Unified CCX Solution Design Considerations

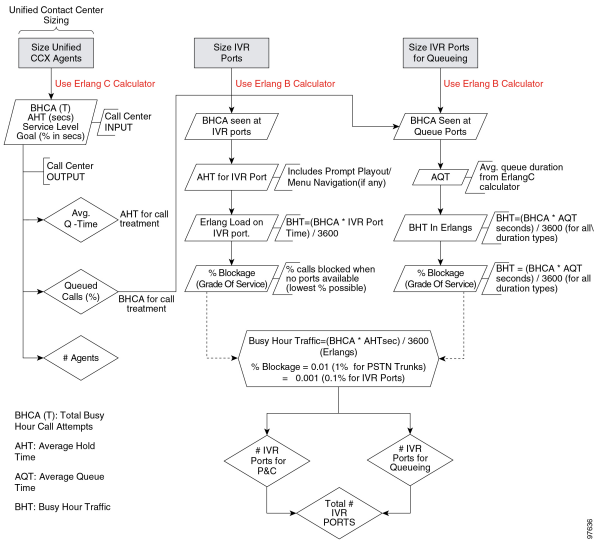
Core Components Design Considerations

General Solution Requirements

Principal Design Considerations for Call Center Sizing

This figure illustrates the principal steps and design considerations for sizing a call center.

Figure 1: Call Center Sizing - Voice Only



This figure is a general overview of the design considerations for call sizing. For a detailed description of the call center sizing design process, refer to the section on sizing call center resources in the *Cisco Unified Contact Center Enterprise Solution Reference Network Design Guide*, available online at the following URL:

http://www.cisco.com/go/ucsrnd

There are similar basic call center sizing considerations and steps for Unified CCE, and they also can be used in sizing a smaller contact center for Unified CCX. This call-sizing approach will provide you with the minimum number of IVR ports to support the total BHCA.

In addition, you should include the following design considerations, specific to Unified CCX, in your call center sizing calculations:

- At a minimum, plan on enough capacity to replace your existing system. The replacement system should perform at least as well as the one it is replacing.
- After all of the Erlang (C and B) calculations are complete for the call center sizing, any changes in queue times or agents will affect the total number of trunks and IVR ports required for an Unified CCX solution.
- As you increase the size of the agent pool, very small changes in the average queue time and percentage of queued calls will affect the required number of gateway trunks and IVR ports.
- Even if you perform all of the calculations for a call center, there are still some variables that you cannot plan for but that will affect the ports needed on a Unified CCX system. For example, one or more agents could call in sick, and that would affect the port count and queue time for each call. Just two agents calling in sick could increase the port count by over 12 percent. This would affect the price of the system and, if not planned for, would affect the ability of the call center to meet caller requirements. Properly sizing call center resources is integral to designing an effective Unified CCX system.

If all of the call sizing information is available, the next step is to apply Unified CCX sizing limits to the call center requirements. For this step, use the Cisco Unified Communications Sizing Tool, available online at:

http://tools.cisco.com/cucst

The Unified Communications downloadable sizing tools help you with the task of sizing Unified Communications deployments.

Preliminary Information Requirements

System designers are advised to create a sizing document to do the following:

- Scope out the preliminary configuration information for the Unified CCX server.
- Size the gateways for the system.

To determine the size of the call center, obtain answers to the following questions:

- How many IVR ports do you need?
- How many PSTN gateway trunk ports do you need?
- How many agents will answer incoming calls?

To answer these questions properly, you will need the sizing metrics and information listed in the following table.

Table 1: Call Center Sizing Metrics

Metric	Description
Average handle time (AHT)	Average duration (talk time) of a call plus after-call work time, which is the wrap-up time after the caller hangs up.
Average IVR port usage time	The total time for prompt playout and/or menu navigation (if any) in the Unified CCX script. This time should not include the queue time the caller spends waiting in queue before an agent becomes available. Queue time is calculated using Erlang-C automatically.
Service level goal for agents	Percentage of calls answered by agents within a specific number of seconds.
Busy Hour Call Attempts (BHCA)	Average number of calls received in a busy hour.
Grade of service (% blockage) for gateway ports to the PSTN	Percentage of calls that get a busy tone (no gateway trunks available) out of the total BHCA.

All of the metrics in this table are basic call-sizing metrics. After this information is obtained, calculate the number of gateway trunk ports, IVR ports, and agents using standard Erlang B and C calculators.

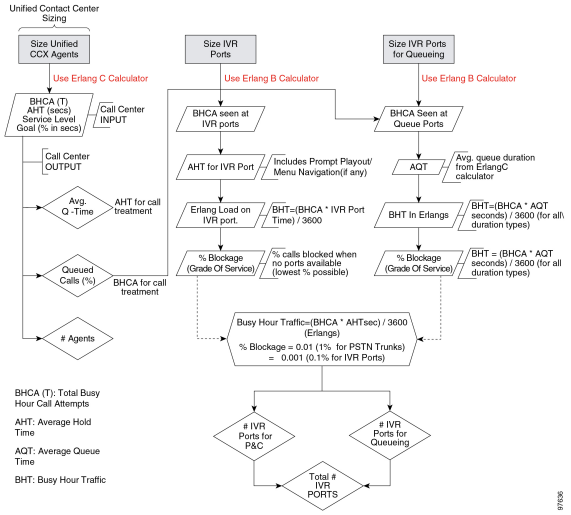
Note If the system being designed is a replacement for an existing ACD or an expansion to an installed Unified CCX or Cisco Unified IP IVR system, you might be able to use the historical reporting information from the existing system to arrive at the above metrics.

In addition, call sizing design considerations may vary if the call center is more self-service oriented.

Terminology

This figure illustrates the common port types and how they map to Unified CCX.

Figure 2: Call Center Port Types



Call center sizing differentiates the port types as follows:

- **Gateway or PSTN trunk ports** — Handles calls originating from the PSTN. They are purchased separately from Unified CCX.
- **Queue ports** — IVR ports that queue calls (when no agents are available) prior to transferring the caller to an available agent. These ports are included at no additional cost with Unified CCX Standard or Enhanced, but they must be sized for proper capacity planning for the Unified CCX server.
- **IVR ports** — Full-featured IVR ports available with the Cisco Unified IP IVR and Unified CCX Premium product.

If you want additional supporting features, such as automatic speech recognition (ASR), text-to-speech (TTS), email notification, web server or client functionality, and database operations, you only need to purchase the Premium package. Additional seats may also be purchased for IVR port licenses if the number of port licenses that come with the seat licenses is not sufficient.

The Unified CCX architecture differs slightly from the example TDM call center configuration in that IVR ports and queue ports (and P&C ports as well) are combined into one logical CTI port as shown in the figure above.

Effect of Performance Criteria on Unified CCX Server

System performance criteria fall into two general categories:

- Unified CCX and Cisco Unified IP IVR components — Applications, software versions, capabilities, server types, and options and quantities that your system requires.
- System usage — The average number of calls placed and received per hour, the average call length, the scripts being executed, and the grammar used for ASR.

Effect of Performance Criteria

Each performance criterion can have an effect on the performance of the Unified CCX or Cisco Unified IP IVR system. In general, the more Unified CCX or Cisco Unified IP IVR components that you install and the

heavier the system usage, the higher the demand on the server. However, the performance criteria can also interact in various non-linear ways to affect performance. The Cisco Unified Communications Sizing Tool for Unified CCX and Cisco Unified IP IVR can help you see and evaluate the effects of performance criteria on the Unified CCX and Cisco Unified IP IVR server.

Network latency between the following components affects the response time:

- Media path between the end customer and the agent via SocialMiner.
- Signaling path between the customer browser and Unified CCX via SocialMiner.
- SocialMiner and mail servers like Exchange Server or Office 365.

The customer chat interface retrieves updates in batches with a maximum delay of 5 seconds between batches.

Impact of Performance Criteria on the Unified CM Servers

Unified CM system performance is influenced by many criteria such as:

- Software release versions— Using the Cisco Unified Communications sizing tool, make sure to select the Unified Communications Manager software version with which Unified CCX will be working.
- The type and quantity of devices registered such as:
  - CTI ports (IP IVR ports for queuing, call treatment, and self-service)
  - Gateway (GW) ports
  - Agent phones
  - Route points
- The load processed by these devices (calls per second)
- Application call flows
  - IVR self-service
  - Call treatment/Prompt and collect
  - Routing to agents, % transfers and conferences
- Special Unified Communications Manager configuration and services
  - Other non-Unified CCX devices—IP phones, GW ports, Unity ports, and dial plan.
  - Music on Hold (MOH)
  - Tracing levels— Unified Communications Manager CPU resource consumption varies depending on the trace level enabled. Changing trace level from Default to Full on Unified CM can increase CPU consumption significantly under high loads. Changing tracing level from Default to No tracing can also decrease CPU consumption significantly at high loads (this configuration is not supported by Cisco TAC). CPU consumption due to default trace will vary based on load, Unified Communications Manager release, applications installed, and call flow complexity.
- Server platform type

Cisco Finesse Design Considerations

Cisco Finesse

Introduction

Cisco Finesse is a next-generation agent and supervisor desktop designed to provide a collaborative experience for the various communities that interact with your customer service organization.

Cisco Finesse provides:

- A browser-based administration console and a browser-based desktop for agents and supervisors; no client-side installations are required.
- IP phone based (FIPPA) agent login & state control with limited features.
- A single, customizable cockpit or interface, that gives customer care providers quick and easy access to multiple assets and information sources.
- REST APIs that simplify the development and integration of value-added applications and minimize the need for detailed desktop development expertise.

The following table lists the availability of the Cisco Finesse REST APIs by license packages:

Table 2: Cisco Finesse REST APIs availability by license packages

Service	Unified CCX Premium	Unified CCX Enhanced	Unified CCX Standard
Cisco Finesse REST APIs	Available	Available	Not available

The following table lists the availability of the Cisco Finesse service in the Unified CCX packages:

Table 3: Cisco Finesse service availability by license packages

Service	Unified CCX Premium	Unified CCX Enhanced	Unified CCX Standard	Unified IP IVR
Cisco Finesse	Available	Available	Not available	Not available

Cisco Finesse functionalities

Cisco Finesse supports the following functionalities:

- Basic call control—Answer, hold, retrieve, end, and make calls.
- Advanced call control—Make a consultation call and transfer or conference the call after the consultation.
- Not Ready and Sign Out reason codes—Reasons that agents can select when they change their state to Not Ready.
- Wrap-up codes—Reasons that agents can apply to calls.
- Phone books—List of contacts from which agents can select one to call.
- Live data gadgets—Display current state of agents, teams and CSQs in the contact center.

- Customizable third-party gadgets.
- Recording using MediaSense and/or Workforce Optimization.
- Scheduled call back—Request a callback at a specific callback phone number and also specify the time or date of the callback.
- Reclassify—Reclassify a direct preview outbound call as busy, answering machine, fax, invalid number, or voice.
- Outbound agent—Supports outbound dialing including progressive, predictive, and direct preview modes, allowing agents to handle both inbound and outbound dialing tasks.
- Multisession webchat—Allows agents to work on multiple chat sessions at the same time for increased agent resource usage.
- Multisession email—Allows agents to work on multiple email sessions at the same time for increased agent resource usage.
- Extension mobility—Allows users to temporarily access their Cisco Unified IP Phone configuration such as line appearances, services, and speed dials from other Cisco Unified IP Phones.

Note

- Team composition changes in Cisco Finesse are not updated dynamically. Log in again or refresh the browser session to see the changes.
- Transition to Logout state is possible only from Not Ready state.

You can configure the Cisco Finesse Agent and Supervisor Desktops to use Cisco gadgets and third-party gadgets through a layout management method. You can customize the Cisco Finesse Agent and Supervisor Desktops through the Cisco Finesse administration console. The administrators can define the tab names that appear on the desktops and configure which gadgets appear on each tab.

For information about supported browsers and operating systems, see the Unified CCX Compatibility related information located at: http://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.

Note Video is now supported if you are using Cisco Jabber as agent phone. The agent desktop where Jabber is used for Video should comply to the Cisco Jabber hardware requirements listed in the *Release Notes for Cisco Jabber for Windows* , located at http://www.cisco.com/c/en/us/support/unified-communications/jabber-windows/products-release-notes-list.html and in the *Release Notes for Cisco Jabber for Mac*, located at http://www.cisco.com/c/en/us/support/unified-communications/jabber-mac/products-release-notes-list.html.

Administration

The administrator can access the Cisco Finesse administration web user interface in read and write mode from the Unified CCX publisher node. The Unified CCX subscriber node provides read-only access.

Cisco Finesse REST API

Cisco Finesse provides a REST API that allows client applications to access the supported features. The REST API uses secure HTTP (HTTPS) as the transport with XML payloads.

Cisco Finesse provides a JavaScript library and sample gadget code that can help expedite third-party integration. You can find developer documentation for the REST API, the JavaScript library, and sample gadgets at this location: https://developer.cisco.com/site/finesse/.

Silent monitoring

The supervisors can monitor agents calls using Unified Communications Manager-based silent monitoring with Cisco Finesse.

Cisco Finesse does not support SPAN port-based monitoring and desktop monitoring to silent monitor the agent.

Recording

Cisco Finesse workflows can be used to record agent calls using Cisco Unified Communications Manager with Cisco MediaSense or Cisco Workforce Optimization.

Note The agent phone must have built-in-bridge (BIB) support enabled for Cisco Unified Communications Manager-based call recording and monitoring to work with Cisco Finesse.

For information about the phones that have built-in-bridge support, see the Unified CCX Compatibility related information located at: http://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.

For information about recording APIs, see the at http://developer.cisco.com/web/finesse/docs.

Cisco MediaSense Search and Play Gadget

The Search and Play gadget available on the Supervisor desktop allows you to access all recordings stored in MediaSense.

Recording Tag

Recordings initiated by Unified CCX and stored in Cisco MediaSense are tagged with semantic, contextual metadata. If participants of the call that is being recorded change, there is no change in tags for that call. These tags are prefixed by **CCX:** and contain the following parameters:

- agent = **<agent ID>** of each logged-in Unified CCX agent who participated in the recording.
- team = **<team name>** of all those teams whose agents have participated in the recording.
- CSQ = **<CSQ name>** of that CSQ where the call being recorded was queued and processed.

For example, Tag: CCX:agent=abc,team=Default,CSQ=Auto_CSQ.

These tags enable supervisors and agents to filter and search recordings in Cisco MediaSense Search and Play Gadget based on one or a combination of the parameters.

Multiline support

You can configure one or more secondary lines on an agent phone. The agent's ACD line must be in button positions 1 - 4. Any calls on the observed lines are reported in the historical reports. Finesse displays the calls that are present in the Aget's ACD line.

Direct Transfer Across Line (DTAL) and Join Across Line (JAL) are not supported.

NAT support

Cisco Finesse supports static NAT only with one-to-one mapping between public and private IP addresses. Finesse desktops support Fully Qualified Domain Names (FQDNs) only, where FQDN resolves to the external IP address.

E.164 support

Unified CCX agents and supervisors can login to Finesse with '+' (plus sign) as prefix. Finesse also supports E.164 for the following:

- Enterprise Data
- Phone Book Contacts
- Workflow Rules or Conditions

Cisco Finesse IP Phone Agent

With Cisco Finesse IP Phone Agent (IPPA), agents and supervisors can access Finesse features on their Cisco IP Phones as an alternative to accessing Cisco Finesse through the browser. Cisco Finesse IPPA allows agents and supervisors to receive and manage calls if they lose or do not have access to Cisco Finesse through a browser. It supports fewer features than the Finesse desktop in the browser.

Supervisor Tasks

Cisco Finesse IPPA does not support supervisor tasks such as monitor, barge, and intercept, but supervisors can sign in and perform all agent tasks on their IP Phones. For reporting purpose the supervisor will have to log in to Cisco Unified Intelligence Center to view the live data reports.

Reason Code Limits

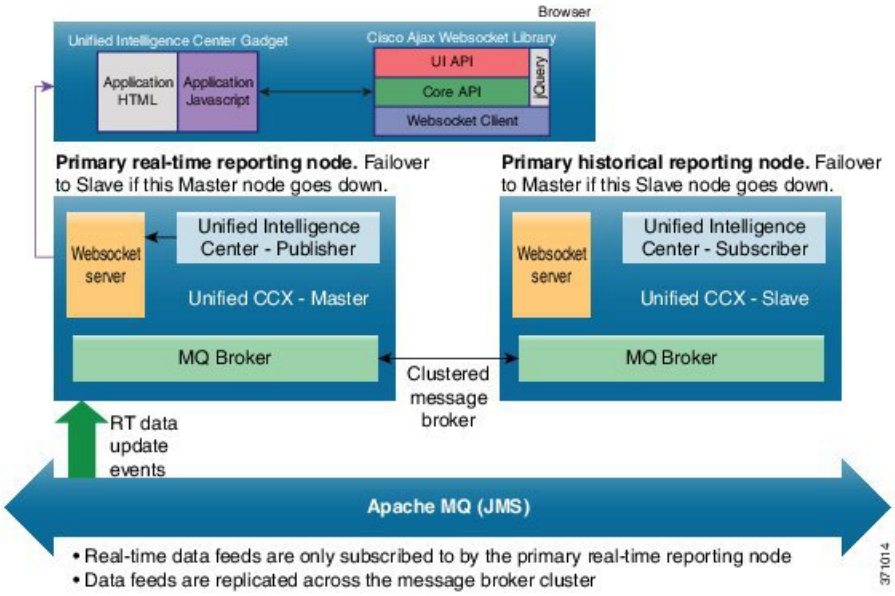
On the IP Phone, Cisco Finesse can display a maximum of 100 Not Ready or Sign Out reason codes. If more than 100 codes are configured, the phone lists the first 100 applicable codes (global codes or applicable team codes).

Cisco Unified Intelligence Center Design Considerations

Unified Intelligence Center Deployments

In Unified CCX deployments, both Unified Intelligence Center and Finesse are coresident on the same server along with Unified CCX.

Figure 3: System Architecture - Cisco Unified Contact Center Express



The above diagram depicts the HA configuration of Unified CCX, where the primary node, by default, is the master, and the secondary node is the warm standby. Historical reports are not available as gadgets.

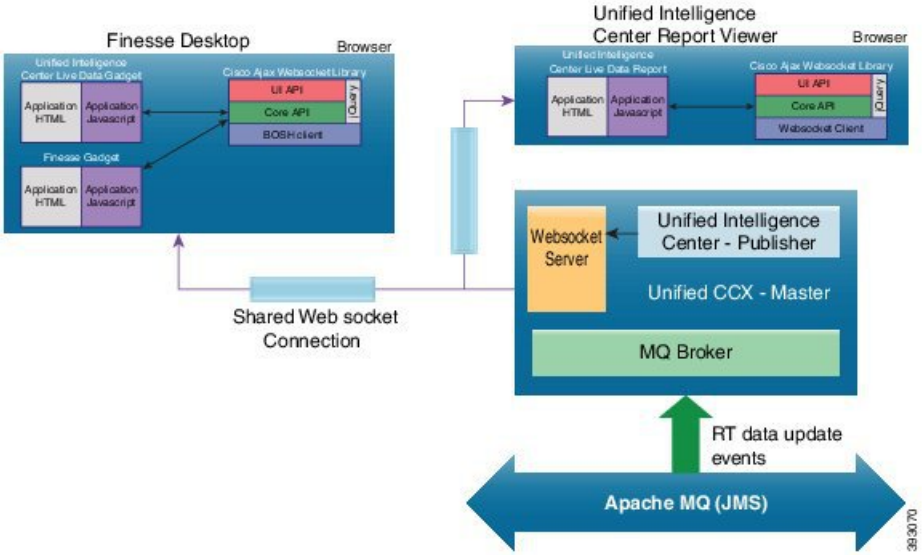
Websocket Server - Only one instance of Websocket server is installed in the Unified CCX node.

Live Data gadget on Finesse desktop - The live-data gadget is loaded on the Finesse desktop only after an Agent or Supervisor has logged in and the Finesse container is initialized. One of the reporting gadgets set up the websocket tunnel. This common tunnel is shared by all the Unified Intelligence Center gadgets.

Live Data report in Unified Intelligence Center Report Viewer or through a native permalink - All the Javascript libraries are required to create the Websocket tunnel and the OpenAjaxHub in the browser are loaded as part of the web page. A Websocket tunnel is then created from the client window to the Websocket server, and shared by all the Live Data reports executed in the client window.

The system diagram for Live Data gadgets embedded in the Finesse desktop and for Live Data reports running in the Unified Intelligence Center Report Viewer is shown below.

Figure 4: Cisco Unified Contact Center Express - Live Data Gadgets



Standalone Cisco Unified Intelligence Center

Unified CCX 11.0(1) and later provides support for a standalone Cisco Unified Intelligence Center system with a premium Cisco Unified Intelligence Center license in addition to the on-box Cisco Unified Intelligence Center (which has a standard Cisco Unified Intelligence Center license).

The version of the standalone Cisco Unified Intelligence Center should be the same as the Unified Intelligence Center that is embedded in Unified CCX. The Standalone Cisco Unified Intelligence Center supports multiple data sources including Unified CCX.

In a Unified CCX High Availability deployment, the standalone Cisco Unified Intelligence Center should be connected to the standby node on Unified CCX to minimize the load on the master node. In case of failover of Unified CCX the Cisco Unified Intelligence Center connects to the new standby node. Standalone Cisco Unified Intelligence Center doesn't support high availability.

To install standalone Cisco Unified Intelligence Center, see the Installation and Upgrade Guide for Cisco Unified Intelligence Center, located at: http://www.cisco.com/en/US/products/ps9755/prod_installation_guides_list.html.

For more information on how to create custom reports, see the Cisco Unified Contact Center Express Report Developer Guide, located at: http://www.cisco.com/en/US/products/sw/custcosw/ps1846/products_user_guide_list.html.

Note Live Data is not supported on the standalone Cisco Unified Intelligence Center.

Cisco Unified Intelligence Center user sync is not supported with the standalone Cisco Unified Intelligence Center and the Unified CCX server.

Optional Cisco Components Design Considerations

Cisco MediaSense Design Considerations

MediaSense is available with Unified Contact Center Express (Unified CCX). The integration is both at the desktop level and at the MediaSense API level.

At the desktop level, MediaSense's Search and Play application is available as a gadget in the Cisco Finesse Supervisor desktop. In this configuration, MediaSense can be configured to authenticate against Cisco Finesse rather than against Unified CM. Therefore, any Cisco Finesse user who has been assigned a Supervisor role can search and play recordings from MediaSense directly from his or her Cisco Finesse desktop. (A special automatic sign-on has been implemented so that when the supervisor signs in to Cisco Finesse, he or she is also automatically signed into the MediaSense Search and Play application.) Note that other than this sign-in requirement, there are currently no constraints on access to recordings. Any Cisco Finesse Supervisor has access to all recordings.

At the API level, Unified CCX subscribes for MediaSense recording events and matches the participant information it receives with the known agent extensions. It then immediately tags those recordings in MediaSense with the agentId, teamId, and if it was an ICD call, with the contact service queue identifier (CSQId) of the call. This subscription allows the Supervisor, through the Search and Play application, to find recordings that are associated with particular agents, teams, or CSQs without having to know the agent extensions.

This integration uses Bi-B or NBR forking, selectively invoked through JTAPI by Unified CCX. Because Unified CCX is in charge of starting recordings, it is also in charge of managing and enforcing Unified CCX agent recording licenses. However, other network recording sources (such as unmanaged BiB forking phones or Unified Border Element dial peer forking sources) could still be configured to direct their media streams to the same MediaSense cluster, which could negatively impact Unified CCX's license counting.

For example, Unified CCX might think it has 84 recording licenses to allocate to agent phones as it sees fit, but it may find that MediaSense is unable to accept 84 simultaneous recordings because other recording sources are also using MediaSense resources. This management also applies to playback and download activities-any activity that impacts MediaSense capacity. If you are planning to allow MediaSense to record other calls besides those that are managed by Unified CCX, then it is very important to size your MediaSense servers accordingly.

Cisco MediaSense 11.5(1) onward supports recording of media streams over IPv6. For Unified Communications Manager built-in-bridge calls, the recordings are done over IPv6 addresses in addition to IPV4 addresses. This is a significant change as Cisco MediaSense can now record calls from endpoints that support only IPv6 addresses. Earlier, MediaSense supported recordings over IPv4-only-stack and dual-stack endpoints. The feature is an add-on support where an administrator can assign an IPv6 address to the MediaSense server, in addition to IPv4 address. The recordings thus made, can be played back or downloaded over IPv4 interfaces.

Note SIP signaling still traverses through IPv4 addresses, thus local IPv4 address is required at MediaSense end.

During a call recording, if an IPv6 address is configured at MediaSense and both IPv4 and IPv6 addresses are supported by endpoint, preference is given to the IPv6 addresses for media streams.

Cisco MediaSense 11.5(1) supports secured recording through secured SIP and SRTP (Secure Real-time Transport Protocol). At the MediaSense end, secured SIP ensures that the signaling used to set up recording

sessions is encrypted. Secured SIP signaling is achieved over TLS transport layer for SIP messages. Next, MediaSense negotiates SRTP streams over signaling channels, and receives and decrypts the encrypted RTP messages. The received media streams are stored in the MediaSense server in a decrypted form and are accessible through all available channels.

With the secured communication feature, MediaSense Release 11.5(1) can now support both RTP and SRTP recordings, at the same time.

Note MediaSense supports SRTP for BiB audio call recordings only.

SocialMiner Design Considerations

You deploy SocialMiner as a large single server. SocialMiner does not support redundant topologies for high availability.

You can deploy the server inside or outside the corporate firewall in "Intranet" and "Internet" topologies:

- The Intranet topology provides the additional security of your network firewall to reduce the risk of an external party accessing the system. Use this topology when SocialMiner accesses internal sites, such as an internal forum site.

  However, this topology prevents partners without VPN access from using SocialMiner. If an external agency manages your public relations functions, this topology prevents easy access by the agency. You also cannot render SocialMiner OpenSocial Gadgets in public internet containers such as iGoogle.

  The Intranet topology complicates proxy configuration, but it simplifies directory integration.

- The Internet topology puts SocialMiner outside of your network firewall. It relies on the built-in security capabilities of the SocialMiner appliance.

  Whether this topology's security is acceptable or not depends on how you use the system and your corporate policies. For example, if SocialMiner only handles public postings in your solution, you do not risk disclosure of sensitive information if it is compromised.

  The Internet topology can complicate directory integration.

You can deploy SocialMiner so that some users access the server through a firewall or proxy. For the customer chat interface, you can deploy the SocialMiner server behind a proxy server or firewall. This reduces the risk of it being abused and limits access by those outside the firewall.

Third-Party Component Design Considerations

DNS Server Deployment Considerations

Consider the following when configuring a DNS servers for your solution:

- Configure the DNS servers for reverse lookup.
- Do not configure the DNS servers beyond a NAT network boundary.
- Deploy redundant DNS servers with low latency on the connection with the servers performing lookups.

Cisco Unified Workforce Optimization Advanced Quality Management Design Considerations

For a Cisco environment running Unified CCX, Advanced Quality Management supports a single system architecture.

This architecture is able to use the following optional external servers to store voice and screen recording files:

- Recording Server-to store voice and screen recording files.
- Media Encoding server-to manage recording requests.
- Monitor server-to monitor agents

Cisco Advanced Quality Management requires one dedicated CTI server for each Unified CM cluster in a Unified CCX environment. For more details on the architecture, see *Cisco Unified Workforce Optimization Advanced Quality Management Design Guide* located at: http://www.cisco.com/c/en/us/support/customer-collaboration/unified-workforce-optimization/tsd-products-support-series-home.html.

Unified CCX Software Compatibility

Unified CCX software is dependent upon integration with many other software components, especially Unified CM. Check that the Unified CCX release you are planning is supported with the Unified CM release for which this deployment is planned.

For the list of supported virtual servers for Unified CCX, see the Unified CCX Compatibility related information located at: http://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-express/products-device-support-tables-list.html.

Cisco Unified CCX Disk Space Usage

This section provides information about determining disk space usage and requirements when you install the Unified CCX. The historical reporting (HR) database (DB) size of the Unified CCX depends on the size of the hard disk on which it is stored. The following table provides an example of disk space usage for these DB types.

Table 4: Cisco Unified CCX Disk Space Usage

Sever Type	Server Disk Size	HR DB Size	Repository DB Size	Configuration DB Size
100 Agent VM profile	1x146 GB	10.78 GB	40 MB	0.5 GB
300 Agent VM profile	2x146 GB	12.45 GB	40 MB	0.5 GB
400 Agent VM profile	2x146 GB	18.91 GB	40 MB	0.5 GB

Deployment Guidelines for Agent Phones that Support G.722 or iLBC

Unified CCX can monitor and record only G.711 and G.729 agent calls. The newer version of some agent phones for Unified CM and Unified CM support G.722 and iLBC. If both the calling device (voice gateway or IP Phone) and agent phone support G.722 or iLBC, these codecs may be chosen as the preferred codec for the call, and monitoring and recording will fail. The following configurations can be used to prevent these codecs from being used in the call:

Unified CM	• Disable advertising G.722 codec capability for the agent phone if the phone supports this codec. • In the Region used by the agent phone, set the audio codec as G.711 or G.729 only and do not set the Link Lossy Type as Lossy to prevent iLBC from being used.