



## CASE STUDY

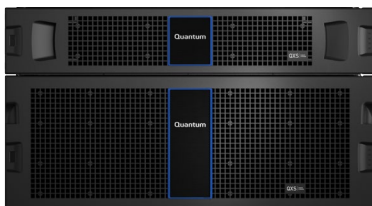
### Knowledge Media Institute/The Open University Relies on QXS Hybrid Storage for Virtualized and Nonvirtualized Storage Demands

The Knowledge Media Institute at The Open University performs research on future Internet technologies, multimedia and information systems, new media systems, and semantic web and knowledge services. The organization uses QXS™ hybrid storage to support a variety of applications ranging from web server access to high-performance computing (HPC) while optimizing storage assets.



#### FEATURED PRODUCTS

#### QXS Hybrid Storage



“We had some ambitious requirements for a new networked storage platform, and the Quantum QXS hybrid storage series met them all. No other solution within the price band could offer the performance and storage density of their 2.5” drive-based systems.”

**Paul Alexander**

Systems & development manager, Knowledge Media Institute, The Open University



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**Paul Alexander** – Systems & development manager, Knowledge Media Institute, The Open University



#### SOLUTION OVERVIEW

- QXS-324 Hybrid Storage

#### KEY BENEFITS

- **Full VMware certification** for storage virtualization
- **Improved productivity** with increased performance and application response times
- **Maximum performance density** with small form factor 2.5-inch SAS drives
- **Simple web-based storage management** without the need for server-based agents
- **Flexible storage infrastructure** with option to mix SAS, SSD, and SATA drives

The Knowledge Media Institute (KMi) was established in 1995 in recognition of the need for The Open University (OU) to be at the forefront of research and development in a convergence of areas that impacted on the OU's very nature: cognitive and learning sciences, artificial intelligence and semantic technologies, and multimedia. The OU chose to call this convergence Knowledge Media.

Knowledge Media is about the processes of generating, understanding, and sharing knowledge using several different media, as well as understanding how the use of different media shape these processes.

KMi operates with reference to a number of basic tenets, which define the context in which it formulates and pursues its research objectives:

KMi's research is aligned with a number of broad strategic threads, currently future Internet, knowledge management, multimedia and information systems, narrative hypermedia, new media systems, semantic web and knowledge services and social software.

In keeping with a lifelong learning perspective, our research agenda takes a broad definition of learning, embracing distance learning, learning in the classroom, and learning in the workplace.

#### KEY STORAGE ISSUES

KMi within the OU has been undergoing a phase of rapid expansion; a mix of researchers, technologists, designers and administrative staff. With this expansion the requirements for data storage have also increased rapidly to serve the multitude of research projects for both academic and commercial clients.

Paul Alexander, systems and development manager for IT services at KMi, explains the issues he faced in providing a data storage infrastructure to accommodate KMi's dynamic expansion. "Our existing SAN was proving difficult to expand. In addition to capacity limits, we were also faced with license fees to expand each configuration with additional JBODs. We needed to find a new platform that would allow easy expansion plus deliver high performance with storage density, as data center space is always at a premium."



“The ability to freely mix drive types to create a tiered architecture was also important,” explains Alexander. “We knew that our storage system requirements were ambitious, and we really didn’t expect to meet all of our parameters within our budget. However, we contacted our long-standing storage and virtualization partner, NCE, who proposed the Quantum hybrid storage series as the ideal candidate.”

### ESTABLISHING A HIGH-PERFORMANCE VIRTUALIZED STORAGE INFRASTRUCTURE

Paul evaluated the QXS-324 recommended by NCE which is an 8Gb Fibre Channel networked RAID array based on 2.5-inch drive technology. “We didn’t realize that a 24-drive 2U chassis using 2.5-inch small form factor drives was available in the general IT channel market until we met the Quantum QXS hybrid storage series,” recalls Alexander. “The ability to freely mix drive types and expand up to 288TB using 3TB SATA drives really made this an ideal platform to future-proof our SAN.”

Ease of deployment was also a deciding factor for Alexander. “The Quantum systems were so intuitive to install. I had the systems up and running within minutes using the wizard-based tools, without even opening the user manual.” All QXS hybrid storage systems offer the same web-based graphical user interface without the need for any server-based agents. Wizard-based configuration tools speed the installation process with full access to advanced features for system tuning.

The data workload characteristics at KMi vary considerably, with a mixture of web-based applications, databases, and HPC tasks dedicated to specific research projects. The ability to mix drive types including SAS, SATA, and SSD has proved invaluable to allow the most effective allocation of storage resources based on the data workload and data life cycle.

“Very often, we have HPC requirements where the high-performance 2.5-inch SAS drives running over our Fibre Channel SAN deliver the performance we need. However, most research

projects have a three-year active life and a five-year data archive requirement, so we can utilize lower cost bulk SATA storage for this purpose,” explains Alexander. “We replicate data between two sites, each with an identical configuration using QXS-324 arrays. Then we backup disk-to-disk using NetVault from Quest Software® for both our physical and virtual environments. The storage arrays are configured using RAID 5 plus one hot spare to reduce recovery time—but they have not missed a beat since installation.”

Server and storage virtualization is used extensively at KMi, so the full VMware certification of the QXS hybrid storage series offers peace of mind in this regard. “We use virtualization to maximize the utilization of our hardware and to provide computing resources to researchers and staff who do not have direct-attach HPC requirements. The Quantum arrays perform very well, and users have reported massive performance improvements since their installation,” says Robbie Bays, systems and network administrator at KMi. The most significant advantage of the QXS hybrid arrays has been the performance density offered by the small form factor (SFF) 2.5-inch drives used in the QXS-324 systems.

### PROVIDING A FLEXIBLE STORAGE SOLUTION

Although KMi has taken advantage of SFF drives in the QXS-324, which can house up to 24 drives within a compact 2-rack unit chassis, it has the option of expanding each configuration with further 24-drive JBOD units or 12-drive expansion units which utilize 3.5-inch drives, giving access to the largest capacity SATA drives on the market for secondary bulk storage needs. “The massive flexibility of the QXS hybrid storage systems is a great asset. We can mix drive types and sizes and the modular design of the systems means that we can upgrade our RAID controllers in the future, but maintain access to all of our existing data with maximum reuse of our investments. Many competitive offerings we considered called for a completely new infrastructure when moving up the chain in terms of performance or features,” says Alexander.

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**Paul Alexander,**  
Systems & Development  
Manager, Knowledge  
Media Institute, The Open  
University

### ABOUT THE OPEN UNIVERSITY

Since the launch in 1969, more than 1.6 million people worldwide have achieved their learning goals by studying with The Open University. The OU is the biggest university in the United Kingdom with more than 260,000 students, close to 7,000 tutors, more than 1,200 full-time academic staff, and more than 3,500 support and administrative staff. Open University students are not just in the United Kingdom. Most courses are available throughout Europe, and some are available worldwide directly from the OU. Many more courses are available through the OU’s partnerships and accredited institutions.

There are currently about:

- 3,500 students in the Republic of Ireland
- 9,000 students elsewhere in Europe
- 7,500 outside the European Union
- 46,000 students in OU-validated programs

## ACCOMMODATING A VAST RANGE OF DATA WORKLOADS AND PERFORMANCE REQUIREMENTS

Research projects at KMi focus on future Internet technologies, multimedia and information systems, new media systems, and semantic web and knowledge services. Wide use is made of open source tools along with the development of new open source technologies. Very often projects require HPC resources where a direct physical connection to the SAN and nonvirtualized compute resources are essential. “We use the QXS-324 arrays extensively for our HPC projects, and the storage infrastructure has never been the bottleneck. Our SAN is 4GB FC right now—but when we do move to 8GB, the QXS hybrid storage systems will be ready to take advantage of the increased bandwidth. At the other end of the spectrum, we have clients who just need

access to a web server with light traffic or development tools. Here we maximize our hardware utilization through virtualization,” explains Alexander. The full certification of all Quantum QXS hybrid storage arrays with VMware® ESX and vSphere provides a solid platform for users deploying a virtual storage infrastructure.

Going forward, KMi plans to extend its infrastructure further with secondary SATA storage, “SATA technology is great for disk-to-disk backup, but it also provides sufficient performance for a number of our web-based applications,” says Alexander. “Quantum QXS hybrid storage has been a winner for us on many fronts and will hopefully accommodate our data needs as we continue to expand.”

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