



Altair

PBS Works™

PBS Works: The Trusted Suite for HPC Workload Management

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April 7, 2014

HPC
USER FORUM

Overview

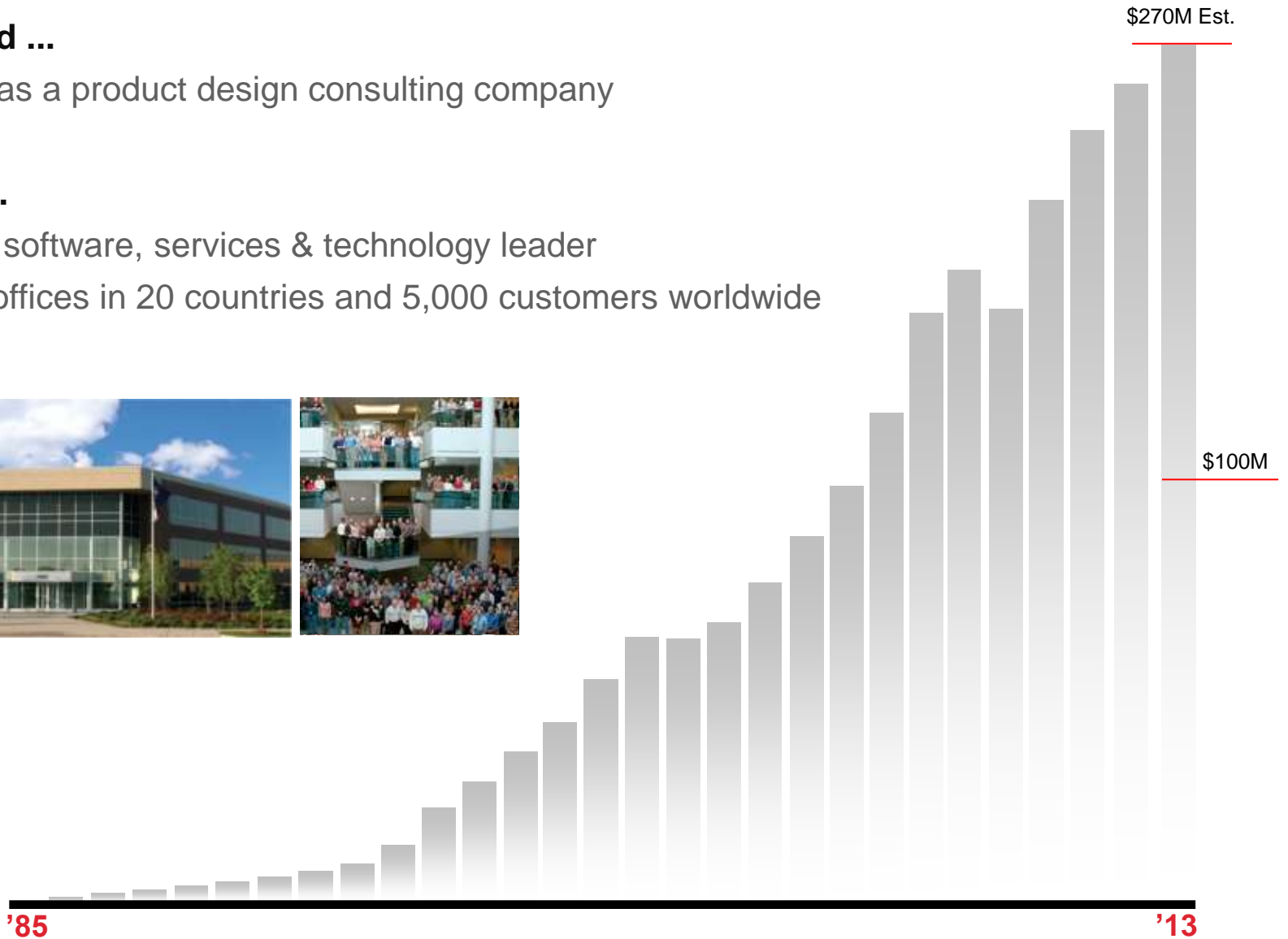


Founded ...

In 1985 as a product design consulting company

Today ...

A global software, services & technology leader
with 48 offices in 20 countries and 5,000 customers worldwide





28

Years of Innovation

48

Offices in 20 Countries

2050

Employees Worldwide

Customers



Automotive	Aerospace	Heavy Equipment	Government	Life/Earth Sciences	Consumer Goods	Energy

5,000 customers worldwide

Altair Knows HPC



Altair is the only company that...

Makes HPC tools

PBS Works™

Develops HPC applications

HyperWorks®

and uses HPC application to solve
real problems!

ProductDesign



***We know how to give
companies the cost-
effective resources needed
to create market-leading
products and drive
business growth***

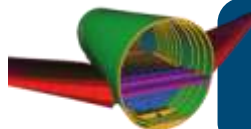
Current HPC Trends



GPUs and Co-processors



Green Computing / Power Management



Big Data

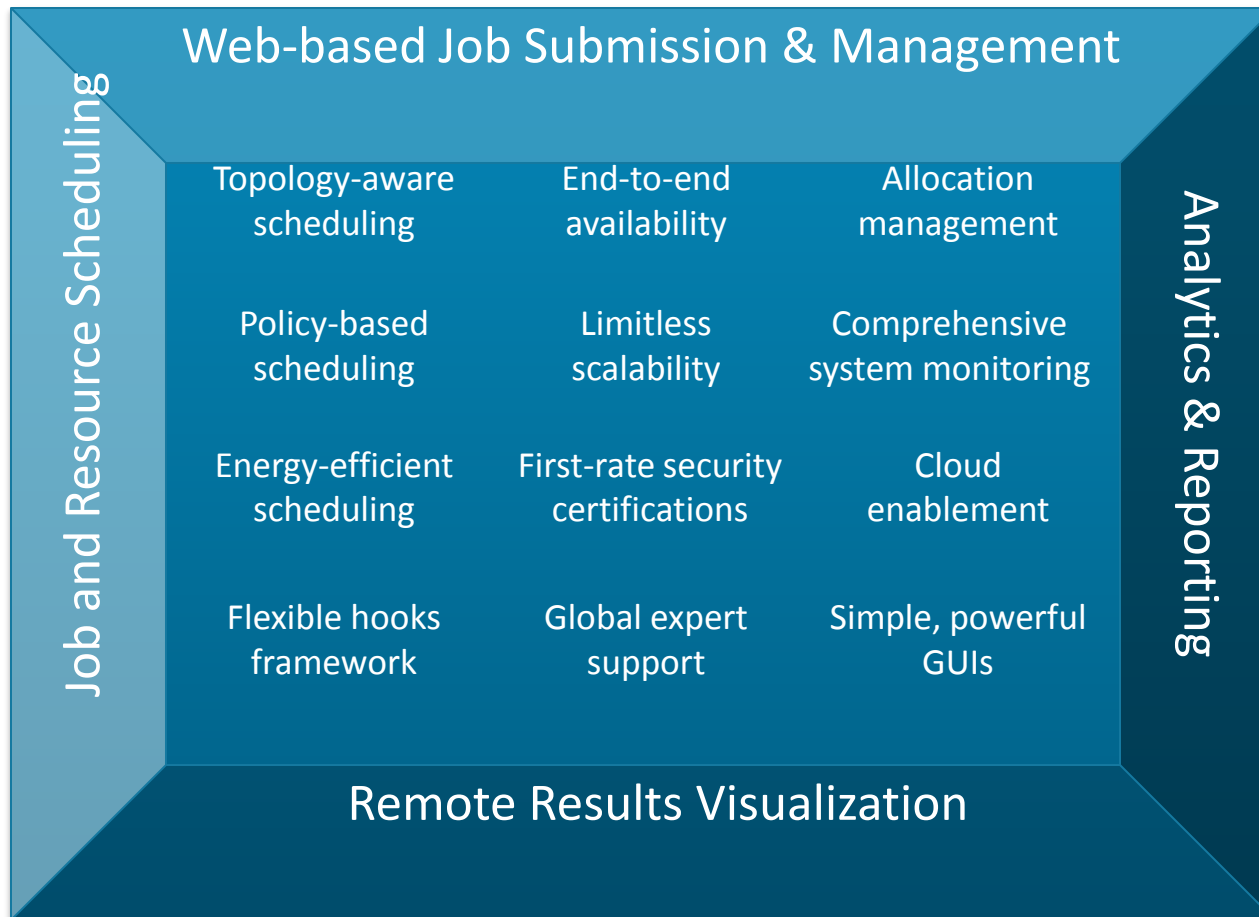


Cloud Computing



Exascale

HPC Workload Management Needs



PBS Works Suite



- Increase Productivity
- Meet HPC Goals
- Reduce Expenses

Easy to Use

Hard to Break

Do More (with less)

Keep Track and Plan

Open Architecture

PBS Professional

SCHEDULE | PRIORITIZE | SCALE



Compute Manager

RUN | MONITOR | MANAGE



Display Manager

VISUALIZE | ACCESS | COLLABORATE



PBS Analytics

VIEW | OPTIMIZE | FORECAST

Allocation Management

COMPUTE | STORAGE | BUDGET

SAO

VISUALIZE | ANALYZE | OPTIMIZE

HPC Job Scheduling & Workload Management

Faster time-to-results, better throughput and utilization

- Scalability and Reliability: Desktops to Clouds
- Within the TOP 3 Job Scheduling Tools (as published by IDC)
- Policy-driven Scheduling
- Accelerator Scheduling (e.g. MIC, GPGPU, FPGA)
- Green Provisioning™ for Power Management
- Topology-aware Scheduling
- EAL3+ Security Certified
- Extensible Plugin Framework
- Mature and Reliable Technology



*NASA's Workload Manager of Choice
for All NAS HPC Resources*

~200k cores scheduled by PBS Professional

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

– NASA Ames

Compute Manager

HPC App-aware Cloud Portal Tuned for End-Users Simplify HPC services – no IT degree needed

- Single “pane of glass” for HPC work (zero client install – browser only)
- Drag-and-drop input decks to submit HPC work (custom options auto-populate)
- Watch progress & view intermediate results while jobs are running
- Post-process and visualize remote results (e.g., graph energies) without moving files
- Even fix inputs “in place” and re-run (without re-uploading big input files)
- Secure, unified access, anywhere... anytime



*I push enter and my jobs run;
results come back when they're done.*

– Major Automotive OEM

Display Manager



Remote Visualization of Big Data within a Single Portal

Visualize Your Datasets for Rapid Collaboration and Innovation

- Consolidate hardware and software resources
- A secure and traceable way to access their intellectual property
- Easy and accessible collaboration tools for globalized infrastructure
- Reduces software maintenance and deployment costs
- Instantaneous application invocation
- Flexible application resource allocation
- Allows for instant collaboration on large volumes of data through a simple interface, anywhere & anytime



Visualize | Access | Collaborate

HPC Accounting & Analytics Portal

Visualize Historical Usage for Optimized Returns on HPC Investments

- Allocate Costs & Plan for Future Capacity
- Visualize Workload & Historical Usage
- Data Drill-down to Underlying Data
- Filter by Project, App, User, Group, Queue, Host, ...
- Canned reports out-of-the-box, and customize your own
- Aggregate data from multiple PBS Professional servers
- Analyze historical data as far back as PBS Pro 5.3
- Slideshow Mode for Continuous Display (in Lobby)
- Export to Customer Billing System



Maximizing our license utilization means we don't have to buy a new license, set up another workstation, and hire another engineer to keep up with demand.

– Trelleborg

Allocation/Accounting Management System



- **Uniquely supports multiple compute, storage and budget (\$) resources**
- **Manages resource grants, quotas, budgets, limits, etc.**
- **Implements complex business logic**
- **Handles charge-back for used resources**
- **Reporting tools**
 - Real-time reporting of accounting/allocation data
- **Soon to be integrated with OpenStack cloud environment**
- **New capabilities/benefits**
 - Single point of managing quotas across all storage systems
 - Daily stakeholder usage reports
 - Daily project usage reports
 - Single accounting system to manage complete environment



What is Software Asset Optimization (SAO) ?



- A rapidly deployed business analytics solution to visualize, analyze and optimize the utilization of enterprise software licenses

Visualize | Analyze | Optimize

For More Information

- **Get the latest news from PBS Works**
 - www.pbsworks.com/
- **Find out about Altair's HPC Cloud offerings**
 - www.altair.com/cloud/
- **Learn more about Altair**
 - www.altair.com/
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