

How Cisco IT Deployed Global Web Conferencing

Cisco Unified MeetingPlace pilot project validates server configurations and integration of e-mail and calendaring.

Cisco IT Case Study / Conferencing / Global Web Conferencing Deployment: This case study describes Cisco IT's internal pilot deployment of the Cisco Unified MeetingPlace voice and Web conferencing system. Cisco Unified MeetingPlace enables Cisco employees to easily and effectively use voice and Web conferencing to communicate with other employees, customers, and partners around the world. Customers can draw on Cisco's real-world deployment experience in this area to help support similar enterprise needs.

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– Lisa Ashcraft, Project Manager, Cisco IT

CHALLENGE

For many years, Cisco Systems® employees have used various voice and Web conferencing applications and systems to communicate with fellow employees, customers, and industry partners. The company's acquisition of Latitude Communications and the MeetingPlace product line in 2004 gave Cisco IT the opportunity to converge Web and voice conferencing onto a single platform. The primary goals of this convergence included the following:

Improve the voice and Web collaboration experience for all employees. Previously, voice and Web conferencing applications were separate functions. Employees had to use separate scheduling tools and other applications for each system, which often led to confusion and lost productivity.

Control costs by converting to an IP-based voice conferencing infrastructure. Although Cisco's telephony infrastructure is

entirely IP-based, several of the existing voice-conferencing systems did not support IP connectivity. Accessing those conferencing systems required an off-network telephone call, with the associated access and toll costs.

Improve consistency for access and usage. Two different conferencing applications were used by Cisco employees: one for internal conferences and another for Internet-based conferences with partners and customers. The previous systems were not interconnected, making it difficult to implement an easy-to-understand dial plan—and requiring expensive (and often international) long-distance telephone charges for individuals located outside the local area of the host conferencing system.

Reduce the number of application vendors and software costs. The previous Web conferencing applications were provided by two different vendors, which increased the complexity of deployment and doubled the required training and support costs.

SOLUTION

Cisco® Unified MeetingPlace® offers an integrated platform that addressed Cisco's conferencing challenges with many beneficial features. For example, Cisco Unified MeetingPlace combines IP-based voice and Web conferencing and can integrate video telephony calls via the Cisco Unified Video Advantage product.

Cisco IT made the decision to replace the existing mix of conferencing systems with a Cisco Unified MeetingPlace solution. Planning began for a pilot implementation, guided by a set of functional requirements created by the Cisco IT project team. These requirements included:

- A distributed architecture that can scale to serve current usage and provide room for growth.
- A global conferencing solution that enables Cisco employees, partners, and customers to dial a local telephone number or use a single Web address to access voice and Web conferences.
- Access to security and authentication using the current Cisco internal directory structure.
- Services integration with Cisco IP telephony products, messaging services, and other conferencing solutions such as Cisco IP/VC videoconferencing gateways.

Distributed architecture

A distributed server architecture was chosen for the internal Cisco Unified MeetingPlace implementation in order to provide the best response time and access for global users. In this architecture, the Cisco Unified MeetingPlace services run on different servers that operate in a cluster. Together, all servers in a cluster function as a single system (Figure 1 and Table 1).

Figure 1. Cisco Unified MeetingPlace services run on different servers within a cluster for improved performance and scalability.

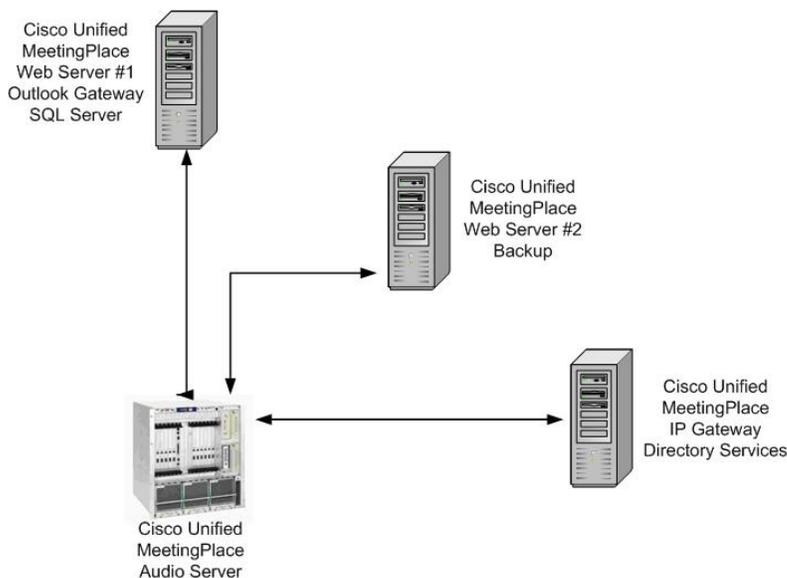


Table 1. Server functions within a Cisco Unified MeetingPlace system cluster.

Cisco Unified MeetingPlace Cluster Server	Function
Voice server	Provides all voice conferencing services.
Web server #1	Provides primary Web conferencing services. A load-balancing feature automatically directs users to Web server #1 or #2. Interfaces to the Microsoft Outlook scheduling and e-mail system used by Cisco employees. Hosts a SQL database server that contains all meeting reservation information for all connected Cisco Unified MeetingPlace Web servers.
Web server #2	Provides secondary Web conferencing services and backup of Cisco Unified MeetingPlace profiles.
IP gateway server	Provides connectivity to the Cisco Unified CallManager systems and hosts Cisco Unified MeetingPlace Directory Services.

Based on current and anticipated usage, seven Cisco Unified MeetingPlace server clusters were defined for the initial deployment. Two additional failover clusters were planned to provide backup.

The location of these clusters was based on the geographic density of users and an IP telephony measurement: projected round-trip delay (RTD). Voice over IP (VoIP) traffic (used by Cisco Unified MeetingPlace for voice conferencing) is susceptible to network delay and jitter, which can degrade voice quality to the point of being unacceptable to the average user. Delay is the time required for a voice signal to travel from point to point in a network; it can be measured as either one-way or round-trip delay. One-way delay calculations require expensive sophisticated test gear and are beyond the budget and expertise of most enterprises. However, measuring round-trip delay is easier and requires less expensive equipment.

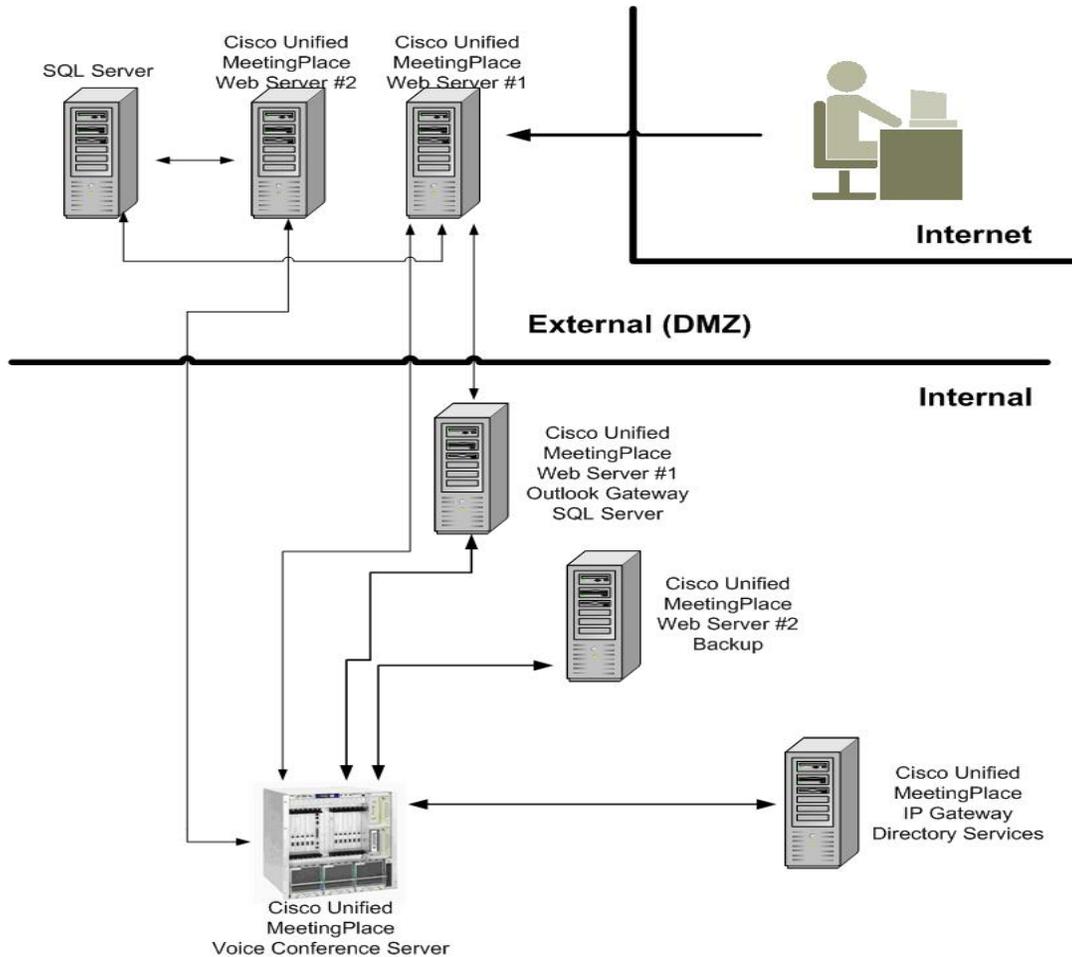
Table 2 shows acceptable levels of service for the location of the Cisco Unified MeetingPlace clusters, based on Cisco IT experience with round-trip delays in VoIP traffic.

Table 2. Measuring RTD values helped Cisco IT evaluate voice quality at potential locations for the Cisco Unified MeetingPlace servers.

RTD Value	Recommendation
< 300 ms	Recommended
> 300 ms and < 350 ms	Acceptable
> 350 ms	Not recommended

To accommodate conferences with Cisco customers, industry analysts, and partners, additional Cisco Unified MeetingPlace Web servers were configured for Internet access at each location (Figure 2).

Figure 2. Separate Web servers in each location allow external users to access the Cisco Unified MeetingPlace system over the Internet.



Global conferencing solution

Cisco Unified MeetingPlace supports both standalone voice conferencing and integrated Web and voice conferencing. For an integrated conference, the user accesses a Web URL to launch the Cisco Unified MeetingPlace login page. Once the login process is completed, Cisco Unified MeetingPlace can place a voice telephone call to the user or the user can call the system.

One goal of the pilot project was to establish an architecture that supported a single URL for internal-only services and a separate URL for external, Internet-based users. This advanced, single-URL design is enabled by the redirection capabilities of the Cisco Distributed Director (DDIR) software and the Cisco Content Switching Module. Figures 3 and 4, and Table 3 and Table 4 show the access processes for internal and Internet-based Cisco Unified MeetingPlace users.

Figure 3. Internal access to Cisco Unified MeetingPlace Web and voice conferencing.

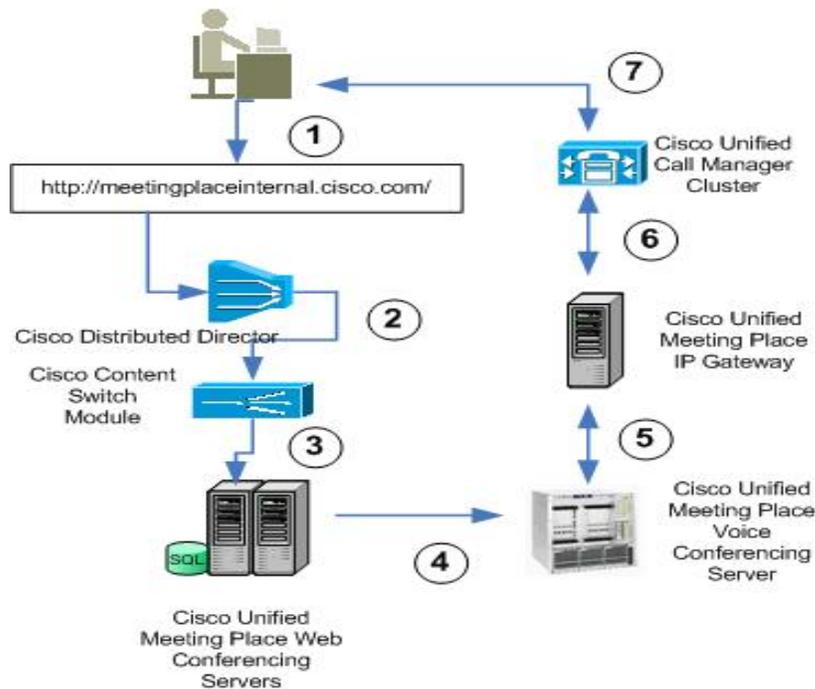


Table 3. Cisco Unified MeetingPlace process for connecting an internal user to a voice and Web conference.

Step	Description
1	Cisco employee selects the URL provided in an e-mail invitation for a conference that has been scheduled in the Cisco Unified MeetingPlace scheduler or the Microsoft Exchange/Outlook calendaring system.
2	The Cisco internal domain name server (DNS) system directs the URL to a Cisco DDIR. The DDIR redirects the client request to the closest Cisco Unified MeetingPlace Web server based on the requestor's IP address.
3	The Cisco Content Switching Module further directs the request to the primary Cisco Unified MeetingPlace Web server in the cluster. The meeting ID appears as a prefix in the request and is used to direct the user connection to the correct conference and server.
4	A connection is established between the client and the host Cisco Unified MeetingPlace Web and voice conferencing servers.
5	The Cisco Unified MeetingPlace voice conference server initiates a voice telephone call to the requesting user.
6	The Cisco Unified MeetingPlace IP gateway (installed on one Cisco Unified MeetingPlace Web server in the cluster) provides an interface between the Cisco Unified MeetingPlace voice conference and the Cisco Unified CallManager system.
7	The nearest Cisco Unified CallManager cluster places a telephone call to the requesting user, over the Cisco WAN, and provides a connection to the Cisco Unified MeetingPlace voice conferencing server.

Figure 4. External access to Cisco Unified MeetingPlace Web and voice conferencing.

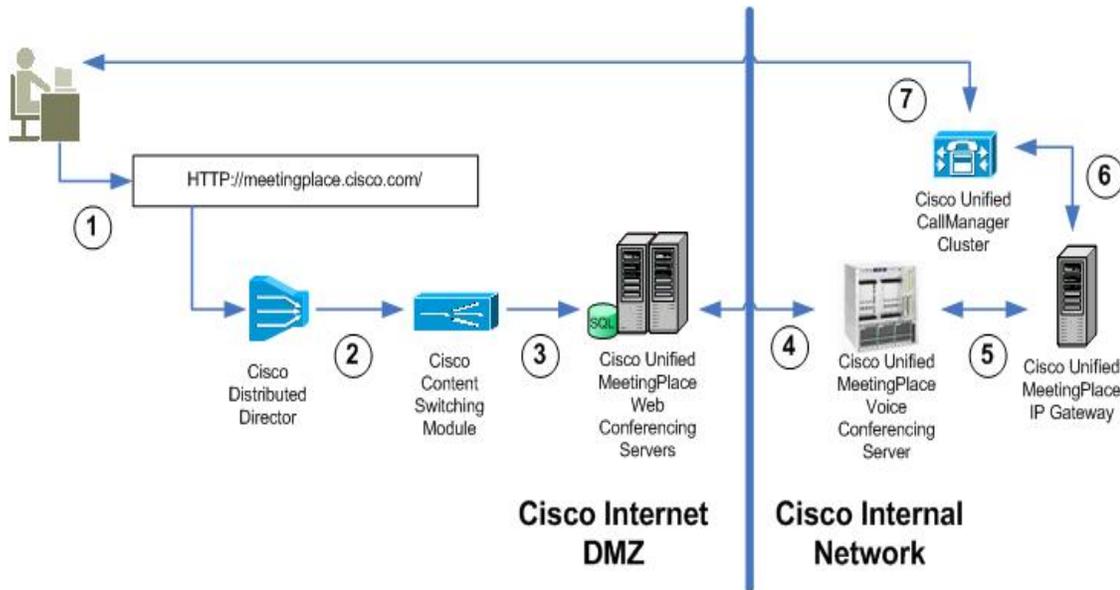


Table 4. Cisco Unified MeetingPlace process for connecting an external user to a voice and Web conference.

Step	Description
1	Cisco customer or partner selects the URL provided in an e-mail invitation for a conference that has been scheduled via the Cisco Unified MeetingPlace scheduler or the Microsoft Exchange/Outlook calendaring system.
2	The DNS system in the demilitarized zone (DMZ) directs the URL to a Cisco DDIR. The DDIR redirects the client request to the closest external Cisco Unified MeetingPlace Web server location, based on the requestor's IP address. The DMZ is a part of the Cisco internal network that provides firewall-protected access from the Internet.
3	The Cisco Content Switch Module further directs the request to the primary external Cisco Unified MeetingPlace Web server in the cluster. Cisco employees are automatically directed to the external Cisco Unified MeetingPlace servers.
4	A connection is established between the client and the host Cisco Unified MeetingPlace Web and voice conferencing servers.
5	The Cisco Unified MeetingPlace voice conference server initiates a voice telephone call to the requesting user.
6	The Cisco Unified MeetingPlace IP gateway (installed on one Cisco Unified MeetingPlace Web server in the cluster) provides an interface between the Cisco Unified MeetingPlace voice conference and the Cisco Unified CallManager system.
7	The nearest Cisco Unified CallManager cluster places a telephone call to the requesting user, over the public network, and provides a connection to the Cisco Unified MeetingPlace voice conferencing server.

Standalone voice conferencing sessions are facilitated by a globally distributed Cisco Interactive Voice Response (IVR) system. This system enables users to enter published telephone numbers for accessing the Cisco Unified MeetingPlace voice conferencing servers. Figure 5 and Table 5 describe this process.

Figure 5. For a standalone voice conference, users can access the Cisco Unified MeetingPlace servers via a Cisco IVR system.

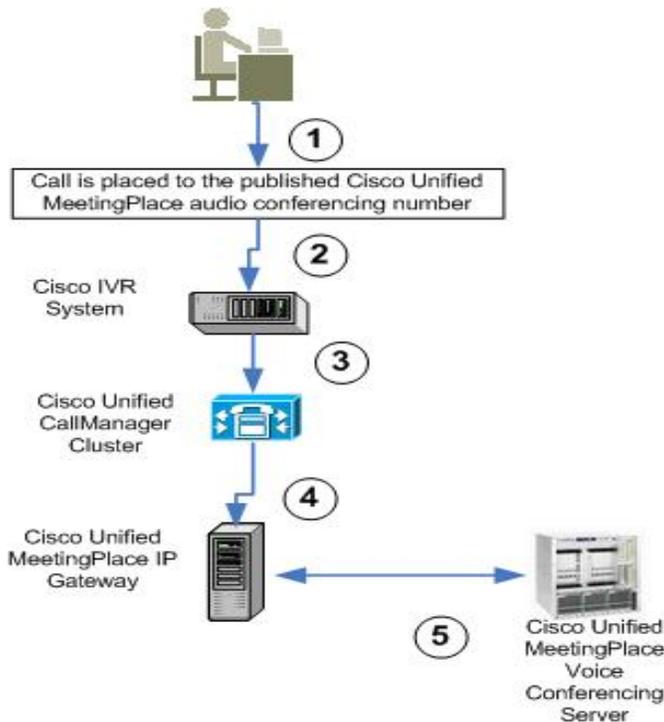


Table 5. Process for accessing standalone voice conferences on Cisco Unified MeetingPlace.

Step	Description
1	Cisco employee, customer, or partner dials the published Cisco Unified MeetingPlace telephone number.
2	The call is directed to the Cisco IVR system, which prompts the caller to enter the Cisco Unified MeetingPlace ID and their name.
3	The Cisco IVR system automatically directs the caller to the Cisco Unified CallManager cluster that is nearest to the Cisco Unified MeetingPlace voice conferencing server hosting the requested meeting.
4	A Cisco Unified MeetingPlace IP gateway (configured on one of the Cisco Unified MeetingPlace Web servers in a cluster) provides an interface between the Cisco Unified CallManager and the Cisco Unified MeetingPlace voice conferencing server.
5	The user is connected to the Cisco Unified MeetingPlace voice conferencing server that is hosting the requested conference call.

Profile Automation and User Authentication

Two processes automate user profiles and authentication. The profile automation process captures and stores employee profile information, derived from Cisco employee databases, then forwards that information to the Cisco Unified MeetingPlace Directory Services application on the distributed Cisco Unified MeetingPlace server clusters. All subsequent profile changes are made on a Webpage and propagated automatically across the Cisco Unified MeetingPlace servers. Figure 6 and Table 6 describe this process.

Figure 6. Employees are authenticated by forwarding profiles from internal Cisco databases.

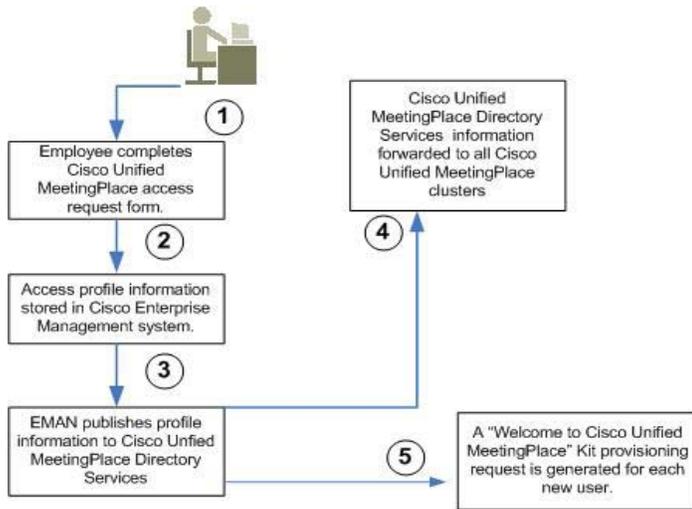


Table 6. Process for authenticating employees to grant Cisco Unified MeetingPlace access.

Step	Description
1	Cisco employee completes a Web-based form to request Cisco Unified MeetingPlace access.
2	Profile information derived from the request form and databases is stored in the Cisco Enterprise Management (EMAN) system. EMAN is a Cisco-developed application that stores network and application profile data.
3	EMAN forwards the user's profile information to the primary Cisco Unified MeetingPlace Web server, located in San Jose, California, for the Cisco Unified MeetingPlace Directory Services database.
4	The access information is forwarded to all Cisco Unified MeetingPlace clusters via the Cisco Unified MeetingPlace Directory Services function.
5	EMAN issues a request to an external vendor to send a "Welcome to Cisco Unified MeetingPlace" kit to the employee. This kit provides various documents on how to access and use Cisco Unified MeetingPlace.

The second process covers user access and login authentication for both internal and external users. In this process, the CA eTrust SiteMinder application provides an interface between Web-based applications such as Cisco Unified MeetingPlace and internal login authentication systems. Figure 7 and Table 7 describe this process.

Figure 7. Employees and guests can use a login process to access a Cisco Unified MeetingPlace conference.

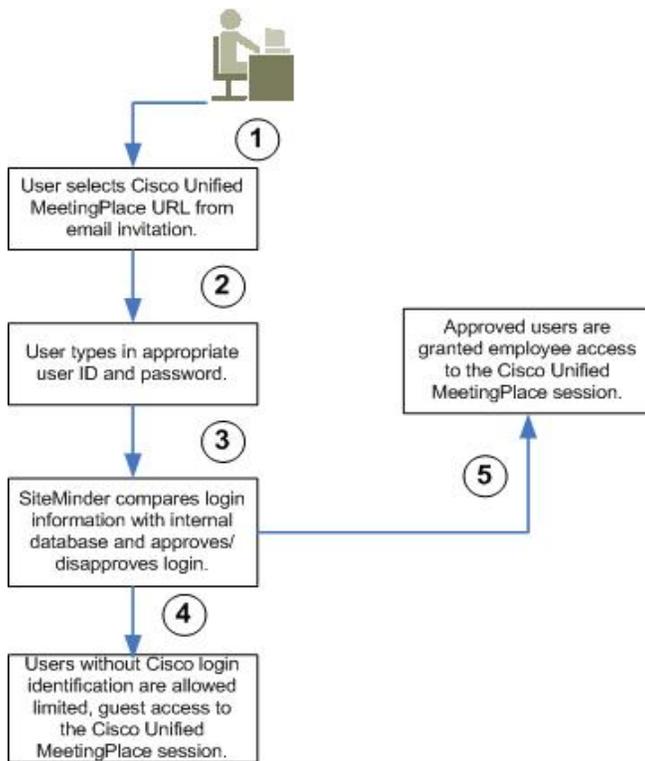


Table 7. Process for login access to a Cisco Unified MeetingPlace conference.

Step	Description
1	User requests access to the Cisco Unified MeetingPlace Web session by entering the URL sent in an e-mail invitation.
2	The Cisco Unified MeetingPlace login page requests a Cisco login ID and password.
3	The CA eTrust SiteMinder application compares the login information with the internal access database and approves or disapproves login access.
4	Non-employees, such as customers and partners, are allowed limited guest access to the requested Cisco Unified MeetingPlace session. Individual Cisco Unified MeetingPlace voice and Web conferences can be additionally secured with a session password.
5	Approved Cisco employees are granted full access (unless limited by session organizers) to the requested Cisco Unified MeetingPlace session.

Standalone voice conference calls can also be secured with a session password, which is managed within the Cisco Unified MeetingPlace system and is configurable by the session administrator.

Pilot Project Goals and Results

Cisco IT ran a pilot implementation from late 2005 through January 2006. Three Cisco Unified MeetingPlace clusters supported 478 registered users. The goals and results of this pilot project are shown in Table 8.

Table 8. Goals and results in Cisco's pilot project for Cisco Unified MeetingPlace implementation.

Goal	Results
Test the stability of the Cisco Unified MeetingPlace server cluster configuration.	The cluster configuration proved to be stable during the pilot.
Ensure the levels of fault tolerance and redundancy met internal service-level agreement (SLA) requirements for availability.	The pilot project proved correct functioning of the active failover capabilities to redundant clusters.
Ensure the integration between the Cisco Unified CallManager and Cisco Unified MeetingPlace systems has sufficient capacity to support expected call volumes.	Capacity was verified as sufficient.
Test the Microsoft Exchange/Outlook scheduling integration with Cisco Unified MeetingPlace.	This integration proved to be a popular feature with users, but generated the most user calls to the help desk (see Lessons Learned section).
Test the voice quality, Web conferencing features and customizations, profile provisioning, notifications, and general application functions.	Identified needed adjustments to certain parameters, such as outbound calls to conference participants.
Test and evaluate processes for applying software upgrades, configuration changes, and customizations.	Upgrades were completed as planned.
Evaluate the effectiveness of user support materials, including the communications plan and deliverables, training materials, and the supporting Website.	Identified changes to product information and training materials that would better support users during the production deployment.
Test and evaluate support processes, response time, and user satisfaction.	Adjusted support processes based on pilot experience. User feedback for the pilot project was very positive.

RESULTS

At the end of the pilot project, an e-mail was sent to all participants asking them to complete a Web-based survey. Seventy responses (15%) were received from the survey. Responses were made on a five-point scale commonly used within Cisco, with a score of 1 equal to least satisfactory and 5 equal to most satisfactory. The overall feedback was very positive, with an aggregate score of 4.1 for all questions. Table 9 presents results of the pilot user survey.

Table 9. Pilot users gave very positive ratings to the pilot program and the Cisco Unified MeetingPlace solution.

Survey Question	Aggregate Response Rating
Overall effectiveness of the pilot program.	4.1
Quality of the e-mail communications and project Website.	4.0
Effectiveness of the learning tools.	3.9
Support tools and assistance.	3.9
Overall satisfaction with scheduling function.	4.1
Overall satisfaction with Web conferencing capability.	4.1

Survey respondents also believe that Cisco Unified MeetingPlace is a more productive tool than the alternative options (Table 10).

Table 10. Survey respondents indicated that Cisco Unified MeetingPlace compared favorably with alternative communication methods.

How would you rate Cisco Unified MeetingPlace against the following alternatives?	Aggregate Response Rating
E-mail	4.0
U.S. travel	3.8
Overseas travel	3.7
Onsite meeting	3.4
Offsite meeting	4.7
No meeting	4.1

“The pilot implementation of Cisco Unified MeetingPlace was a success in two ways,” says Lisa Ashcraft, Cisco IT project manager. “First, the experience helped Cisco IT better prepare for companywide deployment of this new conferencing technology. And second, the positive employee feedback about the system’s functions and the user experience helped us to identify areas for improvement before the production launch.”

LESSONS LEARNED

Based on the lessons learned from the pilot project, the Cisco IT project team developed the following recommendations for other enterprises considering a Cisco Unified MeetingPlace deployment:

Project planning. Several integration tasks were required to implement Cisco Unified MeetingPlace. These tasks included:

- IP telephony integration with Cisco Unified CallManager
- Microsoft Exchange and Outlook connectivity for scheduling
- Cisco Unified MeetingPlace OS server hardening to meet Cisco IT security standards
- User profiling and access authentication
- Provisioning of both intranet and Internet access and the associated requirements for secure access.

Prior to system implementation, Cisco IT highly recommends that enterprises identify and plan all of these integration tasks in detail, and identify and assign subject experts to the implementation teams.

Resiliency. Plan for failure and ensure that adequate failover systems are in place and accessible.

User interactivity. Create written plans and diagrams of all user activity, including scheduling, launching, and using the applications via Web URLs and telephone numbers, and accessing post-meeting resources such as recordings. Test these process plans with a small group of pilot users to ensure that all required integration elements have been identified.

Support and training. Include the support and training team members in all system planning and user interactivity meetings to ensure deployment of proper support processes and training resources. The integration of Microsoft Exchange/Outlook with Cisco Unified MeetingPlace conferencing was a very popular feature with users. However, because it was a new capability, it also generated the highest percentage of user calls to the help desk during the pilot. As a result, the project team modified user materials and support procedures to better address common questions about this feature.

Internet point of presence (POP) bandwidth. Estimate the amount of Internet-based conference usage and ensure that Internet POP circuits have adequate bandwidth. Also ensure that adequate physical space and power is available for hardware systems that may be needed at POP locations.

NEXT STEPS

Cisco IT began a companywide implementation of the Cisco Unified MeetingPlace solution in February 2006. The pilot implementation of three clusters was expanded to a production model of seven Cisco Unified MeetingPlace clusters, installed at four locations around the world, with two additional failover clusters for backup.

Internal users are migrating to the new Cisco Unified MeetingPlace deployment in phases:

Phase 1: Pilot users and employees using other Web conferencing products.

Phase 2: Administrative assistants and employees using voice-only Cisco Unified MeetingPlace services.

Phase 3: Availability for all Cisco employees.

After Phase 3, Cisco IT will introduce multipoint video capabilities to the existing voice and Web conferencing infrastructure. This will allow video participants to use Cisco Unified Video Advantage and room-based group videoconference systems to participate in an integrated voice, Web, and video Cisco Unified MeetingPlace session. Other integration steps planned for the future include applying periodic application upgrades, providing instant messaging integration, and providing meeting access and scheduling via Extended Markup Language (XML)-based applications on Cisco IP phones.

FOR MORE INFORMATION

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NOTE

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