

## PBS 11 Highlights

- **Faster Scheduling:** Scheduler speed is up to three times faster, down to less than 30 seconds per cycle for typical HPC workloads (on up to 80,000 cores).
- **Faster Submission:** Job submission speed is seven times faster.
- **Faster Cold Start:** Cold start is 45 times faster, reduced to less than one minute for 100,000 jobs.



*"The DoD HPCMP has made a 10-year commitment to PBS Professional, serving as the single workload management capability on all of our HPC systems. The EAL3+ security certification recently obtained by Altair for PBS Professional significantly improves our security posture."*

Senior DoD Official

*"Without its flexibility, it wouldn't have been able to handle what we're doing."*

NASA Ames

## PBS Professional®

Commercial-grade HPC workload and resource management

PBS Professional is Altair's **EAL3+ security certified commercial-grade HPC workload management solution**. Serving as the foundation for all PBS Works solutions, PBS Professional efficiently distributes 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.

### PBS Professional Meets a Growing Demand for:

- **Cloud Computing:** HPC Software-as-a-Service (SaaS) Clouds are being powered by the full PBS Works suite, including Altair's own HyperWorks On-Demand.
- **Green Provisioning™:** Monitor, shutdown, and restart computing resources based on HPC workload requirements to support enterprise energy conservation initiatives. Validated by several leading PBS Works sites, Green Provisioning has lowered their energy use by up to 20 percent.
- **Topology-aware Scheduling:** PBS Professional optimizes task placement for all HPC network topologies – such as InfiniBand, SGI, Cray, IBM and GigE – improving application performance and reducing network contention.
- **GPU Scheduling:** Leveraging PBS Professional's extensible architecture allows for graphic processing units (GPUs) scheduling on all platforms.

### Ideal for Customers Who Seek to:

- Add security and reliability to your workload (PBS Professional is the only workload management solution to be EAL3+ certified.)
- Reduce risk by minimizing and automatically recovering from hardware failures
- Maximize end-user productivity and decision making, ensuring you are meeting service levels
- Lower operational costs by minimizing wasted hardware, software, and electrical power
- Implement business priorities by ensuring your most important work runs first and completed on-time
- Add global technical support to meet expectations with personal, one-on-one attention (We have local experts in 18+ countries.)



## Key Features & Benefits

- GPU scheduling prioritizes use and manages access to GPUs, including full access control and accounting
- Estimated job start times enables you to plan your workflows and meet deadlines
- Backfill TopN scheduling eliminates wasted cycles without delaying any work
- Dynamic provisioning hooks automatically change OS to match changing workload demands
- Submission filtering "hooks" to change/ augment capabilities on-site, on-the-fly
- Efficiently distributes workloads for maximum return on investment (ROI)
- Virtually unlimited scalability supports configurations from workgroup clusters to the largest single-system image supercomputers
- Job arrays allow for maximum throughput to schedule, execute and manage unlimited jobs
- Individual user and group limits to implement fine-grained policy adjustments
- Tunable scheduling formula defines any policy, including on-the-fly "exceptions"
- User customizable "runjob hooks" ensures allocation management limits are strictly enforced
- Advanced resource reservations guarantee 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"), allowing you to never lose track of jobs
- Python, the portable modern scripting language, is available everywhere allowing one script to be used across all architectures
- Preemption and checkpointing allows you to immediately run high-priority work

### Technical Features

GPU Scheduling	Standing Reservations	Script-less Job Submission	Checkpoint / Restart
Scheduling Formula	Kerberos	Eligible Time	Job Arrays
Fairshare	Age-based Scheduling	Meta-scheduling	Topology-aware Scheduling
OS Provisioning	License Scheduling	Preemption	Job History (qstat -x)
Web Services	Extensible 'Hook' Plug-ins	Dynamic Resources	Multi-core
Job Dependencies	Estimated Job Start Times	Interactive Jobs	Peer Scheduling
24x7 On-line Community	Beyond Petaflops Scalability	User / Group VIP Limits	Backfill TopN
On-Demand Licensing	Green Provisioning	\$restrict_user	ACLs
Fail-over	Hybrid Jobs (MPI+OpenMP)	MPI Integrations	Heterogeneous Clusters
Policy-based Scheduling	Over-subscription	EAL3+ Security	

## Supported Platforms

PBS Professional supports all major platforms and operating systems.



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**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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