## Moab HPC Suite - Enterprise Edition

Moab HPC Suite - Enterprise Edition is the core application that optimizes workload performance by dynamically adapting resources to requirements of users, workloads, streamlining processes, enforcing SLAs, and achieving organizational objectives. At the core of the Moab technology is a patented policy engine and scheduler for scalable, large-enterprise computing facilities and utility-based computing environments. Moab's architecture enables policy-based optimization of infrastructure resources, software licenses, file spaces, and other devices.

Moab HPC Suite - Enterprise Edition provides enterprise-ready HPC workload management that brings together key enterprise HPC use cases and capabilities as well as implementation and 24x7 support services into a single integrated product to maximize the value from your HPC environment. Key benefits include:

- **Productivity acceleration** to deliver more results faster at lower cost with massive scalability, intelligent management to achieve 90-99% utilization with the lowest power and cooling costs, and fast and simple job submit and management.

- **Uptime automation** to ensure workloads complete successfully and reliably, avoiding failures and missed organizational opportunities and objectives.

- **Auto-SLA enforcement** to schedule and adjust workload to consistently meet service guarantees and business priorities so that the right workloads are completed at the optimal times while accounting for usage and enforcing usage budgets.

- **Grid- and Cloud-ready HPC management** to extend the benefits of traditional HPC environments to manage and share workload across multiple remote clusters to meet growing workload demand or surges.
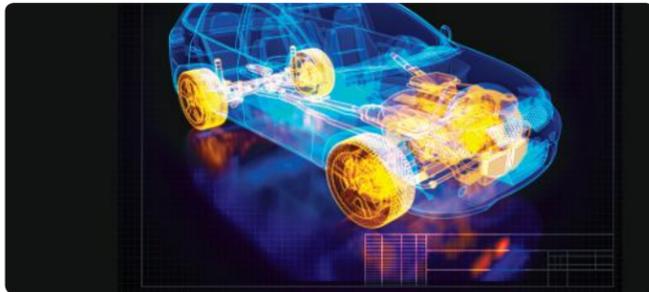
## The Adaptive Computing Advantage: One-Stop Solution for Manufacturing

Adaptive Computing makes HPC simple and accessible for structural analysis, fluid dynamics, device and circuit simulation, and other engineering analysis applications. This one-stop solution eliminates duplication of data inputs across individual applications and solvers, eliminating errors, and improving the productivity and profitability of your product design, development and manufacturing. More importantly, it ensures integrated support for the entire solution. This one-stop solution for Manufacturing includes a suite of integrated software products.

Moab HPC Suite - Application Portal provides a large, extensible set of industry specific application templates that make it simple for engineers to submit, run, and manage HPC workloads from almost any platform or device through a standard web browser.

Moab HPC Suite - Remote Visualization Edition improves visualization resource utilization by 50% by enabling shared visualization resources, reduces hardware costs by 45-50% through sharing of blades and GPUs, and improves staff productivity by 10-20% by eliminating data wait times for transfers.

The core Moab intelligence engine technology in Moab HPC Suite - Enterprise Edition has been patented and battle tested for over 10 years, making it uniquely able to mimic real-world decision-making. It can simultaneously factor and balance multiple dimensions such as current and future time and schedules, priorities and SLAs, workload requirements, and heterogeneous resources capabilities and current cluster events to make the most accurate and efficient scheduling and allocation decisions.

Adaptive Computing is the largest supplier of HPC job and workload management software today. 21% of HPC sites use our commercial and open source job and workload management software. Moab manages many of the Top 500 HPC systems in the world today, including the most powerful system (Titan), and at Fortune 500 companies. We make HPC work for end users.

For more information visit: www.adaptivecomputing.com/products/hpc-products.

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HPC WORKLOAD MANAGEMENT SOFTWARE

**Adaptive** COMPUTING

ADAPTIVE COMPUTING INDUSTRY SOLUTIONS

# HPC FOR MANUFACTURING
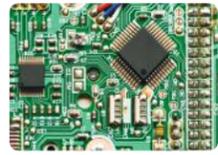
To outflank competitors in today's global marketplace, manufacturers must constantly innovate and reduce cost and time-to-market and improve product quality and reliability. The ever-growing complexity and sophistication of products is driving manufacturers and their supply chains to increasingly use collaborative, iterative, multidisciplinary systems engineering design and analysis methods throughout the product lifecycle – from concept design to detailed component design to system verification and testing.

Manufacturers use a range of applications to accurately predict how complex products behave in real-world environments over a wide-range of operating conditions. The automotive and aerospace industries use a variety of applications for sophisticated analysis of vehicle structures, fluid dynamics, crashworthiness, metal forming, combustion, thermal effects, acoustics, etc. In the electronics industry, several analysis applications are used to collaboratively design, test, validate, and manufacture rapidly shrinking nanometer integrated chips (ICs), printed circuit boards (PCBs), broadband and wireless networking components and electromechanical systems such as automotive electronics and power electronics systems.

Considerable high performance computing (HPC) capabilities are required to perform these comprehensive, high fidelity multi-physics simulations. To improve engineering productivity and get an immediate, significant return on investment, the HPC solution must support and integrate a very broad set of highly compute and data-intensive manufacturing analysis applications with interactive visual applications for the pre and post-processing of engineering simulation inputs and results respectively. The solution must also maximize the speed and capacity for results as well as balance analysis priorities to business needs if manufacturers are to differentiate themselves in time to market, innovation and profitability.

## Overcoming HPC Challenges in Manufacturing

The biggest challenge to the use of HPC in Manufacturing is that enterprise users – typically engineers and not IT experts – are not trained in HPC technologies. This makes it difficult to submit and run applications in an HPC environment and to collaborate across teams and locations. The result? Non-optimized HPC workloads, results delays and failures to achieve compute SLAs, wasted compute capacity and power usage, and increased costs. It is complex and expensive to manage workloads across heterogeneous cluster systems. You need to unify and automate workload management across clusters with mixed processors, memory, GPGPUs, operating systems, and middleware.

Adaptive Computing is leading the HPC revolution in Manufacturing with a modular end-to-end solution set that addresses the entire range of manufacturing industry computing challenges. Users submit data for analysis through their familiar industry application-based templates using an easy-to-use application portal that removes all the complexity of accessing HPC resources. The user can obtain the detailed simulations and rich visualization they need for analysis and decision making, without having to learn any of the complex HPC technologies. We do this through a suite of products that each address different parts of the problem and combine seamlessly to optimize delivery of the final results. And since all the products are integrated, users get integrated support for the entire solution.

The Adaptive Computing end-to-end solution set for manufacturing includes:

- **Moab® HPC Suite - Application Portal Edition** makes it simple for engineers and designers to run their commonly used applications and workloads on HPC resources using intuitive templates. No special HPC training is required to use and leverage the competitive advantage of the HPC resources, users just need to know their application(s). Workload processing is optimized for speed, SLAs and priorities with Moab policies.

### Moab HPC Suite End-to-End Solution Set for Manufacturing Industry



- **Moab HPC Suite - Remote Visualization Edition** optimizes 2D and 3D visualization techniques to interpret data and results more cost effectively and productively. By transferring only pixels instead of data, users can collaborate on simulations and analysis across locations without any data transfer time lags or security issues. This also means that the business gets the innovation and competitive advantage from the analysis at a significantly reduced cost for the required technical compute resources.

- **Moab HPC Suite - Enterprise Edition** lets organizations focus on just optimizing and accelerating HPC workloads to get faster results, higher utilization and balance competing workload priorities. It provides intelligent workload management with policies that dynamically adapt the resources to the requirements of user workloads, streamline processes, enforce SLAs and achieve organizational objectives. Moab HPC Suite - Enterprise Edition is a foundational component of the Application Portal and Remote Visualization Editions, but can also be purchased as a workload management product to work with existing customer portals.
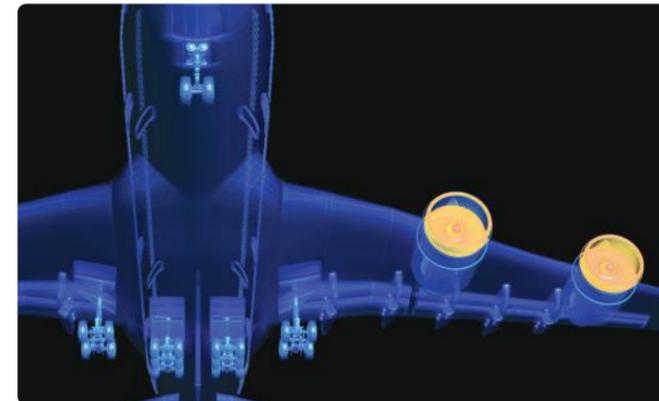


### Moab HPC Suite - Application Portal Edition

Moab HPC Suite - Application Portal Edition is the gateway to the core HPC engine and provides end users single-point access to their applications, data, resources, and job submissions across the analysis and interpretation process. No special HPC training is required. Moab HPC Suite - Application Portal Edition simplifies the specification and running of jobs on HPC resources to a few simple clicks on an application specific template with key capabilities that include:

- **Application-centric job submission templates** enable users to submit complete HPC jobs by just filling in the blanks, with parameters specific to their application, and their job is submitted from virtually any location, internet connection or any browser enabled device. They can also easily monitor their job and retrieve their results. For Manufacturing, the templates cover commonly used applications such as Abaqus, Ansys, Nastran, Fluent, CFX, Star-CCM+, Radioss, PamCrash, LS-Dyna and others. Standard web services integration, tested for both .NET and Java interoperability, also enables immediate integration with your custom applications.

- **Support for batch and interactive applications,** such as simulations or analysis sessions, to accelerate the full project or exploration and production cycle.

- **Distributed data management** to eliminate unnecessary remote file transfers for users, to store data optimally on the network for easy access and protection, and to optimize file transfer to and from user desktops.

### Moab HPC Suite - Remote Visualization Edition

The final goal of any simulation, including the most complex HPC simulation, is visualization of data for analysis and decision-making. Most current technical computing methods do this inefficiently - slow transfers of large data sets limit the access to the visualized data and clog up network bandwidth, user productivity, and team collaboration while increasing data and security risks. The high-cost individual workstations and their software are underutilized by the limited user(s) that have access to them. They are costly to manage and often have gaps in meeting changing workload technology requirements.

Moab HPC Suite - Remote Visualization Edition significantly reduces the hardware, network and management costs of visualization in technical computing. It enables end users easy, centralized access to shared visualization compute, application, and data resources. These compute, application, and data resources reside in a technical compute cloud or grid in your data center and not in expensive and underutilized individual workstations. Key benefits include:

- **Lower hardware costs** by consolidating individual workstations into centralized visualization and thus reducing specialty hardware purchases, such as GPUs, for individual users.

- **Improved workforce collaboration and productivity** as multiple users can access and collaborate on the same visualization data at the same time from almost any location or device with little or no data transfer lag times and no data transfer security risks.

- **Reduced management costs** by moving from remote user workstations to centrally managed visualization servers that require significantly less administration overhead.

- **Decreased network access costs and congestion** significantly lowers the amount of visualized pixels that are transferred to users, and not full data sets.