# Cisco Collaboration: Preferred Architecture and Design

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#### Agenda

- What is the Collaboration "Preferred Architecture"?
- Preferred Architecture Sub-Systems
  - Call Control
  - Bandwidth Management
  - Conferencing
  - Collaboration Edge
  - Core Applications
- Simplified Sizing
- Key Takeaways and Q&A



# What is "Preferred Architecture"?



#### **Collaboration Preferred Architecture Strategy**

- Preferred Architecture provides *prescriptive design guidance* that simplifies and drives *design consistency* for Cisco Collaboration deployments
- The Preferred Architecture is divided into *five sub-systems* 
  - Makes the overall architecture easier to understand
  - Allows products to be categorised based on function





#### **Collaboration Solutions Design Guidance** Available at www.cisco.com/go/ucsrnd



#### **Preferred Architecture Overview**



Process

- Design Overview Document
- Targeted to Pre-Sales
- What with some of the Why !

**Solution Reference Network Design (SRND)** 

#### **Pre-Sales** Process

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- Detailed Design Guidance
- What and Why.
- Reference outside the scope of PA

#### **Cisco Validated Design (CVD)**



Enterprise Collaboration 11.x ahah CISCO

#### **Post-Sales** process

- Detailed Deployment Guidance
- Targeted to Post-Sales
- What, Why, and How !
- Process Driven Guide



# Call Control Sub-System

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# Call Control – Cisco Unified Communications Manager

The Heart of Cisco Collaboration



- Centralised Call Processing
- Centralised IM&P Services
- Consolidated Endpoint Registration
- Common feature set across endpoints
- Central "Dial Plan" Authority
- High Availability and Redundancy



### Call Control with IM&P – Cluster Design



- Call Processing and IM&P with 1:1 Redundancy
- Single TFTP
  Subscriber Pair
- Single MoH Subscriber Pair



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#### What is a Dial Plan About?

- Endpoint Addressing
- Directory Integration
- Class of Services (CoS) Restrictions



#### **Endpoint Addressing**



#### **Design Objectives**

- Use fully qualified E.164 Number with leading "+" as Directory Numbers (DN)
- Provision up to five (5) alphanumeric SIP URIs as aliases to primary DN

DN: +61 3 9659 XXXX SIP URI: mel-mx800@company.com.au mel-carlton@company.com.au



# **Directory Integration**

- Integrate into organisation's corporate LDAP directory to enable:
  - User Provisioning
  - User Authentication
  - Contact Source Jabber
- Manage User Parameters
  - $\circ$  User ID
  - First Name & Last Name
  - Telephone Number (E.164 format)
  - SIP URI





# Class of Service (CoS)



- Classes of Service (CoS) are used to control access to "Services"
- Minimise number of differentiated Classes of Service (CoS)
- Define CoS in CUCM using:
  - Partitions
  - Calling Search Spaces (CSS)



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# SIP Trunks – Why are they important ?



SIP 🗲

TDM

SIP Trunks are used to communicate with other components in PA, such as:

- Cisco Unity Connection
  (CUC) Voicemail Application
- *Conductor* Conferencing
- CUBE SIP PSTN Gateway
- Expressway B2B Calls
- External Video Gateways

#### **SIP Trunk Recommendations**

SIP Profile Configuration		
🗋 Copy 🎦 Reset 🧷 Apply Config 🕂 A	ldd New	
Status		
G Status: Ready		
	tente di la fono e con ele con e cilli tente e fferet	
All SIP devices using this profile must be rea	started before any changes will take affect.	
SIP Profile Information		
Name*	MEL SIP Profile	
Description	MEL SIP Profile Example	
Outgoing T.38 INVITE include audio mline		
Use Fully Qualified Domain Name in SIP Requ	iests	
Trunk Specific Configuration		
Reroute Incoming Request to new Trunk based o	n* Never	~
RSVP Over SIP*	Local RSVP	$\sim$
Resource Priority Namespace List	< None >	$\sim$
✓ Fall back to local RSVP		
SIP Rel1XX Options*	Disabled	
Video Call Traffic Class*	Mixed	~
Calling Line Identification Presentation*	Default	~
Session Refresh Method*	Invite	~
Early Offer support for voice and video calls $^{st}$	Best Effort (no MTP inserted)	~
-SIP OPTIONS Ping		
Finable OPTIONS Ping to monitor destination	status for Trunks with Service Type "None	(Default)"
Ping Interval for In-service and Partially In-servi	ce Trunks (seconds)* 60	(Benduity

- Minimise number of SIP profiles
  - Consider default profiles first
  - Provision SIP profile per group of equivalent trunks
- Recommended SIP profile settings:
  - Set "Use Fully Qualified Domain Name in SIP Requests" on all trunks
  - Enable "SIP OPTIONS Ping" for real-time status monitoring
  - Enable "Best Effort" Early Offer Support

#### Use of FQDN in SIP Requests – Example



# **Bandwidth Management**

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#### **Evolution of Collaboration Landscape**





# Bandwidth Management – Design Objectives

#### Profiling and Prioritisation **"Smart" Media Techniques**

**Admission Control** 



- Consolidate mechanisms to identify and classify collaboration media
- Simplify policies for Queuing and Scheduling

Encoder Decoder Encoder



- Use Media Resilience to reduce impact of packet loss
- Apply **Rate Adaptation** to reduce network congestion



- Build a **Self-Regulating** system supporting supporting "Opportunistic Video"
- Use Call Admission Control (CAC) as last option

#### Bandwidth Management – Traffic Flow Identification Cisco Jabber Example



- Jabber classification based on UDP port ranges and ACL's:
  - Audio streams of all calls (voiceonly and video) marked EF
  - Video streams of Jabber video calls marked AF42
- Clients enabled for RTCP to avoid lip-sync issues

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# Bandwidth Management – Queuing and Prioritisation



- Audio/EF is mapped to the priority queue
  - Includes audio streams from video endpoints and Jabber clients (voiceonly and video calls)
- Video streams of video calls (AF41) and video streams of Jabber calls (AF42) are mapped to the same CBWFQ
- WRED is configured on the video queue:
  - min-max thresholds for AF42: ~10% - ~30% of queue limit
  - min-max thresholds for AF41: ~45% - 100% of queue limit

# Conferencing Sub-System

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Headquarters

#### Conferencing – Design Objectives

Flexible Architectures to support various conference types such as: Ad-hoc (Instant), Rendezvous (Permanent) and Scheduled

**Dynamic** Optimisation of conferencing resources leveraging **TelePresence Conductor** and **TelePresence Server** 

Simplified Conferencing Experience leveraging TelePresence Management Suite (TMS)

Resiliency – High Availability (HA) for all conferencing components

#### **TelePresence Server Platforms**



Note: For simplicity, only capacity for 720p is shown. TS is capable of many other resolutions and frame rates with differing limits on capacity. All numbers represent remotely managed mode (Conductor required) capability. See release notes for further detail.

# TelePresence Conductor – What is it used for ?



- Conference Virtualisation
- Resource management for greater scale
- Intelligent bridge selection and Automatic Cascading for large conferences
- Centralised Conference provisioning and administration



# TelePresence Management Suite (TMS)





# Collaboration Meeting Rooms (CMRs)

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#### **Collaboration Meeting Rooms Deployment Options**





#### **CMR** Premises Architecture



**Requirements:** 

Conductor 4.0 (posted 2<sup>nd</sup> Sept '15) TMS 15.0 (posted 2<sup>nd</sup> July '15) TMSPE 1.5 (posted 3<sup>rd</sup> Sept '15) TS 4.2 (posted 28<sup>th</sup> August '15)

- Utilises Conductor provisioning API for conference setup and configuration
- Easy provisioning and configuration of Personal Collaboration Meeting Rooms (CMRs) via TMSPE
- Personalise CMR on CUCM Self-Care Portal
- Each CMR has an associated video address (DN or URI) that is integrated into CUCM's dial plan

#### **CMR Hybrid Architecture**



- Integrate on-premise video with WebEx participants
- Require a certificate signed by a trusted Root Certificate Authority on Expressway-E
- Supports WebEx, PSTN or TSP audio options
- Supports Scheduled or Non-Scheduled Conferences

#### Cisco Collaboration Meeting Rooms (CMR) Hybrid Configuration Guide



#### **CMR Cloud Architecture**



- Conference Resources and Infrastructure reside in WebEx Cloud
- Requires on-premise CUCM for call control and Expressway for B2B calls
- Each CMR has an associated video address (DN or URI) and URL
- Supports WebEx, PSTN or TSP audio options

#### Cisco Collaboration Meeting Rooms (CMR) Cloud Deployment Guide

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# Collaboration Edge

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# Cisco Collaboration Edge Architecture Components

#### Cisco Expressway

- Business-to-Business (B2B)
- $_{\circ}~$  Mobile and Remote Access (MRA)
- External IM&P Federation (XMPP)

#### Gateways

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- SIP-based PSTN Connectivity Cisco Unified Border Element (CUBE)
- TDM-Based PSTN Connectivity Integrated Services Router (ISR)
- ISDN Video Gateway ISDN 3241 and MSE 8321 (Blade)



# Business-to-Business Communications

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#### Expressway Firewall Traversal Basics





- 1. **Expressway-E** is the traversal server installed in DMZ. **Expressway-C** is the traversal client installed inside the enterprise network.
- 2. Expressway-C initiates traversal connections outbound through the firewall to specific ports on Expressway-E with secure login credentials.
- 3. Once the connection has been established, **Expressway-C** sends keep-alive packets to **Expressway-E** to maintain the connection
- 4. When **Expressway-E** receives an incoming call, it issues an incoming call request to **Expressway-C**.
- 5. Expressway-C then routes the call to Unified CM to reach the called user or endpoint
- 6. The call is established and media traverses the firewall securely over an existing traversal connection

# Mobile and Remote Access

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# Mobile and Remote Access (MRA) Overview

Secure VPN-Less access for Jabber Clients and Hardware-Based Endpoints



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# Voice and Video Gateways

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#### Voice and Video Gateways Portfolio



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# Voice and Video Gateways Recommendations

#### **Deployment Best Practices**

- TelePresence Video Gateways
  - Deploy dedicated ISDN Video Gateways



- PSTN Connectivity
  - Central Site TDM-Based
    Deploy ISR router with ISDN
    Primary Rate (PRI) modules
  - Central Site SIP Trunk Based Deploy ISR or ASR router in DMZ and enable Cisco Unified Border Element (CUBE) functionality

#### • Remote Sites

Deploy ISR router with Analog or ISDN Basic / Primary (BRI/PRI) Rate modules

# **Core Applications**

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#### Core Applications – Cisco Unity Connection (CUC) Architecture Overview



- Redundant Unity Connection nodes
- SIP Trunk integration to Unified CM
- Integrations to directory and e-mail:
  - » LDAP Directory
  - » Microsoft Exchange
- Voicemail Access via
  - Telephone User Interface (TUI)
  - Voice User Interface (VUI)
  - Visual Voicemail
- Email access to voicemail (Single Inbox / Unified Messaging (UM))

#### Core Applications – Prime Collaboration Deployment



- Simplify CUCM, CUCM IM&P and CUC deployments by enabling automated, unattended installation of server nodes
- Facilitate configuration of common network and security settings.

#### Core Applications – Prime Licensing Manager (PLM) Architecture Overview



- Cisco Prime License Manager (PLM)
  enables license fulfilment:
  - » Electronic [requires Internet connectivity]

OR

- » Manual license file request
- Licenses received (over the network or via email)
- Licenses applied to system and propagated to synchronised application instances.

# Simplified Sizing

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#### PA Simplified Sizing vs Collaboration Sizing Tool



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## Key Takeaways

- The Collaboration Preferred Architecture (PA) helps Cisco customers and partners understand the overall Collaboration Architecture and its components
- The Collaboration Preferred Architecture (PA) provides general design best practices and follows a prescriptive approach to simplify deployments
- The Collaboration Preferred Architecture (PA) provides simplified sizing options for typical deployments and is built to scale.
- For deployments outside of the Preferred Architecture (PA), refer to the Collaboration SRND.
- For detailed deployment guidance ("the how"), refer to the Enterprise Collaboration Cisco Validated Design (CVD)

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# Q & A



# Thank you

