Solution Overview

Platform Cluster Manager – Dell™ Edition

Benefits:

- **Easily deploy open clusters**
- **Simplify cluster management**
- **Update compute nodes without re-installing**
- **Perform risk-free, trial software installations**
- **Change node personalities with ease**
- **Complete web-interface**

Highlights:

- **High performance MPI**
- **The most advanced cluster management tools**
- **Integrated workload management**
- **Optimized for Dell systems**
- **Certified and supported**

{ **Platform**
Computing

Clusters made simple

Platform Cluster Manager – Dell Edition (PCM - Dell Edition) represents a "re-think" of how open source clusters are deployed and managed. Based on the open source Project Kusu, Platform Cluster Manager – Dell Edition is a pre-integrated, Dell–certified solution enabling the consistent delivery of scaled-out application clusters. A fully open source solution, it includes all the tools required to deploy, run and manage clusters with unprecedented ease. Using PCM – Dell Edition, cluster administrators can easily perform operations that are simply not possible with less advanced cluster management solutions.

Easy to use web interface – The web interface makes operations like installing and maintaining clusters a snap. Cluster administrators will appreciate the built-in alerting and reporting, console and power management capabilities optimized for Dell hardware, and the ease with which software configurations can be managed and deployed without ever leaving the Platform Management Console (PMC). Cluster users can take advantage of the web portal and the open workload manager, Platform Lava (Platform LSF compatible), that allows them to submit, monitor, and manage their own cluster workloads without ever touching the command line. Ideal for academic and commercial applications alike, the intuitive web interface makes job submission interfaces self-documenting reducing training requirements and error rates and reducing the support burden on busy cluster administrators.
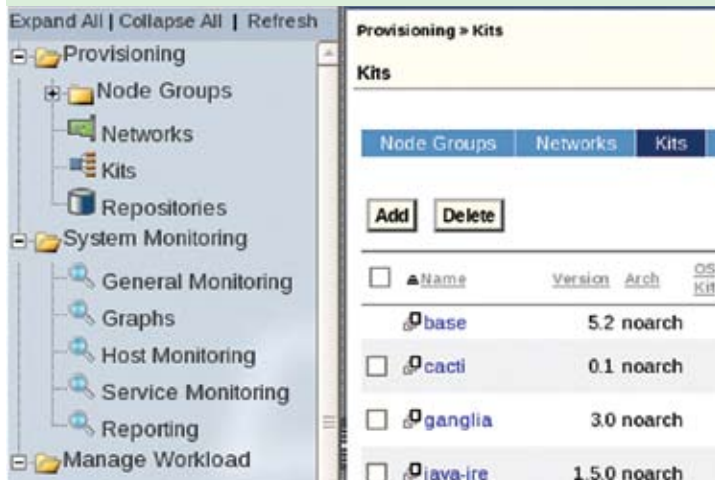
Update compute nodes "on the fly" – As clusters inevitably get busy and user communities grow, scheduling downtime even in small environments can be a challenge. This is especially true in environments with multiple users, or those supporting long-running or parallel workloads. While other cluster management solutions require that nodes be re-installed every time a minor software update is made, PCM – Dell Edition provides a powerful cluster file manager (CFM). For common activities such as package and patch installations, it can transparently synchronize files to cluster nodes without any downtime or re-installation requirement. Updates are properly reflected in the PCM – Dell Edition repository so that changes will be retained the next time nodes are provisioned. For updates that do require a reboot, the web interface makes this apparent to cluster administrators, allowing them to defer the re-installation of nodes according to their own schedule.
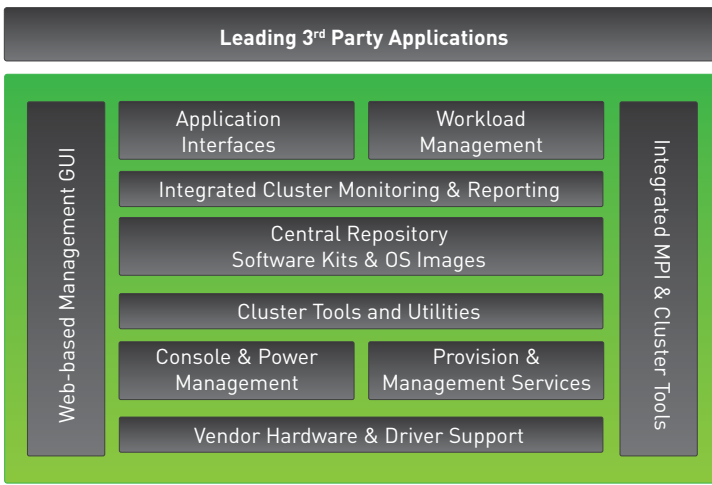
Perform risk-free, trial software installations – PCM – Dell Edition employs a unique and flexible approach to software management supporting multiple repositories that in turn contain different operating systems and software components. Performing software upgrades becomes simple and risk-free. Administrators can snapshot their known good repository, and perform upgrades against a repository copy. If something goes wrong after deploying the upgraded software, node group definitions can simply be linked to the previous repository version, allowing the cluster to be quickly restored to its original state. This unique ability of PCM – Dell Edition, to create "restore points for clusters", and the ability to maintain libraries of installable software components, is ideal for agencies or labs that may need to rapidly deploy earlier software stacks owing to regulatory requirements, or reliably demonstrate the repeatability of prior calculations.

A better way to manage open clusters

Key capability	Leading Open Source Solution	PCM – Dell Edition
Clusters installed quickly and easily	✔	✔
Easily install add-on software	✔	✔
Easy to use web interface	✘	✔
Update software with no re-installing	✘	✔
Perform repository snapshots	✘	✔
Change node personalities anytime	✘	✔
Integrated workload manager	✘	✔
User-friendly job submission portal	✘	✔
Advanced, commercial grade MPI	✘	✔
Integrated power & console management	✘	✔
Built-in monitoring, alerting & reporting	✘	✔
Multiple OS environments	✘	✔
Dell OpenManage certified monitoring	✘	✔
"Plug and play" hardware support	✘	✔

Manage cluster software as installable components

PCM - Dell Edition provides an intuitive extensible web interface allowing administrators to manage the cluster without learning complex command line syntax. Cluster users will appreciate the easy to use web interface for submitting and monitoring simulations and cluster applications.

Leading 3rd Party Applications			
	Application Interfaces	Workload Management	
Web-based Management GUI	Integrated Cluster Monitoring & Reporting		Integrated MPI & Cluster Tools
	Central Repository Software Kits & OS Images		
	Cluster Tools and Utilities		
	Console & Power Management	Provision & Management Services	
	Vendor Hardware & Driver Support		

Platform Cluster Manager Components

Flexible provisioning – While PCM – Dell Edition, by default, employs the same provisioning approach as other cluster managers, it also offers enhanced capabilities. In addition to performing simple package-based installations, PCM – Dell Edition supports image-based installs allowing cluster nodes to be rapidly "cloned" and even provides support for diskless nodes[1]. Multiple operating systems and versions can be deployed concurrently to the same cluster, providing cluster administrators with the flexibility to support special requests from their user communities and accommodate unanticipated changes.

The most advanced HPC tools – Since performance is the whole reason for HPC clusters, PCM – Dell Edition provides the most advanced suite of HPC infrastructure components including libraries optimal for your Dell hardware and network components. Standard benchmark tests are included to ensure your cluster will deliver the best performance possible out-of-the-box. In addition to supporting a wide range of industry standard MPI implementations, PCM – Dell Edition includes Platform MPI, widely regarded as among the industry's best. Platform MPI also supports scalability of parallel jobs to larger numbers of nodes resulting in higher levels of delivered application performance. Platform MPI supports advanced management features including the ability to support multiple applications and multiple network interconnects concurrently with tools that allow you to avoid re-compiling applications when your MPI environment is changed. For organizations requiring enhanced management of parallel workloads, Platform LSF, available separately, can be easily loaded as a kit and deployed to cluster nodes automatically.

Exploit the power of GPUs in your HPC environment

Available as a free optional download for Platform Cluster Manager, the NVIDIA® CUDA™ kit allows customers to easily harness the tremendous floating-point capability of modern graphics processors (GPUs) for general purpose computations. The NVIDIA kit automatically deploys a full CUDA 2.2 environment including all the drivers, tools, SDKs and debuggers needed to deliver breakthrough performance at low cost for a variety of widely used HPC algorithms optimized for NVIDIA GPUs.

Optimized for Dell hardware – Unlike other cluster deployment tools that may leave you scrambling for optimized drivers or specialty software components, PCM – Dell Edition is complete. It provides all the required Dell software components so that Dell clusters are fully integrated out of the box.

These include:
- Configuration support for BMC and BIOS on cluster nodes. Configure BMC settings on the fly without the need to re-install a host
- Remote power-cycling and console access via the Platform PCM – DE console
- Enhanced HPC kit including updated libraries, integrated and tested with OFED 1.4
- Automatic installation and deployment of Dell OpenManage™ agents
- Dell OpenManage™ certified monitoring
- Tuned to support for Dell's latest x 86 hardware
- Dell enhanced device support: Mellanox, Myrinet, Qlogic, Dell vendor kits

Fully supported by Dell– PCM – Dell Edition is the only Linux cluster solution fully supported by Dell. Unlike competing cluster toolkits which are little more than thrown together collections of open-source software, PCM – Dell Edition is the result of a close and long-standing engineering collaboration between two industry leaders. With a focus on quality and platform certification, Dell and Platform Computing jointly provide outstanding support on a 24x7 basis. When dealing with Dell and Platform Computing, you're dealing with the organizations that actually developed and built the key software and hardware components comprising the cluster, ensuring top notch support and speedy problem resolution.

[1]   *Dell is supporting package based provisioning at the time of this writing*

Everything you need is here

PCM – Dell Edition includes everything you need to have your HPC cluster up and running quickly. For ease of installation and management, software is packaged as easy–to–deploy, pre-built "kits". Of course, the PCM – Dell Edition cluster remains fully "open", and administrators can still easily install their own software, using more traditional approaches if they choose. Kits are easy to build and sites may choose to package their own software as kits, or take advantage of a growing library of contributed kits from Platform Computing and others available at http://hpccommunity.org. Pre-integrated in PCM – Dell Edition are a number of standards kits:

- Base – Contains the tools and applications for managing the PCM – Dell Edition cluster
- WebGUI – A comprehensive web interface unique to PCM – Dell Edition
- Cacti* – An open source reporting tool used to collect and graph various node metrics
- Ganglia – A powerful open-source resource monitoring solution
- HPC – A comprehensive collection of tools, libraries and utilities specific to HPC clusters
- Platform Lava – Platform Lava is a powerful, open source workload scheduler 100% compatible with Platform LSF
- Nagios – A powerful open source host, service and network monitoring facility
- NTOP – A tool to monitor network bandwidth and analyze traffic
- OFED – A collection of drivers and libraries for InfiniBand®

- Dell Kit – Dell specific utilities and drivers including OpenManage agents, and useful utilities to streamline the installation and management of Dell systems
- Platform MPI – A fully integrated commercial message passing interface (MPI) that enables users and ISVs to build high performance applications quickly and easily. Also included are a number of open source and 3rd–party MPIs

Built for growth

Most clusters grow – not always in terms of just nodes, but almost certainly in terms of applications, users and complexity as clusters are augmented with new hardware, network and storage devices. PCM – Dell Edition ensures that your Dell cluster is future proof – not only can you easily grow and scale your cluster, but you can easily support different operating systems and provisioning approaches as your needs evolve. With a unique driver patching capability, your cluster can even accommodate the addition of hardware not yet invented, avoiding the need to completely re-install or upgrade the cluster to support new devices. Should your requirements ever outgrow the open source components included in the cluster, a range of optional commercial packages are available that seamlessly integrate with the PCM – Dell Edition cluster providing complete investment protection.

Supported operating systems
- Red Hat® Enterprise Linux 5.1, 5.2, 5.3

* Note: Cacti is an open source rrdtool-based graphing solution.
Copyright 2004-2007 The Cacti Group For more information see http://www.cacti.net

Supported Dell platforms

AMD™		Intel®	
Installer Nodes	Compute Nodes	Installer Nodes	Compute Nodes
Dell™ PowerEdge™ 2970	Dell™ PowerEdge™ M605	Dell™ PowerEdge™ 1950 III	Dell™ PowerEdge™ 1950 III
	Dell™ PowerEdge™ SC1435	Dell™ PowerEdge™ 2950 III	Dell™ PowerEdge™ 2950 III
	Dell™ PowerEdge™ M805	Dell™ PowerEdge™ R510	Dell™ PowerEdge™ M600
	Dell™ PowerEdge™ M905	Dell™ PowerEdge™ R610	Dell™ PowerEdge™ R900
	Dell™ PowerEdge™ R905*	Dell™ PowerEdge™ R710	Dell™ PowerEdge M610
			Dell™ PowerEdge M710
			Dell™ PowerEdge R410
			Dell™ PowerEdge R510
			Dell™ PowerEdge™ R610
			Dell™ PowerEdge™ R710
			Dell™ PowerEdge R900*

*No InfiniBand support

{Platform Computing