

# How Cisco IT Merged Voice and Data Engineering Groups

Traditional boundaries between data and voice teams are dissolved for greater efficiency.

**Cisco IT Case Study / IP Communications / Organizational Transition:** As Cisco migrated to IP communications beginning in the late '90s, the IT group reorganized to reflect the blurring of traditional boundaries between voice and networking. This case study describes how Cisco IT reorganized and helped IT networking and voice engineers adjust to the transition. Cisco customers can draw on Cisco IT's real-world experience in this area to help support similar enterprise needs.

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– Stef de Borchgrave, IT Manager for Cisco Intelligent Network Services (INS), EMEA

## BACKGROUND

### Converged Network Demands Converged Organizations

When Cisco Systems® began migrating to IP communications, previously separate data and voice networks—and their respective organizations—converged. “It’s easier to converge networking and voice technologies than it is to converge organizations of people,” says Marc Holloman, global operations manager for Cisco® Intelligent Network Services (INS). “The challenge is to create an organization that matches the technology convergence. Yet, you still need some type of organizational divisions, otherwise hundreds of people would

report to one manager. With IP communications, those divisions can no longer pertain to data and voice technologies.”

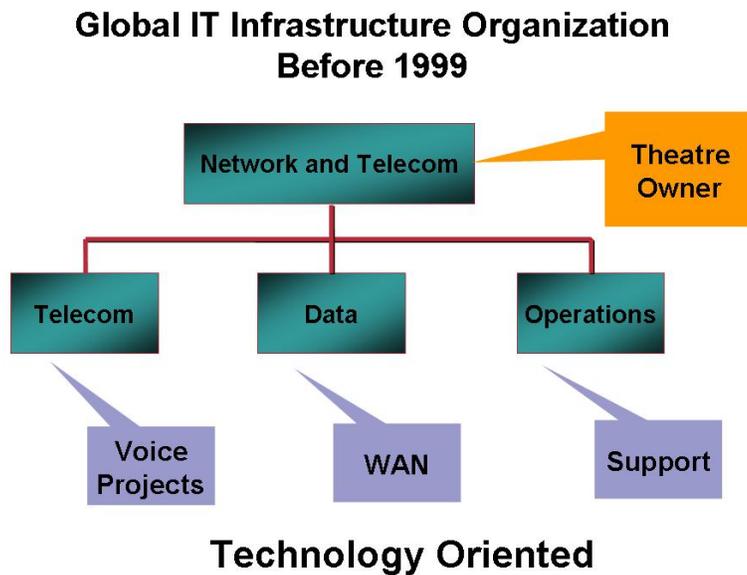
The need to reorganize the IT groups had been demonstrated a few years earlier, when Cisco first deployed a multiservice network. At the time, Cisco had three technology-based organizations. Telecommunications (or “Telecom”) focused on time-division multiplexing (TDM)-based private branch exchange (PBX) switches; networking (or “Data”) concerned itself with LAN and WAN environments; and “Operations” supported voice telecommunications, data networking, and servers and storage devices in data centers and branch offices (Figure 1). Operations teams helped the Telecom team by managing the process of adding new voice users, and supported the Data networking teams by monitoring and alerting Data engineers when alarms indicated that data networking systems were unavailable. However, in the early and mid 1990’s there was little or no interaction between the Telecom teams and the Data networking teams, since voice and data ran on separate networks, with separate types of equipment, and had separate issues and procedures.

This virtual separation of Telecom and Data networking changed a little when Cisco IT began using parts of its data Wide Area Network (WAN) to carry voice traffic between major corporate sites. “After our acquisition of StrataCom in 1996, we were sending voice from traditional PBXs over the network between Cisco offices,” says Stef de Borchgrave, IT manager for the INS team in EMEA. “That’s when it first became evident that the strict distinction between voice and data had blurred.” Even then, however, Telecom engineers considered the Cisco IT WAN to be just another carrier, and Data networking engineers considered voice to be just another IP application.

The organizational transition for the Cisco IT group began in 1998, when Graham Hosie, now a Cisco IT director, was

senior manager for global voice services. Asked to head up an effort to deploy Cisco CallManager to replace legacy TDM switches, Hosie assembled a 60-member global team, whose members offered expertise in voice, data, and hosting. “Until that time, Cisco’s voice and networking groups were located on the same floor, but were unaware of what the other did,” says Hosie. “To deploy a multiservice network, we needed both groups to work together for planning, process, and support.” If a call wasn’t successfully sent over the WAN, for example, Cisco needed a process and organizational model to determine the cause and assign the appropriate people to find a solution to the problem.

**Figure 1.** Cisco IT Organization: Before 1999



## CHALLENGES

The organizational transition introduced new challenges, including ownership issues and job security concerns.

### Sharing Access to Equipment

At the outset, Cisco voice and data engineers hesitated to provide each other with access to their equipment. “The networking group had reservations about enabling the voice group to use the routers that provide access to the public switched telephone network (PSTN), and the voice group didn’t think the data group should have access to the Cisco CallManager,” says Hosie. “Staff worried that someone from the other group might inadvertently bring down the network.” Formal and informal training helped to alleviate these concerns. “We learned to understand, respect, and appreciate each other’s expertise,” says Silva. The training, which Hosie describes as “cross-pollination,” included informal lunch sessions to talk about new technologies. “We took people with extensive voice and limited networking experience, or vice versa, and trained them to support converged voice over IP,” says Hosie. Employees appreciated the reassurance about the continued importance of their jobs, as well as the opportunity to learn new skills. In addition, employees from both groups learned to appreciate the complexity of the other group’s area of expertise, and gained new-found respect for each others’ skills.

### New Change-Management Restrictions

Among the most significant cultural shifts to emerge from IP communications at Cisco was a different view of change management. Traditionally, networking people were able to make changes to the network during the day because people rarely noticed the brief interruption. That was not possible with voice traveling over the network, because even a brief network outage could interrupt live conversations. “Voice is the most visible application we’d deployed on the

network,” says Silva. “In the past, if we had to bring down the network to make a change, we could do it at 5:30 p.m. and almost no one would notice. If someone does a failover to a backup router when voice runs on the network, you can potentially disrupt thousands of phone calls.” Network changes that affect voice are now performed after 9:00 p.m. local time.

### **Job Security Concerns**

When Cisco decided to adopt IP communications, some of the IT staff—especially telephony specialists—wondered how the transition would affect their jobs. The Cisco telephony specialists possessed a collection of skills, in addition to PBX administration, that remain essential even now that Cisco has adopted IP communications. “We didn’t reduce our telecommunications staff due to the converging technologies,” says de Borchgrave. “Our voice specialists were self-motivated to learn about IP telephony, and realized that if they became competent in the technology, they’d be more valuable to the organization.”

The unique expertise that traditional voice experts continue to offer Cisco include:

- Understanding of end users’ business needs—which can be as simple as whether a manager’s and administrative assistant’s phones ring simultaneously or one after the other, and as complex as casual contact centers—where employees interact directly with customers in addition to their other job responsibilities. “These real-world aspects of telephony don’t disappear just because you change the infrastructure and devices,” says Alex Hadden-Boyd, director of marketing for Cisco IP Communications. General telephony functions, such as building dial plans and call-routing plans, remain the same, whether the call processing occurs on a PBX or a server.
- Expertise in working with local- and long-distance carriers—a skill that remains indispensable.
- Interpersonal communication skills— “Network engineers usually don’t concern themselves with the effect of network change on users, because the change is generally invisible,” says Hadden-Boyd. “The moment you change a password or require users to enter a different key sequence, communication with users becomes very important, and telephony specialists have honed this skill.”

Hosie’s team began speaking about these new job opportunities in the planning stages of the transition. “We coined the term ‘IP telephony engineer’ to capture the blend of the existing and new skills we would need,” he says. For example, a PBX technician who worked with a PBX connected to the PSTN could become an IP telephony engineer who worked with Cisco CallManager connected to the LAN and WAN, as well as to the PSTN. “Employees are excited about the greater sophistication of their jobs and new opportunities for learning,” says Hosie. IP telephony engineers now not only have to understand PBX functions on Cisco CallManager, but also how the network is used to route voice packets to the appropriate end device.

As the transition to a process-oriented organization progressed, Cisco management regularly communicated with IT staff. Cisco credits much of the success of the transition to a policy of open communication. “We explained the business-drivers for the transition to IP communications, and clearly communicated the career opportunities,” says Hosie. “Through training and informal lunch sessions, the voice staff began to understand that their careers were not in jeopardy. On the contrary, they would have the opportunity to advance to the leading edge of new IP telephony technology, and their knowledge was critical to the effort. They also understood that their long-term career success was dependent on their ability and willingness to learn a new networking skill set.”

“Ultimately, implementing IP communications is an opportunity for both sides to learn something new,” says Doug McQueen, a solution implementation manager at Cisco. “Network staff want to learn about voice, and voice staff want to get more involved in the network.” De Borchgrave says, “Engineers like the opportunity to work on new technologies because it keeps them involved in learning new technologies.”

## SOLUTION

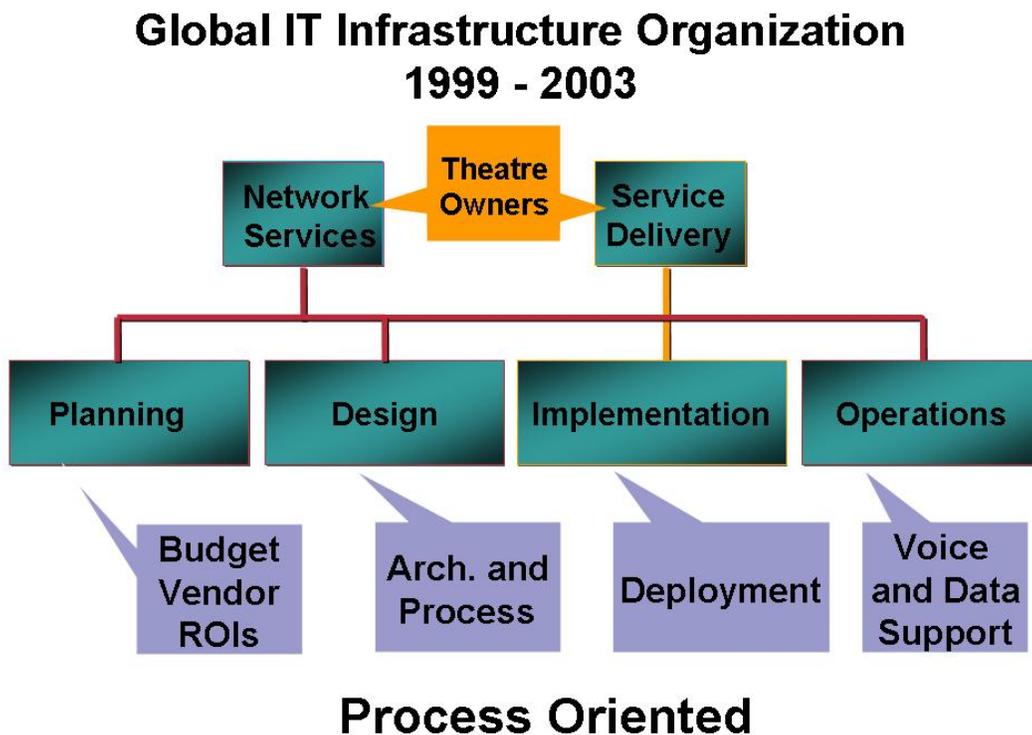
### Building a New Organization

As the company began sending voice over the LAN and WAN, Cisco moved from a technology-oriented organization to a process-oriented one that spans both voice and data. The Cisco Americas theater reorganized its IT into three groups with roles that correspond to the planning, design, implementation, operation, and optimization (PDIOO) organizational model adopted earlier by Cisco EMEA (Figure 2):

- Emerging Technologies investigates new technologies and determines how they can be developed for use in the Cisco internal network. (This role corresponds to planning in the PDIOO model.)
- Foundation Technologies develops architectures and implementation processes, and deploys systems. (This role corresponds to design and implementation in the PDIOO model).
- INS Engineering Operations provides support for both voice and networking. (This role corresponds to operations in the PDIOO model).

“As we continue to adopt new IP communications technologies, the process-oriented organizational model helps eliminate confusion over group ownership and responsibilities,” says de Borchgrave. “We still have specialists in voice and networking, but they now work together more often and more effectively.”

**Figure 2.** Global IT Infrastructure: 1999 to 2003



### Removing Organizational Barriers

Enterprise IT voice and data groups typically have minimal interaction, and often don't realize of the full scope of each other's responsibilities. For example, voice engineers might be unaware of the details involved with working with IP addressing blocks and switch and router configurations, while data engineers might underestimate the complexity of building a dial plan or automatic call distribution (ACD) routing plan.

To begin the transition to a converged IT organization in the United States, Hosie enlisted the support of a senior engineer, known for his technical knowledge, to help remove barriers between the voice and networking organizations. Almost immediately, Hosie physically relocated the groups so that they could work side by side. “Colocating the groups fostered idea sharing and an understanding of the other group’s concerns and expertise,” says Hosie. “Networking and telephony staff began eating lunch together and getting to know each other, and realized that instead of being a threat, the other team provided complementary skills to achieve common goals.”

### **Combining Voice and Data Support**

Even before its adoption of IP communications, Cisco had combined its operations (support) functions so that a single team could troubleshoot both voice and data problems and provide simple break-fix repairs. “The process-oriented organization made it easier for us to cross-train traditional voice specialists on IP telephony, and educate data specialists on voice,” says de Borchgrave. To reconcile the converged network with the continuing need for specialized voice and networking support, the operations team instituted different staffing policies for global tier-1, tier-2, and tier-3 support. Tier-1 support staff are generalists, with enough knowledge to route calls appropriately. Tier-2 support is outsourced. Tier-3 support remains in-house, relying on voice and networking Cisco experts. According to De Borchgrave, the Cisco Technical Assistance Center (TAC) organization employs a similar model, employing experts with specialized expertise in LANs, WANs, and voice.

In the Cisco Americas theater, Cisco retained a Voice Services group within the Operations group for client-facing activities. Cisco deliberately used traditional terminology, “voice services,” so that employees would know whom to call when they had a question about their phones or unified messaging. “The organization that is customer-facing is the overall owner,” says Hosie. “If an employee has a question or problem with their IP telephone, they want to talk to the telephony people. They don’t care that voice is running on the data network.”

### **Subspecialties Still Abound**

Even with its converged network, Cisco continues to distinguish between issues that concern PCs, networking, hosting, and telephony applications. “Cisco CallManager is an application that runs on a server, sits in a data center, and uses IP network as its transport,” says Dennis Silva, IT manager for IP telephony at Cisco. “We still need all those specialties.” For example, if an employee uses Cisco IP Communicator, a softphone application that helps enable voice communication from a laptop, the IP Telephony Operations team partners with the PC support team that manages the laptop. Ensuring that there were hosting specialists on staff also proved important to the Cisco IT organization. “People with a traditional telephony background, like me, are accustomed to applications residing on big mainframes on a proprietary network,” says Silva. “With IP communications, those applications now reside on servers, primarily Windows-based, that run on a LAN. Hosting expertise is an essential piece of the solution.”

## **RESULTS**

As expected, the new process-oriented IT organization facilitates planning, design, implementation, and support for IP communications. It has also created new opportunities for Cisco IT staff. Rather than eliminating jobs, converging the data and voice networks has created new job opportunities. Cisco employees who had previously worked exclusively with voice or data technologies have applied their skills to the new IP communications technologies associated with the convergence, such as Cisco CallManager call processing, Cisco Unity Unified Messaging, Cisco IP Contact Center (IPCC), Web collaboration, and videoconferencing. “Our staff needs didn’t diminish as a result of the convergence,” says Hosie.

While the voice and data specialists who collaborate to support IP communications increase their worth by learning something about the other technology, they still retain their core focus. “IP telephony is an application that uses the IP network as its transport,” says Silva. “When an organization adopts IP communications, telephony engineers continue to apply their same skills, just at a different layer of the data networking stack.”

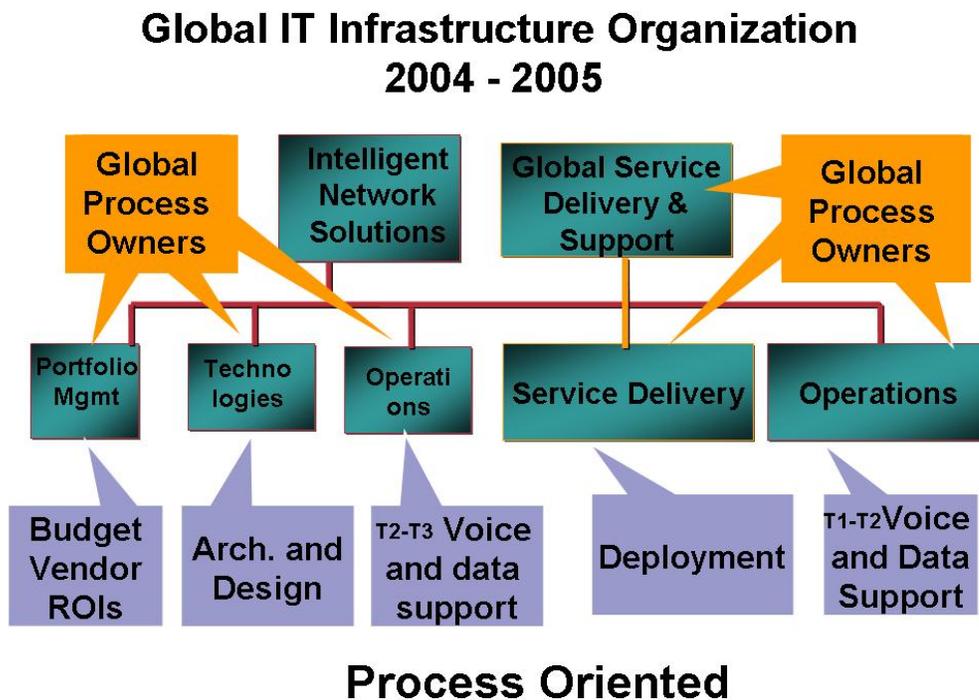
The same applies to network engineers. "Network engineers don't necessarily want to become application specialists," says Holloman. "Their specialty is the technology underneath. There is a need to learn about the voice application, and some of our engineers initially expressed some resistance. But at the end of the day, network engineers viewed IP communications as an opportunity to learn and become even more valuable employees."

## NEXT STEPS

### Globally-Aligned IT Organization

Cisco is gradually eliminating the differences in processes between its various theaters. Its goal is to establish one manager who will define support for all teams, and to have all managers from each region report to a single manager of engineering operations (Figure 3). "All regions will have the same director, standard processes for rolling up statistics, and standard steps to approach the global owner of any process or technology," says de Borchgrave. "A standard global organization is helpful, if not essential, for developing the global networking standards needed for applications such as videoconferencing. All Cisco theaters need to follow the same processes and are subject to the same global design review board. We now have a more cohesive organization."

Figure 3. Globally-Aligned IT Organization Supporting IP Communications



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