**3GPP TSG-WG SA2 Meeting #164S2-2408365**

**Maastricht, NL, 19th Aug – 23rd Aug, 2024 (revision of S2-240xxxx)**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.501** | **CR** | **5566** | **rev** | **-** | **Current version:** | **18.6.0** |  |
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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:*** | Correction of PCF related terminology | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI18, 5GS\_Ph1 | | | | |  | ***Date:*** | | | 2024-08-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | The terms “PCF for the PDU Session” and “PCF for the UE” are not properly used in several places and it is therefore not clear whether the specific PCF is meant or any PCF handling a UE/PDU Session. | | | | | | | | |
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| ***Summary of change:*** | | The terminology for “PCF for the PDU Session” and “PCF for the UE” is corrected in several places and thus aligned with 23.503.  The terminology for AM, SM and UE Policy Association is corrected in several places and thus aligned with 23.503.  The term PCF is added in front of “discovery and selection” in several places to make the description clearer. | | | | | | | | |
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| ***Consequences if not approved:*** | | Inconsistent usage of terminology leading to potential misunderstanding and wrong implementation | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.3.7.1, 6.3.7.3, 6.3.7.4, 6.3.11, 7.2.15 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

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

#### 6.3.7.1 PCF discovery and selection for a UE or a PDU Session

PCF discovery and selection functionality is implemented in AMF, SMF, SCP and PCF for the PDU Session and follows the principles in clause 6.3.1.

When the NF service consumer performs PCF discovery and selection for a UE, the following applies:

- The AMF may utilize the NRF to discover the candidate PCF instance(s) for a UE. In addition, PCF information may also be locally configured in the AMF. The AMF selects a PCF instance based on the available PCF instances obtained from the NRF or locally configured information in the AMF, 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 PCF for the PDU Session selects a (V-)PCF instance for UE Policy Association.

The following factors may be considered at 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 NRF using the UE's SUPI as 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, based on the results of PCF discovery procedures with NRF. The AMF provides the PCF Group ID the SUPI belongs to to other PCF NF consumers as described in TS 23.502 [3].

- DNN replacement capability of the PCF.

- Slice replacement capability of the PCF.

- PCF Selection Assistance Info and PCF ID(s) serving the established PDU Sessions/PDN Connections received from UDM. In case PCF Selection Assistance Info and PCF ID(s) are received from the UDM, the AMF selects the same PCF instance serving the combination of DNN and S-NSSAI as indicated by the PCF Selection Assistance Info, if multiple DNN, S-NSSAI combinations are provided, the AMF selects the DNN,S-NSSAI using local configuration. In case PCF ID(s) are not received, e.g. EPS interworking is not supported, the AMF selects the PCF instance by considering other above factors.

- URSP delivery in EPS capability of the PCF.

When the NF service consumer performs PCF discovery and selection for a PDU Session, the following applies:

- The SMF may utilize the NRF to discover the candidate PCF instance(s) for a PDU Session. 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 information in the SMF, depending on operator's policies.

The following factors may be considered at PCF discovery and selection for a PDU Session:

a) Local operator policies.

b) Selected Data Network Name (DNN).

c) 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.

d) 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 input for PCF discovery.

e) PCF selected by the AMF for the UE.

f) MA PDU Session capability of the PCF, for an MA PDU Session.

g) The PCF Group ID provided by the AMF to the SMF.

h) PCF Set ID.

i) Same PCF Selection Indication.

j) URSP delivery in EPS capability of the PCF.

In the case of delegated discovery and selection in SCP, the SMF includes the factors b) - h), j), if available, in the first request.

The selected PCF instance for serving the UE and the selected PCF instance for serving a PDU Session of this UE may be the same or may be different.

In the following scenarios, information about the PCF instance that has been selected (i.e. the PCF ID, PCF Set Id and, if PCF Set Id is not available, the PCF Group ID (if available)) may be forwarded to another NF. If the NF service consumer performs discovery and selection, this NF may use this PCF instance. If the NF service consumer performs delegated discovery and selection, this NF may include PCF ID, PCF Set Id and, if PCF Set Id is not available, the PCF Group ID (if available) in the request and the SCP may use this information to select the PCF instance (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):

When NF service consumer performs PCF discovery and selection, the following applies:

- During AMF relocation, the target AMF may receive a PCF ID, PCF Set Id and, if PCF Set Id is not available, the PCF Group ID (if available) from the source AMF to enable the usage of the same PCF by the target AMF, and the target AMF may decide based on operator policy either to use the same PCF or select a new PCF.

- The AMF may, based on operator policies, forward the selected PCF to SMF instance(s) during the PDU Session Establishment procedure(s) to enable the usage of the same PCF for the AMF and the SMF instance(s). The SMF may decide based on operator policy either to use the same PCF or select a new PCF. If combination of the DNN and S-NSSAI of the PDU Session matches one of the combination of the DNN and S-NSSAI included in the PCF Selection Assistance info received from UDM, the AMF shall forward Same PCF Selection Indication together with the selected PCF to SMF instance during the PDU Session Establishment procedure. In case that the Same PCF Selection Indication is received together with the PCF ID, the SMF shall select the same PCF instance for SM Policy Control.

- 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 the PCF discovery and selection as described above. The AMF sends the H-PCF ID of the selected H-PCF instance to the V-PCF during the UE Policy Association establishment procedure.

When the SMF receives a a redirection indication with PCF ID from the PCF for the PDU Session, the SMF shall terminate the current SM Policy Association and reselects a PCF based on the received PCF ID. The SMF shall then establish an SM Policy Association with the reselected PCF.

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

- The selected PCF instance may include the PCF Id, PCF Set Id and, if 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 the binding indication, including the (V-)PCF ID and possibly PCF Set ID in the response to the AMF as described in clause 6.3.1.0.

- The AMF first establishes an AM Policy Association; when forwarding the related request message the SCP discovers and selects a PCF instance. Unless binding information is provided in the response to that request the SCP adds the NF function producer ID it selected, i.e. PCF ID, into the response and the AMF uses the received PCF ID and available binding information as discovery and selection parameters for the request to establish the UE Policy Association towards the SCP. The SCP selects the (V-)PCF instance for UE Policy Association based on the received discovery and selection parameters.

- During AMF relocation, the AMF may receive a PCF ID, PCF Set Id and, if PCF Set Id is not available, the PCF Group ID (if available) from the source AMF to enable the usage of the same PCF instance by the AMF. The AMF may decide based on operator policy either to use the old PCF instance or select another PCF instance. If the AMF decides to use the old PCF, the AMF includes the PCF ID PCF Set Id, and if PCF Set Id is not available, the PCF Group ID (if available) as received from the source AMF in the AM Policy Association update request to the SCP.

- The AMF may, based on operator policies, forward the selected PCF ID, PCF Set Id and, if 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 for the AMF and the SMF. The SMF may include that information in the request in discovery and selection parameters to the SCP. The SCP may decide based on operator policy either to use the indicated PCF instance or select another PCF instance.

- 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 ID and available binding information received during the AM Policy Association procedure to send the UE Policy Association establishment request, which also includes the H-PCF ID, to the SCP. The SCP discovers and selects the V-PCF. The V-PCF sends an UE Policy Association establishment request towards the HPLMN, which includes the H-PCF ID as a discovery and selection parameter to SCP.

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

#### 6.3.7.3 Binding an AF request targeting a UE address to the relevant PCF

Binding an AF request targeting a UE address to the relevant PCF instance is described in clause 6.1.1.2 of TS 23.503 [45].

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

#### 6.3.7.4 Binding an AF request targeting a UE to the relevant PCF

Binding an AF request targeting a UE to the relevant PCF is described in clause 6.1.1.2a of TS 23.503 [45].

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

### 6.3.11 CHF discovery and selection

The CHF discovery and selection function is supported by the SMF, the AMF, the SMSF and the PCF. It is used by the SMF to select a CHF that manages the online charging or offline charging for a PDU Session of a subscriber. It is used by the AMF to select a CHF that manages the online charging or offline charging for 5G connection and mobility of a subscriber. It is used by the SMSF to select a CHF that manages the online charging or offline charging for the SMS over NAS transactions of a subscriber. It is used by the PCF to select a CHF that manages the spending limits for a subscriber and/or a PDU Session of a subscriber.

For the PCF to select the CHF, the address(es) of the CHF, including the Primary CHF address and the Secondary CHF address, may be:

- stored in the UDR as part of the PDU Session policy control subscription information as defined in clause 6.2.1.3 of TS 23.503 [45].

- stored in the UDR as part of the UE context policy control subscription information as defined in clause 6.2.1.3 of TS 23.503 [45].

- stored in the UDR as part of the Access and Mobility policy control subscription information as defined in clause 6.2.1.3 of TS 23.503 [45].

- locally configured in the PCF based on operator policies.

- discovered using NRF as described in in clause 6.1 of TS 32.290 [67].

NOTE 1: The operator can perform the above UDR provisioning or local configuration in a consistent manner such that the same CHF address is used for SM policy, AM policy and UE policy. If NRF discovery is used, it is up to the PCF logic (or SCP logic when working in Delegated Discovery mode) and operator configuration to guarantee the CHF address consistency.

The address(es) of the CHF shall be applicable for all services provided by the CHF.

The CHF address(es) that a stored in the UDR or configured in the PCF may be complemented by the associated CHF instance ID(s) and CHF set ID(s) (see clause 6.3.1.0) stored or configured in the same location.

The CHF address(es) retrieved from the UDR and possible associated CHF instance ID(s) and CHF set ID(s) take precendence over the locally configured CHF address(es) and possible associated CHF instance ID(s) and CHF set ID(s), and over the CHF address(es) discoverred by the NRF. If no CHF address(es) is received from the UDR, the PCF selects, based on operator policies, either the CHF addresse(es) provided by NRF, or the locally configured CHF address(es) and possible associated CHF instance ID(s) and CHF set ID(s).

If the PCF has a CHF set ID but no CHF instance ID associated to the CHF address(es) in the same location, the CHF instance within the CHF set may change. If the PCF is not able to reach the CHF address(es), it should query the NRF for other CHF instances within the CHF set.

If the PCF received a CHF set ID and a CHF instance ID associated to the CHF address(es) in the same location, the CHF service instance within the CHF may change. If an PCF is not able to reach the CHF address(es), it should query the NRF for other CHF service instances within the CHF.

In the non-roaming case it is possible to either:

a) Have the SMF select the same CHF that is selected by the PCF for the PDU Session. In this case, operator policies in the PCF indicate it to provide the selected CHF address(es) and, if available, the associated CHF instance ID(s) and/or CHF set ID(s) in the PDU Session related policy information to the SMF as described in Table 6.4-1 of TS 23.503 [45] and the SMF applies the CHF address and if available, the associated CHF instance ID(s) and/or CHF set ID(s) passed from the PCF as defined in clause 5.1.8 of TS 32.255 [68] or

b) Have the SMF select a CHF based on other criteria as defined in clause 5.1.8 of TS 32.255 [68].

In the Home Routed roaming case, the above text shall apply with the change that SMF is replaced by H-SMF, PCF is replaced by H-PCF, CHF is replaced by H-CHF and for b) the other criteria is defined in clause 5.1.9.2 of TS 32.255 [68].

In the non-roaming case, it is possible to either:

a) Have the AMF select the same CHF that is selected by the PCF for the UE. In this case operator policies in the PCF indicate it to provide the selected CHF address(es) and, if available, the associated CHF instance ID(s) and/or CHF set ID(s) in the Access and mobility related policy information and/or in the UE Policy Association supplementary information to the AMF as described in Table 6.5-1 and Table 6.6.7-1 of TS 23.503 [45] respectively, and the AMF applies the CHF address and if available, the associated CHF instance ID(s) and/or CHF set ID(s) passed from the PCF as defined in clause 5.1.3 of TS 32.256 [114] or

b) Have the AMF select a CHF based on other criteria as defined in clause 5.1.3 of TS 32.256 [114].

In the roaming case, the above text shall apply with the change that PCF is replaced by H-PCF, CHF is replaced by H-CHF, Access and mobility related policy information is not relevant, UE Policy Association supplementary information is between the AMF and the V-PCF and between the V-PCF and the H-PCF and for b) the other criteria is defined in clause 5.1.5.2 of TS 32.256 [114].

NOTE 2: Clause 5.1.2 of TS 32.256 [114] describes the charging reporting requirements on the AMF in the roaming scenario.

How the CHF is selected by the SMSF is defined in clause 5.4 of TS 32.274 [118].

If the NF consumer performs discovery and selection via NRF, the CHF selection function in NF consumers selects a CHF instance based on the available CHF instances obtained from the NRF.

The CHF selection functionality in NF consumer or in SCP should consider one of the following factors:

1. CHF Group ID of the UE's SUPI.

NOTE 3: The NF Consumer can infer the CHF Group ID the UE's SUPI belongs to, based on the results of CHF discovery procedures with NRF.

2. SUPI; the NF consumer selects a CHF 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 input for CHF discovery.

In the case of delegated discovery and selection in SCP, the NF consumer shall include all available factors in the request towards SCP.

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

### 7.2.15 BSF Services

The following NF services are specified for BSF as described in TS 23.503 [45]:

Table 7.2.15-1: NF Services provided by BSF

| Service Name | Description | Reference in TS 23.502 [3] |
| --- | --- | --- |
| Nbsf\_Management | Allows a PCF to register/deregister itself and to be discoverable by NF service consumers (NOTE 1). | 5.2.13.2 |
| NOTE 1: There may be both, a PCF for the PDU Session and a PCF for the UE. Each of them may separately and independently register itself at the BSF. Each of them may separately and independently be discovered by a consumer of the BSF. | | |

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