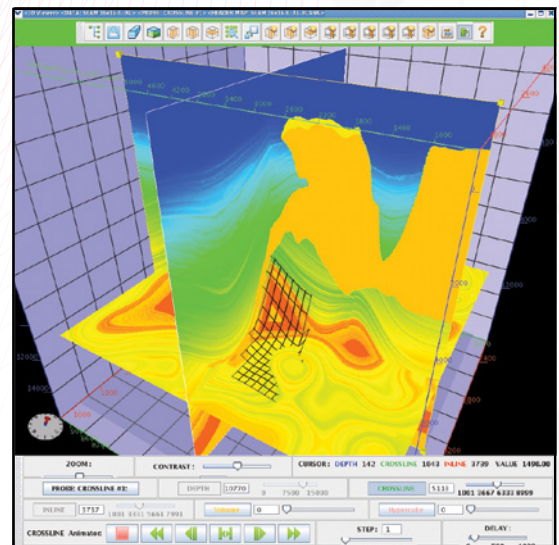# Seismic Coverage Validation Engine

Appro's pre-configured supercomputing solution is pre-tested and certified Intel® Cluster Ready, and it is delivered ready to run Landmark's new Seismic Coverage Validation tools. This wave equation-based illumination and visibility software helps geoscientists design 3D seismic surveys and select processing parameters optimized for geologic targets in traditionally poorly imaged areas. The software runs on a pre-configured Appro GreenBlade™ system based on Intel® Xeon® processors featuring dual sockets and 32 nodes, with up to 12 CPU cores per node and 8 GB of memory.

Overview

Landmark's Seismic Coverage Engine is a new suite of wave equation algorithms optimized for today's high-performance cluster environment. These tools enable the creation of high-value seismic processing workflows designed to maximize an oil company's investments in seismic acquisition and interpretive imaging, particularly in areas of complex geologic regimes. By validating seismic coverage early in an exploration project, Landmark ensures greater confidence in the accuracy of its depth migrations and velocity models in subsequent interpretation activities.

The Seismic Coverage Engine includes the following capabilities:

- New wave equation approaches for seismic illumination and visibility analysis workflows.

- The Appro GreenBlade 32-node solution delivers superior throughput out of the box.

- The pre-configured and optimized solution is fast and easy to deploy, and is ready to run. The performance of the outstanding algorithm is supported by the excellence of Intel Cluster Ready.

- As computational needs grow, the customer can scale up using the same cluster building-block solution.

Features

Landmark's seismic processing applications, including Seismic Illumination and Visibility Analysis, provide unique and efficient algorithms for seismic coverage validation workflows.

Seismic Illumination

Seismic illumination is defined as the energy flux per unit area at a target generated by a seismic source. Conventional approaches to this type of illumination use ray-based or finite difference techniques, whose inherent limitations include general approximations and source-side illumination only.

Landmark offers a source-receiver pair method that allows the geophysicist to detect the power of the reflection strength at a target event for a given acquisition geometry. These capabilities provide both volumetric illumination—total and directional illumination associated with dipping events—and target horizon surface illumination.

Benefits

- Investigate imaging shadows
- Evaluate and compensate for seismic amplitudes (amplitude versus offset (AVO) workflows)
- Incorporate illumination into the interpretation
- Optimize acquisition parameters

Visibility Analysis

Defined by the intensity of reflection wavefields at the receivers, visibility analysis identifies what source and receiver pairs are contributing to the targeted area of interest. This capability helps in the understanding of what acquisition geometries are physically contributing to a targeted event. By providing the geophysicist the ability to selectively migrate portions of the data, the processing cycle for iterative imaging and model building activities can be reduced.

Visibility analysis also helps quantitatively estimate acquisition parameters for a given subsurface target. Given the trend toward costly wide-azimuth (WAZ) surveys, this can mean tremendous savings in acquisition costs.

Benefits

- Geophysicist can design optimal imaging parameters for subsurface targets.
- Provide unique amplitude (AVO) compensation capabilities in poorly imaged areas.
- Quantitatively estimate acquisition parameters, including cable length and azimuth coverage.
- Determine how much specification data may need to be licensed.
- Successfully applied to WAZ deepwater Gulf of Mexico data set.

What is Intel® Cluster Ready?

Developed with the help of hardware and software vendors, Intel Cluster Ready systems and applications use the Intel® Cluster Ready specification that defines a common basis for building clusters and registering HPC applications. The specification includes requirements for hardware, software, manageability, and functionality to help make sure that each cluster component conforms to industry standards or, if no standard exists, best-of-class practices. The result is to provide you with Intel Cluster Ready solutions that are easier to choose, deploy, and maintain—and arrive at your doorstep ready to run.

Scale-out Your Productivity

Clusters help offload work from your workstation by harnessing parallel processing power of many connected servers. Clusters help increase throughput and computing capacity to solve bigger, more complex problems and solve smaller problems faster. Intel Cluster Ready systems and applications are developed to integrate tightly as a complete solution—no matter which systems or application combination you choose.

Manage and Maintain Clusters More Easily with Intel® Cluster Checker

Intel® Cluster Checker is an essential software diagnostics tool that helps make sure system components continue to work together over the cluster's lifetime. It analyzes the cluster's configuration to be certain it remains compliant with the architecture specification. If there is a problem, Intel Cluster Checker identifies it quickly and provides detailed diagnostic information.

Configuration Options	All Systems Are
42U standard rack cabinet	• Intel Cluster Ready
Supports up to 5 Appro GreenBlade™ systems	• Available with custom sizes and features
Scales from 32 nodes	• Sold or leased by Landmark as a package
Based on the Intel® Xeon® processor	
Rack-integrated with 1 head node	
Two Ethernet switches	
Intel® Cluster Ready software installed	
Supports Red Hat Enterprise Linux* or CentOS*	
Linux configured in conformance to Intel Cluster Ready	
Appro Cluster Engine™ Management software installed	

Focus on Buying the Right Cluster

Appro's pre-configured and pre-tested Intel Cluster Ready solution running Landmark's Seismic Coverage Validation tools takes the complexity out of purchasing an high-performance computing cluster. Configuring a cluster can be a difficult process of choosing components and applications and trying to figure out what pieces work together. Buying Landmark's Seismic Coverage Engine means this effort is already done and our solution is verified to provide the architecture needed for the application to execute. Buying our solution then helps you focus on getting the right solution based on the type and size of problem you need to solve with the application.

For more information about Landmark Software and Services, visit
http://www.halliburton.com/ps/Default.aspx?navid=1631&pageid=3815&prodid=MSE%3a%3a1055446855563101

For more information about Appro, visit
www.appro.com/product/ready-to-go-landmark.asp

For more information about Intel® Cluster Ready, visit www.intel.com/go/cluster

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