

# ETSI TS 129 525 V17.6.0 (2022-05)



**5G;  
5G System;  
UE Policy Control Service;  
Stage 3  
(3GPP TS 29.525 version 17.6.0 Release 17)**



---

**Reference**

RTS/TSGC-0329525vh60

---

**Keywords**

5G

**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

---

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° w061004871

---

**Important notice**

---

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at [www.etsi.org/deliver](http://www.etsi.org/deliver).

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

If you find a security vulnerability in the present document, please report it through our  
Coordinated Vulnerability Disclosure Program:

<https://www.etsi.org/standards/coordinated-vulnerability-disclosure>

---

**Notice of disclaimer & limitation of liability**

---

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

---

**Copyright Notification**

---

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2022.  
All rights reserved.

---

# Intellectual Property Rights

## Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

## Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

---

# Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

---

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# Contents

Intellectual Property Rights .....	2
Legal Notice .....	2
Modal verbs terminology.....	2
Foreword.....	6
1 Scope .....	7
2 References .....	7
3 Definitions and abbreviations.....	8
3.1 Definitions .....	8
3.2 Abbreviations .....	8
4 UE Policy Control Service .....	9
4.1 Service Description .....	9
4.1.1 Overview .....	9
4.1.2 Service Architecture .....	10
4.1.3 Network Functions.....	11
4.1.3.1 Policy Control Function (PCF) .....	11
4.1.3.2 NF Service Consumers.....	12
4.2 Service Operations .....	13
4.2.1 Introduction.....	13
4.2.2 Npcf_UEPolicyControl_Create Service Operation.....	13
4.2.2.1 General .....	13
4.2.2.2 UE Policy .....	16
4.2.2.2.1 General .....	16
4.2.2.2.1.1 Provisioning of the UE Access Network discovery and selection policies and UE Route Selection Policy .....	19
4.2.2.2.1.2 Provisioning of Vehicle-to-Everything Policy.....	20
4.2.2.2.1.3 Provisioning of ProSe Policy .....	20
4.2.2.2.2 UE Access Network discovery and selection policies.....	21
4.2.2.2.3 UE Route Selection Policy(URSP).....	21
4.2.2.2.4 Vehicle-to-Everything Policy (V2XP) .....	22
4.2.2.2.5 Proximity based Services Policy (ProSeP) .....	23
4.2.2.3 V2X N2 PC5 Policy .....	23
4.2.2.4 5G ProSe N2 PC5 Policy .....	23
4.2.3 Npcf_UEPolicyControl_Update Service Operation .....	24
4.2.3.1 General .....	24
4.2.3.2 Policy Control Request Triggers .....	27
4.2.3.3 Encoding of updated policy.....	27
4.2.4 Npcf_UEPolicyControl_UpdateNotify Service Operation .....	28
4.2.4.1 General .....	28
4.2.4.2 Policy update notification .....	28
4.2.4.3 Request for termination of the policy association .....	30
4.2.4.4 URSP provisioning for Background Data Transfer policy.....	31
4.2.4.5 UE policy provisioning for V2X communication over PC5 and Uu reference points .....	31
4.2.4.6 UE policy provisioning for 5G ProSe .....	31
4.2.4.7 UE policy provisioning for AF-influenced URSP.....	32
4.2.5 Npcf_UEPolicyControl_Delete Service Operation.....	32
5 Npcf_UEPolicyControl API.....	33
5.1 Introduction .....	33
5.2 Usage of HTTP.....	33
5.2.1 General.....	33
5.2.2 HTTP standard headers.....	33
5.2.2.1 General .....	33
5.2.2.2 Content type .....	34
5.2.3 HTTP custom headers.....	34

5.3	Resources .....	34
5.3.1	Resource Structure .....	34
5.3.2	Resource:UE Policy Associations.....	34
5.3.2.1	Description .....	34
5.3.2.2	Resource definition .....	35
5.3.2.3	Resource Standard Methods.....	35
5.3.2.3.1	POST .....	35
5.3.3	Resource: Individual UE Policy Association.....	35
5.3.3.1	Description .....	35
5.3.3.2	Resource definition .....	36
5.3.3.3	Resource Standard Methods.....	36
5.3.3.3.1	GET .....	36
5.3.3.3.2	DELETE.....	37
5.3.3.4	Resource Custom Operations .....	38
5.3.3.4.1	Overview .....	38
5.3.3.4.2	Operation: Update .....	38
5.3.3.4.2.1	Description.....	38
5.3.3.4.2.2	Operation Definition .....	38
5.4	Custom Operations without associated resources.....	39
5.5	Notifications .....	39
5.5.1	General.....	39
5.5.2	Policy Update Notification .....	39
5.5.2.1	Description .....	39
5.5.2.2	Operation Definition .....	39
5.5.3	Request for termination of the UE policy association.....	40
5.5.3.1	Description .....	40
5.5.3.2	Operation Definition .....	40
5.6	Data Model.....	41
5.6.1	General.....	41
5.6.2	Structured data types.....	43
5.6.2.1	Introduction .....	43
5.6.2.2	Type PolicyAssociation .....	44
5.6.2.3	Type PolicyAssociationRequest.....	45
5.6.2.4	Type PolicyAssociationUpdateRequest .....	48
5.6.2.5	Type PolicyUpdate.....	51
5.6.2.6	Type TerminationNotification.....	51
5.6.2.7	Type UePolicyTransferFailureNotification.....	52
5.6.2.8	Type UeRequestedValueRep .....	52
5.6.3	Simple data types and enumerations.....	52
5.6.3.1	Introduction .....	52
5.6.3.2	Simple data types .....	52
5.6.3.3	Enumeration: RequestTrigger .....	53
5.6.3.4	Enumeration: PolicyAssociationReleaseCause .....	54
5.6.3.5	Enumeration: Pc5Capability .....	55
5.6.3.6	Enumeration: ProSeCapability.....	55
5.7	Error handling .....	55
5.7.1	General.....	55
5.7.2	Protocol Errors.....	55
5.7.3	Application Errors .....	55
5.8	Feature negotiation .....	56
5.9	Security .....	57
<b>Annex A (normative):</b>	<b>OpenAPI specification.....</b>	<b>58</b>
A.1	General .....	58
A.2	Npcf_UEPolicyControl API.....	58
<b>Annex B (normative):</b>	<b>Wireless and wireline convergence access support.....</b>	<b>67</b>
B.1	Scope .....	67
B.2	Npcf_UEPolicyControl Service .....	67

B.2.1	Service Description .....	67
B.2.1.1	Overview .....	67
B.2.1.2	Service Architecture .....	67
B.2.1.3	Network Functions.....	67
B.2.1.3.1	Policy Control Function (PCF) .....	67
B.2.1.3.2	NF Service Consumers.....	67
B.3	Service Operations .....	68
B.3.1	Introduction .....	68
B.3.2	Npcf_UEPolicyControl_Create Service Operation .....	68
B.3.2.1	General.....	68
B.3.3	Npcf_UEPolicyControl_Update Service Operation .....	68
B.3.3.1	General.....	68
B.3.4	Npcf_UEPolicyControl_UpdateNotify Service.....	69
B.3.4.1	General.....	69
B.3.5	Npcf_UEPolicyControl_Delete Service Operation .....	69
B.3.5.1	General.....	69
<b>Annex C (informative):</b>	<b>Withdrawn API versions.....</b>	<b>70</b>
<b>Annex D (informative):</b>	<b>Change history .....</b>	<b>71</b>
History .....		75

---

# Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

---

# 1 Scope

The present specification provides the stage 3 definition of the 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".

---

## 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).

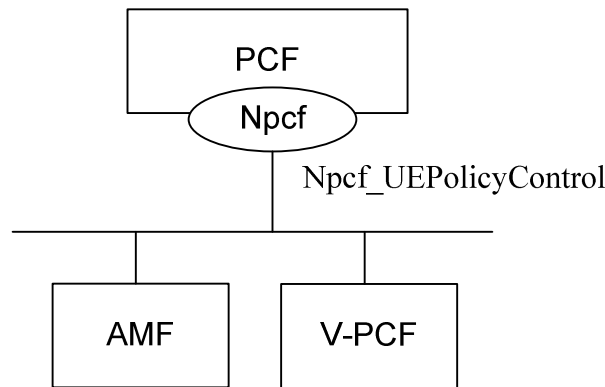
### 4.1.2 Service Architecture

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].

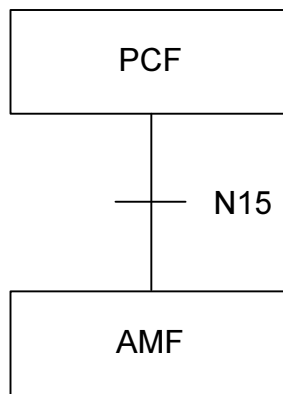
The UE Policy Control Service (Npcf\_UEPolicyControl) is part of the Npcf service-based interface exhibited by the Policy Control Function (PCF).

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).

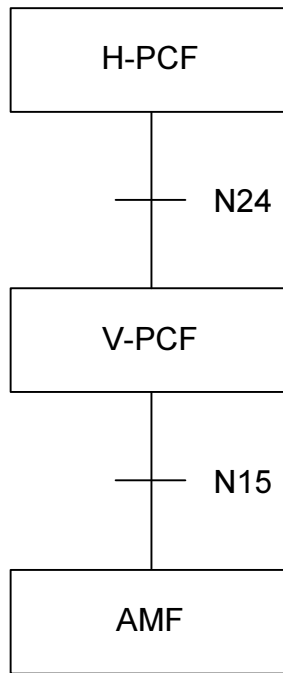
The AMF accesses the UE Policy Control Service at the PCF via the N15 Reference point. In the roaming scenario, the N15 reference point is located between the V-PCF in the visited network and the AMF. The V-PCF accesses the UE Policy Control Service at the Home Policy Control Function (H-PCF) via the 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 subclause 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	<ul style="list-style-type: none"> <li>- Provides the updated policy control request trigger(s) to the AMF by the (V-)PCF in the non-roaming or roaming case;</li> <li>- Provides the updated UE policy and/or policy control request trigger(s) to the V-PCF by the H-PCF; or</li> <li>- Initiates the UE Policy association termination towards the NF service consumer by the NF service producer.</li> </ul>	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 subclause 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 subclause 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 subclause 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 subclause 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] and/or in subclause 7.2.1.1 of 3GPP TS 24.587 [24] 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 subclause 5.8 is supported;
- the 5G ProSe capability within the "proSeCapab" attribute, if the "ProSe" feature defined in subclause 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 "altNotifIpv4Addr" attribute;
- if the NF service consumer is an AMF, the alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addr" 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 subclause 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 subclause 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 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 subclause 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 subclause 4.2.2.2.1.2, and V2X N2 PC5 policy, as detailed in subclause 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 subclause 4.2.2.2.1.3, and 5G ProSe N2 PC5 policy, as detailed in subclause 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 subclause 4.2.2.3 and/or subclause 4.2.2.4;



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

NOTE 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:

- mandatorily, the negotiated supported features encoded as "suppFeat" attribute;
- optionally, the information provided by the NF service consumer when requesting the creation of this policy association encoded as "request" attribute;
- optionally, for the H-PCF as service producer communicating with the V-PCF, UE policy (see subclause 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 subclause 4.2.2.3 and/or subclause 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 subclause 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 subclause 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 General

The UE policy consists of

- UE Access Network discovery and selection policies (ANDSP). It is used by the UE for selecting non-3GPP access 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 subclause 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 subclause 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), WLANSR 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 WLANSR 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 of the PCF which provides the UE policies; and
- b) a UE policy section code (UPSC) containing a unique value within the PLMN selected by the PCF.

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 subclause 5.2.2.3.1.2 of 3GPP TS 29.518 [14], or an N1N2 Transfer Failure Notification as defined in subclause 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 subclause 6.1.6.2.30 of 3GPP TS 29.518 [14].

NOTE: 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 subclause 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.

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

When the UE registers to the network, the "UE STATE INDICATION" message as defined in subclause D.5.4.1 of 3GPP TS 24.501 [15] may be transferred transparently within the "uePolReq" attribute during the creation of a policy association, as described in subclause 4.2.2.1.

The (H-)PCF may store in the UDR and/or retrieve from the UDR, as specified in 3GPP TS 29.519 [17]:

- a) UPSCs and related policy sections of the own PLMN it provided to a UE;
- b) the PEI received from the NF service consumer (e.g. AMF);
- c) the OSId(s) received from the UE as described in the Annex D of 3GPP TS 24.501 [15]; 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].

The (H-)PCF will use the SUPI of the UE as data key and store separate information for each UE in the UDR.

The V-PCF may retrieve UPSCs and related 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].

When receiving the "UE STATE INDICATION" message, the (V-)(H-)PCF shall determine, based on the UPSIs, the ANDSP support indication and the OSId(s) indicated in that message, UPSCs stored in the UDR and local policy, 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.

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 subclause 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 subclause 5.2.8 of 3GPP TS 29.519 [17] and then may make the URSP rules including the Route Selection Validation Criteria for the UE as defined in subclause 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 with the "bdtStatus" attribute within the BdtData data type set to value "INVALID", the (H-)PCF shall not make 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, make 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 on the URSP determination as defined in subclause 6.4.2.15 of 3GPP TS 29.519 [17]. In this case, the (H-)PCF may also use this information as input to determine the URSP that will be provisioned to the UE

When the (H-)PCF decides to provide URSP rules based on the information received from the AF, 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 PCF.

#### 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 subclause 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 subclause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

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 subclause 7.2.1 of 3GPP TS 24.587 [24] during the registration procedure and/or the NAS transport procedure. The "UE POLICY PROVISIONING REQUEST" message is transferred transparently within the "uePolReq" attribute during the creation of a policy association, as described in subclause 4.2.2.1, or during the update of the policy association, as described in subclause 4.2.3.1. The PCF may reject the request by sending back a "UE POLICY PROVISIONING REJECT" message as defined in subclause 7.2.2 of 3GPP TS 24.587 [24] or provision the policy, as defined in subclause 4.2.2.2.1, based on the service specific parameter information retrieved from UE's Application Data in the UDR as defined in subclause 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 subclause 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 subclause 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

subclause 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 subclause 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 subclause 6.2.15 of 3GPP TS 29.519 [17] and the operator's policy.

If the UE does not have valid ProSeP, the UE also includes a "UE POLICY PROVISIONING REQUEST" message defined in subclause 7.2.1.1 of 3GPP TS 24.587 [24] during the registration procedure and/or the NAS transport procedure. The "UE POLICY PROVISIONING REQUEST" message is transferred transparently by the AMF to the PCF within the "uePolReq" attribute during the creation of a policy association, as described in subclause 4.2.2.1, or during the update of the policy association, as described in subclause 4.2.3.1. The PCF may either reject the request by sending back a "UE POLICY PROVISIONING REJECT" message defined in subclause 7.2.2.1 of 3GPP TS 24.587 [24] or provision the policy, as defined in subclause 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 subclause 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 subclause 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

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 (WLANSWP) rules 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, 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 subscription 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.

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 subclause 5.2.3 of 3GPP TS 24.587 [24] and the corresponding encoding is defined in subclause 5.3.1 of 3GPP TS 24.588 [25].

The V2XP over Uu are defined in subclause 5.2.4 of 3GPP TS 24.587 [24] and the corresponding encoding is defined in subclause 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 subclause 5.3 of 3GPP TS 24.555 [29];
  - ProSeP for 5G ProSe direct communications defined in subclause 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 subclause 5.5 of 3GPP TS 24.555 [29]; and/or
    - ProSeP for 5G ProSe Remote UE defined in subclause 5.6 of 3GPP TS 24.555 [29];
- and/or
- ProSeP for 5G ProSe usage reporting configuration and rules defined in subclause 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 subclause 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 subclause 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 subclause 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.

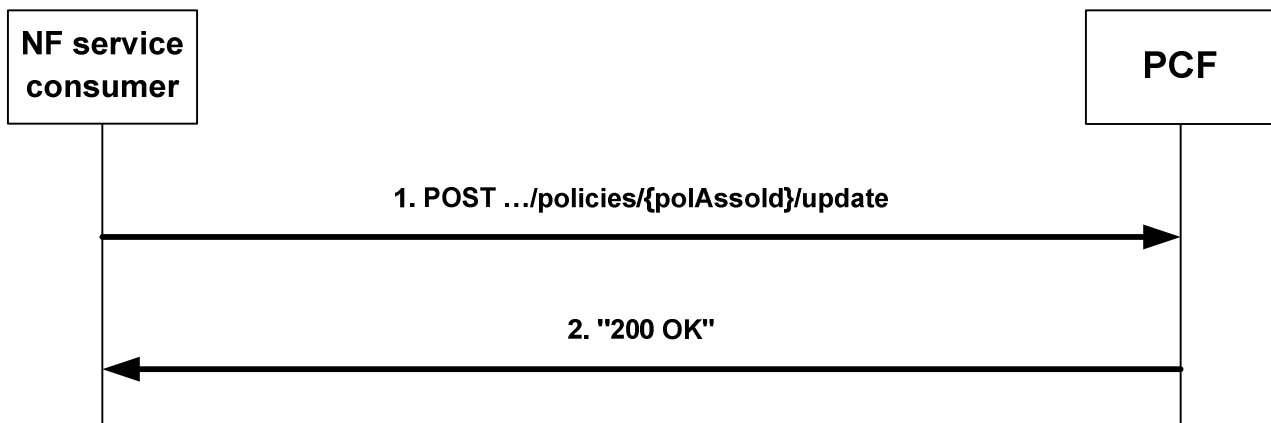
In the roaming or non-roaming case, the (V-)PCF shall use the Namf\_Communication\_N1N2MessageTransfer service operation defined in subclause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send 5G ProSe N2 PC5 policy to the NG-RAN.

### 4.2.3 Npcf\_UEPolicyControl\_Update Service Operation

#### 4.2.3.1 General

The procedure in the present subclause 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 subclause 4.2.3.2) occurs. When the location change trigger, the change of UE presence in PRA trigger, the PLMN change trigger or the UE connectivity state change trigger occurs, the NF service consumer (AMF) shall only invoke this procedure if the PCF has explicitly subscribed to that event trigger. When the UE triggers a policy provisioning request procedure via NAS signalling and the corresponding feature is supported (e.g., the UE requests the provisioning of V2X policies as defined in subclause 7.2.1.1 of 3GPP TS 24.587 [24], and the "V2X" feature is supported) the NF service consumer (AMF) shall always invoke the procedure. When the UE Capabilities change trigger occurs (the UE indicates updated PC5 capability for 5G ProSe) and the "ProSe" feature is supported, 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].

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 subclause 4.2.3.2) occurs. When the "UE\_POLICY" trigger occurs, the V-PCF shall always invoke the procedure. When the PLMN change trigger, the location change trigger, the change of UE presence in PRA trigger or the UE

connectivity state change 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 subclause 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 identifier 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 "altNotifIpv4Adrrs" 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 "altNotifIpv6Adrrs" 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 subclause 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.

12. if a "UE POLICY PROVISIONING REQUEST" message defined in subclause 7.2.1.1 of 3GPP TS 24.587 [24] has been received by the AMF via NAS transport signalling as specified in 3GPP TS 24.501 [15] from the UE in a UE policy container, or by the V-PCF as NF service consumer and respectively the "V2X" feature and/or the "ProSe" feature defined in subclause 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 subclause 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 capability for 5G ProSe occurred and the "ProSe" feature defined in subclause 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 subclause 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 subclause 5.2.2.3.1.2 of 3GPP TS 29.518 [14] or a N1N2 Transfer Failure Notification as defined in subclause 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 received "uePolDelResult" attribute (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 information received within the UE policy delivery protocol encoded in the "uePolReq" attribute, if available, local policy and for the V-PCF taking into consideration any policy received from the H-PCF 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 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 subclauses 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 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 subclauses 4.2.2.2.1.2 and 4.2.2.3, based on the operator's policy;
- for the successful 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 subclause 4.2.2.4, N2 PC5 policy for V2X communications and/or 5G ProSe (for the H-PCF) as specified in subclause 4.2.2.3 and/or Policy Control Request Trigger(s) encoded as described in subclause 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 subclause 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 7: 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 subclauses 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 subclauses 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 subclause 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 subclause 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 subclause 6.1.2.5 of 3GPP TS 23.503 [4]):

- "LOC\_CH", i.e. location change (tracking area): the tracking area of the UE has changed;
- "PRA\_CH", i.e. change of UE presence in PRA: the UE is entering/leaving a Presence Reporting Area. This includes reporting the initial status at the time the request for 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 subclause 7.2.1.1 of 3GPP TS 24.587 [24] has been received by the AMF and is being forwarded to the (V-)PCF or has been received by the (V-)PCF and is being forwarded to the H-PCF;

NOTE 1: The "UE\_POLICY" trigger only applies to the AMF if the "V2X" and/or "ProSe" features are supported.

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

NOTE 2: The "PLMN\_CH" trigger only applies if the "PlmnChange" feature is supported.

- "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 subclause 4.2.2.2) encoded as "uePolicy" attribute, and N2 PC5 policy for V2X communications (see subclause 4.2.2.3) encoded as "n2Pc5Pol" attribute and/or the N2 PC5 policy for 5G ProSe (see subclause 4.2.2.4) encoded as "n2Pc5ProSePo" attribute;
- updated Policy Control Request Trigger(s) (see subclause 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.

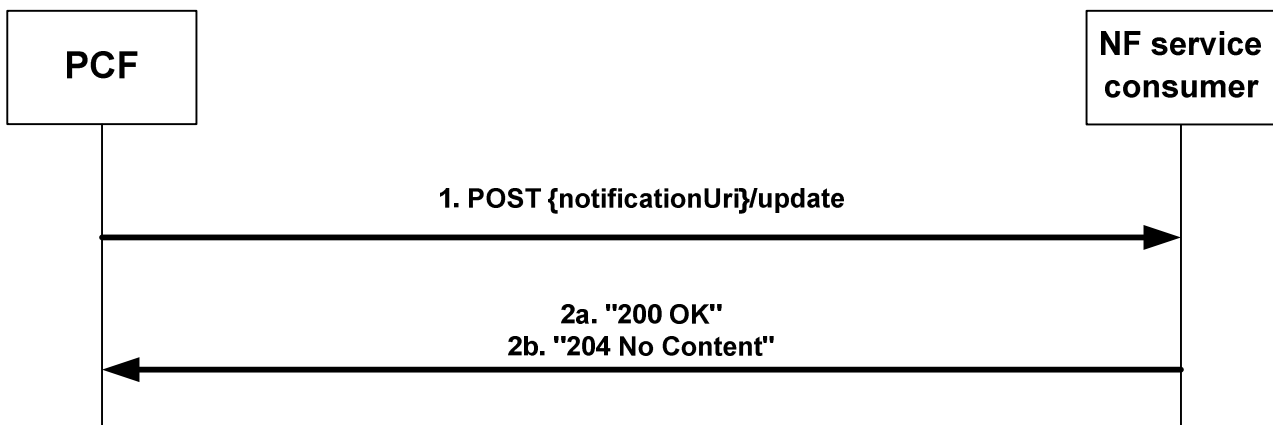
The following procedures using the Npcf\_UEPolicyControl\_UpdateNotify service operation are supported:

- 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 subclause 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 subclause 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 subclause 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.

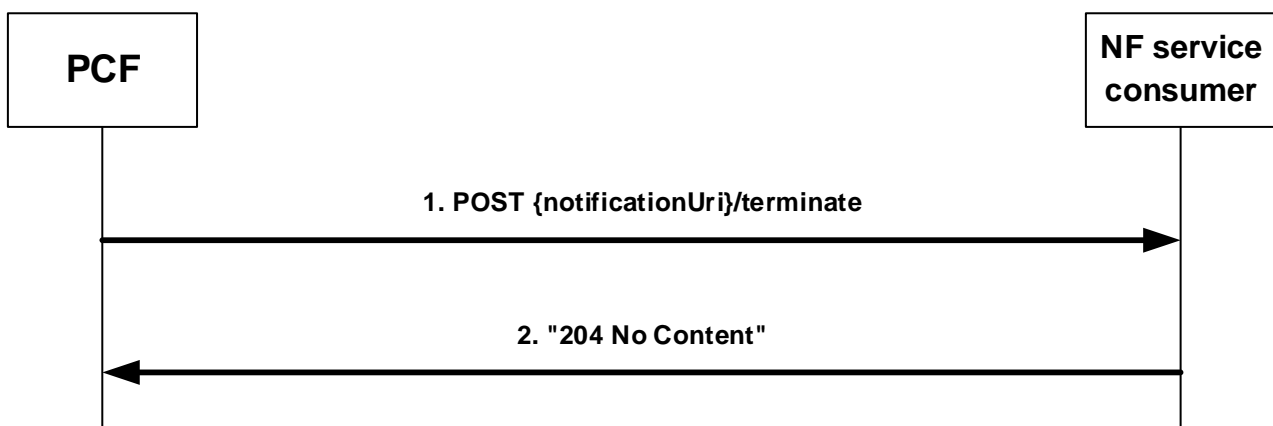
If the (V-)PCF receives a "307 Temporary Redirect" response, the (V-)PCF shall resend the failed policy update notification request using the received URI in the Location header field as Notification URI. Subsequent policy update notifications, triggered after the failed one, shall be sent to the Notification 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 Address(es) or FQDN(s) where to send Notifications (e.g. via "altNotifIpv4Adrrs", "altNotifIpv6Adrrs" or "altNotifFqdns" attributes received when the policy association was created or via AMFStatusChange Notifications, or via the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the service name and GUAMI obtained during the creation of the subscription) to query the other AMFs within the AMF set), the (V-)PCF shall exchange the authority part of the corresponding Notification URI with one of those addresses and shall use that URI in any subsequent communication.

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

#### 4.2.4.3 Request for termination of the policy association

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



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

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

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

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

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

- if the V-PCF is the NF service consumer, shall send as NF service producer for the corresponding policy association (towards the AMF as NF service consumer) a request for a termination of the policy association according to the present clause;
- shall either send an HTTP "204 No Content" response for the successful 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 subclause 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 subclause 6.10.9 of 3GPP TS 29.500 [5].

After the successful 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 subclause 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 29.518 [14], or via link level failures), and the (V-)PCF knows alternate or backup Ipv4, Ipv6 Address(es) or FQDN(s) where to send Notifications (e.g. via "altNotifIpv4Addr", "altNotifIpv6Addr" 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 subclause 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 subclause 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 subclause 6.2.2.1 of 3GPP TS 23.503 [40]. The H-PCF shall provision the URSP to the V-PCF as defined in subclause 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 subclause 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 subclause 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 subclause 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 subclause 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].

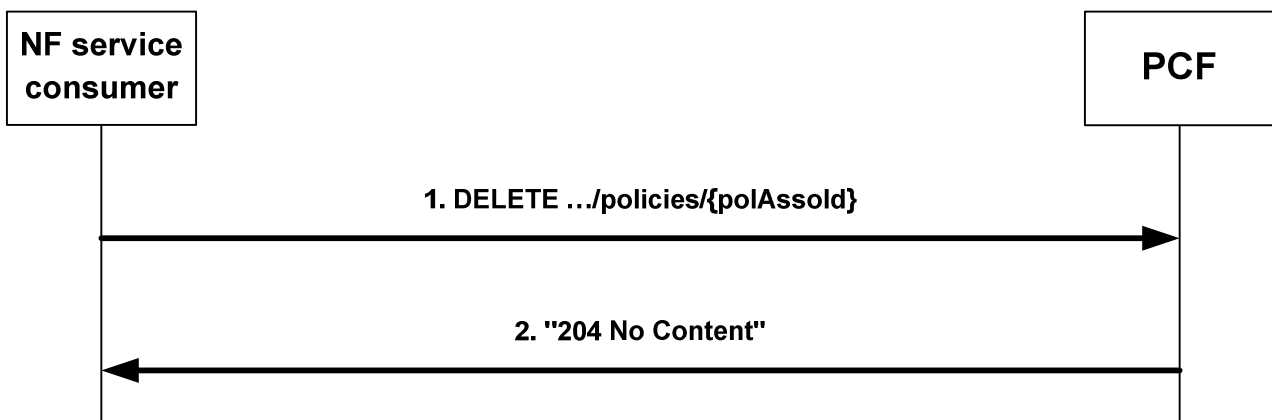
#### 4.2.4.7 UE policy provisioning for AF-influenced URSP

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 subclause 6.3.4 of 3GPP TS 29.519 [17]. In this case, the H-PCF may derive new UE Policy(ies), modify existing UE Policy(ies) or remove existing UE Policy(ies) by using the information received from the UDR(see subclause 4.2.2.2.1.1 for the description of how the (H-)PCF may use this 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 or existing UE Policy(ies) or remove existing UE Policy(ies) to the V-PCF as defined in subclause 4.2.4.2 and then the V-PCF shall invoke the Namf\_Communication\_N1N2MessageTransfer service operation to provision it 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 or existing UE Policy(ies) or to remove existing UE Policy(ies) to the UE via the AMF by sending "MANAGE UE POLICY COMMAND" message(s).

#### 4.2.5 Npcf\_UEPolicyControl\_Delete Service Operation

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



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

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

The AMF as NF service consumer requests that the policy association is deleted when the corresponding UE context is terminated, e.g. during UE de-registration from the network.

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/{polAssold}" 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 subclause 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 subclause 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 subclause 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 subclause 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 subclause 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 subclause 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 subclause 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 subclause 5.2.3.2 of 3GPP TS 29.500 [5] and may support HTTP custom header fields specified in subclause 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

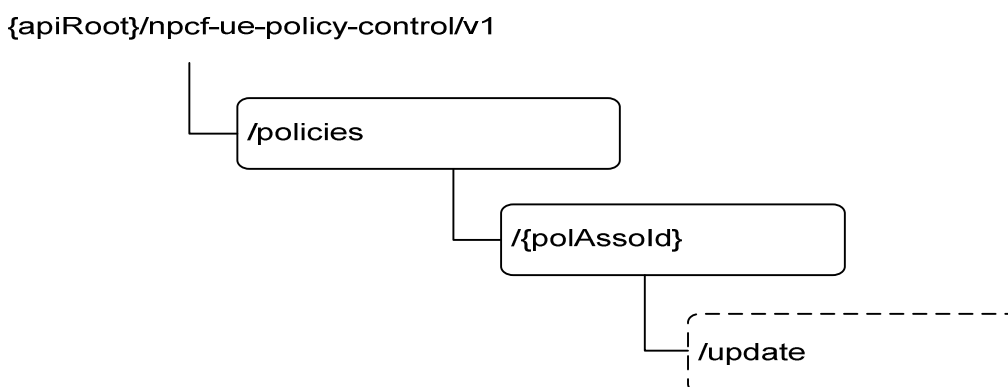


Figure 5.3.1-1: Resource URI structure of the Npcf\_UEPolicyControl API

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/{polAssold}	GET	Read an Individual UE Policy Association resource.
		DELETE	Delete an Individual UE Policy Association resource.
	/policies/{polAssold}/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 subclause 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 subclause 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/{polAssold}

## 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 subclause 5.1.
polAssold	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/{polAssold}/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 subclause 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 subclause 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 subclause 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 subclause 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 subclause 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	ConnectivityStateChange
Fqdn	3GPP TS 29.510 [13]	FQDN	
Gpsi	3GPP TS 29.571 [11]	Generic Public Subscription Identifier	
GroupId	3GPP TS 29.571 [11]		
Guami	3GPP TS 29.571 [11]	Globally Unique AMF Identifier	
Ipv4Addr	3GPP TS 29.571 [11]		
Ipv6Addr	3GPP TS 29.571 [11]		
N1N2MessageTransferCause	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 subclause 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 "prald" attribute within the PresenceInfo data type shall also be the key of the map. The "presenceState" and the "additionalPrald" attributes within the PresenceInfo data type shall not be supplied. The "prald" 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 subclause 4.2.3.2.					

5.6.2.3 Type PolicyAssociationRequest

**Table 5.6.2.3-1: Definition of type PolicyAssociationRequest**

Attribute name	Data type	P	Cardinality	Description	Applicability
notificationUri	Uri	M	1	Identifies the recipient of Notifications sent by the PCF.	
altNotifIpv4Addrs	array(Ipv4Addr)	O	1..N	Alternate or backup IPv4 Address(es) where to send Notifications.	
altNotifIpv6Addrs	array(Ipv6Addr)	O	1..N	Alternate or backup IPv6 Address(es) where to send Notifications.	
altNotifFqdns	array(Fqdn)	O	1..N	Alternate or backup FQDN(s) where to send Notifications.	
supi	Supi	M	1	Subscription Permanent Identifier.	
gpsi	Gpsi	C	0..1	Generic Public Subscription Identifier. Shall be provided when available.	
accessType	AccessType	C	0..1	The Access Type where the served UE is camping. Shall be provided when available.	
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.	
hPcflD	NfInstancelD	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], when the AMF receives an "UE POLICY PROVISIONING REQUEST" message for V2X communications, as defined in subclause 7.2.1.1 of 3GPP TS 24.587 [24], if the "V2X" feature is supported, and/or when the AMF receives an "UE POLICY PROVISIONING REQUEST" message for 5G ProSe as defined in 3GPP TS 24.554 [28], if the "ProSe" feature is supported.	
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.	
altNotifIpv4Adrs	array(Ipv4Addr)	O	1..N	Alternate or backup IPv4 Address(es) where to send Notifications.	
altNotifIpv6Adrs	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 "prald" 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 "additionalPrald" attribute within the PresenceInfo data type shall not be supplied. The "prald" 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 subclause 5.2.2.3.1.2 of 3GPP TS 29.518 [14] or a N1N2 Transfer Failure Notification as defined in subclause 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 AMF or the V-PCF receives an "UE POLICY PROVISIONING REQUEST" message, as defined in subclause 7.2.1.1 of 3GPP TS 24.587 [24], if the "V2X" feature is supported, and/or when the AMF or the V-PCF receives an "UE POLICY PROVISIONING REQUEST" message for 5G ProSe, as defined in subclause 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	PlmnId	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 "prald" 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 "prald" 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 subclause 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 subclause 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 subclause 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 "prald" attribute within the PresenceInfo data type shall also be the key of the map.	
plmnId	PlmnId	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 subclause defines simple data types and enumerations that can be referenced from data structures defined in the previous subclauses.

### 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 subclause 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 subclause 5.2.2.3.1.2 of 3GPP TS 29.518 [14], or an N1N2 Transfer Failure Notification as defined in subclause 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 subclause 10.4 of 3GPP TS 24.554 [28] has been received from the AMF and is being forwarded to the (V-)PCF, or 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 subclause 7.2 of 3GPP TS 24.587 [24] has been received from the AMF and is being forwarded to the (V-)PCF, or has been received by the V-PCF and is being forwarded to the H-PCF. This event does not require a subscription and, when the "V2X" feature is supported, is applicable for the AMF and V-PCF, otherwise, 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 subclause 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 subclauses are applicable for the Npcf\_UEPolicyControl API.

### 5.7.2 Protocol Errors

No specific protocol errors for 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 subclause 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 subclauses.		

**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 subclause 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 subclauses.		

## 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 subclause 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 subclauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [5] and according to HTTP redirection principles for indirect communication, as specified in subclause 6.10.9 of 3GPP TS 29.500 [5].
9	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], subclause 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 subclause 5.3.1 of the 3GPP TS 29.501 [6] for further information).

## A.2 Npcf\_UEPolicyControl API

```

openapi: 3.0.0
info:
  version: 1.2.0-alpha.7
  title: Npcf_UEPolicyControl
  description: |
    UE Policy Control Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.525 V17.6.0; 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 subclause 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:
            $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  policyAssociationTerminationRequestNotification:
    '{$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:
              npcfc-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'
          altNotifIpv4Adrs:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
            minItems: 1
            description: Alternate or backup IPv4 Address(es) where to send Notifications.
          altNotifIpv6Adrs:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
            minItems: 1
            description: Alternate or backup IPv6 Address(es) where to send Notifications.
          altNotifFqdns:
            type: array
            items:
              $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/Fqdn'
            minItems: 1
            description: Alternate or backup FQDN(s) where to send Notifications.
          supi:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
          gpsi:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
          accessType:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
          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: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/Fqdn'
      minItems: 1
      description: Alternate or backup FQDN(s) where to send Notifications.
    triggers:
      type: array
      items:
        $ref: '#/components/schemas/RequestTrigger'
      minItems: 1
      description: Request Triggers that the NF service consumer observes.
    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/PlmnId'
    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/PlmnId'
    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 subclause 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

Subclause 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

Subclause 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 subclause 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 subclause 4.1.3.2 with the differences described in this Annex.

---

## B.3 Service Operations

### B.3.1 Introduction

Subclause 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

Subclause 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 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 NSW0 indication nor any ANDSP policies in the UE Policy.

### B.3.3 Npcf\_UEPolicyControl\_Update Service Operation

#### B.3.3.1 General

Subclause 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 NSW0 indication nor any ANDSP policies in the UE Policy.

## B.3.4 Npcf\_UEPolicyControl\_UpdateNotify Service

### B.3.4.1 General

Subclause 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 NSW0 indication nor any ANDSP policies in the UE Policy.

## B.3.5 Npcf\_UEPolicyControl\_Delete Service Operation

### B.3.5.1 General

Subclause 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] subclause 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: <ul style="list-style-type: none"><li>- SUPI not mandatory (Unnecessary support of Emergency registration).</li><li>- Missing AMF instance id in Policy Association request</li></ul>

## Annex D (informative): Change history





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

---

# History

<b>Document history</b>		
V17.6.0	May 2022	Publication