Hosting Provider Achieves Fourfold Gain in Developer Productivity, Threefold Increase in Scalability

Overview

Country or Region: United States
Industry: Hosting

Customer Profile

Affinity Internet provides Web hosting and related services for more than 200,000 businesses. The company has 250 employees and is based in Fort Lauderdale, Florida.

Business Situation

Affinity Internet began to develop a Web-based control panel for its new hosting environment on PHP and Red Hat Linux, but found that development was slow and the platform did not facilitate a rich user experience.

Solution

The company switched from PHP on Red Hat Linux to Microsoft® ASP.NET 2.0 running on Microsoft Windows Server™ 2003.

Benefits

- Rapid time-to-market
- Threefold increase in sites per server
- Improved customer experience
- Strong reliability and security
- Fourfold increase in developer productivity
- More efficient system management
- Superior hosting economics

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Two months into a planned five-month development effort, Affinity Internet began to have serious doubts about its ability to quickly develop a control panel interface using PHP on Red Hat Linux, the company's existing development platform. Issues included limited developer productivity and a suboptimal user experience. By switching to Microsoft® ASP.NET 2.0 running on Windows Server™ 2003, Affinity Internet increased developer productivity fourfold and delivered a richer, more responsive, and more interactive customer experience than was possible with PHP in such a short period of time. The company's decision to build its new shared hosting environment on Microsoft Windows Server System™ is yielding additional benefits, including rapid time-to-market, superior performance and scalability, strong reliability and security, more efficient system management, and improved hosting economics.

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Situation

Affinity Internet provides Web-based services for more than 200,000 business customers. The company operates several brands, including ValueWeb, Bigstep, HostSave, and WinSave. In addition, Affinity "private-labels" its services for several Fortune 100 companies, which often take advantage of their own brand recognition and integrate the hosting services into their existing product lines. For both Affinity and its partners, Web hosting provides a foundation for delivering a variety of premium services such as Web site design, development, and marketing.

Over the past five years, the company has increased both server count and revenues at an average rate of 25 percent per year. Affinity operates 4,000 dedicated server computers and a few hundred shared servers, of which 30 to 40 percent run the Windows® operating system and the rest run various distributions of UNIX and Linux.

The Affinity brand for shared hosting on Windows is WinSave, which was launched in 2001, runs on the Windows 2000 Server operating system, and does not include access to more modern Microsoft® technologies such as the .NET Framework. Two years ago, in response to customer demand, Affinity began to develop a new hosting platform from the ground up. Called Gate.com, the new offering takes advantage of the latest Microsoft technologies and extends their capabilities to customers.

In building Gate.com, Affinity needed to provide characteristics similar to traditional UNIX-based and Linux-based hosting environments, including clustered servers for high availability and high Web site density (number of Web sites per server). "Shared hosting is a price-sensitive business with lots of competitors," says William Toll, Director of Product Management at Affinity Internet. "Gate.com will help us differentiate ourselves through features such as high-availability clustering, which typically have been out of the reach of small businesses from a cost perspective."

In addition to an entirely new hosting infrastructure and code for provisioning new customers, Affinity had to develop a new Web-based, customer-facing control panel. The company's existing control panel, which was written in PHP and ran on Red Hat Linux, was not capable of supporting the new hosting platform. Among the new requirements were improved usability, better user interactivity, and an ability to support multiple Affinity brands as well as rebranding by third parties.

Because most of its development staff was skilled on Linux, Affinity started to build the new control panel using PHP. However, two months into a planned five-month phase of the project, the company began to have serious concerns about the suitability of PHP for solution development. Six developers had implemented only 2 of the 12 features in the requirements specification, and even those features were lacking in usability. "The issues we faced with PHP included developer productivity and its failure as a platform for the delivery of rich interactivity," says Toll. "In addition, PHP did not support modular software design and was slow to execute, which would have damaged the customer experience."

Solution

Affinity met its deadline for building the new control panel and delivered a richer, more responsive user experience by switching from PHP on Red Hat Linux to Microsoft ASP.NET version 2.0 running on the Microsoft Windows Server™ 2003 operating system, the foundation of Windows Server System™ integrated server software. In less than two weeks, two developers working in parallel with the PHP developers implemented a

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prototype that included all 12 features in the requirements specification and met the approval of the company's Usability and Human Factors group. The formal decision to abandon development on PHP and move forward with ASP.NET 2.0 came a few days later, after a presentation to company executives.

"I spent a few hours with one of our Windows developers, who showed me the ASP.NET user experience, development cycle capabilities, flexibility, and ability to address branding and private labels with simple changes to the code set," says Jon Limbird, Chief Operating Officer for Affinity Internet. "It was readily apparent how ASP.NET 2.0 could help accelerate solution delivery and at the same time deliver a higher-quality user experience than PHP. We made the decision to switch virtually immediately."

Over the next six weeks, the two developers not only finished development of the control panel on time but also were able to go beyond the functionality required for the beta release of Gate.com and implement virtually all the functionality required for its formal launch in early 2006. Such features include one-click installers for the free DotNetNuke and Community Server, two popular Web applications based on ASP.NET. Developers also were able to add control panel elements for features such as customized messages for "404 error" pages which, in the past, required users to edit text files.

"By switching to ASP.NET 2.0, we were able to implement the required functionality more than twice as fast with one-third the resources as compared with PHP," says Mark Richman, Project Lead and Senior Development Engineer at Affinity Internet. "In addition, we were able to deliver the consistency, responsiveness, rich interactivity, and standards compliance that was lacking with PHP. With ASP.NET 2.0, we get support for XHTML [Extensible Hypertext Markup Language], cascading style sheets, SOAP [Simple Object Access Protocol] 1.2, WS-I [Web Services Interoperability], and WSDL [Web Services Description Language], with it all baked into the platform—capabilities that PHP developers have to code from scratch."

Control Panel Development

Affinity built the control panel using the Microsoft Visual Studio® 2005 development system, which provided an integrated tool set for all phases of software development. Developers used a code-behind model (in contrast to a code-inline model, which ASP.NET 2.0 also supports) and made extensive use of generics—a new feature of the Microsoft .NET Framework—to reduce the size of the code base. Generics are programming elements with operations that can be tailored to perform the same functions for a variety of data types. Being able to define a generic class or procedure eliminates the need to define a separate version for each data type.

Developers also used custom server (.ascx) controls, which are loaded on the fly at run time by placeholder controls in the Web pages and are tightly coupled with back-end SOAP-based provisioning Web services that were written in the C# programming language. "With ASP.NET 2.0, we were able to easily create custom server controls that meet our specific business needs," says Richman. "Best of all, they're reusable. We can drag and drop existing server controls to build new features—something you can't do with PHP."

Developers also made heavy use of the new ASP.NET 2.0 site navigation provider, which maps the physical storage locations of ASP.NET pages to a logical model that can be accessed by the new navigation controls in ASP.NET 2.0. Affinity now is looking at how it can use the membership provider to facilitate

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user authentication and management, and the personalization provider to support the customization of Web page layouts for each user.

"By organizing site navigation logically in an XML-based Web.sitemap file, we can adjust Web site navigation without having to change any code," says Richman. "We used the site navigation provider together with the new SiteMapPath control to create a 'bread crumb trail' user interface element that aids in site navigation."

Affinity also took advantage of ASP.NET 2.0 themes and skins, which will enable the company to easily change the control panel's look and feel to support additional brands. Themes are similar to cascading style sheets in that they define a set of common attributes that apply to Web pages. However, themes differ from style sheets in that themes can define many properties of a control or page—not just style properties—and also can include auxiliary files such as graphics. A skin is a set of properties and templates that can be used to standardize size, font, and other attributes of controls on a page. With skins, predefined display settings for a control can be created and the appropriate skin applied at run time.

"We plan to use the new control panel to support some of our other brands, such as ValueWeb," says Richman. "Without ASP.NET 2.0 themes and skins, that would require us to maintain two branches of code and add new features in two places, resulting in extra work and an increased potential for error."

Hosting Environment

The control panel Web site resides on a cluster of two dual-processor server computers, which run Windows Server 2003 Standard Edition. Code-behind pages on the Web site use SOAP 1.2 to invoke provisioning Web services that run on a separate pair of similarly configured servers and also were written using ASP.NET 2.0. The business logic for replication and other provisioning-related functions is written using the C# development language.

Customer Web sites run in a shared environment on load-balanced clusters, each with four servers that run Windows Server 2003 Standard Edition. The Web servers store only the metadata for each customer, with all content residing on—and served directly from—a Network Appliance storage area network.

Internet Information Services (IIS) version 6.0, the built-in Web server in Windows Server 2003, provides significant advantages in such a hosting scenario. Based on a completely different design than IIS 5.0, its predecessor in Windows 2000 Server, IIS 6.0 combines a cache-enabled, kernel-mode Web driver with a new fault-tolerant process model to deliver significantly better performance, scalability, manageability, and security for Web applications and Web services.

"We could not have implemented this type of shared, clustered hosting environment without moving from Windows 2000 Server to Windows Server 2003," says Matt Baldwin, Windows Systems Architect at Affinity. "Improvements in SMB [server message block] and DFS [Distributed File System] capabilities were essential, as were the performance and scalability improvements provided by IIS 6.0."

Other technologies in Windows Server 2003 that play a role in the hosting environment include:

- **Active Directory.** The Active Directory® directory service provides a centralized point of administration, user authentication for all servers, and policy management.

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- **Automated Deployment Services.** Automated Deployment Services will help Affinity rapidly deploy Windows Server 2003 on new servers, decreasing the time that it takes to get a new server into a production cluster.

- **Windows Server Update Services.** Windows Server Update Services provides a single point of management for the distribution of software updates to all servers.

In addition to Windows Server 2003, the hosting environment takes advantage of other Windows Server System server products, including:

- **Microsoft SQL Server 2000.** Customer databases will reside on a server cluster running Windows Server 2003 Standard Edition and SQL Server™ 2000 Workgroup Edition. Affinity expects a single cluster of two dual-processor servers to accommodate roughly 700 customer databases.

- **Microsoft Operations Manager 2005.** Microsoft Operations Manager (MOM) 2005 will be used to monitor the health and performance of every server in the hosting environment. Affinity will use MOM to automatically take predefined actions in response to events and, in the future, to trigger the complete rebuilding of a server if required.

Benefits

Through the superior efficiencies provided by the Windows platform and the ASP.NET 2.0 development environment, Affinity Internet was able to launch its new shared hosting solution on time, with a rich feature set, and at an attractive price. Furthermore, capabilities provided by Windows Server System will help Affinity easily and cost-effectively scale, administer, and ensure the reliability of the hosting environment as it gains popularity with customers who require access to the latest Microsoft technology. Moreover, many of those same benefits will be realized by customers who use the hosting environment.

"We strongly believe that the popularity of Windows hosting solutions among Web designers and Web developers, combined with the power of ASP.NET 2.0, will lead to the success of our new hosting solution," says John Enright, Vice President of Marketing at Affinity Internet.

Rapid Time-to-Market

Due to the rich prebuilt functionality and superior developer productivity provided by the Windows platform, Affinity Internet was able to build its new hosting infrastructure and control panel in time to launch the new brand into beta test as scheduled in November 2005. Furthermore, the developer productivity advantages provided by ASP.NET 2.0 helped the company surpass the planned feature set for its beta release to include additional features such as one-click installers for popular Web applications. And as new Web applications are introduced by Microsoft and other companies, Affinity can rapidly incorporate them into Gate.com to continue maximizing the value provided to consumers.

Superior Scalability and Performance

With Windows Server 2003 and Internet Information Services 6.0, Affinity expects to host 10,000 to 12,000 customer Web sites on a four-server cluster—a threefold increase when compared with a limit of roughly 1,000 Web sites on a single server computer running Windows 2000 Server. Furthermore, capabilities such as Automated Deployment Services will help the company rapidly deploy more servers as customer demand increases. "In the past, it took four to five hours to deploy a new server, with a technician following a procedure document and manually inserting CDs," says Baldwin. "Automated Deployment Services enables us to deploy a new server in 20 minutes, with

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Improved Customer Experience

The functionality and flexibility provided by the Windows platform and the ASP.NET 2.0 development environment enabled Affinity to deliver a control panel that provides a richer and more interactive customer experience. For example, customers can customize "404 error" server messages without having to edit stand-alone text files, and can easily navigate the Web site using the "bread crumb trail" navigation aid that Affinity developed for the control panel using the new site navigation provider and navigation controls provided in ASP.NET 2.0.

Because it is precompiled, ASP.NET 2.0 also is helping the company deliver a faster, more responsive control panel than its PHP-based predecessor. "Quality assurance testing is showing that execution times for ASP.NET 2.0 are much faster than those for PHP, which means that customers will benefit from a more responsive user experience," says Richman.

Affinity shared hosting customers also will benefit from access to the latest Microsoft technology, as provided under the Gate.com brand. Like the company's own developers, customers who are Web developers and designers will appreciate the improvements in developer productivity and user interactivity provided by ASP.NET 2.0, Visual Studio 2005, and Windows Server 2003.

Strong Reliability and Security

By taking advantage of new features and capabilities in Windows Server 2003, Affinity was able to deliver a clustered hosting environment that will significantly improve the reliability of customer Web sites. Similarly, new features provided by IIS 6.0—such as its fault-tolerant architecture and application pools—will help the company ensure that a single poorly behaved Web site does not bring down other customer Web sites running on the same server.

Security is improved through features such as Active Directory, which provides a central point of administration and authentication for all servers on the network. Similarly, Automated Deployment Services will help ensure that new servers are properly configured when deployed, and Windows Server Update Services will enable system administrators to rapidly and efficiently deploy software updates to address potential security issues. Finally, Microsoft Operations Manager will help administrators quickly identify suspicious server behavior and take the appropriate corrective actions.

High Developer Productivity

When combined, the Visual Studio 2005 development system and ASP.NET 2.0 help Affinity realize extremely high levels of developer productivity. Tight integration with source control, rich designers, and integrated debugging tools in Visual Studio allow developers to easily take advantage of the extensive prebuilt functionality provided by ASP.NET 2.0 and the Windows platform, resulting in lower development costs and fast time-to-market for new products and product features.

"With Visual Studio 2005 and ASP.NET 2.0, we can develop new features at least four times as fast as we could in a PHP environment," says Baldwin. "Debugging is also faster by a factor of four in that, with Visual Studio 2005, we can easily trace through exceptions and find the root cause of a problem. In many cases, we can find the problem and fix it before a trouble ticket is opened."

More Efficient System Management

Capabilities provided by Microsoft Operations Manager, Automated Deployment Services,

and Active Directory will help make system administrators more efficient, enabling Affinity to manage its new hosting environment with minimal development and system administration staff. In addition, the clustered hosting environment enabled by Windows Server 2003 will eliminate the need to call in a technician to swap out a failed server in the middle of the night. Instead, other servers in the cluster will ensure uninterrupted access to customer Web sites that were running on the failed server until it can be swapped out the next morning.

"Our goal is that system administrators will never have to log on to a server," says Richman. "Instead, they'll use an extended version of the control panel to handle some tasks and let the automated event response capabilities of MOM handle other types of issues."

Superior Hosting Economics

Because of the efficiencies and scalability that Affinity has realized, the company can offer shared hosting on Windows at a price that, in the past, was only achievable on Linux. That benefit is due as much to the usability and supportability of the Windows platform as to hardware and software costs.

"Amortized costs for hardware and software are about 5 percent of total costs, whereas customer support is 20 to 25 percent of costs," says Toll. "By delivering a better customer experience, as we've been able to do with Windows and ASP.NET 2.0, we'll reduce support costs as well as attrition rates. In the past, when one server went down, 200 customers would call. Now, with a clustered solution based on Windows, customers won't even know if a server fails."

Adds Enright, "In the past, it cost more to provide hosting on the Windows platform than it did on Linux. Thanks to the efficiencies that we now can realize with new Microsoft technology, Windows is rapidly becoming a more cost-effective hosting platform than Linux. Microsoft understands the needs of the hosting community and is working to meet those needs, both through the features of Windows as well as an improved licensing model. In turn, we're better able to provide our Web developer and small-business customers with new technology that can help them succeed."

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- Custom-built two-processor server computers

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