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## The UK's National Synchrotron Facility, Diamond Light Source, Turns to Netapp Flash Storage for a High-Speed Data Buffer

### COMMERCIAL

### KEY HIGHLIGHTS

#### Industry

Scientific research and education

#### The Challenge

Diamond Light Source needed a high-speed data buffer to store data locally that was coming off its beamlines.

#### The Solution

NetApp E540 Flash Array

#### Benefits

- High performance ◀
- Easy to scale ◀
- Easy to manage ◀
- Cost effective ◀



### CUSTOMER PROFILE

Diamond Light Source is the UK's national synchrotron science facility. Located on the site of the Rutherford Appleton Laboratory in Oxfordshire, Diamond generates brilliant beams of light, from infrared to X-rays, to explore the fundamental nature of matter.

These powerful blasts of light enable scientists to study the atomic makeup of materials. For instance, the "beamlines" allow researchers to examine the finest details of a protein's structure, examine electrons as they move on the surface of a magnetic storage disk, and more.

The research at Diamond is both academic and industry-based and covers a wide range of scientific disciplines. The facility is free at the point of access as long as results are published in the public domain. At Diamond, scientists can use synchrotron light for a vast range of applications, from exploring the conditions at the center of the earth to developing vaccines and new drugs.

## Customer profile - continued

One of Diamond's areas of research is cancer, with exploration into the structure of cell molecules that could fight cancer. In the past, this type of research, in which images are gradually built up to reveal the molecular structure, took eight hours to capture a single image. At Diamond these processes have been reduced to fractions of a second.

## The challenge

Given the nature of its work, computing at Diamond is by necessity extremely processor and storage intensive in order to analyze and store data from the beamlines. To achieve the required computing capacity, Diamond provides a general-purpose compute cluster of approximately 1,900 compute cores and 250,000 GPU cores, which is also used for automated fast data processing on beamlines.

The amounts of data generated from beamline research are so enormous that Diamond stores the data on tape systems because it's not cost-effective to keep the data on disks forever, utilizing the 2PB of high-performance storage most efficiently. Diamond aims to keep data on disk for approximately six months from time of collection. That said, the organization has a data dispenser that permits clients to download their data onto disks and take it back to their home institution.

Each beamline at Diamond is optimized for a specific technique. However, the synchrotron wanted to implement a high-speed data buffer for data coming off two beamlines so it could be stored locally before being transferred to the central high-performance file system.

## The solution

Dave Bond, computer systems administrator at Diamond, says, "We had a need for high-speed IOPS for a buffer system that could handle the amount of data coming off the beamlines. In short, we wanted something that would provide a cache between our fast detectors on the beamline and our central storage."

Diamond was already using a NetApp® FAS system for scalable storage for unstructured scientific data and its virtual environment. Although this was answering a different storage need, its capability and flexibility led Diamond to explore NetApp technologies, among others, for a high-speed data buffer.

Following a period of market research, Diamond chose two of the NetApp EF540 Flash Arrays with 12x 800GB SSD. This storage technology is designed for performance-driven applications with submillisecond latency requirements. It delivers extreme performance and IT efficiency and has proven reliability. It delivers more than 300,000 IOPS and 6Gbps throughput. It also cuts space utilization, power, and cooling by up to 95% and maximizes uptime with full redundancy and automated failover.

Bond adds, "For us specifically, NetApp EF540 provided the high-speed IOPS we were looking for.

It can also be extended easily, so we could reuse the arrays and scale them up if required."

***"It's amazingly quick for the price point and very competitive for the performance we gained. There is so much data coming off the beamline, and it provides the local storage we needed."***

*David Bond, Computer Systems Administrator, Diamond Light Source*

*“One of the attractions of the system is that it is very easy to scale our storage requirements. It’s a simple process, and we can add more storage as we need it.”*

*David Bond, Computer Systems Administrator, Diamond Light Source*

## The benefits

NetApp’s development of the NetApp EF540 was driven by the large I/O needs of server and desktop virtualization and is based on 20 years of storage experience. Bond says, “The EF540 is amazingly quick for the price point and very competitive for the performance and feature set we gained. Compared to alternatives, it was quick to implement and provide a storage solution to our need.”

## Easy to scale

One of the two NetApp EF540s currently delivers 7.5TB of raw capacity for Diamond. Bond explains, “This meets our needs at the moment, but one of the attractions of the system is that it is very easy to scale our storage requirements. It’s a simple process, and we can add more storage as or when we need it.”

## Easy to manage

The NetApp EF540 is managed using SANtricity® software, which provides automated path failover for I/O, proactive monitoring and repair, and online administration, among other features.

The management functionality, including a graphical representation of storage systems with an easy-to-use storage interface that can be customized, makes it easy to manage. Further, all management tasks can be performed while the storage remains online.

This allows Diamond to make configuration changes, carry out maintenance, and expand capacity without disrupting I/O. Bond says this was a further compelling feature for Diamond: “SANtricity makes it easy to manage and administrate.”



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