**3GPP TSG SA WG5 Meeting #156 S5-244593d2**

**Maastricht, The Netherlands 19 - 23 August 2024**

**Source: NEC, Intel**

**Title: pCR TR 28.858 add overview and list of refrences**

**Document for: Approval**

**Agenda Item: 6.19.1**

# 1 Decision/action requested

***the group is asked to discuss and approve the proposal***

# 2 References

[1] [SP-240965](https://www.3gpp.org/ftp/TSG_SA/TSG_SA/TSGS_104_Shanghai_2024-06/Docs/SP-240965.zip); Revised SID on Study on AI/ML management - phase 2

[2] 3GPP TR 28.858; AI/ML management – Phase 2

# 3 Rationale

Despite the study on Artificial Intelligence / Machine Learning (AI/ML) management phase 2 [1] having been active for the past two meetings, the TR number was only recently assigned at SA#104 [2]. This contribution proposes the overview and list of references for the draft TR 28.858.

# 4 Detailed proposal

***1st change***

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 28.105: Artificial Intelligence / Machine Learning (AI/ML) management".

[3] 3GPP TS 28.104: "Management and orchestration; Management Data Analytics".

[4] 3GPP TS 28.541: " Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

***Next change***

4 Concepts and overview

4.1 Overview

AI/ML techniques have gained significant interests and advancements across various industries, including telecommunications, where they are now being applied to enhance mobile networks. While AI/ML technologies have matured considerably, certain aspects continue to evolve, and new techniques frequently emerge to complement existing methods.

AI/ML techniques can be characterized from several perspectives:

* **Learning Methods**: AI/ML employs various learning methods such as supervised, semi-supervised, unsupervised, and reinforcement learning. Each method is suited to specific inference categories (e.g., prediction) and requires distinct types of training data.
* **Learning Complexity**: AI/ML techniques vary in complexity, ranging from basic Machine Learning to more advanced e.g., Deep Learning with neural networks.
* **Learning Architecture**: Depending on the topology and location of learning tasks, AI/ML can be categorized into centralized, distributed, and federated learning.
* **Learning Continuity**: AI/ML can be implemented as offline learning or continual learning, depending on whether the learning process is static or ongoing.

In the 5GS, AI/ML capabilities are used across various domains, including management and orchestration, 5GC and NG-RAN. The performance of AI/ML inference function within 5GS depends on how well-trained ML models for accurate and efficient inference.

To effectively deploy AI/ML capabilities in 5GS, it is crucial to manage the ML models and AI/ML inference functions according to the specific characteristics and requirements of the use cases they support.

The study investigates enhancements of AI/ML management capabilities by building on the work from Rel-18 and exploring new management aspects across various 3GPP working groups. Additional advanced use cases are investigated , covering AI/ML management and operational capabilities to support different types of AI/ML technologies required for AI/ML in the 5G system, such as:

* + - Federated Learning
    - Reinforcement Learning
    - Online and Offline Training
    - Distributed Learning
    - Generative AI

Some primary aspects of AI/ML sustainability are studied, including the evaluation of energy and resource consumption and efficiency impacts associated with AI/ML features across all operational phases (training, emulation, deployment, inference).

The present TR also investigates management aspects (LCM CM and PM) of additional AI/ML functionalities defined by 3GPP SA WGs and RAN WGs.

***End of changes***