3GPP TSG-SA WG4 Meeting ad hoc post #129e S4aI240191

Electronic, 26th September–24th October 2024

Title: [FS\_AMD] WT#12: Gap analysis and candidate solutions for QoS monitoring

Agenda Item: 2.6

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Abstract

Provide gap analysis and candidate solutions for QoS monitoring under WT#12.

Background and motivation

Working towards completion of the study item, gap analysis and candidate solutions for QoS monitoring are provided.

Text proposal

The following text is proposed as a modification of TR 26.804 **CR0007**.

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

# 2 References

[XX] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

\* \* \* \* Second change \* \* \* \*
Call flows

#### 5.23.4.2 QoS monitoring for media streaming



Figure 5.23.4.2-1: High-level call flow for QoS monitoring for Media Streaming

1. 5GMS Application Provider provisions the 5GMS AF with the **Network Assistance configuration** as described in step 1 of clause 5.23.4.1 The **Network Assistance configuration** contains the configuration of QoS monitoring, including the parameters to be monitored, reporting frequency (event triggered, periodic), optionally target entity of reporting and optionally the notification via UPF.

NOTE: In case the 5GMS AS is deployed as an EAS instance in the Edge DN, a local UPF can also be inserted for local access to the 5GMS EAS. In order to reduce the latency used for exposure of the QoS monitoring results, the local UPF is expected to provide the notifications of network status directly to the 5GMS AF and 5GMS AS, or via a locally deployed NEF as defined in clause 5.8.2.17 of TS 23.501 [23].

1. The Media Session Handler retrieves Service Access Information with the configuration of QoS monitoring provided inside the client Network Assistance configuration.
2. If the Media Session Handler is interested in understanding the network status (e.g., congestion status, packet latency) it creates an enhanced Network Assistance Session **that includes the requested QoS montoring configuration** on the 5GMS AF at reference point M5.
3. Based on the QoS monitoring configuration received in the previous step, the 5GMS AF interacts with the PCF (or NEF) to enable QoS monitoring via the Npcf\_PolicyAuthorization service at reference point N5 or the Nnef\_AFsessionWithQoS service at reference point N33.

Besides, based on the provisioning from the 5GMS Application Provider, the 5GMS AF understands that QoS monitoring is required for 5GMS AS traffic control, e.g. congestion control, bit rate adaptation for progressive download, the 5GMS AF may also request the PCF or NEF to enable the QoS monitoring.

In the case where the 5GMS AS is deployed in the Edge DN, the 5GMS AF may additionally enable the exposure of QoS montoring results via the local UPF or local NEFby configuring the PCF (or NEF).

1. The 5GMS AF invokes the Npcf\_PolicyAuthorization service or the Nnef\_AFsessionWithQoS service **with the requested QoS monitoring configurations**.
2. The PCF accepts the request and enables QoS monitoring within the 5G System, i.e., by configuring the RAN and/or the UPF for monitoring and reporting of target QoS parameters.
3. Following the QoS monitoring request(s), the PCF exposes the QoS monitoring results to the 5GMS AF periocially or by event triggers.
4. **Alternatively, the QoS monitoring results can be exposed to the 5GMS AF by the UPF directly using the** **Nupf\_EventExposure\_Notify service or via a locally deployed NEF using the Nnef\_EventExposure\_Notifyservice at reference point N33.**
5. If QoS monitoring was requested by the Media Session Handler, **the 5GMS AF sends the notifications of the QoS monitoring results to the Media Session Handler** via the MQTT notification channel at reference point M5 associated with the Network Assistance Session.
6. **The Media Session Handler further provides the QoS monitoring results to the Media Stream Handler at reference point M11.**
7. **The Media Stream Handler may use the notified QoS monitoring results to modify its behaviour.**

For example, in the case of downlink media streaming, the Media Player may use the monitored packet latency to determine when to request the next media segment, and/or to change the bit rate of the next media segemtn based on the monitored congestion status.

\* \* \* \* Third change \* \* \* \*
Gap analysis and requirements

#### 5.23.5.2 QoS monitoring for media streaming

Based on the call flow in clause 5.23.4.3, the following observations are made:

- QoS monitoring does not require modifications to the Media Stream Handler (Media Player or Media Streamer).

- The 5GMS AF needs to explicitly request QoS monitoring by the 5G System for specific parameters (i.e., congestion information, packet latency, data rate and Packet Delay Variation) by interacting with the PCF at reference point N5 (or else via the NEF at reference poiont N33).

- The Policy Template resource structure at reference point M1 needs to be extended to include the QoS monitoring configuration, including the parameters to be monitored, reporting frequency (event triggered, periodic), optionally the target entity of reporting and optionally the notification via UPF.

- The Policy Template Binding data structure carried in the Service Access Information resource at reference point M5 needs to be extended to reflect the value of the L4S capability requirement flag in the corresponding Policy Template.

- QoS monitoring results need to be exposed to the 5GMS AF, either directly at reference point N5 via the Nupf\_EventExposure\_Notifyservice, or else via a locally deployed NEF using the Nnef\_EventExposure\_Notifyservice at reference point N33.

- To expose QoS monitoring results to the Media Session Handler in the 5GMS Client, notification events relating to Dynamic Policies at reference point M5 need to be extended to include the QoS monitoring results.

- The QoS monitoring results need to be further provided to the Media Steam Handler by the Media Session Handler at reference point M11.

\* \* \* \* Forth change \* \* \* \*
Candidate solution

#### 5.23.5.1 Integrating QoS monitoring and/or ECN marking for L4S

#### 5.23.5.2 QoS monitoring for media streaming

Provisioning information is provided by the 5GMS Application Provider at reference point M1 to declare that a Policy Template requires QoS monitoring. The Policy Template structure is enhanced to provide a QoS monitoring configuration (qosMonInfoand directNotifInd as described in clause 5.14.2.1.2 of TS 29.122 [29122]). This QoS monitoring configuration is also provided to the Media Session Handler in the Policy Template binding exposed in Service Access Information.

In this candidate solution, two Policy Templates may be provisioned by the 5GMS Application Provider, one with QoS monitoring configuration and one without. The Media Session Handler in the 5GMS Client then instantiates the appropriate Policy Template depending on its requirements.

When the QoS monitoring configuration is included in the instantiated Policy Template, the 5GMS AF requests QoS monitoring by the 5G System and the 5G System enables the QoS monitoring as requested.

The DynamicPolicy resource is extended to include the QoS monitoring results. When the 5G System reports the QoS monitoring results to the 5GMS AF as requested, the 5GMS AF further provides the notification of the QoS monitoring results to the Media Session Handler via the asynchronous MQTT notification channel as an Application Message conveyed as the payload of an MQTT PUBLISH message.

The Dynamic Policy client API is extended to support the notification events relating to Dynamic Policy. When the QoS monitoring results are received by the Media Session Handler and it further exposes the QoS monitoring results to the Media Stream Handler to react accordingly.

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