Medianet 2.x: Reduced Costs and Informed Decisions with Improved Network Visibility

What You Will Learn

What are the Medianet 2.x components and how do they work together to:

- Reduce IT costs and complexity of deploying video, voice, and data as well as improve the user experience
- Provide improved visibility into the network to accelerate troubleshooting and the ability to assess the impact of voice, video, and data on the network
- Differentiate business-critical applications so that a consistent user experience can be delivered end to end

Challenge

Introducing business video and other rich-media applications in enterprises can help reduce travel costs and improve business productivity, but successful deployment of video, voice, and data collaboration mandates a delivery of a good quality of user experience. Adding new video, voice, and data services radically changes the demands on the network, which not only can affect the quality of applications but also can greatly increase complexity in operations. Typically this increase in complexity includes the need for more qualified personnel to deploy and operate the solution.

Medianet 2.x enables organizations to fully realize the benefits of video, voice, and data applications by providing capabilities that simplify deployment of video endpoints, accelerate troubleshooting, and facilitate the ability to assess the impact of each application in the network before the application is deployed.

Business Benefits

The benefits of medianet to your business include:

- Reduced operating costs:
  - Simplified installation and management of video endpoints
  - Faster troubleshooting for voice, data, and video applications
- Better investment decisions to meet business objectives: Ability to assess the impact of video, voice, and data in your network (for example, determining the right size for your network and avoiding unnecessary bandwidth upgrades)
- Service-level agreement (SLA) assurance and negotiation: Ability to gather important metrics for the service provided
- Faster end-user adoption of rich-media applications through a high-quality, positive user experience

Solution

The Medianet solution includes a variety of components that work together to address the challenges associated with the deployment and management of video, voice, and data applications. This document focuses on new capabilities introduced in Medianet 2.2, 2.3, and 2.4. Be sure to check out also the Cisco® Medianet 2.1 Solution Overview, which describes other components of the solution.

Media Monitoring

Media Monitoring enhances visibility into the network to simplify, baseline, and accelerate troubleshooting of video, voice, and data applications, validating network performance and configuration before deploying new applications or before events.

Media Monitoring is composed of three features: Performance Monitor, Mediatrace, and IP SLA video operation (IP SLA VO). These three features form a suite of tools to enable the network operator to perform media performance monitoring and troubleshooting.

- Performance Monitor allows administrators to analyze the performance of rich-media traffic across the network to provide a holistic view of the network service being delivered.
- Mediatrace discovers Layer 2 and Layer 3 nodes along a flow path. Mediatrace implicitly uses Performance Monitor to provide a dynamic hop-by-hop analysis of media flows in real time to facilitate efficient and targeted diagnostics.
- IP SLA VO generates synthetic traffic streams that are very similar to real media traffic. It can be used in conjunction with Mediatrace to perform capacity planning analysis and troubleshooting even before applications are deployed.

Performance Monitor

Performance Monitor is a medianet Cisco IOS® Software feature that measures the performance of the Real-Time Transport Protocol (RTP), TCP, and IP constant-bit-rate (CBR) traffic on network devices. Performance Monitor analyzes RTP-based audio and video flows and reports on service-affecting metrics such as packet loss and network jitter. For TCP flows, Performance Monitor reports on round-trip time (RTT) and packet-loss occurrences. Hop-by-hop knowledge of these metrics along the network path leads to granular fault isolation and thus easier troubleshooting of user traffic flows.

Performance Monitor can be applied to a variety of media applications including Cisco TelePresence® systems, Tandberg endpoints, Polycom endpoints, Cisco audio and video phones, Cisco video surveillance cameras, Cisco digital media players, Cisco Unified Video Advantage, and Cisco WebEx® client applications. Performance Monitor uses standardized reporting methods that facilitate cross-vendor application support.

Performance Monitor maintains historical data about analyzed flows traversing routers and switches. The metrics collected by Performance Monitor can be exported to a network management tool through NetFlow Version 9 or the Simple Network Management Protocol (SNMP). Network management software can further analyze, summarize, and correlate this information to provide traffic profiling, baselining, and troubleshooting services for the application and network operator of the user network.

Performance Monitor can send alarms from the routers and switches through syslog and SNMP traps. Different media applications, for example Cisco TelePresence conferencing compared to video on demand (VoD), have different sensitivities to packet loss and jitter. These varying sensitivities can be encoded into Performance Monitor threshold evaluations and actions. An example would be the generation of an SNMP trap when Cisco TelePresence traffic loss is greater than 1 percent. When a threshold is crossed, an alarm is generated that can notify the operator of the problem. This event may eventually engage further diagnostics such as Mediatrace to troubleshoot and further isolate the cause of degradation.

Mediatrace

Mediatrace is a network diagnostic tool that monitors the state of an audio, video, or data flow across a network path. Mediatrace discovers Layer 2 and Layer 3 devices along the flow path and can provide different levels of information ranging from the device-specific (CPU or memory), to the interface-specific (input interface speed or output interface drops), to the flow-specific (differentiated services code point [DSCP] values, network jitter, and packet loss).

Table 1. Mediatrace Request Types

Mediatrace Request Type	Functionality
Hops	Discover Layer 2 and Layer 3 network nodes along the flow path
System	Collect system information of network nodes along the path, for example, 1 minute CPU utilization, memory consumed
Performance Monitor	Collect Performance Monitor statistics from the network nodes, for example, network jitter, packet loss count

Mediatrace collects information from network nodes along the flow path and presents this information in a single screen that allows for easy analysis. Depending on the type of Mediatrace request (refer to Table 1), the feature may implicitly enable Performance Monitor to gather flow-specific information. Mediatrace can be manually invoked or run in a periodic fashion along a specific path of routers and switches. Mediatrace also supports initiation of the request from an off-path router. Mediatrace can be invoked in multiple ways: locally on a router or switch using the command-line interface (CLI), using Web Services Management Agent (WSMA) from a network management tool, or from a medianet-enabled endpoint.

With relevant statistics available for a flow from the network nodes along its path, Mediatrace easily and very accurately pinpoints the source or sources of degradation along the network path.

IP SLA Video Operation

IP SLA video operation functions as a valuable tool to assess the readiness of a network to carry rich-media traffic. It can synthetically generate video profiles mimicking real application traffic, such as Cisco TelePresence activity, IP video surveillance, or IPTV traffic. IP SLA VO can also use user-captured packet traces from the customer's existing network, which can then be included in the synthetically generated traffic stream. This feature can also be used to run network readiness tests prior to important collaboration meetings to validate that the network will be able to support the expected rich-media traffic.

The ability of IP SLA VO to generate realistic RTP traffic similar to real-life Cisco TelePresence, IPTV, or IP surveillance traffic in terms of packet sizes, burstiness, and traffic rate provides for accurate and realistic stress testing. IP SLA VO adds to the existing IP SLA probes that are available in Cisco IOS Software, such as User Datagram Protocol (UDP) jitter and Domain Name System (DNS). Users of IP SLA will find that IP SLA VO simply extends the familiar IP SLA control and scheduling CLI and MIB framework, allowing for easy integration with existing network management tools.

When used in conjunction with Performance Monitor and Mediatrace, IP SLA VO provides the ability to troubleshoot bottlenecks that are likely to occur within the network. IP SLA VO generates metrics such as packet loss, jitter, and end-to-end delay for the generated synthetic traffic. Hop-by-hop metrics gathered by Performance Monitor and Mediatrace on the IP SLA VO traffic can help isolate bottlenecks and possibly lead to remedial actions.

Media Awareness

Media Awareness enables the network to become application and rich-media context aware from an end to end perspective. The network works together with the video endpoints and applications for optimal quality of experience for end-users and improved visibility for IT.

Media Awareness uses explicit & implicit signaling mechanism to become application context-aware so that appropriate polices can be applied end to end, eliminating the need for static configuration. Explicit signaling enables richer application-specific policies.

The solution includes three features:

- Flow Metadata allows an application to explicitly signal any arbitrary attributes to the network that can be used by all the network nodes in the flow path. This allows appropriate policies to be applied at each hop, end to end, thereby improving the quality of experience.
- Media Services Proxy (MSP) uses lightweight deep-packet-inspection techniques to snoop standards-based signaling protocols. MSP produces flow metadata attributes that can be shared among network nodes.
- Network Based Aoolication Recognition 2 (NBAR2) enables protocol detection for a network which is the process by which the system determines that a particular network flow is from a specific application.

Flow Metadata

The flow metadata component of medianet allows the application to convey information about itself to the underlying network. This conveyance is accomplished by the presence of the Media Services Interface (MSI) in the endpoint. The metadata attributes emanating from the endpoint accomplish two things:

- Allows the network to identify the flows with the corresponding endpoint or application
- Appropriately provisions network resources for the application; for instance quality of service (QoS)

Flow metadata makes it easy for management software to report information in a more meaningful way. For example, “John from finance is having quality problems with his Jabber® desktop video” is much easier to diagnose than obscure IP addresses and protocol numbers. Imagine extending this meaningful application context information to network policies such as QoS, routing, and SLAs. The medianet flow metadata feature enables granular policies based on application context and not limited to network attributes. For example, with flow metadata, it is now possible to easily prioritize scheduled sessions over impromptu sessions.

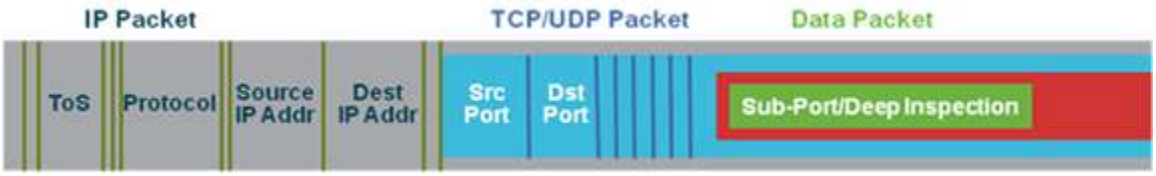
Media Services Proxy

Media Services Proxy (MSP) uses a variety of standard signaling protocols (Session Description Protocol [SDP], Session Initiation Protocol [SIP], H.323, H.245, Real Time Streaming Protocol [RTSP], multicast DNS [mDNS], etc.) to learn about the characteristics of endpoints and applications from legacy systems, allowing sharing of flow attributes among network nodes and allowing existing endpoints and applications to be augmented by the Cisco Intelligent Network while the transition to “smart” endpoints is in progress.

MSP is a software feature available on the Cisco IOS Software recommended to be positioned at the network access layer. When endpoints establish audio and video calls, the MSP identifies the endpoint attributes by sniffing the signaling and associating these attributes with the endpoint. It then provides services on behalf of the endpoint; for instance, generation of metadata that can be used by downstream network nodes.

Network Based Application Recognition 2 (NBAR2)

NBAR2, or Next Generation Network based Application Recognition, is a classification engine that recognizes and classifies a wide variety of protocols and applications, including web-based and other difficult-to-classify applications and protocols that use dynamic TCP/User Datagram Protocol (UDP) port assignments.



Well-known protocols can be classified by L3 and L4 fields

When NBAR2 recognizes and classifies a protocol or application, the network can be configured to apply the appropriate quality of service (QoS) for that application or traffic with that protocol.

The match protocol (NBAR2) command is used to classify traffic on the basis of protocols supported by NBAR2. NBAR2 is capable of classifying the following types of protocols:

- Non-TCP and non-UDP IP protocols.
- Statically assigned TCP and UDP port numbers.
- Dynamically assigned TCP and UDP port numbers. This kind of classification requires stateful inspection.
- Subport classification or classification based on deep packet inspection.

For more information about the NBAR2 protocol library, go to:
http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps6558/ps6616/product_bulletin_c25-627831.html

Media Services Interface

Cisco endpoints are equipped with the Media Services Interface (MSI), a software component that enables endpoints to consistently use intelligent network services to improve the quality of experience and reduce the cost of deployment and operations.

Medianet Releases 2.2 and 2.3 bring MSI support to a broad range of media endpoints, from Cisco Digital Media Players to Cisco IP Surveillance Cameras, to Cisco WebEx meeting clients.

Medianet Service Discovery and Autoregistration

Medianet Service Discovery allows medianet endpoints and applications to dynamically discover a wide variety of medianet services, ranging from application servers to network management servers and including other medianet service nodes such as transcoding platforms. Medianet Service Discovery, which uses the Dynamic Host Configuration Protocol (DHCP) service discovery service provided by MSI, is a fundamental component of medianet autoconfiguration. It builds upon the network autoconfiguration functions that allowed the network switch port to be automatically configured by now facilitating the dynamic configuration of endpoint or application rather than configuration as part of the medianet system. To complete the solution, the endpoint or application can use autoregistration to concurrently register to these medianet services, providing for an automated, ready-to-use provisioning of both the network and the endpoint or application. It also significantly reduces the cost and time to

deploy endpoints and applications and provides a platform for building more dynamic, customized rich-media solutions.

Cisco WebEx

Cisco WebEx web conferencing solutions allow organizations of all sizes to easily meet and collaborate over the web from anywhere, using any device. Cisco WebEx offers a comprehensive suite of software-as-a-service solutions tailored to specific business processes—general collaboration, training, events, and support—that are securely delivered through the Cisco Collaboration Cloud. Cisco WebEx Meeting Center now offers high-quality video, which allows meeting participants to see each other with exceptional clarity in full-screen mode, turning web conferencing into a virtual videoconferencing room.

The growing use of Cisco WebEx video and other rich-media applications across the organization brings legitimate questions from IT about the performance of these services and their impact on available bandwidth compared to other business-critical applications.

Medianet gives network and application administrators unparalleled visibility into their environment for any media, including Cisco WebEx traffic. Medianet capabilities for Cisco WebEx include video traffic simulation through IP SLA VO, Performance Monitoring, and Media Awareness. These features can work in parallel to provide administrators with tools for better network planning, faster problem resolution, higher service quality, and greater bandwidth efficiency.

Video traffic simulation enables administrators to understand the potential effect of video traffic on a particular site prior to deployment. Medianet can simulate Cisco WebEx video traffic on the network so that IT can more precisely model bandwidth usage and determine, for example, whether a particular site can adequately support high-quality or high-definition video.

In addition, Cisco WebEx solutions plan to offer end-to-end video, voice over IP (VoIP), and data monitoring and diagnostic capabilities through the integration of MSI into the Cisco WebEx meeting client. Medianet Media Monitoring provides Cisco WebEx customers with early detection of reduced network services that can affect media quality. Session statistics include packet retransmission rate, latency (RTT), jitter, bandwidth usage, and client CPU usage for each media stream that is monitored.

The session monitoring statistics can be exposed by using a network management system (NMS) through the network devices and eventually through Cisco cloud-based monitoring tools. Both Cisco WebEx–hosted services as well as the Cisco WebEx node for on-premises deployments offer this real-time, IP-based monitoring function.

In the near term, Cisco WebEx customers can use the enhanced network visibility enabled by medianet to isolate and troubleshoot network or client problems more quickly. In the longer term, medianet will provide Cisco WebEx customers with greater application visibility through its flow metadata feature so that Cisco WebEx traffic can be distinguished from other types of traffic in the NetFlow records. Customers will also be able to implement QoS to prioritize their Cisco WebEx voice, video, and data traffic and also to apply granular routing policies based on traffic type or location in order to optimize bandwidth efficiency and improve the rich-media user experience.

Cisco Prime LAN Management Solution

Cisco Prime™ LAN Management Solution (LMS) is an integrated suite of management functions that simplify the configuration, administration, monitoring, and troubleshooting of borderless networks. The medianet "plug-in" for Cisco Prime LMS provides workflows for setting up autoconfiguration and location settings to aid the provisioning and tracking of medianet endpoints such as digital media players and IP video surveillance cameras. The new

Medianet Work Center workflows allow the network operator to select the type of medianet to provision, to automatically prepare the network for deployment, and to check to make sure the appropriate location attributes are configured for tracking and monitoring purposes, reducing the chance for errors and the time required to set up an end-to-end video infrastructure.

For more information about Cisco Prime LMS and the new Medianet Work Center, go to http://www.cisco.com/go/lms.

Cisco Prime Assurance Manager

Cisco Prime Assurance Manager (AM) aggregates real-time information across multiple networks to deliver application-aware network performance visibility and troubleshooting. It helps network operators and engineers gain end-to-end visibility across architectures to facilitate the effective collection, analysis, and troubleshooting of performance, applications, and end-user experience over wired and wireless sessions.

The solution takes advantage of many embedded technologies and standards such as NetFlow, medianet, and SNMP to provide end-to-end application visibility, WAN optimization visibility, troubleshooting, and network readiness workflows while abstracting out a lot of the complexities involved in setting up the instrumentation. The assurance manager is also a multi–network analysis module (NAM) manager because it can centrally discover, manage, and get data from multiple NAMs in an enterprise network.

Features and benefits follow:

- Service assurance: End-to-end visibility for applications, services, and end users
- Centralized performance monitoring: Performance data collected and aggregated from multiple sources
- Troubleshooting: Enhanced troubleshooting such as event triggers based on packet capture parameters
- Multi-NAM management: Central discovery, configuration, reporting, and troubleshooting using multiple NAMs in the enterprise network at various PINs.

For more details about Cisco Prime Assurance Manager, please visit http://www.cisco.com/go/pam.

Cisco Prime Collaboration Manager

Cisco Prime Collaboration Manager (CM) provides a powerful web-based user experience for managing and quickly troubleshooting end-to-end video collaboration over a borderless network. Troubleshooting, managing, and helping to ensure video quality in point-to-point and multipoint video sessions can be challenging. Cisco Prime CM takes the guesswork out of video collaboration management by providing service and network operators with a real-time unified view of all Cisco TelePresence sessions in progress and immediate visibility into the associated media paths of each session, quickly isolating the source of problems.

When Media Monitoring features are deployed in conjunction with Cisco TelePresence, Cisco Prime Collaboration Manager 1.0 can use Medianet to provide deeper visibility into video traffic. Cisco Prime Collaboration Manager can use video performance monitoring and flow-based measurements within its monitoring and troubleshooting workflow, thus allowing service and network operators to use Cisco's unique and powerful Media Monitoring features, including Mediatrace and IP SLA video operations, to provide enhanced path computation, statistics collection, and synthetic traffic generation for medianet-capable network devices. These features also allow for a richer set of information available to service operators as they identify and isolate video collaboration service-related problems.

Cisco Prime Collaboration Manager helps to ensure a superior end user experience by:

- Supporting timely end-to-end visibility and isolation of video-related problems for sessions, endpoints, and the network
- Reducing time to troubleshoot and recover from service-affecting problems
- Providing detailed analysis of the media path with critical fault and performance statistics that support quick isolation of network devices causing service degradation
- Efficiently validating large-scale deployments through comprehensive inventory, health, and status of Cisco TelePresence endpoints as well as service and network infrastructure devices
- Delivering reports that allow operators to track usage and problem history

About Cisco Prime

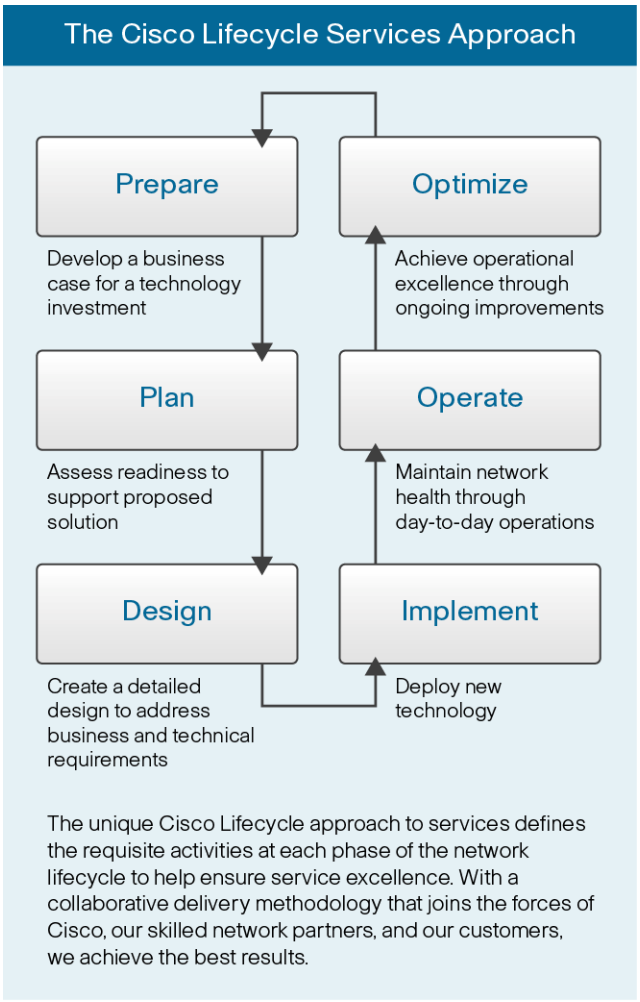
Cisco Prime Collaboration Manager is a product within the Cisco Prime network management portfolio.

The Cisco Prime portfolio of enterprise and service provider management offerings supports integrated lifecycle management of Cisco architectures and technologies based on a business-centered framework. Built on an intuitive workflow-oriented user experience, Cisco Prime products dramatically increase IT productivity, network scalability, and control of the network infrastructure and endpoints. For more information about Cisco Prime Collaboration Manager, visit http://www.cisco.com/go/cpcm.

Cisco Medianet Readiness Assessment Service

The Cisco Medianet Readiness Assessment (MRA) Service helps organizations accelerate smooth deployments of media-rich applications and makes sure that customers get the most from their technology investment.

Figure 1. Service Overview



In today's competitive business environment, enterprises that can effectively communicate, collaborate, and respond rapidly to change are most likely to succeed. In order to make sure that customers can deploy media-rich applications smoothly, they must go through a prepare and plan phase that enables them to understand how best to get their network media ready.

Enterprises can face several challenges as they prepare their case for a technology. Unlike voice, video is more bursty and bandwidth-intensive, and it is more sensitive to delay, jitter, and packet loss. As the benefits of video are realized, the adoption rate of video applications and convergence will accelerate in the coming years, putting more pressure on enterprises to get ready for video.

MRA is a service that should be performed when planning to deploy video (or media-rich) applications over the enterprise IP network. To reap the advantages of the media-rich applications, organizations need to make sure that the network is well prepared to address challenges posed by these applications. MRA is a comprehensive service offering that provides an assessment of all network infrastructure and its ability to transport the media-rich applications that need to be deployed. The service offering helps enterprises prepare, plan, and design their networks for the successful implementation of the media-rich applications. MRA is part of the Cisco lifecycle

approach—prepare, plan, design, implement, operate, and optimize (PPDIOO)—to delivering services that help ensure customer satisfaction and return on investment. MRA encompasses the prepare and plan phase and provides input for the design phase of deployment (Figure 1). The service is delivered by Cisco Services, which has a deep understanding of the requirements imposed on the network by not only the new media-rich applications but also by considerations such as performance, scalability, security, and high availability.

Why Cisco?

Only Cisco can deliver an end-to-end solution with a smarter network and smarter endpoints to deliver predictable and optimal user experiences while reducing complexity and costs. The Cisco solution provides dynamic discovery, binding, and adaptation in the network, optimizing the delivery of rich-media business and collaboration applications.

For More Information

To learn more about Medianet 2.2 and 2.3 capabilities and which products contain which features, please check the Medianet data sheet.

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