Cisco and LightWave: A Total Performance Broadband Solution

"The Cisco ONS 15454 is truly a remarkable platform. Its compact size, power efficiency, and rapid provisioning have allowed us to deliver services in hours instead of weeks and at a cost that is 30 percent below market rates. It has been integral to our success."

- Mark Ricigliano, Founder and Chief Executive Officer, LightWave Communications, Inc.

Executive Summary

Background

LightWave Communications, Inc. is a facilities-based provider of broadband metropolitan access and long distance services. The company has built next-generation SONET networks on dark fiber metropolitan rings along the East Coast seaboard—from Boston to Washington, D.C. including New York City, Newark, New Jersey, Philadelphia, Pennsylvania and Baltimore, Maryland. Its customers range from the large carriers to smaller Internet service providers (ISPs).

Challenge

To compete in highly competitive metropolitan areas dominated by incumbent local exchange carriers (ILECs), LightWave needed to offer its customers a compelling reason to buy its services. Existing SONET-based networking was the established standard but it was proving to be inefficient for the new demands of Internet access and IP-based broadband services.

Solution

LightWave chose to build a high-bandwidth, cost-efficient metro optical access solution using the Cisco ONS 15454 next-generation SONET platform. Each Cisco ONS 15454 is equipped with multiple dense wavelength division multiplexing (DWDM) interfaces to support eight 2.5 Gbps (OC-48) wavelengths on a metro ring for an aggregate bandwidth of 20 Gbps. The metropolitan rings are connected over the long haul backbone using multiple OC-48 circuits.

Results

Each Cisco ONS 15454 delivers *three* services from *one* box—optical DWDM wavelengths, SONET-based private lines, and Gigabit Ethernet—which is unprecedented in the industry and slashes the amount of expensive co-location space LightWave must rent. The platforms also consume less power, reducing operations costs, and the Cisco ONS 15454 allows LightWave to provision new circuits in hours, instead of the weeks typically required with legacy SONET boxes. This allows LightWave Communications to offer a complete access solution that differentiates LightWave from its competitors.

Desire for Change

The status quo in the metro area market is no longer acceptable to many ISPs, competitive local exchange carriers (CLECs), digital subscriber line (DSL) providers, and interexchange carriers (IXCs). Unwilling to tolerate the high costs, long install times, and limited services availability that have been standard practice in the market, many of these providers are looking for newer solutions that deliver radical economic advantages.

LightWave Communications delivers unprecedented breakthrough solutions to this rapidly changing marketplace by deploying Cisco supercharged optical transport platforms. This platform has enabled LightWave to build a high-bandwidth, highly scalable, cost-efficient metro optical access solution that connects ISP and CLEC data centers, carrier hotels, and central offices (COs) to customers in a seamless optical network.

All Services from One Platform

LightWave's metro access networks are based on 30 to 50 Cisco ONS 15454 optical platforms arranged on multiple dark fiber metropolitan rings along the East Coast, from Boston to Washington, D.C.

On each metro ring, LightWave has configured the Cisco ONS 15454 to deliver optical DWDM wavelengths (at 2.5 Gbps), SONET-based private lines, and Gigabit Ethernet—a capability that is unique in the industry. Legacy SONET boxes can only support one traffic type per box—either TDM, IP, or optical—and, therefore, carriers must use multiple boxes to provide the same services that one Cisco ONS 15454 delivers. This dramatically reduces the co-location space LightWave must lease, lowering costs, and also allows LightWave to deliver revolutionary circuit density.

"The multiservice capabilities of the Cisco ONS 15454 means we can support the still-growing DS1 and DS3 business, but we can also handle the growing IP services of tomorrow such as Gigabit Ethernet," says Ricigliano. "And because the platform consumes less power and is easier to manage, we've been able to keep our operations cost much lower than our competitors and deliver on time."

Service Velocity

The Cisco ONS 15454 also delivers dramatic improvements in provisioning time—a clear competitive advantage and major benefit for customers. In a traditional SONET network, configuring circuits entails a long, expensive, and hardware-intensive physical process. LightWave, on the other hand, configures circuits for its clients within hours using the software-based Cisco Transport Controller. This optical management platform provides integrated control over all ONS 15454s stationed on a ring. Each time a Cisco ONS 15454 is plugged into a network, all other nodes automatically learn about each other. These show up on a graphical display on the Cisco Transport Controller. A technician then simply points and clicks to build circuits—usually within a half hour. This ensures that LightWave is able to meet any service deadlines.

Rapidly Scalable Rings

As part of its extraordinary integrated design, the Cisco ONS 15454 also supports DWDM in the metro, dramatically increasing bandwidth capacity by running multiple wavelengths over a single fiber. LightWave's ONS 15454s are configured with multiple OC-48 DWDM cards to support eight 2.5 Gbps (OC-48) wavelengths—delivering a staggering 20 Gbps of aggregate bandwidth across the metropolitan rings. This is eight times the level of bandwidth per fiber than that available from carriers using TDM-based technology.

What's more, the bandwidth LightWave is deploying today is only the entry point of a limitless scalability. New DWDM technologies will soon allow LightWave to scale to 16 wavelengths, and more, per fiber.

"We are using Cisco next-generation DWDM technology in profoundly new ways in the metro and long-haul space to deliver unheard of amounts of bandwidth over the same fiber used by the carriers," says Ricigliano. "This translates into radical economics. By transporting eight times as much traffic across the same fiber facilities, we offer much more bandwidth at much lower cost."

Because the Cisco ONS 15454 is NEBS3-compliant, LightWave has been able to install the optical platforms directly in the ILEC CO. This provides LightWave with direct access to the ILEC loop and reduces costs by eliminating a remote connection to the CO. LightWave's customers that are also located in the CO gain direct connection into the Cisco ONS 15454 over dark fiber or an Ethernet connection. Offsite customers connect to the CO over a leased OC-N connection from the ILEC.

To connect its Cisco ONS 15454 platforms between metro regions, LightWave utilizes OC-48 (2.5 Gbps) long-haul backbone links (soon to be upgraded to OC-192). By using optical DWDM technology throughout its network architecture—from metro to the long haul—LightWave offers a seamless optical service within its target market.

Today LightWave has more than 85 service provider customers ranging from large carriers to smaller ISPs.

New Market Opportunities with Native Ethernet

The Cisco ONS 15454's integrated services capability not only serves LightWave well in its target market—CLECs and ISPs—it is also helping to propel LightWave into new markets.

"We are using the native Fast Ethernet and Gigabit Ethernet capability on the Cisco ONS 15454 to deliver enterprise-class services to Fortune 1000 companies—a new market segment for us," says Ricigliano. "We install Fast or Gigabit Ethernet cards directly on the 15454, allowing enterprises to connect their Gigabit Ethernet LANs directly into our node without any translations. In addition, we are now targeting the large mainframe market—storage service providers—and providing them with a very high-speed, low cost alternative for storage backup. I know of no other platform in the industry that would allow us to handle Gigabit Ethernet along with the TDM and SONET traffic."

Investment Protection

The flexibility of the Cisco ONS 15454 and its ability to support new services through the addition of line cards protects LightWave's investment in the technology.

"We can continue to support the DS1 and DS3 traffic that shows no signs of slowing and at the same time support the Ethernet interfaces and next-generation IP services that are key to tomorrow's profits," says Ricigliano. "And we also have the built-in capability to pursue new markets as the opportunities arise. Working with Cisco and its next-generation SONET technology is strategic to the continued growth and success of our company as a full service provider of complete broadband solutions."

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