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• Orchestration functional requirements specification for large network OAM models ENI

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# Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group Experiential Networked Intelligence (ENI).

# Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](https://portal.etsi.org/Services/editHelp%21/Howtostart/ETSIDraftingRules.aspx) (Verbal forms for the expression of provisions).

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# Executive summary

The present document specifies a high-level functional abstraction of the process of intent policy Multi-Stage translating in ENI system in terms of Functional Modules, Internal Reference Points and working pipelines.

# Introduction

# 1 Scope

This GS will investigate the management and orchestration functions for network OAM large models. Large language models are proven to be a technical break through representing the latest AI technology. This brings encouraging new options for network operators on network orchestration. In order to guide the development of the specification of the interfaces exposed between network OAM large model Functional Blocks (FBs), it is important to have a clear and consolidated set of functional requirements. This GS will standardize orchestration functional requirements specification for network OAM large models

# 2 References

## 2.1 Normative references

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI GR ENI 004: "Experiential Networked Intelligence (ENI); Terminology for Main Concepts in ENI".

[i.2] ETSI GS ENI 005 (V2.1.1): "Experiential Networked Intelligence (ENI); System Architecture".

[i.3] ETSI GR ENI 008: "Experiential Networked Intelligence (ENI); Evaluation of categories for AI application to Networks"

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in ETSI GR ENI 004 [i.1], ETSI GS ENI 005 [i.2].

## 3.2 Symbols

Void.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI GR ENI 004 [i.1], ETSI GS ENI 005 [i.2], ETSI GR ENI 008 [i.3].

# 4 Overview of large network OAM models

## 4.1 Introduction

## 4.2 Functional requirements

## 4.2.1 Basic functions

## 4.2.2 Network specific functions

## 4.3 Model interaction



LLM Model training inference process

### 4.3.1 Model pre-training

Pre-training is the initial phase where the model learns from a vast amount of text data. The goal is to understand language patterns, grammar, context, and general knowledge. This phase uses techniques like unsupervised learning, where the model tries to predict the next word in a sentence or fill in missing words. The pre-training dataset is typically diverse and extensive, spanning various domains to ensure the model has a broad understanding of language.

### 4.3.2 Model turning

After pre-training, the model undergoes fine-tuning to adapt it to specific tasks or improve its performance in certain domains. This process involves training the model on a smaller, task-specific dataset. For example, if the LLM is to be used for medical diagnosis, it would be fine-tuned with medical texts. Fine-tuning adjusts the model's parameters to better align with the target task, enhancing its accuracy and relevance in specific contexts.

### 4.3.3 Model query

The query process involves the interaction between the user and the LLM. It's the mechanism through which users input their requests or questions into the model and receive responses. This process is central to the utility of LLMs, as it's the primary way users engage with the model to extract information, generate content, or get assistance with a variety of tasks. The steps in the query process typically include:

1. **User Input:** The user formulates a question or request and inputs it into the system interfacing with the LLM.
2. **Processing:** The model processes the input, understanding the context and nuances of the query based on its pre-training and any fine-tuning it has undergone.
3. **Response Generation:** The LLM generates a response based on its training, aiming to match the intent and content of the user's query as closely as possible.
4. **Output:** The generated response is presented to the user, completing the query cycle.

### 4.3.4 Model validation

Validation, on the other hand, is a safeguarding step that ensures the quality, appropriateness, and safety of the interactions between users and the LLM. It's an essential process for maintaining the integrity of the model's outputs and protecting users from potentially harmful content. The validation process can be broken down into:

1. **Input Validation:** Before processing a query, the model or an intermediary system checks the input for any inappropriate content, errors, or formats that the model can't understand or shouldn't process. This step helps prevent the model from being exposed to or generating harmful, biased, or sensitive content.
2. **Output Validation:** After the LLM generates a response but before it's delivered to the user, the response is evaluated for accuracy, relevance, and appropriateness. This might involve automated checks, such as filtering out certain types of content, or manual review in sensitive or critical applications.
3. **Feedback Loop:** Users may provide feedback on the quality and relevance of the responses they receive. This feedback can be used to further refine the validation process, improving the model's performance and the safeguards around its outputs.

### 4.3.5 Model registration

In certain scenarios, it might be necessary to delete a model version or its data. This could be due to privacy concerns, legal requirements, or the discovery of biases and errors in the model. Deletion must be handled carefully to ensure that all copies of the data or model are securely removed and that this action is documented for transparency and compliance purposes.

### 4.3.6 Model deletion

Modification involves making changes to the model or its training data to improve performance, correct errors, or update its knowledge. This can include re-training the model with new data, adjusting its architecture, or fine-tuning it further for specific tasks. Modifications should be carefully tested and validated to ensure they achieve the desired outcomes without introducing new issues.

### 4.3.7 Model modification

# 5 OAM scenarios

## 5.1 Network monitoring

## 5.2 Network ticket handling

## 5.3 Network planning

## 5.4 Network fault prediction

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