



# Power BI – CDM & Dataflows

## Your path to self-service ETL

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oh22 group



**Christopher Webb**

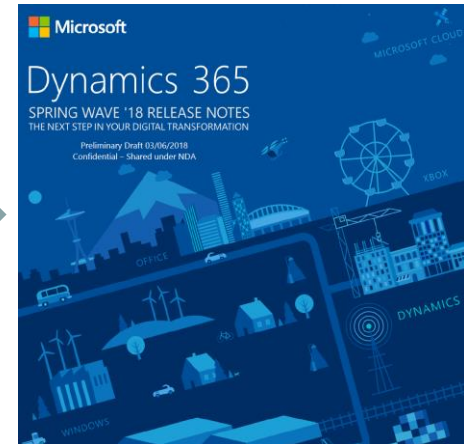
@cwebb\_bi

Following



Drop everything and read this document! It says Dynamics on the cover but it has a lot to say about the future of [#PowerBI](#)  
[download.microsoft.com/download/1/C/0](https://download.microsoft.com/download/1/C/0) ...

1:13 PM - 21 Mar 2018

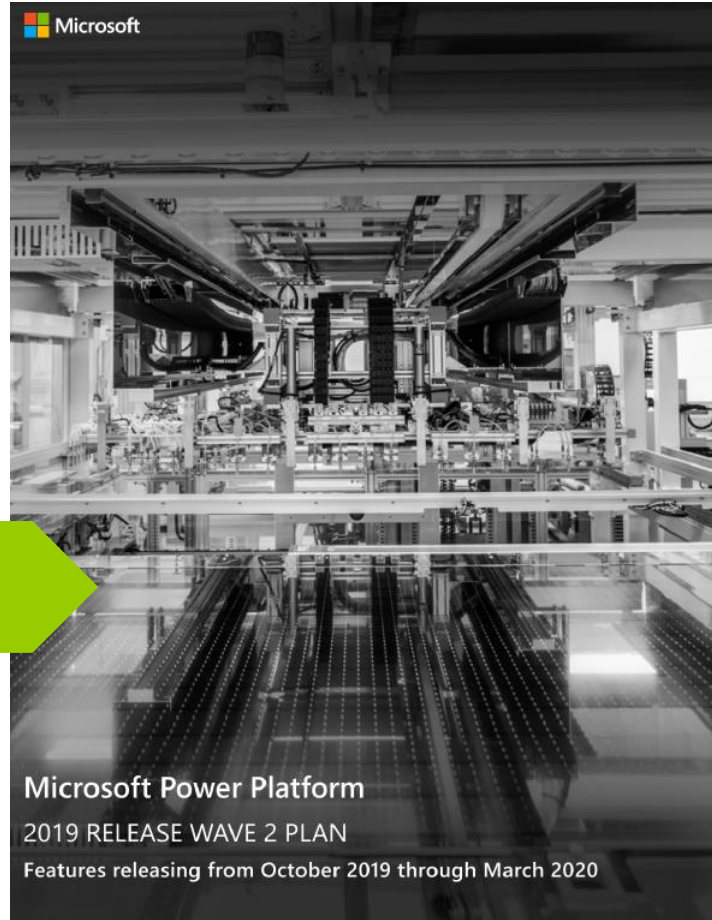




# Business Applications

OCTOBER 2018 RELEASE NOTES

FEATURES RELEASING FROM OCTOBER 2018 THROUGH MARCH 2019



## Microsoft Power Platform

2019 RELEASE WAVE 2 PLAN

Features releasing from October 2019 through March 2020

<https://docs.microsoft.com/en-us/power-platform-release-plan/2019wave2/>



**Amir Netz** → rm • 21 hours ago



Azure AS, (as well as SSAS and Power BI datasets) are all belonging to the OLAP family and their job is to provide a semantic model to end users and provide query acceleration.

CDS for Analytics belongs to the Data Warehouse/Mart/Lake family. Its main job is to aggregate, cleanse, transform, integrate and harmonize data from many sources.

10 years ago the BI industry transitioned from IT-driven OLAP technologies (MD cubes) to simpler, faster technologies that allowed business analysts to self-serve and build their BI models without needing an IT project for that.

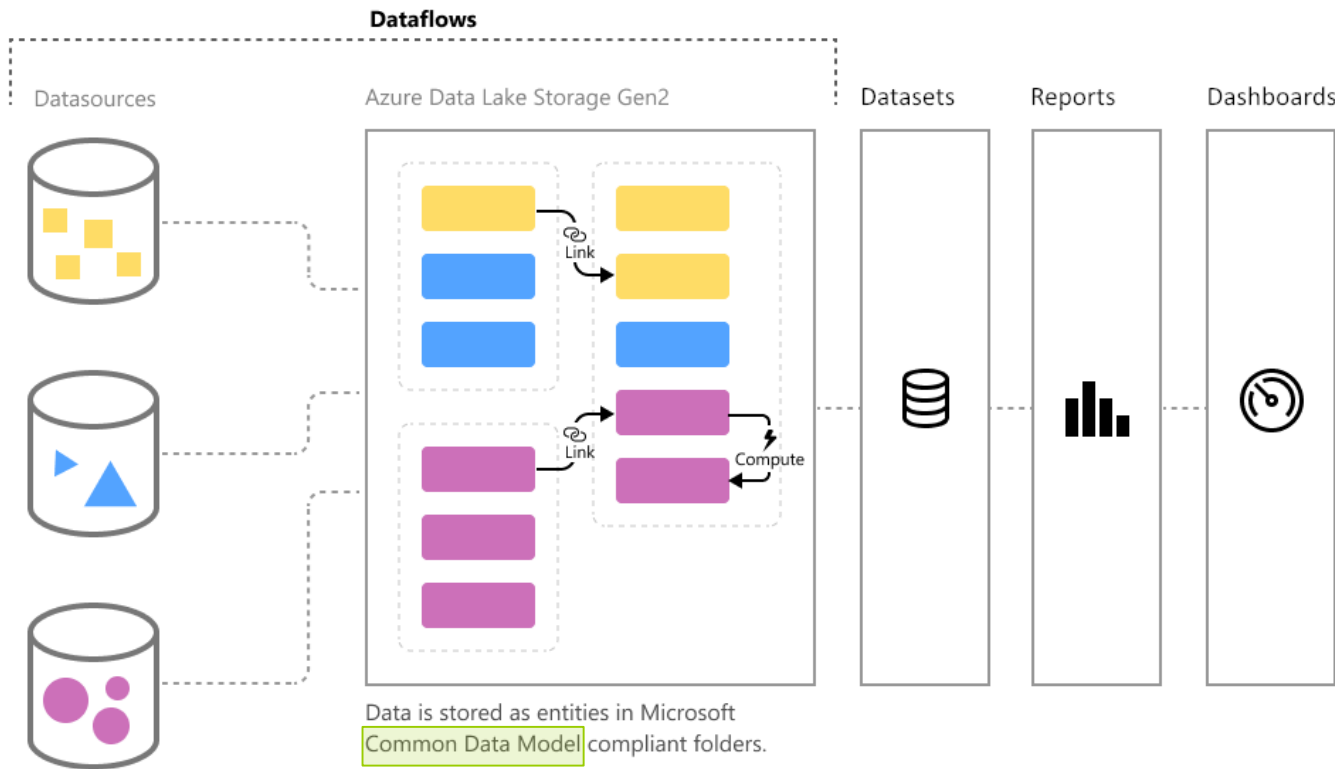
CDS-A for analytics will allow the same kind of transformation in the data warehouse/mart/lake tier as well. Super easy to use for anyone with PowerQuery experience, 70+ connectors to ingest data, standard schema and OOB applications will make any Power BI power user into a data lake expert... :-)

Now Dataflow

Power BI  
Dataflows  
are like  
Excel!!!!



# Power BI Dataflows are like Excel !!!



# Common Data Model (CDM)

The **Common Data Model (CDM)** provides modular, and extensible business entities (Account, Lead, Opportunity, etc.)

It unifies data in a well-known schema with semantic consistency across applications and deployments.

Customers, system integrators, and ISVs can develop turnkey business and intelligence applications, that share data based on these CDM entities. They can also extend entities to capture additional business-specific ideas.

[aka.ms/cdmposter](https://aka.ms/cdmposter)

## CORE

- Account
- Activity
- Contact
- Currency
- Email
- Goal
- Letter
- Note
- Owner
- Organization
- Position
- Task
- ...

## CRM

- Account
- Appointment
- Campaign
- Contact
- Lead
- Marketing List
- Phone Call
- Social Activity
- ...

## SALES

- Competitor
- Discount
- Invoice
- Opportunity
- Order
- Order Product
- Quote
- ...

## SERVICE

- Case
- Contract
- Entitlement
- Resource
- Service
- Scheduling Group
- Task
- ...

## SOLUTION

- MARKET
- Accou
- Conta
- Even
- Market
- Email
- Market
- Page
- ...

## WEB

- Link Clicks
- Web Interactions
- Web Page
- ...

## TALENT

- Department
- Job Position
- Worker
- ...

## HEALTHCARE

- Patient
- Practitioner
- Device
- Care Plan
- Risk Assessment
- Encounter
- Episode of Care

# Common Data Model

- https://github.com/Microsoft/CDM

The screenshot displays the Microsoft Dynamics 365 Common Data Model (CDM) tool interface. The main window shows a hierarchical tree of entities grouped by application (e.g., applicationCommon, foundationCommon, crmCommon). The 'Account' entity is selected, and its attributes are listed in the 'Attributes for Selected' pane on the right. The 'Properties' pane shows the entity name 'Account', its description 'Business that represents a customer or potential customer...', and its source name 'Account'.

**Attributes for Selected**

Attributes for Selected
accountCategoryCode
accountCategoryCode_display
accountClassificationCode
accountClassificationCode_display
accountId
accountNumber
accountRatingCode
accountRatingCode_display
addressAddressId
addressAddressTypeCode
addressAddressTypeCode_display
addressCity
addressComposite
addressCountry
addressCounty
addressFax
addressFreightTermsCode
addressFreightTermsCode_display
addressLatitude
addressLine1
addressLine2
addressLine3
addressLongitude
addressName
addressPostalCode
addressPostOfficeBox
addressPrimaryContactName
addressShippingMethodCode
addressShippingMethodCode_display
addressStateOrProvince
addressTelephone1
addressTelephone2
addressTelephone3
addressUPSZone
addressUTCOffset
addressAddressId
addressAddressTypeCode
addressAddressTypeCode_display
addressCity
addressComposite
addressCountry
addressCountry
addressCountry
...

**Properties**

Properties	
Entity	Account
displayName	Account
description	Business that represents a customer or potential customer. The company that is billed in business transactions.
version	0.7
cdmSchemas	[ "/core/applicationCommon/Account.cdm.json/Account/hasAttributes/attributesAddedAtThisScope" ]
sourceName	Account





Adobe



Microsoft



## Announcing the Open Data Initiative

Deliver unparalleled business insight from your behavioral, transactional, financial, and operational data with the Open Data Initiative—a jointly-developed vision by Adobe, Microsoft, and SAP.



# Open Data Initiative

Own, enrich, renew your data

**Adobe**  
Customer  
Experience Platform

**Microsoft**  
Dynamics 365

**SAP**  
SAP C/4HANA and  
SAP S/4HANA

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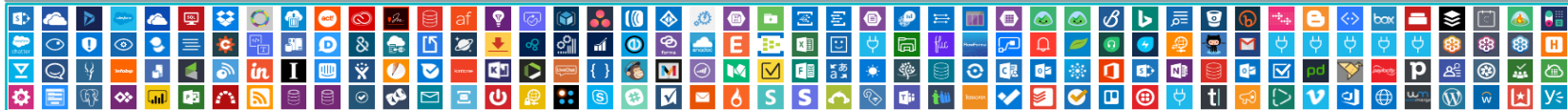
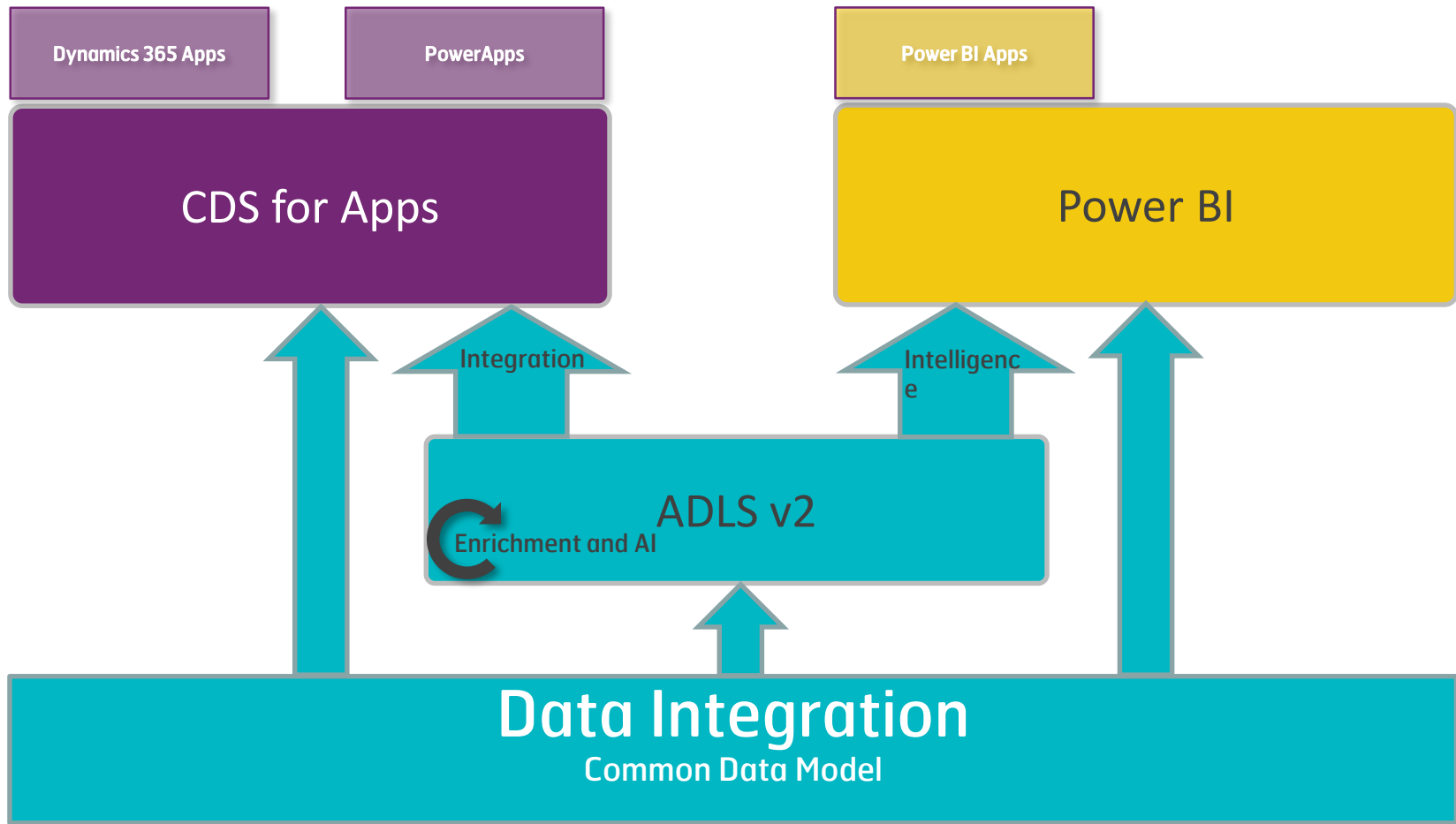


One data model



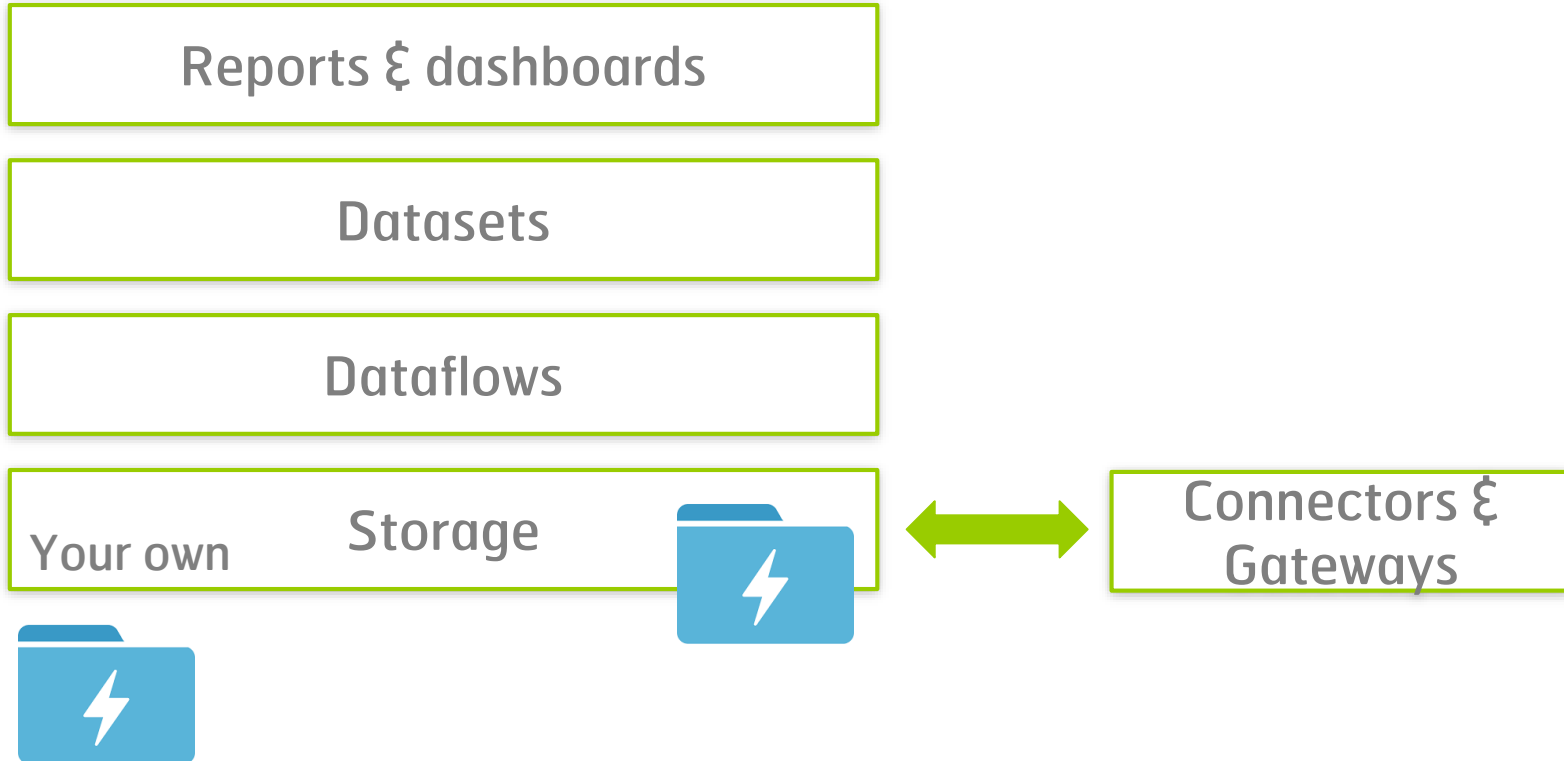
**Microsoft Azure**

Data and AI



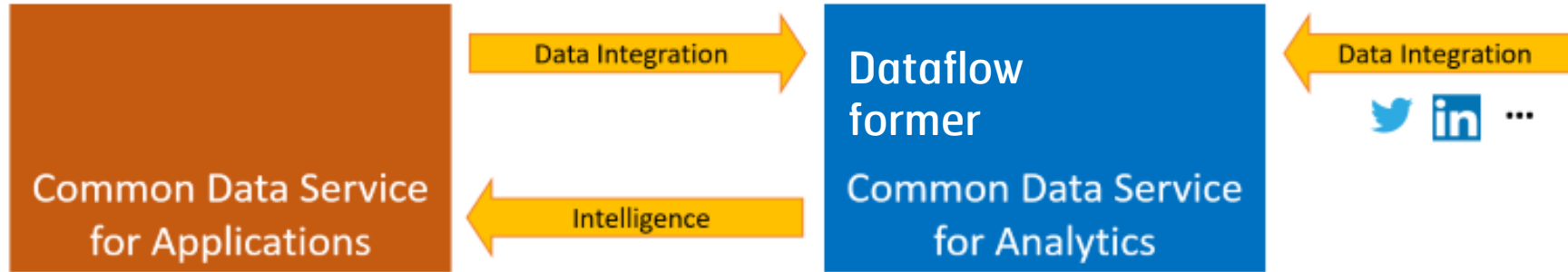
# Common Data Service - Dataflow

- How is it from an architecture perspective?

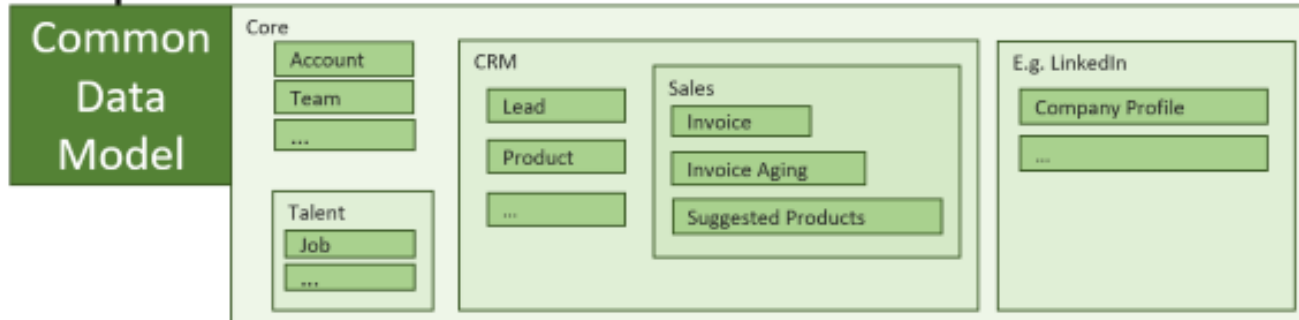


# Dataflows in Pro and Premium Scenario

Dataflow capability	Power BI Pro	Power BI Premium
Scheduled refresh	8 per day	48
Total Storage	10 GB/user	100 TB/node
Dataflow Authoring with Power Query Online	+	+
Dataflow Management within Power BI	+	+
Dataflows Data Connector in the Power BI Desktop	+	+
Integration with Azure	+	+
Computed Entities (in-storage transformations via M)		+
New connectors	+	+
Dataflow incremental refresh		+
Running on Power BI Premium capacity / Parallel execution of transforms		+
Dataflow linked entities		+
Standardized Schema / Built-In Support for the Common Data Model	+	+

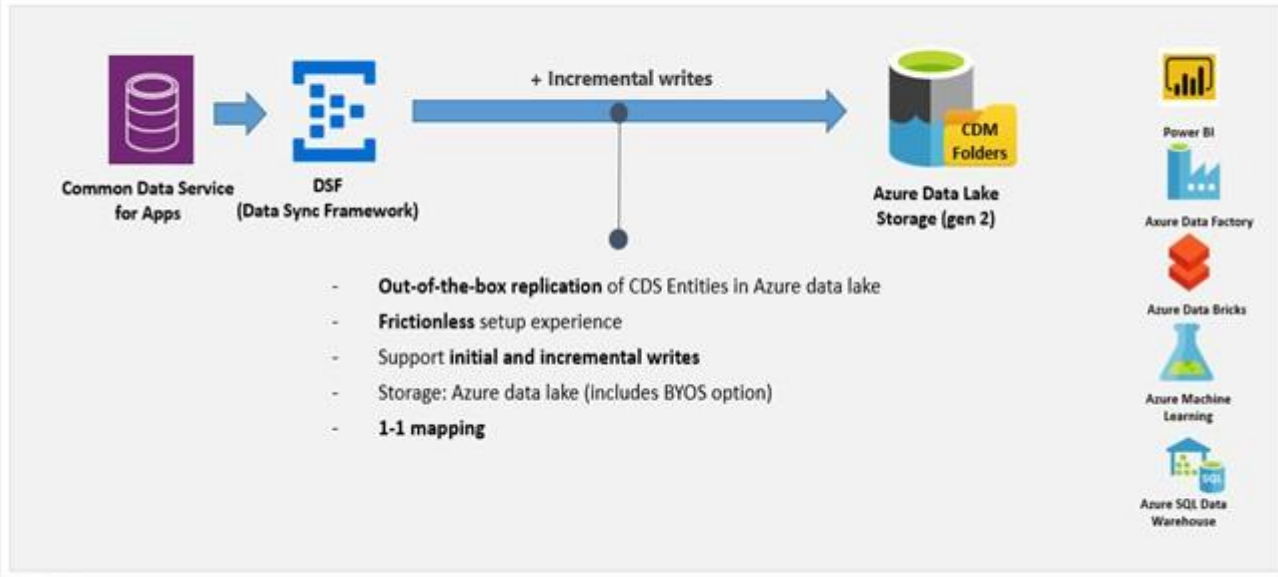


Both the Common Data Service for Apps and Analytics store data in conformance with the Common Data Model definition. They "implement" CDM.

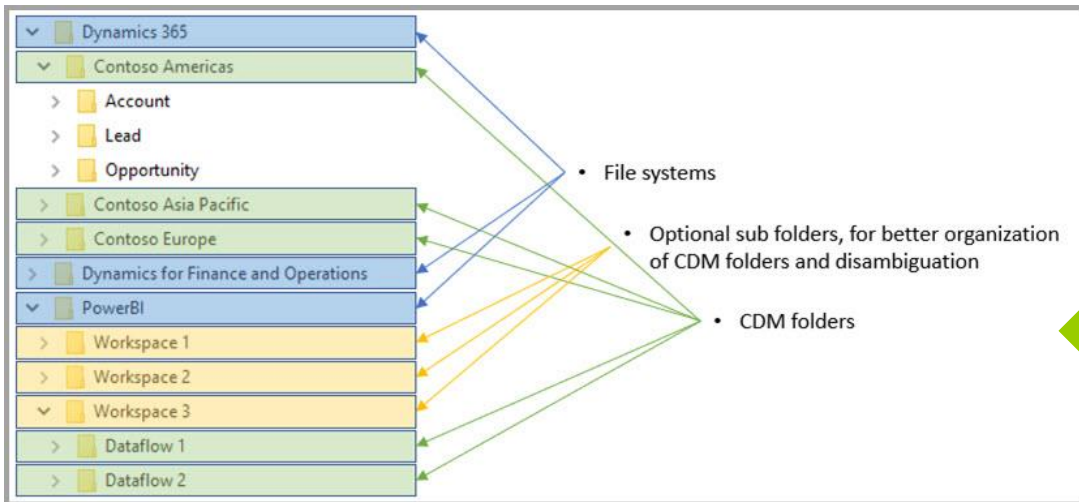
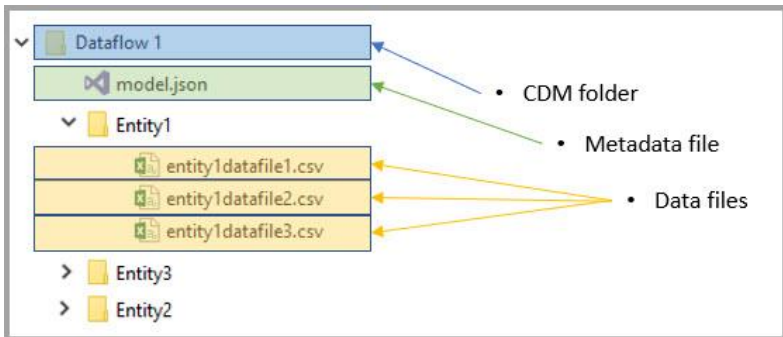


# Power Apps 2 Power BI Dataflow

*"I want to easily gain comprehensive insights and drive business actions based on my CDS data"*



# CDM Folder Structure



## Dataflow storage

Your organization's dataflow data is stored in Power BI provided storage.

### Use your own Azure Data Lake Storage (preview)

When you use Azure Data Lake Storage Gen2 with Power BI, authorized users can access your organization's dataflow data to build cloud-scale data solutions leveraging Azure services, including AI, machine learning, and more. Data Lake Storage is secured, massively scalable, and built to the open HDFS standard, allowing you to run massively-parallel analytics.

### Learn more

- [How to use Azure Data Lake Storage with Power BI](#)
- [About Data Lake Storage](#)
- [Azure Data Lake Storage Gen2 pricing](#)

Connect your Azure Data Lake Storage Gen2



### Connect to Azure Data Lake Storage Gen 2

Enter your Azure Data Lake Storage details. [Learn more](#)

Subscription ID

Resource group name

Storage account name

Cancel

Continue



# Restrictions

- Once a dataflow storage location is configured, it **cannot be changed**.
- Only owners of a dataflow stored in Azure Data Lake Storage Gen2 can access its data by default. To authorize additional people to the dataflows stored in Azure, you must add them to the dataflow's CDM folder
- Creating dataflows with linked entities is only possible when they are stored in the same storage account
- On-premises data sources, in Power BI shared capacities, are not supported in dataflows stored in your organization's data lake

# Common Data Service - Dataflow

- Dataflow triggered as part of the workspace

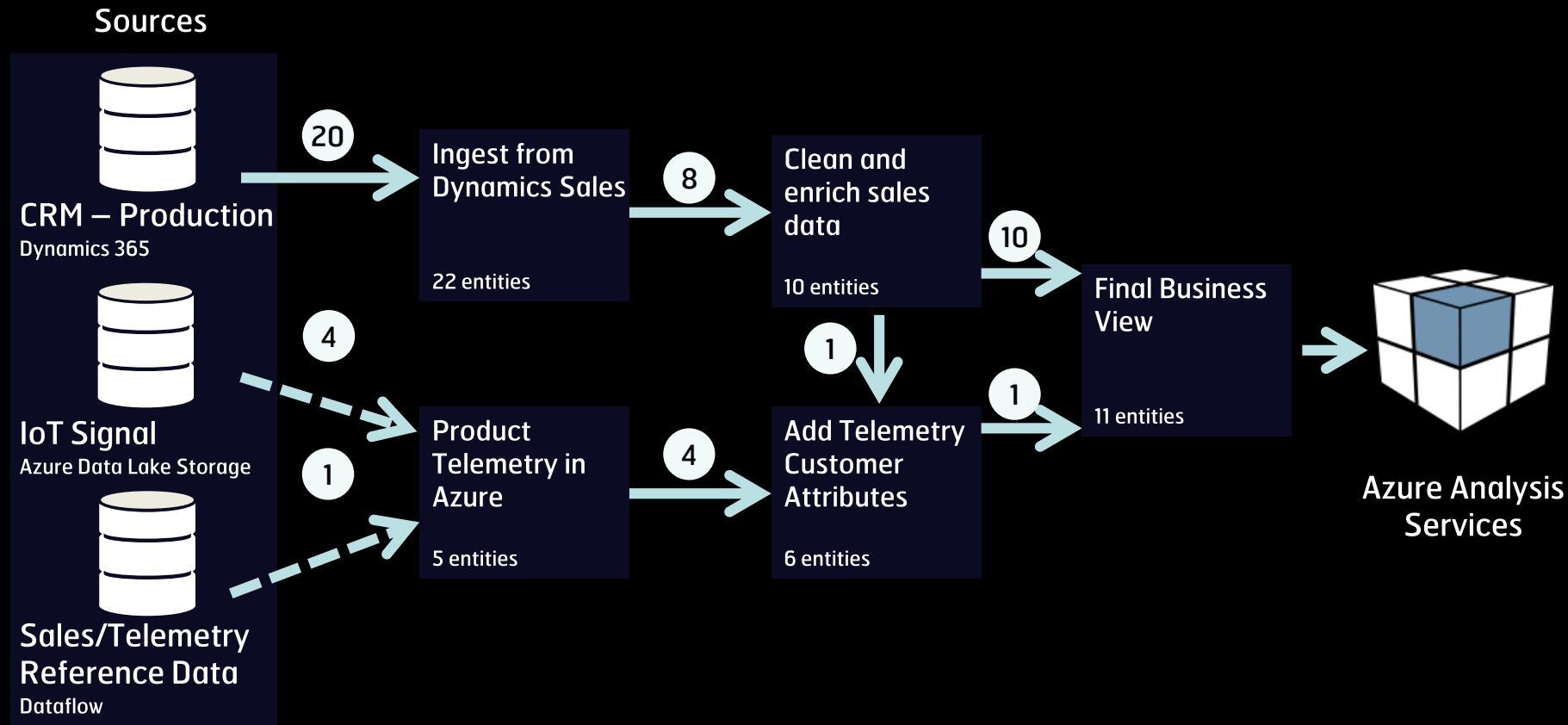
The screenshot displays the Microsoft Power BI workspace interface. On the left is a dark navigation pane with options: Home (preview), Favorites, Recent, Apps, Shared with me, Workspaces, DataFlowsDemo, DASHBOARDS (You have no dashboards), REPORTS (You have no reports), WORKBOOKS (You have no workbooks), DATASETS (You have no datasets), DATAFLOWS (Sales), and Get Data. The main workspace area has a search bar and tabs for Dashboards, Reports, Workbooks, Datasets, and Dataflows (Preview). The 'Dashboards' tab is active, showing a message: "You don't have any dashboards. All dashboards in this workspace will be here." A 'Create' dropdown menu is open, listing options: Dashboard, Report, Dataset, Streaming dataset, and Dataflow. A large green arrow points to the 'Dataflow' option. The top right of the workspace shows '+ Create', 'Access', 'Settings', 'Publish app', and a three-dot menu. The text 'Showing 0 item(s)' is visible on the right side of the workspace.



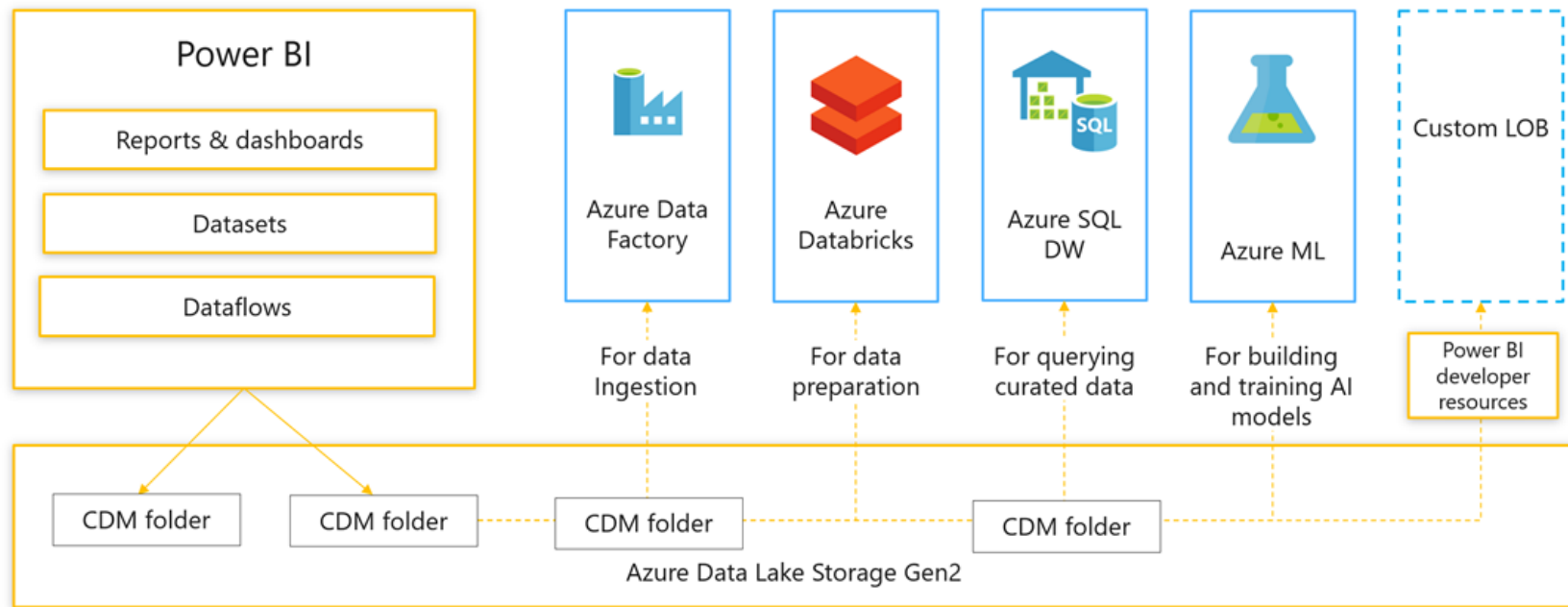
Demo Time

# **COMMON DATA SERVICES – DATAFLOW**

# Power BI Dataflows are like Excel



# Dataflows in the CDM landscape



Business analysts

Low/no code

Data scientists  
Data engineers

Medium to high code

# Integrating CDM Folders with the Modern Data Warehouse

Container: salescdmfolder

Location: cdmdemo

NAME	MODIFIED	ACCESS TIER	BLOB TYPE	SIZE	LEASE STATE
Accounts.csv	9/21/2018, 10:01:24 AM	Hot (Inferred)	Block blob	102.53 KiB	Available
CallCenter.csv	9/21/2018, 10:01:23 AM	Hot (Inferred)	Block blob	294 B	Available
Contacts.csv	9/21/2018, 10:01:24 AM	Hot (Inferred)	Block blob	294 B	Available
Events.csv	9/21/2018, 10:01:24 AM	Hot (Inferred)	Block blob	294 B	Available
Finance.csv	9/21/2018, 9:56:16 AM	Hot (Inferred)	Block blob	102.53 KiB	Available
Financel.csv	9/21/2018, 9:56:16 AM	Hot (Inferred)	Block blob	294 B	Available
model.json	9/21/2018, 10:01:24 AM	Hot (Inferred)	Block blob	17.27 KiB	Available
Products.csv	9/21/2018, 10:01:24 AM	Hot (Inferred)	Block blob	294 B	Available
SalesQuota.csv	9/21/2018, 10:01:24 AM	Hot (Inferred)	Block blob	294 B	Available

Segment	Country	Product	Discount	Units Sold	Manufacture Sale Price	Gross Sales	Discounts Sales	COGS	Profit	Date	Month Na	Year	
Goverme	Canada	Carriers	None	16183	\$1.00	\$20.00	\$	\$32,370.00	\$16,183.00	1/1/2014	1	January	2014
MidAm	Germany	Carriers	None	1321	\$1.00	\$20.00	\$	\$26,400.00	\$13,210.00	1/2/2014	3	January	2014
MidAm	France	Carriers	None	2178	\$1.00	\$15.00	\$	\$32,670.00	\$21,780.00	1/6/2014	6	June	2014
MidAm	Germany	Carriers	None	288	\$1.00	\$15.00	\$	\$13,200.00	\$8,800.00	1/6/2014	6	June	2014
MidAm	Mexico	Carriers	None	2470	\$1.00	\$15.00	\$	\$37,050.00	\$24,700.00	1/6/2014	6	June	2014
Channel	Germany	Carriers	None	1511	\$1.00	\$150.00	\$	\$529,500.00	\$384,380.00	1/12/2014	12	December	2014
MidAm	Germany	Montana	None	921	\$5.00	\$12.00	\$	\$18,815.00	\$9,210.00	1/6/2014	3	March	2014
Channel	Canada	Montana	None	2148	\$5.00	\$12.00	\$	\$30,216.00	\$21,480.00	1/6/2014	6	June	2014
MidAm	France	Montana	None	1899	\$5.00	\$20.00	\$	\$37,980.00	\$18,990.00	1/6/2014	6	June	2014
Channel	Germany	Montana	None	1545	\$5.00	\$12.00	\$	\$18,540.00	\$15,450.00	1/6/2014	6	June	2014
Small B	Mexico	Montana	None	2470	\$5.00	\$15.00	\$	\$37,050.00	\$24,700.00	1/6/2014	6	June	2014
Enterprise	Canada	Montana	None	2665	\$5.00	\$125.00	\$	\$333,187.50	\$266,500.00	1/7/2014	7	July	2014
Small B	Mexico	Montana	None	916	\$5.00	\$100.00	\$	\$287,400.00	\$287,400.00	1/8/2014	8	August	2014
Enterprise	Germany	Montana	None	2146	\$5.00	\$7.00	\$	\$15,022.00	\$10,730.00	1/9/2014	9	September	2014
Enterprise	Canada	Montana	None	345	\$5.00	\$125.00	\$	\$43,125.00	\$43,125.00	1/20/2013	10	October	2013
MidAm	United States	Montana	None	615	\$5.00	\$15.00	\$	\$9,225.00	\$6,150.00	1/12/2014	12	December	2014
Channel	Canada	Pasco	None	292	\$10.00	\$20.00	\$	\$5,840.00	\$2,920.00	1/2/2014	2	February	2014
MidAm	Mexico	Pasco	None	974	\$10.00	\$15.00	\$	\$14,610.00	\$9,740.00	1/2/2014	2	February	2014
Channel	Canada	Pasco	None	2158	\$10.00	\$20.00	\$	\$43,240.00	\$21,580.00	1/6/2014	6	June	2014

```
Schema: [No Schema Selected]
10      "value": null
11
12    },
13    "modifiedTime": "2018-06-07T15:32:55.7161573+00:00",
14    "isHidden": false,
15    "refreshTime": "2018-06-10T11:05:15.1241613+00:00",
16    "dataCategory": "Uncategorized",
17    "attributes": {
18      "name": "Country",
19      "isHidden": false,
20      "dataCategory": "Uncategorized",
21      "dataType": "string",
22      "sourceColumnName": "Segment"
23    },
24    "name": "Country",
25    "isHidden": false,
26    "dataCategory": "Uncategorized",
27    "dataType": "string",
28    "sourceColumnName": "Segment"
29  }
```

Object Explorer

- Connect
- dbo.DimSalesReason
- dbo.DimSalesTerritory
- dbo.DimScenario
- dbo.FactCallCenter
- dbo.FactCurrencyRate
- dbo.FactFinance
- dbo.FactInternetSales
- dbo.FactInternetSalesReason
- dbo.FactResellerSales
- dbo.FactSalesQuota
- dbo.FactSurveyResponse
- sales.DimAccounts
- sales.DimContacts
- sales.DimOwners
- sales.DimProducts
- sales.FactEvents
- sales.FactOpportunities
- sales.FactProductUsage
  - Columns
    - ProductAltKey (int, not null)
    - AccountAltKey (nvarchar(20), null)
    - Location (nvarchar(20), null)
    - TotalUnits (int, null)
    - TotalSales (decimal(10,2), null)
    - UsageDate (datetime2(7), null)
  - Constraints
  - Indexes
  - Statistics
- sales.Leads
- Views
- External Resources
- Programmability
- Storage
- Security

```
--
--Load Accounts DIMENSION -----
--
-- Create a temporary account table
CREATE TABLE dimAccount_temp
([AccountAltKey] int identity(1,1) NOT NULL,
[AccountId] [int] NULL,
[AccountName] [nvarchar](50) NULL,
Industry nvarchar(20),
[Location] nvarchar(20),
[Owner] nvarchar(20),
[BusinessUnit] nvarchar(20),
[City] nvarchar(20),
[State] nvarchar(20),
[Country] nvarchar(20)
)

-- Allow values to be inserted explicitly in the identity column
SET IDENTITY_INSERT dim_Venue_temp ON;

--Insert existing and modified rows in the temporary table.
INSERT INTO dimAccount_temp (AccountAltKey, AccountId, AccountName, Industry, Location, Owner, BusinessUnit, City, State, Country)
-- Existing rows in the dimension table that are not modified
SELECT c2.AccountAltKey,
       c2.AccountId,
       c2.AccountName,
       c2.Industry,
       c2.Location,
       c2.Owner,
       c2.BusinessUnit,
       c2.City,
       c2.State,
       c2.Country
```