The Appliance for Subsurface Computing

GTC Conference, MAR2019
GeoComputing At a Glance

➢ Houston headquartered since 2004

➢ Highly specialized on Petrotechnical solutions

➢ Expertise across entire E&P lifecycle, true SME staff

➢ E&P infrastructure, science, data and application SME’s

1500+ YEARS COMBINED EXPERIENCE
Problem Statement for Petro-technical Computing

- Geoscientist wait time: Time it takes to load data and sluggish applications
- Complexity of the environment
- Shortage and cost of specialty support resources
- Time to deployment of these complex systems
- Many industry solutions are biased to the software supported
- Public Cloud does not match the architecture requirements for this space
Leverage HPC concepts & methodology and applying it to G&G interpretation Environments

**Technology**

- Based on “Supercomputing” Seismic Processing Architectures
- Superfast Parallel File System
- Low Latency High Speed Networks
- High End 3D Graphic Workstations
- Purpose Built Appliance for Exploration Interpretation
- Application and Infrastructure Automation
- Standardizes the Environment and Simplifies Support
- Vendor and Product Agnostic
Beyond Hyper-Converged Appliance

Results

- The Fastest Interpretation Environment in the Market
- Increased Efficiencies and Speed to Results for Geoscientists
- Validated Against All Commonly Used G&G Applications
- Decrease Time to Production by **Months**
- Combining HPC Designs, High End Desktops, and Interpretation Applications in a Single Extreme Performance Appliance
- Your Own E&P Interpretation Cloud

The first and only Plug-and-Work G&G Computing Environment
Every G&G computing environment is tightly integrated and highly complex.

It requires subject matter experts in several different fields to properly implement a successful G&G environment.

It takes a huge amount of time and effort to deploy, refresh, and support a G&G environment.
Oil & Gas Geological/Geophysical Computing is Complex

• RIVA removes all the complexity

• On-going RIVA support is included with the purchase

• Turn-Key G&G computing environment all the way up to applications installed and tested
RIVA – Ecosystem

- Applications Pre-Installed
- Oil & Gas Domain Expertise
- High-Speed Networks
- High-Speed Parallel Filesystem
- GeoComputing
- Mechydyne
- NVIDIA
- LEOSTREAM
- DDN Storage
- GeoComputing Cloud
Benefits of NVIDIA vGPU

- Increased performance and improved user experience
- Flexibly allocate GPU resources to VMs
- Share GPU resources across multiple users and scale up or down as needed
- Enabling remote working - Work from anywhere
RIVA - Volante

- High Performance Parallel Storage Engine
- High Speed Network
- 4 - 500+ Viz Nodes
- Application Servers

Support Included

Network Rack/Power Management + 3D Workstations + Servers + Applications Installed + High Speed Storage

Installation, Upgrades, and Maintenance Included
Which Cloud to Choose for Petro-technical workflows?

The Public Cloud
• Provides easy to build virtual machines and networks
• Delivers a secure environment
• You still have to install and configure your applications

The RIVA Private Cloud
• Provides already built virtual machines and networks
• Delivers a secure environment
• Applications installed, tested and configured
• Designed and built specifically for Oil & Gas
• Support included
• High speed dedicated network connectivity
GeoComputing Cloud Design

In your data center, in ours, or in a combination of both

**Same Operational Model**

OAT, UAT and user experience is the same

**Same Base Architecture**

Application installs, updates, testing, and deployments are identical.

**Simplified and Streamlined Operations**

Support of the entire environment included
Standard environments results in simplified global support and cost reduction

**Data Management Activities Can Remain Unchanged**

Since our design is basically and extension of you LAN Data Management is not impacted

*GeoComputing does offer full Data Management services if needed*
Case Study:

Large Independent Oil & Gas Exploration and Production Company
OBSTACLES

• Need to improve G&G computing performance in order to maintain a competitive environment

• Previous architecture revolved around individual workstations

• Aging workstation assets

• Remote worker capabilities

• Not enough manpower to design a virtual workstation platform
TEST PLAN

- Run existing workflows in current environment as benchmarks
- Both synthetic and actual workloads required
- Run identical workloads against the RiVA
- Allow the G&G teams to provide feedback on the performance and UI
- If it is still standing at the end, find the breaking point
OUTCOME

• Three primary technical takeaways

1. RiVA workstations performed like high performance local workstations

2. The tests outcomes were predictable and repeatable

3. We were unable to locate the breaking point from a performance perspective
RiVA – Extreme Performance
Work with Full Resolution Data Sets

**Extreme performance allows you to work with more of your data**

- Take greater advantage of 3D graphical interpretation
- With RIVA you can interpret entire datasets at full resolution, directly from disk, and extract full value of your seismic data purchase
- No need to decimate or resample your seismic and over-simplify workflows to accommodate slower-performing systems
- Faster data transport from disk to memory means faster pre-fetch times
World Class Performance

Most Oil & Gas Companies are accessing their G&G data at 40-80MBs for single, or even multiple clients, which is 50 to 100 times slower than RIVA.

What does this mean for the end user? Reading large seismic that used to take hours, take only minutes or seconds on RIVA.
RIVA Windows Performance

Never in the Oil & Gas Industry have you seen a Windows desktop R/W data at 2.5GB per second.

Now you have... on RIVA
Petrel Workflow

Petrel – Various workflow tasks/steps comparison

Customers Environment:
- NetApp Storage
- 1GbE to Workstation
- HP Z840 Workstation
- OS Windows

User Comment:
“I had never realized how long those processes took on Windows before seeing RIVA. Most likely, I kicked them off and did something else and checked on them later and didn’t realize how long they took to finish.”

Making a grid of water bottom
(Lower is better)

Computing an RMS extraction between two grids
(Lower is better)
When I tested RiVA yesterday, I purposely selected some parameters that I knew would exponentially increase the computing time, which I normally avoid when I am here in the office – because it takes too long.
Performance Comparison

Petrel Interpretation Window - Reading an inline ZGY (in seconds)

Exporting Geoteric Volume to SEGY (in seconds)

RIVA vs Customer 10

RIVA vs Customer 10

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Performance Comparison - Landmark

This represents time to complete a geophysical workflow in Landmark DSG. There were 24 different tasks that were executed in this workflow.
Thank you for your time

Questions?

Click Here To See Customer Quotes