**TSG-CT WG3 Meeting #117-e *C3-214079***

**E-Meeting, 18th – 27th August 2021 (Revision of C3-214xyz)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.512** | **CR** | 0806 | **rev** | **-** | **Current version:** | **17.3.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Duplicated notification | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eEDGE\_5GC | | | | |  | ***Date:*** | | | 2021-08-18 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | As defined clause 6.4.2 of TS 23.548, the PCF may determine that the duplicated notification is required, i.e. both direct notification to the AF (i.e. sent from UPF) and notification sent via the PCF/SMF is required and indicate it to the SMF with the PCC information. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The PCF can provision the "QOS\_MONITORING" policy control request trigger to the SMF together with the "directNotifInd" attribute set to true to request the duplicated notification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | It is not clear how to request duplicated notifcation | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.1.4.2.1, 4.2.3.25 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

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

##### 4.1.4.2.1 PCC rules definition

A PCC rule is a set of information elements enabling the detection of a service data flow and providing parameters for policy control and/or charging control. There are two different types of PCC rules as defined in 3GPP TS 23.503 [6]:

- Dynamic PCC rules: PCC rules that are dynamically provisioned by the PCF to the SMF. These PCC rules may be either predefined or dynamically generated in the PCF. Dynamic PCC rules can be installed, modified and removed at any time.

- Predefined PCC rules: PCC rules that are preconfigured in the SMF. Predefined PCC rules can be activated or deactivated by the PCF at any time. Predefined PCC rules within the PCF may be grouped allowing the PCF to dynamically activate a set of PCC rules.

Additionally, predefined PCC rules may be grouped within the SMF as predefined PCC rule bases which allow the PCF to dynamically activate these sets of rules. In this case, the PCC rule identifier is used to hold the predefined PCC rule base identifier.

NOTE 1: When the SMF interacts with the PCF for a PCC rule base, the PCF has no way of knowing which individual PCC rule of the PCC rule base caused the interaction. If such knowledge is required for specific PCC rules, then these PCC rules need to be implemented either as dynamic PCC rules or as predefined PCC rules that are not grouped in a PCC rule base. The SMF decision logic for interacting (or not) with the PCF about an event related to a PCC rule base is up to implementation and depends on the specific issue that triggered this interaction.

NOTE 2: The operator can define a predefined PCC rule, to be activated by the SMF. Such a predefined rule is not explicitly known in the PCF.

A PCC rule consists of:

Table 4.1.4.2.1-1: PCC rule information elements

|  |  |  |
| --- | --- | --- |
| Information name | Description | Category |
| Rule identifier | Uniquely identifies the PCC rule, within a PDU Session.  It is used between PCF and SMF for referencing PCC rules. | Mandatory |
|  | Service data flow detection |  |
| Precedence | Determines the order, in which the service data flow templates are applied at service data flow detection, enforcement and charging. | Mandatory |
| Service Data Flow Template | For IP PDU traffic: Either a list of service data flow filters or an application identifier that references the corresponding application detection filter for the detection of the service data flow.  For Ethernet PDU traffic: Combination of traffic patterns of the Ethernet PDU traffic. | Mandatory |
| Mute for notification | Defines whether application's start or stop notification is to be muted. | Optional |
|  | Charging |  |
| Charging key | The charging system (CHF) uses the charging key to determine the tariff to apply to the service data flow. | Optional |
| Service identifier | The identity of the service or service component the service data flow in a rule relates to. | Optional |
| Sponsor Identifier | An identifier, provided from the AF, which identifies the Sponsor, used for sponsored flows to correlate measurements from different users for accounting purposes. | Optional |
| Application Service Provider Identifier | An identifier, provided from the AF, which identifies the Application Service Provider, used for sponsored flows to correlate measurements from different users for accounting purposes. | Optional |
| Charging method | Indicates the required charging method for the PCC rule.  Values: online or offline or none. | Optional |
| Service Data flow handling while requesting credit | Indicates whether the service data flow is allowed to start while the SMF is waiting for the response to the credit request.  Only applicable for charging method online. | Optional |
| Measurement method | Indicates whether the service data flow data volume, duration, combined volume/duration or event shall be measured.  This is applicable to reporting, if the charging method is online or offline.  Note: Event based charging is only applicable to predefined PCC rules and PCC rules used for application detection filter (i.e. with an application identifier). | Optional |
| Application Function Record Information | An identifier, provided from the AF, correlating the measurement for the Charging key/Service identifier values in this PCC rule with application level reports. | Optional |
| Service identifier level reporting | Indicates that separate usage reports shall be generated for this Service identifier.  Values: mandated or not required. | Optional |
|  | Policy control |  |
| 5QI | Identifier of the authorized QoS parameters for the service data flow. | Mandatory |
| ARP | The Allocation and Retention Priority for the service data flow consisting of the priority level, the pre-emption capability and the pre-emption vulnerability. | Mandatory |
| Gate status | The gate status indicates whether the service data flow, detected by the service data flow template, may pass (Gate is open) or shall be discarded (Gate is closed). | Optional |
| QoS Notification Control (QNC) | Indicates whether notifications are requested from 3GPP NG-RAN when the GFBR can no longer (or again) be guaranteed for a QoS Flow during the lifetime of the QoS Flow. | Optional |
| Reflective QoS Control | Indicates to apply reflective QoS for the SDF. | Optional |
| MBR (UL/DL) | The uplink/downlink maximum bitrate authorized for the service data flow. | Optional |
| GBR (UL/DL) | The uplink/downlink guaranteed bitrate authorized for the service data flow. | Optional |
| UL sharing indication | Indicates resource sharing in uplink direction with service data flows having the same value in their PCC rule. | Optional |
| DL sharing indication | Indicates resource sharing in downlink direction with service data flows having the same value in their PCC rule. | Optional |
| Redirect | Redirect state of the service data flow (enabled/disabled). | Optional |
| Redirect Destination | Controlled Address to which the service data flow is redirected when redirect is enabled. | Optional |
| Bind to default QoS Flow | Indicates that the dynamic PCC rule shall always have its binding with the default QoS Flow. | Optional |
| Priority Level | Indicates a priority in scheduling resources among QoS Flows. | Optional |
| Averaging Window | Represents the duration over which the guaranteed and maximum bitrate shall be calculated. | Optional |
| Maximum Data Burst Volume | Denotes the largest amount of data that is required to be transferred within a period of 5G-AN PDB. | Optional |
| Disable UE notifications at changes related to Alternative QoS Profiles | Indicates to disable QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation. The fulfilled situation is either the QoS profile or an Alternative QoS Profile. | Optional |
|  | Access Network Information Reporting |  |
| User Location Required | The serving cell of the UE is to be reported. When the corresponding QoS flow is deactivated, and if available, information on when the UE was last known to be in that location is also to be reported. | Optional |
| UE Timezone Required | The time zone of the UE is to be reported. | Optional |
|  | Usage Monitoring Control |  |
| Monitoring key | The PCF uses the monitoring key to group services that share a common allowed usage. | Optional |
|  | N6-LAN Traffic Steering Enforcement Control |  |
| Traffic steering policy identifier(s) | Reference to a pre-configured traffic steering policy at the SMF. | Optional |
|  | AF influenced Traffic Steering Enforcement Control |  |
| Data Network Access Identifier | Identifier of the target Data Network Access. | Optional |
| Per DNAI: Traffic steering policy identifier | Reference to a pre-configured traffic steering policy at the SMF. | Optional |
| Per DNAI: N6 traffic routing information | Describes the information necessary for traffic steering to the DNAI. | Optional |
| Information on AF subscription to UP path changes events | Indicates whether a notification in case of UP path change is requested, as well as the destination(s) for where to provide the notification. | Optional |
| Indication of UE IP address preservation | Indicates UE IP address should be preserved. | Optional |
| Indication of traffic correlation | Indicates that the target PDU Sessions should be correlated via a common DNAI in the user plane. | Optional |
| Information on User Plane Latency requirements | Indicates the user plane latency requirements. | Optional |
|  | RAN support information |  |
| UL Maximum Packet Loss Rate | The maximum rate for lost packets that can be tolerated in the uplink direction for the service data flow. | Optional |
| DL Maximum Packet Loss Rate | The maximum rate for lost packets that can be tolerated in the downlink direction for the service data flow. | Optional |
|  | MA PDU Session Control |  |
| Application descriptors | Identifies the application traffic to apply the Steering functionality and the Steering mode. | Optional |
| Steering Functionality | Indicates the applicable traffic steering functionality. | Optional |
| Steering mode (UL/DL) | Indicates the UL and/or DL traffic distribution rules between the 3GPP and Non-3GPP accesses together with associated parameters (when applicable) for the traffic matching the service data flow. | Optional |
| Charging for Non-3GPP access | Indicates parameters used for charging packets carried via Non-3GPP access for a MA PDU Session. The same set of parameters as for the Charging information above applies. If a parameter is not included here, the value provided in the Charging information above applies. | Optional |
| Usage Monitoring for Non-3GPP access | Indicates parameters used to monitor usage of the packets carried via Non-3GPP access for a MA PDU Session. The same set of parameters as for the Usage Monitoring information above applies. If a parameter is not included here, the value provided in the Usage Monitoring information above applies. | Optional |
|  | IPTV (NOTE 1) |  |
| IP Multicast traffic control information | Indicates whether the service data flow, corresponding to the service data flow template, is allowed or not allowed. | Optional |
|  | QoS Monitoring for URLLC |  |
| QoS parameter(s) to be measured | UL packet delay, DL packet delay or round trip packet delay. | Optional |
| Reporting frequency | Defines the frequency for the reporting, such as event triggered, periodic, or when the PDU Session is released. | Optional |
| Target of reporting | Defines the target of the QoS Monitoring reports, it can be either the PCF and/or the AF, decided by the PCF. | Optional |
| Indication of direct event notification | Indicates that the QoS Monitoring event shall be reported by the UPF directly to the AF or Local NEF indicated by the Target of reporting. | Optional |
|  | Alternative QoS Parameter Sets (NOTE 2) |  |
| Packet Delay Budget | Indicates the packet delay budget in this Alternative QoS Parameter Set. | Optional |
| Packet Error Rate | Indicates the packet error rate in this Alternative QoS Parameter Set. | Optional |
| GBR (UL/DL) | The uplink/downlink guaranteed bitrate authorized for the service data flow in this Alternative QoS Parameter Set. | Optional |
|  | **TSCAI Input container** |  |
| Burst Arrival Time | Indicates the burst arrival time in reference to TSN GM for TSN or external GM for non-TSN applications at ingress port. | Optional |
| Periodicity | The time period (in reference to TSN GM for TSN or external GM for non-TSN applications) between start of two bursts. | Optional |
| Flow Direction | Direction of the flow. | Optional |
| Survival Time | It refers to the time period an application can survive without any burst. It is expressed in reference to the TSN GM for TSN and external GM for non-TSN applications. | Optional |
| Time Domain | Indicate the (g)PTP domain the (TSN)AF is located in. | Optional |
| NOTE 1: Only applicable to the 5G-RG connecting to the 5GC via NG-RAN as defined in Annex C.  NOTE 2: Only applicable for GBR service data flow with QoS Notification Control enabled.  NOTE 3: The parameter "Bind to QoS Flow associated with the default QoS rule and apply PCC rule parameters" defined in table 6.3.1 of 3GPP TS 23.503 [6] is implemented as follows: a default QoS with a GBR type or delay critical GBR type 5QI and a PCC rule bound to the default QoS flow are provisioned as defined in subclause 4.2.6.2.1.  NOTE 4: The parameter "Indication of exclusion from session level monitoring" defined in table 6.3.1 of 3GPP TS 23.503 [6] is implemented as follows: a PCC rule identifier is included within the "exUsagePccRuleIds" attribute of the UsageMonitoringData instance of PDU session level usage monitoring to indicate that the service data flow shall be excluded from PDU Session usage monitoring as defined in subclause 4.2.6.5.3. | | |

The above information is organized into a set of decision data objects as defined in subclause 4.1.4.4. The exact encoding of PCC rules is defined in subclause 5.6.2.6.

\*\*\* Next Change \*\*\*

#### 4.2.3.25 Policy provisioning of QoS Monitoring to Assist URLLC Service

The QoS Monitoring for URLLC refers to the real time packet delay measurement between the UE and the UPF for a QoS flow corresponding to an URLLC service.

If the "QosMonitoring" feature is supported, the PCF may generate the authorized QoS Monitoring data decision for the service data flow based on the QoS Monitoring request if received from the AF. The PCF shall include within the SmPolicyDecision data structure one or more QosMonitoringData instances within the "qosMonDecs" attribute and "QOS\_MONITORING" within the "PolicyCtrlReqTriggers" attribute if the PCF determines the QoS monitoring report shall be sent to the PCF from the SMF and if it has not been provisioned yet.

NOTE: The QoS monitoring report can be sent to the PCF as described in subclause 4.2.4.24 or to the AF directly as described in 3GPP TS 29.508 [12] or can be directly sent to the Local NEF or AF by the UPF based on the PCF decision.

Editor’s note: it is FFS the service the UPF (Nupf\_EventExposure) uses to notify the Local NEF or AF.

For each QosMonitoringData instance, PCF shall include:

- the requested QoS monitoring parameter(s) to be measured (i.e. DL, UL and/or round trip packet delay) within the "reqQosMonParams" attribute;

- the frequency(s) of reporting (e.g. event triggered, periodic, or when the PDU Session is released, and/or any combination) within the "repFreqs" attribute;

- for the case the "repFreqs" attribute includes the value "EVENT\_TRIGGERED":

- the delay threshold for downlink with the "repThreshDl" attribute if "reqQosMonParams" attribute includes DOWNLINK;

- the delay threshold for uplink with the "repThreshUl" attribute if "reqQosMonParams" attribute includes UPLINK; and/or

- the delay threshold for round trip with the "repThreshRp" attribute if "reqQosMonParams" attribute includes ROUND\_TRIP;

- the minimum waiting time between subsequent reports within the "waitTime" attribute;

- for the case the "repFreqs" attribute includes "PERIODIC", the reporting period within the "repPeriod" attribute;

- either the notification URI within the "notifUri" attribute and the notification correlation id within the "notifCorreId" attribute if the PCF determines that the notification shall be sent to the AF directly from the SMF or the notification URI within the "notifUri" attribute, the notification correlation id within the "notifCorreId" attribute corresponding to the Local NEF or AF and the "directNotifInd" attribute set to true if the feature "EnEDGE" is supported and the PCF determines that the direct notification by the UPF to the Local NEF or AF is required based on the indication of direct notification received from the AF.

NOTE: If the feature "EnEDGE" is supported and if the PCF determines to receive QoS Monitoring report while direct UPF notification is also required, the PCF can provision the "QOS\_MONITORING" policy control request trigger to the SMF together with the "directNotifInd" attribute set to true.

The PCF shall include the value of QoS Monitoring Data ID of QosMonitoringData instance within the "refQosMon" attribute of the corresponding PCC rule and provide the QoS monitoring data decision together with the PCC rule if it has not been provisioned to the SMF. When the SMF receives the PCC rule, the SMF shall send a QoS Monitoring request to the PSA UPF via N4 as defined in 3GPP TS 29.244 [13] and NG-RAN via N2 signalling to request the QoS monitoring between PSA UPF and NG-RAN as defined in 3GPP TS 29.503 [34]. If the feature "EnEDGE" is supported and if the SMF receives both the "QOS\_MONITORING" policy control request trigger and the indication of direct notifcaiton, the SMF shall request the UPF to perform duplicated notification as defined in 3GPP TS 29.244 [13].

If the PCF receives the request to disable the QoS monitoring from the AF or the Local NEF, the PCF shall update the PCC rule with the "refQosMon" attribute set to NULL. The PCF may also remove the corresponding QoS Monitoring Data if no PCC rule is referring to it.

If the PCF receives the request to disable the direct event notification to the local NEF or AF by the UPF, the PCF shall:

- update the PCC rule with the "refQosMon" attribute referring a QosMonitoringData instance which does not include the "directNotifInd" attribute set to true; or

- update the corresponding QosMonitoringData instance by including the "directNotifInd" attribute set to false.

The SMF shall request to the UPF to disable the notification to the AF/(Local)NEF via N4 as defined in 3GPP TS 29.244 [13] and shall start sending the related notifications to the received Notification URI and notification correlation Id, if applicable.

When the EnEDGE feature is supported, the subscription to notification of QoS monitoring events is disabled by removing the "notifUri", the "notifCorrelId" and the "directNotifInd" attribute, if available. When the EnEDGE feature is not supported, the subscription to notification of QoS monitoring events is disabled by replacing the QosMonitoringData instance.

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