Verizon Delivers Next-Generation Networking to Government
'Green' Solutions are Energy-Efficient, Cut Costs

CASE STUDY

Verizon Business has developed Optical LAN Solutions (OLS), the most advanced, high performance enterprise LAN solution available today that uses the same passive optical network (PON) technology and practices that go into Verizon's nationwide fiber-to-the-premise network. The OLS network takes a single strand of single mode fiber from the data center all the way to the individual's desk. The OLS network's Gigabit PON (GPON) architecture means it can deliver full Gigabit Ethernet service to each desktop and, with GPON's sophisticated data-encryption capabilities, provide the secure transport of information between and among users.

Verizon Business, supported by ADC, recently completed two major OLS installations; one in the government sector and one in the commercial sector. By deploying this new 'green' technology in two very different environments – with users requiring the full range of networking options – the team demonstrated the versatility of Verizon's OLS product and the capabilities of advanced fiber-optic architecture.

One government installation was in the metropolitan Washington, D.C. area at a four-story, fully secure building for 800 users with three networks: classified, unclassified and a spare network. Verizon Business was hired to engineer, furnish and install the converged fiber-to-the-desktop solution. The commercial installation is a two-story building in Hanover, Maryland, used by 500 Verizon Business employees. Many trials and small installations have been completed, underscoring the momentum this solution is creating. Verizon Business also has built a laboratory at its Columbia, Maryland facility to further demonstrate the capabilities of OLS to potential customers.

Design Hurdles for a Next-Generation LAN

Developing an in-building, fiber-based Local Area Network (LAN) that takes converged services all the way to the desktop presented some significant challenges. One of the biggest challenges was how to build it for less money than it takes to deploy a traditional enterprise LAN. Another challenge involved how to reduce the required floor space for cabling and manage the necessary volume and length of cables within a raised-floor installation. Finally, Verizon Business wanted to design an optical LAN solutions offering that operates with less environmental impact, making it as "green" as possible.

Solutions for the Future

Verizon Business looked to ADC for help with the next-generation fiber infrastructure for the OLS solution. ADC suggested using its Rapid Fiber system, which enabled Verizon Business to tackle both the cost and cable-management challenges right from the start. Designed as a plug-and-play solution for fiber-optic networks within various types of buildings, the Rapid Fiber system deployed by Verizon Business in the OLS installations included the Rapid indoor Fiber Distribution Hub (iFDH), an inside-plant cabinet that functions as the main distribution and cross-connect point for the building. The iFDH uses factory-terminated and tested mechanical transfer (MT) connectors, rather than splicing, which means faster and less costly installations.

Michael Watts, Verizon Business Implementation Manager, said he originally planned to use the industry's traditional fiber distribution hubs and terminals that use mass fusion splicing. When ADC representatives suggested the pre-connectorized fiber plant, "I cringed," Watts said. "Without knowing the exact [cable] lengths and placement we would need...and with lead times what they were, I thought it was going to be impossible to meet the builder's schedule. But after evaluating the new design, I knew this would not only save on initial capital expense but also drastically reduce the installation time."

In addition, the Rapid iFDH can be wall-mounted, thereby saving valuable floor space, and it requires no power or cooling. By contrast, the workgroup

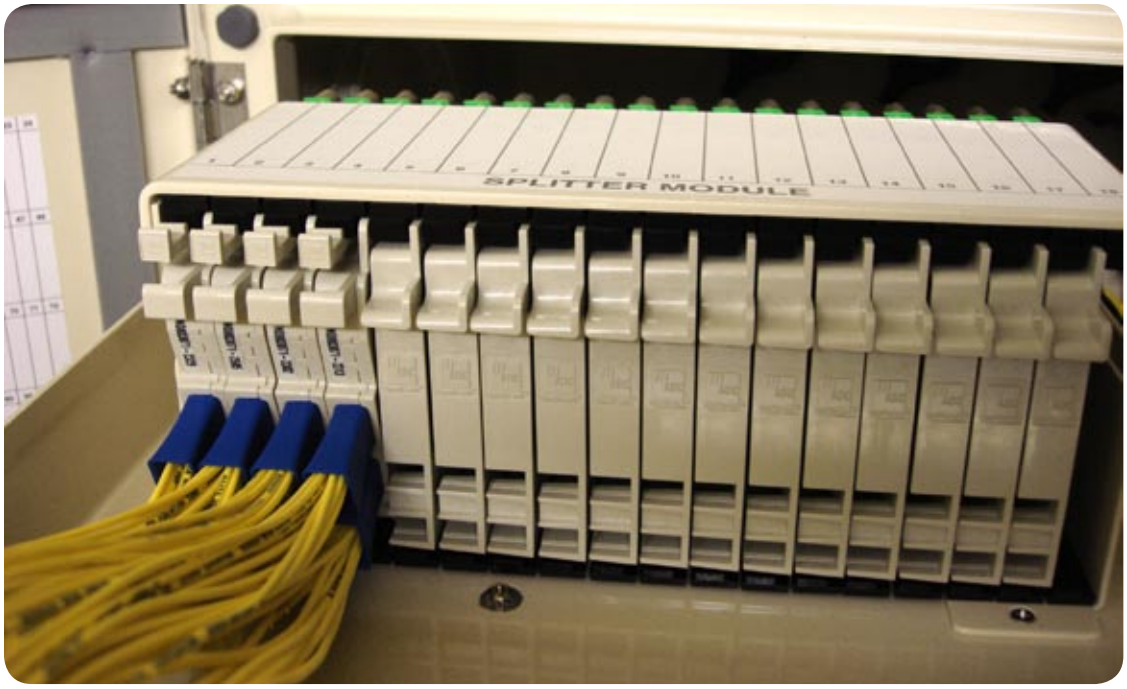
ADC's FDH serves as the primary cross connect point between the fiber distribution terminals and the OLT GPON ports

switches, fiber panels and copper patch panels within a traditional LAN installation require rack space, as well as power, uninterrupted power supply (UPS) and heating/ventilating/air conditioning (HVAC).

No Challenge Too Tough

The OLS Rapid Fiber installations incorporated ADC's Rapid indoor fiber distribution terminals (iFDT), the distribution points for individual desktops. By integrating cable payout systems that allow fast unspooling of up to 500 feet of cable from a single 6"x 9" wall box, these FDTs save even more physical space by eliminating the need for separate cable assemblies, splice cases and boxes.

The Rapid Fiber system within the OLS solution also features ADC's microcable technology with Reduced Bend Radius Fiber, a flexible optical fiber cable that installers can bend around a building's sharp interior corners as they pull it to the distribution point. It is designed for easier, faster installations while preserving the strength



ADC's Plug-and-Play Splitters provide the 1x32 split (1 feed to 32 users)

of the communications signal. Together, the "miniaturized" cable technology, the flexible fiber and Rapid Fiber's integrated slack storage enabled Verizon Business to manage cable volumes easily and conserve space in the process.

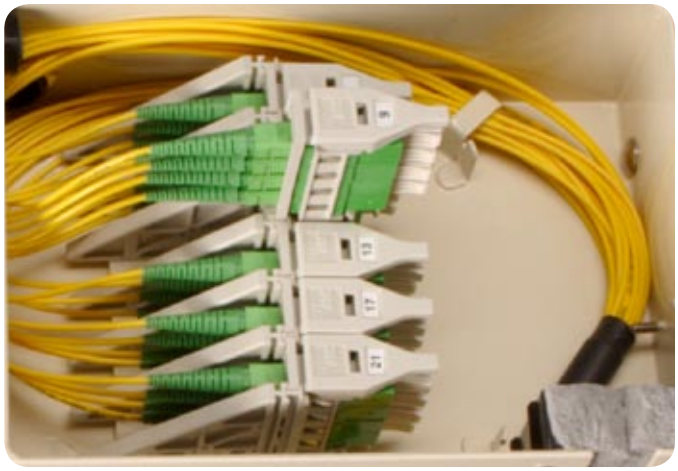
Another challenge arose when one customer required that various networks within the building be separated via color-coded cable. That installation was the first deployment of the relatively new Rapid Fiber system using plenum-rated fiber cable. Having different colors of the same products required the management of more part numbers. To alleviate that issue, Watts proposed placing the standard color Fiber Plant in plenum-rated colored Innerduct. From the FDH and FDT the fiber was placed within 1-inch plenum-rated Innerduct for added protection. This then allowed ADC to offer its basic ivory-colored cable that is used in large volumes for other programs, thus reducing lead times, part numbers, and cost.

"With the help of ADC's Professional Services Group," Watts said, "both projects went off without a hitch. We did not have a single fiber port test outside of the standards. So with the combined focus of Verizon Business and ADC, we were able to meet our installation dates, with one project finishing ahead of schedule, due to the reduction of labor hours required to install the product."

The Benefits of a Converge, Connect and Conserve Solution

The Verizon OLS solution offers several advantages over traditional network architectures. Using single-mode fiber all the way to the desktop can theoretically provide data rates of up to 25 terabits per second (Tbps), voice-over-Internet Protocol (VoIP) service and as many as 2,000 video channels at distances of up to 12 miles on a single strand of fiber. By comparison, traditional architectures generally use a separate medium for each type of traffic: dual-strand, multi-mode fiber to deliver data rates of 10 Gbps; twisted copper pair for voice service; and coaxial cable for video. "We are constantly working with our vendors to test and develop a cutting edge solution for our customers," Watts said.

Eric Welty, Verizon Business Project Manager, said, "The OLS solution's use of a single strand of fiber not only reduces network infrastructure to a fraction of what is required in the conventional Ethernet approach, but it also reaches end users who are located up to 12 miles from your data center–with no need for signal regeneration. In addition, because the fiber is expected to support advances in PON technology far into the future, this makes your network more prepared for future demands."



The sliding pack adapters in iFDT make interconnecting new users easier without disrupting existing user circuits

He added, "OLS is truly a green solution because it is completely passive and requires no power or HVAC between the data center and the end user. When compared to traditional LAN architectures, OLS enables customers to significantly reduce power consumption and cooling costs of operating the network."

By taking a "converge, connect and conserve" approach with OLS, Welty said, "Verizon Business intends to leave customers feeling like they aren't just getting another network solution, but that their network requirements have finally been solved."

CASE STUDY

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