



Visual Studio **LIVE!** | San Diego
EXPERT SOLUTIONS FOR .NET DEVELOPERS

Power BI: What Have You Done for Me Lately?

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Level: Intermediate

Code Again for the First Time!

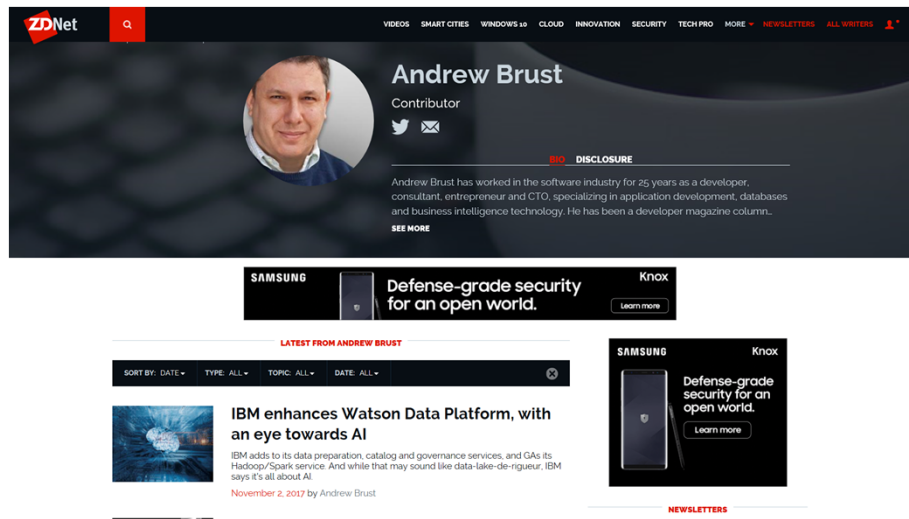
Visual Studio 25 YEARS OF CODING INNOVATION

Meet Andrew

-  **BLUE BADGE** Founder and CEO
INSIGHTS
- Big Data blogger for ZDNet
- Data and Analytics analyst for Gigaom
- Microsoft Regional Director, MVP
- Co-chair Visual Studio Live!
- Twitter: @andrewbrust



Andrew's Blog (bit.ly/abrustzdnet)



Power BI Basics





About Power BI

- Desktop, Cloud and Mobile BI
- Based on same columnar, in-memory BI engine as Azure Analysis Services and SQL Server Analysis Services Tabular mode
- Three subscription levels: \$0, \$10/month/seat, \$5K+/month/unlimited
- Easy to use, extensible, embeddable, connects to a huge array of conventional and cloud data sources
 - Pervasive DirectQuery support
- Highly integrated across Microsoft stack



Power BI Ingredients



Power BI Desktop

- Windows desktop app
- Acquire, shape data with query editor
- Visualize data in report view



Browser Environment

- www.powerbi.com
- Create, edit, consume
- On-prem gateways



iOS, Android, Windows Store Apps

- iPad, iPhone, Android phones and tablets
- Windows tablets, PCs
- Consumption only





Power BI Desktop

- Windows desktop application; free download
 - Available in conventional MSI or through Windows Store
 - Updated every single month
- Has a “main” window for report authoring and some data modeling
 - Report view
 - Data view
 - Relationships view
- Has a Power Query Editor window for data import and transformation
 - Same code as the Get & Transform section of Data tab in Excel ribbon
- Can save files (.pbix) locally and publish them to powerbi.com






Power BI Reports Overview

- Data exploration and visualization client
- Visualizations work as filters, too
- Design and view experiences are unified
- Many built-in viz types
- Technology based on D3.js
- Supports 3rd party (“custom”) visuals





The Views

-  Report: the report designer/viewer
-  Data: view data in grid format
 - Sort by a column (ascending or descending)
 - Set data types and categories
-  Relationships: create, view and edit relationships
- Fields well in Report and Data views:
 - Rename/delete/hide columns and tables
 - Add DAX measures and calculated columns
 - Create hierarchies



Drilldown and Visual Interactions

- Create hierarchies in the field list by right clicking a field and selecting “New hierarchy”
 - Then drag in other levels
 - Optionally, hide the standalone fields
- For visuals, select the hierarchy itself rather than a field
- Enable drill-down in viz using button @ upper-right.
 - Click on an item to drill
 - Use buttons @ upper-left to drill up or drill all to next level
- Visual Interactions controls whether and how the selected viz will be filtered by the others: Filter, (Highlight,)None



Power BI Reports

DEMO



Power BI Cloud Service

- Authoring and consumption tool
- Can create three things
 - Dataset
 - Report
 - Dashboard
- Also available: “Quick Insights”
- On-Prem Gateway facilitates scheduled refresh and DirectQuery interactions





Dashboards

- A collection of “pinned” visualizations from existing Power View reports
- Pin entire reports, too!
 - Single visualizations are not interactive
- What else you can pin:
 - Web content, images, video, text boxes
 - Visualizations from Quick Insights
 - Excel spreadsheet assets
 - SQL Server Reporting Services assets



Q&A

- Natural language query interface to data in underlying model
- Ask a question, get a visualization
 - IntelliSense-like feature helps you along
 - Can specify visualization type in the question
- Available in numerous contexts:
 - Dashboards in Power BI Service
 - “Ask a Question” feature (preview) in PBI Desktop
 - In bot form in iOS application





On-Premises Gateway

- Permits import and scheduled refresh of on-prem data in cloud copy of report
- “DirectQuery” supported for numerous databases
- “Live Connection” supported for SSAS (Tabular or MD)
- Supports PowerApps, Azure Logic Apps, Microsoft Flow and Azure Analysis Services (preview)



Power BI Service

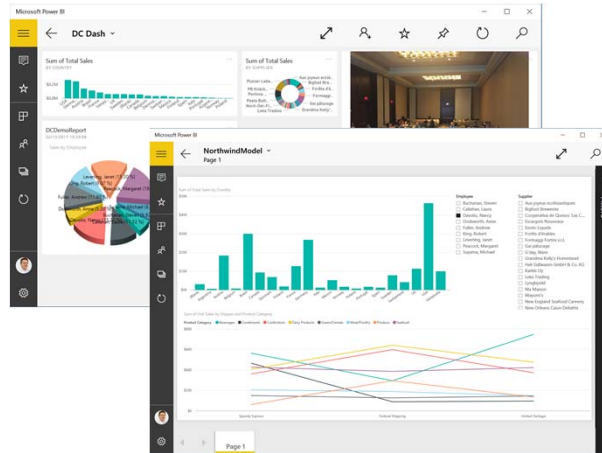
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iOS, Android, Windows Universal Apps



- Consumption only
- Dashboards
- Reports are interactive

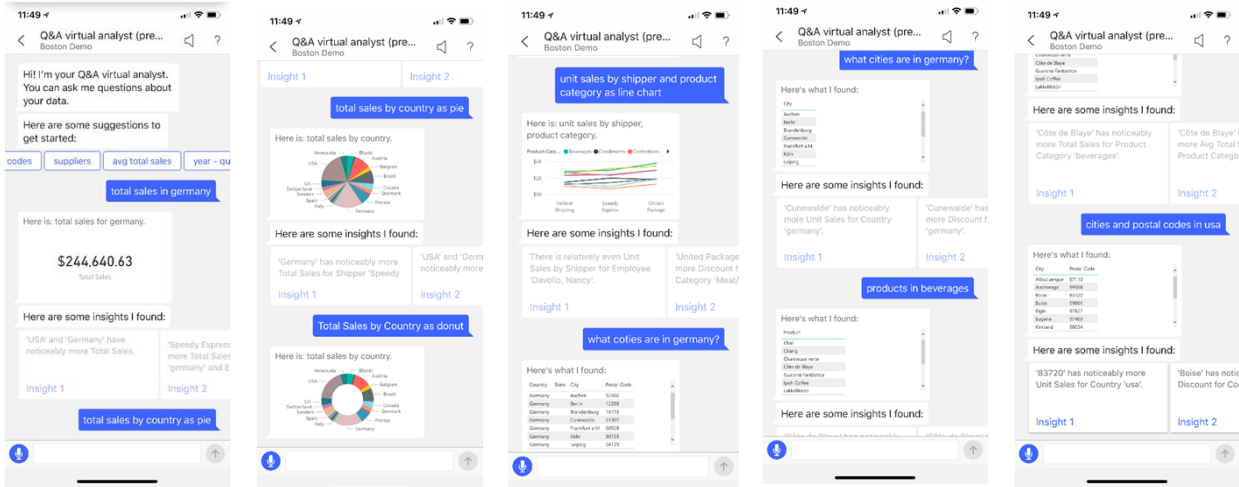


Power BI 2.0 Windows Store App

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Q&A on iPhone



New and Recent Features



Bookmarks, Spotlight, Show/Hide

- Bookmarks are ways to save a specific state of your report without having to save the file that way
- What you can save
 - Filter and slicer settings
 - Focus mode
 - Spotlight mode (one viz highlighted, all other content faded)
 - Shown/hidden state of vizzes
- Bookmarks can be grouped
- View mode lets viewers page through in sequence; will show only bookmarks in group when non-root view selected



Bookmarks, Spotlight, Show/Hide

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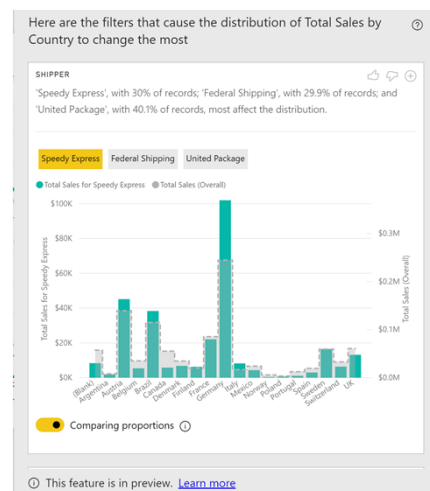
Extended Q&A Availability

- Q&A Explorer (Q&A button)
 - Ability to add Q&A in reports for user consumption
 - Viz won't be added to report
 - But can add as a “suggested question”
 - Add a Q&A button or a standard button and set Action.Type to Q&A
- Q&A For Report Creation (“Ask a Question”)
 - Use Q&A as an authoring tool, then edit viz as if it were created conventionally



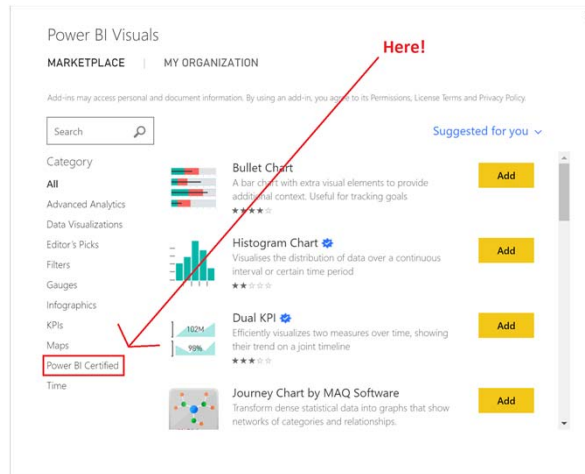
Distribution Factor Insights

- Finds filter columns and values for which proportional data distribution will change
- To test
 - Right-click on a column or bar chart
 - Choose “Analyze”->“Find where distribution is different” context menu option
- Use “+” button @ upper-right of a viz to add to report



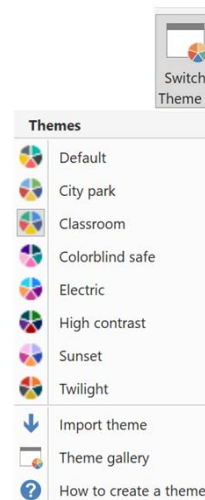
Custom Visuals Experience and Power BI Certified Category

- Click on the “From Marketplace” button in Custom Visuals section of the ribbon’s Home tab
- You’ll get a store-like experience for finding custom visuals that will be added to your viz palette
- Click on the “Power BI Certified” category to find custom visuals that have passed Microsoft quality checks, etc.



Built-In Report Themes

- Themes were introduced earlier as a feature for designers to build their own
- But now a variety of *built-in* themes
- Just click on Switch Theme drop down in the Home tab of the ribbon
 - Theme gallery available too; just download and import from there!



Report UI Enhancements

DEMO



M IntelliSense and Syntax Coloring

- When using the Advanced Editor in the Power Query Editor, IntelliSense now available and code is syntax-colored



R and Python Data Sources and Visualizations



- These features leverage R and Python scripts and translation between selected columns and an R or Pandas DataFrame
- Scripts produces a Dataset when used as a source
- Scripts consume, manipulate and plot data when used for visualizations
- R/Python visualizations can be filtered by other visualizations, slicers, etc.
- Authoring and editing can only be done in Power BI Desktop
 - Can be consumed in cloud environment.
 - Python vizs are in preview and so are only a Desktop feature



Programming Enhancements

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Composite Models

- Composite models allow you to mix Import and DirectQuery storage modes in a single model
- Each table can be Import, DirectQuery or Dual
- To configure, use Field Properties task pane
 - Show it by right-clicking a table and selecting “Properties” option from context menu
 - Then view or change “Storage mode” drop-down setting
 - Converting to Import is irreversible



Aggregations

- Aggregations let you have one table that's an aggregated version of another.
- When your query of the detail table can be satisfied by the aggregation table, it will be
- With an agg table configured for Import and its detail table is configured as DirectQuery, you've got a Big Data-optimized set up
- Use Manage aggregations dialog to configure
- Use SQL Server Profiler to confirm things are working correctly



Composite Models and Aggregations

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Power BI Premium

- Dedicated Infrastructure
- Multi core and, optionally, multi-server
- Pay per node, per month
 - P1 node is \$4,995/month
 - 8 cores, 25GB RAM
- Unlimited consumption users
- Authoring requires Pro subscription as well (\$10/user/month)
- Lots more. Read white paper linked to in Resources slide





Power BI Report Server

- Power BI Premium includes an on-premises deployment option: Power BI Report Server
- PBI RS is a superset of SSRS, licensed for same number of cores as your cloud license
- Licensees of SQL Server Enterprise Edition with Software Assurance (“EE + SA”) can get PBI RS without a Power BI Premium subscription



Resources

- Power BI site
 - www.powerbi.com
- Power BI Embedded
 - <https://powerbi.microsoft.com/en-us/power-bi-embedded/>
- Power BI team blog
 - <http://www.microsoft.com/en-us/powerBI/bi-blog.aspx>
- Analysis Services team blog
 - <http://blogs.msdn.com/b/analysisservices/>
- Power BI downloads
 - <http://powerbi.microsoft.com/downloads>
- Power BI Premium white paper
 - <https://aka.ms/pbipremiumwhitepaper>
- How to create custom visuals
 - <https://powerbi.microsoft.com/en-us/documentation/powerbi-custom-visuals-getting-started-with-developer-tools/>



Thank You!

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