

IBM Lotus® Forms® White Paper

September 2007

“Politics without Principle, Education without Character, Science without Humanity and Commerce without Morality are not only useless, but positively dangerous”



Twenty Years Experience In
Technical Evaluation

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Abstract

In this paper we recommend replacing paper with Electronic Forms (e-Forms), as a means of capturing, storing, and transporting information. We show the ways e-forms can help to bring a business more effectively into the Web 2.0 world of the Internet, at the same time realizing significant savings over the costs of maintaining, creating and using paper forms. We also make the case for e-Forms as a business tool, especially as they help to implement Service Oriented Architecture and Web Portals, and describe two important open standards that are widely used to support this implementation.

We identify significant players in the e-Forms market, and conclude that IBM® Lotus® Forms leads the pack because of its better adherence to open standards, quicker development times, and superior throughput.

The report concludes with 4 case studies, done in a variety of private and government documentation environments, in which customers chose IBM Lotus Forms over several different competing products, resulting in the savings of hundreds of millions of dollars.

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1.0 The Market for Electronic Forms

1.1 The Need for Electronic Forms

Once viewed as a necessary bureaucratic evil, data entered to forms is increasingly utilized as a tool to systematically capture information, serve as an interface to a process step, and bridge the paper-digital divide. For example, content originating outside the enterprise can drive internal, back-office transactions; content created inside the business can capture knowledge; and content delivered externally can influence and persuade customers to take action.

The most effective management of this information is obtained through the use of electronic forms, e-Forms, for several reasons.

1.1.1 Time to Design

1.1.1.1 The Paper Problem

Paper forms require significant work and re-work to produce, usually by especially skilled graphics designers. This involves anticipation of the user interface, an understanding of the type of information that will be entered, and effective use of the usual 8-1/2 by 11 form factor, involving hours of time to create. Designers already use desktop editors and graphics tools to create forms, save current content, and do quick revisions when required. Why not save steps, and design, create, store and modify the forms online?

1.1.1.2 The e-Forms Solution

e-Forms software does just that, by providing a forms design environment. Using this environment and a what-you-see-is-what-you-get display, the designer lays out the form as the user will see it, including all fields and graphics. Support of the forms design task is enhanced as well, through the addition of features such as initialization of field content, entry validation, automation of field layout, and definition of logical relationships between the field entries. The design function is thereby strengthened, enabling the designer to take into account not only appearance and content, but also the user's real-time experience when making entries to the form. Once the core design has been done, the developers responsible for the process flow can easily make additional changes within their usual integrated design environment (IDE). And, the completed form is immediately available online.

Result? Rapid form design, creation of a re-useable library of forms and form components, and support of efficient developer teams.

1.1.2 Standards and Security

1.1.2.1 The Paper Problem

As paper and its content move through the business process, a "paper trail" is necessarily created in order to prove that the process conforms to regulatory requirements. This trail is itself prone to error, and requires its own distinct management. Is there a way to enforce conformance to regulations, and at the same time automate some of the management process?

1.1.2.2 The e-Forms Solution

Yes, in at least two ways. First, e-Forms can be tracked and limited to a controlled flow within a secure process. No document is passed to an inappropriate next step in the process; no document is accepted if it lacks the data needed. Movement from step to step in the process is tracked in real time, and that record can be used to support quickly available and more easily generated business metrics. In addition, each document can be signed digitally, ensuring that no data is lost or changed during transmission.

1.1.3 Cost to Store and Handle

1.1.3.1 The Paper Problem

Relying upon paper to record and control the business process comes with its own significant costs. Blank forms must be stored, inventoried, and distributed when needed. Updated forms must be printed and distributed, and the old stock of forms must be destroyed. This requires a paper document "footprint" which can approach warehouse size. As for the costs of paper, a single paper form costs \$30- \$165 to use, enter, process and file. \$22.5B is spent on pre-printed forms in the US alone, and of these, 30% are wasted.

Handling contributes its own costs. Employees must be trained to use the new forms; they make errors while they learn. Forms filled out incompletely or illegibly by customers must be identified, and follow-up calls are often required in order to make the corrections. When content is wrong, it must be captured again and inserted at the proper step in the process; this re-entry is itself liable to error. All this significantly increases call center and support man-hour costs. Can this cost of warehousing and handling be reduced?

1.1.3.2 The e-Forms Solution

Certainly. Effective use of e-Forms comes close to entirely removing the need to handle and store paper. Each form exists in its best current version, stored online, which can be called up when and where needed; there is no need to physically store or distribute blank forms. The form at its inception can be displayed with many fields already filled with accurate data, based for example on the location in which it is being used or an ID code provided by the user, or even the simple duplication of repetitive data, such as addresses and phone numbers.. User prompts and data entry explanations can be presented along with the form. The data itself can be validated as it is entered, to conform to pre-defined user permissions and business process requirements. Result: forms that are complete, legible, free from errors, and immediately useable by an automated business system.

1.1.4 Partnering in the Process

1.1.4.1 The Paper Problem

In addition to the defects already described, paper forms are passive, useless until human action adds content to the business process. Distribution of completed forms by faxing or mailing adds to cost, and slows the business process. Complex manual procedures need to be devised in order to link forms, signatures, and attachments together in an end-to-end business transaction. Is there a way to compel forms to carry their own weight?

1.1.4.2 The e-Forms Solution

There is. Properly constructed e-Forms can be integrated into a well-designed flow in a way that supports streamlining and automating the entire process. Each step in the process can present a list of its data needs as a form, already partially populated with information from a database or the content of a form from a previous step in the process. Because the populated content is generated following standards, and the human entries are validated using the same standards, the resulting form and its content are guaranteed to be ready for use by the next step in the process. Further, since form generation and population can be automated, it becomes possible to create a form whose entire content is generated, and to pass it to the next step in the process without any human attention at all.

1.2 SOA in the Web 2.0 World

As we proceed into the 21st century, we find ourselves in a revolutionary age, the age of Web 2.0, which O'Reilly Media has defined as "the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform."

Some characteristics of this revolution applicable to the e-Forms arena are:

- The transition of web sites from being isolated sources of displayed information to sources of formatted content deliverable as documents, with built-in field validation and formatting as well as real-time help and automated insertion of field content.
- Enhanced organization and categorization of content, with ready access to document locations well below the site's top page.
- Creation of rich, interactive applications and services to effectively support business processes on the Web and making them directly accessible to the customer's browser.

Part of this process has been to convert desk top applications to be available on websites, present an interface to the user when the proper URL is accessed, perform a series of operations when requested, and produce a retainable product.

In the more general case, a company may build an application that, at the user's request, performs a set of functions that give the user access to some part of the company's online business infrastructure and at the same time capture information to be used by the company. An example might be a request for a mailing of product information. The user of course needs to provide a mailing address, and will probably be asked for other background information as well, which the application might store into a database for later retrieval. This application would probably use some variant of Extended Markup Language (XML) to communicate the information to and from the user, and to provide information to the database.

By doing so, the application becomes part of a "Web Service", which is simply a software system designed to support interoperable machine to machine interactions over a network. In addition to using XML, a Web Service will often also provide a method for securing or encoding the data transmission from and to the user over the network, to protect critical information such as credit card numbers. This is done by attaching a string of text, called a digital signature, to the data, based upon a "key" uniquely associated with the user.

Extend the mailing request example by imagining a second Web Service, which prints out the names of customers recently added to the database, along with the type of product information that was asked for. If for example the product is the new Gee-whiz Widget 2.0 AND the customer is under

the age of 25, an employee could generate the list and send a follow-up Widget Carrying Case brochure to the customer.

In this example, two distinct Web Services are used, in two distinct steps. A reasonable improvement would be to connect these two steps, so that the second step is automatically performed following the first. If this is done, the company will have begun to implement Service Oriented Architecture (SOA), and will have created a Portal into its business operation.

A formal definition of "Portal" is a framework for integrating information, people and processes across organizational boundaries, so-called perhaps because it is similar to a portal in the side of a ship. It provides a view into a small part of the business, without necessarily allowing a view of or access to any of the adjacent information on the company's business site.

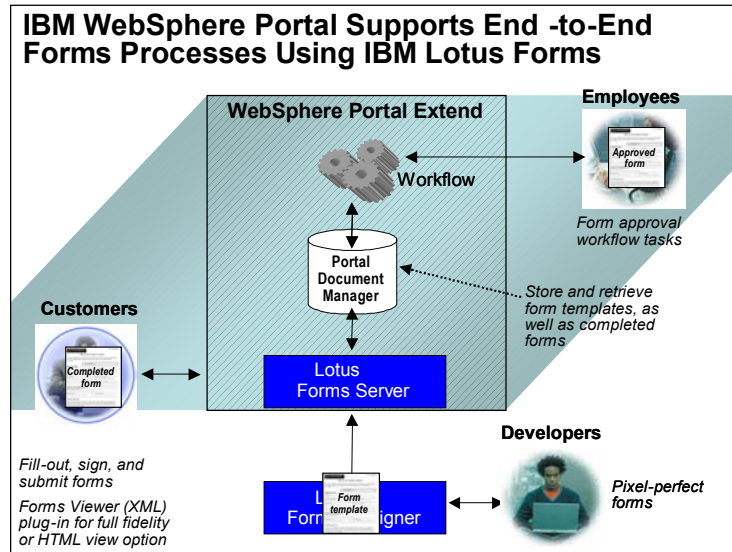
"Service-oriented" means to loosely associate various services to support the requirements of business processes and users, and "architecture" means the structure within which they are associated. "Loosely associate" means that only the interface with each service needs to be controlled; the application underlying each service can be replaced by any other, as long as the new application accepts the same input and generates the same output.

Using the SOA approach, with its objective of maintaining a consistent process flow, the business obtains several benefits:

- Faster application development and delivery
Since the services are modular, limited to performing a certain set of tasks, the scope of work necessary to change each of them is also limited.
- Improved developer productivity
A well-designed service can perform several different tasks, depending upon the input provided to it. For example, in our original example, the second service could also contain a feature which recognizes and creates a greeting for the user in a subsequent sign-on. The developer needs only to assemble existing services together to accomplish almost any series of tasks, rather than creating entirely new applications.
- Guaranteed data consistency and availability
Services retrieve information from a single set of databases, guaranteeing that data will be up-to-date and appear the same to all users.
- Consistent adherence to compliance requirements
Good SOA design practice requires interfaces to processes to be kept constant, and data content to be well defined and predictable. Once this has been achieved, and found to be compliant with documentation standards, compliance will be ongoing.

Figure 1-1 shows one of many ways this can be done, diagramming an IBM Websphere Portal, which provides a front-end document support function to an SOA environment. Users see a portal page layout which has been defined by the company's developers, where they make entries to interactive forms served up by the Lotus Forms server. These forms, created using the Lotus Forms Designer, are pulled from an on-line database, which is always current. Completed forms are automatically passed to the appropriate departments for handling.

Figure 1-1: Lotus Forms as Part of SOA



The best e-Forms software will support the Web 2.0 business model, and support the SOA development process by doing all of these:

- Support Web Services that can be used to provide data to pre-populate forms, collect data into forms, and process data collected by forms.
- Enable creation of dynamic, rich Web 2.0 e-Forms without expensive and time-consuming programming
- Enable customer access to rich, interactive applications entirely through a browser.
- Extend business processes via well-secured portals to be accessible to customers, both inside and outside the firewall.
- Present customers with a dynamic, interactive interface, including:
 - Real-time field validation and formatting.
 - Real-time value calculation (updating totals, counts, conditional logic, context-sensitive help text, etc.)
 - Real-time personalization, with colors and graphics pertinent to the particular user.

1.3 Open Standards in the Web 2.0 World

When creating the Portals described in the previous section, it will clearly be advantageous for each application to be able to handle the greatest possible number of tasks presented to it. Chances of achieving this are enhanced if the application is written to conform to one or more "open standards", in the expectation that the data being presented is likely to match one of those standards.

A standard represents a choice made, generally by a technical organization, among several competing solutions to a certain problem. An "open" standard is one that, though possibly created by a certain company or person, may be used by anyone, without paying royalties, to implement the solution. To the extent that such a solution is generally pretty good, being the result of the group effort of the best minds, and costs nothing to use, it is likely that that it will be more or less universally adopted, which in turn leads to a general compatibility of data and solutions in the arena to which the standard applies.

To maintain the integrity of a standard, a standards group needs to be created. For the World Wide Web the main international standards organization is the World Wide Web Consortium (W3C). The W3C's member organizations maintain full-time staff for the purpose of working together in the development of standards for the W3. As of March 2007, the W3C had 441 members.

Of these open standards, two important ones apply to e-Forms.

- **XFDL:** Extensible Forms Description Language is a high-level W3C specified computer language that facilitates definition of a form as a single, stand-alone object using XML elements and attributes. It offers precise control over form layout down to the pixel level, permitting precise replacement of existing business and government forms. In addition to providing syntax for inclusion of in-line mathematical and conditional expressions, the form designer can include custom items, options, and external code functions. XFDL supports multiple digital signatures, which can be applied to specific sections of a form. IBM's Lotus Forms uses XFDL.
- **XForms:** Not yet fully implemented, XForms received its official W3C recommendation in March of 2006. XForms is an XML format used to specify a data processing model for XML data, along with the user interfaces for the data. XForms was designed to be the next generation of HTML/XHTML forms, but is generic enough that it can also be used standalone or with presentation languages other than XHTML to describe a user interface and a set of common data manipulation tasks. IBM is a key driver on the committee working to make this a completed standard, and uses XForms as part of Lotus Forms.

1.4 Dynamics in the e-Forms Market

1.4.1 Key Players

Four key players stand out in the e-Forms market: IBM, Adobe, Microsoft and Cardiff Software. Each of these companies provides the basic e-Forms platform:

- A general-purpose e-forms product that contributes solutions across the enterprise.
- A substantial and diverse customer base at least 250 strong using e-forms products.
- Advanced, stand-alone e-forms functionality without requiring an OEM partner.

As would be expected, each of these companies has its additional specific strength in the market:

- **IBM - Lotus Forms** offers a strong forms design capability based on industry and task-specific XML modules; online form completion, submission and validation; and architecture scaleable to support the needs of large to small companies. Lotus Forms is built upon open standards such as W3C XForms. Adherence to this standard greatly reduces development time, since it makes possible the use of out-of-the-box modules and the re-use of custom-built components. Use of the XForms standard in itself ensures strong performance due to the smaller file sizes that can be used, and supports multi-approval workflows, with the capability of applying digital signatures to specific sections of each document. IBM's huge product portfolio can provide the whole solution, combining rich clients with composite applications and multi-channel business processes to ensure a consistent and collaborative user experience
- **Adobe - Like IBM, Adobe LiveCycle** provides forms design capability; XML support; online form completion, submission and validation; and scaleable architecture. Adobe is particularly strong in the forms design arena, consistent with the strength of its LiveCycle product, offering a range of out-of-the-box forms templates, 2D bar code support, and advanced capabilities such as support for 3D images.

- Microsoft - Infopath offers an accessible design whose users can range from business analysts to advanced designers utilizing Visual Studio. While Microsoft of course offers the capability to turn any of its Word, Excel, or Access documents into Infopath forms, it lacks a capture capability.
- Cardiff - LiquidOffice Forms focuses on the needs of organizations that use forms across broad, horizontal processes. It provides a business-user-friendly design environment integrated into a specialized Business Process Management (BPM) offering.

1.4.2 IBM as a Lead Player

Noting the growing e-Forms market, IBM has moved aggressively to position itself, providing a coordinated set of applications dedicated to dynamic forms presentation and processing:

- IBM Lotus Forms Designer

This single development platform, built on the Eclipse open framework and the XForms open standard, allows easy integration with the customer's existing systems and other Eclipse-based tools. Designers can use existing business logic and easily integrate existing Web Services. Documents of record can be secured with digital signatures for sections, pages or whole documents. Forms themselves can be built using drag-and-drop components based on an open XML-schema data model with precision down to the pixel level.

- IBM Lotus Forms Viewer

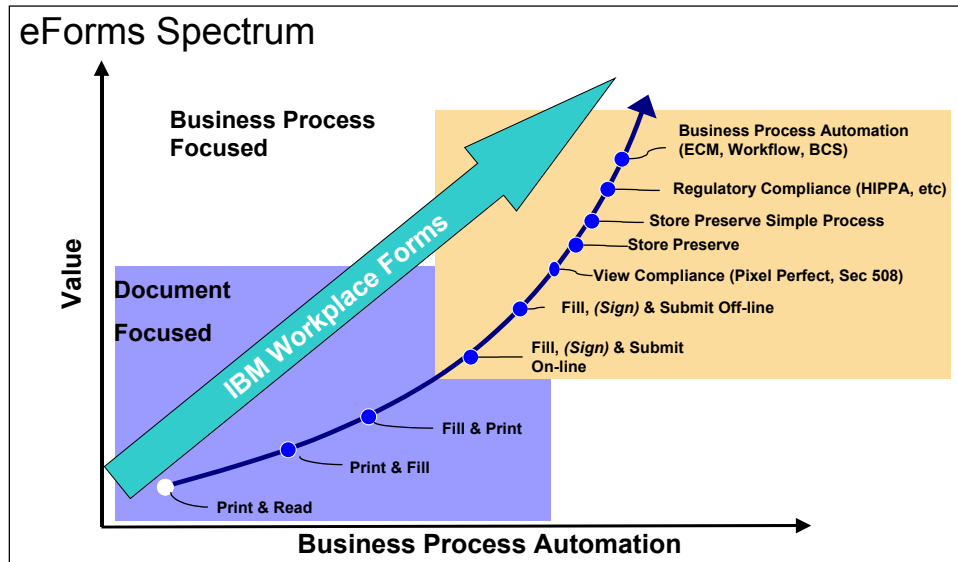
This tool enables users to quickly and interactively complete forms, personalizing the entry experience, enforcing accurate data entry, and providing entry help on demand. Files produced are small, secured, and routable in various ways, ranging from e-mail to workflows.

- IBM Lotus Forms Server

The Server provides electronic forms to external users from within almost any browser, without requiring the customer to download and install additional plug-ins. The Server works across the standard JAVA platform (Enterprise Edition, JAVA J2EE) and Microsoft .NET environments, enabling rapid, high-throughput data interchange with back-end systems. Support of the SOA development process is built in, based upon the Forms Services function of the XForms open standard.

1.4.2.1 IBM's Lotus Forms

Figure 1-2 shows the remarkable enhancements to employee productivity and business processes that can be achieved using the Lotus Forms automated e-Forms handling tool. The block in the lower left shows the limited capabilities provided by applications that focus on desk-top, fill and print forms. The block at the upper right shows the substantially greater capabilities available with an application, such as Lotus Forms, designed specifically to support SOA and the online business world.

Figure 1-2: The Power of Automation

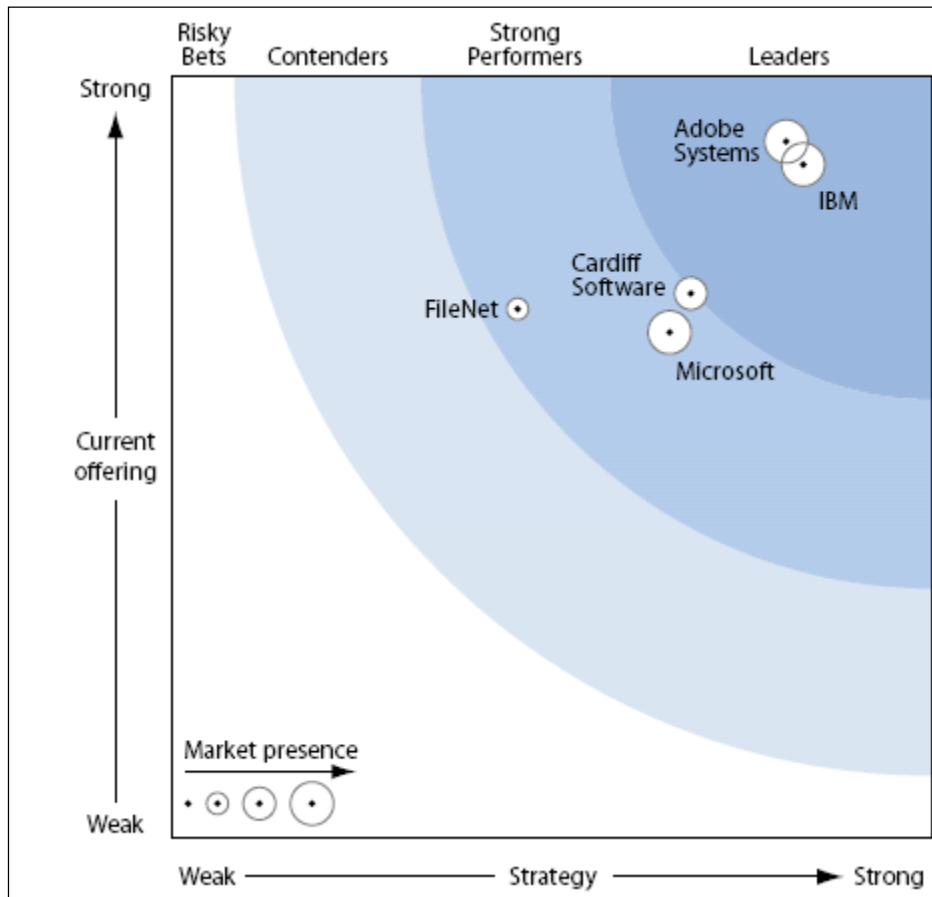
Consider these advantages:

- **Design Interface** - Lotus Forms offers a user-friendly design interface with comprehensive drag-and-drop functionality, form component libraries, composite and subform creation support, business rules support, dynamic layout support, and XML schema support via XFDL. The product offers good language support, 2D bar code support, and testing and preview options. It provides basic wizards and form templates out of the box, including XFDL Digital Signature Support. Reliance on the XForms standard allows creation of a library of re-usable form components, which can be combined and deployed to satisfy almost any set of client requirements.
- **Distribution and Access** - Lotus Forms provides forms access options through either the Lotus Forms Viewer or HTML, integration with the IBM DB2 Content Manager for forms management, basic workflow, and integration to other IBM products for more holistic process management capabilities. In particular, this enables a high degree of application interoperability. Forms can be provided on any device, in 26 different languages, for use by any able or impaired person, in any role within a business process.
- **Processing** - Lotus Forms offers comprehensive online submission support, and validation of schemas, rules, and code. Because it follows the XForms standard, enabling the use of standard XML schemas and smaller XML file sizes, it also reduces the server side processing load, which in turn improves performance.
- **Architecture and Platform** - Lotus Forms supports common IT platforms, provides solid XML and Java support, has comprehensive security options, and can scale to support large enterprise deployments. Again, consistency with the XForms standard, which provides a Forms Data Processing Model and supports active content using declarative rules & Web Service, enhances and complements SOA development.

1.4.2.2 IBM's Leadership in the e-Forms market

Figure 1-3 is taken from the June 16, 2006, Forrester Wave™: e-Forms Software, Q2 2006 publication. This respected source rated what were then the 5 leading e-Forms companies, showing IBM and Adobe to be Leaders. (FileNet has since been acquired by IBM.)

Figure 1-3: e-Forms Leadership



Source: The Forrester Wave™: e-Forms Software, Q2 2006, Barry Murphy, June 16, 2006,

Forrester Research, Inc., 400 Technology Square, Cambridge, MA 02139 USA

1.4.3 Differentiators: IBM Lotus Forms and Adobe LiveCycle

1.4.3.1 The Price of Using Acrobat

A major factor contributing to Adobe's strong market presence is the omnipresence of its desktop publishing product, Acrobat, and its proprietary document format, PDF. When the picture is limited to presenting documents of any kind on-line, to be printed, filled out, and returned for physical processing at the desktop level, Acrobat has no peer.

But that is not what the e-Forms world is about. Rather, the goal is to capture, transmit, and store information, ideally without it ever having been printed to an actual piece of paper. Effective use of e-Forms requires the ability to break documents into constituent pieces and transmit the resulting information to other departments, where it can be used to create web page presentations or build other documents. This is accomplished by converting each document into an XML stream, transmitting it, and, using XML schemas, building the stream or its parts into other documents or web page presentations at the receiving end. There needs to be a strong focus, designed in from the beginning, on efficient data transfer and support of large numbers of simultaneous users.

Providing this focus as an afterthought is not effective. Adobe, in order to enable online handling of XML schemas and PDF documents, must first convert them to its proprietary XML transmission format, XML Data Package (XDP). The resulting transmitted XML stream must then be translated back to its original form at the receiving end. This builds a dependency upon Adobe servers and APIs into the process of presenting, viewing, and creating documents. The conversion process, once to send and again to receive, slows processing at both ends.

Use of the handle-anything PDF format requires file sizes that are significantly larger than those required by Lotus Forms. This also reduces throughput, even before the added translation time.

In contrast, Lotus Forms uses native XML schemas embedded in each form. The e-Forms require no translation in order to be sent or received. They are readable and understandable by any server. Each individual data packet, along with its schema, having never been translated into a non-standard format, is immediately available upon receipt, either to rebuild the document or to be sent, along with its appropriate schema, to the appropriate user.

1.4.3.2 Making It All Go

Effective use of e-Forms includes the ability to attach functionality to the form, making subsequent use and transmission steps dependent upon the existing form content and the newly entered data.

Adobe's ability to do this is limited to its Reader Extensions product and the capabilities of JavaScript, as well as a special feature, its Form Guides. In the case of the former, as well as requiring the ability to write code in JavaScript, this also means form interaction must be translated into an HTML event-programming model, which can become quite complex and tedious to work with. Form Guides are specialized tools, limited to specifying acceptable user interactions with forms, and are dependent both upon Adobe's proprietary Flex™ developer environment and use of XDP.

By contrast, Lotus Forms uses a data-driven Wizard to personalize the form interaction. The Wizard relies upon a set of previously defined user-created rules and knowledge of the fields in the XML schema for the form, and is controlled by simple if-then-else decisions. The form's capabilities can be further extended by embedding Java functionality, or by dynamically extending the IBM Lotus Forms Viewer.

Lotus Forms also links seamlessly with IBM's Enterprise Content Management environment. With this, a form can be stored, and its form, content, and logic can be reused in applications other than the one it was originally designed for.

1.4.3.3 Attention to Standards

As described earlier, to work with XML, Adobe requires time-consuming translations to convert documents to and from its proprietary XDP format.

In contrast, IBM Lotus Forms uses a lightweight server that runs on any Application Server. Lotus Forms supports numerous open standards, which integrate with portals, content management systems and back-end systems. In particular it uses as its form templates language the Extensible Forms Description Language (XFDL), a standard forms design and document processing meta-language, which creates forms presentations from multiple schemas.

2.0 Customer Experiences with IBM's Lotus Forms

2.1 Summary

This section presents case studies over a broad variety of customers, in which there was a clear need to automate an existing manual forms filling processes, and shows how the need was best satisfied by IBM's Lotus Forms solution. For each case study, we discuss the business problem that the customer faced, the solution that IBM provided and the resulting benefits from the solution implementation.

We summarize the results in two tables. Table 2-1 shows the value components of the IBM solution which each customer considered most critical in solving its business problem. The level of importance that the customers placed on each of these value components was scored on a scale of 1 to 5 with 5 being most important. Only the high scoring components are shown; it is probable the others had supporting value in the decision to use Lotus Forms.

Table 2-1: Lotus Forms Solution - IBM's Value Proposition

	US Army	US Gov Contracting Organization	Oxfordshire County Council, UK	Woodmen of the World
Dynamic User Experience		5		5
Forms Customization to meet unique requirements	5	5		4
Multi-Approval Workflows with Signature Support	4	5		5
Regulatory Compliance & Document Integrity	4		4	4
Streamlined Business Processes (1)	4	5	5	5
Scalability/ Performance; support for large number of concurrent users	5		5	
Zero-footprint solution		5		
Support for Open Standards	4	4		
Offline Support	4			4

(1) By means of process integration to legacy applications, third party applications, and databases as well as use of out-of-the-box integration adapters.

Table 2-2 lists the measurable benefits achieved by each customer when the Lotus Forms solution was implemented.

Table 2-2: Lotus Forms Solution - Benefits

	US Army	US Gov Contracting Organization	Oxfordshire County Council, UK	Woodmen of the World
Savings	\$1.3B per year in administrative costs	Significant savings due to fewer legacy applications to maintain.	£300,000 per year	Significant cost savings due to streamlined processes
Productivity	75% increase in process efficiency 6 to 1 time savings to complete each form Millions of person hours saved by using e-signature capabilities	300% increase in efficiency in procurement process	Improved staff productivity	Insurance policy issuance time reduced from weeks to days
Other	Reduced maintenance costs Fewer user errors Improved security	900% ROI Reduction in inventory by 67% Legacy applications reduced from 55 to 3	33% ROI in the very first year Better data quality Reduced data management & application integration costs	Significant ROI achieved. Better data integrity resulting in more completed applications.

2.2 Case Study 1: The US Army

2.2.1 Customer Background

The Army has an inventory of more than 100,000 different types of forms, used by about 1.4 million Army personnel around the world. With a mandate to protect freedoms and to preserve the peace, effective and rapid decision-making is of paramount importance. Thousands of decisions are made daily—from supply orders to medical, logistical, transportation and personnel matters. Those decisions can't be implemented until they are properly authorized. And for centuries, the best way to confirm that authorization was with a signature on a paper form.

2.2.2 Business Need for an e-Forms Solution

The United States Army's manual methods for filling out and distributing forms and other mission critical documents were driving down productivity, increasing costs and threatening its ability to meet new government regulations.

The Army Publishing Department (APD) required a web based enterprise information infrastructure that combined content management, document management, records management and workflow

with easy access for military personnel anywhere in the world who needed to process electronic forms.

In 2003, the army determined to develop a program to implement an enterprise-wide software solution to control the life-cycle process of organizational information that was then being managed and supported by paper based forms. Those forms were the administrative backbone of the organization. At that time, the majority of forms-based processes were supported by a user filling in a form on a computer, printing and signing the form, and processing the form manually or through numerous legacy applications, which had created a large number of stovepipes. The new program was designed to establish a set of standards and create a standard hardware and software infrastructure to automate these manual processes by adopting and developing an enterprise solution.

A primary goal of the program was to shift the focus from the form itself to the content that was being captured and processed. To implement this strategy, the customer, in partnership with the enterprise functional communities, needed to develop and field interactive user interfaces where the form was one of many possible outputs, but not necessarily the primary user interface. Such a partnership between lead customer and functional communities is vital to the successful implementation of a standard forms solution strategy for the enterprise organization. Whether the automated business process is developed on a central hardware and software infrastructure or on an existing functional community infrastructure, adherence to consistent data and implementation standards will enable all developed solutions to be interoperable.

The technical requirements identified to implement the program were as follows:

- Use of open standards
- Accessible off-line
- Use of wizards for the creation of business processes
- Ability to embed business process logic within the form
- Flexibility to integrate directly with backend systems
- Smaller file size than incumbent systems
- Section 508 compliant
- Stable five (5) year product development plan

2.2.3 The Solution

In late 2003, the army began to evaluate the following e-Forms solution vendors:

- PureEdge (now IBM Lotus Forms)
- Adobe
- InfoPath
- Formatta

The selection process was conducted over a nine (9) month period. In June 2004 IBM/PureEdge was selected and the contract was formally awarded in September of the same year. The solution was deployed in December. The IBM/PureEdge solution was selected due to the flexibility and scalability of the tools. The use of open-standards and the ability to link into any legacy infrastructure across the organization were key to the success. During the testing phase of the selection process, the IBM team received more than double the score of its nearest competitor. The selection process determined that the IBM solution was the only viable solution on the market that could meet the customer's rigorous requirements.

The implemented solution is based on IBM DB2® Content Manager, IBM WebSphere® Application Server, IBM WebSphere Portal, IBM DB2 WebSphere Information Integrator for Content and IBM DB2 Universal Database™, as well as DB2 Records Manager, IBM Tivoli® Access Storage Manager and IBM Tivoli Identity Monitoring Suite Manager.

2.2.4 Benefits of the Solution

Currently v2.5 of IBM's Lotus Forms is being used, with plans to upgrade to v 3.0 when it is released in 3Q 2007. To date, the program has generated a yearly return on investment to the customer of more than 100 times the program investment. There is an anticipated total savings of \$1.3 billion annually in administrative processing costs when the system is fully automated. The customer has been able to eliminate more than 50% of paper generated forms and has started to reduce the number of legacy systems required to conduct daily operations, with a resulting 75% increase in process efficiency. When the system is fully automated, users are projected to save about one third of the time previously required to fill out forms.

The implementation of XML electronic forms with digital signatures promises to improve efficiencies of Army personnel in the field. (XML stands for Extensible Markup Language and is a specification designed especially for Web documents.) As a recognized standard, XML allows for the definition, transmission, validation and interpretation of data between applications and organizations. Support for XML documents, such as IBM Lotus Forms built into IBM's on-demand operating environment, enables the exchange of information among applications, systems and people.

The use of electronic signatures in the e-form eliminates the need for soldiers to organize combat patrols to get documents signed. These convoys used to consist of several Army personnel in a three-to-four vehicle convoy transporting a printed form to a fort-operating base for signature in combat areas, such as Iraq. Similarly, pallets of paper forms were flown by air cargo ships through war-torn countries back to the United States for processing and storage. The new process will eliminate the need for Army personnel to be exposed to enemy fire in transporting forms for signature and approval.

Previous paper-based form processes were estimated, conservatively, to take 10 hours to complete each form. With one form having been handled by about six personnel throughout the year, it is predicted the Army will save a total of 60 person hours annually per form. In total, the implementation of XML e-forms with electronic signature capabilities is expected to save the Army millions of person hours across numerous departments.

The new e-forms program is also projected to yield the following benefits:

- Reduced development and system maintenance costs
- Reduction of system redundancies and common user errors
- Improved security of information and provision of auditable records
- Interoperability with existing infrastructures and system extensibility—the ability to add new features to an existing program without disturbing any existing code
- Regulatory compliance (Government Paperwork Elimination Act)

2.3 Case Study 2: A US Government Contracting Organization

2.3.1 Customer Background

The customer is a US Government contracting organization whose primary mission is to provide military forces with quality supplies and services. With its headquarters in the eastern US, and

employing a worldwide workforce of more than 24,000 personnel, this military department oversees logistics programs in the areas of supply operations, conventional ordnance, contracting, resale, fuel, transportation, and security assistance.

2.3.2 Business Need for an e-Forms Solution

In mid-2006, the customer decided that it wanted to create an electronic procurement/workflow system that would allow it to create, consolidate and share information about all its procurement related documents. Such a system would also allow it to move work electronically to various personnel, inside and outside the organization, for actions and approvals throughout the procurement process. Interfaces between the system and external systems and databases would allow it to send and receive contractual documents electronically, increasing organizational efficiency and reducing errors. Contract file information would be available for authorized users throughout the organization to support management reports and improve document tracking and accountability. The customer required the solution to comprise all the tools necessary to eliminate as many legacy systems as possible, while continuing to provide a bi-directional interface with ones that were not directly owned by the customer. The solution needed to have a way to communicate with potential vendors in a zero-footprint environment. One of the most critical technical requirements asked for a dynamic checklist for each type of procurement, which would be intelligent enough to force the procurement officer through the mandated steps for each acquisition. This checklist would interface with the repository and the workflow tool only, allowing an officer to move to the next step of the process once all documents and procedures had met the legal requirements stipulated in the acquisition regulation.

2.3.3 The Solution

The customer selected the following vendors for evaluation of their e-Forms solution offerings:

- IBM
- Oracle w/Adobe
- FileNet w/Adobe
- Government built solution

To select the right solution/vendor, the customer had conducted a standard RFP process, but the primary business owner was not happy with the selection. The primary customer did not feel that the company which had been selected could deliver a full solution that would be useful to the customer for the following 5 to 7 years. The customer received a press release for a project with a different set of tools and a different approach to business processes. This document drove the customer to explore the new set of tools as a potential solution for the requirements. Conducting rigorous testing over a 2-week period, the customer discovered that the IBM tools provided it with a flexible solution that could evolve as the procurement process changed. After testing a variety of scenarios, that customer's technical lead concluded that the IBM Lotus Forms solution was the most flexible among tools available on the market.

The contract was sole-sourced to IBM and solution design began in Dec 2006. The solution production date is June/July 2007. Version 2.6.1 of Lotus Forms is being used.

The implemented solution is a complete SOA infrastructure including:

- Lotus Forms (PureEdge)
- IBM DB2 Content Manager
 - Library Server

- Resource Manager
- IBM DB2 Records Manager
- IBM DB2 Universal Database
- IBM WebSphere Portal
- IBM WebSphere Business Integration Server Foundation
- IBM WebSphere Information Integrator for Content
- IBM WebSphere MQ / Workflow
- IBM Tivoli Access / Identity / Storage Manager
- Silanis Approve-it Desktop/XHTML Server
- Business Objects Reporting

2.3.4 Benefits of the Solution

The procurement lifecycle has been significantly shortened and transformed by the new system, as well as the workflow for the creation, completion, archival and legacy migration. The customer estimates that this tool will result in a 300% increase in efficiency in the procurement process.

The customer also estimates that it will receive a 9x return on investment the day that the system is put into production (June/July 2007) because 12 of the 14 existing systems will be shut down and the maintenance contracts will be cancelled. This should reduce the number of legacy applications from 55 to about 3 or 5.

The standardization of a single forms solution allowed the organization to set a strong standard for all forms. This allowed the organization to reduce its inventory by more than 2/3 and to put policy and procedures in place for moving forward with any new forms creation. It also put in place an infrastructure that can be used to automate all business processes across the enterprise no matter the functional area. The key business processes that were transformed were in the Personnel, Human Resources, and Administrative space.

In short, the business impact of the IBM solution on the customer can be summarized as follows:

- Single open standard for all forms
- Enterprise SOA infrastructure
- All components of the infrastructure are already integrated
- Integration into backend systems has been dramatically simplified
- Use of legacy systems has been reduced
- The customer has reduced the number of systems that they have had to procure

2.4 Case Study 3: Oxfordshire County Council, UK

2.4.1 Customer Background:

Managing £500 million of public money annually, Oxfordshire County Council provides a range of services to the citizens of Oxfordshire, United Kingdom. The group oversees schools, social services, fire service, roads, libraries, museums, transportation planning and waste management.

The council comprises 74 democratically elected county councilors and a total of 19,000 employees. Owing to recent efforts to streamline central services, Oxfordshire has only half as many central support employees as an average county in the United Kingdom. The city has approximately 615,000 citizens.

2.4.2 Business Need for an e-Forms Solution:

Oxfordshire County Council had been mandated to deploy an electronic social care record solution to aggregate its many data sources. The county's social care practitioners were having difficulty tracking patient data through numerous agencies and applications, and they were wasting valuable time retyping information gathered via paper forms. The council began to look for a software solution that would enable it to consolidate the patient data that was dispersed throughout Oracle databases and other business applications to provide its social care practitioners with a comprehensive and timely overview of patients.

2.4.3 The Solution:

Oxfordshire County Council engaged IBM Software Services for Lotus along with IBM Business Partner EIM to implement IBM Lotus Forms software to consolidate its disparate data sources.

The IBM team first delivered a proof of concept for Oxfordshire County Council to demonstrate that IBM Lotus Forms V2.5 software would meet its business requirements. The proof of concept also showed the council that the solution would not introduce any errors or issues into the council's existing systems.

Next, the IBM team worked with the council to implement the Lotus Forms solution. The IBM solution integrates many types of data that were previously dispersed throughout multiple applications, including Oracle databases, IBM Content Management, IBM Lotus Domino and IBM WebSphere software. The council's data consisted of Oracle database data, structured data in other business applications and unstructured content data derived from multiple sources.

2.4.4 Benefits of the Solution:

By implementing the Lotus Forms solution and eliminating the use of paper forms to share information between agencies, Oxfordshire County Council expects to save £300,000 per year on an initial investment of £200,000 on the IBM solution.

Data that had been dispersed through multiple applications can now be integrated, forms will not need to be filled out continuously, and social care staff can share data in a structured, standardized format.

When patient data is gathered by one agency, the software enables it to be shared with key business application within the county, so that multiple practitioners and agencies have access to the same updated information. The solution also enables the Council to keep a record of the data distribution process, in compliance with county regulations.

Critically, the solution ensures the accuracy of data. Because data is validated during the initial form-filling process, applicants - or patients in this case - can't get it wrong, and staff don't have to waste time going back to amend incorrect or insufficient information.

In addition, using the Lotus Forms solution has enabled Oxfordshire County Council to:

- Meet its regulatory requirements
- Reduce management costs
- Increase staff productivity within the Social Care department
- Reduce line-of-business application integration and data management costs
- Leverage its existing software investments

- Improve its data quality through the Lotus Forms software's data validation features

2.5 Case Study 4: Woodmen of the World

2.5.1 Customer Background

With more than 800,000 members holding nearly one million life insurance and annuity certificates, Woodmen of the World Life Insurance Society (Woodmen) wrote \$650 million in annual premiums in 2004 and has more than \$33 billion of in-force business. Despite these robust numbers, Woodmen took a hard look at what insurance companies were doing to remain competitive, and decided it needed to make changes.

2.5.2 The Business Need for an e-Forms Solution

Woodmen required a new business process to modernize and automate the way its field representatives around the country conducted business. Representatives needed an easy-to-use process that improved efficiencies of core customer-facing activities, such as filling out policy applications, updating forms and providing quotes. In addition, the forms it used and its solution for streamlining forms handling would have to comply with regulations.

For a nationwide company such as Woodmen of the World, dealing with forms is exceedingly complex. The company has to provide 51 variations of its insurance forms to satisfy regulatory requirements specific to the states in which it does business. In addition, multiple variables involved in individual life insurance applications result in a multitude of forms and thousands of business rules. For instance, a typical set of life insurance forms can amount to more than 20 pages, depending on the specific applications and applicant's answers. An individual may need to complete additional questions—and more forms—according to predetermined factors, such as whether the applicant is a smoker or recreational pilot, for example, or a juvenile, who would require the authorized signature of a parent or guardian.

Woodmen's field representatives need to make every minute count. Time spent searching for correct forms, sifting through duplicate data, and checking into the minutia of business rules and regulations takes money out of their pockets.

2.5.3 The Solution

For Woodmen of the World, the answer to streamlining business processes for its field representatives came from IBM. IBM Lotus Forms provides an industry-proven, cost-effective solution for automating new business acquisition processes for the insurance industry. It provides a comprehensive solution that avoids the tedious paper trail. The solution creates the latest state-regulated forms by managing the thousands of business rules involved throughout the application process.

Also, the solution enables Woodmen to manage business rules in a spreadsheet-style framework. The company's business analysts and customer representatives can enter, update and access data in forms, and easily complete and submit the forms without having to worry about data synchronization issues or compliance.

Woodmen's IBM Lotus Forms solution includes:

- Integration with an IBM Lotus® Notes® database
- Enablement of laptops for online or offline capabilities

- E-signature pad integration to conduct business electronically, reducing the policy application issuance process from weeks to days
- Business intelligence and process automation for streamlining the management of thousands of business rules and multiple variables for numerous forms
- Precise layout of industry standard forms

2.5.4 Benefits of the Solution

IBM Lotus Forms produces the correct insurance application for each state, and automatically fills out applications with data already collected. The company's insurance representatives can now seamlessly guide their clients through the insurance application process, leading to better customer relationships. The electronic forms software automatically populates relevant fields with predefined data to help reduce data-entry errors and ensure accuracy. IBM Lotus Forms increases the insurance agent's capability to sign—and keep—new business.

The IBM solution also has reduced the need to re-enter data, and helps field representatives minimize data entry errors, achieve significant cost savings and decrease cycle times. With laptops enabled for online or offline capabilities, the company's insurance representatives can conduct business electronically and speed policy application completion and issuance from weeks to days.

In short, the Lotus Forms solution has helped to increase productivity, reduce costs and meet regulatory requirements, while leveraging existing corporate and line-of-business applications and data. It has helped Woodmen of the World to modernize and automate its field operations to achieve a significant ROI.

Additional benefits of the Woodmen e-forms implementation include:

- Simplified application process
- Improved data integrity, resulting in fewer incomplete and abandoned applications
- Reduced time for application processing
- Streamlined workflows for field representatives
- Improved worker productivity, leading to increased competitiveness

IBM Lotus Forms solution eliminates the hassles of filling out forms the old way, enabling representatives to focus their time on developing customer relationships and selling more insurance.

Appendix A: About Strategic Focus

Strategic Focus, founded in 1986 is a business strategy-consulting firm focused on creative problem solving with out-of-the-box thinking. Strategic Management methodologies as well as a variety of market research techniques within the Enterprise Software and Services space are used. Besides having expertise in using traditional approaches, such as Customer Interviews and Phone Surveys, to help its clients address strategic and competitive issues the company complements these methods with hands-on evaluations of Enterprise Software products in its own laboratory.

The core competencies of the firm may be summarized as follows:

- Use of Business Strategy Development along with supporting market research and the Balanced Score Card methodologies to help client companies increase their penetration within the Mid and Enterprise Software vertical market segments. This may include:
 - Understanding customer requirements, customer experience, software, and vendor selection criteria as well as competitive analysis via phone interviews in USA, Europe and Japan
 - Market segmentation, analysis, positioning, value proposition, and sizing of market opportunities
 - Scenario Planning -- including understanding strategies of the competition and forecasting future moves
 - Partner analysis and development
 - Developing strategies to target the competitor's customer base
 - Case Studies as Sales Collaterals to compare and contrast customer experience between the vendor and its competition
 - TCO and ROI studies.
- Hands-on technical competitive evaluation of all of the major domains of the Enterprise Software and Services Market in our own laboratory by software engineers. We are pioneers in this space, starting in 1993 long before other research firms jumped into the fray. Our reports are used for competitive analysis, product improvements, and product planning as well as for developing Sales Collaterals.

The company has domain expertise in the following areas: Portals, CRM, ERP, Open Source, Development Tools, BI Tools, SOA, Application Servers, RSS Feed Servers, SOA, J2EE and Database Application Performance Management Tools, Enterprise Application Integration, Web Services, Mobile Solutions and other emerging market segments. Strategic Focus has conducted numerous projects over the years in all of these areas.

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