



Overview of Cisco Multicast Manager

Cisco Multicast Manager (CMM) is a web-based network management application that enables monitoring and troubleshooting of IP multicast networks. CMM allows you to:

- Discover the devices in your IP multicast network.
- Determine the network topology to visualize the network architecture.
- Manage the network elements through multicast polling and monitoring of alerts.
- Troubleshoot problems by identifying the source of network faults.
- Support for Protocol Independent Multicast (PIM), PIM Sparse Mode (PIM-SM), PIM Dense Mode (PIM-DM), PIM Source Specific Multicast (PIM-SSM), and Multicast VPN (MVPN).

This chapter contains the following sections:

- [CMM Applications and Architecture, page 1-1](#)
- [Additional Product Features, page 1-5](#)



Note

CMM can run on Linux systems. CMM is not supported on Sun Solaris 10 and Windows Servers.

CMM Applications and Architecture

CMM is used in several industries, by:

- Financial services customers who broadcast information such as stock quotes and prices for other financial instruments over IP multicast.
- Service providers who deliver video over IP multicast. Using CMM, video service providers can monitor video quality over multiple channels, view alarms that indicate problems in the video delivery network, and isolate the source of faults that effect video broadcast.

CMM includes support for Cisco VidMon monitoring on Cisco 7600 Series routers and Cisco ASR 9000 devices.

- Service providers who need to manage their Multicast VPN (MVPN) environment.

Review Draft - Cisco Confidential**Multicast Monitoring and Troubleshooting**

CMM provides powerful features for monitoring IP multicast networks, including:

- Automated multicast discovery and topology generation
- Proactive multicast polling and monitoring
- Real-time multicast diagnostics, including multicast trace for Layer 2 and Layer 3 devices by PIM neighbor address or by IP Management Address
- For VidMon devices (Cisco 7600 series devices and Cisco ASR 9000 series devices, unicast trace as well as multicast trace.
- Alerting and reporting
- Support for Protocol Independent Multicast (PIM), PIM Sparse Mode (PIM-SM), PIM Dense Mode (PIM-DM), PIM Source Specific Multicast (PIM-SSM), and Multicast VPN (MVPN)

Figure 1-1 shows how Cisco Multicast Manager can be used to trace a multicast group. The trace is presented in tabular and graphical format. The table can update dynamically, showing the packet per second (PPS) rate, output errors, and discards for each interface along the tree. Cisco Multicast Manager also includes support for video probes that might be deployed for monitoring video quality. Video probe monitoring includes the ability to monitor Digital Content Managers (DCMs). The embedded address management database shows which channels are affected if there is a problem with a specific multicast group.

Figure 1-1 Using Cisco Multicast Manager to Trace a Multicast Group

Tracing multicast group 224.0.1.40 (cisco-rp-discovery [Farinacci]) transport from source 126.0.1.16

Router	PPS	Forwarding Int	Out Errors/Sec	Out Discards/Sec	Neighbor	Neighbor IP	Neighbor Int	In Errors/Sec	In Discards/Sec	Flow Status
cmm-6504-o4	0.0	GigabitEthernet3/44	0.0	0.0	cmm-7604-d1.dns-sj.cisco.com	126.1.14.17	GigabitEthernet1/7	0.0	0.0	
cmm-6504-o4	0.0	GigabitEthernet3/47	0.0	0.0	wj-4948	126.1.29.25	GigabitEthernet1/2	0.00	0.00	
cmm-6504-o4	0.0	GigabitEthernet3/42	0.0	0.0	cmm-6506-cl.dns-sj.cisco.com	126.1.8.13	GigabitEthernet3/42	0.0	0.0	
cmm-6504-o4	0.0	GigabitEthernet3/15	0.0	0.0	cmm-7604-g2.dns-sj.cisco.com	126.1.16.18	GigabitEthernet2/1	0.0	0.0	
cmm-6504-o4	0.0	GigabitEthernet3/38	0.0	0.0	cmm-6506-c3	126.1.10.15	GigabitEthernet3/38	0.0	0.0	
cmm-6506-cl.dns-sj.cisco.com	0.0	GigabitEthernet2/13	0.0	0.0	cmm-7206-sd1	126.1.2.11	GigabitEthernet0/3	0.0	0.0	
cmm-6506-cl.dns-sj.cisco.com	0.0	GigabitEthernet3/49	0.0	0.0	cmm-7604-sd2.dns-sj.cisco.com	126.1.4.12	GigabitEthernet2/2	0.0	0.0	
cmm-6506-c3	0.0	TenGigabitEthernet5/4	0.0	0.0	crs1.cisco.com	126.1.18.20	TenGigE0/1/0/0	0.00	0.00	
cmm-6506-c3	0.0	GigabitEthernet3/2	0.0	0.0	cmm-gsr	126.1.17.19	GigabitEthernet0/1/1/2	0.0	0.0	
cmm-6506-c3	0.0	GigabitEthernet3/42	0.0	0.0	cmm-6503-c2	126.1.9.14	GigabitEthernet0/4/2	0.0	0.0	
cmm-7604-g1.dns-sj.cisco.com	0.0	FastEthernet2/37	0.0	0.0	cmm-2611-01	126.1.25.22	FastEthernet0/1	0.0	0.0	
cmm-2611-01	0.0	FastEthernet0/0	0.0	0.0	cmm-2600-02	126.1.26.23	FastEthernet0/0	0.0	0.0	
cmm-2600-02	0.0	FastEthernet0/1	0.0	0.0	4503	126.1.27.24	FastEthernet2/3	0.00	0.00	
cmm-6504-o4	0.0	Loopback0	0.0	0.0				0.0	0.0	
cmm-6506-cl.dns-sj.cisco.com	0.0	Loopback1	0.0	0.0				0.0	0.0	

In environments that use MPLS Point-to-Point Traffic Engineering (P2MP TE), CMM performs a complete multicast trace that traces flows from a source customer network through the P2MP TE tunnel to the destination customer network(s).

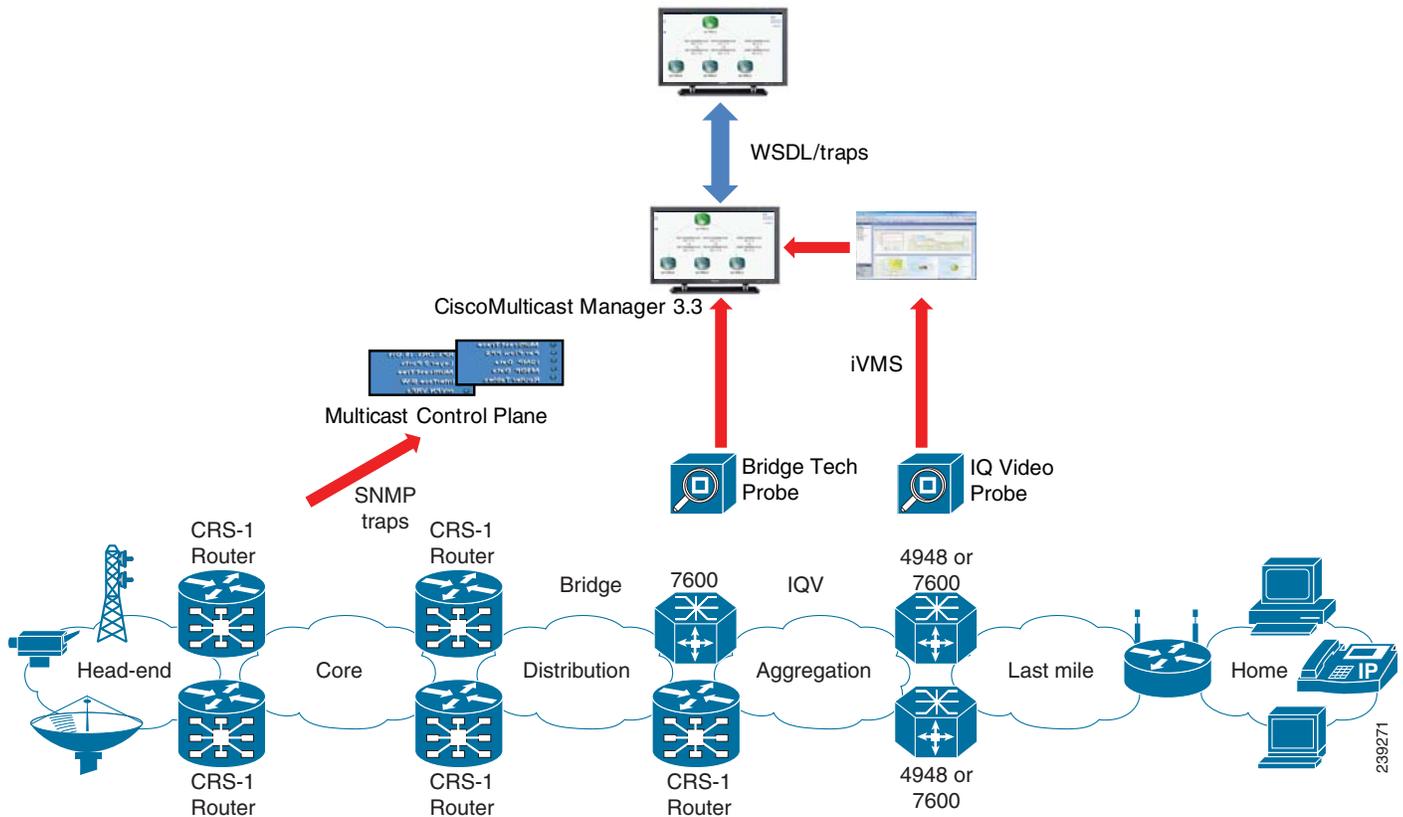
Support for Cisco Video Solutions

CMM can be used to monitor multicast flows used in video networks. For example, CMM is used in the Cisco Video Assurance Management Solution (VAMS), which monitors end-to-end video transmission networks. CMM receives traps from industry standard video probes such as BridgeTech probes, IneoQuest probes, and Mixed Signals probes.

Figure 1-2 shows a typical CMM architecture in a video network.

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Figure 1-2 Cisco Multicast Manager in a Video Network



When users view CMM events in the event lists in Cisco VAMS, they can use the cross-launch capability in Cisco VAMS to launch CMM to perform a trace and other analysis of the IP multicast network.

For more information on Cisco VAMS see the *User Guide for Cisco Multicast Manager, 2.0* at the following location:

http://www.cisco.com/en/US/docs/net_mgmt/cisco_video_assurance_mgt_solution/2.0/user/guide/vams_20_user.html

Cisco VidMon Support

The Cisco IOS supports video monitoring on Cisco 76xx devices and on Cisco ASR 9000 Series devices. IOS video monitoring, referred to as Cisco VidMon, is implemented through IOS CLI commands.

CMM video monitoring includes support for the VidMon capability provided in Cisco 7600 series routers running IOS 12.2(33)SRE and in ASR 9000 Series (Viking) devices running IOS XR 3.9.1.

The VidMon support in CMM varies for Cisco 7600 series routers and ASR 9000 devices. The Cisco 7600 supports VidMon metrics only on the enhanced service blade (ES+) line cards

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VidMon Metrics

Cisco VidMon provides the following video metrics:

- **Media Delivery Index (MDI) Reporting**—MDI is a metric developed in cooperation between IneoQuest and Cisco and presented in RFC 4445. MDI is a combination of two metrics that are used to measure the network's contribution to video impairments. The two MDI metrics are:
 - **MDI:MLR**—MDI:Media Loss Rate indicates whether MPEG packets were dropped.
 - **MDI:DF**—MDI:Delay Factor (DF) indicates the buffering requirements for the packets in the media stream. DF represents the difference between the arrival and drain rates of a media stream. This is largely based on the arrival of the IP flow. The DF over an interval period represents the buffering required to handle variations in transmission at a point in the transmission path.
- **MRV Reporting**—Media Rate Variation (MRV) measures loss as a function of the L3/L4 header. For Constant Bitrate Flows (CBR) a normalized bit arrival rate is created based on the known media arrival rate.

VidMon Media Rate Variation (MRV) measures loss as a function of the L3/L4 header. For Constant Bitrate Flows (CBR) a normalized bit arrival rate is created based on the known media arrival rate. The video flow is monitored for variations in the arrival rates which represent perturbations caused by excessive delay or loss in the media flow.

CMM Implementation of Cisco VidMon

CMM implements Cisco VidMon support as follows:

1. When CMM monitors a video flow using VidMon, depending on the device that is monitored, CMM uses two tables: a MDI table and a CBR table. The monitored IOS devices support MDI and CBR as follows:
 - The Cisco 7600 platform supports both MDI and CBR. The VidMon implementation on Cisco 7600 devices uses a MDI table or a CBR table.
The MDI table contains both DF and MDI information. The CBR table contains DF and MRV information.
 - ASR 9000 Series devices support only CBR through a CBR table.
2. When CMM detects a video flow it looks for the presence of an MDI table. If there is an MDI table, then CMM retrieves DF and MLR information.
3. If there is no MDI table, CMM examines the CBR table for the flow and retrieves DF and MRV information from the CBR table.

MLR Reporting

For Cisco 7600 devices, CMM allows you to set a MLR threshold in packets.

DF Reporting

For both Cisco 7600 series devices and Cisco ASR 9000 series (Viking) devices, CMM allows you to set a delay factor in milliseconds and generates a VIDEO DF HIGH event when the DF threshold is exceeded.

MRV Reporting

For both Cisco 7600 series devices and Cisco ASR 9000 series (Viking) devices, CMM allows you to set a maximum and minimum MRV rate in millisecond percentages, and generates alerts if the maximum or minimum MRV is exceeded:

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- When a specified MRV Maximum threshold is exceeded, CMM generates a VIDMON MRV HIGH alert.
- When a specified MRV Minimum threshold is reached, CMM generates a VIDMON MRV LOW alert.

Using the Graphs tab in the CMM Dashboard interface, you can view real-time graphs that compare MLR, DF, and MRV data for up to four devices at a time.

Northbound API

CMM provides a software development kit (SDK) that allows you to develop a client application that communicates with CMM by using Web Services Definition Language (WSDL) messages. The API operations provided by the SDK allow you to perform tasks such as:

- Getting a trace image file from the CMM server for use by your application.
- Getting the Source and Group (S,G) in a domain or on a device.
- Getting multicast events.
- Getting the multicast devices in a domain.
- Adding Layer 2 devices, Layer 3 devices, or video probes in bulk.
- Adding, deleting, and viewing polling configurations.

Additional Product Features

CMM 3.4 release provides the following additional features:

- **IPv6 Server Support**—Starting from this release, CMM provides IPv6 server support and can be installed in IPv6-enabled Linux servers only.
- **P2MP Discovery**—In this release, P2MP device discovery performance has been improvised by reducing the time taken to discover all devices in a network. This is achieved by parallelly executing MIB queries from multicast discovery instead of using device CLIs, which takes more time to process.

**Note**

MIB query-based device discovery is supported only for XR devices and hence no device credentials required in Domain Management interface. But for IOS devices, discovery is performed using device CLIs only and device credentials are required in Domain Management interface.

- **Trap-based Tree Report**—Starting from this release, tree polling in CMM is based on trap notifications received from ASR9k devices. Once a trap is received, CMM rediscovers devices in a network, automatically. Tree polling compares the newly generated trace with the baseline trace and when a trace change event is triggered, changes to topology are represented in both graphical and tabular formats.

CMM receives the following traps from ASR9k devices:

- cmplsTeP2mpTunnelDestUp(1.3.6.1.4.1.9.10.142.0.1)
- cmplsTeP2mpTunnelDestDown(1.3.6.1.4.1.9.10.142.0.2)
- mplsTunnelUp(1.3.6.1.2.1.10.166.3.0.1)

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- mplsTunnelDown(1.3.6.1.2.1.10.166.3.0.2)
- mplsTunnelRerouted(1.3.6.1.2.1.10.166.3.0.3)
- mplsTunnelReoptimized(1.3.6.1.2.1.10.166.3.0.4)
- **Browser Support**— CMM provides support for Firefox 27 and IE 11.x on Windows 7.
- **ESXI Support**—CMM provides support for Linux Instance of ESXI 5.5.



Note

Cisco Multicast Manager 3.3 and later releases support Nexus 7K with version 6.1.2 for Discovery, Trace, Polling, and Diagnostic. If Nexus 7k devices are configured with multicontext VDCs, then CMM will discover the default VDC as well as other VDCs as separate devices.
