



Department Of Defense Applications

Delivering Flexibility and Performance in a Rugged Design for Harsh DoD-specific Networking Applications

Executive Summary

DoD applications are specialized, requiring unique physical characteristics and stringent security functionality in addition to the traditional enterprise data center features and protocols.

In the modern information-centric battlefield, network equipment is being carried into demanding locations, with deployments of "data centers in a box" brought to advanced positions. Mobile data centers are being mounted in planes, Humvees, submarines, warships, and many other transportation based platforms. This coincides with the growing number of advanced data collection devices which drive an ever increasing volume of tactical data used for mission critical decisions that leverage real-time information.

Space Optimized Solution

Mellanox created a unique, small form factor, high speed, Ethernet switch that is unlike anything in the industry. At just 7.87" wide, two SN2100 switches can sit side by side in a standard 19" rack, consuming a single rack unit for the pair of highly available switches. This minuscule size makes it ideal for deploying in the tight spaces found in rapid deployment vehicles such as helicopters or Humvees.

Real-time information has never been more critical, as first responders are frequently required to access tactical data quickly and maintain connectivity wherever they are deployed. Compact, but high speed, connectivity that is self-contained is fundamental to realizing the rapid deployment of mission-critical networking.

Planes and Warships

Mobile data centers are not limited to land-based platforms but are also being deployed in helicopters, planes, submarines, and a variety of ships. As advanced data collection and analysis devices are expanding in number and variety, so must the network fabric that connects them. Built around Mellanox's 6.4Tbps Spectrum switch ASIC, the SN2100 packs an unprecedented amount of network throughput in a miniature footprint. Besides providing superior packet forwarding, buffering, and latency characteristics, the Spectrum ASIC has best in class power consumption, which is a significant advantage for mobile data center applications where low power consumption equals a low cooling overhead.

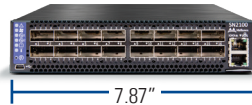
The SN2100 is available in an array of flexible physical configurations, expanding on the variety of places a network can be deployed. The airflow direction of a switch must match the airflow of adjacent servers and other neighboring equipment to ensure proper cooling and to avoid damaging air recirculation loops. The SN2100 is offered in two different air flow directions: front-to-back and back-to-front cooling as well as two different lengths. In many ships and planes, longer switches won't fit in the tight confines of traveling communication closets, so the diminutive depth of the SN2100 allows it to be used in places that cumbersome dimensions of competitive solutions prevent deployment.

Future Proof Networking

The Mellanox SN2100 provides a level of upgradability unmatched in the industry. It can be used as a simple 16 port 1/10GbE switch and then later upgraded to 25, 40, 50, or 100GbE with a simple swap of the cables. Up to 64 ports can be accessed from a single SN2100 switch using the same breakout cables made popular by web-scale IT shops and in the process, simplifying cable management. Support for 100 Gigabit Ethernet means that it can be safely counted on to provide cost-effective edge connectivity for a decade to come. Mellanox is also committed to supporting extended service cycles of up to 8 years which are needed for mobile platforms that have infrequent infrastructure refreshes.

The Mellanox SN2100 Effectively Delivers:

- Unique Form Factor Ideal for DoD Applications
- Highest Density Switch with up to 64 Ports
- DoD Compliant Strict Security Mode
- Zero Packet Loss
- 8 Year Future Proof Life Cycle – 1/10/40GbE today 25/100GbE tomorrow
- Simple Upgrade by Changing Cables
- Lowest Power Consumption – Perfect for Mobile Deployments
- APIs for Automation Enabled Software-defined Data Centers
- Application, Storage and Front-end one Network Fabric



Superior SWaP-C

SWaP-C represents four key measureable factors that differentiate the SN2100 for tactical data communication deployments. S= Size, W=Weight, P=Power, and C=Cost. At just 7.87" wide and a very short depths, the SN2100 has an important size advantage. Tipping the scales at just 4.540kg (10 lbs), it also holds a weight advantage. With a typical power consumption of just 93 watts (under 6 watts per port), it offers the lowest power consumption of any 100GbE capable switch. Lastly, the SN2100 has price advantage, with the lowest dollar per Gigabit of throughput of any switch of this capacity.

Fault Tolerant Resilient Networking

Mission critical deployments require resilient operation, which the SN2100 delivers with redundant power supplies and fans that are included with the switch at no additional cost. The SN2100 comes with the MLNX OS operating system, which includes a number of advanced high availability networking features, like Multi-chassis Link Aggregation (MLAG), LACP, and ECMP for active/active Layer 3 forwarding and redundancy.

Dropping mission-critical tactical data is unacceptable and the SN2100 is the only switch in its class with zero packet loss, being able to transmit packets of all sizes across all port combination at line rate without dropping any packets.

Mellanox Strict Security Mode

Security compliance is a must-have requirement for any communication gear and particularly important with networking equipment. Mellanox created an innovative Strict Security Mode which hardens many features on the SN2100 to comply with the NIST 800-131a and FIPs 140-2 standards. In this strict security mode, only those ciphers accepted by NIST are permitted, only secure network monitoring with SNMPv3 is allowed, and remote access must be secured with SSHv2 or HTTPS. Older, less secure, methods of monitoring and remote access are blocked. NIST-compliant certificate keys can be self-generated or trusted keys can be installed onto the switch for thoroughly secure access using SSH, HTTPS, or LDAP protocols. Local passwords are not allowed to be stored in clear text or even when encrypted with a simple MD5 hash, but instead, local accounts are encrypted using the stronger SHA512 algorithm.

The SN2100 also supports a fully encrypted file system, so that all sensitive data, including log files, certificates, keys, usernames and passwords are accessible only with the encryption key. This key can be stored internally on the switch or placed in the USB port.



Lastly, the image file for the switch Operating System is digitally signed to safeguard against any third party that might modify the operating system – a necessary precaution to avoid sophisticated supply chain tampering.

This strict security-focused functionality is complemented by an easy to follow user guide which clearly documents how to configure the cryptographic settings and other access rules to safeguard the switch from intrusion and to ready the switch for deployment in secure environments.

Automated Provisioning and Orchestration

Manual network configuration using a command line interface are prone to human-errors and mistakes. A reliable alternative is to implement an automated, scriptable configuration tool for provisioning and re-configuring the network infrastructure in a secure, repeatable, error-free manner. The Mellanox SN2100 comes with broad support for automation tools and is integrated with many software defined networking solutions.

Mellanox End-to-End Ethernet Solution

Mellanox is the only networking vendor who makes their own NICs, cables, optical transceivers, and switch silicon. This comprehensive end-to-end Ethernet solution allows Mellanox to reduce the risks associated with the deployment and management of high-speed networking. Optimized for ultra-low latency lossless fabrics, the Mellanox Ethernet switches support the requirements of today's high performance data centers and work as the ideal top-of-rack switches for various hyper-converged infrastructure deployments. Equipped with intelligent ASICs, Mellanox Ethernet adapter cards provide offloading mechanisms such as Erasure Coding, TCP and UDP offloads, and VXLAN overlay offloads. By bypassing the CPU with RDMA over Converged Ethernet (RoCE), the server resources are freed up, leaving more CPU cores available to analyze tactical data or other storage and compute tasks, allowing for higher scalability and efficiency within the mobile data center.

About Mellanox

Mellanox Technologies (NASDAQ: [MLNX](#)) is a leading supplier of end-to-end Ethernet and InfiniBand intelligent interconnect solutions and services for servers, storage, and hyper-converged infrastructure. Mellanox intelligent interconnect solutions increase data center efficiency by providing the highest throughput and lowest latency, delivering data faster to applications and unlocking system performance.



350 Oakmead Parkway, Suite 100, Sunnyvale, CA 94085
Tel: 408-970-3400 • Fax: 408-970-3403
www.mellanox.com

MLNX-31-427