



The Mathworks Case Study

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▶ Matt Petrie
eMarketing Manager

The MathWorks Assigns 60% of IT Web Support Staff to Other Duties, While Growing Managed Content 1,000%

Long-Time Percussion Customer Evolves Content Management Solution; Empowers Users Across Multiple Departments to Control Content; Frees IT Resources

Putting Web Publishing Power into the Hands of Content Owners

The MathWorks is the world’s leading developer of technical computing software for engineers and scientists in industry, government, and education. With an extensive 80-product offering, grouped under the MATLAB® and Simulink® software product lines, the company provides software and Services to solve challenging problems and accelerate innovation in automotive, aerospace, communications, financial services, biotechnology, electronics, instrumentation, process, and other industries. Headquartered in Natick, MA, The MathWorks employs more than 1,100 people worldwide and maintains a complex, multidomain Web presence to serve its global customer base.

Since 2001, The MathWorks has leveraged an evolving Content Management System (CM System) solution from Percussion Software. From its earliest implementation, through successive upgrades to today’s state-of-the-art solution, The MathWorks has continued to utilize the Percussion CM System to better improve its Web-based marketing and communications efforts. In fact, by putting publishing power into the hands of users across departments who own the content, Percussion has enabled the company to reduce the IT staff responsible for Web updates 60 percent, while gaining additional productivity by assigning those developers to other projects. At the same time, The MathWorks has increased the volume of Web content managed by more than 1,000 percent. The keys to this success - and the long-term health of the customer/vendor relationship - are smart technology and tireless support.

“Percussion gives us a robust solution that meets our global needs, using standards-based technologies that are easier for us to maintain,” says Matt Petrie, an eMarketing Manager at The MathWorks. “Over many years, through system customizations, issue resolution and a series of upgrades, we’ve been treated as a special customer. It’s one of the advantages of buying important technology from a company that puts customer concerns first.”

Percussion: The Right Fit Since 2001

In 2001, The MathWorks had a trio of homegrown content management systems but the systems were inflexible, not particularly scalable and difficult to manage. More importantly, it wasn’t practical to extend those systems to accommodate new types of content that weren’t then under content management, but were handled manually using HTML editors. The MathWorks wanted to centralize their CM efforts and eventually bring all content types into a single system. They conducted a competitive evaluation of 50 vendors and chose Percussion.

Replacing Home-Grown CM Systems and Manual Web Page Creation

Prior to Percussion, The MathWorks had several small proprietary CM systems that existed as separate silos of information. "They were based in Perl and MySQL, an open-source database with limited functionality," Mead explains. "Perl forms were used to collect data for content, which was written to the database, then Perl scripts were used to generate Web pages from the database information. Each CM system had its own interface and style of operation, which had to be learned by the Web IT staff."

Making content changes in this environment was time-consuming. For example, updating metadata for a single piece of content had to be done manually in each of the three systems. "The old CM systems weren't flexible or scalable, and had been handled by so many developers over time that, even if consolidated, they would have been tough to maintain," Mead says. "There was no workflow - the process management was handled manually - and there was no guaranteed touch point to gate content going to the Web, material could go out with no one on the Web design team having seen it."

But that's not all, because The MathWorks also had a number of content types that weren't in any of the existing CM systems. This content was prepared for the Web using Dreamweaver and HTML editor scripts - basically a manual process for converting original Word files into Web pages. Content owners would create a .doc file, developers would generate an HTML file from it, content owners would then edit a hard copy, and developers would implement the changes. "Percussion has enabled us to eliminate most of our outdated Web content processes," Petrie says.

Petrie explains, "We wanted to get the IT Web group out of producing HTML pages and enable our users across departments to be responsible for a more efficient, better managed process of content creation, editing, workflow and deployment. We selected Percussion after rejecting a number of competing products that were too large and complex, with a lot of distracting bells and whistles we didn't need. These were systems that expected us to know too many coding languages and maintain a myriad of skill sets to administer the CMS. In Percussion, we found a system that gave us the functionality and performance to support our global Web environment, but it was easy enough to use and understand without constantly spending consulting dollars. We decided to go with a Java code base and rely on XML, and Percussion was the ideal choice."

Phil Mead, The MathWorks Tools and Infrastructure Manager responsible for content and document management at that time, adds, "Percussion was a better fit for us, not only in how it was built, but in looking forward to where we wanted to go. The technology is flexible and easily extended, and lent itself to the kind of customization we had in mind."

The MathWorks originally implemented Percussion CM System 3.0, and over the past four years, has upgraded several times and now uses Percussion CM System 5.5. The company piloted their solution by converting the books, user stories and images from their homegrown CM systems, for an initial deployment of about 1,500 XML content items. They later focused on their largest type of content, product information, which grew the total number of content items to 11,000. Adding the links and cross references in The MathWorks multi-domain environment, and the Percussion CM System currently supports 15,000 to 20,000 individual content items.

This order-of-magnitude growth in content volume did not require The MathWorks to add IT Web support staff. In fact, as users across departments were empowered to own the entire content production process using the Percussion CM System, the company was able to eliminate three of their five full-time HTML coding positions (a 60 percent reduction, with savings reaching into six figures) while gaining additional productivity by assigning those developers to other projects.

Customization Key to Initial Percussion Solution

The MathWorks selected Percussion based on the strength of its existing capabilities, including its user interface and workflow engine, easy reuse of content items across the Web presence, and cost-effective scalability for the multi-domain environment. But there were some things that The MathWorks wanted in their solution that weren't part of the out-of-the-box Percussion CM System offering back in 2001 - and that meant customization.

"We worked closely with Percussion services to implement complex capabilities that weren't originally in the system," says Mead. "This has enabled us to grow with Percussion as the CM System evolved over the years. We customized 15 major capabilities for our solution, and Percussion has seen the value of that work and included the most significant of those functions in the Percussion CM System over time. For example, we created an XML export function that turned into the standard CM System XML import/export capability."

As another example, Mead describes the Percussion CM System page preview function, which enables a content owner to preview an entire HTML page, including all content types (text, images, links) with the correct formatting and navigation. This capability began with The MathWorks desire for a preview function for their Java Server Pages (JSP).

"We needed a way to render a dynamic page so the user could review and approve

Percussion Integrates with FreeMarker

Though The MathWorks avoided significant amounts of customization in their recent Percussion CM System 5.5 implementation, rather than use Percussion's built-in Managed Navigation, they continued to use their existing Web page delivery system based on FreeMarker and BEA WebLogic®.

The MathWorks uses FreeMarker, a Java tool, as a "template engine" for generating parts of the HTML design. This approach allows The MathWorks to keep these aspects of Web page design and navigation separate from the run-time code built in BEA WebLogic. To achieve this integration, the CM System publishes the content with FreeMarker template mark-up which is then used by BEA WebLogic to add additional formatting and navigation to deliver the final Web pages to site visitors.

Although The MathWorks has been very satisfied with this integration, they are currently evaluating the Percussion CM System's Managed Navigation.

The Mathworks Environment

- ▶ Percussion Content Management Server: HP/Compaq 380GE, 2GB RAM, 2 CPUs
- ▶ Operating System: Red Hat 3
- ▶ Database: SQL Server 2000
- ▶ Web Environment: Tomcat server bundled with Percussion CM System
- ▶ Application Server: Apache cluster for images and PDFs, BEA WebLogic cluster for HTML
- ▶ Output Formats: FreeMarker templates labeled as HTML
- ▶ Languages: Java

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all content, formatting and navigation," he says. "It had a number of steps: the first was configuring the Percussion CM System publisher to create a file of JSP code, which had to go through our Apache and Java servers to make the page render correctly. The system had to remember the location of that file and point the browser at it so you could preview the page prior to publishing it to the Web. This wasn't the normal CM System publishing process at that time, but in the newer versions, the page preview function is a built-in function, and basically follows our original custom process with a couple minor changes."

The MathWorks also did some custom work for complex Web pages that required what they called Subsidiary Content. These were pages that included multiple types of content, requiring multiple content editors etc., which they wanted to group together in a single folder. At the time, it was customary to group content only by type of content or by content editor. By grouping all the Subsidiary Content together in one folder, The MathWorks enabled the content owners to easily create, update and publish the finished Web pages. Percussion has extended this capability with additional functionality, known as Site Folder Publishing, in newer versions of the Percussion CM System. All materials for each Web page are now grouped together in the same folder for easy access, publishing and "unpublishing". As each new section for a Web site is created with its own folder in the CM System, Site Folder Publishing automatically mirrors the new folder structure on the Web server to keep the Web site synchronized with the CMS.

Petrie notes, "We continue to receive the highest quality of attention and support from Percussion - it's what sets them apart from their larger competitors. This was particularly important when we were running a highly customized version of the system and sometimes lagged behind the rest of the customer base on which version we were running."

Easy Content Reuse in the Multi-Domain Environment

The MathWorks relies on Percussion to serve a large component of their customer-facing Web presence, including MathWorks.com and nine international domains. "Much of the content deployed on Mathworks.com is reused on our other sites. In fact, content reuse is almost more important than managing content itself," says Petrie. "For example, we may not get much response for a specific seminar on the page that lists every seminar we're doing, but if the Web visitor goes to the aerospace page and we present an aerospace seminar link, we see many more registrations - it's a way that easy content reuse with The Percussion CM System enables us to do better, more targeted marketing."

Petrie notes that The MathWorks makes good use of the CM System's Intelligent Relationships - the ability to actively maintain dependencies among different pieces of content that are reused throughout the site. For example, to lead site visitors to the full text of a user success story, the CM System serves the title of the story in a variety of places in the multi-domain environment. In other places, the entire first paragraph of the success story is presented. Percussion's Intelligent Relationships maintains the dependencies between those related, but separate content items no matter where they appear, ensuring there are never broken links, and clicking on the title or first paragraph at any point takes the site visitor to the full success story. Intelligent Relationships also allows the content to be updated in the place while ensuring the updates are propagated to all the places where the content is used.

"The Percussion De-Coupled Delivery Architecture is also very important for us," Petrie says. "Since the Web is such an important and comprehensive channel for our marketing information, we can't afford for the CMS to become a single point of failure that can bring down the multi-site environment. The Percussion delivery architecture means content will continue to be served seamlessly and without impact to the customer experience."

Leaping Ahead With Percussion CM System 5.5

The MathWorks now uses the state-of-the-art Percussion CM System 5.5, and Petrie notes a number of improvements, including the updated administrative user interface, the Site Folder Publishing functionality, and enhanced search engine. "Percussion has also built Java into the Content Explorer user interface, putting many functions only a single click away," he says. "For example, you can begin work in the content edit window without having to go through multiple steps - you right-click and pick from a list to select the editor window. We probably save a couple people-months per year simply in not waiting for screens to refresh. Percussion has made an amazing leap forward with the newer versions of the CM System."

For their Percussion CM System 5.5 implementation, The MathWorks also has moved beyond the need for all that custom coding. "Working with the most up-to-date versions of the CM System has made it easier for us to lessen our reliance on customization," Mead explains. "We're taking full advantage of new functionality Percussion has built-in, and look forward to a far simpler upgrade process downstream."

Though The MathWorks didn't need to use the Fast Forward for WCM rapid implementation capabilities of Percussion CM System 5.5, Mead says that they were glad such things as pre-defined templates were available. "We used the Fast Forward materials as a guide for our own configuration efforts," he says. "For example, if we needed to create certain types of controls on a content editor, going to the Fast Forward pre-defined type would show us how to define those controls. It made our implementation a lot easier."

Petrie also compliments Percussion on how easy it is to train Percussion CM System 5.5 users. "Training was difficult on our homegrown CM systems, but the Percussion CM System is very straightforward," he says. "I conduct a CM System overview session for an hour, and for most content types, it takes only one additional hour for a user to learn the system and become productive. In fact, I had one employee start recently, who took only 1.5 hours to learn everything, and was publishing content the next day using the Percussion CM System."

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