



Let's build a smarter planet



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## Smart is...

### *Applying research data to drive economic development.*

Desert Research Institute's (DRI) vision is to be the scientific leader in investigating the effects of natural and human-induced environmental change, and advancing environmental technologies aimed at assessing a changing planet. Its cutting-edge research is applied to help solve some of the world's most pressing environmental problems. To support this work and help the state of Nevada diversify its economy, DRI worked with the Nevada Governor's Office of Economic Development (GOED) and the Nevada Department of Employment, Training and Rehabilitation (DETR) to implement a powerful cloud computing platform from IBM that enables scientists and engineers to analyze data faster; deliver data as a service to partner organizations and agencies; and deliver workforce training in emerging industries. Already, the platform has helped DRI scientists make new discoveries in the movement of water through plants that could ultimately help communities in arid environments increase crop production.

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## Desert Research Institute

*Advancing scientific discovery with IBM PureSystems offerings*

Desert Research Institute (DRI) is the environmental research arm of the Nevada System of Higher Education. With more than 550 scientists, engineers and technicians, and campuses in Reno and Las Vegas, DRI staff work to solve some of the world's biggest environmental issues—from helping third world countries provide citizens with safe drinking water, to improving air quality and water management around the world.

As in many industries, one of the challenges that scientists have faced in recent years is analyzing an increasing volume, velocity and variety of data from field observations, lab systems, remote sensor networks and mathematical models. The amount of data collected is extraordinary. In fact, atmospheric scientists at DRI are working with NASA on planning for missions that will produce up to 24 terabytes of data per day.

DRI faculty members have traditionally been responsible for acquiring the computing and storage technology they needed to support their research projects. Often, data collected from remote locations around the world is stored in flat files and managed by individual research teams. This decentralized approach increased IT costs and limited how the organization's research data could be used.





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## Business benefits

- Analyzes data up to 10 times faster, helping scientists make new discoveries in the field of hydrology
  - Enables fast time-to-value, deploying systems in two days and applications in minutes
  - Helps foster new economic development and provides workforce training in key areas such as water resources management
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Dr. Wells, president, DRI, explains: “After our people, DRI’s most valuable asset is its data, which is growing phenomenally every day. So the question is: How do we store that data; how do we manage and extract value from it; and how do we provide governance for security? We need cloud-based access because we work around the world—from here in Nevada to Antarctica to rural areas in Africa. And we have to have business-level reliability for the mission-critical contract work that we do for federal agencies and companies.”

## Preparing Nevada for the 21<sup>st</sup> century

Better leveraging its data for scientific advancement was only one challenge the organization faced. At the same time, DRI worked in partnership with the Nevada Governor’s Office of Economic Development (GOED) and the Nevada Department of Employment, Training and Rehabilitation (DETR) to identify ways to diversify the state’s economy and drive advanced workforce development.

“Nevada has an incredible hospitality, gaming, and tourism industry, but we’ve seen over the last few years that that isn’t sufficient,” says Dr. Wells. “We have to stimulate innovation and develop a workforce of the future. So, as we looked at new technology and started to consider a strategic investment in computing, we needed a system that would not only help us advance our scientific research but also support our partnership with the GOED and DETR, and support our public service role.”

IBM offered DRI, GOED and DETR more than a technology solution with the IBM® PureSystems™ offering.

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## Smarter Research:

## Driving innovation with expert integrated systems

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### Instrumented

Collects and centralizes data from field observations, lab systems, remote sensor networks and mathematical models.



### Interconnected

Uses a cloud-based platform to deliver data as a service, enabling public and private organizations to leverage scientific research within their work and help drive economic development.



### Intelligent

Enables scientists to analyze data using more sophisticated models than possible with previous systems—which is driving new discoveries in the areas of hydrology, atmospheric sciences, and the earth and its ecosystems.



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## Solution components

### Systems

- IBM® PureApplication™ System
- IBM PureData™ System for Transactions

### Software

- Esri ArcGIS

### IBM Business Partner

- Esri
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*“IBM PureSystems are a catalyst not just for DRI, but also for the state of Nevada, and will open doors for economic growth in new and emerging industries.”*

—Dr. Stephen Wells, President, Desert Research Institute

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“DRI needed more than just a vendor, we needed a partnership that was unprecedented,” says Dr. Wells. “IBM stepped up and gave us that partnership.”

## IBM PureSystems offering provides the building blocks for the future

IBM PureApplication™ System and IBM PureData™ System for Transactions, part of the IBM PureSystems family, were chosen as the building blocks of DRI's new IT infrastructure.

PureApplication System provides DRI with a standardized cloud application platform that enables it to consolidate its database applications from numerous disparate systems onto a single system.

“We wanted to future proof our investment, so we adopted integrated systems as a strategic bet on the future of IT,” says Dr. Wells. “We selected IBM PureSystems because they had a great blend of capabilities—easy to deploy, use and maintain; faster processing; highly scalable, available and secure; and cloud ready.”

Adds Dr. Thomas Jackman, interim senior director for DRI's Center for Advanced Visualization, Computation and Modeling, “We opted for the PureData System because it represented a trusted system that could serve as the secure, reliable repository for our scientific “product”: intellectual capital and data. We also saw hosted data services as a revenue opportunity.”

He continues, “We selected the PureApplication System because, as we considered migrating to a centralized computing model, we wanted platforms that could be shared through a simplified user experience, without undue effort and training on the part of researchers. We also saw cloud delivery as another good services opportunity.”

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## Capturing and automating expertise

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“Many times, our researchers aren't just dealing with one or two applications—they're dealing with an entire work flow. Using the PureApplication System, they can quickly and easily encapsulate the entire sequence of activities in a pattern. This not only makes the process much simpler, but also enables teams to build patterns of expertise that can be leveraged across the organization.”

—Dr. Thomas Jackman, Interim Senior Director, Center for Advanced Visualization, Computation and Modeling, Desert Research Institute



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### **Patterns of expertise reduce deployment times**

IBM PureSystems offerings were deployed and running at DRI in two days. Within six weeks, the organization obtained results in several key areas.

For example, Dr. Jackman says that the built-in patterns of expertise of the PureApplication System help simplify previously cumbersome application deployment processes. Case in point: DRI scientists often use ESRI ArcGIS software to map environmental changes. In the past, as research teams launched a new project, they would have to deploy the application and all the supporting components from scratch. The process often took several hours or days even. Now, using the ESRI ArcGIS application pattern on the PureApplication System, DRI scientists can reuse deployed ArcGIS software in minutes.

“With ESRI ArcGIS server patterns, our research teams can redeploy the software for new projects at the click of a button,” says Dr. Jackman.

Users can also easily create patterns for entire workflows to help accelerate research.

“Many times, our researchers aren’t just dealing with one or two applications, they’re dealing with an entire work flow,” Dr. Jackman explains. “Using the PureApplication System, they can quickly and easily encapsulate the entire sequence of activities in a pattern. This not only makes the process much simpler, but also enables teams to build patterns of expertise that can be leveraged across the organization.”

### **Analyzing data 10 times faster**

Together, PureData System for Transactions and PureApplication System offerings also help DRI more quickly process and analyze scientific data—which is helping researchers gain new insight from the data.



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—Dr. Thomas Jackman, Interim Senior Director,  
Center for Advanced Visualization,  
Computation and Modeling,  
Desert Research Institute

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Take, for example, researchers work to better understand how plants take in and utilize water. Such knowledge is critical in helping communities increase crop production, and support the growing demand for food worldwide.

“IBM PureSystems are engineered for big data type applications,” says Dr. Jackman. “PureSystems allowed us to analyze data 10 times faster and, for the first time, to review that data three dimensionally—just one of the many ways that we’ve been able to use PureSystems to advance science at DRI. We’re already seeing that people can do more science, much faster.”

### **New Center of Excellence to help expand Nevada’s economy**

While DRI scientists often conduct research around the world, DRI, the Nevada Governor’s Office of Economic Development, and the Nevada Department of Employment, Training and Rehabilitation sought to use the institution’s advanced data analytics and visualization capabilities to potentially create new economic opportunities at home as well. To this end, IBM PureSystems offerings also serve as the platform of choice for the new Nevada Center of Excellence (COE). This center will leverage the world-renowned expertise of DRI and the other Nevada System of Higher Education institutions in the field of hydrologic sciences. This water-focused COE will utilize IBM PureSystems capabilities to deliver high-value “shared” services to a broad range of clients in the private and public sectors throughout the United States and around the world. Based in Las Vegas, this new COE will deliver services in water resources management and big data analytics.

This work, according to Dr. Wells, is critical for Nevada’s growth. “IBM PureSystems are a catalyst not just for DRI, but also for the state of Nevada, and will open doors for economic growth in new and emerging industries,” he says.

## For more information

To learn more about how IBM can help you transform your business, please contact your IBM sales representative or IBM Business Partner.

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For more information about the Desert Research Institute, visit:  
[www.dri.edu](http://www.dri.edu)

For more information about the Nevada Center of Excellence, visit:  
[www.dri.edu/coe-business-model](http://www.dri.edu/coe-business-model)

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