



ONE
SUMMIT

Intent Driven Orchestration for Autonomous Networks Leveraging GenAI, Nephio & ONAP

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Agenda



1. Towards autonomous networks & Intent based Orchestration

2. 5G SBP project "Intent Driven Orchestration for Autonomous Networks Leveraging GenAI"

3. Enhancing general intent management based on large models in ONAP

4. Next Steps

Autonomous Network



Carry **hundreds of billions of connections** in the digital society

Provide **ubiquitous computing power** as social service

Support the digitalization **of thousands of industries**

Accelerate **digital and intelligent transformation** of network

- ◆ 5.5/6G/Fusion perception, high-precision position, etc

- ◆ Connected and enhanced computing power by network
- ◆ Flexible and efficient computing force network services

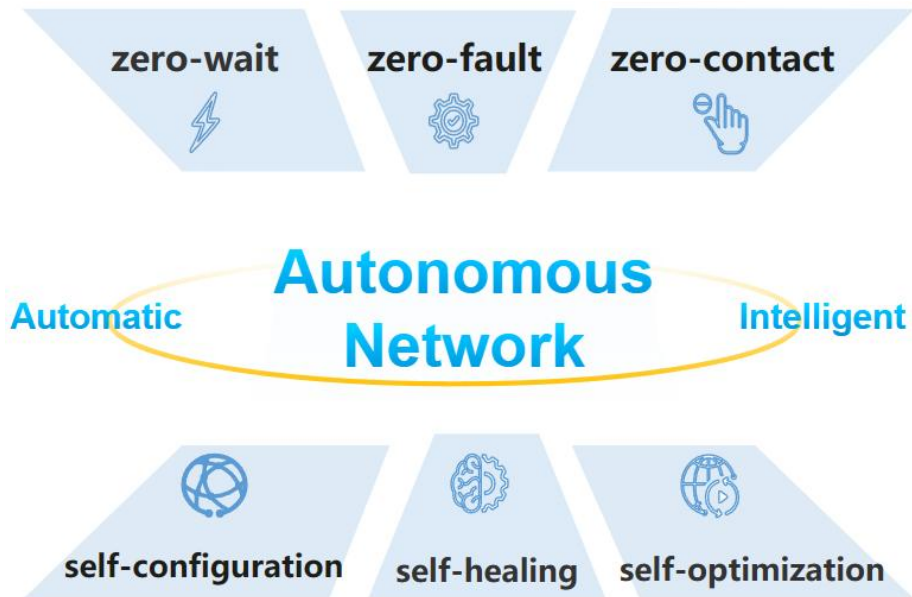
- ◆ Differentiated network services
- ◆ Deterministic network experience

- ◆ High-quality network to ensure network security and stability, reduce costs and increase efficiency

Intent Driven Orchestration for Autonomous Networks



The concept and vision of Autonomous Network



01

Focused on User Intent

The design and operation of network systems prioritize user intent, automatically adjusting network resources through the analysis and understanding of user requirements.

02

Automation and Intelligence

Utilizing advanced automation and intelligent technologies, such as artificial intelligence and machine learning, to achieve optimal allocation of network resources.

03

Zero-Wait, Zero-Fault, Zero-Contact

Real-time business activation; zero-fault experience through end-to-end network monitoring and intelligent fault recovery mechanisms; contactless experience through data and capability openness and self-service.

04

Full-Scenario Network Autonomy

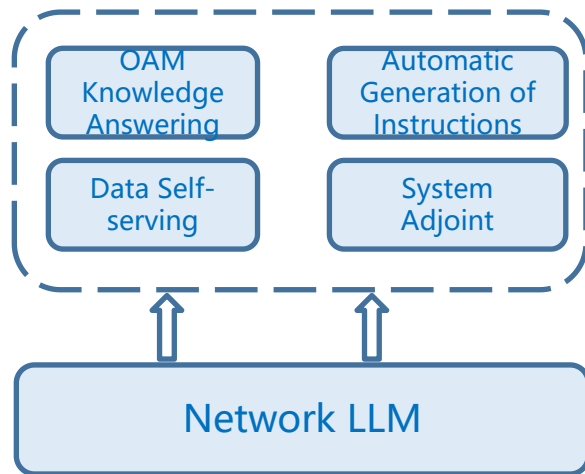
Based on the four management levels of network elements, resources, services, and business, build a systematic capability to achieve full-scenario network autonomy.

Large models facilitate the evolution of autonomous networks towards a more advanced level



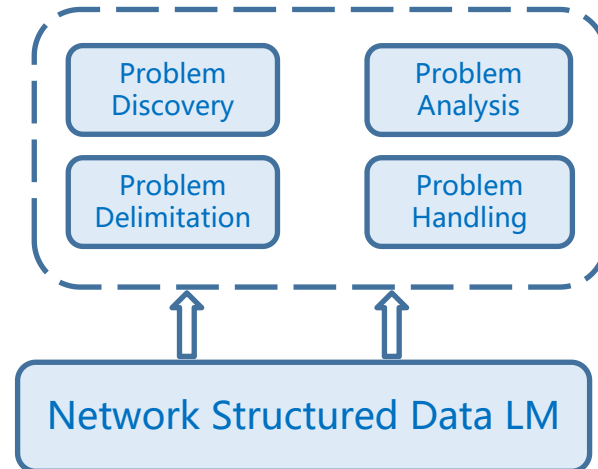
Network LLM

- Support various scenarios such as OAM knowledge FQA and data self-serving, reduce manual intervention, improve network operation efficiency and service



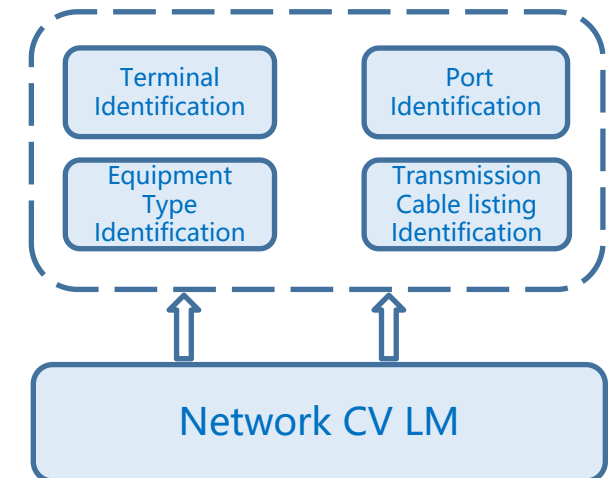
Network Structured Data LM

- Support wireless network problem discovery, analysis and processing from end to end, improve the level of network self-service.



Network CV LM

- Support various tasks of equipment status and resource information, improve both audit efficiency and the accuracy of network resource data.



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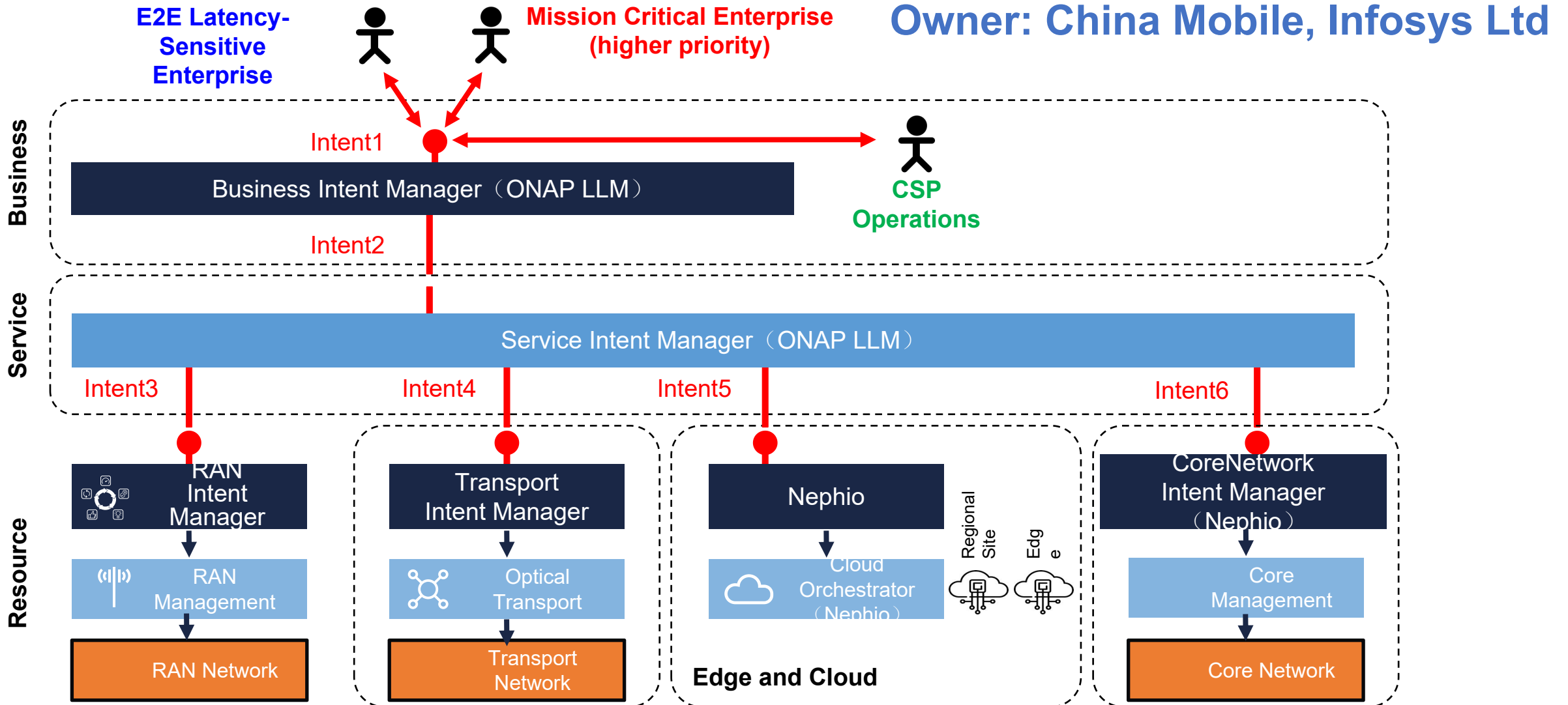
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Project Overview



Requirements List



Req 01

Intent Processing Enhancement

Enhancing intent processing capabilities by introducing large models

Req 02

Large Model Convergence

Provide a convergence platform for large models to integrate various capabilities of multiple large models

Req 03

Agent Construction

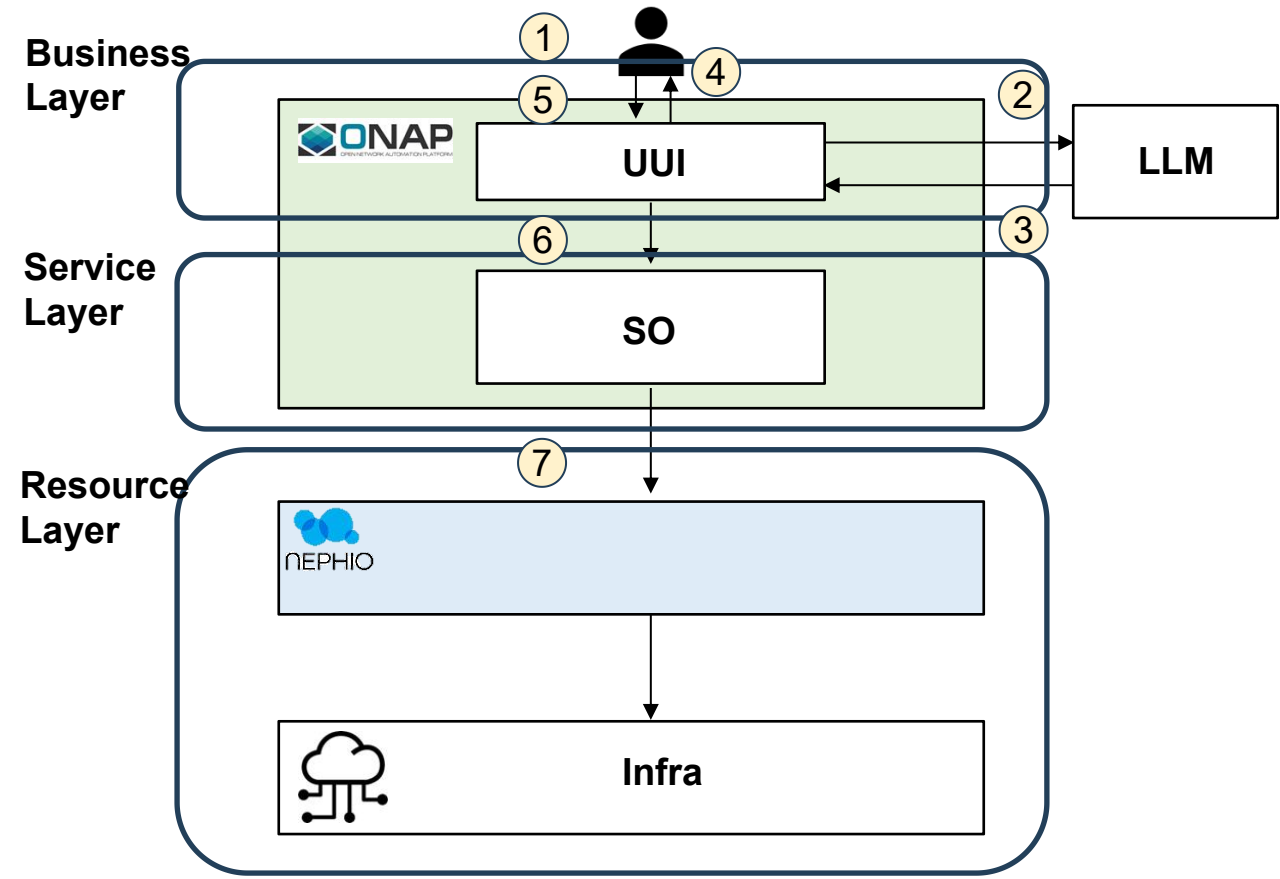
Building intelligent agents based on large models, and providing the ability to handle cross-domain complex tasks

Req 04

Multi-domain Support

End-to-end intent-driven autonomous network, supporting intent processing across different domains such as RAN, Transport, Cloud, and Core.

Illustrative Solution Procedure



1. User provides input in natural language
2. The request is sent to LLM
3. The LLM interprets the requests and provides response
4. Response is received by user
5. User approves request for further processing
6. UI sends request to SO for Orchestration at Service Layer
7. ONAP SO invokes Nephio API to deploy network functions on infrastructure

Fully Utilize Existing Achievements



Standards Guidance

Lead 10 intent-related standards and, as an active contributor, consistently follow up on intent standard projects such as TMF and 3GPP, with these standards serving as inputs for open-source implementation solutions.



Large Model Assistance

- **Natural Language Intent Recognition:** Capturing the deep semantic information, improving the accuracy of intent recognition.
- **Intent Translation:** Integrates information from various sources, such as network status, user historical behavior, etc., to generate an action plan more adapted to current situation.
- **Intent Optimization:** Can continuously learn from network operation data and optimize its own decision-making policies.
- **Intelligent Q&A:** Provides strong language understanding and generation capabilities, accurately responding to user inquiries.
- **Intent Report Integration:** Effectively integrate and analyze a large amount of intent reports, providing more comprehensive and in-depth intent insights.

Existing Capabilities

- **Large Models:** Can integrate open-source large models or corporate large models (such as China Mobile's Jiutian Large Model), providing large model assistance capabilities.
- **ONAP:**
 - (1) China Mobile has led a series of intent-driven requirements in ONAP, providing a general intent solution.
 - (2) The existing modules such as SO in ONAP can perform service orchestration.
- **Nephio:** Nephio provides intent-based resource deployment and orchestration capabilities, which can play a significant role in intent processing at both the network layer and the NE (Network Element) layer

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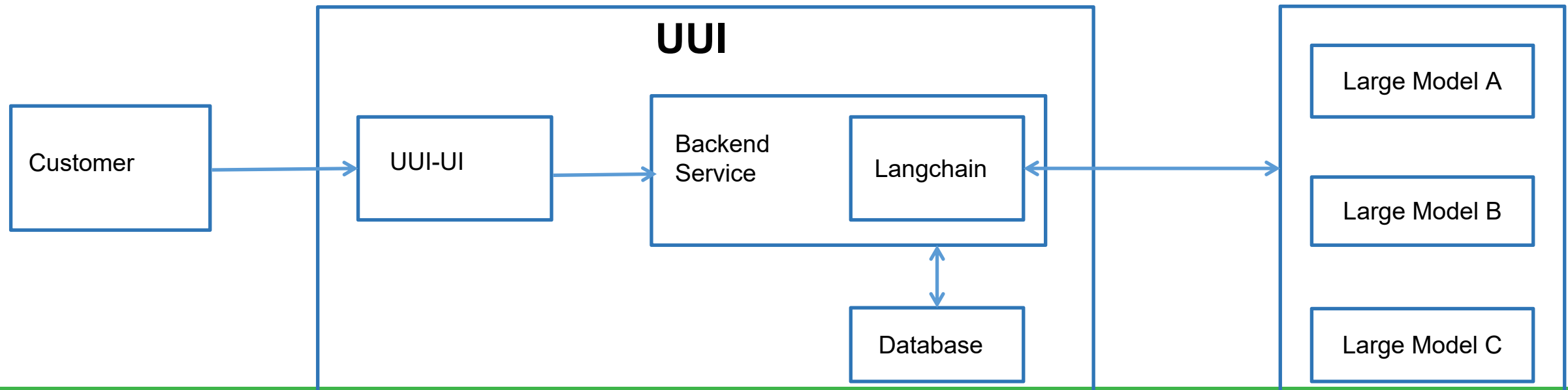
Introducing Generative AI Solution Based on Large Models



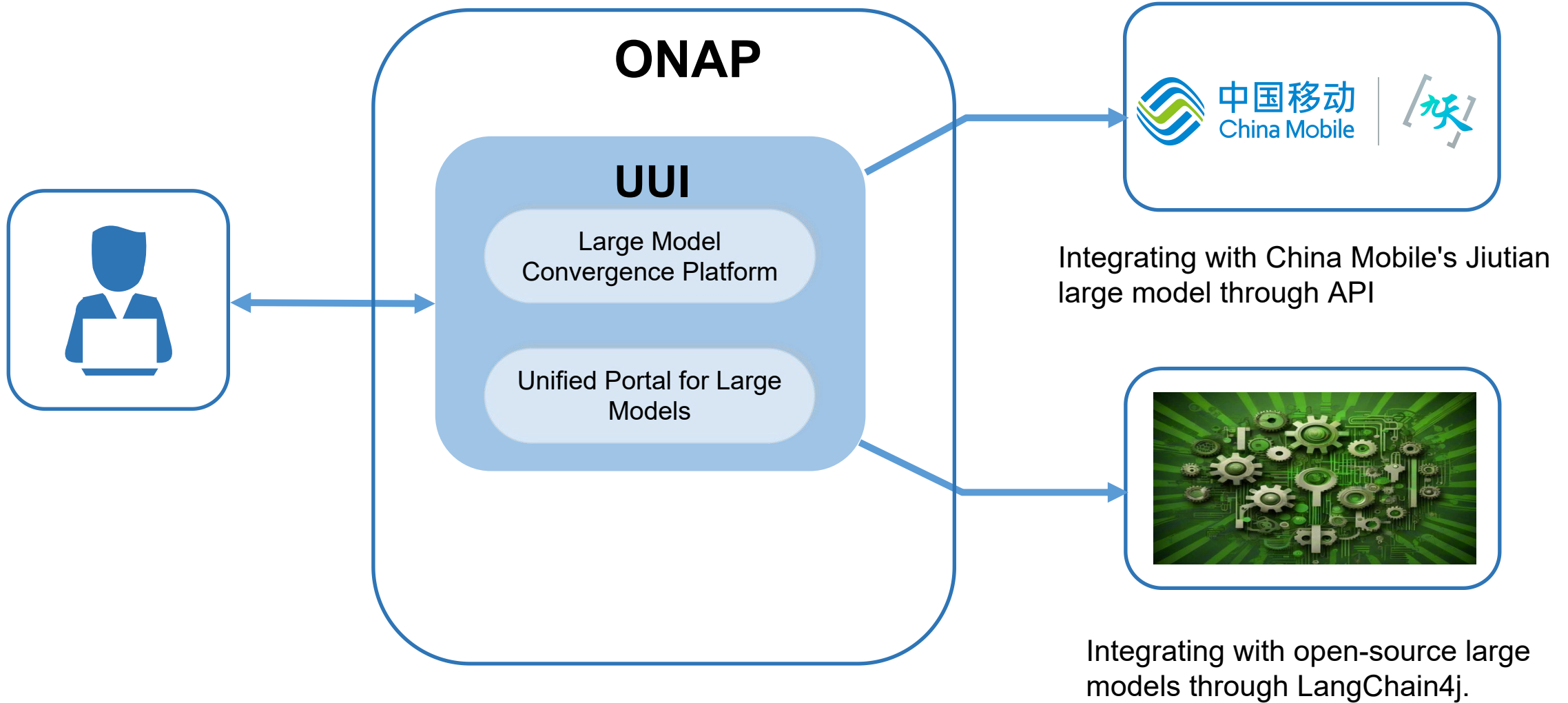
Requirement name: REQ-1588 R14: Introducing Generative AI Solution Based on Large Models

Owner: China Mobile

- The backend services of UUI can integrate with LangChain, offering the capability to handle large models.
- LangChain allows integration with multiple large models, enabling customer to choose and integrate different large models through UUI based on their requirements.
- UUI-UI provides customers with a unified input interface. The database is used to store usage records of large models for optimizing user experience



Target1: Converging different large models in ONAP (Done)



Target2: Unified Portal for Large Models (Done)



Use case ui

- Home
- Customer
- Services
- Package Management
- Network Topology
- Monitor
- Intent Management
- Large Model

What is ONAP streamlining evolution?

ONAP Streamlining evolution is an enhancement of the ONAP deployment methodology that allows individual ONAP components to be picked up through a chosen CD (Continuous Configuration). This evolution has revolutionized the way ONAP components are deployed and managed in a network. The new approach enables operators, vendors, and enterprises to easily manage their networks with less complexity and effort. With ONAP Streamlining evolution, network automation can now be applied to any ONAP component, making it easier to model, orchestrate, and control network services and applications.



General Knowledge Q&A



ONAP Domain Knowledge Q&A



Historical Q&A Records Display

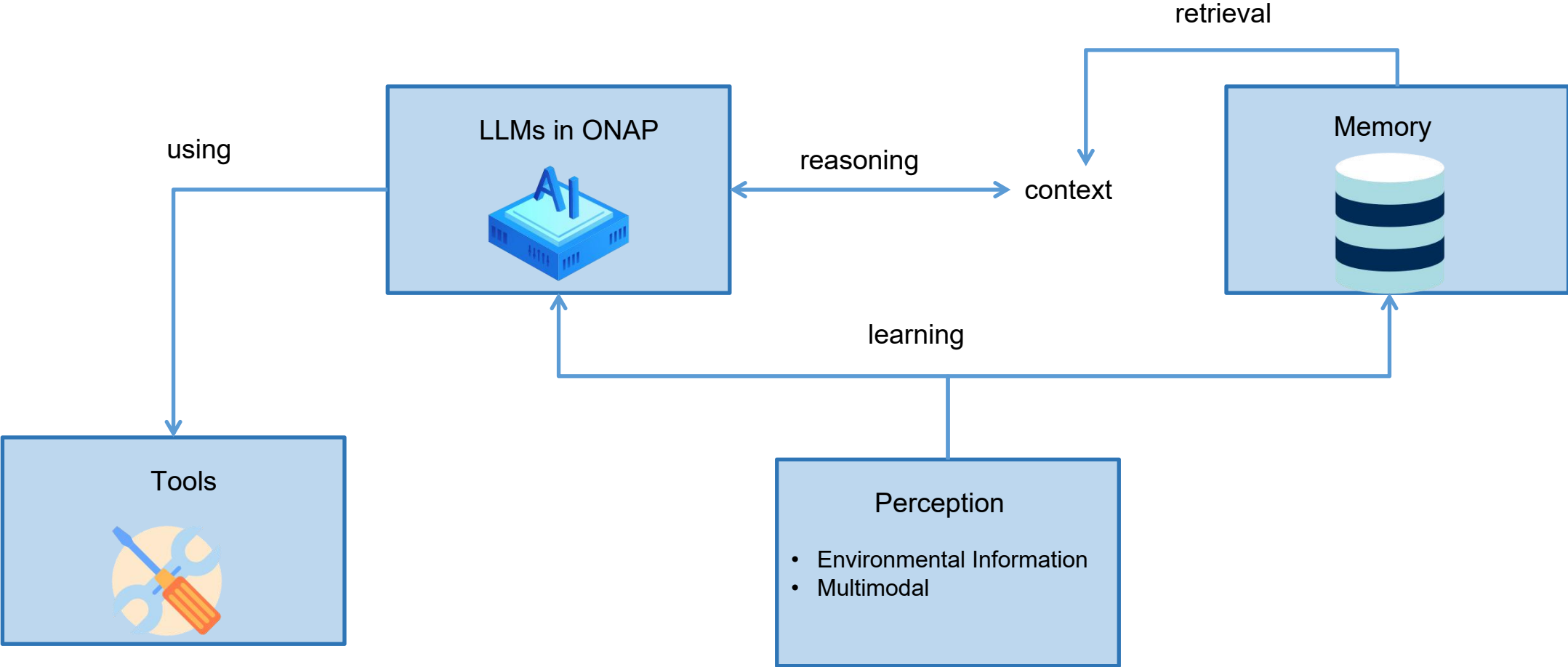


Unified Portal for Large Models



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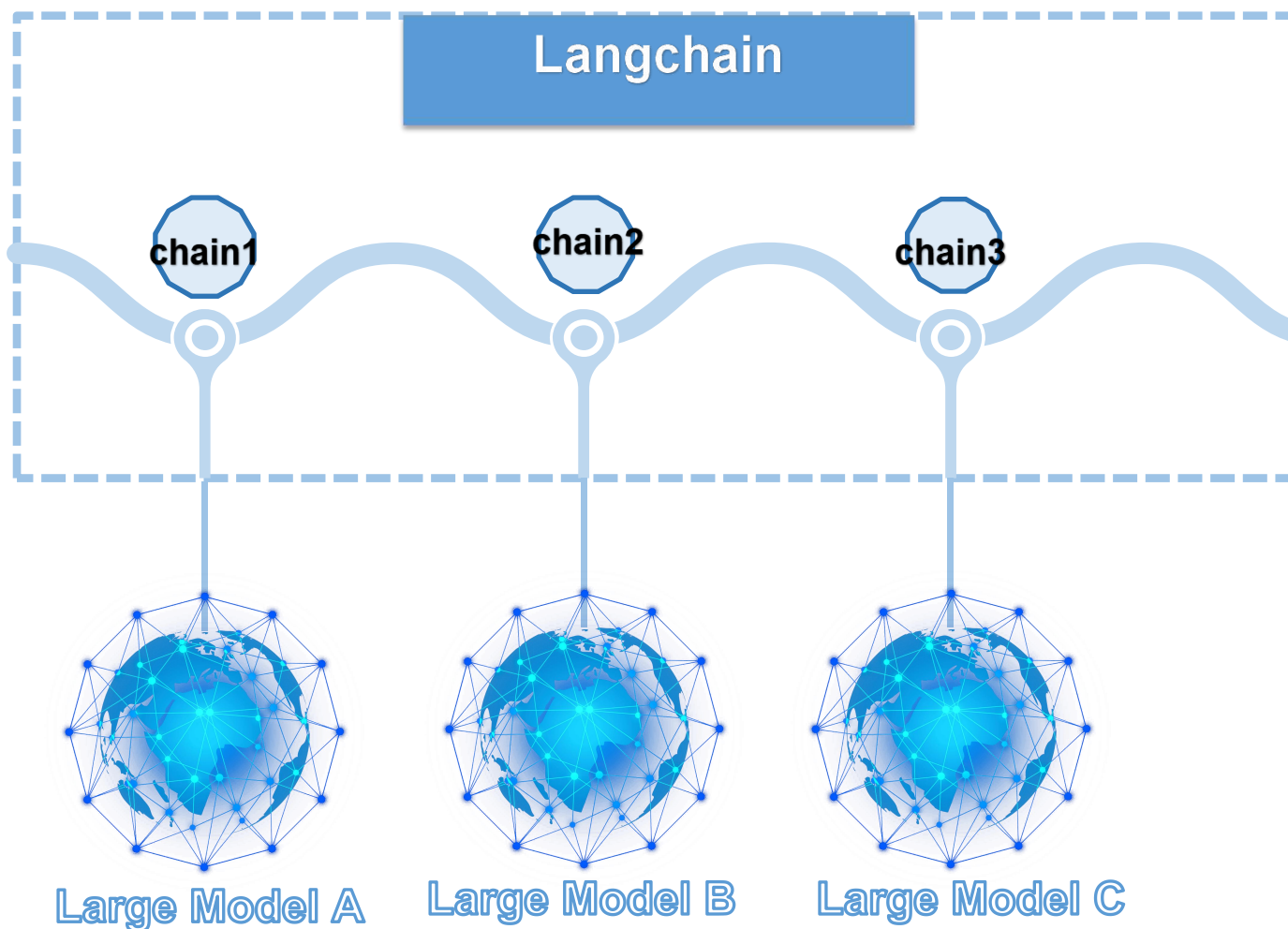
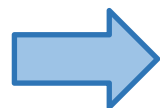
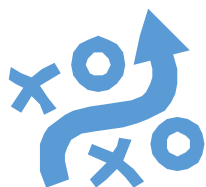
Target3: Building intelligent agents based on large models introduced through ONAP (Doing)



Target4: Processing complex tasks by forming a chain of different large models (Doing)



Complex tasks: for example, end-to-end cross-domain intent processing in autonomous networks.



Use Case 1: Based on Large Models - ONAP Knowledge Q&A



Demo Presentation



ONAP
Knowledge

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Following Key Tasks

Continue to implement an end-to-end intent-driven autonomous network, achieving cross-domain intent processing, including Business, Service, and Resources (RAN, Transport, Core, Edge, and Cloud)

Continuously enhance the ONAP large model convergence platform to support the integration of more large models

Continuously develop intelligent agents based on large models to promote the evolution of autonomous networks to a higher level of automation and intelligence, achieving optimized allocation and dynamic management of network resources

Thanks!

Looking forward to more partners joining our work!

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