

Power Platform Dataflows

Power Query (and more) in the Cloud

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workingondata.wordpress.com



Power Platform

Powerful alone. Better together.

The Microsoft Power Platform is more than the sum of its parts. Connect them together—and to Office 365, Dynamics 365, Azure, and hundreds of other apps—and build end-to-end business solutions.

Power BI

Make informed, confident business decisions by putting data-driven insights into everyone's hands.

[Learn more >](#)

Power Apps

Turn ideas into organizational solutions by enabling everyone to build custom apps that solve business challenges.

[Learn more >](#)

Power Automate

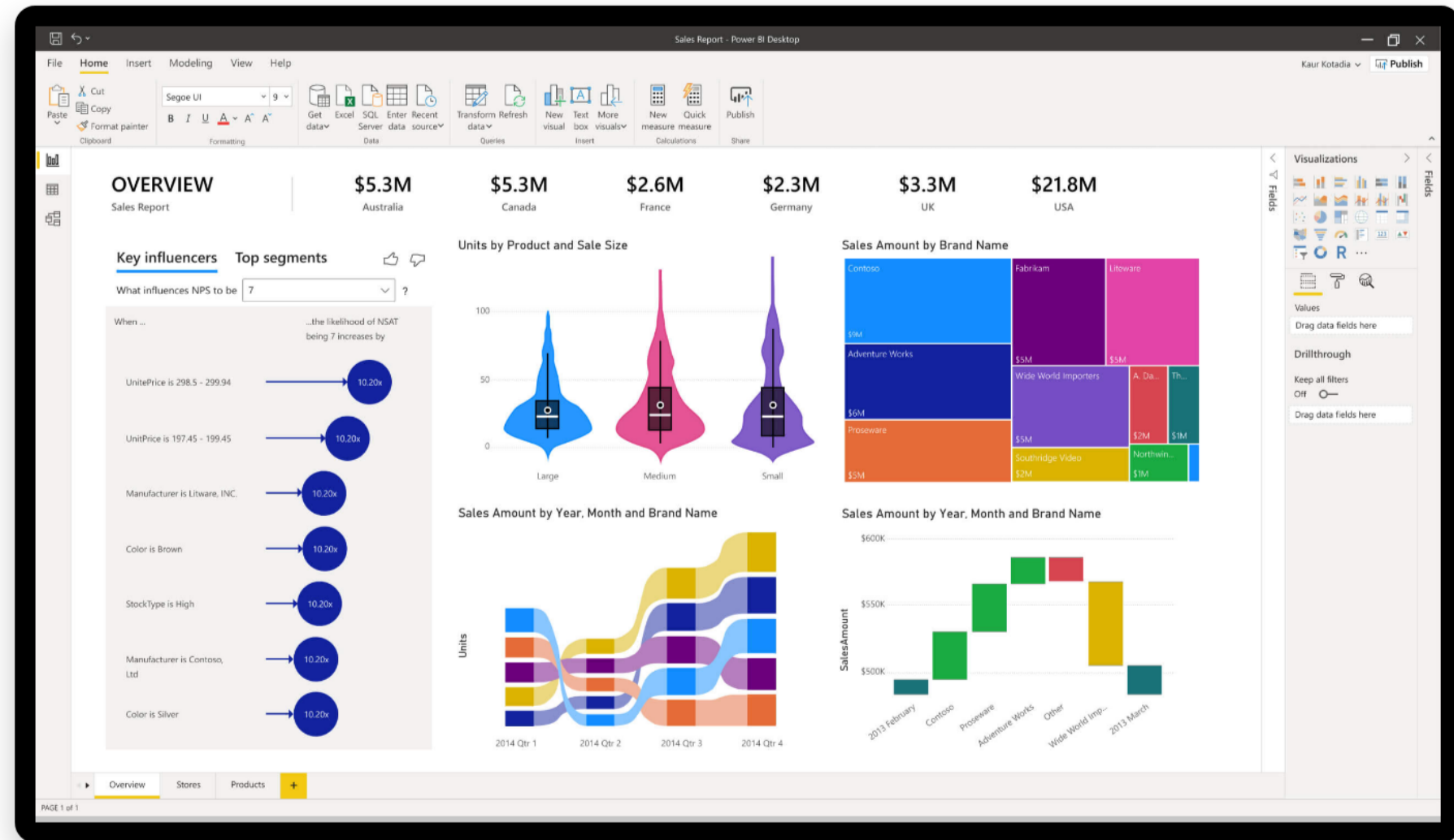
Boost business productivity to get more done by giving everyone the ability to automate organizational processes.

[Learn more >](#)

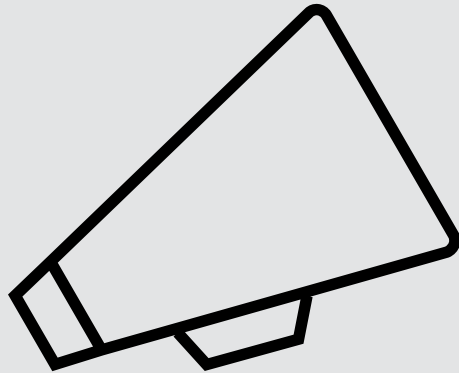
Power Virtual Agents

Easily build chatbots to engage conversationally with your customers and employees—no coding required.

[Learn more >](#)



Power Platform Dataflows



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Self-Service

Data Integration in the Cloud

Information Hierarchy

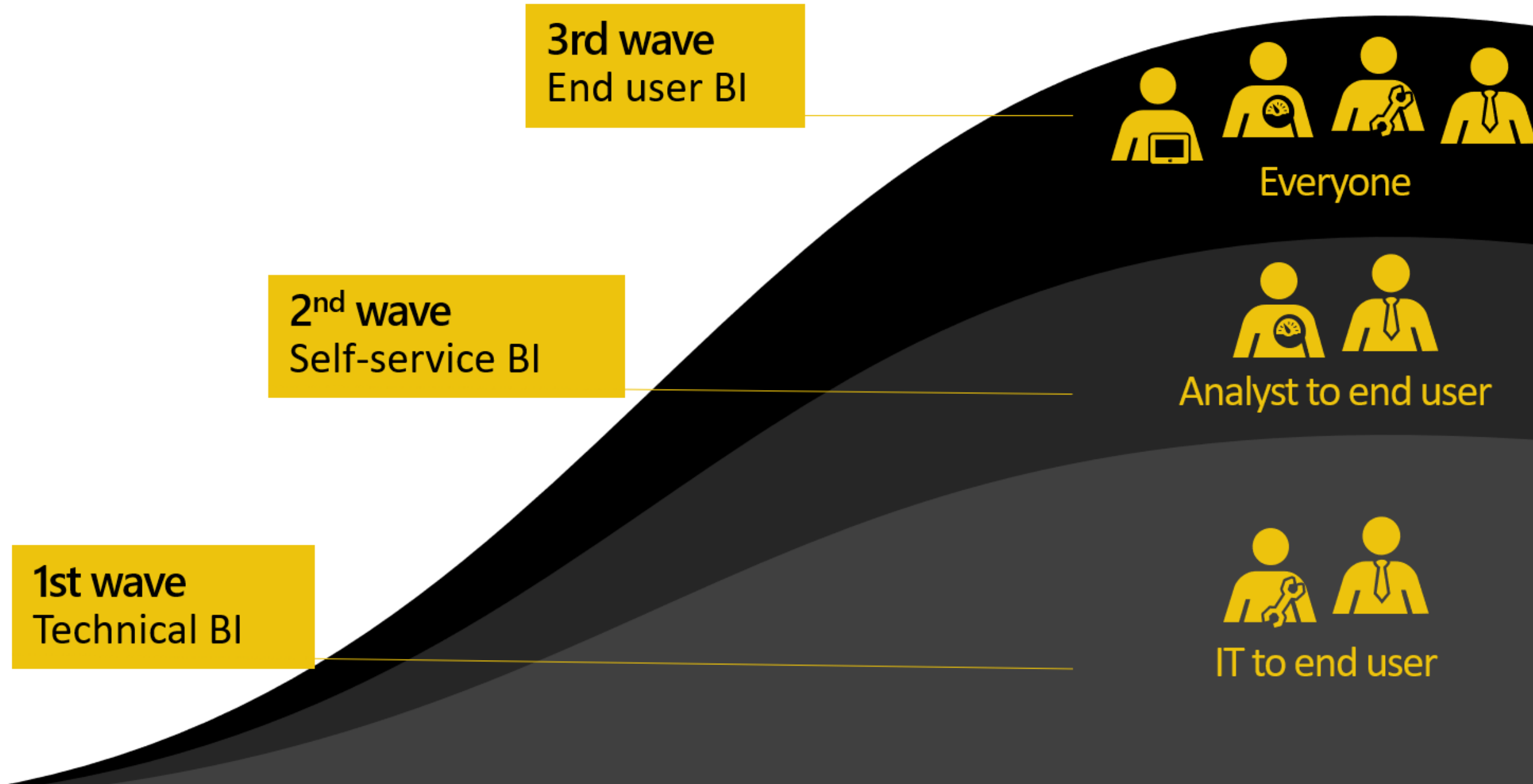
Reusability

Data Lake

Common Data Model (CDM)

Power Query (Online)

Evolution of Business Intelligence





Self Service BI

BI / Reporting



ETL

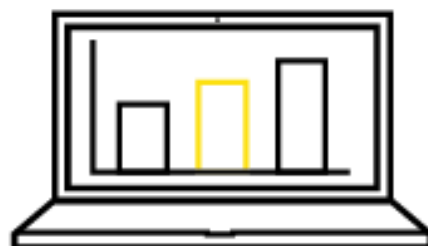


Hundreds of data sources



CONNECT

Power BI Desktop



PUBLISH

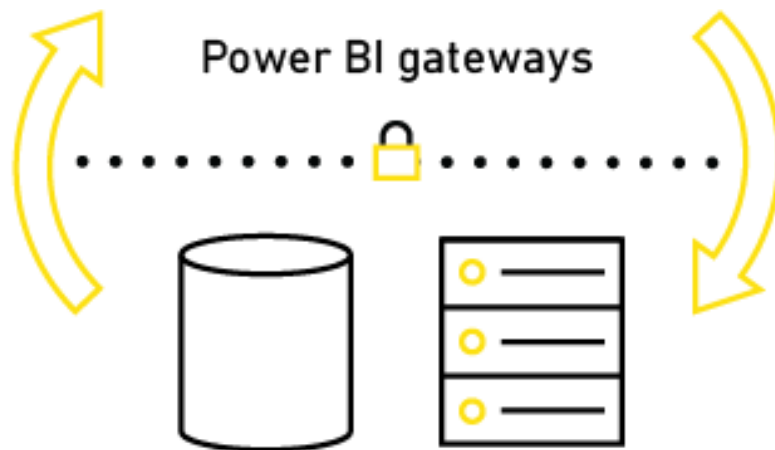
Power BI service



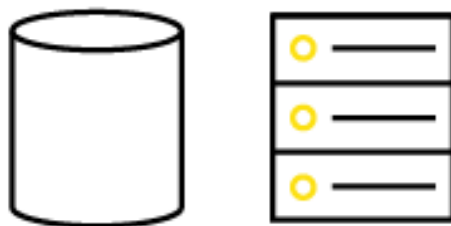
ACCESS



Power BI gateways



YOUR ORGANIZATION'S DATA



Interactive Reporting

Sales Report



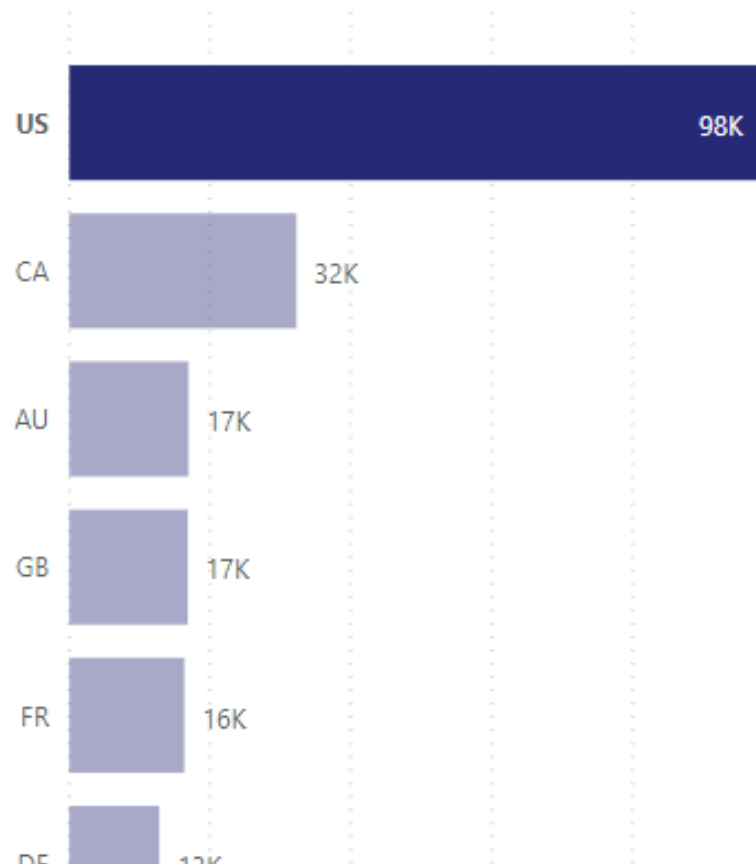
98K

Units Sold

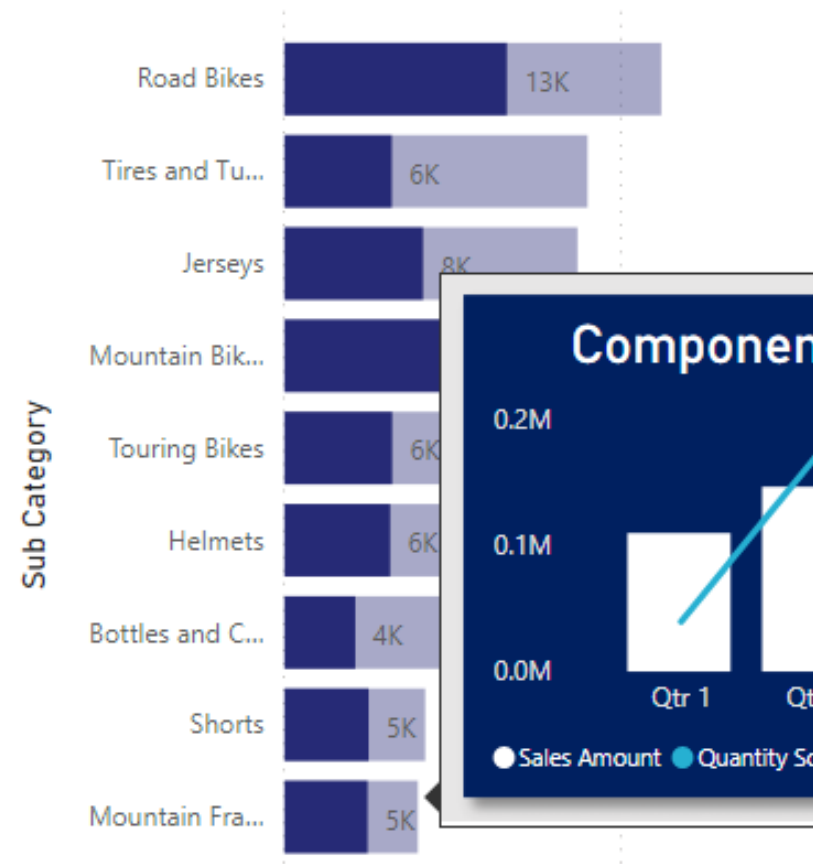
14.79M

Sales Amount

Country Breakdown

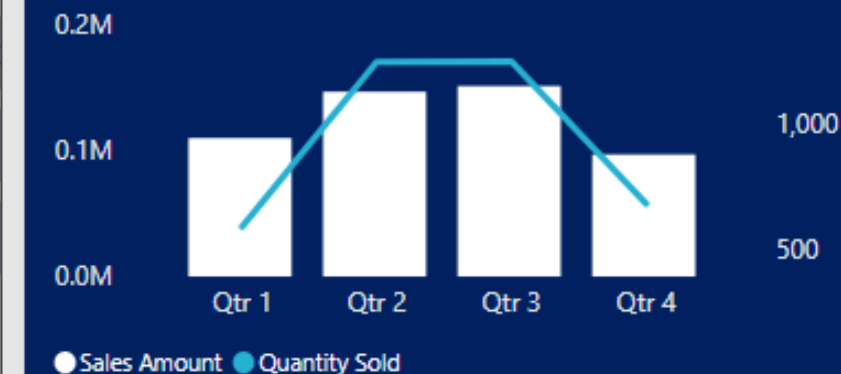


Product Breakdown

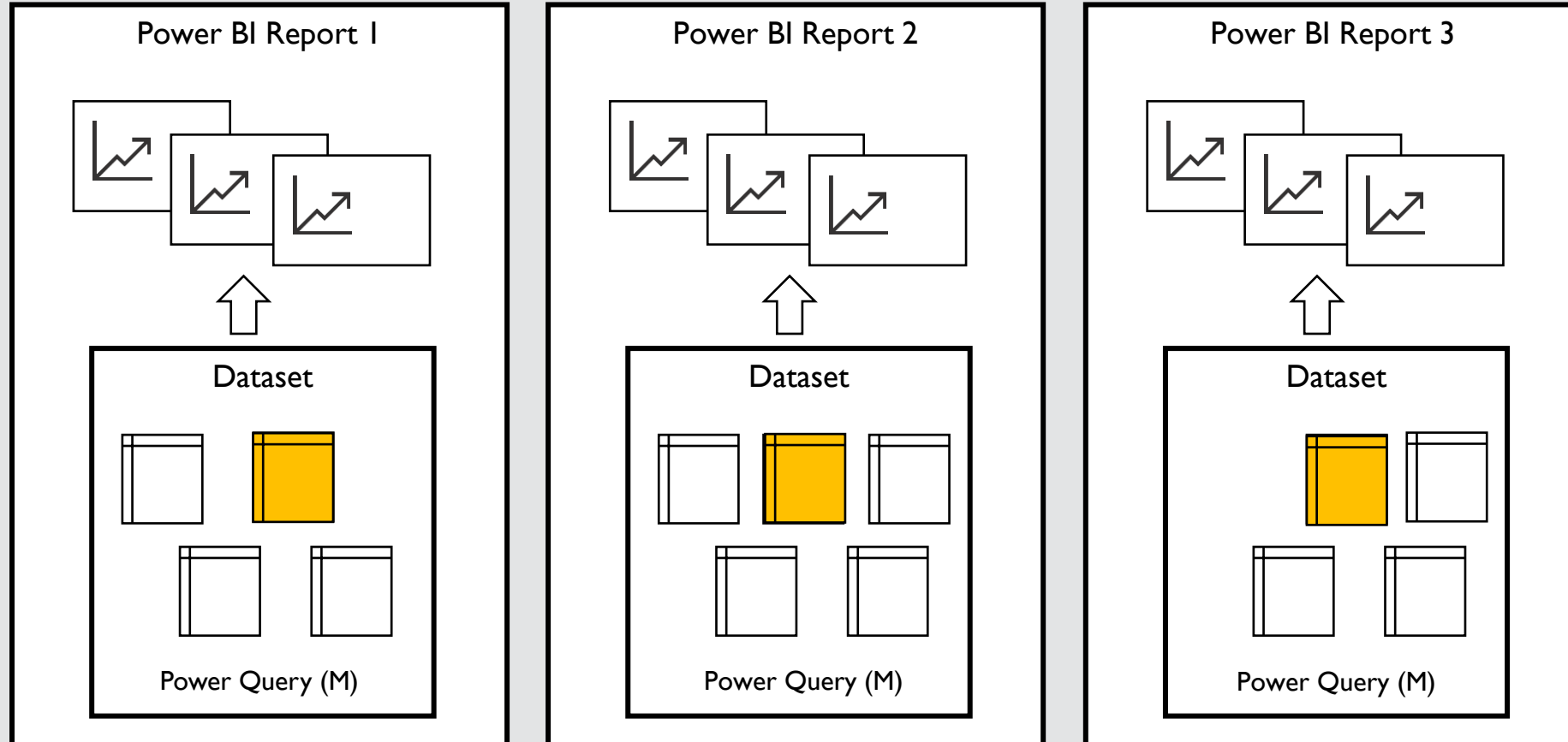


Quantity sold per year as column chart

Components



(Reusable) ETL in Power BI



Power Query

DIAD Final Report - Power Query Editor

File Home Transform Add Column View Help

Close & Apply Close New Source Recent Sources Enter Data Data source settings Manage Parameters Refresh Preview Advanced Editor Properties Choose Columns Remove Columns Keep Rows Remove Rows Sort Split Column Group By Data Type: Text Use First Row as Headers Replace Values Merge Queries Append Queries Combine Files Text Analytics Vision Azure Machine Learning

Queries [9]

- Transform File from International [3]
 - Sample Query [2]
 - Sample File
 - Sample File Parameter1 (Sample Fi...
 - Transform Sample File from Internat...
 - Transform File from International
 - Other Queries [5]
 - Sales
 - Product
 - Geography
 - Manufacturer
 - International

Zip City Region District Country

Valid 100 % Valid 100 % Valid 94 % Valid 100 % Valid 100 %
Error 0 % Error 0 % Error 0 % Error 0 % Error 0 %
Empty 0 % Empty 0 % Empty 6 % Empty 0 % Empty 0 %

1000 distinct, 1000 unique 775 distinct 3 distinct, 0 unique 13 distinct, 1 unique 2 distinct, 0 unique

1 22654 Star Tanner
2 22655 Stephens Ci
3 22656 Stephenson
4 22657 Strasburg, V
5 22660 Toms Brook
6 22663 White Post,
7 22664 Woodstock,
8 22701 Culpeper, V
9 22709 Aroda, VA, U
10 22711 Banco, VA, U
11 22712 Bealeton, VA
12 22713 Boston, VA,
13 22714 Brandy Stati
14 22715 Brightwood,
15 22716 Castleton, V
16 22718 Elkwood, VA
17 22719 Etlan, VA, U
18 22720 Goldvein, VA, USA
19 22722 Haywood, VA, USA

Copy
Remove
Remove Other Columns
Duplicate Column
Add Column From Examples...
Remove Duplicates
Remove Errors
Change Type
Transform
Replace Values...
Replace Errors...
Split Column
Group By...
Fill
Unpivot Columns
Unpivot Other Columns
Unpivot Only Selected Columns
Rename...
Move
Drill Down
Add as New Query

By Delimiter...
By Number of Characters...
By Positions...
By Lowercase to Uppercase
By Uppercase to Lowercase
By Digit to Non-Digit
By Non-Digit to Digit

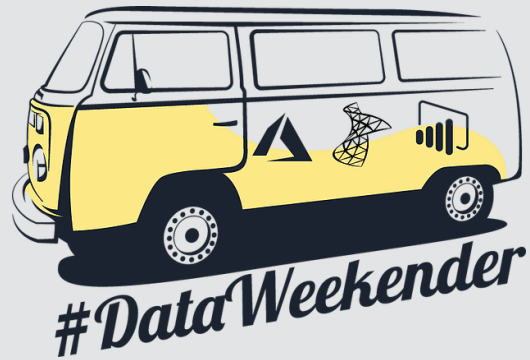
Query Settings

PROPERTIES

Name
Geography

APPLIED STEPS

- Source
- Navigation
- Changed Type
- Removed Top Rows
- Promoted Headers
- Changed Type1



Power BI Dataflows

Power BI Information Hierarchy (before Dataflows)

Dashboards

Interactive Reports

Paginated Reports

Datasets

Raw Data

Power BI Information Hierarchy

Dashboards

Interactive Reports

Paginated Reports

Datasets

Dataflows

Raw Data

DEMO

Power BI Dataflows

Power Query Online

Power Query - Choose data source

All categories

File

Database

Power Platform










































Azure

Online services





Other

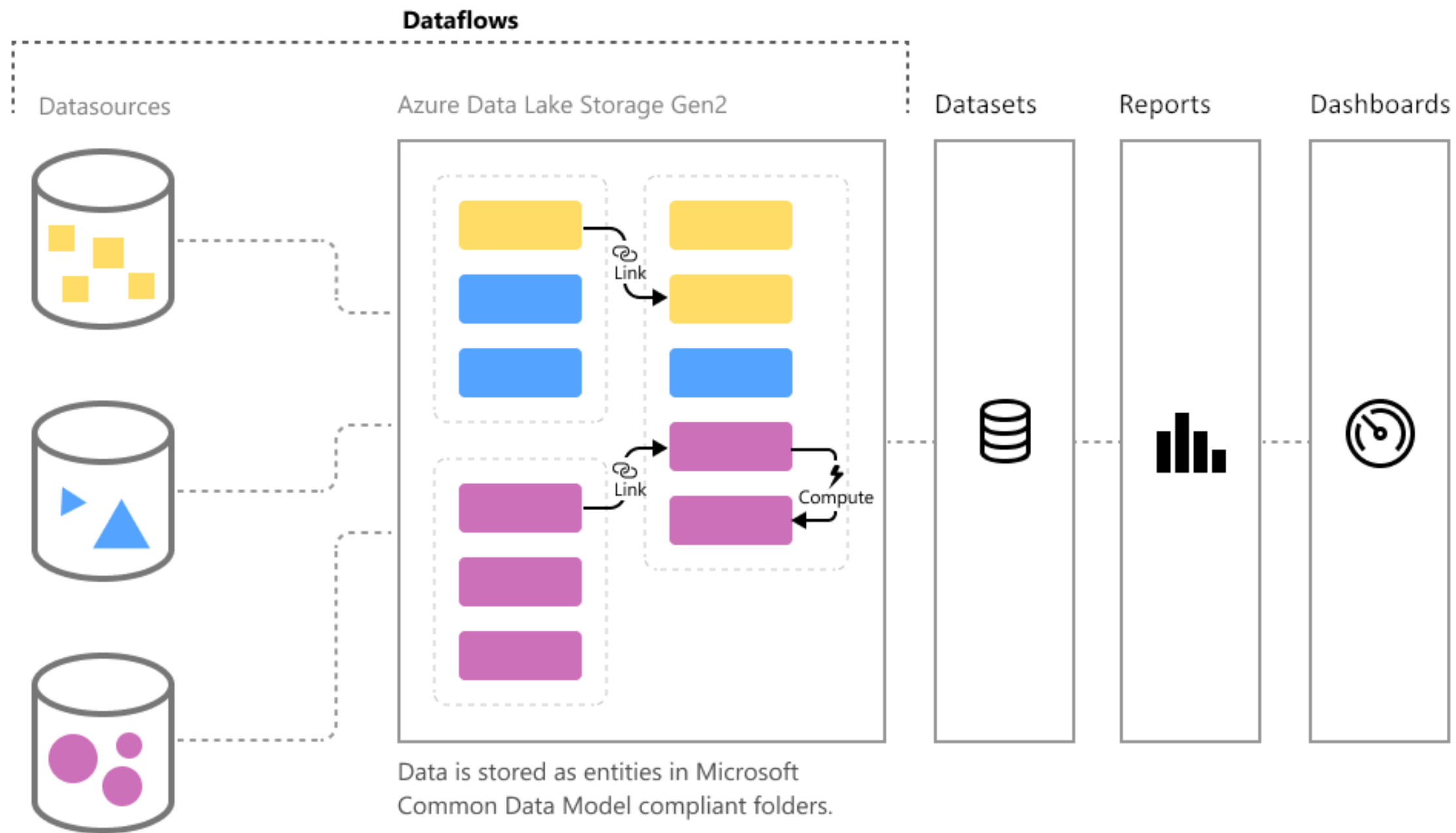
Search

Data sources

 Access File	 Excel File	 Folder File	 JSON File	 PDF File	 SharePoint folder File
 Text/CSV File	 XML File	 Amazon Redshift Database	 Google BigQuery Database	 IBM Db2 database Database	 MySQL database Database
 Oracle database Database	 PostgreSQL database Database	 SQL Server database Database	 Sybase database Database	 Teradata database Database	 Vertica Database
 Azure Blobs Azure	 Azure Data Explorer (Kusto) Azure	 Azure Data Lake Storage Gen2 Azure	 Azure HDInsight Spark Azure	 Azure SQL Data Warehouse Azure	 Azure SQL database Azure
 Azure Tables Azure	 Microsoft Exchange Online Online services	 Salesforce objects Online services	 Salesforce reports Online services	 SharePoint Online list Online services	 Smartsheet Online services
 Active Directory Other	 Common Data Service Power Platform	 OData Other	 Odbc Other	 Power BI dataflows Power Platform	 SharePoint list Other
 Spark Other	 Web API Other	 Web page Other	 Blank table Other	 Blank query Other	

Templates

 Accounts, leads, opportunities Salesforce Online services	 Lead to cash Dynamics 365 Sales Online services	 Leads, opportunities Dynamics 365 Sales Online services	 Quotes, orders, invoices Dynamics 365 Sales Online services
---	---	--	---



Dataflows are like Excel

[illegible]

Common Data Model

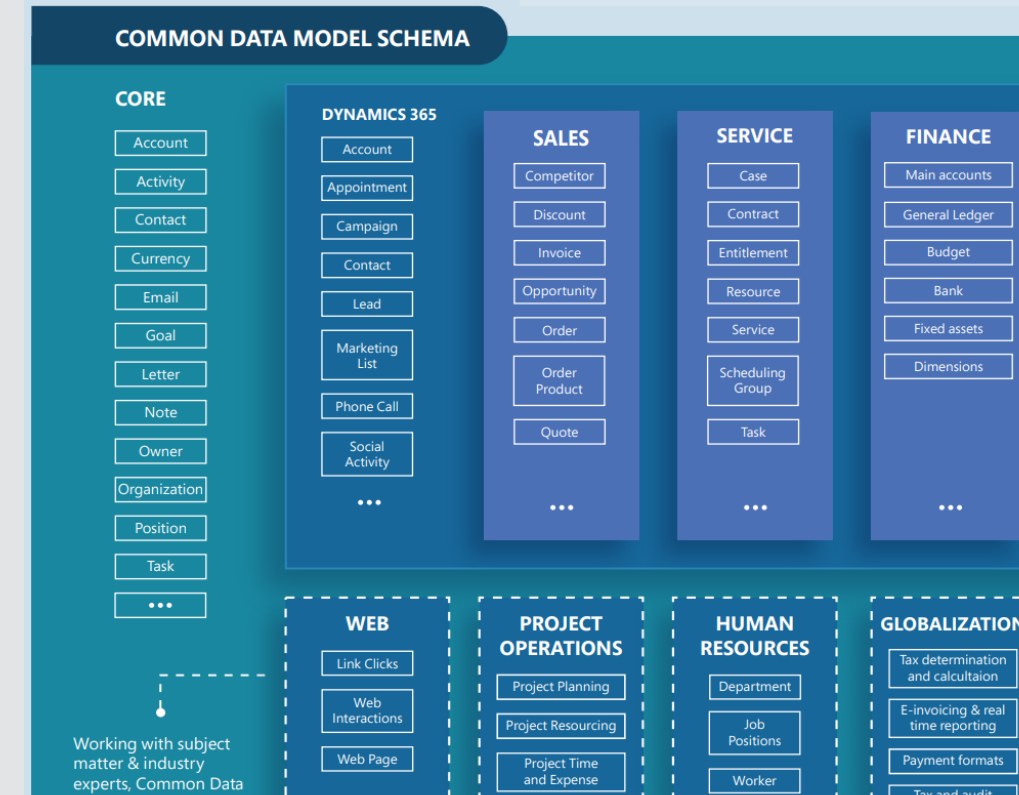
Set of

- standardized, extensible data schemas

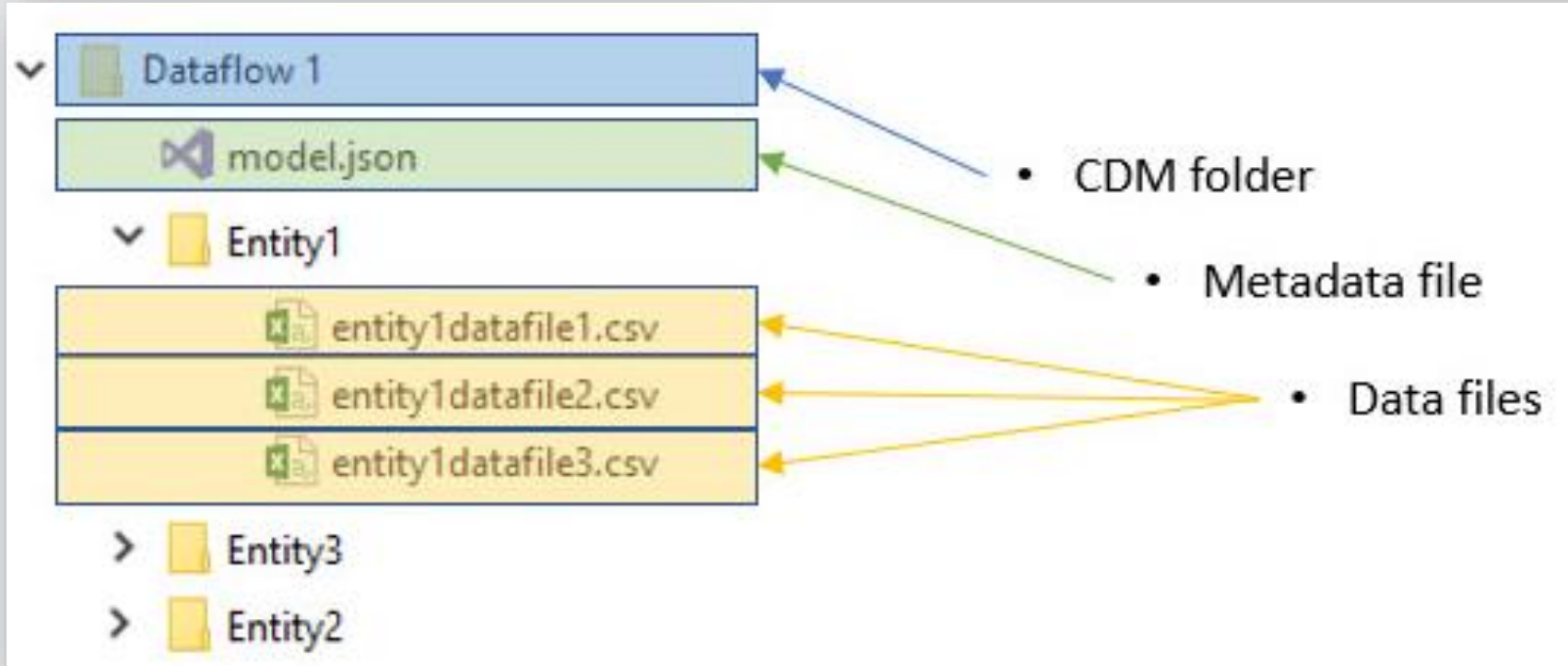
- Entities
- Attributes
- Semantic Metadata & Relationships

What's in Common Data Model?

In addition to the metadata system, Common Data Model includes a set of standardized, extensible data schemas that Microsoft and its partners have published. This collection of predefined schemas includes entities, attributes, semantic metadata, and relationships. The schemas represent commonly used concepts and activities, such as **Account** and **Campaign**, to simplify the creation, aggregation, and analysis of data. This graphic shows some elements of the standard entities. More information: [Common Data Model repository on GitHub](#)



CDM Folders

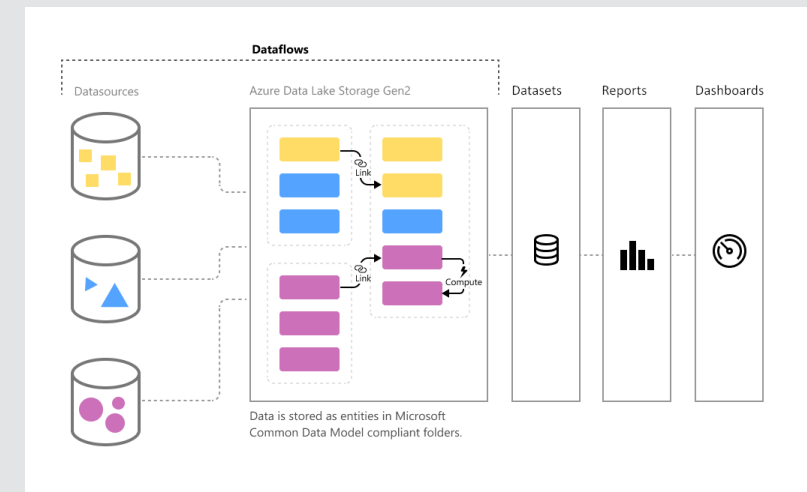


```
{ } Sales From Excel.json • { } First Dataflow.json •  
1 {  
2   "name": "Sales From Excel",  
3   "description": "",  
4   "version": "1.0",  
5   "culture": "en-US",  
6   "pbi:mashup": {  
7     "fastCombine": true,  
8     "allowNativeQueries": false,  
9     "queriesMetadata": {  
10      "Sales": {  
11        "queryId": "40b69972-542b-49ee-ab",  
12        "queryName": "Sales",  
13        "loadEnabled": true  
14      }  
15    },  
16    "document": "section Section1;\r\n\nshared",  
17  },  
18  "entities": [  
19    {  
20      "$type": "LocalEntity",  
21      "name": "Sales",  
22      "description": "",  
23      "pbi:refreshPolicy": {  
24        "$type": "FullRefreshPolicy",  
25        "location": "Sales.csv"  
26      },  
27      "attributes": [  
28        {  
29          "name": "SalesOrderNumber",  
30          "dataType": "string"
```

Fact Sheet – PBI Dataflows

Power Query processes in the cloud

- .. run **independently** of a **Power BI report**
- .. store **output** into a **data lake** (ADLS Gen2)
- .. **entities** (result tables)
- .. use **Common Data Model** for entity definition
- .. not in “my workspace”



Bring your Own Storage Account (BYOSA)

Dataflow storage (preview)

Your Azure Data Lake Storage account is connected to Power BI

datalake4cdm

Allow workspace admins to assign workspaces to this storage account [Learn more](#)

☒ Allow

Apply

Cancel

powerbi

Upload Download New Folder Select All Copy Paste Rename Manage Access Properties Delete Refresh

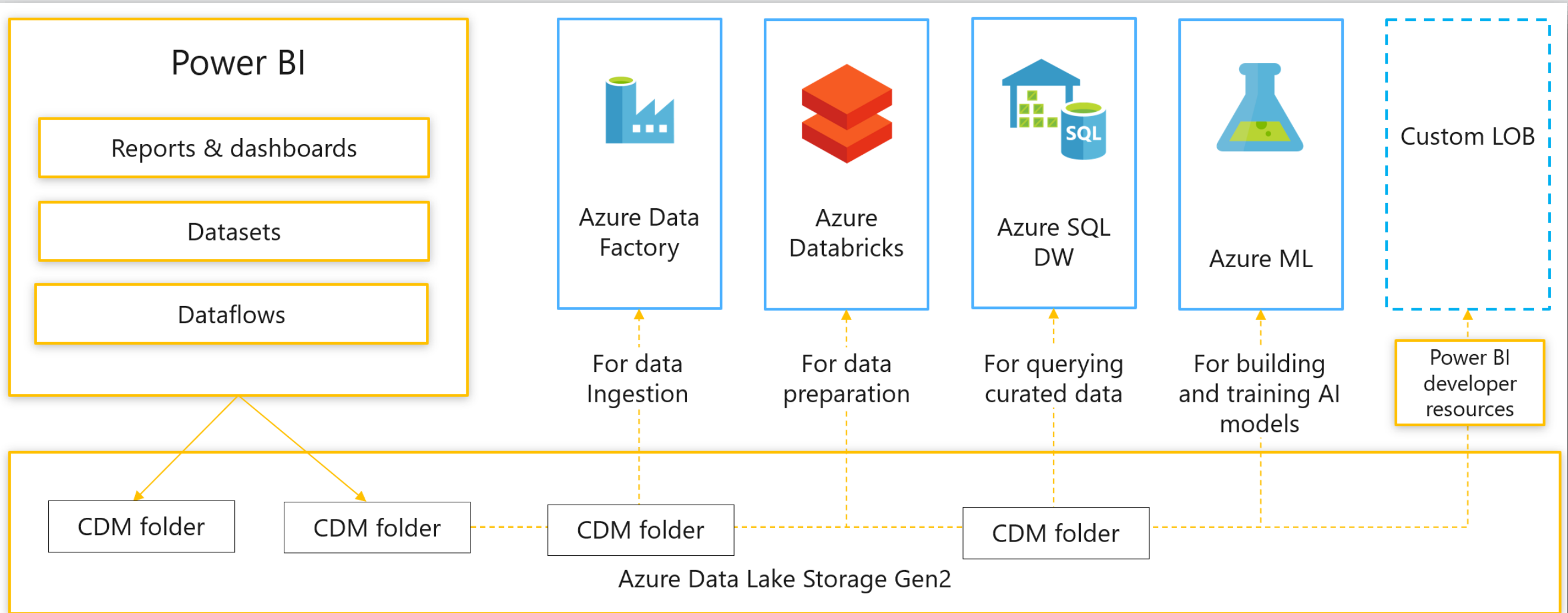
powerbi > Dataflow2Lake > Product dataflow

Name	Access Tier
model.json.snapshots	
model.json	Hot (inferred)

z: > Track 2 BI > Dataflows > Product dataflow > {} model.json > [] entities > {} 0 > [] attributes > {}

```
1 {
2   "name": "Product dataflow",
3   "description": "",
4   "version": "1.0",
5   "culture": "en-US",
6   "modifiedTime": "2019-12-02T20:34:28.5677753+00:00",
7   "pbi:mashup": {
8     "fastCombine": false,
9     "allowNativeQueries": false,
10    "queriesMetadata": {
11      "Products": {
12        "queryId": "eed1d3a0-543f-48fd-bd2a-e5938d922b08",
13        "queryName": "Products",
14        "loadEnabled": true
15      }
16    },
17    "document": "section Section1;\r\nshared Products = let\r\n  Source"
18  },
19  "entities": [
```

Power BI Dataflows and the Data Lake



Business analysts

Low/no code

Data scientists
Data engineers

Medium to high code

DEMO

Consume Dataflow Entities

Get Data

Search

All

File

Database

Power Platform

Azure

Online Services

Other

Power Platform

Power BI datasets

Power BI dataflows

Common Data Service

Power Platform dataflows

Navigator

Display Options

Power BI dataflows [9]

Bauer BI 2019

dataflows CPH

Dataflows demo (Premium) [8]

Combined OrdersInformation

Customer Comments

Date dataflow

Dim Date

OrderStatistics

Premium DataFlow Linked Plus Computed

Sales Combined [3]

CalendarTable

Sales

Sales Combined

Sales dataflow

Dataflows Demos [9]

dataflows HQ

DemoWorkspace

PASSCamp Wolfgang

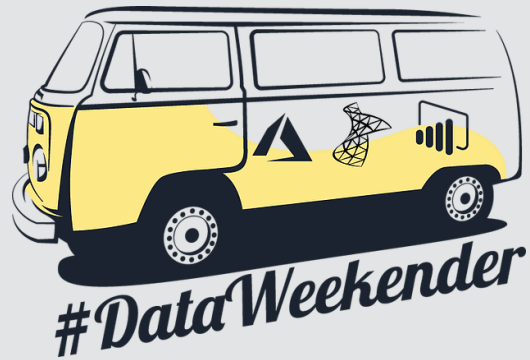
PASSCamp Wolfgang DEMO

Sales Combined

shipToContactName	productName	quantity	createdOn
Customer 1	Bike	10	01.08.2017 00:00:00
Customer 1	TV	5	01.08.2017 00:00:00
Customer 2	Bike	5	01.09.2017 00:00:00
Customer 2	TV	3	01.09.2017 00:00:00
Customer 1	Bike	4	01.10.2017 00:00:00
Customer 2	TV	9	01.10.2017 00:00:00
Customer 1	Bike	7	01.11.2017 00:00:00
Customer 2	Notebook	10	01.11.2017 00:00:00
Customer 3	Notebook	7	01.12.2017 00:00:00
Customer 3	Rocket	8	01.12.2017 00:00:00
Customer 2	Bike	1	08.12.2017 00:00:00
Customer 2	Car	1	19.12.2017 00:00:00
Customer 1	TV	1	23.12.2017 00:00:00
Customer 3	Rocket	1	01.01.2018 00:00:00
Customer 1	Rocket	11	01.01.2018 00:00:00
Customer 2	Car	6	02.01.2018 00:00:00
Customer 2	Car	1	03.01.2018 00:00:00
Customer 2	Notebook	1	03.01.2018 00:00:00
Customer 3	Mobilephone	22	13.01.2018 00:00:00
Customer 1	Car	5	13.01.2018 00:00:00
Customer 1	Car	3	01.02.2018 00:00:00
Customer 3	Rocket	1	01.02.2018 00:00:00
Customer 2	Rocket	1	01.03.2018 00:00:00

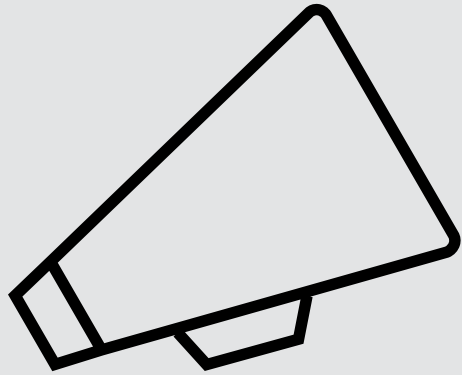
Load

Transform Data



Power Platform Dataflows

Power Platform Dataflows



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Data Integration in the Cloud
Self-Service Data Preparation

75%

“Three-quarters of companies are ***not able to act on the majority of data*** they collect...”

Harvard Business Review, Closing the Customer Experience Gap

80%

“Data Analysts spend *up to 80% of their time on data preparation* delaying the time to analysis and decision making.”

- Gartner

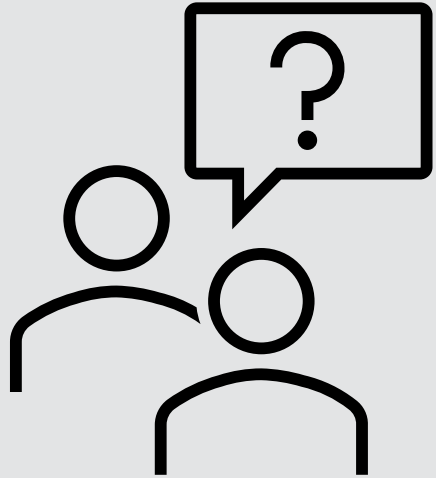
How can Dataflows help?

Connectors

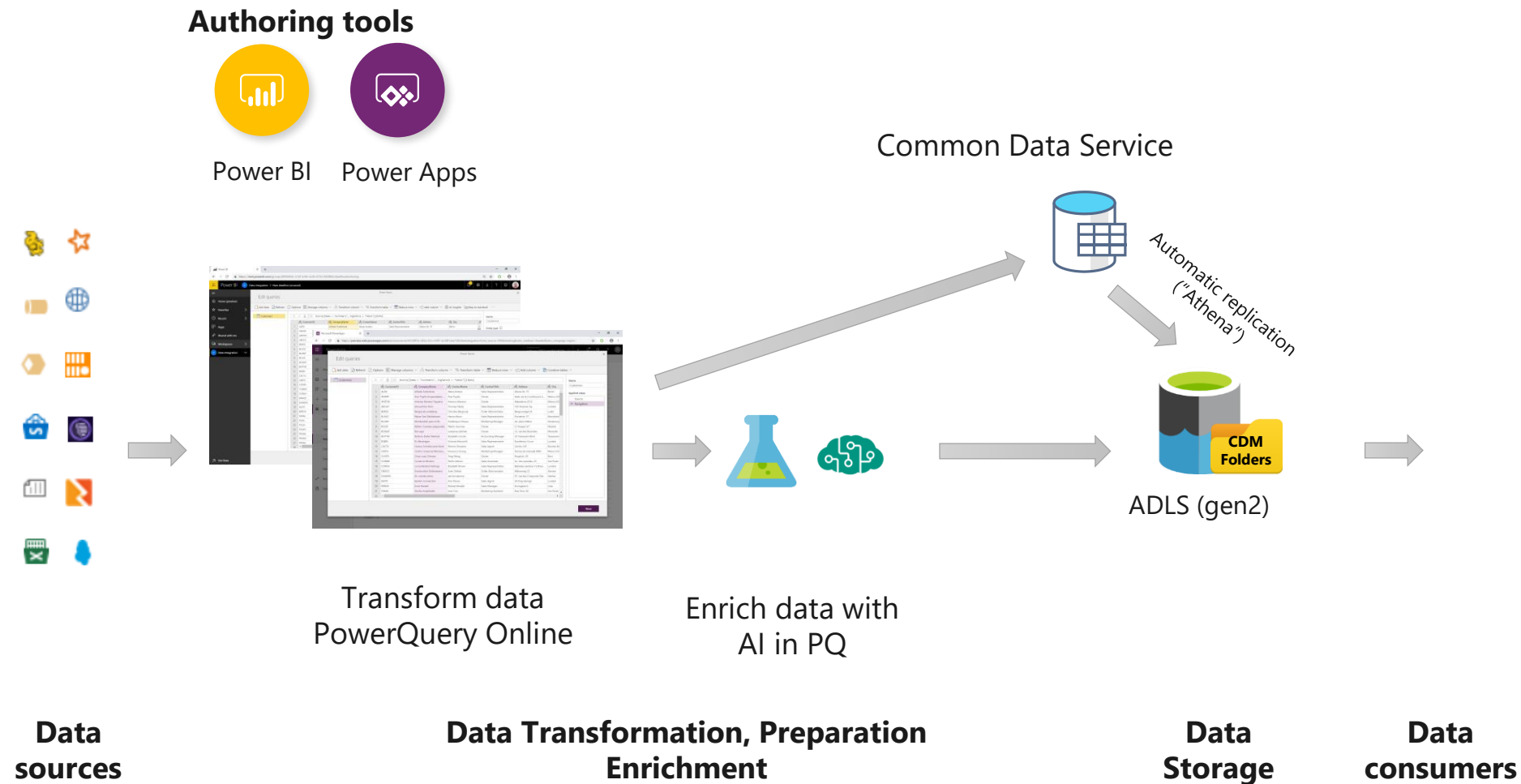
Interactive & intuitive

Consistency of experience

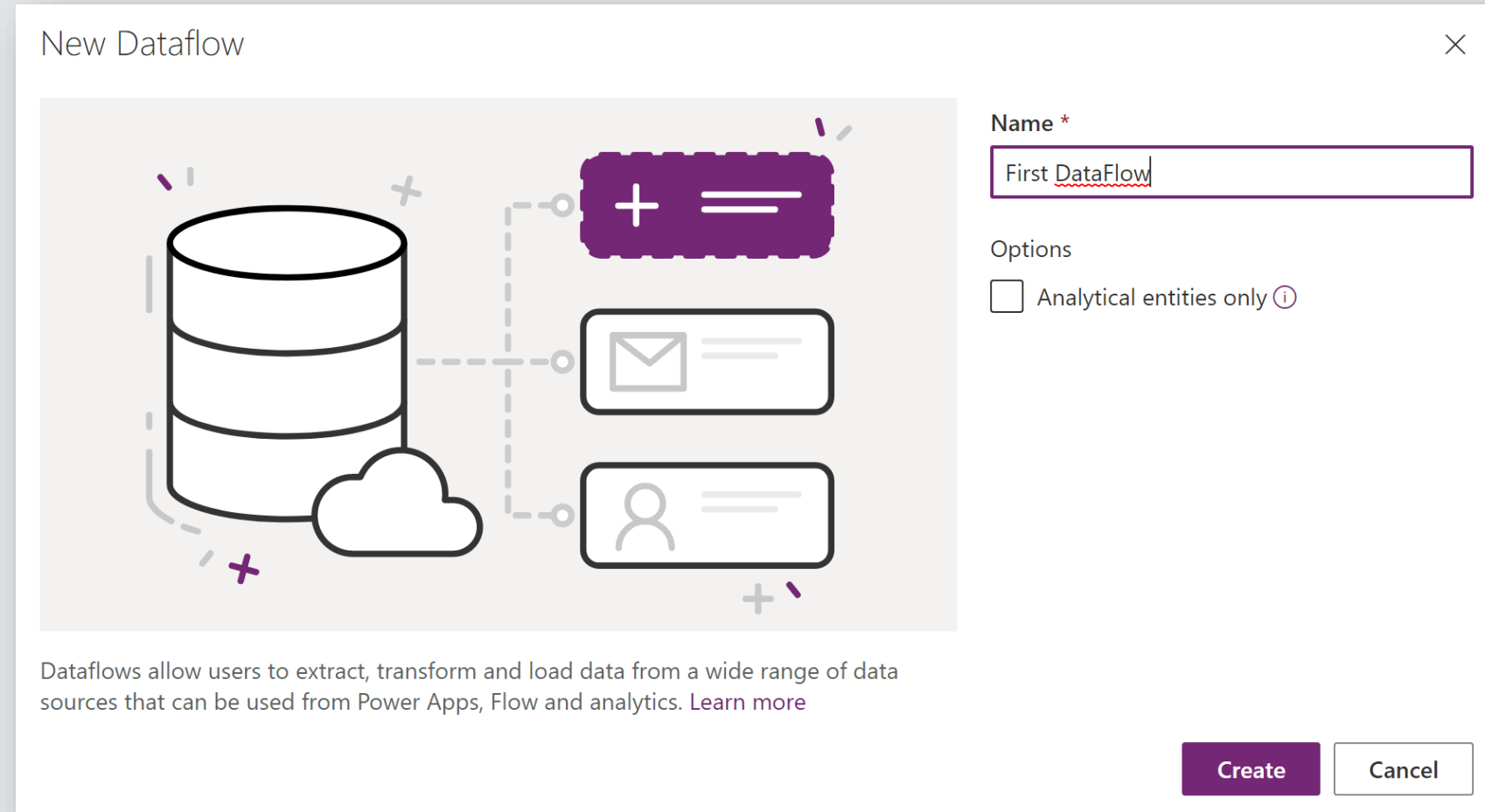
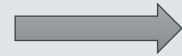
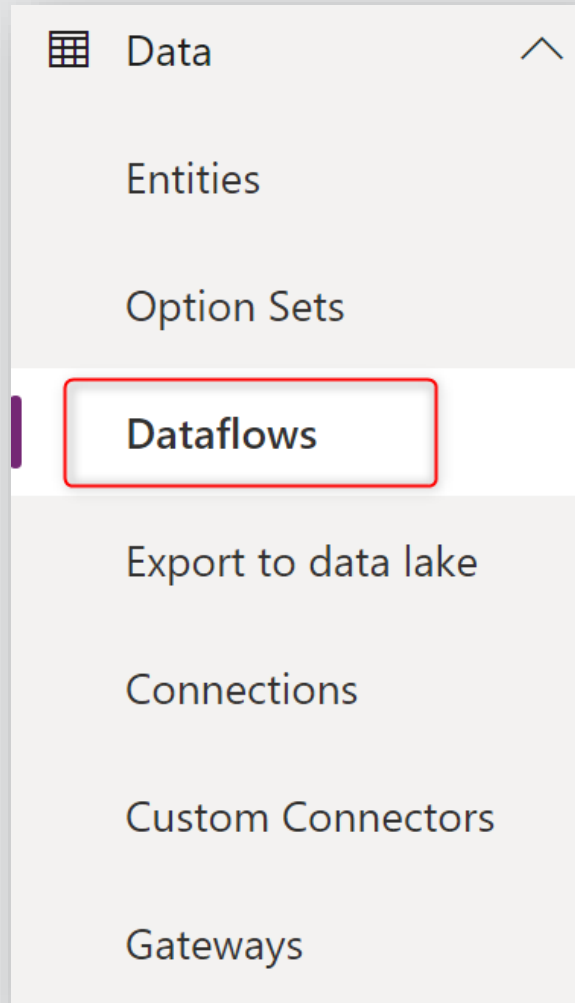
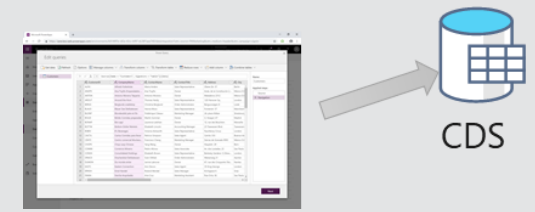
Semantic understanding and data consistency



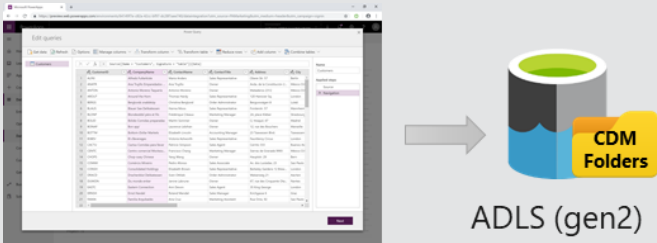
Power Platform Dataflows overview



Load Data into CDS



“Standard” versus Analytic Entities



New Dataflow

Dataflows allow users to extract, transform and load data from a wide range of data sources that can be used from Power Apps, Flow and analytics. [Learn more](#)

Name *

First DataFlow

Options

☒ Analytical entities only ⓘ

Queries

Products

Load settings

☐ Load to new entity

☒ Load to existing entity

☐ Do not load

Destination entity

cdmtmp_Product

Entity display name

Product

Entity description

An item that is available for sale.

☐ Delete rows that no longer exist in the query output ⓘ

Field mapping

Key fields

cdmtmp_ProductNumber

(none)

cdmtmp_DefaultBuyingUnitOfMeasure

(none)

cdmtmp_DefaultSellingQuantity

(none)

cdmtmp_DefaultSellingQuantity_UOM

(none)

cdmtmp_DefaultStockingUnitOfMeasure

(none)

cdmtmp_Description

(none)

cdmtmp_IsStocked

Name

cdmtmp_Name

(none)

cdmtmp_OrganizationId.cdmtmp_OrganizationNumber

(none)

cdmtmp_ProductCategoryId.cdmtmp_CategoryId

ArticleId

cdmtmp_ProductNumber

Category

cdmtmp_ProductType

(none)

cdmtmp_SellingUnitPrice

(none)

cdmtmp_SellingUnitPrice_CurrencyCode

(none)

cdmtmp_StandardCostAmount

(none)

cdmtmp_StandardCostAmount_CurrencyCode

(none)

cdmtmp_Status

(none)

cdmtmp_UnitOfMeasureScale

(none)

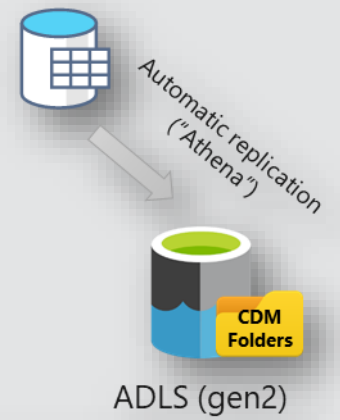
Entity/image

Auto map

DEMO

Power Platform Dataflows

Export to Data Lake – Project “Athena”



Data



Entities

Option Sets

Dataflows

Export to data lake

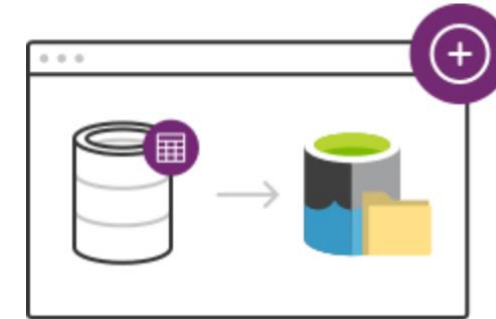
Connections

Custom Connectors

Gateways

+ New link to data lake ← Import from solution ↻ Refresh

Export to data lake



You haven't linked the Common Data Service environment to a data lake
Before you can export to data lake, link the Common Data Service environment to a data lake

New link to data lake



wolfgangcdsexportstorage - Configuration

Storage account

Search (Ctrl+/)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Data transfer
- Events
- Storage Explorer (preview)

Settings

- Access keys
- Geo-replication
- CORS
- Configuration
- Encryption
- Shared access signature
- Firewalls and virtual networks
- Private endpoint connection...
- Advanced security
- Properties
- Locks

Save Discard

Account kind

StorageV2 (general purpose v2)

Performance ⓘ

Standard Premium

Secure transfer required * ⓘ

Disabled Enabled

Access tier (default) ⓘ

Cool Hot

Replication ⓘ

Read-access geo-redundant storage (RA-GRS)

Large file shares ⓘ

Disabled Enabled



The current combination of storage account kind, performance

[Learn more.](#)

Identity-based access for file shares

Azure Active Directory Domain Service (AAD DS) ⓘ

Disabled Enabled

Data Lake Storage Gen2

Hierarchical namespace ⓘ

Disabled Enabled

New link to data lake



Select Storage Account

wolfgangcdsexportstorage



Add Entities

Select Storage Account

Select the storage account that you want link to the Common Data Service environment. The stor

the same region as your environment.

Your environment is located in: **West Europe**

Please attach a storage account in one of the following location(s): **West Europe**

Subscription *

Microsoft Azure Sponsorship

Resource group *

MVP_Demos-rg

Storage account *

wolfgangcdsexportstorage

As part of linking the Common Data Service environment to a data lake, you are granting the Exp

additional roles to your storage account. By using the Export to data lake service, you agree that

Power Apps' compliance boundary. For more information, see the Privacy Notice in the [technical](#)

[service.](#)

New link to data lake

✓ **Select Storage Account**

wolfgangcdsexportstorage

✓ **Add Entities**

1 of 107 selected

Add Entities

Select the entities that you want to export to data lake. Only entities enabled for change tracking will be visible in the list below.

Filter by keyword



Manage entities for wolfgangcdsexportstorage

✓ **Manage entities**

2 of 107 selected

Filter by keyword



<input type="radio"/>	Approval Request	msdyn_flow_approvalrequest
<input type="radio"/>	Approval Response	msdyn_flow_approvalresponse
<input checked="" type="radio"/>	Article	kbarticle
<input type="radio"/>	Attachment	attachment
<input type="radio"/>	Attachment	activitymimeattachment
<input type="radio"/>	Attribute Map	attributemap
<input type="radio"/>	AttributeImageConfig	attributeimageconfig
<input type="radio"/>	Await All Approval Model	msdyn_flow_awaitallapprovalmodel
<input type="radio"/>	Basic Approval Model Data	msdyn_flow_basicapprovalmodel
<input checked="" type="radio"/>	Business Unit	businessunit
<input type="radio"/>	Canvas App	canvasapp
<input type="radio"/>	Category	category

What's in my Data Lake?



commondataservice-powerofbiatdefaultupgrade-orgbfa74bd0

Name



businessunit



Microsoft.Athena.TrickleFeedService

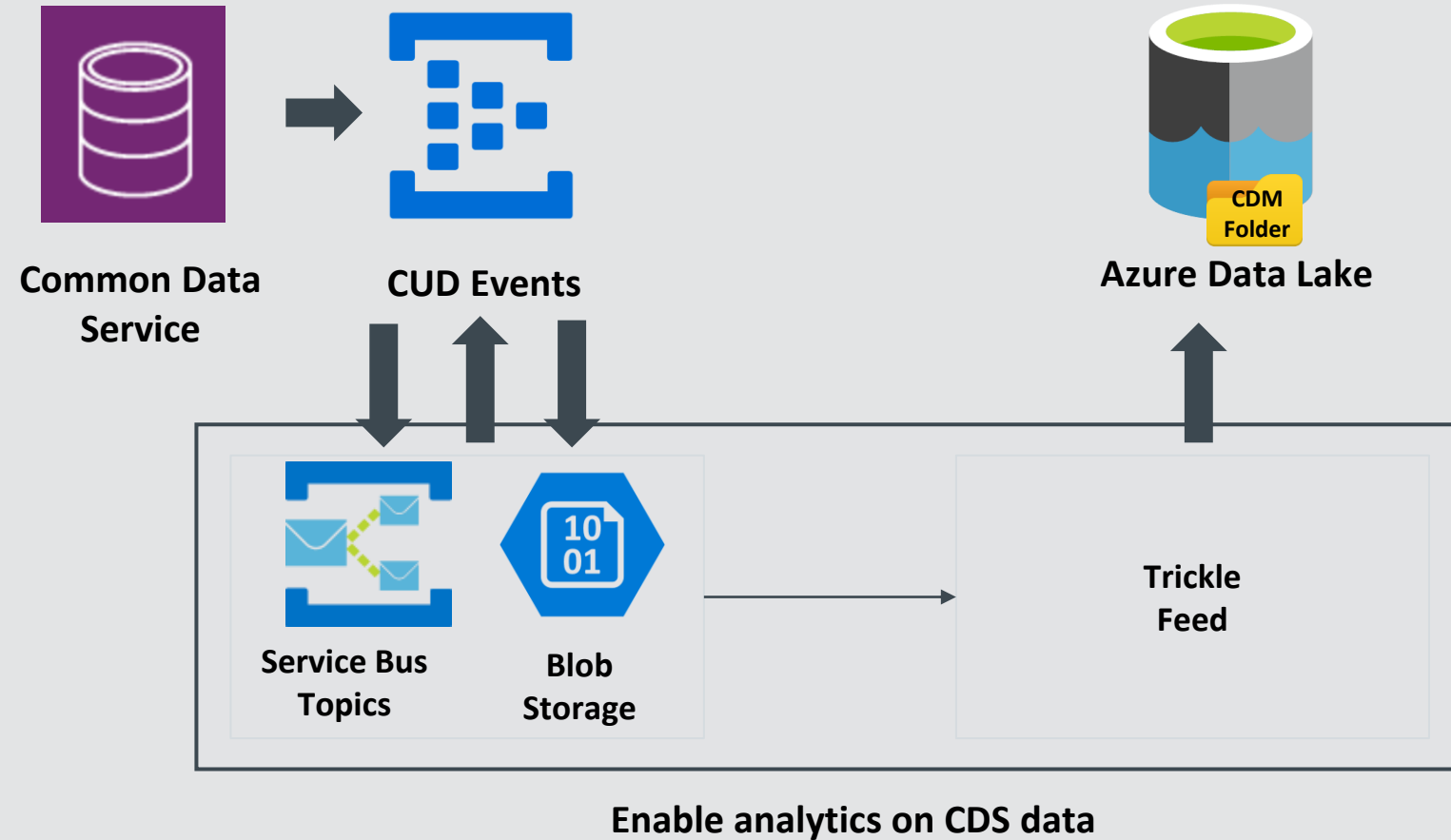


model.json

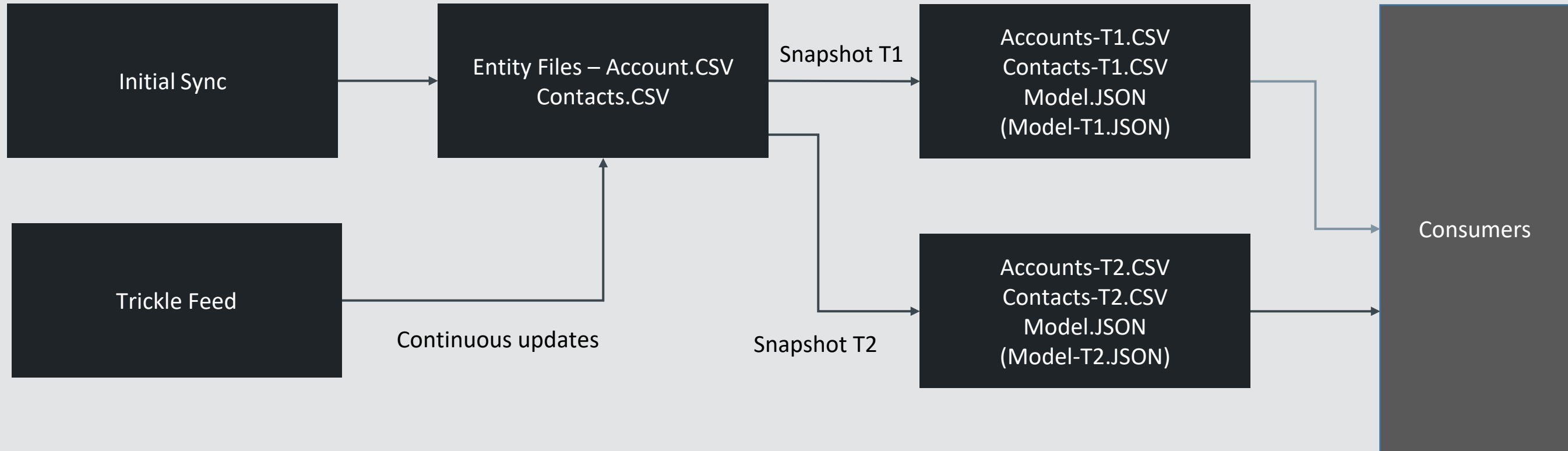
```
{
  "name": "cdm",
  "description": "cdm",
  "version": "1.0",
  "entities": [
    {
      "$type": "LocalEntity",
      "name": "businessunit",
      "description": "businessunit",
      "annotations": [
        {
          "name": "Athena:PartitionGranularity",
          "value": "Year"
        },
        {
          "name": "Athena:InitialSyncState",
          "value": "Completed"
        },
        {
          "name": "Athena:InitialSyncDataCompletedTime",
          "value": "3/1/2020 5:58:33 PM"
        }
      ]
    }
  ]
}
```

Behind the Scenes

Support for **full** and **incremental** **Trickle feed** to write data to ADLS Gen2



Consistent Data & Metadata Updates



Consume in Power BI (Option 1)

Get Data

Search

All

File

Database


Power Platform


Azure


Online Services


Other


Azure


 Azure SQL database


 Azure SQL Data Warehouse


 Azure Analysis Services database


 Azure Blob Storage


 Azure Table Storage


 Azure Cosmos DB


 Azure Data Lake Storage Gen2


 Azure Data Lake Storage Gen1


 Azure HDInsight (HDFS)

 Azure HDInsight Spark

 HDInsight Interactive Query

 Azure Data Explorer (Kusto)

 Azure Cost Management

 Azure Time Series Insights (Beta)

https://wolfgangcdsexportstorage.dfs.core.windows.net/commondataservice-po...

Content	Name	Extension	Date accessed	Date modified	Date created	Attributes	Folder Path
Binary	2019.csv	.csv	null	01.03.2020 18:17:54	null	Record	https://wolfgangcdsexportstorage.dfs.core.windc
Binary	model.json	.json	null	01.03.2020 18:00:27	null	Record	https://wolfgangcdsexportstorage.dfs.core.windc

<

>

Combine & Transform Data

Transform Data

Cancel

Consume in Power BI (Option 2)

Start creating your dataflow

Define new entities

Choose a data source to define the entities for your dataflow. You can map your data to [standard Common Data Model](#) entities, or define custom entities instead. [Learn more](#)

Add new entities

Link entities from other dataflows

Linking to entities from other dataflows reduces duplication and helps maintain consistency across your organization. [Learn more](#)

Add linked entities

Import Model

Choose a dataflow model to import into your workspace. [Learn more](#)

Import model

Attach a Common Data Model folder (preview)

Attach a Common Data Model folder from your Azure Data Lake Storage Gen2 account to a new dataflow, so you can use it in Power BI. [Learn more](#)

Create and attach



Attach a Common Data Model folder to a new dataflow

Name *

cds

Description

Common Data Model folder path *

<https://wolfgangstorgen2.dfs.core.windows.net/powerbi/cds/model.json>

Create and attach

Cancel



Dashboards Reports Workbooks Datasets Dataflows

NAME ↑

ACTIONS



cds

EXTERNAL

...

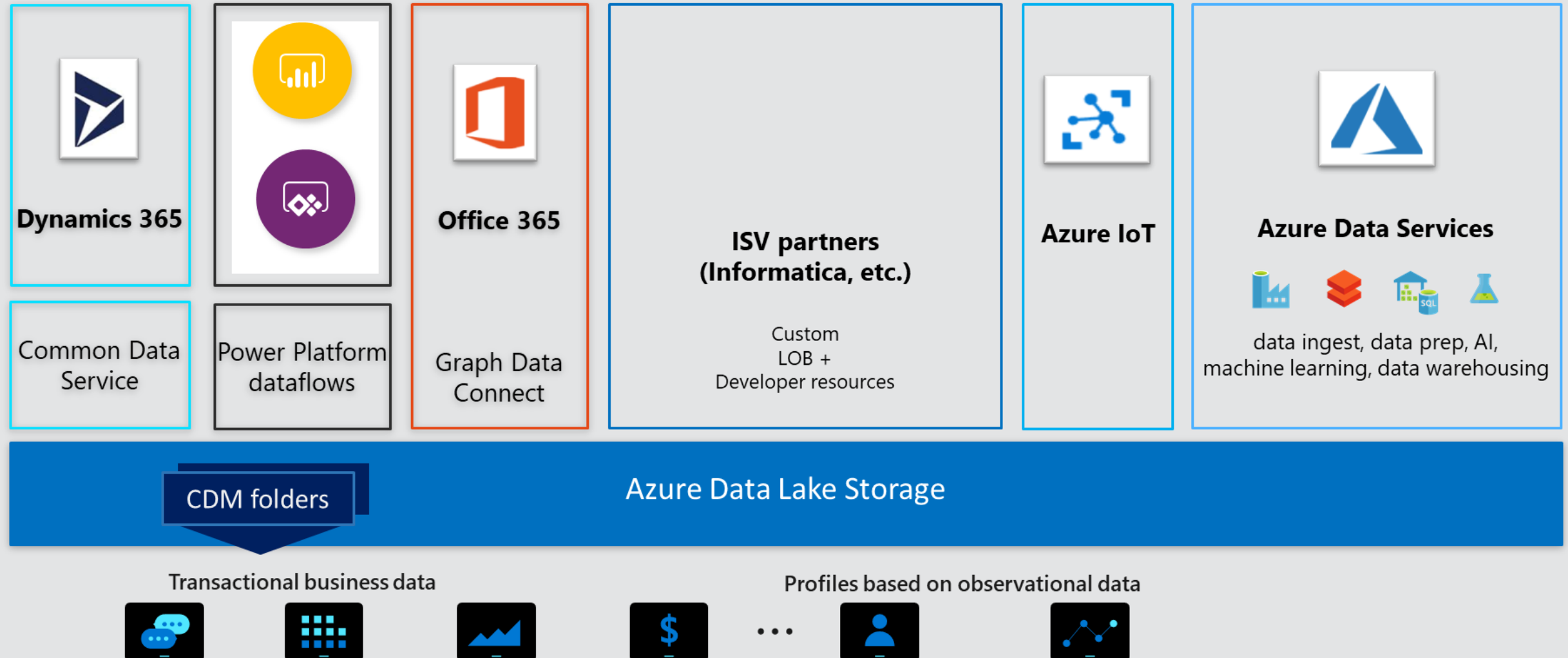
Power Platform Dataflows and the Data Lake

Decision Makers, Business analysts

No code, low code

Data scientists, Data engineers

Low to high code



Power Platform Dataflows...

Data Integration & Preparation in the Cloud

Data Lake

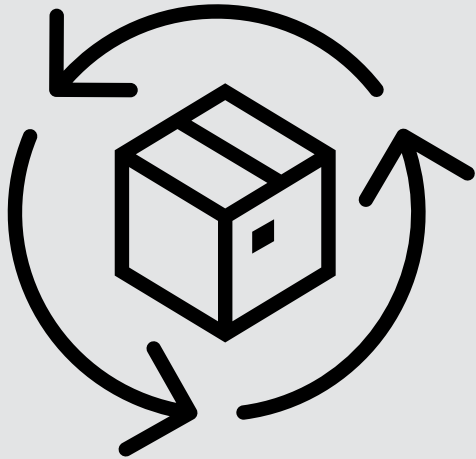
Common Set of Technology

Connectors

Power Query

CDM Folders

Data Exchange made easy

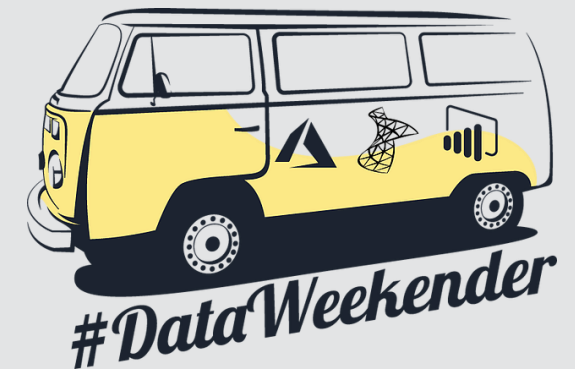
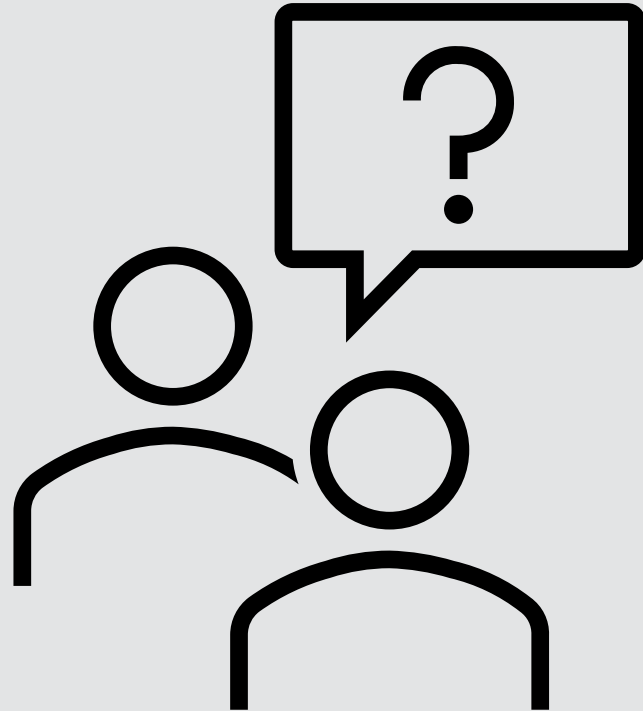


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Additional Links

- Common Data Model

<https://docs.microsoft.com/en-us/common-data-model/>

- Common Data Model (github)

<https://github.com/Microsoft/CDM>

- Additional Datasources for Power BI Dataflows (no UI)

<https://docs.microsoft.com/en-us/power-bi/service-dataflows-data-sources#connecting-to-additional-data-sources>

- Power Apps Dataflows

<https://docs.microsoft.com/en-us/powerapps/maker/common-data-service/create-and-use-dataflows>