

Electronic Design Automation (EDA) Optimizing Compute Farm Efficiency and Software Utilization

High-performance computing (HPC) workload management software is a key element of an efficient EDA computing environment. Altair's market-leading PBS Works products are used by EDA organizations to increase efficiency in server farms and other computing environments.

Meeting the EDA Industry's Technical Computing Needs

Managing an electronic design automation (EDA) server farm requires keeping utilization high, reducing time to results, and balancing requirements across a highly heterogeneous environment. Using PBS Works to manage these environments maximizes job throughput and software license usage while simplifying system management.

PBS Professional's fast, powerful scheduler scales to millions of jobs per day and integrates with leading applications from vendors like Synopsys. In addition, Altair is an EDA-focused supplier with proven excellence in customer service – we are committed to helping clients save time and money, maximize uptime, and get to market faster.

Why Altair PBS Works for EDA:

- Named #1 HPC Software in 2014*
- Fast, powerful and highly scalable workload manager
- EDA development commitment
- Key integrations with Synopsys and other application vendors
- Proven track record of excellence in customer support, with experts in 40+ offices across 22 countries



The #1 product for HPC workload management*, PBS Works provides a simple yet comprehensive solution set for EDA.

The PBS Works suite comprises the following products:

PBS Professional®, the industry-leading, commercial-grade HPC workload and resource management solution, running on many TOP500 systems. PBS Professional scales to support millions of jobs per day – from clusters to the largest HPC systems – guaranteeing maximum value from EDA software license investments.

An ideal solution for customers who:

- Want a reliable solution that just works. PBS Professional keeps large jobs running, automatically detecting failed nodes and rescheduling around them, to deliver results as quickly as possible.
- Need a fast, powerful scheduler. PBS Professional 13.0 scales to millions of jobs per day with fast, reliable startup of huge MPI jobs.
- Care about customer service. Altair operates 40+ offices in 22 countries and is known for first-rate service and support.

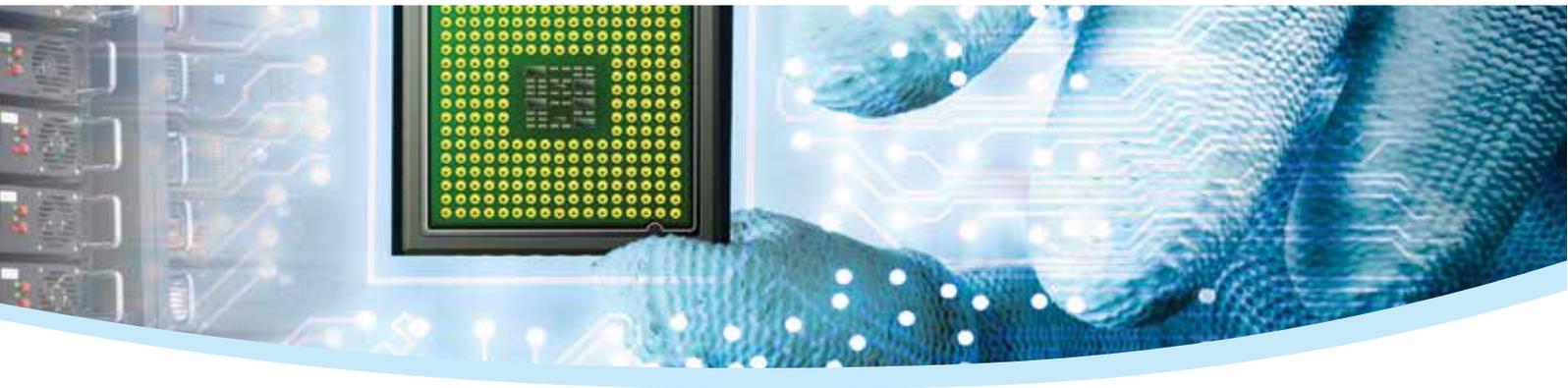
Other key features & benefits include:

- GPU and co-processor scheduling prioritizes use and manages access to all types of accelerators (NVIDIA, AMD) as well as the Intel® Xeon Phi™ co-processor, with full access control and accounting.
- Green Provisioning™ provides the ability to schedule jobs in a manner that minimizes the use of power and electricity on execution nodes.
- Extensive scheduling options to maximize performance, including peer-to-peer, backfilling, fairshare, formula-based, and preemptive scheduling for time- and resource-critical workloads.
- License scheduling for sharing application licenses served by 3rd party software like FlexNet or FlexLM.
- Plugin framework provides for extensive user customization, including integrating with allocation management to ensure limits are strictly enforced.
- Broad Platform Support – LINUX, UNIX and Windows.
- Fairshare
- Control Groups (cgroups) to eliminate resource contention.
- Fast, easy migration from legacy schedulers.
- Fast job submission

PBS Analytics™, an easy-to-use data analysis and visualization solution that provides administrators with advanced job analyses to support data-driven planning and decision making.

An ideal solution for customers who:

- Require flexibility in creating clean, concise charts of data analysis. PBS Analytics provides customizable charts and graphs, including additional chart options (such as XYZ plots), to furnish a deeper understanding of an organization's HPC infrastructure and better root-cause analysis with the new chart designer.
- Seek to visualize multiple different charts on one display with dashboards.
- Want to track hardware utilization, including accounting for configuration changes over time (i.e. adding/deleting nodes; downtime).
- Need to analyze large quantities of usage data quickly and easily with a new, high-performance database and more robust data collectors.
- Require the ability to support billing for node wall time.
- Need to track utilization by job, software, hardware, user, project, node class, etc.
- Need to drill down to underlying data and export to Excel.



Compute Manager™, a Web-based job submission and management portal that is application aware, so end-users only have to concern themselves with the data and applications they wish to run.

An ideal solution for customers who:

- Want a simple but powerful Web-based interface for submitting and monitoring jobs in PBS Professional queues.
- Need to browse & modify remote files, and to minimize the effort needed to write, modify and test complex application scripts.
- Want to automate job submission tasks to maximize end-user productivity while optimizing resource availability.
- Desire automated staging of input and output files.
- Need to diagnose remote jobs without downloading huge files.

Display Manager™, a Web-based portal that enables seamless remote visualization of Big Data, optimizing performance by removing the need to move large data sets across networks.

An ideal solution for customers who:

- Want a simple but powerful Web-based interface for visualizing large datasets.
- Need to consolidate hardware and software resources.
- Desire a secure and traceable way to access their intellectual property.
- Want to make IT processes more efficient.
- Require easy and accessible collaboration tools for their globalized infrastructure.
- Want to reduce software maintenance and deployment costs.

HyperWorks Unlimited™, a state-of-the art private cloud appliance available in both physical and virtual formats, offering unlimited use of all Altair software.

An ideal solution for customers who:

- Seek infinite exploration of Altair's software. HyperWorks Unlimited contains unlimited licenses for usage for massive virtual exploration.
- Need a single vendor. HyperWorks Unlimited reduces operational expenses in setting up & supporting HPC infrastructure & software.
- Seek an innovative pricing model. The physical appliance is leased to customers, shifting HPC investments from capital expense to operational expense, and the virtual appliance is based on cloud provider pricing models with a choice of where to deploy your tools for the best response times.
- Desire a fully integrated, plug and innovate HPC cluster. HyperWorks Unlimited is delivered as a turnkey system, loaded with Altair's software applications and HPC tools for simplified deployment. Installation for the physical appliance takes hours vs. days or weeks.
- Look for third party solver support. HyperWorks Unlimited's open architecture allows for third party solvers to be fully integrated for a monthly fee on a BYOL (bring your own license) model.

To learn more about PBS Works' solutions for the EDA industry, please contact your Altair account manager or visit www.pbsworks.com/eda.



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