



Definition of Service Intent in Autonomic Networks

(draft-zhu-anima-service-intent-00)

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Background & Motivation

- Traditional Service Descriptions
 - ❑ Connection-centric: Focus merely on endpoints and basic transport metrics.
 - ❑ Limited Scope: Unable to represent quality objectives for complex, multi-dimensional tasks.
- The Challenge of Emerging Services
 - ❑ Beyond Connectivity: Workloads like AI inference and interactive media require more than just a network path.
 - ❑ Heterogeneous Dependencies: Strictly constrained by the coordinated use of Network, Compute, and Storage.
- The Gap:
 - ❑ Lack of semantics to express cross-resource coordination constraints (e.g., coupling compute placement with transport path selection).



Overview

- This document focuses strictly on the semantic model and format of the Service Intent.
- The detailed mechanisms for realizing intent interpretation and automated service deployment are out of scope for this document.
- Relies on mechanisms described in draft-ietf-anima-network-service-auto-deployment and draft-du-anima-service-intent-auto-deployment for actual autonomic service deployment.



What is "Service Intent"?

- Definition: A structured, machine-interpretable declaration of desired service objectives and resource constraints across heterogeneous infrastructure.
- Core Characteristics:
 - ❑ Outcome-oriented, not configuration-oriented : Specifies the intended operational state without mandating specific device-level configurations or realization mechanisms.
 - ❑ Goal-driven orchestration: Enables automated resource discovery, path computation, compute scheduling, and storage placement within an Autonomic Domain.



Service Intent Model

- The Service Intent is defined with a concise format encompassing metadata and multi-dimensional resource content
 - Metadata & Lifecycle Management
 - ✓ Intent Identifier & Version: Ensures uniqueness and stable tracking across updates.
 - ✓ Intent Timestamp & Lifetime: Defines the temporal validity period.
 - ✓ Intent Scope: Restricts applicability to specific domains, sub-domains, tenants, or topology segments.
 - Intent Content (content-obj):
 - ✓ A structured object declaratively specifying constraints across three dimensions: Network, Compute, and Storage



Resource Requirements (1): Network & Storage

- Network Resource Requirement Intent:
 - ❑ Specifies performance, availability, and forwarding characteristics.
 - ❑ Key Fields: Bandwidth Requirement (bps), Latency/Jitter Bounds (ms), Destinations, and Multipath Permission (boolean).
- Storage Resource Requirement Intent:
 - ❑ Specifies capacity, performance, locality, and persistence.
 - ❑ Key Fields: Storage Capacity and Storage Throughput.



Resource Requirements (2): Compute

Specifies processing capacity, placement constraints, and latency characteristics.

- Compute Capacity: Defined by type (cpu or gpu) and capacity value (GFLOPS).
- Request Latency Bound: Maximum acceptable request-to-response latency (ms).
- Transport Coordination (Cross-layer constraint): A boolean indicating if compute processing and data transport can proceed concurrently.

Active Mailing List Discussion (Special thanks to Brian for the valuable reviews)

- Key Topic 1: Intent Data Format (JSON vs. CDDL)
 - ❑ Feedback: Suggests formalizing with JSON or CDDL (if targeting GRASP).
 - ❑ Response: The exact format depends on the WG consensus regarding the origin and transport of the intent (e.g., local orchestrator via JSON vs. distributed between nodes via a GRASP Objective using CDDL).
- Key Topic 2: "Hard Problems" of Intent Scope
 - ❑ Feedback: How are domain names acquired, and borders identified reliably?
 - ❑ Response: The Service Intent relies on the existing ANIMA architecture. Mechanisms for domain identification and bootstrapping are inherently handled by underlying protocols like BRSKI (RFC 8995, domainID) and the ACP.



Next Steps

➤ Draft Refinement:

- ❑ Add clarifying text to explicitly reference existing ANIMA specifications (BRSKI, ACP) for resolving "Intent Scope" boundaries and domain identification.
- ❑ Standardize the semantic definitions into strict CDDL or JSON schema based on further WG feedback.



THANKS!