

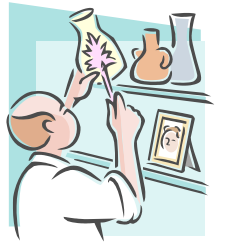
What You Make Possible



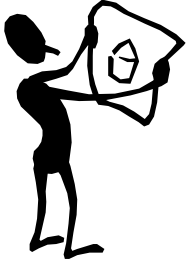
Network Considerations for Collaboration and Real Time Media

BRKUCC-2058

Housekeeping



- We value your feedback- don't forget to complete your online session evaluations after each session & the Overall Conference Evaluation which will be available online from Thursday
- Visit the World of Solutions and Meet the Engineer
- Visit the Cisco Store to purchase your recommended readings
- Please switch off your mobile phones
- After the event don't forget to visit Cisco Live Virtual:
www.ciscolivevirtual.com



Agenda

- What is Medianet?
- Application Traffic Patterns and Demands
- Media Monitoring
- Media Awareness
- Summary

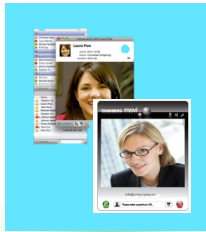
What is Video Collaboration?

WebEx



Web Conferencing

Jabber



Soft Clients

CP-9971
CP-89xx



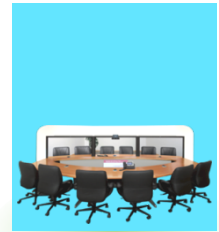
Video IP Telephony

EX90
SX20
TC Endpoints



Desktop/ Room Video Conferencing

1xxx,3xxx Series
TX Series



Immersive TelePresence

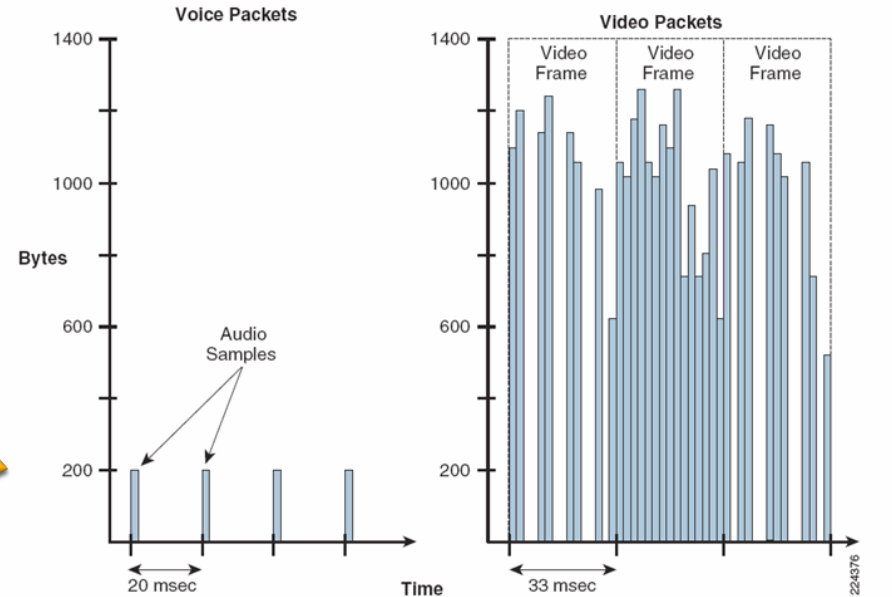
Collaborative Rich Media Traffic Patterns



But Video Is Not Voice

- Traffic profile is very different
- Variable Bit Rate
- More data on the wire

**32 to 209
times
the
bandwidth**



Video Application Bandwidth

Video requirements continue to grow

WebEx

- VoIP: 30-40 kbps, Desktop Share: 40 kbps, Video: 220 Kbps¹
- HQ Video (360p 1.5Mbps, 180p 0.5 Mbps) Min 300k

Video IP Telephony

- E20 128 kbps – 1152 kbps
- CP-99xx 256 kbps – 1024 kbps

Soft Clients

- CUVA 460 kbps
- MOVI 384 kbps – 2 Mbps

Desktop Video Conferencing

- 384 kbps – 6 Mbps

TelePresence

- 1.5 Mbps – 24+ Mbps

Network Requirements of Video Collaboration Apps

	One Way Latency	Jitter	Loss
Desktop Share (WebEx)	< 1000 ms	< 100 ms	< 0.05%
Video Conferencing	< 150 ms	< 30 ms	< 0.10%
TelePresence	< 150 ms	< 10 ms	< 0.05%
IP Telephony	< 150 ms	< 30 ms	< 0.10%
VC Soft Clients	< 150 ms	< 30 ms	< 0.10%

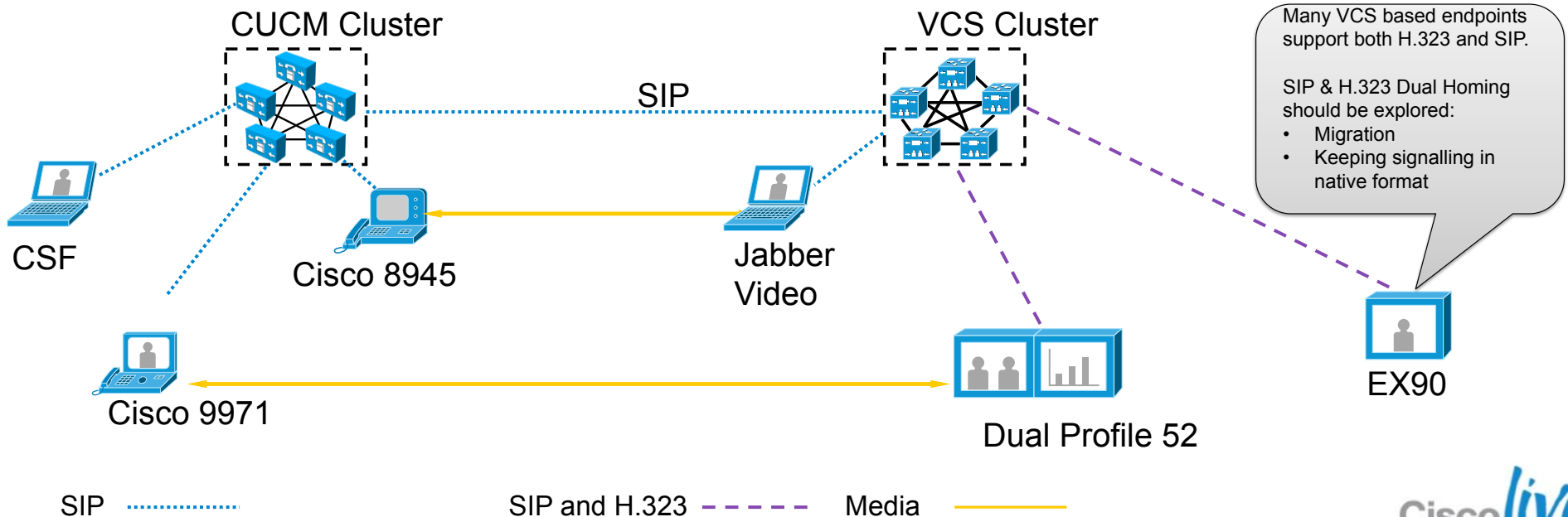
Media Synchronisation

audio + discrete info (slide show):	< 1000 ms
audio + pointed objects w/ narration:	< 200 ms
Lip Sync: audio advance over video:	< 30 ms
Lip Sync: audio delay following video:	< 100 ms

Point to Point Video Conferencing

Intra-Company, SIP to SIP

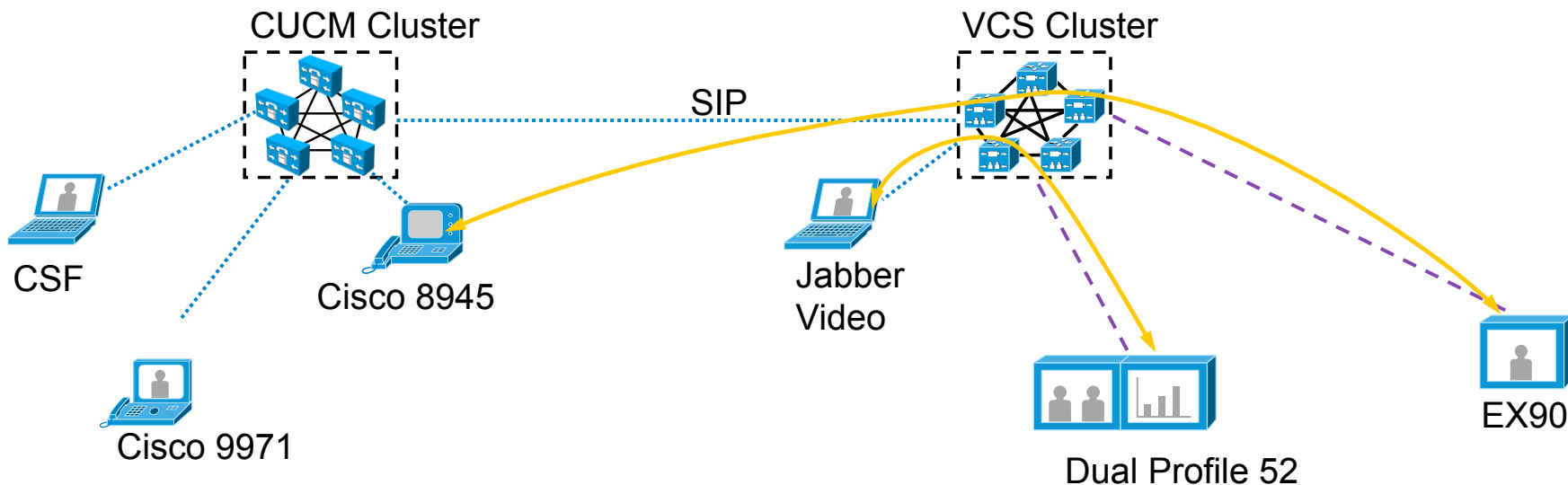
- **Call Signalling** may traverse multiple servers
 - No Signalling Protocol Interworking Required
- **Media Flows** Directly between Terminating Endpoints



Point to Point Video Conferencing

Intra-Company, SIP/H.323 interworking

- **Call Signalling** may traverse multiple servers
- **Media Flows through the VCS** (which performs media translation)
 - Because of media anchoring, geographical location of the VCS is Important

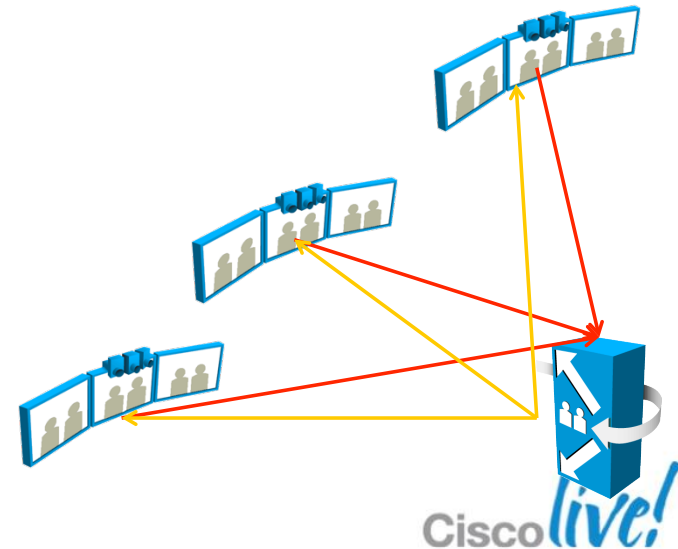


SIP H.323 SIP and H.323 - - - - - Media —————

Multipoint Video Conferencing

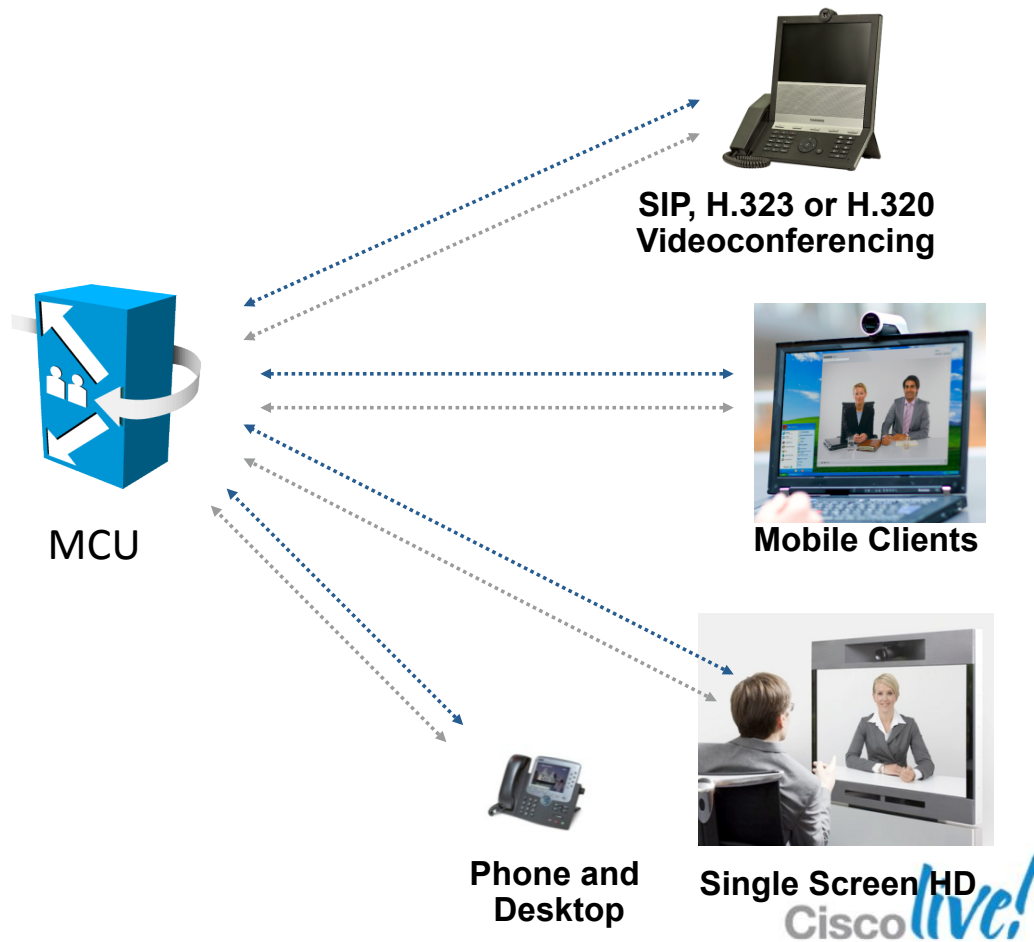
- Multiple solutions to enable multipoint conferencing.
- Participants send their audio/video stream to centralised device (MCU/CTMS)
- Device selects, possibly re-encodes, and retransmits audio/video to participants
- Cascading a possibility for some MCUs (better BW optimisation but some loss of functionality)

Device	Usage
Cisco TelePresence Multipoint Switch (CTMS)	Immersive Cisco TelePresence multi-party
TelePresence Server	Active-Presence & Transcoded TelePresence
TelePresence MCU	Multipoint Transcoded Video Conferencing
Multi-site on certain endpoints	Adhoc multipoint conferencing



Traditional Video Conferencing MCU

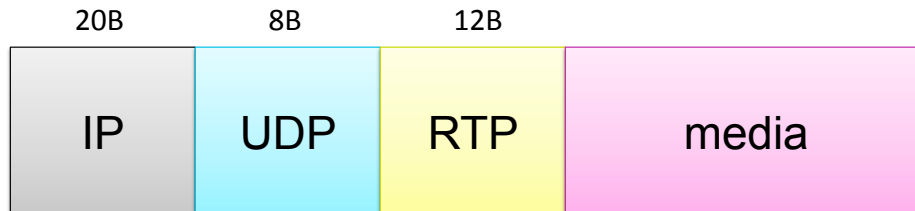
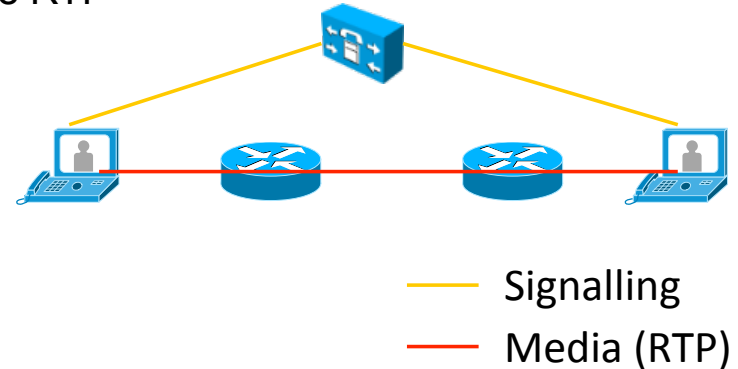
- Endpoints send audio and video towards central MCU
- MCU
 - Receives, blends/selects media and transmits
 - Mixes audio
 - Transcodes video to match receiving endpoint capabilities
 - Performs interop between devices
 - May operate in screen switching or composite modes
- MCUs are placed at:
 - High WAN bandwidth connected sites
 - Balancing end to end latency



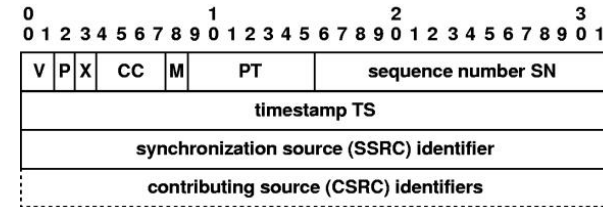
Traffic Details

IP Telephony and Video Conferencing

- IP Telephony and video conferencing almost always use RTP
 - RTP (RFC3550) over UDP
 - RTP header provides
 - Sequencing
 - Timestamp
 - Payload types
 - Multiplexing of different media
 - RTCP (RTP UDP port + 1) provides
 - Reporting
- Control channel

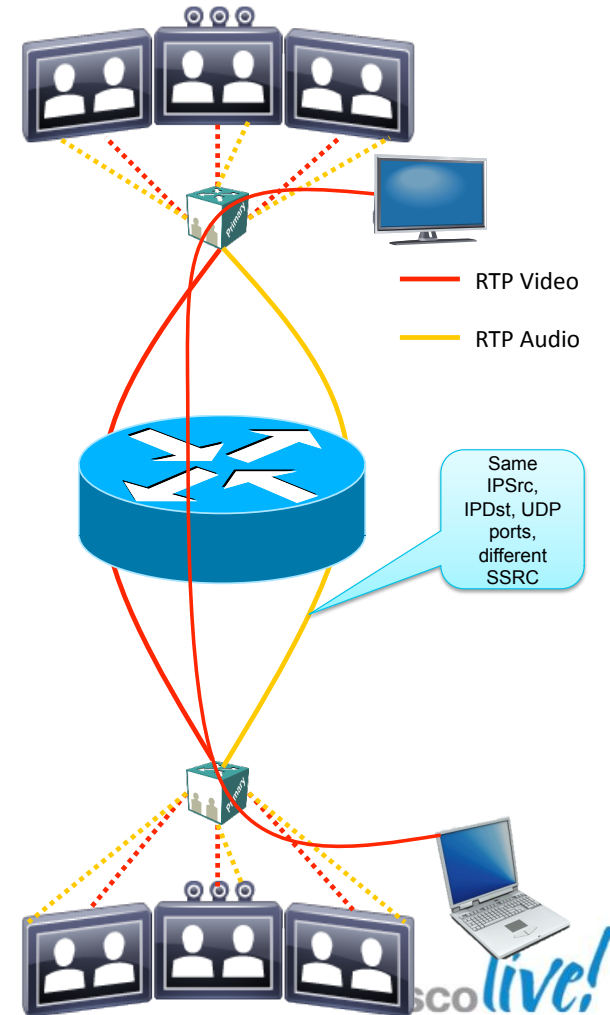


RTP header



RTP and Media types

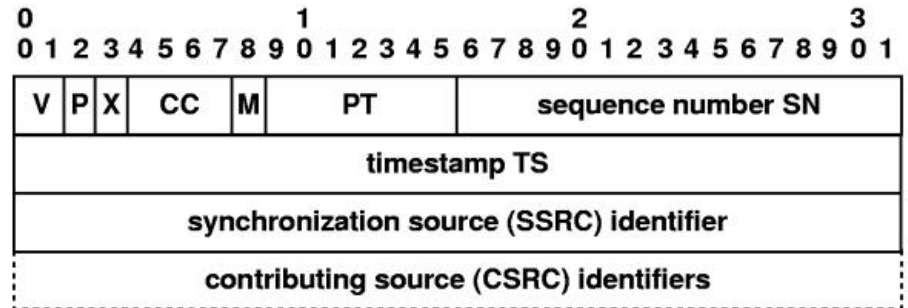
- Each media stream (audio, video, desktop share, etc.) is a unique SSRC
- Implementation specific: multiple SSRCs of same media type might be multiplexed together (same IPsrc, IPdst, UDP protocols)
- CTS:
 - 1 Audio UDP flow (multiple audio channels)
 - 1 Video UDP Flow (multiple channels)



RTP Payload Types

- RTP Payload Type (PT) field designates type of media
- Divided into static (mostly legacy audio) and dynamic.
 - <http://www.iana.org/assignments/rtp-parameters>
- Dynamic range (96-127) PT communicated via signalling (SIP, H.323)
 - Identifying video can become a challenge.

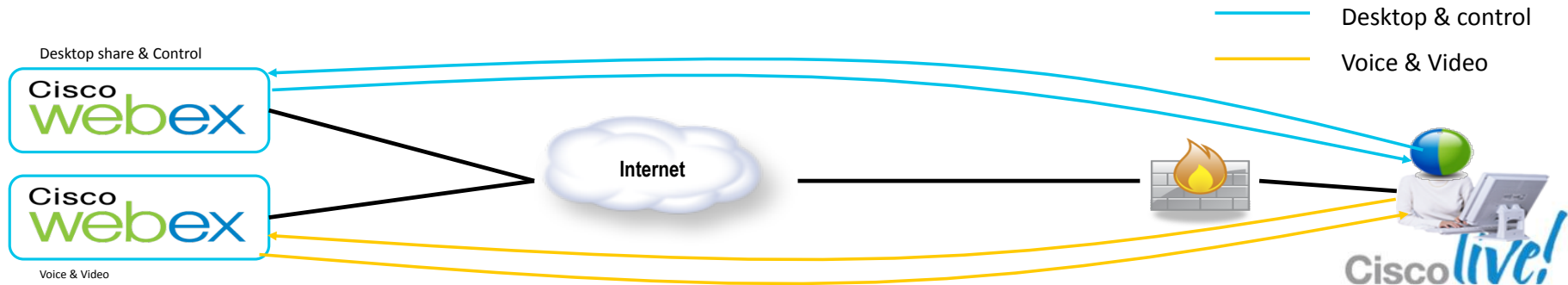
RTP header



Traffic Details

WebEx Meeting Centre

- WebEx comprised of 2 main channels:
 - 2 TCP sessions shared by Control and Desktop share (can be HTTP/SSL or TCP)
 - Audio/Video (TCP/HTTPS or UDP)
- Generally, audio is handled via PSTN vs. integrated with client
- UDP Video is an option but uncommon (firewall traversal issues) but bandwidth wise, most efficient



Video Requests Come From All Over

Executives

Telepresence

Executive Broadcasts

Special Departments: Facilities or Marketing

Safety and Security Video Surveillance

Digital Signage

Digital Advertising

IT Resources

Mid-Management

Video Conferencing

Training On Demand

Employees

Skype-like Video

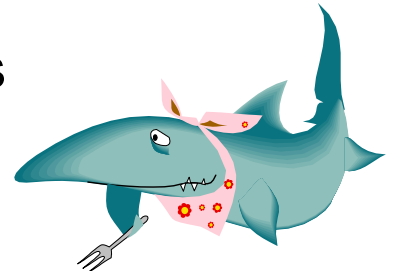
YouTube-like sharing

PC-based Video Conferencing

What Does Video Mean to You?

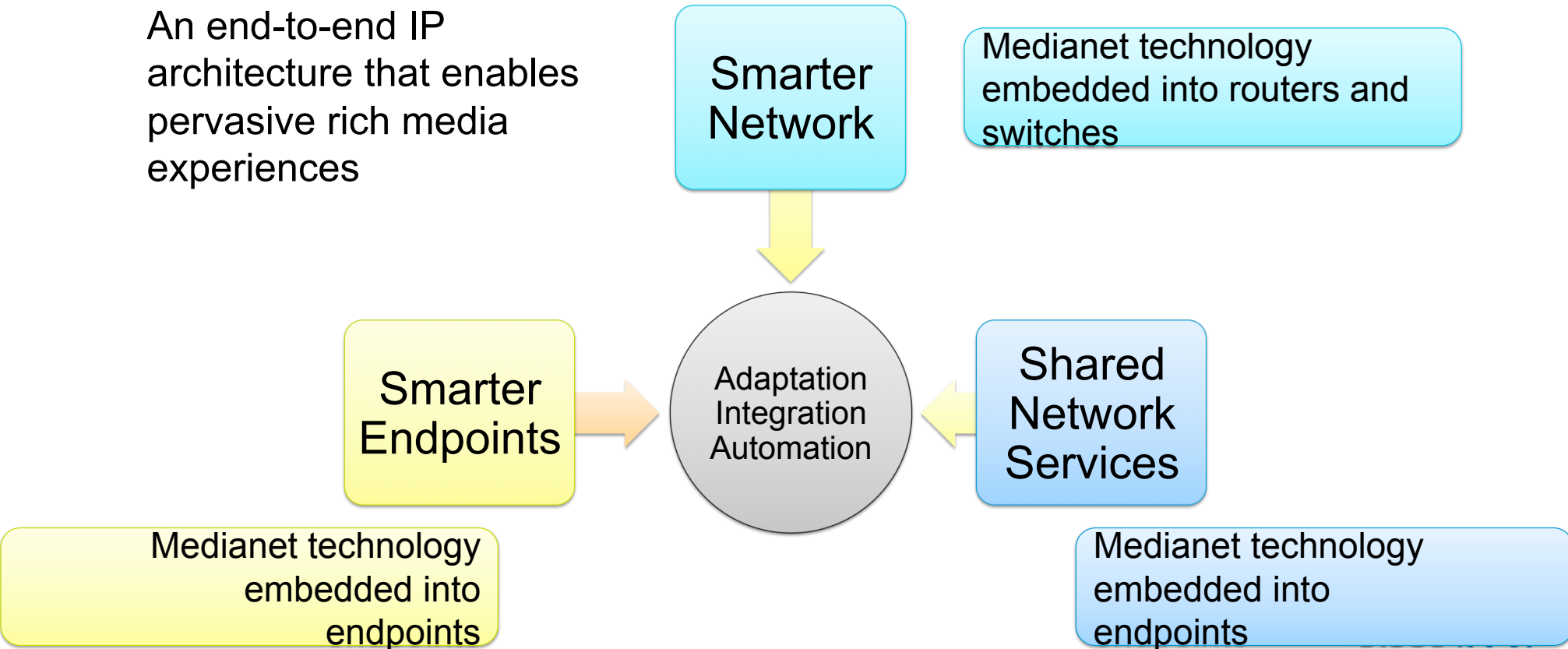


- New SLAs from application groups regarding rich media applications.
 - SPs: Medianet is tooling the enterprise to validate these SLAs!
- Video is bandwidth hungry
Need tools, features to understand and manage this bandwidth.(and maybe more bandwidth)
- Video is sensitive to network conditions.
Greater pressure to detect and resolve problems quickly.



Cisco's Medianet Architecture

An end-to-end IP architecture that enables pervasive rich media experiences

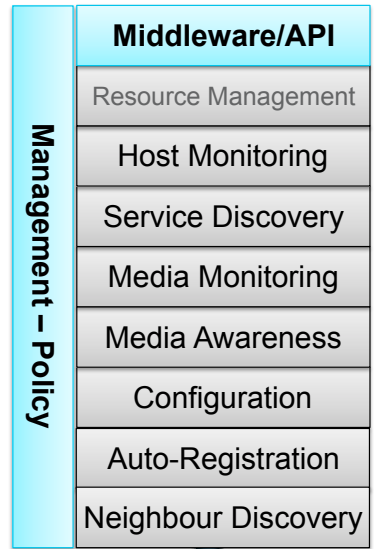


Media Services Interface (MSI)



Media Services Interface (resides at the video endpoint):

- API
- Middleware
- Host Stacks / Protocols



Media Services Interface Deliverables

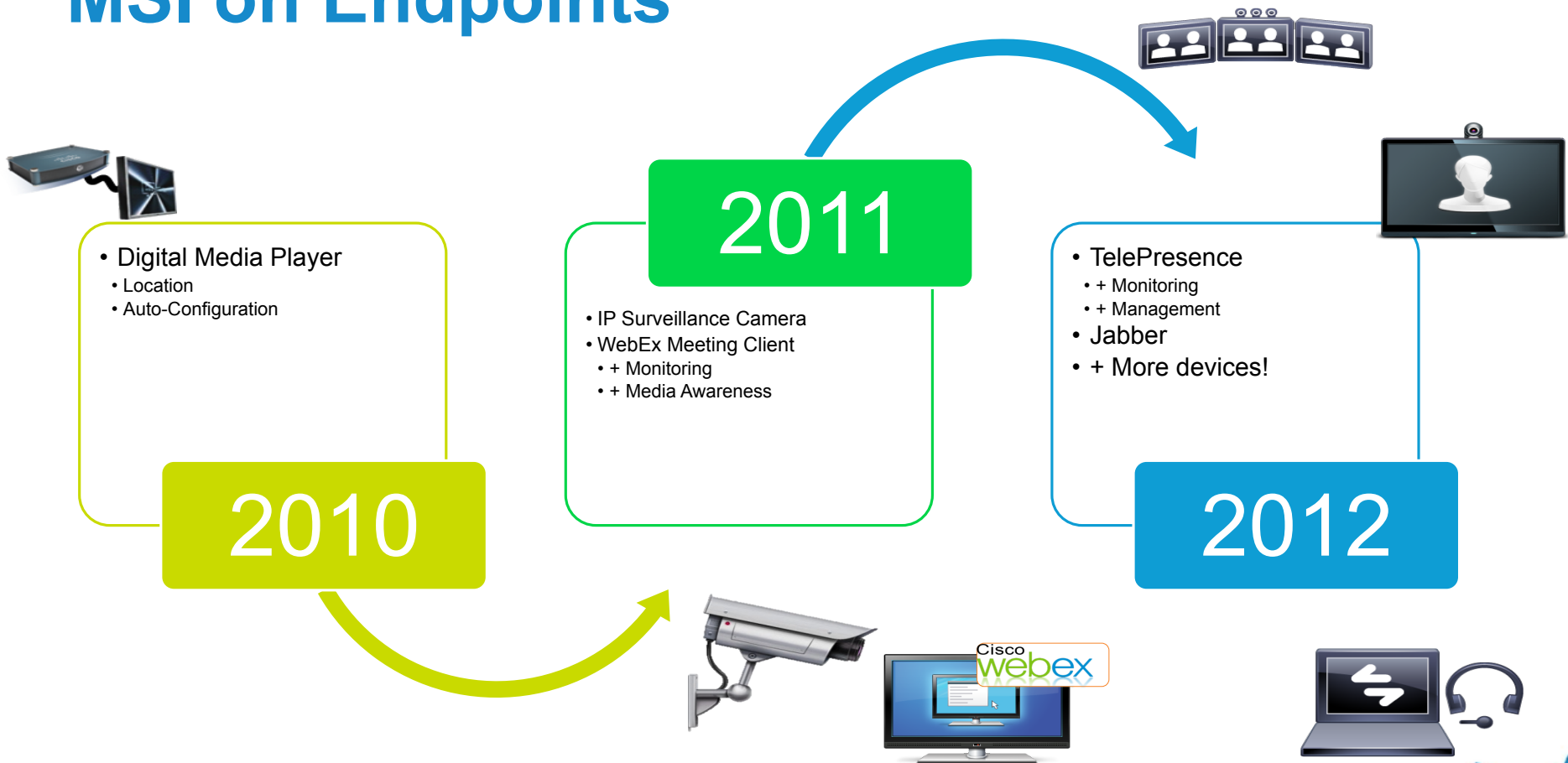


MSI Reference implementation
API SDK
Simulation - Test environment
Support - Documentation



Platform Portability Layer:
Win, Mac, embedded Linux, mobile OS

MSI on Endpoints



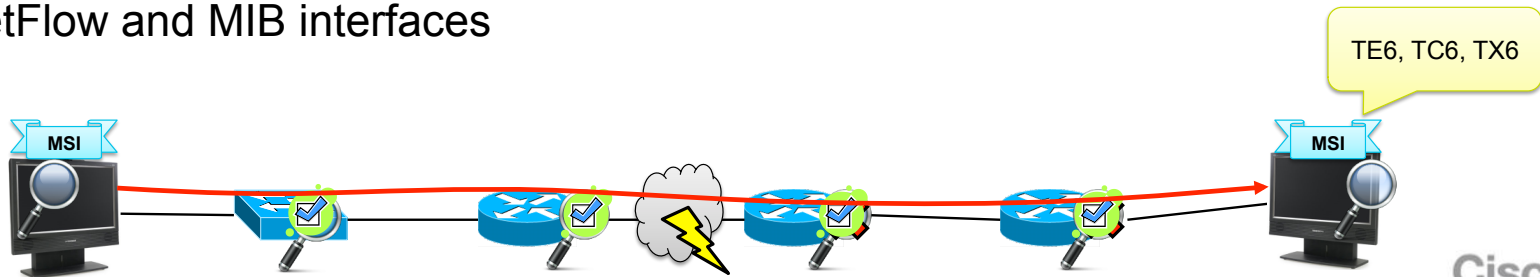
Media Monitoring



IOS Performance Monitor

Endpoint/Router/Switch native RTP and TCP analysis

- Network nodes are able to discover & validate **RTP, TCP** and **IP-CBR** traffic on hop by hop basis
- **À la carte metric (loss, latency, jitter etc.) selections**, applied on operator selected sets of traffic
- Allows for **fault isolation** and network span validation
- Cross-network synchronised time windows for measurement
 - same 30 second (default) intervals measured
- Per-application threshold and altering.
- NetFlow and MIB interfaces





Perf-mon: Wide Applicability

- Tested with:
 - Cisco EX90, MXP1700, Cisco TelePresence (1xxx, 3xxx), CUVA, CP-9971, CP-7985, CP-7960 (audio only), MS Lync, Avaya, Polycom
 - Cisco Video Surveillance Cameras, WebEx (HTTPS), IPTV (VLC)
 - Just plain web transactions (wget)



Network Management for Performance Monitor

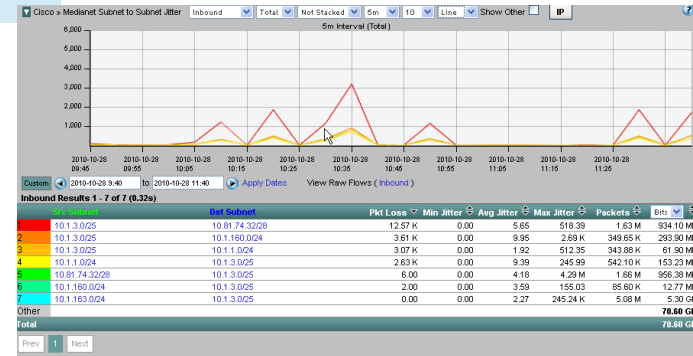
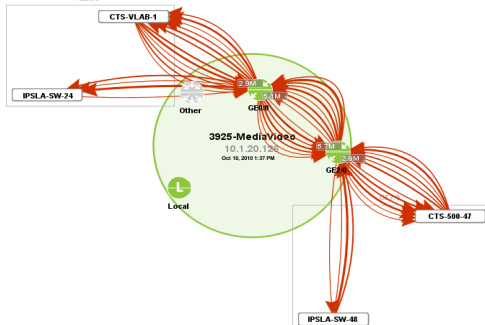
Application	Type
Cisco Prime Assurance (includes configuration)	Network
Cisco Prime Collaboration Manager	Application
ActionPacked LiveAction (configuration also planned)	Network
Plixer Scrutiniser	Network
SevOne SevOneNMS	Network
CA/NetQoS UCM	Application
ManageEngine NetFlow Analyser	Network
Sonoco ICmyNet	Network
14+ NMS application vendors engaged!	

Devices View Groups View QoS Flow Routing IP SLA

Enable Polling Pause Display No Display Filtering Port End Points IP Address Playback Top Analysis Dissemination Aggregation NetFlow v9 Collector Polling: 30 seconds

Name	Protocol	In IP	Out IP	Src IP Addr	Src Port	Dst IP Addr	Dst Port	RTP SSRC	Fraction Lost	Packet Loss Count	Loss Event Count	Interarrival Jitter Mean	Interarrival Jitter Max	BE Rate	Media Packet Rate	Measured
UDP	GgsktEthernet0/0	CTS-500-47	GgsktEthernet0/0	21,142	CTS-VLAB-1	31,026	2,005,09...	153	46	44	0	164	5 Mbps 49	10,346		
UDP	GgsktEthernet0/0	GgsktEthernet0/0	GgsktEthernet0/0	23,704	CTS-500-47	25,634	1,003,63...	0	0	0	0	44	60 Mbps 132	125,429		
UDP	GgsktEthernet0/0	GgsktEthernet0/0	GgsktEthernet0/0	25,634	CTS-VLAB-1	23,704	608,602...	1,110	862	598	0	2,747	53 Mbps 115	110,300		
UDP	GgsktEthernet0/0	GgsktEthernet0/0	GgsktEthernet0/0	31,026	CTS-VLAB-1	21,142	436,085...	0	0	0	0	85	5 Mbps 50	10,506		

ActionPacked



plixer

Metrics

Perf-mon Initial Release (VM1 15.1(3)T)

- Variety of network centric metrics added.

Metric/Data Value	Protocol
transport rtp ssrc	RTP
application media packets counter (long)	All
application media bytes counter (long)	All
application media bytes rate	All
application media packet rate	All
transport packets lost counter	RTP
transport packets expected counter	RTP
transport packets lost rate	RTP
counter bytes rate	All
transport event packet-loss counter	TCP, RTP
transport round-trip-time	TCP
transport rtp jitter maximum	RTP
transport rtp jitter minimum	RTP
transport rtp jitter mean	RTP
application media packets rate variation	IP-CBR
application media event	-
counter packets dropped	All

for reference

Metrics in Performance Monitor 2.0



VM2 Initial Release: IOS 15.2(2)T

- Additional audio/video metrics
- More emphasis on TCP metrics

Metric/Data Value	Protocol
RTP payload type	RTP
IPv6 support	(all new and existing metrics)
Flexible NetFlow (FNF) field imports	all
TCP Max Segment Size	TCP
TCP min/max/avg Window Size	TCP
Out of order bytes	RTP
Out of order packets	RTP

for reference

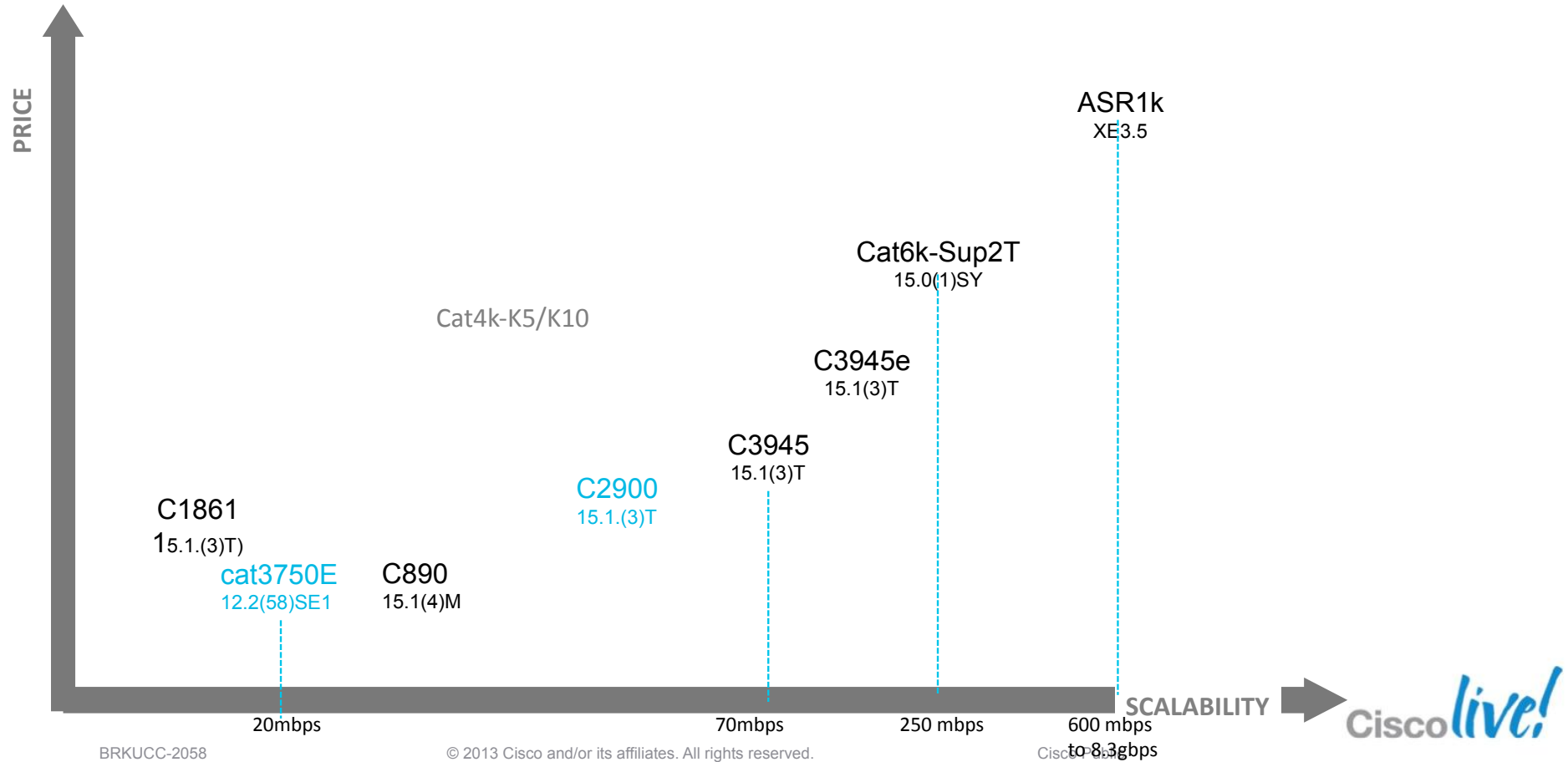
Endpoint and Network Points of Measurement

Metric	Metric	Routers/Switches	MSI
Layer 2	VLAN	✓	✗
	MAC address	✓	✗
IP	IP Address(s)	✓	✓
	DSCP	✓	✓
Transport	RTP - Loss	✓	✓
	TCP – Loss	✗ (only loss event)	✓
	TCP Round Trip Time	✓	✓
	RTP Jitter	✓	✓
Media	Frame Discards	✗	✓
	Frame Repairs	✗	✓
	Frame IDR Count	✗	✓

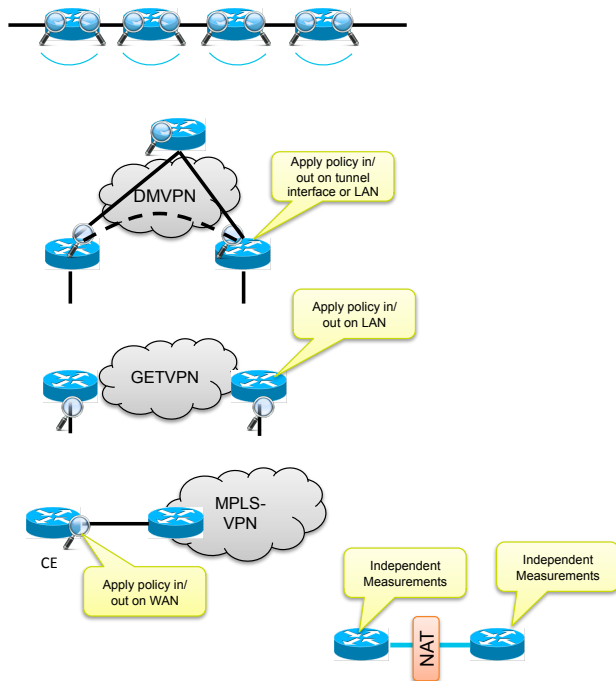


Platform Wide Scalability

Performance Monitor



Performance Monitor: Deployment



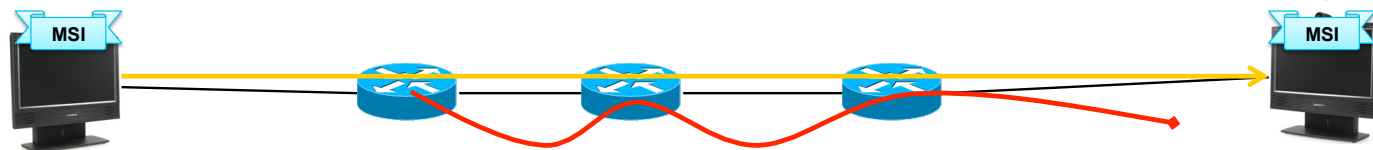
- Enable pervasively (if possible)
 - More monitoring points, the better the data
- Applications:
 - VoIP, WebEx, TelePresence, Desktop Video Conferencing (Cisco EX/MXP, Polycom, etc), Skype, Microsoft MOC/Lync
 - Any TCP traffic: Oracle, SAP, HTTP(s)
- Scenarios:
 - Remote sites without local IT staff
 - Telecommuter / cisco virtual office
 - WAN edge
 - DMVPN – tunnel interface
 - GETVPN – LAN interface
 - Mutation (NAT, SBC, etc.) – will require correlation

Dynamic Monitoring with Mediatrace

Released
Nov 2010
15.1(3)T

Let mediatrace do the walking for you!

- Mediatrace **discovers and queries L2 and L3 nodes** along a flow's path
- Gathers system resource, interface and flow specific (perf-mon) stats
 - For performance monitor: dynamically configures monitoring policy (if needed) 5-tuple + intervals etc. match static policy).
- **Consolidates information into a single screen**
- Allows for **easy comparisons** of device behaviour
 - Which interface dropping packets?
 - Where is DSCP getting reset?
- Can be requested by remote device
- Automatically (based on thresholds) via EEM script



Mediatrace Perf-Mon Poll

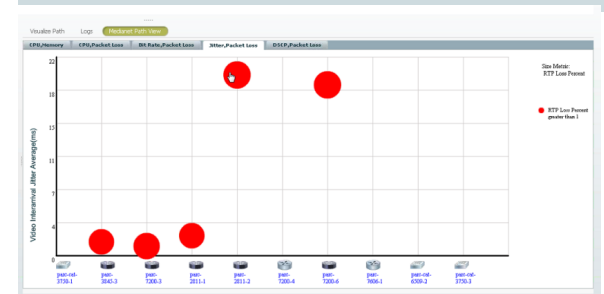
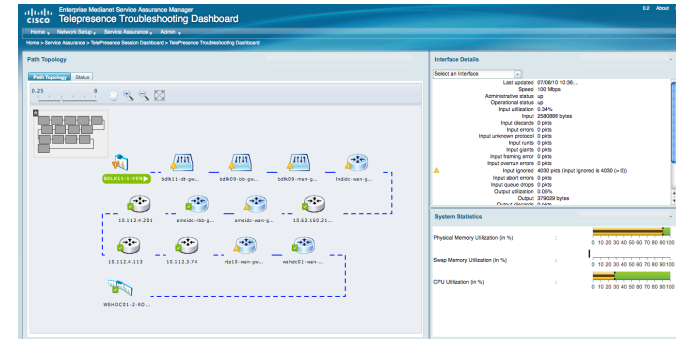
- **Mediatrace perf-mon poll**
 - Flow specific statistics
- Performance-monitor policy automatically configured (if needed) along path, then flow data collected
- Fixed field-sets for RTP and TCP flow analysis
- Mediatrace 2.0 removes requirement of Layer-4 ports in mediatrace request.

```
VXR-AA0310#mediatrace poll path-specifier source  
10.1.160.3 destination 10.1.3.3 perf-monitor
```

```
Started the data fetch operation.  
Waiting for data from hops.  
This may take several seconds to complete...  
Data received for hop 0  
Data received for hop 1  
Data received for hop 2  
Data fetch complete.  
Results:  
...  
Mediatrace Hop Number: 0 (host=VXR-AA0310, ttl=255)  
...  
Mediatrace Hop Number: 1 (host=3845-AA0216, ttl=250)  
Metrics Collection Status: Success  
Reachability Address: 10.1.162.2  
Ingress Interface: Fa0/0/0  
Egress Interface: Fa0/0/1  
Metrics Collected:  
Flow Sampling Start Timestamp: 01:30:42  
Loss of measurement confidence: FALSE  
Media Stop Event Occurred: FALSE  
IP Packet Drop Count (pkts): 0  
IP Byte Count (Bytes): 207398  
IP Packet Count (pkts): 898  
IP Byte Rate (Bps): 6913  
Packet Drop Reason: 0  
IP DSCP: 34  
IP TTL: 57  
IP Protocol: 17  
Media Byte Rate Average (Bps): 6314  
Media Byte Count (Bytes): 189438  
Media Packet Count (pkts): 898  
RTP Interarrival Jitter Average (usec): 6677  
RTP Packets Lost (pkts): 0  
RTP Packets Expected (pkts): 893  
RTP Packet Lost Event Count: 0  
RTP Loss Percent (%): 0.00
```

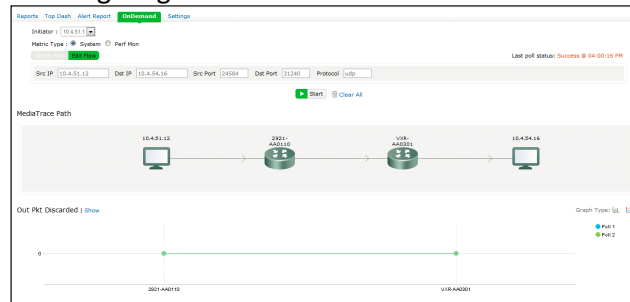
Network Management Support for Mediatrace

- Cisco Prime Cisco Collaboration Manager
Cisco Prime Assurance
ActionPacked LiveAction
ManageEngine NetFlow Analyser
- Mediascope project
<http://medianet.soureforge.net>

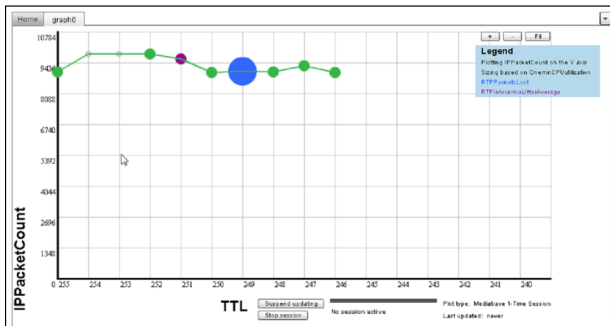


Cisco Prime Collaboration Manager

ManageEngine



mediascope



BRKUCC-2058

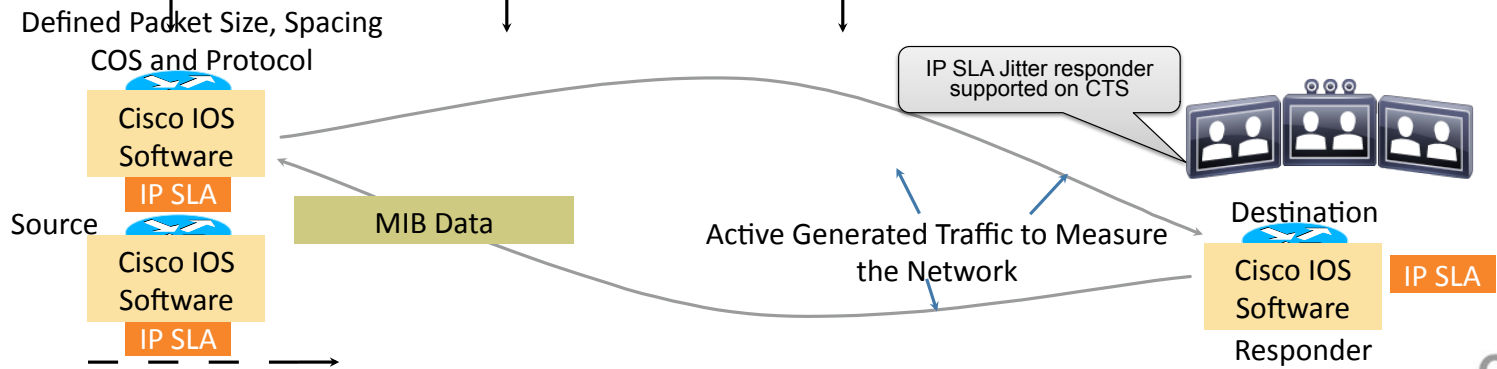
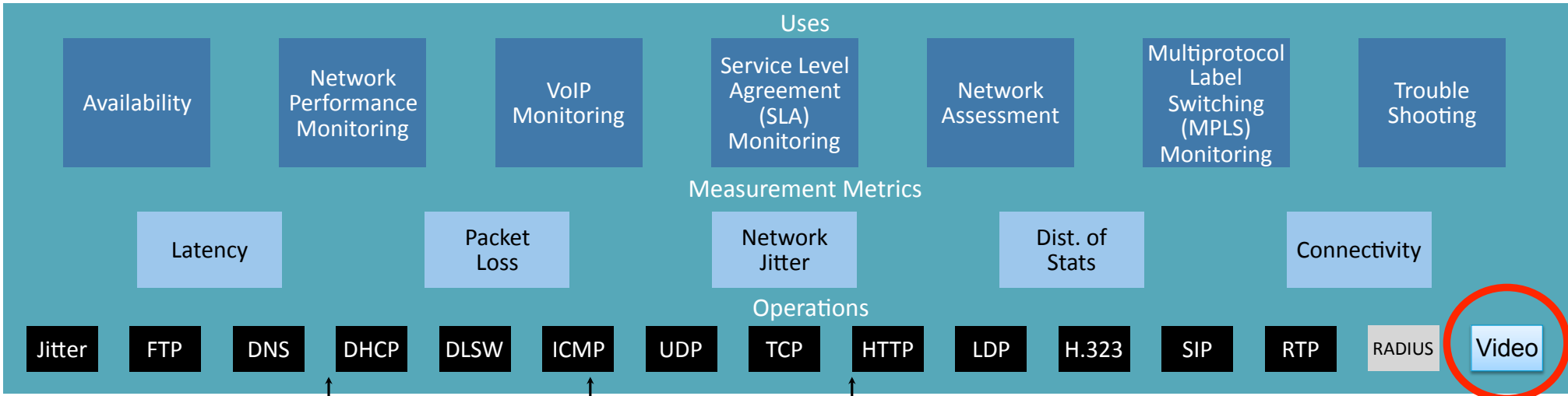
More info: CDN Partners Page:
<http://developer.cisco.com/web/mnets/partners>

Comparing Monitoring Technologies

	IPSLA	NetFlow metering	Performance Monitor/ SPVIDMON	Mediatrace
Synthetic Traffic				reporting only
User Traffic Accounting				
User traffic Performance				reporting only
Measurement point (MP)	Responder	Single Node/interface	Single Node/interface	Multiple Nodes along path
Measurement scope	Between Generator and responder	Source and MP	Source and MP	Source and each MP
Endpoint	 Late 2012*	 Late 2012	 2011	 2011
Network			 2010	 2010

* IPSLA Responder avl on CTS 1.5+ already

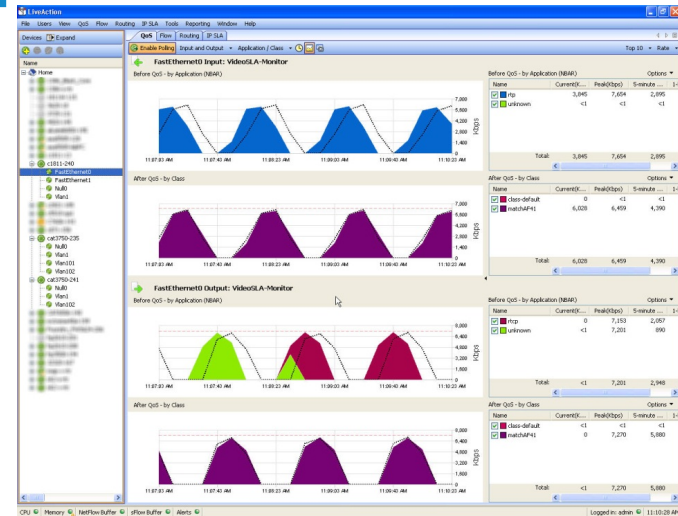
IP SLA: Synthetic Traffic Measurements



IPSLA Video Operation Embedded Traffic Simulator

March
2011

- IPSLA known in industry for jitter, ICMP, etc. probes
- Most probes measure experience without affecting user traffic (hopefully)
- Need traffic to **stress test** network
- IPSLA VO provides
 - Realistic representation of arbitrary video (RTP) traffic
 - Packet sizes, burstiness, traffic rate, etc.
 - pre-packaged profiles:
 - IPTV, Video Surv, CTS
 - Extensible via data file
 - Custom profile generation from packet capture



ActionPacked

IPSLA Video Operation Network Management

Application	Type
Cisco Prime Collaboration Manager	Application
Cisco Prime LMS 4.1	Network/Device
Cisco Prime Performance Manager 1.0.3	Network
ActionPacked LiveAction	Network
SevOne SevOneNMS	Network
14+ NMS application vendors engaged!	

The screenshot displays the Cisco Prime Collaboration Manager interface. A pop-up window shows an alarm for 'CTS-500-2 to CTS-500-1' and 'CTS-500-1 to CTS-500-2', both labeled as 'Major Alarm'. The main interface shows a 'Proactive Troubleshooting' section with session details for 'parc-nme-sw-1' to 'parc-cat-3750-3' at IP address '80.4.0.92'. The application type is 'TELEPRESENCE (6.6 Mbps)' and the test duration is 60 minutes. A table of 'IPSLA Test Result' is visible, showing various performance metrics like Jitter, Latency, and Packets Lost.

Cisco Prime Collaboration Manager (IPSLA VO)

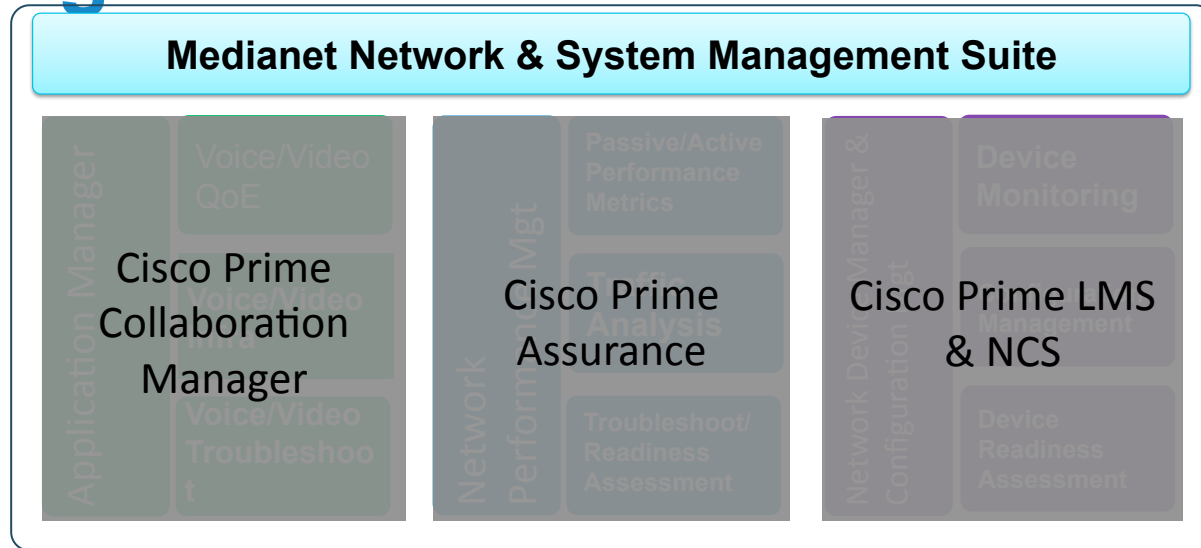
More info:
 Cisco Prime LMS: cisco.com/go/lms
 Cisco Prime CM: cisco.com/go/cpcm
 Cisco Prime Performance Manager: www.cisco.com/en/US/products/ps11715
 CDN Partners Page: <http://developer.cisco.com/web/mnets/partners>

Demo of Endpoint Monitoring Management

Cisco Prime Collaboration Manager (CPCM)



Enterprise Medianet Network & System Management



Mediatrace IPSLA
VO MSI
SDR IOS
Perf Monitor



MSI (VDI, etc.)
MIB IPSLA
VO Mediatrace



NetFlow (PfR, NBAR)
FNF (IOS Perf Monitor)



MIB IPSLA
VO CLI



Network, Video & Voice Infrastructure/Applications



Cisco Prime Collaboration

Unified Simplified Management of Voice and Video Networks

▪ Provisioning

- Accelerates Unified Communications site rollouts and dramatically reduces time to perform user moves, adds, changes and deletions (MACD)
- Removes complexity, enabling delegation to help desk personnel, which can lower operating expenses

▪ Assurance

- Helps ensure reliable service delivery through pro-active fault detection and rapid isolation using purpose-built diagnostic tools
- Expedites operator resolution of service quality issues before impacting end users

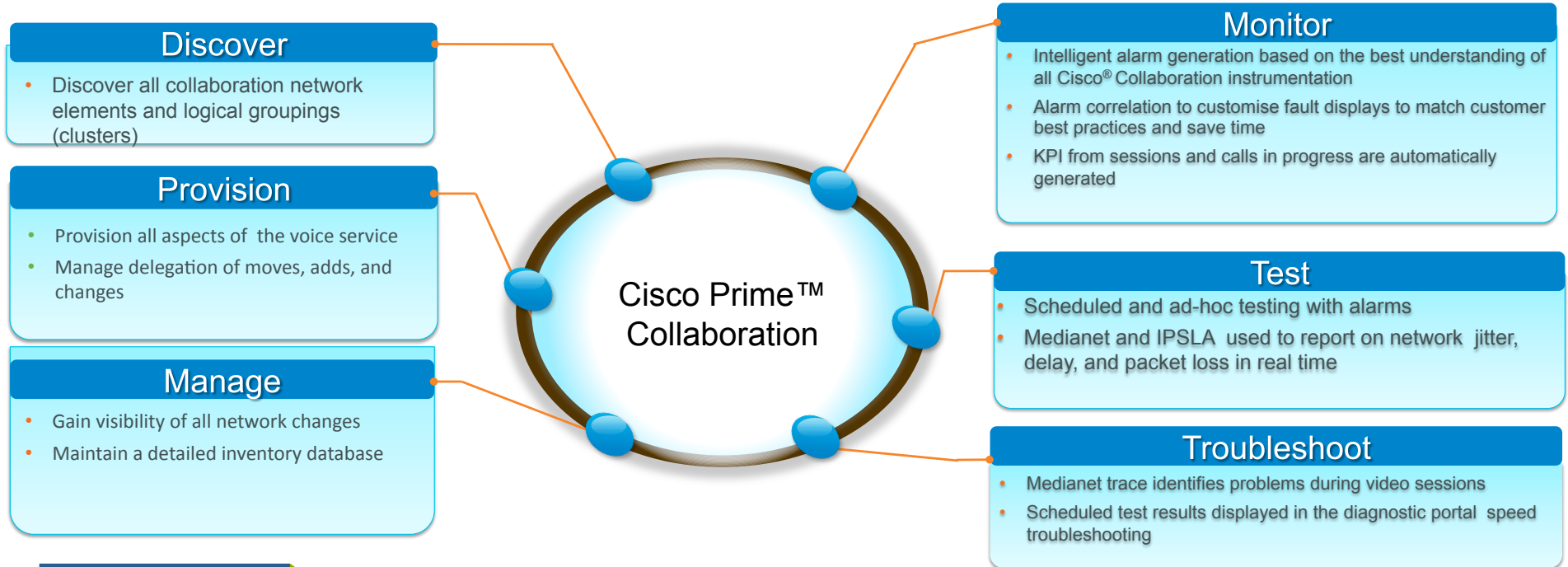
▪ Advanced Reporting*

- Helps enable administrators to analyse trends for capacity planning, resource optimisation, and quality of service
- Quickly determines the success of advanced collaboration technology adoption to advance future investment decisions



* Advanced reporting will be available in Cisco Prime™ Collaboration in March 2013

Cisco Prime Collaboration: Complete Lifecycle Management



- Single product for all collaboration lifecycle needs
- Simplification and automation of many day-to-day tasks

Diagnostic Testing

Phone Tests

- Call hold
- Call forward
- Call park
- Call conference
- Call transfer
- Call test

Synthetic Tests

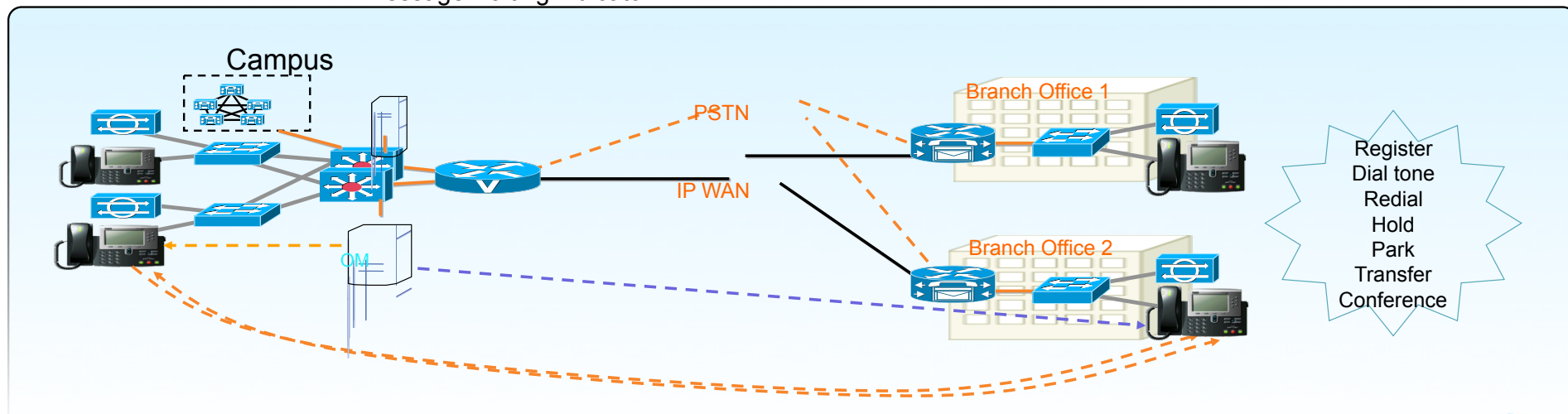
- Phone registration
- End-to-end call
- TFTP download
- Dial tone
- Emergency call
- Message waiting indicator

Phone Status Test

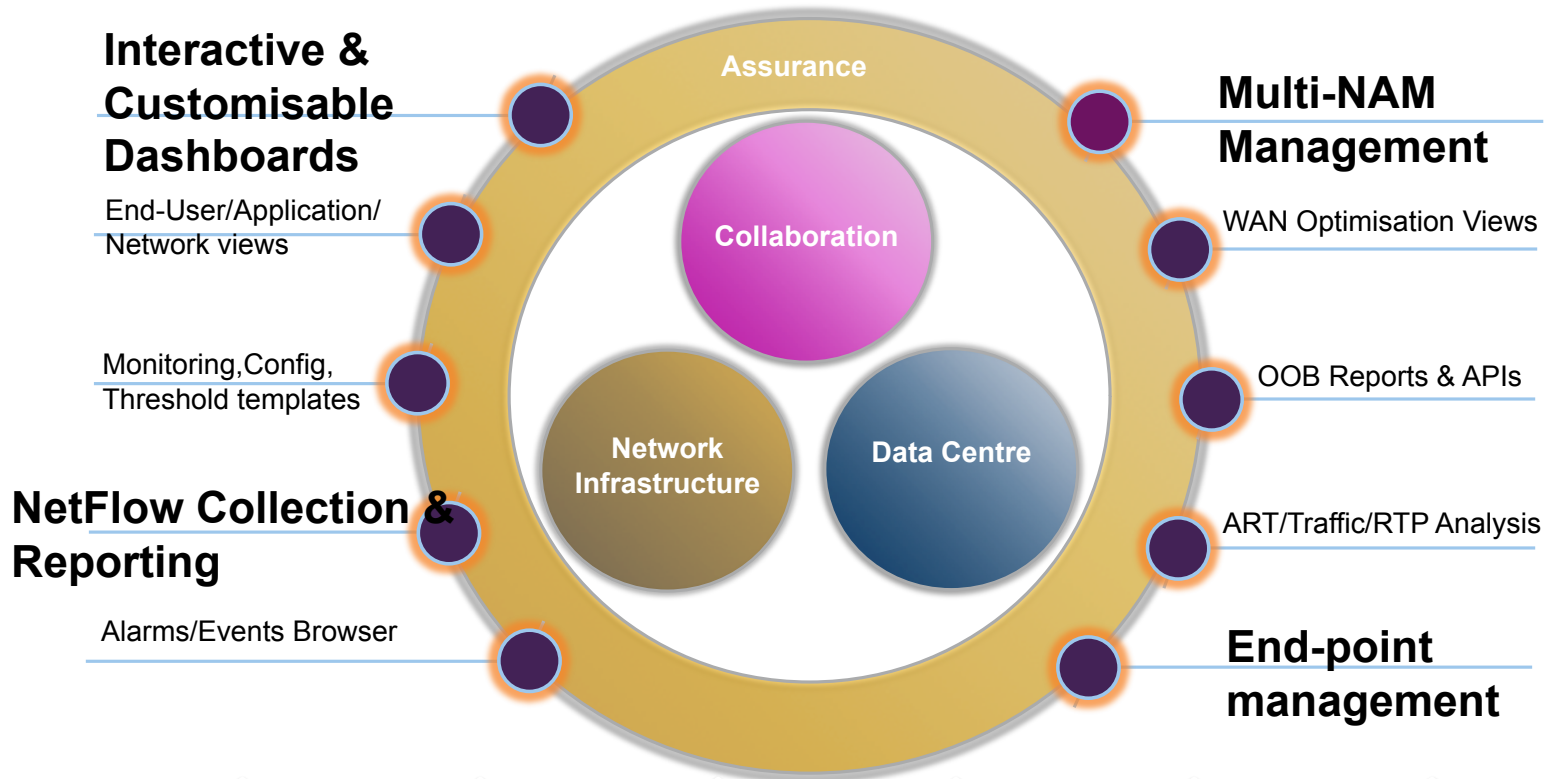
- IPSLA ping
- Verifies reachability

Node-to-node testing

- Ping and ping-path echo
- UDP echo
- UDP jitter for voice over IP
- Gatekeeper registration delay



Cisco Prime Assurance for Enterprise



PA



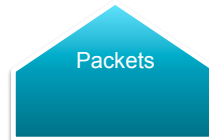
Medianet
Performance
Monitor



NetFlow & NBAR



SNMP
(IF, CBQoS)



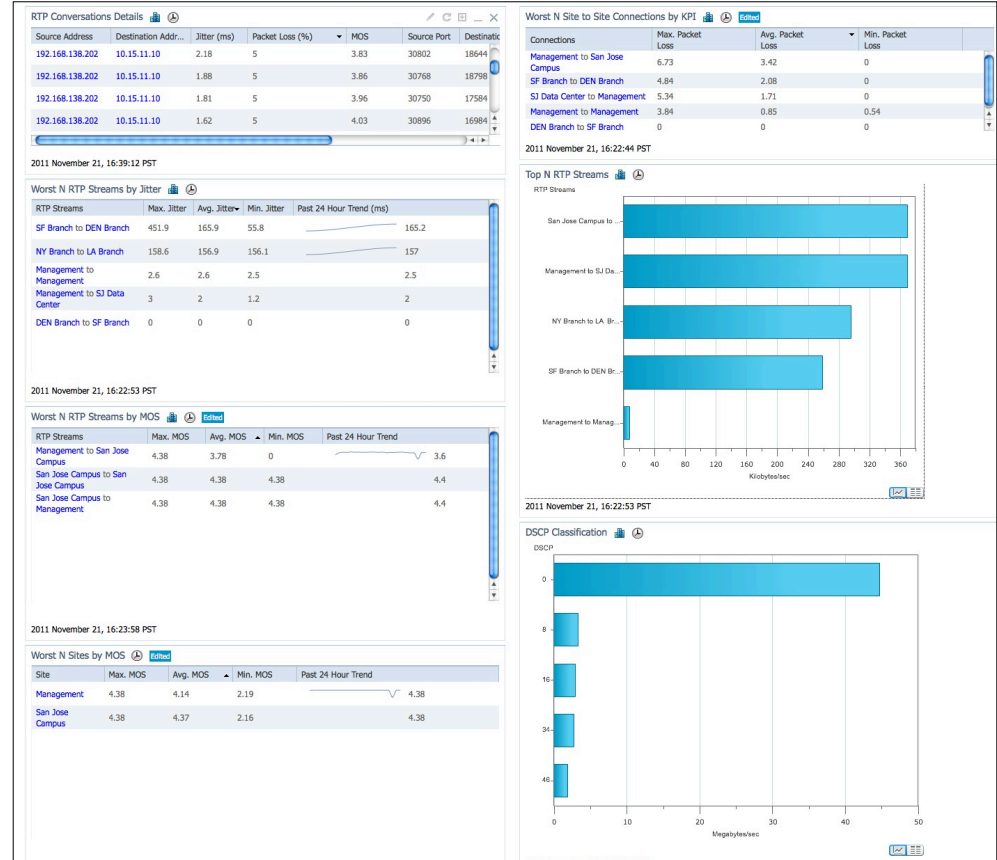
Packets



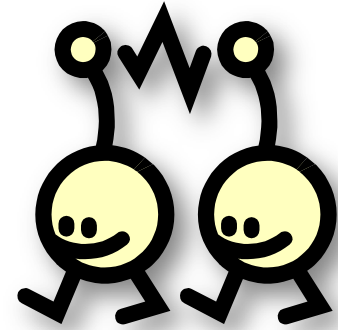
Events

Prime Assurance: Voice/Video Dashboard

- DSCP Classification
- RTP Conversations Details
- Top N RTP Streams
- Voice Call Statistics
- Worst N RTP Streams by Jitter
- Worst N RTP Streams by Packet Loss
- Worst N RTP Streams by MOS
- Worst N Sites by MOS
- Worst N Site to Site Connection KPI



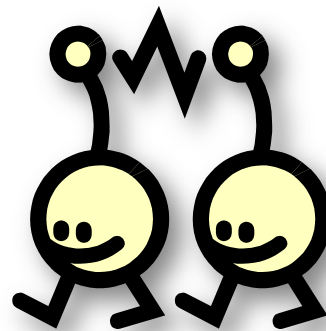
Application Awareness



Defining Application Awareness

‘Application Awareness’ is...

A collection of techniques to detect different types of endpoints, media and application types (TelePresence, video surveillance, desktop collaboration and streaming media) in order to deliver the best experience.



Why Media Awareness?

Example Policies

Example Use Cases



QoS

- Prioritise Voice & Video
- Protect Business Critical Applications



Monitoring

- Troubleshooting
- SLA



Routing

- Avoid Bandwidth upgrade by leverage the backup path
- Protect Business Critical Applications



Security

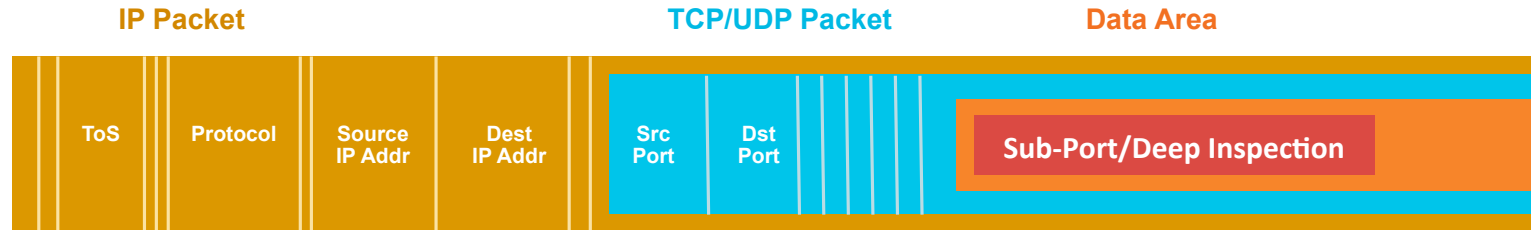
- Access Control
- Firewall traversal

Application Awareness Methods

How?	Mechanisms	Technologies
Network figures it out	Implicit – Deep Packet Inspection (control signalling protocols for the establishment of sessions, packet headers and payload)	Network Based Application Recognition (NBAR/NBAR2) Media Services Proxy (MSP)
Endpoint/Application directly tells the network what type of applications	Explicit – Endpoint/Application signals to the network	Flow Metadata
Network administrator configures the network	Static configuration	ACLs

NBAR: Full-Packet Inspection

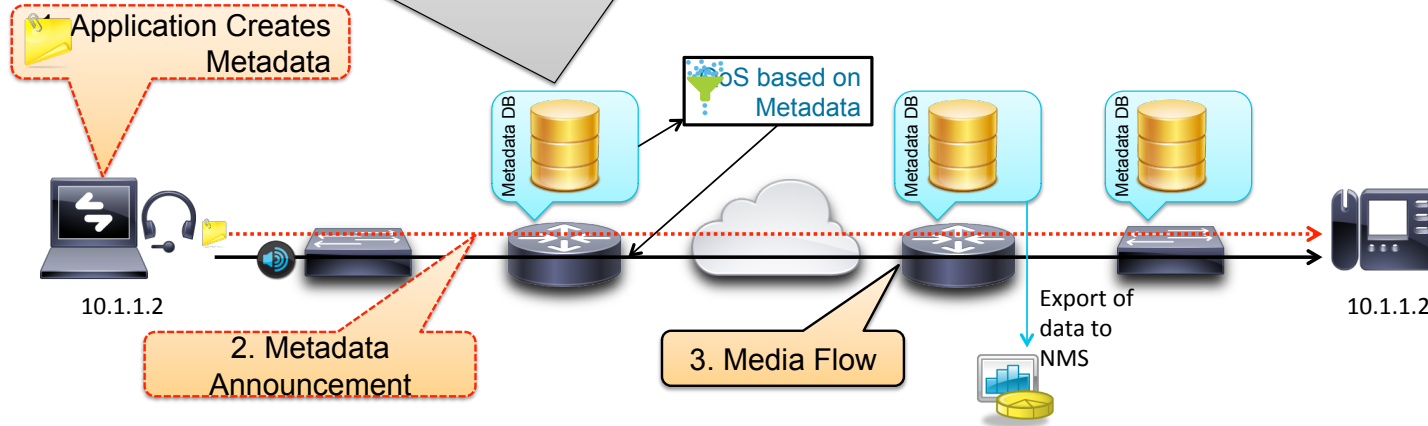
Stateful and Dynamic Inspection



- Used for intelligent policy (QoS, filtering, etc.) or reporting
- Identifies over 400 applications and protocols TCP and UDP port numbers
 - Statically assigned
 - Dynamically assigned during connection establishment
 - RTP and RTP payload type identification
 - Cisco TelePresence media and signalling supported in IOS 15.1(3)T
 - WebEx desktop-share/audio/video supported in 15.2(2)T
- Non-TCP and non-UDP IP protocols
- Data packet inspection for matching values

Introducing Medianet Flow Metadata

Flow Identifier					Metadata				
IP Src	IP Dst	Prot	L4 Src	L4 Dst	Application	Vendor	Dial From	Dial To	Caller ID
10.1.1.2	20.1.1.2	UDP	2000	4000	Video-Conference (Audio)	Cisco	83922564	85268229	Albert Albatross



Metadata Attributes

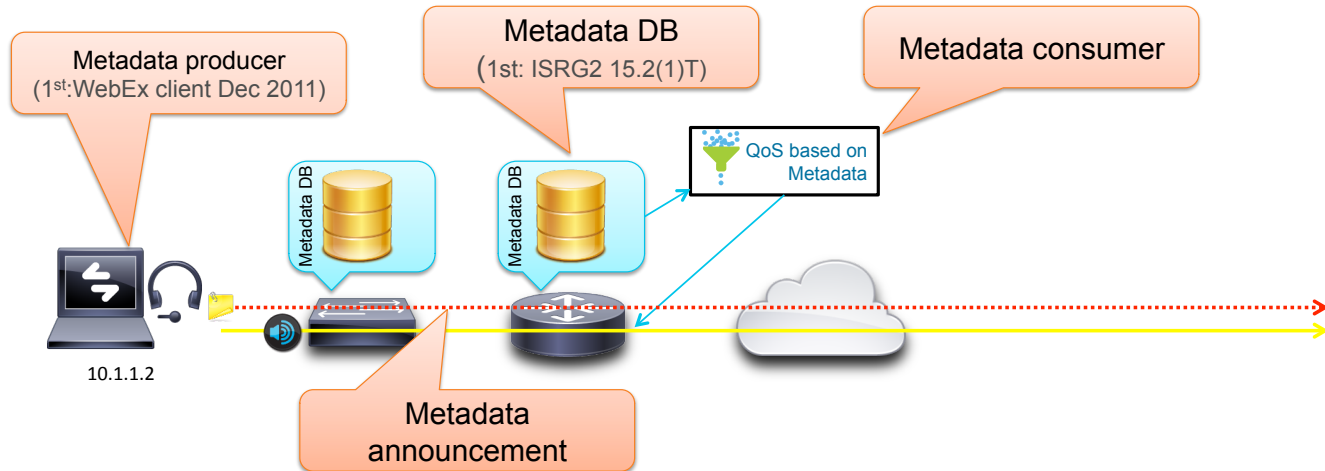
A Sample



Attributes	CTS-3000, Telepresence	Tandberg MOVI
app-ID	Telepresence-media	rtp
sub-app-ID	N/A	N/A
application model, vendor, version	CTS-3000, 1.5, Cisco	MOVI, 1.1, Cisco
end point model, version, model	N/A	Apple, MAC, xxx
GSID/MPID	xxx	yyy
media-type	Video	audio
clock frequency	90 Khz	8 Khz
codec type	H.264	G.711
flow bandwidth	15 Mbps	3 Mbps
device-class	telepresence	software-phone
Category/sub-category	voice-and-video	voice-and-video
application-group	voice-video-chat-collaboration	voice-video-chat-collaboration
Device name	SJC24-SeaBreeze Conference Room	Bob's Cool EX90
ID From/To	SeaBreeze	Bob Cool
CNAME	conf234@cisco.com	Bob.cool@cisco.com
Dial Number From/To	89944483	Bob.cool@cisco.com

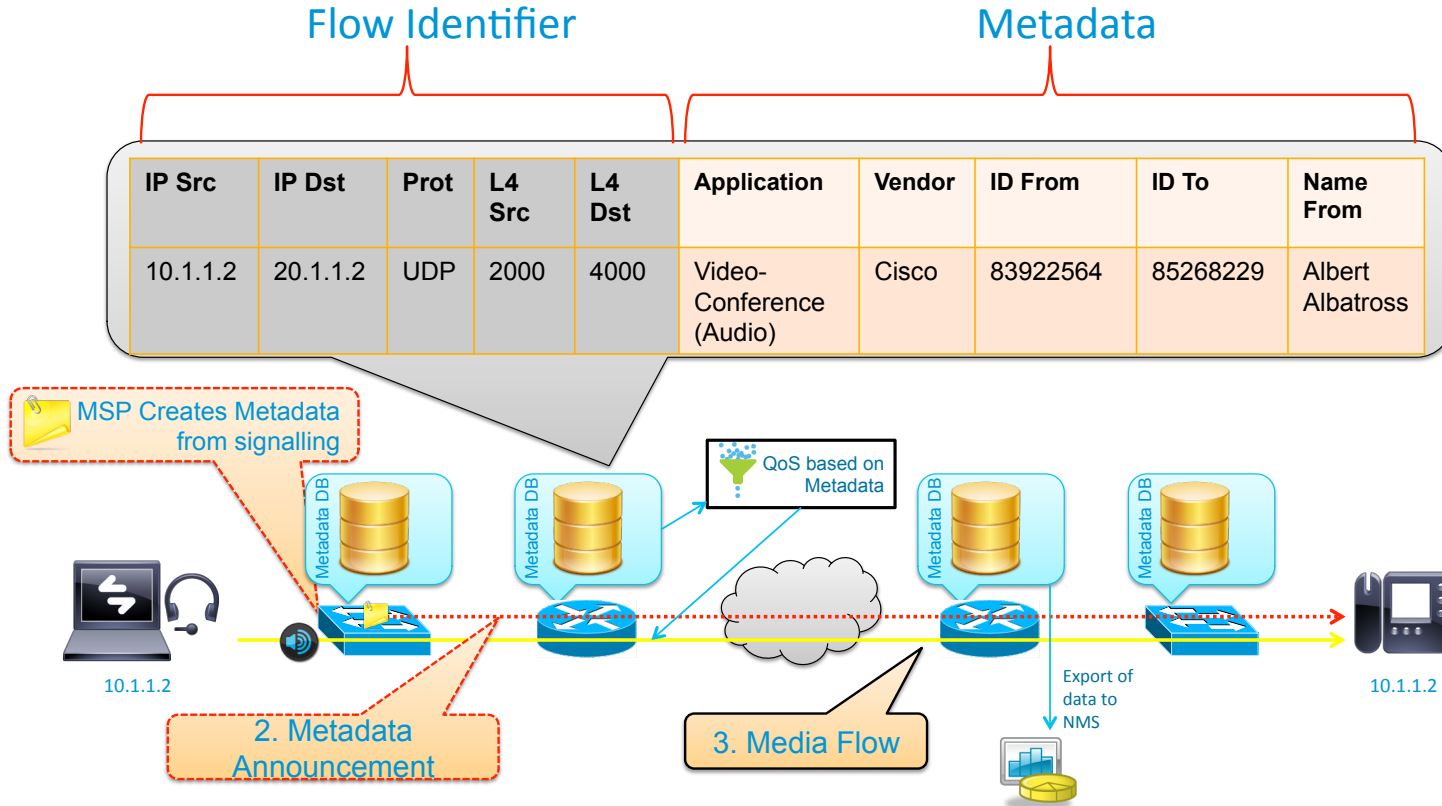
Flow Metadata Components

- **Metadata protocol:** announces flow parameters and attributes to network nodes along a path
- **Metadata flow DB:** maintains flow attribute information, and coordinates metadata producers/consumers.
 - **Producer:** creates metadata information
 - **Consumer:** utilises metadata information
- Nodes that do not support metadata will pass it silently



Medianet Metadata

Metadata Created by Media Services Proxy (MSP)




Medianet Feature Availability

- Autoconfiguration
- Media Monitoring
- Media Awareness
- Media Services Proxy

 WBS29.SP32 ■ 1H2012	 Digital Media Player 4310G/4400 ■	 4300/4500 Series HD Box Cameras ■	 Jabber for Windows ■ 1H2012 ■ 2H2012	 VXI ■ 2H2012 ■ 2H2012	 TP CTS ■ 2H2012 ■ 2H2012	 TP C & Ex Series ■ 2H2012 ■ 2H2012
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Media Services Interface

- | | | |
|--|---|--|
| <p>Auto Configuration:</p> <ul style="list-style-type: none"> • Auto smart ports • Location | <p>Media Monitoring:</p> <ul style="list-style-type: none"> • Performance monitor • Mediatrace • IPSLA VO | <p>Media Awareness:</p> <ul style="list-style-type: none"> • Media Services Proxy • Flow Metadata |
|--|---|--|


 Cisco ISR G2 2900/3900 Series ■ Q1 2012 ■ Q1 2012	 Catalyst 2960S/2960 Series ■	 Catalyst 3750/3560 Series ■	 Catalyst 4500/Catalyst 6500/6500-E 4900 Series ■ 1H2012 ■ 1H2012 ■ 1H2012	 Catalyst 6500/6500-E Series ■ 2H2012 ■ 2H2012	 Cisco ASR 1000 Series ■ 2H2012 ■ 2H2012
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Medianet Readiness Assessment Service

Network Management



Cisco Prime: Collaboration Manager 1.1
 LMS 4.1
 Cisco Prime Assurance Manager 1.1





Medianet Video Monitoring

Perf-mon & Mediatrace Platform Proliferation Roadmap



Medianet Video Monitoring

IPLA Video Operation



Times are in calendar year (CY)

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1st Release

2nd Release



Medianet Summary

- Medianet is a solution that includes components within the end systems, network and management
- Medianet features assist in service validation, troubleshooting, and accelerate video application deployment
- Planning, Pre-Deployment
 - IPSLA VO, Performance-Monitor
- Troubleshooting
 - Performance Monitor, Mediatrace, CPCM, IPSLA VO
- Scalable Control and Policy
 - Media Service Proxy, Auto Smart Ports, Metadata



Medianet @ Cisco Live Melbourne

World Of Solutions

- 'Video Optimised Network' booth (Australian for Medianet)
 - Cisco Prime Collaboration Manager
 - Cisco Prime Assurance
 - Metadata and Media Service Proxy
 - Mediatrace
 - Performance Monitor
- LABRST-2050 Performance Monitor and Mediatrace Lab WISP labs in WoS
- ManageEngine: NetFlow Analyser 9600
- CA Technologies: Unified Communicators Monitor (UCM)

Connect with Your Peers and Cisco

- Discuss business, IT, architecture, adoption and product topics with peers
 - Unified communications, collaboration applications, customer care, telepresence
- Interact with Cisco Product Managers, Technical Marketing Engineers and Services Consultants
- Learn about new product announcements
- Join the Collaboration User Group
 - Influence product direction
 - Access to Beta trials
 - Exclusive programs, advisory groups and briefings
 - Membership is free!

Cisco Collaboration Community and User Group

Welcome, Guest | Help | Login

Cisco Communities | Directory | Search Cisco Communities

Cisco Communities > Technology > Collaboration

Collaboration

ANNOUNCEMENT: Watch New Announcements Webcasts and WVI | Show Details

Sign up for Email Notifications

Get email when a post is made in the community. Simply respond to the email to post without logging in. | Subscribe (Login Required)

Navigate to a Topic and Post

- Cisco Collaboration Virtual Launch Experience
- Enterprise Social Software
- Business Conversations and Sharing
- Product Conversations and Sharing
 - TelePresence
 - Unified Communications
 - WebEx Meeting Applications
 - WebEx Connect
 - Other
- Cisco User Groups
- Cisco News and Events
- Cisco Live Collaboration Virtual Experience
- Community Info and Feedback

Popular Tags

discussions_unified_communications_cius collaboration collaboration_user_group contact_center_group unified_communications_video virtual_experience virtual_launch_experience_virtualization

Cisco Cius Announcement and Customer Stories

Learn about the Cisco AppHQ announcement and hear from customers how they are using the Cisco Cius in their businesses. | Learn and ask questions

Product Announcements: Select one

Navigate to Topic and Post: Select One

About the Collaboration Community

Collaboration User Group Dashboard [Not a user group member? Join now for free]

User Group Members: Log into the community now to post and respond to non-confidential conversations and resources in the public Collaboration Community and access private spaces to participate in exclusive user group programs and conversations sharing confidential information. This page will also be enhanced to display posts from private spaces. Not a User Group Member? Join our user group now to influence product direction, access early product releases and get exclusive programs and VIP perks at Cisco Live. It's free! Membership is open to Cisco Collaboration customers and partners only.

Join User Group How

Step1: Log into Community

Step2: Join User Group

Click on each image to learn about user group benefits:

- Beta and Early Field Trials
- Technical Briefings
- Virtual Office Hours
- Feature Request Tool
- Special Interest Groups
- VIP Perks at Cisco Live
- Contact Center User Group

Visit the Collaboration Community and join the Collaboration User Group at:

www.cisco.com/go/joinconversation

Additional Medianet Resources

- Medianet on Cisco.com
<http://www.cisco.com/go/medianet>
 - Autoconfiguration
<http://www.cisco.com/go/autoconfiguration>
 - Media Monitoring
<http://www.cisco.com/go/mediamonitoring>
 - MSI
http://www.cisco.com/en/US/solutions/ns340/ns857/ns156/ns1094/media_services_interface.html
- Medianet Knowledge Base
<http://www.cisco.com/web/solutions/medianet/knowledgebase/index.html>
- Medianet Support FORUM
<https://supportforums.cisco.com/community/etc/medianet>
- Medianet Blogs
<http://blogs.cisco.com/tag/medianet/>
- Cisco Developer Network for Medianet
<http://developer.cisco.com/web/mnets>
- Cisco Remote Management Services (RMS)
www.cisco.com/go/rms
- Cisco Prime Collaboration Manager
<http://www.cisco.com/go/cpcm>
- Cisco TelePresence Management Suite
<http://www.cisco.com/en/US/products/ps11338/>

Q & A



Complete Your Online Session Evaluation

Give us your feedback and receive a Cisco Live 2013 Polo Shirt!

Complete your Overall Event Survey and 5 Session Evaluations.

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- By visiting the Cisco Live Mobile Site www.ciscoliveaustralia.com/mobile
- Visit any Cisco Live Internet Station located throughout the venue

Polo Shirts can be collected in the World of Solutions on Friday 8 March 12:00pm-2:00pm



Cisco *live!* 365

Don't forget to activate your Cisco Live 365 account for access to all session material, communities, and on-demand and live activities throughout the year. Log into your Cisco Live portal and click the "Enter Cisco Live 365" button.

www.ciscoliveaustralia.com/portal/login.www

Cisco *live!*



Reference Slides



Media Awareness Technologies Summary

How?	Technologies	Mechanisms	Application Context	Considerations
Network figures it out	Network Based Application Recognition NBAR/ NBAR2	Implicit via Deep Packet Inspection (Inspect the payload)	AppID, Traffic Categories (e.g. Email, file-sharing, etc.)	<ul style="list-style-type: none"> ➤ DPI result is not reusable across nodes ➤ DPI may not be available on node ➤ Data may not be visible for DPI due to encryption
Network figures it out	Media Services Proxy	Implicit via light weight DPI by snooping signalling protocols (e.g. SIP, H.323, SDP, etc.) Note: MSP & NBAR2 will converge	Limited to what is available from the signalling protocols (see example later)	<ul style="list-style-type: none"> ➤ Signals need to be visible ➤ MSP shares flow attributes amongst network nodes
Endpoint/ Application announces to the network	Flow Metadata	Explicit via Endpoint/ Application signalling	Any arbitrary attributes (e.g. Dept #, location, ad-hoc versus scheduled, importance of the meeting, etc.)	<ul style="list-style-type: none"> ➤ Metadata can address the encryption challenges ➤ Metadata can carry flow attributes from node to node ➤ Metadata can be used to share flow attributes amongst network nodes

TelePresence Remote Managed Services Summary

Services		Assisted Management	Enhanced Management	Comprehensive Management *
Monitoring & Management	24x7 Monitoring and Ticketing	✓	✓	
	Incident, Change & Problem (Reactive)	✓	✓	
	Proactive Problem	optional	✓	
Software Upgrades	Execution of Endpoint and Infrastructure Upgrades	optional	✓	
Customer Service	24x 7 Help Desk	✓	✓	
	Customer Relationship Manager	optional	✓	
	Advanced CRM	optional	optional	✓
Ancillary Services	TelePresence Room Service	optional	✓	
	VIP Event Monitoring	optional	optional	✓
	Dedicated Technical Engineer	optional	optional	
Training and Reporting	Service Training – How to use service	✓	✓	
	Enhanced Reporting	optional	✓	
	Standard Reporting	✓	✓	
Conference Scheduling	Scheduling requests via phone/e-mail	optional	optional	✓

*Customer must purchase either Assisted Management or Enhanced Management service level SKUs for each TelePresence endpoint. This is a pre-requisite to ordering Comprehensive Management service level which is added at the customer level. © 2013 Cisco and/or its affiliates. All rights reserved. Cisco Public



TelePresence RMS Support Model

Tier 1 Service Desk

- Service Desk support around-the-clock
- Assists with general room information
- How do I...?
- Multipoint call initiation
- Notification on impacting incidents
- Verification of scheduling



- Around-the-clock incident management support
- Monitor proactive alarms
- Prioritise incidents per severity and urgency of impact
- Resolve the incident or engage TAC or BU
- Provide technical leadership, collaboration on incident with vendors on behalf of customer

Tier 2 Incident Management

Tier 3 Problem Management

- Analyse incident trends to identify patterns or systemic conditions (**Proactive problem management – Enhanced**)
- Create incidents and refer to tier 2
- Provide root cause analysis
- Perform lab re-creates



Cisco Remote Management Services (RMS)

Increases

- Ability to quickly adopt and deploy advanced technologies

Enables

- Customers to avoid cumulative costs of hiring & training mgmt team
- IT to maintain focus on enabling core bus strategies

Delivers

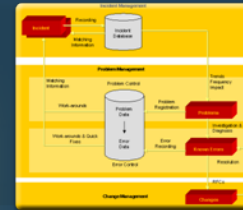
- High availability and performance for full benefits of AT/ET

Guarantees

- Customer retains control of their network, gains network visibility

- Remote Monitoring
- 24x7 NOC / Service Desk
- Incident Management
- Problem Management
- Change Management
- Configuration Management
- Release Management
- Security Administration

Cisco Remote Management Services



Why Monitor Video Services?

- Video service delivery validation & troubleshooting
- End users associate poor video quality with poor network service

Validation via monitoring will lead to earlier identification of issues and greater confidence in network

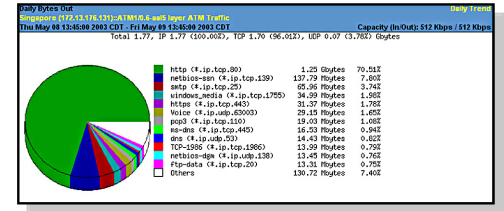
Video is sensitive: early detection of network issues that may affect all traffic

- Contractual SLAs need to be validated
- Violations may incur punitive costs

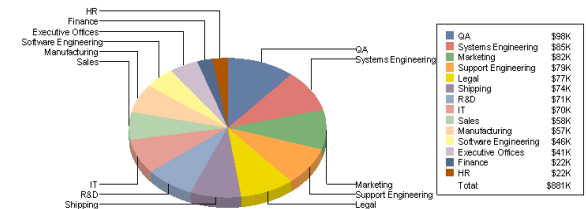


Cisco IOS NetFlow—What Is It?

- Developed and patented at Cisco Systems in 1996
- NetFlow is the de facto standard for acquiring IP operational data
- Standardised in IETF via IPFIX
- Provides network and security monitoring, network planning, traffic analysis, and IP accounting
- Packet capture is like a **wire tap**
- NetFlow is like a **phone bill**



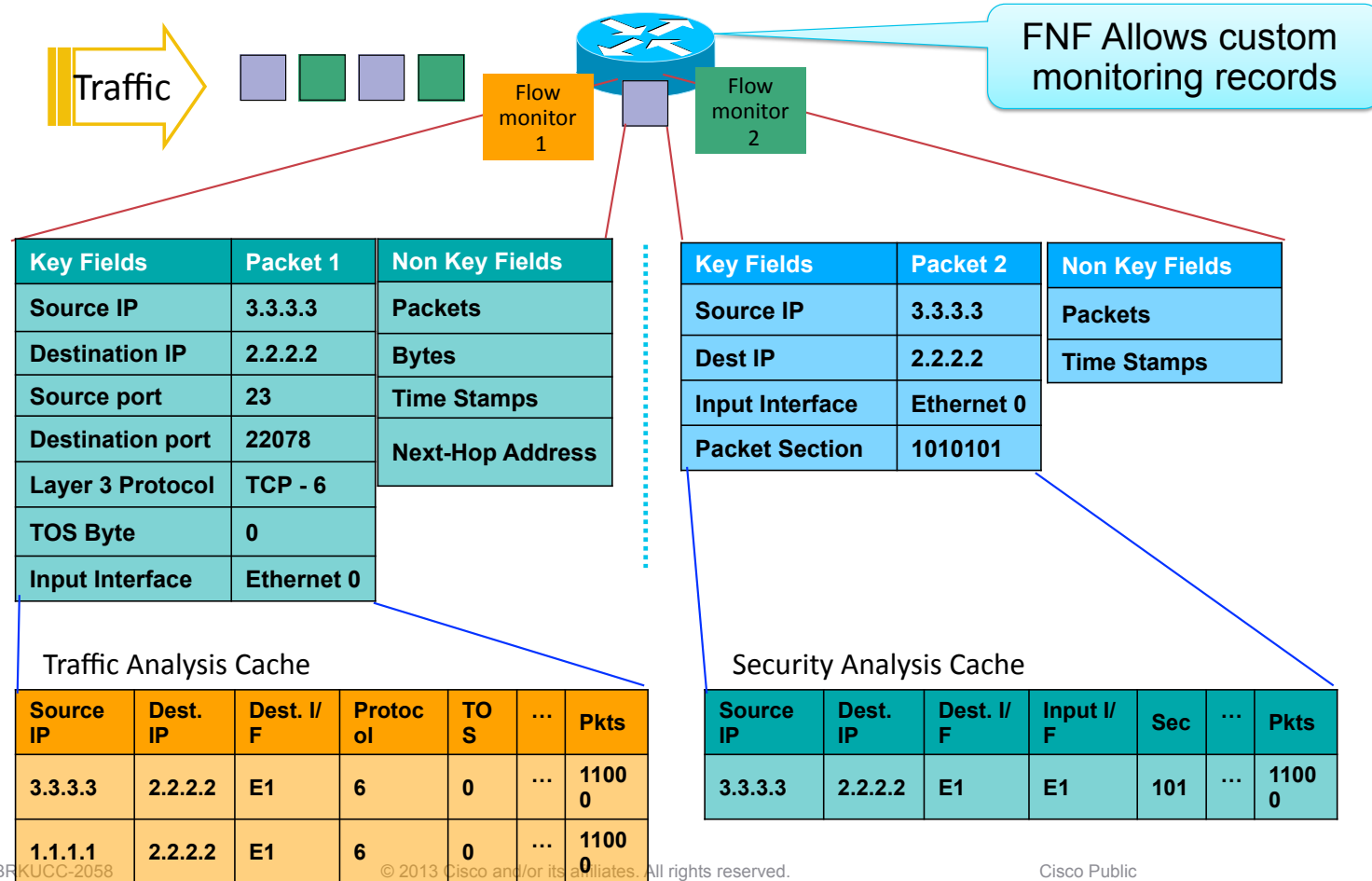
Consumption by Department from 1/1/2004 to 3/31/2004



Network World Article—NetFlow Adoption on the Rise
<http://www.networkworld.com/newsletters/nsm/2005/0314nsm1.html>

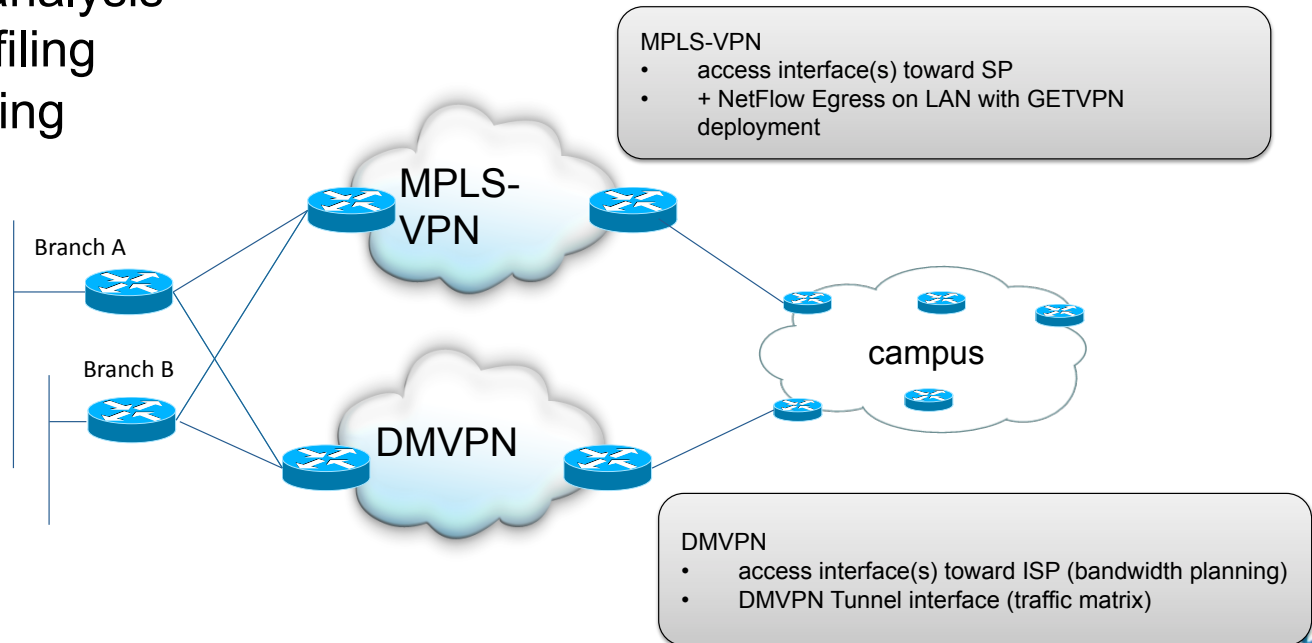
Flexible NetFlow (FNF)

Multiple Monitors with Unique Key Fields



Where to Apply NetFlow Monitoring

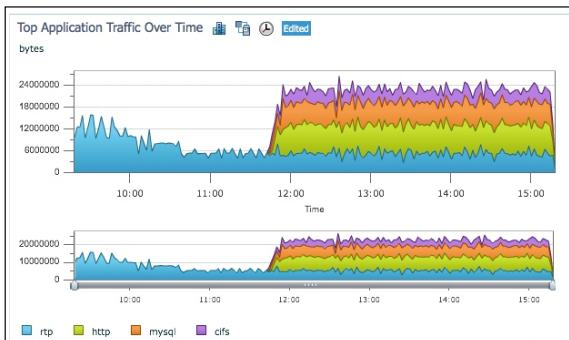
- NetFlow allows
 - Application discovery
 - Traffic pattern analysis
 - Application profiling
 - Capacity Planning



Flexible NetFlow & NBAR Integration

IOS 15.0

```
router(config)# flow record app_record
router(config-flow-record)# match ipv4 source address
router(config-flow-record)# match ipv4 destination address
router(config-flow-record)# match application name
```



Host1	Host2 Site	Host2	Application
10.1.12.19	-	10.15.12.12	apple-ichat
10.1.12.18	-	10.15.12.12	telnet
10.0.250.12	-	10.1.12.13	ftp
10.15.12.19	-	10.1.12.18	telnet
10.1.12.15	-	10.0.250.11	sap

Reporting Example (Cisco Prime Assurance)

nbar = Static Applications

```
show flow mon <app_mon> cache
```

IPV4 SRC ADDR	IPV4 DST ADDR	APP NAME
10.0.1.1	10.0.1.2	nbar rtcp
10.0.1.1	10.0.1.2	nbar ssh
10.0.1.1	10.0.1.2	nbar telnet
10.0.1.1	10.0.1.2	NBAR lunar_light

NBAR = Custom Applications

NBAR application name inclusion in Flexible NetFlow record creates association of application name with flow reporting.

CBQoS MIB

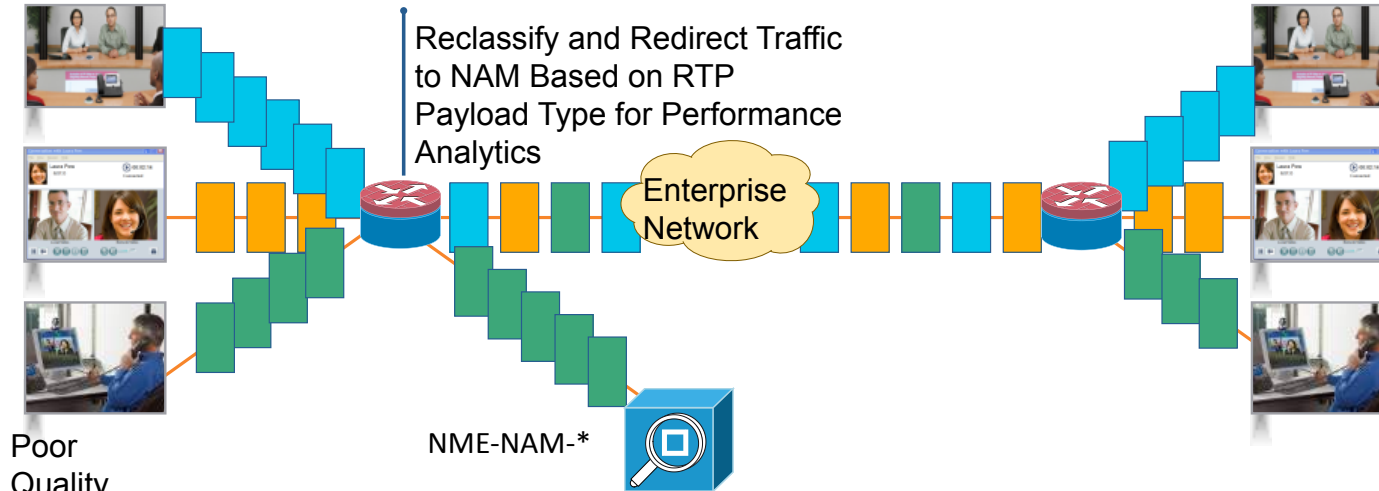
- IOS QoS collects vital information regarding health of QoS classes
- Pre and Post bytes, drops, etc
- Same class names from different routers can be compared
- 'snmp mib persist CBQoS'



Class	Pre Policy	Dropped	% Dropped	Post Policy	% Post Policy
VOIP	6.58 KB	153.00 Bytes	2.32%	6.42 KB	49.68%
MissionCritical	5.16 KB	0.00	0.00%	5.16 KB	39.93%
TransactionalData	1.34 KB	0.00	0.00%	1.34 KB	10.39%
class-default	0.00	0.00	0.00%	0.00	0.00%
Total	13.09 KB	153.00 Bytes		12.93 KB	

Advanced Video Performance Analytics

With Network Analysis Module (NAM)



Poor Quality Video

- Troubleshoot application performance problems
- Analyse application behaviour and trends for capacity planning
- Perform pre- and post-deployment monitoring of app optimisation and acceleration services
- Identify application consolidation opportunities
- Define and assure services levels

Video Stream Details	
Source Address:	172.20.122.200
Source Port:	4428
Destination Address:	128.11.10.2
Destination Port:	1234
Payload Type:	MP2T
SSRC:	18352
RTP Packet Count:	271
RTP Packet Loss:	8
RTP Packet Loss Rate 10 ⁶ :	28673
Start Time:	Thu 27 Sep 2007, 23:48:12 UTC
Last Timestamp:	2548216201
Last Sequence:	56448

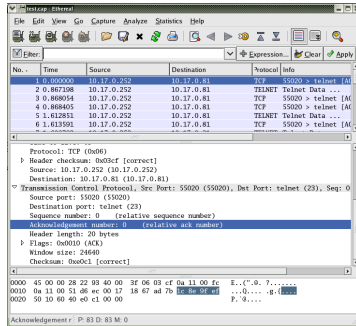
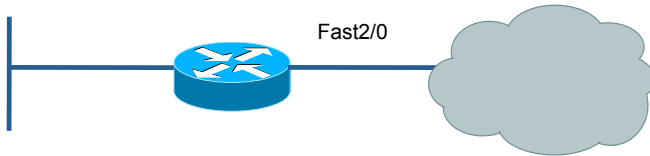
IP Traffic Export, Capture & Analyse



- Capture packets locally to buffer on router
- Store to flash, USB, FTP, TFTP for analysis in protocol analyser
 - IOS XE Cat 4k Sup 7E & Sup 7L-E (XE 3.3.0 SG) include built in Wireshark decode capability
- Capture does not add traffic to network

```
LY-2851-8(config)#ip traffic-export profile test mode capture
LY-2851-8(config)#int fast 2/0
LY-2851-8(config-if)#ip traffic-export apply test

LY-2851-8#traffic-export interface fast2/0 start
LY-2851-8#traffic-export interface fast2/0 stop
LY-2851-8#traffic-export interface fast2/0 copy ftp://10.17.0.252/images/test.cap
```



Quick Mediatrace

- Available via:
 - Cisco IOS Exec CLI
 - Periodic configuration via IOS configuration
 - Launch from endpoints
- Modes:
 - **Hop Poll:** performs only path discovery
 - **System Poll:** in addition to performing node and interface discovery, statistics from the interfaces are collected
 - **Perf-Mon Poll:** collects flow specific statistics. If additional information, such as the IP protocol and Layer 4 ports, is specified, the query will be as detailed as possible

Learn More

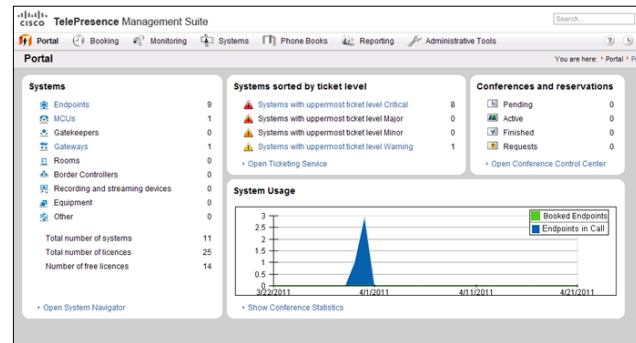
- Quick Start Guide - http://www.cisco.com/en/US/solutions/collateral/ns340/ns856/ns156/ns1094/whitepaper_c11-653899.pdf
- Deployment Guide - http://www.cisco.com/web/solutions/medianet/docs/guide_c07-684466_v2.pdf
- Configuration Guide - http://www.cisco.com/en/US/docs/ios/media_monitoring/configuration/guide/mm_mediatrace.html

Cisco TelePresence Management Suite

Simple, Comprehensive TelePresence Solution Management

TMS simplifies TelePresence solution management and maximises ROI:

- Plan, Create and Schedule Conferences from a Centralised Control Centre – simple, effective conference management
- Determine where to invest, using detailed management reporting information. Customise reports, charts and dashboards to support informed decision making
- Manage and integrate Directory information. Ensure that all contact information is easily accessible, accurate and consistent.

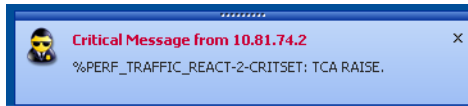


Thresholds & Alerts

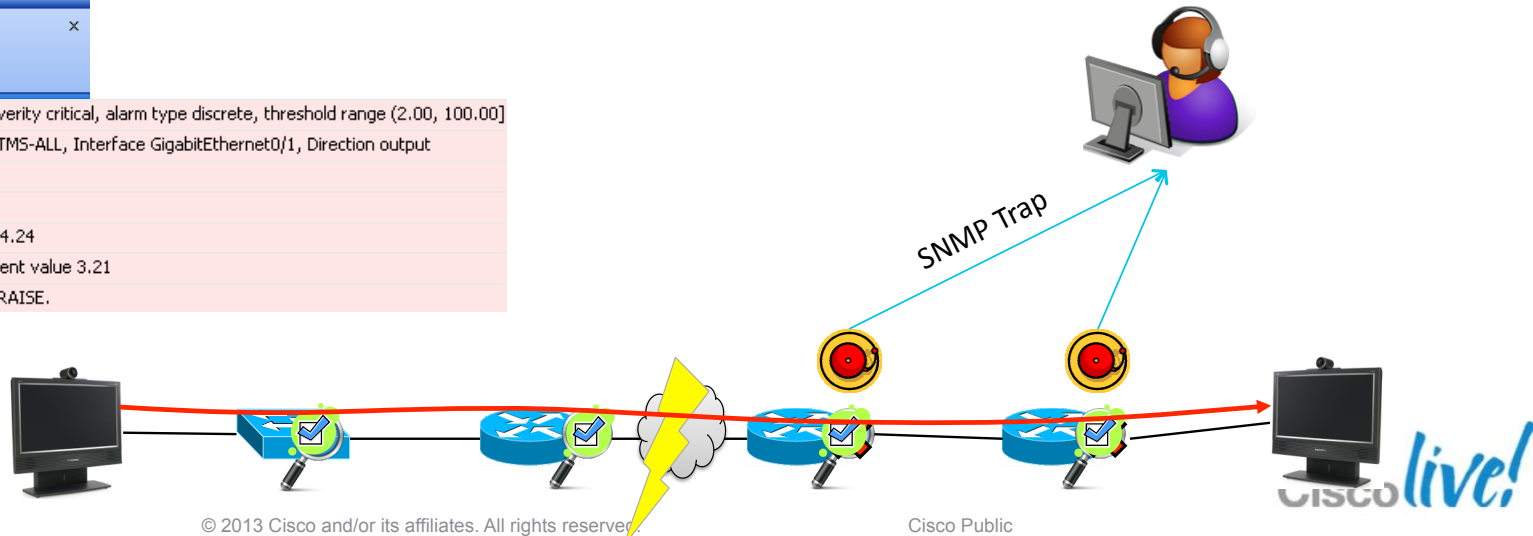
Performance Monitor

- Metrics can be **tested against thresholds** to **trigger actions**
 - Multi-level Alarm Raise/Clear, SNMP Traps, Syslog, embedded scripts, automatic mediatrace, path adaptation (PfR)

SyslogWatcher



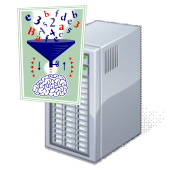
React info: id 1, criteria rtp-lost-fraction, severity critical, alarm type discrete, threshold range (2.00, 100.00]
Policy info: Policy-map TP-CTMS, Class TP-CTMS-ALL, Interface GigabitEthernet0/1, Direction output
<{0x09}> ssrc 1510891189
<{0x09}> src port 16390, dst port 20828
Flow info: src ip 10.81.74.18, dst ip 10.80.14.24
Detailed info: Threshold value crossed - current value 3.21
%PERF_TRAFFIC_REACT-2-CRITSET: TCA RAISE.





Reports - NetFlow & MIB

- **NetFlow** based metrics **export** from network
 - Can be based on **flows**, or **aggregations of flows**, etc.
 - Variety of uses: **capacity planning**, **troubleshooting**, **baselining**, etc.
- Historical interval (going back default 5 min) reports available on box via WSMA, MIB, mediatrace, and CLI
- MIB common with SPVIDMON (c7600, ASR9k)



NetFlow
Analyser

