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CUSTOMER PROFILE

Avera Health

Challenges

- Remote incremental backups often take more than a day to complete
- Need for efficient backup for virtual machines
- Time-consuming and unreliable tape restores, potentially impacting patient care

Solutions

- EMC Avamar backup and recovery solution with source data deduplication
- EMC NetWorker solution for centralized management of traditional and deduplicated backup and recovery
- VMware ESX Server virtualization solution

Key benefits

- Daily full backups of 56 remote sites—even across T1 and 56K dial-up links
- Full backup timeframes reduced from weeks to under three hours
- Fast, single-step recovery
- Daily remote backup administration decreased from six hours to 15-20 minutes
- Savings of $283,000 due to reduced expenditures for tape, storage, servers, and staff resources

Data deduplication technology reduces backup times, streamlines operations, and improves reliability while driving down costs of physical and virtual IT infrastructures

Avera Health is a regional partnership of health professionals at nearly 300 facilities serving close to one million patients in eastern South Dakota and surrounding states. Nationally recognized for using information technology for clinical and operational excellence, Avera electronically links its academic medical center in Sioux Falls to doctors' offices and hospitals in rural areas. From any location, Avera practitioners access financial and business operations data, a patient electronic medical record (EMR), an electronic prescribing capability, and one of the nation's largest private telemedicine consulting programs to deliver specialty care to patients locally throughout the region.

Avera faced explosive data growth as they automated paper-based processes and captured information electronically. Data backup and recovery was becoming increasingly critical to ensuring patient safety, and yet they were having difficulty backing up remote facilities connected to the Sioux Falls data center due to slow—and often single—T1 or 56K connections. Even incremental backups would often take more than 24 hours, forcing IT to split datasets and back up a single server over two nights.

Andrew Harkin, Avera's network engineer, said, "We needed to provide IT support to healthcare facilities that are in very remote locations—often hundreds of miles apart. At these sites, doctors and nurses use medical equipment, such as asthma monitoring devices, to help them diagnose and treat patients. These devices generate critical data that needs to be backed up and protected daily.

"Our remote backups used to be painfully slow and often failed. Restores weren't easy either because we had to retrieve tapes from an offsite location and then send data back over the network. We were dealing with incredible stress trying to get everything backed up so patient care wouldn't be affected."

EMC Avamar backup and recovery solution with source data deduplication

Avera deployed EMC® Avamar® backup and recovery software with integrated data deduplication technology to reduce the size of backup data at the source, or client, and enable fast daily full backups over existing networks. Using Avamar, Avera backs up clinical and business applications for all 56 physical and virtualized VMware® servers at 22 remote sites. Lightweight Avamar agents are deployed within each virtual machine, delivering fast daily, full, guest-level backups and granular recovery options. Avera's remote backups are stored on Avamar Data Store systems at the main data center in Sioux Falls.

Unlike traditional backup methods, Avamar deduplicates backup data at the source—within and across virtual and physical environments—so that only new, unique sub-file data segments are transferred and stored during daily full backups. Avamar also deduplicates backup data stored to disk across sites and servers, reducing total required backend disk storage by up to 50 times.

Monthly, Avera transfers patient data stored on Avamar—that must be kept indefinitely—to tape using EMC NetWorker® software. Avera also uses EMC NetWorker in the Sioux Falls data center to back up its 500 physical and virtualized servers running clinical and business workflow applications to tape and disk.

At the main data center, Avera's primary storage infrastructure resides on an EMC CLARiiON® CX380, which is used to store file shares on SATA drives. Its MEDITECH health care information system (HCIS) and GE Healthcare radiology PACS applications are on Fibre Channel. Virtual machines virtualized with VMware ESX® Server also are stored on CLARiiON SATA and Fibre Channel drives. Some PACS data also resides on EMC Celerra® NS80 network-attached storage. In addition, Avera archives PACS images from CLARiiON to the EMC Centera® for long-term storage.

Successful Avamar implementation reduces costs and backup times, increases productivity, and much more

Avera IT is planning to install a second Avamar grid to replicate all remote site backups and local NetWorker backups. The company expects even more backup efficiency and significant reduction in tape requirements as a result of this expansion.

Today, lengthy backup windows and an archaic restore process are no longer issues for Avera. With Avamar, Avera obtains fast, daily full backups—even across T1 and 56K dial-up links—as well as a fast, single-step recovery.

Because of Avamar's source deduplication technology, Avera deduplicated about 80 percent of the data during the initial backup of a new physical server, so only 20 percent needed to be transferred. Subsequent daily full backups only transfer new, unique, sub-file data segments that represent just one to two percent of existing data. Avera IT has found that the deduplication rate for virtual servers, because they are built from similar images rather than physical devices, is even higher.

"Typically our backups now are less than one percent of the actual data on these systems," said Harkin. "Our highest backup volumes barely break three percent. And it takes under three hours to complete our entire nightly full backup of 56 remote servers. Prior to Avamar, full backups would have taken weeks. It's been just phenomenal."

> "With NetWorker, we're able to centrally and efficiently manage our backups across hundreds of physical and virtual servers. It's a very reliable and stable solution and we know it won't fail us when we need to recover a file or database."
>
> **Andrew Harkin, Network Engineer**

Patient care is also enhanced because restores are easier and more reliable. Before, if tapes were offsite, it would take at least a day to retrieve the tape and restore the file. Even onsite tape restores would require 30 minutes to complete. Now, backups are retained on Avamar for one year before being moved to tape. With 99.8 percent of Avera's restores generated by Avamar, clinicians at remote sites can always depend on having up-to-date diagnostic and monitoring data on their patients.

"With Avamar, we've never had an inability to restore, or even a delay," noted Harkin. "We just go in, click the file, tell it to restore, and boom—it's done in a single step in just a few minutes."

Avera also has significantly decreased its total cost of ownership since deploying Avamar and VMware. The company has calculated savings of $283,000 in 48 months due to reduced tape media, tape maintenance, and software licensing costs, slower server and storage growth, and decreased administrative time.

Additionally, IT productivity at Avera has improved. For example, Harkin used to spend six hours a day working exclusively on remote site backups. Now, with Avamar, the analyst who has taken over that responsibility devotes just 15-20 minutes daily on remote backup administration. As Avera continues the transition toward a completely virtualized environment, there are additional savings since IT can leverage one operational skill set with Avamar to protect both physical and virtual servers.

In addition, Avamar's reporting function has contributed to increased efficiency by advising Avera IT on backup status, completion rates, and backup timeframes. Alerts inform IT of any problems immediately, and weekly reports enable IT to identify trends that may require changes to the backup infrastructure.

"The Avamar reporting is very solid and reliable," noted Harkin. "We can always trust what it's telling us. The solution itself is so reliable that we've only had one or two support calls in two and a half years. When we receive alerts that a backup has failed, the issue is always a server or link that went down."

Harkin also praises EMC NetWorker, which is the primary backup solution at Avera's main data center. "With NetWorker, we're able to centrally and efficiently manage our backups across hundreds of physical and virtual servers. It's a very reliable and stable solution and we know it won't fail us when we need to recover a file or database."

Over a two-and-one-half-year period, Avera's move to paperless operations along with increased medical imaging has nearly doubled data volumes to three terabytes at the remote sites. With Avamar and EMC storage and archiving, they've been able to absorb this data growth seamlessly. For example, by moving inactive data PACS images from CLARiiON to Centera content-addressed storage (CAS), Avera has reduced production storage costs, avoided lengthy backup windows, and decreased image retrieval turnaround time.

Because of the successful Avamar implementation, Avera IT is planning to install a second Avamar grid to replicate all remote site backups and local NetWorker backups. The company expects even more backup efficiency and significant reduction in tape requirements as a result of this expansion.

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