

# TeamSite helps health system untangle its Web

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**Takeaway:** Does your organization have a handle on its Web content? Learn how one health-care enterprise is delivering Web-based content to allow patients and medical personnel to access information quickly and easily.

**By Karen D. Schwartz**

The doctor delivers the bad news that you need an angioplasty, and fast. Now you want to learn about the operation, find the best doctor to perform the surgery, and determine which hospitals have the facilities to execute the procedure.

The physician performing the surgery also has her work cut out for her. Not only must she quickly learn about your medical history, but she must also locate the appropriate facilities and familiarize herself with the hospital's policies and procedures. To find this information, doctors often must access disparate computer systems, check reams of paper manuals, and make numerous phone calls.

To help patients and medical personnel navigate this maze, some health care systems are delivering Web-based content that lets patients and medical personnel access information quickly and easily.

One such system is Novant Health, a Winston-Salem, N.C.-based health care conglomerate that serves more than 3 million people in 32 counties from Virginia to South Carolina. In 2000, Novant embarked on an ambitious project to coordinate vast amounts of information on medical procedures, patient information, and internal policies and procedures. The health care system's Web site, which also serves about 13,000 employees, was generating 20,000 pages of information each year. A team of 20 technology writers spent much of its time revising and formatting that information. The system was slow and plagued with dead links and multiple versions of documents. In addition, about 10 percent of the pages became obsolete each year.

Before revamping the system, Novant produced static content on a first-generation intranet. "There was no real collaborative infrastructure to share in the creation or distribution of information," says Doug Smith, Novant's director of Internet technologies. For example, each of the organization's eight hospitals had different policy and procedure manuals online that duplicated some information. In addition, there was no central storage repository for all the information the hospitals produced: policy manuals, patient information and brochures, physician charts, information on facilities and medical conditions, and a multitude of forms.

At the time, Novant used HEALTHvision, an Irving, Texas-based ASP specializing in the health care market, for its Internet accessibility, Web site production, and hosting. Using an ASP allowed Novant to publish its content to the Web quickly. Ultimately, Novant completed enough of its content management infrastructure to go it alone.

## Technology helps to cope with content

The organization resolved to aggregate both digital content residing on disparate systems and paper-based content. Because the undertaking was so large, Smith's team broke it down into two parts. The first phase, currently under way, aims to provide customers with more information about Novant, medical procedures, and the services available from member hospitals and physicians. Another part of this effort involves providing physicians with relevant clinical information, policies, and procedures. During the second phase, the system will be upgraded to allow customers to create and access medical records and lab results, take health risk assessments, and retrieve information specific to their needs.

The system is based on Interwoven's TeamSite content repository. It resides in Novant's Charlotte, N.C., data center on a configuration of 16 Windows NT-based IBM Netfinity 6000R servers. TeamSite works hand-in-hand with Interwoven's TeamXML, a product Smith noted for its ability to break up and repurpose content, as well as store content natively as XML for delivery to a variety of sources, including the Web, paper, and electronic devices such as PDAs. All of Novant's data is stored in TeamXML, allowing customers, employees, and medical personnel to find and reuse the pieces as needed.

"We knew XML would be the communication standard for the future no matter what the application, and as we move toward Web services, that becomes even more apparent. We also knew that writing applications in Java would let them talk to each other using XML," says Smith. "XML-izing our content opens up all kinds of doors in terms of how we can leverage this content."

XML really was the only choice given the situation, says Cori Czekaj, a principal consultant at Arbortext assigned to the Novant project. "For Novant, the reuse of information, consistency, and information-sharing meant we had to get everything into pieces, and

most of the information wasn't structured content," she says.

Arbortext's Epic E-Content Engine (E3) helps transfer all content from its existing format—paper, PDF, Word documents—to XML. Arbortext's technology also helps the system reuse content and publish to multiple sources. When something is ready to go into production, it's moved into a production area organized by output type—Web, wireless, print. Epic converts the XML file to a PDF and then stores it in the appropriate place as defined by workflow settings.

To allow searchers to browse medical information quickly, the system employs Verity's K2 Enterprise, a knowledge organizer that arranges information by topic and allows for easy drill-downs.

#### Content that costs less

Coordinating information from a multitude of disparate systems, as Novant is doing, is the best way to reduce costs and prepare organizations for a leaner, more productive future, says Andrew Warzecha, senior program director for electronic business strategies at Meta Group, a Stamford, CT, IT consultancy. "It puts the power in the authors' hands to determine the level of granularity that can be used at a later time," he says. Reworking multiple systems and processes into one cohesive system, he added, is the most efficient use of an organization's resources, even if it produces short-term financial and logistical pain.

Novant is just finishing phase one, but it has already seen impressive returns, both in terms of labor efficiencies and cost savings. Smith estimates that the effort it takes to develop and deliver content has been reduced by 20 to 30 percent, while productivity has increased by as much as 60 percent through concurrent content development and collaboration, combined with shorter revision and update cycles.

Cost savings also are significant. With the cost of creating new information pegged at \$150 per page, combined with labor costs of \$150 per hour for engineers and \$75 per hour for technical writers, any reduction in cost is helpful. Smith estimates that reuse reduces translation costs by up to 80 percent, whereas automatic formatting reduces technical writing costs by 33 percent. In all, Smith estimates an annual cost reduction from automatic page formatting, reuse, lower redundancy rates, automatic publishing, and services improvements to be more than \$2.5 million.

#### Getting personal

Once the new site is formally launched this spring, Novant will turn its attention to adding new capabilities to the system. First up is providing some personalization for its legions of users, such as tying notification of policy and procedure changes at specific Novant facilities to employees directly affected by those changes. This would take place through an employee portal, enabled in part by the Dynamo application server from Art Technology Group (ATG). That functionality will be available by this summer, says Smith.

Doctors and patients also will benefit by getting increasingly personalized access to clinical information, patient records, and other information. Using a combination of the Dynamo application server, which stores the personalization files, and the Arbortext E3's XML-enabling translation capabilities, the system can begin to develop profiles of users that can be used to serve content based on the profiles.

#### Adding commerce to the content mix

Novant's new content management infrastructure will also allow for expansion into the realm of e-commerce.

Smith says he can see the day when a variety of e-commerce activities may take place over the network, such as bill payment, selling Web services to physicians for use with their patients, or even selling relevant products and services to patients as they are leaving the hospital. The ability to provide such services is already built into the system, based on ATG's application server and Enterprise Commerce suite.

Because of the volume of legacy data in the system, however, making the e-commerce scenario a reality will take some time and effort. However, rather than attempt an internal integration effort, Novant has opted to partner with McFadyen Consulting, a Vienna, VA, company specializing in e-commerce applications.

#### Doctors on the move

Novant is also looking at providing wireless access to its Web-based content. Eventually, physicians will be able to use handheld devices to connect to the data, either via wireless access points or through "toasters" located in medical facilities. The devices would request the pages needed via HTTP and cache them; Arbortext's E3 would perform the transformation from XML to Wireless Markup Language or HTML by applying Extensible Stylesheet Language style sheets, pulling data from the content stored in TeamSite.

Through these handheld units, physicians could access patient education information, policies, and procedures specific to a patient's medical condition. Doctors also could perform other tasks, such as downloading calculations of cardiac risk factors stored in the TeamSite system. Eventually, physicians and patients might even be able to communicate via wireless technology.

Wireless accessibility is a year or two away, Smith says. "The system is scalable enough to handle it, but there are issues of patients' rights to work through," he says. "The harder part, though, will be trying to pull content from legacy systems and map it back to the new system."

Karen D. Schwartz is a freelance writer specializing in technology and business issues. Her work has appeared in numerous publications, including *CIO*, *InformationWeek*, *Business 2.0*, and *Mobile Computing & Communications*.

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