**3GPP TSG- WG3 Meeting # *C3-231083***

**E-Meeting, 17th - 21st** **April, 2023**

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| *CR-Form-v12.2* | | | | | | | | |
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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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| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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.  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, 5.6.2.1.1, 5.6.2.1.2, 5.6.2.1.2, 5.6.2.2.1, 5.6.3.1.1, 5.6.3.1.2, 5.6.3.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* 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 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 ot update the URSP in step 2, 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 \* \* \* \*

#### 5.6.2.1 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 PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.2.1.2.

\* \* \* 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 PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.2.2.2.

\* \* \* 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 \* \* \* \*

#### 5.6.3.1 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 PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.3.1.2.

##### 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 \* \* \* \*

#### 5.6.3.2 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 PCF for a PDU session replaces the AMF in the procedure described in clause 5.6.3.2.2.

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