**3GPP TSG- Meeting #**

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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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | The agreed TEI17\_DCAMP WID foresees the enablement of dynamically changing AM policies triggered by requests from an AF and/or the reported or detected start/stop of applications.  In order to support this, it is required to introduce new NEF and PCF services for requesting AM policy changes and new procedures for handling all cases of dynamically changing AM policies. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR:  - Adds procedures that specify how dynamic changes of AM policies can be triggered by an AF, including mechanisms for informing the PCF serving the AMF that a service that requires AM policy changes is in use or that a new PDU session serving a DNN, S-NSSAI for a UE is established.  - Adjust the AM Policy Association Establishment/Modification/Termination procedures to reflect the fact that PCFs that manage the AM policies of a UE may register to the BSF and that AFs that have requested dynamic AM Policy changes now also become part of these procedures.  - Adds descriptions of the new Nnef and Npcf services (Nnef\_AMInfluence, Nnef\_AMPolicyAuthorization, Npcf\_AMPolicyAuthorization) which offer the capability to influence AM policies.  - Updates the Nudr\_DM services in order to support the new functionality. | | | | | | | | |
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| ***Consequences if not approved:*** | | Dynamically changing AM policies are not supported by the 5GC. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.15.6, 4.16.1.2, 4.16.2, 4.16.3.2, 5.2.5, 5.2.6, 5.2.12.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.502, TS 23.503 | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* First change \* \* \* \*

### 4.15.6.X Procedures for AF-triggered dynamically changing AM policies

#### 4.15.6.X.1 General

Access and mobility policies may be modified dyncamically as described in clause 4.16.2. Clause 4.15.6.X describes the procedures for triggering such modifications in scenarios belonging to "case B" of clause 4.16.2.0 that are initiated by the AF.

The following cases can be distinguished:

- AF requests targeting an individual UE (identified by its SUPI or GPSI) with an already established AM Policy Association; these requests are routed (by the AF or by the NEF) to an individual PCF, potentially using the BSF. This case is described in clause 4.15.6.X.2.

- AF requests targeting an individual UE (identified by its SUPI or GPSI), a group of UEs (identified by an Internal Group Identifier or an External Group Identifier), all UEs, or any UE accessing a combination of DNN and S-NSSAI. This case is described in clause 4.15.6.X.3. For such requests the AF shall contact the NEF and the NEF stores the AF request information in the UDR. PCF(s) receive a corresponding notification if they had subscribed to the creation / modification / deletion of the AF request information corresponding to UDR Data Keys / Data Sub-Keys. This is defined in 23.501 [2] clause 6.3.7.2 and further described in clause 4.15.6.X.3.

NOTE: Such requests can target UEs with or without an already established AM Policy Association and with or without ongoing PDU Sessions.

#### 4.15.6.X.2 Dynamic AM Policy change requests targeting an individual registered UE

This procedure works when an AM Policy Association has already been established (i.e., the UE is already registered) at the moment that the AF provides its AM Policy related request. Depending on the AF deployment (see TS 23.501 [2], clause 6.2.10), the AF may interact with NFs of the Core Network either directly or via the NEF. The procedure for the direct case is described in Figure 4.15.6.X.2-1, while the procedure for the NEF-mediated case is described in Figure 4.15.6.X.2-2.



Figure 4.15.6.X.2-1: Handling an AF request targeting an individual UE with an established AM Policy Association without using NEF

This procedure concerns only non-roaming scenarios.

NOTE 1: The PCF for the UE and the PCF for the PDU Session can be the same entity, without affecting the steps of this procedure.

1. An AM Policy Association is established for a UE as described in clause 4.16.1.

2. A PDU session may be established by this UE as described in clause 4.3.2, including the registration of the PCF for the PDU Session to the BSF as the PCF that manages this PDU Session providing as inputs the UE SUPI/GPSI, the UE address, and the DNN, S-NSSAI.

NOTE 2: Step 2 can also occur after step 3a and before step 3b.

3a. The AF may search the PCF for the PDU Session using Nbsf\_Management\_Subscribe with SUPI or GPSI and (DNN, S-NSSAI) as parameters.

3b. The BSF provides to the AF the identity of the PCF for the PDU Session and the UE address for the requested SUPI or GPSI and (DNN, S-NSSAI) combination via an Nbsf\_Management\_Notify operation. If a matching entry already exists in the BSF when step 3a is performed, this shall be immediately reported by Nbsf\_Management\_Notify.

NOTE 3: Steps 3a and 3b can be omitted if the AF is configured with the target PCF address(es).

3c. The AF may subscribe to the PCF for the PDU Session for the "application traffic start/stop" event (see TS 23.503 [20] clause 6.1.3.18), providing the UE address and an Application ID or a set of SDF filters in a Npcf\_PolicyAuthorization\_Subscribe request.

3d. Application traffic start/stop detection is performed as described in steps 6 and 7 of Figure 4.16.X.2-1.

3e. The PCF for the PDU Session notifies the AF about the detected application traffic start/stop event using Npcf\_PolicyAuthorization\_Notify.

4a. The AF may search the PCF for the UE using Nbsf\_Management\_Subscribe with SUPI or GPSI as input, indicating that it is searching for the PCF that handles the AM Policy Association of the UE.

4b. The BSF provides to the AF the identity of the PCF for the UE for the requested SUPI or GPSI via an Nbsf\_Management\_Notify operation. If a matching entry already exists in the BSF when step 4a is performed, this shall be immediately reported by Nbsf\_Management\_Notify.

NOTE 4: Steps 4a and 4b can be omitted if the AF is configured with the target PCF address(es).

4c. The AF sends to PCF for the UE its request for the AM policy of the UE (identified by SUPI or GPSI) using Npcf\_AMPolicyAuthorization (optionally providing a timer on how long this policy shall last) and gets informed about the status of the operation. As part of the Npcf\_AMPolicyAuthorization request, the AF may subscribe to relevant events specified in TS 23.503 [20] clause 6.1.3.18, e.g., events related to change of coverage.

5. An AM Policy Association Modification procedure initiated by the PCF for the UE is performed as described in clause 4.16.2.2. If the AF has subscribed to access and mobility management related events in step 4, then the PCF sets the respective Policy Control Request Triggers in the AMF as part of the AM Policy Association Modification procedure.



Figure 4.15.6.X.2-2: Handling an AF request targeting an individual UE with an established AM Policy Association using NEF

This procedure concerns only non-roaming scenarios.

NOTE 5: The PCF for the UE and the PCF for the PDU Session can be the same entity, without affecting the steps of this procedure.

1. An AM Policy Association is established for a UE as described in clause 4.16.1.

2. A PDU session may be established by this UE as described in clause 4.3.2, including the registration of the PCF for the PDU Session to the BSF as the PCF that manages this PDU Session providing as inputs the UE SUPI/GPSI, the UE address, and the DNN, S-NSSAI.

NOTE 6: Step 2 can also occur after step 3b and before step 3c.

3a. The AF may subscribe to the NEF for the "application traffic start/stop" event, providing the UE SUPI or GPSI, the (DNN, S-NSSAI) combination, and an Application ID or a set of SDF filters in a Nnef\_EventExposure\_Subscribe request.

3b. The NEF may search the PCF for the PDU Session using Nbsf\_Management\_Subscribe with SUPI and (DNN, S-NSSAI) as parameters.

3c. The BSF provides to the NEF the identity of the PCF for the PDU Session and the UE address for the requested SUPI and (DNN, S-NSSAI) combination via an Nbsf\_Management\_Notify operation. If a matching entry already exists in the BSF when step 3b is performed, this shall be immediately reported by Nbsf\_Management\_Notify.

3d. The NEF may subscribe to the PCF for the PDU Session for the "application traffic start/stop" event (see TS 23.503 [20] clause 6.1.3.18), providing the UE address and an Application ID or a set of SDF filters in a Npcf\_PolicyAuthorization\_Subscribe request.

3e. Application traffic start/stop detection is performed as described in steps 6 and 7 of Figure 4.16.X.2-1.

3f. The PCF for the PDU Session notifies the NEF about the detected application traffic start/stop event using Npcf\_PolicyAuthorization\_Notify.

3g. The NEF notifies the AF about the detected application traffic start/stop event using Nnef\_EventExposure\_Notify.

4a. The AF sends to NEF its request for the AM policy of the UE (identified by SUPI or GPSI) using Nnef\_AMPolicyAuthorization (optionally providing a timer on how long this policy shall last). As part of the Nnef\_AMPolicyAuthorization request, the AF may request to subscribe for relevant events specified in TS 23.503 [20] clause 6.1.3.18, e.g., events for change of service coverage.

4b. The NEF may search the PCF for the UE using Nbsf\_Management\_Subscribe with SUPI as input parameter, indicating that it is searching for the PCF that handles the AM Policy Association of the UE.

4c. The BSF provides to the NEF the identity of the PCF for the UE for the requested SUPI via an Nbsf\_Management\_Notify operation. If a matching entry already exists in the BSF when step 4b is performed, this shall be immediately reported by Nbsf\_Management\_Notify.

4d. The NEF sends to PCF for the UE its request for the AM policy of the UE (identified by SUPI) using Npcf\_AMPolicyAuthorization (having potentially translated GPSI to SUPI and optionally providing a timer on how long this policy shall last) and gets informed about the status of the operation. As part of the Npcf\_AMPolicyAuthorization request, the NEF may subscribe for relevant events specified in TS 23.503 [20] clause 6.1.3.18, e.g., events for change of coverage.

4e. The NEF informs the AF about the outcome of the AM policy authorization in an Nnef\_AMPolicyAuthorization response.

5. An AM Policy Association Modification procedure initiated by the PCF for the UE is performed as described in clause 4.16.2.2. If the AF has subscribed to access and mobility management related events in step 4, then the PCF sets the respective Policy Control Request Triggers in the AMF as part of the AM Policy Association Modification procedure.

#### 4.15.6.X.3 Processing AF requests to influence AM policies

With this procedure, the AF can provide its AM Policy related request (for one or multiple UEs) either before or after an AM Policy Association for the affected UEs has been established.



Figure 4.15.6.X.3: Handling an AF request to influence AM Policy

This procedure concerns only non-roaming scenarios.

NOTE 1: The PCF for the UE and the PCF for the PDU Session can be the same entity, without affecting the steps of this procedure.

1. AM Policy Association establishment as described in clause 4.16.1.

2. The PCF for the UE subscribes to policy data related to AM influence (Data Set = Application Data; Data Subset = AM influence information, Data Key = S-NSSAI and DNN and/or Internal Group Identifier or SUPI).

3a. To create a new request, the AF provides “AM influence information” data to the NEF using the Nnef\_AMInfluence\_Create service operation, including a target (one UE identified by SUPI or GPSI, a group of UEs identified by an External Group Identifier, all UEs, or one or more subscriber categories or subscribed services, which can be used to retrieve a set of UEs), an optional indication of target application traffic (DNN, S-NSSAI and optionally an Application ID or SDF filters), a priority level, and requirements related to AM policy (e.g. service coverage requirements, throughput requirements). The request contains also an AF Transaction Id. If with this request the AF subscribes to events related with access and mobility management policies, the AF indicates also where it desires to receive the corresponding notifications. To update or remove an existing request, the AF invokes an Nnef\_AMInfluence\_Update or Nnef\_AMInfluence\_Delete service operation providing the corresponding AF Transaction Id.

NOTE 2: The priority level is used to resolve conflicts when that start/stop of different applications requires the usage of different AM policies. In such cases, the policy with the highest priority is selected.

3b. The NEF stores, updates, or removes the policy data of step 3a in the UDR, having translated any External Group Identifier to an Internal Group Identifier and any GPSI to a SUPI.

3c. The UDR informs the NEF about the result of the operation of step 3b.

3d. The NEF informs the AF about the result of the Nnef\_AMInfluence operation performed in step 3a.

NOTE 3: Steps 1, 2, and 3 can occur in any order.

4. The UDR notifies the PCF(s) that have a matching subscription (from step 2) about the data stored, updated, or removed in step 3. If matching entries already existed in the UDR when step 3b is performed, this shall be immediately reported by Nudr\_DM\_Notify.

5. A PDU session may be established by the UE as described in clause 4.3.2, including the registration of the PCF for the PDU Session to the BSF as the PCF that manages this PDU Session providing as inputs the UE SUPI/GPSI, the UE address, and the DNN, S-NSSAI.

NOTE 4: Step 5 can occur any time after step 1 and before step 6b.

6a. The PCF for the UE may search the PCF for the PDU Session using Nbsf\_Management\_Subscribe with SUPI and (DNN, S-NSSAI) as parameters.

6b. The BSF provides to the PCF for the UE the identity of the PCF for the PDU Session and the UE address for the requested SUPI and (DNN, S-NSSAI) combination via an Nbsf\_Management\_Notify operation. If a matching entry already exists in the BSF when step 6a is performed, this shall be immediately reported by Nbsf\_Management\_Notify.

7a. The PCF for the UE may subscribe to the PCF for the PDU Session for the "application traffic start/stop" event (see TS 23.503 [20] clause 6.1.3.18), providing the UE SUPI and an Application ID or a set of SDF filters in a Npcf\_PolicyAuthorization\_Subscribe request.

7b. Application traffic start/stop detection is performed as described in steps 6 and 7 of Figure 4.16.X.2-1.

7c. The PCF for the PDU Session notifies the PCF for the UE about the detected application traffic start/stop event using Npcf\_PolicyAuthorization\_Notify.

8. An AM Policy Association Modification procedure initiated by the PCF for the UE is performed as described in clause 4.16.2.2. If the AF has subscribed to access and mobility management related events in step 3, then the PCF sets the respective Policy Control Request Triggers in the AMF as part of the AM Policy Association Modification procedure.

\* \* \* \* Second change \* \* \* \*

#### 4.16.1.2 AM Policy Association Establishment with new Selected PCF



Figure 4.16.1.2-1: AM Policy Association Establishment with new Selected PCF

This procedure concerns both roaming and non-roaming scenarios.

In the non-roaming case the role of the V-PCF is performed by the PCF. For the roaming scenarios, the V-PCF interacts with the AMF.

1. Based on local policies, the AMF decides to establish AM Policy Association with the (V-)PCF then steps 2 to 3 are performed under the conditions described below.

2. [Conditional] If the AMF has not yet obtained Access and Mobility policy for the UE or if the Access and Mobility policy in the AMF are no longer valid, the AMF requests the PCF to apply operator policies for the UE from the PCF. The AMF sends Npcf\_AMPolicyControl\_Create to the (V-)PCF to establish an AM policy control association with the (V-)PCF. The request includes the following information: SUPI, Internal Group (see clause 5.9.7 of TS 23.501 [2]), subscription notification indication and, if available, Service Area Restrictions, RFSP index, Subscribed UE-AMBR, the Allowed NSSAI, GPSI which are retrieved from the UDM during the update location procedure, and may include Access Type and RAT Type, PEI, ULI, UE time zone, and Serving Network (PLMN ID, or PLMN ID and NID, see clause 5.34 of TS 23.501 [2]).

3. The (V)-PCF responds to the Npcf\_AMPolicyControl\_Create service operation. The (V)-PCF provides Access and mobility related policy information (e.g. Service Area Restrictions) as defined in clause 6.5 of TS 23.503 [20]. In addition, (V)-PCF can provide Policy Control Request Trigger of AM Policy Association to AMF.

The AMF is implicitly subscribed in the (V-)PCF to be notified of changes in the policies.

4. [Conditional] The AMF deploys the Access and mobility related policy information which includes storing the Service Area Restrictions and Policy Control Request Trigger of AM Policy Association, provisioning Service Area Restrictions to the UE and provisioning the RFSP index, the UE-AMBR and Service Area Restrictions to the NG-RAN as defined in TS 23.501 [2].

5. The (V-)PCF may register to the BSF as the PCF that handles the AM Policy Association for this UE. This is performed by using the Nbsf\_Management\_Register operation, providing as inputs the UE SUPI/GPSI and the PCF identity, indicating that the entry is about access and mobility management.

6. The BSF responds to the (V-)PCF about the success (or not) of its registration request.

\* \* \* \* Third change \* \* \* \*

### 4.16.2 AM Policy Association Modification

#### 4.16.2.0 General

There are three cases considered for AM Policy Association Modification:

- Case A: A Policy Control Request Trigger condition is met: the procedure is initiated by the AMF.

- Case B: PCF local decision or trigger from other peers of the PCF (i.e. UDR, AF): the procedure is initiated by the PCF.

- Case C: AM Policy Association Modification with the old PCF during AMF relocation: the procedure is initiated by the AMF.

#### 4.16.2.1 AM Policy Association Modification initiated by the AMF

##### 4.16.2.1.1 AM Policy Association Modification initiated by the AMF without AMF relocation

This procedure is applicable to Case A.



Figure 4.16.2.1.1-1: AM Policy Association Modification initiated by the AMF

This procedure concerns both roaming and non-roaming scenarios.

In the non-roaming case the role of the V-PCF is performed by the PCF. For the roaming scenarios, the V-PCF interacts with the AMF.

1. When a Policy Control Request Trigger condition is met the AMF updates AM Policy Association and provides information on the conditions that have changed to the PCF by invoking Npcf\_AMPolicyControl\_Update.

2. The (V-)PCF stores the information received in step 1 and makes the policy decision.

3. The (V-)PCF responds to the AMF of the updated Access and Mobility related policy control information as defined in clause 6.5 of TS 23.503 [20] and the updated Policy Control Request Trigger parameters.

4. The AMF deploys the access and mobility control policy, which includes storing the Service Area Restrictions and Policy Control Request Trigger of AM Policy Association, provisioning the Service Area Restrictions to the UE and provisioning the RFSP index, UE-AMBR and Service Area Restrictions to the NG-RAN as defined in TS 23.501 [2].

5. If an AF has previously subscribed to an event related with the Policy Control Request Trigger that was met (see step 1), the (V-)PCF sends a respective notification to the AF using Npcf\_AMPolicyAuthorization\_Notify.

##### 4.16.2.1.2 AM Policy Association Modification with old PCF during AMF relocation

This procedure is applicable to Case C. In this case, AMF relocation is performed without PCF change in handover procedure and registration procedure.



Figure 4.16.2.1.2-1: AM Policy Association Modification with the old PCF during AMF relocation

This procedure concerns both roaming and non-roaming scenarios.

In the non-roaming case the role of the V-PCF is performed by the PCF. For the roaming scenarios, the V-PCF interacts with the AMF.:

1. [Conditional] When the old AMF and the new AMF belong to the same PLMN, the old AMF transfers to the new AMF about the AM Policy Association information including policy control request trigger(s) and the PCF ID. For the roaming case, the new AMF receives V-PCF ID.

2. Based on local policies, the new AMF decides to establish UE Context with the (V-)PCF and contacts the (V‑)PCF identified by the PCF ID received in step 1.

3. The new AMF sends Npcf\_AMPolicyControl\_Update to the (V-)PCF to update the AM policy association with the (V-)PCF. The request may include the following information: policy control request trigger which has been met, Subscribed Service Area Restrictions (if updated), subscribed RFSP index (if updated) which are retrieved from the UDM during the update location procedure, and may include access type and RAT, PEI, ULI, UE time zone, service network. The (V-)PCF updates the stored information provided by the old AMF with the information provided by the new AMF.

4. The (V-)PCF may update the policy decision based on the information provided by the new AMF.

5. The AMF deploys the access and mobility control policy, which includes storing the Service Area Restrictions, provisioning Service Area Restrictions to the UE and provisioning the RFSP index, UE-AMBR and Service Area Restrictions to the NG-RAN.

6. If an AF has previously subscribed to an event related with the Policy Control Request Trigger that was met (see step 1), the (V-)PCF sends a respective notification to the AF using Npcf\_AMPolicyAuthorization\_Notify.

#### 4.16.2.2 AM Policy Association Modification initiated by the PCF

This procedure is applicable to AM Policy Association modification due to Case B.



Figure 4.16.2.2-1: AM Policy Association Modification initiated by the PCF

This procedure concerns both roaming and non-roaming scenarios.

In the non-roaming case the role of the V-PCF is performed by the PCF. For the roaming scenarios, the V-PCF interacts with the AMF.

NOTE: The V-PCF stores the access and mobility control policy information provided to the AMF.

1. [Conditional] PCF determines locally that the new status of the UE context requires new policies, potentially triggered by an AF as described in clause 4.15.6.X.

2. The (V-)PCF makes a policy decision.

3. The (V-)PCF sends Npcf\_AMPolicyControl\_UpdateNotify including AM Policy Association ID associated with the SUPI defined in TS 29.507 [32], Service Area Restrictions, UE-AMBR or RFSP index.

4. The AMF deploys the Access and mobility related policy information, which includes storing the Service Area Restrictions and Policy Control Request Trigger of AM Policy Association, provisioning of the Service Area Restrictions to the UE and provisioning the RFSP index, UE-AMBR and Service Area Restrictions to the NG-RAN.

\* \* \* \* Fourth change \* \* \* \*

#### 4.16.3.2 AMF-initiated AM Policy Association Termination



Figure 4.16.3.2-1: AMF-initiated AM Policy Association Termination

This procedure concerns both roaming and non-roaming scenarios.

In the non-roaming case the role of the V-PCF is performed by the PCF. For the roaming scenarios, the V-PCF interacts with the AMF.

1. The AMF decides to terminate the AM Policy Association during Deregistration procedure or due to mobility with change of AMF and (V-)PCF in the registration procedure or handover procedure, then if a AM Policy Association was established with the (V-)PCF steps 2 to 3 are performed.

2. The AMF sends the Npcf\_AMPolicyControl\_Delete service operation including AM Policy Association ID to the (V-)PCF.

3. The (V-)PCF removes the policy context for the UE and replies to the AMF with an Acknowledgement including success or failure.

4. The AMF removes the AM Policy Association for this UE, including the Access and Mobility Control Policy related to the UE. The AMF deletes the subscription to AMF detected events requested for that Policy Association.

5. The (V-)PCF may deregister from the BSF as the PCF that handles the AM Policy Association for this UE. This is performed by using the Nbsf\_Management\_Deregister operation, providing the UE SUPI/GPSI and an indication that the deregistration is about access and mobility management.

6. The BSF responds to the (V-)PCF about the success (or not) of its deregistration request.

7. If an AF has previously subscribed to events related with the change of PCF that handles the AM Policy Association of this UE, the (V-)PCF sends a respective notification to the AF using Npcf\_AMPolicyAuthorization\_Notify.

\* \* \* \* Fifth change \* \* \* \*

#### 5.2.5.X Npcf\_AMPolicyAuthorization Service

##### 5.2.5.X.1 General

**Service description:** This service is to authorise an AF request and potentially create or change access and mobility management policies of a UE based on the request of the authorized AF. This service allows the NF consumer to subscribe/unsubscribe the notification of events for reporting change of coverage (defined in clause 6.1.3.18 of TS 23.503 [20]).

##### 5.2.5.X.2 Npcf\_AMPolicyAuthorization\_Create service operation

**Service operation name:** Npcf\_AMPolicyAuthorization\_Create

**Description:** Authorizes the request, and optionally determines and installs AM Policy Control Data according to the information provided by the NF Consumer.

**Inputs, Required:** SUPI.

**Inputs, Optional:** Throughput requirements, service coverage requirements, policy duration, AF Application Identifier, priority indicator, subscribed events.

The subscribed event includes Event ID as specified in Npcf\_AMPolicyAuthorization\_Notify service operation, Event Reporting Information defined in Table 4.15.1-1 (only the Event Reporting mode and the immediate reporting flag when applicable), Notification Target Address.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** Identification of the created application context, the inputs that can be accepted by the PCF.

##### 5.2.5.X.3 Npcf\_AMPolicyAuthorization\_Update service operation

**Service operation name:** Npcf\_AMPolicyAuthorization\_Update

**Description:** Provides updated information to the PCF.

**Inputs, Required:** Identification of the application context.

**Inputs, Optional:** Throughput requirements, service coverage requirements, policy duration, priority indicator.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** The inputs that can be accepted by the PCF.

##### 5.2.5.X.4 Npcf\_AMPolicyAuthorization\_Delete service operation

**Service operation name:** Npcf\_AMPolicyAuthorization\_Delete

**Description:** Provides means for the NF Consumer to delete an application context.

**Inputs, Required:** Identification of the application context.

**Inputs, Optional:** None.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** None.

##### 5.2.5.X.5 Npcf\_AMPolicyAuthorization\_Notify service operation

**Service operation name:** Npcf\_AMPolicyAuthorization\_Notify

**Description:** provided by the PCF to notify NF consumers of the subscribed events.

**Inputs, Required:** Event ID.

The event that can be subscribed is the event for reporting change of coverage defined in clause 6.1.3.18 of TS 23.503 [20].

**Inputs, Optional:** Event information as defined in clause 6.1.3.18 of TS 23.503 [20].

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

##### 5.2.5.X.6 Npcf\_AMPolicyAuthorization\_Subscribe service operation

**Service operation name:** Npcf\_AMPolicyAuthorization\_Subscribe

**Description:** provided by the PCF for NF consumers to explicitly subscribe the notification of events.

**Inputs, Required:** Event ID as specified in Npcf\_AMPolicyAuthorization\_Notify service operation, Event Reporting Information defined in Table 4.15.1-1 (only the Event Reporting mode and the immediate reporting flag when applicable), Notification Target Address.

**Inputs, Optional:** Subscription Correlation ID (in the case of modification of the event subscription).

**Outputs, Required:** When the subscription is accepted: Subscription Correlation ID.

**Outputs, Optional:** None*.*

##### 5.2.5.X.7 Npcf\_AMPolicyAuthorization\_Unsubscribe service operation

**Service operation name:** Npcf\_AMPolicyAuthorization\_Unsubscribe

**Description:** Enable NF consumers to explicitly unsubscribe the notification of PCF events related to Npcf\_AMPolicyAuthorization\_Subscribe operation.

**Inputs, Required:** Subscription Correlation ID.

**Inputs, Optional:** None.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** None*.*

\* \* \* \* Sixth change \* \* \* \*

#### 5.2.6.X Nnef\_AMPolicyAuthorization Service

##### 5.2.5.X.1 General

**Service description:** This service is to authorise an AF request and trigger a respective Npcf\_AMPolicyAuthorization request. This service allows the NF consumer to subscribe/unsubscribe the notification of events for reporting change of coverage defined in clause 6.1.3.18 of TS 23.503 [20].

##### 5.2.5.X.2 Nnef\_AMPolicyAuthorization\_Create service operation

**Service operation name:** Nnef\_AMPolicyAuthorization\_Create

**Description:** Authorizes the request and triggers an Npcf\_AMPolicyAuthorization\_Create, potentially translating GPSI to SUPI.

**Inputs, Required:** SUPI or GPSI.

**Inputs, Optional:** Throughput requirements, service coverage requirements, policy duration, AF Application Identifier, priority indicator, subscribed event.

The subscribed event includes Event ID as specified in Nnef\_AMPolicyAuthorization\_Notify service operation, Event Reporting Information defined in Table 4.15.1-1 (only the Event Reporting mode and the immediate reporting flag when applicable), Notification Target Address.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** Identification of the created application context, the inputs that can be accepted by the PCF.

##### 5.2.5.X.3 Nnef\_AMPolicyAuthorization\_Update service operation

**Service operation name:** Nnef\_AMPolicyAuthorization\_Update

**Description:** Provides updated information about an application context to the NEF and triggers an Npcf\_AMPolicyAuthorization\_Update.

**Inputs, Required:** Identification of the application context.

**Inputs, Optional:** Throughput requirements, service coverage requirements, policy duration, priority indicator.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** The inputs that can be accepted by the PCF.

##### 5.2.5.X.4 Nnef\_AMPolicyAuthorization\_Delete service operation

**Service operation name:** Nnef\_AMPolicyAuthorization\_Delete

**Description:** Provides means for the NF Consumer to delete an application context by triggering an Npcf\_AMPolicyAuthorization\_Delete.

**Inputs, Required:** Identification of the application context.

**Inputs, Optional:** None.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** None.

##### 5.2.5.X.5 Nnef\_AMPolicyAuthorization\_Notify service operation

**Service operation name:** Nnef\_AMPolicyAuthorization\_Notify

**Description:** provided by the NEF to notify NF consumers when the NEF receives from the PCF notifications about subscribed events.

**Inputs, Required:** Event ID.

The event that can be subscribed is the event for reporting change of coverage defined in clause 6.1.3.18 of TS 23.503 [20].

**Inputs, Optional:** Event information as defined in clause 6.1.3.18 of TS 23.503 [20].

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

##### 5.2.5.X.6 Nnef\_AMPolicyAuthorization\_Subscribe service operation

**Service operation name:** Nnef\_AMPolicyAuthorization\_Subscribe

**Description:** provided by the NEF for NF consumers to explicitly subscribe the notification of events, triggering an Npcf\_AMPolicyAuthorization\_Subscribe.

**Inputs, Required:** Event ID as specified in Nnef\_AMPolicyAuthorization\_Notify service operation, SUPI, Event Reporting Information defined in Table 4.15.1-1 (only the Event Reporting mode and the immediate reporting flag when applicable), Notification Target Address.

**Inputs, Optional:** Subscription Correlation ID (in the case of modification of the event subscription).

**Outputs, Required:** When the subscription is accepted: Subscription Correlation ID.

**Outputs, Optional:** None*.*

##### 5.2.5.X.7 Nnef\_AMPolicyAuthorization\_Unsubscribe service operation

**Service operation name:** Nnef\_AMPolicyAuthorization\_Unsubscribe

**Description:** Enable NF consumers to explicitly unsubscribe the notification of events related to Nnef\_AMPolicyAuthorization\_Subscribe operation.

**Inputs, Required:** Subscription Correlation ID.

**Inputs, Optional:** None.

**Outputs, Required:** Success or Failure.

**Outputs, Optional:** None*.*

#### 5.2.6.Y Nnef\_AMInfluence service

##### 5.2.6.Y.1 General

**Service description:** This service is to authorize the request and store in the UDR application data that can be retrieved by relevant PCFs in order to influence access and mobility management policies of one or multiple UEs. This service allows the NF consumer to subscribe/unsubscribe the notification of events about service coverage (defined in clause 6.1.3.18 of TS 23.503 [20]).

##### 5.2.6.Y.2 Nnef\_AMInfluence\_Create operation

**Service operation name:** Nnef\_AMInfluence\_Create

**Description:** Authorize the request for AM policy influence and store the request data in the UDR, potentially translating GSPI to SUPI and External Group Identifier to Internal Group Identifier.

**Inputs, Required:** AF Transaction Id.

The AF Transaction Id refers to the request.

**Inputs, Optional:** The address (IP or Ethernet) of the UE, SUPI, GPSI, DNN, S-NSSAI, External Group Identifier, subscriber category, application identifier or traffic filtering information, AF Service Identifier, throughput requirements, service coverage requirements, policy duration, AF Application Identifier, priority indicator, subscribed event.

The subscribed event includes Event ID as specified in Nnef\_AMInfluence\_Notify service operation, Event Reporting Information defined in Table 4.15.1-1 (only the Event Reporting mode and the immediate reporting flag when applicable), Notification Target Address.

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

##### 5.2.6.Y.3 Nnef\_AMInfluence\_Update operation

**Service operation name:** Nnef\_AMInfluence\_Update

**Description:** Authorize the request and forward the request to update the AM policy influence data, potentially translating GSPI to SUPI and External Group Identifier to Internal Group Identifier.

**Inputs, Required:** AF Transaction Id.

The AF Transaction Id identifies the NF Service Consumer request to be updated.

**Inputs, Optional:** Same as in Nnef\_AMInfluence\_Create.

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

##### 5.2.6.Y.4 Nnef\_AMInfluence\_Delete operation

**Service operation name:** Nnef\_AMInfluence\_Delete

**Description:** Authorize the request and forward the request to delete(s) request for AM policy influence.

**Inputs, Required:** AF Transaction Id.

The AF Transaction Id identifies the NF Service Consumer request for AM policy influence to be deleted.

**Inputs, Optional:** None.

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

##### 5.2.6.Y.5 Nnef\_AMInfluence\_Get operation

**Service operation name:** Nnef\_AMInfluence\_Get

**Description:** Get the current AM policy influence parameters.

**Inputs, Required:** AF Transaction Id.

The AF Transaction Id refers to the request.

**Inputs, Optional:** The address (IP or Ethernet) of the UE, SUPI, GPSI, DNN, S-NSSAI, External Group Identifier, subscriber category, application identifier or traffic filtering information, AF Service Identifier, AF Application Identifier.

**Outputs, Required:** Operation execution result indication, requested data.

**Outputs, Optional:** None.

##### 5.2.6.Y.6 Nnef\_AMInfluence\_Notify operation

**Service operation name:** Nnef\_AMInfluence\_Notify

**Description:** Forward the notification of change of service coverage event report to the AF.

**Inputs, Required:** AF Transaction Id, Event ID.

The AF Transaction Id identifies the AF request for AM policy influence that the event report is related to.

The event that can be subscribed is the event for reporting change of coverage defined in clause 6.1.3.18 of TS 23.503 [20]

**Inputs, Optional:** Event information (as defined in clause 6.1.3.18 of TS 23.503 [20]).

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

\* \* \* \* Seventh change \* \* \* \*

##### 5.2.12.2.1 General

The operations defined for Nudr\_DM service use following set of parameters defined in this clause:

- Data Set Identifier: uniquely identifies the requested set of data within the UDR (see clause 4.2.5).

- Data Subset Identifier: it uniquely identifies the data subset within each Data Set Identifier. As specified in the procedures in clause 4, e.g. subscription data can consist of subsets particularised for specific procedures like mobility, session, etc.

- Data Keys defined in Table 5.2.12.2.1-1

For Nudr\_DM\_Subscribe and Nudr\_DM\_Notify operations:

- The Target of Event Reporting is made up of a Data Key and possibly a Data Sub Key both defined in Table 5.2.12.2.1-1. When a Data Sub Key is defined in the table but not present in the Nudr\_DM\_Subscribe this means that all values of the Data Sub Key are targeted.

- The Data Set Identifier plus (if present) the (set of) Data Subset Identifier(s) corresponds to a (set of) Event ID(s) as defined in clause 4.15.1

An NF Service Consumer may include an indicator when it invokes Nudr\_DM Query/Create/Update service operation to subscribe the changes of the data, to avoid a separate Nudr\_DM\_Subscribe service operation.

Depending on the use case, it is possible to use a Data Key and/or one or multiple Data sub keys to further identify the corresponding data, as defined in Table 5.2.12.2.1-1 below.

Table 5.2.12.2.1-1: Data keys

|  |  |  |  |
| --- | --- | --- | --- |
| Data Set | Data Subset | Data Key | Data Sub Key |
|  | Access and Mobility Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | SMF Selection Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | UE context in SMF data | SUPI | PDU Session ID or DNN |
| Subscription Data (see clause 5.2.3.3.1) | SMS Management Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | SMS Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | Session Management Subscription data | SUPI | S-NSSAI |
|  |  |  | DNN |
|  |  |  | Serving PLMN ID and optionally NID |
|  | Slice Selection Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | Group Data | Internal Group Identifier or  External Group Identifier | - |
|  | Identifier translation | GPSI |  |
|  |  | SUPI | Application Port ID |
|  | Intersystem continuity Context | SUPI | DNN |
|  | LCS privacy | SUPI | - |
|  | LCS mobile origination | SUPI | - |
|  | UE reachability | SUPI | - |
|  | Group Identifier Translation | Internal Group Identifier or  External Group Identifier | - |
|  | UE context in SMSF data | SUPI | - |
|  | V2X Subscription data | SUPI | - |
| Application data | Packet Flow Descriptions (PFDs) | Application Identifier | - |
|  | AF traffic influence request information | AF transaction internal ID |  |
|  | (See clause 5.6.7 and clause 6.3.7.2 in TS 23.501 [2]). | S-NSSAI and DNN  and/or  Internal Group Identifier or SUPI |  |
| Background Data Transfer  (NOTE 3) | Internal Group Identifier or SUPI |  |
| Service specific information (See clause 4.15.6.7) | S-NSSAI and DNN  or  Internal Group Identifier or SUPI |  |
| AM policy influence request information (See clause 4.15.6.X.3) | AF transaction internal ID |  |
| S-NSSAI and DNN  and/or  Internal Group Identifier or SUPI or subscriber category |
| Policy Data | UE context policy control data  (See clause 6.2.1.3 in TS 23.503 [20]) | SUPI |  |
|  | PDU Session policy control data | SUPI | S-NSSAI |
|  | (See clause 6.2.1.3 in TS 23.503 [20]) |  | DNN |
|  | Policy Set Entry data  (See clause 6.2.1.3 in TS 23.503 [20]) | SUPI (for the UDR in HPLMN) |  |
|  |  | PLMN ID (for the UDR in VPLMN) |  |
|  | Remaining allowed Usage data | SUPI | S-NSSAI |
|  | (See clause 6.2.1.3 in TS 23.503 [20]) |  | DNN |
|  | Sponsored data connectivity profiles (See clause 6.2.1.6 in TS 23.503 [20]) | Sponsor Identity |  |
|  | Background Data Transfer data  (See clause 6.2.1.6 in TS 23.503 [20]) | Background Data Transfer Reference ID. (NOTE 2) |  |
|  |  | None. (NOTE 1) |  |
| Exposure Data | Access and Mobility Information | SUPI or GPSI | PDU Session ID or |
| (see clause 5.2.12.1) | Session Management information | SUPI or GPSI | UE IP address or DNN |
| NOTE 1: Retrieval of the stored Background Data Transfer References for all ASP identifiers in the UDR requires Data Subset but no Data Key or Data Subkey(s).  NOTE 2: Update of a Background Data Transfer Reference in the UDR requires a Data key to refer to a Background Data Transfer Reference as input data.  NOTE 3: The Background Data Transfer includes the Background Data Reference ID and the ASP id that requests to apply the Background Data Reference ID to the UE(s). Furthermore, the Background Data Transfer includes the relevant information received from the AF as defined in clause 6.1.2.4, TS 23.503 [20]. | | | |

The content of the UDR storage for (Data Set Id= Application Data, Data Subset Id = AF TrafficInfluence request information) is specified in TS 23.501 [2], clause 5.6.7, Table 5.6.7-1. This information is written by the NEF and read by the PCF(s). PCF(s) may also subscribe to changes onto this information.

\* \* \* \* End of changes \* \* \* \*