

[SA1#99e, LS S1-222073] LS on DN energy efficiency data analytics - Version 0.0.1
SA1

Title: LS on DN energy efficiency data analytics

Response to:

Release: Rel-18

Work Item: FS_ADAES

Source: SA WG6

To: SA WG5, SA WG1

Cc:

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Send any reply LS to: 3GPP Liaisons Coordinator, <mailto:3GPPLiaison@etsi.org>

Attachments: None

1 Overall description

SA6 is investigating the Application Data Analytics Enablement service (ADAES) as part of a Release 18 Study Item (FS_ADAES, TR 23.700-36), to provide application-layer and edge related analytics to vertical customer / 3rd party application service providers. ADAES can be seen as an AF which can be deployed by the MNO, a trusted 3rd party (e.g. edge/cloud provider), or by the vertical customer.

In SA6 #48-e (S6-220860), it was proposed to discuss a key issue related to the DN energy efficiency calculation and analysis at the ADAE layer. The energy efficiency for a DN can relate to the per EAS/AS energy efficiency as well as the per EDN / platform energy efficiency. Such metric can be derived based on analyzing the performance/data volumes of the edge/cloud platform capabilities (e.g. EES/EAS, abstracted network services) as well as the expected energy consumption for a DN/EDN which can be due to the EES/EAS vCPU usage, the API invocations (for edges services produced or consumed by the EDGE platform) and other energy consumptions (e.g HW/NFVI layer).

In telco cloud environments (in ICT domain), the energy measurement for the ICT equipment can be supported by a Remote Management Server (RMS) which can provide energy metering from 3rd party perspective and can also provide energy data analysis services which include various reports, with database management, and potential correlation services to understand the power consumption structure and optimization possibilities and progress [see ETSI ES 202 336-12 V1.2.1, ETSI ES 202 336-1]. Based on ETSI ES 202 336-12, non-real time energy analytics services for ICT equipment have been shown out of scope (Figure 4 of ETSI ES 202 336-12 v1.2.1). Such analytics services could be discussed in SA6 and could help

providing energy related data and/or analytics for the ICT equipment (edge/cloud platform) and the application servers hosted at the platform in a unified and standardized manner.

Based on the above description, SA6 would like to ask SA5 view on whether such potential capability is overlapping with current or planned SA5 activities. In particular, SA6 would like to ask SA5 the following:

Q1: Is SA5 defining Energy Efficiency (EE) KPIs for the enablement layer functions (like EDGEAPP, SEAL) and EE KPIs for the 3rd party applications / edge applications? If the answer is yes, how SA5 is expected to derive requirements for defining such EE KPIs?

Q2: Does MDAS or any other management service provide analytics/data on EE for the edge/cloud resources?

Q3: If the answer to Q2 is yes, is the exposure of energy data/analytics to 3rd party / applications defined as part of SA5, and what parameters are expected to be exposed?

Q4: Is the understanding of SA5 that the energy measurement and analytics for external DNs / 3rd party applications lies within the coverage of SA5; hence any mechanism needs to be specified there?

Based on the above description, SA6 would also like to ask SA1 whether requirements for energy efficiency analytics for application layer entities and edge/cloud resources are in scope of the Rel-19 new SID on Energy Efficiency as a service criteria (FS_EnergyServ).

1.1 China Mobile's draft reply [S1-222186]

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Feedback Form 1: Comments/Questions about China's Mobile Draft Reply

1 – Deutsche Telekom AG

It is not clear to me if 5GS includes the application enabler layer as I cannot find definition of 5GS. In the scope it is written:

The present document describes the service and operational requirements for a 5G system, including a UE, NG-RAN, and 5G Core network.

It does not specifically mention the application enabler layer defined in SA6.

As we have discussed - RAN is working on a KPI to show/have configurations for specific amount of MB to be transferred for specific amount of energy. It is not clear how this could affect SA6 EDGEAPP work. Can you provide some details?

2 – Huawei Tech.(UK) Co.. Ltd

From the FS_EnergyServ SID: *"This study is aiming at identifying use cases, providing gap analysis and defining potential requirements in the following aspects regarding enhancement on energy efficiency of 5G network."*

Given that the 5GN is the 5G Access Network plus the 5G Core Network, this means that the scope of FS_EnergyServ should include only network elements from gNB to the UPF. Edge is always north of the

UPF (per TS 23.548), and therefore is not part of the 5G Network. For this reason, we do not agree that the Edge as defined in either SA2 or SA6 is part of the 5G Network.

3 – Huawei Tech.(UK) Co.. Ltd

@Vasil - TS 23.501 defines the 5G System: 3GPP system consisting of 5G Access Network (AN), 5G Core Network and UE.

4 – TNO

KPN concurs that strictly speaking in 3GPP terminology EDGE is not part of 5G network, but part of 5G system. On the other hand, when KPN buys a 5G network, it may actually consider EDGE to be part of it :-).

SA6 has mechanisms to find (and if needed establish) an edge server. It is quite possible that there are differences on energy efficiency between different locations where the edge server is that is used. E.g. more centralised edge servers may be more energy efficient at the expense of some service latency. This is exactly the kind of energy efficiency service options we think are relevant to provide to customers. Specific customers may have different requirements on the balance between energy efficiency and service latency.

5 – Deutsche Telekom AG

I fully agree from SA2 point of view EDGE is considered outside of 5GS.

From reading the SA5 reply, it seems SA5 asks for specific criteria based on which to define specific performance measurements and points out also existing ones are already existing for EDGEAPP. SA5 also asks for additional use cases where additional performance measurements can be defined. My understanding is SA6 itself would not define specific measurements, but can provide specific requirements for SA5 to define such.

When looking to SA6 question: *Based on the above description, SA6 would also like to ask SA1 whether requirements for energy efficiency analytics for application layer entities and edge/cloud resources are in scope of the Rel-19 new SID on Energy Efficiency as a service criteria (FS_EnergyServ).*

It is not clear to me how SA1 can provide requirements for energy efficiency analytics as the analytics are not at all part of SA1 study on EE. I would like to understand more on the specific relation.

6 – TNO

In response to DT: SA1 can come up with requirements that imply that SA6 solutions on EDGE node selection shall take into account energy efficiency analytics and/or shall use policies that for a specific application user determine the relative importance of optimizing for latency compared to optimized for energy efficiency? E.g. optimize for low latency first and then optimize for energy efficiency, or e.g. optimize for energy efficiency as long as latency is kept within specific bounds.

We are trying to find out what we can do with the FS_EnergyEfficiency. I find it disappointing when people say that we cannot include aspects related to EDGE nodes, simply because the WID states 5G Network and not 5G System. Or because 5G System may or may not include EDGE. It should be clear that SA6 is looking at EDGE applications, and I see no reason why SA1 cannot provide requirements for what SA6 is doing. If the current ToRs say different, then that is a reason to change.

2 Actions

To SA5

ACTION: SA6 kindly asks SA5 to provide feedback on the above questions (Q1-Q4)

Overall Description: SA5 would like to thank SA6 for your LS on DN energy efficiency data analytics. 3GPP SA5 would

To SA1

ACTION: SA6 kindly asks SA1 whether requirements for energy efficiency analytics for application layer entities and edge/cloud resources are in scope of the Rel-19 new SID on Energy Efficiency as a service criteria (FS_EnergyServ).

3 Dates of next TSG SA WG 6 meetings

SA6#49-bis-e 22nd June – 1st July 2022 e-meeting

SA6#50-e 22nd August – 31th August 2022 e-meeting

4 Documents related this discussion:

Table 3:

TO	S1-222073	S6-221347	LS on DN energy efficiency data analytics
CC	S1-222071	S5-224342	Reply LS on DN energy efficiency data analytics
OUT	S1-222186	China Mobile	Reply LS on DN energy efficiency data analytics