Maximize Ethernet Bandwidth on Dell OneFS Storage with ATTO Performance Ethernet™ using NFS over RDMA

BACKGROUND

With the explosion of unstructured data and exponential growth of file sizes are formats companies of all sizes are looking for ways to store and manage unstructured data without sacrificing performance and mitigating the costly downtime that can present itself while waiting for incredibly large pools of data to be transferred. Demand for higher-performance and bleeding edge technology is on the rise. As a result, new methods have been developed to take Ethernet bandwidth beyond what is possible on workflows with throughput requirements that exceed current TCP transport technologies with 10/40 Gigabit Ethernet (GbE).

ATTO and Dell have worked tirelessly to bring this joint solution together featuring support for these new methods including support for Remote Direct Memory Access (RDMA), advanced protocols like NFS over RDMA, next generation NIC technology with SMART offloads, and ATTO360™ Networking software featuring a custom tuning profile for OneFS storage that automatically brings it all together in a simple, easy-to-use manner. Now ATTO and Dell customers can take full advantage of state-of-the-art Ethernet standards including 25/50/100 Gigabit Ethernet (GbE).

MANAGE LATENCY WITH SMARTNIC TECHNOLOGY

It is important to note that throughput is at least partially a function of latency, or the lack thereof. In order to achieve the 25/50/100Gb/s throughput required to support multiple streams of unstructured data, latency must be carefully managed since data transfer from computer memory through the CPU and Ethernet TCP/IP stacks introduces significant overhead.

While a latency effect was prevalent with 10GbE and 40GbE technology, most users were still able to achieve enough throughput via TCP even though they were sacrificing latency via overhead there were tuning adjustments that could be made to help alleviate pesky overhead. ATTO and Dell previously worked together successfully to create a robust set of tuning profiles that utilized TCP tuning to optimize 10/40GbE connections and get the most out of Ethernet. Its important to note this is still a viable option for operating systems that do not support RDMA like macOS.

No other solution on the market today is able to fully realize the potential of TCP transfers then the custom ATTO and Dell OneFS solution. This latest offering takes that to the next level for Linux and Windows based solutions by taking advantage of how RDMA manages latency.

RDMA TRANSFERS VERSUS TCP

Remote Direct Memory Access (RDMA) is a feature designed to enable memory-to-memory data transfers. It has the benefit of eliminating the intermediate step of utilizing the CPU to transfer data, which decreases latency (and, as a result, increases throughput) while freeing up the CPU to conduct other tasks. *(Figure 1)*
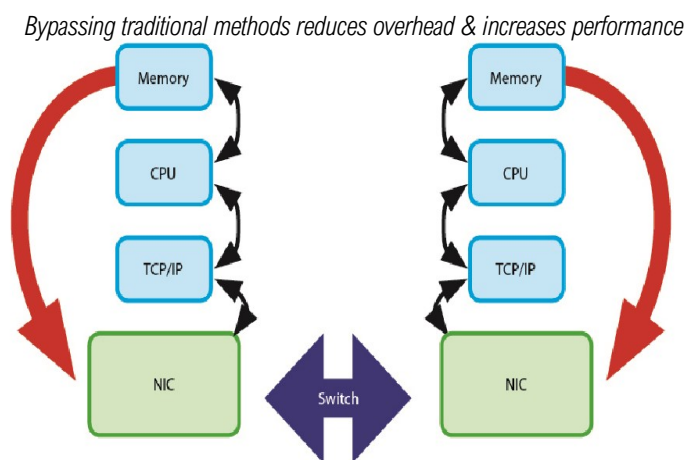
Bypassing traditional methods reduces overhead & increases performance

Figure 1(Red = RDMA transfer; black = TCP transfter)

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TECHNICAL FEATURES

- FastFrame SmartNIC Ethernet Adapters (10/25/40/50/100GbE)
- ATTO360™ Networking software
- Several custom tuning profiles for Dell OneFS storage optimized for SMB, NFS, or NFS over RDMA[1]
- RDMA over Converged Ethernet (RoCE) enables industry-leading low-latency (1us MPI ping latency) and decreases CPU utilization
- Driver support for Windows®, Linux® and Mac® operating systems
- TCP/UDP/IP hardware-based stateless offloads
- Guaranteed bandwidth and low-latency services
- Energy Efficient Ethernet enables lowest power draw on the market for a SmartNIC
- Hardware-based I/O virtualization

[1] No RDMA support for MacOS at the time of this publication

WHAT CAN I EXPECT FROM THIS JOIN SOLUTION?

ATTO FastFrame™ Performance Ethernet™ come with free support for ATTO360 Networking software. This software not only has sophisticated analytics & monitoring capabilities allowing users to troubleshoot with pinpoint accuracy but have custom configurations for Dell OneFS storage systems. These tuning profiles are designed to optimize your connection to Dell storage and increase throughput significantly. ATTO engineers have developed and fine tuned these profiles over a number of years and users can expect a performance benefit up to 30% on TCP transfers and virtually eliminating overhead on RDMA producing near line-rate speeds.

RDMA SIMPLIFIED WITH ATTO 360, OPTIMIZED FOR DELL ONEFS

ATTO FastFrame™ single- and dual-port 10/25/40/50/100GbE Smart network interface cards (NICs) feature industry-leading latency management using RDMA. With ATTO360, Dell OneFS users can connect to their storage with a simple easy-to-use custom tuning profile that ensures they are getting the most out of their connection. Users can expect lightning fast throughput while behind the scenes ATTO360 is implementing their NFS over RDMA connection, making sure the Smart Offloads inside our FastFrame silicon is enabled and other parameters are configured based on countless hours of testing and validation done by ATTO and Dell engineering.

Dell Precision — ATTO FastFrame™ 10/25/40/50/100GbE

Mac Pro — ATTO FastFrame™ 10/25/40/50/100GbE

Dell Precision — ATTO ThunderLink® 10/25GbE

iMac Pro — ATTO ThunderLink® 10/25GbE

Dell Precision — ATTO FastFrame™ 10/25/40/50/100GbE

OneFS