CHAPTER 1

Product Overview

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The Cisco TelePresence Exchange System is an integrated video service-creation platform that enables service providers and strategic partners to offer secure cloud-based managed and hosted Cisco TelePresence and business video services. The Cisco TelePresence Exchange System is a software environment that simplifies end-to-end subscriber service provisioning; optimizes intelligent call routing for endpoints and network bandwidth; manages the call processing and allocation of media resources for conferencing; consolidates a centralized control point for management, billing, and administration; and presents an open application programming interface (API) for application integration such as scheduling and directory services.

Based on proven technology and powered by a fully redundant and horizontally scalable architecture, it delivers an open, scalable, and robust multi-tenant solution that can grow in scale and functions based on service needs. As a result, it accelerates time to market by simplifying the process of new services production and promotes service innovation through APIs that support service customization and partner on-boarding.

The following sections provide additional information about the Cisco TelePresence Exchange System:

Benefits

The Cisco TelePresence Exchange System provides the following benefits to service providers:

- Secure and scalable network-based telepresence services for inter-company conferencing.
- Call admission control and network bandwidth management for inter-company point-to-point meetings.
- A standard interconnect architecture across service providers to facilitate peering.
- Interoperability with legacy video systems to expand the service footprint.
- Organization ports functionality to manage network utilization on a per-customer basis.

- Open application programming interfaces (APIs) to create service differentiation (for scheduling portals and vertical applications) and to facilitate integration with existing billing and operational support systems.

Network Architecture

This section describes the network architecture in which the Cisco TelePresence Exchange System operates, and includes the following topics:

Overview

The Cisco TelePresence Exchange System manages the media resources and the call processing that inter-company telepresence services require. The Cisco TelePresence Exchange System fulfills the following network-level responsibilities:

- Controls the reservation and allocation of media resources.
- Manages the resource usage for organizations.
- Provides connectivity between service provider networks.

The Cisco TelePresence Exchange System consists of a server cluster that is designed to provide carrier-grade availability and reliability. With this implementation, the service provider would typically locate the server cluster in its data center.

To provide Cisco TelePresence services, the Cisco TelePresence Exchange System interacts with the following Cisco platforms:

- Cisco Session Border Controller (SBC)
  - The SBC provides call control and security at the demarcation between enterprises and the service provider. The SBC also provides interconnection to other service providers.
  - Session border control is integrated into several Cisco IOS routers. For specific models supported by the Cisco TelePresence Exchange System, see the applicable *Release Notes for Cisco TelePresence Exchange System*, at http://www.cisco.com/go/ctx-relnotes.
- Cisco Application Control Engine (ACE) appliance
  - The ACE appliance provides access control, load balancing, and high availability functionality for the Cisco TelePresence Exchange System server cluster.
- Cisco Router with Integrated Voice Response (IVR)
  - The Cisco TelePresence Exchange System uses the IVR router for calls that have a missing or incorrect meeting PIN and for calls that encounter exception conditions. The IVR plays the appropriate prompts and collects the meeting PIN from the customer.
  - IVR functionality is integrated into several Cisco IOS routers. For specific models supported by the Cisco TelePresence Exchange System, see the applicable *Release Notes for Cisco TelePresence Exchange System*, at http://www.cisco.com/go/ctx-relnotes.

- Cisco TelePresence Multipoint Switch
  - The Cisco TelePresence Multipoint Switch is a multipoint control unit that provides media switching for multipoint meetings that involve Cisco TelePresence System endpoints.
- Cisco TelePresence Manager
  - The Cisco TelePresence Manager provides scheduling integration for a cluster of Cisco TelePresence Multipoint Switch resources, and supports One-Button-to-Push (OBTP) session initiation for endpoints on the Cisco TelePresence Exchange System network. When you enable OBTP on an endpoint, the Cisco TelePresence Manager automatically provisions the information that is necessary to allow an endpoint either to directly dial another endpoint with a simple touch of a button, or authenticate and join a scheduled multipoint conference without any need for additional user interaction.
- Cisco Unified Communications Manager (Unified CM)
  - The Unified CM provides configuration, management, and call routing to configure a set of telepresence endpoints. The service provider Unified CM is used to support hosted endpoint deployments.
- Cisco TelePresence Media Services Engine (MSE) 8000 Series products
  - The Cisco TelePresence MSE 8000 Series products support carrier-class telepresence services. The chassis contains a supervisor module and provides nine slots for optional service modules. The Cisco TelePresence Exchange System uses the following types of service modules:

Cisco TelePresence MCU MSE 8510	Provides inter-working with single-screen telepresence endpoints that support the H.323 or integrated services digital network (ISDN) standard.
Cisco TelePresence Server MSE 8710	Provides inter-working with single-screen and multi-screen telepresence endpoints.
Cisco TelePresence ISDN Gateway (GW) MSE 8321	Provides inter-working with ISDN endpoints.

- Cisco Catalyst Switch
  - The switch provides layer 2 and layer 3 connectivity for the Cisco TelePresence Exchange System and the other Cisco platforms. For specific switch models that the Cisco TelePresence Exchange System supports, see the applicable *Release Notes for Cisco TelePresence Exchange System*, at http://www.cisco.com/go/ctx-relnotes.
- Cisco TelePresence Video Communication Server
  - The Cisco TelePresence Video Communication Server (Cisco VCS) extends face-to-face video collaboration across networks and organizations by supporting any-to-any video and telepresence communications. When an enterprise wants to deploy Cisco TelePresence and third-party standards-based H.323 and ISDN endpoints, the enterprise must install at least one Cisco VCS.

Cisco TelePresence Exchange System Components

The Cisco TelePresence Exchange System server cluster includes the following components:

- Administration Server—Provides the administration console for configuring and maintaining the Cisco TelePresence Exchange System. The administration server also exposes the APIs.

- Database Server—Provides a MySQL database for persistent data.
- Call Engine Server—Provides SIP call control for the services that are offered by the Cisco TelePresence Exchange System.

Deployment Models

The Cisco TelePresence Exchange System supports the following deployment models:

- **Hosted endpoint service**—For organizations that want the service provider to host the telepresence service. The organization deploys only the telepresence endpoints. The service provider data center contains the Unified CM cluster and Cisco TelePresence Manager components for hosted organizations. Customer endpoints register with the service provider Unified CM.
- **Enterprise endpoint service**—Enterprise endpoint service enables organizations to own and manage the telepresence service within their enterprise network. The enterprise provides the Unified CM cluster and the Cisco TelePresence Manager. Connectivity with the Cisco TelePresence Exchange System uses SIP trunking from the enterprise to the service provider SBC.

  For enterprise deployment of Cisco TelePresence or third-party standards-based endpoints, the enterprise must install at least one Cisco VCS.

Supported Features

The Cisco TelePresence Exchange System supports the features that are listed in Table 1-1.

Table 1-1 Supported Features

Feature	Description
Meet-Me service	The Meet-Me service provides conferencing for two or more Cisco TelePresence or third-party endpoints and includes the following functionality: • The scheduling API provides web services to schedule and manage Meet-Me meetings. • Cisco TelePresence Exchange System provides automated One-Button-to-Push (OBTP) functionality for hosted endpoints. • The Cisco TelePresence Exchange System monitors Cisco TelePresence Multipoint Switch operational status, to ensure that new meetings are scheduled using only operational Cisco TelePresence Multipoint Switch units. In addition, the Cisco TelePresence Exchange System monitors the operational status of the Cisco TelePresence MSE 8000 Series. • An integrated IVR application provides greetings and voice prompts for the conference participants. Service Providers can install branded voice prompt files. • Cisco TelePresence Exchange System reserves the appropriate meeting resource (Cisco TelePresence Multipoint Switch or Cisco MSE 8000 Series) capacity for each meeting when it is scheduled. • Cisco TelePresence Exchange System prevents additional participants from joining a meeting if the meeting is already using its maximum capacity.

Table 1-1 Supported Features (continued)

Feature	Description
Two-party direct dial calls	Cisco TelePresence Exchange System supports ad-hoc and scheduled direct dial calls between two endpoints in the same organization. The Cisco TelePresence Exchange System does not reserve any media resources for direct dial calls. A two-party direct dial meeting can be scheduled only between two provisioned endpoints, and the two endpoints must be associated with a CTS-Manager. The value of scheduling the meeting is to provide OBTP functionality for the endpoints. Ad-hoc direct dial calls can be between any two endpoints in the organization. For a description of endpoint types, see the "Endpoint Types" section on page 1-8.
Scheduling API	The scheduling API provides web services to enable development of third-party scheduling portals. The scheduling API services allow the portal to schedule and manage Meet-Me meetings and two-party meetings.
Call Detail Records (CDR) API	The CDR API provides services to retrieve call detail records from the Cisco TelePresence Exchange System.
Management, monitoring, and provisioning	The administration console provides web-based administration and configuration for the Cisco TelePresence Exchange System.
Carrier-grade availability and scalability	The Cisco TelePresence Exchange System incorporates the following high-availability features: • The Cisco TelePresence Exchange System server cluster includes redundant servers for each of the functional components. • The Cisco Application Control Engine (ACE) provides load balancing to the administration servers and the call engine servers. If one server becomes unavailable, the other server processes the full traffic load. Because ACE provides a single IP address to the server cluster, the service remains available to the users. • Persistent data is stored in a replicated database on the database servers. If the active database server becomes unavailable, the standby database server becomes active. • Database backup and restore capability. • Media resources are provided by clusters of media servers. If a media server becomes unavailable, calls that are using resources on that server are dropped. The remaining active media servers in the cluster handle all new calls.
Support for Cisco TelePresence MSE 8000 Series	The Cisco TelePresence MSE 8000 Series products support carrier-class telepresence services. The chassis contains a supervisor module and provides nine slots for optional service modules. The Cisco TelePresence Exchange System uses the following types of service modules: • Cisco TelePresence MCU MSE 8510—Provides inter-working with single-screen standards-based telepresence endpoints that support either the H.323 or ISDN standard. • Cisco TelePresence Server MSE 8710—Provides inter-working with single-screen and multi-screen telepresence endpoints. • Cisco TelePresence ISDN GW MSE 8321—Provides inter-working with ISDN endpoints.
Guest Dial Out	Allows any unprovisioned H.323 or ISDN endpoint to participate in a Meet-Me conference.

Table 1-1 Supported Features (continued)

Feature	Description
Support for multiple points of presence (POPs) within a region	Media resources can be configured in more than one data center in a region. All media resources in a region are considered to be equivalent, even if the resources span multiple POPs.
Inter-company direct dial with call detail records (CDRs)	The Cisco TelePresence Exchange System provides CDRs for direct dial calls between two enterprises that are hosted by the same service provider.
Inter-service provider direct dial with CDRs	The Cisco TelePresence Exchange System provides CDRs for direct dial calls to other service providers.

Licensing

The Cisco TelePresence Exchange System requires the installation of a license to enable Meet-Me and direct dial services. The system checks the license before scheduling a meeting or initiating a Meet-Me or direct dial call. The system blocks these operations if a valid license is not detected.

The Cisco TelePresence Exchange System comes preinstalled with a 30-day evaluation license. After 30 days, you must install a permanent license to continue to use the Meet-Me and direct dial services. The permanent license is perpetual, meaning that it does not expire and does not need to be renewed.

The license is locked to the call engine servers. If you replace a call engine server, you need to request a new license file for the replacement server.

Key Concepts

Cisco TelePresence Exchange System uses a set of concepts that are described in the following sections:

Service Providers

A service provider offers telepresence services to a set of business customers (organizations) by using media resources that are provisioned at one or more regions in their network.

The Cisco TelePresence Exchange System provides the ability to customize the service greetings and IVR prompts for each service provider.

Regions

A region represents a major geographic region in which a service provider operates.

The region contains one or more resource clusters, which generally include either a Cisco TelePresence Multipoint Switch and/or Cisco TelePresence MSE 8000 Series, Cisco router with integrated voice response (IVR) records, and a Session Border Controller (SBC). A resource cluster is a connected set of resources in one physical data center and is also known as a point of presence (POP).

All media resources in a region are considered to be equivalent for resource allocation purposes, even if the resources span multiple POPs.

All media resources in a region are dedicated to one service provider.

A service provider might have multiple regions configured on a Cisco TelePresence Exchange System.

Organizations

An organization is a business customer served by a service provider. An organization controls one or more telepresence rooms (also known as endpoints) that can be included in a meeting. An organization can choose hosted-endpoint service or enterprise-endpoint service.

Collaboration Services

You can define the following collaboration services on the Cisco TelePresence Exchange System: meetings, standing meetings, IVR prompts, and service numbers.

There is a set of pre-defined meeting types that the service provider can configure. For more information, see the "Meeting Types" section on page 1-7.

The service number is the number that users dial to reach the service such as Meet-Me. You must configure at least one service number for each service provider on the Cisco TelePresence Exchange System.

The service number configuration specifies the associated IVR prompts files. This enables the service provider to configure multiple service numbers for a service, each one with a different set of voice prompts.

Meeting Types

The Cisco TelePresence Exchange System supports the following types of meetings:

- **Meet-Me meeting**—A Meet-Me service meeting that is hosted by this Cisco TelePresence Exchange System. The system reserves and allocates media resources for all of the endpoints in the meeting and provides One-Button-to-Push (OBTP) functionality to the provisioned endpoints. The system also reserves bandwidth for the meeting, if requested.
- **Remote meeting**—A Meet-Me service meeting that is hosted by a remote Cisco TelePresence Exchange System. The Cisco TelePresence Exchange System does not reserve any media resources for a remote meeting. You schedule remote meetings to provide OBTP functionality in the provisioned endpoints and to reserve the bandwidth, if requested.

- **Scheduled two-party direct meeting**—A scheduled direct dialed meeting between two Hosted provisioned endpoints. The Cisco TelePresence Exchange System does not reserve any media resources for a direct dialed meeting. Two party direct meetings are scheduled to provide OBTP functionality for those endpoints within the same organization.

Each meeting is associated with a service provider and a region. All media resources for the meeting are allocated from the specified region, even if some participants are from another region or a different service provider. You must specify the region when you schedule the meeting.

Endpoint Types

The Cisco TelePresence Exchange System provides telepresence services for Cisco TelePresence System (CTS) endpoints and third-party endpoints. Cisco TelePresence endpoints include both TIP-based endpoints and standards-based H.323 and ISDN endpoints. Supported third-party endpoints only include select single-screen endpoints that are H.323 and ISDN standards-based.

The Cisco TelePresence Exchange System supports the following types of endpoints:

- **Provisioned endpoints**—Endpoints for which all configuration details (such as name, phone number, number of screens, and organization) are known by the administrator and configured on the Cisco TelePresence Exchange System. Meet-Me and direct dial calls are placed on provisioned endpoints.
- **Unprovisioned endpoints**—Endpoints for which none of the configuration details are known by the administrator except the name of the meeting scheduler for the endpoint. Through the administration console you can reserve bandwidth for unprovisioned endpoints on the service provider network. This allows the endpoint to connect with other known endpoints within the network that are scheduled for the same meeting. This capability is useful for intercompany meetings.
- **Remote endpoints**—Endpoints for which no configuration details are known. Remote endpoints are endpoints that join the meeting from another service provider network. Configuring a remote endpoint on the Cisco TelePresence Exchange System reserves capacity for the endpoint on the service provider network on which it is resident. The Cisco TelePresence Exchange System automatically determines and reserves the capacity to support these interprovider meetings.

Endpoint Capacity

Three factors determine how many segments the Cisco TelePresence Exchange System reserves for an endpoint: the bridge type that handles the call (Cisco TelePresence Multipoint Switch or Cisco TelePresence MSE 8000 Series), the type of call (dial in or dial out), and the number of endpoint screens.

Note that beginning with Cisco TelePresence Exchange System Release 1.0(3), you can specify either that the smallest amount of capacity possible will be reserved for endpoints, or the maximum capacity per endpoint, depending on your needs.

For more details on endpoint capacity calculation, see the "Endpoint Capacity" appendix.

Organization Ports Management

Organization ports management allows each organization to control the number of organization ports that are consumed by telepresence traffic on the network between the organization and the Cisco TelePresence Exchange System.

You specify the maximum number of ports when you configure an organization. The units are segments (screens). The ports required for each endpoint are specified in the endpoint table. You must specify the ports that are required by endpoints when you schedule the meeting.

When the system schedules a meeting, the port requirement for each organization is calculated, based on the endpoints that are included in the meeting. If the total port capacity for the organization exceeds the maximum value (for all meetings that are scheduled in the time slot), the system rejects the attempt to schedule this meeting.

Session Border Controllers

The session border controller (SBC) is located at the border of a network. The SBC controls call admission to the network and protects the network from excessive call load and malicious traffic. The SBC also provides media bridging.

The SBC includes signaling functionality managed by the Signaling Border Element (SBE) and media functionality managed by the Data Border Element (DBE). The SBC operates in the unified deployment model, which means that the SBE and DBE coexist on same network element.

The SBC controls adjacencies, which represent a signaling relationship with a remote call agent. There is one adjacency defined per external call agent. The adjacency defines protocol-specific parameters as well as admission control and routing policy. Each incoming call is matched to an adjacency, and each outgoing call is routed out over a second adjacency.

The Cisco TelePresence Exchange System connects to SIP endpoints by using an SBC that supports the SIP protocol, and connects to H.323 endpoints by using an SBC that supports the H.323 protocol. A single SBC can support both the SIP and H.323 protocol.

Call Routing

On the Cisco TelePresence Exchange System, a route is a reference to an adjacency on an SBC. Each adjacency on the SBC is assigned a unique tag. The tag value is included in SIP messages between the SBC and Cisco TelePresence Exchange System, which simplifies routing.

For example, the SBC has an adjacency for each enterprise Cisco Unified Communications Manager. The adjacency is configured with a unique tag. The same tag value is configured in the Cisco TelePresence Exchange System route for that organization. The outgoing route on the SBC is found by matching the tag value in the SIP message.