**3GPP TSG-SA Meeting #104 SP-240970**

**Shanghai, CN, 17 – 21 June 2024**

**Source: Deutsche Telekom,****AT&T, BT, CAICT, CATT, China Mobile, CKH IOD UK LIMITED, DISH Network, DSIT, ETRI, ICS, 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 3GPP AI/ML Consistency Alignment**

**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 3GPP AI/ML Consistency Alignment

Acronym: FS\_AIML\_CAL

Unique identifier: 1040084

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  |  |  |  |
| No | x |  |  |  |  |
| Don't know |  | x | x | x | 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 address different usage scenarios and associated specific use cases exploiting AI/ML for the operation of the 3GPP System ranging from radio interface operations (e.g. beam management, positioning), NG-RAN operations (e.g. energy saving, load balancing), to network management & orchestration, media services, and application enablement aspects.

With the complexity of the 3GPP systems and its operations and that of AI/ML, it is vital that the use of AI/ML in the operation of the 3GPP system (incl. related AI/ML model LCM) for any given use case be bound to specific principles, guidelines, design criteria, and requirements to safeguard the operation of the 3GPP System. This includes the capability to, e.g. fallback to non-AI/ML operation (i.e., not relying on inference process) whenever necessary not to negatively affect the NW and E2E performance.

This requires, as a minimum, the introduction of a common set of definitions to prevent any inconsistencies in the definition and use of AI/ML LCM across 3GPP WGs, to identify any misalignments/inconsistencies, and to communicate such inconsistencies to WGs for better alignment within 3GPP across different AI/ML related initiatives.

Note that AI/ML models and associated algorithms are certainly implementation specific and therefore out of scope of this study.

# 4 Objective

This study will investigate ongoing AI/ML work in TSG CT, TSG RAN and TSG SA Working Groups and identify instances of any potential misalignment and/or inconsistencies. The study is led by TSG SA in close collaboration and inputs from TSG CT and TSG RAN.

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

NOTE 1: The AI/ML related content captured in TR 21.918 ("Release 18 Description; Summary of Rel-18 Work Items") can be considered as a starting point.

WT2: Identify any potential inconsistencies on AI/ML related terminology (i.e. set of definitions, acronyms) across 3GPP, based on WT1.

WT3: Identify any potential misalignments and inconsistencies among existing AI/ML related features specified in 3GPP, including cross-domain (UE, RAN, core network, media, OAM, and application enablement) aspects. Examples of areas to be investigated are LCM for AI/ML, data collection/storage/exposure, model training/delivery/ (de)-activation/inference emulation, inference/storage/exposure, performance evaluation and accuracy monitoring.

NOTE 2: Any RAN related aspects are subject to early coordination and feedback from TSG RAN.

WT4: Provide information on any potential outcome from WT1, WT2 and WT3 to the respective WGs (according to their Terms of Reference (ToR)) to resolve any issues with appropriate SA-level co-ordination as necessary.

NOTE 3: The study item does not impact ongoing studies and normative 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 |  |  | WT1 |
| WT#3 | 4 |  | Maybe | WT#1, WT#2 |
| WT#4 | TBD |  |  | 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"  | {e.g. "22.XXX" or actual number if known} | Study on 3GPP AI/ML Consistency Alignment | TSG#107 (Mar 25) | TSG#108 (Jun 25) | Xiaobo Wu, vivo, xiaobo.wu@vivo.com |
|  |  |  |  |  |  |

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# 6 Work item Rapporteur(s)

Primary rapporteur: Achter, Johannes, Deutsche Telecom, johannes.achter@magenta.at

Secondary rapporteur: Xiaobo Wu, vivo, xiaobo.wu@vivo.com

# 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 |
| ICS |
| 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 |
| Nokia |
| China Telecom |
| OPPO |
| Huawei |
| MediaTek |
| InterDigital |
| Lenovo |
| Futurewei |
| China Unicom |
| LG Electronics |
| ZTE |
| Orange |
| Intel |