

In Cisco Application Centric Infrastructure (ACI), protocols are used to manage network traffic, automate configurations, and maintain secure and efficient data flow. Here are the key protocols and concepts used within ACI:

1. VxLAN (Virtual Extensible LAN)

Purpose: Encapsulates Layer 2 frames within Layer 3 packets, enabling Layer 2 networks to extend across Layer 3 infrastructures.

Role in ACI: Forms the foundation of the ACI fabric, allowing for network segmentation and multi-tenancy by creating overlay networks over the physical fabric.

2. IS-IS (Intermediate System to Intermediate System)

Purpose: A link-state routing protocol used to exchange routing information within a network.

Role in ACI: Acts as the underlay routing protocol within the ACI fabric, enabling spine and leaf switches to communicate and share reachability information.

3. COOP (Council of Oracle Protocol)

Purpose: Manages endpoint information (such as MAC addresses and IPs) within the ACI fabric.

Role in ACI: Runs on the spine switches, acting as a distributed directory that allows for efficient lookups of endpoint information, ensuring traffic is correctly routed across the fabric.

4. MP-BGP (Multiprotocol Border Gateway Protocol)

Purpose: Extends BGP capabilities to support multiple address families and carries routing information for various types of networks.

Role in ACI: Used for exchanging endpoint information (such as IP prefixes) between different nodes, particularly in scenarios involving multi-pod or multi-site deployments, or when integrating external networks with the ACI fabric.

5. IGMP (Internet Group Management Protocol)

Purpose: Manages multicast group memberships.

Role in ACI: Ensures efficient delivery of multicast traffic by enabling ACI to understand which endpoints are interested in receiving specific multicast traffic.

6. OpFlex

Purpose: A southbound protocol that allows the APIC (Application Policy Infrastructure Controller) to communicate with the ACI fabric.

Role in ACI: Facilitates the translation of high-level policies defined in APIC into specific configurations on switches, enabling policy-driven networking.

7. DHCP Relay

Purpose: Forwards DHCP requests and responses between clients and servers across different subnets.

Role in ACI: Allows for central DHCP server management, even if the servers and clients are on different parts of the ACI fabric.

8. ARP (Address Resolution Protocol)

Purpose: Resolves IP addresses to MAC addresses within the same Layer 2 domain.

Role in ACI: Ensures devices can communicate within the ACI network by providing the necessary IP-to-MAC mapping.

9. LLDP (Link Layer Discovery Protocol)

Purpose: A Layer 2 protocol used by network devices to advertise their identity and capabilities.

Role in ACI: Helps with the automatic discovery of devices, ensuring proper fabric initialization and configuration.

10. LACP (Link Aggregation Control Protocol)

Purpose: Combines multiple network connections into a single logical link for redundancy and increased bandwidth.

Role in ACI: Used for creating port channels, ensuring high availability and load balancing across multiple links.

These protocols work together to ensure ACI's functionality as a policy-driven, software-defined network solution, providing automation, scalability, and streamlined management.