**3GPP TSG-SA5 Meeting #145-e *S5-225480***

**e-meeting, 15 - 24 August 2022**

**Source: Huawei**

**Title: pCR 28.865 Add solution of service deployment related to DCSA**

**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] S5-224421: "TR 28.865 Study on deterministic communication service assurance"; v0.3.0

[3] 3GPP TS 28.541: "5G Network Resource Model (NRM); Stage 2 and stage 3"; v18.0.0

# 3 Rationale

This tdoc addresses the solution of service deployment related to DCSA. In [3], some management aspects have been specified related to deterministic communication service.

## 3.1 Service requirements and QoS attributes related to DCSA

### 3.1.1 Service requirements related to deterministic communication

In clause “6.3.3 ServiceProfile <<dataType>>” and “6.3.4 SliceProfile <<dataType>>”in [3], there are some network slice related service requirement attributes which are related or specific to (highlighted) deterministic communications. The following attributes are extracted from ServiceProfile for example.

|  |  |
| --- | --- |
| Attribute name | S |
| dLLatency | O |
| uLLatency | O |
| availability | O |
| delayTolerance | O |
| dLDeterministicComm | O |
| uLDeterministicComm | O |
| dLThptPerSlice | O |
| dLThptPerUE | O |
| uLThptPerSlice | O |
| uLThptPerUE | O |
| dLMaxPktSize | O |
| uLMaxPktSize | O |
| maxNumberofPDUSessions | O |
| termDensity | O |
| jitter | O |
| survivalTime | O |
| radioSpectrum | O |
| reliability | O |
| maxDLDataVolume | O |
| maxULDataVolume | O |
| synchronicity | O |
| positioning | O |

The *survivalTime* attribute specifies the time (millisecond) that an application consuming a communication service may continue without an anticipated message.

The *synchronicity* attribute specifies whether synchronicity of communication devices is supported, it is important for deterministic communication service.

The *dLDeterministicComm* attribute and *uLDeterministicComm* attribute specifies the properties of the deterministic communication in downlink and uplink respectively for periodic user traffic. Whose attributes are available in clause “6.3.8 DeterminComm <<dataType>>”in [3], as listed in the table below.

|  |  |
| --- | --- |
| Attribute name | S |
| servAttrCom | CM |
| availability | M |
| periodicityList | M |

The *servAttrCom* attribute is mandatory only *when requirements are being defined on* deterministic communication for periodic user traffic per network slice (GSMA attribute). Otherwise, the attribute is optional.

The *periodicityList* attribute specifies a list of periodicities supported by the network slice for deterministic communication.

The “6.3.9 XLThpt<<dataType>>” defines the throughput properties for attributes dLThptPerSlice, *dLThptPerUE,* uLThptPerSlice, *uLThptPerUE*, in which the attributes guaThpt and maxThpt (highlighted) are related to GFBR QoS flow type for deterministic communications.

|  |  |
| --- | --- |
| Attribute name | S |
| servAttrCom | CM |
| guaThpt | O |
| maxThpt | O |

The *guaThpt* attributedescribes the guaranteed data rate.

The *maxThpt* attribute describes the maximum data rate.

Some of the above attributes above are also available in “6.3.4 SliceProfile <<dataType>>”, which contains *CNSliceSubnetProfile, RANSliceSubnetProfile, TopSliceSubnetProfile*.

### 3.1.2 QoS attributes related to deterministic communication

In clause “5.3.76 FiveQICharacteristics” in [3], some attributes related or specific to (highlighted) deterministic communication service are defined.

|  |  |
| --- | --- |
| **Attribute name** | **S** |
| fiveQIValue | M |
| resourceType | M |
| priorityLevel | O |
| packetDelayBudget | O |
| packetErrorRate | O |
| averagingWindow | O |
| maximumDataBurstVolume | O |

The *averagingWindow* attribute indicates the Averaging Window (in unit of ms) of a 5QI. The *maximumDataBurstVolume* attribute indicates the Maximum Data Burst Volume (in unit of Byte) of a 5QI. These two parameters are used for deterministic communication service.

In clause “5.3.84 QoSData <<dataType>>”in [3], some attributes for GBR QoS flow type closely related to (highlighted) determinintic communications are extracted as follows:

|  |
| --- |
| **Attribute name** |
| qosId |
| fiveQIValue |
| maxbrUl |
| maxbrDl |
| gbrUl |
| gbrDl |
| maxPacketLossRateDl |
| maxPacketLossRateUl |
| extMaxDataBurstVol |

The *gbrUl* attribute and *gbrDl* attribute represents the guaranteed uplink and downlink bandwidth respectively. The *extMaxDataBurstVol* attribute denotes the largest amount of data that is required to be transferred within a period of 5G-AN PDB.

In clause “5.3.81 PccRule <<dataType>>”in [3], some properties specific to GFBR QoS flow type (highlighted) for determinintic communications are extracted as follows:

|  |  |
| --- | --- |
| Attribute name | S |
| pccRuleId | M |
| qosData | M |
| tscaiInputUl | O |
| tscaiInputDl | O |

The *tscaiInputDl* attribute contains transports TSCAI input parameters for TSC traffic at the ingress of the NW-TT (downlink flow direction).

The *tscaiInputUl* attribute contains transports TSCAI input parameters for TSC traffic at the ingress interface of the DS-TT/UE (uplink flow direction).

TSCAI describes TSC traffic characteristics for use in the 5G System. TSCAI may be used by the 5G-AN, if provided by SMF. The knowledge of TSC traffic pattern is useful for 5G-AN as it allows more efficiently scheduling of QoS Flows that have a periodic, deterministic traffic characteristics either via Configured Grants, Semi-Persistent Scheduling or with Dynamic Grants.

In clause “5.3.93 TscaiInputContainer <<dataType>> in [3], this data type is defined.

|  |  |
| --- | --- |
| Attribute name | S |
| periodicity | O |
| burstArrivalTime | O |

The *Periodicity* attribute identifies the time period between the start of two bursts in reference to the TSN GM. The *burstArrivalTime* attribute Indicates the arrival time (in date-time format) of the data burst in reference to the TSN GM.

## 3.2 The role of DCSA MnS producer in service deployment

There are mainly two aspects for the above contents in existing specification, the service requirements and QoS attributes related to DCSA.

For the service deployment of deterministic communications, the generic procedure of network slice provisioning could be utilized, including decomposition of ServiceProfile in the cross domain management into SliceProfile which contains *CNSliceSubnetProfile, RANSliceSubnetProfile, TopSliceSubnetProfile* in different domain management, feasibility check etc. It is considered the configuration of network resources, QoS policy for the support of deterministic communications etc are the responisibility of the domain management.

DCSA MnS producer in the cross domain management can provide support of SLS requirement analysis, SLS decomposition and feasibility check for ServiceProfile processing. It is handled by the module “service requirement modelling” in DCSA MnS producer. The inputs are the attributes in the ServiceProfile. The outputs are the attributes in the SliceProfile.

DCSA MnS producer in the domain management can provide support of network slice subnet requirement analysis, feasibility check in the network slice subnet level, network resource, network optimization policy e.g. SON policy and QoS policy configuration processing etc. It is handled by the module “Network preparation” and module “Service and Network analysis” in DCSA MnS producer.

It is proposed to add service requirements, QoS attributes and role of DCSA MnS producer in service and network requirements processing for deterministic communication service from management perspective. An example of procedure is also provided.

# 4 Detailed proposal

This document proposes the following changes in TR 28.865.

|  |
| --- |
| **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.X.2 Potential solutions

#### 5.X.2.a Potential solution #x:service deployment

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

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

For service deployment of deterministic communication in a certain network slice, the modelling and analysing of SLS requirements, feasibility check for network slice and network slice subnet, network resource management policy and QoS policy configuration specific to deterministic communications etc should be supported.

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

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

**1. Service requirements related to deterministic communication**

In clause “6.3.3 ServiceProfile <<dataType>>” and “6.3.4 SliceProfile <<dataType>>”in [3], there are some network slice related service requirement attributes which are related or specific to deterministic communications. The following attributes are extracted from ServiceProfile for example.

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The *survivalTime* attribute specifies the time (millisecond) that an application consuming a communication service may continue without an anticipated message.

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| maxPacketLossRateUl |
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|  |
| --- |
| **End of change** |