)	C	1..N	The RAT Type(s), if available, for the reported "accessTypes" where the served UE is camping. It shall be provided, if available, for trigger "ACCESS_TYPE_CH" when the access type(s) changes or when the access type(s) is initially reported as consequence of the provisioning of the trigger.	AccessChange
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
rangSlCapab	array(RangSLCapability)	O	1..N	Contains the Ranging/SL related UE capabilities.	Ranging_SL
NOTE: The "mappedHomeSnssai" attribute within the ConfiguredSnssai data type may only be provided if the "NssaiChange" feature is supported.					

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 UE policy association related to the notification. (NOTE 2)	
uePolicy	UePolicy	O	0..1	The UE policy as determined by the H-PCF.	
n2Pc5Pol	N2InfoContent	O	0..1	The N2 PC5 policy for V2X communications as determined by the H-PCF.	V2X
n2Pc5PolA2x	N2InfoContent	O	0..1	The N2 PC5 policy for A2X communications as determined by the H-PCF.	A2X
n2Pc5ProSePol	N2InfoContent	O	0..1	The N2 PC5 policy for 5G ProSe as determined by the PCF.	ProSe
triggers	array(RequestTrigger)	O	1..N	Request Triggers that the PCF subscribes. (NOTE 1)	
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 PresenceInfoRm 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.	PresenceInfo
andspDelInd	PolicyStatus	O	0..1	Information about whether the updated ANDSP/WLANSP has been successfully delivered to the UE.	SliceAwareANDSP
delivReport	map(UePolicyNotification)	O	1..N	Contains the delivery outcome of VPLMN-Specific URSP rules. It may be included if the V-PCF indicated the subscription to delivery outcome events as described in clause 4.2.2.2.3.2. The key of the map represents the AF request of the corresponding subscription, i.e. its value shall match the key that was previously provided by the V-PCF in the “vpsUePolGuidance“ attribute.	VPLMNSpecificURSP
pduSessions	array(PduSessionInfo)	O	1..N	Contains the list of the DNN and SNSSAI pairs for which LBO information is being requested. It may be provided when the "LBO_INFO_CH" request trigger is provided.	VPLMNSpecificURSP
pcfUeInfo	PcfUeCallbackInfo	O	0..1	Contains the PCF for the UE callback information necessary for the PCF for the PDU session to send established/terminated events notifications to the PCF for the UE.	URSPEnforcement

matchPdus	array(PduSessionInfo)	O	1..N	Indicates the matched PDU session(s) for which the AMF shall forward the PCF for the UE information in the "pcfUeInfo" attribute to the SMF. It shall be present when the "pcfUeInfo" attribute is present. (NOTE 3)	URSPEnforcement
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
n2Pc5RsppPol	N2InfoContent	O	0..1	The N2 PC5 policy for Ranging/SL as determined by the H-PCF.	Ranging_SL

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: 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 UE Policy Association resource related to the notification.
NOTE 3: The DNN encoded within the PduSessionInfo element(s) of the "matchPdus" array may contain a full DNN or only the DNN Network Identifier. 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 UE policy association 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 UE Policy Association resource related to the termination notification.

5.6.2.7 Type UePolicyTransferFailureNotification

Table 5.6.2.7-1: UEPolicyTransferFailureNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
cause	UePolicyTransferFailureCause	M	1	Indicates the reason why the UE policy could not be transferred by the AMF. When the feature "EnErrorHandling" is supported, the "cause" attribute may include the enumeration values defined in the "N1N2MessTransferErrorReply" data type.	
retryAfter	Uinteger	O	0..1	The V-PCF may include this IE if the AMF requests to stop sending the N1N2MessageTransfer before timeout of the indicated time period.	EnErrorHandling
ptis	array(Uinteger)	M	1..N	Contains a list of PTI assigned by the H-PCF corresponding to the UE policy(s) which could not be transferred by the AMF.	

5.6.2.8 Type UeRequestedValueRep

Table 5.6.2.8-1: Definition of type UeRequestedValueRep

Attribute name	Data type	P	Cardinality	Description	Applicability
userLoc	UserLocation	C	0..1	The location of the served UE is camping shall be provided for trigger "LOC_CH".	
praStatuses	map(PresenceInfo)	C	1..N	The UE presence statuses for tracking areas shall be provided for trigger "PRA_CH". The "praId" attribute within the PresenceInfo data type shall also be the key of the map.	
plmnId	PlmnIdNid	C	0..1	The serving network identity (a PLMN or an SNPN) of the served UE shall be provided for trigger "PLMN_CH".	PlmnChange
connectState	CmState	C	0..1	The connectivity state of the served UE. It shall be provided for trigger "CON_STATE_CH".	ConnectivityStateChange
satBackhaulCategory	SatelliteBackhaulCategory	C	0..1	Indicates types of the satellite backhaul based on satellite types (when satellite backhaul is used) or non-satellite backhaul (when satellite backhaul is not used). It shall be provided for trigger "SAT_CATEGORY_CHG".	EnSatBackhaulCategoryChg
urspEnfRep	map(UrspEnforcementPduSession)	C	1..N	Represents information about the enforced URSP rule(s) in one or more PDU sessions for the affected UE. The key of the map is a character string that represents an integer value (it may correspond with a PDU session identifier). It shall be present when the notified policy control request trigger is "URSP_ENF_INFO".	URSPEnforcement
lboRoamInfo	array(LboRoamingInformation)	C	1..N	Contains a list of LBO roaming information for a DNN and S-NSSAI combination. It shall be provided for trigger "LBO_INFO_CH".	VPLMNSpecificURSP
confSnssais	array(ConfiguredSnssai)	C	1..N	The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home network corresponding to the configured S-NSSAI in the serving PLMN. It shall be provided for trigger "CONF_NSSAI_CH".	NssaiChange
accessTypes	array(AccessType)	C	1..N	The Access Type(s) where the served UE is camping. Shall be provided for trigger "ACCESS_TYPE_CH".	AccessChange
ratTypes	array(RatType)	C	1..N	The RAT Type(s), if available, for the reported "accessTypes" where the served UE is camping. It shall be provided, if available, for trigger "ACCESS_TYPE_CH.	AccessChange

5.6.2.9 Type UePolicyParameters

Table 5.6.2.9-1: Definition of type UePolicyParameters

Attribute name	Data type	P	Cardinality	Description	Applicability
urspGuidance	array(UrspRuleRequest)	O	1..N	Contains the service parameter used to guide the VPLMN-specific URSP.	
deliveryEvents	array(Event)	O	1..N	Identifies the AF subscribed event(s) related to AF provisioned guidance for VPLMN-specific URSP rules. (NOTE)	
NOTE: In this release of the specification, only the "SUCCESS_UE_POL_DEL_SP" ,"UNSUCCESS_UE_POL_DEL_SP" and if feature "ExtDeliveryOutcome" is supported, "PARTLY_UNSUCC_UE_POL_DEL_SP", "UNSUCCESS_PCF_SERVICE_AUTHORIZATION" events apply.					

5.6.2.10 Type LboRoamingInformation

Table 5.6.2.10-1: Definition of type LboRoamingInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
lboRoamAllowed	boolean	O	0..1	Indicates whether local breakout for the DNN and S-NSSAI is allowed when roaming. true: allowed false: not allowed. If the attribute is absent it means not allowed.	
dnn	Dnn	M	1	Data Network Name with Network Identifier only.	
snssai	Snssai	M	1	S-NSSAI.	

5.6.2.11 Type UrspEnforcementPduSession

Table 5.6.2.11-1: Definition of type UrspEnforcementPduSession

Attribute name	Data type	P	Cardinality	Description	Applicability
urspEnfInfo	UrspEnforcement Info	M	1	Represents UE provided information about the enforced URSP rule(s) in one PDU session.	
sscMode	SscMode	C	0..1	SSC Mode of the PDU session. It shall be provided when URSP rule enforcement information is provided for the first time.	
ueReqDnn	Dnn	C	0..1	UE requested DNN. It shall be provided when URSP rule enforcement information is provided for the first time, if available and different from the selected DNN.	
ueReqPduSession Type	PduSessionType	C	0..1	UE requested PDU session Type. It shall be provided when URSP rule enforcement information is provided for the first time.	
dnn	Dnn	C	0..1	Selected DNN. It shall be provided when URSP rule enforcement information is provided for the first time.	
snssai	Snssai	C	0..1	S-NSSAI of the HPLMN. It shall be provided when URSP rule enforcement information is provided for the first time.	

5.6.2.12 Type UePolicyNotification

Table 5.6.2.12-1: Definition of type UePolicyNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
eventNotifs	array(PcEventNot ification)	M	1..N	Represents the events to be reported according to the subscription to delivery outcome events as described in clause 4.2.2.2.3.2. (NOTE)	
NOTE: In this release of the specification, only the "SUCCESS_UE_POL_DEL_SP" , "UNSUCCESS_UE_POL_DEL_SP" and if feature "ExtDeliveryOutcome" is supported, "PARTLY_UNSUCC_UE_POL_DEL_SP", "UNSUCCESS_PCF_SERVICE_AUTHORIZATION" events apply for the "events" attribute within the PcEventNotification data type.					

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 clauses.

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
UePolicy	Bytes	"MANAGE UE POLICY COMMAND" message content, as defined in Table D.5.1.1.1 of 3GPP TS 24.501 [15]	
UePolicyDeliveryResult	Bytes	"MANAGE UE POLICY COMPLETE" message content, as defined in Table D.5.2.1.1 of 3GPP TS 24.501 [15], or "MANAGE UE POLICY COMMAND REJECT" message content, as defined in Table D.5.3.1.1 of 3GPP TS 24.501 [15]	
UePolicyRequest	Bytes	"UE STATE INDICATION" message content, as defined in Table D.5.4.1.1 of 3GPP TS 24.501 [15] or "UE POLICY PROVISIONING REQUEST" message content, as defined in clause 7.2.1.1 of 3GPP TS 24.587 [24].	

5.6.3.3 Enumeration: RequestTrigger

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

Table 5.6.3.3-1: Enumeration RequestTrigger

Enumeration value	Description	Applicability
LOC_CH	Location change (tracking area): the tracking area of the UE has changed. (NOTE)	
PRA_CH	Change of UE presence in PRA: the 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. (NOTE)	
UE_POLICY	A "MANAGE UE POLICY COMPLETE" message, a "MANAGE UE POLICY COMMAND REJECT" message, as defined in Annex D.5 of 3GPP TS 24.501 [15] has been received by the V-PCF and is being forwarded to the H-PCF, or has been received by a PCF for a PDU session and is being forwarded to the (V-)PCF (and then from the V-PCF to the H-PCF) when the "EpsUrsp" feature is supported. A Namf_Communication_N1N2MessageTransfer failure response as defined in clause 5.2.2.3.1.2 of 3GPP TS 29.518 [14], an N1N2 Transfer Failure Notification as defined in clause 5.2.2.3.2 of 3GPP TS 29.518 [14], a UE Policy transfer failure is notifying to the H-PCF, or a UE Policy transfer failure is notifying to the (V-)PCF when the "EpsUrsp" feature is supported. When the "ProSe" feature is supported it indicates that a "UE POLICY PROVISIONING REQUEST" message, as defined in clause 10.4 of 3GPP TS 24.554 [28] has been received by the V-PCF and is being forwarded to the H-PCF. When the "V2X" feature is supported it indicates that a "UE POLICY PROVISIONING REQUEST" message, as defined in clause 7.2 of 3GPP TS 24.587 [24] has been received by the V-PCF and is being forwarded to the H-PCF. When the "A2X" feature is supported it indicates that a "UE POLICY PROVISIONING REQUEST" message, as defined in 3GPP TS 24.577 [32] has been received by the V-PCF and is being forwarded to the H-PCF. When the "Ranging_SL" feature is supported it indicates that a "UE POLICY PROVISIONING REQUEST" message, as defined in 3GPP TS 24.514 [42] has been received by the V-PCF and is being forwarded to the H-PCF. This event does not require a subscription and is only applicable for the V-PCF as NF service consumer and the H-PCF as NF service producer or a PCF for a PDU session as NF service consumer and the (V-)PCF as NF service producer when the “EpsUrsp” feature is supported.	
PLMN_CH	PLMN change: the serving network (a PLMN or an SNPN) of UE has changed. (NOTE)	PlmnChange
CON_STATE_CH	Connectivity state change: the connectivity state of UE has changed. (NOTE)	ConnectivityStateChange
GROUP_ID_LIST_CHG	UE Internal Group Identifier(s) has changed: the AMF reports that UDM provided list of group Ids has changed. This policy control request trigger does not require a subscription.	GroupIdListChange
UE_CAP_CH	UE Capabilities change: the UE provided 5G ProSe capabilities have changed. This policy control request trigger does not require subscription.	ProSe
SAT_CATEGORY_CHG	Satellite Backhaul Category change: the AMF has detected a change between different satellite backhaul category, or a change between satellite and non-satellite backhaul. (NOTE)	EnSatBackhaulCategoryChg
CONF_NSSAI_CH	Configured NSSAI change: the configured NSSAI has changed. This policy control request trigger only applies in roaming scenarios when the NF service consumer is the AMF. (NOTE)	NssaiChange
NON_3GPP_NODE_RESELECTION	Wrong TNGF or N3IWF: the UE has connected to a wrong non-3GPP access node that does not match its subscribed S-NSSAI(s). This policy control request trigger does not require a subscription.	SliceAwareANDSP
FEAT_RENEG	The target AMF determines feature re-negotiation is required. This policy control request trigger does not require subscription.	FeatureRenegotiation
URSP_ENF_INFO	The V-PCF has received URSP rule enforcement information about the enforced URSP rule(s) in one or more PDU sessions. This trigger only applies in roaming scenarios and to the V-PCF. (NOTE)	URSPEnforcement

LBO_INFO_CH	LBO information change: The AMF reports LBO roaming allowed or not allowed for the requested DNN(s) and S-NSSAI(s). This policy control request trigger only applies in roaming scenarios when the NF service consumer is the AMF. (NOTE)	VPLMNSpecificURSP
ACCESS_TYPE_CH	Access Type change: The registered access type and RAT type has changed, an access type and RAT type is added or removed. (NOTE)	AccessChange

NOTE: The report of this trigger includes reporting the current value at the time the trigger is provisioned during the update or update notification of the policy association.

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 policy association 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 policy association.	

5.6.3.5 Enumeration: Pc5Capability

The enumeration Pc5Capability indicates the specific PC5 RAT(s) which the UE supports for V2X communication over PC5 reference point. It shall comply with the provisions defined in table 5.6.3.5-1.

Table 5.6.3.5-1: Enumeration Pc5Capability

Enumeration value	Description	Applicability
LTE_PC5	This value is used to indicate that the UE supports PC5 LTE RAT for V2X communication over PC5 reference point.	
NR_PC5	This value is used to indicate that the UE supports PC5 NR RAT for V2X communication over PC5 reference point.	
LTE_NR_PC5	This value is used to indicate that the UE supports both PC5 LTE and NR RAT for V2X communication over PC5 reference point.	

5.6.3.6 Enumeration: ProSeCapability

This enumeration indicates the 5G ProSe capabilities. It shall comply with the provisions defined in table 5.6.3.6-1.

Table 5.6.3.6-1: Enumeration ProSeCapability

Enumeration value	Description	Applicability
PROSE_DD	Indicates that the UE supports 5G ProSe Direct Discovery.	
PROSE_DC	Indicates that the UE supports 5G ProSe Direct Communication.	
PROSE_L2_U2N_RELAY	Indicates that the UE supports acting as a Layer-2 5G ProSe UE-to-Network Relay UE.	
PROSE_L3_U2N_RELAY	Indicates that the UE supports acting as a Layer-3 5G ProSe UE-to-Network Relay UE.	
PROSE_L2_REMOTE_UE	Indicates that the UE supports acting as a Layer-2 5G ProSe Remote UE.	
PROSE_L3_REMOTE_UE	Indicates that the UE supports acting as a Layer-3 5G ProSe Remote UE.	
PROSE_L2_U2U_RELAY	Indicates that the UE supports acting as a Layer-2 5G ProSe UE-to-UE Relay UE.	ProSe_Ph2
PROSE_L3_U2U_RELAY	Indicates that the UE supports acting as a Layer-3 5G ProSe UE-to-UE Relay UE.	ProSe_Ph2
PROSE_L2_END_UE	Indicates that the UE supports acting as a Layer-2 5G ProSe End UE.	ProSe_Ph2
PROSE_L3_END_UE	Indicates that the UE supports acting as a Layer-3 5G ProSe End UE.	ProSe_Ph2
PROSE_MH_L2_U2N_RELAY	Indicates that the UE supports acting as a 5G ProSe Layer-2 UE-to-Network Relay UE supporting 5G ProSe Layer-2 multi-hop UE-to-Network Relay.	ProSe_Ph3
PROSE_MH_L3_U2N_RELAY	Indicates that the UE supports acting as a 5G ProSe Layer-3 UE-to-Network Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-Network Relay.	ProSe_Ph3
PROSE_MH_L2_REMOTE_UE	Indicates that the UE supports acting as a 5G ProSe Layer-2 Remote UE supporting 5G ProSe Layer-2 multi-hop UE-to-Network Relay.	ProSe_Ph3
PROSE_MH_L3_REMOTE_UE	Indicates that the UE supports acting as a 5G ProSe Layer-3 Remote UE supporting 5G ProSe Layer-3 multi-hop UE-to-Network Relay.	ProSe_Ph3
PROSE_MH_L2_INTERMEDIATE_UE	Indicates that the UE supports acting as a 5G ProSe Layer-2 Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 multi-hop UE-to-Network Relay.	ProSe_Ph3
PROSE_MH_L3_INTERMEDIATE_UE	Indicates that the UE supports acting as a 5G ProSe Layer-3 Intermediate UE-to-Network Relay supporting 5G ProSe Layer-3 multi-hop UE-to-Network Relay.	ProSe_Ph3
PROSE_MH_L3_U2U_RELAY	Indicates that the UE supports acting as a 5G ProSe Layer-3 UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.	ProSe_Ph3
PROSE_MH_L3_END_UE	Indicates that the UE supports acting as a 5G ProSe Layer-3 End UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.	ProSe_Ph3

5.6.3.7 Enumeration: Non3gppAccess

The enumeration Non3gppAccess represents the possible Non-3gpp access nodes. It shall comply with the provisions defined in table 5.6.3.7-1.

Table 5.6.3.7-1: Non3gppAccess

Enumeration value	Description	Applicability
N3IWF	Non-3gpp Interworking Function	
TNGF	Trusted Non-3GPP Gateway Function	

5.6.3.8 Void

5.6.3.9 Enumeration: N1N2MessTransferErrorReply

The enumeration N1N2MessTransferErrorReply represents the possible errors the V-PCF may send to the H-PCF when the V-PCF receives from the AMF an error reply to the N1N2MessageTransfer request. It shall comply with the provisions defined table 5.6.3.9-1.

Table 5.6.3.9-1: N1N2MessTransferErrorReply

Enumeration value	Description	Applicability
UE_NOT_REACHABLE	The UE is not reachable for paging.	
UNSPECIFIED	Unspecified error.	

5.6.3.10 Enumeration: RangSLCapability

The enumeration RangSLCapability represents the Ranging and Sidelink Capability. It shall comply with the provisions defined in table 5.6.3.10-1.

Table 5.6.3.10-1: Enumeration RangSLCapability

Enumeration value	Description	Applicability
PC5_RANGING_SL	Indicates that the PC5 Capability for Ranging and Sidelink is supported by the UE.	

5.6.3.11 Enumeration: PolicyStatus

The enumeration PolicyStatus represents the configuration status of a UE Policy in the UE. It shall comply with the provisions defined in table 5.6.3.11-1.

Table 5.6.3.11-1: PolicyStatus

Enumeration value	Description	Applicability
CONFIGURED	The UE Policy is configured in the UE.	
NOT_CONFIGURED	The UE Policy is not configured in the UE.	

5.6.3.12 Enumeration: A2xCapability

The enumeration A2xCapability indicates the A2X capabilities the UE supports for A2X communication. It shall comply with the provisions defined in table 5.6.3.12-1.

Table 5.6.3.12-1: Enumeration A2xCapability

Enumeration value	Description	Applicability
EUTRA_PC5	This value is used to indicate that the UE supports PC5 E-UTRA RAT for A2X communication over PC5 reference point.	
NR_PC5	This value is used to indicate that the UE supports PC5 NR RAT for A2X communication over PC5 reference point.	
UU	This value is used to indicate that the UE supports A2X communication over Uu reference point.	

5.6.3.13 Enumeration: SliceSpecificN3gNodeSelectionCapability

Table 5.6.3.13-1: SliceSpecificN3gNodeSelectionCapability

Enumeration value	Description	Applicability
ONLY_N3IWF_SS_SEL	Indicates that the UE supports N3IWF selection based on the slices the UE wishes to use over untrusted non-3GPP access.	
ONLY_TNGF_SS_SEL	Indicates that the UE supports TNGF selection based on the slices the UE wishes to use over trusted non-3GPP access.	
TNGF_N3IWF_SS_SEL	Indicates that the UE supports N3IWF selection based on the slices the UE wishes to use over untrusted non-3GPP access and TNGF selection based on the slices the UE wishes to use over trusted non-3GPP access.	

5.6.4 Data types describing alternative data types or combinations of data types

5.6.4.1 Type: UePolicyTransferFailureCause

Table 5.6.4.1-1: Definition of type UePolicyTransferFailureCause as a list of non-exclusive alternatives

Data type	Cardinality	Description	Applicability
N1N2MessageTransferCause	0..1	The failure causes notified by the AMF within the N1 Message Transfer Failure notification.	
N1N2MessTransferErrorReply	0..1	Error reply the AMF may indicate within the response to N1N2MessageTransfer request.	

5.7 Error handling

5.7.1 General

For the Npcf_UEPolicyControl 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_UEPolicyControl API.

5.7.2 Protocol Errors

No specific protocol errorsfor the Npcf_UEPolicyControl API are specified.

5.7.3 Application Errors

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

Table 5.7.3-1: Application errors when PCF acts as a server

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 UE 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 UE 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_UEPolicyControl 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	PendingTransaction	This feature indicates support for the race condition handling as defined in 3GPP TS 29.513 [7].
2	PlmnChange	This feature indicates support for the change of PLMN trigger handling.
3	ConnectivityStateChange	This feature indicates support for the UE connectivity state change trigger handling.
4	V2X	This feature indicates support for the UE policy provisioning and N2 information provisioning for V2X communications.
5	GroupIdListChange	This feature indicates the support for the notification of changes in the list of internal group identifiers.
6	ImmediateReport	This feature indicates the support of the current applicable values report corresponding to the policy control request triggers for policy update notification.
7	ErrorResponse	This feature indicates support for "404 Not Found" error response code for policy update notification between AMF and (V-)PCF.
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	ProSe	This feature indicates support of UE policy and N2 information provisioning for 5G ProSe.
10	FeatureRenegotiation	This feature indicates the support of feature renegotiation during the update of a policy association triggered by UE mobility with AMF change.
11	SliceAwareANDSP	This feature indicates the support of ANDSP/WLANSP policies that consider the slices supported by the UE.
12	EpsUrsp	This feature indicates support of URSP provisioning in EPS and is only applicable in the case of of 5GC and EPC interworking.
13	EnSatBackhaulCategoryChg	This feature indicates the support of notification of a change between different satellite backhaul categories, or dynamic satellite backhaul categories, or between satellite backhaul and non-satellite backhaul.
14	UECapabilityIndication	This feature indicates the support of the provisioning by the H-PCF to the V-PCF of the UE Capability for UE Policy, when the UE Capability is not received from the UE and the information is available and reliable in the UDR.
15	A2X	This feature indicates support of A2X communications.
16	NssaiChange	This feature indicates support for the change of Configured NSSAI trigger handling.
17	ProSe_Ph2	This feature indicates the support of UE policy and N2 information provisioning for 5G ProSe UE-to-UE Relay function. This feature requires that the "ProSe" feature is also supported.
18	PresenceInfo	The feature indicates the support of policy update to remove the existing presence reporting areas entry.
19	URSPEnforcement	This feature indicates the support of the report of URSP rule enforcement information by the V-PCF to the H-PCF.
20	VPLMNSpecificURSP	This feature indicates the support of AF guidance on VPLMN-specific URSP rules. It requires the support of NssaiChange feature.
21	Ranging_SL	This feature indicates the support of the ranging and sidelink positioning functionality. The following functionalities are supported: - Support for the UE policy provisioning and N2 information provisioning for Ranging and sidelink positioning.
22	AccessChange	This feature indicates the support of the reporting of an access type and RAT type changes, the addition of an access type and RAT type or the removal of an existing access type and RAT type.
23	EnErrorHandling	This feature indicates the support of the indication from the V-PCF to the H-PCF of the received AMF error response to the UE Policy Delivery transfer request.
24	SLAMUP	This feature indicates the support of the provisioning to the AMF of the CHF information of the CHF selected by the PCF for UE policy.

25	EnhEstRoaming	The feature enhanced UE Policy Establishment procedure in roaming scenarios indicates the provisioning of the AMF to the V-PCF of the H-PCF Set Id and H-PCF URI of the selected H-PCF ID.
26	ProSe_Ph3	This feature indicates the support of the second set of enhancements to the 5G ProSe functionality. The following sub-functionalities are supported: - Support UE policy and N2 information provisioning for Multi-hop UE-to-Network Relay. - Support UE policy and N2 information provisioning for Layer-3 Multi-hop UE-to-UE Relay. This feature requires that the "ProSe_Ph2" feature is also supported.
27	CHFGroup	This feature indicates the support of the CHF Group ID handling for the discovery of the CHF.
28	ExtDeliveryOutcome	Indicates the support of notifications about the unsuccessfully executed UE policy outcome together with the partially unsuccessful UE policy delivery event related to the invocation of AF provisioned service parameters. This feature requires the support of VPLMNSpecificURSP feature.

5.9 Security

As indicated in 3GPP TS 33.501 [19] and 3GPP TS 29.500 [5], the access to the Npcf_UEPolicyControl 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 consumer, prior to consuming services offered by the Npcf_UEPolicyControl 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_UEPolicyControl service.

The Npcf_UEPolicyControl API defines a single scope "npcf-ue-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_UEPolicyControl 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_UEPolicyControl API

```
openapi: 3.0.0

info:
  version: 1.4.2
  title: Npcf_UEPolicyControl
  description: |
    UE Policy Control Service.
    © 2026, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.525 V19.7.0; 5G System; UE Policy Control Service.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.525/'

servers:
  - url: '{apiRoot}/npcf-ue-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-ue-policy-control

paths:
  /policies:
    post:
      operationId: CreateIndividualUEPolicyAssociation
      summary: Create individual UE policy association.
      tags:
        - UE 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-ue-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/UeRequestedValueRep'
            '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: ReadIndividualUEPolicyAssociation
      summary: Read individual UE policy association.
      tags:
        - Individual UE 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: DeleteIndividualUEPolicyAssociation
    summary: Delete individual UE policy association.
    tags:
      - Individual UE 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: ReportObservedEventTriggersForIndividualUEPolicyAssociation
    summary: >
      Report observed event triggers and possibly obtain updated policies for an individual UE
      policy association.
    tags:
      - Individual UE 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-ue-policy-control: Access to the Npcf_UEPolicyControl API

  schemas:
    PolicyAssociation:
      description: >
        Contains the description of a policy association that is returned by the PCF when a policy
        Association is created, updated, or read.
      type: object
      properties:
        request:
          $ref: '#/components/schemas/PolicyAssociationRequest'
        uePolicy:
          $ref: '#/components/schemas/UePolicy'
        n2Pc5Pol:
          $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
        n2Pc5PolA2x:
          $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
        n2Pc5ProSePol:
          $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
        triggers:
          type: array
          items:
            $ref: '#/components/schemas/RequestTrigger'
          minItems: 1
          description: >
            Request Triggers that the PCF subscribes.
        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.
        andspDelInd:
          $ref: '#/components/schemas/PolicyStatus'
        andspInd:
          description: >
            Indication of UE support of ANDSP. When set to true, it indicates the UE supports ANDSP,
            when set to false it indicates the UE does not support ANDSP.
          type: boolean
        pduSessions:
          type: array
```

```
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
        minItems: 1
        description: Combination of DNN and S-NSSAIs for which LBO information is requested.
      chfInfo:
        $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/ChargingInformation'
      chfGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      n2Pc5RsppPol:
        $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
      pcfUeInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
      matchPdus:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
        minItems: 1
    required:
      - suppFeat

  PolicyAssociationRequest:
    description: >
      Represents information that the NF service consumer provides when requesting the creation 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.
      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
        description: >
          The Access Type(s) where the served UE is camping.
          It shall be provided, if available, for trigger "ACCESS_TYPE_CH.
      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
        description: >
```

```
        The RAT Type(s), if available, for the reported "accessTypes" where the served UE is
        camping. It shall be provided, if available, for trigger "ACCESS_TYPE_CH.
    groupIds:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
      minItems: 1
    hPcfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    hPcfUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    hPcfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    uePolReq:
      $ref: '#/components/schemas/UePolicyRequest'
    guami:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
    serviceName:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/ServiceName'
    servingNfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    pc5Capab:
      $ref: '#/components/schemas/Pc5Capability'
    a2xCapab:
      type: array
      items:
        $ref: '#/components/schemas/A2xCapability'
      minItems: 1
    proSeCapab:
      type: array
      items:
        $ref: '#/components/schemas/ProSeCapability'
      minItems: 1
    confSnssais:
      type: array
      items:
        $ref: 'TS29531_Nnssf_NSSelection.yaml#/components/schemas/ConfiguredSnssai'
      minItems: 1
      description: >
        The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home
        network corresponding to the configured S-NSSAI in the serving PLMN.
    n3gNodeReSel:
      $ref: '#/components/schemas/Non3gppAccess'
    sliceN3gNodeSelCap:
      $ref: '#/components/schemas/SliceSpecificN3gNodeSelectionCapability'
    satBackhaulCategory:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
    5gsToEpsMob:
      type: boolean
      description: >
        It indicates the UE Policy Association is triggered by a 5GS to EPS mobility
        scenario.
    vpsUePolGuidance:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/UePolicyParameters'
      minProperties: 1
      description: >
        Contains the service parameter used to guide the VPLMN-specific URSP and may contain
        the subscription to VPLMN-specific URSP delivery outcome.
        The key of the map represents the AF request to guide VPLMN-specific URSP rules.
        This attribute only applies in roaming and when the V-PCF is the NF service consumer.
    lboRoamInfo:
      type: array
      items:
        $ref: '#/components/schemas/LboRoamingInformation'
      minItems: 1
      description: >
        Contains LBO roaming information for DNN and S-NSSAI combination(s).
        This attribute only applies in roaming and when the AMF is the NF service consumer.
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    rangSlCapab:
      type: array
      items:
        $ref: '#/components/schemas/RangSLCapability'
      minItems: 1
  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.
        praStatuses:
          type: object
          additionalProperties:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
          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.
          minProperties: 1
        userLoc:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
        uePolDelResult:
          $ref: '#/components/schemas/UePolicyDeliveryResult'
        uePolTransFailNotif:
          $ref: '#/components/schemas/UePolicyTransferFailureNotification'
        uePolReq:
          $ref: '#/components/schemas/UePolicyRequest'
        guami:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
        servingNfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        plmnId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
        connectState:
          $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/CmState'
        groupIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
          minItems: 1
        pc5Capab:
          $ref: '#/components/schemas/Pc5Capability'
        a2xCapab:
          type: array
          items:
            $ref: '#/components/schemas/A2xCapability'
          minItems: 1
        proSeCapab:
          type: array
          items:
            $ref: '#/components/schemas/ProSeCapability'
          minItems: 1
        confSnssais:
```

```
        type: array
        items:
          $ref: 'TS29531_Nnssf_NSSelection.yaml#/components/schemas/ConfiguredSnssai'
        minItems: 1
        description: >
          The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home
          network corresponding to the configured S-NSSAI in the serving PLMN.
      n3gNodeReSel:
        $ref: '#/components/schemas/Non3gppAccess'
      sliceN3gNodeSelCap:
        $ref: '#/components/schemas/SliceSpecificN3gNodeSelectionCapability'
      satBackhaulCategory:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
      urspEnfRep:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/UrspEnforcementPduSession'
        description: >
          Contains information about the enforced URSP rule(s) in one or more PDU sessions.
          The key of the map is a character string that represents an integer value.
        minProperties: 1
      vpsUePolGuidance:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/UePolicyParameters'
        minProperties: 1
        description: >
          Contains the service parameter used to guide the VPLMN-specific URSP and may contain
          the subscription to VPLMN-specific URSP delivery outcome.
          The key of the map represents the AF request to guide VPLMN-specific URSP rules.
          This attribute only applies in roaming and when the V-PCF is the NF service consumer.
        nullable: true
      lboRoamInfo:
        type: array
        items:
          $ref: '#/components/schemas/LboRoamingInformation'
        minItems: 1
        description: >
          Contains LBO roaming information for DNN and S-NSSAI combination(s).
          This attribute only applies in roaming and when the AMF is the NF service consumer.
      accessTypes:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
        minItems: 1
        description: >
          The Access Type(s) where the served UE is camping.
          It shall be provided, if available, for trigger "ACCESS_TYPE_CH.
      ratTypes:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
        minItems: 1
        description: >
          The RAT Type(s), if available, for the reported "accessTypes" where the served UE is
          camping. It shall be provided, if available, for trigger "ACCESS_TYPE_CH.
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      rangSlCapab:
        type: array
        items:
          $ref: '#/components/schemas/RangSLCapability'
        minItems: 1
        description: >
          Contains the Ranging/SL related UE capabilities.

  PolicyUpdate:
    description: >
      Represents updated policies that the PCF provides in a notification or in the reply to an
      Update Request.
    type: object
    properties:
      resourceUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      uePolicy:
        $ref: '#/components/schemas/UePolicy'
      n2Pc5Pol:
        $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
```

```
      n2Pc5PolA2x:
        $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
      n2Pc5ProSePol:
        $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
      triggers:
        type: array
        items:
          $ref: '#/components/schemas/RequestTrigger'
        minItems: 1
        nullable: true
        description: >
          Request Triggers that the PCF subscribes.
      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 PresenceInfoRm data type is the key of the map.
        minProperties: 1
        nullable: true
      andspDelInd:
        $ref: '#/components/schemas/PolicyStatus'
      delivReport:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/UePolicyNotification'
        minProperties: 1
        description: >
          Contains the delivery outcome of the VPLMN-specific URSP.
          The key of the map represents the AF request of the corresponding subscription, i.e. its
          value shall match the key that was previously provided by the V-PCF in the
          vpsUePolGuidance attribute.
          This attribute only applies in roaming and when the V-PCF is the NF service consumer.
      pduSessions:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
        minItems: 1
        description: >
          Combination of DNN and S-NSSAIs for which LBO information is requested.
        nullable: true
      pcfUeInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
      matchPdus:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionInfo'
        minItems: 1
        nullable: true
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      n2Pc5RsppPol:
        $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N2InfoContent'
    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

  UePolicyTransferFailureNotification:
    description: >
      Represents information on the failure of a UE policy transfer to the UE because the UE is
      not reachable.
    type: object
    properties:
      cause:
```

```
        $ref: '#/components/schemas/UePolicyTransferFailureCause'
      retryAfter:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      ptis:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
        minItems: 1
        description: >
          This contains a list of PTI assigned by the H-PCF corresponding to the UE policy(s)
          which could not be transferred by the AMF.
    required:
      - cause
      - ptis

  UeRequestedValueRep:
    description: >
      Contains 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.
      plmnId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
      connectState:
        $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/CmState'
      confSnssais:
        type: array
        items:
          $ref: 'TS29531_Nnssf_NSSelection.yaml#/components/schemas/ConfiguredSnssai'
        minItems: 1
        description: >
          The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home
          network corresponding to the configured S-NSSAI in the serving PLMN.
      satBackhaulCategory:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
      urspEnfRep:
        type: object
        additionalProperties:
          $ref: '#/components/schemas/UrspEnforcementPduSession'
        description: >
          Contains information about the enforced URSP rule(s) in one or more PDU sessions.
          The key of the map is a character string that represents an integer value.
        minProperties: 1
      lboRoamInfo:
        type: array
        items:
          $ref: '#/components/schemas/LboRoamingInformation'
        minItems: 1
        description: >
          Contains LBO roaming information for DNN and S-NSSAI combination(s).
      accessTypes:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
        minItems: 1
        description: >
          The Access Type(s) where the served UE is camping.
          It shall be provided, if available, for trigger "ACCESS_TYPE_CH.
      ratTypes:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
        minItems: 1
        description: >
          The RAT Type(s), if available, for the reported "accessTypes" where the served UE is
          camping. It shall be provided, if available, for trigger "ACCESS_TYPE_CH.

  UePolicyParameters:
    description: >
```

```
      Contains the service parameters used to guide the VPLMN-specific URSP rule determination.
    type: object
    properties:
      urspGuidance:
        type: array
        items:
          $ref: 'TS29522_ServiceParameter.yaml#/components/schemas/UrspRuleRequest'
        minItems: 1
        description: >
          Contains the service parameter used to guide the VPLMN-specific URSP.
      deliveryEvents:
        type: array
        items:
          $ref: 'TS29522_ServiceParameter.yaml#/components/schemas/Event'
        minItems: 1
        description: >
          AF subscribed event(s) notifications related to AF provisioned guidance
          for VPLMN-specific URSP rules.
        nullable: true
    nullable: true

  LboRoamingInformation:
    description: >
      Contains LBO roaming information for a DNN and S-NSSAI.
    type: object
    properties:
      lboRoamAllowed:
        type: boolean
        description: >
          Indicates whether LBO for the DNN and S-NSSAI is allowed when roaming.
      dnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    required:
      - dnn
      - snssai

  UrspEnforcementPduSession:
    description: >
      Represents URSP rule enforcement information for a PDU session.
    type: object
    required:
      - urspEnfInfo
    properties:
      urspEnfInfo:
        $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/UrspEnforcementInfo'
      sscMode:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SscMode'
      ueReqDnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      ueReqPduSessionType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
      dnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      snssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'

  UePolicyNotification:
    description: >
      Contains the delivery outcome of VPLMN-specific URSP rules.
    type: object
    required:
      - eventNotifs
    properties:
      eventNotifs:
        type: array
        items:
          $ref: 'TS29523_Npcf_EventExposure.yaml#/components/schemas/PcEventNotification'
        minItems: 1
        description: >
          Represents the events to be reported according to the subscription to notifications
          of VPLMN-specific URSP delivery outcome events.

  UePolicy:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'

  UePolicyDeliveryResult:
```

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

    UePolicyRequest:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'

    RequestTrigger:
      anyOf:
      - type: string
        enum:
          - LOC_CH
          - PRA_CH
          - UE_POLICY
          - PLMN_CH
          - CON_STATE_CH
          - GROUP_ID_LIST_CHG
          - UE_CAP_CH
          - SAT_CATEGORY_CHG
          - NON_3GPP_NODE_RESELECTION
          - CONF_NSSAI_CH
          - LBO_INFO_CH
          - FEAT_RENEG
          - URSP_ENF_INFO
          - ACCESS_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.
        - UE_POLICY: A MANAGE UE POLICY COMPLETE message or a MANAGE UE POLICY COMMAND REJECT
          message, as defined in Annex D.5 of 3GPP TS 24.501 or a "UE POLICY PROVISIONING REQUEST"
          message, as defined in clause 7.2.1.1 of 3GPP TS 24.587, has been received by the AMF
          and is being forwarded.
        - PLMN_CH: PLMN change. the serving PLMN of UE has changed.
        - CON_STATE_CH: Connectivity state change: the connectivity state of UE has changed.
        - GROUP_ID_LIST_CHG: UE Internal Group Identifier(s) has changed. This policy
          control request
          trigger does not require a subscription.
        - UE_CAP_CH: UE Capabilities change: the UE provided 5G ProSe capabilities have changed.
          This policy control request trigger does not require subscription.
        - SAT_CATEGORY_CHG: Indicates that the AMF has detected a change between different satellite
          category, or non-satellite backhaul.
        - NON_3GPP_NODE_RESELECTION: The UE has connected to a wrong non-3GPP access node that
          does not match its subscribed S-NSSAI(s). This policy control request trigger does not
          require a subscription.
        - CONF_NSSAI_CH: Configured NSSAI change. Indicates that the configured NSSAI has changed.
        - LBO_INFO_CH: LBO information change. The AMF reports LBO roaming allowed or not allowed
          for the requested DNN(s) and S-NSSAI(s). This policy control request trigger only applies
          in roaming scenarios when the NF service consumer is the AMF.
        - FEAT_RENEG: The NF service consumer notifies that the target AMF is requesting feature
          re-negotiation.
        - URSP_ENF_INFO: The V-PCF has received URSP rule enforcement information about the enforced
          URSP rule(s) in one or more PDU sessions. This trigger applies in roaming scenarios and
          to the V-PCF.
        - ACCESS_TYPE_CH: Access Type change. The registered access type and RAT type
          has changed, an access type and RAT type is added or removed.

    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 policy association termination.
        Possible values are:
```

```
      - UNSPECIFIED: This value is used for unspecified reasons.
      - UE_SUBSCRIPTION: This value is used to indicate that the policy association 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 policy association.

    Pc5Capability:
      anyOf:
      - type: string
        enum:
          - LTE_PC5
          - NR_PC5
          - LTE_NR_PC5
      - 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 specific PC5 RAT(s) which the UE supports for V2X communications over
        PC5 reference point.
        Possible values are:
        - LTE_PC5: This value is used to indicate that UE supports PC5 LTE RAT for V2X
          communications over the PC5 reference point
        - NR_PC5: This value is used to indicate that UE supports PC5 NR RAT for V2X communications
          over the PC5 reference point.
        - LTE_NR_PC5: This value is used to indicate that UE supports both PC5 LTE and NR RAT for
          V2X communications over the PC5 reference point.

    ProSeCapability:
      anyOf:
      - type: string
        enum:
          - PROSE_DD
          - PROSE_DC
          - PROSE_L2_U2N_RELAY
          - PROSE_L3_U2N_RELAY
          - PROSE_L2_REMOTE_UE
          - PROSE_L3_REMOTE_UE
          - PROSE_L2_U2U_RELAY
          - PROSE_L3_U2U_RELAY
          - PROSE_L2_END_UE
          - PROSE_L3_END_UE
          - PROSE_MH_L2_U2N_RELAY
          - PROSE_MH_L3_U2N_RELAY
          - PROSE_MH_L2_REMOTE_UE
          - PROSE_MH_L3_REMOTE_UE
          - PROSE_MH_L2_INTERMEDIATE_UE
          - PROSE_MH_L3_INTERMEDIATE_UE
          - PROSE_MH_L3_U2U_RELAY
          - PROSE_MH_L3_END_UE
      - type: string
        description: >
          This string provides forward-compatibility with future
          extensions to the enumeration but is not used to encode
          the content defined in the present version of this API.
      description: |
        Represents the 5G ProSe capabilities.
        Possible values are:
        - PROSE_DD: This value is used to indicate that 5G ProSe Direct Discovery is supported
          by the UE.
        - PROSE_DC: This value is used to indicate that 5G ProSe Direct Communication is supported
          by the UE.
        - PROSE_L2_U2N_RELAY: This value is used to indicate that Layer-2 5G ProSe UE-to-Network
          Relay is supported by the UE.
        - PROSE_L3_U2N_RELAY: This value is used to indicate that Layer-3 5G ProSe UE-to-Network
          Relay is supported by the UE.
        - PROSE_L2_REMOTE_UE: This value is used to indicate that Layer-2 5G ProSe Remote UE is
          supported by the UE.
        - PROSE_L3_REMOTE_UE: This value is used to indicate that Layer-3 5G ProSe Remote UE is
          supported by the UE.
        - PROSE_L2_U2U_RELAY: This value is used to indicate that Layer-2 5G ProSe UE-to-UE
          Relay is supported by the UE.
        - PROSE_L3_U2U_RELAY: This value is used to indicate that Layer-3 5G ProSe UE-to-UE
          Relay is supported by the UE.
        - PROSE_L2_END_UE: This value is used to indicate that Layer-2 5G ProSe End UE is
          supported by the UE.
        - PROSE_L3_END_UE: This value is used to indicate that Layer-3 5G ProSe End UE is
```

```
        supported by the UE.
      - PROSE_MH_L2_U2N_RELAY: Indicates that the UE supports acting as a 5G ProSe Layer-2
        UE-to-Network Relay UE supporting 5G ProSe Layer-2 multi-hop UE-to-Network Relay.
      - PROSE_MH_L3_U2N_RELAY: Indicates that the UE supports acting as a 5G ProSe Layer-3
        UE-to-Network Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-Network Relay.
      - PROSE_MH_L2_REMOTE_UE: Indicates that the UE supports acting as a 5G ProSe Layer-2 Remote
        UE supporting 5G ProSe Layer-2 multi-hop UE-to-Network Relay.
      - PROSE_MH_L3_REMOTE_UE: Indicates that the UE supports acting as a 5G ProSe Layer-3 Remote
        UE supporting 5G ProSe Layer-3 multi-hop UE-to-Network Relay.
      - PROSE_MH_L2_INTERMEDIATE_UE: Indicates that the UE supports acting as a 5G ProSe Layer-2
        Intermediate UE-to-Network Relay supporting 5G ProSe Layer-2 multi-hop UE-to-Network
        Relay.
      - PROSE_MH_L3_INTERMEDIATE_UE: Indicates that the UE supports acting as a 5G ProSe Layer-3
        Intermediate UE-to-Network Relay supporting 5G ProSe Layer-3 multi-hop UE-to-Network
        Relay.
      - PROSE_MH_L3_U2U_RELAY: Indicates that the UE supports acting as a 5G ProSe Layer-3
        UE-to-UE Relay UE supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.
      - PROSE_MH_L3_END_UE: Indicates that the UE supports acting as a 5G ProSe Layer-3 End UE
        supporting 5G ProSe Layer-3 multi-hop UE-to-UE Relay.

  Non3gppAccess:
    anyOf:
    - type: string
      enum:
        - N3IWF
        - TNGF
    - 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 a non-3gpp access node.
      Possible values are:
      - N3IWF: Non-3gpp Interworking Function.
      - TNGF: Trusted Non-3gpp Gateway Function.

  N1N2MessTransferErrorReply:
    anyOf:
    - type: string
      enum:
        - UE_NOT_REACHABLE
        - UNSPECIFIED
    - 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 an N1N2 Message Transfer error.
      Possible values are:
      - UE_NOT_REACHABLE: The UE is not reachable for paging.
      - UNSPECIFIED: Unspecified error.

  RangSLCapability:
    anyOf:
    - type: string
      enum:
        - PC5_RANGING_SL
    - 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: |
      Indicates the Ranging and Sidelink Capability.
      Possible values are:
      - PC5_RANGING_SL: Indicates that the PC5 Capability for Ranging and Sidelink is supported
        by the UE.

  PolicyStatus:
    anyOf:
    - type: string
      enum:
        - CONFIGURED
        - NOT_CONFIGURED
    - 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 configuration status of a UE Policy in the UE.
        Possible values are:
        - CONFIGURED: The UE Policy is configured in the UE.
        - NOT_CONFIGURED: The UE Policy is not configured in the UE.

    A2xCapability:
      anyOf:
      - type: string
        enum:
          - EUTRA_PC5
          - NR_PC5
          - UU
      - 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 A2X capabilities the UE supports for A2X communication.
        Possible values are:
        - EUTRA_PC5: This value is used to indicate that the UE supports PC5 EUTRA RAT for A2X
          communications over the PC5 reference point
        - NR_PC5: This value is used to indicate that the UE supports PC5 NR RAT for A2X
          communications over the PC5 reference point.
        - UU: This value is used to indicate that UE supports A2X communications over the Uu
          reference point.

    SliceSpecificN3gNodeSelectionCapability:
      anyOf:
      - type: string
        enum:
          - ONLY_N3IWF_SS_SEL
          - ONLY_TNGF_SS_SEL
          - TNGF_N3IWF_SS_SEL
      - 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 UE capabilities with regard to slice-specific non-3gpp node selection.
        Possible values are:
        - ONLY_N3IWF_SS_SEL: Indicates that the UE supports N3IWF selection based on the slices
          the UE wishes to use over untrusted non-3GPP access.
        - ONLY_TNGF_SS_SEL: Indicates that the UE supports TNGF selection based on the slices
          the UE wishes to use over trusted non-3GPP access.
        - TNGF_N3IWF_SS_SEL: Indicates that the UE supports N3IWF selection based on the slices
          the UE wishes to use over untrusted non-3GPP access and TNGF selection based on the
          slices the UE wishes to use over trusted non-3GPP access.
#
    UePolicyTransferFailureCause:
      description: UE Policy Transfer Failure Cause.
      anyOf:
        - $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/N1N2MessageTransferCause'
        - $ref: '#/components/schemas/N1N2MessTransferErrorReply'
```

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

B.1 Scope

This annex provides the stage 3 definition of the UE Policy Control Service for wireless and wireline convergence access support for 5GS.

The stage 2 definition and procedures of the UE Policy Control Service for wireless and wireline convergence access support for 5GS are contained in 3GPP TS 23.316 [23].

B.2 Npcf_UEPolicyControl Service

B.2.1 Service Description

B.2.1.1 Overview

Clause 4.1.1 applies with the modification that the 5G-RG and FN-RG replace the UE. Only URSP policies are applicable for a 5G-RG or an FN-RG connected via wireline access.

The support of PIN by 5G-RG or FN-RG is not specified.

NOTE: The URSPs related to the FN-RG are delivered to 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 (V-PCF and H-PCF specific functionality) shall not apply in this Release of the specification for UE 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 differences:

- Only URSP policies are applicable. The PCF should not provide any UE policy other than URSP for a 5G-RG connected via wireline access.
- If the PCF provides the URSP policy to the 5G-RG or FN-RG, the PCF should only provide the following URSP policy information:
  - Rule Precedence.
  - Traffic Descriptor, including only: Application descriptors (not applicable for FN-RG), IP descriptors, Domain descriptors (not applicable for FN-RG), Non-IP descriptors, DNN (not applicable for FN-RG), Connection Capabilities (not applicable for FN-RG), Connectivity Group ID (not applicable for FN-RG), or "match all" traffic descriptor (not applicable for FN-RG).
  - Route Selection Descriptor Precedence.
  - Route selection components, including only: SSC Mode Selection, Network Slice Selection, DNN Selection, PDU Session Type Selection.

- Route Selection Validation Criteria, including only: Time Window

- The Visited Policy Control Function (V-PCF) shall not apply for 5G-RG connecting via wireline access and FN-RG.

- The PCF provides the UE access selection and PDU session selection policy control as described in this Annex.

B.2.1.3.2 NF Service Consumers

The NF service consumer functionality shall apply as defined in clause 4.1.3.2 with the differences described in this Annex.

B.3 Service Operations

B.3.1 Introduction

Clause 4.2.1 is applied with the following differences:

- UE is replaced by the 5G-RG or or FN-RG.

- Update of an UE Policy Association for the case that the AMF is relocated due to the UE mobility and the old PCF is selected is not applicable when the 5G-RG or FN-RG connects the 5GC via wireline access.

- Roaming scenario is not applicable when the 5G-RG or FN-RG connects the 5GC via wireline access in this release of specification.

B.3.2 Npcf_UEPolicyControl_Create Service Operation

B.3.2.1 General

Clause 4.2.2.1 is applied with the following differences:

- UE is replaced by the 5G-RG or FN-RG. The 5G-RG connecting via wireline access and the FN-RG do not indicate the support of the URSP rule enforcement capability as described in clause 4.13 of 3GPP TS 24.501 [15].

- The PEI that may be included within the "pei" attribute shall have one of the following representations:

  i. If the 5G-BRG supports only wireline access, the PEI shall be the 5G-BRG MAC address.

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

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

  iv. 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 of the FN-RG, the PEI cannot be trusted for regulatory purposes and cannot be used for equipment based policy evaluation.

- When the 5G-BRG or FN-BRG connects the 5GC via W-5GBAN, the "n3gaLocation" attribute shall be included in the "userLoc" attribute. Within the "n3gaLocation" attribute:

  - the Global Line Identifier shall be included in 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 is encoded 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.
- Roaming scenario is not applicable when the 5G-RG or FN-RG connects the 5GC via wireline access in this release of specification.
- The PCF should neither include NSWO indication nor any policies other than URSP in the UE Policy.

B.3.3 Npcf_UEPolicyControl_Update Service Operation

B.3.3.1 General

Clause 4.2.3.1 is applied with the following differences:

- UE is replaced by the 5G-RG or FN-RG.
- Roaming scenario is not applicable when the 5G-RG or FN-RG connects the 5GC via wireline access in this release of specification.
- The PCF should neither include NSWO indication nor any policies other than URSP in the UE Policy.

B.3.4 Npcf_UEPolicyControl_UpdateNotify Service

B.3.4.1 General

Clause 4.2.4.1 is applied with the following differences:

- UE is replaced by the 5G-RG or FN-RG.
- Roaming scenario is not applicable when the 5G-RG or FN-RG connects the 5GC via wireline access in this release of specification.
- The PCF should neither include NSWO indication nor any policies other than URSP in the UE Policy.

B.3.5 Npcf_UEPolicyControl_Delete Service Operation

B.3.5.1 General

Clause 4.2.5 is applied with the following differences:

- UE is replaced by the 5G-RG or FN-RG.
- Roaming scenario is not applicable when the 5G-RG or FN-RG connects the 5GC via wireline access in this release of specification.

Annex C (informative): Withdrawn API versions

This Annex list withdrawn API versions of the Npcf_UEPolicyControl API defined in the present specification. 3GPP TS 3GPP TS 29.501 [6] clause 4.3.1.6 describes the withdrawal of API versions.

The API versions listed in table C-1 are withdrawn for the Npcf_UEPolicyControl API.

Table C-1: Withdrawn API versions of the Npcf_UEPolicyControl service

API version number	Remarks
1.0.0	Deficits in: - SUPI not mandatory (Unnecessary support of Emergency registration). - Missing AMF instance id in Policy Association request

Annex D (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2018-10	CT3#98-Bis	C3-186282				First TS version created based on suitable parts of TS 29.507v15.1.0	0.1.0
2018-12	CT3#99	C3-187094				API Version	0.2.0
2018-12	CT3#99	C3-187532				ExternalDocs OpenAPI field	0.2.0
2018-12	CT3#99	C3-187096				Location header field in OpenAPI	0.2.0
2018-12	CT3#99	C3-187533				Security	0.2.0
2018-12	CT3#99	C3-187098				supported content types	0.2.0
2018-12	CT3#99	C3-187534				HTTP Error responses	0.2.0
2018-12	CT3#99	C3-187673				Alternate IP address in Npcf_UEPolicyControl_Update	0.2.0
2018-12	CT3#99	C3-187673				Corrections on Protocol and Application errors	0.2.0
2018-12	CP#82	CP-183130				TS sent to plenary for information and approval	1.0.0
2018-12	CP#82	CP-183175				PCR 29.xyz Corrections of Cardinality in OpenAPI	1.1.0
2018-12	CP#82	CP-183250				TS number assigned for approval at plenary	1.1.0
2018-12	CP#82	CP-183252				TS approved by plenary	15.0.0
2019-03	CP#83	CP-190114	0001	1	F	Usage of the Namf_Communication Service by V-PCF	15.1.0
2019-03	CP#83	CP-190114	0002	1	F	Allignment with TS 24.501 changes on UE STATE INDICATION message	15.1.0
2019-03	CP#83	CP-190114	0005		F	OpenAPI version Update	15.1.0
2019-03	CP#83	CP-190114	0006		F	Correction to the overview	15.1.0
2019-03	CP#83	CP-190114	0007		F	Correction to the descriptions of network functions	15.1.0
2019-03	CP#83	CP-190114	0008	1	F	Correction to the service operation introduction	15.1.0
2019-03	CP#83	CP-190114	0011	3	F	Correction to the Npcf_UEPolicyControl_UpdateNotify operation	15.1.0
2019-03	CP#83	CP-190114	0012		F	Correction to the PresenceInfo data type	15.1.0
2019-03	CP#83	CP-190114	0013		F	UE Policy Control support for Emergency Registration	15.1.0
2019-03	CP#83	CP-190114	0014		F	Correction to the group identifier	15.1.0
2019-03	CP#83	CP-190114	0017	1	F	Adding AMF instance id in Policy Association request	15.1.0
2019-03	CP#83	CP-190114	0018	3	F	V-PCF Interworking procedures for UE policy delivery service	15.1.0
2019-03	CP#83	CP-190214	0019	3	F	Correction on the handling of URSP and ANDSP policies	15.1.0
2019-06	CT#84	CP-191082	0021	1	F	ANDSP correction	15.2.0
2019-06	CT#84	CP-191082	0022	2	F	Correction to PolicyAssociationReleaseCause data type	15.2.0
2019-06	CT#84	CP-191082	0023	1	F	Resending the UE policy	15.2.0
2019-06	CT#84	CP-191082	0024	2	F	Correction to the service operation procedure	15.2.0
2019-06	CT#84	CP-191082	0028	2	F	Withdrawing API version	15.2.0
2019-06	CT#84	CP-191082	0029	1	F	Precedence of OpenAPI file	15.2.0
2019-06	CT#84	CP-191082	0030	1	F	API version Update	15.2.0
2019-06	CT#84	CP-191082	0031		F	Correction to the serviceName attribute	15.2.0
2019-06	CT#84	CP-191160	0034	2	F	Copyright Note in YAML file	15.2.0
2019-06	CP#84	CP-191089	0027	1	F	Correction on Policy Association Termination	16.0.0
2019-06	CP#84	CP-191089	0032	1	B	Race condition handling	16.0.0
2019-06	CP#84	CP-191101	0035	1	F	API version Update	16.0.0
2019-09	CP#85	CP-192178	0036		B	Adding NID as input for policy decisions	16.1.0
2019-09	CP#85	CP-192148	0038		A	UE policy correction in AMF	16.1.0
2019-09	CP#85	CP-192152	0040	1	B	Support of wireline and wireless access convergence, Annex Skeleton	16.1.0
2019-09	CP#85	CP-192176	0041	1	B	Support of wireline and wireless access convergence, NFs	16.1.0
2019-09	CP#85	CP-192224	0043	3	A	Message transfer failure notification	16.1.0
2019-09	CP#85	CP-192171	0044	3	B	URSP rule provisioning for supporting xBDT	16.1.0
2019-09	CP#85	CP-192148	0046	1	A	GUAMI included in the Update operation	16.1.0
2019-09	CP#85	CP-192160	0047	1	B	PLMN change for V2X	16.1.0
2019-09	CP#85	CP-192173	0048		F	OpenAPI version update for TS 29.525 Rel-16	16.1.0
2019-12	CP#86	CP-193197	0050	1	F	Data type of the "serviceName" attribute	16.2.0
2019-12	CP#86	CP-193223	0051		F	Correcting references related to xBDT support	16.2.0
2019-12	CP#86	CP-193189	0053	1	A	Correction to the trigger of UE policy association establishment	16.2.0
2019-12	CP#86	CP-193223	0054	3	B	URSP provisioning for xBDT	16.2.0
2019-12	CP#86	CP-193197	0055	1	B	Format of hPcfId attribute	16.2.0
2019-12	CP#86	CP-193197	0057	1	B	Subscription to UE Connectivity state changes	16.2.0
2019-12	CP#86	CP-193197	0058		F	Removal of TABs from OpenAPI file	16.2.0
2019-12	CP#86	CP-193202	0059	1	F	correction to PLMN change trigger	16.2.0
2019-12	CP#86	CP-193223	0060	1	B	store BDT reference ID in SMPolicyData	16.2.0
2019-12	CP#86	CP-193189	0064		A	Correction to PolicyUpdate	16.2.0
2019-12	CP#86	CP-193189	0066	1	A	Correction on 307 error	16.2.0
2019-12	CP#86	CP-193191	0067	1	B	Clarification of PEI format, TS 29.525	16.2.0
2019-12	CP#86	CP-193227	0068	2	B	Wireline Location information	16.2.0
2019-12	CP#86	CP-193212	0069		F	Update of API version and TS version in OpenAPI file	16.2.0

2020-03	CT#87e	CP-200223	0071		B	Correction on UE Policy Association Establishment	16.3.0
2020-03	CT#87e	CP-200212	0072	1	B	Network function enhancement for V2X communication	16.3.0
2020-03	CT#87e	CP-200212	0073	1	B	UE Policy for V2XARC	16.3.0
2020-03	CT#87e	CP-200262	0074	2	B	N2 PC5 Policy for V2XARC	16.3.0
2020-03	CT#87e	CP-200203	0075	1	B	Complete the procedure for WWC	16.3.0
2020-03	CT#87e	CP-200207	0076		B	Completing the description of "PLMN_CH" and "CON_STATE_CH" triggers.	16.3.0
2020-03	CT#87e	CP-200216	0078	1	B	Update of OpenAPI version and TS version in externalDocs field	16.3.0
2020-06	CT#88e	CP-201224	0080	1	A	Location Header of 307 status code	16.4.0
2020-06	CT#88e	CP-201224	0082	1	A	Notification URI	16.4.0
2020-06	CT#88e	CP-201233	0083		B	FQDN of alternative AMF	16.4.0
2020-06	CT#88e	CP-201224	0085		A	Description of scopes field and presenceStatus attribute	16.4.0
2020-06	CT#88e	CP-201228	0086		F	Removal of MAC address	16.4.0
2020-06	CT#88e	CP-201244	0087		F	Removal of unbreakable spaces	16.4.0
2020-06	CT#88e	CP-201228	0088	2	B	Untrusted FN-RG PEI	16.4.0
2020-06	CT#88e	CP-201244	0089	1	F	Storage of YAML files in ETSI Forge	16.4.0
2020-06	CT#88e	CP-201238	0090	1	B	Correction to the UE policy definition	16.4.0
2020-06	CT#88e	CP-201238	0091	1	B	Correction to the V2X Policy provisioning	16.4.0
2020-06	CT#88e	CP-201238	0093	1	B	Remove editor's node	16.4.0
2020-06	CT#88e	CP-201256	0094	1	F	URI of the Npcf_UEPolicyControl service	16.4.0
2020-06	CT#88e	CP-201238	0095		F	AF-based service parameter provisioning	16.4.0
2020-06	CT#88e	CP-201238	0096		F	Complete service description for V2X	16.4.0
2020-06	CT#88e	CP-201238	0097		F	Corrections on N2 PC5 policy	16.4.0
2020-06	CT#88e	CP-201238	0098		F	Include V2XP info contents into policy section	16.4.0
2020-06	CT#88e	CP-201213	0099	1	B	Support of Dual Connectivity end to end Redundant User Plane Paths	16.4.0
2020-06	CT#88e	CP-201238	0100		F	Correction to 4.2.4.1	16.4.0
2020-06	CT#88e	CP-201244	0101		F	Optionality of ProblemDetails	16.4.0
2020-06	CT#88e	CP-201244	0102	1	F	Supported headers, Resource Data type, Operation Name	16.4.0
2020-06	CT#88e	CP-201255	0105		F	Update of OpenAPI version and TS version in externalDocs field	16.4.0
2020-09	CT#89e	CP-202069	0106		F	Include N2 PC5 policy in update response	16.5.0
2020-09	CT#89e	CP-202069	0107		F	Remove the dependency of subscription data in UDR for V2X	16.5.0
2020-09	CT#89e	CP-202079	0108	1	F	report initial presence status for PRA	17.0.0
2020-09	CT#89e	CP-202073	0109	1	B	Successful Response	17.0.0
2020-09	CT#89e	CP-202073	0110		B	Error status code	17.0.0
2020-09	CT#89e	CP-202085	0112		F	Update of OpenAPI version and TS version in externalDocs field	17.0.0
2020-12	CT#90e	CP-203139	0115	1	A	Essential corrections and alignments	17.1.0
2020-12	CT#90e	CP-203139	0117	1	A	Storage of YAML files in 3GPP Forge	17.1.0
2020-12	CT#90e	CP-203143	0119	1	A	Correction to PRA	17.1.0
2020-12	CT#90e	CP-203129	0121	1	A	Correction to the BDT policy re-negotiation	17.1.0
2020-12	CT#90e	CP-203119	0126	1	A	Correction to Policy Update Notification	17.1.0
2020-12	CT#90e	CP-203148	0127	1	F	Report current value in Update for location related triggers	17.1.0
2020-12	CT#90e	CP-203148	0128	1	B	Adding 200OK response for UpdateNotify	17.1.0
2020-12	CT#90e	CP-203148	0129	2	B	Support of 307&404 response codes for Policy update notification	17.1.0
2020-12	CT#90e	CP-203148	0130		F	"400 Bad Request" response on notification	17.1.0
2020-12	CT#90e	CP-203150	0132	1	A	Correction to URSP rules, support of 5G VN services	17.1.0
2020-12	CT#90e	CP-203153	0136		F	Update of OpenAPI version and TS version in externalDocs fieldFilename: draft29525-h10-rm-v0.doc	17.1.0
2021-03	CT#91e	CP-210191	0139	1	A	Support of stateless NFs	17.2.0
2021-03	CT#91e	CP-210210	0141	1	A	Correction to N2 PC5 policy	17.2.0
2021-03	CT#91e	CP-210218	0142		F	Adding "description" field for map data types	17.2.0
2021-03	CT#91e	CP-210218	0143		F	OpenAPI reference	17.2.0
2021-03	CT#91e	CP-210219	0144		F	Clarification on optional HTTP custom headers	17.2.0
2021-03	CT#91e	CP-210227	0146	1	F	Clarification of update operation	17.2.0
2021-03	CT#91e	CP-210221	0147	1	F	Ambiguous concept of NF service consumer terminology	17.2.0
2021-03	CT#91e	CP-210221	0148	1	F	Adding some missing description fields to data type definitions in OpenAPI specification files	17.2.0
2021-03	CT#91e	CP-210191	0150	1	A	Correction to resource identifiers descriptions used in notifications	17.2.0
2021-03	CT#91e	CP-210240	0152		F	Update of OpenAPI version and TS version in externalDocs field	17.2.0
2021-06	CT#92e	CP-211133	0153	4	B	5G ProSe related updates to the Npcf_UEPolicyControl_Create Service Operation	17.3.0

2021-06	CT#92e	CP-211245	0155	1	B	GLI report	17.3.0
2021-06	CT#92e	CP-211200	0157	1	A	Temporary and Permanent Redirection	17.3.0
2021-06	CT#92e	CP-211218	0158	1	B	Support of UE policy updates for AF influence on URSP	17.3.0
2021-06	CT#92e	CP-211265	0160		F	Update of OpenAPI version and TS version in externalDocs field	17.3.0
2021-09	CT#93e	CP-212220	0161	1	F	Correction of URI structure	17.4.0
2021-09	CT#93e	CP-212250	0163	1	A	Correction to V2X Policy Provisioning Request	17.4.0
2021-09	CT#93e	CP-212188	0164	1	F	Correction to ProSe Policy Provisioning Request	17.4.0
2021-09	CT#93e	CP-212188	0165	1	F	Separation of 5G ProSe N2 PC5 and V2X N2 PC5 policies.	17.4.0
2021-09	CT#93e	CP-212188	0166		B	Update of URSP definition	17.4.0
2021-09	CT#93e	CP-212188	0167	1	B	Notification of 5G ProSe capability changes	17.4.0
2021-09	CT#93e	CP-212224	0168	1	F	Correction to the reused data types	17.4.0
2021-09	CT#93e	CP-212224	0169		F	Correction to immediate PRA report	17.4.0
2021-09	CT#93e	CP-212188	0170	1	B	Removal of some 5G ProSe related ENs	17.4.0
2021-09	CT#93e	CP-212224	0171	1	F	Miscellaneous corrections to the Npcf_UEPolicyControl service	17.4.0
2021-09	CT#93e	CP-212190	0174		A	Correction of URI related attribute for the termination notification	17.4.0
2021-09	CT#93e	CP-212223	0175		F	Update of OpenAPI version and TS version in externalDocs field	17.4.0
2021-12	CT#94e	CP-213229	0177		F	Direct access to SNPN	17.5.0
2021-12	CT#94e	CP-213243	0178		F	Correction to Update procedure	17.5.0
2021-12	CT#94e	CP-213213	0179	1	B	Updates to ProSeP for 5G ProSe UE-to-network relay	17.5.0
2021-12	CT#94e	CP-213223	0180		B	Handling of retrieved URSP policies from the UDR	17.5.0
2021-12	CT#94e	CP-213248	0181		B	Support of RSN and PDU Session Pair ID in the URSP Rule	17.5.0
2021-12	CT#94e	CP-213244	0182	1	F	Error handling when no UE Policy Association exists	17.5.0
2021-12	CT#94e	CP-213246	0183		F	Update of OpenAPI version and TS version in externalDocs field	17.5.0
2022-03	CT#95e	CP-220206	0184	1	B	PCF checking of redundant PDU session applicability	17.6.0
2022-03	CT#95e	CP-220176	0185	1	A	Alignment of "Application Errors" clause with SBI TS template	17.6.0
2022-03	CT#95e	CP-220186	0186	1	B	Resolutions related to URSP guidance handling at the PCF	17.6.0
2022-03	CT#95e	CP-220185	0187	1	F	Handling of supported features for Edge Computing	17.6.0
2022-03	CT#95e	CP-220185	0188	1	F	Removal of Editor's Notes related to AF guidance of URSP determination	17.6.0
2022-03	CT#95e	CP-220167	0191	1	A	Handling of error responses	17.6.0
2022-03	CT#95e	CP-220174	0193	1	A	Description of a "307 Temporary Redirect" response	17.6.0
2022-03	CT#95e	CP-220193	0195	1	F	Description of a "307 Temporary Redirect" response in table 5.5.2.2-2	17.6.0
2022-03	CT#95e	CP-220196	0196		F	Removing the remaining ENs on ProSeP definition2022-03	17.6.0
2022-03	CT#95e	CP-220194	0200		F	Update of info and externalDocs fields	17.6.0
2022-06	CT#96	CP-221154	0201	1	F	Formatting of description fields	17.7.0
2022-06	CT#96	CP-221154	0202	-	F	Using the common data type for FQDN	17.7.0
2022-06	CT#96	CP-221126	0203	-	F	Validation of guidance information	17.7.0
2022-06	CT#96	CP-221126	0204	-	F	Limitation of URSP derived based guidance information	17.7.0
2022-06	CT#96	CP-221126	0205	1	F	Notification of outcome of URSP provisioning	17.7.0
2022-06	CT#96	CP-221116	0208	1	F	Correction to ProSe related triggers	17.7.0
2022-06	CT#96	CP-221253	0209	2	F	Correction to GROUP_ID_LIST_CHG trigger	17.7.0
2022-06	CT#96	CP-221138	0210	1	B	UE Policies support in SNPN	17.7.0
2022-06	CT#96	CP-221254	0211	2	A	Request of ProSeP/V2XP during NAS Transport procedure	17.7.0
2022-06	CT#96	CP-221151	0215	-	F	Update of info and externalDocs fields	17.7.0
2022-09	CT#97e	CP-222123	0217	1	F	Alignment with the SBI template	17.8.0
2022-09	CT#97e	CP-222133	0218	1	F	Correction in the handling of precedence for URSP rules	17.8.0
2022-09	CT#97e	CP-224217	0220		A	Correction of policy update procedures	17.8.0
2022-09	CT#97e	CP-222178	0221	1	F	Correction of UE Policy Association management for URSP and ANDSP	17.8.0
2022-09	CT#97e	CP-224322	0222		F	Correction to UE policy provisioning for AF-influenced URSP	17.8.0
2022-12	CT#98e	CP-223162	0223	2	F	Removal of the request of V2XP and/or ProSeP during registration	17.9.0
2022-12	CT#98e	CP-223177	0229		F	Corrections to PLMN change trigger	17.9.0
2022-12	CT#98e	CP-223177	0231		F	Correction to UE Policies determination in a serving SNPN	17.9.0
2022-12	CT#98e	CP-223188	0232		F	Update of info and externalDocs fields	17.9.0
2022-12	CT#98e	CP-223201	0225	1	B	Feature awareness during UE mobility with AMF change	18.0.0
2022-12	CT#98e	CP-223191	0227		F	Adding the mandatory error code 502 Bad Gateway	18.0.0

2022-12	CT#98e	CP-223199	0228	1	F	Correction on the handling of UE policy delivery errors	18.0.0
2022-12	CT#98e	CP-223178	0230		B	SNPN mobility	18.0.0
2022-12	CT#98e	CP-223189	0233		F	Update of info and externalDocs fields	18.0.0
2023-03	CT#99	CP-230133	0234	1	B	Adding Configured NSSAI to UE Policy Control inputs	18.1.0
2023-03	CT#99	CP-230166	0236		F	Correction of the description fields in enumerations	18.1.0
2023-03	CT#99	CP-230147	0237	1	B	NWDAF-assisted for URSP rules determination	18.1.0
2023-03	CT#99	CP-230152	0238	1	B	URSP provisioning in EPS	18.1.0
2023-03	CT#99	CP-230181	0239	1	F	Feature negotiation in roaming scenarios	18.1.0
2023-03	CT#99	CP-230130	0240	1	B	Support of the satellite backhaul category	18.1.0
2023-03	CT#99	CP-230161	0241		F	Update of info and externalDocs fields	18.1.0
2023-06	CT#100	CP-231174	0242	1	B	Support of Non-3GPP access for SNPN scenarios	18.2.0
2023-06	CT#100	CP-231165	0243	1	B	Trigger slice-aware ANDSP/WLANSP determination	18.2.0
2023-06	CT#100	CP-231165	0244	1	B	ANDSP delivery notifications	18.2.0
2023-06	CT#100	CP-231145	0246	1	B	Representation of N43 reference point	18.2.0
2023-06	CT#100	CP-231133	0247	1	F	ANDSP support indication to V-PCF	18.2.0
2023-06	CT#100	CP-231182	0248	1	B	Support of PIN ID in URSP	18.2.0
2023-06	CT#100	CP-231156	0249	1	B	Support for A2X service authorization and policy provisioning in Npcf_UEPolicyControl Service Operation	18.2.0
2023-06	CT#100	CP-231131	0251	1	D	Miscellaneouse changes	18.2.0
2023-06	CT#100	CP-231173	0252	1	B	Complete the feature negotiation during the AMF relocation	18.2.0
2023-06	CT#100	CP-231145	0253	3	B	Support for URSP awareness	18.2.0
2023-06	CT#100	CP-231145	0254	2	B	Support of the configured NSSAI change	18.2.0
2023-06	CT#100	CP-231165	0255	1	B	Support of TNGF selection for S-NSSAI	18.2.0
2023-06	CT#100	CP-231132	0258	1	F	HTTP redirection clause correction	18.2.0
2023-06	CT#100	CP-231184	0259	1	B	Support UE policies for 5G ProSe UE-to-UE relay	18.2.0
2023-06	CT#100	CP-231145	0260	1	B	URSP Provisioning in EPS roaming support	18.2.0
2023-06	CT#100	CP-231134	0261	1	B	URSP Provisioning in EPS corrections regarding the delivery of the initial UE policy container with the UE STATE INDICATION message	18.2.0
2023-06	CT#100	CP-231145	0262	1	B	Provisioning of VPLMN specific URSP rules	18.2.0
2023-06	CT#100	CP-231145	0263	1	B	Completion of URSP provisioning in EPS	18.2.0
2023-06	CT#100	CP-231173	0264	1	B	Solving remaining ENs on feature re-negotiation	18.2.0
2023-06	CT#100	CP-231141	0265		F	Update of info and externalDocs fields	18.2.0
2023-09	CT#101	CP-232098	0266	1	F	Update on PresenceInfo for PolicyUpdate	18.3.0
2023-09	CT#101	CP-232104	0267		F	EN resolution for A2XP related UE policy encoding	18.3.0
2023-09	CT#101	CP-232104	0268		F	EN resolution for A2X subscription	18.3.0
2023-09	CT#101	CP-232108	0269		B	UE policy based on subscribed DNN/S-NSSAI for PIN scenarios	18.3.0
2023-09	CT#101	CP-232092	0270	1	B	Enhancement to Npcf_UEPolicyControl service for URSP rule enforcement	18.3.0
2023-09	CT#101	CP-232099	0271	1	B	Spending limits report for UE Policy	18.3.0
2023-09	CT#101	CP-232121	0272	1	B	Completion of the reporting of Satellite Backhaul changes	18.3.0
2023-09	CT#101	CP-232092	0273	1	B	URSP rule enforcement	18.3.0
2023-09	CT#101	CP-232240	0274	1	B	Completion of the Provisioning of VPLMN specific URSP	18.3.0
2023-09	CT#101	CP-232092	0275	1	B	Solving URSP delivery in EPS ENs related to roaming scenarios	18.3.0
2023-09	CT#101	CP-232092	0276	3	B	Completion of the reporting of configured NSSAI changes	18.3.0
2023-09	CT#101	CP-232110	0277	1	B	N1N2MessageSubscribe during AMF relocation	18.3.0
2023-09	CT#101	CP-232110	0278		B	Discovery of Namf_Communication service	18.3.0
2023-09	CT#101	CP-232110	0279	1	B	Non-subscribed SNPN signalled URSP	18.3.0
2023-09	CT#101	CP-232104	0280	1	B	Support of A2X policy provisioning for A2X communication over Uu reference point	18.3.0
2023-09	CT#101	CP-232085	0281		F	Update of info and externalDocs fields	18.3.0
2023-12	CT#102	CP-233245	0282	2	B	Support the change of the PDU Session Type for a 5G VN group	18.4.0
2023-12	CT#102	CP-233244	0285	1	B	Remove the EN for the details that the PCF receives the report of URSP rule enforcement info from NWDAF	18.4.0
2023-12	CT#102	CP-233202	0286	1	F	Correction to the report of URSP rule enforcement info	18.4.0
2023-12	CT#102	CP-233244	0287		F	Wrong attribute name	18.4.0
2023-12	CT#102	CP-233256	0288	2	D	Incorrect feature name	18.4.0
2023-12	CT#102	CP-233256	0289	1	F	Correction in error handling in roaming scenarios	18.4.0
2023-12	CT#102	CP-233244	0290	1	B	Enhancement to Npcf_UEPolicyControl service for URSP rule enforcement in EPS	18.4.0
2023-12	CT#102	CP-233268	0293	1	B	Update UE Policy Control Service for Ranging_SL	18.4.0
2023-12	CT#102	CP-233244	0295	1	F	Miscellaneous changes	18.4.0
2023-12	CT#102	CP-233244	0297	1	B	Subscription to the outcome of the provisioning of VPLMN specific URSP	18.4.0

2023-12	CT#102	CP-233244	0298	1	B	URSP provisioning in EPS in Home Routed scenarios	18.4.0
2023-12	CT#102	CP-233172	0299	2	B	Same UE Policy Association shared by 3GPP and non-3GPP	18.4.0
2023-12	CT#102	CP-233244	0300	1	F	Corrections on PCRT for immediate report	18.4.0
2023-12	CT#102	CP-233244	0301		F	definition of term Configured NSSAI	18.4.0
2023-12	CT#102	CP-233244	0302	1	B	Update for the URSP rule enforcement without UE assistance	18.4.0
2023-12	CT#102	CP-233230	0304	1	F	HTTP RFC uplifting	18.4.0
2023-12	CT#102	CP-233253	0305	1	B	Support for services deployed on GEO satellite	18.4.0
2023-12	CT#102	CP-233283	0306		B	Non-subscribed SNPN signalled WLANSP	18.4.0
2023-12	CT#102	CP-233256	0307	1	B	Completion of error handling functionality	18.4.0
2023-12	CT#102	CP-233237	0309		F	Update of info and externalDocs fields	18.4.0
2024-03	CT#103	CP-240183	0292	2	F	EN resolution on selecting a PDU session for URSP provisioning in EPS	18.5.0
2024-03	CT#103	CP-240202	0311		F	Resolve ENs related to A2XP encoding.	18.5.0
2024-03	CT#103	CP-240188	0315	1	F	Missing applicable feature for suppFeat attribute	18.5.0
2024-03	CT#103	CP-240180	0316		F	Error handling update and miscellaneous changes	18.5.0
2024-03	CT#103	CP-240190	0317	1	B	Support of CHF address(es) information	18.5.0
2024-03	CT#103	CP-240181	0318	1	F	UE Policy restrictions and differences for Wireline Access	18.5.0
2024-03	CT#103	CP-240183	0319		F	Data type correction	18.5.0
2024-03	CT#103	CP-240183	0320		F	Re-used data types	18.5.0
2024-03	CT#103	CP-240179	0321	1	B	Various corrections and alignments	18.5.0
2024-03	CT#103	CP-240173	0322	1	F	Correction on 200 OK response	18.5.0
2024-03	CT#103	CP-240181	0323	1	B	Slice based TNGF and N3IWF selection	18.5.0
2024-03	CT#103	CP-240183	0324		F	Miscellaneous Corrections	18.5.0
2024-03	CT#103	CP-240242	0325	2	F	UE Policy Association over 3GPP and non-3GPP access	18.5.0
2024-03	CT#103	CP-240166	0326		F	Update of info and externalDocs fields	18.5.0
2024-06	CT#104	CP-241107	0327	1	F	Miscellaneous changes	18.6.0
2024-06	CT#104	CP-241097	0328	2	B	Resolve EN on URSP rule enforcement when the UE moves from EPS to 5GS	18.6.0
2024-06	CT#104	CP-241093	0330	1	F	Corrections on the trigger description	18.6.0
2024-06	CT#104	CP-241097	0331	1	B	URSP rule enforcement	18.6.0
2024-06	CT#104	CP-241097	0332		B	URSP over EPS, SM and UE Policy Association selection	18.6.0
2024-06	CT#104	CP-241113	0333	1	F	Clarification to UPSI determination and Access Type Change	18.6.0
2024-06	CT#104	CP-241097	0335	1	B	Missing PDU Session Type in URSP rule enforcement information	18.6.0
2024-06	CT#104	CP-241093	0337	1	F	Description update and miscellaneous changes	18.6.0
2024-06	CT#104	CP-241113	0339	1	F	completion of 4.2.3.2	18.6.0
2024-06	CT#104	CP-241113	0340	1	F	Correction of AMF Relocation scenario	18.6.0
2024-06	CT#104	CP-241097	0341		F	Corrections on UE policy Notification	18.6.0
2024-06	CT#104	CP-241097	0342		F	Corrections on VPLMN Specific URSP	18.6.0
2024-06	CT#104	CP-241098	0343	1	F	Removal of reported parameters in URSP rule enforcement information	18.6.0
2024-06	CT#104	CP-241097	0344		F	URSP Enforcement information and PDU session parameters	18.6.0
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2024-09	CT#105	CP-242151	0353	1	F	Indication of slice-related N3GPP node selection capability	18.7.0
2024-09	CT#105	CP-242151	0354	1	F	Missing attribute	18.7.0
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2024-09	CT#105	CP-242118	0349	1	F	Correct presence field for some of the attributes	19.0.0
2024-09	CT#105	CP-242118	0350		F	UrspEnforcementPduSession Presence condition and miscellaneous changes	19.0.0
2024-09	CT#105	CP-242131	0355	1	B	Spending limits for UE Policy and Support of CHF information in roaming scenario	19.0.0
2024-09	CT#105	CP-242138	0360	1	B	UE Policy Association control based on UDM Subscription Data	19.0.0
2024-09	CT#105	CP-242131	0361	1	B	CHF selection aspects considering roaming scenarios	19.0.0
2024-09	CT#105	CP-242131	0363	1	B	Support of spending limits for UE policies in roaming case	19.0.0

2024-12	CT#106	CP-243090	0368	1	F	Presence condition update, Null addition and miscellaneous changes	19.1.0
2024-12	CT#106	CP-243107	0370	1	A	Miscellaneous Corrections to the UE policy service	19.1.0
2024-12	CT#106	CP-243111	0371	1	B	Support 5G ProSe Multi-hop UE-to-Network Relay	19.1.0
2024-12	CT#106	CP-243111	0372	1	B	Support 5G ProSe Multi-hop UE-to-UE Relay	19.1.0
2024-12	CT#106	CP-243142	0373	1	B	Provisioning of charging information to AMF	19.1.0
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2024-12	CT#106	CP-243082	0375		F	URSP rule limitations with PIN.	19.1.0
2024-12	CT#106	CP-243115	0376		B	Precedence of VPLMN specific URSP rules	19.1.0
2024-12	CT#106	CP-243083	0377	1	F	Clarification on URSP and ANDSP rules used by UE in non-subscribed SNPN.	19.1.0
2024-12	CT#106	CP-243083	0378		F	Clarification regarding PDU Session Traffic analytics	19.1.0
2024-12	CT#106	CP-243129	0380	1	A	Corrections to the data type PolicyAssociation and PolicyUpdate	19.1.0
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2024-12	CT#106	CP-243115	0383	1	B	Connectivity Group ID support	19.1.0
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2024-12	CT#106	CP-243115	0385	1	B	URSP rules provisioning for Background Data Transfer	19.1.0
2024-12	CT#106	CP-243147	0386	-	F	Update of info and externalDocs fields	19.1.0
2025-03	CT#107	CP-250093	0388		B	Support Layer-2 multi-hop UE-to-Network Relaying	19.2.0
2025-03	CT#107	CP-250093	0389		B	Updates to the definition of 5G ProSe Multi-hop UE-to-Network Relay and 5G ProSe Multi-hop UE-to-UE Relay	19.2.0
2025-03	CT#107	CP-250093	0390		F	Corrections to 5G ProSe Multi-hop UE-to-UE Relaying	19.2.0
2025-03	CT#107	CP-250112	0391	1	F	Clarifications on the Indirect Network Sharing	19.2.0
2025-03	CT#107	CP-250129	0394		F	Update of info and externalDocs fields	19.2.0
2025-06	CT#108	CP-251083	0397	2	B	Extending Charging support in 5GC	19.3.0
2025-06	CT#108	CP-251083	0398	1	F	Handling of charging info for redundancy based on NF Set concept	19.3.0
2025-06	CT#108	CP-251231	0399		F	Update of info and externalDocs fields	19.3.0
2025-09	CT#109	CP-252073	0401		F	TS reference correction	19.4.0
2025-09	CT#109	CP-252090	0403	1	B	Complete the partially unsuccessful ursp rule delivery outcome	19.4.0
2025-09	CT#109	CP-252113	0405		F	Update of info and externalDocs fields	19.4.0
2025-12	CT#110	CP-253031	0400	3	F	Correction of charging information	19.5.0
2025-12	CT#110	CP-253029	0406	1	F	Corrections to UE policies for supporting V2X/A2X Capability	19.5.0
2025-12	CT#110	CP-253030	0407	1	F	Corrections to Supported Features	19.5.0
2025-12	CT#110	CP-253064	0408		F	Update of info and externalDocs fields	19.5.0
2026-03	CT#111	CP-260067	0409		F	Corrections to the support of the CHF Group ID handling	19.6.0
2026-03	CT#111	CP-260081	0411		F	Update of info and externalDocs fields	19.6.0
2026-06	CT#112	CP-261193	0418		A	Correcting attribute and custom operation names	19.7.0
2026-06	CT#112	CP-261213	0423	1	A	Incorrect attribute	19.7.0
2026-06	CT#112	CP-261249	0427		F	Update of info and externalDocs fields	19.7.0

History

Version	Date	Status
V19.4.0	January 2026	Publication
V19.5.0	February 2026	Publication
V19.6.0	March 2026	Publication
V19.7.0	July 2026	Publication