Designing and Deploying Multiparty Conferencing for Telepresence Video

Abhijit Dey, Technical Marketing Engineer
Albert Amparan, Technical Marketing Engineer
Questions?
Use Cisco Spark to communicate with the speaker after the session

How
1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install Spark or go directly to the space
4. Enter messages/questions in the space

cs.co/ciscolivebot#BRKCOL-2803
Agenda

- Introduction
- Cisco Meeting Server
- Platform Options
- New in Cisco Meeting Server
- Scheduling & Management
- Microsoft Interop
- Video Architecture
A Day in the Life of a Collaboration User

- Video Meeting?
- External Participants?
- Compatible Solutions?
- Share Content?
Cisco Meeting Server
Integrating the silos

Enterprise UC Client
Microsoft Lync / Cisco Jabber

Video-Conferencing / Telepresence
Cisco, Polycom

Audio & Web-Conferencing

IP Telephony Platform
Multi - Vendor

Cisco Meeting Server
What is a Space?

- A Space is an always available personal meeting room.
- Users can have multiple Spaces.
- Participants dial consistent addresses to reach a Space.
- Participants can be Voice/Video/Web/Skype and have a consistent experience.
- Synced from Active Directory.
- Can be defined via API or from admin UI.
Joining a Space …

• **Personal meetings**
  - Invite others to your personal meeting using your own join details

• **Scheduled meetings**
  - Cisco TelePresence Management Suite (including Microsoft Outlook integration)
  - One-Button-to-Push support

• **Ad hoc conference with UCM**
  - Escalate 1:1 calls to add participants

SIP Endpoints Dial: conference@mysystem.com

CMA WebRTC Go to: https://join.mysystem.com

CMA Go to: your personal Space

S4B OnPrem / O365
Click: [Join Skype Meeting](https://join.mysystem.com)

Phone Dial:
+1(408)555-5555

Click: [Join Skype Meeting](https://join.mysystem.com)
Cisco Meeting Server Architecture

Architectural Components

- **Web Admin** – Enables GUI for the Server
- **Call Bridge** – Audio, Video & Content Conferencing Component
- **Database** – Stores information about Spaces
- **Web Bridge** – Enables joining through WebRTC based clients
- **XMPP Server** – Registration & Signaling for CMA and WebRTC clients
Cisco Meeting Server Architecture

Architectural Components

- **Load Balancer** – Load Balancer for XMPP Server
- **TURN Server** – Firewall Traversal for SIP media
- **Recorder** – Records Conferences on CMS Server
- **Streamer** – Streams Conferences from CMS Server
Cisco Meeting Server Deployment

Single Server Deployment

In the DMZ

Web Admin

Call Bridge | Web Bridge | Load Balancer | Recorder
---|---|---|---
Database | XMPP Server | TURN Server | Streamer
Cisco Meeting Server Deployment

Split Server Deployment

Core Components in the Datacenter

<table>
<thead>
<tr>
<th>Call Bridge</th>
<th>Web Admin</th>
<th>Recorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>XMPP Server</td>
<td>Streamer</td>
</tr>
</tbody>
</table>

Edge Components in the DMZ

<table>
<thead>
<tr>
<th>Web Bridge</th>
<th>Load Balancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Admin</td>
<td>TURN Server</td>
</tr>
</tbody>
</table>
CallBridge Clustering

- Cluster to increase scale
- Cluster up to 8 CMS Servers (8+ with BU involvement)
- RTT of 300ms within cluster
- Active-Active Redundancy
  - All the servers can receive calls
  - Participants can be on any CallBridge and still be in the same conference
  - 9 participants on the cascade link (preview from CMS 2.3 onwards)
CallBridge Clustering
CallBridge Groups and Intelligent Load balancing

- To group CallBridges in same Location
- Enables rejecting calls than reducing resolution when capacity is reached
- CallBridge Groups require Cisco Call Manager
  - Requires “INVITE with Replaces” (not supported by Cisco VCS)
  - RTT of 100ms within CallBridge Group,
- Enables Load Balancing of CallBridges within same CallBridge groups
  - Incoming calls (CMS 2.1 onwards)
  - Outgoing calls (CMS 2.2 onwards)
- Maximum load percentage for callBridge
- Maximum percentage of free capacity before rejecting existing conferences
- Maximum percentage of free capacity before rejecting new conferences
Database Redundancy

- Active-Standby
- Cluster, min 3 and max 5
- Max latency = 200 ms RTT
- Might or might not stay on the same CallBridge
- 1 database per location recommended
- Upgrade the database schema manually before upgrading the callBridge to new release
- Read-Write only on the Master node
Cisco Meeting Server
Recorder Deployment

**Recorder**
- 720p30 H.264 Video Coding
- 64kbps AAC-LC
- 2 recordings per physical core
- 16 physical core maximum
- Requires Recorder license

**NFS Sizing**
- Maximum 1GB per hour

**Diagram:**
- XMPP Server
  - Call Bridge
  - Recorder
  - Recorder acts as client to XMPP server

**Network File Server (NFS)**
Cisco Meeting Server 2.1
Streamer Deployment

**Streamer**

- RTMP stream to external streaming server with bitrate of 2Mbps
- 720p30 H.264 Video Coding
- 64kbps AAC-LC
- 6 streams per vCPU and 1GB of memory
- Maximum 32 vCPUs
- Use recorder licenses for streaming Sizing

Streamer acts as client to XMPP server

![Diagram](rtmp://xxx/xxx)
Recorder & Streamer Redundancy

- 1 Recorder/Streamer for multiple CallBridges
- License needed on CallBridge hosting the recording/streaming, not on the recorder/streamer server

CallBridge Group 1
  - CMS1
    - CallBridge 1
    - XMPP 1
  - CMS2
    - CallBridge 2
    - XMPP 2

CallBridge Group 2
  - CMS3
    - CallBridge 3
    - XMPP 3

- CMS3
  - Recorder 1
  - Streamer 1
Recorder & Streamer Redundancy

- Multiple Recorders/Streamers for 1 CallBridge
- Active-Active redundancy
Cisco Meeting Server Administration

Mainboard Management Processor (MMP)
- Command Line Interface (CLI)
  - Console
  - SSH
  - Low Level Configuration

Browser Interface
- WebAdmin Interface
  - Call Bridge User Interface
  - HTTPS access

Application Programming Interface (API)
- Enhanced integration capability
- ReST API Methods
  - GET
  - POST
  - PUT
  - DELETE

SFTP Interface
- CMS file access
  - Upgrades
  - Backup/restore
  - Certificate file management
Platform Options
Cisco Meeting Server 1000
Virtualized Platform

- 1RU UCS
- Virtualized Platform:
  - VMware ESXi 6 and above
  - 70 Hyper-threaded cores
  - Co-residency not supported
  - Virtual Machine version 11 and above
- Supports SIP:
  - Trunk to CUCM
  - Trunk to VCS/Expressway
  - Trunk (Trusted) to Lync/Skype for Business
- 96 HD calls
- 3000 audio calls

Cisco UCS C220 M4
Cisco Meeting Server 2000
New High Capacity Platform

- 6RU UCS
  - UCS 5108 Chassis with 8 x 6324 Fabric Interconnects
  - 8 x B200M4 Blades
- Complimentary to CMS 1000
- Sold as appliance – bare metal hardware
- Supports core components only
  - CallBridge
  - WebBridge
  - XMPP Server
- 700 HD calls (CMS 2.3 MR onwards)
- 3000 audio calls
- Enable conferences to span all blades (CMS 2.3 MR onwards)

CMS 2.3 ML Coming Soon
## Cisco Meeting Server 1000 vs 2000
### Platforms – IMPORTANT Differences

<table>
<thead>
<tr>
<th>Feature</th>
<th>CMS 1000</th>
<th>CMS 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Capacity</td>
<td>96 720p HD Ports</td>
<td>700 720p HD Ports (CMS 2.3 MR onwards)</td>
</tr>
<tr>
<td>Audio Ports</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Can be clustered</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Requires VMWare</td>
<td>Yes</td>
<td>No – Bare Metal</td>
</tr>
<tr>
<td>CMS Core Services</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CMS Edge Services</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CMS Recorder Support</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CMS Streamer Support</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
# CMS Sizing Guidelines

<table>
<thead>
<tr>
<th>Platform (CMS Core)</th>
<th>CPU / RAM (Recommendation)</th>
<th>CPU Hyperthreading</th>
<th>Capacity (Participants)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co Localized VMs (BE6k / BE7k)</td>
<td>2.5 Ghz Intel Xeon CPU 1 GB RAM per CPU core</td>
<td>Disabled</td>
<td>1.25 HD ports per CPU core</td>
</tr>
<tr>
<td>Standalone VM</td>
<td>2.5 HD ports per CPU core</td>
<td>Enabled</td>
<td>2.5 HD ports per CPU core</td>
</tr>
<tr>
<td>CMS1000</td>
<td>NA</td>
<td>NA</td>
<td>96 HD</td>
</tr>
<tr>
<td>MM 410 (legacy)</td>
<td>NA</td>
<td>NA</td>
<td>64 HD</td>
</tr>
<tr>
<td>MM 400v (legacy)</td>
<td>NA</td>
<td>NA</td>
<td>32 HD</td>
</tr>
</tbody>
</table>

Note: CMS Edge sizing is not linked to port capacity. Edge VMs that connect to a single CMS Core use 4 cores and 4 GB vRAM. In other cases use 8 cores and 8 Gb vRAM.

Note: Meeting recording has (limited) impact on resource consumption & platform capacity. For assured capacity, it is recommended to enable the recording service on a dedicated VM (4 cores & 4 GB vRAM) - will allow 8 simultaneous recordings.

1 HD = 720p30 main video + 720p5 content

Estimated resources capacity for:
- 1080p30 : x 0.5
- 720p30 : x 1
- 480p30 : x 2
New in Cisco Meeting Server
Cisco Meeting Server 2.3 Release

**CMS 2.3**
- CMS2k – 40% capacity increase (Feb 18 release)
- Improved quality with S4B
- H.264 High Profile – ease Polycom migrations
- Enhanced VBrick integration
- Cross cluster experience improvements

**CMA 1.10**
- New User Experience with improved workflows & new use cases
- Includes new CE endpoint joining plus share content at 30fps
- In-Meeting Controls
- WebRTC browser improvements

**CMM 1.0**
- New platform for CMS Management
- Initial delivery – “White glove operator service” to manage active meetings across CMS cluster
- Included with existing CMS licensing
New Web Bridge

- New Cisco Meeting App WebRTC and Cisco Meeting App (CMA) 1.10
  - Supports CMS 2.2 (CMS 2.3 recommended)
- CMA 1.10 needs CMS Edge (Expressway Support coming soon)
- New Features – Intelligent Pairing (CMA only), Enhanced Search, Mute all, Lock/Unlock.
- Validates XMPP server certificate (CMA WebRTC)
- Load Balancing between WebRTC participants & Cisco Meeting Apps (CMA 1.10 onwards). On by default. To disable:
  - `/callBridgeGroups`
  - `loadBalancingEnabled = true`
  - `loadBalanceUserCalls = false`
New Web Bridge

• Passcode applied same time as Guest ID.

• The legacy mode for guest access on the Web Admin interface (Configuration>General> Guest access via ID and passcode) has no effect. From version 2.3, if passcodes are required for guest, then the passcode needs to be supplied at the same time as the guest id.

• Web Bridge can only be customized through the API. Only Following can be customized:
  • Text on browser tab (browserTabLabel in sign_in_settings.json)
  • Sign in background image for WebRTC app (sign_in_background.png)
  • Sign in logo (sign_in_logo.png)
  • Text below sign in logo (panelLabel in sign_in_settings.json)
Miscellaneous Features

- You can prevent incoming audio-only calls from creating video streams for outgoing calls to a new destination when the Meeting Server acts as a gateway.
  - `callProfile`
    - `audioGatewayCallOptimization = true`
  - Note - *The outgoing call leg will remain audio-only, even if the incoming call leg later changes to audio and video.*
  - Note - *This feature requires ‘early offer’ enabled on Cisco Unified Communications Manager deployments.*

- Support for ESXi 6.5 and also ESX 6.0 Update 3 on the Cisco Meeting Server 1000 and on generic Cisco Meeting Server VM deployments.
Miscellaneous Features

• Support for TLS 1.2 by default. To reduce TLS version:
  • MMP Interface:
    • tls <service> min-tls- version <minimum version string>
  • Note - 
    *CUCM 11.5(1)SU3 and earlier versions only support TLS 1.0.*

• Dual Screen endpoints now enabled by default. To Disable:
  • /compatibilityProfiles/<compatibilityProfileId>
    • sipMultistream = false
  • /system/profiles
    • Apply the above compatibilityProfileId
CMA WebRTC
Login Page Screenshots

Users Log In

Guests Log In

Landing Page
CMA WebRTC
User Interface Screenshots

New Meet Button

Advanced Search & Recent Spaces
CMA WebRTC
User Interface Screenshots

Join Abhijit Dey's Space

No Audio/Video
Can Chat
Meeting Controls
CMA WebRTC
In Meeting Control Screenshots

Add participants

Name, address or number

Participants

In call

AD Abhijit Dey
CMA WebRTC
In Meeting Control Screenshots

Controls

Recording and Streaming

Recording

Streaming

Muting

Audio - all participants

Video - all participants

Layouts

All Equal

Speaker Large

Speaker Only

Audio Only

Presentation

Presentation and Video
Cisco Meeting App

Video and Bandwidth Settings
Increase Panes Across Distribution Links

• Prior to CMS 2.3 a maximum of 4 remote participants could be sent across distribution links.

• CMS 2.3 increases this number to 9 streams

• Bandwidth requirement of 2Mbps or greater on link
  • Not linear
  • BW<2Mbps = 4 panes
  • BW>2Mbps = 9 panes

• Enabled via API or Web Admin UI
Recording with VBrick
Better Cisco Collaboration Experience

- Simplify pushing recordings to the VBrick Rev platform.
- **Uploader** component will enable Automatic pushing of recordings from NFS to Vbrick.
- Read/ Write permissions on NFS. Rewrites the file name while uploading. Marks file as uploaded once uploaded.
Recording with VBrick
Better Cisco Collaboration Experience

- Uploader component should not be enabled on Call Bridge.
- Can be on Recorder, add couple of vCPUs.
- Dedicated Server – 4 physical cores, 4 Gb RAM.
API Additions

• Control whether call legs can add other participants
  • addParticipantAllowed = true/ false
    • PUT /calls/<call id>
    • PUT /calls/<call id>/callLegs
    • PUT /calls/<call id>/participants
    • PUT /callLegProfiles
    • PUT /callLegProfiles/<call leg profile id>
    • GET /callLegs/<call legid>/callLegProfileTrace

• Control whether call legs using a specific callLegProfile can change the importance of participants in the call
  • setImportanceAllowed = true/ false
    • /callLegProfiles
    • /callLegProfiles/<call leg profile id>
API Additions

• Control whether a Cisco Meeting App user can send email invites
  • canSendEmailInvite = true / false
    • /userProfiles
    • /userProfiles/<user profile id>

• Control whether a Cisco Meeting App user is allowed to change non-member access
  • canChangeNonMemberAccessAllowed = true / false
    • /coSpaces/<coSpaceid>/coSpaceUsers/<coSpace user id>
API Additions

- Identify the call type of an individual active call
  - callType = coSpace / forwarding / adHoc / lyncConferencing
    - /calls/<call id> (GET response only)

- Display the associated human-readable name for a call
  - name = <string>
    - /calls/<call id>

- Find whether a conversation with a specified ID has been found
  - /uriUsageQuery with parameter = uri and tenant
    - coSpaceId
    - userId
    - ivrID
API Additions

• Find whether a callLeg is a distributed Lync connection
  • lyncDistribution
    • /callLegs/<call leg id> (GET response only)

• Find the original destination address for outbound callLegs or the remote address first signaled to the Call Bridge for inbound call legs
  • originalRemoteParty
    • /callLegs/<call leg id> (GET response only)

• Find the remote address first used by or signaled to the CallBridge
  • originalUri
    • /participants/<participant id> (GET response only)
Some Notes

• CTS 3000 no longer supported
  • You will experience corrupted video if you use CTS 3000 endpoints and upgrade to version 2.3

• H.323 gateway component – to be deprecated in CMS 2.5
  • In line with direction for an Expressway Single Edge
  • Any H.323 endpoints registered to Expressway-E or Expressway-C will not consume Rich Media Session (RMS) licenses when calling into the Cisco Meeting Server from Expressway version X8.10 onwards.
Scheduling & Management
TelePresence Management Suite

- Provisioning and configuration of conferencing infrastructure
- Booking and scheduling of endpoints and infrastructure
- Runs on windows server 2008 R2, 2012, 2012 R2
- Robust APIs available for 3rd party applications
- Previously available as an Appliance, **Now only available as software** (can be run in VMware)
## TMS Extensions

<table>
<thead>
<tr>
<th>Extension</th>
<th>Description</th>
<th>Compatibility</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TMSxN</strong></td>
<td>Cisco TelePresence Management Suite Extension for Lotus Notes</td>
<td>Integrates TMS with IBM Lotus Domino Server 7.0.x, 8.0.x, 8.5.x</td>
<td>Separate Server than TMS</td>
</tr>
<tr>
<td><strong>TMSba</strong></td>
<td>Cisco TelePresence Management Suite Extension Booking API</td>
<td>Provides a Web Services API that interfaces with the TMS booking engine</td>
<td>Option Key on TMS</td>
</tr>
<tr>
<td><strong>TMSpe</strong></td>
<td>Cisco TelePresence Management Suite Provisioning Extension</td>
<td>Enables provisioning of telepresence users and endpoints for large-scale deployments and setting VCS FindMe options in single user portal Also provides the Smart Scheduler portal</td>
<td>Replaces older TMS Agent Legacy. Both are supported in TMS 13, only TMSPE supported from 14.1</td>
</tr>
</tbody>
</table>
TMS Scheduling with Cisco Meeting Server

- CMS supported in TMS as well as Cisco TelePresence Server and MCU’s
- Cisco Meeting Server Scheduling Support
  - OBTP
  - Early Join
  - Auto Extend
- Multiple CMS CallBridges and Clusters Supported
- TMS admin interface, Outlook with XE Integration, Smart Scheduler or Booking API all supported
TMS Scheduling with Cisco Meeting Server
OBTP Experience

TC/CE based Endpoints & DX 70/80Endpoints Support OBTP
Cisco Meeting Management
Typical concierge and white glove services:

- Conference scheduling and launching
- Monitor and manage ongoing conferences
- Manage recording and streaming
- Troubleshooting problems
Cisco Scheduling and Management Strategy
Next Generation Meeting Management

**TMS**
- Scheduling
- Endpoint Management

Schedule meetings using TMS. OBTP to endpoints.

**CMM**
- White glove tool (Meeting Manager)

Monitor and manage ongoing meetings using Meeting Management.

**NOTE:** Information is not exchanged between Meeting Management and TMS in CMM 1.0.
Cisco Scheduling and Management Strategy

Next Generation Meeting Management

TMS Conference Control Center

- Integrated in TMS
- MCU and TS only
- Windows and Java based

Cisco Meeting Management

- Built on same platform as CMS
- Future proof for adding more services
- CMS only
Cisco Meeting Management

Feature Overview

Meeting Management
• See list of active or recent meetings
• Search by meeting title or individual participant
• Pin meeting at top of the list

Cisco Meeting Server management
• See connected Cisco Meeting Servers
• Add and remove Call Bridge nodes or clusters

In-conference controls
• Meeting details
• List of participants in a meeting
• Change layout for all participants in a meeting
• Access controls and see details for individual participants
• View and download event log for a meeting
• Start and stop recording and streaming

Notifications and logs
Cisco Meeting Management Solution Architecture

Single CMM Deployment

Single instance of Meeting Management can manage deployments from single Call Bridge to multiple Call Bridge Clusters

NTP servers synchronize Meeting Servers and Meeting Management instances

User access is authenticated via LDAP

External syslog server for system and audit logs

Meeting Manager does not require any specific configuration on UCM clusters or Expressway/VCS environment
Cisco Meeting Management Solution Architecture
Resilient CMM Deployment

Up to 2 instances of Meeting Management supported for added resiliency

Meeting Management instances configured independently (active: active)

Recommended to deploy the 2 instances in different locations

Meeting Management connect to Meeting Servers via Call Bridge API
Information about active meetings received via API requests and CDRs
## Cisco Meeting Management
### CMM Application Scale

<table>
<thead>
<tr>
<th></th>
<th>Small and medium deployments</th>
<th>Large deployments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server manufacturer</td>
<td>Any</td>
<td>Any</td>
</tr>
<tr>
<td>Processor type</td>
<td>Intel, AMD</td>
<td>Intel, AMD</td>
</tr>
<tr>
<td>Processor frequency</td>
<td>2.0 GHz minimum</td>
<td>2.0 GHz minimum</td>
</tr>
<tr>
<td>vCPU</td>
<td>4 cores</td>
<td>8 cores</td>
</tr>
<tr>
<td>RAM</td>
<td>4 GB</td>
<td>8 GB</td>
</tr>
<tr>
<td>Storage</td>
<td>100 GB Thick Provisioned Eager Zeroed</td>
<td>100 GB Thick Provisioned Eager Zeroed</td>
</tr>
<tr>
<td>Hypervisor</td>
<td>VMware ESXi 6.0 U3, ESXi 6.5</td>
<td>VMware ESXi 6.0 U3, ESXi 6.5</td>
</tr>
<tr>
<td>Network interfaces</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Cisco Meeting Management
LDAP and Users

- User access is authenticated via LDAP
  - Active Directory
  - Open LDAP
- User groups can have following roles
  - Administrator
  - Video operators
- LDAP groups are mapped to roles
- There is no support for local users
Cisco Meeting Management
Feature Overview – Participant Detail

- View connection details per participant
- Mute audio/video individually
- Drop active participant from meeting
- Per participant layout change/override conference wide setting
- Detailed audio and video call information
Cisco Meeting Management

Feature Overview – Meeting Detail

- List overview of all participants in a meeting
- Conference wide layout change per meeting
- Start and stop recording and streaming *
- Controls to mute audio/video and drop participants
- View and download event log for a meeting

* Require recording and streaming services configured on CMS with Vbrick
Microsoft Interop
Microsoft Interop
Skype for Business Integration Conference Types

- **Gateway:** Allows calling between standards room endpoints and Lync/Skype for Business

- **Spaces (Rendezvous):** Standard Room endpoints and Lync/Skype for Business users all connect on CMS for best experience & content sharing

- **Dual Home Conferencing:** Standards room endpoints connect on CMS with connection to Lync/Skype for Business meetings as full-featured participants (video, audio, & content)

Support for:
- SVC/H.264UC (Skype for Business/Lync 2013)
- RTVideo (Lync 2010 & 2011)
- IM and Presence
- Multi-party conferencing
- Drag and drop
- Bidirectional RDP Content Sharing
Improved Dual-Homed Meeting Experience
With CMS 2.3
Dual Encoding – enhanced quality with Skype for Business

• Currently AVMCU send a VSR (Video Source Request) requesting a resolution dictated by the participant with the lowest bit rate or resolution on the AVMCU side

• CMS 2.3 will support sending two quality levels of different resolutions to Lync meeting. This will typically be a high and low resolution.

• How this works:
  • CMS will store the highest and lowest resolutions requested by AVMCU. If only one is requested CMS will send the one initially requested. If two are requested CMS will send both.

• NOTE: if Lync 2010 client is present in the call, the server must send RTV Stream for Lync 2010 clients to decode to AVMCU
Cisco Meeting Server 2.3 Interoperability
Skype for Business, improved experience when lower resolution clients join conference

- CMS sends a high and low resolution stream for each participant to Skype AVMCU.

- Participants capable of 720p streams do not lose resolution when participants sending lower resolutions are in the call.

Note: Dual Encode feature not supported with Microsoft Lync RTV clients.

How this works:
1. Lync will send VSR (Video Source Request) to the server requesting certain resolution. The server stores the highest and lowest resolutions once they are received.
2. This will be the highest and lowest resolution requested from Lync AVMCU.
3. If Lync AVMCU does not request 2 specific resolutions, server will send the one initially received.
4. If two are requested, server will send both to AVMCU. Server transcodes the High and low resolutions from the Server connected endpoints.
Cisco Meeting Server 2.3 Interoperability
Ability to choose call bridge interaction with Skype AVMCU

- Call Bridge Mode: Dual Home Cluster
- Dual Home Cluster functions in the same way as Dual Homed conferences in previous versions
- SIP endpoints meet in a space on one or more call bridges. Single cascade link to Skype front end
- Skype clients meet on the Skype front end.
- Audio/video mixed on AVMCU for all participants

Note: Dual Home Cluster is the default configuration in CMS 2.3
Cisco Meeting Server 2.3 Interoperability
Ability to choose call bridge interaction with Skype AVMCU

- Call Bridge Mode: Dual Home Call Bridge
- SIP endpoints join conference on 1 or more call bridge(s) in single or more locations
- Each call bridge cascades to Skype Front End
- The Skype AVMCU mixes audio and video for the conference

Good option for multi-locations to limit inter-cluster reserved/used ports
Cisco Meeting Server 2.3 Interoperability
Ability to choose Call Bridge interaction with Skype AVMCU

- Call Bridge Mode: Gateway
- SIP endpoints use IVR to join a Skype conference
- CMS makes call to Skype AVMCU per endpoint
- The Skype AVMCU mixes audio and video for the conference

Good for audio only conferencing designs, no inter-cluster links reserved
Microsoft Interop
On-Prem Skype Outlook Scheduling Experience

- Dual Homed for On-Prem Lync/S4B
- Video Users Dial-In
- Requires TMS-XE Integration
- Domain for OBTP is defined for Cisco Meeting Server

1. Click on “New Skype Meeting” for a Dual Homed Conference
2. Lync clients click here
3. Video & CMA endpoints dial this
Microsoft Interop
O365 Outlook Scheduling Experience

- Dual Homed for O365 users
- Requires TMS-XE Integration
- Domain for OBTP is defined for Cisco Meeting Server
- Video users join only via OBTP

1. Click on “New Skype Meeting” for a Dual Homed Conference

2. Lync clients click here

No Dial-In for Video-Only users OBTP Only
Video Architecture
# Cisco Meeting Server Solution Architecture

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Control</td>
<td>Standards SIP Trunk</td>
</tr>
<tr>
<td>Collaboration Edge</td>
<td>Cisco MeetingServer Edge (legacy, CMA only)</td>
</tr>
<tr>
<td></td>
<td>Cisco Expressway Edge</td>
</tr>
<tr>
<td>Scheduling</td>
<td>Cisco TelePresence Management Suite</td>
</tr>
<tr>
<td></td>
<td>Microsoft Outlook</td>
</tr>
<tr>
<td>Recording and Streaming</td>
<td>Cisco CMS Recorder/ Streamer</td>
</tr>
<tr>
<td>Meeting Applications</td>
<td>Cisco Meeting Application Software</td>
</tr>
<tr>
<td></td>
<td>Cisco Meeting Application Mobile</td>
</tr>
<tr>
<td></td>
<td>Cisco Meeting Application WebRTC</td>
</tr>
<tr>
<td>Video Endpoints</td>
<td>Standards SIP</td>
</tr>
<tr>
<td>Conference Management</td>
<td>Cisco TelePresence Management Suite</td>
</tr>
<tr>
<td></td>
<td>Cisco Cisco Meeting Manager (CMM)</td>
</tr>
<tr>
<td>Customization and extensibility</td>
<td>CMS API</td>
</tr>
</tbody>
</table>
Cisco Meeting Server

- Unified Collaboration
- Intercompany Federation
  - Skype For Business
  - O365 skype for Business

LEGEND
- SIP
- SVC H.264/RTC
- FW Traversal
- WebRTC
- H.323
Conclusion
Key Takeways

• Cisco Meeting Server
  • Single box On-Prem conferencing solution

• Microsoft Interop
  • CMS Integrates with On-Prem S4B &
  • CMS Integrates with Cloud O365

• Scheduling & Management
  • Cisco TelePresence Management Server for scheduling
  • Cisco Meeting Management for Active Meeting Management &
    In-Conference control and statistics
Questions?
Use Cisco Spark to communicate with the speaker after the session

How
1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install Spark or go directly to the space
4. Enter messages/questions in the space

cs.co/ciscolivebot#BRKCOL-2803
• Please complete your Online Session Evaluations after each session

• Complete 4 Session Evaluations & the Overall Conference Evaluation (available from Thursday) to receive your Cisco Live T-shirt

• All surveys can be completed via the Cisco Live Mobile App or the Communication Stations

Don’t forget: Cisco Live sessions will be available for viewing on-demand after the event at www.ciscolive.com/global/on-demand-library/.
Continue Your Education

- Demos in the Cisco campus
- Walk-in Self-Paced Labs
- Tech Circle
- Meet the Engineer 1:1 meetings
- Related sessions
Thank you