

Customer Success

Great River Energy

Key Highlights

Industry: Energy

Location: Maple Grove, Minnesota

Business Profile: Great River Energy is a not-for-profit cooperative which provides wholesale electricity to more than 1.7 million customers.

IT Environment

- > Over 200 Windows and Linux servers, including virtual machines
- > Four data center sites; three connected via an OC48 WAN and the fourth by DS3
- > Averaging more than 4,000 NetBackup jobs per day (28,000 per week)
- > Total of 155 TB of application data to protect and 27 TB backed up on a weekly basis

Backup Software

- > Veritas NetBackup by Symantec

Business-Critical Applications

- > Oracle
- > VMware

Customer Challenges

Tape backups run 24/7 yet many would fail due to tape media errors, drive failures or queuing delays. The backup administrator spent one full day per week debugging backup issues and restores typically took almost a full day.

The Solution

- > 4 Data Domain DD565 systems, each with 2 E520 disk shelves
- > Data Domain DD530 system
- > Data Domain VTL option

Business Benefits

- > Administration reduced to about ten minutes per day
- > Backup success rate now over 99%
- > Recovery times reduced by half
- > Data compression rates as high as 100:1 and cumulative 23:1 across all apps
- > Backup retention period increased 3x
- > Significantly reduced footprint, cooling and 45% reduction in power utilization compared to expansion of legacy tape library infrastructure

Competitor Challenges

At the time of the evaluation, no other vendor was able to offer a proven and reliable deduplication storage and VTL in one solution to Great River Energy's satisfaction.

Data Domain Enhances Great River Energy's Green Strategy

Great River Energy is a not-for-profit cooperative which provides wholesale electricity to more than 1.7 million people through 28 member distribution cooperatives in Minnesota and Wisconsin. With more than \$2 billion in assets, Great River Energy is the second largest utility in the state, based on generating capacity, and the fifth largest generation and transmission (G&T) cooperative in the United States. Great River Energy's member cooperatives range from those in the outer-ring suburbs of the Twin Cities to the Arrowhead region of Minnesota to the farmland of southwestern Minnesota.

The organization runs a total of four data center sites. Its operations center at Elk River deals with grid systems. Another data center at corporate headquarters in Maple Grove runs business systems and databases. The organization also utilizes a smaller data center at a coal plant in North Dakota, as well as a remote disaster recovery (DR) facility. Three of these sites are connected by an OC48 WAN, and the fourth data center is connected by DS3. Between them there are over 200 Windows and Linux servers, including virtual machines.

Great River Energy prides itself in its green building strategy. This was recognized recently when its headquarters building was awarded the Platinum LEED (Leadership in Energy and Environmental Design) certification by the U.S. Green Building Council. The award is the highest designation available to buildings that demonstrate energy efficiency and sustainability. The building is the first in Minnesota to achieve the distinction and one of fewer than 100 buildings worldwide to receive the designation.

"The cheapest kilowatt of energy is the one we don't have to produce," said David Saggau, president and CEO, Great River Energy. "The additional five percent spent to construct the building will be recovered in seven years, in part because of the \$90,000 in annual energy savings we expect to realize through the use of innovative energy efficiency technologies."

Customer Challenges

Previously, Great River Energy utilized a Sun StorageTek L700 tape library with 10 LTO2 tape drives at its headquarters and managed more than 700 tapes. A smaller tape library was utilized for backups at one of its remote sites. The tape hardware struggled to deal with the backup demands of several hundred servers. Each instance of Oracle, for example, had to be backed up hourly. The organization staggered backups throughout the day and night – one type of backup job or another was running 24/7.

"We had so many concurrent backups, it was a scheduling nightmare," said Joe Gleason, IT Systems Engineer for Great River Energy.

Due to the volume of traffic, backups would build up in queues. Increasingly, instead of the preferred hourly backups, some Oracle instances had to be skipped for several hours. For example, development and testing lab backups had to be scaled back. Fortunately, no major data loss incidents occurred.

And these problems were compounded by the physical limitations and failings of tape. Drives would lock-up, media would stick and backup jobs would have to be aborted.

"We could easily spend one full day a week scheduling and troubleshooting backups as physical tape requires so much babysitting," said Gleason. "In addition, restores took much too long – about five hours."

Things came to a head when the organization decided to centralize some systems at its Maple Grove HQ to allow the Elk River data center to focus solely on grid operations.

"With the current volume of data and our projected growth, our analysis demonstrated that it was impractical to purchase additional tape technology, or to move the existing L700 tape library elsewhere due to space and energy restrictions," said Gleason. "We sold the aging L700 and used our data center project to re-architect our backup processes."



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IT Systems Engineer
Great River Energy

Data Domain Solution

The IT team contacted its trusted storage solutions provider, Datalink Corporation, and discussed its storage needs. These meetings reinforced that the organization was exacerbating its backup challenges due to the fact that multiple copies of files were being transmitted. As an example, the organization had literally hundreds of copies of some documents existing in its backup library, yet was continuing to back them up again and again. Datalink recommended deduplication storage technology from Data Domain to address this issue and specified a Virtual Tape Library (VTL) implementation as the simplest way to harness its existing Veritas NetBackup software.

At its Elk River data center, Great River Energy implemented two Data Domain DD565 systems, each with two ES20 disk shelves for added capacity, as well as another two DD565 units, again with two ES20 disk shelves, at its Maple Grove HQ. In addition, a DD530 resides at a remote site in Bismarck, North Dakota.

These units were put in place prior to commencement of the data center relocation project as the organization planned to be completely tapeless before the move. Great River Energy has the luxury of an organizational data retention period of three months. The IT department, therefore, wanted at least three months of operational experience with Data Domain as its backup system before moving to the new location. With everything functioning correctly and backups being done efficiently, the move to the new data center took place.

"Implementation of our new systems was a seamless process," said Gleason. "We set up the Data Domain units in a couple of hours, pointed NetBackup at them and we were on our way."

As the next phase in Great River Energy's Data Domain implementation, Gleason plans to begin replicating between the Data Domain systems, using the Veritas NetBackup Vaulting capabilities, across their data center locations to further consolidate backups.

Business Benefits

Great River Energy has realized incredible benefits directly as a result of the switch from tape to disk-based deduplication storage. "On our VMware backups, we are getting data compression of 100 to one, and on one application we can achieve 385 to one," said Gleason.

He reports that the time taken to physically mount a tape, for example, is down from several minutes to around 10 seconds. The organization can also afford to backup far more data. Gone are missed backups, hourly Oracle backup instances that were delayed for several hours, or backups rescheduled due to lack of bandwidth. In addition, Great River Energy has enough capacity to easily extend the time it retains some backups from three months to nine months.

"Before the change, we couldn't efficiently backup our total capacity – which at the time was about 35 TB," said Gleason. "Today, our IT department is tasked with managing more than 155 TB of data across our various systems, and our tape infrastructure could not have coped with that volume based on our data retention objectives. Now we can handle this growth with ease."

Based on Great River Energy's backup and retention policies, the total amount of backup data currently protected by Data Domain systems is about 800 TB, prior to any reduction. This total protected capacity is reduced to about 33 TB of compressed backup data on the systems. Gleason quotes

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cumulative data compression rates of 23 to 1, and noted that those rates would be much higher if it wasn't for the Oracle instances backed-up each hour.

"Gone are the days of queuing delays or missed backups," said Gleason. "We are now receiving higher than 99 percent backup success rates. Restores are now done in half the time and backup administration has been cut down from one day per week to ten minutes."

Green IT Benefits

Green IT, of course, is a major focus at Great River Energy. Its Maple Grove facility, in particular is one of the few buildings in the world to have achieved the coveted Platinum LEED certification. The 166,000-square-foot building uses 50 percent less energy than a comparable facility built to state code requirements and 90 percent less water than a similarly sized corporate campus. It features an in-lake geothermal HVAC system, in-floor displacement ventilation, daylight harvesting, 72 kilowatts of on-site solar panels and a 200-kilowatt wind turbine.

When building the new data center at Maple Grove, IT was very conscious of such things as the power and weight of new servers. IT staff specified low power, Energy Smart certified models without sacrificing on performance. In addition, it reduced the number of physical servers by aggressively adopting VMware. And, of course, the adoption of Data Domain appliances very much ties in to this strategy.

"Compared to a scenario in which we would expand on our legacy tape library platform, this solution has provided us with significant power, cooling and data center footprint advantages," noted Gleason.

The power consumption of the four DD565 systems and eight ES20 expansion shelves offers about 45 percent reduction in wattage, along with associated reduced cooling, when compared to the addition of L700 libraries. And the total Data Domain footprint, currently storing 800 TB of backup data prior to compression, utilizes only 24U, or about half of a standard six foot rack.

"We are achieving far more performance per watt with this backup system," said Gleason. Great River Energy plans to add another Data Domain system in order to increase replication capabilities for added protection when they build their new DR facility.



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