



Measuring the Value of an Electronic Form Management System

a White Paper prepared by:
Cardiff Software, Inc.
September 2002

OVERVIEW

Purpose

The purpose of this white paper is to show how any organization can obtain substantial savings by converting from paper-based form-processing methods to the Cardiff LiquidOffice™ eForm Management System, a web-based software solution that creates, deploys, and automatically manages the data-entry, routing, tracking, and approval processing of online electronic forms (eForms). At the same time, this paper explores the features and technologies used by LiquidOffice to achieve these savings by exploring a step-by-step implementation of the system.



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The Forms-Processing Challenge

According to the Gartner Group, the cost of processing forms in the U.S. is now \$15 billion per year — with the cost of document scanning now reaching \$.08 per page. This is not surprising since the following difficulties plague the use of most paper forms:

- Time wasted using incorrect or outdated forms and delays in locating the correct form
- Time spent filling in the same information, over and over
- Data-entry errors and miscalculations followed by error corrections and corresponding delays
- Improper use of forms by ineligible employees
- Illegible forms
- Re-entry of the data contained on a form into software applications
- Incorrect form routing and failure to obtain the correct signatures and approvals for prompt action
- Delays caused by the absence of authorized individuals or co-contributors
- Costly printing, storage, dissemination, and disposal of outdated forms

In an attempt to resolve these problems, some organizations have adopted pre-Internet technologies that rely on cumbersome client/server architectures that lock them into proprietary form formats that have limited interoperability. Such approaches fail to take advantage of standards-based web technologies that provide an efficient, convenient, and cost-effective solution to the forms-processing challenge.

The LiquidOffice Solution

LiquidOffice completely replaces the use of paper forms and avoids the pitfalls of proprietary client/server technologies. In doing so, it transforms every aspect of processing forms — from creation, printing, storage, and distribution to filling in, routing, signing, checking, obtaining authorizations, and making available the valuable data contained on forms to mission-critical and business-critical software applications. In accomplishing this task, LiquidOffice delivers the following immediate benefits:

- Eliminates the cost of printing, distributing, storing, and disposing of pre-printed paper forms
- Creates a central repository of updated forms with controlled access and distribution
- Provides easy-to-use access through a standard browser interface
- Improves worker productivity by saving time in locating, filling in, routing, and approving forms
- Eliminates data-entry errors and routing delays with auto-fill, auto-correction/calculation functions, and validation capabilities that guard against ineligible submissions and improper use

- Makes data instantly available to all users, 24/7, at any location through standard web browsers
- Eliminates data re-entry costs by making data immediately accessible to other business applications
- Streamlines approval processing and eliminates delays
- Enables collaborative work methods and escalation procedures for complex, multiple-part documents
- Requires no proprietary formats or code downloads to client PCs by the IT staff

An Open-System, Standards-Based Approach

LiquidOffice completely sidesteps proprietary form formats and client-server technologies. Instead, it delivers the benefits of online eForms by using standard web browsers and an n-tiered application architecture (explained in the section entitled "Replacing Pre-Internet, Client/Server Technologies"). By selecting LiquidOffice, organizations can avoid the costly mistake of transforming burdensome paper systems into burdensome electronic systems that increase the workload of busy IT staff members. Instead, LiquidOffice adds value to the current investment that organization already have made in web technologies such as browsers - eliminating extensive training requirements and avoiding the need to upgrade user hardware. In addition, the standards-based LiquidOffice solution is fully interoperable with existing workgroups and applications while keeping the door open to additional applications in the future.

LiquidOffice Savings at a Glance

At a typical organization with 500 employees, the LiquidOffice eForm Management System can deliver savings in excess of \$300,000 per year (explained the section entitled "A Phased Approach to eForm Benefits"). The significance of this figure can be more readily appreciated by referring to an organization's profit margin. At companies with a profit margin of 10%, for example, it is necessary to increase annual gross sales by more than \$3 million to pay for the cost of using conventional paper forms. At insurance and healthcare organizations, where documentation is vital to mission-critical tasks, the savings attainable through LiquidOffice are even more dramatic.

Profit Margin at Firm with 500 Employees	Additional Gross Annual Sales Required to Obtain the Same Return Achieved by LiquidOffice
1% profit margin	\$30,700,000.00
10% profit margin	\$ 3,070,000.00
20% profit margin	\$ 1,535,000.00
30% profit margin	\$ 767,500.00

A PHASED APPROACH TO eFORM BENEFITS

Phase 1: Centralization and Access

Descriptive Overview

In a Phase 1 implementation, users can:

- Identify and retrieve electronic forms stored in a central online repository
- Print out the blank forms
- Fill in the forms
- Route the completed forms to their recipients

Liquid Office Process Automation Platform Phase 1



Centralization

In a Phase 1 implementation, LiquidOffice provides two key benefits that deliver immediate value. The first benefit is the creation of a central electronic repository containing all of the forms used within an organization — benefit and claim forms, purchase orders, time sheets, time-off requests, expense reports, and employee requisitions, just to name a few.

LiquidOffice enables organizations to add the forms to the central repository in a number of ways — by importing them as eForms from an existing format, by converting existing paper forms to electronic format, and by creating new electronic forms from scratch. The forms are loaded, organized, and classified by type of form in the central repository. Once there, they can be managed, updated, and removed as needed. With a central repository of eForms, there are no more questions about using the latest version of a form. Just as important, a central repository of eForms eliminates the expense of printing, storing, and distributing large quantities of forms that have a limited shelf life. Furthermore, it eliminates the waste of collecting and discarding them when they are replaced or changed.



Access

The second benefit of a Phase 1 implementation is immediate worldwide access to the online forms — regardless of the time of day or the geographic location of the user. Users who already know which form to use can simply open up the appropriate form folder, select a form, print it on demand, and fill in the necessary information. Those who are not sure about which form to use can utilize the search functions of LiquidOffice to identify the correct form before printing it and filling in the information. This greatly reduces user-access time and the number of questions posed to the staff members responsible for distributing the forms. At the same time, it eliminates the time and cost of distributing forms by fax or by mail. As a result, there is a tremendous increase in convenience for everyone involved — employees and other form users, management, and the departments that process the forms.

Phase 1 Savings

An organization that has 500 employees can save approximately \$5,000 per month, or \$60,000 per year, with a Phase 1 implementation of LiquidOffice:

- 500 employees x 5 forms per month = 2,500 forms
- Cost of each form (printing, storage, and disposal) = \$2
- 2,500 forms per month x \$2 per form = \$5,000 per month
- \$5,000 x 12 months = \$60,000 per year



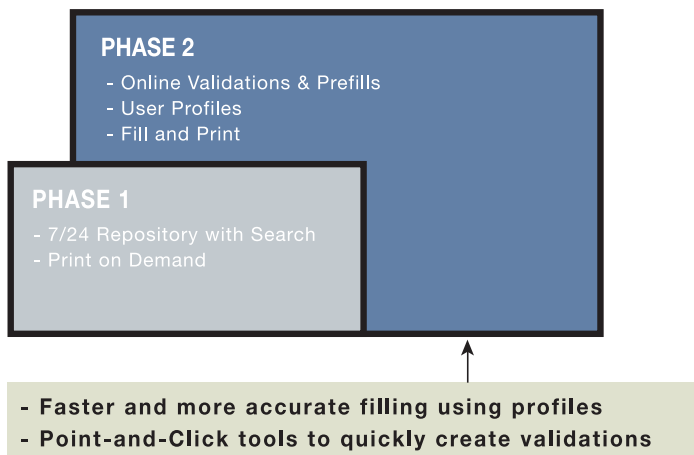
Phase 2: Speed and Accuracy with "Active" eForms

Descriptive Overview

In a Phase 2 implementation, users can:

- Utilize the features of Phase 1 (identify, retrieve, print forms from central online repository)
- Utilize the features of Phase 2:
 - View the forms with personal information already pre-filled based upon personal user profiles
 - Type in relevant data before printing the forms
 - Automatically validate key calculations, vendor names, dates, exclusions, etc., before printing
 - Print the forms after they are completely filled in
 - Route the printed — 100% legible — forms to their recipients

Liquid Office Process Automation Platform Phase 2



The Organization's Perspective: Creating "Active" eForms

In a Phase 2 implementation, LiquidOffice provides point-and-click tools that transform static legacy forms into "active" electronic forms that perform intelligent functions while users are filling in the information. Using the point-and-click tools, organizations can define selected areas of electronic forms as "fields" that will contain information to be supplied by the person filling in the form. LiquidOffice automatically collects the information entered into these fields to accomplish two tasks: (1) create a personal profile for each user that will pre-fill repetitive information on all forms retrieved by the user and (2) validate the information provided on the form by performing embedded calculations and other validation functions (by referring to other internal systems such as accounting) — all while the form is being filled in by the user. Creating the form is fast and easy, and filling it in is even easier.



The User's Perspective: Profiles and Validation

Each time a user opens an electronic form, LiquidOffice automatically fills in the standard personal information that employees typically repeat on every form — name, department, etc. This information is stored as a personal profile for each user, and it appears in the appropriate locations on every form retrieved by an employee — saving valuable time and preventing mistaken entries. In addition, LiquidOffice has a validation function that checks the variable information that users type on a form. On a purchase order, for example, LiquidOffice will recognize the incorrect entry of a vendor name. Similarly, LiquidOffice performs mathematical calculations and excludes improper entries. For example, if an employee is making a vacation request, LiquidOffice can verify that the dates are correct and that the correct duration of time is not exceeded. As a result, employees avoid making mistakes that cause processing delays and waste time in the review and re-submission process. Finally, when employees print the forms for submission, they are completely readable — eliminating the chore of deciphering illegible handwriting.

Phase 2 Savings

An organization that has 500 employees can save an additional \$2,500 per month, or \$30,000 per year, with a Phase 2 implementation of LiquidOffice:

- 500 employees x 5 forms per month = 2,500 forms
- 10% require follow-up (250 forms) x \$10 per form = \$2500
- \$2,500 x 12 months = \$30,000 per year

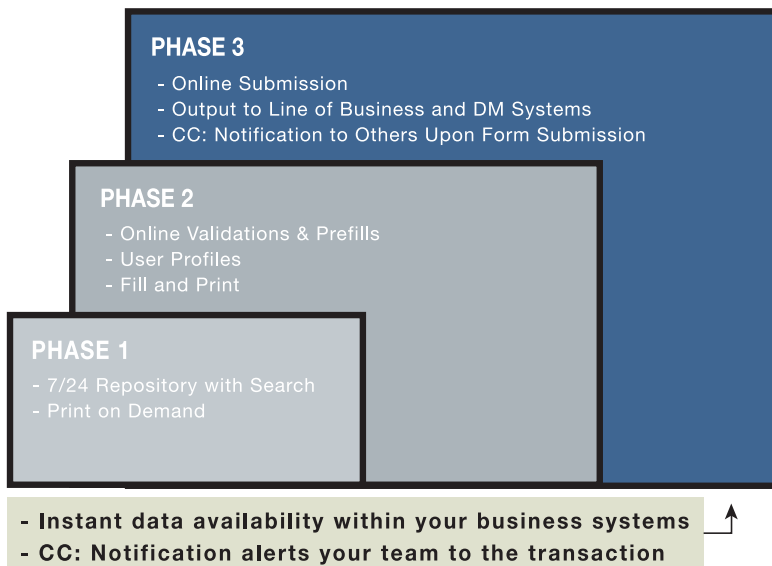
Phase 3: Automatic Online Form Submission

Descriptive Overview

In a Phase 3 implementation, users can:

- Utilize the features of Phase 1 (identify, retrieve, print forms in central online repository)
- Utilize the features of Phase 2 (access pre-filled forms, key in new data, automatically validate data entry, print completed forms, route printed forms)
- Utilize the features of Phase 3:
 - Submit/route completed forms online automatically without specifying recipient information
 - Automatically output submitted data to the correct lines of business and their applications
 - Automatically output submitted forms to the document management (DM) system for archiving and later search and retrieval
 - Route courtesy copies to other interested parties
 - Have instantaneous, enterprise-wide access to the data on the forms

LiquidOffice Process Automation Platform Phase 3





Automated Submission

When employees or other users finish the online process of completing partially pre-filled, automatically validated forms, they can submit the forms with a click of the mouse. This automatically routes the form to the correct recipient without requiring additional recipient information. At the same time, the data is automatically output to the appropriate line of business software and to the document management (DM) system, where it will be archived. By using the courtesy-copy function, employees can notify other interested parties that the form has been submitted — keeping members of a work team informed about the progress of a document. These capabilities save valuable time for employees and other users.

Instantaneous Availability of Data

Once a form is submitted online, the data on the form is instantly available to various departments and to their applications. Data-entry and research tasks are minimized because once an employee has entered the data for the first and last time, it is available when needed to accounting, claims processing, purchasing, and human resource departments. Users of content and document management systems can search the archives for stored files and retrieve them instantly. Consequently, organizations save valuable time and resources.

Phase 3 Savings

An organization that has 500 employees can save an additional \$2,500 per month, or \$30,000 per year, with a Phase 3 implementation of LiquidOffice:

- Monthly savings from automated data-entry = \$1,650
- 2,500 forms per month require 5 minutes each for redundant data entry
- Assume that 50% of the forms (1,250) are configured for automatic entry
- 1,250 forms x 5 minutes = 6,250 minutes (approximately 104 hours)
- 104 hours = 65% of a full-time employee's time
- 65% of a data-entry employee's \$30,000 annual salary = \$20,000 (\$1,650 per month))
- Monthly savings from automated archiving and research = \$850
- Assume there are 2,500 forms per month and that 50% (1,250) are configured for automatic archiving
- Assume only 5% of the archived forms (67) require retrieval to answer inquiries each month
- 67 forms per month x \$12.50 per form retrieval = \$850 per month
- \$1,650 + \$850 = \$2,500 saved each month
- \$2,500 x 12 months = \$30,000 per year



Phases 4 and 5: Process Automation

Descriptive Overview of Phases 4 and 5

In a Phase 4 implementation, users enjoy automation of the processes surrounding electronic forms:

- Utilize the features of Phase 1 (identify, retrieve, print forms in central online repository)
- Utilize the features of Phase 2 (access pre-filled forms, key in new data, automatically validate data entry, print completed forms, route printed forms)
- Utilize the features of Phase 3 (online form submission, courtesy copying, data output to line-of-business and DM applications, instant data availability)
- Utilize the features of Phase 4:
 - Process automation
 - Online routing, tracking, and approvals
 - Transaction reporting and auditing
 - Shared work queues to support load-balancing among work groups or departments
- Utilize the features of Phase 5:
 - Document attachments
 - Digital signatures
 - Structured workflow escalation
 - External process initiation

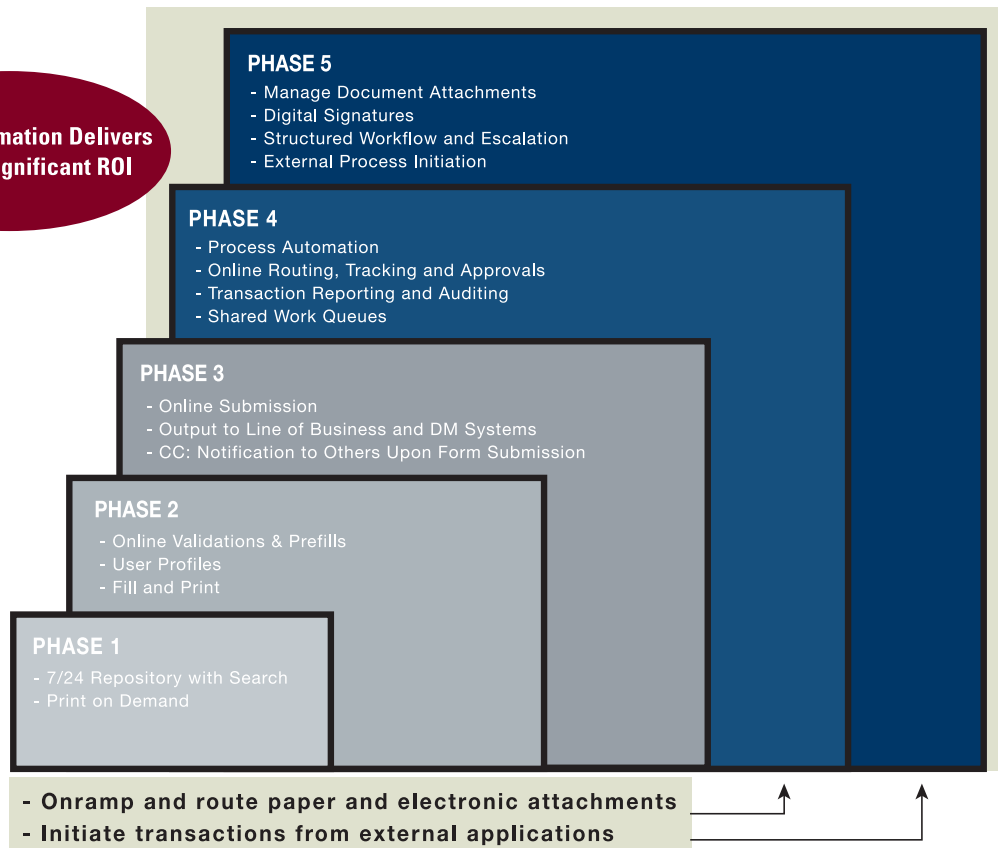
Phase 4 Workflow Benefits: Processing, Reporting, and Balancing

In a Phase 4 implementation, LiquidOffice utilizes sophisticated process-automation capabilities to keep complex, mission-critical and business-critical processes moving forward. For example, if a series of multiple-part forms must be submitted in a pre-defined sequence and approved by several people, LiquidOffice possesses the capability of automatically moving the task forward by issuing automatic alerts when delays occur, by requesting missing information, by tracking submissions for management oversight, and by eliminating delays that would occur with paper forms. This applies to a range of processes — from engineering change orders at a manufacturing firm to insurance-claim forms at an insurance company, to loan applications at a financial institution. Since a typical task encompasses several steps, the series of small delays that can occur during each step may add up to significant delays in overall task completion.

Online routing ensures that the correct person receives the form immediately — without either party leaving their desk. Online tracking builds a record of who completed a task and when it was completed. Similarly, the online approvals function enables individuals to affix their electronic approvals at the correct time in the processing flow without delay. Just as important, the transaction reporting and auditing function enables managers to compile data from submitted forms to create reports that identify sources of delay and enhance the speed and efficiency of a business process. Finally, the

LiquidOffice Process Automation Platform Phase 4 & 5

**Process Automation Delivers
the Most Significant ROI**



shared-work-queues feature enables lean organizations to utilize scarce resources more efficiently in a dynamic business environment by offloading excess work from a heavily burdened work group to a work group that has excess resources. Because the flow of data to the system is constant and instantaneous, LiquidOffice enables organizations to respond dynamically to an ever-changing situation. Furthermore, it enables numerous employees to have access to the same form simultaneously to support a complex process. As a result, LiquidOffice:

- Enhances productivity by automating the processing of forms
- Eliminates bottlenecks that delay task completion - reducing the amount of time spent on routing and processing by 50% to 90%
- Enables managers to audit processes to identify sources of delay and document increases in productivity with reporting tools
- Enables large groups of employees to simultaneously contribute to task completion and balance the work load through shared work queues



Phase 5 Workflow Benefits: Critical Action and Information

With a Phase 5 implementation, users can attach documents to forms as they submit them. For example, electronic brochures or résumés can be attached to qualification forms. Similarly, scanned-in medical reports, receipts, and invoices can accompany insurance-claims forms, expense reports, and purchase orders. To authenticate a signer's identity, LiquidOffice supports a variety of digital signature options — enabling a process to move forward without delay, even when the signer is at a remote location. The structured workflow and escalation function automatically issues alerts to selected individuals if personal attention is required. The trigger for these alerts can be a pre-set amount of time, a spending limit, or a threshold number of tasks or transactions. For example, if two days elapse and a critical task has not been completed, LiquidOffice automatically notifies an appropriate party so that action can be taken — even from remote locations. Finally, since LiquidOffice utilizes XML technology, specially tagged data can initiate external processes — whether those processes take place outside of the user's department or outside of the firm at a vendor's office. With these features, users are able to:

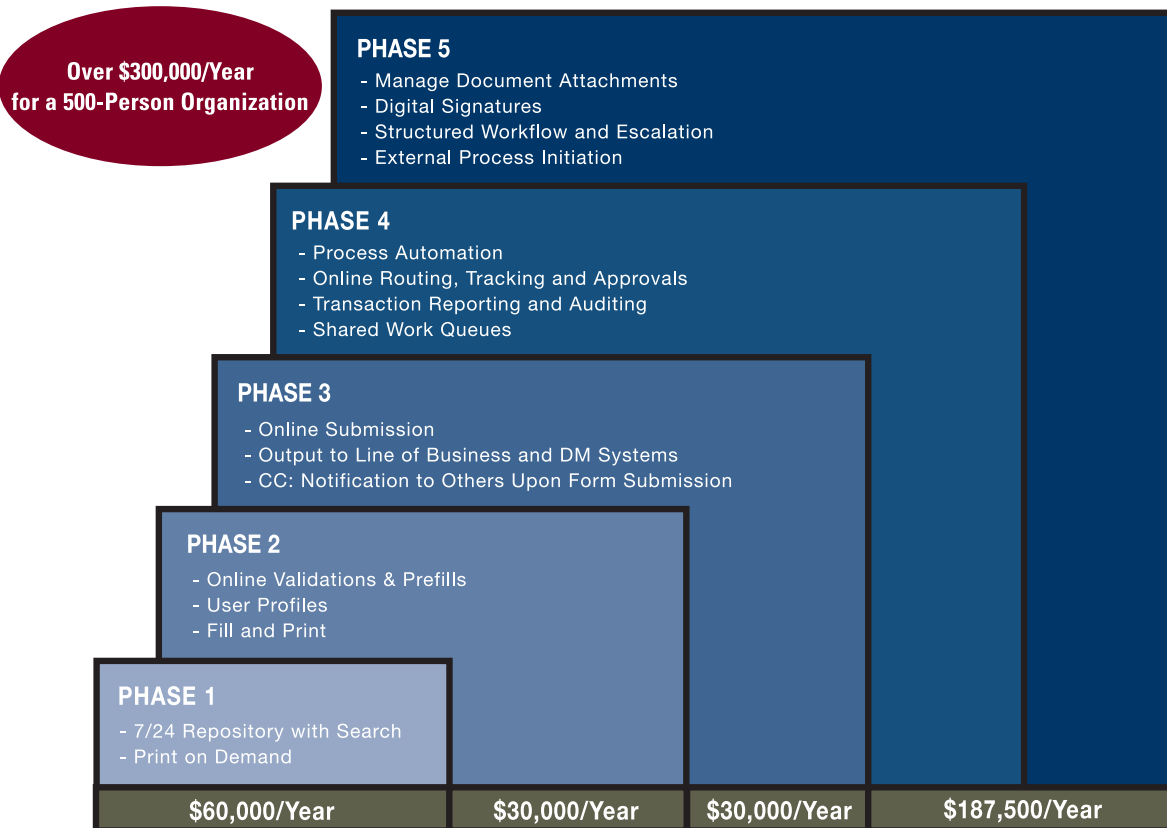
- Provide information needed to quickly complete a process by attaching documents to submitted forms
- Keep projects moving forward by digitally signing forms from any location at any time
- Avoid bottlenecks by triggering escalation functions in a workflow structure
- Ensure timely processing of transactions by initiating an external process with XML technology

Phase 4 and 5 Savings

An organization that has 500 employees can save an additional \$15,625 per month, or \$187,500 per year, with a Phase 4 and 5 implementation of LiquidOffice:

- 2,500 forms per month
- 25% of forms (625 forms) require approval each month
- \$25 per form (a low estimate) x 625 forms = \$15,625 per month
- \$15,625 x 12 months = \$187,500 per year

LiquidOffice Process Automation Platform



CUMULATIVE SAVINGS OF THE PHASED APPROACH

The savings achieved in phases one through five are both cumulative and significant — validating the claims made in the section entitled "LiquidOffice Savings at a Glance." An organization that has 500 employees can save more than \$300,000 per year with LiquidOffice as a result of implementing phases one through five.

Cumulative Savings	
Phase 1:	\$ 60,000
Phase 2:	\$ 30,000
Phase 3:	\$ 30,000
Phase 4:	\$187,500
TOTAL ANNUAL SAVINGS	\$307,500



REPLACING PRE-INTERNET, CLIENT/SERVER TECHNOLOGIES

What's Below the Surface Counts

It is easy to grasp the convenience and savings that accrue from having a central repository of eForms, pre-filled data, auto-correction, auto-routing, and auto-processing capabilities. In contrast, the savings in time and expense that stem from LiquidOffice's underlying web technologies require a few minutes of reflection. Nonetheless, these technology-driven rewards are just as important as the easily observed benefits. Furthermore, they represent an immediate halt to online delays, slow system speeds, unnecessary hardware expenditures, and the day-to-day drain upon scarce IT resources, IT time, and IT expertise — difficulties that plague organizations that rely on pre-Internet solutions for delivering online forms. What is puzzling is why so many organizations cling to aging client/server technologies that were created to solve yesterday's challenges — despite the fact that the "Age of the Internet" has already become a cliché.

Web-Based N-Tiered Architecture Replaces Client/Server Technology

The Origins of Client/Server Architecture

Client/server technology was developed originally to resolve the challenges of enterprise-wide computing. Back in the 1980s and 1990s, large corporations rapidly merged and acquired each other — simultaneously acquiring disparate computer networks plagued by interoperability problems and proprietary software. Client/server architecture provided a way to connect these disparate networks so that the freshly merged organizations could continue to function. Soon afterward — in the mid-1990s — the idea of converting paper forms to electronic forms, or eForms, first became practical. Early adopters of the eForm concept also adopted the prevailing method of implementing that concept. At the time, this included proprietary eForm formats and extensive programming code for the "form filler" applications that supported the new eForms. Much of this programming code resided on the client (or user) PC — giving rise to the term thick client. On systems that rely on the thick-client approach, each PC must have the resources to process the code, and the IT staff must load updates onto every client PC when new code becomes available. Consequently, hardware requirements for client PCs are more demanding than necessary, and code maintenance tasks are significant. Furthermore, these proprietary approaches are not compatible with all operating systems and browsers. Even worse, the "work-arounds" that are put in place to resolve these challenges add their own drawbacks to the original problem.

Web Technologies Take the World by Storm

The unforeseen development of the web — along with browser technologies — has yielded a simpler, more elegant solution for managing eForms. At the heart of this solution is today's n-tiered application architecture. In a typical n-tiered architecture, the application is broken into three layers, or tiers: (1) the business-logic tier that resides on one set of computers, (2) the database tier residing on another, and (3) the user-interface tier, which operates from a standard web browser on each client PC. With an n-tiered architecture, developers do not have to rewrite an entire application when they



modify or add code. They only change the code for a specific tier. For organizations that use LiquidOffice, this reduces client hardware requirements and minimizes IT maintenance tasks.

- First, client hardware demands are minimized because the JavaScript applets travel with each form and load onto the browser only when the form is called up. In addition, these applets contain only a fraction of the code required for thick-client client/server systems. Most of the code for LiquidOffice's thin-client system resides on the servers. This not only reduces hardware demands; it also cuts access time and boosts system speed — increasing user convenience.
- Second, LiquidOffice eliminates IT code-installation tasks on client PCs. Whenever code changes occur to a LiquidOffice eForm, the changes load automatically — on the fly — along with the form. This frees the IT staff from the significant burden of replacing old code with new code.

Standards-Based LiquidOffice vs. Proprietary Technologies

In addition to the intrinsic speed and efficiency of n-tiered, thin-client architecture is a fundamental difference that delivers immediate and long-term benefits to organizations concerned about interoperability. This difference is LiquidOffice's standards-based, non-proprietary form format. As a member and technical editor of the World Wide Web Consortium (W3C), Cardiff Software built LiquidOffice — from the ground up — on the XForm standard specification for forms processing. By adhering to open standards such as PDF, HTML, XML, and XForm, the LiquidOffice web desktop dovetails with standard desktop applications (such as Microsoft® Internet Explorer, Netscape Navigator, and Adobe® Acrobat®) and functions instantly within any workgroup and content-management application - including FileNET® Panagon™ 2000, Lotus® K-station™, Microsoft Outlook and Outlook Web Access, Open Text®, Livelink®, and others. This eliminates the incompatibilities, expense, and security issues that require so much IT attention in the case of proprietary systems. With LiquidOffice, the time and expense of integrating new products with eForm management are a thing of the past.

An Investment in Current and Long-Term Value

By implementing the LiquidOffice solution, organizations gain additional leverage from their existing investment in web technologies and position themselves for the future. Web users already know how to use their browsers, and LiquidOffice uses the same interface for all of its forms — eliminating the training requirements imposed by proprietary solutions. In addition, since LiquidOffice integrates well with existing and future enterprise applications, it extends the life of current products and keeps the door open to new ones — including new electronic signing technologies and disability-access technologies that are already required at federal agencies for voice-enabled and sightless utilization of online forms. As more and more industries adopt n-tiered architectures for their applications, LiquidOffice stands ready as the ideal eForm management solution to accommodate these changes.



CONCLUSION

As the up-front costs and organizational inefficiencies of paper-based systems mount, the LiquidOffice alternative increases in potential value. With profit margins squeezed by competition as well as changes in the economic climate, decisions that directly improve the bottom line can make the difference between just getting by and having a significant impact on the business landscape. The current investment in browser technologies makes the decision even easier: since most organizations already have the necessary web infrastructure in place, and since LiquidOffice fits into any business environment, the conversion to online eForms ensures that existing resources are used to maximum capacity. Furthermore, a phased implementation enables organizations to make a gradual transition - upgrading their work processes while at the same time measuring the savings in time, dollars, and frustration.



Put Information to Work - Cardiff™ Software is a leading global provider of business process automation solutions. Cardiff products provide an integrated suite that automates the capture and processing of business forms and documents, dramatically reducing the high cost of manual data entry and form processing. This raises employee productivity, improves customer responsiveness and increases revenue. Cardiff is the only solution for managing both paper and online forms and documents and is dedicated to providing ease-of-use, open standards and flexibility across its entire product line. In business since 1991, Cardiff has a global distribution network spanning every continent and more than 20,000 customers worldwide. For more information on Cardiff, visit www.cardiff.com.

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