3GPP TSG SA WG2#164 S2-2408564r01

Maastricht, 19-23 August 2024 (revision of S2-2408564)

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **4984** | **rev** | **-** | **Current version:** | **19.0.0** |  |
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| *For* [***HELP***](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:***  | Local offloading policy provisioning to I-SMF |
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| ***Source to WG:*** | Nokia |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** |  eEDGE\_5GC\_Ph3 |  | ***Date:*** | 2024-08-09 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-19 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | To address the outcome of KI#1 in approved eEDGE\_5GC\_Ph3 WID SP-240996 on reducing the impact on central 5GC NFs by using I-SMF based approach, provisioning of local offloading policy to I-SMF from PCF via SMF is introduced. |
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| ***Summary of change:*** | Introduce PCF to provision local offloading policy to I-SMF via SMF. |
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| ***Consequences if not approved:*** | Missing functionality |
|  |  |
| ***Clauses affected:*** | 4.16.5.2, 4.23.6.2, 5.2.5.3.2, 5.2.5.3.3, 5.2.5.4.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 23.501 CR 5605TS 23.503 CR 1363 |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

FIRST CHANGE

#### 4.16.5.2 PCF initiated SM Policy Association Modification

The PCF may initiate SM Policy Association Modification procedure based on internal PCF event or triggered by other peers of the PCF (AF, NWDAF, CHF, UDR and TSCTSF).



Figure 4.16.5.2-1: PCF initiated SM Policy Association Modification

This procedure may be triggered by a local decision of the PCF or based on triggers from other peers of the PCF (AF, NWDAF, CHF, UDR and TSCTSF):

An SM Policy Association is established, with the PCF as described in clause 4.16.4 before this procedure is triggered.

For local breakout roaming, the interaction with HPLMN (e.g. step 1b and step 2) is not used. In local breakout roaming, the V-PCF interacts with the UDR of the VPLMN.

1a. Alternatively, optionally, the AF, NEF or TSCTSF provides/revokes service information to the PCF e.g. due to AF session signalling, by invoking Npcf\_PolicyAuthorization\_Create Request or Npcf\_PolicyAuthorization\_Update Request or Npcf\_PolicyAuthorization\_Subscribe Request service operation. The PCF responds to the AF, NEF or TSCTSF.

1b. Alternatively, optionally, the CHF provides a Spending Limit Report to the PCF as described in clause 4.16.8. and responds to the CHF.

1c. Alternatively, optionally, the UDR notifies the PCF about a policy subscription change by invoking Nudr\_DM\_Notify (Notification correlation Id, Policy Data, SUPI, updated data, "PDU Session Policy Control Data" | "Remaining allowed Usage data"); if the PCF uses the 5G VN group data and subscribes to 5G VN group data change, the UDR notifies the PCF about the 5G VN group data change by invoking Nudr\_DM\_Notify (Notification correlation Id, Subscription Data, Group Data). The PCF responds to the UDR.

1d. Alternatively, optionally, some internal event (e.g. timer, or local decision based on analytics information requested and received from NWDAF) occurs at the PCF. The analytics (i.e. Analytics ID) which can be requested from NWDAF are described in clause 6.1.1.3 of TS 23.503 [20].

2. If the PCF determines a change to policy counter status reporting is required, it may alter the subscribed list of policy counters using the Initial, Intermediate or Final Spending Limit Report Retrieval procedures as defined in clause 4.16.8.

NOTE 1: The PCF ensures that information received in step 1 and 2 can be used by later policy decisions.

NOTE 2: For local breakout roaming, PDU Session policy control subscription information and Remaining allowed usage subscription information for monitoring control as defined in clause 6.2.1.3 of TS 23.503 [20] are not available in V-UDR and V-PCF uses locally configured information according to the roaming agreement with the HPLMN operator.

3. The PCF makes a policy decision. The PCF may determine that updated or new policy information need to be sent to the SMF. In the non-roaming case, the PCF may also decide to subscribe to a new Analytics ID from NWDAF as described in clause 6.1.1.3 of TS 23.503 [20].

 If the AF provided a Background Data Transfer Reference ID in step 1a, the PCF may retrieve it from the UDR by invoking the Nudr\_DM\_Query (BDT Reference Id, Policy Data, Background Data Transfer) service.

4. If the PCF has determined that SMF needs updated policy information in step 3 or if the PCF has received a Port Management Information Container for the PDU Session and related port number from the AF or TSCTSF in step 1a or if the PCF has received an update to the local offloading policy containing FQDN(s) and/or IP range(s) that are allowed to be locally offloaded to a DNAI in step 1a, the PCF issues a Npcf\_SMPolicyControl\_UpdateNotify request with possibly updated policy information about the PDU Session.

 If the PCF has received a subscription for 5GS Bridge/Router information Notification in Step 1a, the PCF can include a subscription for SMF event for "5GS Bridge/Router information" associated with the PDU Session into the Npcf\_SMPolicyControl\_UpdateNotify request. In this case, if the SMF has stored the 5GS Bridge/Router information and has not reported the event to the PCF, the SMF notifies the PCF for the event of "5GS Bridge/Router Information ".

 If the PCF has received a Npcf\_PolicyAuthorization\_Unsubscribe request to unsubscribe for 5GS Bridge/Router information Notification, the PCF can remove the subscription for SMF event for "5GS Bridge/Router information" associated with the PDU Session and issue a Npcf\_SMPolicyControl\_UpdateNotify request with the updated policy information about the PDU Session.

NOTE 3: If the TSCTSF receives a Requested 5GS delay and the TSCTSF does not have the 5GS Bridge/Router information for the AF-session, the TSCTSF can subscribe for the 5GS Bridge/Router information from the PCF by triggering a Npcf\_PolicyAuthorization\_Subscribe request.

 If the PCF has received a subscription to notification on BAT offset along with the TSC Assistance Container from TSCTSF in step 1a, the PCF can include a subscription to notification on BAT offset associated with the PDU Session into the Npcf\_SMPolicyControl\_UpdateNotify request.

5. The SMF acknowledges the PCF request with a Npcf\_SMPolicyControl\_UpdateNotify response.

 If the Npcf\_SMPolicyControl\_UpdateNotify request is received from new PCF instance in the PCF Set, the SMF store the SM policy association towards the new PCF instance.

Second CHANGE

#### 4.23.6.2 Policy Update Procedures with I-SMF

Figure 4.23.6-1 shows procedures related to provisioning of PCC rules containing traffic steering information related to an I-SMF.



Figure 4.23.6-1: Policy Update procedure

In cases where step 1a in figure 4.23.6-1 is triggered in response to PCF receiving AF request, below steps 3 and 4 are applicable, in addition to those steps as explained in clause 4.3.6.1.

 Step 3: SMF provides to I-SMF with DNAI(s) of interest for this PDU Session for local traffic steering. If PCC rule changes for traffic offloaded via ULCL/BP due to the AF request, the SMF provides the updated N4 information to the I-SMF. If the Local Offloading Policy is received in PCC rule, SMF provides the Local Offloading Policy to I-SMF in a transparent container.

 Step 4: The procedure described in clauses 4.23.9.1, 4.23.9.2 and 4.23.9.3, from step 2 is executed.

Third CHANGE

##### 5.2.5.3.2 Npcf\_PolicyAuthorization\_Create service operation

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

**Description:** Authorize the request and optionally determines and installs SM Policy Control Data according to the information provided by the NF Consumer or provides Port Management Information Container for ports on DS-TT or NW-TT, or User plane node Management Information Container.

**Inputs, Required:** UE (IP or MAC) address, identification of the application session context.

**Inputs, Optional:** GPSI(s) or SUPI(s) if available, Internal Group Identifier, DNN if available, S-NSSAI if available, Media type, Media format, bandwidth requirements, sponsored data connectivity information if applicable, flow description information as described in clause 6.1.3.6 of TS 23.503 [20], AF Application Identifier, AF Communication Service Identifier, AF Record Identifier, Flow status, Priority indicator, emergency indicator, ASP Identifier, resource allocation outcome, AF Application Event Identifier, a list of DNAI(s) and corresponding routing profile ID(s) or N6 traffic routing information, FQDN(s) and/or IP range(s) that are allowed for local traffic offloading per target DNAI, AF Transaction Id, Early and/or late notifications about UP path management events, temporal validity condition, spatial validity condition, Information for EAS IP Replacement in 5GC, Indication for EAS Relocation, AF indication for simultaneous connectivity over source and target PSA at edge relocation, EAS Correlation indication, Common EAS IP address, Traffic Correlation ID, FQDN(s) as described in clause 5.6.7 in 23.501 [2], Background Data Transfer Reference ID, priority sharing indicator as described in clause 6.1.3.15 of TS 23.503 [20], pre-emption control information as described in clause 6.1.3.15 of TS 23.503 [20], Port Management Information Container and related port number, User plane node Management Information Container, TSN AF parameters provided by the TSN AF to the PCF as described in clause 6.1.3.23 of TS 23.503 [20], TSCTSF parameters provided by the TSCTSF to the PCF as described in clause 6.1.3.23a and clause 6.1.3.23b of TS 23.503 [20], QoS Monitoring parameter(s) as defined in clause 5.45 of TS 23.501 [2], Reporting frequency, Target of reporting and optional an indication of direct event notification as described in clause 6.1.3.21 of TS 23.503 [20], QoS Reference or individual QoS parameters as described in clause 6.1.3.22 of TS 23.503 [20], RT Latency Indication as described in clause 6.1.3.22 of TS 23.503 [20], Alternative Service Requirements (containing one or more QoS Reference parameters or Requested Alternative QoS Parameter Sets in a prioritized order), TSC Assistance Container, MPS for Data Transport Service indicator as described in clause 6.1.3.11 of TS 23.503 [20], Packet Delay Variation requirements as described in clause 6.1.3.26 of TS 23.503 [20], SFC Identifier(s), Metadata, Periodicity as described clauses 6.1.3.22 and 6.3.1 of TS 23.503 [20], PDU Set QoS Parameters as described in clause 5.7.7 of TS 23.501 [2], Protocol Description as described in clause 5.37.5 or 5.37.8.3 of TS 23.501 [2], Data Burst Handing Information as described in clause 6.3.1of TS 23.503 [20], Indication of ECN marking for L4S as described in clause 6.1.3.22 of TS 23.503 [20], Notification Target Address for PMIC/UMIC UPF event, Correlation ID for PMIC/UMIC UPF event, Multi-Modal Service ID together with Multi-modal Service Requirements information for each data flow as described in clause 6.1.3.27.3 of TS 23.503 [20], QoS duration, QoS inactivity interval as described in clause 6.1.3.22 of TS 23.503 [20].

NOTE 1: When only one DNAI and corresponding routing profile ID(s) and the Indication for EAS Relocation are available, the presented DNAI is the target DNAI as defined in clause 6.3.7 of TS 23.548 [74].

NOTE 2: A dedicated Notification Target Address for PMIC/UMIC UPF event and Correlation ID for PMIC/UMIC UPF event are provided by the event consumer over Npcf\_PolicyAuthorization as the corresponding events are reported by the UPF and not by the PCF. Providing such information indicates that the consumer of the Npcf\_PolicyAuthorization (TSN AF, TSCTSF) supports PMIC/UMIC via Nupf event reporting.

**Outputs, Required:** Success or Failure (reason for failure, e.g. as defined in clauses 6.1.3.16 and clause 6.1.3.10 of TS 23.503 [20]).

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

Fourth CHANGE

##### 5.2.5.3.3 Npcf\_PolicyAuthorization\_Update service operation

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

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

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

**Inputs, Optional:** Media type, Media format, bandwidth requirements, sponsored data connectivity information if applicable, flow description information as described in clause 6.1.3.6 of TS 23.503 [20], AF Application Identifier, AF Communication Service Identifier, AF Record Identifier, Flow status, Priority indicator, resource allocation outcome, AF Application Event Identifier, a list of DNAI(s) and corresponding routing profile ID(s) or N6 traffic routing information, FQDN(s) and/or IP range(s) that are allowed for local traffic offloading per target DNAI, AF Transaction Id, Early and/or late notifications about UP path management events, temporal validity condition, spatial validity condition, Information for EAS IP Replacement in 5GC, Indication for EAS Relocation, AF indication for simultaneous connectivity over source and target PSA at edge relocation as described in clause 5.6.7 of TS 23.501 [2], Background Data Transfer Reference ID, priority sharing indicator as described in clause 6.1.3.15 of TS 23.503 [20], pre-emption control information as described in clause 6.1.3.15 of TS 23.503 [20], Port Management Information Container and related port number, User plane node Management Information Container, TSN AF parameters provided by the TSN AF to the PCF as described in clause 6.1.3.23 of TS 23.503 [20], TSCTSF parameters provided by the TSCTSF to the PCF as described in clause 6.1.3.23a and clause 6.1.3.23b of TS 23.503 [20], QoS Reference or individual QoS parameters as described in clause 6.1.3.22 of TS 23.503 [20], Alternative Service Requirements (containing one or more QoS Reference parameters or Requested Alternative QoS Parameter Sets in a prioritized order), TSC Assistance Container, QoS Monitoring parameter(s) as defined in clause 5.45 of TS 23.501 [2], Reporting frequency, Target of reporting and optional an indication of direct event notification as described in clause 6.1.3.21 of TS 23.503 [20], MPS for Data Transport Service indicator as described in clause 6.1.3.11 of TS 23.503 [20], Packet Delay Variation requirements as described in clause 6.1.3.26 of TS 23.503 [20], SFC Identifier(s), Metadata, Periodicity as described clauses 6.1.3.22 and 6.3.1 of TS 23.503 [20], PDU Set QoS Parameters as described in clause 5.7.7 of TS 23.501 [2], Protocol Description as described in clause 5.37.5 or 5.37.8.3 of TS 23.501 [2], Data Burst Handing Information as described in clause 6.3.1of TS 23.503 [20], Notification Target Address for PMIC/UMIC UPF event, Correlation ID for PMIC/UMIC UPF event, updated information for Multi-modal Service Requirements as described in clause 6.1.3.27.3 of TS 23.503 [20].

NOTE: When only one DNAI and corresponding routing profile ID(s) and the Indication for EAS Relocation are available, the presented DNAI is the target DNAI as defined in clause 6.3.7 of TS 23.548 [74].

**Outputs, Required:** Success or Failure (reason for failure, e.g. as defined in clause 6.1.3.16 of TS 23.503 [20]).

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

Provides updated application level information and communicates with Npcf\_SMPolicyControl service to determine and install the policy according to the information provided by the NF Consumer. Updates an application context in the PCF.

Fifth CHANGE

##### 5.2.5.4.2 Npcf\_SMPolicyControl\_Create service operation

**Service operation name:** Npcf\_SMPolicyControl\_Create.

**Description:** The NF Service Consumer can request the creation of a SM Policy Association and provides relevant parameters about the PDU Session to the PCF.

**Inputs, Required:** SUPI (or PEI in the case of emergency PDU Session without SUPI), PDU Session id, DNN, S-NSSAI and RAT Type.

**Inputs, Optional:** Information provided by the SMF, such as PDU Session Type, Request Type, Access Type, the IPv4 address and/or IPv6 prefix, PEI, GPSI, User Location Information, UE Time Zone, Serving Network identifier (PLMN ID, or PLMN ID and NID, see clause 5.34 of TS 23.501 [2]), Charging Characteristics information, Session-AMBR, subscribed default QoS information (5QI, 5QI Priority Level, ARP), UE support of reflective QoS (see TS 23.501 [2], clause 5.7.5.1), Number of supported packet filters for signalled QoS rules for the PDU Session (see TS 23.501 [2], clause 5.7.1.4), 3GPP PS Data Off status, Trace Requirements and Internal Group Identifier (see clause 5.9.7 of TS 23.501 [2]), DN Authorization Profile Index, DN authorized Session AMBR, Framed Route information (as defined in Table 5.2.3.3.1-1), MA PDU Request indication, MA PDU Network-Upgrade Allowed indication, ATSSS capabilities of the MA PDU Session, QoS constraints from the VPLMN (as defined in clause 5.7.1.11 of TS 23.501 [2]), Satellite backhaul category, list of NWDAF instance Ids (used by AMF, SMF, UPF) and corresponding Analytics ID(s), PVS IP address(es) and/or PVS FQDN(s) and Onboarding Indication in the case of ON-SNPN (see clause 5.30.2.10.4.2 of TS 23.501 [2]), URSP rule enforcement that including Connection Capability, PCF binding information (address(es) of PCF for UE, instance id of PCF for UE), HR-SBO support indication (see clause 6.2.1.2 of TS 23.503 [20]), Alternative S-NSSAI (see clause 5.15.19 of TS 23.501 [2]), URSP delivery in EPS support indication, (target) DNAI.

NOTE 1: If SMF receives the DN authorized Session AMBR from the DN-AAA at PDU Session establishment, it includes the DN authorized Session AMBR within the Session-AMBR, instead of the subscribed Session-AMBR received from the UDM, in the request.

NOTE 2: It is up to stage 3 to determine whether the corresponding supportedFeature in Npcf\_SMPolicyControl can be reused as URSP delivery in EPS support indication.

NOTE 3: SMF provides target DNAI to PCF if the local offloading allowed indication is set to true for the target DNAI.

W-5GAN specific PDU Session information provided by the SMF is specified in TS 23.316 [53].

**Outputs, Required:** SM Policy Association ID defined in TS 29.512 [57]. Success or Failure.

**Outputs, Optional:** Policy information for the PDU Session as defined in TS 23.503 [20] and Policy Control Request Trigger(s) of SM Policy Association as defined in clause 6.1.3.5 of TS 23.503 [20].

See clause 5.8.2.2 of TS 23.501 [2] for allocation of IPv4 address and IPv6 prefix. The IPv6 prefix length is /64, or is shorter than /64 when Prefix Delegation applies.

See clause 4.16.4 for the detail usage of this service operation.

See clauses 4.22.2.1 and 4.22.3 for detailed usage of this service operation for ATSSS.

End of CHANGES