CHAPTER 15

Overview of Cisco Unified Communications Call Control

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After the network infrastructure and call routing have been properly designed and deployed for your Cisco Unified Communications System, the next phase involves deploying a group of core call control components. These call control components allow users to initiate calls more easily, enhance user capabilities, and enhance the experience of remote callers as well. The following aspects are essential to Unified Communications call control components:

- Integration with central Lightweight Directory Access Protocol (LDAP) directories
- Access to media resources such as audio conferencing or codec transcoding
- Capabilities for music on hold for callers into the Unified Communications System
- Capabilities and feature sets for Unified Communications endpoints
- Applications embedded in the call routing, such as click-to-call dialing, manager-assistant applications, and the ability for users to log in to any phone

This part of the SRND provides coverage for all the various call control components mentioned above. Each chapter provides an introduction to the call control components, followed by discussions surrounding architecture, high availability, capacity planning, and design considerations. The content of each chapter focuses on design-related information rather than product-specific support and configuration information.

This part of the SRND includes the following chapters:

- LDAP Directory Integration, page 16-1

  This chapter covers aspects of Unified Communications integration with the LDAP directories, including the Cisco Unified Communications Manager directory architecture itself as well as design considerations for LDAP synchronization and authentication. Directory access from Unified Communications endpoints and security considerations are also explored.

- Media Resources, page 17-1

  This chapter examines all components classified as Unified Communications media resources. Digital signal processors (DSPs) and their deployment for voice 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.

- Unified Communications Endpoints, page 18-1

  This chapter discusses all the Unified Communications endpoints available in the Cisco portfolio, and it lists their capabilities in table form for easy comparison. Software-based endpoints are discussed in addition to wireless and hard-wired phones. The chapter also covers video telephony endpoints and gateways that provide foreign exchange station (FXS) ports for analog connectivity.

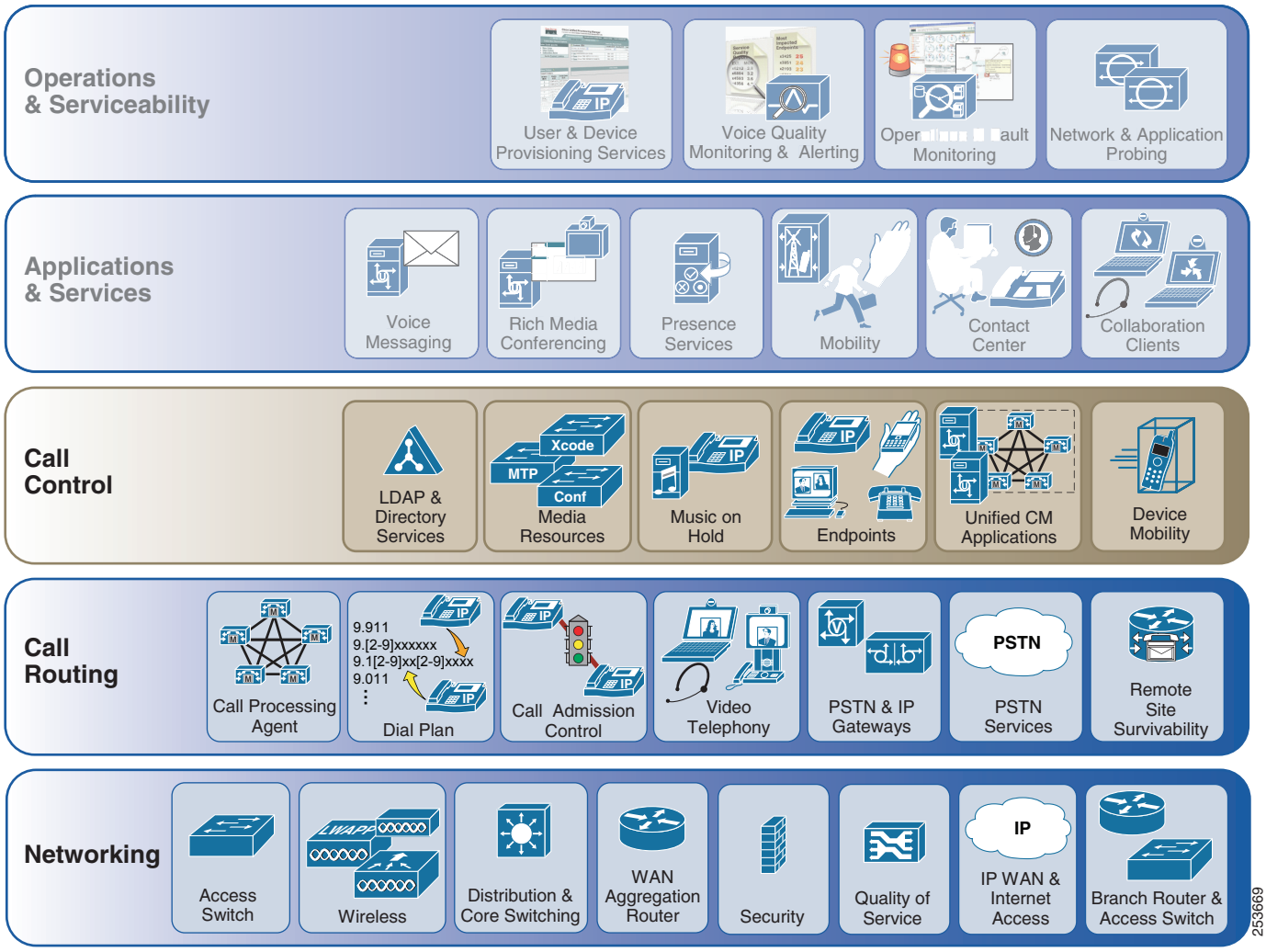
- Cisco Unified CM Applications, page 19-1

  This chapter covers the inherent applications built into Cisco Unified Communications Manager (Unified CM): IP Phone Services, WebDialer, Unified CM Assistant, and Extension Mobility (EM). In addition, this chapter covers Attendant Console applications and their integration through CTI to Unified CM. The chapter first explains the architecture behind the applications, followed by a discussion of design considerations. The chapter also explores variations in the applications such as Extension Mobility Cross Cluster (EMCC) and Unified CM Assistant proxy-line versus shared-line mode.

Architecture

As with other network and application technology systems, unified communications call control components build upon the underlying network and system infrastructures. Figure 15-1 shows the logical location of unified communications call control components in the overall Cisco Unified Communications System architecture.

Figure 15-1 Cisco Unified Communications Call Control Architecture



Unified communications call control components such as conferencing resources, music on hold, directory integration, and endpoints require the unified communications networking infrastructure and unified communications call routing architecture to be well designed and already deployed. These call control components build on the unified communications system and provide enhanced (and usually required) user features.

High Availability

As with the network and call routing, call control infrastructure should be made highly available to ensure that required features and functionality remain available during outages in the network or call processing entities. It is important to understand the various types of failures that can occur and the design considerations around these failures. In some cases, the failure of a single server or feature can impact multiple services because many unified communications components are dependent on others. For example, while the various service components of Cisco Unified Communications Manager (Unified CM) applications may be functioning properly, the loss of the Unified CM call processing

service will effectively render the Unified CM applications unusable because the deployment is dependent upon Unified CM to place or receive calls. In many cases, all or part of the functionality can be handled by a redundant resource, thus giving end users the ability to continue to leverage services in the event of certain failures.

For media resources and music on hold, high availability considerations include temporary loss of functionality due to network outages and server or DSP platform failures. This could lead to a poor user experience (for example, initiating a conference only to see a "Resources Not Available" or similar message on the phone) as well as a poor experience for callers into the system (for example, possibly hearing silence instead of a specific advertising message while on hold). Design details around configuration best practices and deployment of redundant resources are discussed in the respective chapters.

Unified CM applications are deployed by enabling specific services on Unified CM nodes in the cluster. If there is a service outage, it will result in a degraded or completely non-functional user experience. Users logging in to phones or accessing IP phone services will experience long delays and typically re-initiate the connection several times, further exacerbating the problem. The chapters in this part of the SRND explain the architecture of the applications and provide design considerations related to which nodes and/or how many nodes in the cluster to enable for application-specific features.

Similarly, for LDAP directory integrations, an LDAP directory server can go offline or the connection between LDAP and the call processing entity can become unavailable. There must be design considerations to allow for LDAP authentication or user directory lookups to continue to function with an alternate server or through an alternate path.

Capacity Planning

Network, call routing, and call control infrastructures must be designed and deployed with an understanding of the capacity and scalability of the individual components and the overall system. When deploying various unified communications call control components, it is important to consider not only the scalability of the components themselves, but also the underlying infrastructures. Certainly the network infrastructure must have available bandwidth and be capable of handling the additional traffic load these components create. Likewise, the call routing infrastructure must be capable of handling user and device configuration and registration as well as additional load surrounding protocols and connections associated with call control elements.

There are capacity planning considerations across all of the chapters of this part of the SRND. For LDAP directory integrations, the most common consideration is the number of users that can be synchronized in the unified communications database, along with polling updates and how they can affect system performance. DSP media resources have a finite number of conferencing or transcoding sessions they each can handle, so proper sizing and allocation of DSPs is critical to a good design. Each Unified CM application has its own set of upper limits, whether it is the supported Extension Mobility login rate or the number of IP Manager Assistants that can be configured in the system. Each call control chapter contains a capacity planning section that offers capacity design guidance and assists in architecting sound Unified Communications designs.

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.