**3GPP TSG-CT WG3 Meeting #137 *C3-245132***

**Hefei, CN, 14 – 18 October, 2024**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.513** | **CR** | **0570** | **rev** | **2** | **Current version:** | **19.0.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| M | | | | | | | | | | |
| ***Title:*** | Correction on policy decisions based on PDU session traffic | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Nokia | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SBIProtoc19 | | | | |  | ***Date:*** | | | 2024-10-17 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | TS 29.520 specifies PDU Session Traffic analytics when “PduSesTraffic” feature is supported. There is no “UrspEnforcement” feature supported in Nnwdaf APIs.  Clause 5.8.1 is only applicable when there is UE assistance. It is still possible that the PCF gets the information from the NWDAF. The flows described in the sub-clauses only apply when the UE is in 5GC.  Clauses 5.8.2 and 5.8.3 incorrectly refer to AM Policy Association establishment procedure instead of UE Policy Association procedure. The figures in both clauses do now show the interaction towards the UE for the provisioning of URSP rules. Figure 5.8.3-2 wrongly enumerates the last step. The arrows for 14-15 are not going to any NF. | | | | | | | | |
| ***d*** | |  | | | | | | | | |
| ***Summary of change:*** | | Clause 5.4.3 is updated to correct the name of the feature.  Clause 5.8 is updated to indicate that it only applies for the cases with UE assistance and within 5GC.  Clauses 5.8.1 and 5.8.2 correct the figures and refer to the proper clauses. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Incorrect specification brings misoperation issues. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.4.3; 5.8.1; 5.8.2; 5.8.3. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 has no impact on OpenAPI description. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

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

### 5.4.3 Policy decisions based on Network Analytics

The following Analytics IDs (observed events as described in 3GPP TS 29.520 [11]) are relevant for Policy decisions: "Slice Load level information", "Service Experience", "Network Performance", "Abnormal behaviour", "UE Mobility", "UE Communication", "User Data Congestion", "Data Dispersion", "Session Management Congestion Control Experience", "DN Performance", "WLAN performance", "Redundant Transmission Experience" and "PDU Session traffic".

The PCF may subscribe to these events and/or may retrieve the observed events when the information is needed.

In order for the PCF to subscribe to these events, the PCF shall act as NF Service Consumer of the NWDAF as specified in 3GPP TS 29.520 [11] behaving as follows:

- The PCF may subscribe to notifications of network analytics related to "Slice Load Level Information" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "SLICE\_LOAD\_LEVEL", the "snssais" attribute including the network slice and the "notificationMethod" attribute in "eventSubscriptions" attribute set to "THRESHOLD".

NOTE 1: PCF does not subscribe to event "NSI\_LOAD\_LEVEL" since the network slice instance of a PDU session is not available in the PCF

- If the feature "ServiceExperience" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "Service Experience" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "SERVICE\_EXPERIENCE", the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute, the "appIds" attribute with the identification of application(s) to which the subscription applies, the "ratFreqs" attribute if the feature "ServiceExperienceExt" is also supported including all the RAT types and/or all the frequencies that the NWDAF received for the application or specific RAT type(s) and/or frequencies where the UE camps and the service experience threshold value(s) for the RAT Type(s) and/or Frequency value(s).

- If the feature "NetworkPerformance" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "Network Performance" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "NETWORK\_PERFORMANCE", the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies within the "intGroupIds" attribute and the "networkArea" attribute with the identification network area to which the subscription applies.

- If the feature "AbnormalBehaviour" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "Abnormal Behavior" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "ABNORMAL\_BEHAVIOUR", the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute and either the "exptAnaType" attribute with the expected analytics or the"excepRequs" attribute with a list of exception Ids with the associated thresholds. Per each Exception Id, it is possible to provide additional information as described in TS 29.520 [11]. Upon receiving Abnormal Behaviour events for the target UE(s) from the NWDAF, the PCF, based on operator policies, may store a Restricted Status for the UE(s) in the UE/AM/SM policy data of the UDR by invoking the Nudr\_DataRepository\_Update service operation as specified in TS 29.519 [12] (see "restriStatus" attribute). Based on the operator policies, network conditions, and additional reports from the NWDAF, the PCF may remove the Restricted Status for the UE(s) by invoking the Nudr\_DataRepository\_Update service operation as specified in TS 29.519 [12]. The PCF may subscribe to changes of Policy Data by invoking Nudr\_DataRepository\_Subscribe service operation as specified in TS 29.519 [12], and determine policies based on the information related to the Restricted Status that it receives from the UDR.

- If the feature "UeMobility" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "UE Mobility" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "UE\_MOBILITY", the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies within the "supis" or "intGroupIds" attribute and the "networkArea" attribute with the identification network area to which the subscription applies.

- If the feature "UeCommunication" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "UE communication" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "UE\_COMMUNICATION", the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis"or "intGroupIds" attribute and optionally the "appIds" attribute with the identification of application(s) to which the subscription applies.

- If the feature "UserDataCongestion" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "User Data Congestion" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "USER\_DATA\_CONGESTION" and the "tgtUe" attribute with the identification of the target UE to which the subscription applies included in the "supis" attribute and optionally the "networkArea", "congThresholds" attributes with the area of interests and the reporting threshold respectively. If the feature "UserDataCongestionExt" is supported, the PCF may also provide the "maxTopAppUlNbr" and/or "maxTopAppDlNbr" attributes with the requested maximum number of top applications that contribute the most to the traffic.

- If the feature "Dispersion" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "Dispersion" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "DISPERSION", the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute and the "disperType" attribute within the "disperReqs" attribute set to the applicable dispersion analytic type. Optionally, the PCF may include the "networkArea" attribute with the identification network area to which the subscription applies, the identification of the network slice(s) by "snssais" attribute and/or the dispersion analytics requirements in "disperReqs" attribute, which for the requested dispersion type may include dispersion class within "disperClass" set to "TOP\_HEAVY". If the PCF is interested in the average data rate in the network slice, the PCF may set the "disperType" attribute within the "disperReqs" attribute set to "DVDA" and it shall provide the network slice within the "snssais" attribute and the "tgtUe" attribute set to "anyUe".

- If the feature "DnPerformance" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "DN Performance" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "DN\_PERFORMANCE" and the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute and optionally the "appIds" attribute with the identification of application(s) to which the subscription applies.

- If the feature "SMCCE" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "Session Management Congestion Control Experience" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "SM\_CONGESTION" and the "tgtUe" attribute with the identification of target UE to which the subscription applies included in the "supis" attribute and the "dnns" attribute with the identification of the DNN and/or the "snssais" attribute with the identification of the network slice.

- If the feature "WlanPerformance" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "WLAN Performance" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "WLAN\_PERFORMANCE" and the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute. The PCF may provide any of "networkArea", "ssIds" or "bssIds" attributes to which the subscription applies within "wlanReqs" attribute.

- If the feature "RedundantTransmissionExp" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "Redundant Transmission Experience" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "RED\_TRANS\_EXP" and the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute. The PCF may provide the identification of network area within "networkArea" attribute, DNNs within "dnns" attribute and other requirements within "redTransReqs" attribute.

- If the feature "PduSesTraffic" is supported as defined in TS 29.520 [11], the PCF may subscribe to notifications of network analytics related to "PDU Session traffic" using the Nnwdaf\_EventsSubscription\_Subscribe service operation including the "event" attribute set to "PDU\_SESSION\_TRAFFIC" and the "tgtUe" attribute with the identification of target UE(s) to which the subscription applies included in the "supis", "intGroupIds" or "anyUe" attribute, the PDU Session traffic analytics requirements in "pduSesTrafReqs" attribute, which includes the known Application Identifier, IP Descriptions or Domain Descriptors and the "dnns" attribute with the identification of the DNN and/or the "snssais" attribute with the identification of the network slice. The PCF may include the "networkArea" attribute with the identification network area, to which the subscription applies, and/or an optional list of analytics subsets by "listOfAnaSubsets" attribute with value(s) only applicable to "PDU\_SESSION\_TRAFFIC" event, if the "EneNA" feature is supported.

When the PCF requires the events related to any of these analytics Ids immediately, it shall initiate an Nnwdaf\_AnalyticsInfo\_Request service operation towards the NWDAF. In this case, the same level of information as for the subscription to events shall be provided as query parameters in the request, that is, the required event, filter and requirement information shall be provided in the "event-id", "event-filter" and "ana-req" URI query parameters.

Upon reception of any of the events as described above either in a subscription or retrieval request, the NWDAF shall behave as described in TS 29.520 [11].

The subscribing and/or retrieving of analytics information by the PCF from the NWDAF may be triggered by:

- Requests from AF/NEF;

- AM Policy association establishment or modification request from the AMF;

- UE Policy association establishment or modification request from the AMF;

- SM Policy association establishment or modification request from the SMF;

- Notifications received from UDR or CHF on UE subscription change;

- Analytics information received.

NOTE 2: Examples of operator policies where network analytics information from NWDAF is required as inputs for policy decisions are described in clause 6.1.1.3 of 3GPP TS 23.503[4].

NOTE 3: Care needs to be taken with regards to signalling and processing load caused when requesting analytics targeting "Any UE". A PCF preferably limits the analytics requests to a smaller UE set to reduce the load.

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

### 5.8.1 General

Clause 5.8 specifies the detailed call flows for awareness of URSP rule enforcement with UE assistance over the Npcf service-based interfaces and their relationship with the flow level signalling in the 5G system.

NOTE 1: In the Home Routed roaming case, the H-PCF for a UE interacts with the PCF for a PDU session in the HPLMN.

NOTE 2: In the LBO roaming roaming case, the V-PCF for a UE interacts with the PCF for a PDU session in the VPLMN.

NOTE 3: Awareness of URSP rule enforcement is also possible without UE assistance, based on network analytics as described in clause 6.1.1.5.3 of 3GPP TS 23.503[4].

NOTE 4: URSP Rule enforcement report is not supported in EPS.

\*\*\* Third Change \*\*\*

### 5.8.2 Forwarding of URSP Rule Enforcement Information (non-roaming and Home Routed roaming)



Figure 5.8.2-1: Forwarding of URSP Rule Enforcement Information (non-roaming and Home Routed roaming)

This procedure concerns both non-roaming and Home Routed roaming scenarios. In the Home Routed roaming case, the H-PCF for the UE interacts with the PCF for a PDU session in the HPLMN.

1. An UE Policy Association is established as described in clause 5.6.1.

2. If the UE indicated the support of URSP rule enforcement, the (H-)PCF for the UE may indicate in one or more URSP rule(s) sent to the UE to send reporting of URSP rule enforcement as described in clause 4.2.2.2.3.1 of 3GPP TS 29.525 [31]. For the PDU sessions related to the URSP rule(s) whose enforcement has been requested, the (H-)PCF for the UE triggers the discovery of the PCF(s) for the PDU session as described in step 4.

3. The (H-)SMF establishes a SM Policy Association as described in clause 5.2.1. If the "URSPEnforcement" feature is supported, the (H-)SMF may include the URSP rule enforcement information provided by the UE and additional PDU session information as specified in clause 4.2.2.2 of 3GPP TS 29.512 [9]. The PCF for the PDU session, in the response, may subscribe with the (H-)SMF to the report of URSP rule enforcement by providing the Policy Control Request Trigger "UE reporting of URSP rule enforcement information" as specified in clause 5.6.3.6 of 3GPP TS 29.512 [9].

4. The (H-)PCF for the UE discovers the PCF(s) for a PDU Session that handle(s) the respective UE traffic as described in clause 8.4a.

5-6. When the (H-)PCF for the UE receives the notification about a PDU session that may be handling the traffic of a URSP rule, if the "URSPEnforcement" feature is supported, the (H-)PCF for the UE subscribes to the PCF for the PDU Session for notifications about UE reporting of URSP rule enforcement information using the Npcf\_PolicyAuthorization\_Subscribe service operation as described in 3GPP TS 29.514 [10] clause 4.2.6.9.

7-8. If not already provisioned, the PCF for a PDU session provisions the Policy Control Request Trigger to request the (H-)SMF to detect "UE reporting of URSP rule enforcement information" as defined in clause 4.2.6.4 of 3GPP TS 29.512 [9].

If the PCF for the PDU session contains URSP rule enforcement information (e.g., it was received during SM Policy Association establishment), the PCF for the PDU session notifies the (H-)PCF for the UE as described in steps 12-13.

9. When the (H-)SMF receives a UE report of URSP rule enforcement via PDU session modification, the Policy Control Request Trigger "UE reporting of URSP rule enforcement information" is met.

10-11. The (H-)SMF notifies the PCF for a PDU session using the Npcf\_SMPolicyControl\_Update service operation as described in clause 4.2.4.2 of 3GPP TS 29.512 [9].

12-13. The PCF for the PDU Session notifies the (H-)PCF for the UE about the detected URSP rule enforcement event using the Npcf\_PolicyAuthorization\_Notify service operation by sending an HTTP POST request to the notification URI received in the subscription in step 5, and the (H-)PCF for the UE responds with "204 No Content", as described in 3GPP TS 29.514 [10] clause 4.2.5.25.

14. The (H-)PCF for the UE checks operator policies and then may make policy control decisions, e.g. may adjust the URSP rules when needed, based on the notified URSP rule enforcement information.

\*\*\* Fourth Change \*\*\*

### 5.8.3 Forwarding of URSP Rule Enforcement Information (LBO roaming)



Figure 5.8.3-1: Forwarding of URSP Rule Enforcement Information (LBO roaming)

This procedure concerns LBO roaming scenarios.

1. An UE Policy Association is established as described in clause 5.6.1. The H-PCF for the UE may send the "URSP\_ENF\_INFO" Policy Control Request Trigger to the V-PCF for the UE to request the forwarding of URSP rule enforcement information as specified in clause 4.2.2.2.3 of 3GPP TS 29.525 [31].

2. If the UE indicated the support of URSP rule enforcement, the H-PCF for the UE may indicate in one or more URSP rule(s) sent to the UE to send reporting of URSP rule enforcement as described in clause 4.2.2.2.3.1 of 3GPP TS 29.525 [31]. For the PDU sessions related to the URSP rule(s) whose enforcement has been requested, the V-PCF for the UE triggers the discovery of the PCF(s) for the PDU session as described in step 4.

3. The V-SMF establishes a SM Policy Association as described in clause 5.2.1. If the "URSPEnforcement" feature is supported, the V-SMF may include the URSP rule enforcement information provided by the UE and additional PDU session information as specified in clause 4.2.2.2 of 3GPP TS 29.512 [9]. The PCF for the PDU session, in the response, may subscribe with the V-SMF to the report of URSP rule enforcement by providing the Policy Control Request Trigger "UE reporting of URSP rule enforcement information" as specified in clause 5.6.3.6 of 3GPP TS 29.512 [9].

4. The V-PCF for the UE discovers the PCF(s) for a PDU Session that handle(s) the respective UE traffic as described in clause 8.4a.

5-6. When the V-PCF for the UE receives the notification about a PDU session in LBO mode that may be handling the traffic of a URSP rule, if the "URSPEnforcement" feature is supported, the V-PCF for the UE subscribes to the PCF for the PDU Session for notifications about UE reporting of URSP rule enforcement information using the Npcf\_PolicyAuthorization\_Subscribe service operation as described in 3GPP TS 29.514 [10] clause 4.2.6.9.

7-8. If not already provisioned, the PCF for a PDU session provisions the Policy Control Request Trigger to request the V-SMF to detect "UE reporting of URSP rule enforcement information" as defined in clause 4.2.6.4 of 3GPP TS 29.512 [9].

If the PCF for the PDU session contains URSP rule enforcement information (e.g., it was received during SM Policy Association establishment), the PCF for the PDU session notifies the V-PCF for the UE as described in steps 12-13.

9. When the V-SMF receives a UE report of URSP rule enforcement via PDU session modification, the Policy Control Request Trigger "UE reporting of URSP rule enforcement information" is met.

10-11. The V-SMF notifies the PCF for a PDU session using the Npcf\_SMPolicyControl\_Update service operation as described in clause 4.2.4.2 of 3GPP TS 29.512 [9].

12-13. The PCF for the PDU Session notifies the V-PCF for the UE about the detected URSP rule enforcement event using the Npcf\_PolicyAuthorization\_Notify service operation by sending an HTTP POST request to the notification URI received in the subscription in step 5, and the V-PCF for the UE responds with "204 No Content", as described in 3GPP TS 29.514 [10] clause 4.2.5.25.

14-15. If the V-PCF for the UE has received the request to forward URSP rule enforcement information from the H-PCF in step 1 and the V-PCF for the UE is notified about the detected URSP rule enforcement event in step 12-13, then the V-PCF reports the received information from the PCF for the PDU Session to the H-PCF using the Npcf\_UEPolicyControl\_Update service operation as specified in clause 4.2.3 of 3GPP TS 29.525 [31].

16. The H-PCF for the UE checks operator policies and then may make policy control decisions, e.g. may adjust the URSP rules when needed, based on the notified URSP rule enforcement information.

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