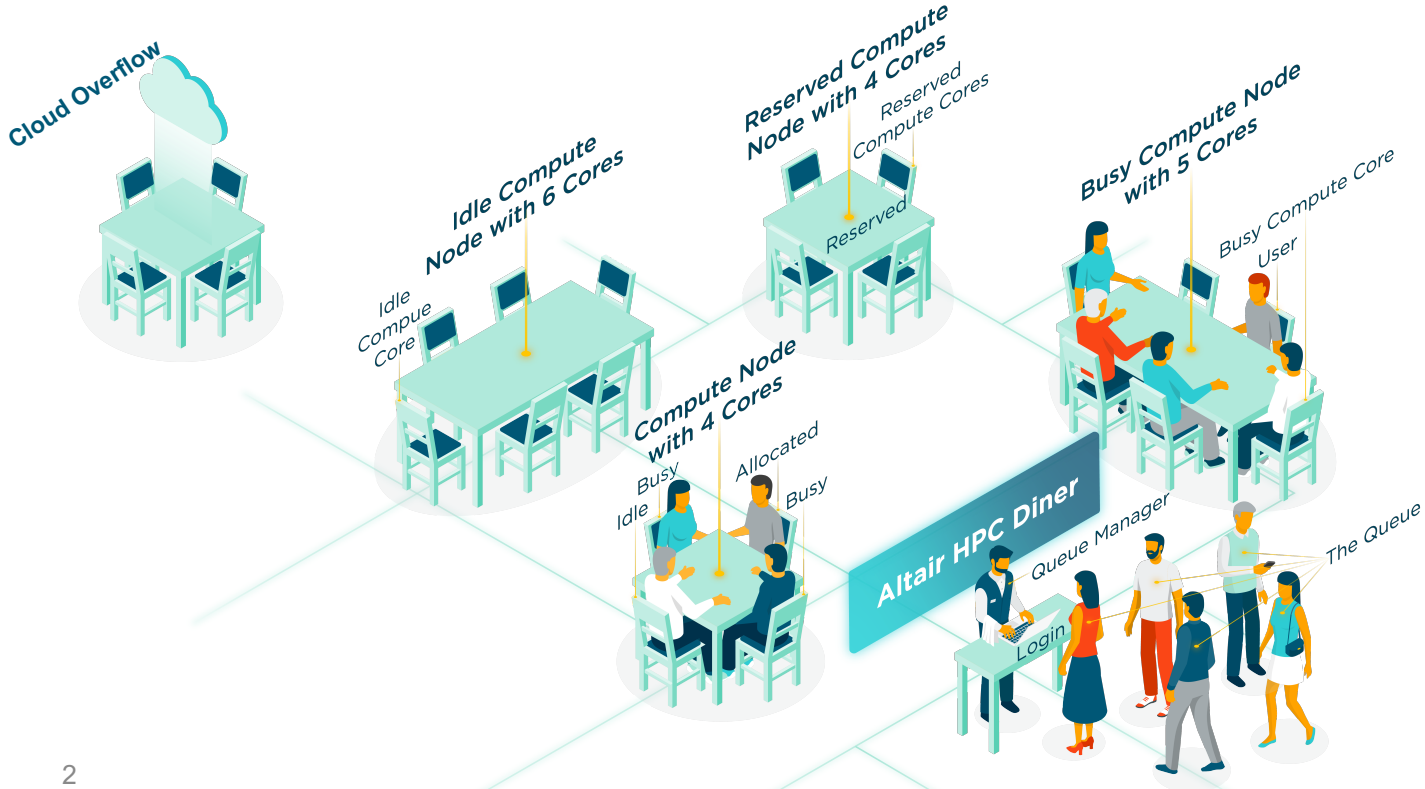# ALTAIR PBS PRO SUITE

2021 Overview

△ **ALTAIR**

Why Do Organizations Need HPC Solutions?

Maximize utilization of HPC infrastructure across organizations that can include thousands of users with competing priorities

Cloud Overflow

Idle Compute Node with 6 Cores

Reserved Compute Node with 4 Cores

Reserved Compute Cores

Reserved

Busy Compute Node with 5 Cores

Busy Compute Core

User

Idle Compue Core

Compute Node with 4 Cores

Busy

Allocated

Idle

Busy

Altair HPC Diner

Queue Manager

The Queue

Login

ALTAIR

Source: the concept of this image was sourced from GitHub here: https://hpc-carpentry.github.io/hpc-intro/13-scheduler/index.html

Altair HPC solutions

30+ years as HPC's most trusted solutions provider, Altair makes HPC easier to access, manage, and optimize for over 2,000+ enterprise computing customers.

HPC for Engineers & Researchers
Accelerate engineering, research, and design with simple access to HPC, no IT expertise required

Middleware for Clusters & Clouds
Optimize performance and embrace new technology with industry-leading workload management and scheduling

Tools for IT Administrators
Analyze, configure, secure, budget, and predict the future with comprehensive management tools

Workload Management

Cloud Computing

Remote Visualization

IT Analytics

Cross-domain Security

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Altair PBS Professional™ Features

Automates job scheduling, management, monitoring, and reporting. The trusted solution for Top500 systems and S-M clusters alike.

Highlights

- **Performant:** million-core scalability, fast throughput
- **Secure:** EAL3+ security certification and MLS (SELinux) support
- **Intelligent:** policy-driven and topology-aware scheduling
- **Scalable:** proven to run millions of jobs per day
- **Green Provisioning™:** power management and control
- **Robust:** known in the industry for stability and support
- **Open Architecture:** implement virtually any new policy
- **Modern:** containers, cloud bursting, parallel scheduling
- **Full-spectrum Scheduling**: including both HPC and HTC scheduling
- **Budgeting:** allocation management services to control and optimize budgets
- **Workload Simulating:** Simulate scheduler performance under hypothetical configurations
- **Cloud Bursting:** automatic cloud bursting during peak demand

NASA's workload manager of choice
for all NAS HPC resources
250k+ cores scheduled by one Altair PBS Professional™

ALTAIR

Altair PBS Professional™ Capabilities

Altair PBS Professional is a fast, powerful workload manager designed to improve productivity, optimize utilization and efficiency, and simplify administration for HPC clusters, clouds, and supercomputers.

Policy

Meet enterprise-wide scheduling and use policies with resource-based scheduling to ensure the right jobs run at the right times on the right resources

Utilization

Maximize ROI and minimize waste, ensuring the best use of hardware, software licenses, energy, and cloud resources

Performance

Fast and scalable execution to meet the needs of even the most demanding enterprises with thousands of users and millions of cores

Resilience

Secure and hardened to minimize downtime; health checks and automatic failover ensures jobs get done despite faults and failures

Open

Extensible plugin framework to meet each site's unique needs

Simulate

Run a simulation to perform what-if analysis and determine the most productive way to scale HPC resources.

Allocate

Allocate resources per compute, storage, budget and limitation requirements; support chargebacks;

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PBS Professional: What's New?

Available exclusively in PBS Professional 2020 and above

▶ Full-spectrum scheduling: **high-performance and high-throughput**

▶ **Budgeting** across organizations, departments, offices, teams, etc

▶ Workload **simulation**

▶ **Cloud bursting** to any provider, dynamic or static

▶ Additional performance, compatibility, security, scheduling and administrative updates

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Budgeting

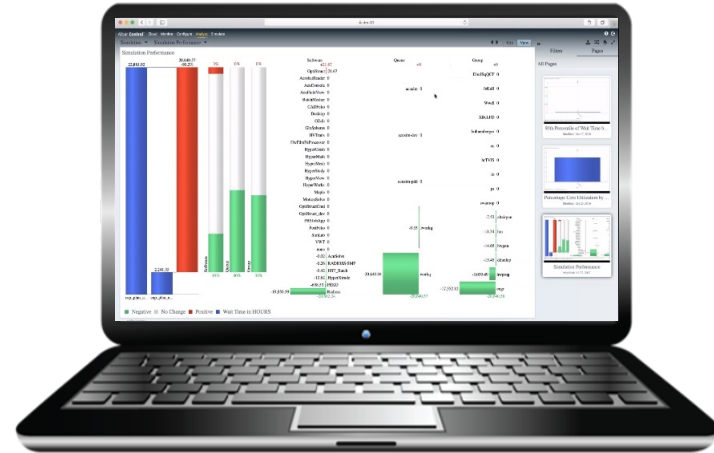Allocation management services help control and optimize budgets across your enterprise, and for multiple HPC clusters.

▶ Investors can provide credit to groups (e.g. departments) who can allocate that credit to user and project accounts

▶ Both consumable and quota-type currencies can be defined, and full reporting of group and account credit consumption is available for internal visibility of HPC usage

▶ Allocate resources per compute, storage, budget and limitation requirements; support chargebacks

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Workload Simulation

Run a simulation to determine the most productive way to scale HPC resources. Simulate scheduler performance under hypothetical configurations using historical job data and the PBS Professional™ scheduler.
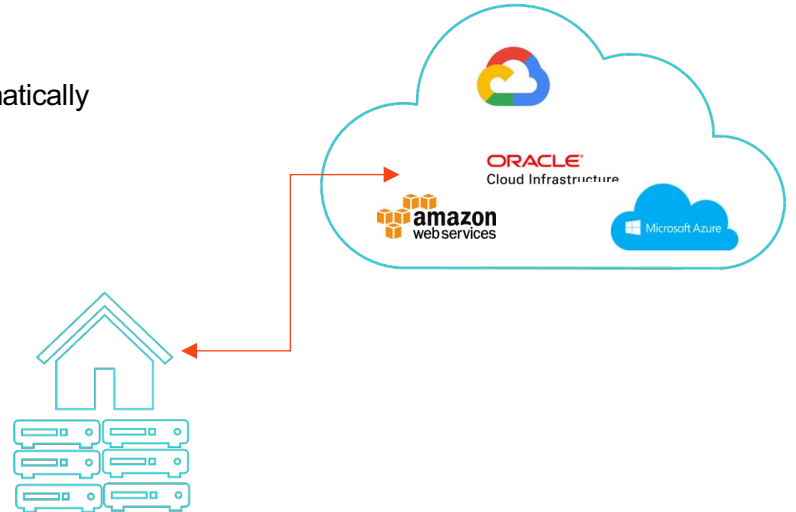
▶ Measure real-world impact in advance of change

▶ Runs ten times faster than real-time testing

▶ Minimal up-front configuration

▶ No impact on productivity

▶ No dedicated development clusters needed

ALTAIR

Cloud Bursting

Dynamic extension of your cluster with on-demand cloud resources from all public cloud providers or your private cloud

- ► AWS, Google Cloud, Azure, Oracle

- ► Mobilize resources quickly & securely to meet real-time demand. Automatically sale up/down

  - Based on policy
  - Based on demand
  - Based on workload

- ► Burst only when cost-efficient with on-premises utilization awareness

- ► Vendor-agnostic: no lock-in
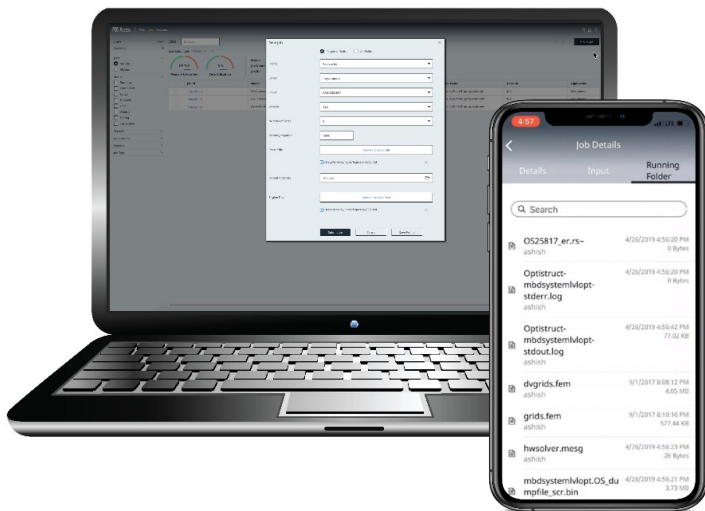
- ► Fast: +1,000 nodes in minutes

Altair Access™

Portal for engineers and researchers

ALTAIR

Altair Access™ Features

Simple, powerful, and consistent interface for accessing HPC: Submit and monitor jobs on remote clusters, clouds and other resources with no IT expertise required.

Highlights

- **Novice to expert:** simple and powerful

- **Same UX:** desktop and web

- **Secure:** protected access to HPC resources

- **End-to-end:** submit, monitor progress, steer, fix, and rerun jobs

- **Collaborate:** shared 3D analysis

- **3D remote visualization**

- **Save time:** Simplify job submission and management thanks to a powerful GUI with smart, simplified interfaces

- **Be more productive:** Spend more time focused on work and not IT tasks

- **Increase ROI:** Consolidate access to applications and optimize license availability

- **Reduce errors and improve consistency:** Embed your company's best-practice know-how directly into application definitions used for job submission

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Altair Access™ Capabilities

Engineers, scientists, and researchers can easily access portals that provide access to HPC — no IT expertise needed — to run solvers, view progress, manage data, and use 3D remote visualization via web and desktop.

Files

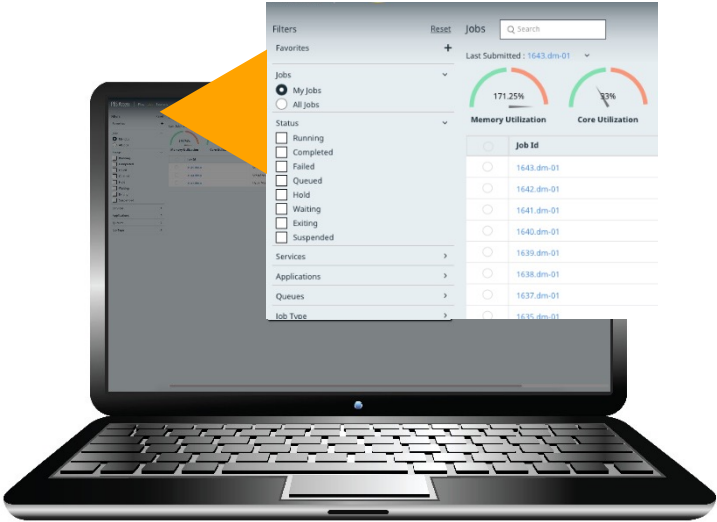Simplify job file submission and management thanks to a powerful GUI with smart, simplified interfaces.

Jobs

Easily define and configure applications for job submission via PBS Application Services (PAS).

Sessions

Manage 3D remote visualization sessions and data directly from the secure web portal.

Instant-on experience

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Altair Control™ Features

Altair Control is an easy-to-use web application for monitoring and managing jobs and nodes on a high-performance computing (HPC) cluster, with advanced analytics to support **data-driven planning and decision-making**.

Highlights

- **Single pane of glass:** configure, deploy, monitor, burst, manage, troubleshoot, simulate, analyze, and tune

- **Real-time monitoring:** simplify troubleshooting and maintenance

- **Reporting and analytics:** powered by Altair SmartSight™

- **Workload simulator:** simulate and optimize infrastructure sizing

- **Multi-cloud bursting:** burst to any cloud for peak loads

- **Modern UX:** drag-and-drop simplicity

Altair Control™ Capabilities

A platform to easily manage, monitor, analyze, and simulate HPC clusters

Design

Design an HPC model so that an HPC cluster can burst to public and private clouds, adding capacity exactly when needed.

Manage

Deploy an HPC model in the cloud. **Manage** cloud bursting by updating HPC details.

Monitor

Monitor and manage an HPC cluster's nodes and jobs. Monitoring is divided into sub-tabs for easy viewing.

Configure

Configure default WLM server and security settings and manage queues, resource defaults, and limits.

Analyze

Easy-to-use job accounting and reporting solution with advanced **analytics** to support data-driven planning and decision-making.

Simulate

Run a **simulation** to perform what-if analysis and determine the most productive way to scale HPC resources.
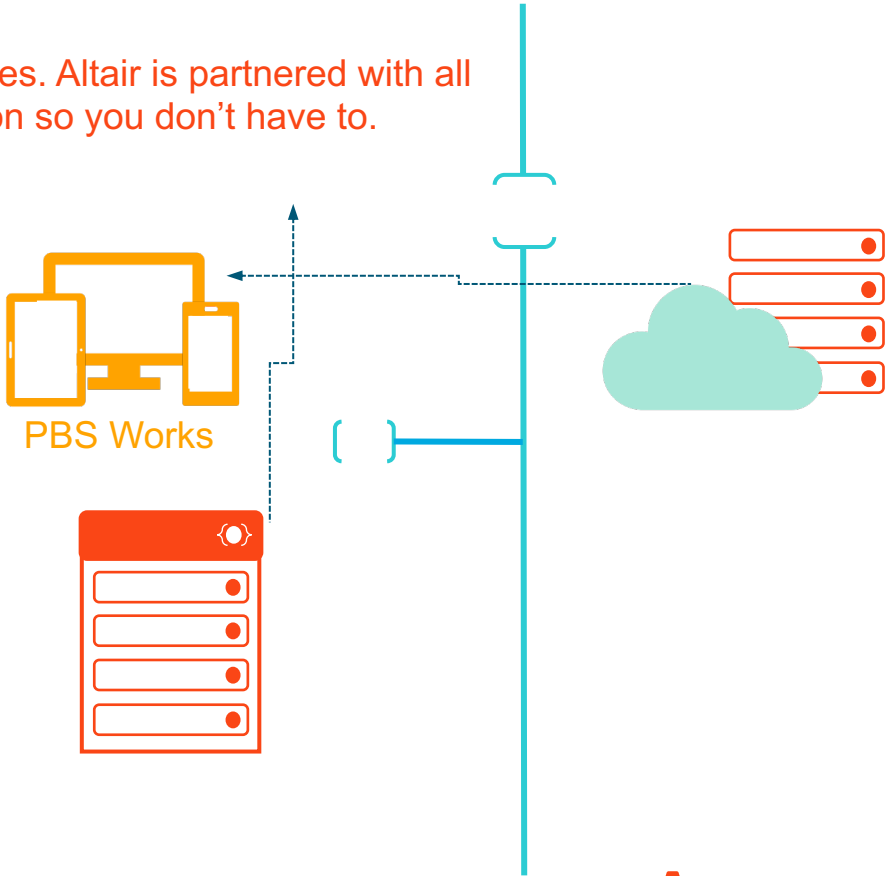
Allocate

Allocate resources per compute, storage, budget and limitation requirements; support chargebacks; balance complex stakeholder logic.

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Altair Control™: Cloud Bursting

Accelerate innovation with on-demand cloud resources. Altair is partnered with all leading cloud providers, and we handle the integration so you don't have to.

- AWS, Google Cloud, Azure, Oracle

- Cut down time to market with automatic cloud bursting during peak demand

- Mobilize resources quickly & securely to meet real-time demand

- Burst only when cost-efficient with on-premises utilization awareness

- Vendor-agnostic: no lock-in

- Fast: +1,000 nodes in minutes

PBS Works

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ALTAIR CONTROL™: Workload Simulator

Run a simulation to determine the most productive way to scale your HPC resources. Simulate scheduler performance under hypothetical configurations using historical job data and the Altair PBS Professional™ scheduler.

- Measure real-world impact in advance of change
- Runs ten times faster than real-time testing
- Minimal up-front configuration
- No impact on productivity
- No dedicated development clusters needed

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THANK YOU

altair.com

#ONLYFORWARD

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