CHAPTER 2

Overview of Cisco Unified Communications Networking

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A solid network infrastructure is required to build a successful Unified Communications system in an enterprise environment. Other key aspects of the network architecture include voice security, unified communications deployment models, and migration strategies.

Unified Communications – including IP telephony, rich media, collaboration, and many other functions – 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 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 applications.
- Voice Security — Ensures a general security policy for Unified Communications applications and a hardened and secure networking foundation for them to rely upon.
- Unified Communications Deployment Models — Provide tested models in which to deploy Unified Communications call control and applications, as well as best practices and design guidelines to apply to Unified Communications deployments.
- IP Telephony Migration Options — Provide guidelines on how to plan and approach a migration from separate standalone voice, video, and collaboration systems to an integrated Cisco Unified Communications System.

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 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 chapters treat the areas of design, high availability, quality of service, and bandwidth provisioning as is pertinent to each infrastructure.

- Unified Communications Security, page 4-1

  This chapter presents guidelines and recommendations for securing Unified Communications networks. The topics in this chapter range from general security, such as policy and securing the infrastructure, to phone 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.

- Unified Communications Deployment Models, page 5-1

  This chapter describes the deployment models for Cisco Unified Communications Manager 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.

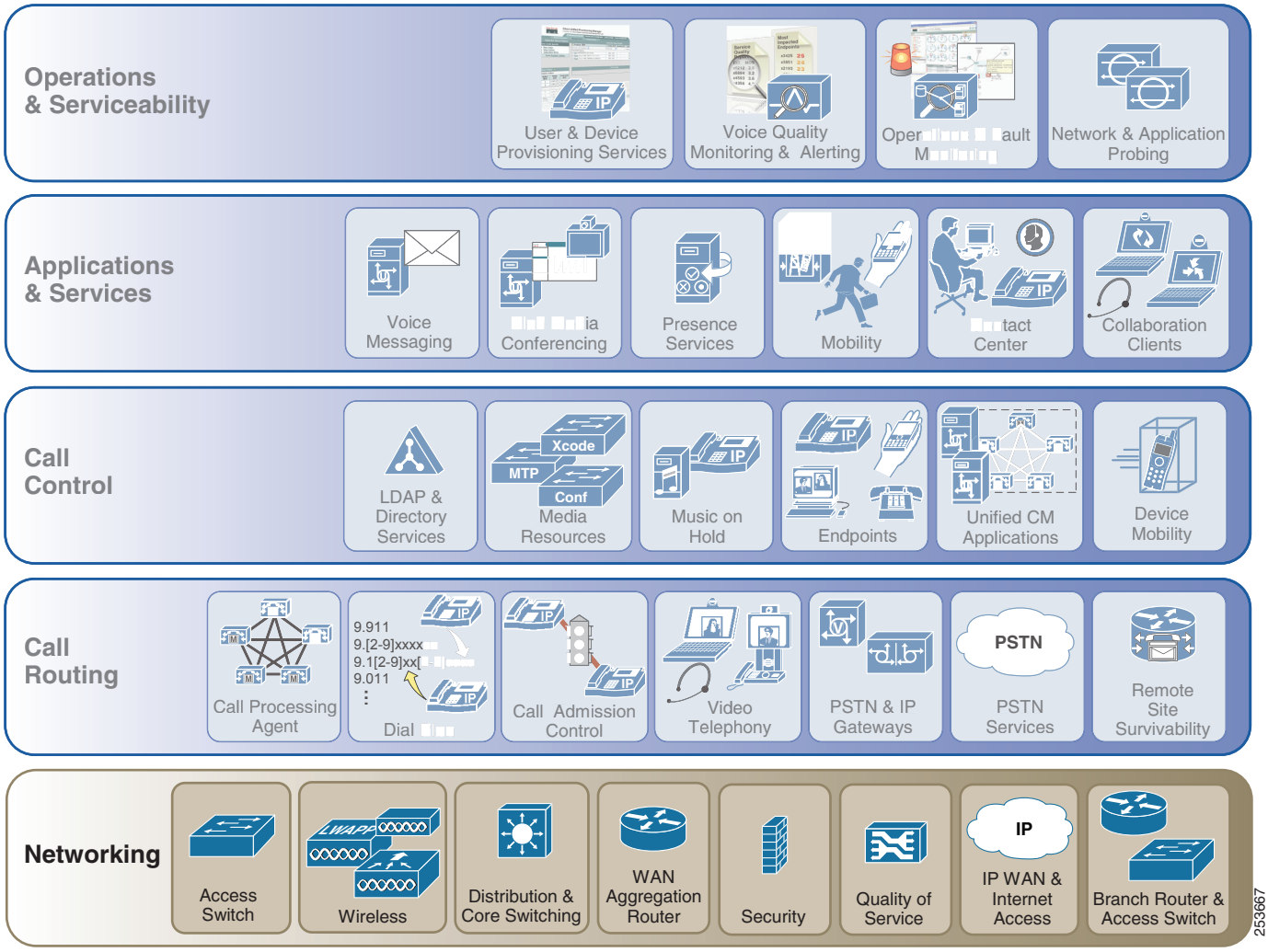
- IP Telephony Migration Options, page 6-1

  This chapter describes several methods for migrating from separate standalone voice, video, and collaboration systems to an integrated Cisco Unified Communications System. It discusses the pros and cons of both phased migration and parallel cutover. It also describes the services needed to connect a private branch exchange (PBX) to a new Unified Communications system. The major topics discussed in this chapter include IP telephony migration, video migration, and migration of voice and desktop collaboration systems.

Architecture

The networking architecture lays the foundation upon which all other layers of the Unified Communications System are deployed. Figure 2-1 shows the logical location of the networking layer in the overall Cisco Unified Communications System architecture.

Figure 2-1 Cisco Unified Communications Networking Architecture



All other layers of the Unified Communications System architecture, including call routing, call control, applications and services, and operations and serviceability, rely heavily on the readiness of the network to support their services. The networking layer is the single most important aspect of a solid Unified Communications foundation in that it provides the quality of service needed to ensure applications have uncompromised access to network services. The networking layer also ensures the correct deployment of servers and the proper bandwidth for endpoints and services to communicate effectively and securely.

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 IP telephony 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 endpoints such as the Cisco Unified Wireless IP Phones 7921G and 7925G, voice 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 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 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 services can run.

Capacity Planning

Scaling your network infrastructure to handle the Unified Communications 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 Unified Communications Design and Deployment Sizing Considerations, page 29-1.