

# Virtualize Seismic Analysis for Best Experience Anywhere

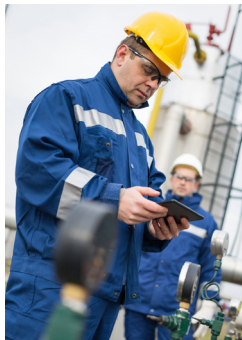
## ANYWHERE, ANYTIME SEISMIC INTERPRETATION

Upstream energy companies work in the most urban to the most remote areas of the world using specialized applications to determine where to explore, what assets to develop, and how to optimize drilling and production - all based upon the data captured and used in these applications. With downward pressure on costs driven by continual fluctuations in the price of oil and gas, companies are realizing the urgent need to re-engineer their processes and take advantage of new technology to improve operations and control their spend.

One critical area for improvement is gaining better access to seismic data and analysis tools, like Schlumberger Petrel® and Landmark Solutions DecisionSpace®. The outputs from these analyses are one of the most important determinants of where and how an asset is developed. The interpretation of seismic data speeds decisions and decreases the time to first production by increasing accuracy and providing valuable insights into the location of the resources and the required well design. Visualization of this data allows personnel to collaborate closely on the work needed in a field. However, this process is graphically and computationally intensive. Seismic data is hosted in large, standalone environments that may not deliver the agility needed when dealing with large numbers of users and changing datasets. Users would have to be near the datacenter for the best experience, which can greatly slow the overall process in the field.

## VIRTUALLY ACCESS SEISMIC DATA AND APPLICATIONS

In-field access to data and applications for collaboration and decision making is key to decreasing time-to-production and minimizing risk.



Unlocking the power of seismic interpretation requires bringing the full power of the datacenter to end users everywhere. This is accomplished through desktop and application virtualization, or more generically VDI. Data and applications remain in the data center while the user conducts analyses and views results through a lightweight application or browser powered by VDI. The 'heavy lifting' is done by the datacenter infrastructure, and the large volumes of seismic data secured there can be rapidly accessed by the application. The use of server-side graphical processing units (GPUs) further transforms the visualization experience, providing end users ranging from geophysicists to drilling and petroleum engineers with the best possible experience from virtually anywhere.

## THE NUTANIX ENTERPRISE CLOUD

Nutanix helps make IT invisible. The Nutanix Enterprise Cloud OS combines the agility and simplicity of the public cloud with the security and control of a

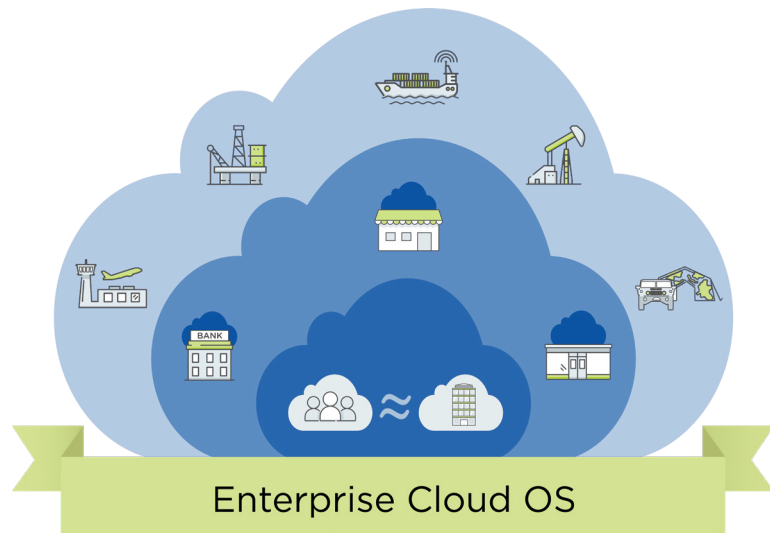
- **Virtualize** your most-used seismic applications
- **Use from anywhere** to give your employees access to the tools they need
- **Access all available data** for best decisions anywhere with low latency
- **Collaborate** with colleagues for in-depth analysis

## NUTANIX ENTERPRISE CLOUD HIGHLIGHTS:

- **Scale incrementally** one node at a time with no 'forklift' upgrades
- **Simple, 'one-click' operation** for easy management and effortless upgrades
- **Powerful graphics acceleration** for full fidelity visualization from virtually anywhere
- **Secure all data and apps** in the datacenter, with no data send to end points
- **Freedom to choose** your hypervisor and hardware - Nutanix is 100% software

private cloud, providing the flexibility organizations need with the security they demand. What makes this concept of agile, simple and invisible infrastructure real is the Nutanix convergence of x86-based server compute and storage with virtualization. The 100% software-defined hyperconverged infrastructure (HCI) provides management and control while enabling simpler deployment, 'one-click' upgrades and easy, incremental scalability. HCI is the foundation for the Nutanix Enterprise Cloud OS, which is a secure on-premises cloud that also has the flexibility of the public cloud.

The Nutanix Enterprise Cloud OS makes it easy for organizations to manage and scale VDI while vastly improving the end user experience. Like many workloads, VDI started on traditional datacenter infrastructure, defined as separate server, storage and networking components.



This was fine for pilot deployments, but suboptimal as organizations needed to scale and upgrade their capabilities and users, and as a result many VDI deployments stalled or failed. Because the Nutanix Enterprise Cloud OS virtualizes both compute and storage, it resolves these issues and allows VDI to grow and scale beyond its original deployment by adding as little as one node at a time. When high performance GPUs are included, organizations now have the ability to support a complete visualization workflow, providing extraordinary end-user experience from virtually anywhere with internet connectivity.

A major focus for oil and gas is security, the Nutanix approach is holistic, building it into each part of the OS from the ground up. STIGs - Security Technical Implementation Guides - automate compliance against common standards and can be deployed in a small number of steps using the unique microsegmentation features of the software. Checks for compliance can be scheduled to run as frequently as needed and at a time where it does not interfere with the performance of the platform. To protect data at rest, encryption can be applied, and a large ecosystem of partners help amplify the platform's unique capabilities. More information is available in the [Nutanix Security Guide](#). To learn more about the Nutanix Enterprise Cloud, please reference the [Nutanix Bible](#) and [Nutanix.com](#).

## NUTANIX ENTERPRISE CLOUD SOLUTION FOR SEISMIC WORKFLOWS

For oil and gas companies, the Nutanix Enterprise Cloud OS enables teams to conduct seismic interpretation by virtualizing their preferred seismic workflow application. This allows end users to directly access the application and data via the internet from the datacenter where the applications are hosted and the large seismic data sets are stored.

The solution built on the Nutanix Enterprise Cloud OS is hosted on a choice of hardware - the Nutanix NX, Dell XC Series, Lenovo HX and many others. Hypervisors supported include Nutanix AHV and VMware(R) ESXi(R). The solution is constructed from these base components and sized for the appropriate number of end users and their specific needs:

- Nutanix Enterprise Cloud 'Core' - Acropolis, Prism
- Nutanix Files, a software-defined scale-out file storage solution
- Choice of hardware platform (servers/appliances) and hypervisor
- NVIDIA GPUs

Seismic data and your seismic workflow application (Petrel or other) are hosted in the Nutanix Enterprise Cloud and made available virtually to remote end users. Refer to Nutanix Best Practices Guide on the solution on [www.nutanix.com/resources](http://www.nutanix.com/resources) for details.

### PETREL ON NUTANIX SOLUTION

Schlumberger Petrel presents unique challenges for virtualized use. The Nutanix architecture includes recommendations for complete solution including CPU, GPU, memory, networking and storage to help ensure excellent end user experience, especially for visualization.

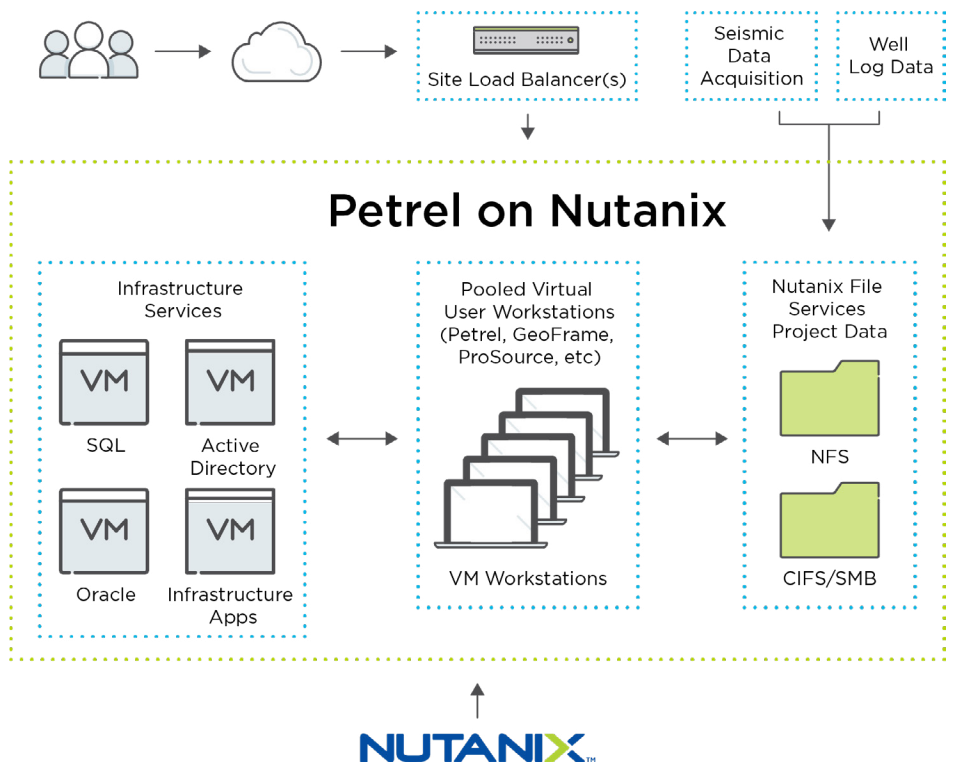


Figure: Schlumberger Petrel on Nutanix

### GRAPHICAL ACCELERATION FOR VIRTUALIZED SEISMIC WORKFLOWS

GPUs in this virtualization solution for seismic workflows provide end users with a superb visualization experience. Nutanix supports standard GPU passthrough and vGPU support with NVIDIA cards on the Nutanix native hypervisor, AHV. AHV supports NVIDIA GRID technology, enabling multiple guest VMs to use the same physical GPU concurrently. AHV also enables direct interface to storage devices for the VM, crash-consistent snapshots

(including the VM configuration and disk contents), support for virtual L2 networks as well as L3 managed networks. Nutanix also supports vGPU with the ESXi hypervisor.

By virtualizing your seismic applications with cutting-edge GPU graphical acceleration, your end-users will have the same high-quality virtualization experience in the office or in a remote location. Because the application is run within the datacenter with direct access to seismic data sets and leveraging the GPU capabilities, end users can run analyses, leverage high-end visualization for exploration and drilling, collaborate and make decisions faster. Data remains secure and only the screen images are sent to the remote user.



The Nutanix Enterprise Cloud OS solution uses only a fraction of the power, space and cooling of your existing legacy architectures - good for your budget and the environment.

### **COST EFFECTIVE INFRASTRUCTURE THAT SCALES EFFORTLESSLY**

In the upstream industry, making the best use of limited data center space is always a consideration. By maximizing compute, storage, and performance per rack-unit (RU) using web-scale architecture, the Nutanix Enterprise Cloud OS gives IT the ability to support the HCI infrastructure using a fraction of the power, space, and cooling of traditional legacy IT solutions—with none of the complexity previously required. Adding additional capacity is as simple as adding more nodes, all the while maintaining a superb end-user experience.

With an intuitive consumer-grade management framework for end-to-end infrastructure management and operations, an [IDC report](#) found that Nutanix requires 61% less IT staff time to deploy, manage, and support\*. As compared to legacy infrastructure, Nutanix had an ROI of 534% with a 7 month payback.

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### **RICH BENEFITS FOR YOUR ORGANIZATION**

Web-scale infrastructure delivers compelling benefits to organizations that virtualize their applications, including simplified management, improved time to value, and increased efficiency—all of which translates into IT staff saving countless hours normally required to design, configure, and test servers.

#### **For IT Management:**

- Non-disruptive one-click upgrades reduce downtime and eliminate need for dedicated specialists - puts the focus on the seismic workflow.
- Self-healing design keeps end-users happy and connected to their applications and data.
- Cloud automation and life cycle management reduce costs and time needed to manage the platform and the solution.
- The [most-lauded HCI solution](#) available with a record number of wins and awards in 2018, including:
  - > [Nutanix Positioned as a Leader](#) in the November 2018 Gartner
  - > [Nutanix named as a leader](#) in “The Forrester Wave: Hyperconverged Infrastructure, Q3 2018,” published by Forrester Research, Inc.

#### **For End Users and Application Owners:**

- Puts the power of the datacenter behind remote seismic interpretation and petrophysical modeling, with access to all available data for better decisions
- Easily manages large data volumes with resiliency
- Scales to accommodate as many end users as needed
- Delights end users with agile GPU-powered visualization for collaboration
- Best user experience from virtually anywhere
- Consistent user experience with a tested, pre-configured infrastructure solution

## For IT Architects and Administrators:

- Deploy and manage with one-click simplicity, with 68% less staff time to deploy storage\*
- Linear and predictable scale to meet growing demands, one node at a time and no required 'forklift' upgrades..
- Native software-based file services for user and application data lower cost and complexity
- Reduced datacenter footprint - and reduced cooling/power loads
- Enhanced reliability with 97% fewer outages than legacy infrastructure\*
- Choice of hardware platform and hypervisor
- Built-in management tools for cost monitoring and control
- Secure and under your control, from data to app to user

(\*Statistics from IDC study, 2017)

## NUTANIX: TRANSFORMING OIL AND GAS

Nutanix helps oil and gas organizations transform their operations for upstream exploration and analysis by extending the ability for employees to access needed data and visualization capabilities throughout their organization.

With experience gained through thousands of VDI deployments worldwide, Nutanix supports VDI with documented reference architectures, best practices and case studies which support the breadth and depth of VDI solutions and their use by customers. We are committed to helping companies modernize their data center so that they can shift their focus from maintaining infrastructure to innovating in their business. Schedule a customized technical briefing today by connecting with your Nutanix representative or emailing us at [energy@nutanix.com](mailto:energy@nutanix.com).



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Nutanix makes infrastructure invisible, elevating IT to focus on the applications and services that power their business. The Nutanix enterprise cloud platform leverages web-scale engineering and consumer-grade design to natively converge compute, virtualization and storage into a resilient, software-defined solution with rich machine intelligence. The result is predictable performance, cloud-like infrastructure consumption, robust security, and seamless application mobility for a broad range of enterprise applications. Learn more at [www.nutanix.com](http://www.nutanix.com) or follow us on [Twitter@nutanix](https://twitter.com/nutanix).

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