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Office Design Case Study: How Cisco Designed the Collaborative Connected Workplace Environment

Optimized workplace reduces real estate costs and boosts employee productivity and satisfaction.[Back to abstract](#)

BUSINESS CHALLENGE

Cisco Systems® employees work differently than they did as recently as a few years ago. An increasingly global workforce and customer base makes it more likely that employees need to work at nontraditional hours, such as 6:00 a.m. or 10:00 p.m., leaving their offices vacant at other times. More complex business and technology issues increase the need for collaboration with team members in the same building or at various sites worldwide. Employees are often away from their desks, in meetings or workgroup discussions. "Even Cisco employees who work on site are likely to be mobile within the building," says Christine Ross, manager in the Workplace Effectiveness Team for Cisco Workplace Resources (WPR), the Cisco® group in charge of real estate.

Like most companies, however, Cisco designed its office space under the traditional assumption that employees would work in their own cubicles during regular work hours and would need assigned work spaces with their own desks, PCs, and phones. The result was that meeting rooms were often in short supply, while offices and cubicles remained vacant 65 percent of the time on average. Most employees had cubicles; only those managers with eight or more employees (direct reports) have private offices. "The work environment we've been building is not necessarily what employees need," says Ross.

"Nobody would consider building a manufacturing facility that they intended to use just one-third of the time," says Mark Golan, Cisco vice president for WPR. "And yet that's what we routinely do with workspace. We realized that assigning resources based on utilization would significantly reduce Cisco real estate costs."

Cisco WPR resolved to build a work environment based not on titles, but rather on the needs of individuals, by giving all employees a broad choice of workspaces and technology tools to do their jobs. "In college, a professor doesn't say, 'Complete this project from 9:00 a.m. to 5:00 p.m. in the library,'" says Dolly Woo, Cisco workplace strategist. "Rather, you're given a task and a deadline, and how you complete that task is up to you. We had the same vision for Cisco. Employees would have the freedom to choose their environment based on the requirements of their current task." By creating a "connected workplace," as the team dubbed the project, WPR hoped to achieve measurable business benefits such as reducing real estate costs, in addition to increased productivity and employee satisfaction.



Figure 1. Movable Furniture Makes Collaboration Easier

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EARLIER SUCCESS WITH SHARED WORKSPACE

Cisco had previous success with the concept of shared workspace: "During our rapid growth periods we had no choice but to share workspace because we couldn't acquire new space fast enough," says Ross. In the Stockley Park, London location, for example, the ratio of employees to workstations was six to one. And in most of its sales offices worldwide, Cisco IT retained the same physical cubicles but did not assign them to specific employees. In any cubicle employees could log on to an IP phone as their own using the Extension Mobility feature of Cisco CallManager servers.

Buoyed by the success of shared workspace in Cisco sales offices, WPR wanted to extend it to other Cisco facilities. The goals were to increase the number of employees in the office without increasing real estate costs, and to create a more productive and pleasant environment than that afforded by traditional cubicles. WPR decided to create a proof of concept in San Jose's Building 14.

REQUIREMENTS FOR A CONNECTED WORKPLACE SOLUTION

Cisco employees are increasingly mobile and less and less working at a particular desk. Therefore, WPR's vision was to support the new mobility of employees with technologies such as wireless and the mobility features of Cisco IP Communications technology. The new environment would enable them to choose any workspace for as long as they needed it, less than an hour or all day. For its proof of concept, WPR drafted the following requirements:

- Encouraging collaboration. The floor plan would provide spaces for both planned and spontaneous meetings (see Figure 1) and for small and large groups. Technologies that encourage collaboration over distance include Cisco VT Advantage for video telephony, Cisco Meeting Place for audio- and videoconferencing, interactive white boards, instant messaging, e-mail, and voice mail. Other technologies that encourage collaboration within an onsite meeting room include portable or mobile videoconferencing units.
- Reducing real estate costs. By designing a space without assigned seating, two-thirds of which is vacant at any given time, Cisco could comfortably assign more people to the same size building. The building used for the proof of concept could accommodate 140 employees compared to the 88 who would be assigned to the same space in a traditional Cisco building. Real estate costs would drop by 37 percent.
- Reducing infrastructure costs. A wireless environment requires less cabling, one of the most expensive infrastructure components, and fewer wall jacks, which cost \$200 each. In addition, the resulting reduction in the number of switch ports would free up space for other switch resources, such as blades for security, content caching, or additional infrastructure applications.

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- Other switch resources, such as blades for security, content serving, or additional infrastructure applications.
- Accommodating different work styles. WPR would design a workspace with a variety of seating options instead of a single assigned seat for each employee. Throughout the day, employees would select an appropriate environment to accomplish the task at hand: meeting in a group, participating in a conference call, or working alone on a spreadsheet or project plan. Enabling technologies for the various workspaces include wireless LAN and Cisco IP Communications (most notably Extension Mobility), Cisco IP Communicator, and Cisco Unity® voice mail (see Figure 2).



Figure 2. Using Bluetooth Headsets, Cisco IP Communicator, and Wireless LAN Connectivity to Attend a Conference Call from the Break Room

[Click on Image to Enlarge](#)

WORKPLACE EFFECTIVENESS PROOF OF CONCEPT

Preplanning

WPR created the Workspace Effectiveness project with the assumption that each of four categories of workers at Cisco—engineering, sales, call center, and general administration—has a distinct set of needs for space, services, technology, support, and policies and procedures. WPR supported its assumption with studies by Cisco and other technology companies concluding that collaborative groups accomplish more than individuals.

Specifically, WPR designed the proof of concept to test the hypothesis that a flexible, collaborative workspace could improve productivity and increase employee satisfaction while reducing real estate space and costs by increasing user density. WPR assembled a team of specialists not only in IT, human resources (HR), and workplace resources, but also cultural anthropology, architecture, design, psychology, and sociology. Metrics for success would include cost savings, improved productivity, and increased employee satisfaction. Cisco IT's role would be to provide the tools to enable mobility and enhance collaboration among global teams.

Cisco and WPR regarded the proof of concept as an experiment to determine the environments that work best for different employees under different circumstances. The plan was for continual improvement as the team learned more.

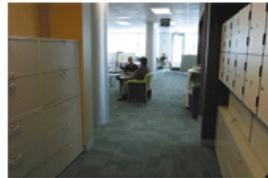


Figure 3. Storage in Large Filing Cabinets (Left) and Personal Lockers (Right)

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Volunteer Recruitment

WPR began by recruiting general administration workgroups to volunteer to relocate to the proof-of-concept building, Cisco's Building 14. Volunteers included the WPR group itself, the Cisco on Cisco IT infrastructure team, part of the Cisco Internet Business Services Group (IBSG), and the HR Creative Learning Studio. Total participants numbered 140 and included individual contributors as well as vice presidents, directors, and managers.

Planning

To assess employee workspace needs, WPR conducted focus groups, employee interviews, surveys, and observations. "We worked through representatives from each workgroup that we identified as technology change leaders," says Lyle Rochon, Cisco IT manager. "They brainstormed requirements from their respective teams and brought them into our focus groups." A frequently mentioned need was for quiet areas to be used for short periods during the day. Another was personal lockers for belongings like purses or lunches, and larger filing cabinets for employees whose jobs required them to store forms or records (see Figure 3).

Employees also helped formulate the etiquette associated with each type of workspace. For example, focus group participants agreed that if they had to meet with just one other person about a nonprivate matter, they could do it in an open area instead of an enclosed conference room.



Figure 4. Cisco Connected Workplace Floor Plan

[Click on Image to Enlarge](#)

Design

A central design principle for the general administration workgroups was a completely wireless environment, to enable mobility. IT added wired jacks, as well—although 60 percent fewer than in a typical Cisco building—for high-speed communications needs such as PC backups and video streaming. Only administrative assistants were assigned a permanent workspace, so that their teams would know where to find them without using the location tools they would use to locate others.

The Connected Workspace floor plan was inspired by a university theme, with open spaces called quads, plazas where employees can meet informally, a commons area for breaks, and enclosed offices called colleges (see Figure 4). The absence of cubicle walls lets in more natural light and creates a more open and spacious atmosphere.

The designers included different types of work spaces to accommodate different work styles and business needs.



Figure 5. Workstation with Docking Station, IP Phone, Keyboard, and Screen

[Click on Image to Enlarge](#)

- Individual workstations, equipped with:
 - Docking station, which enables quick connection to desktop accessories such as flat-screen monitors, keyboard, and mouse (see Figure 5)
 - Cisco IP 7960 Phone, which employees personalize with their phone number and preferences with a login, using Extension Mobility or
 - Cisco IP Communicator, a software IP phone that runs on a laptop and sends voice over the wireless network. Employees use either wired headphones or a wireless Bluetooth headset to turn their laptops into high-quality IP phones. Employees who use hardware IP phones tend to retrieve their Cisco Unity voice mail by phone while those using Cisco IP Communicator on their laptops tend to more often use their laptop browser to review, listen to, and manage voice mail.
 - Liquid crystal display monitors at some workstations
- Collaboration spaces, both formal and informal. Formal meeting spaces have closed doors for privacy. They also have tables, speakerphones, and some IP videoconferencing stations. Two of the largest meeting rooms can be quickly reconfigured into smaller rooms using a movable wall. Informal spaces have soft seating on wheels, mobile tables, and movable privacy screens, enabling participants to spontaneously create a collaborative meeting space (see Figure 6).
- A quiet space, "the library," where employees can work without distractions (see Figure 7).

- A lab area to support both IT product testing and new product deployments in the Cisco Connected Workplace test area.



Figure 6. Informal and Formal Meeting Areas

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Employees often move to different areas throughout the day. When Woo was interviewed for this story, for example, she was seated in a small conference room, which she had chosen for privacy and so that her phone conversation would not disturb others. After the interview she planned to move to an individual workstation, the library, or a soft-seating area for individual work.

Technology Selection

After WPR developed the workspace requirements, the group brought its requirements to Cisco IT. "Cisco IT was a full partner with WPR to develop processes that would reduce operational expense," says Rochon. "We looked at Cisco technology roadmaps to see what's on the horizon for IP telephony, specifically to enhance mobility and the user experience. Some of our recommendations cut costs. For example, in the shared workspace we realized we could allocate two wired jacks per workspace instead of six, which is the standard at Cisco. At a cost per jack of \$200 per line, we're saving \$800 per employee, or \$160,000."

Rochon and his team selected the following technologies:



Figure 7. "Library" Area Within the Connected Workplace Building

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- Cisco IP Communicator, a software-based application that delivers enhanced telephony support through PCs with wired or wireless headsets (see Figure 8)
- Extension Mobility, a feature of Cisco CallManager that enables employees to log on within seconds to any Cisco IP phone to personalize it with their own telephone number and options
- Cisco VT Advantage, for videoconferencing
- Cisco Web Meeting, for audio and Web conferencing
- Third-party tools that enable employees to quickly locate each other in different areas throughout the building
- Video conferencing units inside conference rooms, including interactive white boards and plasma displays, to enable collaboration with remote participants; many of these units are on wheels so they can be used throughout the space

Cisco selected the technology at the end of February 2004 and began the pilot in July 2004.

Employee Communications

During construction, WPR conducted workshops with pilot participants to prepare them for what to expect. "The connected workplace is a big change for Cisco employees," says Woo.

"People are accustomed to working in the same cube or office every day. Now, nothing belongs to them except their personal locker. Therefore, we realized that change management would be essential to the success of this project."

To ease the transition, Woo and the project team communicated regularly with employees to prepare them for the change and to hear their concerns. "Before the pilot even began we wanted the participants to know what workspace would look like, how they could work in it, and details about the technology tools," she says. During design, construction, and for two weeks before and one month after the move, e-mail or in-person communications occurred daily. Now the team sends a newsletter when needed, about once a week.



Figure 8. People Use Wired and Wireless IP Telephony to Stay in Touch

[Click on Image to Enlarge](#)

Communications address three types of change:

- Setting. At the beginning, Woo educated the employees about their choices of work setting, including a workstation, open collaborative space, or closed collaborative space. Employees have the option to work at home some of the time but are encouraged to come to the office. "Within the Cisco culture, teamwork is important," says Woo. "A face-to-face collaborative environment creates an energy that helps people be more productive. Therefore, we designed an inviting environment so employees would want to come into the office."
- Personal work style. A choice of work setting gives employees the opportunity to be more productive based on their choices. Employees can choose the area most conducive to their work, from a variety of meeting rooms and areas to an even wider variety of individual workspaces. People can work together or independently, among people or alone-always in a large, expansive, well-lit environment with many windows. "The workplace is open and comfortable, and I've grown to appreciate my ability to select my workplace rather than being required to work in the same cubicle every day," says participant Rich Gore, a member of the Cisco on Cisco IT infrastructure team. Shefali Budhraya, interactive designer with the HR Creative Learning Studio, agrees: "I wouldn't want to work in the old cubicles environment any more."

Organizational behavior. Employees in the pilot project helped craft etiquette guidelines, such as when it is appropriate to occupy a conference room. "The very short-term view is that by sitting in a conference room all day with the door closed, an employee can be productive," says Woo. "However, if the employee leaves the room when privacy is no longer needed, they regain the collaboration and informal interaction that's key to organizational success, and also release a resource that others might need. That's the big-picture view we try to encourage."

Employees are invited to provide input through the group's Website. "During the first month or two, employees submitted many questions and comments, ranging from etiquette suggestions to requests for monitor stands with height adjustment," says Woo. WPR acknowledged all comments and addressed them as appropriate (see Figure 9).

Designing a WLAN for Dense Populations

Because the Connected Workplace proof of concept encourages mobility and has the capacity for 200 employees instead of the 88 that would ordinarily occupy a space of the same size, Cisco IT needed to build a wireless infrastructure that could support a denser-than-usual user population. "In regular buildings, Cisco IT provides wireless data connectivity at a density of about 25 employees per access point," says Dave Castaneda, member of the technical staff in Cisco IT. Each quarter of a typical building, therefore, has 2 or 3 wireless access points, whereas the proof of concept building has 10. Reasons for needing more access points include:

- More than twice as many employees can work in the proof-of-concept building than in a





Figure 9. Employees Requested Flexible Work Station Heights that Can Be Customized for Different Needs

[Click on Image to Enlarge](#)

typical Cisco building.

- Employees are encouraged to cluster in small areas, further increasing density.
- Cisco IP Communicator uses the same wireless connection used for data, adding to wireless bandwidth requirements.

Cisco IT continually monitors wireless usage to ensure that the infrastructure delivers the needed performance. In general, Cisco IT tries to ensure that no more than six to eight employees associate with a given access point at one time. "We achieve this ratio manually by taking 'snapshots' of the number of associations on each access point," says Castaneda. For example, when employees in the pilot began congregating in a particularly sunny area near the windows, Cisco IT discovered that more than 25 laptops were associated with a single access point and responded by adding an access point in that area. In the future, Cisco IT plans to install the CiscoWorks Wireless LAN Solution Engine (WLSE) to track the number of associations and ensure that no single access point is overloaded.

Supporting voice over a wireless LAN requires

special design attention. "Wired networks set up for voice can provide a measure of call admission control, but wireless access points currently can't differentiate between a voice and data stream," says Castaneda. Employees who place wireless voice calls from Cisco IP Communicator receive the needed voice quality when the wireless access point has sufficient capacity. Some employees use the wireless Cisco IP Phone 7920, which provides a form of call admission control called the Quality-of-Service Basic Service Set (QBSS). Castaneda explains, "The Cisco IP Phone 7920 uses the Received Signal Strength Indicator (RSSI) to identify the access point with the best signal strength, and also uses the QBSS to determine how many voice channels that access point is currently supporting. If the strongest access point is already supporting the maximum number of voice calls it can support with good quality, the wireless IP phone roams to the next strongest access point signal with an acceptable QBSS voice channel utilization. This ensures that wireless IP phones make a call only if the wireless network has the capacity to carry the call with sufficient bandwidth."

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Mark Golan
Vice President, Worldwide Real Estate and Workplace Resources, Cisco Systems

RESULTS

Cisco WPR is evaluating the success of the proof of concept in terms of effectiveness and efficiency. Effectiveness is the increase in productivity and participant satisfaction resulting from the integrated workplace design and IT solutions. Efficiency is the improvement in key metrics such as space utilization and cost and portfolio optimization.

Greater Employee Satisfaction

WPR performs periodic interviews with each organization and plans to administer a survey. "Common feedback is that most employees like the choice of work environments, cutting-edge technologies, light, openness, and the opportunity for interorganizational collaboration," says Ross. Some employees and workgroups found it more challenging to make the transition to a mobile environment—typically the ones that spend most of their day at desks or need to work with paper documents. Even these employees indicated that they like the variety of spaces and technologies available to them. "In the end, the most important question is, 'Would you go back to the old environment?'" says Ross. "To date, most participants say no."

Cost Savings

The shared workspace generates significant cost savings for Cisco, as shown in Table 1.

Table 1. Cost Savings from the Shared Workspace	
Cost Category	Percent Savings
Real estate rent: Accommodating more people in the same amount of space	37%
Construction: Building a smaller space than typically required for 140 employees	42%
Workplace services: Reducing utilities and maintenance costs, and nearly eliminating the costs of moves, adds, and changes for workspaces through the use of flexible furniture settings	37%
Furniture: Purchasing less (and slightly less expensive) furniture than typically used in cubicles	50%
IT capital spend: Spending less on switches and switch ports	40%
Cabling: Reducing the number of wired IP cables required per workspace	60%
Equipment room space: Racking fewer switches because of wireless infrastructure	50%

The total cost of the space is \$117 per square foot, allocated as follows:

- Construction: 51%
- Technology: 18%
- Furniture: 15%
- Design and visual communication: 10%
- Change management: 6%

LESSONS LEARNED

The most challenging aspect of the project for IT was support, according to Rochon. "Because this was a proof of concept, we had to negotiate with the Cisco IT support team to provide resources to answer questions about Cisco IP Communicator and other newly introduced technologies. The lesson learned was to engage the support team early and provide them with support information in the form of FAQs right away so they could become familiar with issues that are unique to the shared workspace."

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Another lesson learned was the importance of providing power outlets at most of the workplaces. Cautious about the limits of their laptop battery life, employees need to stay connected to the wired power network at least part of the day, and seats near power outlets proved popular. WPR tried providing uninterruptible power supplies in various parts of the building, but the units began beeping after about an hour to signal low power, disrupting nearby employees. Currently, WPR is addressing the need by providing more power drops and laptop charges at more locations. An option under evaluation is to provide shared battery recharging stations where employees can exchange their exhausted laptop batteries for fully charged ones.

At the beginning of the proof of concept, the organizers returned furniture and collaboration tools to their "home" locations at the end of each week. "We encourage people to reconfigure the furniture to suit their work needs," says Woo. "We realized at one point that if a particular piece of furniture or tool is always moved to a certain location or arranged in a certain way, perhaps the new location should become the designated home."

NEXT STEPS

Designing the optimum work environments for different types of workers requires an in-depth understanding of the movement of people within these environments. Cisco IT plans to monitor employee movement using radio-frequency ID (RFID), WiFi, and ultra-wideband tracking. To avoid introducing privacy concerns, Cisco IT will not associate the tracking with a particular individual. Instead, it might track a badge that employees are asked to grab out of a bin when they arrive at work, for instance.

To enhance safety and security, IT is investigating the use of optical tools to monitor the number of people who enter and leave the building. For example, when a person with a Cisco badge enters a building, another person without a badge might come in directly after. "It's important for Cisco Security to be able to monitor this activity and track people coming in the building," says Castaneda. "Similarly, it's important to be able to track the number of people in a building in the event of an emergency to ensure that nobody is trapped and unaccounted for."

Yet another future plan is installing a "virtual building receptionist," an interactive screen in the lobby that can answer basic questions, page employees to come out and meet their visitors, provide temporary badges to visitors, and connect visitors to a live receptionist in another building when needed.

Cisco has completed another proof of concept for the sales environment in Charlotte, North Carolina, and is planning yet another for a call center outside the United States. "After the final results of the proof of concept are in, we'll evaluate whether and how we need to modify the Connected Workplace to roll it out in other Cisco offices around the world," says Ross. "Several Cisco companies tour the environment every week to investigate how we're integrating people, process, and technologies to support our business objectives. For Cisco as well as our customers, the most compelling benefits include real estate cost savings, an enhanced ability to collaborate, and increased employee satisfaction."

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