

## Rapid Storage Improves Productivity by Giving Faster-Than-Local Data Access *Using FlashDisk® with RAID 6*



With 1,200 employees, KVOS, based in Reykjavik, Iceland, is one of the world's leading printing companies. The company's design team is far from some of its customers in the United States so fast computer communications is essential for the delivery of quality service. "Our equipment was the bottleneck in accessing images and other files needed to progress printing projects," said Gudmundur Benediktsson, Technical Director for KVOS. "Our recent upgrade to Winchester Systems' FlashDisk in a RAID 6 gives our designers and layout people faster access to 25 Terabytes of centralized, server-attached storage than their own local disks could deliver. Designers no longer have to wait for data so their productivity has been substantially improved."

ODDI Printing, a subsidiary of KVOS, specializes in pre-press, printing and binding of books, catalogs and magazines with a special emphasis on fine art printing. The printing industry on this North-Atlantic island thrives on Iceland's literary heritage which is rooted in the medieval sagas. The company has a team of consultants based in the United States and shipment to the United States typically takes ten days on the water and four days for customs and delivery or five hours for air freight and a day for customs and delivery. ODDI has printed many educational books for universities such as Princeton University School of Architecture and Harvard University School of Design, art books and catalogs such as *City Spaces* by Bob Thall and *American Sculpture Catalog*, periodicals such as *In Magazine* and historical books such as *London Perceived*.

### ***Problems handling large volumes of data***

The high-quality printing done by ODDI requires working with huge amounts of data, primarily high resolution image files. Many of the company's projects involve reprinting earlier jobs or new jobs that reuse images or other data from previous jobs. The company prints so many photo and art books and publica-

tions that it currently has 25 Terabytes (TB) of data from the jobs it has printed just since 1997. ODDI designers and layout people access this data on a continual basis as they prepare new jobs for printing. Designers and layout people typically have 1 TB of files checked out at any given time.

"In the past, we stored this data on several RAID systems connected to an Apple Xserve server running Apple OS," said Bjorn Fróðason, System Administrator for KVOS. "We were never totally satisfied with any of the storage solutions that we tried. Our designers and layout people experienced considerable delays in accessing data. Delays were particularly troublesome when many people were trying to access data at the same time. It often seemed as if our designers and layout people were spending as much time waiting for data as they were getting jobs ready for the presses. Designers accessed the data over a Gigabit Ethernet network – but surprisingly, the link was not the problem, it was the storage response time. We also felt that it took too long to get help when we had problems with the storage system."



### ***Picking a storage system***

"We heard about Winchester Systems FlashDisk SATA on the web," Fróðason said. "I checked with a few of their customers and discovered they had a good reputation for delivering very high levels of performance at a reasonable cost. FlashDisk SATA allows each SATA unit to house its own RAID controllers for performance applications. The disk arrays have a large hardware cache and application specific integrated circuits (ASICs),

designed for the parity calculations involved in RAID 6. The use of ASICS for parity calculations helps deliver the raw write performance required in data intensive applications. This architecture also cost-effectively scales to both large and small systems. ODDI's application processes large files that are data throughput intensive and fit well with SATA technology and did not require more expensive Fibre Channel or SAS disk arrays for high speed random access.

**“Yesterday, the equipment was the bottleneck, today the designer is the bottleneck.”**

***Gudmundur Benediktsson,  
Technical Director***

valuable time because two disks failed at about the same time,” Fróðason said. “That’s why we moved to RAID 6.” RAID 6 is a dual distributed parity mechanism that permits two disk drives to fail in an array and still be able to recover and rebuild data from the remaining disk drives. RAID 6 increases the mean time to data loss (MTDL) by two to four orders of magnitude relative to RAID 5, providing MTDL measured in thousands of months or hundreds of years.

“Their technical sales team helped us pick out the right model for our needs,” Fróðason said. ODDI currently uses a Winchester Systems’ FlashDisk SATA SX-2302 with 12 TB, SA-4562 with 12 TB and SA-3442 with 5 TB of storage. ODDI’s information technology department developed a web-based application using Microsoft .NET framework, Apache web server, Microsoft SQL Server and the WebGUI front-end that delivers files to designers and layout people. “This environment makes it totally transparent as to where the data is being stored,” Fróðason said.

#### ***Ensuring data security***

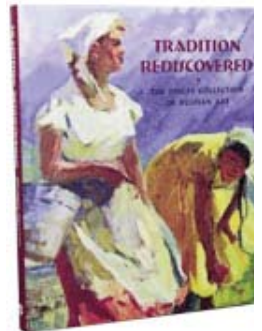
With large arrays such as the one used at ODDI, the odds of multiple drive failures are increasing. But RAID 5 protects only against a single drive failure. To perform a successful rebuild, every sector on all of the other drives must be readable or permanent data loss occurs. The probability of a rebuild failure increases with the total number of disks. A 20 TB array can be expected to have some rebuild failures in RAID 5 - which is simply unacceptable.



“Before we started using Winchester Systems storage systems there were two occasions when we lost the arrays and

#### ***Speed is phenomenal***

“The speed of the new storage system is phenomenal,” Benediktsson said. “There are no delays in accessing data now regardless of how many of our people are working at one time. The RAID system can theoretically handle between 500 and 600 Megabytes per second (MB/s) and we are seeing real world performance of 300 MB/s. Each client is able to access data at a rate of 60 MB/s so it takes only about 17 seconds to access a Gigabyte file.”



“We have long experience as RAID users, we have tried a lot of vendors and we did not like any of them until we found Winchester Systems on the web,” Fróðason concluded. “Since then life has been what we call ‘total happiness.’ Productivity is not only higher; the environment for designers and layout people has taken a quantum leap. They are doing things on central servers today that were not possible 10 years ago. For instance, they now work with 100 to 500 MB Photoshop files with layers, viewing pages in high resolution without waiting for opening and saving files, creating a final product PDFs directly from their apps, etc. Yesterday, the equipment was the bottleneck, today the designer is the bottleneck. This was made possible by using fast storage, fast servers, fast workstations and a fast network.”