# Data-Driven iOS Apps for iPad<sup>®</sup> and iPhone<sup>®</sup>

with FileMaker® Pro, Bento® by FileMaker, and FileMaker Go





# Data-Driven iOS Apps for iPad<sup>™</sup> and iPhone<sup>®</sup>

with FileMaker Pro®, Bento® and FileMaker Go

Jesse Feiler



800 East 96th Street, Indianapolis, Indiana 46240 USA

# Data-Driven iOS Apps for iPad and iPhone with FileMaker Pro, Bento by FileMaker, and FileMaker Go

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# **About the Author**

Jesse Feiler is a developer, web designer, trainer, and author. He has worked with mobile devices starting with Apple's Newton and continuing with the iOS products (iPhone, iPod touch, and iPad).

His books include Using FileMaker Bento (Sams/Pearson), Sams Teach Yourself Drupal in 24 Hours (Sams/Pearson), Get Rich with Apps! Your Guide to Reaching More Customers and Making Money NOW (McGraw-Hill), Database-Driven Web Sites (Harcourt), How to Do Everything with Web 2.0 Mashups (McGraw-Hill), iWork '09 For Dummies (Wiley), The Bento Book (Sams/Pearson), and FileMaker Pro in Depth (Sams/Pearson).

He has developed software on a range of platforms ranging from Mac OS X, iOS, Windows, and mainframe computers. His clients represent a variety of organizations, including nonprofits and governments, production management, publishing, and banking.

He is the author of MinutesMachine, the meeting management software for iPad. There are more details at champlainarts.com.

A native of Washington, DC, he has lived in New York City and currently lives in Plattsburgh, NY.

He can be reached at northcountryconsulting.com.

# Acknowledgments

Thanks go most of all to the people at Apple and FileMaker, who have built an incredibly elegant and powerful platform for databases and mobile devices. If you go back to the very roots of what is now Mac OS X, you will find the key concepts that make the technologies in this book possible. For example, networking data in what is now called "the cloud" was part of the very first versions of the operating system. The tremendous work at Apple (and, to be fair, at other places) to let mobile devices discover one another has been integral to the mobile world we have today. With that focus, developers, engineers, and end users were able to make the most of mobile technologies as they have matured.

In all seriousness, there's another thank you. There have been ups and downs in the world of technology, and the subset of it that is Apple. To all the people who stayed with it and tried to get out of the occasional bad times through innovation and yet more creativity, thanks for helping to make today's environment possible.

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# Introduction

# Welcome to FileMaker on the Move

The rise of mobile devices such as iPhone and iPad during the first decade of the twenty-first century has been as dramatic an event in the technology world as the introductions of personal computers and the World Wide Web. In fact, some (including the author) would argue that mobile computing is a much bigger innovation because it has quickly and dramatically changed the ways in which people use technology. Personal computers were smaller and more flexible than mainframe computers, and the Web is a fast and powerful way to present and consume organized data, but what you can do with a FileMaker database in your hand wherever you go is not just smaller, more flexible, or faster; it is different.

The significance of the mobile revolution was immediately apparent to some people and organizations (yes, this refers to the people at Apple among others), but it was not quite so apparent to many others. When the first ads for iPad were shown, one commentator pointed out that people using iPads were sitting with their feet up on sofas or footstools. They were not using iPads while sitting at a desk in an office, and the commentator reasoned that meant that iPads were not for business use.

Some people objected to that line of reasoning. Perhaps it is desks and offices that are no longer relevant to business. And within the first year, iPads became Apple's long-desired entree to the world of corporate enterprises.

Through its wholly owned FileMaker subsidiary, Apple is uniquely positioned to merge the worlds of databases and mobile computing. This book introduces you to the FileMaker products that are designed for mobile devices; it also shows you how to tweak existing FileMaker databases and solutions to make them easier to use on mobile devices.

# Who Should Read This Book

This book is for anyone who wants to develop or use mobile data on iPhone, iPod touch, or iPad using any of FileMaker's tools: FileMaker Pro, FileMaker Server, FileMaker Go, and Bento by FileMaker. If you are not familiar with FileMaker or Bento, you might want to refer to the author's book *FileMaker Pro in Depth* or the extensive documentation that comes with those products. The focus here is just on mobile data and the issues you need to understand to use it.

If you are not certain that you want to put your data on a mobile device, this book might help you make up your mind. Although there are a few decisions you have to make carefully, the benefits of having your data with you (literally in your hand or your pocket) outweigh a little bit of work in getting things set up.

# **Downloading the Example Files**

Example files can be downloaded from the author's website at northcountryconsulting.com or from the publisher's site at quepublishing.com.

# How This Book Is Organized

There are four parts to this book. You can focus on whichever one addresses an immediate problem, or you can get a good overview by reading straight through.

# Part I: Data to Go

This part introduces the basic issues of the book and shows you principles and techniques that apply to all the products discussed:

- **Chapter 1, "Making Data Mobile"**—This chapter introduces you to the products described in this book. You also take a close look at the interfaces in order to see how they differ from desktop and laptop computers to mobile devices. These observations help you design your own mobile layouts later on in the book.
- **Chapter 2, "Introducing the FileMaker Architecture"**—FileMaker Go lets you access FileMaker databases from mobile devices, so you need to know what those databases look like and what they can do. You also use this knowledge in Part IV when you use web publishing to put FileMaker databases on the web and from there onto mobile devices.
- **Chapter 3, "Managing Data on the Move"**—When your data is moving around, how do you manage it? This chapter shows you the principles and techniques involved in sharing, copying, and synchronizing data so that wherever it is, it is correct and timely.
- Chapter 4, "Working with Mobile Devices"—A lot of what you have learned about interface design does not apply to mobile devices (after all, there are no menus and no resizable windows). This chapter introduces you to the issues you need to think about as you prepare data and layouts for the mobile world.

- **Chapter 5, "Preparing FileMaker for Mobile Use"**—Here are specific issues and techniques to think about and use as you create and modify FileMaker databases for mobile use and for the web.
- **Chapter 6: "Introducing FileMaker Server"**—FileMaker Server enables you to share FileMaker databases among large groups of people. It supports access from FileMaker Pro and FileMaker Go, and also provides tools for publishing databases on the web. When you publish a database on the web, that means it is accessible to any web browser; that, in turn, means that you have a way to put your databases on mobile devices that do not run FileMaker Go but have a browser built into them.

#### Part II: FileMaker Go

FileMaker Go runs on iPhone, iPod touch, and iPad (there are separate versions for iPhone/iPod touch and for iPad). It lets you access FileMaker databases that are shared over a network or that are located on the mobile devices. Here are the details:

- **Chapter 7, "Introducing FileMaker Go"**—This is a hands-on guide to what FileMaker Go can do and how you can use it. It includes the new features for FileMaker Go 1.2 such as signature capture.
- **Chapter 8, "Optimizing FileMaker Databases for FileMaker Go"**—There are a few features of FileMaker that work differently in FileMaker Go. This chapter explores the differences and shows you how to work around issues that might arise. In addition, you see how to take advantage of some of the differences to do things that you could not do on FileMaker.
- **Chapter 9, "Designing a FileMaker Go Solution"**—This chapter provides a step-by-step guide to building a FileMaker Go solution for iPhone and a variation for iPad.
- Chapter 10: "Using Printing and Charting with FileMaker Go"—FileMaker has long had sophisticated printing features that let you move and resize fields during the print process so as to close up blank space and do other ad hoc formatting. With FileMaker Pro 11, charting functionality was added to FileMaker. As a result, FileMaker Pro and FileMaker Go can not only store and manipulate data, but they can also present it attractively and effectively on screens of various sizes, in print, and in graphical formats. This chapter shows you how to make the most of these features for FileMaker Go.

## Part III: Bento by FileMaker

Bento is the personal database from FileMaker. It is designed for individuals and small workgroups. It is simple to deploy and use, which makes it perfect for many mobile projects:

- **Chapter 11, "Using Bento and Bento Libraries"**—This chapter provides a detailed look at Bento on Mac OS X to get you up to speed if you have never used it before. If you are an experienced Bento user, you will probably find new tips and techniques to make you even more productive.
- Chapter 12, "Using Bento Records, Fields, Forms, and Tables"—Inside your Bento libraries, records and fields store your data just as they do with FileMaker. Instead of FileMaker layouts, Bento gives you forms and tables for the presentation and manipulation of data. To make life even easier, it automatically creates these for you, although you can customize them if you like.

- Chapter 13, "Working with Location and Media Fields"—Bento takes advantage of the location services on mobile devices so that you can automatically store geographic data in your Bento libraries and manipulate it. Those features as well as the features for media fields that incorporate the camera are the topic of this chapter.
- Chapter 14, "Importing and Exporting Bento and FileMaker Data"—This chapter helps you move your data back and forth between FileMaker and Bento. These tools also let you move data back and forth between Bento and other application programs.

# Part IV: FileMaker Web Publishing: Instant Web Publishing (IWP) and Custom Web Publishing (CWP)

Because mobile devices have web browsers, moving your FileMaker database to the web enables it to be used on mobile devices. Here are some special tips and issues to consider:

- Chapter 15, "Deploying FileMaker/IWP with FileMaker Server Advanced"—Here are the settings required to use IWP to share your database. The point of IWP is to develop a web-based solution that looks as much as possible like your desktop version. On a mobile device you might want to re-think the look and feel, particularly if iPhone is your target.
- **Chapter 16, "Deploying FileMaker/CWP with FileMaker Server"**—FileMaker supports a PHP interface, so if you want to write code for your FileMaker-driven website, here is how you do it. The chapter also explores the built-in iPhone template to make mobile development even easier.

# Appendix

Many people find it convenient to pair a wireless keyboard with a mobile device when data entry is involved. This section gives you the details on how to do that.

• Appendix A, "Connecting a Wireless Keyboard to a Mobile Device"—If you are doing a lot of typing, a wireless keyboard can be a valuable accessory to an iPad or an iPhone. This appendix describes how to connect and use one. Even more important, it includes how to switch a wireless keyboard between a desktop or laptop Mac and your mobile device.

# •••••4

#### IN THIS CHAPTER

- Using Your Fingers
- Working with Text
- Managing Mobile Files
- Printing with a Mobile Device

# Working with Mobile Devices

Although the world of mobile devices has been expanding over the last few years, a pattern is taking shape. That pattern is centered around four types of devices:

- Laptops of various screen sizes
- · Netbooks, which generally have smaller screen sizes than laptops
- Tablet computers, such as iPad
- Smartphones, such as iPhone

Laptops and netbooks generally have keyboards built into them; tablet computers and smartphones might have small keyboards, onscreen keyboards, or the ability to connect wireless keyboards to them. Many (including iPad and iPhone) have several of these options.

The combination of the relatively smaller screen size than a desktop-based computer and the use of a smaller keyboard for input is at the heart of what you have to think about when you are developing for a mobile device. Of course, at the same time, you have to consider that these mobile devices and their owners can go many places where traditional computers cannot go. The marketplace seems to be deciding that whatever drawbacks a smaller screen size might have (and, in the case of iPad, many people would argue that the screen is just fine as is) and that the smaller keyboard might pose, the greater mobility is far worth it.

The issues of screen size and keyboard, as well as what you have to think about when you are working in a world of touch control, recur throughout this book. Anyone who develops for mobile devices has to be aware of them because it is a new way of thinking about interfaces.

This chapter deals with issues common to most mobile devices. In the next chapter, you see some of the issues that are common to both mobile devices and the FileMaker database tools.

# **Working with Your Fingers**

Pointing with your finger and pointing with a computer are two very different experiences; neither is intrinsically better than the other. It is your job as a designer of a database solution to handle both appropriately. There are two primary issues to consider:

- A computer mouse with its pointer on the screen can point much more precisely than a fingertip can. This means that clickable items on a user interface can be much smaller than tappable items on a touch interface: Fingertips are enormous compared to the tip of a pointer on a computer screen.
- For most people, a fingertip can move farther and faster than a computer mouse can. Even a wireless mouse needs to be picked up and moved away from the edge of a desk when you need to move the pointer on the screen a bit further.

There is another point to consider when comparing your fingertip to a computer mouse: Although you can watch the mouse pointer move along the screen as you drag the mouse on the desk, there is no comparable behavior with a touch interface. A computer mouse can participate in mouse-up tracking (that is, the movement of the mouse and its pointer on the screen without the button being down), but if your finger is not touching the screen, its movement cannot be tracked.

This means that every aspect of an interface that relies on mouse-up tracking just does not work on a touchscreen—there are no tooltips or help tags to guide people along. (Apple uses the latter term; the tooltip term and functionality were introduced in Microsoft Word 95.)

#### **TOUCHING AND TAPPING A MOBILE SCREEN**

Mobile devices such as iPad and iPhone use *touchscreens* (one word). The technology is referred to as *touchscreen technology* and there are many variations on that phrase (people sometimes talk about a touch environment). Touch is the basic technology.

The actions that the user performs are called *gestures*. The two most common gestures are taps and touches. There is a distinction (and it is a distinction that you will find in a standard dictionary, although the nuances of the distinction matter more in the world of touchscreens).

A *tap* is a down-and-up action. For programmers, in many cases it is the up part of the action that they care about. The *touchup* event is what triggers an action similar to a mouse click in many applications.

A *touch* is the down part of a tap. It comes into play in cases where the finger remains in contact with the touchscreen. You frequently find instructions such as, "Touch and hold the image and then drag it to your document." The hold part of that command can be a very short period of time, but the touch-and-hold action is just enough to let the device understand that something else such as the drag is going to happen.

You can see how touch-and-hold works on iPhone or iPad when you touch and hold your finger over some text, as you see in Figure 4.1.

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#### Figure 4.1

Touch and hold over some text to bring up the magnifying glass.



The text is enlarged so that you can see where the insertion point is. As you drag your finger along the screen, the *magnifying glass* moves so that you can see exactly where the insertion point is.

When you lift your finger up, the dragging of the magnifying glass ends, and the *selection buttons* appear, as shown in Figure 4.2.



# What to Do Without a Keyboard

Although iPad and iPhone have onscreen keyboards and the ability to use a wireless keyboard, as the designer of a mobile database solution, you should recognize that particularly for speedy touch-typists, the onscreen keyboard slows them down. For that reason (as well as the fact that not everyone carries a wireless keyboard with them), you can improve your mobile database solutions by constantly looking for what you can do without a keyboard.

When you don't have a keyboard, you can present tappable objects, such as radio buttons and checkboxes, wherever possible. These work very well in a touch environment, and, in fact, most people can handle them as quickly or even faster than a skilled touch-typist can enter data with a keyboard.

But there is one point to remember: In a desktop environment where a typist has a keyboard available as well as a mouse, the physical transition from hands on the keyboard to a hand on the mouse can slow people down. What this means to you is that you might have to think about having two interfaces for heavy dataentry portions of a database. You use one version for a desktop environment with a keyboard and mouse, and you use the other for a touchscreen environment.

Remember that this really becomes an issue only for intense data entry and for speedy typists. But even if it is an issue, FileMaker helps you out a good deal: Because the interface (*layouts* in FileMaker terms) is relatively independent of the data that it handles, you can switch layouts quickly and easily (and even automatically).

So the point remains for a mobile database designer: Look for every opportunity to convert data entry into touch.

And while you are looking for new opportunities to include a touch interface, there are two other points to consider. The first is worth mentioning, but it rarely causes issues for users. When you add touch to your interface for a database that is also shown in FileMaker Pro, you wind up with two ways of accomplishing the same task: a mouse-driven way and a touch-driven way. The experiences are so different (and people are now so used to them) that this just is not an issue.

What can be an issue is that because people are usually holding a mobile device in their hand, they can easily tap the screen inadvertently. Just as a stray mouse click on a desktop-based interface usually does not pose a problem, a stray tap also does not hurt in most cases. On the desktop, a stray mouse click that just happens to click on a Submit or OK button can do damage. On a mobile device, you close the mobile equivalents or dialogs or alerts by tapping somewhere outside the alert; there is normally no Cancel button. People soon learn this, but you might incorporate it into your design by remembering that dismissed dialogs might have been inadvertently dismissed, so you might want to re-confirm any action that is dramatic.



One terrific way to speed keyboard input is to use the auto-complete option. As a user begins to type, those characters are used to suggest a word or phrase that can be completed automatically. Unfortunately, this feature is not supported on FileMaker Go.

# What to Do About Text

When you are designing a FileMaker solution for mobile devices, you move into a world that you cannot control as tightly as you can with desktop-based systems. If you use web publishing, you are at the mercy of the specific browser and operating system installation when it comes to available fonts. For iPhone and iPad, you are still at the mercy of the devices, but you have a bit more control in that you know the available fonts.

On the web, designers have gotten used to using fonts that they know will be available in all environments. This provides predictable stability and, in some cases, a bit of boredom when it comes to typography design. Although the collections of fonts on iPhone and iPad are likely to change over time, the current rosters of fonts on those devices are included later in this section. You can safely use those in your FileMaker layouts for FileMaker Go; layouts presented on those devices through Safari and Bento often work properly with those fonts. So, go ahead and design the interface you want with a bit more visual excitement than Helvetica.

These are the fonts available for iPhone and iPod touch:

- Arial
- Arial Rounded MT Bold
- Courier
- Courier New
- Georgia
- Helvetica

These are the fonts for iPad:

- Arial
- Arial Rounded MT Bold
- Courier
- Courier New
- Georgia
- Helvetica
- Helvetica Neue
- Times New Roman
- Trebuchet MS
- Verdana

- Helvetica Neue
- Times New Roman
- Trebuchet MS
- Verdana
- Cochin
- Academy Engraved LET
- Baskerville
- Chalkduster
- Optima
- Palatino
- Gill Sans
- Futura
- Cochin
- Snell RoundHand
- Didot

# What to Do About Graphics

iPad can present a surprising challenge to you when you move a FileMaker database solution to it. This applies to any of the tools you might use: FileMaker web publishing, Bento, and FileMaker Go. The challenge stems directly from one of the great achievements of iPad: its remarkably clear screen. (That screen also accounts for the crispness of the installed fonts.)

The issue is inherent in iPad and iPhone 4 and later. Apple promotes its Retina Display (first launched on iPhone 4) as using pixels so small that they cannot be seen by the eye: Only the overall effect is visible. The flip side of that statement is that images stored in databases also are shown in amazing detail. Just as with the advent of high-definition TV, flaws and imperfections are noticeable. (More than one TV station had to rebuild or at least seriously touch up its news and other local programming sets as part of the transition to high-definition.)

If you have an existing database that contains graphics, it is time to start thinking about what you are going to do about the quality of those graphics. The first step is probably to recognize the issue and to move to higherquality images for all future data entry into the database. Depending on your database and your users, you might want to launch an ongoing project to upgrade the existing images. In some cases, that is a matter of converting images, but in many more cases, it is a matter of reshooting photographic images or otherwise starting from scratch. Because this can be a long-term process, and because it is inherent in the use of high-resolution devices such as iPad and iPhone (in other words, it is not just a FileMaker issue), it makes sense to formulate a strategy and get started on it as soon as possible.

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If you store images in your database, consider adding an image quality field with a companion value list (displayed in radio buttons or a pop-up menu). The values for the value list can be terms such as OK, Reshoot, Retouch, Hi-Def, or Lo-Res depending on your circumstances. It is often not enough to just look at the resolution of the embedded images: You need subjective human judgment about whether or not a speck of dust in the background of the image is now visible enough to ruin the image or to require manipulation with an image-editing tool. Furthermore, you may need to formulate standards and procedures for retouching images if you do not have them already so that it is clear what types of adjustments require new artwork and what types can be retouched.

# **Integrating Without a Visible File System**

People have gotten used to organizing their files on their desktop-based computers. Although some files are hidden, and some files are protected from modification, the vast majority of files and folders on a desktop-based computer are your data, and you can use them as you see fit. You can rename and reorganize them until the structure makes sense to you. The standard File Open and File Save dialogs let you locate the files wherevyou want them on your computer, as well as on any connected servers. If you want to put your accounting files in a folder called Photos, no file-organizing police will stop you.

Designers of operating systems have made this possible, and some of them have had second thoughts. There is something attractive to OS designers in having separate areas for the files of each application. Most operating systems implement some concept of a file's owner (the application that will be used by default to open it), but even in those cases, users can often change the file's owner so that, if you want, you can open your vacation photos with AccountEdge or Quicken (or at least try to).

If you are deploying a FileMaker database for use on iPad or iPhone, you have to think about two types of files:

- The database files need to be available to users.
- Graphics and other files used by the database need to be available.

Your FileMaker database files can be served up from FileMaker Server; you can access them using a local Wi-Fi connection or by connecting to them over the Internet. You use FileMaker Pro and the File, Open Remote command to connect to these databases; on mobile devices, you can use FileMaker Go.

→ There is more on FileMaker Go in Part II, "FileMaker Go," **p. 151**.

You can also publish databases on the web using FileMaker Server; in that case, people connect to your database using a browser. The browser option is available for mobile devices such as iPhone and iPad.

→ There is more on FileMaker Server in Part IV, "FileMaker Web Publishing: Instant Web Publishing (IWP) and Custom Web Publishing (CWP)," p. 325.

As for the files that your database needs to access, these can be inserted into the database directly; you also can insert them by reference. Those techniques are also described later in this section.

## Moving FileMaker Databases to Your Mobile Device

Each application on your iPhone or iPad has its own area for files. You place files in that area either by moving them to your device or by creating them with an app. As you see in this section, you move them back and forth between your computer and your mobile device with iTunes or email.

One consequence of this is that if you remove an app from your device, all the files you have stored in that app's area are also removed; you should back them up to another device before removing the app.

#### **Using iTunes**

iTunes is the basic tool you use for moving files to and from your mobile device. The device normally has to be connected to your computer with a cable in order to move files back and forth. (Apps such as Contacts, Calendar, and Mail move data over wireless connections, but that data consists of relatively small items, such as individual phone numbers, appointments, and the like.)

To move files from your computer to your mobile device, connect the device. iTunes might open automatically; if it does not, launch it yourself. In the left-hand side of the window is a section for devices; your iPad or iPhone should appear there after a few seconds. If you do not see your device, check the cable connection and verify that it is turned on. Figure 4.3 shows an iPad connected through iTunes. Tabs at the top of the window let you see various parts of your device's storage: Click Apps to manage storage.

Scroll down to the bottom of the Apps tab, as shown in Figure 4.4.

Here is where you can see the file storage system on your iOS device. Each app has its own set of files. Click on an app, and you see the files (and, as noted, remove the app, and its files are removed, too).

Developers see more of the file structure, but basically this is it. People can discuss and argue about whether it is better or worse than the totally user-controlled file structure on personal computers in general, but this is what is provided on iOS.

If you want to add a file to your device so that an app such as FileMaker Go can access it, you connect your device, launch iTunes (if it does not launch automatically), and scroll down to the app in question.

#### Figure 4.3

Connect a mobile device using iTunes.



#### Figure 4.4

Scroll down to see file storage.

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LIBRARY	Summary Info 💽	Music Movies TV Shows IT	lunes U Books Photos
JJ Music			
E Movies			
LUI TV Shows			
T Podcasts		tation Alas P	actos Pod
X. Kabio	Automatically sync new apps	Select apps to be installed on	your iPad or drag to a specific home screen.
TORE		Drag to rearrang	e app icons or home screens.
Tunes Store			
¢Q Ping	File Sharing		
DEVICES	The anne listed below can trapefer d	on mosts behavior ways iDed and	this computer
Jesse's IPad 😑 🔘	The apps issued below can transfer o	ocumenta between your iPao and	ana compoter.
J3 Music	Anna	EileMaker Co Desumente	
Movies	white	FileMaker Go Documenta	,
UTV Shows	FileMaker Go	👔 iPadEntry.fp7	Yesterday 11:29 AM 64 KB
🗇 iTunes U 💮	8.9	TReservations.fp7	9/22/10 3:08 PM 128 KB
III Books	GoodReader		
-Q- Classical Music	-		
-Q- Music Videos	Google Earth		
QP Recently Played	-		
Ef Big Band	Keynote		
EP BWAYL			
ill in co	Numbers		
ID has Todays - Les ava			
ID hely Carland 1	Pages		
EP Miss Liberty (Original			
II) Party	Stanza		
PP Purchased			
EP Saturday Night - 200			Add Save to
10 Spamalot			•
di Home Sharing			
2DNUS	SiLI7 GE 🗾 Audio 📕 Video		Other Free Sync
Rig Genius			

As Figure 4.4 shows, there are two buttons in the bottom right of the window that let you move files in and out. Click Add, and a standard File Open dialog opens that lets you select a file from your computer or available network locations and add it to your device. The file is immediately sent down to your device. You can also drag the file from your disk into this window; just make certain that you have selected the proper app.

With any of the files on your device selected, the Send button in the bottom right of the window opens a File Save dialog. This lets you choose a location and name for the file on your device. The file is saved on your disk (or network locations) with the name that you provide. It is not removed from your device. If you want to do that, you do it on the mobile device as you see later in this chapter (see Figure 4.9).

Note that this is not anything special about FileMaker Go. Files for the iWork apps (Pages, Numbers, and Keynote) work exactly the same way as do files for any other app that supports its own files.

The FileMaker Go files on your iPad are shown at the left of the screen you see when you launch the app, as shown in Figure 4.5.



#### Using a Non-Paired Copy of iTunes

Figure 4.5 FileMaker Go files are

FileMaker Go.

An iTunes library is paired with a specific iPad or iPhone (it can be paired with one of each). That enables you to sync your apps, music, and videos between your computer and your mobile devices. If you change computers or mobile devices, you can move your apps, music, and video to the new device or the new computer, but you only can have at most one iPhone and one iPad paired with your computer. (This is part of *digital rights* management—DRM. It protects copyrighted material from unauthorized distribution and duplication.)

Because most of the synchronization between your mobile device and your computer has to do with copyrighted material, the security mechanisms are activated when you connect the device to your computer.

However, the files that belong to you can be moved to and from the mobile device without running afoul of intellectual property laws. (That is, of course, unless you are trying to move a database that belongs to someone else to your mobile device or from it to your computer. That is against the law, but iTunes does not prevent you from doing so. The owner of the database or other copyrighted file must have it out with you.)

Because it is perfectly legal to move your own files between your iPad or iPhone and your own computer, iTunes lets you do so. However, it does remind you about the copyrighted material that is involved and asks you if you want to synchronize that material. Remember that most people are used to just plugging in their iPad, iPhone, or iPod and having their music sync automatically.

Here are the steps to take if you want to move your own files between an iPhone or iPad and your own computer. When you connect your mobile device, iTunes might launch automatically. Depending on your settings, it might start to synchronize your music, movies, apps, and photos automatically.

If you connect your mobile device to a computer that is not paired with it, iTunes might still launch automatically. If it does not, launch it yourself. You see a warning like the one in Figure 4.6.



The text of the dialog box presents you with two choices for your iTunes library (that is, your music, movies, and apps—copyrighted material that you have downloaded from the iTunes store whether or not it is a free app or a movie you have paid for). You can choose to erase the iTunes library from the device you have just plugged in and replace it with the contents of the iTunes library on the computer to which it is now connected. On the other hand, you might want to transfer the iTunes library content from the mobile device to the computer. Either way, at the end of the operation, the iTunes library on the mobile device and the computer will be synchronized.

If you click Cancel, neither of those things happens. If you are interested only in moving your own files between your mobile device and your computer, Cancel is your option.

You move on to your photos, as shown in Figure 4.7.

Figure 4.7

Cancel photo synchronization.



As you can see from the text in the dialog in Figure 4.7, you have an option to replace synced photos on your mobile device with those from the computer you are using (you do not have the reverse option as you did with the iTunes library).

If you are interested just in transferring your files, click Cancel again here.

In this way, all that happens during the connection is that you synchronize files and, perhaps, change some mobile device settings and recharge it as necessary.

If you refer to Figure 4.3, you can see that iTunes does not recognize any apps from the attached mobile device because it is not being synced for apps. At the right of Figures 4.3 and 4.4, you can see a dimmed version of the device's home screen (you can normally rearrange the app icons here). That image is dimmed and not modifiable unless you have decided to pair the device with the computer.

#### Using eMail

Figure 4.8

You can also move files to your iPad or iPhone using email. In many ways, this is simpler because you do not have to connect your mobile device directly to your computer.

In order to move a file to an iPad via email, just send it as an attachment to an email message to the iPad's owner. It arrives in the same way that any email message with an attached file arrives. Figure 4.8 shows such an incoming message.



When you tap an enclosed file, you are given the opportunity to open it in the application associated with it, as you see in Figure 4.8. (If no such application can be found, the attachment icon simply is displayed in the message.)

After you have tapped a FileMaker database from an email message, it is opened in FileMaker Go and it is moved to the FileMaker Go file storage area. From now on, it shows up in the Files on Device (left-hand) column of the FileMaker Go home screen, as you see in Figure 4.9.

Figure 4.9

on your iPad.



Figure 4.9 also shows how you can remove a file from your device: the standard left-to-right swipe brings up the Delete button, as you see in Figure 4.9.

On iPhone, the screen shown in Figure 4.9 is replaced by a file browser. By default, you see recent files on iPhone, as shown in Figure 4.10.

Figure 4.10 Start from recent files on your iPhone.



If you tap the File Browser button, you can look at the different types of files (Recent Files, Files on Device), and from the lists in those categories, you can open the files directly. Those screens are shown in Figure 4.11.



It is important to note the iTunes display of files for apps on your iOS device (shown previously in Figure 4.5). With iTunes, you can add files to your device or save them from your device to a location on your computer's disk or network. Remove files from the list on your device or select them on the Apps tab in iTunes (see Figure 4.4) and use the Delete command. This is standard practice for most apps.

# **Inserting Files and File References into FileMaker Databases**

FileMaker databases can contain *container* fields. These are fields into which you can place references to files or even the contents of files. (In many ways, they are similar to *blob* fields in databases such as MySQL.)

When you place binary data into a container field (that is, data that could be the content of a file), its structure is preserved. FileMaker cannot display it or manage it in most cases, but it does store the data and can present it as needed. Another application can then process the data.

The most common use for container fields is to store images, movies, spreadsheets, PDFs, and even other FileMaker databases. You can do this in either of two ways:

- **Inserting files.** You can select a container field and then choose a command from the Insert menu to insert a Picture, QuickTime, sound, or file. In cases where you specify the type of content, FileMaker might be able to display it in the field. By inserting the file, you make your FileMaker database bigger (because it now contains movies, images, and the like).
- **Inserting file references.** A checkbox on the dialog that opens from the Insert menu lets you choose to insert a file reference rather than the file itself. This keeps your database's size manageable; the file

and all of its data remains on your hard disk or network. However, if you move your FileMaker database to another location, you must move the referenced files in such a way that FileMaker can find it.

Thus, you have a clear tradeoff: more portability of your FileMaker database versus larger database size. This matters when you are publishing a database on the web because you need to move the database and its referenced files together, and it also matters if you are moving a database to a mobile device (for the same reason).

# **Using Signature Capture**

FileMaker Go introduces a new use for container fields: You can use them to capture signatures from an iOS device. When you tap a container field on an iOS device, you have the option to insert a photo from your library or to capture a signature directly into the container field (after all, these are *touchscreens*). In addition, on iPhone you have the option to take a photo and automatically have it inserted into the container field. Figure 4.12 shows a container field in action on iPad.



→ You see how to build the Estimator example shown in Figure 4.12 in Chapter 9, "Designing a FileMaker Go Solution," p. 213.

# **Using Multiple Files in FileMaker Solutions**

In Chapter 2, "Introducing the FileMaker Architecture," the section "Structuring Solutions and Sub-Solutions" described how you can use multiple files to construct your solution so that files focusing on interface elements are separate from those supporting the data itself. When it comes time to think about deploying your solutions and sub-solutions, you might have to address the issues relating to those files.

The issues center on the fact that you do not have the kind of access to the files and file system on the mobile device that you have on a desktop-based computer. All of your FileMaker files will be together in the FileMaker Go section of the device. Therefore, if you have constructed a complicated file structure (perhaps by connecting files in several folders or even several disks), this structure might not work easily on a mobile device. (In fact, this is very much the issue that you can encounter when deploying files for FileMaker Server. In that case, files are placed in a Databases folder for FileMaker Server, and so complex file/folder relationships are very much as simplified as they are for FileMaker Go.)

The simplest way to organize your files in a multi-file FileMaker solution is to place all the files in a single folder; you can then move that folder around (to the FileMaker Server deployment or to the FileMaker Go deployment) and the files remain together. This means that the links among the files are always within that one folder, with each related file being no more than one step away from any other file.

Before you can use an external file in a multi-file solution, you need to define it to FileMaker. To do so, you use the File, Manage, External Data Sources command, as shown in Figure 4.13.

Figure 4.13	
Specify external data	
sources.	

000	Edit Data Source	
Name: Attendees		
Type: 💿 FileMaker	OODBC	
Click Add File to add one list. Specify one file path the list.	or more FileMaker files to the path list, or type f per line. FileMaker will search for the file in the o	le paths directly into the order the paths appear in
File Path List (in searc	h order)	Add File
Examples	File Path Format	
Relative path Full path Full path Network path FileMaker Network	file:directoryName,fileName filemac;/velumeName/directoryName/fileName filewin://complexterr-r/directoryName/fileName filewin://complexteName/shareName/directoryN fmnet:/hostIPAddress/fileName	iame/fileName
	Can	

→ Figures 4.13 and 4.14 show parts of the Reservations example which you will see how to build in Chapter 7, "Using FileMaker Go," p. 151.

In this dialog, you can name an external data source and specify its location. As the dialog shows in the examples at the bottom, you can use files in other directories and on other servers as external data sources. You can also use non-FileMaker files if they conform to ODBC protocols.

If you are placing a file on a mobile device with FileMaker Go, it is easiest to use the single folder structure described in this section. If you are accessing a FileMaker Server database, you can deploy it as you normally would and simply connect to it from the mobile device.

After you have specified an external data source, you can use it in your relationships graph. Simply click the add table button at the bottom left as shown in Figure 4.14, and you can choose an external data source. (If it

is not already set up, you can add it from the dialog, as shown in the figure.) After you have selected the data source, its tables are displayed, and you can select the one you want to use. From then on, everything is the same as if you were using tables within your main database file.

Events     alb     confirmed     Date     Insign     Location     Trans     Cration*     ZCration*     ZCration*     zdb     adb     adb	nie dra z indruäe Data So iPadřat supplie invento	off in Current File (* Attendens Add FileMaker Add FileMaker Add DBC Dat Manage Data S	leservations.fp?) Data Source a Source iources	
Tables / Relationships Arrange	Name iPadEr Tools	Carter Ca	ancel) OK	

#### Figure 4.14

Select the table from an external data source.

# Printing

Some special-purpose mobile devices incorporate printers. Examples are devices that print receipts, such as for car rental returns. Most mobile devices do not print, and for many people and many applications, this has posed a problem: People often need records of their transactions. The desire for printed output from mobile devices has spawned a variety of solutions right from the start. Initially, the iOS devices supported printing with third-party apps; however, within a relatively brief period of time, printing became an integral part of iOS.

→ With the release of FileMaker Go 1.2, printing is expanded even beyond the basics described here. FileMaker has very extensive print handling code that enables you to dynamically reduce the size of some fields and even move them around on the layout depending on the data that they contain. This is so important that it receives its own chapter: Chapter 10, "Using Printing and Charting with FileMaker Go," p. 237.

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Actually, printing in iOS was there from the start (indeed, from before the start), although not all of the pieces of the implementation were complete. Printing is usually a part of an operating system; you can notice this by observing that the print dialog for each of your applications on a desktop-based computer typically uses the same dialog. Often, an individual application adds certain special features to the common dialog, and printers, too, add certain options. However, the dialog basically remains the same. In the NeXTSTEP operating system (which became OPENSTEP, then Rhapsody, and then Mac OS X), built-in printing supported printing to a printer as well as faxing through a connected fax modem. This heritage of being able to print through a fax modem—that is, being able to print to a printer that is not physically connected directly to the computer—has been important in the development of iOS printing. There are three ways of printing with FileMaker Go (and many other apps). The first way is to generate a PDF file that can be sent via email, and the second is to use the printing features that have been built into iOS since version 4.2. (In fact, deep down beneath the user interface, the two methods are actually very much the same.) The third way is the FileMaker-specific method described in Chapter 10.

Just as is the case with desktop-based computers, printing is supported and implemented in the operating system, but it is up to individual applications to enable printing of their documents and data. With FileMaker, printing is one of the security settings that you can control with FileMaker Pro using the Manage, Security dialogs.



# How to Print with a PDF File

FileMaker Go provides an example of printing through a PDF file:

- 1. You start by navigating to the data that you want to print.
- 2. Tap the wrench in the upper right of the screen to open the menu of commands, as shown in Figure 4.15.

#### Figure 4.15

Tap to show the menu of commands.

ioner Jesse Feiler			
cator: 32 MacDonough	Menu	Done	
Task: Repair	Current Window		
uency Once	Layout	Front >	
hoture:	View As	Form List Table	
	Show Toolbar	ON	
	Refresh Window		
	Print	>	
	Save / Send	>	
	Perform Script	>	
	۶ Settings	>	
withe:	🚱 Help		

**3.** Tap Print to show the options you see in Figure 4.16. This enables you to choose the page range, orientation, and so forth as shown in Figure 4.16.

#### Figure 4.16

Select your printing options.

cator: 32 MacDonough	New Print S	etup	Print
Task: Repair Price \$45.00 / Each	Record Range	Current Record	
uency: Once	Number Pages From	1	
	Page Range	All Pages	
	Paper Size	US Letter	
	Orientation		
	Scale	100% 3	
	PDF	3	
ware:			

4. Tap PDF to select the final options as shown in Figure 4.17. As you can see, there are three basic choices for saving and sending; not all of them are available in all cases. Your choices might be limited by security (not all users can print, for example), or they might be limited by the current selection (you can only save or send field contents if you have selected a field...and if your security level allows you to do so).

Figure 4.17	6	Estimator (JF FileMaker Server)	0
Select your PDF options.	Customer: Jesse Feiler Location: 32 MacDonough	PDF	
	Task: Repair Price \$45.00 / Each	View	
	Picture:	Email	
		Save	
	Signature:		
			0
	Forl	Texcend 3 of 3	*2 15

As you see in Figure 4.17, you have three choices:

• You can view it on your device. If you choose this option, you can then choose further actions, as shown in Figure 4.16, so that you can open the file in iBooks or another app that handles PDF files (the choices depend on the apps you have installed), you can select from your apps, or you can print it as described in the following section (see Figure 4.17).

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- You can email the PDF. If you have a printer that supports web printing, you can email the document to your printer. Web printing is supported on various printers that are connected directly to the Internet and that, therefore, can have their own email address. (The HP ePrint feature is a web printing feature.) You can use the email option shown in Figure 4.16 to send the PDF directly to a printer if it is configured properly and supports web printing.
- You can save it. If you choose to save the PDF, it is saved to your device, and you are able to view it or download it in the FileMaker Go section of iTunes, as described previously in this chapter in the "Using iTunes" section.

# How to Print to a Printer for FileMaker Web Publishing

Beginning with iOS 4.2, Apple introduced its AirPrint feature that builds on the web printing and PDF emailing features described in the previous section. There is a subtle difference between AirPrint and the web printing technology described in the previous section. Web printing (such as HP's ePrint) sends print jobs to addressable printers over the Internet using email. AirPrint locates printers on the local area network where your computer or mobile device is located, and it sends the print job to the local printer. To print to a printer that is not on your local area network, use web printing and send the print job (a PDF file in most cases) via email.

This technique works with any app that supports printing. If you are using FileMaker's web publishing tools as described in Part IV, this is how you (or your users) can print out the results using Safari on iPad.

Here is how to print using AirPrint:

- 1. Go to the data you want to print. Various apps on iPhone and iPad support AirPrint (Safari is one of them).
- 2. Printing is provided in the Actions menu (the box with the arrow coming out of the top). It is located to the left of the address field in the toolbar on iPad; on iPhone, it is located at the center of the bottom toolbar. Figure 4.18 shows both interfaces.



#### Figure 4.18 Print from Safari on iPad.

- 3. Tap Print.
- 4. Choose the printer and the number of copies that you want, as shown in Figure 4.19. That is all you need to do.

Printer Options Printer Select Printer ) ist Frei   Prev   Record 5-2d 2   Nev   Last Record List Printer   Beard Meetrog 2   Beard Meetrog	Set up the print options		10.0.1.8/fmi-test	phpsa/Reservatio	Record List ns/recordlist.php?-maxe4	258-ski 🖒	Google		
Printer Select Printer ) I Copy	t up the plint options.	Prin	nter Options						
ASC Print Print Record 12.0/2 Next + Last Record List Field At Summary Report Record List Add Record _ Field _ Record List _ Field At _ Summary Report _		Printer	Select Printer >						
First     Print       Print     Print       Print     Print       Print     Bard Mering       Print     Bard Mering       Print     Executive Constitue       Summary Report		1 Copy	- +	List					
Print al SortOrder Name Location Date Time * Record List <u>1</u> Board Meeting * Find All * Summary Report * Record List Find All Summary Report				-	First   Prev	Record 1 - 2 of	2   Next	Last	
Record List			Print	nal Sort Order	Name	Location	2 of 2   Nect   Last a Data Zena		
Find All     Z     Executive Committee      Summary Report      Reservations: Add Record: Find: Record List: Find All: Summary Report		<ul> <li>Record List</li> </ul>		1	Board Meeting				
Summary Report      Reservations: Add Record: Find: Record List: Find All: Summary Report:		# Find All		2	Executive Committee				
Reservations   Add Record   Find   Record List   Find All   Summary Report							2 Next Last		
Reservations Add Record Find Record List Find All Summary Report									
			Reservatio	ns Add Record	Find Record List Find	All Summary	Report		
		4							_

**4.** If you want to manage the print queue (for example, cancel a job or change the order in which jobs print), you can use Print Center. Double-tap the Home button to open the multitasking control at the bottom of the screen, as shown in Figure 4.20. Find Print Center at the left. (It only appears when a job is printing.) A badge on the Print Center shows you the number of jobs in the queue.



5. If there is more than one print job in the queue, tap Print Center to see a list of the current jobs, as shown in Figure 4.21. You can reorder the jobs in this list just by touching and holding a job and moving it up or down.

#### Figure 4.20

Use the Print Center.



**6.** Tap a job to get its details, as shown previously in Figure 4.20. As you can see, this is where you can remove a job before it has printed (this is useful if you know that you have made a mistake and you do not want to waste paper and ink).

# **Further Steps**

Perhaps more than any other topic, printing from a mobile device gets to the heart of how mobile devices differ from desktop-based computers. If you use a desktop-based computer, look around at the cables; they are everywhere. Most long-time computer users have a carton of old cables stashed away somewhere. Cables are not cheap, and users often keep old cables around so that they have them on hand in case they need another one. When the need arises, you search out the carton, and upend its contents to find the FireWire cable, the USB cable, the serial cable, or whatever. (Of course, in that entire carton, you have every type of cable except the one you need.)

With the advent of efficient and relatively inexpensive cordless connectivity, you can toss out those cables. Along with those cables, you can toss out the dust and dirt that always accumulate in that rat's nest of cables behind or under your desk. What people are relying on today is the ability of devices such as computers and printers to communicate directly over the Internet. When you can send a print job via email to your printer (or to a colleague's printer halfway around the world), cables do not matter that much any more. (Of course, things such as security do matter so that you do not receive junk print jobs from halfway around the world.)

This standardization on Internet communication protocols is a large part of what has made mobile devices possible. It takes some getting used to the idea of connecting a printer to a computer through the Internet, particularly when the devices are sitting right next to one another, but the gains in productivity can be tremendous.

Along with the standardization on Internet communication protocols, the world is moving more and more toward the use of cloud computing and data storage that, like your printer, might be located a continent away. You can use mobile devices the way you have always used computers, but experiment with the new technologies to see what you can do.

As you experiment with these technologies, you will come to see why some of the initial complaints about mobile devices such as iPhone and iPad are irrelevant. The clamor for USB ports, serial ports, and special connectors ignored the movement toward these standard protocols.

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