Accelerating Red Hat Ceph Storage While Delivering Massive Scalability and Reduced Cost

Mellanox Maximizes the Value of Software-Defined Ceph Storage by:

Increase Throughput up to 5x compared to 10GbE

Lower Latencies by 50% to maximize performance and availability

Ensuring Future-proof scalability with 25/40/50/100GbE support

Hardware Flexibility to lower the cost of enterprise storage

Executive Summary

The advent of cloud computing, big data, and the increased use of analytics on data pools has left organizations struggling to keep pace with their storage demands. Red Hat® Ceph Storage uses standard server hardware to scale capacity and performance, and the addition of Mellanox Ethernet solutions allows Ceph to scale more economically and efficiently. Together, Mellanox switches, adapters and cables, and the Red Hat's Ceph Storage platform provide the right storage combination for today's cloud and enterprise customers.

True Scale-Out Network

Red Hat Ceph Storage is a leading software-defined storage solution with the ability to support block, object and file storage requirements. Based on Ceph, the open source storage software that is overwhelmingly preferred by OpenStack users, it has a scale-out cluster design to enable growth of both capacity and performance.

There is a front-end (public) network for connecting to clients and a back-end (cluster) network for handling storage replication, rebalancing, and recovery. The cluster network can carry up to three times the traffic of the public network for data writes and more when rebuilding or rebalancing nodes. Additional advantages of Ceph include no single point of failure, and software-defined services for self-managing, and self-healing, and to help reduce administration costs.

10GbE Is Not Enough

The growing need for additional bandwidth in servers used for Red Hat Ceph Storage and the increasing use of flash means 10GbE is not enough to keep pace with performance requirements. And if the public and cluster networks are run on the same physical network, bandwidth requirements can easily be multiplied.

If a node fails, Red Hat Ceph Storage automatically recreates and restores the node which requires a large amount of bandwidth to do so. During high-IOPS workloads, such as running MySQL database, both the public and cluster networks demand low latency to deliver the best performance.
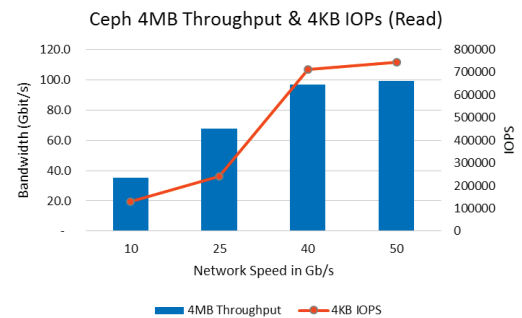

Figure 1 – Mellanox 25, 40, and 50GbE networks increase Ceph large block throughput and small block IOPs.

Accelerates Storage Performance

Testing by Red Hat, Mellanox, Supermicro, Quanta Cloud Technology, Cisco, and others all show that 10GbE can constrain performance for dense-capacity Ceph servers (>12 spinning disks per server) in either all-disk or a combination of disk and flash environments. The same testing also proved that a Mellanox 25, 40 or 50GbE end-to-end network accelerates Ceph sequential throughput up to 5 times and cuts Ceph latency in half compared to a standard 10GbE network.

Future-Proofs Your Network

Mellanox adapters and switches support 10, 25, 40, 50 and 100Gb Ethernet, allowing you to scale and future-proof your Ceph network. Customers can separate the Ceph networks for security and manageability, running the public network on 10 or 25GbE and the more demanding cluster network on 40 or 50GbE. Or to simplify deployment, both Ceph networks can run on one unified 40 or 50GbE network.

Mellanox networking solutions let you run the Ceph nodes at 10 or 25GbE today and non-disruptively upgrade to 40, 50, or 100GbE when faster CPUs, more disks, or flash SSDs are acquired in the future.

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Freedom from Traditional Storage Limitations

To stay competitive, organizations need to re-evaluate storage deployment methodologies and look for solutions that provide a foundation for managing exponential data growth while improving on economics. Red Hat Ceph Storage combines the ability of object, file and block storage with off-the-shelf hardware. Paired with Mellanox enterprise Ethernet solutions, Ceph clusters can be deployed at scale to meet next-gen data center performance requirements with confidence.
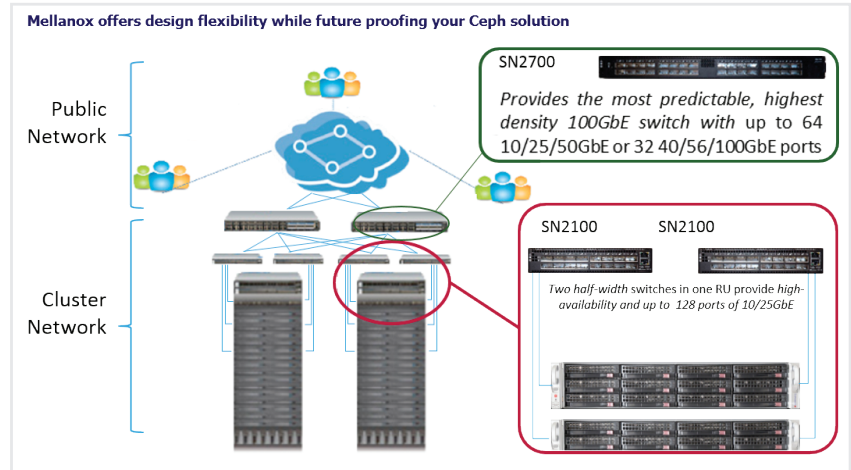

Mellanox offers design flexibility while future proofing your Ceph solution

Public Network

Cluster Network

SN2700

Provides the most predictable, highest density 100GbE switch with up to 64 10/25/50GbE or 32 40/56/100GbE ports

SN2100   SN2100

Two half-width switches in one RU provide high-availability and up to 128 ports of 10/25GbE

Figure 2– Chose a combination of 10, 25, 40, 50, or 100GbE ports to maximize storage performance and future-proof your Ceph network

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. Mellanox offers a choice of high performance solutions: network and multi-core processors, network adapters, switches, cables, software and silicon, that accelerate application runtime and maximize business results for a wide range of markets including high performance computing, enterprise data centers, Web 2.0, cloud, storage, network security, telecom and financial services. More information is available at www.mellanox.com.

About Red Hat

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.

EXPLORE FURTHER

For more information visit: Mellanox.com/solutions/storage

To learn more about Red Hat Ceph Storage, visit: Redhat.com/en/technologies/storage/ceph

Download the Mellanox and Ceph White Paper

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