**3GPP TSG-CT WG3 Meeting #136 *C3-244323***

**Maastricht, NL, 19 – 23 Aug, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **29.525** | **CR** | **0357** | **rev** | **-** | **Current version:** | **18.6.1** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Corrections to the provisioning of VPLMN Specific URSP rules |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eUEPO |  | ***Date:*** | 2024-07-30 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)Rel-20 (Release 20)* |
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| ***Reason for change:*** | * It is missing the specification of how the V-PCF indicates to the H-PCF the removal of AF guidance on VPLMN-Specific URSP rules. It implies that the VPLMN-Specific URSP rules may remain in the UE till the UE leaves the VPLMN.
* In addition:
	+ Clause 4.1.3.1 is missing the description in roaming of the V-PCF and H-PCF for the delivery of VPLMN specific URSP rules.
	+ Clause 4.2.2.2.1.1 it is ambiguous how the (H-)PCF provisions VPLMN-specific URSP rules to the UE.
	+ Clause 4.2.2.2.3.2, it remains ambiguous in the specification when the (H-)PCF may provision VPLMN-specific URSP rules.
	+ Clauses 4.2.4.2 and 4.2.4.7 are missing information about the V-PCF notification about the UE Policy Delivery outcome.
	+ Editorial mistake, duplication of trigger definition, in 4.2.3.2.
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| ***d*** |  |
| ***Summary of change:*** | * Support of the null value for the UePolicyParameters concerned values and for the vpsUePolGuidance attribute. Though applying this change (without feature support) strictly speaking is NBC, CT3 is considering for CT3#136 that due to it can be assumed that no implementation is still available for Rel-18, and for the sake of clarity, the proposed change can be considered as BC.
* In addition:
	+ Clause 4.2.2.2.1.1 clarifies the difference between the VPS URSP IE from the UE Policy Sections with VPLMN Specific URSP.
	+ Clause 4.2.2.2.3.2 is completed to clarify when the (H-)PCF may provision VPLMN-specific URSP rules.
	+ Clauses 4.2.4.2 and 4.2.4.7 are completed to specify V-PCF notification about the UE Policy Delivery outcome.
	+ Duplicated trigger in 4.2.3.2 is removed.
* The corresponding changes are applied to the data model and to the OpenAPI definition.
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| ***Consequences if not approved:*** | It is not possible to remove the AF guidance on VPLMN-specific URSP rules for the VPLMN specific URSP rules provided by the V-PCF. It is not possible to mute subscriptions to notifications about VPLMN-specific URSP rule(s) delivery outcome from the V-PCF. |
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| ***Clauses affected:*** | 4.1.3.1, 4.2.2.2.1.1, 4.2.2.2.3.2, 4.2.3.1, 4.2.3.2, 4.2.4.2, 4.2.4.7, A.2  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** | This CR impacts the OpenAPI definition with a backwards compatible correction. |
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| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* First Change \*\*\*

#### 4.1.3.1 Policy Control Function (PCF)

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

- supports unified policy framework to govern network behaviour;

- provides UE policy, including Access Network Discovery and Selection Policy (ANDSP), UE Route Selection Policy (URSP), Vehicle-to-Everything Policy (V2XP), Aircraft-to-Everything Policy (A2XP), 5G ProSe Policy (ProSeP) and/or Ranging and Sidelink Positioning Policy (RSLPP) via the AMF transparently to the UE;

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

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

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

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

- provides URSP via a PCF for a PDU session transparently to the UE in case of URSP provisioning in EPS;

- provides policy control request trigger(s) to a PCF for a PDU session in case of URSP provisioning in EPS; and

- provides slice-based N3IWF/TNGF selection policies based on the UE subscribed S-NSSAI(s).

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

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

- provides the ANDSP of the VPLMN via the AMF transparently to the UE;

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

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

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

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

- in case of AF guidance of VPLMN-specific URSP rules for inbound roamers:

a. provides the AF guidance for VPLMN-specific URSP rules to the H-PCF; and

b. if requested by the AF, notifies the NEF in the VPLMN about the outcome of the delivery of VPLMN-specific URSP rules;

- provides slice-based N3IWF/TNGF selection policies based on the UE Configured NSSAI; and

- for the LBO roaming scenarios, and in case of URSP provisioning in EPS:

a. provides policy control request trigger(s) received from the H-PCF to a V-PCF for a PDU session; and

b. forwards to the UE the URSP received from the H-PCF using a V-PCF for a PDU session.

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

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

- provides the UE policy (e.g. ANDSP, URSP, V2XP, A2XP, ProSeP or RSLPP) of the HPLMN to the V-PCF for forwarding to the UE via the the AMF;

- provides the N2 PC5 policy for V2X communications and/or A2X communications and/or 5G ProSe and/or Ranging/SL to the V-PCF for forwarding to the NG-RAN via the AMF;

- in case of AF guidance of VPLMN-Specific URSP rules:

a. provides VPLMN-specific URSP rules to capable UE(s) using AF guidance for VPLMN-specific URSP rules retrieved from the HPLMN UDR and/or received from the V-PCF; and

b. notifies the NEF in the HPLMN and the V-PCF about the outcome of the VPLMN-specific URSP rules delivery to the UE;

- in case of URSP provisioning in EPS:

a. for the LBO roaming scenarios, provides URSP to the V-PCF for forwarding to the UE via a V-PCF for a PDU session.

b. for the Home Routed scenarios, provides URSP to the PCF for the PDU session in the HPLMN, for forwarding to the UE via the H-SMF.

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

- Information obtained from the UDR (e.g., UE Policy Subscription data and/or Service Parameter Data provided by the AF/NEF via the UDR);

- Information obtained from the AMF, e.g., UE related and access related information;

- Information obtained from the NWDAF;

- Information from the CHF about spending limits control, e.g., status of each relevant policy counter and optional pending policy counter statuses; and

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

- PCF pre-configured policy context.

\*\*\* Next Change \*\*\*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

NOTE 2: The VPS URSP configuration IE includes zero or more tuples, each tuple containing a tuple Id, VPLMN ID(s) and a list of UPSC(s) (of HPLMN's UE policy sections) with UE policies with URSP rules applicable to the VPLMN(s) and its equivalent PLMN(s). The (H-)PCF can indicate to add new tuple(s), to update or removed a stored tuple(s) or to replace the full list of tuples.

\*\*\* Next Change \*\*\*

###### 4.2.2.2.3.2 Provisioning of VPLMN-specific URSP Rules

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

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

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

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

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

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

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

The H-PCF generates new or updated VPLMN-specific URSP rules using the received application guidance on the URSP rule determination, where the VPLMN ID(s) included in the (H-)AF and/or V-PCF request is used to indicate to the UE that this URSP rule applies when the UE is registered in the VPLMN ID. The H-PCF provides URSP rules for the received AF-guidance parameter values that are within the subscribed values defined in the UE Policy Data Set, as specified in 3GPP TS 29.519 [17]. The VPLMN ID(s) received in the (H-)(V-)AF request, as specified in 3GPP TS 29.522[39], and/or received in the V-PCF request, and provided by the H-PCF within the VPLMN-specific URSP rule, as specified in 3GPP TS 24.501 [15], may contain one or more specific values for the MCC and MNC and/or may indicate any MNC for a MCC.

The H-PCF, based on operator policies, may set the precedence in the URSP Rules to ensure that the UE checks the VPLMN ID(s) that contain one or more specific values for the MCC and MNC before any URSP Rule related the VPLMN ID(s) that contain non-specific values for MCC and/or MNC. The H-PCF should also set the precedence in the URSP rules to ensure that the UE checks any VPLMN-specific URSP rule related to the serving PLMN before any non-VPLMN specific URSP rules.

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

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

\*\*\* Next Change \*\*\*

#### 4.2.3.1 General

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

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



Figure 4.2.3.1-1: Update of a UE policy association

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

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

NOTE 2: The AMF uses the Namf\_Communication\_N1MessageNotify service operation specified in 3GPP TS 29.518 [14] to send to the V-PCF a "MANAGE UE POLICY COMPLETE" message or a "MANAGE UE POLICY COMMAND REJECT" message, as defined in Annex D.5 of 3GPP TS 24.501 [15] or a "UE POLICY PROVISIONING REQUEST" message as defined in clause 7.2.1.1 of 3GPP TS 24.587 [24].

If an AMF as NF service consumer knows by implementation specific means that the UE context has been transferred to an AMF with another GUAMI within the AMF set, it may also invoke this procedure to update the Notification URI.

NOTE 3: Either the old or the new AMF can invoke this procedure.

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

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

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

To request policies (e.g. policy control request trigger(s) is/are met) from the PCF, to update the Notification URI, to renegotiate features, to update the trace control configuration or to request the termination of trace, the NF Service Consumer shall request the update of the associated UE Policy Association by providing the relevant parameters about the UE context in an HTTP POST request with "{apiRoot}/npcf-ue-policy-control/v1/policies/{polAssoId}/update" as Resource URI and the PolicyAssociationUpdateRequest data structure as request body that shall include:

- at least one of the following:

1. a new Notification URI encoded in the "notificationUri" attribute;

2. observed Policy Control Request Trigger(s) (see clause 4.2.3.2) encoded as "triggers" attribute;

3. if a UE location change occurred, the UE location encoded as "userLoc" attribute;

4. if a "MANAGE UE POLICY COMPLETE" message or a "MANAGE UE POLICY COMMAND REJECT" message of the UE policy delivery protocol defined in Annex D of 3GPP TS 24.501 [15] has been received by the V-PCF as NF service consumer, and at least parts of the contents relate to UPSIs of the HPLMN, the parts of that message that relate to UPSIs of the HPLMN encoded as "uePolDelResult" attribute;

5. if the Policy Control Request Trigger "Change of UE presence in PRA" is provided, the current presence status of the UE for the presence reporting areas for which reporting was requested, if not previously provided, or the presence reporting areas for which reporting was requested and the status has changed encoded as "praStatuses" attribute;

NOTE 5: If the PCF included the identifer of a Core Network predefined Presence Reporting Area Set within the "praId" attribute during the subscription to changes of UE presence in PRA, the AMF only provides the presence reporting area information corresponding to the concerned individual Presence Reporting Area Identifier(s) within the Set. The "praId" attribute within each returned "PresenceInfo" data type hence includes the identifier of the concerned individual Presence Reporting Area.

6. if the NF service consumer is an AMF, for AMF relocation scenarios, if available, alternate or backup IPv4 Address(es) where to send Notifications encoded as "altNotifIpv4Addrs" attribute;

7. if the NF service consumer is an AMF, for AMF relocation scenarios, if available, alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addrs" attribute;

8. if the NF service consumer is an AMF, for AMF relocation scenarios, if available, alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute;

9. for AMF relocation scenarios, the GUAMI encoded as "guami" attribute;

NOTE 6: An alternate NF service consumer than the one that requested the generation of the subscription resource can send the request. For instance, an AMF as service consumer can change;

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

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

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

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

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

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

12. if a "UE POLICY PROVISIONING REQUEST" message defined in clause 7.2.1.1 of 3GPP TS 24.587 [24] has been received by the V-PCF as NF service consumer and respectively the "V2X" feature and/or the "A2X" feature and/or the "ProSe" feature and/or the "Ranging\_SL" feature defined in clause 5.8 is/are supported, the message encoded as "uePolReq" attribute;

13. if a UE Internal Group Identifier(s) change occurred and the "GroupIdListChange" feature defined in clause 5.8 is supported, the Internal Group Identifier(s) of the served UE encoded as "groupIds" attribute;

14. if a change of PC5 capablity for 5G ProSe occurred and the "ProSe" feature defined in clause 5.8 is supported, the PC5 capability for 5G ProSe encoded as "proSeCapab" attribute;

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

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

16. when a response with HTTP status code 4xx or 5xx as defined in clause 5.2.2.3.1.2 of 3GPP TS 29.518 [14] or a N1N2 Transfer Failure Notification as defined in clause 5.2.2.3.2 of 3GPP TS 29.518 [14] is received by the V-PCF after provisioning the UE policy by invoking the Namf\_Communication\_N1N2MessageTransfer service operation to the AMF, this UE policy transfer failure notification encoded as "uePolTransFailNotif" attribute;

17. if the NF service consumer is an AMF, the "SliceAwareANDSP" feature is supported, and the "NON\_3GPP\_NODE\_RESELECTION" trigger is reported within the "triggers" attribute, the wrongly selected type of non-3gpp access node encoded as "n3gNodeReSel" attribute, and, in the roaming case, also the Configured NSSAI for the serving PLMN encoded as "confSnssais" attribute;

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

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

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

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

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

b. if the AF requested to the VPLMN notifications about the delivery of UE Policies or the update of the subscription to notification information previously provided, the "deliveryEvents" attribute including the"SUCCESS\_UE\_POL\_DEL\_SP" and/or "UNSUCCESS\_UE\_POL\_DEL\_SP" events;

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

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

Upon the reception of the HTTP POST request:

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

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

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

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

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

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

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

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

(i) the (V-)PCF shall send the determined UE policy using Namf\_Communication\_N1N2MessageTransfer service operation(s); and

(ii) the (V-)PCF shall be prepared to receive UE Policy Delivery Results from the AMF within the Namf\_Communication\_N1MessageNotify service operation, and for the V-PCF, if the received UE Policy Delivery results relate to UE policy sections provided by the H-PCF, the V-PCF shall use the Npcf\_UEPolicyControl\_Update Service Operation to send those UE Policy Delivery results to the H-PCF; and

NOTE 11: A PolicyUpdate data structure with only mandatory attribute(s) is included in the "200 OK" response when the PCF decides not to update the policies.

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

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

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

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

- if the "SliceAwareANDSP" feature is supported, the PCF received the "NON\_3GPP\_NODE\_RESELECTION" trigger, and the PCF has successfully delivered to the UE the ANDSP/WLANSP with the slice selection information for the corresponding non-3gpp node, the indication of the successful UE configuration by providing the "andspDelInd" attribute with the value "CONFIGURED". The PCF may delay the indication of the configuration result to a subsequent Npcf\_UEPolicyControl\_UpdateNotify request as described in clause 4.2.4.2; and

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

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

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

- if the feature "ES3XX" is supported, and the (V-)(H-)PCF determines the received HTTP POST request needs to be redirected, send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5];

according to the following provisions:

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

If the PCF received a new GUAMI, the PCF may subscribe to GUAMI changes using the AMFStatusChange service operation of the Namf\_Communication service specified in 3GPP TS 29.518 [14], and it may use the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the obtained GUAMI and possibly service name) to query the other AMFs within the AMF set.

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

When the "URSPEnforcement" feature is supported and the AMF receives the "matchPdus" attribute, the AMF shall update the affected established PDU session(s), by forwarding the received PCF for the UE callback information for the PDU session(s) matching the new S-NSSAI and DNN combination(s) to the SMF, and removing the previously provided PCF for the UE information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) from the SMF as defined in 3GPP TS 29.502 [31]. When the AMF receives the "pcfUeInfo" attribute with updated SBA binding indication, the AMF shall apply the updated PCF for the UE callback information to the new PDU sessions only, i.e., already established PDU sessions are not affected.

\*\*\* Next Change \*\*\*

#### 4.2.3.2 Policy Control Request Triggers

The following Policy Control Request Triggers are defined:

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

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

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

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

NOTE 1: The "PLMN\_CH" trigger only applies if the "PlmnChange" feature is supported.

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

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

- "CON\_STATE\_CH", i.e. connectivity state change: the connectivity state of the UE has changed;

NOTE 4: The "CON\_STATE\_CH" trigger only applies if the "ConnectivityStateChange" feature is supported.

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

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

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

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

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

NOTE 7: The "SAT\_CATEGORY\_CHG" trigger only applies if the "EnSatBackhaulCategoryChg" feature is supported.

- "NON\_3GPP\_NODE\_RESELECTION", i.e. wrong TNGF or N3IWF: the UE indicated to the AMF the support of slice-based N3IWF and/or TNGF selection as specified in 3GPP TS 24.501 [15] and the AMF determined that the UE has connected to a non-3GPP access node that is not compatible with the allowed S-NSSAI(s);

NOTE 8: The "NON\_3GPP\_NODE\_RESELECTION" trigger only applies if the "SliceAwareANDSP" feature is supported. This Policy Control Request Trigger does not require expilict subscription by the PCF.

- "CONF\_NSSAI\_CH", i.e. Configured NSSAI change: the Configured NSSAI has changed;

NOTE 9: The "CONF\_NSSAI\_CH" trigger only applies if the "NssaiChange" feature is supported.

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

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

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

NOTE 11: The "LBO\_INFO\_CH" trigger only applies to the AMF and when the "VPLMNSpecificURSP" feature is supported.

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

NOTE 12: The "ACCESS\_TYPE\_CH" trigger only applies when the "AccessChange" feature is supported.

- "FEAT\_RENEG", i.e. the target AMF determines feature re-negotiation is required.

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

\*\*\* Next Change \*\*\*

#### 4.2.4.2 Policy update notification

Figure 4.2.4.2-1 illustrates the policy update notification.



Figure 4.2.4.2-1: policy update notification

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

The (V-)(H)-PCF may decide to update, based on external triggers (e.g. notifications received from UDR about new or updated service parameter data as described in 3GPP TS 29.519 [17]) or internal triggers (e.g., the activation of a pending policy counter provided via the Nchf\_SpendingLimitControl Service as described in 3GPP TS 29.594 [33]) policy control request trigger(s) and in the roaming case, the H-PCF may also decide to update the UE Policy, the N2 PC5 policy for V2X communications if the "V2X" feature is supported and/or the N2 PC5 policy for A2X communications if the "A2X" feature is supported and/or the N2 PC5 policy for 5G ProSe if the "ProSe" feature is supported and/or the N2 PC5 policy for Ranging/SL if the "Ranging\_SL" feature is supported.

NOTE: In this release of the specification, policy decisions based on policy counters provided via Nchf\_SpendingLimitControl service apply only for non-roaming cases and UE policies refer to URSP only.

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

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

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

- if the UE update with the ANDSP/WLANSP with the slice selection information for the corresponding type of non-3GPP node fails, the PCF provides the "andspDelInd" attribute set to value "NOT\_CONFIGURED".

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

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

The (V-)(H-)PCF shall then send an HTTP POST request with "{notificationUri}/update" as URI (where the Notification URI was previously supplied by the NF service consumer) to the NF service consumer and the PolicyUpdate data structure as request body encoded as described in clause 4.2.3.3.

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

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

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

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

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

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

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

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

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

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

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

When the "URSPEnforcement" feature is supported and the AMF receives the "matchPdus" attribute, the AMF shall update the affected established PDU sesssion(s), by forwarding the received PCF for the UE callback information for the PDU session(s) matching the new S-NSSAI and DNN combination(s) to the SMF, and removing the previously provided PCF for the UE callback information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) from the SMF as defined in 3GPP TS 29.502 [31]. When the AMF receives "pcfUeInfo" attribute with updated SBA binding indication, the AMF shall apply the updated PCF for the UE callback information to the new PDU sessions only, i.e., already established PDU sessions are not affected.

If the feature "ErrorResponse" is supported and if the AMF as NF service consumer is not able to handle the notification but another unknown AMF could possibly handle the notification, it shall reply with an HTTP "404 Not found" error response.

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

If the (V-)PCF becomes aware that a new AMF is requiring notifications (e.g. via the "404 Not found" response or via Namf\_Communication service AMFStatusChange Notifications, see 3GPP TS 29.518 [14], or via link level failures), and the (V-)PCF knows alternate or backup IPv4, Ipv6 Addess(es) or FQDN(s) where to send Notifications (e.g. via "altNotifIpv4Addrs", "altNotifIpv6Addrs" or "altNotifFqdns" attributes received when the policy association was created or via AMFStatusChange Notifications, or via the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the service name and GUAMI obtained during the creation of the subscription) to query the other AMFs within the AMF set), the (V-)PCF shall exchange the authority part of the corresponding Notification URI with one of those addresses and shall use that URI in any subsequent communication.

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

\*\*\* Next Change \*\*\*

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

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

If the "VPLMNSpecificURSP" feature is supported by the Nudr\_DataRepository service, the (H-)PCF may be informed about changes on service parameter data in the HPLMN that contain AF guidance on VPLMN-specific URSP rule determination as defined in 3GPP TS 29.519 [17]. For the roaming case and when the feature "VPLMNSpecificURSP" is supported, the H-PCF may be informed about changes on VPLMN-specific URSP from the V-PCF as defined in clause 4.2.3.1. Based on the received information, the (H-)PCF determines the VPLMN-specific URSP rules as specified in clause 4.2.2.2.3.2 and the new UE Policy Sections and VPS Configuration as defined in clause 4.2.2.2.1.1.

The (H-)PCF shall:

- for the roaming case, provision the derived new UE Policy Sections, and/or update and/or remove existing UE Policy Sections to the V-PCF as defined in clause 4.2.4.2 and then the V-PCF shall invoke the Namf\_Communication\_N1N2MessageTransfer service operation to provision the received UE Policy Sections to the UE; or

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

In the roaming case, when the AMF informs the V-PCF that the UE is temporarily unreachable (see 3GPP TS 29.518 [18]), the V-PCF notifies the H-PCF accordingly (including the "uePolTransFailNotif" attribute within the PolicyAssociationUpdateRequest data structure, as described in clause 4.2.2.2.1.0).

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

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

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

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

b. each "eventNotifs" entry shall contain the reported event(s) ("SUCCESS\_UE\_POL\_DEL\_SP" or "UNSUCCESS\_UE\_POL\_DEL\_SP") within the "event" attribute and in case of delivery failure, the "delivFailure" attribute with the corresponding failure reason;

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

When the AMF (non roaming case) or the V-PCF (roaming case) informs the (H-)PCF that the UE is temporarily unreachable (see 3GPP TS 29.518 [18]), the (H-) PCF may subscribe to "CON\_STATE\_CH" trigger if not done before and reattempt the provisioning of URSP(s) when the UE becomes reachable.

\*\*\* Next Change \*\*\*

# A.2 Npcf\_UEPolicyControl API

openapi: 3.0.0

info:

 version: 1.3.0

 title: Npcf\_UEPolicyControl

 description: |

 UE Policy Control Service.

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externalDocs:

 description: 3GPP TS 29.525 V18.6.0; 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 clause 4.4 of 3GPP TS 29.501

security:

 - {}

 - oAuth2ClientCredentials:

 - npcf-ue-policy-control

paths:

 /policies:

 post:

 operationId: CreateIndividualUEPolicyAssociation

 summary: Create individual UE policy association.

 tags:

 - UE Policy Associations (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PolicyAssociationRequest'

 responses:

 '201':

 description: Created

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PolicyAssociation'

 headers:

 Location:

 description: >

 Contains the URI of the newly created resource, according to the structure

 {apiRoot}/npcf-ue-policy-control/v1/policies/{polAssoId}'

 required: true

 schema:

 type: string

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 callbacks:

 policyUpdateNotification:

 '{$request.body#/notificationUri}/update':

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PolicyUpdate'

 responses:

 '200':

 description: >

 OK. The current applicable values corresponding to the policy control request

 trigger is reported

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/UeRequestedValueRep'

 '204':

 description: No Content, Notification was successful

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 policyAssocitionTerminationRequestNotification:

 '{$request.body#/notificationUri}/terminate':

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/TerminationNotification'

 responses:

 '204':

 description: No Content, Notification was successful

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 /policies/{polAssoId}:

 get:

 operationId: ReadIndividualUEPolicyAssociation

 summary: Read individual UE policy association.

 tags:

 - Individual UE Policy Association (Document)

 parameters:

 - name: polAssoId

 in: path

 description: Identifier of a policy association

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Resource representation is returned

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PolicyAssociation'

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 delete:

 operationId: DeleteIndividualUEPolicyAssociation

 summary: Delete individual UE policy association.

 tags:

 - Individual UE Policy Association (Document)

 parameters:

 - name: polAssoId

 in: path

 description: Identifier of a policy association

 required: true

 schema:

 type: string

 responses:

 '204':

 description: No Content. Resource was successfully deleted

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 /policies/{polAssoId}/update:

 post:

 operationId: ReportObservedEventTriggersForIndividualUEPolicyAssociation

 summary: >

 Report observed event triggers and possibly obtain updated policies for an individual UE

 policy association.

 tags:

 - Individual UE Policy Association (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PolicyAssociationUpdateRequest'

 parameters:

 - name: polAssoId

 in: path

 description: Identifier of a policy association

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Updated policies are returned

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/PolicyUpdate'

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 npcf-ue-policy-control: Access to the Npcf\_UEPolicyControl API

 schemas:

 PolicyAssociation:

 description: >

 Contains the description of a policy association that is returned by the PCF when a policy

 Association is created, updated, or read.

 type: object

 properties:

 request:

 $ref: '#/components/schemas/PolicyAssociationRequest'

 uePolicy:

 $ref: '#/components/schemas/UePolicy'

 n2Pc5Pol:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 n2Pc5PolA2x:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 n2Pc5ProSePol:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 triggers:

 type: array

 items:

 $ref: '#/components/schemas/RequestTrigger'

 minItems: 1

 description: >

 Request Triggers that the PCF subscribes.

 pras:

 type: object

 additionalProperties:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfoRm'

 minProperties: 1

 description: >

 Contains the presence reporting area(s) for which reporting was requested.

 The praId attribute within the PresenceInfoRm data type is the key of the map.

 andspDelInd:

 $ref: '#/components/schemas/PolicyStatus'

 andspInd:

 description: >

 Indication of UE support of ANDSP. When set to true, it indicates the UE supports ANDSP,

 when set to false it indicates the UE does not support ANDSP.

 type: boolean

 pduSessions:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionInfo'

 minItems: 1

 description: Combination of DNN and S-NSSAIs for which LBO information is requested.

 suppFeat:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 n2Pc5RsppPol:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 pcfUeInfo:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'

 matchPdus:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionInfo'

 minItems: 1

 required:

 - suppFeat

 PolicyAssociationRequest:

 description: >

 Represents information that the NF service consumer provides when requesting the creation of

 a policy association.

 type: object

 properties:

 notificationUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 altNotifIpv4Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 minItems: 1

 description: Alternate or backup IPv4 Address(es) where to send Notifications.

 altNotifIpv6Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 minItems: 1

 description: Alternate or backup IPv6 Address(es) where to send Notifications.

 altNotifFqdns:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Fqdn'

 minItems: 1

 description: Alternate or backup FQDN(s) where to send Notifications.

 supi:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'

 gpsi:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'

 accessType:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

 accessTypes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

 minItems: 1

 description: >

 The Access Type(s) where the served UE is camping.

 It shall be provided, if available, for trigger "ACCESS\_TYPE\_CH.

 pei:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Pei'

 userLoc:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

 timeZone:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/TimeZone'

 servingPlmn:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnIdNid'

 ratType:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

 ratTypes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

 minItems: 1

 description: >

 The RAT Type(s), if available, for the reported "accessTypes" where the served UE is

 camping. It shall be provided, if available, for trigger "ACCESS\_TYPE\_CH.

 groupIds:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/GroupId'

 minItems: 1

 hPcfId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

 uePolReq:

 $ref: '#/components/schemas/UePolicyRequest'

 guami:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Guami'

 serviceName:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

 servingNfId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

 pc5Capab:

 $ref: '#/components/schemas/Pc5Capability'

 a2xCapab:

 type: array

 items:

 $ref: '#/components/schemas/A2xCapability'

 minItems: 1

 proSeCapab:

 type: array

 items:

 $ref: '#/components/schemas/ProSeCapability'

 minItems: 1

 confSnssais:

 type: array

 items:

 $ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/ConfiguredSnssai'

 minItems: 1

 description: >

 The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home

 network corresponding to the configured S-NSSAI in the serving PLMN.

 n3gNodeReSel:

 $ref: '#/components/schemas/Non3gppAccess'

 satBackhaulCategory:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'

 5gsToEpsMob:

 type: boolean

 description: >

 It indicates the UE Policy Association is triggered by a 5GS to EPS mobility

 scenario.

 vpsUePolGuidance:

 type: object

 additionalProperties:

 $ref: '#/components/schemas/UePolicyParameters'

 minProperties: 1

 description: >

 Contains the service parameter used to guide the VPLMN-specific URSP and may contain

 the subscription to VPLMN-specific URSP delivery outcome.

 The key of the map represents the AF request to guide VPLMN-specific URSP rules.

 This attribute only applies in roaming and when the V-PCF is the NF service consumer.

 lboRoamInfo:

 type: array

 items:

 $ref: '#/components/schemas/LboRoamingInformation'

 minItems: 1

 description: >

 Contains LBO roaming information for DNN and S-NSSAI combination(s).

 This attribute only applies in roaming and when the AMF is the NF service consumer.

 chfInfo:

 $ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/ChargingInformation'

 suppFeat:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 rangSlCapab:

 type: array

 items:

 $ref: '#/components/schemas/RangSLCapability'

 minItems: 1

 required:

 - notificationUri

 - suppFeat

 - supi

 PolicyAssociationUpdateRequest:

 description: >

 Represents Information that the NF service consumer provides when requesting the update of

 a policy association.

 type: object

 properties:

 notificationUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 altNotifIpv4Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 minItems: 1

 description: Alternate or backup IPv4 Address(es) where to send Notifications.

 altNotifIpv6Addrs:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 minItems: 1

 description: Alternate or backup IPv6 Address(es) where to send Notifications.

 altNotifFqdns:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Fqdn'

 minItems: 1

 description: Alternate or backup FQDN(s) where to send Notifications.

 triggers:

 type: array

 items:

 $ref: '#/components/schemas/RequestTrigger'

 minItems: 1

 description: Request Triggers that the NF service consumer observes.

 praStatuses:

 type: object

 additionalProperties:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

 description: >

 Contains the UE presence status for tracking area for which changes of the UE presence

 occurred. The praId attribute within the PresenceInfo data type is the key of the map.

 minProperties: 1

 userLoc:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

 uePolDelResult:

 $ref: '#/components/schemas/UePolicyDeliveryResult'

 uePolTransFailNotif:

 $ref: '#/components/schemas/UePolicyTransferFailureNotification'

 uePolReq:

 $ref: '#/components/schemas/UePolicyRequest'

 guami:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Guami'

 servingNfId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/NfInstanceId'

 plmnId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnIdNid'

 connectState:

 $ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/CmState'

 groupIds:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/GroupId'

 minItems: 1

 pc5Capab:

 $ref: '#/components/schemas/Pc5Capability'

 a2xCapab:

 type: array

 items:

 $ref: '#/components/schemas/A2xCapability'

 minItems: 1

 proSeCapab:

 type: array

 items:

 $ref: '#/components/schemas/ProSeCapability'

 minItems: 1

 confSnssais:

 type: array

 items:

 $ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/ConfiguredSnssai'

 minItems: 1

 description: >

 The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home

 network corresponding to the configured S-NSSAI in the serving PLMN.

 satBackhaulCategory:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'

 urspEnfRep:

 type: object

 additionalProperties:

 $ref: '#/components/schemas/UrspEnforcementPduSession'

 description: >

 Contains information about the enforced URSP rule(s) in one or more PDU sessions.

 The key of the map is a character string that represents an integer value.

 minProperties: 1

 vpsUePolGuidance:

 type: object

 additionalProperties:

 $ref: '#/components/schemas/UePolicyParameters'

 minProperties: 1

 description: >

 Contains the service parameter used to guide the VPLMN-specific URSP and may contain

 the subscription to VPLMN-specific URSP delivery outcome.

 The key of the map represents the AF request to guide VPLMN-specific URSP rules.

 This attribute only applies in roaming and when the V-PCF is the NF service consumer.

 nullable: true

 lboRoamInfo:

 type: array

 items:

 $ref: '#/components/schemas/LboRoamingInformation'

 minItems: 1

 description: >

 Contains LBO roaming information for DNN and S-NSSAI combination(s).

 This attribute only applies in roaming and when the AMF is the NF service consumer.

 accessTypes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

 minItems: 1

 description: >

 The Access Type(s) where the served UE is camping.

 It shall be provided, if available, for trigger "ACCESS\_TYPE\_CH.

 ratTypes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

 minItems: 1

 description: >

 The RAT Type(s), if available, for the reported "accessTypes" where the served UE is

 camping. It shall be provided, if available, for trigger "ACCESS\_TYPE\_CH.

 suppFeat:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 rangSlCapab:

 type: array

 items:

 $ref: '#/components/schemas/RangSLCapability'

 minItems: 1

 description: >

 Contains the Ranging/SL related UE capabilities.

 PolicyUpdate:

 description: >

 Represents updated policies that the PCF provides in a notification or in the reply to an

 Update Request.

 type: object

 properties:

 resourceUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 uePolicy:

 $ref: '#/components/schemas/UePolicy'

 n2Pc5Pol:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 n2Pc5PolA2x:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 n2Pc5ProSePol:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 triggers:

 type: array

 items:

 $ref: '#/components/schemas/RequestTrigger'

 minItems: 1

 nullable: true

 description: >

 Request Triggers that the PCF subscribes.

 pras:

 type: object

 additionalProperties:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/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

 andspDelInd:

 $ref: '#/components/schemas/PolicyStatus'

 delivReport:

 type: object

 additionalProperties:

 $ref: '#/components/schemas/UePolicyNotification'

 minProperties: 1

 description: >

 Contains the delivery outcome of the VPLMN-specific URSP.

 The key of the map represents the AF request of the corresponding subscription, i.e. its

 value shall match the key that was previously provided by the V-PCF in the

 vpsUePolGuidance attribute.

 This attribute only applies in roaming and when the V-PCF is the NF service consumer.

 pduSessions:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionInfo'

 minItems: 1

 description: >

 Combination of DNN and S-NSSAIs for which LBO information is requested.

 nullable: true

 pcfUeInfo:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'

 matchPdus:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionInfo'

 minItems: 1

 nullable: true

 suppFeat:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 n2Pc5RsppPol:

 $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N2InfoContent'

 required:

 - resourceUri

 TerminationNotification:

 description: >

 Represents a request to terminate a policy association that the PCF provides in a

 notification.

 type: object

 properties:

 resourceUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 cause:

 $ref: '#/components/schemas/PolicyAssociationReleaseCause'

 required:

 - resourceUri

 - cause

 UePolicyTransferFailureNotification:

 description: >

 Represents information on the failure of a UE policy transfer to the UE because the UE is

 not reachable.

 type: object

 properties:

 cause:

 $ref: '#/components/schemas/UePolicyTransferFailureCause'

 retryAfter:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

 ptis:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'

 minItems: 1

 description: >

 This contains a list of PTI assigned by the H-PCF corresponding to the UE policy(s)

 which could not be transferred by the AMF.

 required:

 - cause

 - ptis

 UeRequestedValueRep:

 description: >

 Contains the current applicable values corresponding to the policy control request triggers.

 type: object

 properties:

 userLoc:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/UserLocation'

 praStatuses:

 type: object

 additionalProperties:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PresenceInfo'

 minProperties: 1

 description: >

 Contains the UE presence statuses for tracking areas. The praId attribute within the

 PresenceInfo data type is the key of the map.

 plmnId:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PlmnIdNid'

 connectState:

 $ref: 'TS29518\_Namf\_EventExposure.yaml#/components/schemas/CmState'

 confSnssais:

 type: array

 items:

 $ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/ConfiguredSnssai'

 minItems: 1

 description: >

 The Configured NSSAI for the serving PLMN, and the mapped S-NSSAI value of home

 network corresponding to the configured S-NSSAI in the serving PLMN.

 satBackhaulCategory:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'

 urspEnfRep:

 type: object

 additionalProperties:

 $ref: '#/components/schemas/UrspEnforcementPduSession'

 description: >

 Contains information about the enforced URSP rule(s) in one or more PDU sessions.

 The key of the map is a character string that represents an integer value.

 minProperties: 1

 lboRoamInfo:

 type: array

 items:

 $ref: '#/components/schemas/LboRoamingInformation'

 minItems: 1

 description: >

 Contains LBO roaming information for DNN and S-NSSAI combination(s).

 accessTypes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/AccessType'

 minItems: 1

 description: >

 The Access Type(s) where the served UE is camping.

 It shall be provided, if available, for trigger "ACCESS\_TYPE\_CH.

 ratTypes:

 type: array

 items:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/RatType'

 minItems: 1

 description: >

 The RAT Type(s), if available, for the reported "accessTypes" where the served UE is

 camping. It shall be provided, if available, for trigger "ACCESS\_TYPE\_CH.

 UePolicyParameters:

 description: >

 Contains the service parameters used to guide the VPLMN-specific URSP rule determination.

 type: object

 properties:

 urspGuidance:

 type: array

 items:

 $ref: 'TS29522\_ServiceParameter.yaml#/components/schemas/UrspRuleRequest'

 minItems: 1

 description: >

 Contains the service parameter used to guide the VPLMN-specific URSP.

 deliveryEvents:

 type: array

 items:

 $ref: 'TS29522\_ServiceParameter.yaml#/components/schemas/Event'

 minItems: 1

 description: >

 AF subscribed event(s) notifications related to AF provisioned guidance

 for VPLMN-specific URSP rules.

 nullable: true

 nullable: true

 LboRoamingInformation:

 description: >

 Contains LBO roaming information for a DNN and S-NSSAI.

 type: object

 properties:

 lboRoamAllowed:

 type: boolean

 description: >

 Indicates whether LBO for the DNN and S-NSSAI is allowed when roaming.

 dnn:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

 snssai:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

 required:

 - dnn

 - snssai

 UrspEnforcementPduSession:

 description: >

 Represents URSP rule enforcement information for a PDU session.

 type: object

 required:

 - urspEnfInfo

 properties:

 urspEnfInfo:

 $ref: 'TS29512\_Npcf\_SMPolicyControl.yaml#/components/schemas/UrspEnforcementInfo'

 sscMode:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SscMode'

 ueReqDnn:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

 ueReqPduSessionType:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/PduSessionType'

 dnn:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'

 snssai:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'

 UePolicyNotification:

 description: >

 Contains the delivery outcome of VPLMN-specific URSP rules.

 type: object

 required:

 - eventNotifs

 properties:

 eventNotifs:

 type: array

 items:

 $ref: 'TS29523\_Npcf\_EventExposure.yaml#/components/schemas/PcEventNotification'

 minItems: 1

 description: >

 Represents the events to be reported according to the subscription to notifications

 of VPLMN-specific URSP delivery outcome events.

 UePolicy:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

 UePolicyDeliveryResult:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

 UePolicyRequest:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

 RequestTrigger:

 anyOf:

 - type: string

 enum:

 - LOC\_CH

 - PRA\_CH

 - UE\_POLICY

 - PLMN\_CH

 - CON\_STATE\_CH

 - GROUP\_ID\_LIST\_CHG

 - UE\_CAP\_CH

 - SAT\_CATEGORY\_CHG

 - NON\_3GPP\_NODE\_RESELECTION

 - CONF\_NSSAI\_CH

 - LBO\_INFO\_CH

 - FEAT\_RENEG

 - URSP\_ENF\_INFO

 - ACCESS\_TYPE\_CH

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the possible request triggers.

 Possible values are:

 - LOC\_CH: Location change (tracking area). The tracking area of the UE has changed.

 - PRA\_CH: Change of UE presence in PRA. The AMF reports the current presence status

 of the UE in a Presence Reporting Area, and notifies that the UE enters/leaves the

 Presence Reporting Area.

 - UE\_POLICY: A MANAGE UE POLICY COMPLETE message or a MANAGE UE POLICY COMMAND REJECT

 message, as defined in Annex D.5 of 3GPP TS 24.501 or a "UE POLICY PROVISIONING REQUEST"

 message, as defined in clause 7.2.1.1 of 3GPP TS 24.587, has been received by the AMF

 and is being forwarded.

 - PLMN\_CH: PLMN change. the serving PLMN of UE has changed.

 - CON\_STATE\_CH: Connectivity state change: the connectivity state of UE has changed.

 - GROUP\_ID\_LIST\_CHG: UE Internal Group Identifier(s) has changed. This policy

 control request

 trigger does not require a subscription.

 - UE\_CAP\_CH: UE Capabilities change: the UE provided 5G ProSe capabilities have changed.

 This policy control request trigger does not require subscription.

 - SAT\_CATEGORY\_CHG: Indicates that the AMF has detected a change between different satellite

 category, or non-satellite backhaul.

 - NON\_3GPP\_NODE\_RESELECTION: The UE has connected to a wrong non-3GPP access node that

 does not match its subscribed S-NSSAI(s). This policy control request trigger does not

 require a subscription.

 - CONF\_NSSAI\_CH: Configured NSSAI change. Indicates that the configured NSSAI has changed.

 - LBO\_INFO\_CH: LBO information change. The AMF reports LBO roaming allowed or not allowed

 for the requested DNN(s) and S-NSSAI(s). This policy control request trigger only applies

 in roaming scenarios when the NF service consumer is the AMF.

 - FEAT\_RENEG: The NF service consumer notifies that the target AMF is requesting feature

 re-negotiation.

 - URSP\_ENF\_INFO: The V-PCF has received URSP rule enforcement information about the enforced

 URSP rule(s) in one or more PDU sessions. This trigger applies in roaming scenarios and

 to the V-PCF.

 - ACCESS\_TYPE\_CH: Access Type change. The registered access type and RAT type

 has changed, an access type and RAT type is added or removed.

 PolicyAssociationReleaseCause:

 anyOf:

 - type: string

 enum:

 - UNSPECIFIED

 - UE\_SUBSCRIPTION

 - INSUFFICIENT\_RES

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the cause why the PCF requests the policy association termination.

 Possible values are:

 - UNSPECIFIED: This value is used for unspecified reasons.

 - UE\_SUBSCRIPTION: This value is used to indicate that the policy association needs to be

 terminated because the subscription of UE has changed (e.g. was removed).

 - INSUFFICIENT\_RES: This value is used to indicate that the server is overloaded and needs

 to abort the policy association.

 Pc5Capability:

 anyOf:

 - type: string

 enum:

 - LTE\_PC5

 - NR\_PC5

 - LTE\_NR\_PC5

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the specific PC5 RAT(s) which the UE supports for V2X communications over

 PC5 reference point.

 Possible values are:

 - LTE\_PC5: This value is used to indicate that UE supports PC5 LTE RAT for V2X

 communications over the PC5 reference point

 - NR\_PC5: This value is used to indicate that UE supports PC5 NR RAT for V2X communications

 over the PC5 reference point.

 - LTE\_NR\_PC5: This value is used to indicate that UE supports both PC5 LTE and NR RAT for

 V2X communications over the PC5 reference point.

 ProSeCapability:

 anyOf:

 - type: string

 enum:

 - PROSE\_DD

 - PROSE\_DC

 - PROSE\_L2\_U2N\_RELAY

 - PROSE\_L3\_U2N\_RELAY

 - PROSE\_L2\_REMOTE\_UE

 - PROSE\_L3\_REMOTE\_UE

 - PROSE\_L2\_U2U\_RELAY

 - PROSE\_L3\_U2U\_RELAY

 - PROSE\_L2\_END\_UE

 - PROSE\_L3\_END\_UE

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 the content defined in the present version of this API.

 description: |

 Represents the 5G ProSe capabilities.

 Possible values are:

 - PROSE\_DD: This value is used to indicate that 5G ProSe Direct Discovery is supported

 by the UE.

 - PROSE\_DC: This value is used to indicate that 5G ProSe Direct Communication is supported

 by the UE.

 - PROSE\_L2\_U2N\_RELAY: This value is used to indicate that Layer-2 5G ProSe UE-to-Network

 Relay is supported by the UE.

 - PROSE\_L3\_U2N\_RELAY: This value is used to indicate that Layer-3 5G ProSe UE-to-Network

 Relay is supported by the UE.

 - PROSE\_L2\_REMOTE\_UE: This value is used to indicate that Layer-2 5G ProSe Remote UE is

 supported by the UE.

 - PROSE\_L3\_REMOTE\_UE: This value is used to indicate that Layer-3 5G ProSe Remote UE is

 supported by the UE.

 - PROSE\_L2\_U2U\_RELAY: This value is used to indicate that Layer-2 5G ProSe UE-to-UE

 Relay is supported by the UE.

 - PROSE\_L3\_U2U\_RELAY: This value is used to indicate that Layer-3 5G ProSe UE-to-UE

 Relay is supported by the UE.

 - PROSE\_L2\_END\_UE: This value is used to indicate that Layer-2 5G ProSe End UE is

 supported by the UE.

 - PROSE\_L3\_END\_UE: This value is used to indicate that Layer-3 5G ProSe End UE is

 supported by the UE.

 Non3gppAccess:

 anyOf:

 - type: string

 enum:

 - N3IWF

 - TNGF

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents a non-3gpp access node.

 Possible values are:

 - N3IWF: Non-3gpp Interworking Function.

 - TNGF: Trusted Non-3gpp Gateway Function.

 N1N2MessTransferErrorReply:

 anyOf:

 - type: string

 enum:

 - UE\_NOT\_REACHABLE

 - UNSPECIFIED

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents an N1N2 Message Transfer error.

 Possible values are:

 - UE\_NOT\_REACHABLE: The UE is not reachable for paging.

 - UNSPECIFIED: Unspecified error.

 RangSLCapability:

 anyOf:

 - type: string

 enum:

 - PC5\_RANGING\_SL

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration

 but is not used to encode content defined in the present version of this API.

 description: |

 Indicates the Ranging and Sidelink Capability.

 Possible values are:

 - PC5\_RANGING\_SL: Indicates that the PC5 Capability for Ranging and Sidelink is supported

 by the UE.

 PolicyStatus:

 anyOf:

 - type: string

 enum:

 - CONFIGURED

 - NOT\_CONFIGURED

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the configuration status of a UE Policy in the UE.

 Possible values are:

 - CONFIGURED: The UE Policy is configured in the UE.

 - NOT\_CONFIGURED: The UE Policy is not configured in the UE.

 A2xCapability:

 anyOf:

 - type: string

 enum:

 - EUTRA\_PC5

 - NR\_PC5

 - UU

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: |

 Represents the A2X capabilities the UE supports for A2X communication.

 Possible values are:

 - EUTRA\_PC5: This value is used to indicate that the UE supports PC5 EUTRA RAT for A2X

 communications over the PC5 reference point

 - NR\_PC5: This value is used to indicate that the UE supports PC5 NR RAT for A2X

 communications over the PC5 reference point.

 - UU: This value is used to indicate that UE supports A2X communications over the PC5

 reference point.

#

 UePolicyTransferFailureCause:

 description: UE Policy Transfer Failure Cause.

 anyOf:

 - $ref: 'TS29518\_Namf\_Communication.yaml#/components/schemas/N1N2MessageTransferCause'

 - $ref: '#/components/schemas/N1N2MessTransferErrorReply'

\*\*\* End of Changes \*\*\*