N2K: Noise to Knowledge
Microsoft Power BI

Self-Service Business Intelligence for unlocking your data and building Shared Visualization

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MonmouthCares, Inc.
https://goo.gl/xN7t8S
# Game Changer: Power BI is that

<table>
<thead>
<tr>
<th></th>
<th>Without PBI</th>
<th>With PBI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>During the Game</strong></td>
<td>• Work hard for most of the game.</td>
<td>• Spend some time learning (feels good to learn something new).</td>
</tr>
<tr>
<td></td>
<td>• Use up lots of energy.</td>
<td>• Apply what you learn and make quick progress (this also feels pretty good).</td>
</tr>
<tr>
<td><strong>End of the Game</strong></td>
<td>• Make some progress.</td>
<td>• Once you know a little you can do quite a lot. New ideas come easily. You want to do more.</td>
</tr>
<tr>
<td></td>
<td>• Does anyone care?</td>
<td>• People like what you did for them, express appreciation, and use it because it’s fun to work with (looks nice, too).</td>
</tr>
<tr>
<td></td>
<td>• Does it matter?</td>
<td>• Some of the things you do are truly amazing, you don’t believe it -- Graphically display measures of simple &amp; complex relationships.</td>
</tr>
<tr>
<td></td>
<td>• Does it make a difference?</td>
<td>➢ This is a Game Changer – what is PBI?</td>
</tr>
</tbody>
</table>

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4/27/2017
Power Defined ...

Power BI (PBI) is a self-service, business intelligence platform; a cloud-based analytics service.

https://powerbi.microsoft.com/en-us/what-is-power-bi/

The more data you want to understand, the more useful PBI is for seeing the data, unlocking insights hidden in the data, and managing and sharing it all.
Power Plan: What you can do right now.

Power BI – an idea whose time is now.

- **Purpose of Workshop:**
  Overview of PBI, learning options, what you can do, ways to share.

- **Game Plan:**
  Definitions, Resources, Building Blocks, Example, Button it up, Supports

- **Options:**
  Follow along, ask questions, try demo, try sample data, set up your PBI account, brainstorm, skim resources …

- **Outcome:**
  New thinking for applying PBI and ways to continue learning PBI.

Sit, stand, move, enjoy the workshop or …

- Set up your Power BI account (education or work e-mail) & try things with sample data.
- Use demo account to explore sample data sets.
- Page thru a PBI eBook or PBI Book.
- Look through the PPP handout.
- Click on Presentation link to visit the resources included in the workshop.
- Explore a Link to learning resources.
- Install the Power BI app on your device.

Links at: https://goo.gl/xN7t8S
Power On: PBI Demo Account

- PBI demo site: http://powerbi.com
  click Sign In (select Work or School account)

  login: demo@mcares.onmicrosoft.com

  password: O365-PBI

- 8 sets of sample data. Analysis Samples for:
  - Customer, HR,
  - IT, Opportunity,
  - Procurement, Retail,
  - Sales, Supplier.

- Each set includes (left nav panel):
  - Dashboard, Report, Dataset

- Expand the left panel (upper left) by clicking
  3 stacked line segments below 9 tiny squares.
# Power Sources: Data Sources to Data Sets ...

<table>
<thead>
<tr>
<th>On Premises</th>
<th>Extract-Download</th>
<th>Cloud Platforms</th>
<th>Web Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Packages</td>
<td>Content Packages (more control)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curated</td>
<td>-</td>
<td>QuickBooks Online, SalesForce.com, …</td>
<td>Bing, Google Analytics, …</td>
</tr>
<tr>
<td>Refresh</td>
<td>Manual or Gateway</td>
<td>Automatic</td>
<td>Automatic</td>
</tr>
<tr>
<td>Publish</td>
<td>Manual or Gateway</td>
<td>Manual or Gateway</td>
<td>Automatic</td>
</tr>
</tbody>
</table>

Get Data: Import (for creating visualizations in PBI) vs Connect (e.g., Power View via Excel)
Power Looks
Local CSV files & SharePoint Online Lists

Curated: Google Analytics for Agency web site

Curated: Bing Search results for Power BI (simple)

Content Pack: Sample data for IT Spend Analysis

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**Power Plays & Accessories**

**Power BI Service** (1 GB/user)
- Dashboards, Tiles, Workspace, Groups, Reports, Workbooks, Datasets
- Quick Insights
- Natural Lang. Queries
- Collaborate
- View Content Packs
- Sharing, Restricting
- Daily Refresh (cloud)
- Stream 10K rows/hr
- Not use PBI Gateway
- Not use Office 365 Groups
- Not create Content Packs

**Power BI Desktop (Win10)**
- Report canvas
- Query editor
- Relationships

**Power BI Mobile**
- Smartphone, Tablet Apps
- iOS, Android, Win10

**Power BI Excel**
- Publish to PBI
- Excel Analyzer

**Power BI Pro (PBI + …)**
- 10GB/user
- 8 refreshes/day
- Stream 1M rows/hr
- PBI Gateway
- Row Level Security
- Office 365 Groups
- Content Packs

**Power BI Gateway**
- On-premises data refresh
- Personal
- Enterprise

Power BI/Power BI Pro & Power BI Desktop work as standalone tools. Their capabilities are enhanced when used with Office 365.

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Power Tools: Ways to Learn Power BI

### Microsoft Links

### Other Training & Reference Links
- [https://www.edx.org/course/analyzing-visualizing-data-power-bi-microsoft-dat207x-4](https://www.edx.org/course/analyzing-visualizing-data-power-bi-microsoft-dat207x-4)
- [https://www.youtube.com/playlist?list=PL1N57mwBHtN0jFoKSR0n-tBkUJHeMP2cP](https://www.youtube.com/playlist?list=PL1N57mwBHtN0jFoKSR0n-tBkUJHeMP2cP)
- [https://powerpivotpro.com/self-paced-online-video-training/](https://powerpivotpro.com/self-paced-online-video-training/)

### Online:
- EdX.org, powerpivotpro.com, Lynda.com

### Interactive:
- Community, User Groups, Trainers, Global Power BI, RtRS site, PBI support site

### Videos:
- YouTube, Partner Showcase, PBI in your organization

### Books:
- PowerPivotPro, eBook-Rookie_to_Rock_Star

### Microsoft.com
- Guided Learning

### Webinars:
- powerbi-webinars

### Power BI Support & Community
- [https://community.powerbi.com/](https://community.powerbi.com/)
- [https://www.pbiusergroup.com/home](https://www.pbiusergroup.com/home)
- [https://www.facebook.com/groups/powerbi/](https://www.facebook.com/groups/powerbi/)

Links at [https://goo.gl/xN7t8S](https://goo.gl/xN7t8S)

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**N2K**

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Power Up: Climbing Power BI

Get Ready

Service: Create Power BI account
Desktop: Install Power BI Desktop
Desktop: Get Data - Query, Clean, Load
Desktop: Model Data, Relationships
Desktop: Create Visualizations, Pages, Report
Desktop to Service: Publish Report-Pages
Service: Create Dashboard & Tiles
Service: Share Report-Dashboard
Service & Mobile: View Power BI
Desktop, Service or Gateway: Refresh Data
Service: Publish to web, Pin, Print, embed

Get Set

Create PBI account: use work or edu e-mail
Install PBI Desktop (Windows)
Get Data: query, …, clean, load
Model data, relations
Create visuals, pages, report
Publish Report to PBI Svc
Create Dashboard And Tiles
Share Report, Dashboard
View on Devices - Make better decisions

Go - Shared Visualization

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Power BI Desktop
- Data Analytics: local, extract, cloud
- Facebook Analytics

Power BI Service
- Bing Analytics
- Web Site Google Analytics
- QuickBooksOnline

Power BI Options
- [any Report/dataset] Quick Insights
- [any Dashboard] Natural Language Query
- [any public data] State of NJ data …
What’s great about PBI?
• Overwrite data
• Data refresh
• Sharing
• Speed
• Scale - millions of rows
• Quick Insights
• Access on most web or mobile platform
• Ease of use
• Enjoyable to use
• Lots of support
• Many ways to learn
• Large user community
• Familiar interface
• Many options for customizing

N2K: Noise to Knowledge
Microsoft Power BI
Self-Service Business Intelligence
for unlocking your data and building Shared Visualization

• Display last refresh date.
• Use Sort By feature
• Aging function
• Subtract dates
• Date hierarchies
• Data transform
• Same Period Last Year
• Quick Insights
• Refresh, Save, Publish
• Measures & KPIs
• Phone View
• Permissions
• Content packs

Power Walk: Keep using Power BI

What Else …

• If you would like to participate in a Power BI User Group send a message to jscriptunas@monmouthcares.org

• Would you like a half-day or full-day hands-on workshop next month?

• Tell your management how your organization would benefit by using Power BI.

• Identify someone else to be a learning partner in your organization.

• Links from the workshop are available at https://goo.gl/xN7t8S
Power BI Downloads

Custom Visualizations
- [R Engine](https://go.microsoft.com/fwlink/?LinkId=829099)

Power BI Desktop – Terms and Definitions
https://blogs.msdn.microsoft.com/samlester/2017/04/12/power-bi-desktop-terms-and-definitions/

Power Pivot and Power BI Reference Card, DAX
https://powerpivotpro.com/2015/10/giving-back-steal-this-reference-card/

Infographics, [https://gqbi.wordpress.com/](https://gqbi.wordpress.com/)
- Power BI Infographic
- Power BI Gateway Infographic
- Power BI Free vs Pro
Power Eye: Custom Visuals

https://app.powerbi.com/visuals/
Power Eye: More Custom Visuals

https://app.powerbi.com/visuals/R-powered
**Analytics pane** – In Power BI Desktop, for adding reference lines (constant lines, trend lines, max line, min lines, etc.) to certain visuals.

**Column** – Columns (or calculated columns) are evaluated for each row in the table and saved back into the model. Columns are helpful when applying a DAX function to each row in a table. Ex: Add a new column that applies the PREVIOUSYEAR function to a date column to make this available throughout the reports.

**Custom Visuals** – Visuals created by the community that can be downloaded from the custom visual gallery and imported into Power BI Desktop by clicking on the ellipsis (…) in the Visualizations pane to “Import a Custom Visual”.

**Dashboard** – In the Power BI Service, dashboards are a customized view of some subset of underlying datasets that can be easily shared with others. Tiles and visualizations from different Reports can be added to a Dashboard.

**Dataset** – collection of data that you import or connect to. The dataset appears in the Fields section within Power BI Desktop and can be used to create visuals or as parameters in creating new measures or columns.

**Data Sources** – The available types of data connections that can be made in Power BI Desktop to input a dataset into your report. When you click the “Get Data” button, you’ll see numerous data sources available, including csv, Excel, SQL Server, web pages, Access, Azure SQL Database, and many more.

**Data View** – One of the three views in Power BI Desktop. The data view allows you to view the data after it has been loaded into the data model.

**DAX** – Data Analysis Expressions (DAX) is the functional formula language used throughout Power BI Desktop. DAX functions are similar to functions used in Excel, though DAX offers much more functionality. Create a new measure that represents today’s date. The measure is defined as “TodaysDate = TODAY()”, where “TODAY()” is a DAX function that resolves to the current date. Use Power Query (M) to query data sources, clean and load data. Then use DAX to analyze the data in Power BI Desktop.

**Drill-down** – Hierarchical data visuals can be edited for drill-down use. By enabling drill-down, the visual changes to display the next “level” of data in the same chart. Ex: Drilling from yearly to quarterly to monthly data.
Edit Interaction – button in the format menu allows for modification to the default interaction behavior, allowing you to filter, cross-highlight, or ignore changes to other visuals. If you want to have a card visual displaying total sales and do not want this visual to change when clicking on other charts/filters, you can use “edit interactions” to change the default value of filter to none.

Fields – The fields list contains all data sources, including columns, measures and calculated columns that can be in visuals, filters, etc.

Filter – Filters can be applied as visual level filters, page level filters, or report level filters. Add a filter to a visual (visual level filter) to show only customers greater than 20 years old, or add a report level filter to only show throughout the whole report where year = 2017.

Format pane – Nearly all visuals include a format pane where you modify text size, column headers, title, background, etc.

M – M is a programming language used in Power BI Desktop as well as in Power Query in Excel Get & Transform that is optimized for building queries that mashup data. First you use Power Query (M) to query data sources, clean and load data. Then you use DAX to analyze the data in Power Pivot.

Measure – Measures are evaluated when used in a visual and thus not saved into the model. Measures work well for aggregation (sum, average, etc.).

Natural Language Query – a feature in Power BI that allows the user to type in questions about their data and receive a response.

Parameter – Parameters are managed through the “Manage Parameters” button. Parameters are easy to create and can be used as data sources, replace values/rows functions, and filter rows functions.

Power BI – Suite of business analytics tools to analyze data and share insights. The term encompasses Power BI Service/Power BI Pro, Power BI Mobile, Power BI Desktop, and more.

Power BI Desktop – Standalone business intelligence tool that allows you to create a collection of queries, data connections, data models, interactive visualizations and reports. Files created in Power BI Desktop are saved in the *.pbix file extension and can be shared like any other file or published via Power BI service.

Power BI Gateway – provides automatic refresh of on-premises data sources.

Power BI Mobile apps for viewing Power BI dashboards in tablets and smartphones (iOS, Android, Windows 10).

Power BI Excel Add-ins, Excel Publish to PBI and Excel Analyzer.

Power Query is called M in Power BI Desktop.

Power Pivot in Excel is similar to a visualization in Power BI Desktop.

Power View & Power Map are capabilities in Excel that are also available in Power BI Desktop visualizations.
Power BI Terms

**R** – Open source programming language for statistical computing and graphics display. The custom visual gallery includes R-Powered Visuals that are simple to use and contain some of the more popular R visualization code/packages.

**R-Powered Visuals** – Custom visuals based on R code, which require installing the R engine and potentially additional R packages to run the scripts in the custom R-powered visuals.

**Relationships View** – One of the three views in Power BI Desktop. The relationship view shows all tables, columns, and relationships in a visual display to help understand the relationships between data.

**Report** – One or more pages of visualizations. In Power BI Desktop, additional pages appear as tabs in the bottom of the report viewer. New tabs can be added to the report. Report pages can be duplicated, renamed, or deleted.

**Report View** – One of the three views in Power BI Desktop. The report view is the visual creation view, where you drag/drop visuals onto the canvas to create the data display.

**RLS** – Row Level Security (available in Power BI Pro).

**Solution Template** – Easy to install, end-to-end enterprise-ready solutions that create underlying Azure components to process data and provide robust Power BI reports to process data and provide robust Power BI reports based upon numerous industries. Power BI Desktop includes a button in the ribbon to navigate to the solution templates. Current templates include dashboards for Twitter Analytics (brand management), SAP, Salesforce, SCCM, and more.

**Template** – Power BI templates (*.pbit files) include the definition of a Report, Data Model and queries, but not the actual data. Templates can be created via File -> Export -> Power BI Template, which generates a *.pbit file. (Useful for sharing report designs).

**Themes** (or Custom Themes) – Themes allow you to select a set of colors to use across numerous charts. The creation of custom themes is simple, but you can also download many great examples from the custom theme gallery.

**Visuals** (or Visualizations) – The collection of built-in functionality that allows you to display data in a “visual form”. These include bar/line/donut charts, maps, filters, tables, matrices, cards, and much more. Also custom visualizations.

Several definitions are from:
https://blogs.msdn.microsoft.com/samlester/2017/04/12/power-bi-desktop-terms-and-definitions/
Infographic
Create, Collate, Visualize & Explore

CREATE

Power BI Desktop

CONNECT

40 + Data Connectors & Curated Content Packs

CONNECT

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Source: gqbi.wordpress.com

COLLATE

Power BI Service

Publish to Web

Reports

Datasets

Data Alerts

Pin from Excel

Dashboards

Web

ACCESS

COLLABORATION

YOUR ORGANISATIONS DATA

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Source: gqbi.wordpress.com

VISUALIZE & EXPLORE

Power BI On-Premise Gateway

Publishing and Sharing
Organisational Content Packs
Row Level Security
Group Workspaces
Email Subscriptions
SharePoint Modern

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Power BI Desktop

- Import
  - 50+ Apps or data sources to get data into Power BI Desktop
  - Ability to shape data using the Query Editor

- Create
  - Create Calculated Measures
  - Create Calculated Columns

- Visualise
  - Interactive visualisations to gain insights into your data
  - Custom visuals to further enhance insights & easier understanding of your data
  - R scripting language built into Power BI Desktop
  - Frequent enhancements & new features into Power BI Desktop & Power BI Service

Source: gqbi.wordpress.com

Power BI Service

- Publish Power BI Desktop Models to Power BI Service
- Ability to view & interact with reports
- Ability to create dashboards (which can be data from different data sets)
- Can publish to the web (this option can be turned off)
- Q&A (Natural Query Language) to ask questions of your data
- Data Alerts based on metrics
- Pin from Excel & SQL Server Reporting Services
- Access Power BI Datasets within the Power BI Service

Power BI Access

- Access your data from any device (Web, Tablet or Mobile) in the Power BI Service (Cloud)
- Restrictions can be applied from within Microsoft Office 365 Security & Compliance Centre
- Ability to manage mobile devices using Microsoft Intune

Power BI Collaboration

- Can publish & share with others
- Organisational content packs that can be shared with users or groups in your organisation. Users can then edit & customize to their requirements
- Row Level Security gives the capability for a user to only see their data that they are allowed to see
- Group workspaces which can be used to share & collaborate across a group of people within the organisation
- Email Subscriptions for report pages
- Integration of Power BI into SharePoint Modern Web Parts

On-Premise Gateway

- Keeping your data current and up to date
- Refresh On Premise data on a defined schedule
- Capability to direct query certain data sources (For example SQL Server, Analysis Services OLAP & Tabular)
Infographic: Power BI
Free vs Pro

Source: gqbi.wordpress.com

FREE

- Create, View & Share Personal Dashboards & Reports
- Data Limit 1 GB/User
- Publish to Web
- Curated Content Packs
- Mobile Devices (iOS, Windows, Android)
- Natural Language Query (Q&A)
- Consume streaming data 10K rows/Hour
- Tiles pinned from SSRS

PRO

- Data Limit 10 GB/User
- Control data access with Row Level Security for Users & Groups
- Consume live data sources (DirectQuery)
- Consume Content that’s scheduled to refresh Hourly (Can schedule 8 refreshes)
- SharePoint Modern Web Parts
- Email Subscriptions
- Access Datasets in Power BI Service
- Access On-Premise data using Personal or On-Premise Data Gateway
- Create, publish & View Organizational Content Packs
- Collaborate using Group Workspaces
N2K
Infographic
PBI Gateway

Power BI Gateway

Power BI Gateway comprises of the following
- Query Editor Engine
- Direct Query or Live Connection
- Routing of data between On-Premise & Power BI Service via Azure Service Bus
- Connectivity

Supported Data Sources
- Analysis Services (Tabular & Multidimensional) *
- SQL Server *
- SAP HANA *
- Oracle *
- Teradata
- File
- Folder
- SharePoint List (on-premise)
- Web
- OData
- IBM DB2
- MySQL
- Sybase
- SAP BW
- IBM Informix Database
- ODBC

HEAVY PROCESSING
- All work done in Query Editor (Refreshing in Power BI Desktop is either CPU or Memory intensive)
- Multiple refreshes running simultaneously
- Will require more CPU’s & Memory

Query Editor Intensive Processing
- Multiple CPU’s
- More Memory

Pass through Processing
- CPU’s
- Memory

LIGHT PROCESSING
- Used as pass through for Direct Queries or Live Connections
- If Row Level Security is being used, will require separate queries per user.
- Will require CPU’s for Routing & Memory

Source: gqbi.wordpress.com

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Thank you!

N2K: Noise to Knowledge

Microsoft Power BI

Self-Service Business Intelligence
for unlocking your data
and building Shared Visualization

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MonmouthCares, Inc.
https://sites.google.com/monmouthcares.org/GtPBI