Cisco IT Brief
Collaborate Anywhere, Anytime. On Any Device– At Less Cost

Cisco's most valuable asset is our people—75,000 as of 2017. We often work in teams that span countries and continents. A product launch team, for instance, might include people from San Jose, Bangalore, and London. Making it simpler for our people, partners, and customers to collaborate accelerates innovation. Leads to better decisions. Lowers training costs. And improves the customer experience.

Over the years we've continually improved collaboration with people inside and outside the company, whether they're down the hall or across the world. The goal: collaborate from anywhere, on any device, at any time. Along the way, we've found ways to save millions of dollars monthly on communications costs. The complete story of our collaboration journey to date could fill a book; here are some highlights.

Starting Our Journey by Converging Voice, Video, and Data Networks (2001-2002)

Until 2001, we maintained separate networks for voice, video, and data. Most offices had their own private branch exchange (PBX) or key system plus a voicemail server. In 2001, we started our journey to IP telephony by replacing PBX systems connected to telephone company lines with Cisco CallManager (now Cisco Unified Communications Manager) servers connected to our IP network. We removed hundreds of long-distance voice circuits. Voice traffic traveled over our existing data network, and we took precautions to protect voice quality.

At first, we swapped out each PBX or key system for a server—a one-for-one replacement. Benefits included:

- Simpler collaboration with coworkers in other offices. Suddenly we could simply dial an extension—not a country code, area code, and phone number.

- Savings of $10 million in 2002 alone. About $6 million of that came from eliminating the separate voice network. The remaining $4 million came from toll bypass. Calls between Cisco offices travel over our WAN, bypassing the public switched telephone network (PSTN) entirely. Calls to other locations travel over our WAN to a Cisco office near the destination, and only then hop off to the PSTN. This technique is called tail-end hop off. We're constantly optimizing tail-end hop off, and in 2017 we had 59 hop-off locations around the world. Read that story here.

- Simpler troubleshooting. Getting rid of PBX systems meant we no longer had to painstakingly trace every phone to its connection in a tangled wiring closet.

- Elimination of fees for telephone extension moves, adds, and changes (MACs). Employees who move to a new desk or new building can simply pick up their IP phone and connect it in the new location. The phone reregisters automatically. Service providers charge $75-$200 for each MAC. So if 100 people move down the hall, we saved $20,000—just like that.

- Lower building construction costs. Not having to add a separate voice network in new buildings saves $150 to $200 per port. From 2000 to 2001, savings amounted to $2.33 million for 18 new buildings in the U.S.

- Elimination of PBX maintenance costs. In 2002 we saved $1.45 million annually in the US alone.

- Lower server costs for voicemail. Switching from third-party voicemail servers to Cisco Unity voicemail on Windows servers saved $6.4 million in 2003.

What did we do with all that found money? "Every year Cisco IT wants to do 10 things, the business wants us to do another 20, and we have budget for 5," says Rich Gore, Cisco IT manager and Cisco IT Distinguished Engineer. "Every dollar we save on equipment and staff resources is a dollar we can spend on IT innovation to support the business."

Saving $4 Million Annually by Centralizing the Architecture

When we started out with IP telephony, we installed a pair of voice servers in each building—35 pairs on the San Jose campus. That's a lot of servers to manage and maintain. So in 2003 we began centralizing our voice servers. Now a single Cisco Unified Communications Manager cluster serves multiple Cisco buildings—sometimes in different cities. If you place a local call from a Cisco building that doesn't have its own cluster, the call goes out over the PSTN through a Cisco gateway. Long-distance calls go to the cluster and then out to our WAN.

We gradually consolidated from two servers in every office to just 13 Cisco Unified Communications Manager clusters worldwide. That move saves us $4 million annually on equipment, management, and data center space, power, and cooling.

Saving More by Moving Unified Communications to Cisco UCS Servers

In 2011 we moved Cisco Unified Communications Manager from physical servers to virtual servers running on Cisco Unified Computing System (UCS) servers, as described in this case study. Consolidating from 574 to 191 physical servers slashed capital and operational costs:

- 67 percent fewer servers

- 84 percent less power and cooling consumption

- 87 percent less space and cabling

We multiplied the savings by also moving Cisco Unity voicemail (story here) and Cisco Unified Contact Center from physical servers to virtual machines running on Cisco UCS (story here).

Adding On: Richer Collaboration (2003-2004)

After converting offices to IP telephony, we gradually introduced new capabilities that weren't available on existing PBX systems:

- Extension mobility. Logging into any IP phone in any global office customizes it with our phone number, speed dials, etc. Now it's much easier to collaborate with team members who travel.

- Cisco Unity unified messaging: Voicemails appear in our email inbox as attachments that we can play back in any order. We don't have to separately check email and voicemail, which means we often hear urgent messages sooner.

- Cisco IP video phones: People on distributed teams like being able to associate a face with a name. Video also helps to make communications more accurate, especially when people on a call aren't native speakers of the same language. With Cisco IP video phones, making a video call is exactly the same as making a voice-only call. We just dial the other party and, if they also have a video endpoint, video starts up automatically.

- Cisco IP wireless phones. Some employees work on campus but are rarely at their desks—Workplace Resources employees, for instance. They receive wireless IP phones so that people can reach them anywhere on campus by dialing their office number.

In 2008 we introduced presence. Beside each name in the directory we can see which phones and other devices the person has available, whether the phone is busy, and which device they prefer. Imagine a salesperson meeting with a customer and needing a quick answer about a feature. Instead of calling one number after another trying to reach the expert, the salesperson can reach the person on the right device, the first time.

Teleworker Solution: 2008

All Cisco employees work from home occasionally. Most of us use the Cisco AnyConnect VPN client and Cisco Spark for voice calls. More than 28,000 Cisco employees work from home offices about three days a week. They receive our teleworker solution: a Cisco IP phone or Cisco DX video phone and a Cisco Virtual Office (CVO) router. When we call coworkers from the online directory, we can't tell whether they're in a corporate office or home office. The experience is identical.

Collaborating from Anywhere with Cisco Connected Workplace: 2008

Cisco teams often include people in different time zones, so we sometimes join calls from home at, say, 6:00 a.m. or 10:00 p.m. By 2008, more employees worked non-traditional hours. As a result, offices and cubicles were vacant about 65 percent of the time. That meant we paid too much for office space. At the same time, meeting rooms were in short supply. We decided to redesign our floor plan.

Today we have Cisco Connected Workplace buildings on campuses around the world. The buildings include spaces for planned and spontaneous meetings for large and small groups, as well as communal work areas and private rooms. People work wherever it makes sense—for a few minutes or all day. We connect their laptops over Wi-Fi and collaborate using Cisco Spark or by logging into a nearby Cisco phone or video phone. We can also join Cisco TelePresence session. We can even reserve a space and log into the phone from a mobile app before we arrive.

The Connected Workspace design significantly reduces real estate and furniture costs, as described in this case study. And being able to collaborate from anywhere improves business resilience. If we can't get to our usual office, we can work from another Cisco building, home, or anywhere else with a good wired or wireless connection. Business isn't interrupted because of weather, building problems, disasters, pandemics, or a sick family member.

Richer Meetings with WebEx: 2008

Group collaboration became richer and easier when we introduced Cisco WebEx. Instead of dialing into a conference bridge, meeting participants click a button to join a web collaboration session combining voice, video, and screen sharing. Everyone in the session can see each other's names and who is talking, and send group or private messages.

Employees like seeing who joined a call instead of just hearing a beep signaling that someone had joined. Trainers share presentations with large groups—recording the entire session (voice, video, and screen sharing) for people who miss the session or are hired later. Sales teams with people in different offices meet with customers with people in different offices. Marketing teams conduct webinars. Helpdesk agents ask callers to share their screens, which speeds up troubleshooting. Schools and universities use WebEx for distance learning.

Over time, more teams have started turning on their laptop video cameras during WebEx sessions. Video improves communications because we can see if someone is puzzled, for example, and whether they've finished speaking or just taking a breath. Many of us join WebEx sessions from mobile devices—say, if we're at the airport or in an Uber.

As a cloud service, Cisco WebEx takes very little effort from IT. We don't have to manage on-premises infrastructure or client software.

In-person meeting experience, with Cisco TelePresence (2008-2009)

Some types of interactions require an in-person meeting. Contract negotiations. First-round interviews for high-level jobs. Executive strategic planning sessions. Previously we traveled for these meetings. Airfare and travel costs mounted. Meetings were delayed for days or weeks until everyone could clear their calendars for travel.

In 2008, we introduced Cisco TelePresence, a breakthrough that provides an in-person experience over the network. We built dedicated telepresence rooms in offices around the world, with ultra-high-definition monitors, high-fidelity audio, and conference tables that appeared to complete the conference table on the other side of the connection. We see life-size video images of the other participants. We can hear them and see nuanced facial expressions as if they were seated three feet away—not on the other side of the world. The experience seems so in-person that people sometimes forget that it's not—and try to shake hands with someone in another room. Some of our customers use Cisco TelePresence to connect their customers to experts in other locations, such as a mortgage specialist (financial institution), home-improvement advisor (retailer), interpreter (healthcare), or traffic court judge (local government).

November 2017

Telepresence initially required a big effort from IT. We used QoS to give priority to telepresence traffic, and Call Admission Control to only allow a new session if sufficient bandwidth was available. Today, our offices have enough bandwidth to consistently deliver outstanding video quality. As of 2017, we have almost 300 large three-screen immersive Cisco TelePresence endpoints, 4900 TelePresence systems in meeting rooms, and 27,000 personal desktop TelePresence units in campuses, branch offices, and home offices.

In 2017 we made scheduling easier, using Cisco Collaboration Meeting Room (CMR), a WebEx feature. Now the meeting organizer doesn't have to specify the precise Cisco TelePresence system an invitee will join from. We can spontaneously move to a different conference room and join from whatever system is available. No need to reissue the invitation if someone moves.

BYOD: 2009

When the iPhone and Android arrived, Cisco employees bought them for personal use, loved them, and wanted to use them for work. We created a formal BYOD program as part of our "Any Device, Anywhere, Anytime" strategy (story here). To make security consistent on any device, we used the same security architecture for personal devices that we already had in place for company-owned wired and wireless devices. Employees can use supported personal devices for every activity allowed on company-owned devices—voice, email, and even connecting to applications in our data centers.

Our BYOD program eliminated or reduced costs for company-owned smartphones and mobile service plans. An automated registration process keeps support costs down.

Virtual Rooms: 2015

Collaboration extends to writing (emails, posts, texts) as well as voice and video. Instead of trying to keep track of project-related emails, more and more teams are collaborating in Cisco Spark virtual rooms, a cloud service. When Cisco TAC opens a case, for example, they create a Spark virtual room where engineers and the customer can post, upload documents, draw on a whiteboard, start voice and video conversations—24 hours a day. All room members are notified whenever anyone enters or leaves the room or uploads a document. Spark preserves a record of comments, uploads, and shared links, which means that means new TAC engineers can see everything that happened before they came onboard.

Developer teams also collaborate in Spark virtual rooms. Our developer teams even integrated Spark with their DevOps tools so that the tools push notifications into the room—when an hours-long test completes, for example. Engineers receive a Spark notification on all of their devices whenever a new message arrives, whether from a person or a DevOps tool.

Since Spark is a cloud service, it requires little effort from IT. Like WebEx, it requires no infrastructure and no client software.

Lessons Learned

- Centralize Cisco Unified Communications Manager, delivering voice service to multiple buildings through one cluster. Adding features, speed dials, and security updates becomes simpler when you can do it in fewer places.

- Conduct a full PBX port audit. When we did this we discovered many devices we were unaware of, such as modems and fax machines. A port audit is also an opportunity to clean up your number plan.

- Create a reference architecture.

- Develop standards for QoS to support voice and video before you begin the transition to IP telephony.

- Develop a training plan for staff before you start.

November 2017

Learn More

Here are some articles about the collaboration solutions mentioned in this article:

[A Wider View of Collaboration and Its Benefits](#)

[Cisco Collaboration Meeting Room (CMR) Cloud](#)

[Integrating DevOps Toolchains with Cisco Spark](#)

[Cisco Unified Communications](#)

[Cisco TelePresence](#)

[Migration to Unity Voice Messaging](#)

[Journey to Collaboration (Spanish)](#)