Overview

HPE Insight Cluster Management Utility v8.2

HPE Insight Cluster Management Utility (CMU) is a proven and highly capable utility for the management of HPC and Big Data clusters and other high-performance, scale-out Linux environments. HPE Insight CMU is an integrated, easy-to-use tool for cluster administration, providing complete provisioning, management, and monitoring for clusters of any scale.

With extensive capabilities to manage system images, HPE Insight CMU can rapidly provision and manage a single server, a dynamically defined group of servers, or entire systems using disk-based or diskless deployment. HPE Insight CMU includes a Command Line Interface (CLI) and a customizable Graphical User Interface (GUI) that allows access to all compute node consoles from a single screen via a single mouse click. Through the HPE Insight CMU GUI or CLI, system administrators can remotely halt, boot, or power off any selection of nodes, and broadcast commands to any selected set of nodes.

HPE Insight CMU monitoring makes it possible to see, at a glance, the state of the entire cluster. Very large configurations are supported through monitoring synchronization and a scalable display mechanism in which groups of nodes are aggregated and displayed in user-selected 2D or 3D representations. An included tool—cmu_diff—allows differences between node configurations to be easily identified and remedied between any set of nodes. Other features available are automated firmware updates, BIOS consistency verification, and BIOS setting modification.

What's New

- Option to set Preboot Execution Environment (PXE) as a default boot option to ease future image deployment
- Support for the latest generation of HPE servers, including:
  - HPE Apollo Gen10 systems
  - HPE DL Gen10 servers
  - ARM processor-based Apollo 70 system
- Support for additional operating system versions: Red Hat Enterprise Linux 7.4, SUSE Linux Enterprise Server 12 SP3, and CentOS 7.4.

Models

Licensing and Media Options

HPE Insight Cluster Management Utility 1yr 24x7 Flexible E-LTU QL803BAE

NOTE: One license per node.

NOTE: Includes one year of support.

NOTE: This is an electronic license.

NOTE: This is a perpetual license. The software will continue working even when the support term ends.

NOTE: A 120-day evaluation license is automatically activated for new customers and customers upgrading to the latest version of the product.

HPE Insight Cluster Management Utility 1yr 24x7 Flexible LTU QL803B

NOTE: One license per node.

NOTE: Includes one year of support.

NOTE: This is a perpetual license. The software will continue working even when the support term ends.

NOTE: A 120-day evaluation license is automatically activated for new customers and customers upgrading to the latest version of the product.

HPE Insight Cluster Management Utility 3yr 24x7 Flexible E-LTU BD476AAE

NOTE: One license per node.

NOTE: Includes three (3) years of support.

Standard Features

NOTE: This is an electronic license.

NOTE: This is a perpetual license. The software will continue working even when the support term ends.

NOTE: A 120-day evaluation license is automatically activated for new customers and customers upgrading to the latest version of the product.

HPE Insight Cluster Management Utility 3yr 24x7 Flexible LTU BD476A

NOTE: One license per node.

NOTE: Includes three (3) years of support.

NOTE: This is a perpetual license. The software will continue working even when the support term ends.

NOTE: A 120-day evaluation license is automatically activated for new customers and customers upgrading to the latest version of the product.

HPE Insight Cluster Management Utility 32-node without Support E-LTU Q5U63AAE

NOTE: One license per node.

NOTE: This is a no-charge license for customers with standalone clusters of 32 nodes or less. Customers leveraging this license that later decide to expand their cluster will be prompted to purchase PN BD476AAE or PN QL803BAE.

NOTE: This PN does not include official product support.

HPE Insight Cluster Management Utility 1yr 24x7 Flexible LTU D9Y33A

NOTE: One license per Moonshot chassis (regardless of the number of cartridges within the chassis).

NOTE: Includes one year of support.

NOTE: This is a perpetual license. The software will continue working even when the support term ends.

NOTE: A 120-day evaluation license is automatically activated for new customers and customers upgrading to the latest version of the product.

HPE Insight Cluster Management Utility 3yr 24x7 Flexible LTU D9Y34A

NOTE: One license per Moonshot chassis (regardless of the number of cartridges within the chassis).

NOTE: Includes three (3) years of support.

NOTE: This is a perpetual license. The software will continue working even when the support term ends.

NOTE: A 120-day evaluation license is automatically activated for new customers and customers upgrading to the latest version of the product.

HPE Insight Cluster Management Utility 1 Moonshot Chassis without Support E-LTU Q5U64AAE

NOTE: One license per Moonshot chassis (regardless of the number of cartridges within the chassis).

NOTE: This is a no-charge license for customers with a standalone Moonshot chassis. Customers leveraging this license that later decide to expand their cluster will be prompted to purchase PN D9Y34A or PN Q5U64AAE.

NOTE: This PN does not include official product support.

HPE Insight Cluster Management Utility Media BD477A

NOTE: One media kit per solution.

Standard Features

Distribution Media and Software Documentation

HPE Insight CMU software and documentation is available on a single DVD. Please select the HPE Insight CMU Media SKU (BD477A) to order the DVD.

Customers may download the software and corresponding documentation from the specified URL provided at time of delivery.

Patch kits may be required. Customers can download patch kits from the **HPE Support Center.**

Customers may choose to download HPE Insight Cluster Management for a trial period (for clusters of any size) by visiting **HPE Software Depot**. The trial period will begin at the time of installation and expire after 120 days. At the end of the trial period, customers will be prompted to purchase a license.

For clusters of 32 nodes or less, customers may choose to download the no-charge license by visiting **http://www.hpe.com/solutions/freecmulicense.**

Additional documentation can be downloaded from **http://www.hpe.com/info/cmu.**

Public Forum

Hewlett Packard Enterprise offers a public forum for customers to discuss HPE Insight CMU. Customers may access the fórum by visiting the **HPE Community Home** web page.

Customers may leverage this forum to view the latest product announcements, post feedback about the latest release and request support from the HPE Insight CMU community.

Supported Product

Interface

HPE Insight CMU comes with a Command Line Interface (CLI) and a full JAVA® Graphical User Interface (GUI). The GUI can be customized and allows access to all compute node consoles from a single screen with a single mouse click. The GUI also complies with the HPE One Voice specification.

Provisioning

HPE Insight CMU has the capability to quickly provision an operating system image on the compute nodes in the cluster. HPE Insight CMU can clone (over the network) disk partition contents from an image server to the local disks of the compute nodes. System administrators can use this process for initial installation of compute nodes and to propagate updates to the kernel or current system configuration. Several images can be deployed concurrently, thus permitting rolling upgrades, as well as efficient dynamic provisioning (when coupled with a workload scheduler that supports maintenance tasks and requesting specific OS environments).

HPE Insight CMU automatically manages the target disk partitioning in cases where the target partition differs from the initial image. HPE Insight CMU partitions the target disk during the deployment phase, avoiding the partitioning of each compute node during the initial installation. By adjusting the disk partitions, HPE Insight CMU reduces the number of operation failures due to differing disk sizes.

Deployment functionality is available from both the HPE Insight CMU CLI and GUI.

HPE Insight CMU maintains a repository of golden images that can be used for provisioning sets of nodes in the cluster. These golden images are created by capturing the contents of a selected node in the cluster. Tools are included which permit the administrator to directly edit an image. The HPE Insight CMU image deployment algorithm is scalable and achieves high efficiency through hierarchical provisioning.

In addition, HPE Insight CMU supports diskless cloning for Red Hat® Enterprise Linux®, SUSE Linux Enterprise Server and CentOS. As part of image deployment, HPE Insight CMU has a mechanism for running scripts just after the deployment completes, as well as during the deployment phase, just after netboot. The netboot environment integrates low-level tools such as conrep and ipmitool that enable setup of RAID (hardware) controllers, BIOS, and management cards. HPE Insight CMU also includes scripts for the installation of GPGPU drivers and NVIDIA® CUDA® libraries.

Aside from the deployment feature, HPE Insight CMU also provides the ability to auto install using Kickstart (for Red Hat) and AutoYaST (for SUSE).

HPE Insight CMU v8.0 introduced the first phase of a RESTful application interface (API) for more general integration using JSON payloads. In subsequent versions, the REST API was expanded to mirror additional core functionality of the HPE Insight CMU CLI. In v8.1, for example, the ability to capture an image from the head node and deploy it to multiple nodes at a single time became available through the REST API. A complete list of REST API resources, definitions, and operations are available in the **HPE Insight Cluster Management Utility User Guide.**

Management

HPE Insight CMU can remotely boot, reboot, halt, or power off any selection of nodes using iLO2, iLO3, iLO4, iLO5 and LO100i adaptors or IPMI.

An HPE Insight CMU session can connect to one, sets of, or all nodes in the cluster and broadcast commands to the selected nodes. System managers can interact with the nodes via a smart terminal interface. (The interface does not require installation of X-Windows on the HPE Insight CMU client).

More generally, the HPE Insight CMU GUI provides an extensible method for one-click selection of one or more groups of nodes on which menu-selectable operations can be performed. Examples (included

Supported Product

by default) include pdsh (distributed shell) and pdcp (distributed copy). The pdsh shell is displayed using the smart terminal interface, and comes with a filtering engine, cmu_diff, for scaling the command-line feedback. When commands to the smart terminal interface—for example when using pdsh—result in text output that includes lists of nodes, those lists can be mouse-selected to show a limited drop-down menu.

Other features available by default from the system drop-down menu are automated firmware updates, BIOS consistency verification, and BIOS setting modification. HPE Insight CMU can report and manage cluster events, such as nodes shutting down or powering up. Group and node administration tasks are also available through the HPE Insight CMU CLI and shell commands.

Monitoring

HPE Insight CMU monitoring features make it possible to see, at a glance, the state of the cluster. Very large configurations are supported through monitoring synchronization and a scalable display mechanism in which groups of nodes are aggregated into multi-node windows.

The cluster monitoring GUI provides four different views of the state of selected groups of nodes:

- In Table View, a table is displayed with rows corresponding to nodes and columns corresponding to sensors (or metrics).
- In Instant View, a "flower" is displayed for each set of user-selectable sensors. Each "petal" of flower corresponds 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 value on that node. Additionally, in Instant View, each flower can include a performance gauge which provides the cumulative value of any metric over the nodes that are displayed.
- In Bar Graph View, the monitored values for the selected groups of nodes appear in the form of a bar graph.
- In Time View, a "tube" is displayed for each set of user-selectable nodes. The "tube" is a 3D display where each cross-section contains the information shown in the corresponding flower at a specific time. Thus the tubes show the values of sensors over time. The 3D displays can be manipulated to rotate and stretch, and includes the ability to change angular perspectives. Users can select specific colors to represent certain nodes so that their evolution can be easily examined over time. Users can also choose to store sensor data for later review. These sensor histories can be displayed using HPE Insight CMU Time View.

HPE 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 HPE Insight CMU GUI as colored indicators on the corresponding nodes and can also be viewed in an alert pane. In addition, each alert can be configured to trigger a user-defined action, such as an SNMP trap which could, for example, be processed by HPE Systems Insights Manager'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 CPUs on the compute nodes.

HPE 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. HPE Insight CMU also contains Collectl, a popular lightweight monitoring package which includes a large number of pre-defined sensors.

HPE Insight CMU provides an extended monitoring interface that also allows the administrator to gather data from any source and present it to the monitoring display engine. With the extended monitoring interface, sensor data can be collected directly from the HPE iLO Management Engine—for example, from the HPE 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 include GPU coprocessor temperatures, GPU and coprocessor utilization and server power. In addition

Supported Product

to the sensors that are pre-configured with HPE Insight CMU, administrators can configure their own sensors.

Availability

HPE Insight CMU functions with any third-party HA software. For requirements and prerequisites, see the **HPE Insight CMU User Guide.** The HA layer must interact with HPE 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 HPE 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.

Operating System Support

HPE Insight CMU software is supported on Red Hat® Enterprise Linux® (RHEL) Advanced Server 6, 7 (through release 7.4), SUSE Linux Enterprise Server (SLES) 11, 12 (through SP3), CentOS 7.4 and Ubuntu 12.04 and later releases (through 16.04). Under certain circumstances, other open source Linux distributions like Debian and Scientific Linux can be supported. On HPE Moonshot systems, HPE Insight CMU also supports cloning of Windows Server 2016 and Windows 7 SP1. Please contact your Hewlett Packard Enterprise sales representative or the HPE Insight CMU public forum for more information.

NOTE: CentOS, Red Hat® or a SUSE Linux® operating system version must be installed on the management server prior to installing the HPE Insight CMU software. This software can be purchased from Hewlett Packard Enterprise or acquired separately. Other Linux distributions may be supported on the server. Please contact your Hewlett Packard Enterprise sales representative or visit the HPE Insight CMU public forum.

Management Integration

HPE Insight CMU has an external application interface (API) which allows for tight integration with other software management components, such as workload schedulers. The HPE Insight CMU Connector Program consists of applications which have been updated to use the HPE Insight CMU API, and which follow an approved list of best practices for integration. The resulting integration allows those applications to utilize sensor data, provisioning capabilities and the HPE Insight CMU one-to-many user interface. Current HPE Insight CMU Connector Program applications include:

- Adaptive Computing Moab scheduler
- Altair PBS Professional® scheduler
- Mellanox Unified Fabric Manager®
- UNIVA Grid Engine scheduler
- ScaleMP vSMP virtualization software
- Ganglia monitoring software
- Ansible Playbooks and inventory files

Hardware Requirements

HPE Insight CMU software is supported on the following Gen9 and Gen10 platforms:

- HPE Apollo 2000, 6000 and 6500 systems
- HPE Apollo 4000 family of systems
- HPE Apollo 20 and 40 systems
- HPE ProLiant servers
- HPE MoonShot Systems
- ARM processor-based HPE Apollo 70 system

Clusters of any size can be supported. Scalability is limited only by the performance of the head node and the management network, not by HPE Insight CMU.

Each server can be connected to the others with a valid system interconnect that can be 10 or 40 Gigabit Ethernet, InfiniBand, or Intel® Omni-Path.

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

Supported Product

HPE Insight CMU supports all supported NVIDIA® GPU, AMD GPU and Intel® Xeon® Phi coprocessor options for ProLiant servers

Software Licensing Information

For the Software to be valid on an HPE cluster, each server in the HPE cluster must have a valid HPE Insight CMU license. Subject to the terms and conditions of this Agreement and the payment of any applicable license fee, HPE grants a non-exclusive, non-transferable license to use (as defined below), in object code form, one copy of the Software on one device (server or node) at a time for 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. Use of the Software is subject to these license terms and to the other restrictions specified by Hewlett Packard Enterprise in any other tangible or electronic documentation delivered or otherwise made available 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. HPE reserves the right to monitor compliance with Use restrictions remotely or otherwise. Hewlett Packard Enterprise may make a license management program available which records and reports license usage information, If so supplied, customer agrees to install and run such license management program beginning no later than one hundred and eighty (180) days from the date it is made available and continuing for the period that the Software is Used.

Other terms of the HPE Software License are provided on the license agreement that is delivered with the HPE Insight CMU software.

Electronic Software Delivery

Electronic software is available. Hewlett Packard Enterprise recommends purchasing electronic products over physical products when available for faster delivery and the convenience of not having to manage confidential paper licenses.

License Management Facility Support

With the introduction of HPE Insight CMU version 8.0, Hewlett Packard Enterprise now uses a simplified licensing mechanism based on the HPE AutoPass License Server instead of the FlexNet Publisher license management facility used in previous versions. The license key is provided upon presentation of a valid license key request form. This form is delivered with the software license.

IMPORTANT: Customers upgrading from pre-8.0 versions of HPE Insight CMU will need to replace their flexlm license keys with equivalent AutoPass license keys.

For more information about installing the HPE Insight CMU license keys, refer to the **HPE Insight CMU User Guide.**

Warranty

Hewlett Packard Enterprise will replace defective delivery media for a period of 90 days from the date of purchase. This warranty applies to all HPE Insight CMU products found on the delivery media.

HPE Software Support

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

HPE Insight CMU Software Technical Support and Update Service

Software products include three years of 24 x 7 HPE Software Technical Support and Update Service. This service provides access to Hewlett Packard Enterprise 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.

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

Service and Support

technical support. Using your SAID, you can also go to the HPE Support Center web page to view your contract online.

Join the Conversation
The HPE Support Center is a community-based, user-supported tool for Hewlett Packard Enterprise customers to participate in discussions amongst the customer community about Hewlett Packard Enterprise products. Please visit **https://h20565.www2.hpe.com/portal/site/hpsc/public** for more information.

Contact Support
HPE Worldwide Customer Service contact numbers are available at **http://www8.hp.com/us/en/hpe/contact/support.html**

Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

Related Options

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett Packard Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner. For more information, please visit **https://promotions.ext.hpe.com/WMCF.Web/us/en/page/ProgramGroups/** or contact your Hewlett Packard Enterprise sales representative. 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 Enterprise web site at: **http://www.hpe.com/go/green** These instructions may be used by recyclers and other WEEE treatment facilities as well as HEWLETT PACKARD ENTERPRISE OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
4-Jun-2018	Version 30	Changed	Changes were made throughout the document
4-Dec-2017	From version 28 to 29	Updated	Updated the following sections: What's New Models Operating System Support Hardware Requirements
5-Jun-2017	From version 27 to 28	Updated	Changes made throughout to support the release of 8.2
28-Nov-2016	From version 26 to 27	Updated	Changes were made throughout to support the release of 8.1
20-Jun-2016	From version 25 to 26	Updated	Update all info in the following sections: Overview - Models Software - License Management Service and Support - Software Product Services Related Options - Notice
13-Jun-2014	From Version 24 to 25	Changed	Changes were made throughout for version 7.2 to create version 7.3
13-Jun-2014	From Version 23 to 24	Changed	Changes were made throughout for version 7.2.
13-Jun-2014	From Version 22 to 23	Changed	Changes were made throughout for version 7.2.
30-Aug-2013	From Version 21 to 22	Changed	Changes made throughout the QuickSpecs.
03-Jun-2013	From Version 20 to 21	Changed	Corrected a part number in Models.
31-May-2013	From Version 19 to 20	Changed	Changes made throughout the QuickSpecs
24-Aug-2012	From Version 18 to 19	Changed	Changes were made in Software, Service and Support and in Related Options sections.
06-Mar-2012	From Version 17 to 18	Changed	Changes were made throughout for the version 7.0 update.
05-Oct-2011	From Version 16 to 17	Changed	Updated the Models and Supported Service Offerings sections.
05-Jul-2011	From Version 15 to 16	Changed	Updated the URL in the Public Forum section.
05-Apr-2011	From Version 14 to 15	Changed	The QuickSpecs was completely revised.
10-Jan-2011	From Version 12 to 14	Changed	Updated throughout the document to reflect the change to version 5.0 of the software.
04-Nov-2010	From Version 11 to 12	Changed	Removed TC297AAE from the Ordering Information section.
25-Aug-2010	From Version 10 to 11	Changed	Monitoring was updated in the Overview HPE Cluster Platforms 3000SL and 4000SL, HPE ProLiant SL390c servers, HPE ProLiant DL385 servers and the supported CP4000SL systems are based on the HPE ProLiant SL165z server were added and HPE ProLiant DL320, BL480c, SL2x170z and DL785 servers were removed from Hardware Requirements CMU also includes scripts for the installation of GPGPU drivers, CUDA libraries, etc was added to Provisioning Public Forum was added to Ordering Information
29-Mar-2010	From Version 9 to 10	Changed	Changes were made throughout the QuickSpecs. Note the title has changed.
16-Nov-2009	From Version 8 to 9	Changed	Changes were made throughout the QuickSpecs. Note the title has changed.
26-Aug-2009	From Version 6 to 8	Changed	Changes were made throughout the QuickSpecs. Note the title has changed.

Summary of Changes

30-Jan-2009	From Version 5 to 6	Changed	Changes made within the Overview section include, changing the Cloning section to Provisioning, updating the Monitoring and Hardware Requirements sections and adding the Availability section.
18-Mar-2008	From Version 4 to 5	Changed	Changes were made throughout the entire QuickSpecs. Note also the title was changed from V3.1 to V3.2.
06-Nov-2007	From Version 3 to 4	Changed	The first paragraph in the Ordering Information section was revised.
25-Jul-2007	From Version 2 to 3	Changed	Changed made throughout the Overview section.
02-Feb-2007	From Version 1 to 2	Changed	Changed part number 433258-B21 to 436284-B21.

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