

# **PBI365**

# **Power BI Certification**

# **Bootcamp**

*Mastering the Power BI Platform*

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Course Manual Version 1.6

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## About This Training Course

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<b>Course Title:</b>	Power BI Certification Bootcamp
<b>Course Code:</b>	PBI365
<b>Audience:</b>	Technical Specialists
<b>Format:</b>	In-person and Remote
<b>Length</b>	3 Days

### Course Description

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**Power BI Certification Bootcamp** is an advanced 3-day training class designed to prepare students to pass Microsoft certification exam **70-778: Analyzing and Visualizing Data with Microsoft Power BI**. During the course, students will gain the real-world skills required to design, deploy, upgrade and monitor reporting and dashboard solutions using the rapidly-evolving Power BI platform. All the essential Power BI concepts and techniques discussed in lectures are reinforced with hands-on lab exercises in which students will move through the actual steps required to build reporting and dashboard solutions and then to distribute those solutions to a wide audience using app workspaces and the Power Bi app model.

This course includes in-depth coverage of the query tools and data modeling tools in Power BI Desktop. Students will learn how to design complex queries and to write advanced DAX expressions to calculate rankings, rolling averages and year-to-year comparisons. Students will also learn how to design interactive reports using slicers, bookmarks and drillthrough pages. The course discusses essential differences between reports and dashboards and also examines the strengths and weaknesses between the various types of datasets including imported datasets, DirectQuery datasets and LiveConnect datasets.

This course discusses distributing Power BI content and administrating the Power BI environment at the tenant-level. Students will learn when and how to install an on-premises data gateway to provide connectivity to on-premises data sources such as SQL Server. The course demonstrates how to configure tenant-level settings for Power BI and how to monitor report and dashboard usage within an organization using Power BI audit logs. Along the way, students will learn how to configure row-level security (RLS) and how to leverage the R data analytics platform to extend a Power BI Desktop project using R script visuals.

### Student Prerequisites

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Due to the accelerated nature of this training class, it is recommended that students have 6 months or more experience working with the Power BI Service and Power BI Desktop. All students will require a Windows PC running Windows 10, Windows 8.1 or Windows 7 to complete the lab exercises for this course.



# About the Hands-on Labs

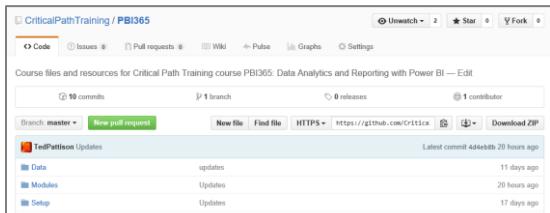
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**Power BI Certification Bootcamp (PBI365)** includes a rich set of hands-on lab exercises designed to reinforce the key concepts and techniques that you learned about in the lectures. The lab exercises for Power BI Certification Bootcamp were designed to run on a student workstation or laptop running the Windows operating system. We recommend that you use Windows 10 but you can also use any version of Windows that support Power BI Desktop. Therefore, it is also possible to complete these lab exercises on any Windows PC running Windows 8.1 or Windows 7.

## GitHub Repository for this course

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Student files for this course are maintained in a GitHub fil repository at <https://github.com/CriticalPathTraining/PBI365>.



## Student Workstation Prerequisites

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All lab exercises should be completed on a student workstation that has the following software.

1. Windows 10, Windows 8.1 or Windows 7.
2. One or more Internet browsers (Chrome, Edge, IE, etc.)
3. Microsoft Excel 2016 or Microsoft Excel 2013 - *If you don't already have it, you can optionally install it during lab 1.*
4. Power BI Desktop – *If you don't already have it, you will it install during lab 2.*

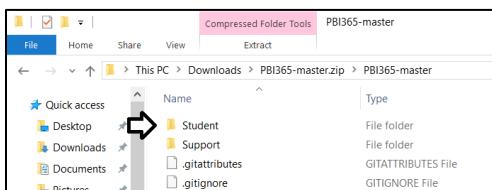
## Copying the Student Lab Files to Your Windows PC

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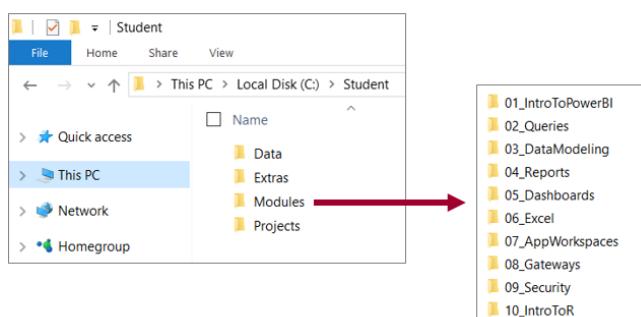
The most recent version of the electronic student files for this course are kept in the **Student** folder of the GitHub repository for this course. You can download the zip archive for this repository from the following URL.

<https://github.com/CriticalPathTraining/PBI365/archive/master.zip>

It is recommended that you that you download the master zip archive and make a local copy of the **Student** folder so that you have a local copy of the files you will need on your computer workstation when going through these labs exercise. Once you download the master zip archive, open it and copy the **Student** folder to a new local folder.



Copy the **Student** folder from the master zip archive to a new local folder at **C:\Student**.





# **Module 01: Introducing the Power BI Platform**

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## **Module Description**

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This module provides an overview of the Power BI platform and explains the role of the Power BI Service, Power BI Desktop and Power BI Mobile. Students will learn how to get started with the Power BI Service creating reports and dashboards using a browser. The module also provides students with a quick primer on working with Power BI Desktop and installing the Power BI app on a mobile device. This introductory module concludes with a discussion of how to keep current with all the monthly updates that Microsoft consistently applies to Power BI Desktop and the Power BI Service.

## **Module Agenda**

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- Understanding the Power BI Platform
- Creating a Trial Office 365 Tenant for Testing
- Creating Datasets, Reports and Dashboards
- Getting Started with Power BI Desktop
- Staying in Sync with Monthly Updates

## **Topics Covered**

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Live Labs for PBI365	Visuals (aka Visualizations)
Student Files for This Course	Editing Visual Properties
Student Background	Report and Datasets
What is Business Intelligence?	Dashboards and Tiles
How is the BI Software Industry Changing?	Creating Dashboards
What is Power BI?	Dashboards and Reports
Power BI Benefits from Microsoft Azure	Project Lifecycle for a Custom BI Solution
The Power BI Service	Working with Power BI Desktop
Power BI Service Architecture	Installing Power BI Desktop
Power BI Licensing	Working with Power BI Desktop
Creating a Power BI Testing Environment	Getting Around in Power BI Desktop
Office 365 admin center	Projects and PBIX Files
Accessing the Power BI Service	Publishing a Power BI Desktop Project
Central Power BI Concepts	Power BI Team Blog
The Power BI Admin Portal	Power BI Community Forums
Reports and Pages	Power BI User Group (PUG)
Report Authoring	

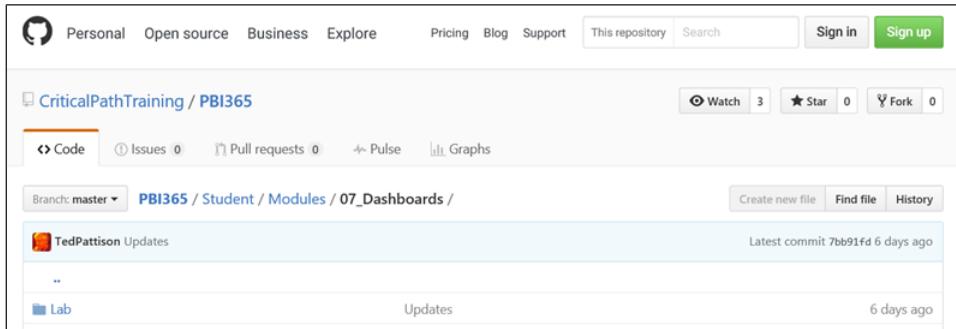
## **Instructor Demos**

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- Getting Around in the Power BI Environment
- Creating Reports and Dashboards using the Power BI Service
- Getting Up and Running with Power BI Desktop
- Publishing a PBIX Project File to the Power BI Service

## Live Labs for PBI365

- Student files for this course maintained in GitHub
  - Students files updated frequently
  - Go to <https://github.com/CriticalPathTraining/PBI365>

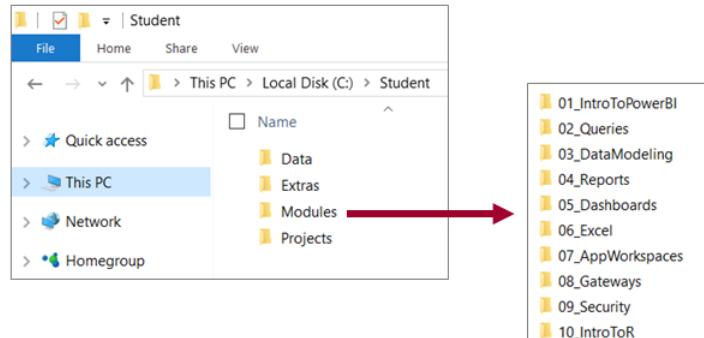


At Critical Path Training, we try our best to stay on top of all of Microsoft's updates as they are applied to the Power BI platform. As you can imagine, this cloud cadence of monthly updates can pose a serious problem to many training companies and content vendors who are faced with the challenge of having to update their courseware on a monthly basis.

Critical Path Training has responded to challenge of dealing with monthly updates with a new student experience that we refer to as **Live Labs**. All the electronic student files for completing lab exercises are published in a public GitHub repository which can be accessed with a browser at <https://github.com/CriticalPathTraining/PBI365>. The Live Labs experience allows us to short circuit the standard courseware publishing process which make it possible to make updates immediately available to all our students.

## Student Files for This Course

- Copy the **Student** folder from the master zip archive
  - Create a new local folder at **C:\Student**
- Each module has folder inside **Student\Modules** folder
  - Slides and lab writeup available through student manual (not in GitHub repository)



The most recent version of the electronic student files for this course are kept in the **Student** folder of the GitHub repository for this course. You can download the zip archive for this repository from the following URL.

<https://github.com/CriticalPathTraining/PBI365/archive/master.zip>

It is recommended that you download the master zip archive and make a local copy of the **Student** folder so that you have a local copy of the files you will need on your computer workstation when going through these labs exercise. Once you download the master zip archive, open it and copy the **Student** folder to a new local folder. Note that each module of the course has its own folder in the **Student\Modules** folder.

## Student Background

- What is your name?
- What are you doing with Power BI?
- Which products/services have you used
  - Excel
  - Access
  - SQL Server, SSRS, SSAS
  - SharePoint and Office 365
  - Tableau
  - Dynamics 365
  - Salesforce
  - Others



When you are called upon by the instructor, please provide a brief background by answering the following questions.

## What is Business Intelligence?

- BI focuses on business health and performance
  - Gather insights into health of business processes
  - Take corrective actions in a timely fashion
- BI projects typically involve the following...
  - Integrate data from multiple sources
  - Perform data transformation and complex calculations
  - Analyze large data sets with rapid query response
  - Create insightful reports and visualizations
  - Provide insights that are “actionable”



"Business Intelligence" is a widely used term that can mean different things to different people. However, BI generally refers to the practice of monitoring business health and performance. People who perform BI roles in an organization have the job of gathering insights into health of business processes and helping the organization take corrective actions in a timely fashion.

Many BI projects share a common set of chores. These include importing and integrating data from multiple sources and performing data transformation and complex calculations on that data. Once the data has been imported and transformed, there is then the need to analyze large data sets with rapid query response and to create insightful reports and visualizations for business executives and managers. And most importantly, a BI project must provide insights that can be used to take action. If a BI project does not produce insights that are actionable, it lacks real business value.

## How is the BI Software Industry Changing?

- Software industry is experiencing new proliferation of data
  - Number of telemetry devices is increasing exponentially
  - Device-generated data is providing new business opportunities
  - Example: Uber has used geolocation data to disrupt taxi industry
- Traditional BI and analytics models are being disrupted
  - New analytics capabilities available with new types of data sources
  - Data discovery and unstructured data analytics are new frontiers
  - Demand for self-service BI tools are on the rise
  - Balance of power shifting from IT to business divisions



Many industries are rapidly changing due to a new and growing proliferation of data. Every year the number of telemetry devices is increasing which means we have new dimensions of data to analyze. Uber is a company whose amazingly quick growth provides an good example of how an industry can be disrupted by competition that has employed real-time geolocation data in a new and innovative manner.

Traditional BI and analytics models are being disrupted. Much of this disruption is due to companies and organizations that are beginning to tap into new types of data sources that offer new analytics capabilities and insights. The new and exciting areas of innovation in business intelligence and analytics are now focused on data discovery and how to best deal with unstructured data to provide actionable insights.

What's also important to recognize is the need to move quickly and remove limitations has begun to shift the balance of power in large organizations from the IT department to its business divisions. This trend can be seen by the large-scale adoption of self-service BI services and tools such as Tableau, Tibco Spotfire and Power BI.

## What is Power BI?

- What is Power BI?
  - Cloud-based subscription service
  - Environment which promotes self-service BI *to the end user*
  - BI Platform to assists with data import, analysis and visualization
- Power BI benefits from being a cloud-based service
  - It takes only 5 seconds to subscribe to the Power BI service
  - New users can create something significant in 5 minutes or less



Power BI is a cloud-based subscription service from which provides business users with an environment participate in self-service BI. For ad-hoc scenarios it provides an end user with a straight-forward manner to import and analyze and to visualize insights from that data. To system integrators and data professionals, Power BI represents a platform for creating business solutions that assists with data analysis and insight visualization.

Because Power BI benefits is a cloud-based service, a new user can subscribe in under a minute. Another important goal of the Power BI team at Microsoft was to remove dependencies so that new users can quickly begin importing data and creating visuals using nothing more than the browser.

As of March 2016, the Power BI service has experience strong adoption numbers. The Power BI service has surpassed 5 million subscribers who come from over 200,000 different organizations. The Power BI service subscribers come from many different countries and take advantage of the fact that the Power BI service has been localized for over 40 different languages.

## Power BI Benefits from Microsoft Azure

- Power BI is built on top of Microsoft Azure
  - Power BI solutions can be scaled as required
  - Power BI solutions have global reach



From an architectural standpoint, it is important to understand that the Power BI service has been built on top of Microsoft's cloud computing platform known as Microsoft Azure. Microsoft Azure provides the Power BI platform with an underlying infrastructure for building, deploying, and managing applications and services through a global network of Microsoft-managed datacenters.

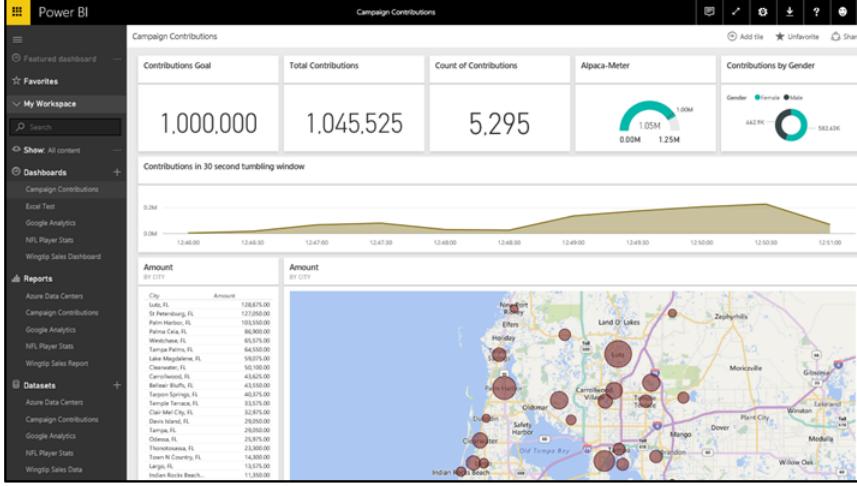
Microsoft Azure provides custom solutions with the potential to scale as needed on demand. Microsoft Azure also provides the Power BI service with coverage around the globe.

A few more facts about Azure...

- 100+ Data Centers
- One of three networks in world with respect to coverage and speed of connection
- Twice as many covered regions as AWS
- Six as many covered regions as Google
- G series provides largest VM available in market – 32 cores, 448GB RAM, SSD

## The Power BI Service

- The Power BI Service
  - Provides cloud-based foundation for Power BI platform
  - Accessible through browser at <https://app.powerbi.com>



The screenshot shows the Power BI Service interface. On the left, there's a navigation sidebar with sections for 'Featured dashboard', 'Favorites', 'My Workspace' (which is expanded), 'Dashboards', 'Reports', and 'Datasets'. Under 'My Workspace', it lists 'Campaign Contributions', 'Google Analytics', 'NFL Player Stats', and 'Wingtip Sales Dashboard'. The main area displays a dashboard titled 'Campaign Contributions' with the following data:

Contributions Goal	Total Contributions	Count of Contributions	Alpaca-Meter	Contributions by Gender
1,000,000	1,045,525	5,295	<div style="width: 105M;">105M</div>	<div style="width: 443,1K;">443,1K</div> <div style="width: 582,4K;">582,4K</div>

A chart titled 'Contributions in 30 second tumbling window' shows a bell-shaped curve peaking around 12:49:00. Below this is a table 'Amount by City' with data:

City	Amount
Gulf B.	138,875.00
St Petersburg, FL	127,260.00
Palm Harbor, FL	103,550.00
Tampa, FL	98,000.00
Westchase, FL	65,575.00
Tampa Palms, FL	64,550.00
Lake Mary, FL	59,375.00
Chesnut, FL	50,100.00
Carrabelle, FL	43,625.00
Bonita Bay, FL	43,000.00
Tarpon Springs, FL	40,375.00
Tampa Heights, FL	33,750.00
Cape May City, FL	32,875.00
Davis Island, FL	29,250.00
Seminole, FL	29,000.00
Olivena, FL	25,875.00
Thonotosassa, FL	23,300.00
South H. Country, FL	14,800.00
Largo, FL	13,575.00
Indian River Beach,	11,300.00

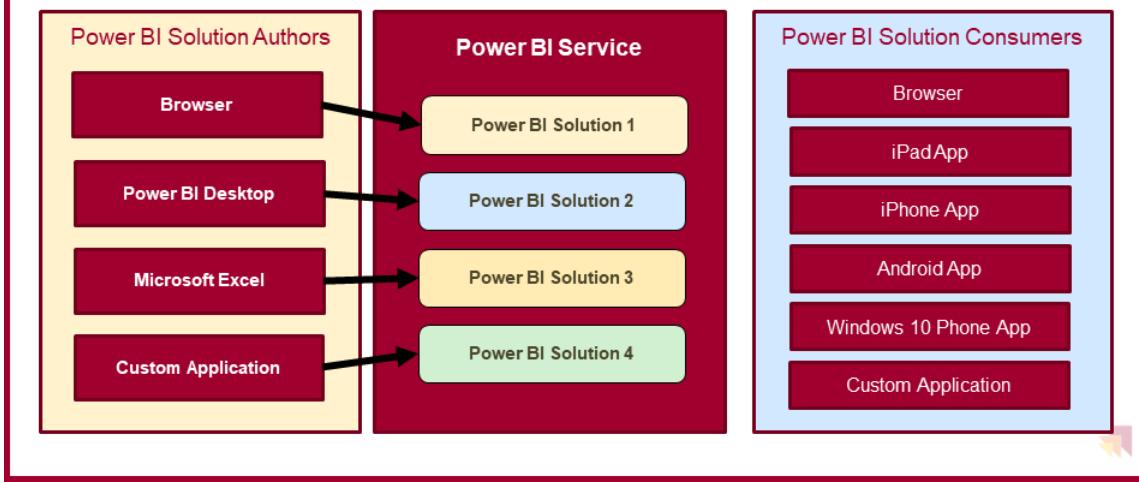
Below the table is a map of the Tampa Bay area with bubble markers indicating contribution amounts for various locations like Oldsmar, Safety Harbor, and Dunedin.

You can think of the Power BI service as the heart and sole of the Power BI platform. Licensed users can access the Power BI service using any modern browser through its primary URL which is <https://app.powerbi.com>. Once a user has been authenticated against the common endpoint of <https://app.powerbi.com>, the user is then connected to the Azure data center which hosts the user's Power BI workspaces.

Using the browser, a Power BI subscriber can view dashboards and interactive reports. The browser-based experience of the Power BI service also provides support to import datasets and to create reports and dashboards.

## Power BI Service Architecture

- Power BI support for authors and consumers
  - BI solution authors have a choice in authoring tools
  - BI solutions consumers can use wide range of devices



Power BI is a platform that can be used to perform ad-hoc data analytics and reporting. It is also a platform that caters to BI solution authors and to the consumers of those BI solutions.

BI solution authors can choose between authoring tools including the browser, Power BI Desktop and Microsoft Excel. Microsoft positions Power BI Desktop as the premiere tool for authoring BI solutions due to its powerful query and data modeling features (aka Power Query and Power Pivot). Note that it is also possible for application developers to automate the creation of a BI solution in the Power BI service using the Power BI REST API.

Another powerful aspect of the BI platform is that BI solutions consumers can use wide range of devices to access dashboard and reports in the Power BI service. Dashboards and reports are fully accessible across recent versions of the industry's most popular browsers including Internet Explorer, Edge, Chrome, FireFox, Opera and Safari. The Power BI platform also provides a Power BI consumer app on devices including iPhones, iPad, Android, Windows surface and Windows 10 phone. It is also possible for application developers to embed Reports and Dashboard tiles from Power BI into external applications and websites.

## Power BI Licensing

- User-based licensing
  - Power BI (free)  
\$0.00 user/month  
A cloud-based business analytics service that enables anyone to visualize and analyze data with greater speed, efficiency, and understanding. It ...  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...
  - Power BI Pro  
\$9.99 user/month  
A cloud-based business analytics service that enables anyone to visualize and analyze data with greater speed, efficiency, and understanding. Power ...  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...
  - Office 365 Enterprise E5  
\$35.00 user/month  
The Office suite, plus email, instant messaging, HD video conferencing, 1 TB personal file storage and sharing, and advanced security, analytics and PSTN ...  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...
- Capacity-based Licensing
  - Power BI Premium P1  
\$4,995.00 instance/month  
Power BI capacity dedicated to your organization, unlocking unlimited content distribution and dependable performance. P1 offers 8 virtual co...  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...
  - Power BI Premium P2  
\$9,995.00 instance/month  
Power BI capacity dedicated to your organization, unlocking unlimited content distribution and dependable performance. P1 offers 16 virtual co...  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...
  - Power BI Premium P3  
\$19,995.00 instance/month  
Power BI capacity dedicated to your organization, unlocking unlimited content distribution and dependable performance. P1 offers 32 virtual co...  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...
  - Power BI Premium EM3 (Month to Month)  
\$2,495.00 instance/month  
Embed Power BI content in your custom application, powered by 4 virtual cores of dedicated capacity. Some Premium features are disabled.  
Office 2016 desktop & mobile apps  
Not included  
Office 365 services  
...

Power BI Licensing can be confusing due to the fact Microsoft sells Power BI using both user-based licensing and capacity-based licensing. In organizations that are only using user-based licensing, users with the Power BI free license cannot share content with other users nor can they consume content shared by others. This means that all users will require a Power BI pro license regardless of whether they are authoring reports and dashboards or just consuming reports and dashboards created by others.

Capacity-based licensing is an option that will appeal to larger organizations. For example, an organization can acquire a Power BI Premium subscription that allows them to take advantage of the Power BI platform's capacity-based licensing model. This makes it possible to share Power BI content with users with the Power BI free license as long as the reports and dashboards are served from a workspace running in a licensed capacity.

Consider a simple example of an organization which has 20 Power BI content authors and 1000 other users who will be read-only consumers for content created in Power BI. Without capacity-based licensing, a company would have to purchase a Power BI Pro license for all users.

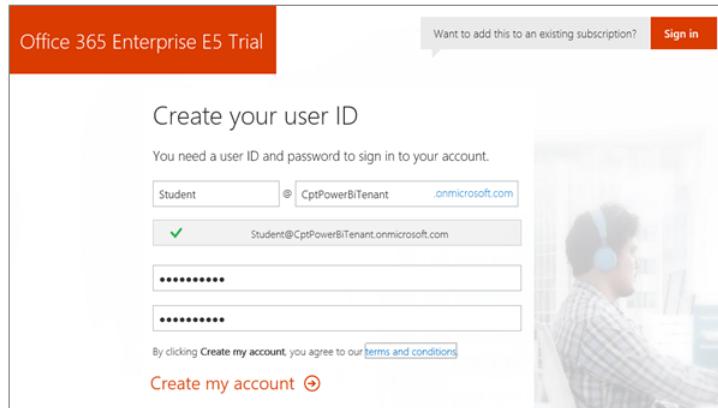
- 1020 Power BI Pro licenses @ \$10/month = \$10,200/month

If an organization purchases the Power BI Premium P1 SKU for \$5000 per month, it will lower its overall licensing cost

- 20 Power BI Pro licenses @ \$10/month = \$200/month
- 1 Power BI Premium P1 license @ \$5000/month
- Total cost = \$5200/month

## Creating a Power BI Testing Environment

- Sign up for an Office 365 Enterprise E5 trial account
  - Creates a new Office 365 tenant
  - Creates an account which is tenant administrator
  - You can create 25 user accounts for testing purposes
  - You can create and test Office 365 unified groups



In the lab exercises for this course, you will go through the steps to sign up for an Office 365 Enterprise E5 trial account. By doing this you will create a new Office 365 tenant which makes it possible to create multiple user accounts. A key point here is that you are creating a trial account for an entire Office 365 organization as opposed to creating a trial account for a single user.

When you initial create the new Office 365 tenant, you will be prompted to enter the user name and password for a new user account. This initial user account will be created with full tenant administrator capabilities. This means that this account will have full administrative control over user management and group management within the Office 365 tenant. This account will also be able to see and modify the organization-wide administrative settings for important cloud services such as Exchange, SharePoint Online and, of course, Power BI.

A significant benefit of creating a test environment in this fashion is that you can create additional users which makes it possible to test Power BI scenarios such as security related to dashboard sharing and dashboard deployment using organizational content packs. An Office 365 Enterprise E5 trial account allows you to add up to 25 user accounts for testing purposes. You will also be able to create and configure group workspaces to test Power BI security features such as row-level security (RLS).

## Office 365 admin center

- Chores to accomplish in Office 365 admin center
  - Learn how to add secondary user accounts for testing
  - Learn how to view and manage groups

The screenshot shows the 'Active users' section of the Office 365 Admin Center. The left sidebar has 'Users' selected, with 'Active users' highlighted. The main area displays a table with two rows of user information:

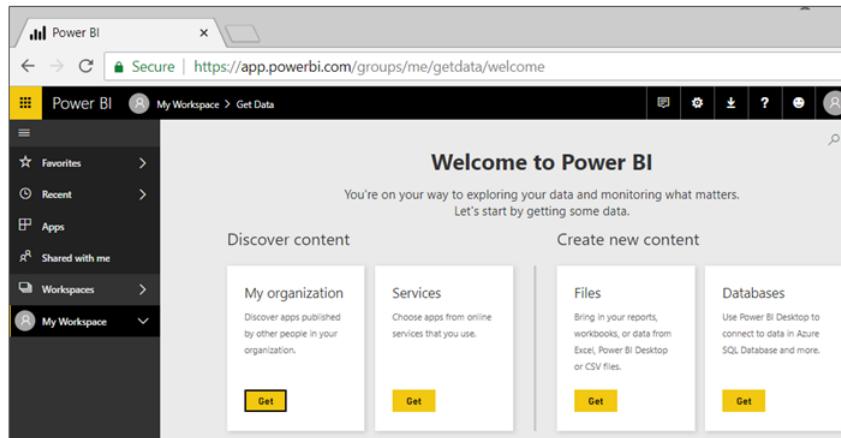
Display name	User name	Status
James Bond	JamesB@PowerBIBootcamp.onmicrosoft.com	Office 365 Enterprise E5
Ted Pattison	Student@PowerBIBootcamp.onmicrosoft.com	Office 365 Enterprise E5

Below the table are three buttons: '+ User', 'Types of users', and 'Filters'. A note at the bottom states: 'Users are people in your organization who can access Office 365.' and 'Different types of users and accounts can use Office 365 in distinct ways.'

Once you have created your new Office 365 Enterprise E5 trial account, you should become familiar with the process of navigating around inside the Office 365 admin center. For example, you need to learn how to add new user accounts. You should also learn how to view and create groups in Office 365. That's because every Power BI group workspace is backed by an underlying Office 365 group. That means that you can use the Office 365 admin center to add and remove users from a Power BI group workspace.

## Accessing the Power BI Service

- Power BI Service is accessible using a browser
  - Access provided through base URL of <https://app.powerbi.com>
  - Power BI Service supports all modern browsers
  - Every licensed user gets their own personal workspace

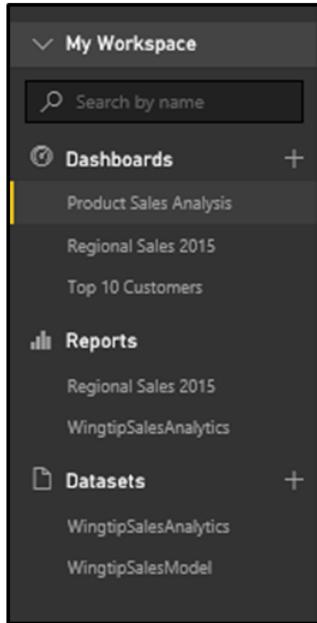


The easiest way to access Power BI is by connecting to the Power BI Service with a browser at <https://app.powerbi.com>.

The Power BI Service support all modern browser and is also accessible on mobile devices by installing the Power BI app published by Microsoft.

Any user accessing the Power BI Service in the browser requires a Power BI license which can be either a Power BI Pro license or a Power BI free license. Every user with a Power BI licenses gets a personal workspace which provides a place to begin creating datasets, reports and dashboards.

## Central Power BI Concepts



- **Workspace**
  - Provides user context and asset container
  - Every user has personal workspace
  - Team development requires group workspaces
- **Dashboard**
  - Consolidated view into reports and datasets
  - Custom solution entry point for mobile users
- **Report**
  - Collection of pages with tables & visualizations
  - Provides interactive control of filtering
- **Dataset**
  - Data model containing one or more tables
  - Can be very simple or very complex



You can think of a workspace as a container that holds three different kinds of assets; dashboards, reports and datasets. Every dashboard, report and dataset created in Power BI must be created within the scope of a specific workspace. A workspace also provides a user context because the current workspace always determines which set of dashboards, reports and datasets are visible to the user.

Every Power BI subscriber has a personal workspace which is named **My Workspace**. An organization can also create app workspaces which make it possible to achieve team-based authoring and staged deployment of custom solutions. The course will go into greater detail on working with app workspaces later in module 7 when discussing how to deploy reports and dashboards.

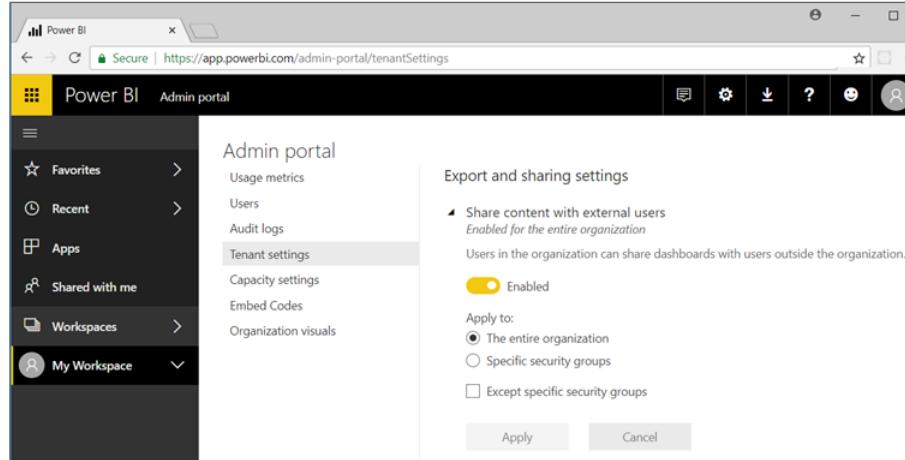
A dashboard typically serves as the top-level entry point into a custom data analytics solution. In Power BI, a dashboard is created as a consolidated view on top of reports and datasets. Dashboard are also important to Power BI mobile users because their display is often optimized for mobile devices such as iPhones, Android phones and Windows 10 phone.

A report is a collection of pages that is associated with exactly one underlying dataset. Each page in a report serves as a canvas on which you can add tables, matrices and other types of visualizations. While dashboards are designed to provide a high-level overview, reports are the opposite because they are used to drill down into the lower-level details. Reports also provide much more interactive filtering control for custom solutions in which the user must be given the ability to drill down into further levels of detail.

A dataset is a collection of one or more tables that defines a data model. A simple dataset can contain a single table with three columns and ten rows. However, a dataset often contains multiple tables which have relationships between them. In the upcoming lab exercises in this course, you will design a dataset using all the different query and data modeling features of Power BI Desktop.

## The Power BI Admin Portal

- Admin portal used to configure tenant-level settings
  - Accessible at <https://app.powerbi.com/admin-portal>
  - Accessible by global tenant admins and Power BI Service admins

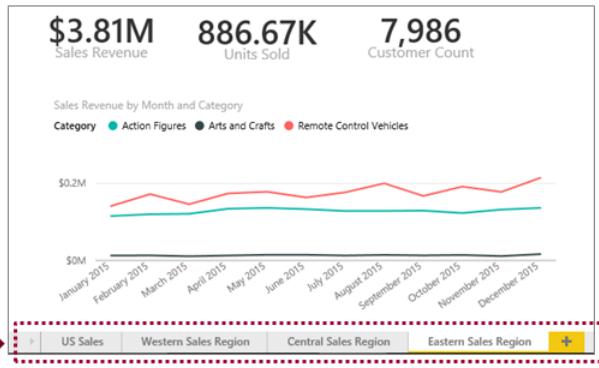


Power BI provides an Admin portal at <https://app.powerbi.com/admin-portal> which can be used to configure tenant-level settings for the Power BI environment. You can use the Power BI admin portal to disable specific Power BI features across an entire organization. For example, you can prevent all users or a specific set of users from sharing Power BI reports with external users and from publishing Power BI reports on the web which are accessible through anonymous access.

In order to access the Power BI admin portal, a user must have administrator-level permissions for Power BI. This includes users in the role of the global tenant admin as well as users who have been configured with the role of Power BI Service Administrator.

## Reports and Pages

- Reports contain one or more pages
  - A report can be designed with a single page
  - A report can be designed with many pages
  - Tabbed navigation located at bottom of report view
  - Each report is associated with exactly one dataset



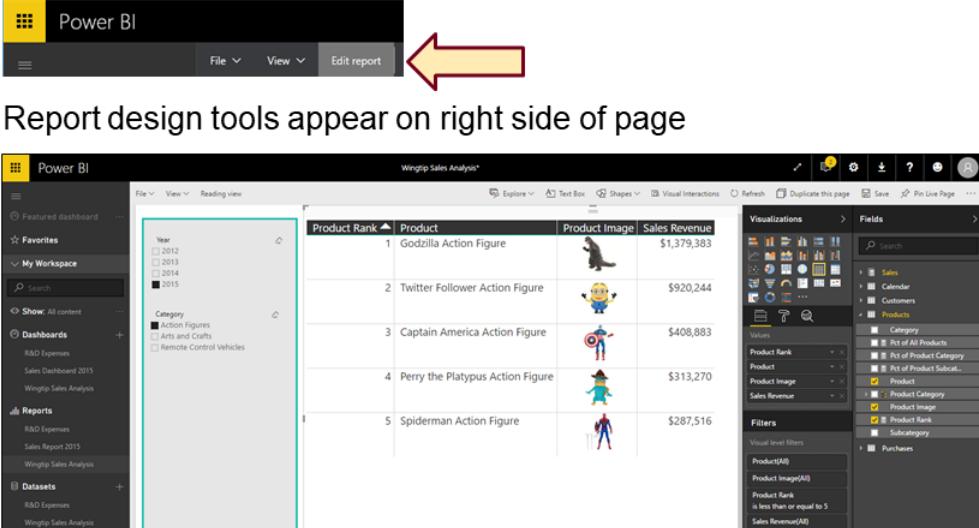
A report contains a collection of one or more pages. Simple report might contain just a single page while a more complicated report can contain 10 pages or more. It's up to you to decide how many pages you want to add to each report you create.

Each report displays a tabbed navigation menu at the bottom. This provides the means to navigate between pages in a multipage page report. This menu also supplies a button with a plus (+) sign on the right which makes it possible to add new pages when a report is in design view. You can also right-click on a page in the tabbed navigation menu to rename a page or to duplicate it to clone a copy.

Keep in mind that each report is associated with exactly one underlying dataset. A report cannot see or display data from any other dataset. You should also understand that deleting a dataset will also delete any report that is based on that dataset.

## Report Authoring

- Report initially opens in reading view
  - Click Edit report to switch to edit mode
- Report design tools appear on right side of page



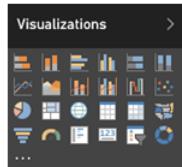
The screenshot shows the Power BI desktop interface. On the left is the ribbon with 'Power BI' selected. The main area displays a report titled 'Wingtip Sales Analysis' showing a table of action figure sales. The right side features the 'Visualizations' pane with various icons for charts and tables, and the 'Fields' pane listing product-related fields like Product, Product Category, and Sales Revenue.

Reports can be viewed in Reading view or in Edit view. When you first navigate to a report, it is initially displayed in reading view which means you cannot edit the report. However, you can click the **Edit report** button in the toolbar to move over into edit view whenever you need to edit a report.

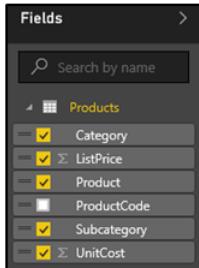
When you switch a report from reading view to edit view, a set of report editing tools appear on the right side of the page. These tools such as the Visualizations pane and the Fields list make it possible to design reports by adding new visuals and configuring their properties.

## Visuals (aka Visualizations)

- Reports are designed using visual (aka visualizations)
  - Each visual is based on an underlying visualization type
  - Visualization type can be changed using **Visualizations** pane



- Visuals are created by using fields from tables inside **Fields** list



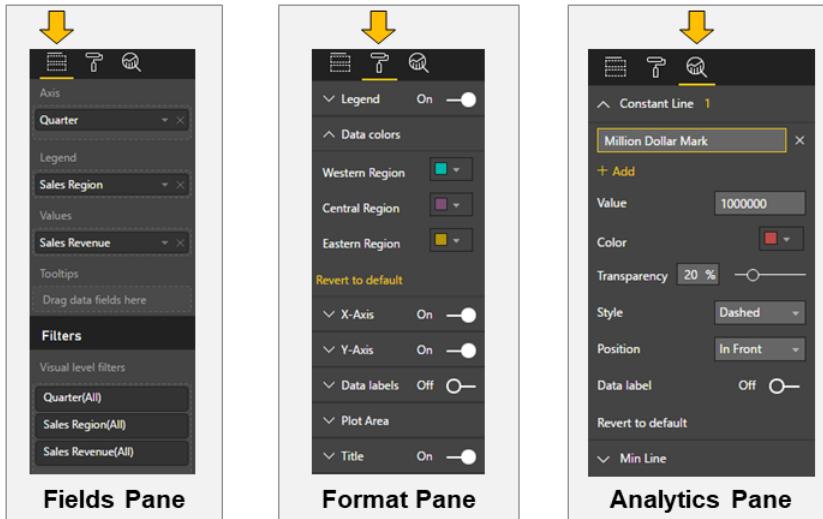
Pages within a report are designed by adding elements known as visuals. Note that Microsoft documentation uses the term “visual” and the term “visualization” interchangeably. In other words, there is no difference between a visual and a visualization. You sound a bit smarter when you use the term “visualization”, but it’s faster to say “visual” because the word only contains three syllables instead of six.

Each visual is based on an underlying visualization type. The set of visualization types available to you when designing a report are displayed in the **Visualizations** pane. Power BI defines a set of built-in visualization types which always appear in the Visualizations pane. One especially appealing aspect of the Power BI platform is that the set of available visualization types is extensible by adding custom visuals which you will learn about in module 6 of this training course.

When working with visuals while designing a report, you will often interact with the **Fields** list on the right side of the Power BI service application window. The Fields list displays all the tables and fields from the dataset associated with the current report. The Fields list is what makes it possible to associate one or more fields with a visual to populate it with data.

## Editing Visual Properties

- Visual properties modified using three property panes
  - Visual properties vary greatly depending on type of visualization



When you are working with the Power BI report editor in the browser, the properties of a visual can be modified using three different property panes on the right side of the Power BI service application windows. These three panes include the Fields pane, the Format pane and the Analytics pane. The screenshot in the slide above show where to click to activate each of these panes.

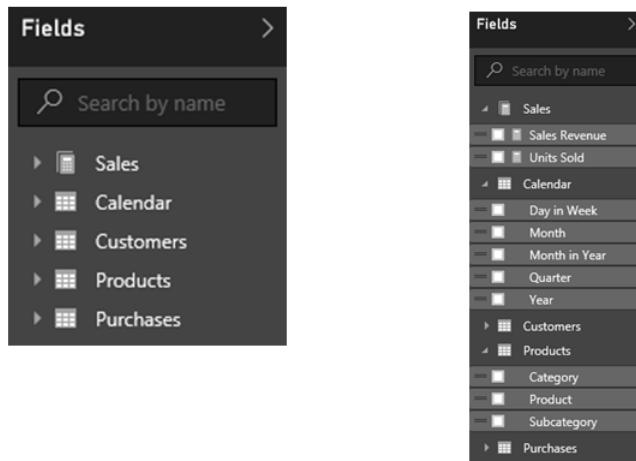
The **Fields** pane contains wells where you add fields from the tables of the dataset associated with the current report. The types of wells will vary greatly between different types of visualizations. For example, a line chart visual will contain wells such as **Axis**, **Legend** and **Values**. A map visual will contain wells such as **Location**, **Legend** and **Size**. A table visual only contains a single well for fields named **Values**.

The **Format** pane contains properties which affect the visual's display characteristics such as color, font size and whether the visual will have a border.

The **Analytics** pane is a new comer as it was just added to the Power BI platform with the August 2016 updates. Currently, only a handful of visuals contain properties which is displayed in the Analytics pane. The purpose of the Analytics pane is to enhance a visual with analytical elements such as trend lines and constant lines.

## Report and Datasets

- Each report is based on an underlying dataset
  - **Fields** list in report designer shows tables and fields
  - Report author sees tables & fields as dataset consumer

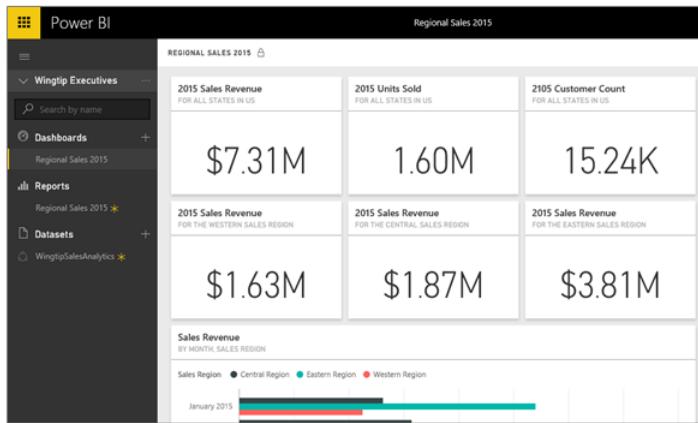


As you know, each report is based on an underlying dataset. The Fields list displays the tables and fields from the dataset that is associated with the current report. When you begin to design report, the Fields list makes it possible to add fields into the wells inside the Fields pane for specific visuals so they can be populated with data.

When you are using the browser to edit a report, it is important to understand that you are only a dataset consumer. You have no ability to actually edit the underlying dataset. The next lecture of this training course will introduce you to a essential tool named Power BI Desktop. When you begin using Power BI Desktop, you will be able to begin editing and designing datasets with a powerful set of data modeling tools.

## Dashboards and Tiles

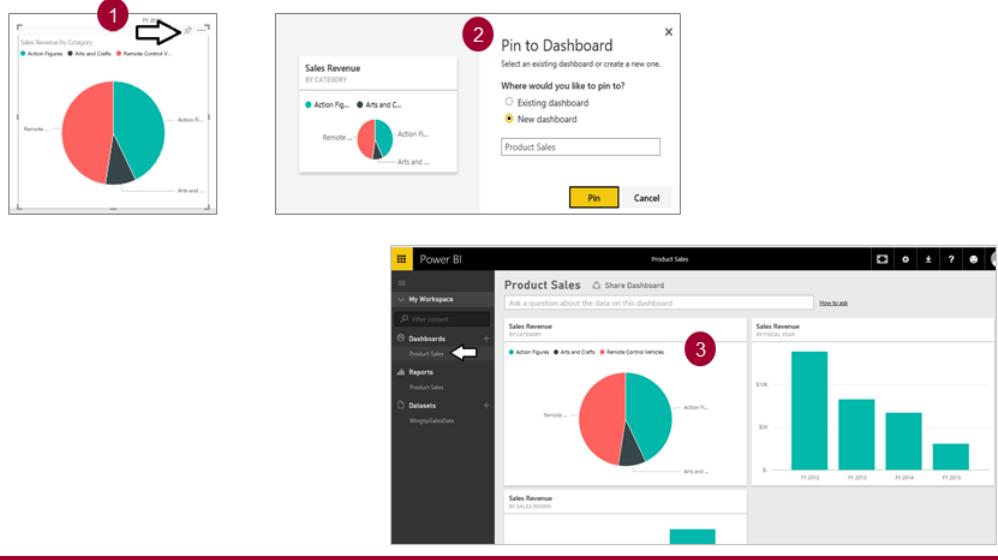
- Dashboard is a collection of tiles
  - Tile can be created by pinning visual from a report
  - Tile can be created by pinning Q&A result from dataset



A dashboard in Power BI is displayed as a collection of dashboard tiles. There are two primary ways to create tiles when designing a dashboard. The most common way to create a tile in a dashboard is to pin a visual from a report. However, a tile can also be added to a dashboard in Power BI by executing the natural language Q&A query and then pinning the query results to create a new tile.

## Creating Dashboards

- Dashboards contain tiles
- Tiles created from visuals on report pages

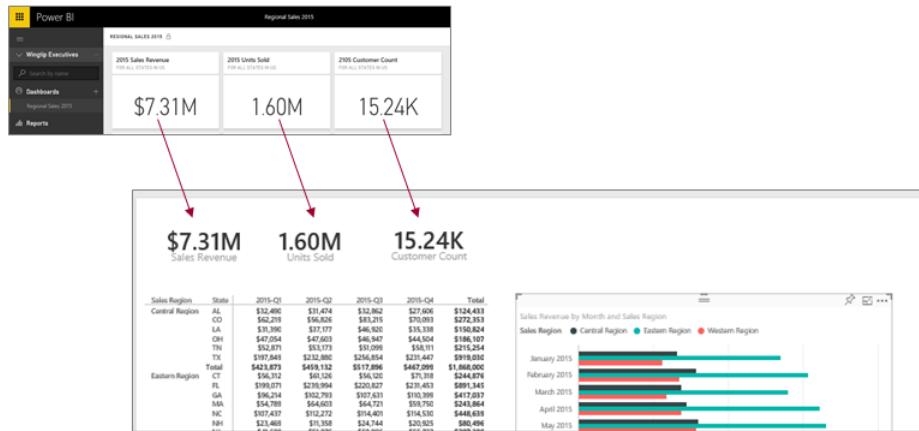


Once you have created a report in your personal workspace, it's pretty easy to take the next step and create a dashboard by following these steps.

- (1) Navigate to a report, hover the mouse over a visual and then click on the thumbtack button to pin it to a dashboard.
- (2) When the **Pin to Dashboard** dialog appears, you can elect to pin the visual to a new dashboard or to an existing dashboard.
- (3) Once you have pinned the visual, you can navigate to the dashboard and see the tile that has been created.

# Dashboards and Reports

- Dashboards link users to reports
  - Dashboard tiles designed to provide high-level view
  - Clicking tiles drills down into report to see more detail

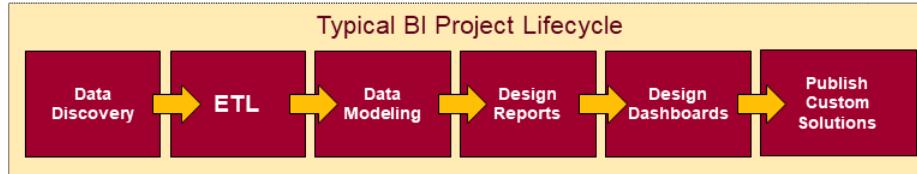


When you create a dashboard tile by pinning a visual from a report, you create a navigation path. When a user examines the dashboard and clicks on that tile, the user will be redirected to the underlying report.

This navigation path created by a dashboard tile emphasizes the key relationship between a dashboard and a report. The dashboard should be designed to convey a high-level overview of the data being analyzed. When a users sees something in a dashboard that needs further inspection, they can click on a tile to navigate to a report where they can dive down into greater levels of detail.

## Project Lifecycle for a Custom BI Solution

- Lifecycle of a typical BI project includes...
  - Discover where the data lives
  - Extract, transform and load (ETL) data
  - Model data to create dataset for analytics and reporting
  - Design and implement reports on top of dataset
  - Consolidate reports into one or more dashboards
  - Package custom solution artifacts for deployment
  - Deploy custom solution to production environment



For decades, people in the IT industry have been working on projects to support various forms of business intelligence. Regardless of the toolset being used, a project to create a custom BI solution typically follows a standard lifecycle moving from one phase to the next.

The first phase requires figuring out what you want to measure and then moving on to discover what data exists to support making these measurements. Next, you must work through the ETL phase where the data is extracted, transformed and loaded into some type of data model. In next phase, you engage in data modeling using something such as the multidimensional model or the tabular model to make the data better suited for data analysis and reporting.

Once you have designed a data model, the next step involves designing reports to display numeric figures and visual elements on the computer screen and/or the printed page. Depending on the tools you are using, reports might be complimented by the creation of dashboards or scorecards which are designed to provide a consolidated overview and key insights using visual elements such as key performance indicators (KPIs).

The final step involves deploying all the work you have done into a production environment so that business users can begin using what you have built in the course of their daily work. This phase typically involves packaging reports and dashboards and using some type of distribution mechanism to make your custom solution available to the general user population.

## Working with Power BI Desktop

- Power BI Desktop focuses on first four phases
  - Query features for Data Discovery
  - Query features for ETL
  - Design features and DAX language for data modeling
  - Report design using a visual report designer
  - No support for designing dashboards
  - Not used to package custom solutions with dashboards



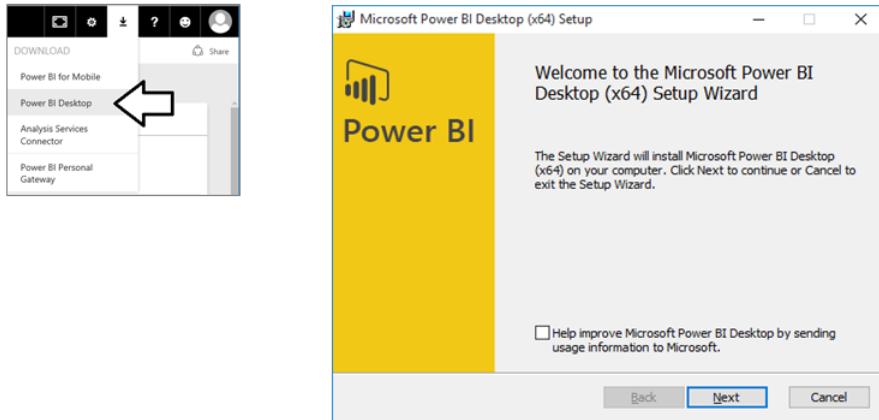
Power BI Desktop doesn't do everything. Instead, it focuses on the first four phases of creating a custom BI solution.

When you begin a project in the data discovery phase, Power BI Desktop is an excellent tool to begin inspecting different forms of data and to assess how useable and useful that data might be to the project. Once you have determined what data you need to work with, the powerful and easy-to-use query features of Power BI Desktop will take you through the ETL phase. Power BI Desktop also provides a rich set of features for modeling data and designing reports.

Currently, Power BI Desktop provides no support for designing dashboards. Once you have designed a data model and a report in a local Power BI Desktop project and then you have published the project to the Power BI service, you will use a browser to complete the final steps of designing a dashboard and deploying all your work using dashboard sharing or an organizational content pack.

## Installing Power BI Desktop

- Power BI Desktop quick & easy to install over the Internet
  - Select Power BI Desktop option from Power BI Download menu
  - Power BI Desktop downloads & installs in less than a minute



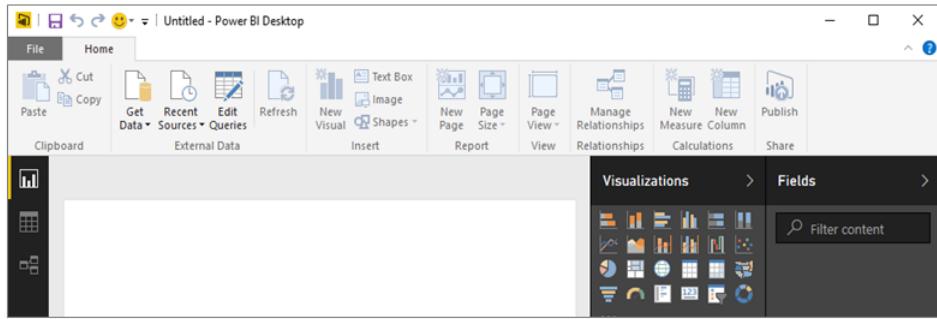
Of course, you can't use Power BI Desktop until you installed it on a computer running Windows. Fortunately, it can be downloaded and installed in less than a minute using a standard Internet connection. Just log into the Power BI service and select the **Power BI Desktop** option from the **Download** menu to begin the download and installation process.

We recommend installing Power BI Desktop on a computer or a virtual machine running a 64-bit version of either Windows 10 or Windows Server 2016. However, it is possible to install Power BI Desktop on older 32-bit versions of Windows all the way back to Windows 7 and Windows Server 2008 R2. The main advantage of using a 64-bit version of Windows over a 32-bit version is that you can load much larger datasets into memory and you can install and test Power BI Gateways which do not support 32-bit operating systems.

Power BI Desktop is built on top of .NET Framework version 4.5 which is automatically installed with recent versions of Windows. However, older versions of Windows might require you to download and install .NET Framework version 4.5 before you will be able to install Power BI Desktop.

## Working with Power BI Desktop

- Power BI Desktop is a Windows application
  - Work is saved and published in terms of projects
  - You can work on multiple projects at once
  - Each project runs in its own Power BI Desktop instance
  - Power BI Desktop can freeze up or act buggy
  - Quit & restart Power BI Desktop if it acts strangely



When you work with Power BI Desktop, all the work you do creating queries, modeling data and designing report is saved and published in terms of projects. For example, you might create one project for expense reporting and another project to create a mobile dashboard for sales analysis.

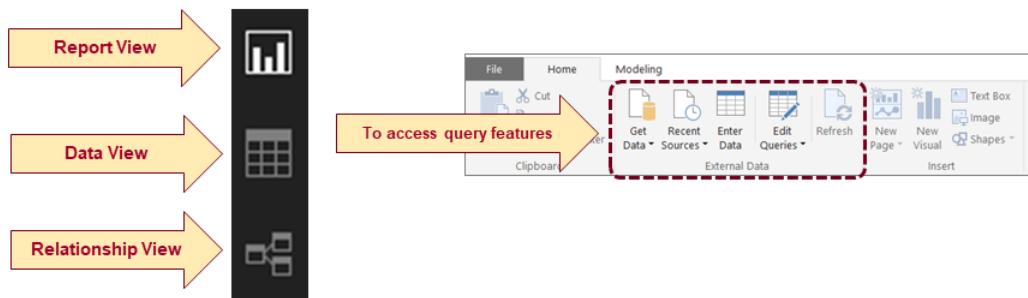
Power BI Desktop has commands to open projects and to create new project but it provides no command to close a project. For this reason, it's easy to start up several instances of Power BI Desktop at once by mistake which can become confusing. When you are done working on a project, you should quit that instance of Power BI Desktop to keep the number of running instances of Power BI Desktop to a minimum.

Power BI Desktop is a cutting-edge Windows application. There are many parts of it that you will absolutely love. But you must keep in mind that Power BI Desktop is an application that has very short release cycles and constantly introduces new preview features. It's not going to be as polished or as stable as some of your other favorite Windows applications.

There will likely be a time this week when you are cursing out Power BI Desktop because it's frozen up on you after you've done a bunch of design work without saving your changes. Other times Power BI Desktop might prompt you with dialog boxes that don't display correctly. If you think that Power BI Desktop is behaving strangely, save your work then shut it down and restart it. But don't let this get you down. We would have never gotten to the moon if we were too afraid to take risks.

## Getting Around in Power BI Desktop

- What do you need to learn to use Power BI Desktop?
  - Query features for importing data
  - Design features for modeling data
  - Report designer for creating reports
- Navigating between view modes

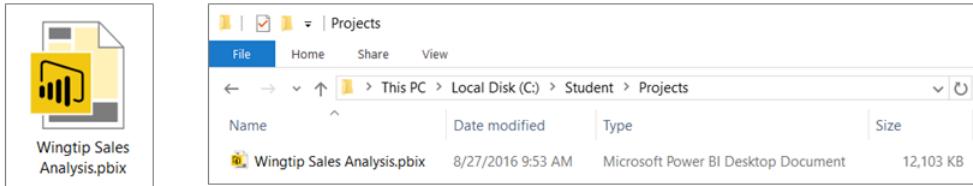


What do you need to learn to get up to speed on Power BI Desktop? There are three main areas to focus on at first which include creating queries, modeling data and designing reports. First, you must learn how to design queries which import data. The creation of queries is what allows you to create a base set of tables in the dataset for a Power BI Desktop project. Next, you must learn how to use the data modeling features so you can extend the project's dataset to create a rich data model with things like calculated columns, measures and hierarchies. After that, you must learn how to use the report designer in Power BI Desktop to present the data analysis for your project using tables and visual images and to provide the user with interactive capabilities.

You will use Power BI Desktop's main application window to model data and to design reports. The main application window provides a left navigation menu that allows you to switch back and forth between report view, data view and relationship view. When you need to create and design queries, you will do that in a separate Query Editor window which can be opened using one of the menu buttons in the ribbon of the main application window inside the **External Data** group on the **Home** tab.

## Projects and PBIX Files

- Power BI Desktop projects saved using PBIX files
  - PBIX file contains data source definitions
  - PBIX file contains query definitions
  - PBIX file contains data imported from queries
  - PBIX file contains exactly one data model definition
  - PBIX file contains exactly one report
  - PBIX file never contains data source credentials



Power BI Desktop projects are saved, loaded and published using PBIX files. A PBIX file is a ZIP archive created using the Open Packaging Convention format just like common Office documents such as DOCX files and XLSX files. The files for datasets that are stored inside and loaded from a PBIX file are managed internally by Power BI Desktop using Microsoft's xVelocity Tabular database engine.

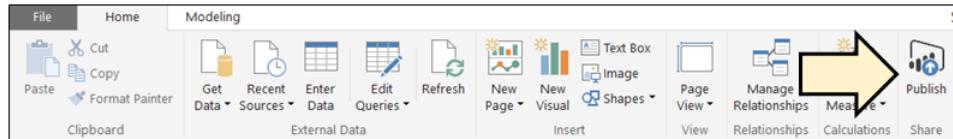
Each project created using Power BI Desktop is stored as a single PBIX file. Just about everything you create and configure when using Power BI Desktop is stored inside the PBIX file for one specific project. A PBIX file stores data source definitions and query definitions as well as tables of data which are populated and refreshed when queries are executed. A PBIX files also includes all the work you have done with data modeling and report design.

From a project management perspective, it's important to understand that a PBIX file represents a single project which contains exactly one dataset and exactly one report. You cannot add a second report to a Power BI Desktop project. However, you can add as many pages as you would like to a project's one and only report.

You should take note that Power BI Desktop will never store data source credentials in a PBIX file. For example, PBIX files never contain the user name and password required to access a secured resource such as a Online service or an on-premises SQL server database. Instead, Power BI Desktop provides the convenience of storing data source credentials in a local cache so you are not required to continually log into the same data source when working with Power BI Desktop. But these credentials are never published along with a PBIX file. After you publish a Power BI Desktop project by uploading its PBIX file, you will be required to configure data source credentials separately using the browser or by using some other automated technique.

## Publishing a Power BI Desktop Project

- Power BI Desktop provides **Publish** command
  - Used to publish project to Power BI service



- Requires logging into your Office 365 account



- Published articles added to target workspace

When you have completed designing the data model and report for a Power BI Desktop project, the next step is to publish it which effectively deploys your project to the Power BI service in the Microsoft cloud. You can execute the Publish command using the **Publish** command button in the ribbon or the **Publish** menu command in the **File** menu.

In order to publish a Power BI Desktop project, you must establish a login session from Power BI Desktop to the Power BI service. Once you have logged into the Power BI service using an Office 365 account with a Power BI license, you can then publish the project to your personal workspace or any group workspace in which you have editing permissions.

## Power BI Team Blog

- Power BI Team Blog is an Essential Resource  
<https://powerbi.microsoft.com/en-us/blog/>
- Be on the lookout for monthly updates

### Power BI Service and Mobile June Feature Summary

Announcements    Features    July 11, 2018 by Nikhil Gaekwad

The month of June flew by quickly for Power BI. With summer in the air and MBAS just around the corner, we are laser focused on planning another unforgettable conference for you in Seattle! There...



Microsoft typically applies monthly updates to the Power BI platform in the last week of each month. Microsoft has been consistent at synchronizing updates to Power BI service along with its updates to Power BI Desktop. That means that the tools are staying in sync with the underlying platform. Microsoft has also been very good about complimenting their monthly platform updates with a blog post which details which features have been added or updated.

The Power BI Team Blog is an essential resource for any professional working with the Power BI platform. This blog is accessible through the URL at <https://powerbi.microsoft.com/en-us/blog>. Anyone that wants to claim expertise with the Power BI platform should be proactive about reading the blog post for monthly updates as soon as it is posted.

## Power BI Community Forums

- Located at <https://community.powerbi.com/>
  - Great place to get answers to tough questions

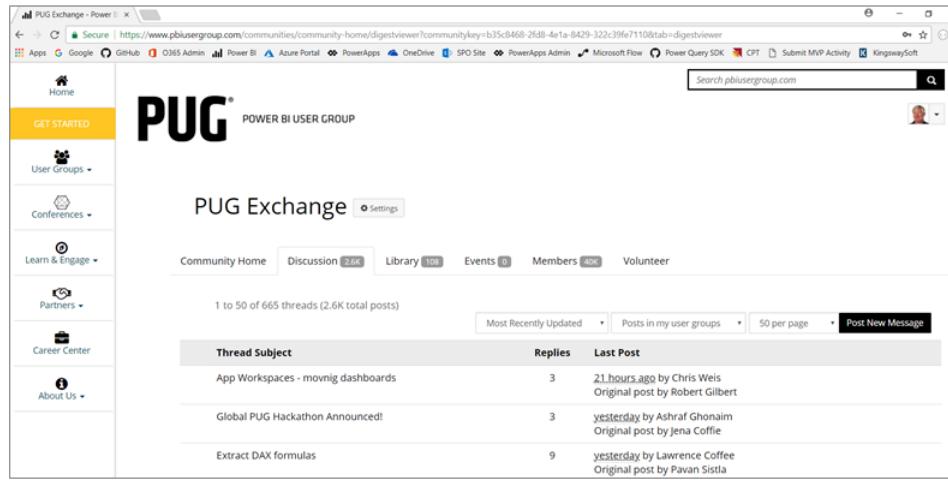
The screenshot shows a web browser window with the URL <https://community.powerbi.com/> in the address bar. The page title is "Home - Microsoft Power BI". Below the title, there are navigation links for Microsoft, Power BI, Products, Solutions, Partners, and Learn. A main heading "Forums (9 Items)" is displayed. Two forum categories are listed:

TITLE	POSTS
<b>Desktop</b> Data shaping, modeling, and report building in the Power BI Desktop app. Latest Topic - the traditional cultures - the Roma	174296
<b>Service</b> Dashboards, reports, sharing, and everything else you do at app.powerbi.com. Latest Topic - One dashboard multiple recipients with locked fil...	38336

Microsoft maintains a very active set of technical forums focusing on Power BI at <https://community.powerbi.com/>. This is a great place to post tough questions and get quality answers from Microsoft Product Team members and Microsoft MVPs. It is worth your while to create an account in this community and explore the resources that are available.

## Power BI User Group (PUG)

- Located at <http://pbiusergroup.com/>
  - PUG Exchange is another place to get questions answered
  - Also let's you find and connect with local Power BI User Groups



The screenshot shows the PUG Exchange website interface. The left sidebar has a yellow header 'GET STARTED' and links for Home, User Groups, Conferences, Learn & Engage, Partners, Career Center, and About Us. The main content area has a search bar 'Search pbiusergroup.com'. Below it, there are tabs for Community Home, Discussion (2.6K), Library (108), Events (0), Members (40K), and Volunteer. A message bar says '1 to 50 of 665 threads (2.6K total posts)'. A dropdown menu shows sorting options: Most Recently Updated, Posts in my user groups, 50 per page, and Post New Message. A table lists three threads:

Thread Subject	Replies	Last Post
App Workspaces - moving dashboards	3	21 hours ago by Chris Weis Original post by Robert Gilbert
Global PUG Hackathon Announced!	3	yesterday by Ashraf Ghonaim Original post by Jena Coffie
Extract DAX formulas	9	yesterday by Lawrence Coffee Original post by Pavan Sista

The Power BI User group maintains a world-wide community site at <http://pbiusergroup.com/>. You can use this site to find or start up a local Power BI user group. There is also a valuable set of technical forum where you can get answers to questions especially those that involve Power BI integration with financial software such as Dynamics 365, Microsoft CRM, Navision, Axapta, Great Plains and Solomon.

# Module 01 Lab: Getting Up and Running with the Power BI Service

**Setup Time:** 60 minutes

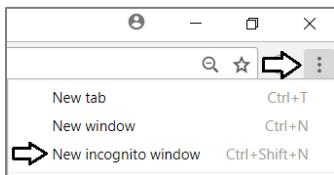
**Lab Folder:** C:\Student\Modules\01\_IntroToPowerBI\Lab

**Overview:** This lab covers how to get up and running with Power BI by creating a new Office 365 tenant with trial subscriptions to Office 365 and Power BI Pro. The act of creating and configuring this new Office 365 tenant will yield an isolated testing and development environment for working on projects with the Power BI service and using Microsoft's latest self-service BI tools such as Power BI Desktop and Microsoft Excel 2016. One valuable aspect of creating a new and isolated Office 365 tenant is that you will have tenant-level administrative permissions allowing you to configure the tenant with multiple user accounts for testing your Power BI projects in isolation from any existing Office 365 tenancy.

## Exercise 1: Create a new Office 365 Trial Tenant

In this exercise, you will create a new Office 365 tenant which allows you to create up to 25 user accounts with Enterprise E5 trial licenses. Note that the Enterprise E5 trial license provides the benefits of the Power BI Pro license. Being able to create multiple Office 365 user accounts in your Power BI testing environment will be important so that you can test the effects of sharing Power BI dashboards between users.

1. Navigate to the Office 365 trial sign up page using an Incognito browser window.
  - a) Launch the Chrome browser.
  - b) Using the dropdown menu in the upper right, select the command to open a **New incognito window**.



- c) Copy and paste the following URL into the address bar of the incognito window to navigate to the sign up page.

<https://go.microsoft.com/fwlink/?LinkId=698279&culture=en-US&country=US>

It's not always necessary to sign up for an Office 365 trial account using an incognito window. However, most errors that occur when attempting to sign up are caused by cached browser settings such as residue from an earlier Office 365 trial account. The solution to overcoming most errors when signing up for a trial account is using an incognito window.

2. Fill out the form with your personal information and click **Next**.

The screenshot shows the 'Welcome, let's get to know you' step of the sign-up process. It includes fields for country (United States), first name (Anna), last name (Conda), email (annaconda@subliminalsystems.com), phone number ((888)111-2222), company (Subliminal Systems), and company size (10-24 people). A 'Next' button is at the bottom. The background features a photo of a person wearing headphones.

The information you provide on the next page of the signup process will be used to name your new Office 365 tenant.

3. On the Create your user ID page...
  - a) Enter a user name
  - b) Enter a unique company name (you might have to try a few before you get one that's unique)
  - c) Enter a password that you will remember.

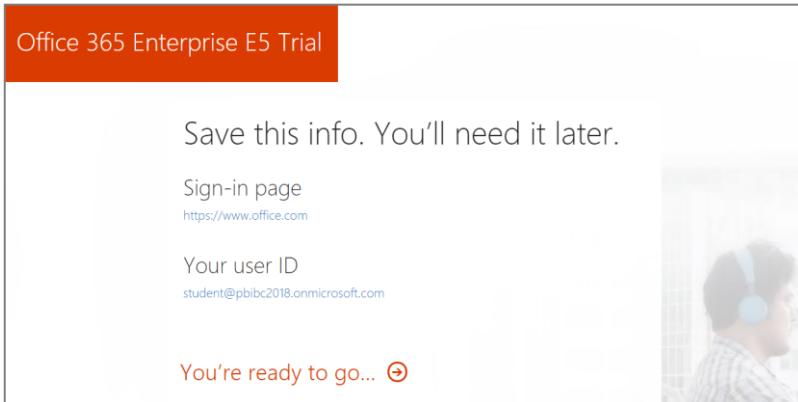
The screenshot shows the 'Create your user ID' page. At the top, there is a red header bar with the text 'Office 365 Enterprise E5 Trial'. Below the header, the main title 'Create your user ID' is displayed. A message says 'You need a user ID and password to sign in to your account.' There are input fields for 'User name' (containing 'Student') and 'Email address' (containing 'pbibc2018.onmicrosoft.com'). Below these are two password fields, both containing '.....'. At the bottom, there is a link 'By clicking Create my account you agree to our terms and conditions.' followed by a 'Create my account' button.

Note that the company name you enter on this page will be used to create the domain name for your new Office 365 trial tenant. For example, if you were to enter a company name of **pbibc2018**, it would result in the creation of a new Office 365 tenant within a domain of **pbibc2018.onMicrosoft.com**. The user name you enter will be used to create the first user account which will be given administrative rights within the Office trial tenant. If you enter a user name of **Student**, then the email address as well as user principal name for this account will be **Student@pbibc2018.onMicrosoft.com**.

4. Click **Next** to continue to step 3.
5. Complete the validation form in step 3 by proving you are not a robot.
  - a) Select the **Text me** option and provide the number of your mobile phone.
  - b) When you go through this process, a Microsoft service will send you a text message that contains an access code.
  - c) You retrieve the access code from your mobile device and use it to complete the validation process.

The screenshot shows a 'Prove. You're. Not. A. Robot.' page. It features a radio button for 'Text me' (which is selected) and another for 'Call me'. Below these is a dropdown menu for country/region and a text input field for 'Phone number'. At the bottom is a 'Text me' button.

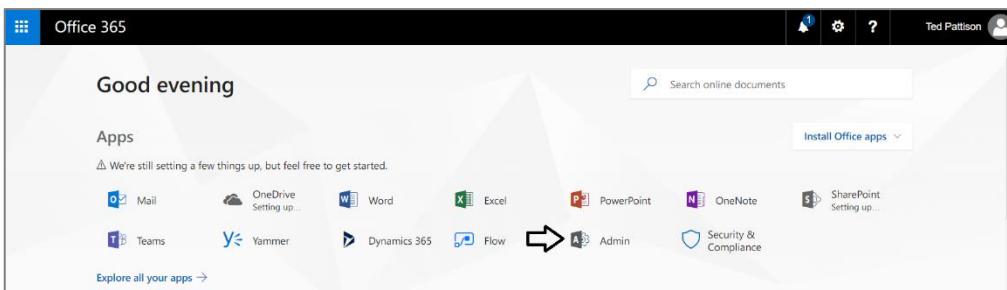
6. Once you have completed the validation process, click the **You're ready to go...** link to navigate to the portal welcome page for your new Office 365 trial tenant. Note that you should already be logged on using the user account that was created during the signup process.



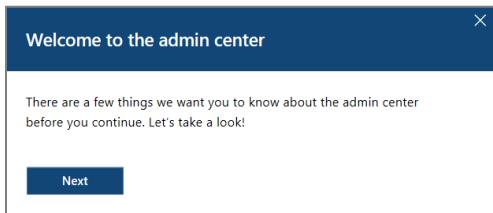
At this point, you have already created your new Office 365 tenant which can support creating up to 25 user accounts with Office 365 Enterprise E5 trial licenses. Note that some Office 365 services within your new Office 365 tenant such as the Office 365 admin center and Power BI can be accessed immediately. Other services within your Office 365 tenant such as SharePoint Online, Exchange and Outlook are not ready immediately and can take some time to provision.

There is no more need to run the browser in incognito mode anymore because it's only required to get through the signup process. You can now return to using a standard browser window. However, it's always a good thing to check to see who you are logged in as because sometimes the browser may log you on using a different Office 365 account you have instead of your new trial account.

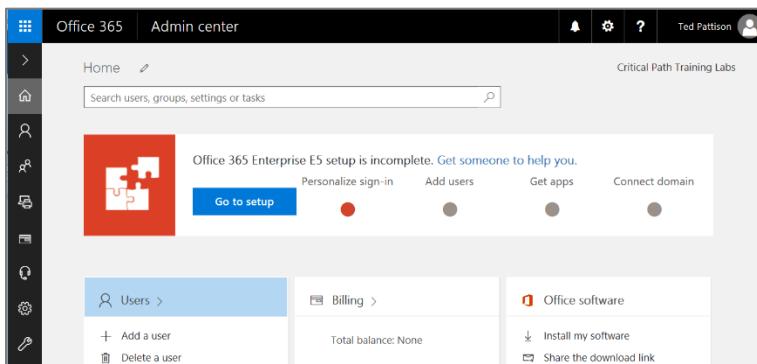
7. At this point, you should be located on an Office 365 welcome page. Click the **Admin** tile to go to the **Office 365 admin center**.



8. If you are presented with the Office 365 admin center welcome dialog, close it by clicking the X menu in the upper right corner.



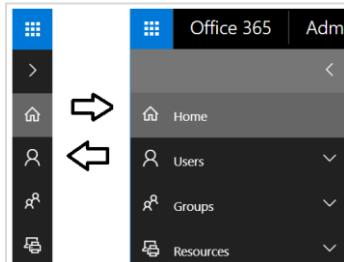
9. Verify that you are able to access the home page of the **Office 365 admin center**.
  - a) The following screenshot shows the Office 365 Admin home page.



- b) Locate the top **Menu** button for the left navigation menu. It's the second button from the top with the arrow icon which sits just beneath the Office 365 App Launcher menu button.



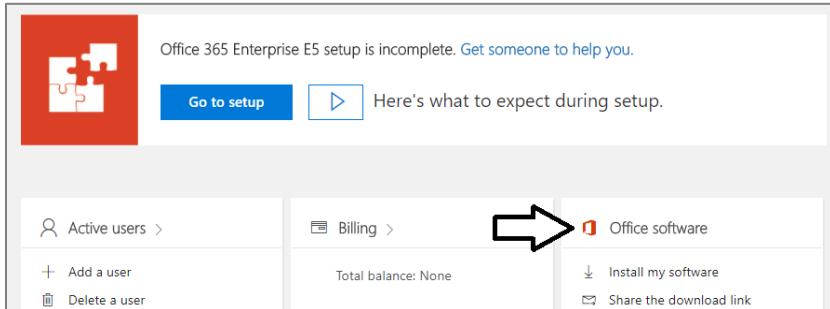
- c) Click the top **Menu** button several times and see how it toggles the left navigation between a collapsed and expanded mode.



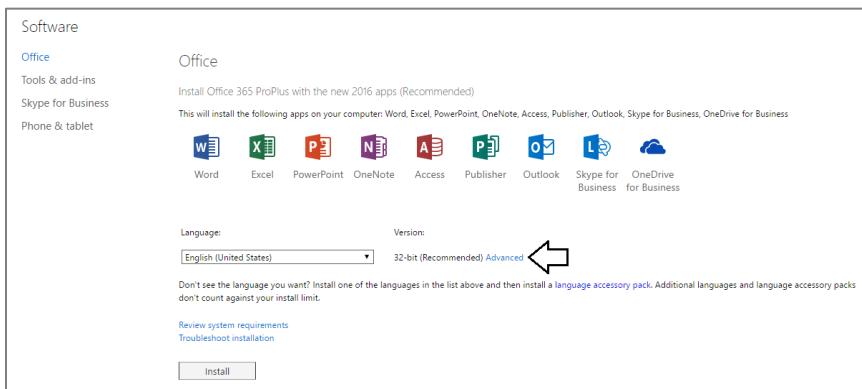
In later lab exercises it will be required that you have Microsoft Excel installed on your student workstation. There's no extra steps if you already have an installed version of either Microsoft Excel 2016 or Microsoft Excel 2013. However, if you have not installed Microsoft Excel on your student workstation, you can install it along with trial version of Office Professional 2016 in the following step.

#### 10. Install Office 2016 Professional [*Optional Step*]

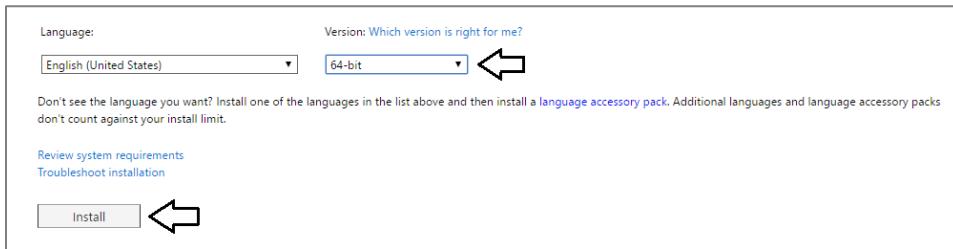
- a) On the home page of the Office 365 Admin center, click the **Install my software** link in the Office software section.



- b) You should now be at the **Office** tab of the **Software** page. Locate and click the **Advanced** link to set the installation option to install the 64-bit version of Office 2016 instead of the 32-bit version.



- c) Use the dropdown menu to change the Version setting to **64 bit**. And then click the **Install** button to begin the installation.



- d) Follow the instructions to install Office 2016.

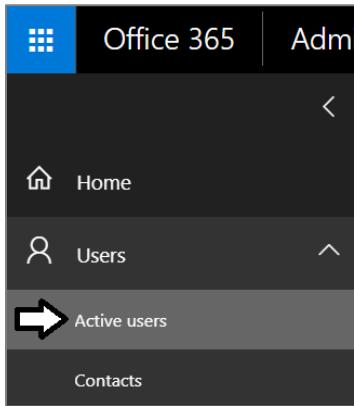
Note that you can move on to the next exercise and continue working while you're waiting for the Office 2016 installation to complete.

11. When you see the Success dialog indicating the installation of Office 2016 Pro is completed, complete the following steps.
  - a) Launch Microsoft Excel to verify the installation of Office 2016 Pro.
  - b) When prompted to activate Office 2016 Pro, use the email of your new Office 365 account to complete the activation process.

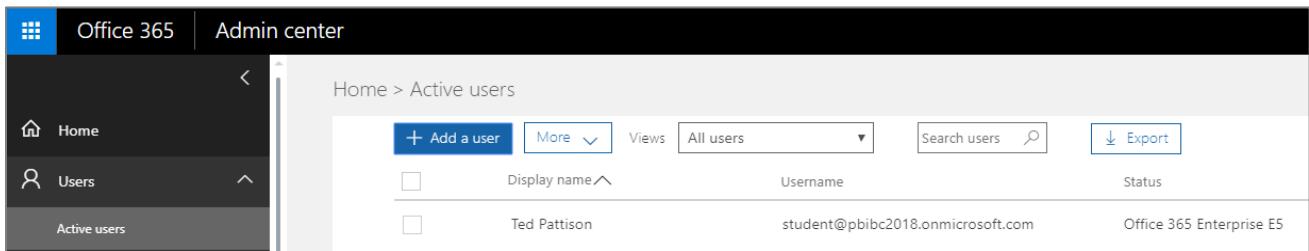
## Exercise 2: Add a Secondary User Account for Testing Purposes

In this exercise, you will configure your new Office 365 tenant by creating a secondary user account that you will need later when you begin experimenting with the Power BI dashboard sharing process.

1. Make sure you are in the browser at the home page of the Office 365 admin center.
2. Inspect the set of Active Users in the current tenancy.
  - a) In the left navigation menu, expand the **Users** node and click **Active users** to navigate to the **Active Users** page.

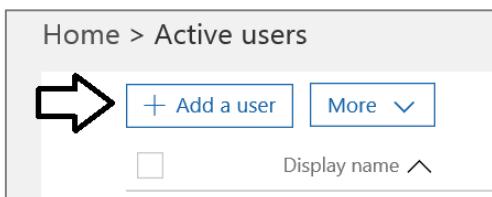


- b) Once the **Active Users** page is displayed, you should be able to verify that the user account you are currently logged on as is the only user account that exists in the current tenancy. Remember that this account has been set up as a Global Administrator to the tenant because it is the account that was used when creating the tenant.

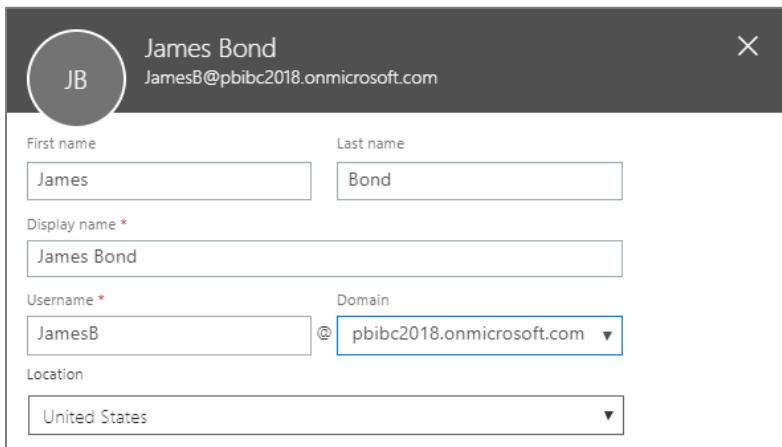


3. Create a new user account.

- a) On the **Active Users** page, click the button **Add a user** button to create a new user account



- b) Fill in the **Create new user account** form with information for a new user account. When creating this account, you can use any name you would like. These lab instructions will demonstrate this by creating a user account for a person named **James Bond** with a user name and email of **JamesB@pbibc2018.onmicrosoft.com**.



First name	Last name
James	Bond
Display name *	
James Bond	
Username *	Domain
JamesB	@ pbibc2018.onmicrosoft.com
Location	
United States	

- c) Expand **Password** section under **Contact Information** section.
- Select the option for Let me create the password.
  - Enter a password of **pass@word1** into the textboxes labeled **Password** and **Retype Password**.
  - Uncheck the checkbox for the option labeled Make this user change their password when they first sign in.

Contact information

>Password Admin-created

Auto-generate password

Let me create the password

Password \*

\*\*\*\*\* Strong

Make this user change their password when they first sign in

- d) Expand the roles section. You do not need to change anything in this section, although you should note that this new user account will be created as a standard user account without any administrator access or privileges.

Roles User (no administrator access)

You can assign different roles to people in your organization. [Learn more about admin roles](#)

User (no administrator access)

This user won't have permissions to the Office 365 admin center or any admin tasks.

Global administrator

This user will have access to all features in the admin center and can perform all tasks in the Office 365 admin center.

Customized administrator

You can assign this user one or many roles so they can manage specific areas of Office 365.

Note that the new account is usually assigned a trial license for **Office 365 Enterprise E5** plan. However, it's a good practice to check and make sure the new user has been assigned a license for **Office 365 Enterprise E5** which includes the **Power BI Pro** license.

- e) In the **Product licenses** section, make sure the **Office 365 Enterprise E5** license is set to **On**.

Roles User (no administrator access)

Product licenses \* Office 365 Enterprise E5

Office 365 Enterprise E5 On ←

24 of 25 licenses available

To-Do (Plan 3) On

Microsoft Forms (Plan E5) On

- f) Click the **Save** button at the bottom of the new user form to create the new user account.
- g) When you see the **User was added** message, click **Send email and close** to dismiss the **Add new user** task pane.
- h) Verify that the new user account has been created and is displayed along with your primary user account.

Display name	Username	Status
James Bond	JamesB@pbibc2018.onmicrosoft.com	Office 365 Enterprise E5
Ted Pattison	student@pbibc2018.onmicrosoft.com	Office 365 Enterprise E5

### Exercise 3: Use the Power BI Service to Import a New Dataset

Now, after all that busy work, you are finally ready to begin working with Power BI. In this exercise you will begin by importing data from an Excel workbook to create a new Power BI dataset. In the exercise steps that follow, you will create a report and a dashboard.

1. Use Microsoft Excel to inspect the Excel workbook named **WingtipSalesData.xlsx**. Later in this exercise you will import the data from this Excel worksheet into Power BI to create a new dataset.
  - a) Ensure you have downloaded the **Student.zip** file associated with this training course and extracted the contents of this zip archive into a local direct at **C:\Student**.
  - b) Locate the sample Excel workbook file at the following path.

**C:\student\Modules\01\_IntroToPowerBI\Lab\wingtipsalesdata.xlsx**

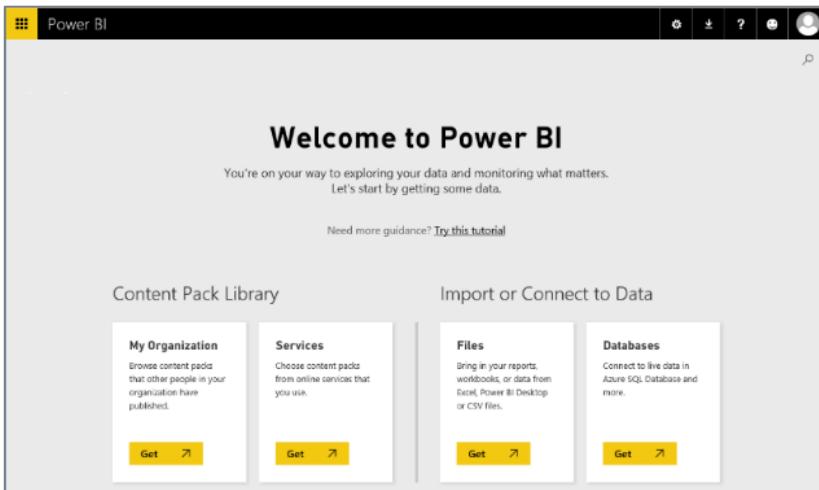
- c) Open this worksheet with Microsoft Excel and examine the worksheet and the table inside.

1	A	B	C	D	E	F	G
	Fiscal Year	Sales Region	State	Category	Subcategory	Product	Sales Revenue
2	FY 2012	Western Region	AZ	Action Figures	Cute and Huggable	Black Power Ranger Action Figure	\$52.50
3	FY 2012	Western Region	AZ	Action Figures	Cute and Huggable	Green Angry Bird Action Figure	\$158.40
4	FY 2012	Western Region	AZ	Action Figures	Cute and Huggable	Perry the Platypus Action Figure	\$1,777.95
5	FY 2012	Western Region	AZ	Action Figures	Cute and Huggable	Phineas and Ferb Action Figure Set	\$937.65
6	FY 2012	Western Region	AZ	Action Figures	Cute and Huggable	Twitter Follower Action Figure	\$660.00
7	FY 2012	Western Region	AZ	Action Figures	Cute and Huggable	Woody Action Figure	\$467.65
8	FY 2012	Western Region	AZ	Action Figures	Tough Guys	Batman Action Figure	\$1,375.40
9	FY 2012	Western Region	AZ	Action Figures	Tough Guys	Captain America Action Figure	\$3,354.05
10	FY 2012	Western Region	AZ	Action Figures	Tough Guys	GI Joe Action Figure	\$1,031.55

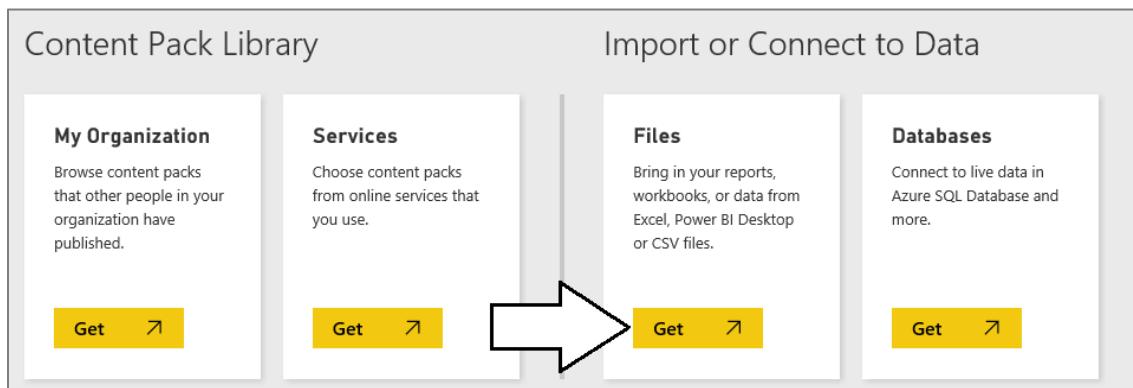
- d) Once you have inspected the data, close Microsoft Excel without saving any changes to **WingtipSalesData.xlsx**.
2. In the browser, navigate to the Power BI service at <https://app.powerbi.com>.

What usually happens when you navigate to the Power BI Service is that you are shown a view with the dashboards, reports and datasets in your personal workspace. However, your personal workspace is initially empty so it doesn't contain any dashboards, reports or datasets yet. Therefore, the Power BI service display a special welcome page that allows you to get started by linking to or importing data.

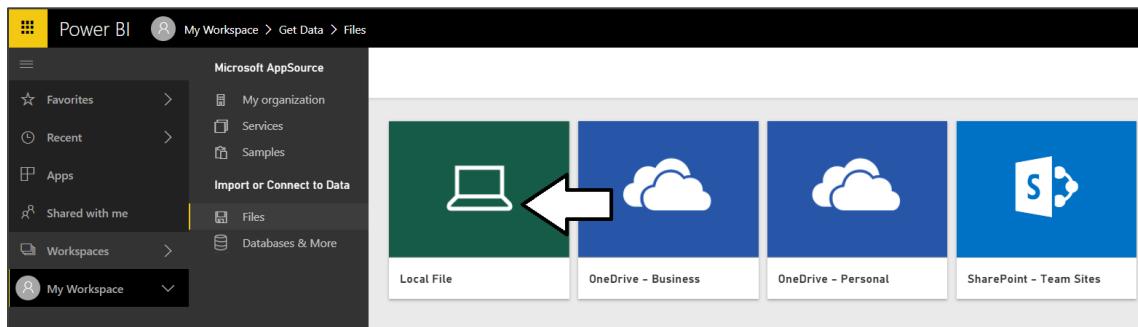
3. At this point, you should be at the Welcome to Power BI page as seen in the following screenshot.



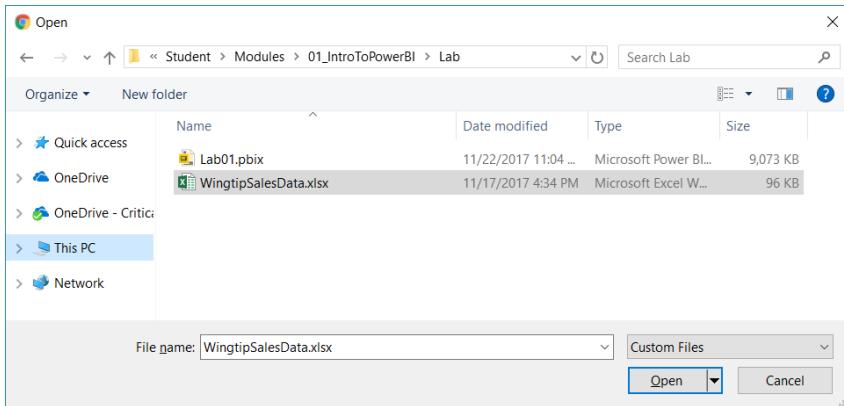
4. Import data from an Excel workbook file.
  - a) Click in the **Get** button in the **Files** tile under the **Import or Connect to Data** section header.



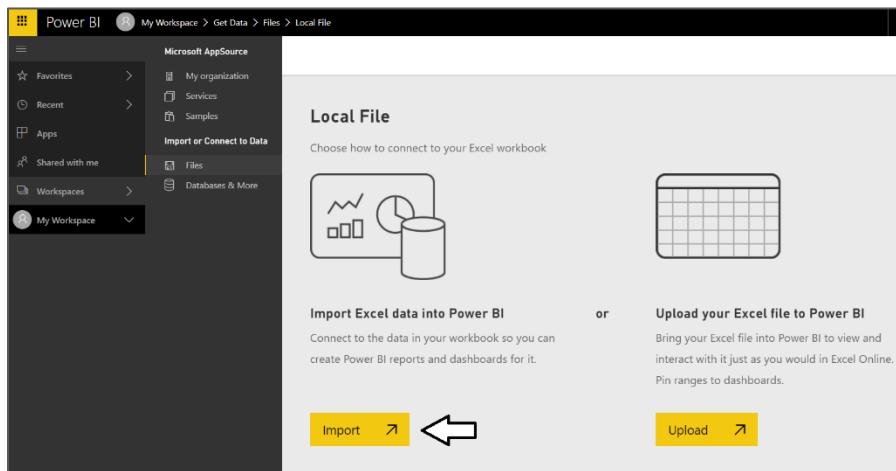
- b) On the next page you should see several tiles which indicate your choices for the location of the file you would like to connect to or import. Click on the tile with the caption **OneDrive – Business** so you can import data from the Excel workbook you uploaded to your OneDrive site in a previous exercise.



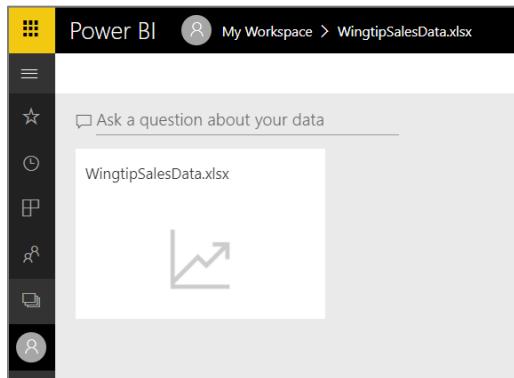
- c) In the File Open dialog, select the Excel workbook named **WingtipSalesData.xlsx** at the following path.  
`C:\Student\Modules\01_IntroToPowerBI\Lab\wingtipsalesdata.xlsx`
- d) Once you have selected the workbook file named **WingtipSalesData.xlsx** in the open dialog, click the **Open** button to begin the process of importing the data to create a new dataset.



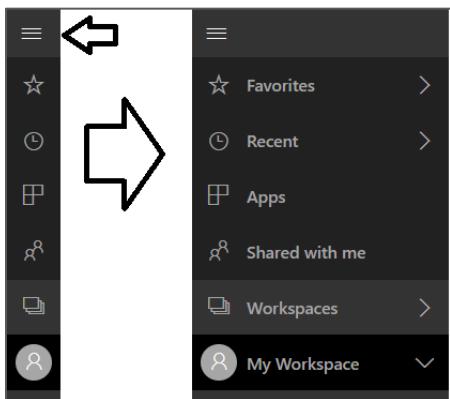
- e) After clicking the **Open** button in the previous step, you are taken to a page which prompts you to **Choose how to connect to your Excel workbook**. Click the **Import** button on the bottom left-hand side of the page to import data from the Excel workbook into the Power BI service to create a new dataset.



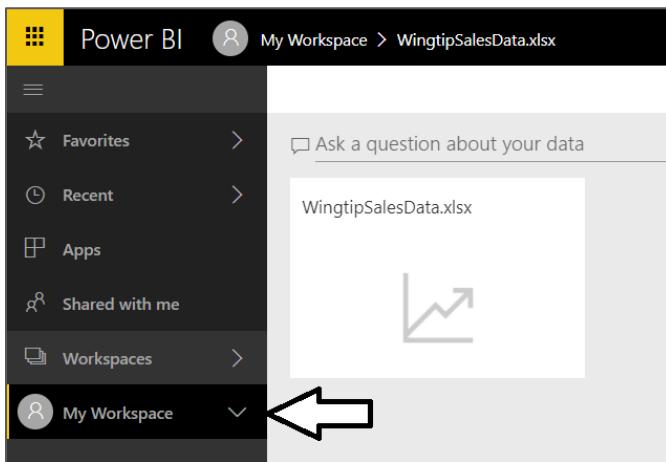
- f) After the import process has completed, the Power BI service will display a dashboard that was created during the import of the file **WingtipSalesData.xlsx**.



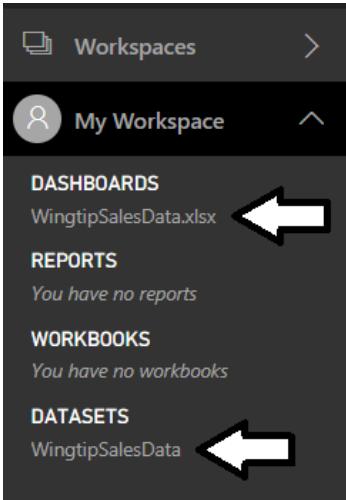
5. Expand the **My Workspace** menu at the bottom of the left navigation menu.  
a) Make sure left navigation is in an expanded state.



- b) Click the **My Workspace** drop down menu at the bottom of the left navigation menu to see the workspace contents.



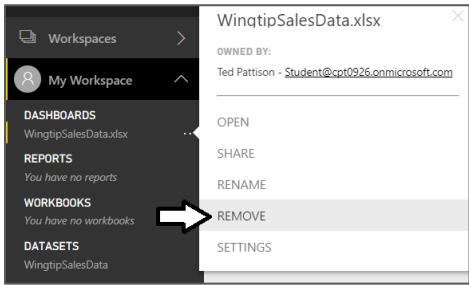
- c) You should see there is a dashboard named **WingtipSalesData.xlsx** and a dataset named **WingtipSalesData**.



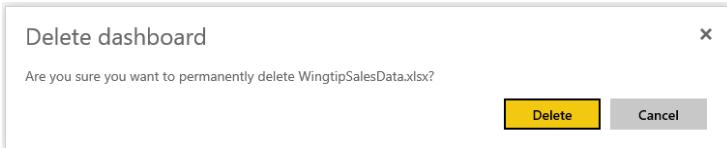
Note that when importing data from an Excel workbook that the Power BI service creates both a new dataset and a new dashboard. However, you might want just the dataset but not the dashboard. You should delete the dashboard if you do not plan to use it.

6. Delete the dashboard named **WingtipSalesData.xlsx**.

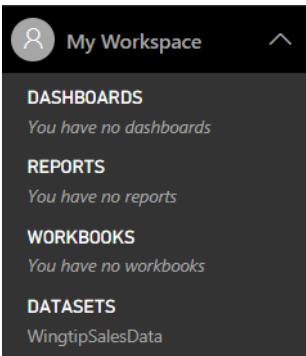
- a) Expand the ellipse menu to the right of the **WingtipSalesData.xlsx** dashboard and selecting the **REMOVE** command.



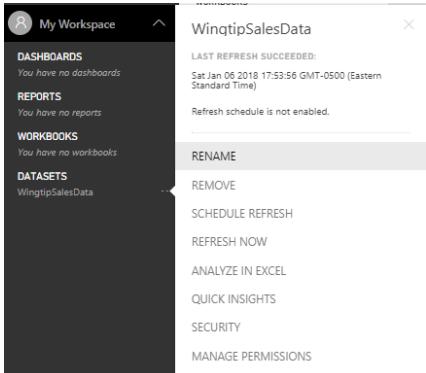
- b) When prompted, confirm you want to delete this dashboard.



- c) Your personal workspace now contains the **WingtipSalesData** dataset but there should not be any dashboards or reports.



7. Expand the ellipse flyout menu (...) to the right of the **WingtipSalesData** dataset link just to see what menu commands are available from you to run on the new dataset you have just created.

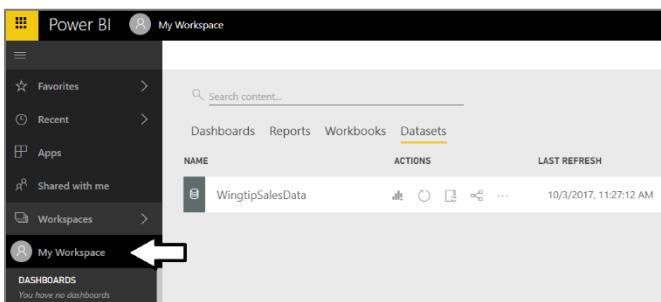


There's no need to execute any command from the dataset flyout menu. You should just take note of the commands available for a dataset. You can see the dataset menu include **RENAME**, **REMOVE**, **SCHEDULE REFRESH**, **REFRESH NOW**, **ANALYZE IN EXCEL**, **QUICK INSIGHTS**, **SECURITY**, **MANAGE PERMISSIONS**.

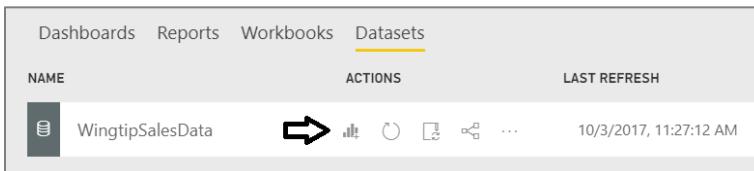
## Exercise 4: Create a New Power BI Report with Multiple Pages

Now that you have created a dataset, the next setup step involves creating a new report with two pages of visualizations.

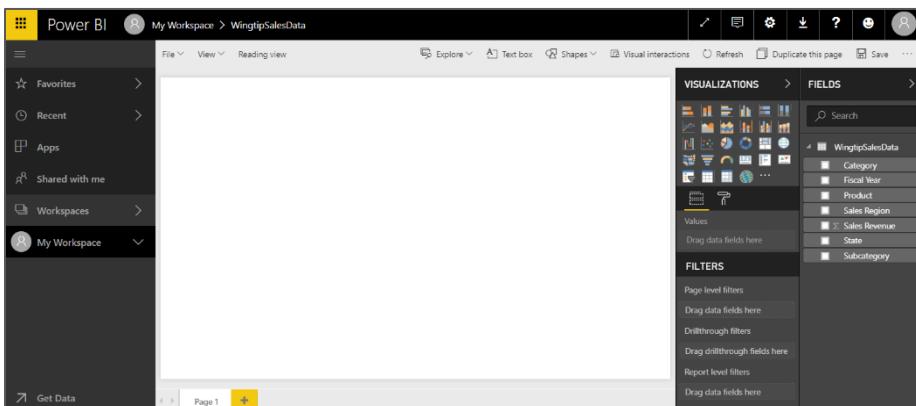
1. Create a new report using the **WingtipSalesData** dataset.
  - a) Click the **My Workspace** menu link in the left navigation to display the summary page for your personal workspace. After you do this, your screen should match the following screenshot.



- b) Locate the dataset named **WingtipSalesData** and click the **Create Report** button to the right.

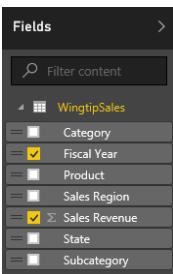


- c) You should now see a new report in edit view which displays the **Fields** list for the dataset on the right-hand side of the page.

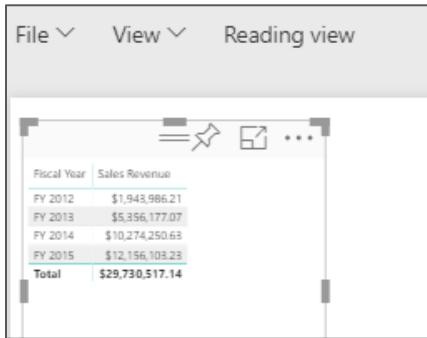


2. Add a new visual to the report to create a line chart.

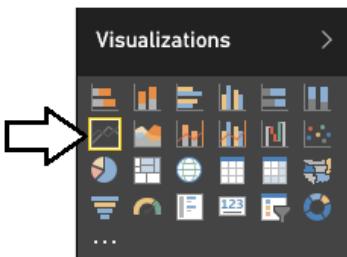
- a) In the **Fields** list on the right-hand side of the page, click the checkbox beside **Fiscal Year** and then select the checkbox beside **Sales Revenue**.



- b) This should create a table visual in the new report as shown in the following screenshot.



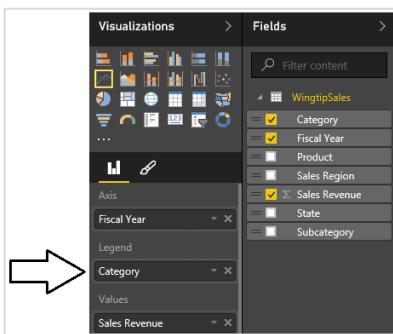
- c) Change the visual type from a table to a line chart by clicking the **Line chart** button in the **Visualizations** list.



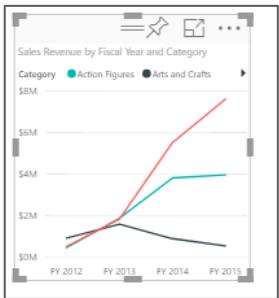
- d) At this point, you should see that the visual on the report now displays a line chart.



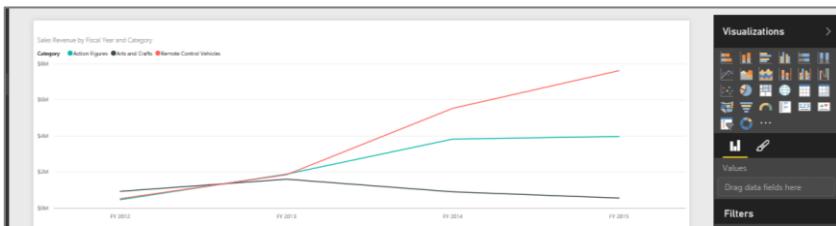
3. Next, you will add a new dimension to your visual to show how sales revenue is distributed across product categories. First, make sure the visual with the line chart is selected and then drag-and-drop the **Category** field from the **Fields** list into the **Legend** well in the **Visualizations** pane as shown in the following screenshot.



4. At this point, your visual should match the line chart shown in the following screenshot. However, the visual is not yet wide enough to display correctly.

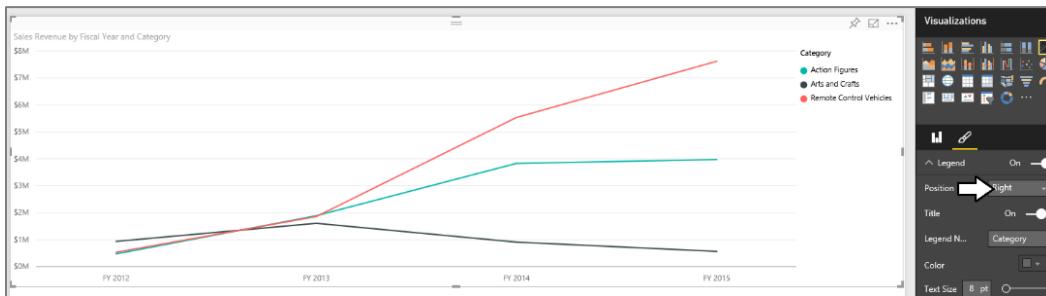


5. Select the handle at the bottom-right corner of the visualization and resize it so it takes up the width of the current report page.



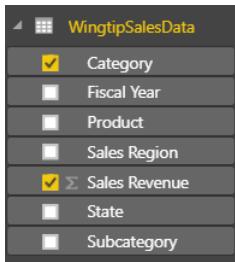
6. Reposition the Line chart's legend.

- Make sure the visual with the Line chart is selected.
- In the **Visualizations** pane, click the pen icon to activate the **Format** properties pane.
- In the **Legend** section, locate the **Position** property and update it to **Right**.
- The legend should now be displayed in the upper right corner of the line chart visual.

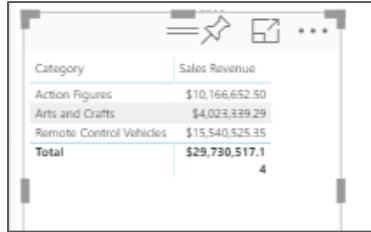


7. Add a second visualization to the current report page.

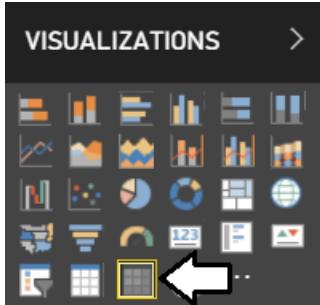
- Begin by clicking the white space under the line chart visualization so that the visualization is no longer selected.
- Return to the **Fields** list.
- Select the checkbox beside the **Category** field.
- Select the checkbox beside the **Sales Revenue** field.



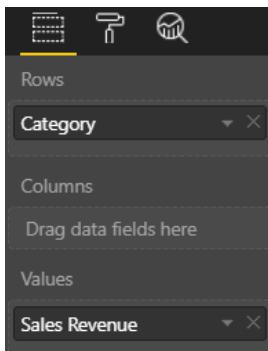
- e) You should see that a new table visual has been created like the table visual shown in the following screenshot.



- f) Change the type of visualization from table to matrix by clicking the **Matrix** button in the **Visualizations** list.



- g) If you examine the **Fields** pane under the **Visualizations** list, you should see that the **Rows** well contains the **Category** field while the **Values** well contains the **Sales Revenue** field.



- h) At this point your matrix visual should look like the following screenshot.

Category	Sales Revenue
Action Figures	\$10,166,652.50
Arts and Crafts	\$4,023,339.29
Remote Control Vehicles	\$15,540,525.35
Total	\$29,730,517.14

- i) Drag and drop the **Subcategory** field from the **Fields** list into the **Rows** well below the **Category** field.

The screenshot shows the Power BI Fields pane on the right. Under the 'WingtipSalesData' table, the 'Category' and 'Subcategory' fields are checked and highlighted in yellow. Below the Fields pane is a matrix visual. In the 'Rows' well of the matrix visual, there are two entries: 'Category' and 'Subcategory', both with dropdown arrows next to them. An arrow points from the 'Subcategory' entry in the Fields pane towards the 'Subcategory' entry in the matrix's Rows well.

Once you have two or more fields to the **Rows** well of a matrix visual, a new set of button appear at the top of the visual which makes it possible to expand the levels of rows shown.

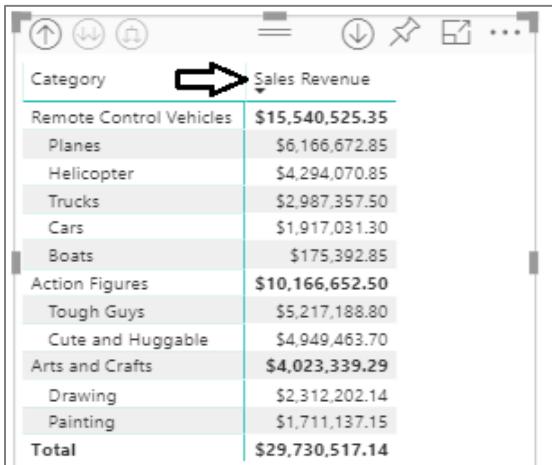
- j) Click on the **Expand All One Level** button so the matrix shows subcategories in addition to categories.

The screenshot shows the matrix visual with the 'Action Figures' row expanded. The expanded row contains four subcategories: 'Cute and Huggable', 'Tough Guys', 'Drawing', and 'Painting'. At the top of the matrix, there is a toolbar with several icons, including an arrow pointing left, which is highlighted with a black arrow. This icon corresponds to the 'Expand All One Level' button.

- k) The matrix in your report should now appear like the matrix shown in the following screenshot.

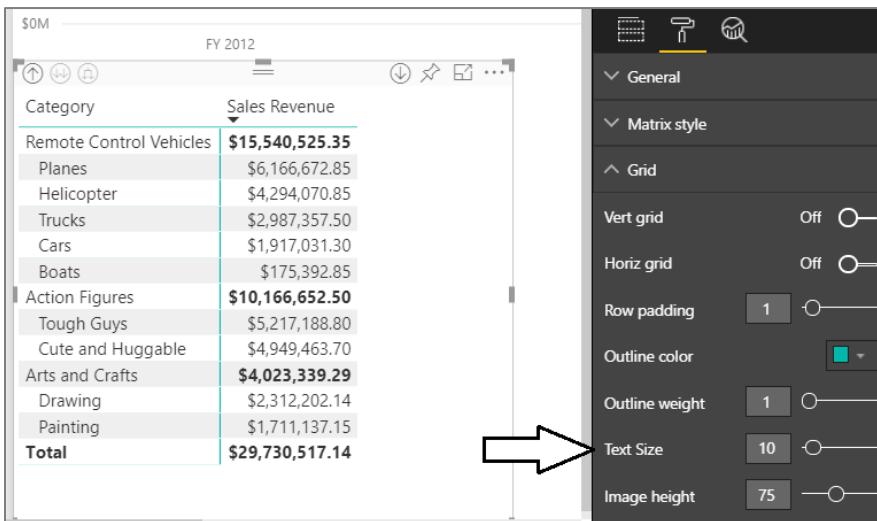
The screenshot shows the final expanded matrix visual. The 'Category' column lists 'Action Figures', 'Arts and Crafts', and 'Remote Control Vehicles'. The 'Action Figures' category has been fully expanded to show all its subcategories: 'Cute and Huggable', 'Tough Guys', 'Drawing', and 'Painting'. The 'Arts and Crafts' category has also been expanded to show its subcategories: 'Boats', 'Cars', 'Helicopter', 'Planes', and 'Trucks'. The 'Remote Control Vehicles' category has been expanded to show its subcategories: 'Boats', 'Cars', 'Helicopter', 'Planes', and 'Trucks'. The total sales revenue for each category and its subcategories are listed in the adjacent column.

- i) Inside the matrix, click on the **Sales Revenue** column header to resort the data in the matrix so that the product categories and subcategories with the highest amounts of sales revenue are sorted to the top of the matrix.



Category	Sales Revenue
Remote Control Vehicles	\$15,540,525.35
Planes	\$6,166,672.85
Helicopter	\$4,294,070.85
Trucks	\$2,987,357.50
Cars	\$1,917,031.30
Boats	\$175,392.85
Action Figures	\$10,166,652.50
Tough Guys	\$5,217,188.80
Cute and Huggable	\$4,949,463.70
Arts and Crafts	\$4,023,339.29
Drawing	\$2,312,202.14
Painting	\$1,711,137.15
Total	\$29,730,517.14

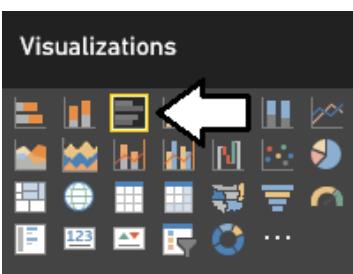
- m) Increase the font size of the matrix visual by locating the **Text Size** property in the **Grid** section of the **Format** properties pane and setting the **Text Size** property value to **10pt**.



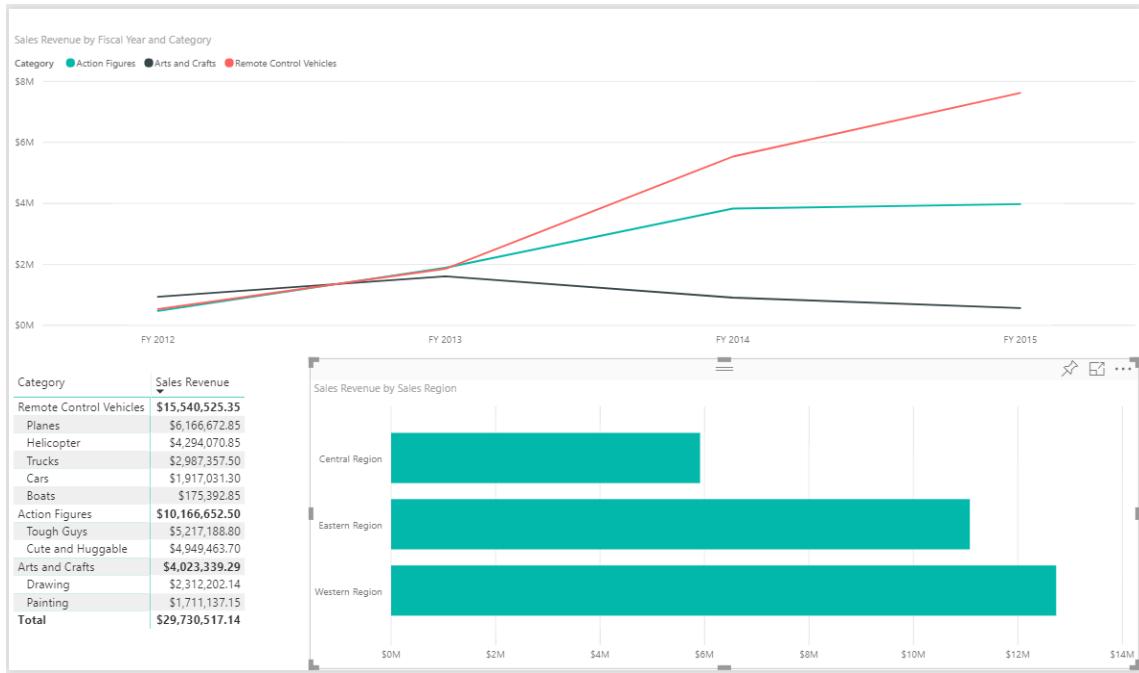
The screenshot shows a Power BI report page with a matrix visual. The matrix has columns for 'Category' and 'Sales Revenue'. The data includes categories like Remote Control Vehicles, Planes, Helicopter, Trucks, Cars, Boats, Action Figures, Tough Guys, Cute and Huggable, Arts and Crafts, Drawing, and Painting, along with their respective sales figures. To the right of the matrix is the 'Format' properties pane. Under the 'Grid' section, there is a 'Text Size' property with a value of '10'. A large arrow points from the text 'Text Size' in the question to this property in the pane.

8. Add a third visual to the current report page.

- Click the white space on the report page outside of the two existing visuals so that neither visual is selected.
- Return to the **Fields** list and select the checkbox beside the **Sales Region** field.
- Select the checkbox beside the **Sales Revenue** field.
- After creating the new visual, change the visualization type to a to a **Clustered bar chart** using the **Visualizations** list.

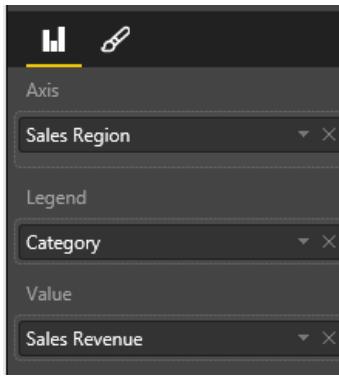


- e) Using the mouse, reposition the new visual so it takes up the bottom right corner of the page.

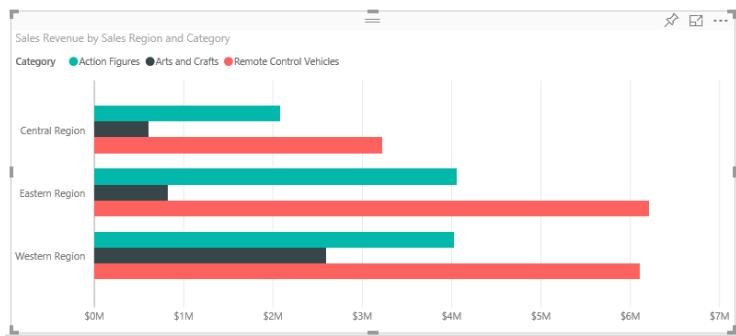


Next, you will add a legend to the Clustered bar chart to visualize how revenue breaks down across product categories.

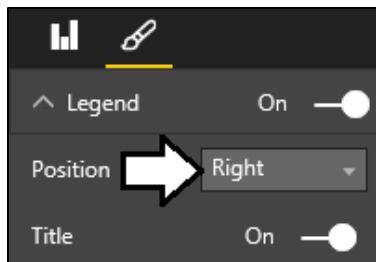
- f) Make sure the Clustered bar chart visual is selected.  
 g) Click on the chart icon in the **Visualizations** task pane so you can edit the **Field** properties of the new **Clustered bar chart**.  
 h) Drag the **Category** field from the **Fields** list into the **Legend** well in the **Field** properties pane.



- i) You should not see revenue for each sales region is further broken out by product category.



- j) Modify the position of the legend for the Clustered bar chart to the right.



- k) Your Clustered bar chart should now look like the one in the following screenshot.



If you have time, you might explore the other options available for editing the appearance of a visualization by examining the other options that are available on the **Visualizations** task pane when a visual is selected. Note that the set of available options change depending on what type of visual is selected.

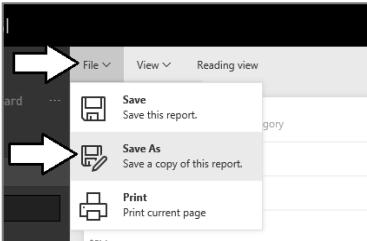
9. Now it is time to save the report. Begin by changing the name of the current page. Locate the report page name section at the bottom left of the current page and observe that the page has been given an initial name of **Page 1**.



10. Double click on the page name of **Page 1** to enter edit mode and then update the page name to **Sales by Product Category**.



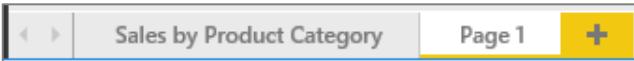
11. Save the report by dropping down the reports **File** menu and selecting the **Save As** menu command.



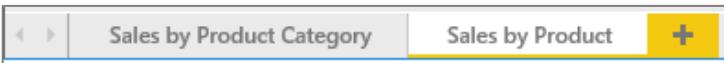
12. When prompted, enter a report name of **Product Sales** and click the **Save** button.



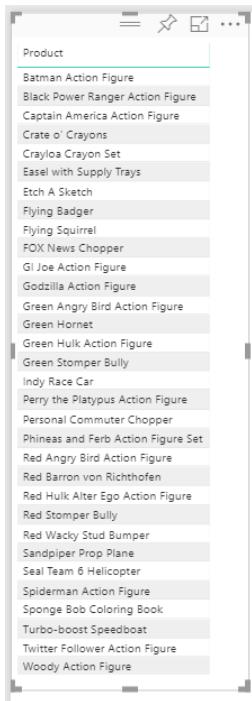
13. After saving the **Product Sales** report, you should be able to see a link for it in the **Reports** section of the left-hand navigation.  
14. Now, add a second page to the **Product Sales** report. Accomplish this by clicking the button with the plus (+) sign to the right of the page name. The Power BI service will respond by creating a second page named **Page 1**.



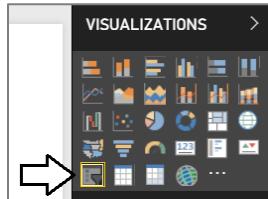
15. Change the name of the second page from **Page 1** to **Sales by Product**.



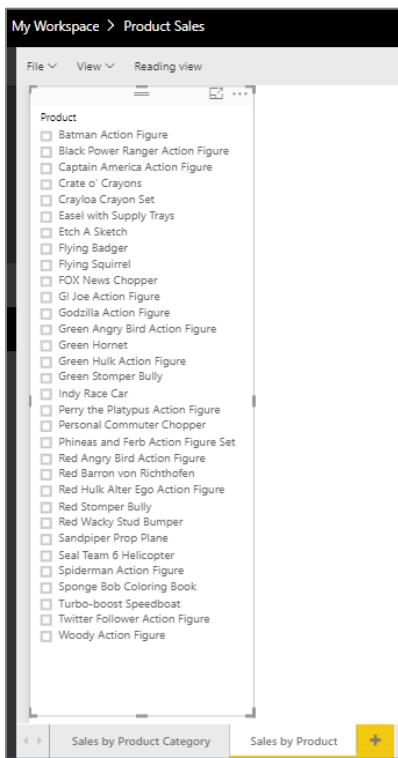
16. On the new **Sales by Product** page, add a new slicer visual  
a) Add a new table visual by selecting the checkbox beside the **Product** field from the **Fields** list. Resize the height of the table visual to display all products at once without the need for a scrollbar.



- b) Change the type of visualization from a table to a slicer by clicking the **Slicer** button in the **Visualizations** list.



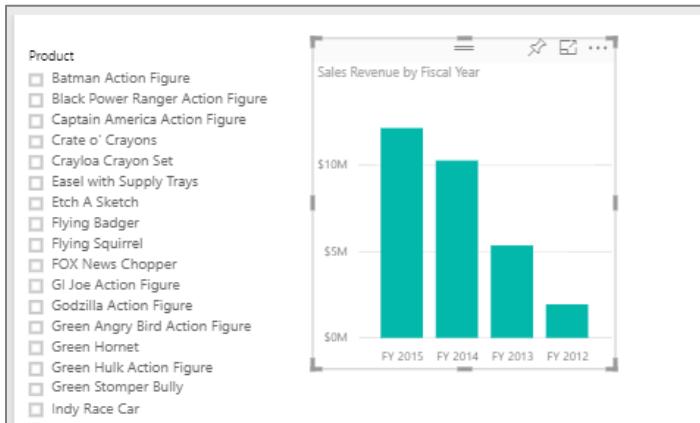
- c) Now that the visualization has been changed to a slicer, you should see that each product has an associated checkbox.



Keep in mind that this slicer visual adds the ability for the current user to interact with this report by selecting one or more products using these checkboxes. When a user changes the selection of products, the Power BI service will automatically refresh the other visualizations on the page by filtering the results using the selected product or products. Learning how to make reports interactive is a key to creating effective BI solutions with Power BI.

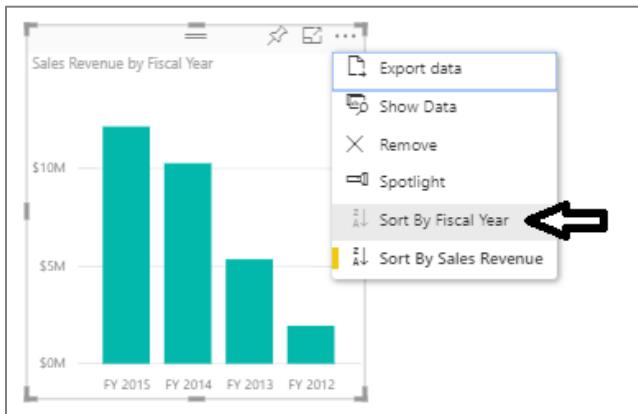
17. Add a second visualization to **Sales by Product** page.

- Click whitespace in the report to ensure the first visualization is not selected.
- Create a new visualization by selecting the checkbox for the **Sales Revenue** field and then selecting the checkbox for the **Fiscal Year** field.
- The new visual as a bar chart should now match the following screenshot.

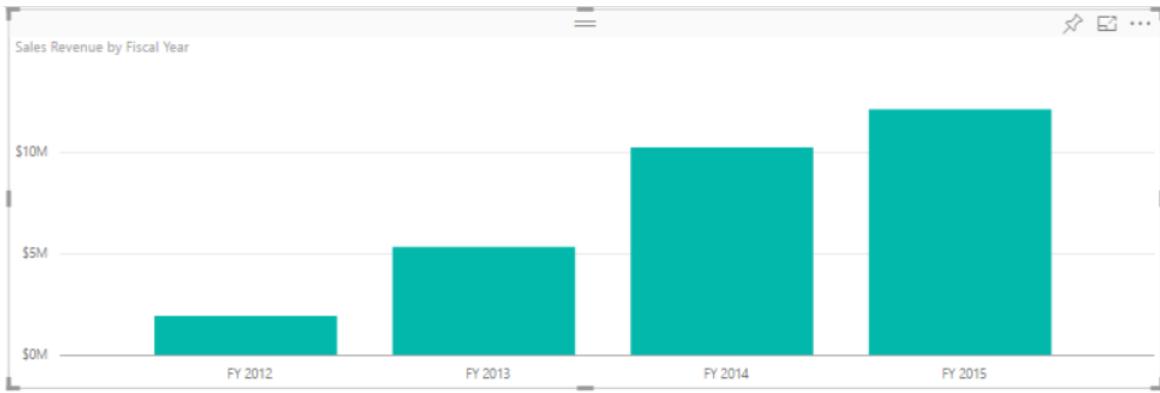


Note that the bar chart has been created with the fiscal years decreasing as it moves from left to right. In the next step you will reverse the order of the columns in this bar chart so that columns for earlier years are sorted to the right and that later years are sorted left.

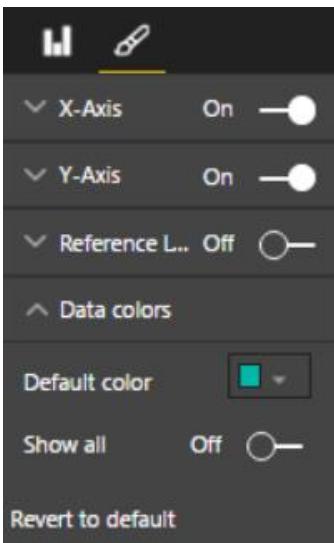
- Click the flyout menu at the top-right corner of the bar chart visual and select **Sort By Fiscal Year** menu command.



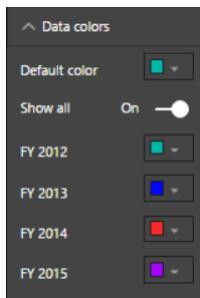
- e) Use the mouse to reposition the new visual so it takes up the top right corner of the page.
- f) The bar chart should now display its bars with fiscal year increasing as you move to the right.



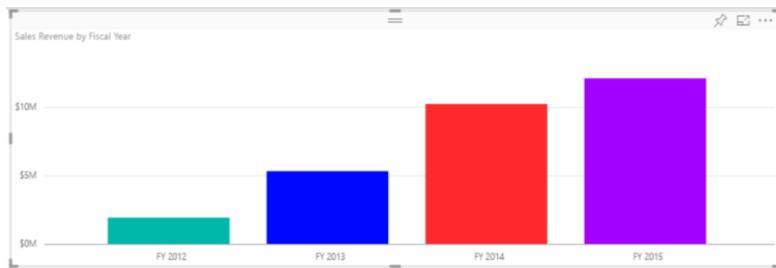
- g) With the bar chart selected, look inside the **Format** properties pane and locate the **Data colors** section. Inside the **Data colors** section, you should see that the **Show all** property is set to **Off**.



- h) Change the **Show all** property to **On**.
- i) Assign a different color to each of the 4 fiscal years.



- j) Your bar chart should now display bars that have a different color for each year.

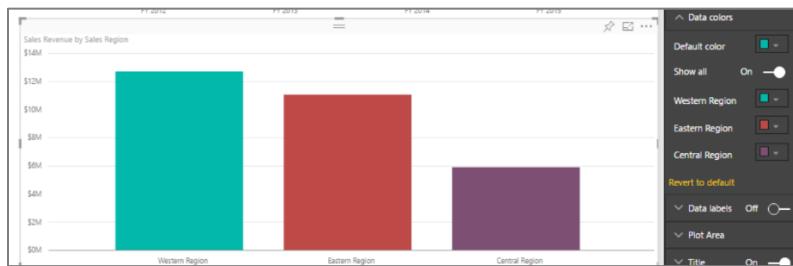


18. Add a third visual to the page.

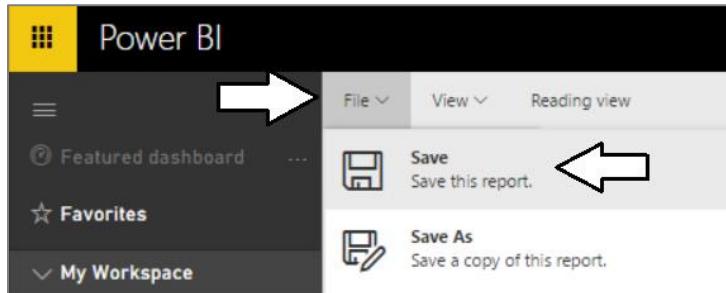
- Click whitespace in the report to ensure the neither of the two visualizations are currently selected.
- Create a third visualization by selecting the checkbox for the **Sales Revenue** field and then selecting the checkbox for the **Sales Region** field.
- Use the mouse to reposition the new visual so it takes up the bottom right corner of the page.
- The new visual should now match the following screenshot.



- Modify the **Data colors** section in the **Format** properties pane to give each column its own unique color.

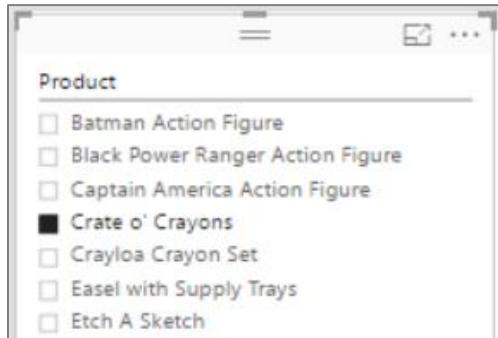


- f) Save your work by executing the **Save** command from the **File** menu.

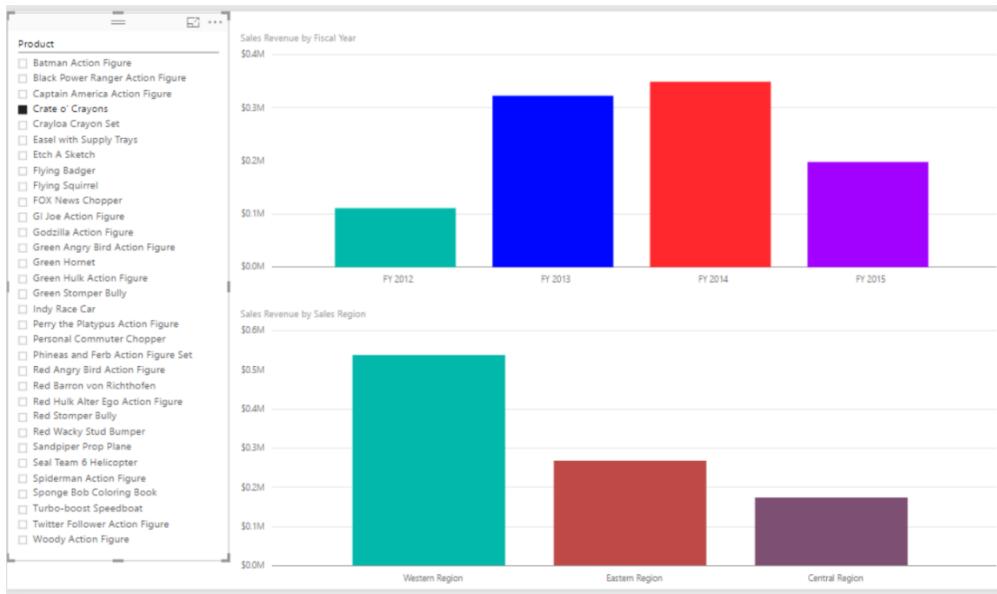


19. Test out the interactive effect of selecting products in the slicer.

- a) Select one product at a time.



- b) Observing how the two other visualizations on the page automatically refresh to show sales data for one product at a time.



- c) Play the role of a business analyst and determine which products have the most positive increases in sales revenue from year to year. Also, find the products with downward trending sales. If you examine the sales data for the **Crate o' Crayons**, you can see sales revenue for this is trending in the wrong direction over the last four years. What other products are showing decreasing sales in this set of 32 products?

Now that you have created a report with multiple pages, it is time to move on to the next exercise where you will create a new dashboard and then you will test sharing this dashboard with another user in your Office 365 trial tenant.

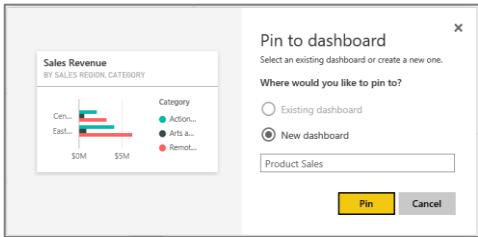
## Exercise 5: Create a Power BI Dashboard

Now that you have created a dataset and a report, you will now create a simple dashboard.

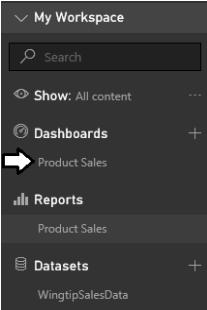
1. Navigate to the **Sales by Product Category** page of the **Product Sales** report.
2. Inspect the Clustered bar chart with product categories. Locate and click the button with the thumbtack icon which is used to pin a report visualization to a dashboard.



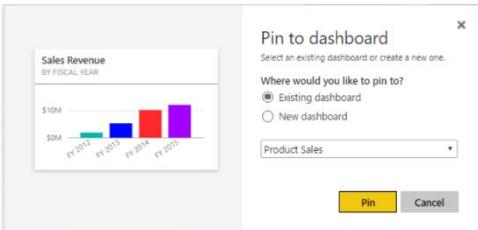
3. When you click the button with the thumbtack icon, you will be prompted with the dialog which asks you where to pin the visualization. Select the option to pin the visualization to a **New Dashboard** and give the new dashboard a name of **Product Sales**. When the **Pin to Dashboard** form is filled out like the one shown in the following screenshot, click the **Pin** button.



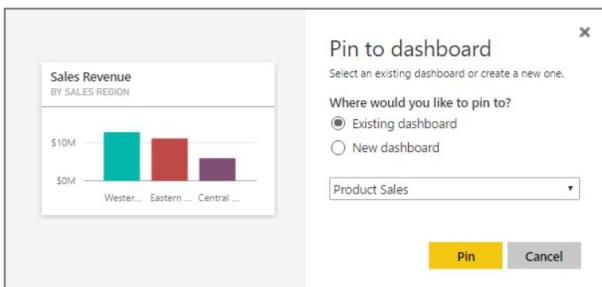
- At this point, the new **Product Sales** dashboard should be created and a link to it should appear in the left navigation menu.



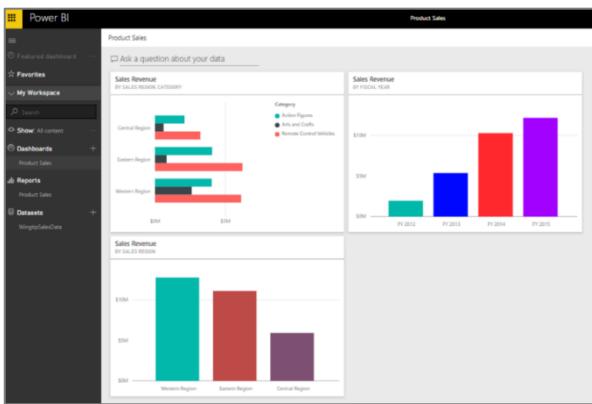
- Navigate to the **Sales by Product** page of **Product Sales** report and follow the same steps to pin the bar chart visualization showing sales revenue by fiscal year to the **Product Sales** dashboard.



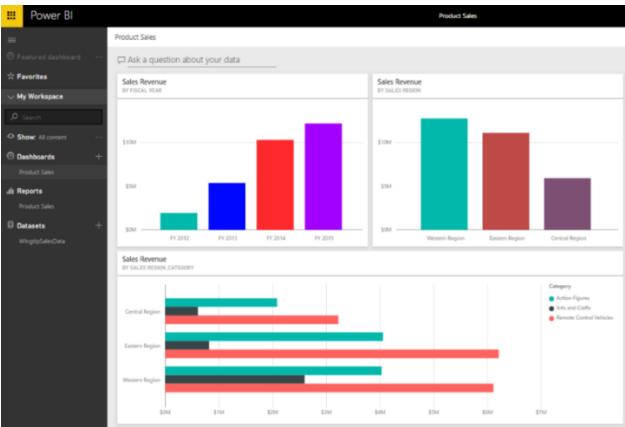
- Remain on the **Sales by Product** page of **Product Sales** report and follow the same steps to pin the bar chart visualization showing sales revenue by sales region to the **Product Sales** dashboard.



- Click on the **Product Sales** link in the **Dashboards** section of the left navigation menu to display the **Product Sales** dashboard. You should be able to verify that you see three tiles that have been created from the three report visualization that you pinned to this dashboard.



8. Note that you can move or resize the tiles inside the dashboard. This is due to the fact that you are the dashboard author and you are in dashboard edit mode. Use your mouse to rearrange the tiles in the dashboard to match the screenshot below.



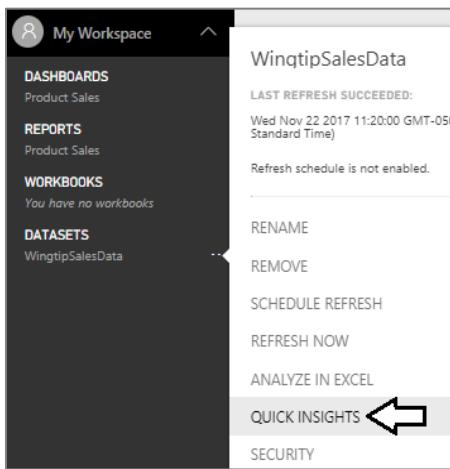
9. Experiment by clicking on the tiles in the dashboard. You will find that clicking a tile will navigate the user to the report and page that contains the visualization which was pinned to the dashboard.

Now you have created a dataset, a report and a dashboard which are the main three building blocks when building data analytics and reporting solutions with Power BI. Next, you will experiment with the Power BI Quick Insights feature to see if it has anything interesting to say about the dataset you have just imported.

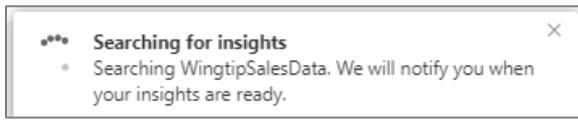
## Exercise 6: Get Quick Insights on a Power BI Dataset

In this exercise, you will run a Power BI command to generate quick insights for the WingtipSalesData dataset.

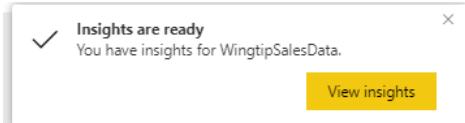
1. Get Quick Insights on the dataset named **WingtipSalesData**.
  - a) Drop down the fly out menu for the **WingtipSaleData** and click the **VIEW INSIGHTS** menu command.



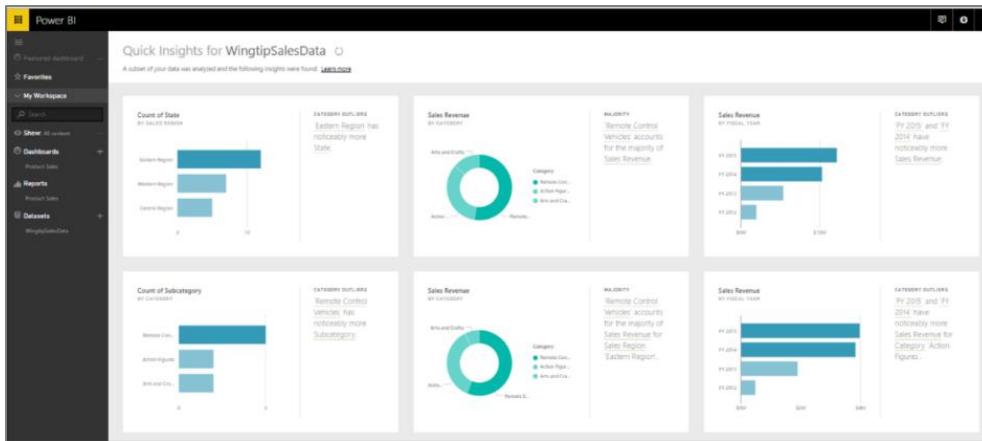
- b) Wait while the gathering insights process runs. It should not take more than



- c) When you see the **Insights are ready** notification, click the **View insights** button.



- d) The Power BI service should generate a page with the title **Quick Insights for WingtipSalesData**. Take a few minutes to review all the quick insights that have been generated.



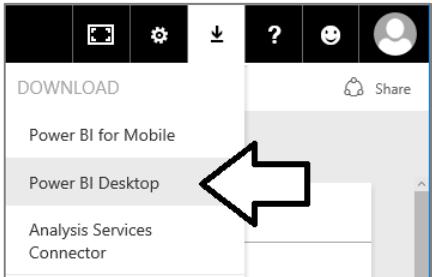
In the final exercise you will open a project in Power BI Desktop and publish it to the Power BI service.

## Exercise 7: Getting Started with Power BI Desktop

In this exercise, you will first download and install Power BI Desktop if you have not already done so. Note that if Power BI desktop is already installed on your student workstation, you can skip ahead in this exercise to step 12.

1. Using the browser, navigate to the landing page of the Power BI service at <https://app.powerbi.com>.

2. On the top right of the Power BI service window, drop down the **Downloads** menu and click the **Power BI Desktop** menu command to begin the download of the installation file.



3. Wait for the MSI file to download.



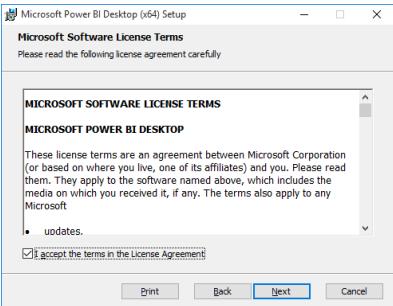
4. Once the file has downloaded, click the **Run** button to begin the installation of Power BI Desktop.



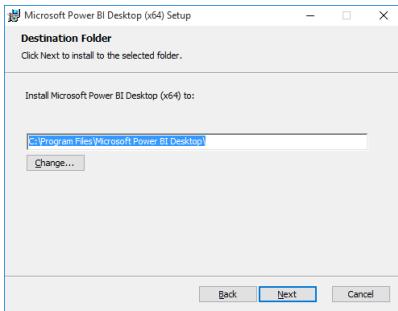
5. When you see the Welcome screen, click **Next** to continue with the installation.



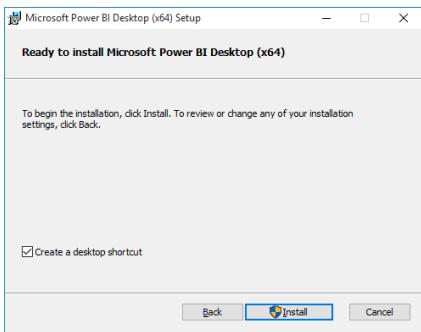
6. Click the checkbox to accept the license agreement and click **Next**.



7. Accept the default location for the installation and click **Next**.



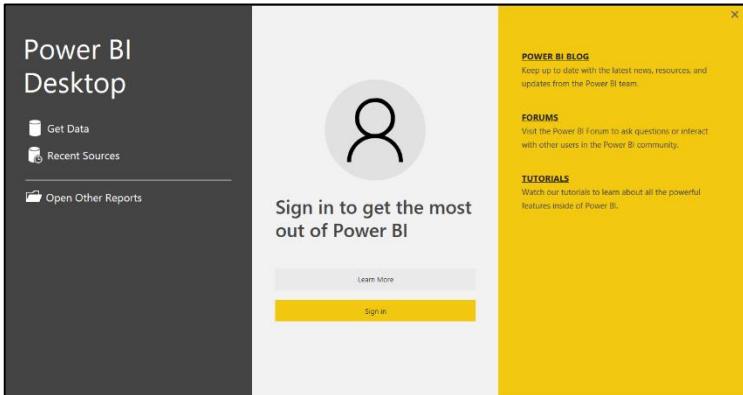
8. On the next screen, click **Install**.



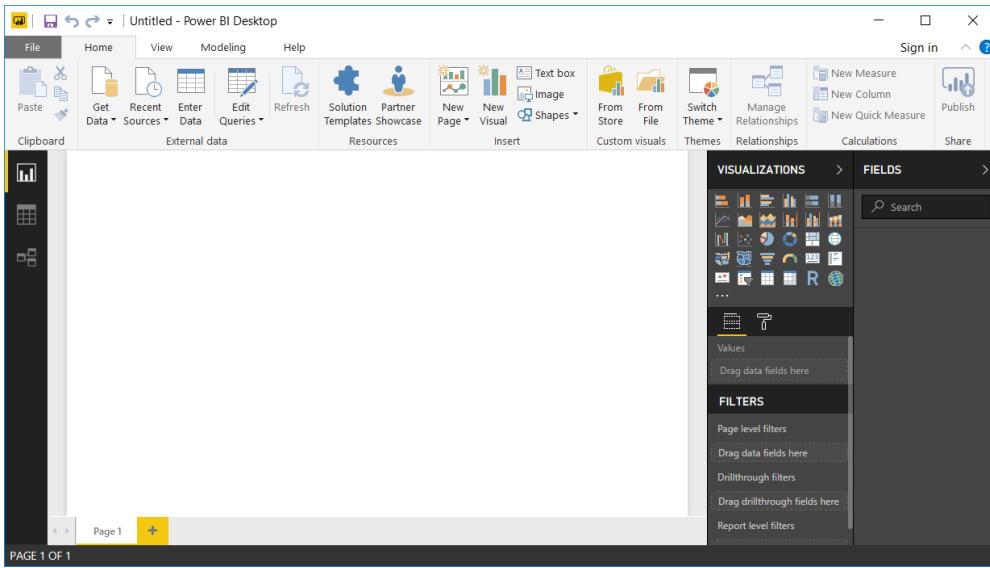
9. When you see the **Completed the Microsoft Power BI Desktop Setup Wizard** screen, click **Finish** to launch Power BI Desktop.



10. When Power BI Desktop launches for the first time, it displays a Welcome screen as shown in the following desktop. Click the (X) button in the upper right corner to close this window.



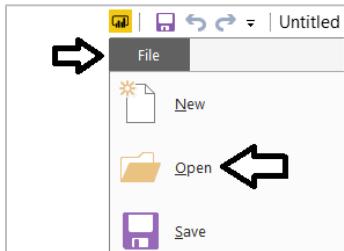
11. At this point, you should have Power BI Desktop running with a new, unsaved project as shown in the following screenshot.



You can start this exercise here if Power BI Desktop was already installed.

12. Open the Power BI Desktop project file named **Lab01.pbix**.

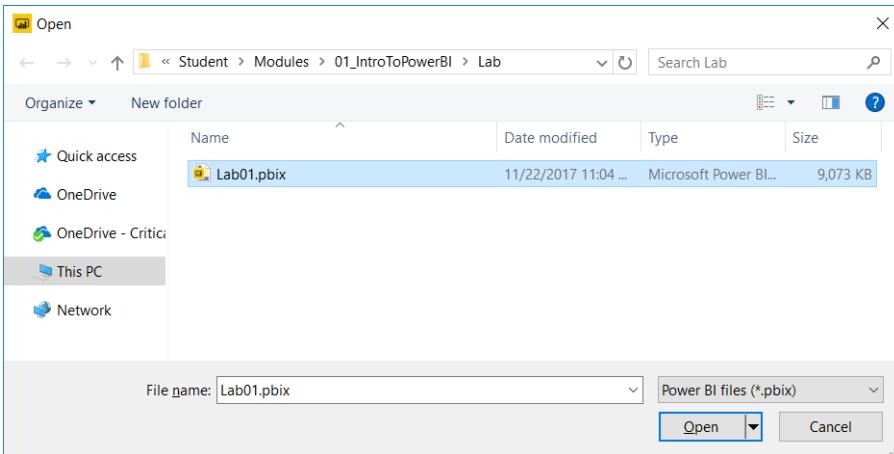
- Select the **File > Open** command from within Power BI Desktop.



- Locate the PBIX file located at the following path.

**C:\student\Modules\01\_IntroToPowerBI\Lab\Lab01.pbix**

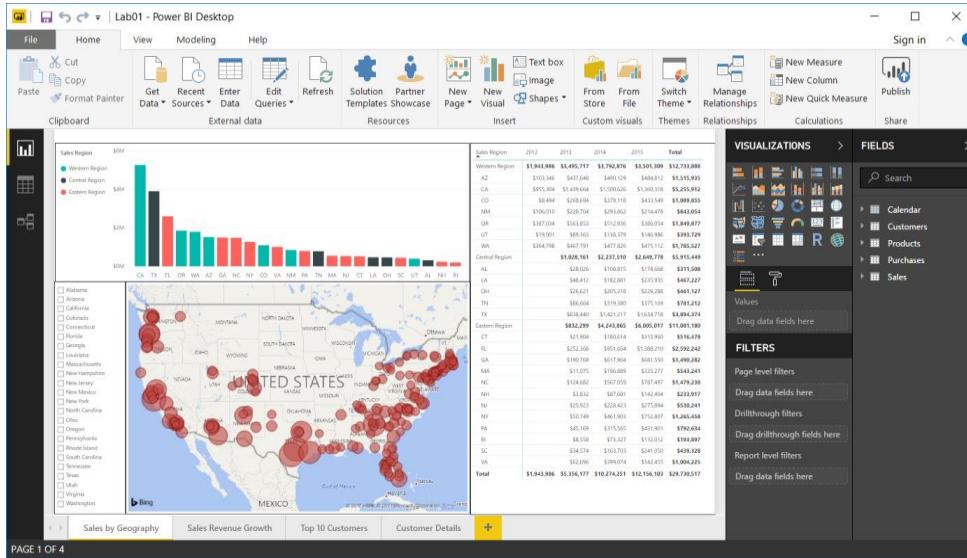
- Open **Lab01.pbix** to load this project into Power BI Desktop.



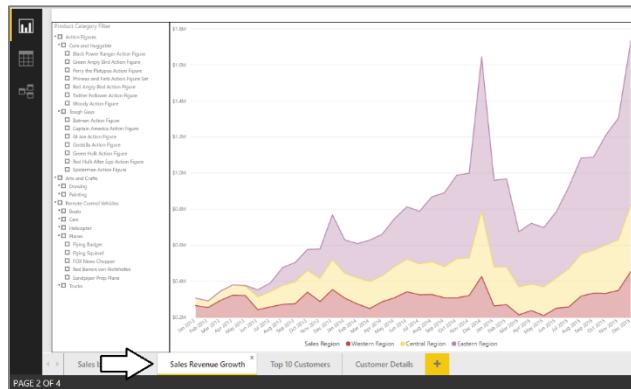
The project should now be open in Power BI desktop.

13. Inspect the contents of the Power BI Desktop project named **Lab01.pbix**.

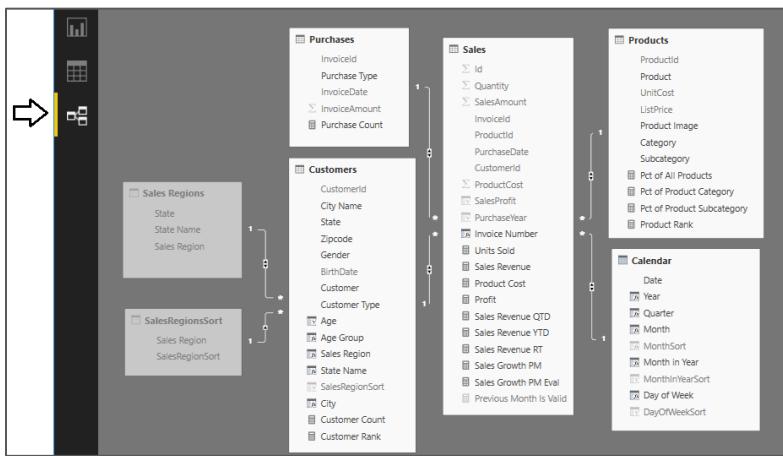
- a) Inspect the report that has been created inside this project. You should see if provides four pages.



- b) Using the navigation tabs at the bottom of the report, move from page to page to inspect each page in the report.



- c) Click on the Relationship view button in the left navigation to see the tables included in data model and their relationships.



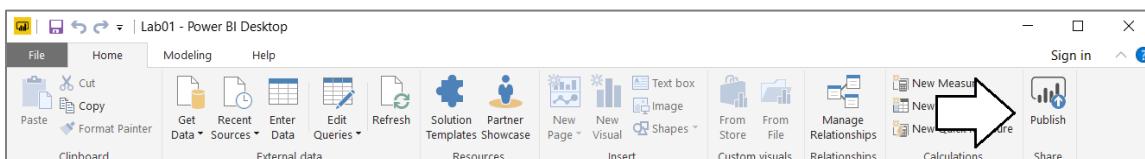
- d) Click on the Data view button in the left navigation to see a tabular view of the data inside the project's data model. Note that you can select a table in the FIELDS list on the right to see the data in that table.

The screenshot shows the Power BI Data view interface. On the left, there's a navigation bar with icons for Home, Modeling, Help, and Publish. Below it are buttons for Cut, Copy, Paste, Format Painter, Get Recent Sources, Enter Data, Refresh, Solution Templates Showcase, New Page, New Visual, Text box, Image, Shapes, From Store, From File, Manage Relationships, New Measure, New Calculations, and Publish. A large yellow arrow points from the left side towards the 'Products' table in the main view. The main view displays a table titled 'TABLE: Products (32 rows)' with columns: ProductId, Product, UnitCost, ListPrice, Product Image, and Category. The 'Category' column shows values like Action Figures, Arts and Crafts, and Remote Control. The 'Product Image' column contains URLs for product images. The 'FIELDS' list on the right shows the same tables as the previous screenshot, with 'Products' selected.

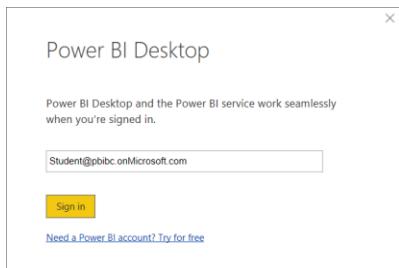
You do not need to make any changes to the Power BI Desktop project named **Lab01.pbix**. The purpose of this lab is for you to open an existing project that has already been completed and then to publish it to your personal workspace.

#### 14. Publish the **Lab01.pbix** project to the Power BI Service.

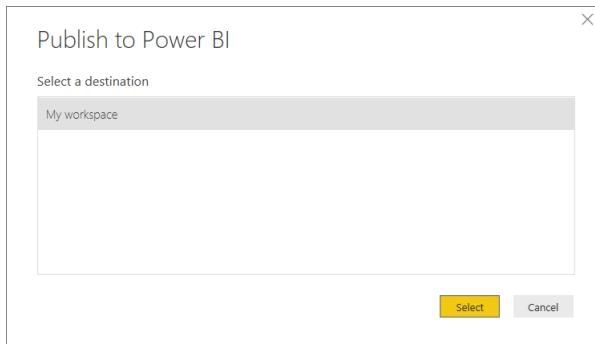
- a) Navigate to the **Home** tab in the ribbon and click the **Publish** button on the far right-hand side.



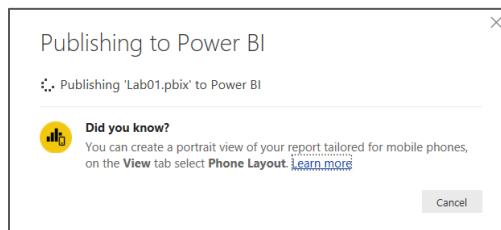
- b) When prompted with the **Sign in to Power BI** dialog, click the **Sign In** button



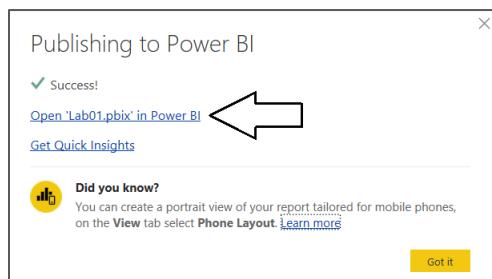
- c) When prompted for your password, sign into the Power BI service.
- d) When Power BI Desktop prompts you with the **Publish to Power BI** dialog, select **My workspace** and then click **Select**.



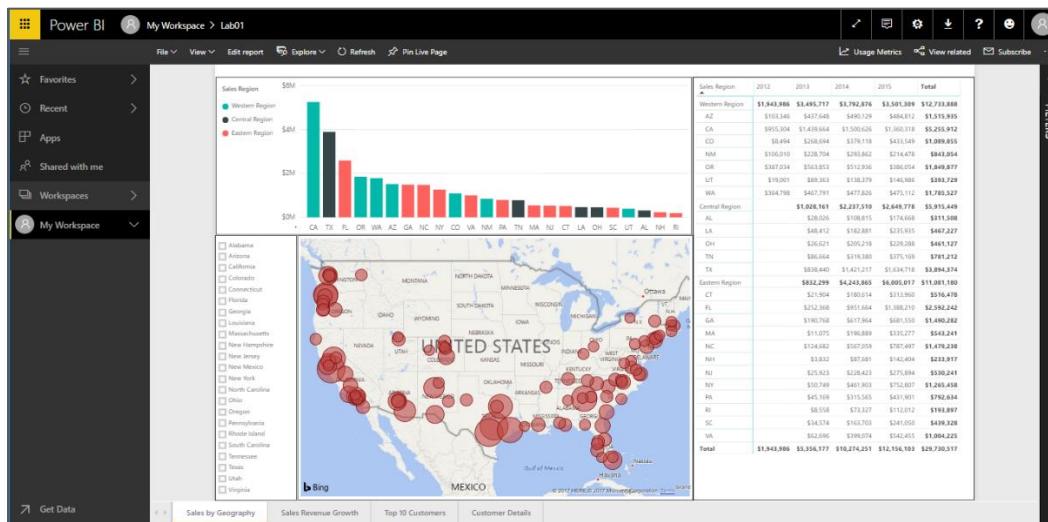
- e) Power BI Desktop will display the **Publishing to Power BI** dialog as the publishing process begins.



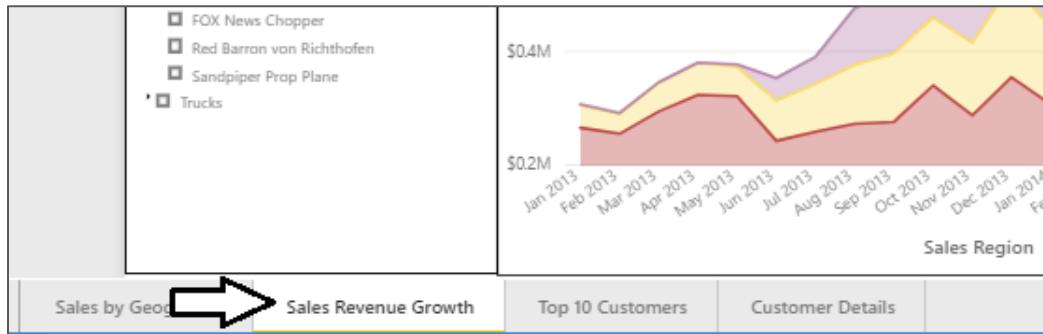
- f) Once the publishing process has completed, the **Publishing to Power BI** dialog will display a success message and provide you with a link to **Open Lab01.pbix in Power BI**. Click on that link to navigate to the Power BI service using the browser.



- g) You should now be able to see the **Sales by Month** page of the report you just created.



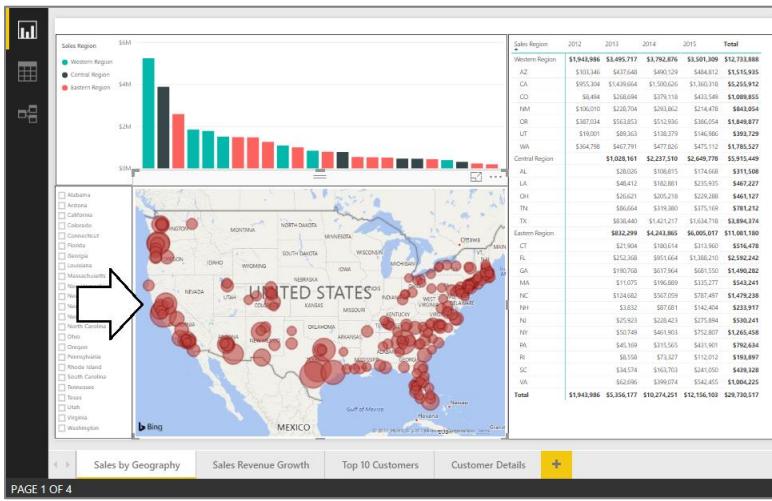
- h) Click on the **Sales by State** link at the bottom of the screen to see the second page of the report.



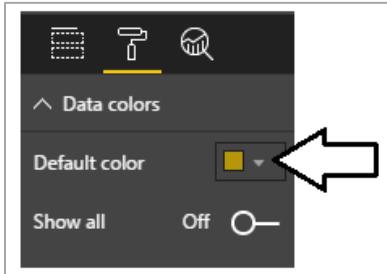
You have now successfully published a PBIX project using Power BI Desktop. But what happens when you want to make a change to a report after it has been published? It's very easy because you can make changes to your Power BI Desktop project and republish it on top a previous version of the same project that has already been published.

15. Change the type of the visual that displays sales revenue by month and purchase type.

- Return back to Power BI Desktop and make sure you are in report view for the project named **Lab01.pbix**.
- Return to the **Sales by Geography** page.
- Select the **Map** visual.



- d) Update the **Default color** property in the **Data colors** section in the **Format pane** to change the color of the bubbles from red to a different color such as yellow or purple.



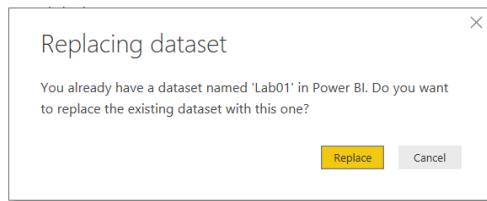
- e) Verify that the bubbles in the Map visual are now a different color than red.



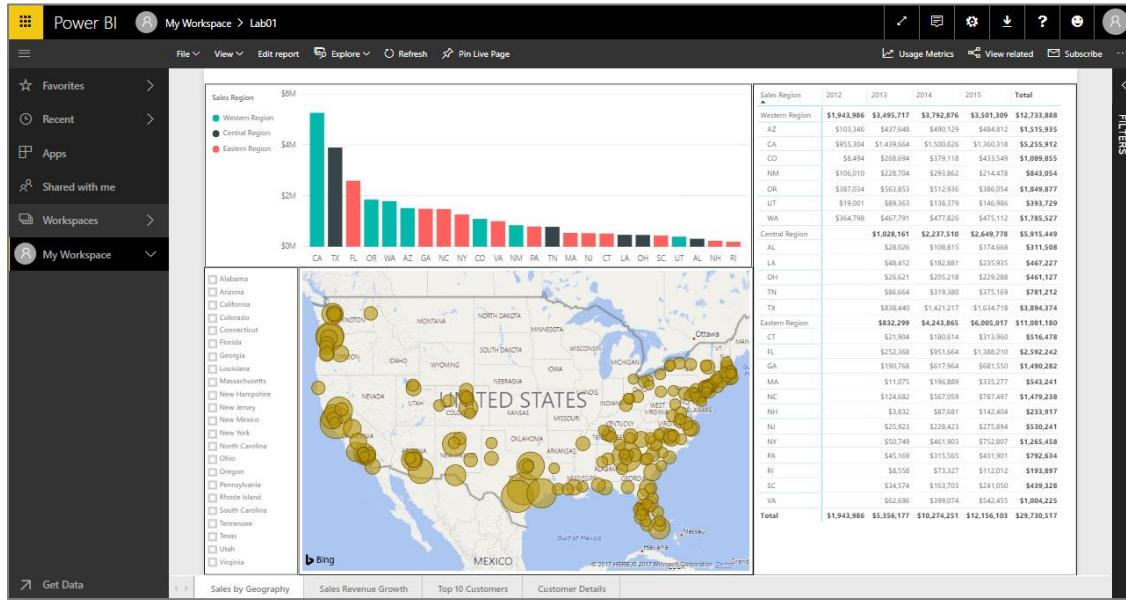
- f) Save your changes to **Lab01.pbix**.

16. Republish the project to the Power BI service.

- Click the **Publish** button on the far right-hand side of the **Home** tab in the ribbon.
- When Power BI Desktop prompts you with the **Publish to Power BI** dialog, select **My workspace** and then click **Select**.
- When prompted with the **Replacing dataset** dialog, click **Replace** to begin the publishing process.



- d) Once the publishing process has completed, inspect the published report in the Power BI service using the browser. Verify that the bubble color within the Map visual has been updated.



Congratulations, you have now finished this lab. If you finish early before other student and you still have extra time, experiment by clicking the **Edit report** button in the browser and seeing how you can continue to modify the pages of the report after the report has been published to the Power BI service. Note that any changes you make to the report through the browser will be overwritten if you republish the report with Power BI Desktop.