



Cisco Workforce Optimization System Configuration Guide

Release 1.1

June 2008

Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (64387)
Fax: 408 526-4100



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1. Introduction

The purpose of this document is to assist Cisco partners in correctly configuring Cisco Unified Workforce Optimization systems including one or both of its applications: Quality Management and Workforce Management.

Correct configurations will ensure:

- Accurate customer quotations

- Successful customer deployments

- Continued customer satisfaction as the configured system provides both the performance and capacity to meet customer needs

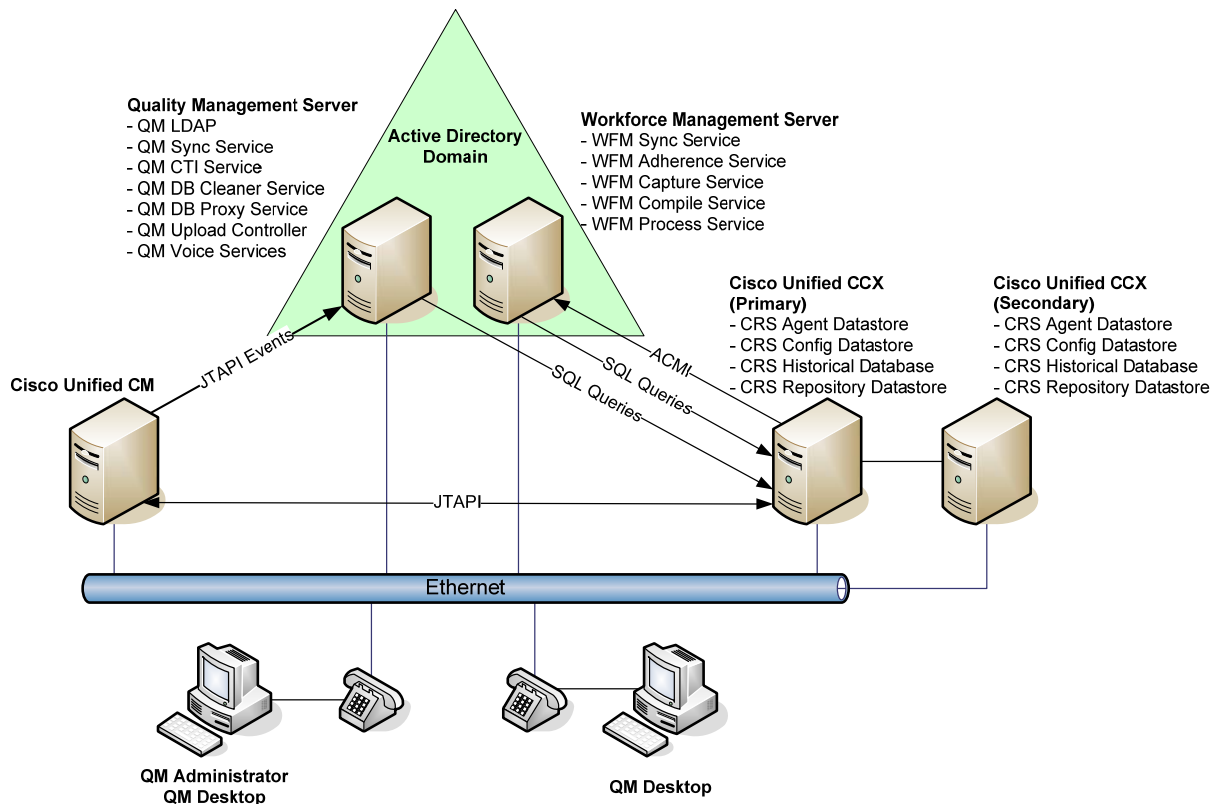
A step-by-step methodology is employed to guide partners through the process of identifying the necessary hardware and system software components required for their customer's specific situation.

2. About Cisco Unified Workforce Optimization

Cisco Unified Workforce Optimization (WFO) for Unified CCX is a full-featured solution for optimizing performance and quality and is an integral component of the Cisco Unified Communications System. The WFO suite provides two solutions: Workforce Management (WFM) and Quality Management (QM).

- Workforce Management allows for forecasting and development of schedules for agents across multiple sites and channels. It also provides real-time dashboards, enabling supervisors to track key performance indicators and manage agents' adherence to schedules.
- Quality Management is a voice and screen recording, compliance and evaluation solution for agent performance optimization and dispute resolution.

The following architecture diagram shows the overall service communications medium between the WFO solutions and Unified CCX.



3. User Licensing Considerations

3.1 Named or Configured Versus Concurrent Users

WFO applications are licensed on a named user basis. This is different from the concurrent agent licensing model utilized by Unified CCX. A named user is any scheduled or recorded agent plus all other users with active login rights to use the WFO applications, like supervisors, managers, quality evaluators or schedulers. The term *Configured* is sometimes used in place of *Named* when referring to application users and the terms are considered synonymous.

3.2 Who Needs to be Licensed?

Only active users and agents who are recorded or scheduled by the WFO applications require licensing. It is not required to have WFO licenses for all agents within the ACD. Each WFO application can also license a separate set of agents or users; it is not required that the same users be licensed for both applications.

3.3 Managing User Licenses

The user administration tool provides a means to license and unlicense users. Unlicensing previously-licensed users allows customers to reuse the named user licenses for users who have become inactive, for example agents who have left the organization. Unlicensing a user will remove them as an active login but will not affect their preexisting recordings or database information within the WFO system.

4. WFO Application Server Software

4.1 Operating System Requirements

Each Workforce Optimization (WFO) application server requires Microsoft Windows Server 2003 R2 Standard edition. The most economical configuration of this is to purchase with 5 client access licenses (CALs). Since WFO application users do not directly access or use the Windows server software, additional client access licenses for WFO application users should not be required. Additional details about client access licensing for Windows Server 2003 can be found at: <http://www.microsoft.com/windowsserver2003/howtobuy/licensing/caloverview.msp> .

4.2 Database Requirements

Each Workforce Optimization application – QM or WFM – requires one database instance hosted on Microsoft SQL Server 2005. WFO application deployments can meet this requirement in two ways:

Internally, by installing and hosting SQL Server 2005 on the application single server or on the database server within multi-server configurations.

Externally, by creating an SQL database instance for the WFO application(s) on an external SQL server.

Generally, systems will use the internal option but may consider the external option to reduce database licensing costs – particularly if the customer already has an enterprise licensed SQL server capability or if the enterprise desires to share SQL licensing between WFO and/or other applications.

Note: The current release of Cisco WFO-WFM 8.2 does not support the external SQL database option. This functionality is planned to be added within the Cisco WFO-WFM 8.4 release targeted for Q3 2008.

4.2.1 SQL Licensing Guidelines

Acquiring and properly licensing the SQL database used by the WFO application(s) is the responsibility of the deploying partner and the end customer. Cisco provides the following guidelines as a convenience for our partners but cannot guarantee the accuracy of the information nor should this be construed as a replacement for the partners due diligence in understanding software licensing terms and how they apply to a specific implementation.

4.2.2 Guidelines for an Internal SQL Database Licensing

4.2.2.1 Processor verses CAL Licensing

WFO applications require Microsoft SQL Server 2005 Standard edition. Cisco's interpretation of Microsoft's client access licensing (CAL) terms is that each WFO user would require a CAL. Since the cost of SQL server plus 30 or more CALs would be more expensive then the cost of a processor license, Cisco recommends using the processor license which eliminates the need for user-based CALs. Additional information on Microsoft SQL licensing can be found at:

<http://www.microsoft.com/sql/howtobuy/default.msp> .

4.2.2.2 Multiple Processor SQL Licensing

If SQL is hosted on a server with multiple physical processors, like an MCS 7845 or equivalent server, then Cisco's interpretation of Microsoft SQL licensing terms is that multiple SQL processor licenses would be required.

4.2.2.3 Multi Core SQL Licensing

If SQL is hosted on a single physical processor with multiple cores, then only a single SQL processor license is required. See details at <http://www.microsoft.com/sql/howtobuy/multicore.mspx>.

4.2.2.4 Virtual server, aka VMware, SQL licensing.

Although virtual servers are not an approved WFO hardware configuration, they are often used for demonstration environments. The following link explains virtual server licensing for SQL. <http://www.microsoft.com/sql/howtobuy/faq.mspx>

4.2.3 Guidelines for an External SQL Database

When using an external database, ensure the database server has additional capacity to handle the WFO application load. If sharing an SQL database between the Cisco WFO applications, QM and WFM, Cisco recommends the SQL database be hosted on a dedicated SQL server on a platform equivalent to the largest platform recommended for either of the WFO applications.

5. Server Hardware Configurations

5.1.1 Matching the Hardware to the Number of Users

The server configuration recommended is directly dependent upon the expected number of named and concurrent users of the application. The maximum recommended users are based upon scalability testing done by Cisco to ensure a reliable and responsive system for the customer. Partners should take into account not only the initial number of users within the deployment but also consider potential growth factors and size the system to accommodate potential expansion of the user base, at least for the first year after deployment.

5.1.2 Server Hardware Specifications

Cisco specifies application servers based upon a few specific Cisco MSC server configurations. Partners may substitute different hardware provided it is equivalent or better than the target MCS server. Partners should verify the latest MCS server configurations when designing a QM system to ensure they are deploying equivalent or better configurations.

Cisco MCS server configurations are listed at

http://www.cisco.com/en/US/products/hw/voiceapp/ps378/prod_models_home.html

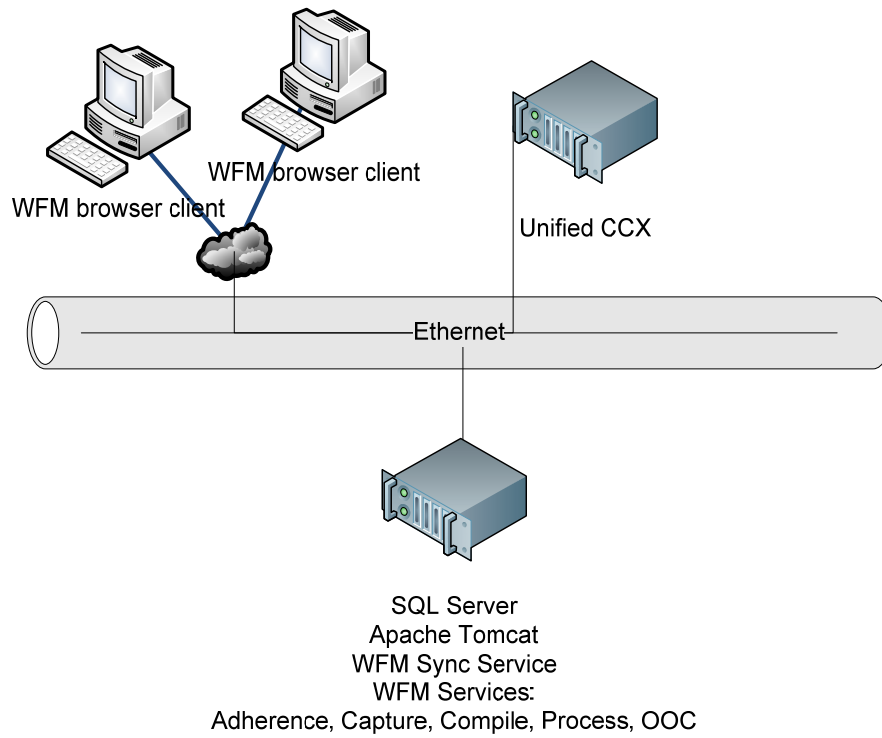
5.2 Workforce Management Hardware

5.2.1 Workforce Management Single Server Hardware Configuration

The current Cisco WFM release supports a single server configuration with all WFM services installed upon a single MCS equivalent server. The specific model required is defined by the maximum number of named or concurrent users as shown in the table below:

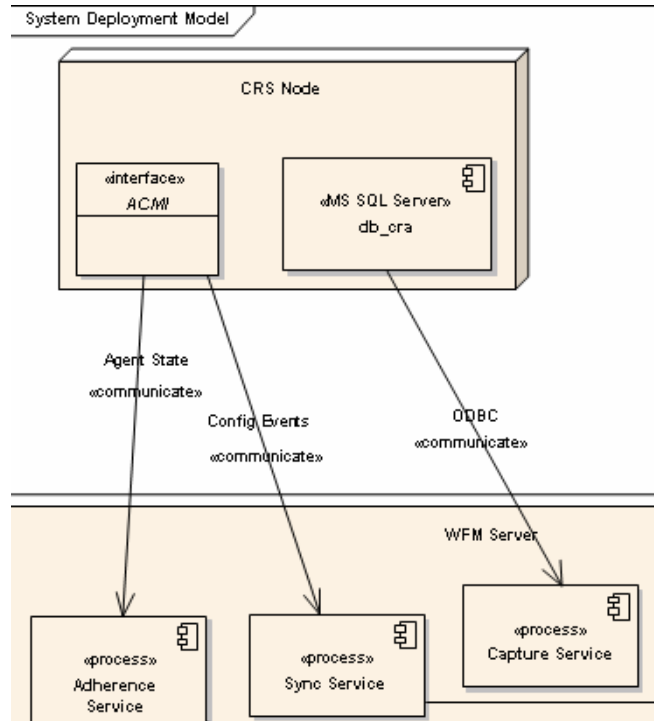
Workforce Management Server Capacities		
Processor	Intel 5140 Xeon 2.33 GHz	2 x Intel 5140 Xeon 2.33 GHz
Memory	2 GB	4 GB
System Storage	40 GB	
Cisco MCS Equivalent	MCS 7835	MCS 7845
Workforce Management: Single Server Configuration		
Maximum number of named users	450	900
Maximum number of concurrent agents users	150	300

Single Server Configuration



5.2.2 WFM Services Descriptions

The diagram below shows the detailed service interaction between WFM services and the Unified CCX environment:



5.2.2.1 WFM Capture Service

The Workforce Management Capture Service watches for historical call data reports created by the Workforce Management OOC (Odyssoft ODBC Collector) Service. When the Workforce Management Capture Service detects a new report, it sends a compilation request to the Workforce Management Compile Service.

5.2.2.2 Compile Service

The Workforce Management Compile Service listens for compilation requests from the Workforce Management Capture Service. The Workforce Management Compile Service can compile historical data for agents, services or teams by day, week, month, or year, for use in forecasting and scheduling. When requested by Capture Service, compiles historical data by day, week or month.

5.2.2.3 OOC Service

Every 30 minutes, the Workforce Management OOC Service collects all of the call data for the preceding 30 minutes from the ACD database using the Open Database Connectivity (ODBC) interface. The Workforce Management OOC Service then writes the call data into historical reports.

High availability (HA) configurations can use multiple data sources. The Workforce Management OOC Service always connects to the primary Unified CCX node, however, and fails over to the secondary Unified CCX node only if the first connection fails.

5.2.2.4 Request Service

Processes user requests to generate forecasts and schedules.

5.2.2.5 Adherence (RTE) Service

The Workforce Management RTE (Real-Time Engine) Service uses the Advanced Contact Management Interface (ACMI) protocol to get real-time information on agent states from the Unified CCX server. Calabrio WFM displays agent state information in the Supervisor Adherence dashboard. Uses ACMI to get real-time agent states from the Unified CCX server.

5.2.2.6 Sync Service

The Workforce Management Sync Service retrieves and processes user configuration data, such as skill group configurations, team configurations, and agent configurations from the ACD.

5.2.2.7 Tomcat Service

Provides web services for WFM browser based clients

5.3 Quality Management Hardware

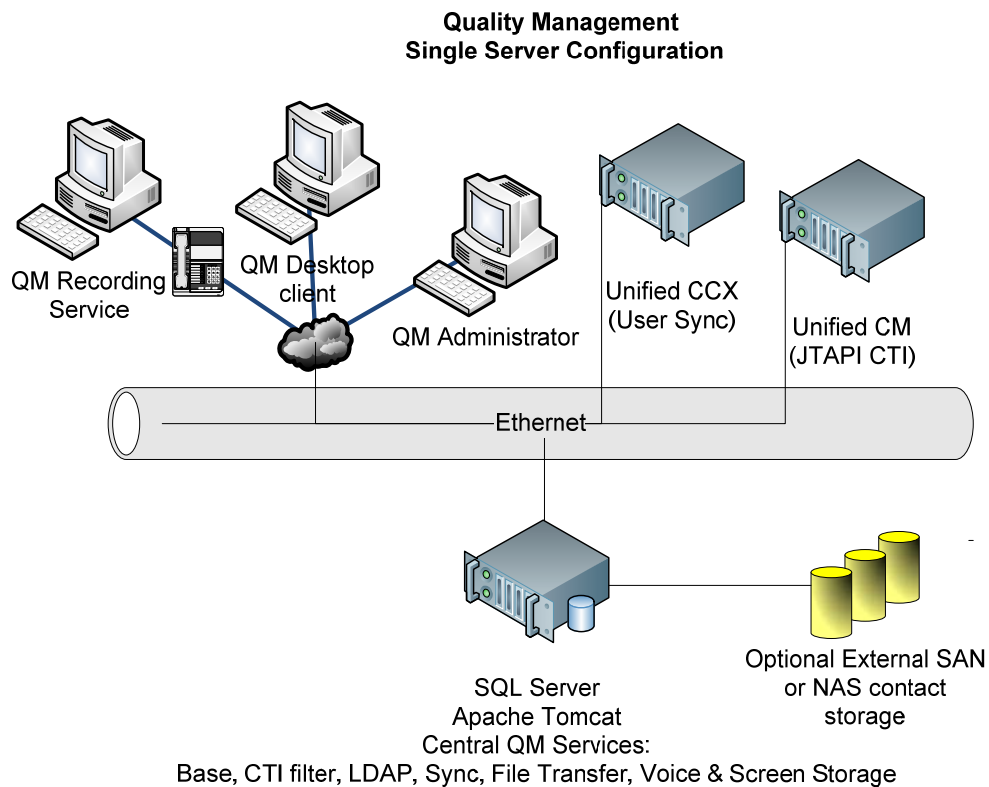
5.3.1 Quality Management Single Server Hardware Configuration

The QM single server configuration has all QM services installed upon a single MCS-equivalent server. The specific model required is defined by the maximum number of named or concurrent users as shown in the table below:

Quality Management Server Capacities				
Processor	Intel Celeron D 352 3.2 GHz	Intel Dual-Core Xeon 3050 2.13 GHz	Intel 5140 Xeon 2.33 GHz	2 x Intel 5140 Xeon 2.33 GHz
Memory	2 GB	2 GB	2 GB	4 GB
System Storage	40 GB			
Recording Storage	Varies by Usage			
Cisco MCS Equivalent	MCS 7816	MCS 7825	MCS 7835	MCS 7845
Single Server Configuration				
Maximum number of named users	450	900	1500	3600
Maximum number of concurrent agents/users	150	300	300	300

Notes:

1. Dual processor MCS 7845-equivalent servers can be used for this configuration but may require an additional SQL database processor license, increasing the overall server costs.
2. Additional storage capacity will likely be required.



5.3.2 Calculating Quality Management Contact Storage Capacity

In addition to the normal disk storage for the operating system, SQL database and QM server software QM deployments must also plan for storage space for the recorded contacts. The total amount of storage required is based upon the cumulative time and types of recording to be stored on the system. Calculate the cumulative storage requirements using these formulas:

Recorded minutes/day = average call time * # calls/day * # of agents

Recorded minutes in QM = Rec minutes/day * work days/agent/month * months to save

Voice Storage = Recorded minutes * 0.12 MBytes/min

Screen Storage = Recorded minutes * 1.2 MBytes/min

Note: The screen storage rate represents the average recording rate over thousands of contacts. The rate for individual contacts may vary with the amount of screen activity.

5.3.3 Quality Management Contact Storage Example

Average call time = 330 seconds or 5.5 minutes

calls/day = 40

of agents = 60

Recorded minutes /day = 5.5 minutes * 40 calls * 60 agents = 13,200 minutes

Average work days /agent /month = 21 (full time, 5 days per week)

Months to save = 2 (Saving for 60 days through quality evaluation & review cycle)

Recorded minutes in QM = 13,200 minutes/day * 21 days/month * 2 months = 554,400 min

Voice Storage = 554,400 minutes * 0.12 MBytes/minute = 66 GBytes

Screen Storage = 554,400 minutes * 1.2 MBytes/minute = 665 GBytes

Note: A single system may have multiple groups of recorded users with variations in recording rules or retention periods so this calculation may need to be repeated for each group and the results summed together to get to total storage requirements.

5.3.4 Quality Management Contact Storage Calculator

To assist in calculating storage requirements, the Quality Management Storage Server Sizing Spreadsheet is available for download here:

http://portal.calabrio.com/tiki/tiki-list_file_gallery.php?galleryId=17

(Access to the site requires a one-time registration.)

Note: The formulas and Calculator referenced above will return the minimum amount of storage space required. Additional storage capacity should be provided to accommodate for normal usage variations.

5.3.5 Options for Quality Management Contact Storage

QM supports a variety of contact storage options including local disk, network attached storage (NAS) or storage area networks (SAN) by allowing the installer to specify the storage location

for voice and screen recordings as a universal naming convention (UNC) location during install or change the location by moving the existing contacts and running the post install process to specify the new contact storage location. Cisco recommends the usage of external enterprise class SAN or NAS storage for critical recordings because of the additional fault tolerant options provides by these storage architectures.

5.3.5.1 Local Storage

Contact storage can be hosted within the QM single server or on the Voice and Screen Storage servers in the multi-server configuration. The storage used can either be a portion of the server’s primary partition on the base disk(s) that came with the server or can be on a secondary partition using additional drives added to the base server. In either case, it is recommended that contact storage be provided on a RAID volume to protect the recorded contacts from drive failure. The following table shows the base and expansion capacity of the Cisco MSC server configurations recommended for QM deployments. It is from a worksheet within the storage calculator worksheet described previously.

MCS Server Recording Storage Capacity										
MCS Model	Base Capacity						Expansion Capacity			
	SATA Disk slots	Base disks	Disk capacity GB	RAID capacity GB	Reserved system capacity GB	Capacity for recording GB	Available disk slots	Expansion disks	Disk capacity GB	RAID recording capacity GB
7816-H3	2	1	160	160	40	120	1	1	160	120
7816-I3	2	1	160	160	40	120	1	1	160	120
7825-H3	2	2	160	160	40	120	0	0		0
7835-H2	8	2	72	72	40	32	6	6	250	1250
7845-H2/I2	8	4	72	144	40	104	4	4	250	750
7845-H2/I2-ECS1	8	8	72	288	40	248	0	0		0

To calculate actual expansion capacity of servers fill in the yellow highlighted cells, default values show the maximum potential capacity

Notes:

The MCS 7835 provides the maximum expansion capacity for recording storage. Popular expansion 2.5” drive capacities can be selected via a drop down in the Disk Capacity column.

MCS 7816 base only provides a single 160 GB disk with no RAID protection for the primary partition. It is recommended that disk expansion be done with an equivalent disk capacity, binding the expansion drive to the base disk in a RAID 1 volume.

The base reserved system capacity is an estimate of the space required for the OS, database and QM server application and may need to be adjusted for the actual server configuration.

5.3.5.2 Network Attached Storage or Shares

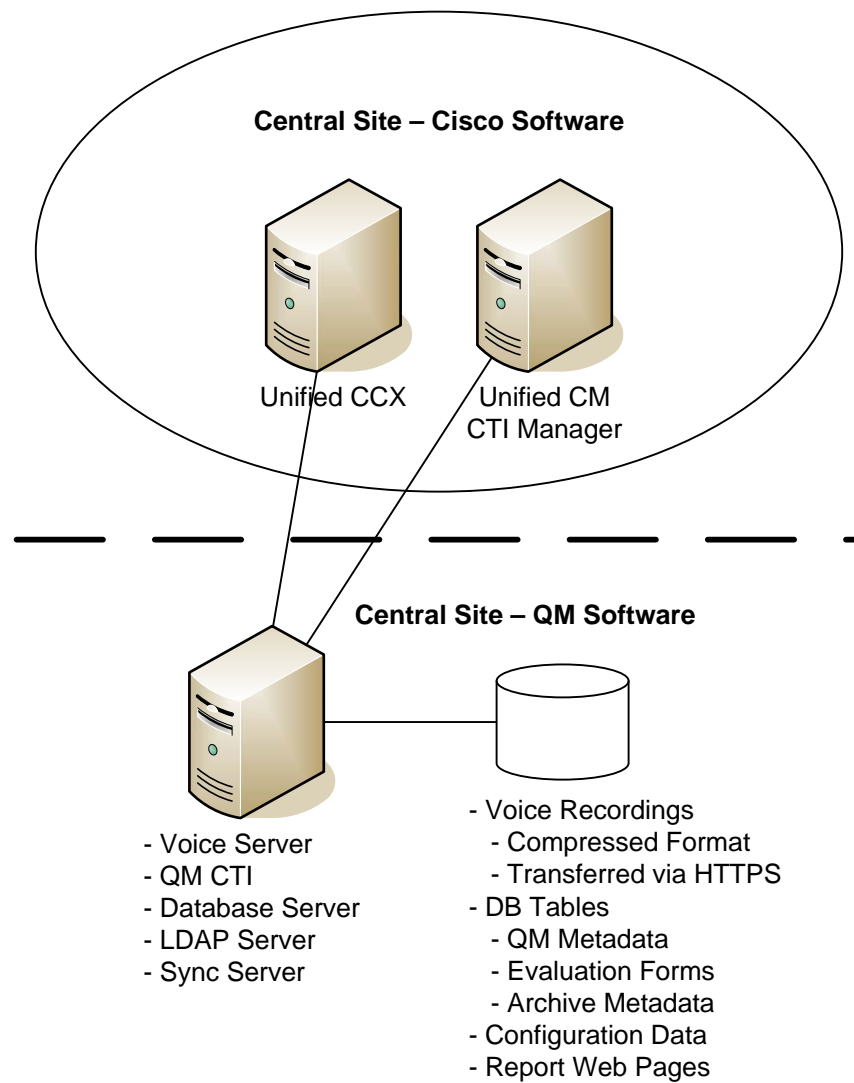
Configure the NAS or share to allow read and write access from the QM server and allocated the required storage capacity to the share. Set the UNC storage location during QM install to the server name and share to be utilized.

5.3.5.3 Storage Area Network (SAN)

Map a dedicated SAN volume to the QM server and create a file system partition on that volume. Then setup the recording storage to point to the mapped drive or a share name within the partition

5.3.6 Quality Management Interaction with Cisco Unified CCX

The diagram below shows the detailed service interaction between QM services and Unified CCX/Unified CM environment:



5.3.7 CTI Server

This provides the CTI feed to the Recording component. The QM CTI Service bridges the Recording Service and the Cisco Unified CM/CTI Manager. The QM CTI Service sends events to the Recording Service when the status of the phone the Recording Service is monitoring changes.

The QM CTI Service communicates with the CTI Manager using the Cisco JTAPI interface to listen for phone events (it does no call control). The QM CTI Service forwards these events on to the recording client for workflow processing.

When agents that have been configured in QM log in to a PC with the recording service installed, a message is sent to the QM CTI Service. The QM CTI Service in turn registers an event listener with JTAPI and is notified when phone events occur. When the agent logs off the PC, the registration with JTAPI is removed for that agent.

5.3.8 Sync Service

The QM Sync Service reads data from the Unified CCX system using an ODBC interface. It maintains an ODBC connection with the UDB and runs queries every ten minutes and stores the information on the QM Base server (LDAP). The information that is read consists of:

- Agents
- Teams
- Supervisors

5.3.9 Quality Management Client (Endpoint) PC Requirements

In order to ensure that the endpoint recording service can operate in the background on the agent's PC without impacting the PC's capability to execute other critical programs, the following client PC guidelines are recommended as listed in the Quality Management Install guide

Operating System	Processor	Memory	Disk Space
Windows 2000 Pro SP4+	500 Mhz Voice only	256 MB Ram	20 GB
Windows XP, SP 2+	1 Ghz Voice and Screen	256 MB Ram	20 GB
Windows Vista	1 Ghz	256 MB Ram	40 GB

5.3.9.1 Recording Client Network Access Considerations

Quality Management voice recording utilizes the same endpoint capture technology as in Cisco Agent Desktop (CAD). The agent PC Network Interface Card (NIC) is placed in promiscuous mode allowing the capture service to copy the RTP voice stream packets as they are transferred to the IP phone. To enable the recording service to capture the voice, the endpoint PC and phone must be configured as shown in below diagrams.

Note: Certain Cisco phones such as the 79xx phones must be configured to span ports in the Unified CM administrator in order to pass these packets on to the agent PC.

Figure 2. QM Recording hardware setup (hard IP phone),

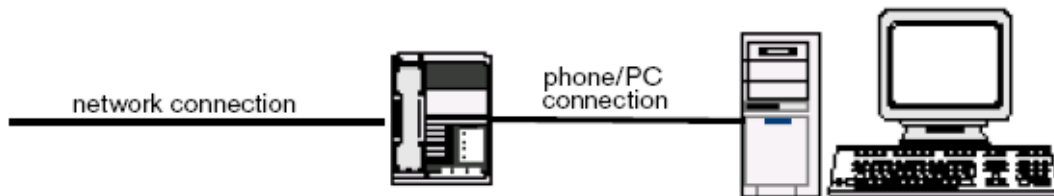
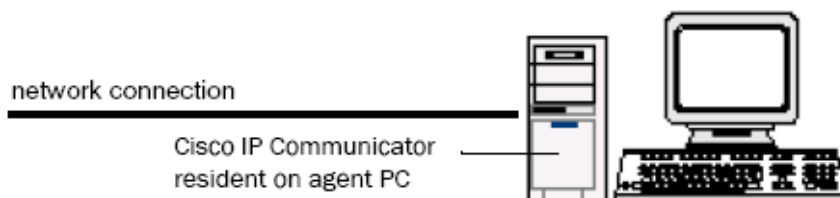


Figure 3. QM Recording hardware setup (Cisco IP Communicator soft phone).



5.3.9.2 Network Interface Card Compatibility

A list of NIC cards which are known to support endpoint recording is available at:

http://www.cisco.com/application/pdf/en/us/guest/products/ps14/c1221/cdcont_0900aecd800e3149.pdf

6. Additional Considerations

All product documentation is available online; please visit Cisco.com for the latest product documentation. For additional product questions send email to ask-wfo@external.cisco.com.

When deploying in an AD environment, both QM and WFM servers should be a member of the domain. The Unified CCX server is recommended but not required to be a member of the domain-- in which case additional setup is required. See installation document for more details.

- When deploying WFO, a user must exist or be created on the Unified CCX server who has read access to db_cra
- WFO products do not currently provide redundancy. However, note that both QM and WFM do support redundant Unified CCX environment and is able to switch to secondary/backup on failure of the primary Unified CCX system.
- WFM and QM servers should be installed on the same Campus LAN as the Unified CCX servers and the CTI Managers that they are communicating with. The round-trip delay between all these servers should be less than 2 ms.