

# MONASH UNIVERSITY eRESEARCH CENTRE IMPROVES RESEARCH SUPPORT WITH RED HAT CEPH STORAGE



## SOFTWARE AND SERVICES

Red Hat® Ceph Storage

Red Hat Consulting

Red Hat Training

## HARDWARE

Dell PowerEdge R630 and R730xd rack servers

Mellanox ConnectX-4 40Gb adapter cards

Mellanox Spectrum Ethernet switch

**40 EMPLOYEES**  
SUPPORTING OVER  
**4,800 RESEARCHERS**  
WORLDWIDE

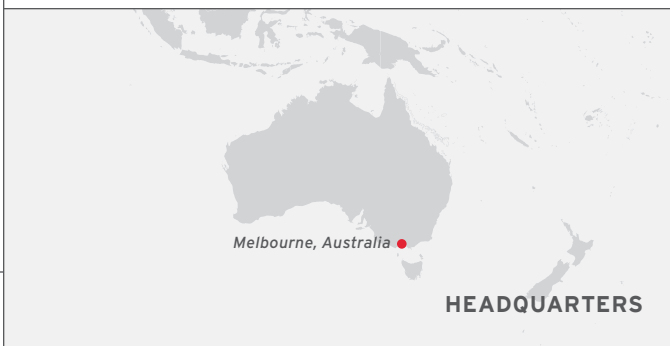


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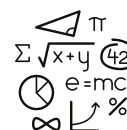
Monash University, an Australian public research university based in Melbourne, faced a mixed blessing. It received a large injection of research infrastructure funds to investigate and create a cloud environment for researchers. However, the university had little funding available for the needed cloud storage. In addition, the university's rapidly expanding base of internal and external research clients meant uncertain performance and scalability requirements.

As leaders of accessible and effective research infrastructure, the university was highly motivated to find a solution. It decided to implement a software-defined storage solution. With help from Red Hat Consulting, the Monash University eResearch Centre deployed Red Hat Ceph Storage on Dell PowerEdge servers. As a result, the university gained cost-effective flexibility and scalability. The university's eResearch Centre now manages massive workloads of five petabytes of data – with growing capacity – within a single infrastructure, one of the largest deployments of its kind in the Southern Hemisphere.



*"Our researchers collect, generate, process, analyse, manage, share, and re-use a vast amount of data from a plethora of disciplines and specialisations. Red Hat Ceph Storage is the software-defined, multipurpose hub central to our research data infrastructure. Its flexibility helps us deal with today's challenges and gives us confidence in dealing with whatever comes next."*

BLAIR BETHWAITE  
SENIOR HPC CONSULTANT,  
MONASH ERESEARCH CENTRE



## EDUCATION INDUSTRY

### BENEFITS

- Deployed software-defined Red Hat Ceph Storage infrastructure to unify management of research workloads and offer self-service storage to users
- Supported collaboration between local and global researchers by offering globally accessible storage, including access outside of the university's firewall
- Gained access to comprehensive Ceph expertise and training through Red Hat Consulting and Red Hat Training

## LEGACY STORAGE RESTRICTS RESEARCH CAPABILITIES

Monash University, an Australian public research university based in Melbourne, hosts the Monash eResearch Centre (MeRC). MeRC partners with research groups to accelerate and transform their research practice by connecting them – and their collaborators – to appropriate hardware, software, and services. At the core of the centre's philosophy is the realization that in modern research, it is very rare that a lone researcher discovers a new and fantastic breakthrough. Research is typically built on someone else's data or software.

Providing computing infrastructure that spans the needs of cross-organisational collaboration, performance, and scale is significant. Multiple funding sources and stakeholder buy-ins are often required to balance all concerns. For example, MeRC's first attempt at a research cloud underestimated the type and amount of storage per core required for effective use by researchers. Without a subsequent investment in storage, the research cloud would fail to deliver effectively.

In addition, MeRC also needed to meet its commitment to supply compute and storage capacity to the National eResearch Collaboration Tools and Resources (Nectar) project. The project aims to provide an online infrastructure that supports researchers and lets them share ideas and research outcomes with local and global colleagues. As a result, the centre faced the challenge of offering enough scalable object-based storage to support a variety of research use cases in an OpenStack®-based cloud.

"We had to deal with research that is sometimes high in petabytes or input/output operations per second (IOPS), and we wanted it all as one infrastructure," said Steve Quenette, deputy director of MeRC. "And in most cases, the communities that gather around an application come from different fields of research, different universities, and different industry partners, so the infrastructure needs to be accessible outside of the firewall."

Previously, the centre used traditional fibre channel (FC) and storage area network (SAN) technology to provide storage for research application hosts. "However, something different was needed to meet the growing research requirements," said Blair Bethwaite, senior high-performance computing (HPC) consultant at Monash eResearch Centre.

## A SOFTWARE-DEFINED SOLUTION FOR GROWING STORAGE NEEDS

To achieve the storage scalability and flexibility needed to meet client demand, MeRC sought to adopt agile, software-based storage. The centre determined that a software-defined storage solution would cost-effectively provide the scale and flexibility to support Monash's highly agile research environment.

"We didn't have a solid idea of our performance and scalability requirements, but we thought a software-defined storage solution would be the best approach to meet the future needs of our university and external clients," said Bethwaite.

The centre chose to deploy Red Hat Ceph Storage running on Dell servers to achieve the needed storage capabilities, prevent vendor lock-in, and allow the research community to independently scale capacity and performance.

"Ceph was distinguishing itself as highly flexible, cost-effective, and massively scalable – exactly what we needed," said Bethwaite. "And through our partnership with Dell, we were able to get competitive server pricing."

To successfully implement Red Hat Ceph Storage, the centre's IT team engaged Red Hat Consulting to prepare the storage cluster and learn how to make the deployment process quicker and more efficient.

## **IMPROVED SUPPORT FOR GLOBAL RESEARCH STORAGE NEEDS BETTER COLLABORATION FOR RESEARCHERS**

About 50% of Monash's research resources are allocated to local research, while 40% goes to national initiatives. The balance supports joint research with international partners.

With the Red Hat Ceph Storage solution, MeRC can better support collaboration between researchers—whether locally in Australia or with global research partners—by offering globally accessible storage, including access outside of the university's firewall.

Ceph makes it simple to expose and share large amounts of data publicly and privately. It is flexible enough to provide the multi tenant infrastructure, such as generic block storage, that is required in a large research environment.

The replication and erasure coding capabilities of Red Hat Ceph Storage address researchers' data availability needs and offer data protection. In addition, the new solution also provides a self-service storage platform.

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## **ACCESS TO EXPERT GUIDANCE AND TRAINING**

In addition to using Red Hat Consulting to gain expert insight during deployment, MeRC also worked with Red Hat Training to further its IT team's skills and knowledge on the Red Hat Ceph Storage solution. The centre's IT teams participated in a Red Hat Training course that focused on Ceph technology and its integration with Cinder block storage and Glance, OpenStack's image service.

With this training, the centre's enterprise IT technicians rapidly gained the skills and experience to independently support the new storage solution using Ceph's intuitive, easy-to-use command set.

## **COST-EFFECTIVE FLEXIBILITY AND SCALABILITY**

The Red Hat Ceph Storage solution helps MeRC meet researchers' varying IT storage needs at a lower cost. With this solution, the centre can flexibly scale its infrastructure without needing different products for different styles of storage.

"Traditional, proprietary, file-system-based storage is built with architectures that are just too rigid at this level of petabyte installation. Our software-defined environment lets us offer many research models without a prohibitive investment in traditional SAN or parallel file systems," said Bethwaite.

With the deployment flexibility of Red Hat Ceph Storage, the centre can quickly, easily add capacity to its new storage solution without proprietary hardware or software vendor lock-in—or the high investment required for most proprietary solutions.



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CUSTOMER CASE STUDY Monash University eResearch centre improves research support with Red Hat Ceph Storage

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STEVE QUENETTE  
DEPUTY DIRECTOR,  
MONASH ERESEARCH CENTRE

## CONTINUED SUPPORT FOR RESEARCH INNOVATION AND COLLABORATION

With Red Hat Ceph Storage running on Dell PowerEdge servers, the Monash University eResearch Centre can now manage massive workloads, encompassing five petabytes of data within a single infrastructure.

"Big data's impact on any enterprise is profound, and it's going to make more people behave like researchers," said Quenette. "There is a need to provide a single service that offers a large, scalable object store. Red Hat Ceph Storage provides that."

As a result of the success of its initial deployment, the centre plans to expand its Red Hat Ceph Storage deployment to continue to fulfill researchers' growing data needs.

"Due to our satisfaction and confidence in Red Hat Ceph Storage, we will shortly increase that capacity to seven petabytes of raw storage on a single cluster," said Quenette. "We would not have been able to achieve our project goals without the powerful, object-based storage capabilities of the Red Hat Ceph Storage and Dell solution."

## ABOUT MONASH UNIVERSITY

Monash University was founded by an act of Parliament in 1958. The goal was to create a research-focused tertiary institution with an emphasis on science and technology. It has since opened two off-shore campuses, in Malaysia and South Africa. In 1999, Monash University became a founding member of the Group of Eight, the coalition of Australia's most prestigious research-intensive universities.

[www.monash.edu](http://www.monash.edu)



## ABOUT RED HAT

Red Hat is the world's leading provider of open source software solutions, using a community-powered approach to provide reliable and high-performing cloud, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.



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