



SAP PLM Program Review

“An integrated offering for global business value”

September 2011

A CIMdata Program Review

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*Produced by
CIMdata, Inc.*

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SAP PLM Program Review

“An integrated offering for global business value”

SAP, a global leader in enterprise software, was also one of the first ERP providers to offer a solution in the Product Lifecycle Management (PLM) space. While the SAP solution has evolved greatly since its introduction, SAP has committed significant resources over the last several years to expand and enhance their offerings. This program review describes their efforts, their current SAP PLM portfolio, and how they bring their solutions to market.

1. Introduction

Companies of all sizes exist to deliver products and services to customers. One way to build a sustainable competitive advantage is in optimizing the internal processes used to develop and deliver these products and services to their intended markets. Many software solutions exist to help companies reach this goal. Over the last twenty years, the market for such solutions has evolved to collectively support Product Lifecycle Management (PLM), a strategic approach to most effectively achieve a company's product and service goals. SAP, a global leader in enterprise software, was one of the first solution providers in the PLM space.

This CIMdata Program Review provides a summary of SAP's strategy in the PLM market, the SAP PLM offerings, go-to-market strategies, and other aspects of their PLM program. This review is not intended to cover the entire SAP PLM offering in detail. Our discussion will focus on many of the improvements made by SAP in the last few years, focusing mainly on SAP PLM release 7.01 (delivered in Enhancement Pack 5), which will be generally available in 2011.

Research for this paper was supported by SAP.

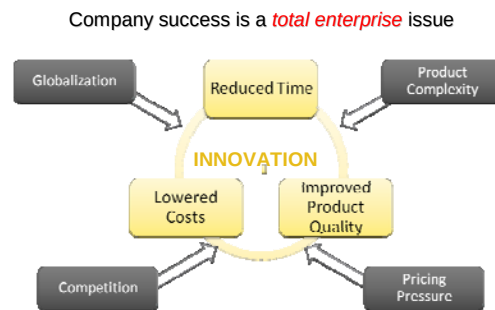
2. Business Challenges

For many years, companies have sought to simultaneously optimize three criteria:

- Reduce development time
- Lower product cost
- Improve product quality.

At the same time, products and services were becoming more complex, with more features and variants required to achieve mass customization. Now add globalization to the mix. According to economist Thomas Freidman, the world

is getting flatter every day, with new competition increasing pricing pressure. Companies have to run increasingly faster just to stay in the same place, if they are lucky. Most just fall behind. Figure 1 summarizes the effects of all of these forces.



Innovation comes in many forms – both internal and external facing

Figure 1—Today's Competitive Environment

In their most recent global CEO study, the IBM Institute for Business Value finds that managers expect this complexity to continue to increase in the coming years, and more than half of CEOs doubt their ability to manage it. According to the study's results, which correlate CEOs' answers with their companies' business performance, the most successful companies succeed through innovation—including customers and other actors in the innovation process.

It is not enough to simply innovate. Companies must ensure that their innovation process is optimal, leveraging all possible information sources. Optimizing product development is crucial to capturing maximum value, no matter where a company sits in the value chain. The Boston Consulting Group (BCG), working with *BusinessWeek* magazine, annually surveys over sixteen hundred executives about their innovation practices. After pulling back on innovation spending in 2009, their 2010 survey showed that 72% of respondents put innovation in their top three organizational priorities (vs. 64% in 2009). Innovation

was seen as vital to taking advantage of the recovering global economy to 84% of respondents.

The need to innovate and capture value is true for companies of all sizes, and across multiple industries. Those at the top of the value chain have to include customers, partners, and suppliers in the innovation process, taking care to effectively capture, manage, and leverage their intellectual property over multiple product lifecycles. For companies that are currently suppliers, their path to success comes from increasing their own intellectual content in what they deliver. If they can supply more than just parts, they can demand higher prices, and keep more of the increase for themselves. This takes different skills, such as design and engineering and will require different sets of IT solutions.

How can companies get there? PLM has evolved over the last twenty-plus years, from a set of tools to an enterprise business strategy, enabled by technology that can help companies of all sizes to optimize their product development processes. SAP, one of the world's largest software companies, is a major player in the PLM market.

3. SAP's PLM Strategy

Founded in 1972, SAP is one of the world's leading software companies. They are a global leader in the enterprise resource planning (ERP) market, and their SAP Business Suite solution portfolio spans most enterprise application requirements including:

- Customer relationship management (CRM)
- Enterprise resource planning (ERP)
- Product lifecycle management (PLM)
- Supply chain management (SCM)
- Supplier relationship management (SRM)

SAP claims that they have over fifty-three thousand employees support over one hundred thousand customers from locations in more than fifty countries worldwide. They also claim that their ecosystem includes twenty-one global services partners, more than seventeen hundred services partners, more than five hundred software partners, twenty-nine global technology partners, and over two million members of SAP on-line communities.

SAP began to offer PLM solutions with their introduction of a product data management (PDM) offering in the 1990s. According to SAP's management, PLM is one of the strategic pillars of their overall business. Based on CIMdata's annual PLM Market Analysis Report (MAR), SAP has had a strong position in the collaborative product definition management (cPDm) segment over the last

several years. SAP and its business partners focus on delivering SAP PLM as part of the SAP Business Suite.

One of the primary benefits of the SAP PLM offering is providing a fully integrated "single source of truth" for product data across the extended enterprise. SAP provides both discrete and process PLM capabilities in the same application platform.

SAP's customers and prospects shared the need to work both faster and smarter. The SAP portfolio includes a lot of leading technology, but was often difficult to assimilate. With a large installed base concerned with expensive "big bang" upgrades, SAP needed to take an incremental approach, offering functionality in business-oriented modules. At the same time, these modules had to offer state-of-the-art PLM capabilities that could entice new customers.

To meet this need on a technical level, SAP moved from a "monolithic" release process to an approach based on "enhancement packs," that could readily be added to existing SAP implementations. These packs include new functionality to make them appeal to existing customers and prospects alike. This approach also energized SAP's sales force and partners, giving them new and expanded capabilities to sell on a regular basis. It also provided the opportunity to showcase other parts of the greater SAP portfolio, like SAP BusinessObjects, which can enhance the value of a company's existing SAP implementation.

SAP also moved from focusing on supplying technology to supplying business solutions that address pressing organizational challenges. PLM fits within "Line of Business Product Development," one of nine elements within this overall approach. Currently, SAP is focused on three major initiatives within Product and Services Leadership:

- Integrated Product Development
- Product Innovation
- Product Compliance

These initiatives address solving business problems, and are delivered using "end-to-end processes," fully developed, role-based business processes enabled by appropriate SAP technology.

SAP's strategic goal is to deliver these end-to-end processes any time anywhere, as shown in Figure 2. SAP's traditional portfolio delivers enterprise applications on-premise. With Business ByDesign and other offerings, they have also strongly entered the on-demand market. Finally, their long-time partnership with Sybase for on-device solutions resulted in the Sybase acquisition, giving SAP a strong position in mobile computing.

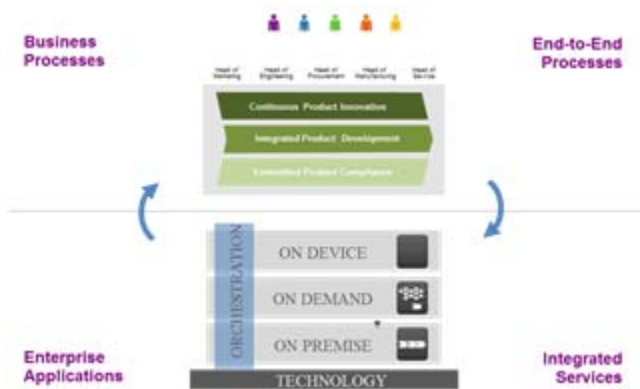


Figure 2—SAP PLM Supports Discrete and Process PLM

4. SAP’s PLM Program and Solutions

In our long-term study of the PLM market, CIMdata has found it useful to develop and maintain a model that generally describes offerings employed by organizations to pursue their PLM strategies. This hierarchical model, shown in Figure 3, includes:

- Foundation technologies, which provide a set of utilities, services, and capabilities upon which higher order application functions rely.
- Core functions, most of which are met by solution offerings now called product data management (PDM) systems.
- Applications, which build upon foundation technologies and PDM to provide capabilities in program/portfolio management and Requirements Management.
- Business solutions, which through data model extensions and the encoding of industry-specific business knowledge can help companies adopting PLM-enabling solutions achieve a more rapid time to value.

In this section, we will use this PLM model to help structure our description of the SAP PLM 7.x offering.

4.1 Solution Packaging

Our discussion of the SAP Business Suite offering starts at the bottom of Figure 3 with its foundation, architecture.

4.1.1 Architecture and Operating Environment

The foundation for the SAP Business Suite, and these enhanced PLM capabilities, is the ERP Central Component 6 (ECC 6), built on SAP’s NetWeaver platform. This foundation also provides the basis for core PLM functionality, including bill of material (BOM) management, engineering change management (ECM), document management, and other functions that map well to the foundation technologies shown in Figure 3.

SAP positions NetWeaver as a service-oriented application and integration platform. According to SAP, it was built on open and de facto industry standards, and interoperates with other commercial solutions, such as .NET, Java, and WebSphere. Existing customers seeking to leverage the new PLM capabilities described in this program review must be on ECC 6.

4.1.2 User Environment

One of the major improvements in the SAP PLM suite is its user experience. Historically, SAP was known for its many complex screens, transactions, and other interaction methods that were in stark contrast to those of other PLM solution providers, who offered simpler, more customizable interfaces. For SAP PLM 7.x, SAP took what was, for them, a radical approach based on “use cases.” This software development technique focuses on users, what they do, and how they do it. Software developers use these simple descriptions to define how users interact with the

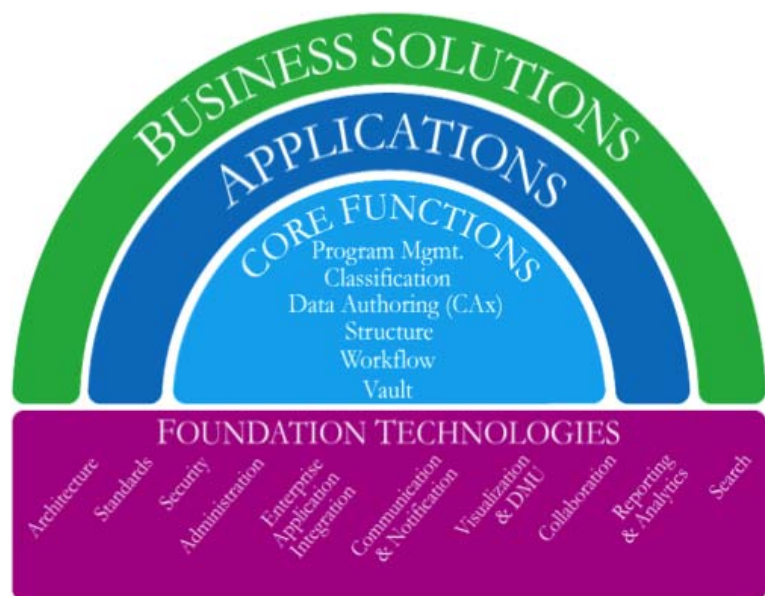


Figure 3—CIMdata’s PLM Model Depicts Breadth of PLM

system, and what functionality needs to exist to support this interaction. It is important to note that this new UI had to support both discrete and process-oriented PLM users, as shown in the top of the figure.

SAP provides this enhanced user experience with a common “look and feel” to users that access SAP PLM in three different ways:

- A web-based UI accessible using web browsers such as Microsoft Internet Explorer
- The SAP NetWeaver Business Client, which can provide better performance
- The SAP NetWeaver Portal

The new UI is shown in Figure 4 below. The user landing page after login—their Control Center/Work Center—provides ready access to all open tasks, system notifications, and other work items. Users can also customize this page based on personal preferences.

A major recent enhancement in the SAP PLM UI is the

Object Navigator, a form of global “where-used” that graphically illustrates the relationships between any object of interest and other managed information. For example, when users are defining an engineering change, the Object Navigator quickly shows them all related information they might need to support the decision-making process.

SAP PLM also enhanced the user interface by bringing the power of SAP BusinessObjects to the desktop. In 2007 SAP acquired BusinessObjects, a leading provider of business intelligence (BI) solutions. BI is a computer-based approach for identifying, extracting, and synthesizing business data. BI can help identify trends in data that could not previously be analyzed in a timely fashion. Within the SAP PLM solution, BI technologies are used in SAP’s Business Context Viewer (BCV), which is a core part of the SAP PLM user interface. The BCV provides embedded analytics within the context of a user’s on-going work. Relevant analytics can be provided in the “side panel” of the SAP PLM UI as shown in Figure 4, or can also be delivered in

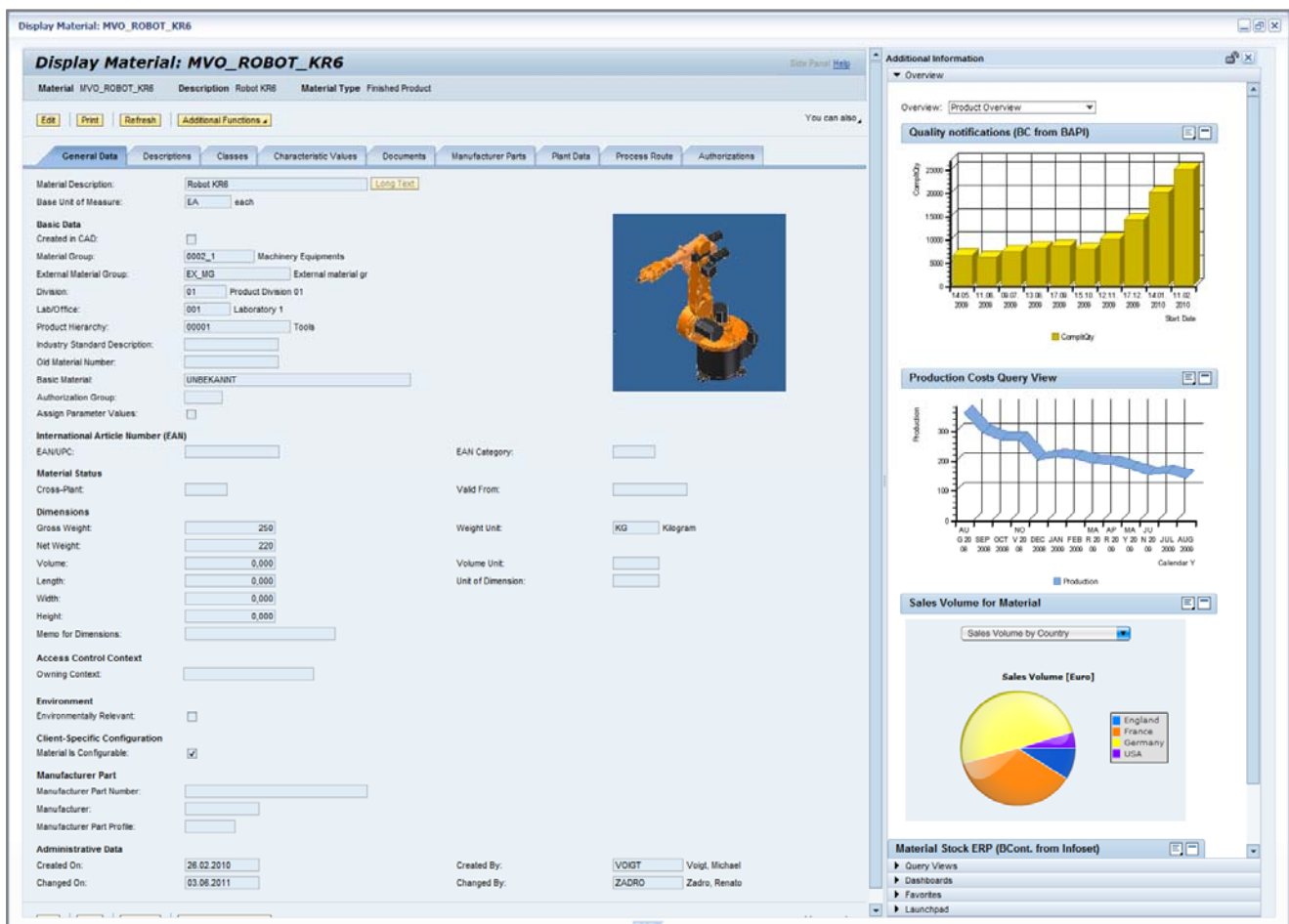


Figure 4—SAP PLM User Interface Cleaner, More Flexible

custom dashboards. Product information is aggregated from across the relevant SAP functions, and provided to the user in a context-sensitive manner. The BCV functionality is part of all Product and Service Leadership value scenarios.

As part of their Customer Engagement Initiative (CEI), SAP sent staff members around the world to watch their customers work on a day-to-day basis. This in-depth study was supplemented by strong customer interaction during the development process. For example, in creating their new Recipe Development solution, SAP developers worked closely with ten current customers, with whom they held virtual meetings over two and a half years, over ninety meetings in all. Input from these meetings was used to help define the user interface for this solution including screen layout. Further, this process helped identify which elements were the most important to support. The overall result is a solution that helps deliver the full capabilities of the SAP Business Suite platform, with a user interface and interaction methods that are more flexible and user-tailorable than before.

4.1.3 Core PLM Functions and Foundation Technologies

This new set of common UIs provides access to SAP's core PLM functions, which organize into four categories:

1. Product Management
2. Product Development and Collaboration
3. Product Data Management
4. Lifecycle Management

These categories are logical, and are not necessarily reflected in the physical packaging of the SAP offering. The rest of this section will focus on the first two items, since many of the solution enhancements introduced by SAP in their past releases are in these categories.

Product Management—Idea Management

Enhancements for Product Management have been a major focus for SAP over the last few years. Tools for “idea management,” which some term the “fuzzy front end” of the product development process, are critical to optimizing the innovation process. The BCG 2010 innovation study cited above suggests that supporting the idea management process was vital, with “difficulty selecting the right ideas to commercialize” and “not enough great ideas” being two of the top-five issues identified by their respondents.

Solution providers in this space tend to be small, niche providers. While they can provide some good functionality, they are not integral with other business processes. (For those that use other third party offerings, SAP will continue to support integrations with them). To meet this need within

the Business Suite offering, SAP collaborated with a major consumer packaged goods (CPG) customer, Colgate, to gain insights into what was needed. CPG companies are known for their innovative marketing and product management practices, making Colgate a good source of process knowledge. Beyond Colgate, SAP added a number of other customers, all working in a co-innovation, development process where all employees could influence the solution features.

The result is SAP's recent ideation offering, code named “Edison.” Edison supports six steps, which can be mixed and matched by users to meet their needs:

1. Create ideation session
2. Submit ideas
3. Working with ideas
4. Create evaluation session
5. Evaluate ideas
6. Review evaluation results & promote ideas

The process starts with collecting and soliciting ideas. Ideation sessions are ad hoc tasks where people are identified who might have inputs to provide, and are then asked to participate. Users can invite people they know, or use the search function to find subject matter experts in the corporate directory managed in the SAP HR system. As part of defining an ideation session, they can include questions (using a simple, embedded survey development tool) to be answered as part of data entry. Participants are contacted by email, with a link provided to Edison.

Of course, ideas don't only come from within the organization. Companies in many industries are talking about “open innovation,” where ideas can come from anywhere, and SAP sought to support this process. To work with people outside the organization, companies can integrate Edison with SAP's StreamWork offering (to be described later) that works outside the firewall, and then bring that information back into Edison.

The session owner can then work with the ideas, organizing them, adding other content, or manipulating the ideas as necessary. The Edison UI supports many “social computing” type features, like search and tagging for organizing and linking ideas. The goal is to get them ready for the next step, an “evaluation session,” which works much like the ideation session. Ideas can come from the current ideation session or from others selected by the user. Evaluation sessions can use the same participants, or define others to provide input on the ideas under consideration. The session owner defines the set of criteria upon which the ideas should be rated. The invitation to this virtual session goes out to participants to get their input. In the final and most important step, Edison provides the user with the

panelists' feedback and helps them promote ideas for further development as part of the product development process.

Product Management—Enterprise PPM

This promotion process leads naturally to the next major enhancement to the front end of the product development process, SAP's Enterprise Portfolio and Project Management (PPM) offering, shown in the top of Figure 5. If organizations have both applications, users can promote ideas from Edison into PPM for further development. Previously, SAP had two solutions that supported different aspects of this domain: cProjects and Resource and Portfolio Management (xRPM). SAP sought to take the best elements of these two solutions, again with help from lead users in consumer products. SAP formed a council of consumer products customers, who worked with SAP for over three years to bring this solution to fruition, and which first became available in 2009. The first release focused on combining the existing cProjects and xRPM functionality. According to SAP, the latest release, in general availability since November 2010, added some new capabilities, including capital project portfolio management, resource management, better integration with BusinessObjects Explorer, enhanced Excel import capabilities, and better document management support. This new release also provides better integration with SAP's Project System (PS), their heavyweight project and program management solution.

Supporting product and service innovation was only one of three types of enterprise portfolio and project support SAP sought to provide. The second focus area was to help IT organizations align activities and resources with business strategy which often includes managing large SAP deployments. Finally, SAP wanted to better support companies managing portfolios of capital projects.

Many companies manage their capital projects using solutions from Primavera (acquired by Oracle in 2008), and connecting with Primavera was vital in this market space. In December 2009, SAP acquired SOALogix, whose Confero EPM solution provided a bi-directional integration between Oracle Primavera P6 and PS and the SAP Plant Maintenance system. This SOALogix offering formed the basis of the first release of SAP's Enterprise Project Connection (EPC) offering. This allows users to continue managing projects and do resource scheduling in Primavera. In future releases, SAP will use this intellectual property to develop bi-directional integrations with other leading solutions, such as Microsoft Project/Project Server. (This is planned to be a major improvement over their current direct, one-way integration with Microsoft Project.)

SAP's PPM solution allows companies to manage and version their portfolios, providing the dashboarding and analytics capabilities users would expect in this space. Because it is part of the SAP portfolio, it can access financial, resource management, and other data from other SAP Business Suite modules. The project management tools support multiple, nested projects, Gantt charting, and best practices like Six Sigma and Advanced Product Quality Planning (APQP). Users can also import project information directly from Microsoft Project as supported in cProjects.

In 2011, SAP plans to introduce more detailed portfolio monitoring capabilities to the market delivered using their "Rapid-Deployment Solution" approach (which will be detailed later in the "Go-to-Market" section of this program review).

Product Development and Collaboration

This SAP PLM category includes most of what CIMdata and the market would describe as core cPDm functionality. Figure 5 depicts a high level view. One major recent development for SAP is the movement of concept development and variant management into the core of SAP PLM. Previously, concepts and variants would be created in the integrated Product Process Engineering (iPPE) solution, and then the "concept BOM" would be moved into SAP PLM for detailing using the managed MCAD information. Because the two systems were separate, any changes made on either side of the equation would require extra work. Now, this functionality is embedded in the Product Structure Management function within SAP PLM, making the process much more integrated. Their Integrated Variant Configuration UI uses tables to show how different elements map to each variant.

As in most cPDm solutions, users can create, manage and modify BOMs, and complete the handoff from engineering to manufacturing. However, the integration of BOM management with core SAP Business Suite functionality allows engineers and others in the development process to readily tap part cost, availability, and other attributes to better support their work. This extends to suppliers and partners in product development, subject to the appropriate access controls and security. Users can also initiate engineering changes against managed parts, assemblies, and products. The SAP PLM 7.01 release includes major enhancements to engineering change support. In the past, SAP PLM was known for rigid workflows that could only be defined by system administrators. Now users can create ad hoc workflows, using the Object Navigator to find and select the relevant information, set the appropriate change effectivity information, and identify the necessary routing

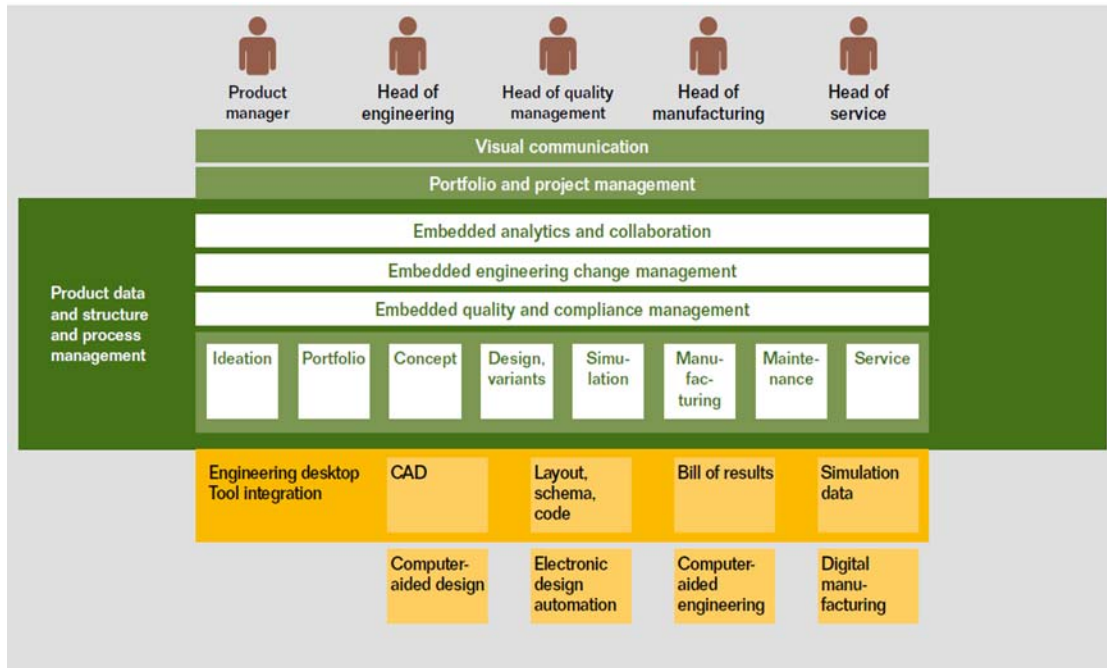


Figure 5—SAP PLM Spans Ideation, Engineering and Manufacturing

and all the other information necessary to kick off the process, all from their Control Center / Work Center UI.

SAP PLM 7.01 is also planned to include two new, important capabilities in BOM management. SAP will increase support for product structure management, better enabling functional structures and views; integrated variant configuration and simulation; and enhanced change management. In response to customer demand, SAP has also developed Product Structure Synchronization (PSS), an offering that is designed to improve the handoff from engineering to manufacturing. Pushing a BOM from engineering to manufacturing has been available for many years. The problems arise when changes occur in one domain and need to be incorporated in the other domain, e.g., engineering changes that affect manufacturing processes, and changes originating in manufacturing that require additional engineering effort to incorporate in the product. This new PSS solution enables work to proceed in parallel and helps provide the necessary synchronization between the engineering and manufacturing BOMs. It also supports multiple BOMs for multiple manufacturing sites, remembering where the BOM elements originated and where they need to relate.

An area of great improvement for SAP over the last several releases is their support for 3D data and engineering work-in-process (WIP). In April 2005, several SAP development partners—Cideon, CENIT, DSC Software AG, and .riess—

formed the “PLM Alliance...to jointly develop, market and implement solutions surrounding SAP PLM.”¹ Two other companies, Right Hemisphere and LeverX, recently joined the alliance as Associate Members. One advantage for companies using solutions developed and packaged by the PLM Alliance is that they are on the SAP price list and are directly supported by SAP just like any solutions developed by SAP internally. PLM Alliance members can provide any desired additional support.

These PLM Alliance technologies and consulting services include direct integrations between SAP PLM and the major mechanical CAD (MCAD) offerings in the market. Integrations link the capabilities of MCAD solutions with the Engineering Desktop shown in Figure 5. SAP states that twelve hundred of their eight thousand SAP PLM customers are using these solutions to manage engineering WIP. Based on some recent implementation projects, these MCAD integrations can meet the requirements of many engineering departments to support product development. For example, Allison Transmission, a world leader in commercial-duty transmissions, is in the early stages of an SAP PLM implementation program. Allison is a long time user of NX, a leading MCAD solution from Siemens PLM Software. The first major element of their program plan is to replace their existing system that manages NX and

¹ www.plmalliance.com

engineering WIP with SAP PLM (using the NX integration from DSC Software AG). This PLM implementation plan was developed knowing that their product development plan includes more new products being developed in the next few years than in the previous seventy years. SAP PLM release 7.01 should further enhance the current MCAD integration offerings.

Of course, the use of 3D data and representation of product information and design has value across the enterprise, not just in engineering. To that end, SAP PLM has supported a number of different visualization solutions that work within the SAP PLM user interface to help end users leverage that 3D information for better decision-making. In 2007, SAP Ventures made an equity investment in Right Hemisphere, a leading independent provider of visual product communication and collaboration solutions. In 2008, SAP announced that Right Hemisphere's 2D and 3D solutions would be integrated into the SAP PLM solutions and would "serve as the standard for viewing, collaborating and publishing graphical product data for SAP's next generation of enterprise applications." Visualization is embedded in the SAP PLM Control Center / Work Center user interface, supporting thumbnails and other access to visualization data expected in the cPDM solution space. While SAP had visualization capabilities before, the tight integration with Right Hemisphere helps provide stronger digital mockup (DMU) capabilities—functionality that many engineering organizations consider an essential part of their product development process. This DMU functionality is essential to SAP PLM's dynamic assembly viewing and simulation capability. Integrated with SAP PLM's native variant configuration management capability, it allows users in product engineering to simulate and visualize product variants to support clash analysis. Beyond engineering, this same information can support marketing in collateral development. In September 2011, SAP demonstrated their commitment to this technology and its strategic importance to their PLM offering by acquiring Right Hemisphere. Beyond just the technology, this acquisition shows that CAD and 3D data are more than just "documents" in SAP PLM, playing a crucial role in enabling visual decision-making capabilities.

In 2011 SAP will introduce the "SAP PLM Rapid Deployment Solution," a basic package for enabling their core design processes to help companies more easily adopt SAP PLM. Specifically designed to help companies overcome common SAP PLM installation hurdles, the SAP PLM Rapid Deployment Solution is planned to include basic configurations for SAP PLM to help implementers get their clients up and running faster. PLM Foundation is focused on design process definition and management,

master data management (MDM), and product data management (PDM).

While Figure 5 emphasizes mechanical products, SAP also offers an integrated solution for process-oriented products within the SAP Business Suite. Their existing solution, Recipe Management is focused on collecting and managing data—mainly specifications, a core SAP data object. It was included in SAP's Product Data Management category for that reason. However, SAP's Recipe Management customers required a more complete solution. As with the other areas of their solution, SAP conferred with their consumer products lead users for direction, to understand where and how they develop many recipes, and variants of those recipes, to build their brands. These customers did not want to lose the existing Recipe Management functionality. They needed something to help them take their formulation information out of their lab notebooks and Excel spreadsheets and put it into a solution where they could readily create BOMs and master recipes, and then transfer them to manufacturing. Working jointly with these lead users, SAP created use cases by visiting customers around the world, and following their formulators, product designers and other professionals to learn just what they did on a day-to-day basis. The original list included ten customers and over ninety in person and virtual meetings. Their goal was to create a new Recipe Development solution that an average user could pick up and use without extensive training.

In the process industry, the term "specifications" has a different meaning than in discrete manufacturing. In the process industry, a specification defines all of the elements that go into a given product. From these details, the system can calculate calorie and vitamin content, pH, and other key process indicators. Users can build multi-level, nested recipes, making the development of new variants much easier.

The Recipe Development solution includes tools to take this specification information and create the information necessary for labeling, regulatory submissions, and other downstream documentation. While this may sound simple, global companies have to manage labeling that meets many different national and regional standards, and in multiple languages. Enhanced support for such regionalization was a major focus for the SAP PLM 7.01 release. Beyond that, the need for marketing statements like "low fat" and "heart healthy" is essential for product differentiation on the shelf. More importantly, people with dietary restrictions, like Kosher, Halal, or nut allergies, rely on the labels being correct. Companies producing those products want the SAP solution to help them provide accurate information. (In

many cases, this information is exported in XML to third party label artwork solutions.)

As with other SAP solutions, Recipe Development is built into the SAP ECC core, allowing users access to all of the pricing, sourcing, and supply-chain information managed in other SAP Business Suite modules. For example, the new solution provides recipe optimization tools that can help adapt an existing formulation to find one that has a minimum price while maintaining a desired threshold of Vitamin A and C. Before, users would have to take ingredients information out of SAP, put it into a spreadsheet to complete the calculations, and then re-enter the information into SAP, a time consuming and potentially error-inducing process. Now users can stay in one tool, do the calculation and go on with their work.

One of the main benefits SAP claims for its Business Suite is its seamless integration across the product lifecycle. All of the information created during the product development process is readily available for use in manufacturing. Just as with BOM information for discrete products, getting specifications and manufacturing process information to the factory floor is crucial. An enhancement to this solution planned for later in 2011 is an improved “Handover to Manufacturing for Process” module.

4.1.4 PLM Applications for cPDm and Digital Manufacturing

Collaborative product definition management (cPDm) should be at the core of any company’s PLM strategy. CIMdata defines cPDm as solutions that address managing the complete product or plant definition lifecycle, including all of the mechanical, electronic, software, and documentation components and the processes that are used during the lifecycle including in-service operation and maintenance. It includes Comprehensive Technology Suppliers, and Focused Application Suppliers (e.g., visualization and collaboration, and content and document management.).

The SAP PLM portfolio includes other functionality that CIMdata would categorize as cPDm applications. SAP’s offering includes additional features and functions, such as Quality Management (which is a core part of their ERP solution in the SAP Business Suite), and their Environmental Health and Safety (EH&S) offering, which is licensed separately. Many of the SAP PLM customers use these offerings.

SAP has long offered embedded compliance solutions that were conceptually packaged as part of their “Lifecycle Management” solution. Compliance is a difficult problem, one that requires information from across the extended

enterprise. The integrated nature of the SAP Business Suite makes that information available. Supporting this important business process is the main objective of the “Embedded Product Compliance” value scenario.

In SAP PLM 7.01, SAP is enhancing their support for the REACH (Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment), RoHS (Restriction of Hazardous Substances), and WEE (Waste from Electrical and Electronic Equipment) standards. These enhancements cover both discrete and process PLM, and extend from design to manufacturing and service. These enhancements leverage the embedded analytics provided by the Business Context Viewer, and the SAP BusinessObjects platform.

Digital manufacturing solutions, which CIMdata defines as systems that support definition of the processes used to produce a product. This definition includes supporting simulation and analysis of those processes; and the manufacturing environments used to produce the product, including production equipment and lines. Adopting digital manufacturing solutions can help extend a company’s PLM vision and strategy to the shop floor. In 2007, SAP acquired Visiprise, which they combined with their existing SAP Manufacturing Integration and Intelligence (MII) offering to provide enhanced visibility into shop floor processes and results. SAP uses this solution to provide feedback from the plant to the engineering and manufacturing functions, helping them dynamically improve a product and the associated manufacturing processes.

4.1.5 Business and Industry Solutions

Because SAP enterprise solutions are used extensively in many industries, through repeated adoption and adaptation their solutions have come to incorporate the data and processes important to those industries.

CIMdata places Business Solutions at the top of the CIMdata world-class PLM model shown in Figure 3. Each layer in this model builds on the layers below. Business solutions are applications that focus on specific problems faced from within a business context, and could be focused on a specific industry. They apply best practices to develop workflows, and often include extensions of the underlying data model to support these specific requirements. Using this definition, much of what SAP offers can be termed business solutions. But SAP and other PLM solution providers faced a problem. While their solutions embodied significant business and industry knowledge, and could be adapted to address a wide range of problems, in the end they were still selling software.

SAP’s solution was to develop an end-to-end process-centric strategy, as was briefly described in Section 3. This

strategy is delivered, in part, using “end-to-end processes,” pre-defined workflows that span multiple organizational functions (e.g., marketing, R&D, operations, and product management) that can be delivered using several different SAP offerings. But the focus here is on delivering value, and on the customer’s business problems, not on which pieces of software must be purchased. For example, SAP’s process for integrated product development illustrated in Figure 6 shows the roles in the process, and lists what functionality best supports those roles.

SAP recognizes that the whole scenario is too large to be implemented in one step. These scenarios set a vision for R&D, marketing and other functions for SAP to deliver against. For example, Figure 6 includes some of the new functionality described earlier, such as Idea Management and Concept Development.

To help deliver rapid time to value for these new solutions within existing SAP PLM implementations, SAP has developed and is starting to deploy a new approach to services enablement. Termed “Rapid-Deployment Solutions,” these packages are designed to include

everything SAP Services or a services partner needs to implement a specific SAP offering. This includes SAP software pre-configured for the implementation, a set of pre-defined services, and other enablement content to quickly empower services organizations. SAP believes their Rapid-Deployment Solutions are complete. They include SAP best practice processes, and are delivered in a modular fashion to ensure both integration to the current IT landscape and support of future enhancements. The goal is to get customers up and running, typically in less than ninety days, at a fixed price and scope. This fixed scope and price technique has been proven by other PLM solution providers. SAP claims to be getting good early returns, with some early adopters achieving a 20% reduction in total cost of ownership (TCO) versus their existing methods of implementation.

For example, in 2011 SAP is planning to release a Rapid-Deployment Solution for portfolio monitoring. Focused on their existing SAP Project System (PS) customers, it is intended to enable portfolio-based decision making for new PS projects, and allow users to monitor those projects on a

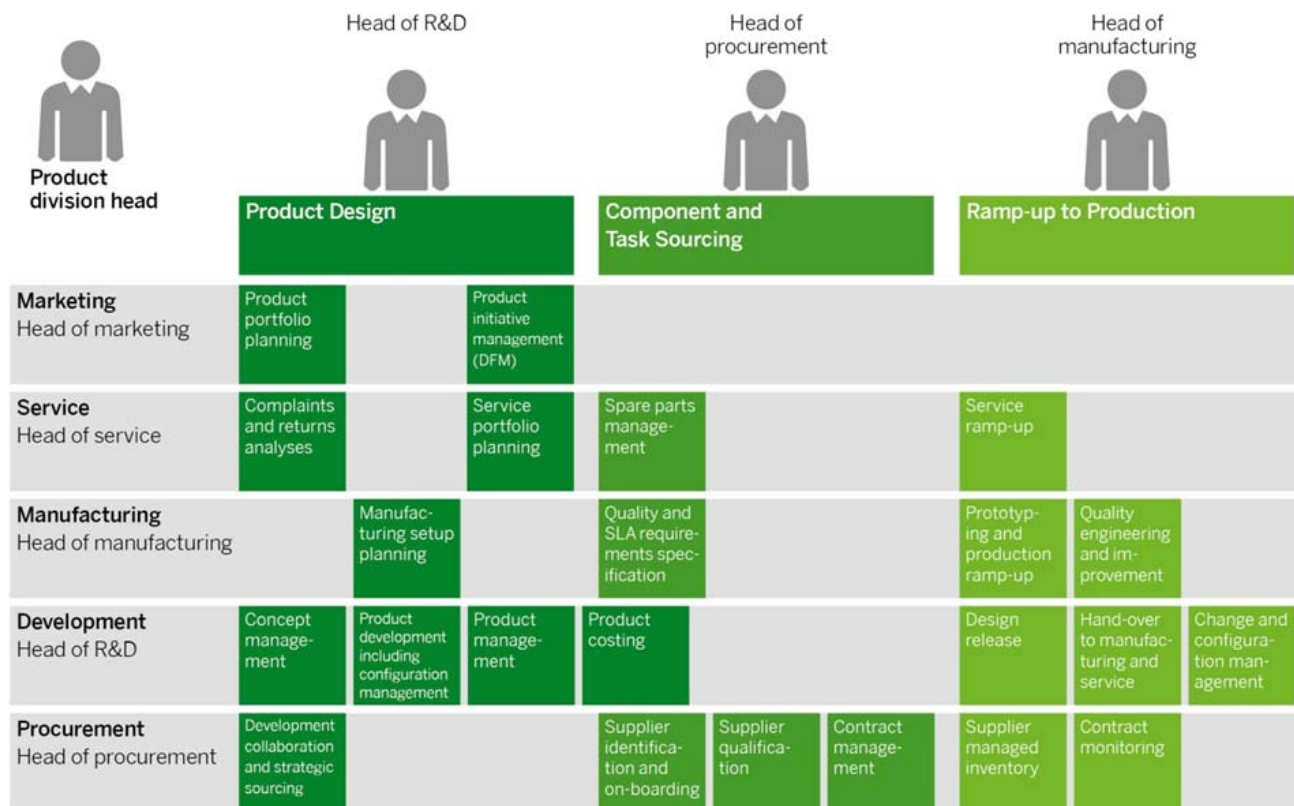


Figure 6—SAP’s Support for an Integrated, End-To-End Development Process

portfolio level. This includes accessing SAP financials and other standard analytics using the Business Context Viewer. To be able to deliver on the TCO promise of this packaged offering, SAP must qualify customers, determining if they have the right level of software, as well as project management process maturity to be ready for a rapid adoption process. Based on initial results, SAP plans to develop more Rapid-Deployment Solutions in the future.

4.2 Go-to-Market

CIMdata's definition of a solution providers "PLM Program" includes how those providers will get their solutions in the hands of their end users, i.e., their "go-to-market" process.

SAP primarily uses direct channels, relying on their worldwide network of subsidiaries to market and distribute their products and services locally. Over thirteen thousand services employees help implement SAP solutions and support their customers around the world. According to SAP, their services include:

- Implementation consulting
- Business analytics consulting
- Transformational consulting
- Custom development
- Support and maintenance
- Program management and quality assurance
- Education and training

In 2010, over 20% of SAP's total revenue came from professional services and other services.

SAP's partner network expands their global reach, and includes companies such as independent software vendors (ISVs), systems integrators, and business process outsourcing (BPO) providers across all partner categories. SAP's services partners for SAP PLM include:

- Accenture
- Axon
- Deloitte
- HP Services
- IBM
- ILC GmbH
- Infosys
- LeverX
- Linx AS
- Platinum DB
- Tata Consultancy Services

To help their services partners deliver rapid time to value with SAP PLM implementations, SAP is starting to deploy "Rapid-Deployment Solutions" across their partner base. SAP is using packaged solutions and implementation knowledge to bring new and existing partners up to speed.

5. CIMdata's Assessment of SAP PLM

SAP has been a major PLM solutions supplier for many years. Dozens of SAP PLM references are available on www.sap.com for their more than eight thousand SAP PLM customers.

SAP's move to the "fuzzy front end" of the innovation process could not come at a better time. Companies are more focused on the top line than ever, and ideation is the starting point. The fact that SAP has developed both an integrated solution in Edison and plans to include solutions outside the firewall like SAP StreamWork in ideation workflows should position them well for the open innovation that many companies see as crucial to their market success.

Historically, SAP was a manufacturing-centric solution. SAP recognized this limitation and built their roadmap to both address these limitations and to expand their footprint to encompass more of the complete product lifecycle. The new functionality released in SAP PLM 7.0 and now planned for 7.01 appears to be moving their offering from manufacturing-centric to being more engineering and enterprise friendly. Their MCAD integrations continue to be improved by their PLM Alliance partners, and have shown acceptance by engineering groups in recent implementations. Support for BOM management and configuration management is also enhanced. One of the biggest philosophical changes for SAP is to put 3D information in the center of the decision-making process. Their acquisition of Right Hemisphere and the deep integration of their offerings in the SAP PLM solution and in the value scenarios illustrate their commitment to this shift in emphasis. SAP has also improved their solutions for the bi-directional communication of engineering information with manufacturing.

Another potential advantage for SAP customers is brought by their acquisition of BusinessObjects in 2007. SAP has embedded BusinessObjects technology in SAP PLM with the Business Context Viewer, which provides on-demand business intelligence to support product lifecycle decisions. The side panel in the UI is easily customizable and can be adapted by user organizations to deliver a wide variety of information. Users can supplement this information with

enterprise search and Internet search, putting a wide range of product-related information on the user's desktop. Their investments in in-memory search have shown some significant performance improvements in searching large enterprise deployments, and could prove to make this capability even more valuable for SAP PLM users in the future.

CIMdata is encouraged by SAP's technology and the go-to-market improvements described in this paper. Some of their initial introductions, like PPM, have contributed to the incremental increases in SAP PLM revenues the last several years in our global PLM market study. Since most of this growth was in license sales, this should drive subsequent increases in maintenance and services revenue for SAP and their partner ecosystem. Being able to more quickly deliver value using Rapid-Deployment Solutions within both SAP Services and their services partners should help them increase their ability to get SAP PLM solution into production, since having capable services professionals is a problem for all solution providers.

Another potential benefit of the SAP PLM offering is that it is a single, integrated solution. Some may see this as a negative, but for existing customers, and those that are considering an investment in SAP this has potential value. As SAP offers both discrete and process PLM in an integrated offering this can be important for companies in CPG and other industries where the complete "product" includes both components.

As we have seen in this paper, the SAP PLM solution is being designed to leverage the information from other SAP functionality to help empower product development professionals. Based on CIMdata's work in assessing the benefits of implementing a PLM strategy, a significant cost arises from developing and maintaining integrations between multiple business systems. Allison Transmissions cited integration costs as one overriding factor in their decision to move to SAP PLM from best-of-breed solutions.

The bottom line is that for companies using SAP, the question was often "Why SAP?" In the past, SAP's offerings sometimes could not match capabilities in best-of-breed solutions. This was particularly true for engineering organizations. With the improvements in their PLM offering, expansion of their PLM portfolio, their focus on

solving pressing business issues, and bringing their solution to market in digestible portions, companies using SAP should evaluate if SAP PLM can now meet (or even exceed) the requirements of their PLM strategy.

About CIMdata

CIMdata, a leading independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. Since its founding more than twenty-five years ago, CIMdata has delivered world-class knowledge, expertise, and best-practice methods on PLM solutions. These solutions incorporate both business processes and a wide-ranging set of PLM enabling technologies.

CIMdata works with both industrial organizations and suppliers of technologies and services seeking competitive advantage in the global economy. CIMdata helps industrial organizations establish effective PLM strategies, assists in the identification of requirements and selection of PLM technologies, helps organizations optimize their operational structure and processes to implement solutions, and assists in the deployment of these solutions. For PLM solution suppliers, CIMdata helps define business and market strategies, delivers worldwide market information and analyses, provides education and support for internal sales and marketing teams, as well as overall support at all stages of business and product programs to make them optimally effective in their markets.

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through PLM certification programs, seminars, and conferences worldwide. CIMdata serves clients around the world from offices in North America, Europe, and Asia Pacific.

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