ENI ISG PoC Report Template

1 General

The following normative disclaimer shall be included on the front page of a PoC report:

> *Submission of this ENI ISG PoC Report as a contribution to the ENI ISG does not imply any endorsement by the ENI ISG of the contents of this report, or of any aspect of the PoC activity to which it refers.*

2 ENI ISG PoC Report

2.1 PoC Project Completion Status

Indicate the PoC Project Status. Can the PoC be considered completed? If this is a multi-stage PoC project, indicate the Reported Stage status and plans for future Project Stages/Milestones:

- Overall PoC Project Completion Status: _____Completed_____

2.2 ENI PoC Project Participants

Specify PoC Team; indicate any changes from the ENI ISG PoC Proposal:

- PoC Project Name: _____PINet— Polymorphic Intelligent Network_____
- Network Operator/Service Provider: China Telecom

  Contact: Ziting Zhang (zhangzt9@chinatelecom.cn)
- Network Operator/Service Provider: China Mobile Research Institute

  Contact: Jiachen Zhang (zhangjiachen@chinamobile.com)
- Manufacturer A: Asia Info

  Contact: Da Wang (wangda3@asiainfo.com)
- Manufacturer B: Maipu Communication Technology Co., Ltd.

  Contact: Lisha Lan (lanlisha@mail.maipu.com)

2.3 Confirmation of PoC Event Occurrence

To be considered as complete, the PoC should have been physically demonstrated with evidences extracted from the demonstration, i.e. the following information should be provided:

- **ETSI ENI #20 plenary meeting, online, December 15, 2021**

The new PoC proposal was led and presented by China Telecom on ENI #20 plenary meeting. This was the first time the concept of PINet (Polymorphic Intelligent Network) was introduced. More details such as project goals, team members, project stages/milestones, and PoC framework, were also provided.

Fig.1 New PoC proposal presented by China Telecom

- **CTPINet Seminar, online, January 15, 2022**

China Telecom hosted polymorphic intelligent network online seminar, where speakers from project participated and presented on the progress of key technologies research and prototype platform construction.

Fig.2 CTPINet online seminar

- **ETSI ENI #21 plenary meeting, online, March 9, 2022**

The PoC progress was presented on ENI #21 plenary meeting. Network models were highly clarified by using several examples and discrimination with traditional IP-based model.

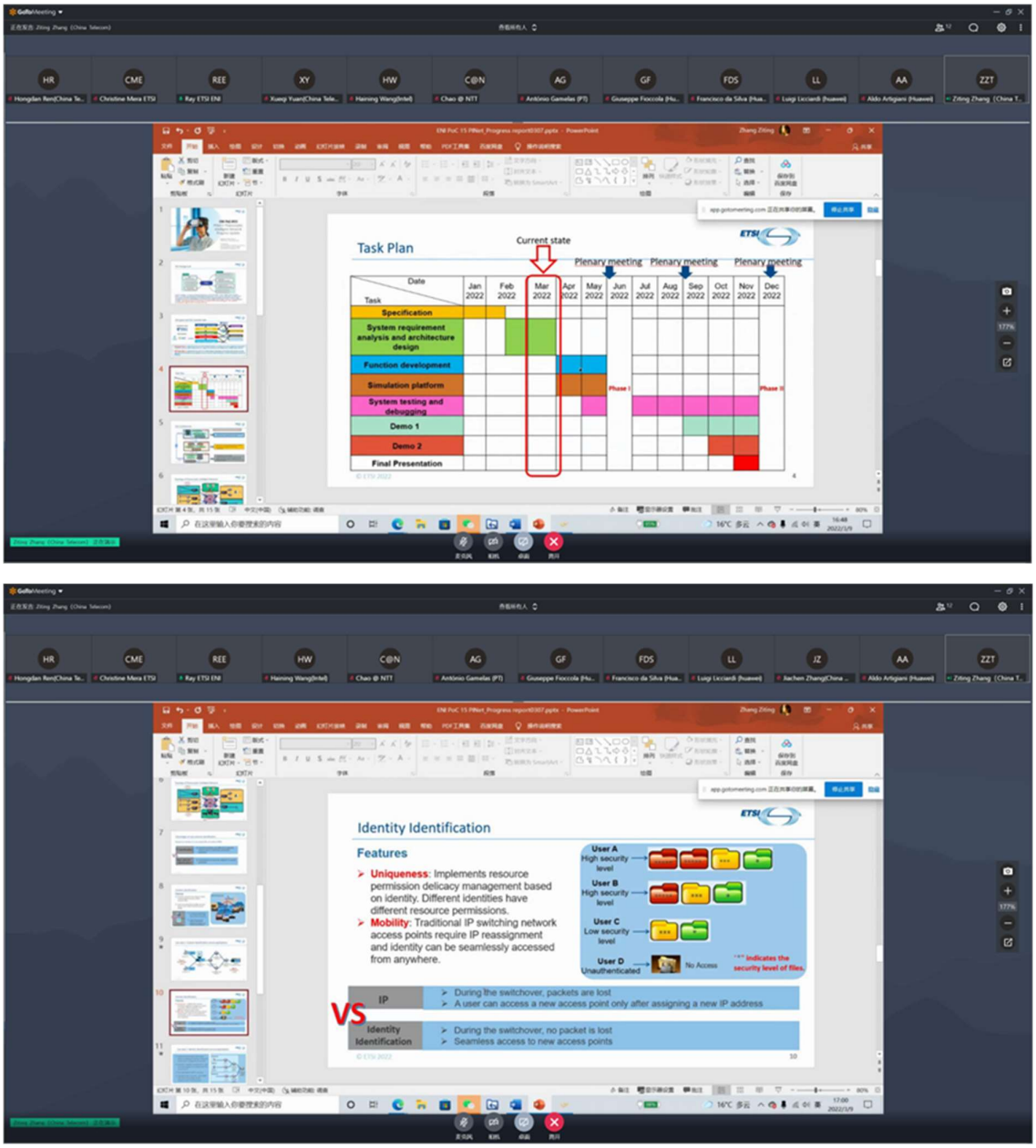

Fig.3 PoC #15 Progress report on ENI #21 plenary meeting

- **ETSI Webinar, Online, April 28, 2022**

This PoC was presented on the Bright Talk, which was also recorded and available at [ETSI - Webinar: PINet—Polymorphic Intelligent Network]().

Fig.4 ETSI webinar

- **ETSI ENI #22 plenary meeting, online, June 22, 2022**

The PoC progress was presented on ENI #22 plenary meeting.

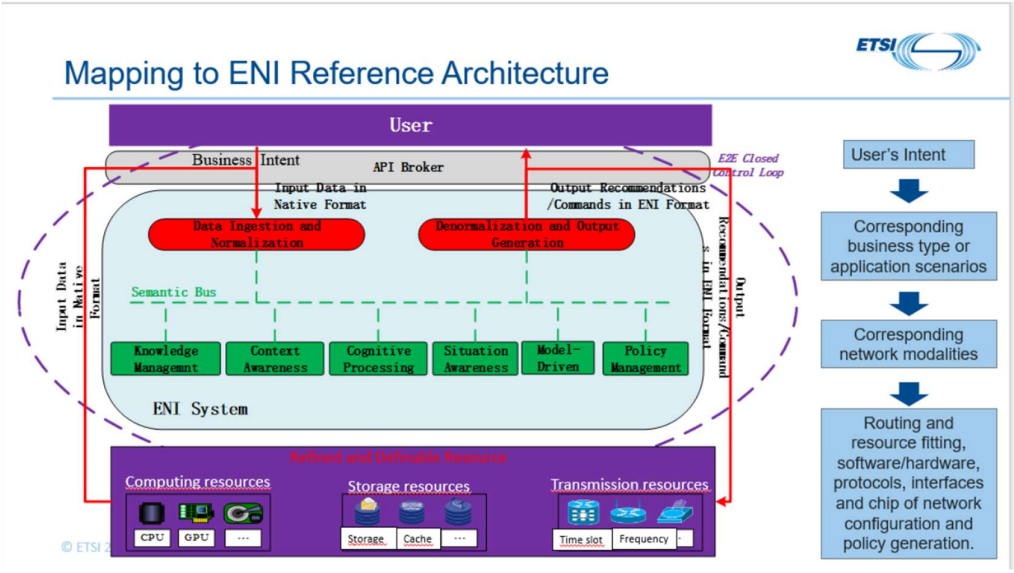

Fig.5 PoC #15 Progress report on ENI #22 plenary meeting

2.4 PoC Goals Status Report

Specify PoC Goals from ENI ISG PoC Proposal (clause A.1.2). Identify any changes from the original ENI ISG PoC Proposal with an explanation as to why the changes were made. Indicate the extent that each goal was met. Provide sufficient information for those not familiar with the PoC goals to understand what has been achieved and/or learned.

- PoC Project Goal #1: Demonstrate the use of intent-based interface to translate the network application requirement to different network modal configuration and support the coexistence and collaboration of polymorphic network. Goal Status (Demonstrated/Met?) Demonstrated.

  The goal has been fully demonstrated. PINet receives the users' network business intent, makes detailed policies for the user-initiated business according to the basic business parameters and performance expectations, and relies on the fitting relationship between business and service to realize the mapping from business intent to detailed configuration of devices. The underlay network device establishes a polymorphic heterogeneous identification space addressing and routing model. It flexibly supports the user's requirements according to the service characteristics of different routes, thus realizing autonomous and intelligent network model switching.

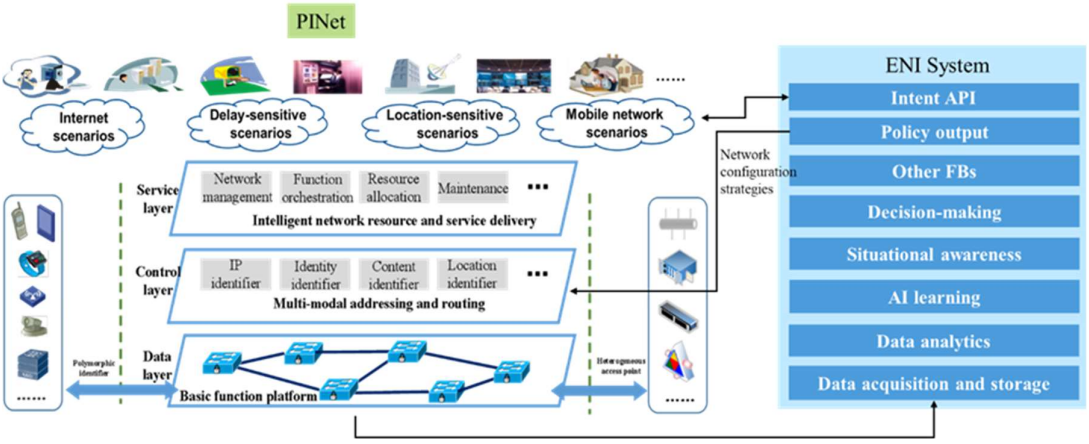

Fig.6 PINet framework and interaction with ENI system

Coexistence and collaboration of multiple models in the same network were demonstrated by the packet capturing experiment.

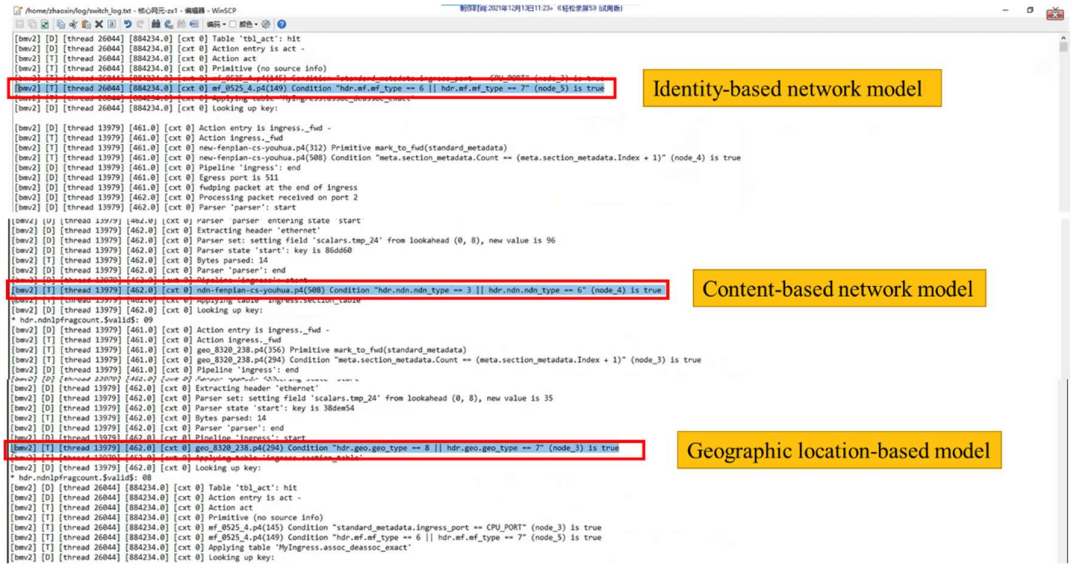

Fig.7 Packet capture test results

- PoC Project Goal #2: Demonstrate the use of AI to realize adaptive adjustment and configuration between network resources and diversified services, optimize network structure, resource allocation, function management and service efficiency. Goal Status (Demonstrated/Met?) Demonstrated.

  The goal has been fully demonstrated. The intelligent closed loop can be formulated as a circle of "perception-comprehension-decision-action-adaptation". "Perception" means that the system constructs a resource view and a business view related to service requirements through observing current status information, contextual, situational and historical information and user's intent. Comprehend the acquired data and information is helpful for ENI system to make fitting decisions. Adaptation means that the system manages resource and orchestrates functions according to fitting decisions to meet service requirements. After adaptation a feedback is collected, based on which the system will update resource and business views and adjust the fitting strategy based on the intelligence ability.

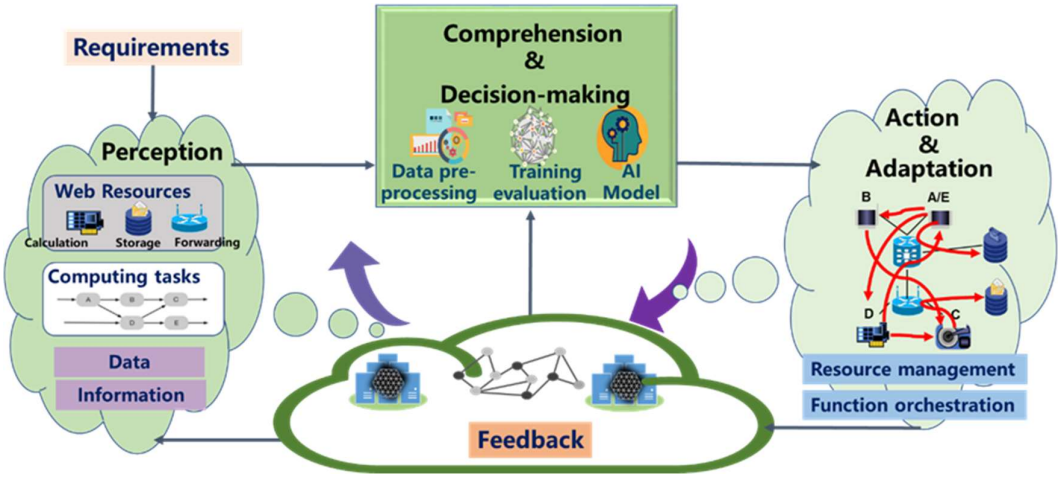

Fig.8 AI Assisted Intelligent Management and Scheduling

2.5 PoC Feedback Received from Third Parties (Optional)

Where applicable, provide in a free text, feedback received from potential customers, Ecosystem partners, event audience and/or general public.

We received the following questions from the delegates from ENI plenary meeting and audience from CTPINet seminar.

- Q: Do routers and servers in polymorphic intelligent network platform need to be customized? Is it self-developed?

  A: The routers were self-developed, while the servers were not. Furthermore, no special router is available. The three-layer (physical layer, link layer, and network layer) switch has a routing function to allow multiple models to coexist.

- Q: PINet platform is tested and verified in the experimental environment. Is the future cost and difficulty of such disruptive network infrastructure transformation being considered?

  A: There is a certain level of difficulty. It can be compared with the evolution of transportation modes. In the past, we only had roads. Now, there are railways, planes and ships. We can choose the best way to travel from one place to another based on our individual requirements. For the internet, previously, we only had IP-based network. PINet aims to allow multiple models to coexist while also customizing the corresponding network model according to user's goal. This PoC is an early exploration to build a new network and key technologies, and there is still long way to go before large-scale deployment.

3 ENI PoC Technical Report (Optional)

3.1 General

3.2 PoC Contribution to ENI ISG

Use table B.1 to list any contributions to the ENI ISG resulting from this PoC Project.

Table B.1

Contribution	WG	WI/Document Ref	Comments
ENI(22)000_166r1 Update ENI 001 Clause 5.4.7 use case #3-7 based on PoC 15	ENI	ETSI GS ENI 001 Use Cases	Add a typical scenarios (Internet of vehicles) use case in PINet applications for reference.
ENI(22)000_142 CR on ENI 002-update requirements extracted from PoC 15	ENI	ETSI GS ENI 002 Requirements	Add some network planning and deployment, security and privacy, data collection related requirements.
ENI(22)000_143r2 CR on ENI 004 update PoC 15 related terminology	ENI	ETSI GR ENI 004 Terminology	Add PINet related terms and Abbreviations.
ENI(22)023_024 Whitepaper B.3 PoC section_PoC#15	ENI	ETSI ENI White Paper	Add cognitive management related content.

3.3 Gaps identified in ENI standardization

3.4 PoC Suggested Action Items

3.5 Additional messages to ENI

None.

3.6 Additional messages to Network Operators and Service Providers

PINet is a new network infrastructure that subverts and rebuilds the previous network architecture. We encourage more network operators and service providers to participate in the exploration of PINet application. It requires more attention and industry collaboration to meet the needs of future network intelligence, diversification, personalization, robustness and efficiency.