

Overview

SchedMD Slurm

Slurm Workload Manager is a market-leading, free open-source workload manager designed specifically to satisfy the demanding needs of high-performance computing (HPC), high throughput computing (HTC) and AI. Slurm maximizes workload throughput, scale, reliability, and results in the fastest possible time while optimizing resource utilization and meeting organizational priorities.

Customers choose SchedMD Slurm for:

- Massive scalability to handle performance requirements for large cluster and Exascale supercomputer needs spanning HPC and AI workloads with proven reliability
- First class resource management for GPUs and ultra granular task allocation by specialized resources (core, GPUs, threads, etc.)
- Top-class workload throughput, supporting 12,000+ jobs per minute, 17,000,000 jobs per day, 120,000,000 jobs per week
- Advanced policies, scheduling algorithms, and queues/partitions management that simplifies and optimizes management of complex workload mix to meet project and organizational priorities
- Optimize utilization to get more value from existing HPC investments
- Agile innovation and integration to meet needs, driven by strong open source community and partnerships

SchedMD Slurm Workload Manager Support

SchedMD is the core developer and services provider for Slurm providing support, consulting, configuration, development and training services to accelerate workload results with proven best practices and innovation. SchedMD offers 5-10x more complex HPC and AI scheduling experience, including half of the biggest systems in the TOP500, to optimize the speed, throughput and resource utilization for each unique workload mix so organizations can get more results faster and easier. SchedMD expert services enable organizations to quickly implement, maximize throughput, manage complexity, and easily grow their high performance workloads on HPE HPC solutions.

Customer add SchedMD Slurm support for:

- Consulting and implementation expertise that speeds custom configuration tuning to increase throughput and utilization efficiency on complex and large-scale systems
- Support services that ensure cluster workload management configuration continually processes workload at peak levels as mix and scale evolves for improved productivity
- Unique HPC workload expertise that spans Slurm development, software & computer engineering, and systems administration for resolution speed and quality, without escalation delays
- Best practices for optimal workload performance from an expert team with complex HPC scheduling experience, including half of the biggest system in the TOP500
- Slurm Proof of Concept plan to assist with seamless and smooth site migration. Full access to SchedMD support with a dedicated engineer and configuration review
- Tailored Slurm expert training that empowers users on harnessing Slurm capabilities with HPE exascale technologies to speed projects and increase adoption
- Cloud workload management expertise and proven best practices to ensure optimal performance and streamlined management for workloads across on-prem systems, public and private clouds

Distribution Media & Software Documentation

Slurm Workload Manager is available for download as free, open-source software along with documentation and installation guides at slurm.schedmd.com.

Customers may purchase SchedMD Slurm Workload Manager Support via HPE as part of their HPC solution. Upon order delivery, PointNext will receive SchedMD support access confirmation and instructions via electronic delivery to begin submitting support requests on behalf of the customer. PointNext will need to visit the specified SchedMD website to complete the support account and PointNext and customer users setup. Customers can also access additional details and information on SchedMD Slurm support services at <https://www.schedmd.com/services.php>.



Standard Features

Slurm Workload Management for HPE HPC Systems

Slurm is part of the HPE HPC software portfolio, integrated as an open source, agile, modern choice to provide highly scalable, fault-tolerant workload management policies, algorithms and reporting. These capabilities enable HPE customers to achieve faster job processing, optimal utilization of specialized HPE system resources, and increased throughput that are all aligned with organizational priorities. Slurm delivers optimized workload performance for HPE Cray and SGI supercomputers, Apollo density-optimized systems purpose-built for HPC and AI workloads, and HPE Greenlake cloud services.

Slurm capabilities for HPE HPC systems include:

- Allocates and optimizes exclusive/non-exclusive access to ultra granular resources: Slurm provides this for users and jobs for duration of time for each workload including network topology, fairshare scheduling, advanced reservations, preemption, resource limits, and accounting factors
- Framework for starting, executing, and monitoring workloads on allocated nodes and/or GPUs: Slurm capabilities include accounting for task level in real time, power-consumption, and API usage, as well as automatically re-queuing jobs.
- Simplifies management and arbitrates contention for resources: Slurm manages a queue of pending work according to organizational and work priorities.
- Accelerates processing and throughput of work: Slurm provides extensive policies and algorithms, including those for high throughput computing workloads, to support 1000's of job submissions/second.
- Slurm natively supports elastic and cloud bursting capabilities

Slurm Support Service capabilities for HPE HPC systems include:

- Level 3 Support: High-performance systems must perform at high utilization and performance to meet end users and management return on the investment expectations. Customers covered by a support contract can reach out to SchedMD Slurm experts to help resolve complex workload management issues and questions quicker, including detailed answers directly from the Slurm Development team, instead of taking weeks or even months to try to resolve them in-house.
- Configuration assistance: Valuable assistance when the customer system is initially being configured to use Slurm or being modified as requirements change. Customers can review cluster requirements, operating environment, and organizational goals with a Slurm engineer who will work with them to optimize the configuration to achieve their needs.
- Optional Tailored Slurm Training: SchedMD can provide optional customized Slurm training for HPE customers who need or desire it. HPE representatives or customers can contact Jess Arrington at SchedMD, jess@schedmd.com, to request a training quote. A customer scoping call before the remote or onsite training ensures coverage of their specific use cases and needs for the in-depth and comprehensive Slurm technical training is delivered in a hands-on lab workshop format to ensure users are empowered on Slurm best practices as well as site-specific use cases and configuration optimization.

License Management in Slurm

Slurm can help with software license management by assigning available licenses to jobs at scheduling time. Dynamically modify the license count to sync with license server availability. If the licenses are not available, jobs are kept pending until licenses become available. Licenses in Slurm are essentially shared resources, meaning configured resources that are not tied to a specific host but are associated with the entire cluster. Licenses are supported as a preemptible resource.

Licenses in Slurm can be configured in two ways:

- Local Licenses: Local licenses are local to the cluster using the `slurm.conf` in which they are configured.
- Remote Licenses: Remote licenses are served by the database and are configured using the `sacctmgr` command. Remote licenses are dynamic in nature as upon running the `sacctmgr` command, the `slurmd` updates all clusters the licenses are assigned to.



Standard Features

Operating System Compatibility

Slurm Workload Manager has been thoroughly tested on most popular Linux distributions using arm64 (aarch64), ppc64, and x86_64 architectures. Some features are limited to recent releases and newer Linux kernel versions. Currently supported distributions include:

- Cray Linux Environment 6
- Cray Linux Environment 7
- Debian (jessie, stretch, buster, and newer)
- RedHat Enterprise Linux 6 (RHEL6), CentOS 6, Scientific Linux 6 (deprecated, and will be removed in a future release)
- RedHat Enterprise Linux 7 (RHEL7), CentOS 7, Scientific Linux 7
- RedHat Enterprise Linux 8 (RHEL7), CentOS 8 (and newer)
- SUSE Linux Enterprise Server (SLES) 12 (and newer)
- Ubuntu (16.04, 18.04, and newer)

Support

Support for SchedMD Slurm is provided by a combination of HPE Services services and direct-to-vendor support. Contact HPE Services Services for assistance and SchedMD will partner with them, as needed, to deliver expedient resolution.



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.

[HPE Managed Services | HPE](#)

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.

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

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

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



Configuration Information

SchedMD's configuration of Support for Slurm is configured based on the number of sockets in the system. The first tier (1 to 100 sockets) is a flat tier which means that the fee is the same whether you purchase support for one socket or 100. This also means that when configuring systems up to 100 sockets only configure a quantity of 1 for the relevant SKU.

All other tiers are based on a per socket basis being charged a unit price per the total number of sockets in the system. Note that in a configuration the total sockets sold for a deal, even if they are sold across multiple systems, should determine the tier to use for the correct SKU.

Example: Single customer with two main system deployments (760 sockets each) and a test and development system (48 sockets) to be supposed for four years. Configure 1,568 of SKU S1R70AAE.

Description	SKU
SchedMD SLURM 1-100 Sockets 3-year Support	S1R63AAE
SchedMD SLURM 101-1000 Sockets 3-year Support	S1R66AAE
SchedMD SLURM 1001-5000 Sockets 3-year Support	S1R69AAE
SchedMD SLURM 5000+ Sockets 3-year Support	S1R72AAE
SchedMD SLURM 1-100 Sockets 4-year Support	S1R64AAE
SchedMD SLURM 101-1000 Sockets 4-year Support	S1R67AAE
SchedMD SLURM 1001-5000 Sockets 4-year Support	S1R70AAE
SchedMD SLURM 5000+ Sockets 4-year Support	S1R73AAE
SchedMD SLURM 1-100 Sockets 5-year Support	S1R65AAE
SchedMD SLURM 101-1000 Sockets 5-year Support	S1R68AAE
SchedMD SLURM 1001-5000 Sockets 5-year Support	S1R71AAE
SchedMD SLURM 5000+ Sockets 5-year Support	S1R74AAE

Renewals of Support after the initial term can be configured using the following SKUs multiplied out by the number of sockets and the number of years of extended service. These SKUs can only be used when renewing support. New sales must use the SKUs above and commit to a minimum three-year term.

Example: A system with 400 sockets needs to be renewed for 2 year of additional support. Configure 800 of SKU S1R77AAE

SchedMD SLURM 1-100 Sockets 1-year Extension Support	S1R78AAE
SchedMD SLURM 101-1000 Sockets 1-year Extension Support	S1R77AAE
SchedMD SLURM 1001-5000 Sockets 1-year Extension Support	S1R76AAE
SchedMD SLURM 5000+ Sockets 1-year Extension Support	S1R75AAE

Notes: Each 1 GPU counts as 1 socket when quoting support for Slurm.



Summary of Changes

Date	Version History	Action	Description of Change
08-Jan-2024	Version 2	Changed	HPE Services Rebranding
02-Oct-2023	Version 1	New	New QuickSpecs



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