

Cray Inc.

Convergence for Convenience



Background

Founded in 1972, Cray Research Inc. is synonymous with supercomputing, and remains the global market leader in high-end supercomputers, which address the world's most challenging computing requirements, solving problems of major economic and scientific importance. Cray systems have helped people design the cars and trucks we drive, creating new materials and life-saving drugs, predicting severe weather and climate change, analyzing complex data structures, safeguarding national security, and a host of other applications that advance the frontiers of science and engineering. The legendary Cray systems combine enormous capacity with enormous capability to provide exceptional bandwidth, communication, and synchronization.

Cray merged with Silicon Graphics, Inc. (SGI) in 1996. In 1999, SGI decided to spin off Cray Research, and in April 2000, finalized a deal to sell the division to Tera Computer Company. Tera changed its name to Cray Inc. and is combining Cray's supercomputing technologies with its own Multithreaded Architecture (MTA) system to create a new generation of supercomputing systems. The new company has major offices in Seattle, Washington, Eagan and Mendota Heights, Minnesota, and Chippewa Falls, Wisconsin.

Challenge

With the acquisition, Cray needed to build a new data, voice, and video networks in its Eagan, Mendota Heights, and Chippewa Falls offices. Cray started preliminary investigation in August 1999, and began intensive design in April 2000. The biggest challenge was choosing technologies that would allow an IT staff of one to maintain and operate the network with minimal resources. Cray wanted to offer its employees the advantages of the latest technologies, yet in a cost-conscious manner. The nature of its business calls for a network similar to its products, a network that delivers both high bandwidth and complex intelligence.

Tom Stephens, Network Group Leader at Cray, recommended a converged, all-IP network to Cray executive management. "Convergence has been the direction of networking since the early 1990s. At the time, I only knew IP, so using a single IP network to support data, voice, and video intrigued me," he says. "We also discovered that we could install a converged network for the same price as a traditional PBX network by itself."

Cray partnered with SBC, a division of Ameritech, to design and build its new network. Cisco Systems is the network equipment and IP telephony vendor. The Cisco AVVID (Architecture for Voice, Video, and Integrated Data) solution

meets Cray's need for a robust, standards-based infrastructure that can handle large amounts of data, support voice and video services, and grow over time with minimal disruption. "We care about adds, moves, and changes," says Stephens. "We want to keep all management in-house. The Cisco solution is much faster and simpler than traditional PBX solutions. We have help now, but when this all started I was the entire networking staff for the three sites."

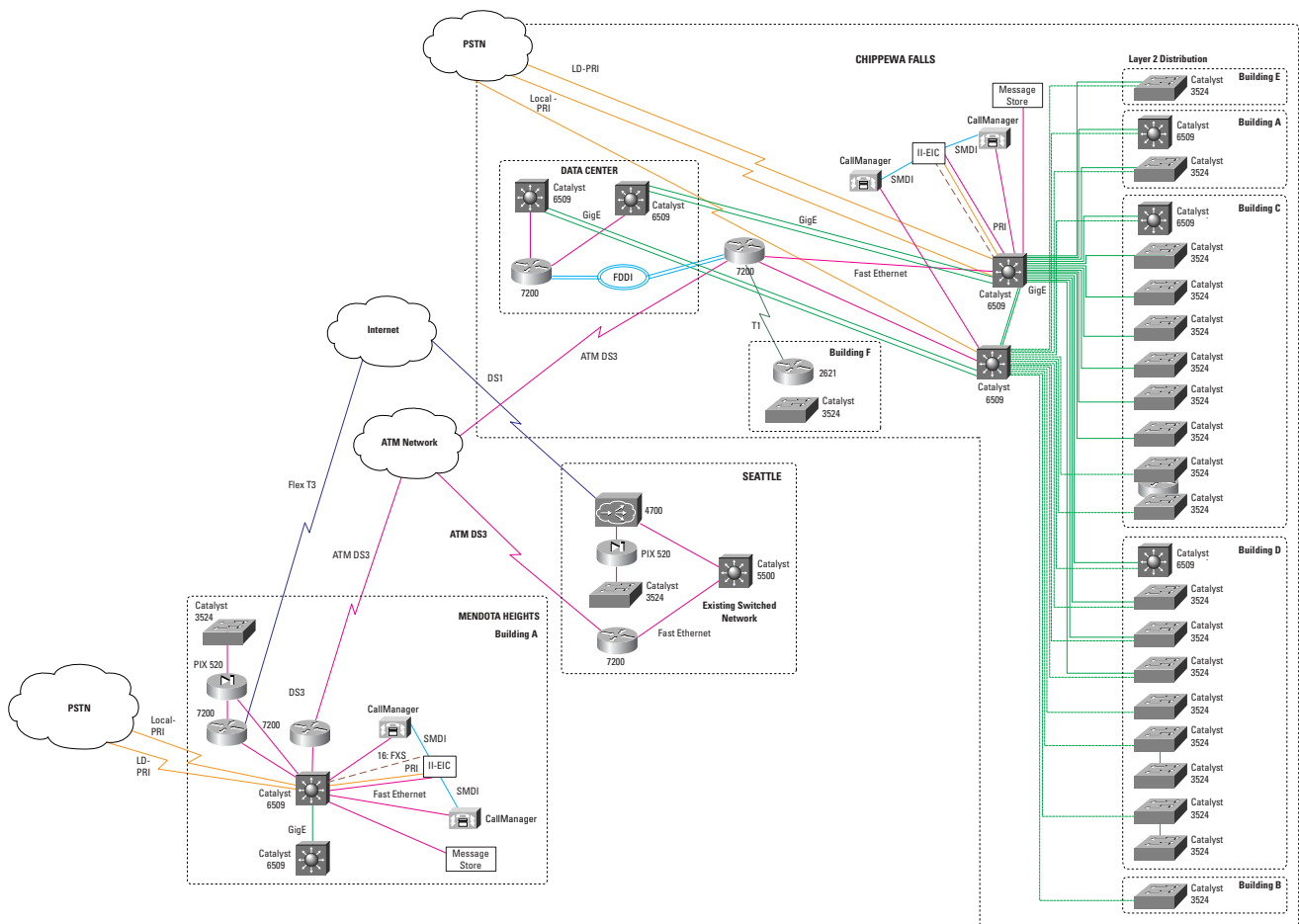
Solution

The Chippewa Falls facility houses the Cray data center and was already wired, as was the Eagan facility. "The Eagan site was vacated and all people relocated to Mendota Heights, but this created no issue as far as their calls were concerned," says Stephens. "That's a testimony to how easy it is to manage the IP telephony system." Cray had to install Category-5 cabling at the unwired Mendota Heights site.

The Layer-3 enabled Gigabit Ethernet network backbone at each facility uses Cisco Catalyst 6500 series switches with Multilayer Switch Feature Cards (MSFC). In the wiring closets, Cisco Catalyst 3524 switches with 10/100 Ethernet inline power modules connect a total of 650 Cisco 7960 IP Phones among the three sites. PRI Gateway cards within Catalyst 6500 switches at each facility route external and 800 calls to and from the PSTN and interoffice calls to Cisco 7200 routers, which connect to a T3 WAN (Figure 1).

Two Cisco CallManager clusters—one in Chippewa Falls, the other at Mendota Heights—handle call processing. "We were the first enterprise to deploy multiple CallManager clusters to provide resiliency," says Stephens. "It created some integration challenges. Cisco, and SBC all stepped up to the plate to resolve all the issues that came up. On several occasions we ran into roadblocks, both during design and deployment. People really adjusted to make sure the deployment date was not compromised."

Figure 1 Cray IP Telephony Network



Stephens followed the Cisco guidelines for enabling quality of service (QoS) in a Cisco AVVID network. Cray uses CiscoWorks 2000 to manage its network. "IP telephony technology actually improves the data network," he says. "People are intolerant of bad voice calls, so you have to clean up the data side to get IP telephony to work well. You must pay closer attention to management than you might in a data-only environment. As a result, we have a more efficient data network, and that was an added benefit we didn't look for."

Service and Support

Stephens also had a positive experience working with Cisco Service and Support teams. Cray hired SBC Professional Services to assist with design and managing the installation. "Our internal management knew the value of project management and professional services. It was the correct decision," says Stephens. "We just had too much other stuff to do. If we had relied only upon in-house resources, the project would have been a disaster, and we wouldn't have gotten it done in time. We were moving every office we had in the world, and we really had to trust that all the contractors on the deployment would come through. For the most part, they did."

"We're good customers of the Cisco TAC [Technical Assistance Center]," says Stephens. "They did a great job and solved most of our problems easily. However, there were a couple of nagging issues, and the TAC quickly escalated them to the design engineers."

Results

Prior to live deployment, the entire Cisco AVVID network was built and tested for three weeks in SBC's Memphis Tennessee laboratory. Cray met a very aggressive timeline for design, deployment, and turnup. The production network was installed over a weekend in October 2000. "Design never stopped. We were doing some design work during the weekend of the cutover. At first, users were incredibly skeptical about IP telephony," admits Stephens, "but we put it in and it worked. Users have been pretty quiet about it."

With the network running smoothly, Stephens wants to take advantage of new capabilities. With the TAPI interfaces available on CallManager version 3.09, he hopes to enable more features that deliver information directly to IP Phones. He also wants to use XML-based applications to IP Phones, starting with general-purpose services such as traffic and weather reports and corporate directory services. He is also exploring "push" applications to alert users with time-sensitive information that may impact their business. "Converged networking is the right thing to do for both economic and technical reasons," says Stephens. "And the coolness factor didn't hurt either."



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