Overview of Cisco Collaboration System Components and Architecture

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A solid network infrastructure is required to build a successful Unified Communications and Collaboration system in an enterprise environment. Other key aspects of the network architecture include selection of the proper hardware and software components, system security, and deployment models.

Unified Communications and Collaboration over an IP network places strict requirements on IP packet loss, packet delay, and delay variation (or jitter). Therefore, you need to enable most of the Quality of Service (QoS) mechanisms available on Cisco switches and routers throughout the network. For the same reasons, redundant devices and network links that provide quick convergence after network failures or topology changes are also important to ensure a highly available infrastructure. The following aspects are essential to the topic of Unified Communications and Collaboration networking and are specifically organized here in order of importance and relevance to one another:

- Network Infrastructure — Ensures a redundant and resilient foundation with QoS enabled for Unified Communications and Collaboration applications.
- Voice Security — Ensures a general security policy for Unified Communications and Collaboration applications, and a hardened and secure networking foundation for them to rely upon.
- Deployment Models — Provide tested models in which to deploy Unified Communications and Collaboration call control and applications, as well as best practices and design guidelines to apply to Unified Communications and Collaboration deployments.

The chapters in this part of the SRND cover the networking subjects mentioned above. Each chapter provides an introduction to the subject matter, followed by discussions surrounding architecture, high availability, capacity planning, and design considerations. The chapters focus on design-related aspects rather than product-specific support and configuration information, which is covered in the related product documentation.

This part of the SRND includes the following chapters:

- Network Infrastructure, page 3-1

  This chapter describes the requirements of the network infrastructure needed to build a Cisco Unified Communications and Collaboration System in an enterprise environment. The sections in this chapter describe the network infrastructure features as they relate to LAN, WAN, and wireless LAN infrastructures. The chapter treats the areas of design, high availability, quality of service, and bandwidth provisioning as is pertinent to each infrastructure.

- Cisco Collaboration Security, page 4-1

  This chapter presents guidelines and recommendations for securing Unified Communications and Collaboration networks. The topics in this chapter range from general security, such as policy and securing the infrastructure, to endpoint security in VLANs, on switch ports, and with QoS. Other security aspects covered in this chapter include access control lists, securing gateways and media resources, firewalls, data center designs, securing application servers, and network virtualization.

- Gateways, page 5-1

  This chapter explores IP gateways, which are critical components of Unified Communications and Collaboration deployments because they provide the path for connecting to public networks. This chapter looks at gateway traffic types and patterns, protocols, capacity planning, and platform selection, as well as fax and modem support.

- Cisco Unified CM Trunks, page 6-1

  This chapter covers both intercluster and provider trunks, which provide the ability to route calls over IP and to leverage various Unified Communications and Collaboration features and functions. This chapter discusses H.323 and SIP trunks, codecs, and supplementary services over these trunks.

- Media Resources, page 7-1

  This chapter examines components classified as Unified Communications and Collaboration media resources. Digital signal processors (DSPs) and their deployment for call termination, conferencing and transcoding capabilities, and music on hold (MoH) are all discussed. Media termination points (MTPs), how they function, and design considerations with SIP and H.323 trunks are also covered. In addition, design considerations surrounding Trusted Relay Points, RSVP Agents, annunciator, MoH, and secure conferencing are included in the chapter.

- Collaboration Endpoints, page 8-1

  This chapter discusses the various types of Unified Communications and Collaboration endpoints available in the Cisco portfolio. Endpoints covered include software-based endpoints, wireless and hard-wired desk phones, video endpoints, and analog gateways and interface modules for analog connectivity based on time division multiplexing (TDM).

- Call Processing, page 9-1

  This chapter examines the various types of call processing applications and platforms that facilitates voice and video call routing. The chapter examines the call processing architecture, including platform options, clustering capabilities, and high availability considerations for call processing.

- Collaboration Deployment Models, page 10-1

  This chapter describes the deployment models for Cisco Unified Communications and Collaboration Systems as they relate to the various network infrastructures such as a single site or campus, multi-site environments, and data center solutions. This chapter covers these deployment models and the best practices and design considerations for each model, including many other subtopics pertinent to the model discussed.

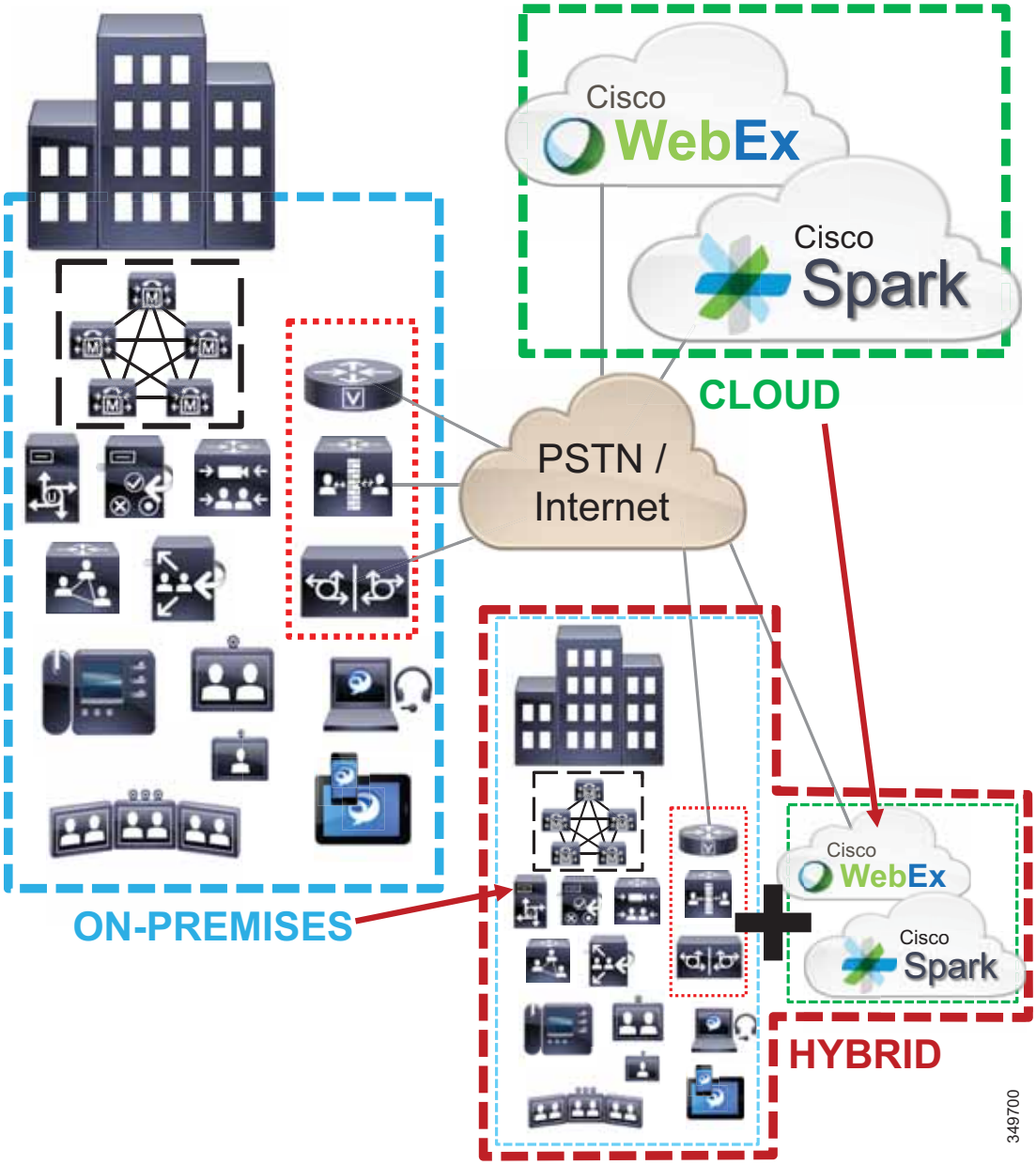
- Cisco Rich Media Conferencing, page 11-1

  This chapter explores rich media conferencing, which allows users of the Unified Communications and Collaboration system to schedule, manage, and attend audio, video, and/or web collaboration conferences. The chapter describes the different types of conferences as well as the software and hardware conferencing components, including the Cisco TelePresence Video Communication Server (VCS) and Multipoint Control Units (MCUs). The chapter also considers various aspects of rich media conferencing, such as deployment models, video capabilities, H.323 and SIP call control integrations, redundancy, and various solution recommendations and design best practices.

Architecture

The system architecture lays the foundation upon which all components of the Unified Communications and Collaboration System are deployed. Figure 2-1 illustrates, in a generalized way, how collaboration applications and services can be delivered solely on-premises, solely in the cloud, or in combination as a set of hybrid service deployments.

Figure 2-1 Enterprise Collaboration Deployments: On-Premises, Cloud, and Hybrid



All aspects of the Unified Communications and Collaboration System, including call routing, call control, applications and services, and operations and serviceability, rely heavily on proper design and deployment of the system architecture.

High Availability

Proper design of the network infrastructure requires building a robust and redundant network from the bottom up. By structuring the LAN as a layered model (access, distribution, and core layers) and developing the LAN infrastructure one step of the model at a time, you can build a highly available, fault tolerant, and redundant network. Proper WAN infrastructure design is also extremely important for normal operation on a converged network. Proper infrastructure design requires following basic configuration and design best-practices for deploying a WAN that is as highly available as possible and that provides guaranteed throughput. Furthermore, proper WAN infrastructure design requires deploying end-to-end QoS on all WAN links.

Wireless LAN infrastructure design becomes important when IP telephony is added to the wireless LAN (WLAN) portions of a converged network. With the addition of wireless Unified Communications and Collaboration endpoints, voice and video traffic has moved onto the WLAN and is now converged with the existing data traffic there. Just as with wired LAN and wired WAN infrastructures, the addition of voice and video in the WLAN requires following basic configuration and design best-practices for deploying a highly available network. In addition, proper WLAN infrastructure design requires understanding and deploying QoS on the wireless network to ensure end-to-end voice and video quality on the entire network.

After designing and implementing the network infrastructure properly, you can add network and application services successfully across the network, thus providing a highly available foundation upon which your Unified Communications and Collaboration services can run.

Capacity Planning

Scaling your network infrastructure to handle the Unified Communications and Collaboration applications and services that it must support requires providing adequate available bandwidth and the capability to handle the additional traffic load created by the applications.

For a complete discussion of system sizing, capacity planning, and deployment considerations related to sizing, refer to the chapter on Collaboration Solution Sizing Guidance, page 25-1.