

HPE Insight Cluster Management Utility

Proven HPC and Big Data cluster management at scale

HPE Insight Cluster Management Utility (CMU) simplifies the management and the rapid deployment of Linux® clusters from one node to a cluster containing thousands of nodes. It offers a comprehensive feature set complemented by a flexible and efficient interface, which helps maximize resource delivery to applications, optimize resource usage, and improve productivity.

HPE Insight Cluster Management Utility (CMU) speeds time to production, increases operational efficiency, streamlines system management, and provides deep insights with easy-to-use monitoring tools designed for HPC.

Simplify the Deployment and Management of HPC and Big Data Clusters

High performance computing (HPC) stands at the forefront of commercial innovation and scientific discovery. The latest HPC technologies allow companies to address mission-critical problems, reveal new insights from massive data sets, and boost their competitiveness in the marketplace. Yet, these organizations begin to scale out their HPC clusters to build capacity and performance, challenges arise. System management and operations become more complex as new and different workloads are added to the same cluster. Resources are not fully utilized or properly prioritized due to limited insights. System administrators are held back from identifying performance bottlenecks from hard-to-use software. To accelerate IT operational efficiency, it's time to demand a highly flexible and scalable utility that eases the deployment and management of HPC and Big Data clusters.

The Ideal Cluster Management Solution

HPE Insight CMU is used to configure and install cluster software environments, monitor cluster and node metrics, and remotely manage resources. The software makes even the largest cluster easy to manage through a complete set of user interfaces, which allow system administrators to interact with the cluster as they prefer. Companies around the world, including many organizations on the HPC TOP500¹ list, use HPE Insight CMU to manage their clusters.

HPE Insight CMU is a powerful tool for installing and managing complete Linux software images, including middleware such as development packs, development and runtime libraries, resource managers, and job schedulers. It is an ideal tool for customers implementing any cluster solution including those using open source or third-party software components.

Managing configurations of any size, but especially those of hundreds or thousands of nodes, is challenging. To support a broad range of cluster deployments and use cases, HPE Insight CMU is designed to manage key tasks independent of the operating system and other configured software components.

¹ Hewlett Packard Enterprise is the number one vendor in the latest HPC TOP500 list, June 2016. top500.org/lists/

HPE Insight CMU supports the latest HPE ProLiant servers, including HPE Apollo, HPE ProLiant DL, HPE ProLiant SL, HPE ProLiant BL systems, and HPE Moonshot servers. HPE Insight CMU also includes enhancements for accelerator-based computation.

HPE Insight CMU is supported on Red Hat® Linux, SUSE Linux Enterprise Server (SLES), and multiple community Linux distributions. In addition, it has been augmented to enable Windows® provisioning of HPE Moonshot servers.

What's New

Ease of Operation

- Improved diskless boot time, scaling faster than ever before
- Streamlined process for adding nodes to an image group as part of provisioning
- Out-of-the-box features enabled by default, including diskless and auto install options for provisioning, and Ansible configuration

Improved Monitoring

- New alerts to monitor aggregated metrics
- Streamlined Management
- Expanded RESTful API now includes power control options
- Dynamically update system components within inventory files for Ansible Playbooks

Architecture

HPE Insight Cluster Management Utility manages a cluster from a single management or “head” node. This enables:

- Remote text-based console access during all server states (Setup, boot, OS, or halted)
- Remote control of server power, regardless of the state of the server (even if the server is off)
- Remote BIOS setup

The “limitless” architecture of HPE Insight CMU allows it to provision, manage, and monitor clusters of virtually any scale that can be built on a flat management network. HPE Insight CMU scalability easily extends beyond 4096 nodes and is limited only by the performance of, and the configured traffic on, the network.

The HPE Insight CMU graphical user interface (GUI) displays real-time monitoring of selected metrics in an intuitive and uniquely scalable design. This capability allows the system administrator to view the status of the entire cluster at a glance or to focus on one node, or a selected group of nodes, and monitor and reconfigure the displayed metrics as necessary.

HPE Insight Cluster Management Utility provides a rich set of preconfigured metrics and the flexibility to add customized metrics. System administrators can also customize the grouping of nodes to simplify monitoring. The software can be integrated with various batch schedulers to dynamically create and manage groups of nodes that correspond with the workloads currently active on the cluster. 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.



Figure 1. HPE Insight Cluster Management Utility Instant View

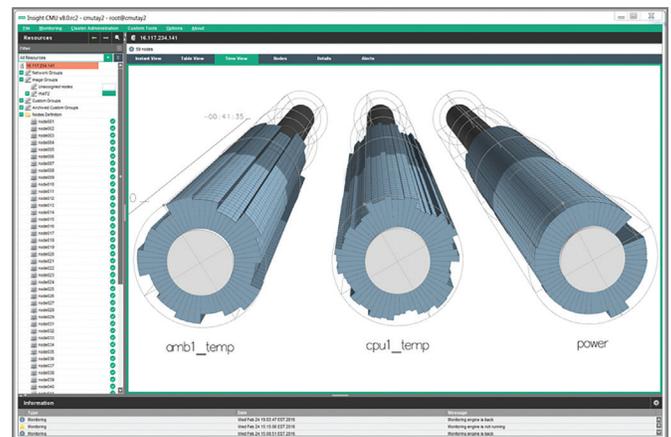


Figure 2. HPE Insight Cluster Management Utility Time View



HPE Insight Cluster Management Utility provides in-depth monitoring for a variety of metrics, including Hadoop metrics and GPU activity.

Provisioning

HPE Insight Cluster Management Utility is designed to rapidly provision cluster—no matter the size. The limitless architecture allows HPE Insight CMU to provision clusters beyond 4096 nodes. Hierarchical provisioning speeds up time to production in large clusters while parallel image management speeds up provisioning of small clusters.

Disk-based and diskless provisioning are supported for Red Hat Enterprise Linux and for SUSE Linux Enterprise Server.

HPE Insight CMU supports network disk partitioning from an image server, target disk partitioning, setup of RAID (hardware) controllers, and includes scripts for the installation of GPGPU drivers and NVIDIA® CUDA libraries. HPE Insight CMU supports auto install using kick start (for Red Hat), and AutoYaST (for SUSE).

Management

HPE Insight CMU provides an integrated and comprehensive set of management tools, which includes Cmu_diff, multi-window broadcast, Smart Window, BIOS and firmware management tools, remote node management, power and UID (Unit ID LED) control, and more.

Cmu_diff allows for at-a-glance identification of node configuration differences, speeding up the resolution of performance and maintenance issues, and helping to ensure that the cluster remains in the desired production state. Multi-window broadcast allows commands to be issued simultaneously to any set of nodes with display options enabling side-by-side or cascaded views. Smart Window improves productivity even more in the command line interface (CLI) by providing dynamic, context-sensitive menus through a point-and-click interface.

HPE Insight CMU allows any node to be shutdown, powered down, powered up, or booted and its UID set remotely.

Interoperability

Faced with a limited view of their entire infrastructure, system administrators traditionally had to manage and monitor their clusters at the component level. HPE Insight CMU Partner Connectors, which leverage a RESTful application interface (API), addresses this challenge by streamlining the sharing of information across the entire cluster and providing a single location to monitor system performance and health.

HPE Insight CMU Connectors are available for popular high-performance computing management products, including PBS Professional from Altair Engineering, Adaptive Computing Moab, Ansible Playbooks, Mellanox Unified Fabric Manager (UFM) and Platform LSF.

HPE Insight CMU provides a RESTful application interface (API) designed to easily extend the management architecture. HPE Insight CMU Connectors, which use this interface, are available for popular high-performance computing management products, including PBS Professional from Altair Engineering, Adaptive Computing Moab, Ansible Playbooks, and Platform LSF.

Monitoring

HPE Insight Cluster Management Utility monitoring was designed to collect and present environmental, performance, and administration information from any portion of the cluster for easy use by the cluster administrator. In this way, HPE Insight CMU helps reduce administrative overhead, improves productivity, and reduces operating costs.

Monitored metrics are presented to the administrator in a single system view, as opposed to a concatenation of data collected from the individual nodes of the cluster. Monitoring, similar to all other features of HPE Insight CMU, is designed for scalability. No additional resources are needed to deliver high-performance, highly efficient monitoring—even as a cluster grows to include hundreds or thousands of nodes.

Provision more than 1000 nodes in less than 30 minutes: The push button, scale-out provisioning available with HPE Insight CMU reduces the time of system installation and configuration for each node within the cluster. Concurrent provisioning with different images supports rolling upgrades and reduces downtime.

System administrators can choose to display metrics in text-based console windows or consolidated 2D and 3D display windows. The HPE Insight CMU Time View renders the metric display in 3D over a period of time showing cluster behavior across multiple metrics in parallel.

HPE Insight CMU can also trigger alerts based on user-selected metric thresholds and initiate automated responses. In addition, HPE Insight CMU includes a highly efficient database for historical metric data that can be accessed and viewed through the same displays as real-time data.

Image management

HPE Insight Cluster Management Utility can maintain and manage a repository of “golden images” that can be used for provisioning nodes in the cluster. These golden images are easily created by capturing the disk contents of a selected node. The included tools permit the administrator to edit the golden image directly. Image management is available through both the HPE Insight CMU CLI and GUI. Concurrent provisioning with different images supports rolling upgrades to reduce time out of production.

Table 1. Feature/Advantage/Benefits

Features	Advantages	Benefits	
HPE Insight Cluster Management Utility	Provisioning	Concurrent image deployment, provisioning different images to support rolling upgrades Management through GUI or CLI Image repository with direct editing capability	Speed time to production: provision 1,000 nodes in less than 30 minutes Ease of operation: easily provision one to thousands of nodes
	Monitoring	2D and 3D data displays to view selected nodes Repository for historical data points Alerts and reactions	Ease of operation: view results and metrics in the format of your choice Address issues faster: automate responses to important events
	Management	Multi-window broadcast: issue the same command to multiple nodes by entering it only once Cmu_diff: analyze text outputs related to a system command to determine differences in a selected group of nodes Remote management through iLO integration	Increase operational efficiency: intuitive remote control of target nodes

Support and services

HPE Insight CMU software is the recommended cluster management software for HPE. A full range of services, from design to factory pre-installation and configuration to acceptance, as well as training, is available to complement the HPE Insight CMU software.

Try HPE Insight CMU

HPE Insight Cluster Management Utility is available for download from the **HPE Software Depot**. A free trial license is included for 120 days for clusters of any size. HPE Insight CMU can also be deployed at no charge for standalone clusters of up to 32 nodes by requesting a free CMU license.

Learn more at hpe.com/info/cmu



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