Why PBS Professional?

- Proven for over 20 years
- Thousands of customers worldwide
- Massive scalability to hundreds of thousands of cores
- Flexible plugin framework to meet complex requirements with ease
- Unparalleled security with EAL3+ certification and support for SELinux
- Leading-edge scheduling with power management, topology-awareness, cloud solutions, and GPU / Xeon Phi support
- Global support with local experts in 48 offices across 20 countries

"PBS Professional is the right choice for any production systems with complex and changing requirements, from departmental to large-scale computing systems. The product’s flexibility, and the company’s expertise and support, is simply unparalleled."

Fujitsu

"PBS Professional proved its superiority as the most flexible and reliable workload manager."

NCI

<table>
<thead>
<tr>
<th>Why PBS Professional?</th>
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<td>PBS Professional is the trusted leader in high-performance computing (HPC) workload management. Proven for over 20 years at thousands of global sites, PBS Professional efficiently schedules HPC workloads across all forms of computing infrastructure. Easily scaling to support hundreds of thousands of processors – from clusters to the largest HPC systems – PBS Professional ensures you receive the maximum value from your computing investments.</td>
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Customers choose PBS Professional to:

- Maximize end-user productivity and decision making, ensuring service level agreements (SLAs) are met.
- Implement business priorities by ensuring the most important jobs run first and complete on time.
- Reduce risk by minimizing and automatically recovering from hardware failures.
- Simplify HPC administration with a reliable, flexible workload manager.
- Reduce operational costs by minimizing wasted hardware, software, and electrical power.
- Ensure the highest levels of security and reliability (PBS Professional is the only workload manager solution to be EAL3+ certified with support for Cross Domain Solutions with RedHat SELinux).
- Access global technical support to meet expectations with personal, one-on-one attention – Altair has local experts in 48 offices across 20 countries.
- Quickly gain workload management proficiency by leveraging Altair’s extensive global training.

Key Capabilities:

- **Shrink-to-fit Jobs**: Increase utilization and run jobs sooner – one top supercomputing center recovered more than 800,000 idle CPU hours in only a few months.
- **Plugins for "Execution Events"**: Gain unmatched extensibility with new plugins to easily support health checks, third party integrations, and site-specific customization.
- **On the Road to Exascale**: PBS Professional 12 enables 40% faster scheduling, 10x faster power-on startup, and 10x faster node configuration – all on massive, complex systems.
- **Accelerator and Coprocessor Scheduling**: Monitor, control access, allocate, and provide accounting for GPU and coprocessors (Intel® Xeon Phi™).
- **HPC Cloud Computing**: Gain a foundation for both public and private HPC computing – PBS Professional powers Altair’s HyperWorks On-Demand cloud service and HyperWorks Unlimited, a turnkey HPC private cloud appliance.
- **Power Management**: Monitor, shutdown, and restart computing resources to support enterprise energy conservation initiatives. Validated by several leading user sites, our Green Provisioning™ has lowered their energy use by up to 30%.
- **Topology-aware Scheduling**: Optimize task placement for all HPC network topologies – such as InfiniBand, SGI, Cray, IBM and GigE – improving application performance and reducing network contention.
Key Features & Benefits

- Shrink-to-fit jobs boost utilization, especially before planned system outages, and jobs actually run sooner
- GPU / co-processor scheduling prioritizes use and manages access to all types of accelerators (nVidia, AMD) as well as the Intel® Xeon Phi™ coprocessor
- Estimated job start times enable you to plan your workflows and meet deadlines
- Backfill TopN scheduling eliminates wasted cycles without delaying top priority work
- Dynamic provisioning automatically changes OS to match changing workload demands
- Submission filtering "hooks" to change/ augment capabilities on-site, on-the-fly
- Virtually unlimited scalability supports configurations from workgroup clusters to the largest supercomputers
- Job arrays allow for maximum throughput to schedule, execute and manage unlimited jobs
- User, group, and project limits to implement fine-grained policy adjustments
- Tunable scheduling formula defines any policy, including on-the-fly "exceptions"
- User customizable "runjob hooks" ensure allocation management limits are strictly enforced
- Advance resource reservations guarantees resources for recurring needs
- Unified job & resource ("Vnode") architecture allows you to write job requirements once and automatically optimizes placement
- Job status with history (via "qstat -x"), so you never lose track of jobs
- Python is available everywhere allowing one script to be used across all architectures
- Preemption and checkpointing allows you to immediately run high-priority work

The PBS Works Suite

PBS Professional combined with these other PBS Works products delivers a comprehensive HPC workload management solution:

- **PBS Analytics** for reporting and accounting
- **Compute Manager** for web-based job submission
- **Display Manager** for remote visualization

Learn more at [www.pbsworks.com](http://www.pbsworks.com)

Technical features

<table>
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<tr>
<th>Feature</th>
<th>PBS Professional Support</th>
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<tr>
<td>GPU and coprocessor (Xeon Phi) scheduling</td>
<td>Heterogeneous clusters, Standing reservations, Checkpoint/restart</td>
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<tr>
<td>Scheduling formula</td>
<td>Kerberos, Eligible time, Job arrays</td>
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<td>Fairshare</td>
<td>Age-based scheduling, Metascheduling via peer scheduling, Topology-aware scheduling</td>
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<td>OS provisioning</td>
<td>License scheduling, Preemption, Job history (qstat -x)</td>
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<td>Web services</td>
<td>Extensible plugin framework (&quot;hooks&quot;), Dynamic resources, Multi-core</td>
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<td>Job dependencies</td>
<td>Estimated job start times, Interactive jobs, Backfill TopN</td>
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<td>24x7 online community</td>
<td>Beyond petaflops scalability, User / group / project limits, &quot;Shrink-to-fit&quot; jobs</td>
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<td>On-demand licensing</td>
<td>Green provisioning™, $restrict_user, Cross domain solutions</td>
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<td>Fail-over</td>
<td>Hybrid jobs (MPI+OpenMP), MPI integrations, Power-aware scheduling</td>
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<td>Policy-based scheduling</td>
<td>Over-subscription, EAL3+ security, Health monitoring</td>
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Supported Platforms

PBS Professional supports all major platforms and operating systems.

For more information about PBS Professional, visit [www.pbsworks.com](http://www.pbsworks.com) to request a quote or view a demo.

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