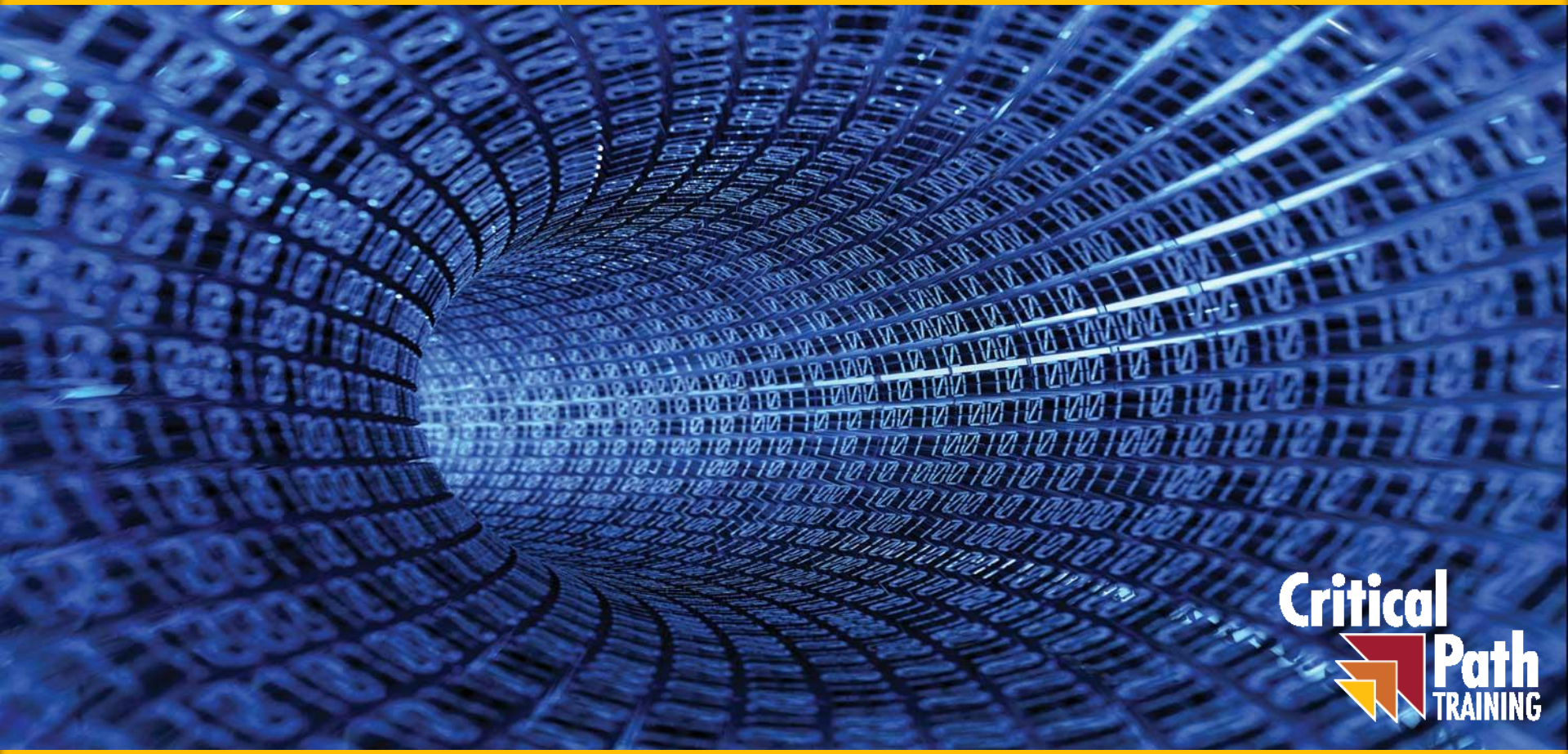
Developer Introduction to Power BI



Agenda

- Introduction to Power BI
- Creating PBIX Projects with Power BI Desktop
- Developer Opportunities in Power BI
- Developing for Power BI Embedded
- 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?

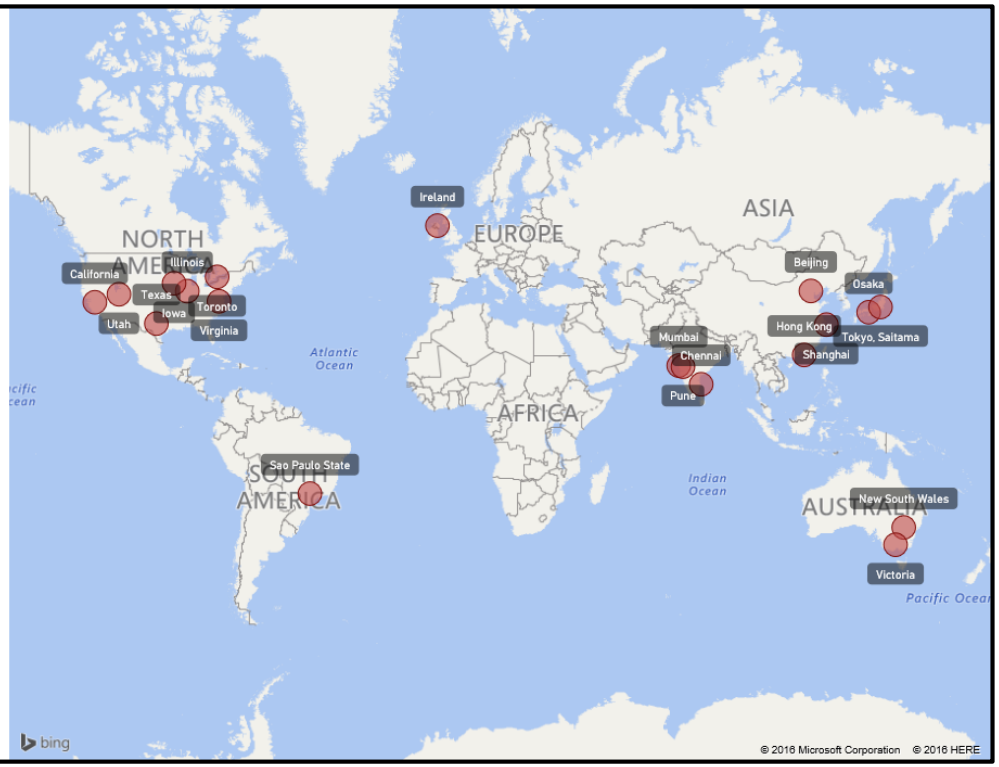
- What is Power BI?
  - Cloud-based subscription service
  - Environment which promotes self-service BI *to the end user*
  - BI Platform to assists with data import, analysis and visualization

- 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

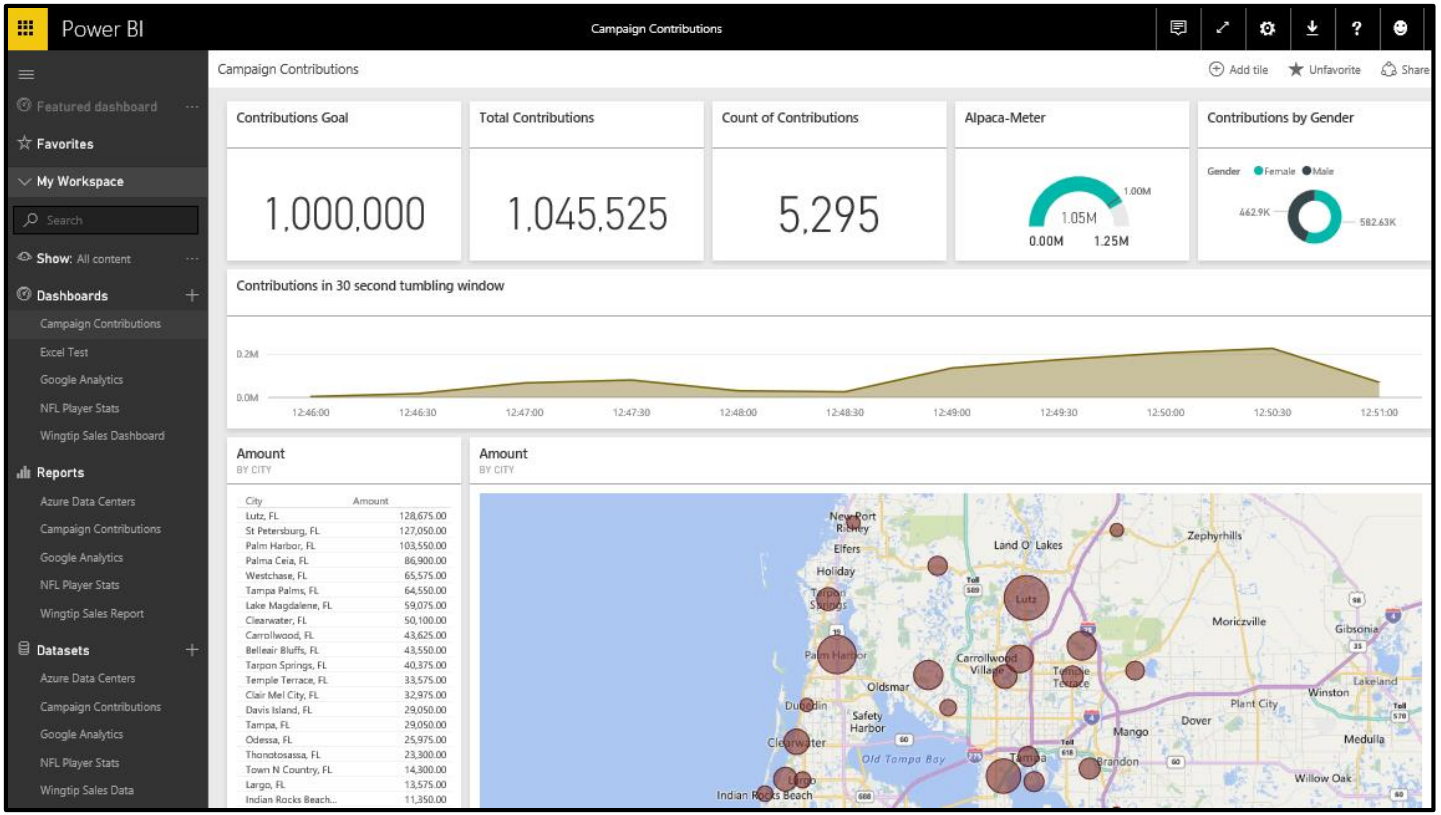
- Power BI is built on top of Microsoft Azure
  - Power BI solutions can be scaled as required
  - Power BI solutions have global reach

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



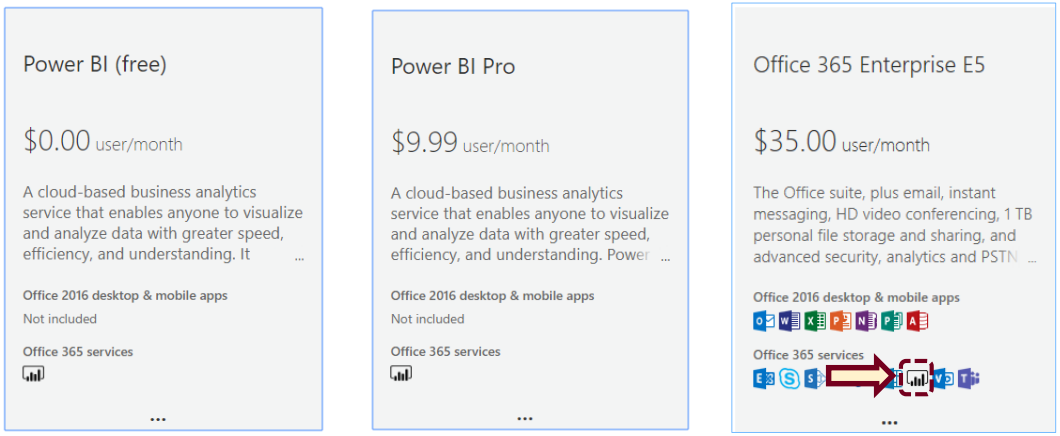
The Power BI Service

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

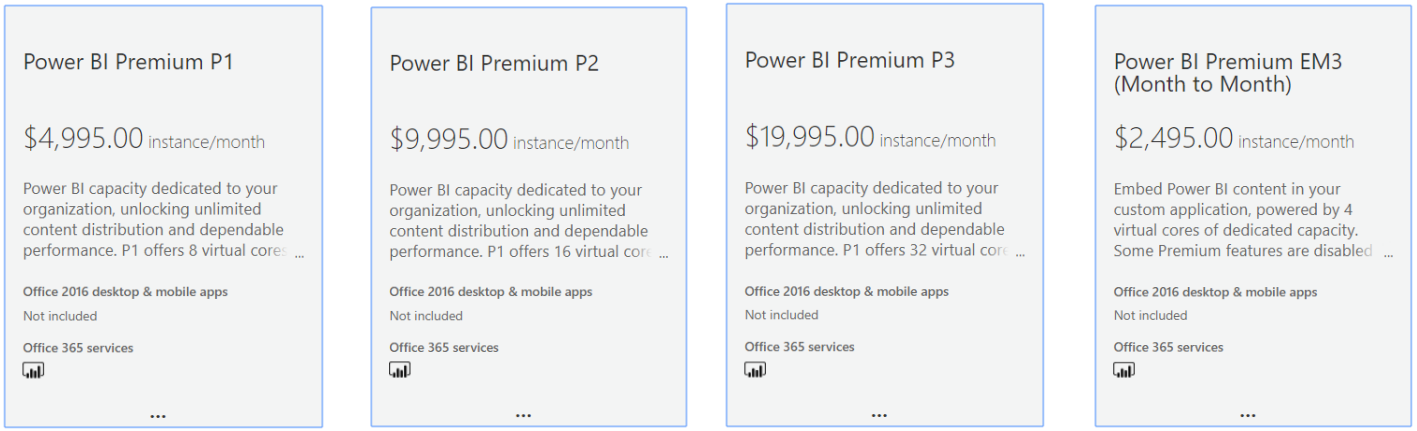


Power BI Licensing

- User-based licensing

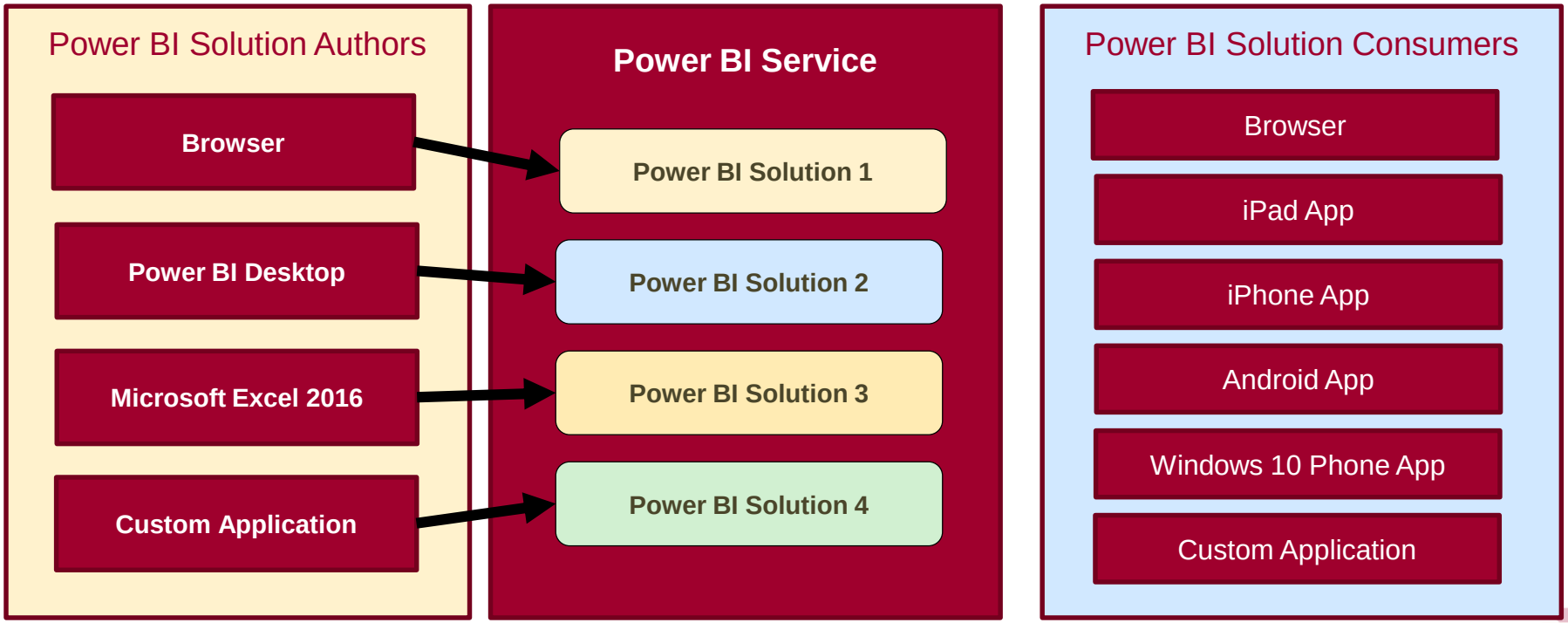


- Capacity-based Licensing

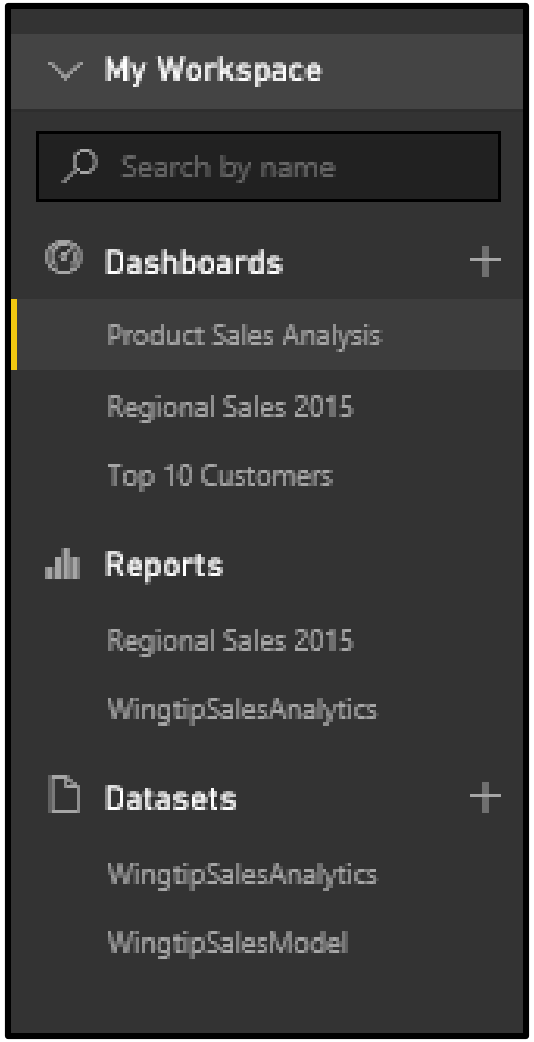


Power BI Service Architecture

- 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



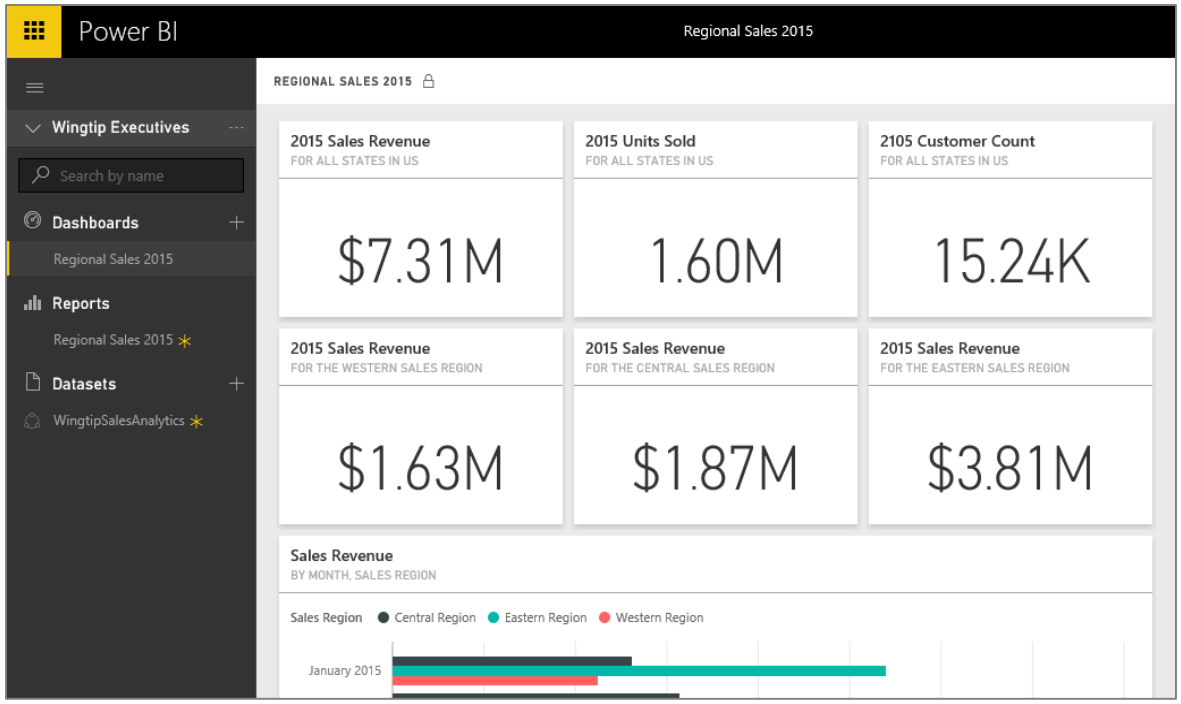
Central Power BI Concepts



- 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

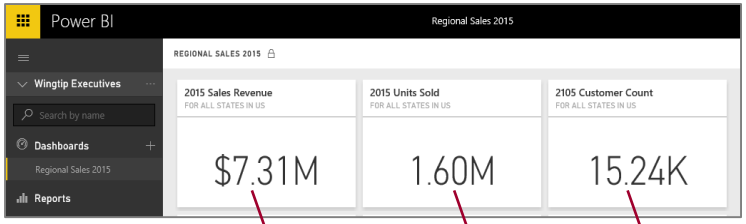
Dashboards and Tiles

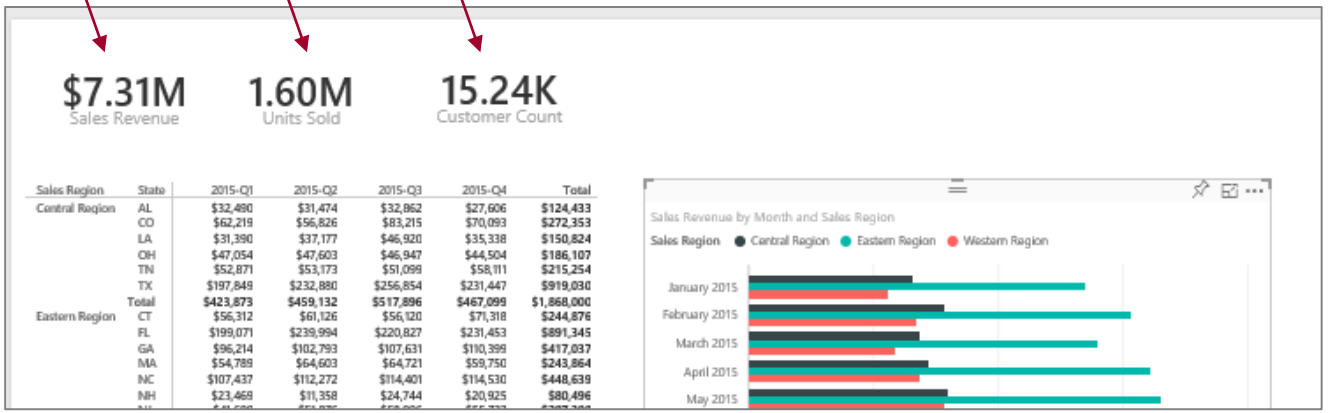
- Dashboard is a collection of tiles
  - Tile can be created by pinning visual from a report
  - Tile can be created by pinning query result from dataset



Dashboards and Reports

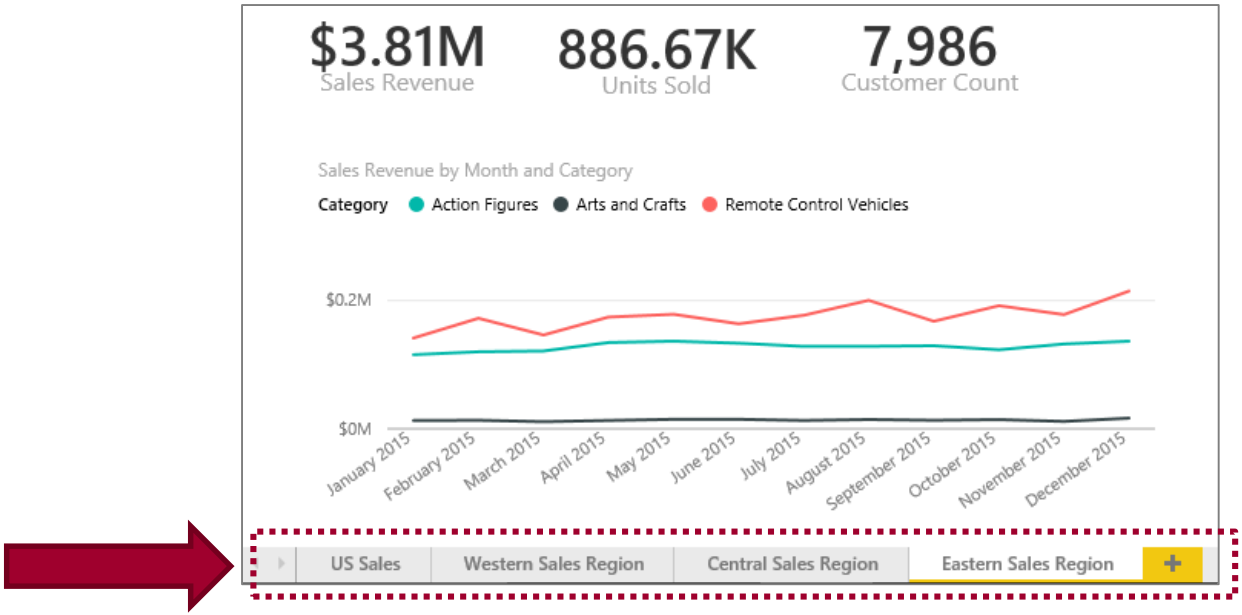
- Dashboards link users to reports
  - Dashboard tiles designed to provide high-level view
  - Clicking tiles drills down into report to see more detail





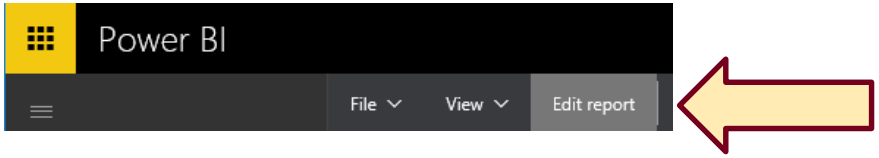
Reports and Pages

- 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

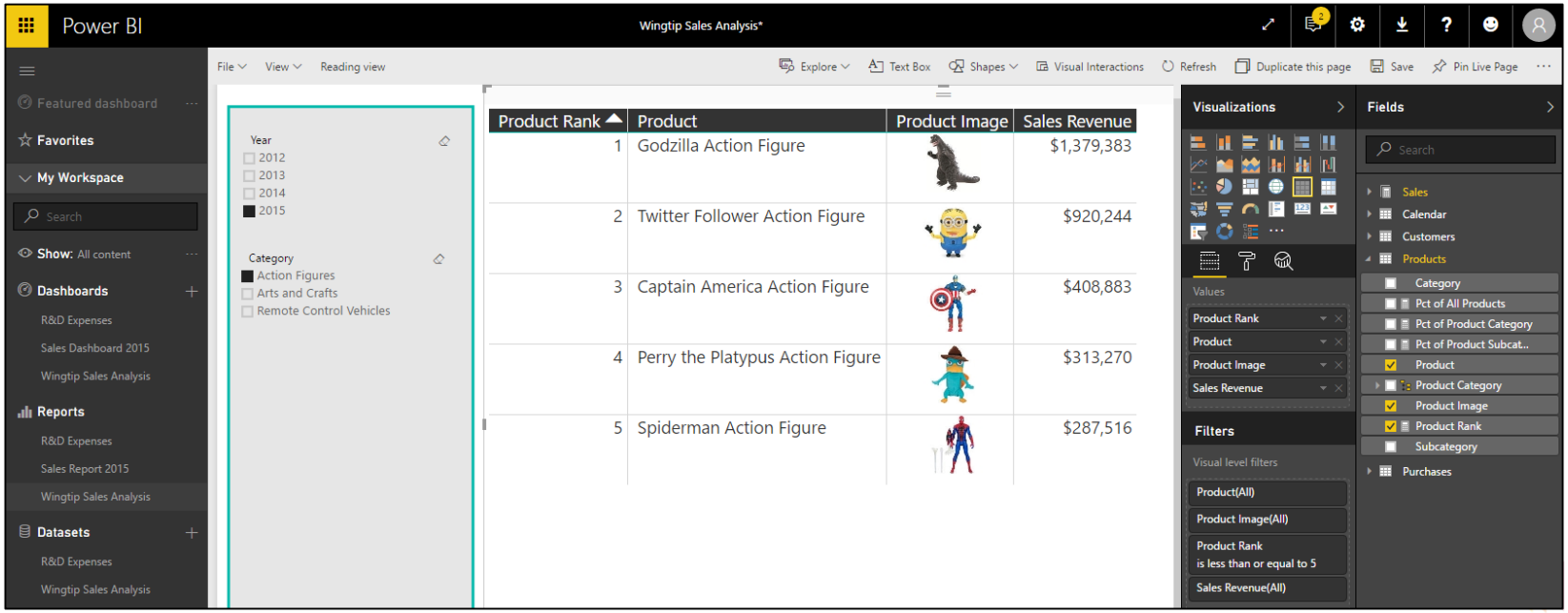


Report Authoring

- Report initially opens in reading view
  - Click Edit report to switch to edit mode

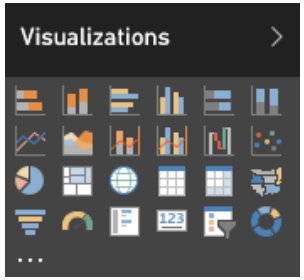


  - Report design tools appear on right side of page

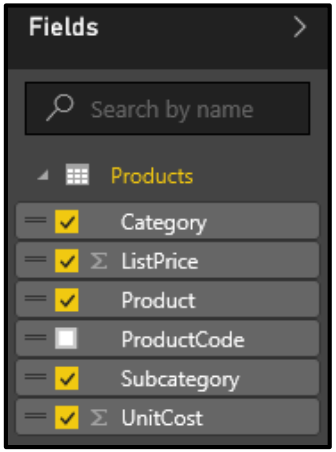


Visuals (aka Visualizations)

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

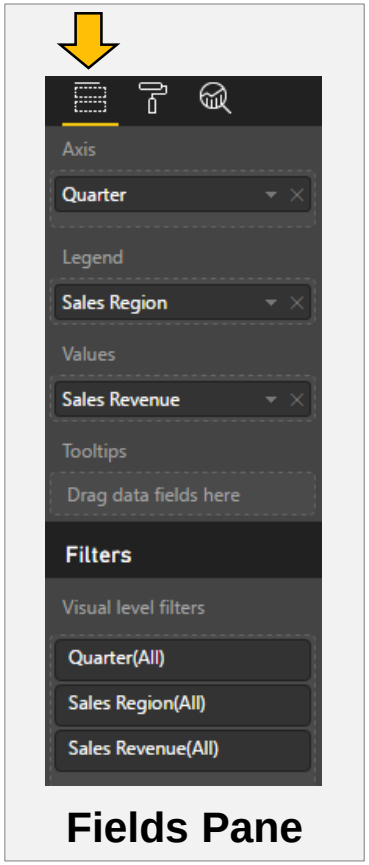


  - Visuals creating by using fields from tables inside **Fields** list

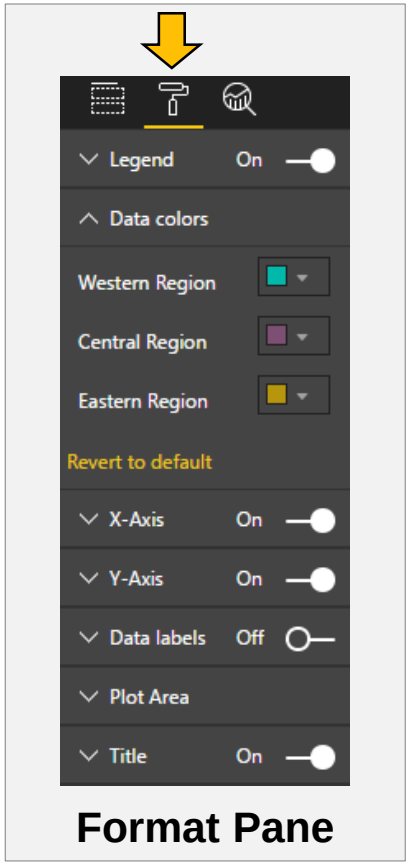


Editing Visual Properties

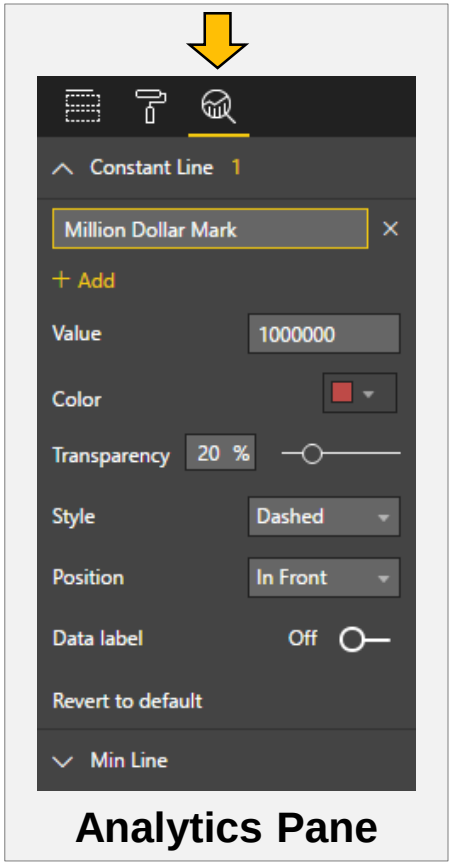
- Visual properties modified using three property panes
  - Visual properties vary greatly depending on type of visualization



Fields Pane



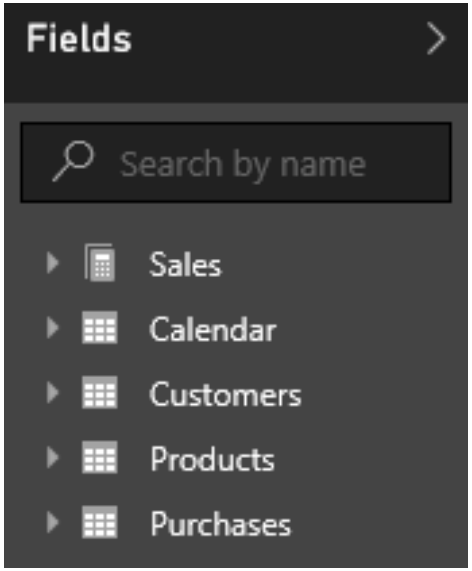
Format Pane

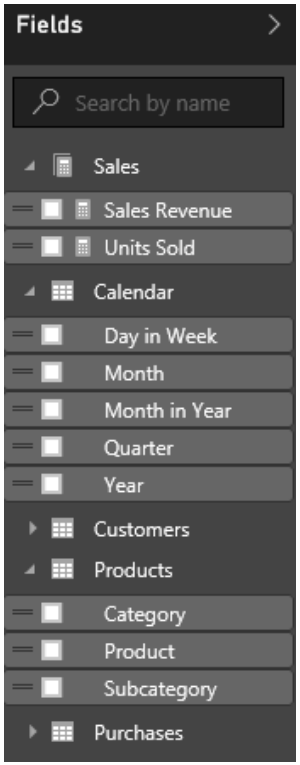


Analytics Pane

Report and Datasets

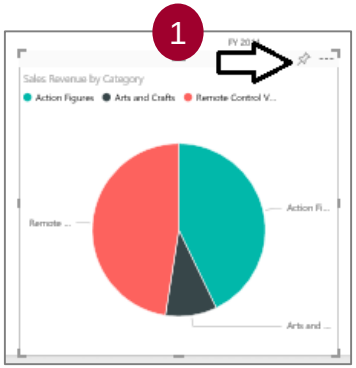
- Each report is based on an underlying dataset
  - **Fields** list in report designer shows tables and fields
  - Report author sees tables & fields as dataset consumer

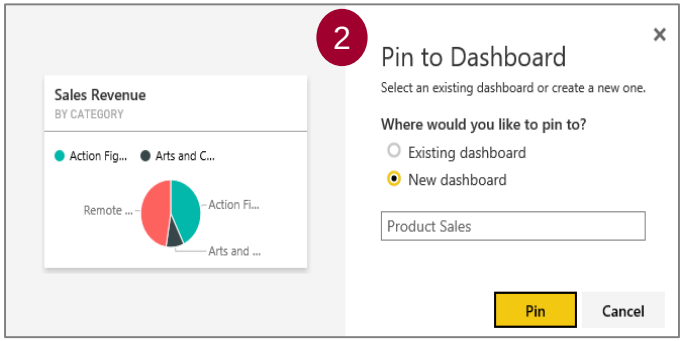


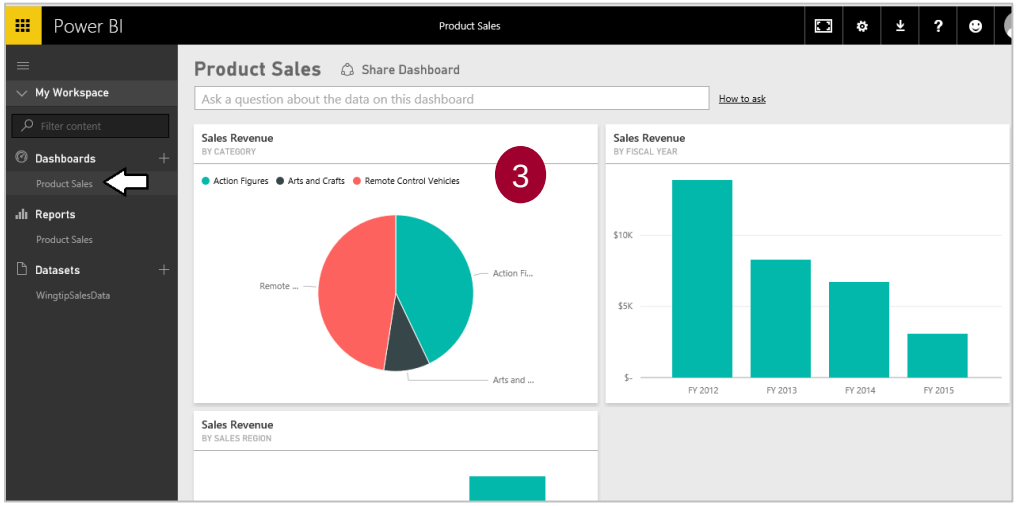


Creating Dashboards

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








DEMO
Getting started with Datasets,
Reports and Dashboards

Agenda

- ✓ Introduction to Power BI
- ➢ Creating PBIX Projects with Power BI Desktop
- Developer Opportunities in Power BI
- Developing for Power BI Embedded
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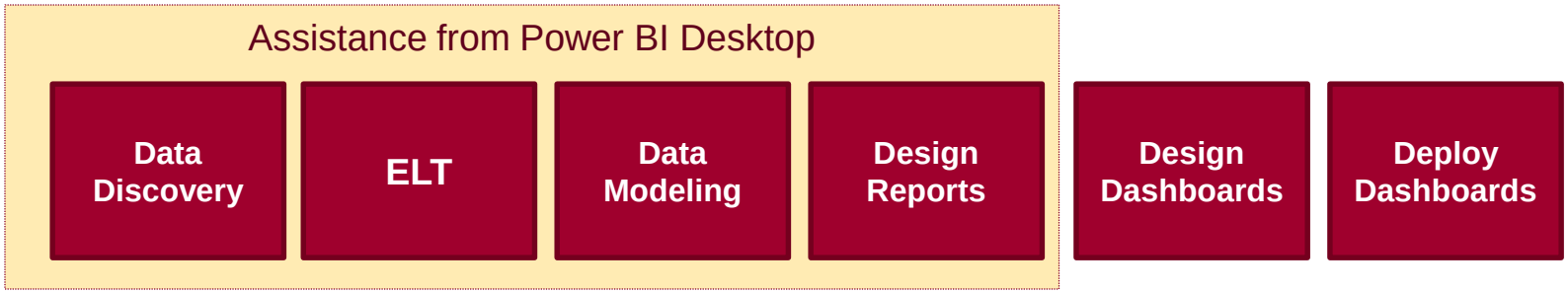
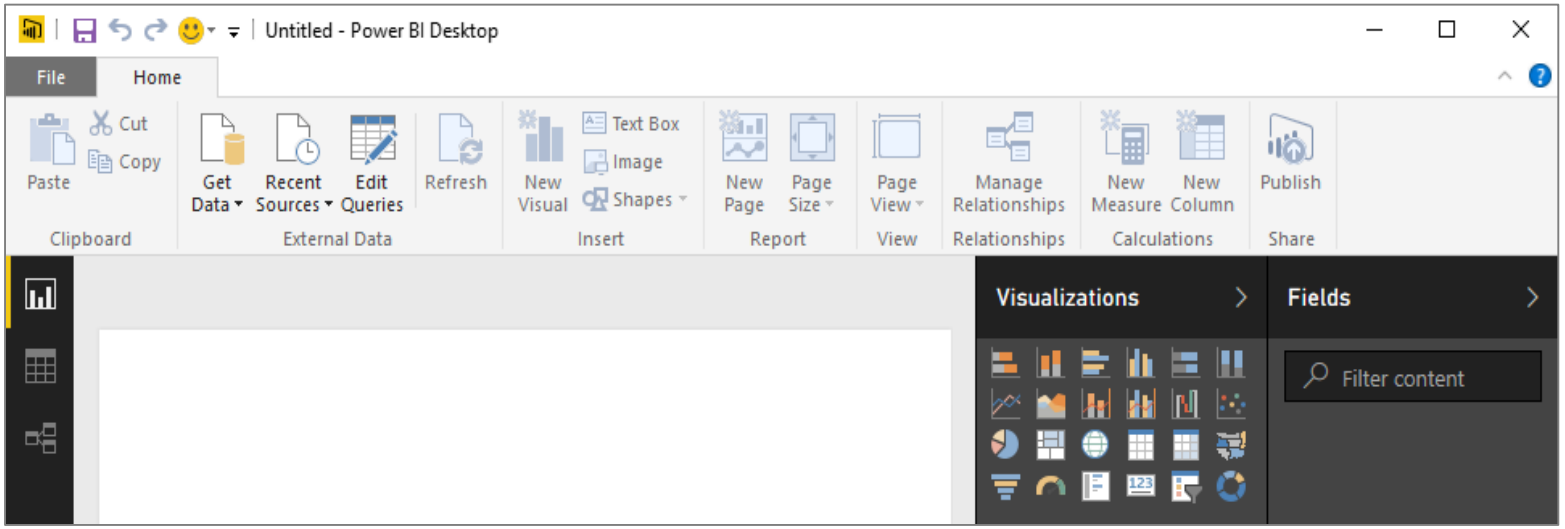
Working with Power BI Desktop

- 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



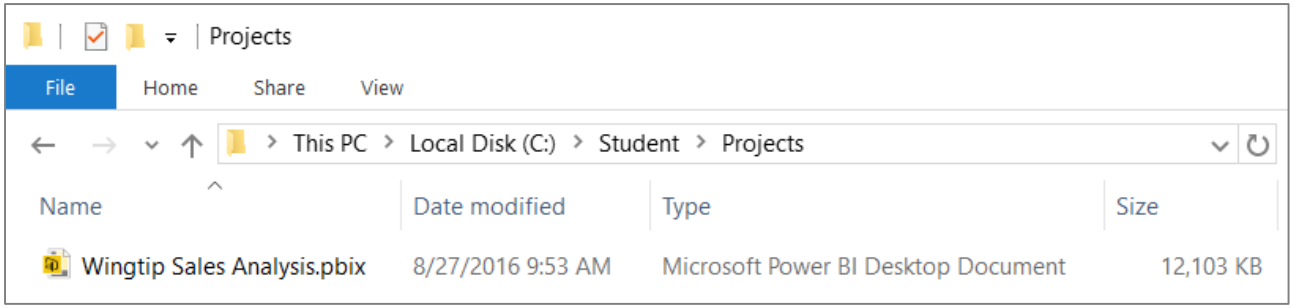
Working with Power BI Desktop

- 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

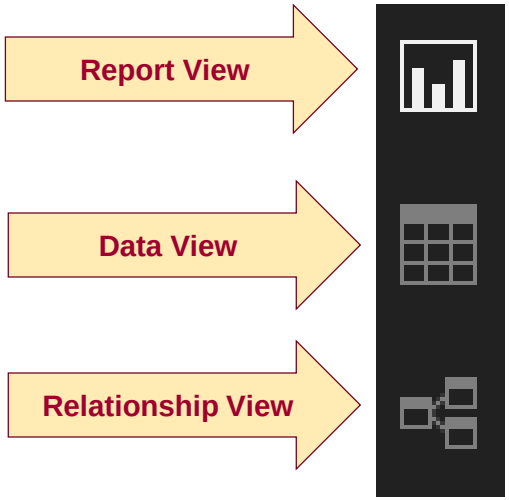
- Power BI Desktop projects saved using PBIX files
  - PBIX file contains data source definitions
  - PBIX file contains query definitions
  - PBIX file contains data imported from queries
  - PBIX file contains exactly one data model definition
  - PBIX file contains exactly one report
  - PBIX file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

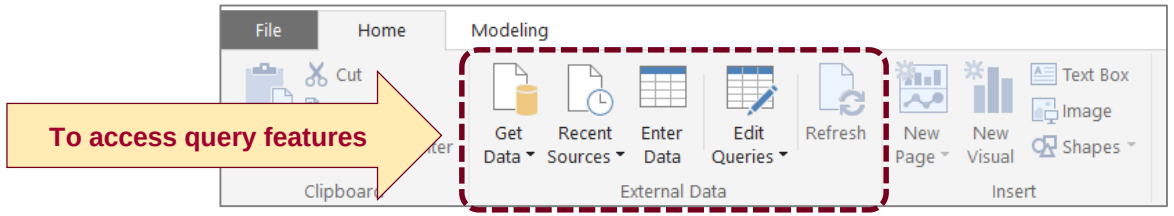


Getting Around in Power BI Desktop

- 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






DEMO
Getting Up and Running
with Power BI Desktop

Agenda

- ✓ Introduction to Power BI
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- ➢ Developer Opportunities in Power BI
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Developer Opportunities in Power BI

1. Developing Custom Visuals
2. Writing and Integrating Code Written in R
3. Programming the Power BI REST API
4. Embedding Power BI Reports in Websites
5. Developing Solutions using Power BI Embedded

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

What is R?

- What is R?
  - Platform for statistics, data analysis and visualization
  - Free, cross-platform, open source software
  - Programming language + Runtime layer + Libraries
  - R code distributed and versioned using packages
  - Flourishing ecosystem of R package authors
- Why do you need it?
  - Analyzing data and generating statistics
  - Creating rich graphs and charts
  - Fitting statistical models for predictive analysis

Writing and Testing R Code in Scripts

01_GettingStarted.R

Source on Save

```r
# use <- for variable assignment
message <- "Hello World"

print(message)

# create vector using the c function
vector1 <- c(2, 4, 6,  8)

# create vectors using sequence
vector2 <- 1:10
vector3 = letters[1:5]
vector4 = LETTERS[24:26]
vector6 = 2^(1:8)

# create vector with electin years
election.years <- seq(from = 1996, to = 2016, by = 4)

# enumerate through election years using for loop
for (year in election.years){
    print(paste(year, "is an election year"))
}

# remove all objects from workspace
rm(list=objects())
```

Where Can You Use R Code in PBIDT?

- As a data source to a query
  - You can use R code to import and reshape data
- Within a Query Applied Step
  - You can use R code to add transforms to a query
- Inside an R Visual in a Power BI Report
  - You can use R code to creates charts from your data

Developing with the Power BI REST API

- Used to develop web and desktop applications
  - Requires registering app with Azure Active Directory
- What can you do with the Power BI REST API?
  - Upload PBIX files and configure data sources
  - Embed PBI reports and dashboard tiles into web apps
  - Create streaming dataset for real-time dashboards

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What is Power BI Embedded?

- Power BI Embedded is an Azure Service
  - PBI Embedded service can be provisioned on-demand
  - Service provisioned in terms of workspace collections
  - PBI Embedded service requires an Azure subscription

- What is the core value of Power BI Embedded?
  - It eliminates need for Power BI license for each user
  - It eliminates need for Office 365 account for each user
  - It decouples user security from app security
  - It opens up PBI platform to commercial applications

PowerBI.com versus Power BI Embedded

PowerBI.com

- Accessed via https://app.powerbi.com
- Requires Office 365 accounts
- Requires Power BI License
- Custom development not required
- Azure subscription not required

Power BI Embedded

- Accessed via custom URL
- No Office 365 accounts required
- No Power BI user licenses required
- Requires custom development
- Requires Azure subscription

The Big Picture for Power BI Embedded

1. Create > Design > Test a PBIX project file on local PC
   - Done using Power BI Desktop
   - Note that Power BI Desktop only runs on Windows
2. Provision Azure resources for Power BI Embedded
   - Create a Power BI workspace collection
   - Create Power BI workspaces
3. Upload PBIX file to Power BI Embedded workspace
   - Use PowerShell, Power BI CLI or Azure REST API
4. Develop Web App with Embedded Power BI Reports
   - Most easily accomplished using ASP.NET MVC

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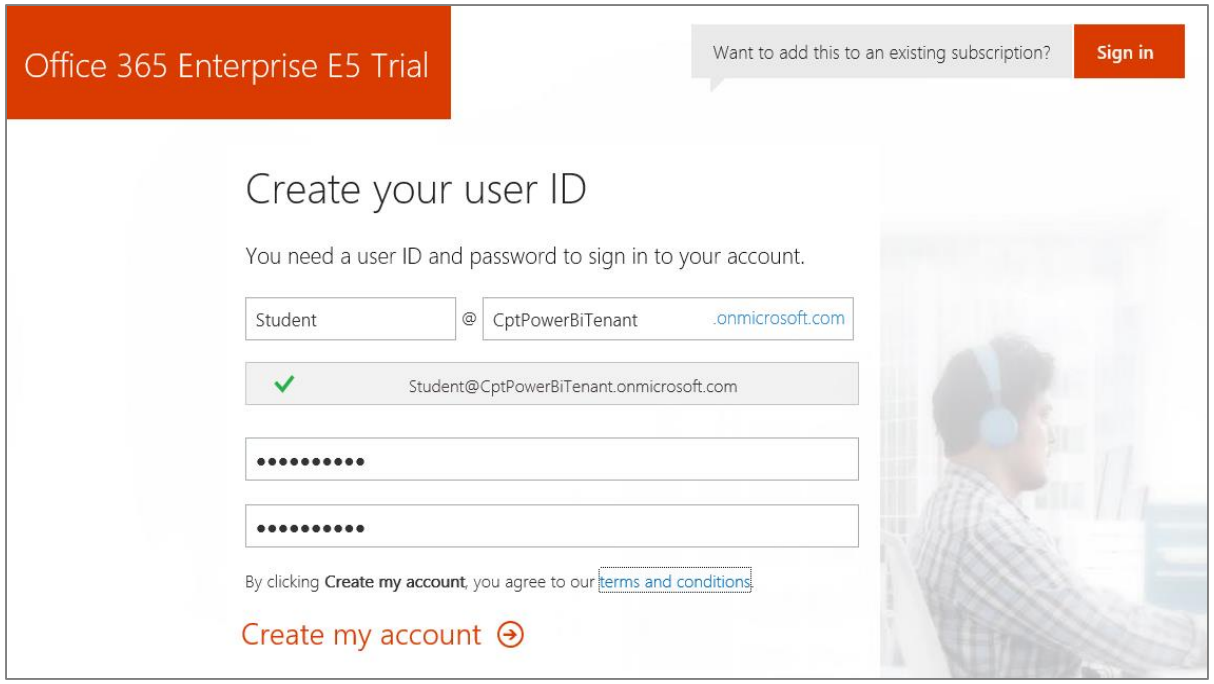
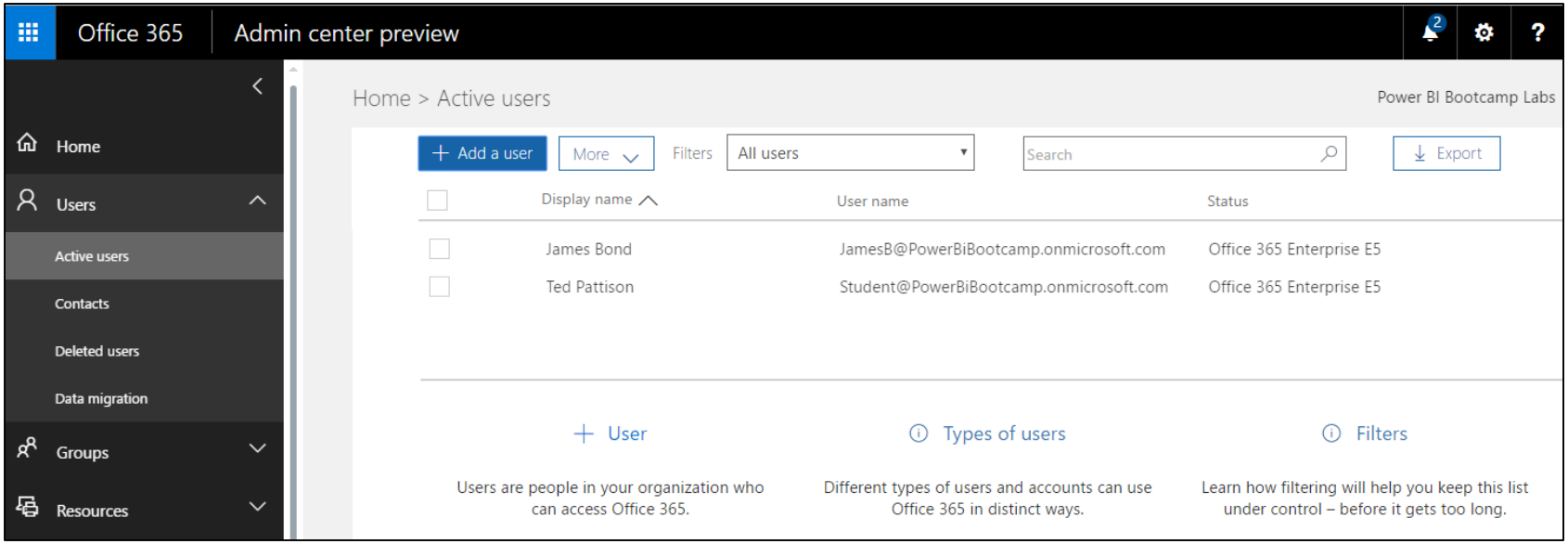
Creating a Power BI Dev Environment

- 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



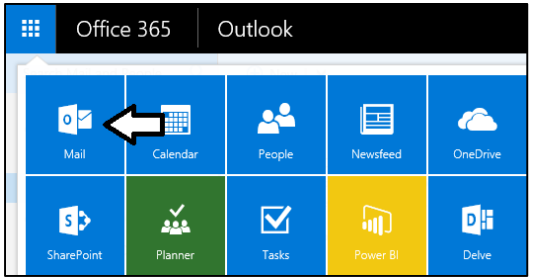
Office 365 admin center

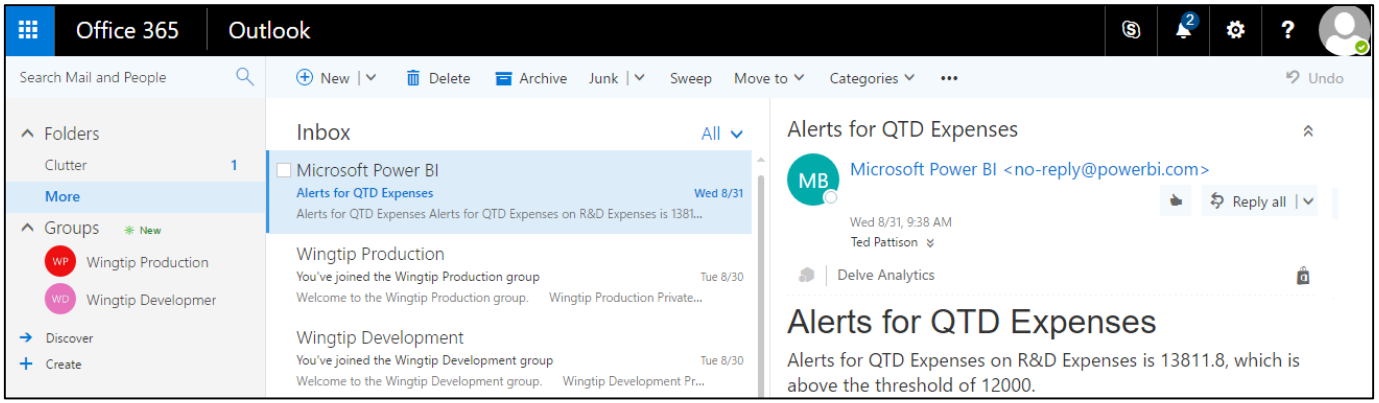
- Chores to accomplish in Office 365 admin center
  - Learn how to add secondary user accounts for testing
  - Learn how to view and manage groups



Accessing Your Office 365 Mailbox

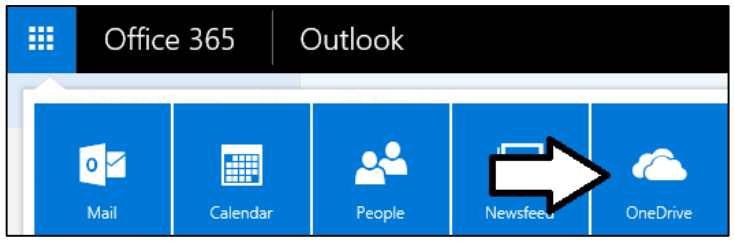
- Make sure you can access your Exchange Inbox
  - Accessible in browser using Outlook Web App (OWA)
  - View messages sent by Power BI service
  - View and interact with Office 365 groups

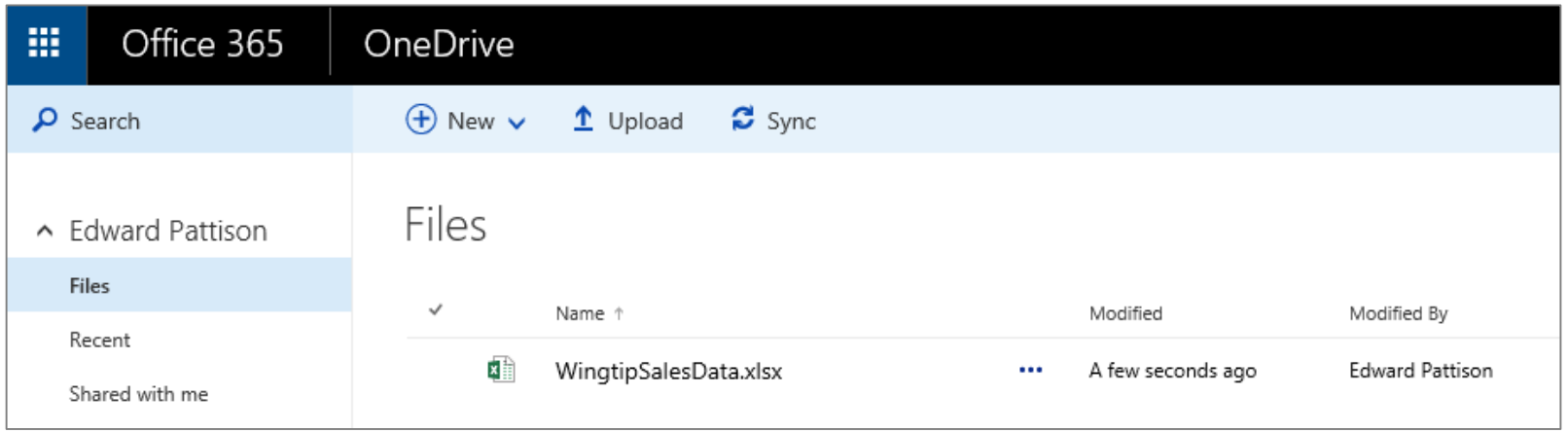




Uploading Data Files to OneDrive for Business

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





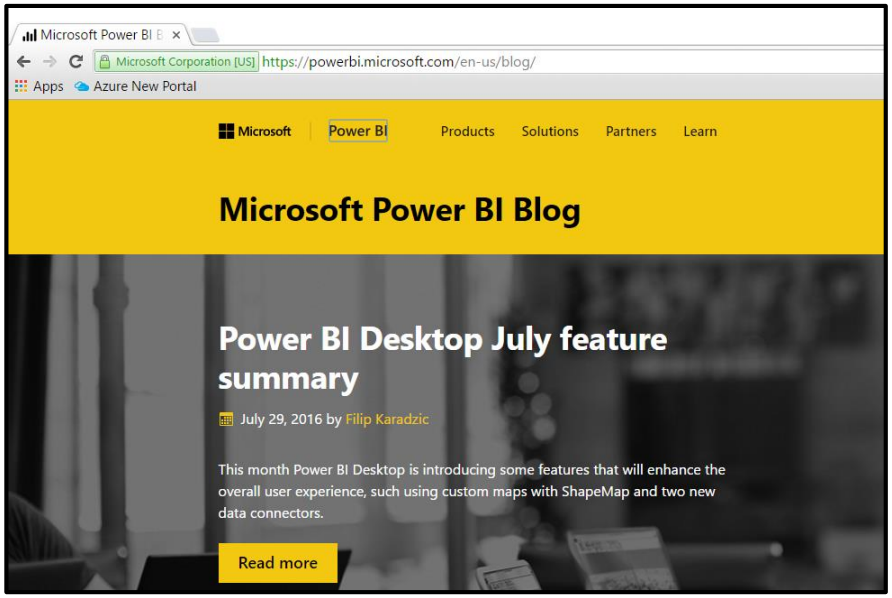

DEMO
Managing Users and Subscriptions
in the Office 365 admin center

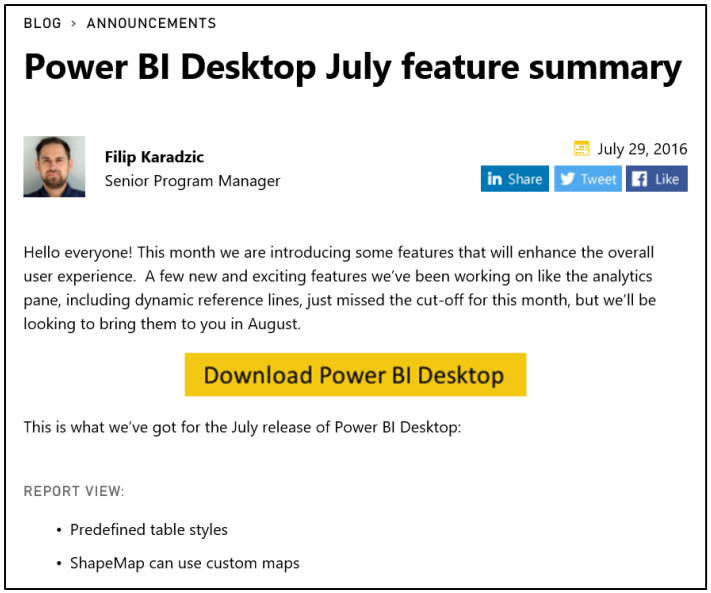
Power BI Team Blog

- Power BI Team Blog is an Essential Resource

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

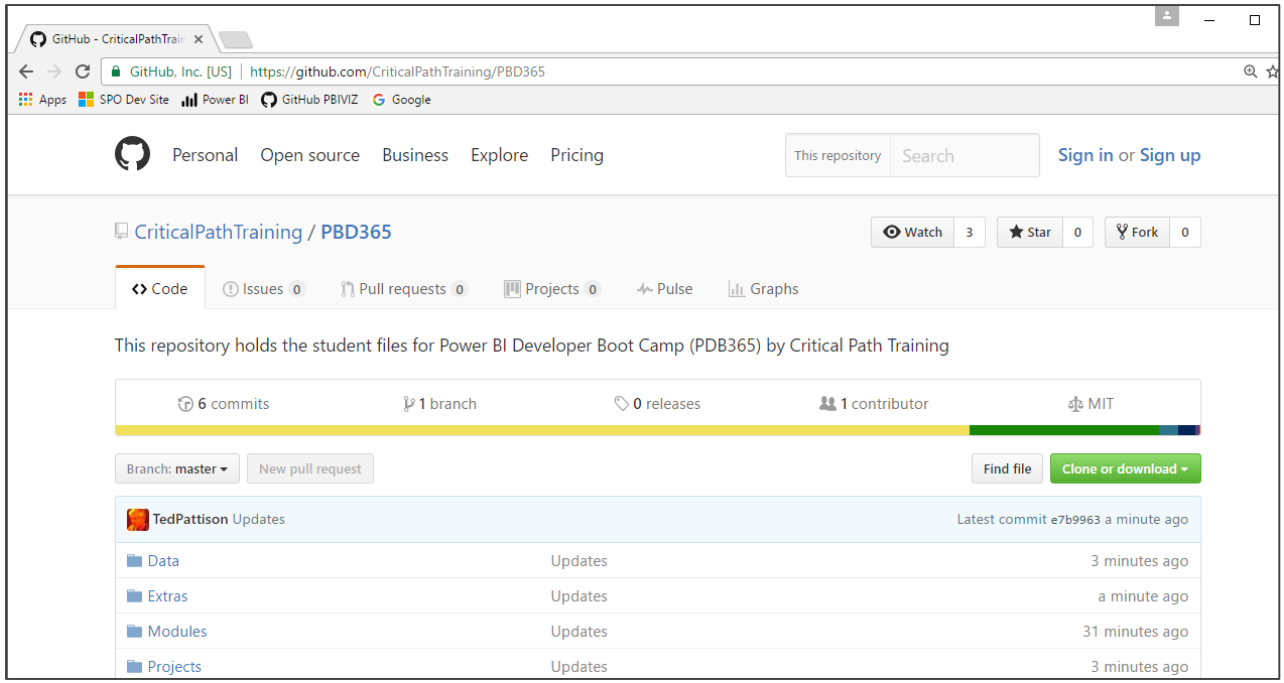
- Be on the lookout for monthly updates





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

- ✓ Introduction to Power BI
- ✓ Creating PBIX Projects with Power BI Desktop
- ✓ Developer Opportunities in Power BI
- ✓ Developing for Power BI Embedded
- ✓ Creating a Power BI Development Environment