



15 edycja konferencji SQLDay

8-10 maja 2023, WROCŁAW + ONLINE



partner złoty



partner srebrny



partner brązowy





Bartłomiej Graczyk, Paweł Potasiński

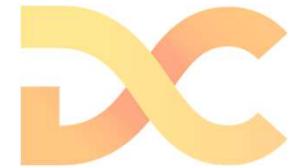
Back to the future

-

analytics on the Microsoft platform today and tomorrow



Speakers



Bartek



Work Lead Cloud Solution Architect @ Microsoft
LinkedIn linkedin.com/in/bartlomiejgraczyk/
Twitter @bagracyjk

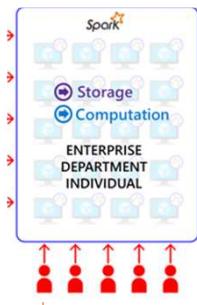
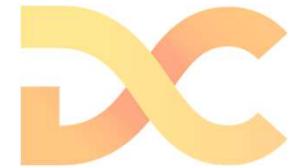
Paweł



Work Sr Program Manager @ Microsoft
LinkedIn linkedin.com/in/pawelpotasinski/
Twitter @PawelPotasinski



AGENDA



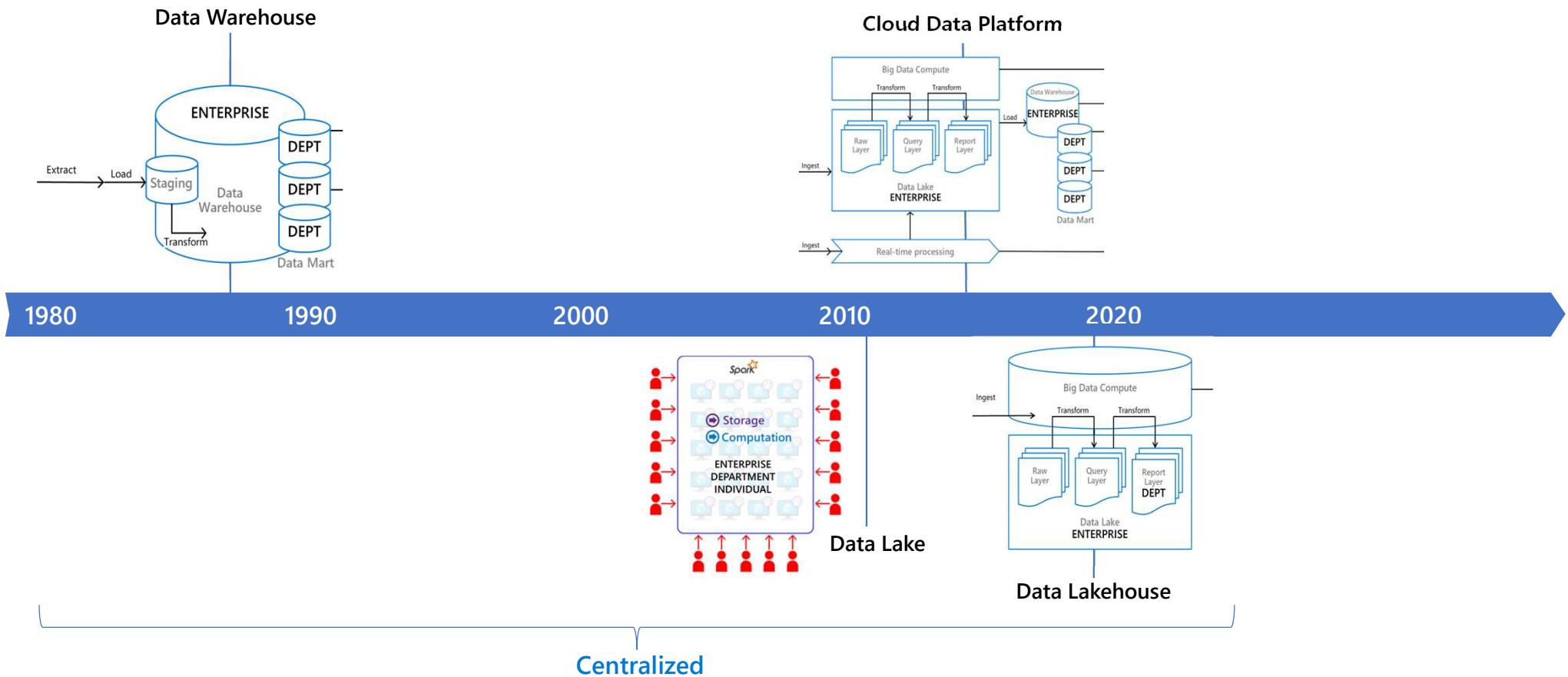
Data Architecture
for Analytics



Persona-oriented
Platform

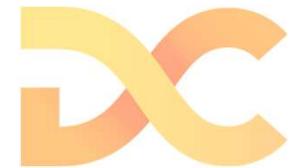


Evolution of Data Architecture

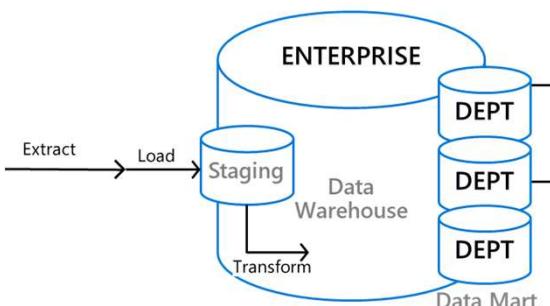




Evolution of Data Architecture



Late 1980s Data Warehouse



- **Central repository**
- Typically used for business reporting and analysis
- **Highly structured**
- Data is **cleaned and deduplicated**

PROs:

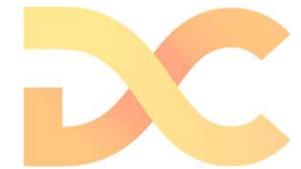
- Solves the problem of silos of operational data
- Decision support for authorized business users + executives
- Improved data quality allows for consistent business steering

CONs:

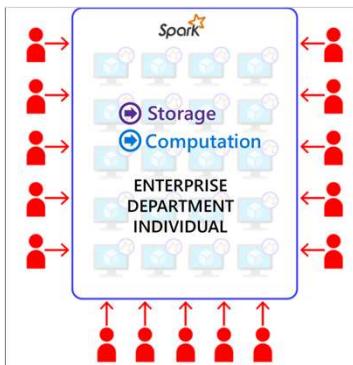
- Design + deployment is large undertaking
- Flood of data integration processes is hard to maintain
- Vendor lock-in (hard to migrate)
=> high cost, complex, not scalable



Evolution of Data Architecture



Late 2000s Data Lake



- **Central repository**
- Data is stored in its **natural format**
- Can store all kinds of data, **structured + unstructured**
- **Schema-on-read**

PROs:

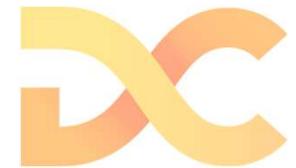
- Holds all enterprise data, not just the one with specific need
- Supports Data Science + ML
- Flexible
- No vendor lock-in - **open data formats** and protocols

CONs:

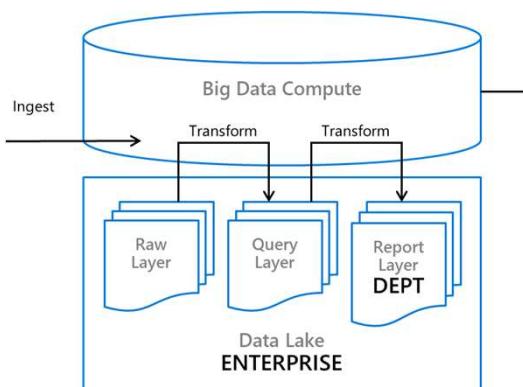
- Hard to govern and maintain
- Data might be inconsistent and unclean



Evolution of Data Architecture



Early 2020s Data Lakehouse



- **Central repository**
- Combines the **best of DWH and Data Lake**
- Uses **cheap storage** of the Data Lake
- Has similar Data Management features like DWH
- Separate **scaling of storage and compute**

PROs:

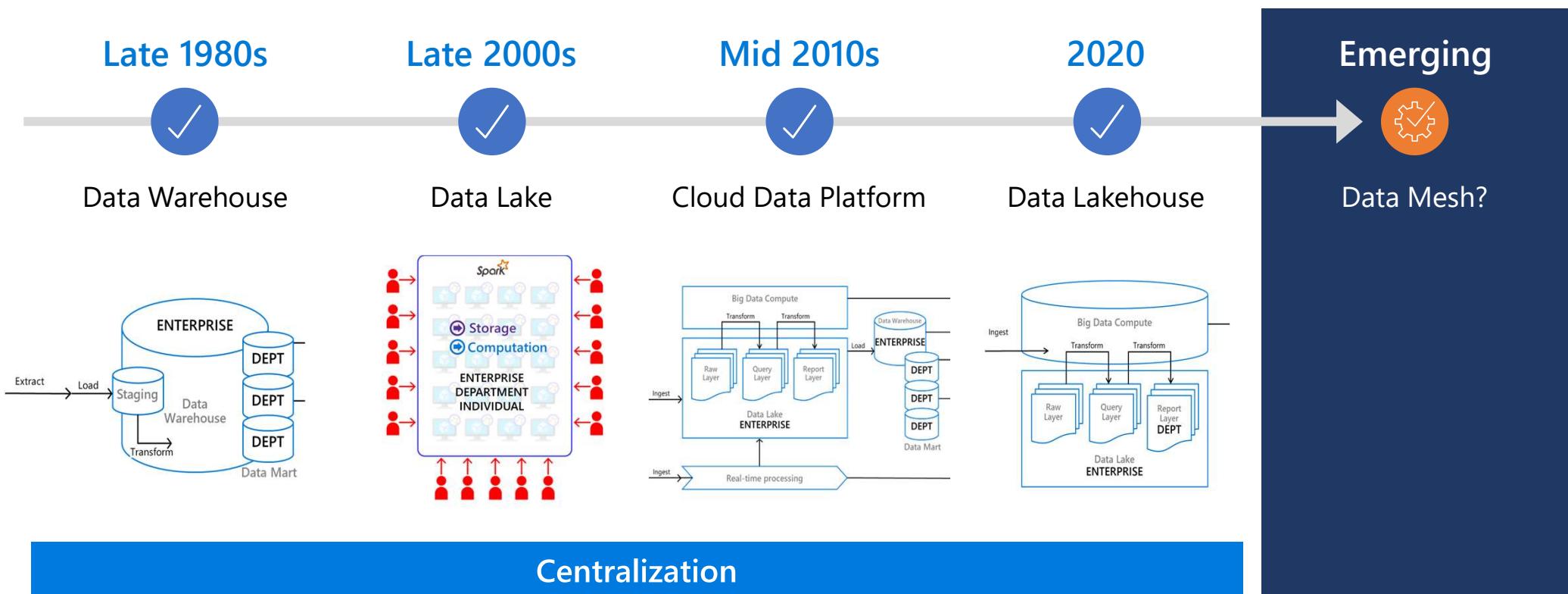
- Cloud-native
- Separate scaling of storage and compute
- Supports diverse workloads

CONs:

- Data teams might be bottleneck
- Data consumers, data teams and data producers are separated => worse data quality

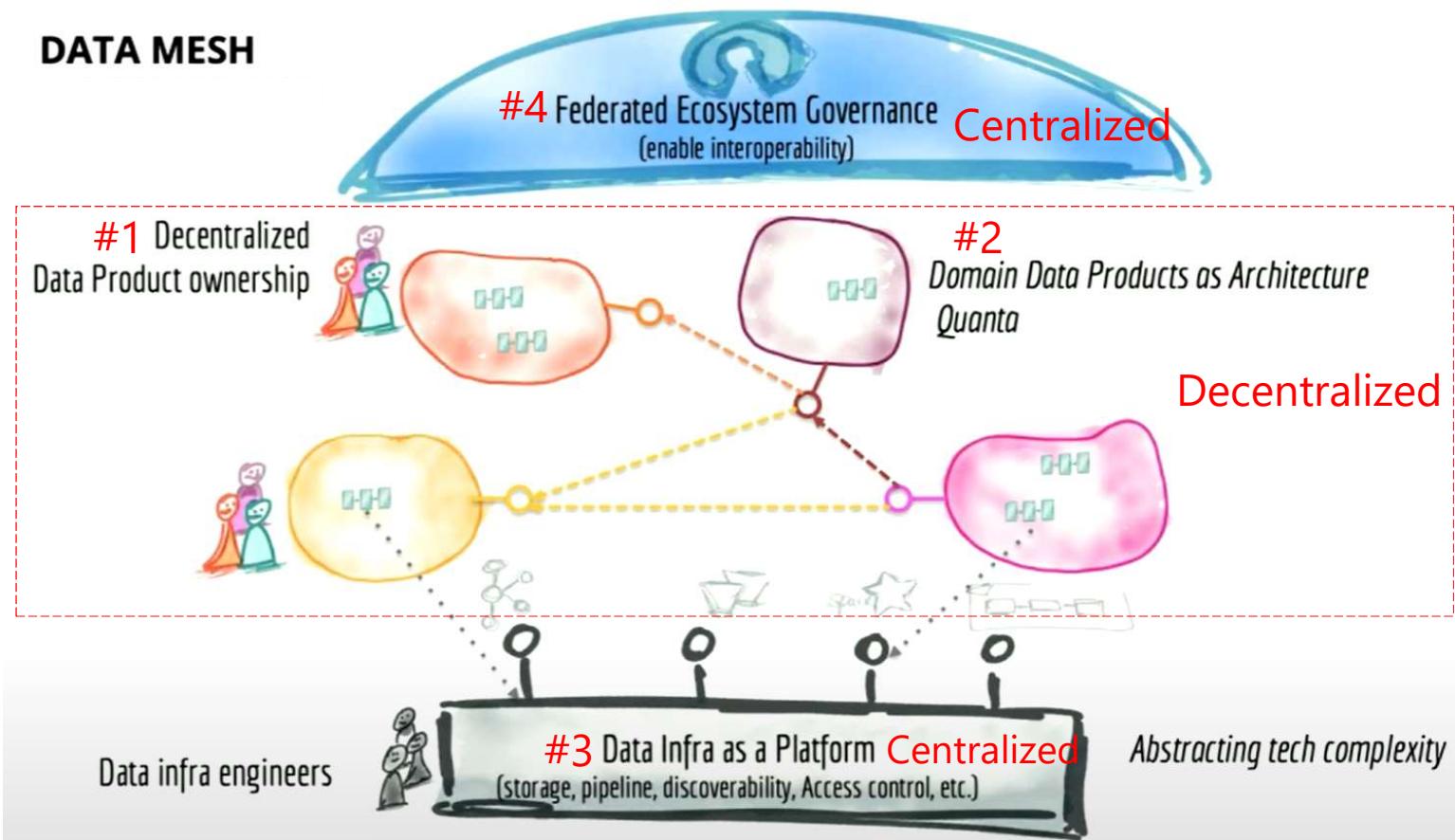
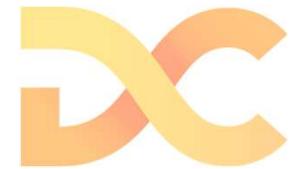


The Evolution Of Data Architecture





Operating Model



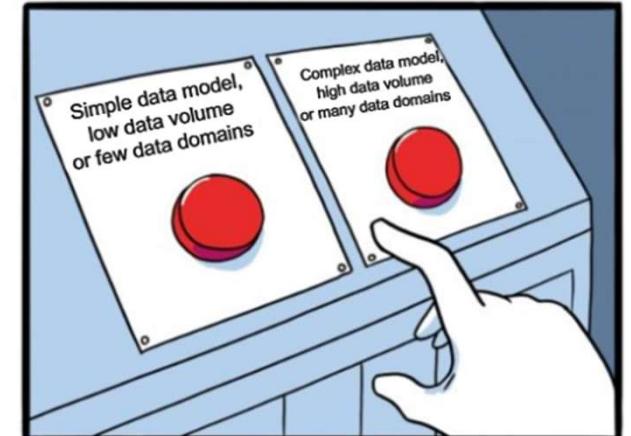
Credit: Zhamak Dehghani, Thoughtworks



Is Data Mesh a Replacement for All?



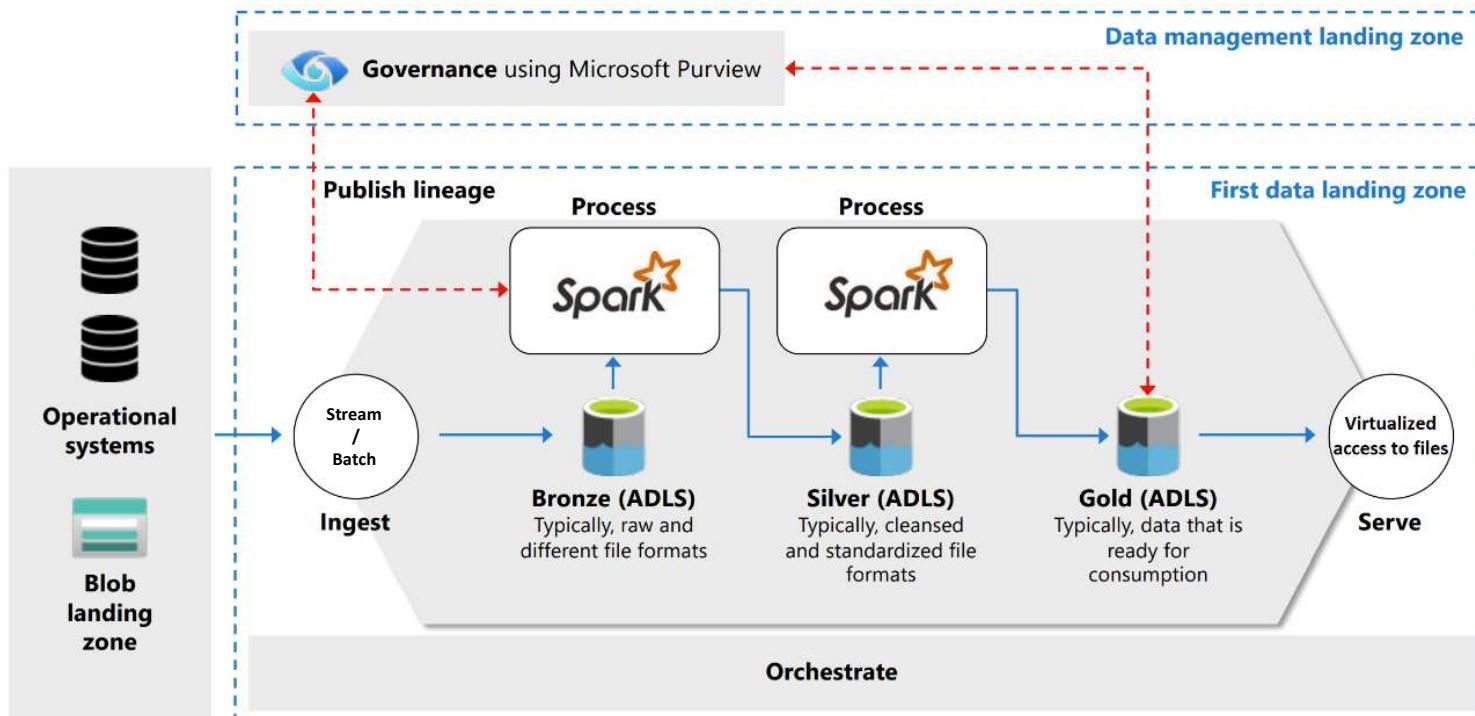
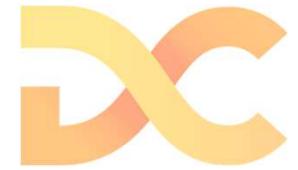
- Data Mesh = business operating model for analytics and data
- NOT a replacement of the Data Warehouse



JAKE-CLARK.TUMBLR

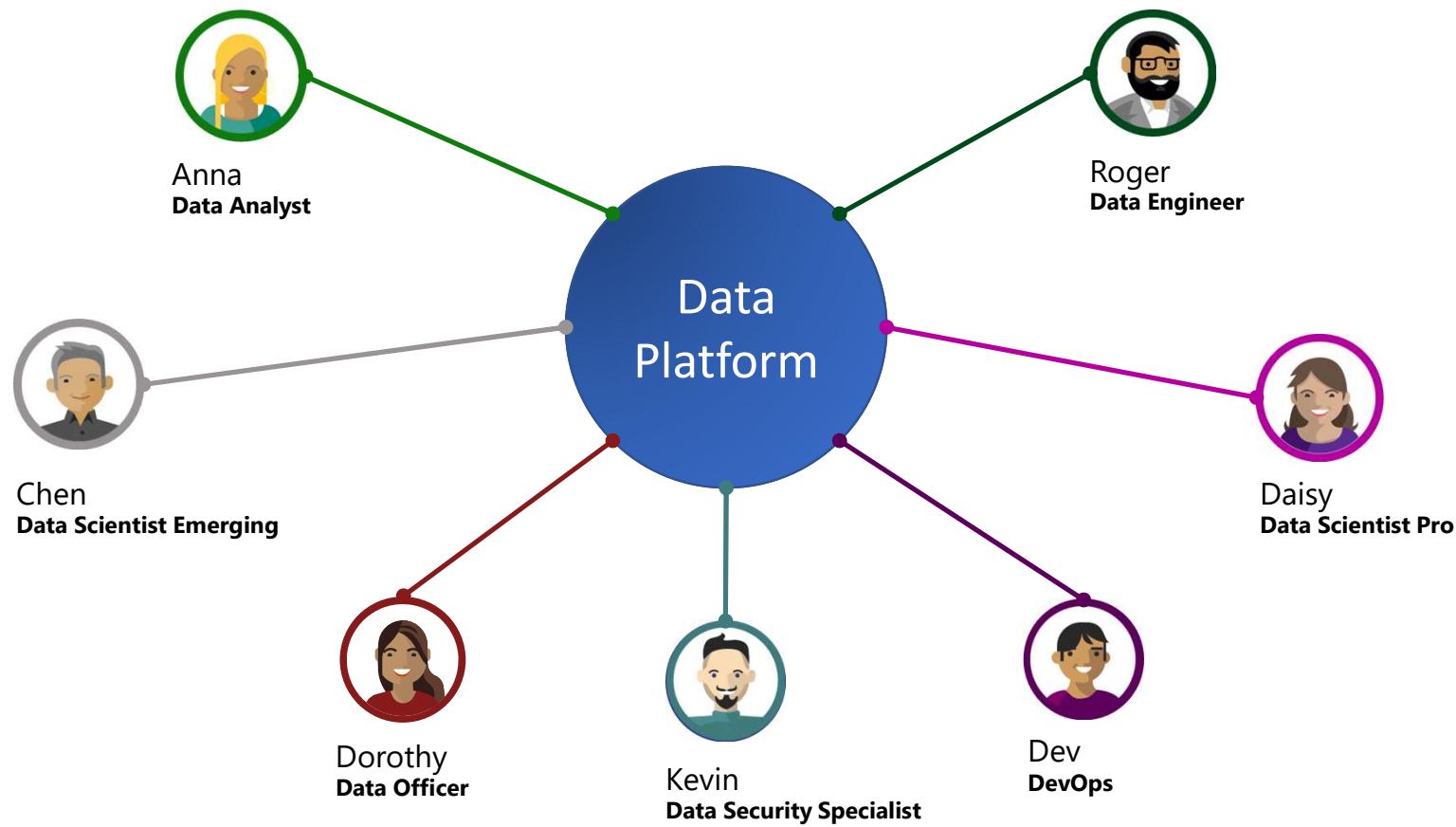
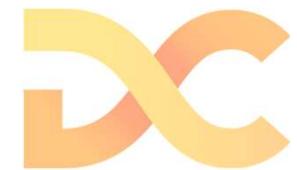


Where We Land: Lake-centric (Medallion)



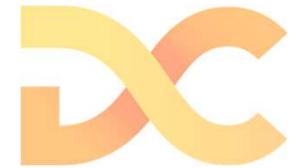


Persona-oriented

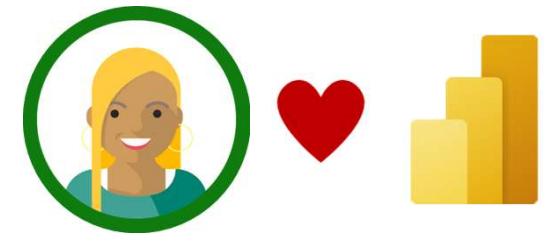




Data Analyst



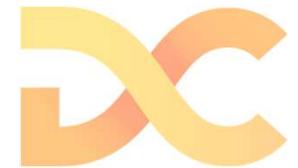
- Self-service data integration
- Ad-hoc data analysis (SQL)
- Self-service data modeling
- Data visualization & storytelling
- Integration with productivity tools
- AI-powered citizen development



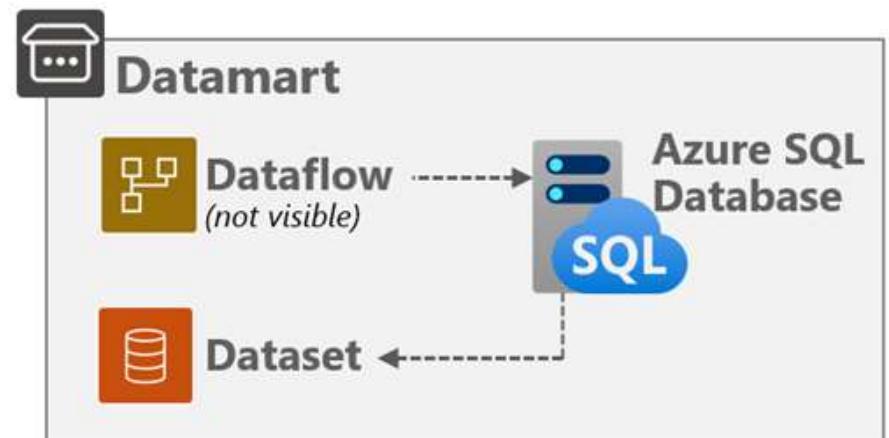
Anna
Data Analyst



Power BI Datamart



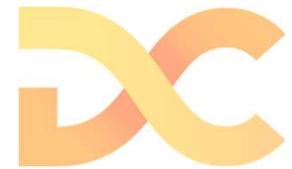
- **Dataflow**
 - Ingest and transform data
 - Multiple data sources possible
- **Azure SQL Database**
 - Fully managed analytical store
 - Users can build queries visually and using SQL
 - Can be accessed with SQL tools
- **Dataset**
 - Built on top of Azure SQL DB
 - Can be enriched with relationships, measures and RLS



<https://www.coatesdatastrategies.com/blog/diagram-power-bi-datamart-overview>



Self-Service Data Modeling



Power BI Azure Synapse + Power BI Demo NYC Yellow Taxi Report Trial: 26 days left Search ...

Home Help
New New measure column table
Create Manage roles New report
Browse Calculations Security Reporting
Data hub Metrics Apps Deployment Pipelines
Learn Workspaces Azure Synapse +...

All tables +

Properties

- Show the database in the header when applicable: No
- Show related fields when card is collapsed: Yes
- Pin related fields to top of card: No

Data

- Search
- Cards
- LDW vwDimDate
- LDW vwDimPaymentType
- LDW vwDimVendor
- LDW vwFactTrip
- LDW vwFactTripAgg
- Measure

Settings

Azure Synapse + Power BI Demo

- About Premium Azure connections
- Workspace admins (radio button selected)
- Specific users and groups

Enter users and groups

Workspace OneDrive (Optional)

Develop a template app

Template apps are developed for sharing outside your organization. A template app workspace will be created for developing and releasing the app. [Learn more](#)

Allow contributors to update the app for this workspace

Data model settings

Users can edit data models in the Power BI service (preview)

Allow workspace members to edit data models in the service. Edits are permanent and automatically saved in this feature preview, and version history isn't saved. This setting doesn't apply to editing a dataset through an API or XMLA endpoint. [Learn more](#)



PowerPoint for Data



Game Analysis - Power BI Desktop

File Home Insert Modeling View Help External Tools Format Data / Drill

Cut Copy Format painter Get Excel Power BI SQL Enter Dataverse recent sources Data workbook datasets Server data Transform Refresh data New visual Text More box visuals New Quick measure measure Sensitivity (preview) Share Publish

Clipboard Data Queries Insert Calculations Sensitivity Share

Number of games by publisher

Publisher	Count	Percentage
Publisher A	809	23.79%
Publisher B	700	20.59%
Publisher C	645	18.97%
Publisher D	627	18.44%
Publisher E	619	18.21%

Ask a question with Q&A

Ask a question about your data

Try one of these to get started

top genres by #games top rating by #games

Sentiment by platform

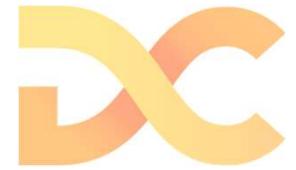
Platform	Sentiment
PS2	0.63
DS	0.63
Wii	0.61
PS3	0.56
X360	0.56

Q&A Demo Decom Tree Decom Tree Analysis Page 1 +

Page 1 of 4



Investments in Data Visualizations



String Based Conditional Formatting - Power BI Desktop

Pawel Potasinski

Sales Amount by Category

Check how Audio sales compares to other categories

100M
80M
60M
40M
20M
0M

Sales Amount

Category

Category	Sales Amount
Home Appliances	100M
Computers	90M
Cameras and camcorders	55M
TV and Video	40M
Cell phones	25M
Audio	5M
Games and Toys	5M
Music, Movies and Audio Books	5M

Build a visual

Visual types

(Off) Suggest a type

X-axis

Category

+Add data

Y-axis

Sales Amount

+Add data

Legend

+Add data

Small multiples

+Add data

Tooltips

+Add data

Format

Search

Visual Properties

Title

X-axis

Size and style

Font

Segoe UI

Color

Max area height

Concatenate labels

Title

Reset to default

Y-axis

Legend

Page 1

Page 1 of 1 Confidential/Microsoft Extended

88%



Investments in Data Visualizations



Conditional
formatting

1

Edit interactions

2

Slicer default value

3

Tooltips

4

Container

1

Card

2

States

3

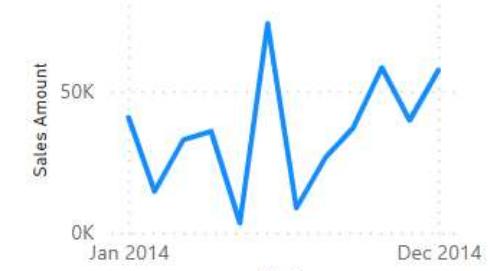
Labels

4



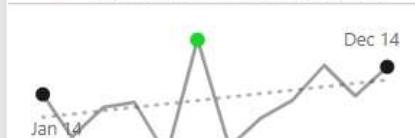
VISUAL IMPROVEMENTS

Sales Amount by Month



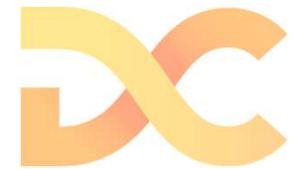
Revenue: 0.4m

▼ -1.8% target | ↗ Trending up/mo





Storytelling with PowerPoint

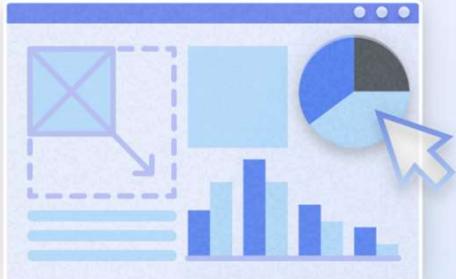


Power BI

Getting started in Power BI

Explore the main ways you can interact with Power BI reports.

[Get started](#)



Here's what we cover:

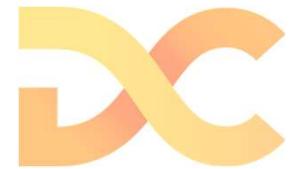
- 1 Tooltips**
See highlights about the data in visuals
- 2 Cross-highlight & cross-filter**
Explore relationships between visuals
- 3 Drill mode & drill through**
Dive in to get the details in the data
- 4 Sort visuals & tables**
Change the sorting to see new insights
- 5 Filtering pages & visuals**
See just the data you want to focus on

Getting Started in Power BI, Getting started | General
Data updated on 1/17/23, 1:08 PM

000 ^ F ^ B ^ V



Power BI + Teams



Screenshot of the Microsoft Power BI application interface, showing the integration with Microsoft Teams.

The interface includes:

- Left Sidebar:** Activity, Chat (2 notifications), Teams (7 notifications), Calls, Files, Approvals, Calendar, Tasks by Pl..., and Apps.
- Top Bar:** Back, Forward, Search, and Close buttons.
- Header:** Power BI Home, Create, Browse, Data hub, Learn, About.
- Metrics Section:** Metrics is a data-driven and collaborative way to track key business metrics. It shows four cards:
 - Increase full time staff % to 85% ...** 83%/85% (At risk)
 - Attract and Retain the Best Talent** 5.00/5.00 (On track)
 - Bad attrition rate less than 15% (...** 14%/15% (On track)
 - Bad attrition rate less than 15% (...** 16%/15% (Behind)
- Scorecards Section:** + New scorecard, Recommended, Metrics you own, Favorites, and a list of recent scorecards:
 - Customer Satisfaction KPIs (Owner: Customer Satisfaction, Opened: an hour ago, Endorsement: —, Sensitivity: General)
 - FY22 Scorecard (Owner: Workforce Planning, Opened: 37 seconds ago, Endorsement: —, Sensitivity: Highly Confidential)
 - My FY23 metrics (Owner: Workforce Planning, Opened: an hour ago, Endorsement: —, Sensitivity: Highly Confidential)
- Bottom Bar:** Get data, Help, and a search bar.

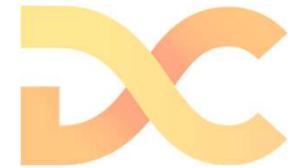


Power BI + Teams (coming)





AI-powered Development



Sales Amount by Category and Class

Category	Class	Sales Amount (M)
Audio	Deluxe	~1.5
	Economy	~2.0
	Regular	~2.5
Cameras and camcor...	Deluxe	~15.0
	Economy	~12.0
	Regular	~30.0
Cell phones	Deluxe	~8.0
	Economy	~7.0
	Regular	~11.0
Computers	Deluxe	~30.0
	Economy	~18.0
	Regular	~48.0
Games and Toys	Deluxe	~2.0
	Economy	~5.0
	Regular	~3.0
Home Appliances	Deluxe	~40.0
	Economy	~18.0
	Regular	~42.0
Music, Movies and Au...	Deluxe	~2.0
	Economy	~1.5
	Regular	~2.0
TV and Video	Deluxe	~8.0
	Economy	~8.0
	Regular	~23.0

Quick measure

Select a calculation to create a measure or describe the measure you need and we'll generate suggestions in DAX, which you can customize later.

Calculations Suggestions

Calculate average sales amount by month for Audio (category)

Generate

Suggested measures

Average total sales amount where category is Audio per category

Preview value

121879692.40410...

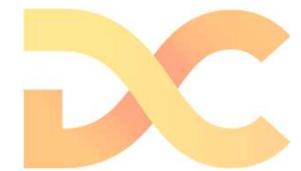
DAX

```
Measure =  
AVERAGEX(  
    KEEPFILTERS(  
        VALUES(  
            'Sales'[Category]  
    )  
)
```

Page 1 of 1 Confidential\Microsoft Extended



AI-powered Development



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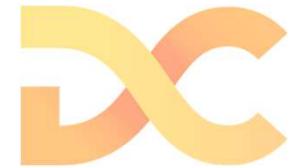
121879692.40410...

DAX ⓘ

Measure =
AVERAGEX(
KEEPFILTERS(
VALUES(
'Sales'[Category])



Data Engineer



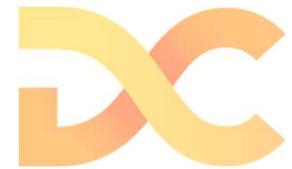
- Data ingestion and integration
 - Connectors for cloud and on-premises required
- Choice of data engineering tools
 - SQL vs Spark
 - Low-code data transformation
 - Metadata-driven frameworks
- Data serving & sharing
- Data lineage tracking



Roger
Data Engineer



Connectors



Amazon Marketplace Web Service	Amazon RDS for Oracle	Amazon RDS for SQL Server	Azure SQL Database Managed Instance	Azure Search	Azure Synapse Analytics	HubSpot	Informix	Jira	QuickBooks (Preview)	Quickbase (Preview)	REST	teradata.	Twilio (Preview)	Vertica
Amazon Redshift	Amazon S3	Amazon S3 Compatible	Azure Table Storage	Cassandra	Concur (Preview)	Magento (Preview)	MariaDB	Marketo (Preview)	SAP BW Open Hub	SAP BW via MDX	SAP Cloud For Customer	Web Table	Xero	Zendesk (Preview)
Apache Impala	Asana (Preview)	Azure Blob Storage	Couchbase (Preview)	DB2	Dataverse (Common Data Service for Apps)	Microsoft 365 (Office 365)	Microsoft Access	MongoDB	SAP ECC	SAP HANA	SAP ODP (Preview)	Zoho (Preview)	data.world (Preview)	Azure Batch
Azure Cognitive Services	Azure Cosmos DB (MongoDB API)	Azure Cosmos DB (SQL API)	Drill	Dynamics 365	Dynamics AX	MongoDB Atlas	MySQL	Netezza	SAP TABLE	SFTP	SQL server	Azure Data Lake Analytics	Azure Databricks	Azure Function
Azure Data Explorer (Kusto)	Azure Data Lake Storage Gen1	Azure Data Lake Storage Gen1 for Cosmos Structured Stream	Dynamics CRM	FTP	File system	ODBC	OData	Oracle	Salesforce	Salesforce Marketing Cloud	Salesforce Service Cloud	Azure HDInsight	Azure Machine Learning	Azure Machine Learning Studio (classic)
Azure Data Lake Storage Gen2	Azure Data Lake Storage Gen2 for Cosmos Structured Stream	Azure Database for MariaDB	GitHub	Google AdWords	Google BigQuery	Oracle Cloud Storage (S3 API)	Oracle Eloqua (Preview)	Oracle Responsys (Preview)	ServiceNow	SharePoint Online List	Shopify (Preview)	Azure Synapse Analytics (Artifacts)		
Azure Database for MySQL	Azure Database for PostgreSQL	Azure Databricks Delta Lake	Google Cloud Storage (S3 API)	Greenplum	HBase	Oracle Service Cloud (Preview)	PayPal (Preview)	Phoenix	Smartsheet (Preview)	Snowflake	Spark			
Azure File Storage	Azure Key Vault	Azure SQL Database	HDFS	HTTP	Hive	PostgreSQL	Power BI	Presto	Square (Preview)	Sybase	TeamDesk (Preview)			



Change Data Capture Pattern



Microsoft Azure | Search factory and documentation | CDC > adfdc1 | X

Tell us what you think, share your feedback in this quick [survey](#) about Azure Data Factory

Data Factory | Validate all | Publish all

Factory Resources | Filter resources by name | +

- Pipelines 506
- Change Data Capture (preview) 50 **(highlighted)**
- Datasets 1602
- Data flows 747
- Power Query 7

CDC > adfdc1 | Status Running | Last processed 3 minutes ago

Refresh | Edit CDC | Delete CDC | Chennai, Kolkata, Mu... : Last 24 hours

CHANGES READ CHANGES WRITTEN

40,381 40,381

Captured changes count

Date	Count
Mar 03, 12:48 AM	~10
Mar 03, 12:49 AM	~10
Mar 03, 12:50 AM	~2200
Mar 03, 12:51 AM	~2200
Mar 03, 12:52 AM	~2200
Mar 03, 12:53 AM	~2200
Mar 03, 12:54 AM	~4500
Mar 03, 12:55 AM	~1500
Mar 03, 12:56 AM	~1800
Mar 03, 12:57 AM	~3200
Mar 03, 12:58 AM	~500
Mar 03, 12:59 AM	~100

Details

Status: Running

CDC Id: 79cda366618f4d1e9ab66decfccea42a

Latency: Real-time

Last processed: 3/3/2023, 12:58:56 AM

Source type(s): AzureBlobFS

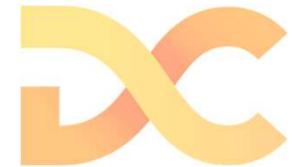
Source linked service(s): myStorage

Target type(s): AzureSqlDatabase

Target linked service(s): CDC_Test_DB

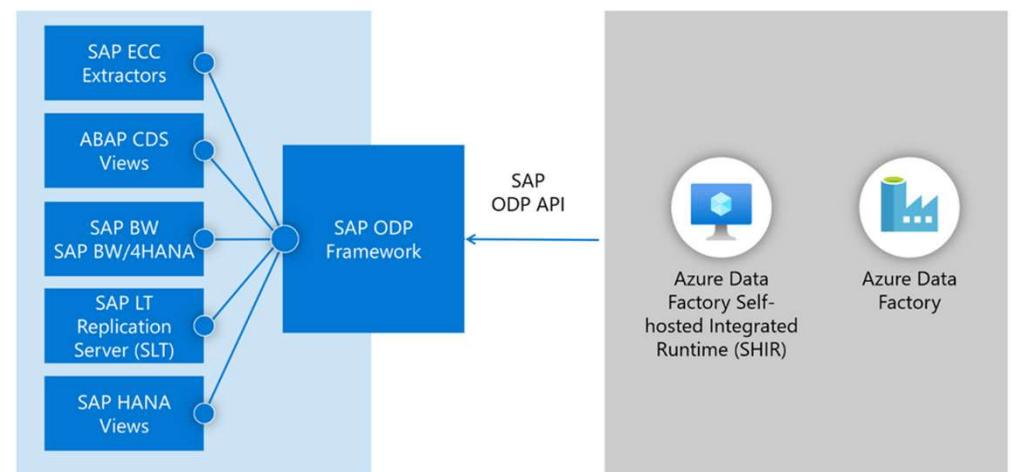


Specialized Connectors



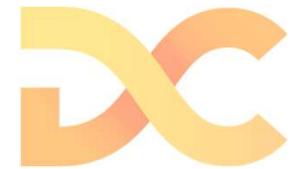
SAP Change Data Capture (CDC) Connector

- Extract delta from SAP applications
- Access to a wide range of sources across all major SAP applications
- Leverages SAP Operational Data Provisioning (ODP) framework



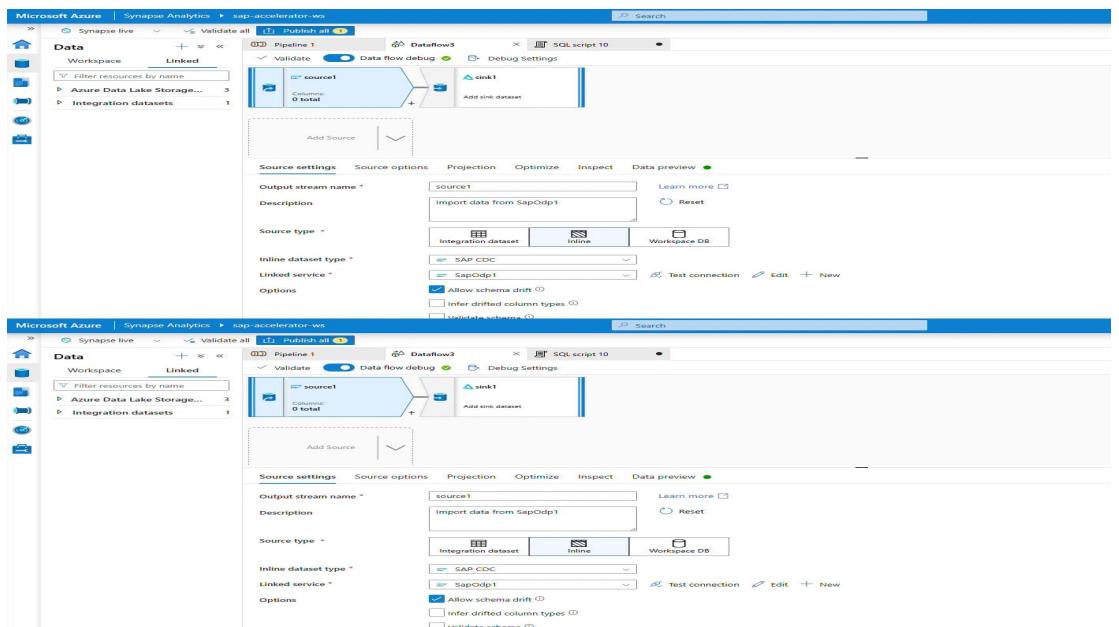


Specialized Connectors



SAP Change Data Capture (CDC) Connector

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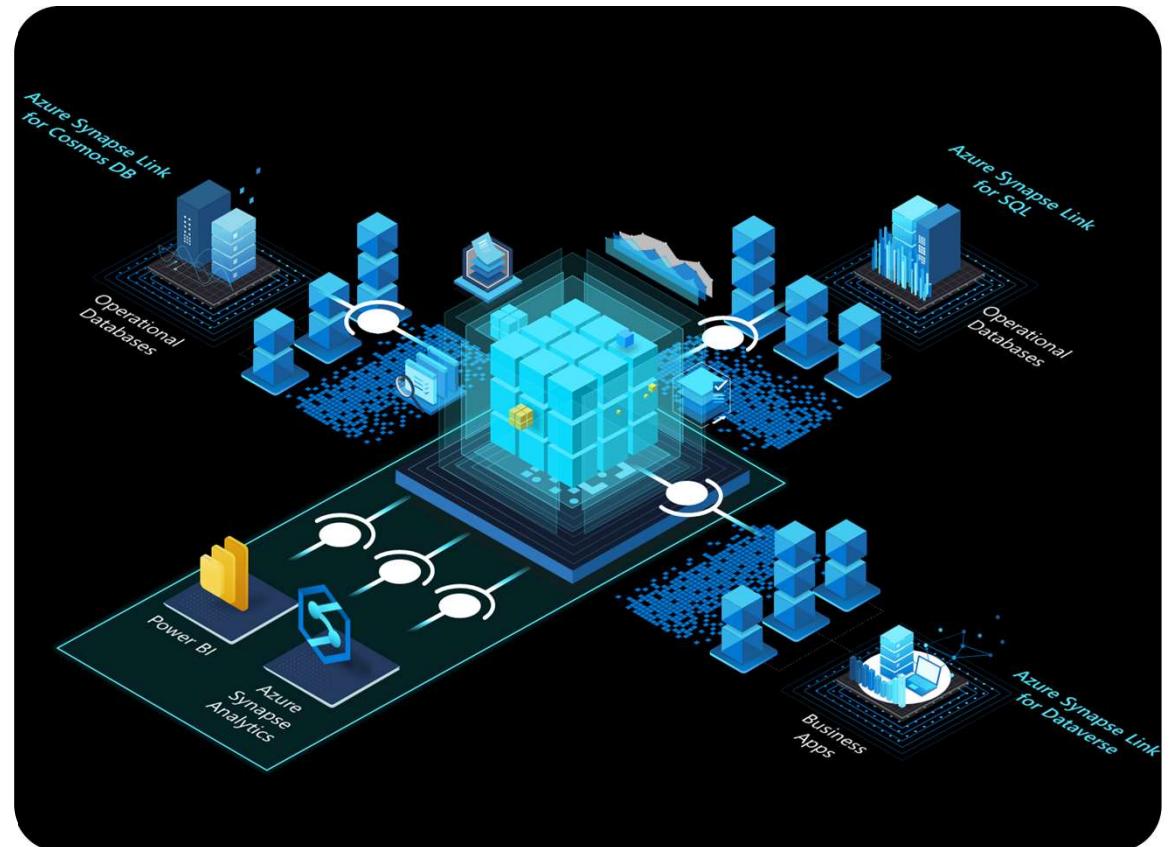




Hybrid Transactional Analytical Processing (HTAP)

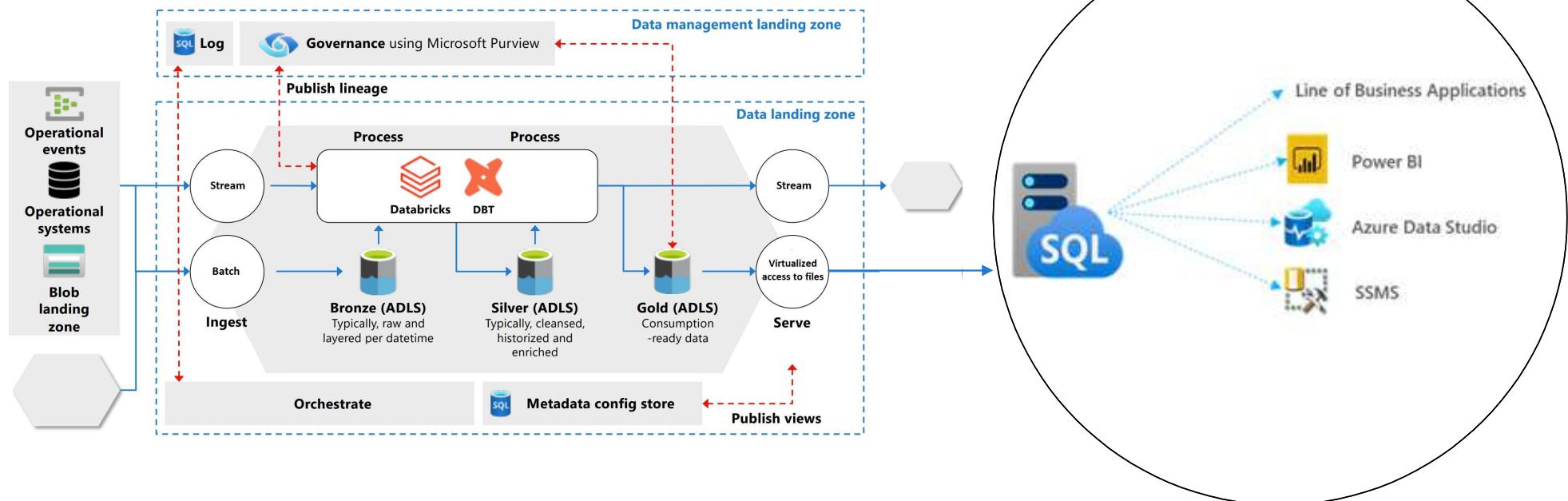


- No managed ETL
- Built for convergence
- Near real-time analytics



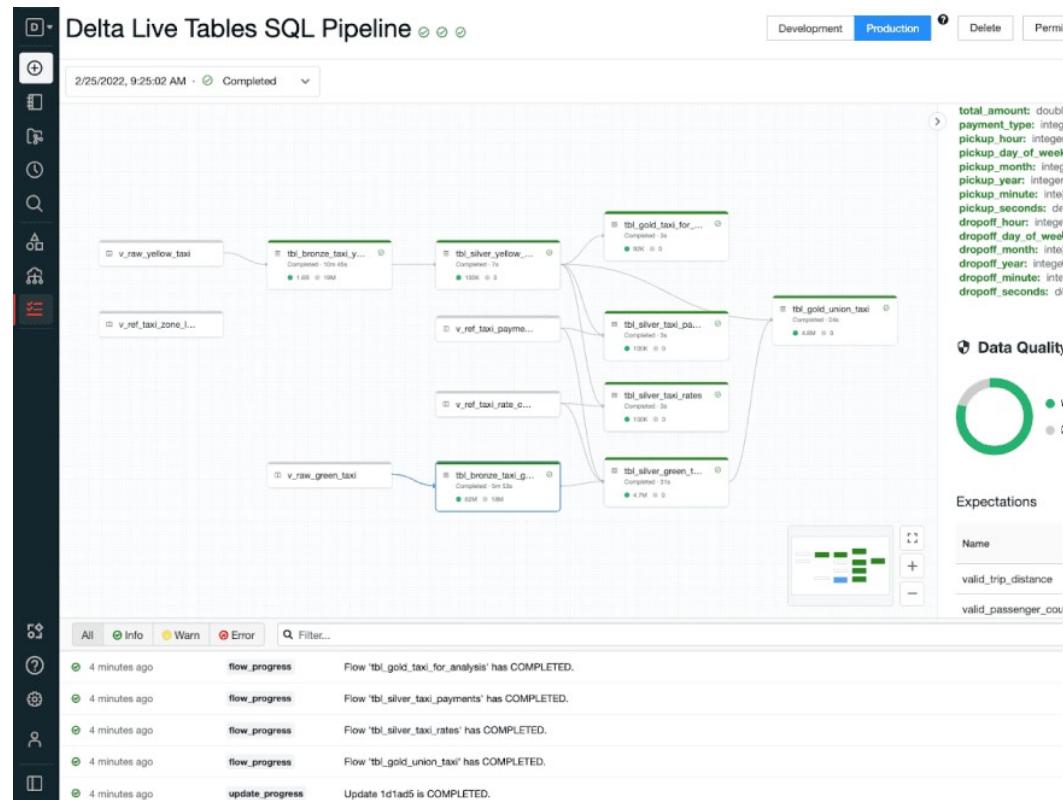
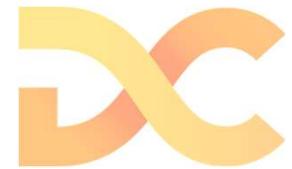


Choice of Data Engineering Tools



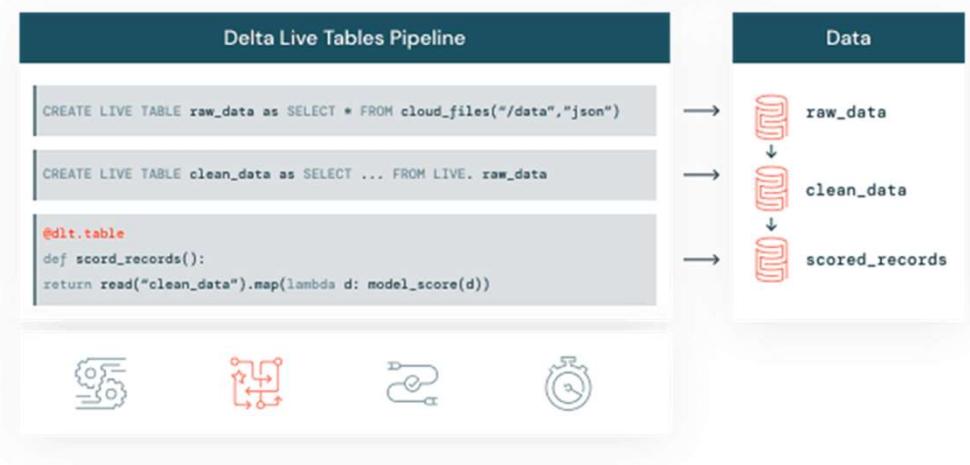


Choice of Data Engineering Tools



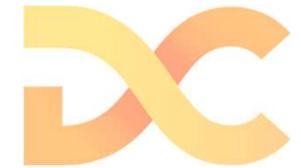
total_amount: double
payment_type: integer
pickup_hour: integer
pickup_day_of_week: integer
pickup_month: integer
pickup_year: integer
pickup_minute: integer
pickup_seconds: integer
dropoff_hour: integer
dropoff_day_of_week: integer
dropoff_month: integer
dropoff_year: integer
dropoff_minute: integer
dropoff_seconds: integer

Delta Live Tables understands and coordinates data flow between your queries





Metadata-driven Frameworks



[Large-scale data copy pipelines with metadata-driven approach in copy data tool in ADF](#)

[A cross tenant metadata driven processing framework for Azure Data Factory and Azure Synapse Analytics \(by Paul Andrew\)](#)

Microsoft Azure | Data Factory

Copy Data tool

Properties

Source

Target

Settings

Review and finish

Properties

Select copy data task type and configure task schedule

Task type

Built-in copy task
You will get single pipeline to copy data from 90+ data source easily.

Metadata-driven copy task
Metadata is required to be stored in external control tables to load data at large-scale.

Control table data store *

Test connection

Table * -
 Create new table

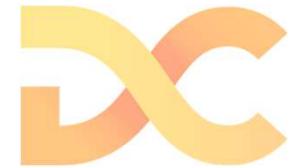
Task cadence or task schedule *
 Run once now Schedule Tumbling window

Start Date (UTC) *

< Previous



Microsoft Purview Data Sharing

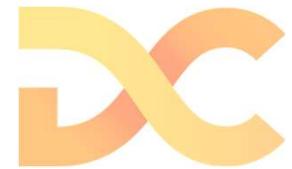


- Easily share in-place with no data duplication
- Near real time access to shared data
- Centrally manage sharing relationships
- Supports Azure Data Lake Storage (ADLS Gen2) and Blob Storage

The screenshot shows the Microsoft Purview Governance Portal interface for Data Sharing. The top navigation bar includes 'Overview', 'Sent shares' (highlighted with a red box), 'Received shares', and a search bar. The main content area is titled 'Data share (preview)' with a sub-section 'Create a share' (also highlighted with a red box). It explains that data can be shared internally or with other organizations. Below this are sections for 'What is Data share?', 'How to send shares', and 'How to receive shares'. On the right side, there are two tables: 'Purview' showing a 'New share' entry and 'Pending share' entries, and 'Purview' showing 'Pending share' details with an 'Accept and configure' button.



Data Lineage Tracking



Screenshot of the Microsoft Purview Governance Portal showing the Data Lineage Tracking feature for the "Fabrikam For Purview Field" catalog.

The portal displays the following information:

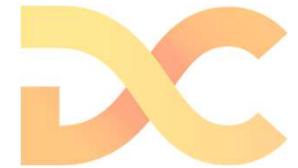
- Catalog Summary:** 84 sources, 1,509,133 assets, 251 glossary terms.
- Recently accessed items:**

Name	Last update
factSales	...
TicketPaymentInfoTable	a month ago
Human Resources Sample	4 months ago
ITICKETKEYVH	9 months ago
Human Resources Sample	4 months ago
TicketReservation	a year ago
- Links:**
 - [Microsoft Purview overview](#) - Discover the capabilities offered by Microsoft Purview and learn how to make the most of them.
 - [Getting started](#) - Learn about how to use Microsoft Purview Governance Portal.
 - [Documentation](#) - Visit the documentation center for quickstarts, how-to guides, and references, etc.
- Key Features:**
 - [Browse assets](#) - Explore assets by source type and collection.
 - [Manage glossary](#) - Create and edit terms with custom term templates.
 - [Knowledge center](#) - Discover learning materials and tutorials.

The interface includes a search bar, navigation menu, and user profile information at the top right.



DevOps



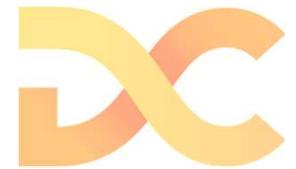
- Continuous integration
- Continuous deployment
- Source control
- Monitoring



Dev
DevOps



Power BI Deployment Pipelines



The screenshot shows the Power BI Deployment pipelines (preview) interface for the "MyFoods full pipeline". The interface is divided into three main stages:

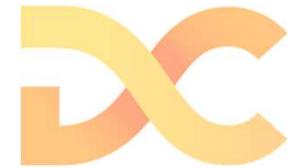
- Development:** Design, review, and revise your content in a development workspace. When it's ready for testing and previewing, deploy the content to the test stage.
- Test:** Test and verify your content in a preproduction workspace. When it's ready for distributing, deploy the content to the production stage.
- Production:** Your content has been tested and is ready for distributing to consumers as an app or by access to the production workspace.

Each stage displays a summary of datasets, reports, and dashboards. In the Development stage, there are 5 datasets, 5 reports, and 4 dashboards. In the Test stage, there are 4 datasets, 4 reports, and 3 dashboards. In the Production stage, there are 4 datasets, 4 reports, and 3 dashboards. Buttons for "Deploy to test" and "Deploy to production" are visible in the Development and Test stages respectively.

[Overview of Power BI deployment pipelines - Power BI | Microsoft Learn](#)



Power BI Deployment Pipelines



VisualStudio | Marketplace

Nimrod Shalit (nishalt@microsoft.com) Sign out

Azure DevOps > Azure Pipelines > Power BI automation tools (Preview)

Power BI automation tools (Preview) | Reports | Manage

Microsoft | 3 installs | ★★★★★ (0) | Free

Automate release management tasks related to Power BI deployment pipelines

[Get it free](#)

[Overview](#) [Q & A](#) [Rating & Review](#)

The Power BI [deployment pipelines](#) tool enables BI teams to build an efficient and reusable release process for their Power BI content. You can leverage the tasks in this Azure DevOps extension to integrate Power BI into your organization's automation process. Here are a few examples of what can be done using the APIs:

- Manage Power BI pipelines from start to finish, including creating a pipeline, assigning a workspace to any stage, deploying and deleting the pipeline.
- Assign users to a pipeline.
- Deploy all/selected items in a Power BI pipeline to the next stage.

Learn more about using these tasks [here](#).

To get started with deployment pipelines, learn more [here](#).

Release Notes

Version	Remarks
1.0.0	Public preview release.

Add tasks | Refresh

- Remove a workspace from a deployment
- Add user to a deployment pipeline

Categories

Azure Pipelines

Tags

dataset Deployment Pipelines PBIX Power BI release

Works with

Azure DevOps Services
Azure DevOps Server

Resources

Get Started

[Automate your deployment pipeline by using APIs and Azure DevOps - Power BI | Microsoft Learn](#)



Power BI Deployment Pipelines



The screenshot illustrates the Power BI Deployment Pipelines interface, showing the flow from Development to Test and the resulting code changes.

Development Stage:

- Sales of MyFoods.com [Dev]: Shows 1 Dataflows, 0 Datamarts, and 5 Datasets.
- AdventureWorks OData Service
- Product revenue
- Sales analysis drilldown
- Change review button
- Deploy button

Test Stage:

- Sales of N: Shows 1 Dataflows.

Comparison Stage:

- Compare button
- Change review window for Sales of MyFoods.com [Dev] / Sales analysis drilldown:
 - To be modified [Test]:

```
1 {
2   "annotations": [
3     {
4       "name": "PBIDesktopVersion",
5       "value": "2.115.6852.1"
6     }
7   ],
8   "name": "PBI_QueryOrder",
9   "value": "[\"DimDate\", \"DimCustomer\", \"DimGeography\"]"
10 },
11 {
12   "name": "__PBI_TimeIntelligenceEnabled",
13   "value": "1"
14 },
15 {
16   "culture": "en-US",
17   "cultures": [
18     {
19       "name": "en-US",
20       "linguisticMetadata": {
21         "content": "DynamicImprovement: HighConfidence",
22         "entities": [
23           "dim_customer": {
24             "binding": {
25               "conceptualEntity": "DimCustomer"
26             },
27             "state": "Generated",
28             "terms": [
29               {
30                 "customerInformation": {}
31               }
32             ]
33           }
34         ]
35       }
36     }
37   ]
38 }
```
 - To be deployed [Development]:

```
1 {
2   "annotations": [
3     {
4       "name": "PBIDesktopVersion",
5       "value": "2.115.6863.1"
6     }
7   ],
8   "name": "PBI_QueryOrder",
9   "value": "[\"DimDate\", \"DimCustomer\", \"DimGeography\"]"
10 },
11 {
12   "name": "__PBI_TimeIntelligenceEnabled",
13   "value": "1"
14 },
15 {
16   "culture": "en-US",
17   "cultures": [
18     {
19       "name": "en-US",
20       "linguisticMetadata": {
21         "content": "DynamicImprovement: HighConfidence",
22         "entities": [
23           "dim_customer": {
24             "binding": {
25               "conceptualEntity": "DimCustomer"
26             },
27             "state": "Generated",
28             "terms": [
29               {
30                 "customerInformation": {}
31               }
32             ]
33           }
34         ]
35       }
36     }
37   ]
38 }
```

Now on Deployment Pipelines: View item's code changes before deploying it | Microsoft Power BI Blog



TMDL



Tabular Model Definition Language

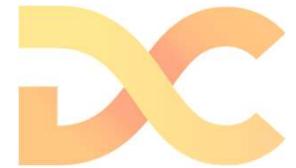
- Human readable
- YAML-like syntax
- Better editing experience
- Folder output format

```
Customer.tmd M Sales.tmd X
Model > tables > Sales
  You, 2 hours ago | 1 author (You)
    table Sales
      ordinal: 7
    3
    4 > partition Sales = M...
    16
    17
    18 > measure Margin = [Sales Amount] - [Total Cost]...
    24
    25 > measure 'Sales Amount' = SUMX ( Sales, Sales[Quantity] * Sales[Net Price] )...
    31
    32 > measure 'Sales Quantity' = SUM ( Sales[Quantity] )...
    34
    35 > measure 'Total Cost' = SUMX ( Sales, Sales[Quantity] * Sales[Unit Cost] )...
    41 > You, 2 weeks ago • Converted to TMDL
    42 > column CurrencyKey ...
    52
    53 > column CustomerKey ...
    63
    64 > column 'Delivery Date' ...
    75
    76 > column 'Net Price' ...
    87
    88 > column 'Order Date' ...
    99
    100 >
    110
    111 > column 'Order Line Number' ...
    119
    120 > column OrderNumberKey ...
```

[The Future of Version Control for Tabular Models - Mathias Thierbach & Gabi Münster - YouTube](#)



TMDL



Tabular Model Definition Language

- Human readable
- YAML-like syntax
- Better editing experience
- Folder output format

The screenshot shows the Azure DevOps Pipelines interface for a project named "tmdl-demo". The left sidebar lists "Overview", "Repos", "Pipelines" (which is selected), "Environments", "Releases", "Library", "Task groups", and "Deployment groups". The main area displays the "Jobs in run #20230317.21" for the "tmdl-demo" pipeline. The jobs listed are: Deploy to Environment (status: Queued), Initialize job (status: <1s), Checkout tmdl-demo... (status: <1s), pbi-tools Deploy (status: <1s), and Post-job: Checkout tmdl-... (status: <1s). On the right, a "Deploy to Environment" step is expanded, showing its log output:

```
1 Pool: Azure Pipelines
2 Image: windows-latest
3 Queued: Just now [manage_parallel_jobs]
4 Agent: Hosted Agent
5 Started: Just now
6
7 The agent request is already running or has already completed.
8 ▶ Job 2 queue time variables used
9 Job live console data:
10 Starting: Deploy to environment
```

[The Future of Version Control for Tabular Models - Mathias Thierbach & Gabi Münster - YouTube](#)



Scanner API



[Updates to Scanner API | Microsoft Power BI](#)

- Artifact metadata
 - Scheduled refresh settings
 - RDL data source properties
- Dataset sub-artifact metadata content
 - Enable load
 - Parameters
 - RLS configuration
- Dataset sub-artifact coverage
 - XMLA changes
 - Autogenerated datasets
 - Datasets created via Quick create and Quick share
 - Web modeling modifications
- Datamarts metadata (including lineage)

```
"datasets": [  
  {  
    "id": "0aacd0ec-36dd-446a-8f6b-eb3f73691762",  
    "name": "SampleDataset",  
    "tables": [],  
    "configuredBy": "alias@microsoft.com",  
    "configuredById": "fedabcd4-0ab9-4e89-b7a5-a7e07125d601",  
    "isEffectiveIdentityRequired": true,  
    "isEffectiveIdentityRolesRequired": true,  
    "refreshSchedule": {  
      "days": [  
        "Tuesday",  
        "Wednesday"  
      ],  
      "times": [  
        "01:00",  
        "01:30",  
        "02:00"  
      ],  
      "enabled": true,  
      "localTimeZoneId": "AUS Eastern Standard Time",  
      "notifyOption": "MailOnFailure"  
    },  
    "targetStorageMode": "Abf",  
    "createdDate": "2021-12-05T08:49:23.99",  
    "contentProviderType": "PbixInImportMode",  
  }]
```



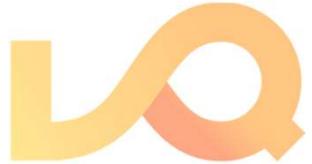
Data Security Specialist



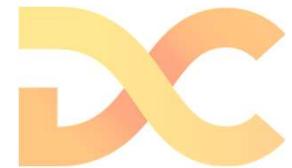
- Data residency
- Compliance
- Data access control
- Security for sensitive data



Kevin
Data Security Specialist



Secure By-design



Large global footprint,
offering storage in 54
data centers WW

Multi-geo capacities



119 local and
international
compliance standards

34 local and
international industry
certifications



Service tags
Private links
VNet
TLS 1.2 enforcement



BYOK encryption via
Azure Key Vault
Double encryption
at rest



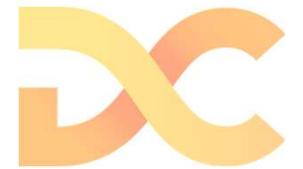
Classify and protect
data with MIP
Monitor and protect
data with MCAS

Integrated security policy
management, audit and
compliance

Admin governance -
permissions, settings,
metrics



Secure By-design



Microsoft Purview | Governance Portal > ContosoPurview

Search assets

Data catalog Data map Data estate insights Management

Sources Collections Source management Scan rule sets Integration runtimes Annotation management Classifications Classification rules

Classification rules

+ New Edit Delete Refresh Disable Enable

System Custom

How Azure Purview classifies data

Filter by name...

Name	State
ABA Routing Number	Enabled
Age of an individual	Enabled
Argentina National Identity (DNI) Number	Enabled
Australia Bank Account Number	Enabled
Australia Business Number	Enabled
Australia Company Number	Enabled



Secure By-design



Power BI ContosoFinanceDepartment

Search ...

ContosoFinanceDepartment

Create app

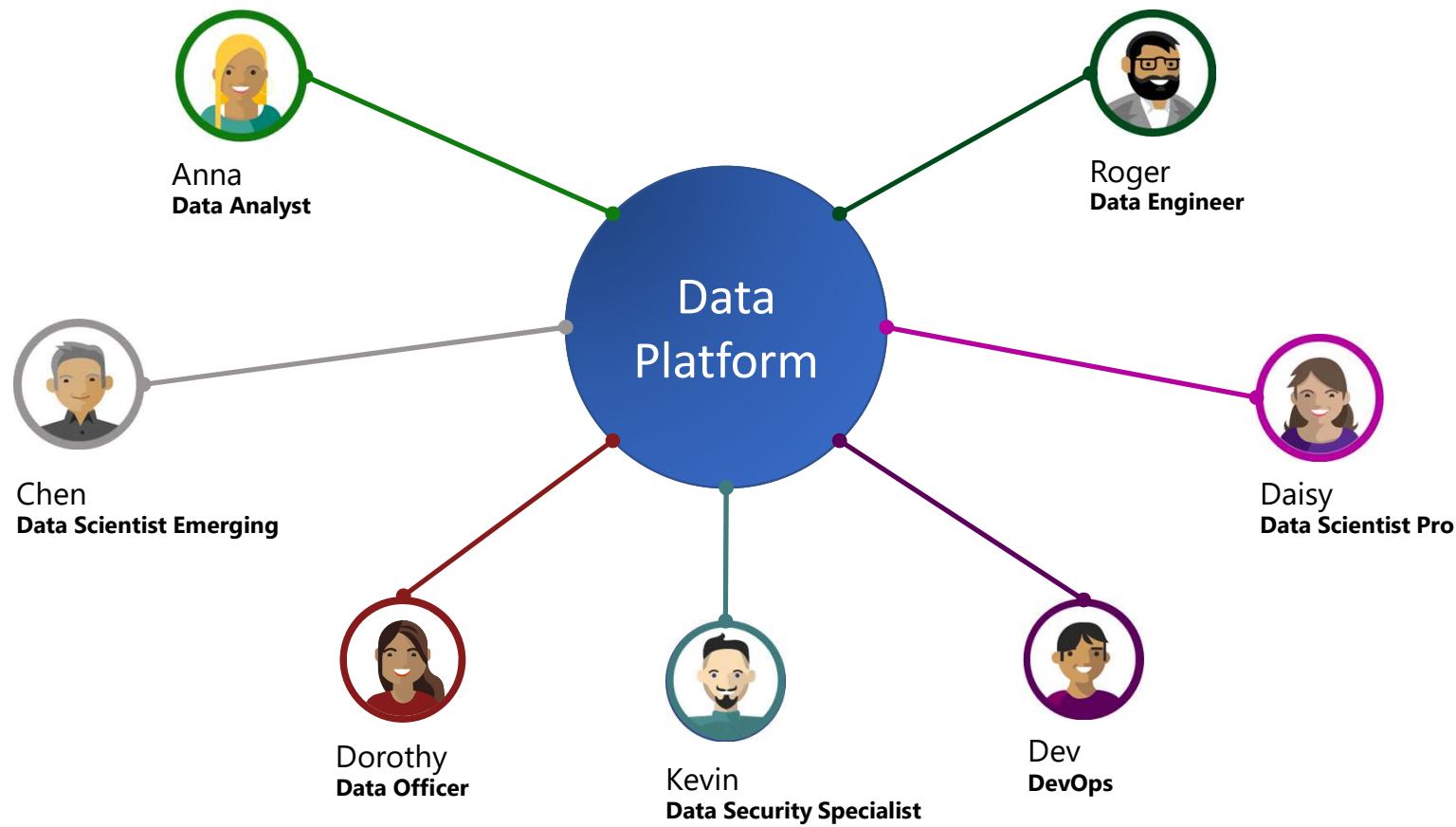
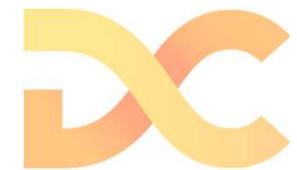
New Create a pipeline

All Content Datasets + dataflows

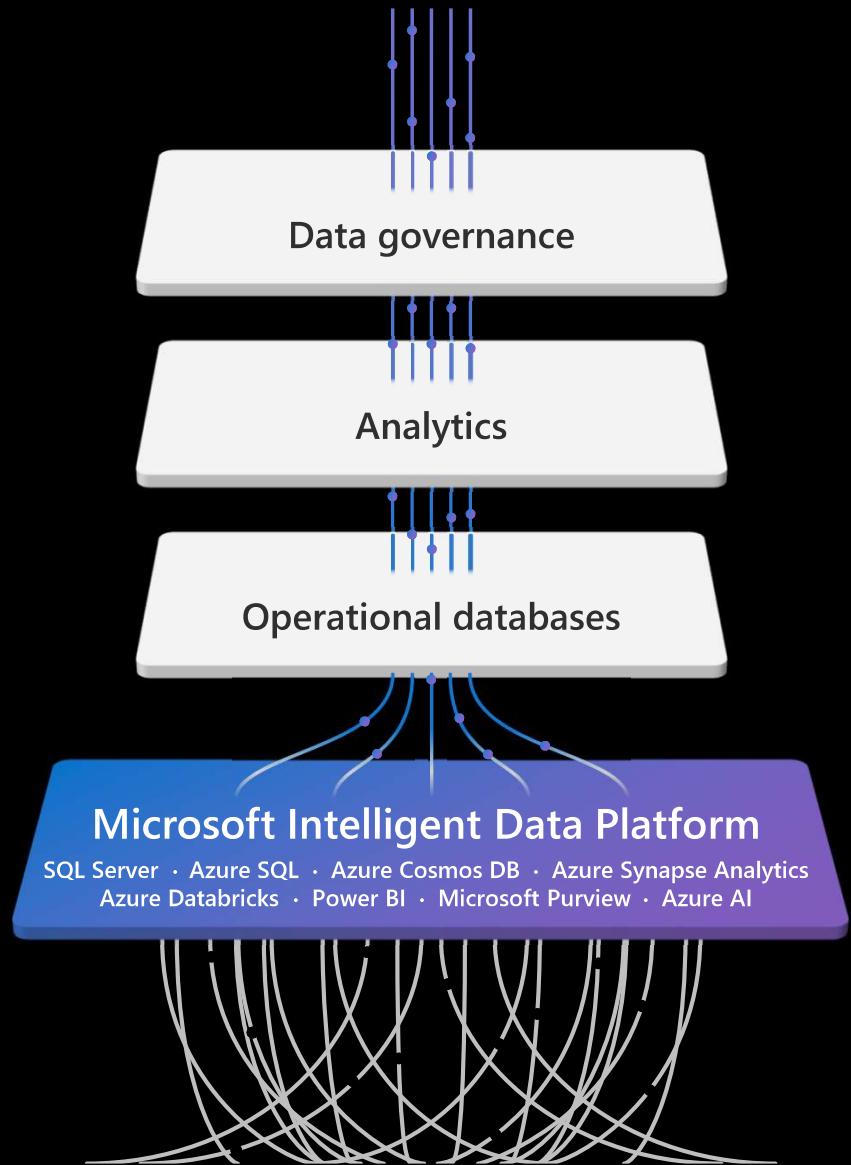
Name	Type	Owner	Refreshed	Next refresh	Endorsement	Sensitivity	Include in app
Business Units & Regions	Report	ContosoFinanceDepa...	4/21/21, 10:38:10 AM	—	Promoted	—	Yes
Company Metrics	Dataset	ContosoFinanceDepa...	4/21/21, 10:38:10 AM	N/A	Promoted	Confidential/Internal...	...
Executive Summary	Dashboard	ContosoFinanceDepa...	—	—	—	Highly Confidential\In...	Yes
Finance	Report	ContosoFinanceDepa...	4/21/21, 10:38:10 AM	—	Promoted	Highly Confidential\In...	Yes
HR Metrics	Report	ContosoFinanceDepa...	4/21/21, 10:38:10 AM	—	Promoted	Highly Confidential\In...	Yes



Persona-oriented



Microsoft Intelligent Data Platform





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May 23-25, 2023



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DISTRIBUTED.**





Persona-oriented



Amir Netz
@AmirNetz

...

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