

Menlo College: *Summer School for IP Telephony*

MENLO COLLEGE USED THE 2000 SUMMER BREAK TO BUILD A CISCO AVVID (ARCHITECTURE FOR VOICE, VIDEO AND INTEGRATED DATA) NETWORK FROM THE GROUND UP—LITERALLY. WITH ALL-NEW FIBER AND CATEGORY 5 CABLING, THE GIGABIT ETHERNET NETWORK SUPPORTS DATA AND IP TELEPHONY SERVICES CAMPUS WIDE, INCLUDING THE DORMITORIES.

Background

As a four-year, private college for approximately 700 students from 40 nations, Menlo College prepares the managerial leaders of the 21st century by coupling an outstanding liberal arts curriculum with access to two of the world's most exciting professional communities—nearby Silicon Valley and San Francisco. The college's three core areas of instruction include management, liberal arts, and mass communications. Partnerships with sister colleges in England, China, and Chile support an interdisciplinary approach to education, blending philosophical, historical, and global perspectives in an increasingly diverse and dynamic world. Established in 1927, Menlo College is located in Atherton, California, and has gained the respect of the academic community for preparing its students to succeed in a competitive global marketplace.

Challenge

With an IT staff of four, Menlo College relied heavily upon outside contractors to help manage its separate data and telephone networks. Prior to 1984, Menlo College contracted AT&T to handle all its on-campus telephony services, and after the AT&T breakup, that task was transferred to the independent local exchange carrier (ILEC). Menlo College's first campus network was a shared, 10-megabit Ethernet Cabletron LAN in 4 of the 13 college buildings interconnected by a fiber ring.

More recently, the cost of maintaining this arrangement became quite significant. Students living in campus dormitories had to arrange their own Centrex-based telephone services directly with the ILEC. They had no direct access to the on-campus LAN facilities, and had to use

telephone lines for Internet access. Faculty was limited in their ability to communicate electronically with staff and students, and was unable to make online course materials available to students. Between the telephone and data networks, the wiring was showing its age. "Pacific Bell handled all our wiring problems at a large premium," says Patrick Olson, Director of Information Technology at Menlo College.

In early 2000, Olson and his team decided to upgrade both the telephone and data services. In order to remain competitive in attracting students, the college needed to provide high-speed Internet access to the dormitories, and enable faculty to place course materials on line. It also needed to control administration costs by enabling a robust intranet and automating manual processes.

Olson decided to converge the two campus networks into one for several reasons. First, managing one network instead of two costs less in overhead expense and staff time. Secondly, Olson needed to reduce the amount of time his staff were spending on adds, moves, and changes to the telephone network, a common occurrence at the college. Third, a converged network would support emerging integrated applications to enhance the college faculty's ability to do their job.

To meet this goal, Menlo College would have to invest in a new intermediate distribution frame (IDF) and Category 5 wiring for each building and install fiber between the rest of its 13 buildings. After wiring, it needed a new IP data network and IP telephone system, and would then connect it all to the Internet and the Public Switched Telephone Network (PSTN).

Solution

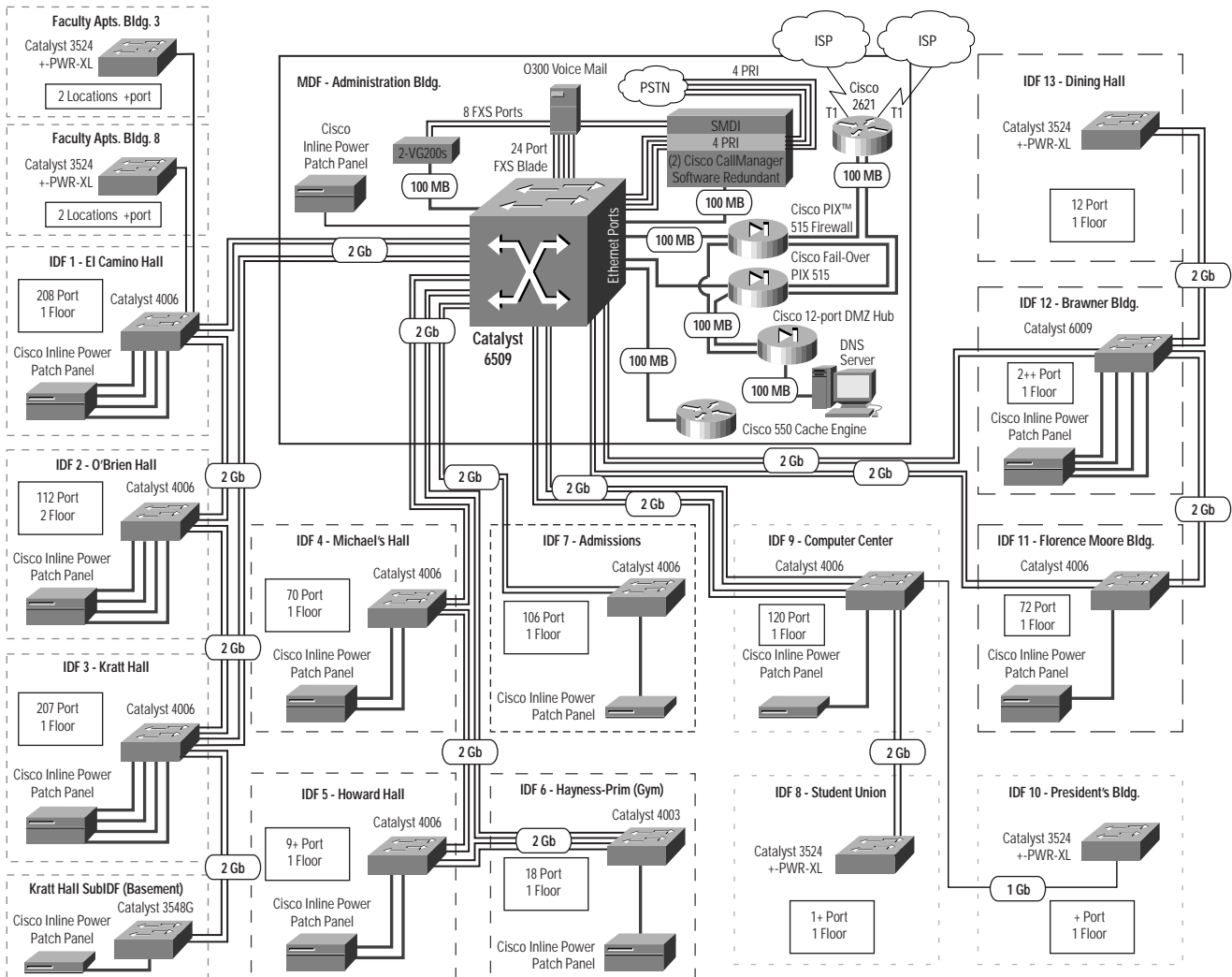
Olson engaged several partners to design, build, and configure the network. VOICEPRO designed the IP telephone system atop a Cisco AVVID network designed and built by AMS.net. The two systems integrators worked hand-in-hand to ensure a tightly integrated voice/data solution. Delta Technology and Advanced Cable Technology (ACT) laid fiber between buildings and performed the in-building Category 5 wiring.

VOICEPRO, AMS.net, and Menlo College decided to build a Cisco AVVID network because it offers the only large-scale IP telephony system available, and also because Cisco AVVID leaves room for Olson to add future systems and third-party applications. “We should be able to put whatever we want into the network. We don’t want to

rebuild anything unless it’s structural,” says Olson. “Cisco has proven abilities in IP to the desktop and scalability. At this level of technology, the danger is when you say that it’ll last 15 years, you don’t want to be stuck in five years with something expensive and stupid. Cisco is not going away, and I believe the Cisco AVVID solution will meet our needs for the foreseeable future.”

The new network supports four discrete fiber rings throughout the campus, all connected to a Catalyst® 6509 switch in the data center. This Gigabit Ethernet backbone connects to Catalyst 6000, 4000, or 3500 series switches in every building, for a total of 1100 ports. Each switch is connected to a Cisco inline power patch panel to power Cisco IP telephones (Figure 1).

Figure 1 Menlo College Cisco AVVID Network



The data center houses all data servers, dual Cisco CallManager 3.0s on Cisco 7835 servers, a Cisco 550 Cache Engine, dual PIX™ Firewalls, a Domain Name System (DNS) server, the college's external Web site, and a Cisco 2621 router for Internet access. Dual T1 lines to separate providers assure full-time Internet access, and more will be added as traffic loads increase.

With a multilayer services feature card (MSFC) in the central Catalyst 6509 switch, Olson has divided the campus into several virtual LANs (VLANs) for management and security purposes using a private IP address scheme. All IP telephones reside in one VLAN, with other VLANs for management, student data, administrative systems, faculty, and so forth. Network Address Translation (NAT) provided by the Cisco PIX Firewall hides internal addresses from the Internet.

For the telephone system, VOICEPRO provided an Octel 300 voice-mail system connected to dormitory telephones via a 24-port foreign exchange station (FXS) card in the Catalyst 6509 switch, and connected to staff and administrative telephones and the PSTN via dual Cisco VG-200 gateways. Billing records are stored in the Cisco CallManager.

Dormitories have one switched 100-Mb Ethernet "port per pillow," so each student can connect an IP phone to the wall jack and a PC to the IP phone. Menlo College charges students a fee to use their telephones for local calls. Students can choose their own long-distance provider. The fee is less than what students paid Pacific Bell for Centrex services, yet helps Menlo College recover its capital investment expense.

Results

It was an exciting moment when the President of Menlo College placed the college's first outbound IP telephone call to its sister college in Oxford, England, in a special ceremony. The summer had been short, but successful. The wiring project went forward with few glitches, and the Cisco AVVID network was installed, configured, and tested by early August. All dormitory rooms had IP telephones by August 20, in time for the fall semester. When completed, the campus will have about 500 IP telephones. What's more, "We encountered none of the things you'd have in normal telephony migrations," says Olson. "The easiest piece was putting the phones in. We had no crosstalk, no echo, nothing. We programmed all the student phones in two days and distributed them with their registration materials. And all the partners worked together extremely well to make that happen."

Aside from e-mail, faculty and staff are already using the intranet to place facilities work orders, post and examine meeting and course information, and submit expense reports directly to Accounts Payable. The administration staff has identified eight other manual flows—such as purchase orders—that will soon be automated via the intranet.

Olson expects that the next steps will exploit the integrated Web interface on the Cisco IP Phone. One option on the table is a unified messaging system such as the Cisco Unified Open Network Exchange (uOne). The college may also deploy Web-based registration services, announcements, and other services directly to IP telephones, allowing students to register and obtain campus information without a PC.

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