ISG ENI - Industry Specification Group on Experiential Networked Intelligence

The Experiential Networked Intelligence Industry Specification Group (ENI ISG) is defining a Cognitive Network Management architecture. This is using Artificial Intelligence (AI) techniques and context-aware policies to adjust offered services based on changes in user needs, environmental conditions and business goals. It therefore fully benefits the 5G networks with automated service provision, operation, and assurance, as well as optimized slice management and resource orchestration. ENI also has launched PoCs aiming to demonstrate how AI techniques can be used to assist network operation including 5G.

The use of Artificial Intelligence techniques in the network will solve problems of future network deployment and operation.

ENI focuses on improving the operator experience, using closed-loop AI mechanisms based on context-aware, metadata-driven policies. This enables the ENI system recognize and incorporate new and changed knowledge, and hence make actionable decisions. This model gives recommendations to decision-making systems, such as network control and will interact with management systems, to adjust services and resources offered based on changes in user needs, environmental conditions and business goals.

ENI has published the first version of the System Architecture and Context Aware Policy Management and three versions of the Use Cases, Requirements, two versions of the Terminology, and the Proof of Concept (PoC) Framework in Release 2. Also reports on Classification of Networks, Evaluation of Classification and Intent-based Architectures, these reports are release independent.

Recently published deliverables: nine published outputs,

1. **ETSI GS ENI 001 V2.1.1 (2019-09) Two revisions Published**

Experiential Networked Intelligence (ENI); ENI use cases

2. **ETSI GS ENI 002 V2.1.1 (2019-09) Two revisions Published**

Experiential Networked Intelligence (ENI); ENI requirements

3. **ETSI GR ENI 003 V1.1.1 (2018-05) Published**

Experiential Networked Intelligence (ENI); Context-Aware Policy Management Gap Analysis

4. **ETSI GR ENI 004 V2.1.1 (2018-10) Two revisions Published**

Experiential Networked Intelligence (ENI); ENI General Terminology

5. **ETSI GS ENI 005 V1.1.1 (2019-09) Published**

Experiential Networked Intelligence (ENI); System Architecture

6. **ETSI GS ENI 006 V2.1.1 (2020-05) Two revisions Published**

Experiential Networked Intelligence (ENI); ENI Proof of Concept (PoC) Framework

7. **ETSI GR ENI 007 V1.1.1 (2019-11) Published**

Definition of Categories for AI Application to Networks

The System Architecture is being specified, with a new draft version 2 including a high-level architecture using detail of AI decision techniques. ENI has opened new work-items to collect release 3 of the Terminology, measuring of Evaluation of Classification, Intent knowledge within the Architecture and Data mechanisms and Data telemetry. Two Specifications on Mapping between ENI architecture and operational systems, also on Inference, semantics and ontologies are also being developed.

ENI has launched a continuing Proof of Concepts activity. A PoC review team was created and tasked with reviewing incoming proposals. Each PoC Team proposal shall address at least one goal relevant to ENI, related with an ENI Use Case, an ENI Requirements or the suitability of the ENI System Architecture reference point & aspect. The output of each PoC project shall contribute to the completion of the version 2 specifications within ISG ENI. To improve the output of the Work-items. Alignment with existing activities is required. Each PoC Proposal will provide proof of the technical feasibility of ENI within the Industry. Proof of Concept (PoC)

Proposals are called for in line with the approved PoC framework. With the publication of the revised PoC Framework the proof of reference points between equipment is added.

ISG ENI has the following ongoing PoCs:

Title	PoC Team Members	Main Contact	Start Time	Current Status (March -2021)
PoC #1: Intelligent Network Slice Lifecycle Management	**China Telecom** Huawei, Intel, CATT, DAHO Networks, China Electric Power Research Institute	Haining Wang	Jun-2018	Completed
PoC #2: Elastic Network Slice Management	**Universidad Carlos III de Madrid** Telecom Italia S.p.A., CEA-Leti, Samsung R&D Institute UK, Huawei	Marco Gramaglia	Nov-2018	Completed
PoC #3: SHIELD, security through NFV	**Telefonica** Space Hellas, ORION, Demokritos (NCSR)	Diego R. Lopez Antonio Pastor	Jan-2019	Completed
PoC #4: Predictive Fault management of E2E Multi-domain Network Slices	**Portugal Telecom/Altice Labs** SliceNet Consortium	António Gamelas Rui Calé	Mar-2019	Completed
PoC #5: AI Enabled Network Traffic Classification	**China Mobile** Huawei, Intel, Tsinghua University	Weiyuan Li	Jun- 2019	Completed
PoC #6: Intelligent caching based on prediction of content popularity	**China Unicom** Beijing University of Posts and Telecommunications, Samsung, Cambricon, Huawei	Bingming Huang	Sep-2019	Completed
PoC #7: Intelligent time synchronization of network	**China Unicom** Beijing University of Posts and Telecommunications, Samsung, Cambricon, Huawei	Bingming Huang	Sep-2019	Completed
PoC #8: Intent-based user experience optimization	**China Telecom/Huawei Technologies** China Telecom, Huawei Technologies, AsiaInfo, Beijing University of Posts and Telecommunications	Dong Li	Jan-2020	Completed

PoC #9: Autonomous Network Slice Management for 5G Vertical Services	**Nextworks** TIM, Nextworks, Samsung, WINGS, UC3M	Gino Carrozzo	Jan-2020	Extension to March 2021 Final report soon
PoC #10: Intelligent Telecom Network Energy Optimization	**China Mobile** China Mobile Research Institute, Intel, Quanta Cloud Technology, Hong Kong ASTRI (Applied Science and Technology Research Institute)	Yan Yang	Jan-2020	Completed
PoC#11: Intelligent Energy Management of DC	**China Telecom** Intel, AsiaInfo, Samsung, Huawei	Yu Zeng	April-2020	Ongoing
PoC #12: Intelligent Transmission Network Optimization	**China Mobile** China Mobile Research Institute, China Mobile Group Zhejiang Co., Ltd., CEA, Commissariat à l'Énergie Atomique et aux Énergies Alternatives, Huawei, Intel	Chen Shaofan	Sept.-2020	Ongoing
PoC#13: Intelligent Coverage Optimization of 5G Massive MIMO BS	**China Telecom** China Telecom, Intel, Inspur	Xueqi Yuan	Oct.-2020	Ongoing

ISG ENI has presently 61 Members /Participants: 43 Members, 18 Participants and 0 Counsellors.