Andrew's Blog (bit.ly/bigondata)

About Power BI

- Desktop, Mobile and Cloud BI
- Based on same columnar, in-memory BI engine as SQL Server Analysis Services Tabular mode
- Two subscription levels: $0 and $10/month/seat
  - New for groups! - Power BI Premium
- Easy to use, extensible, embeddable, connects to a huge array of conventional and cloud data sources
  - Growing 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, Widows Store Apps
- iPad, iPhone, Android phone
- Windows tablets, PCs
- Consumption only

Power BI Desktop

- Windows Desktop Application
- Has a "main" window for report authoring and some data modeling
  - Report view
  - Data view
  - Relationships view
- Has a Query Editor window for data import and transformation
  - Same code as the Get & Transform section of Data tab in Excel 2016's ribbon
- Can save files (.pbix) locally and publish them to powerbi.com

Power BI Query Editor: Overview

- Launched with Get Data option (from ribbon or splash page)
- Re-entered using Edit Queries ribbon button
- Use it to import and shape data
- Use Close & Load ribbon button when done
- Try not to confuse this window with the data view in the main window

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Data Shaping, Manipulation

- Configure data types
- Rename and remove columns
- Insert custom columns
- Split columns (i.e. convert delimited text to columns)
- Sort, Group
- Pivot, unpivot columns
- Filter data
- Replace values
- Keep top n rows, or specific range of rows
- Remove duplicates

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Power BI Query Editor

DEMO

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How Does it Work?

- Each operation you perform generates a formula, that appears as a "step"
  - Expose applied steps using Query Settings button in View tab of ribbon
  - Formula bar can be shown or hidden
- Steps can be renamed, re-ordered and deleted
- Configuration of some steps can be edited
- Formulas:
  - Can be edited
  - Are batched together in a script
- Script:
  - Can be edited using Advanced Editor ribbon button; allows addition of custom steps
  - Can be written from scratch using New Source/Blank Query option
  - Uses a language called "M." Remember project "Oslo?"

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Column-Oriented Stores

- I

Employee ID	Age	Salary
1	43	90000
2	38	100000
3	35	100000

- Y

Employee ID	1	2	3
Age	43	38	35
Salary	90000	100000	100000

- Perf: values you wish to aggregate are adjacent
- Efficiency: great compression from identical or nearly-identical values in proximity
- Fast aggregation and high compression means huge volumes of data can be stored and processed, in RAM

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

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Power BI Reports

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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

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R Data Sources and Visualizations

- These features leverage R scripts and translation between selected columns and an R DataFrame
- R script produces a Dataset when used as a source
- R script consumes, manipulates and plots data when used for visualizations
- R 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.

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Advanced Viz

DEMO

Power BI Cloud Service

- Authoring and consumption tool
- Can create three things
  - Dataset
  - Report
  - Dashboard
- Publish report from PBI Desktop, get link to cloud version
- Also available: "Quick Insights"

Dashboards

- A collection of "pinned" visualizations from existing Power View reports
- Pin entire reports, too!
  - Single visualizations are not interactive
- What you can pin:
  - Web content, images, video, text boxes
  - Visualizations from Quick Insights
  - Excel spreadsheet assets
  - SQL Server Reporting Services assets
  - Camera photos (via iPhone App)
- Create Live Tile from a dashboard (via Windows Universal app)

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On-Premises Gateway

- Permits import and scheduled refresh of on-prem data in cloud copy of report
- Personal mode:
  - Runs as app for single user
- Enterprise mode:
  - Runs as service for multiple users
  - "DirectQuery" supported for SQL Server, Oracle, Teradata, SAP HANA
  - "Live Connection" supported for SSAS (Tabular or MD)
  - Supports PowerApps, Azure Logic Apps, Microsoft Flow and Azure Analysis Services (preview)

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PowerBI.com

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Power Q&A

- Natural language query interface to data in underlying model
- Available at top of dashboard
- Visualization is pin-able

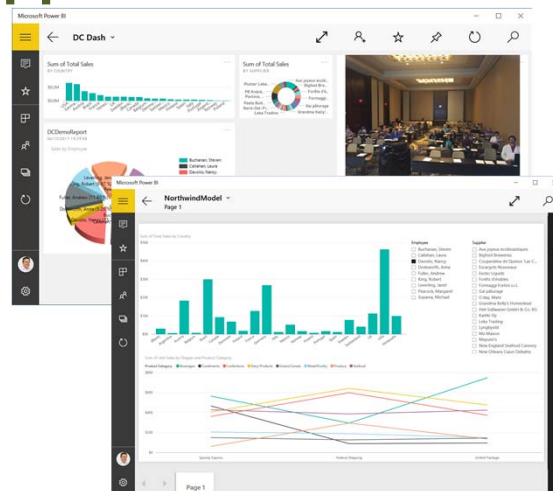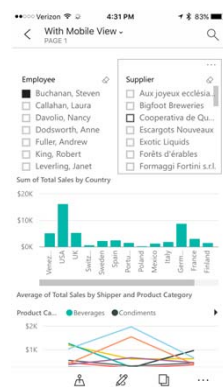- Featured Q&A questions/suggestions

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Q&A

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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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SQL Server Reporting Services Integrations

- Power BI pbix files can be stored in SQL Server Reporting Services servers
  - They will be identified by unique icon
  - Click to open in PBI desktop
- SSRS charts can be pinned to PBI dashboards
  - Requires setup
- SSRS Mobile Reports can be viewed in PBI Mobile apps
  - Requires network connectivity between mobile device and SSRS server

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Excel, SSAS Integration

- "Analyze in Excel" option in PBI service
- Power BI Publisher for Excel
- Power BI Live Connection to SSAS
- Excel connectivity to SSAS

Client/Source	Power BI Desktop	Power BI Service	Analysis Services
Power BI Desktop		●	●
Power BI Service	○	●	●
Excel	●	●	●

● = yes
○ = no
● = via gateway

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

Recent Additions

- Add Column from Examples
- Quick Measures
- New Table, Matrix vizzes
- (Relative) date slicers and filters
- Phone Layout
- Live connect to PBI service and Azure Analysis Services
- Custom Visuals available directly from Power BI desktop

August, 2017 Update

Microsoft | Power BI

Reporting:
- Show values on rows for matrix
- Color scales on font colors for table & matrix
- Custom subtotal settings per level of matrix
- Line styles and legend options
- Scatter chart performance improvements
- New custom visuals
  - Dot Plot by MAQ Software
  - Power KPI
  - Funnel plot
  - Beyondsoft Calendar

Analytics & modeling:
- What if parameters
- New scatter chart analytics features
  - Symmetry shading
  - Ratio line
- New quick measure: weighted average

Data Connectivity:
- Live connect to the Power BI service is generally available
- Google BigQuery connector (beta)

New and Recent Features

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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/

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Thank You!

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