



## **Simplifying High Performance Data Storage at Westinghouse Nuclear Services**



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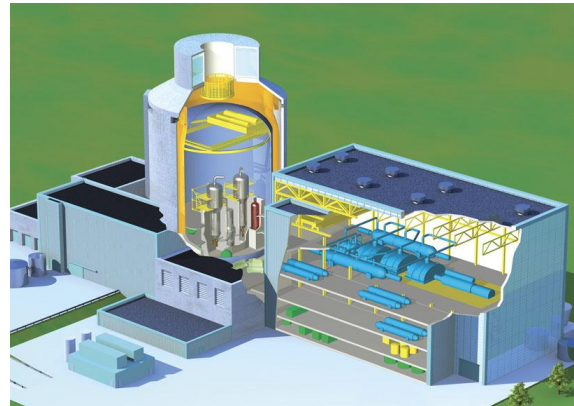
## Overview

With locations throughout the United States, Europe, Asia and South Africa, Westinghouse Electric Company's Nuclear Services business offers a wide range of products and services to help keep nuclear power plants operating safely and competitively worldwide.

Westinghouse Electric Company, a group company of Toshiba Corporation, is the world's pioneering nuclear power company and is a leading supplier of nuclear plant products and technologies to utilities throughout the world. Westinghouse supplied the world's first commercial PWR in 1957 in Shippingport, Pennsylvania. Today, Westinghouse technology is the basis for more than 40 percent of the world's operating nuclear plants, including 60 percent of those in the United States.

## Summary

Westinghouse engineers work with both internal and external clients to provide technical analysis that supports a variety of projects, from new power plant design to power output assessments for existing plants. The company recently chose Terascale's MTS 1000 Storage Appliance to deliver vast amounts of scratch storage space for data generated by engineers using applications such as ANSYS for structural analysis, CFX for computational fluid dynamics, and internally developed analysis codes.



## 'Plug and Play' for Fast Deployment

"The output files generated by our analysis applications can be extremely large; larger than you'd want to store on local disk. It isn't practical to store that type of data with a typical file server like NFS. We needed a larger file space that could be shared by all the nodes in the cluster and could deliver fast I/O to help our users be as effective as possible," said Matt Sigler, an engineer in Westinghouse Nuclear Services' Software and Systems Technology group.

The company's IT staff chose the Terascale MTS 1000 because it provided the high performance, high throughput, and high capacity the company's engineers required along with appliance packaging for fast deployment.

"We needed to get the solution up and running quickly to meet upcoming project needs and we knew it needed to be compatible with our environment," said Sigler. "When we looked at the Terascale product, we were immediately struck by the fact that it was 'plug and play.' We were able to bring the Terascale MTS 1000 in, plug it in, add the InfiniBand cables and we had the whole system up and running in three days."

Since installing the Terascale system, Westinghouse has been able to dramatically reduce run times and its applications now run faster as well. In fact, run time for an ANSYS post processing run has been reduced from 68 hours to 10 hours with Lustre modifications provided by Terascale support.

## Built in Management

The MTS 1000 was designed to be easy to use and manage, with a built-in management system that makes it easy to add capacity and throughput or to fine tune key aspects of the environment.

“The Terascala MTS 1000 is easy and straight-forward to use and to manage,” said Joe Walsh, IT Consultant. “I like the fact that it’s open, and we can actually log into one of the metadata servers and see what’s running. There’s no ‘black magic’ under the hood. It’s all transparent and it’s easy to see what’s going on.”

Sigler also said that adding additional systems to the MTS 1000 was a simple operation.

“Initially, we hooked the Terascala system up to a limited number of systems, but over time, we’ve been able to connect additional compute nodes to the network. The whole process has been smooth and pain-free. We were able to grow our environment around the MTS 1000 with little effort,” he said.

Terascala’s management console provides a comprehensive window into the system, and gives full remote access to all parameters and environmental conditions to allow administrators to monitor and manage their installation at the rack, enclosure, or blade level. The management solution also integrates through SNMP to other management environments.

“The MTS 1000’s management console is well designed, with email notifications to alert us of certain situations. I usually have the management console up on my desktop to keep an eye on things and to make sure that everything is running smoothly,” said Walsh.

## Experienced, Knowledgeable Technical Support

Dave DiBasilio, Westinghouse Nuclear Services’ Software and Systems Technology engineer, said that Terascala’s technical support team worked with his team to tune the system to achieve optimum performance and to assist with an application-related issue.

“We had a unique situation in that we had purchased code from a vendor and to operate, it opened 32,000 files simultaneously. This had a performance impact no matter what kind of file system we were using. We were able to work closely with the Terascala team to develop a fix so that the user can manipulate the number of open files and optimize performance,” he said.

## Centralized Storage Helps Westinghouse Nuclear Achieve Performance Goals

“Our users are working with files that contain terabytes of data. If that data was streaming across the network every day, it would grind our operation to a halt. The MTS 1000 enables us to provide centralized storage so that our users can transfer large files to the unit one time and leave it there until they need to run it,” said Sigler. “The Terascala MTS 1000 delivers the high performance, high throughput and high capacity we need for our environment. We’ve been extremely pleased with the system and it helps our users and their applications work faster and more efficiently,” he said.



## Terascala's Storage Appliance



The Terascale MTS 1000 is the world's first storage appliance with built-in redundant metadata designed to provide high availability, high throughput storage. Lustre file system based, the MTS 1000 features an integrated, active – passive redundant metadata server architecture that ensures that your metadata is always available. Tuned for performance and reliability, data is stored in a RAID 10 array that is linked directly to both processing units. The MTS 1000 is architected for maximum throughput and data availability so that applications run at peak efficiency, and delivers over 2GB/sec from a single enclosure and up to 10 GB/sec from a full rack. Designed to plug directly into the compute client network environment, the MTS 1000 has an optimized data path from the client network through to the disks within the storage device.

Simplification of deployment and ongoing management is a key aspect of the MTS 1000. It is delivered as an appliance with all of the software installed and tuned to deliver performance. With its built-in management system, it is easy to add additional capacity and throughput or to fine tune key aspects of the environment. The MTS 1000 is designed to be operated and managed by system administrators without extensive storage experience.

Terascala leverages Lustre because it is an open source, high performance clustered software initially developed for applications needing very high throughput, scalability and capacity. It offers high levels of reliability, scalability and performance, having been deployed in some of the largest compute installations in the world. Lustre leverages a simple metadata/stored object architecture, where the metadata server stores location information about data and the object store servers act as the repository for the actual data. This approach allows throughput to be scaled by simply adding additional object store servers. Terascala has an optimized architecture and has tuned Lustre for the specific capabilities of the MTS 1000, so the appliance delivers a simple, easy to use and expandable solution.

The MTS 1000 is part of a family of parallel file system based appliances from Terascala. All the Terascala solutions include the Terascala Integrated Storage Information System (TISIS™) which provides real time storage optimization and complete management. Terascala solutions are all delivered as fully configured, ready to go appliances Contact Terascala at [www.terascala.com](http://www.terascala.com) or [info@terascala.com](mailto:info@terascala.com) to learn more about all our solutions.



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