



Creating Business Applications with Office 365

Techniques in SharePoint,
PowerApps, Power BI, and More

Jeffrey M. Rhodes

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*This book is dedicated to my friend and mentor, Brigadier
General Erlind G. "Lindy" Royer, USAF, Retired.*

Dedication

Quite a bit has changed since my last book, 2009's *Programming for e-Learning Developers*. Although I greatly enjoyed my 19 years of running a software company, I decided to return to my alma mater, the U.S. Air Force Academy (USAFA), first as a Senior IT Specialist and more recently as the Academic Chief Technical Officer. My sincere appreciation goes to my bosses in both the 10th Communications Squadron and in the Dean of Faculty for taking a chance on someone who had never used SharePoint or worked at a college (other than as an adjunct Economics teacher): Mr. Joe McKeehan, Mr. Neland North, Colonel Tom Swoveland, Colonel Joyce Storm, and Colonel Doug Mellars. What sealed the deal for both of these positions – as with other opportunities in my life – was a strong recommendation by my mentor (and the former Dean of Faculty at USAFA), Brigadier General Royer, PhD.

I first met Lindy¹ in the Fall of 1984 when I was a sophomore at USAFA and he was the Head of the Electrical Engineering Department. He happened to be my instructor in the core circuits course. After a couple of exams, he wrote a note on my paper asking if I had considered Electrical Engineering as a major. Although I had already declared Astronautical Engineering as a major, I went to see him. Lindy asked what my goals were and, finding out that I wanted to be a Rhodes scholar, called up his friend and colleague, Colonel Malham Wakin.² Colonel Wakin connected me with Ms. Fern Kinion in the Scholarship Office, eventually leading

¹Of course I exclusively called him Colonel Royer then ☺.

²Colonel Wakin (now Brigadier General, USAF, Retired) is a lion in military ethics and morality of war. He was the long-time Head of the Philosophy Department at USAFA. His books on Amazon can be found at <https://tinyurl.com/y7chumnk>.

DEDICATION

to my becoming the first cadet to win a British Marshall Scholarship while at USAFA. Lindy became my advisor and mentor. His letter of recommendation was a key factor in winning that scholarship. At least once a week, my future wife Sue and I would stop by his office to say hi on the way to dinner (he pretty much always worked late ☺).

The picture in Figure 1 is from graduation after I received a medal from the country of Chile that goes to the #1 graduate in each class. Around the same time, Lindy was selected as USAFA Dean of Faculty and promoted to Brigadier General.

Fast-forward 5 years and I had decided to leave the Air Force.³ Although Lindy recommended that I stay in the Air Force, he gave me a job in the new commercial business he was building as part of Titan Corporation. It was there that I discovered an affinity for writing software, particularly in the e-learning field. Four years later, the hardest part of starting my own company, Platte Canyon Multimedia Software Corporation, was telling Lindy that I was leaving. He was fully supportive and even jumped in to help when I needed sage advice over the years.



Figure 1. Colonel Lindy Royer and Cadet Jeff Rhodes – 1987

³At the time I thought I wanted to get into politics. I was also undecided if I wanted to make the Air Force a career. The incentive was either to stay at least 20 years (when you are eligible for retirement) or get out as soon as you are eligible. I didn't understand how valuable that retirement was; I'm lucky that I have been able to buy those years back now that I have joined Civil Service.

When I decided to return to the Air Force as a Federal civilian in 2015, Lindy was very supportive and closed the deal by serving as a reference as I mentioned. He continues to serve as Vice President of the *Friends of the Air Force Academy Library* among other endeavors. Figure 2 shows a more recent picture of us. Lindy is an inspiration to me and many others!



Figure 2. *Lindy Royer and me next to my USAFA office – 2018*

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About the Author



Jeffrey M. Rhodes is the Academic Chief Technical Officer at the United States Air Force Academy. Prior to that, he was a Senior IT Specialist in charge of SharePoint, Remedy, and other key systems at the Academy. Jeff was the founder and Chief Technical Officer of Platte Canyon Multimedia Software Corporation, a leader in developing commercial e-learning software. He graduated at the top of his class at the Air Force Academy,

where he earned a Bachelor of Science in Electrical Engineering. Jeff received a master's degree in Economics from the London School of Economics, which he attended under a British Marshall Scholarship. He is the author of *Programming for e-Learning Developers: ToolBook, Flash, JavaScript, and Silverlight*; *VBTrain.Net: Creating Computer and Web Based Training with Visual Basic .NET*; and *The ToolBook Companion*. He lives in Colorado Springs with his wife Sue and is the proud father of his sons Derek and Michael.

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Arun loves challenges in the Microsoft playing field combining it with his domain knowledge in banking, insurance, FMCG, government (local), retail, and telecom. He is very active in community as author of international research papers, technical speaker, reviewer, blogger, and LinkedIn Sales Navigator. He is also recognized with the title of MCT from Microsoft and pursuing Doctor of Business Administration post his M.B.A. and M.Tech. (CS). Arun Sharma can be found on Twitter at [@arunkhoj](https://twitter.com/arunkhoj).

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Acknowledgments

Massive thanks go to my wife Sue. You are always loving and supportive. Asking you to marry me 31+ years ago was the best decision of my life.

From the time of my first book (2001), my sons Derek and Michael went from being in their first decade of life to college graduates and exceptional members of society. I am proud of your accomplishments and even prouder of the men you have become.

Finally, I would like to thank my sister Joni and my brother Jim. We've been very close our whole lives, and it has been a tremendous blessing. Joni is the rock of our family and the host of every family event. You will not find anyone with a bigger heart. Jim has endured tremendous physical struggles but perseveres with an amazingly positive attitude. Thanks for always loving and taking care of your little brother!

The original version of this book was revised. A correction to this book is available at https://doi.org/10.1007/978-1-4842-5331-1_24

Introduction

This book is targeted at power users and what I call business developers. While some of the applications and techniques require a degree of understanding programming, my objective is to make the solutions accessible to the non-computer scientist.¹ We are looking at client-side solutions that can be accomplished with the built-in Office 365 applications (primarily SharePoint, PowerApps, Flow, Forms, and Power BI) as well as additional SharePoint capabilities using JavaScript, InfoPath, and/or SharePoint Designer. The solutions target Office 365² except where noted, but many of the SharePoint solutions will work in SharePoint 2013 or older versions as well.

Audience Level

While some programming expertise will be helpful for some of the more advanced examples, we do *not* assume that you are a programmer. Anyone who is willing to learn and feels at home in front of a keyboard is welcome.

¹Which I am as well. My undergraduate degree is in Electrical Engineering, while my master's is in Economics.

²Most examples are for the version of SharePoint included with Office 365 for Business Plan. Some features shown, particularly *Microsoft Forms* and publishing to *Power BI*, use Office 365 for Education.

A Bit of Background

What makes me qualified to write a book like this? I mentioned in the “Acknowledgments” section that I had never used SharePoint until I started at the Air Force Academy in March 2015. At that time, we were migrating from SharePoint 2010 to 2013. I found that my skills in JavaScript, jQuery, Cascading Style Sheets (CSS), REpresentational State Transfer (REST), and general programming served me well and gave me the baseline to explore SharePoint’s capabilities, particularly adding JavaScript/jQuery and taking advantage of InfoPath and SharePoint Designer.

Separately at first, I discovered *Power BI* and started using it to visualize SharePoint surveys, Excel spreadsheets, Remedy tickets,³ and Access databases. When we moved to Office 365 at the Academy, we now had Power BI in the browser as well as *PowerApps*, *Flow*, and *Forms* to add more power. I particularly fell in love with PowerApps, as you will see in the chapters to come.

I hope you can apply some or all of these solutions in your environment.

³I managed our BMC Remedy help ticketing environment. I found that pointing Power BI directly at the SQL Server database allowed for much improved ticket tracking and displaying survey results. We cover that solution later in this book.

CHAPTER 1

Enabling SharePoint Designer and Custom Scripting

Many of the SharePoint solutions to follow involve either connecting with *SharePoint Designer* or injecting custom JavaScript, Hypertext Markup Language (HTML), and/or Cascading Style Sheets (CSS) content into a SharePoint page. Both of these are disabled by default in Office 365. Fortunately, the same solution described in the following fixes both issues.

For injecting JavaScript, HTML, and/or CSS, I typically insert a *Content Editor* web part. However, Office 365 “modern” pages are missing both the *Content Editor* and *Script Editor* as shown in Figure 3.

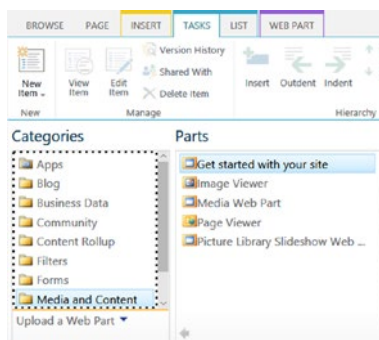


Figure 3. Missing Content Editor in Office 365

If you have administrator rights, you can follow the steps listed next to add the *Content Editor* back. If not, you can pass this along to an administrator. If you are using an older version of SharePoint, the *Content Editor* will already be there.

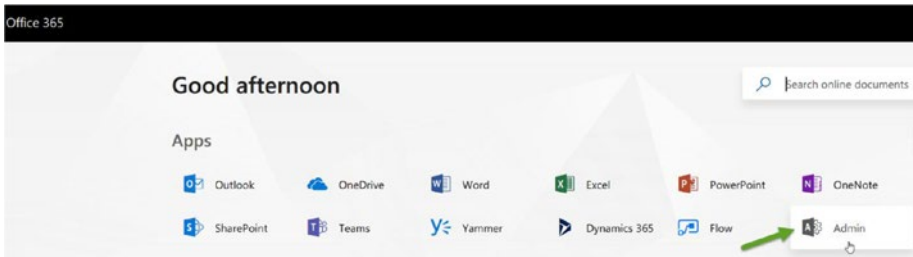


Figure 4. Office 365 dashboard showing the Admin button

1. Go to the Office 365 dashboard and select *Admin* as shown in Figure 4.
2. Select the SharePoint *admin center*.
3. Select *settings*.
4. Finally, choose the options *Allow users to run custom script on personal sites* as well as *Allow users to run custom script on self-service created sites*. Notice the warning that changes might take up to 24 hours. All of these options are shown in Figure 5.

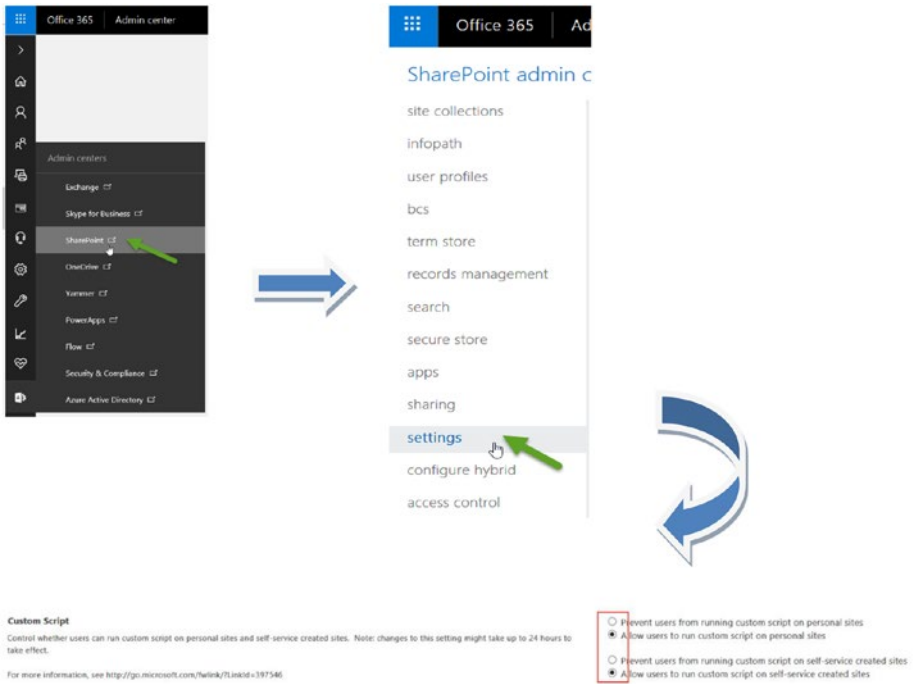


Figure 5. Opening the SharePoint admin center and allowing users to run custom scripts

Once Office 365 has updated the settings, Figure 6 shows that the *Content Editor* is now available.

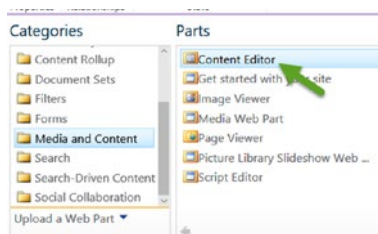


Figure 6. Content Editor available after updating SharePoint settings

CHAPTER 2

Updating a SharePoint List Using PowerApps

*PowerApps*¹ is a powerful new form tool in Office 365. It is not a direct replacement of *InfoPath* (which we also use in this book) as it does things differently (and often better). I particularly like that PowerApps can be created completely in the browser, are optimized for mobile devices, can connect to a multitude of data sources, and have a familiar Visual Basic-like syntax.²

In this chapter, we will build a simple application to view and update a SharePoint list. Our overall objective is to create a help ticketing system with these requirements:

- Users will fill out a form when they arrive in person at the help desk. It will only include information that they know such as issue, description, who they are, and their department.

¹I found Shane Young of BoldZebras' YouTube channel helpful for learning about PowerApps: www.youtube.com/channel/UC7_OGRP8BYvtGB8eZdPG6Ng.

²For example, by using the & to concatenate values. I'm a big Visual Basic fan and actually wrote a previous book called *VBTrain.Net: Creating Computer and Web Based Training with Visual Basic .NET*.

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CHAPTER 2 UPDATING A SHAREPOINT LIST USING POWERAPPS

- Technicians see new items by default but can search for existing items. They can set additional information such as the status, issue category, assigned technician, and notes. Technicians can also add items for situations like phone and email support.

We will build the data source (SharePoint list), make relatively minor changes to the default form, and then create another form to add to or update the list. We will then continue the development in Chapter 15.

Figure 7 shows our SharePoint list along with the default form. Notice that clicking the *Customize with PowerApps* link launches PowerApps.



Figure 7. Help Tickets SharePoint list with corresponding SharePoint form. Clicking *Customize with PowerApps* launches PowerApps

Customizing the form won't meet all our requirements only a single form can be launched when the user clicks *New* (we want separate forms for users and technicians). Plus, we don't want to have to go to

the SharePoint site at all. We want to make all edits via PowerApps. The SharePoint site will instead mainly be a *Power BI* data source for visualizations showing our ticket information.³

There is still some value in customizing the form as it gives us nice new capabilities and helps us learn PowerApps. One of the first things you will notice in our customized form is that the *Description* is now only a single line. Figure 8 shows how we drag the *Height* to give more space and then set the *Mode* property to be *TextMode.MultiLine*. While we were at it, we set the *HintText* property to give the user more instructions on what to do.

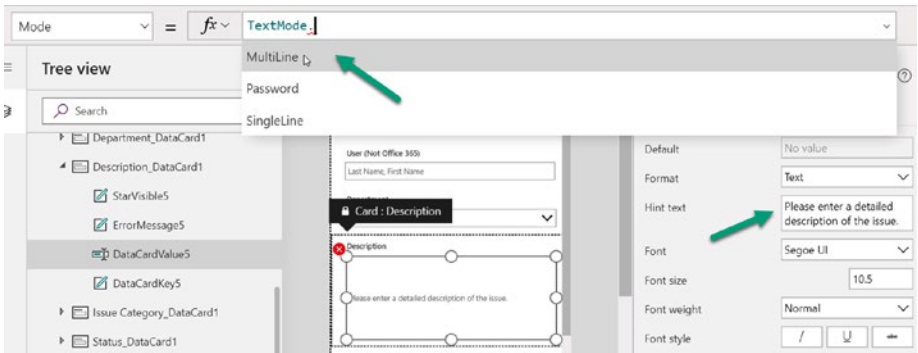


Figure 8. Updating the *Height*, *HintText*, and *Mode* properties of the *Description* input

Figure 9 shows the resulting form in SharePoint.

³We will dig deep into Power BI in later chapters. Another use of SharePoint would be to have a “New Tickets” view that could be sorted by date and time. Technicians could use to determine who has been waiting longest and call that person next. We hope to build this into the PowerApps technician application as well.

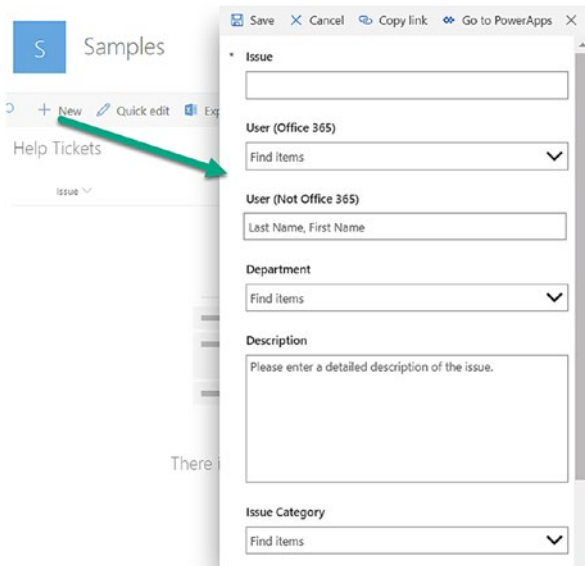


Figure 9. *New Item form customized with PowerApps*

More powerful in our case will be to use PowerApps to create a mobile-friendly application for adding, deleting, and editing items as well as searching. To do that, we launch PowerApps directly from our Office 365 home screen. We then choose the *Start from data* Canvas app. This default to the *phone* size (the other choice we can do from a blank app is *tablet*). From there, we select SharePoint as our data source. We enter in the URL for our site (just include the site and not the list). Figure 10 shows the result. Notice how PowerApps created the screens for browsing the data, viewing the details, and editing the data. We update the *App name* and *Description* properties and then set the application to *Confirm exit* and then set a corresponding message.

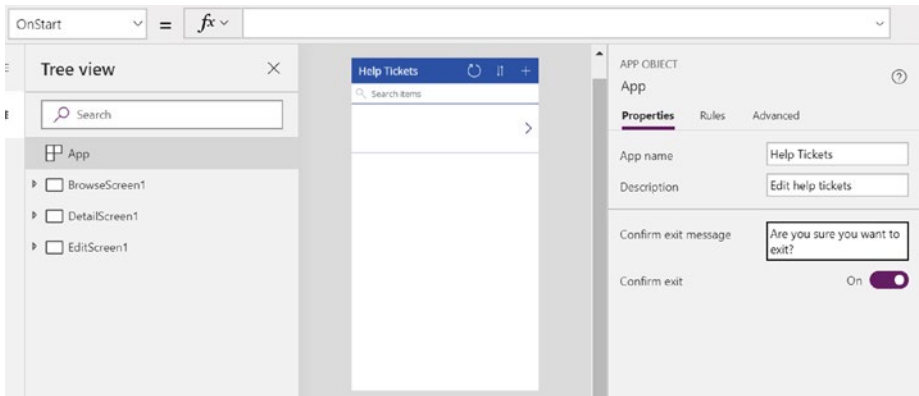


Figure 10. PowerApps application with Browse, Details, and Edit screens

We could do extensive edits as needed within PowerApps, but we will save this for a more customized solution in Chapter 15. For now, we will save⁴ and then share it with other users. Figure 11 shows the resulting *New Item* screen. Notice that we could access this with the *PowerApps* mobile application as well.

⁴Be sure to save immediately as automatic saving does not kick in until you save the application the first time.

The screenshot shows the 'New Item' form for a 'Help Tickets' list. The form is titled 'Help Tickets' and has a close button (X) and a checkmark button. The fields are as follows:

- * Issue:** Text input field containing 'Test Issue'.
- User (Office 365):** Dropdown menu with 'Find items' selected.
- User (Not Office 365):** Empty text input field.
- Department:** Dropdown menu with 'Engineering' selected.
- Description:** Empty text input field.
- Issue Category:** Dropdown menu with 'Computer Hardware', 'Networking Issue', and 'New Account' visible. 'Computer Hardware' is currently selected.

Figure 11. *New Item screen for Help Tickets list*

CHAPTER 3

Customizing Date Displays with jQuery

One of the richest opportunities for customizing SharePoint functionality is by using JavaScript and, in particular, the popular open source library, *jQuery*.¹ At the Air Force Academy, we added it as well as the *jQuery UI*² set of controls to our master pages, making the libraries available on every page in our environment. I won't do that with these Office 365 examples, but it is fairly easy to link to them directly.

In this example, the customer asked for dates in a *Task List* to show up in amber when the *Due to Director* or *Overall Suspense* dates are within 7 days of the current date. The dates need to be in red once those dates have passed. As shown in Figure 12, the *Due to Director* already shows up in red since that functionality is built in for the *Due Date* column only. But we need jQuery to help us with the rest.

¹Learn more, download, contribute, and read the documentation at <http://jquery.com>.

²jQuery UI allows you to “skin” controls with a standard or customized theme. I've used the *Button* and *Dialog* controls extensively in SharePoint and the rest of the controls in other applications. We cover this in the next chapter. Visit <http://jqueryui.com> to learn more.

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