

Securing and serving data that drives global research insights

Oregon State University deployed Dell AI Factory to securely fast-track marine ecosystem analyses and environmental research as part of the NSF Ocean Observatories Initiative.



Photo credit: Kim Kenny, OSU

Business needs

Dell AI Factory was chosen by Oregon State University to manage protect and disperse vast amounts of critical data to support vital global scientific research for the National Science Foundation (NSF) funded Ocean Observatories Initiative. And it's now able to future-proof infrastructure to keep pace with AI advancements and protect itself from complex cyber threats.

Business results



Secures petabytes of data for at least 30 years.



Safeguards critical data from thousands of malicious attacks daily, and against accidental loss.



Achieves 160:1 reduction ratio using PowerProtect Data Manager, protecting 16.6 PB of data – the equivalent of \$126,000 of tape.



Strengthens scientific analysis via free, on-premises AI and High-Performance Computing resources.

Solutions at a glance

- [Dell PowerProtect Data Domain](#)
- [Dell PowerProtect Data Manager](#)
- [Dell PowerProtect Cyber Recovery with CyberSense](#)
- [Dell PowerScale](#)
- [Dell Unstructured Data Solutions Cyber Protection Suite](#)
- [Dell PowerEdge with NVIDIA GPUs](#)
- [Dell PowerSwitch Z-Series](#)
- [Dell VxRail](#)

The Ocean Observatories Initiative (OOI) is a science-driven ocean observing network that collects invaluable oceanographic data used for vital research on environmental trends, seismic activity, marine ecosystems and critical environmental issues. Funded by the U.S. National Science Foundation, the OOI is a partnership between Oregon State University (OSU), Woods Hole Oceanographic Institution (WHOI), and the University of Washington (UW) that collects and serves real-time data from more than 900 instruments that measure physical, chemical, geological, and biological variables in the ocean, the atmosphere above, and on the seafloor. The data are freely available online to anyone.

The Pacific Northwest coastal component of OOI – called the Endurance Array – is operated and maintained by Oregon State University (OSU), home of one of the nation's foremost marine science programs. OSU deployed a series of long-term moorings off the coast of Oregon and Washington, and supervises a network of undersea gliders, all of which transmit data onshore several times a day. Off Oregon the Endurance Array connects to the University of Washington managed Regional Cabled Array (RCA). Starting in Pacific City, OR, the RCA cable extends west across the Juan de Fuca plate to Axial Seamount, the largest and most active volcano on the Juan de Fuca Ridge. OOI monitors Axial Seamount, which is forecast to possibly erupt in 2025, with a wide variety of sensors including a high definition camera.

“We’re really happy with Dell Technologies. We rolled out the solution with zero disruption and now have more storage, more compute, and we can operate seamlessly.”

Craig Risien,
OOI Cyberinfrastructure Project Manager,
Oregon State University

“This is one of the largest oceanography programs in the world,” said Craig Risien, OOI Cyberinfrastructure Project Manager, Oregon State University. “There are few if any programs that compare to the number of instruments, the number of variables, and the breadth of scientific data we collect.”

Cybersecurity is vital

These valuable data require reliable, around-the-clock security; OSU faced 130,000 threats to their systems between December 2024 and March 2025 alone.

Breaches, theft or corruption could have devastating consequences, possibly compromising OOI's mission or disrupting research continuity, which could potentially lead to devastating reputational and financial damages. It's why the program requires a cybersecurity and cyber resilience solution that protects the data's availability, accuracy and safety, enabling groundbreaking scientific discoveries and secure global data sharing for at least the next two decades.

Faced with the challenge of managing vast and continuously growing datasets with limited resources, OSU must futureproof its infrastructure to keep pace with advancements in AI, sensing technology and cybersecurity. Using the Dell AI Factory, OSU has a comprehensive mechanism that unites data, services, open architecture and infrastructure to harness the full potential of AI. The OOI Data Center relies on the Dell AI Factory for cybersecurity, data storage, compute and accessibility, even during emergencies. “These datasets are irreplaceable,” said Risien, who started working at OSU in 2006, joined the OOI Endurance Array in 2010 and the OOI Data Center in 2020. “These are really, really critical scientific records, so we’re obligated to protect that data.”

To manage and protect this massive amount of data and make it available with minimal latency, the OOI chose OSU for its experience with big data. The state-of-the-art OOI 2.5 Data Center was built in 2024, in Corvallis, Oregon, and effortlessly handles a dizzying amount of data that arrives via cable, fiber, satellite, and cellphone.

AI becomes more critical

As a facilitator of researchers' faster time-to-science, AI is becoming a vital component of the OOI data solution. The enormous amount of data involved makes it all but impossible for humans to scan, evaluate, and analyze.

“Automation is really helpful when you have a really small team managing petabytes of data and hundreds of servers, and you’re responding to the needs of a program that is very large,” Risien said.

PowerEdge R760xa servers with NVIDIA L40S GPUs accelerate AI-driven research and predictive analysis, enabling advanced modeling and insights. Research collaboration on the PowerEdge C-series cluster enhances research efficiency by letting users access and directly process data online with AI integration, reducing the need for massive data transfers. The Dell PowerSwitch Z9664F-ON provides high density and bandwidth, low latency and scalability for artificial intelligence (AI) and machine learning (ML) workloads.



**The new OOI Data Center in Corvallis, Ore., both stores
and distributes more than 20 TB per month.**

Creating the OOI 2.5 Data Center

The initial transfer of petabytes (PB) of data from the now retired OOI 2.0 Data Center was completed at a lightning-fast rate. The migration was so smooth that no users reported experiencing any delays or latency issues. Risien credits the seamless transfer of data to the Dell AI Factory which was integral when migrating to the latest version of PowerScale. He says a perfect example is the VxRail compute cluster, which enabled OSU to move hundreds of running virtual machines from old clusters to the new cluster with zero downtime or service disruption.

As of early 2025, OSU's OOI 2.5 Data Center was storing nearly 1.7 PB of scientific data on disc, with the addition of approximately 20 terabytes (TB) per month thanks to PowerScale's storage solution. Dell PowerProtect Data Domain provides immutable backup of the virtual machines running on the VxRail cluster that do the system monitoring, computation, and data delivery to end users.

"I'm incredibly proud of the OOI Cyberinfrastructure team's work with Dell to build the OOI 2.5 Data Center," Risien said. "The data center was built, and all data and services migrated with almost no downtime or disruption to the program or its users. That's a success story."

A resilient foundation for AI-powered research

With a mission based on collaboration, it's imperative for OSU to support the OOI project with a complete and reliable infrastructure to manage and handle data in a way that's easy for users to access, while also remaining safe from malicious intrusions and theft.

It starts with a high-performance Dell PowerScale, which provides scalable and reliable storage for high volumes of data, enabling its ingestion and dispersion of data at rapid speeds. Unstructured Data Solutions Cyber Protection Suite works with PowerScale and provides the first line of protection, allowing data to be scanned, managed and safeguarded to prevent unauthorized access.

Cyber protection and resiliency are vital features of the Dell AI Factory. PowerProtect Data Manager and PowerProtect Cyber Recovery with CyberSense deliver enhanced security across the virtual machines running on the VxRails, while ensuring researchers can access large data volumes at speed. The solutions automate protection against cyber threats, ensure data integrity and rapid recovery capabilities, while safeguarding virtual machines with reliable backup and recovery.

Dell's solutions have had a resounding impact: despite 130,000 malicious attempts over a three-month period, OSU has experienced zero downtime since the Cyber Recovery vault was installed a year ago. PowerProtect Data Manager has enabled the team to restore virtual machines in minutes and is protecting 16.6 PB of data with a 160:1 reduction ratio. Risien estimates this to be the equivalent of \$126,000 worth of tape, while removing any time or cost-intensive storage and management related to backup recoveries. Daily backups to a 12 PB ObjectScale storage environment also enable long-term data redundancy and disaster recovery to protect against localized disasters or cyberattacks. Ultimately, the Dell portfolio has provided something of even greater value to OSU: peace of mind with its data.



**Dell provided an end-to-end
solution from design to financing
and procurement to installation
and configuration."**

Craig Risien,
OOI Cyberinfrastructure Project Manager,
Oregon State University

“ I want high-performance, reliable, redundant, enterprise level storage, so we went with PowerScale. We got the complete package, as a solution to meet and accelerate AI demands.”

Craig Risien,
OOI Cyberinfrastructure Project Manager,
Oregon State University



Photo credit: D. Kelley, University of Washington, V19

Partnership makes a splash

For OSU, the decision to partner with Dell is proving to be a discovery of another variety.

“We chose Dell because it’s an end-to-end solution – from design, finances, procurement, installation and configuration,” Risien said. “Without our partnership with Dell including their financial and professional services teams, we would not have been able to successfully deliver a more capable and secure OOI 2.5 data center.”

Any opinions, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the U.S. National Science Foundation.

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“ With constantly evolving cybersecurity threats, building more resilient systems that minimize disruption is critical. By leveraging Dell’s PowerProtect portfolio, we know we have the systems in place to meet our recovery time objectives.”

Craig Risien,
OOI Cyberinfrastructure Project Manager,
Oregon State University

Learn More About the Dell AI Factory Security Solutions.

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