Cisco Unified Web and E-Mail Interaction Manager Solution Reference Network Design Guide

For Unified Contact Center Enterprise

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Preface

- About This Guide
- Document Conventions
- List of Acronyms and Initialisms
- Other Learning Resources
Welcome to Cisco® Interaction Manager™, multichannel interaction software used by businesses all over the world to build and sustain customer relationships. A unified suite of the industry’s best applications for web and email interaction management, it is the backbone of many innovative contact center and customer service helpdesk organizations.

Cisco Interaction Manager includes a common platform and one or both of the following applications:

- Cisco Unified Web Interaction Manager (Unified WIM)
- Cisco Unified E-Mail Interaction Manager (Unified EIM)

### About This Guide

Cisco Unified Web and E-Mail Interaction Manager Solution Reference Network Design Guide is intended for engineers, system architects, and other technical audience responsible for planning the deployment and maintenance of Cisco Interaction Manager for Cisco Unified Contact Center Enterprise (Unified CCE).

The document is designed to provide an overview of the system, system architecture, system flow for different types of interactions, deployment models, sizing guidelines, high-availability and load-balancing options, network latency considerations, firewall and hardening considerations, and interface boundaries.


### Document Conventions

This guide uses the following typographical conventions.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Indicates</th>
</tr>
</thead>
</table>
| *Italic*   | Emphasis.  
   Or the title of a published document. |
| **Bold**   | Labels of items on the user interface, such as buttons, boxes, and lists.  
   Or text that must be typed by the user. |
| Monospace  | The name of a file or folder, a database table column or value, or a command. |
| Variable   | User-specific text; varies from one user or installation to another. |

### List of Acronyms and Initialisms

Acronyms and initialisms used in this document are listed here:

- **ARM Interface**: Agent Reporting and Management Interface
- AAS: Agent Assignment Service
- BAPI: Blender Application Programming Interface
- CAD: Cisco Agent Desktop
- CMB: Cisco Media Blender
- CSA: Cisco Security Agent
- CTI: Computer Telephony Integration
- DB: Database
- DSM: Distributed Services Manager
- EAAS: External Agent Assignment Service
- EMS: Event Management Service
- HA: High Availability
- IPCC: Internet Protocol Contact Center
- ICM: Intelligent Contact Manager
- LAS: Live Application Servlet
- MR Interface: Media Routing Interface
- MRD: Media Routing Domain
- PG: Peripheral Gateway
- PIM: Peripheral Interface Manager
- SLA: Service Level Agreement
- TES: Task Event Services
- Unified CCE: Cisco Unified Contact Center Enterprise
- Unified SCCE: Cisco Unified System Contact Center Enterprise
- Unified EIM: Cisco Unified E-Mail Interaction Manager
- Unified WIM: Cisco Unified Web Interaction Manager
- UI: User Interface
Other Learning Resources

Various learning tools are available within the product, as well as on the product CD and our web site. You can also request formal end-user or technical training.

Online Help

The product includes topic-based as well as context-sensitive help.

<table>
<thead>
<tr>
<th>Use</th>
<th>To view</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎨 Help button</td>
<td>Topics in <em>Cisco Unified Web and E-Mail Interaction Manager Help</em>, the Help button appears in the console toolbar on every screen.</td>
</tr>
<tr>
<td>F1 keypad button</td>
<td>Context-sensitive information about the item selected on the screen.</td>
</tr>
</tbody>
</table>

*Online help options*

Document Set

The latest versions of all Cisco documentation can be found online at http://www.cisco.com

- All Unified EIM documentation can be found online at http://www.cisco.com/en/US/products/ps7236/tsd_products_support_series_home.html
- All Unified WIM documentation can be found online at http://www.cisco.com/en/US/products/ps7233/tsd_products_support_series_home.html
- In particular, Release Notes for these products can be found at http://www.cisco.com/en/US/products/ps7236/prod_release_notes_list.html
- For general access to Cisco Voice and Unified Communications documentation, go to http://www.cisco.com/en/US/products/sw/voicesw/tsd_products_support_category_home.html

The document set contains the following guides:

- *Hardware and System Software Specification for Cisco Unified Web and E-Mail Interaction Manager*
- *Cisco Unified Web and E-Mail Interaction Manager Solutions Reference Network Design Guide*
- *Cisco Unified Web and E-Mail Interaction Manager Installation Guide*
- *Cisco Unified Web and E-Mail Interaction Manager Browser Settings Guide*

User Guides for Agents and Supervisors

- *Cisco Unified Web and E-Mail Interaction Manager Agent’s Guide*
- *Cisco Unified Web and E-Mail Interaction Manager Supervisor’s Guide*

User Guides for Knowledge Base Managers and Authors

- *Cisco Unified Web and E-Mail Interaction Manager Knowledge Base Author’s Guide*
User Guides for Administrators

- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Administration Console
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Routing and Workflows
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Chat and Collaboration Resources
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Email Resources
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Data Adapters
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Reports Console
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to System Console
- Cisco Unified Web and E-Mail Interaction Manager Administrator’s Guide to Tools Console
System Overview

- Cisco Unified E-Mail Interaction Manager (Unified EIM)
- Cisco Unified Web Interaction Manager (Unified WIM)
- Cisco Interaction Manager for Unified CCE and Cisco Unified ICM
- Basic and Advanced Packages of Cisco Interaction Manager
- Feature Matrix for Standalone and Integrated Deployments
Cisco Unified Email Interaction Manager (Unified EIM) and Cisco Unified Web Interaction Manager (Unified WIM) are key application components that are part of an integrated suite of applications known as Cisco® Interaction Manager™.

Cisco Interaction Manager helps businesses set up multichannel customer interaction hubs to provide consistent high quality service across all interaction channels such as email, chat, and phone. Users can efficiently administer and manage rich knowledge base repositories, departments, queues, business workflows, and data adapters. Historical reporting across channels is also available from a single Reports Console.

The integration between Cisco Interaction Manager and Unified CCE helps address the multichannel handling needs of traditional call centers.

**Cisco Unified E-Mail Interaction Manager (Unified EIM)**

An integral part of Cisco Interaction Manager, Unified EIM enables organizations to intelligently route and process inbound emails, webform inquiries, faxes, and letters.

Key features and capabilities include:

- Business workflows to manage incoming email and webform requests across different teams, with the ability to set service level agreement (SLA) targets for call center service efficiency.
- Intelligent parsing of all incoming email content, to generate auto-responses and suggest useful responses to agents.
- Complete display of customer information and interaction history for agents, across media channels, thereby enabling informed interactions.
- A common knowledge base that enables agents to accurately resolve complex inquiries and processes, interacting directly with data sources and devices where required. Agents can also contribute to the knowledge base.
- Varied collaboration options with experts within and outside the system.
- Web-based consoles for a range of users such as agents, supervisors and managers, business analysts, knowledge authors, programmers, and system administrators.
- Comprehensive analytics, real-time alarms, and monitors for operational performance management.

**Cisco Unified Web Interaction Manager (Unified WIM)**

An integral part of Cisco Interaction Manager, Unified WIM provides agents with a comprehensive set of tools for serving customers in real-time. It enables call center agents to provide immediate personalized service to customers through text chat messaging and web page-pushing. Agents also use Unified WIM to assist customers to navigate through web pages while providing support on the phone.
Key features and capabilities include the ability to:

- Exchange text messages and web pages with customers.
- Web callback and blended collaboration (simultaneous voice call and chat) capabilities for agents and customers.
- Integrate with other channels, while using a common knowledge base, customer view and customer history.
- Handle interactions from multiple channels such as chat, callback, and blended collaboration from the Agent Console. This console supports a single login to Unified EIM and Unified WIM queues (MRD), with a single-click common logout.
- Tag multiple activities together, irrespective of the channel or when they were created, using case management features.
- Service multiple chats at the same time, along with page-push, from one unified Agent Console.

Cisco Interaction Manager for Unified CCE and Cisco Unified ICM

The Cisco Interaction Manager and Unified CCE integration provides agents with the capability to selectively handle email, chat, and phone requests using a unified system that includes Cisco Interaction Manager and Unified CCE. Some of the key points of the integration include:

- An integration wizard to selectively download relevant configuration data such as MRDs, Agents, and Skill Groups from Unified CCE, and to map these to objects in Cisco Interaction Manager.
- The ability for agents to launch Cisco Interaction Manager within CAD Embedded Browser, and work with email, chat, and voice using a unified interface.
- User authentication for agents in Cisco Interaction Manager through Unified CCE.
- The ability to alert users using a pop-up window when a new email or chat activity is assigned to them.
- An External Agent Assignment Service (EAAS) and a Listener Service to facilitate routing and reporting via Unified CCE.
- A reliable channel for communication, through session management, between Cisco Interaction Manager, and the MR and ARM, and BAPI interfaces.
- The availability of the integration as two Cisco Interaction Manager packages, Basic and Advanced. Basic licenses can be upgraded to Advanced, but an Advanced license cannot be downgraded to a Basic one.
Basic and Advanced Packages of Cisco Interaction Manager

The basic editions of Unified WIM and Unified EIM contain fewer features than the advanced editions. All Cisco Interaction Manager documents describe features and functionality available in the advanced editions. Features that are not available in the basic editions are listed in this section.

Unified WIM Basic

Unified WIM Basic does not include the following features. These features are present in Unified WIM Advanced.

- **Ability to define custom activities**: The basic edition allows the creation of only chat type of activities, and supports incoming callback and blended collaboration types of activities.
- **Ability to define custom attributes for business objects**: The basic edition provides only the standard attributes for business objects such as the customer or user object.
- **Ability to add custom fields or change the order of fields on screens**: The user interface cannot be changed in the basic edition.
- **Ability to create user roles**: The basic edition provides only the standard roles.
- **Use of certain types of data links**: Only JDBC data links are available in the basic edition.
- **Use of proxy server**: The basic edition only allows simple page-pushing.

Unified EIM Basic

Unified EIM Basic does not include the following features. They are present in Unified EIM Advanced.

- **Ability to add departments**: The basic edition contains one department. Additional departments cannot be added.
- **Ability to define custom activities**: The basic edition allows the creation of only email type of activities.
- **Ability to define custom attributes for business objects**: The basic edition provides only the standard attributes for business objects such as the customer or user object.
- **Ability to add custom fields or change the order of fields on screens**: The user interface cannot be changed in the basic edition.
- **Ability to create user roles**: The basic edition provides only the standard roles.
- **Use of certain types of data links**: Only JDBC data links are available in the basic edition.
- **Use of advanced workflow features**: The basic edition does not include the ability to add custom rules, create outbound and general workflows, or manage tasks with workflows.
Cisco Interaction Manager supports both integrated and standalone deployment methods. Customers can choose the deployment method that best matches their multichannel contact center needs. The following table provides a quick view of the features that are available in each deployment.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Integrated Deployment</th>
<th>Standalone Deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound email</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Outbound email</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Inbound chat</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Web callback</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Blended collaboration</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Interruptibility (e.g. Voice or chat interrupts email)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Dynamic Run Application Script Request (DRASR)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Universal queuing</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Pull and pick activities from same or other queue</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Search capability</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Search-based activity transfer</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Supervisory transfer of activities in agent's inbox</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Interdepartmental transfer of activities</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Standalone routing</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Non-ICM Picks the Agent (NIPTA) routing</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ICM Picks the Agent (IPTA) routing</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Agent availability considered when displaying Chat entry points</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Automatic pushback for emails</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Automatic pushback for chat</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Alarm workflow that can act on users</td>
<td>No (but alarm workflows act on integrated queues)</td>
<td>Yes (but not supported for supervisor queues)</td>
</tr>
<tr>
<td>Supervisory loop for outbound email review</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Feature</td>
<td>Integrated Deployment</td>
<td>Standalone Deployment</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Department sharing</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(But integrated agents can transfer activities to integrated queues in foreign departments.)</td>
<td></td>
</tr>
<tr>
<td>User administration</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(The Administration Console allows an administrator to add users, keep users as standalone, or integrate user manually with an ICM user)</td>
<td></td>
</tr>
<tr>
<td>User group administration</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(But the visibility of agents under IPTA user/skill groups is available only in Unified CCE)</td>
<td></td>
</tr>
<tr>
<td>Queue administration</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sticky agent functionality</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Exception queue access</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(Mapped administrators can pull from the Exception queue. Access is also available through alarm workflows)</td>
<td></td>
</tr>
<tr>
<td>Knowledge Base suggestion and authoring</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Knowledge Base approval process</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(Allows IPTA users, but not IPTA user groups, to be part of the approval process)</td>
<td></td>
</tr>
<tr>
<td>Data adapters</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unified EIM and WIM historical reports</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(Available from the Reports Console)</td>
<td></td>
</tr>
<tr>
<td>Unified EIM and WIM realtime reports</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(But realtime reports are available from Unified CCE)</td>
<td></td>
</tr>
<tr>
<td>Monitoring Queues</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>(Activities that have been fetched by EAAS, and activities queued in Unified CCE are not included in the count)</td>
<td></td>
</tr>
<tr>
<td>Feature</td>
<td>Integrated Deployment</td>
<td>Standalone Deployment</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Impact of interruptibility</td>
<td>- On Unified EIM and WIM historical reports: None&lt;br&gt;- On WebView/CUIC realtime reports: Yes</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Impact of Media Routing/CTI failover</td>
<td>- On Unified EIM and WIM historical reports: None&lt;br&gt;- On WebView/CUIC realtime reports: Yes</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>- On WebView/CUIC historical reports: Yes</td>
<td></td>
</tr>
<tr>
<td>Impact of Max Wait Time (MWT) and First-in First-out (FIFO) requeuing</td>
<td>- On Unified EIM and WIM historical reports: None&lt;br&gt;- On WebView/CUIC realtime reports: None&lt;br&gt;- On WebView/CUIC historical reports: Yes&lt;br&gt;(Same activity may be counted more than once)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Impact of Blended Collaboration and Callback call flows</td>
<td>- On Unified EIM and WIM historical reports: Yes&lt;br&gt;(Limited to Blended Collaboration and Callback Volume Reports)&lt;br&gt;- On WebView/CUIC realtime reports: Yes</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Cisco Interaction Manager Components

Architecture Overview

Communication Protocols Among Components

Port Number Configuration Between Components

Integration Between Cisco Interaction Manager and Unified CCE

Interface Boundaries
Cisco Interaction Manager is an enterprise class application built on native web-centric architecture. It helps enterprises address business-critical tasks, while offering an unmatched array of resources and response tools. It is built in a modular component-based architecture, combining superior design with easy maintainability.

Cisco Interaction Manager Components

A Cisco Interaction Manager installation has the following six components:

- Database Server
- Web Servers
- Application Servers
- File, Services, and Messaging Servers

These components can be installed in any of the following three types of configurations:

- Single-server (or collocated)
- Split-server (or collocated)
- Distributed-server

For details about these configuration options, see “Deployment Models” on page 42.
Architecture Overview

This section describes the system architecture of Cisco Interaction Manager.

Cisco Interaction Manager system architecture

Agents and Customers

Cisco Interaction Manager is a 100% web-based product that agents and end-customers can access using a web browser from their respective desktops.

Agents can access the application using Microsoft Internet Explorer, or the embedded CAD browser, and customers can access the chat customer console using specific versions of Microsoft IE, Mozilla Firefox, or Chrome. Cisco Interaction Manager is not supported on agent desktops running in a Citrix terminal services environment. For information on browser support, see the Hardware and System Software Specification for Cisco Unified Web and E-Mail Interaction Manager.

Firewall and Load Balancer

To enforce stricter control over access to specific Cisco Interaction Manager servers, a firewall may be configured by a system administrator. The firewall can be configured between the web and application servers.
(as in the case of Unified WIM deployments), or behind the web servers to limit access to the web servers from unknown IP addresses.

A load balancer may also be used in a distributed installation of the application so that requests from agents and customers are either routed to the least-loaded web servers, or evenly distributed across all the available web servers.

**Web Servers**

The web server is used to serve static content to the browser.

**Application Servers**

The application server is used as a web container (JSP/servlet engine) and EJB Container. The core business logic resides here as well as in the stored procedures residing on the database server. The business logic residing in JAVA classes is deployed on the application server. The JSP/servlets interact with the business objects through the business client layer, and these in turn interact with the database to execute relevant business logic on data present in the database.

**File, Services, and Messaging Servers**

**File Server**

The file server is used to store the complete file system corresponding to the application. This includes, but is not limited to, email and article attachment files, report templates, all locale-specific strings, and online help files. There is only one file server in a configuration.

**Services Server**

Cisco Interaction Manager has processes that perform specific business functions, such as fetching emails from a POP3 or IMAP server, sending emails through an SMTP server, processing workflows, assigning chats to the standalone agents, maintaining integrated connections to the ICM server, etc. All services run on the services server and are managed by the Distributed Service Manager (DSM). There is only one services server in a configuration.

Cisco Interaction Manager facilitates the creation of multiple instances of services with work distributed among the various instances. For instance, the service used to retrieve emails could be configured to have multiple instances to retrieve emails from different email addresses. This capability can be used to process increasing volumes of customer interactions coming into a contact center.

**Messaging Server**

This component manages asynchronous communication between server side components and the user interface. In the application, java messaging clients use the publisher-subscriber model to interact with each other, and the messaging server controls these interactions. There is only one messaging server in a configuration.
Database Server

Cisco Interaction Manager includes databases that are SQL-compliant and work with HTML and XML data-sources and ultimately web services that consume and produce SOAP messages.

The installation program creates the following databases:

- A master database, where system level information is stored.
- An active database, where all business related information is stored. This is also referred to as the partition database.
- An archive database, where all archived data is stored.
- A reports database, where all data used by the reports module is stored. This database is created only in deployments that use the enterprise edition of MSSQL Server.

MS SQL Server clustering is supported, and can be used to achieve failover for the databases.

Unified CCE Integration

As part of the system integration with Unified CCE, the services server has two additional services, the External Agent Assignment Service (EAAS) and the Listener Service. These services interact with the MR PG and CTI Server components of Unified CCE respectively via the MR, ARM, and BAPI interfaces.

Additionally, the Cisco Interaction Manager application server component establishes a connection with the Unified CCE Administration Workstation (AW) database server to import relevant configuration, and map the configuration to business objects in the Cisco Interaction Manager database. For details see the architecture diagram for the Cisco Interaction Manager integration with Unified CCE on page 27.

In parent-child configurations, there is no multi-channel routing and integration through the parent ICM. MR PG’s need to connect to the child CCE. A separate Cisco Interaction Manager installation is required for each child.

In hosted ICM/CCH environments, there is no multi-channel routing through the NAM. Integration is at the CICM level only. MR PGs needs to connect to the CICM.

Communication Protocols Among Components

Browser-Server Communication

Since the Cisco Interaction Manager consoles are all web-based, all communication between the browser and the server is conducted using HTTP. The SSL variant of HTTP, HTTPS, is supported for agent browsers to access the application through a Secure Socket Layer. There is neither custom encryption, nor compression, on data that is transferred between the browser and server.
Messaging Between Server-Side Components

Messaging among the various server-side modules is limited to local-method calls in case of “in-process” invocation, and remote-method invocation in case the server-side component is “out-of-process”. The Java Message Service (JMS), an integral part of the J2EE platform is also used for server-side communication.

Server-Browser Event Publishing

Although request-response communication from browser-server is common, server-side “push” of events and other critical information is achieved via “pushlets”, a framework unique to Cisco Interaction Manager. Using this robust server-side-to-browser push framework, one could publish key events to connected browser clients. It also allows browser clients to subscribe to specific topics and be notified when messages arrive for those topics.

Communication Between Distributed Components

Cisco Interaction Manager includes a complex distributed framework of remote objects that communicate with each other. The primary communication protocol employed is “remote method invocation (RMI)”, an integral part of the J2EE platform.

Port Number Configuration Between Components

This section describes the inbound and outbound ports that need to be opened for the flow of requests between the various components. The default port numbers are listed here. Ports that can be modified at the time of installation are identified with an asterisk *. Ports that can be changed by editing property files are identified with a plus sign +.

<table>
<thead>
<tr>
<th>From Server</th>
<th>To Server</th>
<th>Default Destination Ports and Protocols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Server</td>
<td>Services Server</td>
<td>15099 (RMI Registry port) [Protocol: RMI] 25000 - 25025 (Cache Manager ports for all services on the Services Server) [Protocol: TCP] 1025-5000 (Dynamic port range used by RMI server objects) [Protocol: TCP]</td>
</tr>
<tr>
<td>Application Server</td>
<td>File Server</td>
<td>139 or 445 [Protocol: NETBIOS - TCP]</td>
</tr>
<tr>
<td>Application Server</td>
<td>Database Server</td>
<td>1433 [Protocol: TCP]</td>
</tr>
<tr>
<td>Application Server</td>
<td>Messaging Server</td>
<td>2089 [Protocol: JNP]</td>
</tr>
<tr>
<td>Application Server</td>
<td>Application Server</td>
<td>12345 - 123nn where nn is the number of application servers in the deployment. [Protocol: TCP]</td>
</tr>
<tr>
<td>Application Server</td>
<td>SMTP Server</td>
<td>25 [Protocol: SMTP]</td>
</tr>
<tr>
<td>Web Server</td>
<td>Application Server</td>
<td>15006, 15007, 15008 [Protocol: TCP]</td>
</tr>
<tr>
<td>From Server</td>
<td>To Server</td>
<td>Default Destination Ports and Protocols</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Web Server</td>
<td>File Server</td>
<td>139 or 445 [Protocol: NETBIOS - TCP]</td>
</tr>
<tr>
<td>Messaging Server</td>
<td>File Server</td>
<td>139 or 445 [Protocol: NETBIOS - TCP]</td>
</tr>
<tr>
<td>Services Server</td>
<td>File Server</td>
<td>139 or 445 [Protocol: NETBIOS - TCP]</td>
</tr>
<tr>
<td>Services Server</td>
<td>Database Server</td>
<td>1443 [Protocol: TCP]*</td>
</tr>
<tr>
<td>Services Server</td>
<td>Messaging Server</td>
<td>2089 [Protocol: JNP]**</td>
</tr>
<tr>
<td>Services Server</td>
<td>Application Server</td>
<td>2089 [Protocol: JNP]**</td>
</tr>
<tr>
<td>Services Server</td>
<td>Web Server</td>
<td>80 [Protocol: HTTP]</td>
</tr>
<tr>
<td>Services Server</td>
<td>SMTP Server</td>
<td>25 [Protocol: SMTP]</td>
</tr>
<tr>
<td>Services Server</td>
<td>POP3 Server</td>
<td>110 [Protocol: POP3]</td>
</tr>
<tr>
<td>Active Database Server</td>
<td>File Server</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Active Database Server</td>
<td>Archive Database Server</td>
<td>1433 [Protocol: TCP]**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>135 [Port for Remote Procedure Call (RPC)]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5000-5020 (Port range for RPC ports required for MSDTC to work across firewall)</td>
</tr>
<tr>
<td>Reports Database Server</td>
<td>Active Database Server</td>
<td>1433 [Protocol: TCP]**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>135 [Port for Remote Procedure Call (RPC)]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5000-5020 (Port range for RPC ports required for MSDTC to work across firewall)</td>
</tr>
<tr>
<td>Cisco Interaction Manager</td>
<td>Primary CTI Server</td>
<td>42027</td>
</tr>
<tr>
<td>Cisco Interaction Manager</td>
<td>Secondary CTI Server</td>
<td>42028</td>
</tr>
<tr>
<td>Cisco Interaction Manager</td>
<td>MR Interface</td>
<td>38001</td>
</tr>
<tr>
<td>Cisco Interaction Manager</td>
<td>CMB</td>
<td>15099+</td>
</tr>
</tbody>
</table>

*Note: Port ranges are for Remote Procedure Call (RPC) ports required for MSDTC to work across firewall.*
Integration Between Cisco Interaction Manager and Unified CCE

The key interfaces used in the integration are Media Routing (MR) Interface, Agent and Reporting and Management (ARM) Interface, and the Blender Application Programming Interface (BAPI).

Unified CCE integration architecture

For a two-way socket connection from an MR PG to the EAAS through the MR interface, an MR PIM needs to be setup in Unified CCE by running the ICM setup utility. The MR PIM needs to be configured with the fully qualified host name or IP address of the Cisco Interaction Manager services server.

For a two-way socket connection from the Listener Service to the CTI server through the ARM interface, which embeds an Agent PG, the primary and/or secondary CTI servers need to be configured for the Agent PG using ICM Configuration Manager. Additionally, the Agent PIM of the Agent PG/CTI Server listens to incoming socket connection requests from the Listener Service, and therefore the Agent PIM needs to be configured too using the ICM setup utility.

Both the MR PG and CTI Server of Unified CCE support duplex connections with Cisco Interaction Manager components for high availability. Using the Unified CCE setup utility, the administrator has the option to install side A and side B for these components to establish duplex capability.

For the MR PG, either side A or side B of the MR PIM can be active at a given point, and this active side stays connected to the EAAS, while the other side remains idle. If this MR PIM side fails, the other side automatically initiates a connection with the EAAS to restore functionality seamlessly.

Likewise, the Listener Service stays connected to a single active side of the Agent PIM, corresponding to the Agent PG/CTI Server, while the other Agent PIM side remains idle. If the active Agent PIM side fails or goes idle, the Listener Service automatically initiates a connection with the other side, which then becomes active. However, the CMB component does not support duplex capability in this release, and therefore, all Listener Service connections to the CMB through the BAPI interface are simplex.
Microsoft Active Directory Dependency

Unified CCE uses Microsoft Active Directory for managing the ICM instances, and ICM objects that have been created under the respective instances. For information about Unified CCE and Microsoft Active Directory configuration, refer to the Unified CCE SRND guide at www.cisco.com/go/srnd.

Interface Boundaries

This section describes the various external interfaces and key components used to facilitate the integration between the two systems. For multi-channel agents, CAD acts as the interface between Cisco Interaction Manager and Unified CCE applications. Task buttons can be pre-configured within CAD to launch the Unified Cisco Interaction Manager UI in the CAD embedded browser.

Key Protocols

The key protocols involved in the integration are outlined in this section. These are:

- TCP
- HTTP/HTTPS
- ODBC

TCP

TCP is the protocol used for socket communication between Cisco Interaction Manager and the key interfaces of Unified CCE, namely, MR and ARM. A TCP socket connection establishes the communication channel for messaging.

HTTP/HTTPS

Cisco Interaction Manager supports a non-secure connection from browsers to the web server through HTTP, or a secure connection through HTTPS.

ODBC

ODBC is the protocol used by the Cisco Interaction Manager Integration Wizard and Cisco Interaction Manager to connect to ICM Configuration database that further facilitates the selective download of configuration data into Cisco Interaction Manager.

Key Components

The key components of the integration are outlined in this section. These are:

- Cisco Interaction Manager
- ICM Interfaces
Cisco Interaction Manager

External Agent Assignment Service

- The External Agent Assignment Service acts as the TCP server for incoming connections from the MR PG through the MR interface of Unified CCE, and accepts a successful connection.
- This service fetches new tasks that arrive into an external routing queue in Cisco Interaction Manager, and is responsible for submitting a route request for each task to Unified CCE, for identification of a target agent or skill group.

Listener Service

- The Listener Service acts as the TCP client for initiating connections to the CTI Server through the ARM interface of Unified CCE.
- The service has the capability to support multiple instances, with each instance dedicated to communicate with a single Agent PG/CTI Server through the ARM interface. An Agent PG can be an IPCC/CCM PG, a non-voice PG, or an ACD PG.
- Each instance is responsible for reporting the current state of an agent and task based on agent UI operations, to the Agent PG/CTI Server to which the agent belongs.

Cisco Interaction Manager Integration Wizard

- The integration wizard is used for establishing mappings between Cisco Interaction Manager and Unified CCE configuration objects that are needed to create a unified system for integrated routing, assignment, and reporting.
- The wizard allows the user to select configurations to import, such as application instance name, Unified CCE peripherals, Unified CCE MRDs, Unified CCE Skill Groups, etc. Upon saving the selected configurations, the system is considered to be integrated.

ICM Interfaces

Media Routing Interface and Agent Reporting and Management Interface

Media Routing (MR) interface allows the application to access Unified CCE’s task and agent management services for different customer contact channel such as email, fax, web collaboration, chat, and voice.

When an application receives a contact request from a customer over a particular channel such as email or chat, the application uses the MR interface to ask Unified CCE for instructions on how to handle this new task. Upon receiving the request, Unified CCE identifies and runs a pre-defined routing script. As a result of the execution of the routing script, Unified CCE tells the application to do one of the following:

1. Execute an application script: The application returns a script execution result to Unified CCE. Unified CCE then continues executing the routing script, possibly utilizing new data collected as a result of running the application script. This step may repeat as directed in the routing script.
2. Offer the task to the specified agent: Route the new task to best available agent – one who has the matching skill within the enterprise – as identified by Unified CCE.

   Alternatively, the routing script may return a label that can be interpreted by the application. The routing script is now considered complete for this task.

In order for Unified CCE to manage the agent activities and properly route tasks, Unified CCE must monitor all the agents that are logged into Unified CCE peripherals such as traditional ACDs, IPCC/EA peripherals, and application instances (multimedia applications). The application instances report the agent’s activities and agent status through the extended Unified CCE CTI/ARM interface. The Agent Reporting and Management (ARM) Interface allows the application to manage agents and report on task activity associated with agents for different customer contact channels. The application can use the Task Event Services (TES) to monitor agent and task events for different customer contact media.

**Blender Application Programming Interface (BAPI)**

BAPI is a simple API framework for applications to interface with Cisco Media Blender. BAPI is implemented using JAVA RMI as a communication mechanism. It exposes various set of interfaces to the application to manage sessions, agents, callers, and the provider. Provider is used to monitor state changes of agents and sessions at the same time maintains connectivity between application and Cisco Media Blender (CMB). CMB in turn provides web callback and blended collaboration integration with a Cisco Multichannel contact center environment. It shares software events between Cisco Interaction Manager and the Unified CCE PG, or a legacy ACD PG. CMB functions as an event bus with two participating medias to combine the events and keeps the parties (Voice and Web) synchronized providing seamless integration. It provides platform for session tracking, event distribution, CTI workflow, and routing of web requests through an ACD.
System Flow

- Email Routing
- Chat Routing
- Callback Routing
- Blended Collaboration Routing
This chapter illustrates the major components involved in the life-cycle of email, chat, callback, and blended collaboration activities as they move through the system. It includes the various steps in the handling of an interaction from the point at which a customer query is received to it being routed to the appropriate user or queue.

Email Routing

There are various steps involved in efficiently responding to emails from customers. Emails are first retrieved into the system and routed to appropriate users or queues. Once a response is created, it is processed through the system and sent to the customer. The general system flow for standalone and integrated email routing is described in this section. It includes:

- System Flow for Email Routing Through Cisco Interaction Manager
- System Flow for Email Routing Through Unified CCE

System Flow for Email Routing Through Cisco Interaction Manager

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A customer sends an email into the system.</td>
</tr>
<tr>
<td>2.</td>
<td>The Retriever service picks up the email from the email server configured for the alias. Emails can be fetched from both POP3 and IMAP servers.</td>
</tr>
<tr>
<td>3.</td>
<td>An activity is created in the system for the email, and a case is created to hold all subsequent activities that relate to the same issue.</td>
</tr>
<tr>
<td>4.</td>
<td>The email activity is processed by an inbound workflow, which applies the rules configured within the workflow, and then routes the email activity to a Unified EIM standalone queue or user.</td>
</tr>
<tr>
<td>5.</td>
<td>If the workflow assigns the activity to a user directly, the user finds it in the inbox in the Agent Console. The agent can also pull an activity from a queue. Queues can be configured to push the activity to one among a group of selected agents (through either load balancing or round robin algorithms).</td>
</tr>
<tr>
<td>6.</td>
<td>The agent responds to the activity and performs a Send or Send and Complete action. This sends an email response back to the customer and the email activity is completed. A Case ID number is added to the subject line of the outgoing email.</td>
</tr>
<tr>
<td>7.</td>
<td>The customer responds. The Retriever service picks up the email from the email server and creates a new activity for the email. The system recognizes the Case ID number and threads the new activity into the existing case.</td>
</tr>
</tbody>
</table>

*General system flow for email routing through Cisco Interaction Manager*
## System Flow for Email Routing Through Unified CCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A customer sends an email.</td>
</tr>
<tr>
<td>2.</td>
<td>The Retriever service picks up the email from the email server configured for the alias. Emails can be fetched from both POP3 and IMAP servers.</td>
</tr>
<tr>
<td>3.</td>
<td>An activity is created in the system for the email, and a case is created that will hold all subsequent activities that relate to the same issue.</td>
</tr>
<tr>
<td>4.</td>
<td>The email activity is processed by an inbound workflow, which applies the rules configured within the workflow, and then routes the email activity to a Unified EIM queue that is mapped to an Email MRD.</td>
</tr>
<tr>
<td>5.</td>
<td>For the given email activity, the External Agent Assignment Service sends a route request to Unified CCE through the MR Interface to handle the new activity.</td>
</tr>
<tr>
<td>6.</td>
<td>Unified CCE executes a routing script, identifies an available agent based on factors such as the number of agents who are logged in, concurrent task limits, etc., and sends a message saying that an agent has been identified.</td>
</tr>
<tr>
<td>7.</td>
<td>On successfully receiving a message that a given agent in the PG has been chosen to handle the task, the Listener Service assigns the task to the given agent, and reports the status of the task and agent to ICM through the ARM Interface for user interface actions.</td>
</tr>
<tr>
<td>8.</td>
<td>The agent responds to the activity, and performs a Send or Send and Complete action. An email response is sent back to the customer and the email activity is completed. A Case ID number is added to the subject line of the outgoing email.</td>
</tr>
<tr>
<td>9.</td>
<td>The customer responds. The Retriever service picks up the email from the email server and creates a new activity for the email. The system recognizes the Case ID number and threads the new activity into the existing case.</td>
</tr>
</tbody>
</table>

*General system flow for email routing through Unified CCE*

## Chat Routing

There are various steps involved in efficiently responding to chat requests received from customers. The general system flows for handling a chat request in a standalone system, a system integrated with Unified CCE, and a system that is integrated with a legacy ACD (Avaya) are described here. This section includes:

- System Flow for Chat Routing Through Cisco Interaction Manager
- System Flow for Chat Routing Through Unified CCE
- System Flow for Chat Routing Through Legacy ACD (Avaya)
## System Flow for Chat Routing Through Cisco Interaction Manager

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point.</td>
</tr>
<tr>
<td>2.</td>
<td>A chat activity is created, and this reaches a Unified WIM standalone queue.</td>
</tr>
<tr>
<td>3.</td>
<td>The Agent Assignment Service (AAS) receives the request, assigns an available agent, and the Live Engine sends a response back to the customer indicating that an agent will be with the customer shortly.</td>
</tr>
<tr>
<td>4.</td>
<td>The chat activity is pushed to the agent’s inbox and the agent and customer can start exchanging chat messages.</td>
</tr>
<tr>
<td>5.</td>
<td>All chat message exchanges that are in progress are stored in memory periodically, while all other attributes of the activity are written into the DB asynchronously.</td>
</tr>
</tbody>
</table>
| 6.   | When the agent ends a chat:  
  - All exchanged chat messages are written into the DB.  
  - The agent load is decremented.  
  - An exit page is rendered to the customer. |

*General system flow for chat routing through Cisco Interaction Manager*
## System Flow for Chat Routing Through Unified CCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point.</td>
</tr>
<tr>
<td>2.</td>
<td>A chat activity is created and this reaches a Unified WIM queue that is mapped to a Chat MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in Step 3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router executes a routing script that picks an agent within the given Agent PG for the given MRD who can handle the chat request from the customer.</td>
</tr>
<tr>
<td>6.</td>
<td>If no agent is immediately available to handle the task, Unified CCE may be configured to optionally request the EAAS to execute a script to notify the customer of expected wait time before an agent services the chat request. This applies both to chat and blended collaboration types of activities.</td>
</tr>
<tr>
<td>7.</td>
<td>Upon picking an available agent, the ICM Router communicates back to MR PG, and MR PG sends a response back to EAAS with agent identifier corresponding to the mapped agent that is to handle this chat request. At the same time, a pre-call notification is sent to the Agent PG / CTI server that an agent belonging to this Agent PG has been picked for assignment.</td>
</tr>
<tr>
<td>8.</td>
<td>EAAS receives this response, and notifies the Listener Services of the agent identifier. The Listener Service offers the task to the agent by pushing the activity to the agent inbox. If the CTI server does not receive the offer confirmation within a specified period of time, the agent state is marked as “Non-Routable” in ICM.</td>
</tr>
<tr>
<td>9.</td>
<td>After the activity reaches the agent inbox, the Listener Service keeps the CTI server informed of task state at all times through the ARM interface, for various agent operations, such as, when clicking the activity for the first time, when switching between chat activities in the inbox, and when sending and completing the activity. If either the agent or customer leaves the chat session, wrap-up time is accumulated from that point causing the activity to go into wrap-up state. All the messaging that occurs with the CTI server through the ARM interface is used for unified reporting by supervisors and ICM administrators in Unified CCE.</td>
</tr>
</tbody>
</table>

*General system flow for chat routing through Unified CCE*
System Flow for Chat Routing Through Legacy ACD (Avaya)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point. Only single-session chat is supported by Legacy ACD.</td>
</tr>
<tr>
<td>2.</td>
<td>A chat activity is created, and this reaches a Unified WIM queue that is mapped to a Voice MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in Step 3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>ICM Router executes a routing script that returns a LABEL, in a message back to EAAS. The EAAS performs a hand-shake with the Listener Service at this point.</td>
</tr>
<tr>
<td>6.</td>
<td>The Listener Service requests Media Blender to pick an agent corresponding to this label.</td>
</tr>
<tr>
<td>7.</td>
<td>Media Blender runs a CTI strategy (such as PhantomNoCallRelease).</td>
</tr>
<tr>
<td>8.</td>
<td>The ACD assigns an agent to handle the task.</td>
</tr>
<tr>
<td>9.</td>
<td>The Listener Service connects the customer and agent in a chat session.</td>
</tr>
<tr>
<td>10.</td>
<td>Customer and agent communicate through text chat. Reporting occurs through the Legacy ACD.</td>
</tr>
</tbody>
</table>

General system flow for chat routing through Legacy ACD (Avaya)
Callback Routing

Callback allows customers to submit a phone number using a web form. An agent who can handle the call is identified, and a call is placed, connecting the agent to the customer.

System Flow for Web Callback Routing Through Unified CCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point.</td>
</tr>
<tr>
<td>2.</td>
<td>An activity is created, and this reaches a Unified WIM queue that is mapped to a Voice MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in step #3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router executes a routing script that picks an agent. Subsequently, the MR PG notifies the EAAS of the identified agent through the MR interface.</td>
</tr>
<tr>
<td>6.</td>
<td>ICM sends a pre-call notification to the Agent PG. The Media Blender gets the pre-call message from the CTI server, runs a CTI strategy (such as Agent Resolved) and places a call from the agent to the caller. The pre-call message contains information such as the Agent ID, caller’s phone number, etc.</td>
</tr>
<tr>
<td>7.</td>
<td>The caller’s phone rings, and the agent is now on a voice call with the caller.</td>
</tr>
</tbody>
</table>

*General system flow for web callback through Unified CCE*
System Flow for Web Callback Routing Through Legacy ACD (Avaya)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point.</td>
</tr>
<tr>
<td>2.</td>
<td>An activity is created, and this reaches a Unified WIM queue that is mapped to a Voice MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in Step 3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router picks a skill and service, and notifies the MR PG, which in turn notifies EAAS through the MR interface.</td>
</tr>
<tr>
<td>6.</td>
<td>ICM sends a legacy pre-call notification to the ACD PG. The Media Blender gets the pre-call message from the CTI server, runs the configured CTI strategy (such as PhantomWaitRelease, etc.) and places a call from the agent to the caller. The pre-call message contains information such as the skill and service dialled number that Unified CCE picked, caller's phone number, etc.</td>
</tr>
<tr>
<td>7.</td>
<td>The caller's phone rings, and the agent is now on a voice call with the caller.</td>
</tr>
</tbody>
</table>

General system flow for web callback through legacy ACD (Avaya)

System Flow for Delayed Callback Routing Through Unified CCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point. For delayed callback, the phone number and the delay time are required fields. The voice call is generated after this delay period.</td>
</tr>
<tr>
<td>2.</td>
<td>An activity is created, and this reaches a Unified WIM queue that is mapped to a Voice MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in Step 3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router executes a routing script that picks an agent. Subsequently, the MR PG notifies the EAAS of the identified agent through the MR interface.</td>
</tr>
<tr>
<td>6.</td>
<td>ICM sends a pre-call notification to the Agent PG. The Media Blender gets the pre-call message from the CTI server, runs a CTI strategy (such as AgentReserved) and places a call from the agent to the caller. The pre-call message contains information such as the Agent ID, caller's phone number, etc.</td>
</tr>
<tr>
<td>8.</td>
<td>The caller's phone rings, and the agent is now on a voice call with the caller.</td>
</tr>
</tbody>
</table>

General system flow for delayed callback through Unified CCE
System Flow for Delayed Callback Routing Through Legacy ACD (Avaya)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point. For delayed callback, the phone number and the delay time are required fields. The voice call is generated after this delay period.</td>
</tr>
<tr>
<td>2.</td>
<td>An activity is created, and this reaches a Unified WIM queue that is mapped to a Voice MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in Step 3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router picks a skill and service, and notifies the MR PG, which in turn notifies EAAS through the MR interface.</td>
</tr>
<tr>
<td>6.</td>
<td>ICM sends a legacy pre-call notification to the ACD PG. The Media Blender gets the pre-call message from the CTI server, runs the configured CTI strategy (such as PhantomWaitRelease, etc.) and places a call from the agent to the caller after the specified delay period (if the specific delay period has been exceeded, the call must be tagged as unhandled, and treated as a failed call). The pre-call message contains information such as the skill and service dialled number that Unified CCE picked, caller's phone number, etc.</td>
</tr>
<tr>
<td>7.</td>
<td>The caller's phone rings, and the agent is now on a voice call with the caller.</td>
</tr>
</tbody>
</table>

General system flow for delayed callback through legacy ACD (Avaya)
## Blended Collaboration Routing

### System Flow for Blended Collaboration Routing Through Unified CCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point.</td>
</tr>
<tr>
<td>2.</td>
<td>An activity is created, and this reaches a Unified WIM queue that is mapped to a Blended Collaboration MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in Step 3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router executes a routing script that picks an agent. Subsequently, the MR PG notifies the EAAS of the identified agent through the MR interface.</td>
</tr>
<tr>
<td>6.</td>
<td>If no agent is immediately available to handle the task, Unified CCE may be configured to optionally request the EAAS to execute a script to notify the customer of expected wait time before an agent services the chat request. This applies both to chat and blended collaboration types of activities.</td>
</tr>
<tr>
<td>7.</td>
<td>After Unified CCE has determined an available agent, the agent and customer get connected via a voice call, and Cisco Interaction Manager also initiates a chat session for web page sharing.</td>
</tr>
<tr>
<td>8.</td>
<td>Messages are sent from the Listener Service to the CTI server through the ARM interface once the customer and agent are connected in a chat session. If either the agent or customer leaves the chat portion of the blended collaboration session, wrap-up time is accumulated from that point causing the activity to go into wrap-up state, until the activity is completed.</td>
</tr>
</tbody>
</table>

*System flow for blended collaboration routing through Unified CCE*
## System Flow for Blended Collaboration Routing Through Legacy ACD (Avaya)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Customer (caller) fills a web form by adding name, phone number, and other details pertaining to the request that needs to be handled by an agent, and submits the form through an entry point.</td>
</tr>
<tr>
<td>2.</td>
<td>An activity is created, and this reaches a Unified WIM queue that is mapped to a Voice MRD.</td>
</tr>
<tr>
<td>3.</td>
<td>The field values from the web form are stored in Cisco Interaction Manager variables that map to Unified CCE Expanded Caller Context Variables (ECC variables). A Script Selector is mainly used by Unified CCE to determine the routing script that needs to be executed.</td>
</tr>
<tr>
<td>4.</td>
<td>The External Agent Assignment Service (EAAS) within Cisco Interaction Manager executes, and sends a routing request to Unified CCE through the MR interface. All the context in the form of ECC variables populated in step #3 are passed along with this route request.</td>
</tr>
<tr>
<td>5.</td>
<td>The ICM Router executes a routing script, picks a skill group or service within the ACD, and returns a LABEL that identifies the service or skill in a message to the EAAS.</td>
</tr>
<tr>
<td>6.</td>
<td>EAAS holds the request, and asks the Media Blender for the given peripheral to pick an agent, by passing the skill group or service obtained from the label, to the Media Blender.</td>
</tr>
<tr>
<td>7.</td>
<td>Media Blender runs a specific CTI strategy (such as Phantom Wait Release), in order to locate a suitable agent on the ACD, and when the ACD has identified an available agent, the Media Blender places the call from the agent to the caller.</td>
</tr>
<tr>
<td>8.</td>
<td>The caller’s phone rings, and the agent is now on a voice call with the caller.</td>
</tr>
<tr>
<td>9.</td>
<td>Cisco Interaction Manager adds the agent into a chat session with the customer.</td>
</tr>
<tr>
<td>10.</td>
<td>Agent and caller can now share web pages and collaborate, while speaking on the phone. At any point of time, if the voice call gets dropped, blending from phone to web session can optionally take place between the caller and the agent, and vice-versa.</td>
</tr>
</tbody>
</table>

*General system flow for chat routing through Legacy ACD (Avaya)*
Deployment Models

- Single-Server (or Collocated) Deployment
- Split-Server (or Collocated) Deployment
- Distributed-Server Deployment
Due to the modular, component-based nature of the architecture, Cisco Interaction Manager has the ability to cater to the growing demands for concurrent user loads. To provide the flexibility to suit deployments of varied sizes, Cisco Interaction Manager supports various components that may be distributed across various servers in a deployment. This chapter provides details of the possible deployment options.

**Single-server (or collocated)**

All components are on a single server. This is the simplest type of configuration. A true single-server deployment is possible only for Unified EIM installations. If the installation includes Unified WIM, it becomes a collocated deployment, where the web server may be installed on a separate machine outside the firewall.

**Split-server (or collocated)**

Components are split across two servers. The database is on one server, while all other components are on the other server. A true split-server deployment is possible only for Unified EIM installations. If the installation includes Unified WIM, the web server may be installed on a separate machine outside the firewall.

**Distributed-server**

Components are distributed over three or more servers. A wide range of options are available for distributed-server configurations. The database is usually installed on a dedicated server, and the other components are spread over two or more servers. If the installation includes Unified WIM, the web server may be installed on a separate machine outside the firewall.

### Single-Server (or Collocated) Deployment

All components are typically installed on a single server. For Unified WIM, the web server can either be separated from the application server and reside inside or outside the firewall, or be on the same server as the application server inside the firewall, if the customer access to the web servers is within the firewall. The former case establishes the minimum need for two servers. It is also valid for the web server to be outside the firewall in a single deployment.
**Split-Server (or Collocated) Deployment**

The database server is installed on one server, while all other components are installed on another server. For Unified WIM, the web server can either be separated from the application server and reside inside or outside the firewall, or be on the same server as the application server inside the firewall, if the customer access to the web servers is within the firewall. The former case establishes the minimum need for three servers. It is also valid for some web servers to be inside the firewall and others to be outside the firewall in a single deployment.

![Typical split-server deployment](image)

**Distributed-Server Deployment**

**Typical Distributed-Server Deployment**

In a typical distributed server configuration, the database server is installed on one server, services server is installed on another server, and application, web, messaging, and file server components are installed on a third server. For Unified WIM, the web server can either be separated from the application server and reside inside or outside the firewall, or be on the same server as the application server inside the firewall if the customer access to the web servers is within the firewall. The former case establishes the minimum need for four servers. It is also valid for some web servers to be inside the firewall and others to be outside the firewall in a single deployment. Also, more than one web-application server is supported, and the web servers can be used in a load-balancing cluster.

![Typical distributed-server deployment](image)
Additional Considerations for Distributed-Server Deployments

One Services Server

Each installation of Cisco Interaction Manager can have only one services server. All services such as the Retriever, Dispatcher, Workflow, Listener, EAAS, etc., run on the services server. If the services server needs to be scaled based on high volumes of emails, it needs to be scaled vertically, i.e. by adding more physical RAM and additional CPUs.

One Messaging Server

Each installation of Cisco Interaction Manager has one messaging server. This component hosts the JMS engine used by various components in the application for event publish and subscribe operations. While this server exists in the architecture, no external user load needs to be applied to this server, as all user load is directed to one or more of the available application servers in the same deployment. The application servers internally communicate with the messaging server for system transactions.

One or More Database Servers

The master and active databases of Cisco Interaction Manager are installed on one database server machine. If needed, the database server has to be scaled vertically by adding more physical RAM, more CPUs, and configuring the hard disks on RAID 10 configuration. This limitation implies that this server is a single point of failure unless the database server is configured for SQL clustering. The database server supported with Releases 4.3(1) and above is SQL Server 2005 (both Standard and Enterprise editions).

The Archive database may be installed either on the same database server as the Active and Master databases, or on a separate database server. This determination is must be made when Cisco Interaction Manager 4.3(1) is installed.

Additionally, with SQL Server 2005 Enterprise Edition, the reports tables are partitioned into a dedicated Reports database, which can either co-exist on the same server as the other Cisco Interaction Manager 4.3(1) databases, or on a separate SQL Server 2005 Enterprise Edition instance that is installed on a different server. The automated mechanism to partition the reports tables into a separate database from the Active database is part of the Cisco Interaction Manager 4.3(1) installer. The Reports table partitioning capability is not available with deployments that use SQL Server 2005 Standard Edition. However, for customers wishing to upgrade to the Enterprise edition of SQL Server, the Cisco Configuration Utility is available with Release 4.4(1). This utility can be used to migrate the reporting tables into a dedicated Reports database that resides within a SQL Server 2005 Enterprise Edition instance. For details see the Cisco Unified Web and E-Mail Interaction Manager Deployment and Maintenance Guide.

If the Archive and Reports databases are on a different database server, use the same sizing guidelines as that of database server on which the Active and Master databases are installed.

Microsoft SQL Server 2005 software and corresponding licenses need to be procured independently, and are not shipped with the Cisco Interaction Manager software. The choice of a SQL Server license model is left entirely to the customer. Please note that the sizing guide does not provide any specific recommendations on the SQL Server license model that should be used by a customer. However, the following are commonly used SQL Server license models.

- Licensing per user (client access licensing model, e.g., 50 users => 50 SQL licenses)
Licensing per CPU (processor based model; e.g., 2 CPU => 2 SQL licenses)

Please contact a Microsoft-certified reseller for more information about SQL Server licensing.

**Application Servers**

If one or more application servers crash, the entire application does not need to be restarted. It is sufficient to restart the impacted application servers alone, and maintain a running state with the overall Cisco Interaction Manager deployment.

**Web Servers**

A dedicated web server must exist in the Cisco Interaction Manager deployment for each application server. Cisco Interaction Manager supports SSL connections to the web server (IIS) through HTTPS. Connectivity encryption supported by Cisco Interaction Manager is limited to the encryption capability available with SSL.
Sizing Guidelines

- Sizing Inputs
- Planning for Database Growth
- Location of Files for Cisco Interaction Manager
- File Server Growth
- Virtual Servers
- Sizing for Cisco Unified Email Interaction Manager (EIM)
- Sizing for Cisco Unified Web Interaction Manager (WIM)
- Sizing for Combined Email, Web, and Voice Scenarios
- Sizing for Cisco Media Blender
Sizing Inputs

Configurations presented in the following sections provide sizing for standardized agents who handle up to 12 email messages per hour, or one chat session at a time. If agents are expected to handle more than 12 email messages per hour, on average, or more than one chat session at a time, convert the agent count into a standardized agent count using the following formula:

**Email:**

\[
\text{Standardized agent count for email} = \frac{\text{Actual agent count} \times \text{Average Number of messages handled per hour by each agent}}{12}
\]

**Chat:**

\[
\text{Standardized agent count for chat} = \frac{\text{Actual agent count} \times \text{Average number of concurrent chat sessions handled by each agent}}{}
\]

**Email and Chat:**

\[
\text{Standardized agent count} = \text{Standardized agent count for email} + \text{Standardized agent count for chat}
\]

Use the standardized agent count to find the appropriate configuration to fit your needs. For sizing for Combined Email, Chat, and Voice Scenarios, see page 71.

---

Important: The number of concurrent agents per application server cannot exceed 250, as this is the maximum number of concurrent agents that can be supported for email and chat by one application server in Cisco Interaction Manager.

---

Planning for Database Growth

The following factors are considered for calculating the rate of growth of database.

- Incoming and outgoing email volume per month.
- Average size of each email (KB): This excludes the size of attachments since attachments are stored on the file server, and not in the database.

The following formula can be used to compute the approximate rate of growth of the database server (MB) per month for activities of type email:

\[
\left(\left(\text{Number of incoming and outgoing emails per month} \times 2\right) \times (6 + (\text{Average size of each email message in KB} \times 2)) \right) / 1024
\]

The following formula can be used to compute the approximate rate of growth of the database server (MB) per month for activities of type chat, callback, or blended collaboration:

\[
\left(\left(\text{Number of incoming and outgoing chat messages per month} \times 3\right) \times (6 + (\text{Average size of each chat message in KB} \times 3 \times 2)) \right) / 1024
\]

---

Important: These formulas are meant to be used to plan for database growth. Values arrived at using computation may not be an exact match to actual sizes.
Archive jobs for archiving activities older than a certain number of days must be configured via the Cisco Interaction Manager Administration Console, if the Active database size exceeds 100 GB. The maximum size of the Active database must not exceed 110 GB, in order to ensure optimal system performance.

**Location of Files for Cisco Interaction Manager**

All files related to the Cisco Interaction Manager installation, all log files for Cisco Interaction Manager, and all email attachments are stored on the file server.

**File Server Growth**

Disk usage on file server is directly proportional to two factors:

1. Number and size of email attachments with incoming and outgoing emails. If the number of incoming and outgoing emails per month and the average size of attachments with each email are known, the growth rate of space occupied by attachments can be computed.

2. Rate of growth of log files for Cisco Interaction Manager. Average growth rate of size of log files with logging level set to ERROR is 20MB per day. If the logging level is set to DEBUG, the growth rate of size of log files is approximately 10 times more than that of ERROR. At any point, the DEBUG level logging must be used for debugging purposes only. If this level is set for an extended period of time, system performance can be affected from excessive logging.

Combining (1) and (2) provides an estimate of how much the disk space usage will increase per month on the file server. The following formula can be used for computing the monthly growth rate of file server size:

\[
\text{Growth rate} = \left( \frac{\text{Number of emails per month with attachments} \times \text{Average size of attachments (K)}}{1024} \right) + 20 \times 30
\]

For example, if average volume of incoming and outgoing emails with attachments is 50,000, and average size of each attachment is 5 KB, monthly rate of growth for file server can be computed as:

\[
\left( \frac{50,000 \times 5}{1024} \right) + 20 \times 30 = 845 \text{ MB per month}
\]

**Virtual Servers**

Virtual server support exists for all servers in the Cisco Interaction Manager deployment. Virtualized deployments must utilize the OVA templates available on the DocWiki for proper sizing and resource utilization.

For details see [http://docwiki.cisco.com/wiki](http://docwiki.cisco.com/wiki). Locate the page for Unified Communications Virtualization Downloads (including OVA/OVF Templates), and navigate to the section for Cisco Unified Email Interaction Manager and Web Interaction Manager.

For details about implementing a deployment on virtual servers, see [http://cisco.com/go/uc-virtualized](http://cisco.com/go/uc-virtualized).
Sizing for Cisco Unified Email Interaction Manager (EIM)

This section includes the following sizing information.

- Support for up to 100 Standardized Concurrent Agents
- Support for 101 to 140 Standardized Concurrent Agents
- Support for 141 to 250 Standardized Concurrent Agents
- Support for 251 to 500 Standardized Concurrent Agents
- Support for 501 to 750 Standardized Concurrent Agents
- Support for 751 to 1000 Standardized Concurrent Agents
- Support for 1001 to 1250 Standardized Concurrent Agents

Important Information About Sizing

- For a distributed deployment, the concurrent user load must be spread evenly across all the web-application servers in the cluster. Sizing is not affected by the existence of a firewall between the web server and the application server, and by whether the web and application servers are collocated or not.
- In the sizing configurations described here, dual CPU can be replaced by 2 single core CPU, quad CPU can be replaced by 4 single core CPUs, or 2 dual core CPUs, and so on.
- As long as the machines match the CPU, RAM, and hard disk requirements outlined in each section, Cisco Interaction Manager is agnostic to the brand or architecture of physical machines used in the deployment.

Determining Maximum Number of Emails Per Agent Per Hour

- To determine the maximum number of emails per agent per hour for a deployment, use the following calculation:

  \[
  \text{Number of emails per agent per hour} = \frac{(600 \times 12)}{(\text{Maximum number of concurrent email agents})}
  \]

  If the result is not a whole number, it must be rounded off to the preceding whole number.

Here are some examples:

- If number of concurrent email agents is \(\leq 600\)
  
  Each agent can work on up to the following number of emails per hour: \(\frac{(600 \times 12)}{600} = 12\).

- If number of concurrent email agents is \(= 750\)
  
  Each agent can work on up to the following number of emails per hour: \(\frac{(600 \times 12)}{750} = 9.6 = 9\).

- If number of concurrent email agents is \(= 900\)
  
  Each agent can work on up to the following number of emails per hour: \(\frac{(600 \times 12)}{900} = 8\).

- If number of concurrent email agents is \(= 1050\)
  
  Each agent can work on up to the following number of emails per hour: \(\frac{(600 \times 12)}{1050} = 6.85 = 6\).
If number of concurrent email agents is = 1250

Each agent can work on up to the following number of emails per hour: \( (600 \times 12) / 1250 = 5.76 = 5 \).

### Additional Configuration to Meet Sizing Requirements

- In the data source connection pool file of Cisco Interaction Manager
  
  \( \text{Cisco\_Home}\/\text{eService}\/\text{config}\/\text{dataaccess}\/\text{egpl\_ds\_connpool.map.xml} \), the maximum connection pool capacities of active database sections (where Active = “y”) must be set to a value which is 60% of the total concurrent user or session volume per application server. For example, if the number of email agents per application server is 250, the maximum capacity of the pool in this file for active sections must be set to 60% of 250 = 150.

- Tuning EAAS heap size: For each cached activity that is awaiting processing by an ICM script (wait node), and for which a response has not been returned to Unified EIM & WIM, the average heap usage is 2 KB. As the default heap size for EAAS is 128m, approximately 50,000 activities (with buffer left for other operations) can be queued in EAAS without the EAAS running out of memory. If the queuing volume is anticipated to be higher than 50,000, the JVM size must be doubled, and the physical services server RAM must be such that it accommodates this increase in heap size.

  The heap size can be increased by modifying the following XML properties in
  
  \( \text{Cisco\_Home}\/\text{eService}\/\text{config}\/\text{egpl\_dsm.xml} \) on the file server.

  ```xml
  <JVMParams>
    <default>-Xmx128m</default>
    <EAAS-process>-Xmx512m</EAAS-process>
    <Listener-process>-Xmx512m</Listener-process>
  </JVMParams>
  ```

### Support for up to 100 Standardized Concurrent Agents

Support for up to 100 concurrent agents, an incoming email rate of 120,000 emails per month, and with each agent handling 12 emails per hour.

In Cisco Interaction Manager, 100 agents working on Unified EIM can be supported on a single-server configuration consisting web, application, file, messaging, services, and database server components.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web, Application, File, Messaging, Services and Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 4</td>
</tr>
<tr>
<td>RAM</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
</tr>
</tbody>
</table>

*Configuration for 100 agents*
Support for 101 to 140 Standardized Concurrent Agents

Support for 101 to 140 concurrent agents, an incoming email rate from 200,000 per month, and with each agent handling 12 emails per hour.

In Cisco Interaction Manager, up to 140 agents working on Unified EIM can be supported on a split-server configuration with file, application, messaging, services, and web components on one server, and the database component on another server.

<table>
<thead>
<tr>
<th>Item</th>
<th>File, Application, Messaging, Services, and Web Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
</tr>
<tr>
<td>RAM</td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues.</td>
</tr>
</tbody>
</table>

Configuration for 101 to 140 agents

Support for 141 to 250 Standardized Concurrent Agents

Support for 141 to 250 concurrent agents, an incoming email rate from 200,000 to 700,000 emails per month, and with each agent handling 12 emails per hour.

In Cisco Interaction Manager, up to 250 agents working on Unified EIM can be supported on a distributed server configuration with one web and application server, one file server, one messaging server, one services server, and one database server.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web and Application Server (1)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
</tr>
<tr>
<td>RAM</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues.</td>
</tr>
</tbody>
</table>

Configuration for 141 to 250 agents
Support for 251 to 500 Standardized Concurrent Agents

Support for 251 to 500 concurrent agents, an incoming email rate of 200,000 to 700,000 emails per month, and with each agent handling 12 emails per hour.

In Cisco Interaction Manager, up to 500 agents working on Unified EIM can be supported on a distributed server configuration consisting of two web-application servers, one file server, one messaging server, one services server, and one database server. All the user load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web and Application Servers (2)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 4</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>8 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
</tbody>
</table>

Configuration for 251 to 500 agents

Support for 501 to 750 Standardized Concurrent Agents

Support for 501 to 750 concurrent agents, an incoming email rate of 1,500,000 emails per month, and with each agent handling X emails per hour. To calculate the value of X, see Determining Maximum Number of Emails Per
Agent Per Hour on page 50.

In Cisco Interaction Manager, up to 750 agents working on Unified EIM can be supported on a distributed server configuration consisting of three web-application servers, one file server, one messaging server, one services server, and one database server. All the user load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web and Application Servers (3)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for 501 to 750 agents

Support for 751 to 1000 Standardized Concurrent Agents

Support for 751 to 1000 concurrent agents, an incoming email rate of 1,500,000 emails per month, and with each agent handling X emails per hour. To calculate the value of X, see Determining Maximum Number of Emails Per Agent Per Hour on page 50.

In Cisco Interaction Manager, up to 1000 agents working on Unified EIM can be supported on a configuration consisting of four web-application servers, one file server, one messaging server, one services server, and one database server. All the user load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web and Application Servers (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
</tbody>
</table>
Support for 1001 to 1250 Standardized Concurrent Agents

Support for 1001 to 1250 concurrent agents, an incoming email rate of 2,000,000 emails per month, and with each agent handling X emails per hour. To calculate the value of X, see Determining Maximum Number of Emails Per Agent Per Hour on page 50.

In Cisco Interaction Manager, up to 1250 agents working on Unified EIM can be supported on a configuration consisting of five web-application servers, one file server, one messaging server, one services server, and one database server. All the user load must be evenly distributed across the web-application servers.
Sizing for Cisco Unified Web Interaction Manager (WIM)

This section describes the configuration required to support a production environment for the Unified WIM application in Cisco Interaction Manager.

- Sizing for Concurrent Agent-to-Customer Chat Sessions
- Sizing for Concurrent Web or Delayed Callback Sessions
- Sizing for Concurrent Blended Collaboration Sessions

Important Information About Sizing

- For a distributed deployment, the concurrent chat session load must be spread evenly across all the web-application servers in the cluster.
- In the sizing configurations described here, dual CPU can optionally be replaced by 2 single core CPUs, a quad CPU can optionally be replaced by a 4 single core CPUs, or 2 dual core CPUs, and so on.
- Sizing is not affected by the existence of a firewall between the web server and the application server, and by whether the web and application servers are collocated or not.
- As long as the machines match the CPU, RAM, and hard disk requirements outlined in each section, Cisco Interaction Manager is agnostic to the brand or architecture of physical machines used in the deployment.

Determining Maximum Number of Chats Per Agent Per Hour

- To determine the maximum number of chats per agent per hour for a deployment, use this formula
  \[ \text{Number of chats per agent per hour} = \frac{(600 \times 12)}{\text{Maximum number of concurrent chat sessions}} \]

Here are some examples:
- If number of concurrent chat sessions is \( \leq 600 \)
  Each agent can work on up to the following number of chats per hour: \( \frac{(600 \times 12)}{600} = 12 \).
- If number of concurrent chat sessions = 750
  Each agent can work on up to the following number of chats per hour: \( \frac{(600 \times 12)}{750} = 9.6 \approx 9 \).
- If number of concurrent chat sessions = 900
  Each agent can work on up to the following number of chats per hour: \( \frac{(600 \times 12)}{900} = 8 \).
- If number of concurrent chat sessions = 1050
  Each agent can work on up to the following number of chats per hour: \( \frac{(600 \times 12)}{1050} = 6.85 \approx 6 \).
- If number of concurrent chat sessions = 1250
  Each agent can work on up to the following number of chats per hour: \( \frac{(600 \times 12)}{1250} = 5.76 \approx 5 \).
**Additional Configuration to Meet Sizing Requirements**

- In the data source connection pool file of Cisco Interaction Manager
  \(Cisco_{\text{Home}}\backslash eService\backslash config\backslash dataaccess\backslash egpl_ds_connpool.map.xml\), the maximum connection pool capacities of active database sections (where Active = “y”) must be set to a value which is 60% of the total concurrent user or session volume per application server. For example, if the concurrent session volume per application server is 250 sessions (250 agents and 250 customers), the maximum capacity of the pool in this file, for active sections must be set to 60% of 500 = 300.

- Tuning EAAS heap size: For each cached activity that is awaiting processing by an ICM script (wait node), and for which a response has not been returned to Cisco Interaction Manager, the average heap usage is 2 KB. As the default heap size for EAAS is 128m by default, approximately 50,000 activities (with buffer left for other operations) can be queued in EAAS without the EAAS running out of memory. If the queuing volume is anticipated to be higher than 50,000, the JVM size must be doubled, and the physical services server RAM must be increased to accommodate the increase in heap size. Increase the heap size by modifying the following XML properties in \(Cisco_{\text{Home}}\backslash eService\backslash config\backslash egpl_dsm.xml\) on the file server.

```xml
<JVMParams>
  <default>-Xmx128m</default>
  <EAAS-process>-Xmx512m</EAAS-process>
  <Listener-process>-Xmx512m</Listener-process>
</JVMParams>
```

**Sizing for Concurrent Agent-to-Customer Chat Sessions**

This section includes information about the following:

- Support for up to 100 Standardized Concurrent Agent-to-Customer Chat Sessions
- Support for up to 250 Standardized Concurrent Agent-to-Customer Chat Sessions
- Support for up to 500 Standardized Concurrent Agent-to-Customer Chat Sessions
- Support for up to 750 Standardized Concurrent Agent-to-Customer Chat Sessions
- Support for up to 1000 Standardized Concurrent Agent-to-Customer Chat Sessions
- Support for up to 1250 Standardized Concurrent Agent-to-Customer Chat Sessions
Support for up to 100 Standardized Concurrent Agent-to-Customer Chat Sessions

In Cisco Interaction Manager, up to 100 concurrent agent-customer chat sessions can be supported on a two server configuration, consisting of one web server, and another server with the file, application, messaging, services, and database components.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server</th>
<th>Application, Services, File, Messaging, and Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 4</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
</tr>
</tbody>
</table>

Configuration for up to 100 concurrent sessions

Support for up to 250 Standardized Concurrent Agent-to-Customer Chat Sessions

In Cisco Interaction Manager, up to 250 concurrent agent-customer chat sessions can be supported on a configuration consisting of one web server, one application server, one file server, one messaging server, one services server, and one database server.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (1)</th>
<th>Application Server (1)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
</tbody>
</table>

1. 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file
2. 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.

Configuration for up to 250 concurrent sessions
Support for up to 500 Standardized Concurrent Agent-to-Customer Chat Sessions

In Cisco Interaction Manager, up to 500 concurrent agent-customer chat sessions can be supported on a seven server configuration, consisting of two web servers, two application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (2)</th>
<th>Application Server (2)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 4</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>8 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Recommendation:
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file
2. 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues.

Optimal Recommendation:
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file
2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues.
Support for up to 750 Standardized Concurrent Agent-to-Customer Chat Sessions

In Cisco Interaction Manager, up to 750 concurrent agent-customer chat sessions can be supported on a configuration consisting of three web servers, three application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (3)</th>
<th>Application Server (3)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 1</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 8</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. 2 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for up to 750 concurrent sessions

Support for up to 1000 Standardized Concurrent Agent-to-Customer Chat Sessions

In Cisco Interaction Manager, up to 1000 concurrent agent-customer chat sessions can be supported on a configuration consisting of four web servers, four application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (4)</th>
<th>Application Server (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 1</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 8</td>
</tr>
</tbody>
</table>
In Cisco Interaction Manager, up to 1250 concurrent agent-customer chat sessions can be supported on a configuration consisting of five web servers, five application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

**Support for up to 1250 Standardized Concurrent Agent-to-Customer Chat Sessions**

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (5)</th>
<th>Application Server (5)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>8 GB</td>
<td>16 GB</td>
</tr>
</tbody>
</table>
| Hard Disk | Standard HDD | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | Minimum Recommendation:  
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file  
2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues |

Configuration for up to 1250 concurrent sessions
Sizing for Concurrent Web or Delayed Callback Sessions

This section includes the following:

- Support for up to 120 Standardized Concurrent Web or Delayed Callback Sessions
- Support for up to 240 Standardized Concurrent Web or Delayed Callback Sessions
- Support for up to 360 Standardized Concurrent Web or Delayed Callback Sessions
- Support for up to 480 Standardized Concurrent Web or Delayed Callback Sessions
- Support for up to 600 Standardized Concurrent Web or Delayed Callback Sessions

Support for up to 120 Standardized Concurrent Web or Delayed Callback Sessions

In Cisco Interaction Manager, up to 120 concurrent agent-customer web or delayed callback sessions can be supported on a configuration consisting of one web server, one application server, one file server, one messaging server, one services server, and one database server.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (1)</th>
<th>Application Server (1)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 1</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
</tbody>
</table>
| Hard Disk  | Standard HDD            | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | Minimum Recommendation:  
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file  
2. 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.

Configuration for up to 120 concurrent sessions

Support for up to 240 Standardized Concurrent Web or Delayed Callback Sessions

In Cisco Interaction Manager, up to 240 concurrent agent-customer web or delayed callback sessions can be supported on a seven server configuration, consisting of two web servers, two application servers, one file and
messaging server, one services server, and one database server. Load must be evenly distributed across the web-
application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (2)</th>
<th>Application Server (2)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 1</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 4</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>8 GB (Additional RAM required for upgrading to 8 GB)</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 74 x 73GB RAID 10 – configured for data files, database log files and full text catalogues. Optimal Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues.</td>
</tr>
</tbody>
</table>

Configuration for up to 240 concurrent sessions

Support for up to 360 Standardized Concurrent Web or Delayed Callback Sessions

In Cisco Interaction Manager, up to 360 concurrent agent-customer web or delayed callback sessions can be supported on a configuration consisting of three web servers, three application servers, one file server, one
messaging server, one services server, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (3)</th>
<th>Application Server (3)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>16 GB (Additional RAM required for upgrading to 16 GB)</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for up to 360 concurrent sessions

Support for up to 480 Standardized Concurrent Web or Delayed Callback Sessions

In Cisco Interaction Manager, up to 480 concurrent agent-customer web or delayed callback sessions can be supported on a configuration consisting of four web servers, four application servers, one file server, one messaging server, one services server, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (4)</th>
<th>Application Server (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>8 GB (Additional RAM required for upgrading to 8 GB)</td>
<td>16 GB (Additional RAM required for upgrading to 16 GB)</td>
</tr>
</tbody>
</table>

Sizing Guidelines 64
Configuration for up to 480 concurrent sessions

Support for up to 600 Standardized Concurrent Web or Delayed Callback Sessions

In Cisco Interaction Manager, up to 600 concurrent agent-customer web or delayed callback sessions can be supported on a configuration consisting of five web servers, five application servers, one file server, one messaging server, one services server, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (4)</th>
<th>Application Server (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
</table>
| Hard Disk           | Standard HDD   | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | Minimum Recommendation:  
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file  
2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues |

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (5)</th>
<th>Application Server (5)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
</tbody>
</table>
Sizing for Concurrent Blended Collaboration Sessions

This section includes the following:

- Support for up to 120 Standardized Concurrent Blended Collaboration Sessions
- Support for up to 240 Standardized Concurrent Blended Collaboration Sessions
- Support for up to 360 Standardized Concurrent Blended Collaboration Sessions
- Support for up to 480 Standardized Concurrent Blended Collaboration Sessions
- Support for up to 600 Standardized Concurrent Blended Collaboration Sessions

Important Information About Sizing

- For a distributed deployment, the concurrent user load must be spread evenly across all the web-application servers in the cluster.
- In the sizing configurations described here, dual CPU can optionally be replaced by 2 single core CPUs, a quad CPU can optionally be replaced by a 4 single core CPUs, or 2 dual core CPUs, and so on.
- Sizing is not affected by the existence of a firewall between the web server and the application server, and by whether the web and application servers are collocated or not.
- As long as the machines match the CPU, RAM, and hard disk requirements outlined in each section, Cisco Interaction Manager is agnostic to the brand or architecture of physical machines used in the deployment.
In the data source connection pool file of Cisco Interaction Manager, the maximum connection pool capacities of active database sections (where Active = “y”) must be set to a value which is 60% of the total concurrent user or session volume per application server. For example, if the concurrent session volume per application server is 120 sessions (120 agents and 120 customers), the maximum capacity of the pool in this file, for active sections must be set to 144.

Tuning EAAS heap size: For each cached activity that is awaiting processing by an ICM script (wait node), and for which a response has not been returned to Cisco Interaction Manager, the average heap usage is 2 KB. As the default heap size for EAAS is 128m by default, approximately 50,000 activities (with buffer left for other operations) can be queued in EAAS, without the EAAS running out of memory. If the queuing volume is anticipated to be higher than 50,000, the JVM size must be doubled, and the physical services server RAM must be verified such that it accommodates this increase in heap size. The heap size can be increased in the following XML properties:

```xml
<JVMParams>
  <default>-Xmx128m</default>
  <EAAS-process>-Xmx512m</EAAS-process>
  <Listener-process>-Xmx512m</Listener-process>
</JVMParams>
```

Support for up to 120 Standardized Concurrent Blended Collaboration Sessions

In Cisco Interaction Manager, up to 120 concurrent blended collaboration sessions can be supported on a configuration consisting of one web server, one application server, one file server, one messaging server, one services server, and one database server.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (1)</th>
<th>Application Server (1)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Recommendation:
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file
2. 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.
Support for up to 240 Standardized Concurrent Blended Collaboration Sessions

In Cisco Interaction Manager, up to 240 concurrent blended collaboration sessions can be supported on a configuration consisting of two web servers, two application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (2)</th>
<th>Application Server (2)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 4</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>8 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Recommendation:
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file
2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues

Optimal Recommendation:
1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file
2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues
Support for up to 360 Standardized Concurrent Blended Collaboration Sessions

In Cisco Interaction Manager, up to 360 concurrent blended collaboration sessions can be supported on a configuration consisting of three web servers, three application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (3)</th>
<th>Application Server (3)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 8</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for up to 360 concurrent blended collaboration sessions

Support for up to 480 Standardized Concurrent Blended Collaboration Sessions

In Cisco Interaction Manager, up to 480 concurrent blended collaboration sessions can be supported on a configuration consisting of four web servers, four application servers, one file, one messaging, one services, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (4)</th>
<th>Application Server (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) 8</td>
</tr>
</tbody>
</table>
Configuration for up to 480 concurrent blended collaboration sessions

**Support for up to 600 Standardized Concurrent Blended Collaboration Sessions**

In Cisco Interaction Manager, up to 600 concurrent blended collaboration sessions can be supported on a configuration consisting of five web servers, five application servers, one file server, one messaging server, one services server, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (4)</th>
<th>Application Server (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>8 GB (Additional RAM required for upgrading to 8 GB)</td>
<td>16 GB (Additional RAM required for upgrading to 16 GB)</td>
</tr>
</tbody>
</table>
| Hard Disk| Standard HDD   | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | 2 x 73 GB Ultra3 SCSI RAID 1 | Minimum Recommendation:  
1. 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file  
2. 12 x 73 GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues |

Item | Web Server (5) | Application Server (5) | File Server | Messaging Server | Services Server | Database Server |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
</tr>
</tbody>
</table>
Cisco Interaction Manager can support multiple media, namely, email chat, callback, and blended collaboration. The following combinations of users can be supported on respective configurations described here.

- **Support for Concurrent Email and Chat Agents**
- **Support for Any Combination of Email, Chat, or Blended Collaboration Sessions**

### Important Information About Sizing

- For a distributed deployment, the concurrent load must be spread evenly across all the web-application servers in the cluster.
- In the sizing configurations described here, dual CPU can optionally be replaced by 2 single core CPUs and a quad CPU can optionally be replaced by a 4 single core CPUs.
- Sizing is not affected by the existence of a firewall between the web server and the application server, and by whether the web and application servers are collocated or not.
- For MCS servers that by default do not have the required memory (RAM) specified in the tables here, it will be necessary to add sufficient RAM to meet the requirements.
Additional Configuration to Meet Sizing Requirements

- In the data source connection pool file of Cisco Interaction Manager
  
  `Cisco_Home\eService\config\dataaccess\egpl_ds_connpool.map.xml`, the maximum connection pool capacities of active database sections (where Active = “y”) must be set to a value which is 60% of the total concurrent user or session volume per application server. For example, if the concurrent session volume per application server is 250 sessions (250 agents and 250 customers), the maximum capacity of the pool in this file, for active sections must be set to 300.

- Tuning EAAS heap size: For each cached activity that is awaiting processing by an ICM script (wait node), and for which a response has not been returned to Cisco Interaction Manager, the average heap usage is 2 KB. As the default heap size for EAAS is 128m by default, approximately 50,000 activities (with buffer left for other operations) can be queued in EAAS, without the EAAS running out of memory. If the queuing volume is anticipated to be higher than 50,000, the JVM size must be doubled, and the physical services server RAM must be verified such that it accommodates this increase in heap size. The heap size can be increased in `Cisco_Home\eService\config\egpl_dsm.xml` on the file server, by modifying the following XML properties:

```xml
<JVMParams>
  <default>-Xmx128m</default>
  <EAAS-process>-Xmx512m</EAAS-process>
  <Listener-process>-Xmx512m</Listener-process>
</JVMParams>
```

Support for Concurrent Email and Chat Agents

This section includes the following:

- Support for up to 100 Standardized Concurrent Agents
- Support for up to 250 Standardized Concurrent Agents
- Support for up to 500 Standardized Concurrent Agents
- Support for up to 750 Standardized Concurrent Agents
- Support for up to 1000 Standardized Concurrent Agents
- Support for up to 1250 Standardized Concurrent Agents

Support for up to 100 Standardized Concurrent Agents

Support for up to 100 concurrent agents handling email or chat, where each agent can work on emails at the rate of 12 emails per hour, or work on a single active chat session, at the rate of 12 chat sessions per hour. Configuration supports an incoming email rate of up to 120,000 emails per month.
In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 100, can be supported on a two-server configuration consisting of one web server, and another server with the web, application, file, messaging, services, and database components.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server</th>
<th>Application, Services, File, Messaging, and Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 4</td>
</tr>
<tr>
<td>RAM</td>
<td>2 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
</tr>
</tbody>
</table>

*Configuration for up to 100 concurrent email and chat agents*

**Support for up to 250 Standardized Concurrent Agents**

Support for up to 250 concurrent agents handling email or chat, where each agent can work on emails at the rate of 12 emails per hour, or work on a single active chat session, at the rate of 12 chat sessions per hour. Configuration supports an incoming email rate of 200,000 emails per month. In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 250, can be supported on a configuration consisting of one web server, one application server, one file server, one messaging server, one services server and one database server.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (1)</th>
<th>Application Server (1)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
</tbody>
</table>

1. 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file
2. 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.

*Configuration for up to 250 concurrent email and chat agents*

**Support for up to 500 Standardized Concurrent Agents**

Support for up to 500 concurrent agents handling email or chat, where each agent can work on emails at the rate of 12 emails per hour, or work on a single active chat session, at the rate of 12 chat sessions per hour. Configuration supports an incoming email rate of 700,000 emails per month.
In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling 500 can be supported on a configuration consisting of two web servers, two application servers, one file server, one messaging server, one services server and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (2)</th>
<th>Application Server (2)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 4</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>8 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues. Optimal Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

**Configuration for up to 500 concurrent email and chat agents**

**Support for up to 750 Standardized Concurrent Agents**

Support for up to 750 concurrent agents handling email or chat, where each agent can work on emails at the rate of 12 emails per hour, or work on a single active chat session, at the rate of 12 chat sessions per hour. Configuration supports an incoming email rate of 1,500,000 emails per month.

Within the mixed load of 750, if the concurrent volume of email agents alone exceeds 600, or the concurrent volume of chat sessions alone exceeds 600, determine the maximum number of emails per agent per hour, or maximum number of chats per agent per hour, respectively, for the specific activity type that exceeds 600. For
details see “Determining Maximum Number of Emails Per Agent Per Hour” on page 50 and “Determining Maximum Number of Chats Per Agent Per Hour” on page 56.

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 750, can be supported on a configuration consisting of three web servers, three application servers, one file server, one messaging server, one services server and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (3)</th>
<th>Application Server (3)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 1</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 2</td>
<td>Intel Xeon (2.33 GHz or higher speed) Quantity: 8</td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>4 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for up to 750 concurrent email and chat agents

Support for up to 1000 Standardized Concurrent Agents

Support for up to 1000 concurrent agents handling email or chat, where each agent can work on emails at the rate of 12 emails per hour, or work on a single active chat session, at the rate of 12 chat sessions per hour. Configuration supports an incoming email rate of 1,500,000 emails per month.

Within the mixed load of 1000, if the concurrent volume of email agents alone exceeds 600, or the concurrent volume of chat sessions alone exceeds 600, determine the maximum number of emails per agent per hour, or maximum number of chats per agent per hour, respectively, for the specific activity type that exceeds 600. For details see “Determining Maximum Number of Emails Per Agent Per Hour” on page 50 and “Determining Maximum Number of Chats Per Agent Per Hour” on page 56.
In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 1000 can be supported on a configuration consisting of four web servers, four application servers, one file server, one messaging server, one services server and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (4)</th>
<th>Application Server (4)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 1</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 8</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>8 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for up to 1000 concurrent email and chat agents

Support for up to 1250 Standardized Concurrent Agents

Support for up to 1250 concurrent agents handling email or chat, where each agent can work on emails at the rate of 12 emails per hour, or work on a single active chat session, at the rate of 12 chat sessions per hour. Configuration supports an incoming email rate of 2,000,000 emails per month.

Within the mixed load of 1250, if the concurrent volume of email agents alone exceeds 600, or the concurrent volume of chat sessions alone exceeds 600, determine the maximum number of emails per agent per hour, or maximum number of chats per agent per hour, respectively, for the specific activity type that exceeds 600. For details see “Determining Maximum Number of Emails Per Agent Per Hour” on page 50 and “Determining Maximum Number of Chats Per Agent Per Hour” on page 56.
In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling up to 1250 can be supported on a configuration consisting of five web servers, five application servers, one file server, one messaging server, one services server, and one database server. Load must be evenly distributed across the web-application servers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (5)</th>
<th>Application Server (5)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>8 GB</td>
<td>16 GB</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum Recommendation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. 12 x 73 GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Configuration for up to 1250 concurrent email and chat agents**

**Support for Any Combination of Email, Chat, or Blended Collaboration Sessions**

Support for any combination of email agents, chat sessions, or blended collaboration sessions, with the total number of email agents and chat or blended collaboration sessions not exceeding 1250, with each email agent handling 12 emails per hour, with an incoming email rate of 2,000,000 emails per month, each chat agent working on 12 chat sessions per hour, and each BC agent working on 12 BC sessions per hour.

Within the mixed load of 1250, the maximum number of BC sessions supported is 600. If the concurrent volume of email agents alone exceeds 600, or the concurrent volume of chat sessions alone exceeds 600, determine the maximum number of emails per agent per hour, or maximum number of chats per agent per hour, respectively, for the specific activity type that exceeds 600. For details see “Determining Maximum Number of Emails Per Agent Per Hour” on page 50 and “Determining Maximum Number of Chats Per Agent Per Hour” on page 56.

In Cisco Interaction Manager, any combination of chat or blended collaboration sessions and email agents totaling up to 1250 can be supported on a configuration consisting of five web servers, five application servers, one file server, one messaging server, one services server, and one database server. Load must be evenly distributed across the web-application servers.
Note: For all the recommended configurations, disk space usage on the database server can be optimized and managed efficiently by configuring archive jobs through the Cisco Interaction Manager application, and setting these to run periodically based on different criteria.

<table>
<thead>
<tr>
<th>Item</th>
<th>Web Server (5)</th>
<th>Application Server (5)</th>
<th>File Server</th>
<th>Messaging Server</th>
<th>Services Server</th>
<th>Database Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
<td>Intel Xeon (2.33 GHz or higher speed)</td>
</tr>
<tr>
<td></td>
<td>Quantity: 1</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 2</td>
<td>Quantity: 8</td>
</tr>
<tr>
<td>RAM</td>
<td>1 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>2 GB</td>
<td>8 GB (Additional RAM required for upgrading to 8 GB)</td>
<td>16 GB (Additional RAM required for upgrading to 16 GB)</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>Standard HDD</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>2 x 73 GB Ultra3 SCSI RAID 1</td>
<td>Minimum Recommendation: 1. 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file 2. 12 x 73GB RAID 10 – split into 2 array-sets; one configured for data files and other for database log files and full text catalogues</td>
</tr>
</tbody>
</table>

Configuration for any combination of sessions
**Sizing for Cisco Media Blender**

*Important:* Cisco Media Blender must not be installed on the same server as the Agent Peripheral Gateway. For details refer to the documentation for Cisco Media Blender.

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
</table>
| Cisco Media Convergence Servers (MCS)     | Use MCS-7835 or equivalent servers, if fewer than 100 concurrent agents/sessions.  
                                        | Use MCS-7845 or equivalent servers, if greater than 100 concurrent agents/sessions.  |
| Minimum Recommended Hardware              | **CPU:** 1 X Intel Xeon (2.33 GHz or higher speed)  
                                        | **RAM:** 1 GB RAM  
                                        | **Hard Disk:** 73 GB Ultra3 SCSI  
                                        | **Networking:** 1 x 100/1000 Ethernet port  
                                        | **DVD-ROM drive** |
Fault Tolerance and Redundancy

- Load Balancing Considerations
- High Availability Options
- Managing Failover
To optimize resource utilization and enhance performance, access to the Cisco Interaction Manager application can be set up for fault tolerance and redundancy. This chapter discusses some considerations for load-balancing and for configuring systems to achieve high-availability and failover.

**Load Balancing Considerations**

The web service component of a Cisco Interaction Manager deployment can be load-balanced to serve large number of agents accessing the application at the same time. The web (or web-application) servers can be configured behind the load balancer with a virtual IP address, and an agent can access Cisco Interaction Manager through this IP address. Depending on the load balancing algorithm set, the load balancer will send a request to one of the web-application server behind it and send a response back to the agent. This way, from a security perspective, the load balancer serves as a reverse proxy server too.

One of the most essential parameters while configuring a load balancer is to configure it to support sticky sessions with cookie based persistence. After every scheduled maintenance task, before access is opened for users, it is advised to verify that all web-application servers are available to share the load. In absence of this, the first web-application server could be overloaded, due to the sticky connection feature. With other configurable parameters, one can define load balancing algorithms to meet various objectives such as equal load balance, isolation of a web-application server, or sending lesser requests to a low powered web-application servers.

The load balancer monitors the health of all web-application servers in the cluster, and if a problem is observed, the load balancer removes the given web-application server from the available pool of servers, thus preventing new web requests from being directed to the problematic web-application servers.
High Availability Options

Based on typical customer deployment scenarios, the following recommendations apply towards achieving a high-available system deployment.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Balancer</td>
<td>The load balancer is used for distributing web requests across different web servers. Various types of load balancers are available in the industry. Each of these could be configured with different options work distribution, handling failures, or increased activity.</td>
<td>◦ Helps distribute load across different servers. ◦ Helps configure load distribution based on server capacity and current server resources. ◦ Helps handle failures by alternate means of routing a web request.</td>
</tr>
<tr>
<td>High-Speed Dedicated LAN</td>
<td>The network is a key ingredient to a successful and highly available application. All Cisco Interaction Manager servers must be located within the same LAN, and not span over other network domains, to ensure good response times.</td>
<td>◦ Stable network connections for distributed components. ◦ Helps serve web requests in a more predictable and reliable manner. ◦ Less delay in responses and thereby increases user experience.</td>
</tr>
<tr>
<td>Configuring more than one web-application server</td>
<td>It is highly recommended that more than 1 web-application server be configured. The load balancer detects web server failures and redirects requests to other available web servers, after which, users will have to re-login to Cisco Interaction Manager and a new user session will be created on the target web server.</td>
<td>◦ More than one web-application server helps to load balance web requests to multiple servers based on both system load and availability of servers. ◦ Helps the system scale better to meet growing needs of the enterprise.</td>
</tr>
<tr>
<td>Using VMware High Availability options</td>
<td>With the support for virtual servers in Release 4.4, deployments can benefit from the features of VMware High Availability (VMHA). For details about virtual server support, see <a href="http://cisco.com/go/uc-virtualized">http://cisco.com/go/uc-virtualized</a> For details about VMware High Availability, see the VMHA documentation.</td>
<td>◦ Removes single points of failure from the deployment.</td>
</tr>
</tbody>
</table>

Recommendations for high availability needs

In addition to these recommendations, if a load balancer is configured to monitor the health of web-application servers, it also serves the purpose of high availability.

Managing Failover

Cisco Interaction Manager supports SQL Server clustering for the database server. Some of the key methods of handling failure conditions within a Cisco Interaction Manager and Unified CCE integrated deployment are listed here.
Web and Application Servers: Multiple web-application servers can be deployed in any distributed server deployment. If any of the web-application servers go down, a load balancer can help handle the failure through routing requests to alternate web-application servers. The load balancer detects application server failure and redirects requests to another application server. Users can log into Cisco Interaction Manager without experiencing any significant loss of productivity.

Database Server: Cisco Interaction Manager is certified with SQL Server 2005 Cluster Edition. If the database server is enabled with Microsoft SQL Server clustering, a primary and secondary database instance will be managed automatically by the cluster for the given database. In the event of a failure to the primary database instance, the secondary database instance will automatically become active. A replication job must be configured by a DBA to periodically keep the primary and secondary database nodes synchronized with the latest data. If SQL Server clustering is not enabled, and the database server goes down, when the database server comes back up, the Cisco Interaction Manager services automatically reconnect to the database.

The clustering ability of this edition allows adding additional database failover capabilities to a configuration to boost the availability of SQL Server.

Note that this capability is different from splitting the different Cisco Interaction Manager databases (active, master, archive, etc.) across different machines. In deployments where each of these databases is installed on a separate machine, clustering can be used on each machine to achieve failover for that particular Cisco Interaction Manager database.

Services and Messaging Servers: Cisco Interaction Manager is certified with VMware ESXi 4.x which supports VMware High Availability. When VMware HA is configured, automatic failover is managed by VMware.

Unified CCE components: The deployment can allow Cisco Interaction Manager services to failover with duplex Unified CCE components (e.g., MR PIM of MR PG and CTI Server of CTI Gateway) to eliminate downtime of the application in failure circumstances.
Network Latency

- Network Latency
- Bandwidth Requirements
- Geographic Server Distribution
Network Latency

Like any web-based application, it is required to setup Cisco Interaction Manager in a high-performance network environment that has sufficient bandwidth with low latency. If the network conditions degrade, it could impact the application performance, which is not desirable. Listed here are some recommendations for network latency:

- Servers which are part of Cisco Interaction Manager should be connected on same ethernet switch / VLAN.
- When agents are connecting to access the application remotely, the permissible network latency is 200 milliseconds (one way). Otherwise, higher latency between the agents and the applications servers could lead to slower performance on the agent interface.
- The maximum permissible one-way network delay between the Cisco Interaction Manager servers and the Unified CCE servers is 200 milliseconds.

These points serve well towards ensuring application performance. However, it may be important to note that bandwidth is also related to what the user perceives as good performance. For example, one typical “operation” within the application may take \( n \) seconds to complete with certain bandwidth, and it may take \( n - m \) seconds to complete, if the available bandwidth is more. In both cases, application is usable, although one user perceives it to be faster than the other.

Bandwidth Requirements

The minimum required network bandwidth for an agent connecting to the Cisco Interaction Manager servers at login is 384 kilobits/second or higher. After login, at a steady state, an average bandwidth of 40 kilobits/second or higher is required.

An attachment size of up to 50 KB can be accommodated within this required bandwidth. For attachments of size greater than 50 KB, temporary slowness may be experienced in the agent user interface during download of the attachments.

Geographic Server Distribution

Cisco Interaction Manager does not provide support for geographical distribution of Cisco Interaction Manager application components. However, all Unified CCE components such as the Agent PG may be geographically distributed. The network latency each way between the Cisco Interaction Manager servers and the Unified CCE components must be \( \leq 200 \) milliseconds in order to ensure optimal communication between Cisco Interaction Manager and the geographically distributed Unified CCE components.
Firewall and Hardening

- Firewall Considerations
- Server Hardening Considerations
This chapter discusses some of the firewall and hardening considerations that are useful for Cisco Interaction Manager.

## Firewall Considerations

- For agents to access Cisco Interaction Manager, either the HTTP or HTTPS (for secured connections) port needs to be opened at the firewall.

  Considerations of applying firewall rules may vary depending on the security policies in effect. If a web server is configured within the firewall with access to the file server ports, Port 139 or 445 to the file server can be blocked from outside the firewall. For details about port configuration, see “Port Number Configuration Between Components” on page 25.

- In a typical installation where agents using Cisco Interaction Manager could be spread across multiple locations, the load balancer, along with the Cisco Interaction Manager web servers, may be deployed in a DMZ. This is a required deployment for Unified WIM installations where customers enter chat sessions from outside the intranet. However, having the web-application servers within the intranet is possible, too. The services and database server can reside in the network over the same or different VLAN.

  If integration of these servers is implemented with Active Directory, then associated ports should be opened for communication with Domain Controllers.

- Firewalls must not be configured between Cisco Interaction Manager and Unified CCE, or between Cisco Interaction Manager and Cisco Media Blender.

## Server Hardening Considerations

Dual strategies could be implemented towards securing the Cisco Interaction Manager application. The first includes implementing standard best practices for physical and software level access controls. These steps could typically be at the corporate level. The other measure is hardening of the server OS and its service components. Please obtain Cisco Security Agent (CSA) with certified security profiles from http://www.cisco.com for all the Cisco Interaction Manager servers to enable intrusion detection and prevention features. For details about the version of CSA that you can use with Cisco Interaction Manager, see the Hardware and System Software Specification for Cisco Unified Web and E-Mail Interaction Manager.

### Cisco Security Agent

Cisco Security Agent provides threat protection for servers, also known as endpoints. It identifies and prevents malicious behavior, thereby eliminating known and unknown (“day zero”) security risks and helping to reduce operational costs. The Cisco Security Agent aggregates and extends multiple endpoint security functions by providing host intrusion prevention, distributed firewall capabilities, malicious mobile code protection, operating system integrity assurance, and audit log consolidation (in managed mode), all within a single product.

Unlike antivirus applications, Cisco Security Agent analyzes behavior rather than relying on signature matching, but both remain critical components to a multi-layered approach to host security. Cisco Security Agent should not be considered a substitute for antivirus applications.
Deploying Cisco Security Agent on Cisco Interaction Manager components involves obtaining a number of application-compatible agents and implementing them according to the desired mode.

For more information on CSA, please go to http://www.cisco.com

Default Windows and IIS Service Requirements for Cisco Interaction Manager

- In Accessories, No Document Templates, No Mouse Pointers.
- In Communications, No Hyper Terminal.
- In Application Server, No Application Server Console, No ASP.NET, No Enable network DTC access, No Message Queuing, IN IIS, No BITS, NO FTP, No FrontPage, No Internet Printing, No NNTP, No, SMTP, In WWW, only WWW Services.
- No Certificate Services
- No Email and Fax Services
- No Indexing Services
- No Networking Services
- No Other Network Files & Print Services
- No Security Configuration Wizard
- No Terminal Server
- No Terminal Server Licensing
- No UDDI
- No Windows Deployment
- No Windows Media Services
- In Management & Monitoring Tools, Only SNMP

Guidelines for Microsoft SQL Server

- Restrict windows authentication user to access .mdf and .ldf files and assign read/write access to appropriate users.
- Use NTFS file system as it provides advanced security and recovery features.
- Rename the Windows Administrator account on the SQL Server server to discourage hackers from guessing the administrator password.
- Hide SQL Server service from appearing in the server enumeration box in Query Analyzer, using the /HIDDEN: YES switch of NET CONFIG SERVER command.
- Disable Windows guest user account on production servers.
- Setup roles in SQL Server and configure permissions for windows authentication. Take advantage of the fixed server and database roles by assigning users to the appropriate roles.
- Restrict access to the SQL logs directory.
Secure registry by restricting access to SQL Server registry keys like 
\texttt{HKEY\_LOCAL\_MACHINE\Software\Microsoft\MSSQLServer}.

- Encrypt User Views, Stored procedure, Functions, and triggers while going live.
- Examine the audit for login failure events and look for trends to detect any possible intrusion.

**Hardening the JMX Console and Web Console**

- Cisco Unified EIM and WIM has been certified with secure JMX and Web Consoles. For instructions on securing the JMX and Web Consoles on the messaging and all application servers, see 
  https://community.jboss.org/wiki/SecureTheJmxConsole?_sscc=t