**SA WG2 Meeting #S2-147ES2-2107639r03**

**18 - 22 October, 2021, Electronic meeting** (revision of S2-2106812)

Source: Huawei, HiSilicon, Alibaba, China Unicom, Convida Wireless, Intel, Toyota, vivo, Nokia, Nokia Shanghai Bell

Title: New SID on Enhancement of support for Edge Computing in 5G Core network — phase 2

Document for: Approval

Agenda Item: 9.1.3

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Enhancement of support for Edge Computing in 5G Core network — phase 2

Acronym: FS\_eEDGE\_5GC\_ph2

Unique identifier:

Potential target Release: *Rel-18*

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  |  | X |  |
| No | X |  |  |  |  |
| Don't know |  | X | X |  | X |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Feature |
|  | Building Block |
|  | Work Task |
| X | Study Item |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  | N/A |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 830032 | Study on enhancement of support for Edge Computing in 5GC | Corresponding study of architecture enhancements and procedures (SA2) |
| 900016 | Enhancement of support for Edge Computing in 5G Core network | Rel-17 WI for Enhancement of support for Edge Computing (SA2) |
| 880002 | Study on Security Aspects of Enhancement of Support for Edge Computing in 5GC | Study of the security aspects of Edge Computing (SA3). |
| 870015 | Study on Streaming Architecture extensions For Edge processing | Study of media architecture to support processing of media services with edge computing deployment (SA4). |
| 870029 | Study on enhancements of edge computing management | Study of the management aspects of Edge Computing (SA5). |
| 880030 | Study on charging aspects of Edge Computing | Study of the charging aspects of Edge Computing (SA5). |
| 860006 | Architecture for enabling Edge Applications | Application layer architecture and corresponding mechanisms to enable Edge Computing deployment (SA6). |

# 3 Justification

Edge Computing is supported in 5GS since Rel-15. In Rel-17 FS\_enh\_EC study, further enhancements for supporting Edge Computing are studied, including discovery and re-discovery of EAS, edge relocation etc. 4 key issues from FS\_enh\_EC study have been concluded and progressed to the normative phase according to TR 23.748. Due to Rel-17 timeline, the key issue on Consecutive traffic steering in different N6-LAN was not addressed in Rel-17.

Furthermore, there are some other issues were raised during the Rel-17 study but not studied due to the time limitation in Rel-17. The issues include:

- Supporting accessing to Edge Hosting Environment (EHE) in VPLMN when roaming .

 Current specifications do not support the UE to access EAS via a Home Routed PDU Session. So, if a roaming UE wants to access EAS in EHE deployed in VPLMN, it has to establish a dedicate LBO PDU Session for the local traffic routing, and another HR PDU Session for other services. One or more dedicated DNN(s) have to be assigned to these applications in URSP rules determined by the HLPMN.

- Improvement to fast and efficient network exposure of UE traffic related information to Edge Application Server via Local UPF/NEF to support exposure of additional information, such as network congestion status.

- Supporting for EAS (re-)discovery for split UE with separated TE and MT.

- Support the definition of offload policies for more granular sets of UE(s).

- Influence PSA-UPF and EAS (re)location for collection of UEs in scenarios when UE(s) are not members of a pre-defined group and should be treated the same way, e.g. striving to use the same EAS for multi-user gaming or platooning, etc. while there is UEs mobility.

- Investigate the potential need and solutions to avoid the UE to switch the EC traffic away from the EC PDU Session and 5GS altogether, due to conflicting connectivity preferences in the device (e.g. via means outside of 3GPP connectivity, e.g. non-integrated Wifi).

Finally, as indicated in the SA#92E LS out SP-210583, the ongoing GSMA Operator Platform Group work may have impacts on SA2 work.

This study is to further investigate the issues described above for completing support for Edge Computing in 5GS.

# 4 Objective

The study item will study the potential system enhancements for enhanced edge computing support, including:

WT1) Improvements to roaming, to support access to EHE in a VPLMN

WT2) Supporting consecutive traffic steering in different N6-LAN as described in KI#4, clause §5.4 in TR 23.748.

WT3.1) Define use cases that may benefit from exposure of additional data via the Local UPF/NEF including describing (on a high level) the characteristics of the data and data delivery to fulfil the use cases.

WT3.2) Investigate the solutions and their feasibility and suitability for improved network exposure of UE traffic related information to common Edge Application Server via Local UPF/NEF, such as network congestion status.

NOTE: XR/media and AI/ML services specific QoS information exposure are to be studied in corresponding study items with considering the same exposure framework as defined by this study.

WT4) Supporting EAS (re-)Discovery for split UEs with separate TE and MT.

WT5) Investigate the potential need and solutions for supporting offload policies to match more granular sets of UE(s) without exposing operator-internal configurations to 3rd party AFs.

WT6) Investigate the potential need and solutions to influence of PSA-UPF and EAS (re)location for collection of UEs, e.g. in scenarios when UE(s) should use the same EAS and are not members of a pre-defined group.

WT7) Investigate potential impacts related to the GSMA Operator Platform Group work, and potential improvements related with 5GC and EHE being operated by different organizations.

WT8) Investigate the potential need and solutions to avoid the UE to switch the EC traffic away from the EC PDU Session and 5GS altogether, due to conflicting connectivity preferences in the device (e.g. via means outside of 3GPP connectivity, e.g. non-integrated Wifi).

NOTE: Existing solutions defined in Rel-15, Rel-16 and Rel-17 will be considered as baseline in this study.

NOTE: Alignment with corresponding work on EdgeApp in SA6 will take place as necessary.

## TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Work Task ID | TU Estimate(Study) | TU Estimate(Normative) | RAN Dependency(Yes/No/Maybe)  | Inter Work Tasks Dependency Editor’s Note: This column should highlight if WT#x is self-contained, or is depended on completion of other WTs |
| WT#1 | 1,5 | 1 | no | self-contained |
| WT#2 | 1,5 | 1 | no | self-contained |
| WT#3 | 1,5 | 0,75 | maybe | self-contained |
| - WT#3.1 | 0,5 | — |  | — |
| - WT#3.2 | 1 | 0,75 |  | — |
| WT#4 | 0,75 | 0,5 | no | self-contained |
| WT#5 | 0,75 | 0,5 | no | self-contained |
| WT#6 | 1,25 | 0,75 | no | self-contained |
| WT#7 | 1 | 0,5 | no | self-contained |
| WT#8 | 0,75 | 0,5 | no | self-contained |

Total TU estimates for the study phase: 9

Total TU estimates for the normative phase: 5,5

Total TU estimates: 8 + 5 = 14,25

# 5 Expected Output and Time scale

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| Internal TR | TR 23.xxx | 5G System Enhancements for Edge Computing — phase 2 | TSG#96, June 2022 | TSG#97, Sept 2022 | Patrice Hédé, Huawei (patrice dot hede at huawei dot com) orShubhranshu Singh, Nokia (Shubhranshu dot singh at nokia dot com)TBD, see below |

# 6 Work item Rapporteur(s)

Patrice Hédé, Huawei Technologies, patrice dot hede at huawei dot com OR

Shubhranshu Singh, Nokia, Shubhranshu dot singh at nokia dot com TBD with one rapporteur only

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Security aspects are considered by SA3.

Media layer aspects are considered by SA4.

Management and charging aspects are considered by SA5.

Application layer aspects are considered by SA6.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Huawei |
| HiSilicon |
| Nokia |
| Nokia Shanghai Bell |
| Alibaba |
| AT&T |
| CATT |
| China Unicom |
| Convida Wireless |
| Deutsche Telekom |
| Ericsson |
| Futurewei |
| Intel |
| InterDigital |
| Lenovo |
| LG Electronics |
| Motorola Mobility |
| NTT Docomo |
| OPPO |
| Oracle |
| Qualcomm |
| Sony |
| Telecom Italia |
| T-Mobile USA |
| Toyota |
| vivo |
| ZTE |