**3GPP TSG-WG SA2 Meeting #147E e-meeting S2-2107572r04**

**Elbonia, October 18 – 22, 2021 (Revision of S2-2106808-was6147r05-was4231)**

**Source: China Mobile, vivo**

**Title: Study on Enablers for Network Automation for 5G - phase 3**

**Document for: Approval**

**Agenda Item: 9.1.3**

3GPP™ Work Item Description

For guidance, see [3GPP Working Procedures](http://www.3gpp.org/About/WP.htm), article 39; and [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm).
Comprehensive instructions can be found at <http://www.3gpp.org/Work-Items>

# Title: Study on Enablers for Network Automation for 5G - phase 3

Acronym: FS\_eNA\_Ph3

Unique identifier:

Potential target Release: *{Rel-18}*

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

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

|  |
| --- |
| 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 |
| 840022 | Study on Enablers for Network Automation for 5G - phase 2 | Antecedent study item (TR 23.700-91) |
| 760047 | Study of enablers for Network Automation for 5G | Antecedent study item (TR 23.791) |
| 830034 | Study on UPF enhancement for control and SBA | Related to how UPF report data to NWDAF |
| 830047 | Enablers for Network Automation for 5G | Antecedent Work item (TS 23.288) |
|  |  |  |

# 3 Justification

Based on the work in Rel-15 and Rel-16, in Rel-17 further framework and solutions are investigated for supporting network automation leveraging 5GC information exposure and network data analytics. It will be of benefit to have discussion on further architecture enhancement, new cases and Rel-17 leftover.

This study also targets to investigate different deployment options for NWDAFs.

# 4 Objective

This study item aims at further investigating system enhancements for NWDAF, based on what has been specified in the previous releases to allow 5GS to support network automation. This study focuses on analytics for 5GC NFs with the target to support in their decision making. The work will further study the necessary inputs to NWDAF and the necessary NWDAF outputs and to study the potential architecture enhancement, new scenarios and R17 leftover for network data analytics in order to support:

**Objective#1: The following key issues deprioritized from R17**

WT#1.1: whether and how new types of output need to be provided by NWDAF and how would those outputs be defined

WT#1.2: Study possible mechanisms for improved correctness of NWDAF analytics

**Objective#2: KIs with no conclusion from R17**

WT#2.1: Whether and how NWDAF can assist application detection

NOTE: Solutions shall not cause degradation of UPF performance.

WT#2.2: Whether and how to support data and analytics exchange in roaming case (including network sharing)

**Objective#3: Rel-17 features enhancement:**

WT#3.1: data collection and data storage enhancements (including DCCF and ADRF enhancements, e.g., DCCF relocation, ADRF selection, ML model storage)

WT#3.2: Whether and how to enhance trained ML Model sharing for different vendors.

NOTE: Coordination with SA5 is needed in case SA5 is to study AI/ML management.

WT#3.3: UPF data report to NWDAF to support UPF data report for analytics as specified in R16/R17 and additional UPF data identified in R18.

NOTE: Coordination with FS\_ UPEAS / Study on UPF enhancement for Exposure and SBA is needed.

WT#3.5: Study whether and howinteractions between NWDAF can leverage and MDAS/MDAF functionality for data collection and analytics

NOTE: The study should be coordinated with SA5 and conclusions will be reached jointly

KIWT#3.4: Enhancements related to analytics subscription transfer between NWDAFs (i.e. when analytics are for a group of UEs)

WT#3.5: Impact of non-typical situations (e.g. un-scheduled events, disaster) on data collection and analytics

WT#3.6: NWDAF-assisted URSP

WT#3.7 enhancements on QoS Sustainability analytics

* Whether and how to increase QoS sustainability with finer granularity

NOTE: Double-check the study conclusions with 5GAA before proceeding.

* Investigate QoS sustainability in Multi-MNO/Cross-border environments

**Objective#4: enhanced architecture/new Use Case(s):**

WT#4.1: Study whether and how to enhance architecture to support federated learning in the 5GC

NOTE: Coordination with SA5 is needed in case SA5 is to study FL

WT#4.2: NWDAF enhancements considering the finer granularity of location information than TA and cell level

 NOTE: Coordinated activities between the study FS\_eLCS\_PH3 and this study are needed if NWDAF need to get Location information.

WT#4.3: NWDAF enhancements considering inputs from SCP

WT#4.4: Study whether and how UE consume data analytics from NWDAF

 NOTE: Potential coordination between the study 5G\_AIML and this study are needed

WT#4.5: Study whether and how to enhance architecture to support online learning in the 5GC

## TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **Inter Work Tasks Dependency**  |
|  |  |  |  |  |
| WT#1.1 | 0.5 | 0.5 | NO | WT#1.1 is self-contained |
| WT#1.2 | 0.5 | 0.5 | NO | WT#1.2 is self-contained |
|  |  |  |  |  |
| WT#2.1 | 1 | 0.5 | NO | WT#2.1 is self-contained |
| WT#2.2 | 1 | 0.5 | NO | WT#2.2 is self-contained |
|  |  |  |  |  |
| WT#3.1 | 0.5 | 0.5 | NO | WT#3.1 is self-contained |
|  |  |  |  |  |
| WT#3.2 | 1 | 0.5 | NO | WT#3.3 is self-contained |
| WT#3.3 | 0.5 | 0.5 | NO | WT#3.4 is self-contained, but may coordinate with SID FS\_UPCAS |
|  |  |  |  |  |
| WT#3.4 | 0.5 | 0.5 | NO | WT#3.6 is self-contained |
| WT#3.5 | 0.5 | 0.5 | NO | WT#3.7 is self-contained |
| WT#3.6 | 1 | 0.5 | NO | WT#3.8 is self-contained |
| WT#3.7 | 1 | 0.5 | NO | WT#3.9 is self-contained except that “Investigate QoS prediction in Multi-MNO/Cross-border environments” is related with KI#2.2. |
|  |  |  |  |  |
| WT#4.1 | 2 | 1 | NO | WT#4.1 is self-contained |
|  |  |  |  |  |
| WT#4.3 | 0.5 | 0.5 | NO | WT#4.3 is self-contained  |
| WT#4.4 | 1 | 0.5 | NO | WT#4.4 is self-contained |
| WT#4.5 | 1 | 0.5 | NO | WT#4.5 is self-contained |
|  |  |  |  |  |
|  |  |  |  |  |

**Total TU estimates for the study phase: 13**

**Total TU estimates for the normative phase:-8.5**

**Total TU estimates: 13+8.5=21.5**

# 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 | 23.xxx | Study on Enablers for Network Automation for 5G - phase 3 | June 2022 | September 2022 | First Rapporteur is responsible for objective 2 & Objective 4& Objective 5 and also responsible for TR editing. Secondary Rapporteur is responsible for objective 1& Objective 3. |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
|  |  |  |  |

# 6 Work item Rapporteur(s)

The primary Rapporteur: Aihua Li, China Mobile, liaihua@chinamobile.com, is responsible for objective 2 & Objective 4& Objective 5 and also responsible for TR editing.

The secondary Rapporteur: Xiaobo Wu, vivo, xiaobo.wu@vivo.com, is responsible for objective 1& Objective 3.

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

SA5 are relevant working groups for this study and TR, and tight coordination/alignment with them is expected during the work.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| China Mobile  |
| vivo |
| China Telecom |
| Huawei |
| China Unicom |
| China Southern Power Grid Co., Ltd |
| AT&T |
| CATT |
| KDDI |
| CAICT |
| NEC |
| Alibaba |
| Lenovo |
| ZTE |
| Intel |
| Deutsche Telekom |
| Convida Wireless |
| Orange |
| NTT DoCoMo |
| ETRI |
| Tencent |
| Spreadtrum Communications |
| Academy of Broadcasting Science |
| Charter Communications |
| Oracle |
| Spirent |
| Sandvine |
| Rakuten Mobile |
| Ericsson |
| Nokia? |