



Mapping the **Network** to the Business

Trimble is upgrading its LAN with Cisco Catalyst® 4500 Series switches in key wiring closets and the backbone to build a robust switching infrastructure and enable an IP telephony system. The platform offers the right combination of performance, network convergence, port density, high bandwidth, and price to suit both Trimble's budget and business model.

Background

Founded in 1978 and headquartered in Sunnyvale, California, Trimble is one of the industry's leading providers of global positioning system (GPS), laser, and optical positioning technologies. Trimble products are used in agriculture, surveying, automobile navigation, machine guidance, mapping, fleet management, wireless platforms, and wireless telecommunications infrastructure to improve productivity, provide greater convenience, or increase safety. The company employs 2400 people across a total of 40 sites, in more than 20 countries worldwide. Four main campuses in the United States are located in Sunnyvale, California; Dayton, Ohio; Westminster, Colorado; and Chandler, Arizona.

Trimble customers include government agencies, automotive electronics and portable device manufacturers, earth-moving and construction contractors, fleet operators, wireless infrastructure providers, agri-businesses, and others. The company understands the importance of using the network infrastructure to enable dynamic business processes that help it respond to particular customer requirements.

Paul Forbes, senior network engineer at Trimble, sums up the company's technology philosophy: "We like to be leading edge. We like to think aggressively." At Trimble, this philosophy extends to the company's business tools—including the network.

Trimble relies upon its network for business resilience—keeping business processes flowing at all times. Trimble management recognizes that "there are areas where resilience is extremely important," and there are areas where it is less important, says Chief Information Officer Bob Denis. "On the transaction side, it is extremely important that you have resilience. If you cannot take orders or if you cannot invoice, you're directly impacting revenue," he explains. "On the engineering side, we cannot encounter delays or stoppage. ASIC [application-specific integrated circuit] simulations are extremely complex, resource-driven applications. If engineers are conducting an ASIC simulation that may take days, they certainly want to be on a network that they know is going to stay up."



Challenges

Trimble reconciles its demand for the latest technologies with a strict IT budget and minimal IT staff. Its LAN upgrade addresses two challenges: a Centrex-based telephone system that is no longer cost-effective, and a pressing need for new network services, network resiliency and greater capacity to support critical business applications and bandwidth-hungry engineering requirements. “We were looking for an all-in-one solution at an affordable price,” says Stanley Ching, corporate network manager at Trimble.

The primary driver for the LAN upgrade is network convergence—the ability to use a single IP network to support both data and voice applications. Managing costs on the current Centrex solution at the Sunnyvale site has proved difficult for Trimble. “Tomorrow [the Centrex provider] can walk in and say, ‘We’re hiking your price by 20 percent,’” says Denis. “We want to stabilize our expense base without sacrificing functionality.” The Dayton site has an older private branch exchange (PBX) system, so the time seemed ripe for an upgrade.

Trimble decided to invest in a network based on Cisco AVVID (Architecture for Voice, Video and Integrated Data), which enables network convergence and provides an infrastructure that supports future integrated applications. “It is a huge opportunity to reduce costs for Trimble because it allows us to deploy more than basic telephony,” says Shawn Wilde, the company’s director of Information Technology. “We can reduce dependence on outside suppliers for implementations and enhancements. My expectation is that if we continue to grow with Cisco, some of the more exotic telephony features of the future will be available in as timely, or more timely a manner, than their competitors can offer.”

The second consideration is flexibility. Trimble also needs a LAN environment that allows it to tailor its network segments to the particular requirements of each business area. Says Denis, “We need vertical partitioning of each business to identify [each business] and operate very, very efficiently.”

However, at Trimble, ‘efficiently’ means different things to different departments. As a result, “we’re always trying to adjust our systems to cater to the different vertical business models as opposed to normalizing across all of them,” says Denis.

The third challenge is bandwidth. “The engineers are absolutely dying for Gigabit Ethernet on the desktop,” Wilde explains. “These engineers are truly the chip design community, and they are moving massive files around.” In order to provide the engineers with the tools they need to get their jobs done and improve productivity, Wilde says, Trimble requires a switching solution that provides predictable Gigabit Ethernet performance and one that is unfailingly reliable and well designed. “The switch I buy needs a backplane that I don’t have to worry about. If I have to engineer the backplane, I’ve picked the wrong product. Zero engineering makes me happy.”



Solution

The Cisco Catalyst 4500 Series Switch meets all these challenges. It supports converged networking with a high performance, resilient switching infrastructure, integrated, redundant inline power supplies, high-density 10/100 inline power Ethernet line cards, intelligent services such as granular quality-of-service (QoS) to prioritize voice traffic, and complementary Cisco IP telephony products. Its modular design, rich Cisco IOS[®] Software features, and add-on modules make it flexible for tailoring network segments to specific user requirements. Support for high-density Gigabit Ethernet to the desktop with a 48-port 10/100/1000BASE-T line card will meet Trimble engineers' desire for desktop bandwidth at Gigabit speeds without compromising on intelligent services such as QoS and security. Its passive backplane and centralized architecture allow for the addition of advanced networking features via Cisco Catalyst Supervisor Engine upgrades without the need to swap line cards. The new Supervisor Engine IV brings predictable, high-performance, integrated Layer 2, Layer 3, and Layer 4 switching and services at 48 Mpps and 64 Gbps into the wiring closet and collapsed backbone with robust intelligent services, including QoS, security, availability, and management features. For business resilience, the Cisco Catalyst 4507R chassis supports a redundant Supervisor Engine IV configuration, 1+1 power redundancy, and software fault tolerant features such as Hot Standby Routing Protocol. The future NetFlow Services Module for the Supervisor Engine IV will provide metering with usage statistics that can be imported into third-party applications for accounting purposes.

“The Catalyst 4500 gives us everything we need and more for both the present and the future,” Ching says. “The Catalyst 4500 brings price performance, resiliency, and a lot of advanced service features into the 500-user site, the right size for our sites.”

The fact that Cisco technology is industry proven was also a selling point, Ching adds. “Cisco AVVID has been tested in far larger deployments than ours. There is maturity in the [Cisco] code base.”

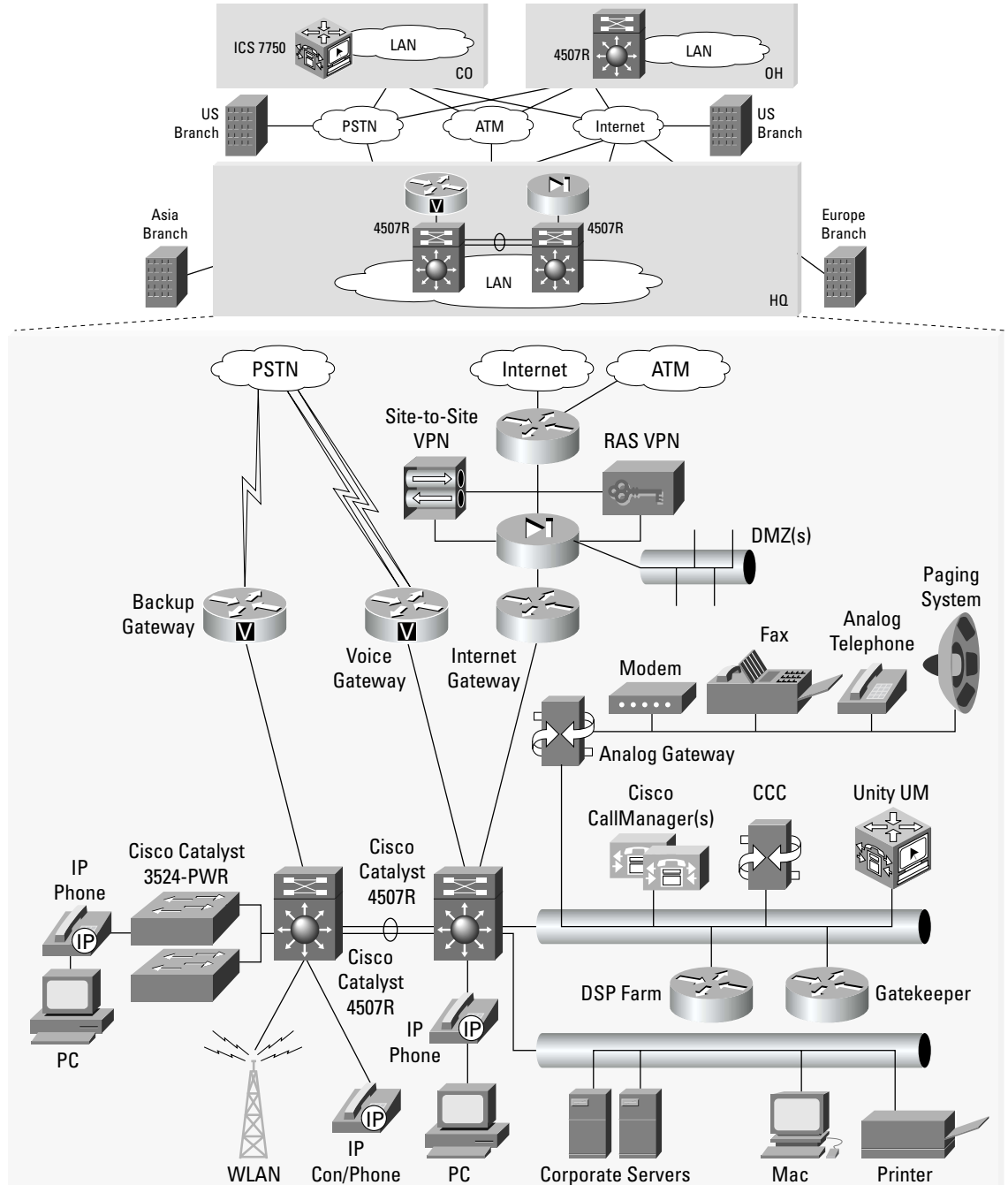
Just as important to Trimble is the fact that Cisco backs its products with outstanding service and support, and helps customers understand how the network enables them to improve business. “When you're really trying to help the business, you've got to meet the challenges the business faces,” Wilde says.

The Trimble LAN has installed Cisco Catalyst 4507R switches with dual Supervisor Engine IV in a collapsed backbone at each company site. The Catalyst 4500 switches also provide Gigabit Ethernet connectivity to the desktop in high-bandwidth wiring closets for the design engineering groups. Other closets have Cisco Catalyst 3524-PWR Series switches (Figure 1).

In the summer of 2002, Trimble successfully deployed a Cisco IP telephony solution in Westminster, Colorado as the pilot site. By mid-2003, the Sunnyvale, Dayton, and Chandler sites will each house a Cisco CallManager cluster and other Cisco telephony servers, and Cisco IP phones will reside on every desk. In a future deployment phase, satellite offices will connect to the nearest CallManager cluster in a semi-centralized call processing architecture. The existing Cisco site-to-site virtual private network (VPN) will carry interoffice calls over the Internet.



Figure 1
Cisco AVID Network at Trimble



The new LAN replaces a third-party switched infrastructure. Ching is thrilled that Catalyst 4500 Series switches with Supervisor Engine IV use Cisco IOS Software, allowing him to take advantage of his team's current knowledge as Trimble restructures its LAN. "One reason we hadn't deployed Cisco technology at the LAN level until now was the

operating system. With Cisco IOS Software in the switches, we don't have to learn another set of commands. We can have consistent software images in both our routers and switches for easier management and optimal performance."

Results

With Cisco IP telephony replacing Centrex, the network at Trimble, based on Cisco AVVID and the Catalyst 4500 Series switches will pay for itself shortly after implementation, according to Ching. This allows Trimble to maintain its tight IT budget, yet still bring the latest technologies to its users. The savings will begin with the changeover, he says. "We expect a 10 percent return soon after that."

Trimble expects to realize further cost savings in the future by using its remote-access VPN infrastructure for Cisco Unity® voice-mail access. Traveling employees can connect to the nearest Trimble office equipped with a Cisco VPN 3000 Concentrator for voice-mail access through the VPN WAN.

The migration gives the Trimble IT staff an opportunity to grow. Denis expects that as the data and telecom teams merge, staff members can increase their skills and increase their value to the company.

Wilde points out that the Catalyst 4000 Series was the platform that moved enterprises from switched 10-Mbps to 100-Mbps Ethernet, while the Catalyst 4500 "is a product that has its foot in the future. It's the box that takes us from 100 Mbps to Gigabit Ethernet and beyond."



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