



ENKI's PrimaCloud

Situation

Founded in 2006, ENKI is a provider of managed cloud computing and offers its 30 plus customers access to its shared cloud infrastructure. ENKI's customers are typically Software-as-a-Service vendors & start-ups - companies that require a flexible cloud solution to accommodate growing demand for performance as the number of application users grows or as they need more resources for product testing.

ENKI's legacy cloud used GigE to connect servers and storage. However, they found that Ethernet simply could not scale effectively to meet the performance demands of their customers. ENKI's infrastructure is most heavily stressed by storage-intensive I/O operations and communications between applications collaborating across virtual machines on different physical servers. These applications typically have a database-intensive load on at least one of their virtual machines, resulting in high levels of I/O congestion. This common problem with many cloud services can cause customers to overpay for their computing resources while they wait for the network. GigE bottlenecks also impacted ENKI's ability to offer customers virtual infrastructure management, including starting new virtual machines and moving them from one physical machine to another.

"Our customers come to us with projects that either succeed and grow or fail and end," said Eric Novikoff, COO of ENKI. "The ones who stay always need more performance over time."

Since ENKI's Ethernet-based solution couldn't keep up with the demands of its existing or potential customers, the company knew that it needed to develop a new architecture for its customers with an interconnect solution that would bridge the performance gap. After considerable research, ENKI introduced an

InfiniBand-based cloud architecture called PrimaCloud.

Solution

In assessing the technology requirements for PrimaCloud, ENKI considered the I/O performance needed and realized that a 10 GigE solution would not allow them to meet the performance requirements of their customers. This could impact the high levels of SLAs (service level agreements) that ENKI guarantees to its customers and takes pride in standing behind them. ENKI's research showed that the average customer would be happy with 4 gigabits per second throughput per virtual machine (VM). Yet, with up to 10 VMs on each physical server (or even more), it was clear that the performance needed would be much more than 10GigE could supply without expensive link bonding. Also, the cost had to be roughly equivalent to a 10 GigE solution, but with better performance and a more capable VLAN and I/O virtualization.

ENKI knew that Mellanox offers virtual I/O over InfiniBand and InfiniBand-to-Ethernet bridging solutions, and such a solution would allow ENKI to keep its current Ethernet switching fabric, while also enabling them to offer significantly increased performance for customers. Mellanox also offers high performance and cost effective storage SAN solutions with its partners – such solutions can deliver up to 1600 MB/sec of throughput from VMs. Such a solution would enable ENKI to compete with other cloud providers on cost while offering superior performance.

Finally, ENKI's customers had expressed interest in an InfiniBand solution. They knew of InfiniBand's reputation for speed in the HPC community, and some wanted to use PrimaCloud to run HPC applications while others simply

wanted HPC's InfiniBand-based performance for more traditional business computing.

The new PrimaCloud infrastructure was architected to be processor-vendor and storage system agnostic to allow for a wide range of cost/performance tradeoffs. ENKI's initial implementation uses technology from AMD for its low power profile, and Sun's SSD-based Open Storage platform equipped with a native InfiniBand interface, for its high transactional load performance.

ENKI chose Mellanox's industry-leading ConnectX-2 40Gb/s InfiniBand adapters and InfiniScale IV-based switches for PrimaCloud because of their enterprise-class performance and availability. Mellanox's InfiniBand provides end-to-end connectivity spanning servers and storage, giving ENKI a way to deliver the highest performance from its virtualized, multi-core CPU infrastructure, drawing customers away from purpose-built datacenters.

Mellanox's ConnectX-2 also provides PrimaCloud with support for I/O virtualization, transparent NIC and storage HBA interfaces to VMs, delivering more virtual machines per CPU core and the performance needed to support CPU-intensive, high data volume applications.

Results

By deploying InfiniBand end-to-end, PrimaCloud can support high volume and high performance requirements, on demand, and offer service that scales as customers' needs change and grow. PrimaCloud has not experienced any of the previous I/O waits that were due purely to local network traffic for applications since deploying the InfiniBand infrastructure. The result is higher service levels for customers, guaranteed service levels in the face of sudden usage spikes, and most importantly happy customers who come back to PrimaCloud for more services. The InfiniBand-based cloud infrastructure enables PrimaCloud to deliver five 9s reliability and service guarantees compared to other cloud service

providers who can do three 9s of reliability at best and most often do not offer credits to their customers for service outages.

Among ENKI's customers is a company that provides a CRM SaaS service to large enterprises. They experienced a 1000% performance improvement over ENKI's previous cloud service when they moved to PrimaCloud's InfiniBand-Connected servers and NAS, enabling ENKI to close the deal.

The new PrimaCloud infrastructure has already enabled ENKI to expand its customer base and to offer a new level of service to its customers. One customer is using it to test the performance of their software so they don't have to buy their own equipment; another is running a proof-of-concept in its efforts to transition its customers from packaged software to a SaaS model.

Architecture

- Mellanox ConnectX-2 40Gb/s InfiniBand adapters
- InfiniScale IV-based switches
- AMD Processors
- Sun SSD-based Open Storage



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