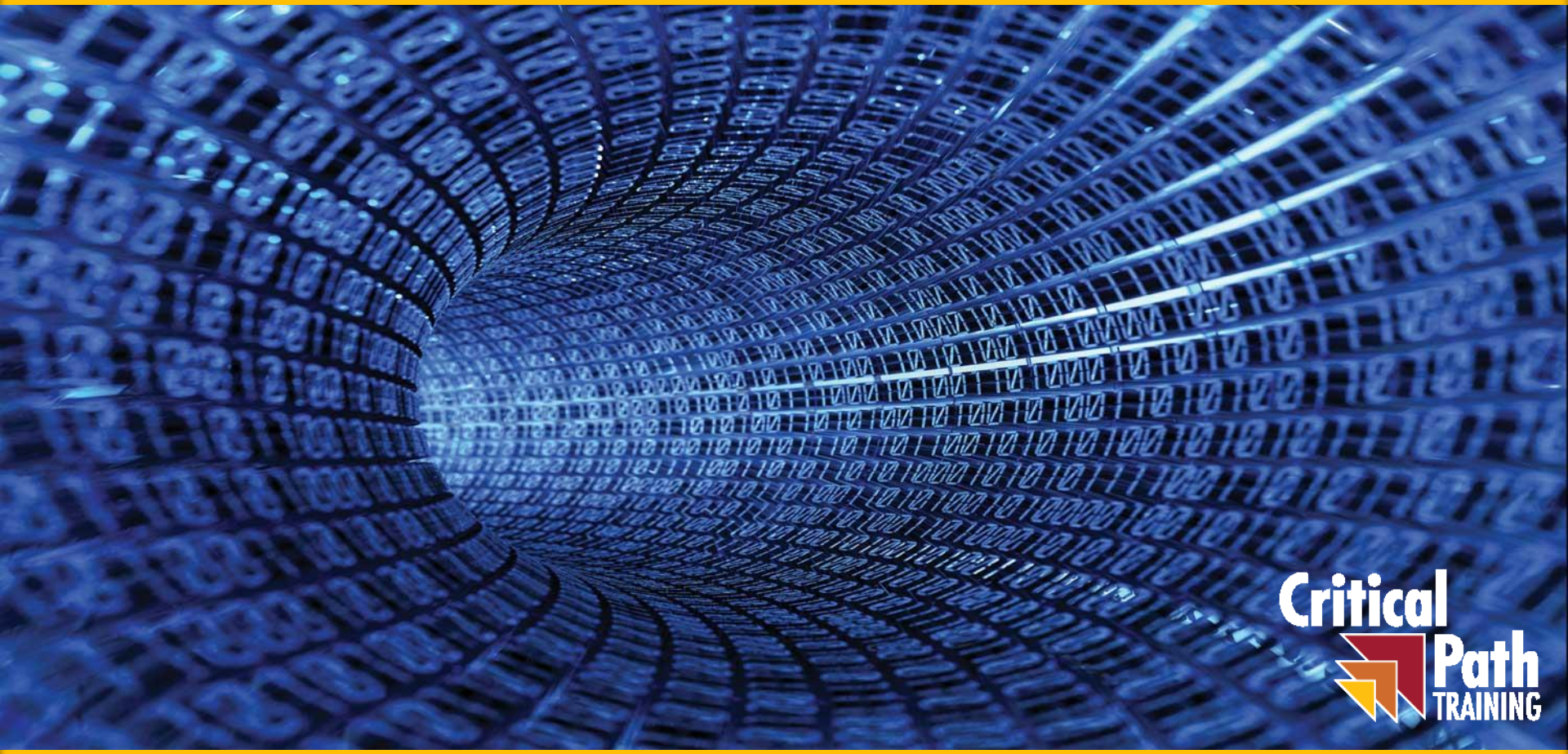
Integrating Excel Workbooks into Power BI



Agenda

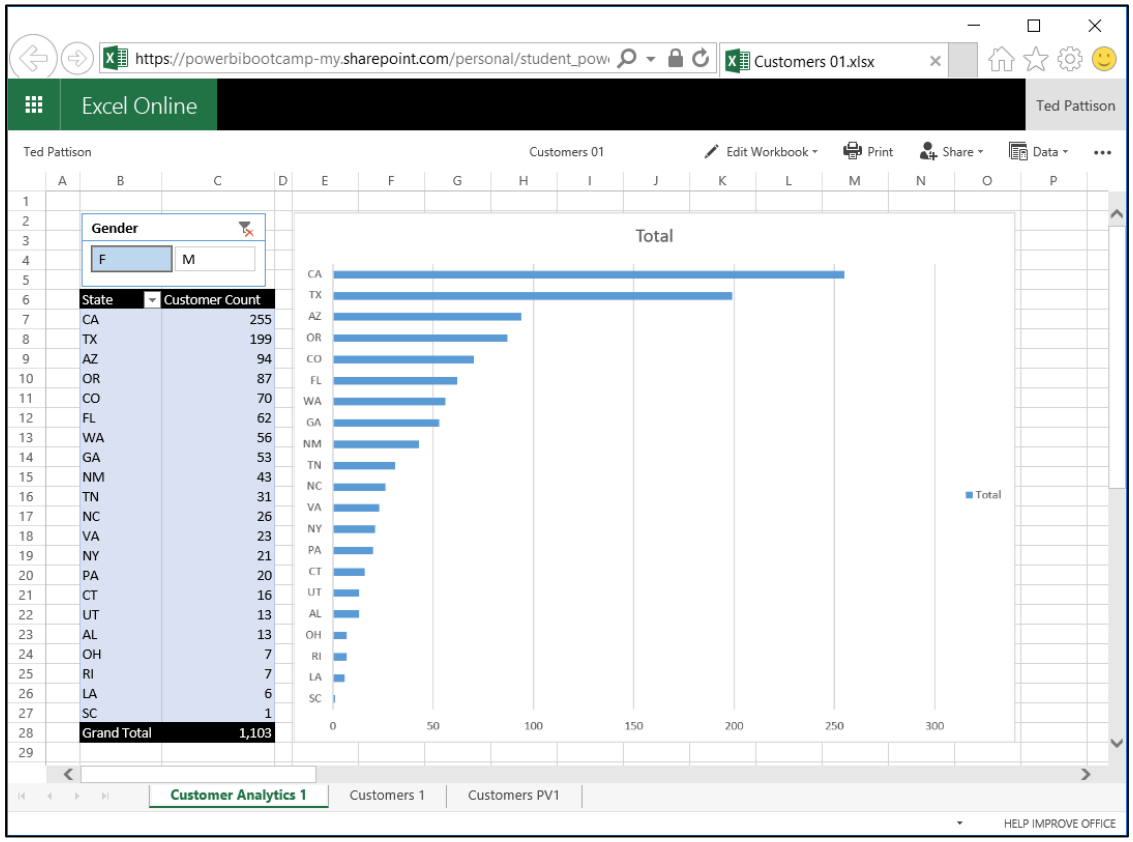
- Understanding Excel Integration with Power BI
- Designing Data Models in Microsoft Excel
- Connecting to Excel Data Models from Power BI
- Importing Data Models into Power BI Desktop
- Using the Power BI Publishing for Excel Add-in
- Connecting from Excel to a Power BI Dataset

Microsoft Excel Integration with Power BI

- Excel can be used as a query and data modeling tool
  - Excel provides Power Query and PowerPivot
  - Similar query and data modeling features to Power BI Desktop
  - Power BI can connect to an Excel data model
  - Excel data model can be imported into Power BI Desktop project
- Excel as a tool to publish worksheet content to Power BI
  - Excel worksheets can be rendered inside Power BI workspace
  - Provides best way to create PivotTables in Power BI custom solution
  - **Power BI publisher for Excel** add-in allows publishing to dashboard
- Analyze in Excel Feature
  - Makes it possible to connect Excel workbook to Power BI Dataset
  - Create PivotTables to analyze datasets running in Power BI service

Excel Online Integration with Power BI

- Excel Online used to render Excel workbooks in browser
  - Workbooks in OneDrive & SharePoint can be accessed thru browser
  - Excel Online rending service can be hosted inside Power BI report



State	Customer Count
CA	255
TX	199
AZ	94
OR	87
CO	70
FL	62
WA	56
GA	53
NM	43
TN	31
NC	26
VA	23
NY	21
PA	20
CT	16
UT	13
AL	13
OH	7
RI	7
LA	6
SC	1
Grand Total	1,103

Agenda

- ✓ Understanding Excel Integration with Power BI
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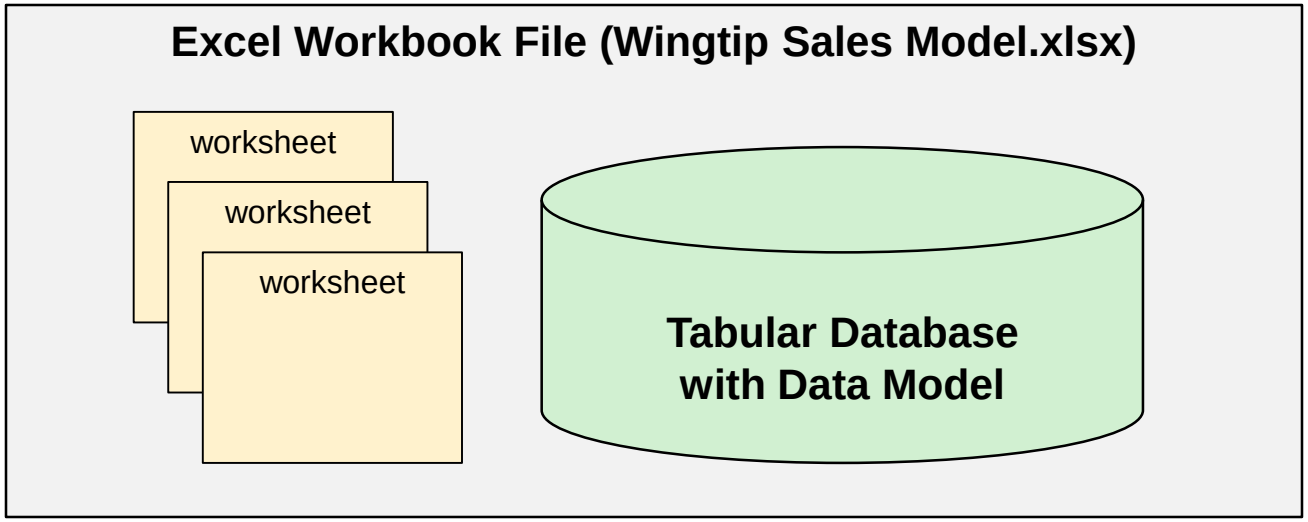
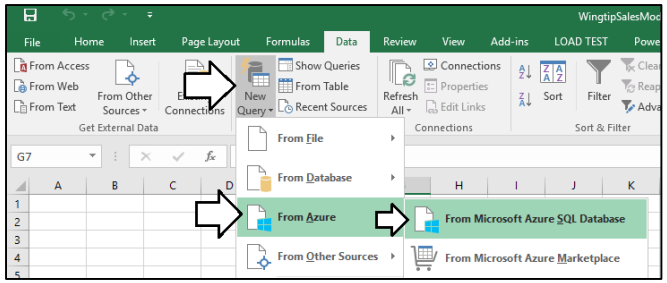
The Excel Data Model

- Every Excel workbook file contains a data model
  - Data model stored as tabular database inside XLSX file
  - Based on **xVelocity** database engine just like PBIDT and SSAS
- When importing data with from an Excel query…
  - You can add the imported data as a table in a worksheet
  - You can add the imported data as a table in the data model

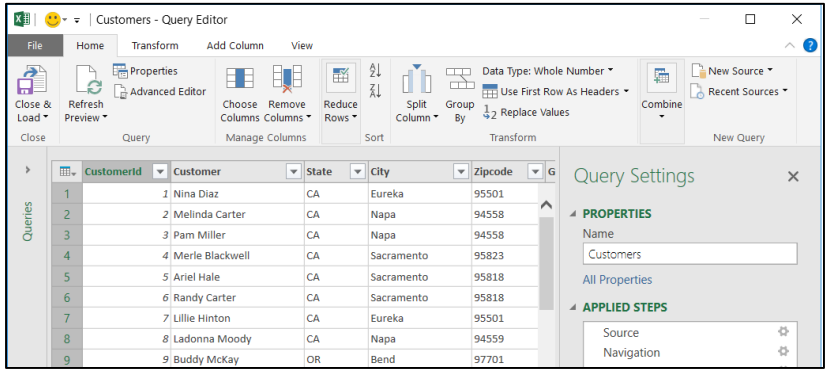


Working with Query Tools in Microsoft Excel

- Microsoft Excel provides query tools similar to PBIDT
  - Included with Excel 2013/2010 using Power Query add-in
  - Included natively in Excel 2016 – Power Query add-in retired
  - Query functionality provided in Query tab in ribbon

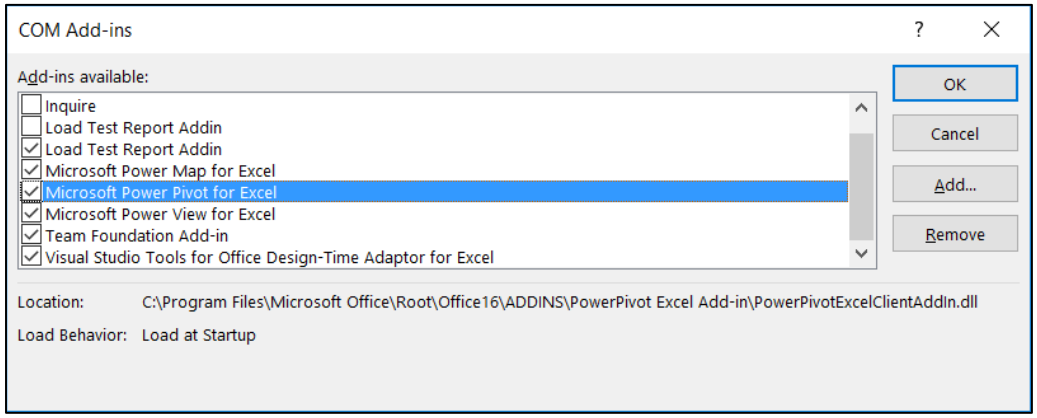


  - Excel queries are edited in separate Query Editor window

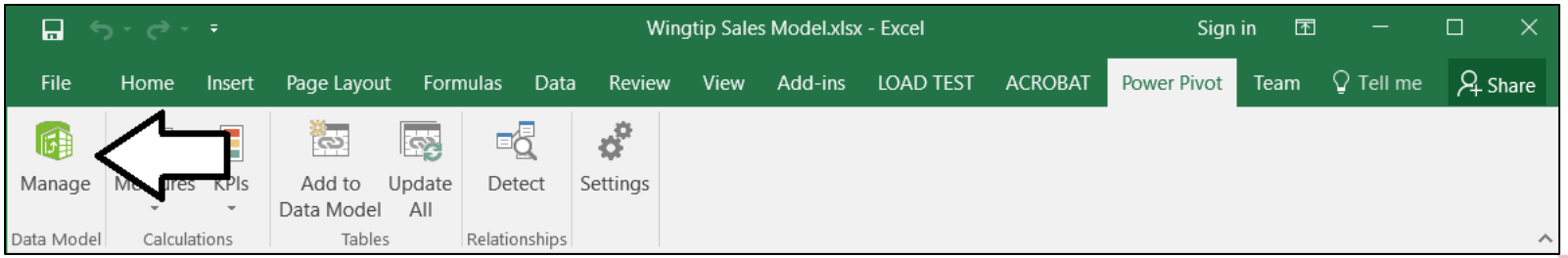


Working with the Power Pivot Add-in

- Data Modeling requires activation of Power Pivot add-in
  - Not activated by default in Excel 2016 or Excel 2013
  - Not activated nor even installed by default in Excel 2010



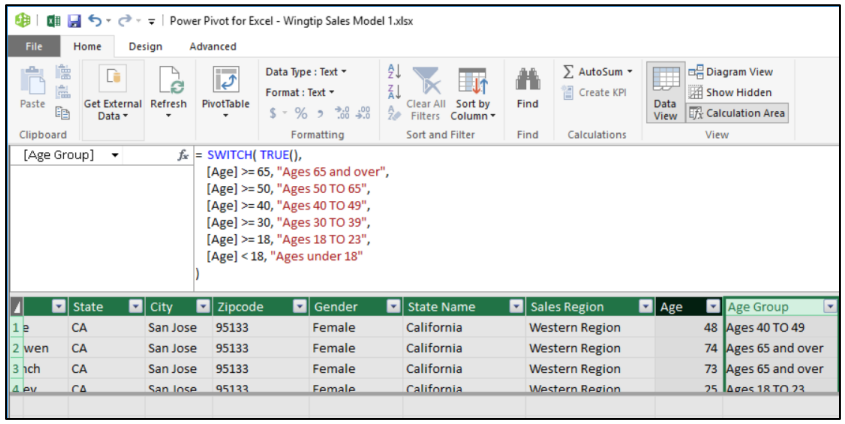
  - Once activated, new **Power Pivot** tab appears in ribbon

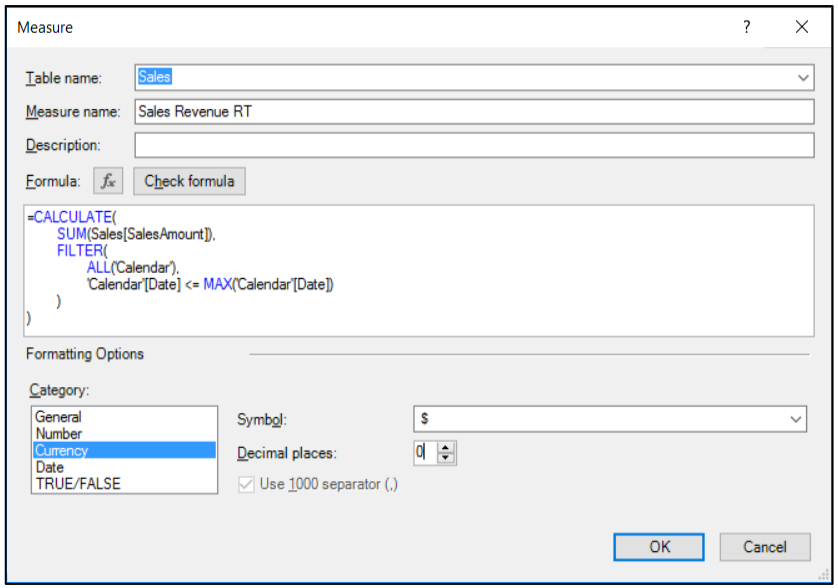


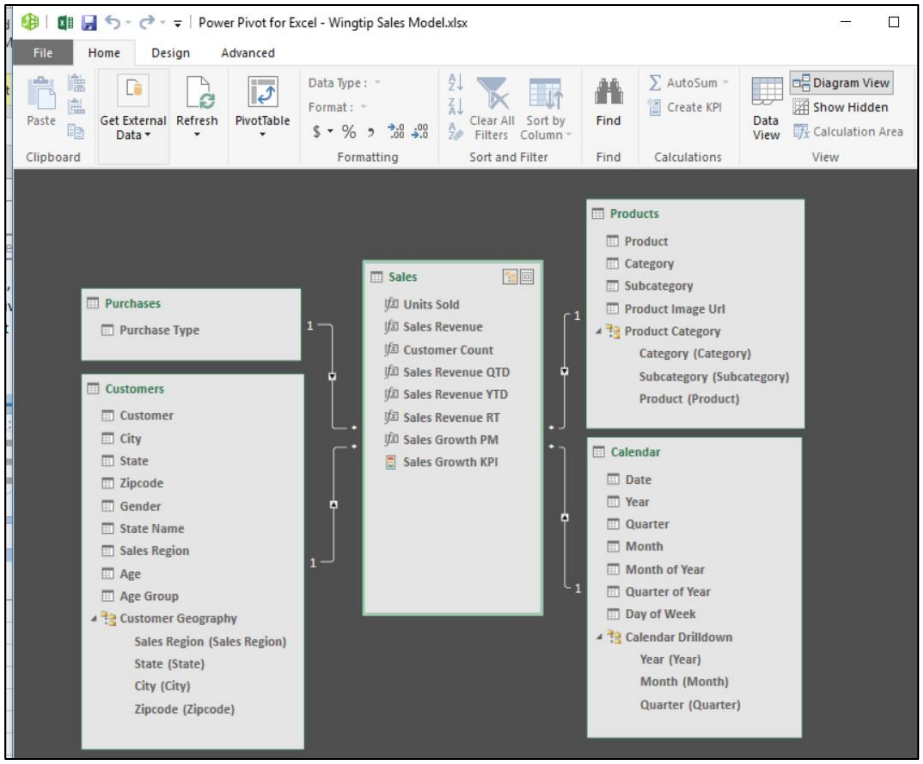
Building Data Models in Excel Workbooks

- You create data model just like in Power BI Desktop
  - Convert column types and format column values
  - Add calculated columns using DAX expressions
  - Add measures using DAX expressions
  - Add a calendar table to support DAX time intelligence
  - Add dimensional hierarchies
- Excel data model supports adding KPIs
  - Power BI Desktop does not provide equivalent feature

Using Power Pivot Add-in for Excel

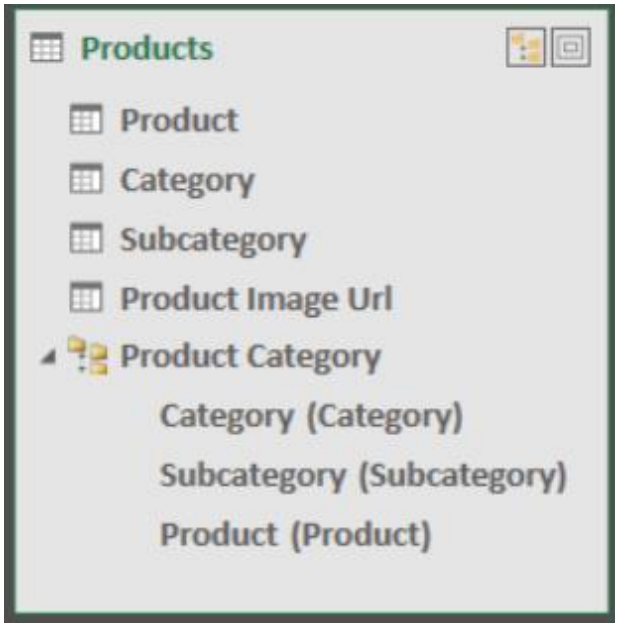






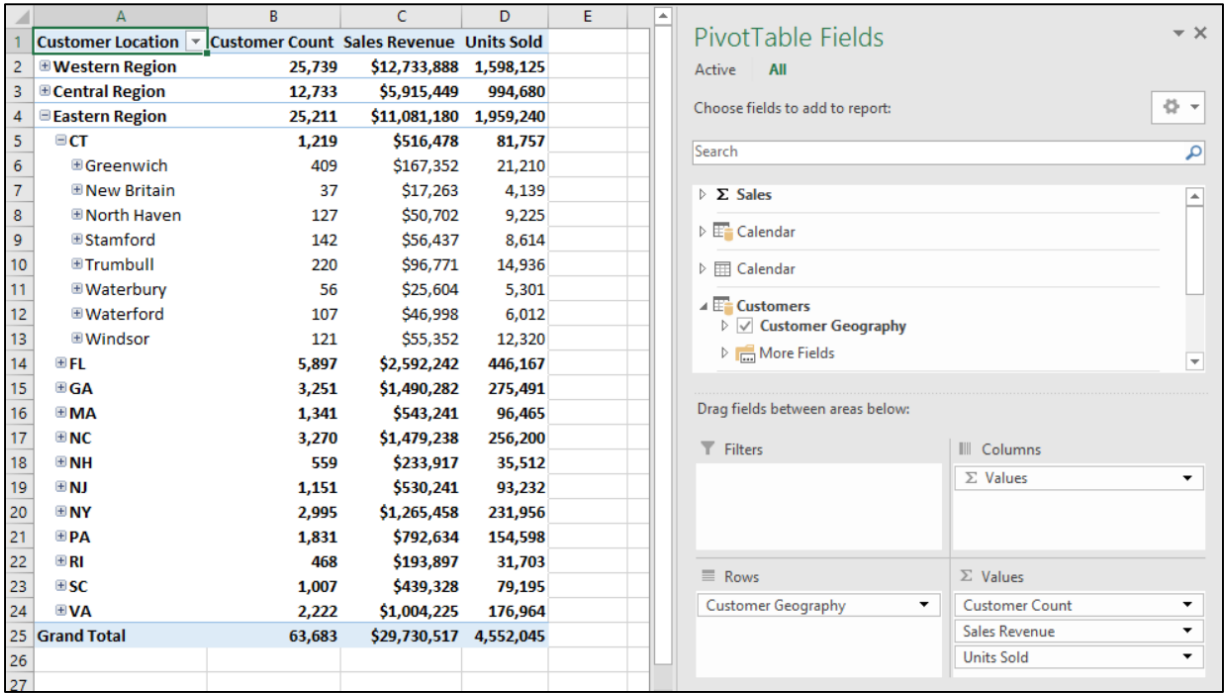
Adding Hierarchies to an Excel Data Model

- Excel data model supports dimensional hierarchies
  - All column in a hierarchy must be from single table
  - Provides the same effect as dimensional hierarchies in PBIDT
  - Technique for creating hierarchies in Excel different from PBIDT



Creating PivotTables from Excel Data Model

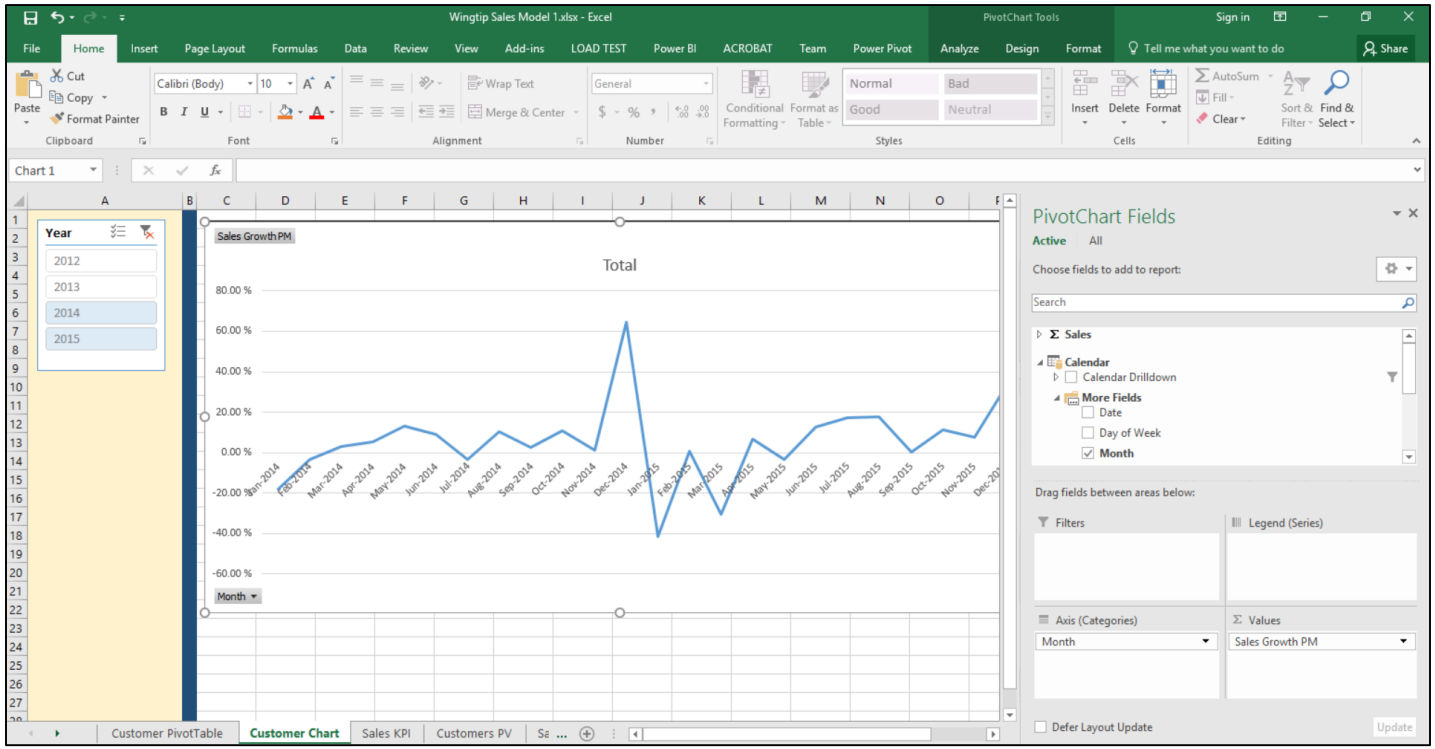
- Excel allows creation of PivotTables from data model
  - PivotTables are very popular with business users and data analysts
  - PivotTable allows user-friendly drilldown during data analysis
  - Excel PivotTables can be published to Excel Online
  - Power BI currently offers no visualization that matches Excel PivotTable



Customer Location	Customer Count	Sales Revenue	Units Sold
Western Region	25,739	$12,733,888	1,598,125
Central Region	12,733	$5,915,449	994,680
Eastern Region	25,211	$11,081,180	1,959,240
CT	1,219	$516,478	81,757
Greenwich	409	$167,352	21,210
New Britain	37	$17,263	4,139
North Haven	127	$50,702	9,225
Stamford	142	$56,437	8,614
Trumbull	220	$96,771	14,936
Waterbury	56	$25,604	5,301
Waterford	107	$46,998	6,012
Windsor	121	$55,352	12,320
FL	5,897	$2,592,242	446,167
GA	3,251	$1,490,282	275,491
MA	1,341	$543,241	96,465
NC	3,270	$1,479,238	256,200
NH	559	$233,917	35,512
NJ	1,151	$530,241	93,232
NY	2,995	$1,265,458	231,956
PA	1,831	$792,634	154,598
RI	468	$193,897	31,703
SC	1,007	$439,328	79,195
VA	2,222	$1,004,225	176,964
Grand Total	63,683	$29,730,517	4,552,045

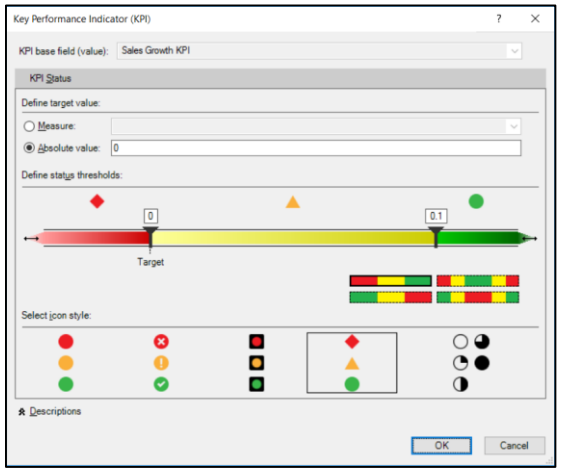
Creating a Chart from an Excel Data Model

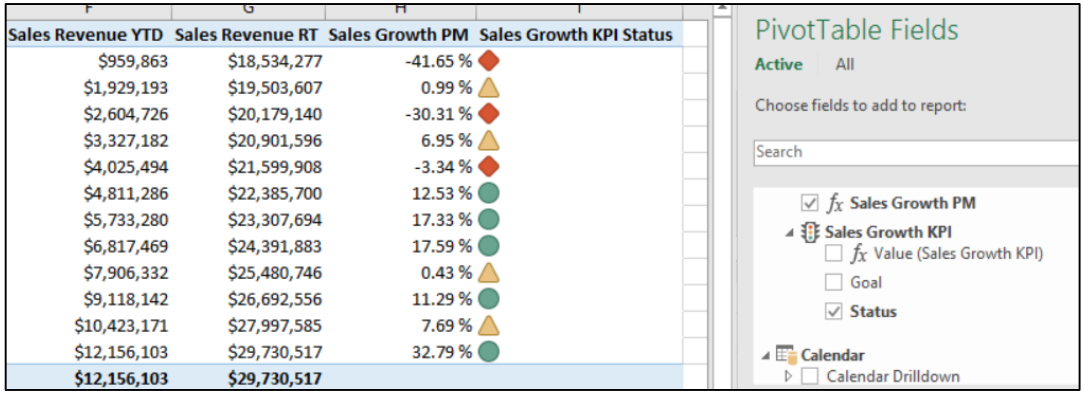
- Excel provides rich charting capabilities
  - Excel charts can also be published to Excel Online



KPIs in an Excel Data Model

- Excel supports adding KPIs to data model
  - KPI created as visual layer on top of a measure
  - Power BI Desktop has no equivalent KPI support
  - Excel KPI can be used in Excel PivotTable



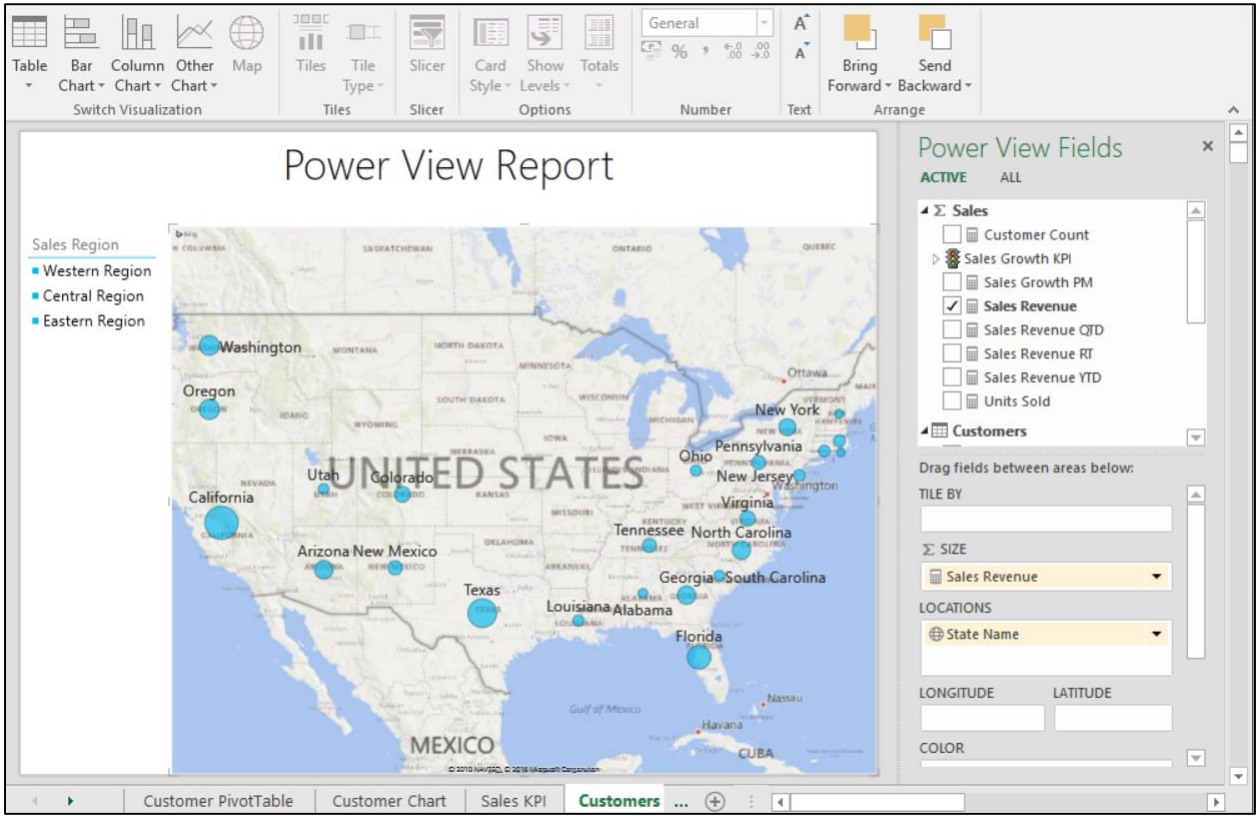


Sales Revenue YTD	Sales Revenue RT	Sales Growth PM	Sales Growth KPI Status
$959,863	$18,534,277	-41.65 %	
$1,929,193	$19,503,607	0.99 %	
$2,604,726	$20,179,140	-30.31 %	
$3,327,182	$20,901,596	6.95 %	
$4,025,494	$21,599,908	-3.34 %	
$4,811,286	$22,385,700	12.53 %	
$5,733,280	$23,307,694	17.33 %	
$6,817,469	$24,391,883	17.59 %	
$7,906,332	$25,480,746	0.43 %	
$9,118,142	$26,692,556	11.29 %	
$10,423,171	$27,997,585	7.69 %	
$12,156,103	$29,730,517	32.79 %	
$12,156,103	**$29,730,517**		

  - KPI from Excel data model can be used in Power BI report

Power View Reports in Excel

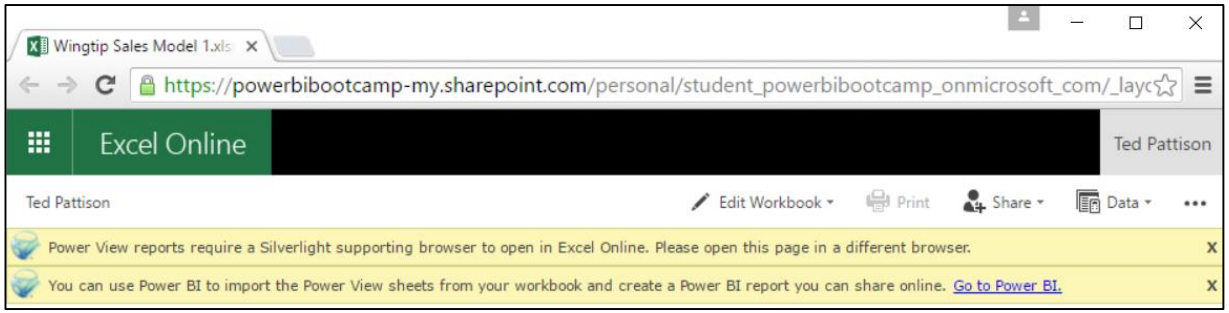
- Excel 2013 supports creating reports with Power View
  - Power View is reporting layer on top of Excel data model
  - Power View report added as worksheet within workbook file



Power View Requires Silverlight

- Use of Power View requires Microsoft Silverlight
  - Required when using Power View in Excel and in Browser
  - Often requires user to install Silverlight

- Silverlight dependencies considered undesirable
  - Power View reports inaccessible to many browsers and mobile devices
  - Microsoft is currently trying to move away from using Silverlight




DEMO
Working with Query and Data Modeling Features in Microsoft Excel

Agenda

- ✓ Understanding Excel Integration with Power BI
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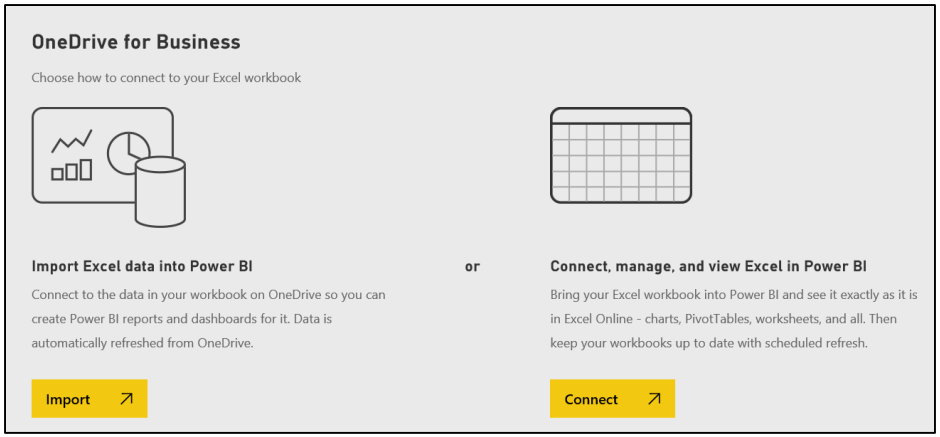
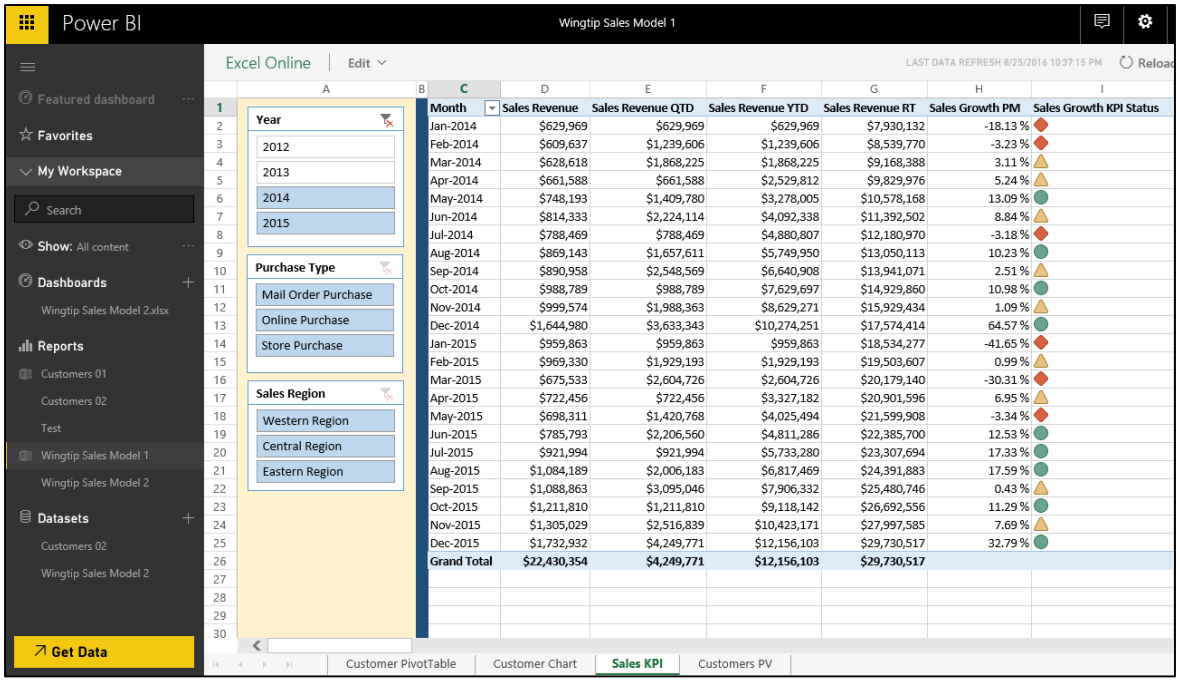
Connect versus Import

- Connecting to a Workbook from Power BI
  - Data model inside Excel workbook file becomes live source of data
  - Excel Online renders Excel worksheets inside Power BI workspace
  - All visualizations built into Excel workbook preserved "as is"
- Importing a Workbook into Power BI
  - Data model from workbook file is converted into Power BI dataset
  - Power View reports converted to Power BI reports
  - Other visualizations from workbook must be recreated from scratch



Hosting Excel Online inside Power BI

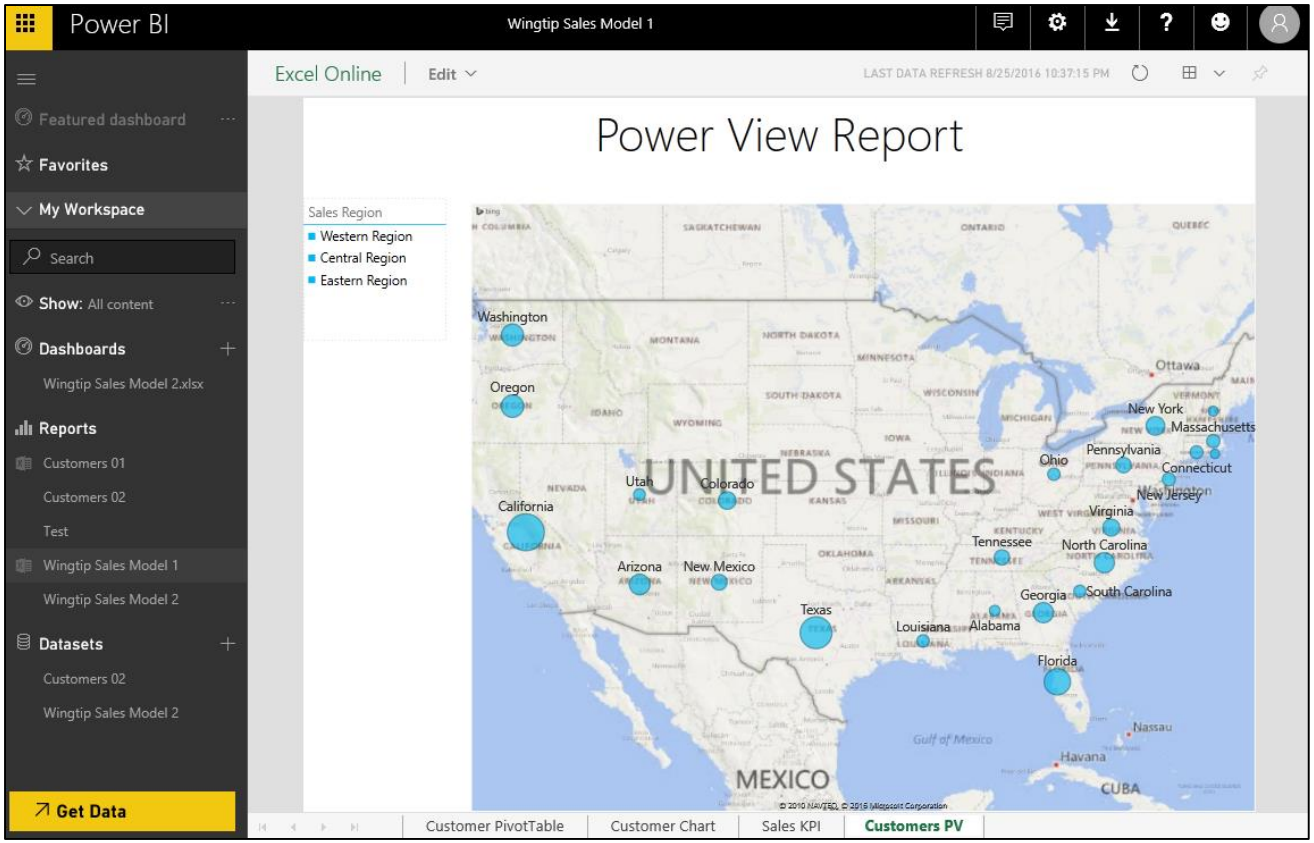
- What happens when you "Connect To" an Excel workbook?
  - Excel workbook renders inside Power BI using Excel Online hosting
  - Makes it easy to add Excel workbooks into Power BI user experience
  - All visualizations built into workbook as leveraged "as is"
  - Best way to provide true PivotTables in Power BI environment

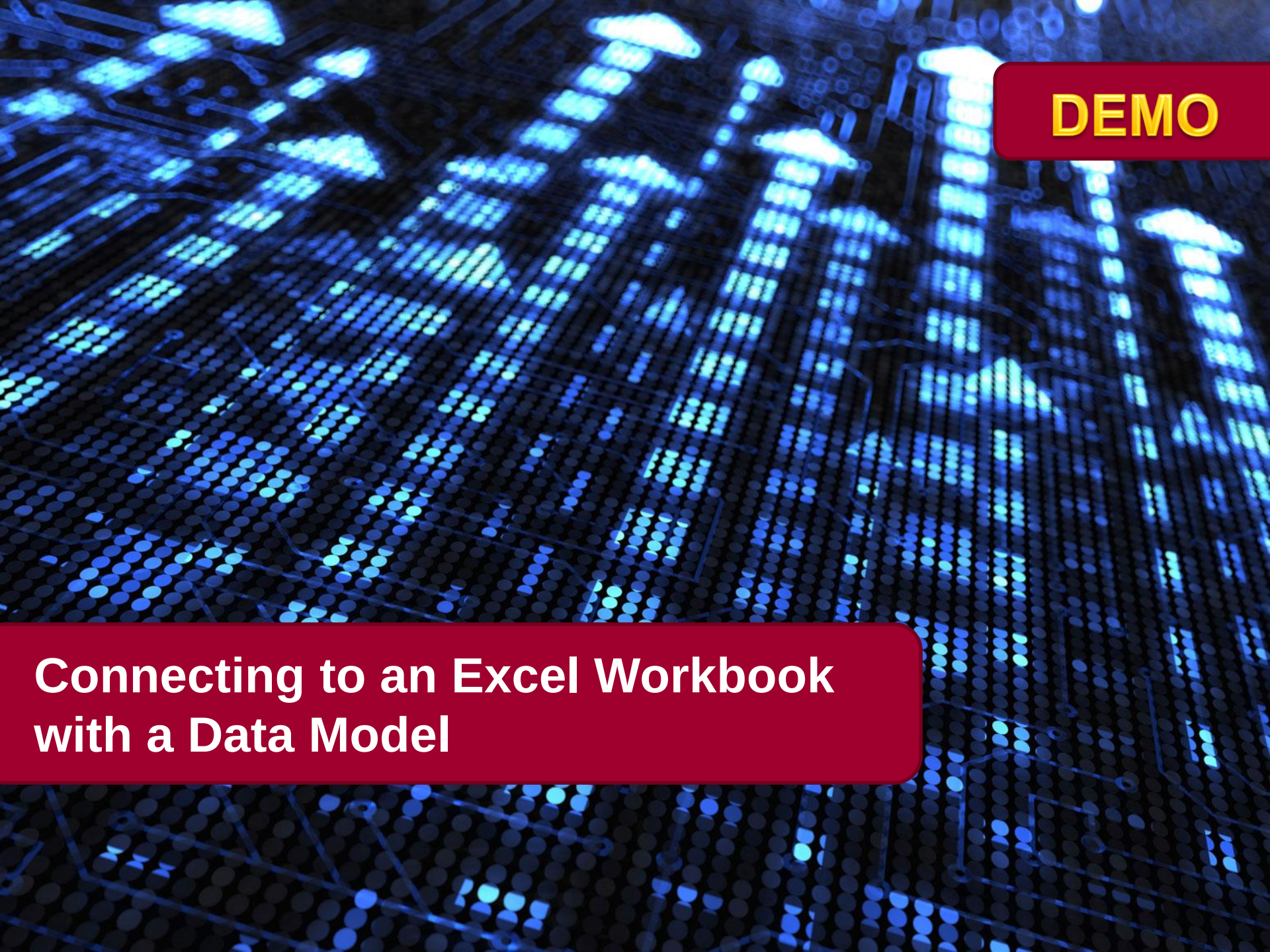


Month	Sales Revenue	Sales Revenue QTD	Sales Revenue YTD	Sales Revenue RT	Sales Growth PM	Sales Growth KPI Status
Jan-2014	$629,969	$629,969	$629,969	$7,930,132	-18.13 %	
Feb-2014	$609,637	$1,239,606	$1,239,606	$8,539,770	-3.23 %	
Mar-2014	$628,618	$1,868,225	$1,868,225	$9,168,388	3.11 %	
Apr-2014	$661,588	$661,588	$2,529,812	$9,829,976	5.24 %	
May-2014	$748,193	$1,409,780	$3,278,005	$10,578,168	13.09 %	
Jun-2014	$814,333	$2,224,114	$4,092,338	$11,392,502	8.84 %	
Jul-2014	$788,469	$788,469	$4,880,807	$12,180,970	-3.18 %	
Aug-2014	$869,143	$1,657,611	$5,749,950	$13,050,113	10.23 %	
Sep-2014	$890,958	$2,548,569	$6,640,908	$13,941,071	2.51 %	
Oct-2014	$988,789	$988,789	$7,629,697	$14,929,860	10.98 %	
Nov-2014	$999,574	$1,988,363	$8,629,271	$15,929,434	1.09 %	
Dec-2014	$1,644,980	$3,633,343	$10,274,251	$17,574,414	64.57 %	
Jan-2015	$959,863	$959,863	$959,863	$18,534,277	-41.65 %	
Feb-2015	$969,330	$1,929,193	$1,929,193	$19,503,607	0.99 %	
Mar-2015	$675,533	$2,604,726	$2,604,726	$20,179,140	-30.31 %	
Apr-2015	$722,456	$722,456	$3,327,182	$20,901,596	6.95 %	
May-2015	$698,311	$1,420,768	$4,025,494	$21,599,908	-3.34 %	
Jun-2015	$785,793	$2,206,560	$4,811,286	$22,385,700	12.53 %	
Jul-2015	$921,994	$921,994	$5,733,280	$23,307,694	17.33 %	
Aug-2015	$1,084,189	$2,006,183	$6,817,469	$24,391,883	17.59 %	
Sep-2015	$1,088,863	$3,095,046	$7,906,332	$25,480,746	0.43 %	
Oct-2015	$1,211,810	$1,211,810	$9,118,142	$26,692,556	11.29 %	
Nov-2015	$1,305,029	$2,516,839	$10,423,171	$27,997,585	7.69 %	
Dec-2015	$1,732,932	$4,249,771	$12,156,103	$29,730,517	32.79 %	
Grand Total	**$22,430,354**	**$4,249,771**	**$12,156,103**	**$29,730,517**		

"Connecting To" a Power View Report

- When connecting to workbook with Power Reports…
  - Excel Online can render Power View reports in Power BI service
  - Requires a Silverlight-enabled browser – this can be a pain point




DEMO
Connecting to an Excel Workbook with a Data Model

Agenda

- ✓ Understanding Excel Integration with Power BI
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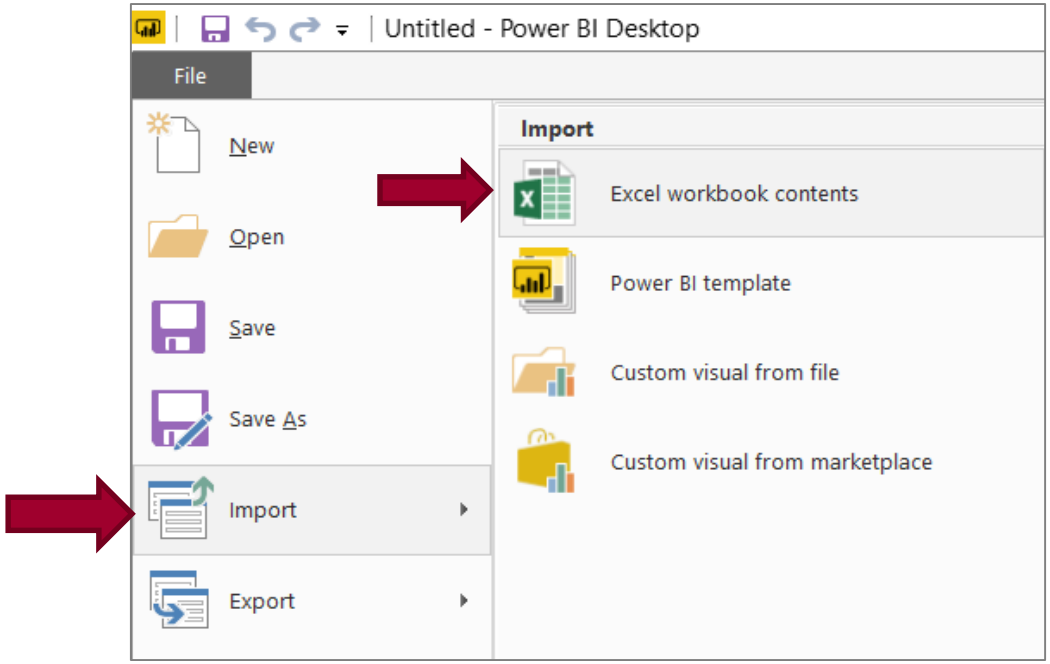
Importing Excel Data Models into Power BI

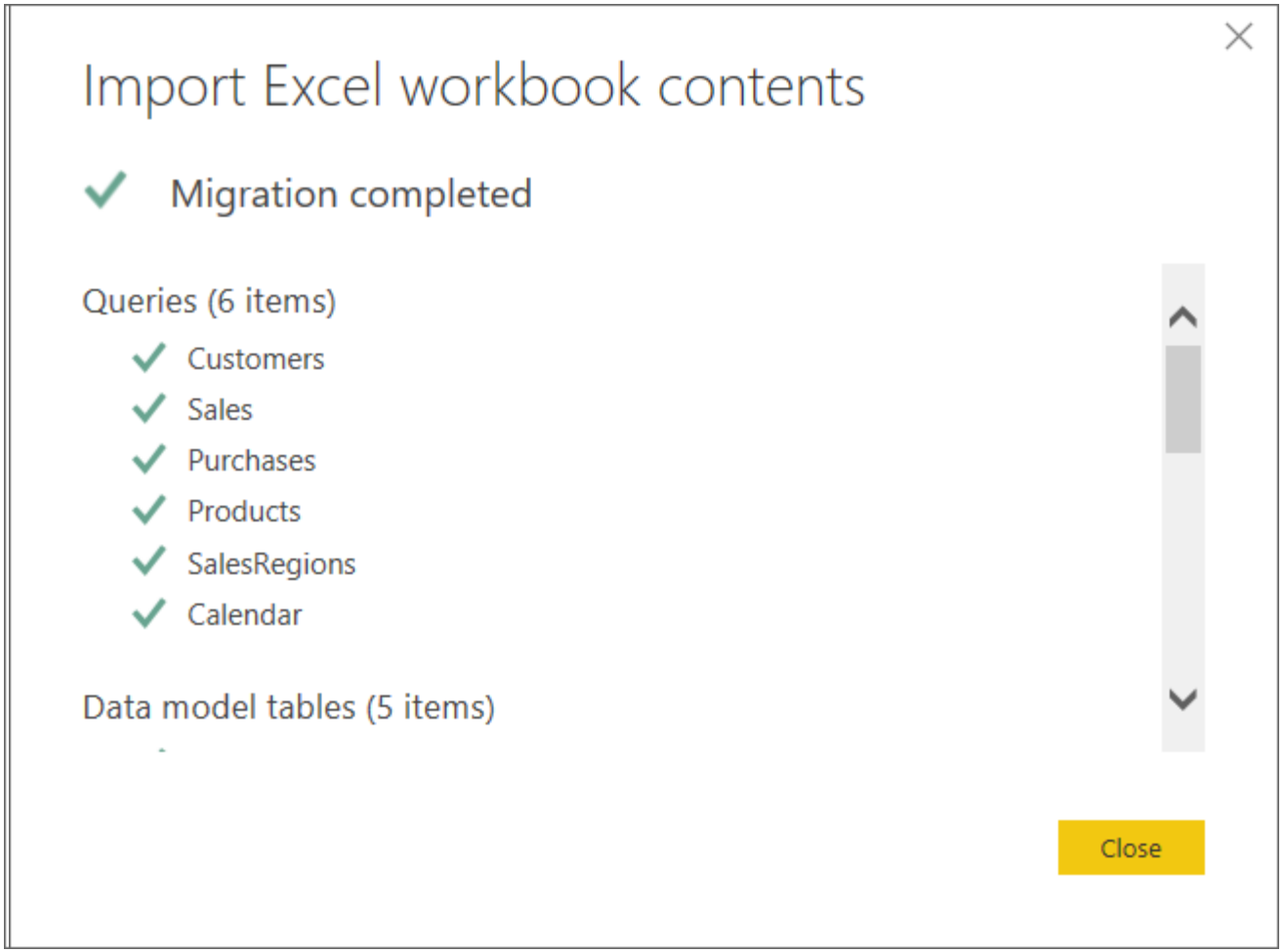
- Two way to import Excel Data Model into Power BI
  - Import data model into Power BI service using browser
  - Import data model into new Power BI Desktop project
- Importing data model into Power BI service is limited
  - Power BI imports read-only copy of data model
  - Any modifications to data model must be made through Excel
  - All data refreshing must be accomplished manually through Excel
- Importing data model into Power BI Desktop is better
  - Importing removes dependencies on source Excel workbook
  - Imported dataset can be modified in Power BI Desktop
  - Imported dataset can be configured for server-side refresh

Importing Data Model into Power BI Desktop

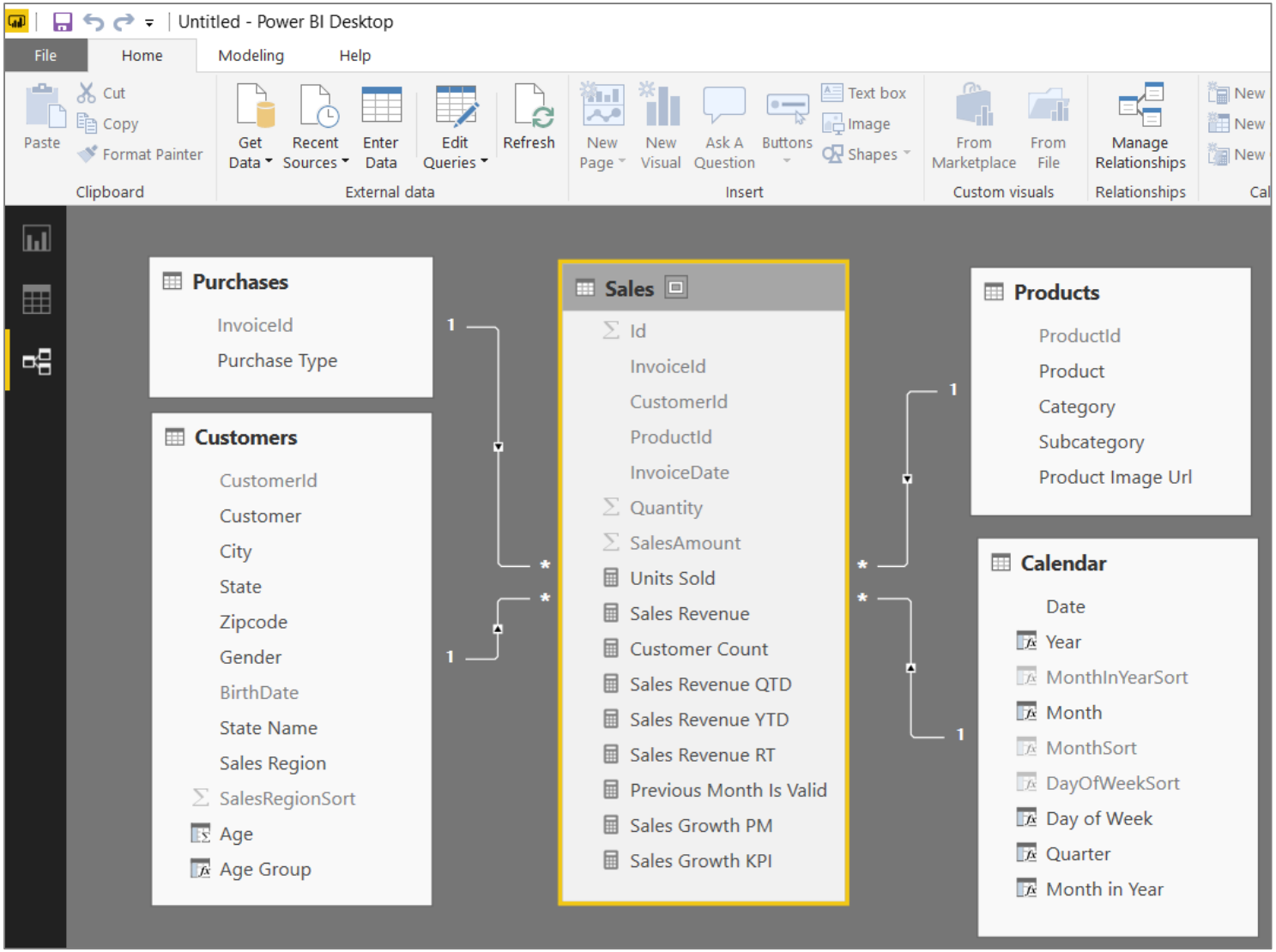
- Data model must be imported into nee project
  - Accomplished using **Import > Excel workbook contents**
  - You cannot import a dataset into an existing project



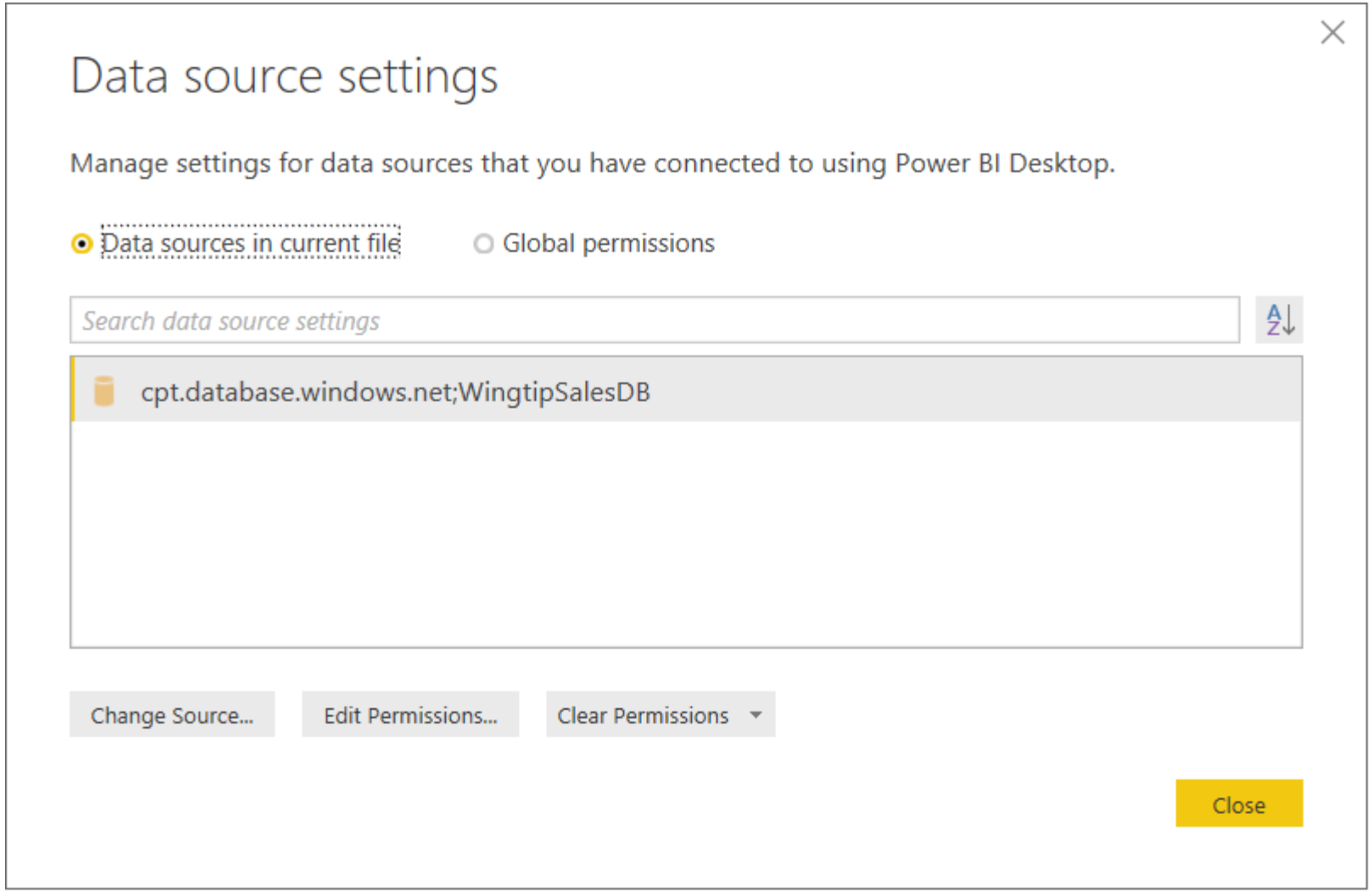
The Data Model Import Process



Inspecting the Imported Data Model

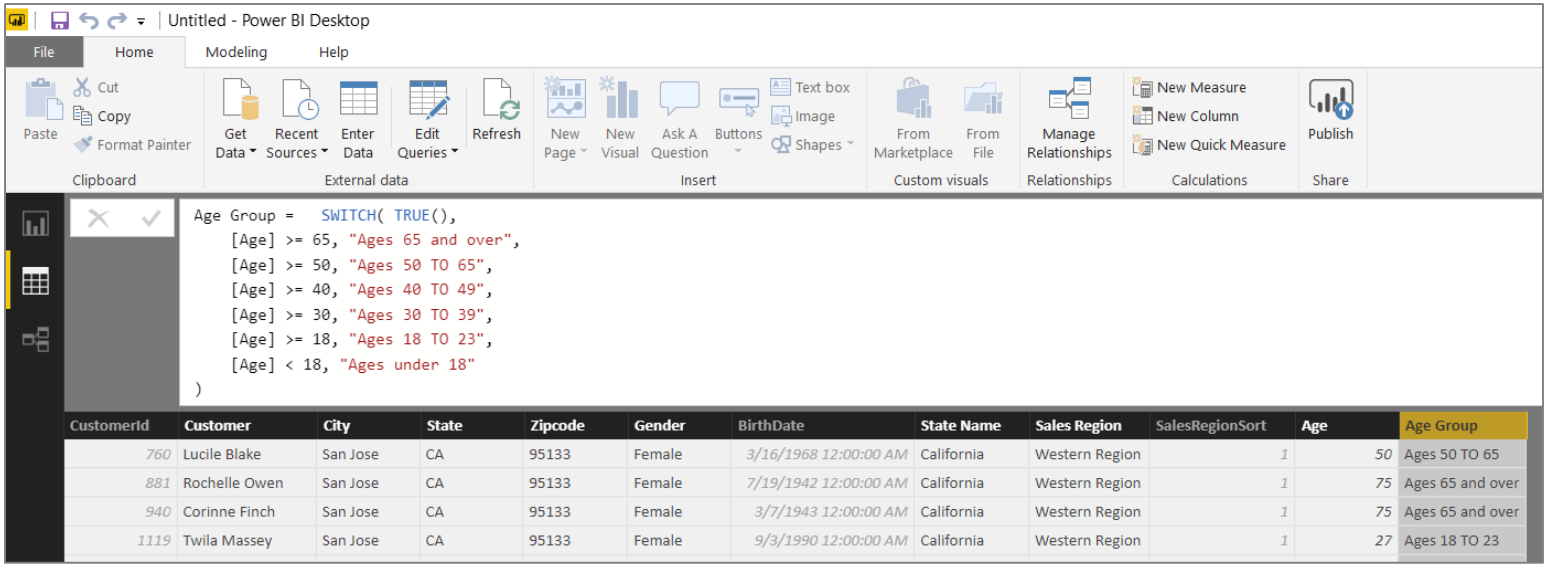


Inspecting the Project Data Sources



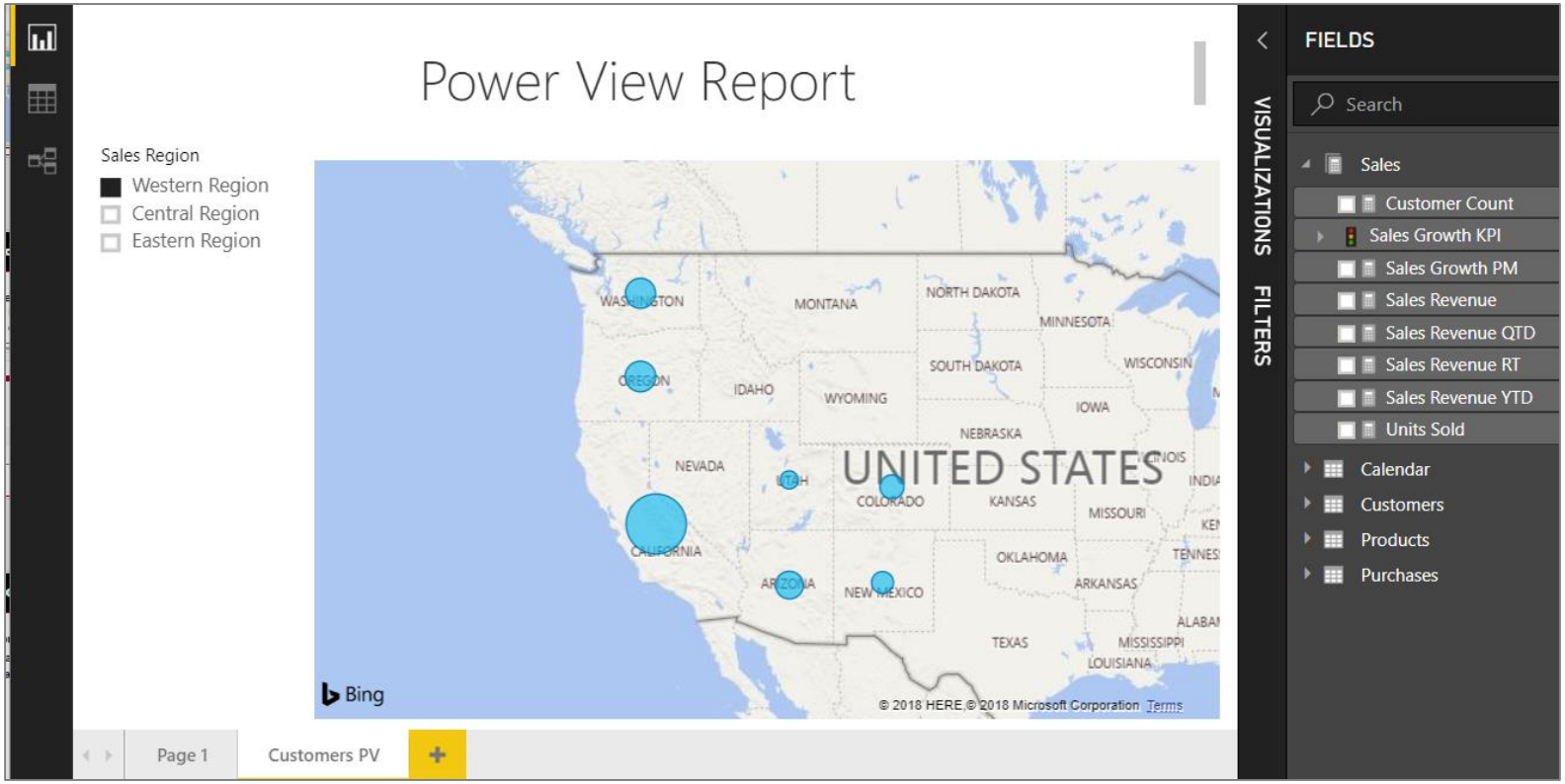
Modifying the Data Model

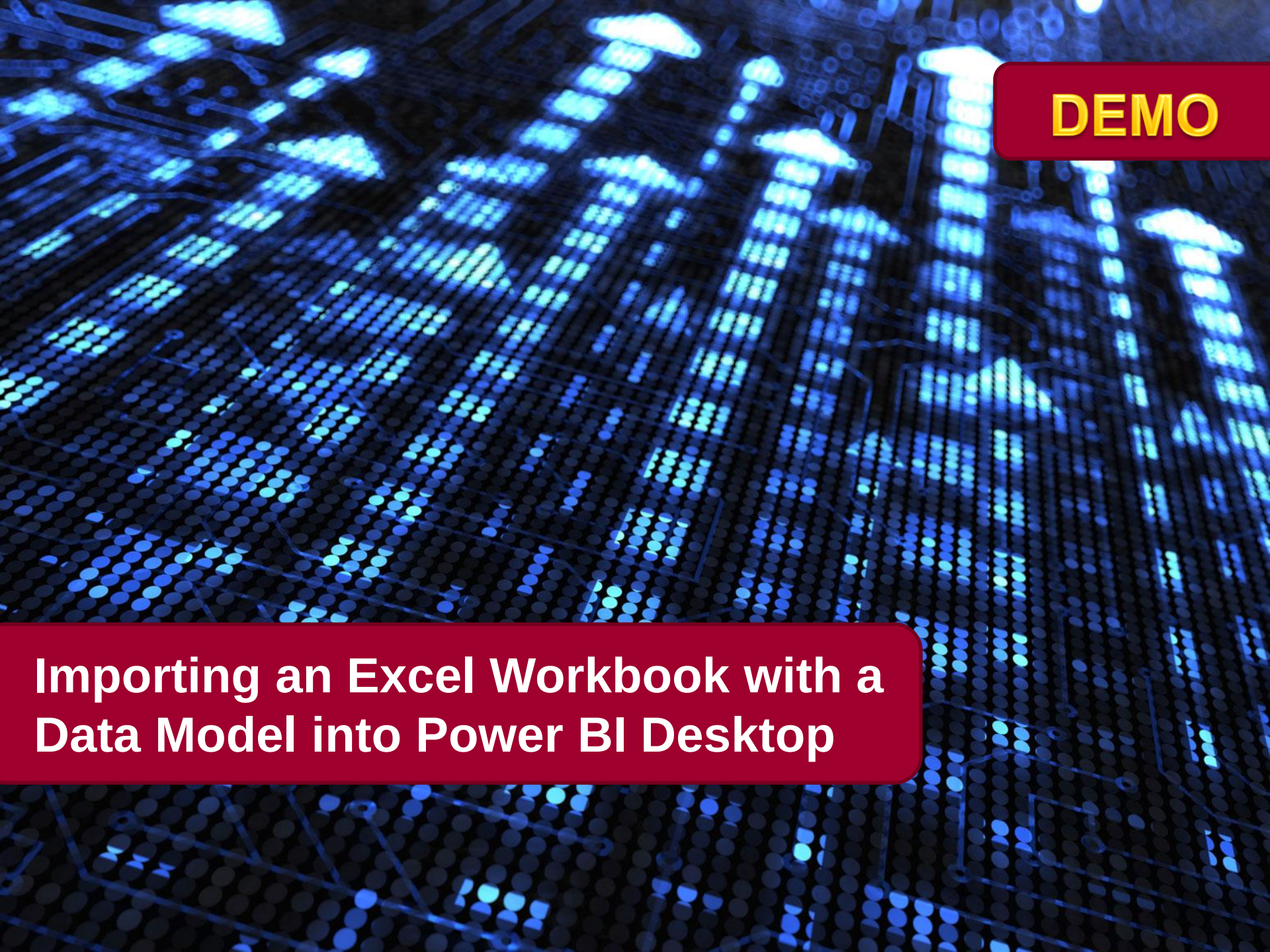
- DAX code is now editable



Power View Report Migration

- Power View Reports are migrated to new project
  - Built using standard Power BI visuals (no Silverlight)
  - All other visualizations must be built from scratch ☹




DEMO
Importing an Excel Workbook with a Data Model into Power BI Desktop

Agenda

- ✓ Understanding Excel Integration with Power BI
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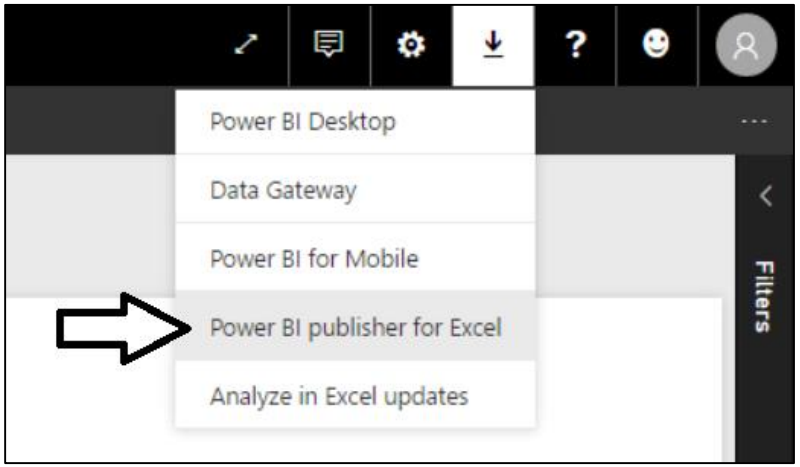
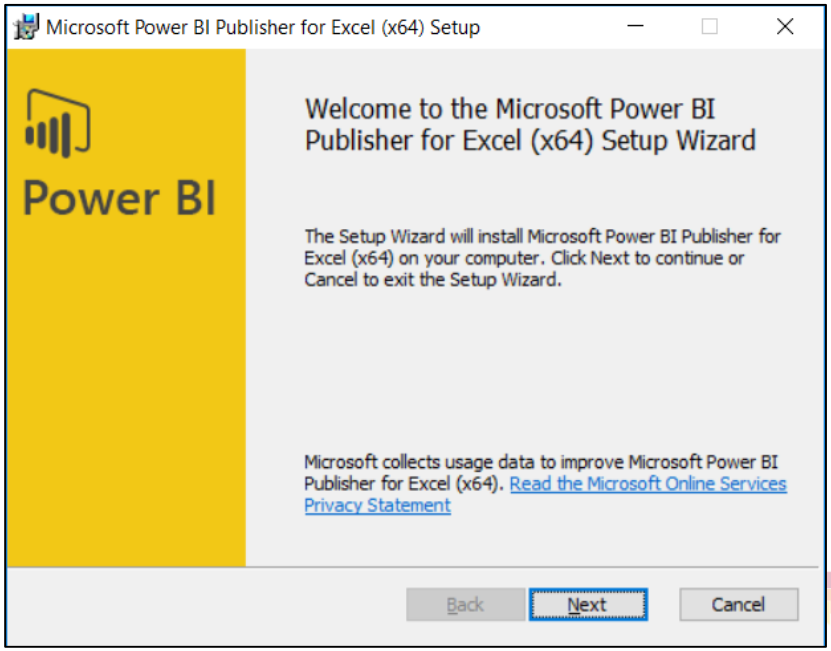
- ➢ Using the Power BI Publishing for Excel Add-in
- Connecting from Excel to a Power BI Dataset

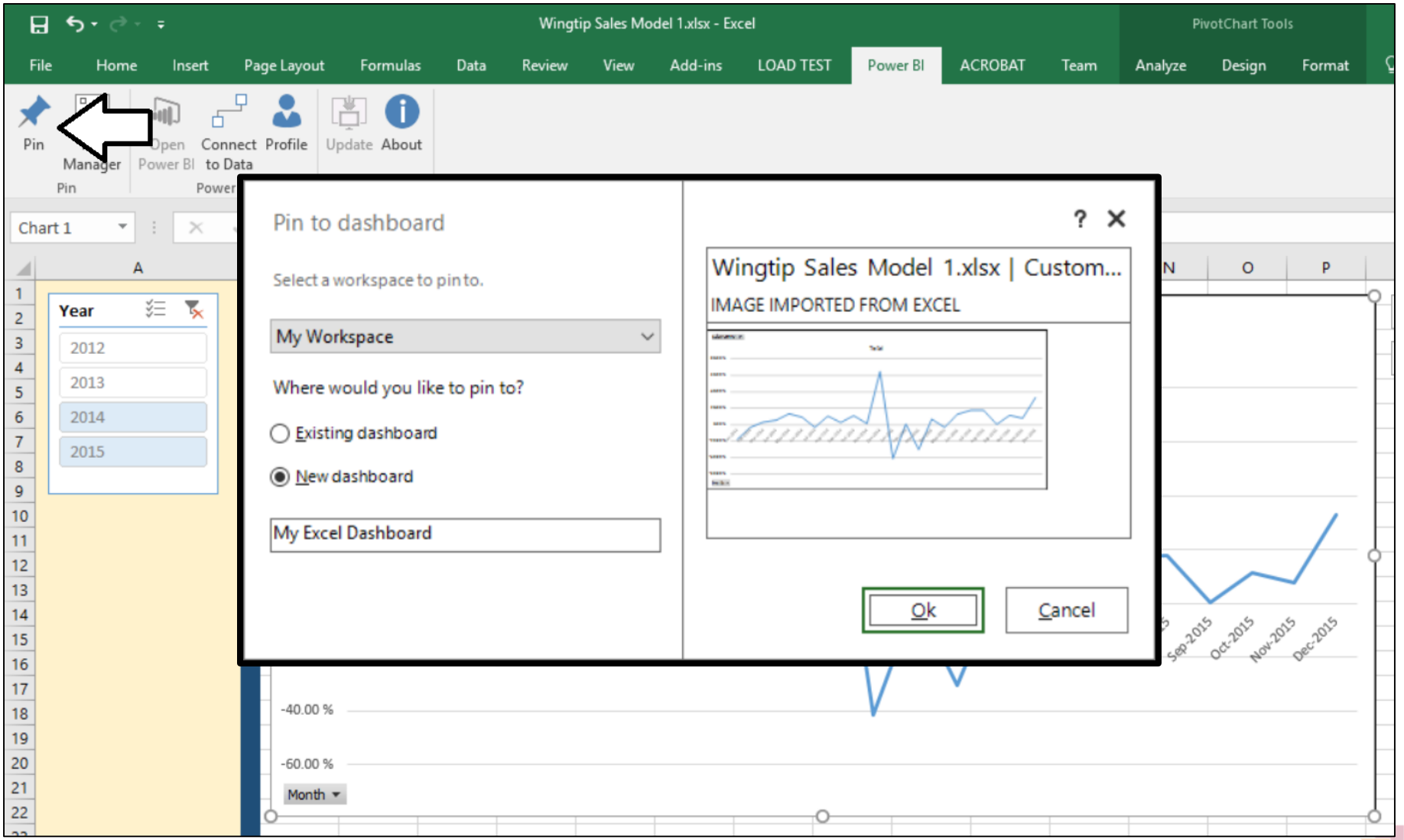
Power BI Publisher for Excel Add-in

- What is the Power BI Publisher for Excel Add-in?
  - An add-in that you first must downloaded and install
  - A utility to pin Excel elements to Power BI dashboard
  - Worksheet elements are pinned as non-dynamic snapshots
  - Pinned elements can be updated manually when needed

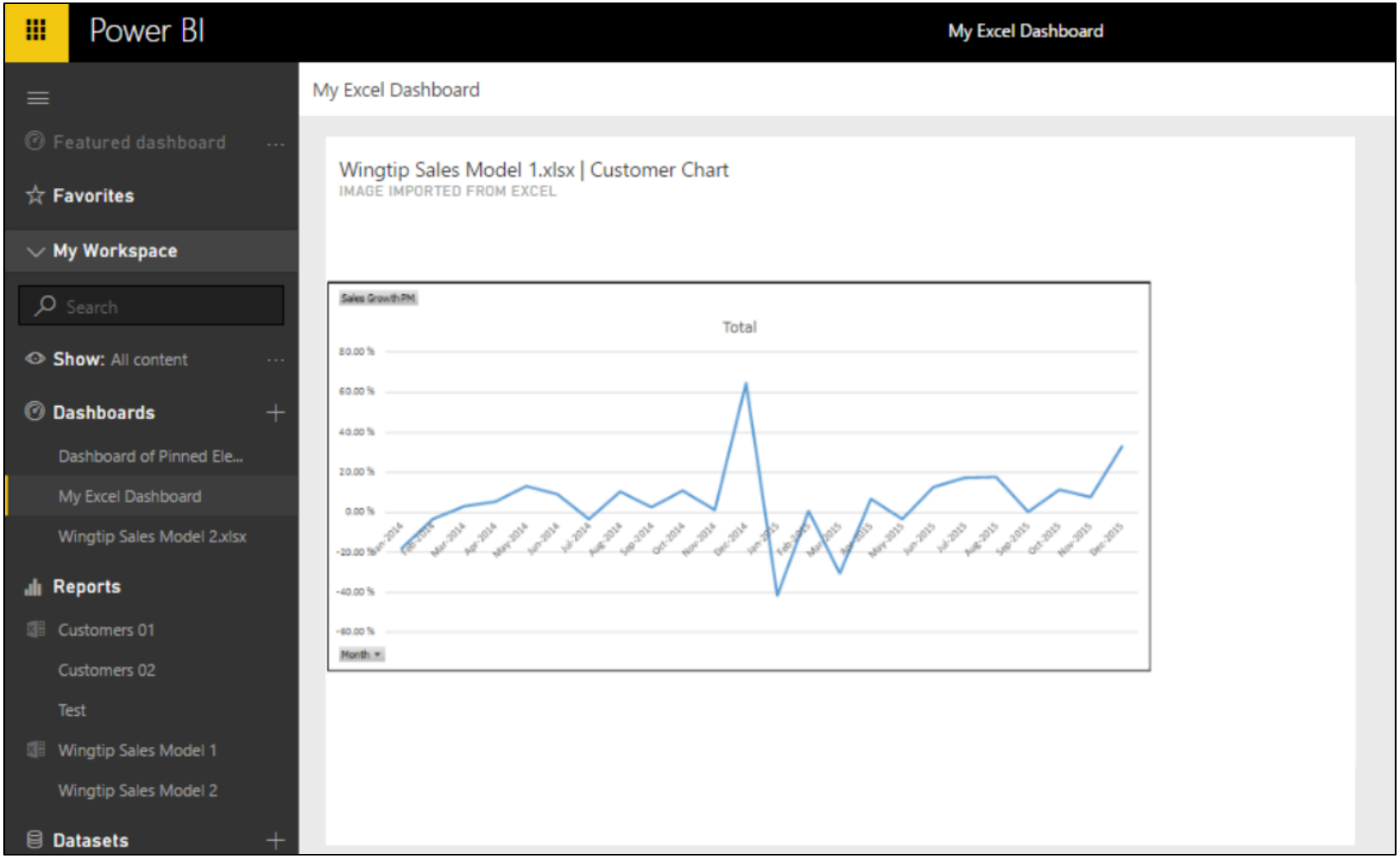




Pinning an Excel Chart to a Dashboard



A Pinned Excel Chart in a Dashboard



Agenda

- ✓ Understanding Excel Integration with Power BI
- ✓ Designing Data Models in Microsoft Excel
- ✓ Connecting to Excel Data Models from Power BI
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- ✓ Using the Power BI Publishing for Excel Add-in
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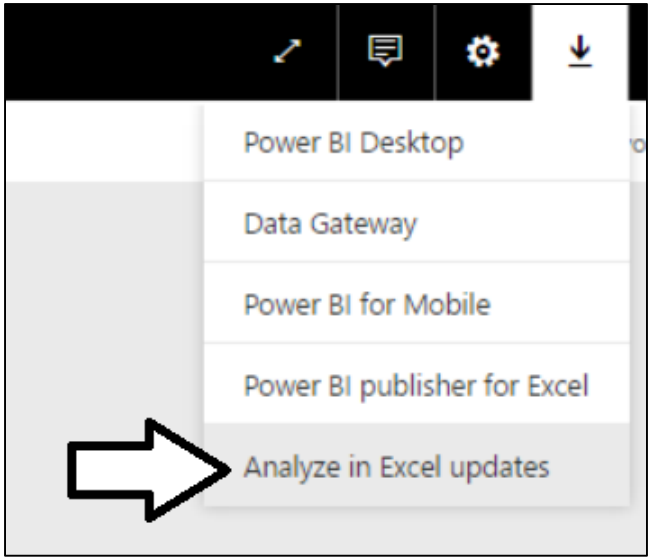
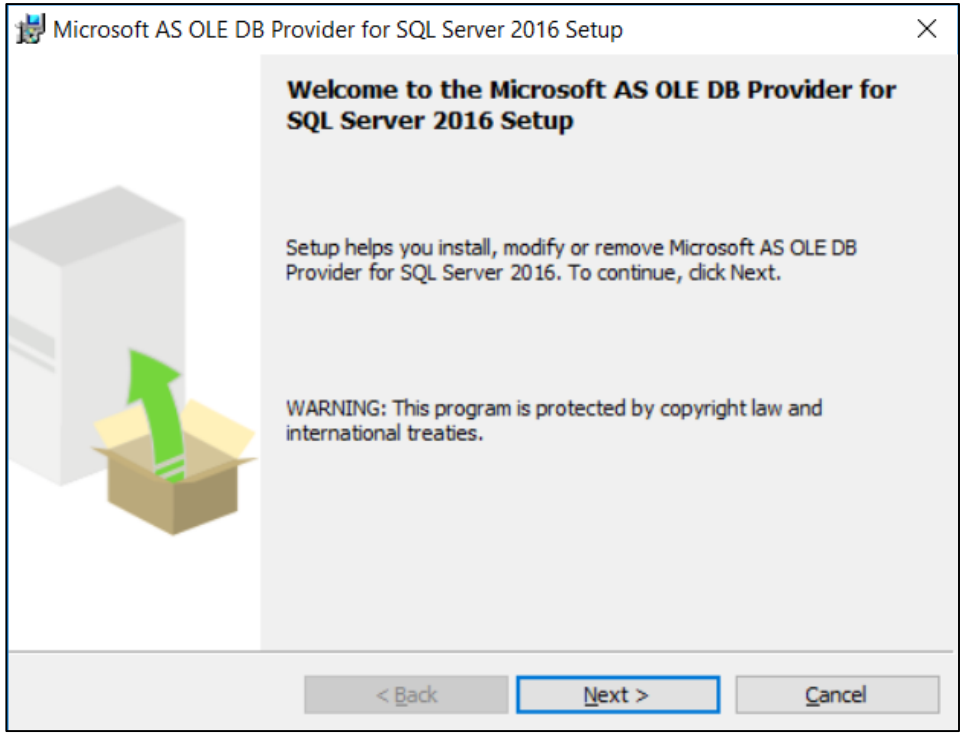
Analyze in Excel

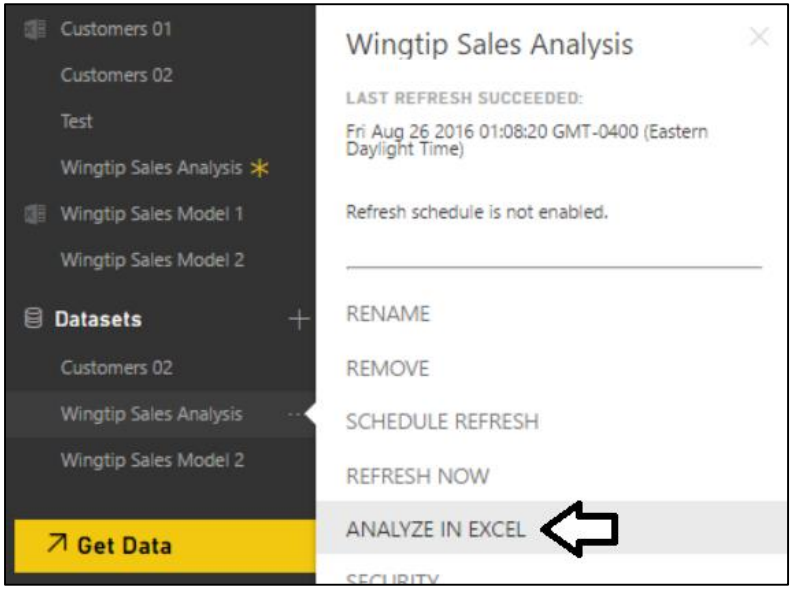
- Feature to connect Excel worksheet to Power BI dataset
  - Requires downloading & installing drivers using setup program
  - Once installed, connection is created from within Power BI service

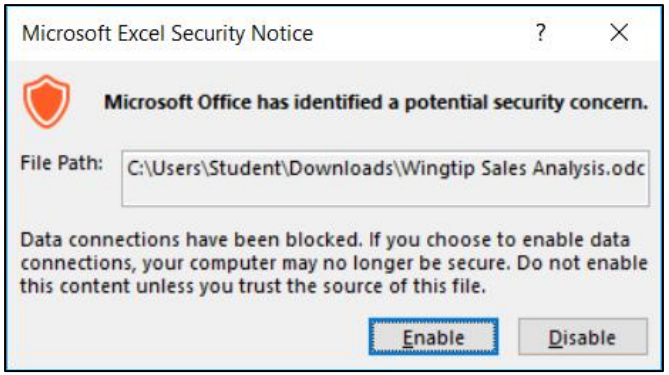




Creating a Connected Workbook

- Dataset provides ANALYZE IN EXCEL menu command
  - Used to create new Excel workbook with connection to dataset
  - Creation of new workbook triggered by download of **.ODC** file
  - Connecting can require user to enable data connections

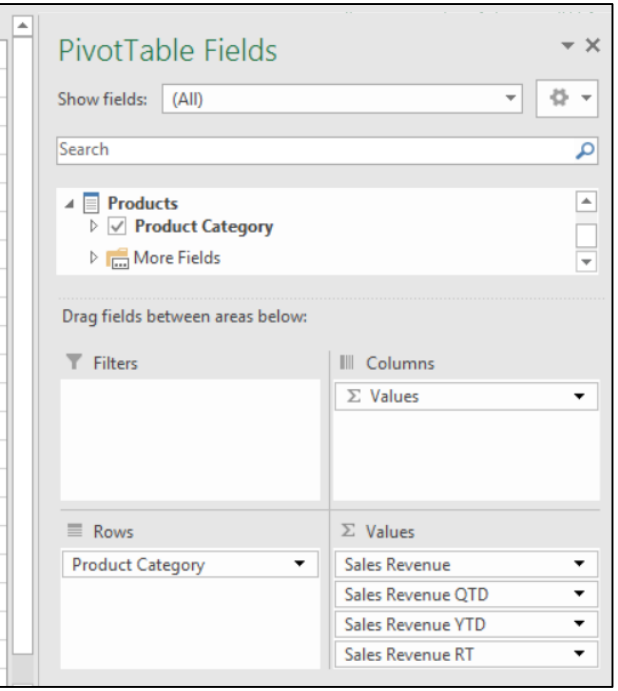




Analyzing a Power BI Dataset in Excel

- Once you connect Excel workbook to a Power BI dataset
  - You can analyze data just as it were from local data model
  - Power BI dataset plays the role of SSAS in the cloud

Row Labels	Sales Revenue	Sales Revenue QTD	Sales Revenue YTD	Sales Revenue RT
Action Figures	$10,166,653	$1,329,609	$3,973,086	$10,166,653
Cute and Huggable	$4,949,464	$502,033	$1,616,758	$4,949,464
Tough Guys	$5,217,189	$827,577	$2,356,328	$5,217,189
Batman Action Figure	$225,012	$31,634	$88,011	$225,012
Captain America Action Figure	$855,607	$142,463	$408,883	$855,607
GI Joe Action Figure	$294,231	$41,800	$123,592	$294,231
Godzilla Action Figure	$2,970,735	$492,745	$1,379,383	$2,970,735
Green Hulk Action Figure	$144,842	$19,810	$57,292	$144,842
Red Hulk Alter Ego Action Figure	$28,149	$3,980	$11,651	$28,149
Spiderman Action Figure	$698,614	$95,144	$287,516	$698,614
Arts and Crafts	$4,023,339	$187,779	$566,371	$4,023,339
Drawing	$2,312,202	$143,174	$446,491	$2,312,202
Painting	$1,711,137	$44,605	$119,880	$1,711,137
Remote Control Vehicles	$15,540,525	$2,732,383	$7,616,646	$15,540,525
Boats	$175,393	$30,742	$77,597	$175,393
Cars	$1,917,031	$331,980	$936,237	$1,917,031
Helicopter	$4,294,071	$773,454	$2,126,758	$4,294,071
Planes	$6,166,673	$1,116,375	$3,116,069	$6,166,673
Trucks	$2,987,358	$479,832	$1,359,985	$2,987,358
Grand Total	$29,730,517	$4,249,771	$12,156,103	$29,730,517




DEMO
Using the Analyze in Excel Feature

Summary

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