Siemens Medical Solutions:
Integrated Content Management Keeps Customers on the Cutting Edge

A business case study sponsored by IBM

Becoming on demand

Siemens Medical Solutions, a leading provider of medical imaging solutions, created a globally integrated publishing system to deliver critical and constantly changing information to customers faster—thus keeping customers on the leading edge. The company also responded to customers' needs for less complexity in the upgrade process by providing them with more personalized and dynamic information that is easier to act on.

Why IBM

"We want to push the envelope on what it means to be responsive to customers. IBM has the expertise and technology to help us make it happen."

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BUSINESS DRIVERS	**Customer Business Challenge**	As a broad-line provider of solutions to the medical community, Siemens Medical Solutions needed to provide current and potential customers with convenient access to the most up-to-date information on products. This information was critical for medical customers trying to make purchase and upgrade decisions for extremely complex products. At the outset of the project, Siemens Medical Solutions sought to improve the way it delivered product and technology information. Key contributing factors included a diverse and manual set of content publishing processes and a high incidence of static information.
	on demand Business Rationale	Siemens Medical Solutions wanted to become more responsive to information changes that affected customers, including product line changes. As part of this, the company wanted to deliver more dynamic and up-to-date information, thus keeping customers on the leading edge. To facilitate customer decision-making, Siemens Medical Solutions wanted to make it less complex for customers to articulate their needs, and easier to act on these needs. The company also wanted a resilient solution that could absorb seasonal or event-driven volume spikes and scale as-needed.
BECOMING ON DEMAND	**Business Process Adaptations**	Siemens Medical Solutions created a highly automated, globally integrated solution that streamlined the publishing cycle. The company also made its site content more dynamic by integrating it with backend systems. To facilitate complex decision-making, Siemens Medical Solutions incorporated sophisticated personalization capabilities into its customer site. The company also consolidated its systems and processes onto a single platform, making it more flexible and responsive to increased processing demands.
	on demand Operating Environment	The design and development of the solution was performed by IBM Business Consulting Services and IBM Global Services: Application Management Services and the Architecture & Technology Center of Excellence. Its key elements include IBM WebSphere Application Server, IBM WebSphere Commerce and IBM HTTP Server.
ON DEMAND BENEFITS		• By providing stimulating purchases and upgrades, Siemens Medical Solutions expects the solution to lead to improved outcomes for hospitals, clinics and private practices. • By providing cutting-edge information, the solution has improved customer satisfaction and strengthened the company's competitive position within the medical community. • The solution enables more efficient, lower-cost content management processes. • The solution's open-standards support facilitates the absorption of future acquisitions and its integration with other platforms • By consolidating its systems, Siemens Medical Solutions can balance worldwide traffic over a single infrastructure, eliminating the logjams that had occurred at the local or regional level. • An open, integrated infrastructure gives the company more freedom to increase or decrease capacity as needed, providing more variability in—and control over—infrastructure costs.

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Background

A unit of Siemens AG based in Erlangen, Germany, Siemens Medical Solutions is among the world's largest providers of medical equipment, software and services, with revenues of 7.6 billion euro (Mrd. €) and 31,000 employees worldwide. As the division's name implies, Siemens Medical Solutions specializes in delivering complete solutions to its customers, which include hospitals, clinics, home health agencies and doctors' offices. The core of these solutions is the division's state-of-the-art equipment products, which range from imaging systems (e.g., magnetic resonance imaging and mammography equipment) to therapy equipment. To complement its hardware line, Siemens Medical Solutions offers a series of software-based solutions designed to increase or optimize the performance of customers' systems. For instance, by upgrading the image processing software used by imaging devices, hospital customers can significantly improve the resolution of these devices, resulting in a physician realizing more powerful detection capabilities and—ultimately—improved clinical outcomes.

Business Drivers: Helping Customers Manage Complexity

One of the defining elements of the medical equipment industry is a near-continuous increase in product innovation, resulting in both new products and incremental improvements to existing products. From the perspective of the customer, this dynamism represents a double-edged sword. While the flood of innovations promises to improve outcomes, it also presents medical customers with an increasing complex decision environment. Keeping abreast of rapidly changing technologies and products in the marketplace is becoming an increasing challenge, as is the comparison of different products.

Another dimension of this challenge is seen in the way hospital customers manage their installed base of medical equipment and software. To fully capitalize on the improved capabilities of new medical technologies, hospital decision-makers face a dual challenge—the need to track and manage existing systems across the hospital, while at the same identify the innovations in the marketplace that are relevant to (i.e., can benefit the performance of) these systems. The challenge of performing this balancing act is often exacerbated by the decentralization of hospital assets and the hectic schedules of hospital decision-makers, which can range from clinical specialists and radiologists to CFOs and hospital administrators. Overall, the combination of these factors has led to a strong need in the medical community for assistance in navigating this increasingly dynamic and complex decision environment.

As a provider of medical solutions, Siemens Medical Solutions wanted to make it as easy as possible for its medical customers to be keep abreast of and fully capitalize on changes in medical technology. For Siemens Medical Solutions, the operational implications of this need were three-fold. First, the company wanted to minimize the cycle time required to publish product information, thus maintaining its role as the leading-edge source for clinical technology content. Second—and along the same thematic lines—Siemens Medical Solutions wanted

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to keep its content up-to-date, thus ensuring that its customers had access to only the freshest, most relevant information. Finally, Siemens Medical Solutions wanted to provide information in a way that added value to customers by actively supporting their decision-making. This meant presenting information within a strategic, customer-specific context that would help them be more responsive to changes in the medical technology environment.

To deliver information in a way that made its customers more responsive, Siemens Medical Solutions itself wanted to streamline and integrate its processes for managing product data. Under the company's existing process, content management was highly decentralized, making it hard for customers to navigate across product or subject areas. The management and publishing of dynamic information were also adversely impacted by decentralization. Under the previous approach, information on new products or changes in existing product information needed to pass through a series of time-consuming publishing processes, which sometimes delayed distribution of this information to the company's 125 country-specific operations. "To be a major player in the health care market, a vendor needs to offer products that solve today's problems," says the project's manager. "When it comes to information on medical equipment, doctors only want to deal with the newest information—any other information is a distraction."

Siemens Medical Solutions realized it needed to create a new business system that could provide its medical customers with the leading-edge information they required to perform at their best. This system would cut the time required to get new information out to customers in a timely fashion and—by delivering dynamic data—would ensure the freshness and relevancy of data. Finally, it would provide complex information in a convenient, personalized format that aided the customer decision process. As Ajit Singh, President & CEO of the company's Oncology Care Systems Group explains, the ability to deliver data in a dynamic and flexible way were seen as a must. "We operate in a very complicated and dynamic business," says Singh. "We needed a solution whose flexibility would enable us to reduce complexity for customers—while at the same time keeping up with the need for dynamic information."

ACTION PLAN AND DECISION PROCESS

Business Process Adaptations

To address its content management challenges, Siemens Medical Solutions created a globally integrated content management system that simplified the content review and approval cycle. Under the previous system, a substantial portion of content review was performed offline, which lengthened the already-lengthy process by which technical and product information was reviewed and approved. The new content management workflow streamlines the review process by introducing standardized processes and templates, and by consolidating what had been a series of country-specific platforms into a single globally integrated system. Because the new system allows Siemens Medical Solutions to publish in a more efficient way, its customers now receive information sooner. This capability

strengthens the company's status in the industry as a provider of fresh, leading edge information for the medical imaging community.

Another major business challenge for Siemens Medical Solutions was to make it less complex for its customers to navigate a sea of product and technology information—thereby simplifying the dauntingly complex decision process for purchasing new or upgraded medical imaging devices. To meet this challenge, the company fundamentally redesigned its customer Web site, making it easier for customers to find information through intelligent content links and personalized presentation of information. One of the most significant process adaptations was the addition of a solution finder tool, which—by presenting customers with purchase and upgrade options based on their existing installed base of medical imaging systems—enables them to cut through the complexity and make optimal clinical and business decisions.

In the same way its previous content publishing system made it harder to standardize processes, its dispersed Web infrastructure—each country essentially had it own—made it harder for the company to optimize the system's resiliency on a macro level. To remedy this, the company consolidated its far-flung systems into a single, unified architecture. Process improvements emanating from this consolidation include more coherent capacity planning and server provisioning, which in turn strengthens the resiliency of the company's overall infrastructure.

Decision Process

In 2001, after a comprehensive evaluation process, Siemens Medical Solutions selected IBM Global Services Business Consulting Services to build a solution using IBM WebSphere Application Server as its core application server. The company also selected IBM WebSphere Commerce's catalog functionality (running under WebSphere Application Server) to integrate product data from the company's backend SAP solution. Singh cites WebSphere Application Server's strong support for open standards like XML and J2EE as the dominant factor in its selection. "We were very comfortable with IBM's support for open standards, which not only makes our current integration [with the content management platform] easier, but also ensures us flexibility in the future," says Singh. "We were also impressed with WebSphere Application Server's ability to generate dynamic content." For the content management platform, Siemens Medical Solutions employed IBM Business Partner Interwoven's TeamSite™ product.

SOLUTION PROFILE AND IMPLEMENTATION STRATEGY

The Solution: Deployment Strategy and Overview

The design and development of the Siemens Medical Solutions platform was performed by an IBM Global Services engagement team made up of staff from Business Consulting Services, Applications Management Services (AMS) and the Architecture & Technology Center of Excellence. The team was divided into four subunits, each of which was focused on a component of the solution. These subunits were delineated as follows:

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- Content Management Team, which was focused on the deployment of the Interwoven TeamSite platform.

- WebSphere Commerce Team, which focused on the deployment of the catalog portion of the solution.

- "Middle-Layer" Team, whose core task was to translate the content generated from the Interwoven platform and integrate it with WebSphere Application Server.

- Testing Team, which performed system testing in a variety of environments. [There was also a small group focused on administrative tasks such as software and hardware monitoring.]

The implementation of the solution unfolded in three phases. During the initial requirements gathering phase, begun in late 2001 and completed the following April, the team developed style guides for the Web site, as well as graphics, imaging, and branding. Having established the information elements that would be displayed on the site, the team began the technical design of the solution in June 2002, first at a high level (completed in late June) and then at a detailed level (completed in July). After beginning the development phase in August, the team rolled out the first release of the solution in September. Two subsequent releases (November 2002 and April 2003) featured incremental additions of content.

EXHIBIT 1: KEY MILESTONES: THE SIEMENS MEDICAL SOLUTIONS PROJECT

Project Tasks	2001	2002				2003		
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Requirements gathering	███	███	██					
High-level technical design				██				
Detailed technical design				██				
Development of initial release					██ ◄			
Development of releases 2 and 3					████	████	██	

Primary Teams Involved	IBM Global Services/ Siemens Medical Solutions	IBM Global Services: BCS, AMS, IBM Architecture & Technology Center of Excellence.

Implementation Challenges	"One of the most challenging aspects of the development process was the need to integrate WebSphere Commerce and Interwoven at the data level. It was critical that we achieve this because we needed to represent data from both these applications on a Web page. The fact that each business unit had unique requirements—but still required a consistent user experience also presented a challenge."

Source: Siemens Medical Solutions and IDC

The solution employs a J2EE-based architecture, with IBM WebSphere Application Server providing Web and application server functionality. Within the WebSphere Application Server environment, Enterprise Java Beans (EJBs) are used to process user requests for dynamic data. In the backend of the solution, the ERP system (SAP) delivers an extract containing product and pricing data to an IBM WebSphere Commerce catalog (running on WebSphere Application Server) stored on a database server. This database server also houses Web content delivered from the Interwoven TeamSite server in XML format.
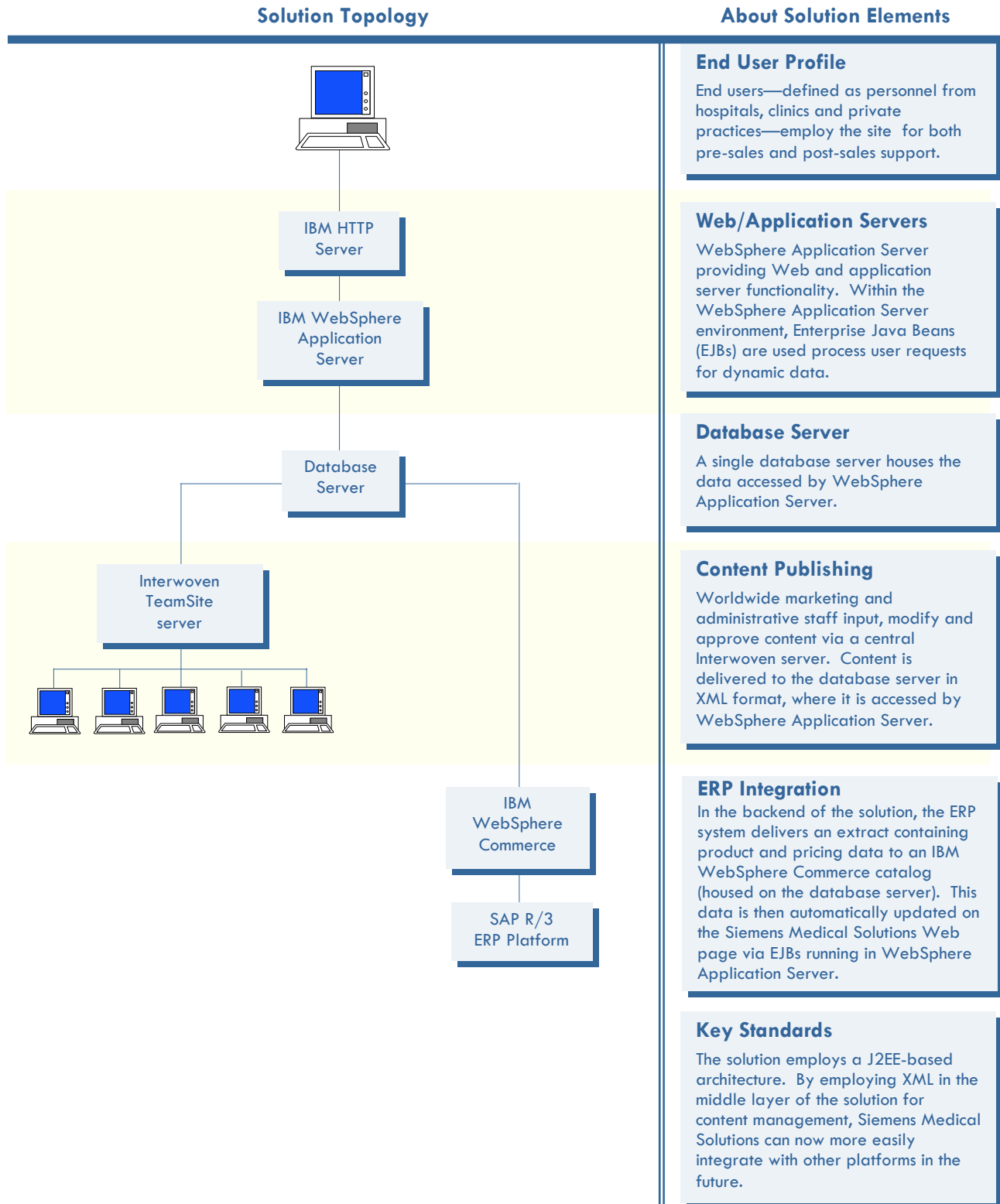
The Solution in Action

The solution in action can be viewed from two perspectives—customers using the site and employees using the content management solution. On the customer side, users—defined as personnel from hospitals, clinics and private practices—employ the site for both pre-sales and post-sales support. The site's pre-sales support features are primarily designed to provide potential customers with access to product-related subject-matters (e.g., oncology). To make the site easier to navigate, pages have been constructed with intelligent, dynamic links and sophisticated search capability. Once a user finds a product, they can use the site's configuration engine to specify features. Users seeking to purchase a product have the option of buying it online or using the site's request for proposal (RFP) functionality. As with the redesign of the site in general, the site's RFP request feature aims to make life easier for the user—in this case, by shifting the burden of establishing contact from the user (say, a busy doctor calling off-hours) to Siemens Medical Solutions marketing staff.

The site also offers powerful information tools for existing customers, many of which are designed to help customers improve the performance of their existing Siemens Medical Solutions systems. One of the most common challenges for customers with large installations is obtaining a holistic view of their solutions and, based on this, determining their ability to upgrade and/or consolidate their systems. This challenge is heightened by the complexity of the typical installed base—which makes it harder to map upgrade paths—and the fact that many users are clinical or business-level (i.e., non-IT) staff. To address this challenge, the Siemens Medical Solutions Web site offers a "solution finder" that provides customers with upgrade data in a customized, context-specific fashion. At its most valuable, the solution finder allows customers to see options they might not otherwise have seen—improving imaging capabilities through a software release; reducing costs by consolidating and/or reconfiguring systems. Yet another site feature designed to help customers get the most out their investments are customer case study "communities" through which users of specific products or technologies can share lessons learned. These features have in common the goal of making customers better able to optimize the functional and/or financial performance of their systems.

EXHIBIT 2: BASIC ARCHITECTURE OF THE SOLUTION

Solution Topology

About Solution Elements

End User Profile

End users—defined as personnel from hospitals, clinics and private practices—employ the site for both pre-sales and post-sales support.

Web/Application Servers

WebSphere Application Server providing Web and application server functionality. Within the WebSphere Application Server environment, Enterprise Java Beans (EJBs) are used process user requests for dynamic data.

Database Server

A single database server houses the data accessed by WebSphere Application Server.

Content Publishing

Worldwide marketing and administrative staff input, modify and approve content via a central Interwoven server. Content is delivered to the database server in XML format, where it is accessed by WebSphere Application Server.

ERP Integration

In the backend of the solution, the ERP system delivers an extract containing product and pricing data to an IBM WebSphere Commerce catalog (housed on the database server). This data is then automatically updated on the Siemens Medical Solutions Web page via EJBs running in WebSphere Application Server.

Key Standards

The solution employs a J2EE-based architecture. By employing XML in the middle layer of the solution for content management, Siemens Medical Solutions can now more easily integrate with other platforms in the future.

On the employee side, the new content management solution streamlines and automates what had been a rather diverse and manual set of processes. This compromised the competitive differentiation of the Siemens Medical Solutions site by making it less responsive to customers' need for up-to-date information. The new solution addresses this by establishing a common, highly automated content publishing workflow across the enterprise. Under the new solution, content is captured from a variety of sources worldwide and stored in XML format (in the same database that holds the catalog-based product data from the ERP system). When a user requests dynamic data, WebSphere Application Server retrieves the data from the database via EJBs and processes the request.

BUSINESS RESULTS

The most significant business-level benefit of the solution is that it made Siemens Medical Solutions more responsive to its customers' need for timely, actionable information delivered in a format that helps them capitalize on it. For Siemens Medical Solutions, this improved responsiveness promises to deliver a wide range of strategic benefits, starting with improved customer satisfaction and continued high marks from the medical community as a source of cutting-edge information. While much has been said of the solution's ability to rapidly absorb new content, it's also important to point out its resistance to "errors of inclusion"—displaying untimely or invalid data. As Karl Steigele, the IBM Global Services Project Executive on the engagement points out, maintaining vestigial or "cemetery" data is especially risky in the realm of medical services and solutions. "Having product information on the site dynamically linked to SAP all but eliminates the risk of providing outdated material—a risk that was high when it was a manual process," says Steigele. "This significantly cuts the chances of future liability for invalid data."

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>
> — Britta Fuenfstueck, Siemens Medical Solutions

By providing a catalyst to customer upgrades, Siemens Medical Solutions also expects the solution to support advanced clinical outcomes for hospitals and clinics. As the Oncology Care Systems Group's Singh explains, the site's "solution finder" functionality provides a solid supplement to the company's core channels. "Assume for example that a new software upgrade for a CT scan becomes available," says Singh. "If through our normal sales channel we were able to get 200 hospitals from our installed base to do an upgrade—but because of this new platform we are able to get 300—then the system will have provided additional clinical value for our customers."

The solution also offers a range of technology benefits. The most important of these is an increased degree of resiliency resulting from the consolidation of the company's systems. By moving from a highly fragmented approach—with each country running its own infrastructure—Siemens Medical Solutions became much more flexible in terms of its ability to optimize infrastructure traffic. This newfound flexibility is seen in the way the company can now balance worldwide traffic over a single infrastructure, making logjams less likely. Having a unified infrastructure makes it much easier for Siemens Medical Solutions to forecast overall usage and procure server resources on an as-needed basis. Indeed, Fuenfstueck of Siemens Medical Solutions believes this increased flexibility makes

EXHIBIT 3: BUSINESS RESULTS FOR THE SOLUTION

Business-Level Benefits	Enabling Process Changes	Linkage to Solution
Improved Clinical/Operational Outcomes	By providing a catalyst to customer purchases and upgrades, Siemens Medical Solutions expects the solution to support advanced clinical/operational outcomes for hospitals, clinics and private practices.	The solution assists customers in determining their ability to upgrade and/or consolidate their systems.
Improved Customer Satisfaction/ Improved Competitive Position	By providing cutting-edge information, the solution has improved customer satisfaction and strengthened the company's competitive position within the medical community.	The solution provides timely, actionable information delivered in a format that helps customers capitalize on it.
Improved Efficiency/Lower Cost	The solution enables more efficient, lower-cost content management processes.	The solution streamlines and shortens the content management cycle within Siemens Medical Solutions's worldwide operations.
Improved Flexibility	The solution's open-standards support facilitates the absorption of future acquisitions and its integration with other platforms	The company relies heavily on industry standards such as XML and J2EE.

Technology Benefits	Underlying Product/Attribute	Benefit in Action
Increased Resiliency	**Improved Load Balancing**	By consolidating its systems, Siemens Medical Solutions can balance worldwide traffic over a single infrastructure, making logjams less likely.
Increased Resiliency	**Optimized Peak Performance**	Increased flexibility makes the company better able to address seasonal surges in site volume. The heaviest usage period for the site is between September and December, when medical professionals want to know what is new and what is available.
Increased Variability	**Centralized Server Provisioning**	Having an open, integrated infrastructure gives us much more latitude to increase or decrease capacity as the need arises, which in turn gives us more variability in—and control over—our infrastructure costs.

Source: Siemens Medical Solutions and IDC

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the company better able to address seasonal surges in site volume. "The heaviest usage period for our site is between September and December, when medical professionals want to know what is new and what is available," says Fuenfstueck. "Having an open, integrated infrastructure gives us much more latitude to increase or decrease capacity as the need arises, which in turn gives us more variability in—and control over—our infrastructure costs. This kind of cost variability would have been impossible to achieve under the previous solution."

CASE EPILOGUE

Reflecting on the future, Singh sees the content management project as part of a larger drive to increase process-level integration with customers, and in so doing provide them with more transparent access to information across the supply chain. "For us, transparency means providing relevant information, at the right time, in the right hands that supports business decisions," says Singh. "We see our investments in platforms like SAP, WebSphere and Interwoven as critical components of that strategy."

To advance this goal, Siemens Medical Solutions plans to add an array of rich functional enhancements that will bring the company closer to its customers. One of the company's first moves will be to further refine the solution's automated features by leveraging the strong messaging capabilities of the WebSphere Application Server platform. This will, for example, enable the solution to add various "push" features such as alerts triggered by content changes. Singh sees WebSphere Application Server's ability to support this functionality—a function of its strong support for J2EE—as evidence of the value of open standards. "We want to push the envelope on what it means to be responsive to customers," says Singh. "IBM has the technology to help us make it happen."

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