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ADF Mapping Data Flow

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  - TSQL | Stored Procedures | Performance Tuning
    - Integration Services | Reporting Services | Power BI
- Data Community
  - Lider Krakowskiej Grupy | Były Członek Zarządu
  - Organizator i prelegent SQLDay, SQLSaturday
- Pasjonat kolarstwa górskiego i maratonów MTB
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MVP Microsoft® Most Valuable Professional

Agenda

- Azure Data Factory Overview
- Mapping Data Flow
- Transformations
- Demo

Azure Data Factory

- The Azure Data Factory service is a fully managed service for composing data storage, processing, and movement services into streamlined, scalable, and reliable data production pipelines

Azure Data Factory

- Productive
  - Build automated data integration solutions with visual drag-&-drop UI. Move data seamlessly from over **80 sources** without writing code.
- Trusted
  - Data movement using Azure Data Factory has been certified by HIPAA/HITECH, ISO/IEC 27001, ISO/IEC 27018, and CSA STAR.
- Hybrid
  - Build data integration pipelines that span on-premises and cloud. Easily lift your SQL Server Integration Services (SSIS) packages to Azure.
- Scalable
  - Build serverless cloud-based data integration with no infrastructure to manage. Take advantage of elastic capabilities to scale out with your customer growth.

Azure Data Factory

- Visual drag-&-drop UI
  - Maximize productivity by getting pipelines up and running quickly. Use the code-free drag-&-drop interface to build, deploy, monitor, and manage your data integration
- SSIS package execution in Azure
  - Easily execute and schedule your SQL Server Integration Services (SSIS) packages in managed execution environment
- Comprehensive control flow
  - Looping, branching, conditional constructs, on-demand executions, and flexible scheduling
- Multiple Language Support
  - Use the visual interface or write your own code in Python, .NET, or ARM to build pipelines using your existing skills
- Code-free data movement
  - Improve your TCO with 80+ natively supported connectors including Azure data services

New ADF service

Home > New > New data factory

New data factory

* Name
MyAzureDataFactory

* Subscription
Microsoft Azure Sponsorship

* Resource Group
Create new Use existing
MyRG

Version
V2 (Preview)

* Location
East US

Home > MyAzureDataFactory > Settings

MyAzureDataFactory
Data factory

Delete

Essentials

Resource group
MyRG
Location
EastUS
Provisioning state
Succeeded
Getting started
Quick start

Type
Data factory (V2)
Subscription name
Microsoft Azure Sponsorship
Subscription id
14275120-0b96-4eef-98fa-b54e9272fee4

All settings

Quick links

Documentation

Author & Monitor ...

Monitoring

PipelineRuns

100

Settings
MyAzureDataFactory

Filter settings

SUPPORT + TROUBLESHOOTING

Diagnose and solve problems
Activity log
New support request

GENERAL

Properties

GETTING STARTED

Quick start

RESOURCE MANAGEMENT

Tags
Locks

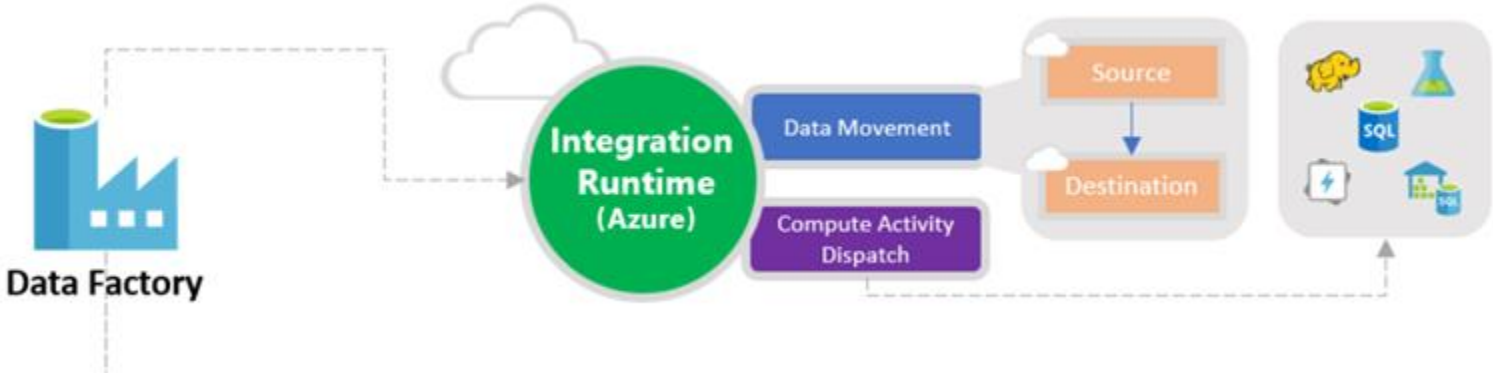
Components

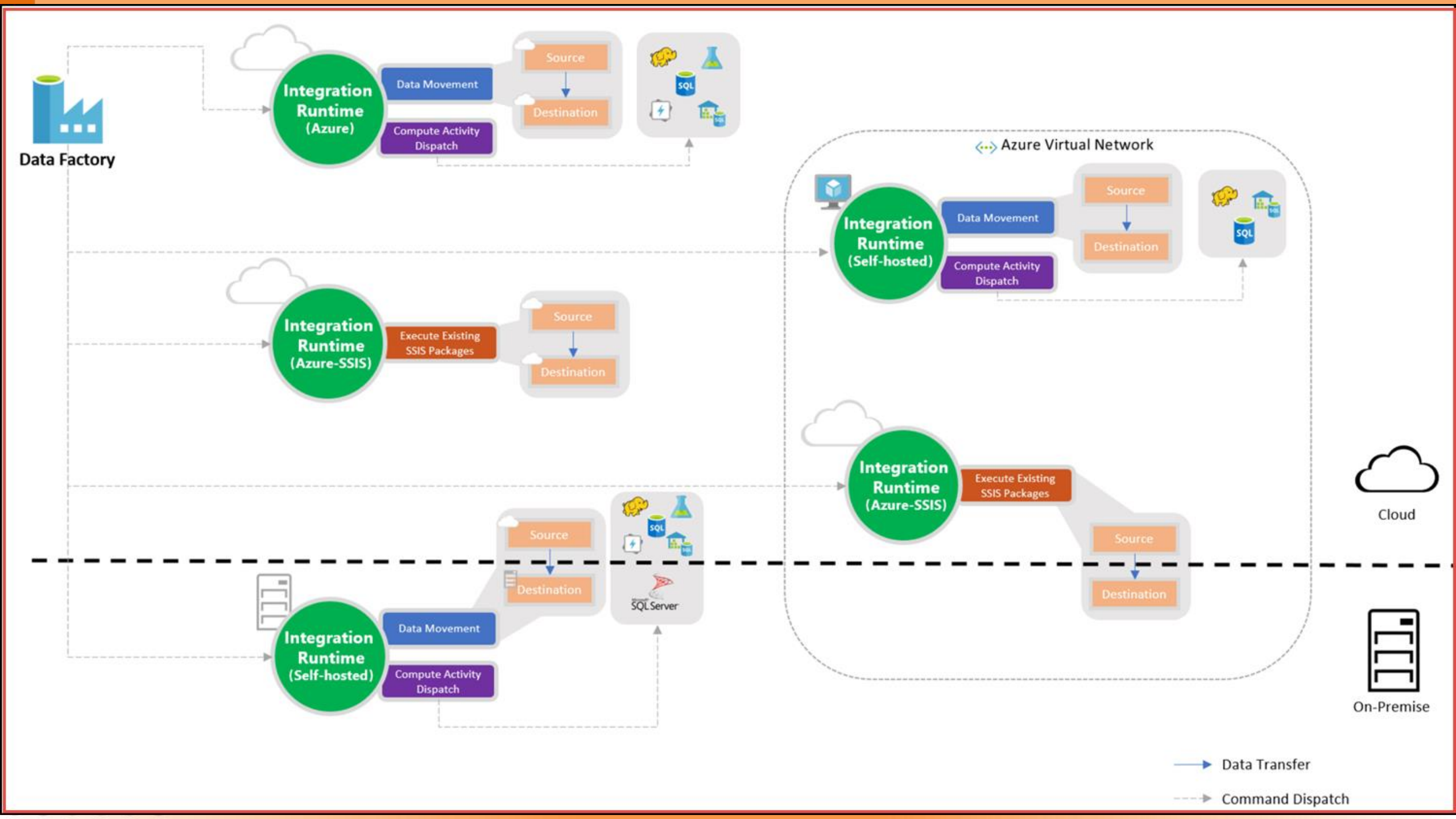
- **Pipeline** – key concept in ADF; workflow of activities
- **Activity** - processing step in a pipeline (copy data, run integration job)
- **Datasets** – data structures
  - point to the data you want to use as inputs or outputs
- **Linked service** – connection string
  - Data store - Azure/ on-premise/ Oracle/ Azure blob storage account
  - Compute resource - execution of an activity – HDInsight Hive/ Pig/ MapReduce/ Streaming
- Triggers - unit of processing
- Parameters

Integration Runtime (IR)

- Data movement
- Activity dispatch - monitor transformation activities
- SSIS package execution: Natively execute SSIS packages

- Types:
- Azure
- Self-hosted
- Azure-SSIS




Data Factory
Integration Runtime (Azure)
Data Movement
Compute Activity Dispatch
Source
Destination
Azure Virtual Network
Integration Runtime (Self-hosted)
Data Movement
Compute Activity Dispatch
Source
Destination
Integration Runtime (Azure-SSIS)
Execute Existing SSIS Packages
Source
Destination
Integration Runtime (Azure-SSIS)
Execute Existing SSIS Packages
Source
Destination
Cloud
Source
Destination
SQL Server
Integration Runtime (Self-hosted)
Data Movement
Compute Activity Dispatch
On-Premise
Data Transfer
Command Dispatch

Azure Data Factory

ADF MAPPING DATA FLOW

Mapping Data Flow

- Transformation capabilities for Azure Data Factory.
  Behind the scene ADF JSON code (generated by drag&drop interface) is converted into Scala programming language and compiled and executed in Azure Databricks which is automatically scale-out as needed.
- Does not require understanding of Spark, Big Data Executions Engines, Clusters, Scala, Python, Java… (Zero-Code)
- Focus on building business logic and data transformations
  - Data cleansing
  - Aggregation
  - Data conversion
  - Data preparation
  - Data exploration

Data Flows vs SSIS

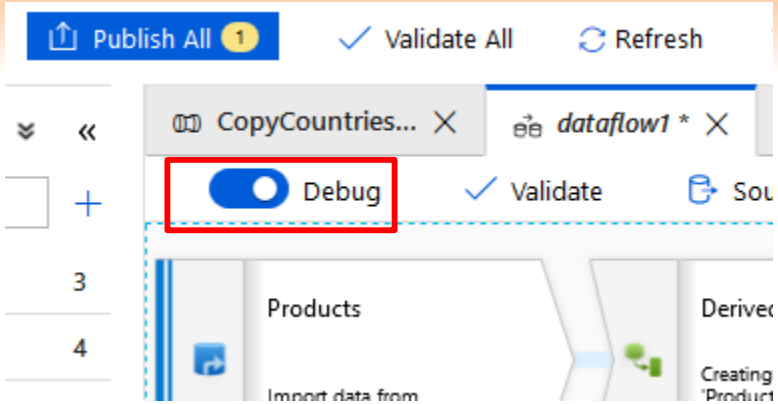
SQL Player
Play with data & have fun!

Operation / Activity	Description	SSIS equivalent	SQL Server equivalent
New branch	Create a new flow branch with the same data	Multicast (+icon)	`SELECT INTO` `SELECT OUTPUT`
Join	Join data from two streams based on a condition	Merge join	`INNER/LEFT/RIGHT JOIN,` `CROSS/FULL OUTER JOIN`

Conditional Split	Route data into different streams based on conditions	Conditional Split	`SELECT INTO WHERE condition1`
			`SELECT INTO WHERE condition2`
			`CASE ... WHEN`

Union	Collect data from multiple streams	Union All	`SELECT col1a UNION (ALL)` `SELECT col1b`
Lookup	Lookup additional data from another stream	Lookup	*Subselect, function,* `LEFT/RIGHT JOIN`
Derived Column	Compute new columns based on the existing once	Derived Column	`SELECT Column1 * 1.09 as NewColumn`
Exists		Lo[illegible]	
Select	Choose columns to flow to the next stream	OUTPUT in components, mapping columns	`SELECT Column1, Column4` `FROM Table`
Filter	Filter rows in the stream based on a condition	Conditional Split	`SELECT * FROM Table` `WHERE [Column] LIKE '%pattern%'`
Sort	Order data in the stream based on column(s)	Sort	`SELECT * FROM Table` `ORDER BY [Column] ASC`
Extend	Use any custom logic from an external library	Script Component	*SQL CLR*
Source	Source for your data flow. Obligatory first element of every Data Flow in ADF.	OLE DB Source and more ...	`SELECT * FROM SourceTable`
Sink	Destination for your data flow	OLE DB Destination and more...	`INSERT INTO TargetTable`

Debug Mode



- Interactively build data flow with a running Azure Databricks interactive cluster
- Session will close once you turn debug off in ADF.
- Hourly charges incurred by Azure Databricks during the time that the debug session turned on

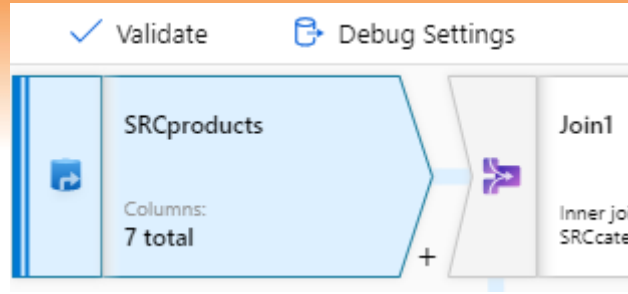
- https://github.com/kromerm/adfdataflowdocs/blob/master/Concepts/adf-data-flow-debug-mode.md

Expression Builder

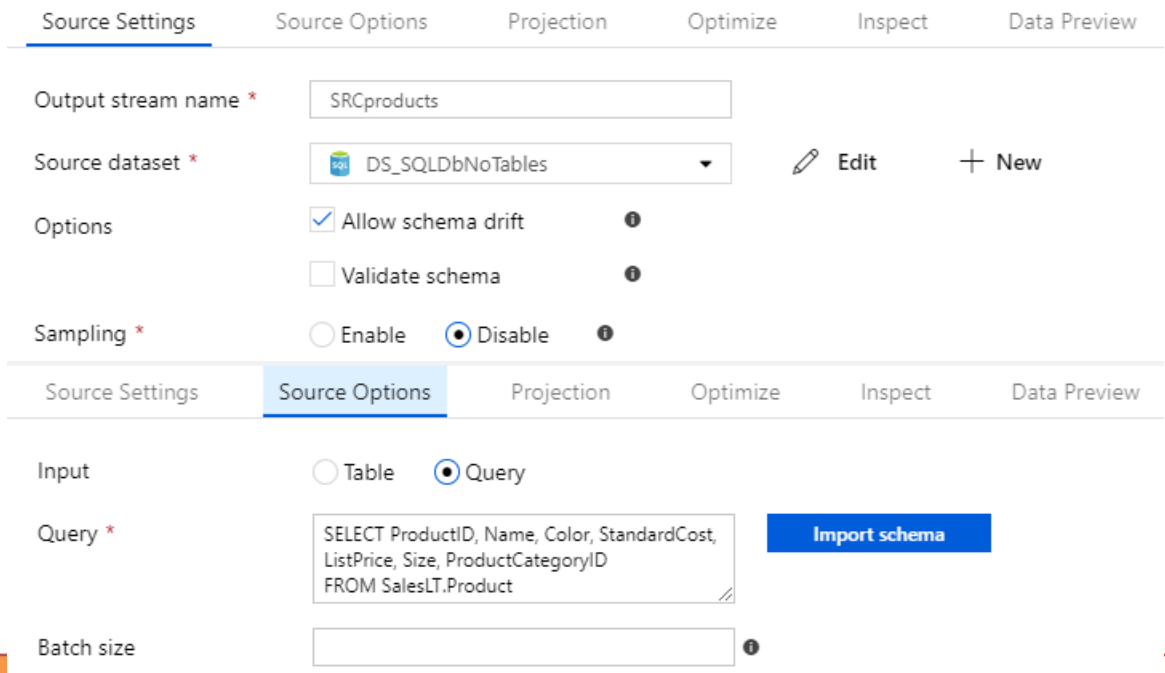
- Some transformations use expressions which could be created in Expression Builder.
- Expressions use columns, fields, variables, parameters and functions.
- Auto-complete feature reads from the entire Azure Data Factory Data Flow object model with syntax checking and highlighting.
- Using Debug mode, live in-progress preview data results and real-time live debugging is enabled.

Transformations

Source



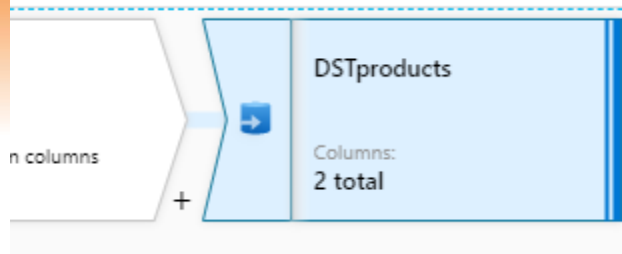
- Data flow can include more than one source.
- Every data flow requires at least one source transformation.
- You can join those sources together with a join transformation or a union transformation.
- Dataset defines the shape and location of the data you want to write to or read from.
- You can use wildcards and file lists in your source to work with more than one file at a time.

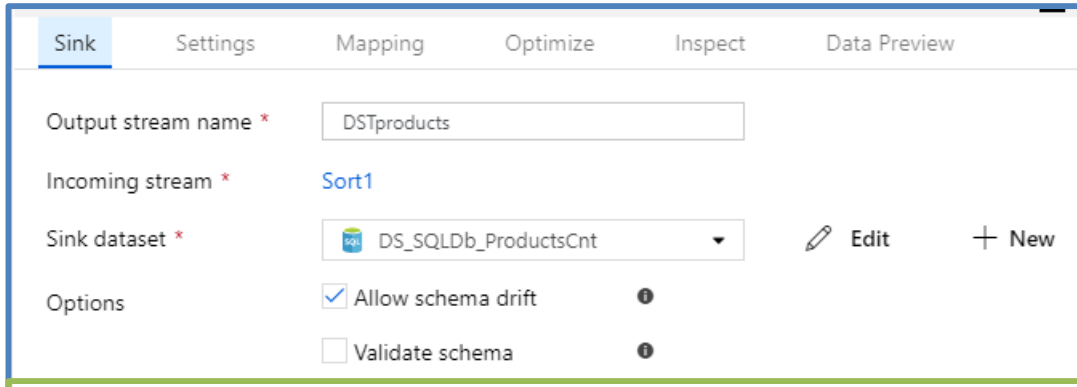


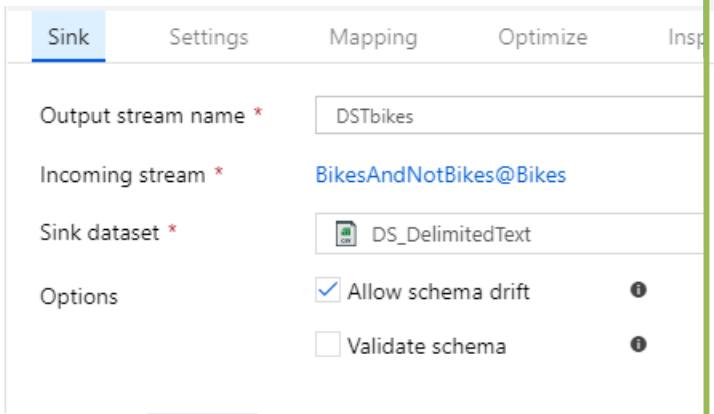
Transformations

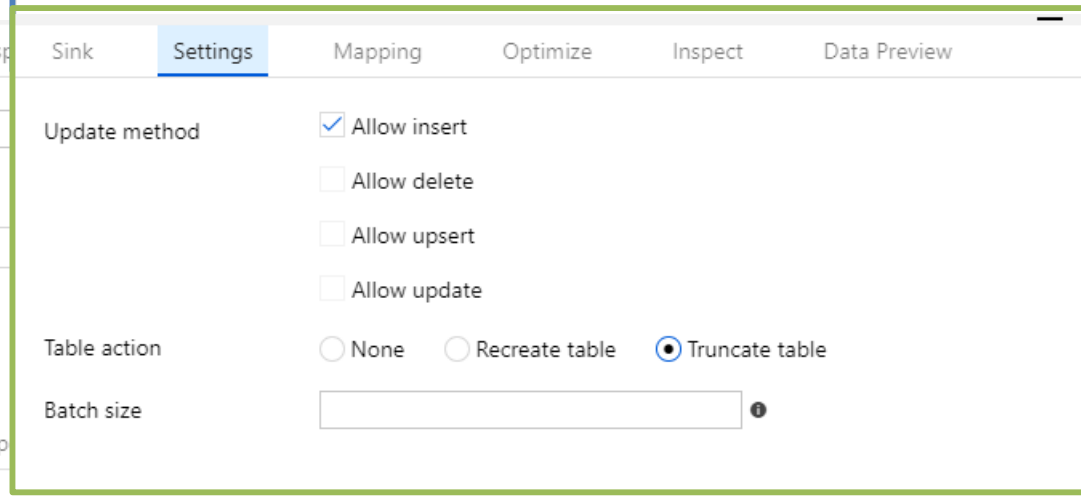
Sink

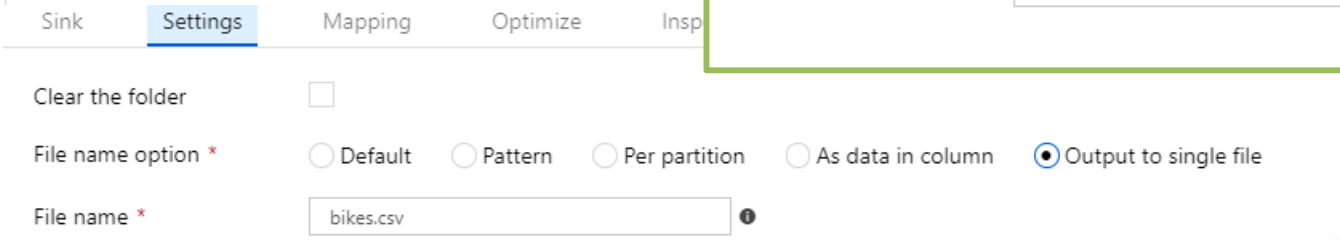
- Data flow can include more than one sink (destination).
- File name options
  - Default
  - Pattern
  - Per partition
  - As data in column
- Database options
  - Update method
  - Recreate table
  - Truncate table
  - Batch size
  - Enable staging







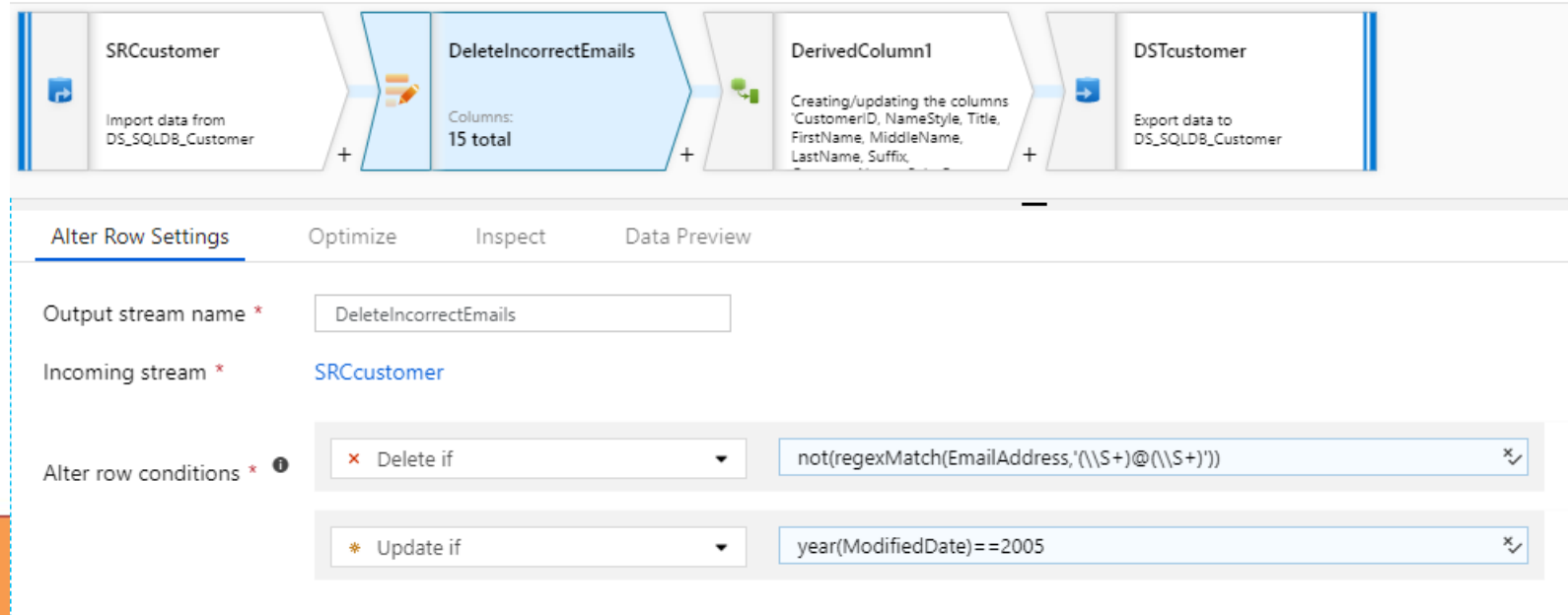




Transformations

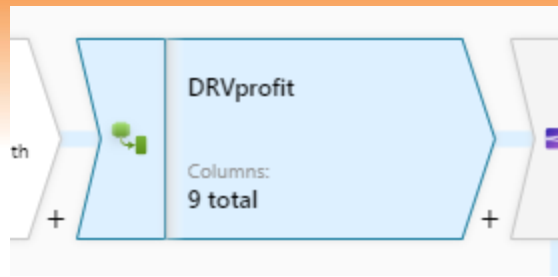
Alter Row

- To set insert, delete, update, and upsert policies on rows.
- Based on expressions (conditions) rows will be inserted, updated, deleted, or upsert
- Alter Row can produce both DDL & DML actions against database.

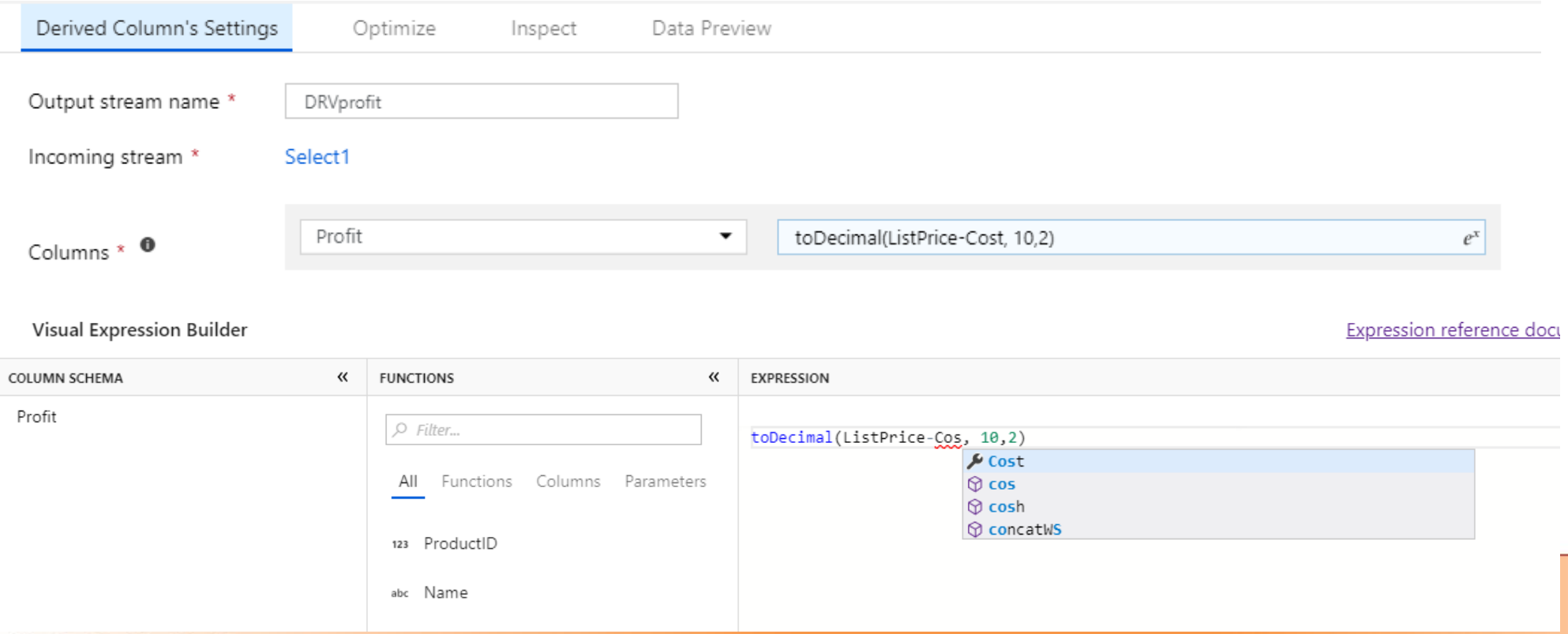


Transformations

Derived Column

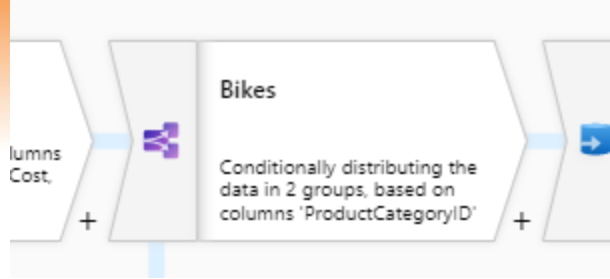


- Generate new columns or to modify existing fields.
- Expression Builder window to build the expression for the derived columns using expression functions.



Transformations

Conditional Split



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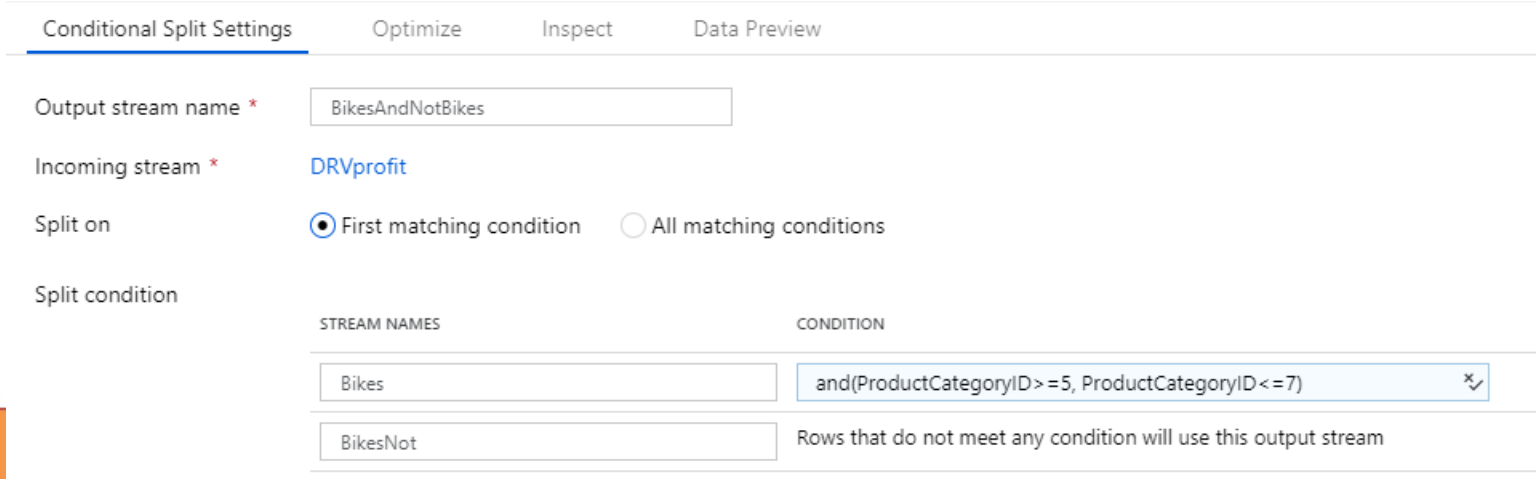
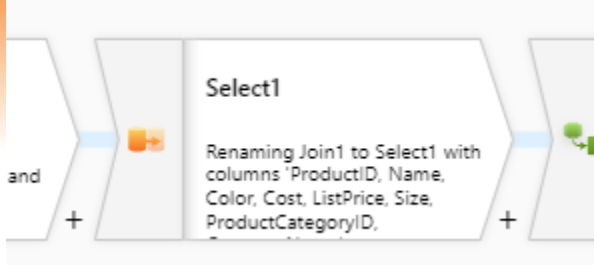
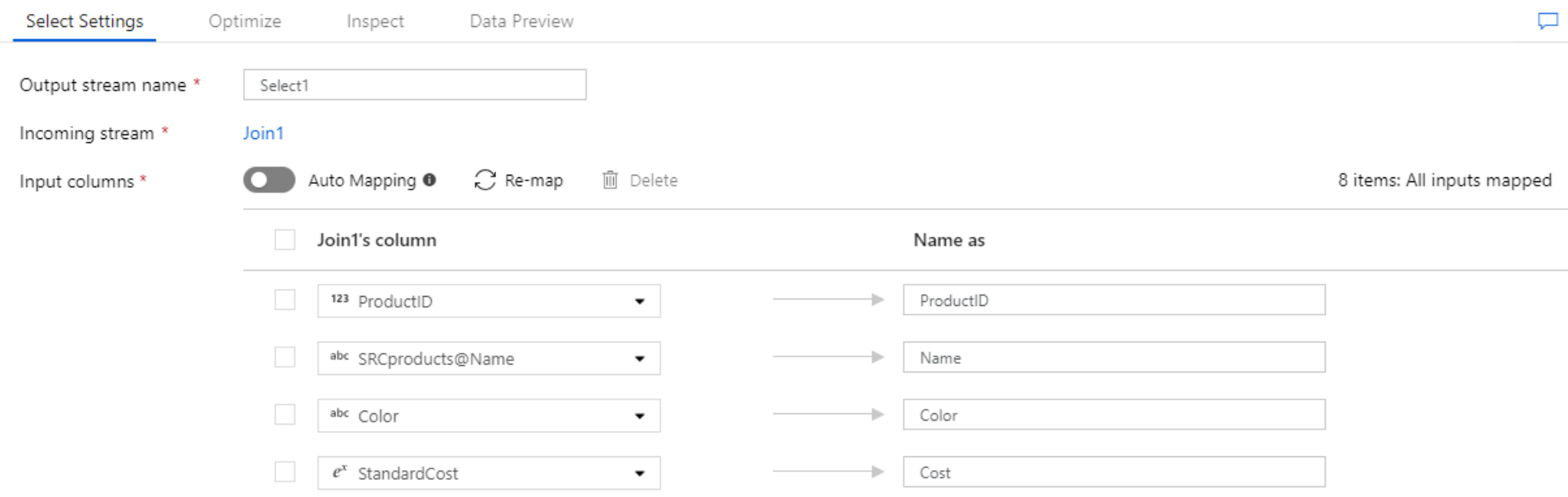


Transformations

Select



- Column selectivity (reducing number of columns)
- Alias columns and stream names

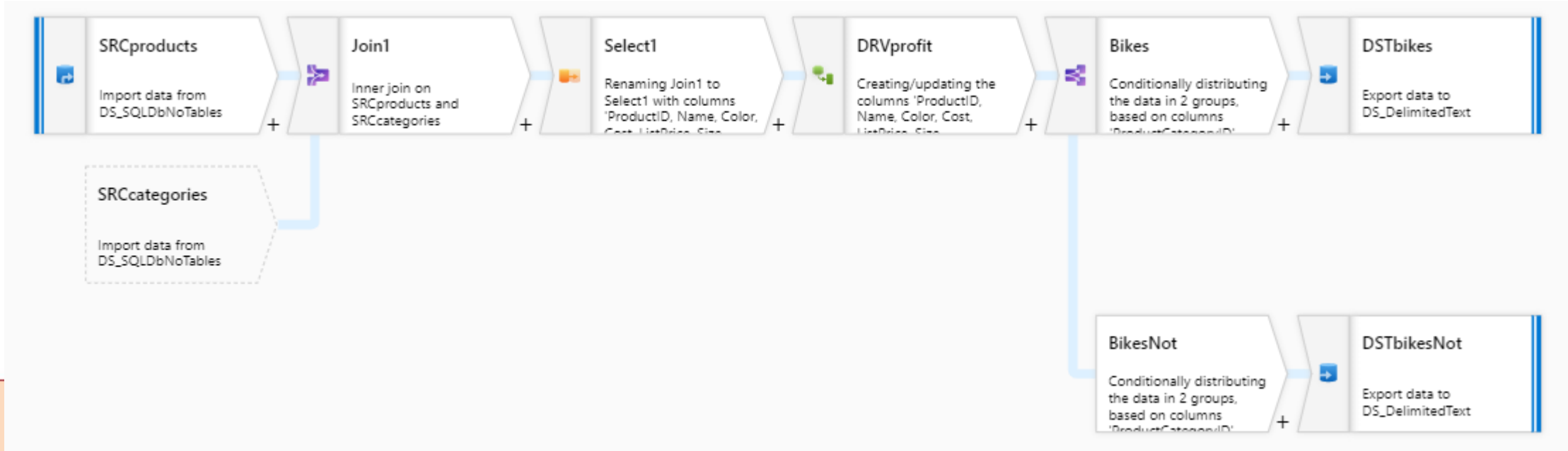


DEMO

A. Load products from table, join with category names and split into bikes and other products.

B. Load products.csv, aggregate – grouping by category name, sort and save results into new table.

C. Sync data in table using Alter Row (delete incorrect email).



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