

NetApp Data ONTAP GX System Clustered Storage for High Performance Computing and Beyond



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Abstract:

The NetApp Data ONTAP GX system is a clustered NAS storage system that can scale from two to 24 storage controllers. NetApp will focus on selling the GX into the one billion dollar high performance computing (HPC) market.

The NetApp Data ONTAP GX system represents more than just a product but also a major shift in the market. Anyone who once felt that clustered storage was a pipe dream is in for a rude awakening. NetApp is now in the game and the rules are about to change.

The NetApp GX system is a NAS storage system that has a clustered storage architecture enabling companies to add storage controllers into a single cluster, scaling performance in a linear fashion as needed. When additional storage controller nodes are added to the cluster you add more processors, cache memory, bandwidth and disk actuators. The value of this is that companies can keep adding resources seamlessly based on the demands of their environments. Clustered storage systems can start out modestly and then grow to massively parallel systems. This is a cost effective approach that doesn't require you to buy ahead of your needs. Additionally, by adding more storage controllers into the cluster you keep raising the performance ceiling. The NetApp GX system provides just-in-time scalability. Regardless of how big the cluster gets it is a single logical system to manage. As a single logical system it is essentially just as easy to manage a NetApp GX system with two nodes as it is with 24 nodes. Physically there are more storage controllers but logically it is a single system.

The HPC Storage Market

ESG estimates the HPC market is well over \$1 Billion in annual revenue growing with a 20 percent CAGR with the following breakdown:

- **Oil and Gas.** This is a very lucrative market and the timing for NetApp is great. With oil prices going up new opportunities exist today that didn't just a year ago. Research is used to accelerate the discovery and delivery of energy. Seismic processing requires massive parallelism for high performance. Additionally, this environment typically requires lots of storage capacity and grows rapidly. The applications for Oil and Gas include upstream seismic image processing and downstream analysis and interpretation. ESG estimates this to be about a \$260 million market.
- **Life Sciences.** The segment includes big pharmaceutical research, Bio IT firms and Genomics. The Life Sciences field creates very large files that typically have to be shared by multiple users. As such, large file systems that provided scalable performance are required. Research analysts require high performance to examine large amounts of data without the storage being a bottleneck. They also need simplicity since they don't want to be in the business of IT. ESG estimates that the storage market for this segment is approximately \$275 million.
- **Scientific Research.** There are some extremely demanding environments within national lab and research facilities sometimes referred to as the "lunatic fringe". ESG estimates that the storage market for this segment is approximately \$200 million.
- **Media and Entertainment.** This includes film making and editing as well as streaming media. Special effects and post production require high performance to meet deadlines, which equates to reducing the bottom line (and increasing profitability), getting to market faster and generating revenue. The media and entertainment market extends beyond film making with cable and television stations and music getting in the game. Services like On Demand will require lots of storage with concurrent access. ESG estimates that the storage market for this segment is approximately \$225 million.

Other markets that require high performance include online services that provide images and audio files uploaded and downloaded by millions of users. Additionally the Government market is also substantial including research, satellite, video surveillance, etc. Electronic design automation (EDA) requires high performance, scalable storage. ESG does not have actual market projections for these market segments but we are certain that there is a great deal of opportunity in each.

NetApp has a heritage in the HPC market but smartly focused on the extremely lucrative corporate and commercial business. However, the HPC market is far more attractive now than ever before and it's going to continue to grow. Additionally, mainstream businesses will

begin to require the same scalability in the near future as the HPC customers do today.

NetApp Data ONTAP GX System: The Important Points

Performance. The NetApp GX system supports from two to 24 nodes in a single logical cluster. The GX system is targeted to the HPC community making performance a major focus. The NetApp GX system aggregates its hardware resources (CPU, memory, bandwidth, disk actuators), which enables linear performance scalability. NetApp FlexVol HPO can stripe and mirror data across the entire cluster, which greatly improves read/write performance. The more disk actuators you have serving I/O requests, the better performance you will have. In some cases you may not want to stripe all of your data across all of the disk drives. The answer to that is simple: don't. You can combine data placement strategies; it is not an all or nothing proposition. If you want to stripe one file system or even a single file across a large number of drives for performance, then do so. And if you want to stripe another file system across only four or eight drives, then that will work too. The NetApp GX system improves performance for lots of concurrent users or clients accessing lots of different files; and lots of concurrent users or clients accessing the same or a small number of files.

Scalable Capacity. The NetApp GX system supports a lot of capacity, scaling up to 6 PB in a 24 node system. ESG is aware of HPC customers requiring PBs of capacity and the need will just continue to grow.

Tiered Storage. Since the GX system supports both FC and SATA drives, system administrators can move data off of high performance and more expensive FC drives to lower cost SATA drives within the same storage system. This provides an excellent balance of price/performance. Newly created data may require high performance and it can utilize the FC drives for performance optimization. When the initial work is completed on that data, it can be transparently migrated to SATA disk drives in the GX system to be stored more cost effectively until it is needed again. System administrators can move data from FC to SATA drives within the NetApp GX cluster while it's online and it will be completely transparent to users and applications.

Snapshot Support. The NetApp GX system is one of the few clustered NAS storage system that supports snapshots. Why is that important? NetApp Snapshot technology efficiently and cost effectively protects data in the case of deletion or corruption. This data is extremely important and is often core to generating revenue. Losing it should not be an option.

Large File System and Global Name Space. NetApp can support very large file systems well over 100 TB in size. Additionally, they also support global names space, which provides a single logical view and control of multiple file systems. The NetApp GX system allows you to create very large file systems and smaller file systems, and a global name space to manage them all even more simply.

It's NetApp. The way the world works is that having lots of customers, revenue, sales, support and marketing personnel is important to furthering your success. There is stability in working with a major vendor. Major vendors have more resources to test and support complex environments. Large vendors can support you globally. Large vendors can be in more places at once. That is just the way it is. And NetApp isn't just any major storage vendor. NetApp knows how to sell and support their products. NetApp customers, for the most part, really like them.

ESG's View

NetApp is broadening its markets with the recent announcement of the FAS6000 going after the Enterprise data center, and now with the new NetApp Data ONTAP GX clustered storage system focusing on HPC. These are necessary and timely strategies that will allow NetApp to continue to expand its business. NetApp is at a stage where their unified storage story is having some plot twists. They no longer have one storage system platform that shares all of their software solutions. Now they have the FAS, the VTL and the GX system, and are becoming a little bit more like their competition with multiple storage products. But I am certain that these three products will converge somewhere down the road and become truly unified. Today NetApp has a strong portfolio of products and they are heading to an even greater vision.

My recommendation is not to listen to the naysayers that will focus on how long it took to get the NetApp GX system into the market. Who cares? NetApp's business is doing extremely well with 30 percent year-on-year growth and gross margins over 60 percent. Who else in the high-tech system business with over two billion in revenue can make this claim today?

NetApp does have some compelling competitors that focus on the HPC market that have very advanced technologies and solutions. ESG believes that the NetApp GX system doesn't spell doom for the best of these competitive vendors. However, some of them are at risk and we believe that eventually NetApp will take a leadership position in the HPC market.

ESG is a big proponent of clustered storage systems and the NetApp GX system is a strong validation for this architecture and approach. The short term implications created by the NetApp Data ONTAP GX system is that they will become a storage leader in the HPC market. For the longer term, the underlying GX technologies will get integrated into all of NetApp storage system products. In the mean time, NetApp will continue to make its very healthy business even healthier.

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