

Dell EMC Storage Center & Chelsio

Chelsio 25Gb & 100Gb iSCSI adapters, a key piece in Dell EMC's all flash Storage Center array performance enhancements

Introduction

Chelsio has been partnering with Dell EMC for years on their flagship Dell Compellent Storage Center arrays. This product line originally shipped with Chelsio Ethernet adapters well before Dell acquired “startup” Compellent in 2010. Storage Center has been using Chelsio 10Gb Ethernet adapters ever since. We describe here how Dell EMC is now scaling Storage Center to 25Gb and 100Gb with Chelsio adapters.

Storage Center Refresh

In the last year, Dell EMC did a Storage Center product line refresh with the introduction of all flash models. Because of the speed of flash, the storage Ethernet adapters had to keep up, which prompted Dell EMC to increase the Ethernet link speed to 25 Gb/s using Chelsio adapters. With the release of the new Storage Center firmware SCOS 7.3, Dell EMC increased the link speed further to 100 Gb/s using Chelsio adapters. Chelsio 2-port and 4-port adapters are now shipping in the Dell EMC models SCv3020, SC5020/SC5020F, SC7020/SC7020F, and SC9000.



Figure 1 – Dell EMC SC7020F Server

Dramatic Performance Boost

With the introduction of SCOS 7.3, Dell EMC saw a dramatic increase in performance. According to Dell, they are now shipping three Storage Center platforms that exceed 1 million IOPS, with the SC9000 topping the list with more than 2.2 million IOPS! This was no accident. Chelsio has been working closely with Dell EMC engineering to performance tune the device drivers to critically increase the efficiency of the existing Chelsio hardware with dramatic results.

Dell EMC Leading with iSCSI Offload

One interesting aspect of Storage Center's dramatic improvement in performance has been to shatter the perception that iSCSI is a poor person's storage protocol. A key piece of technology Dell EMC uses is offloading the iSCSI protocol to the Chelsio adapters. In fact, offloaded iSCSI actually approaches the speeds of RDMA by utilizing zero copy, similar to RDMA. It's no wonder, with the same Chelsio adapter models, customers are utilizing RDMA for great performance as well, using the same underlying technology for other applications such as NVMe over Fabrics.

Storage Network Scaling: 10Gb → 25Gb → 100Gb

Dell EMC continues to use Chelsio for iSCSI precisely because the performance scales. With the unique pipelined approach of the underlying T6 ASIC, Chelsio is able to scale not just speeds to 100 Gb/s but also the number of connections to the tens of thousands. This means, over 90 Gb/s can be achieved on a 100G link with single connection or 10,000+ connections in aggregate. It means that latencies through the hardware are the same for a single connection as they are for the 10,000+ connections. Dramatic reduction in host CPU utilization as compared to using software based iSCSI in the host results. This in turn frees up the processors to scale to more connections, freeing up cores for other storage or application duties, as well as giving the architect a choice to reduce cost by utilizing less expensive processors.

Use Chelsio on the iSCSI Initiator Client

Matching the use of Chelsio in Storage Center arrays, the client side gives the same great performance with the same great benefits. Chelsio has available offload adapters for iSCSI initiator drivers for the most popular Operating Systems including Windows, Linux, ESX, and FreeBSD. This means the client/compute side can scale storage networking performance optimally with the latest technology from Chelsio.



Figure 2 – Chelsio T62100-LP-CR

Conclusion

Chelsio has a long and prosperous collaborative relationship with Dell EMC and the Storage Center team. The partnership has allowed the Storage Center product line to scale from 10Gb to 25Gb and now to 100Gb while taking performance to new heights. Taking advantage of Chelsio products on the client side is another great option to add value to the datacenter and cloud.

Related Links

- Chelsio Adapters: <https://www.chelsio.com/nic/unified-wire-adapters/>
- Dell EMC SCv3020: <https://www.dell.com/en-us/work/shop/povw/storage-scv3000>
- Dell EMC SC5020/F: <https://www.dell.com/en-us/work/shop/povw/storage-sc5000>
- Dell EMC SC7020/F: <https://www.dell.com/en-us/work/shop/povw/storage-sc7020>
- Dell EMC SC9000: <https://www.dell.com/en-us/work/shop/povw/storage-sc9000>
- Dell EMC SC Blog: <https://blog.dellemc.com/en-us/storage-center-os-7-3-brings-big-performance-boost-to-sc-series-arrays/>
- Review: Dell EMC SCOS 7.3: https://www.storagereview.com/dell_emc_scos_73_firmware_review
- Demartek benchmark paper: https://www.demartek.com/Reports_Free/Demartek_Chelsio_T6_iSCSI_Offload_Evaluation_2017-11.pdf