Developer Introduction to Power BI

Agenda

- Introduction to Power BI

- Creating PBIX Projects with Power BI Desktop

- Developer Opportunities in Power BI

- Creating a Power BI Development Environment

Student Introductions

- Basic Info
  - What's your name?
  - Where do you work? (optional)
  - How long have you been a developer?

- List skills with which you already feel comfortable
  - Working with the Power BI platform
  - Creating PBIX projects with Power BI Desktop
  - Programming with JavaScript and/or TypeScript
  - Working with the R platform
  - Developing with C# and ASP.NET MVC
  - Programming against REST and ODATA web APIs
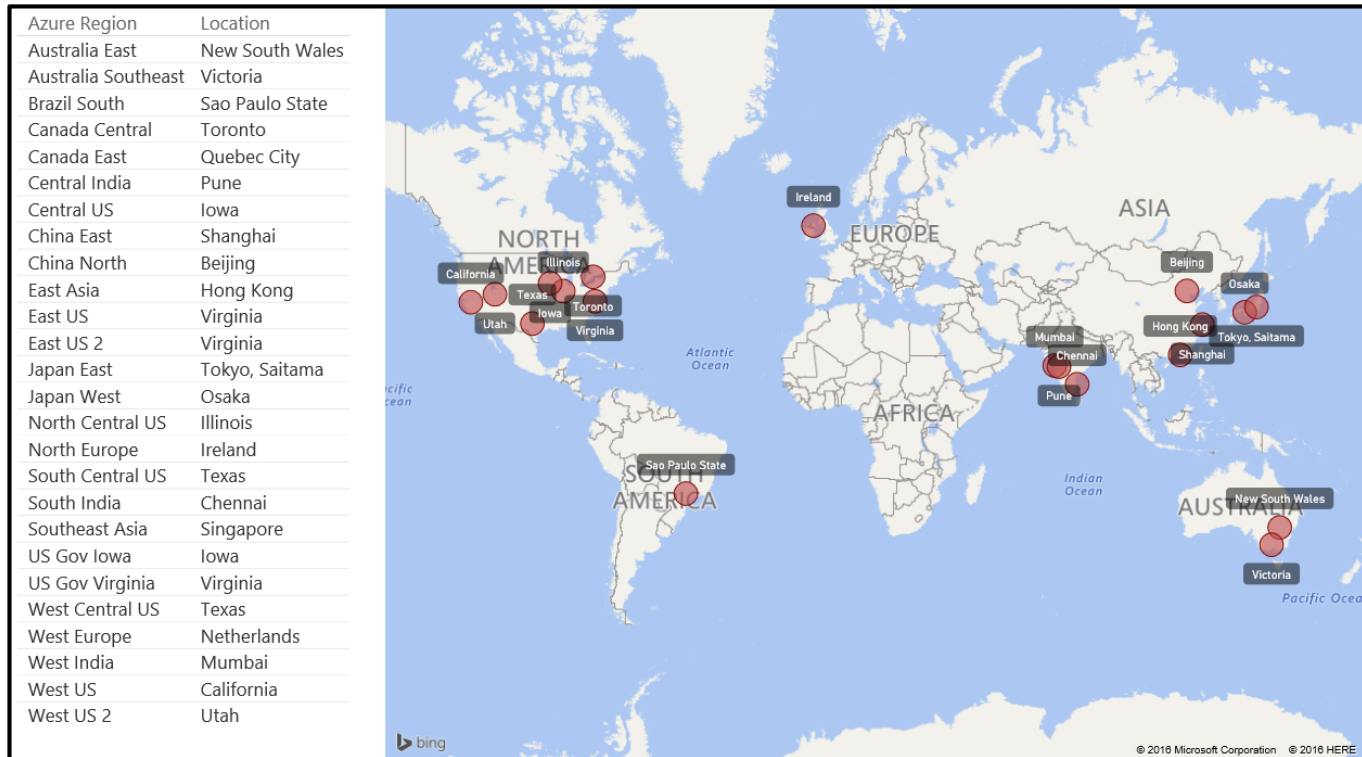 - Developing with Microsoft Azure

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
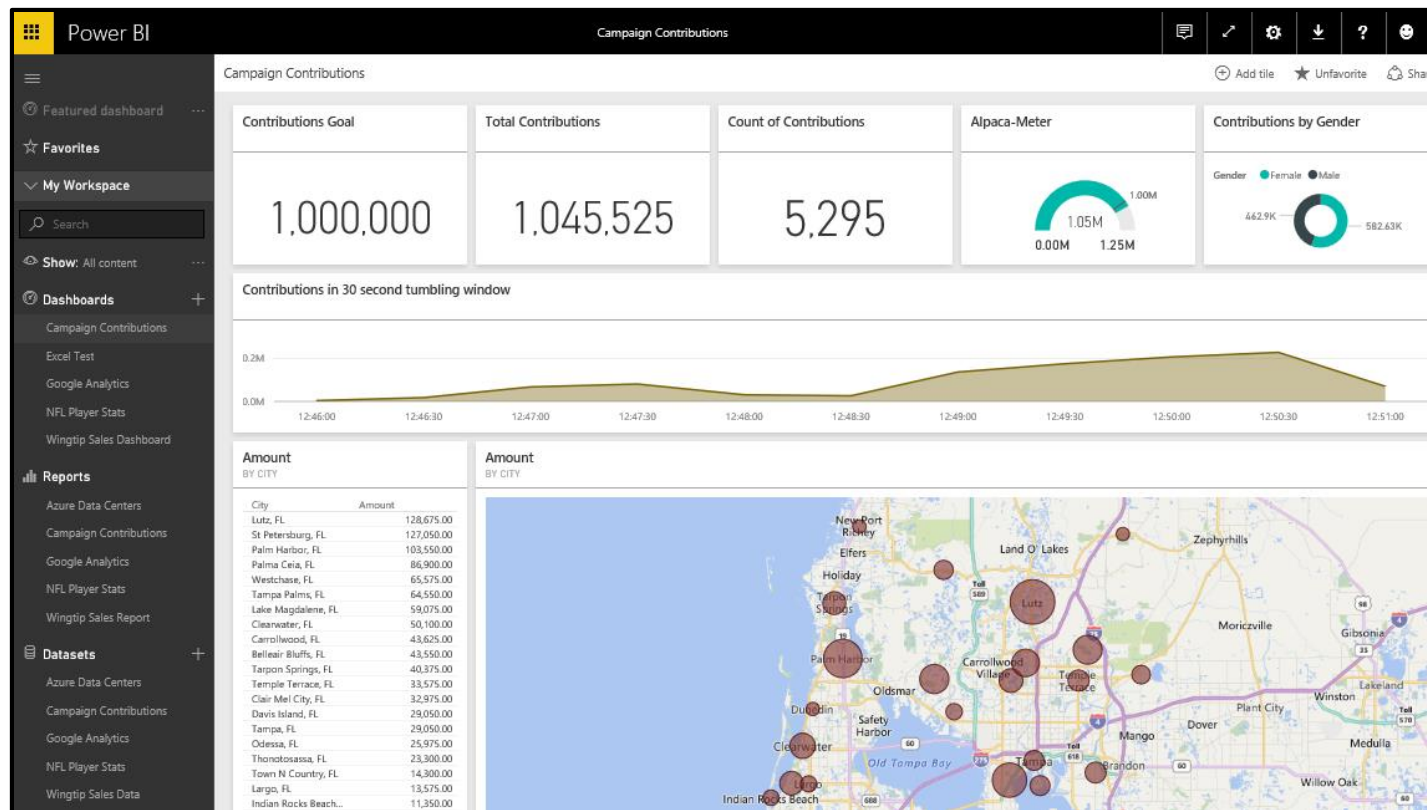
Power BI Benefits from Microsoft Azure

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

Azure Region	Location
Australia East	New South Wales
Australia Southeast	Victoria
Brazil South	Sao Paulo State
Canada Central	Toronto
Canada East	Quebec City
Central India	Pune
Central US	Iowa
China East	Shanghai
China North	Beijing
East Asia	Hong Kong
East US	Virginia
East US 2	Virginia
Japan East	Tokyo, Saitama
Japan West	Osaka
North Central US	Illinois
North Europe	Ireland
South Central US	Texas
South India	Chennai
Southeast Asia	Singapore
US Gov Iowa	Iowa
US Gov Virginia	Virginia
West Central US	Texas
West Europe	Netherlands
West India	Mumbai
West US	California
West US 2	Utah

The Power BI Service

- ## The Power BI Service

  - Provides cloud-based foundation for Power BI platform

  - Accessible through browser at https://app.powerbi.com

Power BI Licensing

- ## User-based licensing

Power BI (free)	Power BI Pro	Office 365 Enterprise E5
$0.00 user/month	$9.99 user/month	$35.00 user/month
A cloud-based business analytics service that enables anyone to visualize and analyze data with greater speed, efficiency, and understanding. It ...	A cloud-based business analytics service that enables anyone to visualize and analyze data with greater speed, efficiency, and understanding. Power ...	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 2016 desktop & mobile apps Not included	Office 2016 desktop & mobile apps
Office 365 services	Office 365 services	Office 365 services

- ## Capacity-based Licensing

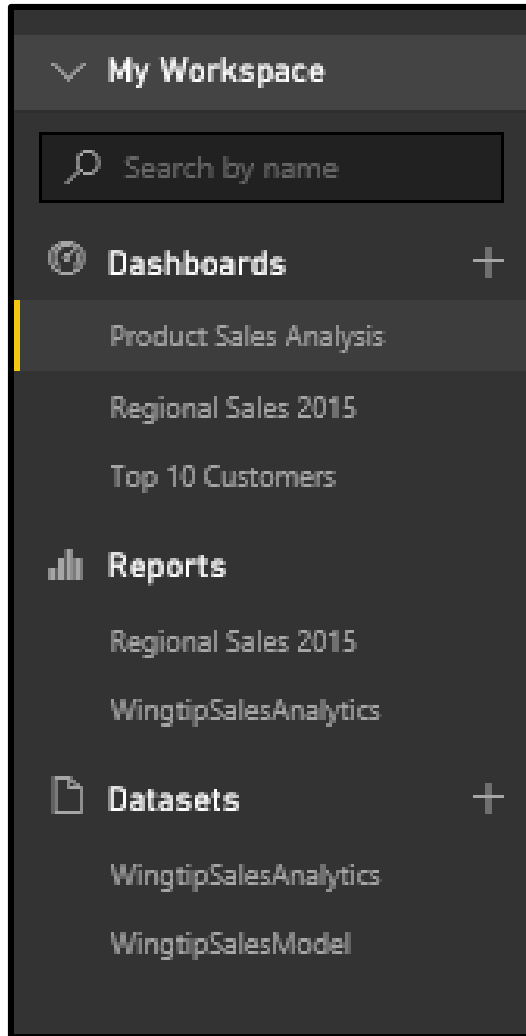| Power BI Premium P1	Power BI Premium P2	Power BI Premium P3	Power BI Premium EM3 (Month to Month)
$4,995.00 instance/month	$9,995.00 instance/month	$19,995.00 instance/month	$2,495.00 instance/month
Power BI capacity dedicated to your organization, unlocking unlimited content distribution and dependable performance. P1 offers 8 virtual cores ...	Power BI capacity dedicated to your organization, unlocking unlimited content distribution and dependable performance. P1 offers 16 virtual cores ...	Power BI capacity dedicated to your organization, unlocking unlimited content distribution and dependable performance. P1 offers 32 virtual cores ...	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 2016 desktop & mobile apps Not included	Office 2016 desktop & mobile apps Not included	Office 2016 desktop & mobile apps Not included
Office 365 services	Office 365 services	Office 365 services	Office 365 services

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 Solution Authors	Power BI Service	Power BI Solution Consumers
Browser	Power BI Solution 1	Browser
Power BI Desktop	Power BI Solution 2	iPad App
Microsoft Excel 2016	Power BI Solution 3	iPhone App
Custom Application	Power BI Solution 4	Android App
		Windows 10 Phone App
		Custom Application
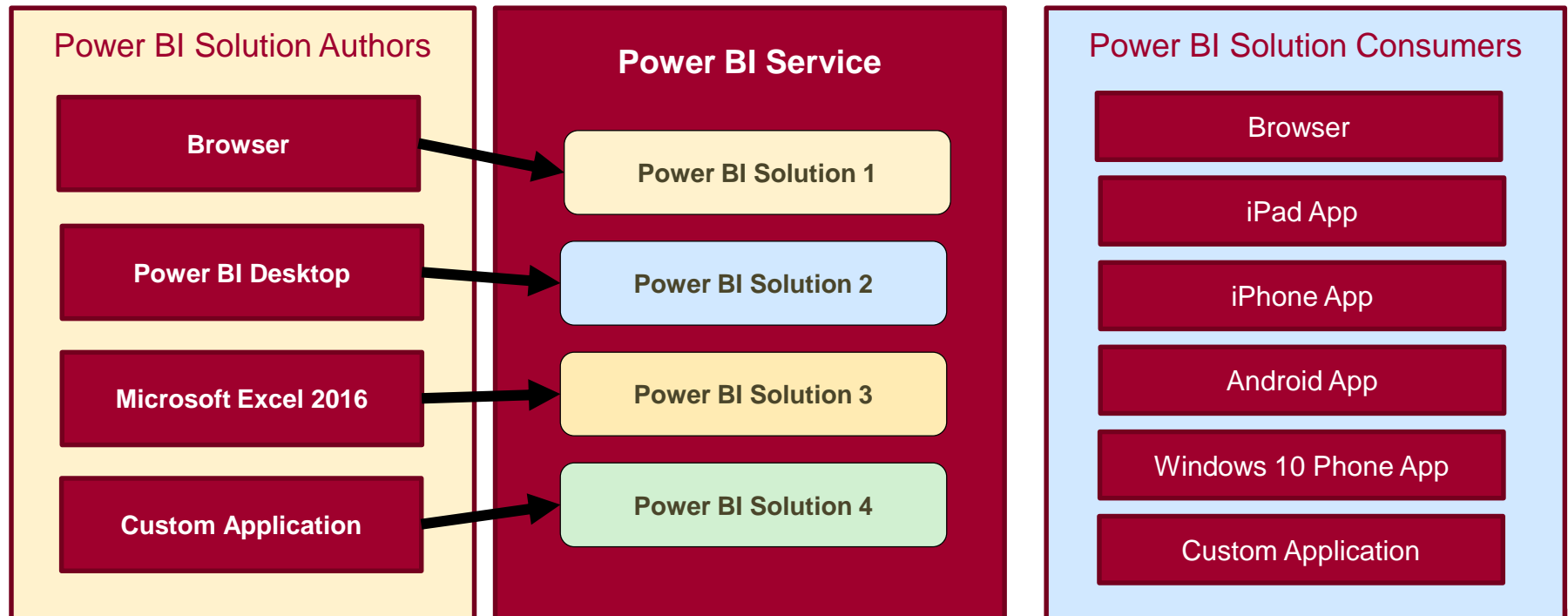
Central Power BI Concepts

My Workspace

Search by name

Dashboards +

Product Sales Analysis

Regional Sales 2015

Top 10 Customers

Reports

Regional Sales 2015

WingtipSalesAnalytics

Datasets +

WingtipSalesAnalytics

WingtipSalesModel

- 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

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 query result from dataset
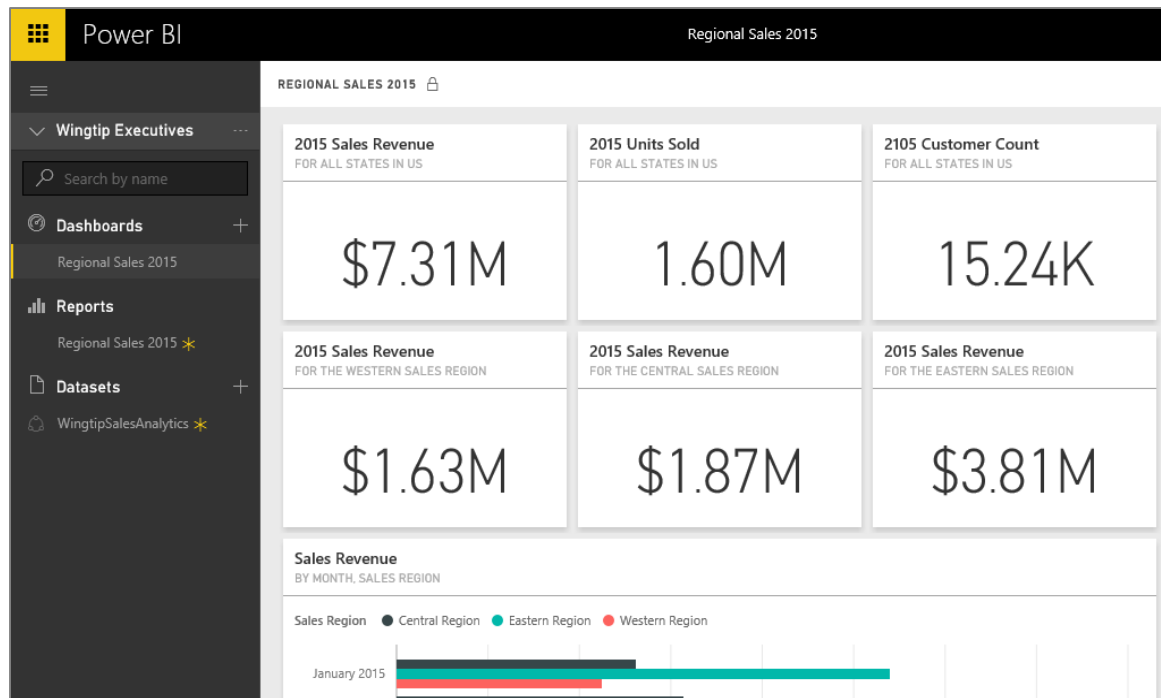
Dashboards and Reports

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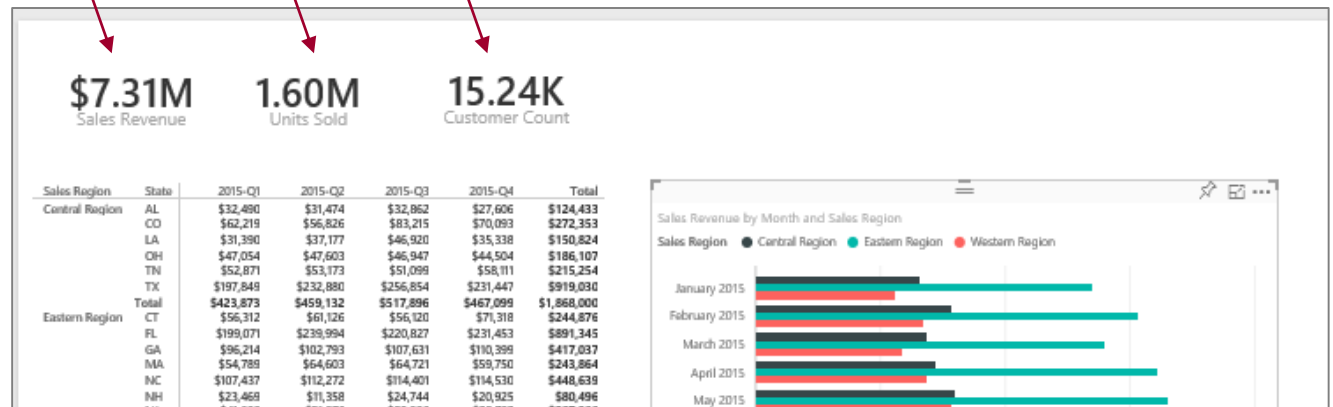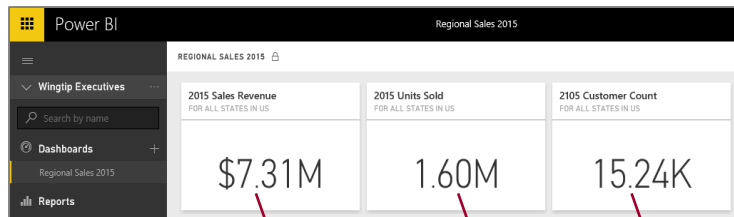
Reports and Pages

- 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
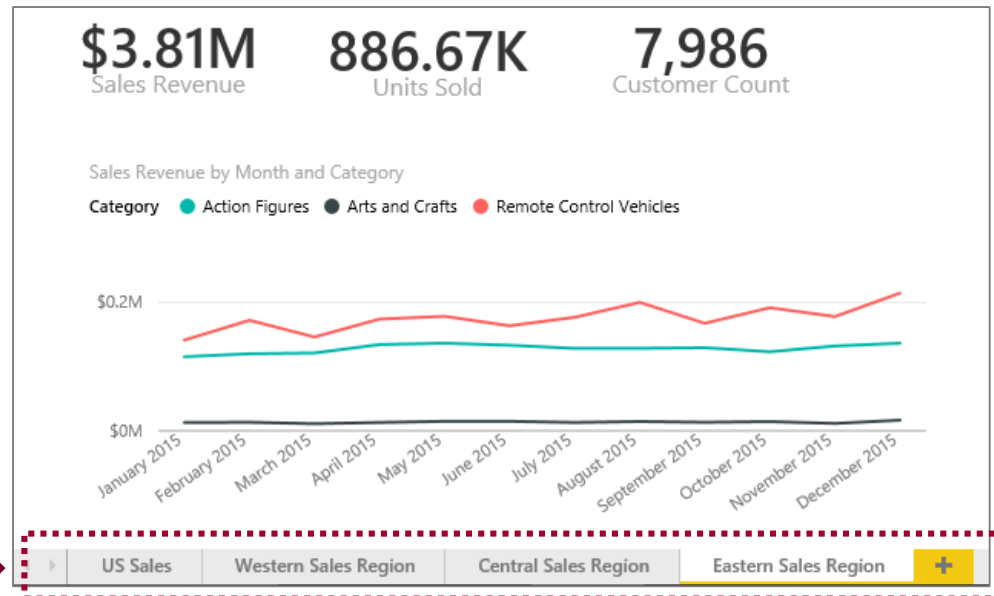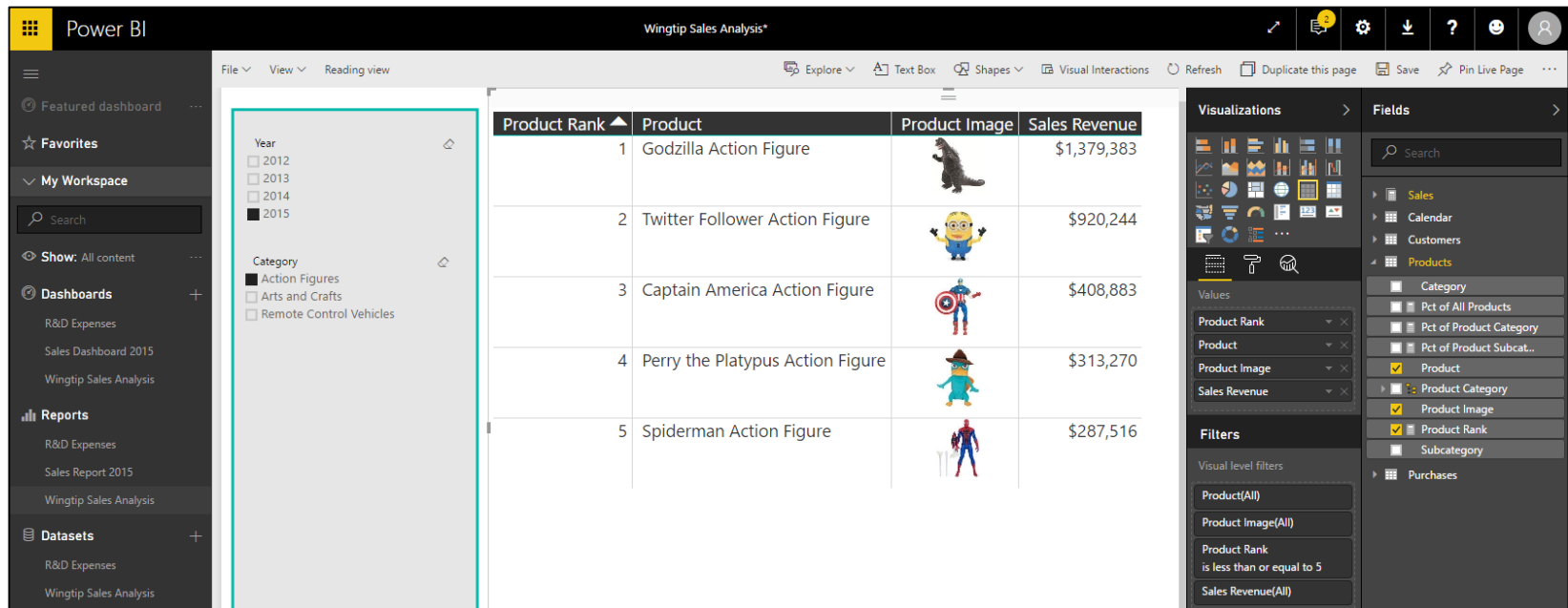
Report Authoring

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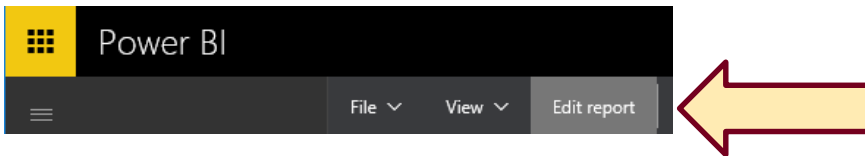
  - Report design tools appear on right side of page

Visuals (aka Visualizations)

- Reports are designed using visual (aka visualizations)
  - Each visuals is based on an underlying visualization type
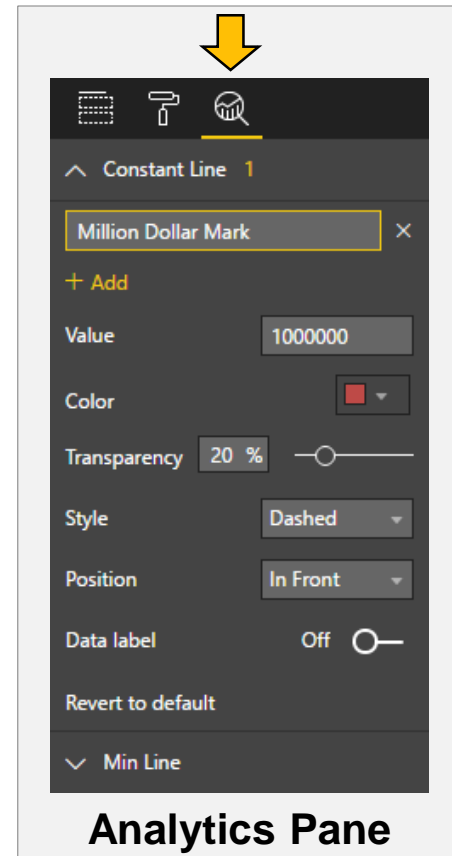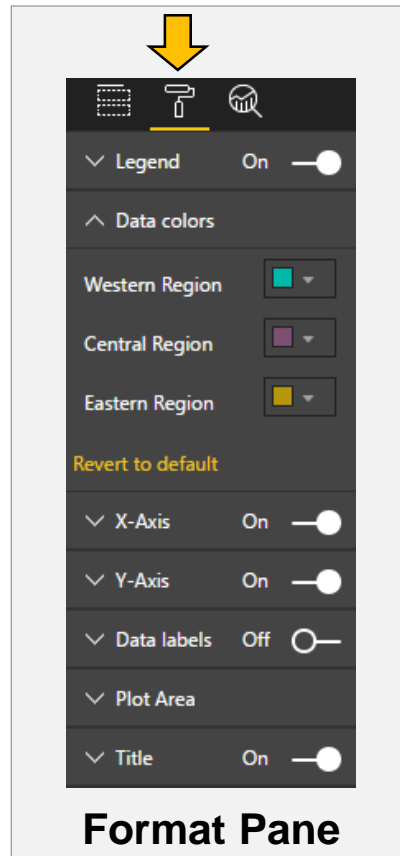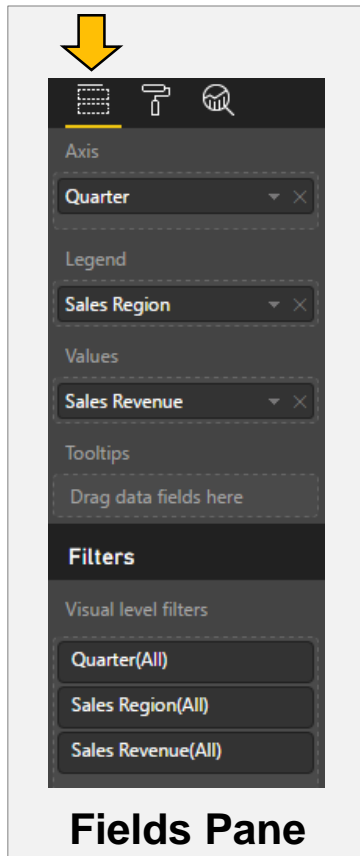 - Visualization type can be changed using **Visualizations** pane
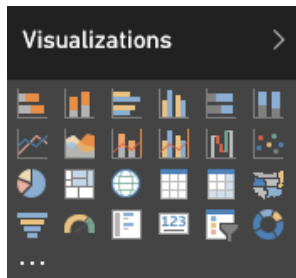
 - Visuals creating by using fields from tables inside **Fields** list
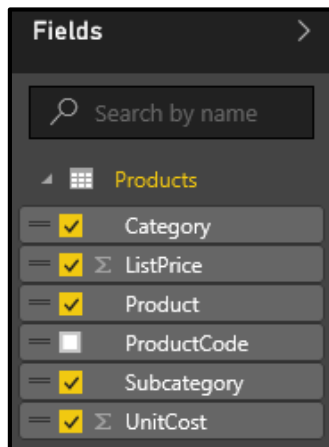
Editing Visual Properties

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

Fields Pane

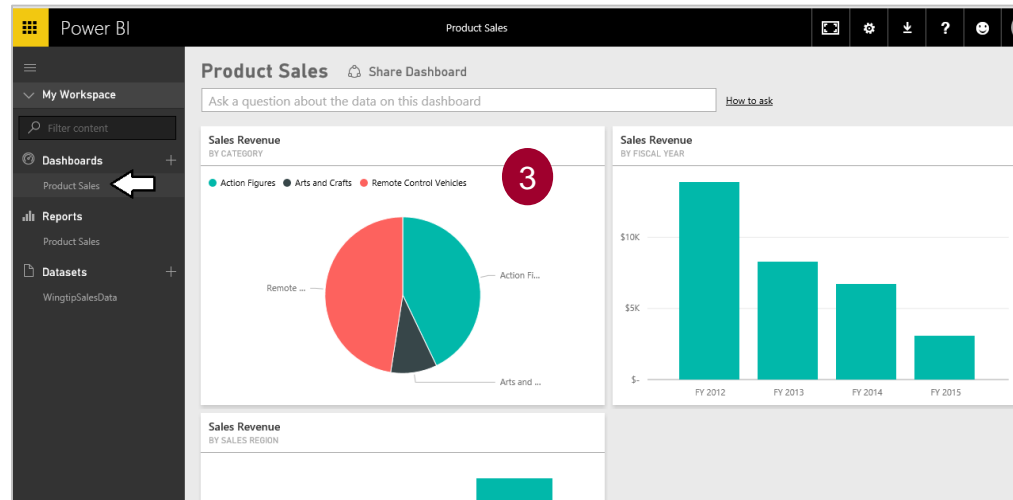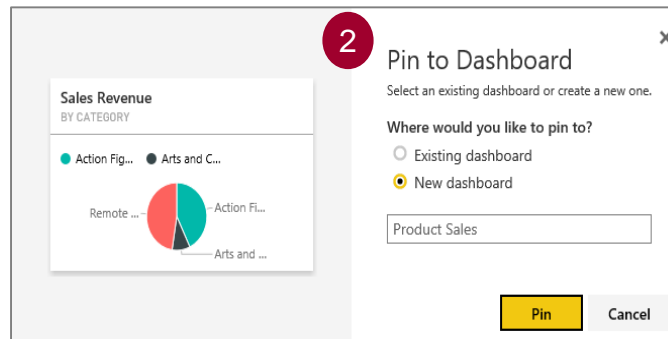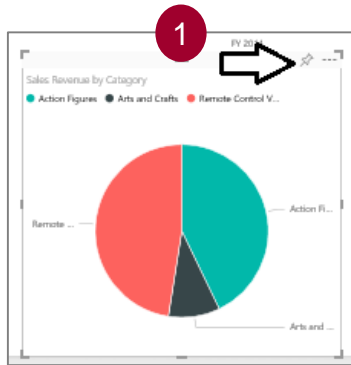**Format Pane**

Analytics Pane

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
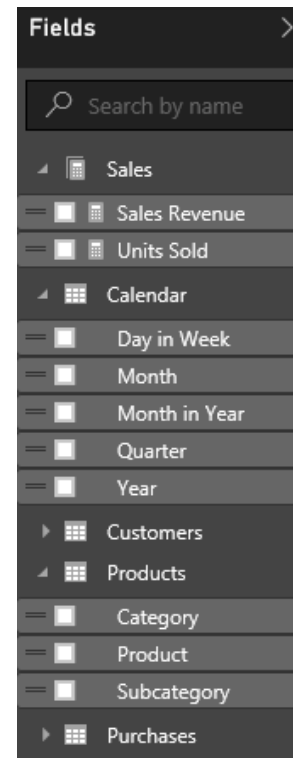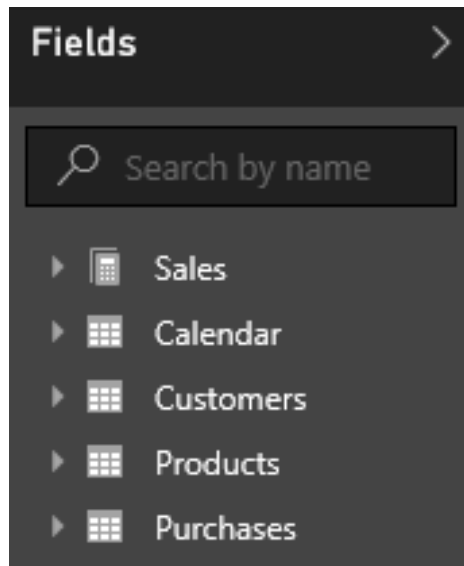
Creating Dashboards

- ## Dashboards contain tiles

  - ### Tiles created from visuals on report pages

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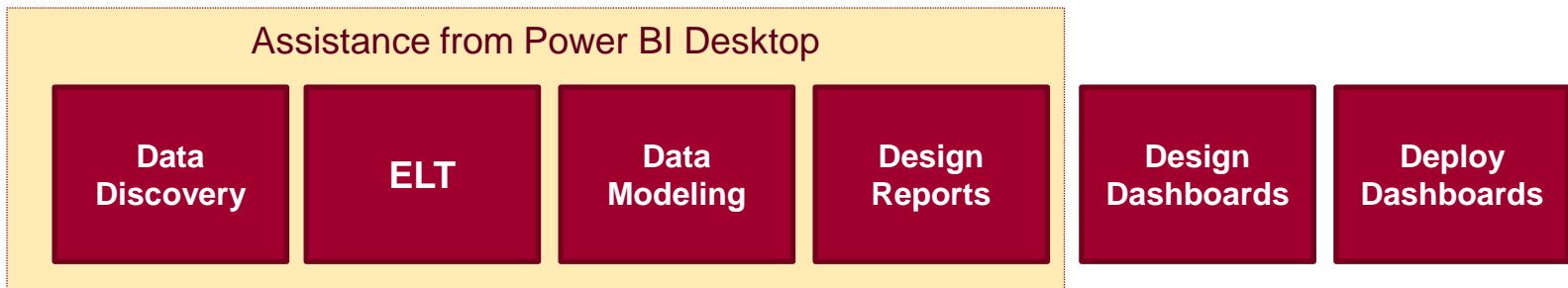
Getting started with Datasets, Reports and Dashboards

Agenda

- ✓ Introduction to Power BI
- ➢ Creating PBIX Projects with Power BI Desktop
- • Developer Opportunities in Power BI
- • Creating a Power BI Development Environment

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
    - No support for packaging an entire solution

| Assistance from Power BI Desktop					
Data Discovery	**ELT**	**Data Modeling**	**Design Reports**	**Design Dashboards**	**Deploy Dashboards**

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
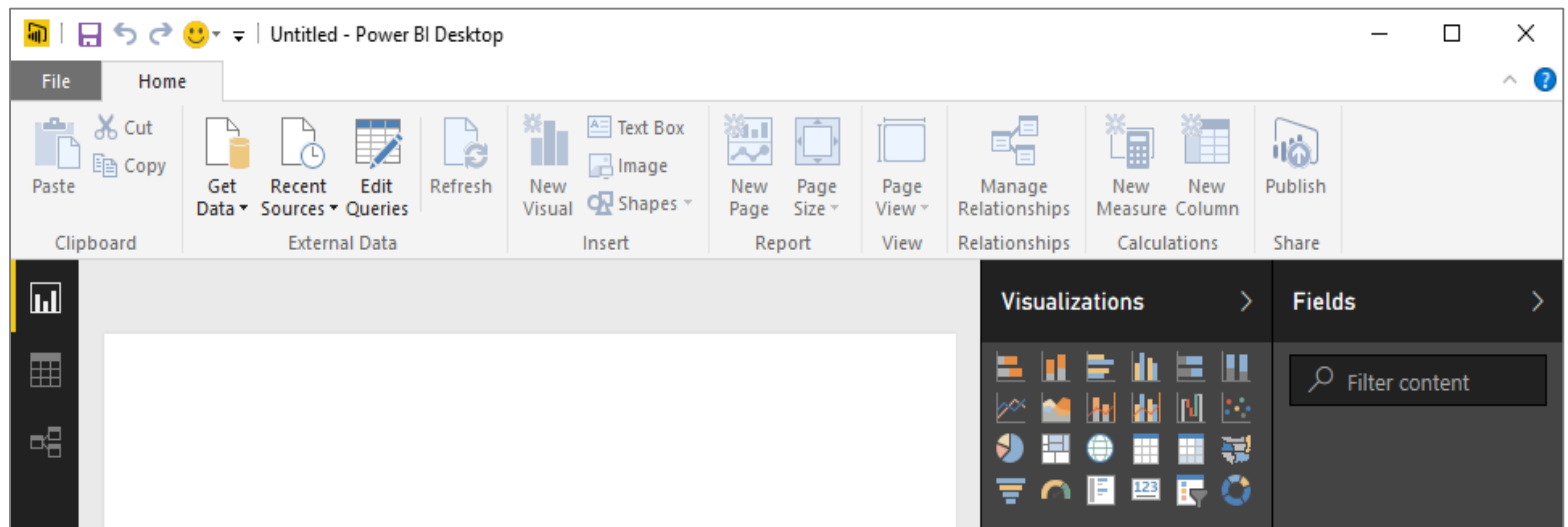
Projects and PBIX Files

- 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
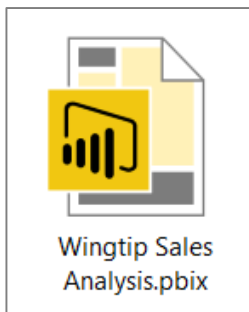
Getting Around in Power BI Desktop

- 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

Report View

Data View

Relationship View

To access query features
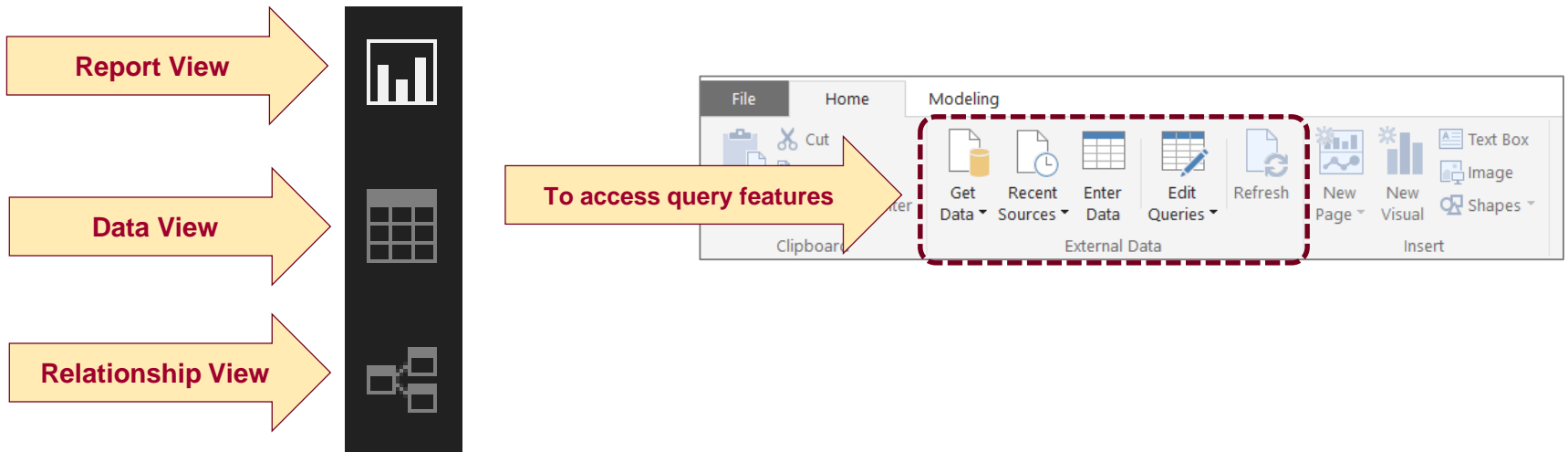
Getting Up and Running with Power BI Desktop

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Developer Opportunities in Power BI

1. Developing Custom Visuals
2. Programming the Power BI Service API
3. Embedding Reports in Custom Applications
4. Developing Solutions with Real-time dashboards
5. Developing Custom Solutions using R
6. Developing Custom Connectors using M

Developing Custom Visuals

- What is involved?
  - Learning to program in TypeScript instead of JavaScript
  - Learning to use graphics libraries such as D3.js
  - Getting up to speed on the cross-platform toolchain
  - Creating and debugging custom visuals using Node.js
  - Packaging custom visuals for distribution

Developing with the Power BI Service API

- Used to develop web and desktop applications
  - Requires registering app with Azure Active Directory

- What can you do with the Power BI Service API?
  - Upload PBIX files and configure data sources
  - Create and manage app workspaces
  - Embed PBI reports and dashboard tiles into web apps
  - Create streaming dataset for real-time dashboards

Integrating R with Power BI

- What is R?
  - Platform for statistics, data analysis and visualization
  - Programming language + Runtime layer + Libraries
  - Strong ability to generate statistics and visualizations

- Where can you use R code in Power BI?
  - Inside a query to perform data extraction and cleanup
  - Inside an R visual to generate rich visualizations

Developing Custom Data Connectors

- Custom Connectors let you write reusable query logic
  - Custom connector is written using M programming language
  - Custom connector can be used across PBIX project files

- Common motivation for developing a custom connector
  - Creating a friendly view of a REST API for business analyst
  - Providing branding on top of existing connector
  - Exposing a limited/filtered view over your data source
  - Control how mashup engine authenticates against datasource
  - Implementing OAuth v2 authentication flow for a SaaS offering
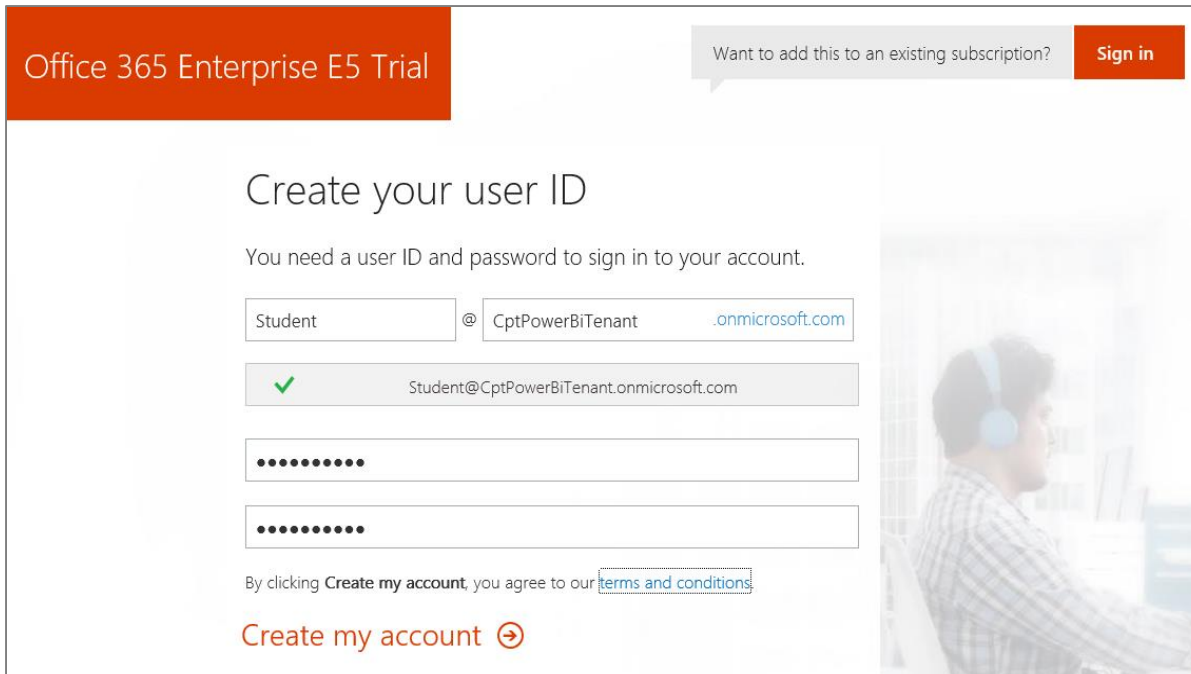
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Creating a Power BI Dev Environment

- 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

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

Accessing Your Office 365 Mailbox

- Make sure you can access your Exchange Inbox
  - Accessible in browser using Outlook Web App (OWA)
  - View messages sent by Power BI service
  - View and interact with Office 365 groups
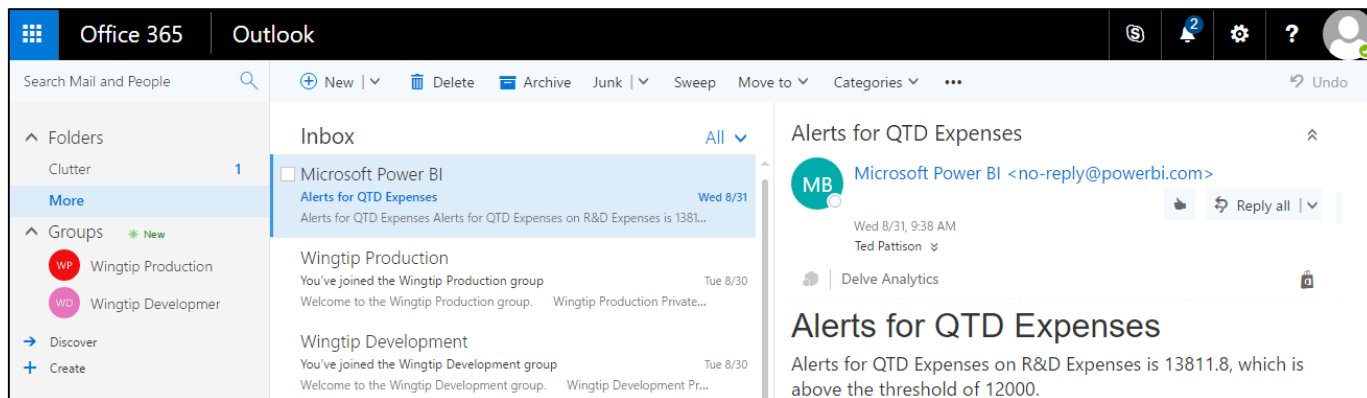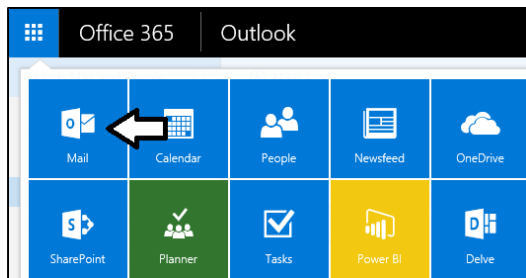
Uploading Data Files to OneDrive for Business

- Preferred location for data files consumed by Power BI service
  - Excel workbooks
  - CSV files
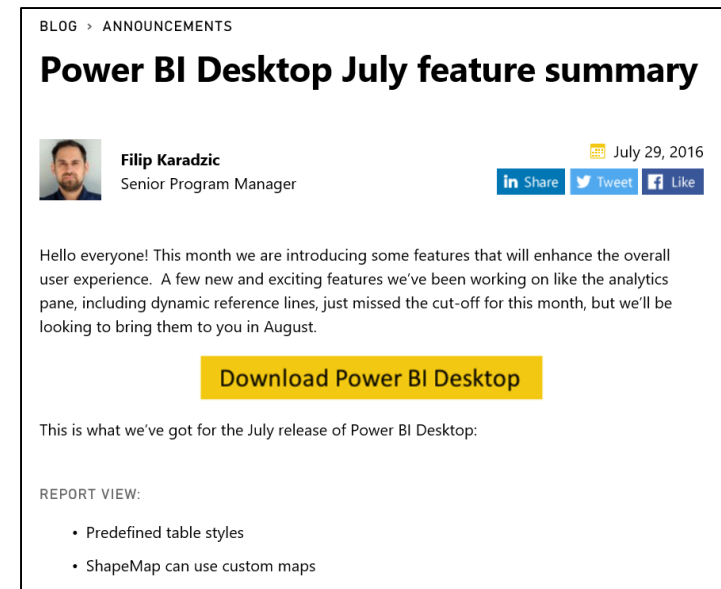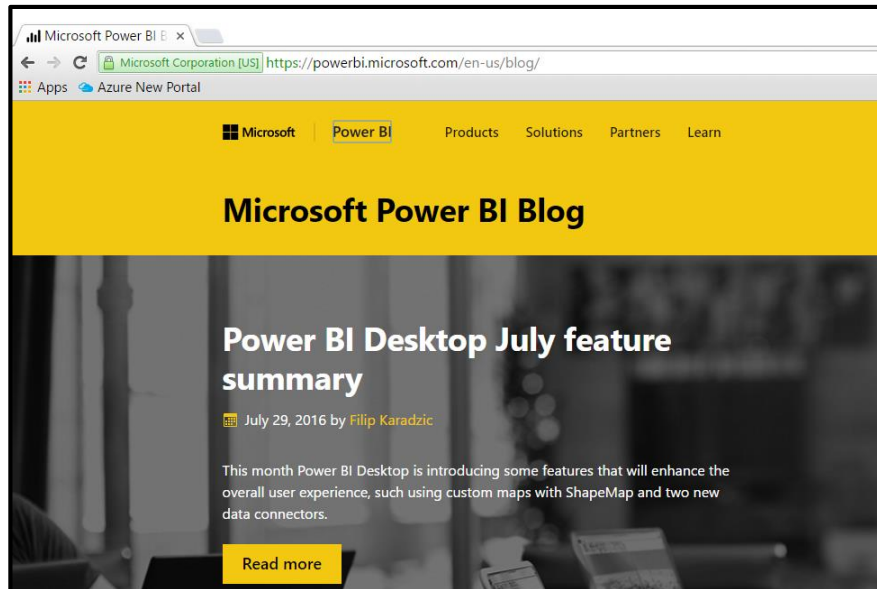 - PBIX files created using Power BI Desktop
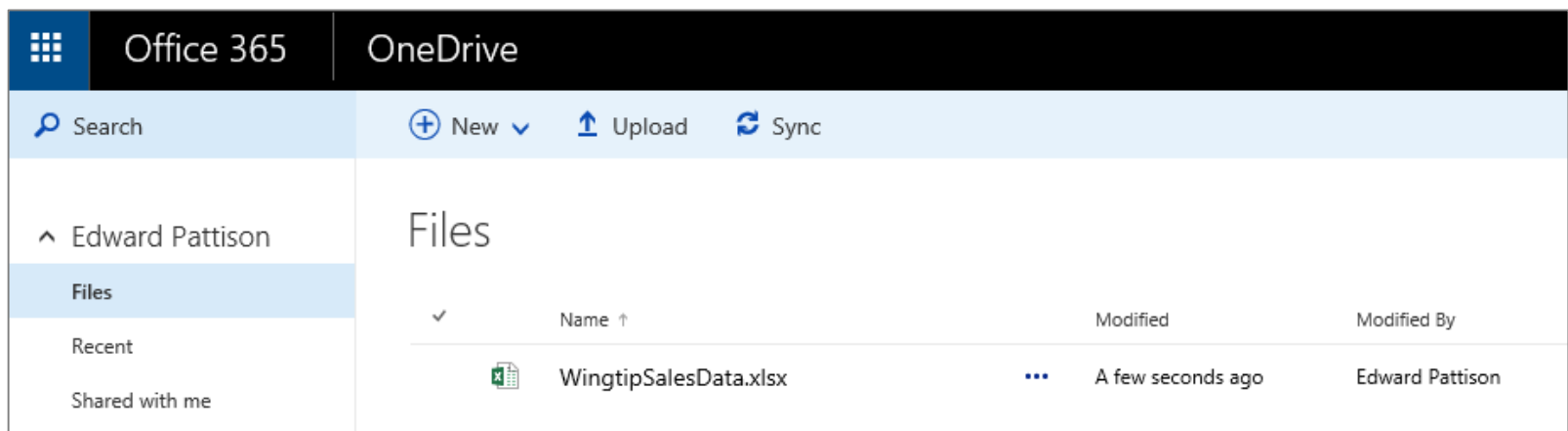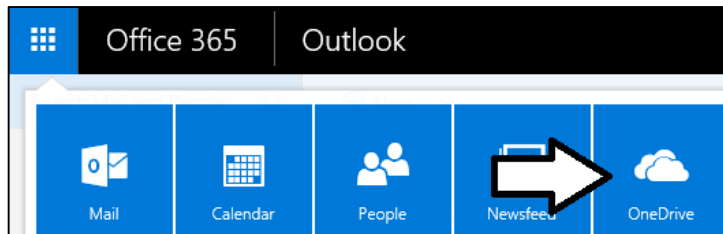
DEMO

Managing Users and Subscriptions in the Office 365 admin center

Power BI Team Blog

- Power BI Team Blog is an Essential Resource

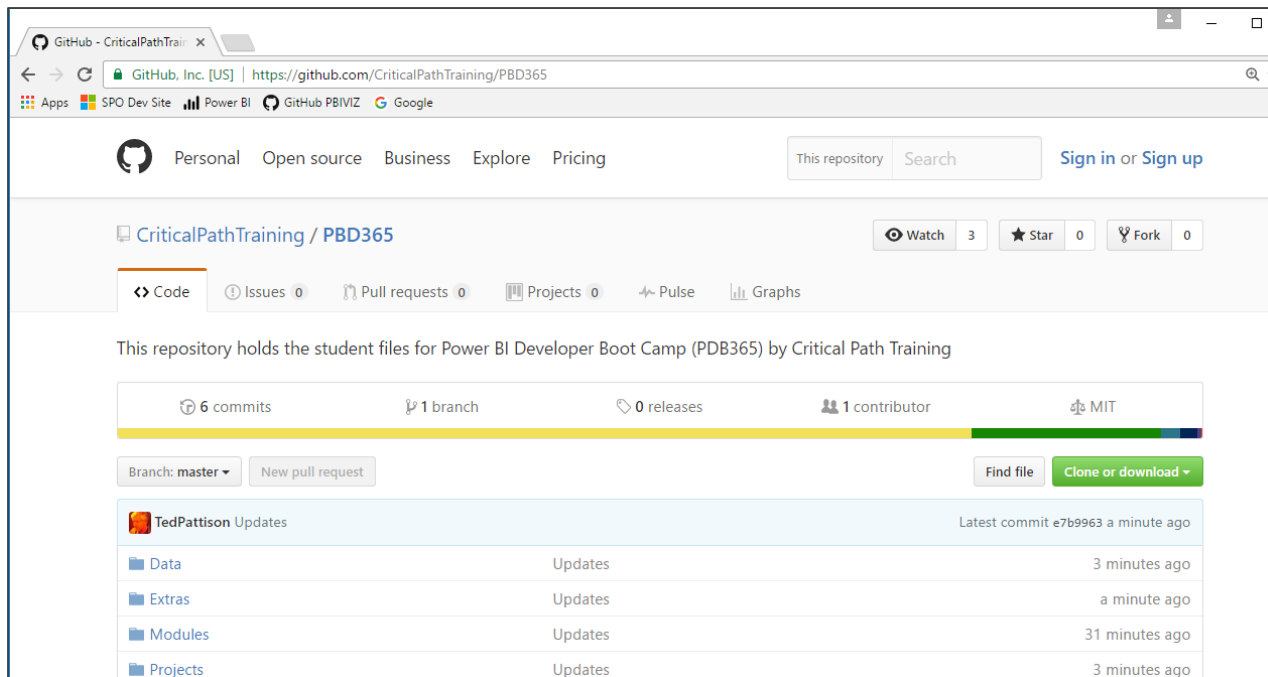 https://powerbi.microsoft.com/en-us/blog/

- Be on the lookout for monthly updates

Live Labs for PBD365

- Student files for this course maintained in GitHub
  - Students files updated on a monthly basis
  - Lab write-ups available in PDF and XPS formats
  - Go to https://github.com/CriticalPathTraining/PBD365

Summary

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