

Unified Data Fabric for the NRL LD-JCTD

Scaling Data Centers Globally in Support of Clouds, Virtualization, and Big Data Transport

EXECUTIVE SUMMARY

Customer Name:

Naval Research Labs

Industry:

Government

Location:

US and Asia

Challenge:

The NRL needed to ingest, process and analyze large data from a broad range of sources in real time across geo-diverse locations.

Solution:

Vcinity's global fabric extension technology enables a global federated data platform maximizing existing infrastructure and providing scalable performance across long distances.

Results:

- Nearly 100% efficient vs. 20 to 40% IP efficiency
- Robust and resilient response to surge loads and outages
- Ready for IP/MPLS 40G Carrier Ethernet WAN
- Scalable and extensible - 10X to 100X faster

Challenge

The Naval Research Lab's Large Data Joint Capabilities Technology Demonstration (LD-JCTD) faced the fundamental challenge of gathering, sharing and analyzing in real-time, data and imagery from various sources to achieve its objectives.

The mission of the LD-JCTD was to build a Global "Large Data" Network infrastructure to rapidly access and produce knowledge from the best information available fused from federated, distributed sensors and digital media assets:

- Integrate federated, distributed computational grids, realtime sensors, and digital historical information
- Scale to support exponentially increasing data archives
- Privacy, authenticity and security demands: InfoAssured
- Affordable ... highly available ... E2E QoS flows
- Legacy and rapidly evolving technology integration
- Perf, NetOps, Information Assurance tools/sensors
- Reachback, Traceback realtime capabilities

The challenges faced by the NRL required that their scientists and engineers architect a solution that leveraged the latest technologies in data acquisition, storage, retrieval, analysis and data center interconnection to enable the real-time use of geographically dispersed data for battlefield planning.

The NRL needed an integrated, coherent large-scale data storage architecture that could connect over the WAN for moving data to/from users in an efficient, lossless and timely manner. The amount of raw data being transferred could easily be in the range of Petabytes to Exabytes, which required ingestion and output rates exceeding 3Gbps.

The data being processed needed to be shared amongst data centers across two continents with fiber interconnections ranging from 15km to 15,000km.



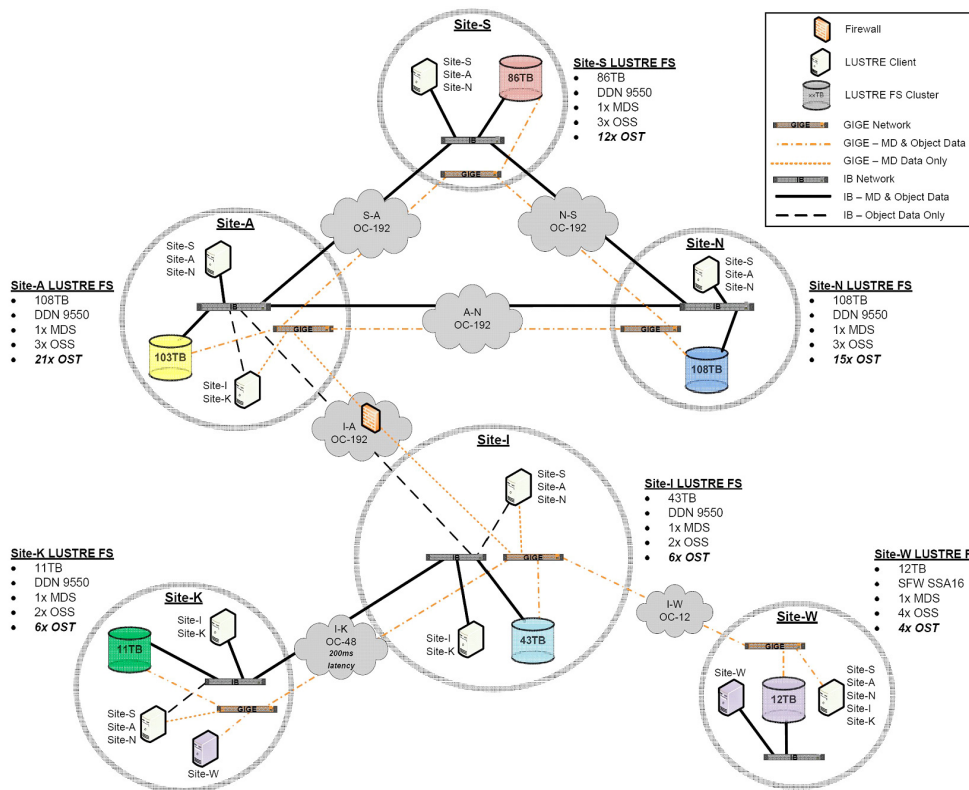
The Vcinity Solution

The global fabric extension technology from Vcinity™ allowed the NRL to extend its data center fabrics beyond the local data center and virtualize its Lustre file system across campus, cities, states and around the world. By providing virtualized buffering and WAN extension, physical and logical layer 2 networks were connected on a global basis with performance and determinism available only locally within the data center today. Vcinity’s global fabric extension technology performed this by creating smart connections with traffic engineering support for multiple flows and integrating with the underlying parallel file system – creating a unified data fabric.

Vcinity’s technology enabled RDMA and InfiniBand over the WAN to create a true, seamless global file system that allowed the NRL to work with large data across long distances as if it were stored locally. It provided the following benefits:

- Enabled global federated data platform providing seamless, efficient and instant access to mission-critical data
- Seamlessly integrated with and maximized existing compute, storage and network infrastructure while improving mission agility
- Showed substantial improvement in network utilization (compared to the existing method) lowering recurring WAN costs and requiring less frequent upgrades with growing demand
- Provided scalability that migrates up and down, simplifying advanced planning and stranded service awaiting demand increase

Vcinity provides deterministic, efficient, low-latency and lossless global fabric extension solutions to create a unified data fabric. We enable our customers with a localized view of assets around the world while enhancing operating margins and bridging the bandwidth-revenue gap.



Sources:
 • www.largedata.net
 • OFA Developer Workshop – RDMA in WAN by Linden Mercer et al., 2013



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