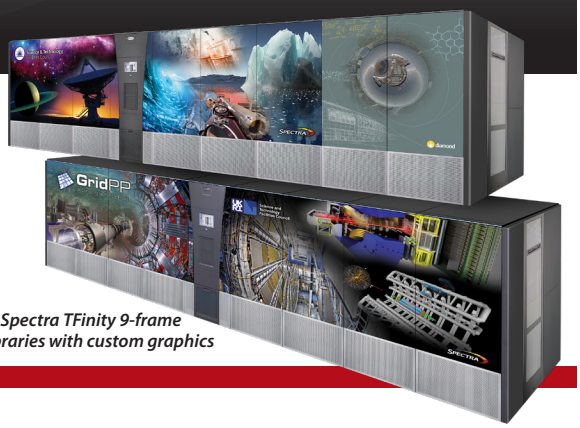
CASE STUDY

STFC Rutherford Appleton Laboratory to process and preserve more than 60 PB of scientific research data with Spectra

> "Our new Spectra tape library will allow the massive volumes of environmental data we collect to be made available to environmental scientists and support their research for many years to come."

Professor Bryan Lawrence, JASMIN principal investigator, University of Reading



Two Spectra TFinity 9-frame libraries with custom graphics

Science and Technology Facilities Council

STFC is a world-leading multi-disciplinary science organization, which aims to deliver economic, societal, scientific and international benefits to the U.K., and more broadly to the world. A part of U.K. Research and Innovation (UKRI), STFC supports an academic community of around 1,700 people who work in the U.K., Europe, Japan and the U.S. on particle physics, nuclear physics and astronomy, including space science. STFC's two main campuses are at the Rutherford Appleton Laboratory (RAL) in Oxfordshire and the Daresbury Laboratory in Cheshire – each of which offers technological expertise that underpins and ties together diverse research fields.

The Challenge

STFC's Scientific Computing Department (SCD) supports some of U.K.'s most advanced scientific facilities to make vital discoveries and deliver progress. As leaders in scientific computing, SCD's research and development drives improvements across the scientific research landscape. The department is home to STFC's Scientific Data Centre, which hosts the JASMIN facility and the IRIS infrastructure. The JASMIN facility is comprised of an environmental science supercomputer and data facility, while the IRIS project coordinates e-infrastructure needs for a 'cooperative' of partners which enable the exploitation of data outputs from high-energy physics and other communities.

SCD manages high performance computing facilities and services, developing the infrastructure that allows STFC to process huge amounts of data. The organization needed to increase its capacity for storing and managing the vast and ever-growing amounts of data it receives. The extra capacity needed to be at least 60 petabytes – the equivalent of storing more than 10 million DVDs

RAL is located on the Harwell Campus (aerial view).

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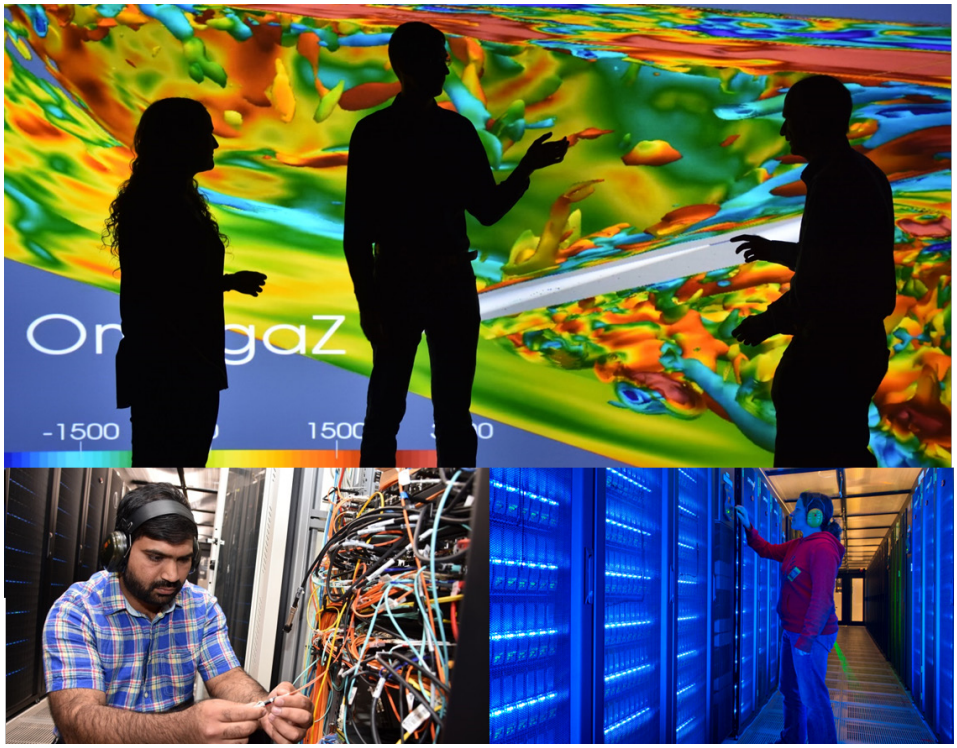
– with the potential to expand to meet future data demands. The organization desired a mix of the open-standard LTO drives and enterprise-class drives, and also needed the new solution to handle requests from multiple applications concurrently. Finally, SCD required a system that could run continuously, 24 hours per day, seven days per week.

The Solution

Installed within STFC's Scientific Data Centre at RAL, the new Spectra® TFinity® ExaScale Tape Library has an initial capacity of 65PB, 48 Drive Bays and a mix of 17 open-standard LTO-8 tape drives and 16 IBM® TS1160 tape drives. Implementing the latest tape drive technology in their new storage system will enable future expansion. This library will provide for the predicted data growth from existing groups over the next decade, and act as an active archive for JASMIN users and the IRIS science communities. It brings SCD's total tape storage capacity within the RAL Scientific Data Centre to 240PB.

In December 2019, STFC enhanced their data storage capabilities at RAL by acquiring a second Spectra TFinity ExaScale Tape Library. Their second Spectra library was deployed with 20 IBM® TS1160 tape drives with JE media. They added two additional IBM® TS1160 FC drives to their library in March 2020, bringing their total drives in the second Spectra TFinity to 22 tape drives. They also added two expansion frames to their first Spectra TFinity, expanding it to a total of 30 IBM® TS1160 tape drives.

Should SCD need to employ multiple HSM solutions concurrently, the TFinity tape library can handle simultaneous requests either by using multiple partitions in the library, or by having multiple robotic interface modules (RIMs) active in the same partition. Redundancies like multiple tape access robots, power supplies, control paths and power distribution units mitigate failure and ensure the system will be able to run continuously, 24 hours per day, seven days per week.



Compute and visualisation at SCD

Environment Snapshot

- Nine-frame Spectra TFinity Exascale Tape Library with 17 LTO-8 tape drives and 30 IBM® TS1160 tape drives
- Nine-frame Spectra TFinity Exascale Tape Library with 22 IBM® TS1160 tape drives
- Spectra Certified Media
- BlueScale® Vision Camera
- Two High Performance Transporters (HPT)
- CASTOR Hierarchical Storage Management System

Spectra's Solution Recap

Spectra TFinity ExaScale Tape Library – With unsurpassed storage density packaged in the smallest footprint of any enterprise library on the market, the Spectra TFinity ExaScale offers industry-leading scalability with the speed necessary to meet requirements of the most demanding environments. The Spectra TFinity ExaScale provides maximum flexibility by allowing you to select the tape technology that is the perfect fit for your business. In addition to LTO tape technology, the Spectra TFinity Exascale is also compatible with IBM TS11X0 enterprise tape technology and Oracle® T10000x enterprise tape technology, enabling all three in the same library. The library's modern design provides a tape archive and backup solution to fully meet the needs of the Enterprise IT, federal government, high performance computing, and media and entertainment markets.

Spectra Certified Media – Combined with Media Lifecycle Management (MLM), a Spectra BlueScale software feature that proactively monitors over 40 tape media health statistics, Spectra Certified Media assures data integrity using an integrated, intelligent and comprehensive set of Data Integrity Verification (DIV) tools. Spectra offers certified media for both LTO and IBM's TS11XX media.

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