ENI PoC #25: Intelligent Scheduling of Computational Power for Smart Grids Progress Update

Rapporteur:

China Telecom, China South Grid, Asiainfo, China Unicom, ZTE

ENI PoC project #25: Intelligent Scheduling of Computational Power for Smart Grids

PoC Goals and PoC member task

Host/Team Leader:

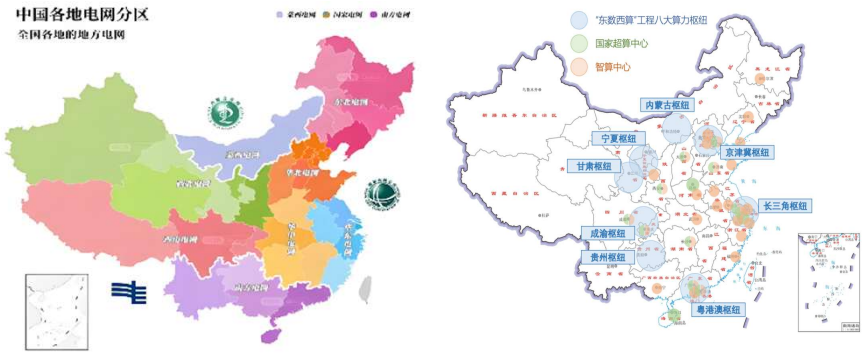
Team members:

- ✓ **PoC Project Goal #1: Cross-Domain Synergy Scheduling. Demonstrate how to dynamically match computational tasks and resources with real-time grid supply conditions, such as time-of-use electricity pricing and renewable energy availability, to achieve efficient synergy between computational demand and power grid operations.**
- ✓ **PoC Project Goal #2: Dynamic Cost-Stability Optimization. Demonstrate how to respond to grid regulation signals, optimize overall operational costs for computational infrastructure, and enhance grid stability through flexible and responsive computational load scheduling.**

ENI PoC project #25: Intelligent Scheduling of Computational Power for Smart Grids

01 The distribution of energy and computing power resources is uneven.

East Computing Power eager + **West Resource Rich** → **Electricity Resources is unevenly distributed**



02 High electricity costs in the east and high transmission losses in the west-to-east power transfer.

Electricity Price + **Transmission Cost** → **East Electricity Cost is Higher than the West**

- **Electricity Cost:** Taking the Shanghai Lingang 10,000-card cluster as an example, the annual electricity consumption is calculated as follows: Number of cabinets × Power per cabinet × Average annual PUE × Operating hours. Based on 8 4U servers per cabinet, each with 8 GPUs, a 10,000-card pool with 9,216 GPUs requires approximately 144 liquid-cooled cabinets. With a power of about 41.8kW per cabinet and a PUE of 1.15, operating 24 hours a day for 365 days a year, the annual electricity consumption is approximately 60 million kWh. Calculated at Shanghai's average electricity price of 0.9 yuan/kWh, the annual cost is about **54 million** yuan; calculated at Qinghai's average price of 0.4 yuan/kWh, the annual cost is about **24 million** yuan, resulting in an annual difference of approximately 30 million yuan.
- **Transmission Loss and Cost:** The loss rate for ultra-high voltage transmission lines is approximately 2% to 7%. However, the construction costs are high, and the requirements for operational technology and safety are also very demanding.

ENI PoC project #25: Intelligent Scheduling of Computational Power for Smart Grids

alance the utilization rate of computing power resources between the eastern and western regions, address the issues of resource scarcity and high energy costs in computing clusters during peak periods, promote the consumption of green power, and achieve a "dual reduction" in both the operating costs of computing clusters and carbon emissions.

- Core Logic and Objective Breakdown

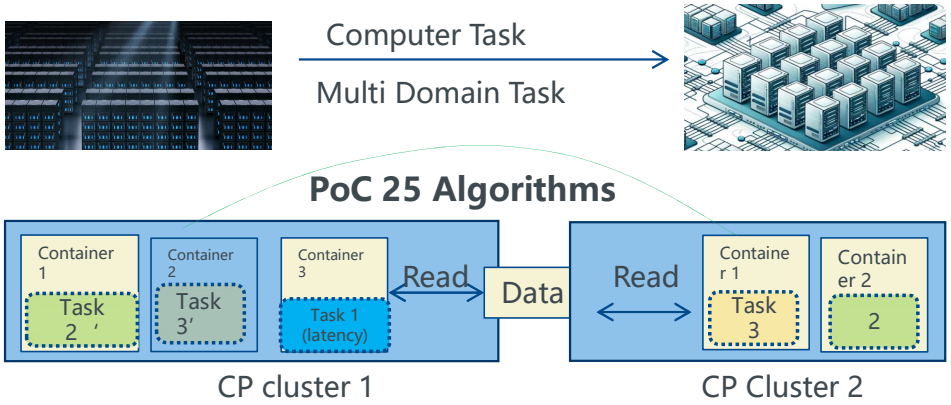
1. Resource Balancing: Balance the utilization of AI computing resources between the eastern and western regions.
2. Cost Optimization: Leverage the lower price of green electricity in the west compared to thermal power in the east to reduce the electricity cost for computing tasks.
3. Green Power Consumption: Mitigate the issue of renewable energy curtailment in the western region, improve utilization rates, reduce reliance on thermal power, and support the "Dual Carbon" strategy.

- Application Scenarios

1. Computing clusters need to handle various tasks, including real-time AI inference (high priority, low latency), big data analysis (medium priority, elastically schedulable), and cold data storage (low priority, high latency tolerance). Given the resource scarcity and high costs in eastern clusters, contrasted with high idle rates and low electricity prices in western clusters, cross-data center (DC) and cross-regional scheduling can be implemented to balance demand.

- Implementation Plan

1. Develop a collaborative computing-power bidirectional scheduling management platform. Collaborate with provincial companies in the eastern and western regions and central power enterprises to conduct cross-DC and cross-regional computing task scheduling experiments for cross-regional computing and power collaborative dispatch scenarios.
2. Validate the feasibility of key factors such as scheduling algorithms, network transmission, latency efficiency, and cost. Integrate interfaces with the power grid dispatch system and the green power trading platform to conduct feedback and assessment.
3. Establish a matching model between computing demand and green power supply, utilizing computing as a form of energy storage to promote the consumption of green power.



Expected Outcomes:

Alleviate the shortage of AI computing resources in eastern provinces and improve the utilization rate of newly built green data centers in western provinces.

Effectively reduce computing costs for eastern provinces while increasing AI computing business revenue for western provinces.

Promote the consumption of clean energy and green electricity in the western region, conduct beneficial explorations for future operators' participation in the green power market trading mechanism, and contribute to achieving the dual carbon goals.

ENI PoC project #25: Intelligent Scheduling of Computational Power for Smart Grids

PoC Milestones and Current Progress

Current

Target

PoC Milestone	Stages/Milestone description	Target Date	Additional Info
P.S	PoC project submission	12/2025	Approval during #ENI 36
P.TP.1	PoC Test Plan 1	03/2026	Initial testbed up and running
P.D1	PoC Demo 1	03/2026	Webinar demo at the ENI#37 plenary meeting
P.D2	PoC Demo 2	06/2026	Demo at ENI#38
P.D3	PoC Demo 3	09/2026	Demo at ENI#39
P.C1	PoC Expected Contribution 1	10/2026	Contributions to ENI use case
P.C2	PoC Expected Contribution 2	10/2026	Contributions to ENI requirement
P.R	PoC Report	10/2026	PoC-Project-End Feedback
P.E	PoC Project End	12/2026	Presented to ISG ENI for information