virtualIron™

High Performance Computing for Energy and Geosciences

Dramatically reduce the cost and complexity of modeling and analytics by combining grid computing and virtualization

Oil and gas, mining and other geosciences companies have unique applications like reservoir modeling, seismic processing/imaging, and risk analysis that require high performance computing (HPC). These applications need to process very large data sets and harness the power of many CPUs or computers. Traditional solutions, such as large, multi-way UNIX servers are extremely expensive to develop, purchase and maintain. As a result, companies are turning to grids — groups of many independent computers — for modeling and analysis to reduce costs, improve precision/accuracy, and shorten time-to-market. While grid computing offers benefits, many companies are finding that it presents numerous challenges as well, including:

- Complexity of managing hundreds of compute nodes

- Inability to manage grid infrastructure used by concurrent projects with diverse applications and workloads

- Lack of support for sharing grids and running applications concurrently

- Lack of software fault isolation - a software crash on a single node can bring the entire grid down or impact other running applications using that node.

- High cost of rewriting applications to leverage grids.

- Inefficiencies in system management since each node is often managed as a separate system.

- No support for dynamic re-provisioning and real-time deployment of resources

Leverage virtualization to isolate applications, optimize resource utilization, increase up-time and improve manageability

Virtual Iron's advanced virtualization and management software solutions help energy and geosciences organizations reduce the cost of deploying, operating and managing HPC applications. With Virtual Iron, companies can improve operating efficiency, reduce capital expenditures, and enable a more flexible and agile grid infrastructure. The benefits are dramatic and include:

- **Risk-free sharing of grid infrastructure.** Virtual Iron runs workloads on virtual servers which are isolated from other virtual servers running on the same physical computer. Software defects or operating system crashes are isolated to the one virtual server and do not impact other virtual servers hosting applications on that same computer.

- **Rapid reconfiguration — commission servers in seconds vs. days.** Virtual Iron enables rapid grid deployment and reconfiguration. At the core is a virtualization layer that enables dynamic sharing and software-based reconfiguration of all available server, storage and network resources.

- **Dynamic response to changing resource demands.** With Virtual Iron, spare computing capacity can be moved into a shared pool to be applied when and where it's needed, automatically via policy. Users can deploy and re-purpose physical resources based on business policies such as time of day, failover, or different types of load. These shared pools require dramatically less hardware than application silos, reducing software, hardware, and data center operating costs.

- **Decoupling of applications from the constraints of underlying physical resources.** Data Center Virtualization allows applications to be moved seamlessly among any servers in the data center (nodes in the grid) without complicated migration scripts and SAN reprogramming.

- **Simplified provisioning of new equipment and deployment of applications.** With Virtual Iron, applications can be deployed in minutes. Using a graphic management interface, administrators can point and click to assemble a virtual server in seconds. The operating system and applications for each server are provisioned via the GUI by selecting a pre-configured and pre-installed reference software image.

- **Streamlined grid application development and deployment lifecycle activities.** With Virtual Iron, each software image can run on any hardware in the data center, significantly reducing the total number of images to manage and maintaining consistency between environments. This reduces both the cost and time of software and operating system maintenance

Sharing infrastructure and delivering "grid computing" as a utility service

The Virtual Iron solution is built from the ground up for high-performance, scale-out application workloads. The software optimizes the utilization of all resources available to the grid and it does this on industry-standard hardware and operating systems. Some of its unique capabilities include:

Flexible Virtualized Grid — The software virtualizes the servers, storage, and network resources used by the grid applications to hide the hardware details. This complete hardware independence enables software-based reconfiguration and policy-based automation of the underlying infrastructure to provide maximum flexibility, utilization and responsiveness. Companies use Virtual Iron's software to create dynamic pools of standards-based resources that are shared among many applications. Administrators use a management console or automated policies to place any subset of processor, storage, or networking component(s) in the grid, rather than reconfiguring physical machines, cables, and switches.

Shared Infrastructure — Virtual Iron combines all computing resources into a sharable, infrastructure-wide pool that can be shared by multiple applications in development, testing or production. The software helps orchestrate the various analytical models across all the resources while

isolating individual applications. This approach prevents a single application failure from impacting the other applications running on the shared grid. It also handles peak workloads without over-provisioning and accommodates changing application demands without service disruptions.

Automated Resource Management — Virtual Iron's unique policy-driven automation simplifies the management of computing resources, improves workload management and enables rapid provisioning and deployment without increased administrative overhead. The software includes a web-based management server that controls the "bare metal" servers and I/O devices. This console configures the physical resources and virtual servers and allows administrators to create and manage policies that automatically maintain application availability and acceptable performance and response levels. These policies automate resource management by triggering reconfigurations based on user-defined rules and performance thresholds, e.g. add another CPU to a virtual server when CPU utilization is greater than 90 percent. These changes are done on-the-fly without impacting running applications.

Virtual Iron's advanced virtualization and management solutions dramatically reduce the cost of deploying, operating and managing HPC applications. As a result, companies can greatly improve operating efficiency, reduce capital expenditures, and enable a more flexible and agile HPC infrastructure. Learn more about how Virtual Iron can help you by calling 978.849.1200, or visit us on the Web at www.virtualiron.com.

VirtualIron™

Virtual Iron Software, Inc.
900 Chelmsford Street
Tower I, Floor 2
Lowell, MA 01851

T 978.849.1200
F 978.849.1299
www.virtualiron.com