**3GPP TSG-SA Meeting #106SP-241923**

**10 - 13 December 2024, Madrid, Spain Revision of SP-241841**

**Source: Nokia**

**Title: pCR TR 22.850 ML model training analysis across 3GPP**

**Document for: Approval**

**Agenda Item: 7**

# 1 Decision/action requested

***The group is asked to discuss and agree on the proposal.***

# 2 References

[8] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[9] 3GPP TS 28.105: "Management and orchestration; Artificial Intelligence/ Machine Learning (AI/ML) management".

[34] 3GPP TS 23.482: "Functional architecture and information flows for AIML Enablement Service".

# 3 Rationale

This pCR aims to capture ML model training related aspects from Release 18 normative work across 3GPP. It seeks to identify inconsistencies and misalignments among them.

# 4 Detailed proposal

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| **Start of modification** |

# 6 Analysis on AI/ML across 3GPP

## 6.3 AI/ML related features

### 6.3.X Analysis on ML model training services

The analysis focuses on the specifications from SA WG2, SA WG5 and SA WG6, considering these are the working groups defining services and operations related to ML model training in 3GPP Release 18. SA WG1, SA WG3, SA WG4, RAN WG1, RAN WG2, and RAN WG3 have not defined any services or operations related to ML model training.

Table 6.3.X-x provides a detailed overview of the specific services defined by each working group.

The key findings from the analysis are as follows:

* SA WG2: Emphasizes a structured approach to ML model training services by defining a clear consumer-producer relationship. This enables specific entities to consume and produce these services, ensuring a well-defined and controlled environment for service utilization.
* SA WG5: Offers a more flexible approach by defining generic ML model training services. This allows for greater adaptability in implementation and usage, without the constraints of a specific consumer-producer relationship.
* SA WG6: Mirrors the approach of SA WG2, prioritizing a clear consumer-producer relationship for its defined services. This aligns with the structured approach advocated by SA WG2.

Editor’s note**:** This analysis is based on Release 18 and does not consider Release 19 for SA WG2 and SA WG5. Further analysis needs to be conducted as Release 19 matures and normative work progresses for these groups.

While SA WG2 and SA WG6 restrict the potential producers and consumers, SA WG5 emphasizes flexibility and adaptability. The choice of approach will depend on the specific needs and requirements of the individual service provider and consumer.

Editor’s note: Further investigation is needed to understand the implications of these different approaches and their impact on the overall 3GPP ecosystem.

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| ML Model Training |
| TSG (TS/TR) | Service/API Type | Service/API/IOC Name | Description [Consumer, Producer] |
| SA WG2 TS 23.288 [8] | ML Model Provisioning Services | Nnwdaf\_MLModelProvision\_Subscribe | The consumer subscribes to NWDAF ML model provision with specific parameters to receive a notification when an ML Model matching the subscription parameters becomes available.*Consumer:* NWDAF AnLF, LMF*Producer:* NWDAF MTLF |
| Nnwdaf\_MLModelProvision\_Unsubscribe | The consumer unsubscribes to NWDAF ML model provision.*Consumer:* NWDAF AnLF, LMF*Producer:* NWDAF MTLF |
| Nnwdaf\_MLModelProvision\_Notify | The NWDAF notifies the ML model information to the consumer which has subscribed to the NWDAF ML model provision service.*Consumer:* NWDAF AnLF, LMF*Producer:* NWDAF MTLF |
| ML Model Information Services | Nnwdaf\_MLModelInfo\_Request | The consumer requests and gets NWDAF ML Model Information.*Consumer:* NWDAF AnLF, LMF*Producer:* NWDAF MTLF |
| ML Model Training Services | Nnwdaf\_MLModelTraining\_Subscribe | The consumer subscribes to NWDAF ML model training with specific parameters.*Consumer:* NWDAF MTLF*Producer:* NWDAF MTLF |
| Nnwdaf\_MLModelTraining\_Unsubscribe | The consumer terminates NWDAF ML model training.*Consumer:* NWDAF MTLF*Producer:* NWDAF MTLF |
| Nnwdaf\_MLModelTraining\_Notify | The NWDAF notifies about the trained ML model to the consumer which has subscribed to the NWDAF ML model training service.*Consumer:* NWDAF MTLF*Producer:* NWDAF MTLF |
| ML Model Training Information Services | Nnwdaf\_MLModelTrainingInfo\_Request | The consumer requests for the information about NWDAF ML model training with specific parameters.*Consumer:* NWDAF MTLF*Producer:* NWDAF MTLF |
| SA WG5 TS 28.105 [9] | ML Training Management Services | MLTrainingRequest | It represents the ML model training request to train an ML model which is triggered by the ML training MnS consumer towards the ML training MnS producer.*Consumer:* Any authorized network function, any authorized management function, operator*Producer:* Any function that is capable of training an ML model |
| MLTrainingReport | It represents the ML model training report provided by the ML training MnS producer to the ML training MnS consumer who has requested for ML model training.*Consumer:* Any authorized network function, any authorized management function, operator*Producer:* Any function that is capable of training an ML model |

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|  |  | MLTrainingProcess | It represents the ML model training process. When a ML model training process starts, an instance of the MLTrainingProcess is created by the MnS Producer and notification is sent to MnS consumer who has subscribed to it.*Consumer:* Any authorized network function, any authorized management function, operator*Producer:* Any function that is capable of training an ML model |
| SA WG6 TS 23.482 [34] | ML Model Training APIs | Aimles\_MLModelTraining Request | The consumer sends an ML model training request to the producer, requesting to assist in its ML model training. This request consists of ML model information or ML model requirement information, etc. *Consumer:* VAL server*Producer:* AIMLE Server |
| Aimles\_MLModelTraining Response | If the consumer is authorized, the producer identifies and selects the appropriate ML model for training based on the ML model requirement information. The producer returns a success response indicating the selected ML model for training; otherwise, a failure response indicating the reason for failure.*Consumer:* VAL server*Producer:* AIMLE Server |

**Table 6.3.X-x:** ML model training related services and operations as specified across 3GPP WGs

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| **End of modifications** |