FROM INFRASTRUCTURE TO INNOVATION: REDEFINING THE ROLE OF INFORMATION TECHNOLOGY IN DIGITAL ENGINEERING

How IT Can Cut Costs, Accelerate Design Cycles, and Boost Engineering Productivity

Introduction

Engineering and product development are undergoing rapid change, driven by advances in artificial intelligence (AI), multiphysics simulation, and data-centric design. To stay competitive, organizations must deliver better products faster and more efficiently — a transformation that demands access to the latest tools and scalable high-performance computing (HPC) infrastructure. For IT organizations, this evolution demands a strategic rethink of infrastructure to support dynamic workloads, new delivery models, and rigorous governance, security, and cost controls.

This paper examines how IT leaders can modernize their engineering environments to deliver measurable business value with Altair One®, a cloud gateway that unifies access to software, collaboration tools, and scalable HPC infrastructure in a single, integrated platform. It explores four key use cases that illustrate how Altair One can help organizations:

1. Enable self-service innovation through simplified orchestration
2. Optimize costs and resource utilization across hybrid environments
3. Ensure flexibility and prevent vendor lock-in
4. Strengthen security, compliance, and governance

By partnering with design, engineering, and data science teams, IT can help simplify operations, improve cost efficiency, and accelerate innovation.

Growing Demands on Corporate IT

Engineering teams face rising customer expectations to deliver smarter, more connected products under increasingly tight schedules. Meeting these demands requires a greater reliance on simulation, data-driven optimization, and AI-enabled tools to thoroughly explore design alternatives early in the development cycle. Organizations that underinvest in design and simulation risk costly late-stage design flaws that can lead to delays, in-field failures, recalls, and potential brand damage.

Designers and engineers need access to state-of-the-art software tools, scalable HPC infrastructure, and specialized GPUs to power the latest accelerated solvers and new AI workloads for model training and inference. They also need software tools that help them collaborate with colleagues and share data across engineering disciplines and geographies.

Organizations increasingly compete based on the scale, agility, and efficiency of their IT infrastructure. IT organizations must therefore strike a careful balance, as illustrated in Figure 1 — supporting increasing business demands while addressing complexity, capacity, and compliance issues, with limited capital and operational budgets.

Figure 1 – Balancing increasing business demands against IT constraints

Faced with this dilemma, the traditional models of acquiring and deploying on-premises assets, such as software, clusters, and storage, no longer work for most organizations. Managing on-premises infrastructure is too complex and costly, and organizations often lack staff with the necessary skills. Given the rapid pace of technological change, expensive capital assets can become obsolete before they're fully depreciated, inhibiting competitiveness and straining an organization's financial resources.

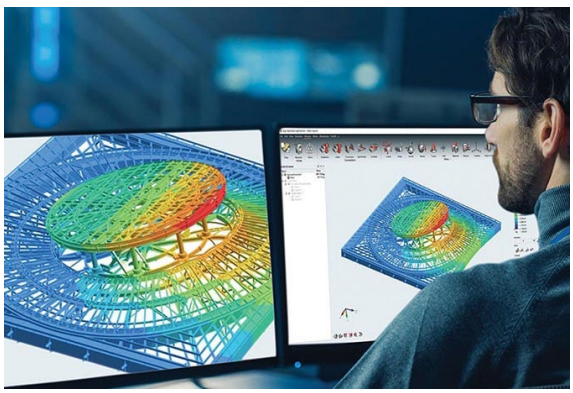
Deploying workloads to the cloud provides scalability and flexibility; however, it also introduces new challenges. Concerns include overspending, lack of visibility and cost transparency, cloud vendor lock-in, security, and shadow IT risks that complicate compliance and governance. Achieving this balance requires a unified, collaborative environment that simplifies access to tools, data, and scalable HPC resources. IT organizations need to give their designers, engineers, and data scientists access to the latest AI-powered tools and cloud infrastructure while maintaining governance, cost control, and security.

About Altair One

Altair One is a unified cloud innovation gateway for collaborative engineering, data engineering, and analytics. Built on decades of Altair expertise in simulation, HPC, and artificial intelligence, Altair One gives designers and engineers seamless access to the applications, data, and compute resources they need across every stage of the product development life cycle. Users can choose from a wide range of Altair and third-party design, simulation, analytics, and AI tools and run them locally or in their preferred cloud.

Unlike other engineering software suites, Altair One is exceptionally easy to use. It provides a consistent interface and intuitive workflow, enabling users at all skill levels to become more productive, collaborate with colleagues, and run simulations on their desktops, local clusters, or in the cloud.

Better yet, users and administrators don't need to worry about details that often complicate design environments, such as deploying and managing complex HPC infrastructure, shared storage, license servers, or remote access solutions. Users can simply log in to the Altair One portal and become productive immediately. Altair One platform components:



- Altair® HyperWorks®
- Altair® HPCWorks®
- Altair® RapidMiner®
- Altair Marketplace™
- Altair Drive™
- Altair® Material Data Center™
- Altair Community

Altair One automatically handles job scheduling, data movement, license allocation, and workload scaling, freeing IT administrators from repetitive tasks and burdensome support requests while ensuring optimal utilization and infrastructure allocation in accordance with policies developed by IT in cooperation with business units.

A major convenience of Altair One for IT professionals is that users can submit and track technical support requests directly through the Altair One portal. IT help desks are relieved of the burden of dealing with routine day-to-day issues such as password resets, solver setup issues, unexpected terminations during runs, licensing or feature request problems, and cloud resource provisioning or scaling failures. Altair handles all these day-to-day requests with oversight from IT management.

For hybrid and multi-cloud environments, Altair One provides centralized governance and cost visibility. IT administrators can monitor utilization, track cloud spending, and apply role-based access controls (RBAC) to enforce security and compliance policies. By default, Altair One runs its cloud services in Microsoft Azure; however, IT organizations can easily customize appliances and take full control over their cloud usage with Altair® NavOps®, a component of Altair One. Using NavOps' bring your own cloud (BYOC) model, cloud administrators can supply their organization's private cloud credentials and run user sessions and simulations in their preferred cloud, including AWS, Microsoft Azure, Google Cloud Platform (GCP), and Oracle Cloud Infrastructure (OCI). Altair One eliminates the need for custom cloud integrations or one-off configurations.

How IT Can Increase the Productivity of Engineering Design

Altair One can transform the way design teams work, improving collaboration, reducing cycle times, and helping them design higher-quality, more competitive products faster while addressing key IT challenges. In the following sections, we highlight four key use cases for Altair One, illustrated in Figure 2. We explain how Altair One can help IT organizations enable self-service innovation, optimize costs and resource utilization, ensure flexibility, and help strengthen security, compliance, and governance.

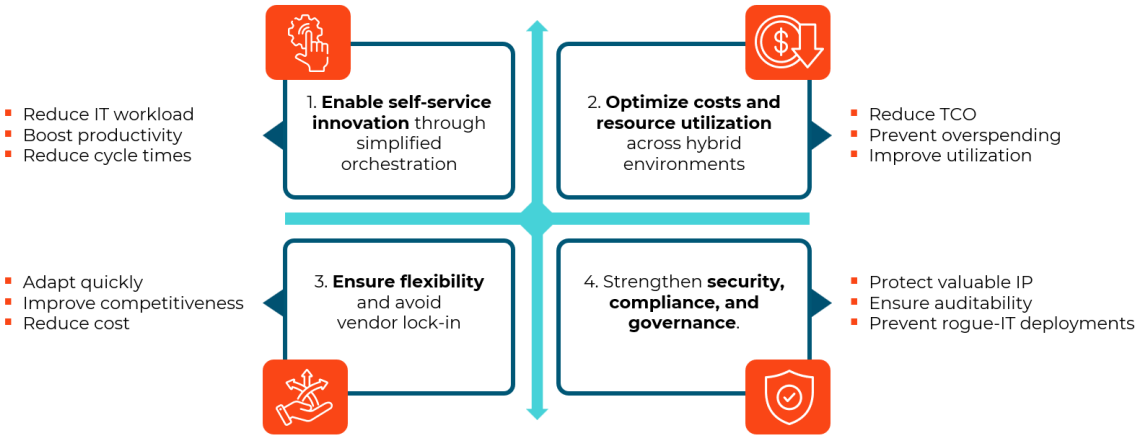


Figure 2 – Four use cases for IT organizations improving design and engineering productivity

1. Enable self-service innovation through simplified orchestration

As technology becomes increasingly critical to competitiveness, engineers need fast self-service access to the latest AI-powered tools and scalable infrastructure. Organizations can no longer afford the luxury of lengthy procurement and deployment cycles for traditional HPC clusters and storage environments.

At the heart of Altair One is a flexible, software appliance model that packages applications, solvers, and prerequisite components into preconfigured virtual environments. Designers and engineers simply log in to the Altair One portal to access powerful desktop appliances running as cloud-resident virtual machines (VMs), without installing or configuring software. Licensing is automatically managed, giving IT full visibility and control over license features, distribution, and usage while minimizing the administrative burden.

When users launch simulations, Altair One automatically provisions compute appliances — cloud-based equivalents of HPC clusters—containing the necessary software, libraries, and workload management tools, including Altair® Access™, Altair® PBS Professional®, and Altair solvers. Depending on the application, these appliances can run CPU- or GPU-accelerated simulations or AI workloads such as model training and inference. Altair One frees administrators from managing license servers, shared storage, or data-replication solutions, and from using infrastructure-as-code (IaC) tools such as HashiCorp® Terraform®, and cloud-specific tools such as AWS ParallelCluster® or AWS CloudFormation® to provision and manage cloud infrastructure.

With Altair One, IT administrators choose how much control to exert over their cloud deployments. In the managed software-as-a-service (SaaS) model, users simply run pre-configured Altair appliances in the Altair One cloud. Alternatively, IT can assume full control over cloud deployments, using NavOps to create custom appliances that are automatically deployed to their preferred cloud(s). IT administrators retain full visibility into cost and resource usage, benefit from existing cloud discounts, and avoid vendor lock-in while users continue to enjoy a seamless SaaS experience. Using NavOps also allows deployed clusters to be shared among users, further improving resource efficiency and reducing costs.

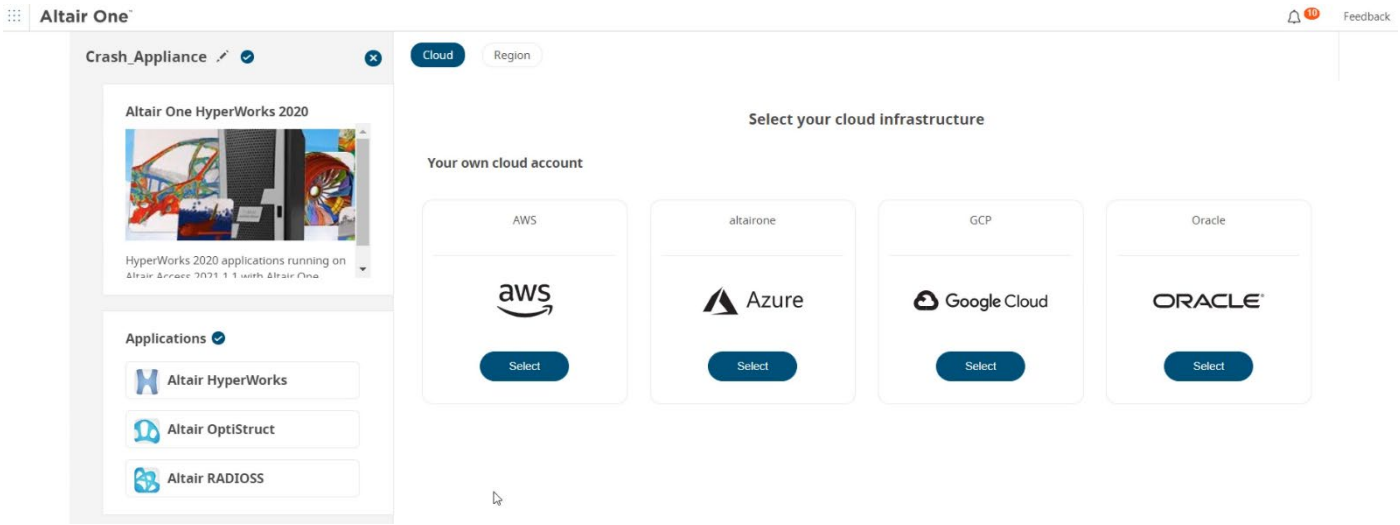


Figure 2 - NavOps can deploy custom appliances using an organization's private cloud credentials

Altair One enables user self-service and improves IT efficiency by:

- Providing on-demand access to applications, licenses, and scalable HPC/GPU resources
- Reducing IT overhead for infrastructure deployment and maintenance
- Minimizing support tickets with self-service provisioning and integrated support facilities
- Accelerating time-to-innovation with rapid access to advanced design and AI tools

2. Optimize costs and resource utilization across hybrid environments

While self-service access to cloud resources is convenient for engineers, controlling costs remains a major challenge for corporate IT and finance organizations. According to Flexera's 2025 State of the Cloud Report, 84% of respondents cite managing cloud spend as their top concern.[1] A separate survey by Azul found that 83% of CIOs are overspending on cloud services by an average of 30%.[2]

Altair One addresses these challenges by combining self-service flexibility for users with comprehensive visibility and governance controls for IT. Administrators can enforce cost, license, and infrastructure policies to optimize resource utilization and eliminate cloud overspending. Key capabilities include:

- **Centralized license management:** Centralized license allocation and monitoring through the Altair One admin console enables administrators to ensure licenses are optimally allocated.
- **Policy-based governance:** Define quotas and enforce usage policies at the user, group, or project level to limit total compute hours, node counts, and cloud spending.
- **Shared private clusters:** Unlike competing engineering simulation SaaS offerings, where private clusters are provisioned for each user, NavOps supports shared cluster environments managed by workload schedulers, enabling fair resource sharing, job prioritization, and queue-level policy enforcement.
- **Automated cluster shutdown:** Idle compute nodes and clusters are automatically deprovisioned when workloads complete, preventing idle or orphaned instances that drive up cloud computing bills.[3]

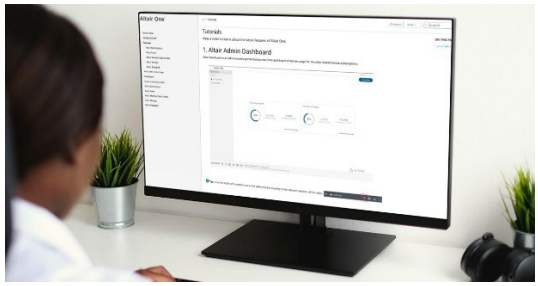
[1] Flexera 2025 State of the Cloud Report
[2] Businesswire, March 2025: Azul Report Finds 83% of CIOs are Spending More on their Cloud Infrastructure and Applications than Anticipated, While Only 2% are Under Budget
[3] Altair One also supports idle-node detection and auto-scaling hooks, which are part of the NavOps orchestration logic.

- **Real-time cost visibility:** Users and administrators can access built-in NavOps dashboard and usage reports to track cloud resource consumption by user, project, and department for chargeback or showback accounting. Also, because NavOps' BYOC model uses customer-provided cloud credentials, IT organizations can leverage enterprise discount programs and cost management tools native to their preferred cloud, including AWS Cost Explorer, Azure Cost Management, and Google Cloud Platform's billing and operations suite.

The ability to easily access on-premises infrastructure is another important lever for managing costs. For IT organizations that determine it's more cost-effective to deploy HPC clusters on-premises, Altair One supports hybrid cloud deployment models, where, subject to configurable policies, engineers can direct simulations to on-premises HPC clusters and burst to cloud resources only when local capacity is insufficient.[4] Administrators can obtain software for best-in-class workload management solutions from the Altair One portal and connect local clusters to Altair One to balance capital and operational spending and deliver a seamless user experience.

Altair One helps IT organizations:

- Gain real-time visibility into license and cloud spending
- Prevent overspending with automated scaling, quotas, and policy controls
- Improve asset utilization through resource sharing and dynamic allocation
- Deliver a consistent, secure, and cost-efficient hybrid HPC experience



3. Ensure flexibility and prevent vendor lock-in

With shorter product cycles and distributed teams, organizations need to remain agile — scaling compute and collaboration resources as workloads evolve. IT organizations must deliver scalable, secure, and cost-efficient compute environments that can evolve quickly based on changing business needs.

Altair One simplifies design and engineering environments by combining collaboration, workflow automation, and hybrid cloud orchestration in a unified, cloud-native platform. This means that IT leaders can easily support evolving engineering priorities while maintaining efficiency, flexibility, and control — empowering engineers to innovate freely.

Altair One helps IT organizations stay agile and flexible in several critical areas:

- **Elastic scaling across on-premises and cloud resources:** Organizations can run their simulations anywhere, easily accommodating changes in workload demand, eliminating delays related to hardware procurement and deployment, and avoiding under- or over-provisioning infrastructure.
- **Unified self-service access to tools and data:** By providing self-service access to applications, licenses, and data, and enabling collaboration across teams, Altair One enables faster project startup time and iteration, helping organizations react quickly to new business priorities.
- **Support for hybrid and multi-cloud strategies:** Altair One integrates with existing HPC environments and leading cloud providers, enabling workloads to be deployed where they make the most business sense. This flexibility helps organizations avoid vendor lock-in and quickly adapt to evolving business requirements and technologies.
- **Rapid adoption of new technologies:** As a cloud-native platform, Altair One enables fast adoption of new solvers, GPU architectures, and AI frameworks. In managed SaaS deployments, updates are handled automatically, reducing IT overhead and ensuring users have access to the latest capabilities.

In addition to integrating Altair solvers and design tools, Altair One provides an open, extensible environment that seamlessly integrates with third-party CAD and CAE software. Engineers can use Altair Drive to securely share and comment on third-party model files, while tools within Altair HyperWorks support direct data exchange with more than 250 CAD and CAE systems.[5] Lightweight visualization tools such as Altair® HyperView® and Altair® HyperGraph® can display output from a wide range of third-party solvers, including Ansys®, Abaqus®, MSC Nastran®, Adams®, and LS-DYNA®.

[4] This functionality requires network VPN configuration to make the local cluster reachable from Altair One and is facilitated by Altair Access Web, included in the Altair One software stack. See the Altair Access Web documentation for details on registering and connecting to local HPC clusters.
[5] For details see the Altair HyperWorks product page.

To ensure interoperability, Altair One provides native and partner-based integrations with leading enterprise systems for product lifecycle management (PLM), product data management (PDM), and application lifecycle management (ALM). Supported solutions include Siemens Teamcenter®, Siemens Polarion® ALM™, PTC Windchill®, Dassault Systèmes 3DEXPERIENCE®/ENOVIA®, Aras Innovator®, and others.

Together, these capabilities help IT organizations adapt quickly to new business priorities, optimize resource use across hybrid environments, and maintain an open, future-ready engineering ecosystem that supports both Altair and third-party tools.

4. Strengthen security, compliance, and governance

For organizations engaged in design and engineering activities, intellectual property (IP) is among their most valuable assets. Proprietary models, simulation data, and design files often represent years of research and millions of dollars of investment, making data protection an essential priority. According to Flexera's 2025 State of the Cloud survey, 77% of IT professionals identify security as a primary concern.[6] Given the prevalence of ransomware, phishing, and other cyber threats — and the financial and reputational costs of data breaches — robust security and governance are essential to every organization's cloud strategy.

As an ISO/IEC 27001:2022 certified provider, Altair applies proven security practices across its operations.[7] Altair's dedicated cybersecurity team conducts regular vulnerability assessments, penetration testing, and continuous monitoring to help safeguard customer environments. Among the security features built into Altair One are enforced RBAC, strong multi-factor authentication (MFA), data encryption (at rest and in motion), secure APIs with rate limiting and authentication validation, and robust audit logs, versioning, and regular integrity checks.[8] Altair can also help IT teams enforce data residency and regional compliance controls.

Depending on their industry, manufacturers face a wide range of regulatory requirements. Every design change, material substitution, and model assumption must be tracked, and engineers may need to reproduce and justify design decisions years after a product's initial release. IT plays a central role in enabling traceability and ensuring that digital engineering systems meet compliance, reporting, and audit readiness standards.

Altair One supports these requirements by providing unified, policy-driven access to software, data, and compute resources within a secure, auditable environment. Centralized governance, integrated version tracking, and interoperability with PLM and compliance systems enable manufacturers to meet regulatory obligations without slowing innovation — ensuring data integrity, security, and traceability across the full product lifecycle.

Key capabilities supporting these outcomes include:

- **A secure, centralized data repository:** Altair Drive provides encrypted, versioned storage for simulation data, project files, and metadata, helping IT maintain control of sensitive IP and prevent data loss through unmanaged transfers.
- **Role-based access controls** enforce least-privilege principles to align with corporate security standards and ensuring users only access resources relevant to their roles and assignments.
- **Comprehensive audit trails** track file access, job submissions, and compute usage to support accountability, compliance reporting, and security investigations.
- **Governed cloud resource provisioning:** Through NavOps' BYOC model, IT retains full control over cloud providers, regions, and instance types, enforcing organizational security policies and preventing unauthorized or shadow IT deployments.

Introducing Altair One to Your Environment

Whether engineers are new to Altair tools or already use them in their day-to-day work, they can get started quickly by registering for a free trial. Once logged into the Altair One portal, users can begin exploring applications, running simulations, and accessing extensive educational resources, including online help and video tutorials.

Unlike typical cloud-based engineering platforms, Altair One is designed to complement existing enterprise environments. To realize its full value, active IT involvement is essential during the planning, pilot, and integration phases of any deployment. IT leaders play a key role in aligning Altair One with organizational policies, data management, and infrastructure strategies.

[6] See Flexera 2025 State of the Cloud Report. 77% of survey respondents see security as a top challenge, closely followed by managing software licenses (75%) and governance (75%).
[7] See Altair Earns ISO/IEC 27001:2022 certification for global operations.
[8] Altair One supports MFA and works with third-party authentication tools, including Okta Verify, Google Authenticator, and Security Key or Biometrics Authentication. See Altair One documentation for details.

Altair One can be deployed in three ways, depending on an organization's needs and existing infrastructure investments:

- **Altair One Cloud**: SaaS offering hosted and managed by Altair
- **Altair One Enterprise**: Customer-managed deployment on-premises or in a customer's private cloud
- **Altair Unlimited**: Managed, turnkey hardware and software bundle, offered as a physical or virtual appliance

Hybrid delivery models are also supported. For example, an organization may use the Altair One cloud platform for SaaS-based management while leveraging on-premises clusters for simulation.

A valuable first step is to engage Altair for a deployment and best-practices workshop to define an implementation roadmap. Typical IT-oriented workshop topics include the following:

- **Integration and architecture planning:** Connecting existing HPC clusters, storage systems, license servers, and enterprise directories
- **Cloud and infrastructure strategy:** Selecting preferred cloud providers, defining appliance deployment models, and implementing strategies for data synchronization, auto-scaling, and cluster sizing
- **Security compliance and governance:** Aligning Altair One with corporate security policies, authentication schemes, and PLM/PDM/ALM integrations
- **Cost management and budget controls:** Implementing usage tracking and reporting, chargeback/showback models, quotas and spending caps, and approval workflows
- **User onboarding and change management:** Role definitions, workspace and resource configurations, license allocations, support request policies, and initial user training
- **Ongoing monitoring and management:** Continuous improvement and optimization

Conclusion

Altair One gives IT administrators a unified, policy-driven platform that delivers secure, scalable, efficient access to HPC, data, and simulation resources. By integrating applications, data management, cloud orchestration, and governance controls into a single environment, Altair One enables IT leaders to modernize engineering infrastructure while maintaining control, compliance, and cost efficiency.

Across the four use cases discussed in this paper, Altair One demonstrates measurable value:

- **Self-service innovation:** Engineers gain rapid, policy-controlled access to cloud and on-premises resources, reducing ticket volumes and accelerating time-to-solution.
- **Cost and resource optimization:** Centralized license management, automated scaling, and quota enforcement ensure efficient utilization and eliminate overspending across hybrid environments.
- **Flexibility without lock-in:** Support for hybrid and multi-cloud deployment models, open integration with enterprise PLM/PDM/ALM systems, and BYOC functionality enable IT to retain architectural control while supporting evolving business and technology requirements.
- **Strengthened security and governance:** Enterprise-class controls including RBAC, MFA, encryption, audit logging, and regulatory traceability protect intellectual property and support compliance across global operations.

For IT executives, Altair One represents a path to unify engineering and data-intensive workloads under a consistent operational, security, and governance framework — reducing complexity, increasing agility, and enabling sustainable innovation at scale. To explore deployment options or schedule an enterprise IT readiness workshop, visit Altair One or contact your Altair representative.