ENI PoC #15

PINet— Polymorphic Intelligent Network Progress Update

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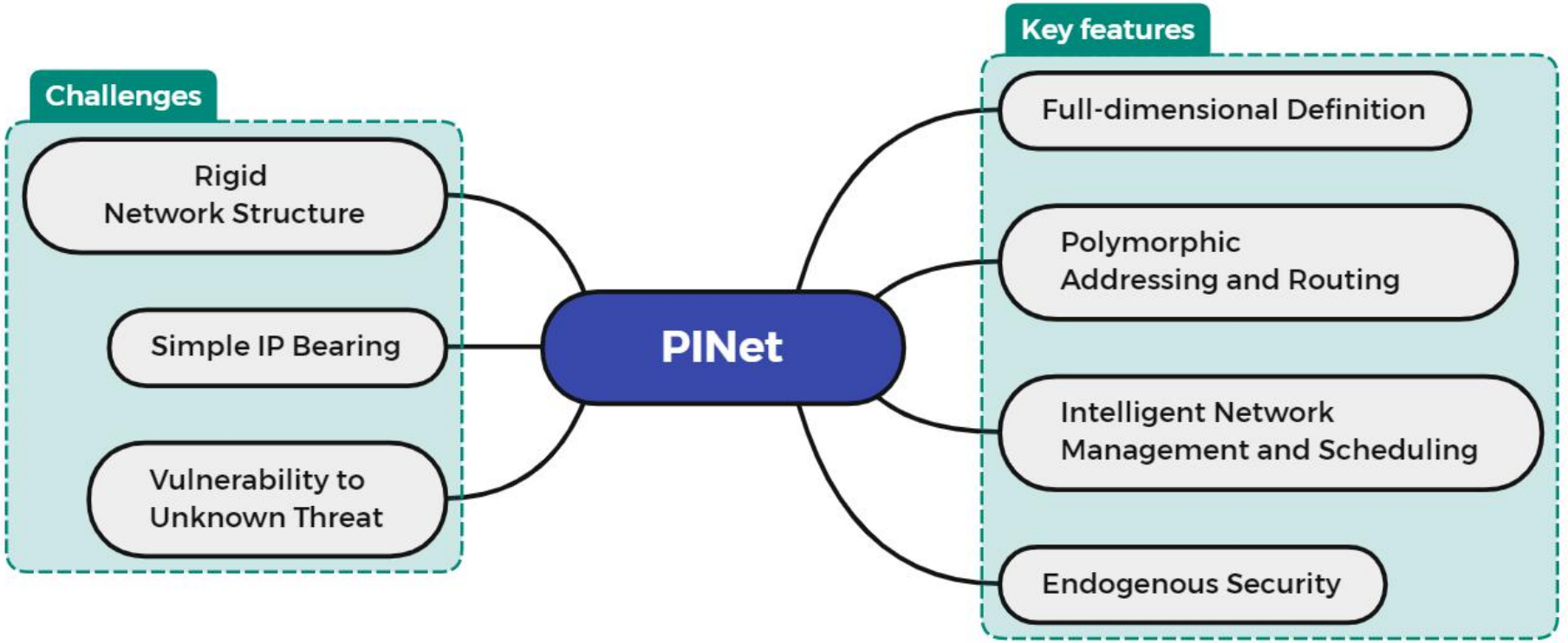
Co-Rapporteur:
Menglong Li (NDSC, National Digital Switching System Engineering &Technological Research Center), Jiachen Zhang(China Mobile Research Institute), Da Wang (Asia Info), Lisha Lan (Maipu Communication Technology Co., Ltd.)

Content

PART 01

PoC Task Plan

PoC Background



Short Description：The current network mainly faced several challenges, such as rigid network structure, simple IP bearing, and difficulty in dealing with unknown threats. Based on above challenges, the goal of this PoC project is to realize polymorphic presentation of addressing and routing, and provide feasible design strategy for operators to automatically deploy network according to different types of business and application scenarios. PINet fundamentally meets the business requirement of network intelligence, diversification, personalization, high robustness and high efficiency.

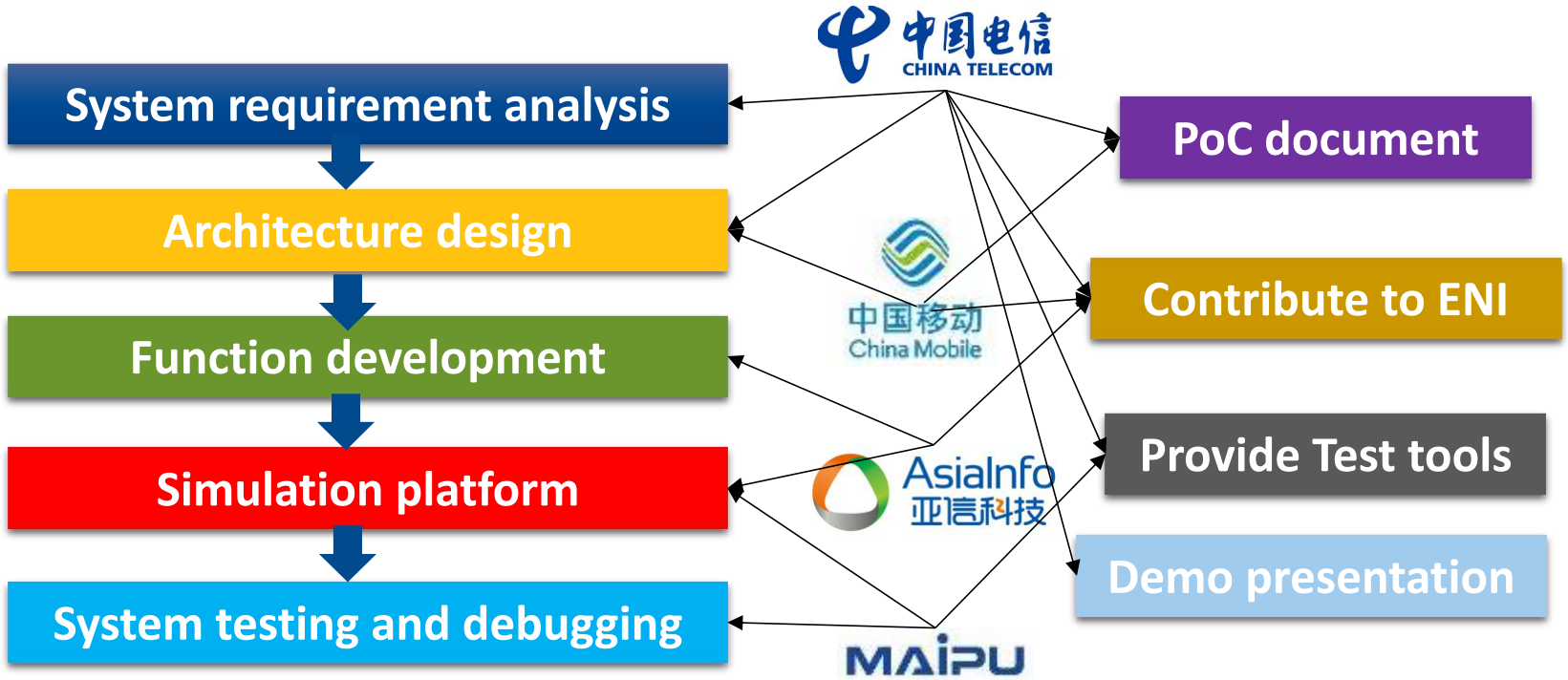
PoC Goals and PoC Member Task

Host/Team Leader:

中国电信 CHINA TELECOM

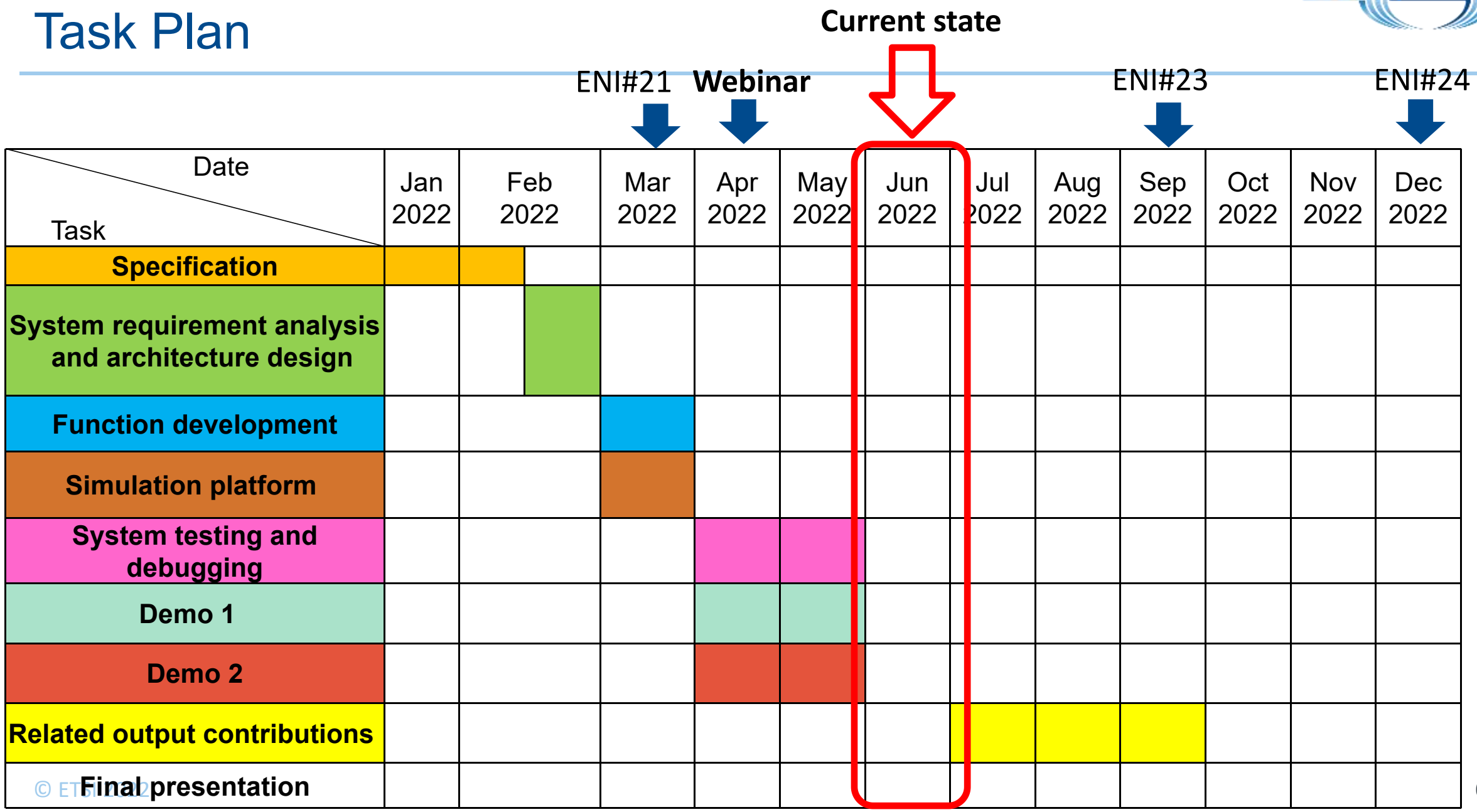
Team members:

中国移动 China Mobile　AsiaInfo 亚信科技　MAIPU



- **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.
- **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.

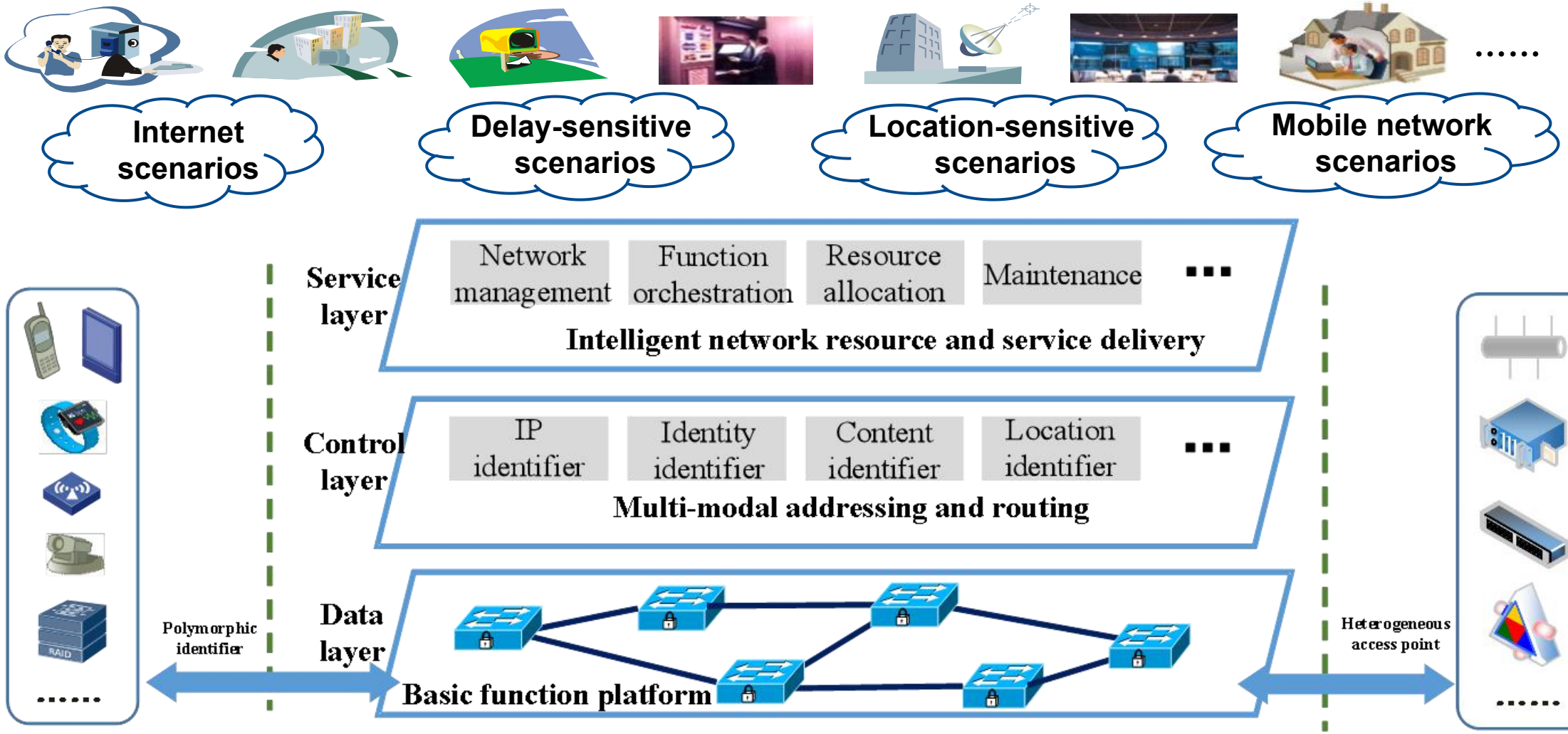
Task Plan



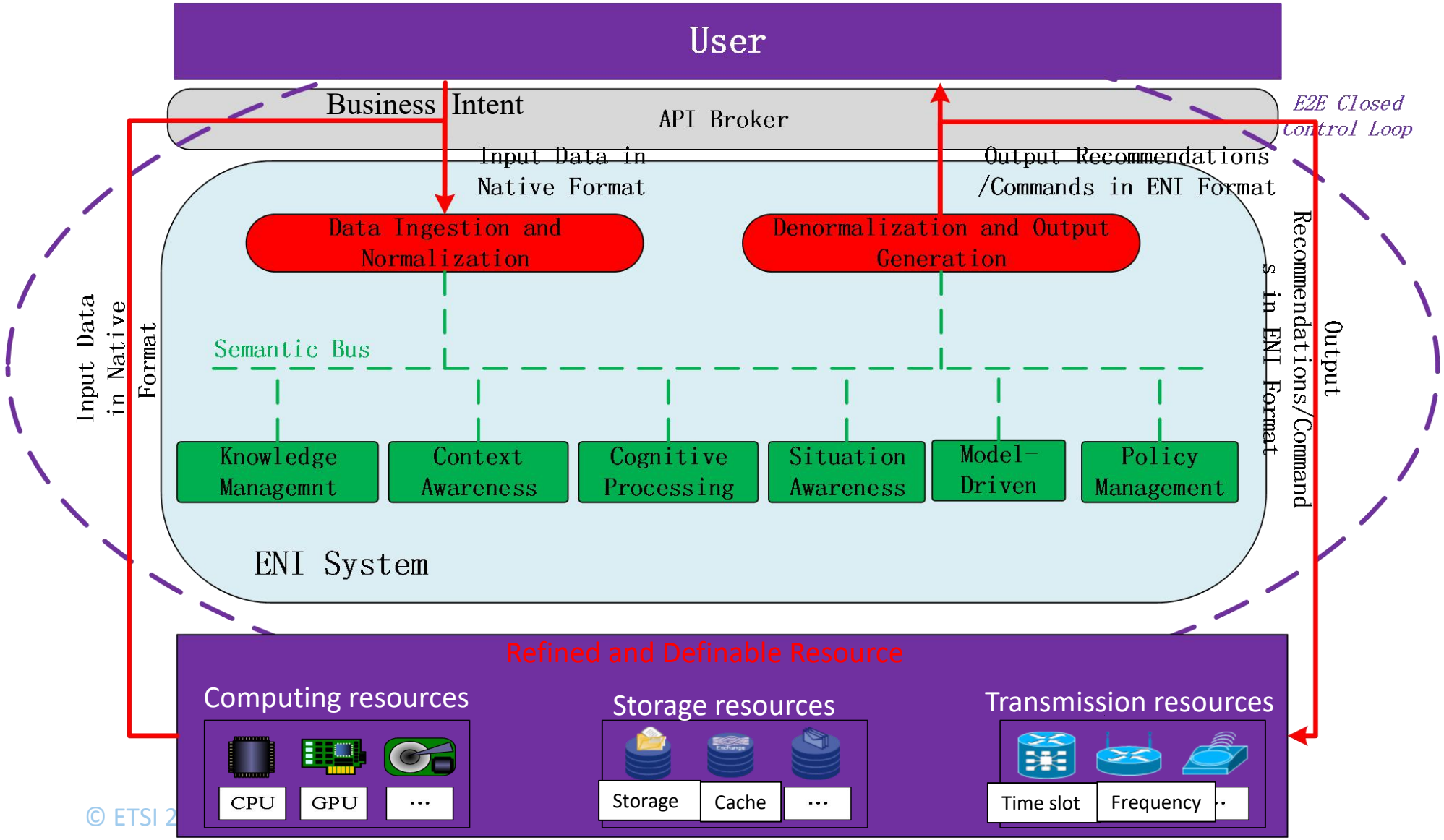
PART 02

Architecture

PINet Architecture

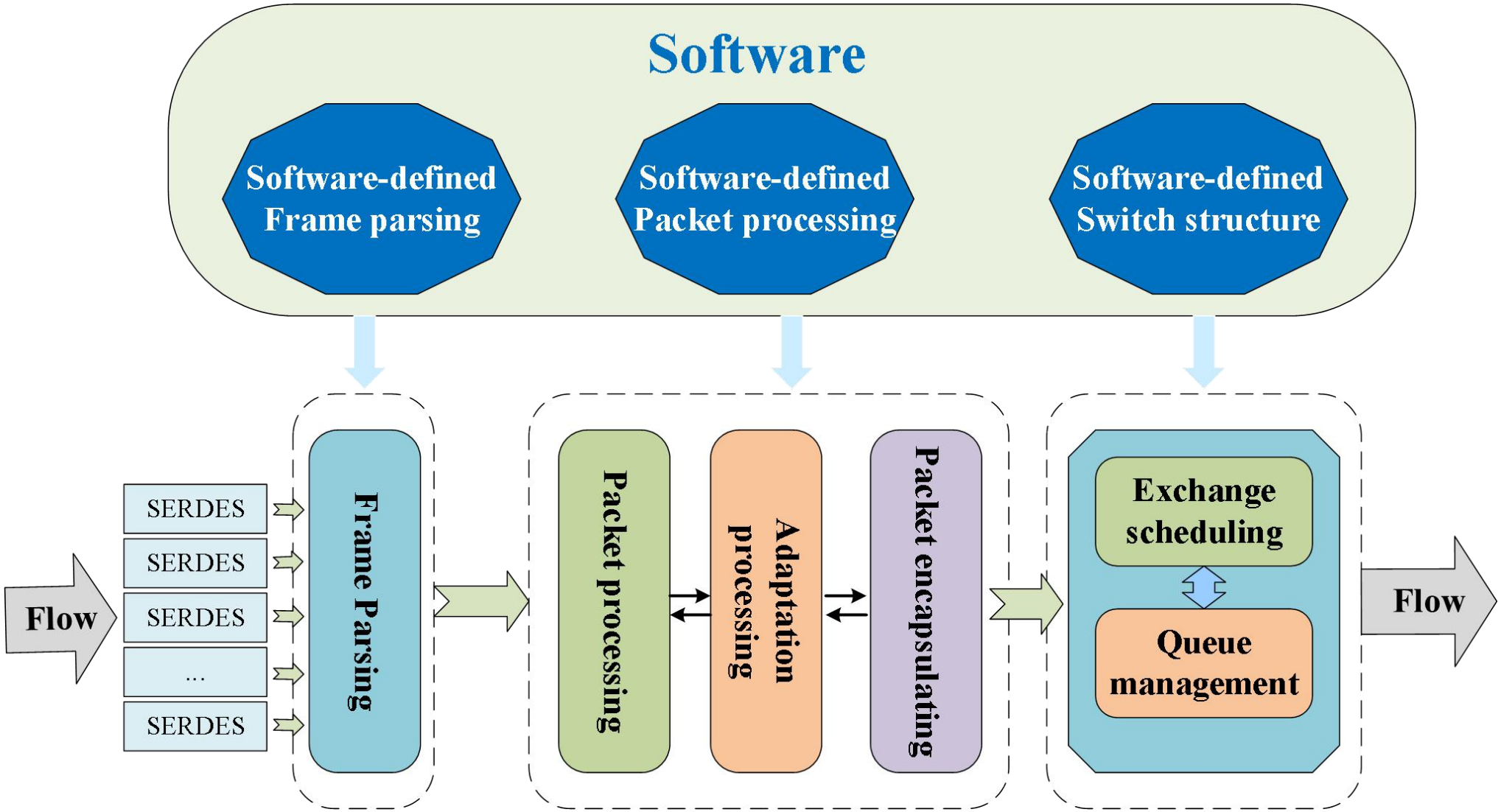


Mapping to ENI Reference Architecture



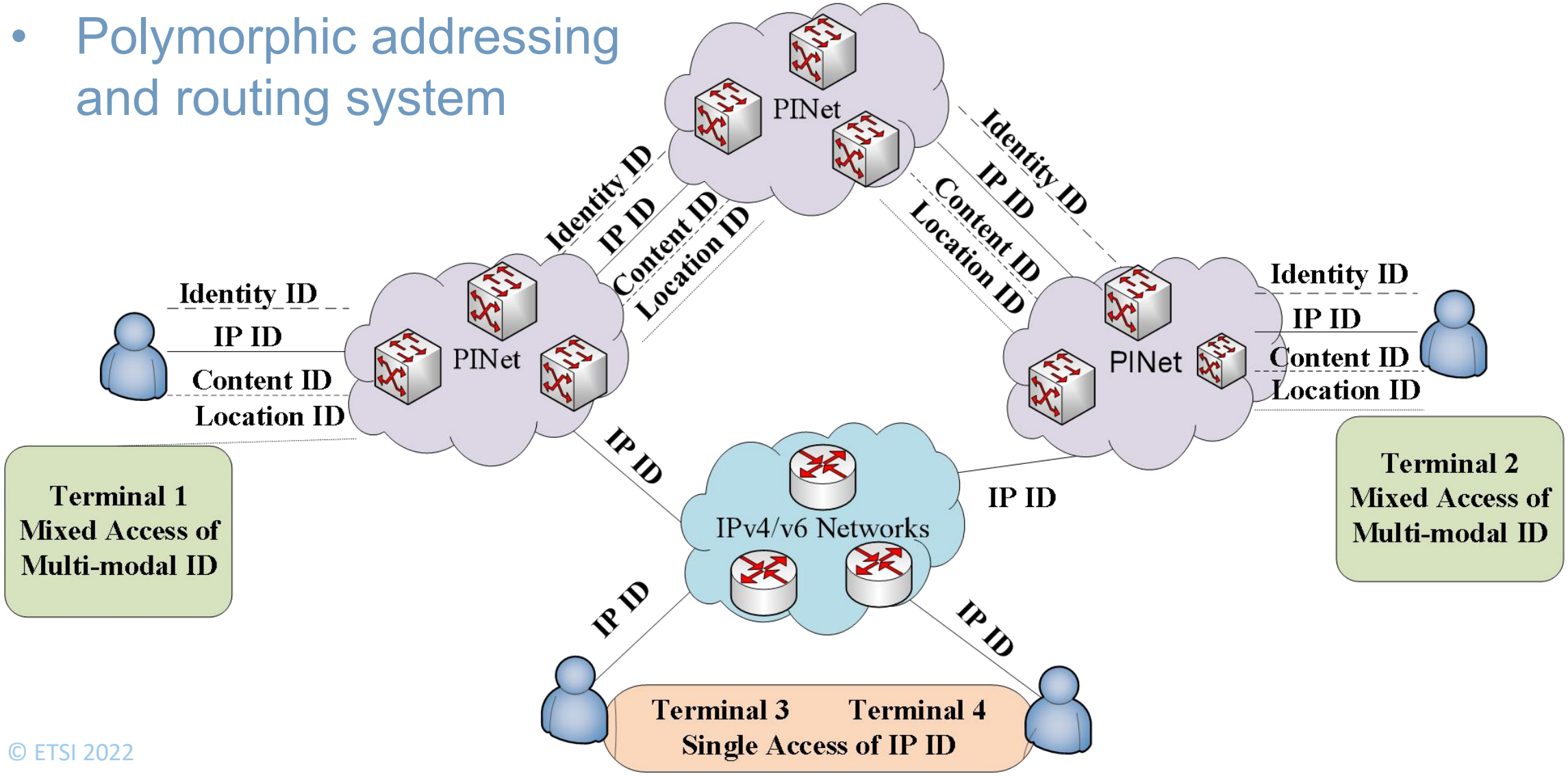
- User's Intent
- Corresponding business type or application scenarios
- Corresponding network modalities
- Routing and resource fitting, software/hardware, protocols, interfaces and chip of network configuration and policy generation.

Data Layer of PINet: Full-dimensional Definition

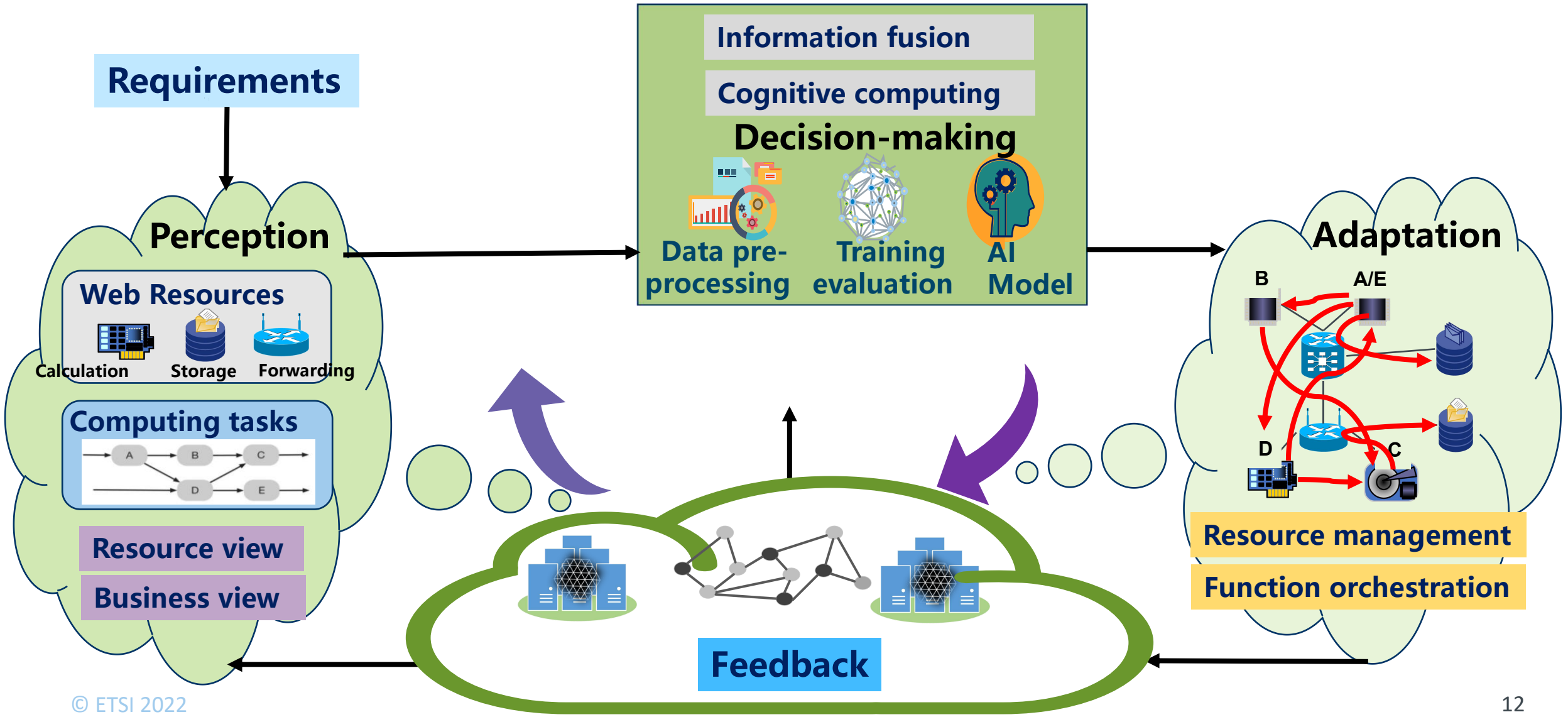


Control Layer of PINet: Polymorphic Addressing and Routing

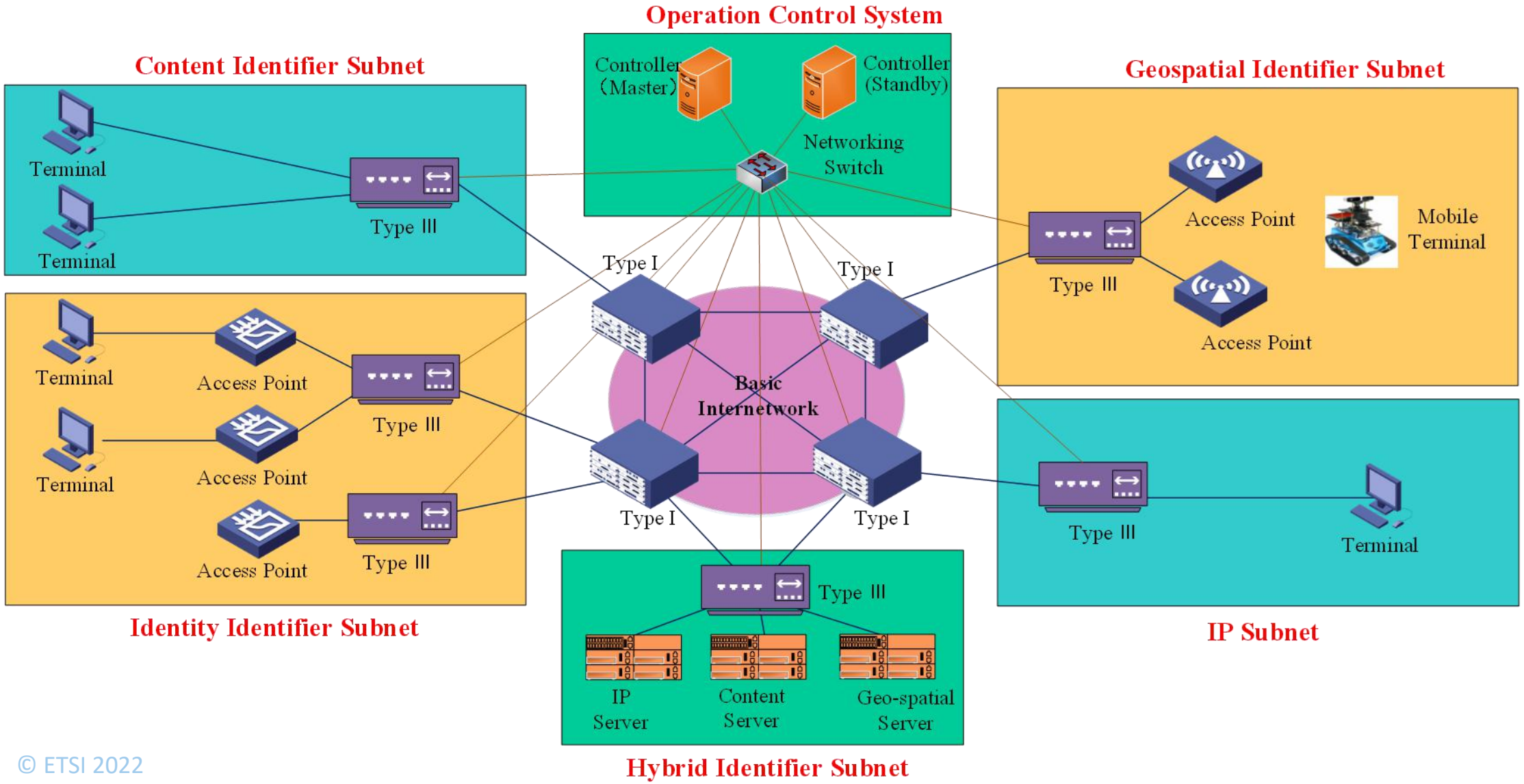
- Polymorphic addressing and routing system



Service Layer of PINet: ENI Assisted Intelligent Management and Scheduling



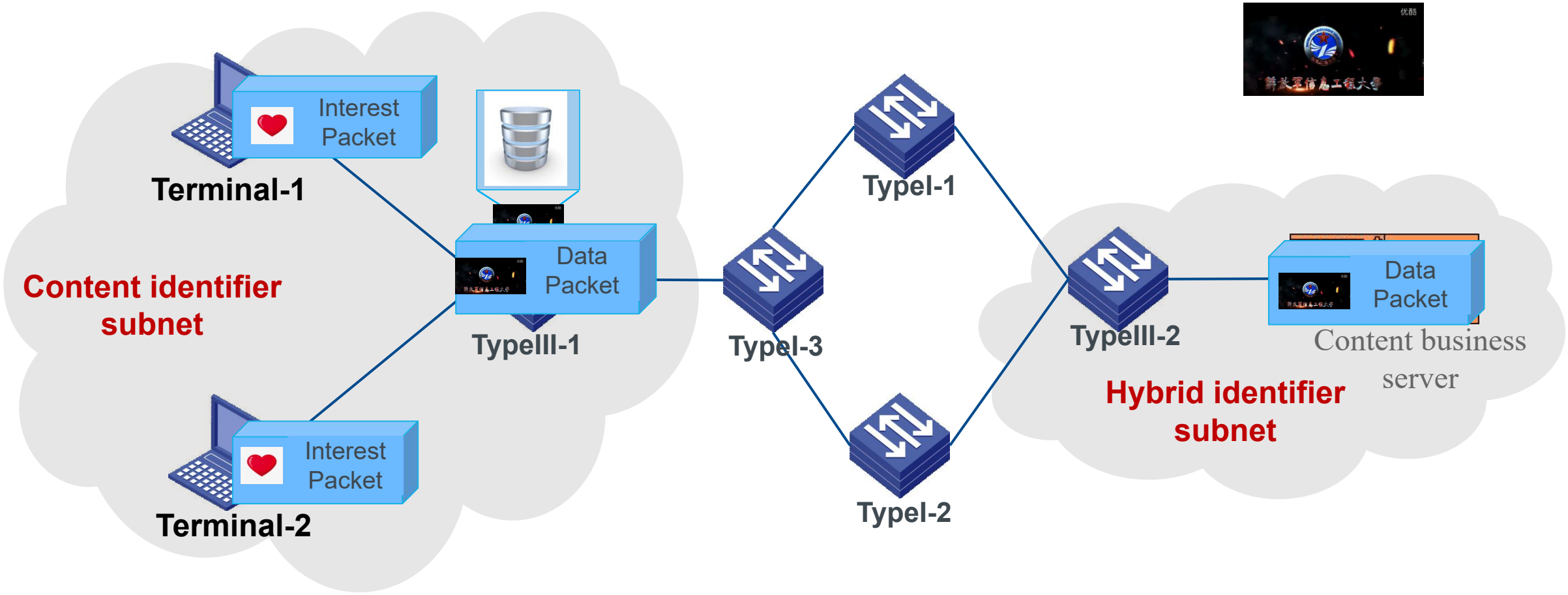
Topology of Polymorphic Intelligent Network



PART 03

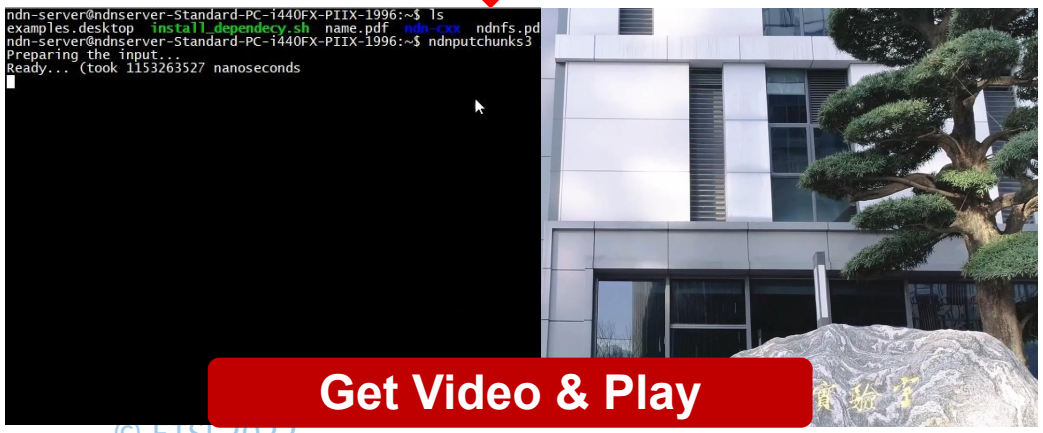
Demos

Demo1: Content identifier service applications



Demo 1: Content identifier service applications

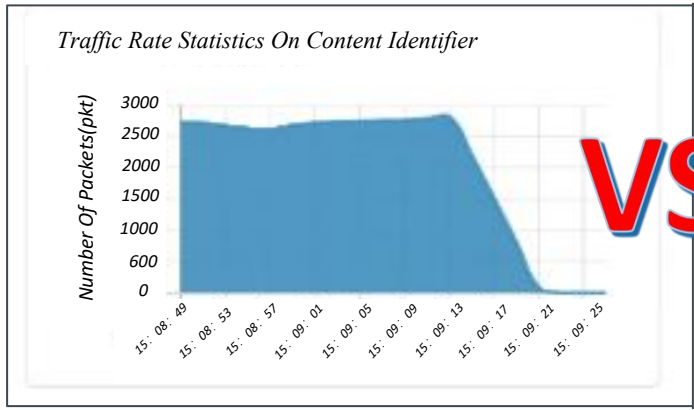
Experimental process



Experimental results

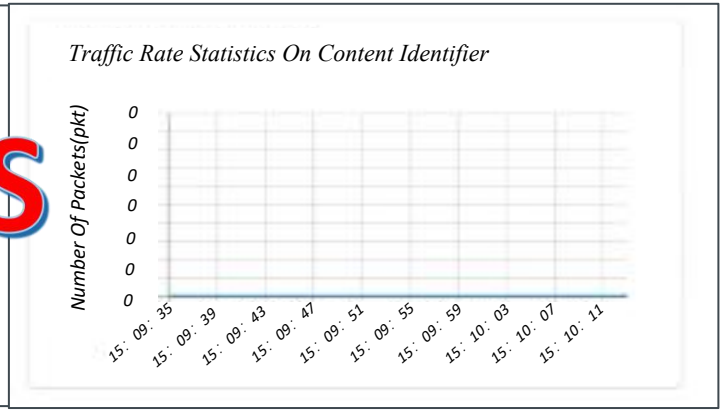
1.Core Network Traffic Statistics

First Request



VS

Second Request



2. The time consumption

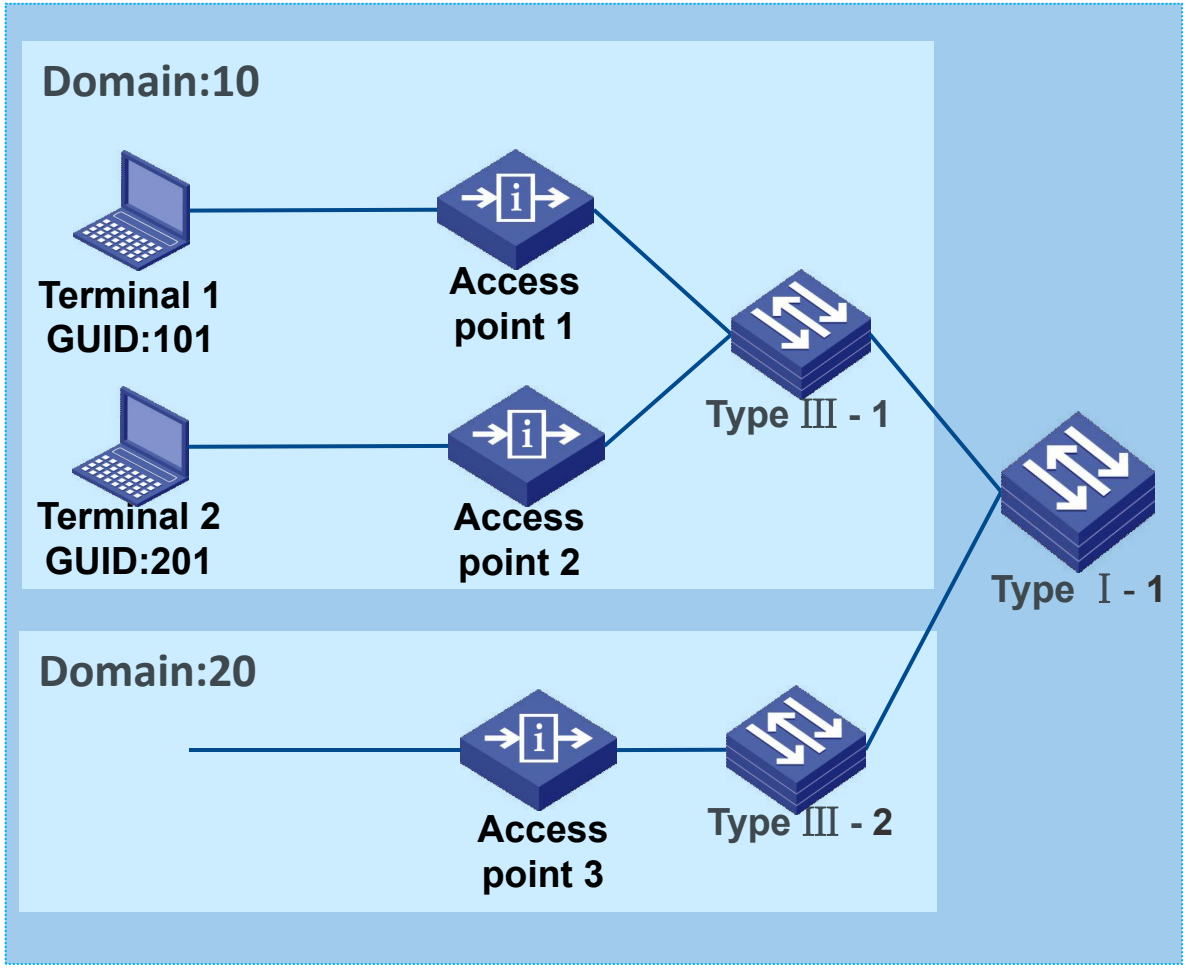
```
root@zjlab-hd-host:~# ndncatchunks3 /snt/sedan/state -o>zjlab.mp4
TIMEOUT: last interest sent for segment #1875
Took 38.9765 s
```

VS

```
root@zjlab-hd-host:~# ndncatchunks3 /snt/sedan/state -o>zjlab.mp4
TIMEOUT: last interest sent for segment #1875
Took 13.753 s
```

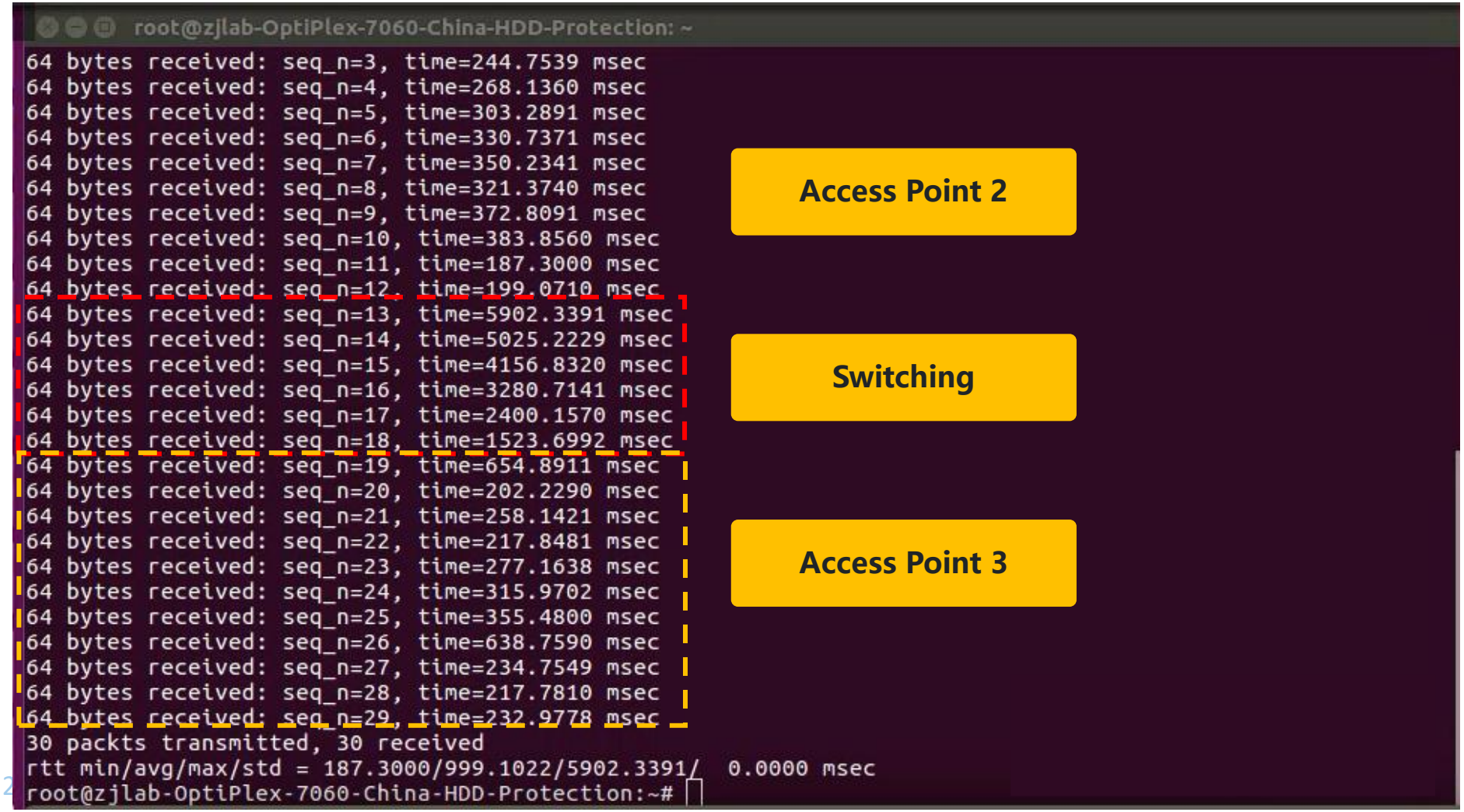
Demo 2: Identity identifier service applications

- Divide into two domains. Two access points are deployed in Domain 10 and one access point is deployed in Domain 20.
- Terminal 1 connects to Access point 1 and terminal 2 switches from Access point 2 to Access point 3
- Expected result: Terminals 1 and 2 PING each other successfully, and the switchover does not lose packets

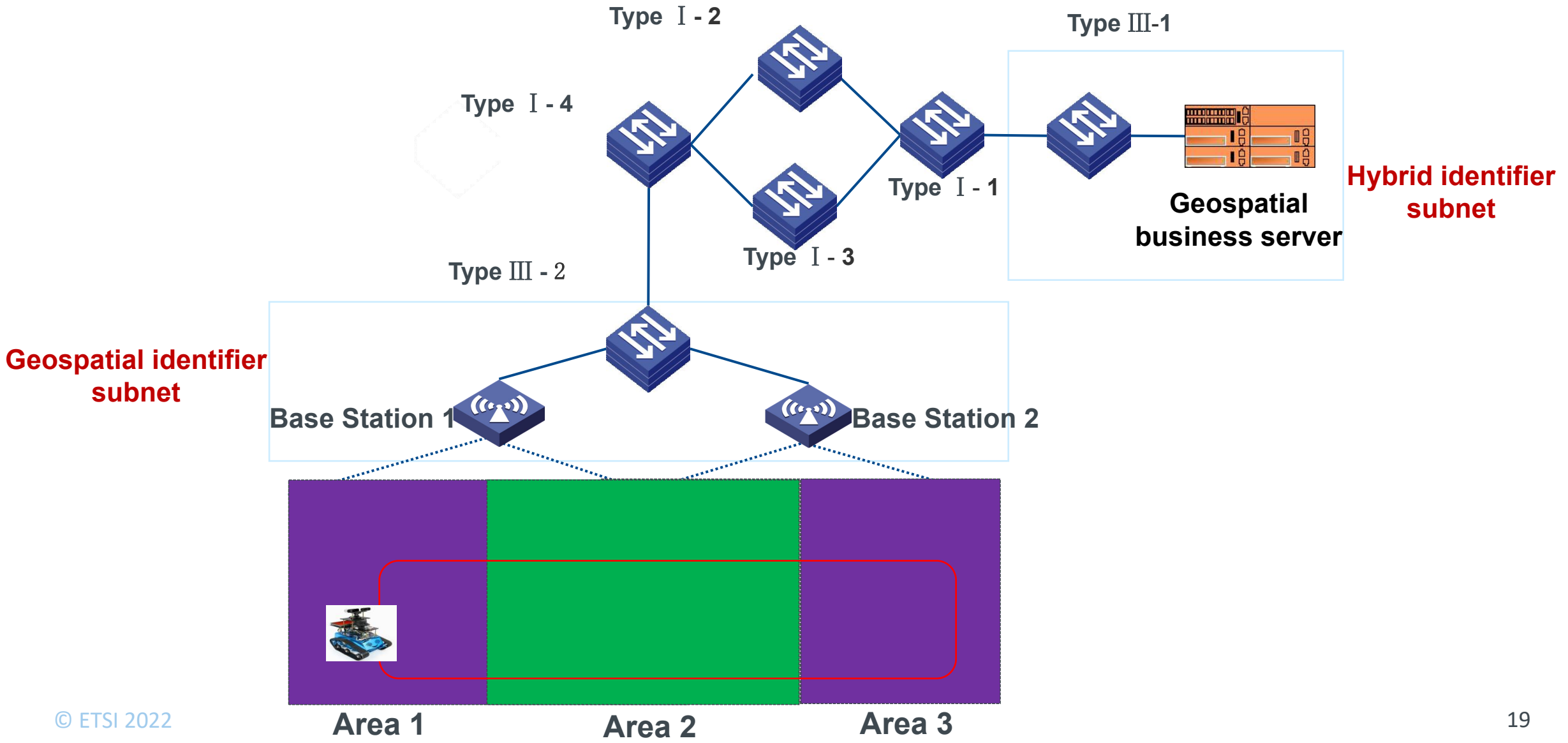


Demo 2: Identity identifier service applications

Experimental results



Demo 3: Geospatial identifier service applications



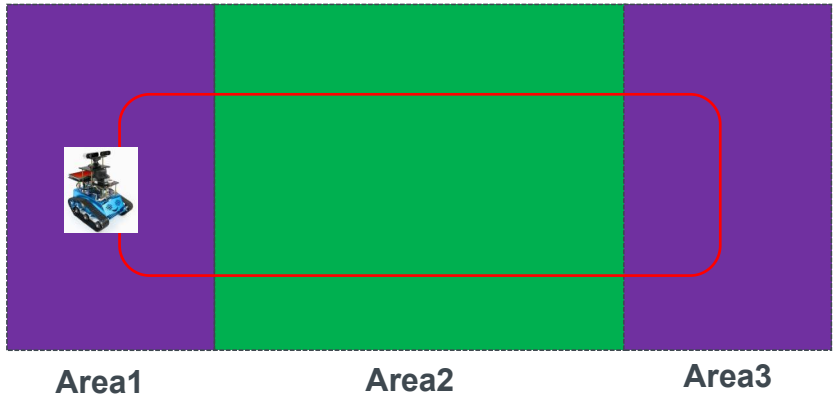
Demo 3: Geospatial identifier service applications

Designed Scenario 1

Action: Single area message push

(Send message to area 1)

Expected result: When the car enters area 1, the light will be on. When the car leaves area 1, the light will go out.



Designed Scenario 2

Action: Multi-area message push

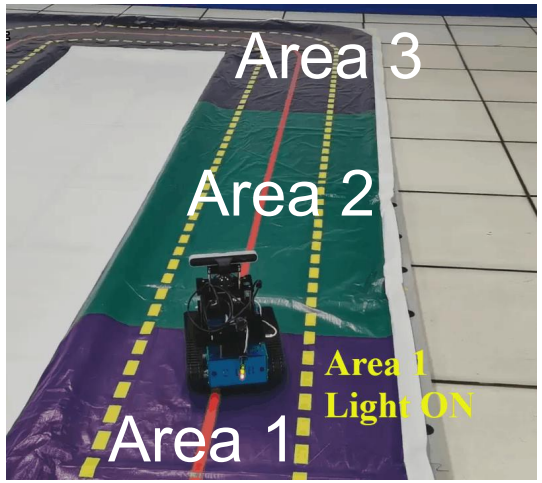
(Send message to area 1 and 3)

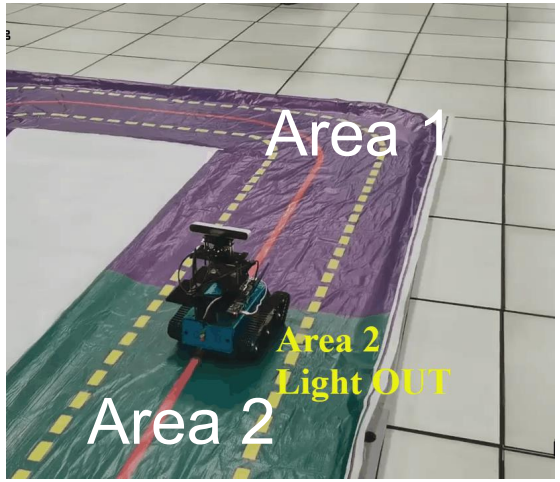
Expected result: When the car enters area 1 or area 3, the light will be on. When the car enters area 2, the light will go out.

Demo 3: Geospatial identifier service applications

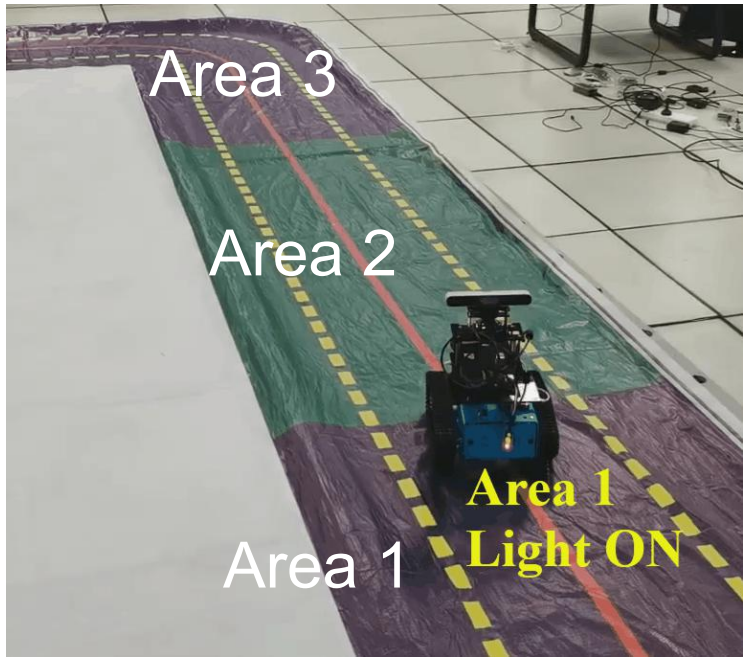
Experimental results

Single area message push





Multi-area message push

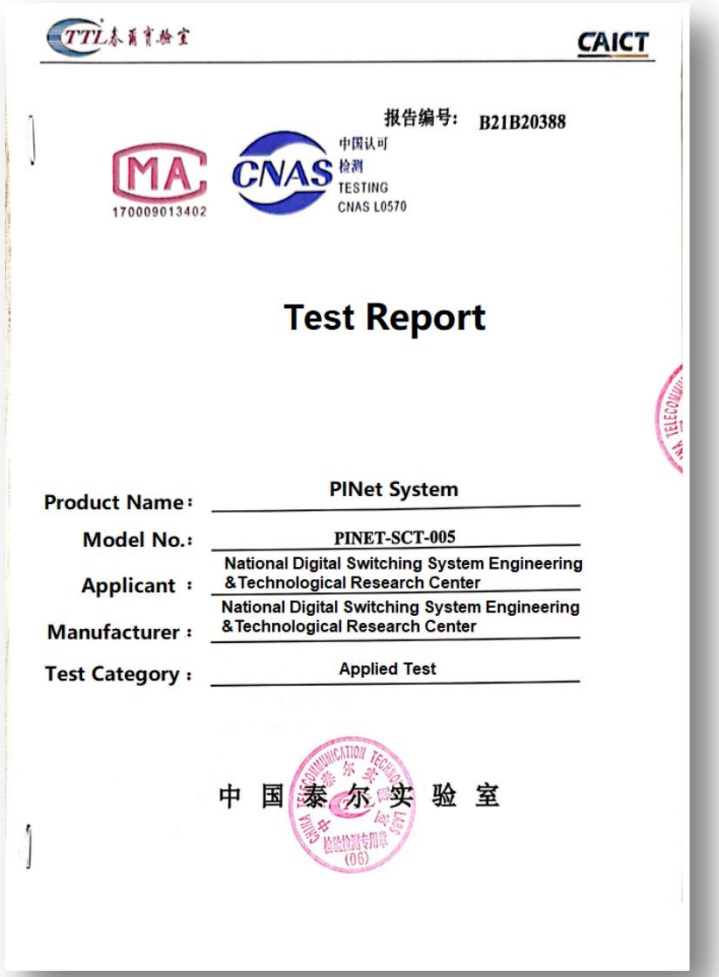


PART 04

PoC Impact

Third party certification

Test Report from CAICT 中国信通院 (China Academy of Information and Communications Technology)



TTL泰尔实验室 CAICT

报告编号: B21B20388

MA 170009013402 CNAS 中国认可 检测 TESTING CNAS L0570

Test Report

Product Name:	PINet System
Model No.:	PINET-SCT-005
Applicant:	National Digital Switching System Engineering &Technological Research Center
Manufacturer:	National Digital Switching System Engineering &Technological Research Center
Test Category:	Applied Test

中 国 泰 尔 实 验 室

A list of the tested content

System name: Polymorphic intelligent network

	Test item	Measured item	Qualified item	Unqualified item
Test content:				
1、PINet networking function	10	10	10	0
2、Content identifier application	5	5	5	0
3、Identification identifier application	7	7	7	0
4、Geospatial identifier application	4	4	4	0
5、IP identifier application	5	5	5	0
Total	31	31	31	0

100%qualified

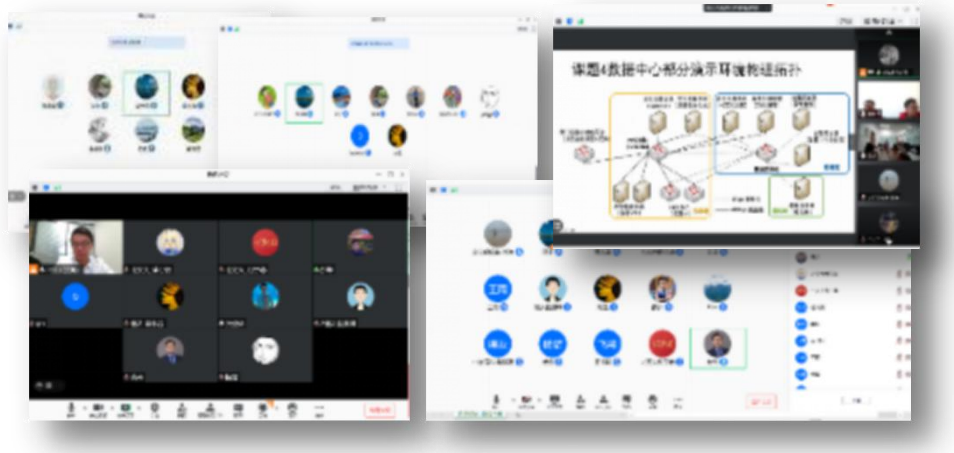
PoC Impact

2021 CT PINet Online Forum

2021 Summer Camp: PINet Science

PINet summits by key scholars

Some 20+ PINet related seminars



PoC Impact

Apr 28 2022， ETSI WEBINARS

PINet— Polymorphic Intelligent Network (ENI POC #15)

Apr 28 2022 | Duration: 44 mins

Presented by

Ziting Zhang and Menglong Li (ISG ENI)

PART 05

PoC Milestones and Current Progress

PINet—Polymorphic Intelligent Network

PoC Milestones and Current Progress

PoC Milestone	Stages/Milestone description	Target Date	Additional Info	
P.S	PoC Project Start	12/2021	Presentation during ENI #20	✓
P.D1	PoC Demo 1	03/2022	Presentation during ENI #21	✓
~~P.D2~~	~~PoC Demo 2~~	~~05/2022~~	~~Demo at Beijing CTIDC conference 2022~~ Cancelled because of epidemic situation in Beijing	
P.D2	PoC Demo2	04/2022	ETSI Webinar	✓
P.C1	PoC Expected Contribution 1	07/2022	Contributions to ENI Requirement.	
P.C2	PoC Expected Contribution 2	08/2022	Contributions to ENI Use Case.	
P.C3	PoC Expected Contribution 3	09/2022	Contributions to ENI Terminology.	
P.R	PoC Report	09~~10~~/2022	PoC-Project-End Feedback	
P.E	PoC Project End	11/2022	Presented to ISG ENI for information	
Milestones need to be entered in chronological order. NOTE:				

Current

Target