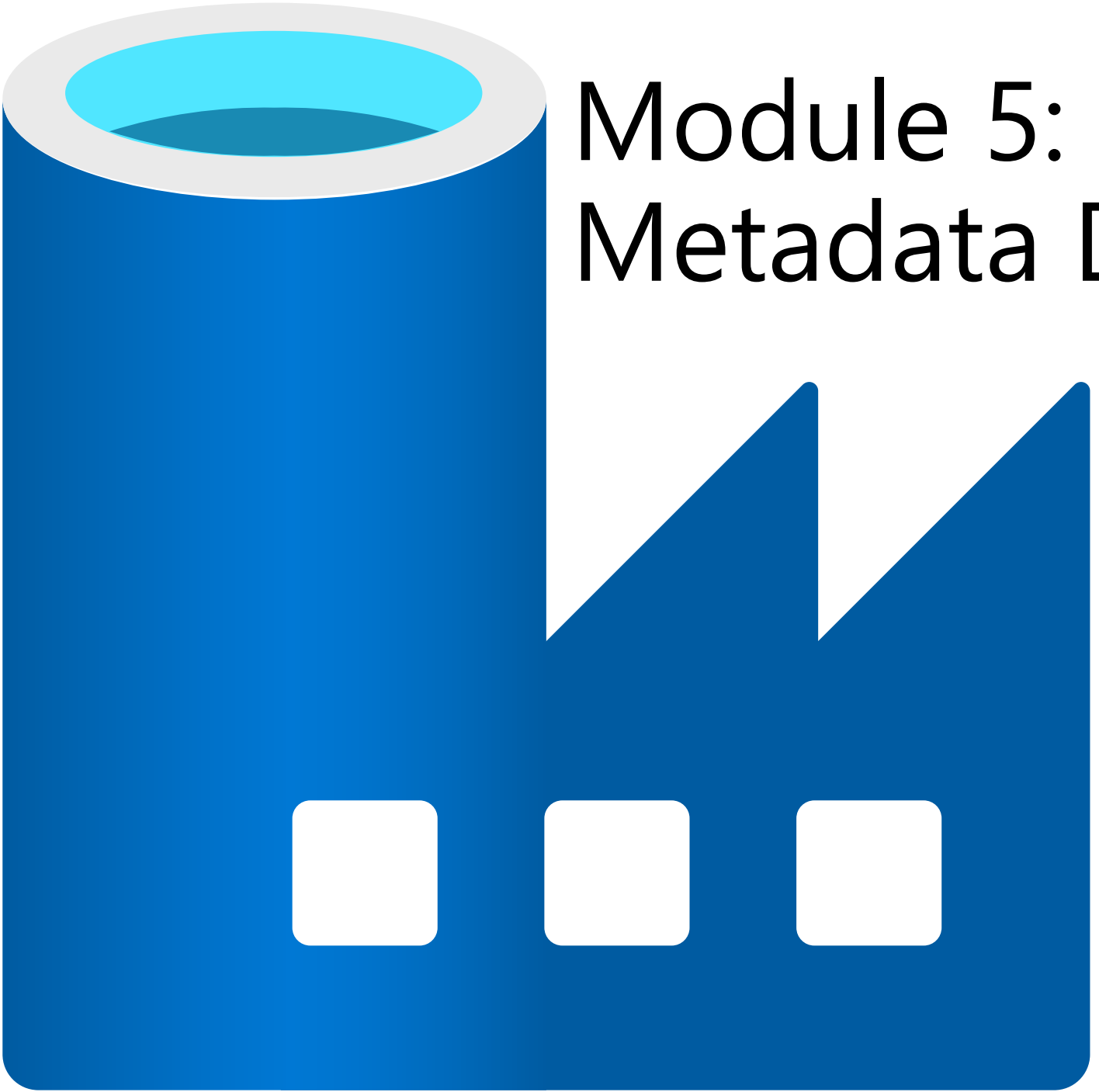
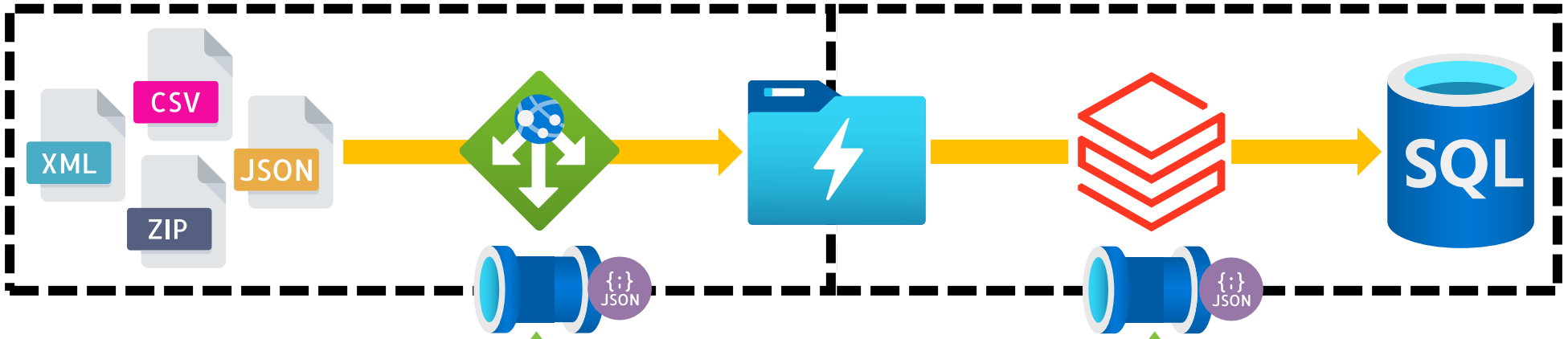


Module 5:
Metadata Driven Pipelines

- Expressions
- Dynamic Pipeline
- Orchestration Framework
  - procfwk.com

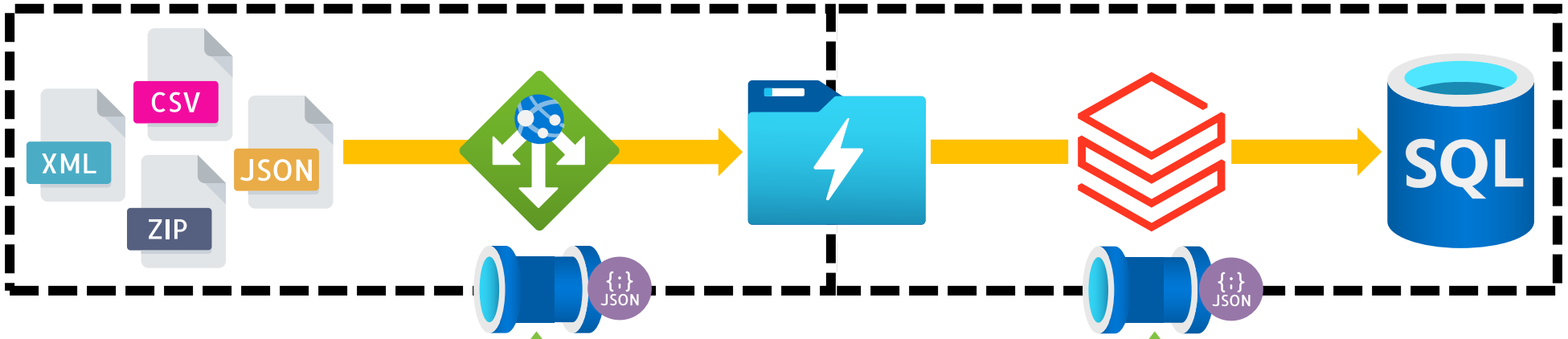
Expressions

Data Factory Components

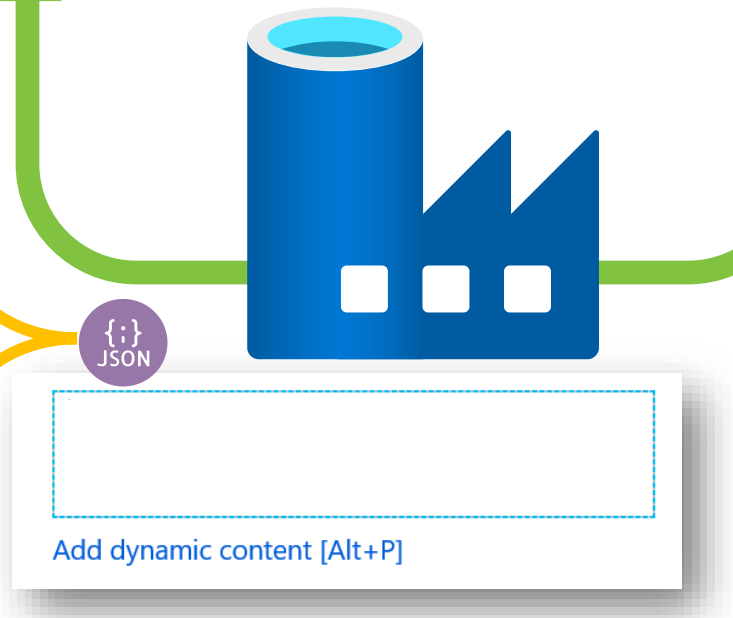


1. **Linked Services**
2. **Datasets**
3. **Activities**
4. **Pipelines**
5. **Triggers**

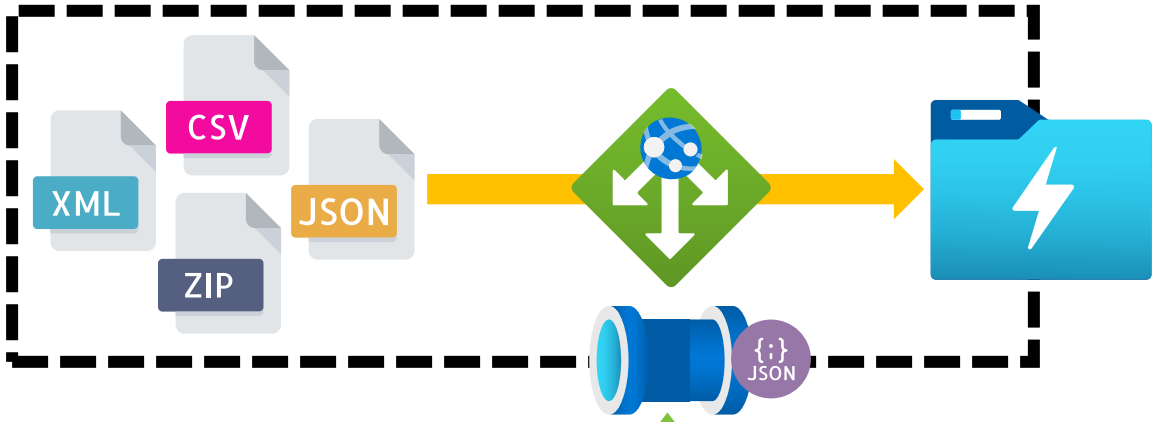
Data Factory Components – Add Dynamic Content



1. **Linked Services**
2. **Datasets**
3. **Activities**
4. **Pipelines**
5. **Triggers**



Control Flow Expressions



1. **Linked Services**
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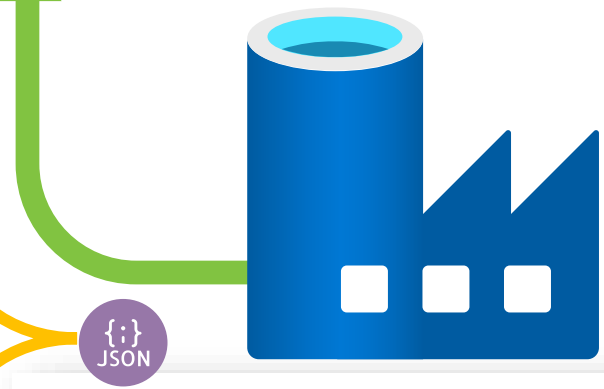


Add dynamic content

@pipeline().parameters.DemoParam

Clear contents

Filter...

Use expressions, functions or refer to system variables.

- System variables
  - Data factory name: Name of the data factory the pipeline run is running within
  - Pipeline Name: Name of the pipeline
  - Pipeline run ID: ID of the specific pipeline run
  - Pipeline trigger ID: ID of the trigger that invokes the pipeline
  - Pipeline trigger name: Name of the trigger that invokes the pipeline
  - Pipeline trigger time: Time when the trigger that invoked the pipeline. The trigger time is the actual fired time, not the sch...
  - Pipeline trigger type: Type of the trigger that invoked the pipeline (Manual, Scheduler)
- Functions
  - Expand all
  - Collection Functions
  - Conversion Functions
  - Date Functions
  - Logical Functions
  - Math Functions
  - String Functions

https://docs.microsoft.com/en-us/azure/data-factory/control-flow-expression-language-

Control Flow Expressions

Save | Save as template | Validate | Debug

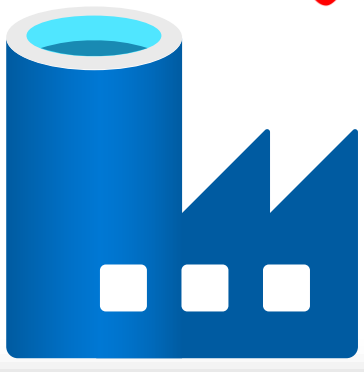
```
"SomethingDynamic": {
    "value": "@pipeline().parameters.DemoParam",
    "type": "Expression"
}
```

```
"SomethingDynamic": "@pipeline().parameters.DemoParam"
```

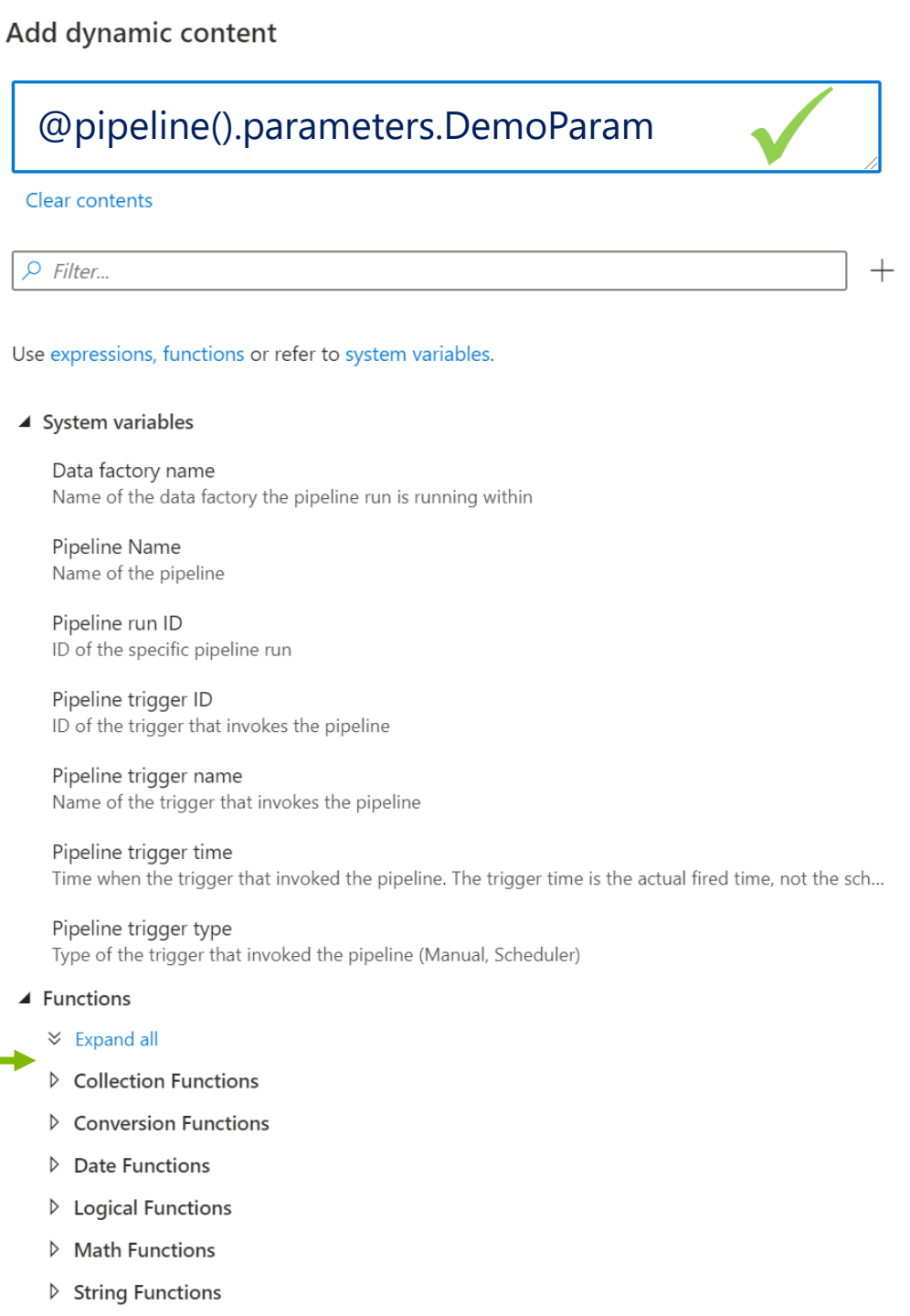
String Interpolation

```
"SomethingDynamic": "Hello World"
```

```
"parameters": {
   "DemoParam": {
   "type": "string",
   "defaultValue": "World"
}
```




```
"SomethingDynamic": "Hello @{pipeline().parameters.DemoParam}"
```

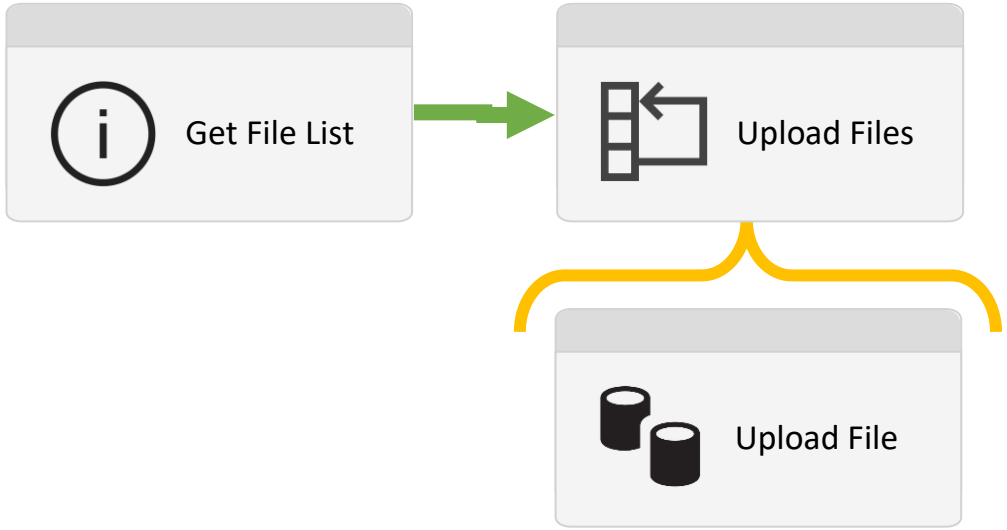


Dynamic Pipelines


DEMO

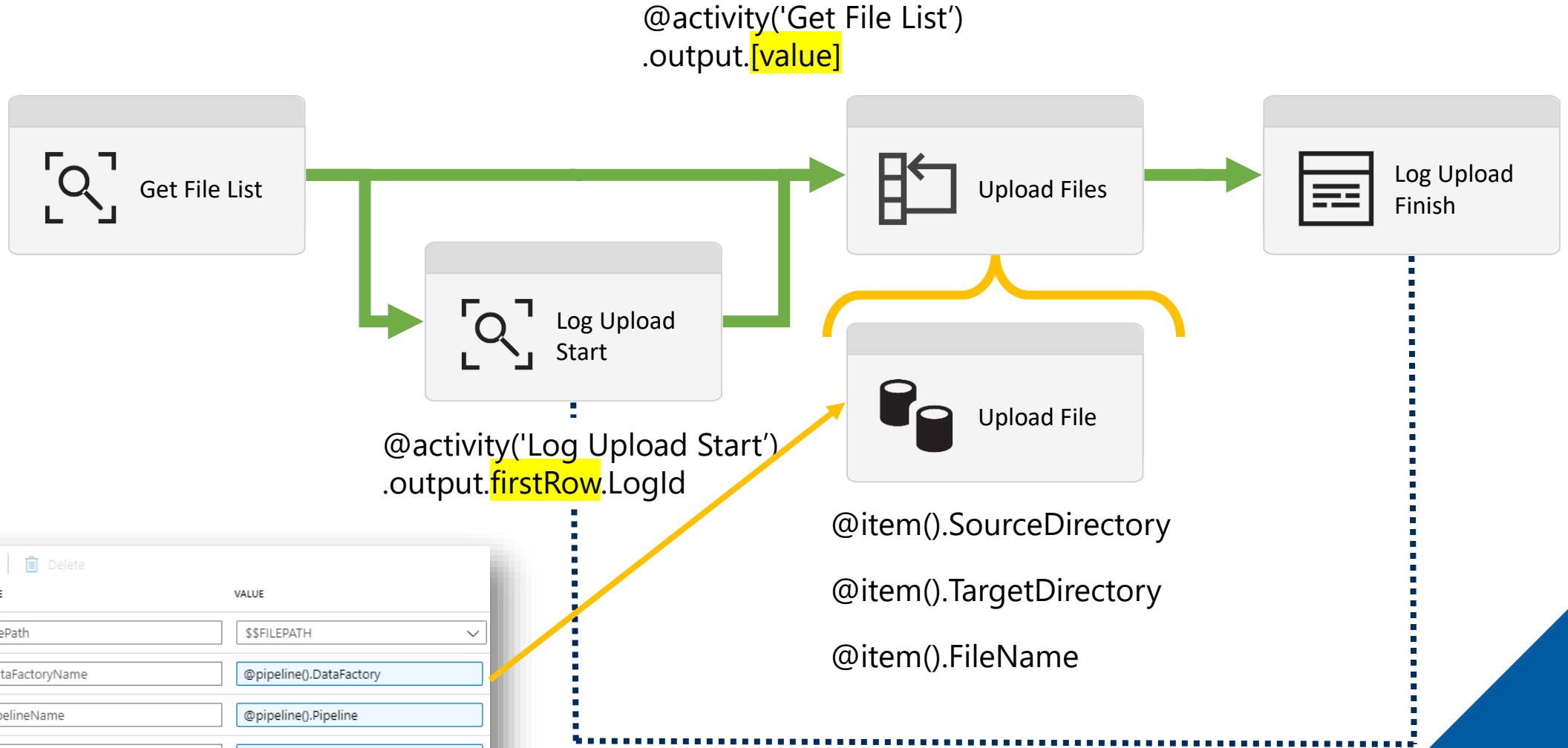
Demo Pipeline 1 – Discovery and Upload

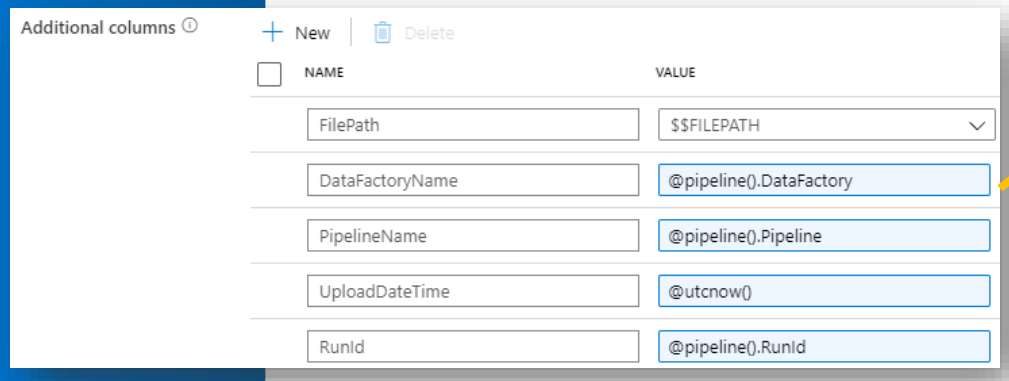
@activity('Get File List')
.output.[childItems]



@item().name

Demo Pipeline 2 – Simple Metadata and Upload

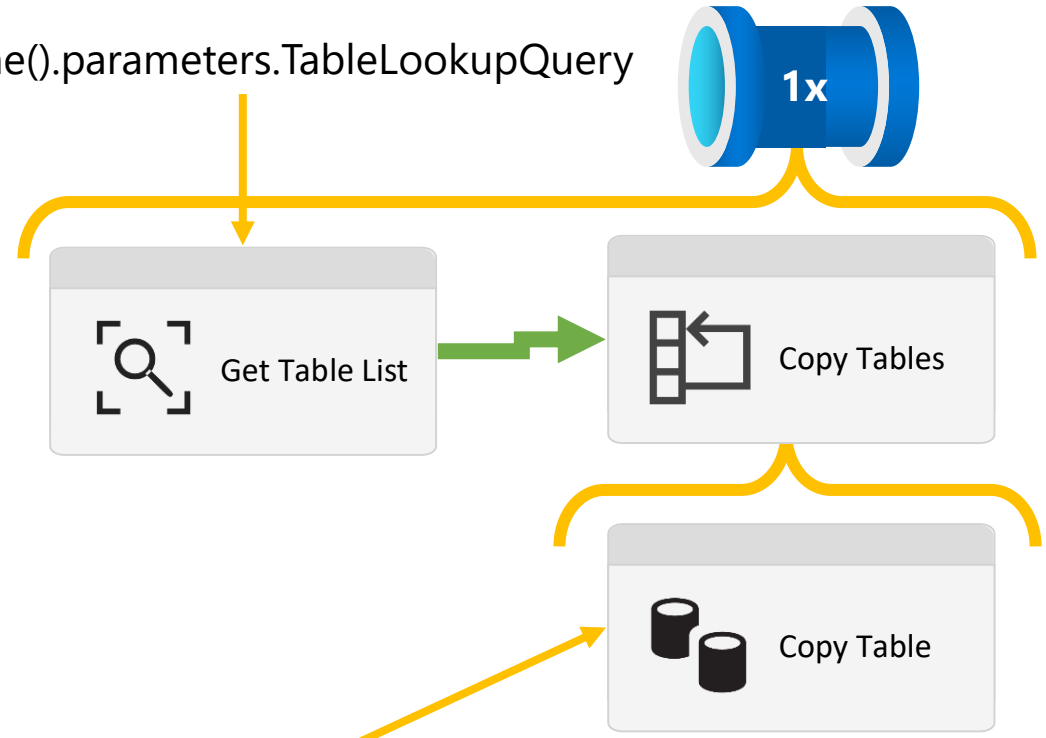


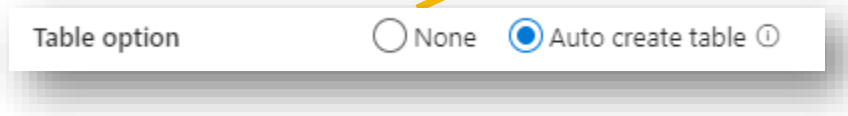


Demo Pipeline 3 – Lazy SQLDB Replication

```
SELECT s.name AS SchemaName, o.name AS TableName FROM sys.objects o
INNER JOIN sys.schemas s ON o.schema_id = s.schema_id WHERE o.[type] = 'U'
```

@pipeline().parameters.TableLookupQuery






```
IF OBJECT_ID(
                '@{item().SchemaName}.@{item().TableName}'
                ) IS NOT NULL

TRUNCATE TABLE @{item().SchemaName}.@{item().TableName}
```

1x

1x

@pipeline().parameters.SourceConnectionSecret

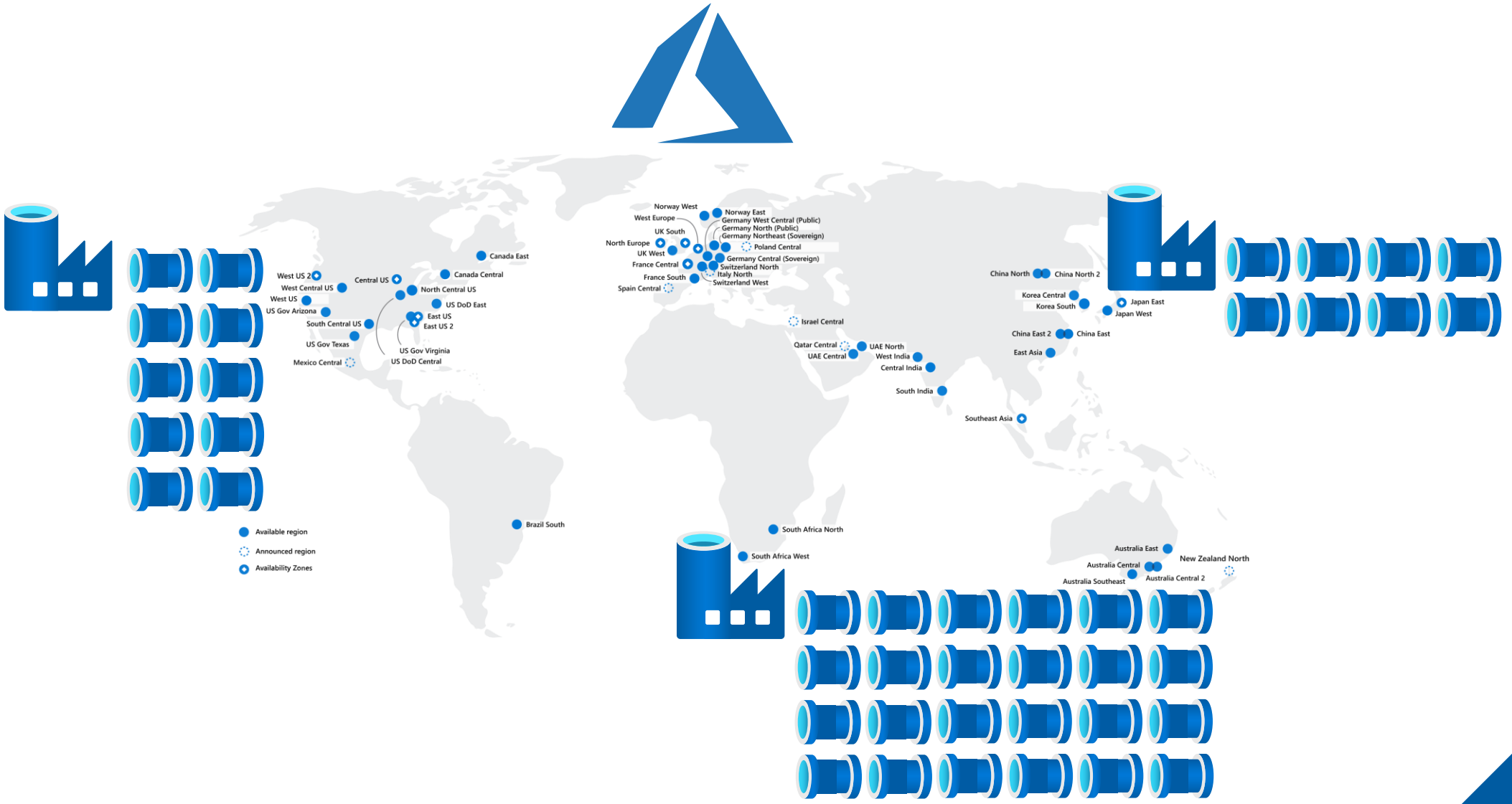
@pipeline().parameters.TargetConnectionSecret

@dataset().LinkedServiceConnectionSecret

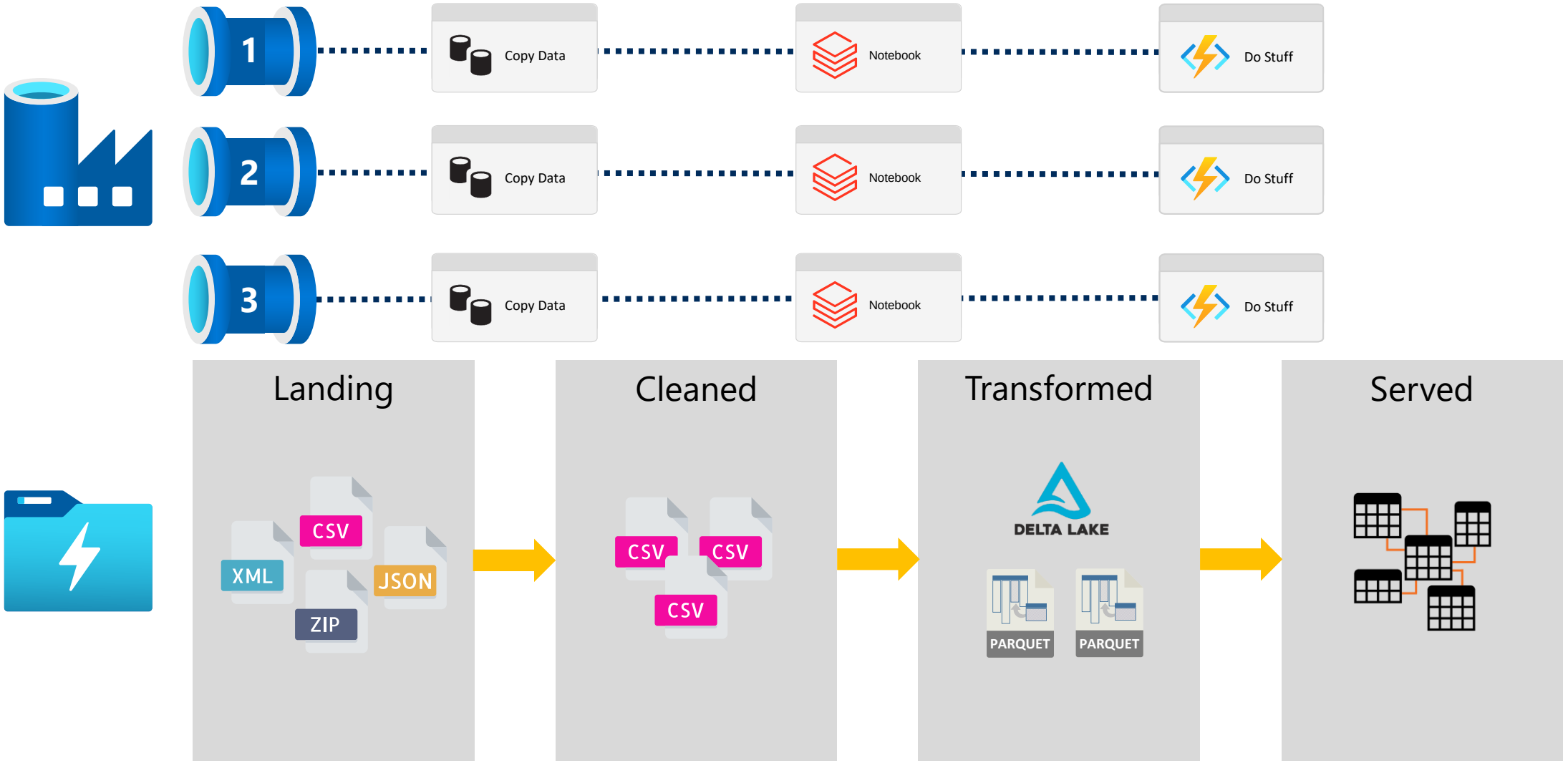
@linkedService().DBConnectionSecret

Orchestration Framework

Problem: How should we structure our Data Factory Pipelines?



Problem


1
Copy Data
Notebook
Do Stuff
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Notebook
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3
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Landing
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XML
JSON
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Cleaned
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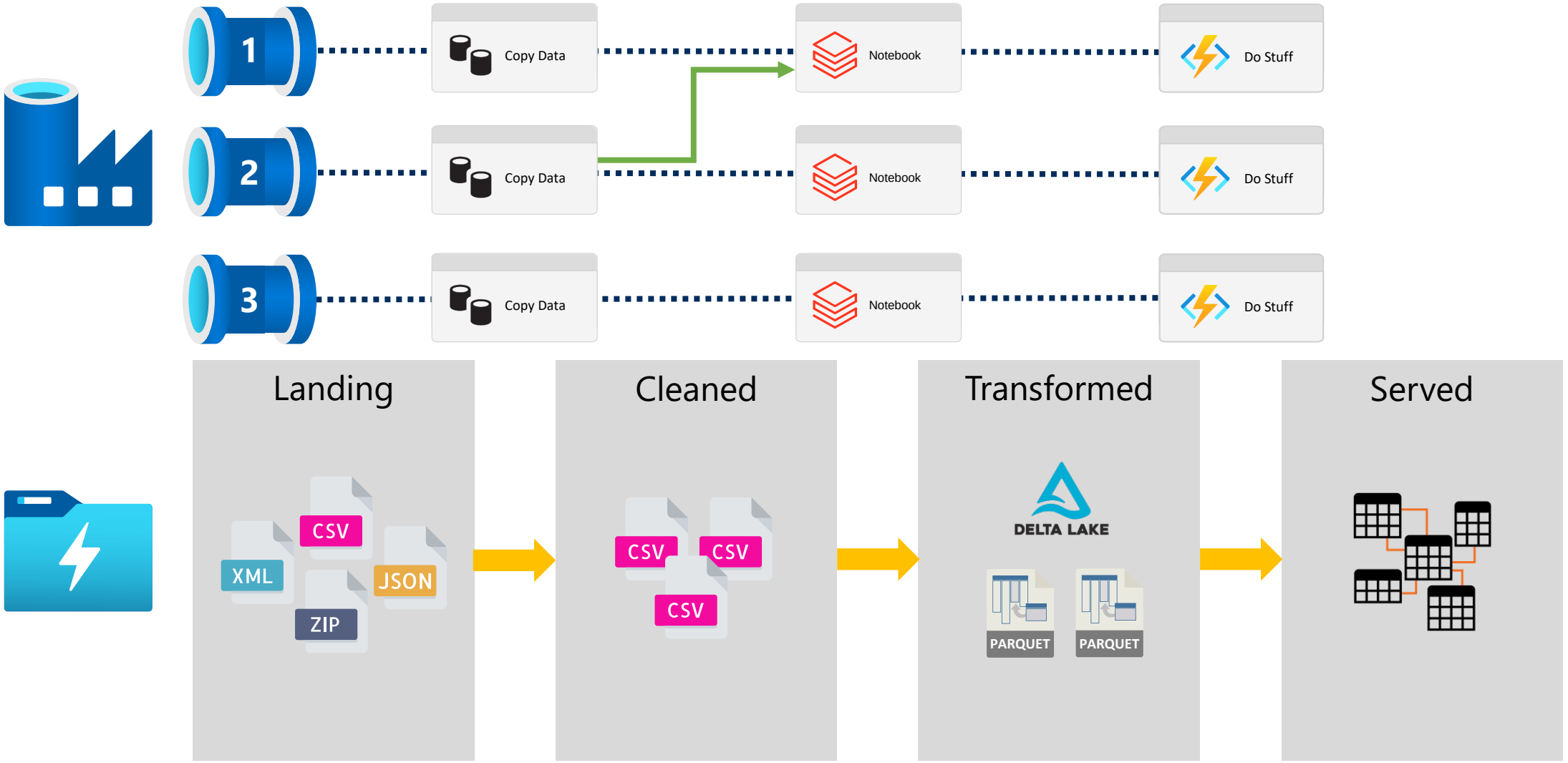
DELTA LAKE
PARQUET
PARQUET
Served

Problem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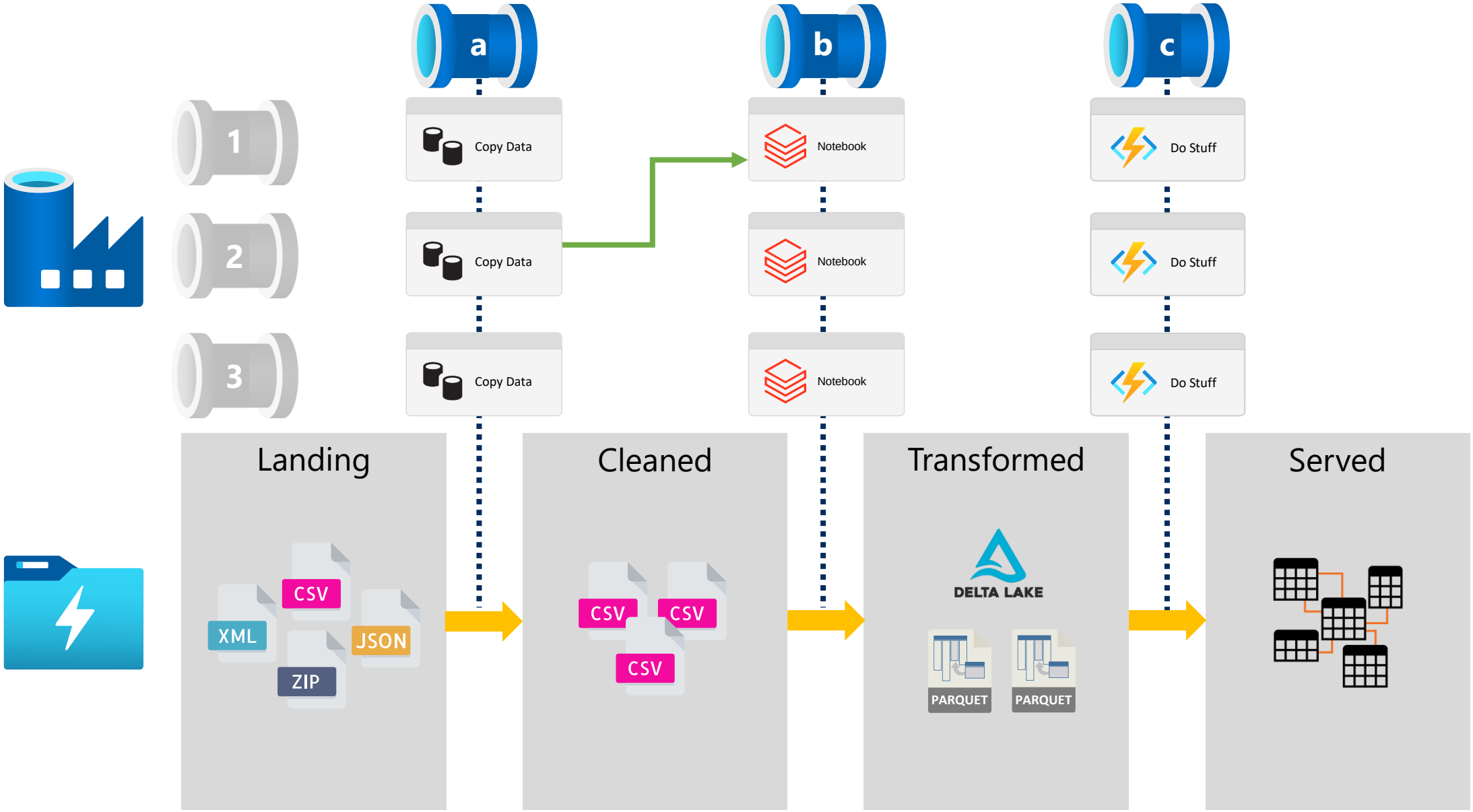
PARQUET

Problem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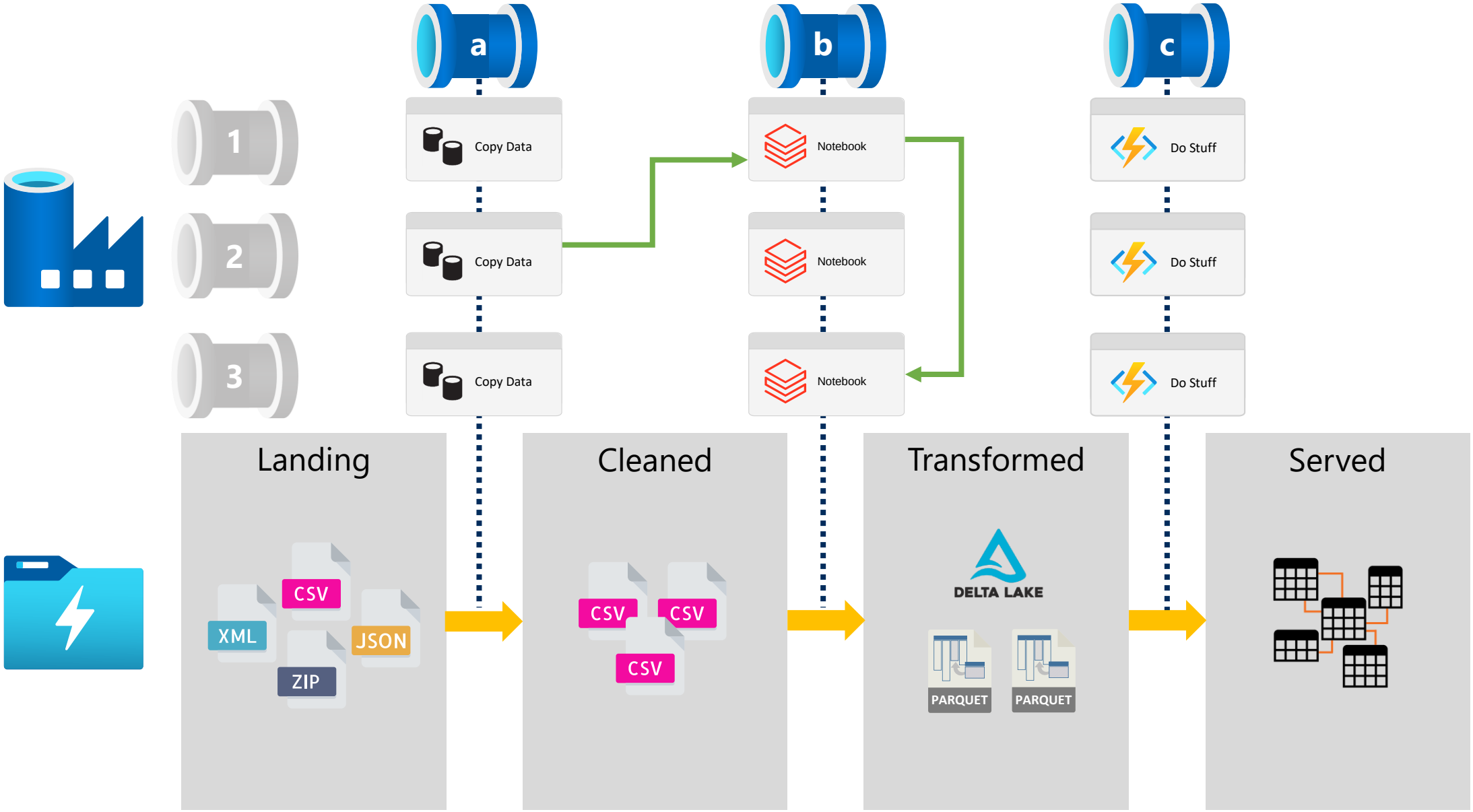
Problem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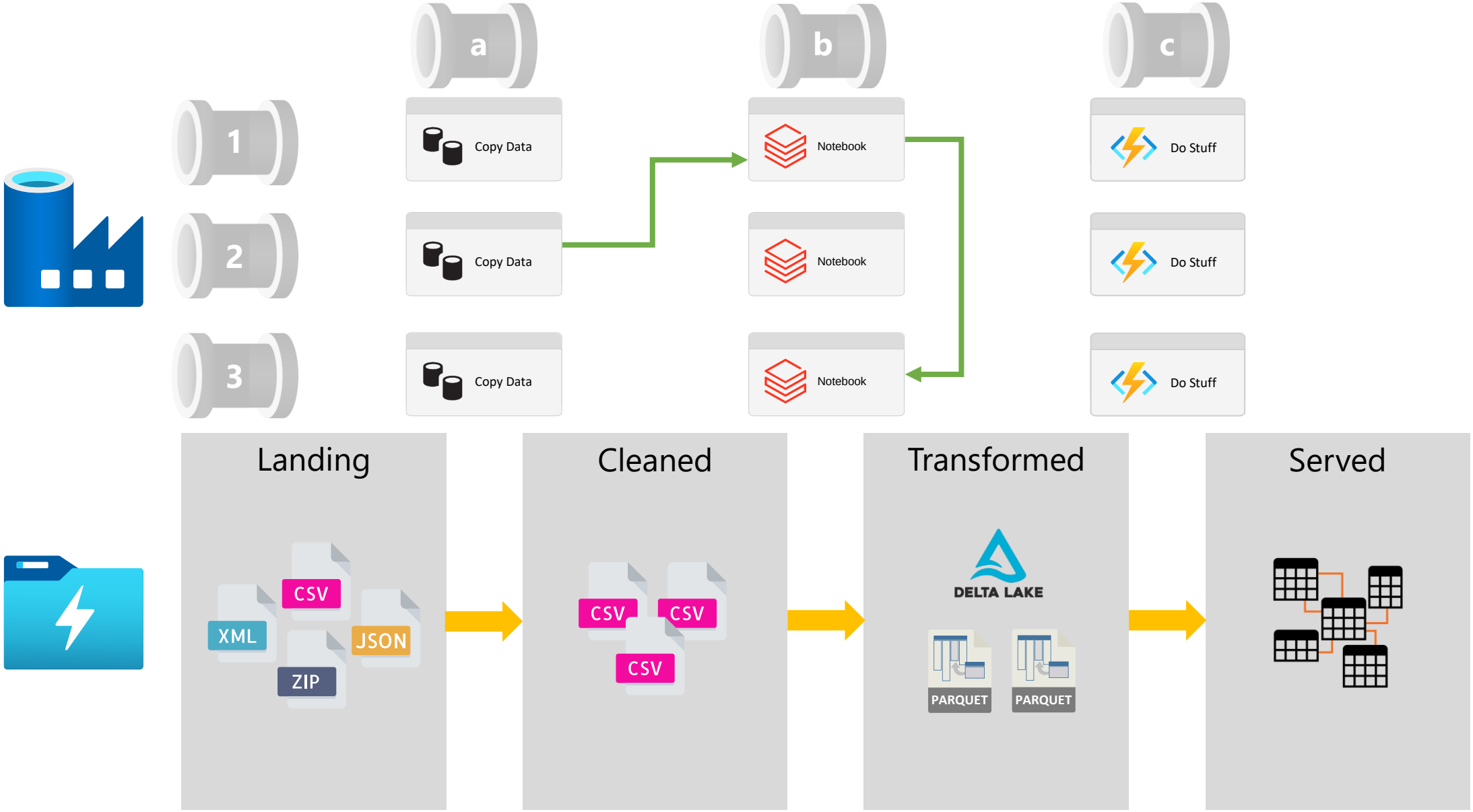
Problem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Do Stuff
Do Stuff
Landing
Cleaned
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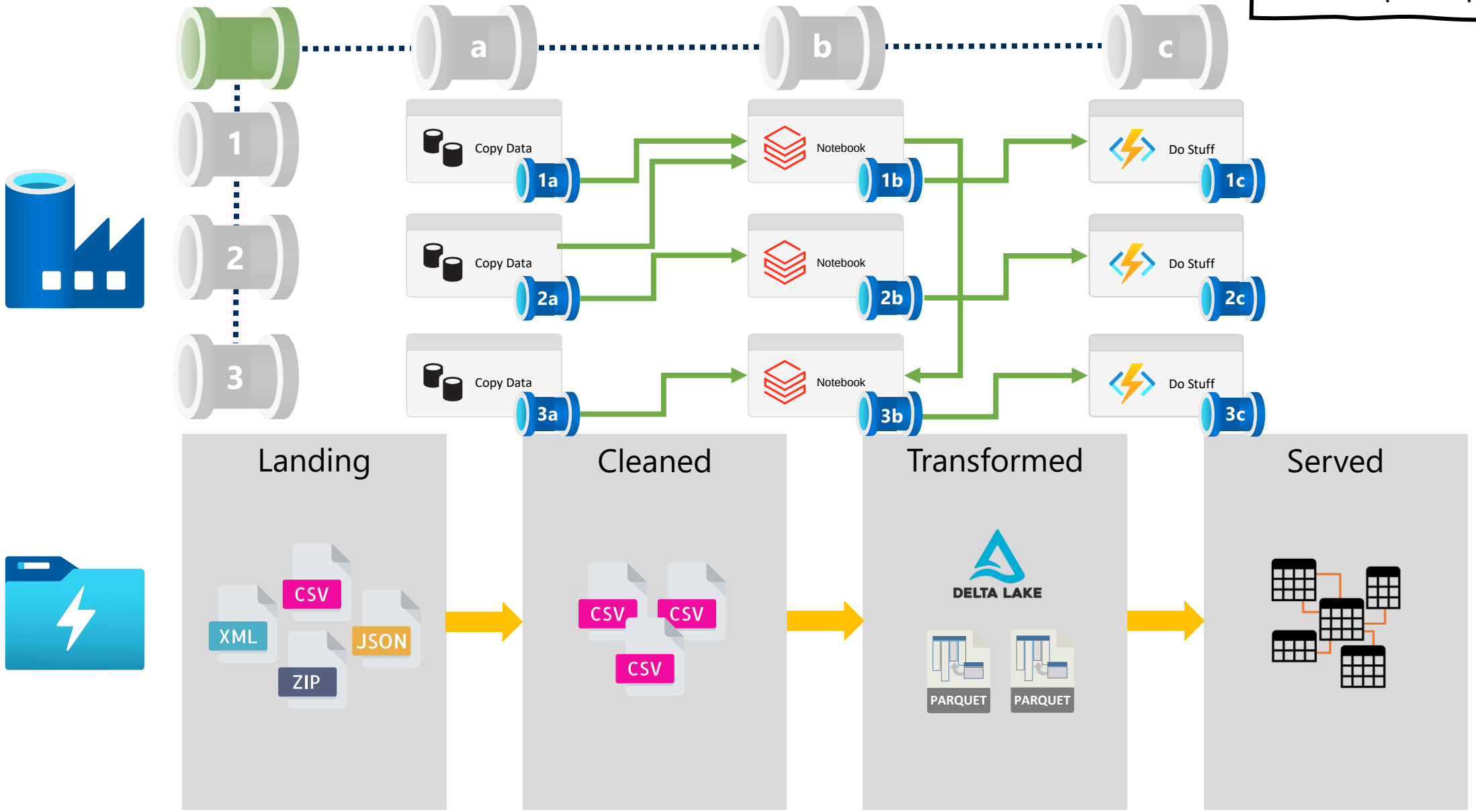
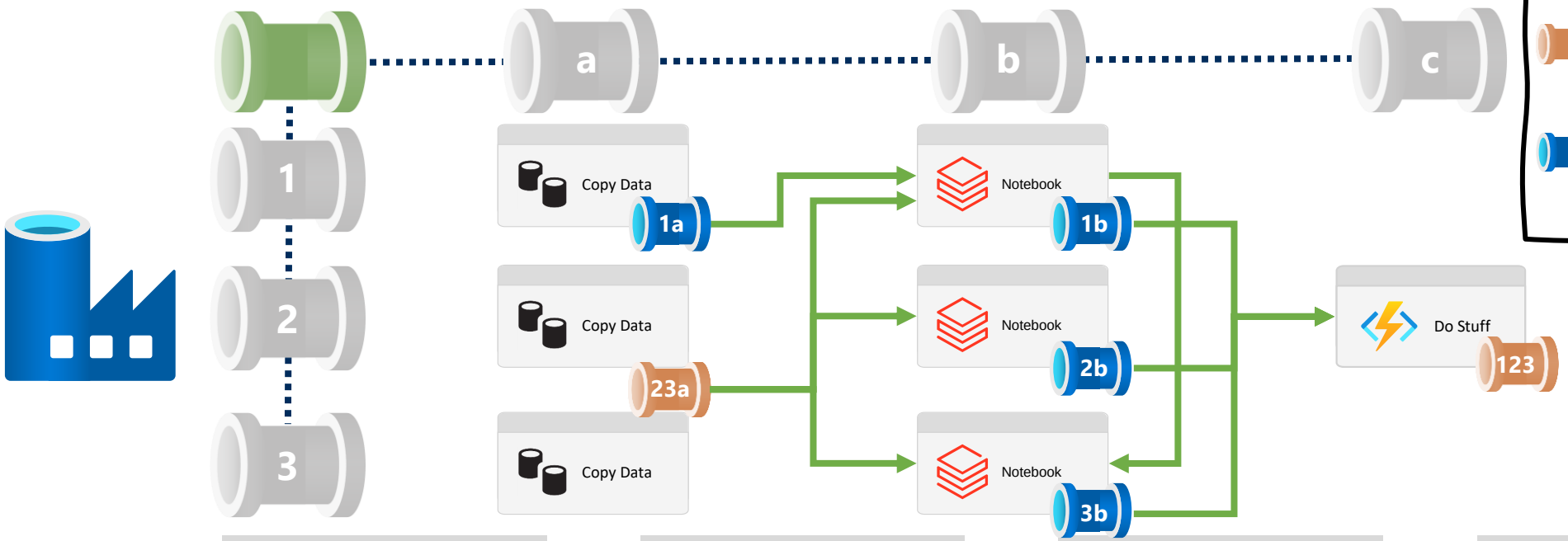
PARQUET

Problem

Only 40 Activities per Pipeline.



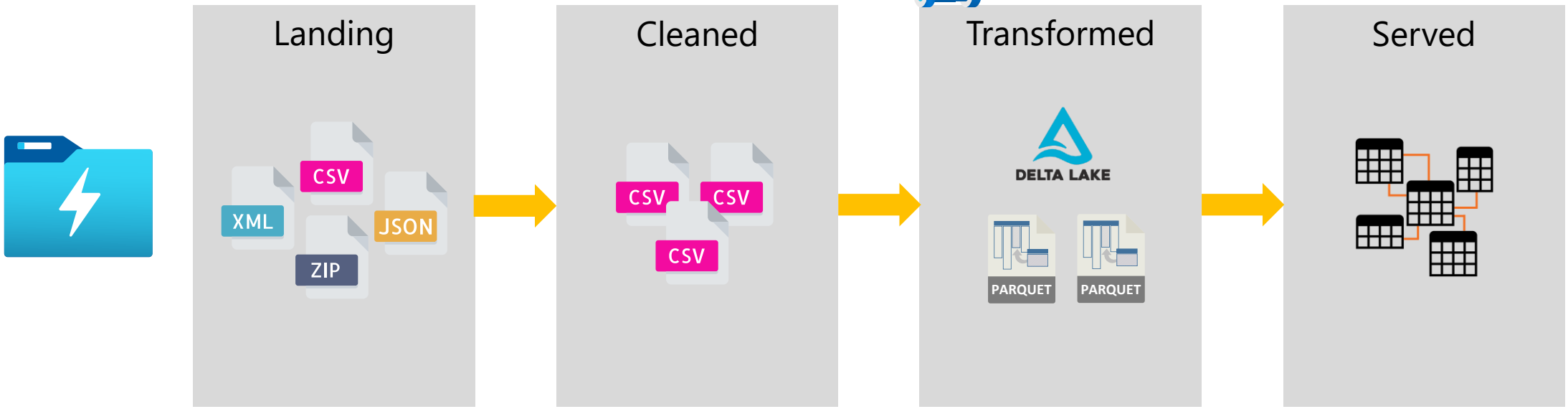
Problem



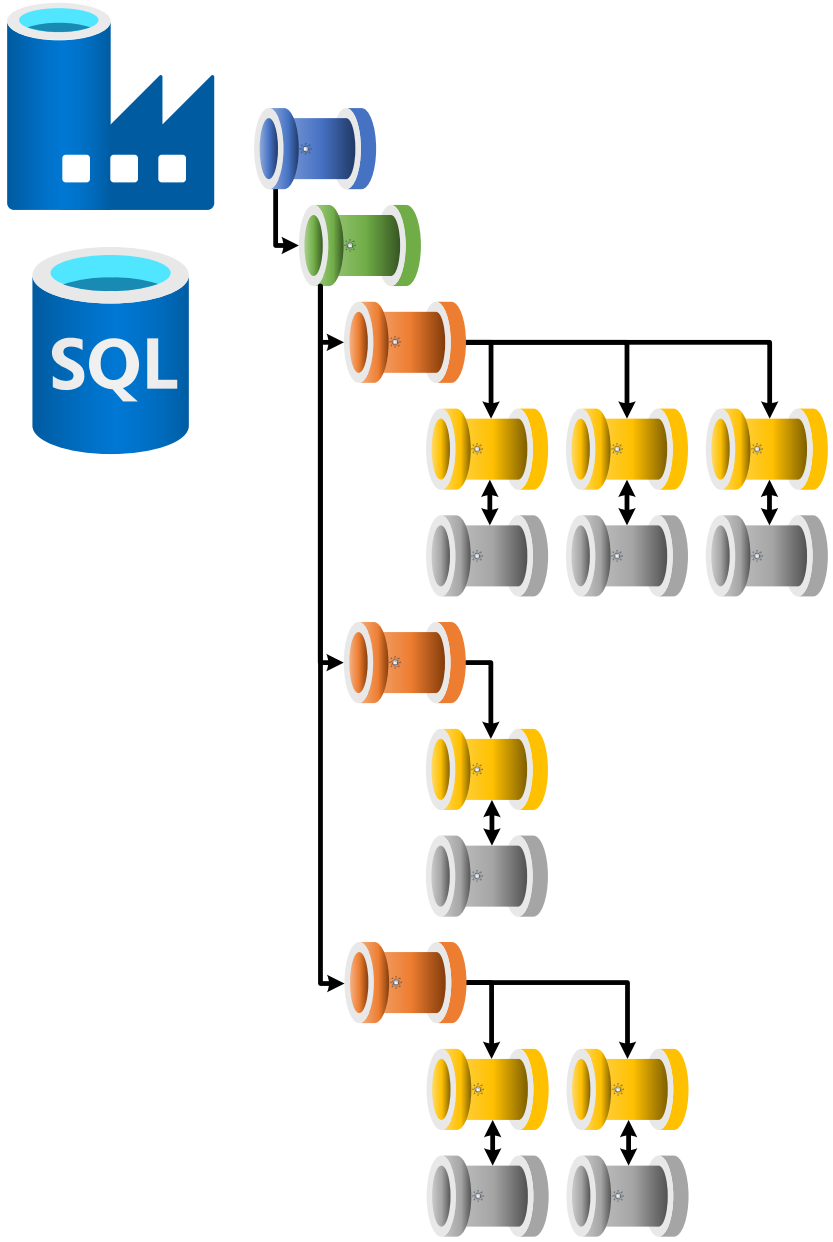
Grandparent pipeline for all processing.

Parent pipeline to consolidate work.

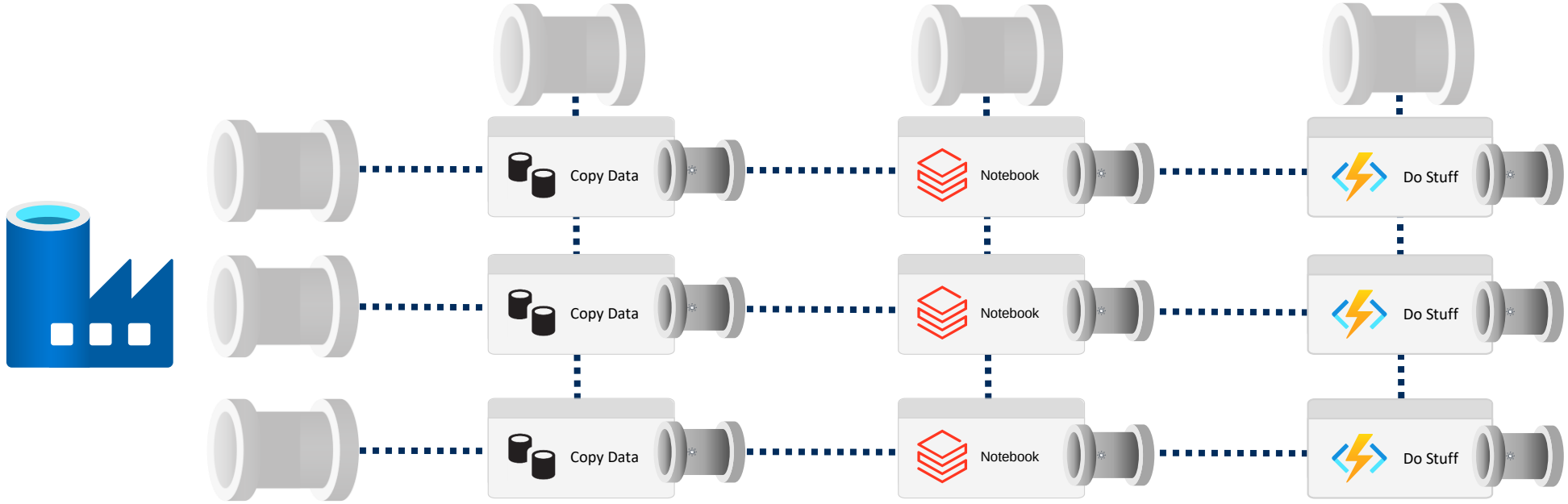
Child pipelines for low level dependencies.



Solution: Use Metadata to Drive Data Factory Pipelines



Solution

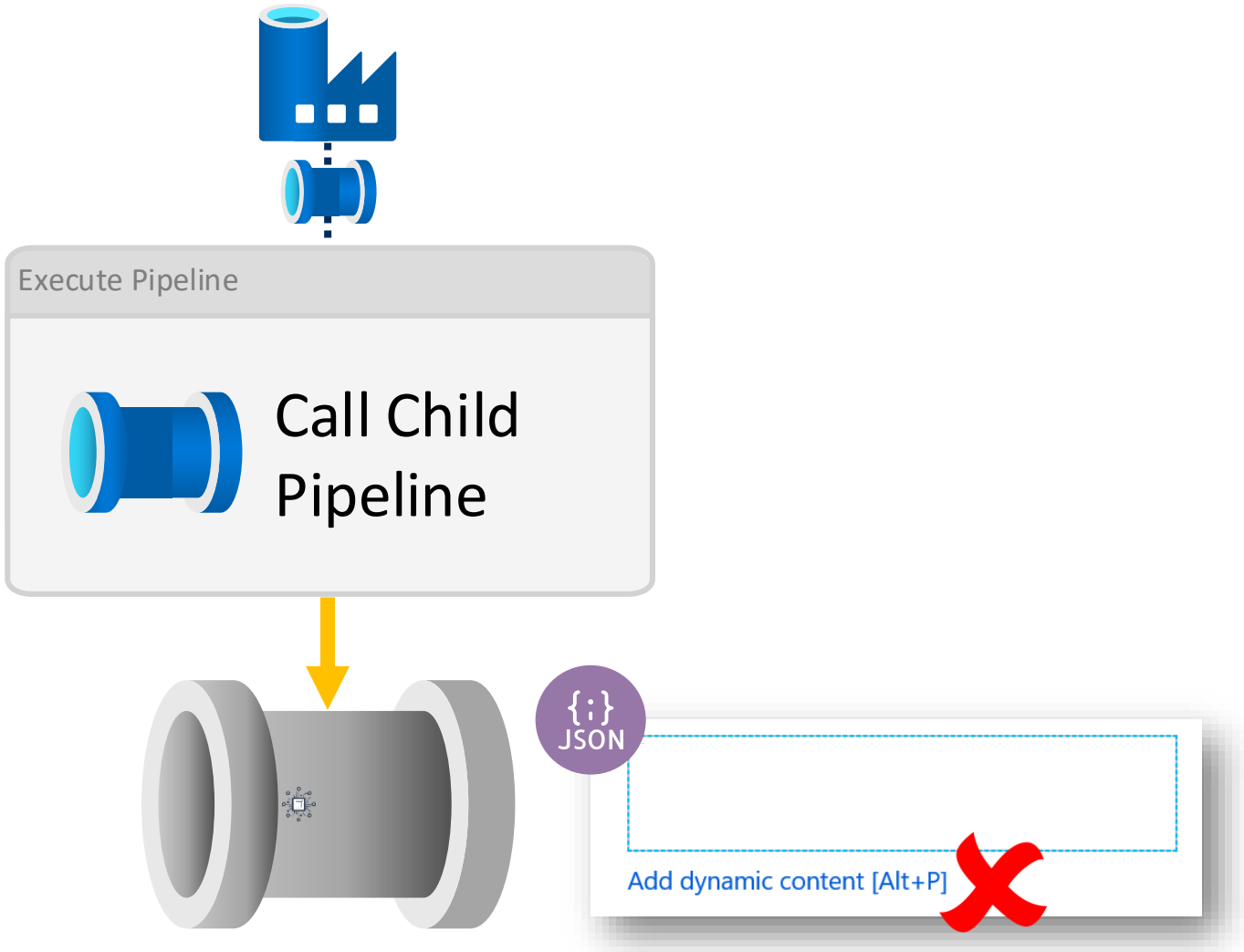


Stages
1
2
3

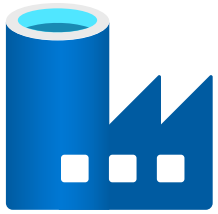
Pipelines
a
b
c
d
e
f
g
h
i

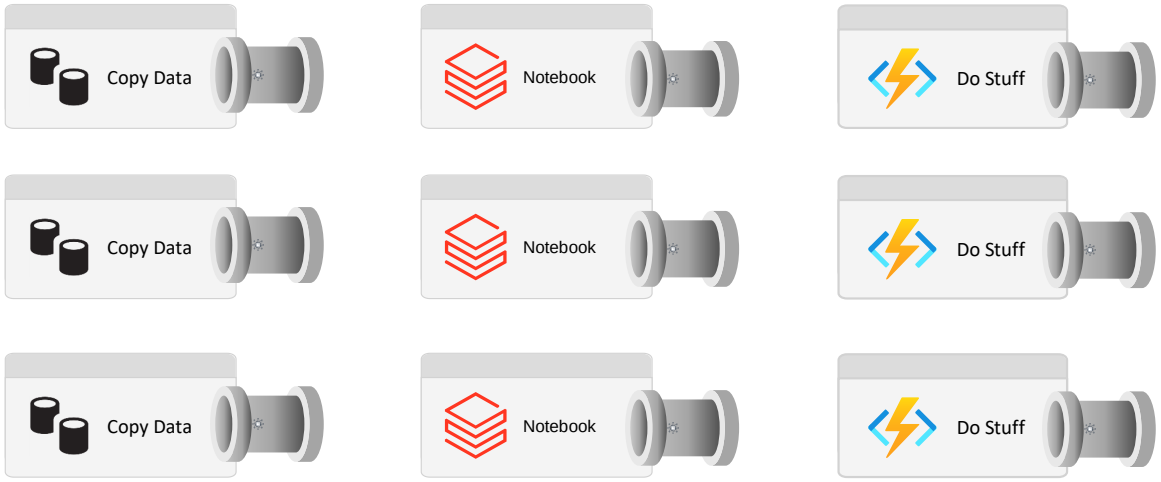
Stage	Pipeline
1	a
1	b
1	c
2	d
2	e
3	f
3	g
3	h
3	i

One More Problem



Calling Our Worker Pipelines



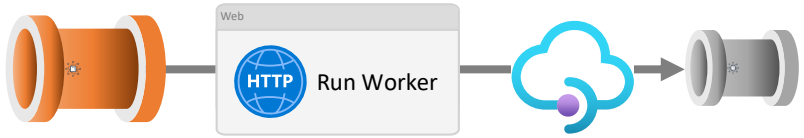


Stages
1
2
3

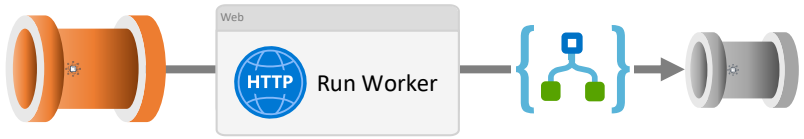
Pipelines
a
b
c
d
e
f
g
h
i

Stage	Pipeline
1	a
1	b
1	c
2	d
2	e
3	f
3	g
3	h
3	i

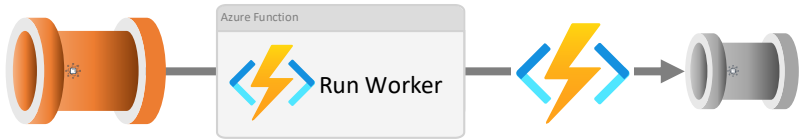
Option 1:



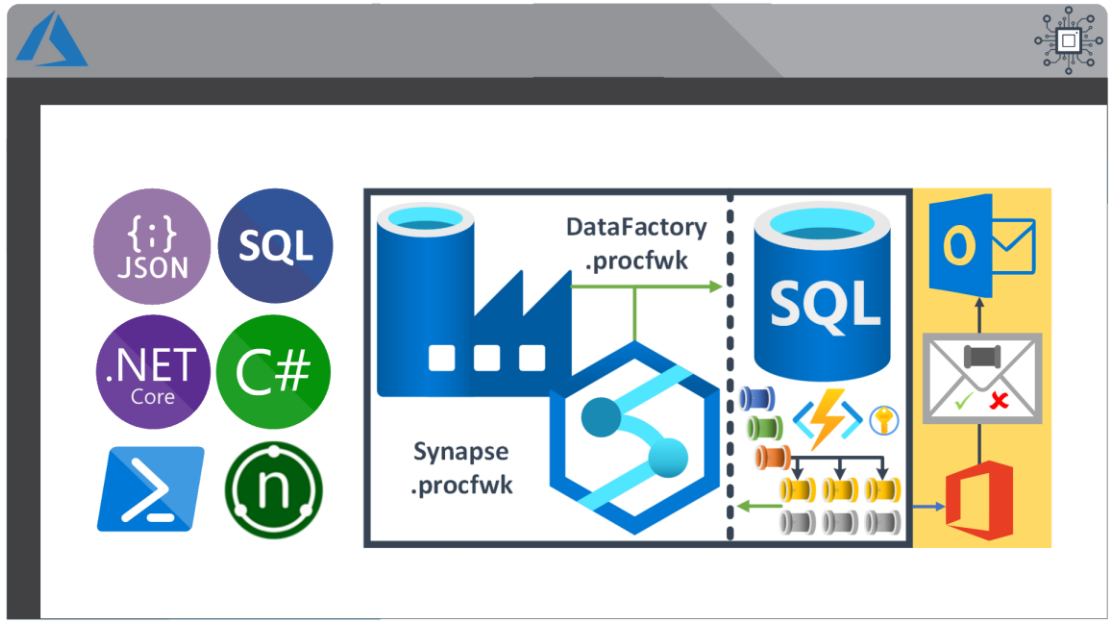
Option 2:



Option 3:

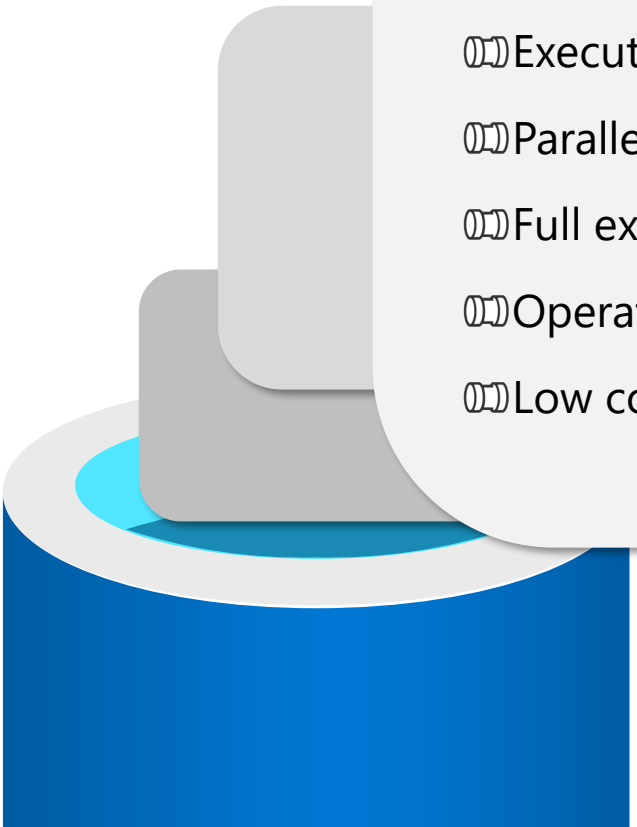


Introducing procfwk.com

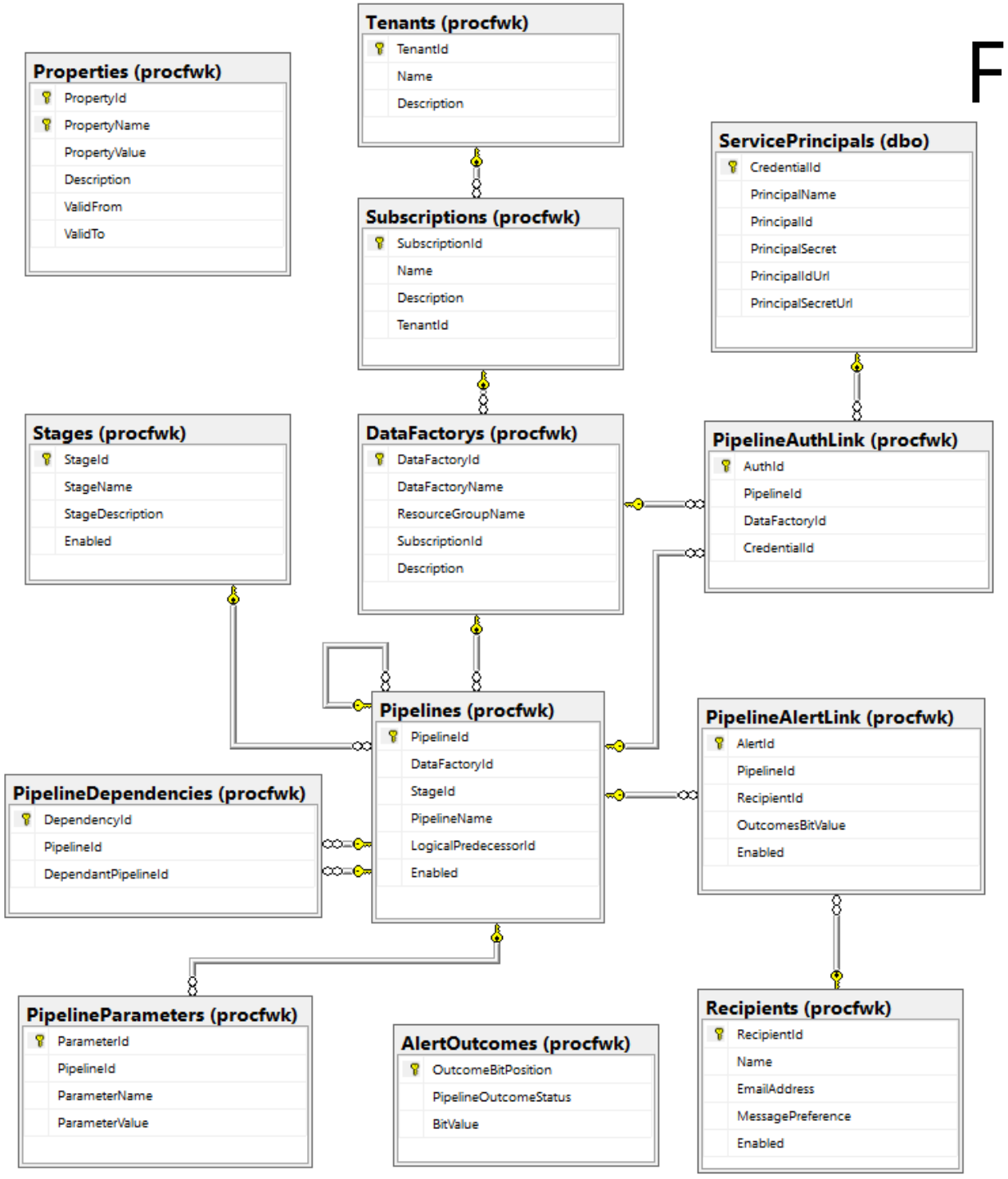


Procfwk Features

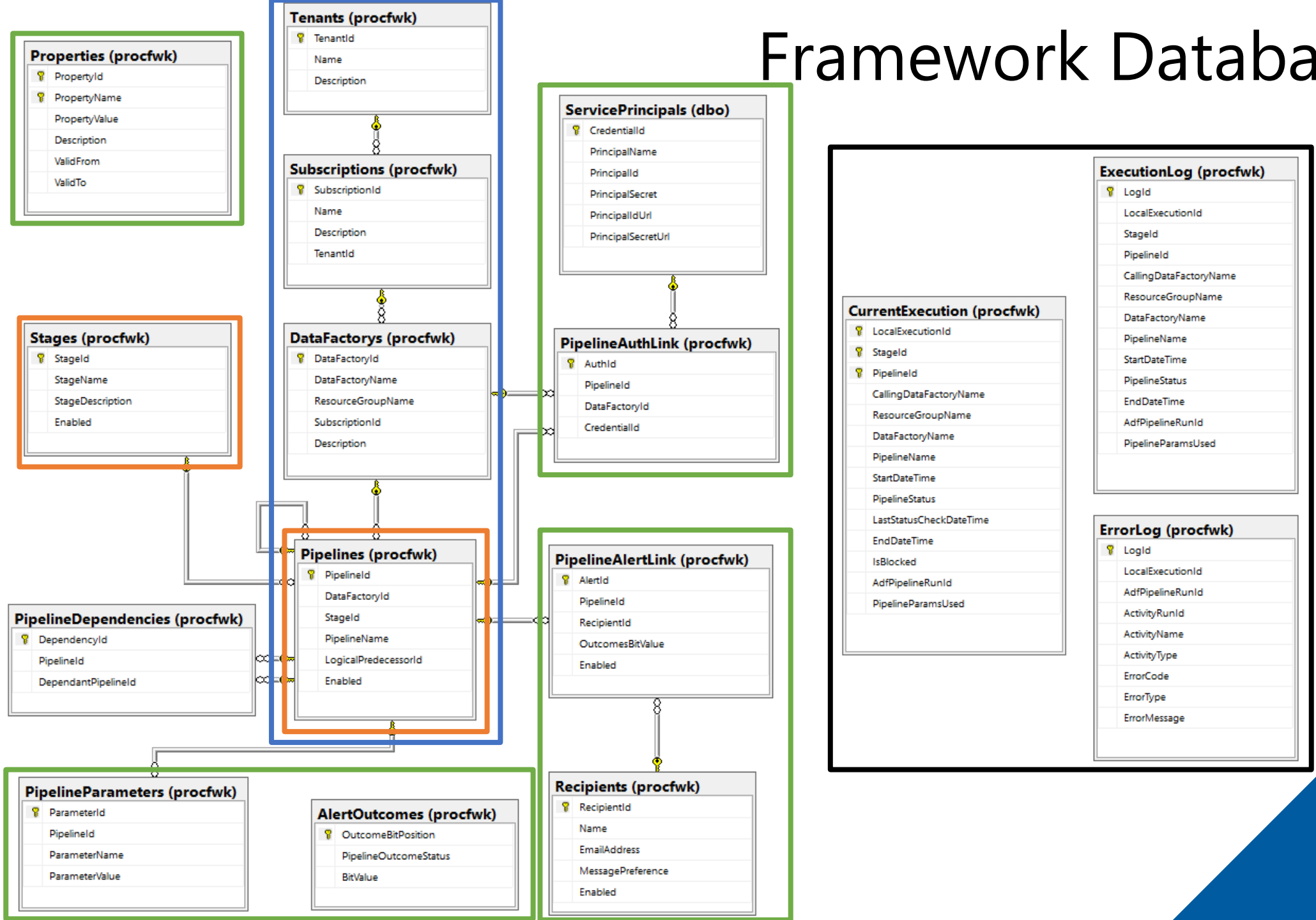
- Granular metadata control.
- Metadata integrity checking.
- Global properties.
- Complete pipeline dependency chains.
- Execution restart-ability.
- Parallel execution.
- Full execution and error logs.
- Operational dashboards.
- Low cost orchestration.
- Disconnection between framework and worker pipelines.
- Cross Tenant/Subscription/Data Factory control flows.
- Pipeline parameter support.
- Simple troubleshooting.
- Easy deployment.
- Email alerting.
- Automated testing.
- Azure Key Vault integration.



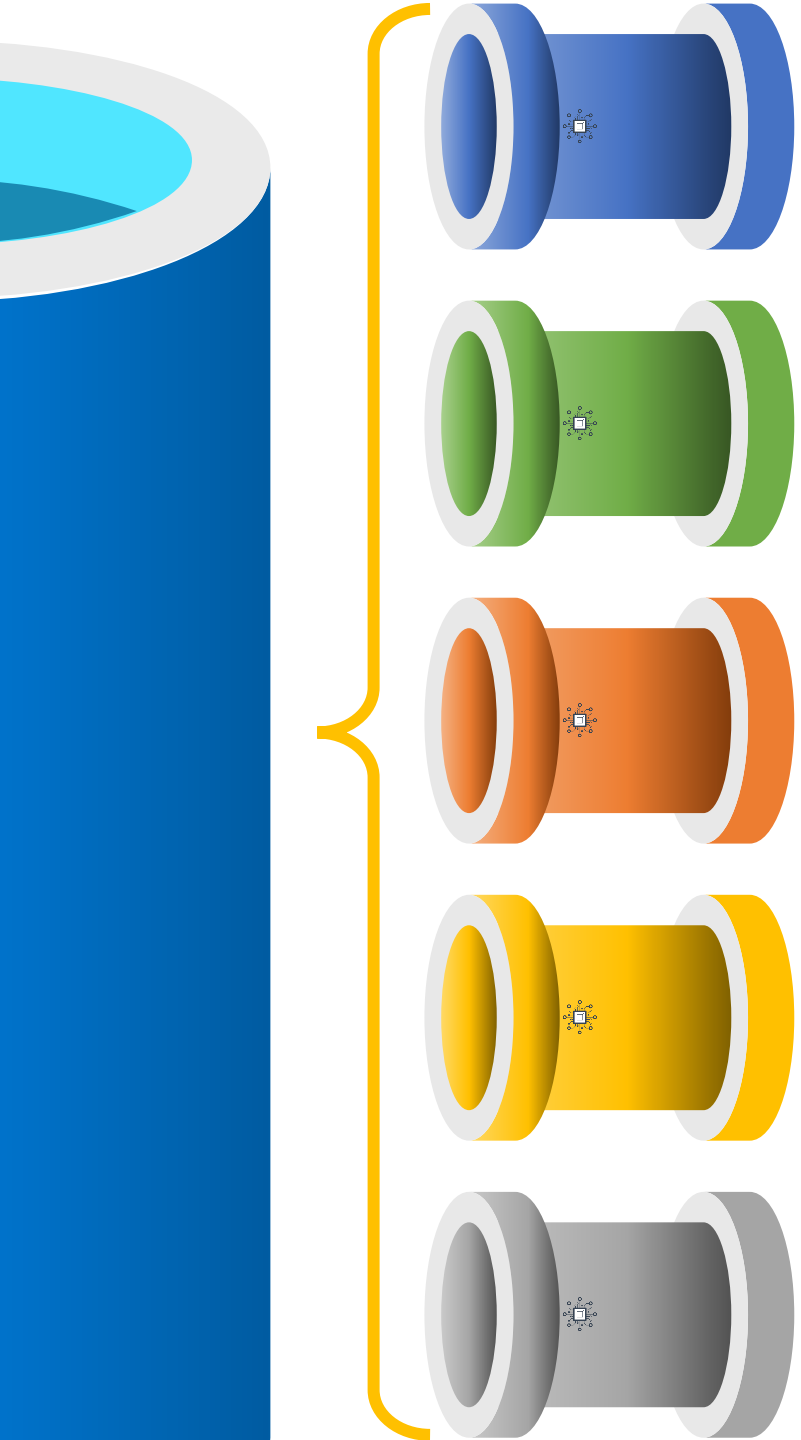
Framework Database



Framework Database



Pipeline Hierarchy



- Grandparent

Role: Optional level platform setup, for example, scale up/out compute services ready for the framework to run.

- Parent

Role: Execution run wrapper and execution stage iterator.

- Child

Role: Scale out triggering of worker pipelines within the execution stage.

- Infant

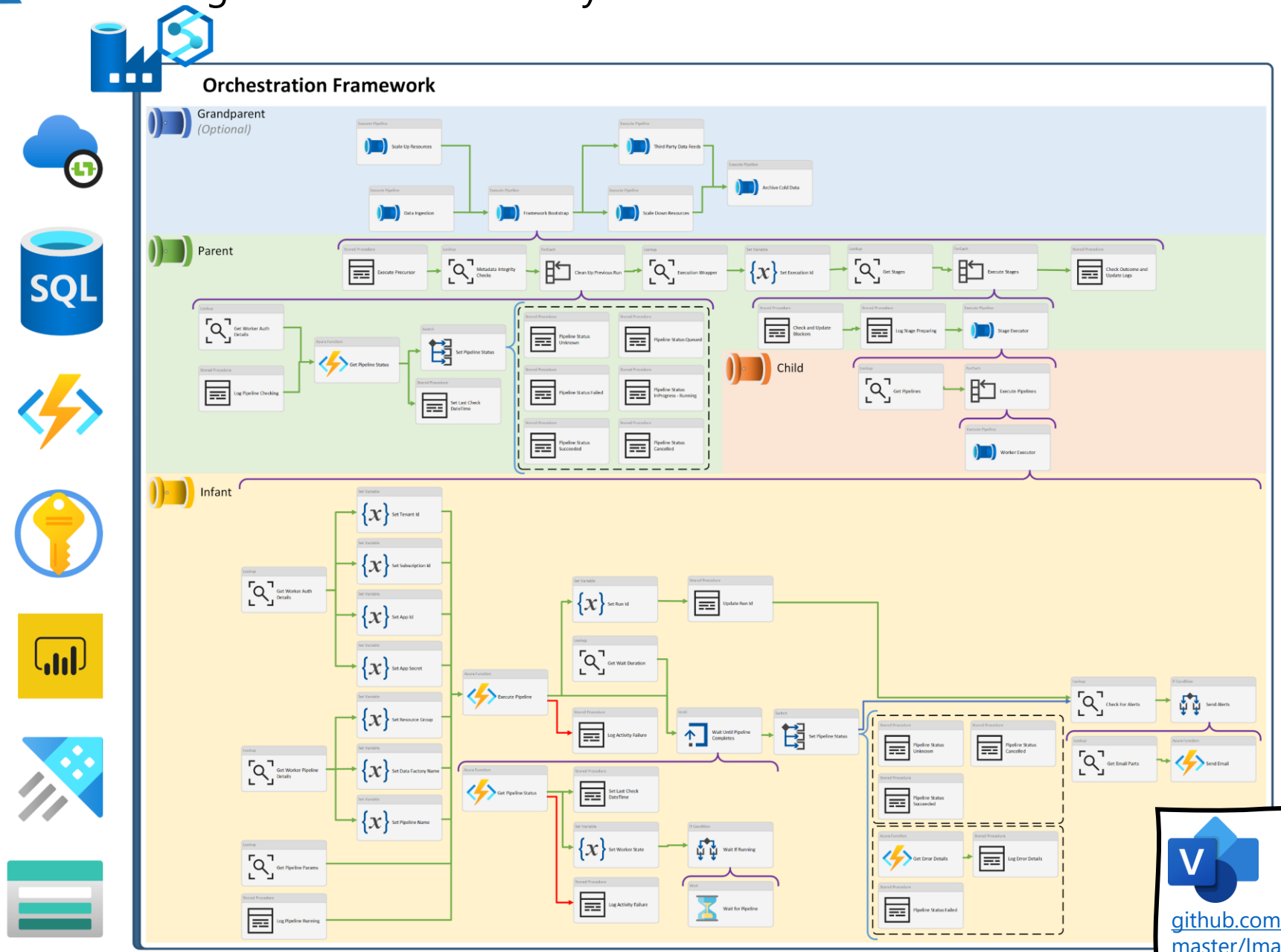
Role: Worker executor, monitor and reporting of the outcome for the single worker pipeline.

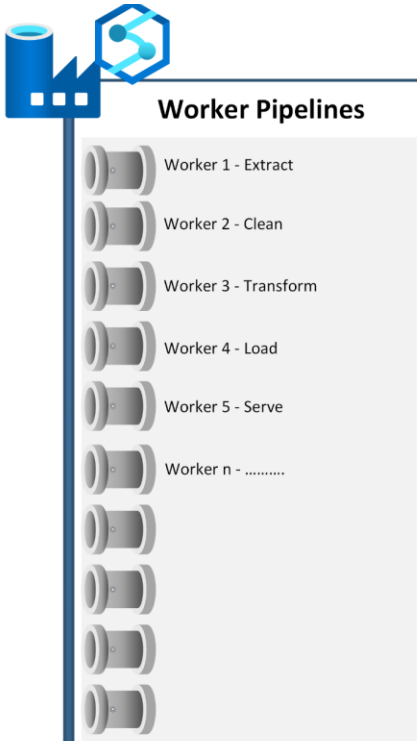
- Worker

Role: Anything specific to the process needing to be performed.

Processing Framework - Activity Chain

Orchestration Framework Support Resources





Go to Visio file in GitHub:
github.com/mrpaulandrew/procfwk/blob/master/Images


DEMO

Module 5:
Metadata Driven Pipelines

- Expressions ✓
- Dynamic Pipeline ✓
- Orchestration Framework ✓