vSAN™ Networking Done Right

Increase vSAN Efficiency with Mellanox Ethernet Interconnects

VMware Virtual SAN

VMware's Virtual SAN (vSAN) brings performance, low cost and scalability to virtual cloud deployments. An issue that cloud deployment model raises is the problem of adequate storage performance to virtual instances. Spinning disks and limited bandwidth networks lower IO rates over local drives. VMware's solution to this is vSAN which adds a temporary local storage "instance" in the form of a solid-state drive to each server. vSAN extends the concept of local instance storage to a shareable storage unit in each server, where additionally, the data can be accessed by other servers over a LAN. vSAN brings. The benefits of VSAN include:

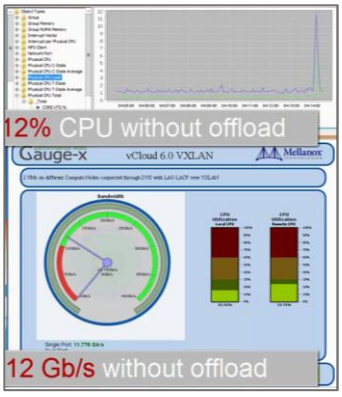
- Increased performance due to local server access to Flash storage
- Lower infrastructure cost by removing the need for networked storage appliances
- Highly scalable -- simply add more servers to increase storage
- Eliminate boot storms since data is stored locally
- Unified management -- no storage silo versus server silo separation problems

Mellanox 10/25G Ethernet interconnect solutions enable unmatched competitive advantages in VMware environments by increase efficiency of overall server utilization and eliminating I/O bottleneck to enable more virtual machines per server, faster migrations and speed access to storage. Explore this reference guide to learn more about how Mellanox key technologies can help improve efficiencies in your vSAN environment.

Higher Efficiency

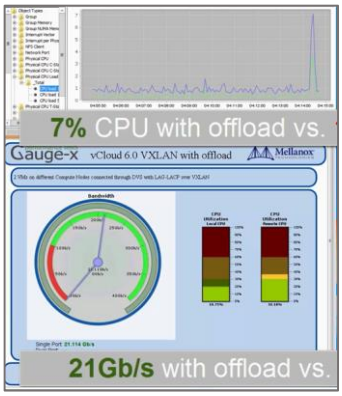
Efficient Hardware Offloads

A variety of new workloads and technologies are increasing the load on CPU utilization. Overlay networks protocols, OVS processing, access to storage and others are placing a strain on VMware environments. High performance workloads require intensive processing which can waste CPU cycles, and choke networks. The end result is that application efficiency is limited and virtual environments as a whole becomes inefficient. Because of these challenges, data center administrators now look to alleviate CPU loads by implementing, intelligent, network components that can ease CPU strain, increase network bandwidth and enable scale and efficiency in virtual environments.



Without Offloads

Mellanox interconnects can reduce the burden by offloading many networking tasks, thereby freeing CPU resources to serve more VMs and process more data. Side-by-side comparison shows over a 70% reduction in CPU resources and a 40% improvement in bandwidth.

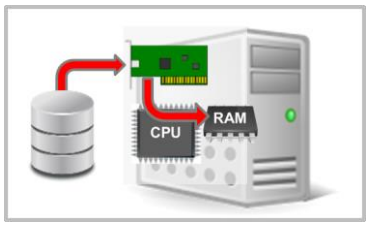


With Mellanox Offloads

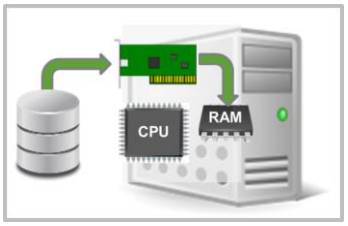
RoCE Certified

Reduce CPU Overhead

vSphere 6.5, introduced Remote Direct Memory Access over Converged Ethernet (RoCE). RoCE allows direct memory access from one computer to another without involving the operating system or CPU. The transfer of data is offloaded to a RoCE-capable adapter, freeing the CPU from the data transfer process and reducing latencies. For virtual machines a PVRDMA (para-virtualized RDMA) network adapter is used to communicate with other virtual machines. Mellanox adapters are certified for both in vSphere.



Without RDMA



With RDMA

RoCE dramatically accelerates communication between two network endpoints but also requires a switch that is configured for lossless traffic. RoCE v1 operates over lossless layer 2 and RoCE v2 supports layer 2 and layer 3. To ensure a lossless environment, you must be able to control the traffic flows. Mellanox Spectrum switches support Priority Flow Control (PFC) and Explicit Congestion Notification (ECN) which enables a global pause across the network to support RDMA. Once RoCE is setup on vSphere close-to-local, predictable latency can be gained from networked storage along with line-rate throughput and linear scalability. This helps to accommodate dynamic, agile data movement between nodes.

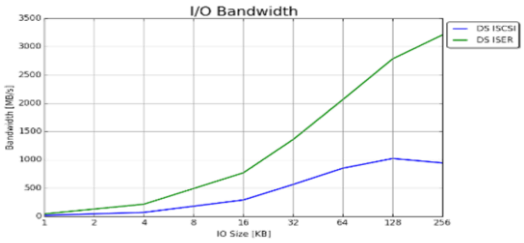
Increasing vSAN Efficiency

Increase vSAN Efficiency with Mellanox Ethernet Interconnects

iSER

Deliver 3X Efficiency

Storage virtualization requires an agile and responsive network. iSER accelerates workloads by using an iSCSI extensions for RDMA. Using the iSER extension lowers latencies and CPU utilization to help keep pace with I/O requirements and provides a 70% improvement in throughput and 70% reduction in latencies through Mellanox Ethernet interconnects.



Hyper-Converged

Reduce CapEx Expense

Hyper-Converged Infrastructure (HCI) is a demanding environment for networking interconnects. HCI consists of three software components: compute virtualization, storage virtualization and management, in which all three require an agile and responsive network. Deploying on 10, or better, 25G network pipes assists as does network adapters and switches with offload capabilities to optimize performance and availability of synchronization and replication of virtualized workloads.

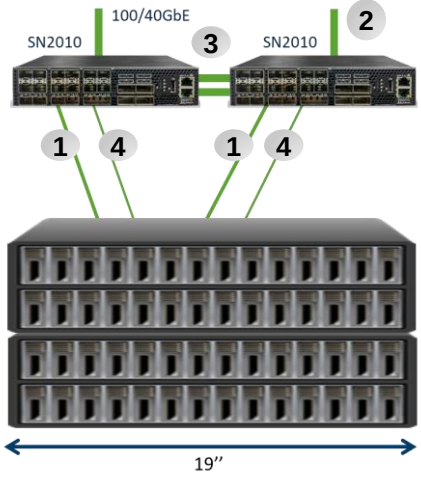
Mellanox adapters and switches accelerate VM resources to improve performance, enhance efficiency and provide high-availability and are a must-have feature for any VMware environment.

	10GbE	25GbE
# of Network Ports	2 @ $400	1 @ $500
# or Storage Ports	2 @ $400	1 @ $500
16 Nodes Cluster Price	$25,600	$16,000
32 Nodes Cluster Price	$51,200	$32,000
64 Nodes Cluster Price	$102,400	$64,000

CapEx Analysis: 10G vs. 25G

Mellanox Interconnects

Deployment Config



- ½ 19" width, 1U height
- 18x10/25GbE + 4x40/100GbE
- 57W typical (ATIS)

1. 25/10GbE link: QSFP to SFP+
2. 100/40GbE link: QSFP to QSFP
3. 100GbE link: QSFP to QSFP
4. 1GbE link: 1GbE Transceiver

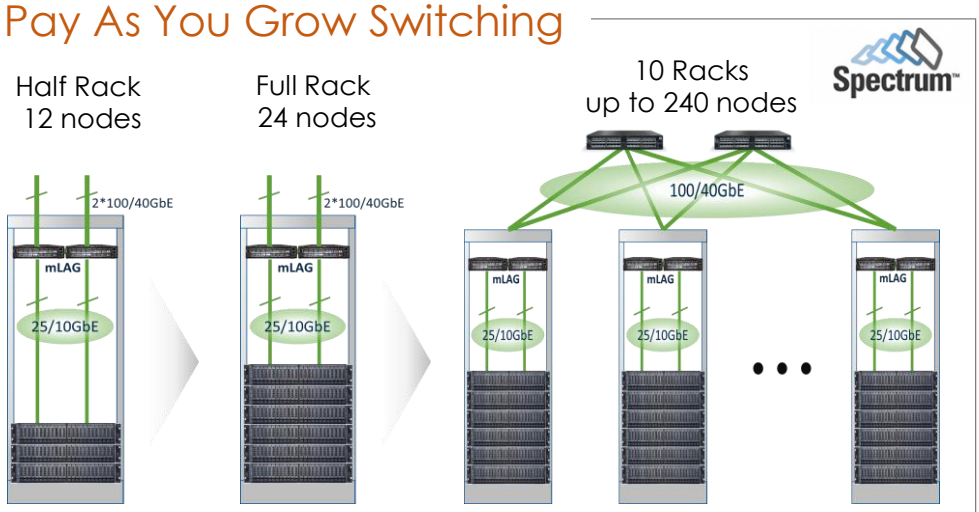
Ethernet Adapters

Mellanox Connect-X adapters:

- Enable near-native performance for VMs thru Stateless offloads
- Extend hardware resources to 64 PF, 512 VF w/ SR-IOV & ROCE
- Accelerate virtualized networks with VXLAN, GENEVE & NVGRE
- Align network services with compute services for multitenant network support

ConnectX-5 | ConnectX-4

Pay As You Grow Switching



Scalable from a half rack to multiple racks

Automated Network

Provisioning & Orchestration

- Zero-touch provisioning
- VLAN auto-provisioning
- Migrate VMs without manual configuration
- VXLAN/DCI support for VM migration across multiple datacenters for DR

Monitoring

- Performance monitoring
- Health monitoring
- Detailed telemetry
- Alerts and notifications

ONYX