



PLM simulation and analysis solution from IBM

Integrated engineering infrastructure for innovation

The trend continues: Your development dollar has to get more mileage than ever before. To win, you need to keep pace with consumer demands and competition. Introduce more products with greater carry over. Enable innovative ways to collaborate with suppliers. Reduce development lead times. Lower the cost and time of physical prototyping. And improve the ROI of engineering IT investments you've made. IBM can help.

Integrated engineering framework for the future

Bringing together our aerospace and automotive product lifecycle management (PLM) solutions and application software with highly tuned hardware, middleware, services and IBM Business Partner products, we now offer the PLM simulation and analysis solution from IBM. Our solution has three related goals:

- Help reduce the time and cost of design validation with advanced computer aided analysis and simulation tools.
- Promote innovation with breakthrough integration, optimization and engineering data management tools.
- Improve the flexibility and efficiency of the supporting IT environment.



Our solution includes IBM's Deep Computing On Demand Operating Environment, a flexible and open architecture that can be adapted to the needs of individual customers.

Reducing design and analysis cycle times requires a coordinated application of multiple approaches and solutions. Along with our Business Partners, we provide solutions that can help:

- Reduce the number of physical prototypes to validate the design, thus helping reduce cost and accelerate time to market.
- Reduce product development time by integrating, optimizing and managing engineering processes.

- Promote innovation by driving analysis "sizings" earlier in the development cycle.
- Identify full vehicle clash problems in digital mock-up, helping to significantly reduce the costs associated with field engineering changes.
- Streamline your current computing environment to maximize performance, utilization, productivity, insight and collaboration, helping you to reduce time to market and respond much faster to changes in the marketplace.

Optimize complex analysis and design environments

Business benefits that can be achieved as a result of the PLM simulation and analysis solution from IBM can include:

- Reduction in analysis and simulation time and effort to help reduce engineering costs and increase productivity.
- Enhanced product and process innovation.
- Increased collaboration across engineering teams.
- More informed decision making by predicting product performance early in the development process.
- Access to supercomputing power on an as needed basis to help save costs and speed time to market.
- Reduced administration costs associated with data and storage management.

Revolutionizing product development and delivery

From aerospace and automotive manufacturers to electronic component suppliers, speeding design and engineering analysis is key to getting innovative products to market faster. We offer an integrated approach that addresses business processes, applications and IT infrastructure to help you automate the development process, dramatically reducing cycle times and improving design integrity.

Customer-driven projects and offerings

Working with leading aerospace and automotive engineering solution providers, IBM is applying innovative technologies to enable the automation, integration and optimization of iterative design and analysis processes, and simultaneously supporting IT infrastructure.

Through the PLM simulation and analysis solution,

IBM leverages our expertise, breadth of best-in-class offerings and the strengths of key relationships to achieve this goal.

To help you implement the PLM simulation and analysis solution, we have established Centers of Design Innovation. Through these centers, your organization can tap into the expertise of IBM and our IBM Business Partners in a variety of ways, including:

- Technology briefings
- Application workshops
- Solution design workshops
- Proof-of-concept projects
- Implementation services

Bring value by optimizing processes, infrastructure

High-performance computing has been used by leading aerospace and automotive OEMs for years to analyze and simulate product performance—computer-aided engineering (CAE). The improvement in performance and reduction in cost of hardware, coupled with increasingly sophisticated software help predict and analyze product performance virtually in the computer while in design phase, reducing the need for physical prototypes and testing.

Today, you may be facing challenges that simply adding more computing power can't solve. Our solution can help in many ways, including the development of mathematical analysis and simulation processes or "workflows"; the integration and optimization of various disparate analysis, design and business tools; high-volume data management; collaboration with suppliers; and the efficient use of IT investments.

The PLM simulation and analysis solution is a flexible, open framework that can be adapted to your company's specific needs and help you:

- Integrate simulation and analysis within your design tools to:
 - Speed the creation of analysis models.
 - Create consistent design and analysis models.
 - Improve model quality.
- Manage analysis and simulation processes to:
 - Streamline and automate workflow.
 - Reduce time delays.
 - Comply with engineering standards and best practices.
 - Reduce tedious and error-prone IT administrative tasks.
- Use simulation data management to:
 - Increase design reuse.
 - Reduce manual data management tasks.
 - Integrate design and analysis.

- Improve product integrity and quality.
- Simplify storage and retrieval management.
- Optimize designs to:
 - Automate design and analysis iterations.
 - Meet multiple performance requirements.
- Facilitate grid computing to:
 - Improve the capabilities of the IT infrastructure.
 - Reduce development lead times.
 - Speed job turnaround.
 - Enable business priority-based resource allocation.
- Provision supercomputing resources to:
 - Use these resources "as needed" to help reduce costs.
 - Run more jobs, more quickly.
- Adopt new, scalable approaches to visualization to:
 - Enable high-end, immersive visualization environments.
 - Enable distributed, remote viewing of complex models.

Demonstrated success

IBM has implemented PLM simulation and analysis solutions for many companies.

- IBM designed and delivered a PLM solution to a sport vehicle company for automated clash analysis through integration of grid technologies, CATIA V5 interference tools, reporting tools based on IBM WebSphere® Application Server and reengineering of clash management processes in partnership with IBM Global Business Services. Now the company can analyze more than 10 vehicle configurations overnight.
- IBM has worked with a software company to enable a European automotive OEM to manage simulation data across multiple sites. With this solution—which includes IBM DB2® and IBM WebSphere products—engineers at two sites are able to view and share analysis data to increase design reuse and product quality.
- A corporation that designs advanced computer-aided engineering tools for simulating and analyzing fluid flow is using the IBM Deep Computing Capacity on Demand service to offer their clients the ability to run large-scale tests beyond the capacity of physical wind tunnels, and to complement and supplement their in-house high-performance computing capacity. More than 15 clients from the automotive and heavy truck industries have been served to date using this solution.
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Speed PLM ROI for bottom-line results

The PLM simulation and analysis solution can help you:

- Improve knowledge reuse through enhanced product and simulation data management.
- Reduce design and simulation cycle time with greater integration of analysis and simulation, advanced optimization techniques and visualization.
- Improve efficiency of IT investments through dynamic provisioning, infrastructure virtualization and capacity on demand.
- Consolidate simulation and product data management to further simplify data administration and streamline the interaction between design and engineering.

Streamline the engineering development process

The PLM simulation and analysis solution from IBM provides a comprehensive open standards-based platform for computer-aided design (CAD) and computer-aided engineering (CAE) simulation and analysis. Bringing together broad capabilities under a single CAE initiative, IBM provides a powerful resource to help companies—from aerospace and automotive to electronics—manage simulation processes and data more effectively.

IBM provides a guided path to innovative PLM

IBM is an innovation leader in business processes, products and technology. We:

- Have a standing 13-year record as the PLM patent leader.
- Deliver application integration solutions such as CAE tools and product data management (PDM) systems with high-performance leading-edge IT solutions such as storage area network-based file systems, grid technology, middleware, cluster computing and scalable visualization.
- Support multiple CAE and solution framework vendors.
- Offer an open, standards-based and scalable platform based on IBM's On Demand Operating Environment.
- Provide access to a full range of IBM skills and resources through our IBM Innovation Centers.

Simplify IT operations while increasing capabilities

PLM simulation and analysis solution components have been integrated and optimized to address each phase of the design, analysis and simulation lifecycle. Our solution is based on the IBM On Demand Operating Environment—an open, standards-based service-oriented architecture (SOA). The architecture of the framework is stable yet open to include new technologies from IBM and IBM Business Partners as they are available. Solution components vary, based on your unique criteria, but may include:

- CATIA V5 Analysis, which supports an early assessment of product behavior, reduces the need for physical prototypes, and easily adapts to the needs of designers and specialists.
- SimManager from MSC Software, which simplifies the management of analysis data at the object level and helps to eliminate laborious file check-in and check-out procedures.
- An analytical framework from Engineous that supports federated process execution and overcomes the interface costs of engineering, automating and integrating dissimilar business and engineering applications to help ensure a seamless, automated and fully integrated development process that saves time and money.
- High-performance compute clusters such as IBM System p™ platform, IBM System x™ platform, LinuxCluster 1350 and IBM BladeCenter® for high-performance compute, database and application servers and blades, extending the benefits of clustered computing, while offering flexibility and manageability to the IT department.
- IBM Virtualization Engine™ to define and view business-oriented performance objectives for workloads running across different platforms.
- IBM TotalStorage® SAN File System to provide a centralized and policy-based storage and data management for heterogeneous server, operating system and storage platforms.
- IBM Tivoli® Storage Manager for policy-driven automatic backup and retrieval of PLM design and analytical data.

Real-world, world-class examples

For a major aviation manufacturer the challenges were clear.

- Deliver high-quality jets tailored to client requests.
- Develop aircraft with risk-sharing partners from across the globe.
- Provide superior maintenance and support.

Integrating IBM infrastructure components with their existing systems, the company reduced the time required to develop an entirely new aircraft platform by approximately 30%, with fewer errors and lower costs.

- IBM WebSphere provides the integration infrastructure for synchronizing frequent data exchanges between the manufacturer and its partners.
- IBM DB2 and ENOVIA VPM provide the flexible information infrastructure, management and control to design and visualize entire aircraft within the computer.

Attractive price and performance

The PLM simulation and analysis solution from IBM helps reduce the cost of ownership of IT resources associated with CAE through:

- Highly attractive price and performance of IBM compute clusters and storage systems.
- Improved efficiency of IT resources through advanced workload management, automated provisioning and grid computing.
- Reduced storage and systems administration costs.
- Expedite response by enabling on demand resources via the IBM Deep Computing Capacity on Demand offering or IBM System p servers Capacity on Demand program, providing systems with excess processors that can be activated as needed.

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