

Overview

HPE Cray Operating System

The HPE Cray Operating System is based on SUSE Linux Enterprise Server (SLES) version 15. HPE Cray OS enhances SLES with open source, third-party proprietary, and HPE proprietary components for performance, scaling, reliability, and time-to-market purposes. HPE Cray OS also installs a subset of SLES packages by default to limit compute node memory usage. HPE Cray OS software includes a kernel, commands, libraries and services that run on compute and non-compute nodes.

HPE Cray Operating System is available for HPE Cray EX systems and HPE Cray supercomputers.

Standard Features

Base OS included

- SUSE SLES 15

Kernel modifications, including

- Additional hugepage sizes, which can improve performance for certain applications
- Memory accounting and defragmentation improvements which 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, process address space change notifications for networking and GPU software stacks)
- Extensions currently 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

Reliability, Availability, Serviceability (RAS)

- PCIe link bandwidth monitoring

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 monitoring framework
 - Subscribe to and react to node state changes elsewhere in the system, in order to provide termination and failover/failback capabilities for higher-level compute node software
 - Integrate with HPE Cray Slingshot dump framework
 - 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.

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 can provide 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



Standard Features

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, through pm_counters, provided by the node controller to compute node applications
 - A plugin service to provide per-job power statistics to users
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HPE Pointnext Tech Care is the new operational service experience for HPE products. Tech Care 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 Pointnext Tech Care has been reimagined from the ground up to support a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Pointnext Tech Care 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>

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Service and Support

Software Licensing Information

For the Software to be valid on an HPE Cray system, each node in the system must have a valid HPE Cray Operating System license. Subject to the terms and conditions of this Agreement and the payment of any applicable license fee, HPE grants a nonexclusive, 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 Cray Operating system.

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.

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 products found on the delivery media.

HPE Software Support

Protect your business beyond warranty with HPE Pointnext Operational Service
HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provide innovative new approaches to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple. HPE Software Support offers additional software support services, many of which are provided to our customers at no additional charge.

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



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.
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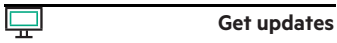
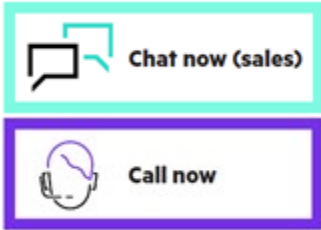
Summary of Changes

Date	Version History	Action	Description of Change
16-May-2022	Version 5	Changed	Service and Support section was updated.
02-May-2022	Version 4	Changed	Removed incorrect statement related to Scalability Standard Features section was updated
15-Nov-2021	Version 3	Changed	Service and Support section was updated.
22-Feb-2021	Version 2	Changed	Configuration Information section was updated.
05-Oct 2020	Version 1	New	New QuickSpecs



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