**3GPP TSG-SA Meeting #101 S2-2310425**

**Bengaluru, India, September 11-15, 2023 (revision of S2-231xxxx)**

Source: Intel

Title: New SID on Enhancement of support for Edge Computing in 5G Core network — phase 3

Document for: Approval

Agenda Item: 7.4

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 3

Acronym: FS\_eEDGE\_5GC\_ph3

Unique identifier:

Potential target Release: *Rel-19*

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  |  | X |  |
| No | X | X | X |  |  |
| Don't know |  |  |  |  | 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) |
| 970026 | Edge Computing Phase 2 | Re-18 WI for Edge Computing Phase 2 (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 and 18 Edge Computing related study items, further enhancements for supporting Edge Computing are studied, but there are still some aspects requiring further study. These aspects include:

- More efficient management of Edge Hosting Environment information:

- Support of Rel-17/18 defined Edge Computing requires heavy impacts to existing 5GC Control Plane function entities, e.g. the edge network and application information need be stored at the SMF, which is regarded as disadvantage in deployment. A light weighted solution with less impact to 5GC Control Plane should be studied. For example, EAS (re)discovery and relocation, local UPF selection, can be supported via assistance of a localized Control Plane function with less impact to the central 5GC Control Plane function entities (e.g. SMF).

- In current design per 23.548, the (re)discovery of the EAS by EASDF is based on the EAS Deployment Information which only includes the network deployment information, i.e. the topology information of UPF, however the load status of EAS are not considered since this information is not applicable to EASDF. In order to (re)discover a more suitable EAS, some dynamic information (e.g. EAS load, N6 delay between the local PSA and EAS) needs to be taken into consideration, which should be investigated together.

- For cloud application, some of the traffics can be steered to Edge first, then be further processed at Edge. After processing, some of the application traffics may still need to be forwarded to cloud for further processing. In some cases, the application traffics may not be able to be routed directly between the local DN and the Cloud Server in the central DN. Thus, how to route the processed application traffics between local DN and the Cloud Server in the central DN needs to be studied. The same issue applies to TS 23.548 on how to route the DNS messages between the local DNS server in the local DN and central DNS server in the central DN when the DNS messages can’t be routed directly between them.

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

# 4 Objective

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

WT#1) How to support more efficient Edge Hosting Environment information management and related EAS Discovery

- WT#1.1: Handle the edge network and EAS related information (e.g. EAS load, UPF and EAS deployment information, DNAIs) locally with less impact to 5GC central NFs (e.g. central SMF ) to address more flexible EAS (re)discovery/(re)selection, local UPF (re)selection.

- WT#1.2: Void.

- WT#1.3: Whether and how to take into account, EAS load and N6 Delay between the local PSA and EAS for local UPF and EAS (re)selection.

WT#2) Void.

WT#3) How to support end-user traffic sent to/from Anchor PSA after being processed by Edge Hosting Environment, e.g. when there is no communication possibility between the local part of the DN and central part of the DN (e.g. due to usage of private IP address, lack of secure tunnel). Below two scenarios will be addressed​:

- Scenario 1: Enhance the case where local DNS server or EASDF has no connectivity with the central DNS server

- Scenario 2: Support the User Plane routing and traffic steering of Application traffic between the local DN and a cloud server located in the central DN

NOTE: For WT#3, all connectivity models defined in TS 23.548 will be addressed.

WT#4) Void.

WT#5) Void.

## 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 | 2 | 1.25 |  | self-contained |
|  |  |  |  |  |
| WT#1.3 | 0.5 | 0.25 |  | self-contained |
|  |  |  |  |  |
| WT#3 | 1.5 | 1 |  | self-contained |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Total TU estimates for the study phase: 4

Total TU estimates for the normative phase: 2.5

Total TU estimates: 6.5

# 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 3 | TSG#103, March 2023 | TSG#104, June 2023 |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Security aspects are considered by SA3.

Management and charging aspects are considered by SA5.

Application layer aspects are considered by SA6.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Intel |
| ZTE |
| Huawei |
| Hisilicon |
| NTT DOCOMO |
| KDDI |
| China Unicom |
| Telefonica |
| China Mobile |
| CATT |
| NEC |
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