Dell HPC Clusters can be built with Platform Computing ROCKS software package, enterprise edition, optimized on Dell HPCC hardware bundles.

Platform ROCKS Enterprise Edition is a suite of software components for providing tools to ease Cluster Installation, Management and Operation for commodity LINUX clusters.

Platform ROCKS Enterprise Edition is designed to enhance the Linux cluster environment with features that allow users to start, monitor, and control processes on cluster nodes from the cluster's master computer while supporting standard Linux interfaces and tools.

The result is a stable, extensible, production environment that appeals to both end users and software developers, and provides a supported platform for the deployment of advanced clustering applications.
Platform ROCKS Enterprise Edition version 4.0 incorporates version 4.0 of the ROCKS Clustering distribution from rockscluster.org. Major new features include: Red Hat Enterprise Linux 4.0 support.

Dell HPCC Overview

- HPCC is a cost effective method for delivering a parallel computing system platform, targeted towards compute- and data-intensive applications.
- Dell delivers high-volume, standards-based solutions into scientific and compute-intensive environments that can benefit from economies-of-scale, and add systems as requirements change.
- High Performance Computing Clusters (HPCCs) are popular methods for solving complex computing problems because of their low price points and excellent scalability.
- To perform high performance computing, organization’s look for simple and low cost ways of managing and scaling out Linux environments, from small and simplistic to large and complex clusters.
- The low cost, openness and customer choice afforded by Linux architectures pose many challenges. Owing to the open source nature, lack of standards and the large number of tools, finding the right home-grown combination of cluster and systems tools and functionality can be difficult, time-consuming, expensive, and fraught with business risk.

Benefits of Dell HPCC Software Stack

- Dell Cluster Software offering uses the best-of breed Open Source ROCKS cluster software package from San Diego Supercomputing Center. Platform Computing builds upon ROCKS and makes it commercially supportable. The open source software is supported by Platform Computing with pre-defined support offerings. Dell sells a Platform ROCKS support offering.
- Is an integrated package with expert commercial support and predictable upgrades
- Designed to provide reduction of time and hassle in cluster installation and management
- Helps increase predictability and reliability
- Designed to reduce TCO and business risk.
- Platform Computing ROCKS Enterprise Edition is fully tested, validated and optimized on Dell cluster hardware building blocks including Servers, Storage and Interconnect
• Based Red Hat Enterprise Linux 3 (Update 5 kernel) and Enterprise Linux 4 (Update 2 kernel)

**Product Description**

Dell Cluster Software Offering consists of 3 key components:

- Platform ROCKS Enterprise Edition, which includes an extended NPACI ROCKS package, Platform LAVA, and Red Hat Enterprise Linux OS
- Platform ROCKS Annual ClusterCare support
- Dell Support & Professional Services

Platform ROCKS, Enterprise Edition is a comprehensive cluster, systems and workload management software solution, based on the de facto cluster management standard ROCKS.

Platform ROCKS also includes (for an extra charge) Cluster Care, a high value package of commercial support, upgrades, and patches, provided by Platform Computing.

Dell Support and Professional Services consist of limited warranty telephone support, solution design, consultation, installation and backup.

**NPACI ROCKS**

The ROCKS cluster toolkit is an easy-to-use cluster configuration and management package developed by the Grid and Cluster Computing Group at San Diego Supercomputer Center and its collaborators. Rocks is designed to allow end-users to quickly and easily build a high performance computing (HPC) cluster.

Platform ROCKS is an extension of the NPACI package. It also includes some additions that are focused on serving the commercial software customer.

The key features of Platform ROCKS include:

- Default Workload Managers including Platform Lava scheduler, MPIs for Ethernet and Myrinet and Cisco Infiniband, and
- Monitoring tools
  - Cluster Database (ROCKS SQL) - database for storing data about cluster configuration, and information about the nodes in this cluster
- Cluster Status (Ganglia) – graphical interface to live cluster information provided by Ganglia monitors running on each cluster node.

- The monitor gathers values for various metrics such as CPU load, free memory, disk usage, network I/O, operating system version, etc. In addition to metric parameters, a heartbeat message from each node is collected by Ganglia monitors and declares nodes “dead” once a number of heartbeats from any nodes are missed.

- ClusterTop- is a standard top command for a cluster. It is used to present process information from each node in a cluster.

- Cluster Distribution – file system view of the directory tree on the master node (“front end node”) used to hold the repositories of RPM packages used to construct nodes in the cluster, along with the XML kickstart graph that defines the various node types

- CluMon – An open source monitoring tool from NCSA that integrates load metrics with workload data in an easy to use cockpit interface. It is provided in beta form.

Patch Management via RHN – With a customer subscription to the Red Hat Network, patches can be downloaded and applied to a Rocks Cluster for integrated patch management.

- Ability to add and remove rolls from a front-end after it is installed and without requiring a reinstallation, for RHEL 4 U2 based Platform ROCKS.

- Tools to add hosts to the cluster database and set up name, appliance, IP-address, MAC-address association before installing the compute nodes, for RHEL 4 U2 based Platform ROCKS

Utility to configure the BMC and BIOS of compute nodes supported by Dell OpenManage at the time of node installation, for both RHEL 3 U5 and RHEL 4 U2 based Platform ROCKS

The NPACI ROCKS 4.0 release provides support for EM64T and Intel 32-bit, as well as LAM/MPI, Infiniband and visualization rolls.

NPACI ROCKS was originally developed at SDSC and partners at the University of California, Berkeley. More about NPACI ROCKS, including downloads, can be found at http://www.rockscluster.org.

Platform LAVA

☐ Platform Lava is a free batch system based on the same technology as Platform LSF and Platform LSF HPC. It is downloadable on Platform’s website for no charge.

☐ Platform Lava provides the following facilities:
- Batch job submission
- Interactive batch job submission
- Dynamic Node load information
- Job Limits
- Batch job control – suspend, resume, kill, migrate.
- Batch Job Accounting
- Flexible resource and attribute specification.

- Flexible configuration for LAVA includes:
  - Network based Multiple queues
  - Different priority levels
  - Job limits
  - Run and dispatch windows
  - Load based batch scheduling
  - Processor and Slot limits
  - Normalization of hosts
  - Extensible Load Collection

For more information, go to www.Platform.com

**Platform ROCKS Feature Matrix**

Aside from NPACI ROCKS and LAVA, the other product features of Platform ROCKS, Enterprise Edition, are shown in Table 1.

**Table 1.**

Key Features of Platform ROCKS, Enterprise Edition
<table>
<thead>
<tr>
<th>Feature</th>
<th>Component</th>
</tr>
</thead>
</table>
| Workload Management Layer     | Job Scheduler
|                                | Resource Manager                                                         |
|                               | • LAVA (free version of LSF)                                              |
|                               | • LSF HPC                                                                 |
| Cluster Management & Middleware| Cluster Deployment Tool                                                   |
|                               | • Platform ROCKS 4.0 (Open Source) RHEL 4 U2 32-bit and EM64T, and Cisco Infiniband driver support |
|                               | • Platform ROCKS 3.3 (Open Source) with EM64T, Cisco Infiniband driver and RHEL 3 U5 support |
|                               | Cluster Management                                                        |
|                               | • Ganglia (OS level monitoring, Open Source)                             |
|                               | • CluMon (Open Source; beta form)                                        |
|                               | MPIs                                                                      |
|                               | • MPICH, MPICH-GM, MVAPICH, MPD                                          |
|                               | File System                                                               |
|                               | • PVFS, NFS, IBRIX                                                        |
|                               | User Management & Security                                                |
|                               | • 411                                                                     |
|                               | • Open SSH                                                                |
| OS                            | OS Supported                                                              |
|                               | • RHEL 4 (U2) AS/WS IA32, EM64T                                           |
|                               | • RHEL 3 (U5) AS/WS IA32, EM64T                                           |
| Price                         | Software: Free                                                            |
|                               | Support: Annual Cluster Care Support Contracts                             |

Table 2
Platform ROCKS Dell Hardware Support Matrix

Platform Computing ROCKS Enterprise Edition is fully tested and validated on the following Dell cluster bundles, including Servers, Storage and Interconnects building blocks

<table>
<thead>
<tr>
<th>Server</th>
<th>OS</th>
<th>Bundle Sizes</th>
<th>Interconnect</th>
<th>Storage (Via master node)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerEdge 1850</td>
<td>RHEL 3 U5 AS and WS (IA32 and EM64T)</td>
<td>8, 16, 32, 64, 128, and 256 nodes</td>
<td>Gigabit Ethernet Myrinet (PCI-x) Cisco Infiniband</td>
<td>PowerVault 220 Dell</td>
</tr>
</tbody>
</table>
PowerEdge 1855 | RHEL 3 U5 AS and WS (IA32 and EM64T) | 10, 20, 40, 70, 130, and 260 | Gigabit Ethernet Cisco Infiniband | PowerVault 220 Dell | EMC CX300, 500, 700 PE1850 or PE2850 as the master node

PowerEdge SC 1425 | RHEL 3 U5 AS and WS (IA32 and EM64T) | 8,16, 32,64, 128, and 256 | Gigabit Ethernet Myrinet (PCI-x) Cisco Infiniband (PCI-x) | PowerVault 220 Dell | EMC CX300, 500, 700 PE1850 or PE2850 as the master node

In addition to standard bundle configurations, Dell HPCC also supports Platform ROCKS Enterprise Edition on clusters with greater than 256 nodes on a custom basis. Dell clusters can also be designed in larger configurations greater than 256 nodes.

**Dell Service and Support Options**

An Enterprise support offering is available for Dell’s validated HPCC Q1 2006 hardware and software stack release. Also, this support is now available for the PE 2850 as a critical node.

The HPCC support offer includes:
- HPCC skilled L2 technician providing solution troubleshooting and problem isolation
- Access to TAM for managed escalations and accountability
- Nodes within the cluster will have the option of 2 hour on-site² with 6 hour repair, 4 hour on-site², or Next Business Day on-site² break-fix support service
- Complex Issue Resolutions (CIRs) for non-break-fix support and vendor collaboration

Dell Professional Services offers additional services to assist in:
- Solution Design
- Consultation
- Installation and Setup
- Pre-staging of solution at off-site location

**Related Web Sites**

http://www.dell.com/hpcc

http://www.beowulf.org/
http://www.ROCKSclusters.org

Dell cannot be responsible for errors in typography or photography.

1 This term does not connote actual operating speed of 1 Gb/sec. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

2 Service may be provided by third-party. Technician will be dispatched if necessary following phone-based troubleshooting. Subject to parts availability, geographical restrictions and terms of service contract. Service timing dependent upon time of day call placed to Dell. U.S. only.

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