

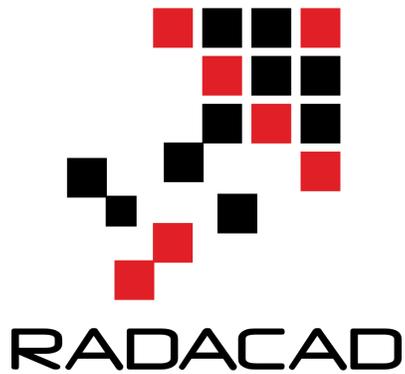
Dataflow and Shared Dataset

Multi-Developer Architecture for Power BI

Reza Rad,

Consultant (RADACAD)

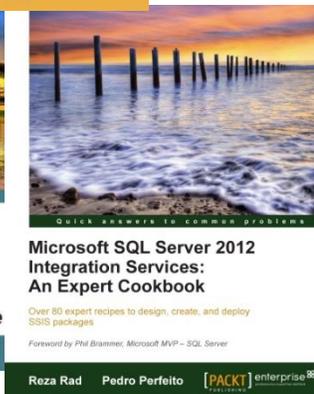
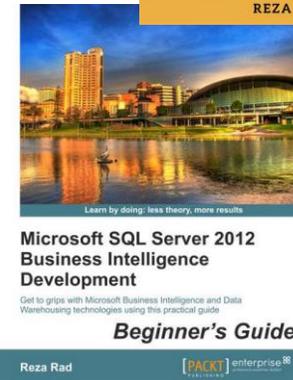
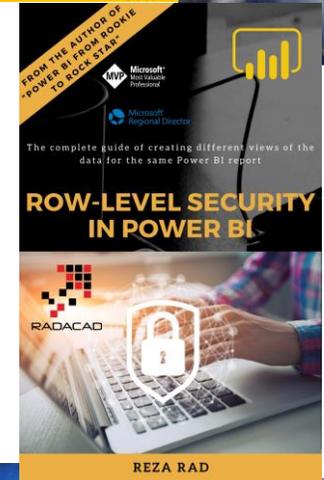
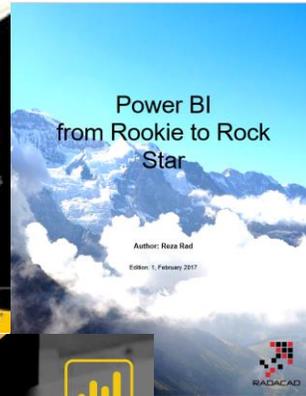
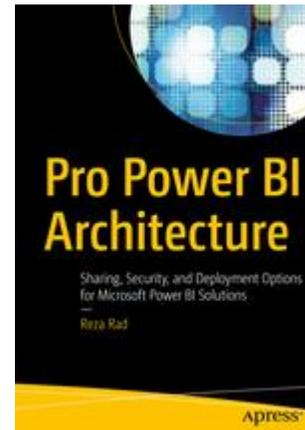
Microsoft Regional Director, MVP



Reza Rad



Consultant, Mentor, Trainer, Speaker
Blogger, (and YouTube content creator)
Microsoft Regional Director
Microsoft Data Platform MVP
Author of BI books
Author of **Power BI from Rookie to Rock Star**
Author of **Pro Power BI Architecture**
Author of **Row-level security in Power BI**



 @rad_reza

 /in/rezarad

 /radacad

 <https://radacad.com>

Single Business Analyst/Developer

One Developer: Business Analyst

One Reporting problem to solve: One Power BI Solution (File)

Multiple Users (end users)

Architecture: One Single File, Import Mode

Everything in One Power BI File

FAST to develop

Fast to respond (because it is import mode)

Agile: easy to make changes in PQ, data model, DAX and visualization

Easy to maintain

Analyst's team: Multiple Developers

A team of developers: Or Business Analysts

One or more reporting problems to solve

Multiple users

Single File Challenges

- **Multiple developers** cannot work on one PBIX file at the same time. Multi-Developer issue.
- It would be very hard to **integrate** the single PBIX file with **another application or dataset**. High Maintenance issue.
- All data transformations are happening inside the model, and the **refresh time would be slower**.
- The only way to expand visualization would be adding pages to the model, and you will end up with **hundreds of visualization pages** after some time.
- Every single change, even small change in the visualization, means **deploying the entire model for every single change**.
- Creating a separate Power BI file with some parts of it referencing from this model would not be possible, as a result, you would need to do a lot of **duplicates**, and **high maintenance** issue again.
- and many other issues.



Using a Query in multiple Files?

Using One Power Query Table in Multiple Power BI Reports

Date Dimension used in Sales.pbix file



Date Dimension used in Inventory.pbix file



Date Dimension transformation executed multiple times, when only once is needed





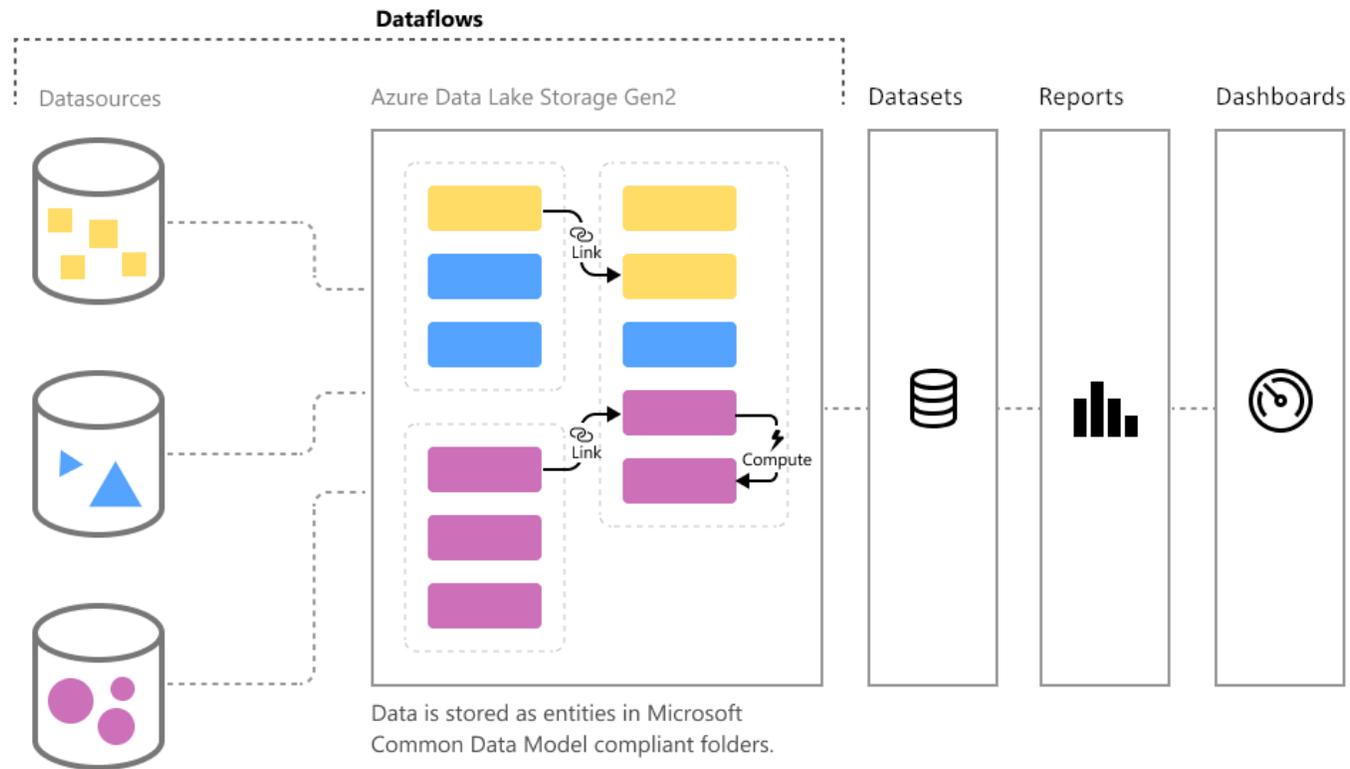
The Solution

Dataflow for Transformation

**What is
Dataflow?**

What is Dataflow?

Dataflow is a **Power Query** process that runs in the **cloud independently** from any Power BI

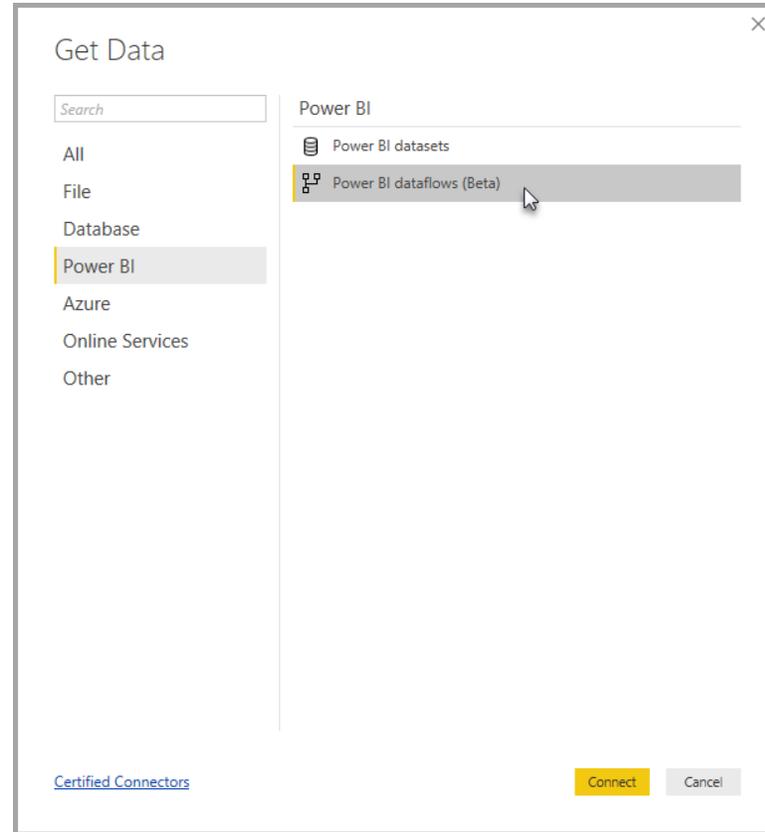


But I Don't Have Azure Data Lake Subscription!

Dataflow manages the Data Lake configurations internally. You won't need anything except your Power BI accounts and subscriptions.



Power BI Can Do Get Data from Dataflow



Using One Power Query Table in Multiple Power BI Reports

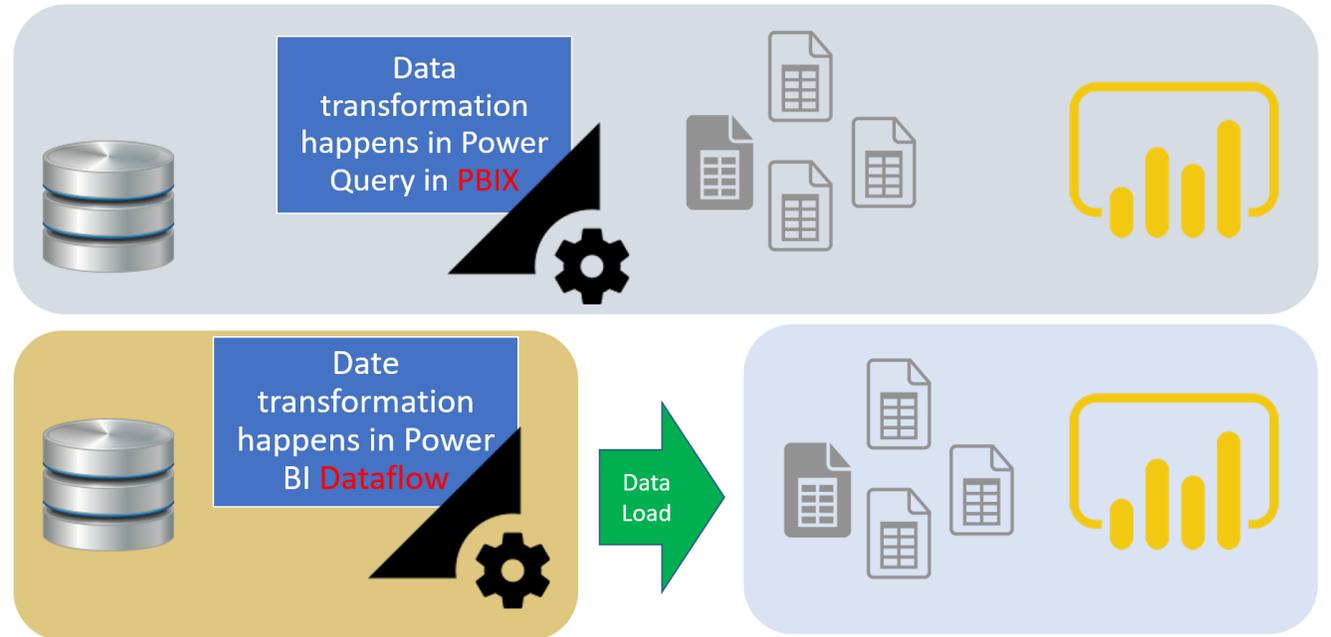
Re-usable tables or queries across multiple Power BI files, are one of the best candidates for Dataflow.



Date Dimension transformation executed only once, and then used multiple times



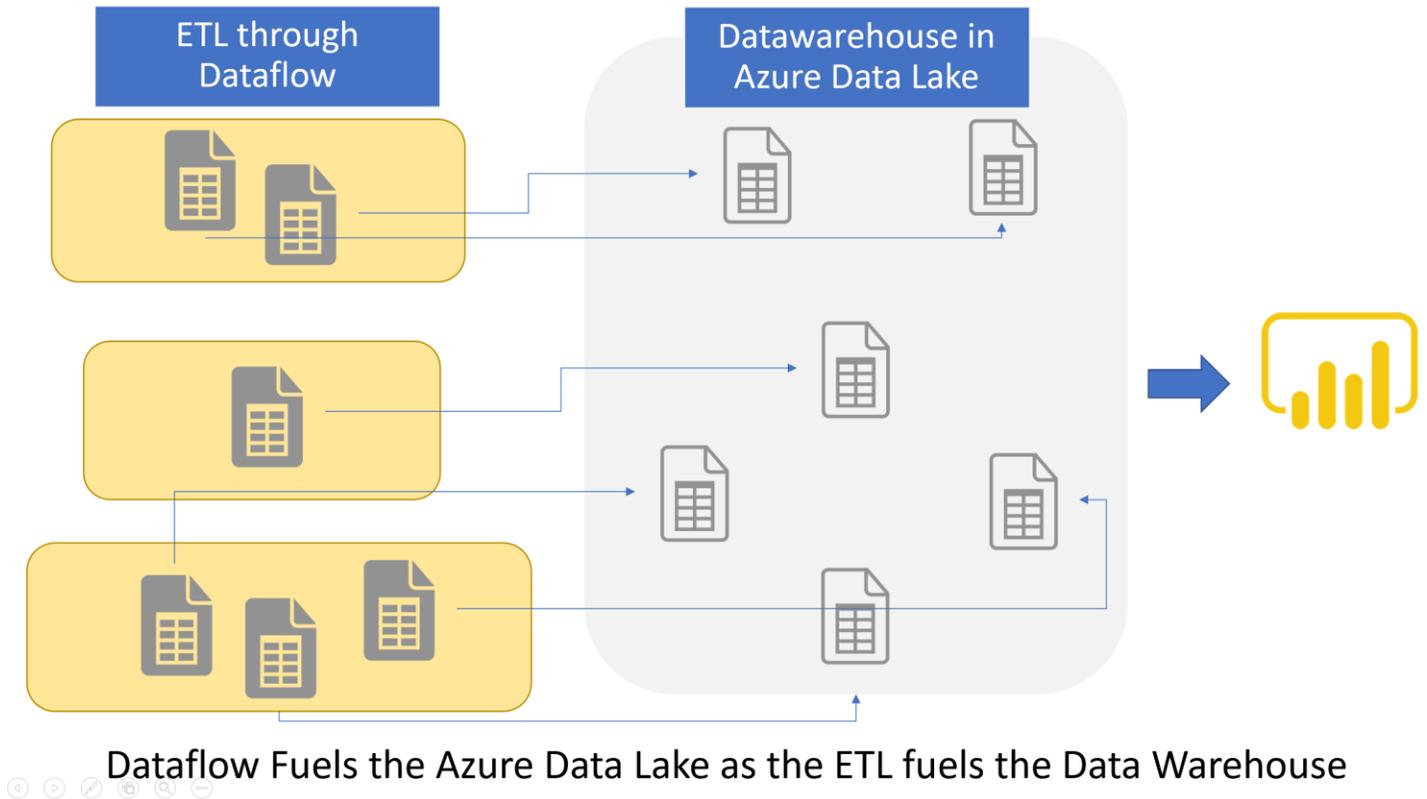
FASTER refresh time



Push heavy transformations to Power BI dataflow

Centralized Data Warehouse

Dataflow can be the ETL engine, that fuels the centralized data warehouse in Azure data lake storage.



Dataflow Demo

Task Manager

File Options View

Processes Performance App history Startup Users Details Services

Name	Status	8% CPU	48% Memory	2% Disk	0% Network	6% GPU
Apps (6)						
> Google Chrome (2)						
> Microsoft Outlook						
> Microsoft Outlook						
▼ Power BI Desktop (9)						
CefSharp.BrowserSubprocess		0%	971.4 MB	0 MB/s	0.1 Mbps	0%
CefSharp.BrowserSubprocess		0%	85.6 MB	0 MB/s	0 Mbps	0%
CefSharp.BrowserSubprocess		0%	47.0 MB	0 MB/s	0 Mbps	0%
CefSharp.BrowserSubprocess		0%	144.6 MB	0 MB/s	0 Mbps	0%
CefSharp.BrowserSubprocess		0%	3.7 MB	0 MB/s	0 Mbps	0%
CefSharp.BrowserSubprocess		0%	133.6 MB	0 MB/s	0 Mbps	0%
Console Window Host		0%	4.9 MB	0 MB/s	0 Mbps	0%
Microsoft Mashup Evaluation Container		0%	51.2 MB	0 MB/s	0 Mbps	0%
Microsoft Power BI Desktop		0%	409.8 MB	0 MB/s	0.1 Mbps	0%
Microsoft SQL Server Analysis Services		0%	91.0 MB	0 MB/s	0 Mbps	0%

Power BI Dataset is hosted through Analysis Services Engine

The **report** is the visualization layer of your Power BI implementation

The **dataset** includes the data, tables, relationships, calculations, and connection to the data source.

What is the Dataset?

Search content...

Dashboards Reports Workbooks **Datasets** Dataflows

NAME ↑	ENDORSEMENT	ACTIONS	REFRESHED	NEXT REFRESH
		    ...	1/7/2019, 5:53:10 AM	N/A
		    ...	11/28/2018, 3:26:01 AM	N/A

Dataset in the Service



**Multiple report
visualizers using
the same
calculation (DAX)?**

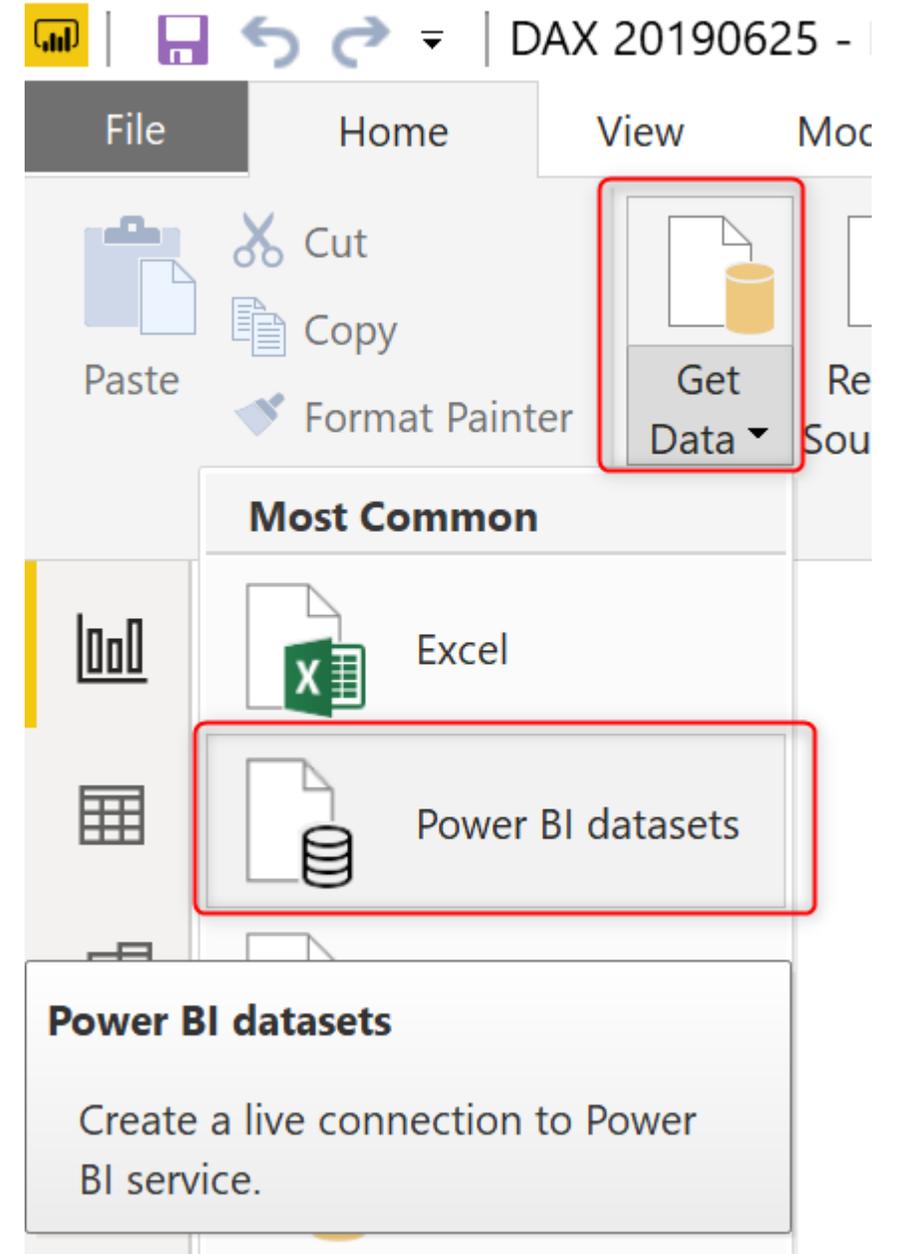
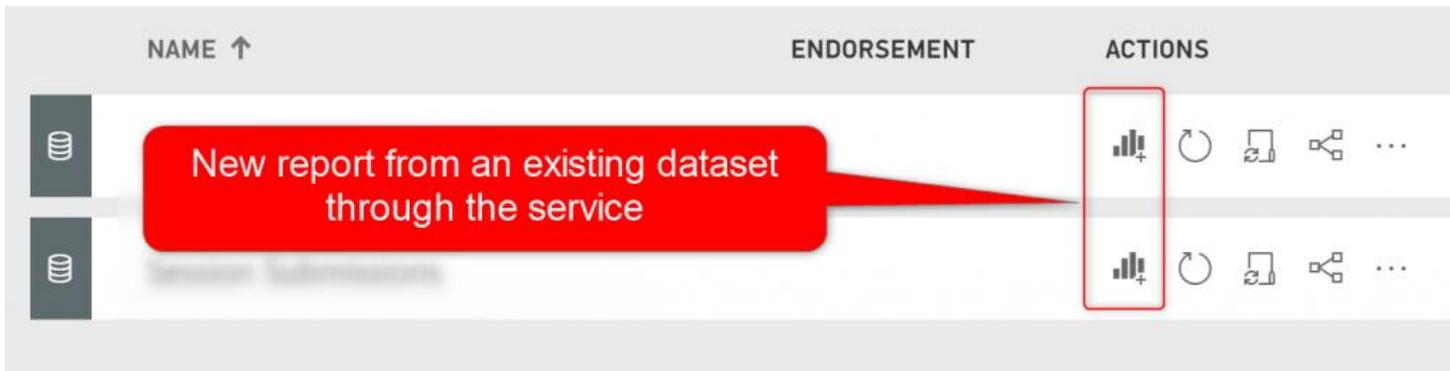


The Solution

Shared dataset

Shared Dataset

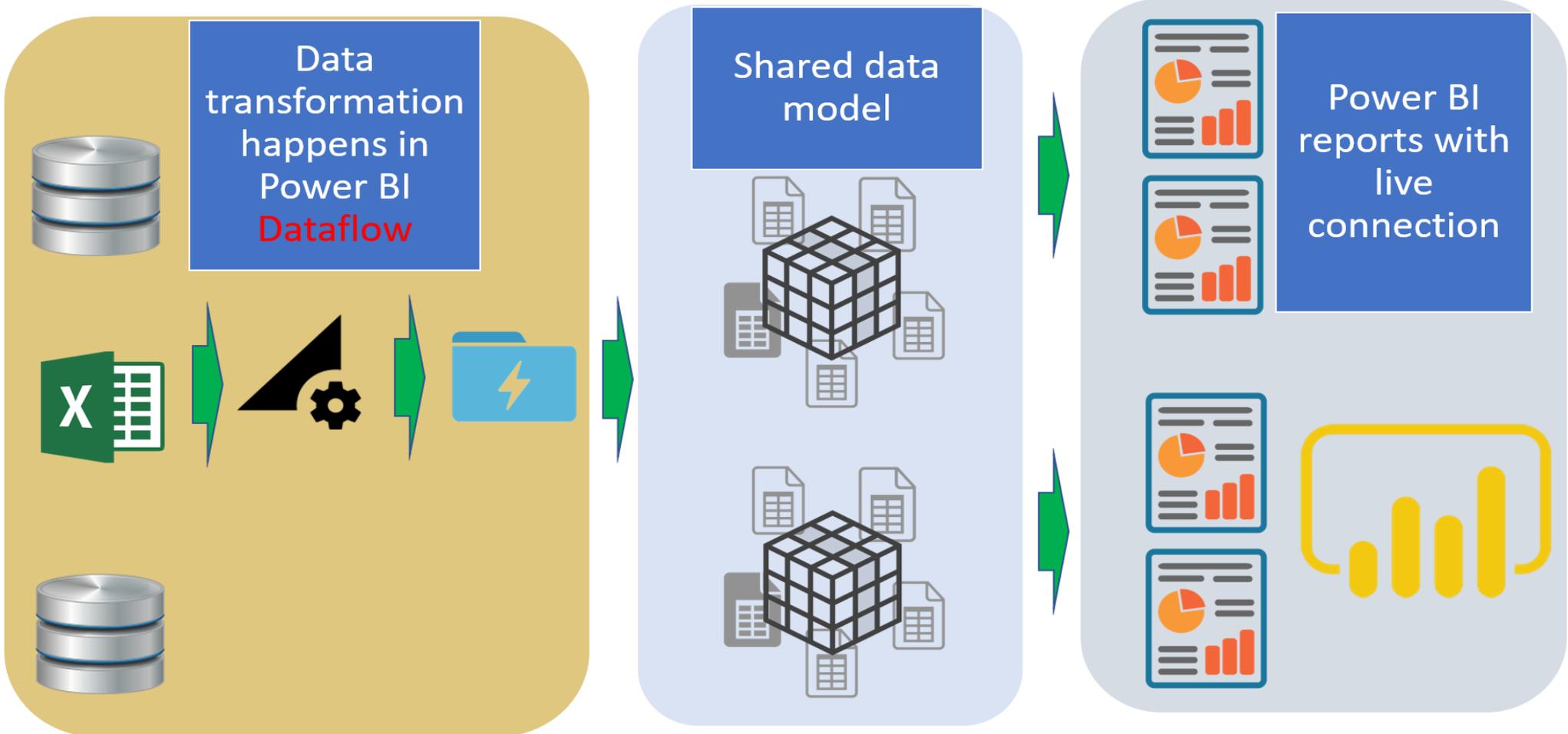
Dataset used in multiple reports



Shared Dataset Demo

The Architecture

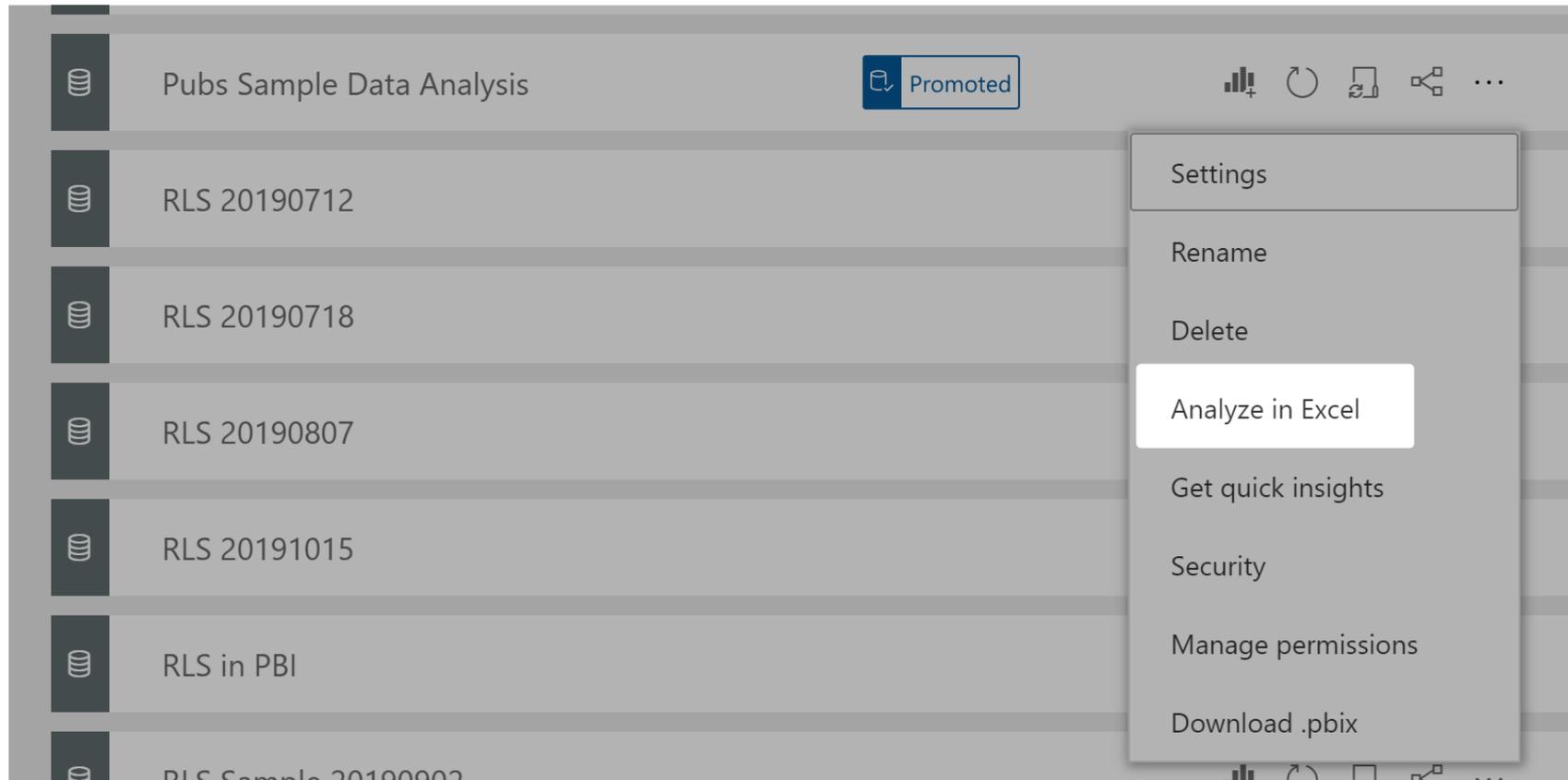
Power BI Architecture for Multi-Developer Tenant Using Dataflows and Shared Datasets



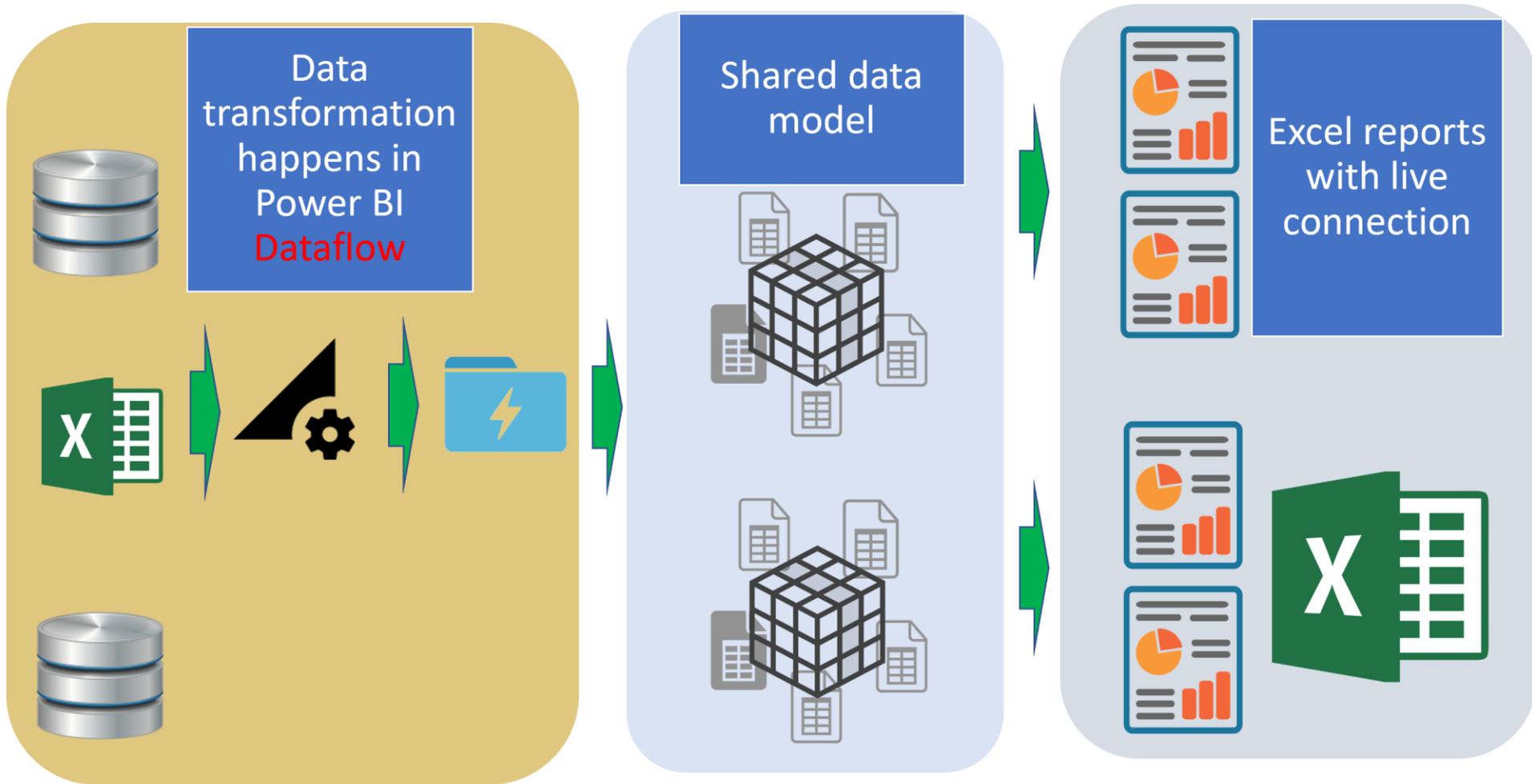
Power BI Solution Architecture

Excel Users: Analyze in Excel

NO Export!



Power BI Architecture for Multi-Developer Tenant Using Dataflows and Shared Datasets

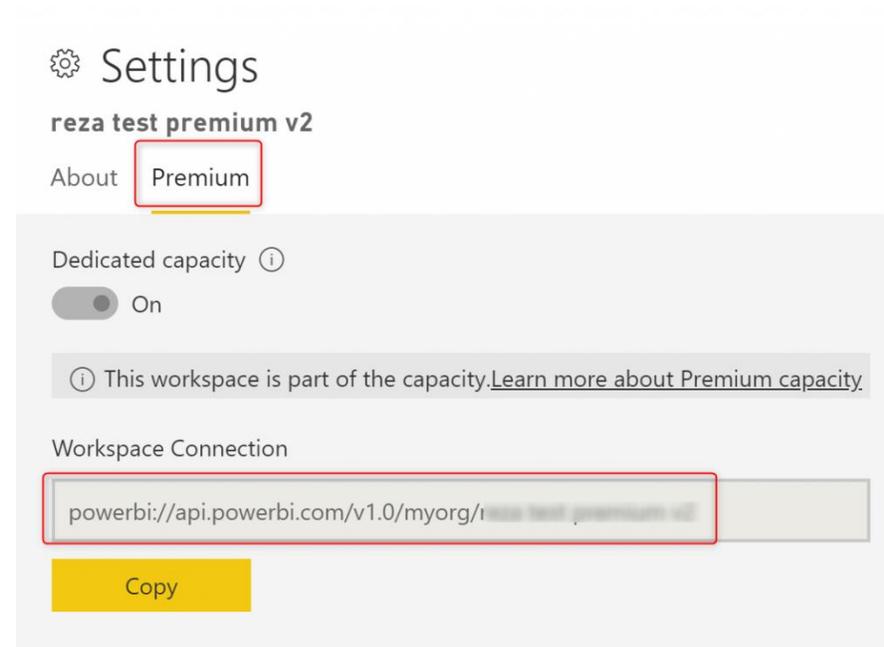


Power BI Solution Architecture

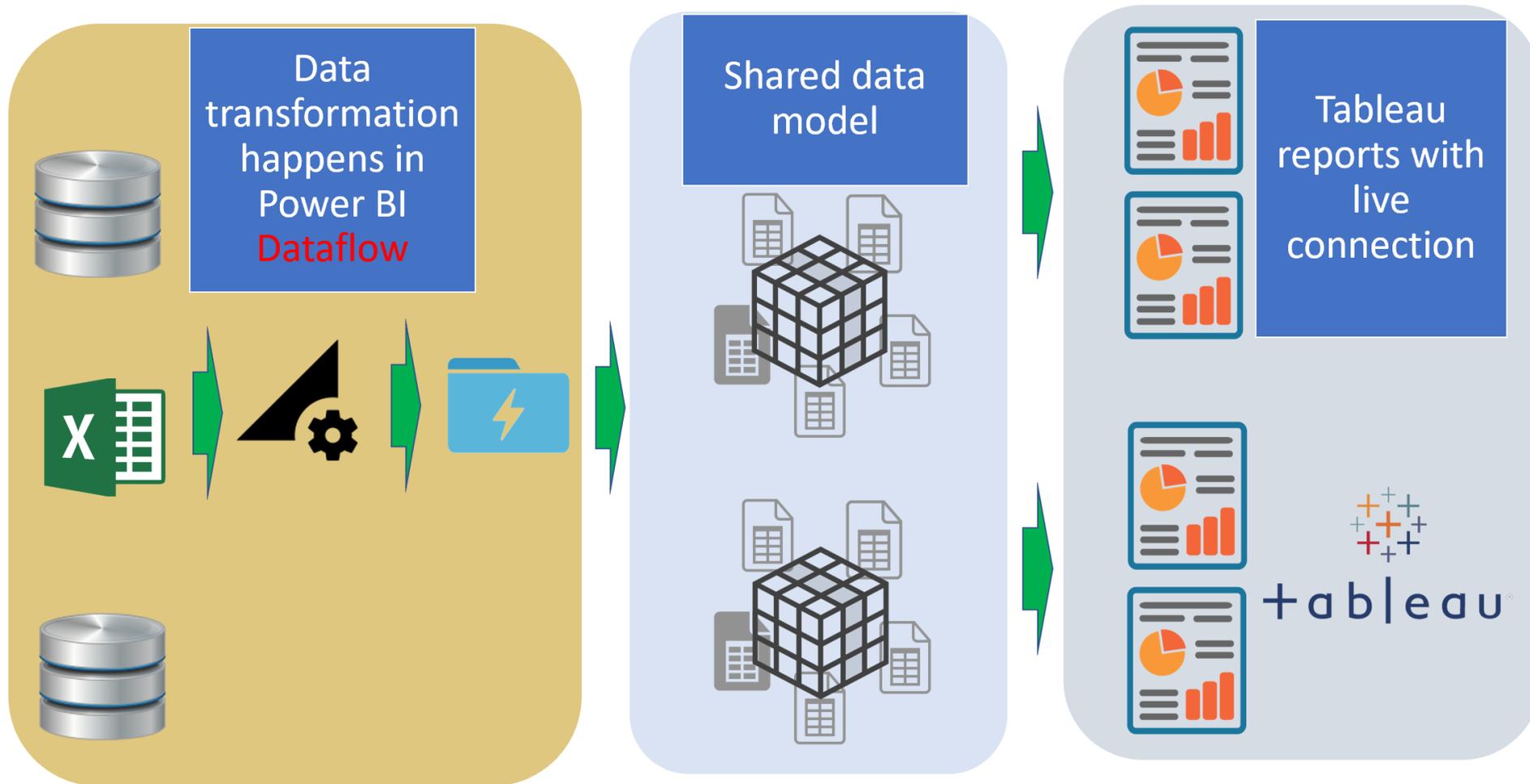
If you use other visualization tools!

No Problem, we got your back.

Power BI covers the limitations of Tableau 😊 😁



Power BI Architecture for Multi-Developer Tenant Using Dataflows and Shared Datasets



Power BI Solution Architecture (Premium)

 @rad_reza

 /in/rezarad

 /radacad

 <https://radacad.com>

Paginated Reports

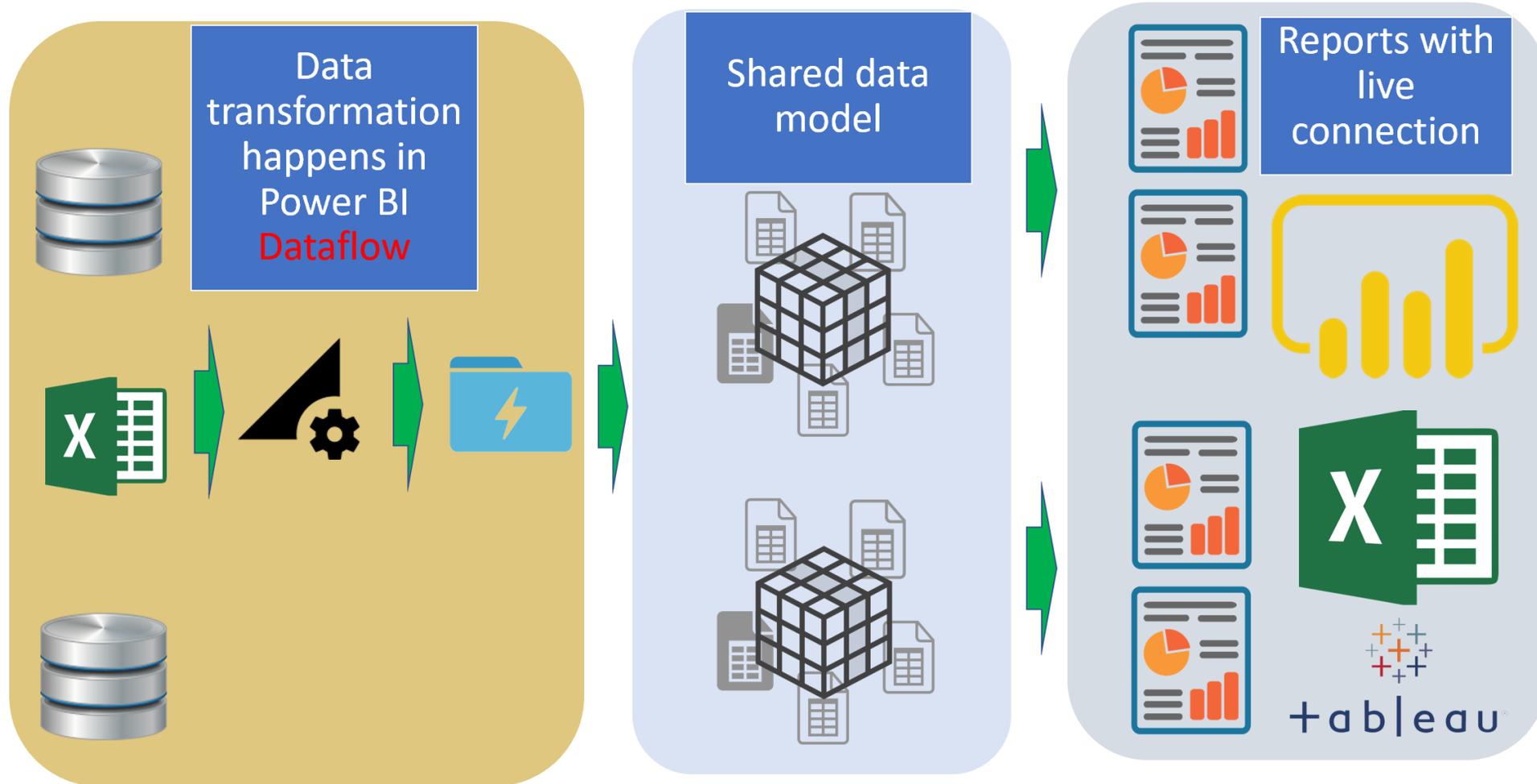
Build for printing, export to PDF, paginated...

The screenshot shows a Power BI report interface. At the top, the title bar reads 'Power BI My Workspace > WWI - Account Statement v2'. Below this, a navigation bar shows 'File', 'Export', and a page indicator '560 of 563'. The main content area is divided into sections:

- Filters:** 'Buying Group' (Tailspin Toys), 'Location' (Absecon, NJ, Aceituna...), 'Invoices From Date' (05/01/2016), and 'Invoices To Date' (05/31/2016). A 'View Report' button is visible.
- Report Header:** 'Buying Group Account Statement', 'Invoice Range: May 01, 2016 to May 31, 2016', 'Buying Group: Tailspin Toys, 201 Customers Selected', and 'Wide World Importers' logo.
- Invoice Details:** 'Invoice No: 73507-70431', 'Invoice 2 of 3', 'Invoice Date: May 31, 2016', 'Purchase Order No: 16826', 'Billed To: Tailspin Toys (Head Office)', 'Delivery Information: Suite 150, 1959 Sarma Road', 'Delivery Time:', and 'Received By:'.
- Table:** A table with columns: Item, Quantity, Unit Price, Tax, and LineTotal.

Item	Quantity	Unit Price	Tax	LineTotal
DBA joke mug - you might be a DBA if (White)	7	\$13.00	\$13.65	\$104.65
Ogre battery-powered slippers (Green) XL	8	\$32.00	\$38.40	\$294.40
Packing knife with metal insert blade (Yellow) 18mm	15	\$2.40	\$5.40	\$41.40
"The Gu" red shirt XML tag t-shirt (White) 3XS	48	\$18.00	\$129.60	\$993.60
TOTAL			\$187.05	\$1,434.05

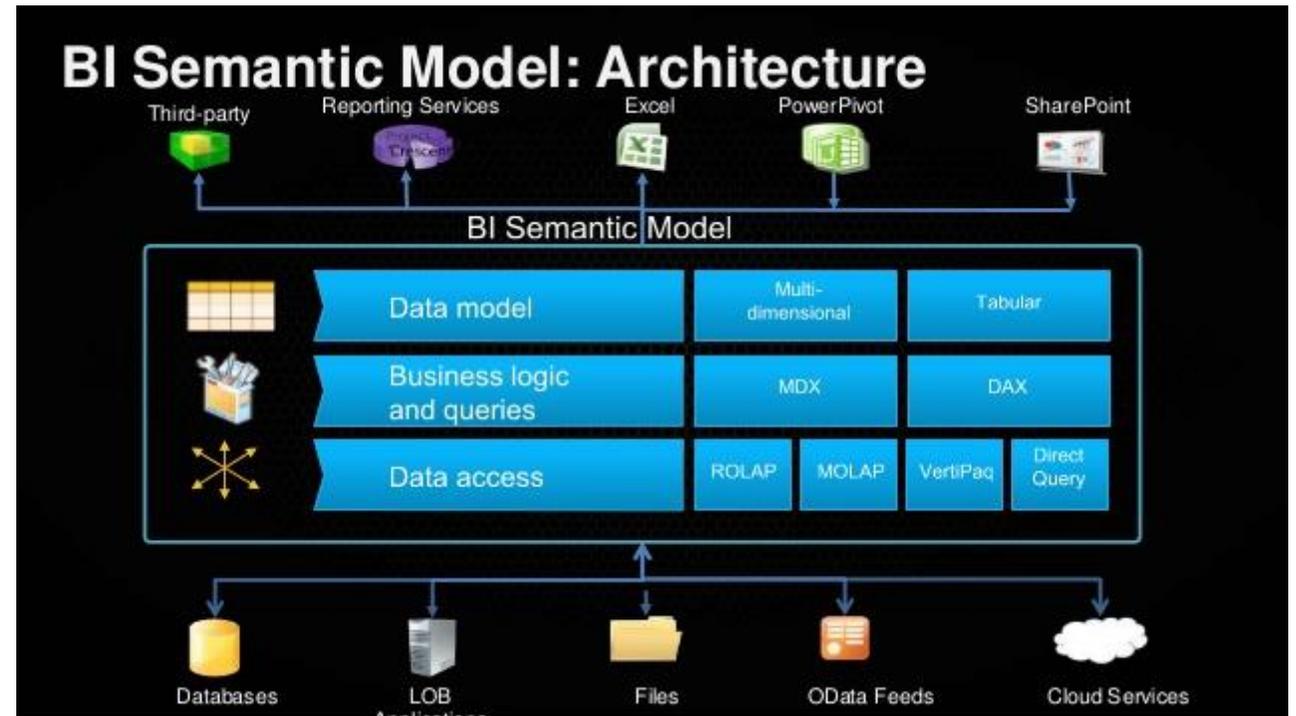
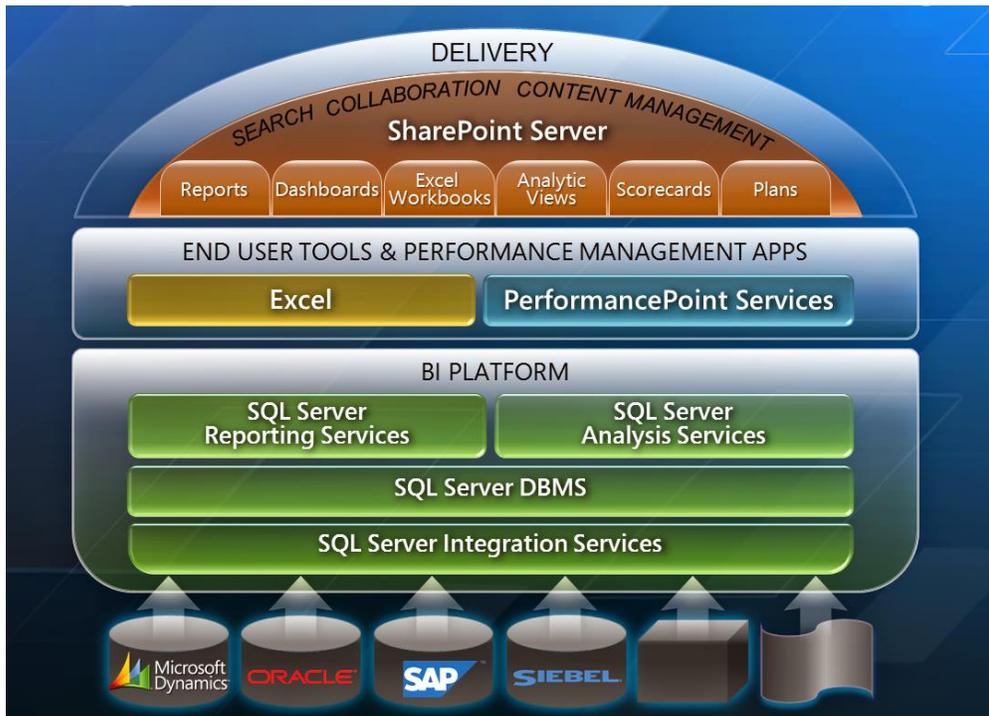
Power BI Architecture for Multi-Developer Tenant Using Dataflows and Shared Datasets



Power BI Solution Architecture

This Architecture is Not New

- Re-using best practices from traditional BI system
- Removing problematic blocks



Benefits of this architecture

Decoupling Data preparation, Modelling, Visualization

Faster Refresh Time for Power BI model

Dataflow is not a core developer tool

Multi-Developer Environment

Re-use of Calculations and Modeling

Dataflow Vs. Dataset

Dataflow	Dataset
Replacement of your Power Query layer	Replacement of your modeling, relationship, DAX expressions
ETL Layer	Modeling Layer
Feeds Data to the Dataset	Feeds the Visualization Layer
Access the data source directly (usually)	Access the data from dataflow (best practice)
Dataflow developer needs to have Power Query skills	Dataset developer needs DAX and modelling skills
Users of dataflow are data modelers	Users of dataset are report visualizers
Dataflow solves the problem of having multiple version of the same table in different PBIX files	Dataset solves the problem of having multiple version of the same DAX code in different PBIX files

Learn & Study More

Free articles about all these techniques:

<https://radacad.com>

Check out my Power BI Architecture video course in RADACAD Academy (and many other Power BI courses):

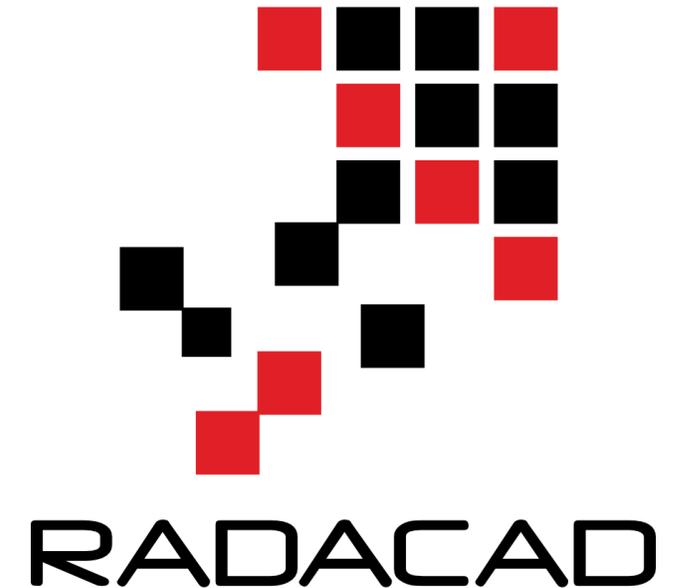
<https://learn.radacad.com>

\$30 Discount for the first month of RADACAD Academy Membership:

(limited to 5 people, be fast 😊)

TorontoPUG

<https://learn.radacad.com/product/academy-membership/>



References to Study More

- **Power BI from Rookie to Rock Star book: FREE**
- <http://radacad.com/online-book-power-bi-from-rookie-to-rockstar>
- [What are the Use Cases of Dataflow for You in Power BI?](#)
- [Getting Started With Dataflow in Power BI – Part 2 of Dataflow Series](#)
- [What is the Common Data Model and Why Should I Care? Part 3 of Dataflow Series in Power BI](#)
- [Linked Entities and Computed Entities; Dataflows in Power BI Part 4](#)
- [How to Use Dataflow to Make the Refresh of Power BI Solution Faster](#)
- [Move your Shared Tables to Dataflow; Build a Consistent Table in Power BI](#)
- [Power BI Architecture for Multi-Developer Tenant Using Dataflows and Shared Datasets](#)
- [Power BI Shared Dataset? How does it work? And why should you care?](#)
- [Refresh Power BI Queries Through Power Platform Dataflows: Unlimited Times with Any Frequency](#)
- [Workaround for Computed Entity in Power BI Pro: Dataflow in Power BI](#)
- [Dataflow Vs. Dataset: What are the differences?](#)
- <https://radacad.com/what-is-the-xmla-endpoint-for-power-bi-and-why-should-i-care>
- <https://radacad.com/power-bi-and-excel-more-than-just-an-integration>
- <https://radacad.com/power-bi-helper>

