

IBM Product Lifecycle Management Solutions

Extending product innovation across the enterprise



Changing for growth

Product Lifecycle Management

is a continuous process that enables an enterprise to effectively and efficiently innovate and manage its products and related services throughout the entire business lifecycle, from initial concept, creation and use through to maintenance, recycling or disposal.

The one constant in the business world is change.

Topping the list of drivers for change are intensified competition, escalating client expectations and unexpected market shifts, coupled with technological advances, regulatory concerns and globalization. To grow and succeed in today's increasingly competitive world, organizations cannot afford to stand still.

Change presents an opportunity to foster innovation within and beyond your company. Making fundamental business changes to respond to external forces is the key to driving the growth of your organization.

The evolution of IBM Product Lifecycle Management

For many years, Product Lifecycle Management (PLM) has encompassed a portfolio of design-centric software applications used primarily by engineers. These tools were developed to address the challenges of complex product planning and design, product data management, engineering, manufacturing and realtime collaboration throughout the product development value chain.

Traditionally, PLM provided an effective means to reduce product development costs. The consistent growth of PLM has proven that its business benefits extend beyond cost reduction, to include a reduced time-to-market, higher quality products and improved product innovation. However, meeting the higher-level CEO challenges of increasing competition, client demand and globalization requires more than disparate design applications. As a result, the scope and definition of PLM is evolving towards an approach that captures every aspect of the product development lifecycle to drive top line growth and differentiation.

PLM is evolving towards an approach that captures every aspect of the product development lifecycle. IBM is the only company that can deliver a complete PLM solution; this is the IBM difference.

The needs of today's enterprises

Today's CEOs need:

- **Business decision support and collaboration** to take advantage of product and customer information – often locked in proprietary applications and contained within organizational silos – and to support growth through new, differentiated products and enhanced customer service. As many as two-thirds of CEOs¹ believe their product information is not easy-to-use, tailored, cost effective or integrated. When information is difficult to get to, productivity will be affected.
- **Flexibility, agility and responsiveness** to react quickly to, and even initiate, market and business process changes. Innovation is not just about new products; innovation applies to business models as well. Yet only one-third of CEOs¹ are currently prioritizing business model innovation. The ability to innovate within business models quickly and easily is the key to tactical flexibility.
- **Integration** of tools, information and skills across the entire value chain, to provide a single source of information and support the execution of the two aforementioned challenges. PLM must expand from an engineering application, to a source of all product information.

A vast majority of CEOs accept that business and technology integration is fundamental to innovation – but only half are currently executing on this to a significant level. With extensive integrators reporting revenue increases three times as often as their less integrated counterparts¹, the importance of integration is clear.

A major driving force behind these needs is the complexity within the product development value chain. The value chain comprises: the companies involved in product development (the customer-facing enterprise, development partners, suppliers, manufacturers and retailers); the activities undertaken by these companies (customer needs management, simulation and analysis, and production and testing); and the business processes that govern the value chain (including sales and marketing, and materials and program management).

IBM is committed to helping companies implement the right tools for PLM and to integrate the business across the value chain.

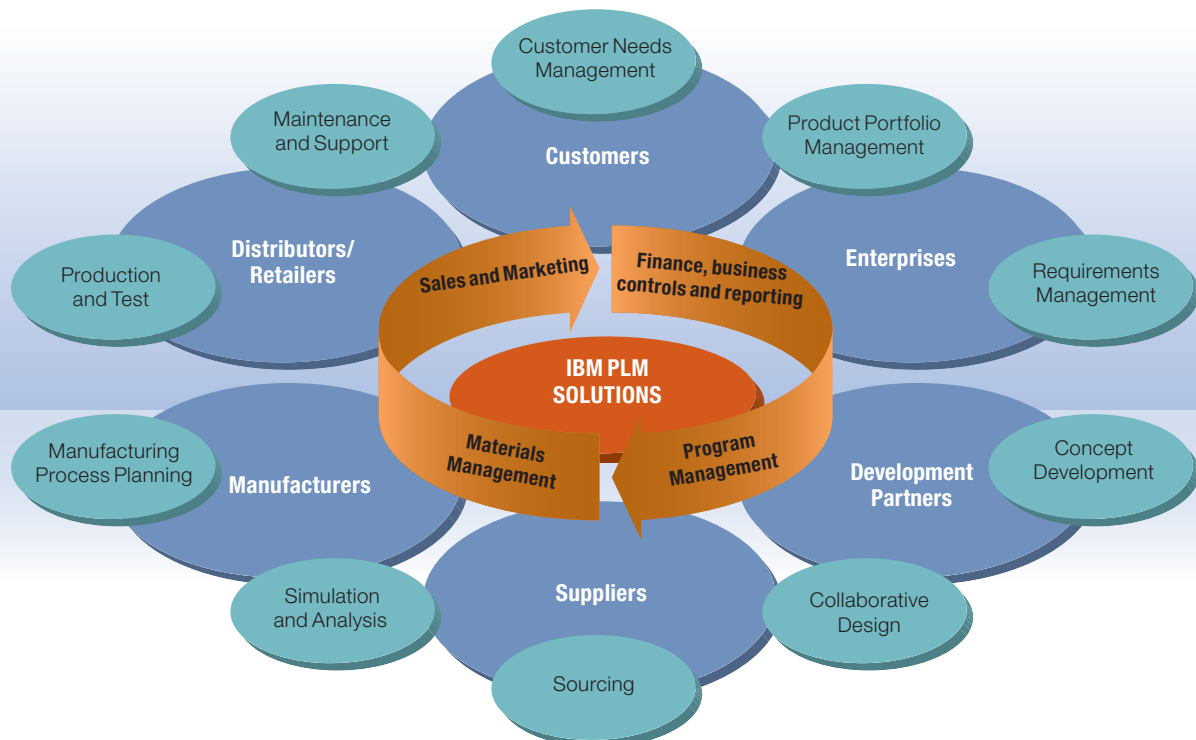


Figure 1: Managing the complexities of the product development value chain with PLM solutions

- The companies within the value chain
- The activities undertaken by the companies
- The business processes that govern the value chain.

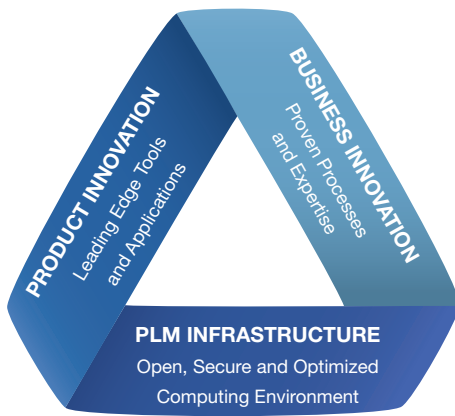


Figure 2: The IBM PLM Solution Model

IBM PLM Solutions

IBM is the only company that can integrate a complete PLM solution across a global value chain. IBM does this through a unique solution model combining product innovation, business innovation and PLM infrastructure. In this model, IBM not only provides leading edge tools and applications, but proven business optimization consulting capabilities, industry knowledge and the real-world experience and expertise needed to improve product innovation across the enterprise. IBM also provides a scalable infrastructure with security-rich and open system features that support the implementation of new business processes, while leveraging existing investments. Together with its vast network of business partners, IBM is uniquely equipped to deliver a complete PLM solution to fit every business need – large or small.

IBM and Dassault Systèmes

Through a strategic relationship spanning more than 25 years, IBM has implemented and supports Dassault Systèmes software applications in over 20,000 clients worldwide. Here are just a few examples of the benefits IBM has delivered:

Panasonic Shikoku Electronics

Reduced new product development time by up to 33 percent and cost by up to 50 percent.

Evernham Motorsports

Reduced cycle times by 50 percent, accelerated response times and maximized car performance using simulation and analysis capabilities

Ichikoh Industries Ltd

Reduced man hours by 80 percent. Modeling that once took more than a day now only takes a few hours.

Payr Engineering GmbH

Reduced data management time by 20 percent through a collaborative platform.

Astra Honda Motor

Increased engineer productivity by 40 percent, reduced prototype requirements for new designs by 70 percent and design iterations by 50 percent, and improved competitiveness and market share.

Product Innovation

IBM helps companies to achieve their goals and reduce the complexities of their product development value chain by delivering six leading capabilities with world class application software developed by Dassault Systèmes and optimized on IBM platforms:

1. Product Design

CATIA Version 5 (V5) facilitates true collaborative engineering and relational product development across the extended enterprise – from style and form design, to digital mockup, analysis and simulation. Knowledge reuse can accelerate development cycles for a faster time-to-market and the freedom to focus on creativity and innovation.

“Because part of the data sent from Japan is already in 3D, we are able to reduce our workload by 20 percent to 25 percent. Moreover, with the accuracy of the digital data improved, we can also increase the efficiency of the processes during the development of the dies and molding.”

Karsono, General Manager IT division, Astra Honda Motor

2. Process and Data Management

ENOVIA is a set of integrated solutions to enable the collaborative management of the entire product lifecycle. Solutions include: **ENOVIA VPLM** for virtual product development, **ENOVIA Digital Mockup (DMU)** for product visualization, analysis and simulation; **ENOVIA SmarTeam** for out-of-the-box departmental product data management; and **ENOVIA MatrixOne** for enterprise PDM, business process development and program management. In addition, **3DLive** provides a single realtime, immersive PLM environment in which stakeholders within or outside engineering can search, navigate, work and collaborate on any or all aspects of the products that drive your business.

3. Digital Manufacturing

DELMIA allows companies to define and simulate optimal manufacturing processes by providing a digital manufacturing process environment for modeling the delivery of actual products. Manufacturers in any industry can virtually define, plan, create, monitor and control all processes (from welding and assembly simulation to line, robot and cell programming) and optimize their production systems on the screen – before they switch to physical implementation.

“It is very helpful for us to be able to quickly and efficiently manufacture mockups and check them with the styling department and the client. Being able to see the real product first-hand to identify and solve issues at an earlier stage is a real benefit.”

Mr Kurokawa, Development Design Group Product Design Team Manager, Panasonic Shikoku Electronics

4. Simulation and Analysis

Assess the structural characteristics of your product and determine its operating performance in a virtual environment prior to manufacture. By effectively integrating, optimizing and automating the design and analysis process, this solution – which includes powerful analysis tools and simulation data and process management capabilities – enables shared visualization, navigation, review, analysis and simulation of digital mockups and development data across the value chain. The result: dramatically reduced design cycle times, fewer physical prototypes and improved design integrity.

5. Systems Engineering

Integrating multiple product development and engineering applications, this IBM solution ties together multiple engineering disciplines – including mechanical, electrical and software engineering – in a collaborative environment. This supports an improved understanding of the performance of the system, allowing potential errors and incompatibilities to be detected at the earliest design stages. This is especially critical as more products are becoming increasingly complex with integrated electronics and software.

“It was important that NASA be forward-looking with the James Webb Space Telescope by using a systems development platform that would be reliable and ahead of the market throughout the extensive life of the mission. Based on open standards, the consistent and unified nature of the IBM software architecture helps curtail any problems that might present themselves down the road.”

Glenn Cammarata, ISIM Flight Software Development Lead, Satellite Software Corporation, a contractor for NASA

6. Collaboration and Integration

IBM works closely with all the leading PLM application providers to unite the companies, activities and processes within the product development value chain, enabling all parties to collaborate in realtime. We provide the applications, open IT environment and integration capabilities needed to enable innovation across the extended enterprise. For instance, integrating to services or after sale processes is critical in many industries. Enterprise asset management, utilizing IBM's Tivoli Maximo product, is a critical business area for which IBM has unique tools and expertise.

“We created the virtual platform to work as though we were on a physical platform, and to share a common database among our 27 partners around the world, in near realtime.”

Jacques Pellas, CIO, Dassault Aviation

PLM Infrastructure



Integrated PLM infrastructure solutions from IBM – bridging business and IT

IBM can provide the expertise and IT infrastructure to help integrate disparate product information and data – to enable a business to collaborate in new and innovative ways. IBM provides this capability through its **service oriented architecture (SOA)**. IBM delivers a SOA foundation that includes a set of middleware software products that allow both your PLM applications and other enterprise applications to flexibly adapt to changes in your business. These open, security-rich, scalable infrastructure products help you to build new business processes and leverage existing processes more cost-effectively.

With IBM SOA, an organization can:

- *Avoid the ‘rip and replacement’ of technology investments and existing PLM tools when integration is required to address changing needs*
- *Leverage the product data trapped in standalone applications and business units*
- *Connect otherwise independent business processes with product information and data.*

To help companies maximize the value of their PLM implementation and existing IT investments, IBM has developed SOA extensions for PLM that combine our industry and PLM knowledge with our IT technology expertise.

Specifically these extensions are industry tailored IBM PLM assets and capabilities that support the integration of multiple enterprise systems and applications. IBM understands each industry is unique and therefore provides the tools and expertise to help companies manage their specific business processes, workflows and data exchange. These SOA extensions for PLM enable authorized users to collaborate across the value chain by providing seamless access to applications and data.

IBM SOA extensions for PLM:

- *Put product innovation at the heart of your business*
- *Link product development into business processes*
- *Make information readily available to executives for an improved view of the business*
- *Allow business processes to be modeled, managed and changed – quickly and easily*
- *Provide an IT foundation that enables all enterprise applications across the value chain to operate in synchronization for data sharing and reuse.*

The power of SOA lies in its ability to take business applications, information and other IT assets and break them down into individual business functions and processes: the ‘building blocks’. These building blocks represent reusable business ‘services’.

Services are functions that, when invoked, accomplish a specific task. Examples of PLM services include such functions as bill of material (BOM) exchange and synchronization, engineering change and product data visualization.

Service oriented architecture (SOA) is an architectural approach that allows services to be mixed and matched to create new, adaptable business processes to suit your business needs – independent of the applications and computing platforms on which they run. Each service can then be reused and combined in different ways to address changing business needs.

The primary IBM software designed to enable IBM SOA includes:

- *IBM WebSphere software for business process management and application integration*
- *IBM Information Management software to extend PLM information to sales, marketing and services, and facilitate parts reuse*
- *IBM Tivoli software for managing composite business applications and accessing secure data across the value chain*
- *IBM Lotus software for realtime PLM collaboration across the value chain*
- *IBM Rational software for software and systems development, portfolio and program management, requirements management, and integrated change management across the entire system.*

Find out more

Visit the IBM Web site at: ibm.com/solutions/plm/pdif

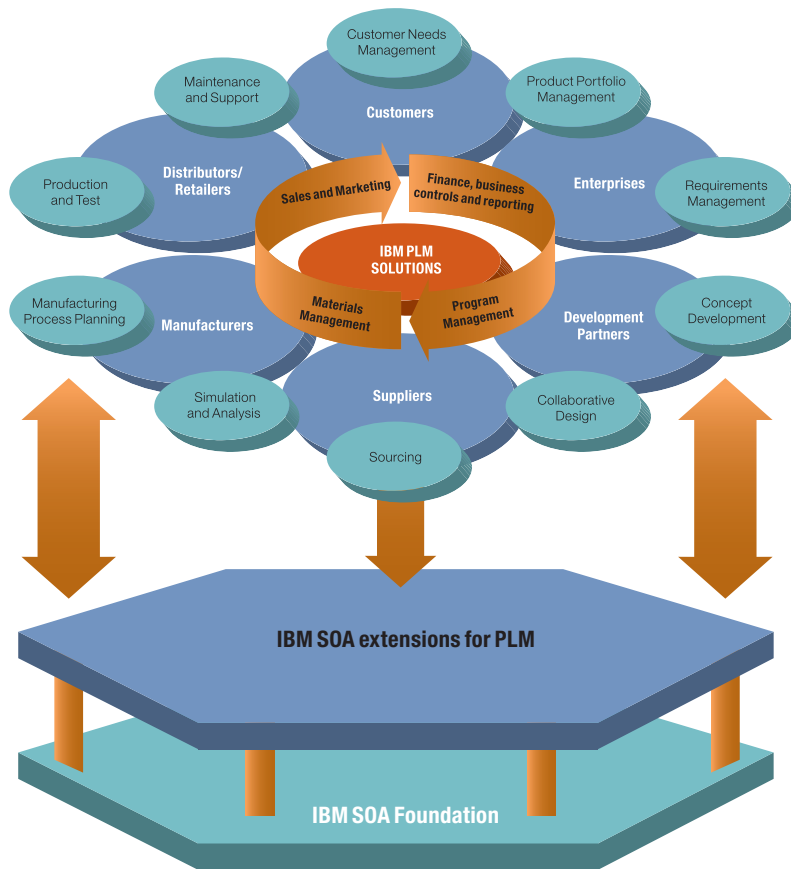


Figure 3: An integrated PLM SOA environment

Business Innovation

Incorporating PLM solutions with strategic business processes can provide you with process flexibility and application support to optimize your business, quickly respond to changing market conditions and maximize return on investment.

At IBM, we don't assume that technology alone will lead to optimal business results. We understand that PLM permeates your entire business and that PLM tools are only as good as the business processes in which they are used.

IBM Global Business Services possesses the deep business optimization consulting capabilities, industry knowledge and real-world experience needed to design business processes that position you for the future. We can analyze your specific needs and determine the best way to use PLM applications to maximize the impact on your bottom line. We also have the skills and methodologies to rapidly implement best-of-breed applications that support your business processes.

To help companies embrace opportunity and achieve business innovation with PLM, IBM has developed a project approach that combines our product innovation expertise with our PLM infrastructure and SOA technologies. Leveraging industry-specific business models built from years of experience and hundreds of engagements with clients, we help clients break their core business processes into their key components. Using SOA, these components can then be standardized and assembled into more flexible, nimble processes that can help a company define competitive advantage, and accelerate the business value of a total PLM investment.



Why choose IBM as your PLM partner?

IBM has helped thousands of companies extend their product innovation across their enterprise. Our clients recognize that PLM is no longer about CAD software alone. It's about ways of doing business in today's global economy. Leveraging PLM to its fullest extent means reevaluating business and product development models, examining new ways of collaborating with global partners, and determining the appropriate infrastructure to support flexibility and rapid change in the business.

IBM is unique as a PLM provider in the following ways:

A world-class manufacturer

IBM possesses deep industry experience and knowledge of the challenges you face. As a primary user of PLM, we understand your business processes and have the support of a global team of engineers to help tackle your real world issues – and keep you ahead of your competition.

The PLM leader

The IBM PLM value proposition is built on a foundation of decades of world-class IBM technology expertise, supported by thousands of IBM engineers and developers in 40 different countries, and eight US national medals of technology. This expertise is valued across the globe, and has enabled us to develop links with business partners that continue to evolve and improve the value we can add for our clients.

An unrivalled commitment

Our unmatched annual investment in Research & Development – the key to innovation – stands at approximately \$5.5 billion. This is testament to our commitment to helping your organization succeed in a world of change. In 2006, IBM innovators contributed to 3,261 patents awarded to IBM – an average of 10 patents a day. United States Patent and Trademark Office statistics show that IBM has generated more patents than any other company for 14 consecutive years.

Breadth of offerings

We can impartially recommend PLM offerings to suit your organization, and employ and integrate the solution within your extended enterprise. Our global presence allows us to help you become a globally integrated enterprise no matter where your plants, suppliers or customers may exist.

IBM Eurocoordination

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¹ Source: IBM Global CEO Survey 2006.

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