# Unified Optical Networks and AI Computing Orchestration (UONACO)

**CCAMP WG, IETF124**

**draft-tan-ccamp-uonaco-problem-statement-00**

**draft-hu-ccamp-uonaco-control-framework-00**

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# Motivation

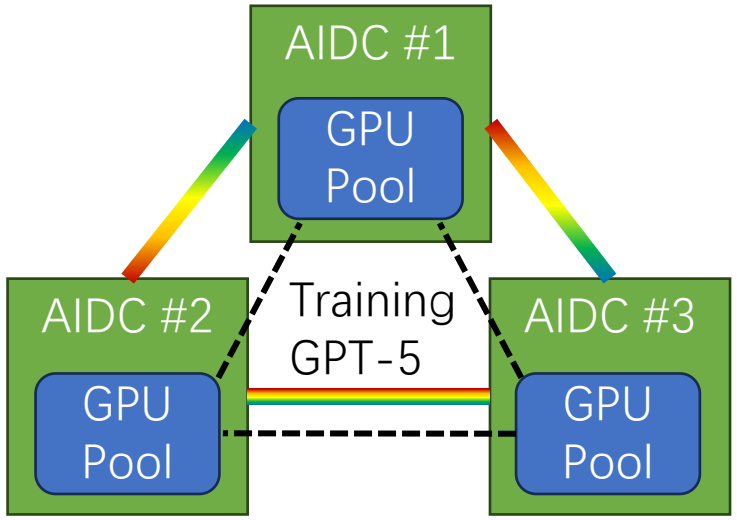
- Coordination between networks and computational resources is a hotpot within the IETF (e.g., CATS and SRv6)
- Key drivers for optical network and AI computing collaboration
  - Latency reduction
  - Bandwidth enhancement
  - Isolation characteristics
- CCAMP WG possesses a solid foundation in optical network control and management, facilitating the process of subsequent works

# Concept

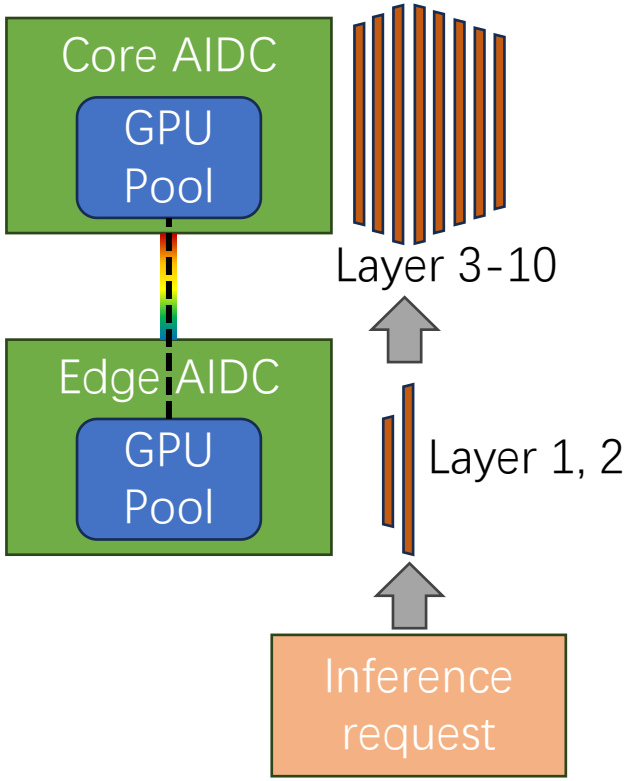
- Unified Optical Networks and AI Computing Orchestration (UONACO) is a framework that enables bidirectional awareness, resource abstraction, and joint orchestration across the compute-optical boundary, resolving the critical isolation between optical transport networks and AI computing infrastructure to optimize compute efficiency and network resource utilization

# Use Cases

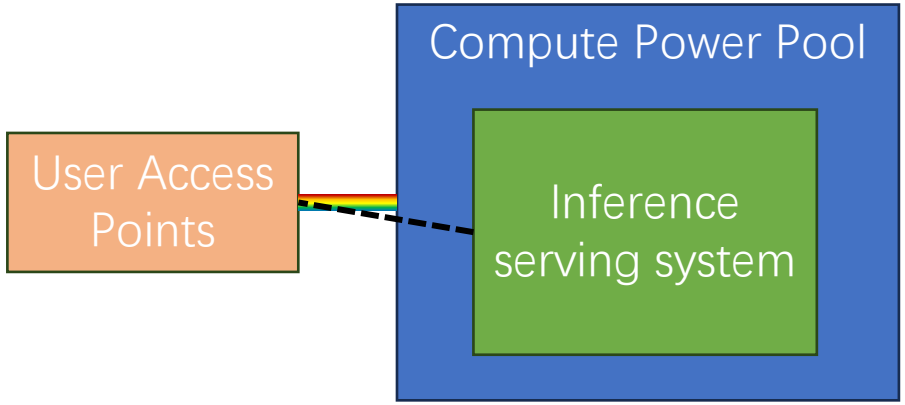
- Distributed AI Training




- Distributed AI Inference



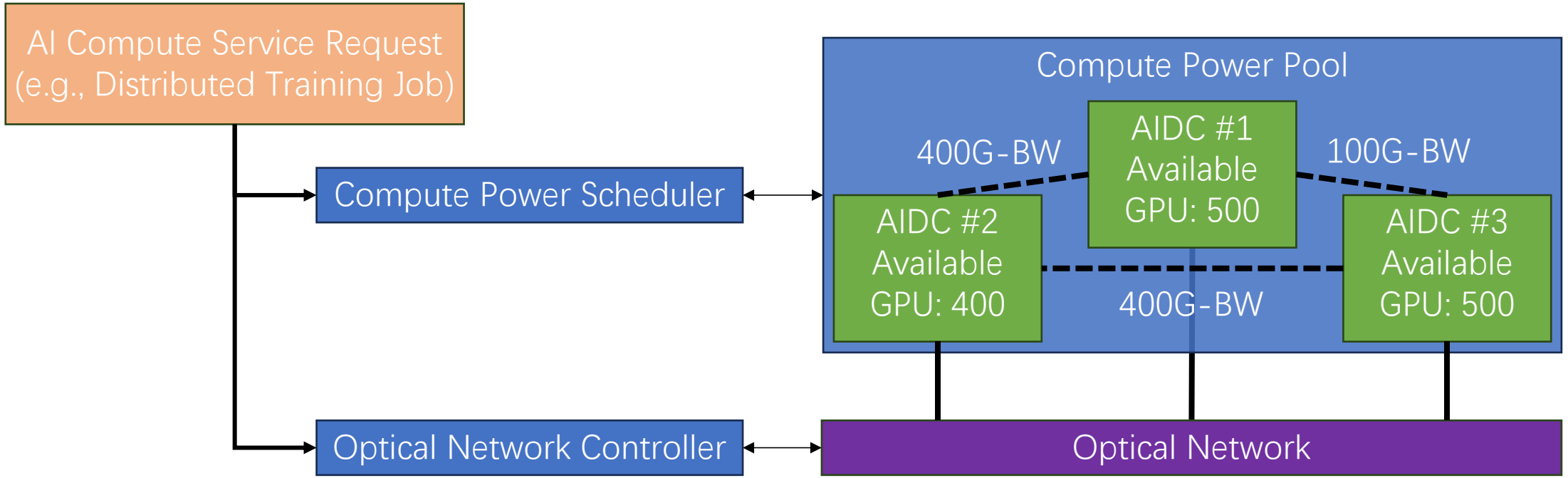

- Accessing Remote AI Service



# Problem Statement

- Isolated Control and Management
- Independent Resource Efficiency Evaluation

**Suboptimal Resource Allocation**

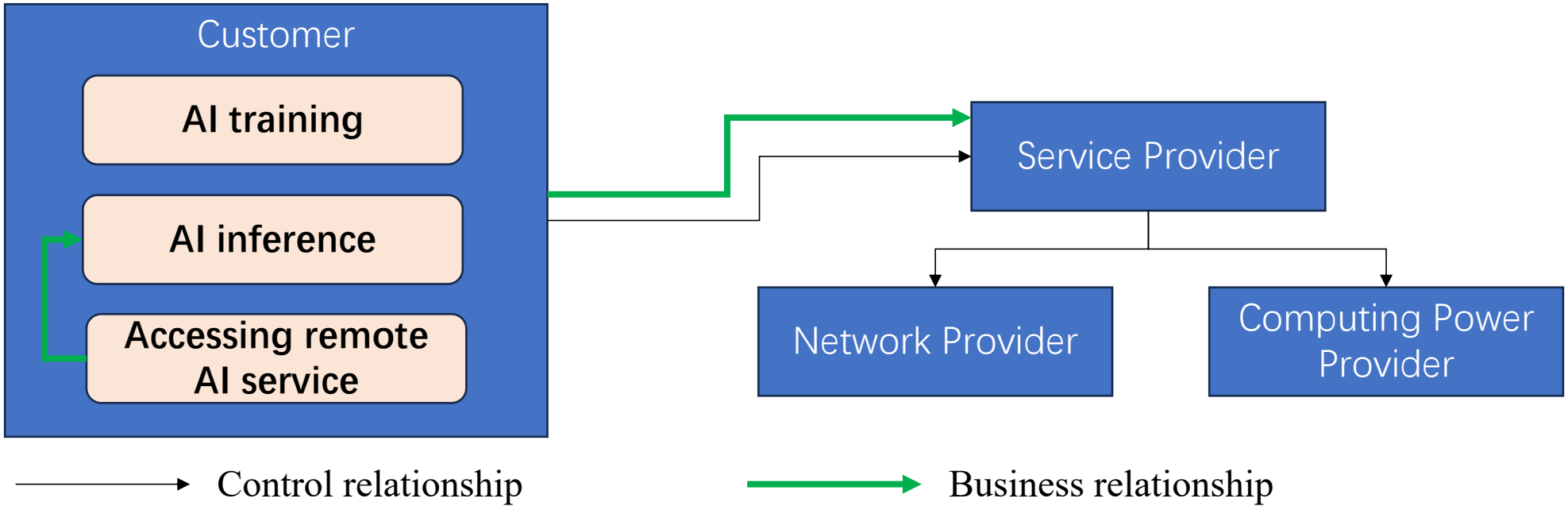


# Requirements

- Integrated Control and Management Architecture
  - An architecture facilitates bidirectional fusion between the compute and network control planes
- Unified Abstraction and Evaluation Framework
  - A common language is needed for both domains to understand each other's capabilities and state
- Scheduling Algorithms for Joint Orchestration
  - Some domain-specific end-to-end resource allocation algorithms

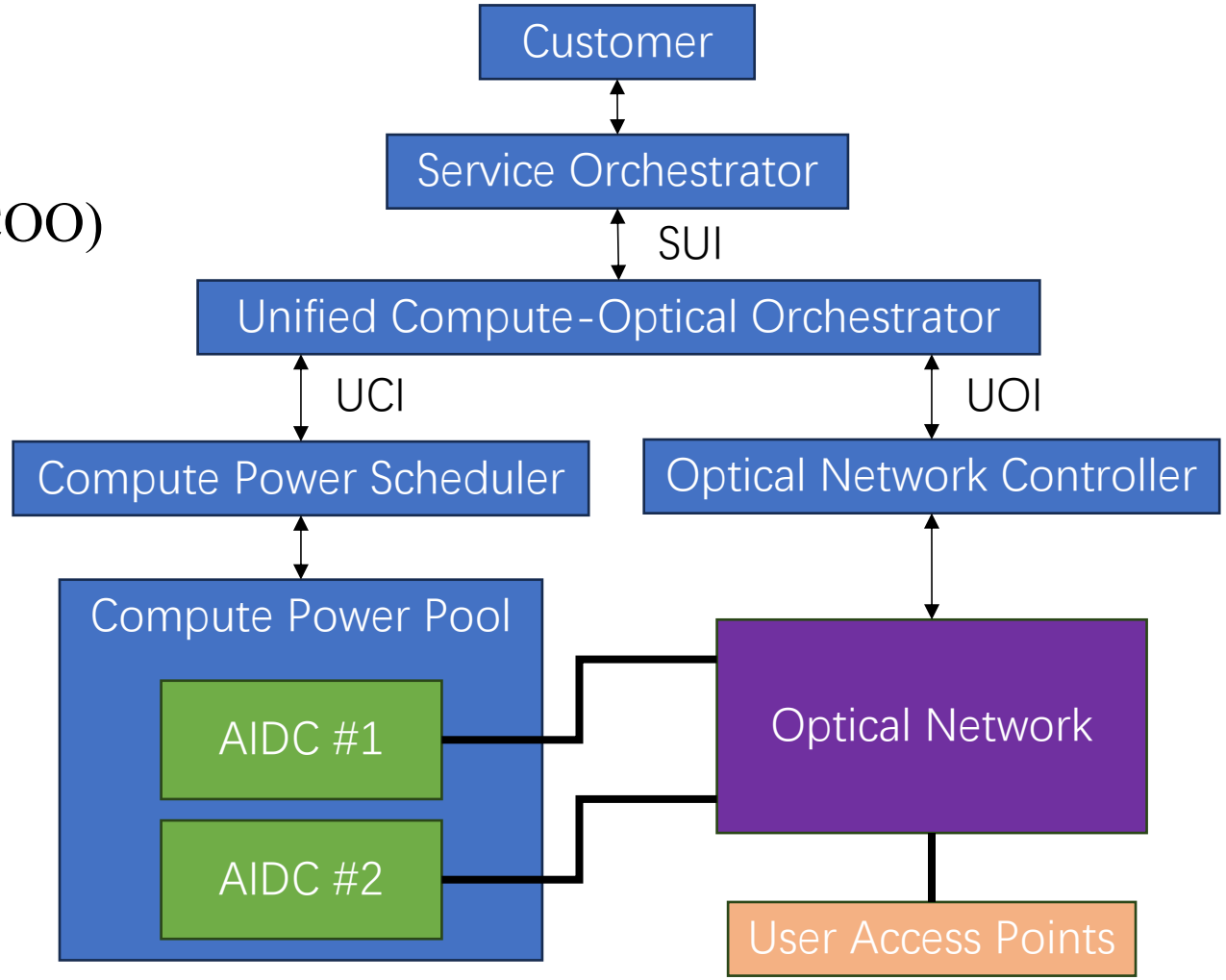
# Service Model

- Customer
  - AI training: specify model, deadline, performance, scale, and data privacy requirements
  - AI inference: lease computing resources to deploy and operate inference models
  - Accessing remote AI service: invoke pre-deployed inference APIs offered by third parties



# UONACO Control and Management Architecture

- Service Orchestrator (SO)
- Unified Compute-Optical Orchestrator (UCOO)
- Optical Network Controller (ONC)
- Computing Power Scheduler (CPS)
- UONACO Interfaces
  - SUI (SO-UCOO Interface)
  - UOI (UCOO-ONC Interface)
  - UCI (UCOO-CPS Interface)



# Next Step

- First draft (version 00)--Open for feedback

- Next steps:
  - Improve the content of the draft upon comments and suggestions
  - UONACO Interfaces and Yang Data Model Design
  - Unified Resource Abstraction and Evaluation Framework

# Thank You