

Integrating Power BI with Excel 2016 and Excel Online



Agenda

- Understanding Excel Integration with Power BI
- Importing and Connecting to Excel Workbooks
- Using the Power BI Publishing for Excel Add-in
- Connecting from Excel to a Power BI Dataset



Excel Integration with Power BI

- Excel as a query and data modeling tool
 - Similar query and data modeling features to Power BI Desktop
 - Excel data model can be imported to create Power BI dataset
- Excel as a tool to publish worksheet content to Power BI
 - Excel worksheets can be rendered inside Power BI service
 - 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



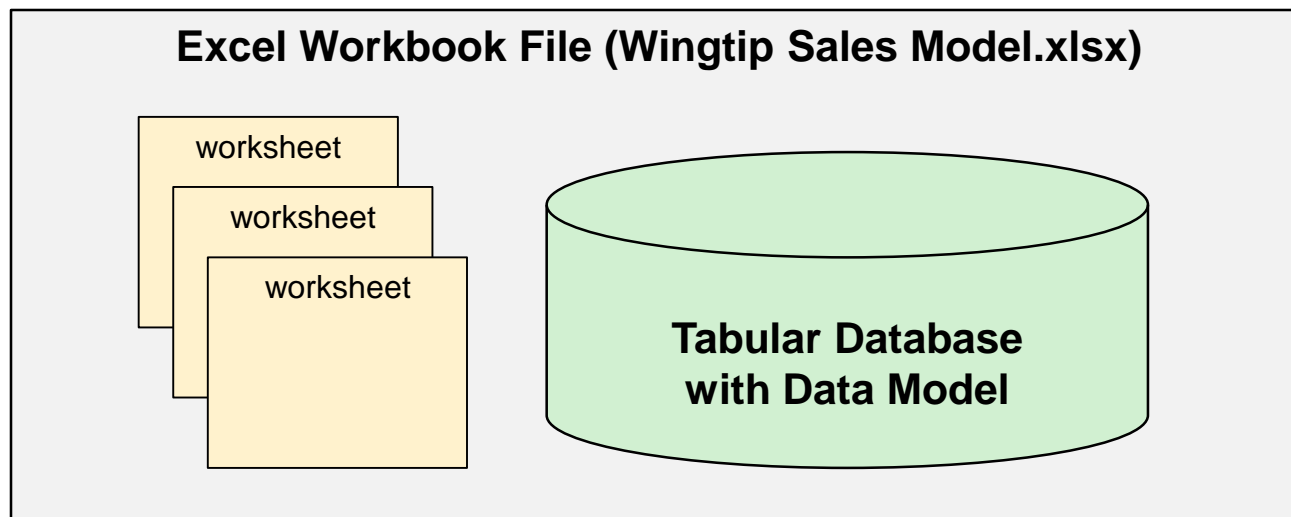
Excel Online Integration with Power BI

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



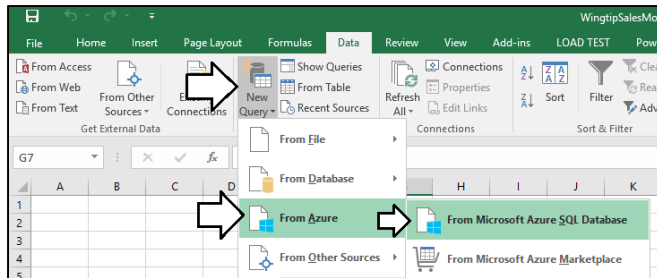
The Excel Data Model

- 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

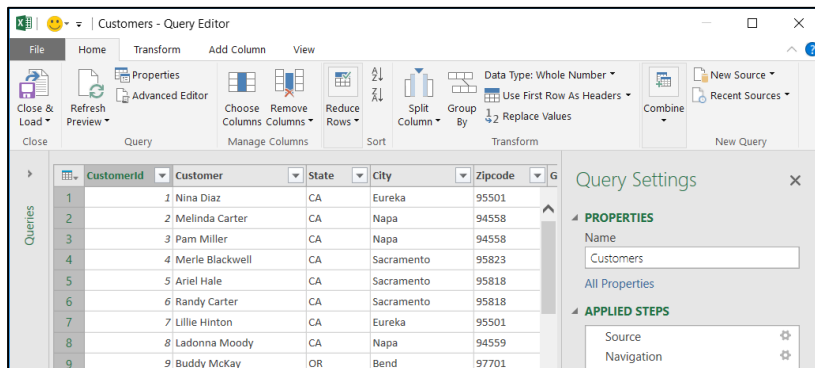


Working with Query Tools in Excel 2016

- Excel 2016 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

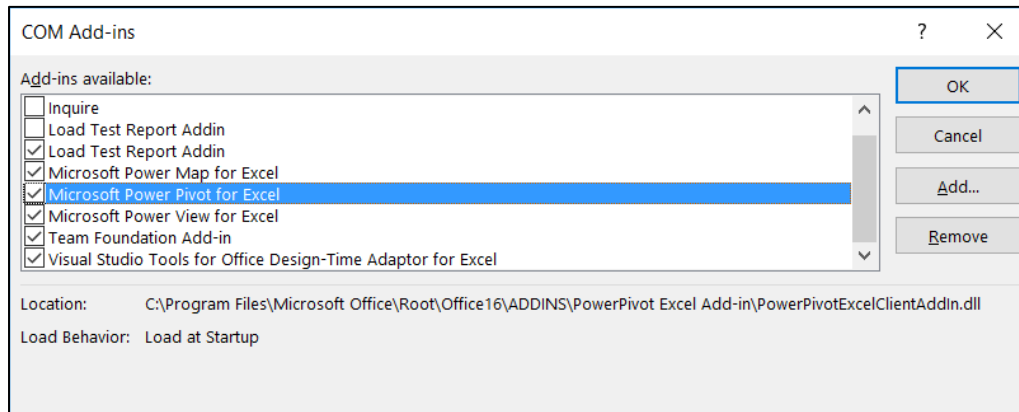


- Excel queries are edited in separate Query Editor window

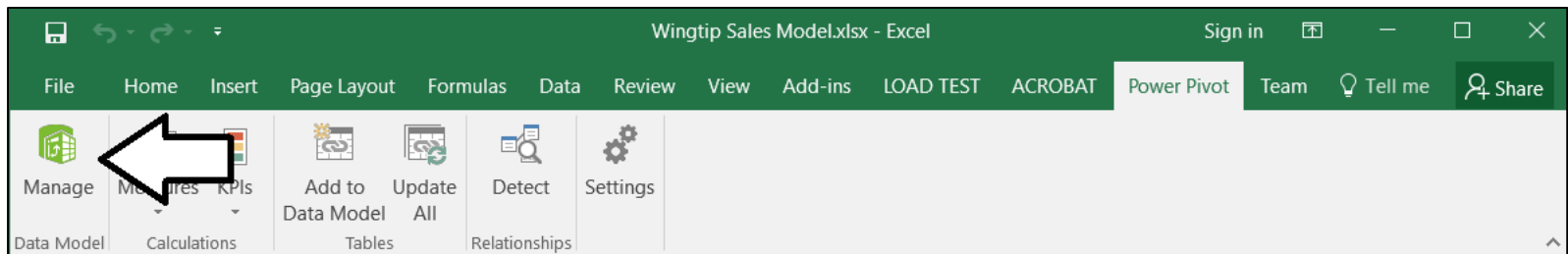


Working with the Power Pivot Add-in

- 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

Power Pivot for Excel - Wingtip Sales Model 1.xlsx

File Home Design Advanced

Paste Get External Data Refresh PivotTable

Data Type : Text
Format : Text

\$ % & #

Clear All Filters Sort by Column

Find

AutoSum Create KPI

Diagram View Show Hidden Calculation Area

Clipboard

[Age Group] = SWITCH (TRUE(),
[Age] >= 65, "Ages 65 and over",
[Age] >= 50, "Ages 50 TO 65",
[Age] >= 40, "Ages 40 TO 49",
[Age] >= 30, "Ages 30 TO 39",
[Age] >= 18, "Ages 18 TO 23",
[Age] < 18, "Ages under 18"

| | State | City | Zipcode | Gender | State Name | Sales Region | Age | Age Group |
|---|-------|----------|---------|--------|------------|----------------|-----|------------------|
| 1 | CA | San Jose | 95133 | Female | California | Western Region | 48 | Ages 40 TO 49 |
| 2 | CA | San Jose | 95133 | Female | California | Western Region | 74 | Ages 65 and over |
| 3 | CA | San Jose | 95133 | Female | California | Western Region | 73 | Ages 65 and over |
| 4 | CA | San Jose | 95133 | Female | California | Western Region | 25 | Ages 18 TO 23 |

Measure ? X

Table name: Sales

Measure name: Sales Revenue RT

Description:

Formula: fx Check formula

```
=CALCULATE(
    SUM(Sales[SalesAmount]),
    FILTER(
        ALL(Calendar),
        Calendar[Date] <= MAX(Calendar[Date])
    )
)
```

Formatting Options

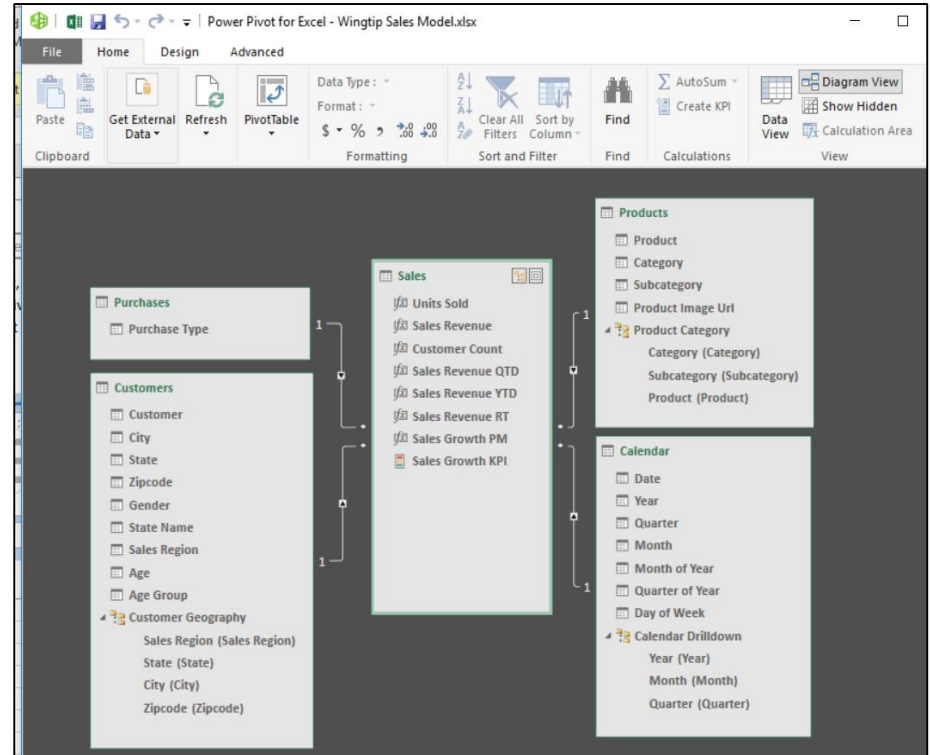
Category:
 General
 Number
Currency
 Date
 TRUE/FALSE

Symbol: \$

Decimal places: 0

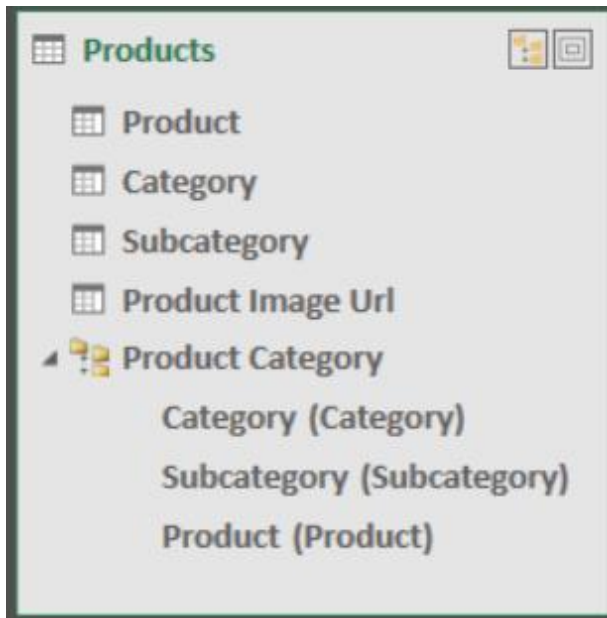
☒ Use 1000 separator (,.)

OK
Cancel



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

| | A | B | C | D | E |
|----|-------------------|----------------|---------------|------------|---|
| 1 | Customer Location | Customer Count | Sales Revenue | Units Sold | |
| 2 | Western Region | 25,739 | \$12,733,888 | 1,598,125 | |
| 3 | Central Region | 12,733 | \$5,915,449 | 994,680 | |
| 4 | Eastern Region | 25,211 | \$11,081,180 | 1,959,240 | |
| 5 | CT | 1,219 | \$516,478 | 81,757 | |
| 6 | Greenwich | 409 | \$167,352 | 21,210 | |
| 7 | New Britain | 37 | \$17,263 | 4,139 | |
| 8 | North Haven | 127 | \$50,702 | 9,225 | |
| 9 | Stamford | 142 | \$56,437 | 8,614 | |
| 10 | Trumbull | 220 | \$96,771 | 14,936 | |
| 11 | Waterbury | 56 | \$25,604 | 5,301 | |
| 12 | Waterford | 107 | \$46,998 | 6,012 | |
| 13 | Windsor | 121 | \$55,352 | 12,320 | |
| 14 | FL | 5,897 | \$2,592,242 | 446,167 | |
| 15 | GA | 3,251 | \$1,490,282 | 275,491 | |
| 16 | MA | 1,341 | \$543,241 | 96,465 | |
| 17 | NC | 3,270 | \$1,479,238 | 256,200 | |
| 18 | NH | 559 | \$233,917 | 35,512 | |
| 19 | NJ | 1,151 | \$530,241 | 93,232 | |
| 20 | NY | 2,995 | \$1,265,458 | 231,956 | |
| 21 | PA | 1,831 | \$792,634 | 154,598 | |
| 22 | RI | 468 | \$193,897 | 31,703 | |
| 23 | SC | 1,007 | \$439,328 | 79,195 | |
| 24 | VA | 2,222 | \$1,004,225 | 176,964 | |
| 25 | Grand Total | 63,683 | \$29,730,517 | 4,552,045 | |
| 26 | | | | | |
| 27 | | | | | |

PivotTable Fields

Active All

Choose fields to add to report:

Search

- Σ Sales
- Calendar
- Calendar
- Customers
 - Customer Geography
 - More Fields

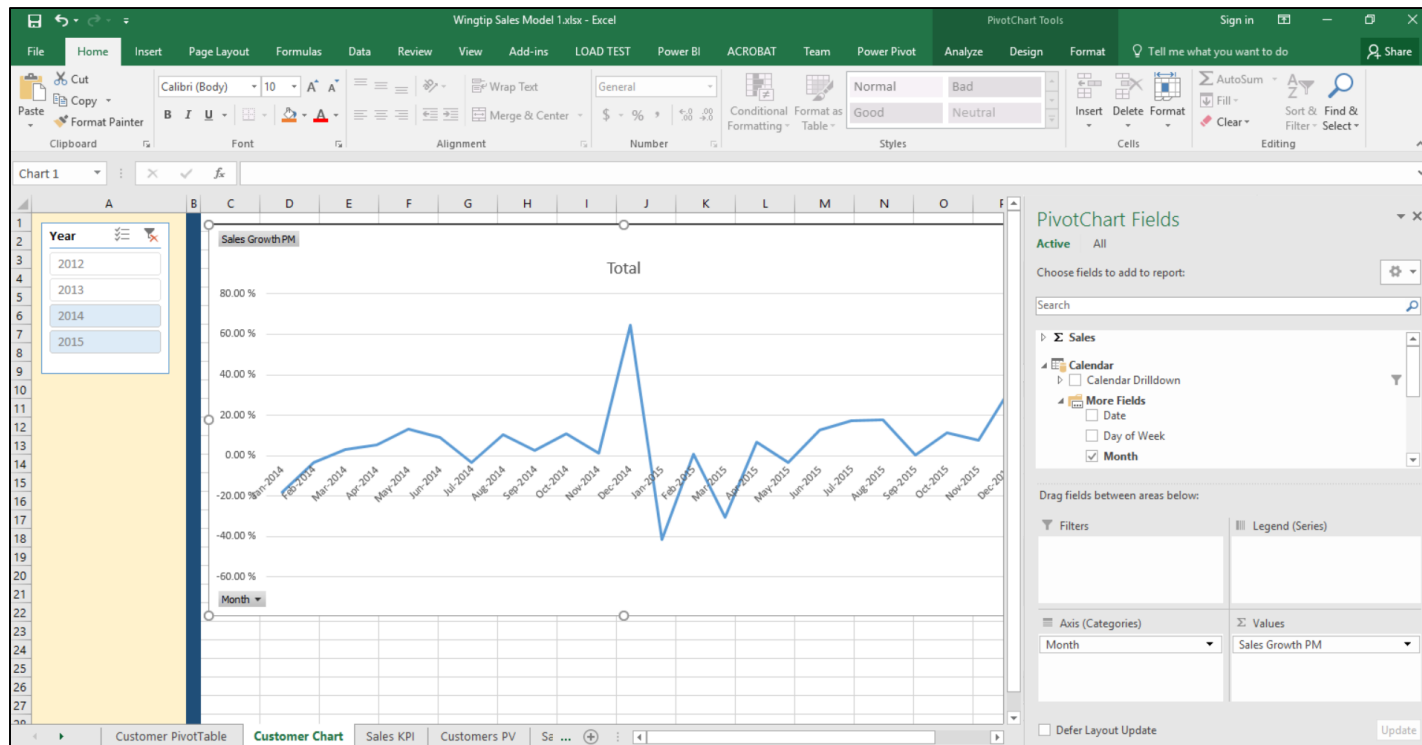
Drag fields between areas below:

| | |
|--------------------|----------------|
| Filters | Columns |
| | Σ Values |
| Rows | Σ Values |
| Customer Geography | Customer Count |
| | Sales Revenue |
| | Units Sold |



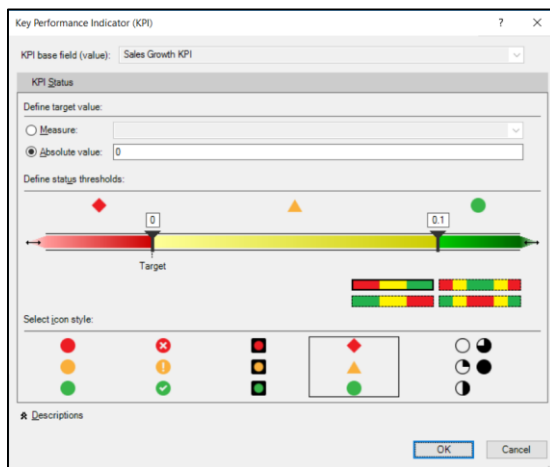
Creating a Chart from an Excel Data Model

- 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 | | |

PivotTable Fields

Active All

Choose fields to add to report:

Search

☒ Σ Sales Growth PM

☒ Sales Growth KPI

☐ Σ Value (Sales Growth KPI)

☐ Goal

☒ Status

☒ Calendar

☐ Calendar Drilldown

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





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Working with Query and Data Modeling Features in Excel 2016

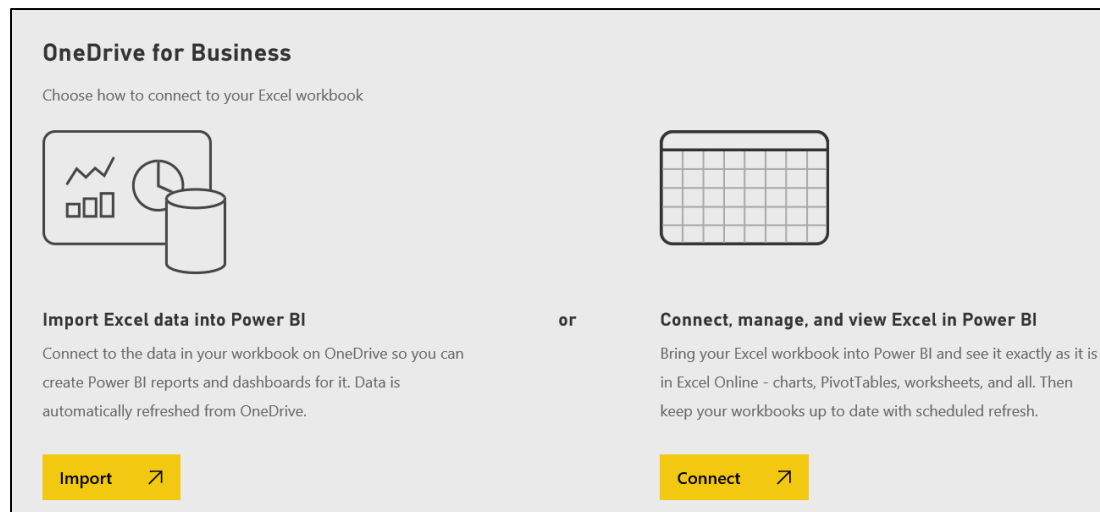
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Connect versus Import

- Connecting to a Workbook from Power BI
 - Excel workbook file becomes live source of data
 - Power BI service hosted Excel Online to render Excel workbook
 - Power View reports can be viewed in browser but require Silverlight
- 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



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
 - Best way to provide true PivotTables from a Power BI solution

The screenshot shows the Power BI interface with a sidebar on the left containing navigation options like 'Featured dashboard', 'Favorites', 'My Workspace', 'Dashboards', 'Reports', and 'Datasets'. The main area displays an Excel Online workbook titled 'Wingtip Sales Model 1'. The workbook has a 'Year' filter (2012-2015), a 'Purchase Type' filter (Mail Order Purchase, Online Purchase, Store Purchase), and a 'Sales Region' filter (Western Region, Central Region, Eastern Region). The data table shows sales revenue and growth metrics for each month from Jan-2014 to Dec-2015, with a 'Grand Total' row at the bottom. The 'Sales Growth KPI Status' column uses colored triangles to indicate performance trends.

| 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 % | Red Diamond |
| Feb-2014 | \$609,637 | \$1,239,606 | \$1,239,606 | \$8,539,770 | -3.23 % | Red Diamond |
| Mar-2014 | \$628,618 | \$1,868,225 | \$1,868,225 | \$9,168,388 | 3.11 % | Yellow Triangle |
| Apr-2014 | \$661,588 | \$2,529,812 | \$2,529,812 | \$9,829,976 | 5.24 % | Yellow Triangle |
| May-2014 | \$748,193 | \$3,278,005 | \$3,278,005 | \$10,578,168 | 13.09 % | Green Circle |
| Jun-2014 | \$814,333 | \$4,092,338 | \$4,092,338 | \$11,392,502 | 8.84 % | Yellow Triangle |
| Jul-2014 | \$788,469 | \$4,880,807 | \$4,880,807 | \$12,180,970 | -3.18 % | Red Diamond |
| Aug-2014 | \$869,143 | \$5,749,950 | \$5,749,950 | \$13,050,113 | 10.23 % | Green Circle |
| Sep-2014 | \$890,958 | \$6,640,908 | \$6,640,908 | \$13,941,071 | 2.51 % | Yellow Triangle |
| Oct-2014 | \$988,789 | \$7,629,697 | \$7,629,697 | \$14,929,860 | 10.98 % | Green Circle |
| Nov-2014 | \$999,574 | \$8,629,271 | \$8,629,271 | \$15,929,434 | 1.09 % | Yellow Triangle |
| Dec-2014 | \$1,644,980 | \$10,274,251 | \$10,274,251 | \$17,574,414 | 64.57 % | Green Circle |
| Jan-2015 | \$959,863 | \$959,863 | \$959,863 | \$18,534,277 | -41.65 % | Red Diamond |
| Feb-2015 | \$969,330 | \$1,929,193 | \$1,929,193 | \$19,503,607 | 0.99 % | Yellow Triangle |
| Mar-2015 | \$675,533 | \$2,604,726 | \$2,604,726 | \$20,179,140 | -30.31 % | Red Diamond |
| Apr-2015 | \$722,456 | \$3,327,182 | \$3,327,182 | \$20,901,596 | 6.95 % | Yellow Triangle |
| May-2015 | \$698,311 | \$4,025,494 | \$4,025,494 | \$21,599,908 | -3.34 % | Red Diamond |
| Jun-2015 | \$785,793 | \$4,811,286 | \$4,811,286 | \$22,385,700 | 12.53 % | Green Circle |
| Jul-2015 | \$921,994 | \$5,733,280 | \$5,733,280 | \$23,307,694 | 17.33 % | Green Circle |
| Aug-2015 | \$1,084,189 | \$6,817,469 | \$6,817,469 | \$24,391,883 | 17.59 % | Green Circle |
| Sep-2015 | \$1,088,863 | \$7,906,332 | \$7,906,332 | \$25,480,746 | 0.43 % | Yellow Triangle |
| Oct-2015 | \$1,211,810 | \$9,118,142 | \$9,118,142 | \$26,692,556 | 11.29 % | Green Circle |
| Nov-2015 | \$1,305,029 | \$10,423,171 | \$10,423,171 | \$27,997,585 | 7.69 % | Yellow Triangle |
| Dec-2015 | \$1,732,932 | \$12,156,103 | \$12,156,103 | \$29,730,517 | 32.79 % | Green Circle |
| 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



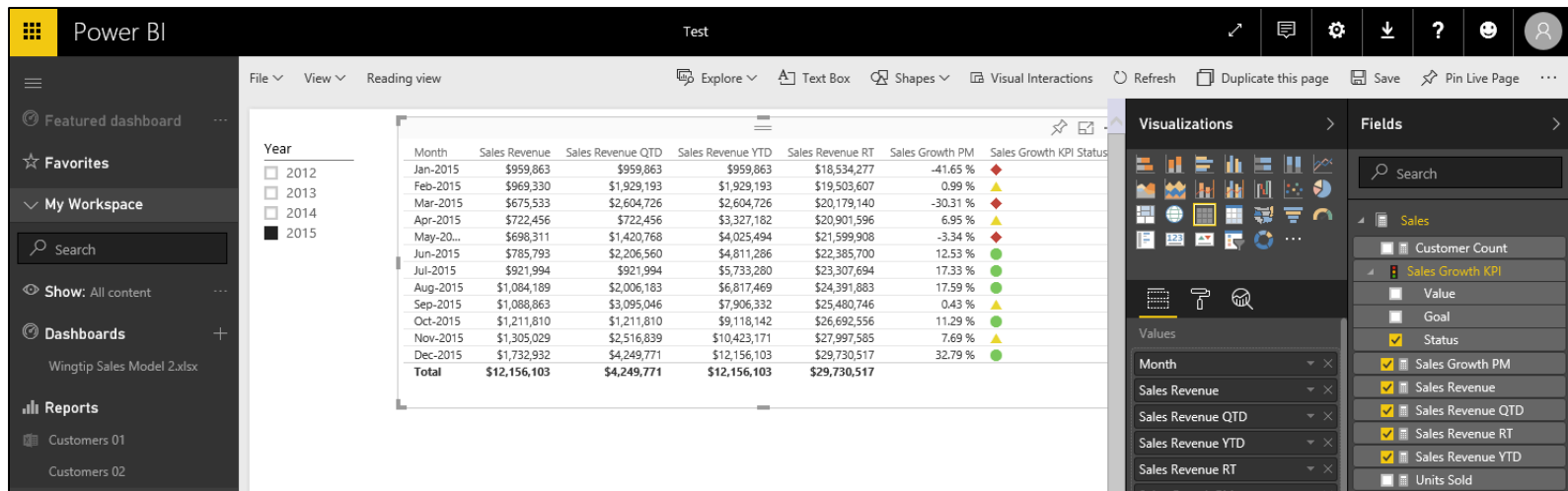


DEMO

Understanding "Connect" versus "Import" with Excel Worksheets

Importing an Excel Data Model into Power BI

- Excel Data Model can be imported into Power BI
 - Done by importing Excel workbook with a data model
 - Excel data model converted into Power BI dataset
 - Dataset can be used to design reports and dashboards
 - KPIs from data model can be added to Power BI report



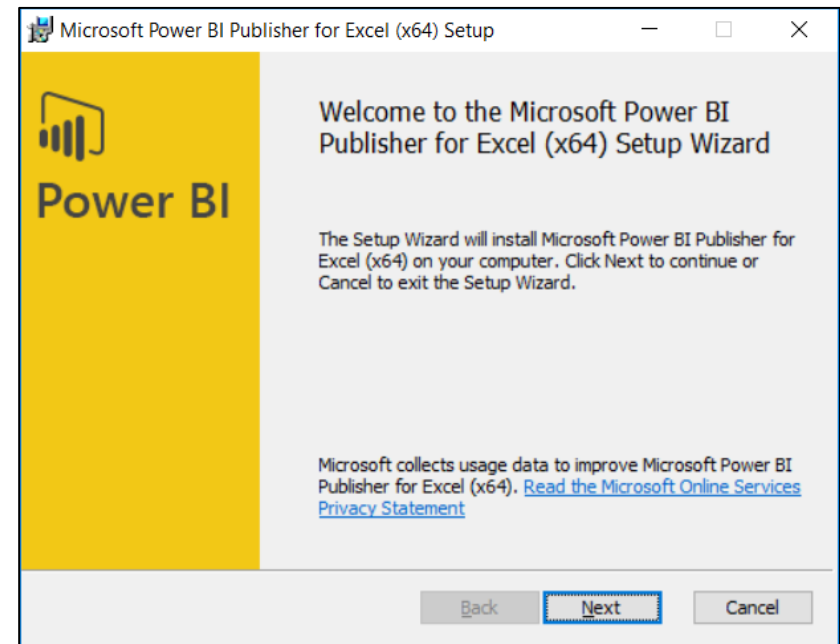
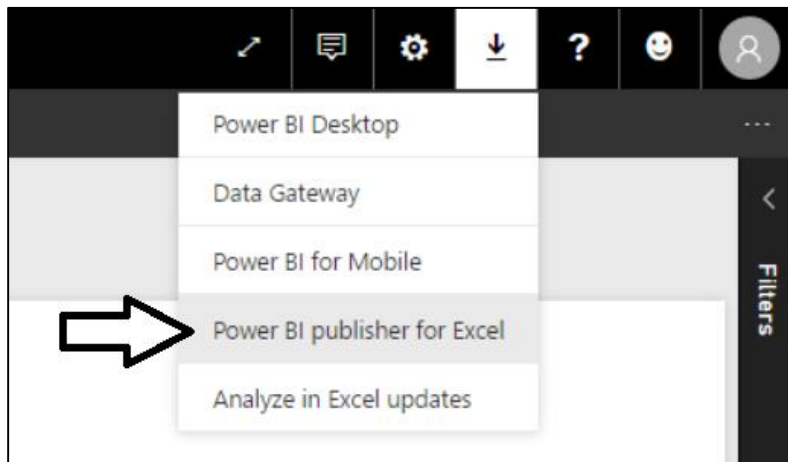
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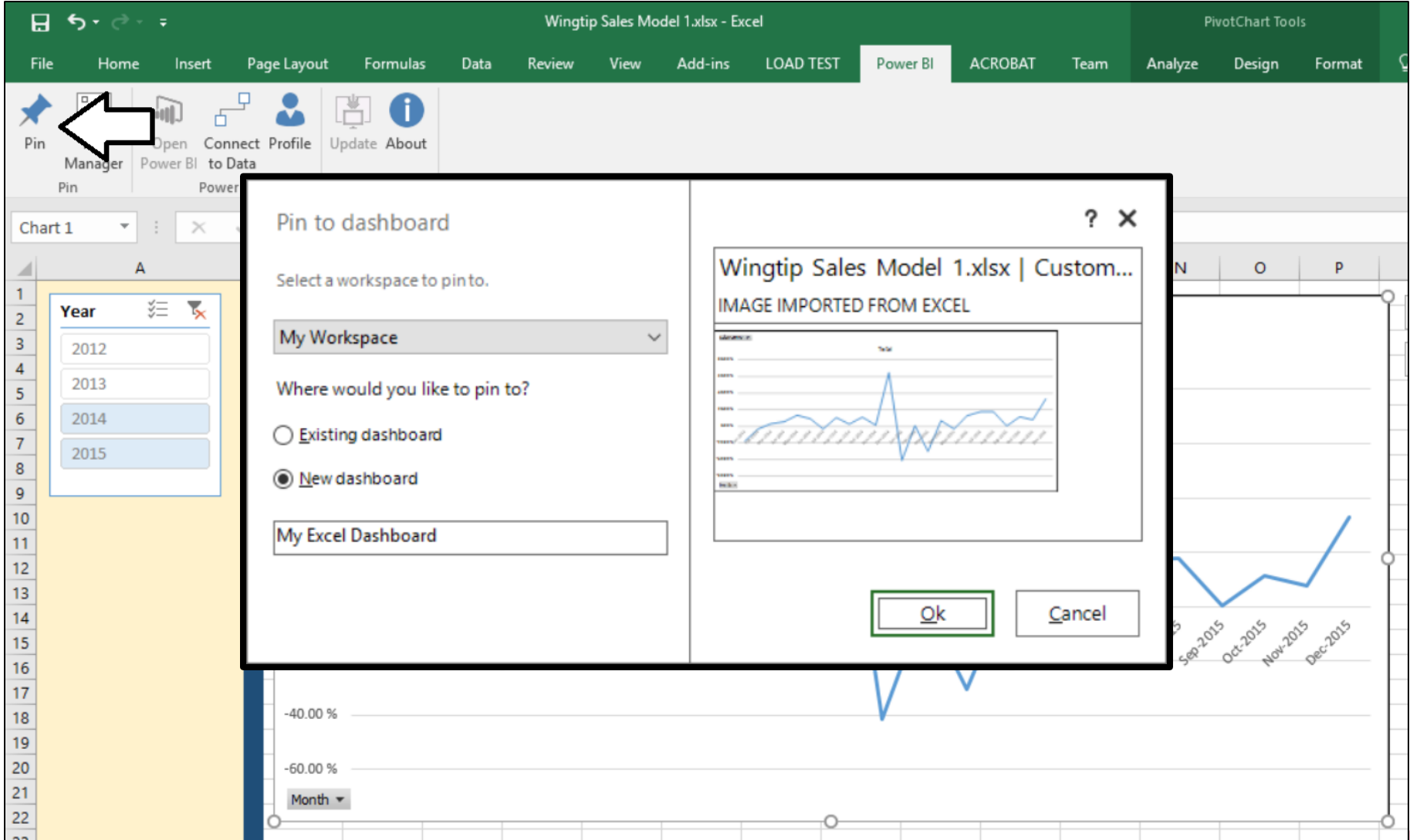


Power BI Publisher for Excel Add-in

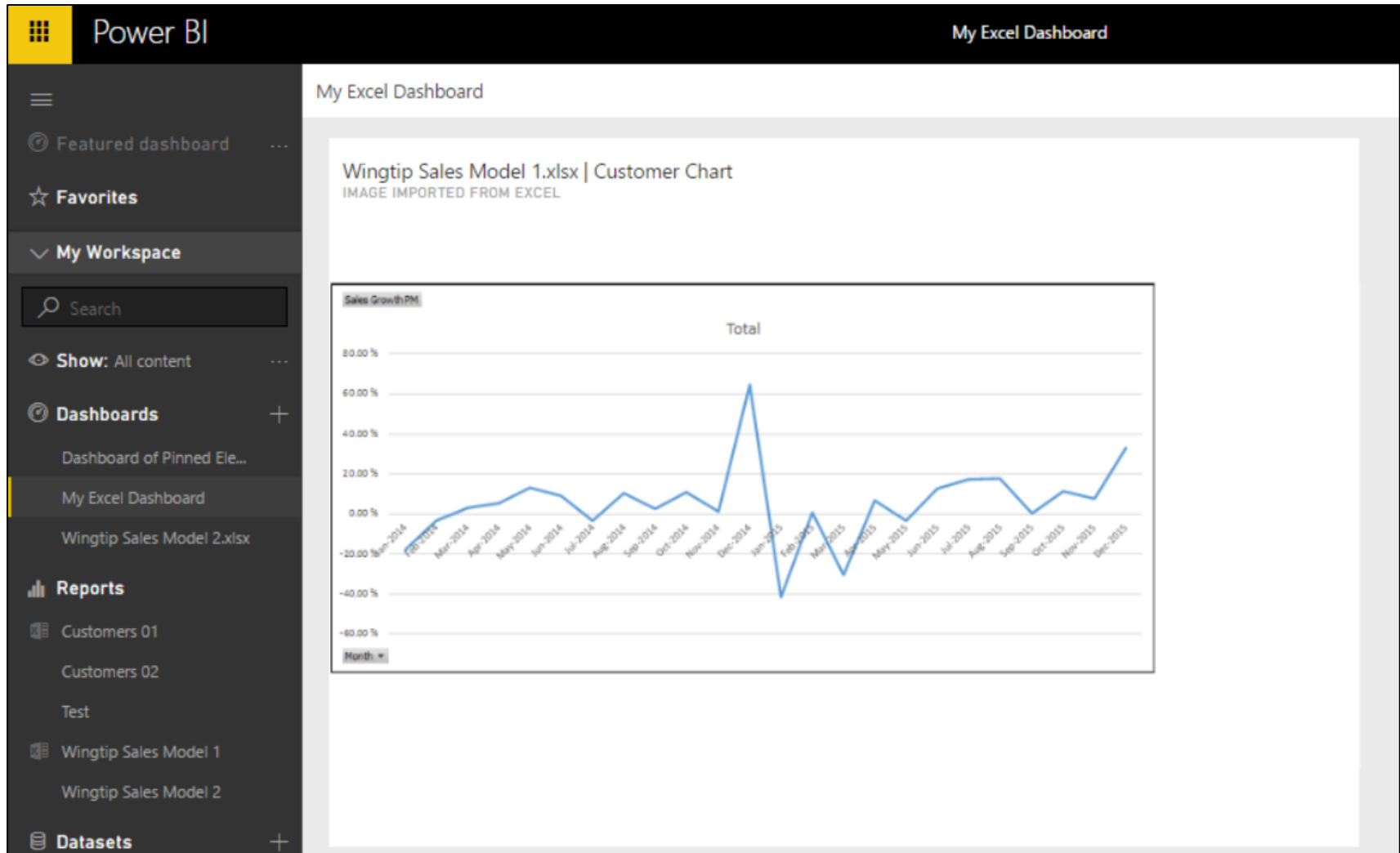
- What is the Power BI Publisher for Excel Add-in?
 - An add-in that you first must download and install
 - A utility to pin Excel elements to Power BI dashboard
 - Worksheet elements are pinned as non-dynamic snapshots
 - Pinned elements can be updated manually when needed



Pinning an Excel Chart to a Dashboard



A Pinned Excel Chart in a Dashboard



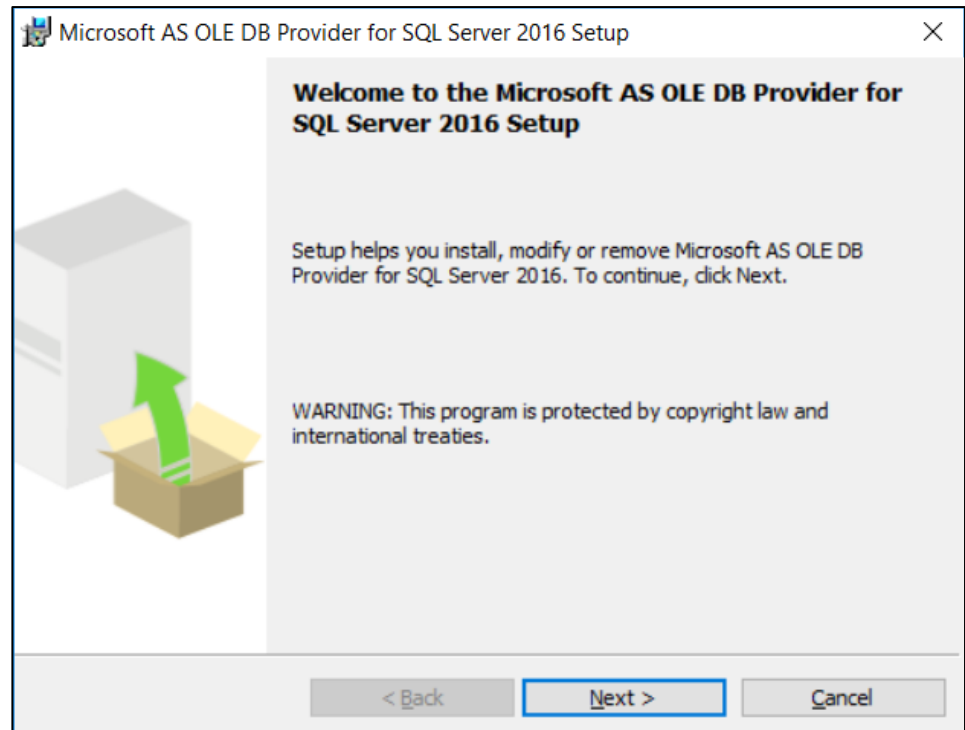
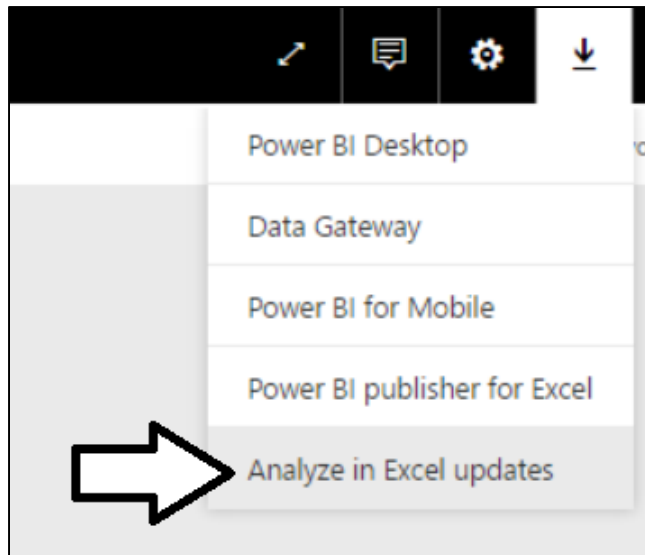
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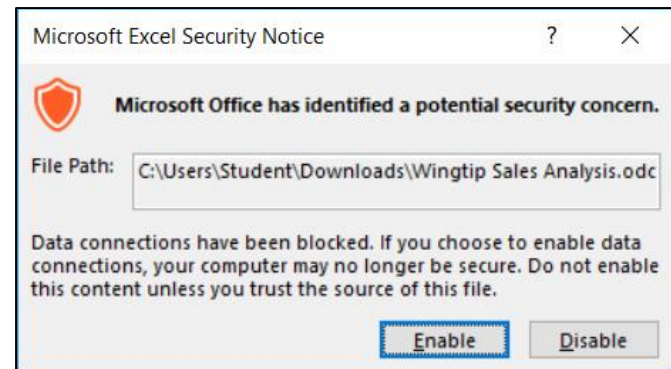
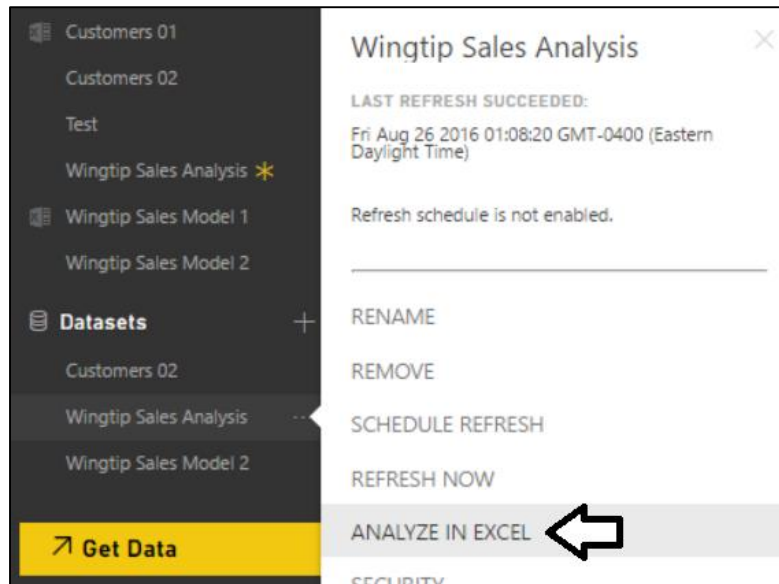
Analyze in Excel

- 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

| | A | B | C | D | E |
|----|----------------------------------|---------------|-------------------|-------------------|------------------|
| 1 | Row Labels | Sales Revenue | Sales Revenue QTD | Sales Revenue YTD | Sales Revenue RT |
| 2 | Action Figures | \$10,166,653 | \$1,329,609 | \$3,973,086 | \$10,166,653 |
| 3 | Cute and Huggable | \$4,949,464 | \$502,033 | \$1,616,758 | \$4,949,464 |
| 4 | Tough Guys | \$5,217,189 | \$827,577 | \$2,356,328 | \$5,217,189 |
| 5 | Batman Action Figure | \$225,012 | \$31,634 | \$88,011 | \$225,012 |
| 6 | Captain America Action Figure | \$855,607 | \$142,463 | \$408,883 | \$855,607 |
| 7 | GI Joe Action Figure | \$294,231 | \$41,800 | \$123,592 | \$294,231 |
| 8 | Godzilla Action Figure | \$2,970,735 | \$492,745 | \$1,379,383 | \$2,970,735 |
| 9 | Green Hulk Action Figure | \$144,842 | \$19,810 | \$57,292 | \$144,842 |
| 10 | Red Hulk Alter Ego Action Figure | \$28,149 | \$3,980 | \$11,651 | \$28,149 |
| 11 | Spiderman Action Figure | \$698,614 | \$95,144 | \$287,516 | \$698,614 |
| 12 | Arts and Crafts | \$4,023,339 | \$187,779 | \$566,371 | \$4,023,339 |
| 13 | Drawing | \$2,312,202 | \$143,174 | \$446,491 | \$2,312,202 |
| 14 | Painting | \$1,711,137 | \$44,605 | \$119,880 | \$1,711,137 |
| 15 | Remote Control Vehicles | \$15,540,525 | \$2,732,383 | \$7,616,646 | \$15,540,525 |
| 16 | Boats | \$175,393 | \$30,742 | \$77,597 | \$175,393 |
| 17 | Cars | \$1,917,031 | \$331,980 | \$936,237 | \$1,917,031 |
| 18 | Helicopter | \$4,294,071 | \$773,454 | \$2,126,758 | \$4,294,071 |
| 19 | Planes | \$6,166,673 | \$1,116,375 | \$3,116,069 | \$6,166,673 |
| 20 | Trucks | \$2,987,358 | \$479,832 | \$1,359,985 | \$2,987,358 |
| 21 | Grand Total | \$29,730,517 | \$4,249,771 | \$12,156,103 | \$29,730,517 |
| 22 | | | | | |
| 23 | | | | | |

PivotTable Fields

Show fields: (All)

Search

Products

- Product Category
- More Fields

Drag fields between areas below:

| Filters | Columns |
|---------|----------|
| | Σ Values |

| Rows | Σ Values |
|------------------|-------------------|
| Product Category | Sales Revenue |
| | Sales Revenue QTD |
| | Sales Revenue YTD |
| | Sales Revenue RT |





DEMO

Use the Analyze in Excel Feature

Summary

- ✓ Understanding Excel Integration with Power BI
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