**3GPP TSG-SA Meeting #104 Draft1\_SP-240950**

**Shanghai, CN, 17 – 21 June 2024**

**Source: Deutsche Telekom,****AT&T, BT, CAICT, CATT, China Mobile, CKH IOD UK LIMITED, DISH Network, DSIT, ETRI, KDDI, KPN, KT corp., LG Uplus, MATRIXX Software, NEC, NTT DOCOMO, NVIDIA, Orange, Qualcomm, SK Telecom, Spark NZ, Telecom Italia, Telefonica, Telenor, Telstra, T‑Mobile USA, UScellular, Verizon, vivo, Vodafone**

**Title: New WID: Study on AI/ML E2E framework**

**Document for: Approval**

**Agenda Item: 3.3**

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 AI/ML E2E framework

Acronym: FS\_AIML\_FWK

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

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

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| x | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 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 |
| 950008 | Study on AI/ML Model Transfer Phase2 | Rel-19 SA1 study on AI/ML model transfer in 5GS |
| 1000030 | AI/ML Model Transfer Phase 2  | Rel-19 SA1 work on AI/ML model transfer in 5GS |
| 1020068 | Study on Core Network Enhanced Support for Artificial Intelligence (AI)/Machine Learning (ML)  | Rel-19 SA2 study on CN enhanced support for AI/ML |
| 1030035 | Study on security aspects of Core Network Enhanced Support for AIML  | Rel-19 SA3 study on security aspects of CN enhanced support for AI/ML |
| 1020007 | Study on AI/ML management - phase 2  | Rel-19 SA5 study on AI/ML mgmt. phase2 |
| 1010005 | Study on application layer support for AI/ML services  | Rel-19 SA6 study on application layer support for AI/ML services |
| 1020093 | Artificial Intelligence (AI)/Machine Learning (ML) for NR air interface  | Rel-19 RAN work item on AI/ML for NR air interface |
| 1021093 | Core part: Artificial Intelligence (AI)/Machine Learning (ML) for NR air interface  | Rel-19 RAN1 Core part of work item on AI/ML for NR air interface  |
| 1020084 | Study on Artificial Intelligence (AI)/Machine Learning (ML) for mobility in NR  | Rel-19 RAN2 study on AI/ML for mobility in NR |
| 1020083 | Study on enhancements for Artificial Intelligence (AI)/Machine Learning (ML) for NG-RAN  | Rel-19 RAN3 study on enhancements for AI/ML for NG-RAN |
| 1022093 | Perf. part: Artificial Intelligence (AI)/Machine Learning (ML) for NR air interface  | Rel-19 RAN4 performance part of work item on AI/ML for NR air interface |
| 940084 | Study on AI (Artificial Intelligence)/ML (Machine Learning) for Air interface | Rel-18 AI/ML in NG-RAN for Air interface to be managed |
| 920030 | Stage 1 of AMMT  | Rel-18 SA1 work on AI/ML model transfer |
| 920037 | AI/ML model transfer | Rel-18 SA1 work on AI/ML model transfer in 5GS. |
| 980019 | Stage 2 for AIML System Support for AI/ML-based Services | Rel-18 SA2 work on system support for AI/ML based services |
| 960037 | Study on Security and Privacy of AI/ML-based Services and Applications in 5G | Rel-18 SA3 study on Security and Privacy of AI/ML-based Services and Applications in 5G |
| 950011 | Study on Artificial Intelligence (AI) and Machine Learning (ML) for Media  | Rel-18 SA4 study on AI/ML for Media |
| 990119 | AI/ML management  | Rel-18 SA5 work on AI/ML management |
| 1020023 | NEF Charging enhancement to support AI/ML in 5GS  | Rel-18 SA5 work item on NEF charging enh. to support AI/ML in 5GS  |
| 970036 | Support for AI/ML services at application enablement layer | Rel-18 SA6 Work on Application layer support for AI/ML services to be managed |
| 940084 | Study on Artificial Intelligence (AI)/Machine Learning (ML) for NR Air Interface | Rel-18 RAN1 study on AI/ML for NG Air Interface |
| 941010 | Artificial Intelligence (AI)/Machine Learning (ML) for NG-RAN | Rel-18 RAN3 work item on AI/ML for NG-RAN |
| 990008 | CT3 aspects of AIML | Rel-18 CT3 aspects of AI/ML |
| 990074 | CT4 aspects of AIML | Rel-18 CT4 aspects of AI/ML |

**Dependency on non-3GPP (draft) specification:**

# 3 Justification

In Rel-18 and Rel-19, most working groups in TSG SA, CT and RAN have already performed SIs and/or have WIs relating to the AI/ML topic. These activities addressed use cases from their own perspective (e.g., NWDAF usage in the CN, MDAS and AI/ML management aspects (including Life Cycle Management) in OAM, application layer support for AI/ML, AI/ML for NG-RAN and for air interface in the RAN domain), but a consistent terminology and E2E framework, especially from the Life Cycle Management (LCM) perspective for AI/ML models and cross-domain training/inference data collection/storage, are still missing. Additionally, there are not commonly established practices for validation/testing of the systems implementing AI/ML models.

AI/ML models and associated algorithms are certainly implementation specific and therefore out of scope of 3GPP specifications, but there is the need to have a common LCM framework at least for those models and associated training/inference data that have impact on the 5G network and E2E performance.

# 4 Objective

The activity seeks to align AI/ML efforts across 3GPP while avoiding the creation of a new high-level architecture.

The activity will investigate ongoing AI/ML work in TSG RAN and TSG SA Working Groups and identify instances of duplicative efforts and/or inconsistencies. Those identified issues should be communicated to the relevant Working Groups, encouraging resolution.

NOTE 1: The study is led by TSG SA in close collaboration with TSG RAN.

[NOTE 2: Contributions to this study can be made by member companies as well as on behalf of WGs level. (to be deleted?)]

WT1: Identify AI/ML related activities of all working groups of Rel-18 features and Rel-19 studies and work items.

NOTE 3: The AI/ML related content captured in TR 21.918 ("Release 18 Description; Summary of Rel-18 Work Items") will be taken into account as a starting point.

WT2: Identify inconsistencies on AI/ML related terminology across 3GPP.

WT3: Identify misalignments, duplicative efforts, and inconsistencies among AI/ML related features specified in 3GPP including e.g. LCM for AI/ML enabled solutions or models (where available) and training/inference data collection/storage/exposure (including cross-domain RAN and core network), performance evaluation and accuracy monitoring.

*Alternative 1 of* WT4: According to the outcome of WT1-3, study the LCM for AI/ML enabled solutions or models (where available) for 3GPP use cases based on the progress(es) in related WGs, and facilitate cross-working groups harmonization, providing appropriate recommendations.
*Alternative 2 of* WT4: According to the outcome of WT1, WT2 and WT3 provide appropriate recommendations to WGs according to their Terms of Reference to resolve identified duplicative efforts and inconsistencies in a co-operative manner.

NOTE 4: The study item does not impact ongoing technical work for AI/ML across all SA/RAN/CT WGs for Rel-19.

## 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 |  |  | Self-contained |
| WT#2 | 1 |  |  | Self-contained |
| WT#3 | 2 |  |  | WT#1, WT#2 |
| WT#4 | 2 |  |  | WT#1, WT#2, WT#3 |

Total TU estimates for the study phase: 6 TU

Total TU estimates for the normative phase: 0 TU

Total TU estimates: 6 TU

# 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" or "External TR". See Note 1} | {e.g. "22.XXX" or actual number if known} | {Title of the specification (as per TR 21.801 §6.1.1), to be aligned as much as possible with the WI/SI title} | TSG#106 (Dec24) | TSG#107 (Mar25) | {<FamilyName>, <GivenName>, <Company>, <email address>. See Note 2} |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| {e.g. "22.281"} | {Possible values: - either free text (e.g. “CS aspects to be removed") - or “Specification to be withdrawn”} | {e.g. "TSG#89"} | {Free text, e.g. "This TS covers Stage 2" or "This TS covers Stage 3" or "This TS covers both stages 2 and 3"} |
|  |  |  |  |

# 6 Work item Rapporteur(s)

{Mandatory: <FamilyName>, <GivenName>, <Company>, <email address>}

{Optional: <FamilyName>, <GivenName>, <Company>, <email address>: Secondary task(s)}

# 7 Work item leadership

TSG SA

# 8 Aspects that involve other WGs

SA1: service and performance requirements and use cases

SA2: architecture aspects for network AI/ML operation

SA3: security and privacy of network AI/ML operation and network analytics

SA4: AI/ML for MultiMedia

SA5: AI/ML based management, orchestration, operations and charging

SA6: application layer support for AI/ML services

RAN1, RAN2 and RAN4: AI/ML for air interface

RAN2: AI/ML for Mobility

RAN3: AI/ML enabled NG-RAN

CT WGs: CT aspects on AI/ML

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Deutsche Telekom |
| AT&T |
| BT |
| CAICT |
| CATT |
| China Mobile  |
| CKH IOD UK LIMITED |
| DISH Network |
| DSIT |
| ETRI |
| KDDI |
| KPN |
| KT corp. |
| LG Uplus |
| MATRIXX Software |
| NEC |
| NTT DOCOMO |
| NVIDIA |
| Orange |
| Qualcomm  |
| SK Telecom |
| Spark NZ |
| Telecom Italia |
| Telefonica |
| Telenor |
| Telstra |
| T-Mobile USA  |
| UScellular |
| Verizon |
| vivo  |
| Vodafone |
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