

How Cisco Migrated to Cisco Unity Connection on Cisco Unified Computing System

Cisco gains more user capacity with fewer servers by migrating to new voicemail system and new computing platform at the same time.

Cisco IT Case Study/Unified Communications/Cisco Unity Connection on Cisco Unified Computing Services: This case study describes how Cisco IT migrated from Cisco Unity®, running on Cisco® 7800 Series Media Convergence Servers, to Cisco Unity Connection, running on Cisco Unified Computing System™ servers. This change gives Cisco the benefits of reduced costs from a smaller voicemail infrastructure and easier system management. Employees also benefit from new options for accessing and managing their messages. Cisco customers can draw on Cisco IT's real-world experience in this area to help support similar enterprise needs.

CHALLENGE

A key Cisco IT strategy is to make virtualization a foundation of new server deployments in the data center. This strategy allows Cisco to obtain benefits such as lower costs by using fewer physical servers, scalable virtual server capacity, improved redundancy for application availability and disaster recovery, and simpler server implementation and management.

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– David Neustedter, Unified Communications Design Engineer, Cisco IT

Virtualization was a factor as Cisco IT considered upgrading its Cisco Unity voicemail system to support more than 87,000 user mailboxes and take advantage of new user features. Cisco IT also wanted to significantly reduce the number of voicemail servers, which would reduce both capital and operational costs.

SOLUTION

To meet the goals for scalability and user features, Cisco IT decided to migrate from Cisco Unity 7.0(2) to Cisco Unity Connection 8.5. Although an upgrade to Cisco Unity 8.0 would have supported the required number of users, this deployment would have needed more nodes than

a comparable CiscoUnity Connection implementation.

At the same time, Cisco IT replaced the physical Cisco 7800 Series Media Convergence Servers (MCS) that previously hosted the Cisco Unity software with virtual servers, running on the Cisco Unified Computing System (UCS)platform.

Implementation Design

Cisco has implemented Cisco Unity Connection on 16 networked nodes using 32 active-active virtual servers,the maximum system configuration. For the Cisco San Jose, California headquarters site, each of the deployed nodesupports up to 20,000 users.

The remaining nodes are located around the world to avoid the latency that could exist if the servers had to connect over long distances. This deployment design means that a few nodes are installed in local-office network closets instead of a data center, and a few other nodes are in service provider racks located in Internet data center hubs.

For local-office closets, the virtual servers are implemented on Cisco UCS C-Series rack-mount servers with built-in storage. In data centers, the virtual servers are implemented on Cisco UCS B-Series blade servers with connections to external SAN storage.

The active-active design allows both servers in a pair to answer calls and process client requests on up to 512 ports simultaneously. The servers provide backup to each other by replicating messages and directory information immediately and by supporting the same maximum of 20,000 users when one server goes offline.

Before the migration, Cisco IT supported voicemail service for 87,000 voicemail boxes with 174 production MCS hosts and 28 additional MCS hosts in the stage (pre-production) environment in our data centers

worldwide. The MCS host servers consisted of:

- 79 production Cisco Unity servers in 41 nodes; each node contained a primary and a secondary failover pair (one server supported two nodes).

EXECUTIVE SUMMARY	
CHALLENGE	<ul style="list-style-type: none"> • Cisco IT wanted to upgrade its voicemail system and increase use of virtual servers.
SOLUTION	<ul style="list-style-type: none"> • Simultaneous migration to Cisco Unity Connection 8.0 and Cisco UCS servers.
RESULTS	<ul style="list-style-type: none"> • Reduced costs and operations demand with 80 percent fewer physical servers. • Simpler voicemail system design and management. • Faster and simpler migration process. • New user options for accessing and managing messages.
LESSONS LEARNED	<ul style="list-style-type: none"> • Migrate to Cisco Unity Connection and Cisco UCS at the same time, as a cutover. • Use server configuration templates and Cisco tools for migrating users and messages. • It may not be necessary to transfer all distribution lists. • Develop contingency plans.
NEXT STEPS	<ul style="list-style-type: none"> • Prepare for supporting video mail messages.

- 63 Microsoft Exchange servers to store the voicemail messages.
- 32 Microsoft Active Directory domain controllers to support user authentication for voicemail access.
- 20 Cisco Unity stage servers and 8 Active Directory stage controllers.

After the conversion to Cisco Unity Connection, the global voicemail service is supported on 16 nodes, implemented on 30 discrete UCS rack servers or blades running VMware ESXi 4.1. (One server is running two instances of Cisco Unity Connection, for a total of 16 virtual server pairs.)

Each node consists of two virtual servers operating in an active-active configuration. At larger sites, where each virtual server supports up to 20,000 users, the physical blade server is dedicated to a single virtual machine, running Cisco Unity Connection on VMware. At smaller sites, where each virtual server needs to support only a few thousand users, the virtual server running Cisco Unity Connection shares the blade with other virtual machines.

Migration Process

Cisco IT used the following process for the migration from Cisco Unity to Cisco Unity Connection:

1. Cisco IT set up the new Cisco Unity Connection on the UCS servers while they were offline. This step meant that the new installation was ready to go when the selected time window began for the voicemail service cutover.
2. To begin the cutover, Cisco IT staff initiated a "switch version" process, which synchronized the subscriber database from Cisco Unity to the new Cisco Unity Connection partition, then started the new Cisco Unity Connection software.
3. When Cisco Unity Connection became active, the IT staff shut down the old Cisco Unity system. This changeover process was transparent to users.

Cisco Unity Connection and Cisco Unified Communications Manager share the same Linux Unified Communications operating system, as well as similar underlying technologies and tools, which simplifies implementation and ongoing management by unified communications teams.

"We learned from a previous migration that doing it in phases creates too many opportunities for human error, such as setting up call routing incorrectly," says David Neustedter, Unified

Communications design engineer for Cisco IT. "Because we did so much work in advance, we felt the flash cutover presented less risk of disruption to our operations and users. If our first attempt at the cutover didn't work, we could just switch the voicemail service back to the old environment."

PRODUCT LIST

Unified Communications

- Cisco Unity Connection
- Cisco Unified Communications Manager

Unified Computing and Servers

- Cisco UCS B-Series Blade Servers
- Cisco UCS C-Series Rack-mount Servers

The migration team started migrating user voicemail accounts and core auto-attendant functionality to the new infrastructure about a month before the cutover. Using the Cisco Unity Connection API, the team wrote Perl scripts to automate migration tasks such as server partitioning, which saved a large amount of time and effort during the migration project.

The migration to Cisco Unity Connection also simplified the implementation design for auto-attendant capabilities. The previous deployment of Cisco Unity required separate call and directory handlers for each language supported at each site. With Cisco Unity Connection, the design is streamlined for multilanguage support, which means Cisco IT maintains far fewer auto-attendant call handlers.

RESULTS

With the combination of Cisco Unity Connection and Cisco UCS, Cisco IT now uses only 30 physical servers to support voicemail services and four UCS hosts for stage testing. By replacing 202 production and stage servers running Cisco Unity 7.0(2) with 34 UCS servers running Cisco Unity Connection, Cisco IT reduced the number of servers to install, support, power, and manage by over 80 percent. It also resulted in an eight-fold decrease in the amount of server power required.

"Although Cisco Unity can also run on Cisco UCS, Cisco Unity Connection offers double the scalability, meaning each node can handle up to 20,000 voicemail subscribers," says Neustedter. "For example, in San Jose, we were able to go from eight Cisco Unity nodes to two Cisco Unity Connection nodes and still have the capacity for more users."

"The upgrade to Cisco Unity Connection also allows us to stop using Microsoft Exchange servers to store voice messages, which itself cut the number of servers by about half," says Neustedter. "And our migration to virtual servers reduces the number of physical servers even more, while it also makes voicemail services more fault-tolerant and resilient."

Operational Benefits

Cisco IT has realized several benefits from running its voicemail services on Cisco UCS servers:

- Ability to handle a much larger call volume than before, because the voicemail servers work in an active-active configuration.
- Simpler upgrade and support process, because Unity Connection allows systems to be run during an upgrade and because upgrades are much faster.
- Deployment flexibility and scalability with simpler support for the voicemail infrastructure, because Cisco provides both the hardware and software.
- Lower total cost of ownership (TCO) and operations with simpler server installations, upgrades, and backups.
- Server consolidation reduces needs for rack space, power, cooling, cabling, and management (see Table 1).
- More effective business continuity and disaster recovery, because both servers are always active and processing voicemail calls, and a new server can be installed easily when needed.

Table 1. Before-and-After Data for Cisco Voicemail Environment

Cisco Voicemail Solution	Before: Cisco Unity 7.0 on MCS servers	Today: Cisco Unity Connection 8.0 on Virtual Servers on Cisco UCS
Number of physical servers	<p>202 Total Servers:</p> <p><u>174 Production hosts</u> 79 Production Cisco Unity Servers 41 nodes 63 Exchange servers for Cisco Unity 32 Active Directory controllers</p> <p><u>28 Stage Hosts</u> 20 servers for stage environment 8 Active Directory controllers</p>	<p>34 Total Virtual Servers on UCS:</p> <p><u>30 Production UCS hosts</u> 16 nodes</p> <p><u>4 Stage UCS hosts</u> Shared with other test servers</p>
Number of voicemail boxes	87,000	87,000
Power required for Production Servers	<p>58.8 KW</p> <p>For 174 MCS 7845 i2s Power draw 338 W under 50% load (measured in data center tests)</p>	<p>6.9 KW</p> <ul style="list-style-type: none"> - For 13 UCS B 200 M1-series blades - 247 W under 50% load - For 17 UCS C-210 M1 servers – 206 W for full chassis under 50% load

The active-active server design for Cisco Unity Connection on the Cisco UCS virtual servers proved highly reliable during lab testing, with no service outages. "From a pure management perspective, the transition to Cisco UCS is a dream. It simplified my lab administration by at least 100 percent because of faster software upgrade processes for Cisco Unity Connection on the individual servers," says Neustedter.

He continues, "As an IT guy, I can say unequivocally that I would always deploy applications on UCS servers if I had any choice in the matter at all. Deploying Cisco Unity Connection on UCS is much faster compared to deploying Cisco Unity on the MCS hardware we used previously."

Cisco Unity Connection on UCS is more stable and easier to maintain. With the reduced infrastructure, coupled with the Cisco Linux appliance not allowing customization at the operating system level, fewer opportunities are available for misconfiguration or incident. "The

dual partitions in the Linux appliance allow us to install new application versions while minimizing any user-impacting downtime," says Neustedter. "We can install the upgrade in the secondary partition of the servers in advance, then switch from the secondary to the primary partition when we want to trigger the upgrade."

The new voicemail infrastructure means Microsoft Exchange servers are no longer needed to store voice messages. Previously, a team of system administration engineers supported this deployment, which did not have the redundancy necessary for a high-availability service. When an Exchange server failed, the voicemail service could experience a lengthy impairment (reduced networked messaging capabilities), because recovering that server was a slow and complex process.

In the new Unity Connection environment, Cisco IT has been able to eliminate the Exchange servers dedicated to the voicemail service. Instead, voice messages are maintained in a high-availability configuration, whether in the local storage provided by the Cisco UCS server or in the attached SAN storage in a data center. And with the active-active configuration, losing a UCS server no longer means any impairment to the voicemail service or any loss of user messages because one server in the pair simply takes over for the other.

User Benefits from Cisco Unity Connection

Cisco employees also benefit from the upgrade to Cisco Unity Connection, with new capabilities for:

- Accessing voicemail via the web using a wide variety of browsers and operating systems, including Microsoft Internet Explorer, Firefox, or Google Chrome running on Microsoft Windows, Apple Mac OS X, or Red Hat Enterprise Linux.
- Retrieving and responding to voicemail messages by using integrated voice recognition, features that are especially useful for hands-free use of a mobile phone while driving.
- Gaining a platform for eventual migration to a single, unified inbox to view both email and voicemail messages. Cisco IT can also consider supporting Cisco SpeechView, which allows users to see text transcripts of voicemail messages, even when they are away from their phones, or to be able to click to hear the audio message. Users can then reply or forward these messages securely from the single inbox; text transcripts are

available for 30 days.

- Receiving Visual Voicemail messages as an RSS feed on mobile smartphones.
- Integration with Cisco Quad™ using a voicemail portlet.

LESSONS LEARNED

Cisco IT learned the following lessons from its simultaneous migration to a new voicemail system and computing platform.

Migrate to Cisco Unity Connection and Cisco UCS at the same time. This strategy simplifies the upgrade process and helps to capture cost savings, especially for server replacement.

"It's much easier to install the new UCS hardware first and upgrade to Cisco Unity Connection later, than to upgrade to Cisco Unity Connection first and later try to migrate it to new UCS servers," says Neustedter.

Prepare the new infrastructure separately, then perform the migration as a flash cutover.

Because the Cisco Unity Connection software can be installed and tested on the Cisco UCS servers before they are activated in production, a gradual, node-by-node transition is not needed.

Use configuration templates. The flexibility of a unified computing environment can create unintended issues when installing applications on the virtual servers. For successful implementation, diligently follow the templates provided with Cisco Unity Connection for both the Cisco UCS and virtual server configuration.

Continue configuring employee phone numbers on specific voicemail nodes. However,

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with fewer nodes, this configuration is much simpler to enter and provides less opportunity for error. Cisco IT needed to assign only two access numbers to employee phones for calling the Cisco Unity Connection servers.

It is not necessary to segregate user access calls

from the secondary server. Instead, all calls to a Cisco Unity Connection system can go to a common pool for answering by either of the active-active servers. This design also reduces configuration complexity on the associated Cisco Unified Communications Manager.

Use the Cisco tools for migrating users and their messages. However, it may not be essential to transfer distribution lists to the new system. "We found that only about 600 distribution lists were actively used, out of a total of more than 75,000 that had been created," says Neustedter. "Although users will have to re-create their distribution lists on Cisco Unity Connection, this is a small inconvenience compared to the large effort that would be required to transfer the lists from the previous system." The Cisco tools (found by searching for "Cisco Unified Backup and Restore Application Suite", or COBRAS) provided with Unity Connection also allowed the migration of user account settings and preferences, which saved a significant amount of time and effort.

Develop contingency plans. While deploying the new UCS servers, Cisco IT experienced a delay in accessing one of the planned node sites. To mitigate this delay, the servers were configured at another location so they could be shipped and installed once the site was accessible. Plans for network rerouting are also important to consider for mitigating a long-term disruption (e.g., from a natural disaster) at a voicemail node location. As another measure to support disaster recovery, Cisco IT deploys the servers in each UCS pair in separate buildings wherever possible.

NEXT STEPS

Cisco IT will begin preparations for supporting new 64-bit platforms for greater speed and scalability, as well as supporting SpeechView (voice transcriptions), integrated voicemail, and email boxes. The new UCS infrastructure will also support upgrades to new Cisco Unity Connection releases in the future.

FOR MORE INFORMATION

For information on Cisco Unity Connection and Cisco Unified Computing Solutions, and on UC on UCS deployments, visit:

- www.cisco.com/go/Unityconnection
- <http://www.cisco.com/go/unifiedcomputing>
- <http://www.cisco.com/go/uconucs>

The Cisco on Cisco blog contains posts on unified communications and unified computing topics: <http://blogs.cisco.com/category/ciscoit/>.

For additional Cisco IT case studies on a variety of business solutions, visit Cisco on Cisco: Inside Cisco IT www.cisco.com/go/ciscoit.

NOTE

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