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Contents

Foreword

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

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  2   presented to TSG for approval;

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  y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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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 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

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

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

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

[12]   3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

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

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

[15]   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]   3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

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

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

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

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

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

[24]   3GPP TS 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".

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].

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
AMF	Access and Mobility Management Function
ANDSP	Access Network Discovery and Selection Policy
API	Application Programming Interface
DNN	Data Network Name
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
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
PEI   Permanent Equipment Identifier
PRA   Presence Reporting Area
ProSeP   5G ProSe Policy
PTI   Procedure Transaction Identity.
RSN   Redundancy Sequence Number
SNPN   Stand-alone Non-Public Network
SUPI   Subscription Permanent Identifier
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
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, ProSeP) 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 5G ProSe determined by the PCF to the NG-RAN via the AMF. 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, ProSeP) to the V-PCF by the H-PCF in the roaming case;

- provisioning of the N2 PC5 policy for V2X communications and/or 5G ProSe 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); and

- enable the PCF to request the termination of a UE Policy Association to the NF service consumer (e.g. AMF).

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 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.
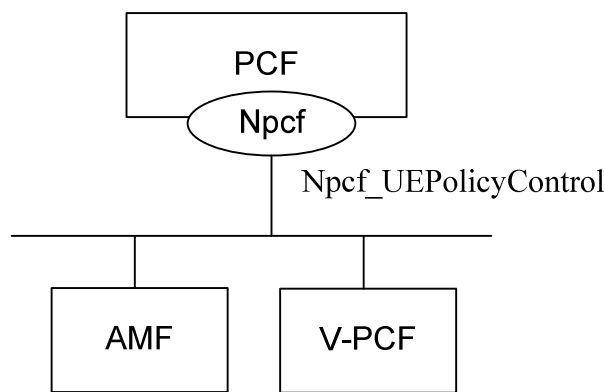
Figure 4.1.2-1: Reference Architecture for the Npcf_UEPolicyControl Service; SBI representation
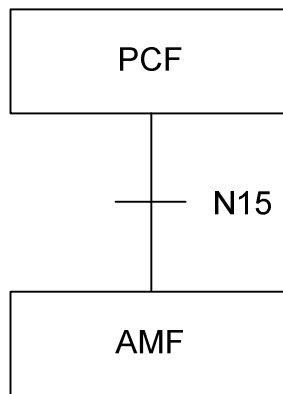
Figure 4.1.2-2: Non-roaming Reference Architecture for the Npcf_UEPolicyControlService; reference point representation
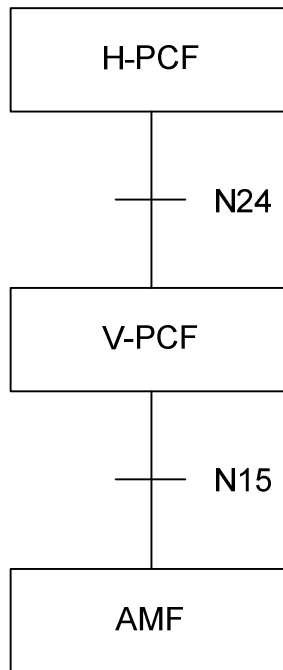
Figure 4.1.3-2: Roaming reference Architecture for the Npcf_UEPolicyControlService; reference point representation

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), V2XP (Vehicle-to-Everything Policy) and/or 5G ProSe Policy (ProSeP) via the AMF transparently to the UE;

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

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 5G ProSe 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 5G ProSe.

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 and/or ProSeP received from the H-PCF via the AMF to the UE; and

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 5G ProSe 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 5G ProSe.

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, or ProSeP) of the HPLMN to the V-PCF for forwarding to the UE via the the AMF; and

- provides the N2 PC5 policy for V2X communications and/or 5G ProSe to the V-PCF for forwarding to the NG-RAN via the AMF.

4.1.3.2   NF Service Consumers

The known NF service consumers of the Npcf_UEPolicyControl are the AMF, and in the roaming case, the V-PCF.

The Access and Mobility Management function (AMF) performs:

- registration management;

- connection management;

- reachability management;

- mobility Management;

- 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 5G ProSe 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, ProSeP) from the H-PCF;

- receiving the N2 PC5 policy for V2X communications and/or 5G ProSe from the H-PCF; and

- reporting of the UE state and UE policy enforcement result to the H-PCF.

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) to the AMF by the (V-)PCF in the non-roaming or roaming case; - Provides the updated UE policy 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 when the NF service consumer creates a UE policy association 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; and

- the AMF is relocated (between the different AMF sets) and the new AMF selects a new PCF. The procedure for the case where the AMF is relocated and the new AMF selects the old PCF is defined in clause 4.2.3.1.

The creation of 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.

When a UE registers to the network and a UE context is being established, 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, the AMF shall establish a 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: 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.

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;

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

- 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 4: The SNPN Identifier consists of the PLMN Identifier and the NID.

- 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;

- 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;

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

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

- 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, ProSeP) 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 ProSeP) 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 PCF determines that N2 PC5 policy (e.g. for V2X communications, for 5G ProSe) 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;

- for the successfull 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 5: 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:

- mandatorilly, 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) encoded as "n2Pc5Pol" attribute (for V2X communications) and/or "n2Pc5ProSePol" attribute (for 5G ProSe);

- 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; and

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

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

NOTE 4: If the PCF uses a Presence Reporting Area identifier referring to a Set of Core Network predefined Presence Reporting Areas as defined in 3GPP TS 23.501 [2], the PCF includes the identifier of this Presence Reporting Area set within the "praId" attribute.

- if 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.

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]; and

- 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 and/or 5G ProSe usage reporting configuration and rules.

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 and/or ProSeP 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. 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; and

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

NOTE 1: 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. 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 2: 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 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 the failure case described above, the (H-)(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 (H-)(V-)PCF may retry to deliver the UE Policy.

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 the UE has one or more stored UE policy sections corresponding to the serving PLMN/SNPN or HPLMN, the UE includes the "UE STATE INDICATION" message as defined in clause D.5.4.1 of 3GPP TS 24.501 [15] , whichis 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; and

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.

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, the ANDSP support indication and the OSId(s) indicated 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 UE policy section(s) need to be installed and whether any existing UE policy section(s) need to be updated or deleted.

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.

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 either N3IWF or ePDG for accessing 5GC via non-3GPP access.

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, i.e. the UE does not support non-3GPP access, the PCF shall not send any Access Network discovery and selection policies to the UE.

4.2.2.2.3 UE Route Selection Policy (URSP)

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.

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 including the Route Selection Validation Criteria for the UE as defined in clause 6.6.2.1 of 3GPP TS 23.503 [4]. If the (H-)PCF provisions the URSP rules including the Route Selection Validation Criteria for the UE, it 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].

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", 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.

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 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 1: 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.

NOTE 2: 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 3: 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.

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];

  and/or

- ProSeP for 5G ProSe usage reporting configuration and rules defined in clause 5.7 of 3GPP TS 24.555 [29].

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.

4.2.3 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.
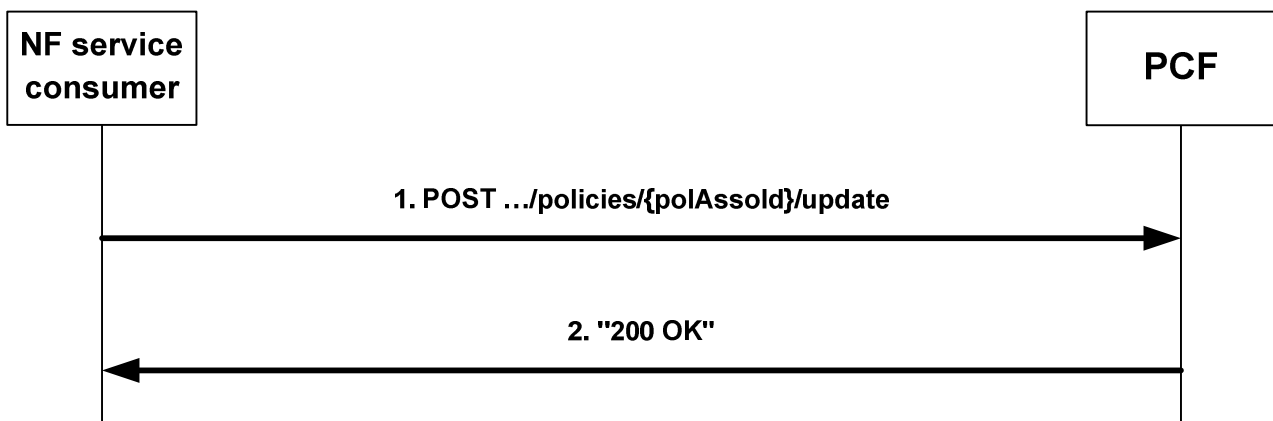
Figure 4.2.3.1-1: Update of a UE policy association

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.

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 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 4: 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 5: 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;

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 6: The SNPN Identifier consists of the PLMN Identifier and the NID.

NOTE 7: When the UE moves between PLMNs, the trigger reports changes of equivalent PLMNs.

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 "ProSe" 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; and/or

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.

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; and/or

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.

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 "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 UE Policy Sections stored in UDR, UE 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 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;

- 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 5G ProSe (for the H-PCF) as specified in clause 4.2.2.3 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 8: 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 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 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.

4.2.3.2   Policy Control Request Triggers

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

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

- "PRA_CH", i.e. change of UE presence in PRA: the UE is entering/leaving a Presence Reporting Area. This includes reporting the initial status at the time the request for 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 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.

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

NOTE 3: 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; and

NOTE 4: 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 5: The "UE_CAP_CH" trigger only applies if the "ProSe" feature is supported. This Policy Control Request Trigger does not require a subscription.

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 5G ProSe (see clause 4.2.2.4) encoded as "n2Pc5ProSePo" 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); or

     b) Change of UE presence in PRA;

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

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

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

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

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

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

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

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

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 5G ProSe N2 PC5 policy, if the "ProSe" feature is supported. The PCF (H-PCF in the roaming case) 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.

- N2 PC5 Policy (e.g. for V2X communications, for 5G ProSe) provisioning.

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

4.2.4.2 Policy update notification

Figure 4.2.4.2-1 illustrates the policy update notification.
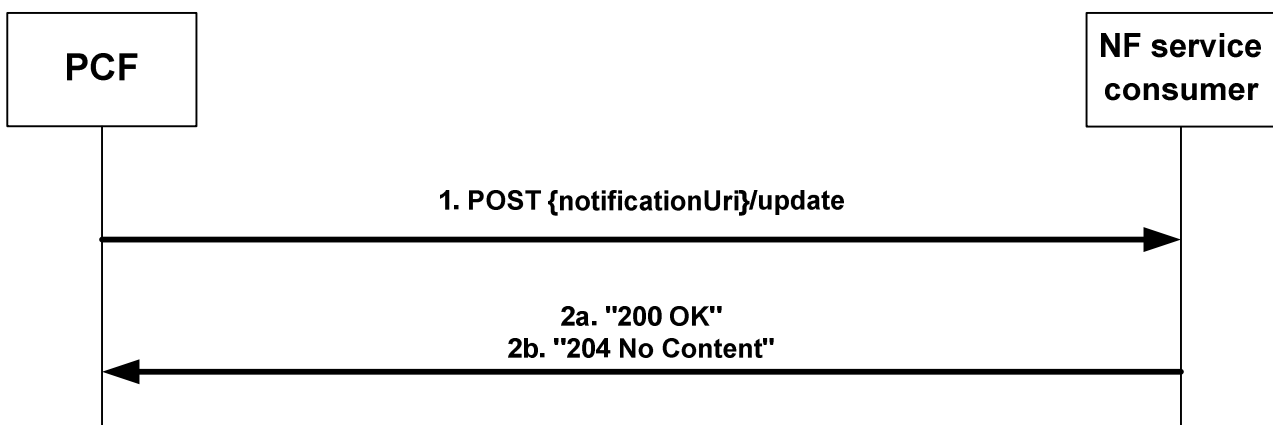
Figure 4.2.4.2-1: policy update notification

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 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 5G ProSe if the "ProSe" feature is supported. 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 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 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);

- 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:

- if the feature "ImmediateReport" is supported and the PCF provisioned the policy control request triggers related to PLMN change, PRA change, connectivity state change or location change, 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;

- 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].

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 theUE 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 [40]. 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 (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 and local operator policy to determine the URSP that will be provisioned to the UE), and it 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).

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].

4.2.5   Npcf_UEPolicyControl_Delete Service Operation

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

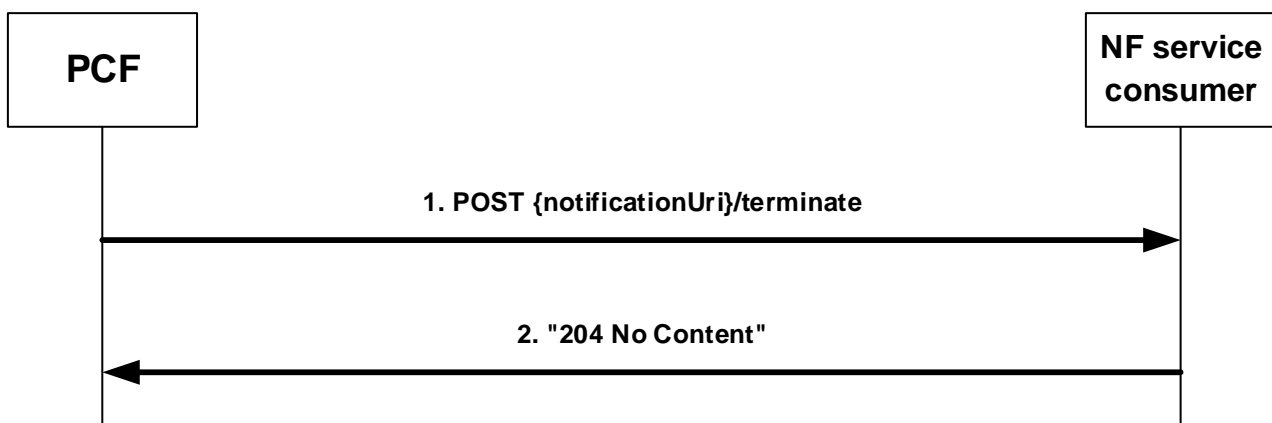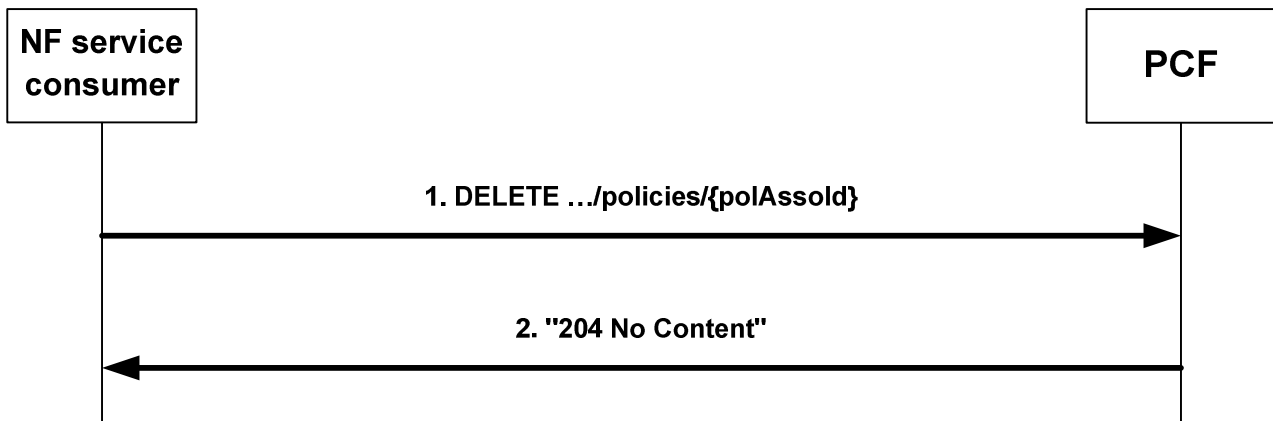**Figure 4.2.5-1: Deletion of a policy association**

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.

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.

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].

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 7540 [8], shall be used as specified in clause 5 of 3GPP TS 29.500 [5].

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

The OpenAPI [10] specification of HTTP messages and content bodies for the Npcf_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 7807 [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.

{apiRoot}/npcf-ue-policy-control/v1
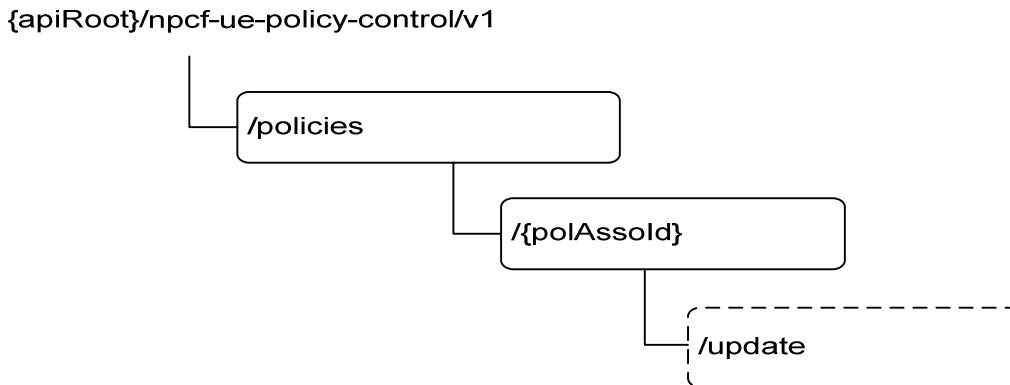
Figure 5.3.1-1: Resource URI structure of the Npcf_UEPolicyControl API

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. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance. Applicable if the feature "ES3XX" is supported.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual UE policy retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance. Applicable if the feature "ES3XX" is supported.
NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				

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

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

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

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

5.3.3.3.2 DELETE

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

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

Name	Data type	P	Cardinality	Description
n/a				

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

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

Data type	P	Cardinality	Description
n/a			

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

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

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

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

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

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

5.3.3.4   Resource Custom Operations

5.3.3.4.1   Overview

Table 5.3.3.4.1-1: Custom operations

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

5.3.3.4.2   Operation: Update

5.3.3.4.2.1   Description

The update custom operation allows an NF service consumer to report the occurrence 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. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance. Applicable if the feature "ES3XX" is supported.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during Individual UE policy modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative PCF (service) instance. Applicable if the feature "ES3XX" is supported.
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.				

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

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

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

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

5.4   Custom Operations without associated resources

None.

5.5 Notifications

5.5.1 General

Table 5.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Policy Update Notification	{notificationUri}/update	update (POST)	Policy Update Notification.
Request for termination of the UE policy association	{notificationUri}/terminate	termminate (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	O	0..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	The NF service consumer shall generate a Location header field containing a URI pointing to another NF service consumer to which the notification should be sent. Applicable if the feature "ES3XX" is supported.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during UE policy notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent. Applicable if the feature "ES3XX" is supported.
ProblemDetails	O	0..1	404 Not Found	The NF service consumer can use this response when the notification can be sent to another unknown host. 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.				

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

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

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

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

5.5.3 Request for termination of the 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. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent as defined in clause 6.5.3.2 of 3GPP TS 29.500 [5]. Applicable if the feature "ES3XX" is supported.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during UE policy notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent as defined in clause 6.5.3.2 of 3GPP TS 29.500 [5]. Applicable if the feature "ES3XX" is supported.
ProblemDetails	O	0..1	404 Not Found	The NF service consumer can use this response when the notification can be sent to another unknown host.
NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				

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

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

5.6 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
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, updated, or read.	
PolicyAssociationReleaseCause	5.6.3.4	The cause why the PCF requests the termination of the policy association.	
PolicyAssociationRequest	5.6.2.3	Information that NF service consumer provides when requesting the creation of a policy association.	
PolicyAssociationUpdateRequest	5.6.2.4	Information that NF service consumer provides when requesting the update of a policy association.	
PolicyUpdate	5.6.2.5	Updated policies that the PCF provides in a notification or in the reply to an Update Request.	
RequestTrigger	5.6.3.3	Enumeration of possible Request Triggers.	
TerminationNotification	5.6.2.6	Request to terminate a policy Association that the PCF provides in a notification.	
UeRequestedValueRep	5.6.2.8	Contains the current applicable values corresponding to the policy control request triggers.	ImmediateReport
UePolicy	5.6.3.2	UE Policies	
UePolicyDeliveryResult	5.6.3.2	UE Policy delivery Result	
UePolicyRequest	5.6.3.2	Request for UE Policies	
UePolicyTransferFailureNotification	5.6.2.7	Information that the UE policy is failure to be transferred to the UE because the UE is not reachable.	

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]		
Bytes	3GPP TS 29.571 [11]	String with format "byte".	
CmState	3GPP TS 29.518 [14]	Connectivity state of UE	ConnectivitySta teChange
Fqdn	3GPP TS 29.571 [11]	FQDN	
Gpsi	3GPP TS 29.571 [11]	Generic Public Subscription Identifier	
GroupId	3GPP TS 29.571 [11]		
Guami	3GPP TS 29.571 [11]	Globally Unique AMF Identifier	
Ipv4Addr	3GPP TS 29.571 [11]		
Ipv6Addr	3GPP TS 29.571 [11]		
N1N2MessageTransfe rCause	3GPP TS 29.518 [14]		
N2InfoContent	3GPP TS 29.518 [14]	Represents a transparent N2 information content to be relayed by AMF.	V2X, ProSe
NfInstanceId	3GPP TS 29.571 [11]		
Pei	3GPP TS 29.571 [11]	Permanent Equipment Identifier	
PlmnId	3GPP TS 29.571 [11]		
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	
ProblemDetails	3GPP TS 29.571 [11]		
RatType	3GPP TS 29.571 [11]		
RedirectResponse	3GPP TS 29.571 [11]	Contains redirection related information.	ES3XX
ServiceName	3GPP TS 29.510 [13]	Name of the service instance.	
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]		
Uinteger	3GPP TS 29.571 [11]		
Uri	3GPP TS 29.571 [11]		
UserLocation	3GPP TS 29.571 [11]		

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
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. Only the values "LOC_CH", "PRA_CH", "PLMN_CH" and "CON_STATE_CH" are permitted.	(NOTE)
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.	
suppFeat	SupportedFeatures	M	1	Indicates the negotiated supported features.	
NOTE: The "PLMN_CH" and "CON_STATE_CH" values in the "triggers" attribute apply under feature control as described in clause 4.2.3.2.					

5.6.2.3 Type PolicyAssociationRequest

Table 5.6.2.3-1: Definition of type PolicyAssociationRequest

Attribute name	Data type	P	Cardinality	Description	Applicability
notificationUri	Uri	M	1	Identifies the recipient of Notifications sent by the PCF.	
altNotifIpv4Addrs	array(Ipv4Addr)	O	1..N	Alternate or backup IPv4 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.	
pei	Pei	C	0..1	The Permanent Equipment Identifier of the served UE. Shall be provided when available.	
userLoc	UserLocation	C	0..1	The location of the served UE. Shall be provided when available.	
timeZone	TimeZone	C	0..1	The time zone where the served UE is camping. Shall be provided when available.	
servingPlmn	PlmnIdNid	C	0..1	The serving network (a PLMN or an SNPN) where the served UE is camping. For the SNPN the NID together with the PLMN ID identifies the SNPN. Shall be provided when available.	
ratType	RatType	C	0..1	The RAT Type where the served UE is camping. Shall be provided when available.	
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 when available.	
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

proSeCapab	array(ProSeCapability)	C	1..N	Indicates whether the UE is capable of one or more of the the following 5G ProSe Capabilities: 5G ProSe Direct Discovery, 5G ProSe Direct Communication, Layer-2 and/or Layer 3 5G ProSe UE-to-Network Relay and Layer-2 and/or Layer 3 5G ProSe Remote UE. It shall be provided when available at the NF service consumer.	ProSe
suppFeat	SupportedFeatures	M	1	Indicates the features supported by the service consumer.	

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.	V2X, ProSe

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
proSeCapab	array(ProSeCapability)	O	1..N	Indicates whether the UE is capable of one or more of the the following 5G ProSe Capabilities: 5G ProSe Direct Discovery, 5G ProSe Direct Communication, Layer-2 and/or Layer 3 5G ProSe UE-to-Network Relay and Layer-2 and/or Layer 3 5G ProSe Remote UE.	ProSe

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
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. Only values "LOC_CH", "PRA_CH", "PLMN_CH" and "CON_STATE_CH" are permitted.	(NOTE 1)
pras	map(PresenceInfo)	C	1..N	If the Trigger "PRA_CH" is provided or if that trigger was already set but the requested presence reporting areas need to be changed, the presence reporting area(s) for which reporting is requested shall be provided. The "praId" attribute within the PresenceInfo data type shall also be the key of the map. The "presenceState" attribute within the PresenceInfo data type shall not be supplied. The "praId" attribute within the PresenceInfo data type shall include the identifier of either a presence reporting area or a presence reporting area set.	
NOTE 1: The "PLMN_CH" and "CON_STATE_CH" values in the "triggers" attribute apply under feature control as described in clause 4.2.3.2.					
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.					

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	N1N2MessageTransferCause	M	1	Indicates the reason why the UE policy could not be transferred by the AMF.	
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	O	0..1	The location of the served UE is camping.	
praStatuses	map(PresenceInfo)	O	1..N	The UE presence statuses for tracking areas. The "praId" attribute within the PresenceInfo data type shall also be the key of the map.	
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	O	0..1	The connectivity state of the served UE.	ConnectivityStateChange

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. A 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], a UE Policy transfer failure is notifying to the H-PCF. 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. 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.	
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
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 UE supports PC5 LTE RAT for V2X communication over PC5 reference point.	
NR_PC5	This value is used to indicate that UE supports PC5 NR RAT for V2X communication over PC5 reference point.	
LTE_NR_PC5	This value is used to indicate that 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	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.	

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.

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: 1.2.2
  title: Npcf_UEPolicyControl
  description: |
    UE Policy Control Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.525 V17.10.0; 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'
              '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'
                '503':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
                default:
                  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
        policyAssocitionTerminationRequestNotification:
          '{$request.body#/notificationUri}/terminate':
            post:
              requestBody:
                required: true
                content:
```

```
                    application/json:
                      schema:
                        $ref: '#/components/schemas/TerminationNotification'
                responses:
                  '204':
                    description: No Content, Notification was successful
                  '307':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
                  '308':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
                  '400':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
                  '401':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
                  '403':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/403'
                  '404':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
                  '411':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/411'
                  '413':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/413'
                  '415':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/415'
                  '429':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/429'
                  '500':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
                  '503':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
                  default:
                    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  /policies/{polAssoId}:
    get:
      operationId: 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'
        '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'
        '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'
            '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'
        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. Only values "LOC_CH" and "PRA_CH" are
permitted.
        pras:
          type: object
          additionalProperties:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
          minProperties: 1
          description: >
            Contains the presence reporting area(s) for which reporting was requested.
            The praId attribute within the PresenceInfo data type is the key of the map.
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - suppFeat
    PolicyAssociationRequest:
      description: >
        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'
          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'
          groupIds:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
            minItems: 1
          hPcfId:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
          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'
          proSeCapab:
            type: array
            items:
              $ref: '#/components/schemas/ProSeCapability'
            minItems: 1
          suppFeat:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        required:
          - notificationUri
          - suppFeat
          - supi
    PolicyAssociationUpdateRequest:
      description: >
        Represents Information that the NF service consumer provides when requesting the update of
        a policy association.
      type: object
      properties:
        notificationUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        altNotifIpv4Addrs:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
          minItems: 1
          description: Alternate or backup IPv4 Address(es) where to send Notifications.
        altNotifIpv6Addrs:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
          minItems: 1
          description: Alternate or backup IPv6 Address(es) where to send Notifications.
        altNotifFqdns:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
          minItems: 1
          description: Alternate or backup FQDN(s) where to send Notifications.
        triggers:
          type: array
          items:
            $ref: '#/components/schemas/RequestTrigger'
          minItems: 1
          description: Request Triggers that the NF service consumer observes.
        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
          proSeCapab:
            type: array
            items:
              $ref: '#/components/schemas/ProSeCapability'
            minItems: 1
    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'
        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. Only values "LOC_CH" and "PRA_CH" are
permitted.
        pras:
          type: object
          additionalProperties:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceInfo'
          description: >
            Contains the presence reporting area(s) for which reporting was requested.
            The praId attribute within the PresenceInfo data type is the key of the map.
          minProperties: 1
          nullable: true
      required:
        - resourceUri
    TerminationNotification:
      description: >
        Represents a request to terminate a policy association that the PCF provides in a
        notification.
      type: object
      properties:
        resourceUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        cause:
          $ref: '#/components/schemas/PolicyAssociationReleaseCause'
      required:
        - resourceUri
        - cause
```

```
    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: 'TS29518_Namf_Communication.yaml#/components/schemas/N1N2MessageTransferCause'
        ptis:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
          minItems: 1
      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'
    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
      - type: string
        description: >
          This string provides forward-compatibility with future
          extensions to the enumeration but is not used to encode
          content defined in the present version of this API.
      description: |
        Possible values are:
        - LOC_CH: Location change (tracking area). The tracking area of the UE has changed.
        - PRA_CH: Change of UE presence in PRA. The AMF reports the current presence status of the
UE
          in a Presence Reporting Area, and notifies that the UE enters/leaves the Presence
Reporting
          Area.
        - 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.
    PolicyAssociationReleaseCause:
```

```
        anyOf:
        - type: string
          enum:
            - UNSPECIFIED
            - UE_SUBSCRIPTION
            - INSUFFICIENT_RES
        - type: string
          description: >
            This string provides forward-compatibility with future
            extensions to the enumeration but is not used to encode
            content defined in the present version of this API.
        description: |
          Possible values are:
          - UNSPECIFIED: This value is used for unspecified reasons.
          - UE_SUBSCRIPTION: This value is used to indicate that the 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: |
          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
        - 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: |
          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.
```

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.

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 4.1.1 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:

- The PCF should not provide Access Network Discovery and Selection Policy (ANDSP) for a 5G-RG connected via wireline access.

- 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 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 "ueLoc" attribute and:

    - 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 ANDSP policies 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 ANDSP policies 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 ANDSP policies in the UE Policy.

B.3.5   Npcf_UEPolicyControl_Delete Service Operation

B.3.5.1   General

Clause 4.2.5.1 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.

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 B-1 are withdrawn for the Npcf_UEPolicyControl API.

Table B-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	TSG #	TSG Doc.	CR	Rev	Cat	Subject/Comment	New
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
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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
2025-03	CT#107	CP-250127	0392		F	Update of info and externalDocs fields	17.10.0

History

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