Weave Net Built a Virtual Network for Containers. The Protocol Carries No Semantic Authority.

by Nick Clark | Published March 28, 2026 | PDF

Weave Net pioneered simple container networking by creating virtual overlay networks with automatic mesh topology, encrypted inter-host communication, and built-in DNS-based service discovery. Containers across hosts could communicate as if on the same network without complex configuration. The connectivity model is elegant. But Weave Net's protocol creates network connectivity without embedding trust scope, governance authority, or semantic routing policy in the traffic itself. The overlay provides a virtual network. It does not provide governed communication. The gap is between automatic connectivity and protocol semantics where authority is intrinsic to the content.

Weave Net's approach to simplifying container networking, especially in the early Docker era, made multi-host container communication accessible. The automatic mesh, fast datapath, and WeaveDNS were practical innovations. The gap described here is about protocol semantics, not about overlay

networking design.

Connectivity without content awareness

Weave Net encapsulates packets in its overlay protocol (VXLAN or its own sleeve protocol) for transport between hosts. The encapsulation provides virtual network addressing and optional encryption. But the encapsulation is a transport function. The protocol does not inspect, interpret, or act on the content it carries based on semantic properties.

A container sending a high-trust governance command and a container sending low-priority telemetry produce packets that the overlay treats identically. The protocol routes based on destination address, not based on the content's governance requirements.

Network policy as an add-on, not a protocol property

Weave Net supports Kubernetes network policies through its policy controller. Policies define which pods can communicate. But policies are applied to the overlay traffic from outside; the traffic itself carries no policy information. Network policies reference Kubernetes labels and namespaces, not protocol-level governance fields.

The traffic is policy-unaware. The enforcement system is policy-aware. This separation means policy decisions depend on correlating network identifiers with external metadata rather than inspecting governance fields intrinsic to the content.

What memory-native protocol semantics provide

A memory-native protocol would embed governance authority in the overlay protocol itself. Each encapsulated packet would carry trust scope, routing policy, and governance constraints as protocol fields. The overlay network would route and enforce based on these intrinsic fields rather than correlating with external Kubernetes metadata.

The automatic mesh topology that Weave Net pioneered could serve as the connectivity layer for memory-native protocol communication. The governed protocol above would ensure that connectivity comes with governance, not as separate concerns.

The remaining gap

Weave Net made container networking automatic and accessible. The remaining gap is in the protocol layer: whether the overlay network can carry governance semantics intrinsically rather than depending on external policy systems to govern the traffic it connects.

Memory-Native Protocol All 21 steps →

Authority intrinsic to the object. Routing by semantic properties.

Primary Technical Disclosure
○ Memory-Native Networking: A Cognition-Compatible Protocol Substrate
Secondary Technical
○ Protocol-Native Carriers: Agents as the Fundamental Unit of Transmission○ Dynamic Routing Protocol: Memory-Aware Path Selection for Semantic Agents○ Trust-Weighted Route Scoring: Dynamic Path Selection Through Policy-Defined Trust Thresholds○ Network Health Monitoring System: Signed Health Agents as Distributed Operational Telemetry○ Health Agents as Semantic Objects: Operational Metrics That Route Like Any Other Agent○ Dynamic Indexing Protocol: Entropy-Driven Restructuring of Semantic Flows○ Soft-Index Anchors: Ephemeral Index Points Inferred From Agent Lineage○ Adaptive Consensus Protocol: Memory-Native Quorum Without Fixed Validator Sets○ Trust-Weighted Voting in ACP: Domain-Scoped Votes Accumulated Against Agent Memory○ Dynamic Alias Resolution: Zone-Local Semantic Aliases Resolved Through Transport Headers○ Horizontally Composable Protocol Stack: Independent Layers Operating in Parallel○ Transport-Layer Agnosticism: One Protocol Stack Above Any Carrier○ Federated Semantic Zone Deployment: Heterogeneous Nodes Coordinating Across Trust Boundaries○ Health-Triggered Quorum Adjustment: Dynamic Thresholds From Network Stability Signals
Applications (General)
○ Edge Computing Without Central Routing Authority○ IoT Device Mesh Governance at Scale○ Vehicle-to-Vehicle Communication With Intrinsic Governance○ Military Mesh Networks Without Central Routing Authority○ Smart City Infrastructure With Self-Governing Transport○ Satellite Communication With Delay-Tolerant Governance○ Industrial IoT Protocols With Embedded Authority○ Healthcare Device Mesh Networking
Applications (Specific)
○ Starlink Built a Satellite Mesh. The Routing Authority Is Still Terrestrial.○ Zigbee Built a Mesh Protocol for IoT. The Messages It Carries Have No Memory.○ Matter Unified Smart Home Devices. The Protocol Still Separates Data From Authority.○ Helium Decentralized Wireless Coverage. The Protocol That Uses It Did Not Follow.○ LoRaWAN Solved Long-Range IoT. The Messages Are Still Passive Payloads.○ Tailscale Made WireGuard Usable. The Coordination Server Still Holds the Authority.○ QUIC Modernized Transport. The Protocol Carries No Semantic Authority.○ MQTT Connected Billions of IoT Devices. The Broker Still Holds the Authority.○ CoAP Brought REST to Constrained Devices. The Protocol Carries No Governance Semantics.○ gRPC Made Service Communication Type-Safe. The Protocol Carries No Trust Semantics.○ ZeroMQ Eliminated the Broker. Routing Authority Still Lives in Application Code.○ WireGuard Simplified VPN Tunnels. The Protocol Has No Semantic Routing Layer.○ Nebula Built Overlay Mesh Networks. The Certificate Authority Is Still Central.○ Calico Enforces Network Policy at the Kernel Level. Policy Authority Is Still External.○ Cilium Made eBPF the Network Data Plane. The Protocol Layer Carries No Governance.● Weave Net Built a Virtual Network for Containers. The Protocol Carries No Semantic Authority.
Memory-Native Protocol overview →
AQ
deterministic
autonomy

Legal

-
- Inventive Steps
- Licensing
- Patents
- Articles
- Legal
- Opportunities
- Sitemap

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