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

For Unified Contact Center Enterprise

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Contents

1.0 Introduction

This document 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 and Hosted and Cisco Unified Intelligent Contact Management (ICM). This guide provides a reference for the solution and related networking aspects of Cisco Interaction Manager. For information about Unified CCE, refer to the Unified CCE SRND guide at www.cisco.com/go/srnd.

The document is designed to provide an overview of the system and its architecture, system flow for different types of interactions, namely, mail and chat, deployment models, sizing guidelines, high-availability and load-balancing options, network latency and Quality of Service (QoS) considerations and interface boundaries.

2.0 Cisco Interaction Manager System Overview

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, which is referred to as Cisco Interaction Manager. Cisco Interaction Manager provides collaborative capability to efficiently administer and manage rich knowledge base repositories, partitions, departments, queues, business workflows, data adapters, historical reporting, etc. The integration between Cisco Interaction Manager and Cisco Unified CCE also helps address multi-channel handling needs of call centers. The following sections explain the key features and capabilities of Unified EIM and Unified WIM and of Cisco Interaction Manager with Cisco Unified Contact Center Enterprise and Hosted and Cisco Unified Intelligent Contact Management (ICM)..

2.1 Cisco Unified E-mail Interaction Manager (Unified EIM)

An integral part of Cisco Interaction Manager, Cisco Unified E-mail Interaction Manager enables organizations to intelligently route and process inbound emails, webform inquiries, faxes, and letters. Key features and capabilities include:

- Workflows to manage incoming email and webform inquiries. Contains service level agreement (SLA) triggers to automate email routing and monitoring.
- Intelligent parsing of the content of all queries. Ability to send auto-responses and recommend responses to agents.
- Complete customer information and interaction history, across channels, available to agents, 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: agents, supervisors and managers, business analysts, knowledge authors, programmers, and system administrators.
- Comprehensive analytics and real-time alarms for operational performance management.

2.2 Cisco Unified Web Interaction Manager (Unified WIM)

An integral part of Cisco Interaction Manager, Cisco Unified Web Interaction Manager 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 page-push abilities. Agents could also use Unified WIM to assist customers while on the phone, by navigating through web pages that the customer is currently browsing. Key features and capabilities include:

- Ability to exchange text messages, as well as, web pages with the customer.

- Integration with other channels. Common Knowledge base, customer-view and history across Chat and non-Chat channels

- Unified agent console for handling multiple channels including Chat. Single login to email and chat queues, one-click logout.

- Easy escalation to chat channel from email

- Case management allows an agent to tag multiple activities together, irrespective of the channel or when they get created.

- Agents can service multiple chats and do both chat & web collaboration from the same console

- Load-balanced algorithm of routing chats to available agents.

- Configurable list of inbox list columns – it will be possible to add/remove new columns to/from the chat inbox easily

- Ability to add custom attributes to the customer data and the ability to link to third party external databases using Data adaptors

- Customer / agent typing indication

- Ability to search for chat activities based on specific criteria, and then download the results into Microsoft Excel .csv files

- Keyboard shortcuts to toggle between chats, and between consoles

- Ability to include frequently-used substitution variables such as customer-name, in the chat typing area as well as in canned responses

- An audit history of the chat interaction is available even while the chat is in progress.

- Re-sizeable chat message typing area

- Ability to check the daily service level for each queue, at any point of time

- Provide notifications to managers when specific conditions are met (for e.g. when SLA for a queue is exceeded, etc) from the Supervision console.

2.3 Cisco Interaction Manager for Cisco Unified Contact Center Enterprise and Hosted and Cisco Unified Intelligent Contact Management (ICM)

The focus of the Cisco Interaction Manager and Unified CCE integration is to provide the capability for agents to selectively handle email, chat, and phone requests using a unified system including Cisco Interaction Manager and Cisco Unified CCE. Some of the key points of the integration include:

- A GUI wizard to selectively download relevant configuration data such as MRDs, Agents and Skill Groups from Cisco Unified CCE, and to map these in Cisco Interaction Manager.

- 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.

- Ability to alert the users when a new email activity is assigned through a pop-up, so that the user can choose the activity to work on.

- Availability of an External Agent Assignment Service (EAAS) and a Listener Service to facilitate routing and reporting via Unified CCE.

- Providing a reliable channel for communication through session management between Cisco Interaction Manager, and the MR and ARM interfaces.

- Support for integration with both Unified CCE and System IPCC (Unified SCCE) provides flexibility in system deployment.

- Availability of the integration as two Cisco Interaction Manager packages, namely, Basic or Advanced. The Basic license can be upgraded to Advanced, but Advanced license cannot be downgraded back to Basic.

2.4 Basic and Advanced packages of Cisco Interaction Manager

The basic editions of Unified WIM and Unified EIM contain fewer features than the advanced editions. Cisco Interaction Manager Documentation describes the advanced editions. The 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, which are present in Unified WIM Advanced:

- **Ability to define custom activities:** The basic edition provides only the standard types of activities such as chat and task.

- **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 UI 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, which are present in Unified EIM Advanced:

- **Ability to add partitions and departments:** The basic edition contains one partition with one department.

- **Ability to define custom activities:** The basic edition provides only the standard types of activities such as email and task.

- **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 UI 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.

3.0 System Flow

This section illustrates the major components involved in the life-cycle of email and chat routing respectively. The various steps in the handling of an interaction from the point where a customer sends a query to it being routed to the appropriate user or queue for the response are detailed below. To service email and chat requests received from customers, agents launch Cisco Interaction Manager using a pre-configured task button within CAD. Upon successful authentication against the Unified CCE database, agents are logged into Cisco Interaction Manager.

3.1 Email Routing

There are various steps involved in efficiently responding to emails received from customers spanning across receiving these, routing appropriately, and being responded by a user. The general system flow for email routing is as tabulated.

a> General system flow for email routing through Cisco Interaction Manager

Serial No.	Action
1.	A customer sends an email into the system.
2.	The retrieval service picks up email from the email server for a configured alias.
3.	An activity is created in the system for the email and a Case is created that will hold all subsequent related activities.
4.	Workflow Engine processes the new email based on the conditions specified and subsequently assigns it to a queue or user.
5.	If the workflow assigns the activity to a user directly, the user will find it in the inbox on logging in. Or the agent can pull an activity to work upon from the queue.
6.	The agent responds to the activity and performs a 'send' and/or 'send and complete' action. This sends an email response back to the customer and the email activity is completed. A Case ID # is put into the subject line of the outgoing email
7.	The customer responds. The retrieval service picks up the email from the email server and creates a new activity for the email.
8.	The system recognizes the Case ID# and threads the new activity into

Serial No.	Action
	the existing case.
9.	The activity is routed to a queue or an agent via a workflow for further action.

b> General system flow for email routing through Unified CCE

Serial No.	Action
1.	A customer sends an email into the system.
2.	The retrieval service picks up email from the email server for a configured alias.
3.	An activity is created in the system for the email and a case is created that will hold all subsequent and related activities.
4.	Email received from the customer is processed by the Workflow Engine according to a set of rules configured within the workflow, and routed to a queue that is marked for external assignment to Unified CCE.
5.	For the given email activity, EAAS sends a request to Unified CCE through the MR Interface to understand how to handle the new activity.
6.	Unified CCE executes a routing script, and determines an available agent. At the time of making the decision, factors like the agents logged in, concurrent task limits, etc, are taken into consideration.
7.	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 UI actions.
8.	The user will find it in the inbox on logging in.
9.	The agent responds to the activity and performs a 'send' and/or 'send and complete' action. This sends an email response back to the customer and the email activity is completed. A Case ID # is put into the subject line of the outgoing email
0.	The customer responds. The retrieval service picks up the email from the email server and creates a new activity for the email.

Serial No.	Action
11.	The system recognizes the Case ID# and threads the new activity into the existing case.

3.2 Chat Routing

There are various steps involved in efficiently responding to chat requests received from customers. The general system flow for handling a chat request is as tabulated.

General system flow for chat routing

Serial No.	Action
1.	Agent who is a mapped user in Unified CCE, logs in to the Live Application Servlet (LAS), which makes agent's entry in the session manager and informs Agent Assignment Service (AAS) about agent login
2.	The customer initiates a chat through an entry point on the website. This entry point is mapped to a Unified CCE queue.
3.	When customer initiates a chat, a request is sent to the LAS, which then checks for agent availability (from AAS) and loads the login template at the customer end.
4.	The customer submits the completed login form, which then creates a session in LAS (also written into the database).
5.	AAS receives this session information, and assigns an available agent and informs LAS about the agent assignment. LAS sends the response back to the customer with the session and connection information to connect with EVS (supplied by the Cisco Interaction Manager platform). Customer gets a nailed connection to EVS and registers himself to receive the messages.
6.	The service template is loaded at the customer end
7.	LAS fetches latest information about the session, publishes message to EVS and sends the selected agent ID to EVS. A nailed connection is then established with the respective agent browser and the agent registers himself to receive the messages
8.	All chat messages are stored in memory periodically; the rest of the activity information is written into the DB asynchronously.

Serial No.	Action
9.	During the chat, the agent and customer browsers contact LAS for their respective connection status.
10.	When the agent ends a call: • Agent browser sends a HTTP request to LAS, which sends a message to the DB. • All session messages are written into the DB. • The LAS informs the AAS (via an RMI call), so that the agent load is decremented. The LAS renders the exit page at the customer end, through a template cache.

4.0 System Architecture

Cisco Interaction Manager is an enterprise level application built on native web-centric architecture. This application which provides enterprises the ability to address business-critical tasks offers an unmatched array of resources and response tools. The product is built in a modular component-based architecture, providing the best advantages of design and maintainability.

4.1 Architecture Overview

This section describes the system architecture of Cisco Interaction Manager. Given below are details of each of the layers and components, and the figure below depicts the detailed architecture diagram.
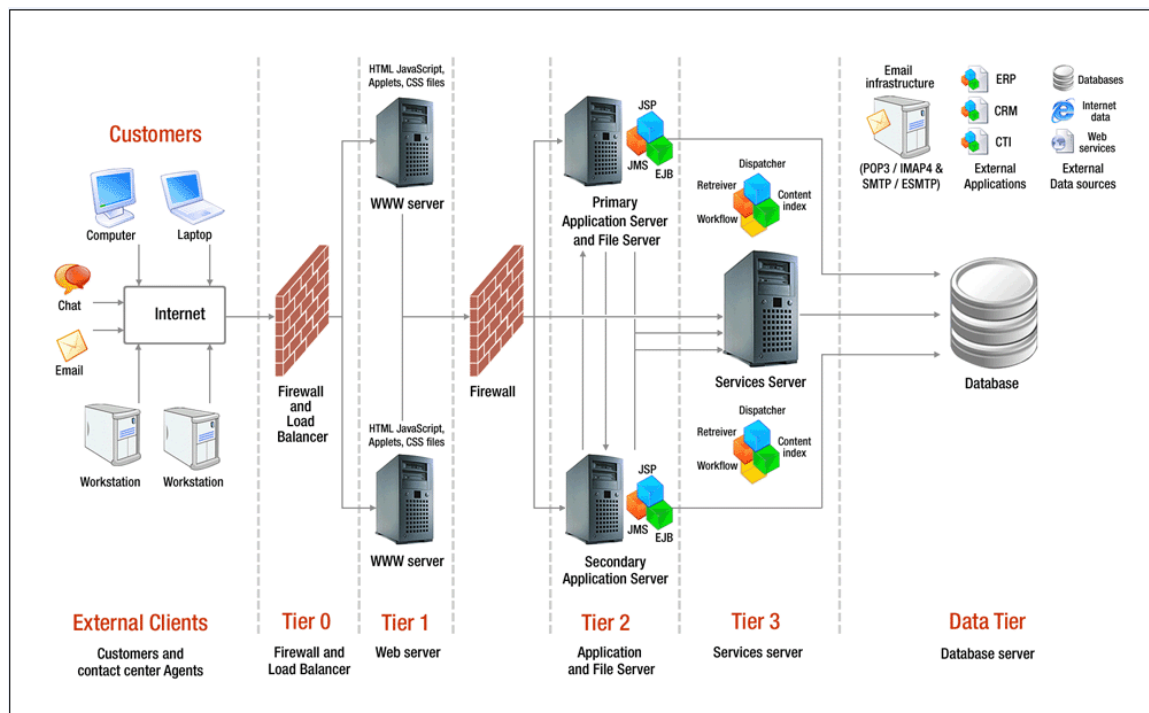
Figure 1: Cisco Interaction Manager System Architecture

- **External Clients**

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 6.0 or the embedded CAD browser, and customers can access the chat customer console using specific versions of Microsoft IE, Mozilla, Firefox, or Netscape. Cisco Interaction Manager is not supported on agent desktops running in a Citrix terminal services environment.

- **Tier 0 – Firewall and Load Balancer**

Agents and customers connect to the application from their respective browsers through a firewall, if configured for the application.

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

- **Tier 1 – Web server**

The Web Server is used to serve static content to the browser.

- **Tier 2 – Application and File server**

The Application Server is used as a web container (a.k.a. the JSP/Servlet engine) and EJB Container. The core business logic resides in the Business Object Layer as well as 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 some business logic on data present in database server.

> Example: Outbound task creation:
> - o User logs in to the application and creates an outbound task.
> - o The JSP layer calls Business Client layer which interacts with Business Objects residing in the same application server where JSPs/Servlets are deployed.
> - o The Business Objects execute queries/stored procedure residing on DB server.
> - o Activities are created and stored in Database tables.

The file server is used for storing all email and article attachment files, report templates and all locale-specific strings used in the application.

- **Tier 3 – Services server**

Cisco Interaction Manager has processes that perform specific business functions, such as fetching emails from a POP server, sending emails to an SMTP server, processing workflows, assigning chats to the agents, etc. All services run on the Services server and are managed by the Distributed Service Manager (DSM).

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.

- **Data Tier – Database server**

The Data tier includes databases that are SQL-compliant, HTML/XML data-sources and ultimately Web services that consume & produce SOAP messages.

Business objects and Data Adapters use this layer to extract data from various third-party applications and data sources. This layer also deals with HTML & XML parsing using relevant J2EE compliant packages to process data in other formats.

- **Unified CCE integration**

As part of the system integration with Unified CCE, the services server consists of 2 additional services, namely the EAAS and the Listener Service, which interact with the MR PG and Agent PG components of Unified CCE respectively via the MR and ARM interfaces.

Additionally, the application server of Cisco Interaction Manager establishes a connection with the Unified CCE Administration Workstation (AW) database server to import relevant configuration, and map the configuration to Cisco Interaction Manager objects in the Cisco Interaction Manager database. The architecture block diagram for the Cisco Interaction Manager integration with Unified CCE is as shown above.

When Cisco Interaction Manager is integrated with Unified SCCE, the multi-channel controller of Unified SCCE is installed on the services server.

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 partition 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.

4.2 Communication protocols used between layers

Following is a description of the various communication protocols used in the Cisco Interaction Manager.

- **Browser-Server communication:**

  All traffic between browser-server is HTTP based since the Cisco Interaction Manager consoles are all web-based. HTTPS, the SSL variant of HTTP is also supported. Cisco Interaction Manager is supported for agent browsers to access it through a SSL. There is neither custom encryption nor compression on data being transferred between the browser and server.

- **Messaging between server-side components:**

  Messaging among 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". Another method of server-side communication is also using Java Message Service (JMS), which is integral to J2EE platform.

- **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 version. Using this robust server-side to browser-push framework, one could publish key events to connected browser clients and it also allows browser clients to subscribe to specific topics and be notified when messages arrive on those topics.

- **Communication between distributed components:**

  Cisco Interaction Manager being an enterprise application caters to large deployments demanding high-availability, high-performance and remote manageability. In order to meet these advanced needs the application implements a complex distributed framework of remote objects. These remote components communicate and work collectively to achieve these objectives. The primary communication protocol employed is through "remote method invocation (RMI)" which is an integral part of the J2EE platform.

4.3 Port number configuration between components

The following diagram shows the ports that need to be open for accessibility and interactions between servers. The presence of firewall between web and application servers prevents unauthorized access to all the ports between web and application and file servers.
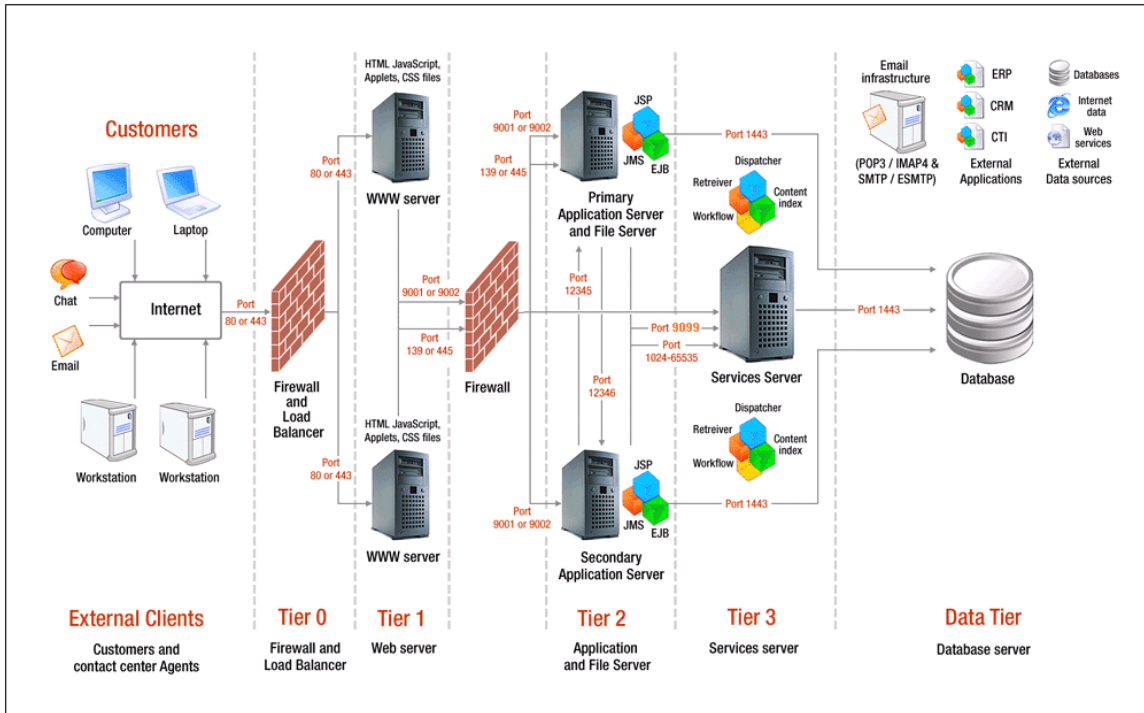
Figure 2: Port number configuration diagram

The following table describes the inbound and outbound ports that need to be opened for the flow of requests.

From Server	To Server	Destination Port(s) Required
Workstation (Internet)	Web Server	80 (for HTTP) 443 (for HTTPS) **Note** **Internet access** to the web server is required only for chat/collaboration deployments.
Web Server	Application Server	9001 or 9002 139 or 445
Application Server	Services Server	9099, 1024 to 65535
Services Server	Database Server	1443
Primary Application Server	Secondary Application Server	12346
Secondary Application Server	Primary Application Server	12345 139 or 445 (for file server)
Primary Application Server	Database Server	1443
Secondary Application Server	Database Server	1443
User Browser	Web Server	80 (for HTTP) 443 (for HTTPS)
Cisco Interaction Manager	Primary CTI Server	42027
Cisco Interaction Manager	Secondary CTI Server	42028
Cisco Interaction Manager	MR Interface	20000

4.4 Integration between Cisco Unified CCE and Cisco Interaction Manager

The following figure depicts the architecture diagram of integration between Cisco Unified CCE and Cisco Interaction Manager. The key interfaces used in the integration are Media Routing (MR) Interface and Agent and Reporting and Management (ARM) Interface.

For a two-way socket connection from an MR PG to the EAAS, 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 that 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 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.

Note:

Unified CCE uses Microsoft Active Directory for managing the ICM instances, and ICM objects that have been created under the respective instances. In the event of an Active Directory migration to a new domain controller, after the functionality of all ICM services running on the ICM servers has been restored following the migration, the Cisco Interaction Manager service needs to be restarted to restore integrated functionality.

For more details on the interface boundaries, refer to section 9.0.
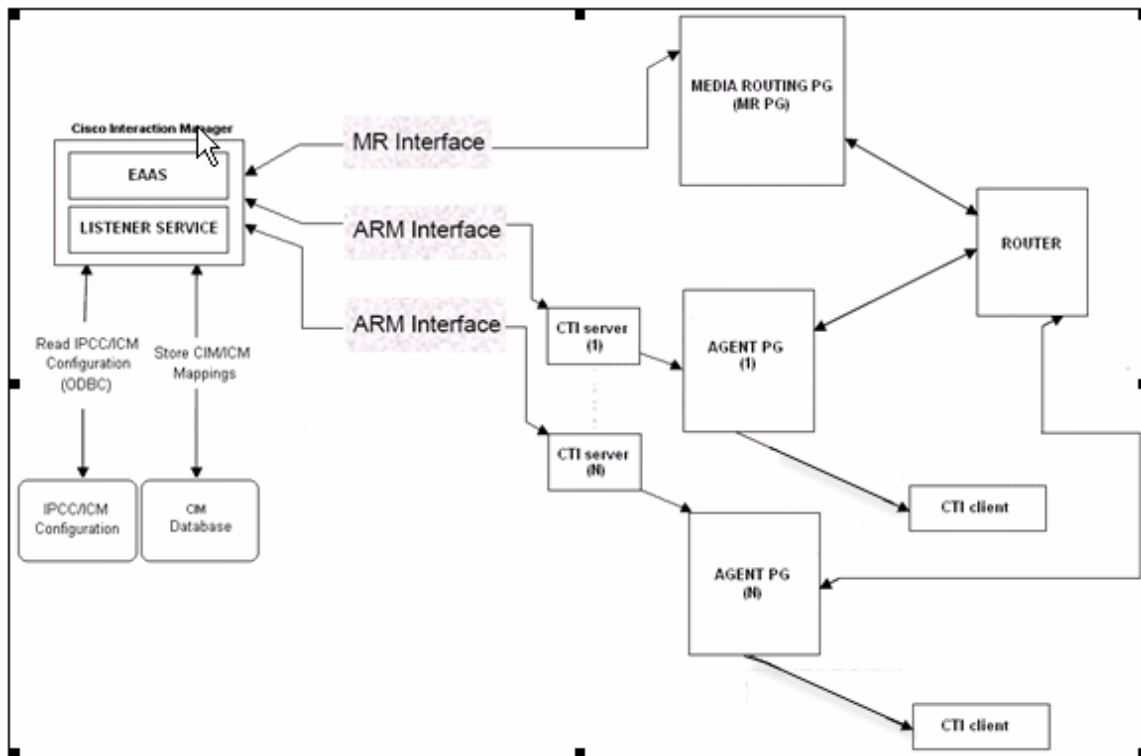
Figure 3: Unified CCE Integration Architecture

5.0   Deployment Models

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 section provides details of the possible deployment options.

5.1 Cisco Interaction Manager Components

A Cisco Interaction Manager installation has the following five components:

Sr. No.	Components	Items included
1.	File Server	The Cisco Interaction Manager file system comprising JSP, JS, HTM, CSS, JAR, CLASS, etc, file extensions
		This should be installed on the primary application server
2.	Database Server	Microsoft SQL Server 2000 SP 4 or Microsoft SQL Server 2005 with Cisco Interaction Manager Active, Master, and Archive databases
3.	Application Server	BEA WebLogic Server 8.1 SP 6 and JDK 1.4.2.11
4.	Web Server	Microsoft IIS 6.0
5.	Services Server	JDK 1.4.2.11 and Cisco Interaction Manager components such as the DSM, Host Manager, RMI Registry, RMID, License Manager, and active processes for all the back-end Cisco Interaction Manager services.
		Note
		In System IPCC (Unified SCCE), the multi-channel controller needs to be installed on this server.

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

1. **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.

2. **Split server:**

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.

3. **Distributed server:**

Components are distributed over three or more servers. A wide range of options is 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.

5.2 Single Server (or collocated) deployment

All components are typically installed on a single server. For chat, 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
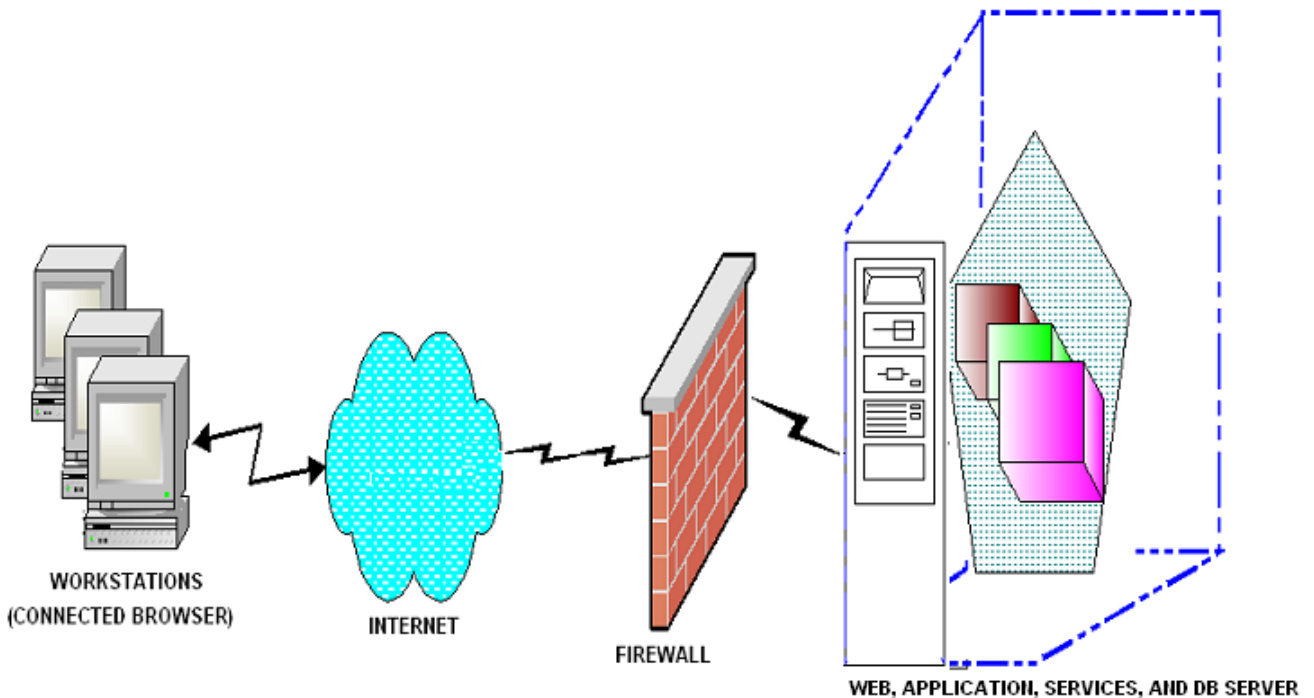
web servers is within the firewall., The former case establishes the minimum need for 2 servers. It is also valid for some web servers to be inside the firewall and others to be outside the firewall in a single deployment.

Figure 4: Typical Single Server Deployment

5.3 Split Server deployment

The database server is installed on one server, while all other components are installed on another server. For chat, 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 3 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.
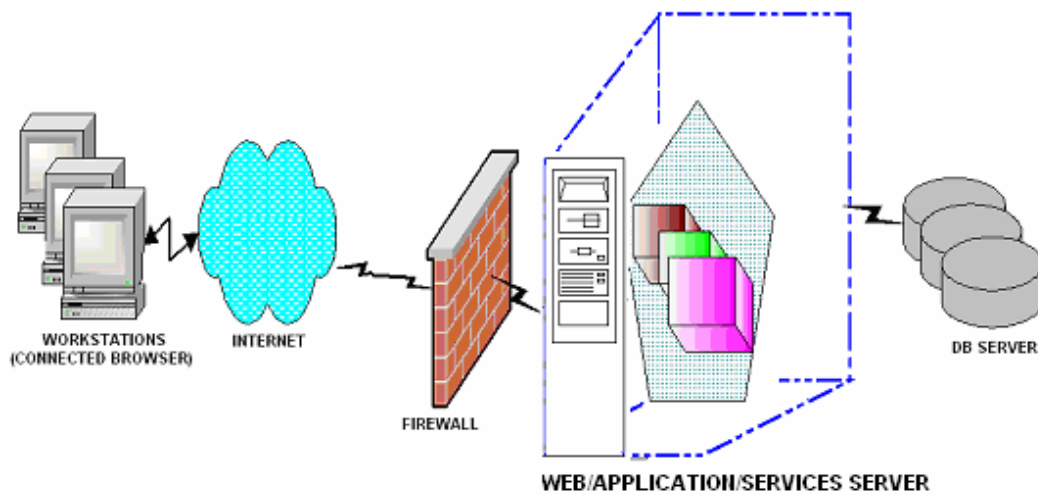
Figure 5: Typical Split Server Deployment

5.4 Distributed Server deployment

In a typical distributed server configuration, database server is installed on one server, services server is installed on another server, and application, web and file server components are installed on the third server. For chat, 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 4 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.
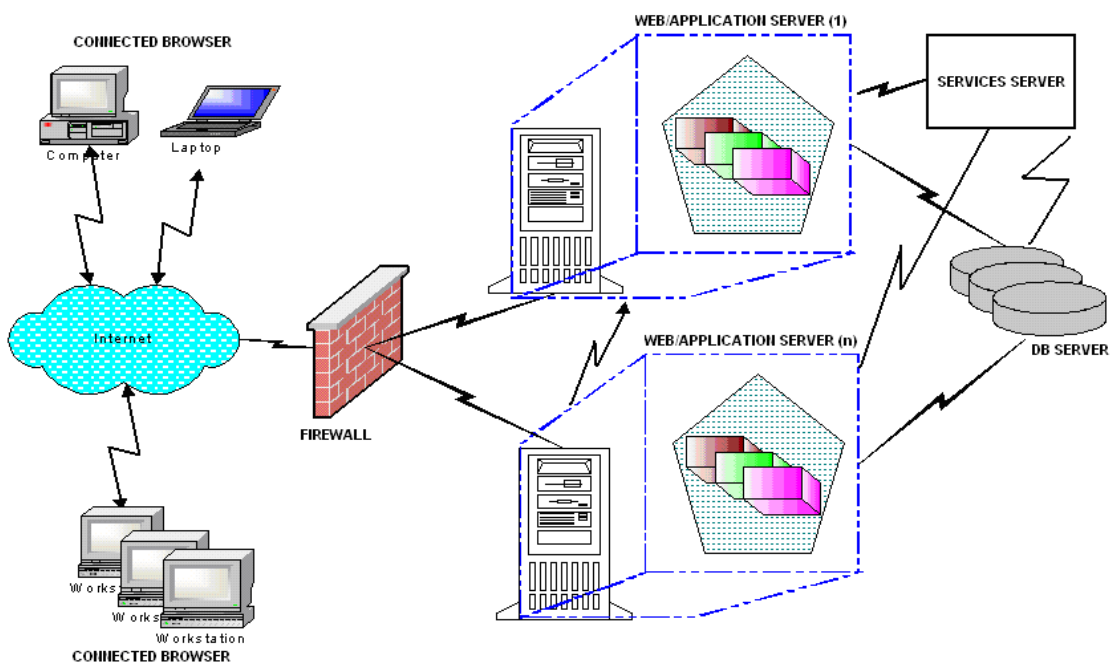
Figure 6: Typical Distributed Server Deployment

5.5 Geographic Server Distribution

The Unified CCE Administration Workstation (AW) server needs to be located within the same LAN as the Cisco Interaction Manager servers. Cisco Interaction Manager does not provide support for geographical distribution of Cisco Interaction Manager application components. However, when integrated with Unified CCE, the Agent PG's of Unified CCE may be geographically distributed. In such a case, the network latency each way between the Cisco Interaction Manager servers and the Agent PG's must be <= 200 milliseconds in order to ensure optimal session communication between Cisco Interaction Manager and the CTI server that corresponds to the Agent PG.

6.0   Sizing Guidelines

6.1 Sizing Inputs

Configurations presented in the following sections provide sizing for *Standardized* agents who handle up to 12 email messages per hour. If your agents are expected to handle more than 12 messages per hour, on average, you must convert your agent count into a *Standardized* agent count using the following formula.

Standardized agent count = Actual agent count * Average Number of messages handled per hour by each agent / 12

Use the standardized agent count to find the appropriate configuration to fit your needs. However, an important point to note is that the number of concurrent agents cannot exceed 120 per the application server, as this is the **maximum** number of concurrent agents that can be supported by the application server in Cisco Interaction Manager.

6.2 Database Growth

Following factors are considered for calculating the rate of growth of database.

1. Incoming and outgoing email volume per month

2. 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 rate of growth of database server (MB) per month with email type of activities:

((Number of incoming and outgoing emails per month) * (6 + (Average size of each email message in KB * 2)) / 1024

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

((Number of incoming and outgoing chat messages per month) * (6 + (Average size of each chat message in KB * 2)) / 1024

6.3 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 will be stored on the Primary Application server.

Having the file server on the primary application server is a best practice, and not a requirement.

6.4 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 SEVERE is 20MB per day. If the logging level is set to FINEST, the growth rate of size of log files is approximately 10 times more than that of SEVERE. At any point, the FINEST level logging must be used for debugging purposes only because if set for an extended period of time, the 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:

((Number of emails per month with attachments * Average size of attachments (K))/1024) + 20*30

E.g., 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:

((50,000 * 5) /1024) + 20*30 = 845 MB per month.

6.5 Considerations

6.5.1 One Services Server

Each installation of Cisco Interaction Manager can have only one services server. All services such as email retriever, email dispatcher, workflows, license manager, session manager, etc, run on the services server

This also means that services server is a single point of failure. If services server goes down (or needs to be restarted), the entire Cisco Interaction Manager application needs to be restarted through the Cisco Service in Windows Services Panel.

If 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.

6.5.2 One Primary Application Server

Each installation of Cisco Interaction Manager can have only one Primary Application server. Based on concurrent agent load, an installation can be scaled by adding more application servers. All the additional application servers are treated as Secondary Application servers.

Difference between Primary and Secondary Application Servers

Apart from serving agent requests (just like secondary application servers), the primary application server also works as the messaging server, i.e., JMS running within the primary application server is used for messaging purposes by all the other secondary application servers and services servers.

Limitation of having a single primary application server in a deployment also implies that this server is also a single point of failure. If this server crashes, or needs to be restarted, the entire Cisco Interaction Manager application needs to be restarted through the Cisco Service in Windows Services Panel.

<table>
<tr><td>⚠ <u>Note</u>

If one or more of the secondary application server(s) crashes, or needs to be restarted, is not required to restart the entire application. Only the secondary application server which crashed needs to be restarted.</td></tr>
</table>

In order to reduce the probability of failure of the primary application server, it is required that if concurrent agent or concurrent chat session load increases beyond 240, the primary application server must not be used for serving agent or chat requests respectively. Requirements about this have been provided in the subsequent chapters that have details about hardware sizing.

6.5.3 One Database Server

Each installation of Cisco Interaction Manager can point to only one database server.
If needed, the database server has to be scaled vertically by adding more physical RAM, more CPU, and configuring the hard disks on RAID 10 configuration.

Limitation of only a single database server per installation also implies that this server is a single point of failure. If database is stopped or server needs to be restarted, the entire application needs to be restarted as a result of this. The database servers supported as of the 4.2(3) release are SQL Server 2000 and SQL Server 2005. However, for Cisco Interaction Manager to support SQL Server 2005, it is first necessary to install CIM 4.2(3) or later with SQL Server 2000, and then perform a database upgrade to SQL Server 2005.

Note

Microsoft SQL Server clustering is not supported.

6.5.4 Security

Cisco Interaction Manager supports SSL connections to the web server (IIS) through HTTPS, and between the web server and the application server (BEA WebLogic Server). Connectivity encryption supported by Cisco Interaction Manager is limited to the encryption capability available with SSL.

6.5.5 Microsoft SQL Server Licensing

Microsoft SQL Server 2000 (with SP 4) or 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.

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

Please contact a Microsoft-certified reseller for more guidance in this area.

6.6 Sizing for Cisco Unified Email Interaction Manager (EIM)

Important Notes

- For sizing greater than 240 concurrent users, no user load must be applied to the primary web/applications server.

- 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 below, every 2 or 4 CPU's can be optionally replaced by a single quad-core CPU. Alternately, 2 CPU's can optionally be replaced by a single dual core CPU too.

- 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 tables below, it will be necessary to add sufficient RAM to meet the requirements.

6.6.1 Support for up to 45 concurrent agents, an incoming email rate of 35,000 emails per month, and with each agent handling 12 emails per hour

In Cisco Interaction Manager, 45 agents working on EIM can be supported on a single-server configuration consisting of application, web, services and database server with the following configuration.

Item	Web, Application, Services and Database Server
CPU	Intel Xeon (3 GHz or higher speed, with hyper-threading enabled) Quantity: 1
RAM	4 GB
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1
Equivalent MCS Configuration	7825 (Additional RAM required – see RAM above)

6.6.2 Support for up to 60 concurrent agents, an incoming email rate of 35,000 emails per month, and with each agent handling 12 emails per hour

In Cisco Interaction Manager, 60 agents working on EIM can be supported on a single-server configuration consisting of application, web, services and database server with the following configuration.

Item	Web, Application, Services and Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	4 GB
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1
Equivalent MCS Configuration	7845 (Additional RAM required – see RAM above)

> ⚠ **Note**
>
> If incoming email volume is more that 35,000 emails per month, the configuration specified for 60 to 80 users will be required.

6.6.3 Support for 60 to 80 concurrent agents, an incoming email rate from 35,000 to 200,000 per month, and with each agent handling 12 emails per hour

In Cisco Interaction Manager, up to 80 agents working on EIM can be supported on a split-server configuration consisting of application, web, services, and database server with the following configuration.

Item	Web, Application and Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	4 GB	4 GB
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 4 x 73GB RAID 10 – configured for data files, database log files and full

		text catalogues.
Equivalent MCS Configuration	7835 or 7845	7845

6.6.4 Support for 80 to 120 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 120 agents working on EIM can be supported on a distributed server configuration consisting of one web/application server, one services server, and one database server with the following configuration.

Item	Web and Application Server (1)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	2 GB	4 GB	4 GB
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues.
Equivalent MCS Configuration	7825	7845	7845

6.6.5 Support for 120 to 240 concurrent agents, an incoming email rate of 200,000 to 700,000 emails per month, and with each agent handling 12 emails per hour

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 240 agents working on EIM can be supported on a four server configuration, consisting of two web/application servers, one services server, and one database server with the following configuration.

Item	Web and Application Servers (2)	Services Server	Database Server (Requires Windows 2003 Enterprise and MSSQL 2000 Enterprise version)
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 4
RAM	2 GB	4 GB	8 GB (Additional RAM required for upgrading to 8 GB)
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues. Optimal Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 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
Equivalent MCS Configuration	7825	7845	7845

6.6.6 Support for 240 to 360 concurrent agents, an incoming email rate of 200,000 to 700,000 emails per month, and with each agent handling 12 emails per hour

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 360 agents working on EIM can be supported on a six server configuration, consisting of four web/application servers, one services server, and one database server with the following configuration. All the user load must be evenly distributed across the secondary web/application servers, and no user load must be applied to the primary web/application server.

Item	Web and Application Servers (4)	Services Server	Database Server (Requires Windows 2003 Enterprise and MSSQL 2000 Enterprise version)
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	2 GB	4 GB	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 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
Equivalent MCS Configuration	7825	7845	N/A

6.6.7 Support for 360 to 480 concurrent agents, an incoming email rate of 200,000 to 700,000 emails per month, and with each agent handling 12 emails per hour

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 480 agents working on EIM can be supported on a seven server configuration, consisting of five web/application servers, one services server, and one database server with the following configuration. All the user load must be evenly distributed across the secondary web/application servers, and no user load must be applied to the primary web/application server.

Item	Web and Application Servers (5)	Services Server	Database Server (Requires Windows 2003 Enterprise and MSSQL 2000 Enterprise version)
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	2 GB	8 GB (Additional RAM required for upgrading to 8 GB)	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 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
Equivalent MCS Configuration	7825	7845	N/A

6.6.8 Support for 480 to 600 concurrent agents, an incoming email rate of 200,000 to 700,000 emails per month, and with each agent handling 12 emails per hour

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 600 agents working on EIM can be supported on an eight server configuration, consisting of six web/application servers, one services server, and one database server with the following configuration. All the user load must be evenly distributed across the secondary web/application servers, and no user load must be applied to the primary web/application server.

Item	Web and Application Servers (6)	Services Server	Database Server (Requires Windows 2003 Enterprise and MSSQL 2000 Enterprise version)
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	2 GB	8 GB (Additional RAM required for upgrading to 8 GB)	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 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
Equivalent MCS Configuration	7825	7845	N/A

6.7 Sizing for Cisco Unified Web Interaction Manager (WIM)

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

Important Notes

- For sizing greater than 240 concurrent agent-customer chat sessions, no load must be applied to the primary web/application server.

- 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 below, every 2 or 4 CPU's can be optionally replaced by a single quad-core CPU. Alternately, 2 CPU's can optionally be replaced by a single dual core CPU too.

- 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 tables below, it will be necessary to add sufficient RAM to meet the requirements.

6.7.1 Support for up to 50 concurrent agent-to-customer chat sessions

In Cisco Interaction Manager, up to 50 concurrent agent-customer chat sessions can be supported on a two server configuration, consisting of one web server, and another server with the application, services, and database components.

Item	Web Server	Application, Services, and Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	1 GB	4 GB
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1
Equivalent MCS Configuration	7825	7845 (Additional RAM required – see RAM above)

6.7.2 Support for up to 80 concurrent agent-to-customer chat sessions

In Cisco Interaction Manager, up to 80 concurrent agent-customer chat sessions can be supported on a four server configuration, consisting of one web server, one application server, one services server, and one database server.

Item	Web Server (1)	Application Server (1)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	1 GB	2 GB	2 GB	4 GB
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	‣ 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file

Item				▸ 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.
Equivalent MCS Configuration	7825	7825	7825	7845

6.7.3 Support for up to 120 concurrent agent-to-customer chat sessions

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

Item	Web Server (1)	Application Server (1)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	1 GB	2 GB	4 GB	4 GB
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	▸ 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file ▸ 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.
Equivalent MCS Configuration	7825	7825	7845	7845

6.7.4 Support for up to 240 concurrent agent-to-customer chat sessions

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 240 concurrent agent-customer chat sessions can be supported on a six server configuration, consisting of two web servers, two application servers, one services server, and one database server.

Item	Web Server (2)	Application Server (2)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 4
RAM	1 GB	2 GB	4 GB	8 GB (Additional RAM required for upgrading to 8 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues. Optimal Recommendation: ▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 12 x 73GB RAID

Equivalent MCS Configuration	7825	7825	7845	7845

6.7.5 Support for up to 360 concurrent agent-to-customer chat sessions

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 360 concurrent agent-customer chat sessions can be supported on a ten server configuration, consisting of four web servers, four application servers, one services server, and one database server. All the load must be evenly distributed across the secondary web/application servers, and no load must be applied to the primary web/application server.

Item	Web Server (4)	Application Server (4)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	1 GB	2 GB	4 GB	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 12 x 73GB RAID

Equivalent MCS Configuration	7825	7825	7845	N/A

6.7.6 Support for up to 480 concurrent agent-to-customer chat sessions

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 480 concurrent agent-customer chat sessions can be supported on a twelve server configuration, consisting of five web servers, five application servers, one services server, and one database server. All the load must be evenly distributed across the secondary web/application servers, and no load must be applied to the primary web/application server.

Item	Web Server (5)	Application Server (5)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	1 GB	2 GB	8 GB (Additional RAM required for upgrading to 8 GB)	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 12 x 73GB RAID

Equivalent MCS Configuration	7825	7825	7845	N/A

6.7.7 Support for up to 600 concurrent agent-to-customer chat sessions

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, up to 600 concurrent agent-customer chat sessions can be supported on a fourteen server configuration, consisting of six web servers, six application servers, one services server, and one database server. All the load must be evenly distributed across the secondary web/application servers, and no load must be applied to the primary web/application server.

Item	Web Server (6)	Application Server (6)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	1 GB	2 GB	8 GB (Additional RAM required for upgrading to 8 GB)	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 12 x 73GB RAID 10 – split into 2

Equivalent MCS Configuration	7825	7825	7845	N/A

6.8 Sizing for Combined Email and Web Scenarios

Cisco Interaction Manager can support multiple media, namely, email and chat. The following combinations of users can be supported on respective configurations described below.

Important Notes

- For sizing greater than 240 concurrent email agents or 240 concurrent chat sessions or any combination of both totaling to 240, no load must be applied to the primary web/applications server.

- For a distributed deployment, the concurrent load must be spread evenly across all the web/application servers in the cluster.

- In the sizing configurations below, every 2 or 4 CPU's can be optionally replaced by a single quad-core CPU. Alternately, 2 CPU's can optionally be replaced by a single dual core CPU too.

- 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 tables below, it will be necessary to add sufficient RAM to meet the requirements.

6.8.1 Support for up to 50 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. Configuration supports an incoming email rate of up to 35,000 emails per month

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 50, can be supported on a single server configuration, consisting of one web server, and another server with the application, services, and database components.

Item	Web Server	Application, Services and Database Server
CPU	Intel Xeon (2.33 GHz or higher speed).	Intel Xeon (2.33 GHz or higher speed) Quantity: 2

	Quantity: 1	
RAM	2 GB	4 GB
Hard Disk	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1
Equivalent MCS Configuration	7825	7845 (Additional RAM required – see RAM above)

6.8.2 Support for up to 80 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. Configuration supports an incoming email rate of up to 35,000 emails per month

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 80, can be supported on a four server configuration, consisting of one web server, one application server, one services server and one database server.

Item	Web Server (1)	Application Server (1)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	1 GB	2 GB	2 GB	4 GB
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	‣ 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file ‣ 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.
Equivalent MCS Configuration	7825	7825	7845	7845

6.8.3 Support for up to 120 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. Configuration supports an incoming email rate of 200,000 to 700,000 emails per month

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 120, can be supported on a four server configuration, consisting of one web server, one application server, one services server and one database server.

Item	Web Server (1)	Application Server (1)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 2
RAM	1 GB	2 GB	4 GB	4 GB
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	‣ 2 x 73 GB RAID 1 – configured as OS and separate logical volume for page file ‣ 4 x 73 GB RAID 10 – configured for data files, database log files and full text catalogues.
Equivalent MCS Configuration	7825	7825	7845	7845

6.8.4 Support for up to 240 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. Configuration supports an incoming email rate of 200,000 to 700,000 emails per month

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 240, can be supported on a six server configuration, consisting of two web servers, two application servers, one services server and one database server.

Item	Web Server (2)	Application Server (2)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed)	Intel Xeon (2.33 GHz or higher speed)	Intel Xeon (2.33 GHz or higher speed)	Intel Xeon (2.33 GHz or higher speed) Quantity: 4

	Quantity: 1	Quantity: 1	Quantity: 2	
RAM	1 GB	2 GB	4 GB	8 GB (Additional RAM required for upgrading to 8 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 4 x 73GB RAID 10 – configured for data files, database log files and full text catalogues. Optimal Recommendation: ▸ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ▸ 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
Equivalent MCS Configuration	7825	7825	7845	7845

6.8.5 Support for up to 360 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. Configuration supports an incoming email rate of 200,000 to 700,000 emails per month

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 360, can be supported on a ten server configuration, consisting of four web servers, four application servers, one services server and one database server. All the load must be evenly distributed across the secondary web/application servers, and no load must be applied to the primary web/application server.

Item	Web Server (4)	Application Server (4)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	1 GB	2 GB	4 GB	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 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
Equivalent MCS Configuration	7825	7825	7845	N/A

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 480, can be supported on a twelve server configuration, consisting of five web servers, five application servers, one services server and one database server. All the load must be evenly distributed across the secondary web/application servers, and no load must be applied to the primary web/application server.

Item	Web Server (5)	Application Server (5)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	1 GB	2 GB	8 GB (Additional RAM required for upgrading to 8 GB)	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 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
Equivalent MCS Configuration	7825	7825	7845	N/A

6.8.7 Support for up to 600 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. Configuration supports an incoming email rate of 200,000 to 700,000 emails per month

Note: The sizing for this configuration applies to 4.2(4) or higher

In Cisco Interaction Manager, any combination of agent-customer chat sessions and email agents totaling to 600, can be supported on a fourteen server configuration, consisting of six web servers, six application servers, one services server and one database server. All the load must be evenly distributed across the secondary web/application servers, and no load must be applied to the primary web/application server.

Item	Web Server (6)	Application Server (6)	Services Server	Database Server
CPU	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 1	Intel Xeon (2.33 GHz or higher speed) Quantity: 2	Intel Xeon (2.33 GHz or higher speed) Quantity: 8
RAM	1 GB	2 GB	8 GB (Additional RAM required for upgrading to 8 GB)	16 GB (Additional RAM required for upgrading to 16 GB)
Hard Disk	Standard HDD	2 x 73 GB Ultra3 SCSI RAID 1	2 x 73 GB Ultra3 SCSI RAID 1	Minimum Recommendation: ‣ 2 x 73GB RAID 1 – configured as OS and separate logical volume for page file ‣ 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
Equivalent MCS	7825	7825	7845	N/A

Configuration				

Note

For all the recommended configurations above, 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.

7.0 Load Balancing and High Availability

To optimize resource utilization and enhance performance, access to the Cisco Interaction Manager application can be set up via load-balancers. This section discusses some considerations for load-balancing and high-availability.

7.1 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 balance algorithm to meet various objectives such as equal load balance, isolation of primary web/application server or sending less request to low powered web/application server.

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 server.

7.2 High Availability options

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

Recommendations for High Availability Needs

Aspect	Description	Advantage(s)
Load Balancer	The load-balancer piece is used for distributing web requests across different web servers. Various types of load balancers are available in	Helps distribute load across different servers. • Helps configure load distribution based on server

	the industry. Each of these could be configured with different options work distribution, handling failures or increased activity.	• Helps handles failures by alternate means of routing a web request.
High-Speed Dedicated LAN	The network is a key ingredient to a successful and highly available application. It is recommended that the entire deployment is self-contained within a LAN and does not span over other network domains. This LAN setup should be setup in such a way that alternate means of routing is provided in case of certain network nodes being flooded or when there are packet losses.	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.
Configuring more than 1 web/application server	It is highly recommended that more than 1 web/application server be configured. The Load balancer detects application server failure and redirects requests to another application server after which a new user session will be created and users will have to re-login to Cisco Interaction Manager.	More than 1 Web/app server helps load balance web requests to multiple servers based on system load, availability of server too. • Helps the system scale better to meets growing needs of the enterprise.
Multiple I/O Channels on Database Server with disk-mirrors	Database servers access disks in which data is stored & retrieved. Since enterprise databases are large and hold different entities that could be accessed in parallel, it is highly recommended that the Cisco Unified E-mail Interaction Manager database schema be created with multiple table-spaces. Each table-space could potentially reside on an individual hard disk that has its own I/O channel for data transfer.	This helps faster data access since I/O could occur in parallel • Helps in data redundancy since data is replicated on mirror disks and could be seamless in the event of disk failures. • Ensures high-availability of database.

In addition, to the above recommendations, if a load-balancer is configured to monitor the health of web/app servers, it also serves the purpose of high availability. Also implementing sound backup and disaster recovery strategies help with bringing the systems up sooner in case of any problems.

7.3 Managing fail-over

Cisco Interaction Manager supports clustered deployments. This ensures high availability and performance via transparent replication, load-balancing and fail-over. Some of the key methods of handling failure conditions within a Cisco Interaction Manager and Unified CCE integrated deployment are listed below:

- Implementing multiple Web/App servers. If the primary server goes down, the load-balancer can help handle the failure through routing requests to alternate Web/App servers. The Load balancer detects application server failure and redirects requests to another application server after which a new user session will be created and users will have to re-login into Cisco Interaction Manager.

- Allowing Cisco Interaction Manager services to fail-over with duplex Unified CCE components (e.g., MR PIM and Agent PIM of the MR PG and Agent PG respectively) to eliminate downtime of the application in failure circumstances.

The single points of failure in Cisco Interaction Manager include the following.

- The primary Web/App server of Cisco Interaction Manager going down as this is the centralized server for JMS message exchange.

- The Services server going down

8.0 Network Latency and QoS Considerations

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 below are some recommendations for network latency and QoS considerations:

- The servers which are part of Cisco Interaction Manager should be connected at wire speed on a LAN.

- Preferably, the setup should be such that the Cisco Interaction Manager agents are on the same LAN as the application servers if low latency is experienced when connecting remotely. Otherwise, high latency between the agents and the applications servers could lead to slower performance on the agent interface. An agent can use the application with reasonable performance if the agent is within 200 ms (one way) network response away, with default QoS parameters set for network communication.

- The Cisco Interaction Manager servers and the Unified CCE Administration Workstation (AW) server that it connects to must be located in the same LAN. The maximum one-way network delay permissible between the Cisco Interaction Manager servers and the AW server is <= 200 ms.

- The application network traffic should get priority among others and should always get allocated bandwidth.

The above 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 useable though.

- **Bandwidth requirements**

33 kilobits/second or higher is the minimum required network bandwidth for an agent connecting to the Cisco Interaction Manager servers. An attachment size of up to 50 KB can be accommodated within this minimum required bandwidth. For attachments of size greater than 50 KB, temporary slowness may be experienced in the agent UI during download of the attachments.

9.0   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 Unified 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.

The key protocols involved in the integration include:

- **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 both, 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 GUI Configuration Wizard and CIM to connect to ICM Configuration database that further facilitates the selective download of configuration data into CIM.

The key components of the integration are:

A> Cisco Interaction Manager

- **External Agent Assignment Service**
  - This service helps to fetch new tasks that arrive into an external routing queue in Cisco Interaction Manager, and submit a request to Unified CCE, for the next action to be performed on it.
  - On successful processing of this request, the task is assigned to an agent, or to a skill group in Cisco Interaction Manager via the Listener Instance.
  - It acts as the TCP server for incoming connections from the MR PG / MR interface of Unified CCE, and accepts a successful connection thereby participating in the creating of a reliable channel for communication with MR interface.

- **Listener Service**
  - This service has a capability to have multiple instances, with each instance dedicated to communicate with an Agent PG through the given ARM interface. An Agent PG can be an IPCC/CCM PG, a non-voice PG, or an ACD PG.

- o Each instance is responsible for reporting the current state of an agent and task based on a given action from the UI, to the Agent PG that the agent belongs.
- o It acts as the TCP client for initiating connections to the Agent PG / ARM interface of Unified CCE, thereby creating a reliable channel for communication with the ARM interface.

- **GUI Configuration Wizard**
  - o The wizard is used for establishing mappings between Cisco Interaction Manager and Unified CCE configuration objects.
  - o It allows the user to input the various configuration fields required to be mapped such as application instance name, Unified CCE peripherals, Unified CCE MRDs, Skill Groups, etc.

B> ICM Interfaces

- **Media Routing interface (MR interface)**
  - o It is used by Cisco Interaction Manager, to request Unified CCE for information on how to handle a given task that has arrived into a CIM queue.
  - o Using this interface, EAAS initiates a dialog with the MR PG, after the MR PG has successfully established a connection with the EAAS of the application instance.

- **Agent Reporting and Management interface (ARM interface)**
  - o This interface is built upon existing CTI Server functionality.
  - o It is used by Cisco Interaction Manager to monitor and report on agent and task activity and state.

10.0 Firewall and Hardening considerations

This section discusses some of the firewall and hardening considerations that are useful for Cisco Interaction Manager.

10.1 Firewall Considerations

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

- Considerations of applying firewall rules may vary depending on the security policies in effect and need. The diagram below outlines the network ports on which different components of Cisco Interaction Manager communicate. Port 139 or 445 to the file server can be blocked from outside the firewall, if a web server is configured within the firewall with access to the file server ports.
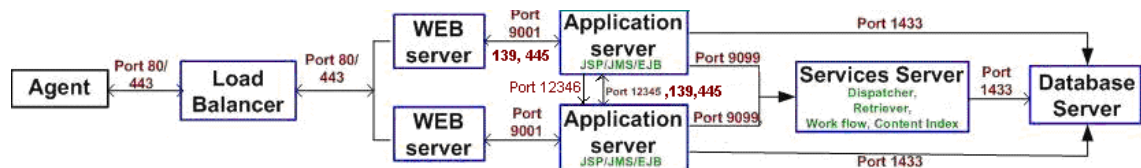
In a typical installation where agents using Cisco Interaction Manager could be spread across multiple locations, the Load balancer along with Web/App servers can be deployed in a DMZ. However, having the web/app within the intranet is possible, too. The Services and Database server can reside in the network over same or different VLAN.

Some of the options on how the application can be accessed are:

- o Agents (for Unified EIM and Unified WIM) from intranet can directly access web servers located on Tier O

- o Agents can access the application externally through the internet, i.e. through Tier 1

- o In case of Unified WIM, customers will always access the customer interface from the internet through Tier 0

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

10.2 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 access controls. These steps could typically be at the corporate level. The other measure is hardening of the server OS and its service components. Some recommendations for the Cisco Interaction Manager deployment are listed below. Please obtain CSA 4.5 with certified

security profiles from cisco.com for all the Cisco Interaction Manager servers to enable intrusion detection and prevention features.

- **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 Enbale 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 Services
  - No 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 NT/2000 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 SQL logs directory

- o Secure registry by restricting access to SQL Server registry keys like HKEY_LOCAL_MACHINE\Software\Microsoft\MSSQLServer.

- o Encrypt User Views, Stored procedure, Function and triggers while going live

- o Examine the audit for login failure events and look for trends to detect any possible intrusion

11.0 Glossary

ARM Interface: Agent Reporting and Management Interface

AAS: Agent Assignment Service

CSA: Cisco Security Agent

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

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