Overview of Cisco's IP Fabric for Media Solution

This chapter contains information about Cisco's IP fabric for media solution.

Licensing Requirements

For a complete explanation of Cisco NX-OS licensing recommendations and how to obtain and apply licenses, see the *Cisco NX-OS Licensing Guide* and the *Cisco NX-OS Licensing Options Guide*.

About the IP Fabric for Media Solution

Today, the broadcast industry uses a serial digital interface (SDI) router and SDI cables to transport video and audio traffic. The SDI cables can carry only a single unidirectional signal. As a result, many cables, frequently stretched over long distances, are required, making it difficult and time-consuming to expand or change an SDI-based infrastructure.

Cisco's IP fabric for media solution helps transition from an SDI router to an IP-based infrastructure. In an IP-based infrastructure, a single cable can carry multiple bidirectional traffic flows and can support different flow sizes without requiring changes to the physical infrastructure.

The IP fabric for media solution consists of a flexible spine and leaf architecture or a single modular switch topology. The solution uses Cisco Nexus 9000 Series switches with the Cisco non-blocking multicast (NBM) algorithm (an intelligent traffic management algorithm) and with or without the Cisco Data Center Network Manager (DCNM) Media Controller. Using open APIs, the Cisco DCNM Media Controller can integrate with various broadcast controllers. The solution provides a highly reliable (zero drop multicast), highly visible, highly secure, and highly available network.

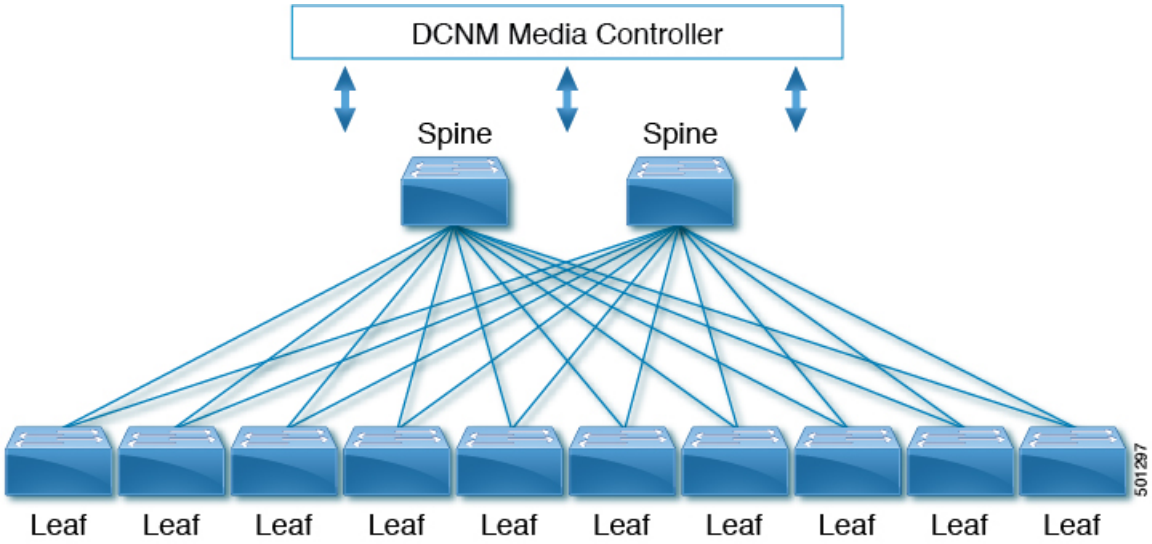
Deployment Types

Cisco's IP fabric for media solution supports the following types of deployments:

- Spine-leaf topology—Flexible architecture for large-scale deployments that are typically seen in an IP studio.
- Single modular switch—Architecture suitable for fixed deployments, with the controller providing features such as flow visibility, security, and monitoring.

Spine-Leaf Topology

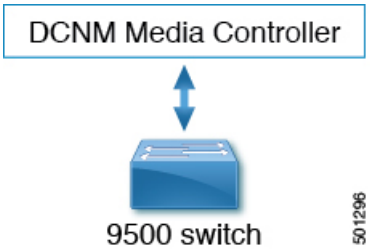
Cisco's IP fabric for media solution supports a spine-leaf topology that consists of multiple spine and leaf switches. The topology supports any combination of leaf switches, including using just one type of leaf switch.



Media sources and receivers connect to the leaf switches, and receivers initiate IGMP join requests to the leaf switches in order to receive the media traffic.

Single Modular Switch Topology

Cisco's IP fabric for media solution supports a single modular switch topology that consists of one Cisco Nexus 9500 Series switch.



IP Fabric for Media Solution Components

Cisco Nexus 9000 Series Switches

The following Cisco Nexus 9000 Series switches are used to transport video and audio traffic through the IP fabric:

Cisco Nexus 9000 Series Switch	Number and Size of Ports	Role in Topology*
Cisco Nexus 9236C switch	36 x 40/100-Gbps ports	Spine or leaf in spine-leaf topology
Cisco Nexus 9272Q switch	72 x 40-Gbps ports	Spine or leaf in spine-leaf topology
Cisco Nexus 92160YC-X switch	48 x 1/10/25-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 9336C-FX2 switch	36 x 40/100-Gbps ports	Spine or leaf in spine-leaf topology
Cisco Nexus 9348GC-FXP switch	48 x 100-Mbps/1-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 9364C switch	64 x 40/100-Gbps ports	Spine in spine-leaf topology
Cisco Nexus 93108TC-EX switch	48 x 1/10-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93108TC-FX switch	48 x 10-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93180LC-EX switch	32 x 40/100-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93180YC-EX switch	48 x 1/10/25-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93180YC-FX switch	48 x 10/25-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93216TC-FX2 switch	96 x 1/10-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93240YC-FX2 switch	48 x 10/25-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 93360YC-FX2 switch	96 x 10/25-Gbps ports	Leaf in spine-leaf topology
Cisco Nexus 9504 or 9508 switch with the following line cards: • N9K-X9636C-R • N9K-X9636C-RX • N9K-X9636Q-R **Note** The N9K-X96136YC-R line card is not supported.	36 x 40/100-Gbps ports (for N9K-X9636C-R line cards) 36 x 40/100-Gbps ports (for N9K-X9636C-RX line cards) 36 x 40-Gbps ports (for N9K-X9636Q-R line cards)	Spine in spine-leaf topology or single modular switch
Cisco Nexus 9316D-GX switch	16 x 400/100-Gbps QSFP-DD ports	Leaf in spine-leaf topology

Cisco Nexus 9000 Series Switch	Number and Size of Ports	Role in Topology*
Cisco Nexus 9364C-GX switch	64 x 100/40-Gbps Quad Small Form-Factor Pluggable (QSFP28) ports	Leaf in spine-leaf topology
Cisco Nexus 93600CD-GX switch	28 x 100/40-Gbps Quad Small Form-Factor Pluggable (QSFP28) and 8 x 400/100-Gbps QSFP-DD ports	Leaf in spine-leaf topology
Cisco Nexus 93180YC-FX3S switch	48 25/50/100-Gigabit Ethernet SFP28 ports (ports 1-48) and 6 10/25/40/50/100-Gigabit QSFP28 ports (ports 49-54)	Leaf in spine-leaf topology
Cisco Nexus 93180YC-FX3	48 x 1/10/25 Gbps fiber ports and 6 x 40/100 Gbps QSFP28 ports	Leaf in spine-leaf topology
Cisco Nexus 93108TC-FX3P	48 x 100M/1/2.5/5/10 Gbps BASE-T ports 6 x 40/100 Gbps Quad small form-factor pluggable 28 (QSFP28) ports	Leaf in spine-leaf topology
N9K-X9624D-R2 line card	Line card with 24 400G QSFP-DD ports (only to be used with 8-slot chassis)	Spine or leaf in spine-leaf topology
Cisco Nexus 9508-FM-R2 line card	Fabric module for 400G line card (only to be used with 8-slot chassis)	Spine or leaf in spine-leaf topology

*The role indicates the place in the fabric that makes the most sense given the port speeds supported by each switch. There are no restrictions as such on the role for which a switch can be used.

DCNM Media Controller

Through open APIs, the Cisco DCNM Media Controller seamlessly integrates with the broadcast controller and provides a similar operator workflow with all the benefits of an IP-based infrastructure. The DCNM Media Controller features an intuitive GUI that enables you to configure your IP fabric using predefined templates that are designed for media networks.

The DCNM Media Controller enables you to do the following:

- Configure secure generic or multicast-specific policies for individual hosts and allow or deny hosts based on their role.
- Configure secure multicast-specific policies for multiple hosts and flows.
- View the traffic flow and bandwidth utilization to identify problem areas (such as link failures or oversubscriptions) in your fabric.
- Use flow analytics to measure and store bit rates and to display the details for individual traffic flows.

- View an audit log of actions that are performed on the fabric.

Failure Handling

Cisco's IP fabric for media solution supports deterministic failure handling.

During a link or switch failure, the affected flows are moved to alternate links, provided sufficient bandwidth is available. With SMPTE 2022-7, redundancy is built on the endpoints, which ensures that the link or switch failure does not affect production traffic.

Benefits of the IP Fabric for Media Solution

Cisco's IP fabric for media solution provides the following benefits:

- Replaces specialized hardware (SDI routers) with a general-purpose switching infrastructure.
- Supports various types and sizes of broadcasting equipment endpoints with port speeds up to 100 Gbps.
- Supports the latest video technologies, including 4K and 8K ultra HD.
- Scales horizontally. When you need more capacity, you can add a leaf switch to support more endpoints.
- Provides a deterministic network with zero packet loss, ultra low latency, and minimal jitter.
- Capable of synchronizing all media sources and receivers.
- Provides deterministic failure handling that sends traffic to the receiver when a link fails between a leaf and the spine.
- Supports the coexistence of live and file-based traffic flows for postproduction work.
- Offers increased network security.
- Provides a non-blocking network design to prevent the oversubscription of links.
- Requires no changes to the existing operator workflow.

Related Documentation

Related Topic	Document Title
Cisco DCNM Media Controller	Cisco DCNM Installation and Upgrade Guide for Media C Deployment Cisco DCNM online help
Cisco NX-OS release information	Cisco Nexus 9000 Series NX-OS IP Fabric for Media Re
Cisco NX-OS software upgrades	Cisco Nexus 9000 Series NX-OS Software Upgrade and I Guide
IGMP snooping and PIM	Cisco Nexus 9000 Series NX-OS Multicast Routing Config

Related Topic	Document Title
IP fabric for media scalability numbers	Cisco Nexus 9000 Series NX-OS Verified Scalability Guide
NX-API REST	Cisco Nexus 3000 and 9000 Series NX-API REST SDK User API Reference
OSPF	Cisco Nexus 9000 Series NX-OS Unicast Routing Configurat
PTP	Cisco Nexus 9000 Series NX-OS System Management Confi Guide
QoS	Cisco Nexus 9000 Series NX-OS Quality of Service Configura
TCAM carving	Cisco Nexus 9000 Series NX-OS Security Configuration Gui
VLANs	Cisco Nexus 9000 Series NX-OS Layer 2 Switching Configura