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Experiential Networked Intelligence (ENI);

Coordination Orchestration of Multiple Elements(CoordOME)

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**Group Specification**

Reference

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# Foreword

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

# Modal verbs terminology

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# Executive summary

The present document discuss the framework of Coordination Orchestration of Multiple Elements, presents its impact on the ENI System Architecture, defines the functions, interfaces, and workflow of the framework of Multiple Elements Coordination orchestration. It also describes a collection of typical use cases of Coordination Orchestration of Multiple Elements.

# 1 Scope

The present documen will investigate the addition of multi-elements coordination orchestration capabilities in the ENI functional block. To support technologies such as digital twins and edge federated learning that require multiple types of resource consumption. The elements in this GS mainly refer to the resources that support business practices (network, computing, storage), OPEX (save energy, etc.), etc. This Specification will standardize element information, to study the impact of the newly added multi-elements coordination orchestration function block on the ENI architecture, multi-elements coordination orchestration framework, processes, potential application scenarios, etc.

# 2 References

## 2.1 Normative 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 necessary for the application of the present document.

[1] ETSI GS ENI 005 (V3.1.1): "Experiential Networked Intelligence (ENI); System Architecture"

## 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.

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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 008(V2.1.1): "Experiential Networked Intelligence (ENI); InTent Aware Network Autonomicity (ITANA) "

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

## 3.2 Symbols

## 3.3 Abbreviations

# 4 Background and Overview

ENI005 specifies the functional architecture of ENI System, defining its functionality, behaviour and the decomposition of sytem into functional blocks. ENI008 describes using intent with the ENI system architecture, which includes accepting, translating and validating intent statements. The present document will discuss how to collaboratively and optimally schedule multiple resource elements for complex business needs based on current ENI system architecture.

With the development of technology, emerging applications such as Cloud Rendering, Metaverse, Internet of Vehicles, AI Large Language Model have strong demand for multiple resource elements, including network, computing power, dataset, storage, application and so on. Meanwhile, the business logic becomes more and more complex. Therefore, how to supply the optimal elements combination for applications to meet these complex business needs has become a difficult problem. Multiple elements coordination orchestration bases on network commucation capabilities, combimes multiple elements capabilities into a unified element view, dynamically and jointly orchestrates these element capabilities as business needs, finally provides an integrated multiple elements capability scheduling strategy.

# 5 Elements

Note: This clause will list all kinds of elements required by coordination orchestration and describe the characteristics, parameter metrics, functionalities of these elements.

## 5.1Overview

This clause discusses the capabilities and parameter metrics of each type of element. Based on these parameter metrics of elements, CoordOME could orchestrate services, processes, workflows, etc., and schedule multiple elements resources to meet business needs accurately, efficiently and reasonably.

## 5.2 Networks

Networks provide connectivity capabilities for business system. Networks include core networks, transport networks, access networks, cloud private networks, etc. The network performance can be measured by metrics such as bandwidth, delay, jitter, and so on.

## 5.3 Computing

Computing powers provide data processing capabilities for business. In ENI system, all the computing powers will be accessed to a unified resource management platform through network. Computing powers can be categorized into general-purpose computing power, intelligent computing power, super computing power, and edge computing power.

General-purpose computing power mainly used for running general-purpose workloads; intelligent computing power mainly used for accelerating AI workloads; supercomputing power is mainly based on supercomputer which process vast amounts of data in parallel by distributing workloads to thousands of processors; edge computing power mainly provides real-time computing power for users nearby, which is a combination of the first three types, and edge computing power focus on solving the problem of network latency.

Some important specifications and features of processors are Core Count, Clock Frequencies, L Cache, Hyper-Threading support, Generation and Micro-architecture, and so on. FLOPS (Floating-point Operations Per Second) is the most common key performance indicator to measure computational capability.

## 5.4 Storage

Storage provides the capability of holding information permanently. Typical storage devices or system include hard disk, Ssd, Nas, San, Nfs, Hdfs, Ceph and so on. The performance metrics of storage devices include storage capacity (units: MB or GB), IOPS (performance of random read/write, units: MB/s), Throughput (performance of sequential read/write, units: MB/s), Response Time/Latency (units: ms or µs), etc.

## 5.5 Data

## 5.6 Application

# 6 Impact of Coordination orchestration of multiple elements on the System Architecture

Note: This clause will discuss the framework details of Coordination orchestration of multiple elements, including new sub functional blocks to be integrated to run strategy scheduling, the functional enhancement on existing functional blocks to support CoordOME, and some new internal and external reference points.

## 6.1 Overview

## 6.2 Functions

## 6.3 Interface

## 6.4 ……

# 7 Work flow

This clause will illustrate the interaction sequences of ENI system between internal functional blocks and assisted systems to perform the functionalites of multiple elements coordination orchestration.

## 7.1 ……

# 8 Use Cases of Coordination orchestration of multiple elements

This clause demonstrate the flexibility and compatibility of CoordOME, presents the use cases that how to use CoordOME when improving the operator experience.

## 8.1 ……

# History