



Lessons learned from 5 years of Power BI implementations

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 @kjonge

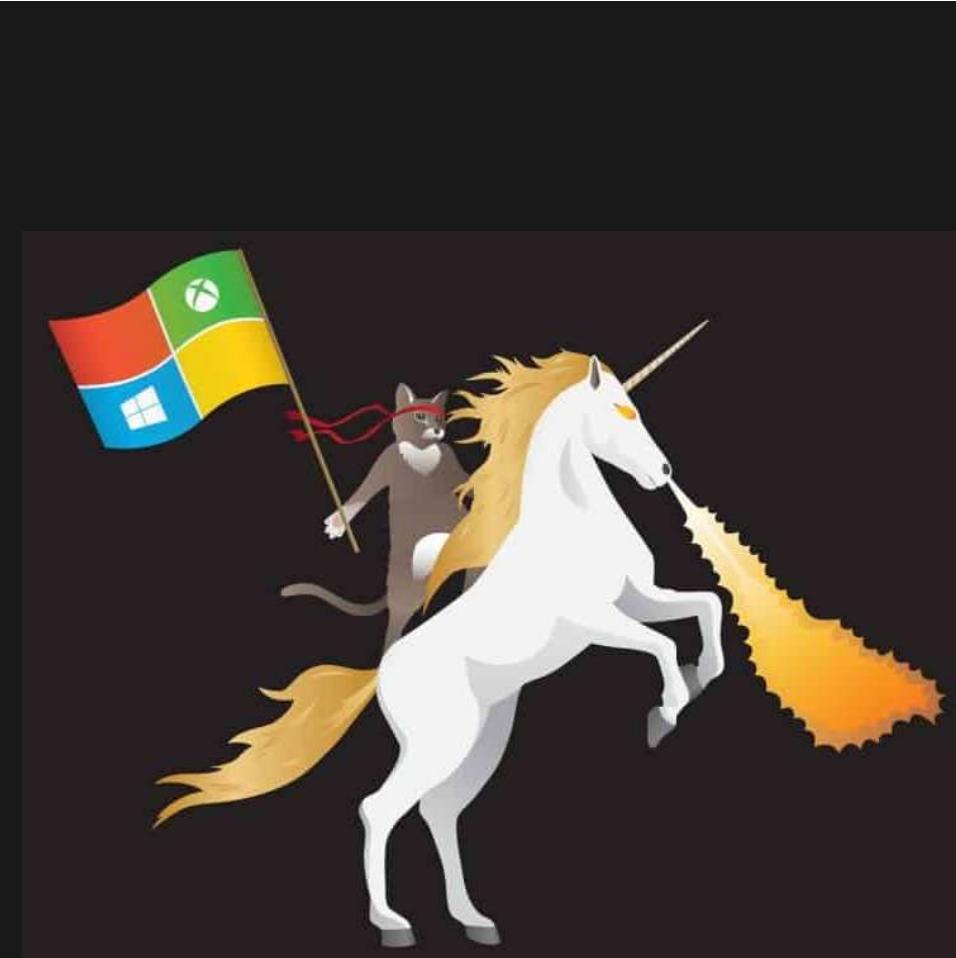


Power BI



CAT

- Small team of “elite ninjas”
- Work with some of the largest customers on their toughest problems
- Are the Power BI tip of the spear
- We then provide feedback to the Power BI team.
- **<https://aka.ms/PowerBISTories>**





Agenda

State of Power BI

Lessons learned:

- Adoption
- Common problems
- Visions of “the lake”





Drive a data culture

everyone | every decision | at any scale

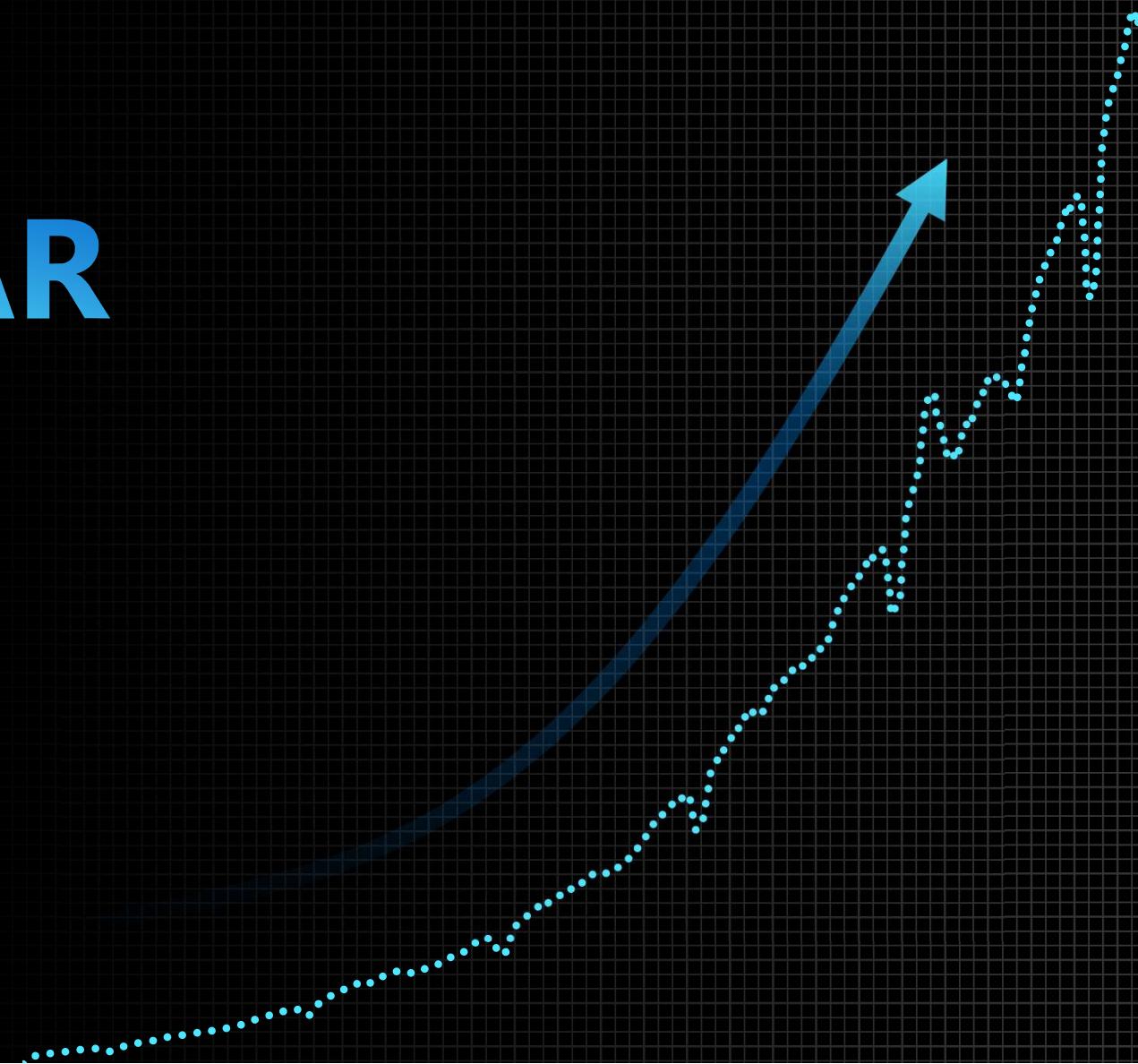


6th YEAR

of rapid growth

260K+

Organizations



Global Cloud BI Service



50+

Datacenters
Worldwide

43

Languages

National Clouds

US Government,
China & Germany

Thriving community



1.4M

Community
Members

300+

Independent
Power BI User
Groups Worldwide

Customer Ideas

500k+ User Votes

95k+ Active Users

23k+ Active Ideas

Rapid innovation

December	January/February	March	April/May	June	July
<p>REPORTING</p> <ul style="list-style-type: none"> Customize current theme (preview) Export current theme Setting table column or matrix value as a custom URL KPI visual formatting settings New decomposition tree formatting Filter pane toggle button in the new ribbon Automatic Page Refresh query details (preview) <p>ANALYTICS</p> <ul style="list-style-type: none"> Load more for Analyze insights New DAX Function: Quarter <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> Personalization of the visualization pane is now generally available xViz Hierarchy tree xViz Bullet chart xViz Parallel Coordinates xViz Gantt chart Zebra BI charts Zebra BI tables Drill Down Combo Bar PRO by ZoomCharts Annotated Bar by Queryon Tachometer 5 Ranges ValQ licensing updates <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Azure Data Lake Storage Gen2 connector is now generally available Power Platform Dataflows connector PostgreSQL connector now includes the Npgsql provider AI Scale connector is now generally available Azure Time Series Insights connector Data Virtuality connector Zucchetti HR Infinity connector <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Updates to AI Insights functions (preview) <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Omnichannel insights for Dynamics 365 Customer service analytics for Dynamics 365 Microsoft Forms Pro for Customer Service <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> Power BI Mobile "new look" generally available 	<p>REPORTING</p> <ul style="list-style-type: none"> Hierarchical slicer (preview) Updates to the new ribbon (preview) <ul style="list-style-type: none"> Title bar updates Keytips Accessibility <p>ANALYTICS</p> <ul style="list-style-type: none"> Incremental refresh generally available New DAX Functions <ul style="list-style-type: none"> FirstNonBlankValue LastNonBlankValue <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> Funnel and pyramid chart by xViz OEE Dashboard by 3AG Systems Organization chart by MAQ Software PI VIZpack by PQ Systems <ul style="list-style-type: none"> Histogram Individuals control chart Individuals and moving range control chart Multi-group individual chart X-bar control chart X-bar and range control chart P-chart U-chart Updates to Zebra BI tables and charts <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Microsoft 365 usage analytics NFL analytics by P3 Acterys for Quickbooks, Xero & WorkflowMax <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Non-admin support for query diagnostics <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> MicroStrategy connector is now generally available FHIR connector is now generally available Factset connector TIBCO connector Jamf Pro connector Asana connector <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> Power BI report server January release Updated Premium Capacity Metrics app with health center Improved report usage metrics Featured content in Power BI home 	<p>REPORTING</p> <ul style="list-style-type: none"> New action types for buttons Page navigation Drill through (preview) Multi-column sort for tables Dual axis for line chart Filter pane search Updates to decomposition tree Bars per level formatting option Updates to behavior of data bar length New ribbon is now on by default <p>ANALYTICS</p> <ul style="list-style-type: none"> The new Q&A visual <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> PowerApps visual is now included by default New xViz visuals Hierarchical Variance Table Linear Gauge Tag Cloud <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Sagra Emigo connector generally available Azure Cost Management connector updated New Workplace Analytics connector <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Query diagnostics Data profiling enhancements <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Azure DevOps dashboard by Data Maru TeamsPower by Encamina <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Query diagnostics is now generally available <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Hive LLAP connector Cognite connector <p>OTHER</p> <ul style="list-style-type: none"> Enhanced dataset metadata (preview) Using default system credentials for web proxy New instructor-led administrator in a day training <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> New Look for Power BI mobile (Preview) September update for On-premises data gateway Template apps update (Preview) Roadmap updates Lineage view Dataset impact analysis Dataflow certification Copy a visual as an Image New look for workspaces Custom navigation for Apps Shortcuts in Android app 	<p>REPORTING</p> <ul style="list-style-type: none"> Automatic page refresh for DirectQuery (preview) <p>ANALYTICS</p> <ul style="list-style-type: none"> The new Q&A visual <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> PowerApps visual is now included by default New xViz visuals Hierarchical Variance Table Linear Gauge Tag Cloud <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> AI insights are now generally available <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Line chart dot formatting options Radar chart by MAQ Software ValQ for Modern Visual Planning Advanced Trellis by xViz Updates to Gantt chart by xViz Updates to Cards with States by OKViz <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Agile HR Analytics Uber User Data Report <p>MODELING</p> <ul style="list-style-type: none"> Model view enabled for live connect (preview) Updates to Model view <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Palantir Foundry connector Enhanced connectivity for Snowflake <p>OTHER</p> <ul style="list-style-type: none"> New Power BI trainings <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> Data protection Dark mode for iOS app Template apps update Improved mobile authoring 	<p>REPORTING</p> <ul style="list-style-type: none"> Enhancements to mobile layout authoring <ul style="list-style-type: none"> New phone emulator Updated visualization pane Support for overlaid visuals Automatic page refresh is now generally available Hierarchical slicer is now generally available <ul style="list-style-type: none"> New options for expand/collapse icons Icons now scale with font size Ability to customize indentation for child items Supported with AI visuals Modern ribbon is now generally available RLS is now supported for Featured Tables in Excel's Data Types gallery <p>ANALYTICS</p> <ul style="list-style-type: none"> Enhancements to Q&A <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> Azure Maps visual (preview) Updates to Multi-Axis Chart by xViz <p>MODELING</p> <ul style="list-style-type: none"> Support for Excel financial functions Model view enabled for live connect is now generally available <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Global option to disable automatic type detection <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> YouTube Analytics by MAQ Software <p>OTHER</p> <ul style="list-style-type: none"> Launch external tools from Power BI Desktop (preview) <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> Link previews for Power BI in Microsoft Teams Timely Premium capacity overload alerts Public preview of Power BI deployment pipelines Template app for Power BI Premium Capacity Metrics app Refresh summary for Premium capacity admins Page view for Paginated Reports Roadmap update for Workspaces Updated mobile authoring in Power BI Desktop Updated breadcrumbs in Power BI service Sensitivity labels persist when a Power BI report is embedded in an app Power BI data protection GA Label inheritance upon creation of new content Updates for Power BI mobile Roadmap updates 	

Rapid innovation

August	September	October	November	December	January/February
<p>REPORTING</p> <ul style="list-style-type: none"> Perspectives support for Personalize visuals (preview) Rectangular lasso select for data points (preview) Added dynamic formatting support to more visuals <p>ANALYTICS</p> <ul style="list-style-type: none"> Direct Query support for Q&A (preview) <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> Linear Gauge by xViz Advanced Pie & Donut by xViz Ratings visual by TME AG Toggle switch by TME AG Drill down Pie PRO by ZoomCharts ADWISE RoadMap Updates to ArcGIS Maps Extending Admin capabilities for AppSource visuals <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Agile CRM Analytics for Dynamics 365 <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Text/CSV By Example (preview) <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Cherwell connector Automation Anywhere connector Acterys connector <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> Multiple data lakes support for Dataflows Updated headers and navigation in Mobile Data protection updates 	<p>REPORTING</p> <ul style="list-style-type: none"> Data point rectangle select for additional charts Added general visual option to maintain layer order Search for a workspace during publish Total labels for stacked visuals Mobile authoring enhancements <p>ANALYTICS</p> <ul style="list-style-type: none"> Export data from Q&A visual <p>MOBILE</p> <ul style="list-style-type: none"> Improved navigation tree (iOS and Android) Share from Power BI (iOS and Android) Pinch and zoom Auto play a slideshow on startup (Windows) <p>SERVICE</p> <ul style="list-style-type: none"> New capabilities in lineage view Excel inherits the Power BI dataset's sensitivity label when using a PivotTable connection Analyze in Excel provides Excel file instead of .ODC Deployment pipelines is now generally available <p>MODELING</p> <ul style="list-style-type: none"> Enhanced Dataset Metadata Performance improvements to aggregation expressions involving columns of currency data type <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> CDS connector (preview) Azure Databricks MariaDB Hexagon PPM Smart API Other data connectivity updates <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> Collage by CloudScope Advanced Trellis / Small Multiples Chart by xViz Waterfall Chart by xViz <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Multichannel Attribution Dashboard 	<p>REPORTING</p> <ul style="list-style-type: none"> Canvas watermarks Personalize visuals is now generally available Data point rectangle select for Treemap <p>ANALYTICS</p> <ul style="list-style-type: none"> Performance improvements to IF and SWITCH functions <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Dynamic M Query Parameters (preview) Automatic Table Detection from Excel and JSON files <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Broader geographical support for Power Platform Dataflows connector MariaDB now supports DirectQuery Updated SharePoint Online List Connector New connectors (Spigit, eWay-CRM) <p>SERVICE</p> <ul style="list-style-type: none"> Updates to the 'new look' experience and release plan <p>MOBILE</p> <ul style="list-style-type: none"> Power BI for HoloLens 2 (preview) Automatic page refresh is now supported on the Windows app Support for notch displays <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> Extended admin capability features New visuals Zebra BI Charts and Tables (version 4.3) RoadMap by ADWISE (version v1.5.0) ZoomCharts (version 1.6) Bullet Chart by xViz <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Simplified installation Find template apps from the Power BI Desktop <p>OTHER</p> <ul style="list-style-type: none"> Export data source to PBIDS in Power BI Desktop Icon update Desktop splash screen dismiss 	<p>REPORTING</p> <ul style="list-style-type: none"> New Field List (Preview) New Model View (Preview) Apply all filters is now generally available Visual Zoom Slider Data point rectangle select extended to Map visual Certificate revocation check for web connections Paginated Reports Updates Crediting total labels for stacked visuals (Sept 2020) <p>ANALYTICS</p> <ul style="list-style-type: none"> Anomaly Detection (Preview) Q&A now supports partial matching data values <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> New Visualizations Zebra BI 4.4 New Visual by ZoomCharts: Drill Down Map PRO xViz Scatter/ Bubble chart Editor's picks <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Hive LLAP connector generally available New connectors: Actian, Anaplan, Starburst Presto <p>OTHER</p> <ul style="list-style-type: none"> Power BI Automation and APIs Fetch more data API 3.4 Enhanced testing of your developed custom visual <p>SERVICE AND MOBILE</p> <ul style="list-style-type: none"> Certified and Promoted reports and apps The 'new look' of the Power BI service is live <p>OTHER</p> <ul style="list-style-type: none"> New Admin APIs and Service Principal authentication to make for better tenant metadata scanning Power BI Visuals Platform adds support for conditional formatting New look for Embedded scenarios 	<p>REPORTING</p> <ul style="list-style-type: none"> DirectQuery for Power BI datasets and Azure Analysis Services (preview) Small multiples (preview) Model View Updates (preview) New Field List (preview) Small Multiples (preview): gridlines and background colors Color picker Smart guides for aligning objects are now available in the mobile layout view New filter operations: "is empty" and "is not empty" More granular control over certificate revocation check for web connections <p>ANALYTICS</p> <ul style="list-style-type: none"> Anomaly detection now in ribbon Enhanced dataset metadata format <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> graphomatice matrix ParaTaskCard SMART KPI List Lipstick Column Chart Lipstick Bar Chart Control Chart XmR ParaHTMLViewer Merged Bar Chart Animated Image and Bubble Chart Animated Bar Race Chart Dynamic Radial Bar Chart by JTA Text Highlighter Shielded HTML Viewer by Nova Silva Zebra BI Tables (version 4.5) Zebra BI Charts (version 4.5) ValQ 2.0 Released with Connected and Collaborative Planning Features Drill Down Combo PRO by ZoomCharts Editor's picks <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Test Your Analytics Maturity Apps on AppSource Power BI Gold suite <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Recent changes to Power Query and Dataflows <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Microsoft Dataverse Connector Azure Time Series Insights Update SurveyMonkey Update Cognite Update <p>OTHER</p> <ul style="list-style-type: none"> New Admin APIs and Service Principal authentication to make for better tenant metadata scanning Power BI Visuals Platform adds support for conditional formatting New look for Embedded scenarios <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Microsoft partners: Installing a preconfigured template app Sales Analytics AI for Microsoft Business Central Developers 	<p>REPORTING</p> <ul style="list-style-type: none"> DirectQuery for PBI datasets and Azure Analysis Services Updates (preview) Search Bar Model View Updates (preview) New Field List (preview) Small Multiples (preview): gridlines and background colors Color picker Smart guides for aligning objects are now available in the mobile layout view New filter operations: "is empty" and "is not empty" More granular control over certificate revocation check for web connections <p>ANALYTICS</p> <ul style="list-style-type: none"> Anomaly detection now in ribbon Enhanced dataset metadata format <p>VISUALIZATIONS</p> <ul style="list-style-type: none"> graphomatice matrix ParaTaskCard SMART KPI List Lipstick Column Chart Lipstick Bar Chart Control Chart XmR ParaHTMLViewer Merged Bar Chart Animated Image and Bubble Chart Animated Bar Race Chart Dynamic Radial Bar Chart by JTA Text Highlighter Shielded HTML Viewer by Nova Silva Zebra BI Tables (version 4.5) Zebra BI Charts (version 4.5) ValQ 2.0 Released with Connected and Collaborative Planning Features Drill Down Combo PRO by ZoomCharts Editor's picks <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Test Your Analytics Maturity Apps on AppSource Power BI Gold suite <p>DATA PREPARATION</p> <ul style="list-style-type: none"> Recent changes to Power Query and Dataflows <p>DATA CONNECTIVITY</p> <ul style="list-style-type: none"> Microsoft Dataverse Connector Azure Time Series Insights Update SurveyMonkey Update Cognite Update <p>OTHER</p> <ul style="list-style-type: none"> New Admin APIs and Service Principal authentication to make for better tenant metadata scanning Power BI Visuals Platform adds support for conditional formatting New look for Embedded scenarios <p>TEMPLATE APPS</p> <ul style="list-style-type: none"> Microsoft partners: Installing a preconfigured template app Sales Analytics AI for Microsoft Business Central Developers

Gartner

February 2021

A Leader in Analytics & BI Platforms*

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2021 Gartner Magic Quadrant for Analytics and Business Intelligence Platforms, Analyst(s): James Richardson, Kurt Schlegel, Rita Sallam, Austin Kronz, Julian Sun

Figure 1: Magic Quadrant for Analytics and Business Intelligence Platforms



FORRESTER®

Microsoft Positioned as a Leader in The Forrester Wave™: Enterprise BI Platforms (Vendor-Managed), Q3 2019*

According to the Forrester report,

"You no longer need to be shy about using Microsoft Power BI; it's a killer BI platform."

FORRESTER® RESEARCH

THE FORRESTER WAVE™

Enterprise BI Platforms (Vendor-Managed)

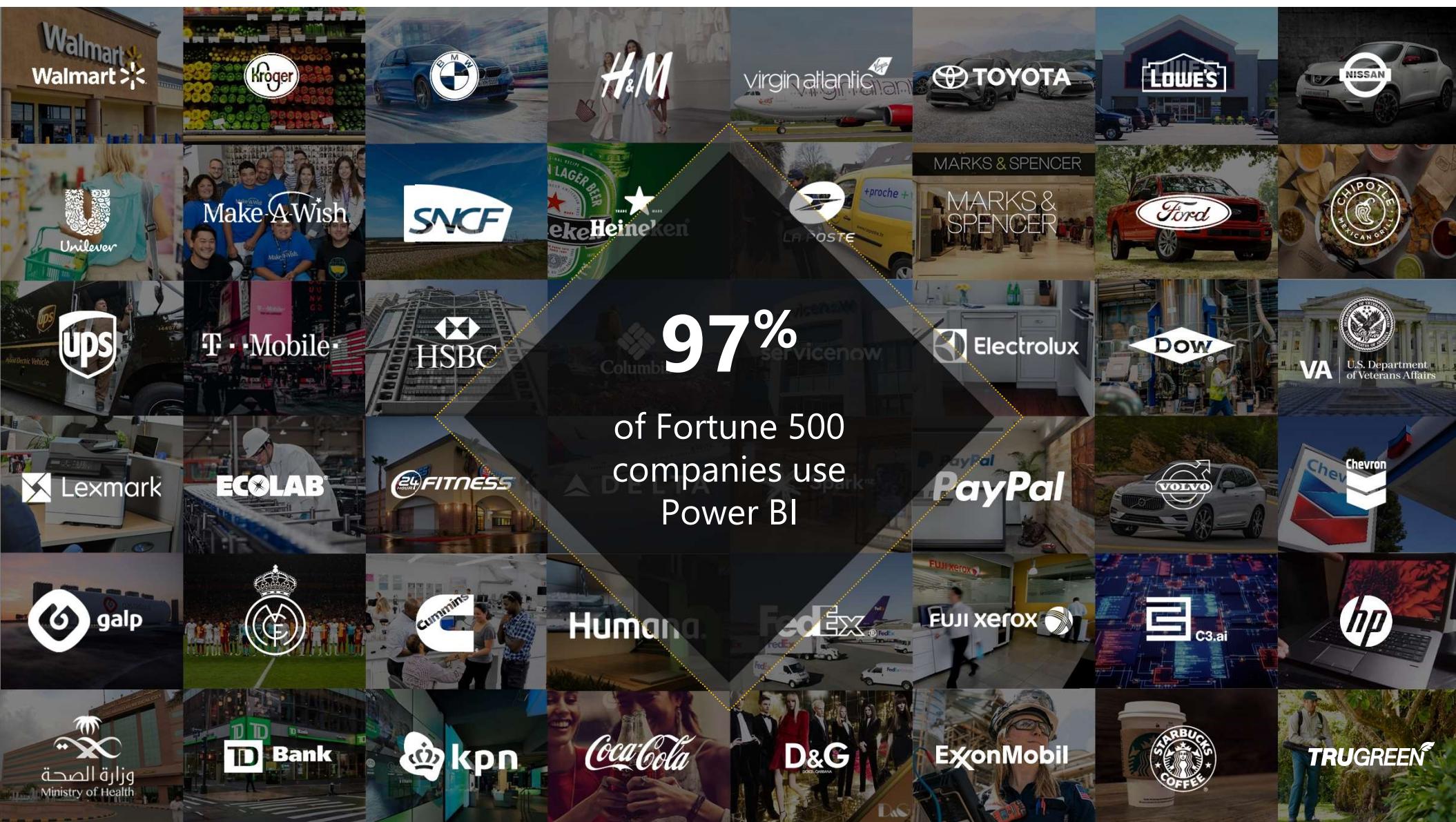
Q3 2019



*The Forrester Wave™: Enterprise BI Platforms (Vendor-Managed), Q3 2019 by Boris Evelson with Srividya Sridharan, Robert Perdoni, Aldila Yunus. The Forrester Wave™ is copyrighted by Forrester Research, Inc. Forrester and Forrester Wave are trademarks of Forrester Research, Inc. The Forrester Wave is a graphical representation of Forrester's call on a market and is plotted using a detailed spreadsheet with exposed scores, weightings, and comments. Forrester does not endorse any vendor, product, or service depicted in the Forrester Wave. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change.



97%
of Fortune 500
companies use
Power BI





Power BI Adoption

Build a data culture is what we are all about..



It's a long road



And often it is not technical.



Its ground up and top down working together



Self-service BI

Bottoms up
Business-led
Agility of distribution

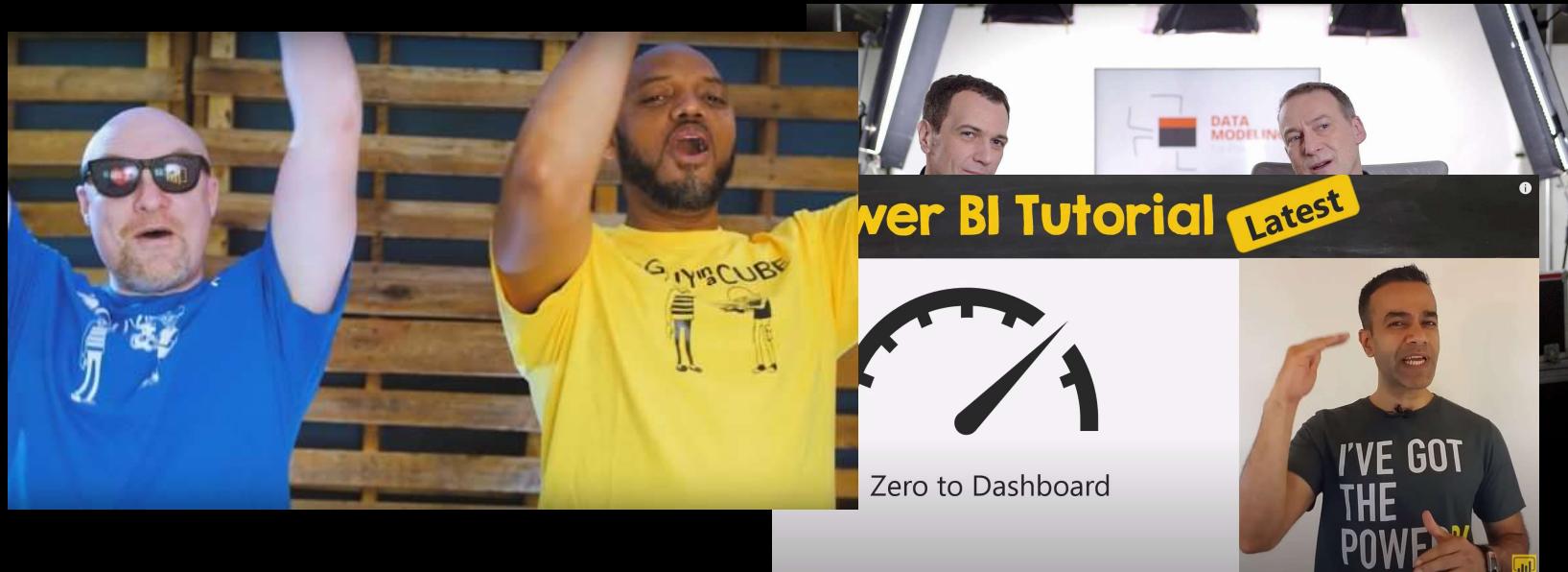
Centralized BI

Tops down
IT- and hybrid-led
Governable and secure



Bottom up is “easy”

- Usually driven by Power BI enthusiast
- Have found Power BI and the online community on their own



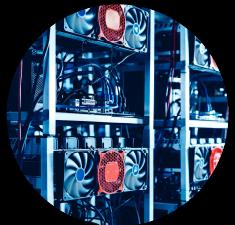
- As such they know what is going on
- But there is a plateau to this.

To grow Power BI further you need IT to support it

- But they also worry about
 - Security?
 - Data sovereignty ?
 - GDPR?
 - Data loss?
 - Governance?



Power BI helps protect your data



Network security

Network security ensures only certain clients or computers are able to connect to a particular endpoint



Data loss prevention

Protect your information with inherited sensitivity labels



Certifications

Power BI security meets the most stringent security and compliance requirements meeting 105+ compliance standards and certifications



Governance

Maintain governance over your data across all access points



Data encryption

Ensure all your data stays secure while at rest and in motion

What to tell you security team?

- Org wide authentication security – AAD security
- Data-at-Rest Encryption – BYOK
- Network security – V-NET, service tags and private endpoints
- Controlled Data Residency – Multi geo
- Full Auditability – Audit logs
- Data Loss Prevention – integration with MIP with labels
- Lineage – data lineage & purview integration
- [Read the security whitepaper](#)
- My security session: https://youtu.be/w4rT_ZZpzcg

Single version of the truth?

- Often struggle with Self serve vs Central managed
- How can we govern this? What problems will we face?
- We will lock it down!

But tightening things down leads to users doing it themselves...



Instead embrace and support

- Publish central certified datasets in the [Dataset Hub](#)
- Use [Sensitivity labels](#) and [MIP](#) for data loss prevention
- Set up [Cloud App Security](#) set up rules and detect malicious attempts



But it is not all technical..

All your analysts and users need to embrace it



Change is hard for everyone!

- Analysts and their users are used to doing things one way
- They probably already use Excel or a competitor



- Roles will change

Building a community helps: Center of Excellence

Analyst need a place to go to for help

- Training, modelling, visualizing data
- Where to find the data?
- Best practices (proactive instead of reactive)
- New features come out all the time
- A yammer \ Teams community to interact and share

This is something a Center of Excellence can provide.

More here: [Building a data culture – BI Polar \(ssbipolar.com\)](http://ssbipolar.com)

Finally, get leadership sponsorship!

- The organization can make more out of available data
- Spend time analyzing data not loading data
- Bring the power to business users who know their data
- Culture shift starts from the top...



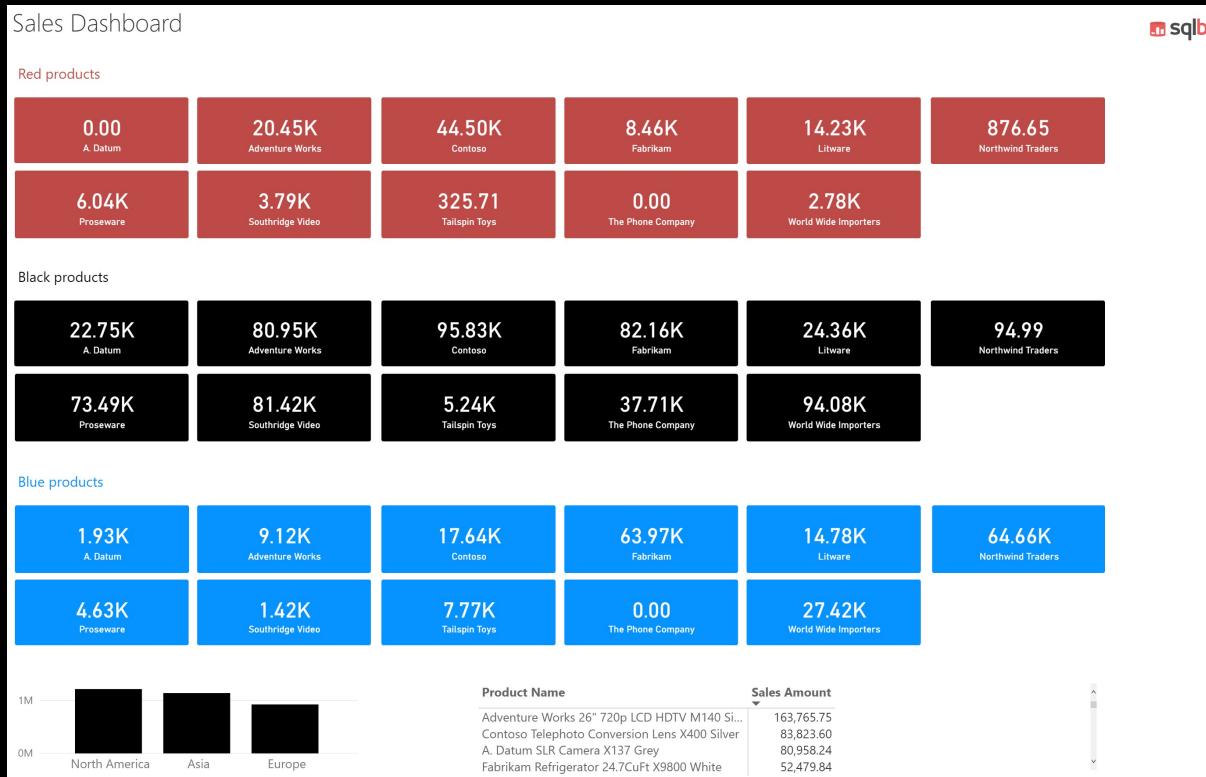


Top Power BI technical issues

My report is slow! The model is too large! Refresh takes long!

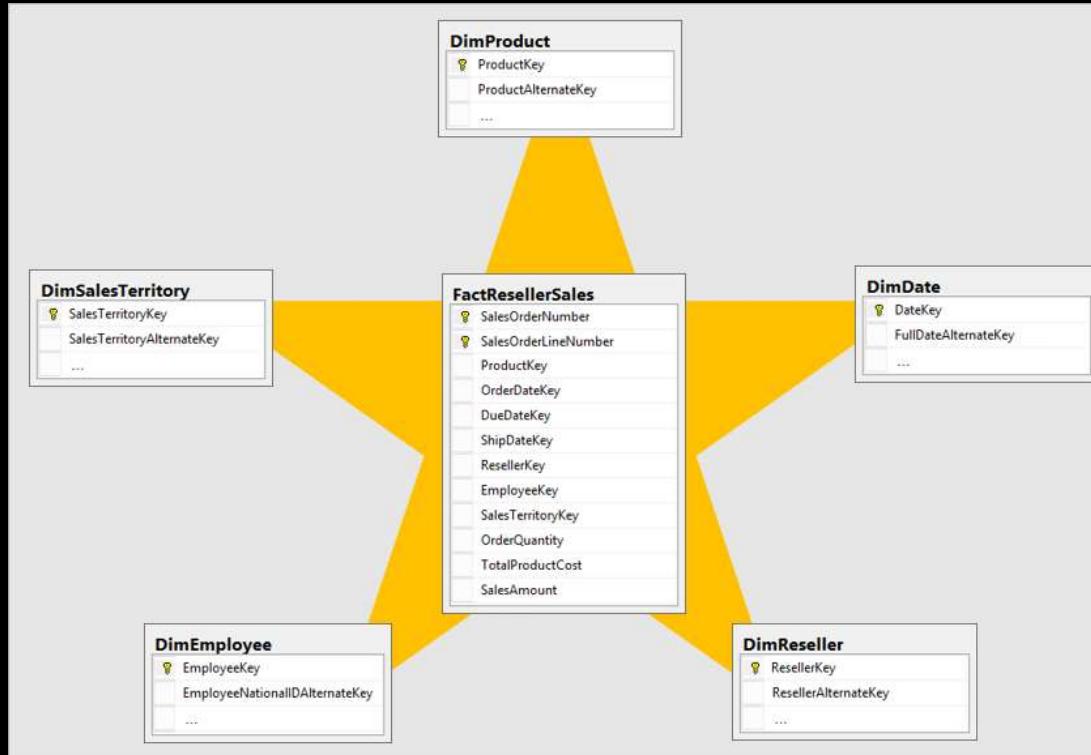


Do you need all those visuals?



- [Optimizing card visuals in slow Power BI reports – SQLBI](#)
- [Using Small Multiples In Power BI To Improve Report Performance](#)

Creating an optimal model helps!



- [Understand star schema and the importance for Power BI - Power BI | Microsoft Docs](#)
- [Common mistakes in big data models – Live Event – SQLBI](#)
- [The importance of star schemas in Power BI - SQLBI](#)

Tips for an optimal model

- Model the data into a star \ snowflake schema
- Turn off auto date time
- Only import data you really need
 - Reduce high cardinality columns
 - Split date and time
 - Investigate with VertiPaq Analyzer
- Avoid Bi-Di cross filtering when not needed
- Be careful with RLS

Tips for optimal DAX

- Iterate over dimension tables not fact
- Filter against a column not the table
- Use variables in your DAX where possible!
- Use the DIVIDE function for division
- Don't use DAX to fix modelling issues
- Don't over-evaluate conditions in DAX formula
- Debug → fix → rinse repeat
 - Use performance analyzer & DAX studio

Learn to use external tools

DAX Studio - 2.3.6

Query1.dax*

```

1 EVALUATE
2 ADDCOLUMNS {
3     'date'[Date], 
4     "Open Orders", SUMX(
5         FILTER(
6             GENERATE (
7                 SUMMARIZE (
8                     'Internet Sales',
9                     'Internet Sales'[Order Date],
10                    'Internet Sales'[Ship Date],
11                    "ROWS", COUNTROWS ('Internet Sales')
12                ),
13                DATESBETWEEN (
14                    'date'[Date],
15                    'Internet Sales'[Order Date],
16                    'Internet Sales'[Ship Date] - 1
17                )
18            ),
19            'date'[Date] = EARLIER ('Date'[Date])
20        )
21    )
22 }
23 [Rows]
24
25 % 4
  
```

Output

Total	SE CPU	Line	Subclass	Duration	CPU	Query
25 ms	16 ms	2	Scan	1	16	SELECT Date[FullDateAlternateKey] FROM Date;
FE	SE	4	Scan	1	0	SELECT Date[FullDateAlternateKey] FROM Date;
20 ms	5 ms	6	Scan	1	0	SELECT 'Internet Sales'[OrderDate], 'Internet Sales'
80.0%	20.0%	8	Scan	2	0	SELECT 'Internet Sales'[OrderDate], 'Internet Sales'

SE Queries 4 **SE Cache** 1 25.0%

Server Timings

DAX Studio

VertiPaq Analyzer Metrics

Name	Cardinality	Table Size	Col Size	Data
LocalDateTable_6b2a749c-799...	2,917,191	242,667,908	193,820,356	12,641,392
LocalDateTable_34271e62-21f...	2,916,096	242,627,288	193,798,072	12,636,656
Sales Fact	228,265	4,959,586	4,954,954	3,444,920
Date	1,461	264,946	262,602	11,680
LocalDateTable_2f8beb19-a2f...	1,461	168,912	144,432	4,816
LocalDateTable_708c245a-856...	1,461	168,912	144,432	4,816
LocalDateTable_f3378248-0bb...	1,461	168,912	144,432	4,816

VertiPaq Analyzer

C:\Projects\AdventureWorks\Model.bim - Tabular Editor 2.1

DAX Editor

```
[Reseller Current Quarter Sales] :=  
TOTALQTD([Reseller Total Sales], 'Date'[Date])
```

Model

- Data Sources
- Perspectives
- Relationships
- Roles
- Tables
- Date
- Geography
- Internet Sales
- Product
- Product Inventory
- Reseller Sales
- Gross Profit
- Other
- Sales
- Reseller Current Quarter Sales
- Reseller Current Quarter Sales Performance
- Reseller Distinct Count Sales Order
- Reseller Previous Quarter Sales
- Reseller Total Sales Proportion
- Reseller Total Sales - Sales Territory slice
- Reseller Total Sales - Sales Territory slice
- Test Folder
- Sales Territory

Basic

- Description
- Display Folder
- Hidden
- Name
- Object Type
- Reseller Current Quarter Sales
- Sales
- False
- Reseller Current Quarter Sales
- Measure

Metadata

- DAX identifier
- Format String
- Options
- Other
- Translations and Perspectives
- Descriptions
- Display Folders
- Perspectives
- Internet Operation
- Inventory
- Reseller Operation

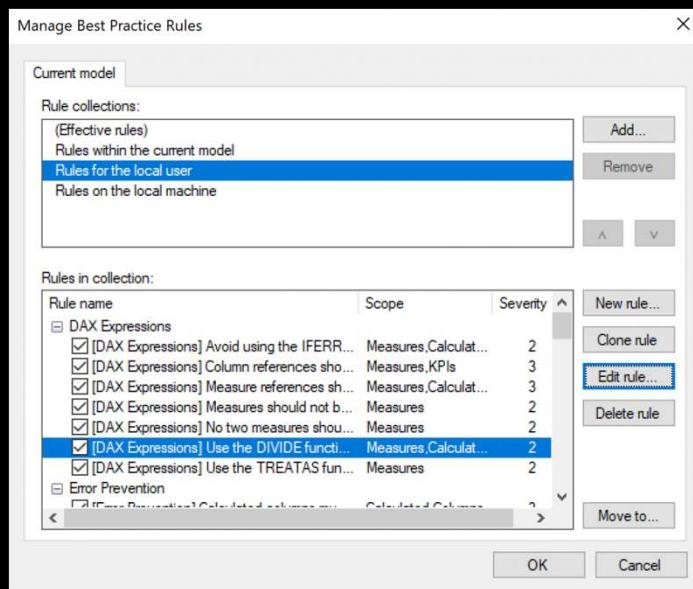
0 empty, 0 translated, 0 default
0 empty, 0 translated, 0 default
0 empty, 0 translated, 0 default
Shown in 1 out of 3 perspectives
False
False
True

Metadata

1 measure selected.

Tabular Editor

Best practice analyzer to the rescue



Over 50 rules to check
your model!

<https://powerbi.microsoft.com/en-us/blog/best-practice-rules-to-improve-your-models-performance/>



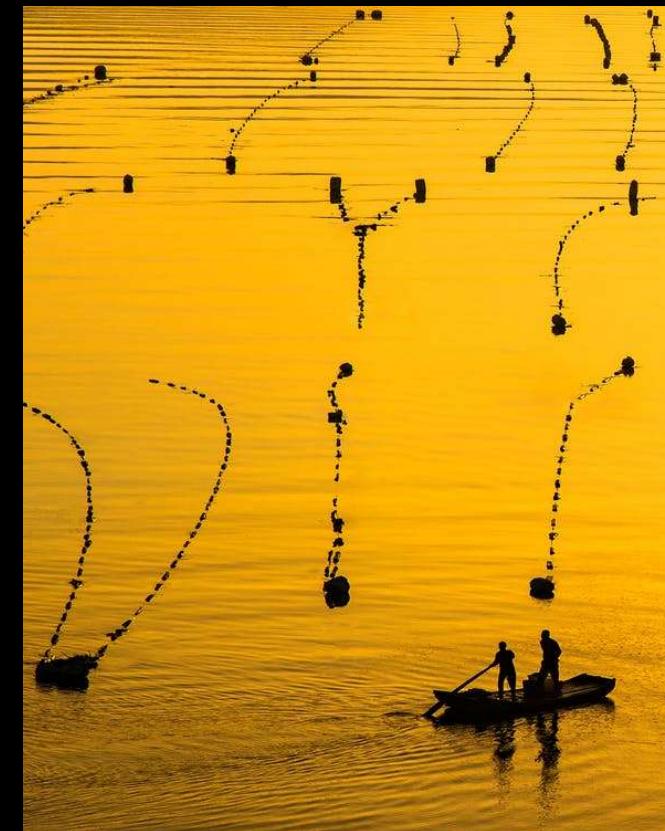
Visions on “the lake”

Data lakes (houses) are getting more common

Customers are looking for business analyst to have access to "data in the lake" directly for self service usage. Expectations are a performant virtual layer on top of the data.

Don't want to move data (heard the big data hype)

- Introduces latency for loading
- Do not want to replicate the security model



But it is not that easy

- It is not easy to build a semantic model over a big dataset
- Power BI is a visual tool
 - It will send multiple queries per page.
 - It allows for interactivity which adds more queries to the mix.
- DirectQuery is a challenge to get right:
 - Queries are not efficient for the data source
 - Concurrency issues
 - Pricy queries to the underlying datasource
 - Data model not efficient for PBI

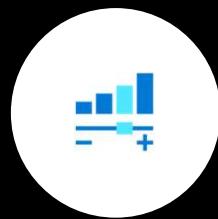
How to make it work?

Import



Great for smaller data sources and personal data discovery
Fine for CSV files, spreadsheet data and summarized OLTP data

DirectQuery



Avoids data movement
Delegate query work to the back-end source

Composite Models & Aggregation Tables



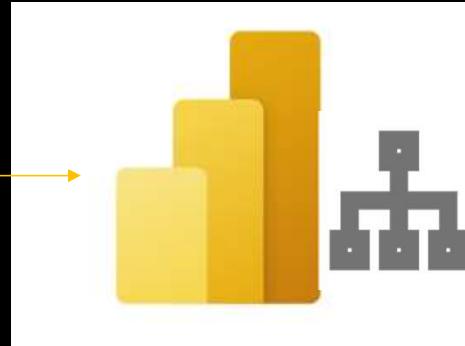
Why choose? Import and DirectQuery in a single model
Keep summarized data local; get detail data from the source

BI team to build a central semantic model

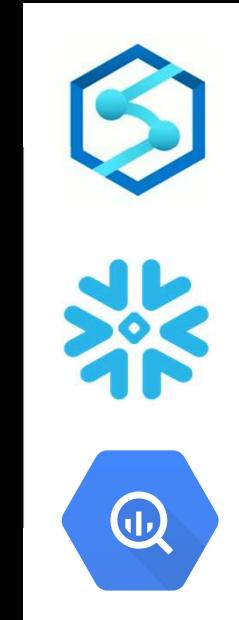
- One model, build by the expert, for many users
- Model using a star schema (see before...)
- Import aggregations and dimensions (subset of the data)
- Use DirectQuery on top of large data source (Synapse or other data source) for the details.
- Or use hybrid tables for “real time access”
- Model can be extended by business user with composite models

Automatic aggregations in Power BI

Power BI collects query patterns
and automatically creates
aggregations for optimal
performance



Works over any data
warehouse



Thank you



Microsoft
Power BI