Cisco Medianet Media Monitoring

Accelerate Troubleshooting and Cut Costs

Patricia Costa – patcosta@cisco.com
Product Manager, Cisco Systems

Dec 6th, 2011

Medianet Overview

Business Video Use Cases

Business Meetings and Ad Hoc Communication

Faster Decisions

Safety and Security

Improve Protection

Corporate Events

Extend Reach

Training / Knowledge Sharing

Share Expertise

Corporate Communications

Better Change Mgmt

Advertising

Personalize Ads

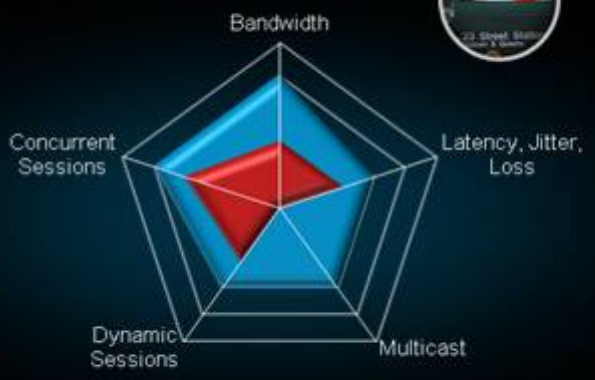
Customer Care

Expert-on-Demand

But, Why is Video Different?

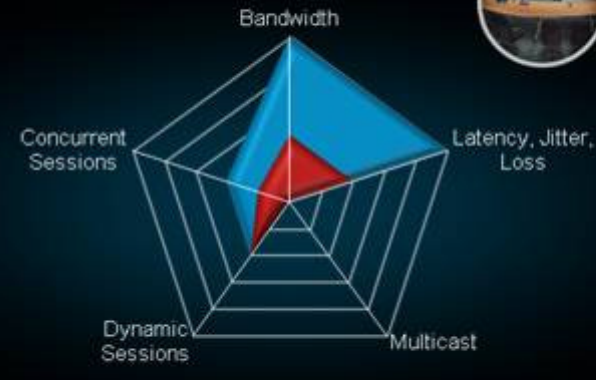
Increasing demands on the network = need for intelligent network

Streaming Media



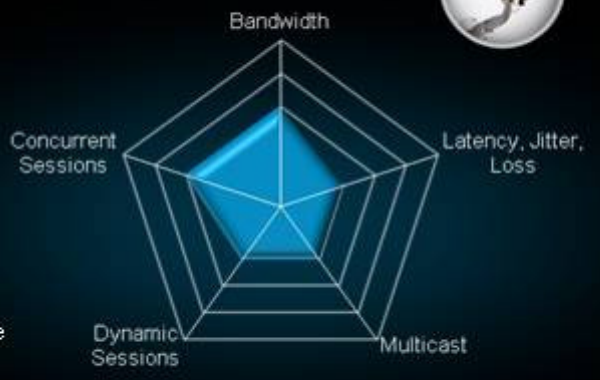
Digital Signage
Video on Demand

Telepresence



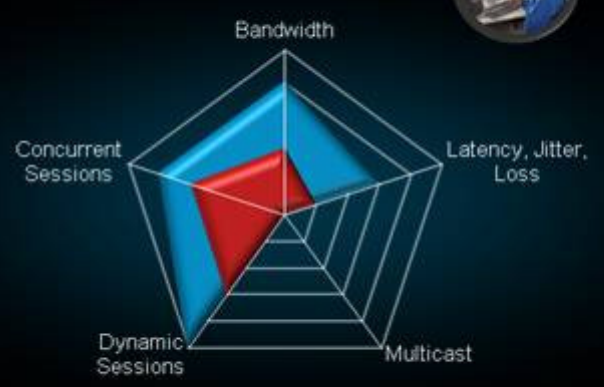
Telepresence
Conferencing

Video Surveillance



Video Surveillance

Desktop Collaboration



Collaboration
Web Cam

Video Requests Come From All Over

Executives

Telepresence

Executive Broadcasts

Special Departments: Facilities or Marketing

Safety and Security Video Surveillance

Digital Signage

Digital Advertising

Mid-Management

Video Conferencing

Webconferencing

Training On Demand

Employees

Skype-like Video

YouTube-like sharing

PC-based Video Conferencing

Medianet – A Phased Approach

A medianet is an end-to-end IP architecture that enables pervasive rich media (video, voice and data!) experiences

Deploy

- Reduced operating costs
- Better investment decisions to meet business objectives

Scale

- Savings with better utilization of existing network resources
- Better integration between the network & applications enables business agility

Optimize

- Additional savings with optimal use of network resources

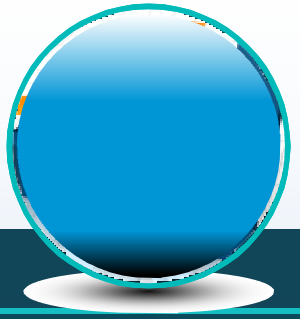
Challenges deploying video, voice and data applications

Deployment

- Complex, manual deployment requires highly skilled personnel
- Is the Network ready for Rich Media Applications

Operations

- Inability to assess and manage Video impact to Business Critical Applications



User Experience

- Inadequate tools to provide predictable and optimal user experience
- Lack ability to differentiate applications

Medianet Architecture
Video and Collaboration

Media Monitoring

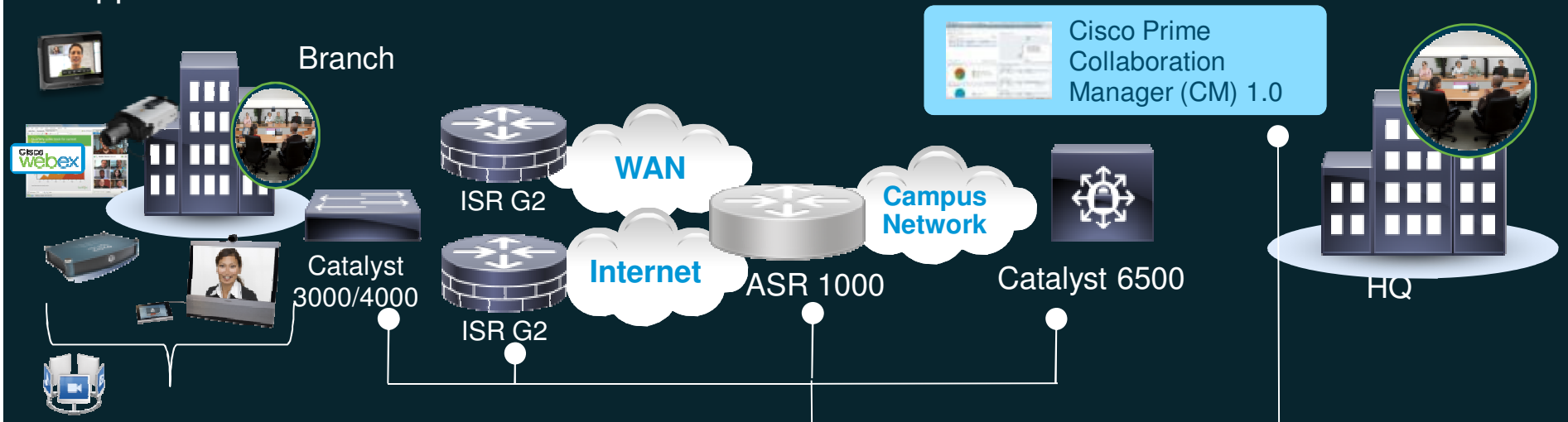
Media Monitoring: Improved Visibility for Quantifiable Informed Decisions

PAIN POINTS

- Is my network ready for vide/rich media?
- Timely detection/recovery of quality issues
- Finger pointing between the network & application

CISCO SOLUTIONS

- Dynamic E2E embedded intelligence offers greater visibility and faster troubleshooting
- Scalable, deployable and measurable



Media Services Interface:
➢Endpoint acts as probe for the network & measures quality
➢Endpoint dynamically activates diagnostics capability while the problem is occurring

End-to-End path & flow visibility
Real-time fault identification and isolation
Pre-deployment assessment

Monitoring, analysis, troubleshooting for video collaboration

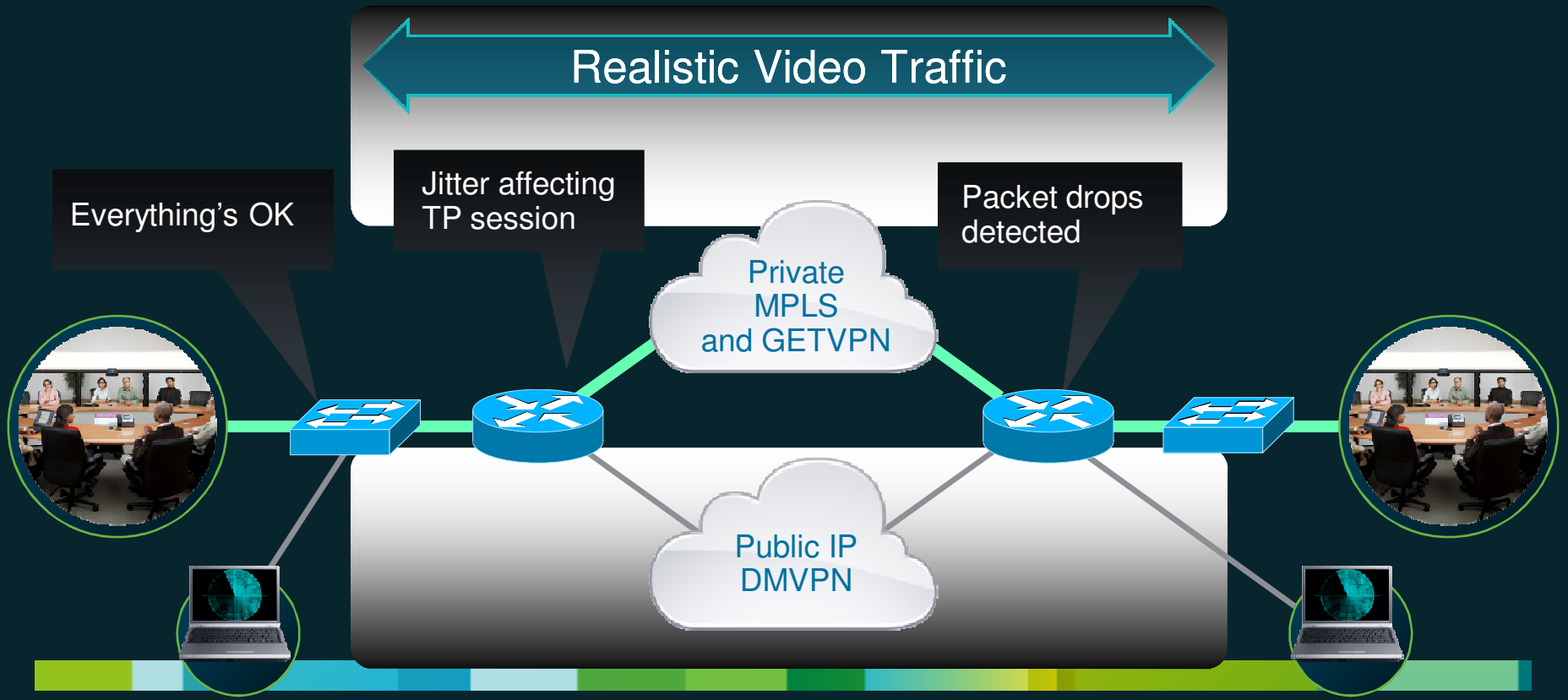
Media Monitoring

Improved Visibility and Troubleshooting, Pre-Deployment Assessment

Performance Monitor: Fault isolation, SLA validation

Mediatrace: Dynamic monitoring

IPSLA Video Operation: Pre-deployment assessment/network validation

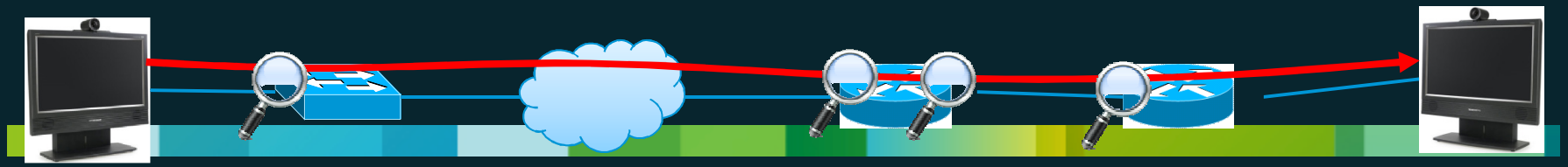


Performance Monitor

Performance Monitor

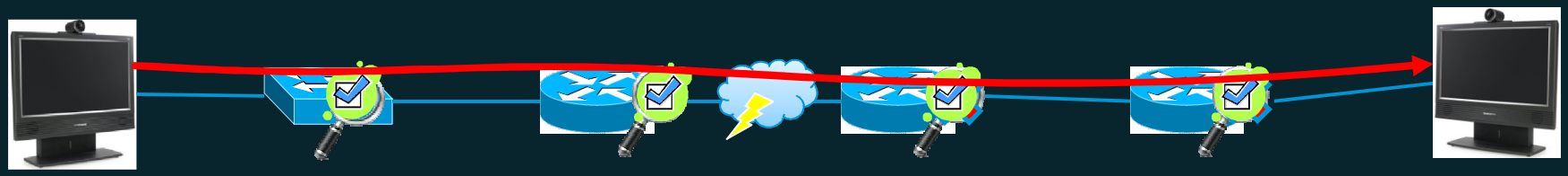
Who, What and Where

- For TCP, RTP and CBR traffic, provides:
  - Fault-isolation, problem ownership assignment
  - Accelerated troubleshooting
  - SLA validation
- Identifies and measures user traffic on routers & switches
  - Phase 1: network contribution (loss, jitter) to media stream
  - Applied on interface: inbound and/or outbound



Perf-Mon: Discovery & Measurement

- Network is able to discover & validate RTP, TCP and IP-CBR traffic on hop by hop basis
- À la carte metric selections, applied on operator selected sets of traffic
- Allows for fault isolation and network span validation
- Cross-network synchronized time windows for measurement
  - same 30 second (default) intervals measured

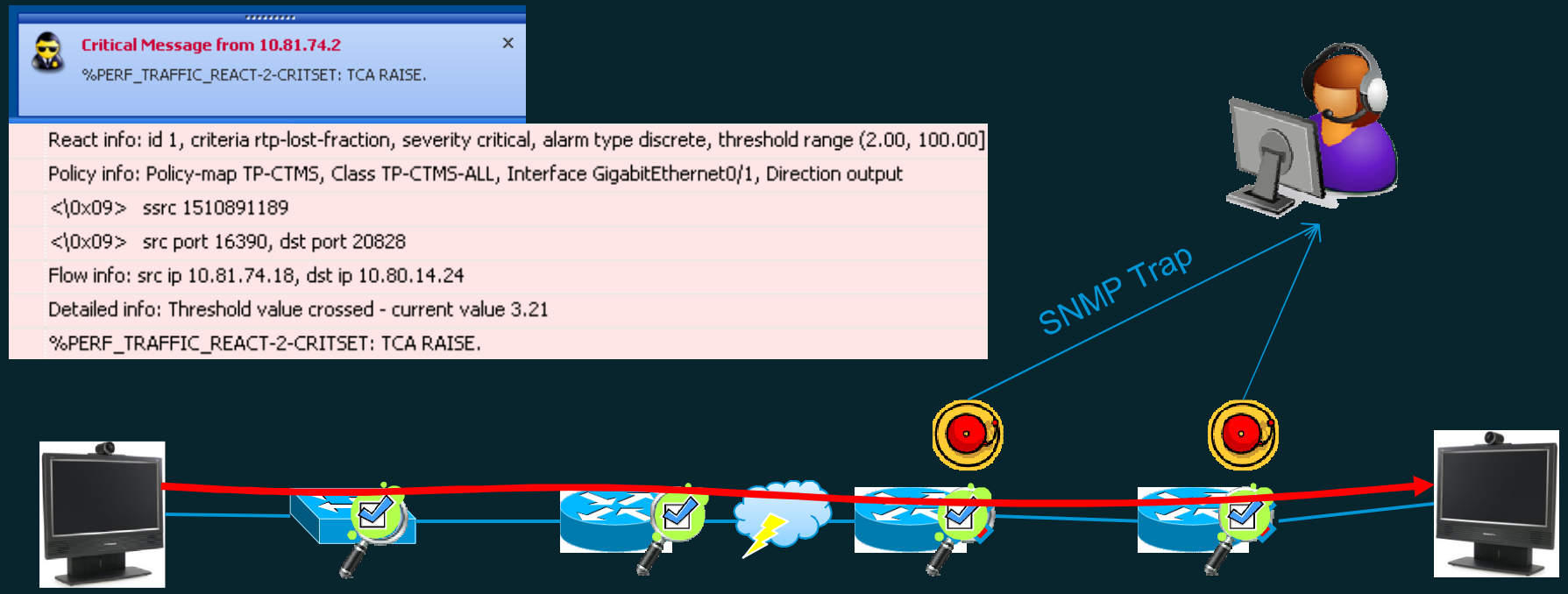


Thresholds & Alerts

- Metrics can be tested against thresholds to trigger actions

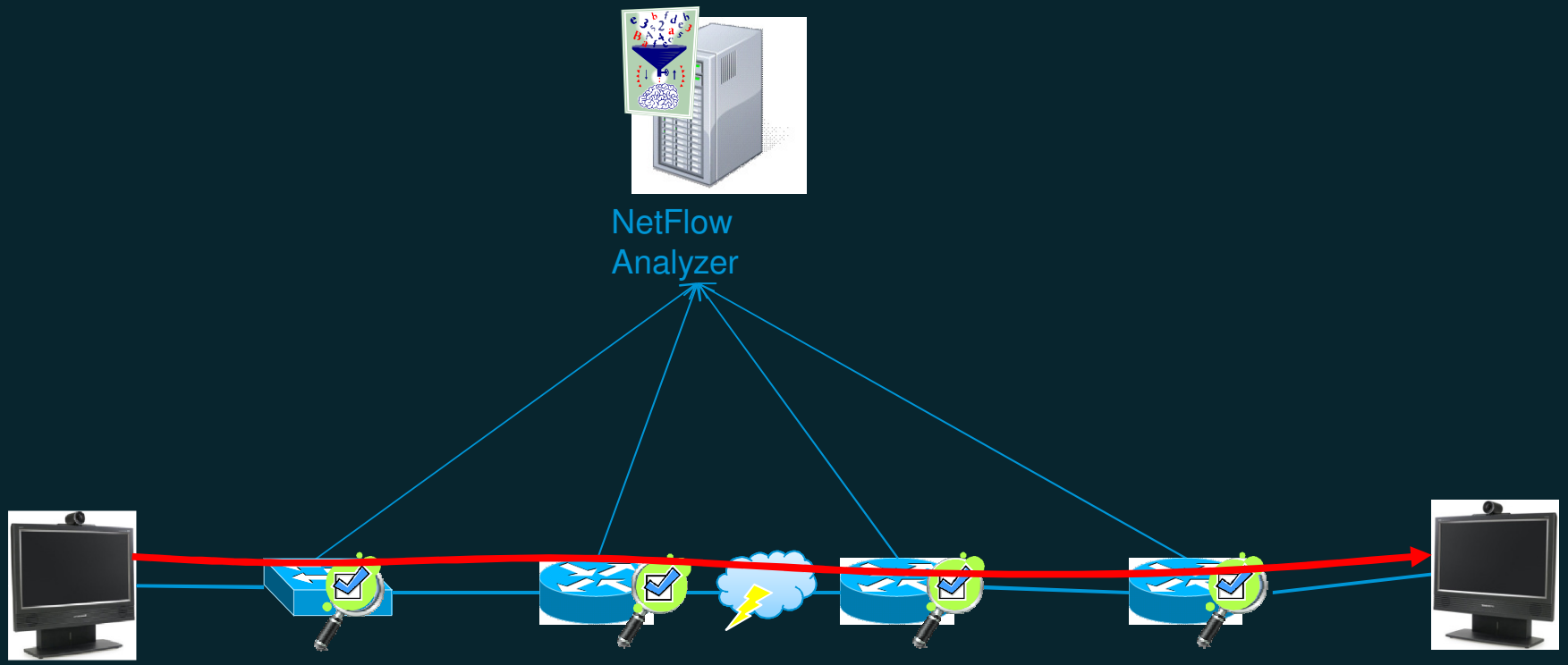
  Multi-level Alarm Raise/Clear, SNMP Traps, Syslog, embedded scripts, automatic mediatrace, path adaptation (PfR)

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.

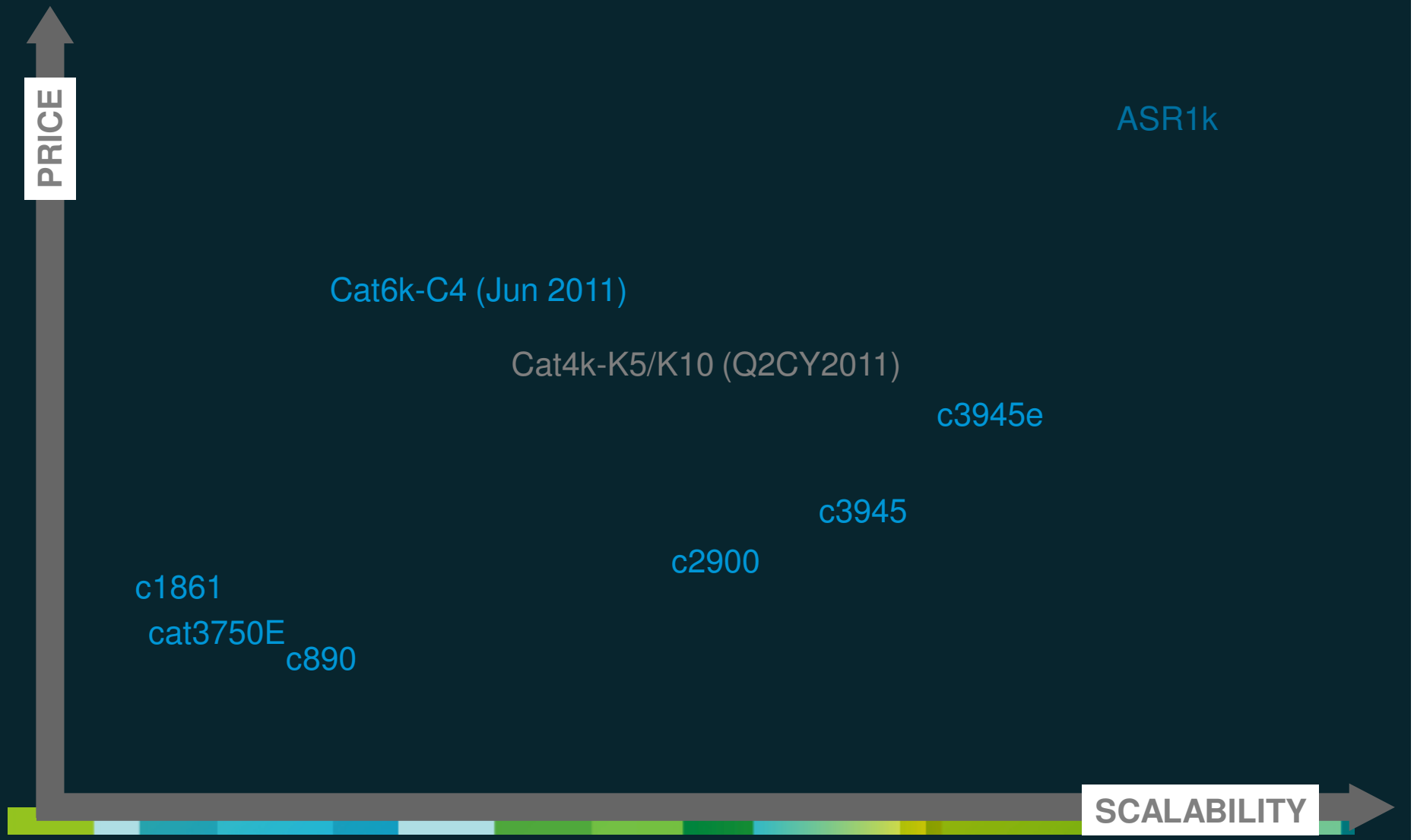


New Metrics in Performance Monitor

- Variety of network centric metrics added
- More metrics and protocols coming

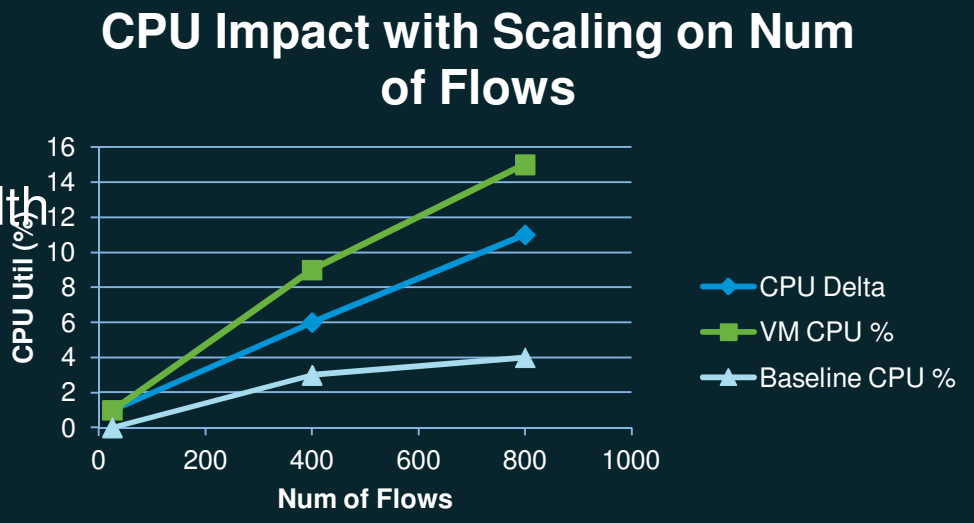
Metric/Data Value	Protocol
transport rtp ssrc	RTP
application media packets counter (long)	All
application media bytes counter (long)	All
application media bytes rate	All
application media packet rate	All
transport packets lost counter	RTP,
transport packets expected counter	RTP,
transport packets lost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

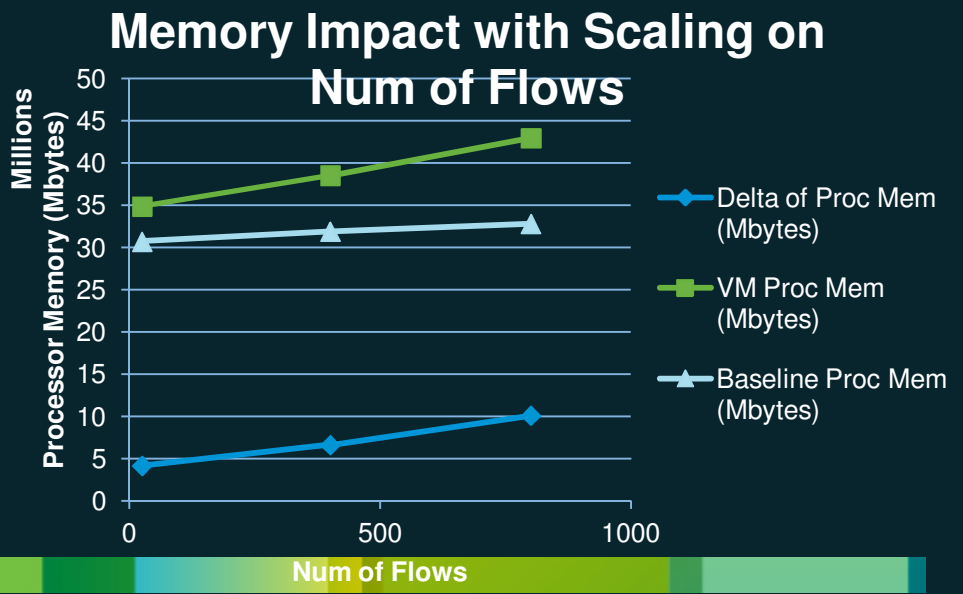
Solution Details: performance monitor



Performance Results: performance-monitor
Cisco c3945

- It depends ☺
- ~70 mbps monitoring bandwidth
- CPU impacted by:
  - Number of flows
  - Complexity of filter
    - NBAR, ACLs, DSCP
  - Number of classes
    - minimal impact until ~80 classes
- Memory impacted by:
  - Number of flows
    - minimal
  - Number of classes



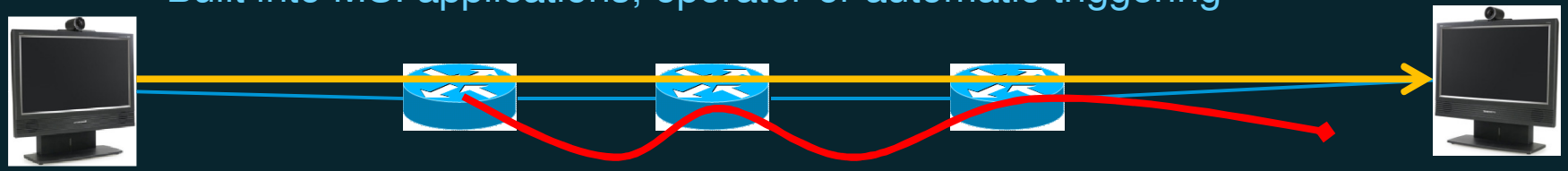


Mediatrace

Dynamic Monitoring with Mediatrace

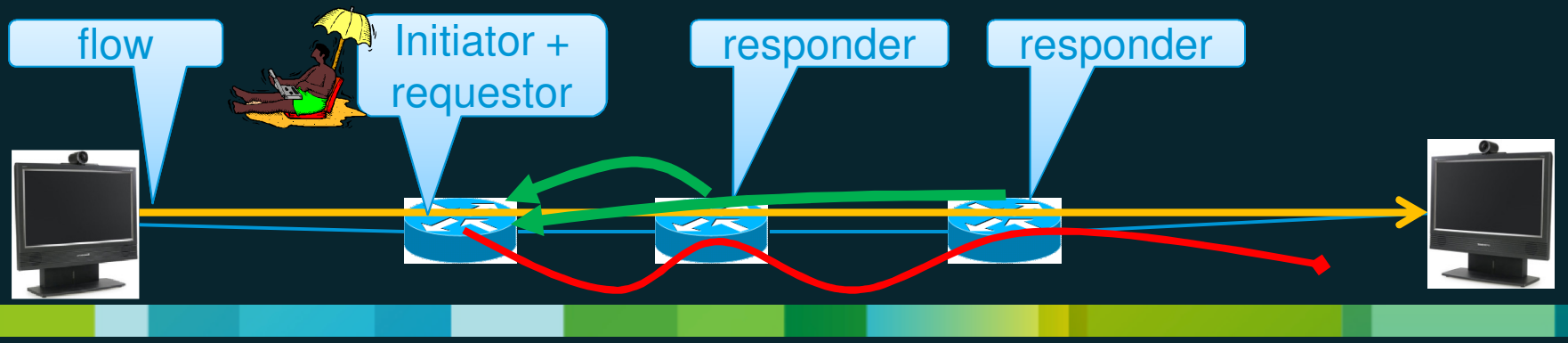
Let mediatrace do the walking for you!

- 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 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



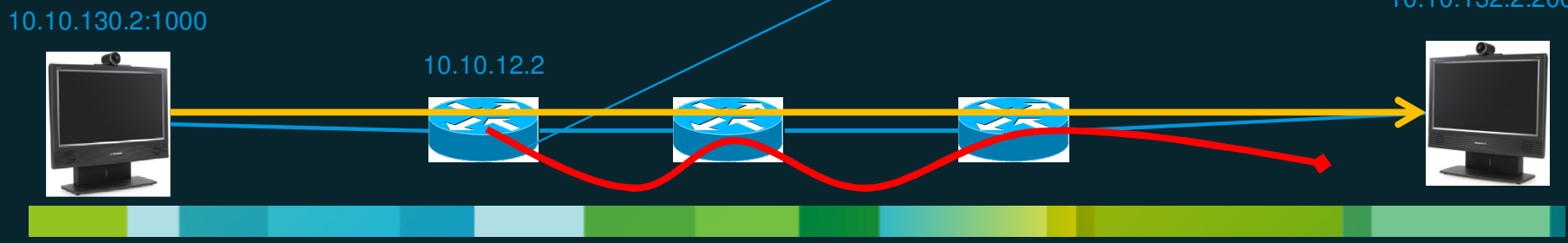
Mediatrace Performance Monitor Session

- 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.



Mediatrace Performance

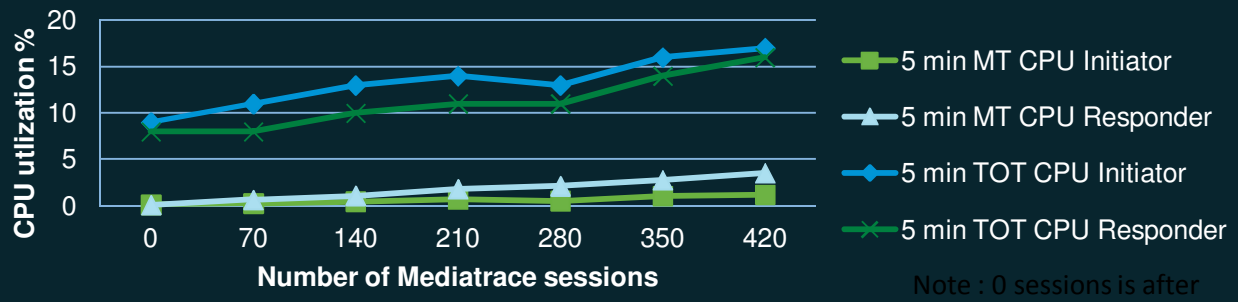
- Performance and scale depends on profile (amount of work) requested
- Perf-mon style requests are 'heaviest'

  IOS limitation of 255 mediatrace + performance flow monitoring

Does not include CPU hit of perf-mon

Platform/role	Max sessions System Profile	Max sessions Perf-monitor Profile	CPU utilization %for Max System profile sessions for Mediatrace	CPU utilization %for Max Perf-mon profile sessions for Mediatrace
3845 Initiator	240	240	2.08	2.07
3845 Responder	240	240	2.55	2.63
3945 Initiator	360	255	2.16	1.62
3945 Responder	360	255	2.00	1.89
3945E Initiator	720	255	0.11	0.41
3945E Responder	720	255	0.96	0.33

CPU utilization for System Profile Cat 3750E platform



Note : 0 sessions is after enabling mediatrace

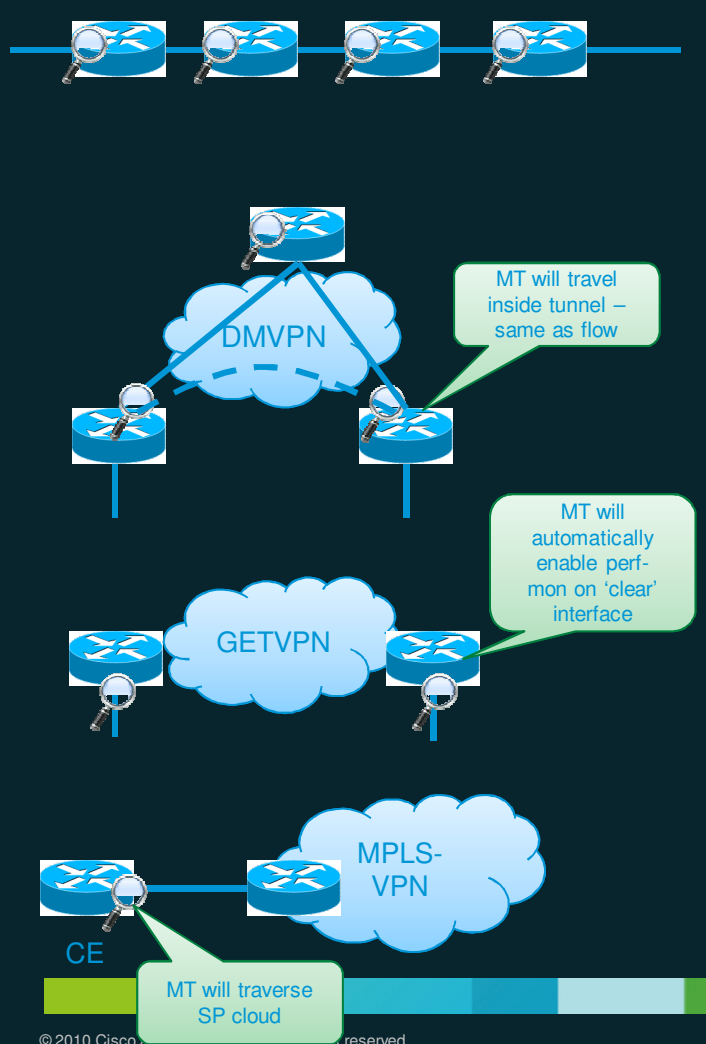
Scaling Performance Monitor

Automating when and what to monitor

- Many types of flows traversing the network
- Likely flow count > monitoring capacity
- Looking for a black swan events
- Is it possible to chase down every alert?
- Which failures are important, and service affecting?

  In some cases (eg forward error correction), network is unable to determine true end result of network impairment

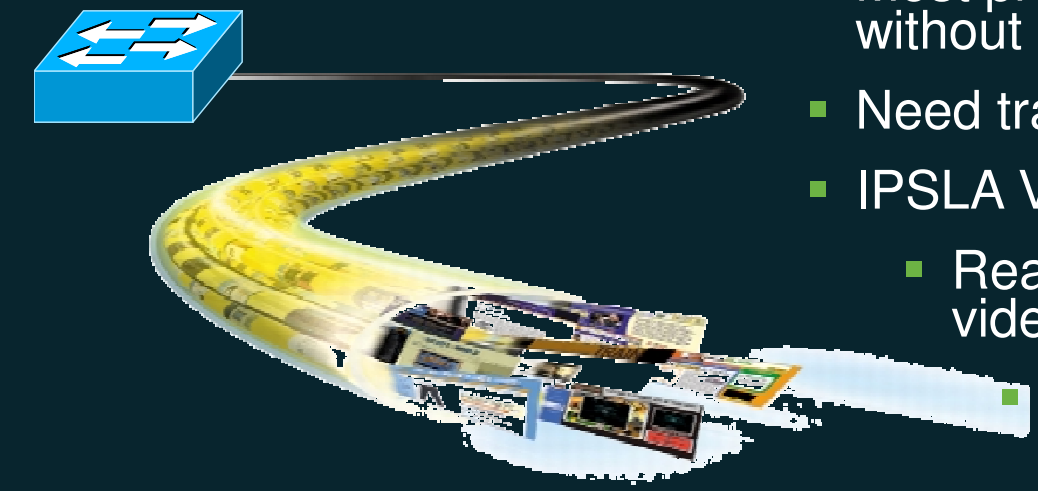
Mediatrace: Deployment



- Enable '`mediatrace-responder`' pervasively (if possible)
  - More monitoring points, the better the data
- Applications (perf-mon):
  - VoIP, WebEx, TelePresence, Desktop Video Conferencing (Cisco EX/MXP, Polycom, etc), Skype, Microsoft MOC/Lync
  - Any TCP traffic: Oracle, SAP, HTTP(s)
- Scenarios:
  - Telecommuter / cisco virtual office
  - WAN edge
    - DMVPN – tunnel interface
    - GETVPN – LAN interface
  - NAT – unsupported, flow is untraceable (roadmap)
  - Firewall –need to allow protocol 46 & router-alert

Synthetic Traffic
IPSLA Video Operation

IPSLA Video Operation
Embedded Traffic Simulator



- 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
  - WebEx profile available for download soon

Pre-Deployment Planning

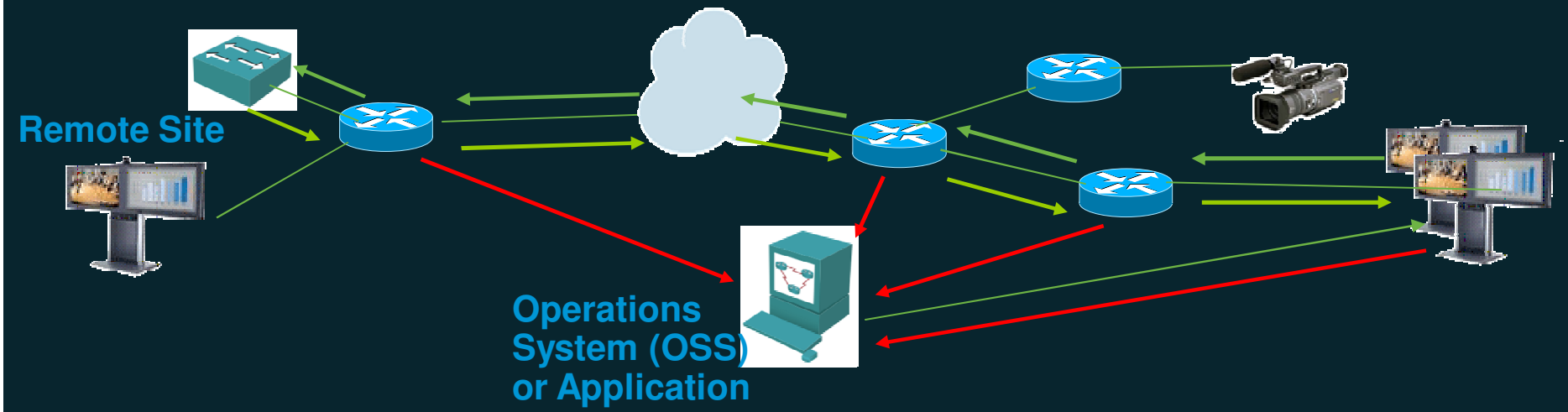
- **Objective**

  Enable clientless deployment and capacity planning

  - How many streams at bandwidth x at this time of day can we expect to support
  - What delay/loss impact does the addition of an extra stream at bandwidth X

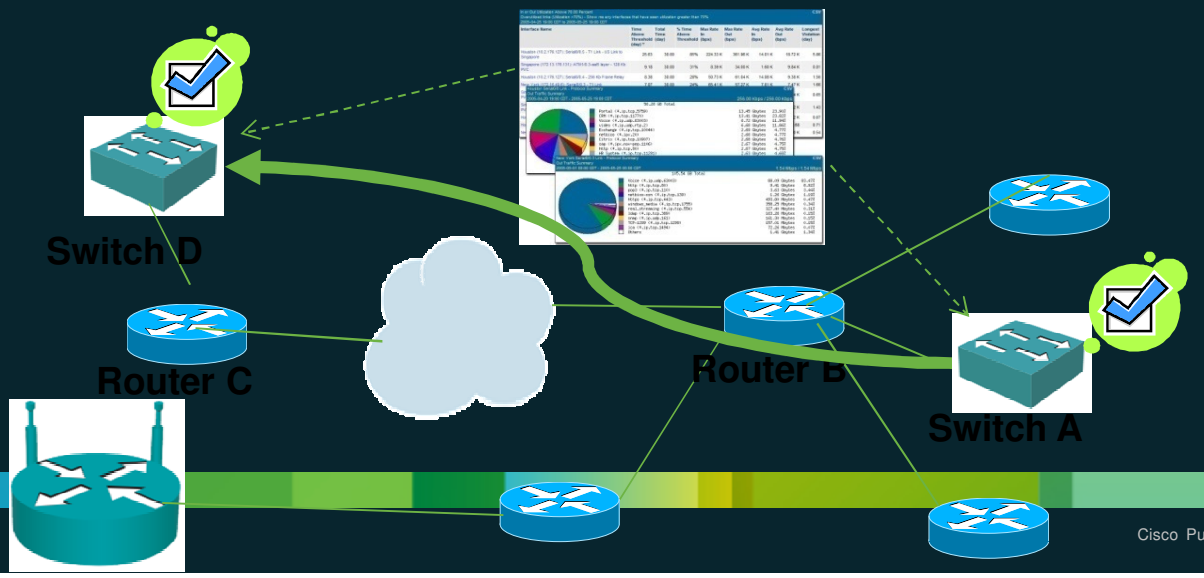
- **Solution Value**

  Clientless pre-deployment and provisioning for network readiness assessment and traffic modeling



IPSLA Video Operation

- Convenient for pre-deployment assessment, pre-event testing and post-event troubleshooting.
  - More bandwidth needed? Deploy PfR?
  - QoS needed?
- Fully integrated with IPSLA control and scheduling framework
- Extension to current IPSLA CLI and MIB interface to allow easy integration with NMS products
- Traffic is RTP: can use mediatrace and performance-monitor to do fault-isolation



Concluding Remarks

Media Monitoring - A Use Case Story

Using Performance Monitor, Mediatrace and IPSLA VO Together

Medianet Products

Autoconfiguration

Media Monitoring

Cisco webex

WBS27.FR26

Digital Media Player
4310G/4400

4300/4500 Series
HD Box Cameras

Media Services Interface

Medianet Services

Media Monitoring:
- Performance monitor
- Mediatrace
- IPSLA VO

Auto Configuration:
- Auto smart ports
- Location

Cisco ISR G2
2900/3900 Series
Cisco ISR
880/890 Series

Catalyst
2960S/2960
Series

Catalyst
3750/3560
Series

Catalyst 4500/
4900 Series
April 2012

Catalyst
6500/6500-E
Series

Cisco ASR 1000
Series
Nov 2011

Network Management

Cisco Prime:
Collaboration Manager 1.0
LMS 4.1

Cisco Developer
Network Tools

Medianet Readiness Assessment Service

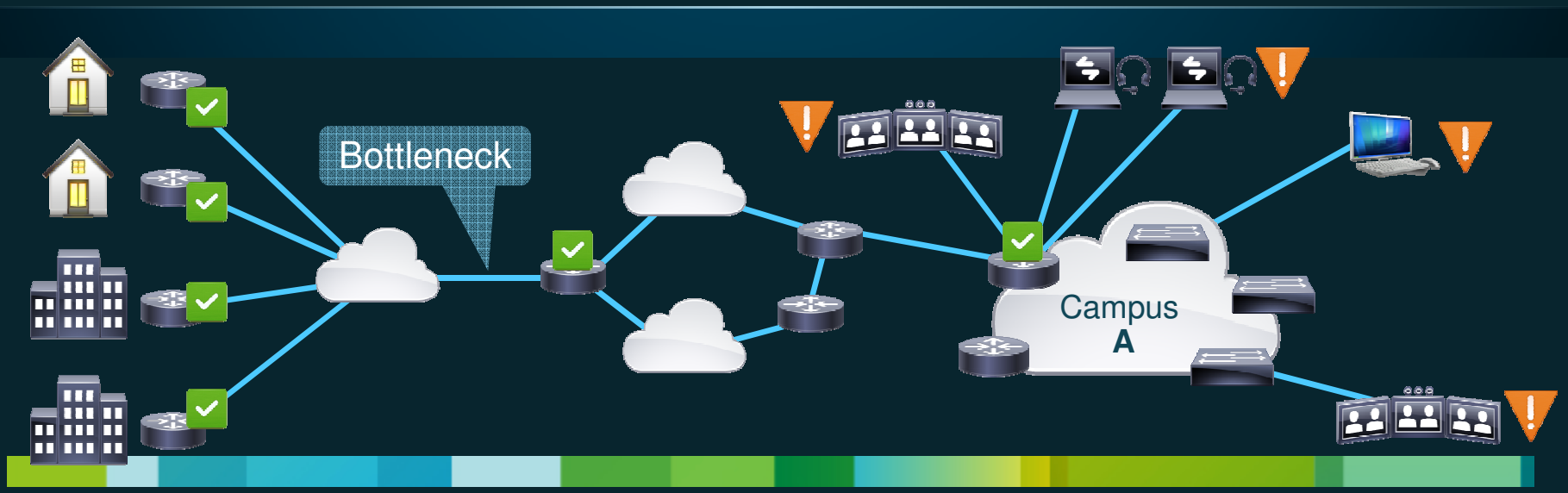
Datasheet: http://wwwin.cisco.com/marketing/medianet/files/data_sheet_c78-612429.pdf

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



Additional 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

Thank you.