METREOS

IP Communications Applications for Business Advantage

Metreos ActiveRelay® Technology Overview

Metreos Communications Environment 2.2

www.metreos.com

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Preface

This manual describes the methods of integration of the Metreos Communication Environment and specifically the Metreos ActiveRelay application, with Cisco CallManager.

Intended Audience

This manual is intended for individuals who already have an understanding of VoIP technologies, and specifically the application of such technologies to a Cisco CallManager environment.

Style and Formatting Conventions

The following typographical components are used for defining special terms and command syntax:

Convention	Description
Bold typeface	Represents literal information such as • Information and controls displayed on screen, including menu options, windows dialogs and field names • Commands, file names, and directories • In-line programming elements, such as class names and XML elements when referenced in the main text
Italic typeface	Italics typeface is used to denote • A new concept • A variable element such as *filename***.mca**. In this example, *filename* represents the filename and **.mca** is the extension. • A reference to a chapter or section heading
`Sans serif` typeface	Denotes code or code fragments
… (ellipsis)	Denotes omitted material
UPPERCASE	Denotes keys and keystroke combinations such as CTRL+ALT+DEL.

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Metreos ActiveRelay

Metreos ActiveRelay lets you receive calls from your business contacts at a single telephone number, regardless of your physical location. When your contact calls an ActiveRelay-enabled number, the application simultaneously rings all your configured *Find Me* numbers, any of which can then be used to answer the call.

Once connected, you can easily transfer the call to other devices configured with ActiveRelay. The call behaves as a normal call, not exhibiting the multiple ring sequences common to legacy call forwarding applications.

This manual describes the specific configuration requirements of Cisco CallManager for use with Metreos ActiveRelay. For information on enabling ActiveRelay users for the MCE platform, please reference Metreos document Metreos Communications Environment 2.2, Application Suite Administrator Guide.

The Metreos Communications Environment

Active Relay, as does all Metreos applications, executes in the context of the Metreos Communication Environment (MCE). The MCE is a proven and secure IP communications application environment, a primary component of which is the MCE application server engine. The MCE application server is the container in which the Metreos application is deployed and executed.

As shown in the following diagram, the MCE architecture is compartmentalized into well defined areas, the major ones described here.

The MCE Application Server

The Metreos Application Server is the container providing security, stability, and deployment and runtime support to the executing IP communications application. Applications execute within virtual machines, providing security and stability both to the application and to its surrounding environment. The application server communicates with external entities in the enterprise via a pluggable interface components in the *provider framework*.

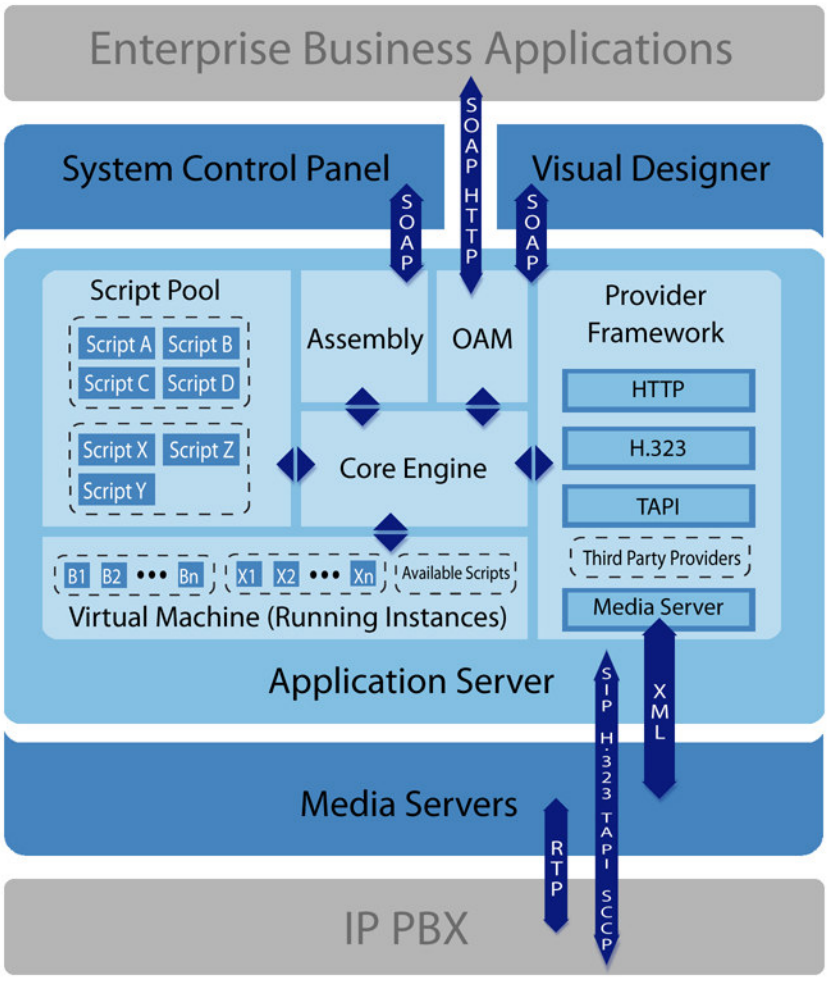
The MCE Provider Framework

The MCE defines an API to pluggable components which it uses to communicate with external entities. The MCE ships with many such providers, used to interface to:

- Call control protocol stacks, such as JTAPI, SIP, H.323, and SCCP
- HTTP events
- Voice/conferencing media servers
- LDAP
- … and more

Additional providers can be written by the customer, by third parties, or by Metreos, to supply whatever external actions, events, and data might be needed to an IP communications application.

Figure 1: The Metreos Communications Environment (MCE)



The MCE Media Engine

One or more Metreos media servers provide powerful media support to MCE applications, offering services such as:

- Playback of recorded prompts and announcements
- Recording of media stream to disk
- Text to speech facilities
- Conferencing
- Speech recognition

A powerful integrated media engine means that your IP communications applications can access media functionality easily and scalably, conserving media resources on the switch, and freeing you from any need to integrate your own external media.

The ActiveRelay Application

Redundancy and Scalability

The Metreos Communications Environment is a scalable architecture including redundancy and clustering capabilities. ActiveRelay, inherently leveraging the MCE architecture, can be configured for redundancy and failover.

In contrast to other products offering single-reach features, Metreos ActiveRelay scales to virtually any number of concurrent users, limited only by the constraints of your CallManager deployment. Scalability is achieved simply by adding additional MCE hardware to the ActiveRelay deployment.

Application Triggering Criteria

Metreos applications are triggered by system events arriving via the provider framework, such as call control activity.

Triggering for the ActiveRelay application in particular is defined by configuring CallManager to route calls whose dialed numbers fall within a specified range, to Metreos Communications Environment servers. This can be accomplished either by routing the call to the MCE as an H.323 gateway in CallManager, or to ActiveRelay-enabled IP phones which have been configured to share a line with an MCE-hosted SCCP or CTI device.

Active Relay Deployment Options

Metreos ActiveRelay can be deployed in either of two basic configurations. The first deployment option is one in which each user's extension is routed directly to the Metreos Communications Environment, with the user primary office extension configured as a Find Me number in the MCE user account profile.

The second option is a configuration wherein each user's primary IP phone shares a line with a MCE-hosted SCCP device or CTI device. The two deployment options are detailed in the following sections.

Active Relay Deployment 1: Calls Routed to MCE

One of the two basic options for deployment of ActiveRelay is to configure each user's primary phone as a Find Me phone, routing each such extension first to the MCE.

Call Flow Narrative

An ActiveRelay call will pass through a number of states within CallManager and the MCE, detailed following. Please reference Figure 2: Active Relay – H.323 Gateway Call Flow page 5 for an illustration of the call flow.

1. Incoming Call
Here a call is placed to an ActiveRelay-enabled user. Typically this number is PSTN-accessible.

2. PSTN H.323 Gateway – Inbound
The PSTN routes the call to a PSTN H.323 gateway, which in turn sends the call to a CallManager cluster.

Metreos ActiveRelay receives notification of call control events via CallManager. A call to an ActiveRelay user must therefore be bound to CallManager before it can subsequently be routed to the MCE.

3. Route Pattern
The route pattern matching the dialed number receives the call, in the process determining the route list for subsequent call routing.

4. Route List
The route list defines a single route group containing MCE H.323 gateways.

The route group will balance load among any number of MCEs, as well as provide the means to route calls to remaining MCE servers should one or more MCEs become unavailable.

5. MCE H.323 Gateway – Outbound
Here the MCE receives notification of the call via H.323 and initiates the ActiveRelay application.

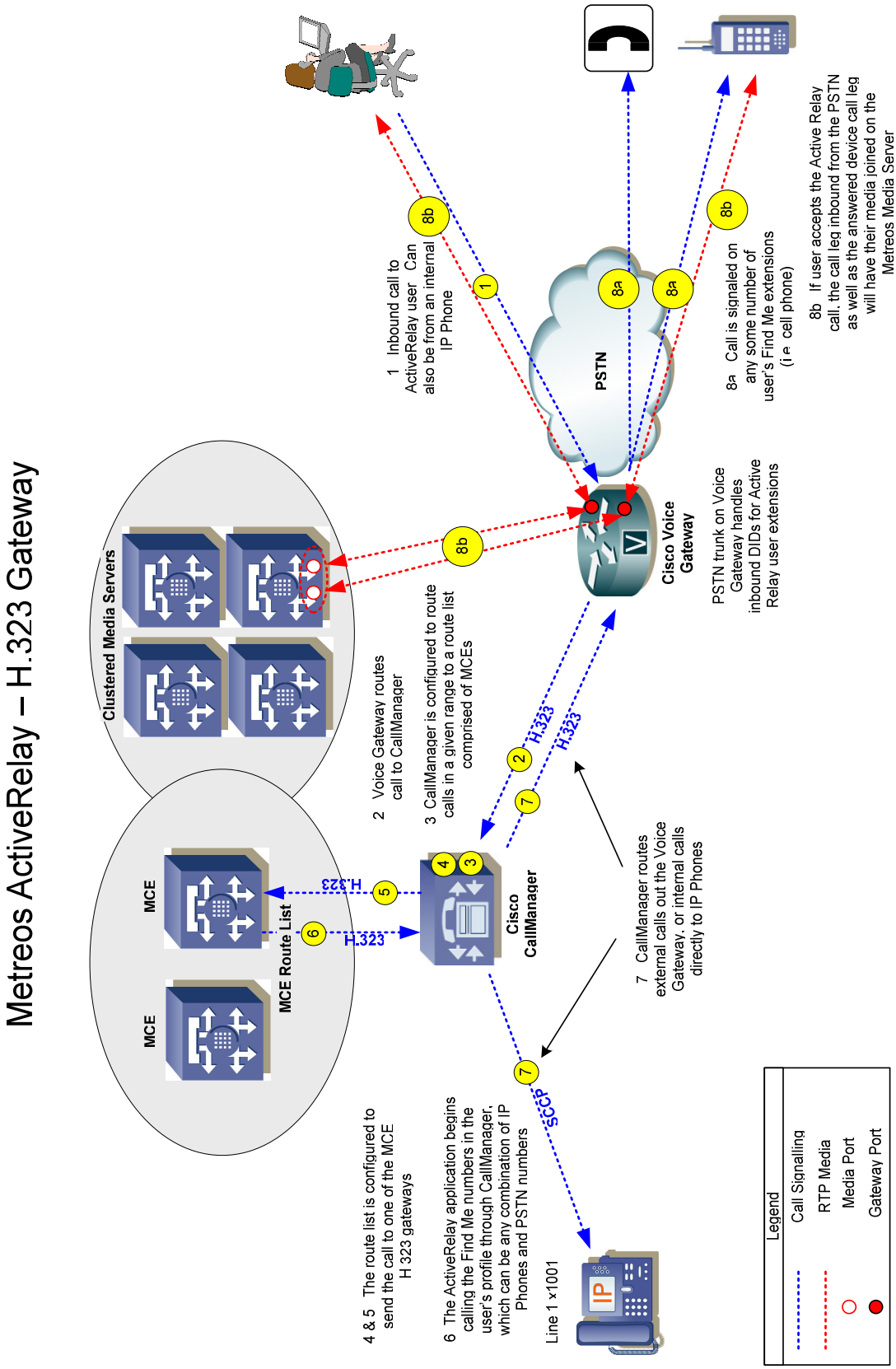


Figure 2: Active Relay – H.323 Gateway Call Flow

H.323 is one of several call control interfaces via which the MCE can receive application-triggering calls. In this case, the use of an H.323 gateway permits ActiveRelay to provide a redundant and load-balanced solution via CallManager call route groups.

6. MCE H.323 Gateway – Inbound
This is the point at which ActiveRelay dials each Find Me number.

The use of H.323 to dial ActiveRelay Find Me numbers permits the MCE to include Caller ID information with the call, further allowing ActiveRelay to propagate the Caller ID present in the original call.

7. PSTN H.323 Gateway – Outbound
Here is where Find Me calls destined for the PSTN are routed.

8. Outbound Call
Find Me phones begin ringing, requiring the answering user to press a confirmation digit on the phone in order to receive an ActiveRelay call made to that phone.

Note that one Find Me number can optionally be configured to require no such confirmation, in order to steer all voice mail to that one extension. Since it cannot be predicted how quickly a voice mail system may pick up on a particular Find Me number, such a confirmation provides the means to give precedence to the voice mailbox of the user's choice.

Performance Characteristics

MCE components on which application performance is primarily determined and measured are the application engine and media engine. Assuming that any instance of either component can reside on dedicated MCE-2400 server hardware, Metreos guarantees the following performance characteristics when deployed per option 1 as described above.

Application Engine
20,000 BHCA (inbound and outbound aggregate)
500 concurrent calls
250 concurrent ActiveRelay conversations

Media Engine (240-port)
120 concurrent ActiveRelay conversations

The numbers cited above are per-server. Multiple application engines and/or media engines can of course be dedicated to a single ActiveRelay deployment in order to scale call load proportionately to the per-server numbers given.

Active Relay Deployment 2: SCCP/CTI Device Shared Lines

When this option is in effect, the MCE is configured as a shared line on each ActiveRelay user's MCE-hosted SCCP or CTI device. In this configuration, a user can answer either their primary IP phone or a Find Me phone. If the IP phone is answered, Find Me dialing/ringing is halted. If a Find Me number is answered and accepted, the IP phone will stop ringing. A walkthrough of each step in this process follows.

Call Flow Narrative

An ActiveRelay call deployed in this manner will pass through various states within CallManager and the MCE, detailed below. Please reference Figure 3: Active Relay – H.323 Gateway Call Flow on page 5 for an accompanying diagram.

1. Incoming Call
Here a call is placed to an ActiveRelay-enabled user. Typically this number is PSTN-accessible.

2. PSTN H.323 Gateway – Inbound
The PSTN routes the call to a PSTN H.323 gateway, which in turn sends the call to a CallManager cluster.

3. Shared Line Configuration
CallManager forks a call to all members of a shared line configuration.

Upon receiving one of the forked call legs, ActiveRelay can begin dialing Find Me numbers based on that user's preferences. Due to inherent behavior of shared line routing, the call is guaranteed to route to the user regardless of the state of the MCE.

4. MCE H.323 Gateway – Inbound
Here ActiveRelay dials each Find Me number.

The use of H.323 to dial ActiveRelay Find Me numbers permits the MCE to include Caller ID information with the call, further allowing ActiveRelay to propagate the Caller ID present in the original call.

5. PSTN H.323 Gateway – Outbound
Here is where Find Me calls destined for the PSTN are routed.

6. Outbound Call
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Note that one Find Me number can optionally be configured to require no such confirmation, in order to steer all voice mail to that one extension. Since it cannot be predicted how quickly a voice mail system may pick up on a particular Find Me number, such a confirmation provides the means to give precedence to the voice mailbox of the user's choice.

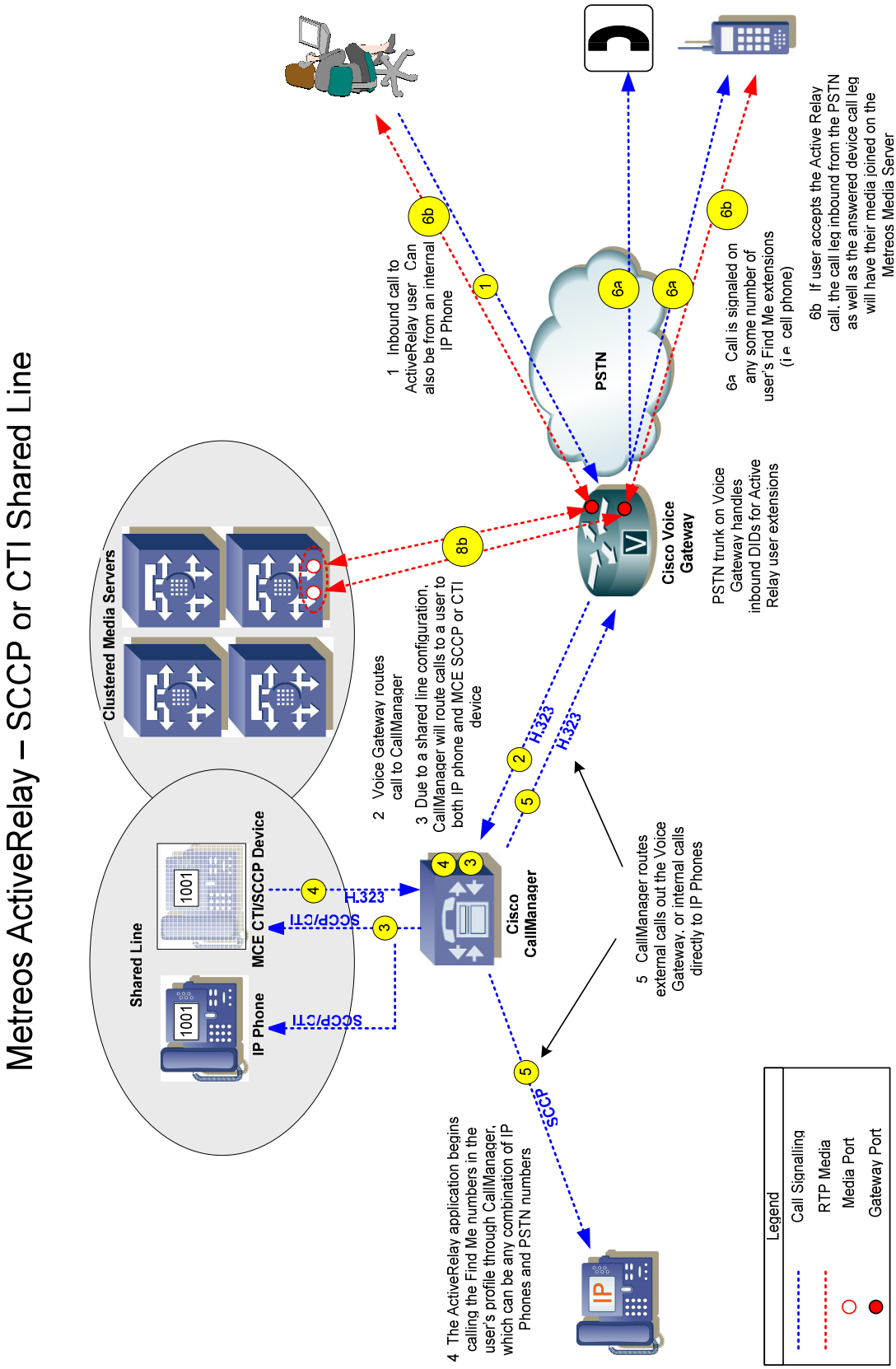

Figure 3: Active Relay – H.323 Gateway Call Flow

Unique to this deployment is the added complexity of the IP phone with a shared line. Assuming this IP phone has voice mail configured, then presumably either the IP phone, or the single Find Me number with no confirmation configured, can accept the voice mail. The user can optionally enable confirmation for *all* Find Me numbers to simplify this situation.

Performance Characteristics

MCE components on which application performance is primarily determined and measured are the application engine and media engine. Assuming that any instance of either component can reside on dedicated MCE-2400 server hardware, Metreos guarantees the following performance characteristics when deployed per option 2 as described immediately preceding.

Application Engine
20,000 BHCA (inbound and outbound aggregate)
500 concurrent calls
250 concurrent ActiveRelay conversations
1500 hosted SCCP or CTI devices used to share lines with user primary IP phones

Media Engine (240-port)
120 concurrent ActiveRelay conversations

The numbers cited above are per-server. Multiple application engines and/or media engines can of course be dedicated to a single ActiveRelay deployment in order to scale call load proportionately to the per-server numbers given.