

Agent networking use cases, requirements, and architecture

Li Zhang (zhangli344@huawei.com)

Huawei Technologies

Agent Networking Era is Coming

- The explosive growth of large-scale agent applications:
 - With the iteration of large model capabilities and the deepening of scenario demands, Agents have evolved from single tools to core entities collaborative interaction capabilities.
 - Agents have been large-scale applied in fields such as enterprise services, industrial internet, and financial risk control, driving the evolution of the internet from "human-computer interaction" to "agent-agent collaboration."
- The key enabler: Agent connection protocols

MCP
<ul style="list-style-type: none">• Providing a standardized interface for interaction between large language models (LLMs) and external data sources and tools

A2A
<ul style="list-style-type: none">• Providing a standardized communication method for multi-agent ecosystems, supporting functions such as task management, capability discovery, and secure collaboration.

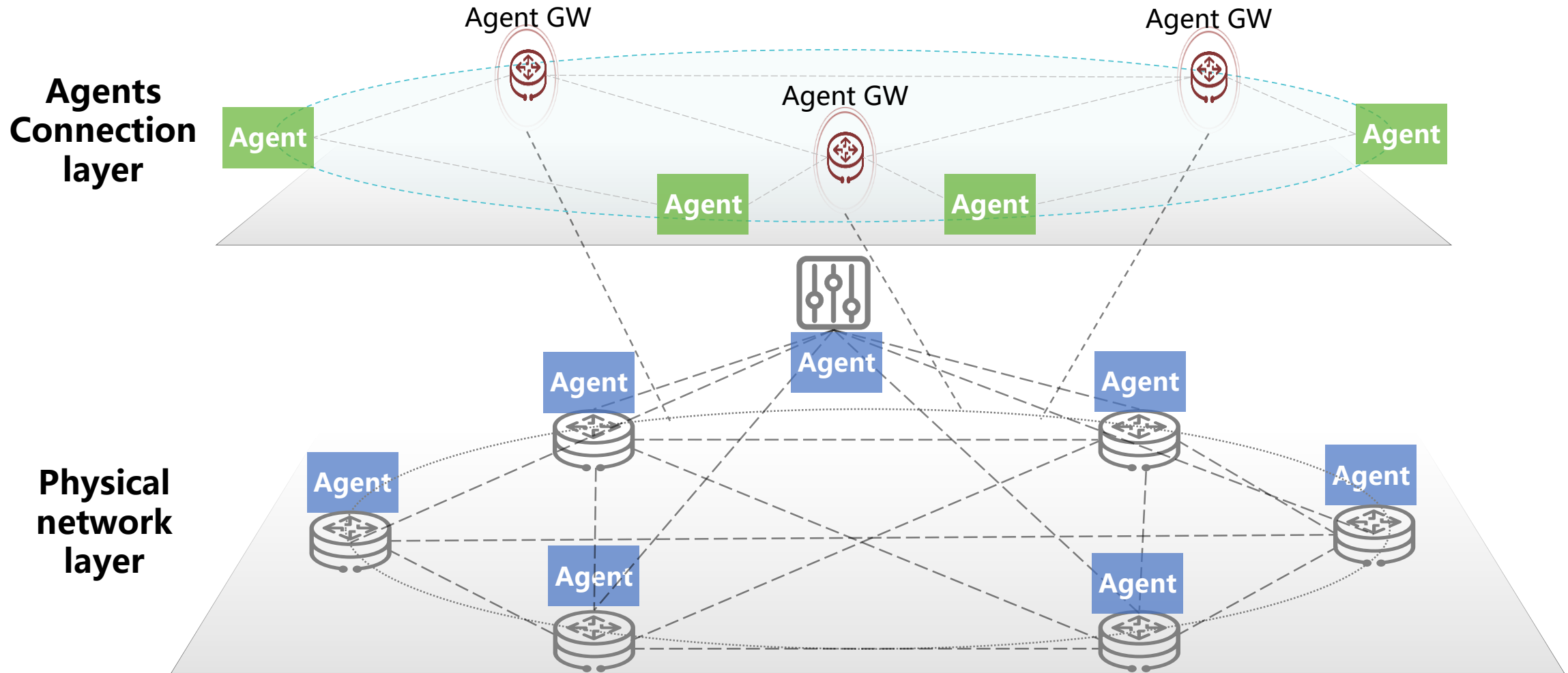
ANP
<ul style="list-style-type: none">• An open-source agent communication protocol designed to create the HTTP protocol for the era of the Internet of Agents.

...



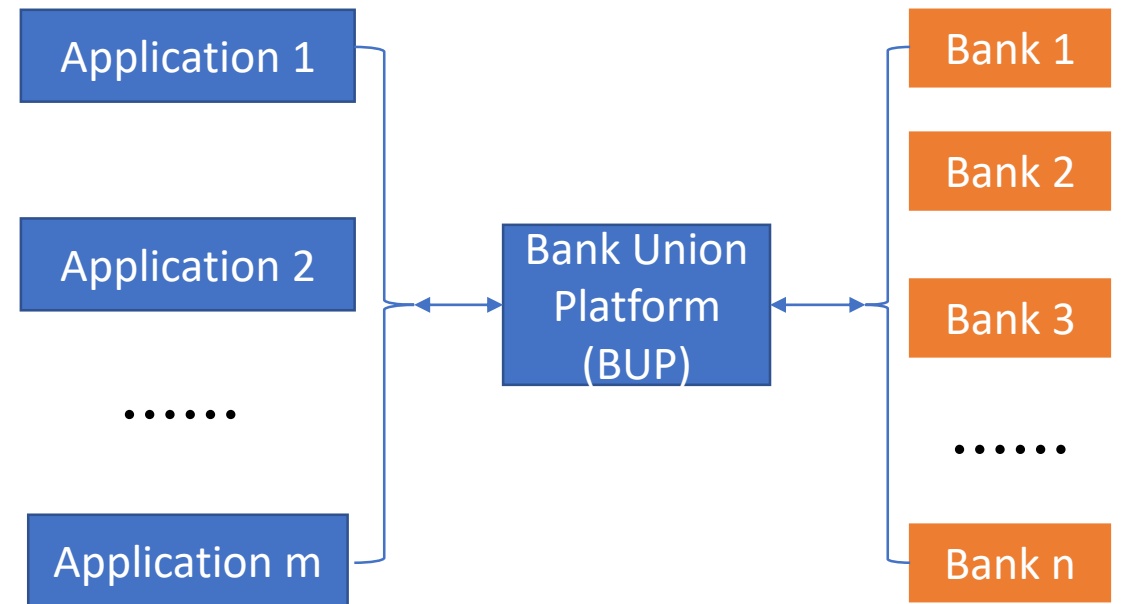
What can the network do in the era of agent networking?

Agent Networking Architecture



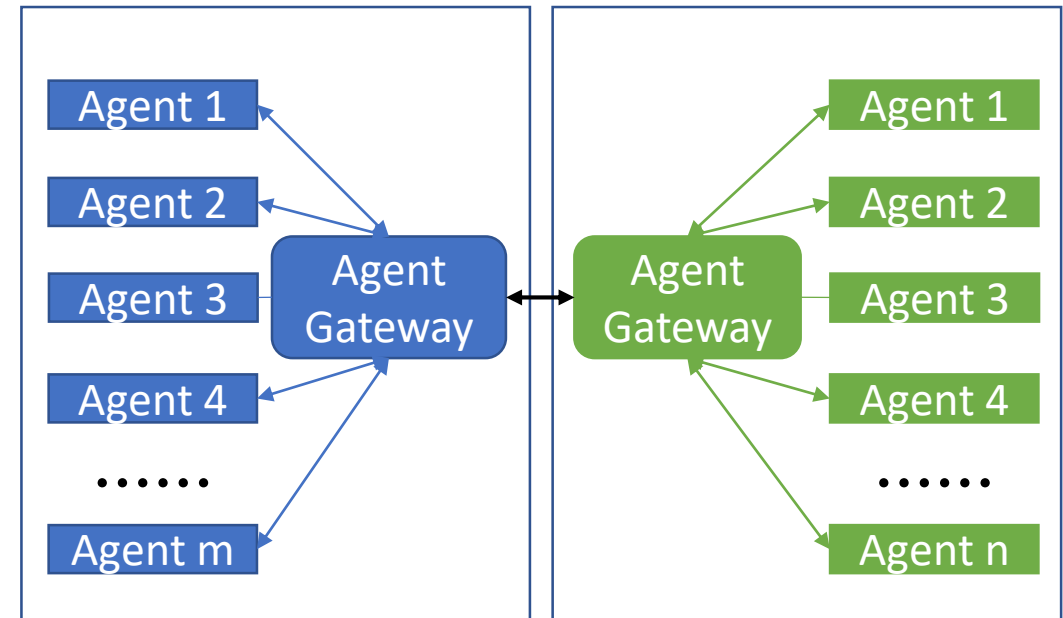
Use Case1: Bank Union Agent Networking

- Banking Union: a non-profit joint organization collectively established by numerous member financial institutions.
- IPO(Initial Public Offering) auditing procedures:
 - A user applies for listing the turnover from one application to the BUP;
 - The BUP forward the application to the banks;
 - Each bank performs user authentication & authorization;
 - Each bank returns the turnover information to the application though BUP.



Use Case1: Bank Union Agent Networking

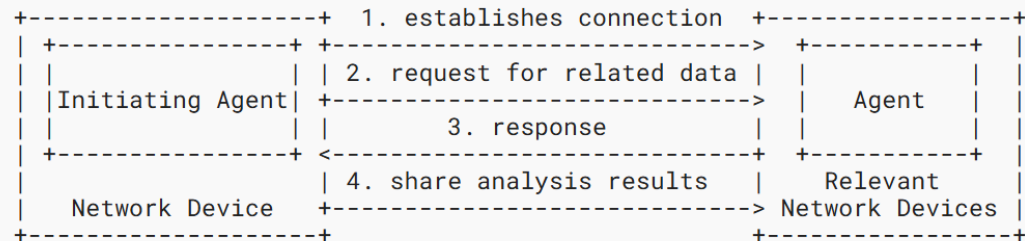
- As-is: API-based service calling
 - Banks provides API to BUP, BUP provides API to Applications
 - **Shortcomings:** BUP need to synchronize the API with every bank and application, requires high cost;
- To-be: Agentic service interconnection
 - Banks and applications provides their service through agents;
 - Agent interconnection replaces API calling, standard APIs are not required anymore;
 - **Agent gateway** controls the boundaries of domains, and **enables secure and scalable cross-domain agent interconnection.**



Use Case2: Network Device Agents Networking

Fault Diagnosis in Data Center Network

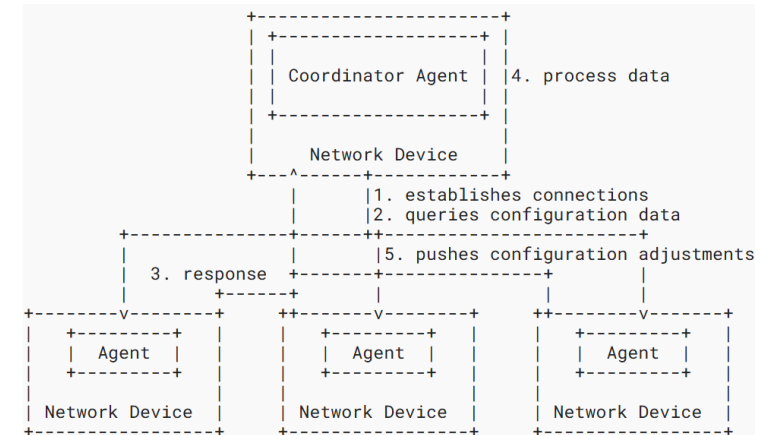
- Fault diagnosis agent can be deployed in data center network devices to detect and diagnosis faults.
- Some faults related to links or neighbor states can be diagnosed through the interactions with neighbors' agent.
- Benefits: **improved the diagnosis efficiency.**



Agent Interconnection in Campus Network

- Network segmentation in campus requires verification of consistent policy across multiple security domains.
- Agents residing in firewalls/switches/wireless controllers can collaboratively audit their configurations against intended policies to identify discrepancies causing the segmentation failure.

Benefits:
**reduced
the labor
costs.**



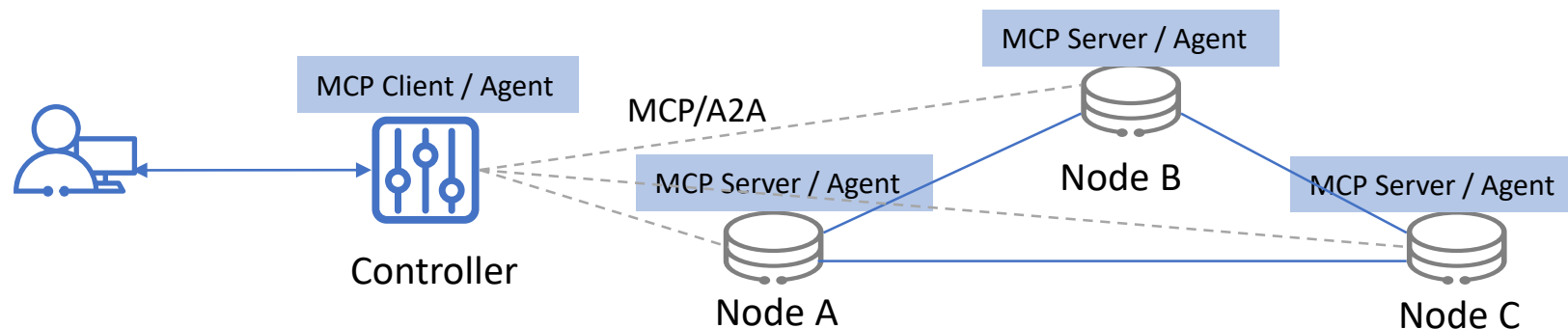
Use Case3: Agents Networking between Controller and Network Devices

Network Performance Monitoring

- Deploying MCP servers or agents in the network devices.
- Deploying an MCP client or another agent in the Controller.
- An operator sends a performance monitoring request to the controller(e.g. show the bandwidth utilization of all core routers).
- MCP client(controller agent) returns the information by the interaction with MCP servers(device agent).

Network Troubleshooting Automation

- Deploying an MCP servers or agents in the network devices.
- Deploying an MCP client or another agent in the Controller.
- An operator sends a troubleshooting request to the controller(e.g. verify the reachability between node A and node B).
- The MCP client(controller agent) returns the result by the interactions with MCP servers(device agent).



Benefits: **Reduced the workload of operators.**

Drafts on Agent Communication

Use Cases

- [draft-zl-agents-networking-scenarios](#)
- [draft-men-rtgwg-agent-networking-in-digibank](#)
- [draft-yuan-rtgwg-security-agent-usecase](#)
- [draft-zhang-rtgwg-ai-agents-measurement](#)
- [draft-zhang-rtgwg-ai-agents-troubleshooting](#)
- [draft-yuan-rtgwg-traffic-agent-usecase](#)

Frameworks

- [draft-mzsg-rtgwg-agent-cross-device-comm-framework](#)
- [draft-zl-agents-networking-framework](#)
- [draft-zm-rtgwg-mcp-network-measurement](#)

Others

- [draft-mao-rtgwg-agent-comm-protocol-gap-analysis](#)
- [draft-liu-rtgwg-agent-gateway-requirements](#)
- [draft-zm-rtgwg-mcp-troubleshooting](#)
- [draft-zgsgl-dispatch-a2a-requirements-enterprise](#)
- [draft-zheng-dispatch-agent-identity-management](#)
- [draft-mao-rtgwg-apn-framework-for-ioa](#)
- [draft-zeng-opsawg-applicability-mcp-a2a](#)
- [draft-zeng-opsawg-llm-netconf-gap](#)
- [draft-zw-opsawg-mcp-network-mgmt](#)

Next Steps

- This is just the beginning, still have a lot of work to be done.
- Welcome for comments and collaborations.

- Welcome to the IoA@Enterprise side meeting on Thursday, we will introduce more detailed information about the use cases.