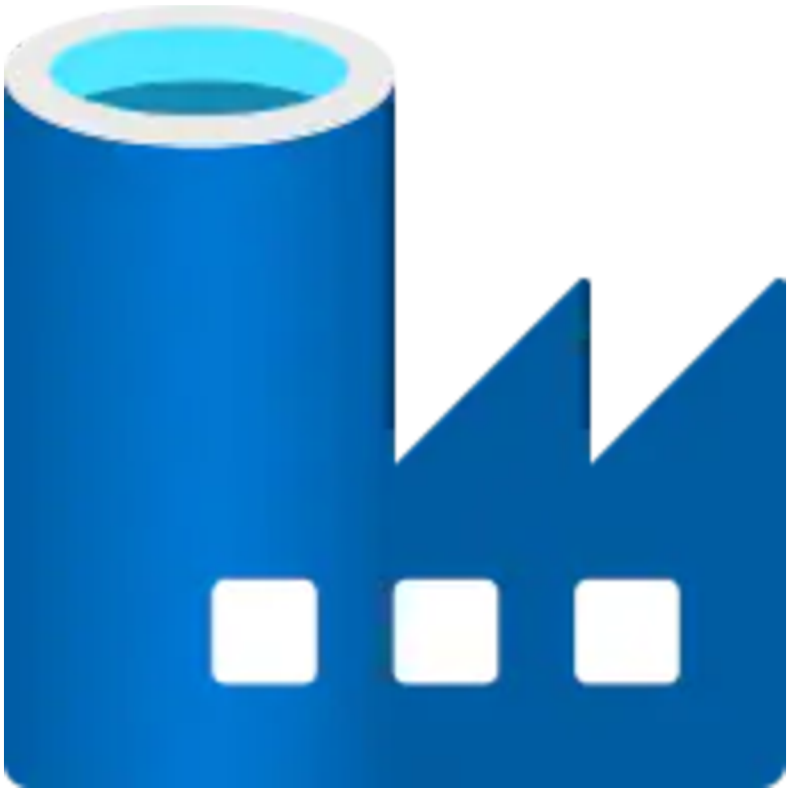


Azure Data Factory

🟦 Azure Data Factory (ADF) Detailed Notes

🔷 What is ADF?

Azure Data Factory (ADF) is a cloud-based ETL (Extract, Transform, Load) and data integration service that allows you to:

- Orchestrate and automate data movement and transformation.
- Build complex pipelines with data from multiple sources (e.g., REST APIs, databases, file systems).
- Perform data ingestion from on-premise or cloud sources and push to storage or data warehouses.

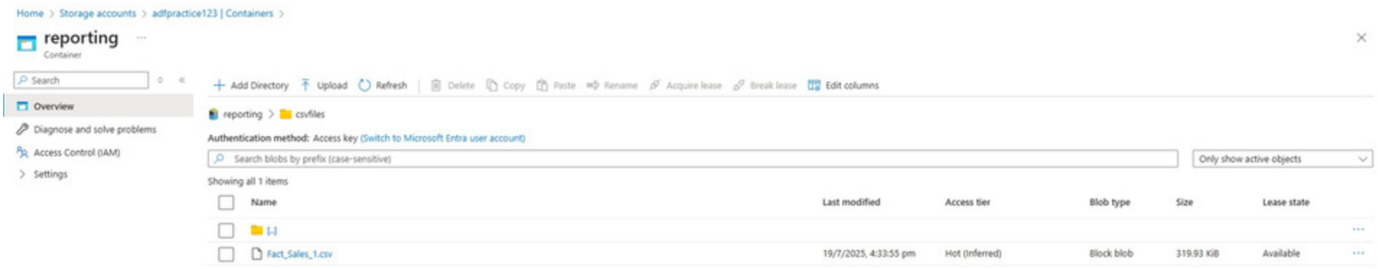
🔷 Azure Resources Setup

1. Create a Resource Group

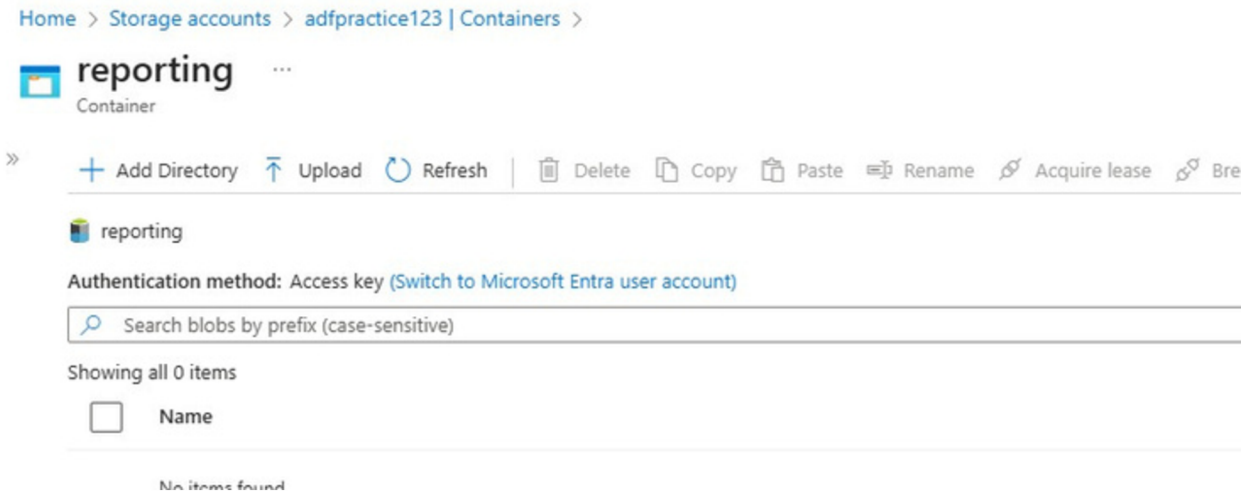
A logical container that holds related Azure resources.

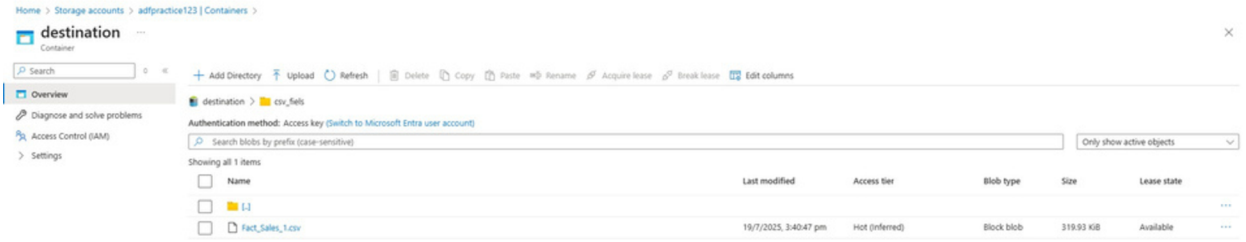
2. Create a Storage Account

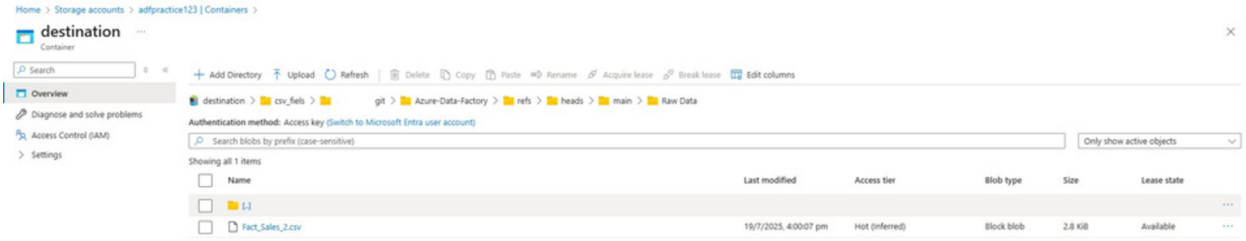
- Choose **Azure Data Lake Storage Gen2 (ADLS Gen2)**.
- Enable **Hierarchical Namespace** to support folder structures.

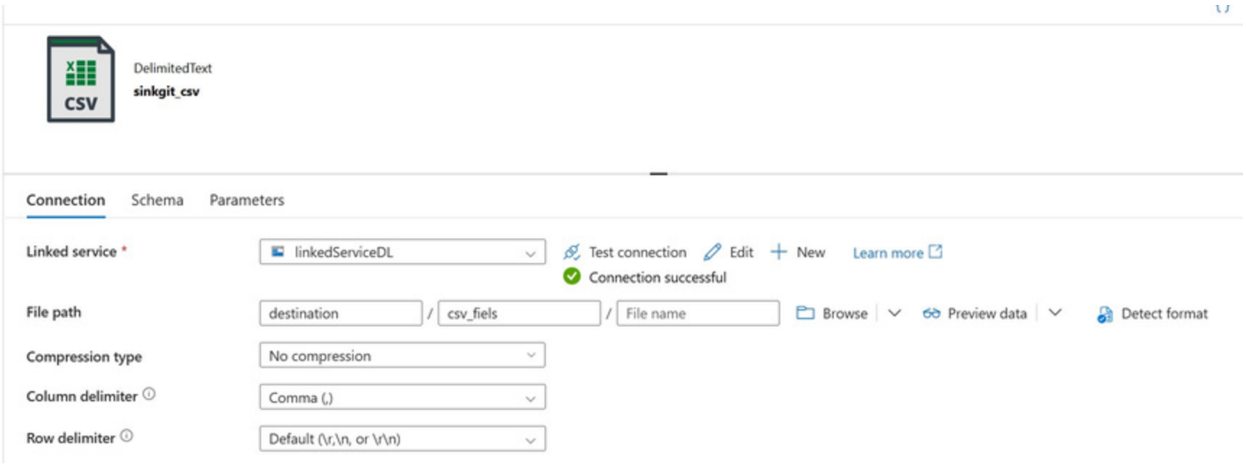


- Create containers/folders inside the storage (e.g., `source`, `reporting`) .









3. Create Azure Data Factory Instance

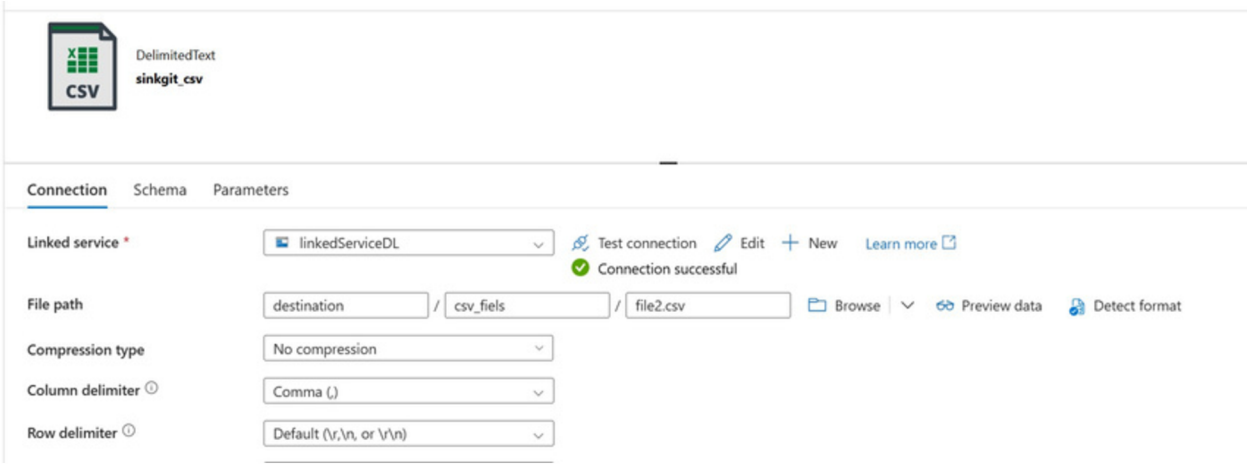
- Use it to build pipelines for data movement and transformation.

🔷 Linked Services in ADF

Linked services act as **connection strings** for ADF to interact with data sources and sinks.

- Go to: **Manage > Linked Services**.
- Create **two linked services**:
    - One for the **source** (e.g., HTTP or ADLS).
    - One for the **destination** (e.g., ADLS Gen2, Blob Storage).

      Http dest file mentioned, can mention any filename. will pick correct file



Example:

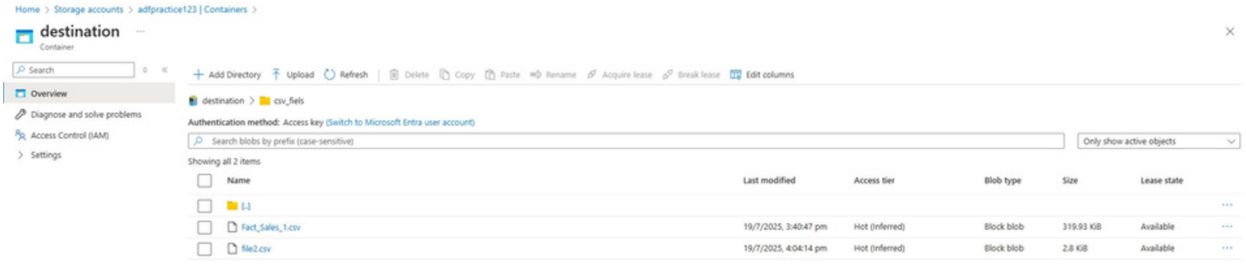
- Source Linked Service → HTTP
- Sink Linked Service → ADLS Gen2

🔷 Datasets

- Represents the **data structure** within the linked service.
- Used to define input and output data (e.g., CSV, JSON, Parquet).

Examples:

- Fact_Sales_1.csv dataset in the **source** folder.
- Output dataset in the **destination** (e.g.,`reporting/Fact_Sales_1.csv`)



🔷 Containers in ADLS = Data Lake Zones

- Logical partitions of storage.
- Example container: `reporting` for storing cleansed and transformed facts data.

🔷 Copy Activity

Used to **copy data from a source to a sink**.

Two examples:

1. From **HTTP API (source)** to **ADLS Gen2 folder (destination)**.

Preview data

Linked service: Linked_git

Object: anshlambagit/Azure-Data-Factory/refs/heads/main/Raw%20Data/Fact_Sales_2.csv

	transaction_id	transactional_date	product_id	customer_id	payment	credit_card	loya
1	4411	5/1/2022 1:02	P0305	6		30271790522719	F
2	4412	5/1/2022 4:00	P0242	7	visa	4041591026711540	F
3	4413	5/1/2022 5:49	P0529	2	mastercard	5048373491517664	F
4	4414	5/1/2022 6:58	P0336	7	mastercard	5048377130633352	T
5	4415	5/1/2022 8:47	P0399	6	visa	4041595611872	F
6	4416	5/1/2022 12:06	P0097	4	visa	4041591008610	F
7	4417	5/1/2022 19:42	P0644	7	mastercard	5048374238650248	T
8	4418	5/1/2022 20:33	P0370	4	americanexpress	374288720448306	T

Preview data

Linked service: linkedServiceDL

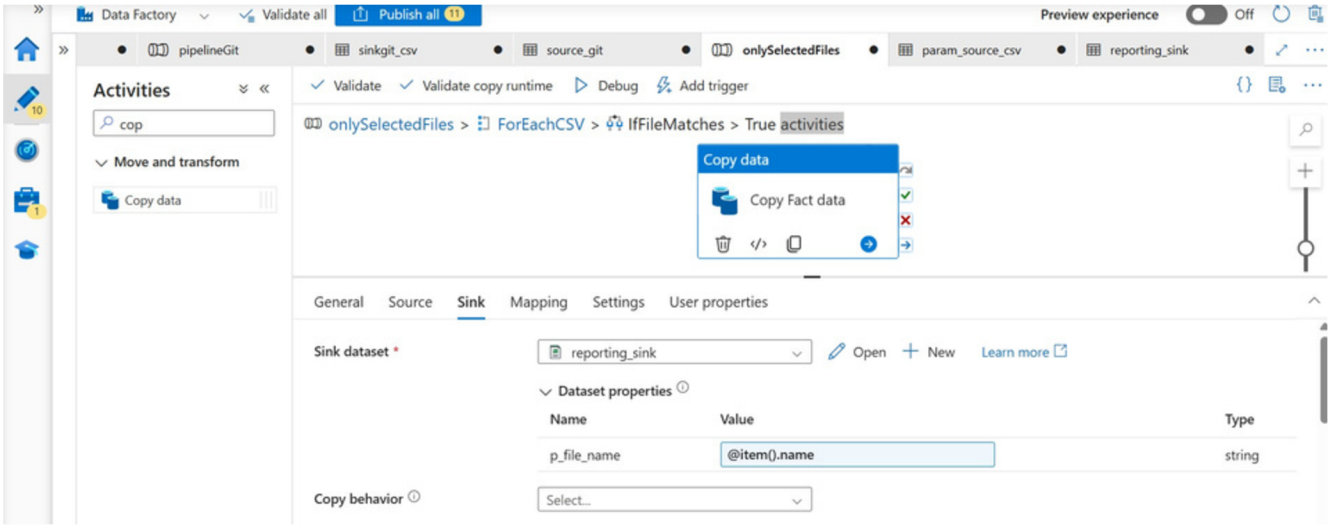
Object: Fact_Sales_1.csv

	transaction_id	transactional_date	product_id	customer_id	payment	credit_card	loy
1	1	2021-05-04 02:00:00	P0494	4	visa	4041593010498829	F
2	2	2021-05-04 03:04:00	P0221	5	visa	4041596151234556	F
3	3	2021-05-04 03:56:00	P0625	5	visa	4041594885335898	F
4	4	2021-05-04 05:20:00	P0431	8	mastercard	5108753677552345	F
5	5	2021-05-04 05:45:00	P0058	5	mastercard	5108752372298261	T
6	6	2021-05-04 06:58:00	P0385	6	americanexpress	374288563442549	F
		2021-05-04					

2. From **ADLS source folder** to **ADLS destination folder**.

? Will data be duplicated if you re-run the pipeline?

- It **will copy again** unless there's logic to **check for existing files** or **overwrite settings are adjusted.**



🔷 URL Concepts in HTTP Linked Service

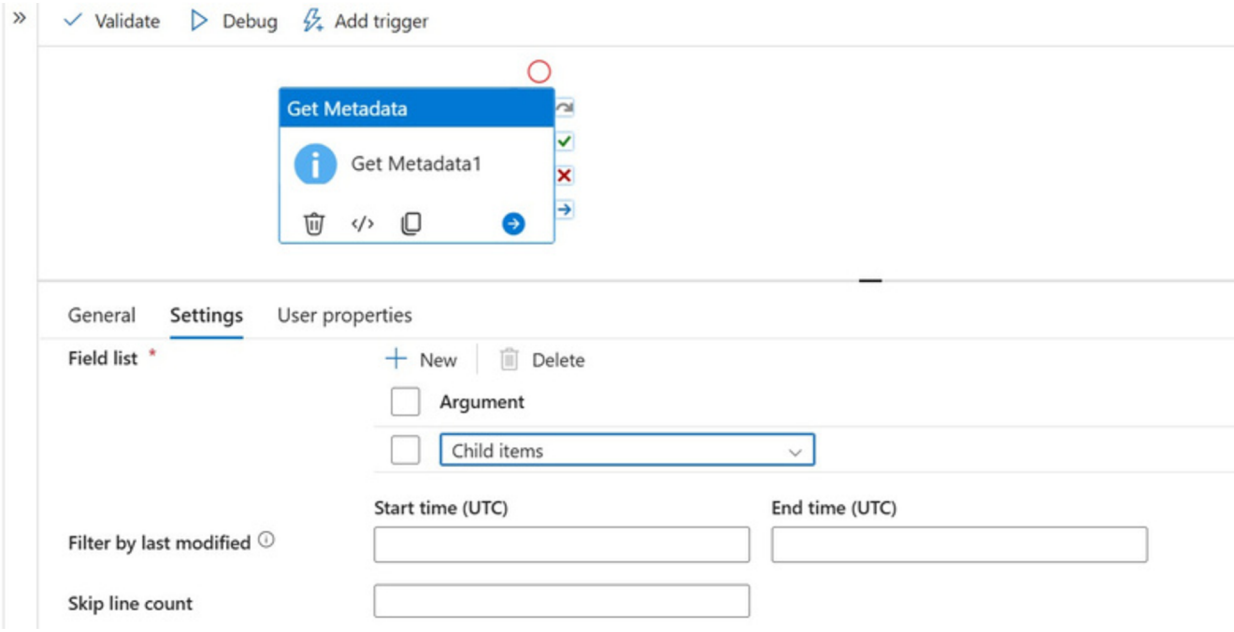
- **Base URL**: `https://site.com`
- **Relative URL**: Path after the base URL
- ADF combines them to make the complete endpoint.

🔷 Data Quality & Governance

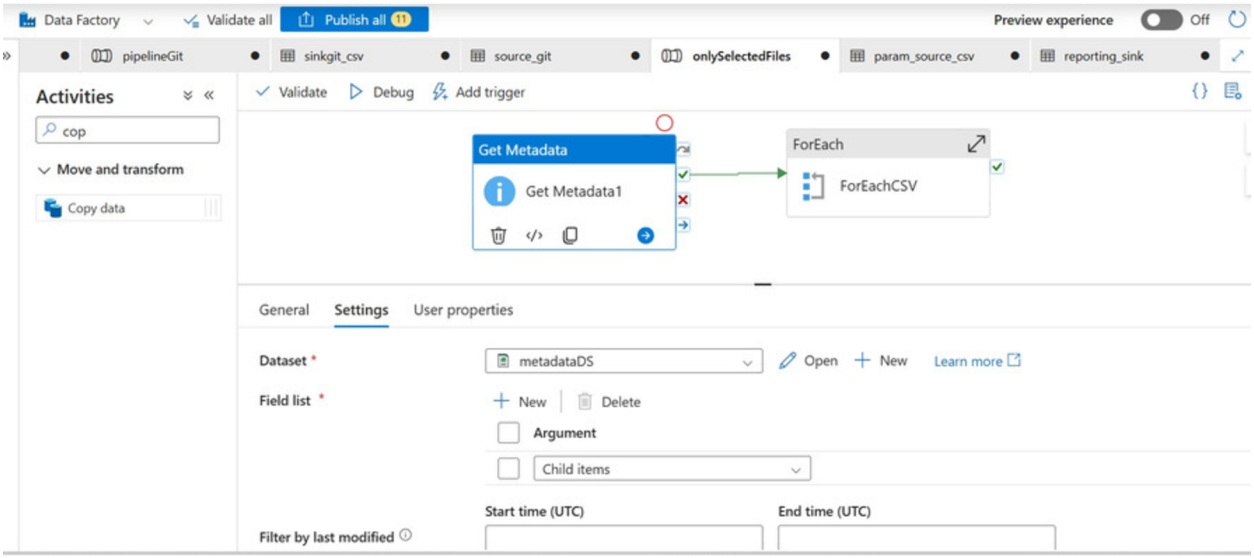
- Store meaningful, validated data in the destination.
- Instead of just naming files like file.csv, use descriptive names like `facts.csv` under a governed container like reporting.

🔷 Metadata Activity

- Returns **metadata about files** or folders in ADLS.
- Commonly used to:
    - Check for the existence of files
    - List all files in a folder (child items)


Validate
Debug
Add trigger
Get Metadata
Get Metadata1
General
Settings
User properties
Field list *
New
Delete
Argument
Child items
Start time (UTC)
End time (UTC)
Filter by last modified
Skip line count


Get Metadata
Get Metadata1
ForEach
ForEachCSV


Data Factory
Validate all
Publish all 11
Preview experience
Off
pipelineGit
sinkgit_csv
source_git
onlySelectedFiles
param_source_csv
reporting_sink
Activities
cop
Move and transform
Copy data
Validate
Debug
Add trigger
Get Metadata
Get Metadata1
ForEach
ForEachCSV
General
Settings
User properties
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Learn more
Field list *
New
Delete
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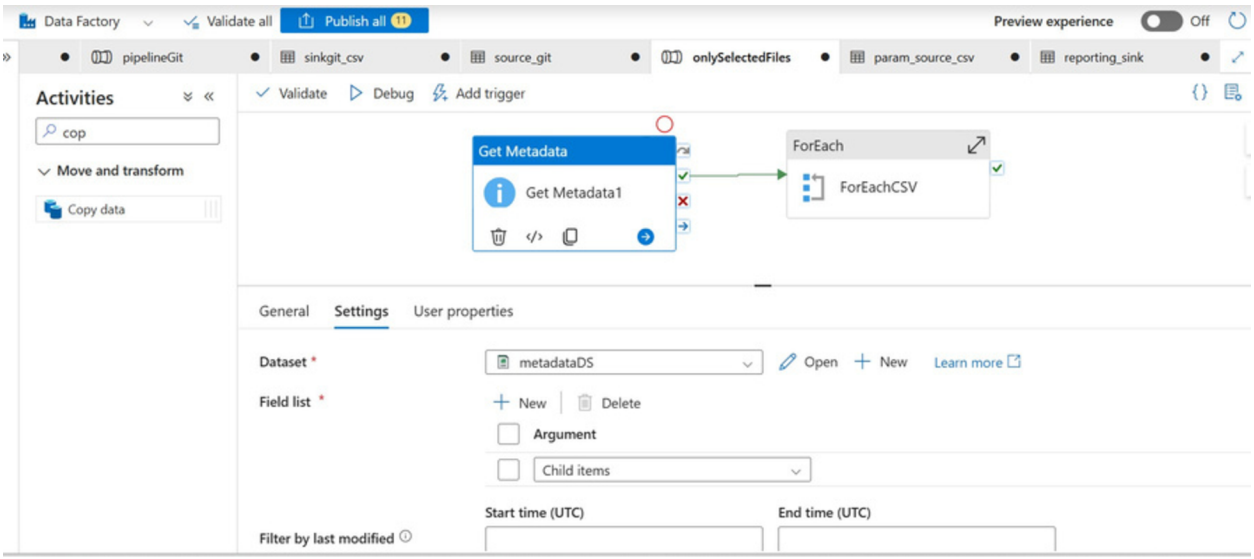
Child items
Start time (UTC)
End time (UTC)
Filter by last modified

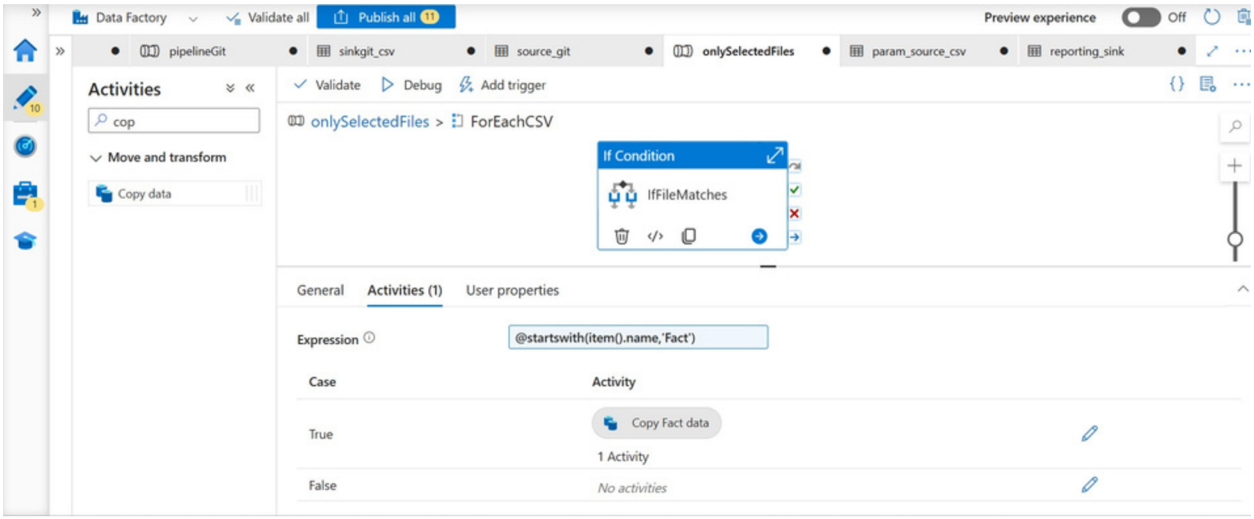


Conditional Copy: If Condition Activity

- Use when you want to **copy only specific files**.

ExampleUse Case:

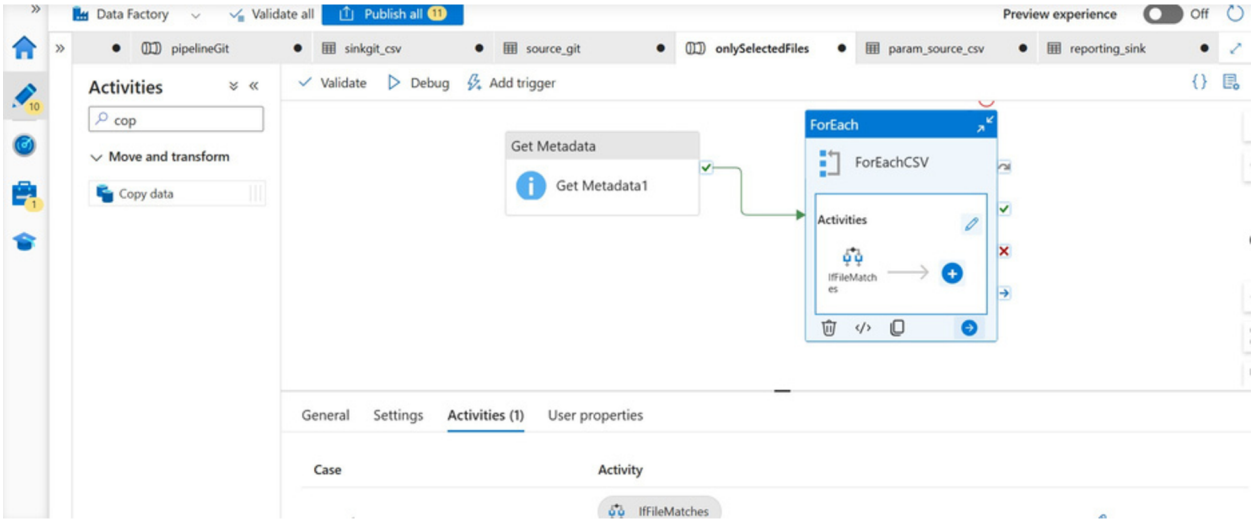
- Copy only if file **name starts with "Fact"**.
- Else → **Do nothing**.



Steps:

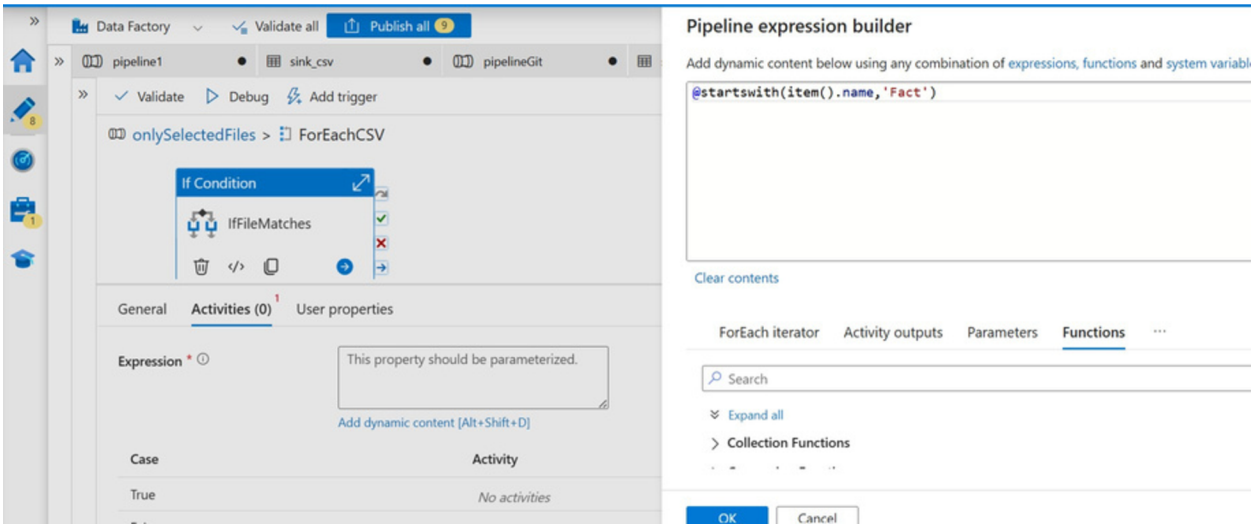
1. Use **Get Metadata** to get child items.

2. Use **For Each** activity to iterate through the files.



3. Inside the loop, use **If Condition** to filter files by name.

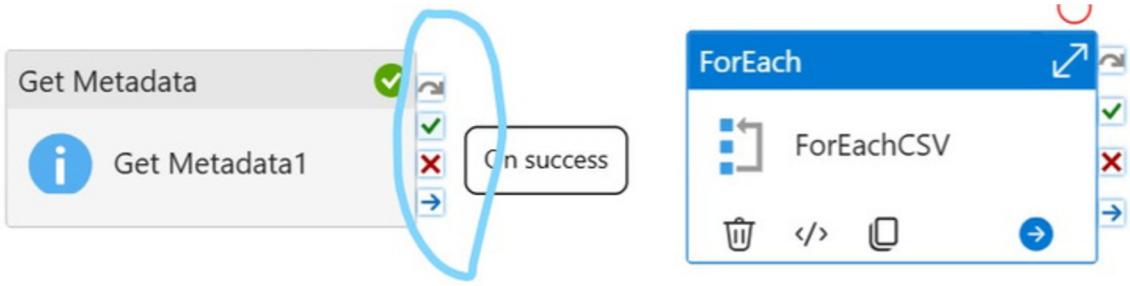
4. If true → Perform **Copy Activity**.



Control Flow: Activity Outcomes

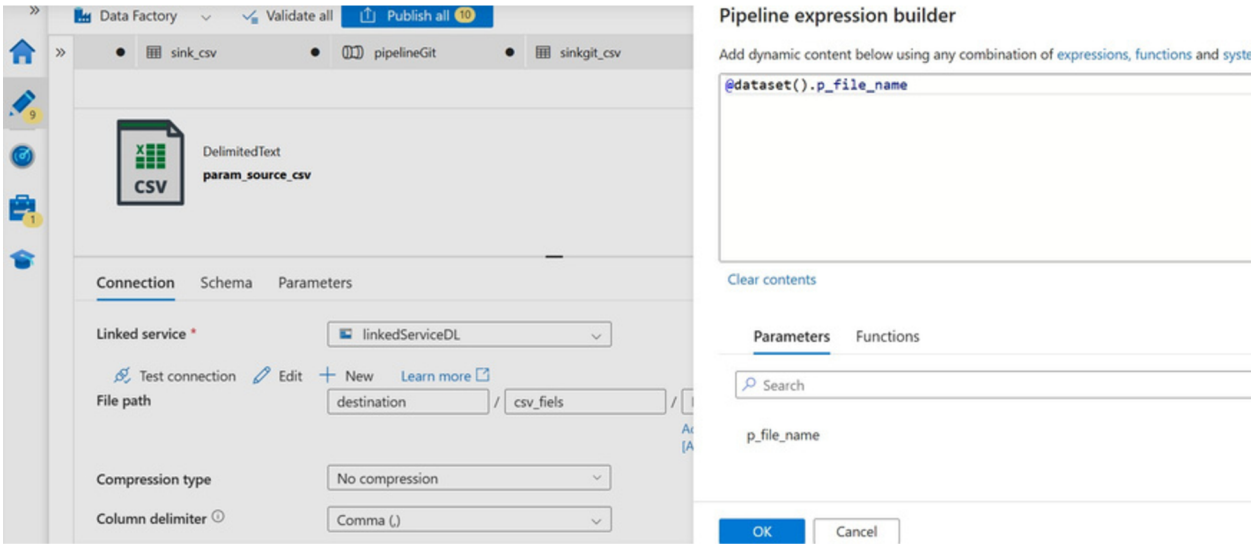
Each activity in ADF can branch based on outcomes:

- **On Success**: Next step if the activity succeeds.
- **On Failure**: If the activity fails.
- **On Completion**: Executes regardless of result.
- **On Skip**: Executes if the activity is skipped.



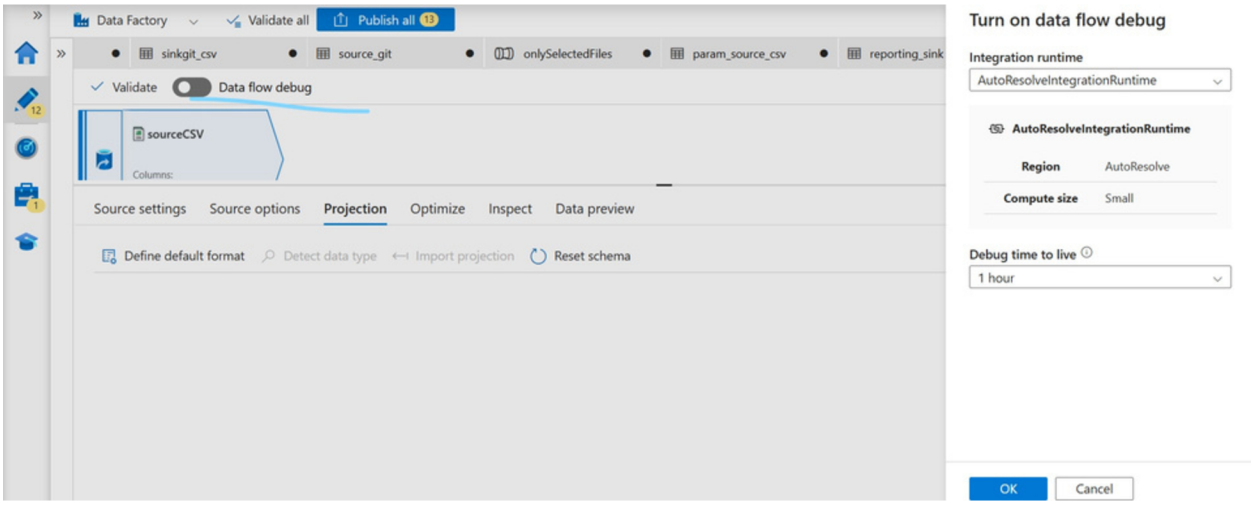
Parameters

- Help make pipelines **dynamic and reusable**.
- Example: Pass source file name, destination folder name, or filter condition.



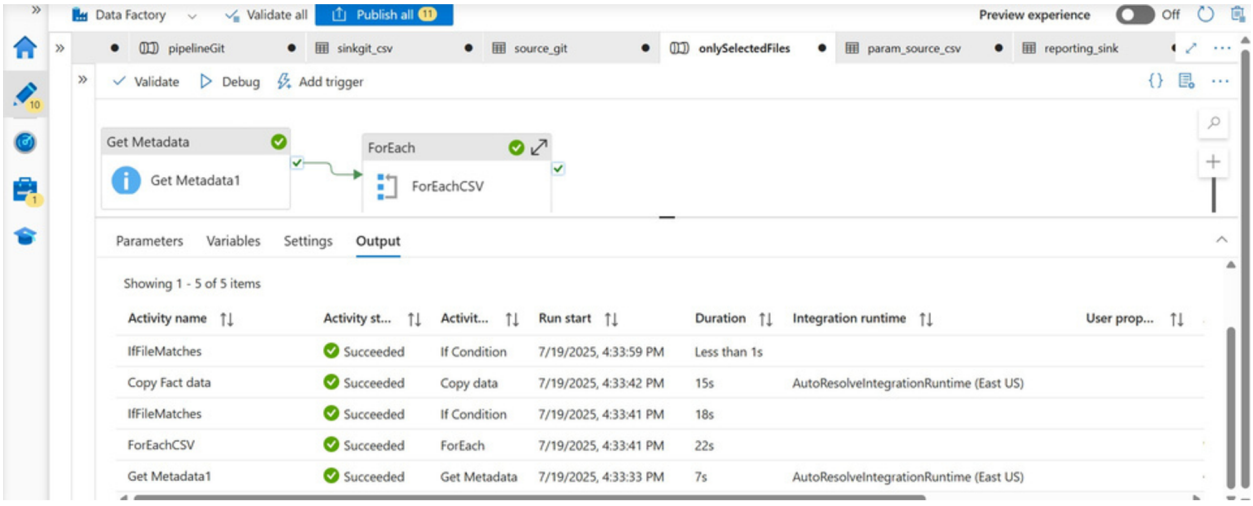
Data Flow (Mapping Data Flow)

- Visual interface for **data transformation** logic.
- More like SSIS with features like joins, filters, derived columns, etc.
- Used for **row-level transformation**.



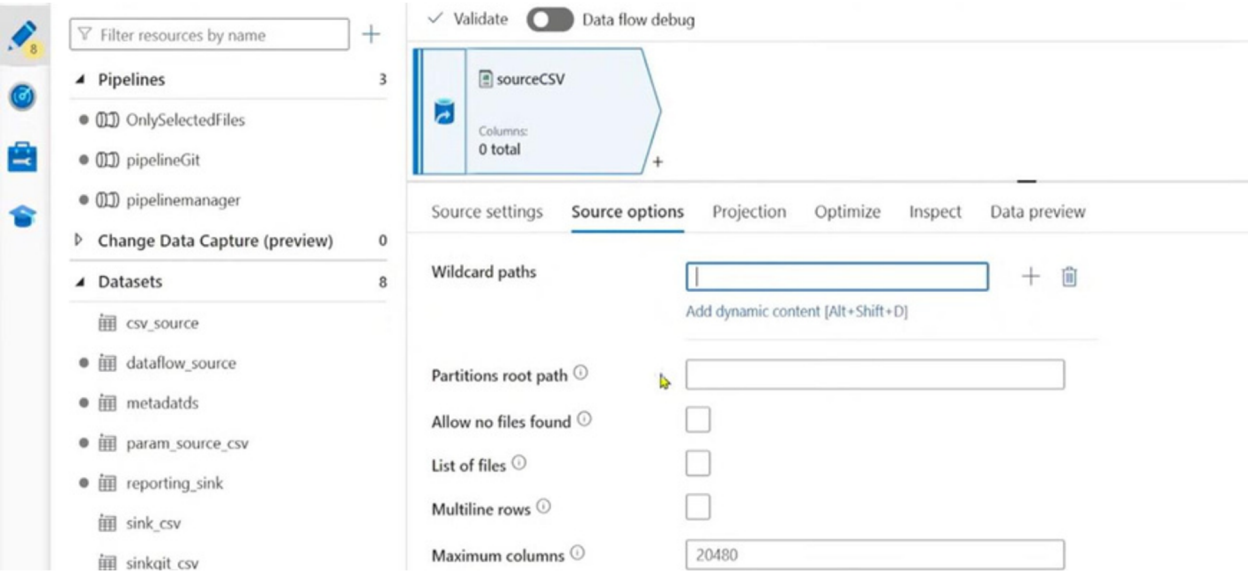
Dynamic Pipelines

- Use expressions, parameters, system variables to **make pipelines dynamic**.
- Helps in handling different files/folders/structures **without hardcoding**.



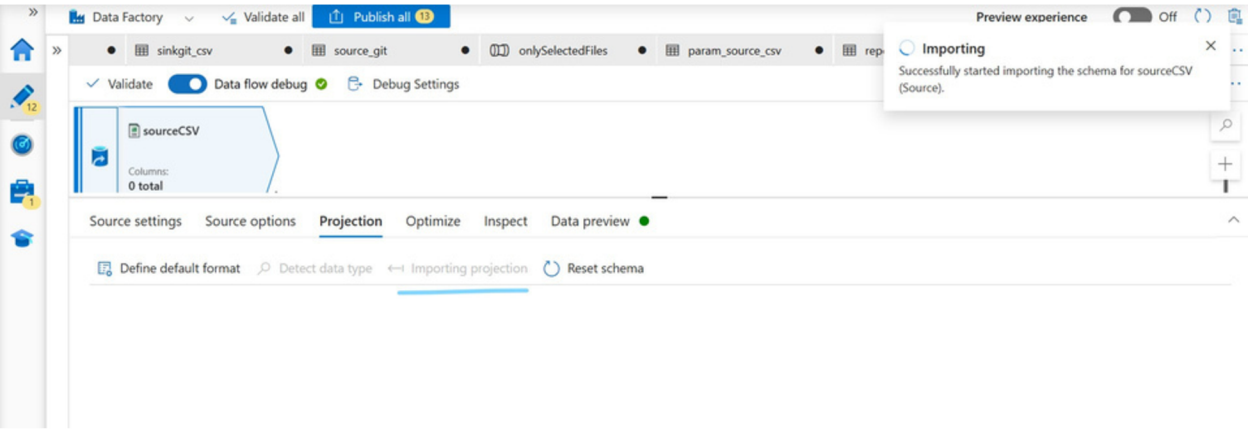
Wildcard Path:

Used in datasets to read multiple files matching a pattern (e.g., Fact_*.csv). Helps automate ingestion of similar structured files.



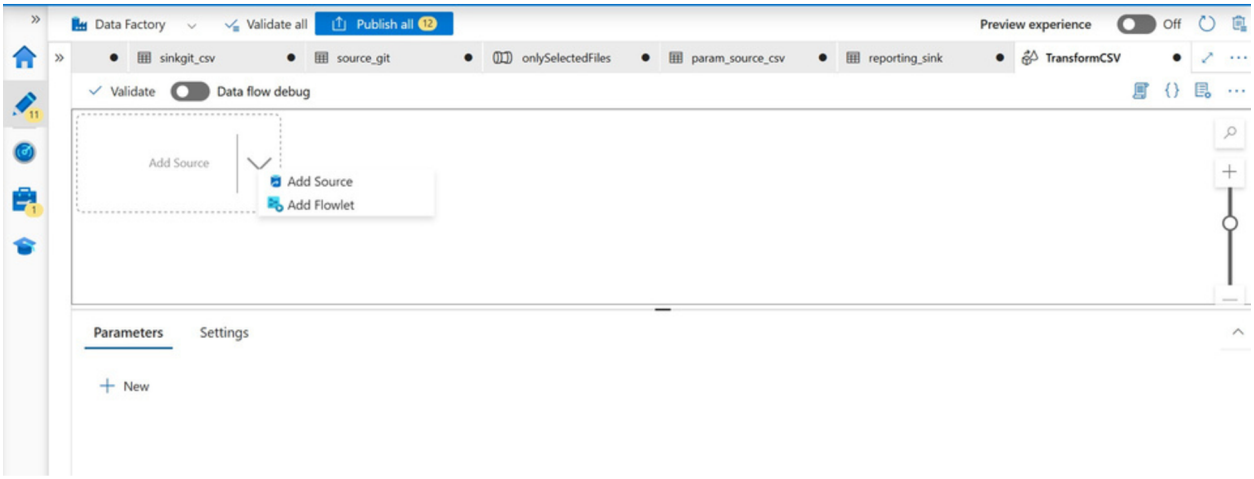
Importing Projection:

In **data flow**, this lets you import the schema from the source to define the structure and mapping of incoming data.



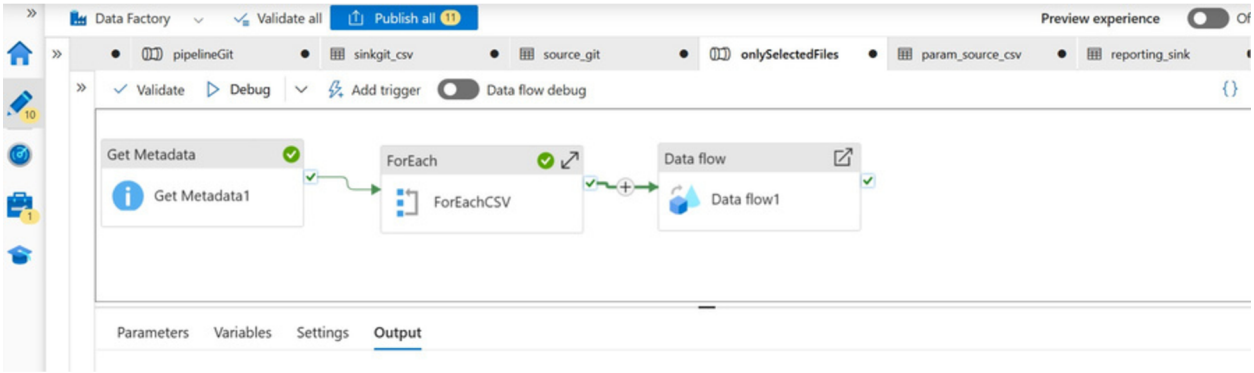
Source Select (Add Source):

In Data Flow, use Add Source to bring in input datasets for transformation. Multiple sources can be merged or joined based on logic.



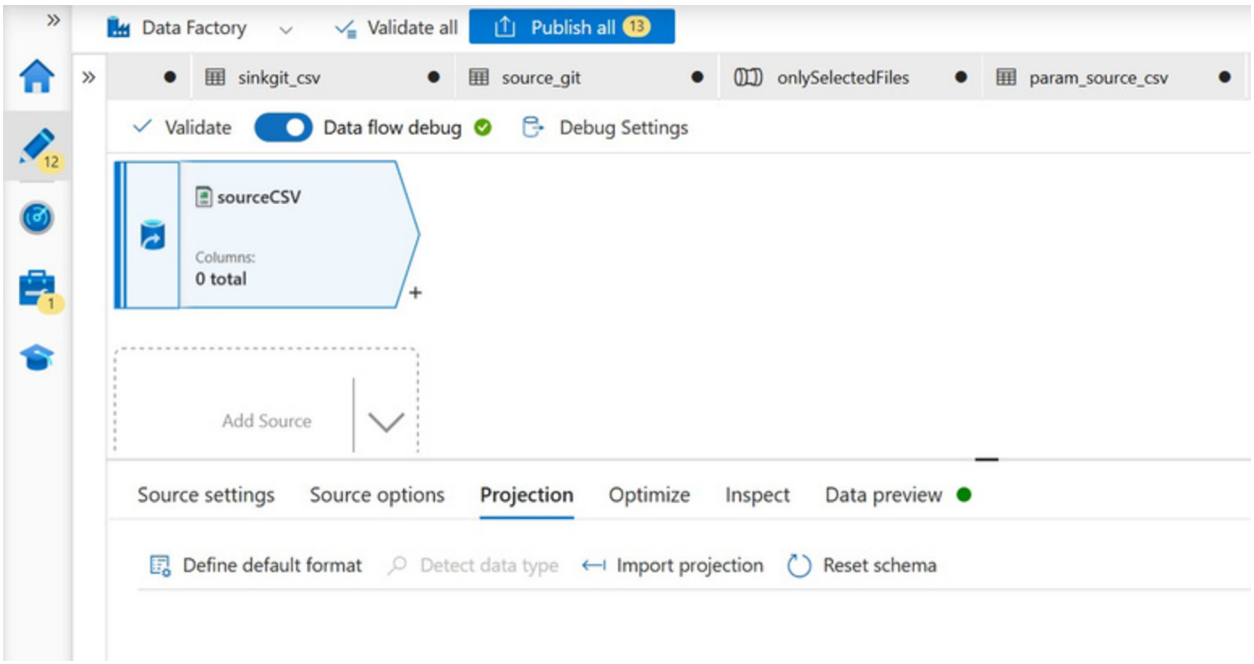
Data Flow for Spark:

ADF's Data Flow runs on **Apache Spark clusters** in the background, allowing **distributed data transformation at scale.**



Data Flow Debug Mode:

Once **debug mode** is enabled in a Data Flow, a green check mark appears. This allows you to preview data at each transformation stage before publishing or running the pipeline.



🔷 Common ADF Best Practices

- Use **naming conventions** for clarity.
- Parameterize wherever possible.
- Use **debug mode** to test pipelines.
- Organize **folders and pipelines** for modularity.

🟩 Answers to Key Questions

Q1: ***If data already copied from API to storage, and I run the copy command again, will it duplicate?***

- Yes, unless overwrite or existence check logic is applied.
- Use 'If Condition' + Get Metadata to avoid copying duplicates.

Q2: ***If I make changes in pipeline activities, do I need to re-run the pipeline?***

- Yes. If the pipeline has already run, any changes require a **new pipeline run** to reflect updated logic