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X. Wang
Y. Yang
Z. Li
CAICT

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Terminology for Networking Infrastructure in the Internet of Agents
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Abstract

The emergence of the Internet of Agents (IoA) introduces new requirements for interoperable collaboration among autonomous agents across heterogeneous networks, platforms, and administrative domains. Supporting such environments requires common understanding of infrastructure functions, collaboration mechanisms, semantic interaction, and trust-related concepts.

This document defines terminology for networking infrastructure in IoA environments, with a focus on Dynamic Multi-agent Secured Collaboration (DMSC). The terminology defined in this document is intended to support consistent usage across DMSC-related architecture, framework, and protocol specifications.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

The Internet of Agents is emerging as a distributed collaboration environment in which autonomous agents interact across heterogeneous networks, platforms, administrative domains, and trust boundaries. Unlike traditional service-oriented systems, agent-based collaboration introduces dynamic capability discovery, semantic interaction, task coordination, and cross-domain interoperability requirements among intelligent entities.

To support scalable and interoperable collaboration, networking infrastructure functions are required to provide registration, discovery, capability management, semantic routing, trust establishment, and coordination mechanisms across intra-domain and inter-domain environments. As DMSC (Dynamic Multi-agent Secured Collaboration) evolves to address these infrastructure challenges, consistent terminology becomes necessary to describe architectural concepts, collaboration behaviors, functional entities, and interaction processes in a unified manner.

This document defines terminology for networking infrastructure in the Internet of Agents, with a focus on DMSC-related collaboration environments and infrastructure functions. The terminology defined in this document is intended to support consistent usage across DMSC-related architecture, framework, and protocol specifications.

The terms defined in this document cover collaboration domains, functional entities, registration and discovery procedures, capability management, semantic interaction mechanisms, and trust-related concepts for interoperable multi-agent collaboration.

This document defines terminology only and does not specify protocols, message formats, or implementation requirements.

2. Functional Entity Terms

The following terms define functional entities that collectively constitute IoA networking infrastructures.

* Internet of Agents(IoA): An Internet-based architecture that extends the existing Internet by taking autonomous agents as first-class interaction entities, and supports scalable communication, coordination, and information exchange across heterogeneous networks, platforms, systems, and administrative domains.

* Agent: An autonomous software or hardware entity capable of perceiving its environment, processing information, and performing actions to achieve defined objectives, either independently or through interaction with other agents within IoA.

* Agent Identifier: An identifier that uniquely distinguishes an agent.

* Agent Gateway: A functional entity that supports distributed agent registration, discovery, request coordination, and cross-domain information exchange.

* Capability Directory: A functional entity that maintains and provides capability-related information used for discovery and matching of agents. The capability information may be organized in forms such as capability registries, metadata directories, or other discoverable capability description structures.

* Registry Entity: A functional entity responsible for registering agents and maintaining their registration information.

* Agent Credential Service: A functional entity responsible for issuing, maintaining, and revoking Agent Credentials associated with agents.

* Trust Service: A functional entity responsible for validating Agent Credentials and managing trust relationships and trust policies between entities within or across collaboration domains.

* IOA Protocol Suite: A collection of interoperable protocols and protocol components that support agent registration, discovery, coordination, secure communication, capability synchronization, semantic interoperability, and cross-domain collaboration within IoA environments.

3. Infrastructure Operational Behaviors and Mechanisms Terms

The following terms define operational processes, coordination behaviors, and collaboration mechanisms used by IoA networking infrastructures to support agent collaboration, synchronization, registration, discovery, and semantic interaction.

1. Registration

* Agent Registration: The process by which an agent is onboarded into a collaboration domain and recorded in the registry system.

* Registration Function: A protocol or mechanism used for registering and maintaining unique Agent Identifiers.

* Registration Synchronization: The process of maintaining consistent Agent Identifier information within a single collaboration domain.

2. Discovery & Capability

* Capability Discovery: The process of locating agents based on their advertised capabilities or semantic descriptions.

* Capability Discovery Function: A protocol or mechanism used for discovering agent capability information based on capability queries, and returning matching capability descriptions or associated agents. Such a function may be realized through agent gateway-based discovery, capability directory lookup, or naming-system-assisted resolution.

* Capability Synchronization: The process of maintaining consistent capability directory within a single collaboration domain.

* Semantic Capability Matching: The process of matching requested intent or constraints with available capabilities using semantic understanding.

3. Semantic Interaction

* Semantic Representation: A structured representation of intent, capability, task, and contextual information used for semantic interpretation and interoperability among agents and infrastructure entities.

* Semantic Interaction: A cross-domain interaction paradigm in IoA. It allows agents and infrastructure entities to unify intent, capability, task and context via semantic comprehension, and facilitates coordinated collaboration among heterogeneous domains.

* Semantic Interaction Function: A set of functional mechanisms that realize Semantic Interaction by enabling intent coordination, task coordination, context translation, semantic routing, and context synchronization among agents and infrastructure entities across domains.

* Semantic Routing: A routing process that selects collaboration paths, agents, or infrastructure entities based on semantic understanding of capabilities, intent, context, or task requirements.

4. Trust Terms

The following terms define trust-related concepts used in IoA networking infrastructures, including credentials, authentication, authorization, and trust establishment mechanisms that support secure and interoperable collaboration among agents and infrastructure entities.

* Agent Credential: A data object associated with an agent identity and used to represent identity attributes, authentication information, or authorization information.

* Trust Establishment: The process of establishing trust relationships between entities or trust domains to support interoperable interactions.

* Agent Authentication: The process of verifying the authenticity of an agent based on Agent Credentials.

* Agent Authorization: The process of granting an agent permission to access resources, services, or collaboration functions according to applicable policies.

5. Security Considerations

This document only defines a set of terms. It does not introduce any issues that require security consideration.

6. Privacy Considerations

This document only defines a set of terms. It does not introduce any issues that require privacy consideration.

7. Operational Considerations

This document only defines a set of terms. It does not introduce any issues that require operational consideration.

8. IANA Considerations

This document does not make any requests of IANA.

Authors' Addresses

Xianghua Wang
CAICT
Huayuan North Road, HaiDian District
Beijing
Beijing, 100191
China
Email: wangxianghua@caict.ac.cn

Yihe Yang
CAICT
Huayuan North Road, HaiDian District
Beijing
Beijing, 100191
China
Email: liyyh2025@gmail.com

Zhe Li
CAICT
Huayuan North Road, HaiDian District
Beijing
Beijing, 100191
China
Email: lizhe@caict.ac.cn