Je vaše síť připravena na podporu multimedií?

COL1 / L2

Jiří Rott - Cisco
Agenda

Motivation

Medianet architecture framework

- Autoconfiguration
- Media Monitoring
- Media Awareness
- UC client support

Conclusion
Why video communication?

People remember ...

- 20% what they hear
- 30% what they see
- 70% what they see and hear

More than 60% communication is nonverbal

Resource: Human Productivity Lab
Pearn Kandola: The Psychology of Effective Business Communications in Geographically Dispersed Teams
Video transport specific

Different flow profile
Variable bit flow - **burstiness**
Extreme sensitivity to **packet loss** (compression ratios to 300:1)

<table>
<thead>
<tr>
<th>Application</th>
<th>Latency (VoD)</th>
<th>Jitter</th>
<th>Loss (VoD)</th>
<th>Loss (Live)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streaming Video</td>
<td>&lt; 1000 ms</td>
<td>&lt; 100 ms</td>
<td>&lt; 0.1%</td>
<td>&lt; 0.05%</td>
</tr>
<tr>
<td>Video Conferencing</td>
<td>&lt; 150 ms</td>
<td>&lt; 30 ms</td>
<td>NA</td>
<td>&lt; 0.10%</td>
</tr>
<tr>
<td>TelePresence</td>
<td>&lt; 150 ms</td>
<td>&lt; 10 ms</td>
<td>NA</td>
<td>&lt; 0.05%</td>
</tr>
<tr>
<td>Digital Signage</td>
<td>&lt; 1000 ms</td>
<td>&lt; 100 ms</td>
<td>&lt; 0.1%</td>
<td>0%</td>
</tr>
<tr>
<td>IPTV</td>
<td>&lt; 1000 ms</td>
<td>&lt; 100 ms</td>
<td>&lt; 0.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Video Surveillance</td>
<td>&lt; 1000 ms</td>
<td>&lt; 100 ms</td>
<td>&lt; 0.1%</td>
<td>&lt; 0.05%</td>
</tr>
</tbody>
</table>
Quality guarantee?
Even in LAN – marking, QoS implementation
CAC implementation (best RSVP)
Medianet
What is Medianet?

**Medianet is:**
- An architecture for successful deployment of multiple media and business applications

**Medianet solutions include:**
- Automatic, plug & play deployment
- Media performance monitoring, troubleshooting and capacity planning
- Media 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 in every hop
How Medianet Helps?

Smarter Video Endpoints

Auto Configuration
Automates deployment of video endpoints reducing costs

Media Monitoring
Simplifies and accelerates troubleshooting reducing costs

Media Awareness
Tightens integration between network and applications for enhanced quality of user experience

Smarter Network

Management
How Medianet Helps?

- **Auto Configuration**: Automates deployment of video endpoints reducing costs
- **Media Monitoring**: Simplifies and accelerates troubleshooting reducing costs
- **Media Awareness**: Tightens integration between network and applications for enhanced quality of user experience

**Smarter Video Endpoints**

**Media Services Interface**

**Smarter Network**
Medianet Plug & Play Configuration

Automatic Port Provisioning Based On Device Intelligence

- Upon endpoint connection, access switch gathers device intelligence via CDP, LLDP, MAC OUI etc
- Automatic port configuration of pre-defined macro based on device ID
- Built-in system macros and customizable
- Cisco Digital Media Players, IP Surveillance Cameras, IP phones, Access points

Autopros provisioning:

- PoE
- VLAN
- 802.1x
- QoS
- Location
How Medianet Helps?

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**Smarter Video Endpoints**

**Media Services Interface**

**Smarter Network**

**Management**
Troubleshooting the network or the application is not enough, an end-to-end view including network, endpoints, applications and management applications is needed.
Media Monitoring – Uses Cases

What path?
What / where is the problem?
Pre-deployment assessment / network validation?
Accounting, auditing & billing
Network monitoring solutions
Media Monitoring Network Services

**Performance Monitor:** Metrics, Fault isolation

**Mediatrace:** Dynamic monitoring, Path detection

**IPSLA Video Operation:** Assessment/network validation

Realistic Video Traffic

- Everything's OK
- Jitter affecting TP session
- Packet drops detected

Where is the problem?

Is my network ready for this application?
Performance monitor
IOS Performance Monitor

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 synchronized time windows for measurement

same 30 second intervals measured

Per-application threshold and altering.

NetFlow and MIB interfaces
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

Critical Message from 10.81.74.2
%PERF_TRAFFIC_REACT-2-CRITSET: TCA RAISE.

---

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
<0x03> src 151091109
<0x03> src port 16390, dst port 20828
Flow info: src ip 10.61.74.18, dst ip 10.00.14.24
Detailed info: Threshold value crossed - current value 3.21
%PERF_TRAFFIC_REACT-2-CRITSET: TCA RAISE.
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
Mediatrace components

**Requestor** - End video system, NMS, same node as initiator, remote router/switch

**Initiator** – include data

**Responder** – send data back to initiator

Different types of data requests
- **Hops** – hop discovery
- **System** – system information
- **Performance monitor** – runs perf-mon, and collects data

Multiple configuration possibilities
- **Poll** – simplest config, runs from IOS (wo level15)
- **Session** – allow periodical repeated requests and history
Mediatrace – Live Video Troubleshooting

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

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

Mediatrace: Hop by hop Collection of Statistics from the Media Path

Video Perf Measurement

Cisco Collaboration Manager

Mediatrace – Live Video Troubleshooting
IP SLA VO
IPSLA Video Operation Embedded Traffic Simulator

IPSLA known in industry for jitter, ICMP, etc. probes
Most probes measure experience without affecting user traffic
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
Management Solutions

- **Cisco Prime LAN Management Solution**
  - Medianet Readiness Assessment
  - Medianet “plug-in” provides workflows for provisioning autoconfiguration and location settings and tracking of Medianet endpoints

- **Cisco Prime Assurance Manager**
  - End-to-end proactive, network based monitoring, troubleshooting & analysis of application traffic
  - Supports a variety of sources including performance monitor

- **Cisco Prime Collaboration Manager**
  - Supports timely end-to-end visibility and isolation of video-related issues for TelePresence & Tandberg sessions
  - Provides deeper network path visibility with Mediatrace

- **CDN Partner Tools**
  - Tools from other vendors supporting Medianet features.
Ukázka Mediatrace a IP SLA VO
How Medianet Helps?

Smarter Video Endpoints

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- **Media Awareness**
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Smarter Network
Media Awareness
• How to enforce a consistent network policy when classification are not available along the path?
  Eg: Rule: Prioritize Voice communication from Mary to John?

• Endpoint can provide information not available or visible on the wire
Introducing Medianet Flow Metadata

### Flow Identifier

<table>
<thead>
<tr>
<th>IP Src</th>
<th>IP Dst</th>
<th>Prot</th>
<th>L4 Src</th>
<th>L4 Dst</th>
<th>Application</th>
<th>Vendor</th>
<th>Dial From</th>
<th>Dial To</th>
<th>Caller ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1.1.2</td>
<td>20.1.1.2</td>
<td>UDP</td>
<td>2000</td>
<td>4000</td>
<td>Video Conference (Audio)</td>
<td>Cisco</td>
<td>83922564</td>
<td>85268229</td>
<td>Albert Albatross</td>
</tr>
</tbody>
</table>

### Metadata

1. Application Creates Metadata
2. Metadata Announcement
3. Media Flow

QoS based on Metadata

Export of data to NMS
DSCCP Values Remarked

- OS (e.g. Windows) remarks traffic
- Security Policy: Do not trust DSCP markings from general purpose computers
- Limited SP DSCP values

Window remarks traffic even though the application correctly sets the DSCP values

Jabber/MSI generates metadata

Voice: set QoS policy

DSCP remarked for SP

Private MPLS and GETVPN

Service Provider supports limited DSCP values

QoS Policy driven by metadata

Traffic remarked back to enterprise values

Security Policy: Network does not trust any laptop or PC, remarks all traffic to best effort

OS (e.g. Windows) remarks traffic
Why Media Awareness?

<table>
<thead>
<tr>
<th>Example Policies</th>
<th>Example Use Cases</th>
</tr>
</thead>
</table>
| **QoS**          | • Prioritize 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 |
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Media Services Interface

Management
Media Service Interface

Media Services Interface (resides at the video endpoint):

- API
- Middleware
- Host Stacks / Protocols

**Management - Policy**

<table>
<thead>
<tr>
<th>Middleware/API</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP/DNS SD</td>
</tr>
<tr>
<td>SAF/XMPP/Bonjour</td>
</tr>
<tr>
<td>RTCP/SNMP/FNF</td>
</tr>
<tr>
<td>RSVP/QoS</td>
</tr>
<tr>
<td>802.1x</td>
</tr>
<tr>
<td>LLDP-MED</td>
</tr>
<tr>
<td>CDP</td>
</tr>
</tbody>
</table>

**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 PCs

PC based Applications
(WebEx, Jabber for Windows)
- Separate download on CCO (yes, it’s really ‘xxxMSI.msi’!)
- Needs Administrator Rights
- Runs as Windows Service
- Shared by all MSI-aware applications
  MSI services enabled (eg. CDP)

Embedded Applications
(EX, C Series, CTS)
- Included in application SW install

```
3945-BB0206-sw#show cdp neighbors fast0/6 detail
-------------------------
Device ID: MEDIANET-SITE
Entry address(es):
  IPv6 address: FE80::E499:2FBE:56A3:663A(link-local)
  IP address: 10.4.9.12
Platform: MSI on Windows,
Capabilities: Host
Interface: FastEthernet0/6,
Port ID (outgoing port): Local Area Connection
Holdtime : 165 sec
64 bit
```
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Smarter Network
Media Service Proxy
Metadata for non-MSI Devices

Devices that do not support MSI may be provided supplementary services by Media Services Proxy (MSP)

MSP generates metadata from gleaning of signaling (SIP, H.323, RTSP, mDNS, etc)
Medianet support
Medianet Feature Availability

**Auto Configuration:**
- Auto smart ports
- Location

**Media Monitoring:**
- Performance monitor
- Mediatrace
- IPSLA VO

**Media Awareness:**
- Media Services Proxy
- Flow Metadata

**Media Services Interface**

**Network Management**
- Cisco Prime: Collaboration Manager 1.1
  - LMS 4.1
- Cisco Prime Assurance Manager 1.1

**Medianet Readiness Assessment Service**

Conclusions

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, MSI

www.cisco.com/go/medianet
1) Potřebujeme prioritizovat komunikaci z Jabber klienta pod MS Windows. Jak?

Pomocí MSI. Nainstalujeme z CCO stránek jako admin.

2) Chceme použít Medianet nástroje. Musí je podporovat všechny prvky v síti Medianet?

Ne, stačí pokud je podporují prvky v důležitých uzlech.
Otázky a odpovědi

Zodpovíme též v “Ptali jste se” v sále LEO v 17:45 – 18:30
e-mail: connect-cz@cisco.com
Prosíme, ohodnoťte tuto přednášku.
Děkujeme za pozornost.