Agents Networking Scenarios and Requirements in Enterprise Network

China Unicom

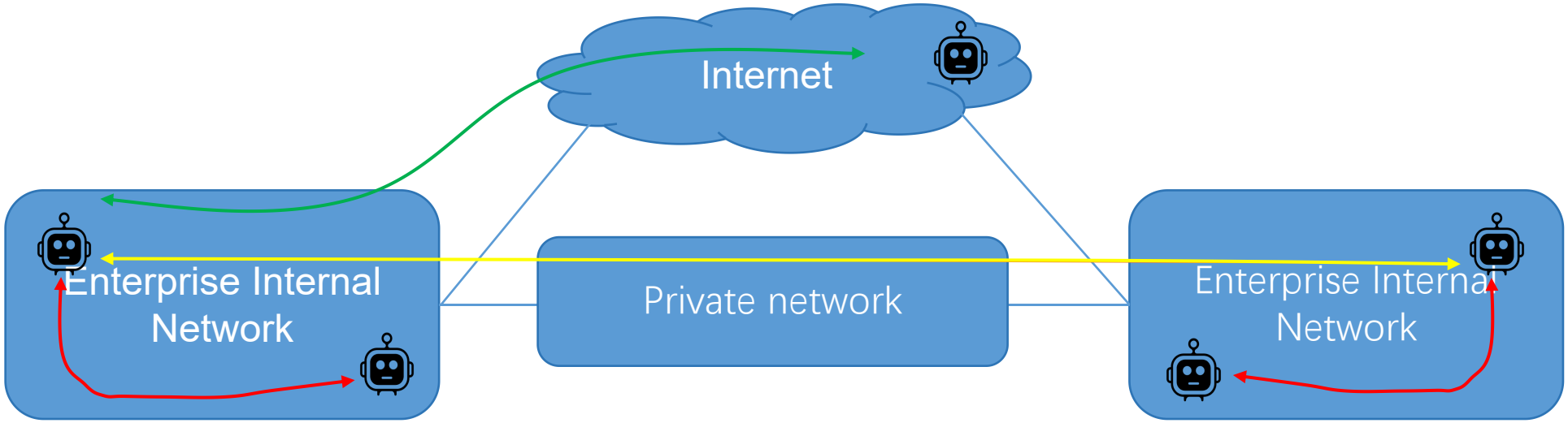
November 2025

Scope & Definition

The AI Agent is progressively becoming the key technological unit supporting both internal enterprise process automation and cross-enterprise ecosystem collaboration

Enterprise network：

- Via Internal Network: AI agents **within the enterprise** are interconnected to perform tasks via the enterprise internal network.
- Via Private Network: AI agents deployed **across multiple branch of enterprise**, which collaborate through private line.
- Via Internet Network: AI agent **within enterprise access Internet** to collaborate with the external AI agents.



Note that these scenarios differ from mobile networks and Internet scenarios.

Features of Agent in Enterprise Networks

- Agent Communication Via Internal Network：
  - The **limited number of agents** may reduce the complexity of agent discovery, routing, and addressing strategies.
  - All agents are **verified** and **trusted**;
  - Internal networks are generally **trusted**, with varying credibility across agents;
  - Agent capabilities and protocol versions may **differ**.
- Agent Communication Via Private Network：
  - The **limited number of agents** may reduce the complexity of agent discovery, routing, and addressing strategies.
  - All agents are **verified** and **trusted**;
  - The network is **relatively trusted**, but **data security and compliance** require consideration.
  - Agent capabilities and protocol versions may **differ**.
- Agent Communication Via Internet Network:
  - The number of external agents to be accessed via the Internet is **uncertain**.
  - Authentication and **verification mechanisms** need to establish for accessing external agents.
  - Agent capabilities and protocol versions may **differ**.

Scenarios and Network Requirements (1/3)

Scenarios

Intelligent Office Agents Collaboration

- For campus/office networks, focusing on clients' daily work needs, an intelligent office assistant of the campus is built to enable convenient using and collaborative services of various tools and agents such as translation, conference, and document management.

Network Requirements

- **Low Latency & High Reliability**: Crucial for **seamless** video conferencing and real-time collaboration.
- **Data Privacy and Security:** Deploy **gateways or other technologies** to intercept private data and ensure enterprise data security; use **encryption** to enhance data security during transmission.
- **Secure Authentication and Authorization:** To ensure Agent actions are strictly compliant with the **authorized scope** granted by the human user or project manager.

Scenarios and Network Requirements (2/3)

Scenarios

Industrial Automation Agents Collaboration

- For industrial production networks, industrial agents independently and collaboratively complete tasks such as material transportation, production line operations, and quality monitoring, realizing the calling and efficient collaboration of multiple agents inside and outside the factory and across campus.

Network Requirements

- **Ultra-low latency & low jitter**: network needs to to provide **QoS guarantees**, ensuring compliance with industrial ultra-reliable low-latency communication requirements, and **making the latency of communication controllable and predictable.**

- **OT and IT convergence**: Define how agents communicate **securely and reliably** with gateway functions connecting OT and IT domains.

- **Data Privacy and Security:** Achieve the **isolation of production data** and operational data to ensure that critical data does not leave the domain.

Scenarios and Network Requirements (3/3)

Scenarios

Business Process Optimization Agents Collaboration

- For business systems, process management agents collaborate with agents of business systems such as CRM and ERP to independently convert business goals into executable tasks, realizing the automation and optimization of business processes.

Network Requirements

- **Heterogeneous Interoperability**: Agent communication protocols should be designed to **bridge communication gaps between legacy IT system APIs and modern AI Agent platforms**.

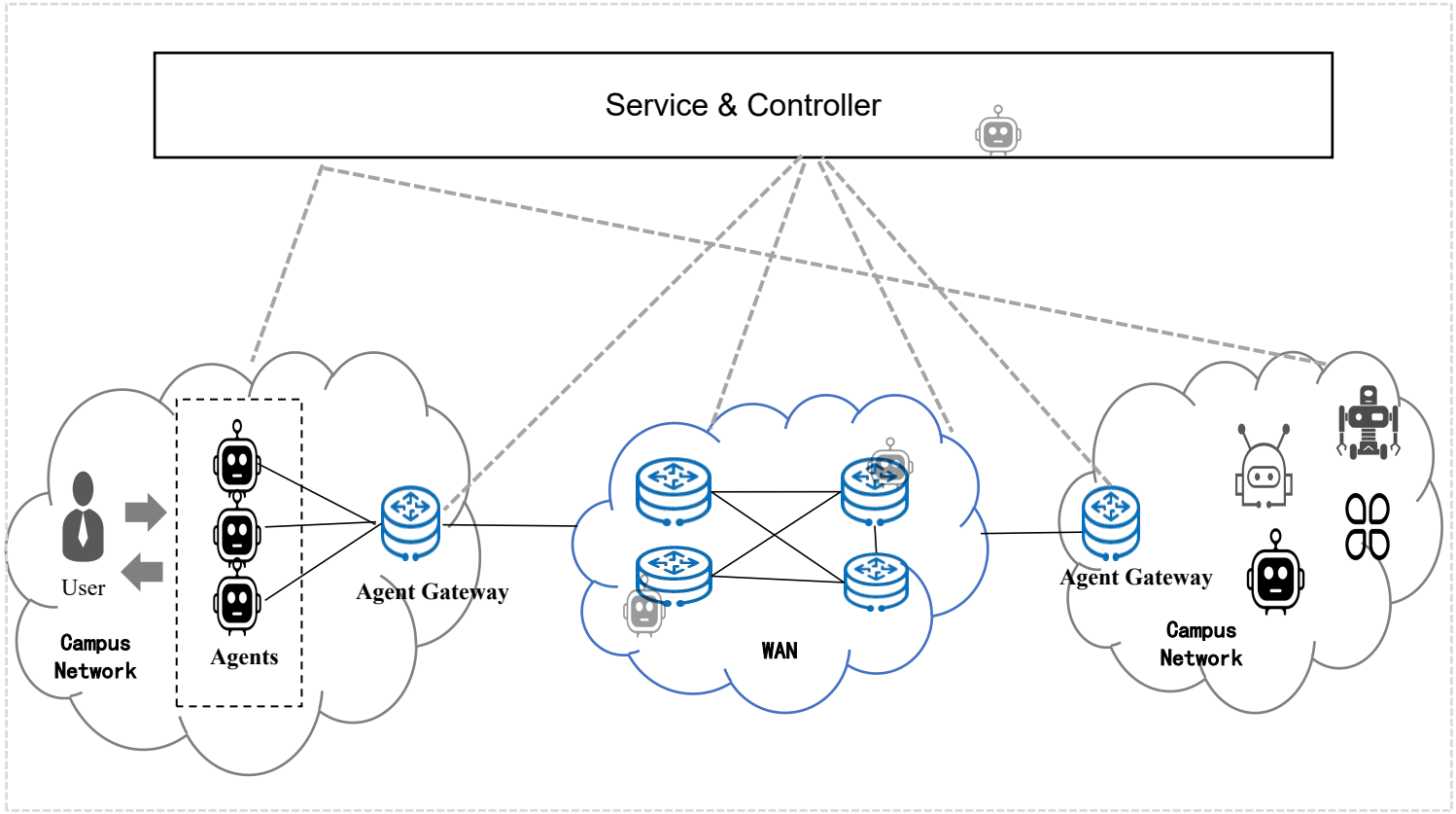
- **High Concurrency and Scalability:** The **network infrastructure should be capable of supporting numerous Agents** engaged in frequent,complex, and high-volume interactions across the enterprise.

Requirements of AI Agent & Network

- **Requirements for AI Agent:**
  - **Agent Identity Identification & Discovery**: Distinguish agents from real users, integrate semantic understanding and addressing to match business needs with corresponding agents.
  - **Heterogeneous Compatibility**: Different agents vary in resources and supported protocols, so adaptation and protocol conversion are required for agents communication.

- **Requirements for Network:**
  - **Efficient Agent Communication**: For agent interaction, consider network reachability, QoS guarantee, and differentiated SLA services. Due to high pressure in peer-to-peer collaboration among multiple agents, convergence is needed to enable hierarchical communication.
  - **Agent Scheduling & Management**: Realize agent scheduling within and across enterprise campus; unify orchestration of network resources and agent services to align network and business.
  - **Security & Privacy**: Implement access management and permission control to enhance security.

Requirements of Agent Networking @ Enterprise



Agent Gateway

Equipped with communication gateway capabilities and agent features to optimize agents communication and collaboration.

- Converge multiple agents to enable hierarchical communication;
- Adapt and convert protocols and semantics of different agents for seamless communication;
- Abstract underlying network capabilities into callable tools or services;
- Provide differentiated QoS guarantees for agent communication;
- Offer agent access management and authorization.

THANKS