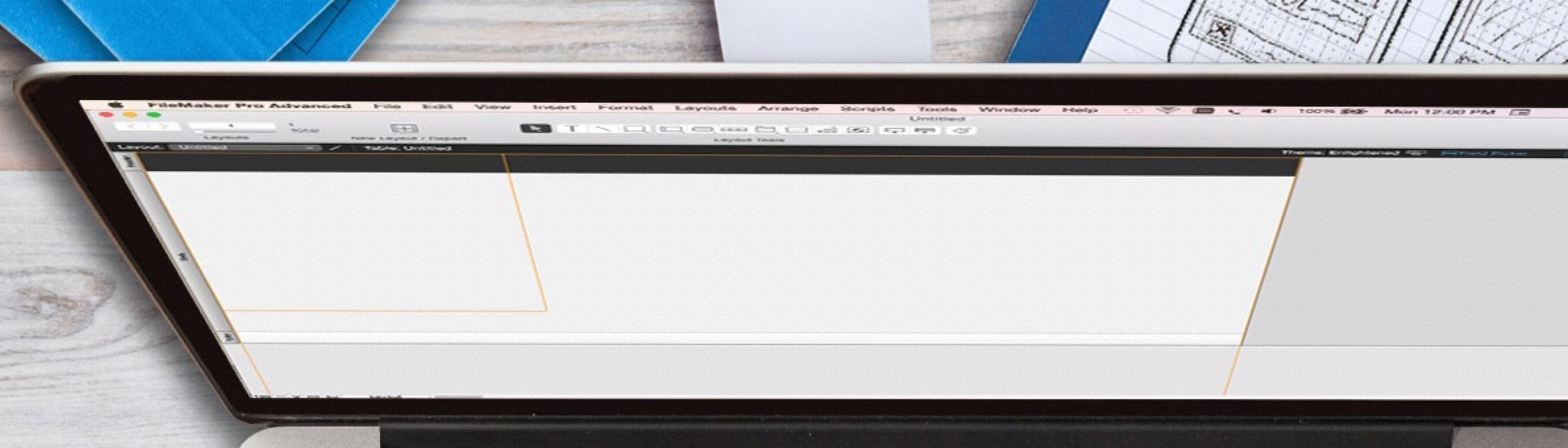


Create

Your step-by-step guide to successfully
create an app with FileMaker



FileMaker[®]
An Apple Subsidiary

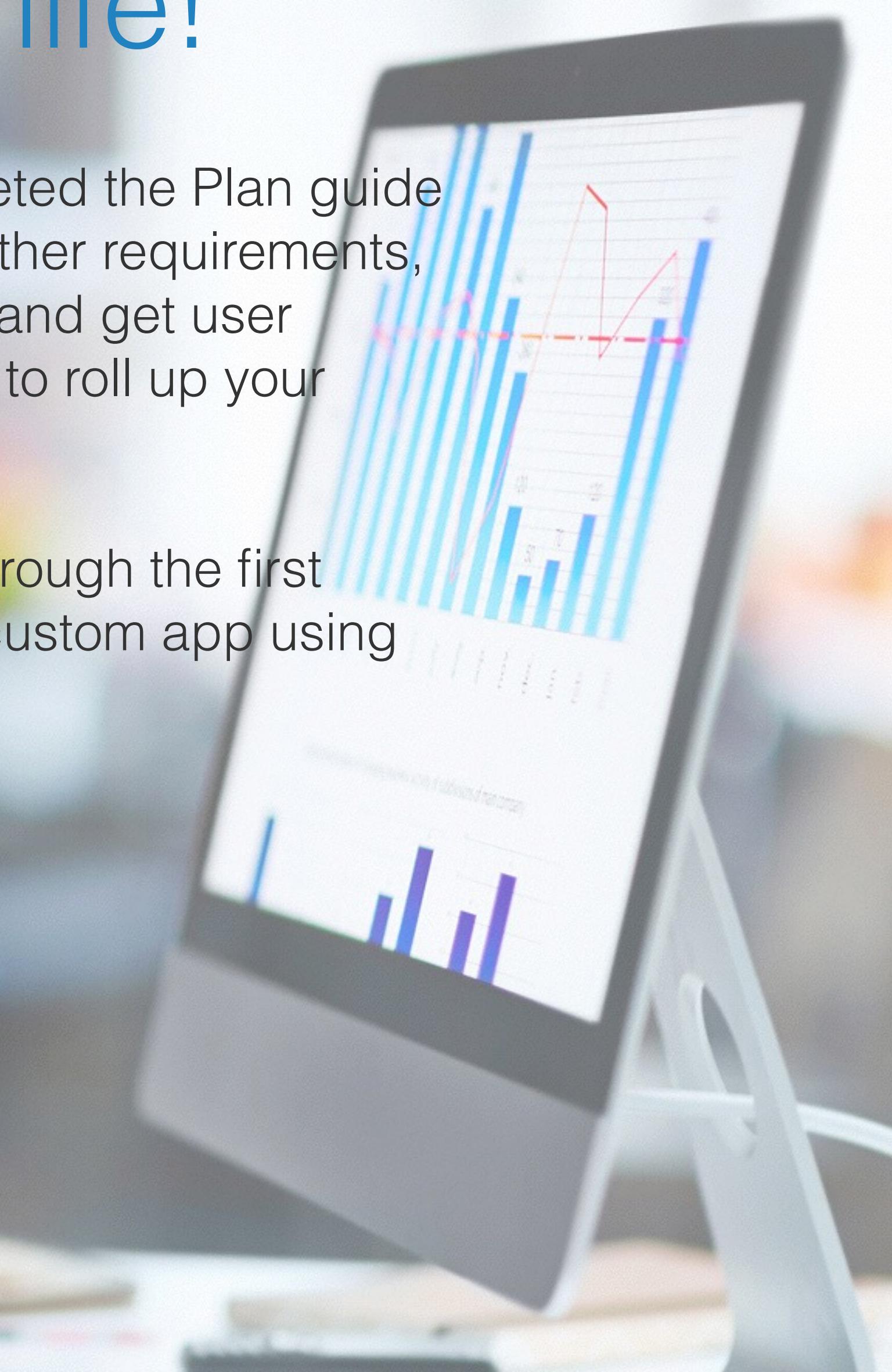




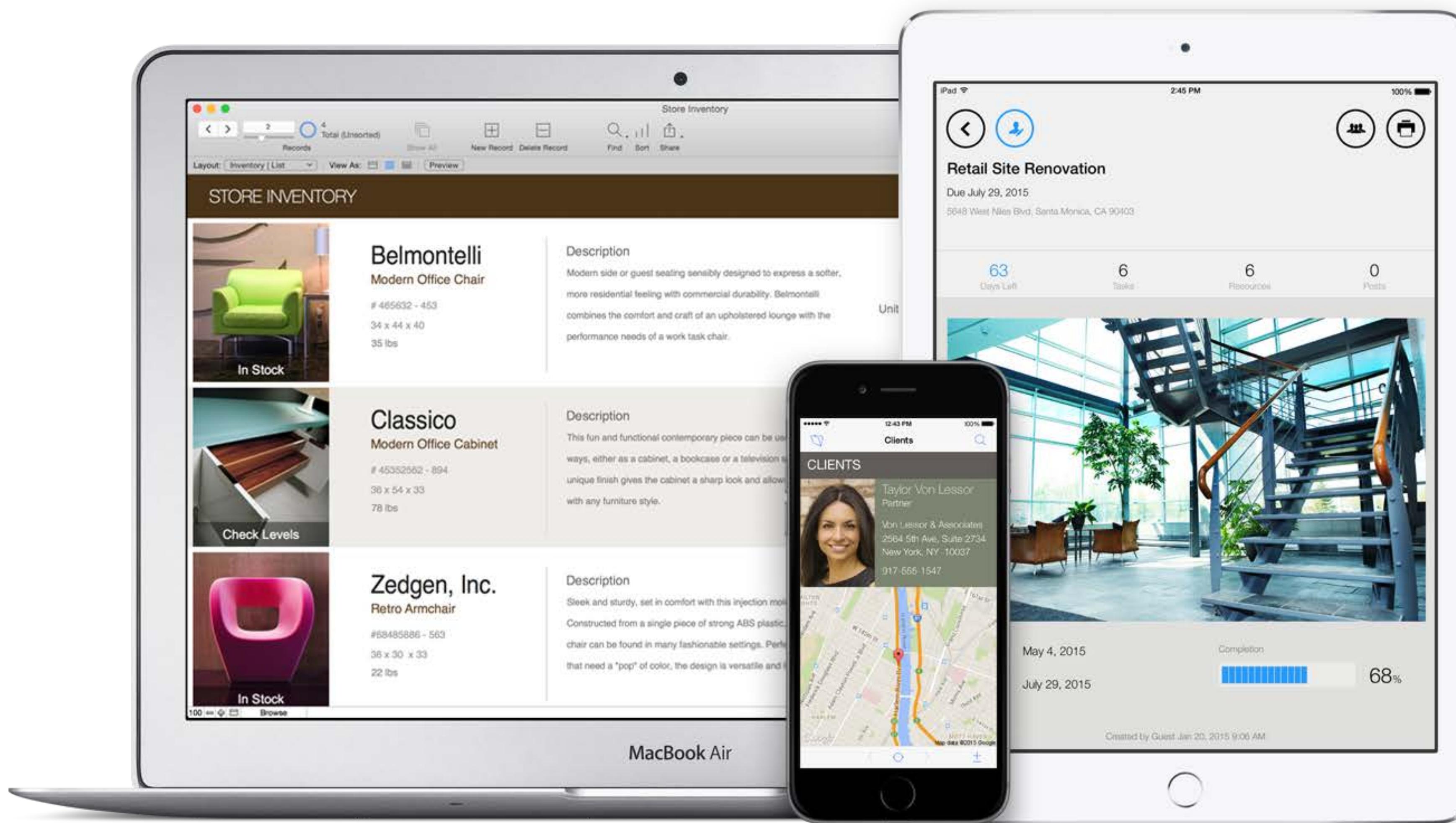
Bring it to life!

Now that you've completed the Plan guide and have learned to gather requirements, prototype your design, and get user feedback, you're ready to roll up your sleeves.

This guide walks you through the first steps of creating your custom app using the FileMaker Platform.



Build the perfect custom apps to connect your team to your business.



Start building your custom app using the FileMaker Platform!

This is the second part of a three-part guide which covers the steps for building a custom app using the FileMaker Platform.

Learn the essential components of FileMaker and then begin to make your idea a reality.

In this guide

<u>The steps to building a custom app</u>	5
<u>Learn about databases</u>	8
<u>Design data model</u>	15
<u>Design user interface</u>	18
<u>Import data</u>	23
<u>Integrate other data sources</u>	27
<u>Create business logic and design workflow</u>	30
<u>Set up security</u>	42
<u>Test your app</u>	48
<u>Appendix A</u>	50

The steps to building a custom app

Building a custom app starts with three principles.

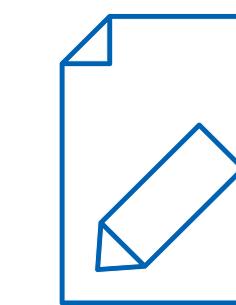
Plan

Create

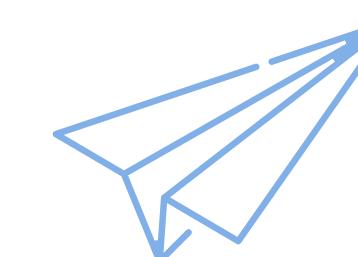
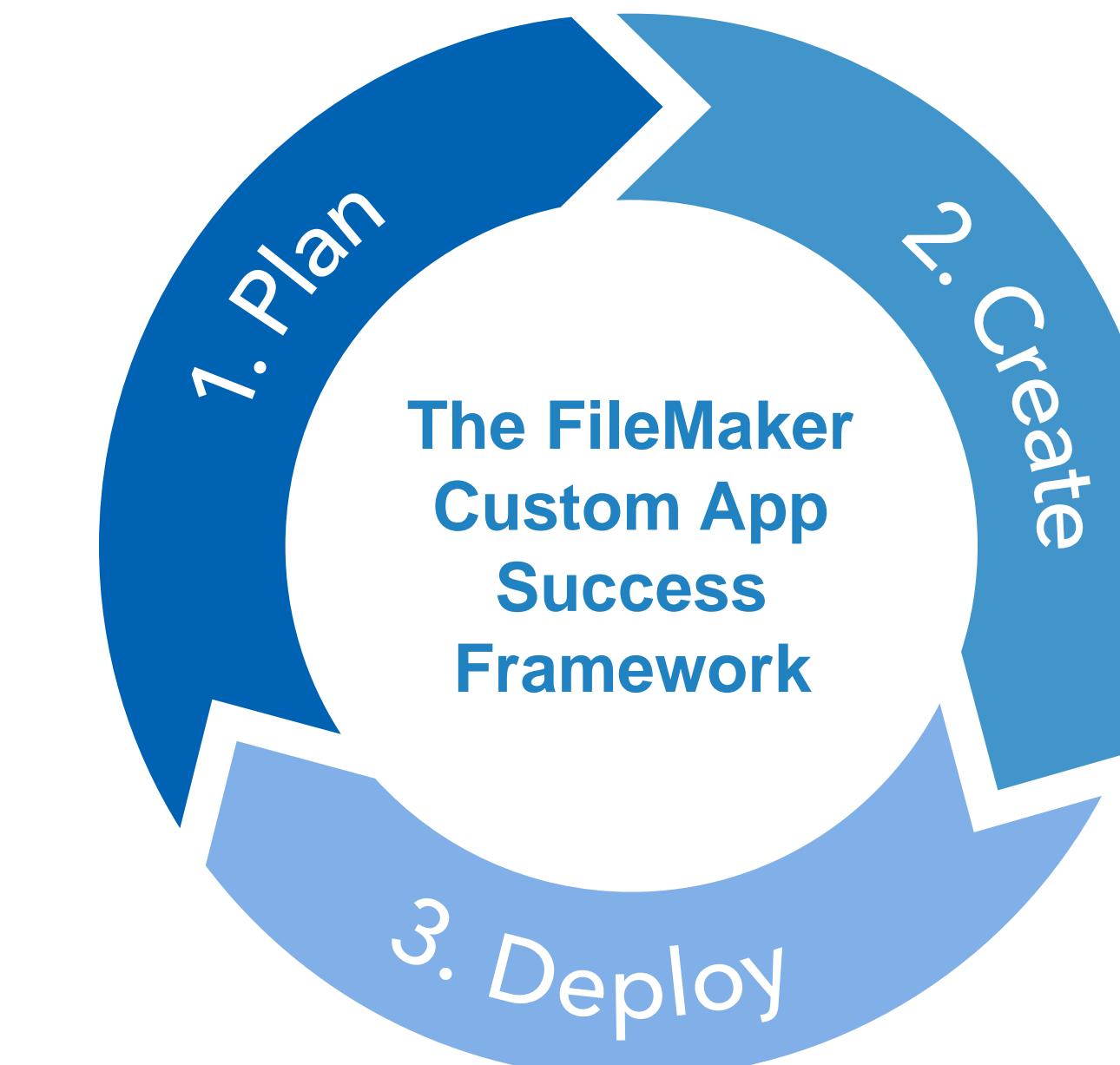
Deploy

These principles, illustrated in three separate guides, lead you through the process of creating a custom app that transforms the way you do business.

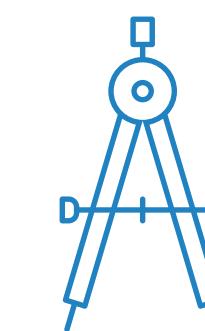
Three principles help you build a custom app.



Explore what you can do with custom apps. Start with *Plan*.



Put your custom app into action. Learn how to roll it out to users with *Deploy*.



Develop your custom app with *Create*, a step-by-step guide to working with the FileMaker Platform.

Assumptions

Make sure you have the most recent version of FileMaker Pro or FileMaker Pro Advanced on your desktop.

If you don't, consider:

Contact Sales: (800) 725-2747 or

Download a Free Trial: www.filemaker.com/trial



FileMaker Pro



**FileMaker Pro
Advanced**

Note: this guide makes references to the user scenario of “Jennifer” outlined in the *Plan Guide*. Please refer to the Plan Guide for more details about this scenario.

FileMaker Platform: A custom app platform

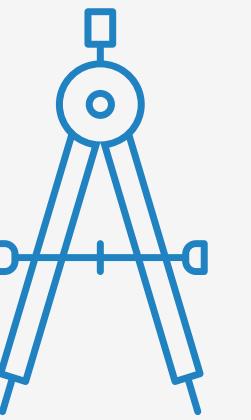
FileMaker is a rapid application development tool.

It has a drag-and-drop graphical user interface to make it easy to build apps.

It has a scripting language for automation.

It has at its core a database providing the structure to store and retrieve a variety of data.

Learn about databases



-
- The steps to building a custom app
 - **[Learn about databases](#)**
 - Design data model
 - Design user interface
 - Import data
 - Integrate other data sources
 - Create business logic and design workflow
 - Set up security
 - Test your app
 - Appendix A

A circular diagram on the right side of the slide. It has a large grey outer ring and a smaller white inner circle. A blue arrow points from the text "2. Learn" on the left towards the center. Another blue arrow points from the center towards the text "2. Create" on the right. The text "2. Create" is written in white on the blue arrow.

2. Create

Foundations

What does a relational database do for you?

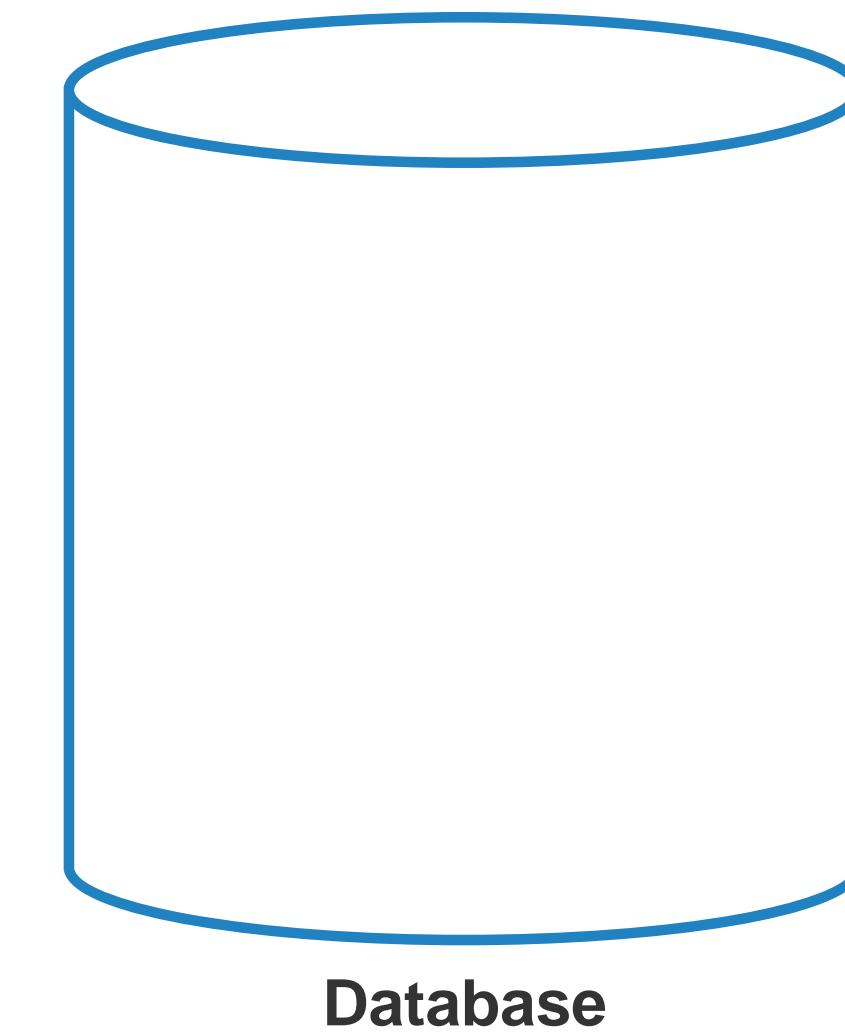
Relational databases are used to manage large amounts of information effortlessly.

Why does this matter to you?

With a single point of entry, you can create or retrieve data while keeping duplication at a minimum.

For example, consider a company with multiple contacts who share the same work address. One work address is shared for contact A, B, and C. If the address needs to change, it only needs to change once for all contacts.

People use relational databases to manage inventories, maintain a list of student grades, track people or assets, and much more.



Organizing your data

The first step in data modeling is looking at your data and figuring out how you're going to organize it. What are the groups of things that you're trying to describe? These are called entities.

Entities describe generic groups or classes of things that are distinct from one another.

You describe each entity using *attributes*, which provide specific and individual information about an entity.

Examples of entities



Entity
Employees

Attributes
company, department, name, address, etc.



Entity
Cars

Attributes
manufacturer, model, year, color, etc.

Relational database structure: Tables, records, and fields

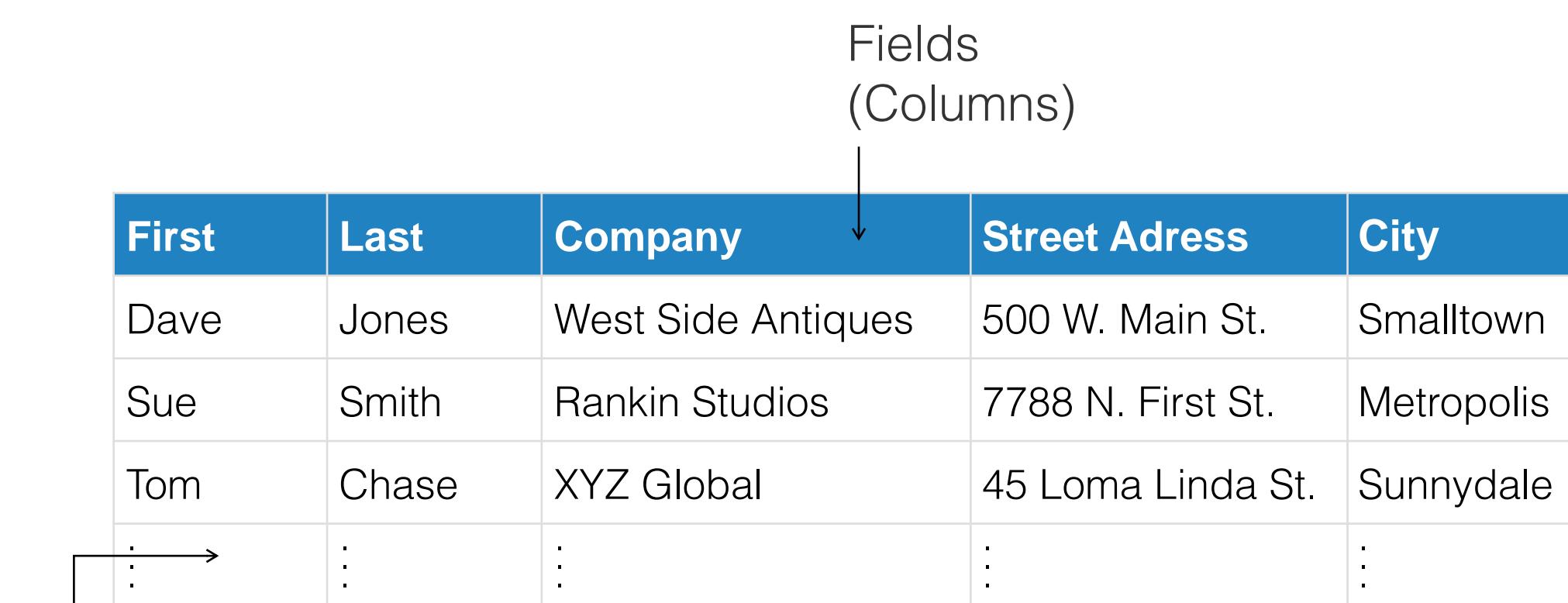
In database terminology, the entities are represented by tables. The individual items in the table are records, and the entities' characteristics or attributes are fields. Together, the tables, records and fields are part of what makes up the database schema.

As you create the schema for your app, the structure of your relational database is modeling the real-world problems you are trying to solve. Relational database tables work together to ensure that the correct data is available when you need it.

Here, we show Jennifer's customer table. The example shown is much like a spreadsheet. Each customer is a record (row), and each customer's attribute such as name, company, address, etc. is a field (column).

When entering data in a database, think about how to break up the data into its most basic components, so that you maximize your search capabilities. For example, when entering a person's name into a database, define the first name and last name as two different fields. Likewise, for a person's postal address, break it up into components such as street address, city, state, etc., as shown in the example.

Customer Table



A diagram illustrating a relational database table structure. On the left, the table is labeled "Customer Table". To the right, an arrow points down from the label to the table, labeled "Fields (Columns)". Another arrow points right from the table to a vertical ellipsis, labeled "Records (Rows)". The table itself has a blue header row with columns labeled "First", "Last", "Company", "Street Adress", and "City". Below the header, there are four data rows: 1. Dave Jones West Side Antiques 500 W. Main St. Smalltown 2. Sue Smith Rankin Studios 7788 N. First St. Metropolis 3. Tom Chase XYZ Global 45 Loma Linda St. Sunnydale 4. (Ellipsis) (Ellipsis) (Ellipsis) (Ellipsis) (Ellipsis)

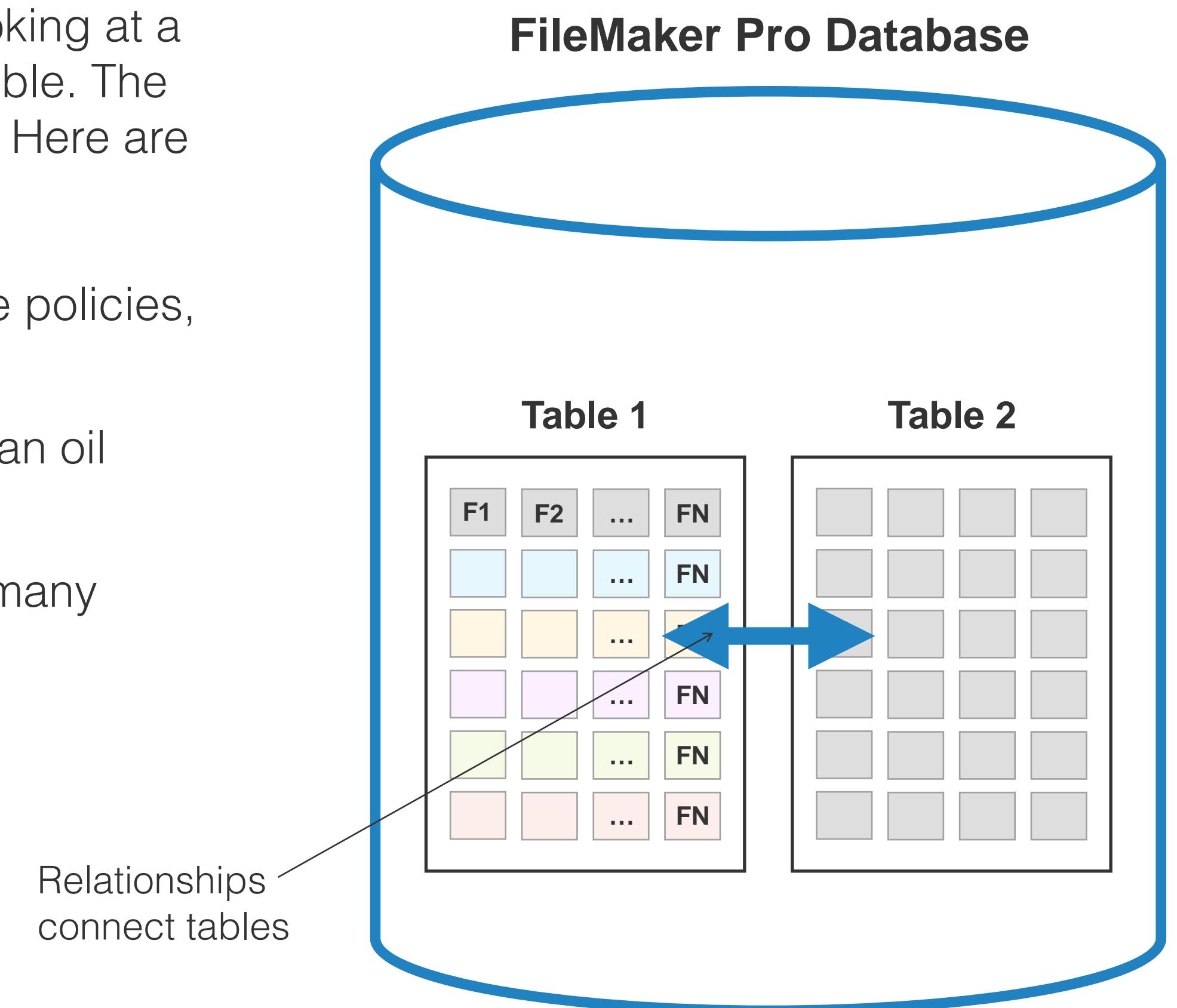
First	Last	Company	Street Adress	City
Dave	Jones	West Side Antiques	500 W. Main St.	Smalltown
Sue	Smith	Rankin Studios	7788 N. First St.	Metropolis
Tom	Chase	XYZ Global	45 Loma Linda St.	Sunnydale
:	:	:	:	:

Relationships

Relationships connect data stored in different tables, so that when you are looking at a record in one table, you also have access to the connected data in another table. The connection is accomplished by matching information between the two tables. Here are some examples:

- A person and his/her insurance policies. A person can have many insurance policies, and each insurance policy belongs to only one person.
- A car and its oil changes. A car may have many oil changes over time, and an oil change is performed on one car.
- A department at a company and its employees. The department may have many employees, and each employee belongs to one department.

Next slide, we'll dig a little deeper into how these connections are made.



Relationships

When setting up a relationship, we match pairs of fields between the two tables in order to connect them. These fields are called “keys” because their values must match for the relationship to make a connection. The fields must be unique, for example an ID field that represents a unique record. In the example below, the

Car ID column in the car table is the primary key, while the Car ID column in the service table is the foreign key. By matching these two fields, each car in the car table is related to one or more service jobs in the service table, and each service job in the service table is related to only one car.

Primary Key
A primary key is a field whose values are guaranteed to be non-empty, unchanging, and unique for the first table in your relationship.

Car Table				
Owner	Make	Model	Year	Car ID
Joseph	Toyota	Prius	2014	35672897
Mary	Ford	Explorer	2009	87390286
Dan	Honda	Accord	2005	54289318
:	:	:	:	:

Car ID	Service Date	Type of Service	Technician ID	Hours Worked	Job ID
35672897	2/5/14	Oil Change	1	3	123
35672897	5/20/14	Tuneup	3	4	456
35672897	8/3/14	Brake Job	5	2	789
87390286	3/30/14	10K Service	1	3	257
87390286	9/17/14	Smog Check	2	4	942
87390286	4/23/15	Oil Change	4	2	715
54289318	6/18/14	Oil Change	2	4	142
54289318	1/8/15	Oil Change	3	5	736
:	:	:	:	:	:

Foreign Key
A foreign key is a field in the second table. Its values are populated so that they match to values in the primary key. It's called "foreign" because its value originates in another table.

Relationships

Now let's look at our example with Jennifer. It has a similar structure to the preceding examples:

- Each customer may have many assets
- Each asset is associated with only one customer

Defining relationships between tables sets up a powerful foundation for future logic and reporting. When you create tables and create relationships between them, you apply data modeling concepts. Review your User Scenarios and Requirements documents to think about the relationships you will need to create. How is your data connected?

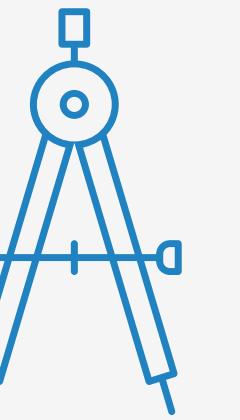
Customer Table

First	Last	Company	Street	Customer ID
Dave	Jones	West Side Antiques	500 W. Main St.	103
Sue	Smith	Rankin Studios	7788 N. First St.	110
Tom	Chase	XYZ Global	45 Loma Linda St.	109
John	White	Iris Designs	392 Oak St.	102
:	:	:	:	:

Asset Table

Customer ID	Category	Item	Serial Number	Cost
103	Telephone	VOIP	779182737S	75
103	Computers	15"	BN299765G	1000
110	Appliances	Espresso	2267155789A	100
110	Office	Desk	5582939281G	50
110	Cameras	Digital	1X2U9H28JS	300
110	Computers	Desktop	ZA9982938829	1200
109	Office	Desk	5575372783E	50
109	Computers	Desktop	ZA9962536488	1200
:	:	:	:	:

Design data model

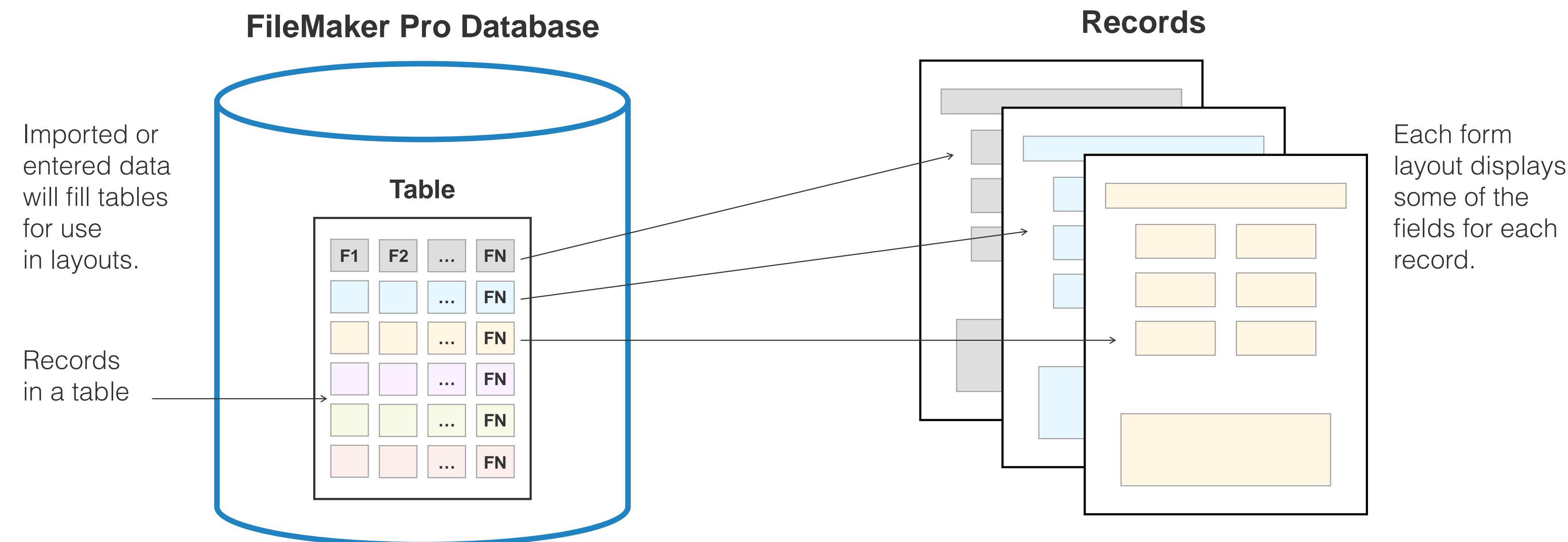


-
- The steps to building a custom app
 - Learn about databases
 - Design data model**
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 - Appendix A

2. Create

Layouts

Layouts are the building blocks of the user interface, allowing the user to view and interact with the data. The data may be displayed as a form, where only one record shown at a time, or as a list or table, where multiple records are shown at once. In the illustration below, the data is being displayed as a form. As the user moves from record to record, the data displayed on the form changes.



Layouts

Layouts can be viewed in three different ways. Table View displays one or more records at a time, similar to a spreadsheet. List View displays one or more records as a list. It provides more formatting options than Table View. Form View displays one record at a time and provides the same formatting options as List View.

Layout views from Jennifer's customer table

Table View

First	Last	Company	Street	...
Dave	Jones	West Side Antiques	500 W. Main St.	...
Sue	Smith	Rankin Studios	7788 N. First St.	...
Tom	Chase	XYZ Global	45 Loma Linda St.	...
...
John	White	Iris Designs	392 Oak St.	...

Displays one or more records at a time in a spreadsheet like view.

List View

Dave	Jones	West Side Antiques	500 W. Main St.	...
Sue	Smith	Rankin Studios	7788 N. First St.	...
Tom	Chase	XYZ Global	45 Loma Linda St.	...
...
John	White	Iris Designs	392 Oak St.	...

Displays one or more records as a list.

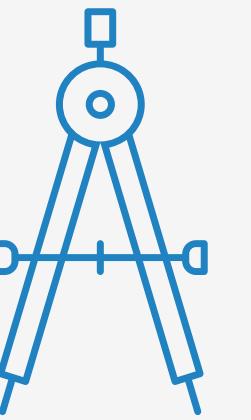
Form View

Dave Jones	
500 W. Main St.	
Paso Robles, CA	800-555-1268
Owner	
West Side Antiques	

Displays one record at a time.



Design user interface



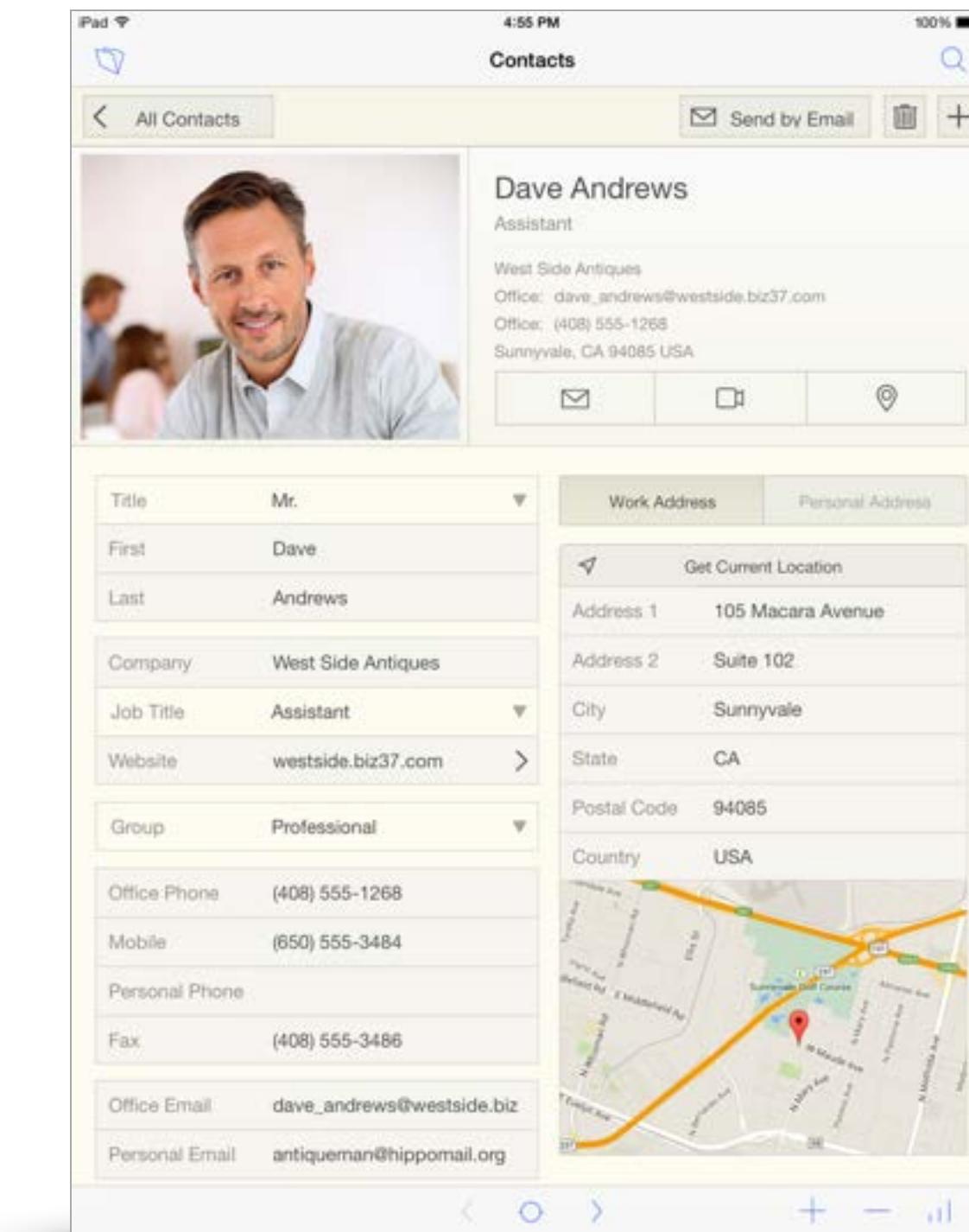
-
- The steps to building a custom app
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A large blue arrow pointing to the right, containing the text "2. Create".

Design user interface

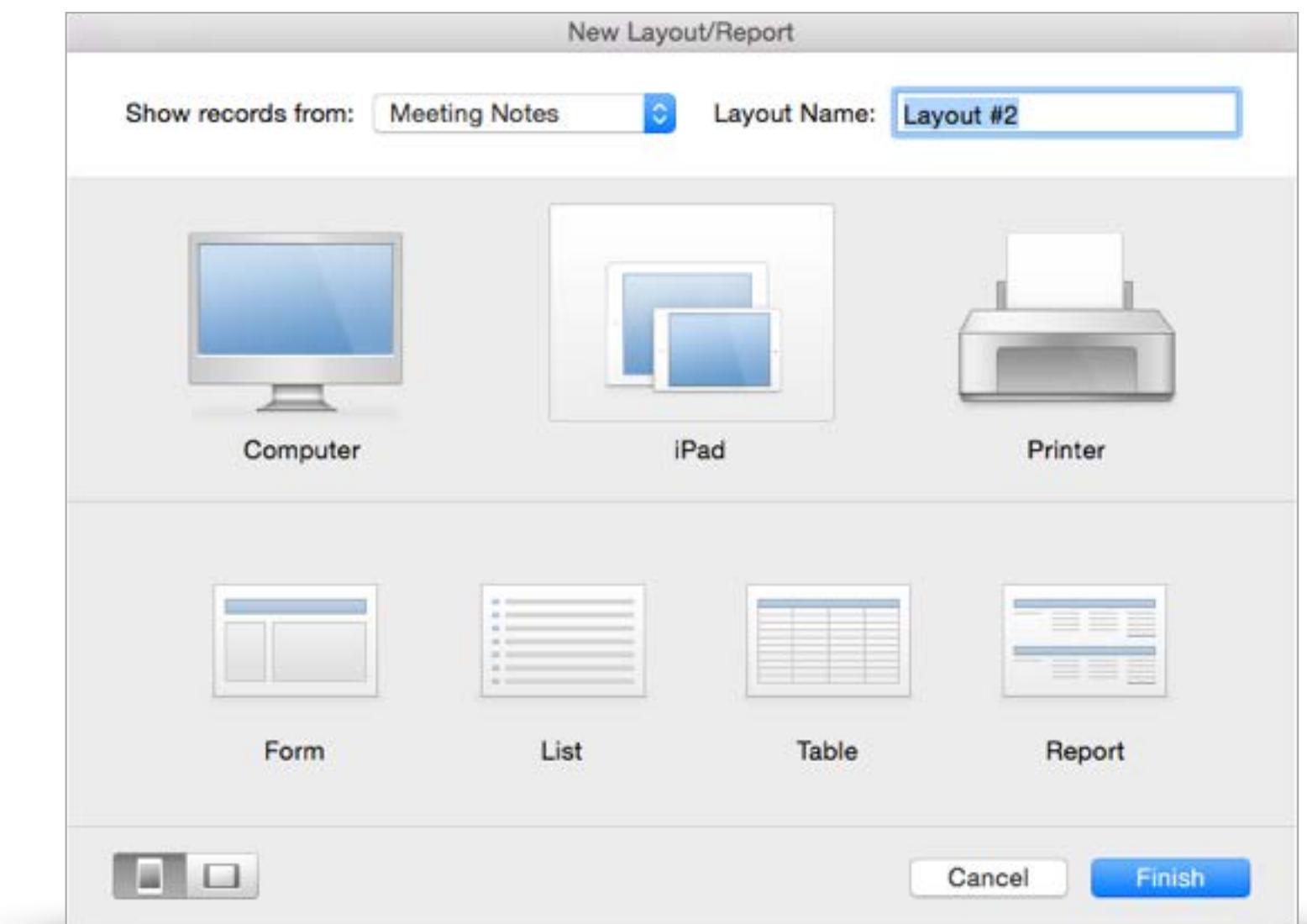
Designing a user interface is an iterative process. You'll start by thinking about the users and the activities they are trying to accomplish. Are they performing data entry? Looking up information? Taking action based on specific data?

The user requirements gathered in the ‘Plan’ step of this framework will help you decide how the user interface needs to look, and what the business rules are to connect your data.



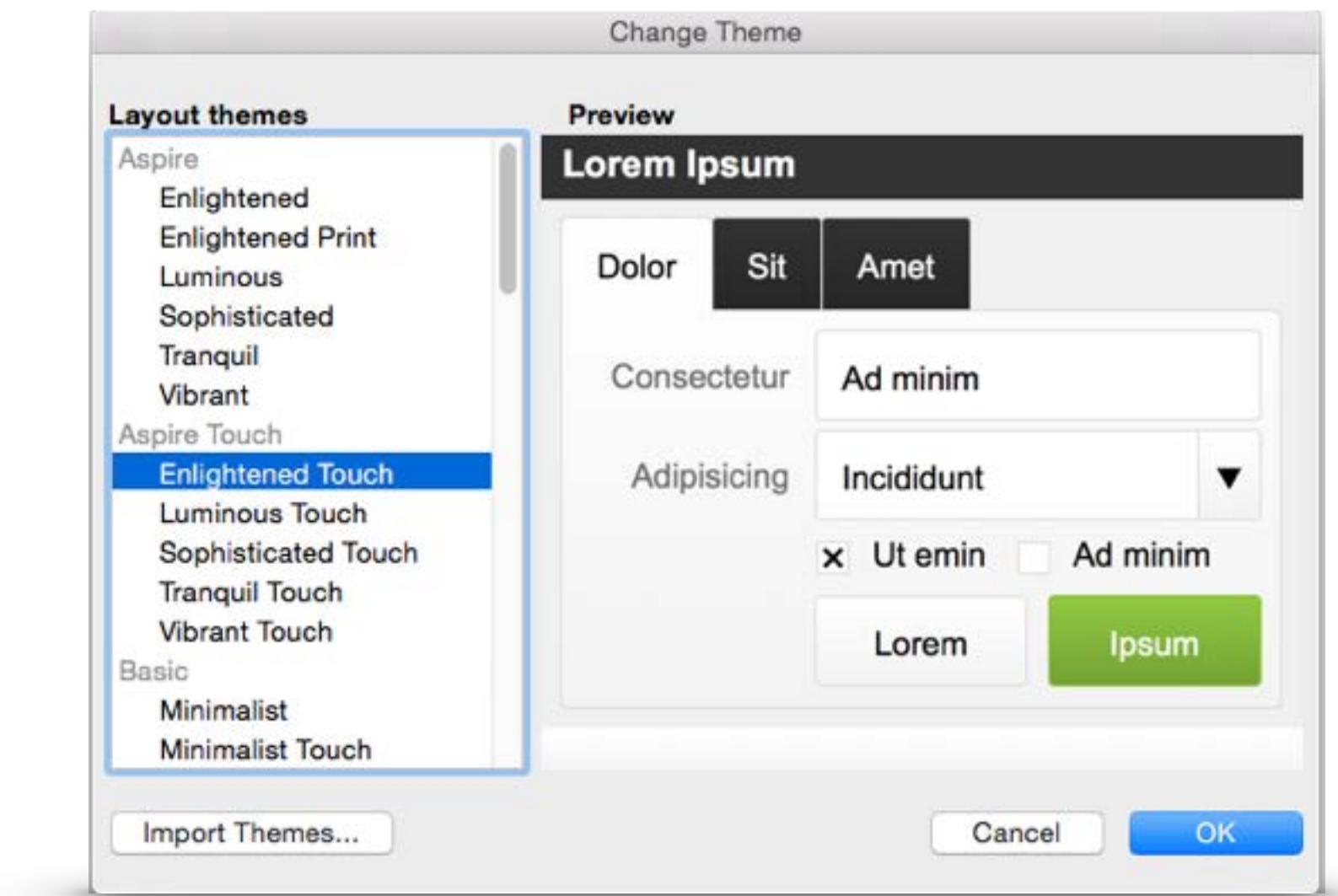
Layout Assistance

When you create a layout, FileMaker helps you choose a layout template appropriate for the device where the layout will be viewed. There are templates for computers (desktops and laptops), iOS devices, and printers. Most Starter Solutions include layouts for mobile devices as well.



Themes

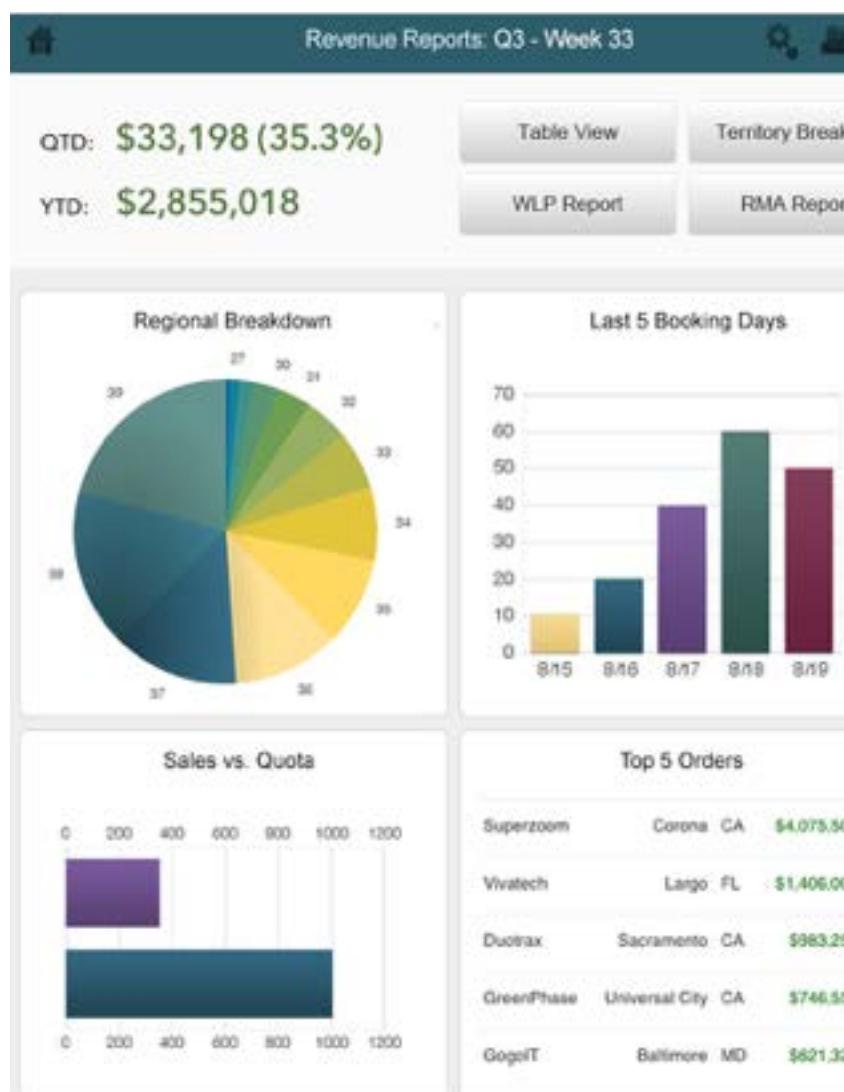
Another great feature FileMaker offers is the ability to choose themes for your layouts. Themes help create a visually attractive user interface by providing consistent styles for buttons, fields, background and other objects on a layout. They apply pre-defined fonts, sizes, colors, and other styling to your layout to give the user interface a professional and attractive look and feel.



Reports

You may want to see data in other formats such as a dashboard or a report. See Appendix A for more layout details.

Dashboard



Dashboards use the charting tool and global fields to summarize the data.

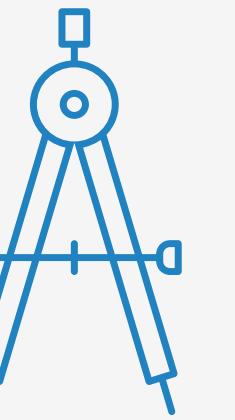
Report

Sales Report By Year and Month			
	Invoices	Invoice Summary Total	Average Invoice
Year of Sale	2006	29	\$354.45
December	2006	2	\$239.00
November	2006	1	\$650.00
September	2006	2	\$209.95
August	2006	2	\$78.90
July	2006	1	\$18.95
June	2006	4	\$7,653.95
May	2006	1	\$0.00
April	2006	4	\$554.85
March	2006	8	\$798.75
February	2006	2	\$34.90
January	2006	2	\$39.90
Year of Sale	2005	252	\$71.49
December	2005	4	\$103.75
November	2005	2	\$154.95
October	2005	3	\$107.80
September	2005	6	\$193.45
August	2005	4	\$76.80
July	2005	6	\$128.65
June	2005	10	\$554.70
May	2005	13	\$5,884.35
April	2005	65	\$6,188.40
March	2005	57	\$1,676.00
February	2005	31	\$890.00
January	2005	51	\$1,986.20

Reports display data in categories, use summary fields and present data at different levels of a hierarchy.

Import data

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2. Create

Choose a way to start

There are three ways to get started:

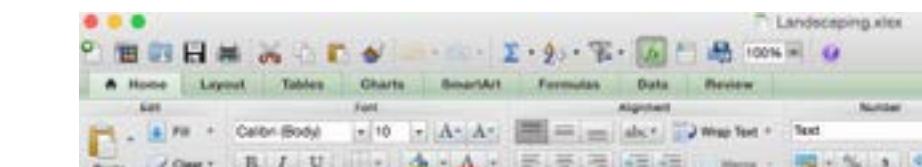
FileMaker Pro or Pro Advanced

Use an example



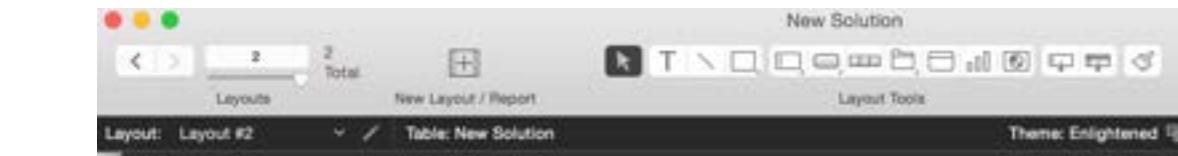
FileMaker Pro provides
Starter Solutions.

Import your data



#	Address	Name	Email	Phone	City
1	1 Magnolia Spring Center	Arthur Phillips	aphillips@magnoliaspringcenter.com	(408) 555-5289	900 Hyde St
2	2 Magnolia Spring Center	Maria Shroeder	mshroeder@magnoliaspringcenter.com	(408) 555-4050	300 Hospital Dr
3	3 Magnolia Spring Center	Carla Nichols	cnichols@magnoliaspringcenter.com	(408) 555-8210	700 Lawrence Expressway
4	4 Pine Executive Station	John Williams	jwilliams@pineexecutivestation.com	(408) 555-2100	Santa Clara
5	5 Oilmum Industrial Station	Patricia Lewis	plewis@oilmuindustrialstation.com	(408) 555-1234	1000 1st Street
6	6 Oak Stream Park	James Miller	jmillier@oakstreampark.com	(408) 555-6789	1200 2nd Avenue
7	7 Oak Stream Park	Megan White	mwhite@oakstreampark.com	(510) 555-6100	South San Francisco
8	8 Oak Stream Park	Robert Webb	rwebb@oakstreampark.com	(510) 555-7892	70 Washington Street
9	9 Elm Greens Park	Annette Benson	abenson@elmgreenspark.com	(704) 555-2390	Oakland
10	10 Elm Greens Park	Bobby Hayes	bhayes@elmgreenspark.com	(403) 555-1230	1800 East Lambert Road
11	11 Elm Greens Park	Donald Hayes	dhayes@elmgreenspark.com	(403) 555-1240	One Elm Street
12	12 Elm Greens Park	Linda Francis	lfrancis@elmgreenspark.com	(909) 555-4420	2000 Fairmount Ave
13	13 Elm Greens Park	Richard Olsen	riolsen@elmgreenspark.com	(909) 555-4782	4950-A Palo Verde Street
14	14 Elm Greens Park	Shawn Miller	smler@elmgreenspark.com	(313) 555-5827	1810-B West Sunburst Boulevard
15	15 Elm Greens Park	Leanne Johnson	ljohnson@elmgreenspark.com	(313) 555-8720	3000 Buchanan Street
16	16 Oak Stream Park	Jeffrey Johnson	jjohnson@oakstreampark.com	(313) 555-9120	500 1st Street
17	17 Cedar Creek Interactive Park	Betty Valdez	bvaldez@cedarcreekinteractivepark.com	(313) 555-4720	312 North Spring Street
18	18 Cedar Creek Interactive Park	Cynthia Butler	cbutler@cedarcreekinteractivepark.com	(602) 555-4270	11231 East Telegraph Road
19	19 Cedar Creek Interactive Park	Stephanie Morris	srmorris@cedarcreekinteractivepark.com	(602) 555-2926	Santa Fe Springs
20	20 Cedar Creek Interactive Park	Mike Morris	mmorris@cedarcreekinteractivepark.com	(602) 555-2927	1431 S Main St
21	21 Green Meadows Park	Audrey Soto	asoto@greenmeadowsparke.com	(702) 555-4217	West Las Vegas
22	22 Green Meadows Park	Philip O'Brien	pobrien@greenmeadowsparke.com	(403) 555-0886	11111 Santa Monica Boulevard
23	23 Green Meadows Park	Phyllis Hall	phall@greenmeadowsparke.com	(403) 555-0886	375 Llaguna Honda Blvd
24	24 Franklin Science Park	Kathleen Morris	kmmorris@franklinsciencepark.com	(510) 555-6340	280 W Main Arthur Blvd

Start from scratch



Header	Body	Footer

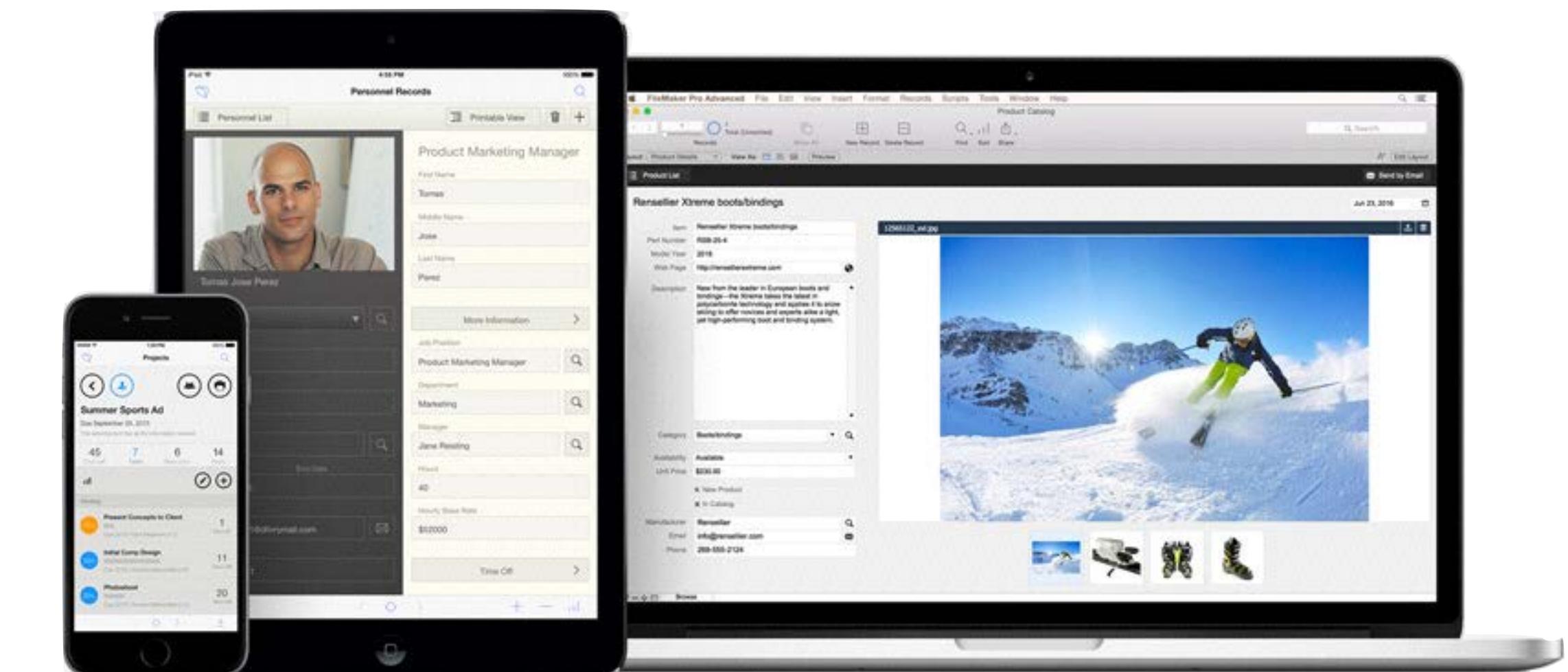
If you know how your interface
needs to look, start here.



Starter Solutions

Start from a FileMaker Starter Solution available in the File Menu.

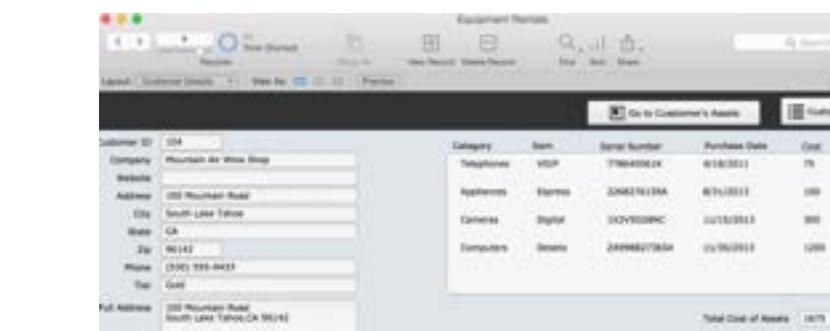
- Projects
- Event Management
- Contacts
- Assets
- Content Management
- Invoices
- Inventory
- Tasks
- Estimates
- Resource Scheduling
- Meetings
- Expense Reports
- Product Catalog
- Personnel Records
- Time Billings
- Research Notes



Import data

When you import data, you are bringing data from another source (usually a file) into a FileMaker file. You can import data from:

- Another FileMaker file
- A Microsoft Excel file, or another supported file type
- An external source like ODBC or MySQL



Another FileMaker file

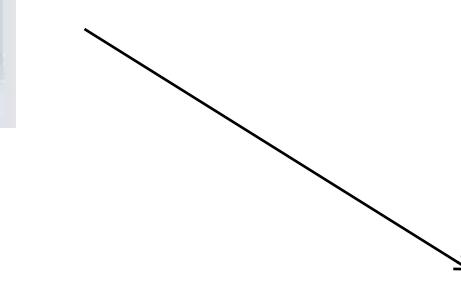
1	Magnolia Spring Center	Arthur Phillips	aphillips@magnoliaspringcenter.com	(415) 555-2160	900 Hyde St	San Francisco	
2	Pine Executive Station	Maria Shadrack	mshadrack@magnoliaspringcenter.com	(617) 555-4500	300 Hospital Dr	Wellesley	
3	Redwood Park Apartments	John Williams	jwilliams@magnoliaspringcenter.com	(408) 555-1234	1234 Redwood Expressway	Sunnyvale	
4	Oaks Grove Station	Glen Clark	gclark@magnoliaspringcenter.com	(510) 555-4712	27000 Orinda Ave	Hayward	
5	Oakwood Creek Center	Megan White	mwhite@magnoliaspringcenter.com	(805) 555-6240	12000 El Camino Real	South San Francisco	
6	Maplewood Park	Angela Bennett	abennett@magnoliaspringcenter.com	(704) 555-2290	800 East Lomita Road	Charlotte	
7	Elm Crest Park	Bobby Foster	bfoster@magnoliaspringcenter.com	(415) 555-2340	One Post Street	San Francisco	
8	Willow Creek Station	Jessica Phillips	jphillips@magnoliaspringcenter.com	(415) 555-2450	1000 Market Street	San Francisco	
9	Cherry River Center	Linda Franklin	lfranklin@magnoliaspringcenter.com	(800) 555-4780	4000 Park Verde Street	Memphis	
10	Walnut Spring Station	Richard Olsen	rolsen@magnoliaspringcenter.com	(310) 555-5637	1800 West Sunset Boulevard	Los Angeles	
11	Hazelwood Park Apartments	David Johnson	djohnson@magnoliaspringcenter.com	(800) 555-8970	14040 Hazelwood Street	Van Nuys	
12	Vanderbilt Stream Park	Lucas Johnson	ljohnson@magnoliaspringcenter.com	(310) 555-4730	312 North Spring Street	Los Angeles	
13	Oak Stream Park	Betty Valdez	bvaldez@magnoliaspringcenter.com	(310) 555-4730	123 Main St	Santa Monica	
14	Maplewood Park Apartments	Stephen Johnson	sjohnson@magnoliaspringcenter.com	(800) 555-2620	1400 S Main St	San Francisco	
15	Amelia View Center	Stephanie Johnson	sjohnson@magnoliaspringcenter.com	(415) 555-4600	1900 Fremont Avenue	San Francisco	
16	Dakota Glen Station	Alan Williams	awilliams@magnoliaspringcenter.com	(310) 555-2520	20 Pacific	Irvine	
17	Greene Spring Center	Philip Scott	pscott@magnoliaspringcenter.com	(415) 555-2630	275 Ladera Nodis Blvd	San Francisco	
18	Maplewood Park Apartments	Angela Scott	ascott@magnoliaspringcenter.com	(800) 555-4800	20 Pacific	Irvine	
19	Franklin Science Park	Phyllis Hall	phall@magnoliaspringcenter.com	(310) 555-4340	280 W MacArthur Blvd	Orlando	
20	Granite Meadow Station	Kathleen Morris	kmorris@magnoliaspringcenter.com				

1955	108	Desktop PC System	z99145A System	ZAA9932716482	Computers		
1956	110	Espresso Machine	LH3000	22671657869A	Appliances		
1957	107	Microwave	77W245Z2A23	Appliances			
1958	105	Desk Chair	ErgoChair 100	65748863204H	Office Furniture		
1959	104	VOIP Telephone	Clear Call 2000	778640061K	Telephones		
1960	109	Desk Chair	ErgoChair 100	5576372760E	Office Furniture		
1961	107	Digital Camera	IX US 801B	1X2U150564AC	Cameras		
1962	110	Desk Chair	ErgoChair 100	5582939281G	Office Furniture		
1963	110	Digital Camera	IX US 801B	1X2U9R28JS	Cameras		
1964	111	VOIP Telephone	Clear Call 2000	778662762G	Telephones		
1965	112	Microwave	77W3738H7B1	Appliances			

Microsoft Excel file

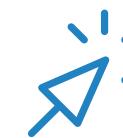


External Source

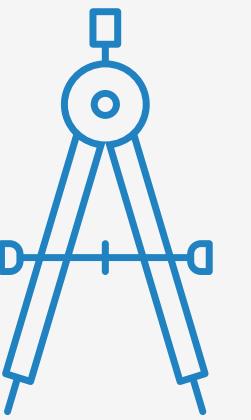


Asset ID	Customer ID	Item	Model	Serial Number	Category
1955	108	Desktop PC System	z99145A System	ZAA9932716482	Computers
1956	110	Espresso Machine	LH3000	22671657869A	Appliances
1957	107	Microwave	77W245Z2A23	Appliances	
1958	105	Desk Chair	ErgoChair 100	65748863204H	Office Furniture
1959	104	VOIP Telephone	Clear Call 2000	778640061K	Telephones
1960	109	Desk Chair	ErgoChair 100	5576372760E	Office Furniture
1961	107	Digital Camera	IX US 801B	1X2U150564AC	Cameras
1962	110	Desk Chair	ErgoChair 100	5582939281G	Office Furniture
1963	110	Digital Camera	IX US 801B	1X2U9R28JS	Cameras
1964	111	VOIP Telephone	Clear Call 2000	778662762G	Telephones
1965	112	Microwave	77W3738H7B1	Appliances	

FileMaker Pro file



Integrate other data sources



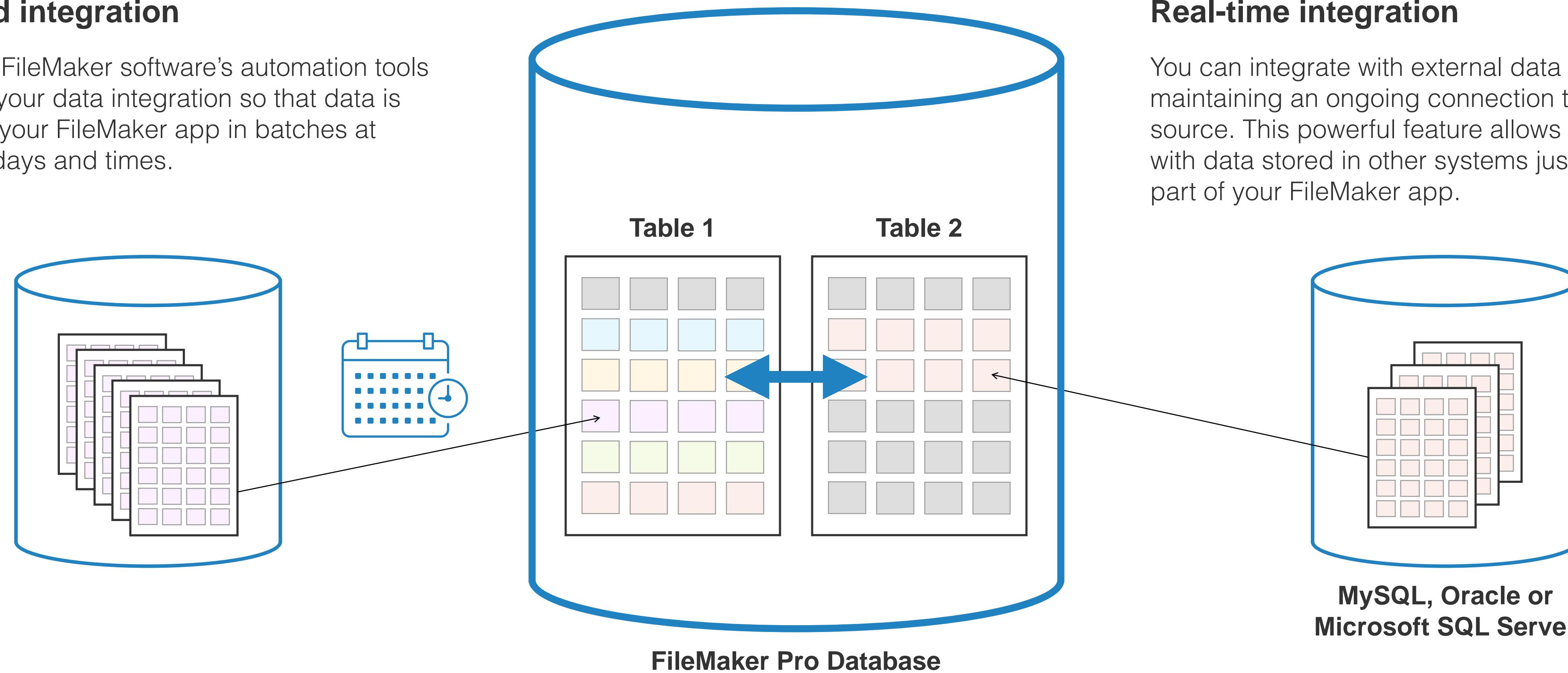
-
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External Data Sources

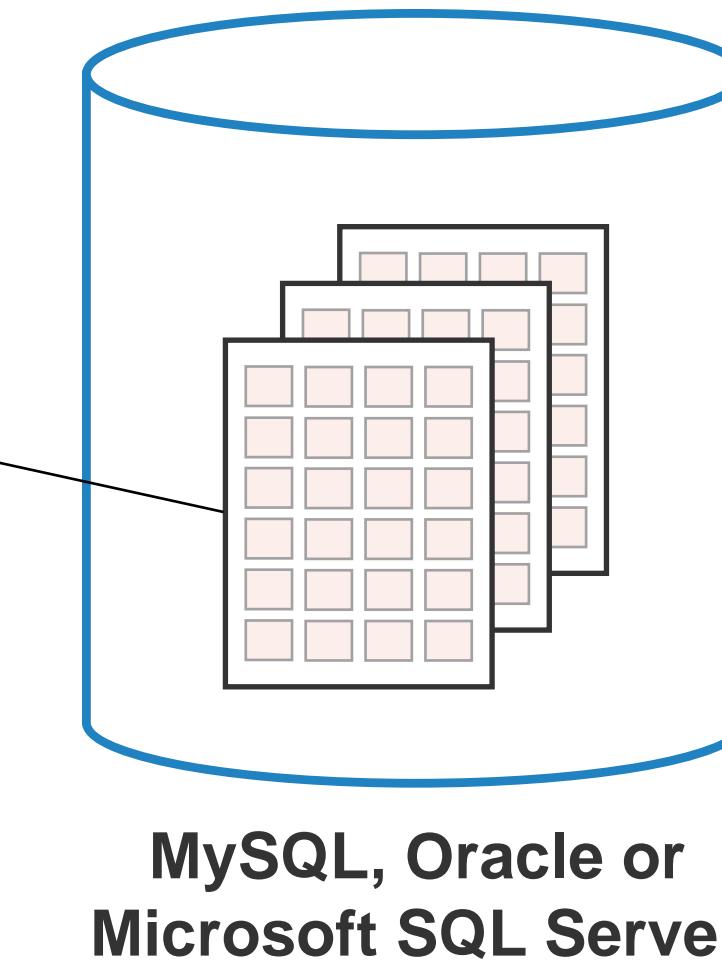
Scheduled integration

You can use FileMaker software's automation tools to schedule your data integration so that data is brought into your FileMaker app in batches at designated days and times.



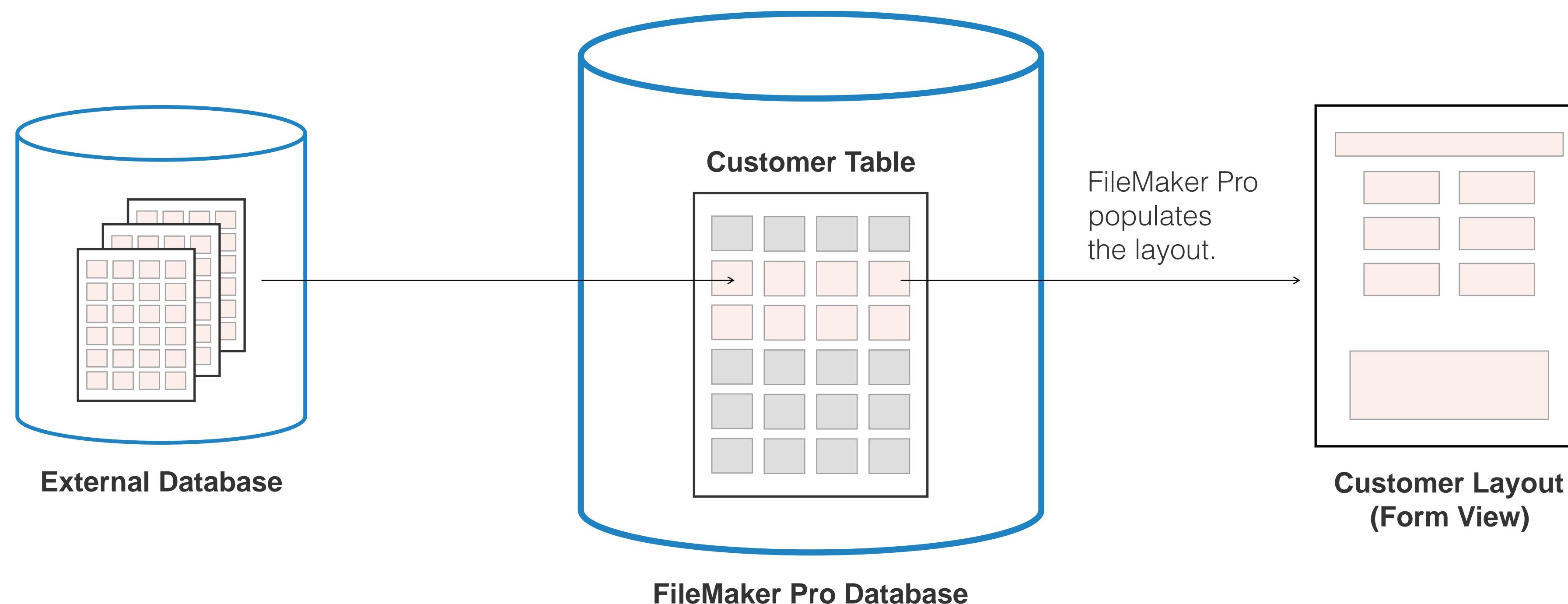
Real-time integration

You can integrate with external data in real-time by maintaining an ongoing connection to an external source. This powerful feature allows you to interact with data stored in other systems just as if it were part of your FileMaker app.

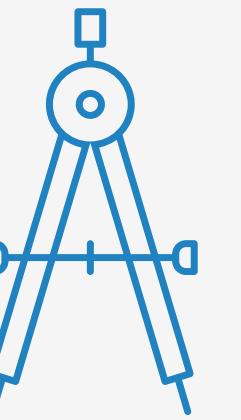


External Data Sources

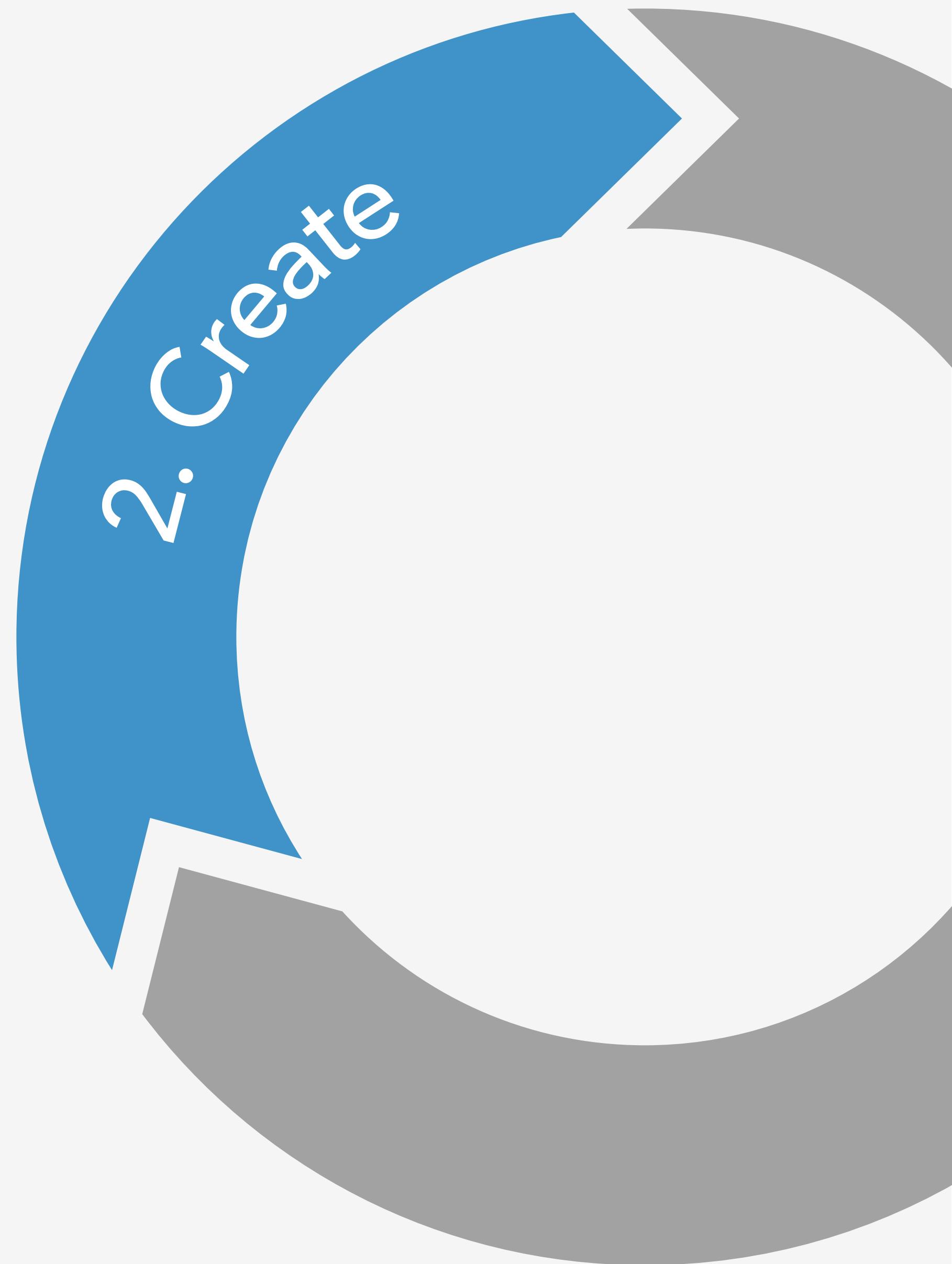
In our example, Jennifer needs to track customer contact information located in an external database in the corporate office. Using FileMaker software's real-time data feed capabilities, an app can be designed to access this external data just as if it were located in a FileMaker Pro table.



Create business logic and design workflow



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What is business logic?

Business logic is the programming that manages the communication between an end user interface and a database. The main components of business logic are business rules and workflows.

- A business rule describes a specific procedure
- A workflow consists of the tasks, procedural steps, required input and output information, and tools needed for each step of that procedure

Business automation

When building your custom app, it's likely that you'll need to automate some aspect of your workflow. FileMaker provides an intuitive scripting language to help with this. This language is easy to read and write, while also providing considerable power and allowing you to model complex scenarios.

In addition to the scripting language, FileMaker includes calculation formulas, functions, and other useful tools for streamlining processes.

Scripting: An important aspect of app logic

Scripting allows you to automate processes, from simple navigation tasks to complex reporting and workflows. Automation is accomplished by creating and using scripts. A script consists of a series of instructions. Scripts can be invoked by performing an action in the app. For example:

- Selecting an item on a menu
- Clicking a button on a layout
- Entering a layout
- Navigating between records
- Opening a file

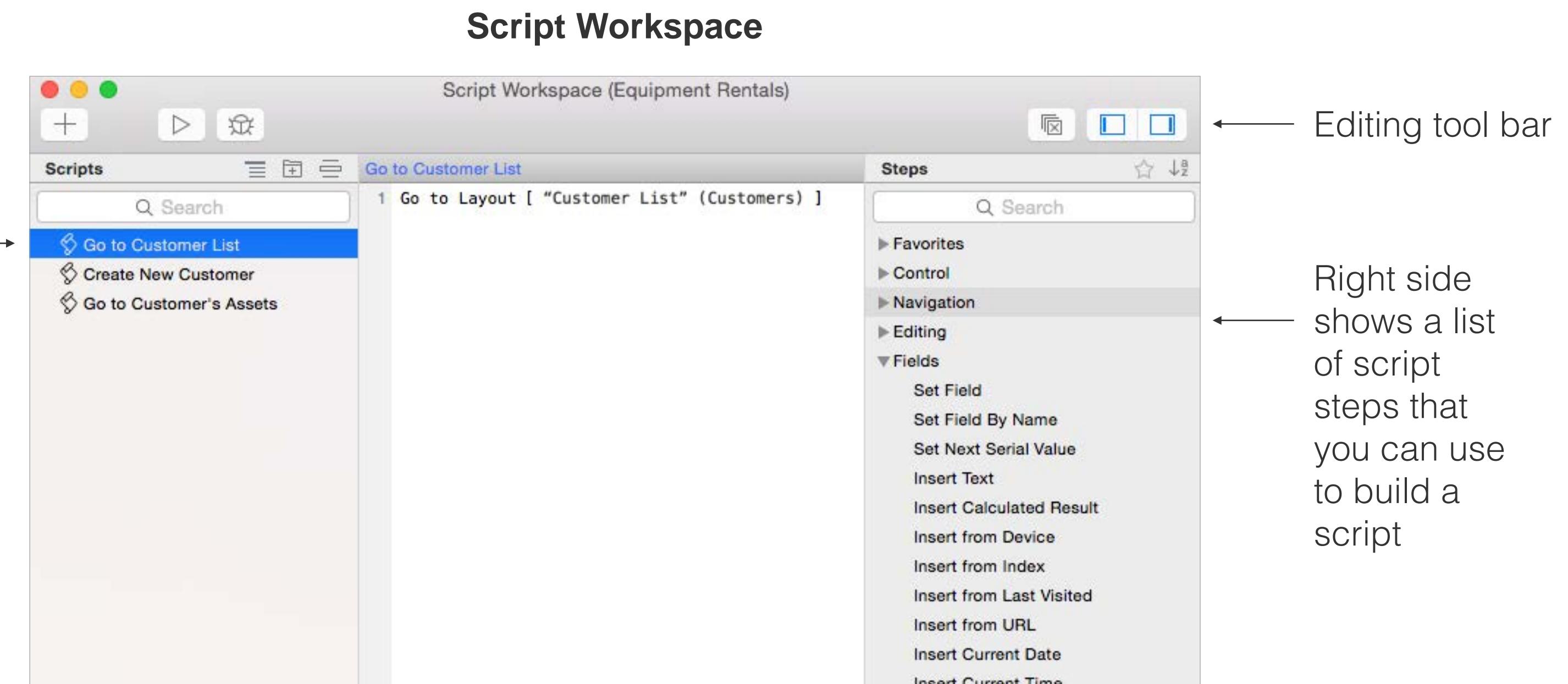


Script Workspace

The Script Workspace in FileMaker is where you create, edit, view, and organize your scripts.

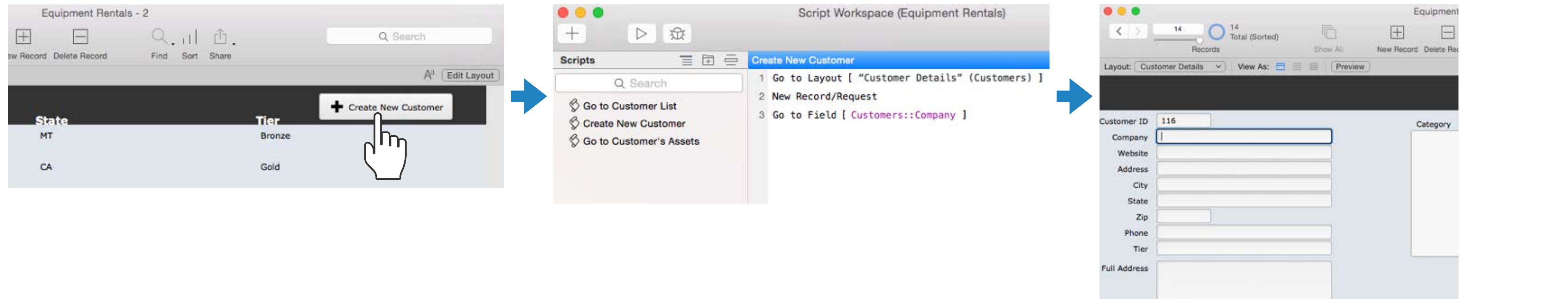
Highlighted below is a one step script that changes the screen, causing the customer list layout to be displayed.

Left bar shows a list of current scripts →



Automating a task

Jennifer needs to enter information on new customers. Here is an example of how a script can meet her needs:



What the user does:

User clicks on the button “Create New Customer”. This button has been set up to invoke the ‘Create New Customer’ script.

What happens:

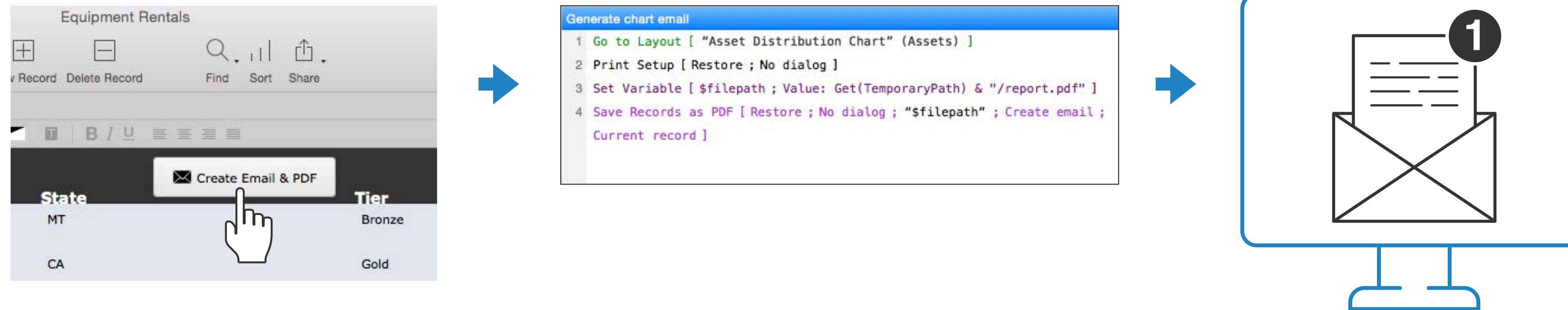
- Step 1: FileMaker Pro goes to the layout called “Customer Details.”
- Step 2: A new record is created.
- Step 3: The cursor moves to a field called “Company.”

What the user sees:

A blank customer form is displayed. The cursor is positioned on the “Company” field, so the user can start entering the new customer’s data.

Automating a task

Jennifer also wants to automate the task of generating reports. Here's what she does:



What the user does:

User clicks on the button “Create Email & PDF.” This button has been set up to generate an email with a PDF attachment.

What happens:

- Step 1: The chart layout is displayed.
- Step 2: Print settings are established (in this case, landscape).
- Step 3: A temporary file path is generated to establish a place to store the PDF file.
- Step 4: The PDF file is generated and attached to an email.

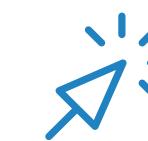
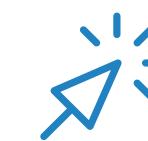
What the user sees:

Users receive an email with the PDF attachment.

Calculations

A calculation uses a formula to generate a result. Sometimes the result is displayed on the screen much as formulas are displayed in a spreadsheet. Other times, the result is used by a script to make decisions about what the script does next. The use of calculations in FileMaker software is similar to the use of formulas in spreadsheets.

Calculations can be used to populate fields, provide tooltip messages, set up dynamic emails, and for many other purposes.



Business Intelligence

Jennifer wants to know the total cost of equipment. She is also interested in metrics like the asset category, the asset purchase date, the rental agreement starting date, and the individual asset cost for inventory planning purposes. Developing a custom app using the FileMaker Platform can help Jennifer make better business decisions by monitoring these specific metrics.

FileMaker Pro can present this information in the form of reports or charts for easy visualization as shown in the next few pages.

Calculations

For Jennifer's app, we can define two calculations, one to find the number of days an asset is leased, and the other to find the total cost of a customer's assets. These metrics can be tracked over time to help Jennifer make better business decisions.

Defining the calculations

Field Name:	Type:
Number of Days Leased	Text
Total Cost of Assets	Text

Calculation details:
Number of Days Leased: = Get(CurrentDate)-In Service Date
Total Cost of Assets: = Sum(Assets::Cost)

Buttons at the bottom: Create, Change, Duplicate, Delete, Copy, Paste

Equipment Rentals

Customer Details View

Customer ID	Category	Item	Serial Number	Purchase Date	Cost
110	Appliances	Espress	2267155789A	1/27/2011	100
Rankin Studios	Office	Desk	5582939281G	6/7/2011	50
rankin.ipsumlorem.net	Cameras	Digital	1X2U9H28JS	7/8/2011	300
7788 North First St.	Computers	Deskt	ZA9982938829	11/6/2013	1200
Santa Clara					
CA					
95052					
(408) 555-7305					
Gold					
Full Address	7788 North First St. Santa Clara, CA 95052				

Total Cost of Assets: 1650

Displaying the calculations

Here the total cost of assets is calculated for this customer.

Data visualization

FileMaker software can generate hierarchical reports that summarize groups of records.

The assets on this report have been grouped into appliances, cameras, computers, office furniture and telephone records for easy viewing of costs.

FileMaker Report

The screenshot shows a FileMaker report window titled "Equipment Rentals" with the layout set to "Asset Report". The report displays data in a tabular format with the following columns: Asset ID, Item, Purchase Date, In Service Date, and Cost. The data is grouped into five categories: Appliances, Cameras, Computers, Office Furniture, and Telephones. Sub-totals are shown for each group, and a final total of \$4225.00 is displayed at the bottom. The report includes standard FileMaker navigation tools like Find, Sort, and Share.

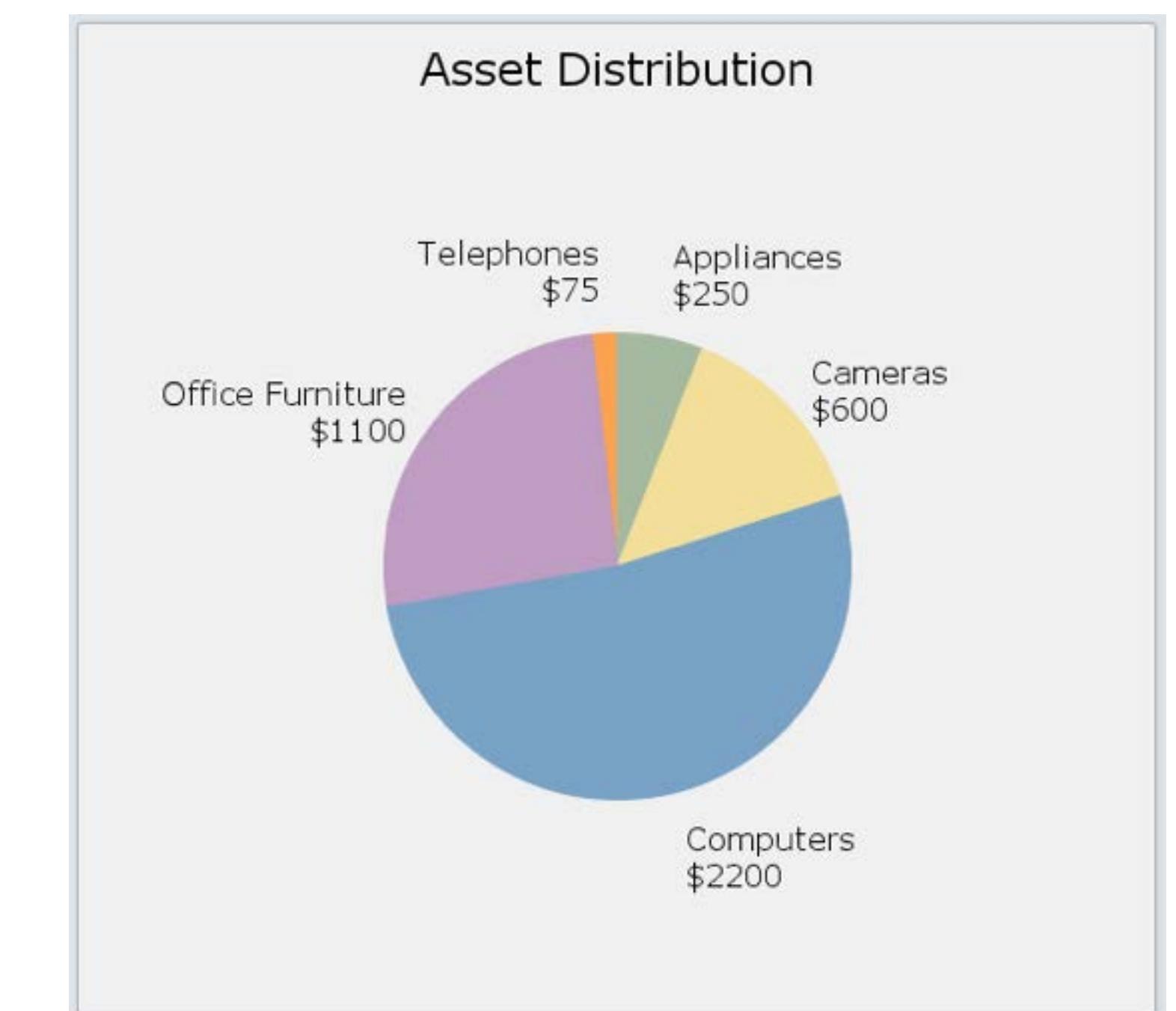
Asset ID	Item	Purchase Date	In Service Date	Cost
Appliances				
1956	Espresso Machine	1/26/15	2/9/15	\$100.00
1957	Microwave	3/17/15	3/31/15	\$150.00
				\$250.00
Cameras				
1961	Digital Camera	5/1/15	5/15/15	\$300.00
1963	Digital Camera	7/8/15	7/22/15	\$300.00
				\$600.00
Computers				
1955	Desktop PC System	1/9/15	1/23/15	\$1200.00
1970	15" Notebook	10/9/15	10/23/15	\$1000.00
				\$2200.00
Office Furniture				
1958	Desk Chair	3/26/15	4/9/15	\$100.00
1960	Conference Table	4/23/15	5/7/15	\$1000.00
				\$1100.00
Telephones				
1959	VOIP Telephone	7/14/15	7/28/15	\$75.00
				\$75.00
TOTAL: \$4225.00				

Data visualization

The same asset data can be presented as a pie chart for easy visualization.

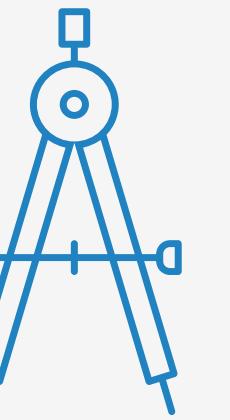
FileMaker Report

Asset Report					
	Asset ID	Item	Purchase Date	In Service Date	Cost
Appliances					
	1956	Espresso Machine	1/26/15	2/9/15	\$100.00
	1957	Microwave	3/17/15	3/31/15	\$150.00
					\$250.00
Cameras					
	1961	Digital Camera	5/1/15	5/15/15	\$300.00
	1963	Digital Camera	7/8/15	7/22/15	\$300.00
					\$600.00
Computers					
	1955	Desktop PC System	1/9/15	1/23/15	\$1200.00
	1970	15" Notebook	10/9/15	10/23/15	\$1000.00
					\$2200.00
Office Furniture					
	1958	Desk Chair	3/26/15	4/9/15	\$100.00
	1960	Conference Table	4/23/15	5/7/15	\$1000.00
					\$1100.00
Telephones					
	1959	VOIP Telephone	7/14/15	7/28/15	\$75.00
					\$75.00
	TOTAL: \$4225.00				



Set up security

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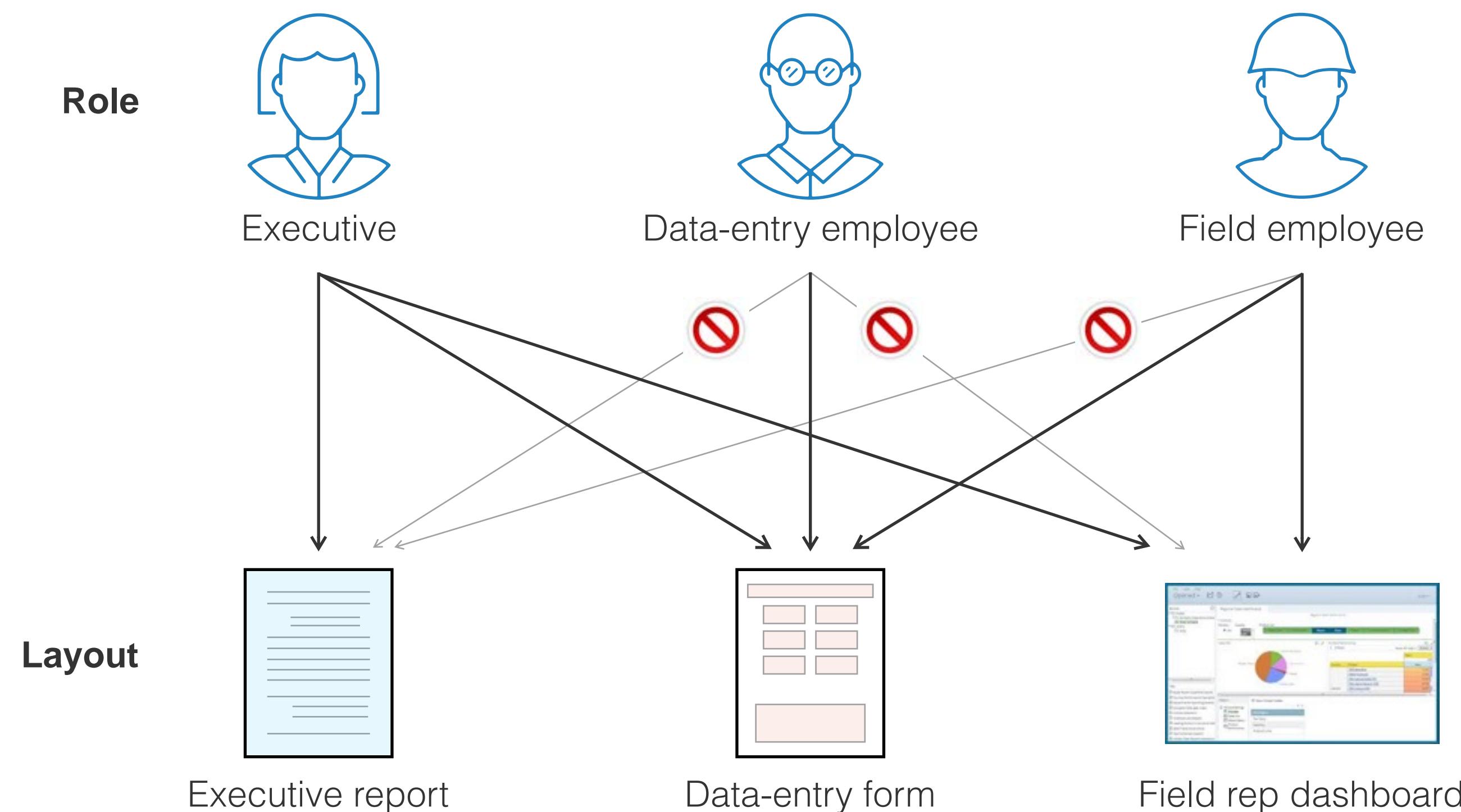
Role-based security: Who will use the app?

Identity

Authentication verifies the identity of the user. The user creates an account which includes a username and password.

Access Control

FileMaker software allows you to set privileges for each user by creating privilege sets and associating them with specific user accounts. Privilege sets control what a user can do. For example, they determine what data the user can view, create, edit, and delete and what layouts and scripts the user can access.



The executive has access to all three layouts, the data-entry employee has access to only one layout, and the field employee has access to two layouts.

Role-based security: Privilege sets

Every new FileMaker app you create has 3 pre-defined privilege sets:

Full Access

The user has complete access to the file.

Data Entry Only

The user can view, create, edit and delete records; and import and export data.

Read Only

The user can view records and export data.

Additionally, you can define custom privilege sets for fine-grained control over what a user can do.

Managing accounts locally or externally

FileMaker provides two types of accounts, local and external, allowing you to manage them within each individual FileMaker file or externally from a directory service.

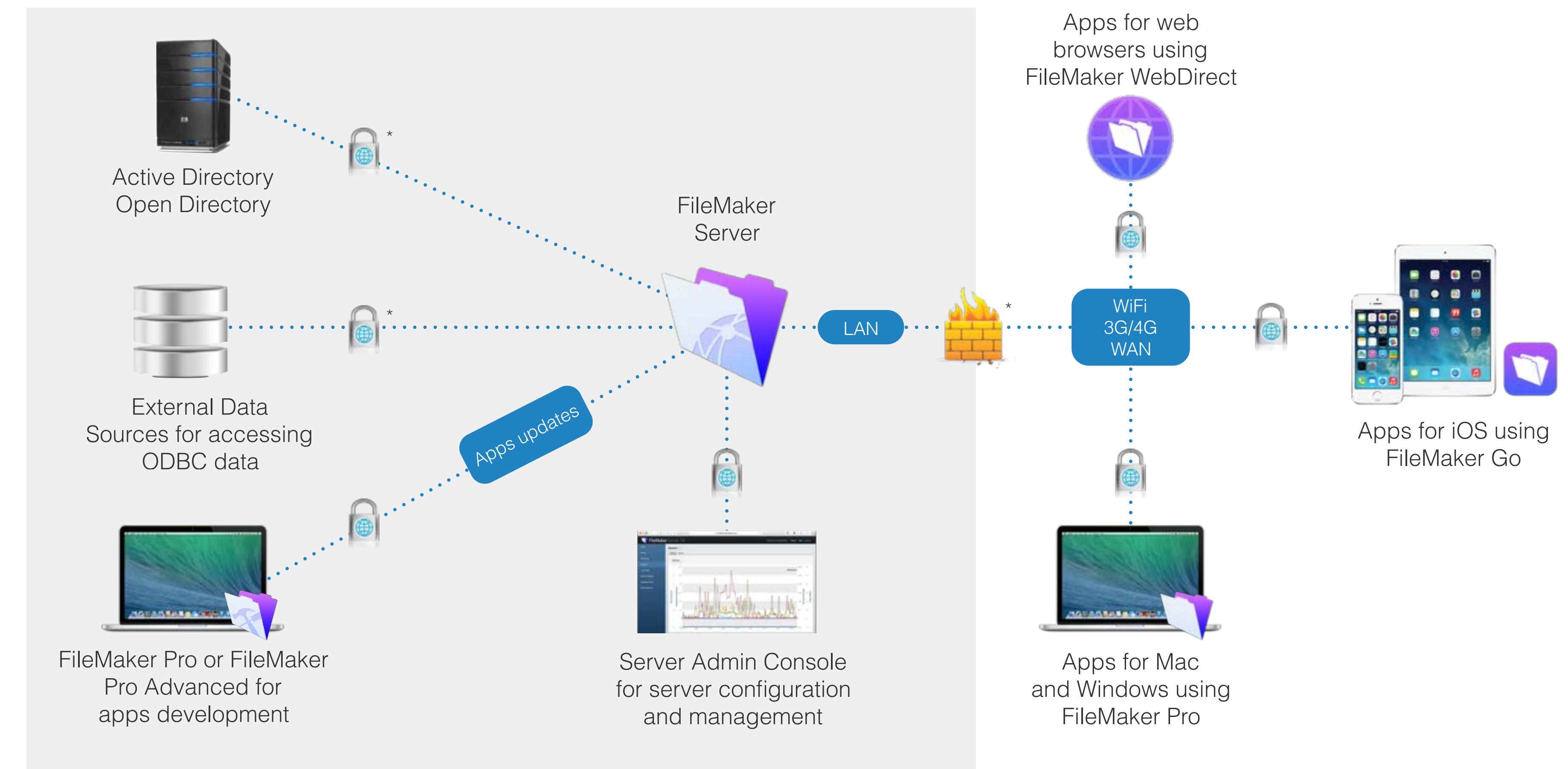
Local accounts are defined within the FileMaker Pro database file itself. You can have as many as you want, and you can use scripts to create and modify them automatically.

With external accounts, accounts are created in an external system, typically Active Directory or Open Directory, so that authentication can be managed by an IT administrator.

High-level security diagram

The FileMaker Platform employs a unified security model, where the security that you establish for an app is applied across iPad, iPhone, Windows, OS X and the web.

(*) Indicates areas where security is setup outside of the FileMaker Platform.



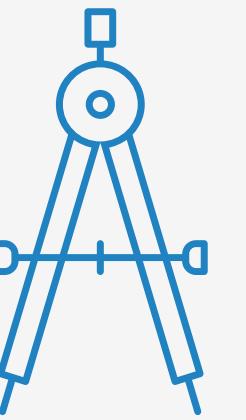
Insuring your data is secure at rest and in flight

FileMaker Pro Advanced offers encryption at rest, which obfuscates and secures all the information stored within a given FileMaker app so that it can only be accessed by authorized users. This is in addition to the account-based security discussed previously.

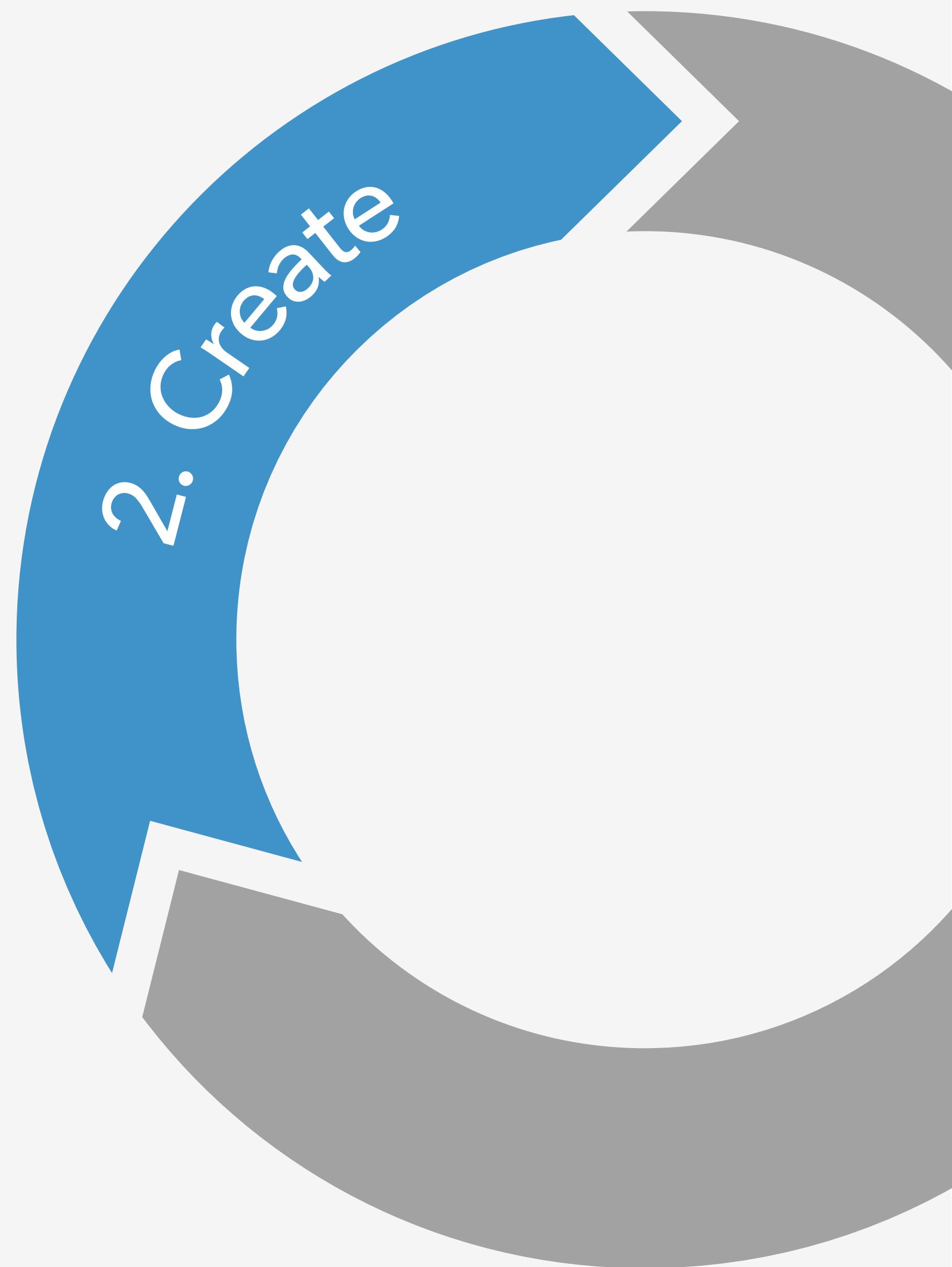
FileMaker Server uses Secure Sockets Layer (SSL) technology to encrypt connections between FileMaker Server and its FileMaker Pro and FileMaker Go clients, as well as between the Web Publishing Engine and its FileMaker WebDirect and Custom Web Publishing clients. This helps to ensure that your hosted communications remain private.



Test your app



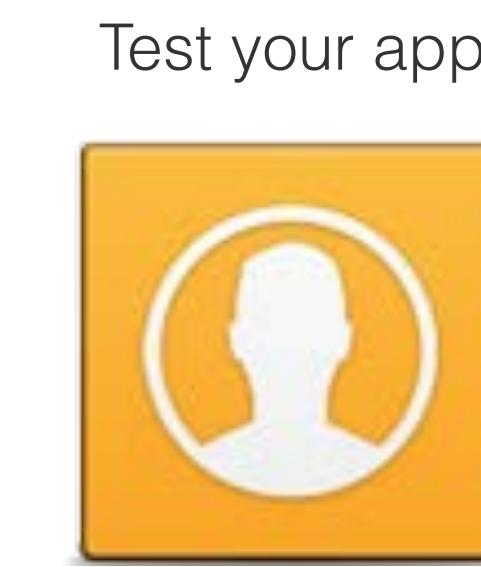
-
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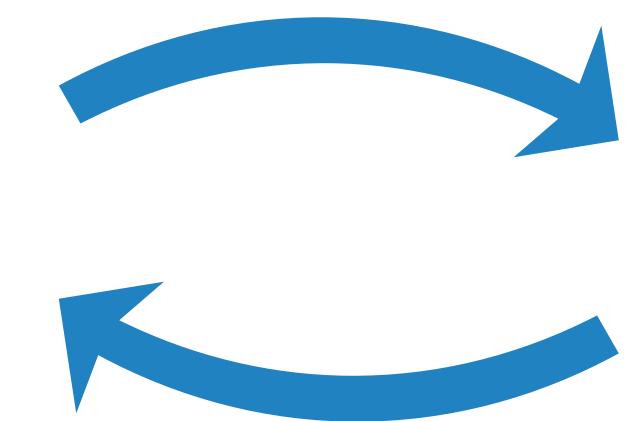
Test your app

After building your app, test your design with the intended users.

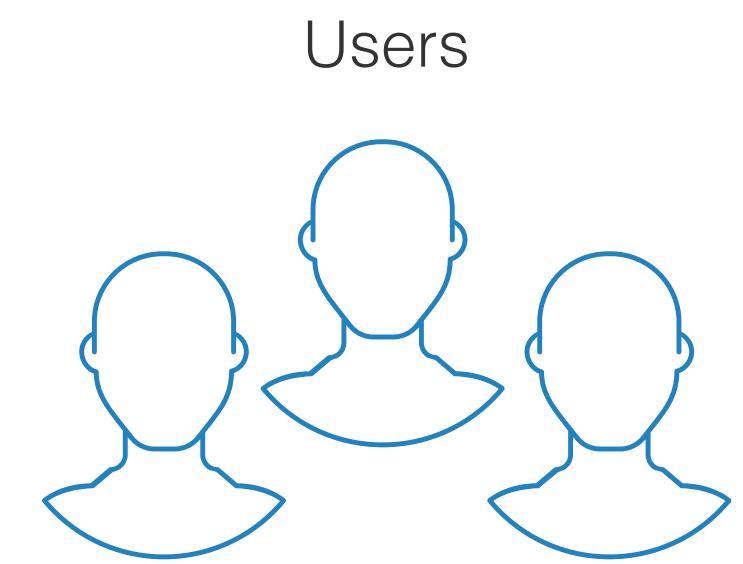
Testing is an iterative process and a critical step in building your app. The results of testing will determine whether you repeat another cycle of the design process before moving on to the 'Deploy' step.



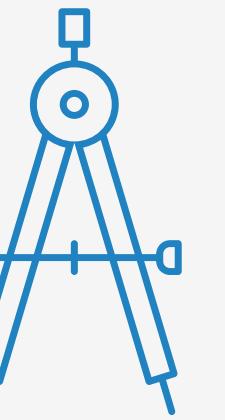
Circle back and test
your design with users



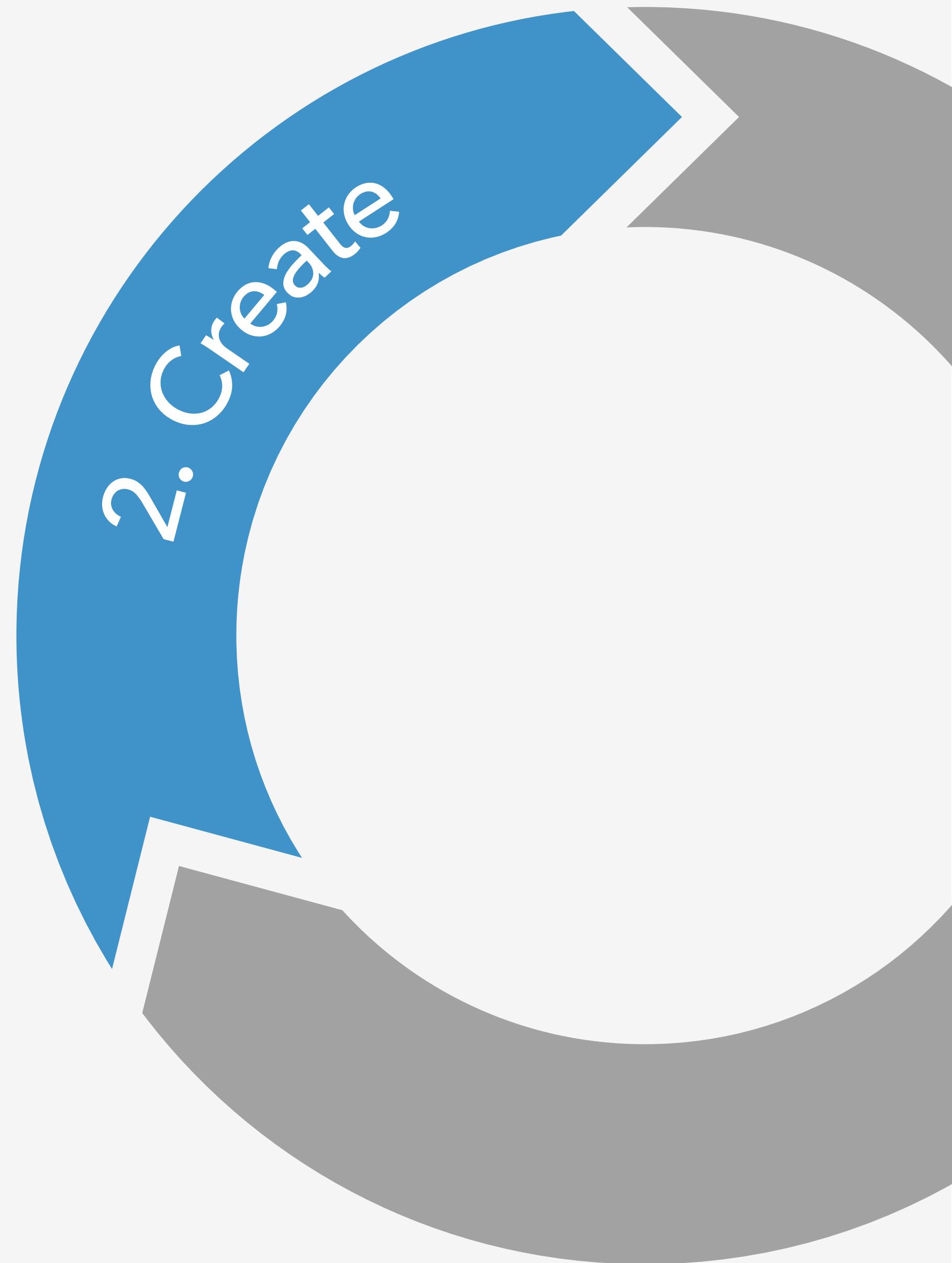
Implement users'
feedback



Appendix A

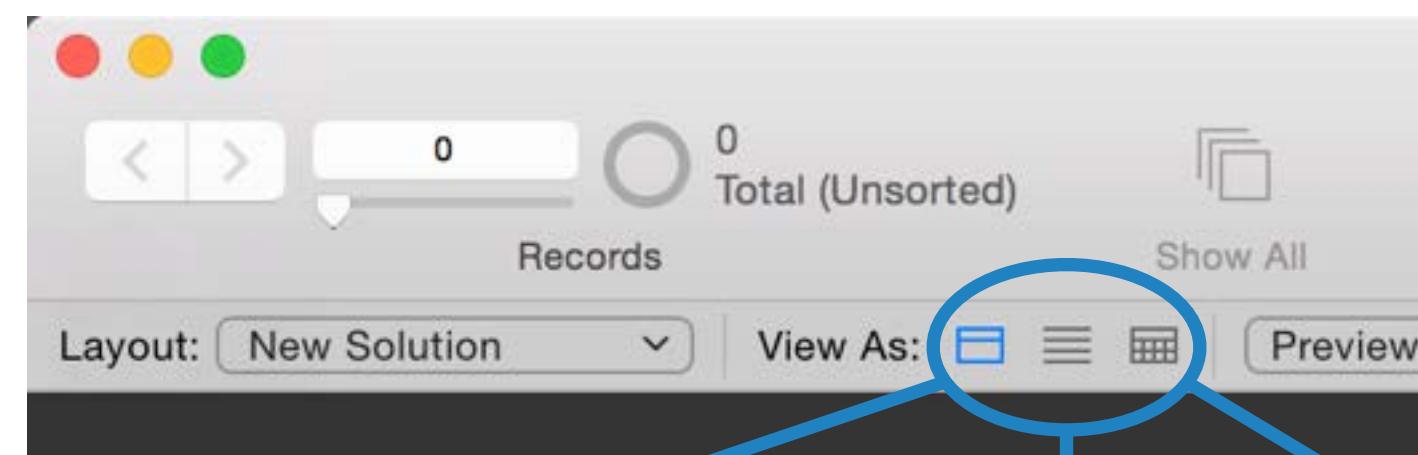


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FileMaker Pro layout views

Layout View Options



Form View

A screenshot of a FileMaker Pro layout in Form View. The layout contains several text and dropdown fields for customer information. On the right side, there is a list of assets with columns for Category, Item, Serial Number, Purchase Date, and Cost. A blue arrow points from the 'Form View' caption to this screen.

List View

A screenshot of a FileMaker Pro layout in List View. It displays a table with columns for Customer ID, Company, State, and Tier. Each row represents a different customer entry. A blue arrow points from the 'List View' caption to this screen.

Table View

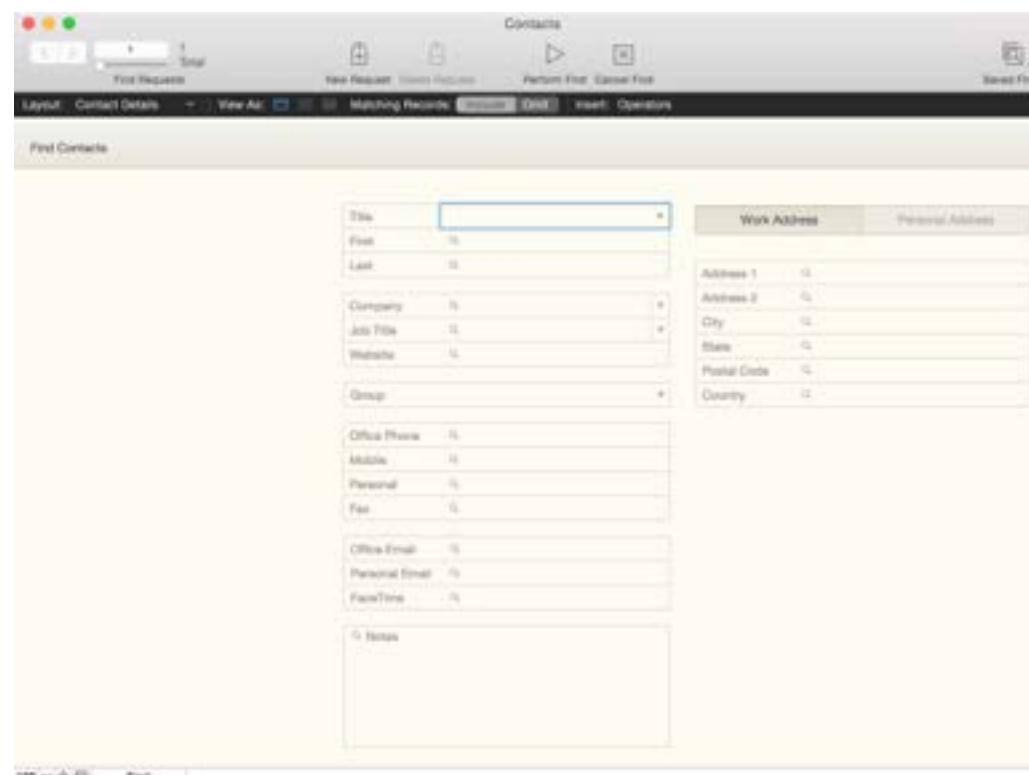
A screenshot of a FileMaker Pro layout in Table View. The layout shows a very large dataset with many rows and columns. The columns include Asset ID, Customer ID, Item, Model, Serial Number, and Category. The table is scrollable, indicated by a vertical scrollbar on the right. A blue arrow points from the 'Table View' caption to this screen.

How are FileMaker Pro four Modes used?

	Mode	What can you do in this mode?
For using the app	Browse	Data entry/view, add, edit, sort and delete records
	Find	Search for records and fields
	Preview	View data before printing; also for reports
For building the app	Layout	Create user interface; edit

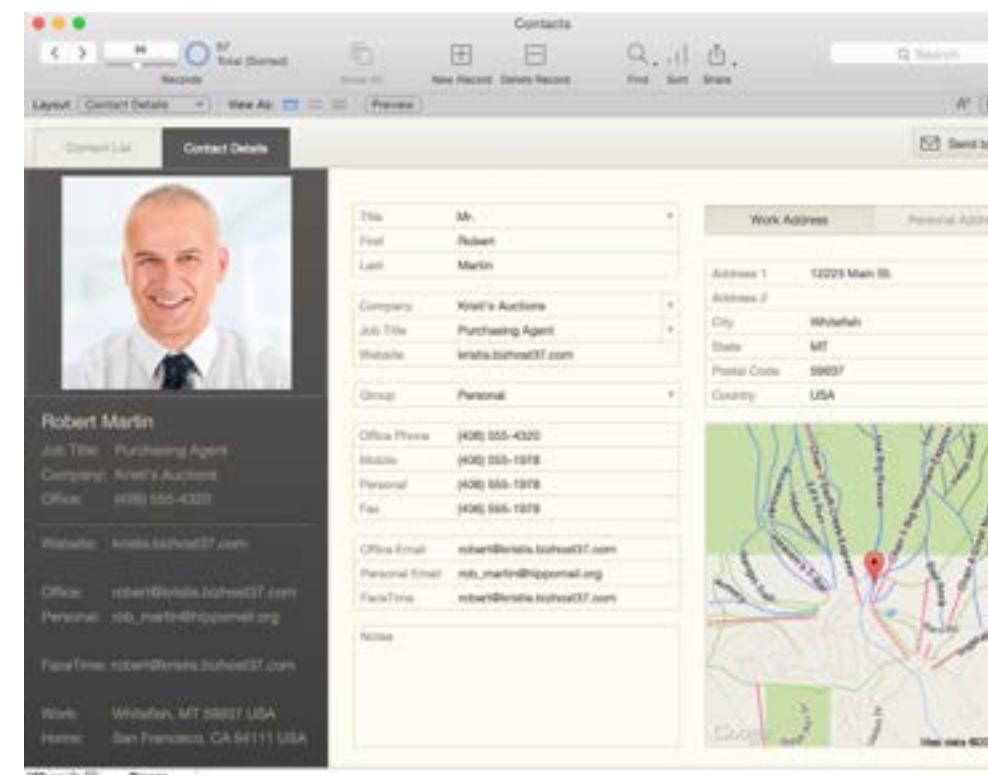
FileMaker Pro Modes

Find Mode



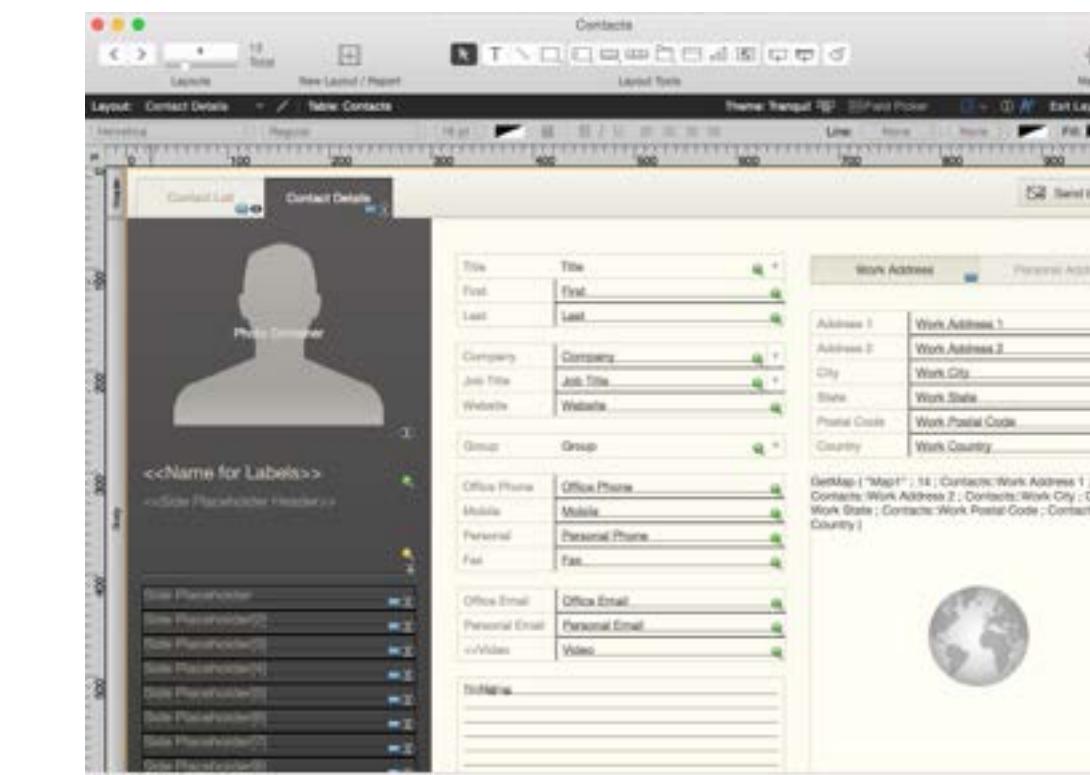
Search through your data and find records that match the criteria you enter

Browse Mode



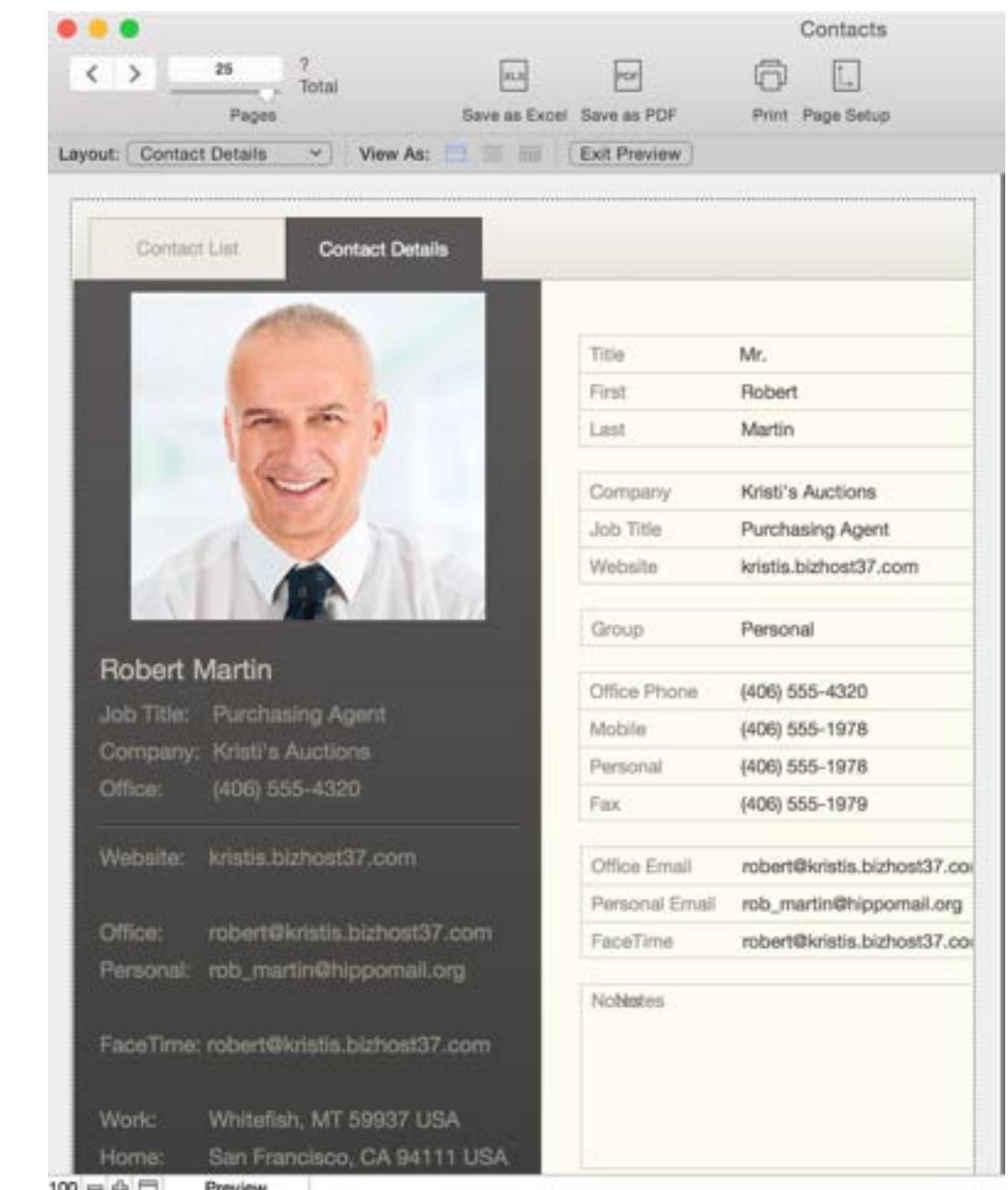
Enter, edit, and view the data

Layout Mode

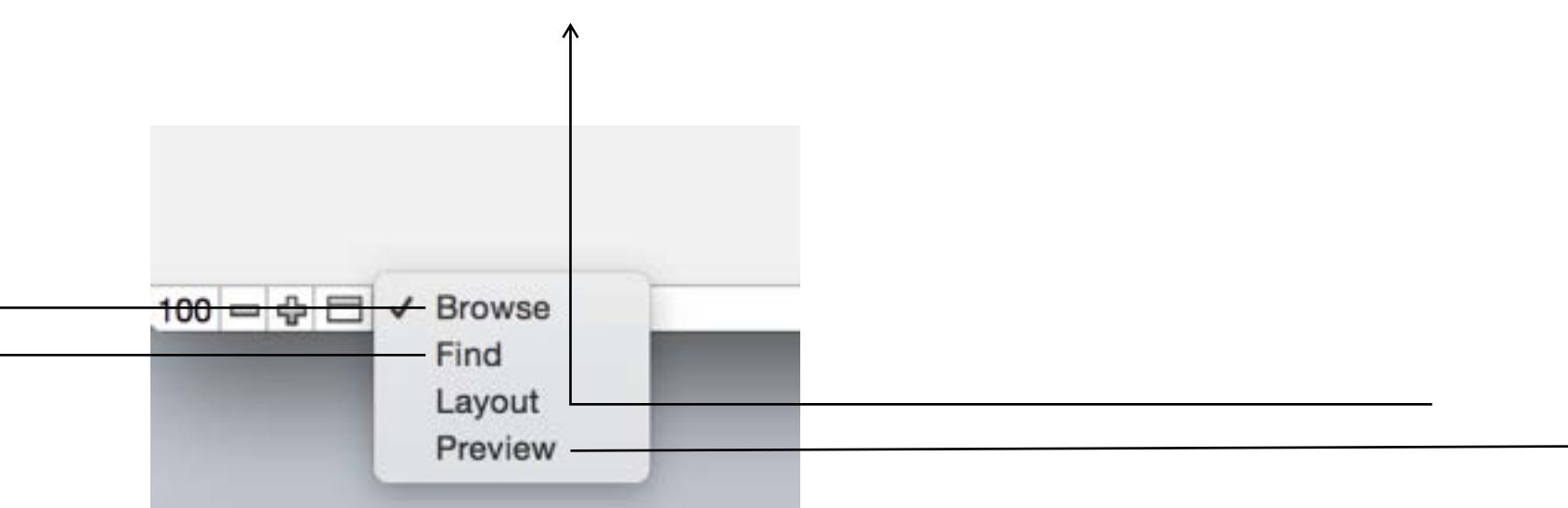


Design interfaces, deciding how data should look

Preview Mode



See how your data and layout will be printed or saved to PDF



Changing modes in layout mode
(Left bottom corner)

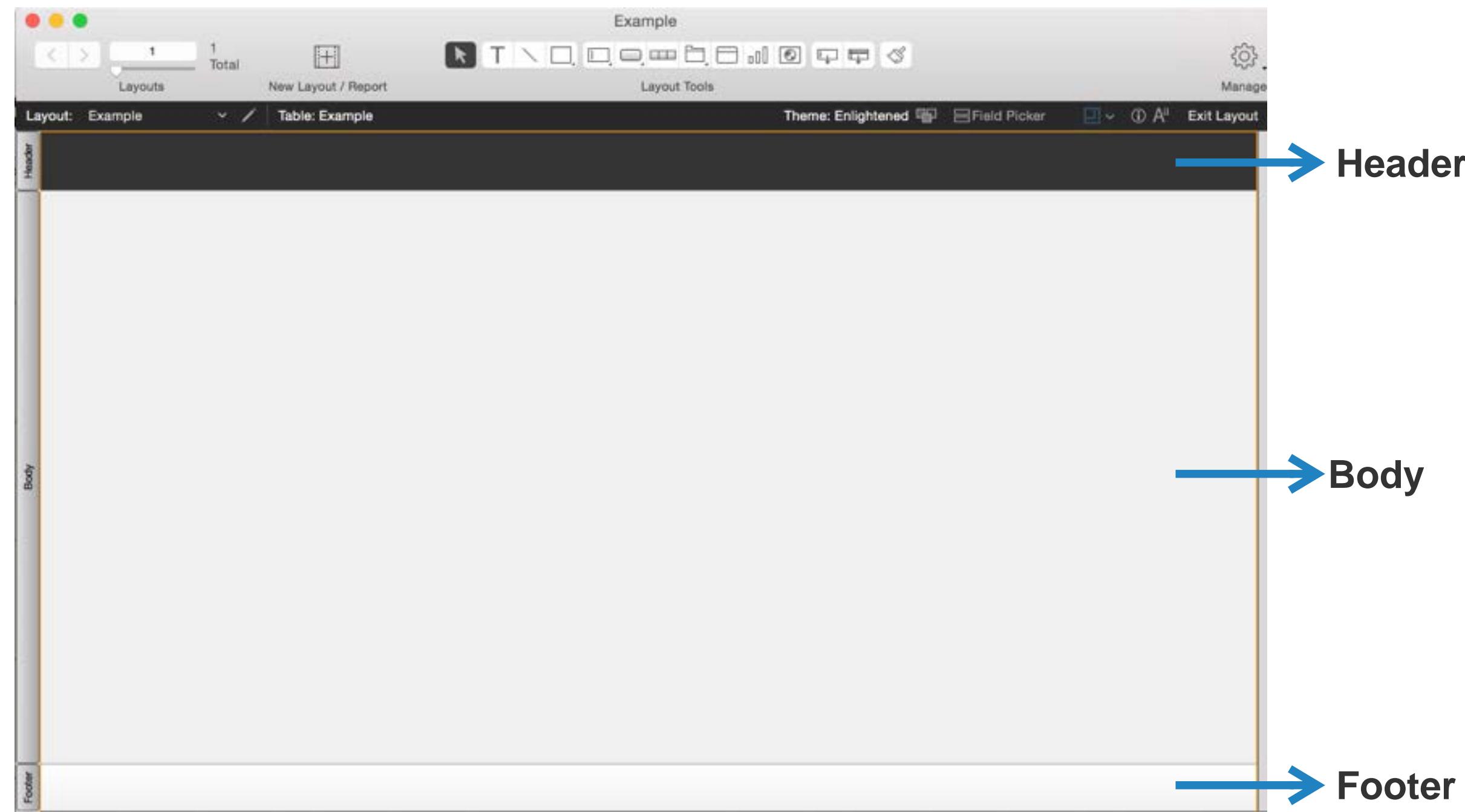
Layout parts

A layout is divided into various parts. The most commonly used ones include:

- Header
- Body
- Footer

Layout parts control how and where objects such as fields, text objects and graphics are displayed.

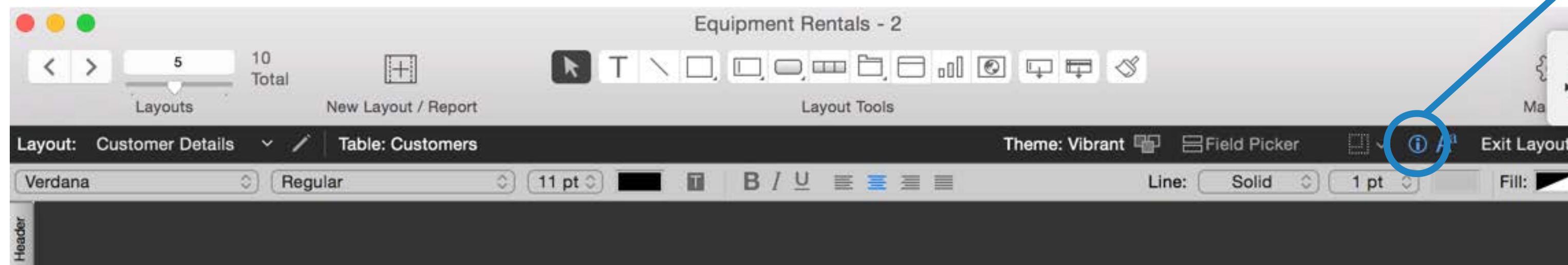
When you create a new layout, it will include one or more parts depending on your choice of layout template and the layouts dimensions are based on device type selected.



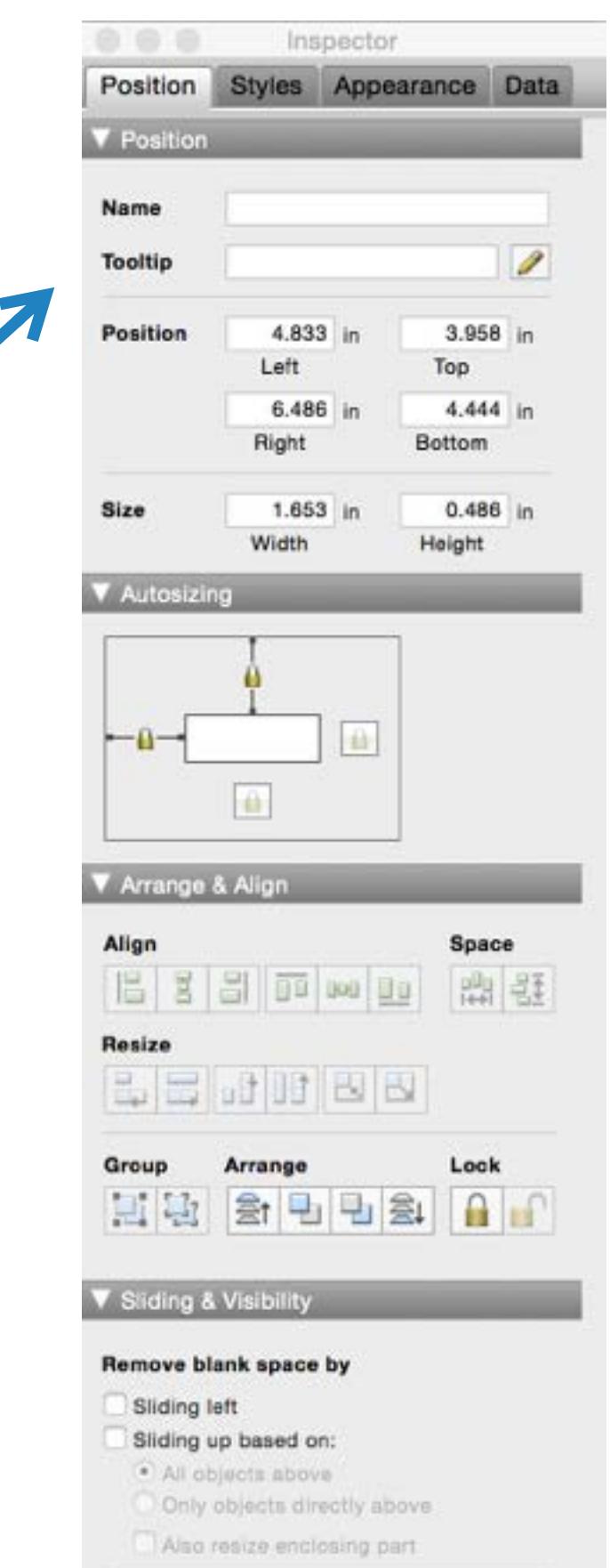
Layout mode navigation and editing tools

In Layout mode, FileMaker provides editing options on the Status Tool Bar to add layout objects such as portals for displaying related table information, button bars for adding navigation or printing a report, web viewers for displaying web content and much more. The Inspector Tool Bar gives you control over the objects placed on the layout.

Status Tool Bar



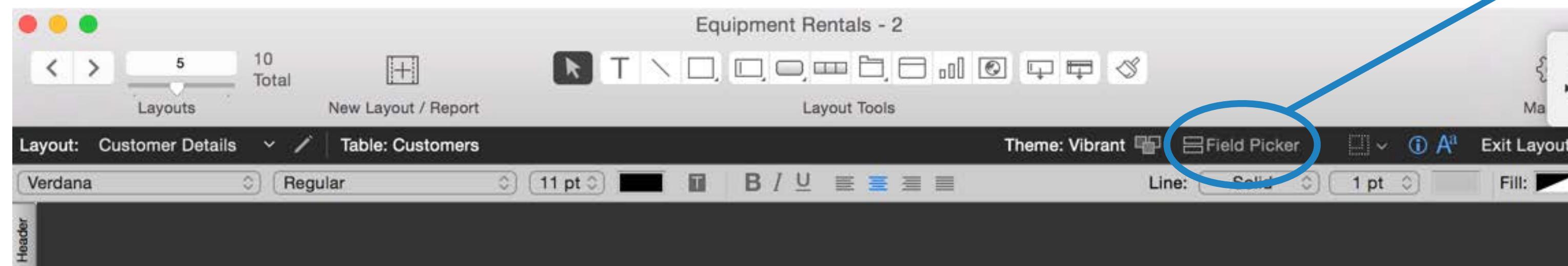
Inspector Tool Bar (Object Control Center)



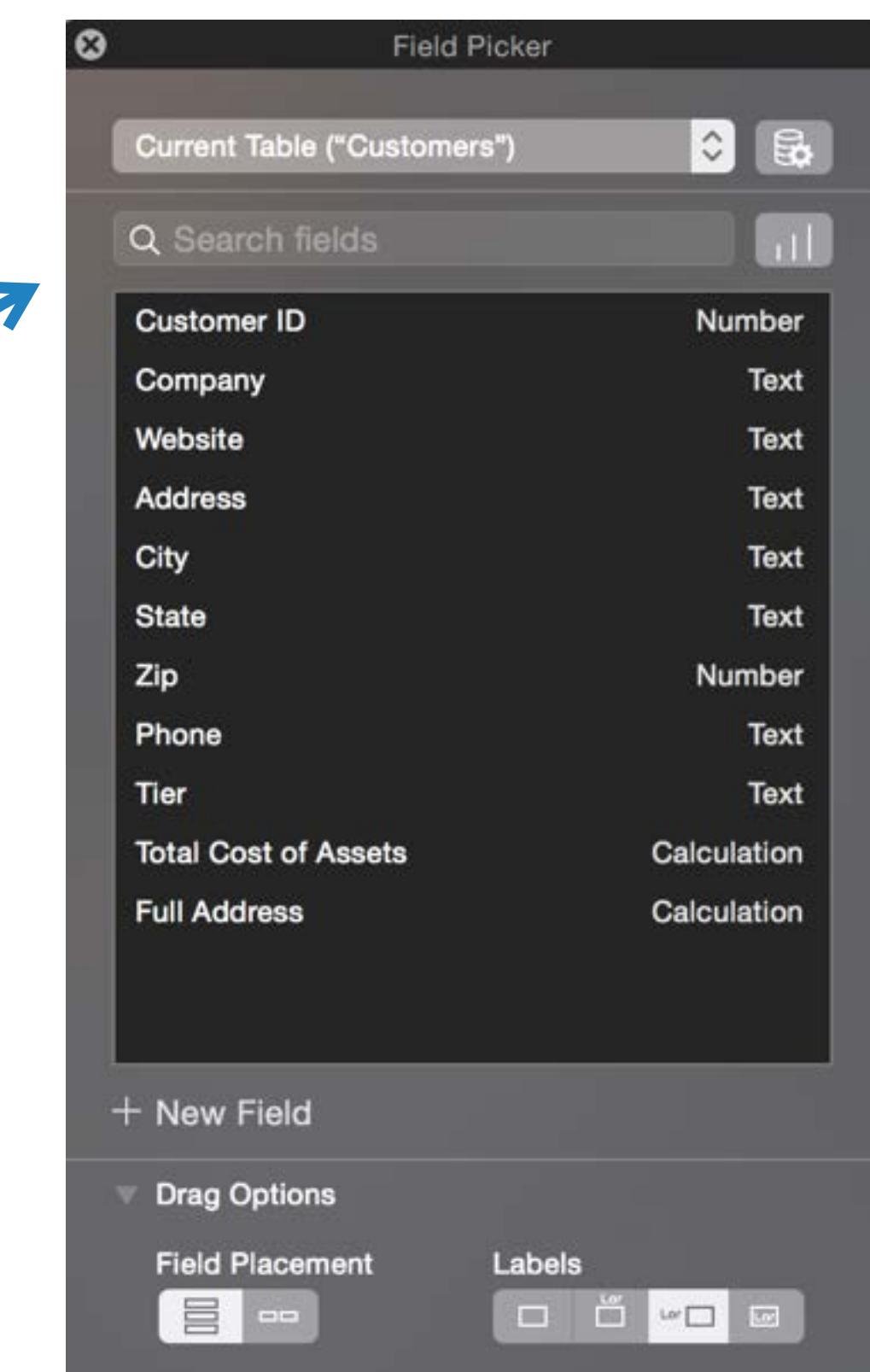
Layout mode navigation and editing tools

The Field Picker is used to define fields for your app, and to add or change fields for an existing layout. Once fields are created, you simply drag them over to your desired layout. You can also view and create fields from other tables using Field Picker.

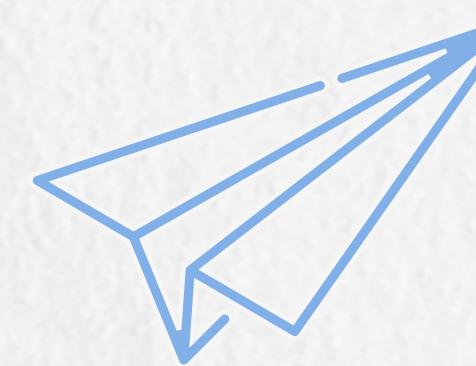
Status Tool Bar



Field Picker



Get started sharing your app with our next guide:



Deploy

Your step-by-step guide to successfully deploying your FileMaker app.