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1ST EDITION

Extending Dynamics 365 Finance and Operations Apps with Power Platform

Integrate Power Platform solutions to maximize the efficiency of your Finance & Operations projects

ADRIÀ ARISTE SANTACREU

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To my wife, Eva, for her support and encouragement in the moments of doubt while writing this book. And to my parents, Pili and Adrià, for providing me with an education, despite the fact that I wasn't the most dedicated of students.

– Adrià Ariste Santacreu

Contributors

About the author

Adrià Ariste Santacreu has been working in the Microsoft Business Applications sphere since 2010, starting with Axapta and Microsoft Dynamics AX, and since 2016 with Microsoft Dynamics 365 F&O. Adrià is a technical solutions architect and developer who loves solving requirements with all the tools available in the Microsoft ecosystem, including Power Platform and the Azure services that can be used with Finance and Operations. Adrià has been recognized as a Microsoft MVP since 2020 in the Business Applications category thanks to his community contributions, including speaking at events and conferences and writing technical articles about Dynamics 365 F&O, Azure, Dataverse, and the Power Platform.

About the reviewers

Cesar Garibaldo is a principal consultant in Microsoft's Industry Solutions Delivery team, with over 13 years of experience implementing D365 F&O and 4 years in D365 CE/Power Platform. With a dual proficiency in both functional areas (Finance, SCM, Sales) and technical roles (Integrations, Data Migration, Development), he has contributed to over 25+ ERP/CRM implementations across 14 industries (Professional Services, Retail, Government) in the US, Canada, and Latin America. Fluent in both English and Spanish, Cesar has successfully delivered projects in both languages. He holds multiple certifications in D365 F&O, CE, and Power Platform.

Nathan Clouse, a Microsoft MVP, is renowned for his expertise in ERP and Microsoft Dynamics Finance and Operations. His career is marked by a passion for developing practical, results-oriented technology solutions that align closely with business objectives. With a robust background in business and accounting, Nathan excels at bridging the gap between technical and business perspectives, ensuring that technology implementations enhance operational efficiency and meet strategic goals. His active role in the technology community highlights his dedication to sharing knowledge and contributing to the advancement of enterprise technology solutions.

I would like to thank my wife and children, the author, and the publishing team.

— Nathan Clouse

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Preface

I have been lucky enough to have been working with Dynamics 365 Finance and Operations since it was released in 2016, when it was first known as AX7. At that time, everything was new for the people who had been working with the previous versions such as Axapta 3.0 or Microsoft Dynamics AX 2009/2012.

During the first months of its life, it went through several name changes and suffix additions and removals, but it was just our old Dynamics AX with a shiny new face. Slowly but steadily, it developed into what it is today.

I remember my first contact with Power Platform as clear as day. It was in 2019 during the Microsoft Business Applications Summit in Atlanta. I attended a session where we followed a hands-on lab in which we used AI Builder. I won't lie and make up a magical story wherein I saw all the potential that Power Platform had, because it wasn't like that.

But I can tell you when that moment was: when we got the virtual tables (called virtual entities at the time) functionality, being able to use F&O data from Power Platform with its native connector, and, above all, all the convergence plans where both Power Platform and Dynamics 365 F&O started to benefit from a more real and reliable integration like the one we have today.

With all these changes, and F&O projects having more of a presence in Power Platform, we as consultants need to learn about it. I think this book can serve as an overview of the tools Power Platform has for F&O, from how we can use and integrate data with dual-write or virtual tables, to creating new functionality outside the Enterprise Resource Planning (ERP) with Power Apps and Power Automate.

As a result, this book is intended to help F&O consultants learn more about Power Platform, as well as Power Platform consultants to learn about some of the different concepts in F&O.

Who this book is for

This book will help consultants specializing in Dynamics 365 Finance and Operations, along with those in the Power Platform field, who are eager to discover how to effectively use various Power Platform tools in their F&O projects.

Technical and solutions architects will find value in acquainting themselves with strategies for addressing business needs using the array of tools provided by Power Platform.

Functional and technical consultants will also benefit from reading this book to learn how we can integrate the data from the ERP and Dataverse and get a general overview of Power Platform.

What this book covers

Chapter 1, *Dynamics 365 F&O and Low-Code Development*, discusses how development has been done traditionally in F&O and how low-code tools like those in Power Platform can help us speed it up. An overview of Power Platform and Dataverse is also provided.

Chapter 2, *Dual-Write and Virtual Tables*, shows how we can integrate the data from F&O into Dataverse and the benefits and issues that come with both methods.

Chapter 3, *Power Automate Flows in Dynamics 365*, provides an overview of Power Automate, its connectors, and the triggers and actions we can have inside a flow. We also compare and learn about the differences between using the Dynamics 365 F&O connector and the Dataverse one with virtual tables in flows.

Chapter 4, Replacing F&O Processes with Power Automate, discusses how we can extend the workflow functionality in F&O using Power Automate and have users approve or reject flows from Teams or emails.

Chapter 5, Building Automations and Integrations, shows how we can use a Power Automate flow instead of X++ to connect to a FTP/SFTP server to retrieve a file and update data inside F&O.

Chapter 6, *Power Apps: What's in It for Finance and Operations Consultants*, serves as an introduction to Power Apps and how we can embed them in existing F&O forms.

Chapter 7, Extend F&O Apps with Power Apps, shows an example of building a canvas Power App in which we display F&O data, create filters, and update the data back in F&O from the canvas app.

Chapter 8, Power BI reporting for Dynamics 365 F&O Apps, shows how we can export data from F&O into Azure Data Lake Storage thanks to the Synapse Link functionality and virtual tables.

Chapter 9, *Integrating AI Builder*, introduces us to AI Builder and its custom and pre-trained models, and shows examples of using those models inside a Power App and from Power Automate.

Chapter 10, Environment Management, serves as an introduction to the Power Platform admin center and Dataverse environments.

Chapter 11, Solution Management, serves as an introduction to the Application Lifecycle Management (ALM) concept and shows the differences between managed and unmanaged solutions, along with examining how we can move the components we create between environments.

To get the most out of this book

You need to have basic knowledge of Dynamics 365 F&O and some concepts, such as data entities, along with an understanding of modules such as Accounts payable or Accounts receivable.

Software/hardware covered in the book	Operating system requirements
Dynamics 365 Finance and Operations Apps	Windows, macOS, or Linux
Power Platform	Windows, macOS, or Linux

If you are using the digital version of this book, we advise you to type the code yourself or access the code from the book's GitHub repository (a link is available in the next section). Doing so will help you avoid any potential errors related to the copying and pasting of code.

Download the example code files

You can download the example code files for this book from GitHub at `https://github.com/PacktPublishing/Extending-D365-Finance-and-Operation-apps-with-Power-Platform-`. If there's an update to the code, it will be updated in the GitHub repository.

We also have other code bundles from our rich catalog of books and videos available at `https://github.com/PacktPublishing/`. Check them out!

Conventions used

There are a number of text conventions used throughout this book.

`Code in text`: Indicates code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles. Here is an example: "OData actions are special methods executed on data entities that are decorated with the `SysODataAction` attribute."

A block of code is set as follows:

```
Patch(
    'CustomersV3',
    LookUp('CustomersV3', 'Customer account' = CustomerGallery.
Selected.'Customer account'),
    {
        'Credit limit': Value(CreditLimitInput.Text)
    }
);
Refresh(CustomersV3);
Set(CreditLimitValue, Value(CreditLimitInput.Text));
```

When we wish to draw your attention to a particular part of a code block, the relevant lines or items are set in bold:

```
[SysODataAction('AASPostSalesOrder', false)]
    public static str postSalesorder(SalesId _salesId)
    {
        SalesFormLetter salesFormLetter;
        salesTable       salesTable;

        salesTable       = SalesTable::find(_salesId);
        salesFormLetter =
SalesFormLetter::construct(DocumentStatus::Invoice);

        salesFormLetter.update(salesTable, DateTimeUtil::date
(DateTimeUtil::applyTimeZoneOffset(DateTimeUtil::utcNow(),
DateTimeUtil::getCompanyTimeZone())), SalesUpdate::All,
AccountOrder::None, NoYes::No, NoYes::Yes);

        return CustInvoiceJour::findRecId(salesFormLetter.
parmJournalRecord().RecId).InvoiceId;
    }
```

Bold: Indicates a new term, an important word, or words that you see onscreen. For instance, words in menus or dialog boxes appear in **bold**. Here is an example: "If we open the **EntityKey** node under **Keys** we see there's only one field, the **CustomerAccount** one."

> **Tips or important notes**
>
> Appear like this.

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Part 1: Dynamics 365 Finance and Operations and Power Platform

In this part, we'll delve into the principles of low-code and no-code methodologies and their connection to Power Platform. Additionally, we'll explore the main methods for making F&O data available within Dataverse to use it in Power Platform.

This part has the following chapters:

- *Chapter 1*, *Dynamics 365 F&O and Low-Code Development*
- *Chapter 2*, *Dual-Write and Virtual Tables*

1

Dynamics 365 F&O and Low-Code Development

System customization in **Dynamics 365 Finance and Operations Apps** has been a developer job since its early days as Axapta. If you needed to change or create new processes for the ERP, you needed a developer. Now, thanks to **Power Platform**, we can accomplish some of these things using a *low-code approach* that can speed up development and also enhance the overall maintainability of F&O. The goal of this chapter is to provide an understanding of Power Platform and how it can help you, learning about Power Apps or Power Automate, and other low-code elements in Power Platform, allowing you to gain insights of this new technology paradigm.

We will explore the following in this chapter:

- Benefits of low-code and no-code
- The foundation of Power Platform – Dataverse
- Components of Power Platform

Benefits of low-code and no-code

If you've been working with Axapta, Dynamics AX, or the latest and current iteration of the product, Dynamics 365 Finance and Operations, you are already familiar with how changing the default behavior of the system when adding new functionality is done. It will probably involve a developer making changes or creating new objects.

And, if you know how the current development and deployment workflow is done, you must be aware that it's a time-consuming process. You need to have developers available, they must make changes or create a new feature, and once it's tested, you need to promote the changes to a sandbox environment and, finally, to your production environment. Deploying to production will require scheduling downtime, which can be inconvenient and must even be planned with enough time depending on your, or your customer's, business.

What can we do to minimize production downtime?

In an ideal world, the answer would be: plan ahead, make a thorough analysis of your requirements, and have a solid testing strategy before releasing something to production. However, bugs are often unavoidable, and changes of requirements do take place, and sometimes you won't test all the scenarios that will appear in the future.

Here is when Power Platform comes in handy to extend the Dynamics 365 F&O functionality. It will be very hard, or impossible in my opinion, to replace all **X++ developments** with Power Platform. But it's possible to use Power Platform's low-code tools to enhance Finance and Operations.

Introducing Power Platform

Power Platform (see *Figure 1.1*) is a low-code and no-code development platform built on top of **Microsoft Dataverse**, a data platform with a database, security, file-hosting, logging, and many more features that power the different components of Power Platform:

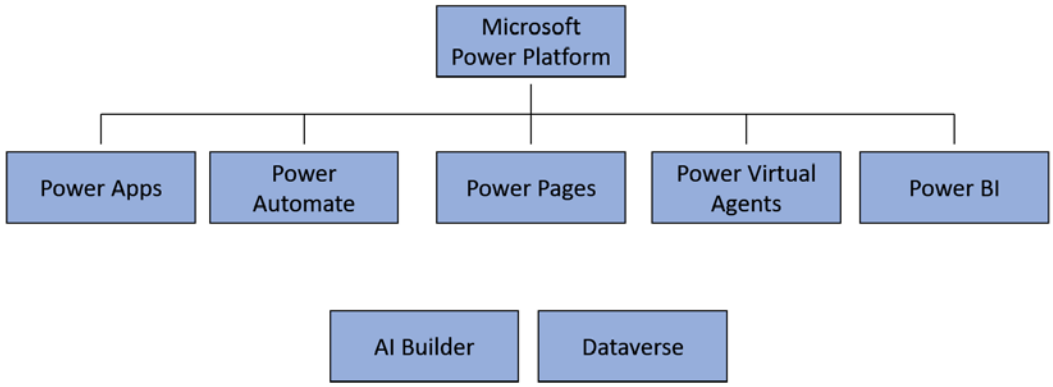

Figure 1.1 – Components of Power Platform

As seen here, Power Platform comprises different low-code tools and components with varying functionalities, enabling you to rapidly develop custom applications, automate processes, or generate insightful reporting, on top of Dataverse.

Understanding low- or no-code

Low-code or no-code is a software development approach that enables us to create applications, websites, or other solutions with little to no programming knowledge. It relies on visual interfaces of the **What You See Is What You Get** (**WYSIWYG**) type, drag-and-drop components, and templates that allow users to create custom solutions without writing lines of code.

And what are the benefits of low-code tools when using them along Dynamics 365 F&O?

Let's take faster delivery of the customizations as an example. With Power Platform, you won't need to deploy changes to F&O environments. Changing your Power Apps or Power Automate flow will be all you'll need to do. You will also benefit from having more resources in your team to make changes thanks to the way you build solutions in Power Platform: developers' or technical consultants' availability won't be a bottleneck because low-code tools can be easily learned by functional consultants and end users with some training.

Is this the end of X++?

No. And that's not just an opinion, but Microsoft's official stance: "*X++ isn't going anywhere.*" Due to the transactional nature of the ERP and its complex business processes, the most common way of solving the requirements will be through X++ development.

Take the posting of a journal, or a sales order invoice: complex transactional processes that involve different parts of the ERP. If you're willing to extend these processes, you'll have to work with event handlers or a chain of command, like you do nowadays.

At the moment, we can see the business events framework as the most common way of interacting with Power Automate, using it as a trigger. Business events allow us to interact with external systems and send notifications from Finance and Operations.

We also have data events available. Similar to business events, data events trigger when **create, read, update, and delete** (**CRUD**) operations are performed and can be enabled for data entities. These events, thanks to the Power Platform integration, allow us to track changes in data and use them in our Power Apps or Power Automate flows.

Of course, those are not our only ways of interacting with Dataverse solutions, and in this book, we'll learn some others.

> **Tip**
>
> With that said, regardless of whether you're an F&O developer or a technical or functional consultant, you should start learning about Power Platform sooner rather than later because it's not Finance and Operations Apps' future; it's already the present!

You will make most of the changes the way you're used to, with the **Application Object Tree** (**AOT**) and X++ in Visual Studio, and thanks to Power Platform, you will add valuable new skills to your toolset. Being able to use Power Automate cloud flows to automate processes, read or write data in Dynamics 365 Finance and Operations, or create a Power App for some users will be a way to reduce coupling from your solutions because it will allow for more agile and faster changes to these processes you're creating.

> **Note**
>
> Don't think about Power Platform as a threat to developers but as an additional resource that will make your life easier.

Convergence

With the "*One Dynamics One Platform*" convergence scenario, Microsoft is bringing Dynamics 365 Finance and Operations Apps and Dataverse closer together – improving the experience of integrating both systems and productivity and a more consistent user experience.

We're already benefiting from this! If you remember the early days of **Dual-Write**, we had to configure the environment linking manually. Now, it's possible to deploy a Dataverse environment along a Finance & Operations instance from **Lifecycle Services** (**LCS**) and then configure the integration with Power Platform with only two clicks.

This new LCS experience also helps us configure Dynamics 365 F&O virtual tables in the linked Dataverse environment and use them in our Power Automate flows or Power Apps, instead of using the standard Dynamics 365 F&O connector.

You can see all these investments in Dataverse and F&O from Microsoft go all in the same direction, on the one hand making our life easier with less setup and configuration needs, on the other hand making a more unified Dynamics 365 product line. How many times has a customer asked, "*But isn't everything Dynamics 365?*"?

In the coming years, we will be getting new experiences such as **One Admin**, which will replace LCS for the **Power Platform Admin Center** (**PPAC**). We already have a hint of this because, if you've got Dataverse-linked environments in your projects, you can already see the F&O environment URL in PPAC at the bottom of your environment's page (*Figure 1.2*):

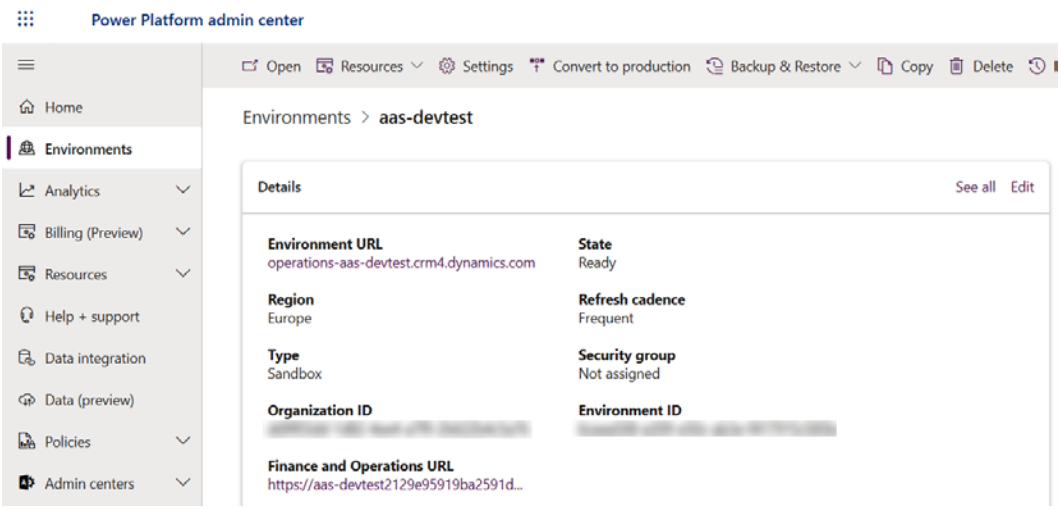

Figure 1.2 – F&O environment URL in PPAC

You can see the Dataverse environment details, with its URL on top under **Environment URL**, and the **Finance and Operations URL** at the bottom.

Another new convergence feature is **One Batch**, which will allow us to have batch jobs in Dataverse, or One Transaction. This will help in providing transactional consistency between Finance and Operations and Dataverse, which have already been announced in the release plans.

The foundation of Power Platform – Dataverse

I've already mentioned Dataverse a few times, and now we're going to learn more about it. First of all, regardless of what we may think upon seeing its name, Dataverse is not a database, which is a common misconception.

Dataverse originated from the **Dynamics CRM** product as the **XRM platform**. In 2018 with the release of Power Apps, its name was changed to **Common Data Service** (**CDS**), and after some more name changes, it became the Dataverse we know today.

If not a database... what is a Dataverse?

Dataverse uses relational databases such as **Azure SQL** to store structured data, but it also uses unstructured databases such as **Cosmos DB** for logs, and it also has file storage.

Data and access are secured thanks to security roles to control access to environments, and of course, you can manage users and user groups in your **Azure Active Directory** (**Azure AD**) tenant for authentication. It also has audit capabilities at record levels to know who created, updated, or deleted a record, or also do that at the field level.

Other features include reporting, being able to export data to a data lake, and using **Power BI**, **Business rules** and **Workflows**, or integration capabilities thanks to the API. And of course, you can use **Power Automate** or **Logic Apps** or many Azure services with Dataverse thanks to the Microsoft cloud.

With this short introduction, we agree that Dataverse is not a database. Dataverse is a platform under the SaaS/PaaS model, and all the aforementioned services (see *Figure 1.3*) are transparent to users:

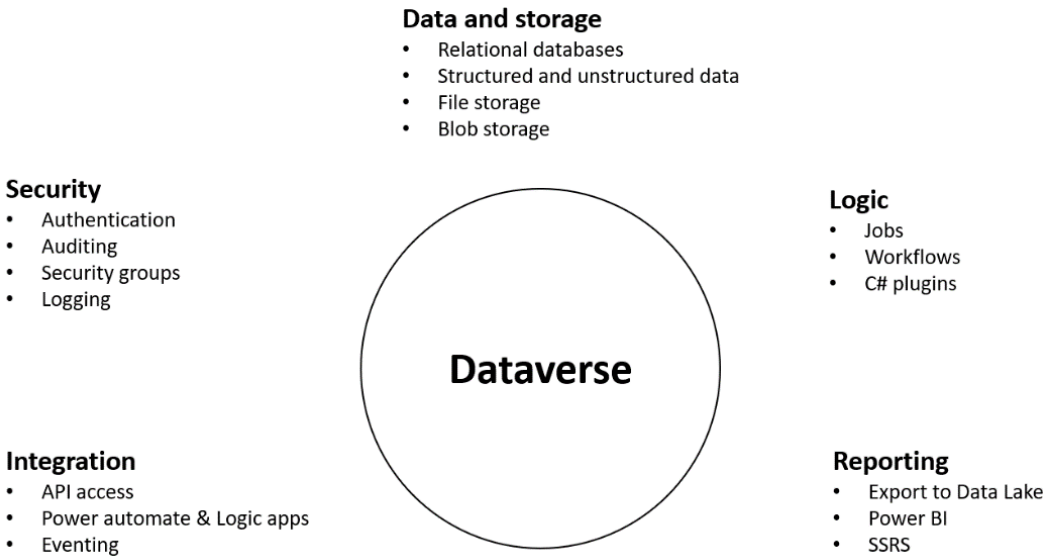

Figure 1.3 – Dataverse

We can use PPAC to manage environments, but we will never see the backing services nor have to take care of maintenance, which is also good news! In the background, Dataverse has relational databases, storage, reporting capabilities, and – of course – security, thanks to Azure AD. Having seen the foundation and benefits of Dataverse as the underlying platform, let's explore which elements make up Power Platform itself.

Components of Power Platform

We've already learned about Dataverse, the platform on which Power Platform is built, and now we'll delve into its different components.

Power Apps

Power Apps is probably the most known of Power Platform's products. It is a low-code platform used to create custom applications that can be run on a phone or a tablet thanks to the Power Apps app (see *Figure 1.4*), or a computer using a browser:

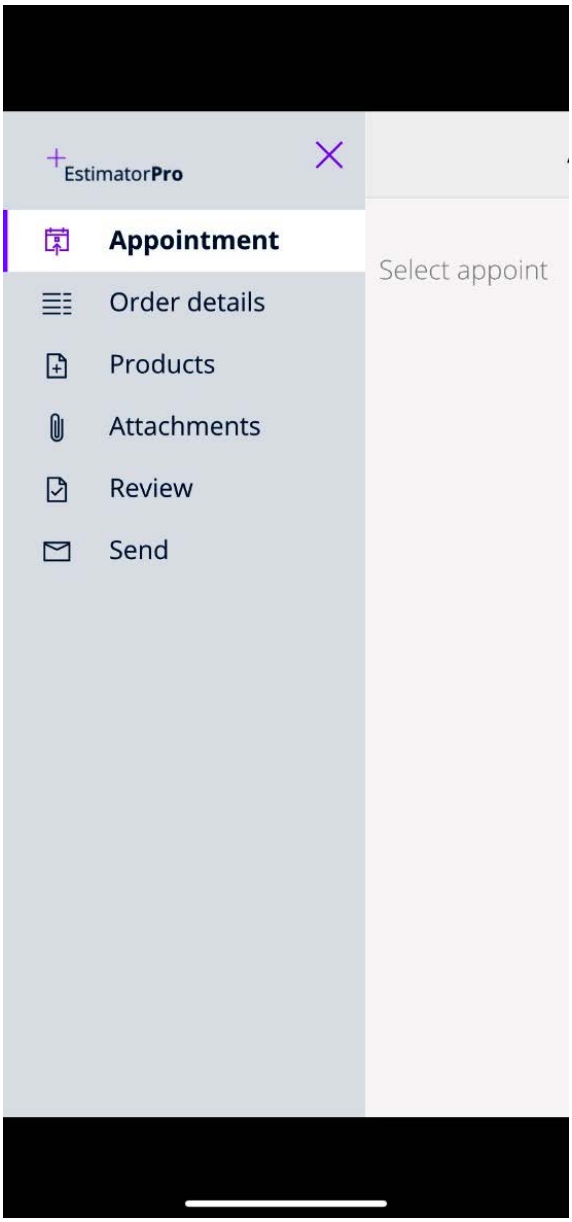

Figure 1.4 – iOS Power Apps player

Thanks to the Power Apps editor we can quickly, and without any programming knowledge, create a canvas app. Thanks to its intuitive UI (see *Figure 1.5*), you can drag and drop the controls you need to the app and customize its design to fit your requirements: