Power BI XMLA endpoint

Open-platform connectivity

Just Blindbæk

▸ Founder of Power BI UG Denmark

▸ Host on the Power BI Quiz show

▸ Consultant in justB

▸ Trainer at Orange Man

▸ 15 years of experience with Microsoft BI

▸ Strong focus on the front-end tools

　◦ Analysis Services

　◦ Reporting Services

　◦ PerformancePoint Services

　◦ Excel and Power Pivot

　◦ Power BI

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Microsoft CERTIFIED Trainer

**Microsoft** CERTIFIED IT Professional

SSAS MAESTRO by Microsoft

MVP **Microsoft** Most Valuable Professional

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Agenda

- ▶ A walk down memory lane to set the scene
- ▶ Power BI merging with Azure Analysis Services
- ▶ What is the XMLA read/write endpoint?
- ▶ Use cases
  - ◦ Single source architecture
  - ◦ Fine-grain data refresh
  - ◦ Deployment with Tabular Editor
  - ◦ Incremental deployment with ALM Toolkit

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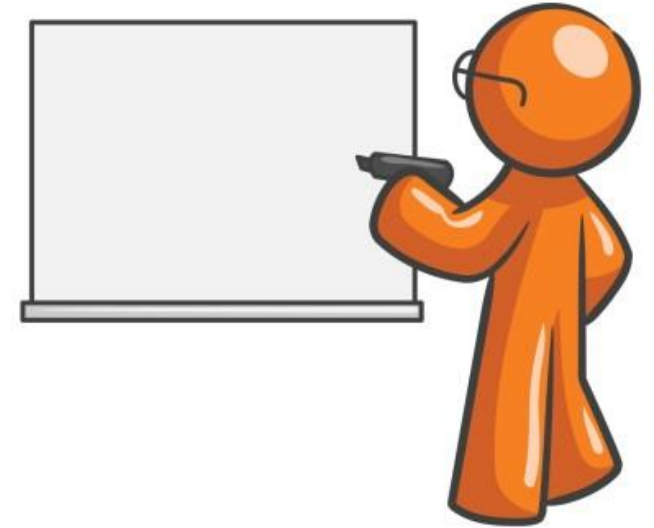
Once Upon a Time

Power Pivot

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2010: PowerPivot in Excel

Power Pivot

2011: PowerPivot in SharePoint and SQL Server

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2012: SQL Server Analysis Services Tabular

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2016: Azure Analysis Services

Azure
Analysis Services

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2013: Excel evolving

Power Query > **Power Pivot** > **Power View**

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2013: Power BI in Office 365
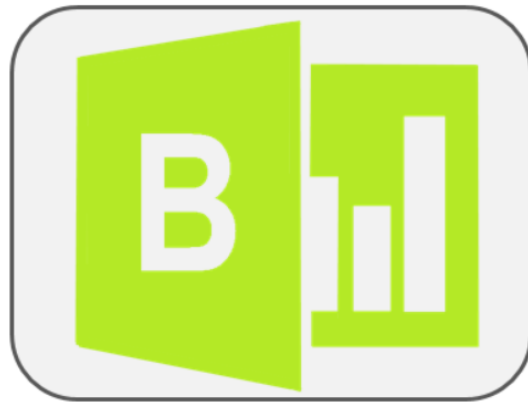

Power Query

Power Pivot

Power View

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2014: Power BI Designer (Preview)

Power BI Designer

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2015: Power BI Desktop and Service
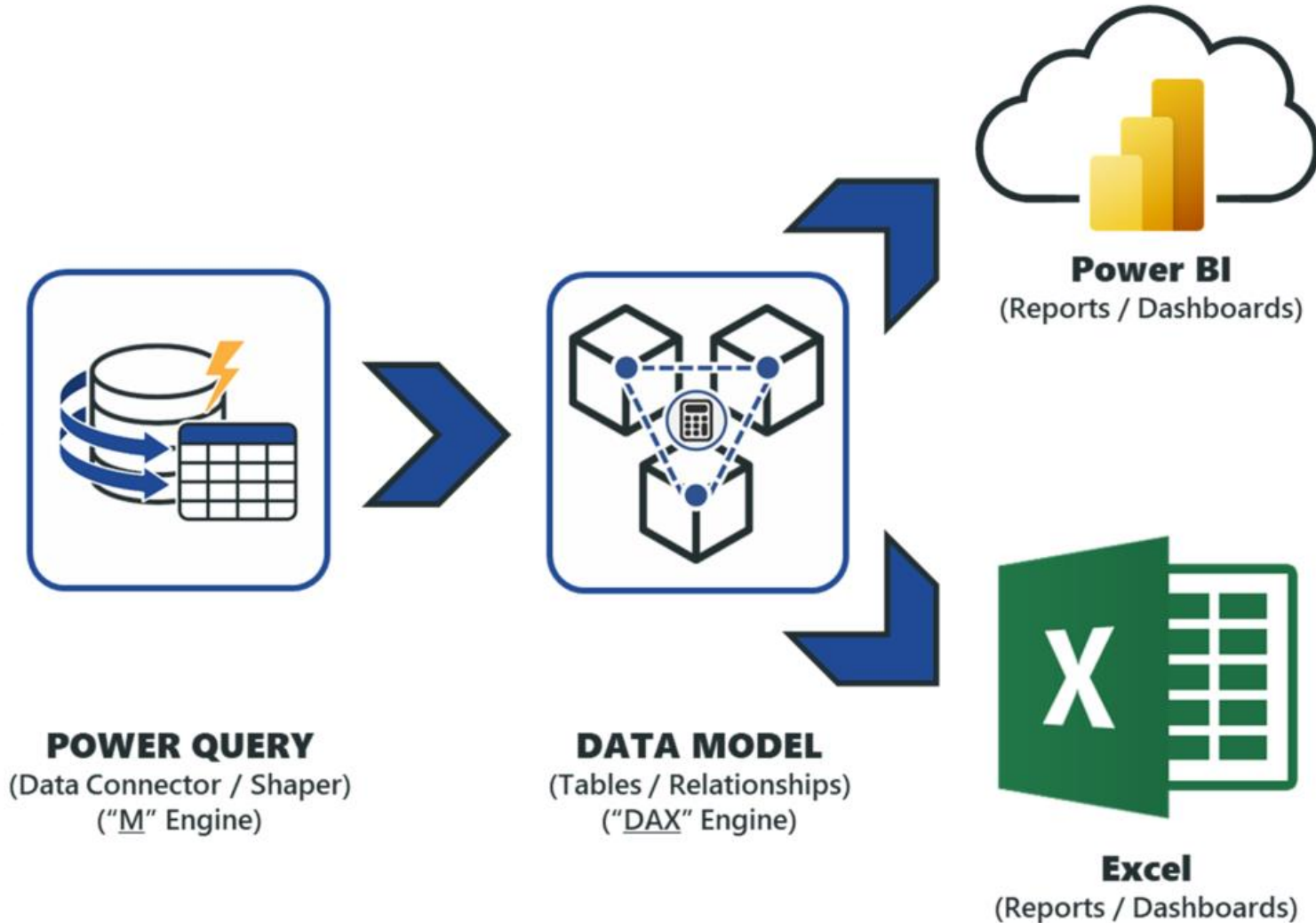
Power BI Desktop

2018: Power BI Desktop and Service

Power BI Desktop

2020: Power BI Desktop and Service

Power BI Desktop

Today: Power BI dataset = Tabular Model

POWER QUERY
(Data Connector / Shaper)
("M" Engine)

DATA MODEL
(Tables / Relationships)
("DAX" Engine)

Power BI
(Reports / Dashboards)
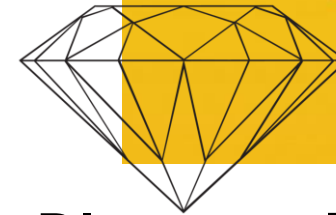
Excel
(Reports / Dashboards)

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Power BI merging with Azure Analysis Services

Enterprise BI   **All BI useSself–service BI users**

Azure Analysis Services   Power BI   Power BI
Premium

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Feature disparity

Power BI Premium

- Unlimited consumption
- Premium workloads for paginated reports, dataflows, and AI

Security
- VNETs, private links & service tags
- Bring your own key

Governance & discoverability
- Azure Purview integration
- Microsoft Information Protection labels
- Lineage view and impact analysis
- Certified datasets
- Datasets hub and Teams integration

Administration & simplified management
- Incremental refresh policies
- Deployment pipelines for ALM
- Scheduled refresh in the PBI service

Performance & scale
- Premium Gen2 architecture
- Aggregations for petabyte-scale analysis
- Performance Accelerator for Azure Synapse Analytics

Modeling
- Power BI Desktop dataset authoring
- Virtualization at scale with composite models
- Lots of data sources / connectors
- Metadata translations in Power BI service

Azure AS

- XMLA endpoint
- Large models
- Azure Log Analytics
- Object-level security
- Backup restore
- Asynchronous refresh
- Query scale out

Tabular models

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https://powerbi.microsoft.com/en-us/blog/power-bi-as-a-superset-of-azure-analysis-services/
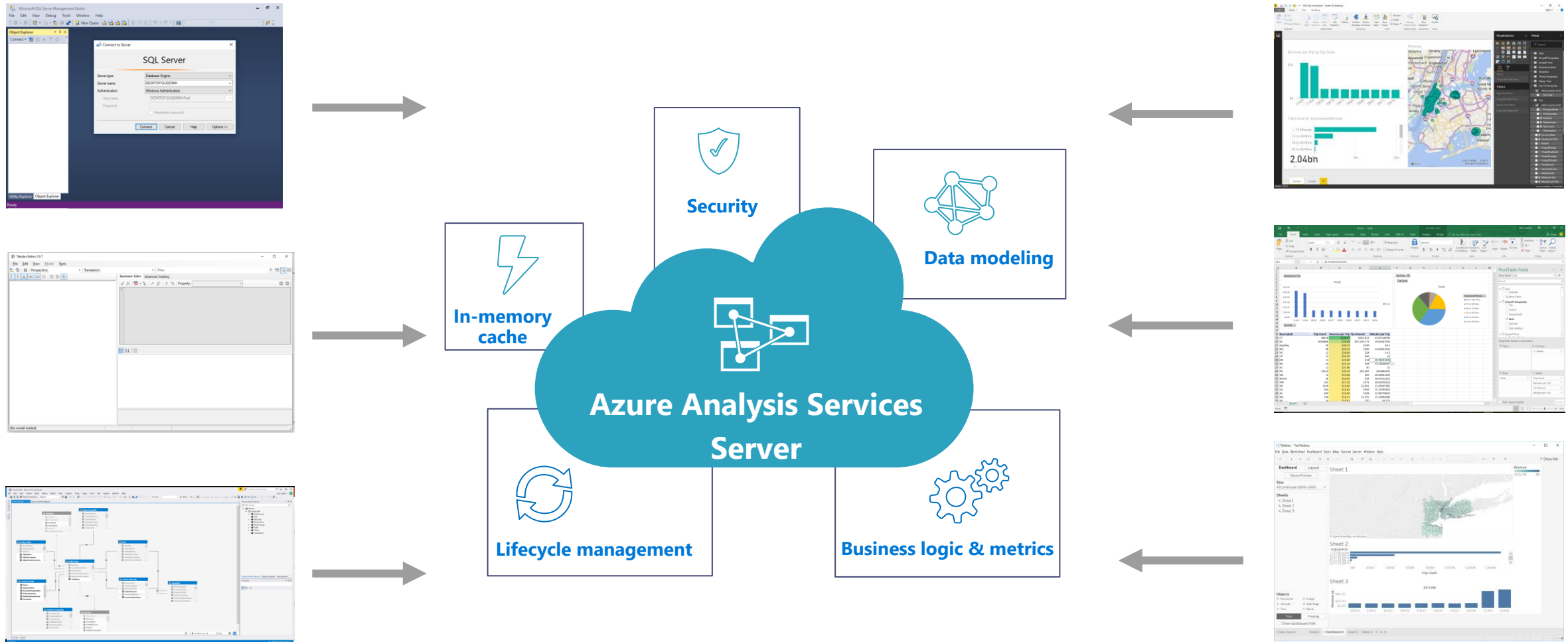
What is the XMLA read/write endpoint?

▸ XMLA is the same protocol used for managing SQL Server Analysis Services and Azure Analysis Services models, a variety of Microsoft and third-party tools can be used with Power BI datasets

▸ Power BI to support self-service and IT-managed enterprise data models on a single, all-inclusive platform

▸ Additional scenarios for dataset management, advanced semantic modeling, debugging and monitoring

▸ Requires dedicated capacity!

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Connectivity: Analysis Services

Security

Data modeling

In-memory cache

Azure Analysis Services Server

Lifecycle management

Business logic & metrics

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Connectivity: Power BI Premium

Security

Data modeling

In-memory cache

Workspace

Lifecycle management

Business logic & metrics

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What is "Dedicated Capacity" ?

	Azure Analysis Services	Power BI Embedded	Power BI Premium	Premium Per User
SKU name	AAS	A SKU	P SKU	Power BI PPU
Purchase	Azure portal	Azure portal	Office 365	Office 365
Use cases	• Only datasets • No Power BI features	• Embed content in external apps • Capacity testing	• Same as A SKU, plus: • Share content with Power BI free users through the Power BI portal • Embed in other SaaS apps (SharePoint, Teams)	• Premium features for SMB market • Capacity testing
Billing	Hourly	Hourly	Monthly	Monthly
Commitment	None	None	Yearly	Monthly

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Dedicated capacity pricing

Virtuel cores	Memory (GB)	Azure Analysis Services		Power BI Embedded		Power BI Premium		Premium Per User
1	3			A1	~$750			
2	5			A2	~$1.500			
4	10			A3	~$3.000			
8	25	S1	~$1.500	A4	~$6.000	P1	~$5.000	
16	50	S2	~$3.000	A5	~$12.000	P2	~$10.000	
32	100	S4	~$6.000	A6	~$24.000	P3	~$20.000	$20 per/user

Price is per month. Analysis Services and A SKU has full elasticity – only pay per hour!

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Demo: Capacity and tenant settings

▸ Turn Premium on a workspace

▸ Enable Read Only or Read Write for the capacity

▸ Tenant-level Export data setting in the Power BI Admin Portal

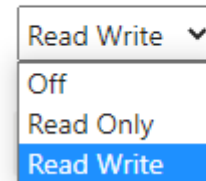◢ Allow XMLA endpoints and Analyze in Excel with on-premises datasets
Enabled for the entire organization

Users in the organization can use Excel to view and interact with on-premises Power BI datasets. This also allows connections to XMLA endpoints.
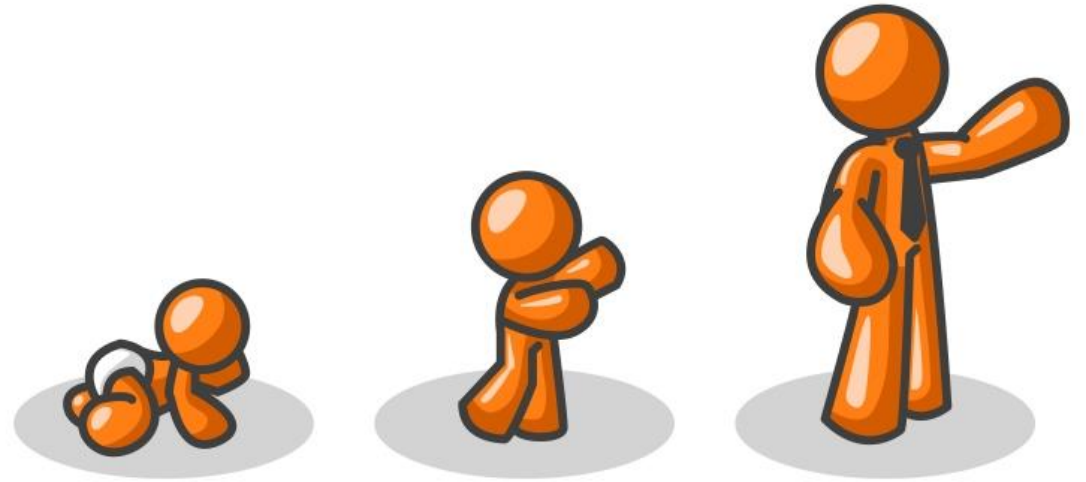
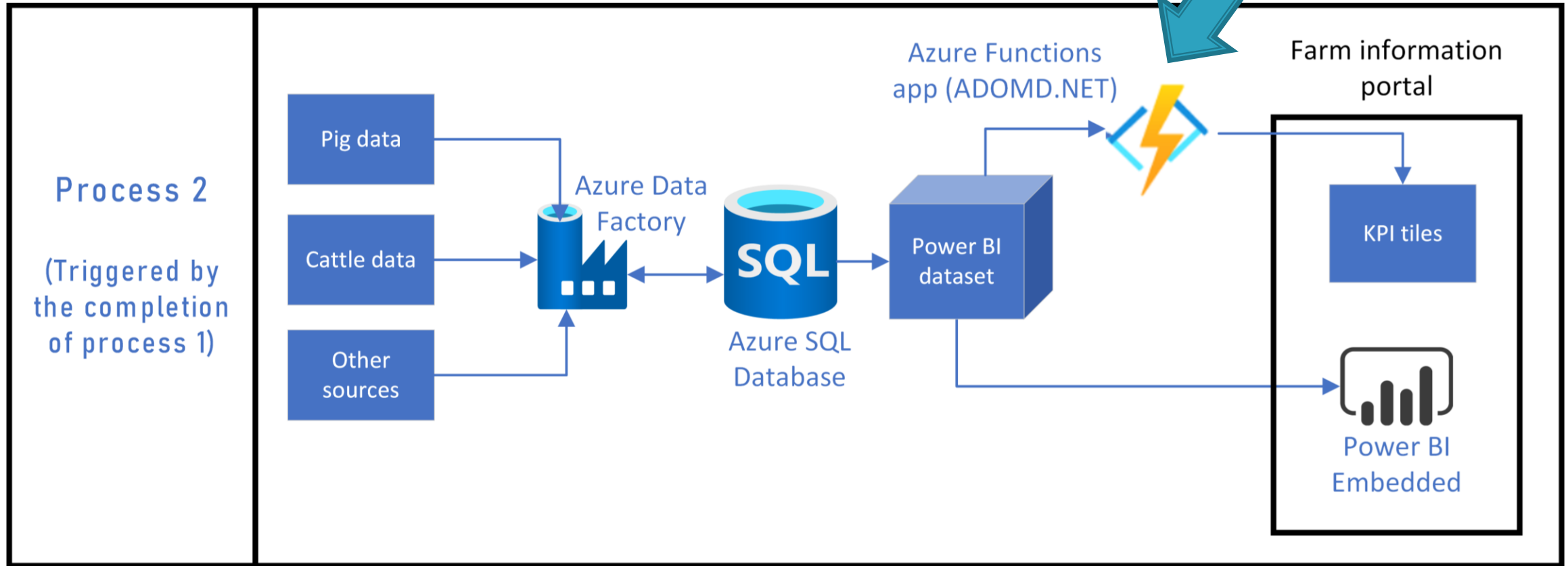⬤ Enabled

◢ Dataset workload settings

XMLA Endpoint

Read Write ▾

| Off |
| Read Only |
| **Read Write** |

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Demo of use cases

Single-source architecture

Process 2

(Triggered by the completion of process 1)

Pig data

Cattle data

Other sources

Azure Data Factory

SQL

Azure SQL Database

Power BI dataset

Azure Functions app (ADOMD.NET)

Farm information portal

KPI tiles

Power BI Embedded

https://customers.microsoft.com/en-us/story/852447-seges-professional-services-power-bi

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Connectivity

- ADOMD.NET client library is required
- Addressing a workspace
  - powerbi://api.powerbi.com/v1.0/myorg/[your workspace name]
  - myorg can be replaced with your tenant name (e.g. "mycompany.com")
  - [your workspace name] is case sensitive and can include spaces
  - May need to specify Initial Catalog
- XMLA endpoints will honor the security group membership set at the workspace/app level
  - Workspace contributors and above have write access to the dataset and are therefore equivalent to Analysis Services database admins
 - App viewers are equivalent to Analysis Services database readers

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Demo: Query from DAX Studio

▸ Connecting to a Premium workspace

▸ Execute a DAX Query

▸ Extra:

  ◦ Execute a DMV Query
  ◦ Run the Vertipaq analyzer

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Tools leveraging the read/write connectivity

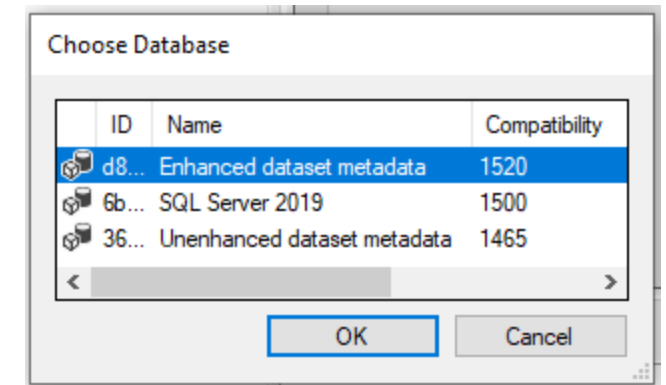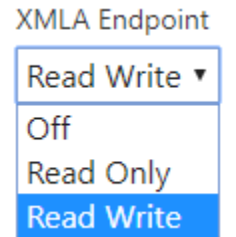| Tool	Description
SQL Server Data Tools (SSDT)	Model authoring with a range of enterprise features, integration with source control, and application-lifecycle management processes.
Analysis Services Deployment Wizard	Deployment of Visual Studio authored tabular model projects. It can be run interactively or from the command line for automation.
Tabular Editor	Open-source, community tool with extensive set of enterprise modelling features, and easy-to-use experience
SQL Server Management Studio	Perform fine-grain data refresh, scripting and management.
ALM Toolkit and BISM Normalizer	Application-lifecycle management, incremental deployments and model merging
PowerShell cmdlets	Analysis Services cmdlets can be used to automate dataset management tasks like refresh operations.
Other third-party tools	

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Near real-time refresh architecture
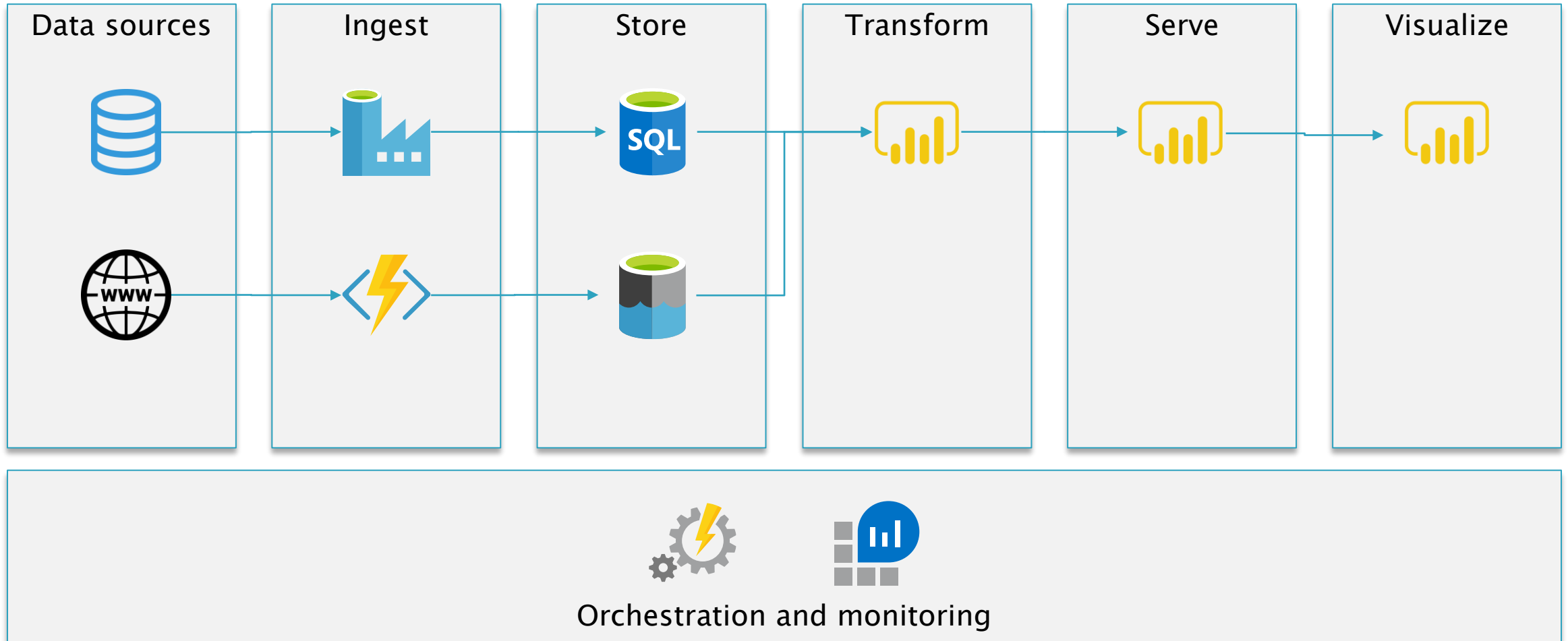
Demo: Fine-grain data refresh

▸ Refresh only one table or partition in a dataset

▸ Scenario: Near real-time refresh

▸ PowerShell cmdlet: Invoke-ProcessTable

▸ Automation with Azure Runbook

ProcessTable.ps1 ✕

```
1    ##  Parameters
2    $Server = 'powerbi://api.powerbi.com/v1.0/myorg/IT-managed datasets'
3    $Database = 'TraditionalDW'
4    $TableName = 'Metadata'
5    $RefreshType = 'Full'
6
7    Invoke-ProcessTable -Server $Server -Database $Database -TableName $TableName -RefreshType $RefreshType
8
```
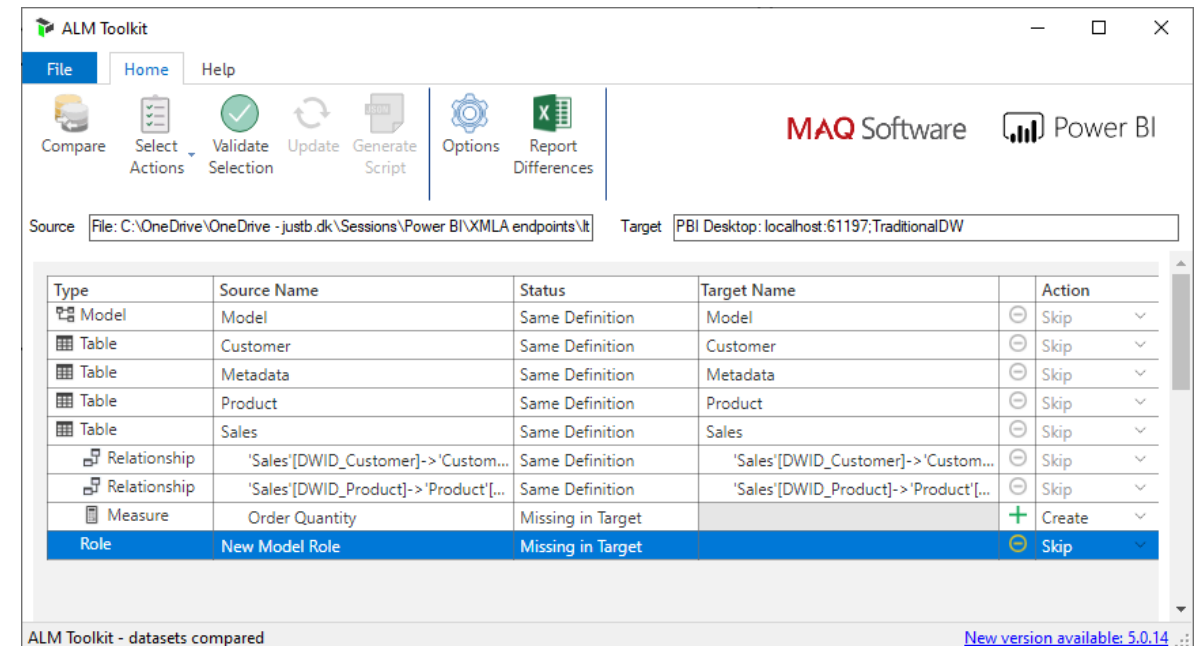
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Demo: Deployment with Tabular Editor

▸ Live connect to dataset with Tabular Editor
▸ Deploy a saved model to the Power BI Service
▸ Automating the deployment process

▸ Download dataset from the Power BI Service?

XMLA Endpoint
Read Write ▾
Off
Read Only
Read Write

Choose Database

	ID	Name	Compatibility
⬚	d8...	Enhanced dataset metadata	1520
⬚	6b...	SQL Server 2019	1500
⬚	36...	Unenhanced dataset metadata	1465

OK   Cancel

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Demo: Incremental deployment with ALM Toolkit

▶ Compare models
  ◦ Power BI Desktop to Dataset in Workspace
  ◦ .BIM file to Dataset in Workspace

▶ Incremental deploy changes

Questions?

Ressources

- https://powerbi.microsoft.com/en-us/blog/announcing-read-write-xmla-endpoints-in-power-bi-premium-public-preview/

- https://aka.ms/XmlaEndpoint

- https://radacad.com/what-is-the-xmla-endpoint-for-power-bi-and-why-should-i-care

- https://justb.dk/blog/2020/04/use-cases-for-the-xmla-endpoint/

- https://justb.dk/blog/2020/04/using-the-xmla-endpoint-without-premium/

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