**3GPP TSG-CT WG3 Meeting #128C3-232244**

**Bratislava, Slovakia, 22nd– 26th May 2023 (revision of C3-231540)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.513** | **CR** | **0444** | **rev** | **2** | **Current version:** | **18.1.0** |  |
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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:*** | URSP provisioning in EPS | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Intel | | | | | | | | | |
| ***Source to TSG:*** | C3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eUEPO | | | | |  | ***Date:*** | | | 2023-05-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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 can be 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | CT3 agreed in CR 1045 to TS 29.512 and CR 0238 to TS 29.525 to support URSP provisioning in EPS.  Furthermore, SA2 has agreed in CR 3952 to TS 23.502 clause 4.11.0a.2a.5 (see S2-2306252) on the “UE Policy Association establishment” and “UE Policy Association Modification” procedures to support the delivery of URSP in EPC. The procedures apply for both both non-roaming scenarios and LBO roaming scenarios.  Accordingly, this CR proposes to add support for URSP provisioning in EPS. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add support for URSP provisioning in EPS. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | URSP provisioning in EPS not supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.6.1.1, 5.6.1.2, 5.6.1.3, 5.6.2.1.1, 5.6.2.1.2, 5.6.2.1.3, 5.6.2.1.2, 5.6.2.2.1, 5.6.2.2.2, 5.6.2.2.3, 5.6.3.1.1, 5.6.3.1.2, 5.6.3.1.3, 5.6.3.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.502 CR 3952 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev2   * add roaming support in clause 5.6.1.3, 5.6.2.1.3, 5.6.2.2.3 and 5.6.3.1.3 in allignment with the SA2 agreement in CR 3952 to TS 23.502 (S2-2306252) | | | | | | | | |

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

## 5.6 UE Policy Association Management

### 5.6.1 UE Policy Association Establishment

#### 5.6.1.1 General

The procedures in this clause are performed when the UE initially registers with the network, when the UE registers with 5GS during the UE moving from EPS to 5GS and if there is no existing UE Policy Association, when the new AMF establishes the UE Policy Association with the new PCF during AMF relocation, or when interworking between 5GS and EPS if a UE Policy Container is received from the UE via SMF+PGW-C for URSP provisioning in EPS.

NOTE 1: For details of the Nudr\_DataRepository\_Query/Update/Subscribe service operations refer to 3GPP TS 29.519 [12].

NOTE 2: For details of the Npcf\_UEPolicyControl\_Create/Update service operations refer to 3GPP TS 29.525 [31].

NOTE 3: For details of the Namf\_Communication\_N1N2MessageTransfer/N1N2MessageSubscribe/ N1MessageNotify service operations refer to 3GPP TS 29.518 [32].

NOTE 4: For URSP provisioning in EPS the (V-)PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.1.2.

#### 5.6.1.2 Non-roaming



Figure 5.6.1.2-1: UE Policy Association Establishment procedure - Non-roaming

1. The AMF receives the registration request from the AN.

* Based on local policy, and the authorized capabilities received from the UE (e.g. V2X capabilities and/or 5G ProSe capabilities), as defined in clause 4.2.2.1 of 3GPP TS 29.525 [31], the AMF decides to select and contact the PCF to create the UE policy association . The AMF invokes the Npcf\_UEPolicyControl\_Create service operation by sending an HTTP POST request to the "UE Policy Associations" resource as defined in clause 4.2.2.1 of 3GPP TS 29.525 [31].For URSP provisioning in EPS, if the "EpsUrsp" feature is supported and a UE Policy Container is received from the UE via SMF+PGW-C, the PCF for a PDU session invokes the Npcf\_UEPolicyControl\_Create service operation by sending an HTTP POST request to the "UE Policy Associations" resource as defined in clause 4.2.2.1 of 3GPP TS 29.525 [31].

2-3. If the PCF does not have the subscription data or the latest list of UPSIs for the UE, it invokes the Nudr\_DataRepository\_Query service operation to the UDR by sending an HTTP GET request to the "UEPolicySet" resource. The UDR sends an HTTP "200 OK" response to the PCF with the latest UPSIs and its content, and/or the subscription data.

Additionally, if the "EnhancedBackgroundDataTransfer" feature defined in 3GPP TS 29.504 [27] is supported, the PCF invokes the Nudr\_DataRepository\_Query service operation to the UDR by sending the HTTP GET request to the "Applied BDT Policy Data" resource to retrieve the applied BDT Policy Data. The UDR sends an HTTP "200 OK" response with the stored applied BDT Policy Data. And then, if the corresponding transfer policy is not locally stored in the PCF, the PCF invokes the Nudr\_DataRepository\_Query service operation by sending the HTTP GET request to the "IndividualBdtData" resource or the "BdtData" collection resource with the URI query parameter "bdt-ref-ids" as specified in 3GPP TS 29.519 [12], to retrieve the related Background Data Transfer policy information (i.e. Time window and Location criteria) stored in the UDR. The UDR sends an HTTP "200 OK" response to the PCF.

Additionally, if the "AfGuideURSP" feature is supported and URSPs are influenced by the AF, and/or V2XP and/or the "ProSe" feature is supported and ProSeP policies may be delivered to the UE, the PCF invokes the Nudr\_DataRepository\_Query service operation to the UDR by sending the HTTP GET request to the "Service Parameter Data" resource to retrieve the service parameter data. The UDR sends an HTTP "200 OK" response with the stored service parameter data.

Additionally, the PCF invokes the Nudr\_DataRepository\_Query service operation to the UDR by sending the HTTP GET request to the "5GvnGroupsInternal" resource to retrieve the group configuration of the received 5G VN Group Id as specified in 3GPP TS 29.505 [47], if not internally available.

NOTE 1: The PCF can internally store the retrieved 5G VN group configuration data for later use for other SUPIs that belong to the same Internal-Group-Id.

4-5. The PCF may request notifications from the UDR on changes in the policy data subscription information (e.g, UE Policy Set resource), and in this case, the PCF shall invoke the Nudr\_DataRepository\_Subscribe service operation by sending an HTTP POST request to the "PolicyDataSubscriptions" resource. The UDR sends an HTTP "201 Created" response to acknowledge the subscription.

Additionally, if the "EnhancedBackgroundDataTransfer" feature defined in 3GPP TS 29.504 [27] is supported, to request notifications from the UDR on changes in the applied BDT Policy Data, the PCF invokes the Nudr\_DataRepository\_Subscribe service operation by sending an HTTP POST request to the "ApplicationDataSubscriptions" resource. The UDR sends an HTTP "201 Created" response to acknowledge the subscription.

Additionally, if the PCF requests notifications from the UDR on changes in the service parameter data, the PCF invokes the Nudr\_DataRepository\_Subscribe service operation by sending an HTTP POST request to the "ApplicationDataSubscriptions" resource. The UDR sends an HTTP "201 Created" response to acknowledge the subscription.

Additionally, to request notifications from the UDR on changes in the 5G VN group configuration data associated to each of the Internal-Group-Id provided to the PCF, the PCF invokes the Nudr\_DataRepository\_Subscribe service operation by sending an HTTP POST request to the "SubscriptionDataSubscriptions" resource as specified in 3GPP TS 29.505 [47], if not internally available. The UDR sends an HTTP "201 Created" response to acknowledge the subscription.

6. The PCF determines whether and which UE policy has to be provisioned or updated as defined in clause 4.2.2.2.1 of 3GPP TS 29.525 [31], and may determine applicable Policy Control Request Trigger(s).

The PCF determines whether and which ANDSP and/or URSP has to be provisioned or updated based on the NF service consumer inputs, the received list of UPSIs from the UE, if available, the UE Policy Sections stored in the UDR, if available, other received UE parameters, if available, the policy subscription and application data retrieved from UDR, if available, analytics information received from NWDAF (applicable to URSP), if available, and local policies as defined in clauses 4.2.2.2.1.1, 4.2.2.2.2 (for ANDSP) and/or 4.2.2.2.3 (for URSP) of 3GPP TS 29.525 [31].

If the "V2X" feature is supported, the PCF determines whether the V2XP and the V2X N2 PC5 policy have to be provisioned as defined in clauses 4.2.2.2.1.2 and 4.2.2.3 of 3GPP TS 29.525 [31].

If the "ProSe" feature is supported, the PCF determines whether the ProSeP and the 5G ProSe N2 PC5 policy have to be provisioned as defined in clauses 4.2.2.2.1.3 and 4.2.2.4 of 3GPP TS 29.525 [31].

In addition, the PCF checks if the size of determined UE policy exceeds a predefined limit.

NOTE 2: NAS messages from AMF to UE do not exceed the maximum size limit allowed in NG-RAN (PDCP layer), so the predefined size limit in PCF is related to that limitation.

- If the size is under the limit then the UE policy information is included in a single Namf\_Communication\_N1N2MessageTransfer service operation and messages 10 to 13 are thus executed one time.

- If the size exceeds the predefined limit, the PCF splits the UE policy information in smaller logical independent UE policy information fragments and ensures the size of each is under the predefined limit. Each UE policy information fragment will be then sent in separated Namf\_Communication\_N1N2MessageTransfer service operations and messages 10 to 13 are thus executed several times, one time for each UE policy information fragment.

7. The PCF sends an HTTP "201 Created" response to the AMF with the Policy Control Request Trigger(s) if applicable.

- For URSP provisioning in EPS, if the PCF decided to provision or update the URSP in step 6, the PCF invokes the Npcf\_UEPolicyControl\_Create response service operation to provision or update the URSP and the PCF for the PDU session invokes the Npcf\_UEPolicyControl\_Update request service operation to forward the response of the UE to the PCF as specified in 3GPP TS 29.525 [31]. Steps 8-15 are not applicable for URSP provisioning in EPS.

8-9. If the "ProSe" feature is supported for the Npcf\_UEPolicyControl service, the PCF may register with the BSF as the PCF serving this UE, if not already registered at the AM Policy Association establishment. This is performed by using the Nbsf\_Management\_Register operation, providing as inputs the SUPI, the GPSI, if available, and the PCF end points related to the Npcf\_AMPolicyAuthorization service.

10. To subscribe to notifications of N1 message for UE Policy Delivery Result, or subsequent UE policy requests (e.g. for V2XP and/or ProSeP), the PCF invokes Namf\_Communication\_N1N2MessageSubscribe service operation to the AMF by sending the HTTP POST method with the URI of the "N1N2 Subscriptions Collection for Individual UE Contexts"” resource.

11. The AMF sends an HTTP "201 Created” response to the PCF.

12. If the PCF determines to provision or update the UE policy in step 6, the PCF sends the UE policy to the UE via the AMF by invoking the Namf\_Communication\_N1N2MessageTransfer service operation.

If the "V2X" feature is supported and the PCF determines to provision V2XP and V2X N2 PC5 policy in step 6, the PCF sends the V2XP to the UE and the V2X N2 PC5 policy to the NG-RAN via the AMF by invoking the Namf\_Communication\_N1N2MessageTransfer service operation.

If the "ProSe" feature is supported and the PCF determines to provision ProSeP and 5G ProSe N2 PC5 policy in step 6, the PCF sends the ProSeP to the UE and the5G ProSe N2 PC5 policy to the NG-RAN via the AMF by invoking the Namf\_Communication\_N1N2MessageTransfer service operation.

The PCF can provision the UE policy (including V2XP and/or ProSeP) and V2X N2 PC5 policy and/or 5G ProSe N2 PC5 Policy in the same message.

13. The AMF sends a response to the Namf\_Communication\_N1N2MessageTransfer service operation.

14. When receiving the UE Policy container, the AMF forwards the response of the UE to the PCF using Namf\_Communication\_N1MessageNotify service operation.

15. The PCF sends a response to the Namf\_Communication\_N1MessageNotify service operation.

NOTE 3: Steps 7 and 10-15 are triggered by the Npcf\_UEPolicyControl\_Create request and can be received by the AMF in any order; e.g., all or some of the steps 10-15 can be received by the AMF prior to step 7. Note that, to ensure the UE Policy delivery response within the N1MessageNotify is received, the PCF should wait for the reception of a successful N1N2MessageSubscribe response (step 11) before sending the N1N2MessageTransfer request (step 12).

16-17. The PCF maintains the latest list of UE policy sections delivered to the UE (in step 12) and updates the UE policy information for the subscriber including the latest list of UPSIs and its content in the UDR by invoking the Nudr\_DataRepository\_Update service operation.

- If there is no UE policy information retrieved in step 3, the PCF sends an HTTP PUT request to the "UEPolicySet" resource, and the UDR sends an HTTP "201 Created" response.

- Otherwise, the PCF sends an HTTP PUT/PATCH request to the "UEPolicySet" resource, and the UDR sends an HTTP "200 OK" or "204 No Content" response accordingly.

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

#### 5.6.1.3 Roaming



Figure 5.6.1.3-1: UE Policy Association Establishment procedure - Roaming

1. The AMF receives the registration request from the AN.

Based on local policy, and the capabilities received from the UE (e.g. V2X capabilities) , as defined in clause 4.2.2.1 of 3GPP TS 29.525 [31], the AMF decides to establish UE Policy Association with the V-PCF. The AMF invokes the Npcf\_UEPolicyControl\_Create service operation by sending an HTTP POST request to the "UE Policy Associations" resource as defined in clause 4.2.2.1 of 3GPP TS 29.525 [31].

* For URSP provisioning in EPS, if the "EpsUrsp" feature is supported and a UE Policy Container is received from the UE via SMF+PGW-C, the V-PCF for a PDU session invokes the Npcf\_UEPolicyControl\_Create service operation by sending an HTTP POST request to the "UE Policy Associations" resource as defined in clause 4.2.2.1 of 3GPP TS 29.525 [31].

2. The V-PCF invokes the Npcf\_UEPolicyControl\_Create service operation by sending an HTTP POST request to the "UE Policy Associations" resource to forward the information received from AMF to the H-PCF. The request includes the parameters received in step 1. The V-PCF also provides the H-PCF the Notification URI where to send a notification when the policy is updated.

3-6. These steps are the same as steps 2-5 in clause 5.6.1.2, except the description of "EnhancedBackgroundDataTransfer" feature is not applicable.

7. The H-PCF determines whether and which ANDSP and/or URSP has to be provisioned or updated based on the NF service consumer inputs, the received list of UPSIs from the UE, if available, the UE Policy Sections stored in the UDR, if available, other received UE parameters, if available, the policy subscription and application data retrieved from UDR, if available, analytics information received from NWDAF (applicable to URSP), if available and local policies as defined in clauses 4.2.2.2.1.1, 4.2.2.2.2 (for ANDSP) and/or 4.2.2.2.3 (for URSP) of 3GPP TS 29.525 [31].

If the H-PCF does not receive information from the UE (the list of UPSIs and/or other UE parameters, as e.g. the ANDSP support indication) in step 2, and this information is available in the UDR and the H-PCF determines the information in UDR is reliable, the H-PCF uses the UE information retrieved from the UDR in the determination of whether and which ANDSP and/or URSP has to be provisioned. In this case, the UE parameters retrieved from UDR (e.g. the ANDSP support indication) are included in step 8 as described in 3GPP TS 29.525 [31].

If the "V2X" feature is supported, the H-PCF determines whether the V2XP and the V2X N2 PC5 policy have to be provisioned as defined in clause s 4.2.2.2.1.2 and 4.2.2.3 of 3GPP TS 29.525 [31].

If the "ProSe" feature is supported, the H-PCF determines whether the ProSeP and the 5G ProSe N2 PC5 policy have to be provisioned as defined in clauses 4.2.2.2.1.3 and 4.2.2.4 of 3GPP TS 29.525 [31].

In addition, the H-PCF checks if the size of determined UE policy exceeds a predefined limit.

NOTE 1: NAS messages from AMF to UE do not exceed the maximum size limit allowed in NG-RAN (PDCP layer), so the predefined size limit in H-PCF is related to that limitation.

If the size is under the limit then the UE policy information is included in Npcf\_UEPolicyControl\_Create response service operation.

- If the size exceeds the predefined limit, the H-PCF splits the UE policy information in smaller logical independent UE policy information fragments and ensures the size of each is under the predefined limit. One fragment will be sent in Npcf\_UEPolicyControl\_Create response service operation, and others will be sent by initiating the PCF-initiated UE Policy Association Modification procedure specified in clause 5.6.2.2.3.

8. The H-PCF sends an HTTP "201 Created" response to the V-PCF with the decided UE policy, Policy Control Request Trigger(s) N2 PC5 policy and UE parameters, if available.

9-10. If the "ProSe" feature is supported for the Npcf\_UEPolicyControl service, the H-PCF may register with the BSF as the PCF serving this UE. This is performed by using the Nbsf\_Management\_Register operation, providing as inputs the SUPI, the GPSI, if available, and the PCF end points related to the Npcf\_AMPolicyAuthorization service.

11. The V-PCF invokes Nudr\_DataRepository\_Query service operation to the UDR by sending an HTTP GET request to the "PlmnUePolicySet" resource to retrieve the list of UPSIs and its content stored in the V-UDR for the PLMN ID of this UE. Alternatively, the V-PCF can have this information configured locally.

12. The V-UDR sends an HTTP "200 OK" response to the V-PCF with the UE policy information.

13. The V-PCF may request notifications from the V-UDR on changes in UE policy information, and in this case, the PCF shall invoke the Nudr\_DataRepository\_Subscribe service operation by sending an HTTP POST request to the "PolicyDataSubscriptions" resource.

14. The V-UDR sends an HTTP "201 Created" response to acknowledge the subscription from the V-PCF.

15. The V-PCF determines whether and which UE policy has to be provisioned or updated as defined in clause 4.2.2.2.1 of 3GPP TS 29.525 [31], and may determine applicable Policy Control Request Trigger(s).

The V-PCF determines whether and which visited ANDSP has to be provisioned based on the NF service consumer inputs, the received list of UPSIs from the UE, if available, the UE Policy Sections locally configured or stored in the UDR for the UE PLMN, other received UE parameters, if available, and local polices as defined in clauses 4.2.2.2.1.1, and 4.2.2.2.2 of 3GPP TS 29.525 [31].

If the V-PCF does not receive information from the UE (the list of UPSIs and/or other UE parameters, as e.g. the ANDSP support indication) in step 1, the "UECapabilityIndication" feature is supported, and UE parameters are received from the H-PCF as defined in in step 8, the V-PCF uses the received UE parameters in the determination of whether and which ANDSP has to be provisioned.

If the "V2X" feature is supported and the V-PCF received the V2XP and the V2X N2 PC5 policy, the V-PCF sends the V2XP to the UE and the V2X N2 PC5 policy to the NG-RAN via the AMF by invoking the Namf\_Communication\_N1N2MessageTransfer service operation.

If the "ProSe" feature is supported and the V-PCF received the ProSeP and the 5G ProSe N2 PC5 policy, the V-PCF sends the ProSeP to the UE and the 5G ProSe N2 PC5 policy to the NG-RAN via the AMF by invoking the Namf\_Communication\_N1N2MessageTransfer service operation.

The PCF can provision the UE policy (including V2XP and/or ProSeP) and V2X N2 PC5 policy and/or 5G ProSe N2 PC5 Policy in the same message.

In addition, the V-PCF checks if the size of determined UE policy exceeds a predefined limit.

NOTE 2: NAS messages from AMF to UE do not exceed the maximum size limit allowed in NG-RAN (PDCP layer), so the predefined size limit in V-PCF is related to that limitation.

- If the size is under the limit then the UE policy information is included in a single Namf\_Communication\_N1N2MessageTransfer service operation and messages 19 to 24 are thus executed one time.

- If the size exceeds the predefined limit, the V-PCF splits the UE policy information in smaller logical independent UE policy information fragments and ensures the size of each is under the predefined limit. Each UE policy information fragment will be then sent in separated Namf\_Communication\_N1N2MessageTransfer service operations and messages 19 to 24 are thus executed several times, one time for each UE policy information fragment.

16. The V-PCF sends an HTTP "201 Created" response to the AMF with the Policy Control Request Trigger(s) if available.

- For URSP provisioning in EPS, and LBO roaming scenarios, if the V-PCF received the URSP in step 15, the V-PCF invokes the Npcf\_UEPolicyControl\_Create response service operation to provision or update the URSP and the V-PCF for the PDU session invokes the Npcf\_UEPolicyControl\_Update request service operation to forward the response of the UE to the V-PCF as specified in 3GPP TS 29.525 [31]. Steps 17-22 are not applicable for URSP provisioning in EPS.

17. To subscribe to notifications of N1 message for UE Policy Delivery Result, or subsequent UE policy requests (e.g. for V2XP and/or ProSeP), the V-PCF invokes Namf\_Communication\_N1N2MessageSubscribe service operation to the AMF by sending the HTTP POST method with the URI of the "N1N2 Subscriptions Collection for Individual UE Contexts" resource.

18. The AMF sends an HTTP "201 Created" response to the V-PCF.

19. The V-PCF invokes the Namf\_Communication\_N1N2MessageTransfer service operation to send the policy decided locally in step 13 and to forward the policy received from the H-PCF in step 8.

20. The AMF sends a response to the Namf\_Communication\_N1N2MessageTransfer service operation.

21. When receiving the UE Policy container for the result of the UE policy, the AMF forwards the response of the UE to the V-PCF using Namf\_Communication\_N1MessageNotify service operation.

22. The V-PCF sends a response to the Namf\_Communication\_N1MessageNotify service operation.

23. Upon receipt of the UE Policy container belonging to the H-PLMN in step 21, the V-PCF invokes the Npcf\_UEPolicyControl\_Update service operation by sending an HTTP POST request to the "Individual UE Policy Association" resource to forward the response of the UE to the H-PCF.

- For URSP provisioning in EPS, and LBO roaming scenarios, the UE Policy container belonging to the H-PLMN is received from the V-PCF for the PDU session using the Npcf\_UEPolicyControl\_Update request service operation.

24. The H-PCF sends an HTTP "200 OK" response to the V-PCF.

NOTE 3: Steps 16-24 are triggered by the Npcf\_UEPolicyControl\_Create request and can be received by the AMF in any order, e.g., all or some of the steps 17-24 can be received by the AMF prior to step 16. Note that, to ensure the UE Policy delivery response within the N1MessageNotify is received, the PCF should wait for the reception of a successful N1N2MessageSubscribe response (step 18) before sending the N1N2MessageTransfer request (step 19).

25-26. The H-PCF maintains the latest list of UE policy information delivered to the UE and updates UE policy including the latest list of UPSIs and its content in the H-UDR by invoking the Nudr\_DataRepository\_Update service operation.

- If there is no UE policy information retrieved in step 4, the H-PCF sends an HTTP PUT request to the "UEPolicySet" resource, and the UDR sends an HTTP "201 Created" response.

- Otherwise, the H-PCF sends an HTTP PUT/PATCH request to the "UEPolicySet" resource, and the H-UDR sends an HTTP "200 OK" or "204 No Content" response accordingly.

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

#### 5.6.2.1 UE Policy Association Modification initiated by the AMF

##### 5.6.2.1.1 General

The procedures in this clause are performed when a Policy Control Request Trigger condition is met or when the new AMF reuses the UE Policy Association established by the old AMF with the PCF during AMF relocation.

NOTE 1: For details of the Nudr\_DataRepository\_Update service operation refer to 3GPP TS 29.519 [12].

NOTE 2: For details of the Npcf\_UEPolicyControl\_Update/UpdateNotify service operations refer to 3GPP TS 29.525 [31].

NOTE 3: For details of the Namf\_Communication\_N1N2MessageTransfer/N1MessageNotify service operations refer to 3GPP TS 29.518 [32].

NOTE 4: When the UE Policy Association is for URSP provisioning in EPS the (V-)PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.2.1.2.

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

##### 5.6.2.1.2 Non-roaming



Figure 5.6.2.1.2-1: AMF-initiated UE Policy Association Modification procedure – Non-roaming

1. When the AMF detects a Policy Control Request Trigger condition is met the old AMF transfers to the new AMF the UE Policy Association information, it invokes the Npcf\_UEPolicyControl\_Update service operation to the PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource with information on the conditions that have changed.

NOTE 1: The old AMF transfers to the new AMF the UE Policy Association when the old AMF and the new AMF belong to the same PLMN or equivalent PLMN or belong to the same SNPN or equivalent SNPN.

During AMF relocation, when the new AMF decides to reuse the UE Policy Association established by the old AMF with the PCF:

a. If the feature "FeatureRenegotiation" is supported, the new AMF invokes the Npcf\_UEPolicyControl\_Update service operation to the PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource, and includes the supported features, the feature(s) related information, if applicable and other information on the conditions that have changed.

b. If the feature "FeatureRenegotiation" is not supported, the new AMF invokes the Npcf\_UEPolicyControl\_Update service operation to the PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource with information on the conditions that have changed.

2. The PCF makes the policy decision including the applicable updated Policy Control Request Trigger(s). When the feature "FeatureRenegotiation" is supported, and the PCF received the features supported by the AMF, the PCF re-evaluates the negotiated features and makes the policy decision considering the resulting negotiated features and the information provided by the new AMF.

The policy decision contains the applicable Policy Control Request Trigger(s) and/or updated UE Policy and/or updated V2X N2 PC5 policy, if the "V2X" feature is supported, and/or, if the "ProSe" feature is supported, updated ProSeP within the updated UE Policy and/or 5G ProSe N2 PC5 policy. The PCF checks if the size of determined UE policy exceeds a predefined limit the same as step 6 in clause 5.6.1.2.

The PCF determines whether and which ANDSP and/or URSP has to be provisioned or updated based on the NF service consumer inputs, policy subscription and application data, if available, the UE Policy Sections previously delivered to the UE, if available, other UE parameters previously received from the UE, if available, the reported information by the AMF and local policies, as defined in clauses 4.2.2.2.1.1, 4.2.2.2.2 (for ANDSP) and/or 4.2.2.2.3 (for URSP) of 3GPP TS 29.525 [31].

3. The PCF sends an HTTP "200 OK" response to the AMF with:

a. When the feature "FeatureRenegotiation" is not supported, the applicable updated Policy Control Request Trigger(s).

b. When the feature "FeatureRenegotiation" is supported, the complete "Individual UE Policy Association" resource representation together with the negotiated supported features as described in clause 4.2.3.4 of 3GPP TS 29.525 [31].

- For URSP provisioning in EPS, if the PCF decided to update the URSP in step 2, the PCF invokes the Npcf\_UEPolicyControl\_Update response service operation to update the URSP and the PCF for the PDU session invokes the Npcf\_UEPolicyControl\_Update request service operation to forward the response of the UE to the PCF as specified in 3GPP TS 29.525 [31]. Step 4 is not applicable for URSP provisioning in EPS.

4. If the PCF decided to update the UE policy, and/or N2 PC5 policy and/or 5G ProSe N2 PC5 policy in step 2, steps 12-15 as specified in Figure 5.6.1.2-1 are executed.

NOTE 2: The messages of step 4 are triggered by the Npcf\_UEPolicyControl\_Update request and some or all of them can be received by the AMF before step 3.

5-6. If the PCF decided to update the UE policy in step 2, the PCF maintains the latest list of UE policy information delivered to the UE and updates UE policy including the latest list of UPSIs and its content in the UDR by invoking the Nudr\_DataRepository\_Update service operation. The PCF sends an HTTP PUT/PATCH request to the "UEPolicySet" resource, and the UDR sends an HTTP "204 No Content" response.

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

##### 5.6.2.1.3 Roaming



Figure 5.6.2.1.3-1: AMF-initiated UE Policy Association Modification procedure - Roaming

1. When the AMF detects a Policy Control Request Trigger condition is met the old AMF transfers to the new AMF the UE Policy Association information, it invokes the Npcf\_UEPolicyControl\_Update service operation to the V-PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource with information on the conditions that have changed.

NOTE 1: The old AMF transfers to the new AMF the UE Policy Association when the old AMF and the new AMF belong to the same PLMN or equivalent PLMN or belong to the same SNPN or equivalent SNPN.

During AMF relocation, when the new AMF decides to reuse the UE Policy Association established by the old AMF with the V-PCF:

a. If the feature "FeatureRenegotiation" is supported, the AMF invokes the Npcf\_UEPolicyControl\_Update service operation to the PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource, and includes the supported features, the feature(s) related information elements, if applicable and other information on the conditions that have changed.

b. If the feature "FeatureRenegotiation" is not supported, the new AMF invokes the Npcf\_UEPolicyControl\_Update service operation to the PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource with information on the conditions that have changed.

2. The V-PCF forwards the information received from AMF in step 1 to the H-PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource if the H-PCF has subscribed the notification.

If the V-PCF received a Namf\_Communication\_N1MessageNotify service request with a UE Policy container and/or the V-PCF is made aware of the delivery outcome of previously provided UE Policy, the V-PCF forwards the received informationto the H-PCF by sending an HTTP POST request to the "Individual UE Policy Association" resource.

NOTE 2: The V-PCF is aware of the delivery outcome either based on the response with the result of UE policy delivery from the UE or based on the AMF knowledge that the UE is temporarily unavailable.

3. The H-PCF makes the policy decision including the applicable updated Policy Control Request Trigger(s) and/or updated UE Policy and/or, if the "V2X" feature is supported, updated V2XP within the updated UE Policy and/or V2X N2 PC5 policy, and/or, if the "ProSe" feature is supported, updated ProSeP within the updated UE Policy and/or 5G ProSe N2 PC5 policy.

If the H-PCF received the response of the UE Policy delivery outcome from the V-PCF and the AF subscribed to notifications about the outcome of UE Policies delivery, steps 7-10 of clause 5.5.8 are executed.

The H-PCF determines whether and which ANDSP and/or URSP has to be provisioned or updated based on NF service consumer inputs, policy subscription and application data, if available, the UE Policy Sections previously delivered to the UE, if available, other UE parameters previously received from the UE, if available, the reported information by the V-PCF and local policies, as defined in clauses 4.2.2.2.1.1, 4.2.2.2.2 (for ANDSP) and/or 4.2.2.2.3 (for URSP) of 3GPP TS 29.525 [31].

In addition, the H-PCF checks if the size of determined UE policy exceeds a predefined limit.

NOTE 3: NAS messages from AMF to UE do not exceed the maximum size limit allowed in NG-RAN (PDCP layer), so the predefined size limit in H-PCF is related to that limitation.

- If the size is under the limit then the UE policy information is included in Npcf\_UEPolicyControl\_Update response service operation.

- If the size exceeds the predefined limit, the H-PCF splits the UE policy information in smaller logical independent UE policy information fragments and ensures the size of each is under the predefined limit. One fragment will be sent in Npcf\_UEPolicyControl\_Update response service operation, and others will be then sent by initiating the PCF-initiated UE Policy Association Modification procedure specified in clause 5.6.2.2.3.

4. The H-PCF sends an HTTP "200 OK" response to the V-PCF with the updated policy information decided in step 3.

5. The V-PCF makes the policy decision including the applicable updated Policy Control Request Trigger(s) and/or updated UE Policy, if applicable. The V-PCF checks if the size of determined UE policy exceeds a predefined limit the same as step 13 in clause 5.6.1.3.

The V-PCF determines whether VPLMN ANDSP has to be provisioned or updated based on NF service consumer inputs, policy subscription for the UE PLMN, other UE parameters previously received from the UE, if available, and local policies, as defined in clauses 4.2.2.2.1.1, 4.2.2.2.2 (for ANDSP) of 3GPP TS 29.525 [31].

6. The V-PCF sends an HTTP "200 OK" response to the AMF with the applicable updated Policy Control Request Trigger(s).

- For URSP provisioning in EPS, and LBO roaming scenarios, if the V-PCF received the URSP in step 4, the V-PCF invokes the Npcf\_UEPolicyControl\_UpdateNotify request service operation to update the URSP and the V-PCF for the PDU session invokes the Npcf\_UEPolicyControl\_Update request service operation to forward the response of the UE to the V-PCF as specified in 3GPP TS 29.525 [31].

7. If the V-PCF decided to update the UE policy in step 5 or the V-PCF received the UE Policy, V2X N2 PC5 policy and/or 5G ProSe N2 PC5 policy in step 4, steps 19-24 as specified in Figure 5.6.1.3-1 are executed.

- For URSP provisioning in EPS, steps 19-22 as specified in Figure 5.6.1.3-1 are not applicable.

NOTE 4: The messages of step 7 are triggered by the Npcf\_UEPolicyControl\_Update request and some or all of them can be received by the AMF before step 6.

8-9. If the H-PCF decided to update the UE policy in step 3, the H-PCF maintains the latest list of UE policy information delivered to the UE and updates UE policy including the latest list of UPSIs and its content in the H-UDR by invoking the Nudr\_DataRepository\_Update service operation. The PCF sends an HTTP PUT/PATCH request to the "UEPolicySet" resource, and the UDR sends an HTTP "204 No Content" response.

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

#### 5.6.2.2 UE Policy Association Modification initiated by the PCF

##### 5.6.2.2.1 General

The procedures in this clause are performed when the UE policy (roaming case) and/or Policy Control Request Trigger(s) are changed.

NOTE 1: For details of the Nudr\_DataRepository\_Update service operation refer to 3GPP TS 29.519 [12].

NOTE 2: For details of the Npcf\_UEPolicyControl\_UpdateNotify service operation refer to 3GPP TS 29.525 [31].

NOTE 3: For details of the Namf\_Communication\_N1N2MessageTransfer/N1MessageNotify service operations refer to 3GPP TS 29.518 [32].

NOTE 4: When the UE Policy Association is for URSP provisioning in EPS the (V-)PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.2.2.2.

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

##### 5.6.2.2.2 Non-roaming



Figure 5.6.2.2.2-1: PCF-initiated UE Policy Association Modification procedure – Non-roaming

1. The PCF receives an external trigger, e.g. the subscriber policy data of a UE is changed, the applied BDT Policy Data is changed, or subscription data for the 5G VN group data is changed, or application detection, or the PCF receives an internal trigger, e.g. operator policy is changed, to re-evaluate UE policy decision for a UE.

NOTE 1: When the external trigger affects more than one UE (e.g. when Network Performance is degraded in a network area info) the PCF will apply the next steps to all the affected active UE Policy Associations.

2-3. If the applied BDT policy Data is changed in step1, and if the corresponding transfer policy is not locally stored in the PCF, the PCF sends the HTTP GET request to the "IndividualBdtData" resource to retrieve the related Background Data Transfer policy information (i.e. Time window and Location criteria) stored in the UDR. The UDR sends an HTTP "200 OK" response to the PCF.

4. The PCF makes the policy decision including the applicable updated Policy Control Request Trigger(s) and/or updated UE Policy and/or updated V2X N2 PC5 policy, if the "V2X" feature is supported, and/or updated 5G ProSe N2 PC5 policy, if the "ProSe" feature is supported. The PCF checks if the size of determined UE policy exceeds a predefined limit the same as step 6 in clause 5.6.1.2.

5. If the PCF decided to update the Policy Control Request Trigger(s) in step4, the V-PCF shall invoke the Npcf\_UEPolicyControl\_UpdateNotify service operation by sending an HTTP POST request to the callback URI "{notificationUri}/update".

- For URSP provisioning in EPS, if the PCF decided to update the URSP in step 4, the PCF invokes the Npcf\_UEPolicyControl\_UpdateNotify request service operation to update the URSP and the PCF for the PDU session invokes the Npcf\_UEPolicyControl\_Update request service operation to forward the response of the UE to the PCF as specified in 3GPP TS 29.525 [31]. Step 7 is not applicable for URSP provisioning in EPS.

6. The AMF sends an HTTP "204 No Content" response to the PCF.

7. If the PCF decided to update the UE policy, V2X N2 PC5 policy and/or 5G ProSe N2 PC5 policy in step 4, steps 12-15 as specified in Figure 5.6.1.2-1 are executed.

8-9. If the PCF decided to update the UE policy in step 4, steps 5-6 in clause 5.6.2.1.2 are executed.

NOTE 2: When the trigger to update the UE policy is AF-based service parameter provisioning as described in clause 5.5.8, the AF requested to be notified of the outcome of the UE Policy delivery and the PCF initiated step 7 based on the AF request, then steps 7 – 10 specified in clause 5.5.8 are executed.

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

##### 5.6.2.2.3 Roaming



Figure 5.6.2.2.3-1: PCF-initiated UE Policy Association Modification procedure – Roaming

If the H-PCF receives a trigger, steps 1 to 4 and 10 to 11 are executed and steps 5 to 8 are omitted.

If the V-PCF receives a trigger, steps 1 to 4 and 10 to 11 are omitted and steps 5 to 8 are executed.

1. The H-PCF receives an external trigger, e.g. the subscriber policy data of a UE is changed, or the PCF receives an internal trigger, e.g. operator policy is changed, to re-evaluate UE policy decision for a UE.

2. The H-PCF makes the policy decision including the applicable updated Policy Control Request Trigger(s) and/or updated UE Policy and/or updated V2X N2 PC5 policy, if the "V2X" feature is supported, and/or updated 5G ProSe N2 PC5 policy, if the "ProSe" feature is supported.

The H-PCF determines whether and which ANDSP and/or URSP has to be provisioned or updated based on policy subscription and application data, if available, the UE Policy Sections previously delivered to the UE, if available, other UE parameters previously received from the UE, if available, and local policies, as defined in clauses 4.2.2.2.1.1, 4.2.2.2.2 (for ANDSP) and/or 4.2.2.2.3 (for URSP) of 3GPP TS 29.525 [31].

In addition, the H-PCF checks if the size of determined UE policy exceeds a predefined limit.

NOTE 1: NAS messages from AMF to UE do not exceed the maximum size limit allowed in NG-RAN (PDCP layer), so the predefined size limit in H-PCF is related to that limitation.

- If the size is under the limit then the UE policy information is included in a single Npcf\_UEPolicyControl\_UpdateNotify service operation and messages 3 to 4 are thus executed one time.

- If the size exceeds the predefined limit, the PCF splits the UE policy information in smaller logical independent UE policy information fragments and ensures the size of each is under the predefined limit. Each UE policy information fragment will be then sent in separated Npcf\_UEPolicyControl\_UpdateNotify service operations and messages 3 to 4, and 9 are thus executed several times, one time for each UE policy information fragment.

3. The H-PCF invokes the Npcf\_UEPolicyControl\_UpdateNotify service operation by sending an HTTP POST request to the callback URI "{notificationUri}/update" with the updated UE policy and/or the updated V2X N2 PC5 policy and/or the updated 5G ProSe N2 PC5 policy and/or Policy Control Request Trigger(s) if applicable.

4. The V-PCF sends an HTTP "204 No Content" response to the H-PCF.

5. The V-PCF receives an external trigger, e.g. operator policy in the V-UDR for the PLMN ID of this UE is changed, or the V-PCF receives an internal trigger, e.g. local policy is changed, to re-evaluate UE policy decision for a UE.

NOTE 2: When the V-PCF receives an internal or external trigger to re-evaluate the UE policy decision for the roaming Ues of a PLMN ID, the PCF applies control mechanisms to avoid signalling storms and potential network overload, as e.g. limiting the number of simultaneous updates distributing the base of visiting Ues in a time dispersion interval.

6. The V-PCF makes the policy decision including the applicable updated Policy Control Request Trigger(s) and/or updated UE Policy.

In addition, the V-PCF checks if the size of determined UE policy and received UE policy from H-PCF in step 3 exceeds a predefined limit.

NOTE 3: NAS messages from AMF to UE do not exceed the maximum size limit allowed in NG-RAN (PDCP layer), so the predefined size limit in V-PCF is related to that limitation.

- If the size is under the limit then the UE policy information is included in a single Namf\_Communication\_N1N2MessageTransfer service operation and message 9 is thus executed one time.

- If the size exceeds the predefined limit, the V-PCF splits the UE policy information in smaller logical independent UE policy information fragments and ensures the size of each is under the predefined limit. Each UE policy information fragment will be then sent in separated Namf\_Communication\_N1N2MessageTransfer service operations and message 9 is thus executed several times, one time for each UE policy information fragment.

7. If the V-PCF needs to update the Policy Control Request Trigger(s) or forward the Policy Control Request Trigger(s) received from the H-PCF in step 3, the V-PCF shall invoke the Npcf\_UEPolicyControl\_UpdateNotify service operation by sending an HTTP POST request to the callback URI "{notificationUri}/update".

- For URSP provisioning in EPS, amd LBO roaming scenarios, if the V-PCF received the URSP in step 3, the V-PCF invokes the Npcf\_UEPolicyControl\_UpdateNotify request service operation to update the URSP and the PCF for the PDU session invokes the Npcf\_UEPolicyControl\_Update request service operation to forward the response of the UE to the V-PCF as specified in 3GPP TS 29.525 [31].

8. The AMF sends an HTTP "204 No Content" response to the PCF.

9. If the V-PCF decided to update the UE policy in step 6 or the V-PCF received the UE Policy and/or V2X N2 PC5 policy, if the "V2X" feature is supported, and/or 5G ProSe N2 PC5 policy, if the "ProSe" feature is supported, in step 3, steps 19-24 as specified in Figure 5.6.1.3-1 are executed.

- For URSP provisioning in EPS, steps 19-22 as specified in Figure 5.6.1.3-1 are not applicable.

10-11. If the H-PCF decided to update the UE policy in step 2, the steps 8-9 in clause 5.6.2.1.3 are executed.

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

#### 5.6.3.1 UE Policy Association Termination initiated by the AMF

##### 5.6.3.1.1 General

This procedure is performed when the UE deregisters from the network, when the UE deregisters from 5GS during the UE moving from 5GS to EPS or when the old AMF removes the UE Policy Association during AMF relocation.

NOTE 1: The old AMF removes the UE Policy Association during AMF relocation when the old AMF decides that the the PCF instance Id is not sent to the new AMF (e.g. inter-AMF mobility with PLMN change, where the new PLMN is not an equivalent PLMN), or when the new AMF indicates to the old AMF that the received UE Policy Association will not be reused.

NOTE 2: For details of the Nudr\_DataRepository\_Unsubscribe service operation refer to 3GPP TS 29.519 [12].

NOTE 3: For details of the Npcf\_UEPolicyControl\_Delete service operation refer to 3GPP TS 29.525 [31].

NOTE 4: For details of the Namf\_Communication\_N1N2MessageUnsubscribe service operation refer to 3GPP TS 29.518 [32].

NOTE 5: When the UE Policy Association is for URSP provisioning in EPS the (V-)PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.3.1.2.

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

##### 5.6.3.1.2 Non-roaming



Figure 5.6.3.1.2-1: AMF-initiated UE Policy Association Termination procedure – Non-roaming

1. The AMF invokes the Npcf\_UEPolicyControl\_Delete service operation by sending the HTTP DELETE request to the "Individual UE Policy Association" resource to delete the policy context in the PCF.

2. The PCF removes the policy context for the UE and sends an HTTP "204 No Content" response to the AMF.

3-4. If the PCF has previously registered to the BSF as the PCF that is serving this UE, the PCF deregisters from the BSF if no AM Policy Association nor UE Policy Association for this UE exists anymore. This is performed by using the Nbsf\_Management\_Deregister service operation.

5. To unsubscribe to notifications of N1 message for UE Policy Delivery Result, the PCF invokes Namf\_Communication\_N1N2MessageUnsubscribe service operation to the AMF by sending the HTTP DELETE method with the URI of the "N1N2 Individual Subscription" resource.

6. The AMF sends an HTTP "204 No Content" response to the PCF.

NOTE 1: Steps 5-6 are triggered by the Npcf\_UEPolicyControl\_Delete request and can be received by the AMF before step 2.

NOTE 2: Steps 5-6 are not applicable for URSP provisioning in EPS.

7. The PCF unsubscribes the notification of subscriber policy data modification from the UDR by invoking Nudr\_DataRepository\_Unsubscribe service operation by sending the HTTP DELETE request to the "IndividualPolicyDataSubscription" resource if it has subscribed such notification.

- The PCF invokes also the Nudr\_DataRepository\_Unsubscribe service operation to unsubscribe from notifications about applied BDT Policy Data changes and service parameter data changes at the UDR by sending an HTTP DELETE request to the "IndividualApplicationDataSubscription" resource if it has subscribed such notifications.

- The PCF invokes also the Nudr\_DataRepository\_Unsubscribe service operation to unsubscribe from notifications about 5G VN group configuration data changes at the UDR by sending an HTTP DELETE request to the "IndividualSubscriptionDataSubscription" resource as specified in 3GPP TS 29.505 [47] if it has subscribed such notification.

NOTE 3: The PCF will not invoke the Nudr\_DataRepository\_Unsubscribe service operation when the PCF has internally stored the retrieved 5G VN group configuration data for later use for other SUPIs that belong to the same Internal-Group-Id.

8. The UDR sends an HTTP "204 No Content" response to the PCF.

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

##### 5.6.3.1.3 Roaming

Figure 5.6.3.1.3-1: AMF-initiated UE Policy Association Termination procedure – Roaming

1. The AMF invokes the Npcf\_UEPolicyControl\_Delete service operation by sending the HTTP DELETE request to the "Individual UE Policy Association" resource to delete the policy context in the V-PCF. The V-PCF interacts with the H-PCF.

2. The V-PCF removes the policy context for the UE and sends an HTTP "204 No Content" response to the AMF.

3. The V-PCF invokes the Npcf\_UEPolicyControl\_Delete service operation by sending the HTTP DELETE request to the "Individual UE Policy Association" resource to delete the policy context in the H-PCF.

4. The H-PCF removes the policy context for the UE and sends an HTTP "204 No Content" response to the V-PCF.

5-6. If the H-PCF has previously registered to the BSF as the PCF that is serving this UE, the H-PCF shall deregister from the BSF if no AM Policy Association nor UE Policy Association for this UE exists anymore. This is performed by using the Nbsf\_Management\_Deregister service operation.

7. To unsubscribe to notifications of N1 message for UE Policy Delivery Result, the V-PCF invokes Namf\_Communication\_N1N2MessageUnsubscribe service operation to the AMF by sending the HTTP DELETE method with the URI of the "N1N2 Individual Subscription" resource.

8. The AMF sends an HTTP "204 No Content" response to the V-PCF.

NOTE 1: Steps 7-8 are triggered by the Npcf\_UEPolicyControl\_Delete request and can be received by the AMF before step 2.

NOTE 2: Steps 7-8 are not applicable for URSP provisioning in EPS.

9. The V-PCF invokes the Nudr\_DataRepository\_Unsubscribe service operation by sending the HTTP DELETE request to the "IndividualPolicyDataSubscription" resource to unsubscribe the notification from the V-UDR on changes in UE policy information if it has subscribed such notification.

10. The V-UDR sends an HTTP "204 No Content" response to the V-PCF.

11. The H-PCF unsubscribes the notification of subscriber policy data modification from the H-UDR by invoking Nudr\_DataRepository\_Unsubscribe service operation by sending the HTTP DELETE request to the "IndividualPolicyDataSubscription" resource if it has subscribed such notification.

- The PCF invokes also the Nudr\_DataRepository\_Unsubscribe service operation to unsubscribe from notifications about service parameter data changes at the UDR by sending an HTTP DELETE request to the "IndividualApplicationDataSubscription" resource if it has subscribed such notification.

- The PCF invokes also the Nudr\_DataRepository\_Unsubscribe service operation to unsubscribe from notifications about 5G VN group configuration data changes at the UDR by sending an HTTP DELETE request to the "IndividualSubscriptionDataSubscription" resource as specified in 3GPP TS 29.505 [47] if it has subscribed such notification.

NOTE 2: The PCF will not invoke the Nudr\_DataRepository\_Unsubscribe service operation when the PCF has internally stored the retrieved 5G VN group configuration data for later use for other SUPIs that belong to the same Internal-Group-Id.

12. The H-UDR sends an HTTP "204 No Content" response to the H-PCF.

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

#### 5.6.3.2 UE Policy Association Termination initiated by the PCF

##### 5.6.3.2.1 General

This procedure is performed when the (H-)UDR notifies the (H-)PCF that the policy profile is removed.

NOTE 1: For details of the Nudr\_DataRepository\_Notify service operation refer to 3GPP TS 29.519 [12].

NOTE 2: For details of the Npcf\_UEPolicyControl\_UpdateNotify/Delete service operations refer to 3GPP TS 29.525 [31].

NOTE 3: For details of the Namf\_Communication\_N1N2MessageUnsubscribe service operation refer to 3GPP TS 29.518 [32].

NOTE 4: When the UE Policy Association is for URSP provisioning in EPS the (V-)PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.3.2.2.

\* \* \* End Change \* \* \* \*