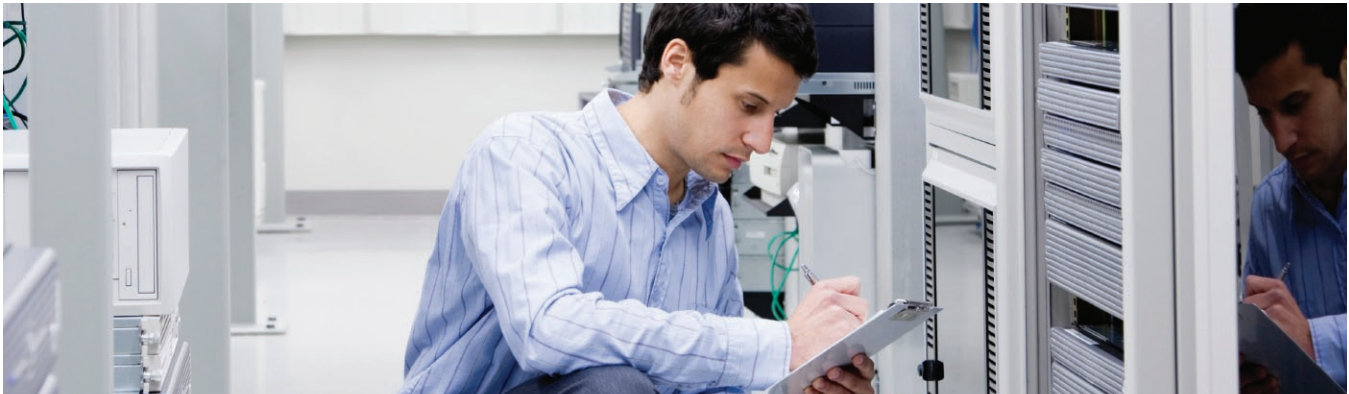




Success Stories

Sky Research Pinpoints UXO



KEY HIGHLIGHTS

Industry

Environmental remediation

The challenge

Handle multiple data types and protocols, enable easy access to data, protect against data loss.

The solution

A NetApp® FAS3020 system stores geographical image data, backed up with NetApp Snapshot™ copies and replicated with NetApp SnapMirror® software to another FAS3020.

Benefits

- Slash cost of data storage from \$17/GB to \$6/GB
- Support multiple protocols
- Increase storage utilization
- Store 10TB+ of data with nearly 100% uptime
- Save cost of dedicated storage personnel

CUSTOMER PROFILE

Sky Research is in the business of environmental remediation, focusing on wide area assessment and detection of unexploded ordnance (UXO) at active and formerly used military sites. Sky Research utilizes airborne and ground sensors such as Synthetic Aperture Radar (SAR), Hyperspectral Imager (HSI), Light Detection and Ranging (LiDAR), digital orthophotography, and electromagnetic and magnetometry sensors, interfaced with GIS and advanced discrimination algorithms. Sky collects and processes high-quality, spatially dense data on thousands of acres. Its objective: to create accurate high-resolution imagery that will help remediation teams pinpoint where there is danger from UXO—and, just as importantly, where there is not.

Sky Research gathers a staggering amount of raw data from its airborne and ground-based systems. Then it's up to Steve Fletcher, IT director at Sky Research, and his team to make sure all that raw data is available for analysis. After the analysts have processed the data and created maps, Fletcher's team ensures that Sky's customers—such as the U.S. Army Corps of Engineers, the Department of Defense, and NASA—can quickly and reliably access those maps to guide their remediation efforts.

THE CHALLENGE

Rapid response to unpredictable growth

There are only a few customers for Sky's services, but they're big, and their projects can be huge. If a major project comes in, Sky might need to double its size virtually overnight, adding technical fieldwork experts and data analysts. During the past five years, Sky has grown from 35 employees to 80, and from a storage capacity of 1TB to 48TB.

To complicate matters further, Fletcher doesn't always know what kind of sensors will be gathering the data for a project. "Sometimes, they're ones we haven't worked with before," he explains. "Flexibility is paramount here, because we don't always know what's coming next."

Looking for options

In the first few years of its growth, Sky used Dell servers with direct-attached storage (DAS). In 2004, lack of scalability and flexibility drove the company to seek other storage solutions. NetApp quickly became a front-runner as one of the few vendors to support multiple protocols including iSCSI. As part of the evaluation process, NetApp Professional Services came out, configured a SAN, racked a NetApp FAS270, and said Sky could keep it for a month on trial.

“What with ease of administration, flexibility, and greater utilization, the NetApp solution slashed our cost of data storage by 65%, from \$17/GB to \$6/GB.”

Steven Fletcher
IT Director, Sky Research

“At the end of that trial period, there was no way we were going to let them take that FAS270,” says Fletcher. “In fact, we still have it, though now it’s folded in to our NetApp FAS3020 and part of a much bigger NetApp deployment.”

THE SOLUTION

Gathering and storing massive amounts of data

Fletcher’s team often faces massive influxes of data: Ground-based sensors generate anywhere from tens to hundreds of MB each day, and airborne sensors pull in about 1GB or more of data per day. A weeklong airborne mission may return with over 100GB of data. Some sensors record data onto removable hard drives; personnel then swap these into workstations on Sky’s LAN and copy the data to NetApp storage via CIFS. Other sensor data is uploaded directly to Sky’s Oracle® Database using custom tools developed in house. Data also comes to the NetApp storage system as CIFS flat files through large USB hard drives. Whether the data comes in through CIFS or NFS/Oracle, it all goes to one place: Sky’s NetApp storage system.

While Sky has three main offices—in Colorado, Vancouver, BC, and Oregon—and remote locations in New Hampshire and Massachusetts, it keeps and processes all of its data at Sky’s Oregon headquarters. Analysts access the data with high-end, multi-CPU workstations with up to 16GB of RAM, and process it using specialized software from ESRI, Geosoft, Mathworks, and others.

Sky stores all this information—GIS data, developers’ files, and its own administrative information—on storage-attached network (SAN) and network-attached storage (NAS) running on a NetApp FAS3020. Fletcher estimates that the NetApp systems store in excess of 10TB of data: approximately 2TB of processed imagery in the Oracle Database, 4TB of raw project data in flat files, and 4TB of corporate data in Microsoft® Exchange and MS SQL Server™.

Making data available to customers

After analysts complete their work, they store the final products in the Oracle10g™ database. Sky uses Web-based mapping

applications to allow clients and project stakeholders access to these images and reports.

Ensuring business continuity and data protection

For high availability and business continuity, NetApp SnapMirror copies data volumes from Sky’s primary FAS3020 to its secondary FAS3020 every hour. The business requirement is not to lose more than a day’s worth of data, so this system design—which makes it unlikely that Sky will lose more than an hour of data—more than meets Sky’s needs.

Sky backs up its data regularly, running scripts that take NetApp Snapshot copies. “We’ve never had to restore a database from a crash, but we’ve done test restores from Snapshot copies both to build production databases and also to upgrade to Oracle10g,” says Fletcher. “It works extremely well. NetApp SnapRestore® is nearly instantaneous.” Sky keeps the majority of its data on disk, and it archives backup copies to tape libraries once a week.

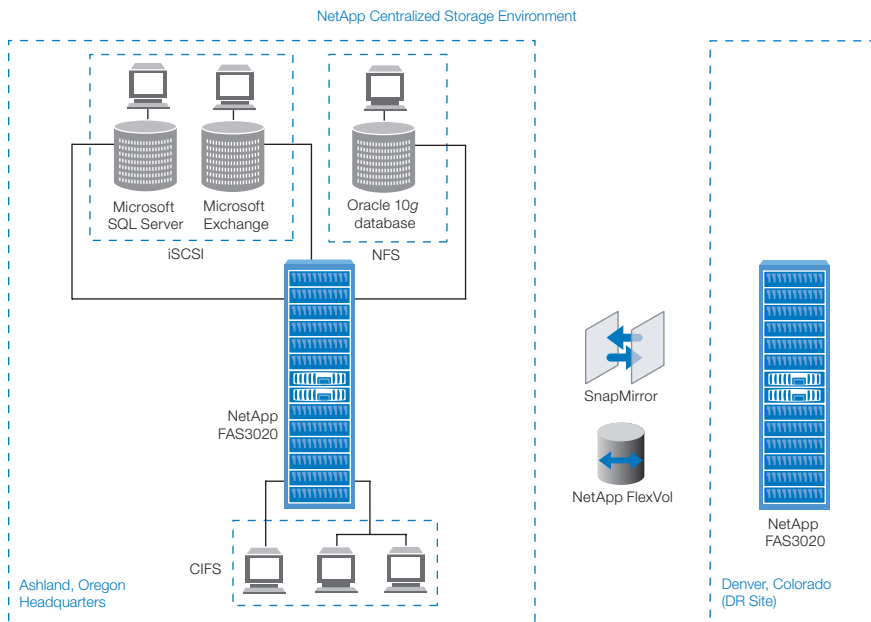


Figure 1) Sky Research keeps and processes all its data at Sky's Oregon headquarters on SAN and NAS running on a NetApp FAS3020. For high availability and business continuity, NetApp SnapMirror copies data volumes from Sky's primary FAS3020 to its secondary FAS3020 every hour.

BUSINESS BENEFITS

Manageable, flexible storage—for less

The NetApp solution enables Sky to serve its customers efficiently, while minimizing the time and resources devoted to managing storage. "Analysts and customers don't have to think about how or where the data is being stored—it's always readily available to them," says Fletcher. "They can just focus on the data, not on IT issues."

Ensuring reliability is easy now, according to Fletcher. "In the unlikely event that a drive fails, I just swap it out," he says. Although he has tested restoring from SnapMirror copies, he has never had to do so as a result of a system problem.

The NetApp solution has also proven highly cost-effective. The flexibility built into NetApp products enables Sky to use NFS and FC drives for Oracle, iSCSI for SQL Server and Exchange, and CIFS for flat files. Sky can minimize its use of pricey FC and maximize its use of lower-cost, more flexible Ethernet.

Sky also conserves its resources by using NetApp FlexVol® to reduce the amount of unused space allocated to volumes. "With our previous solution, sometimes we'd have 500GB of space available on one server, but we'd need it on another server—and there would be no way to access it," says Fletcher. "That doesn't happen anymore. Physical location of storage space is a non-issue."

"This is one easy-to-manage, well-supported system," says Fletcher. Sky doesn't even need a dedicated storage administrator for its NetApp system, which saves the company about \$70,000 annually plus benefits. "What with ease of administration, flexibility, and greater utilization, the NetApp solution slashed our cost of data storage by 65%, from \$17/GB to \$6/GB," he says.

Support for rapid growth

Whenever Sky's storage needs to grow or change, Fletcher turns to NetApp FlexVol. "To provision storage or adjust volume size, I just type in a few NetApp FlexVol commands, and we're done," says Fletcher. "Our previous process doesn't even compare—it sometimes took a couple of days."

When Sky had Oracle on DAS, provisioning storage meant buying new disks, copying data off the DAS, adding disks into the RAID volume, and then copying data back to the expanded space on the DAS.

Planning for the future, with NetApp

Although Fletcher can't predict the growth at Sky, he's sure he'll be using NetApp products to handle it. "Whether we're talking about moving devices into the field, or disaster recovery, or virtualization, we're always looking at new ways to benefit from NetApp storage," he says.

For example, recently Fletcher sent a NetApp FAS2020 out into the field, so that teams on the ground could run their analysis and produce maps in near-real time for an urgent application. "They needed to use both Linux® and Windows®, and since NetApp supports both NFS and CIFS, they didn't have to shuffle data around to allow shared access," he explains. "I never would have dared put a storage device out into the field without the robustness and ease of use we get from NetApp technology."

“To provision storage or adjust volume size, we just type in a few NetApp FlexVol commands, and we’re done. Our previous process doesn’t even compare—it sometimes took a couple of days.”

Steven Fletcher
IT Director, Sky Research

Fletcher is also planning to expand use of NetApp to other Sky sites. “We’re considering putting NetApp hardware in our Denver offices, and using SnapMirror to mirror data between the sites,” he says. “That would give us more protection in the event of a disaster.”

Virtualization is also part of Sky’s plans. “Whether I’m backing up real or virtual machines, I know I want to be using NetApp to do it,” says Fletcher.

SOLUTION COMPONENTS

NetApp Products

NetApp FAS3020 storage systems
Data ONTAP® 7G operating system
NetApp FlexVol software
NetApp SnapMirror software
NetApp SnapManager® for
Microsoft Exchange 2003
NetApp SnapDrive® for Windows

NetApp Professional Services

NetApp Global Services

Protocol

IP SAN
NAS CIFS
iSCSI
NAS NFS

Third-Party Products

Oracle Database 10g
Microsoft Exchange
Microsoft SQL Server

Environment

Applications: ESRI GIS software, applications for enterprise administrative functions, Microsoft Exchange Server
Database: Microsoft SQL Server, Oracle10g
Server platform: Dell, IBM, and HP servers running Microsoft Windows Server 2003, Windows 2000 Servers, Red Hat Linux, Windows XP, and Mac® OS X Server

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