Microsoft

Programming Microsoft Office 365

CURRENT BOOK SERVICE

Covers Microsoft Graph, Office 365 applications, SharePoint Add-ins, Office 365 Groups, and more

Professional

Paolo Pialorsi

FREE SAMPLE CHAPTER

SHARE WITH OTHERS

Microsoft

Programming Microsoft Office 365

Covers Microsoft Graph, Office 365 applications, SharePoint Add-ins, Office 365 Groups, and more

Paolo Pialorsi

PUBLISHED BY
Microsoft Press
A division of Microsoft Corporation
One Microsoft Way
Redmond, Washington 98052-6399

Copyright © 2016 by Paolo Pialorsi

All rights reserved. No part of the contents of this book may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

Library of Congress Control Number: 2015938171
ISBN: 978-1-5093-0091-4

Printed and bound in the United States of America.

First Printing

Microsoft Press books are available through booksellers and distributors worldwide. If you need support related to this book, email Microsoft Press Support at *mspinput@microsoft.com*. Please tell us what you think of this book at *http://aka.ms/tellpress*.

This book is provided "as-is" and expresses the author's views and opinions. The views, opinions and information expressed in this book, including URL and other Internet website references, may change without notice.

Some examples depicted herein are provided for illustration only and are fictitious. No real association or connection is intended or should be inferred.

Microsoft and the trademarks listed at *http://www.microsoft.com* on the "Trademarks" webpage are trademarks of the Microsoft group of companies. All other marks are property of their respective owners.

Acquisitions Editor: Devon Musgrave
Developmental Editor: Devon Musgrave
Editorial Production: Cohesion
Technical Reviewer: Steve Caravajal; Technical Review services provided by Content Master, a member of CM Group, Ltd.
Copyeditor: Ann Weaver
Indexer: Jack Lewis
Cover: Twist Creative • Seattle

This book is dedicated to my family: Paola, Andrea, and Marta. I love you!

—Paolo Pialorsi

This page intentionally left blank

Contents at a glance

Introduction *xv*

PART I GETTING STARTED

CHAPTER 1 Microsoft Office 365: A quick tour 3
CHAPTER 2 Overview of Office 365 development 31

PART II OFFICE 365 PROGRAMMING MODEL

CHAPTER 3 Microsoft Graph API reference 53
CHAPTER 4 Azure Active Directory and security 95

PART III CONSUMING OFFICE 365

CHAPTER 5 Mail, calendar, and contact services 131
CHAPTER 6 Users and Groups services 171
CHAPTER 7 File services 191
CHAPTER 8 Microsoft Graph SDK for .NET 209
CHAPTER 9 SharePoint REST API 237

PART IV SHAREPOINT AND OFFICE APPS

CHAPTER 10 Creating Office 365 applications 271
CHAPTER 11 Overview of Office Add-ins 321
CHAPTER 12 Publishing your applications and add-ins 351

Index *375*

This page intentionally left blank

Table of Contents

Introduction . . . . . *xv*

PART I GETTING STARTED

Chapter 1 Microsoft Office 365: A quick tour 3

What is Microsoft Office 365? 3
Microsoft Office 365 services 4
Microsoft Office on PC/Mac and Click-to-Run 16
Licensing and subscription plans 17
Administration in Office 365 19
The new Office 365 Admin Center 20
The classic Office 365 Admin Center 23
Summary 29

Chapter 2 Overview of Office 365 development 31

Setting up your development environment 31
Setting up an Office 365 developer tenant 31
Configuring your development machine 32
Office 365 Developer Patterns & Practices tools 33
Preparing for the SharePoint Framework 36
Office 365 applications development 37
Web applications 38
Native applications 41
Office 365 Connectors 41
SharePoint online development 43
SharePoint Add-ins 43

What do you think of this book? We want to hear from you!

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

microsoft.com/learning/booksurvey

Remote timer jobs for SharePoint....44
Remote event receivers....46
Remote provisioning....46
Office client development....47
Summary....50

PART II OFFICE 365 PROGRAMMING MODEL

Chapter 3 Microsoft Graph API reference 53

What is the Microsoft Graph API?....53
Microsoft Graph API metadata....57
Consuming users and security groups....59
Yourself and other users....59
Security groups....63
Consuming mail, contacts, and calendars....63
Mail messages....64
Contacts....71
Calendars and events....73
Event invitations....78
Consuming OneDrive for Business....79
Querying files and folders....80
Managing files and folders....85
Searching within a drive....88
Sharing files and folders....89
Working with Office 365 Groups....90
Summary....93

Chapter 4 Azure Active Directory and security 95

Introducing Azure Active Directory....95
Identities in Azure AD....97
Managing Office 365 identities....98
Configuring apps and services in Azure AD....100
Manual configuration....100
Multitenancy....106

Using Microsoft Visual Studio 107
Understanding OpenID Connect and OAuth 2.0 110
The OpenID Connect communication flow 111
Under the cover of OpenID Connect and OAuth 2.0 113
Active Directory Authentication Library 123
Using ADAL in an ASP.NET MVC web application 123
Summary 127

PART III CONSUMING OFFICE 365

Chapter 5 Mail, calendar, and contact services 131

Setting up the environment 131
Mail services 140
Reading folders, messages, and attachments 140
Sending an email message 147
Reply, reply all, and forward email messages 148
Calendar services 149
Reading calendars and events 149
Browsing calendar views 155
Managing series of events 156
Creating and updating events 159
Managing invitations for meeting requests 163
Contact services 163
Reading contacts 164
Managing contacts 168
Summary 169

Chapter 6 Users and Groups services 171

Users services 171
Reading users 172
Groups services 177
Browsing groups 177
Managing groups 180
Managing group membership 181

Office 365 Groups services 182
Querying Office 365 Groups 182
Office 365 Groups capabilities 184
Creating or updating Office 365 Groups 188
Summary 190

Chapter 7 File services 191

Working with drives, files, and folders 191
Browsing for files and folders 192
Consuming files 195
Uploading and updating files 198
Permissions and sharing 204
Managing files permissions 204
Sharing a file 206
Summary 207

Chapter 8 Microsoft Graph SDK for .NET 209

Introduction to the Microsoft Graph SDK 209
Registering the app and using the SDK 210
Request model 214
Querying resources 216
Basic query operations 216
Handling paging of collections 218
Managing resources 220
Adding a resource to a collection 221
Updating a resource 224
Deleting a resource 224
Handling exceptions and concurrency 225
Real-life examples 226
Sending an email 227
Searching for Office 365 Groups 228
Handling content of Office 365 Groups 228
Managing current user's photo 231
Managing current user's manager and direct reports 232

Uploading a file to OneDrive for Business 234
Searching for files in OneDrive for Business 235
Downloading a file from OneDrive for Business 235
Summary 236

Chapter 9 SharePoint REST API 237

Introducing the REST API. 237
API reference 240
Querying data 244
Managing data 249
Cross-domain calls. 253
Security 254
Common REST API usage 256
Creating a new list 258
Creating and updating a list item 259
Deleting an existing list item 261
Querying a list of items 262
Creating a new document library 263
Uploading or updating a document 264
Checking in and checking out documents. 265
Deleting a document 267
Querying a list of documents. 268
Summary 268

PART IV SHAREPOINT AND OFFICE APPS

Chapter 10 Creating Office 365 applications 271

Solution overview 271
Creating and registering the Office 365 application 272
Azure AD application general registration 273
App-only authorization registration 274
Setting Azure AD permissions 278
Basic UI elements with Office UI Fabric. 279
Office 365 suite bar and top navigation 281

Responsive grid 287
Custom components and styles 288
Extending and consuming SharePoint Online 290
Extending the UI of SharePoint Online 291
Provisioning SharePoint artifacts 293
Consuming SharePoint Online with delegated permissions 296
Using the Microsoft Graph 297
Creating and consuming the project's Office 365 Group 298
Sending notifications on behalf of users 300
Creating asynchronous jobs 302
Remote timer job architecture 302
Creating a remote timer job in Azure 303
Publishing the application on Azure 310
Publishing the Azure App Service 311
Publishing the WebJob 312
Office 365 Connectors 313
Creating and registering a webhook 314
Writing the project's connector 316
Summary 320

Chapter 11 Overview of Office Add-ins 321

Introducing Office Add-ins 321
Tools for creating Office Add-ins 322
Add-in manifest 323
Creating Outlook Add-ins 324
Add-in manifest for Outlook 325
Your first Outlook Add-in 328
A more realistic example 330
Using Yeoman generator 339
Office JavaScript APIs 342
Creating Content and Task Pane Add-ins 344
Summary 349

Chapter 12 Publishing your applications and add-ins 351

Options for publishing add-ins and web applications 351
Private corporate publishing 351
Office Store 353
File share publishing 353
Using the Seller Dashboard 354
Publishing Office Add-ins 355
Publishing SharePoint Add-ins 359
Publishing Office 365 web applications 361
Updating or deleting add-ins or Office 365 web applications. 361
Licensing model 362
Types of licenses. 362
Checking license in code 364
Best practices for handling licenses in code 371
Metrics and company profile 372
Metrics. 372
Office Profile 373
Summary 373

Index *375*

What do you think of this book? We want to hear from you!

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

microsoft.com/learning/booksurvey

Introduction

Microsoft Office 365 is a cloud-based software solution that Microsoft offers as a service, targeting the customers who want to externalize the main services they use to run their businesses, like email, collaboration, video conferencing, file sharing, and so on. From a developer perspective, the Microsoft Office 365 offering is a great opportunity to build smart, mobile-aware, and fully integrated solutions that potentially can be sold to millions of users through the public Office Store, leveraging the Office 365 ecosystem and embracing the new add-in development model.

Programming Microsoft Office 365 provides a clear and practical overview of the architectural aspects of Microsoft Office 365 and of the services included in the platform. Moreover, by reading this book, you can learn about the Microsoft Graph API and the Microsoft Graph SDK and about how to create and distribute Office 365 applications, SharePoint Add-ins, and Office Add-ins that fully leverage the Office 365 ecosystem.

Who should read this book

This book is intended to help existing SharePoint and Office developers target the new Office 365 offering, upgrading their skills and knowledge related to the new cloud-based development model. Although it is not fundamental to know about SharePoint and Office 365, this book is really useful for developers who come from the old server-side or full trust code development world. Nevertheless, the book can be useful for developers working with any kind of platform, as long as they can make HTTP requests against the Microsoft Graph API.

Assumptions

This book expects that you have at least a minimal understanding of web development, especially of HTTP, REST, and JSON. Moreover, if you are a .NET developer and you know about ASP.NET, you will find it easier to follow and understand some of the code samples shared within the book. Although the Microsoft Graph API is available to any development platform that supports HTTP and JSON, most of the samples in this book are based on ASP.NET,C#, and PowerShell.

With a heavy focus on the Microsoft Graph API, Azure Active Directory, and the architectural patterns for creating real business-level solutions, this book assumes that you have a basic understanding of the most common collaboration needs.

This book might not be for you if . . .

This book might not be for you if you are not developing solutions for Office 365 or for SharePoint. Moreover, if you don't know anything about C# and ASP.NET, you could find it difficult to understand some of the code samples related to the book.

In contrast, if you are an experienced Office 365 developer using the latest tools and techniques like those illustrated in the Office 365 Developer Patterns & Practices community project, you may already know some of the information shared through this book.

Organization of this book

This book is divided into four sections, each of which focuses on a different aspect or technology related to developing Office 365 solutions. Part I, "Getting started," provides a quick overview of Microsoft Office 365 and the offered services as well as an overview of the extensibility points available and suitable for creating real business-level solutions built on top of Office 365. Part II, "Office 365 programming model," gives you fundamental knowledge about the Microsoft Graph API, from a REST and JSON viewpoint. Moreover, there is a solid introduction to Azure Active Directory (Azure AD) and how to configure authentication and authorization in custom developed solutions that leverage Azure AD. Part III, "Consuming Office 365," provides concrete and practical examples of how to use the Microsoft Graph API in .NET, leveraging Mail, Calendar, Contacts, Users and Groups, and File services. Furthermore, in Part III you can learn about the Microsoft Graph SDK for .NET and about the SharePoint REST API. Finally, Part IV, "SharePoint & Office Add-ins," provides you information about how to architect and create real business-level Office 365 applications and gives some overview information about how to create Office Add-ins. The last chapter of the book gives instructions on how to publish your custom development solutions, whether you are releasing an Office 365 application, a SharePoint Add-in, or an Office Add-in.

Finding your best starting point in this book

The sections of *Programming Microsoft Office 365* cover a wide range of technologies associated with the services Office 365 offers. Depending on your needs and your existing understanding of Office 365, you may wish to focus on specific areas of the book. Use the following table to determine how best to proceed through the book.

If you are	Follow these steps
New to Office 365 in general	Start from Chapter 1 and read the entire book in sequence.
New to Office 365 development or an existing SharePoint 2013 (or earlier) developer, but aware of Office 365 architecture and services	Briefly skim Part I if you need a refresh on the core concepts. Read from Part II through Part IV.
New to the Microsoft Graph API	Read Part II and Part III. Read Part IV if you need to create Office 365 applications or Office Add-ins.
Experienced Microsoft Graph API developer	Briefly skim Part II if you need a refresh on the main topics. Read Part IV to understand how to create real solutions that leverage the Microsoft Graph API.

Most of the book's chapters include code samples that let you try out the concepts you just learned. No matter which sections you choose to focus on, be sure to download and install the sample applications on your system.

Conventions and features in this book

This book presents information using conventions designed to make the information readable and easy to follow.

- In most cases, the book provides step-by-step code samples that you can follow on your own development machine. It is suggested that you download the code samples related to the book to follow the samples more easily.
- Boxed elements with labels such as "Note" provide additional information or alternative methods for completing a step.
- Text that you type (apart from code blocks) appears in bold.
- A vertical bar between two or more menu items (for example, File | Close), means that you should select the first menu or menu item, then the next, and so on.

System requirements

You will need the following hardware and software to complete the practice exercises in this book:

- Any Windows version that can run Microsoft Visual Studio 2015 Update 2 or later or any Mac operating system that can run Visual Studio Code
- Microsoft Visual Studio 2015 Update 2 or Visual Studio Code

- Computer that has a 1.6 GHz or faster processor (2 GHz recommended)
- 1 GB (32-bit) or 2 GB (64-bit) RAM
- 10 GB of available hard disk space
- 5400 RPM hard disk drive
- DirectX 9 capable video card running at 1024 × 768 or higher resolution display
- DVD-ROM drive (if installing Visual Studio from DVD)
- Internet connection to download software or chapter examples and to connect to Microsoft Office 365 and Microsoft Azure
- A Microsoft Office 365 subscription and access to the Office 365 admin portal
- A Microsoft Azure subscription and access to the Azure portal
- Telerik Fiddler 4 (*http://www.telerik.com/fiddler*)

Depending on your Windows configuration, you might require local administrator rights to install or configure Visual Studio 2015.

If you don't have an Office 365 subscription, you can sign up to join the Office 365 Developer Program, and you will get a one-year FREE Office 365 Developer subscription at the following URL: *http://dev.office.com/*.

Downloads

Most of the chapters in this book include exercises that let you interactively try out new material learned in the main text. All sample projects can be downloaded from the following page:

https://aka.ms/ProgOffice365/downloads

Follow the instructions on the target page to download the code sample files.

Note In addition to the code samples, your system should have Visual Studio 2015 or Visual Studio Code installed. If available, install the latest service packs for each product.

Installing the code samples

Follow these steps to install the code samples on your computer so that you can use them with the exercises in this book.

1. Unzip the ProgOffice365.ZIP file that you downloaded from the book's website.
2. If prompted, review the displayed end user license agreement. If you accept the terms, select the Accept option, and then click Next.

Using the code samples

All the code samples are stored within a unique .ZIP file, which can be downloaded and installed following the instructions provided in the previous paragraphs.

- Samples of Chapter 3, "Microsoft Graph API reference," are made of a .SAZ file for Fiddler 4 (*http://www.telerik.com/fiddler*). Install Fiddler 4 and open the file, which is included in the .ZIP file related to the book. Browse the HTTP requests and responses and inspect the related JSON messages, following the flow of the chapter.
- Samples of Part III, "Consuming Office 365" are included in folder MicrosoftGraph.Office365.Generic of the .ZIP file.
- Samples of Chapter 8, "Microsoft Graph SDK for .NET," are included in folder MicrosoftGraph.Office365.DotNetSDK of the .ZIP file.
- Samples of Chapter 9, "SharePoint REST API," are included in folder SharePoint.RESTAPI of the .ZIP file.
- Samples of Chapter 10, "Creating Office 365 applications," are included in folder BusinessApps.O365ProjectsApp of the .ZIP file.
- Samples of Chapter 11, "Overview of Office Add-ins," are included in folder Outlook.ConsumeGraphAPI of the .ZIP file.

Current Book Service

This book is part of our new Current Book Service, which provides content updates for major technology changes and improvements related to programming Office 365. As significant updates are made, sections of this book will be updated or new sections will be added to address the changes. The updates will be delivered to you via a

free Web Edition of this book, which can be accessed with any Internet connection at *MicrosoftPressStore.com*.

Register this book at *MicrosoftPressStore.com* to receive access to the latest content as an online Web Edition. If you bought this book through *MicrosoftPressStore.com*, you do not need to register; this book and any updates are already in your account.

How to register your book

If you have not registered your book, follow these steps:

1. Go to *www.MicrosoftPressStore.com/register*.
2. Sign in or create a new account.
3. Enter the ISBN found on the copyright page of this book.
4. Answer the questions as proof of purchase.
5. The Web Edition will appear under the Digital Purchases tab on your Account page. Click "Launch" to access your product.

Find out about updates

Sign up for the What's New newsletter at *www.MicrosoftPressStore.com/newsletters* to receive an email alerting you of the changes each time this book's Web Edition has been updated. The email address you use to sign up for the newsletter must be the same email address used for your *MicrosoftPressStore.com* account in order to receive the email alerts. If you choose not to sign up, you can periodically check your account at *MicrosoftPressStore.com* to find out if updates have been made to the Web Edition.

This book will receive periodic updates to address significant software changes for 12 to 18 months following first publication date. After the update period has ended, no more changes will be made to the book, but the final update to the Web Edition will remain available in your account at *MicrosoftPressStore.com*.

The Web Edition can be used on tablets that use current web browsers. Simply log into your *MicrosoftPressStore.com* account and access the Web Edition from the Digital Purchases tab.

For more information about the Current Book Service, visit *www.MicrosoftPressStore.com/CBS*.

Acknowledgments

This book has been the most complex and challenging manuscript I ever wrote. Usually, writing a book is a well-defined and time-scoped process, which can be accomplished following a clear schedule.

However, this book covers a topic (Microsoft Office 365) that is continuously changing and growing, almost on a monthly basis, and what you write now should be slightly different within the next few months. Luckily, and thanks to Microsoft Press, I had the opportunity to embrace the Current Book Service model, which allows me to keep the book updated in electronic format and allows you—the reader—to read a continuously updated book that will follow the evolution of the target product. In fact, we will ship three updates within the next 18 months after the first release of the book, and you will be able to stay on track, refreshing and updating your knowledge according to the growth of Microsoft Office 365.

First of all, I would like to thank Microsoft Press and all the publishing people who contributed to this book project. Mainly, I'd like to thank Devon Musgrave, who trusted me and allowed me to write this book and made it possible for this book to be part of the Current Book Service model. Devon helped me during the production process of this book, and without him and his contribution this book wouldn't be possible.

In addition, my colleagues in the Core Team of the Office 365 Dev and SharePoint Patterns & Practices (PnP: *http://aka.ms/OfficeDevPnP*) deserve special thanks because they greatly helped me create the content of this book, helping me find the right ideas and samples and sharing with me their vision, their time, and their minds. In particular, I would like to thank Vesa Juvonen, Bert Jansen, Erwin van Hunen, and Patrick Rodgers. PnP really rocks, and you guys rock even more! "Sharing is caring," and this book is clear proof of that.

Furthermore, I'd like to thank the people from Microsoft who helped me during the definition of the outline of this book. In particular, I want to thank Jeremy Thake, Luca Bandinelli, Yina Arenas, and Vittorio Bertocci.

Last but not least, there are special people who deserve a huge thank you. They are my wife, Paola, my son, Andrea, and my daughter, Marta. I need to thank them for their support, patience, and understanding during the last 12 months. We know that whenever daddy writes a book, it will be a very busy time. However, having you guys counting with me the chapters and the pages lasting to the end of the book and having your unconditioned support to achieve my goals helps me a lot. We are a team, and I'm really thankful for your fundamental and unique contribution.

Errata, updates, & book support

We've made every effort to ensure the accuracy of this book and its companion content. You can access updates to this book—in the form of a list of submitted errata and their related corrections—at:

https://aka.ms/ProgOffice365/errata

If you discover an error that is not already listed, please submit it to us at the same page.

If you need additional support, email Microsoft Press Book Support at *mspinput@microsoft.com*.

Please note that product support for Microsoft software and hardware is not offered through the previous addresses. For help with Microsoft software or hardware, go to *http://support.microsoft.com*.

Free ebooks from Microsoft Press

From technical overviews to in-depth information on special topics, the free ebooks from Microsoft Press cover a wide range of topics. These ebooks are available in PDF, EPUB, and Mobi for Kindle formats, ready for you to download at:

http://aka.ms/mspressfree

Check back often to see what is new!

We want to hear from you

At Microsoft Press, your satisfaction is our top priority, and your feedback our most valuable asset. Please tell us what you think of this book at:

http://aka.ms/tellpress

We know you're busy, so we've kept it short with just a few questions. Your answers go directly to the editors at Microsoft Press. (No personal information will be requested.) Thanks in advance for your input!

Stay in touch

Let's keep the conversation going! We're on Twitter: *http://twitter.com/MicrosoftPress*