**3GPP TSG CT WG3 Meeting #137 *C3-245153r2***

**Hefei, CN, 14 - 18 October, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.513** | **CR** | **0571** | **rev** | **1** | **Current version:** | **19.0.0** |  |
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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:***  | Providing H-PCF URI and H-PCF set identifier for H-PCF reselection |
|  |  |
| ***Source to WG:*** | ZTE, Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | TEI18, 5GS\_Ph1-CT |  | Date: | 2024-10-07 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***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:*** | Agreed S2-2409210 and S2-2409259 allow AMF to provide to V-PCF also URI (e.g FQDN/IP-address) of the hPCF for UE Policy roaming scenario.Agreed C3-244440 in last meeting already allows the AMF to provide to V-PCF the H-PCF Set Id and H-PCF URI of the selected H-PCF ID.Therefore, the procedure for PCF discovery and selection by the AMF needs to be updated accordingly. |
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| ***Summary of change:*** | H-PCF Set Id and H-PCF URI are added to the PCF discovery and selection procedure for UE Policy roaming scenario. |
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| ***Consequences if not approved:*** | Not aligned with stage2 and 29.525. |
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| ***Clauses affected:*** | 8.2 |
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|  | **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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

## 8.2 PCF discovery and selection by the AMF

PCF discovery and selection functionality is implemented in the AMF and the SCP, and follows the principles described in 3GPP TS 23.501 [2], clause 6.3.1. The AMF uses the PCF services for a UE.

When the AMF performs discovery and selection for a UE, the AMF may utilize the Nnrf\_NFDiscovery service of the NRF to discover the candidate PCF instance(s). In addition, PCF information may also be locally configured in the AMF. The AMF selects a PCF instance, or two when roaming, based on the available PCF instances (obtained from the NRF or locally configured in the AMF) and depending on operator's policies.

In the non-roaming case, the AMF selects a PCF instance for AM policy association and selects the same PCF instance for UE policy association. In the roaming case, the AMF selects a V-PCF instance for AM policy association and selects the same V-PCF instance for UE policy association. The following factors may be considered for PCF discovery and selection for Access and Mobility policies and UE policies:

- SUPI; the AMF selects a PCF instance based on the SUPI range the UE's SUPI belongs to or based on the results of a discovery procedure with the NRF using the UE's SUPI as an input for PCF discovery.

- GPSI; the AMF selects a PCF instance based on the GPSI range the UE's GPSI belongs to or based on the results of a discovery procedure with the NRF using the UE's GPSI as an input for PCF discovery.

- S-NSSAI(s). In the roaming case, the AMF selects the V-PCF instance based on the S-NSSAI(s) of the VPLMN and selects the H-PCF instance based on the S-NSSAI(s) of the HPLMN.

- PCF Set ID.

- PCF Group ID of the UE's SUPI.

NOTE 1: The AMF can infer the PCF Group ID the UE's SUPI belongs to or UE's GPSI belongs to based on the results of PCF discovery procedures with the NRF. The AMF can provide the PCF Group ID to other PCF NF consumers as described in 3GPP TS 23.502 [3].

- The features supported by the PCF (e.g. the PCF supporting the "DNNReplacementControl" feature is selected by the AMF supporting DNN replacement).

- The V2X support stored in the NRF.

- The A2X support stored in the NRF.

- The ProSe support stored in the NRF.

- The Ranging/SL support stored in the NRF.

- PCF Selection Assistance Info and PCF Instance Id(s) serving the established PDU Sessions/PDN Connections received from UDM. In case PCF Selection Assistance Info and PCF Instance Id(s) are received from the UDM, the AMF selects a PCF instance that matches one of the received PCF instance Id(s) serving a combination of DNN and S-NSSAI that is included in the the PCF Selection Assistance Info. If multiple DNN and S-NSSAI combinations are provided, the AMF selects the DNN, S-NSSAI using local configuration. In case PCF instance Id(s) are not received, e.g. EPS interworking is not supported, the AMF selects the PCF instance by considering other above factors.

In the case of delegated discovery and selection in the SCP, the AMF shall include in the first request to the PCF the above factors, if available, within the "3gpp-Sbi-Discovery-\*" request headers, as specified in 3GPP TS 29.500 [5], clause 6.10.3.2.

In the following scenarios, information about the PCF instance that has been selected by the AMF (e.g. the selected PCF instance Id, the PCF set ID, and if the PCF set ID is not available, the PCF Group ID, if available) can be forwarded to another NF consumer of the PCF:

- During AMF relocation, the target AMF may receive from the source AMF a resource URI of AM Policy association and/or a resource URI of UE Policy association, a PCF instance ID, a PCF set ID, and if the PCF set ID is not available, a PCF Group ID (if available) to enable the target AMF to reuse the same PCF instance (i.e. reuse the AM Policy association resource and/or UE Policy association resource), and the target AMF may decide based on operator policy either to re-use the AM/UE Policy Association in the same PCF instance or select a new PCF instance.

- In the roaming case, the AMF may, based on operator policies (e.g. roaming agreement), select the H-PCF in addition to the V-PCF for a UE by performing a PCF discovery and selection as described above. The AMF sends to the V-PCF during the UE Policy association establishment procedure the selected H-PCF instance Id, and if the "EnhEstRoaming" feature is supported as defined in 3GPP TS 29.525 [31], optionally the selected H-PCF URI and the ID of H-PCF Set to which the selected H-PCF belongs.

In these scenarios, if the target AMF performs discovery and selection, the target AMF may use the received PCF information instead of performing PCF selection interacting with the NRF as described above (discovery may still be needed depending on what level of information is sent by the AMF, e.g. the address of the PCF instance may not be present)

In addition, in the case of delegated discovery and selection in the SCP, the following applies:

a) The selected PCF instance may include the PCF instance ID, the PCF set ID, and if the PCF set ID is not available, the PCF Group ID (if available) in the response to the AMF.

NOTE 2: The selected (V-)PCF instance can include a binding indication, including the (V-)PCF ID and possibly the PCF Set ID in the response to the AMF.

b) The AMF first establishes an AM policy association; when forwarding the related request message, the SCP discovers and selects a (V-)PCF instance for AM policy association. Unless binding information is provided in the response of the PCF to that request, the SCP adds the PCF instance ID it selected into the response to the AMF, as per clause 6.10.3.4 of 3GPP TS 29.500 [5]. The AMF uses the received (V-)PCF instance Id for the AM policy association and/or the available binding information within the "3gpp-Sbi-Discovery-\*" request headers for the request to establish the UE policy association. The SCP selects the corresponding (V-)PCF instance for UE policy association based on the received discovery and selection parameters.

c) During AMF relocation, the target AMF may receive a resource URI of AM Policy association and/or a resource URI of UE Policy association, a PCF instance ID, a PCF set ID, and if the PCF set ID is not available, a PCF Group ID (if available) from the source AMF to enable it to reuse the same PCF instance. The AMF may decide based on operator policy either to use the old PCF instance or select another PCF instance (i.e. reuse the AM Policy association resource and/or UE Policy association resource). If the target AMF decides to reuse the old PCF instance, the AMF includes the {apiRoot} of the resource URI within the "3gpp-Sbi-Target-apiRoot" request header, the PCF instance ID, the PCF set ID, and if the PCF set ID is not available, the PCF Group ID (if available) within the "3gpp-Sbi-Discovery-\*" request header as received from the source AMF in the AM policy update request and/or the UE policy update request to the PCF via the SCP.

d) In the roaming case, the AMF performs discovery and selection of the H-PCF from NRF as described in this clause. The AMF may indicate the maximum number of H-PCF instances to be returned from NRF, i.e. H-PCF selection at NRF. The AMF uses the received V-PCF instance Id for AM Policy association and/or the available binding information received during the AM policy association procedure as described in bullet b) above to send the UE policy association establishment request to the V-PCF via the SCP. The AMF includes in the Npcf\_UEPolicyControl\_Create request the selected H-PCF instance Id, and if the "EnhEstRoaming" feature is supported as defined in 3GPP TS 29.525 [31], optionally the selected H-PCF URI and the ID of H-PCF Set to which the selected H-PCF belongs. The SCP discovers and selects the V-PCF instance as described in bullet b). The V-PCF sends an UE policy association establishment request towards the H-PCF via the SCP, which includes the selected H-PCF instance Id, and optionally the selected H-PCF URI and the ID of H-PCF Set to which the selected H-PCF belongs, if received from the AMF within the "3gpp-Sbi-Discovery-\*" request header as discovery and selection parameters. The SCP discovers and selects the H-PCF instance based on the received parameters and forwards the request to the H-PCF.

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