Service Oriented Architecture extends the benefits of Product Lifecycle Management

Stimulate product innovation across the value chain

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What if your business could…

- **Extend PLM across your value chain to become a globally integrated enterprise**

- **Create a flexible infrastructure with SOA to drive continual process improvements**

- **Increase opportunities for innovation by collaborating with value chain partners**

- **Integrate product data and processes across your business**

- **Gain visibility into all aspects of your product portfolio across your extended enterprise.**

The challenge

Today's corporate executives face a host of familiar challenges, including revenue growth, cost reductions, asset utilization and risk management. But the approach to meeting these challenges is undergoing a shift. An emphasis on product innovation as a driver of competitive advantage is maturing to include innovating the business processes and models that influence product innovation.

In today's world of rapid change, where new competitors can emerge overnight, and breakthrough innovation can fundamentally shift the competitive landscape, the ability to continually scan the horizon for threats and opportunities and be poised to quickly change directions to meet or seize them has become essential. Traditionally, analysis for making these critical decisions has required information from disparate systems inside and outside the enterprise, proving costly in terms of time and resources.

To succeed today, key players throughout your extended organization need the information to make good business decisions quickly, while achieving cost savings and business model flexibility. You need a supporting technology infrastructure that allows your company to act immediately on those decisions and be completely integrated with your customers and value chain partners to implement those actions.

Capabilities

A powerful new approach known as Service Oriented Architecture (SOA) breaks down the barriers between your company's IT systems and applications to deliver actionable business intelligence in ways never before possible.

Turning innovative ideas into market-leading products requires flexible business processes supported by integrated PLM solutions. Leveraging the IBM SOA Foundation to provide infrastructure support for your PLM systems can help your company achieve the flexibility and integration needed to manage your product-related intellectual capital – from initial conception to retirement.

The combination of an SOA approach with PLM is especially powerful. It delivers greater insight into the business impact of engineering decisions, facilitates collaboration with your external partners regardless of the systems and applications they have chosen and leverages legacy PLM investments, while reducing the cost and complexity of deploying new or updated applications. An SOA approach allows you to empower the investment you have already made in PLM, transforming it from a tool used primarily by product engineers into a powerful business decision support enabler.

Applying flexible SOA approaches to the PLM business domain enables PLM applications to communicate with various business applications – such as Program Management, other PLM applications, ERP, CRM, SCM – despite the fact that they 'speak' different languages. IBM and our IBM Business Partners have built PLM industry extensions for the IBM SOA Foundation, extending the value of applications and business processes that currently run your business, not replacing them.

PLM information and processes are available at the executive and operational level, where the impact of your product development decisions on the entire business can be more quickly and thoroughly evaluated.

PLM coupled with SOA enables flexible, standards-based access to product information, regardless of software application or hardware platform, providing total product information visibility to your product portfolio planners, support engineers, sales and marketing, line of business executives and partners. And because it eliminates traditional information silos, it provides business decision support, increases flexibility and responsiveness and improves integration with your value chain, enabling your businesses to continually innovate their products, business processes and PLM infrastructures.
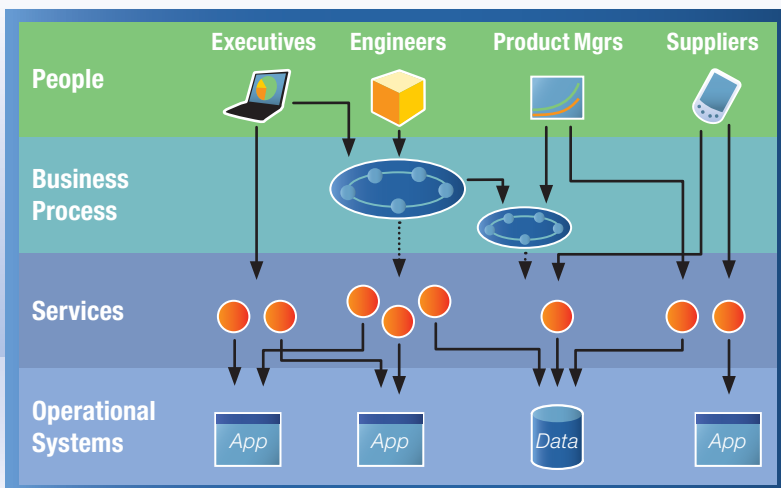
Enabling the full value chain

The SOA approach to enterprise computing allows business functions and processes to be broken into small chunks, or modules, known as services, which can then be reassembled to support different business models. These services can be combined to support one business model today, and a different model when market conditions change. And SOA allows you to integrate these services with customers, partners and suppliers, even if everyone in the chain has different applications and computing platforms.

The IBM SOA Foundation, including standards-based industry extensions for PLM, provides an IT foundation on which virtually all enterprise applications can operate synchronously – sharing and reusing processes and information, and exposing results in a consistent manner across your enterprise. SOA provides the glue that integrates your product development with other business operations and it helps break down the silos that separate engineering from your other organizations, by providing a framework for heterogeneous systems and processes to operate in a homogeneous manner. Business processes exist independent of specific applications and can be viewed and accessed by all companies participating in your product development value chain.

Business processes that impact, or are impacted, by product expectations, performance and configuration must span the entire enterprise and extend beyond PLM software systems. Changes across design partners and engineering disciplines must be coordinated. But often these product management processes are fragmented, isolated and largely undefined.

Figure 1 is a simplified view of how SOA applied to your PLM infrastructure enables users across your extended enterprise with different roles and different data needs to all access the systems they need through common business processes which then call upon SOA services to access the data. Users need not concern themselves with which application 'owns' the data. These SOA services will collect what they need from across disparate application systems and return the information in the format that will be the most meaningful to them based on their role in the organization.

Figure 1: SOA value applied to PLM infrastructure
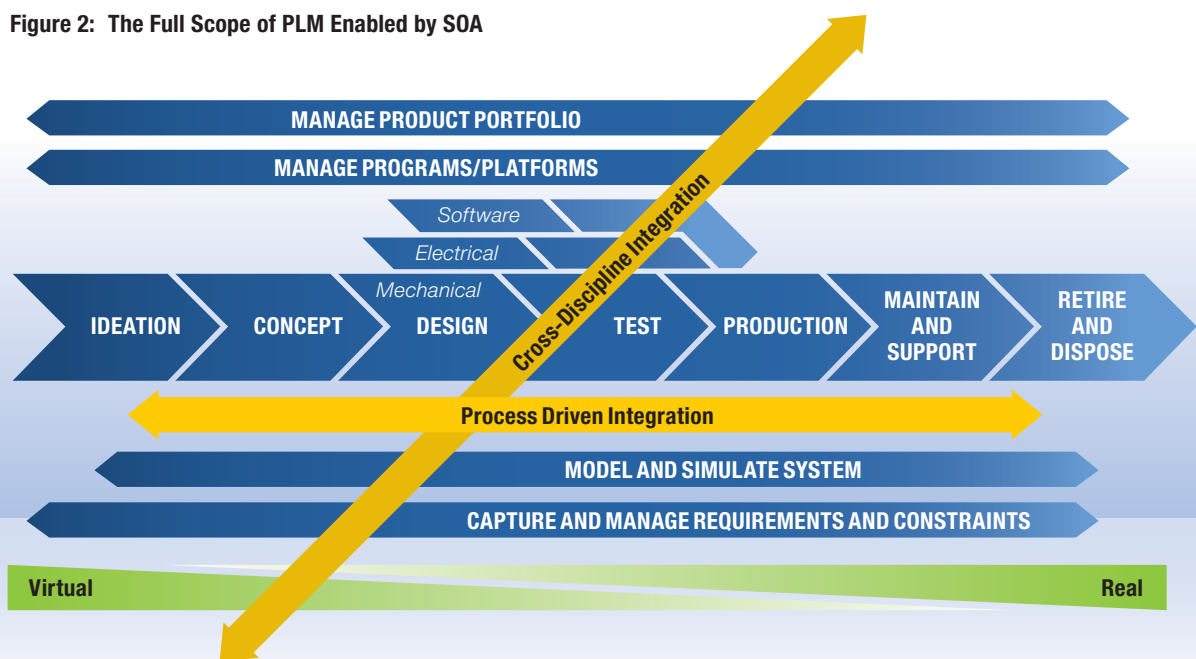

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Enabling your PLM infrastructure with SOA moves your systems from their current siloed, static and hard-wired physical connections to a flexible, dynamic and virtualized environment that is easier to change when business requirements change. When PLM systems can be unleashed in this manner, PLM can bring more benefit to your entire organization, not just engineering, which can completely transform your business and the extended value chain.

This SOA Foundation extended for PLM, which IBM calls the **Product Development Integration Framework (PDIF)**, helps you manage intellectual capital by creating a federated information system that all applications access and share.

PDIF is a collection of IBM and business partner SOA assets, services and data models driven by industry standards and a robust technology infrastructure that integrates an enterprise PLM environment and its business processes. This technology framework can be easily tailored to any customer environment. PDIF enables PLM business processes to operate across companies and systems by combining three layers of capability – collaboration, process management, and enterprise integration – all enabled by SOA.

Figure 2: The Full Scope of PLM Enabled by SOA

IBM's view of the full scope of PLM is illustrated in figure 2. PLM includes all of the horizontal business processes depicted in the center of the graphic required to bring a new product to market: from the time the first product idea originates and an initial concept is considered, through design & development and validation & testing, to product manufacture, maintenance and ultimately retirement. In order to maximize your product and business innovation, the scope of PLM must also include important cross-lifecyle business processes like managing the overall product portfolio, programs and platforms, modeling and simulating the system across the product development lifecycle, and capturing and managing marketplace requirements and operational constraints.

Process Driven Integration enabled by PDIF connects each horizontal stage to the next. This allows you to effectively coordinate and manage the total end to end core business processes involved in product development even if different software applications are used in each step.

Your product development executives also need visibility across these important cross lifecycle business processes, in addition to this core set of horizontal operations. PDIF also enables **Cross-Discipline Integration** which allows you to effectively coordinate product development activities across the three engineering disciplines – mechanical, electrical and software. And before a product design has even left the drawing board, you can test and confirm, well in advance of significant investments of time and money, that a proposed product can be manufactured, serviced and even retired safely and efficiently.

Integrating these processes with PDIF enables better coordination of marketplace, systems and customer requirements. You can do more up front functional modeling, planning and concept design analysis allowing you to test that your functional product requirements will be met very early in the product development process. This changes the product development paradigm. You can now test and then design and build ensuring you get it right the first time.

Benefits

PDIF helps you apply an SOA approach to your product lifecycle management business processes, delivering crucial PLM data across your enterprise. This helps you make better business decisions and deliver greater customer value.

PDIF also provides a comprehensive, modular middleware platform for the development and operating environments of SOA-based solutions.

SOA-enabled PDIF enables all your processes to become interoperable, allowing your enterprise to fully execute PLM throughout the complete value chain. PDIF is poised to help your business solve some of its most complex problems. With PDIF, your enterprise can:

- *Integrate and continually optimize business processes using consistent product information and data available across systems*
- *Speed time to market and improve business flexibility with virtual real-time collaboration tools that are accessible across the value chain*
- *Help to reduce project risk, cost and time to deliver by leveraging open platforms and standards that support a broad ecosystem of partners and optimize product innovation*

- *Leverage existing investments in PLM, PDM, mechanical and electronic CAD authoring tools and software development platforms to enable central management of multiple engineering disciplines and better-manage and control project costs*
- *Increase asset availability and reliability through better performance tracking, while extending the life of your equipment*
- *Decrease the administrative costs of parts proliferation and reduce product failure risk with better search tools that allow you to reuse tested parts and approaches*
- *Respond faster to local, regional and global customer demand and changing requirements, improve cross-selling and event management and gain customer loyalty.*

"With the help of the new solution, our engineers have optimal support for problem analysis and decision making. At the same time, our complex change processes have become significantly more transparent. Even now during the ramp-up phase we can figure the effects in reduced cycle times, error avoidance and improved operative planning."

Hermann Lembeck, Head of Steel Manufacturing, Meyer Werft

Why IBM?

As your PLM partner, IBM offers deep industry knowledge, experience as a world-class manufacturer, strength in R&D, a broad range of solution offerings and a long-standing commitment to PLM. In combination with our relationships with all the leading PLM application software providers, we have the deepest PLM ecosystem supporting PDIF and are therefore the only partner who can truly address this full scope of PLM.

IBM understands not only how PLM solutions fit into the entire operational and IT infrastructure, but also the value of complete product information in the context of the business. PDIF enables process driven integration and cross-discipline integration as well as managing your cross-lifecycle business processes across your extended enterprise environment with SOA.

- *IBM's breadth of business transformation skills, SOA infrastructure and IT know-how are a proven combination upon which we built the open PLM industry extensions to the IBM SOA foundation known as PDIF.*
- *IBM has core competence and experience with SOA and in PLM solutions for virtually every industry in-house or through IBM Business Partners.*
- *IBM offers PLM Centers of Excellence located all over the world staffed by PLM and SOA experts. PLM software applications from IBM and our partners along with the latest versions of our SOA foundation software are installed*

there so we can demonstrate integrated PLM solutions that are already leveraging SOA benefits. Or you can discuss your unique requirements with our experts and we can build a proof of concept to demonstrate first hand the benefits you can achieve by extending your PLM infrastructure on an IBM SOA foundation.
- *IBM's PLM R&D is unmatched in the industry – and we've used our own solutions to transform our company, implementing PLM in-house and within our own value net.*

When you choose IBM to help you extend the benefits of PLM to your value chain and to help you become a globally integrated enterprise, you get the full value of the IBM brand: trust, quality, experience, financial stability, global reach and a proven code of conduct. By leveraging an SOA approach to connect disparate PLM systems both horizontally and vertically across your extended enterprise such benefits as improved decision support, enhanced business flexibility and breakthrough product innovation is not only possible, it's real.

*"IBM has the **dominant market position** in Service Oriented Architecture software markets because of its broad product market position in integration and application server markets."*

Wintergreen Research

For more information contact your IBM Representative, IBM Business Partner, or visit the IBM PLM Web site at:

ibm.com/solutions/plm/pdif