**3GPP TSG-CT3 Meeting #112e C3-205037\_r3**

**E-Meeting, 04th – 13th November 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.513** | **CR** | **0193** | **rev** | **1** | **Current version:** | **16.5.0** |  |
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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:*** | Usage of PCF Group ID for PCF selection when delegated discovery is used | | | | | | | | | |
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| ***Source to WG:*** | Huawei, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_eSBA | | | | |  | ***Date:*** | | | 2020-10-?? |
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| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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:*** | | In case delegated discovery and selection is used for AMF/SMF interactions with the PCF, there is a need to clarify the usage of the PCF Group ID vs the PCF set ID and the PCF instance ID, as per S2-2008233. | | | | | | | | |
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| ***Summary of change:*** | | * Clarify the usage of the PCF group ID in the process of PCF selection, as per S2-2008233. * Additional related editorial corrections. | | | | | | | | |
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| ***Consequences if not approved:*** | | Current text is not correct and can create confusions to readers. | | | | | | | | |
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| ***Clauses affected:*** | | 8.2, 8.3 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR 23.501 CR 2483 | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR does not impact OpenAPI specification files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev 1: Improve the clarity of introduced text and correct some editorial errors. | | | | | | | | |

\* \* \* Start of changes \* \* \* \*

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], subclause 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 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).

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], subclause 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 the selected H-PCF instance Id to the V-PCF during the UE Policy association establishment procedure.

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 subclause. 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, which also includes the selected H-PCF instance Id, to the V-PCF via the SCP. The SCP discovers and selects the V-PCF instance. The V-PCF sends an UE policy association establishment request towards the HPLMN, which includes the selected H-PCF instance Id within the "3gpp-Sbi-Discovery-\*" request header as a discovery and selection parameter to the H-PCF via the SCP.

\* \* \* Next changes \* \* \* \*

8.3 PCF discovery and selection by the SMF

PCF discovery and selection functionality is implemented in the SMF and the SCP, and follows the principles described in 3GPP TS 23.501 [2], subclause 6.3.1. The SMF uses the PCF services for a PDU session. The selected PCF instance may be the same or a different one than the PCF instance used by the AMF.

When the SMF performs discovery and selection for a PDU session, the SMF may utilize the Nnrf\_NFDiscovery service of the Network Repository Function to discover the candidate PCF instance(s). In addition, PCF information may also be locally configured in the SMF. The SMF selects a PCF instance based on the available PCF instances (obtained from the NRF or locally configured in the SMF). The following factors may be considered during the PCF selection.

- Local operator policies.

- Selected Data Network Name (DNN).

- S-NSSAI of the PDU session. In the LBO roaming case, the SMF selects the PCF instance based on the S-NSSAI of the VPLMN. In the home routed roaming case, the H-SMF selects the H-PCF instance based on the S-NSSAI of the HPLMN.

- the features supported by the PCF (e.g. a PCF supporting the "ATSSS" feature is selected for an MA PDU session).

- SUPI; the SMF 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 NRF using the UE's SUPI as an input for PCF discovery.

- GPSI; the SMF 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 NRF using the UE's GPSI as an input for PCF discovery.

- PCF instance ID selected by the AMF for the UE, if available.

- The PCF Group ID provided by the AMF to the SMF, if available.

- PCF Set ID, if available.

In the case of delegated discovery and selection in SCP, the SMF shall include the above factors except the local operator policies if available in the first request, within the "3gpp-Sbi-Discovery-\*" request headers as specified in 3GPP TS 29.500 [5], subclause 6.10.3.2.

The AMF may, based on operator policies, forward the selected PCF instance ID, the PCF set ID, and if the PCF set ID is not available, the PCF Group ID (if available) to the SMF during the PDU Session Establishment procedure to enable the usage of the same PCF instance for the AMF and the SMF.

In this scenario, when the SMF performs discovery and selection, the SMF may decide based on operator policy either to use the same PCF instance or select a new PCF instance. If the same PCF instance is selected by the SMF, the PCF discovery and selection procedure described above is not performed (discovery may still be needed to obtain the address of the PCF instance).

In the case of delegated discovery and selection in the SCP, the SMF may include the received 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 headers in the request to the PCF via the SCP. The SCP may decide based on operator policy either to use the indicated PCF instance or select another PCF instance.

When the feature "SamePcf" is supported, the selected PCF instance may indicate redirection for the SM Policy Control association creation to a different PCF instance, including the redirection URI with the FQDN or IP endpoint of the target Npcf\_SMPolicyControl service in a different PCF instance. The SMF shall behave as follows:

- For direct communication scenarios, at the reception of the redirection request, the SMF shall terminate the current SM Policy Control association creation and reselect a PCF instance based on the received redirection information. The SMF shall then establish an SM Policy Control association with the reselected PCF instance.

- For indirect communication scenarios with delegated discovery and selection, the SCP, based on local policies, as specified in 3GPP TS 29.500 [5], subclause 6.10.9.1, may send the request towards the new PCF instance instead of forwarding the redirect request to the SMF. If the redirect request is received by the SMF, the SMF shall terminate the current SM Policy Control association creation and reselect a PCF instance based on the received redirection information. The SMF shall then establish an SM Policy Control association with the reselected PCF instance using the same or a different SCP and including the {apiRoot} of the received URI within the "3gpp-Sbi-Target-apiRoot" request header.

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