We’re ready.
Are you?
Enterprise Video Content
Cisco Capture - Transform - Share Solution
Robert Morris, Consulting Systems Engineer
Agenda

- Enterprise Video Recording and Streaming Update
- Demo
- Industry Streaming Technologies discussion
- Deployment Architectures
- Cisco Live Case Study
- Conclusion
Extend the Value & Reach of EVERY Video Endpoint

Turn your video endpoints into HD Broadcast & Recording Studio’s
Use Cases
Enterprise Video Content Platform

Knowledge Sharing & Training
- Training events and demos
- Lecture capture
- Team updates
- Webcasts and seminars
- Podcasts/video blog

Corporate Communications
- Town halls
- Live events
- Broadcast announcements
- Breaking news
- Team updates

Enhanced Business Meetings
- Business reviews
- Staff meetings
- Team updates
- Working sessions
- Planning meetings
TelePresence Content
Server Records and streams HD live video from H/323 / SIP Video-enabled endpoints.

Centrally managed, Rev management interface, hosted inside Customer Datacenter(s) or in the Cloud.

Distributed Media Engines collocated in datacenters, support scalable streaming and distribution.
TelePresence Content Server

- Record and stream video and synchronized presentations
- Up to 10 ports of 1080p Recording / 2 ports of Streaming
- Live and on-demand streaming
- Cluster up to 10 TCS's (100 ports of Recording)
- Record scheduled (TMS) and ad hoc calls
- Premium resolution option (up to 1080p30)
- Secure Calling
- Flexible Deployment: Appliance, VM, BE6000
- Integration with CUCM

Capture
Record and stream HD live video from H/323 / SIP Video-enabled endpoints

Share any Content
Share presentations, document camera, desktop synchronized with video

Distribution
Multiple live streaming formats
Open APIs
Introducing Rev
The Enterprise Video Portal

- Next Generation Enterprise Video Portal
- Video on Demand and Live Events
- Cloud/On Prem/Hybrid Deployments
- Mobile friendly HTML5/Responsive design
- Enterprise Security
- Multi-tenant portals
- Integrated Streaming and eCDN
Advanced Video streaming technology
- BYOD/Mobile

Solving the Enterprise Video Distribution Challenge
- ‘I have dozens of telepresence endpoints, but 1000’s of live streaming viewers’

Flexible deployment options
- Virtual and appliances available
Distribution Challenge: Cloud

Unicast connections from the public internet quickly clog the network connection for everyone.
Centralizing content at a single site quickly results in too many connections over the corporate network.
Distribution Challenge Solved: Cloud
Distribution Challenge Solved: On Prem
DME Distribution Functions

Enterprise Content Distribution (ECDN)

- DME can take single live stream across the WAN and deliver to all 50 users on the LAN
- DME can preposition and cache VoD content locally and playback on LAN
- Consider a remote site with 50 users watching a 1Mbps live stream – how much bandwidth?
# Rev & SnS Comparison

<table>
<thead>
<tr>
<th></th>
<th>Rev</th>
<th>SNS</th>
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</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Cloud/On Prem/Hybrid</td>
<td>Appliance</td>
</tr>
<tr>
<td>Mobile</td>
<td>Native/HTML5</td>
<td>iOS app only</td>
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<tr>
<td>Scale</td>
<td>Horizontal Scalability</td>
<td>&lt;4000 concurrent</td>
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<tr>
<td>High Availability</td>
<td>Distributed</td>
<td>Active/Standby</td>
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<tr>
<td>Video Distribution</td>
<td>DME</td>
<td>ECDS</td>
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<tr>
<td>Licensing</td>
<td>User based</td>
<td>Author Based</td>
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</table>
## Previous Generation CXS Solution Components

<table>
<thead>
<tr>
<th>Cisco Product</th>
<th>Recording / Streaming</th>
<th>Transcoding</th>
<th>Video Portal</th>
<th>Live Events</th>
<th>Management/ Reporting</th>
<th>Streaming Origin Server</th>
<th>Content Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>TelePresence Content Server (TCS)</td>
<td><img src="image1" alt="Recording and Streaming" /></td>
<td><img src="image2" alt="Transcoding" /></td>
<td><img src="image3" alt="Video Portal" /></td>
<td><img src="image4" alt="Live Events" /></td>
<td><img src="image5" alt="Management/ Reporting" /></td>
<td><img src="image6" alt="Streaming Origin Server" /></td>
<td>ECDS</td>
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<tr>
<td>Cisco MXE 3500</td>
<td><img src="image7" alt="Show and Share VOD Portal" /></td>
<td><img src="image8" alt="Show and Share Live Event Module" /></td>
<td><img src="image9" alt="Digital Media Manager" /></td>
<td>Wowza</td>
<td></td>
<td></td>
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</tr>
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</table>
**New CXS Solution Components with Rev**

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<td><img src="image" alt="Streaming Origin Server" /></td>
<td><img src="image" alt="Content Distribution" /></td>
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<tr>
<td>Rev</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Distributed Media Engine (DME)</td>
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<td></td>
</tr>
</tbody>
</table>

**Next-Gen REV dramatically simplifies the architecture**

- Cross-platform mobile support
- Cloud, On-premise and Hybrid deployment options
- Distributed, Elastic, and Highly Available
- Integrated streaming and content distribution
Automated Workflow

Use Cases
Any Video Endpoint (H.323 or SIP)
• Corporate training, education
• Organizational communications
• Town hall live events
• Enhanced meetings

YouTube for the Enterprise

Content Distribution Network

AUTOMATED WORKFLOW: Easy / integrated / pervasive

TelePresence Content Server (TCS)
• Recording / streaming in the network
• Turns every TelePresence endpoint into a HD broadcast / streaming studio
• Full integration with TMS, CUCM

Rev Enterprise Video Portal
• Cloud Native Architecture
• Mobile support with HTML 5/Responsive Design
• Modern, consumer friendly UI
• Video-on-Demand and Live streaming Events
• Flexible Deployment options

Distributed Media Engine (DME)
• Advanced Streaming technology
• Distributed streaming architecture
• Scales Video distribution across the Enterprise
TCS Design and New Features
TCS Deployment Discussion
All-in-one video recording & playback

- TCS has SIP trunk to CUCM
- CUCM has route pattern to TCS prefix
- Video Codec calls TCS via SIP signalling
- TCS receives dual stream (main+presentation) H264 video, composites the streams into a single output
- PC user accesses TCS portal via HTTP
- User Views VoD via Flash player on TCS portal

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Overview of New Features

Windows Server 2012 support (TCS 7.0)
- Server 2012 removes support for Windows Media Streaming

Support For SIP Trunk On CUCM (Min 10.5.1 CUCM)
- TCS supports both trunk and terminal modes in SIP and also supports switching between these two modes.

SIP Cluster
- TCS supports a cluster of 10 nodes using SIP protocol.
- Call load distribution and load balancing is managed by CUCM via Route Group, round-robin

TCS on BE6K features
- 2 ports, for one On Demand and one Live call
TCS New Features - Caveats

Windows Server 2012 support (TCS 7.0)
- Server 2012 removes support for Windows Media Streaming
- Use external streaming server (Wowza standalone or DME with Rev)

Support For SIP Trunk On CUCM (Min 10.5.1 CUCM)
- Pin-Protected dial out not supported with SIP calls
- Audio only not supported with SIP calls

TCS on BE6K features
- Windows media is not supported for BE6K.
REV/TCS integration

• TCS can publish to external streaming server (DME)
  • Supported in TCS 6.2.1 and above
• DME has built in interface to Rev
• Allows seamless publishing from TCS to Rev
Rev New Features
Rev/Webex CMR Integration

- Allows user to import one/multiple recordings from their CMR
- Uses Webex CMR APIs to retrieve recording list and .mp4 recording
- Only works with Cloud CMR today (requires .mp4 recording)
Public Webcast

• Allows users to register with email and view a webcast marked as ‘Public’

• Enables B2B and Public facing webcasts from Enterprise Video platform

• Separately licensed
  • Based on viewer hours/year
  • License includes Internet CDN delivery
  • Does not require user license
Closed Captions
Closed Captions/Speech Search

Steve Jobs on Computer Science

Steve Jobs discusses why computer science should be a required course as early as high school.

Uploader: Tammy Butcher
Upload Date: Dec 2, 2015 10:11 AM

00:03 Steve Jobs started creating his computer programming video series early in his career.
00:10 He thought computer science should be a liberal art and computer programming should be available to everyone.

SEARCH RESULTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>UPLOAD DATE</th>
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<tbody>
<tr>
<td>When Black Holes Collide</td>
<td>Nov 16, 2015 9:29 AM</td>
</tr>
<tr>
<td>What do you think happens when two black holes meet but this is scientific</td>
<td>00:00</td>
</tr>
<tr>
<td>Eventually when the two super massive objects get close enough</td>
<td>00:37</td>
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<tr>
<td>When it was</td>
<td>00:23</td>
</tr>
<tr>
<td>The Loneliest Place in the Universe</td>
<td>Nov 16, 2015 9:29 AM</td>
</tr>
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<td>With its lack of math is akin to a hill when light travels up that hill</td>
<td>01:09</td>
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<tr>
<td>That is when it comes down the other side of the hill but because the hill is too steep than it was when the lake lined up</td>
<td>01:20</td>
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<td>The Way We Think about Work Is Broken Barry Schwartz TED Talks</td>
<td>Nov 16, 2015 9:42 AM</td>
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<td>Filled with bouncing from one tenth like adventure when other you may be asking</td>
<td>00:27</td>
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<td>You can't get help anymore when you give people work to do that is demeaning</td>
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<tr>
<td>More created when it is discovered we design human nature by designing the</td>
<td>07:27</td>
</tr>
</tbody>
</table>
Q&A with Moderation Teams

Upgrade webcast administrator view

Flexible layouts

Enables support for future modules
Standalone Q&A View

Shared question inbox

Create a speaker queue on the fly

Track closed questions for easy access during events and post event follow up
eCDN Dashboard

View real-time stats of every DME

Quickly find issues in the distribution network

View real-time usage on each DME throughout the network
Rev Create

- Editing and Desktop creation tool
  - Installed locally on PC/Mac
- Capture webcam and desktop
  - Resizable window capture
- Trim, stitch, upload to Rev
Spark Integration

- Subscribe category to Spark room
- Share individual video to a Spark room
- 7.8 release of Rev (available now)
Streaming Technology Concepts
Streaming Technology Overview

Protocols for delivering streaming video

- **HTTP**
  - Single, large file delivered
  - Maximum compatibility
  - Not really streaming, can’t skip ahead

- **RTMP**
  - Adobe Flash standard
  - Protocol sends segments of original video
  - Streaming, skip ahead

- **HLS (HTTP Live Streaming)**
  - Apple Standard, used by Mobile Devices
  - File is ‘pre-chunked’ into many smaller files
  - Manifest file is an index of the smaller files
  - Chunks are delivered via HTTP
Adaptive Bitrate Discussion

One video, multiple quality levels

- Every File is created at multiple quality/bitrate levels
- Player detects bandwidth and requests appropriate quality/bitrate
- Quality of playback can go up/down over time based on network conditions
- Especially important for mobile devices/networks
Multicast Considerations
When and where to use it

• No Mobile (iOS/Android/etc) Support
• Does not help with VoD delivery
• Wifi considerations

• Protocol Support
  • Windows Media: Legacy, no longer in development
  • RTP/TS: broadcast standard
  • Flash (RTMFP)

• Player Support
  • Windows Media Player: Only windows desktops, legacy
  • Vbrick player: supports RTP/TS multicast,
    • requires player installation (Win/Mac OS)
  • Flash Player: Rev/DME support, best option today
Enterprise Content Distribution Network (eCDN)
Enterprise Content Distribution Network (eCDN)

- Intelligent distribution is essential to scale video delivery
- DMEs are the nodes of an eCDN, controlled by Rev
- Use DME to bring content in from Rev in a Cloud/Hybrid design
- Use DME to distribute live and on-demand content to multiple locations in the network
DME Packaging

3 sizes
• Small/Medium/Large

Virtual Machine
• Spec based virtual machine
• Virtual deployed as OVA file
• Hardened Linux OS

Hardware Options
• Certified on UCS-E/SRE modules in ISR routers
• Available UCS hardware (CVC-DME-S/M/L)

<table>
<thead>
<tr>
<th></th>
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<th>Medium</th>
<th>Large</th>
</tr>
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<tbody>
<tr>
<td>Concurrent Users</td>
<td>100</td>
<td>1000</td>
<td>2200</td>
</tr>
<tr>
<td>Total Streaming bandwidth (mbps)</td>
<td>250</td>
<td>500</td>
<td>3000</td>
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<tr>
<td>CPU Core Count (minimum)</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Memory (GB, minimum)</td>
<td>4</td>
<td>16</td>
<td>32</td>
</tr>
</tbody>
</table>
DME deployment

- Deploy DME
- Point DME to Rev
- Activate DME in Rev
eCDN Zone Mapping

- Create Zone
- Place Zones in a hierarchy for fallback/resiliency
- Assign IP address range for the Zone
- Assign DME for that IP address range to use
- Rev will now redirect users who match that zone to the appropriate DME for playback
NAT traversal to see real IP address

- Rev (in a cloud deployment) would see the NAT’d address of clients connecting to it
- Rev Zones need real/internal IP to map to correct DME
- Use Rev ‘User Location’ Service to relay real/internal IP address for correct zone mapping
- Rev instructs client to connect to internal DME, DME securely relays real/internal IP address to Rev
- DME requires SSL cert installed
What about WAN optimization?

- WAN optimization like Cisco WAAS with Akamai Connect can cache live and on-demand HLS (http-based) video
- WAAS provides optimization across a wide range of services (file, web, email, video, SAAS, etc.)
- No automated way to pre-position content
- Possible issues with multi-bitrate video delivery depending on network (use single bit-rate)
Rev Architecture and Design
Rev On-Premise Requirements

- 3 VMs
  - Runtime (web server, application)
  - Database (Mongo based, distributed database)
  - Search (Elastic Search based)
- Certified on Ubuntu 12.x and RedHat 6.x Linux
- Sizing table at right tested to 5000 users in Live-event scenario, additional scale by adding more VMs.
- Redundancy is provided in ‘Odd’ numbers
  - Minimum redundant configuration requires (3) physical servers
- Load balancer required for redundant deployments
- External NFS storage recommended

<table>
<thead>
<tr>
<th></th>
<th>Rev Runtime</th>
<th>Mongo</th>
<th>Elastic Search</th>
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</thead>
<tbody>
<tr>
<td>CPU Core count</td>
<td>16</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>(virtual)</td>
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</tr>
<tr>
<td>Memory (GB)</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Storage</td>
<td>150 GB min</td>
<td>250 GB min</td>
<td>250 GB min</td>
</tr>
</tbody>
</table>

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On-Premise Single Physical Server Deployment Model – **Basic Installation**

- **Physical Server**
  - Rev #1
  - 16 vCPU
  - 16 GB RAM
  - 150GB + OS

- **MongoDB #1**
  - 8 vCPU
  - 16 GB RAM
  - 250GB + OS

- **ElasticSearch #1**
  - 8 vCPU
  - 16GB RAM
  - 250GB + OS

Basic non-HA installation

Single UCS C220M4 server or spec based VMs

Support for up to 5000 concurrent sessions

Installed via OVA and install script
This is a basic installation using the Rev installer.

VBrick can provide a load balancer using HA Proxy when customers do not use their own.

File storage must be attachable as an external drive (e.g. z: drive) and attached to the Rev Runtime servers.
Recommendation for on-prem deployments is that customers bring their own load balancers and file storage.

File storage must be attachable as an external drive (e.g. z: drive) and attached to the Rev Runtime servers.

Elastic and MongoDB both require an odd number of instances for a quorum to maintain operability in the event of a failure.

This ensures the work load will be distributed to the correct nodes of each if there is a VM failure or server failure.
# DME Packaging

## 3 sizes
- Small/Medium/Large

## Virtual Machine
- Spec based virtual machine
- Specific UCS SKU’s available
- Certified on ISR SRE’s/UCS E-series
- Virtual deployed as OVA file
- Hardened Linux OS

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Deployment Architectures
Cloud-Hybrid Deployment

- Internet Users play VoD and Live video from Public CDN
- Users access Rev Portal via browser over HTTPS
- Rev pulls recordings from Cisco Webex CMR via Webex APIs
- DME sends TCS VoD Live video to Rev. Rev sends uploaded videos to internal DME(s)
- DME pushes VoD and Live video to remote DME(s)
- TCS pushes VoD and Live Video to DME
- Users access Rev Portal via browser over HTTPS
- DME sends TCS VoD Live video to Rev. Rev sends uploaded videos to internal DME(s)
- DME pushes VoD and Live video to remote DME(s)
- Rev pulls recordings from Cisco Webex CMR via Webex APIs

TCS
- ix5000
- DX80
- Jabber
- SIP

CUCM

H264 video

PUBLIC CDN

Cisco Webex

Internet Users

Users play VoD and Live video from Public CDN

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On Premise Deployment

Rev pulls recordings from Cisco Webex CMR via Webex APIs

Internet Users play VoD and Live video from Public CDN

On Prem Rev can be configured to push to Public CDN (not provided)

TCS Pushes VoD and Live Video to DME

DME sends TCS VoD and Live video to Rev. Rev sends uploaded videos to internal DME(s)

Users access Rev Portal via browser over HTTPS

DME pushes VoD and Live video to remote DME(s)

DME sends TCS VoD and Live video to Rev. Rev sends uploaded videos to internal DME(s)

Zone 1

Zone 2

Zone N

DME Pulls recordings from Cisco Webex CMR via Webex APIs

Users play VoD and Live video from nearest DME

Users access Rev Portal via browser over HTTPS

DME pushes VoD and Live video to remote DME(s)

Rev pulls recordings from Cisco Webex CMR via Webex APIs

WEB EX CMR via Webex APIs

On Prem Rev can be configured to push to Public CDN (not provided)
Cisco Live Case Study
You Already Know This Solution!

TCS in use at Cisco Live!

Every Session from Cisco Live! the last 3 years running was captured using Capture-Transform-Share
CXS at Cisco Live!

- 36 breakout rooms were outfitted with a C90 Codec, connected to:
  - Cisco onsite network, private VLAN
  - Speaker PPT feed from laptop (VGA)
  - Cisco camera (HDSDI & control)

- Scheduling
  - All sessions were entered into the TMS scheduling system, and set with 2 participants: room codec & TCS recording port.

- Monitoring
  - The content editors monitor the feeds from the rooms, and move the camera if the speaker wanders off.
  - If they see an issue, the codec team is contacted via radio and immediately responds.
Results

- Over 250 session recordings (400+ hours of on-demand video content)
- 3 trained content editors (no previous TelePresence experience)
- Total Cisco on Cisco deployment: UCS, VXI, TMS, CUCM, TCS
- On-demand content made available to attendees within 3 business days, inside CiscoLive365.com
- 25% more sessions captured, with video, at 30% of the cost of the previous year with outsourced provider.
Recording and Live Streaming Solution with CXS

Leverage Cisco Unified Communications Platform to communicate with the entire organization using Live streaming and On-Demand video.

- Easily Record and live stream from video endpoints
- Extend the reach of video to 10’s of thousands of viewers
- Audience interaction with real time chat, polling, Q/A
- Single Repository for all Video Content

CiscoLive!
Key Take-Aways

- **Integrates Seamlessly** with Cisco TP solutions and many open standards video endpoints extending the value of existing and new Cisco Unified Communications solutions

- Deployment flexibility provides for on-prem, cloud-based, and hybrid models. Each solution provides a **scalable management platform**

- **Scalable distribution model** allows for substantial room for growth of live events.

- VOD support with local office caching allows playback of live events and recorded content while **minimizing impact on network**.

- High impact use cases for video: **Corporate Training – Executive / CEO Broadcasts – Recording & Streaming Meetings – Enterprise Video Sharing Portal – Corporate Communications – etc…**

- **Extend the value & reach of any video endpoint by turning it into a broadcast & recording studio**
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