Borderless Networks – Medianet

Enabling high-quality business video

Søren Dulong Andreasen

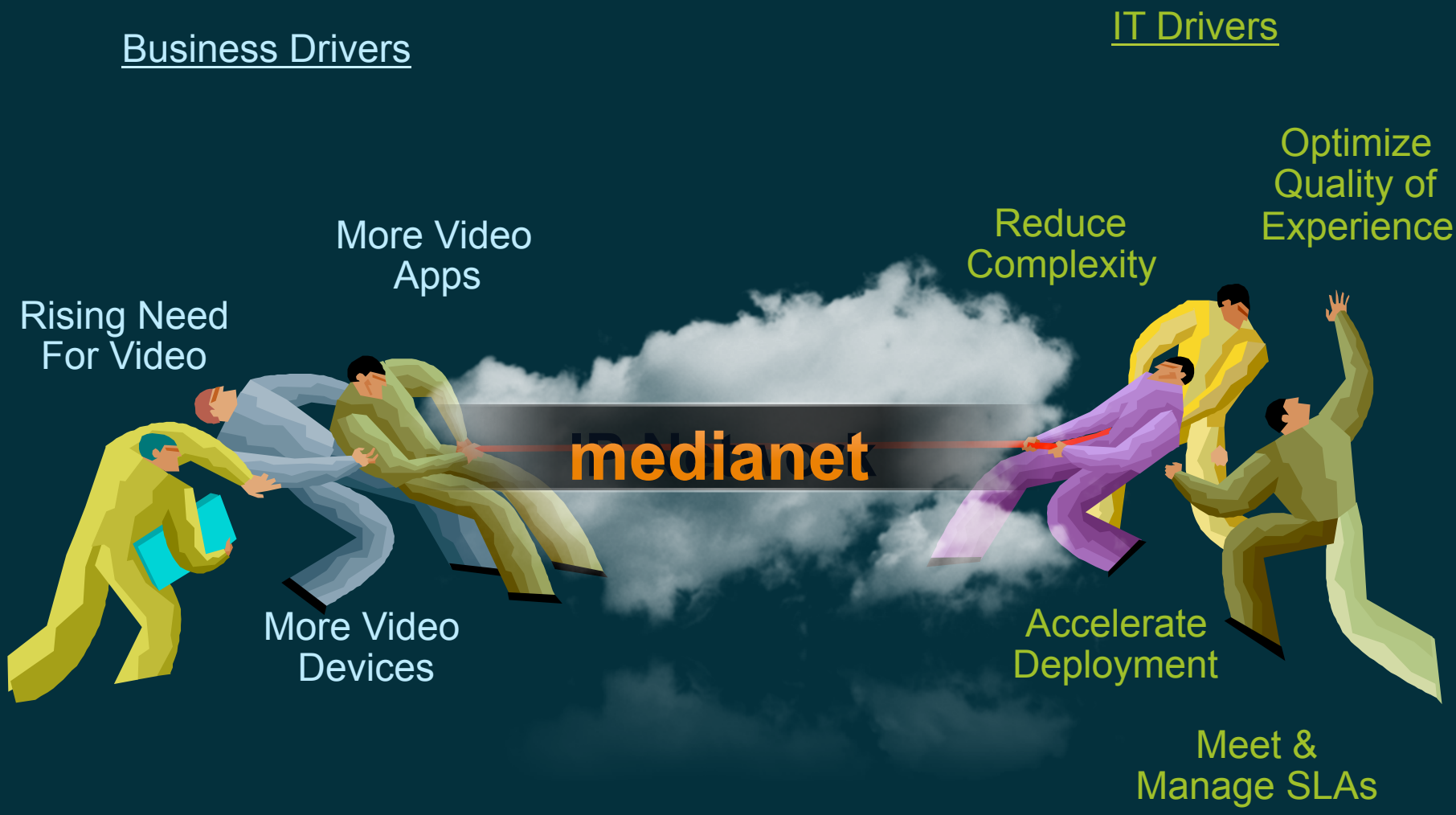
Technical Solution Architect

CCIE #3252

Agenda

- Cisco Medianet (A Dream Come True)
- MSI, Auto-configuration, Video Monitoring and Troubleshooting solutions
- Medianet demo (CLI rules!)
- Cisco Prime Collaboration Manager Demo (But GUI rocks)

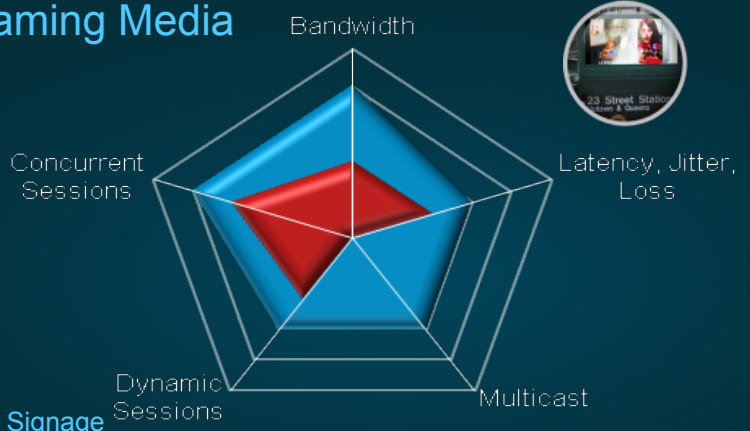
Why medianet? Why Now?



Business Video

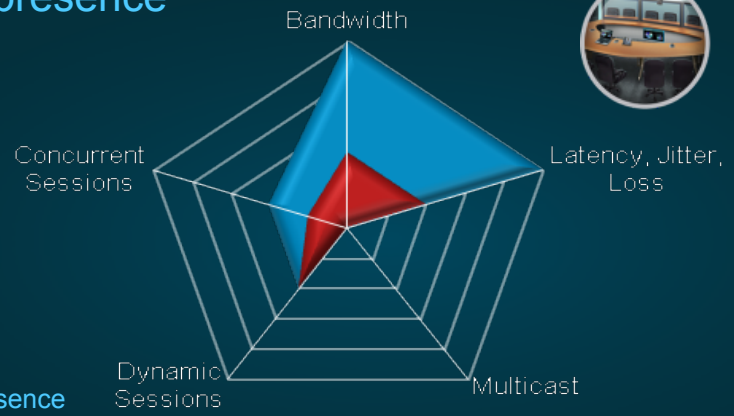
Increasing demands on the network

Streaming Media



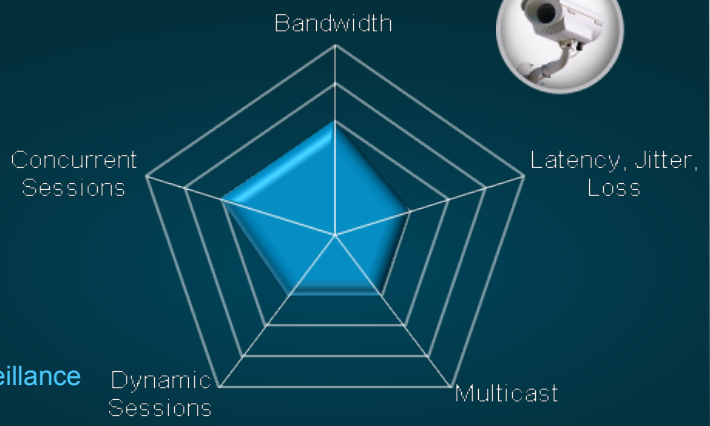
- Digital Signage
- Video on Demand

Telepresence



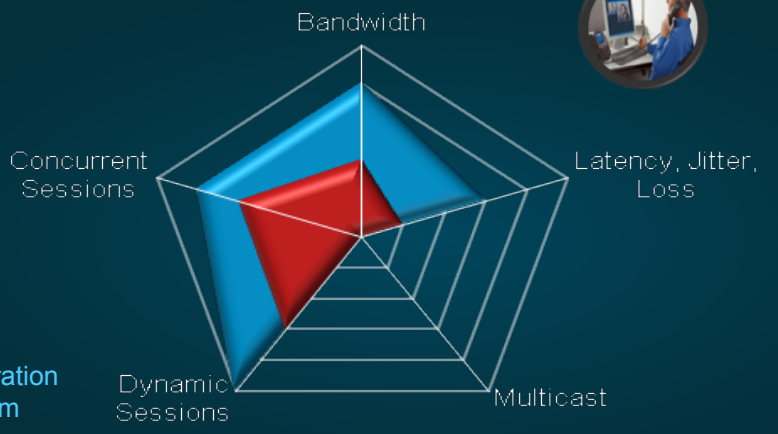
- Telepresence
- Conferencing

Video Surveillance



- Video Surveillance

Desktop Collaboration



- Collaboration
- Web Cam

Challenges Deploying Video

Endpoint Deployment

- Need for high-skilled personnel to deploy endpoints
- On-going support of endpoints is a challenge

Quality of Experience

- High expenditures with troubleshooting
- Don’t know where the problem is most of the time
- Cannot replicate problems

Lack of Visibility

- Inability to assess impact of video, voice and data applications on the network
- High-bandwidth upgrade costs
- Inability to verify service level agreements

Medianet Architecture

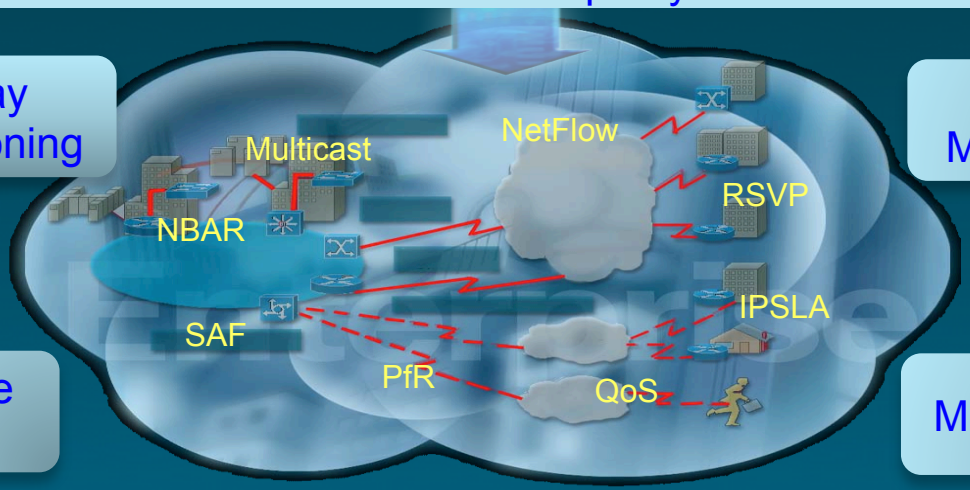
Video & Collaboration

Deliver the network optimized for video anytime, anywhere, any device

Media Services Interface APIs
Media Services proxy

Plug & Play
Auto Provisioning

Media
Monitoring



Resource
Control

Mediatrace

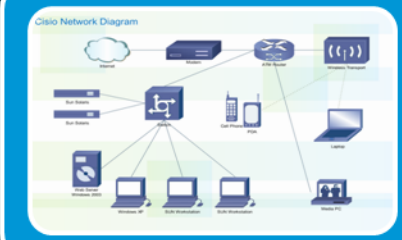
Media
Simulation

Media
Optimization

Seamless security

Management

Demystifying Medianet



Medianet is

- An Architecture/Blueprint for successful deployment of multiple media and business critical applications

Medianet is NOT

- A Product, a SKU, a feature within a network device
- A Marketecture to describe just QoS/CAC

or a bunch of video endpoints

Medianet Solutions include

- Automated, Plug and Play Deployment
- Media performance monitoring, troubleshooting and capacity planning
- Media flow awareness for Bandwidth Management

Medianet Solutions require

- Compliant products and features in both Smart Endpoints/Applications and Smart Network infrastructure
- DO NOT require an entirely end to end Cisco network with medianet enabled on every hop

Media Service Interface

Media Service Interface Endpoint Support

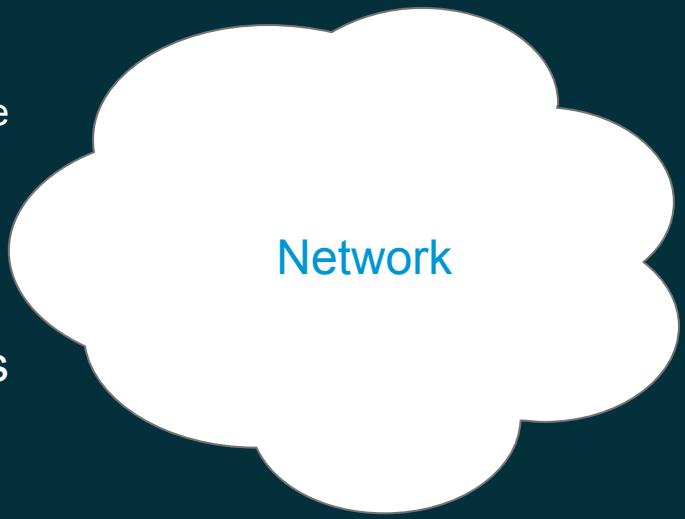
Supported Devices

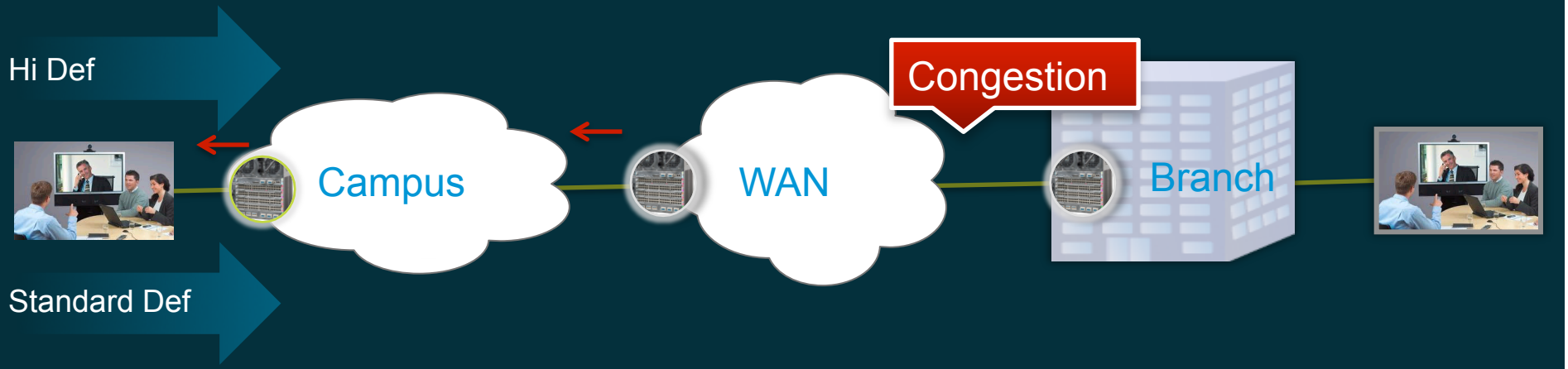
2HCY11	1HCY12
WebEx	CTS
	Tandberg
	VXI
	CIUS

Pass Info
Eg. Application, Device

Get Info
Eg. App perf, Location

Request Services
Eg. BW, Qos settings





Auto Provisioning

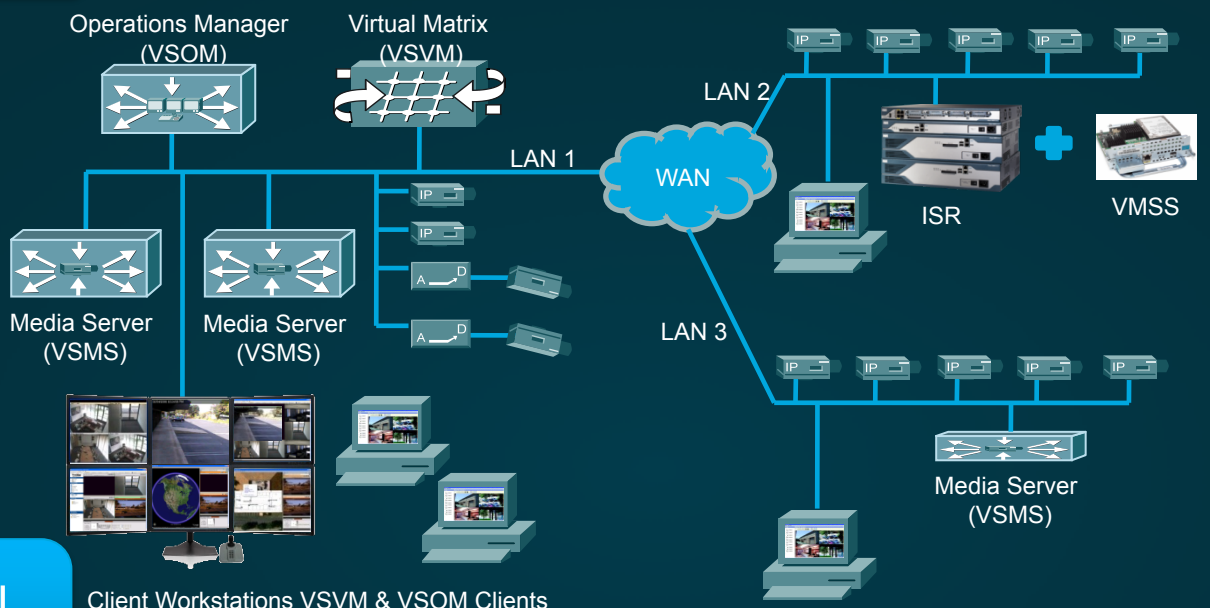
Medianet – Auto-configuration

Addressing Challenges of Mass Deployment

Preparation

Planning

Access switch configuration



Video Skills?

Operational Cost

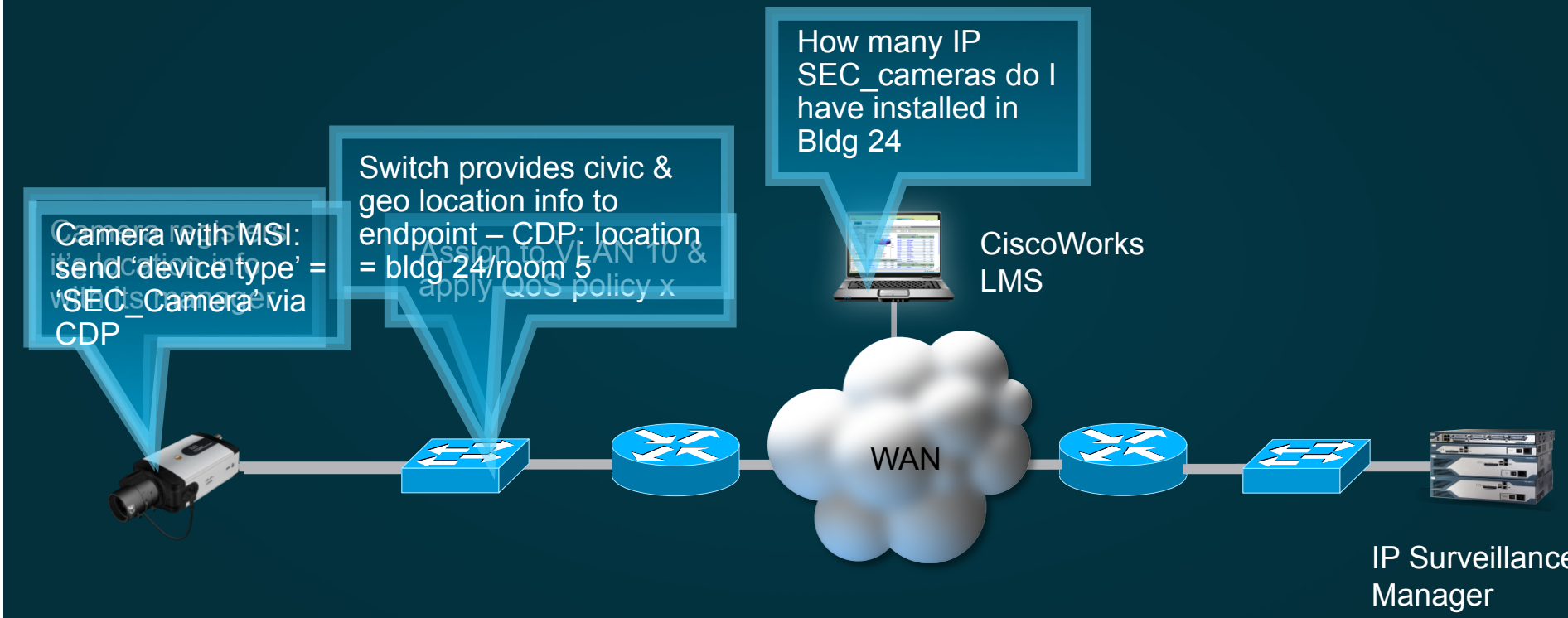
Right Port? Right Config?

IT Skills?

Medianet Auto-Configuration help in reducing installation time and cost

Medianet Auto-configuration

- Automate network configuration – Auto Smartports
- Location awareness – Applications automatically learn from the network



Monitoring and Troubleshooting

A Story
Using perf-mon, mediatrace and IPSLA VO together

Angry user reports issue days after encountering problem
"My video was terrible, the network is terrible!"

"An issue was seen by performance-monitor at the time"
"fault was identified and fixed by our engineers"

"I've got another video meeting today. Can I trust you?"

"Let me verify the network state using IPSLA VO"

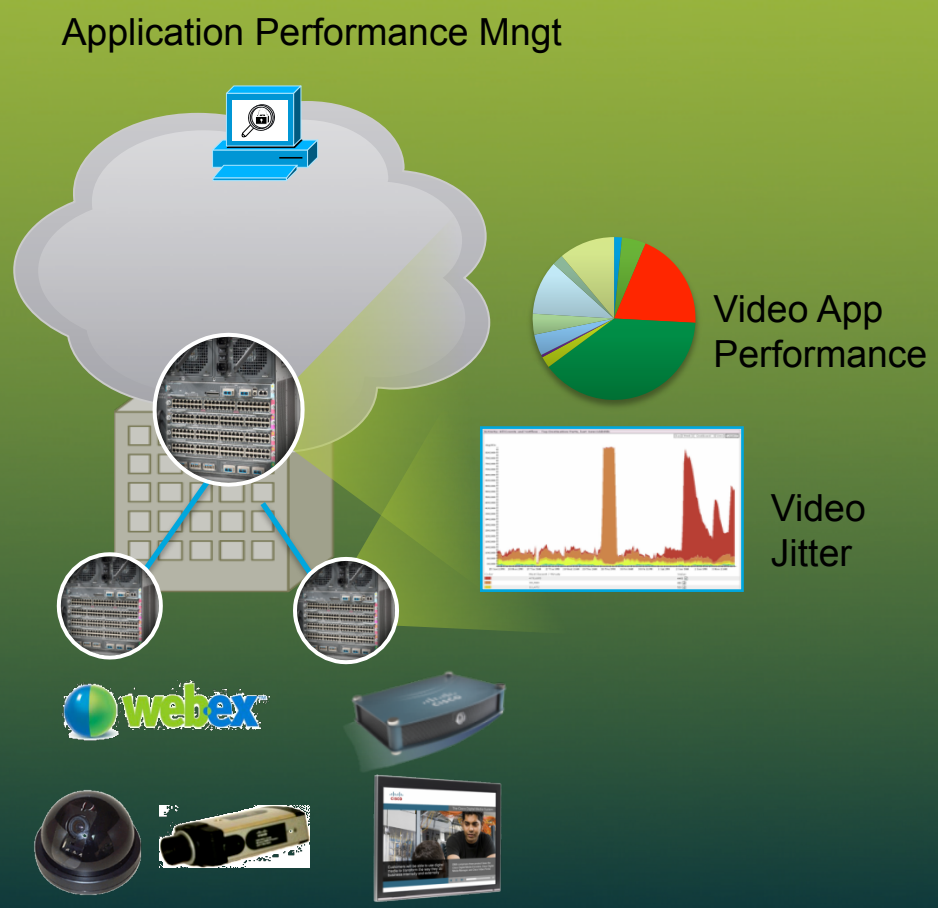
"Yes. It looks good. I also checked via mediatrace that the correct path is being taken"

"If you like, I can run IPSLA VO and mediatrace periodically until your meeting starts…"

Medianet Troubleshooting Tools

- Video Performance Monitoring
- Mediatrace
- IP SLA VO

Medianet Video Troubleshooting
Troubleshoot: Real Time Video Performance Monitoring



- Pervasive infrastructure-based video performance monitoring. Gather per-media flow performance:
  - Jitter,
  - Packet drops,
  - Flow rate,
  - SSRC-ID etc.,
  - TCP round trip time
- Reporting media performance through FNF & MIB

Video Performance Monitoring Wide Applicability

- Tested with:

  Cisco EX90, MXP1700, Polycom, Cisco TelePresence (1xxx, 3xxx), CUVA, CP-9971, CP-7985, CP-7960 (audio only),

  Cisco Video Surveillance Cameras, WebEx (HTTPS), IPTV (VLC)

  Just plain web transactions (wget)









Metrics of Video Performance Monitor

- Variety of network centric metrics added.
- More metrics and protocols coming
- IETF standardization in progress

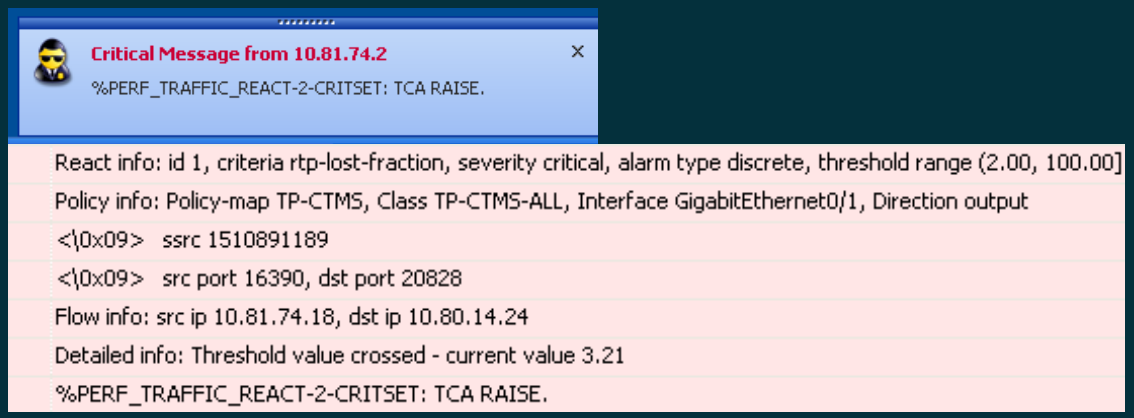
Metric/Data Value	Protocol
transport rtp ssrc	RTP
application media packets counter (long)	All
application media bytes counter (long)	All
application media bytes rate	All
application media packet rate	All
transport packets lost counter	RTP,
transport packets expected counter	RTP,
transport packets lost 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

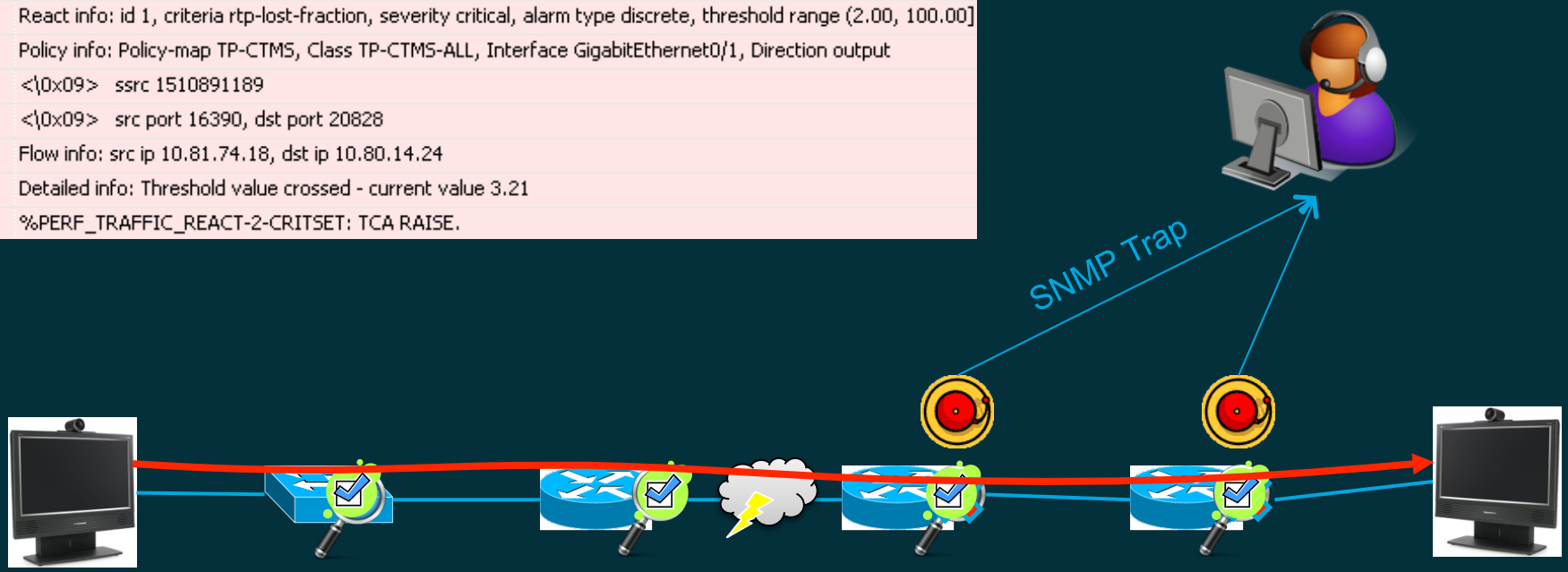
Thresholds & Alerts

- Metrics can be tested against thresholds to trigger actions

  Multi-level Alarm Raise/Clear, SNMP Traps, Syslog, embedded scripts, automatic mediatrace, path adaptation (PfR)

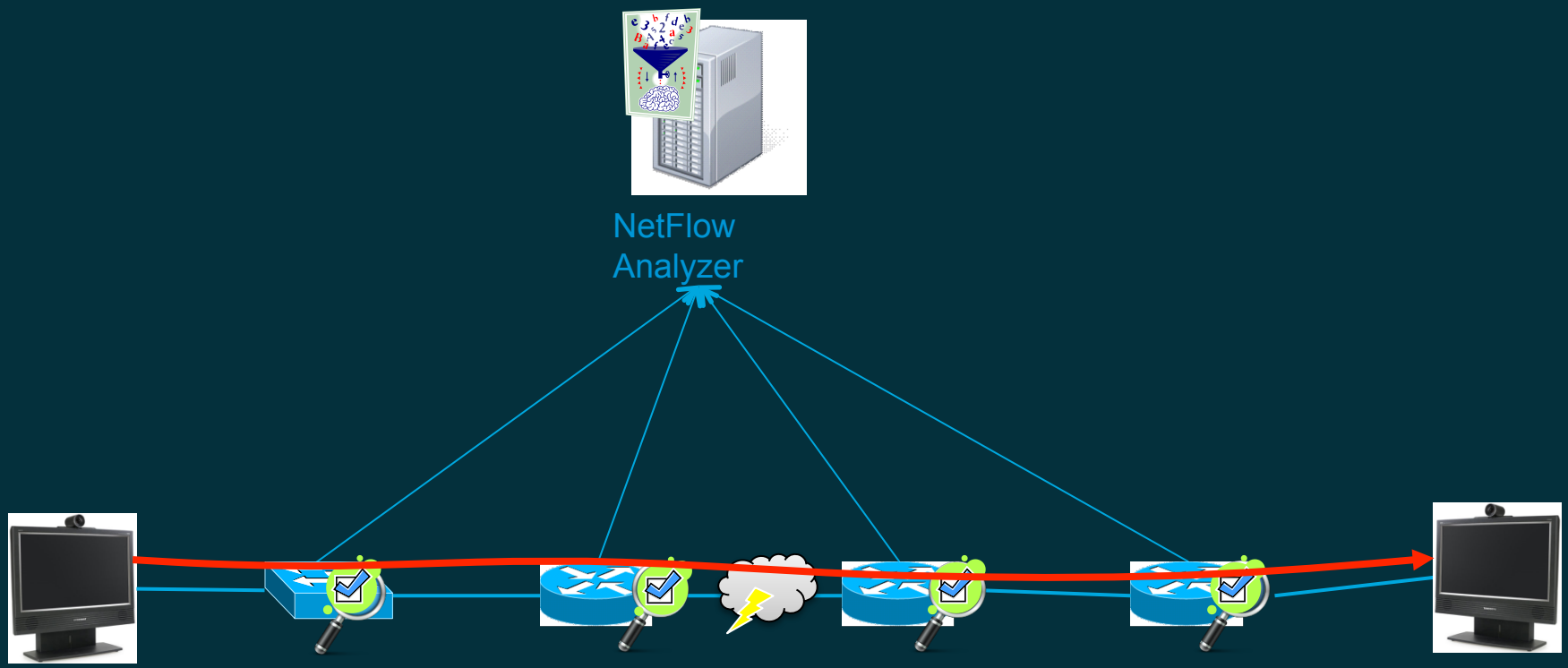
SyslogWatcher





Reports - NetFlow

- NetFlow based metrics export from network
  - Can be based on flows, or aggregations of flows, etc.
  - Variety of uses: capacity planning, troubleshooting, baselining, etc.



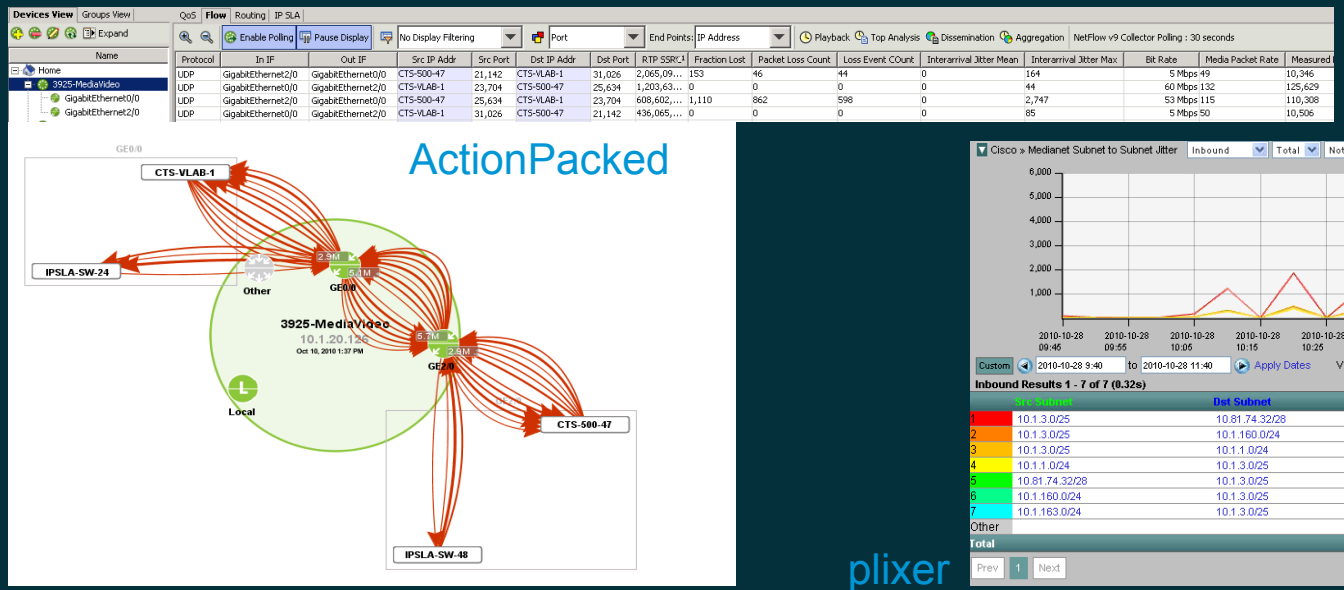
Solution Details:
Third Party Components and Software

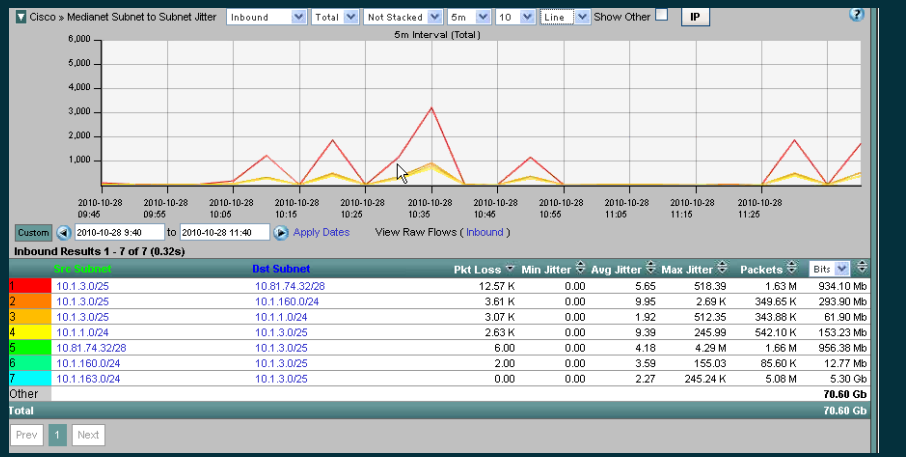
- Performance Monitor (NetFlow v9)

  ActionPacked LiveAction (configuration also planned)
  Plixer Scrutinizer
  SevOne SevOneNMS

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

- 14+ NMS application vendors engaged!

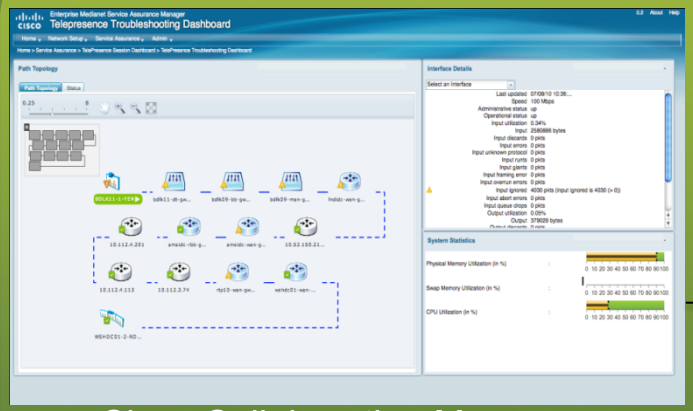




plixer

Medianet Video Troubleshooting
Mediatrace: Live Video Troubleshooting

Debug live sessions: What path did the media take? Where is the problem?



Cisco Collaboration Manager

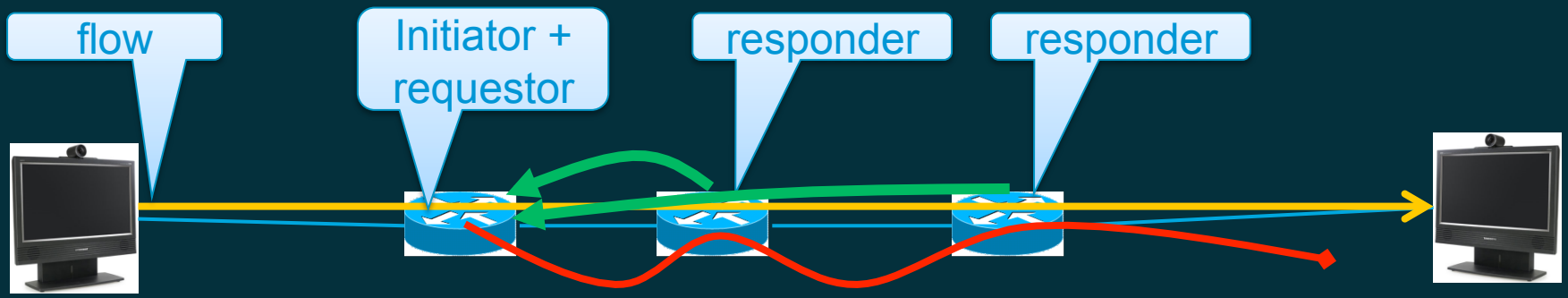
```
initiator#show mediatrace session stats 1
Session Index: 1
…
Mediatrace Hop: 2 (host=responder2, ttl=253)
    Metrics Collection Status: Success
    Reachability Address: 10.10.34.3
    Ingress Interface: Gi0/1
    Egress Interface: Gi0/2
    Metrics Collected:
      Flow Sampling Start Timestamp: 23:45:56
      Loss of measurement confidence: FALSE
      Media Stop Event Occurred: FALSE
      IP Packet Drop Count (pkts): 0
      IP Byte Count (Bytes): 6240
      IP Packet Count (pkts): 60
      IP Byte Rate (Bps): 208
      Packet Drop Reason: 0
      IP DSCP: 0
      IP TTL: 57
      IP Protocol: 17
      Media Byte Rate Average (Bps): 168
      Media Byte Count (Bytes): 5040
      Media Packet Count (pkts): 60
      RTP Jitter Average (usec): 3911
      RTP Packets Lost (pkts): 0
      RTP Packets Expected (pkts): 60
      RTP Packet Lost Event Count: 0
      RTP Loss Percent (%): 0.00
```

Dynamic Monitoring using Mediatrace

- 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 behavior
  - Which interface dropping packets?
  - Where is DSCP getting reset?
- Can be requested by remote device
- Automatically (based on thresholds) via EEM script
  - Built into MSI applications, operator or automatic triggering

Mediatrace Components

- Requestor – origin of request
  - Video end system, NMS, same node as initiator, remote router/switch
- Initiator - injects the trace
- Responder - sends data back to initiator
- Multiple types of data requests
  - Hops – hop discovery
  - System – system information
  - Performance monitor – enables perf-mon, then collects data
- Multiple execution formats
  - Poll – minimal config, run from IOS exec
  - Session – flexible configuration, allows for periodic, recurring requests and history

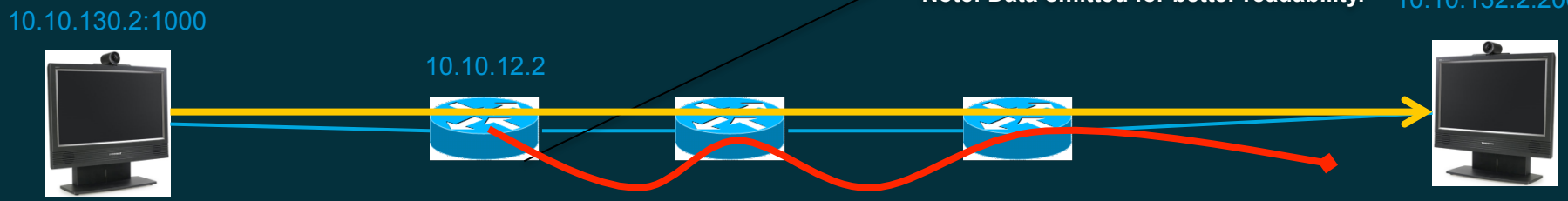


Mediatrace Performance Monitor Session

- Preconfigured mediatrace session- perf-mon profile
- Performance-monitor policy automatically configured (if needed) along path, then flow data collected
- Fixed field-sets for RTP and TCP flow analysis

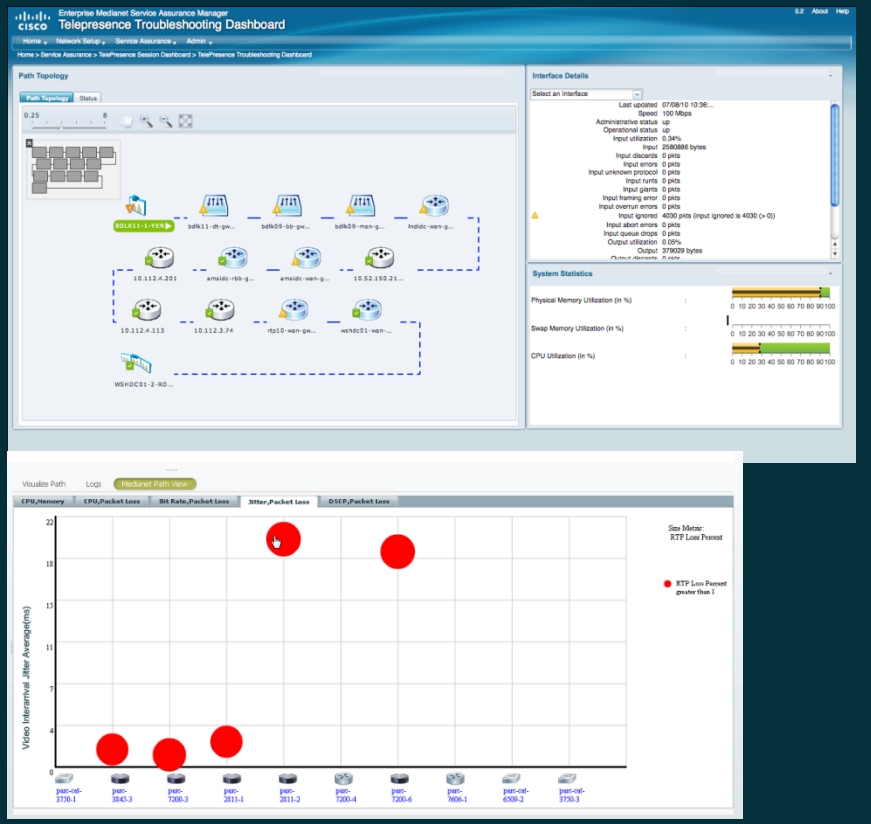
```
initiator#show mediatrace session stats 1
Session Index: 1
…

Mediatrace Hop Number: 2 (host=responder2, ttl=253)
      Metrics Collection Status: Success
      Reachability Address: 10.10.34.3
      Ingress Interface: Gi0/1
      Egress Interface: Gi0/2
      Metrics Collected:
        Flow Sampling Start Timestamp: 23:45:56
        Loss of measurement confidence: FALSE
        Media Stop Event Occurred: FALSE
        IP Packet Drop Count (pkts): 0
        IP Byte Count (Bytes): 6240
        IP Packet Count (pkts): 60
        IP Byte Rate (Bps): 208
        Packet Drop Reason: 0
        IP DSCP: 0
        IP TTL: 57
        IP Protocol: 17
        Media Byte Rate Average (Bps): 168
        Media Byte Count (Bytes): 5040
        Media Packet Count (pkts): 60
        RTP Interarrival Jitter Average (usec): 3911
        RTP Packets Lost (pkts): 0
        RTP Packets Expected (pkts): 60
        RTP Packet Lost Event Count: 0
        RTP Loss Percent (%): 0.00
```

Note: Data omitted for better readability.

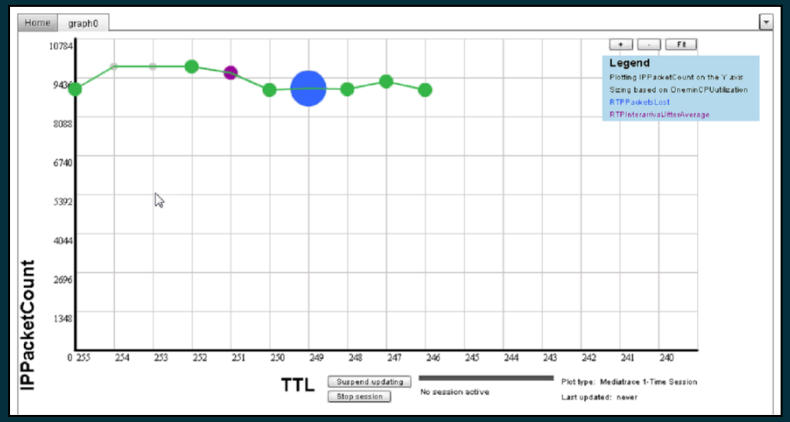


Network Management and Mediatrace

- Cisco Prime Collaboration Manager (CM) uses mediatrace for flow specific stats
- Mediascope research project
- Under investigation by 3rd party NMS vendors



Cisco Prime Collaboration Manager

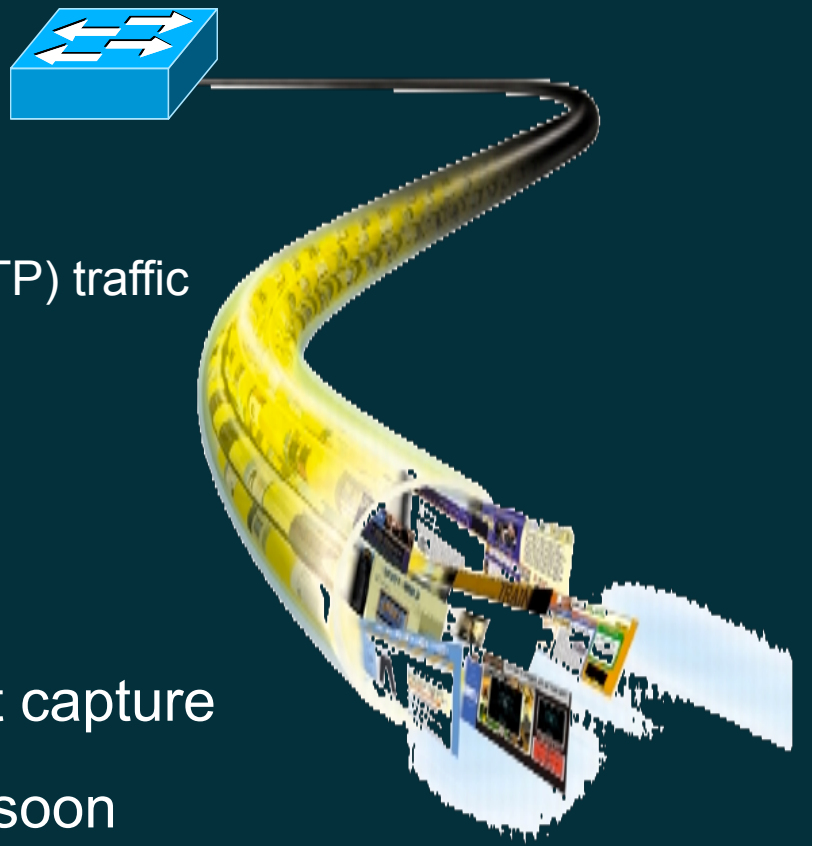


mediascope

More info:
Cisco Prime CM: cisco.com/go/cpcm
Mediascope: medianet.sourceforge.net

IP SLA Video Operation

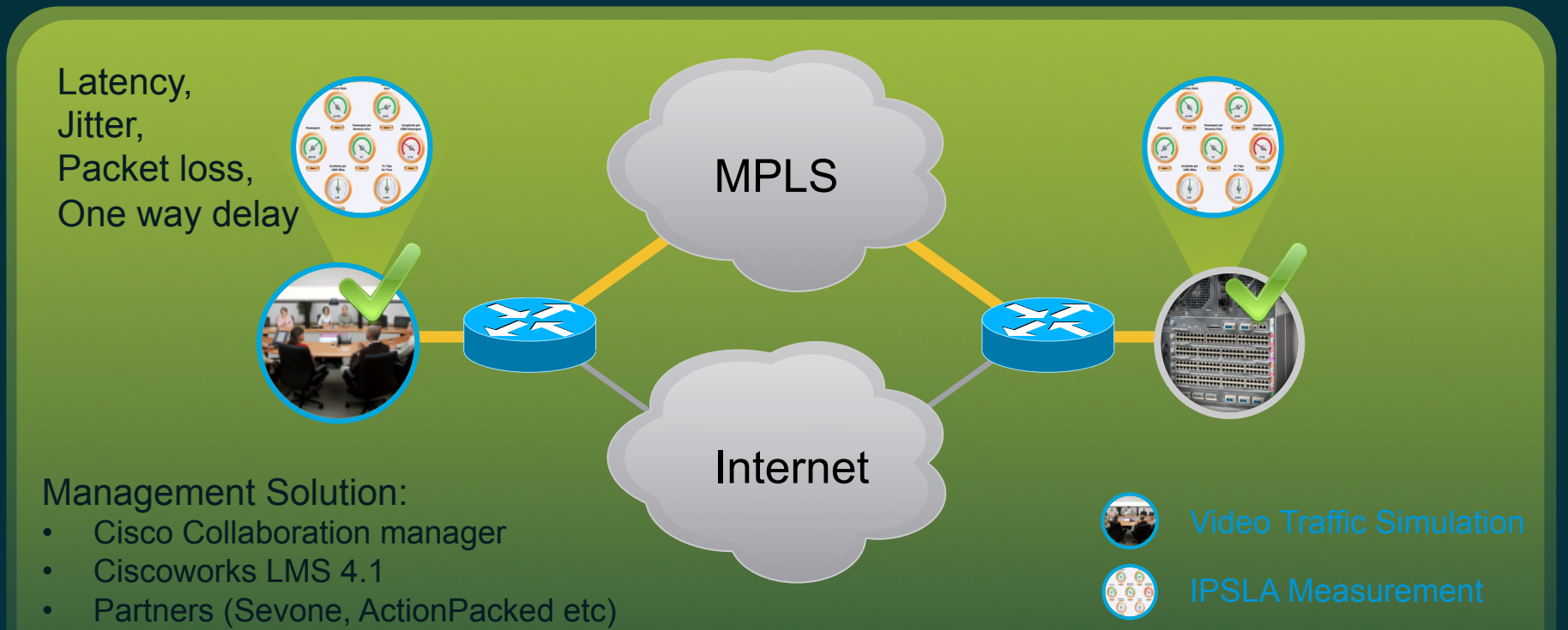
- IPSLA known in industry for jitter, ICMP, etc. probes
- Most probes measure experience without affecting user traffic (hopefully)
- Need traffic to stress test network
- IPSLA VO provides
  - Realistic representation of arbitrary video (RTP) traffic
  - Packet sizes, burstiness, traffic rate, etc.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



Medianet

Planning: Network Assessment with Video IPSLA

- Pre-deployment: Is my network ready for Video?
- Post-deployment: Is the problem with network or application?
  - Hardware based Video IP SLA simulates real-life video traffic.
  - Built-in traffic profiles to generate Telepresence, IPVSC or IPTV traffic
  - Automated scheduling to gather IPSLA during various time of day



Solution Details:
Third Party Components and Software

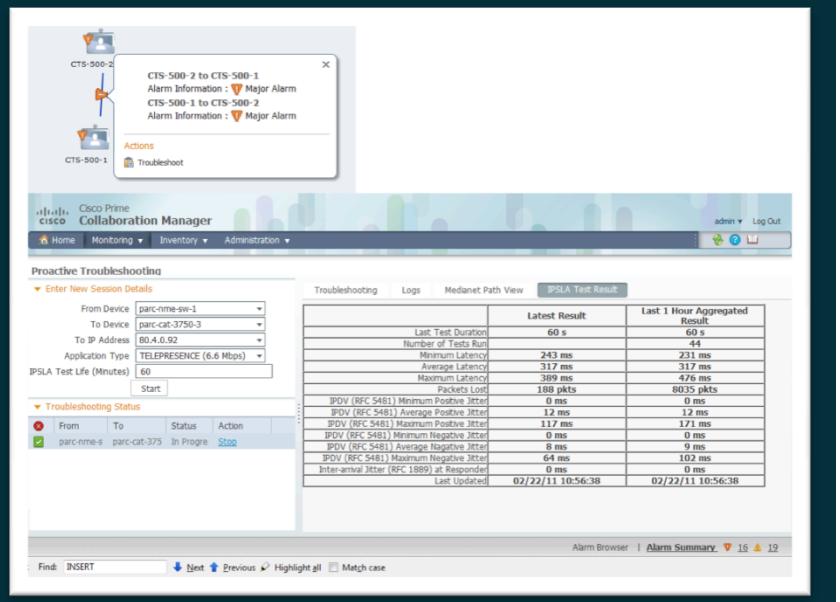
- IPSLA Video Operation

  Collaboration Manager: for CTS traffic

  Cisco PrimeLMS 4.1

- 14 more NMS application vendors engaged! (ActionPacked LiveAction SevOne)

More info:
Cisco Prime LMS: cisco.com/go/lms
Cisco Prime CM: cisco.com/go/cpcm
CDN Partners Page:
http://developer.cisco.com/web/mnets/partners



ActionPacked

Cisco Prime Collaboration Manager (IPSLA VO)

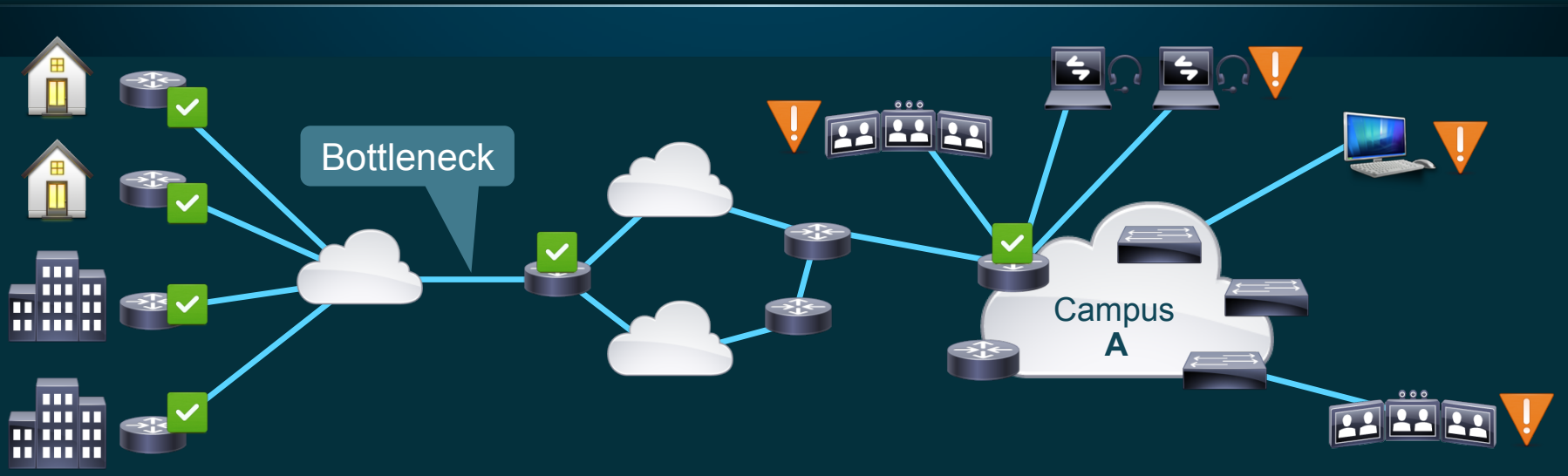
How do I Deploy Media Monitoring?

Do I Have to Upgrade My Whole Network?

- Media monitoring does **NOT** need to be in every hop for benefits to be realized
- Start in trouble spots or high usage areas
- The more locations are upgraded the more visibility and benefits you get!

Here is an example of media monitoring deployment:

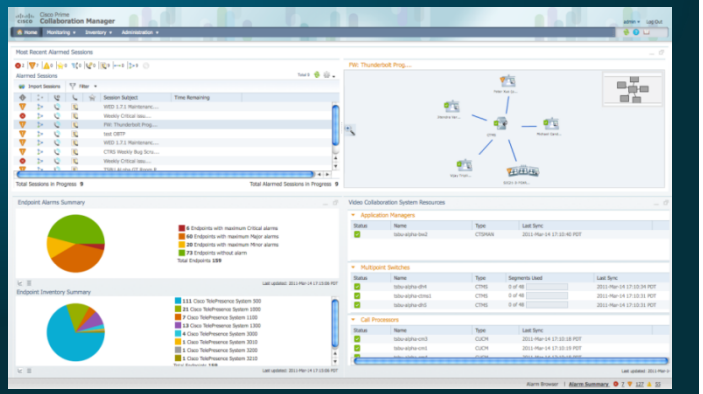
- Phase 1: remote sites (expensive to troubleshoot)—enable Performance Monitor for high value applications (e.g. videoconferencing and webex)
- Phase 2: trouble spots; high value applications—recurring issues on campus A
- Phase 3: new sites where additional visibility is needed to easily localize problems – based on what we learned on phases 1 and 2



Cisco Prime Collaboration Manager

Simplifies operations for video collaboration services

- Intuitive user experience:
  - End-to-end visibility and status of all video collaboration sessions
  - Delivers immediate overview of critical issues
- Quickly troubleshoot:
  - Isolate problems between network path and endpoints
  - Improve overall service levels and end-user video experience
- Provides a complete inventory of all video related assets:
  - Endpoints, network devices, service infrastructure – control costs, plan for and validate upgrades

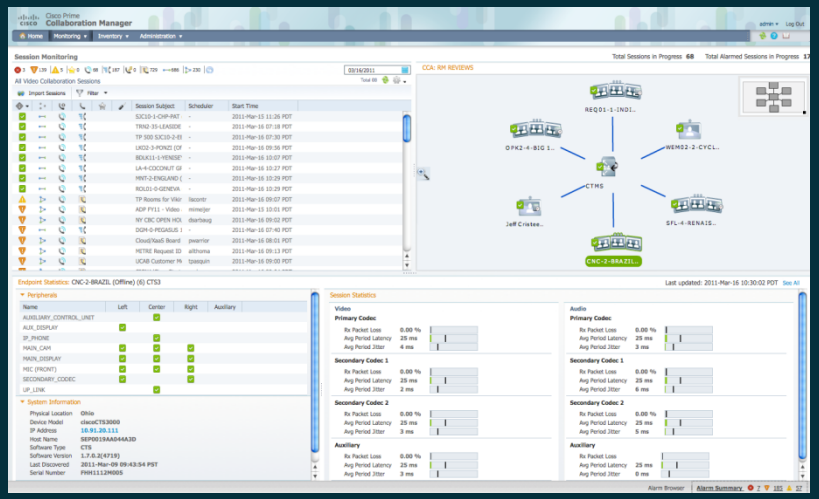


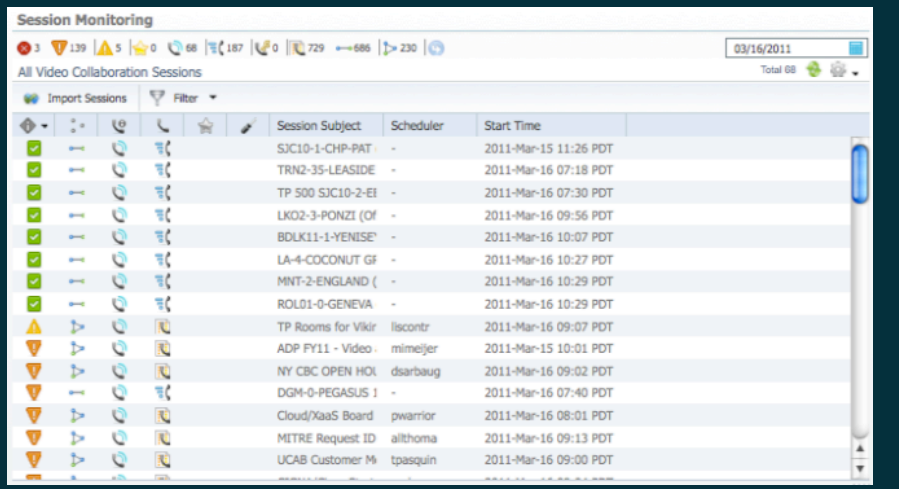
Cisco Prime Collaboration Manager DEMO ?

Cisco Prime Collaboration Manager

- Obtain complete summary of any problems affecting sessions in progress, endpoints, and service infrastructure devices
- Filter by alarm severity of all sessions – in progress, recently completed, and scheduled
- View topology and rapidly determine whether issues are in endpoints or in the network
- See detailed endpoint and session statistics – latency, jitter, packet loss

http://www.cisco.com/go/cpcm

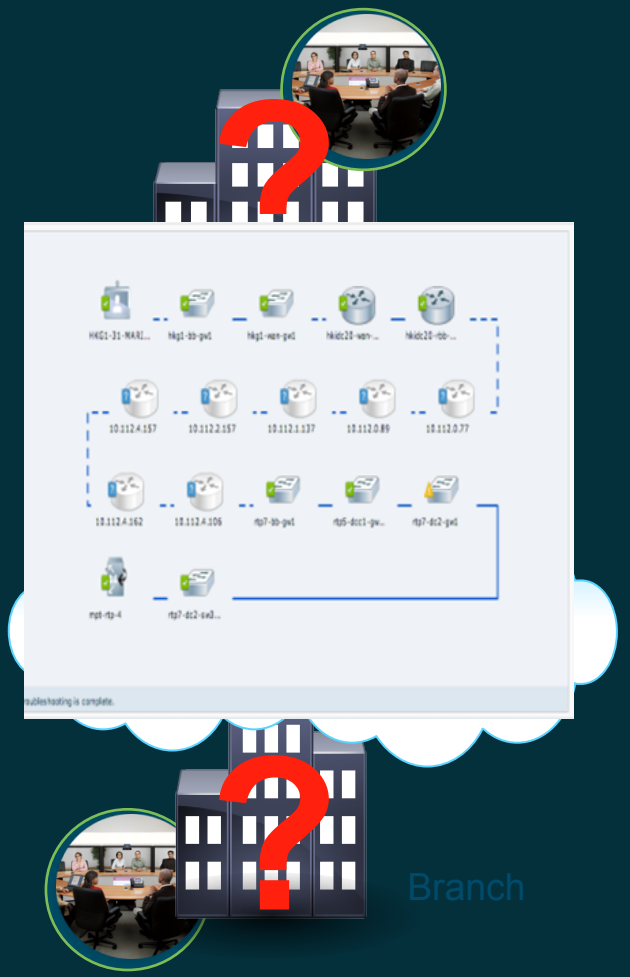




Network Diagnostics

Quickly isolate and troubleshoot the source of video related problems

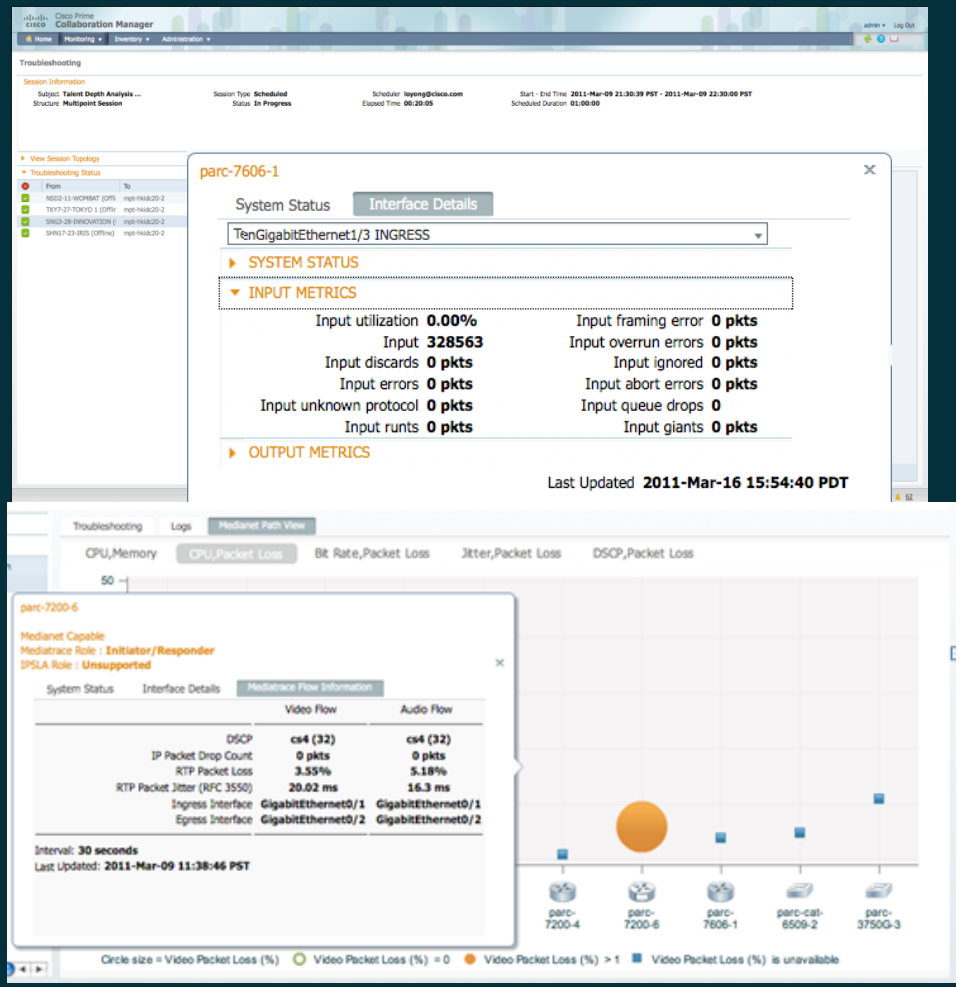
- Improves the overall end-to-end video experience – rapidly isolates and pinpoints video related issues between the network path and endpoints
- Visualizes end-to-end video path and quickly identify trouble spots – with additional flow based information where Medianet enabled devices are deployed
- Automatically captures troubleshooting data for important sessions – allows operator to identify and analyze issues after sessions have completed



Network Diagnostics - *Details*

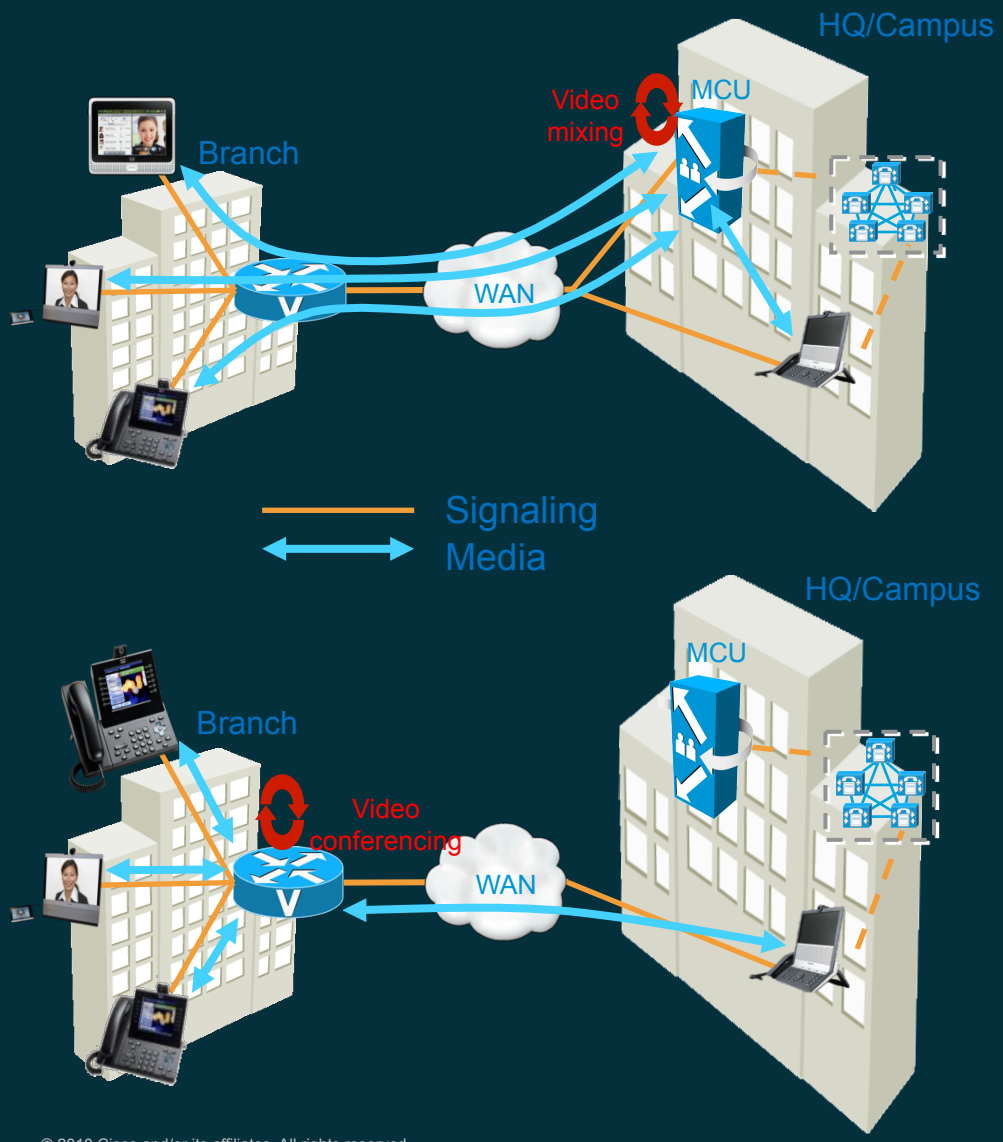
Visualize end-to-end media path between endpoints

- Media path visualization and flow statistics identify network issues degrading service quality
- Analyze detailed device information, CPU, Memory, Interface statistics
- Medianet enabled devices provide additional flow based details – packet loss and jitter
- Troubleshooting data can be captured and exported for trending and later analysis



ISR G2 Video Conferencing Services

15.1.4M



- Multiple video streams traverse the WAN to a central MCU resource – non-optimal use of limited WAN BW
- Video is mixed by a centralized MCU controlled by CUCM

- Video is processed by the ISR G2 DSPs controlled by CUCM
- Keeps traffic local in the branch if all participants are located in the branch
- Ad-hoc and MeetMe conferences

Features/Product Mapping
Switches

Check datasheet for more details!

	Catalyst 2960S/ 2960 Series	Catalyst 3750/ 3560 Series	Catalyst 4500 Series SUP 7-E SUP 7L-E	Catalyst 4500E SUP 6-E 4500 SUP 6L-E	Catalyst 4900 Series	Catalyst 6500/ 6500-E Series
Auto Smartports	12.2(55)SE LAN Base	12.2(55)SE LAN Base	XE3.3.0SG* LAN Base	12.2(54)SG1 LAN Base	12.2(54) SG1 LAN Base	
Location	12.2(55)SE LAN Base	12.2(55)SE LAN Base	XE3.3.0SG* LAN Base	15.1(1)SG* LAN Base	15.1(1)SG* LAN Base	
AutoQoS	12.2(55) SE LAN Base	12.2(55)SE LAN Base				
Performance Monitor		12.2(58)SE IP Base	XE3.3.0SG* IP Base	15.1(1)SG* IP Base		15.0(1)SY IP Services
Mediatrace		12.2(58)SE IP Base	XE3.3.0SG* IP Base	15.1(1)SG* IP Base		15.0(1)SY IP Services
IPSLA VO Sender		12.2(58)SE2 IP Base	XE3.3.0SG* IP Base	15.1(1)SG* IP Base		15.0(1)SY IP Services
IPSLA VO Responder		12.2(58)SE2 IP Base	XE3.3.0SG* IP Base	15.1(1)SG* IP Base		15.0(1)SY IP Services

* Release planned 1H CY2012

Features/Product Mapping
Routers

Check datasheet for more details!

	Cisco ISR G2 2900/ 3900 Series	Cisco ISR 1900 Series	Cisco ISR 880/890 Series	Cisco ASR 1000 Series
Auto Smartports	15(0).1M with switch blade			
Location	15(0).1M with switch blade			
AutoQoS	15(0).1M with switch blade			
Performance Monitor	15.1(3)T UC or Data Package	15.1(3)T Data	15.1(3)T Advanced IP	XE3.5 Advanced IP
Mediatrace	15.1(3)T UC or Data Package	15.1(3)T Data	15.1(3)T Advanced IP	ROADMAP
IPSLA VO Sender	15(0).1M with switch blade 15.2(2)T UC Package			ROADMAP
IPSLA VO Receiver	15.2(2)T IP Base	15.2(2)T IP Base		ROADMAP

Features/Product Mapping
Endpoints

Check datasheet for more details!

	WebEX	DMP 4310G	DMP 4400	4300/4500 IP Cameras
Auto Smartports				●
Location		●		
Auto Registration		●	●	
Performance Monitor	●			
Mediatrace	●			
IPSLA VO				

Enterprise Medianet Today and Beyond

Deploy	Scale	Optimize
Now	2012	2012 & beyond
Reduce TCO	**Maximize Resources**	**Optimize Resources**
• Medianet Readiness Assessment • Auto-configuration to simplify video deployment & location awareness • Media Monitoring for much improved visibility & troubleshooting	• Flow Metadata – Media-aware • Media Services Proxy for legacy, 3rd Party & Cloud services • Resource control to maximize resources	• Media optimization – Optimize resource usage & preserve video quality • Business Policy to support client funded model

Cisco Medianet Architecture Summary

Quality of Experience: Predictable Quality on Any Device

Any to Any: Seamless Experience

Simplicity: Ease of Use

Plug and Play: Speed & Reliability

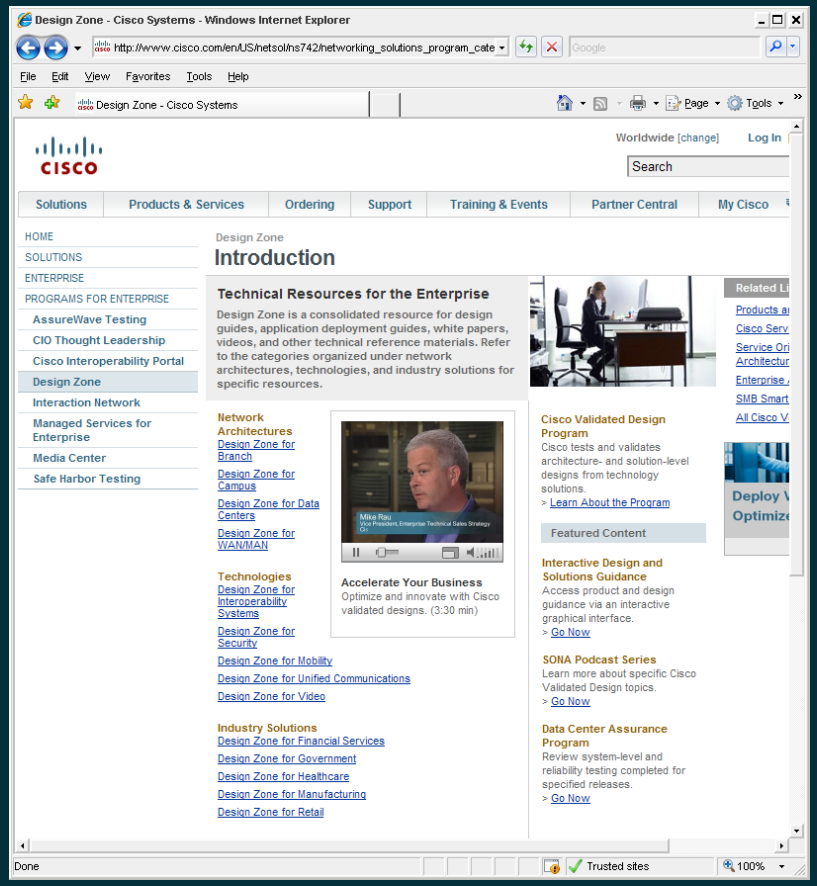
Scalability, Reliability, Availability: Video at Scale

Additional Resources

- http://www.cisco.com/go/medianet
- http://www.cisco.com/go/designzone

  Design zone for video
- http://developer.cisco.com/web/mnets

  Cisco Developer Network for Medianet



Thank you.