**3GPP TSG-SA5 Meeting #148-e *S5-233494***

**e-meeting, 17 – 25 April 2023**

**Source: Huawei**

**Title: pCR 28.865 Add description on reliability analysis**

**Document for: Approval**

**Agenda Item: 6.9.5.2**

# 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] TR 28.865: "Study on deterministic communication service assurance";

[3] TS 22.104: "Service requirements for cyber-physical control applications in vertical domains; stage 1"; v18.3.0

# 3 Rationale

This tdoc addresses the descriptions of reliability analysis related to DCSA [1, 2].

The MDA capability should support reliability analysis, which has not been specified in TS 28.104 [3].

In TS 22.261 [2], the definition of reliability is as follows: in the context of network layer packet transmissions, percentage value of the packets successfully delivered to a given system entity within the time constraint required by the targeted service out of all the packets transmitted. In TS 28.541 [5], the reliability is included in ServiceProfile and SliceProfile as one of the requirements.

The correlation analysis of reliability and latency should be provided. Reliability should be considered within the survival time constraints rather than the average value for a long duration. The packet loss rate together with the applied latency costraints may be provided. The analytics output of reliability may contain the domain demarcation information of RAN, CN, both RAN and CN, or other factors.

# 4 Detailed proposal

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| **1st Change** |

### 5.X.2 Potential solutions

#### 5.X.2.a Potential solution #3: Service and network analysis

##### 5.X.2.a.1 Introduction

Editor's Note: This clause describes briefly the potential solution for issue#1 at a high-level.

The purpose of service and network analysis is to identify service experience and network performance degradation issues for network optimization. Based on the analysis results, network optimization solutions are used to improve the service experience and network performance, e.g. reconfiguration of network resource and/or parameters to reduce the latency and increase data rates.

3GPP management system should provide the analytical information of service experience and network performance related to deterministic communication service, especially for latency, throughput, and positioning because there are more stringent requirements. MDA capabilities of SLS analysis may be consumed or enhanced for this purpose. MDA capabilities of SLS analysis include service experience analysis, network slice throughput analysis, E2E latency analysis etc.

##### 5.X.2.a.2 Description

Editor's Note: This clause further details the potential solution and any assumptions made for issue#1.

The analytics information may include issues and possible causes of the performance metrics that do not meet the deterministic communication services requirements, as listed in the following aspects:

**Latency analytics**:

MDA type of E2E latency related issue analysis in SLS analysis group may be consumed or enhanced for latency analysis, currently the analytics output contain e2ELatencyIssueId, e2ELatencyIssueType and affectedObjects. The e2ELatencyIssueType can indicate the enumerated values RAN latency issue and CN latency issue, further information may be provided as follows.

* Latency issues which are out of time boundary constraints with the applied reliability requirement, e.g. latency of RAN or CN part exceeding the configured PDB (packet delay budget);
* Jitter exceeds the predefined threshold etc;
* BurstArrivalTime issues, data transfer or reception interval issues, e.g. some of the transfer intervals do not conform to the configured periodicy;
* Possible causes of the latency issues, e.g., coverage, interference, and parameter configurations etc;

**Reliability analytics**:

In TS 22.261 [2], the definition of reliability is as follows: in the context of network layer packet transmissions, percentage value of the packets successfully delivered to a given system entity within the time constraint required by the targeted service out of all the packets transmitted. In TS 28.541 [5], the reliability is included in ServiceProfile and SliceProfile as one of the requirements.

The correlation analysis of reliability and latency should be provided. Reliability fulfilment status should be considered within the survival time constraints rather than the average value for a long duration. The packet loss rate together with the applied latency costraints may be provided. Reliability fulfilment status should be considered from the end to end perspective. The analytics output of reliability may contain the domain demarcation information, for example, the analysis may indicate whether the realiability issue reside in RAN, CN, both RAN and CN, or other aspects.

**Throughput analytics:**

MDA type network slice throughput analysis in SLS analysis group may be consumed or enhanced for throughput analysis. Currently some throughput statistics and predictions are provided. More analytics regarding the guaranteed flow bit rate may be considered.

* Throughput below the guaranteed requirement etc;

**Positioning analytics:**

More accuracy of positioning is required for deterministic communications, the positioning related analysis may be considered.

* Positioning accuracy issues;

Editor's Note: These outputs will be revisited.

The corresponding network are optimized if needed based on the analytical report. The optimization results may be reported to the consumer for monitoring or further processing.

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

Editor's Note: This clause provides the conclusion from the aspect of impact on normative work for issue#1.

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| **End of change** |