

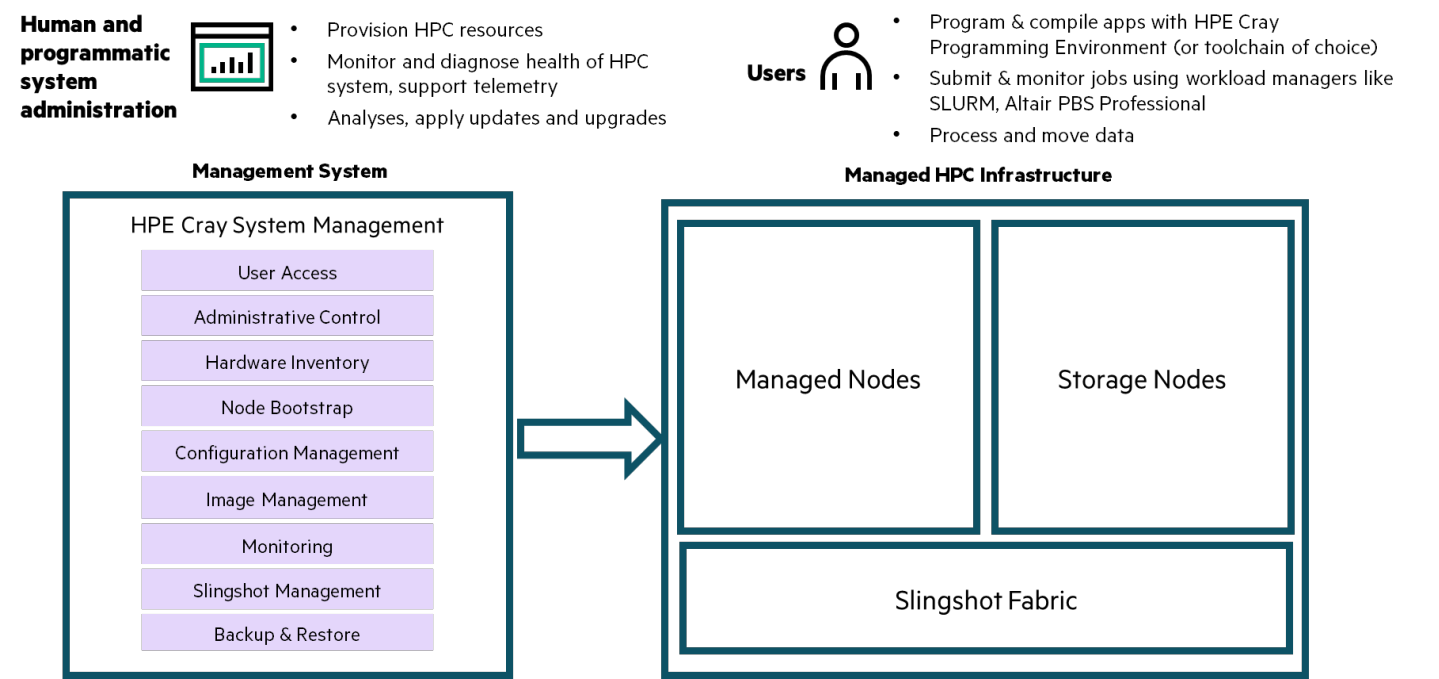
Overview

HPE Cray System Management

HPE Cray System Management is an open-source system management solution that combines microservices and cloud technologies for easier management of large-scale supercomputers. While offering the familiar capabilities of HPC system management software, HPE Cray System Management enables customers to automate and extend system administration and site-reliability with API-first development.

The software solution includes a comprehensive and integrated suite of management and monitoring capabilities for HPE Cray Supercomputers and integration with HPE Slingshot fabric. Comprehensive monitoring and management cover all aspects of the system that includes CPU/GPU, network (Integrated HPE Slingshot Fabric Manager), power management and monitoring, and operational efficiency.

HPE Cray System Management brings forward technology and architecture pioneered in hyper-scaler and cloud environments as foundational components to enable new as-a-Service interactions and enabling customers to add unique value of their own on top of a scalable platform. Platform security and enhanced authentication provide a solution architected to enable a secure multi-tenant environment. To support enhanced integration into customer data centers and operations there is an extensive RESTful API for managing and monitoring all aspects of the system.



Standard Features

Interface

HPE Cray System Management supports a Command Line Interface (CLI) for common system administration tasks as well as a comprehensive RESTful Application Programming Interface (API) to manage all aspects of the system. Also included are graphical interfaces to view and analyze system monitoring data.

System Setup and Provisioning

HPE Cray System Management offers flexible deployment options. We support an integrated environment for installation of system management software including the HPE Cray Operating System. The solution supports closed loop hardware discovery through Redfish for discovery and acquisition of all devices.

HPE Cray System Management supports the following systems and system software:

- HPE Cray EX Supercomputer with HPE Slingshot fabric
- HPE Cray XD Supercomputer with HPE Slingshot fabric
- HPE ProLiant DL Server

For more information refer to the QuickSpec for HPE Cray Ex Supercomputers or HPE Cray Supercomputers for installation services. Once the system is installed customers can customize the software environment to suit the needs of their applications.

Management Services

HPE Cray System Management enables customers to deploy system management services such as workload managers and user login services via lightweight containers and on bare metal servers. Containerizing core system services enables automated load balancing and failover while reducing the need to deploy lightweight services on bare metal but provides the flexibility to deploy resource hungry services on bare metal.

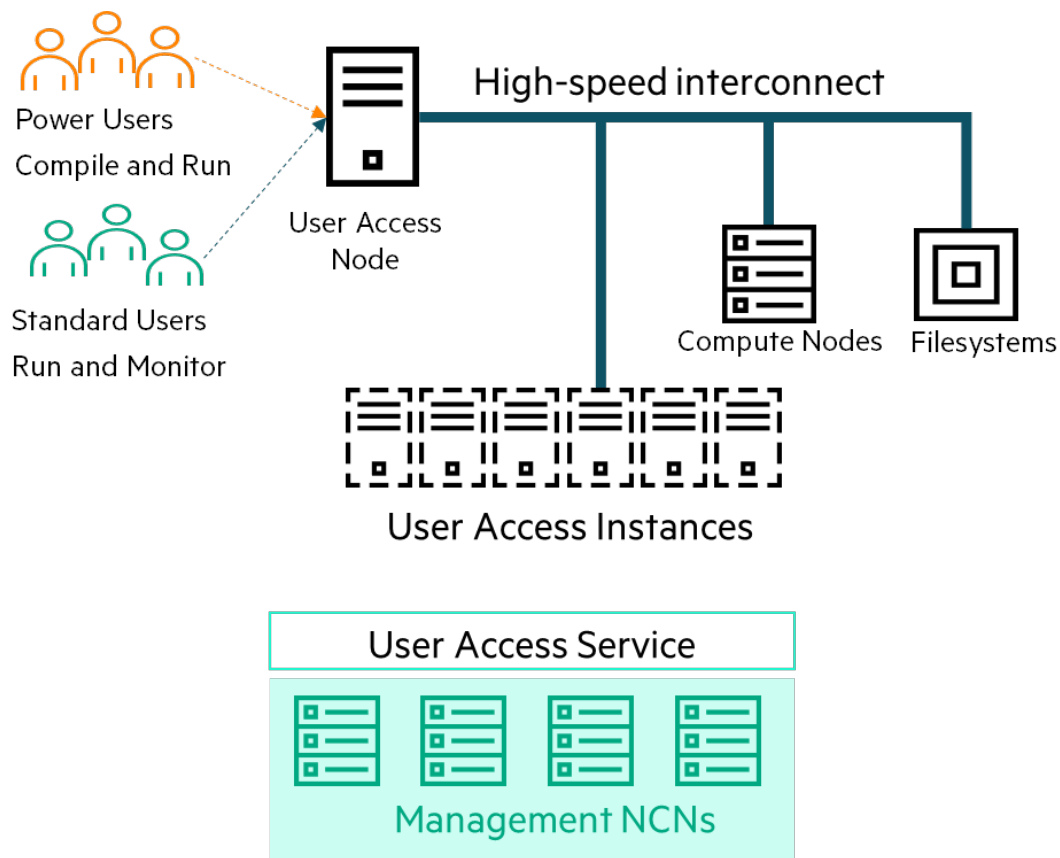
User Access

HPE Cray System Management Solution provides customizable role-based access control for better utilization of systems. Customers can enable users to login into containerized user environments called User Access Instances (UAI) or on standard dedicated login nodes called User Access Nodes (UAN), or both.

User Access Nodes are bare metal dedicated login nodes for stable long term persistent users. It helps to support large compilation and job scheduling by providing shared environment for users with availability of direct external access. The nodes can be configured to match compute node configuration (CPU, GPU).

UAI offer an isolated environment that can be resource controlled and provide users with a customized software environment that does not disrupt other users. UAI also offer a lightweight mechanism to support many users on a shared node with resource constraints so that no one user can impact other users within their own UAI.

Standard Features



System Monitoring and Alerts

HPE Cray System Management collects telemetry from cluster components like iLO logs, CMC, SBMC, as well as other hardware such as cooling units and storage, and stores them in a secure repository. Some standard pre-configured metrics are CPU load, uptime, memory usage, and I/O speeds. Integration with NVIDIA Datacenter GPU Manager enables monitoring of GPU diagnostics, health, configuration, and alerts in a GPU-enabled server. HPE Cray System Management aggregates the GPU metrics to monitor GPU activity across the cluster.

In addition to the metrics, the software uses message queuing applications, like Mosquitto (MQTT) and Kafka to channelize the data flow and collate all the telemetry information for persistent storage and analytics in an OpenSearch cluster. The filtering mechanism in OpenSearch allows Administrators to configure options for producing alerts and additional metrics based on the hardware components in the system. It also includes REST APIs for automation and third-party software integrations such as Grafana.

HPE Cray System Management offers several preconfigured monitoring dashboards in Grafana, such as:

- System Monitoring Dashboard (cluster-level CPU loads and memory, disk read & write data, memory statistics via graphs, as well as info on top 20 performing nodes).
- CDU dashboards (offering detailed information about cooling distribution unit such as temperature, humidity, valve controls, dew point & water flow)
- Scheduler Status Report Dashboard - real-time monitoring of jobs scheduled via either PBS Professional or Slurm showing information such as nodes where the schedulers are running, whether they are active/inactive, jobs statuses & queues, click on Job ID shows CPU utilization data etc.)

Standard Features

Hardware Management

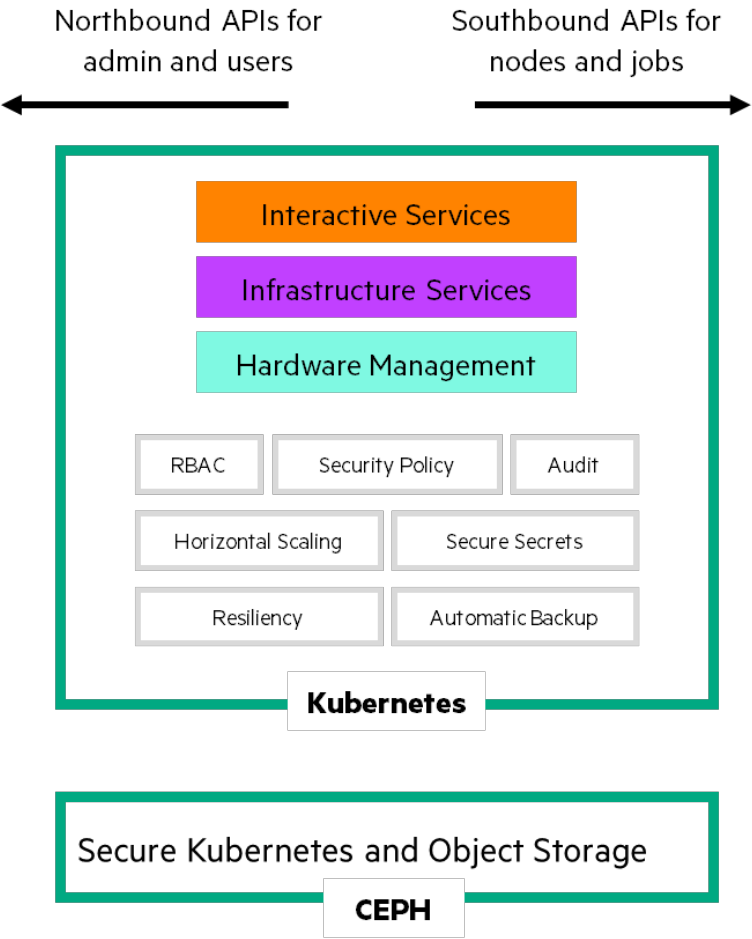
Comprehensive and secure hardware management is integrated into the overall solution supporting all HPE Cray EX Supercomputer, HPE Cray Supercomputer and HPE Proliant DL compute nodes as well as nodes for system management, user login, and additional service nodes. Hardware management supports hardware using industry standard Redfish interfaces and HPE iLO enabled systems. From power management and capping to firmware flashing and management, all the hardware management features required are available. System administrator tasks on the administrative nodes are kept secure from end user access.

Image Management

Software images are created using industry standard tooling and image recipes. Customers can leverage preconfigured images and recipes to get up and running quickly or have the option to customize the images to add software required for production.

Security

HPE Cray System Management was designed with security in mind to enable fine grained control of access for users and administrators. We support human and non-human identity and access management (IAM). The system management solution supports custom role base access control with programmatic interface for change control and supports multiple identity providers.



Operating System Support

HPE Cray System Management software supports HPE Cray OS as the primary operating system for compute nodes. Additional SUSE Linux Enterprise Server is supported for service nodes such as visualization and gateways.



Standard Features

Workload Management and Additional Software

HPE Cray System Management offers integration with the following solutions:

- Altair PBS Professional®
- Slurm® by SchedMD
- Ansible Playbooks and inventory files
- NVIDIA Datacenter GPU Manager
- Arm Performance Reports
- Grafana
- Kafka
- Alerta

HPE Cray System Management supports the following compute node software:

- HPE Cray Programming Environment
- Singularity Community Edition
- Kubernetes

Hardware Requirements

HPE Cray System Management supports the following hardware platforms:

- HPE Cray EX Supercomputer
 - HPE Cray XD Supercomputer
 - HPE ProLiant DL Servers
-



Service and Support

HPE Services

No matter where you are in your digital transformation journey, you can count on HPE Services to deliver the expertise you need when, where and how you need it. From planning to deployment, ongoing operations and beyond, our experts can help you realize your digital ambitions.

<https://www.hpe.com/services>

Consulting Services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.

<https://www.hpe.com/services/consulting>

HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

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Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.

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HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

<https://www.hpe.com/services/completecure>

HPE Tech Care Service

HPE Tech Care Service is the operational support service experience for HPE products. The service goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Tech Care Service delivers a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Tech Care Service is available in three response levels. Basic, which provides 9x5 business hour availability and a 2-hour response time. Essential which provides a 15-minute response time 24x7 for most enterprise level customers, and Critical which includes a 6-hour repair commitment where available and outage management response for severity 1 incidents.

<https://www.hpe.com/services/techcare>



Service and Support

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- Lifecycle Install and Startup Services: Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system.
- HPE Firmware Update Analysis Service: Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment.
- HPE Firmware Update Implementation Service: Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment.
- Implementation assistance services: Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and onsite technical forums.
- HPE Service Credits: Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices.

Notes: To review the list of Lifecycle Services available for your product go to:

<https://www.hpe.com/services/lifecycle>

For a list of the most frequently purchased services using service credits, see the [HPE Service Credits Menu](#)

Other Related Services from HPE Services:

HPE Education Services

Training and certification designed for IT and business professionals across all industries. Broad catalogue of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.

<https://www.hpe.com/services/training>

Defective Media Retention

An option available with HPE Complete Care Service and HPE Tech Care Service and applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

Consult your HPE Sales Representative or Authorized Channel Partner of choice for any additional questions and services options.

Parts and Materials

HPE 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.

How to Purchase Services

Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find services at <https://ssc.hpe.com/portal/site/ssc/>



Service and Support

AI Powered and Digitally Enabled Support Experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience

Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with seamless transition when needed to a live support agent.

<https://support.hpe.com/hpesc/public/home/signin>

Consume IT On Your Terms

HPE GreenLake edge-to-cloud platform brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake edge-to-cloud platform accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

To learn more about HPE Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE"

<https://www.hpe.com/us/en/contact-hpe.html>

For more information

www.hpe.com/services



Configuration Information

Models

HPE Cray System Management for Cray Supercomputers 1 Node 3-year 24x7 Support E-RTU R5Q35AAE

Notes:

- One license per node.
- Includes three years of support.
- This is an electronic license.
- This is a perpetual license. The software will continue working even when the support term ends.

HPE Cray System Management for Cray Supercomputers FIO Software R5Q43A

Notes:

- For factory installation only with HPE Cray EX Supercomputers and HPE Cray Supercomputers.
- This SKU does not include the license.
- Order one per node.



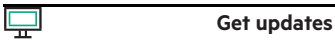
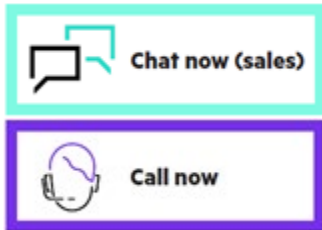
Summary of Changes

Date	Version History	Action	Description of Change
18-Dec-2023	Version 5	Changed	HPE Services Rebranding
17-Apr-2023	Version 4	Changed	Revision to system provisioning and software compatibility sections Standard Features section was updated.
03-Apr-2023	Version 3	Changed	New content added to existing sections
15-Nov-2021	Version 2	Changed	Service and Support section was updated.
05-Oct-2020	Version 1	New	New QuickSpecs



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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.

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