Mike Carlo

PowerBI.tips

https://PowerBI.Tips

Explicit Measures

https://PowerBI.Tips/podcast

Listen on Spotify

@PowerBITips
Or @Mike_R_Carlo

linkedin.com/in/michaelcarlo

YouTube.com/PowerBITips

- *Business Owner Carlo Consulting LLC*
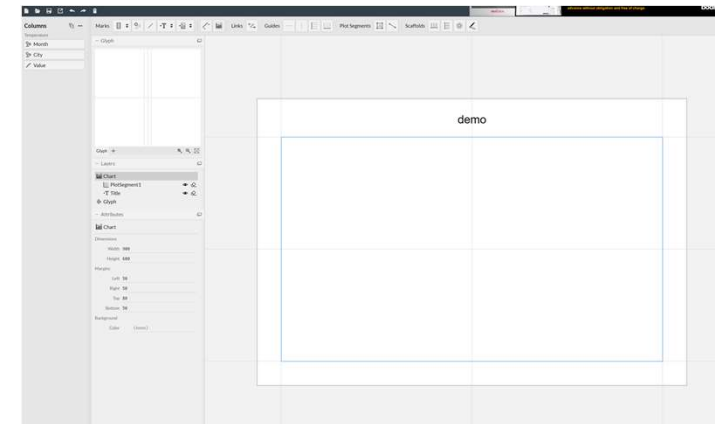- *Blogger, Speaker and Trainer*
- *Microsoft MVP*
- *Mechanical Engineer, MBA, Data Science*

https://PowerBI.Tips

Business Ops

https://Themes.PowerBI.tips
https://Gallery.PowerBI.tips
https://model.powerbi.tips
https://connections.powerbi.tips
https://charts.powerbi.tips
https://powerbi.tips/scrims
https://powerbi.tips/layouts
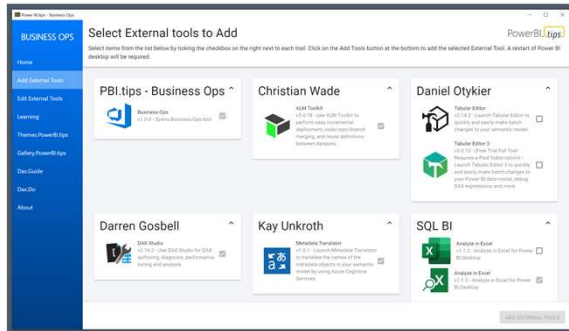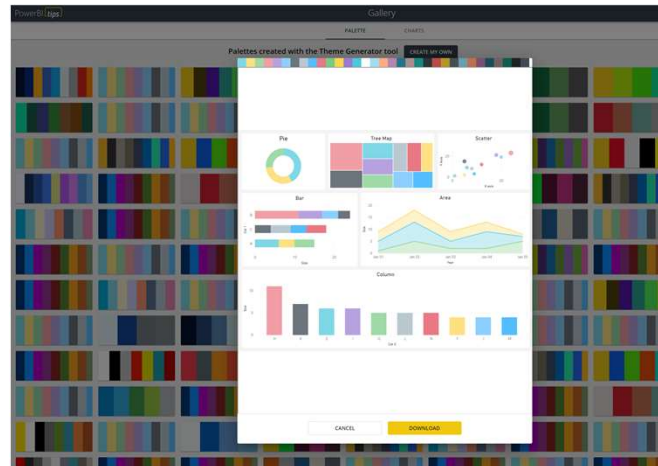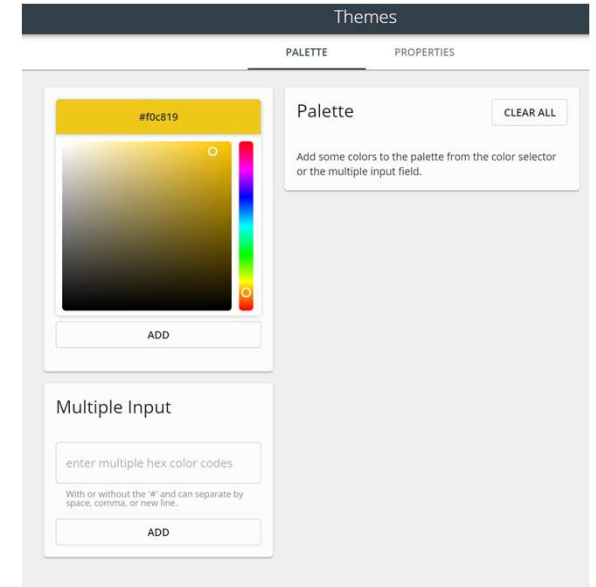
Overview

Report Development Process in Power BI

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)
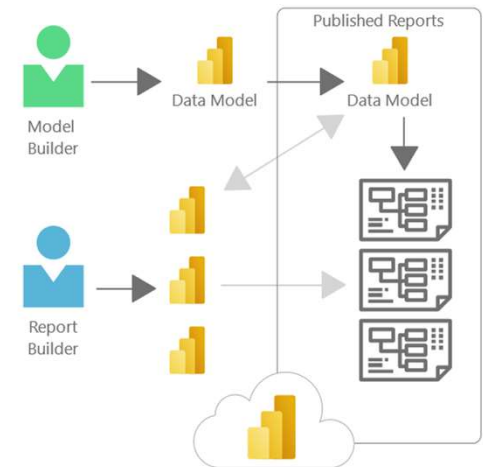
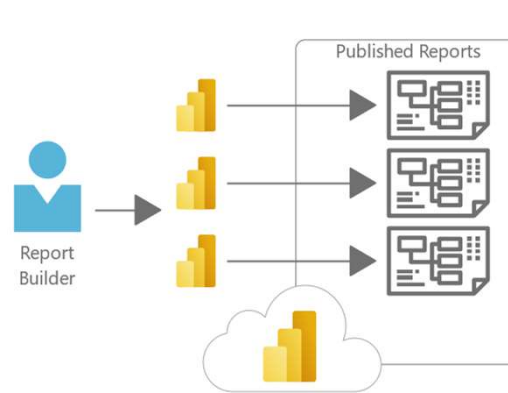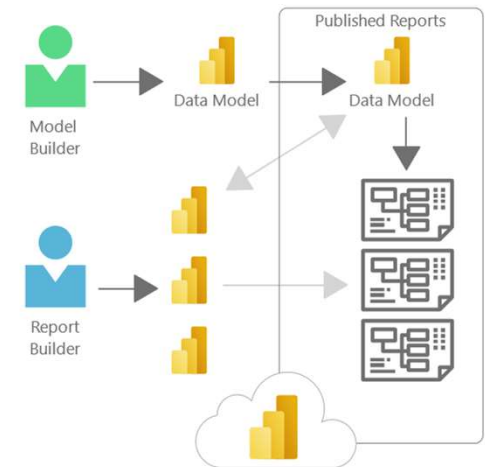# Report Development Process in Power BI

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)

Power BI Suite

Power BI Desktop
Modeling and Reports
Local PC (PBIX Files)

Service
Sharing Reports
app.powerbi.com

Report Server
Reports for on premise
Slower dev cycle

Mobile App
Collaboration
Separate device app

Development Tools
Collection of APIs
Embed content into apps

Custom Visuals
Build on D3.js, Open Source
Lots of Developers
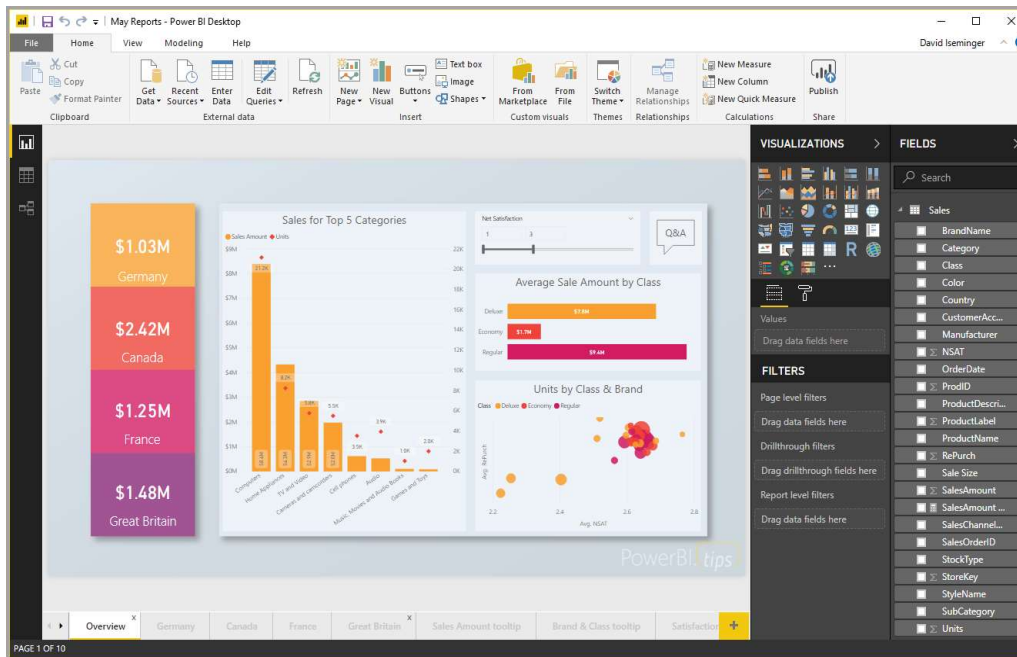
Support
Power BI Community
Guided Learning Msft

Power BI User Groups
Local Communities
Connect with Professionals

What is Power BI Desktop?

*Power BI Desktop is a free application that can be installed on the local computer and which can **connect** to, **transform**, and **visualize** the data.*
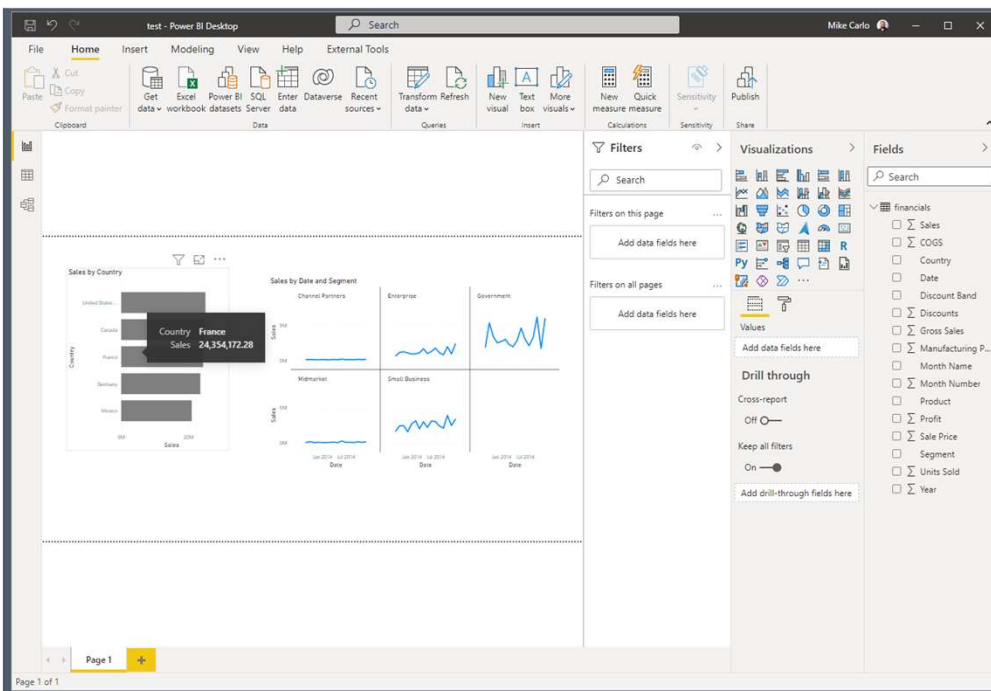

Power BI Desktop is used for:

- Connecting to data

- Transform and clean data

- Create a data model

- Create visuals, such as charts or graphs, that provide visual representations of the data

- Create reports that are collections of visuals, on one or more report pages

- Share reports with others using the *Power BI service*

Reports vs. Powe Query

Desktop

Power Query

What is Power BI Service?

The Microsoft Power BI service (app.powerbi.com), sometimes referred to as Power BI online, is the SaaS (Software as a Service) part of Power BI.
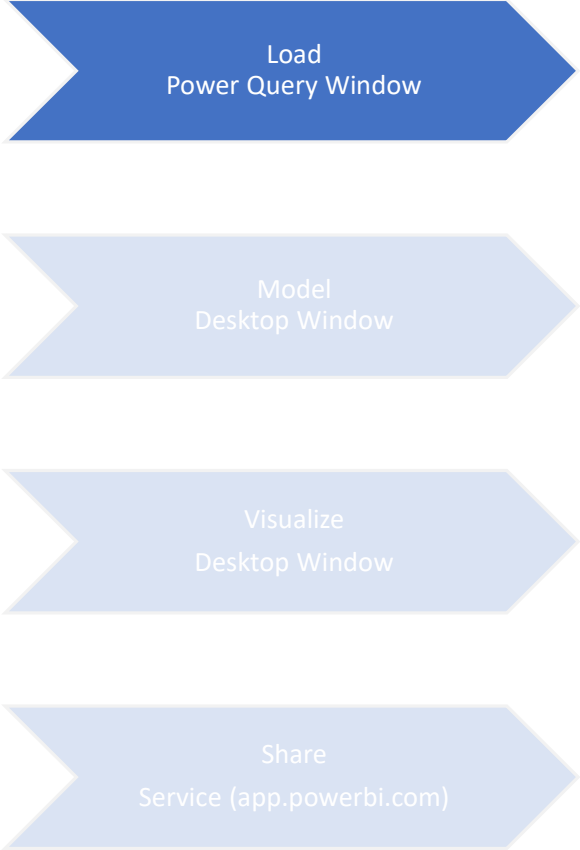
- The **Power BI service** is a cloud-based service. It supports light report editing and collaboration for teams and organizations. You can connect to data sources in the Power BI service, too, but modeling is limited.

Power BI Service（app.powerbi.com）
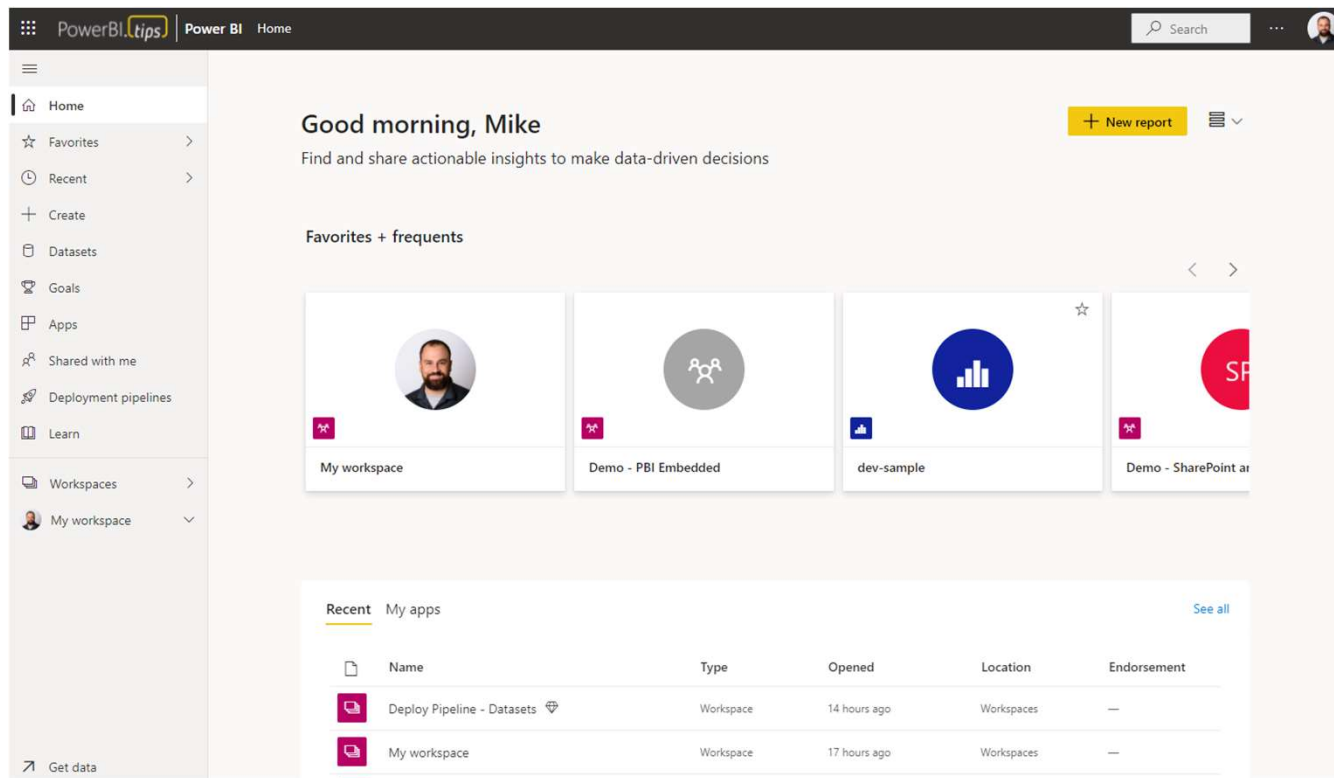
Questions

Steps to Published Report – Load

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)

- Separate window called the Power Query Editor

- Easy to use interface, uses language called Power Query (M Language)

- Can combine data sources, perform complex transformations, then load to the model

ETL – Extract Transform Load

Data
Lots of sources

ETL – Extract Transform Load

Extract
Data is messy!
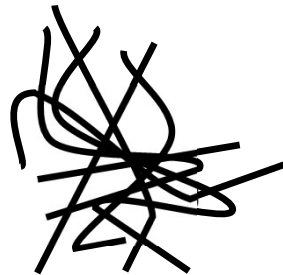
ETL – Extract Transform Load

Transform
Data in tabular format

ETL – Extract Transform Load

Load
Visualize our data

ETL – Extract Transform Load

Data
Lots of sources

→

Extract
Data is messy!

→
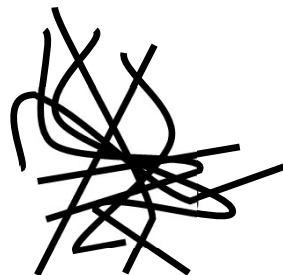
Transform
Data in tabular format

→
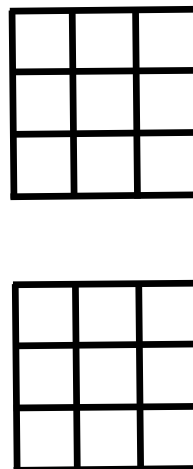
Load
Visualize our data

Import
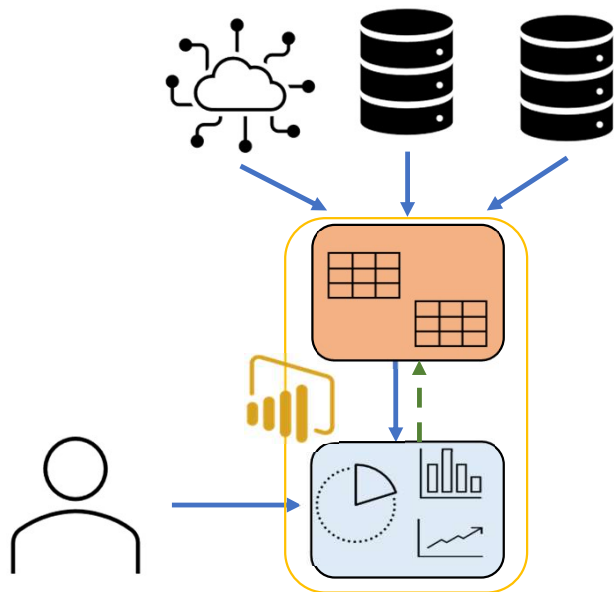
- Data is copied from source to Power BI service (powerbi.com)

- Data is refreshed at intervals up to 8 or 48 times, depending on license

- Complex transformations can take place and complicated busines logic applied

- Report is quick to receive data

Direct Query

- As user interacts (such as load or applies a filter), a query is sent to return the data in the current view.

- Data is not stored on PowerBI.com (only cached)

- Very limited modelling and logic can be applied

- Can be slower to render

- Data is always up to date
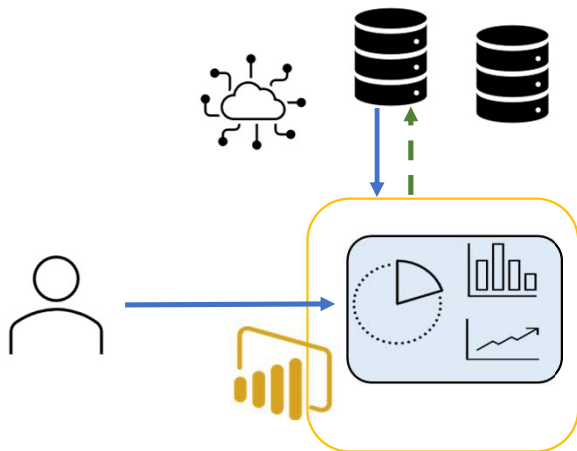
| Load Power Query Window | Model Desktop Window | Visualize Desktop Window | Share Service (app.powerbi.com) |
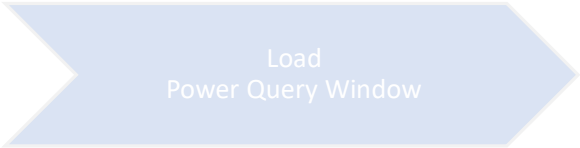
DEMO

Steps to Published Report – Model

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)

- Power BI Desktop main window has a modeling tab

- Create a relational model, by linking many tables, that can help reduce model size and improve performance

- Create calculations (measures and columns) to show correct aggregations in DAX language

Fact vs Dimension

- Dimension tables contain descriptive information

- Fact tables contain business facts or measures and keys

- 1 key in fact table per dimension table

Dimension Tables

Animal ID Key	Animal	Name	Type
1	Gorilla	Big Dave	Terrestrial
2	Cow	Barry	Terrestrial
3	Gorilla	Pete	Terrestrial
4	Crocodile	Mr Fluffy	Amphibian
5	Pig	Pete	Terrestrial

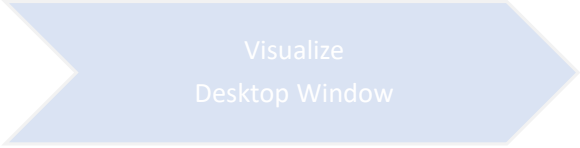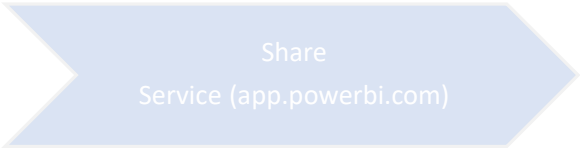| Food ID Key	Food Eaten	Food Type	Perishable within 30 days	Food ID Key.1
101	Banana	Fruit	True	101
102	Grass	Feed	True	102
103	Fish	Animal	True	103
104	Apple	Fruit	True	104
105	Human	Animal	False	105
106	Soy and Corn	Feed	False	106

Date	Month	Weekday
1/1/2020 12:00:00 AM	1	4
1/2/2020 12:00:00 AM	1	5
1/3/2020 12:00:00 AM	1	6
1/4/2020 12:00:00 AM	1	7
1/5/2020 12:00:00 AM	1	1
1/6/2020 12:00:00 AM	1	2
1/7/2020 12:00:00 AM	1	3
1/8/2020 12:00:00 AM	1	4
1/9/2020 12:00:00 AM	1	5
1/10/2020 12:00:00 AM	1	6
1/11/2020 12:00:00 AM	1	7

Time	Hour	Minute	AM or PM
12:00:00 AM	0	0	AM
12:01:00 AM	0	1	AM
12:02:00 AM	0	2	AM
12:03:00 AM	0	3	AM
12:04:00 AM	0	4	AM
12:05:00 AM	0	5	AM
12:06:00 AM	0	6	AM
12:07:00 AM	0	7	AM
12:08:00 AM	0	8	AM
12:09:00 AM	0	9	AM
12:10:00 AM	0	10	AM

Fact Table

Animal ID Key	Food ID Key	Date	Time
1	101	Wednesday, January 1, 2020	10:57:00 AM
2	102	Wednesday, January 1, 2020	11:50:00 AM
3	101	Wednesday, January 1, 2020	11:44:00 AM
4	103	Wednesday, January 1, 2020	2:14:00 PM
2	102	Wednesday, January 1, 2020	3:30:00 PM
1	104	Wednesday, January 1, 2020	3:47:00 PM
4	103	Wednesday, January 1, 2020	2:22:00 PM
2	102	Wednesday, January 1, 2020	7:46:00 PM
1	101	Wednesday, January 1, 2020	7:29:00 PM
3	101	Wednesday, January 1, 2020	10:26:00 PM
1	101	Thursday, January 2, 2020	9:48:00 AM
2	102	Thursday, January 2, 2020	10:23:00 AM
3	101	Thursday, January 2, 2020	1:11:00 PM
4	105	Thursday, January 2, 2020	3:58:00 PM
2	102	Thursday, January 2, 2020	6:00:00 PM
1	101	Thursday, January 2, 2020	8:37:00 PM
3	101	Thursday, January 2, 2020	11:39:00 PM
5	106	Friday, January 3, 2020	5:53:00 AM
5	106	Friday, January 3, 2020	7:21:00 AM
3	101	Friday, January 3, 2020	8:53:00 AM
5	106	Friday, January 3, 2020	9:00:00 AM
1	104	Friday, January 3, 2020	9:12:00 AM
5	106	Friday, January 3, 2020	9:28:00 AM
4	103	Friday, January 3, 2020	11:09:00 AM
2	102	Friday, January 3, 2020	1:44:00 PM
5	106	Friday, January 3, 2020	1:28:00 PM
5	106	Friday, January 3, 2020	2:59:00 PM
1	101	Friday, January 3, 2020	3:42:00 PM
2	102	Friday, January 3, 2020	5:16:00 PM
5	106	Friday, January 3, 2020	6:47:00 PM
1	101	Friday, January 3, 2020	6:30:00 PM

Star Schema

Star Schema is a modeling approach which requires modelers to classify their model tables as either *dimension* or *fact* tables for developing Power BI models that are optimized for performance and usability.

- Dimension tables support *filtering* and *grouping*
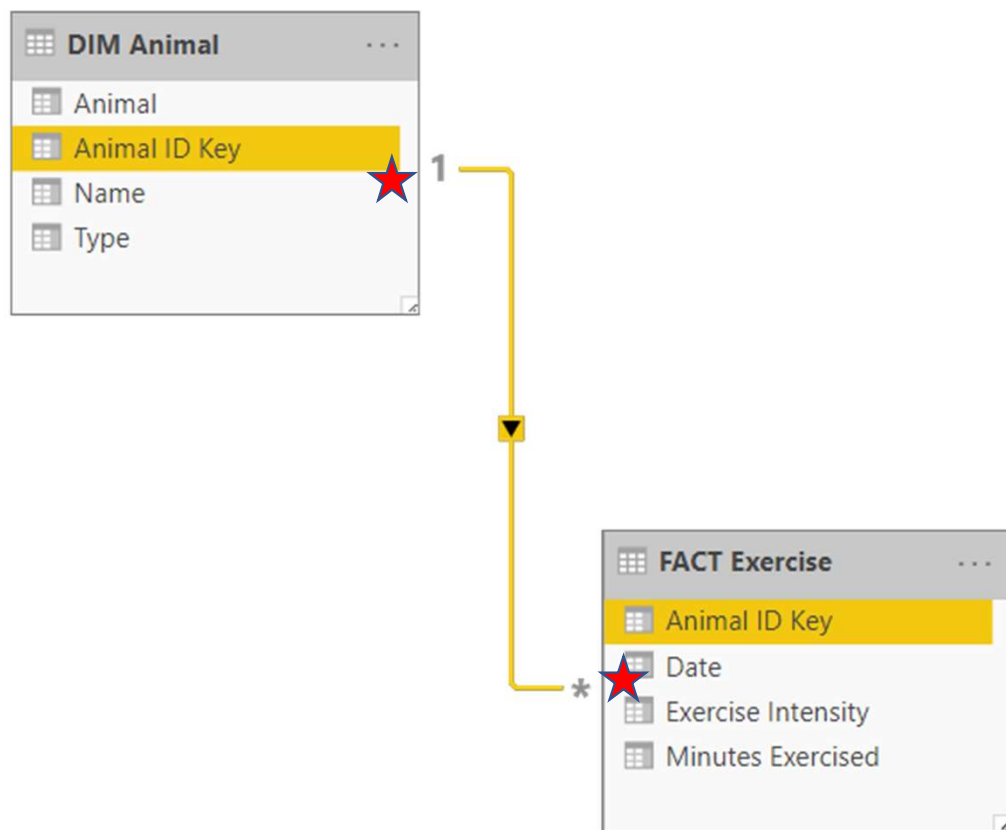- Fact tables support *summarization*
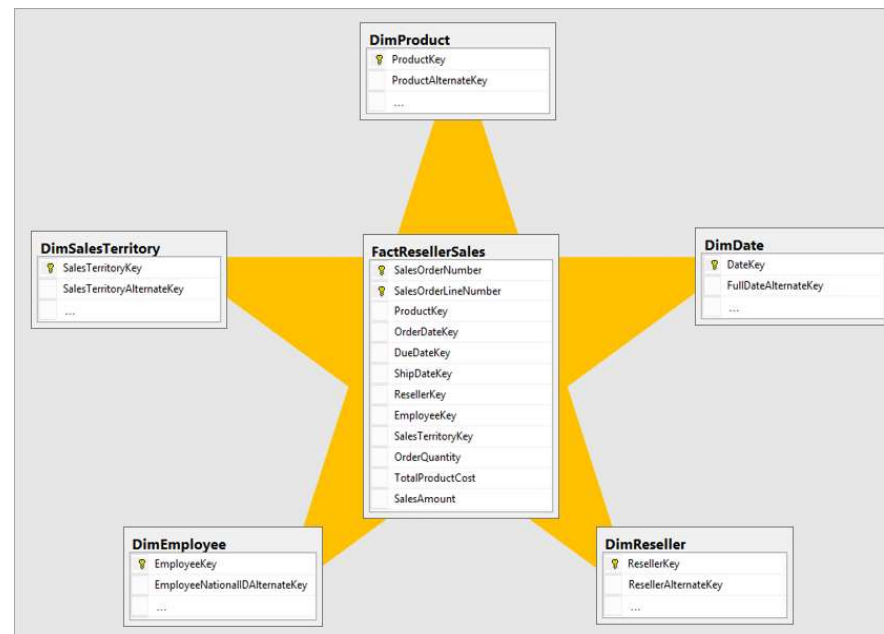
Joined by relationships

DIM Animal · · ·
- Animal
- Animal ID Key ★ 1
- Name
- Type

▼

FACT Exercise · · ·
- Animal ID Key
- Date ★ *
- Exercise Intensity
- Minutes Exercised

- Relationships say how the two tables relate to each other

- Try and always use 1 to many (1-*)

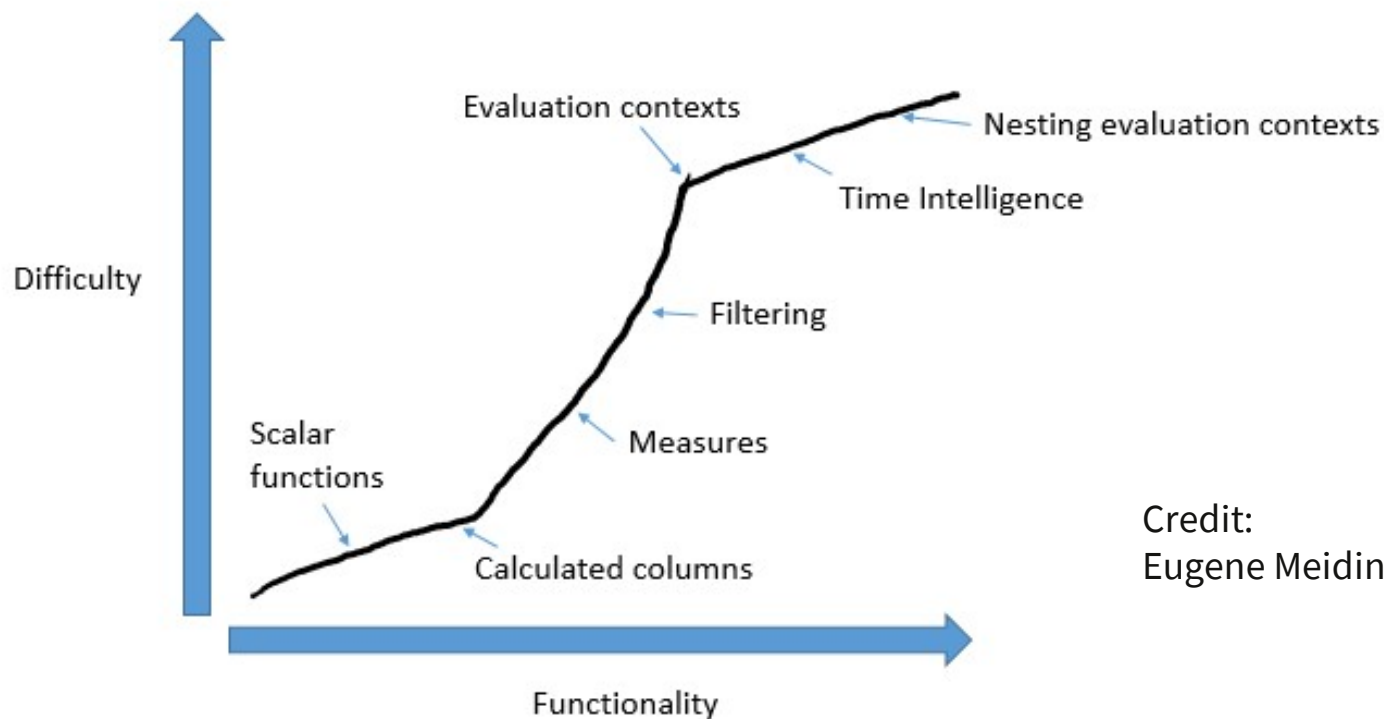- Single direction filters are best!

- Dimension can filter the fact

Progression of Learning DAX

Evaluation contexts

Nesting evaluation contexts

Time Intelligence

Difficulty

Filtering

Scalar functions

Measures

Calculated columns

Functionality

Credit:
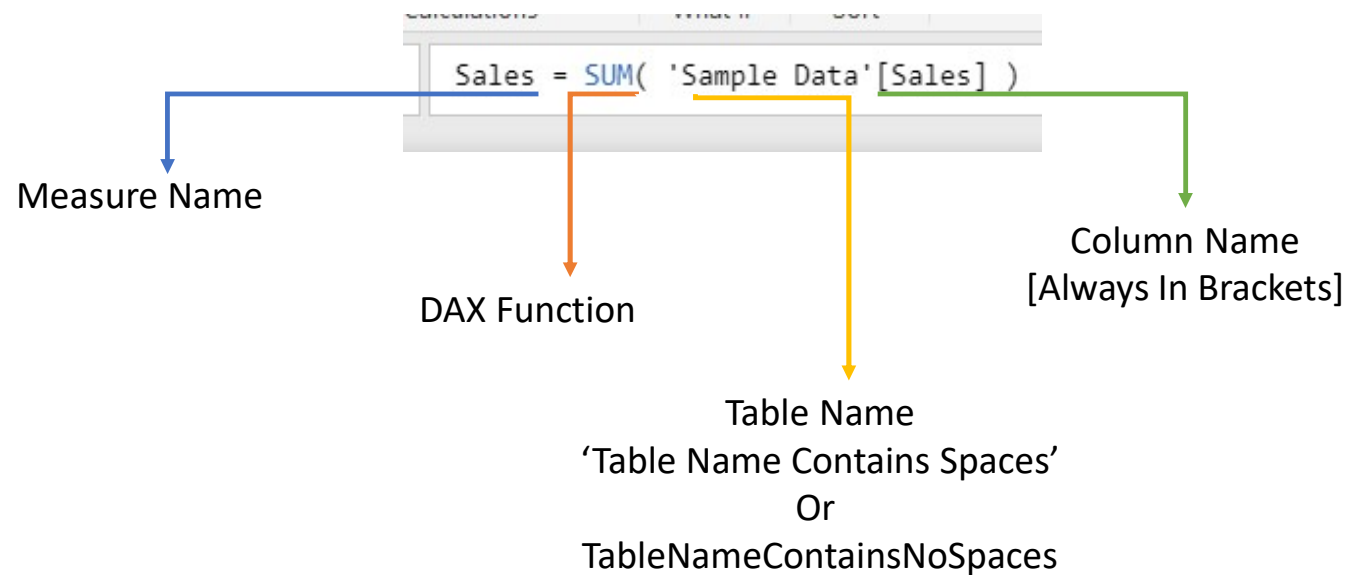Eugene Meidinger

http://www.sqlgene.com/2017/03/30/slides-for-pass-bi-virtual-group/

Load
Power Query Window
Model
Desktop Window
Visualize
Desktop Window
Share
Service (app.powerbi.com)

Measure Syntax

Sales = SUM('Sample Data'[Sales])

Measure Name

DAX Function

Table Name
'Table Name Contains Spaces'
Or
TableNameContainsNoSpaces

Column Name
[Always In Brackets]

Measures

- **Filter Context** is the default behavior for **MEASURES**

- Measures do not live in a specified table and can access all data

- Vertical: Must have an aggregation
  (unless special DAX functions used can change it)

- Take up little space – no data is stored (only the calculation) until added to a report, in contrast to a Calculated Column or Table

Implicit vs. Explicit Measures

- **Implicit Measures** means that the calculation is implied
- Columns from the data tables are added to a visual

- **Explicit Measures** are "Explicitly" defined or hard coded
- Measures are created and then added to visuals
- Preferred method for making calculation on a data model

Calculated Tables

- **Calculated Tables** are added as a new table

- They are only calculated during refreshing the data

- The Calculated table can be entirely generated with code such by using CalendarAuto() or Summarize()

- Take up more space and less dynamic

Calculated Columns

- **Calculated Columns** are added to the data table and use **Row Context**

- They are only calculated during refreshing the data – DAX formulas such as ISFILTERED or HASONEVALUE will not affect them

- Are bound to the row so does not need aggregation
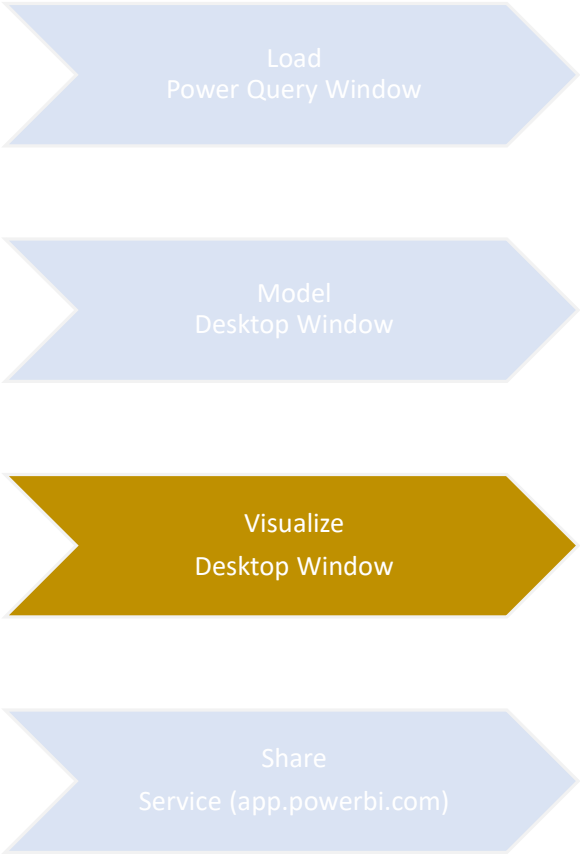
- Take up more space and less dynamic

| Load Power Query Window | Model Desktop Window | Visualize Desktop Window | Share Service (app.powerbi.com) |

DEMO

Steps to Published Report – Visualize

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)

- Build interactive reports to deliver impactful insights

- Use rich features and make visualizations to represent the data

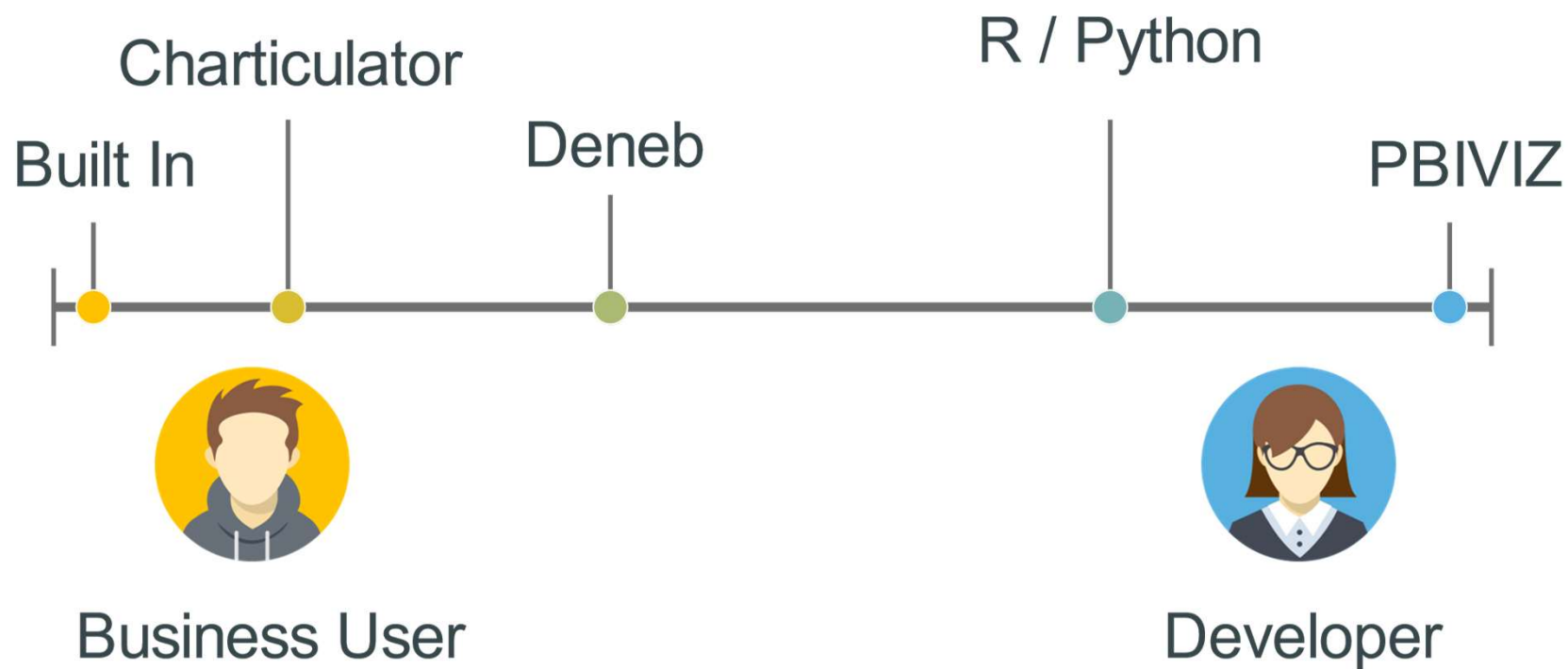- Visuals and measures can be sliced and diced with different filters

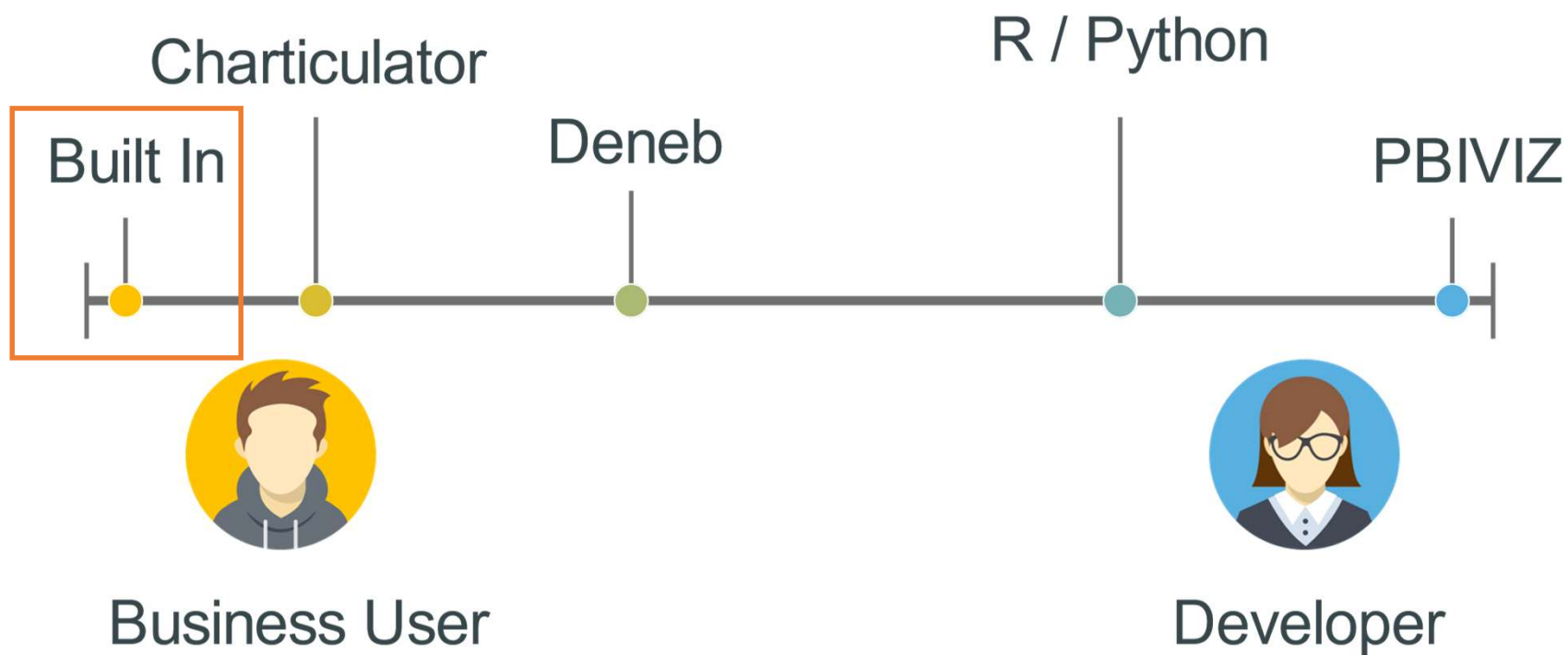| Load
Power Query Window | Model
Desktop Window | Visualize
Desktop Window | Share
Service (app.powerbi.com) |

Visuals Spectrum

Charticulator

R / Python

Built In

Deneb

PBIVIZ

Business User

Developer

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)

Visuals Spectrum

Charticulator

R / Python

Built In

Deneb

PBIVIZ

Business User

Developer

Effective Data Visualization

- Define the Insight
- Think about what data is needed
- Rough out a visual
- Is the Insight answered? / Is this Actionable?
- Re-design Visual or data
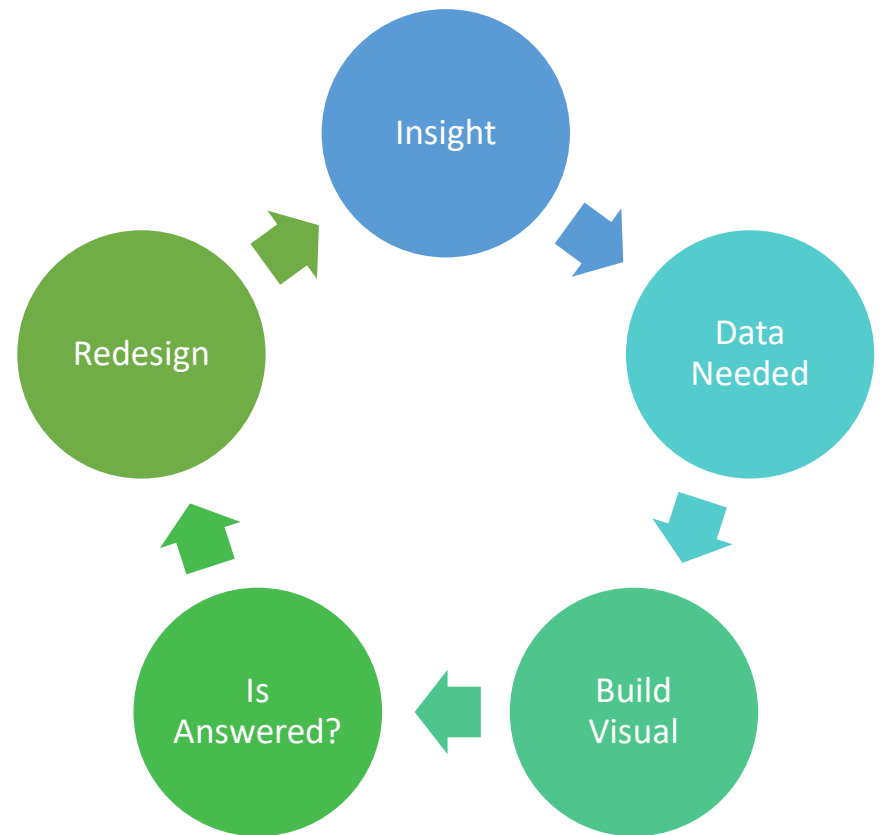
Effective Data Visualization

Minimize the use of tables

Model data for both Power BI and Excel usage
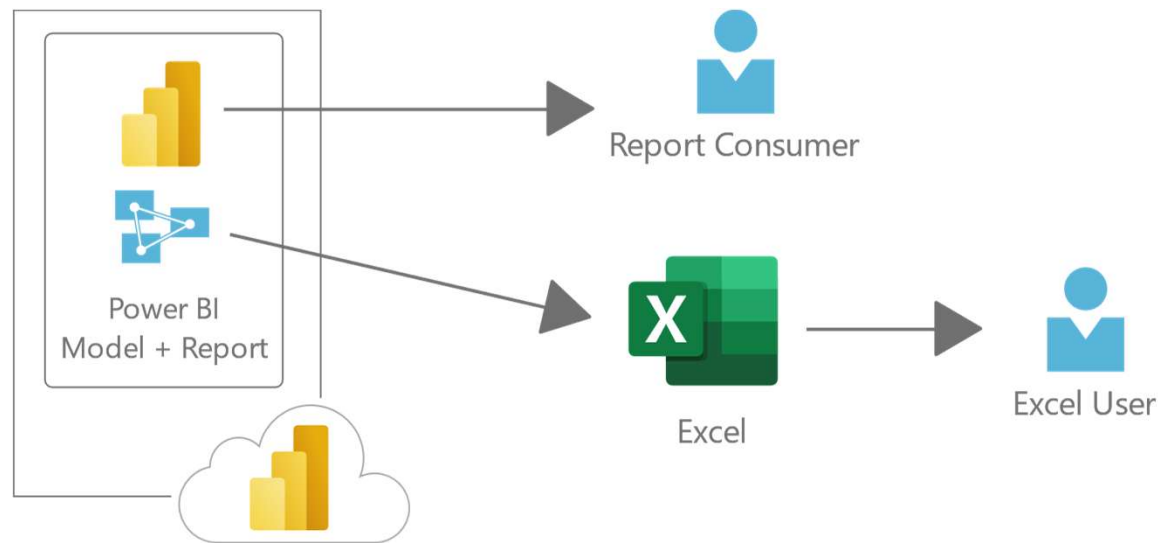
Load Power Query Window	Model Desktop Window	Visualize Desktop Window	Share Service (app.powerbi.com)

DEMO

Formatting Visuals

- Decomposition Tree

- Enables me to "choose" my own adventure

- Allows me to see a breakdown of different categories
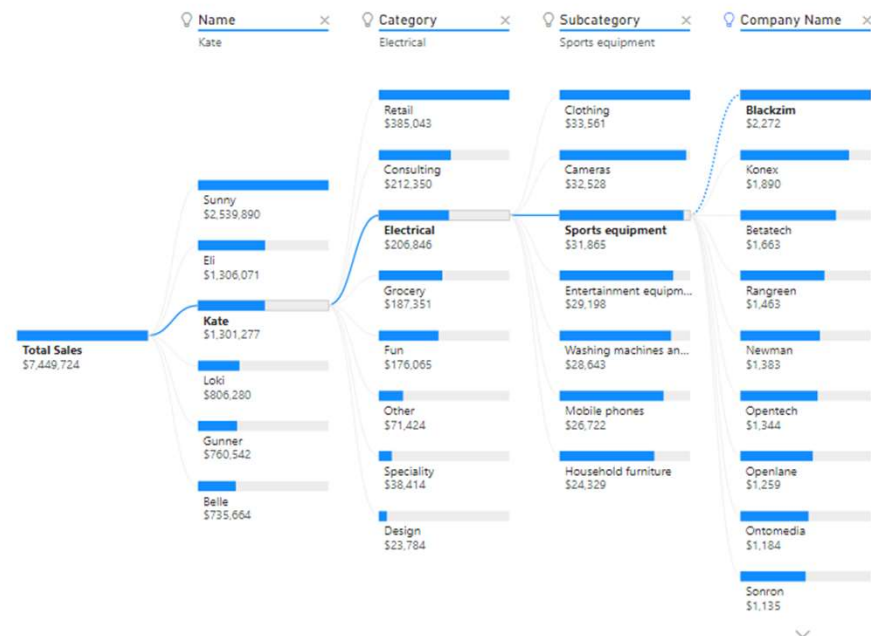
Formatting Visuals
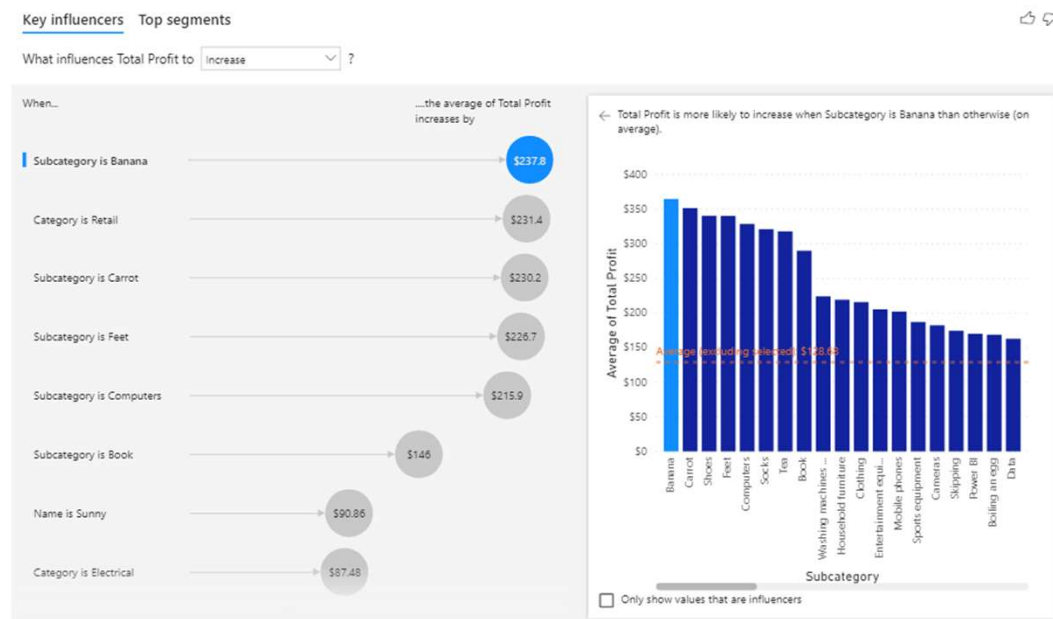
- Key Influencers

- Provides potential reasons why something happened

- Enables you to see things above or below a trend

Formatting Visuals
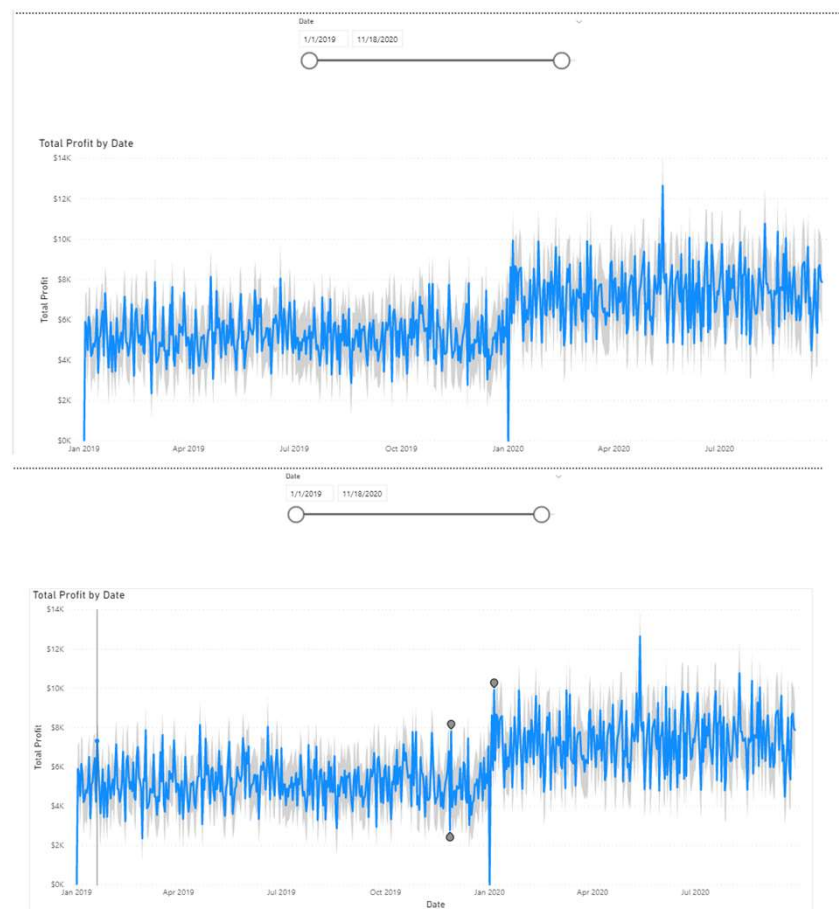
- Anomaly Detection

- Create a line chart

- In the Analytics option add Anomaly detection

Formatting Visuals

- Forecasting
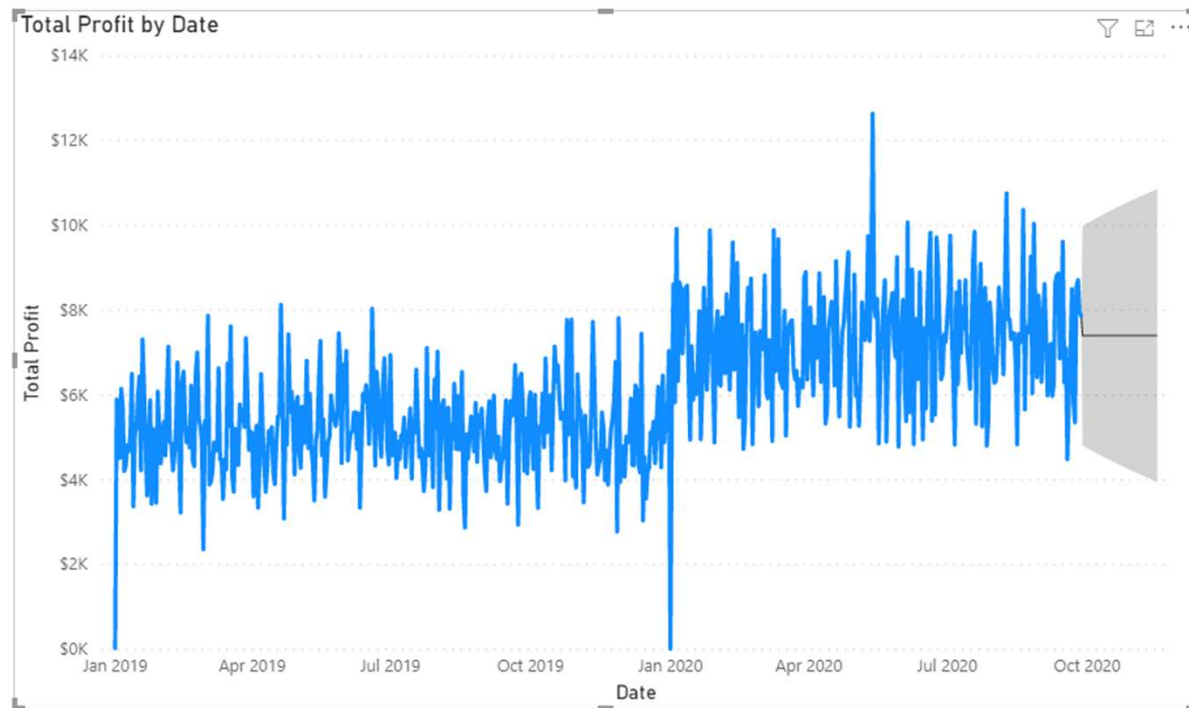
- Create a line chart

- In the Analytics Section add the Forecasting option

Total Profit by Date

Load Power Query Window	Model Desktop Window	Visualize Desktop Window	Share Service (app.powerbi.com)

DEMO

Steps to Published Report – Share

Load
Power Query Window

Model
Desktop Window

Visualize
Desktop Window

Share
Service (app.powerbi.com)

- Publish the PBIX file

- Create different workspaces for different business groups
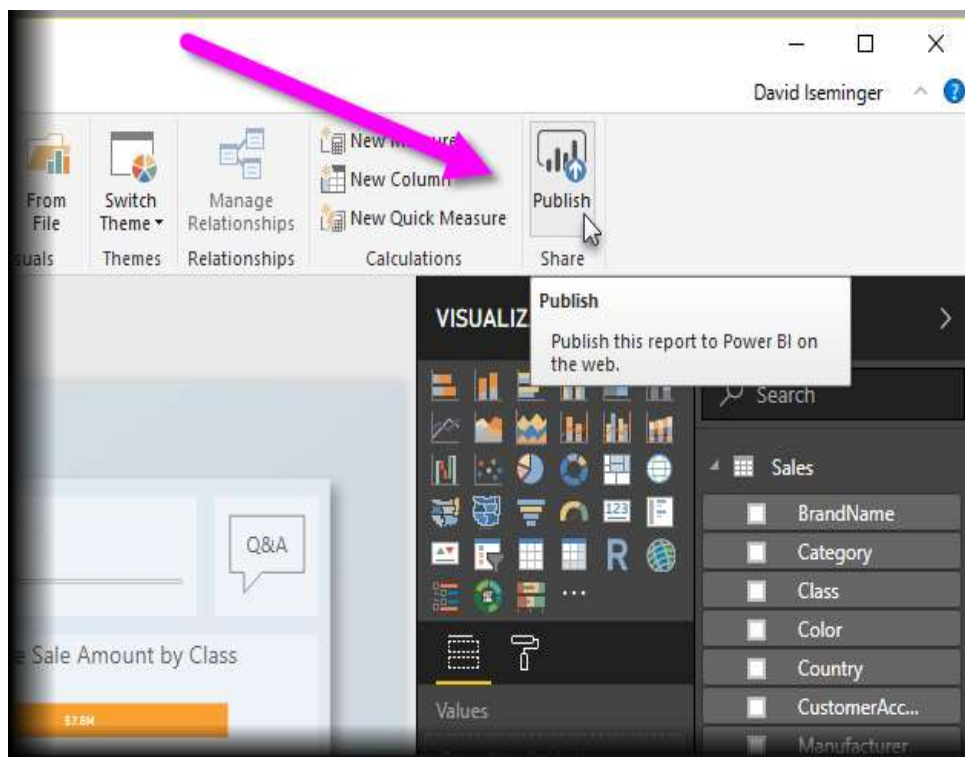
- Share Workspaces with appropriate people

Publish Reports

- Publish Report –
  1. Select *Publish* from the *Home* ribbon.
  2. Once you select *Publish*, Power BI Desktop connects you to the Power BI service using your Power BI account.
  3. It then prompts you to select where in the Power BI service you would like to share the report, such as, your workspace, a team workspace, or some other location in the Power BI service.
  4. You must have a Power BI license to share reports to the Power BI service.
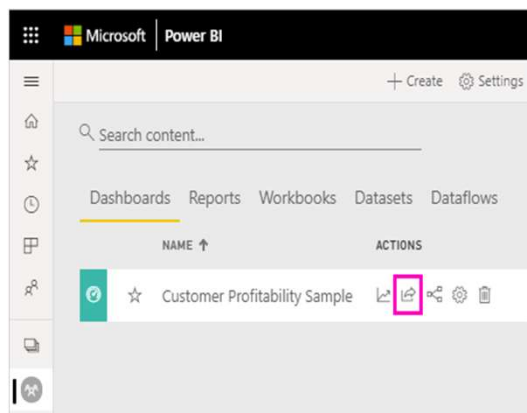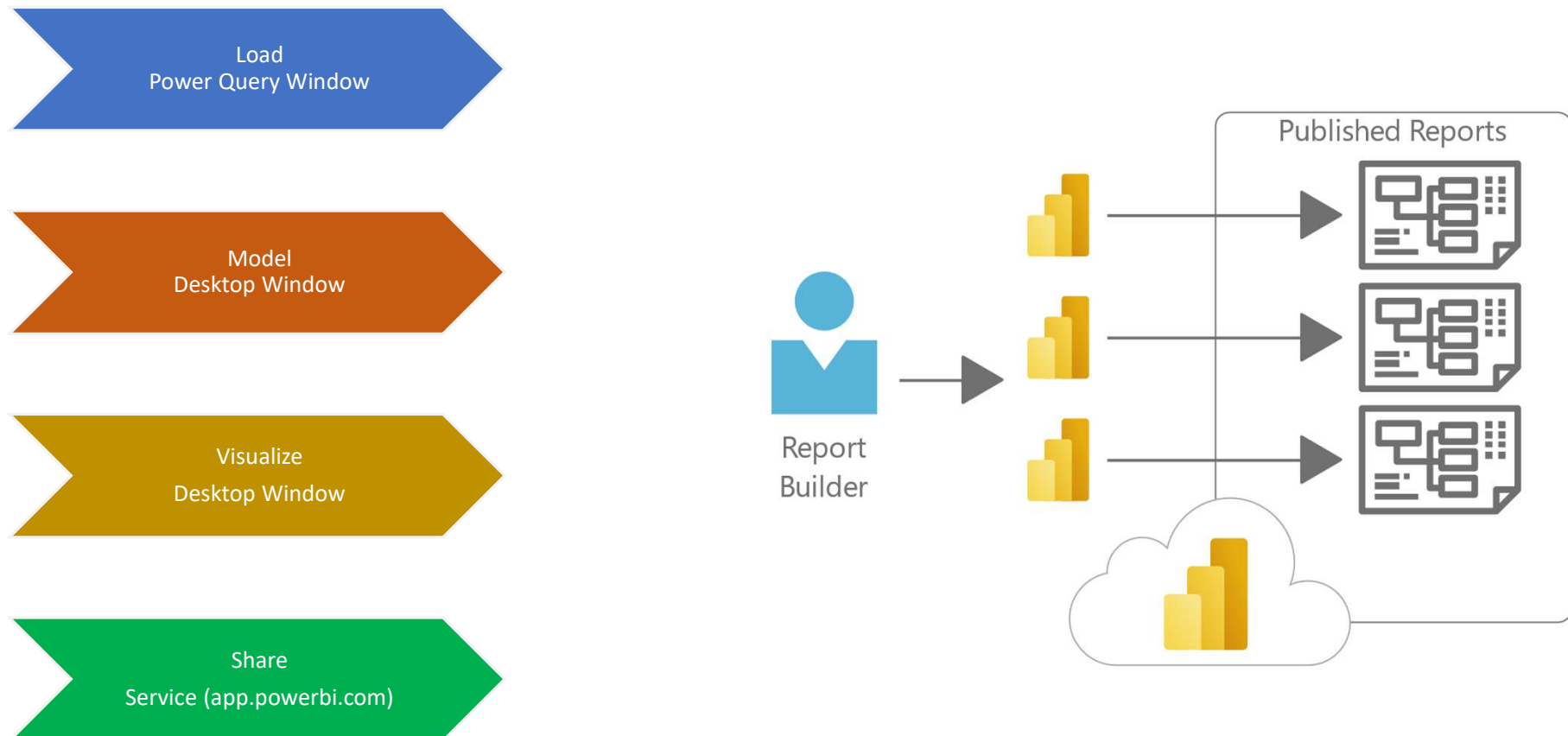
Share Reports

- Share Dashboard/ Report –
  1. In a list of dashboards or reports, (or in an open) select the Share icon.
  2. In the top box, enter the full email addresses for individuals, distribution groups, or security groups.
  3. Add a message if you want. It's optional.
  4. To let your co-workers share your content with others, *check Allow recipients to share your dashboard (or report)*.
  5. If you select *Allow users to build new content using the underlying datasets*, they can create their own reports in other workspaces based on the dataset for this dashboard and click Share.
  6. Once the dashboard/report is shared, you will receive a Success notification.

DEMO

Report Development Process in Power BI

Load
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Service (app.powerbi.com)

Report Builder

Published Reports

Links

Code Share

https://github.com/PowerBI-tips/Charticulator-Templates

https://github.com/PowerBI-tips/DAX-Templates

https://github.com/PowerBI-tips/TabularEditor-Scripts

https://github.com/PowerBI-tips/Deneb-Templates