Adobe® LiveCycle® Designer

Creating Dynamic PDF and HTML5 Forms for Desktop and Mobile Applications

SECOND EDITION

J.P. Terry
and SmartDoc Technologies

Adobe

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Adobe® LiveCycle® Designer, Second Edition
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Dedication

To Shannon, Patrick, Rollins,
and Eva—you make my life dynamic
and interactive.

To my father, the engineer, and my mother, the teacher—
this book is a testament to your influence, encouragement,
and love.

To the incredible SmartDoc Technologies team—
thank you for all your hard work on this book.

— J.P. Terry

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On a personal note, thanks to my siblings, Kevin, Mary Beth, and Dodd, and our extended family and friends for the encouragement you have all given me through the years.

About the Author

J.P. Terry is the CEO of SmartDoc Technologies (www.smartdoctech.com), a leading provider of solutions with Adobe LiveCycle and Adobe Experience Manager (AEM) document services. SmartDoc has developed paperless systems for Fidelity Investments and Merrill Lynch and is an Adobe Business Partner. SmartDoc has offices in New York; New Jersey; and Beijing, China.

J.P. is an ACI (Adobe Certified Instructor) and an ACE (Adobe Certified Expert) in Adobe LiveCycle technology. He often writes and speaks about technology solutions for business and is the author of *Creating Dynamic Forms with Adobe LiveCycle Designer* (Adobe Press, 2007) and *Paperless: Real-World Solutions with Adobe Technology* (Adobe Press, 2009).

J.P. is a graduate of the Rhode Island School of Design. He has programming certificates from Microsoft and Novell, and a certificate in financial management from the Wharton School of the University of Pennsylvania. He has recently completed coursework in Java and Android programming at New York University. He has participated in international mission trips to build housing with local teams and families.

Prior to founding SmartDoc Technologies, J.P. founded BrandWizard Technologies in 1996. BrandWizard was an early pioneer in MRM (Marketing Resource Management) and is now part of the Omnicom Group (OMC). He was the CEO of BrandWizard from 2000 to 2005.

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Introduction

Did you fill out a form to purchase this book?

If not, are you going to fill out a form to expense it to your company?

In the information age, the primary way that we provide information to computer systems is through forms. Computers can communicate with each other easily. However, when we need to provide information to a computer system, we have to fill out some type of form (**Figure I.1**).

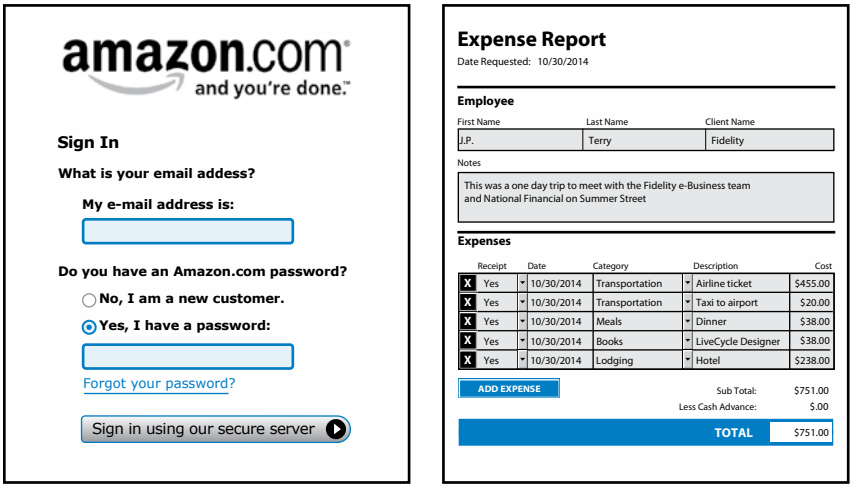


Figure I.1 Some forms that might have been used to purchase this book.

Forms are everywhere today. We're presented with forms when a system or an organization wants some type of information from us. For example, the government uses forms to ask us for income information for tax purposes; youth soccer teams use forms to ask us about our children's health before the start of the season. And with the rise of e-commerce, we're seeing an increase in interactive forms for opening accounts and for purchasing products and services. Paper forms and online forms are part of our daily lives in the information age.

It's interesting to note that computers don't need forms as we think of them. Most computer programs require data in much smaller and simpler structures. The graphic and layout elements in our forms like rules; shapes and images are usually disregarded by the computers that process them. For instance, in a typical address change, the most pertinent information for the computer to know can be contained within a simple and compact file like this one:

```
<addressChange>
   <individual>
      <firstName>James</firstName>
      <lastName>Shannon</lastName>
      <oldAddress>
         <address>1 Main Street</address>
         <city>Springfield</city>
         <state>IL</state>
         <zipCode>62701</zipCode>
      </oldAddress>
      <newAddress>
         <address>101 Main Street</address>
         <city>Springfield</city>
         <state>IL</state>
         <zipCode>62701</zipCode>
      </newAddress>
   </individual>
</addressChange>
```

People are the ones who need clearly designed forms (**Figure I.2**). We need a graphically clear presentation of data to understand it and process it. We need to comprehend the context of the information exchange. We don't want to simply provide and access data. We want to know why we're providing data and what benefits we're deriving from our data provision. Forms should be designed for us and be human compatible.

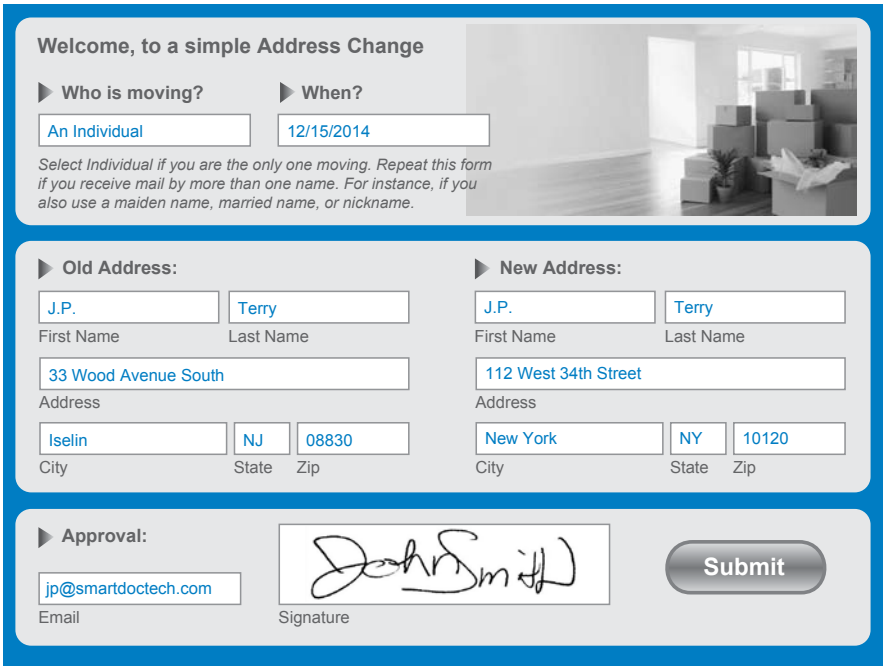


Figure I.2 A well-designed form helps users understand the required information and how to supply it to complete the transaction.

The trouble is that too many forms are difficult to use and fill out properly. According to a survey by Compete Inc., over 70 percent of online account opening forms are abandoned before completion. The cost to business in lost opportunity and increased customer call center traffic is so substantial that it requires us to make a renewed effort to create engaging and effective forms.

If only there were a program with features and tools to help us create engaging and effective forms and link them with data. It would be even better if this program were developed and supported by the unquestioned worldwide leader in graphics software. Well, your dreams have come true, and it gets even better.

Adobe LiveCycle Designer, the premier form development tool for the last l0 years, can now create HTML forms as well as PDF forms. The same LiveCycle Designer source files can be used for both. You can create your interactive and dynamic fully featured forms and deploy them as HTML forms to mobile devices like the Apple iPad and Google Android tablets.

Adobe LiveCycle Designer

LiveCycle Designer (Designer for short) is a Microsoft Windows–based program that provides all the tools you need to create basic or sophisticated forms. You can use Designer in either of the following ways:

- As a standalone program to create forms and documents
- As part of Adobe LiveCycle Enterprise Suite (**Figure I.3**)

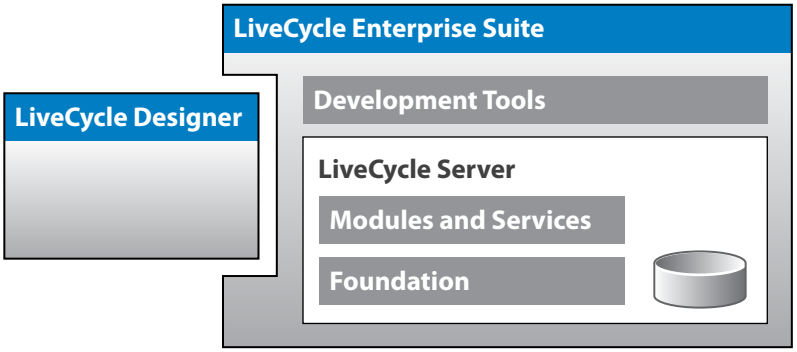


Figure I.3 Designer can be used independently and as part of LiveCycle Enterprise Suite.

LiveCycle Enterprise Suite consists of additional development tools and a LiveCycle Server. You'll learn more about LiveCycle Enterprise Suite in Chapter 9. When it's relevant, I'll mention server tools and features and refer to them simply as "LiveCycle Server" to differentiate them from LiveCycle Designer.

However, the focus of this book is Designer. You'll learn all about Designer's tools and how you can use them to create and manage interactive forms and dynamic documents. There are many step-by-step exercises so you can get hands-on and learn the best practices for creating PDF and HTML forms. After you learn the techniques, the last part of this book will show you how your Designer documents are used in the real world to automate business.

Who This Book Is For

This book is designed for people who want effective and efficient customer engagement with their form systems. You may want to create a new form system or improve an existing one. In either case, the following types of professionals will benefit from this book.

Form Developers

Whether you are new to Designer or you're a seasoned professional, you'll find valuable information and examples in these pages to help you with your craft. As you probably know, today's form developers need to be multi-talented, and this book will help you in these areas:

- Developing your graphic layout and data pattern skills to meet form requirements
- Developing new advanced scripting skills for form automation
- Understanding how your forms fit into your workflow automation
- Understanding the new world of mobile forms

Programmers and IT Professionals

Forms and documents provide the input and output for the computer systems you create and manage. Many of your data goals, including validation and formatting, can be accomplished with well-designed interactive forms. This book will show you how to

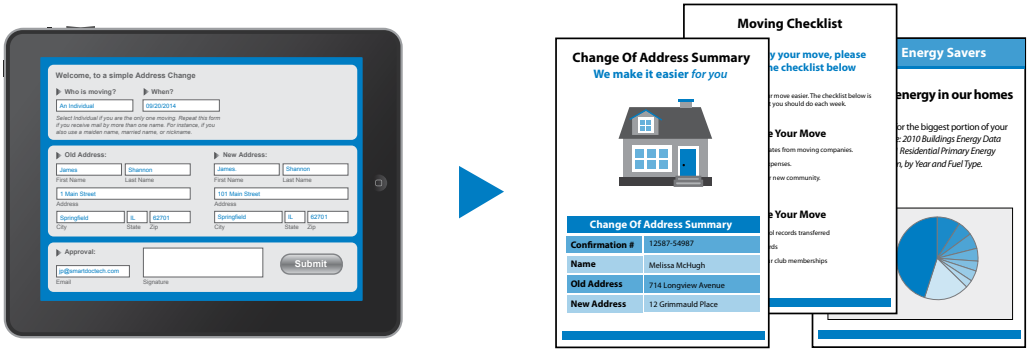
- Take advantage of Designer's out-of-the box tools and features to improve your systems right away.
- Enhance Designer's standard tools with custom scripting.
- Integrate Designer's forms and documents into your existing enterprise systems, including databases, workflow tools, websites, and document management systems.

Business Professionals

Business has changed greatly in the last 20 years. B2C (business-to-consumer) and B2B (business-to-business) e-commerce is an increasingly important aspect of your job. This book will show you how effective forms and workflow automation will help you deliver the following:

- Improved customer engagement with your forms and electronic communications
- Greater conversion of prospects into customers by simplifying the data-gathering process
- Fewer costs and greater speed by converting previously paper-based processes to electronic workflows

Part 4 of this book is designed to show how your paperless and mobile goals will be achieved. You'll learn how Designer and other Adobe LiveCycle modules will save you time and money while improving the quality of your customer communications. You can see a demonstration of these tools on the book's companion site: www.smartdoctech.com/support. You can run this demo on your PC, Macintosh, or mobile tablet (**Figure I.4**).



Interactive Mobile form (HTML)

Automatic Document Generation (PDF)

Figure I.4 The book's companion site includes a demo of an automated Address Change workflow that includes an interactive form and dynamic document generation.

What This Book Covers

You'll learn what Designer is, how you can use it to create PDF and HTML forms, and why this is important for your organization.

The Designer Tool

Part 1 is a thoroughly updated version of the first edition of this book. As in the first edition, this section covers the tools and features of Designer. However, it also includes the new features of Designer like style sheets and has additional advanced scripting techniques that were not part of the first edition. Part 1 ends with a comprehensive step-by-step exercise where you can put your new knowledge to the test. You'll create a complete interactive and dynamic form from scratch.

PDF Forms

Part 2 focuses specifically on PDF forms, documents, and best practices. You'll learn about the various types of PDFs and the different readers that people use to view them. Chapter 4 includes important information about the differences between Adobe Acrobat and the free Adobe Reader and shows you how to Reader extend your files to overcome the limits of the free version. Chapter 5 covers best practices, including form fragments, localization, accessibility, and performance optimization.

HTML Forms

Part 3 covers Designer's new HTML capabilities and details the similarities and differences between Designer's HTML and PDF forms. You'll learn how to iron out some of the differences so you can develop Designer forms that can be used to render whichever form type is needed in your workflow. Like Part 1, this part ends with step-by-step exercises where you'll create interactive and dynamic forms. However, this time they'll be HTML forms.

Automating Business

The last part of the book shows how your Designer forms and documents will be used to automate your business. You'll learn about Adobe's other LiveCycle tools and modules and how they can be used to manage your forms and streamline your workflows. The last chapter of the book covers the new world of mobile forms and compares and contrasts different strategies for competing in this world.

What You Need to Begin

As mentioned, there are many hands-on exercises in this book. Therefore, you'll need the following items to enhance your learning experience.

The Software

You need both LiveCycle Designer and Adobe Acrobat installed on your computer. You'll develop your forms and documents in Designer and preview them with Acrobat. You'll also need a relatively new web browser to view your forms as HTML. Chapter 6 includes a list of supported web browsers.

LiveCycle Designer

You need the Designer program. You may already have it if either of the following is true:

- Your company has a license for Adobe LiveCycle Enterprise Suite.
- You have a version of Adobe Acrobat earlier than 11. Designer shipped with earlier versions of Acrobat, but beginning with Acrobat 11, Designer is sold as a separate product on the Adobe website. Please note that the versions of Designer that shipped with Acrobat prior to Acrobat 11 do not fully support the HTML capabilities described in this book. If you want to develop HTML forms, you must have Designer ES4 (version 11) or later.

If you don't have LiveCycle Designer, you can either buy it or download a trial version from www.adobe.com. As of this writing, Adobe is offering a 60-day free trial at www.adobe.com/products/livecycle/tools/designer.html.

If this link gets changed, simply do a Google search for LiveCycle Designer trial download. You'll need an Adobe ID, and you can select your language version prior to downloading (**Figure I.5**).

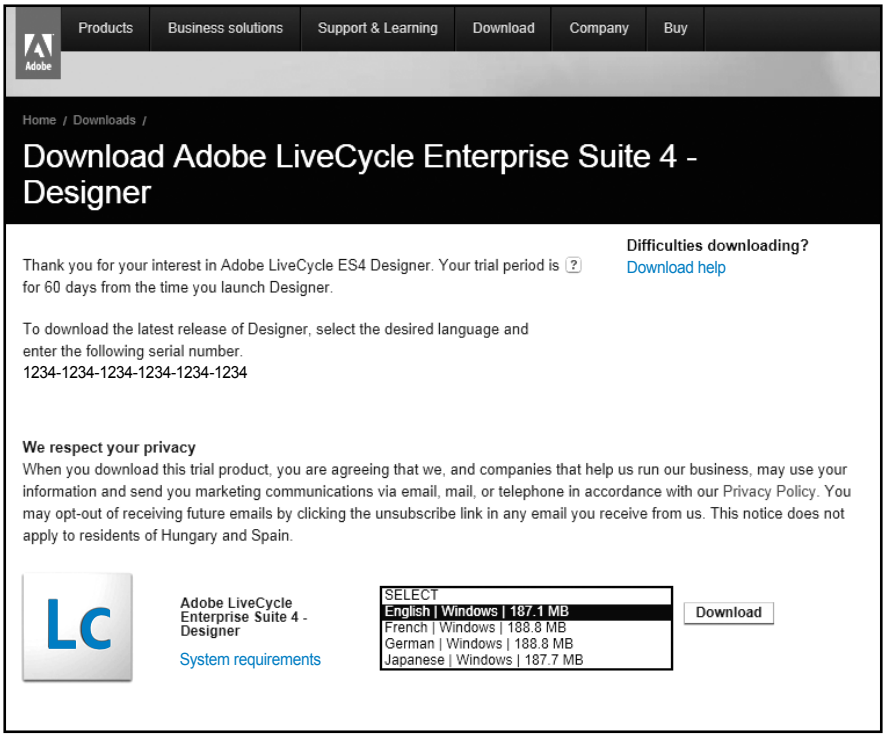


Figure I.5 You can download a free trial version of Designer from the Adobe website.

There are various ways to configure your LiveCycle Designer workspace. To easily follow the exercises in this book, open the following palettes in your Designer workspace. If you don't see any of the palettes listed, you can open them from Designer's Window menu.

- The Script Editor palette
- The Hierarchy palette
- The Data View palette
- The Tab Order palette
- The Object and Fragment Library palettes
- The Style Catalog palette
- The Layout, Border, Object, and Accessibility palettes
- The Font and Paragraph palettes

Adobe Acrobat

In addition to previewing your Designer forms, you'll need Acrobat for some of the exercises in Part 2, "PDF Forms." If you don't have Acrobat, you can either buy it or download a free trial version from www.adobe.com.

The Companion Site

Throughout the book, you'll see this globe icon next to a topic with more information on the book's companion site: www.smartdoctech.com/support.

You'll find support materials on this site, including the following:

- Additional bonus articles and exercises for LiveCycle Designer.
- Links to important information in the Adobe Help System, Knowledge Base, and Developer Connection.
- FAQ (Frequently Asked Questions) about the book.
- Errata: The exercises in this book have been reviewed many times by several technical editors. However, as with all human endeavors, it's possible that something is incorrect. If you find an incompatibility with one of the sample files, please report it to support@smartdoctech.com.

The Sample Files

You can also download the sample files from the book's companion site. You need these files to work through the hands-on exercises in this book.

Moving On

Now that you know what to expect, let's get started by learning the features and functions of Adobe LiveCycle Designer.

4

PDF and Acrobat

There is no such thing as fun for the whole family.

— Jerry Seinfeld

Portable Document Format (PDF) is actually a family of file formats, and this chapter focuses on the ones that are relevant to LiveCycle Designer. You'll learn how to create these various types of PDFs and understand how and why to use each one. All these types work best in the premier client tool for viewing and working with PDFs—Adobe Acrobat.

Like PDF, Adobe Acrobat is a family with many members. It's important to understand the features of the various Acrobat programs because their features affect how your PDF forms function. Acrobat has the agility to run as a stand-alone application or as a plug-in to your web browser, and it gracefully balances these two modes. It can also handle the requirements of different types of users working with different types of PDFs. And it works on virtually every computer system and renders PDF files faithfully and efficiently regardless of the system's fonts and software.

Although Acrobat is the ideal tool, there are also many non-Adobe PDF viewers on the market. If you're deploying PDFs to a heterogeneous user base, you need to know how your PDFs will perform in these third-party tools.

The PDF Family

The term *PDF* refers to a family of file formats and an evolving set of technical specifications. Many of these formats and specifications are International Organization for Standardization (ISO) standards, and some are specific intellectual property owned by Adobe.

XFA PDF (PDF Form)

Adobe uses the term *PDF form* to refer to the interactive and dynamic forms you create with Designer. It's important to note that there's another type of PDF form, called an *Acroform*, that's different from the PDF forms you create in Designer. The forms and files you create with Designer are based on Adobe's XML Forms Architecture (XFA). In many ways, the XFA PDF file format is closer to an HTML file than it is to a traditional PDF file. For instance, the following code shows you what a simple text object looks like in an XFA PDF file:

```
<draw name="StaticText1" y="15.875mm" x="28.575mm" w="29.2864mm"
➥ h="5.2331mm">
   <ui>
      <textEdit/>
   </ui>
   <value>
      <text>Text</text>
   </value>
   <font typeface="Myriad Pro"/>
   <margin topInset="0.5mm" bottomInset="0.5mm" leftInset="0.5mm"
   ➥ rightInset="0.5mm"/>
</draw>
```

As you can see, XFA forms are XML based. This well-structured and flexible format enables a LiveCycle Server to transform your Designer files into many different formats, including traditional PDF and HTML. You can see the complete XML structure of your forms in Designer by selecting the XML Source tab of the Layout Editor. As you learned in Part 1, "The Designer Tool," all the objects and events in these XFA PDFs are scriptable at runtime, so this PDF type offers you a great deal of flexibility and power. You can create both static and dynamic XFA forms in Designer.

NOTE: *The step-by-step instructions in this chapter were created with Acrobat Professional 11 for Windows. If you have a different version, the exact steps and screenshots may differ.*

Static forms

Static XFA PDF forms won't change their layout at runtime, but they can be interactive for the user. The following are a few advantages of static XFA PDF forms:

- Static forms support Acrobat's Comment and Markup tools.
- Static forms enable you to import and export Acrobat comments.
- Static forms support font subsetting, which you will learn about in the next chapter.
- Static forms work in early versions of Acrobat like 6 and 7, but dynamic forms are recommended only for version 8.1 and above.

You can create a static XFA PDF in Designer with the SmartDoc Expense Report form that you developed in Chapter 3, "Creating the SmartDoc Expense Report." Follow these steps to create and view a static PDF form:

1. Launch your Designer program, and open the expenseReportCompleted.xdp file from the Samples folder.
2. Select File > Save As to open the Save As dialog box.
3. Enter **expenseReportStatic.pdf** as your filename, select Adobe Static PDF Form (*.pdf) as your file type, and click Save.
4. Launch Adobe Acrobat from the Windows Start menu. Please note that if you're using the free Adobe Reader program, you won't yet be able to use the commenting tools because this file has not been Reader extended. You'll learn how to do this in an upcoming exercise.
5. Select File > Open and browse to the static PDF you just created.
6. Click the Add Expense button on the form. Notice that a new row is not created because this isn't a dynamic PDF.
7. Open your Comment tools and notice that you can add comments to this type of PDF because it's a static form.

Dynamic forms

Dynamic XFA PDFs can change their layout at runtime, so the commenting and markup features aren't supported. However, dynamic XFA PDFs do offer the following advantages:

- Dynamic forms support client-side scripts that change the layout and pagination of the form. For instance, your SmartDoc Expense Report will expand and paginate to accommodate an endless amount of data if you save it as a dynamic form.
- Dynamic forms support all the properties of your form at runtime, whereas static forms support only a subset (**Figure 4.1**).

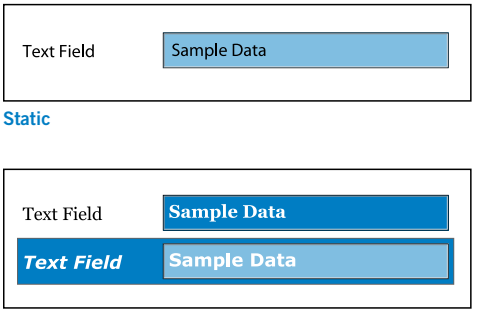


Figure 4.1 In static forms (top), you can change only the background fill of your text field at runtime. Dynamic forms (bottom) enable you to change almost any property of your form at runtime.

Follow these steps to create and view a dynamic PDF form:

8. Go back to your expenseReportCompleted.xdp file in Designer.
9. Select File > Save As to open the Save As dialog box.
10. Enter **expenseReportDynamic.pdf** as your filename, select Adobe Dynamic XML Form (*.pdf) as your file type, and click Save.
11. Launch your Adobe Acrobat or Adobe Reader program from the Windows Start menu.
12. Select File > Open and browse to the dynamic PDF you just created.
13. Click the Add Expense button on the form. Notice that a new row is added because this is a dynamic PDF.

14. Open your Comment tools and try to add a comment. Notice that you can't add comments to this type of PDF form (**Figure 4.2**).

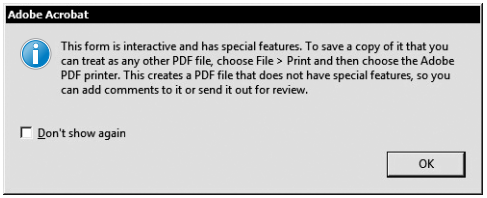


Figure 4.2 Acrobat's commenting features don't work on dynamic PDF forms.

If your Designer form works equally well as either a static or dynamic XFA PDF form, Adobe recommends creating dynamic XFA PDFs for performance benefits.

NOTE: *Dynamic PDF forms support all the XFA script constructs. However, HTML forms currently don't support all the XFA scripting constructs. You'll learn more about this in Part 3, "HTML Forms."*

PDF File (Traditional PDF)

The most popular and pervasive PDF format is the traditional PDF file. There are many ways of creating a traditional PDF file, including using Acrobat and many third-party tools. Acrobat provides all the following ways to create traditional PDF files. If you don't have Acrobat installed, you may not see these options on your computer.

- **By capturing the print stream of a desktop application:** Choose the Print command of an authoring application and select the Adobe PDF printer icon. Instead of a printed copy of your document, you'll have created a PDF file of your document.
- **By using the Acrobat PDFMaker plug-in with Microsoft Office applications:** When you install Acrobat, it adds an Adobe PDF menu to Microsoft Office applications and an icon to the Office ribbon. You can use these added features to create PDF files directly in Microsoft Office.
- **By using Acrobat Distiller to convert PostScript and Encapsulated PostScript (EPS) files into PDFs:** Distiller is typically used in print publishing and other workflows that require a conversion from the PostScript format to the PDF format.

Static documents

Under the hood, a traditional PDF is very different than an XFA PDF. It doesn't have the same XML structure, and since it's created by capturing the print stream of a file, a traditional PDF is a static and read-only file. You can create a traditional PDF file from a dynamic Designer file by following these steps:

1. Launch your Designer program, and open the dunningNotice.xdp file from the Samples folder.
2. Select File > Form Properties > Preview.
3. Select Print Form (One-sided) as your preview type.
4. Locate a data file by clicking the Browse button to the right of the Data Field entry field.
5. Select dunningNoticeData.xml from the Samples folder and click Open.
6. Select Dynamic XML Form as your preview type.
7. Click OK to save these preview settings.
8. Select Preview PDF to see your dynamic form merged with your data file. At this stage, your PDF is still an XFA PDF.
9. Press F8 on your keyboard to display the Acrobat toolbar (**Figure 4.3**).

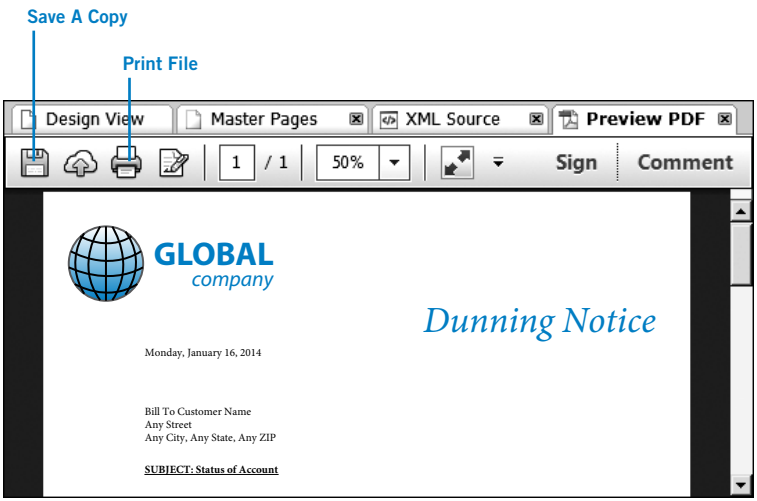


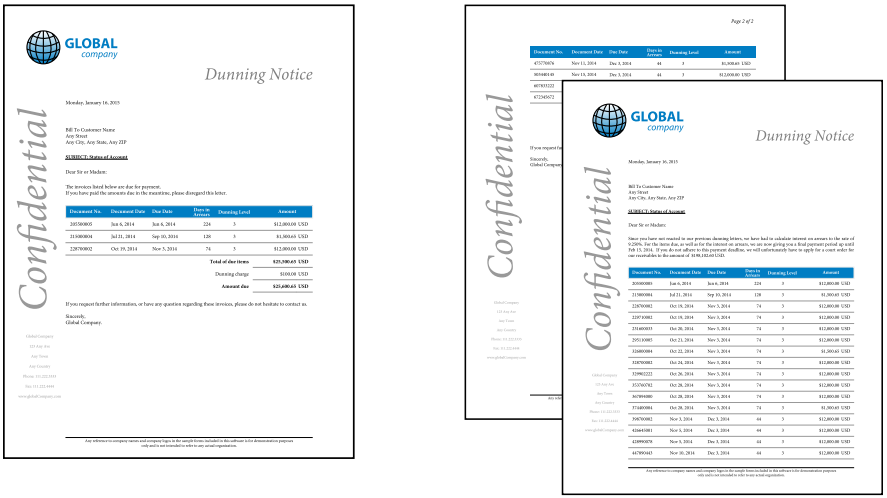
Figure 4.3 The Acrobat toolbar in Designer's Preview PDF tab. If you click Save A Copy, you'll create an XFA PDF. If you click Print File, you'll create a traditional PDF.

10. Click the Print File button. Select Adobe PDF as your printer, and click the Print button on the bottom right.

11. Enter **dunningNoticeTraditional.pdf** as your filename, and click Save. You have now created a traditional PDF file by capturing the print stream of your XFA PDF file. This new PDF file is static and read-only.

Dynamic documents

Since the source file for the Dunning Notice is a dynamic Designer file, the rendered files will grow or shrink based on the length of your data (**Figure 4.4**). There are additional data files in the Samples folder, and each has a different amount of data. You can repeat the steps in this exercise with these data files to see how different PDFs will be created each time. This is an example of dynamic document generation.



1 page's worth of data

2 pages' worth of data

Figure 4.4 The Dunning Notice is a dynamic Designer file that will grow or shrink to accommodate the data that's merged with it.

PDF Is an ISO Standard

In 2008, PDF became an official ISO standard document format. ISO is a worldwide federation of national standards organizations, and its goal is to work with member countries to develop and promote international standards. The American National Standards Institute (ANSI) represents the United States of America in ISO. There are approximately 100 other countries represented in ISO.

Acroforms

Acroforms are Adobe's older interactive form technology; they date back to Acrobat version 3. Adobe provides the Acrobat Forms API Reference, dated May 2003, to provide the technical details for this technology. You can find a link to this on the book's companion site. Acroforms are a combination of the following items:

- A traditional PDF that defines the static layout and graphics of the form.
- Interactive form fields that are bolted on top with the form tools of the Adobe Acrobat program. Please note that these form tools are a small subset of what's available in Designer.

Acroforms can be enhanced and expanded with Designer. However, even when you enhance an Acroform in Designer, it's still a traditional PDF under the hood, and there are limits to how interactive and dynamic you can make these forms. For instance, only some of the form fields in Designer's Object Library are supported in Acroforms, and even the ones that work are only partially supported.

To move beyond the limits of Acroform technology, Adobe has invested in XFA to provide an XML form structure that's both interactive and dynamic. If you're moving from Acroforms to XFA PDFs, you need to know a couple of important facts about these two technologies:

- Designer can edit a PDF form created in Acrobat, but Acrobat *cannot* edit a PDF form created in Designer.

- JavaScript works differently in these two technologies. Some of the JavaScript routines that work in Acroforms won't work in XFA forms. Adobe has documented these differences in a 43-page online PDF called "Converting Acrobat JavaScript for Use in LiveCycle Designer Forms." You can find a link to this on the book's companion site. As mentioned previously, Designer is a much more robust tool for using JavaScript in your forms, so I recommend that you learn how to script in Designer with the XFA object model.

PDF/A

PDF/A (PDF for Archives) builds on the document storage benefits of traditional PDFs with many specific details that enhance long-term archiving. The traditional PDF file format offers many benefits for long-term document storage. The compact nature of PDF facilitates easy transfer and conserves space, and its well-structured nature enables powerful indexing and search capabilities. Traditional PDF has extensive support for metadata, and PDF has a long history of supporting many different computer environments.

Like PDF, PDF/A is an ISO standard specification. It was developed by a task force that included AIIM (Association for Information and Image Management), NPES (National Printing Equipment Association), and the Administrative Office of the U.S. Courts. Since the goal of the PDF/A specification is to provide a long-term archive format, many PDF features are omitted so the files can be self-contained. The following are some key points about the specification that enhance the long-term reproducibility of the PDF/A file:

- All content must be contained in the file, and there can be no dependencies on external sources like hyperlinks, fonts, or software programs.
- All fonts must be embedded, and they need to be fonts that have an unlimited-use license for electronic documents.
- JavaScript isn't allowed.
- Transparency isn't allowed.
- Encryption isn't allowed.
- Audio and video content aren't allowed.
- Color spaces must be defined in a device-independent way.
- All metadata must follow certain standards.

Different PDF/A versions

Although the original standard was based on Adobe's PDF Reference Version 1.4, the ISO technical committee maintains the specification and has created the following versions:

- **PDF/A—1b:** This level is based on PDF version 1.4, and it ensures that the file can be accurately reproduced visually on a computer system in the future.

- **PDF/A—1a:** This level is also based on PDF version 1.4, and it includes all the requirements of 1b plus some additional requirements to ensure the long-term reproducibility of the document's text stream in other devices besides a traditional computer.
- **PDF/A—2:** This is a newer specification (released 2011), and it addresses some of the new features in PDF versions 1.5, 1.6, and 1.7.
- **PDF/A—3:** This is the newest specification (released 2012), and it allows embedding of compliant archived objects, including XML, word processing, and spreadsheet documents.

Viewing a PDF/A file

Two files in the Samples folder were created from the same Microsoft Word file. One was created as a traditional PDF and the other as a PDF/A file. Open these two files in Acrobat Professional:

- simpleWordFile.pdf
- simpleWordFilePDFA.pdf

Although the documents look the same, the PDF/A file opens with a blue bar across the top, indicating that you're viewing this document in PDF/A mode. This blue bar is Acrobat's document message bar (**Figure 4.5**), which you'll see when you open certain types of PDF files.

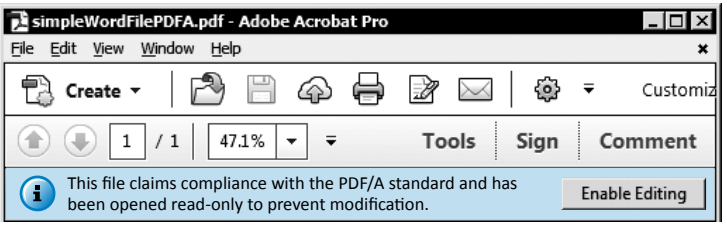


Figure 4.5 Acrobat's document message bar highlighted in blue.

The document message bar includes instructions, and possibly buttons, to help you complete a task. It's color coded, and you'll see the blue color when you open special types of PDFs (like this PDF/A file) as well as certified and digitally signed PDFs. The bar changes to purple for PDF forms and to yellow when you're participating in a PDF review.

NOTE: *It's possible that your document message bar is hidden. You can change this Acrobat setting by going to Edit > Preferences > Forms > and deselecting Always Hide Forms Document Message Bar.*

This message bar indicates that your file conforms to the PDF/A specification. Another compliance indicator is found in the Results pane of Acrobat Professional's Preflight tool. Follow these steps to see how it works:

1. Open the simpleWordFilePDFA.pdf file in Acrobat Professional if it isn't already open.
2. Choose Tools > Print Production > Preflight to open the Preflight dialog box (**Figure 4.6**). If you don't see this option, select the Show Or Hide Panels option in the Tools drop-down in the upper-right corner of the Tools panel.
3. Scroll down to the PDF/A compliance section and select Verify Compliance With PDF/A-1b.
4. Click the Analyze button at the bottom of the dialog box. Acrobat will compare your file to the PDF/A-1b profile and issue a report (**Figure 4.7**).

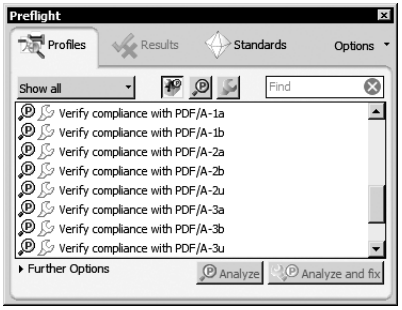


Figure 4.6 The Acrobat Preflight tool shows you various PDF/A profiles that you can test your file against.

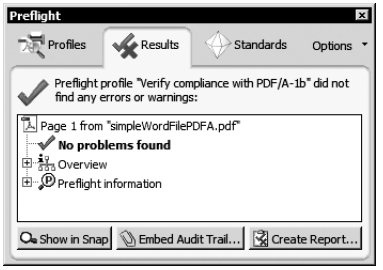


Figure 4.7 The Acrobat Preflight tool shows you the results of the analysis.

If you go back to the Profiles tab and compare your file against other PDF/A profiles, you'll find that it doesn't meet all requirements. You can also open simpleWordFile.pdf and see the issues that this file has. Experiment with the features of this tool. In many cases, you can use the Convert To PDF/A options to make your PDFs compliant with the various specifications. In some cases, you'll need to go back to the source files of your PDFs and make changes in order to reach compliance. LiveCycle Server can automatically convert your Designer files into PDF/A documents.

The Acrobat Family

Now that we've reviewed the PDF family of file formats, let's take a look at the Acrobat family of software tools. The Acrobat family includes various commercial versions of the software used to create and view PDFs, and the free Adobe Reader program used to view PDFs. You can launch Acrobat/Reader as a standalone application and work with it in the same way that you use traditional desktop software. Acrobat/Reader is also launched automatically when you navigate to a PDF file with your web browser if your web browser's default PDF Viewer is set to Acrobat/Reader (**Figure 4.8**).

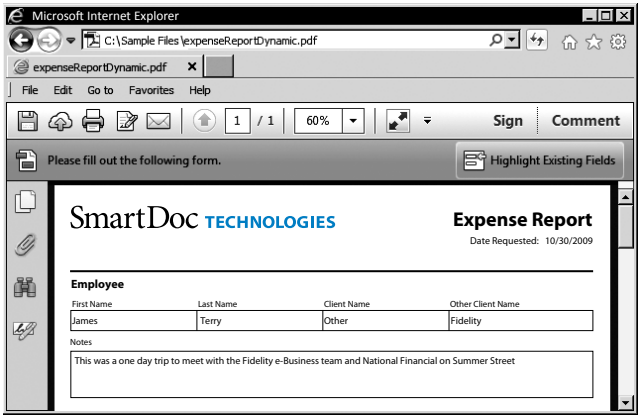


Figure 4.8 When you view a PDF on the web, Acrobat/Reader will launch as a browser plug-in.

All versions of Acrobat and Reader work in this dual way, and all can be used to view PDF forms and files. However, because each is unique, you should be aware of your users' versions so you know their capabilities.

Adobe Reader

You can download the free Reader program for various languages and operating systems, including Windows, Macintosh, and Linux. It's the only free PDF file viewer that works with the entire PDF family of file types. Adobe updates Reader when it updates the commercial versions of Acrobat, so the XFA support is synchronized between the two products. Reader has the same look and feel as the rest of the family but only a subset of the functionality.

As its name implies, Reader is primarily used to read or view PDF files. However, the functionality of Reader can be extended through Reader Extensions. You apply Reader Extensions at the file level. When these extensions have been applied to a file, a user's Reader application automatically unlocks the Acrobat features that have been lying dormant in the program. There are multiple ways and reasons to apply Reader Extensions. For instance, if your user base only has Reader but you need your users to participate in a document review process, you can Reader extend the file. Once the file is extended, your Reader users can access the Acrobat commenting tools, including sticky notes, highlighting, and stamps. Another valuable use of Reader Extensions is to give Reader users the ability to save their data with their form.

Acrobat Standard

Acrobat Standard is available for the Windows platform. This version contains most of the Acrobat features and includes the ability to do the following:

- Reader extend a file so users of Reader 8 or later can save form data
- Create a PDF document from any application that can print a file
- Scan paper documents and convert the text to digital text with Acrobat's OCR (optical character recognition) functionality
- Apply restrictions on copying, printing, and changing PDF files
- Encrypt and digitally sign PDFs
- Save PDFs in the PDF/A (PDF for Archives) format

Acrobat Professional

Acrobat Professional is available for the Windows and Macintosh platforms. Acrobat Professional includes the following tools in addition to those found in Acrobat Standard:

- Redaction tools, used to permanently delete specific text and illustrations (Redaction tools are used by legal professionals to completely remove sections of a document.)
- High-end print production and digital publishing tools, used to preflight and correct PDF files
- Optimization tools, used to enhance PDF reading experiences for mobile users

Acrobat Professional also enables you to

- Validate PDF documents against ISO standards, including PDF/A, PDF/X (high-end graphics), PDF/E (engineering), and PDF/VT (variable-data printing)
- Combine a wide range of file types into a PDF Portfolio with custom layouts, themes, and colors
- Compare two different PDFs and highlight the differences between them
- Create and validate accessible PDF files to meet WCAG (Web Content Accessibility Guidelines) 2.0 and PDF/UA (Universal Accessibility) standards
- Insert Flash video (FLV format) and H.264 video into PDF files
- Automate PDF creation tasks

Understanding Reader Extensions

As mentioned, some of the interactive and dynamic features in your forms won't work in Reader until the form has been Reader extended. In this section, you'll learn about the limitations of Reader and how to transcend these confines with Reader Extensions.

Understanding Adobe Reader Limitations

Although Reader is primarily used to read or view PDF files, you'll often need your Reader users to do more to effectively participate in your smart form workflow. Fortunately, you can extend the features of Reader by applying Reader Extensions to your PDF forms. In this section, you'll explore the following two files to understand and transcend Reader's limitations.

- **notReaderExtended.pdf:** This file was created in Designer and saved as a dynamic XFA PDF.
- **readerExtended.pdf:** This is the same file created in Designer, but it was also Reader extended with LiveCycle Reader Extensions.

Saving data with the form

Believe it or not, Reader users won't be able to save a copy of your PDF form with their data until the form has been extended. When a nonextended PDF is opened, Reader displays a message in the document message bar. If you open the notReaderExtended.pdf file in Reader 9 or above, you'll see a purple document message bar with the following message: *Please fill out the following form. You cannot save data typed into this form. Please print your completed form if you would like a copy for your records.*

Although it's helpful to know this before filling in a complex form, it's hardly in keeping with a smart form workflow to print out the form to retain the data. It's usually best to store the information digitally; your Reader users will be able to do this after the form is extended. Look at the readerExtended.pdf file, and you'll see a purple document message bar with the following message: *Please fill out the following form. You can save data typed into this form.* You'll also need to Reader extend a form if you want to use Reader to import or export XML data into PDF forms at runtime.

Using digital signatures

Digital signatures play an important role in secure smart form workflows. Just think about the many times you have had to sign paper documents. Digital signatures will replace the tasks in your workflow that previously required a handwritten signature on paper. In many ways, digital signatures are more trustworthy than traditional signatures, and there are various ways that you can use them in your Designer forms.

When you open the notReaderExtended.pdf file in Reader 9 or later, the digital signature field is unresponsive. However, when you open the readerExtended.pdf file, you're able to sign the document by clicking the digital signature field.

Connecting to data in real time

The two sample files you've been working with also contain a connection to a web service. However, you'll notice that this web service call works only in the Reader extended file. Follow these steps to call a web service from that sample file:

1. Open the readerExtended.pdf sample file in Adobe Reader 9 or later.
2. Enter **1001** in the Enter ID field.

3. Click the Call Web Service button. This will call a web service at the SmartDoc data center to retrieve a record from a Microsoft SQL Server database. Depending on your security settings, you may see Acrobat Security Warning messages like the one in **Figure 4.9**. You'll need to *trust this document* as explained in step 5 to bypass these messages.

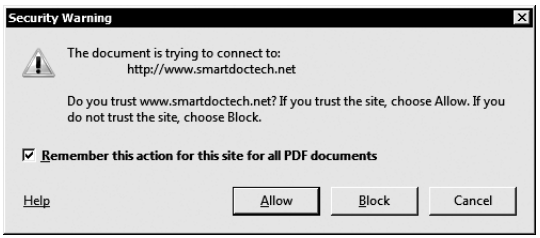


Figure 4.9 The Acrobat Security Warning message.

4. Deselect the "Remember this action for this site for all PDF documents" option, and click Allow.
5. Click the Options drop-down list in the Acrobat document message bar, and select "Trust this document one time only."
6. Click No if you're prompted to save changes.
7. Now that the security questions are answered, you can enter **1001** in the Enter ID field, and click the Call Web Service button.

   The data will automatically flow into the form fields of the PDF. This happens because the form has been Reader extended and the fields are bound to the data connection.

If you try to repeat the preceding steps in Adobe Reader with the notReaderExtended.pdf file, nothing will happen when you click the Call Web Service button.

NOTE: *Acrobat has sophisticated security features, and Adobe provides features and techniques for tuning your PDF applications to meet both your security and functionality requirements. For instance, you can create trusted JavaScript functions that will be handled differently by Acrobat than your standard JavaScript functions.*

Submitting electronic forms

Some types of electronic form submission won't work in Reader until the file has been extended. Reader enables you to submit XML data from a nonextended form, but if you want to submit the form and the data, the form must be Reader extended. Follow these steps with your sample files to see how this works:

8. Open the readerExtended.pdf sample file in Adobe Reader 9 or later.

9. Click the Submit Form button. The Send Email dialog box appears (**Figure 4.10**).

10. If you have Microsoft Outlook, select Default Email Application, and click Continue. Acrobat passes this form to your Outlook program. Note that this functionality doesn't work with all email programs.

The Outlook screen shows your email message with your attached PDF form (**Figure 4.11**).

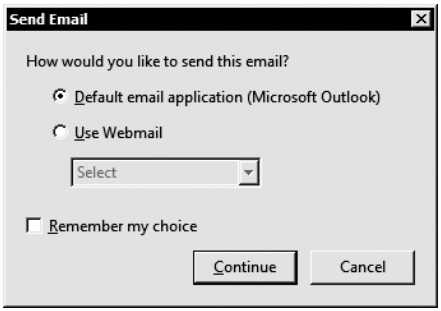


Figure 4.10 The Send Email dialog box.

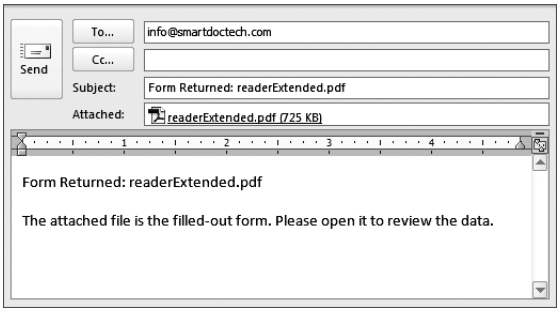


Figure 4.11 An Outlook email message with an attached PDF form.

If you're using Reader and you try to click Submit Form in the notReader Extended.pdf file, nothing will happen. Form submission isn't supported in Reader until the form has been Reader extended. However, you can submit the XML data. Click the Submit Data button and you'll be able to complete the process.

The Submit Data button will work with both files. This button will submit your form data as an XML email attachment. Reader supports XML data submission for both extended and nonextended forms.

Using barcodes

You may sometimes need to integrate paper-based tasks in a digital workflow. Barcodes can help you do this. For instance, if you send an interactive PDF form to users and they fill it out with Reader, they may not necessarily submit the form to you electronically. For various reasons, your users may decide to print out the form and submit it via fax or traditional mail.

In these cases, barcodes can encode the users' form data as they enter it into Reader. You saw an example of this at the end of Chapter 2, "Scripting and Advanced Techniques." These barcodes on the paper forms can be scanned, and the data they contain will be automatically read into your back-end system. If you open the readerExtended.pdf file in Reader 9 or later, you'll see

the barcode in action. The code is wired to encode the data only in the Name field. As you make changes to this data, the visual appearance of the barcode changes. This barcode is an instance of Adobe's Paper Forms barcode, which you can add to your forms with Designer. This two-dimensional barcode is read by a barcode scanner, which retrieves the data you entered in the Name field. You can encode most types of form data into a barcode.

Attaching files

Acrobat enables users to attach other files to a PDF. This capability is useful in cases when a user wants to include supporting documents with a form. These files appear in the Attachments panel, which is always available in Acrobat and active in Reader when a PDF has been extended. Follow these steps to see how to add attachments to PDF forms and files:

11. To open the Attachments panel in Acrobat, select View > Show/Hide > Navigation Panes > Attachments. Alternatively, you can click the paperclip icon in the Navigation pane on the left of the main window.
12. Click the drop-down list and select Add Attachment (**Figure 4.12**, left). The Add Files dialog box will open.
13. Select the file you need to attach to your PDF form and click Open. Your attached file now displays in the Attachments panel.

You won't see this option in Reader when you open the notReaderExtended.pdf file. However, when you open the readerExtended.pdf file, this feature is enabled. You can also open the Attachments panel in Reader by clicking the icon in the Extended Features panel that displays in Reader when a Reader Extended file is active (Figure 4.12, right).

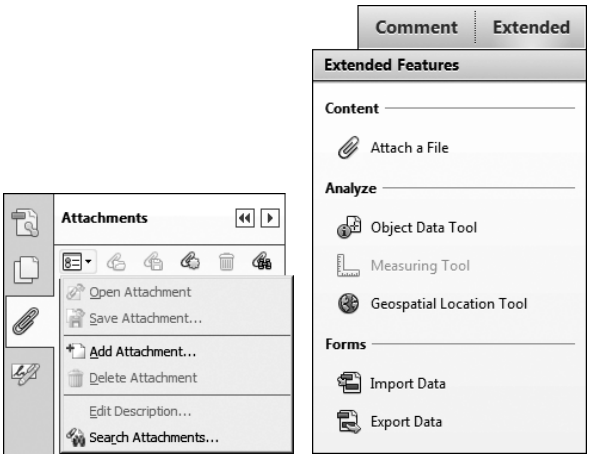


Figure 4.12 The Attachments panel (left) and the Extended Features panel in Reader (right).

Using the Comment and Markup tools

The Acrobat Comment and Markup tools aren't normally a feature of Adobe Reader. However, these tools lie dormant in the program and can be activated when a Reader extended PDF form is opened. Remember, it must be a static XFA PDF in order for you to use these tools. You'll Reader extend a static form in the next exercise.

Extending a PDF Form with Acrobat

Now that you've learned the benefits of Reader extending your form, it's time to learn how to do so with a hands-on exercise. There are two tools you can use to extend a form:

- Adobe Acrobat will do a partial Reader extension of your PDF form.
- LiveCycle Reader Extensions will do a complete extension of your XFA PDF. LiveCycle Reader Extensions is a LiveCycle Server module that needs to be licensed from Adobe separately from Acrobat.

Partial Reader extension with Acrobat Professional

These steps allow you to Reader extend a form using Acrobat Professional:

1. Open the changeOfBeneficiaryStatic.pdf form in Adobe Reader. Notice that the commenting tools in the upper right are grayed-out and inactive.
2. Close the changeOfBeneficiaryStatic.pdf form in Adobe Reader.
3. Open the changeOfBeneficiaryStatic.pdf form in Acrobat Professional.
4. Select File > Save As Other > Reader Extended PDF > Enable More Tools (includes form fill-in and save).

   Acrobat displays a message box describing the features that will be available for this file when it's opened in Reader (**Figure 4.13**).

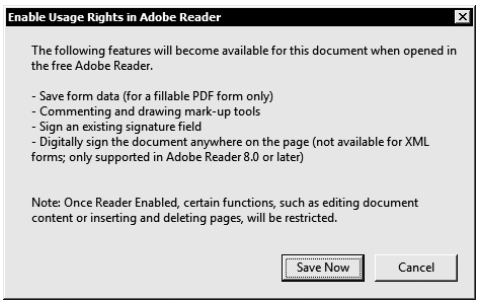


Figure 4.13 Enabling Adobe Reader usage rights.

5. Click Save Now to open the Save As dialog box.
6. Change the filename to **changeOfBeneficiaryStatic_RE.pdf** and click Save.

   Your file is now Reader extended, and it supports the following features:

   - Saving data with the form
   - Using the Comment and Markup tools
   - Submitting electronic forms
   - Using digital signatures
7. Open your new changeOfBeneficiaryStatic_RE.pdf in Adobe Reader. Notice that the commenting tools in the upper right are now active.

NOTE: *The Adobe Acrobat EULA (End User License Agreement) includes a limit of 500 unique data responses for a Reader extended document. If you work for a government agency or a corporation with needs that extend beyond this limit, you must buy LiveCycle Reader Extensions. You can read the complete Adobe Acrobat EULA at www.adobe.com/products/eulas.*

Although Reader extending with Acrobat Professional is good for many cases, you'll have to extend your forms with LiveCycle Reader Extensions if you need Reader users to access any of the following functionality in your XFA PDFs:

- Connecting to data in real time
- Using barcodes
- Attaching files

Complete Reader extension with LiveCycle Reader Extensions

To completely Reader extend your PDF forms, you need to use LiveCycle Reader Extensions. Unlike the previous Acrobat method, Reader Extensions can extend files at design time and at runtime. If you have a license for this LiveCycle Server module, you can extend a file at design time by launching your browser and navigating to the Reader Extensions URL of your LiveCycle Server. The path will follow this format.

http://[*Server Address*]:[Port *Number*]/ReaderExtensions

After you log in with your username and password, the main screen appears (**Figure 4.14**). You can select your PDF file and your usage rights on this screen. After making your choices, click Apply to Reader extend your file.

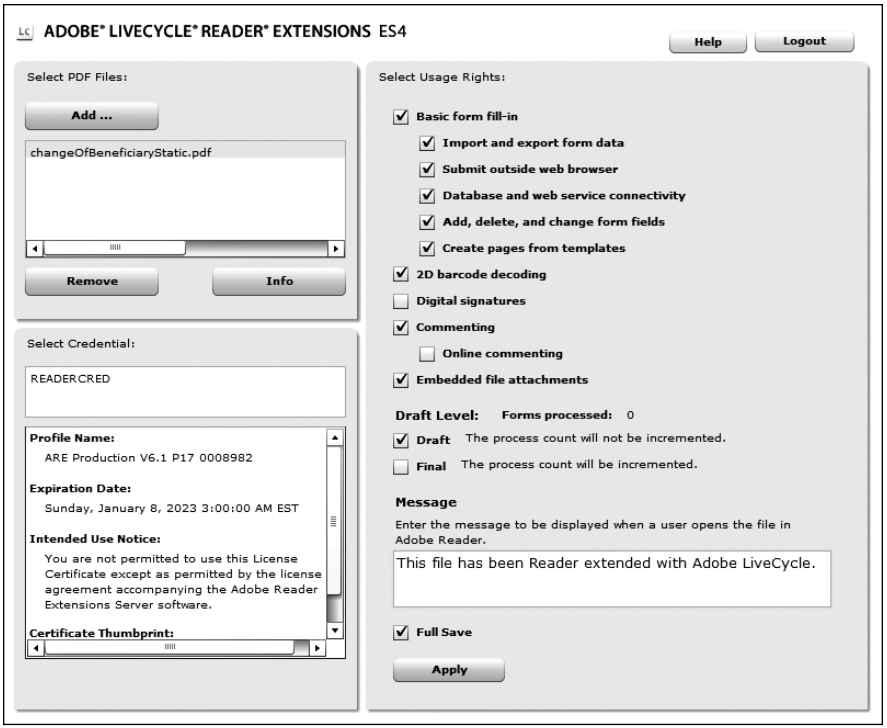


Figure 4.14 The web interface for LiveCycle Reader Extensions. You need this software to enable Reader users to work with barcodes and embed file attachments.

Since this module runs as a LiveCycle service, you can call it at runtime from your LiveCycle, Java, or .NET programs. This is an ideal module to use at runtime to make sure all users of your form will realize its full functionality regardless of whether they are using Acrobat or the free Reader program. As you can see in Figure 4.14, you can even add a custom message that users will see when they open your Reader extended files.

NOTE: *Adobe LiveCycle Reader Extensions is one of Adobe's LiveCycle Server modules for automating enterprise forms and documents. Other important modules include Forms Standard and Pro, Forms Portal, Output, PDF Generator, Rights Management, Digital Signatures, Process Management, and Correspondence Management.*

Third-Party Viewers

There are over 20 commercially available PDF viewing/reading applications for Windows and many others available for tablet devices. Bear in mind that these programs were designed to open, view, and sometimes annotate traditional PDF files. They weren't designed to work with your interactive and dynamic XFA PDF forms.

Because they were designed to read traditional PDF files, these third-party PDF viewers are typically lightweight applications that don't include a JavaScript engine or support for Adobe's XFA object model. If your user base includes third-party PDF readers and you're using XFA PDF forms, it's best to advise your end users to open your forms with the free Adobe Reader. This will enable them to realize all the features and functionality in your forms.

Viewing PDFs on Tablet Devices

Your XFA PDFs also won't work in the third-party PDF viewers that are available for the Apple iPad and Android tablets. Even Adobe's own Reader application for tablet devices doesn't support XFA PDFs. If you're targeting mobile devices with your Designer forms, you should render them as HTML mobile forms; you'll see how to do this in Part 3, "HTML Forms."

Web Browsers with Default Viewers

But perhaps the biggest challenge with non-Adobe PDF readers is the new web browsers that include their own default PDF viewers. The following is a short list of web browsers that have a non-Adobe PDF viewer as their default helper application for PDF files:

- Apple Safari defaults to Apple's own Preview application.
- Google Chrome includes a default viewer that opens PDFs directly in the browser window.
- Mozilla Firefox has its own default PDF viewer.

Changing the default for Google Chrome

Fortunately, you can change your browser's default PDF viewers. Follow these steps to change the default PDF helper application in the Google Chrome browser:

1. Launch your Google Chrome browser.

2. Enter **chrome://plugins** in the navigation bar, and press Enter. You'll see the Chrome Plug-ins panel (**Figure 4.15**).
3. Click Disable in the Chrome PDF Viewer section (Figure 4.15).

   If you have Adobe Acrobat or Adobe Reader on this machine, you can enable it as your default PDF viewer for Chrome. If you don't have it, you must download it first before proceeding with these next steps.
4. Scroll down in your Plug-ins panel until you see the entry for Adobe Acrobat or Reader. Click the Enable link. You will see the grayed-out version become active (**Figure 4.16**).
5. Press Ctrl+O on your keyboard to launch Google's Open File dialog box.
6. Browse to the dynamic XFA PDF expenseReportDynamic.pdf, which you created earlier in this chapter.
7. Click Open, and you'll see your Acrobat/Reader plug-in working inside the Google Chrome window. You now have the full functionality of your dynamic form.

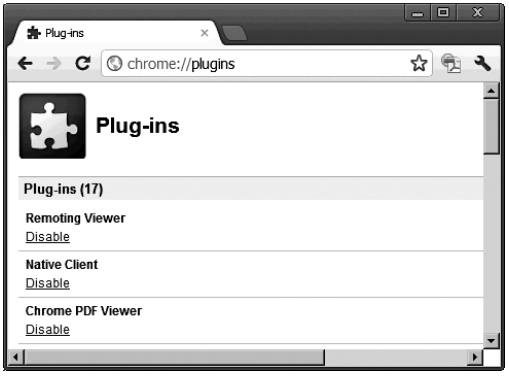


Figure 4.15 The Google Chrome Plug-ins panel.

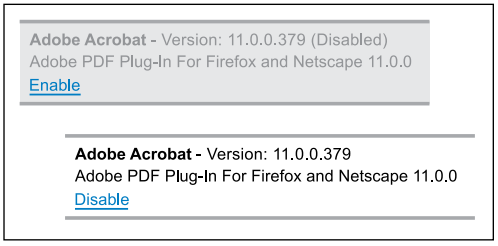


Figure 4.16 Enabling Adobe Acrobat in Google Chrome.

For current information on this topic and to learn how to change the default PDF viewer in other browsers, please refer to the book's companion site.

Moving On

Now that you know more about PDF file types and PDF viewers, let's move on to review the best practices for creating PDFs with Adobe LiveCycle Designer.

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