**3GPP TSG-SA5 Meeting #142eS5-222235**

**4 - 12 April 2022, E-meeting**

**Source: Huawei**

**Title: pCR 32.257 Clarification on the Edge Enabling Infrastructure Resource**

**Document for: Approval**

**Agenda Item: 7.4.1**

# 1 Decision/action requested

***The group is asked to discuss and agree on the proposal.***

# 2 References

[1] 3GPP TS 32.257-100 “Edge Computing domain charging; stage 2”

# 3 Rationale

## 3.1 The EAS ID

According to the TS 28.538 V1.0.0 and TS 23.558, whether the EAS ID is used to identify the applications services or the server.

* Clause 7.2.4 Edge Application Server ID (EASID)

*The EASID identifies a particular application for e.g. SA6Video, SA6Game etc. For example, all Edge SA6Video Servers will share the same EASID.*

*NOTE: The definition of the EASID is out of scope of this specification.*

* Clause 8.2.8 EEC Context in TS 23.558.

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| --- | --- | --- |
| *EAS ID* | *M* | *Identifier of the EAS providing the application services* |

* Clause 6.4.1 Attribute Properties

*Editor's Note: The definition of attributes are not complete, and are subject to changes.*

| *Attribute Name* | *Documentation and Allowed Values* | *Properties* |
| --- | --- | --- |
| *eASIdentifier* | *It refers to EASID that identifies a particular application (e.g. SA6Video, SA6Game, … etc.) (see clause 7.2.4 in TS 23.558 [2]).* | *type: String*  *multiplicity: 1*  *isOrdered: N/A*  *isUnique: True*  *defaultValue: None*  *isNullable: False* |
| *easAddress* | *One or more URLs and/or IP Address(es) of EAS(s) (See TS 23.558 [2]).*  *allowedValues: N/A* | *type: String*  *multiplicity: 1..\**  *isOrdered: N/A*  *isUnique: N/A*  *defaultValue: None*  *allowedValues: N/A*  *isNullable: False* |

The Edge Application server id is used for identifying an application which has the same category, the same category application can be distributed into multiple servers. One servers may implements different applications.

For the edge enabling infrastructure resource usage charging, the charging is specified for the usage of edge enabling infrastructure resources in the EDN of an ECSP to run the virtualized EAS (i.e., EAS is implemented as VNF) provided by an ASP.

**Summary:**

Charged Party: ASP

Charging Party: ECSP based on the provided virtualized EAS.

The chargable content: The usaged virtual resource for the virtualized EAS (a VNF). But how to identify the EAS (VNF)?

## 3.2 Virtual resource

According to the TS 28.538 V1.0.0 and TS 23.558, the virtual resource including the virtual CPU, virtual Memory and virtualDisk.

* 6.3.12.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Attribute name* | *Support Qualifier* | *isReadable* | *isWritable* | *isInvariant* | *isNotifyable* |
| *virtualMemory* | *M* | *T* | *T* | *F* | *T* |
| *virtualDisk* | *M* | *T* | *T* | *F* | *T* |

* 8.2.1.2 MnS Component Type C definition

*Performance measurements related EAS are captured in Table 8.2.1.2.-1:*

*Table 8.2.1.2-1. EAS related performance measurements*

| *Performance measurements* | *Description* | *Related targets* |
| --- | --- | --- |
| *Mean virtual CPU usage* | *Includes the mean usage of the underlying virtualized CPUs for a virtualized 3GPP NF (see clause 5.7.1.1.1 in TS 28.552 [10]).* |  |
| *Mean virtual memory usage* | *Includes the mean usage of the underlying virtualized memories for a virtualized 3GPP NF (see clause 5.7.1.2.1 in TS 28.552 [10]).* |  |
| *Mean virtual disk usage* | *Includes the mean usage of the underlying virtualized disks for a virtualized 3GPP NF (see clause 5.7.1.3.1 in TS 28.552 [10]).* |  |
| *Data volume of incoming bytes to EAS* | *Includes the number of incoming bytes received by the EAS (see clause 5.7.2.1 in TS 28.552 [10]).* |  |
| *Data volume of outgoing bytes to EAS* | *Includes the number of outgoing bytes received by the EAS (see clause 5.7.2.2 in TS 28.552 [10]).* |  |
| *Data volume of incoming packets to EAS* | *Includes the number of incoming packets received by the EAS (see clause 5.7.2.3 in TS 28.552 [10]).* |  |
| *Data volume of outgoing packets to EAS* | *Includes the number of outgoing packets received by the EAS (see clause 5.7.2.4 in TS 28.552 [10]).* |  |

**Summary:**

1. The virtual resource is inconsistent in the TS 28.538.
2. How to use the mean virtual CPU usage, virtual memory usage and Mean virtual disk usage (A single integer value (Unit: %)) for charging purpose?

Where to get the information how much the CPU (e.g. 5m), memory(e.g. 5G) and disk information is? From the configuration?

This pCR is to clarify the edge enabling infrastructure resource usage for EC in the TS 32.257.

# 4 Detailed proposal

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| **First change** |

### 5.1.3 Charging principles for edge enabling infrastructure resource usage

#### 5.1.3.1 General

In the present specification, the charging is specified for the usage of edge enabling infrastructure resources in the EDN of an ECSP to run the virtualized EAS (i.e., EAS is implemented as VNF) provided by an ASP.

The charging for edge enabling infrastructure resources usage, is based on the MnS(s) for performance assurance of Edge Computing specified in TS 28.538 [12], including following resources usage for EAS:

- mean virtual CPU usage;

- mean virtual memory usage;

- mean virtual disk usage;

- data volumes.

The time window during which the charging for edge enabling infrastructure resource usage needs to be enabled, and the criteria (e.g., thresholds) for triggering the charging may be locally configured to CEF, and cannot be controlled by CHF.

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| **End of change** |

#### 5.1.3.2 Requirements

The following are high-level charging requirements specific to the edge enabling infrastructure resources charging:

- The CEF shall be able to consume the MnS (see 28.538 [12]) to collect the following performance measurements about the usage of enabling infrastructure resources that are supporting to run the virtualized EAS, and enable converged charging when the CEF has fetched the performance data file containing these measurements or the CEF receives the performance data of these measurements by the reportStreamData operation from MnS producer:

- mean virtual CPU usage (see TS 28.552 [13]);

- mean virtual memory usage (see TS 28.552 [13]);

- mean virtual disk usage (see TS 28.552 [13]);

- data volumes (see TS 28.552 [13]).

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| **Next change** |

##### 5.2.2.1.2 Applicable Triggers in the CEF

When a charging event is issued towards the CHF by the CEF, it includes details of charging information, such as EAS identifier (e.g., EAS ID, see TS 23.558 [9]).

Each trigger condition (i.e., chargeable event) defined for edge enabling infrastructure resource usage charging, is specified with the associated behaviour when they are met.

The immediate report is applied to the chargeable events for edge enabling infrastructure resource usage charging, i.e., the chargeable events for which.When the CEF consumes the MnS to create measurement job, the converged charging is activated. When the CEF receives or gets the performance data report containing the usage of edge enabling infrastructure resource, the CEF invokes a Charging Data Request to report the charging data based on PEC to CHF.

The charging for edge enabling infrastructure resources usage cannot be enabled and disabled by CHF.

Table 5.2.2.1.2-1 summarizes the set of default trigger conditions and their category which shall be supported by the CEF when charging is active for the edge enabling infrastructure resource usage charging.

Table 5.2.2.1.2-1: Default Trigger conditions in CEF

| Trigger Conditions | Trigger level | Default category | CHF allowed to change category | CHF allowed to enable and disable | Message when "immediate reporting" category |
| --- | --- | --- | --- | --- | --- |
| **Edge enabling infrastructure resource usage reporting** | | | | | |
| CEF has fetched the performance data file containing the measurements for the usage of edge enabling infrastructure resources, based on the notifyFileReady notification from the MnS producer, see TS 28.532 [15] | - | Immediate | Not Applicable | No | PEC: Charging Data Request [Event] |
| CEF receives the performance data containing the measurements for the usage of edge enabling infrastructure resources, by the reportStreamData operation from MnS producer, see TS 28.532 [15]. | - | Immediate | Not Applicable | No | PEC: Charging Data Request [Event] |

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| **Next change** |

##### 5.2.2.2.2 Edge enabling infrastructure resource usage charging enabled by CEF

The following figure 5.2.2.2.2-1 describes an edge enabling infrastructure resource usage charging message flows in PEC, based on the converged charging architecture with MnS producer enabled by CEF (see clause 4.2.2).



**Figure 5.2.2.2.2-1: Edge enabling infrastructure resource usage charging - PEC**

**1) Create measurement job:** The CEF creates measurement job to collect the performance measurements related to Virtualized Resource (VR) usage for EAS to performance assurance MnS producer (see TS 28.538 [12] and TS 28.550 [14]). The performance measurements can be one or more of the following:

- mean virtual CPU usage (see VR.VCpuUsageMean in clause 5.7.1.1.1 of TS 28.552 [13]);

- mean virtual memory usage (see VR.VMemoryUsageMean in clause 5.7.1.2.1 of TS 28.552 [13]);

- mean virtual disk usage (see VR.VDiskUsageMean in clause 5.7.1.3.1 in TS 28.552 [13]);

- incoming data volume (see DataVolum.InBytesEAS in clause 5.7.2.1 of TS 28.552 [13]);

- outgoing data volume (see DataVolum.OutBytesEAS in clause 5.7.2.2 of TS 28.552 [13]).

**1a) Subscribe to performance data file notifications:** If file reporting method is chosen for the measurement job, the CEF subscribes to the performance data file notifications, see TS 28.532 [15].

**2) Generate performance measurements for resource usage for EAS:** performance assurance MnS producer generates the performance measurements according to the measurement job.

**3) Performance data report to CEF:** the performance assurance MnS producer reports the performance data to the CEF according to the reporting method selected by the CEF for the measurement job.

If the file data reporting method is selected:

3a)The performance data are reported by a notifyFileReady notification (see TS 28.532 [15]);

3b) CEF fetches the file containing the performance data.

If the streaming data reporting method is selected:

3c) and 3d) The performance assurance MnS producer establishes the streaming connection with the CEF if the connection has not been established (see TS 28.532 [15]);

3e) The performance data are reported by the reportStreamData operation (see TS 28.532 [15]).

**3ch Decide whether to trigger the charging:** CEF decides whether to trigger the charging. If charging is triggered:

**3ch-a) Charging Data Request [Event]:** The CEF generates charging data for the collected resource usage and sends the charging data request for the CHF to process the related charging data for CDR generation purpose.

**3ch-b) Create CDR:** the CHF creates a CDR to store the received information .

**3ch-c) Charging Data Response [Event]:** The CHF informs the CEF on the result of the request.

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| **Next change** |

##### 6.1.2.1.2 Definition of edge enabling infrastructure resource usage specific charging information

Specific charging information used for edge enabling infrastructure resource usage charging is provided within the Edge Enabling Infrastructure Resource Usage Charging Information.

The detailed structure of the Edge Enabling Infrastructure Resource Usage Charging Information can be found in table 6.1.2.1.2-1.

Table 6.1.2.1.2-1: Structure of Edge Enabling Infrastructure Resource Usage Charging Information

|  |  |  |
| --- | --- | --- |
| Information Element | Category | Description |
| Mean Virtual CPU Usage | OC | This field holds the information of mean virtual CPU usage for the EAS, see VR.VCpuUsageMean in clause 5.7.1.1.1 of TS 28.552 [13]. |
| Mean Virtual Memory Usage | OC | This field holds the information of mean virtual memory usage for the EAS, see VR.VMemoryUsageMean in clause 5.7.1.2.1 of TS 28.552 [13]. |
| Mean Virtual Disk Usage | OC | This field holds the information of mean virtual disk usage for the EAS, see VR.VDiskUsageMean in clause 5.7.1.2.1 of TS 28.552 [13]. |
| Duration Start Time | OC | This field holds the start time of the collection period, see TS 28.550 [14]. |
| Duration End Time | OC | This field holds the end time of the collection period, see TS 28.550 [14]. |

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| **End of change** |