



Web-Based Diagnostic Image Viewer Expected to Boost Maker's Revenues 30 to 40 Percent

Overview

Country or Region: United States

Industry: Healthcare

Customer Profile

Integrated Document Solutions (IDS) provides workflow and document life-cycle solutions and services for the healthcare industry. The company has approximately 400 employees worldwide and is based in Fort Lauderdale, Florida.

Business Situation

IDS needed to enable radiologists and imaging centers to share diagnostic images with referring physicians, in a way that did not require any new investment on the part of the physicians.

Solution

The company developed its DICOM Image Viewer with Microsoft Silverlight, which resulted in a solution that provides a compelling user experience through any web browser with a standard Internet connection.

Benefits

- Compelling new value for IDS customers
- Easy access by referring physicians
- Increased revenue for IDS
- Rapid time-to-market

"By using Expression Blend for UI design and Visual Studio 2010 for development, we were able to work on both areas in parallel, which helped us reduce time-to-market by an estimated 50 percent."

Isaac Aronov, Chief Technology Officer, Integrated Document Solutions

Integrated Document Solutions (IDS), a provider of solutions and services for healthcare providers, received numerous requests from radiology centers to give them a better way to share diagnostic images with referring physicians. IDS chose Microsoft Silverlight to develop its DICOM Image Viewer, which works with virtually any web browser to deliver unparalleled performance and responsiveness over a common Internet connection. The image viewer's rich user experience and unique functionality clearly differentiate IDS and its clients, providing both with a strong market advantage. IDS was able to develop its solution in only four months, leading to a rapid return on the company's latest investment in helping its customers better meet the needs of their own customers: the referring physicians upon whom they depend to send them business.

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Situation

Integrated Document Solutions (IDS) provides workflow and document life-cycle solutions and services for the healthcare industry. The company was founded in 2003, with a focus on medical back-office services such as the transcription and management of documentation to support billing, compliance, and so on. IDS soon realized that its customers had additional needs, such as access to prior studies and reports. Over the years, IDS has continually added new functionality to AbbaDox, its flagship solution, which is delivered over the web as a hosted service.

"We're both a service bureau and a solution provider, which gives us great insight into customer needs," says Yaniv Dagan, Founder and Chief Executive Officer at IDS. "Most of the new features we've added to AbbaDox over the years are a direct result of customers telling us their needs."

One such need is the ability to share information. Many of the company's clients are radiologists, who use AbbaDox not only to capture their interpretations of medical imaging studies, but also to share them with referring physicians. "Radiology is a referral-driven business, and imaging centers need a differentiator to persuade referring physicians to send more patients their way," says Dagan. "We meet that need by enabling physicians who refer their patients to imaging facilities that use AbbaDox to easily access the results of the imaging studies for those patients."

In 2010, IDS set out to meet an additional customer need: the ability for radiologists to share the actual diagnostic images with referring physicians. "It was a logical progression of delivering additional value," says Dagan. "Referring physicians could already log on to AbbaDox to get reports on an imaging study, but our customers

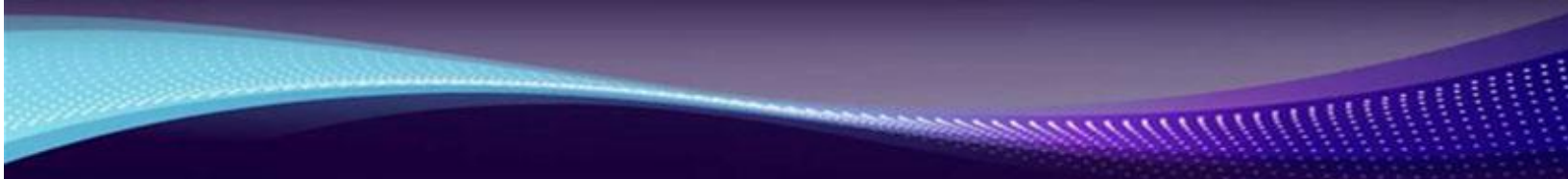
were telling us that many of their referring physicians wanted access to the images, too. However, providing that access to images has traditionally involved time-consuming, resource-heavy, and costly measures."

In the past, enabling physicians to quickly view high-resolution Computerized Tomography (CT, also known as CAT) scan images stored in an imaging center's Picture Archiving and Communication System (PACS) required installing a mini-PACS workstation at the physicians' offices. For radiologists, this required an elaborate IT staff to handle installation, training, and maintenance. For the physicians, it meant paying PACS technology licensing fees and required a high-bandwidth connection to accommodate the large Digital Imaging and Communications in Medicine (DICOM) images generated by a CT scanner, which can reach 500 megabytes for a single imaging study.

"Some PACS vendors have developed Java-based DICOM viewers that run in a browser, but we felt that such an approach still presented too many drawbacks," explains Dagan. "The Java-based viewers were still specific to one PACS system, required a fast Internet connection, and, because the Java viewer did all the image processing, physicians still needed a powerful, modern computer to achieve anything close to an acceptable level of performance. We sought to avoid these issues by delivering a user-friendly, zero-footprint solution that would launch quickly and work with any PACS system or web browser, over any Internet connection."

Solution

IDS began planning to build its DICOM Image Viewer in early 2010. The first step was to choose a development platform. "Given that we didn't want to use Java, we



saw three choices: Microsoft Silverlight; Adobe Flash; or DHTML and AJAX," says Isaac Aronov, Chief Technology Officer at IDS. We dismissed Flash because the technology was entirely unfamiliar to us. We had the skills to build the image viewer in DHTML and AJAX, but it would have required too many roundtrips between the viewer and our data center, which would have limited application responsiveness. In addition, with DHTML, we would have needed to code for compatibility with all the major browsers."

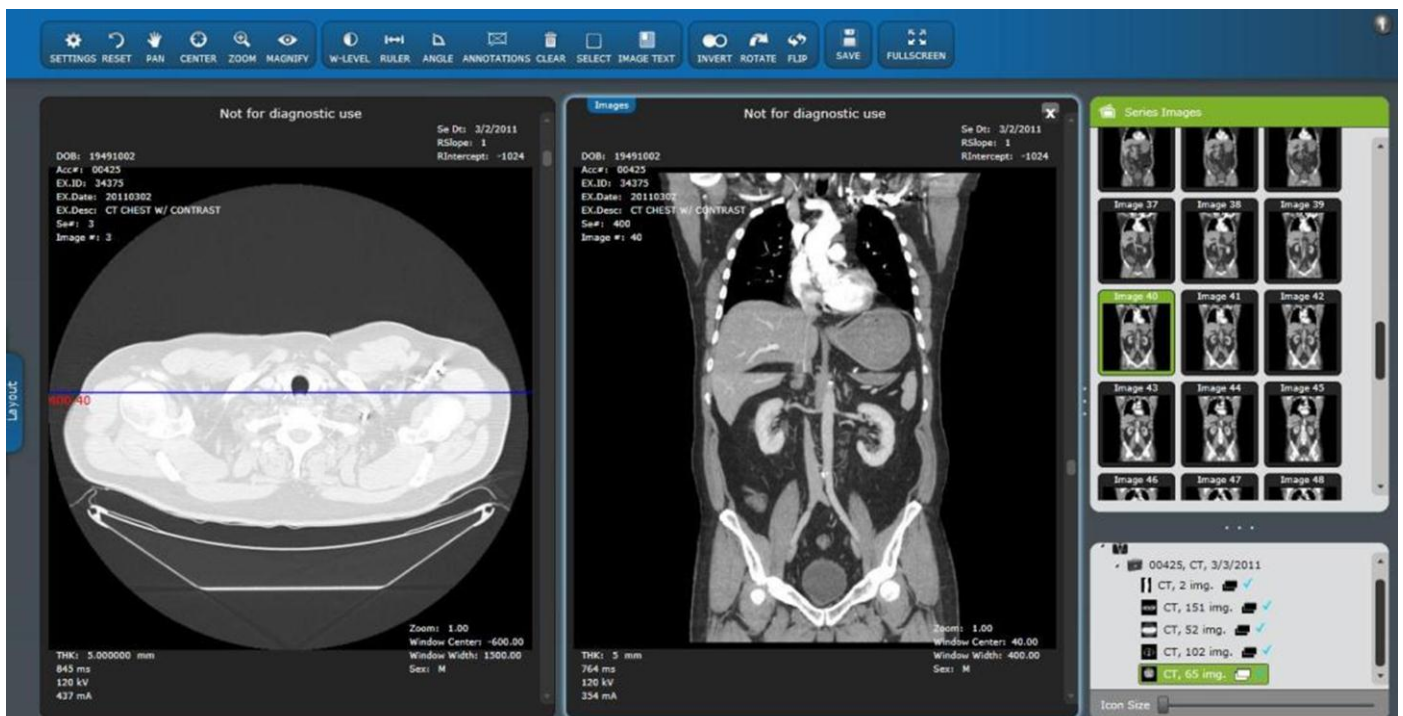
Continues Aronov, "The ubiquity of Microsoft .NET technology and the expertise we already had in-house made Silverlight an optimal choice for this project, even if we didn't have much direct experience with it. With Silverlight, we knew that we could create a compelling, cross-platform user experience; bring a solution to market quickly and efficiently; and take

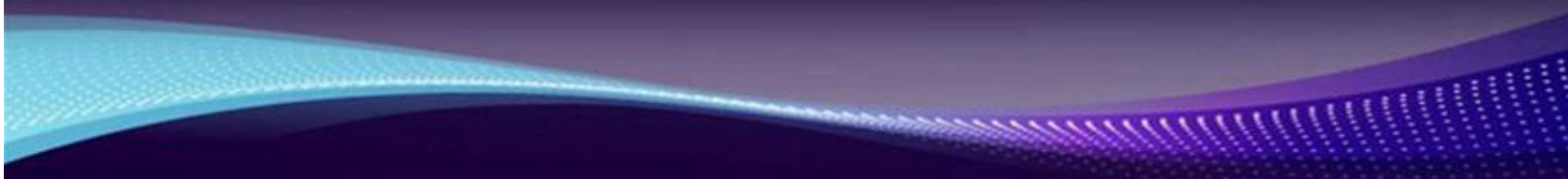
full advantage of the power of our existing hosted services platform."

Fast Development

Development took four months, during which two developers and one designer built the image viewer while two other developers added the new back-end services to the company's hosted solution. The image viewer is based on Silverlight 3 and was developed using the Microsoft Visual Studio 2010 Premium development system and Microsoft Expression Blend 3 design software. It uses HTTPS to communicate with back-end services hosted on the AbbaDox portal, which are written in the Visual C# programming language and run on the Windows Server 2008 R2 Enterprise operating system and Microsoft SQL Server 2008 Standard database software. The hosted services handle all communication and compatibility issues with customers' PACS systems,

Figure 1. The IDS DICOM Image Viewer's synchronized images allow medical providers to simultaneously view images from multiple imaging series and studies, and synchronize scrolling between images.





exposing a standardized API for data and image retrieval by the client.

“We vary the image format and compression level based on the type of user,” Aronov explains. “For example, we may use bitmaps to deliver an image for viewing by an orthopedic surgeon, but may use a PNG format when the same image is being viewed by a family doctor. Viewer functions such as image windowing and leveling are always done on the server to minimize the workload on the client, which uses proprietary intelligence to pre-cache images for an even more responsive user experience. You can’t get anywhere near the same level of performance from Java-based image viewers that download raw DICOM data and then perform all image manipulation locally.”

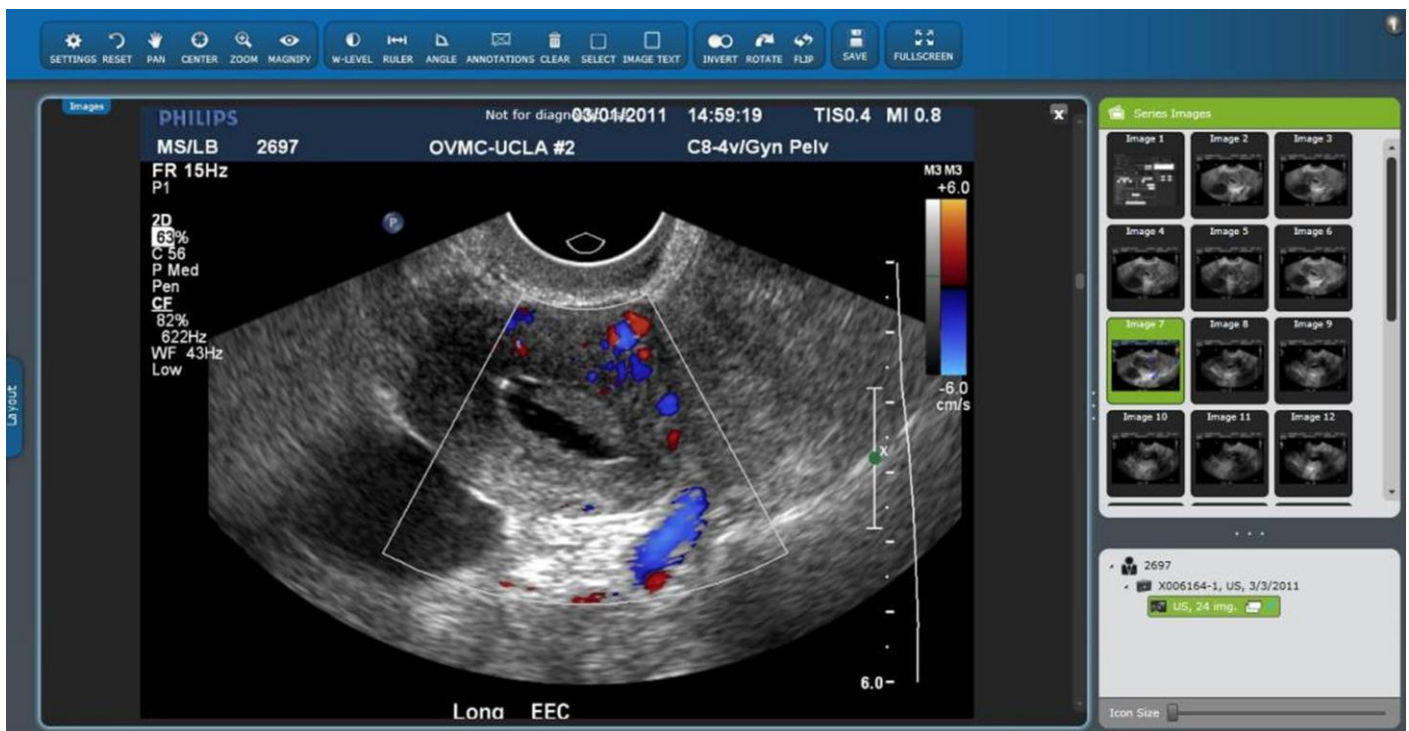
IDS finished development of its image viewer in June 2010, began demonstrating it the following month, and began pilot-testing the viewer with selected customers in October 2010. The IDS DICOM Image Viewer was released for general use in November 2010.

Rich User Experience and Functionality

The rapid growth in usage of the IDS DICOM Image Viewer is a direct result of its compelling user interface and functionality, which IDS modeled after an established PACS workstation. Referring physicians access patients’ diagnostic images on the AbbaDox portal by clicking a report for a patient, and then clicking the DICOM tab at the top of the screen. Key features of the image viewer (see Figures 1 and 2) include:

- **Image pre-caching.** DICOM images can be automatically cached before doctors

Figure 2. The IDS DICOM Image Viewer provides physicians with full control over contrast and window leveling.



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Yaniv Dagan, Founder and Chief Executive Officer, Integrated Document Solutions

log on so that every imaging series is immediately available when referring physicians open their patients' charts in AbbaDox.

- **Synchronized images.** Providers can simultaneously view images from multiple imaging series and studies, and can synchronize scrolling between images using reference lines to show equivalent positioning for each series.
- **Contrast and window leveling.** The image viewer provides full control over image brightness and contrast—essential capabilities for interpreting DICOM images, which capture complex three-dimensional data using up to 65,000 shades of gray.
- **Image manipulation, measurement, and annotations.** Physicians can zoom, pan, magnify, invert, rotate, and flip images. They can also draw rule lines and angles, and add text annotations and callouts with arrows, all of which can be saved for later reference.
- **Safe modification.** None of the modifications made in the image viewer affect the original DICOM images. Rather, they are seamlessly stored as copies that are automatically displayed whenever the physician returns to an image that has been modified.
- **Cross-platform access.** The image viewer is accessible using a PC or Mac running virtually any web browser.

As of May 2011, more than 1,200 physicians per day were using the IDS DICOM Image Viewer. "The image viewer's user base has doubled in the past three months," says Dagan. "We're receiving 10 to 20 requests for new users each day, and the image viewer is getting rave reviews."

IDS is already in the final stages of development for the next version of its image viewer, which will add support for viewing ultrasound images. "With all of the heavy processing handled on the server, it's easy to modify the Silverlight client to support additional uses," says Aronov. "In fact, we're so impressed with Silverlight that we're looking to expand its use across our platform, including our scheduling application and patient chart viewer."

Benefits

With its new DICOM Image Viewer based on Microsoft Silverlight, IDS is delivering compelling new value to radiologists and imaging centers, which IDS expects to generate a 30 to 40 percent increase in revenues among those customers. Just as impressive, with Silverlight, IDS was able to develop its image viewer with modest resources in only four months, leading to an even stronger return on the company's latest investment in meeting new customer needs.

Compelling New Value for IDS Customers

With its DICOM Image Viewer, IDS is delivering strong new value to its customers. Radiologists and imaging centers that use AbbaDox can give referring physicians immediate, unprecedented access to diagnostic images over the web. The solution saves money for imaging centers by eliminating the need to install, maintain, and support complex, dedicated solutions in physicians' offices, and it spares referring physicians from the expense of high-bandwidth connections and PACS software licensing fees.

Testimonials from IDS customers echo these benefits. "Our referring physicians have been impressed, and our marketing reps have been happy to have this key business accelerator at hand," says Mike

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Integrated Document Solutions

Christie, Chief Information Officer of Health Diagnostics, an imaging group with more than 20 facilities across the United States. “It has dramatically improved and simplified the installation process at the physician offices, and has taken out all of the pain of getting the images to the client. We needed to be competitive because other imaging companies are offering enhanced portals. This is one of the best portals we have seen, because it combines high functionality with simple installation and does not tie us to an underlying imaging platform.”

Easy Access by Referring Physicians

Aronov attributes the image viewer’s compelling functionality—and the resulting value provided to IDS customers—to the company’s decision to use Silverlight to meet its market requirements. “With Silverlight, we were able to provide referring physicians with an unprecedented ability to access and interact with diagnostic images over the web,” says Aronov. “Silverlight enabled us to deliver a stunning user experience through a plug-in that’s less than 5 megabytes in size, can be downloaded in seconds, runs on PCs or Macs, and works equally well with all major browsers.”

Increased Revenue for IDS

The IDS DICOM Image Viewer is providing a strong competitive advantage for IDS, which expects its new offering to help drive a significant increase in revenue. “When we introduced our Silverlight-based image viewer, it put us head and shoulders above the competition,” says Dagan. “More than 75 percent of our radiology customers have expressed an interest in our DICOM Image Viewer, which we expect to generate a 30 to 40 percent revenue increase from our radiology and imaging center customer base.”

Rapid Time-to-Market

Just as impressive as the company’s image viewer itself is how IDS was able to develop it in only four months. “By using Expression Blend for UI design and Visual Studio 2010 for development, we were able to work on both areas in parallel, which helped us reduce time-to-market by an estimated 50 percent,” says Aronov.

Use of Silverlight also made it possible for IDS to take advantage of its strong expertise with Visual Studio, the Microsoft .NET Framework, and Visual C#. “A familiar programming environment and tool set was one of the main reasons we chose Silverlight,” says Aronov. “Its extensible controls saved us a good deal of time, as did our use of Windows Communication Foundation to connect the Silverlight client to our data center. Had we tried to build our DICOM Image Viewer in Flash or DHTML instead of Silverlight, it would have taken at least three times as long; we’d probably still be working on our first release, instead of just winding up development on our second release.”

For More Information

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For more information about Integrated Document Solutions (IDS), visit the website at:

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Microsoft Visual Studio 2010

Microsoft Visual Studio 2010 is an integrated development system that helps simplify the entire development process from design to deployment. Unleash your creativity with powerful prototyping, modeling, and design tools that help you bring your vision to life. Work within a personalized environment that helps accelerate the coding process and supports the use of your existing skills, and target a growing number of platforms, including Microsoft SharePoint Server 2010 and cloud services. Also, work more efficiently thanks to integrated testing and debugging tools that you can use to find and fix bugs quickly and easily to help ensure high-quality solutions.

For more information about Visual Studio 2010, go to

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