CIMdata

Dassault Systèmes' V6 Program
"A Focus on PLM 2.0 for Enterprises"

July 2008

A CIMdata Program Review

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Dassault Systèmes recently announced their new V6 platform which they position as enabling a "PLM 2.0" vision. This paper provides a description of the industry challenges that drove this release, a summary of Dassault Systèmes' history and position in the PLM market, a description of the major V6 components, and a review of the new DS V6 program.

1. Introduction

Companies around the world are continuously seeking new and better ways of addressing their markets with innovative products that capture the imagination of their customers. They also focus intensively on improving their business operations to ensure that they cost-effectively produce high-quality products. In order to achieve these goals, they have increasingly turned to Product Lifecycle Management (PLM) strategies and solutions as critical initiatives for their business success. At the same time, PLM solutions have evolved tremendously over the past several years as the suppliers of those solutions have diligently worked to provide PLM offerings that satisfy the growing needs of industry.

Recently, Dassault Systèmes (referred to hereafter as DS) announced their new V6 platform, which they position as enabling a "PLM 2.0" vision. DS states that V6 is intended to address many of the critical issues that companies encounter as they seek to implement extended enterprise PLM strategies that span more and more of their product lifecycles. DS' V6 platform builds upon their already-substantial suite of PLM offerings, and adds a number of key new capabilities to more effectively address the challenges of expanding PLM strategies. The most prominent areas of new capabilities to be incorporated within their new V6 platform include:
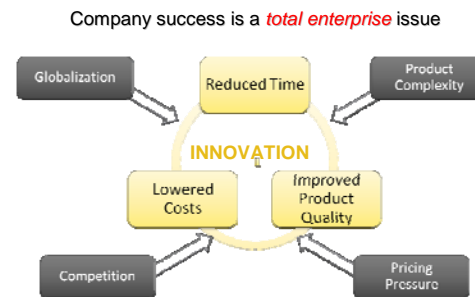
- A simpler, unified collaborative user interface to enhance and simplify the overall user interaction with a company's PLM environment, and facilitate frequent, ad-hoc collaboration.
- Online applications that are available from anywhere, to all stakeholders in the product lifecycle, from content authors to business process participants to the end consumers.
- Federated product information to aggregate and consolidate product-related information from a wide range of applications, both DS and non-DS, used across the extended enterprise.

- Consumer incorporation and empowerment to extend the view of the virtual product to a company's consumers, and incorporate them into the overall development lifecycle using realistic simulation to provide a life-like experience.

This paper will identify the challenges that businesses face in today's markets that are driving development and deployment of PLM solutions, the evolution of PLM, DS' key role in PLM, and a review of their new V6 program.

2. Business Challenge

Today's global marketplace is challenging enterprises to become more innovative to compete more effectively and maintain their competitiveness. Figure 1 illustrates the continuing market pressures that companies face.

Figure 1—Today's Competitive Environment

Globalization has increased the entry of more and potentially lower-cost competition while commoditization is placing continuing pressure on margins. As product complexity continues to increase, customers want to have "their" product or plant configured to their individual specifications and effective management of the "complete" product (mechanical, electronics, software).

In order to address these issues, enterprises must:

- Enable collaboration among virtual product teams spread around the world so that they can conduct product development and support 24/7.
- Leverage their intellectual assets effectively across the entire product lifecycle.
- Create a virtual, global value chain with no time, distance, or organizational boundaries.
- Continually innovate and improve products, and the processes used to design, produce and service them.

Achieving and sustaining business success requires innovation, and companies must establish environments that foster continuous improvement and innovation. The challenge is to have everyone from planners, to designers and analysts, to manufacturers, to service personnel, and finally the customers/users see and participate effectively in the complete product lifecycle.

Being an innovative business means innovating across the board—improving the processes a company uses to produce its products, how it supports its products, as well as designing and manufacturing creative products and plants. Additionally, companies must maximize the use of their intellectual assets, unlocking the data and spurring frequent/global/ad-hoc collaboration. While collaborative innovation is a critical factor in maintaining competitiveness, it must be achieved while reducing overall product-related costs across development, production, and service and sustaining a company's operational excellence.

3. PLM Evolution and DS

The scope, value, and demand for PLM solutions have changed tremendously over the past several years. During the 1980s, companies used customized implementations of functionally-focused applications to address specific issues, primarily CAD file management. During the 1990s, domain-focused applications such as change management were developed by PDM suppliers (forerunners to current PLM offerings). While this evolution delivered a jump in benefits, today enterprises of all sizes demand business-focused solutions that also address issues such as new product development and introduction, product and process planning, and strategic sourcing.

Today, PLM is viewed as an extended enterprise strategy to provide full management of the virtual/digital product lifecycle from concept to retirement that supports and enhances all of these business processes. In addition, this evolution can result in competition between PLM and other enterprise investment alternatives, such as enterprise resource planning (ERP) and customer relationship management (CRM), as senior management looks for maximum total business benefit.

The evolution is about more than technology. Delivering PLM also requires a continuously growing base of industry knowledge about how to most effectively use those solutions for maximum advantage. PLM solutions and environments must incorporate business best practices, be industry-focused as well as domain-focused, and deliver both top and bottom line business impact.

As the breadth of PLM strategies expands, it has become even more critical that PLM solutions are accessible to a much wider audience of users, from technically-focused engineering designers, to manufacturing personnel, field service technicians, administrative support personnel, and managers at all levels of the business. This demand has stressed PLM solution suppliers as they need to accommodate this range of users with increasingly unified and easy to understand user interfaces (UIs). In addition, many users are demanding that these interfaces provide online access, using many of the same innovative UI approaches they have come to expect from their extended use of the World Wide Web.

Another issue that continues to grow in importance for successful PLM strategies and implementations is the necessity of PLM solutions to accommodate and embrace a wider and wider range of applications, both from the primary PLM solution supplier and from many other suppliers of applications used within the enterprise. Additionally, thousands of legacy applications are in widespread use. Their knowledge must be included into the PLM environment to enable a company to successfully compete in their industry with innovative products that the market embraces, and innovative techniques and processes that enable a company to develop and cost effectively produce those products at the right time and with the right level of quality.

For more than 25 years, DS has developed products, services, and solutions to address the needs of manufacturing enterprises. Initially, DS' solutions focused on supporting mechanical design in their customers' engineering operations. However, in response to customer needs for more broad-based solutions that help them increase their competitiveness in the global market, DS has continually expanded the scope, breadth, and depth of their solution offerings.

According to CIMdata's most recent PLM market study, DS is the revenue and market presence leader for overall PLM solutions among the PLM Mindshare Leaders. As a

comprehensive supplier to many industries, DS has developed, acquired, and enhanced solutions that address collaborative Product Definition management (cPDm), 3D Mechanical Design, Digital Manufacturing, Simulation and Analysis, and solutions to extend the use of 3D information beyond engineering departments to users of all types within a company. More recently, DS has expanded their suite of offerings with technologies to enable even broader use of product-related information with solutions intended to enable their customers to share information with the consumers of their products. This enables the use of 3D product information to enhance communication with consumers and other non-technical users of product-related information.

DS has consistently been one of the leading visionaries in the industry and over the years they have expanded their vision to address a wider range of business issues in conjunction with other enterprise IT investments. Correspondingly, DS' solutions have been quite successful in the market and have been adopted by a large base of industrial companies. As a result, DS is a leader in global PLM revenues and its market presence (its overall impact on the market) was the highest among PLM Mindshare leaders in 2007—a position that they have maintained for the past three years.

As DS has expanded the scope of their PLM solutions, they have also expanded the range of industries that they actively seek to support. Currently, DS reports that they are focused on providing solutions targeted at eleven distinct industries:

- Aerospace and Defense
- Automotive and Transportation
- Shipbuilding
- Industrial Equipment
- High Tech
- Consumer Goods
- Consumer Packaged Goods
- Life Sciences
- Architecture and Construction
- Process Power and Petroleum
- Services

DS has established a long and well-known reputation and customer base in many of these industries, including aerospace and defense, automotive, and industrial equipment. However, others such as life science and services are relatively newer markets for DS and illustrate DS' overall strategy of expanding their focus to address a wider range of companies and programs.

4. DS' V6 Program

DS' refers to the most recent expansion of their PLM vision as PLM 2.0, PLM online for all. In the broader Internet community, Web 2.0 is used to connote an evolution of the World Wide Web to include user-developed content and online applications that provide a significant leap in interactivity and power beyond the initial wave of Web content. In that same vein, DS seeks to enable social design and innovation on a global scale with the V6 platform.

V6 is not just a group of products; it is an enterprise-level platform intended to provide a single environment in which product-related information created in both DS and non-DS applications can be consolidated and collaboratively used by participants from all business functions and areas of the extended enterprise that are involved in the product lifecycle.

Figure 2 provides a high-level overview of how DS explains that V6 will enable their vision of PLM 2.0. In DS' depiction, product creators will use an integral set of IP modeling and simulation offerings to collaboratively develop product and process IP. Ecosystem participants will share and collaborate on a global scale to evolve and extend their IP. This includes all participants in the lifecycle, from managers participating in engineering processes, to procurement, marketing, and other business functions, including those across the extended enterprise. Finally, product consumers will experience the product
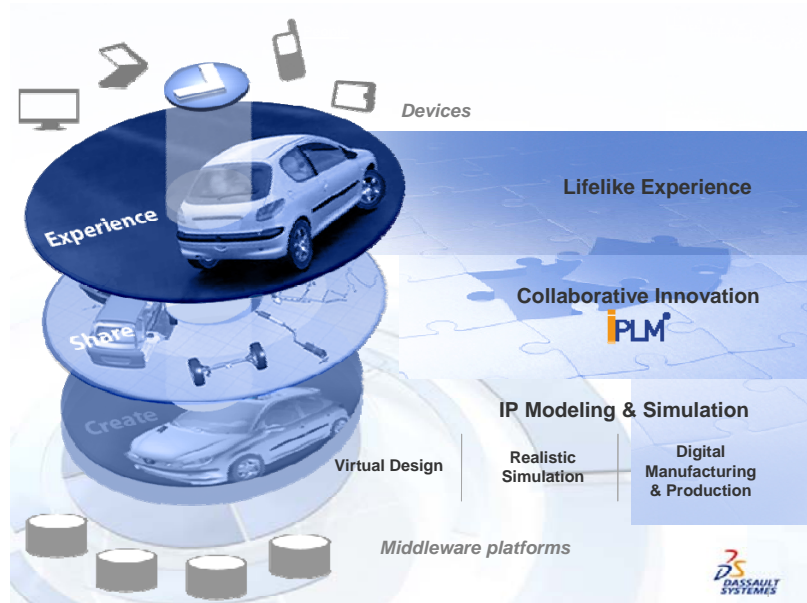

Figure 2—Enabling PLM 2.0 with V6
Courtesy of Dassault Systèmes

virtually in a lifelike setting, which DS refers to as "First Life." In contrast to Second Life (a Web 2.0 construct from Linden Labs), DS' "First Life" concept is about providing a lifelike virtual 3D experience. In First Life, not only do the 3D objects look lifelike, but real life physical constraints apply so that consumers can experience their products looking, working, reacting and interacting as in the physical world.

DS has stated that V6-based solutions will incorporate ready-to-use PLM business processes to unify diverse engineering and enterprise processes such as program and compliance management and sourcing. In addition, they state that packaged business solutions (called V6 Industry Accelerators) will leverage industry-specific PLM best practices and capabilities intended to speed deployment and reduce the time to achieve a return on investments.

4.1 Unified Collaborative User Interface

A key and highly-visible feature of the V6 platform is that it provides common user interface elements and a front-end navigation environment that spans DS' suite of PLM offerings. This new user interface is based on DS' 3DLive's user experience.

The approach is intended to simplify the user experience and more consistently guide users into their own functional domain space, such as mechanical design, simulation and analysis, digital manufacturing, etc. DS' new user interface can be run as a "lightweight," online Web application, and is usable by individuals operating in a widely-distributed working environment. It is also the user interface approach that will be used in all DS-native authoring solutions, i.e., CATIA, DELMIA, SIMULIA, and 3DVIA, as well as the ENOVIA management platform.

The most visible aspect of the 3DLive user experience is that it uses a "turntable" paradigm of user interface for product information navigation. Figure 3 shows how the turntable provides a 3D overview of the entire product—in this case in CATIA V6. However, the more valuable aspect of this approach is that it provides "in-context" visibility and access to information. This includes features such as data viewing, data analysis, searching, collaborative sessions, chats, and buddy lists, as well as context-sensitive searching for experts and for assistance. According to DS, this new UI will "bring IP to life in 3D." As a result, it should help individuals (especially casual users) to more effectively understand the information they are viewing, and thus facilitate and accelerate analysis and decision-making.
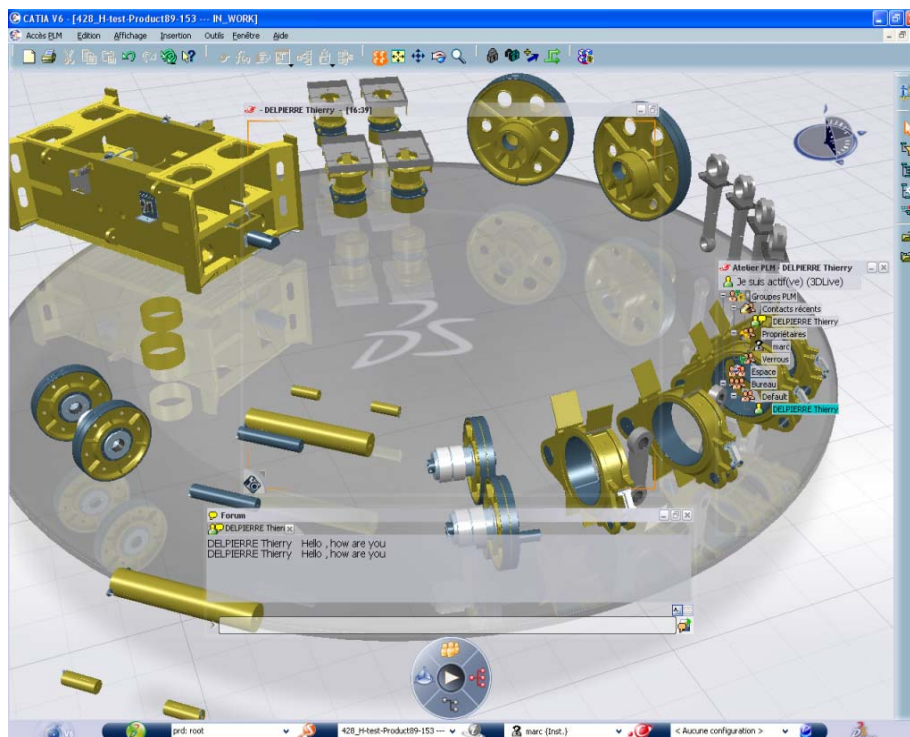

Figure 3—DS' V6 User Experience
Courtesy of Dassault Systèmes

For example, a user could navigate an analyzed view of the product configuration to identify potential problem areas in a development program. In the Buddy List on the right side of Figure 3, the user can see who created the IP and if they are online. Using this contact information, they could launch a collaborative discussion or design session with the set of individuals appropriate to the specific area of the product and the type of problem. The box outlined in the center of the figure is a "heads-up display" that provides a focus for collaboration. This box orients collaborators to the same area in a part or assembly, and can be used to highlight changes, FEA results, or other information of interest to the participants. Most importantly, collaborators can use this mechanism to exchange features when both are working on the same part. They can illustrate these changes by using a slider, which shows a progression or blend of that area from the BEFORE state to the AFTER state. It also includes chat functionality so that collaborators can talk their way through such changes. The application of this online, "collective intelligence" has good potential and bears watching in the marketplace.

Offering consistent user interface elements across multiple solution domains has the potential to reduce training costs and increase consistency across functions. Additionally, these interfaces should offer users a synthesis of IP created and maintained within multiple enterprise systems, which has the potential to offer new, 3D-based approaches to enterprise decision-making. While not the focus of this paper, this innovation bears watching.

4.2 Online Applications

One major difference between previous generations of DS solutions and V6 is the emphasis on providing online access to all product lifecycle information across the value chain. Previously, DS solutions focused mainly on the creators of lifecycle content who were using CATIA and DELMIA on-premise to design the virtual product and the virtual manufacturing processes to produce it. ENOVIA provided most collaborators access to some product information, mainly for participating in business processes through workflow functionality. With V6, this approach is changing significantly. DS' emphasis with V6 is on providing "an online environment for virtual experience in 3D from anywhere."

A key aspect of V6 is that this approach extends to IP authoring online, making full PLM solutions accessible from anywhere. For example, a designer with CATIA on their laptop can log-in from home and directly edit a model which resides in the central office database. This work can also be done concurrently with others on the team.

This online collaboration and IP authoring and modeling is facilitated in V6 via an architecture in which all IP is maintained within a single, integral database managed by ENOVIA. V6 is designed to enable users to work with the same IP simultaneously, regardless of their physical location.

DS states that all V6 applications are interconnected, designed to function together as a united whole. The objective of this approach is to facilitate and encourage frequent, ad-hoc collaboration among individuals, regardless of their physical location, and to empower collaborative, online communities—the same type of online, ad-hoc collaboration that is typical of Web 2.0 applications. As demonstrated by DS in public events, any authorized user can join these communities with a simple Web download of the 3DLive application.

According to DS, their V6 online offerings and architecture employ standard Web technologies: leveraging eXtensible Markup Language (XML) on a Service-Oriented Architecture (SOA).

4.3 Federated Product Information

A primary feature of DS' V6 program is its "federation" capabilities, which DS positions as a way to "harness collective intelligence" from diverse communities. DS uses the term "federation" to mean the ability to aggregate data from a wide range of different data sources into a single consolidated/comprehensive view, thus supporting third-party applications. In this framework, the data is expected to be provided from combinations of both DS-based applications and non-DS-based applications, essentially "reaching into" any business function that supports product-related data and enabling a broader perspective on the product information than could be achieved from any of the individual applications. This includes many different enterprise-class solutions like ERP and CRM.

DS' federated approach is expected to be used to incorporate data from legacy systems and the wide range of product-related applications that already exist across the customer's enterprise to expand the view and use of information from within the V6 environment. Furthermore, the data is classified and normalized within a company's PLM schema so for example, like parts are grouped together. This consolidated data view is then displayed in a consistent form via the common (3DLive) user interface. The objective is to enable companies to aggregate all product-related information and knowledge (intellectual

property) across both DS and non-DS applications to expand collaboration among diverse and distributed groups.

The base framework/foundation for the V6 environment's architecture is built on a single SOA platform, intended to serve both multi-discipline groups and the extended enterprise. It incorporates a scalable enterprise architecture based on the evolution of the MatrixOne platform and extensions derived from both SmarTeam and VPLM. Going forward, the full solution capabilities of these previously-separate products will be offered on the common, integrated V6 platform. The new consolidated V6 Enterprise Foundation layer provides the framework for implementation of their federation strategy. DS believes that a single, open platform and database schema will simplify installation, maintenance, and management, which will dramatically reduce cost of ownership and cut PLM deployment time.

In addition to data federation, DS' V6 approach includes a co-existence strategy for both DS and third-party applications, in particular authoring applications (e.g., non-DS CAD tools, ECAD tools, and software engineering tools) which can be integrated with the V6 platform.

One intent of the V6 federation approach is to leave data (non-DS, legacy, etc.) in place, but manage it in context with DS-based data. This approach recognizes that not all product-related data is produced within DS applications and databases. It embraces the fact that non-DS product data is important to support effective product-related decisions. It also acknowledges that across an enterprise, additional non-DS applications will continue to be added that expand the scope of product information, and that this additional information must be federated into a consistent view to facilitate timely, effective decision-making.

Implementation of this federated approach across both DS and non-DS product-related applications require the creation of integrations between the V6 foundation and the targeted databases. DS calls these integrations "Adaplets," the term previously used with the MatrixOne platform. Once the Adaplets are developed, the V6 enterprise platform looks at the combined sets of data as a single logical database for display and decision purposes. Standard Adaplets are made available by DS and DS' partners such as ProSTEP. DS reports that additional Adaplets are under development and will be available in the coming months as part of DS' normal release cycle.

Regarding DS CAD data management, co-existence scenarios for CATIA V4, V5, and V6 data are key elements in DS's strategy for preserving customer intellectual property. CATIA V6 is built upon the CATIA V5 geometry kernel, and the V5 transition process maps all CATProducts and other V5 data elements into the V6 data structure. DS will offer a V6 Adaplet for CATIA V4 data that combines the geometry migration aspect of the CATIA V4 to V5 migration tool with a mapping to the V6 data model. These capabilities should be very positively received by the DS CATIA customer base, and will enhance their ability to co-utilize these two design solutions in a single product development environment.

4.4 Incorporating the Consumer

One of the interesting aspects of the V6 platform is DS' intent for it to enable their customers to extend the use and interaction with product data into the world of the consumer (i.e., a company's customers), as illustrated in Figure 2. DS has stated that the V6 platform will enable a wide range of people to see and participate in the product lifecycle, including customers/consumers by providing them with realistic, lifelike experiences early in the product lifecycle, where their feedback can have the most beneficial impact on the product definition. This means letting consumers experience the product in a virtual, online space, but with all of the constraints of the real, physical world. DS positions this aspect of V6 as directly supporting PLM 2.0 and represents an expansion of the traditional view of PLM environments which were typically "bounded" within the world of the producing company's value chain.

Providing visibility of the virtual product to consumers and involving them in the product development process is truly a challenge and represents an expansion of the PLM strategy for most companies. However, the value of enabling a company's consumers to see the product as it is conceived, experience its operation in a virtual world, and then provide direct feedback that can significantly improve its market attractiveness and performance is immeasurable in an economy that demands faster and more effective responses to market opportunities. DS believes this approach will help to more effectively capture and define real end-user requirements, improving the success rate of the product development process.

4.5 Packaged PLM Business Processes

ENOVIA now encompasses an impressive suite of applications. The previous MatrixOne "Centrals" and SmarTeam applications are all available as ENOVIA applications on a common V6 platform. Consistent with this common platform approach, ENOVIA is being established as the single brand name for DS' suite of cPDm solutions, eliminating the MatrixOne, SmarTeam, and VPLM solution names. While the solutions are being

combined on one platform, ENOVIA will continue to offer a range of solutions targeted to the needs of specific market segments. VPM will be retained as a separate product name and will be provided with CATIA, where it historically focused. It is CATIA's local data manager and provides the primary mechanism for integration to the underlying CATIA database. VPM functionality will also be available within DELMIA solutions. There will also be an ENOVIA solution focused on the needs of the mid-market to build on the strong market position and customer base of ENOVIA SmarTeam.

ENOVIA-based "Accelerator" solutions are constructed from the suite of ENOVIA offerings as appropriate for the client and/or industry. For example, the MatrixOne "Accelerators" will be delivered as V6 Industry Accelerator solutions. DS states that these solutions are built upon industry knowledge and requirements from their leading customers. DS reports that they will add more Accelerators over time to address key business issues facing customers in their eleven target industries.

CIMdata believes that this new branding for DS' ENOVIA solutions should enable DS to more effectively position their solutions as offerings from a single, broad suite of applications, and help clarify the evolution and roles of the three previously distinct ENOVIA product lines. The challenge for DS is to clearly communicate this new brand positioning to the industry and their customers.

4.6 V6 Availability

DS has announced that their new V6 platform will be implemented across the entire range of DS' PLM solution offerings. The first commercial release of DS' V6 PLM Solutions was in May 2008. This initial release includes ENOVIA V6, CATIA V6, and initial versions of DELMIA, 3DVIA, and SIMULIA V6.

As for previous major versions of their products, DS reports that they will continue to develop V5 releases that expand the value of customers' existing PLM assets and that will enable a smoother transition to V6.

5. Concluding Comments

The V6 platform is a major announcement for DS, and a significant event in the PLM market. With V6, DS is incorporating and leveraging the best aspects of its MatrixOne, SmarTeam, and VPLM suites on one platform and adding the capabilities of 3DLive to unify user interaction and access to all of DS' PLM solutions. DS' concept of PLM 2.0 is interesting, and does describe

phenomena that are gaining attention across the enterprise software world, i.e., online access, innovative UIs, synthesizing IP from multiple sources—including existing systems and communities of subject matter experts, business users, consumers, etc.

One of V6's strengths is that it can enable data sharing and aggregation (federation) across multiple systems—not just DS systems, but also applications from many other solution suppliers as well as internally-developed and legacy applications. This consolidated view of product-related information should provide customers a better ability to understand their situation and make more informed decisions.

Another aspect of V6 that could be a significant strength is its new and interesting approach to facilitate user navigation and analysis of product information, and to encourage ad-hoc collaboration with the right group of individuals. This approach looks quite promising, but needs to be validated through customer use over the coming months.

A key theme for DS is that V6 and PLM 2.0 are about "online." In particular, it is designed to enable online remote product authoring using IP shared in a single database managed via ENOVIA. Product authoring and collaboration support real time concurrent work across multiple distributed locations via the Web. This online, real-time collaboration aspect of V6 could be an effective differentiator for organizations trying to implement a global product development strategy.

The availability of V6 should accelerate CATIA V4 to V5 transitions as it eliminates V4 to V5 data integration as a migration issue. CATIA V4 customers now will have a much more rational and attractive range of alternatives. It should also enable DS to more effectively expand CATIA in large accounts, eliminating a hindrance as V6 should provide significantly enhanced enterprise-level information management capabilities.

DS' V6 program should position DS much more strongly to successfully address markets and industries that are non-CAD driven, e.g., Consumer Packaged Goods, Food and Beverage, Services, etc. The new V6 platform embraces the concept of working collaboratively with third-party applications. In DS' new targeted industries, this will be particularly critical to establish their presence in companies where there are currently no DS products installed.

DS' announcement of their new V6 platform is impressive. The V6 release should significantly improve DS' competitive position, especially for large-scale enterprise information management. It eliminates a previous

competitive weakness for high-end, enterprise-wide, full lifecycle programs, and provides a much more expansive environment to support a company's extended enterprise PLM strategy.

However, DS must now validate the V6 program as a proven, open, scalable solution to address customer concerns and clarify the true business value that implementing V6 provides. Building on a proven enterprise-class solution like MatrixOne is a good start. Basing their solution on a single platform and database schema has the potential to simplify installation, maintenance and management, which could reduce cost of ownership and cut deployment time.

DS' approach to V6 and data federation from multiple DS and non-DS-based applications should provide a relatively well received approach to working with third-party applications. However, this approach also must be demonstrated and validated for V6 to be widely accepted. Proven, successful customer implementations are always required to validate new applications and platforms, and V6 is no exception.

CIMdata is pleased to see the V6 announcement, and believe it is a very positive announcement for DS and for the industry in general. We look forward to seeing V6 put into productive usage in DS' customer base over the coming months.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM) solutions. CIMdata offers 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 by providing world-class knowledge, expertise, and best-practice methods on PLM solutions.

In addition to consulting, CIMdata conducts research, provides PLM-focused subscription services, and produces several commercial publications. The company also provides industry education through international conferences in the US, Europe, and Japan that focus on PLM. CIMdata serves clients worldwide from locations in North America, Europe, and Asia Pacific.

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