**3GPP TSG-SA5 Meeting #156 *S5-244624***

**Maastricht, The Netherlands 19 - 23 August 2024**

**Source: AsiaInfo**

**Title:** **Add solution for edge application deployment location analytics**

**Document for: Approval**

**Agenda Item: 16.9.2**

# 1 Decision/action requested

***In this box give a very clear / short /concise statement of what is wanted.***

# 2 References

[1] 3GPP TR 28.866 v0.2.0 Study on Management Data Analytics (MDA) – Phase 3

# 3 Rationale

This provides the solution for edge application deployment location analytics.

# 4 Detailed proposal

It proposes to make the following changes to TR 28.866.

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| **First Change** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.104: "Management and orchestration; Management Data Analytics (MDA)".

[3] 3GPP TS 28.532: "Generic management services".

[4] 3GPP TS 23.501: "System architecture for the 5G System (5GS)"

[5] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[6] 3GPP TS 28.554: "Management and orchestration;5G end to end Key Performance Indicators (KPI)".

[7] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[8] 3GPP TS 28.538: " Management and orchestration; Edge Computing Management (ECM)".

[9] 3GPP TS 37.817: "Study on enhancement for data collection for NR and ENDC"

[10] 3GPP TS 38.423: "NG-RAN; Xn Application Protocol (XnAP) "

[11] ITU-T Recommendation X.733 (02/92): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[12] 3GPP TS 32.422: "Subscriber and equipment trace; Trace control and configuration management"

[13] 3GPP TS 28.541: "5G Network Resource Model (NRM); Stage 2 and stage 3"

[X] 3GPP TS 28.622: "Telecommunication management; Generic Radio Access Network (RAN) Network Resource Model (NRM); Information Service (IS)".

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| **Second Change** |

## 5.2 End-to-End performance analytics including Edge computing domain

### 5.2.2 Use case 2: Edge application deployment location analytics

#### 5.2.2.1 Description

With the rapid development of edge computing, an increasing number of applications require deployment at the network edge to meet the demands for low latency, high bandwidth, and localized data processing. However, selecting the optimal edge deployment location is a complex issue that involves considering multiple factors such as QoS requirements, network resource information and UE distribution. Currently, edge application deployment locations primarily rely on operator experience and manual configuration, lacking automated and intelligent decision support. This can lead to deployment location that fail to fully leverage the advantages of edge computing.

The use case aims to utilize MDA analytics capabilities to provide data-driven decision support for edge application deployment location selection. MDA can collect and analyse related data (including performance measurement from RAN(e.g. UE throughput, latency, coverage), EDNs connection information, available EDNs virtual resource information, UE location information, QoE data) to determine the deployment location that satisfies user experience.

#### 5.2.2.2 Potential Requirements

REQ-EDGE-APP-LOCATION-01: MDA capability for edge application deployment location analysis should be able to recommend the deployment location that meets user experience.

#### 5.2.2.3 Potential solutions

The solution is to introduce the enabling data for edge application deployment location analytics, the enable data are provided in table 5.2.2.3-1

**Table 5.2.2.3-1: Enabling data for edge application deployment location analytics**

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| --- | --- | --- |
| Data category | Description | References |
| Performance measurements | Packet Delay on air-interface | Average delay DL air-interface(clause 5.1.1.1.1 TS 28.552 [5]);(Average delay UL on over-the-air interface(clause 5.1.1.1.3 TS 28.552 [5]) |
| Round-trip Packet Delay | Round-trip packet delay between PSA UPF and NG-RAN (clause 5.4.8 TS 28.552 [5]). |
| Registered subscribers measurement  | Registered subscribers measurement as defined in clause 5.2.1 in Ts 28.552[5] |
| Integrated uplink/downlink delay in RAN | Integrated downlink delay in RAN (clause 6.3.1.2 in TS 28.554 [6]); Integrated uplink delay in RAN (clause 6.3.1.7 in TS 28.554 [6]). |
| UL/DL throughput for network and Network Slice Instance | Upstream throughput for network and Network Slice Instance as defined in clause 6.3.2 in TS 28.554 [5]; Downstream throughput for Single Network Slice Instance as defined in clause 6.3.3 in TS 28.554 [5]. |
| RAN UE Throughput | RAN UE Throughput as defined in clause 6.3.6 in TS 28.554 [5]. |
| Throughput at N3 interface | Upstream Throughput at N3 interface as defined in clause 6.3.4 in TS 28.554 [5]; Downstream Throughput at N3 interface as defined in clause 6.3.5 in TS 28.554 [5]. |
| UE location reports | UE location information provided by the LMF services which can be used to correlate with the MDT reports. | The UE location information provided by LMF via service-based interface (see TS 23.273 [7]). |
| QoE Data | The QoE data of the different services | QoE data (TS 26.247 [22] and TS 26.114 [23] can be acquired through the procedures defined in TS 28.405 [8]). |
| EDN Identifier | It defines the identifier of the edge data network | ednIdentifier as defined in clause 6.3.10 in TS 28.538[8] |
| EDN Connection Information | It defines the set of information needed to connect to an EDN. | eDNConnectionInfo as defined in clause 6.3.10 in TS28.538[8] |
| Available Edge Virtual Resources  | It defines the available edge virtual resources managed by an EDN | availableEdgeVirtualResources as defined in clause 6.3.10 in TS28.538[8] |

The analytics output of MDA for Edge application deployment location analytics, are provided in table table 5.2.3.3-2

**Table 5.2.2.3-2: Analytics output for edge application deployment location analytics**

| Information element | Definition | Support qualifier | Properties |
| --- | --- | --- | --- |
| edgeApplicationDeplymentLocationRecommendations | It defines geographic locations where are recommended for edge application deployment | M | type: GeoArea (see TS 28.622 [X])multiplicity: \*isOrdered: FalseisUnique: TruedefaultValue: NoneisNullable: False |

#### 5.2.2.4 Evaluation of solutions

Only potential solution #1 is proposed, the requirements are satisfied and this solution is feasible for normative work

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| **Third changes** |

# 6 Conclusions

### 6.2 End-to-End performance analytics including Edge computing domain

The use case, requirements and solution for Use case 2: Edge application deployment location analytics in clause 5.2.2. It is recommended to add new capability in TS 28.104 [2] to support MDA analytics for edge application deployment location, which can be used to recommend the deployment location that meets user experience.

The detailed solution is described in clause 5.2.2.3.

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| **End changes** |