**3GPP TSG-WG2 Meeting #165 *S2-24nxxxx***

**Hyderabad, India, 2024-10-14 -- 2024-10-18**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.503** | **CR** | **-** | **rev** | **-** | **Current version:** | **19.1.0** |  |
|  | | | | | | | | |
| *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:*** | Differentiated QoS for multiplexed media flows | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | XRM\_Ph2 | | | | |  | ***Date:*** | | | 2024-10-04 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The specification of XRM\_Ph2 conclusions on KI#4. Support differentiated QoS handling for multiplexed media flows. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Changes to incorporate the agreed enhancements for KI#3 as in WID, as follows:  - IP packet Filter Set can include Additional Packet Filter  - PCF takes into account UE capability information of whether Additional Packet Filter is supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Differentiated QoS Handling for multiplexed media flows is not supported | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.3.6, 6.1.3.22, 6.2.1.2 (6.2.1?, 6.2.2?, 6.2.3?) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.501 CR ,  TS 23.502 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:*** | |  | | | | | | | | |

\* \* \* \* 1st change (all new) \* \* \* \*

#### 6.1.3.6 Policy control

QoS control refers to the authorization and enforcement of the maximum QoS that is authorized for a service data flow, for a QoS Flow or for the PDU Session. A service data flow may be either of IP type or of Ethernet type. PDU Sessions may be of IP type or Ethernet type or unstructured.

The PCF, in a dynamic PCC Rule, associates a service data flow template to an authorized QoS that is provided in a PCC Rule to the SMF. The PCF may also activate a pre-defined PCC Rule that contains that association.

The authorized QoS for a service data flow template shall include a 5QI and the ARP and may include a 5QI Priority Level. For a 5QI of GBR or Delay-critical GBR resource type, the authorized QoS shall also include the MBR, GBR and may include the QoS Notification Control parameter (for notifications when authorized GFBR can no longer ( or can again) be fulfilled). For 5QI of Non-GBR resource type, the authorized QoS may include the MBR and the Reflective QoS Control parameter. The 5QI value can be standardized (i.e. referring to QoS characteristics as defined in clause 5.7.3 of TS 23.501 [2]), pre-configured (i.e. referring to QoS characteristics configured in the RAN) or dynamically assigned (i.e. referring to QoS characteristics provided by the PCF as Explicitly signalled QoS Characteristics in the PDU Session related policy information described in clause 6.4).

NOTE 1: Further details, special cases and additional parameters are described in clause 6.3.1.

QoS control also refers to the authorization and enforcement of the Session-AMBR, default 5QI/ARP combination and 5QI Priority Level, if applicable. The PCF may provide the Authorized Session-AMBR, the Authorized default 5QI and ARP combination and the 5QI Priority Level as part of the PDU Session information for the PDU Session to the SMF. The Authorized Session-AMBR, Authorized default 5QI/ARP and if available, 5QI Priority Level values take precedence over other values locally configured or received at the SMF.

In home routed roaming, the H-SMF may provide the QoS constraints (defined in clause 5.7.1.11 of TS 23.501 [2]) received from the VPLMN (according to clause 4.3.2.2.2 of TS 23.502 [3]) to the H-PCF. The H-PCF ensures that the Authorized Session-AMBR value does not exceed the Session-AMBR value provided by the VPLMN, that the Authorized default 5QI/ARP contains a 5QI and ARP value supported by the VPLMN and if available, the applicable 5QI Priority Level is supported by the VPLMN. If no QoS constraints are provided the H-PCF considers that no QoS constraints apply unless operator policies define any. The PCF shall also consider the QoS constraints for the setting of the Subsequent Authorized default 5QI/ARP, if available, the applicable 5QI Priority Level and Subsequent Authorized Session-AMBR.

For policy control, the AF interacts with the PCF and the PCF interacts with the SMF as instructed by the AF. For certain events related to policy control, the AF shall be able to give instructions to the PCF to act on its own, i.e. based on the service information currently available. The following events are subject to instructions from the AF:

- The authorization of the service based on incomplete service information;

NOTE 2: The QoS authorization based on incomplete service information is required for e.g. IMS session setup scenarios with available resources on originating side and a need for resource reservation on terminating side.

- The immediate authorization of the service;

- The gate control (i.e. whether there is a common gate handling per AF session or an individual gate handling per AF session component required);

- The forwarding of QoS Flow level information or events (see clause 6.1.3.18).

The UE and the AF shall provide all available Flow Description information (e.g. source and destination IP address and port numbers and the protocol information) to enable the binding functionality and the generation or selection of the service data flow filter(s) in the PCC rules. The AF may also provide a ToS (IPv4) or TC (IPv6) value that is set by the application as part of the Flow Description information.

To request differentiated QoS handling for media flows, the Flow Description information may include extensions specific for multiplexed media when needed to identify the media flows (see TS 23.501 [2] clause 5.7.6.2) e.g. when multiple media are transported in (S)RTP multiplexed into a single UDP/IP traffic flow.

The PCF generates a PCC Rule with service data flow filter(s) (either as IP Packet Filter set as defined in clause 5.7.6.2 of TS 23.501 [2] or as Ethernet Packet Filter set as defined in clause 5.7.6.3 of TS 23.501 [2]) derived from the Flow Description information and when applicable, UE capability information received from SMF.

NOTE 3: A ToS/TC value can be useful when another packet filter attribute is needed to differentiate between packet flows. For example, packet flows encapsulated and encrypted by a tunnelling protocol can be differentiated by the ToS/TC value of the outer header if appropriately set by the application. To use ToS/TC for service data flow detection, network configuration by the operator (and additionally by the 3rd party Service Provider when the transport network is not fully within the operator control) needs to ensure there is no ToS/TC re-marking applied along the path from the application to the PSA UPF and the specific ToS/TC values are managed properly to avoid potential collision with other usage (e.g. paging policy differentiation). An example that the transport network is not fully within operator control is the Edge Hosting Environment according to TS 23.548 [33].

If SMF indicates that a PDU Session is carried over NR satellite access or satellite backhaul, the PCF may take this information into account for the policy decision, e.g. together with any delay requirements provided by the AF.

When SMF indicates that the dynamic satellite backhaul is used to serve the PDU Session, the PCF, based on local policy, may use QoS monitoring (as described in clause 6.1.3.21) to get reports for the packet delay (defined in clause 5.45.2 of TS 23.501 [2]). The PCF may take this reported packet delay information into account for the policy decision along with other criteria, such as the AF requested QoS requirements.

\* \* \* \* 2nd change (all new) \* \* \* \*

#### 6.1.3.22 AF session with required QoS

The AF may request that a data session to a UE is set up with a specific QoS (e.g. low latency or PDV) and priority handling. The AF can request the network to provide QoS for the AF session based on the service requirements with the help of a QoS Reference parameter that refers to pre-defined QoS information. Instead of the QoS Reference, the AF may provide individual QoS parameters associated to the Flow Description.

a) When the AF provides only a QoS Reference to determine the QoS parameters but no individual QoS parameters:

- When the PCF authorizes the service information from the AF, it derives the QoS parameters of the PCC rule based on the service information and the indicated QoS Reference.

NOTE 1: An SLA has to be in place between the operator and the ASP defining the possible QoS levels and their charging rates. For each of the possible pre-defined QoS information sets, the PCF needs to be configured with the corresponding QoS parameters and their values as well as the appropriate Charging key (or receive this information from the UDR).

- The AF may change the QoS by providing a different QoS Reference while the AF session is ongoing. If this happens, the PCF shall update the related QoS parameter sets in the PCC rule accordingly.

b) When the AF provides individual QoS parameters instead of a QoS Reference:

- The AF provides one or more of the following individual QoS parameters, i.e. Requested Priority, Maximum Burst Size, Requested 5GS Delay, Requested Maximum Bitrate, Requested Guaranteed Bitrate and Requested Packet Error Rate.

NOTE 2: Different combinations of individual QoS parameters with specific parameter names exist and they are described in TS 23.501 [2] (for Time Sensitive Communication), in clause 6.1.3.23 (for integration with Time Sensitive Networking) and in TS 29.514 [36].

- If the AF request for QoS is sent via the TSCTSF and the request contains a Requested 5GS Delay, the TSCTSF determines a Requested PDB considering the UE-DS-TT Residence Time (either provided by the PCF or pre-configured).

- When the PCF authorizes the service information from the AF, it derives the QoS parameters of the PCC rule based on the service information and the individual QoS parameters received from the AF and TSCTSF. The PCF should select a standardized, pre-configured or existing dynamically assigned 5QI that matches the individual QoS parameters. If no 5QI exists that matches the individual QoS parameters, the PCF generates a new dynamically assigned 5QI based on the individual QoS parameters.

- The AF may change the QoS by providing different values for the individual QoS parameters while the AF session is ongoing. If this happens, the PCF shall update the related QoS parameter sets in the PCC rule accordingly.

- The PCF may reject the individual QoS parameters received from the AF based on operator policy or impossibility to support the requested values of the individual QoS parameters. If this happens, the PCF may provide in the response to the AF one or more combinations of individual QoS parameters that can be supported. The PCF may indicate in the response to the AF that the request is not authorized because the applicable QoS parameters are not supported in the PLMN where the UE is registered, then the AF may retry the request when the UE moves to a different PLMN.

In addition to the QoS Reference or the individual QoS parameters described above, the AF may provide further parameters associated with the Flow Description, e.g. parameters that describe traffic characteristics as described in clause 6.1.3.23 or 6.1.3.23a and Indication of ECN marking for L4S.

The PCF generates a PCC Rule with service data flow filter (including IP Packet Filter set as in clause 5.7.6.2 of TS 23.501 [2]) or Ethernet Packet Filter set as in clause 5.7.6.3 of TS 23.501 [2]) derived from the Flow Descriptions provided by the AF, the derived PCC rule QoS parameters such a 5QI, ARP, GBR and MBR (see clause 6.3.1 for all possible PCC rule QoS parameters) and the associated TSC Assistance Container as received from the TSN AF or TSCTSF.

AF requests for differentiated QoS handling for multiplexed media flows includes in the Flow Description extensions specific for multiplexed media when needed to identify the media flows (see TS 23.501 [2] clause 5.7.6.2). In this case, PCF determines the PCC Rules and QoS requirements for the media flows under consideration of the UE capability for these extensions as follows:

i. When AF requests differentiated QoS handling for multiplexed media flows for downlink only, PCF generates PCC rules for the relevant media flows (extensions for multiplexed media are included in the IP Packet Filter Set) and the QoS requirements that apply to each of them.

ii. When AF requests differentiated QoS handling for multiplexed media flows for uplink only or for downlink and uplink, if UE capability indicates support for multiplexed media extensions, PCF generates PCC rules for the relevant media flows (extensions for multiplexed media are included in the IP Packet Filter Set) and the QoS requirements that apply to each of them.

iii. When AF requests differentiated QoS handling for multiplexed media flows for uplink only, if UE has not indicated support for multiplexed media extensions, PCF decides the QoS requirements that will be the same for all the multiplexed media flows. PCF may still generate distinct PCC rules for the relevant media flows (extensions for multiplexed media are included in the IP Packet Filter Set) if UPF shall enforce other policies in UL that require media differentiation. PCF notifies AF that the differentiated QoS handling cannot be provided as requested and the QoS requirements selected.

iv) When AF requests differentiated QoS handling for multiplexed media flows for both uplink and down link and if UE has not indicated support for multiplexed media extensions, PCF decides based on operator configuration which of the possible approaches to follow for generating the PCC Rules and QoS requirements. PCF notifies AF that the differentiated QoS handling cannot be provided as requested and QoS requirements selected.

NOTE: PCF decision is based on the assumption that UPF supports in IP Packet Filter Set the extensions for multiplexed media.

Editor’s Note: whether that can be assumed or if it also needs to be controlled and considered is FFS. For TSC QoS, the PCF derives the 5QI value as defined in clause 5.27.3 of TS 23.501 [2], the PCF derives the MBR using the Requested Maximum Bitrate provided by the AF and sets the GBR equal to the MBR unless the AF provides a Requested Guaranteed Bitrate, in which case the MBR and GBR are set separately.

If the PCF gets informed about Policy Control Request Triggers relevant for the AF session, the PCF shall inform the AF about it as defined in clause 6.1.3.18.

If an AF session can adjust to different QoS parameter combinations, the AF may provide Alternative Service Requirements in a prioritized order (indicating the preference of the QoS requirements with which the service can operate) in addition to the QoS Reference or individual QoS parameters. Alternative Service Requirements contain:

- When the AF requests the network to provide QoS with a QoS Reference, one or more QoS Reference parameters in a prioritized order.

- When the AF requests the network to provide QoS with individual QoS parameters, one or more Requested Alternative QoS Parameter Set(s) in a prioritized order. Each Requested Alternative QoS Parameter Set is comprised of the following individual parameters: Requested 5GS Delay, Requested Guaranteed Flow Bitrate and Requested Packet Error Rate. Each requested Alternative QoS Parameter Set may also include a Maximum Burst Size parameter.

If the AF request is sent via the TSCTSF, the TSCTSF determines a Requested PDB considering the Requested 5GS Delay and the UE-DS-TT Residence Time.

An AF that provides Alternative Service Requirements shall also subscribe to receive notifications from the PCF for successful resource allocation and when the QoS targets can no longer (or can again) be fulfilled as described in clause 6.1.3.18.

When the PCF authorizes the service information from the AF and generates a PCC rule, it shall also derive Alternative QoS Parameter Sets for this PCC rule based on the QoS Reference parameters or the Requested Alternative QoS Parameter Sets in the Alternative Service Requirements. If the AF provided Requested Alternative QoS Parameter Sets in the request, the PCF may reject any of the Requested Alternative QoS Parameter Sets it has received based on operator policy or impossibility to support the requested values of the individual parameters. If this happens, the PCF may provide in the response to the AF one or more Requested Alternative QoS Parameters Sets that can be supported.

The PCF shall enable QoS Notification Control and include the derived Alternative QoS parameter sets (in the same prioritized order indicated by the AF) in the PCC rule sent to the SMF. When the PCF notifies the AF that QoS targets can no longer be fulfilled, the PCF shall include the QoS Reference parameter or the set of Requested Alternative QoS Parameters corresponding to the Alternative QoS parameter set referenced by the SMF, or an indication that the lowest priority QoS Reference or the lowest priority set of Requested Alternative QoS Parameters of the Alternative Service Requirements cannot be fulfilled (as described in clause 6.1.3.18).

NOTE 3: The AF behaviour is out of the scope of this TS but can include adaptation to the change of QoS (e.g. rate adaptation) as well as application layer signalling with the UE.

The AF may change the Alternative Service Requirements while the AF session is ongoing. If this happens, the PCF shall update the Alternative QoS parameter sets in the PCC rule accordingly.

The AF may indicate to the PCF that the UE does not need to be informed about changes related to Alternative QoS Profiles. With this indication received from the AF, the PCF decides whether to disable the notifications to the UE when changes related to the Alternative QoS Profiles occur and sets the Disable UE notifications at changes related to Alternative QoS Profiles parameter in the PCC rule accordingly.

The AF may also provide the PCF with QoS duration and QoS inactivity interval. The requested QoS is applied to each QoS duration interval. Once the PCF receives the request from the AF, the PCF provides a PCC Rule with the QoS parameters to SMF to allocate resources. The PCF may allocate resources at the beginning of each QoS duration interval and release the resources at the end of the corresponding QoS duration interval. This process is repeated until the AF session is revoked. If the AF has subscribed to the PCF and resource allocation for any of the QoS duration interval fails, the PCF informs the AF of the resource allocation failure.

NOTE 4: When leveraging the QoS duration and the QoS inactivity interval, both are expected to be in the order of minutes to avoid too frequent signalling between RAN, AF and 5GC/PCF.

If the AF provides an explicit indication (i.e. Indication of ECN marking for L4S) that the UL and/or DL of the service data flow supports ECN marking for L4S or the PCF decides, based on local configuration, that the service data flow supports ECN marking for L4S, then the PCF may explicitly, or implicitly (based on PCF/SMF local configuration), indicate to the SMF to enable for ECN marking for L4S. The PCF decision may be taken, based on local configuration in PCF and SMF and L4S traffic detection result. If L4S support is detected on the UL and/or DL traffic of the service data flow, the QoS Flow is enabled with ECN marking for L4S, see clause 5.37.3 of TS 23.501 [2].

The PCF may generate policies to request to monitor the Traffic Parameter (i.e. N6 jitter range associated with DL Periodicity) and include it into a PCC rule based local policy. Based on the received PCC rule or local configuration, the SMF indicates UPF to monitor and report the requested traffic characteristics as described in clause 5.37.8.2 of TS 23.501 [2] and in clause 6.1.3.27.6.

\* \* \* \* 3rd change \* \* \* \*

#### 6.2.1.2 Input for PCC decisions

The listed information below is not intended to be complete and describes only examples of the information that can be provided by the respective NF.

The PCF shall accept input for PCC decision-making from the SMF, the AMF, the CHF, the NWDAF if present, the UDR and if the AF is involved, from the AF, as well as the PCF may use its own predefined information. These different NFs should provide as much information as possible to the PCF. Depending on the particular scenario all the information may not be available or is already provided to the PCF.

The AMF may provide information related to the UE as defined in clauses 5.2.5.2 and 5.2.5.6 of TS 23.502 [3], for example:

- SUPI;

- PEI of the UE;

- Location of the subscriber;

- Service Area Restrictions;

- RFSP Index;

- RAT Type;

- GPSI;

- Access Type;

- Serving Network identifier (PLMN ID or PLMN ID and NID, see clause 5.34 of TS 23.501 [2]);

- Allowed NSSAI;

- UE time zone;

- Subscribed UE-AMBR;

- Configured NSSAI for the serving PLMN;

- Mapping Of Allowed NSSAI;

- S-NSSAI for the PDU Session;

- Satellite backhaul category;

- Requested DNN.

NOTE 1: The Access Type and RAT Type parameters should allow extension to include new types of accesses.

The UE may provide information such as:

- OSId;

- List of PSIs;

- Indication of UE support for ANDSP.

- Indication of URSP Provisioning Support in EPS.

- Indication of UE capability of reporting URSP rule enforcement to network (see clause 6.6.2.4) and of UE capability to support multiplexed media extensions (see clause 6.1.3.22).

The SMF may provide information related to the PDU Session as defined in clause 5.2.5.4 of TS 23.502 [3], for example:

- SUPI;

- PEI of the UE;

- IPv4 address of the UE;

- IPv6 network prefix assigned to the UE;

- Default 5QI and default ARP;

- Request type (initial, modification, etc.);

- Type of PDU Session (IPv4, IPv6, IPv4v6, Ethernet, Unstructured);

- Access Type;

- RAT Type;

- GPSI;

- Internal-Group Identifier;

- Location of the subscriber;

- S-NSSAI;

- DNN;

- Serving Network identifier (PLMN ID or PLMN ID and NID, see clause 5.34 of TS 23.501 [2]);

- Application Identifier;

- Allocated application instance identifier;

- Detected service data flow descriptions;

- UE support of reflective QoS (as defined in clause 5.7.5.1 of TS 23.501 [2]);

- Number of supported packet filters for signalled QoS rules for the PDU Session (indicated by the UE as defined in clause 5.7.1.4 of TS 23.501 [2]);

- 3GPP PS Data Off status;

- DN Authorization Profile Index (see clause 5.6.6 of TS 23.501 [2]);

- DN authorized Session AMBR (see clause 5.6.6 of TS 23.501 [2]);

- Satellite backhaul category;

- Provisioning Server address(es) (see clause 5.30 of TS 23.501 [2]);

- UE report of URSP rule enforcement from URSP rule associated with the PDU session (see clause 6.6.2.4).

- HR-SBO support indication for requesting VPLMN Specific Offloading Policy (see clause 6.2.1.12 and clause 6.7 of TS 23.548 [33]).

The UDR may provide the information for a subscriber connecting to a specific DNN and S-NSSAI, as described in the clause 6.2.1.3.

The UDR may provide policy information related to an ASP as defined in clause 5.2.12.2 of TS 23.502 [3], for example:

- The ASP identifier;

- A transfer policy together with a Background Data Transfer Reference ID, the volume of data to be transferred per UE, the expected amount of UEs;

- An PDTQ policy together with an PDTQ Reference ID, the requested QoS for each of the AF session for each of the UEs involved and the expected amount of UEs.

NOTE 2: The information related with AF influence on traffic routing may be provided by UDR when the UDR serving the NEF is deployed and stores the application request.

The UDR may provide the service specific information as defined in clause 4.15.6.7 of TS 23.502 [3].

The AF, if involved, may provide application session related information as defined in clause 5.2.5.3 of TS 23.502 [3] directly or via NEF, e.g. based on SIP and SDP, for example:

- Subscriber Identifier(s);

- IP address of the UE;

- Media Type;

- Media Format, e.g. media format sub-field of the media announcement and all other parameter information (a= lines) associated with the media format;

- Bandwidth;

- Sponsored data connectivity information;

- Flow description information, e.g. source and destination IP address and port numbers and the protocol and optionally, ToS (IPv4) or TC (IPv6) value (as described in clause 6.1.3.6);

- Indication of ECN marking for L4S;

- AF application identifier, i.e. an identifier that refers to the application the AF session belongs to, containing either an AF identifier, an external application identifier (if the NEF is involved and performs the mapping to the application identifier) or an application identifier (if the AF is configured accordingly);

NOTE 3: Either Flow description or (external) application identifier for application detection control can be provided.

- DNN and possibly S-NSSAI;

- AF Communication Service Identifier (e.g. IMS Communication Service Identifier), UE provided via AF;

- AF Application Event Identifier;

- AF Record Information;

- Flow status (for gating decision);

- Priority indicator, which may be used by the PCF to guarantee service for an application session of a higher relative priority;

NOTE 4: The AF Priority information represents session/application priority and is separate from the MPS 5GS Priority indicator.

- Emergency indicator;

- Application service provider;

- DNAI;

- Information about the N6 traffic routing requirements;

- GPSI;

- Internal-Group Identifier;

- Temporal validity condition;

- Spatial validity condition;

- AF subscription for early and/or late notifications about UP management events;

- AF transaction identifier;

- TSC individual QoS information as described in clause 6.1.3.22;

- QoS information to be monitored;

NOTE 5: The information related with QoS monitoring may be provided by UDR when the UDR serving the NEF is deployed and stores the application request.

- Service area coverage;

- Indication that high throughput is desired;

- Reporting frequency;

- User Plane Latency Requirement.

The AF may provide BDT related information as defined in clause 5.2.5.5 of TS 23.502 [3] via NEF, for example:

- Background Data Transfer Reference ID;

- BDT Policy;

- Volume per UE;

- Number of UEs;

- Desired time window;

- Network Area Information.

The CHF, if involved, may provide the following information for a subscriber as defined in clause 5.2.5.17 of TS 23.502 [3], for example:

- Policy counter status for each relevant policy counter.

The NWDAF, if involved, may provide analytics information as described in clause 6.1.1.3.

In addition, the predefined information in the PCF may contain additional rules based on charging policies in the network, whether the subscriber is in its home network or roaming, depending on the QoS Flow attributes.

The 5QIs (see clause 5.7.4 of TS 23.501 [2]) in the PCC rule is derived by the PCF from AF or UDR interaction if available. The input can be SDP information or other available application information, in line with operator policy.

The Allocation and Retention Priority in the PCC Rule is derived by the PCF from AF or UDR interaction if available, in line with operator policy.

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