Case Study: Military Base Swaps SONET for LambdaDriver WDM for Backbone Network

To support growing bandwidth demands among its users and a desire to lower costs with voice over IP (VoIP) services, a large, tropically located U.S. Department of Defense (DoD) base went through a complete overhaul of its backbone network. All of this base’s Information Management and Information Technology-related services and support is the responsibility of the Directorate of Information Management (DOIM), which acts as the federal information technology service provider of choice for the region. The DOIM recently replaced its existing backbone network with an MRV LambdaDriver-powered WDM solution to boost its bandwidth and give it better ability to support VoIP and high-speed LANs.

Background
The base’s data communications needs were served by an OC-48 SONET backbone network, which delivered all data and TDM voice. The base was modernizing its networks, adding NAC, VoIP, wireless networks and 10Gbps LANs. This created a bandwidth bottleneck at the backbone network and drove a need for more bandwidth. At first, the DOIM management wanted to upgrade its existing network to OC-192, even though its equipment was encountering some expensive maintenance issues.

This maintenance issue is exacerbated by the tropical jungle geography in which the base is located, which lends itself to increased number of power outages and issues with power quality that can impact the network. In fact, after a power outage caused by a snake, the base made a second order of MRV equipment, this time it was LX 4000 out-of-band network management system to streamline IT’s response to power issues. (More information on the optical backbone network implementation please see case study titled MRV Out-of-Band Power Management Boosts Military Installation Uptime at mrv.com.)

One option open to the DOIM for the backbone network was to use a routed 10G Ethernet backbone. However, the base still needed a multiplexed network, because it needed to channelize secure and non-secure traffic to meet government requirements.

But SONET gear has increased in price to the point it was uneconomical, and with the move to VoIP, the need for a TDM-based backbone network was not critical. In fact, installing the entire MRV WDM network cost less than the SONET upgrade.
MRV Solution
WDM technology was a great fit for the backbone network that the DOIM was building because it was dramatically less expensive than SONET, but offered the security level, data partitioning and the bandwidth needed to support future growth. The base chose to deploy the LambdaDriver® modular WDM system.

Typically, fiber optic backbone networks are good for long distance and high-speed network needs. While the base needed the speed, it didn't necessarily need the distance as most locations were within a couple hundred feet of each other. The new LambdaDriver network supported up to 40Gbps. With the modular architecture of the LambdaDriver, network bandwidth could easily be increased as the DOIM managers upgraded their own services offerings by changing out hot-swappable modules in the WDM chassis. This provided a future-proof system that would enable the base to increase is bandwidth immediately once it was ready.

Implementation
The first step in the network upgrade was to involve trusted partner Advanced Integrated Technologies Corporation (AITC), an end-to-end technology and business process outsourcing services company with specialized experience serving the government sector. AITC worked with the DOIM to drive a brief evaluation process of the various vendor options for the upgrade.

An important capability for the network was LambdaDriver's use of small form factor pluggable (SFP) optics. Because the network was multiprotocol, supporting OC-48, Gigabit Ethernet, Fast Ethernet and others, it was important to have the flexibility to change optics and protocol support on a per interface basis – not needing to buy a whole board for a single port.

Network design flexibility was also important as the network serves three locations on the base. Using the LambdaDriver's add-drop multiplexing capability, network designers were able to build a redundant ring topology.

The network also needed to support traffic from the NIPRNET (Nonsecure Internet Protocol Routing Network) and the SIPRNET (Secure Internet Protocol Routing Network). With the LambdaDriver, the DOIM was able to set up channels for each type of data traffic to isolate classified and unclassified information.

**LambdaDriver**
This family of optical transport solutions consists of multi-functional, compact and modular WDM systems that can create up to 80 independent virtual fiber-optic links. The Lambda Driver family supports both dense WDM (DWDM) and course WDM (CWDM) technology, and can handle data streams with rates from eight Mbps up to 10 Gbps.

The Lambda Driver systems are specifically designed for organizations that require flexible, compact and cost-effective multiplexing and transport of high-speed network, storage, voice, and video data. With its flexible architecture and number of optical networking modules and chassis the LambdaDriver platform is well suited for building high-performance optical backbone networks.

LambdaDriver products support different network topologies such as point-to-point, linear optical add-drop multiplexing (OADM) and ring using DWDM and CWDM technology and support data rates from 8 Mbps to 10 Gbps with a path to seamlessly upgrade to 40 Gbps.
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Success!
Making a complete network overhaul is always a task to approach carefully. The base’s DOIM chose the MRV LambdaDriver for its transition to IP/WDM backbone and found that the entire network was implemented seamlessly in a timely and cost-efficient manner. The success of this network led the DOIM to turn to MRV again for its out-of-band networking solution for power management.