Mellanox Virtual Protocol Interconnect® Creates the Ideal Gateway Between InfiniBand and Ethernet

Background

In today's computing environment, it is critical for companies to get the most possible out of their networks: the highest performance, the most storage, seamless data transfers, maximum bandwidth, and the lowest latency. To remain static is to fall behind. Only by taking advantage of the latest advances in technology is it possible to maintain market supremacy or to gain on the competition.

One area in which data centers can realize this need for optimum network performance is in their interconnect. Whether connecting clustered database servers, native file storage, clouds of virtual machines, or any combination thereof, high speed compute over InfiniBand enables increased throughput in less time with lower latency and with less need for CPU involvement.

However, it is also important that any solution be scalable, providing future-proofing by enabling growth whenever necessary without breaking the bank. The ability to add nodes to further increase compute capacity without sacrificing performance is crucial to the long-

term viability of a company's data center.

Mellanox now offers the latest technology both for providing its customers with the best available interconnect and for ensuring scalability affordably. Virtual Protocol Interconnect® (VPI) allows any port within a switch to run either InfiniBand or Ethernet, and to alternate between the two protocols as necessary. This creates a perfect gateway out-of-the-box, enabling integration between InfiniBand and Ethernet fabric and clusters.

Mellanox VPI offers both port flexibility and financial flexibility. Instead of pay-as-you-grow, you can adapt ports as needed to allow for growth. Moreover, Mellanox VPI provides all the benefits of InfiniBand while maintaining easy connectivity via the existing Ethernet fabric.

Gateway to Network Management

Recently, Mellanox successfully deployed its VPI solution for two different customers from two different market segments and addressing two different needs.

OVERVIEW

Mellanox VPI provides all the benefits of InfiniBand while maintaining easy connectivity via the existing Ethernet fabric.

Virtual Protocol Interconnect® (VPI)
One Switch – Multiple Technologies

1 VPI on Box
Same box runs
InfiniBand OR Ethernet
InfiniBand | Ethernet

2 VPI per Port
Same box runs
InfiniBand AND Ethernet
InfiniBand | Ethernet

3 VPI Bridging
Same box bridges
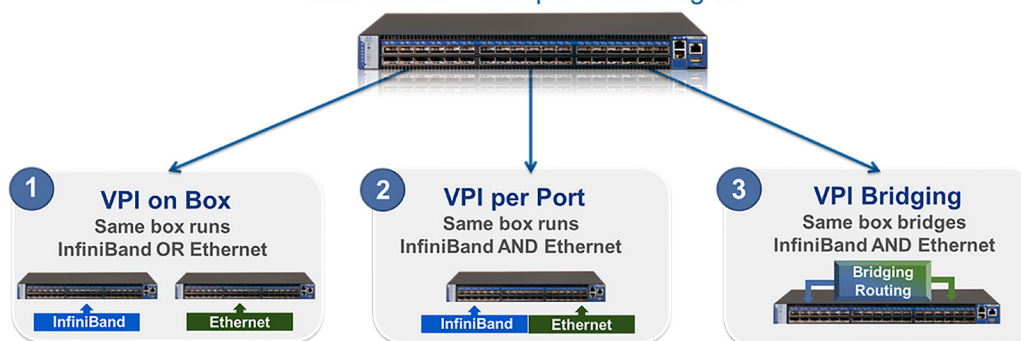InfiniBand AND Ethernet
Bridging Routing

Figure 1. *Virtual Protocol Interconnect from Mellanox*

One recent Mellanox VPI gateway deployment occurred with PensionsFirst, a leading solution provider to the global defined benefit pensions industry. PensionsFirst hosts its customers on a multitenant Microsoft-based private cloud architecture that uses Mellanox RDMA-enabled InfiniBand and Ethernet interconnects to provide a high-performance and cost effective solution that scales easily.

At PensionsFirst, InfiniBand was an overwhelming choice for its cloud computing platform, as it offered suitable performance and bandwidth to allow proper network convergence. 10 GbE was not considered scalable enough for client, storage, and backup traffic combined, and by using RDMA, PensionsFirst gained strong VM scalability for its private cloud, enabling faster data analytics and a better return on investment.

However, since PensionsFirst uses multiple data centers to create its private cloud, and since its client base accesses the cloud via IP traffic, PensionsFirst required an Ethernet solution above and beyond its InfiniBand network. Furthermore, as most network management software still interfaces via Ethernet, PensionsFirst needed the ability to combine InfiniBand and Ethernet architectures within its network.

Mellanox VPI provided a gateway for PensionsFirst to rely on InfiniBand between its compute, storage, and Virtualization layers but to interconnect with its network management plane and external client IP traffic via Ethernet (Figure 2). This provided PensionsFirst with a flexible mixed fabric, yet without any associated performance penalty.

"By using Mellanox's innovative and cost effective interconnect solutions, PensionsFirst was able to converge all of its data communications into a single, protected and cost-effective fabric," said Nick Francis, CTO at PensionsFirst. "We are thrilled with the performance and flexibility that RDMA affords us, and it's a superb platform to underpin our private cloud infrastructure."

Gateway to Storage

A second VPI deployment was with the Joint Supercomputer Center (JSCC) of the Russian Academy of Sciences, one of the top 100 most powerful computer centers in the world with a current peak performance of 523.8 teraflops.

JSCC uses a pure InfiniBand network for its high-performance computing, and decided to use a Mellanox VPI SX6036 switch to maintain InfiniBand connectivity with the compute cluster while establishing Ethernet connectivity to its Netapp storage (Figure 3). The vast majority of storage interfaces use 10GbE to connect to compute clusters, but by using Mellanox VPI as a gateway to its storage, JSCC was able to seamlessly mix its fabric to maintain its InfiniBand network while accessing its storage via Ethernet.
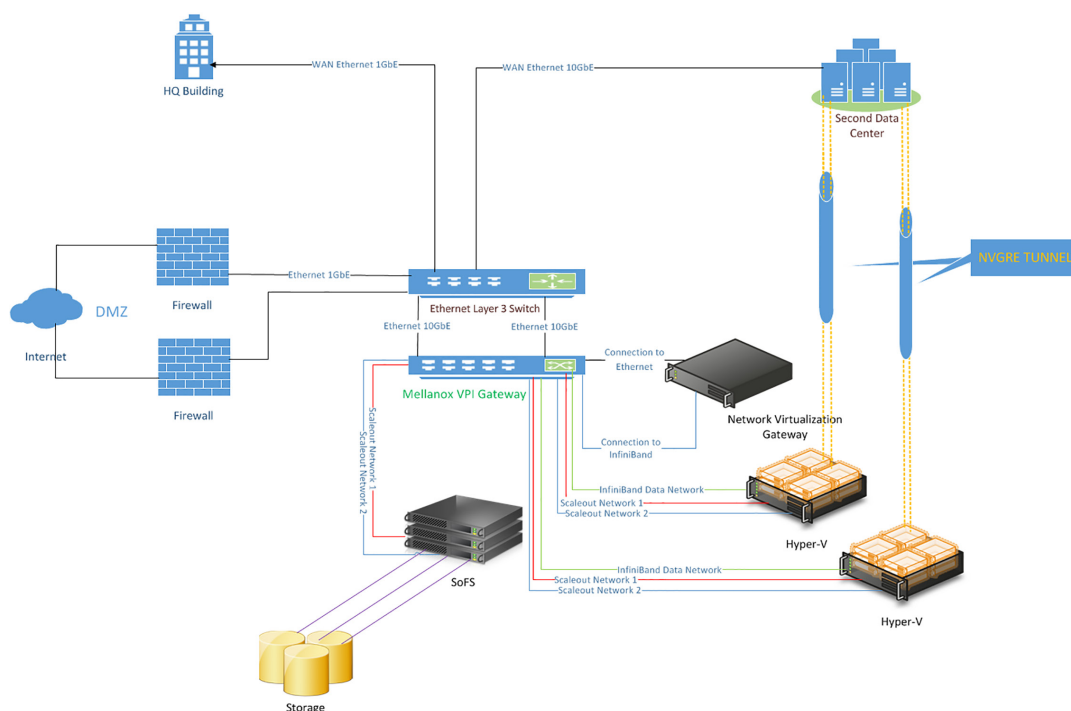

Figure 2. Mellanox's VPI Gateway connects PensionsFirst's InfiniBand compute, storage and Virtualization layers with its Ethernet network management plane and external client IP traffic
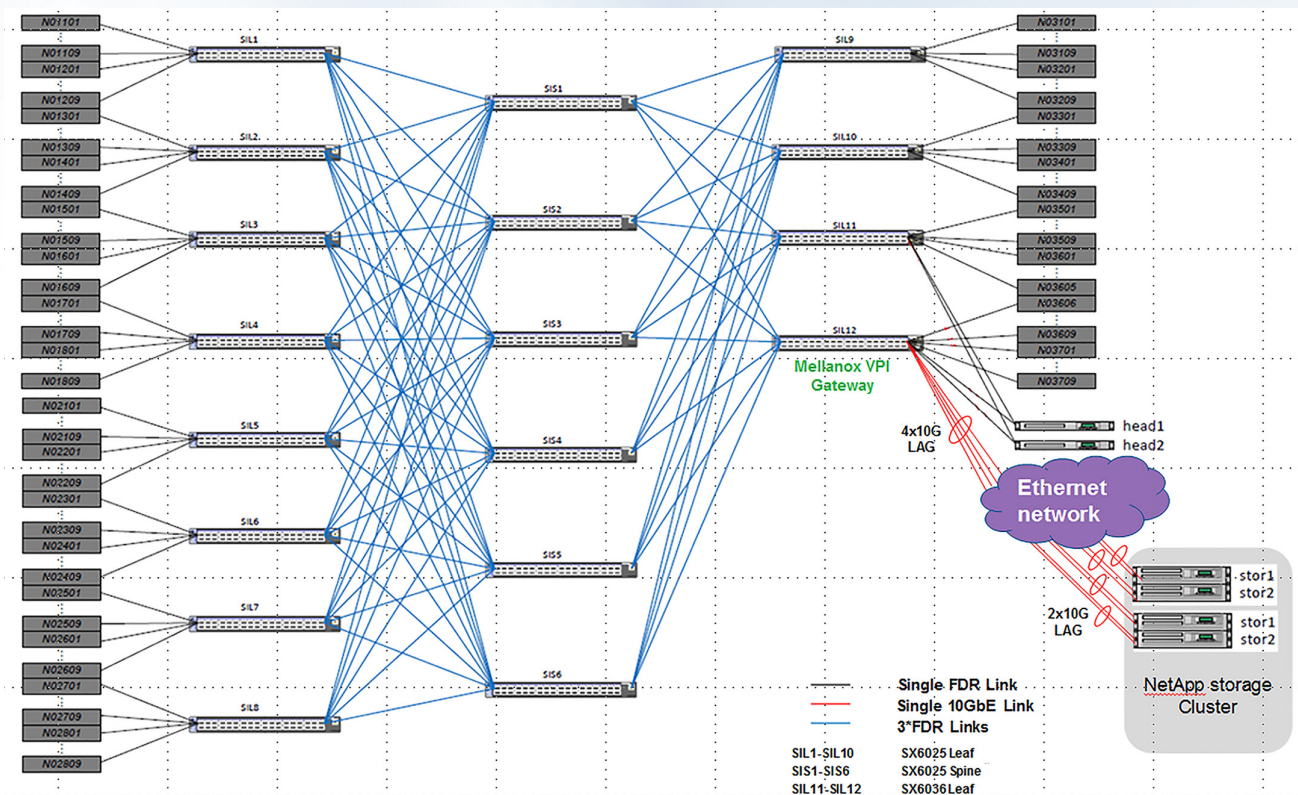
Figure 3. Mellanox's VPI Gateway connects JSCC's InfiniBand high performance compute cluster to its Ethernet NetApp storage

"Mellanox's unique gateway platform enabled us to interconnect our Ethernet-based storage to a fast InfiniBand scientific compute center," said Boris Shabanov, Deputy Director, JSCC of RAS. "The use of the Mellanox gateway eliminated the need for additional infrastructure, saved money, and improved our network performance."

JSCC now plans to increase its Ethernet bandwidth to add to its storage capability by moving more 10GbE links to its storage cluster, which can be accomplished without adding any further infrastructure simply by allocating additional ports on the VPI SX6036 switch that is serving as the gateway.

Conclusion

Mellanox VPI offers all the benefits of a scalable InfiniBand data center with the ease of Ethernet connectivity to network management or storage. This allows a network to scale its existing infrastructure instead of paying for additional hardware as it grows, and it offers the most flexibility in allocating ports for the ideal architecture to meet networking requirements. Most of all, this is achievable with no performance penalty whatsoever, as Mellanox ensures the highest bandwidth and lowest latency in both its InfiniBand and Ethernet offerings.

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