Mellanox Onyx® Advanced Network Operating System

Shape Your Network to Your Needs

Mellanox Onyx® is a high performance switch operating system, designed for the scale and demands of next-generation data centers. Whether building a robust Ethernet Storage Fabric (ESF), public or private cloud, customers can leverage the flexibility of Onyx to tailor their network platform to their environment.

With built-in workflow automation, monitoring & visibility tools, enhanced high availability mechanisms, and more, Mellanox Onyx simplifies network processes, increasing efficiency and reducing operating expenses and time-to-service.

Programmability

The move to modern datacenters is driving new and dynamic operation models. Onyx provides operators with a wide range of tools to address these needs, including enhanced parsing, dynamic pipeline control, and enhanced OpenFlow implementation to enable numerous SDN deployment models. In addition, Onyx supports Docker containers, which enable software to be run in isolation, full SDK access, faster and secure delivery of customized applications, and more.

Figure 1. Sample Screenshots [†]

RDMA over Converged Ethernet (RoCE)

Mellanox Onyx offers multiple best-in-class buffer utilization monitoring and enhanced quality of service (QoS) mechanisms. It also embraces advanced congestion avoidance and congestion management features which are key to unlocking the scalability and performance of applications from the worlds of storage and Artificial Intelligence.

Automation

Mellanox Onyx's built-in automation infrastructure reduces operational expenses and time to service by minimizing manual operations and eliminating configuration and provisioning errors. Automation tools such as Ansible, SaltStack, ZTP and Puppet enable you to automate fabric configuration and large scale deployments.

HIGHLIGHTS

- Future-proofed data center for Storage, Artificial Intelligence (AI) / Machine Learning and Cloud networking
- Low operational overhead via use of Ansible & SaltStack
- Zero Touch Provisioning
- Cloud-level scalability
- Flexibility and feature velocity using Docker containers with full SDK access
- Simple and optimal RoCE deployment
- High availability mechanisms
- Common industry CLI for smooth and easy adoption
- Visibility & performance monitoring
- Quality of Service based on traffic type and service levels
- Scalable & flexible AEON Packet Broker

[†] For illustration only. Actual products may vary.

Cloud-level Scalability

Mellanox Onyx enables customers to build scalable leaf and spine cloud networks that are resource-optimized and cost-efficient, reducing unnecessary layers of switches, optics and fiber. Onyx scalable and robust layers 2 and 3 protocol stacks includes: ECMP load balancing and effective bandwidth utilization, BFD infrastructure for optimal failure recovery, robust layer 2 MLAG deployment, and a L2 VXLAN gateway that integrates with controllers like NSX and OpenStack.

Mellanox AEON Packet Broker

AEON Packet Broker is a built-in scalable and flexible cost effective network packet broker solution. AEON enables the capture and analysis of all required traffic and flows in a data center or service provider network toward analysis tools, such as Riverbed, FireEye, Splunk (and many others).

AEON Packet Broker Use Cases

- Network security – monitors your network for malicious activity
- Network growth planning – proactive plans your network elasticity; grow or expand according to your business strategy
- SLA monitoring – verifies your customers are receiving agreed-upon services as defined by the SLA agreement
- Regulatory compliance – supports regulatory compliance related to your type of network (finance, enterprise, etc.)
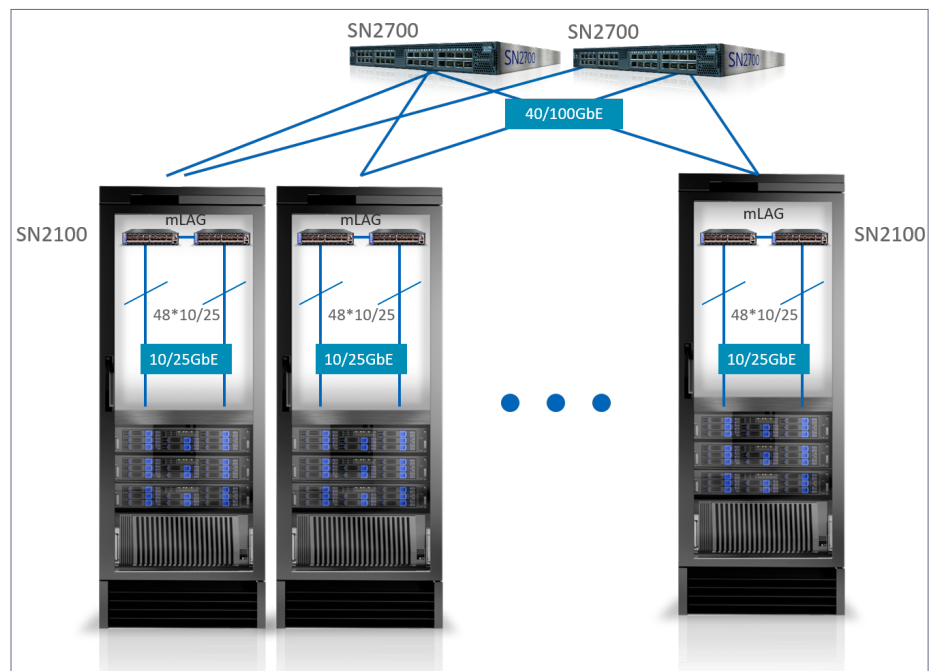- Lawful Interception (LI) capabilities – facilitates CALEA compliance for service providers

Monitoring & Visibility

Mellanox Onyx offers operators a wide variety of monitoring and innovative telemetry tools, providing greater visibility into the network and enabling users to proactively plan and maintain networks —starting from enhanced link diagnostics that deliver detailed information and advisory regarding link-level corrective actions, through sub-microsecond buffer occupancy and congestion.

Using a flexible, user-configurable telemetry agent, the operator can select and adjust the parameters they would like to stream toward a centralized collector, or toward Mellanox's state-of-the-art Mellanox NEO telemetry application.

Figure 2. Mellanox Onyx Fabric

What Just Happened™ (WJH)

As an innovative network telemetry technology, Mellanox's What Just Happened™ (WJH) monitors and alerts on data plane anomalies to reduce system downtime. With built-in capabilities to inspect packets across all ports at line-rate, multi-terabit speeds, WJH avoids time-consuming data collection and manual searches for network problems.

High Availability

Enhanced network mechanisms provide high availability on both Layer 2 and layer 3: ECMP, MLAG. Also included are monitoring mechanisms that support IT departments that have adopted a proactive maintenance approach.

End-to-end Fabric Management with Mellanox NEO®

Mellanox NEO®management platform extends management throughout the entire fabric, with end-to-end capabilities for both switches and NICs. Use Mellanox NEO to enable even greater visibility into the complete data transport path, from the server, through the network fabric and to the server/client.

FEATURES

Layer 2 Feature Set
– Multi Chassis LAG (MLAG)
– IGMP V2/V3, Snooping, Querier
– VLAN 802.1Q (4K)
– Q-In-Q
– 802.1W Rapid Spanning Tree
– BPDU Filter, Root Guard
– Loop Guard, BPDU Guard
– 802.1Q Multiple STP
– PVRST+ (Rapid Per VLAN STP+)
– 802.3ad Link Aggregation (LAG) & LACP
– 32 Ports/Channel - 64 Groups Per System
– Port Isolation
– LLDP
– Store & Forward / Cut-through mode of work
– HLL
– 10/25/40/50/56/100GbE
– Jumbo Frames (9216 BYTES)

Layer 3 Feature Set
– 64 VRFs
– IPv4 & IPv6 Routing inc Route maps:
– BGP4, OSPFv2
– PIM-SM & PIM-SSM (inc PIM-SM over MLAG)
– BFD (BGP, OSPF, static routes)
– VRRP
– DHCPv4/v6 Relay
– Router Port, int Vlan, NULL Interface for Routing
– ECMP, 64-way
– IGMPv2/v3 Snooping Querier

Synchronization
– PTP IEEE-1588 (SMPTE profile)
– NTP

Quality of Service
– 802.3X Flow Control
– WRED, Fast ECN & PFC
– 802.1Qbb Priority Flow Control
– 802.1Qaz ETS
– DCBX – App TLV support
– Advanced QoS- qualification, Rewrite, Policers – 802.1AB
– Shared buffer management

Management & Automation
– ZTP
– Ansible, SALT Stack, Puppet
– FTP \ TFTP \ SCP
– AAA , RADIUS \ TACACS+ \ LDAP
– JSON & CLI , Enhanced Web UI
– SNMP v1,2,3
– In-band Management
– DHCP, SSHv2, Telnet
– SYSLOG
– 10/100/1000 ETH RJ45 MNG ports
– USB Console port for Management
– Dual SW image
– Events history
– ONIE

Network Virtualization
– VXLAN EVPN – L2 stretch use case
– VXLAN Hardware VTEP – L2 GW
– Integration with VMware NSX & OpenStack, etc

Software Defined Network (SDN)
– OpenFlow 1.3:
  • Hybrid
  • Supported controllers: ODL, ONOS, FloodLight, RYU, etc.

Docker Container
– Full SDK access through the container
– Persistent container & shared storage

Monitoring & Telemetry
– What Just Happened (WJH)
– sFlow
– Real time queue depth histograms & thresholds
– Port mirroring (SPAN & RSPAN)
– Enhanced Link & Phy Monitoring
– BER degradation monitor
– Enhanced health mechanism
– 3rd party integration (Splunk, etc.)

Security
– USA Department of Defense certification – UC APL
– System secure mode – FIPS 140-2 compliance
– Storm Control
– Access Control Lists (ACLs L2-L4 & user defined)
– 802.1X - Port Based Network Access Control
– SSH server strict mode – NIST 800-181A
– CoPP (IP filter)
– Port isolation