

Ultimate X File Transfer

100TB / 23Hours @ 10Gbps / ~3000 Miles

EXECUTIVE SUMMARY

Challenge:

- Move 100TB of files across a single 10Gbps WAN connection between CA and MD
- Complete all data movement in under 24 hours
- Perform the transfer using commonly available tools (i.e., Linux "cp")
- Verify lossless data transfer and file integrity

Solution:

Vcinity's ULT X moves or provides remote access to any data, anytime, anywhere by creating a unified data fabric. It seamlessly fits into an existing enterprise - LAN and WAN - environment to move large amounts of data across global distances.

Results:

ULT X data appliances were installed at Vcinity's offices in San Jose, CA and Germantown, MD which are connected via a 10Gbps circuit. The source data files were located in California and copied to the file system in Maryland to simulate data migration or backup processes. The test continued for a period of approximately 23 hours for the transfer and an additional 8 hours for file verification. The transfer's progress was monitored using Vcinity's Command X™ - a web-based management interface.



Ultimate X™ (ULT X) from Vcinity™ is a purpose-built solution for the enterprise market to move or provide access to virtually any data, anywhere, anytime. In conjunction with one of its industry partners, Vcinity recently performed transfer of large datasets - 100 TB of random data - between its offices in San Jose, CA and Germantown, MD.

Environment

The ULT X appliance was installed at each Vcinity location and connected via a 10G WAN service between CA and MD as shown in Figure 1.

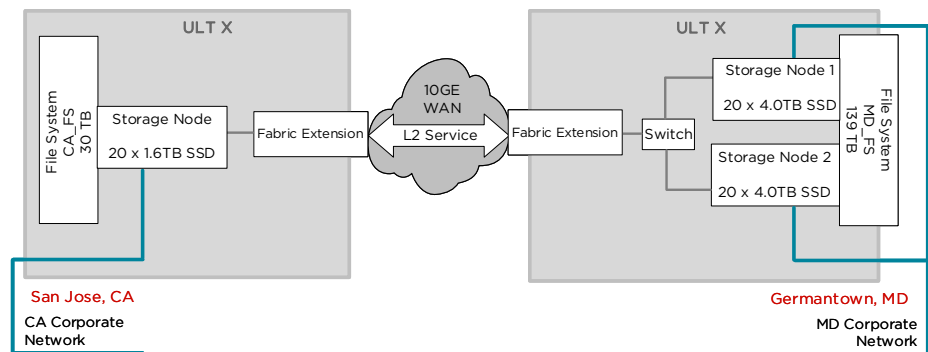


Figure 1. Environment and Network Layout

Configuration	Datasets	Mechanics
<ul style="list-style-type: none"> • CA: Single ULT X-1010 Host Node (30TB) • Fabric Extension operating at 10Gbps • Command X v1.2 • MD: Dual ULT X-1010 Nodes (140TB total) - Single FS • Fabric Extension operating at 10Gbps • Command X v1.2 • Fiber interconnect is a Layer 2, 10Gbps Ethernet WAN Service • Jumbo frames support • ~68ms RTT 	<ul style="list-style-type: none"> • 5TB and 10TB files were used • 2x5TB transfers and 9x10TB transfers for full 100TB test • Actual file sizes are: <ul style="list-style-type: none"> • 5,000,000,010,240 Bytes and • 10,029,068,195,840 Bytes • Source files were reused and renamed via script to minimize source storage requirements 	<ul style="list-style-type: none"> • File transfer was executed through basic scripting - Basic transport function was Linux "cp" of files • File transfer script was initiated at the MD site • Files were copied from CA to MD nodes • Logging occurred at the MD site • Command X was used to monitor the test procedure • File transfer verification was performed using MD-5 checksum

Results

The 100TB file transfer completed in approximately 23 hours, achieved consistent and continuous transfer speeds, and WAN utilization rates above 95%.

Table 1. Results

Xfer Time (Hours)	Xfer Speed (Gbps)	WAN Utilization	Size
1:10:05	9.51249	95.12%	5.00TB
1:09:48	9.5511	95.51%	5.00TB
2:19:49	9.56402	95.64%	10.03TB
2:19:51	9.56174	95.62%	10.03TB
2:19:21	9.59605	95.96%	10.03TB
2:18:40	9.64333	96.43%	10.03TB
2:18:16	9.67123	96.71%	10.03TB
2:17:54	9.69695	96.97%	10.03TB
2:17:27	9.72869	97.29%	10.03TB
2:17:16	9.74169	97.42%	10.03TB
2:17:18	9.73932	97.39%	10.03TB
Totals:	23:05:46	96.37%	100.26TB

As shown in Table 1, the detailed results include:

- 100.26TB of data transferred in 23 hours 5 minutes and 46 seconds.
- The first two transfers of 5TB data sets completed within 17 seconds of each other.
- 10.03TB data sets averaged 2:18:26 hours across nine transfers with standard deviation of 59.12s.
- Average bandwidth utilization across all 11 datasets was 96.37% without using compression or other data modification.

Due to the significant file sizes, eight additional hours were required to perform the MD-5 checksum verification of the copied files at the Maryland location. All files were transferred completely with no loss of data throughout the test period.

Monitoring

Monitoring during the test was performed using the Command X™ software. The application provides a view of various key elements within the environment including the storage subsystems, file systems, processors, and network.

Summary

The 100TB test results illustrate clear advantages of using Vcinity's technologies:

- **Unprecedented performance:**
While not specifically optimized for file transfer applications, the ULT X product still achieves unprecedented performance for transferring large volumes of data across the WAN.
- **Performance predictability:**
The file transfer time variation is minimal across multiple datasets confirming the product's deterministic performance.
- **Linear scalability:**
Vcinity's technology scales its performance linearly with larger data sets and network links as shown by two recent large data transfer tests: 100TB file transfer in 23:05:46 hours over 10Gbps and 1PB in an average of 23:16:12 hours across 100Gbps.
- **Ease of integration:**
As the test was carried over a standard dedicated circuit between Vcinity's CA and MD offices, Vcinity's technologies prove seamless interoperability with routine enterprise LAN/WAN infrastructures.

Vcinity's ULT X product is uniquely qualified to provide high data transfer rates and remote data access while enabling a lossless deterministic quality of service. This makes ULT X ideal for workflows that include improved data ingest/egress for HPC/SC/cloud environments, large scale data migrations without having to ship disks, data recovery of terabyte-level storage failures where the source data is remote, reduced data synchronization times between sites and faster backup times of data to off-site locations.



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