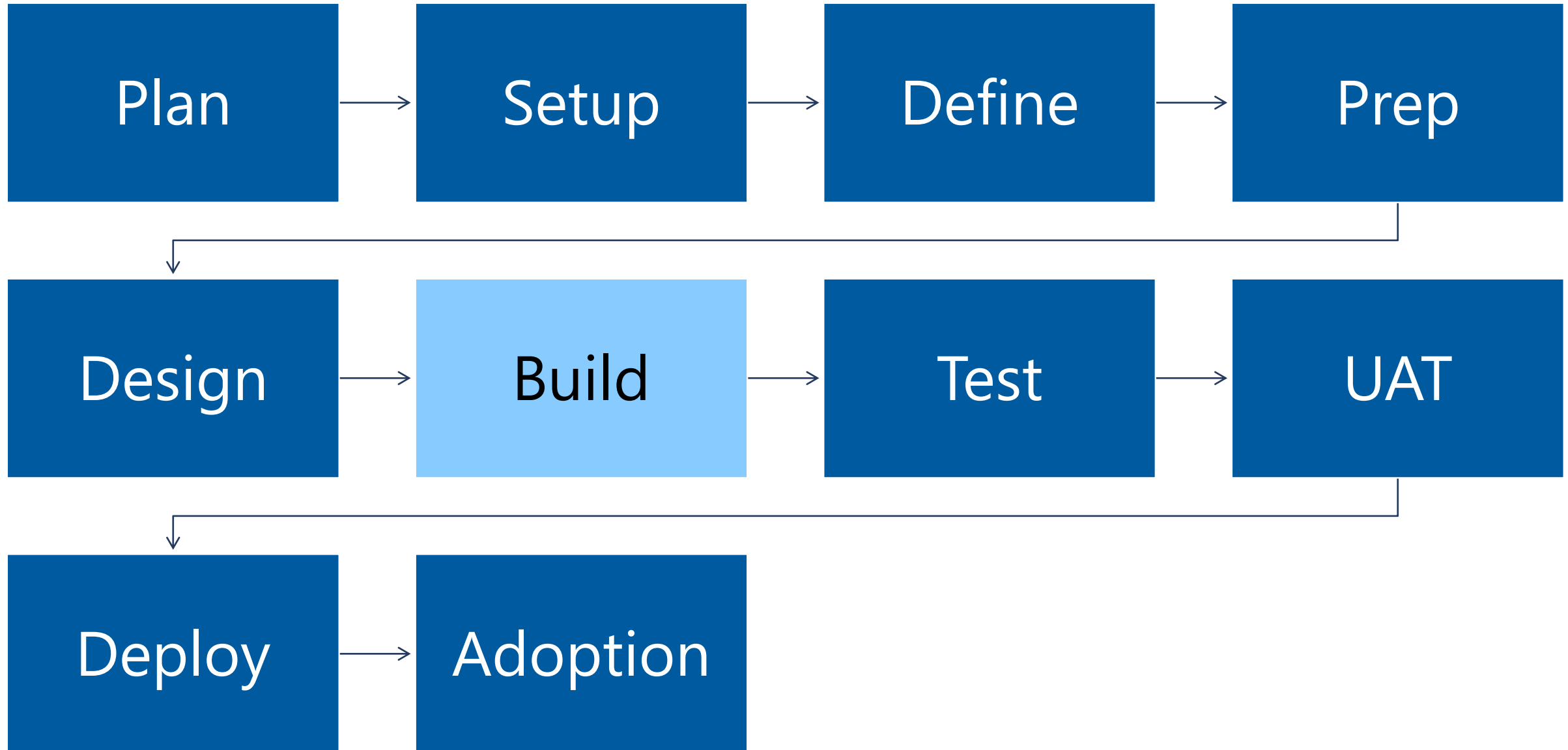Module 02

Build the Solution Data Ingestion, Unification, Relationships & Measures

Consistent Solution Patterns

Plan → Setup → Define → Prep

Design → Build → Test → UAT

Deploy → Adoption

Build – with Design and Test, an iterative process

Data

- Ingestion (Subset)
- Define entities
- Define relationships

Unified profile

- Configure map/match/merge rules
- (Optional) Apply self-conflation
- Execute M3

Activities, measures/KPIs, Segments, Outbound

- Configure activities
- Configure measures/KPIs
- Configure segments
- Configure export destinations
- Execute activities and measures/KPIs
- Execute segment creation and export

Module 2 Agenda

2.1. Data Ingestion

2.2 Data Unification

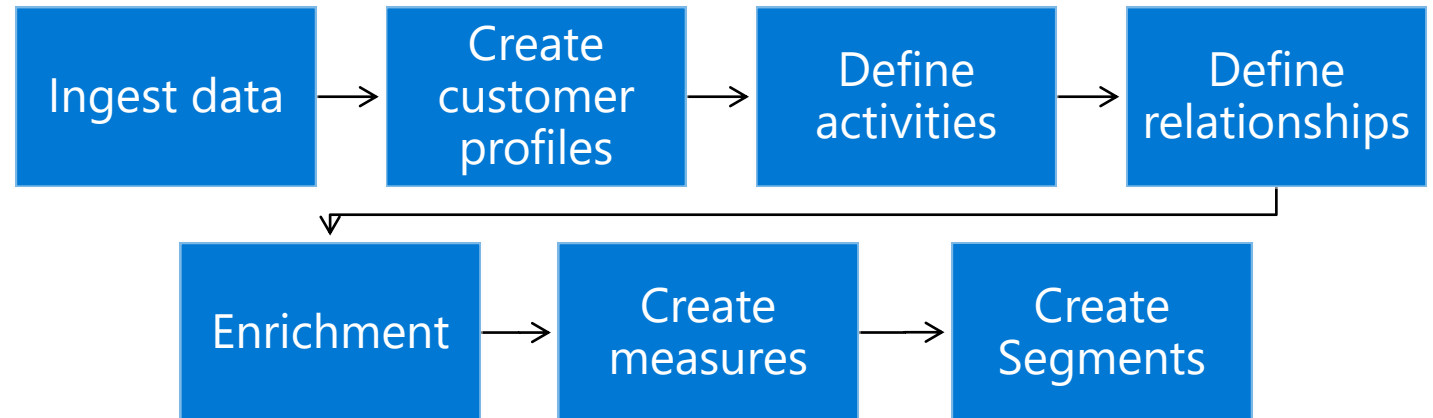2.3 Relationships

2.4 Measures

Lab 2

Review – Terms and Processes

Data source – a container for one or more datasets

Dataset – a logical table of data

Entities – created by loading a dataset; a dataset

Customers Page – a consolidated view of your customers

```
Ingest data → Create customer profiles → Define activities → Define relationships
                                                                      ↓
Enrichment → Create measures → Create Segments
```

2.1 Data ingestion

Supported data sources

Creating data sources

Supported data sources in addition to CDS

File sources	Database sources	Azure sources	Others
Excel/Access	Redshift, BigQuery	Azure Blobs	Active Directory
JSON	SQL Server, DB2	Azure Data Lake Storage Gen2	OData
Text/CSV/XML	MySQL, PostgreSQL	Azure HDInsight Spark	ODBC
File folder	Oracle, DB2. Sybase, Teradata	Azure SQL Data Warehouse	SharePoint list
Sharepoint folder	Vertica, Impala	Azure SQL database	Spark
PDF		Azure Tables	Web API, Web page

Data Sources

Connect to a Common Data Model folder in ADLS

Attach to Dataverse

Import Data using Data Flow Connectors

Creating data sources

Add new data source or edit existing

Audience insights

Primary target audience
Individual consumers

- Home
- Customers
- Segments
- Measures
- Intelligence
- Data
  - Data sources
  - Entities
  - Unify
  - Enrichment
  - Activities
  - Relationships
  - Exports
- Reports (Preview)
- Admin

Choose your import method

- ● Microsoft Power Query
  Files, databases, Microsoft Azure services, third-party online services, and on-premise data (gateway required)
  Learn more

- ○ Azure data lake storage
  Azure Data Lake storage accounts
  Learn more

- ○ Microsoft Dataverse
  Data sets in the Common Data Service data lake
  Learn more

- ○ Customer Insights data library
  Get data from Datahub catalog

Data stored in an online service such as Azure Data Lake Storage may be stored in a different location than where data is proce
with, Dynamics 365 Customer Insights. Learn more at the Microsoft Trust Center

Provide a name to identify your data source.

Save data source as: *

Enter a name, starting with a letter (ex: CustomerData2020)

Use both letters and numbers—no spaces or special characters (3-64 characters).

Azure Data Lake source considerations

Data format must conform to [Common Data Model](#)

Azure Data Lake Gen2 storage accounts required

Data lake and CI environment must be in same Azure region to avoid data movement

Access keys and model.json file may be changed after initial setup

Connecting to a CDM folder in Azure Data Lake storage

Connecting to Microsoft Dataverse-managed Data Lake

Admin rights required on the Common Data Service org

Connecting to Text Files in Azure Blob Storage via Import

Connecting to Dynamics 365 Apps using Common Data Service
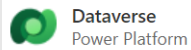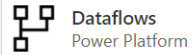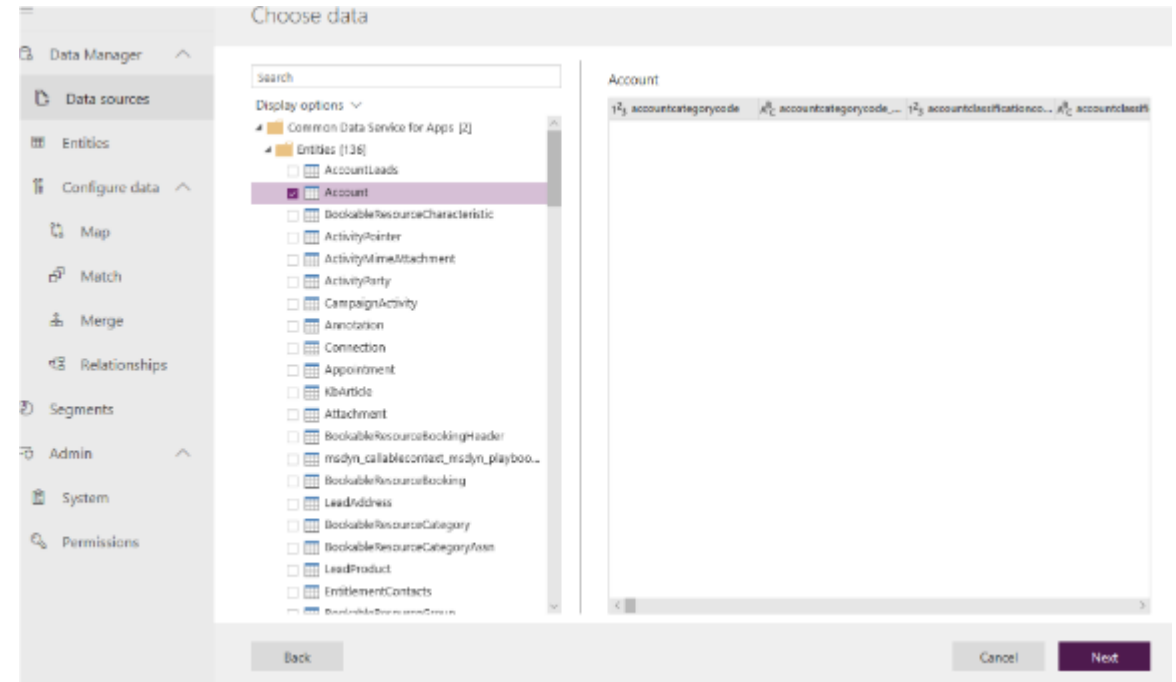
Configuring Incremental Data Refresh

Requires a connection to a data source that supports data refresh (eg Azure SQL DB)

Select entities or tables to ingest

Complete incremental refresh settings (default is full refresh)

> Identify primary key
>
> Identify "last updated" field
>
> Configure refresh interval

Real-time data ingestion

The real-time functionality provides data immediately for consumption in Customer Insights, until the subsequent scheduled refresh pulls this data from the data source.

- Real-time customer profile updates

- Real-time activity creation

Power Query

Power Query is used to help with importing your data sources

You can add, review, and transform the datasets when importing

For reference, see:
https://docs.microsoft.com/en-us/power-query/power-query-what-is-power-query

https://docs.microsoft.com/en-us/power-query/best-practices
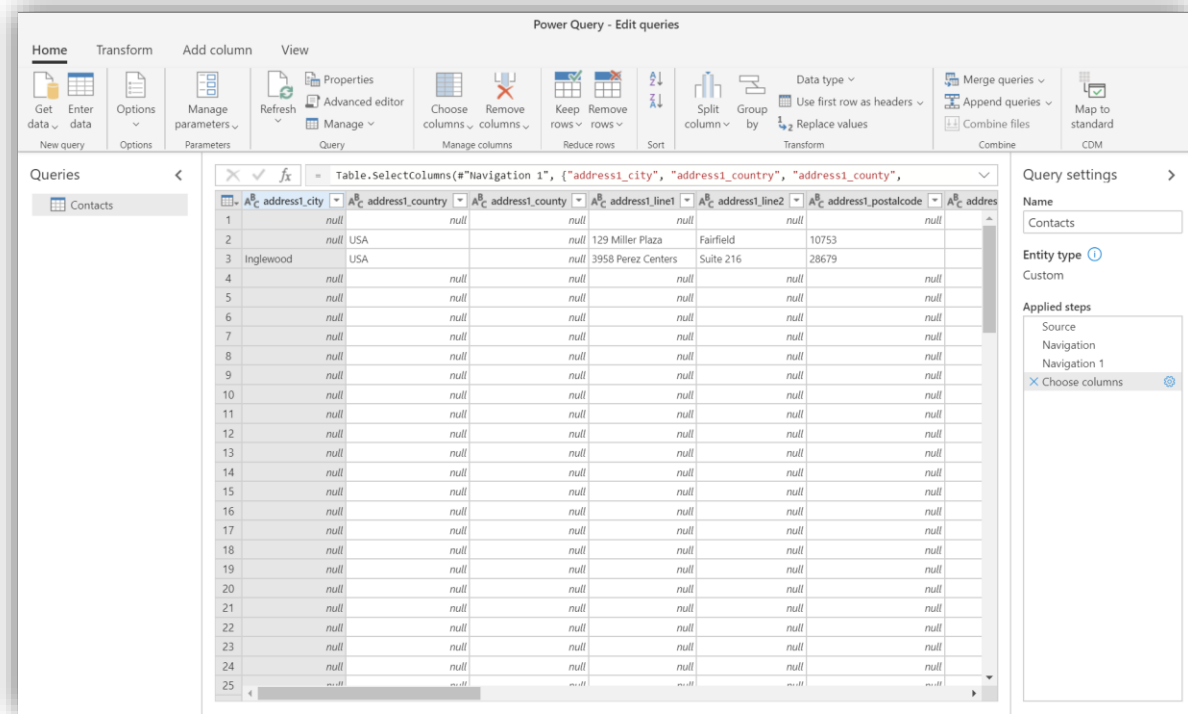
Advanced Query - 'M'

Sometimes there are things you can't do in Power Query In that case you can use the Advanced Editor.

Uses the 'M' formula language
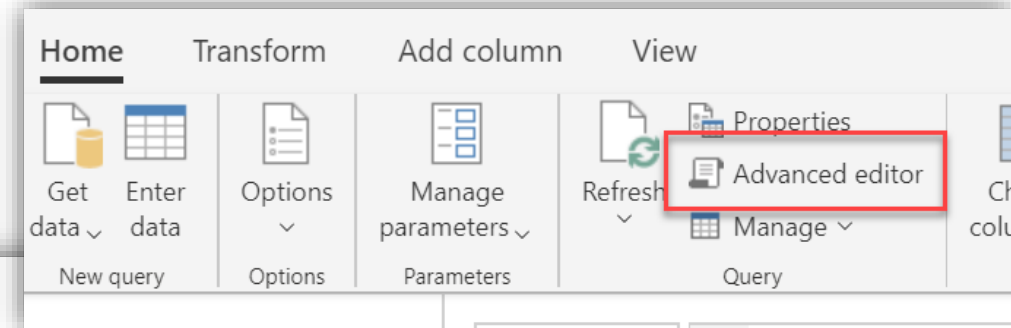

```
1  let
2    Source = Cds.Entities("https://jwiesedemo.crm.dynamics.com", null),
3    Navigation = Source{[Group = "entities"]}[Data],
4    #"Navigation 1" = Navigation{[EntitySetName = "contacts"]}[Data],
5    #"Choose columns" = Table.SelectColumns(#"Navigation 1", {"address1_city", "address1_country", "address1_county", "address1_line1",
       "address1_line2", "address1_postalcode", "address1_stateorprovince", "contactid", "emailaddress1", "entityimage_url",
       "entityimageid", "firstname", "fullname", "gendercode_display", "lastname", "telephone1"})
6  in
7    #"Choose columns"
```

https://docs.microsoft.com/en-us/powerquery-m/

Each dataset you load creates an entity

Multiple capabilities of Customer Insights are built around these entities

Drill down into an Entity to see its structure

Type column maps to CDM definition

Entity summary details

📊 **Click the chart icon to see a summary of the data itself**

Overview of Gender

Updated: 5 days ago

Last run ✓ Successful

Attribute info	
Unique	4 (0%)
Error	0
Missing	16,830 (57.3%)
Total	29,372

💡 Predict missing values

Top values by count
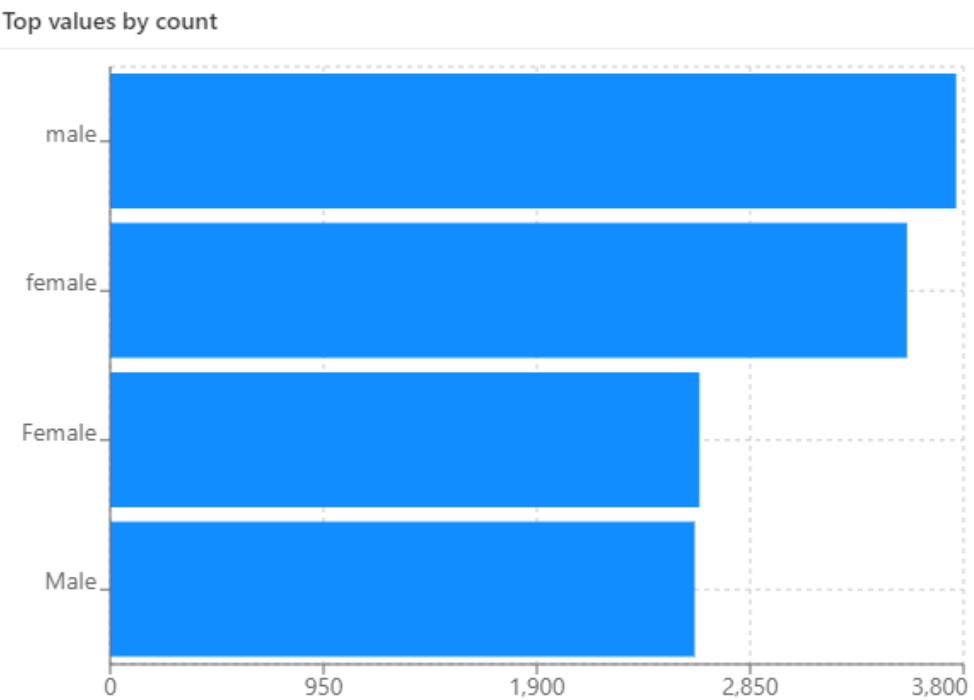
2.2 Unifying Data

Map

Match

Merge

Viewing the unified profile in the Customers Page

Unification Process

The data unification process:

       Unifies data sources that were once disparate into a single customer dataset

       Provides a holistic view of your customers: a unified customer profile.

Unification stages are mandatory and performed in the following order:

Map → Match → Merge
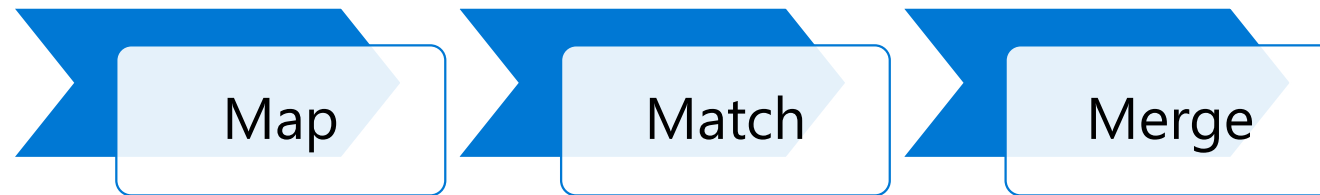
After unification is complete, you will proceed to set up relationships between entities, enrich your data, and define activities from some of the attributes (fields)

Map (1 of 2)

Mapping is the first stage in unification. It consists of 3 phases:

Entity selection: identify the entities that can be combined

Attribute selection: identify the fields/columns to combine and reconcile

Key and type selection: identify each entity's primary key, and a type for each attribute

Note: it is important to select appropriate profile information for mapping. Focus on identifying attributes, not activities taken

Map (2 of 2)

Be sure to map a field to the type Person.FullName to populate the Customer Card

Match

Match specifies how datasets will be combined into the unified customer profile

Requires at least 2 mapped entities

Set Match Order in the Unify page

    Identify the Primary entity

    Primary becomes the basis for unified profile. Other entities are added to it

Define Match rules: identify matching attributes between entities

Run and validate the match

Match order

Set order of entities
If you include all records, every record in the entity will be a unique customer and matched to every following entity.

Entity order	Entity name	Include all records	
Primary ⓘ	eCommerceContacts : ... ∨	☑	✕
2	loyCustomers : Loyalty... ∨	☑	✕

Identify the unique customers in your entities by matching records of customers.

Unique customers ⓘ	Matched records
29,372	5,002

View last run

Done   Cancel

Match rules

At least one rule is required

Match rules specify the logic by which a specific pair of entities will be matched

Review and Validate your matches

Custom Match – Allows you to specify that certain records *Always* match, or *Never* match

Self-conflation – Removes duplicates in an entity

Edit rule

Set conditions on how you will match by choosing equivalent fields in entities.

Name *

[Name+Email]

You can change this later.

Conditions

Condition 1

Entity	Field
CRM_Contact : CRMSystem	Name ⌄

Entity	Field
ERP_Customer : ERPSystem	Name ⌄

Normalize

[Select options ⌄]

Precision level

[Basic ▾]

Precision

Low   Medium   High   Exact

Merge

Merge is the third and last phase in data unification

Reconciles conflicting data

ex: Customer name appearing differently in each dataset

Merging is performed on an attribute-by-attribute basis.

Merge process

View the merged attributes

Unmerge attributes

Add or Remove attributes

Include or exclude attributes

Set the Rank importance

Reconcile conflicting data

Profile attributes   + Add merged attribute

Name	Entity	Source
CalendarDate (2)		

Attributes in CalendarDate

Rank	Name	Entity	Source
1	DateOfBirth	ContactCSV	
2	DateOfBirth	WebAccountCSV	

LocationAddressStreet (2)		
LocationCity (2)		

Rank Name	Entity	Source
1	FirstName	eCommerceContacts	eCommerce
2	FirstName	loyCustomers	LoyaltyScheme
3	FirstName	HotelCustomers	ContosoHotel
4	firstname	Contacts	D365CustSvc

Review the Unified Customer Profiles

Customers Page

Consolidated view of your customers

Available once you create the unified Customer entity

Search and Filter

Useful for a quick data check

2.3 Relationships

Relationships between entities

Relationship types

Custom relationships

Relationships

	Name			Source entity	Source cardinality	Target entity
○	**Subscribers**	✏	🗑	SubscriptionData SubscriberHistory	Many	SubscriptionData Subscribers
	CustomerPurchasesPOS			PoS posPurchases	Many	Customer Insights Customer
	CustomerWebReview			Website webReviews	Many	eCommerce eCommerceContacts
	PoSPurchases			PoS posPurchases	Many	LoyaltyScheme loyCustomers
	OnlinePurchases			eCommerce eCommercePurchases	Many	eCommerce eCommerceContacts
	Logs			SubscriptionData UserLogs	Many	SubscriptionData Subscribers
	CustomerPurchasesEcom			eCommerce eCommercePurchases	Many	Customer Insights Customer

Relationships: what are they?

Connect entities

Create a graph of the data

Help define segments and measures based on multiple data sources

Two type of relationships

Non-Editable

System relationships, created automatically
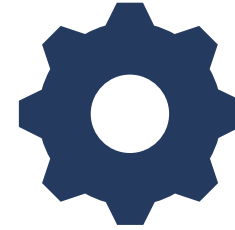
Custom

Created manually by the user

Relationships

Created during match and merge process (system-generated)

Additional relationships can be defined (custom)

Cardinality defines 1 : 1 or 1 : many relationships

    many : many can be modeled see docs

New relationship

To create a new relationship, specify how two entities are connected to each other.

Name *

| Relationship name |

Start with a letter. Use letters and numbers only.

Description

| |

Source details

Entity *

| ⌄ |

Cardinality *

| ⌄ |

Target details

Entity *

| ⌄ |

Cardinality *

| ⌄ |

Equivalent fields

Source field *

| ⌄ |

Target field *

| ⌄ |

2.4 Creating Measures

Measures represent key performance indicators (KPIs)

Reflect the performance and health of specific business areas.

Measures

Track your organization's performance on a business and customer level.

Display name	Type	State
Total Online Spend	Customer attribute	Active
Total Club Points	Customer attribute	Active
Average Web Purchase ($)	Customer attribute	Active
Average Store Purchase ($)	Customer attribute	Active
Lifetime Spend ($)	Customer attribute	Active
Average Web Purchase Value ($)	Business measure	Active
Average Store Purchase Value ($)	Business measure	Active

What are Measures?

KPIs reflecting health and performance

Measure Types

Customer Attribute

A single field per customer that reflects a score, value, or state for the customer. Customer attributes are created as attributes in a new system-generated entity called **Customer_Measure**.

Customer Measure

Insights on customer behavior with breakdown by selected dimensions. A new entity is generated for each measure, potentially with multiple records per customer.

Business Measure

Tracks your business performance and health of the business. Business measures can have two different outputs: a numeric output that shows on the **Home** page or a new entity that you find on the **Entities** page.

Creating Measures

To create a new measure:

Identify the Type: Customer attribute, Customer measure, Business measure

Provide name, display name

Select source entity/entities

Restricted to entities that have relationships to your starting entity.

Optionally, add arithmetic calculations with variables and expressions

(or with SQL)

Optionally, add aggregation functions (adds new value in Measures)

Measure example

Total Club Points

Entities

Select entities that have a relationship with your starting entity.

| Customer : CustomerInsights | ⌄ |

| posPurchases : PoS (Customer : Custom... | ⌄ | ✕

Measure definition *

Function *	Entity/variable *	Field	As	Display name
Sum ⌄	posPurchases : PoS ⌄	RewardPointsAdded ⌄	TotalClubPoints	Total Club Points

Lab 2

In this lab, you will use the environment you configured in Lab 1. You will:

Ingest data from high priority data sources from within the business:

Point-of-Sale (POS)

Loyalty Data

eCommerce Customers and Web Purchases

Configure and realize a unified customer profile from ingested data

Configure business and customers measures in Customer Insights
to identify customers with higher than average spend in store and online.

Estimated time: 90 mins.