

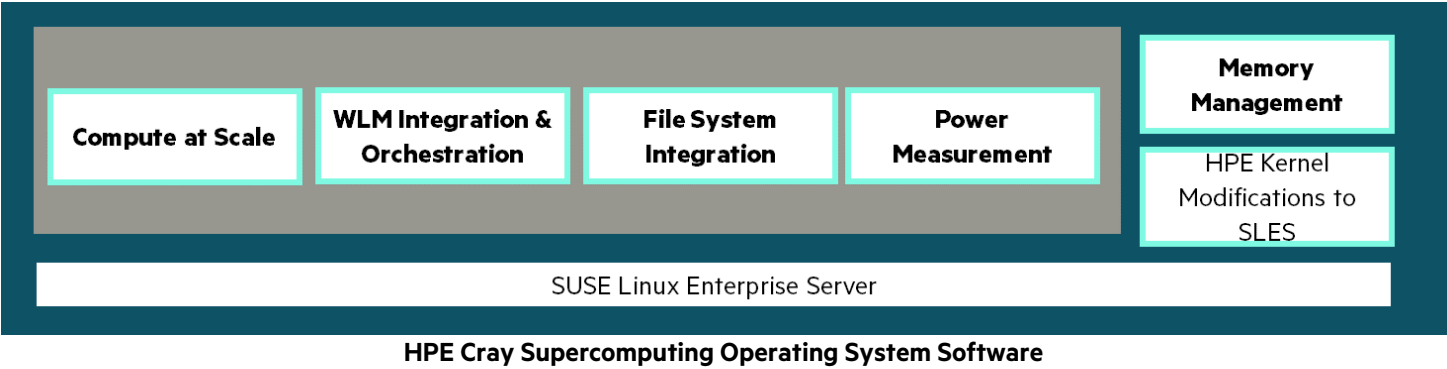
Overview

Shape the Future of QuickSpecs – Your Input Matters

HPE Cray Supercomputing Operating System Software

The HPE Cray Supercomputing Operating System Software is based on SUSE Linux Enterprise Server (SLES) 15. HPE Cray Supercomputing Operating System Software enhances SLES with open source, third-party proprietary, and HPE proprietary components for performance, scaling, reliability, and time-to-market purposes. Default HPE Cray Supercomputing Operating System Software comprise a subset of SLES package to minimize compute node memory usage and operating system noise. HPE Cray OS software includes a kernel, commands, libraries, and services that run on compute and non-compute nodes.

With HPE Cray Supercomputing Operating System Software 23.11, the kernel module and user packages that provide value add features to enhance the compute node environment are packaged separately from kernel modifications to SLES base OS. The separate package is called User Services Software (USS). The modified kernel package is called COS base. Both USS and COS base are installed together to provide full capabilities of HPE Cray Supercomputing Operating System Software. The user services software includes value-add features in the areas of files system integration, compute at scale, power measurement and workload manager integration and orchestration.



HPE Cray Operating System is available for HPE Cray EX systems, HPE Cray XD and HPE ProLiant high performance computing clusters.

What’s new

Starting in September 2025 with COS 25.9, HPE Cray Operating System (COS) will no longer include COS Base, which previously provided HPE kernel modifications on SUSE Linux Enterprise Server (SLES). Moving forward, COS will consist of standard SLES HPC distribution and HPE Cray Supercomputing User Services Software (USS). Customers will receive CVE and security patch updates as they are released by SUSE and made available through HPE. The March 2025 release (COS 25.3) will include COS Base 3.3, which will be the final release to incorporate HPE-provided kernel modifications.

Standard Features

Base OS

- SUSE SLES 15 SP5

Features included in HPE modifications to SLES Kernel (COS base) - Deprecated with COS 25.9 releasing September 2025

- Additional hugepage sizes, which can improve performance for certain applications.
- Memory accounting and defragmentation improvements that optimize the amount of memory available to applications.
- Out of memory (OOM) killer adjustments for more reliable behavior when node memory runs low.
- Upstream changes not yet present in SLES (for example, error reporting improvements, performance tool capabilities).
- Extensions that are necessary to support the XPMEM kernel module.
- Optimizations which improve HPC benchmark and application performance.
- Enhancements to improve core file management for debugging multi-node jobs.

Value-add features provided by User Services Software Package

Reliability, Availability, Serviceability (RAS):

- PCIe link bandwidth monitoring

File system capabilities:

- Data Virtualization Service, an I/O forwarder that provides compute nodes with transparent access to file systems mounted on non-compute nodes within the system. The service provides access to a variety of file systems while maintaining a low memory footprint, providing fault tolerance, and reducing operating system noise and network activity.
- Custom Lustre client and LNet software, which enables Lustre on compute nodes and enables the Data Virtualization Service data transfers.

User application enhancements:

- Application performance extensions
 - XPMEM, a kernel module that enables direct shared memory access among process address spaces. It is used by HPE Cray MPI, SHMEM, and PGAS libraries to improve on-node performance which, in turn, improves overall application performance.
 - libhugetlbfs library modifications to support additional hugepage sizes and optimize their use in application processes.
 - Processor turbo-boost limiting support.
- Performance tools support
 - HPE Cray OS provides third party open-source content not available in SLES, such as msr-safe, a software package that provides user access to model-specific registers to support HPC performance tools.
- User-level power management
 - The Blade Power Management Controller Daemon Module (bpmcdmod) kernel module, which exposes power data counters (pm_counters) provided by the node controller to compute node applications.
 - A plugin service to provide per-job power statistics to users.

User Mode Container Support:

- Enables open source HPC container runtime using shared file systems for access to containers.
- Support for Podman and Singularity with enhancements for HPC delivered:
 - Daemon-less container engine for developing, managing, and running OCI containers.
 - Launched through WLMs (SLURM and PBS Pro).



Standard Features

Workload Management and Application Launch:

- Integration with workload management software such as:
 - SLURM
 - Altair PBS Professional
 - PMIX
- Application Task Orchestration and Management Service:
 - Executes per job tasks and provides per job data to workload management software.
- Parallel Application Launch Service:
 - Application launch tool for Altair PBS Pro that supports the HPE Cray Programming Environment and HPE Slingshot networks.

Integration with HPE Cray System Management:

- **HPE Cray OS provides packages that interoperate with the system management software to:**
 - Manage the compute node boot process.
 - Manage security tokens necessary to access the system management services and endpoints.
 - Provide compute node heartbeat status.
 - Ensure hardware errors and system logs are stored in HPE Slingshot framework.
 - Subscribe to and react to node state changes elsewhere in the system, to provide termination and failover/failback capabilities for higher-level compute node software.
 - Provides node dump capability to compute and user access nodes.
 - Configure compute node images and state via pre- and post-boot Ansible roles.
 - **Micro-services**
 - The Content Projection Service, a micro-service that orchestrates scalable and fault tolerant access to image content from compute nodes. Examples of image content provided by the service includes the HPE Cray OS root file system, HPE Cray Programming Environment content, and analytics programming environment content. The Content Projection Service currently leverages data virtualization service as its data transfer layer.
 - Node Memory Dump, a micro-service that orchestrates the retrieval and storage of compute node memory when a compute node is unhealthy. The service utilizes standard community dump tools, such as kdump.
- NCN Customization, a micro-service that orchestrates configuration of base operating system content on non-compute nodes.
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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.

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Service and Support

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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:

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- 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:

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<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 service 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.

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- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
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Service and Support

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- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

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

For more information

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



Configuration Information

Licensing Options

Description	SKU
HPE Cray Operating System for Cray Supercomputers FIO Software	R5R45A
Notes: For factory installation only with HPE Cray EX systems and HPE Cray Supercomputers. This SKU does not include the license. Please order with R5Q52AAE	
HPE Cray Operating System for Cray Supercomputers 1 Node 3-year 24x7 Support E-RTU	R5Q52AAE
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.	



Summary of Changes

Date	Version History	Action	Description of Change
28-Jul-2025	<u>Version 9</u>	Changed	Update survey link.
14-Apr-2025	<u>Version 8</u>	Changed	Overview and Standard Features sections were updated
26-Feb-2024	<u>Version 7</u>	Changed	Updated overview and standard features Content. Series name was updated.
18-Dec-2023	<u>Version 6</u>	Changed	HPE Services Rebranding
16-May-2022	<u>Version 5</u>	Changed	Service and Support section was updated.
02-May-2022	<u>Version 4</u>	Changed	Removed incorrect statement related to Scalability Standard Features section was updated
15-Nov-2021	<u>Version 3</u>	Changed	Service and Support section was updated.
22-Feb-2021	<u>Version 2</u>	Changed	Configuration Information section was updated.
05-Oct 2020	<u>Version 1</u>	New	New QuickSpecs



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