**3GPP TSG-CT WG3 Meeting #130 *C3-234292***

**Xiamen, China 9th– 13th October, 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.525** | **CR** | **0289** | **rev** | **-** | **Current version:** | **18.3.0** |  |
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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 in error handling in roaming scenarios |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | UEP18 |  | ***Date:*** | 2023-09-20 |
|  |  |  |  |  |
| ***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 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | As defined in 3GPP TS 23.503, clause 6.1.3.18, “the AF requests the (H-)PCF, via V-PCF when roaming, to report on the outcome of the UE Policies delivery due to service specific parameter provisioning procedure, the (H-)PCF reports the outcome of the related UE Policies provisioning procedure for the related traffic descriptor for the UE to the AF, via V-PCF when roaming. The outcome of the UE Policies provisioning procedure includes the success, the failure with an appropriate cause or the interim status report such as the UE is temporarily unreachable or that URSP Rules have not yet been delivered by the H-PCF (see clauses 4.15.6.7 and 5.2.5.7 of TS 23.502 [3])”. This requirement is implemented in TS 29.525. 4.2.2.2.1.0. However, the TS is specifying that the V-PCF is responsible for the reattempt for UE policies provided by the H-PLMN. The UE policies reported to the HPLMN should be reattempted by the HPLMN only. |
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| ***Summary of change:*** | Clauses 4.2.2.2.1.0 and 4.2.4.7 are being updated to distinguish roaming from non roaming cases and in the former case, specify that it is the H-PCF the responsible of reattempting the UE policies that it previously provided. |
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| ***Consequences if not approved:*** | Incorrect specification. Wrong responsibility to the local network for the control of re-attempts.  |
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| ***Clauses affected:*** | 4.2.2.2.10; 4.2.4.7. |
|  |  |
|  | **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 does not impact the OpenAPI file. |
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| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* First Change \*\*\*

###### 4.2.2.2.1.0 General

The UE policy consists of

- UE Access Network discovery and selection policies (ANDSP). It is used by the UE for selecting non-3GPP accesses networks. The encoding of ANDSP is defined in 3GPP TS 24.526 [16];

- UE Route Selection Policy (URSP). This UE policy is used by the UE to determine how to route outgoing traffic. Traffic can be routed to an established PDU Session, offloaded to non-3GPP access outside a PDU Session, can be routed via a ProSe Layer-3 UE-to-Network Relay outside a PDU session or trigger the establishment of a new PDU Session. The encoding of URSP is defined in 3GPP TS 24.526 [16];

- UE Vehicle-to-Everything Policy (V2XP). This UE policy provides configuration information to the UE for V2X communications over PC5 reference point or over Uu reference point or both. The encoding of V2XP is defined in 3GPP TS 24.588 [25];

- UE 5G Proximity based Services Policy (ProSeP). This UE policy provides configuration information to the UE for 5G ProSe direct discovery, 5G ProSe direct communications, 5G ProSe UE-to-network relay, 5G ProSe usage reporting configuration and rules and/or 5G ProSe UE-to-UE relay; and

- UE Aircraft-to-Everything Policy (A2XP). This UE policy provides configuration information to the UE for A2X communications over PC5 reference point or A2X communications over Uu reference point or both. The encoding of A2XP is defined in 3GPP TS 24.578 [33];

The UE Policy is transferred to the UE using the UE policy delivery protocol defined in Annex D of 3GPP TS 24.501 [15]. The (V-)(H-)PCF shall send UE policy using the "MANAGE UE POLICY COMMAND" message and will receive the "MANAGE UE POLICY COMPLETE"or the "MANAGE UE POLICY COMMAND REJECT" messages in the response. Those messages are transparently forwarded by the AMF.

The (V-)PCF shall use the Namf\_Communication\_N1N2MessageTransfer service operation defined in clause 5.2.2.3.1 of 3GPP TS 29.518 [14] to send "MANAGE UE POLICY COMMAND" messages to the UE and use the Namf\_Communication\_N1MessageNotify service operation defined in clause 5.2.2.3.5 of 3GPP TS 29.518 [14] to receive "MANAGE UE POLICY COMPLETE" and "MANAGE UE POLICY COMMAND REJECT" messages from the UE. The (V-)PCF shall only send "MANAGE UE POLICY COMMAND" messages below a predefined size limit.

The H-PCF shall use service operations as defined in the present specification to receive "MANAGE UE POLICY COMPLETE" and "MANAGE UE POLICY COMMAND REJECT" messages from the V-PCF and to send MANAGE UE POLICY COMMAND" messages to the V-PCF. The H-PCF shall encode the "MANAGE UE POLICY COMMAND" message in a "uePolicy" attribute. The H-PCF shall only send "MANAGE UE POLICY COMMAND" messages below a predefined size limit.

The (V-)(H-)PCF may deliver the UE policy to the UE in several "MANAGE UE POLICY COMMAND" messages.

For the purpose of such fragmented delivery and subsequent partial updates of UE policies, the UE policy is divided into policy sections. Such policy sections may be predefined in the (V-)(H-)PCF, may be retrieved by the (V-)(H-)PCF from the UDR as specified in 3GPP TS 29.519 [17], or may be dynamically generated by the (V-)(H-)PCF, but shall comply to the rules detailed below. The (V-)(H-)PCF may combine several policy sections into one "MANAGE UE POLICY COMMAND" message, if the predefined size limit is observed.

The following rules apply to policy sections:

- The size shall be below the predefined size limit.

- The policy section shall only contain complete URSP rule(s), WLANSP rule(s), N3AN node configuration information, V2XP, A2XP and/or ProSeP info content, but no fractions of such rules, configuration information, or info contents.

- To ease a subsequent partial update of UE policies, policy sections should only contain a small number of policies, e.g. URSP rule(s), and/or WLANSP rule(s).

- The entire content of a policy section shall be provided by a single PLMN.

A PCF shall only determine policy sections of its own PLMN. However, a V-PCF may forward UE policy sections received from the H-PCF to the UE.

Each UE policy section is identified by a UE policy section identifier (UPSI). The UPSI is composed of two parts:

a) a PLMN ID part containing the PLMN ID of the PLMN or SNPN of the PCF which provides the UE policies; and

b) a UE policy section code (UPSC) containing a unique value within the PLMN or SNPN selected by the PCF.

NOTE 1: When the UE is operating in SNPN access operation mode, the UE associates the PLMN ID with the NID of the SNPN to differentiate between PLMN UPSI(s) and SNPN UPSI(s).

The (V-)(H-)PCF provides an UPSI when providing a new UE policy section and may then identify that policy section using that UPSI when requesting that that UE policy section is modified or deleted, as specified in Annex D of 3GPP TS 24.501 [15].

If the (V-)(H-)PCF determines that changes are required and/or the V-PCF receives possible new or modified policy sections determined by the H-PCF in the roaming case, it shall send the determined new, updated or deleted policy sections using one or several "MANAGE UE POLICY COMMAND" messages towards the NF service consumer. In the roaming case, the V-PCF may either combine policy sections received from the H-PCF and policy sections the V-PCF selected in the same "MANAGE UE POLICY COMMAND" (as long as the predefined size limit is observed), or use separate "MANAGE UE POLICY COMMAND" messages; however, the V-PCF shall not distribute the policy sections received in one "MANAGE UE POLICY COMMAND" from the H-PCF into several "MANAGE UE POLICY COMMAND" messages as long as the predefined size limit is observed for the policy sections received from the H-PCF. The V-PCF shall allocate a new PTI for the "MANAGE UE POLICY COMMAND" sent by the V-PCF and store the mapping between the new PTI and the PTI within the "MANAGE UE POLICY COMMAND" received from the H-PCF.

After sending a "MANAGE UE POLICY COMMAND" messages, the (V-)(H-)PCF shall wait for a related confirmation in a "MANAGE UE POLICY COMPLETE" messages or failure indication in a "MANAGE UE POLICY COMMAND REJECT" message. When receiving no such message until the expiry of a supervision timer specified in Annex D of 3GPP TS 24.501 [15], or when receiving a failure indication, the PCF should re-send related instructions for the policy sections. In the roaming case, the H-PCF and the V-PCF shall each be responsible for resending those policy sections that it originally supplied. In the case that the V-PCF combined policy sections received from the H-PCF and policy sections the V-PCF selected in the same "MANAGE UE POLICY COMMAND" described below, the V-PCF shall wait for the H-PCF to resend the policy sections of HPLMN, and then resend the combined policy sections. The (V-)(H-)PCF shall always include the initially supplied policy sections when resending the UE policy.

The (V-)(H-)PCF shall determine that a received "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message is related to the result of a "MANAGE UE POLICY COMMAND" based on the PTI within that message. In the roaming case, the V-PCF shall determine that the received message is related to the result of the UE policy provided by the H-PCF if the PTI within the message belongs to one of the stored PTI mapping(s).

If the V-PCF combined policy sections received from the H-PCF and policy sections the V-PCF selected in the same "MANAGE UE POLICY COMMAND", upon reception of a "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message the V-PCF shall:

- forward the corresponding "MANAGE UE POLICY COMPLETE" message to the H-PCF;

- if a "MANAGE UE POLICY COMMAND REJECT" message with UPSI(s) of the HPLMN is received, forward the parts of the "MANAGE UE POLICY COMMAND REJECT" message that relate to the UPSI(s) of the HPLMN to the H-PCF;

- if a "MANAGE UE POLICY COMMAND REJECT" message without UPSI(s) of the HPLMN is received, send a "MANAGE UE POLICY COMPLETE" message to the H-PCF; and

- provide the stored PTI received from the HPLMN in the corresponding "MANAGE UE POLICY COMMAND" within the "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message towards the H-PCF.

If the V-PCF sent a separate "MANAGE UE POLICY COMMAND" containing only the policy sections received from the H-PCF, the V-PCF shall forward the corresponding "MANAGE UE POLICY COMPLETE" or "MANAGE UE POLICY COMMAND REJECT" message to the H-PCF and provide the stored PTI received from the HPLMN in the corresponding "MANAGE UE POLICY COMMAND" within the "MANAGE UE POLICY COMPLETE" message or "MANAGE UE POLICY COMMAND REJECT" message towards the H-PCF.If the V-PCF distributed the policy sections received in one "MANAGE UE POLICY COMMAND" from the H-PCF into several "MANAGE UE POLICY COMMAND" messages to the UE (because the predefined size limit of the VPLMN was exceeded), the V-PCF shall aggregate all corresponding "MANAGE UE POLICY COMPLETE" or "MANAGE UE POLICY COMMAND REJECT" messages received from the UE into one "MANAGE UE POLICY COMPLETE" or "MANAGE UE POLICY COMMAND REJECT" message towards the H-PCF.

When the (V-)PCF receives an Namf\_Communication\_N1N2MessageTransfer failure response as defined in clause 5.2.2.3.1.2 of 3GPP TS 29.518 [14], or an N1N2 Transfer Failure Notification as defined in clause 5.2.2.3.2 of 3GPP TS 29.518 [14], the (V-)PCF shall stop the supervision timer specified in Annex D of 3GPP TS 24.501 [15] corresponding to the affected PTIs. For the N1N2 Transfer Failure Notification case, the (V-)PCF determines the affected PTIs allocated by the V-PCF based on the resource URI within the "n1n2MsgDataUri" attribute of the N1N2MsgTxfrFailureNotification data structure as defined in clause 6.1.6.2.30 of 3GPP TS 29.518 [14].

NOTE 2: The (V-)PCF correlates the Namf\_Communication\_N1N2MessageTransfer request and the corresponding N1N2 Transfer Failure Notification based on the resource URI within the "Location" header included in the response HTTP status code "202 Accepted" of the Namf\_Communication\_N1N2MessageTransfer response and the resource URI within the "n1n2MsgDataUri" attribute of and N1N2 Transfer Failure Notification. And then the V-PCF determines the affected PTIs related with the resource URI.

For the non-roaming case or the roaming case when the V-PCF determines that the affected UE Policy is related to the V-PLMN, the (V-)PCF may provision the policy control request trigger "CON\_STATE\_CH" if not provisioned yet. Upon receiving the notification of UE connectivity state change indicating that the UE enters the CM-Connected state, the (V-)PCF may retry to deliver the UE Policy.

For the roaming case and if the V-PCF determines that the affected UE policy is related with the UE policy delivered by the H-PCF, the V-PCF shall send a POST message as defined in clause 4.2.3.1 to notify the H-PCF of the failure of UE policy transfer by including the "uePolTransFailNotif" attribute within the PolicyAssociationUpdateRequest data structure. Within the UePolicyTransferFailureNotification data structure, the V-PCF shall include the cause of the UE Policy Transfer Failure within the "cause" attribute and the PTI(s) allocated by the H-PCF corresponding to the PTI(s) allocated by the V-PCF within the "ptis" attribute. The H-PCF shall stop the supervision timer corresponding to the affected PTIs. In this case, the H-PCF may provision the policy control request trigger "CON\_STATE\_CH" if not provisioned yet. Upon receiving the notification of UE connectivity state change indicating that the UE enters the CM-Connected state, the H-PCF may retry to deliver the UE Policy.

When the (H-)PCF receives the "MANAGE UE POLICY COMPLETE" or the "MANAGE UE POLICY COMMAND REJECT" message and determines that this message indicates a UE Policy Delivery outcome to which an NF service consumer has subscribed via a request for service specific parameters, the (H-)PCF shall invoke the Npcf\_EventExposure\_Notify service operation as defined in clause 4.2.4.2 of 3GPP TS 29.523 [30].

\*\*\* Second Change \*\*\*

#### 4.2.4.7 UE policy provisioning for AF-influenced URSP

If the "AfGuideURSP" feature is supported by the Nudr\_DataRepository service, after the UE policy association establishment, the (H-)PCF may be informed that service specific parameter information that contains data for AF guidance on the URSP determination has been created, modified or removed via a notification by the UDR for the change or removal of UE's Application Data as defined in clause 6.3.4 of 3GPP TS 29.519 [17]. In this case, the H-PCF may derive new URSP(s), modify existing URSP(s) or remove existing URSP(s) by using the information received from the UDR (see clause 4.2.2.2.1.1 and 4.2.2.2.3 for the description of how the (H-)PCF may use this information, stored UPSC(s), policy subscription information, analytics information received from NWDAF and local operator policy to determine the URSP that will be provisioned to the UE), and it shall:

- for the roaming case, provision the derived new UE Policy Sections, and/or update and/or remove existing UE Policy Sections to the V-PCF as defined in clause 4.2.4.2 and then the V-PCF shall invoke the Namf\_Communication\_N1N2MessageTransfer service operation to provision the received UE Policy Sections to the UE; or

- for the non-roaming case, use the Namf\_Communication Service defined in 3GPP TS 29.518 [14] to convey the derived new UE Policy Sections and/or to update and/or remove existing UE Policy Sections to the UE via the AMF within "MANAGE UE POLICY COMMAND" message(s).

In the roaming case, when the AMF informs the V-PCF that the UE is temporarily unreachable (see 3GPP TS 29.518 [18]), the V-PCF notifies the H-PCF accordingly (including the "uePolTransFailNotif" attribute within the PolicyAssociationUpdateRequest data structure, as described in clause 4.2.2.2.1.0).

When the (H-)PCF receives the "MANAGE UE POLICY COMPLETE" or the "MANAGE UE POLICY COMMAND REJECT" message or deducts that the UE is temporarily unreachable and determines that this message or the internal deduction indicates a UE Policy Delivery outcome to which an NF service consumer has subscribed via a request for service specific parameters, the (H-)PCF shall invoke the Npcf\_EventExposure\_Notify service operation as defined in clause 4.2.4.2 of 3GPP TS 29.523 [30].

When the AMF (non roaming case) or the V-PCF (roaming case) informs the (H-)PCF that the UE is temporarily unreachable (see 3GPP TS 29.518 [18]), the (H-) PCF may subscribe to "CON\_STATE\_CH" trigger if not done before and reattempt the provisioning of URSP(s) when the UE becomes reachable.

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