Overview

HP Insight Cluster Management Utility (HP Insight CMU) is an efficient and robust hyperscale cluster lifecycle management framework and suite of tools for large Linux clusters such as those found in High Performance Computing (HPC) environments. A simple graphical interface enables an 'at-a-glance' view of the entire cluster across multiple metrics, provides frictionless scalable remote management and analysis, and allows rapid software provisioning to all the system nodes. HP Insight CMU makes cluster management more user friendly, efficient, and error free than clusters managed by scripts, or on a node-by-node basis. HP Insight CMU offers full support for iLO2, iLO3, iLO4 and LO100i adaptors and IPMI on all the servers and cartridges in any cluster consisting of HP ProLiant servers as well as HP Moonshot.

What's New

- Support for HP Moonshot
- Saving and displaying metric-histories with 3-D time view
- Modified graphical user interface for compliance with HP Insight software look and feel
- Support for Intel Xeon Phi coprocessors

Models

Licensing and Media Options

HP Insight Cluster Management Utility 3yr 24x7 Flexible License	BD476A
HP Insight Cluster Management Utility 3yr 24x7 Flexible Electronic License	BD476AAE
HP Insight Cluster Management Utility 1yr 24x7 Flexible License	QL803B
HP Insight Cluster Management Utility 1yr 24x7 Flexible Electronic License	QL803BAE

NOTE: One (1) per node managed by HP Insight CMU or which manages HP Insight CMU.

HP Insight CMU Moonshot 1yr24x7 Flex Lic	D9Y33A
HP Insight CMU Moonshot 3yr 24x7 Flexible License	D9Y34A

NOTE: One (1) per Moonshot Chassis (regardless of how many cartridges or servers are in it)

HP Insight CMU Media	BD477A

Distribution Media and Software Documentation

HP Insight CMU software and documentation is available on a single DVD that comes with the product HP Insight CMU Media (PN BD477A). HP Insight CMU software and documentation may also be downloaded from the HP Software Depot. Patch kits may be required, and can be downloaded from http://www.itrc.hp.com/.

Documentation can also be downloaded from http://www.hp.com/go/cmu

Public Forum

An HP Insight CMU public forum has been established for open discussion of issues relating to HP Insight CMU, ways to post new features, announcements about new versions, and so on.

The HP Insight CMU forum is at
http://h30499.www3.hp.com/t5/HP-Cluster-Management-Utility/bd-p/itrc-1555

Standard Features

Interface
HP Insight CMU comes with a Command Line Interface (CLI) and a full JAVA® Graphical User Interface (GUI) that can be customized and allows access to all compute node consoles from a single screen with a single mouse click. The GUI complies with the HP One Voice specification. Very large cluster configurations (up to 4096 nodes) are supported.

Management
From the HP Insight CMU GUI, you can monitor, halt, boot, reboot or power off any selection of nodes using iLO2, iLO3, iLO4 and LO100i adaptors and IPMI. Your HP Insight CMU session connects to several nodes in the cluster and broadcasts commands to the selected nodes. More generally, the HP Insight CMU graphical interface provides an extensible method for one-click selection of groups of nodes on which menu-selectable operations can be performed. Examples (included by default) include pdsh (distributed shell) and pdcp (distributed copy). Pdsh comes with a filtering engine, cmu_diff, for scaling the command-line feedback. Other features available from the default drop-down menu are automated firmware update, BIOS consistency verification, and BIOS setting modification. You can also use HP Insight CMU for reporting and managing cluster events, such as nodes shutting down or powering up. With the HP Insight CMU CLI, you can halt, boot, reboot, or power off any selection of nodes by using the HP server management card functionality where appropriate. Group and node administration tasks such as create, modify and delete are also available through the HP Insight CMU CLI and shell commands. This capability allows, for example, the dynamic creation of groups of nodes matching Adaptive MOAB®, Altair PBS® Professional™, Platform LSF®, and SLURM (and other resource manager) node allocations.

Provisioning
HP Insight CMU has the capability to propagate an operating system image to the compute nodes in the cluster. HP Insight CMU can clone (over the network) disk partition contents from an image server to the local disks of the compute nodes. You use this process for first time installation of compute nodes and also to propagate updates to the kernel or the current system configuration. Several images can be cloned concurrently, thus permitting rolling upgrades as well as efficient dynamic provisioning. HP Insight CMU automatically manages the target disk partitioning in cases where the target partition differs from the initial image. HP Insight CMU partitions the target disk during the cloning phase, avoiding the partitioning of each compute node during the first installation. Cloning functionality is available from both the HP Insight CMU CLI and GUI. HP Insight CMU maintains a repository of 'golden images' that can be used for cloning sets of nodes in the cluster. These golden images are created by capturing the disk contents of a selected node in the cluster. Also, tools are available which permit the administrator to directly edit the golden image. The cloning algorithm is scalable and achieves high efficiency through hierarchical provisioning. In addition, HP Insight CMU supports diskless cloning for Red Hat Enterprise Linux and for SUSE Linux Enterprise Server. As part of the cloning procedure, HP Insight CMU has a mechanism for running scripts just after the completion of cloning and also during the cloning phase, just after netboot. The netboot environment integrates low-level tools such as conrep and ipmitool that enable setup of RAID (HW) controllers, BIOS, and management cards. The conrep tool permits, for example, the remote flashing of the BIOS (when available on the platform). HP Insight CMU also includes scripts for the installation of GPGPU drivers, CUDA libraries, etc. Aside from the cloning feature, HP Insight CMU also provides the ability to auto install using kickstart (for Red Hat), autoyast (for SUSE) or preseed (for Debian) remote installation.

NOTE: HP Insight CMU does not support provisioning of Dynamic Smart Arrays (fake RAID setup) on compute nodes having B110i/B120i/B320i RAID controllers. Any attempts to backup or clone such compute nodes will fail.

Standard Features

Monitoring	The HP Insight CMU monitoring features makes it possible to see, at a glance, the state of the cluster. Very large configurations (up to 4096 nodes) are supported through monitoring synchronization and a scalable display mechanism in which groups of nodes are aggregated into multi-node entities. The cluster monitoring GUI provides three different views of the state of selected groups of nodes. In the HP Insight CMU "table view", a table is displayed with rows corresponding to nodes and columns corresponding to sensors (or metrics). In the HP Insight CMU "instant view", a "flower" is displayed for each of a set of user-selectable sensors. The "petals" of this HP Insight CMU flower each correspond to one of the nodes in the group, and the length of the petal is proportional to the most recently reported value of the sensor on that node. Additionally, in the instant view, each flower can include a performance gauge which provides the cumulative value of any metric over the nodes that are displayed. In the HP Insight CMU "time view", a "tube" is displayed for each of a set of user-selectable nodes. The "tube" is a 3-D display where each cross-section contains the information shown in the corresponding HP Insight CMU flower. Thus the HP Insight CMU tubes show the values of sensors over a time window. The 3-D displays can be manipulated to rotate and stretch tubes, as well as change angular perspectives and select specific colors to represent certain nodes so that their evolution can be easily examined over time. Users can choose to store sensor-data for review at a later time. These sensor-histories can be displayed using HP Insight CMU "time view". HP Insight CMU can also be used to set and configure alerts that are triggered based on threshold values of selected sensors. By default, alerts - when raised - will show up in the HP Insight CMU GUI as colored marks on the corresponding nodes and can also be viewed in an "alert pane". In addition, each alert can be configured to cause a user-defined action, such as an SNMP trap which could, for example, be processed by HP SIM's event management facility. The default update timer for sensor-monitoring is 5 seconds, but it should be noted that the monitoring module does not heavily burden the CPU's on the compute nodes. The HP Insight CMU monitoring data is collected from several sources. The most easily configured source of data is a per-node monitoring daemon that can be optionally installed from the management drop-down menu. HP Insight CMU also contains Collectl, a popular lightweight monitoring package which includes a large number of pre-packaged sensors. For the most general way of gathering sensor data, HP Insight CMU provides an extended monitoring interface that allows the administrator to gather data from any source and present it to the HP Insight CMU monitoring display engine. With the HP Insight CMU extended monitoring interface, sensor data can be collected directly from the HP iLO Management Engine - for example, from the HP Agentless Management software. Some standard pre-configured sensors (also known as metrics) are cpu load, uptime, memory usage, and i/o speeds. Some system-specific sensors, such as those for the ProLiant SL250s and SL270s servers, include the NVIDIA GPU and Intel Xeon Phi coprocessor temperatures, the GPU and coprocessor utilization, server power, etc. In addition to the sensors that are pre-configured with HP Insight CMU, administrators can configure their own sensors.
Availability	HP Insight CMU functions with any third party HA software. For requirements and prerequisites, see the HP Insight CMU User Guide which is included in the HP Insight CMU documentation. The HA layer must interact with HP Insight CMU through /etc/init.d/cmu status|start|stop.
Contrib directory	The /opt/cmu/contrib directory contains scripts that provide additional features or integrations with HP Insight CMU. These scripts may need to be modified to work with a particular cluster configuration. An example of this is the LSF/PBS/MOAB/SLURM Dynamic User Group support scripts, which need to be modified to know where the relevant Workload Scheduler is installed.

Standard Features

Operating System Support The HP Insight CMU software is supported on Red Hat Enterprise Linux (RHEL) Advanced Server 4, 5 and 6 and SUSE Linux Enterprise Server (SLES) 10 and 11. Under certain circumstances, open source Linux distribution like Debian, CentOS, Ubuntu and Scientific Linux can be supported with HP Insight CMU on the compute nodes. Please contact your HP sales representative for more information.

Optional Software and the Connector program HP Insight CMU has an application interface which is designed for easy extensibility of the scalable framework. The Insight CMU Connector program consists of applications which have been modified to use the Insight CMU application interface, and which follow an HP-approved list of best practices for integration of those applications with Insight CMU. The resulting integration allows those applications to utilize sensor-data, provisioning-capability and the Insight CMU one-to-many user interface. The Insight CMU Connector applications include

- The Adaptive Computing Moab scheduler
- The Altair PBS Professional scheduler
- The Mellanox Unified Fabric Manager
- The Insight CMU-Ganglia Connector

Hardware Requirements HP Insight CMU software is supported on HP ProLiant DL-series, BL-series and SL-series servers, as well as the HP WS460c Workstation Blade, the ProLiant ML370 G6, the ProLiant ML350p Gen 8 server and HP Moonshot systems. Insight HP Insight CMU Software can also be supported on other servers, including non-HP servers. For more information, please contact your HP sales representative.

Each server can be connected to the others with a valid system interconnect that could be Gigabit, 10 Gigabit Ethernet or InfiniBand.

All SATA or SAS hard disk drives configurations are supported, provided that those drives are supported by the servers.

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Insight CMU supports all supported NVIDIA GPU and Intel Xeon Phi coprocessor options to the ProLiant SL250s and SL270s servers.

Service and Support

NOTE: The appropriate Red Hat or SUSE Linux or CentOS kit must be installed on the master server before HP Insight CMU Software installation. These kits can be purchased from HP. Other Linux distributions may be supported on the server. Please check with your HP sales representative.

Software Licensing Information	For the Software license to be valid on an HP Cluster, each server in the HP Cluster must be licensed by an HP Insight CMU License. Subject to the terms and conditions of this Agreement and the payment of any applicable license fee, HP grants You a non-exclusive, non-transferable license to Use (as defined below) in object code form one copy of the Software on one device at a time for Your internal business purposes, unless otherwise indicated above or in applicable Transaction Document(s). "Use" means to install, store, load, execute and display the Software in accordance with the Specifications. Your Use of the Software is subject to these license terms and to the other restrictions specified by HP in any other tangible or electronic documentation delivered or otherwise made available to You with or at the time of purchase of the Software, including license terms, warranty statements, Specifications, and "readme" or other informational files included in the Software itself. Such restrictions are hereby incorporated in this Agreement by reference. Some Software may require license keys or contain other technical protection measures. You acknowledge that HP may monitor your compliance with Use restrictions remotely or otherwise. If HP makes a license management program available which records and reports license usage information, You agree to appropriately install, configure and execute such license management program beginning no later than one hundred and eighty (180) days from the date it is made available to You and continuing for the period that the Software is Used. Other terms of the HP Software License are provided on the license agreement that is delivered with the HP Insight CMU software.
Electronic Software Delivery	Electronic software is now available in most countries. HP recommends purchasing electronic products over physical products when available for faster delivery and the convenience of not having to manage-either file away or throw away-confidential paper licenses.
License Management Facility Support	HP Insight CMU supports the FlexNet Publisher license management facility. The FlexNet Publisher license key is provided upon presentation of a valid license key request form. This form is delivered with the software license. For more information about installing the HP Insight CMU license keys, refer to the HP Insight CMU documentation.

Service and Support

Warranty	HP will replace defective delivery media for a period of 90 days from the date of purchase. This warranty applies to all CMU products found on the delivery media.

HP Software Support	HP Software Support HP offers a number of additional software support services, many of which are provided to our customers at no additional charge.

CMU Software Technical Support and Update Service

software products include three years of 24 x 7 HP Software Technical Support and Update Service. This service provides access to HP technical resources for assistance in resolving software implementation or operations problems. The service also provides access to software updates and reference manuals in electronic form. With this service, OneView customers will benefit from expedited problem resolution as well as proactive notification and delivery of software updates. For more information about this service, see http://www.hp.com/services/oneview

Registration for Software and Technical Support and Update Services -

If you received a license entitlement certificate, registration for this service will take place following online redemption of the license certificate/key.

How to Use Your Software Technical Support and Update Service

Once registered, you will receive a service contract in the mail containing the Customer Service phone number and your Service Agreement Identifier (SAID). You will need your SAID when calling for technical support. Using your SAID, you can also go to the HP Support Center web page to view your contract online.

Join the Conversation (www.hp.com/go/hpsc)

The HP Support Center is a community-based, user-supported tool for HP customers to participate in discussions amongst the customer community about HP products.

Contact Support

HP Worldwide Customer Service contact numbers are available at
http://www.hp.com/country/us/en/wwcontact.html.

Related Options

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
		The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

A variety of customer service options are available from Hewlett-Packard for HP Insight CMU. For more information, contact your local Hewlett-Packard office.

Amongst the service options are software factory installation services, where HP Insight CMU is installed and configured on Cluster Platforms at the factory. There are also on-site Consulting and Integration Services available for HP Insight CMU. Contact your local Hewlett-Packard office or your Hewlett-Packard services representative for more information.