**3GPP TSG-SA5 Meeting #144-e *S5-224216***

**e-meeting, 27 June – 1 2022**

**Source: Huawei**

**Title: pCR 28.865 Update solultion of service assurance for video monitoring**

**Document for: Approval**

**Agenda Item: 6.9.5.4**

# 1 Decision/action requested

***The group is asked to discuss and approve the proposal.***

# 2 References

[1] [SP-211442](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3693): "New SID on deterministic communication service assurance"

[2] S5-223735: "draft TR 28.865 Study on deterministic communication service assurance"; v0.2.0

# 3 Rationale

This tdoc addresses the solution update of service assurance for video monitoring.

It is proposed to add some data collection requirements for service assurance for video monitoring in draft TR 28.865.

# 4 Detailed proposal

This document proposes the following changes in TR 28.865.

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| **1st Change** |

# 5 Issues and potential solutions

*Editor's note: this clause will contain the issues and potential solutions for deterministic communication service assurance.* *Relation and potential enhancements to eCOSLA will also be studied for the related issues.*

## 5.Y Issue #2: Service assurance for video monitoring

*Editor's note: this clause will contain the description and potential solutions for the service assurance of video monitoring, e.g. service requirements, related measurements and service performance analysis. Video monitoring is one of the deterministic communication services in cyber-physical control scenarios described in TS 22.104.*

### 5.Y.1 Description

Editor’s note: This clause provides a description of the issue#2.

### 5.Y.2 Potential solutions

#### 5.Y.2.a Potential solution #1: Video monitoring service

##### 5.Y.2.a.1 Introduction

Editor's Note: This clause describes briefly the potential solution for issue#2 at a high-level.

In the deterministic communication service requirement analysis phase, network requirements (data rate, delay, and reliability) are analyzed. Network deployment requirements of different areas need to be considered for network preparation. Deterministic communication services have high SLS requirements. For example, the planning of video monitoring services focus on uplink coverage, uplink capacity, uplink data rate, and E2E latency etc. It demands on high delay stability of video frame transmission. The network requirements need to be derived based on the application characteristics of specific services. For example, network preparation information, such as network capacity, coverage, reliability, and data rate estimation, needs to be output based on the three-layer service requirement model of the video monitoring service.

##### 5.Y.2.a.2 Description

Editor's Note: This clause further details the potential solution and any assumptions made for issue#2.

**1. Data collection**

Collect service experience data and network performance data of video monitoring services based on the three-layer service requirement modeling. For example, the following data may collected: latency and throughput related performance data defined in TS 28.552 and TS 28.554. Abnormal information such as large round-trip delay, large jitter, low data rate distribution, high packet loss rate, and service quality deterioration etc.

Taking the video monitoring services in a large port as an example, it requires high uplink bandwidth, low latency, high availability, mobility, and high reliability. Network preparation is performed to meet these requirements, e.g., deployment and provisioning of the necessary network functions.

**2. Analytics and demarcation**

Service and network analysis of deterministic communication services includes monitoring, poor-QoE identification, demarcation, and root cause analysis. Identify abnormal issues, determine the impact scope, and restore services.

Monitoring and the poor-QoE identification requires two steps:

- Builds the three-layer service requirement model based on service characteristics, including poor experience information.

- Collects experience, service quality, and network-related indicators and abnormal incidents to identify poor-QoE users and services.

Fault demarcation is used to generate service interruption/ poor experience incident when a service anomaly occurs. The E2E network KPI, alarm information, terminal exceptions are correlated and analzed. Demarcation results for video monitoring services are provided accordingly.

**3. Optimization and verification**

**Optimization**:

For video monitoring services, delay-related optimization and uplink data rate optimization are considered. To optimize delay-related problems, it is needed to analyze the average delay, delay jitter, and delay reliability. It can analyzed the delay-related factors of the air interface, such as the uplink and downlink slot assignment proportion, air interface resource capacity, and scheduling policy.

Uplink data rate optimization: The coverage, interference, resource allocation policy, and scheduling policy are optimized to make the uplink rate better match the SLS requirement.

**Verification:**

According to the service assurance objective of deterministic communication, that is, the quality of experience indicator of each service meets the deterministic requirement after optimization, it is further verified that the network capability meets the deterministic requirement. Select indicators that reflect video monitoring service experience, such as stalling and interruption, or indicators that reflect network performance, such as packet loss rate, rate, and delay.

To support the analysis and optimization of video monitoring services (TCP-based), some data collection requirements specific to video monitoring are as in the following table:

| **Number** | **measurements** |
| --- | --- |
| 1 | Uplink rate: the ratio of traffic to data transmission duration by minute’s level |
| 2 | Round-trip delay: the ratio of traffic to data transmission duration by minute’s level. |
| 3 | Uplink packet loss rate: the ratio of the lost data packets to transmitted data packets in minute’s level. |

To support the analysis and optimization of video monitoring services (TCP-based), some data collection requirements for abnormal data specific to video monitoring service are as in the following table:

| **Number** | **measurements** |
| --- | --- |
| 1 | Application layer interruption: This event is triggered when the number of uplink TCP packets carrying load is less than the threshold within a detection period. |
| 2 | High packet loss rate: This event is triggered when the uplink packet loss rate is greater than the threshold within a detection period. |
| 3 | Excessive RTT: This event is triggered if the number of times that the RTT is greater than the threshold within a detection period is greater than the threshold. |
| 4 | Abnormal rate: This event is triggered when the uplink traffic is greater than the traffic threshold and the number of consecutive occurrence periods reaches the threshold within a detection period. |

To support the analysis and optimization of video monitoring services (TCP-based), some data collection requirements are common for all services:

| Category | Indicator Name |
| --- | --- |
| Data rate | Average downlink data rate of TCP/UDP connection |
| Average uplink data rate of TCP/UDP connection |
| UL data rate of TCP/UDP connection at Communication Terminal Side |
| latency | Round-trip delay for TCP connection |
| Uplink delay of TCP connection (From communication terminal to Application Server) |
| Downlink delay of TCP connection (Communication Terminal to Service Terminal) |
| Packet data loss rate | Uplink packet loss rate at server side for the TCP connection |
| Downlink packet loss rate at server side for the TCP connection |
| Uplink packet loss rate at UE side for the TCP connection |
| Downlink packet loss rate at UE side for the TCP connection |
| Jitter | Average uplink RTT jitter for TCP |
| Average downlink RTT Jitter for TCP |
| traffic | Average packet data length |
| Number of uplink Packets |
| Number of payload packets for uplink for TCP |
| Number of payload packets for downlink for TCP |
| Number of downlink payload packets for TCP |
| Number of transmitted packets in uplink for TCP connection |
| Number of transmitted packets in uplink for UDP connection |
| Number of transmitted packets in downlink for TCP connection |
| Number of transmitted packets in downlink for UDP connection |

To support the analysis and optimization of video monitoring services (TCP-based), some data collection requirements for abnormal data are common for all service:

| Number | Abnormal indicators |
| --- | --- |
| 1 | Abnormal round-trip delay |
| 2 | Abnormal packet loss rate |
| 3 | Abnormal average data rate. |
| 4 | The average downlink RTT jitter (TCP) is too large |
| 5 | The average uplink RTT jitter (TCP) is too large |
| 6 | Connection interruption |
| 7 | Traffic interruption |

### 5.Y.3 Conclusion - Impact on normative work

Editor's Note: This clause provides the conclusion from the aspect of impact on normative work for issue#2.

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| **End of change** |