Building an Azure Data Analytics Platform

End-to-End

Paul Andrew | Technical Architect in Azure CoE

Microsoft Most Valuable Professional

avanade

@MrPaulAndrew

In/MrPaulAndrew

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CommunityEvents

Demo code, content and slides from various community events.

C++

{Event/Location}-{Month}-{Year}

Agenda

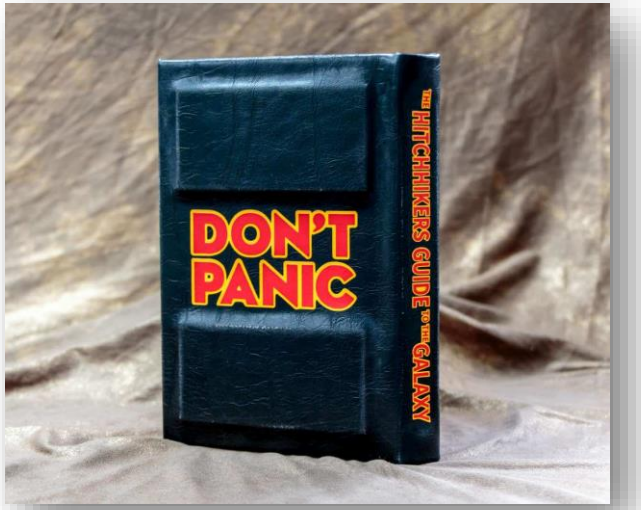
1. Design
2. Extract
3. Transform
4. Load

Agenda

1. Design
2. Extract
3. Transform
4. Load

Question:
What is the answer to life, the universe and everything?

Answer:
42



Answer:
It depends!

Question:
What is big data?

Answer:
It depends!

Answer:
Any data that you cannot process
in the time that you have/want
using the technology you have.

- Buck Woody

@BuckWoodyMSFT

Goal

Paul's Magic Box -
From the Hogwarts School of Witches & Wizardry

Data Sources

Data Warehouse

Data Insights

Data = Information = Knowledge = Power

Goal

Clean
Enrich
Conform
Translate
Transform
Curate
Analyse
Model
Predict
Master

Data Sources → Data Warehouse → Data Insights

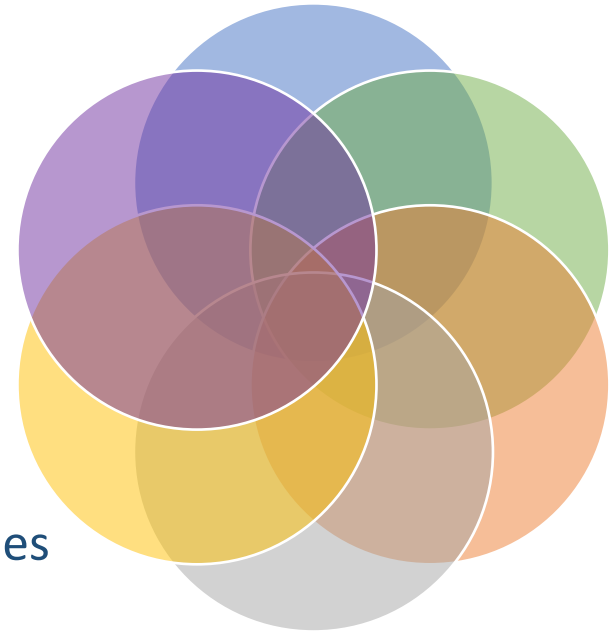
What is your primary design focus?

Resilience

- Disaster recovery
- Transaction level restart ability

Rapid Delivery

- Metadata driven
- Continuous deployments



Performance

- Complex partitioning
- Large compute clusters

(Re)Usability

- Generic code libraries
- Technical contracts

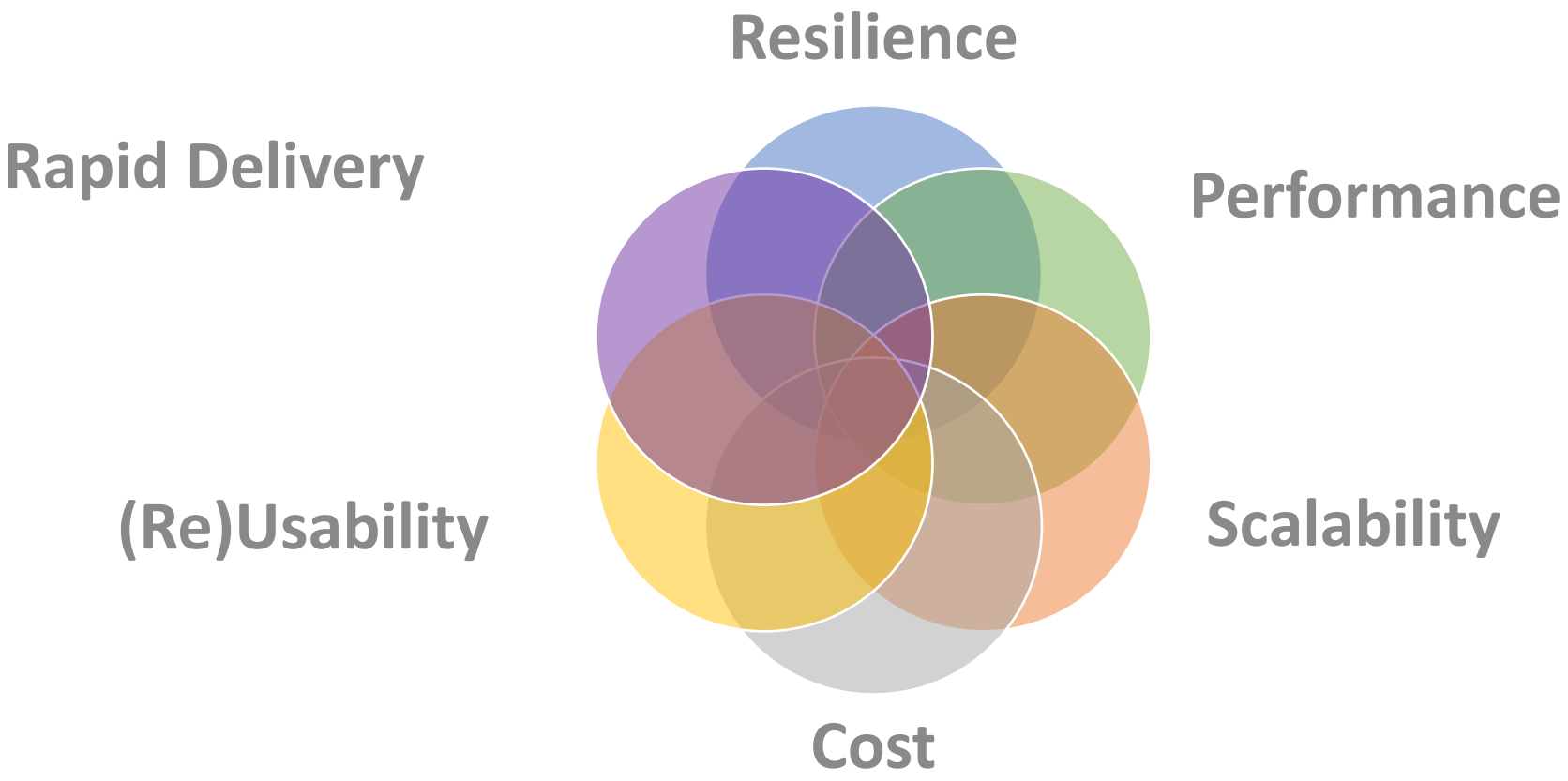
Scalability

- Auto scaling microservices
- Event driven discrete processes

Cost

- Minimum resources used
- Dynamic resource management

What is your primary design focus?



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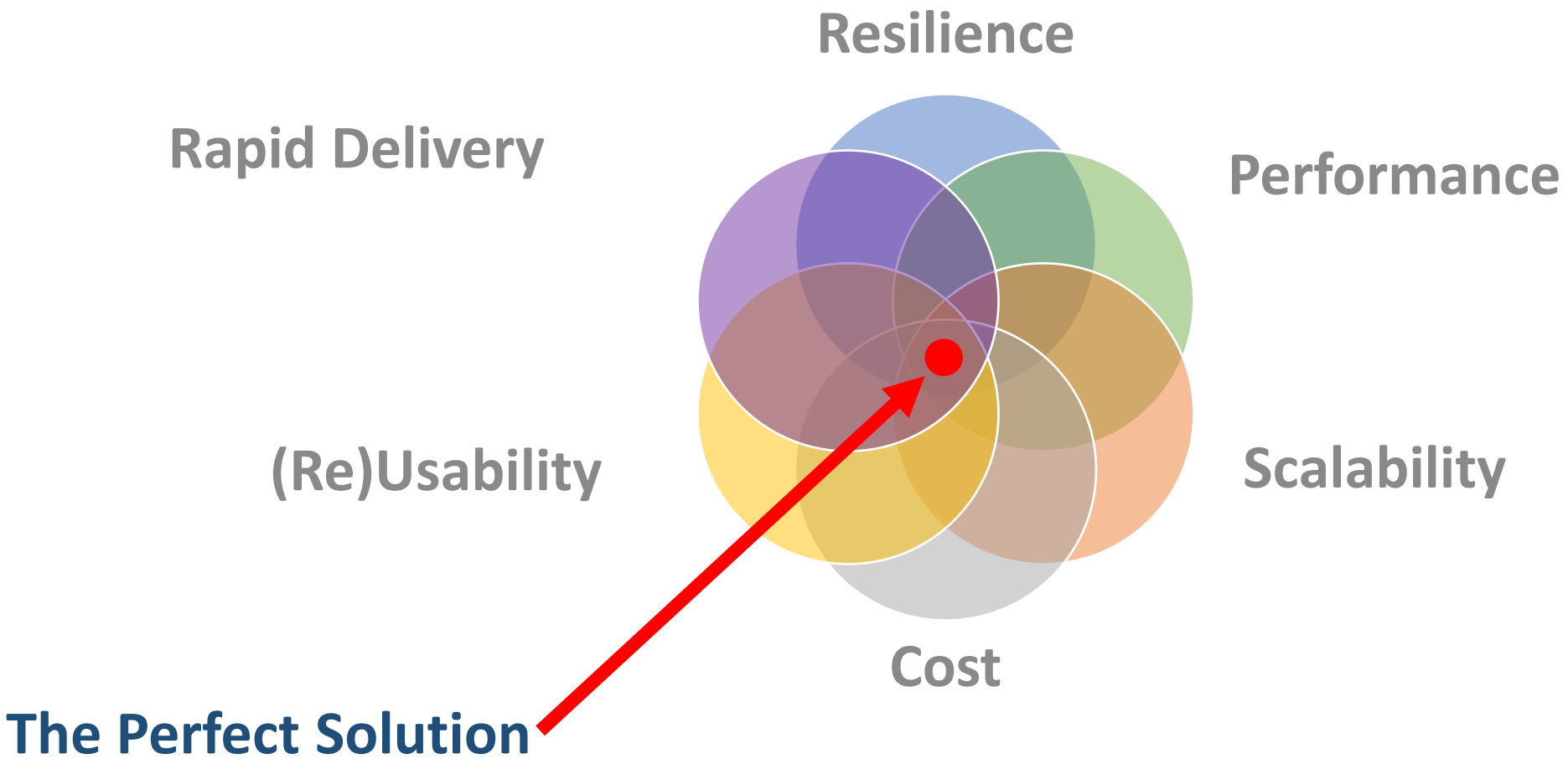

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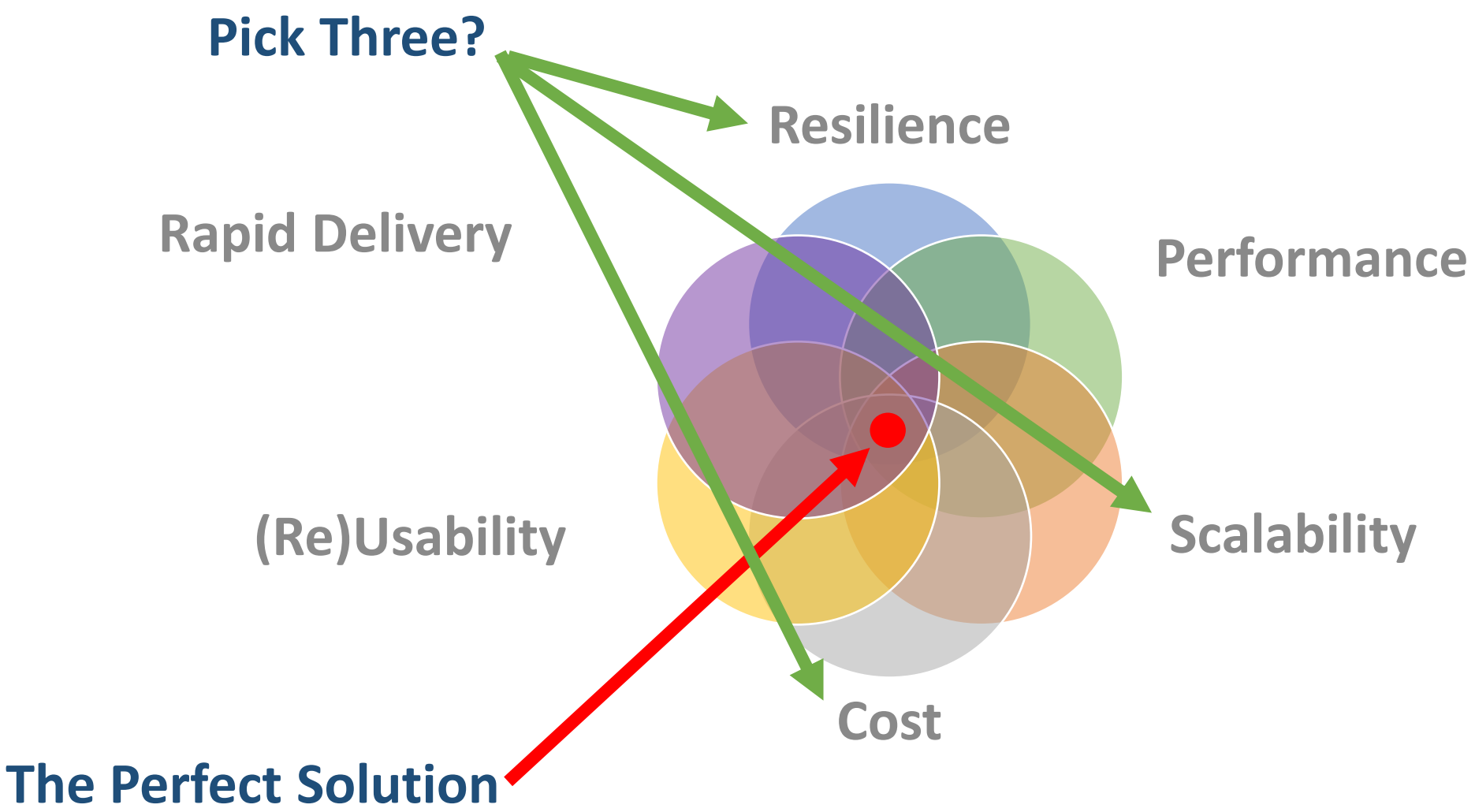


Agenda

1. Design ✓
2. Extract
3. Transform
4. Load

Agenda

1. Design ✓
2. **Extract**
3. Transform
4. Load

Data Extraction & Ingestion

Data Structure

CSV
TXT
XLS
HTML
JSON
TAR
XML
ZIP
DAT
PNG

Data Source

SAP
salesforce

Push or Pull

Batch or Speed

Public or Private Transfer

Data Sensitivity

Data Volume

!= Big

== Big

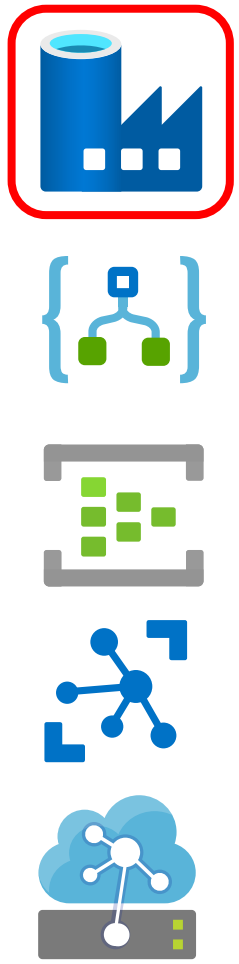
=> Big

Data Extraction & Ingestion – Spec v1

Data Structure

Data Source

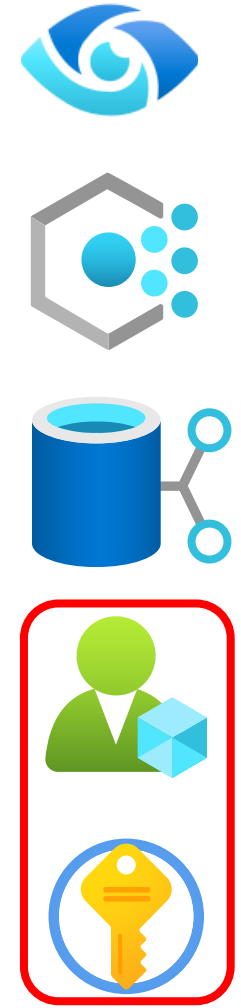
Push or Pull



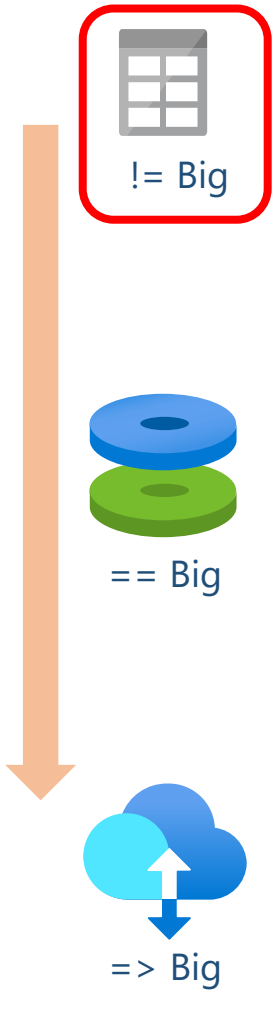
Batch or Speed

Public or Private Transfer

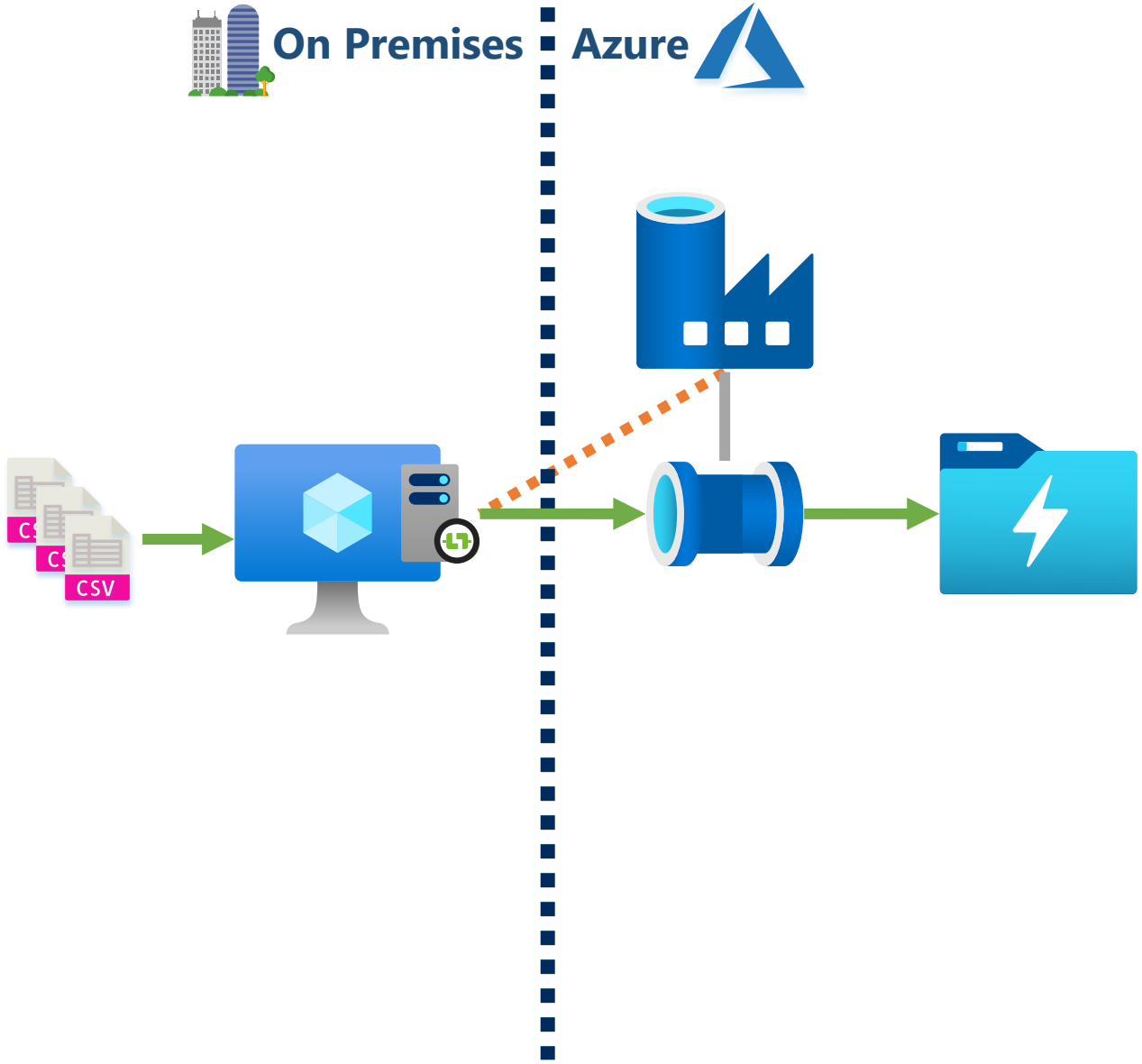
Data Sensitivity



Data Volume



Data Extraction & Ingestion – Solution 1



Requirements:

- Flat files
- From local storage
- Pulled from source
- Batch load
- Public connections
- No PII data
- Small data volumes

Data Extraction & Ingestion – Spec v2

Data Structure

CSV
TXT
XLS
HTML
JSON
TAR
XML
ZIP
PNG
DAT

Data Source

SAP
salesforce

Push or Pull

Batch or Speed

Public or Private Transfer

Data Sensitivity

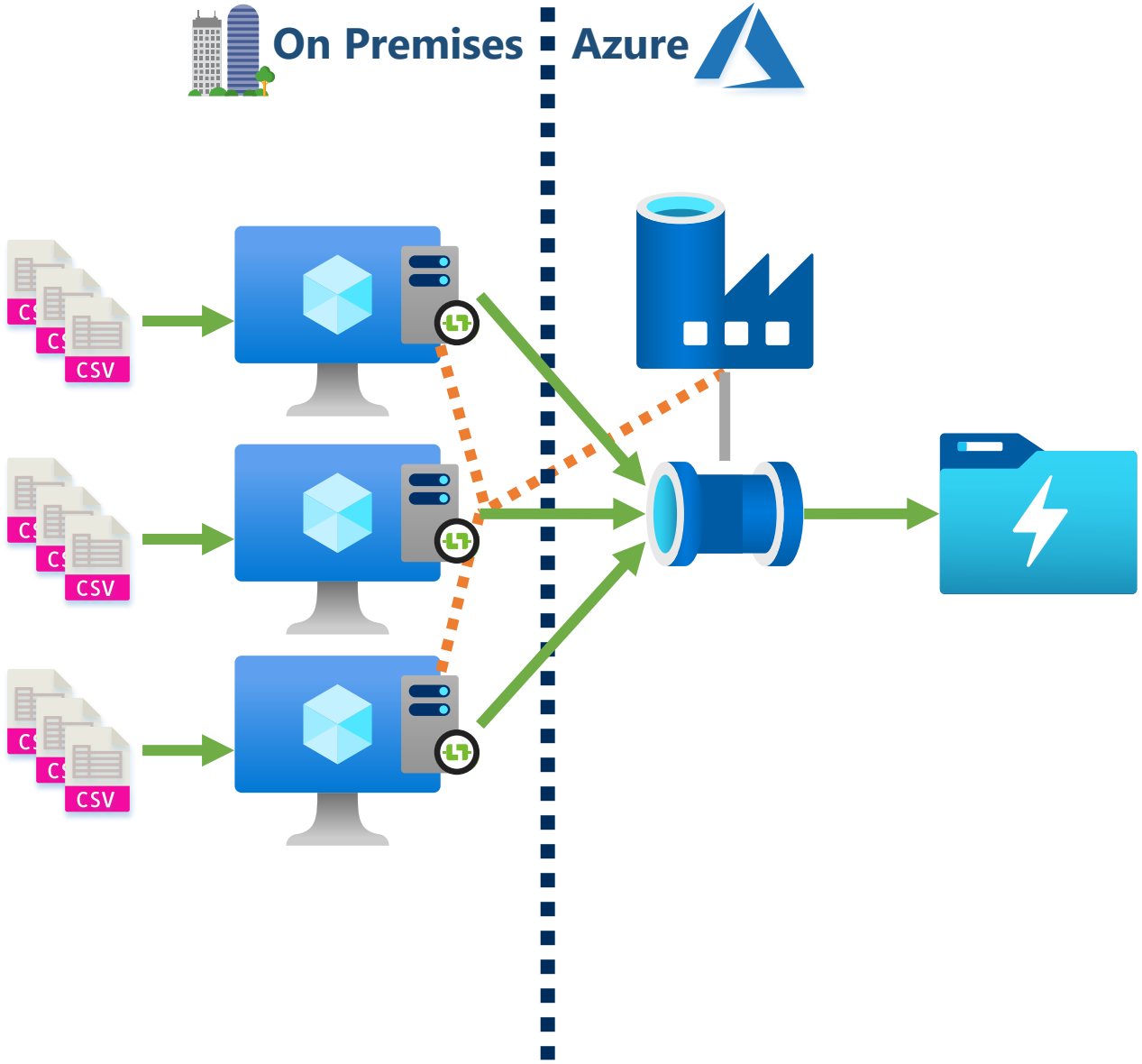
Data Volume

!= Big

== Big

=> Big

Data Extraction & Ingestion – Solution 2



Requirements:

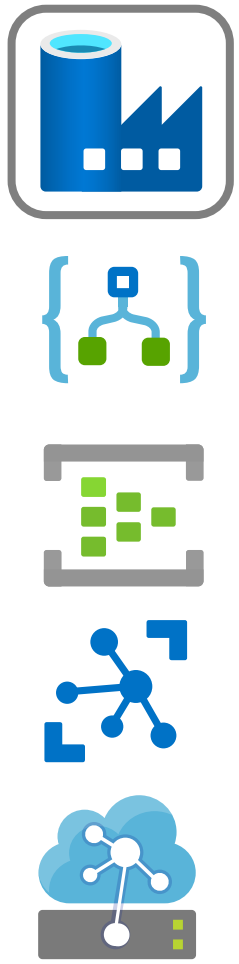
- Flat files
- From local storage
- Pulled from source
- Batch load
- Public connections
- No PII data
- Large data volumes

Data Extraction & Ingestion – Spec v3

Data Structure

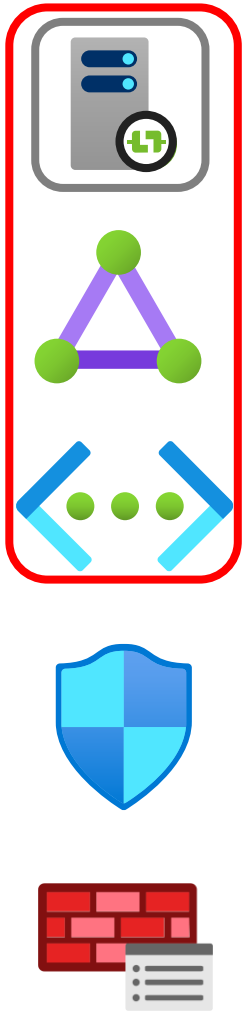
Data Source

Push or Pull

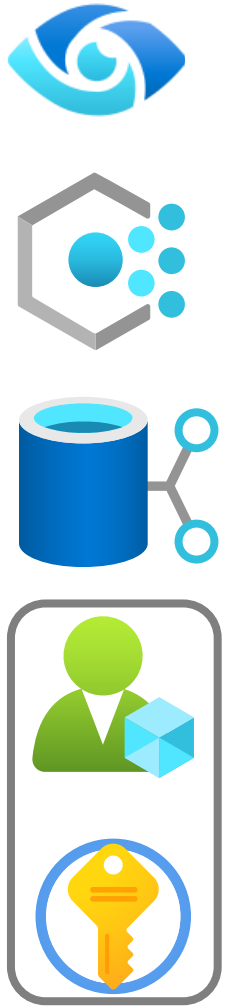


Batch or Speed

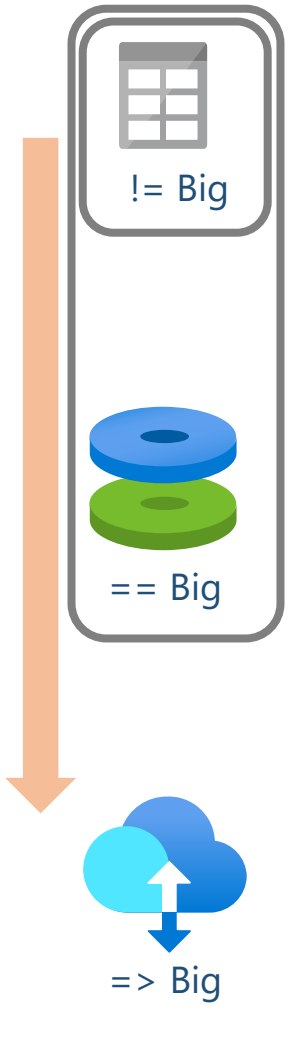
Public or Private Transfer



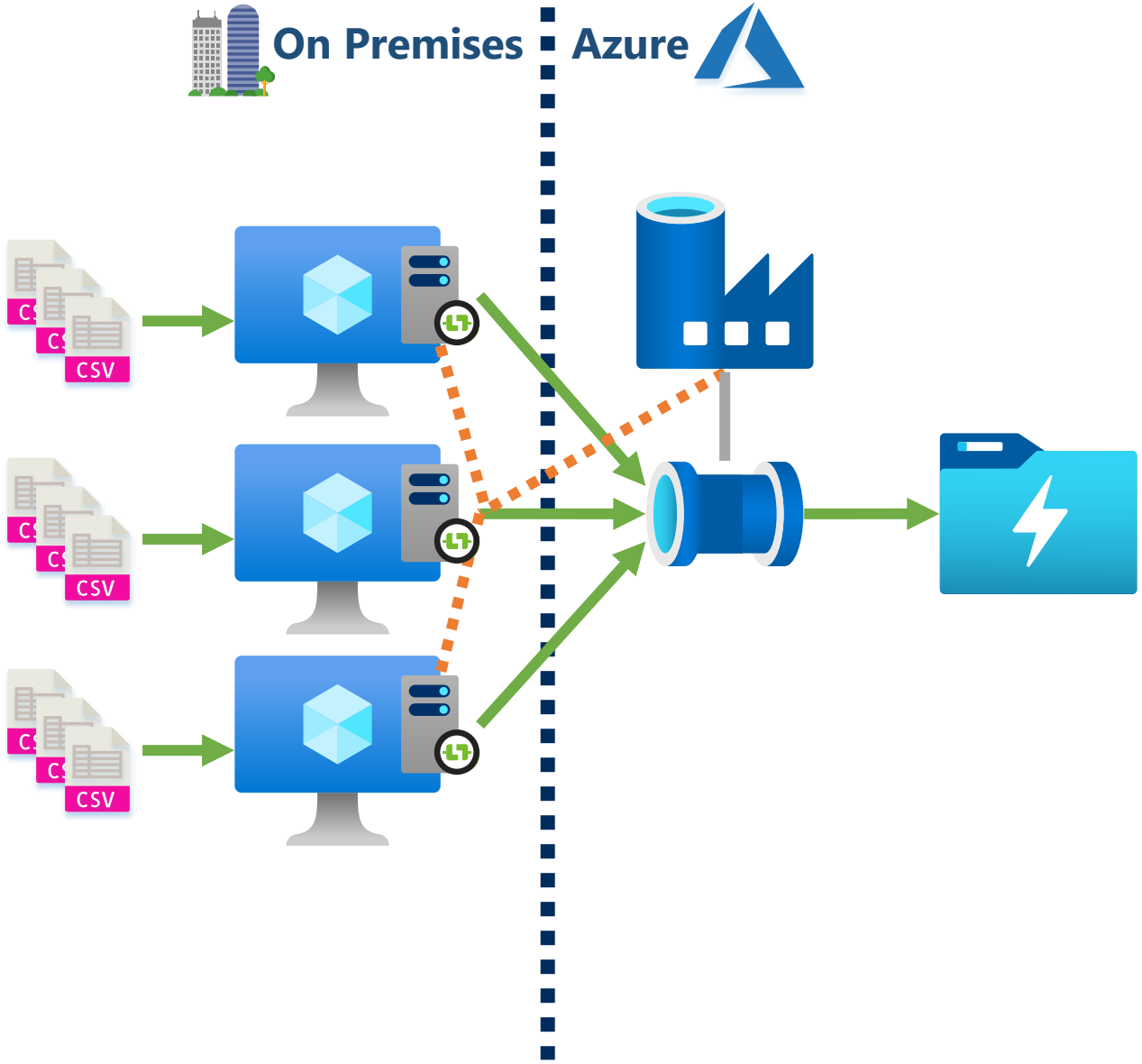
Data Sensitivity



Data Volume



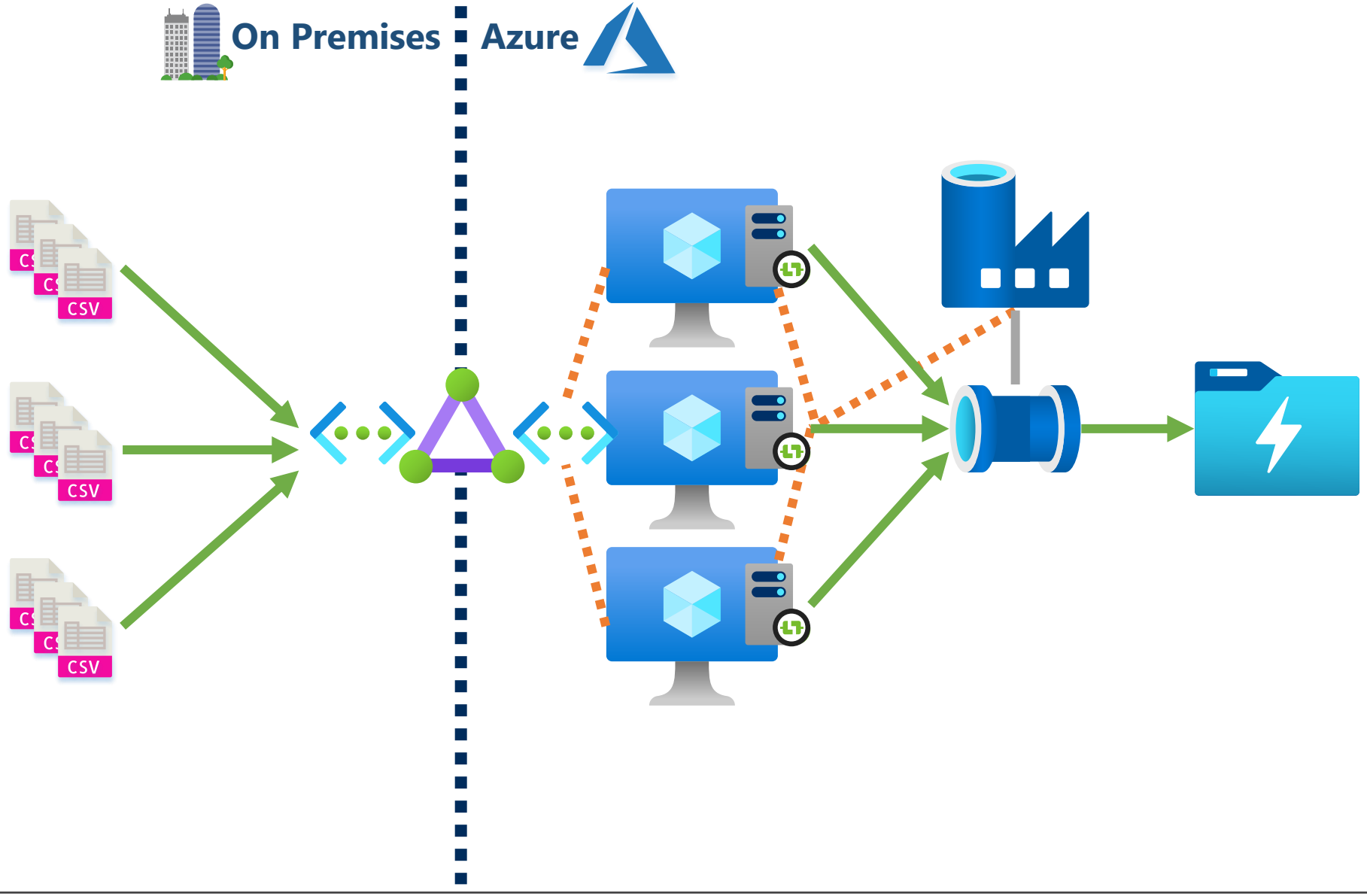
Data Extraction & Ingestion – Solution 3



Requirements:

- Flat files
- From local storage
- Pulled from source
- Batch load
- Private connections
- No PII data
- Large data volumes

Data Extraction & Ingestion – Solution 3



Requirements:

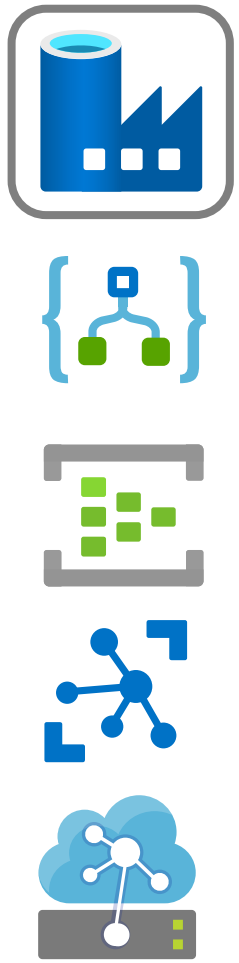
- Flat files
- From local storage
- Pulled from source
- Batch load
- Private connections
- No PII data
- Large data volumes

Data Extraction & Ingestion – Spec v4

Data Structure

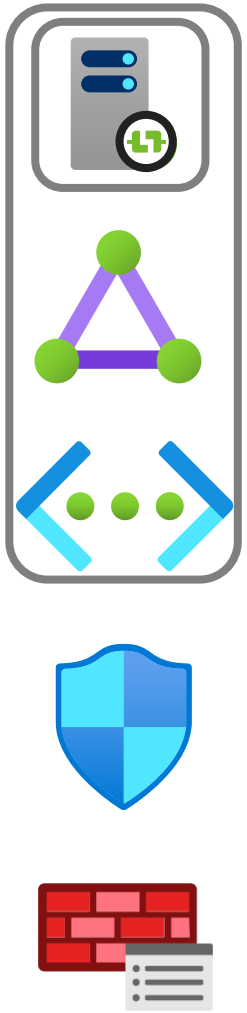
Data Source

Push or Pull

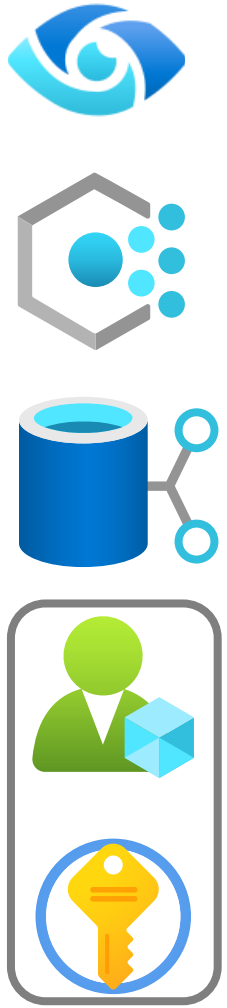


Batch or Speed

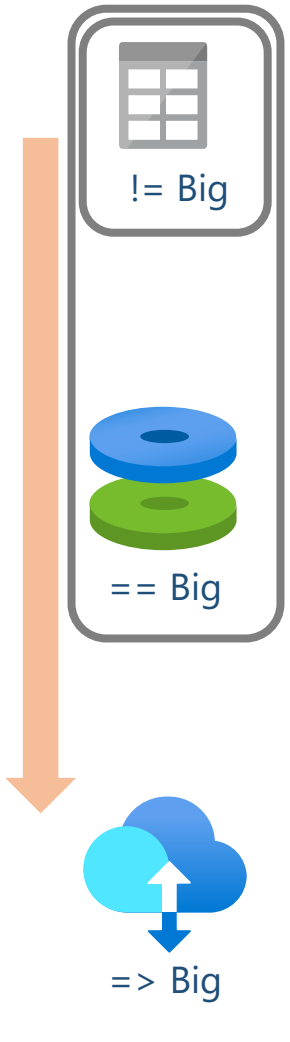
Public or Private Transfer



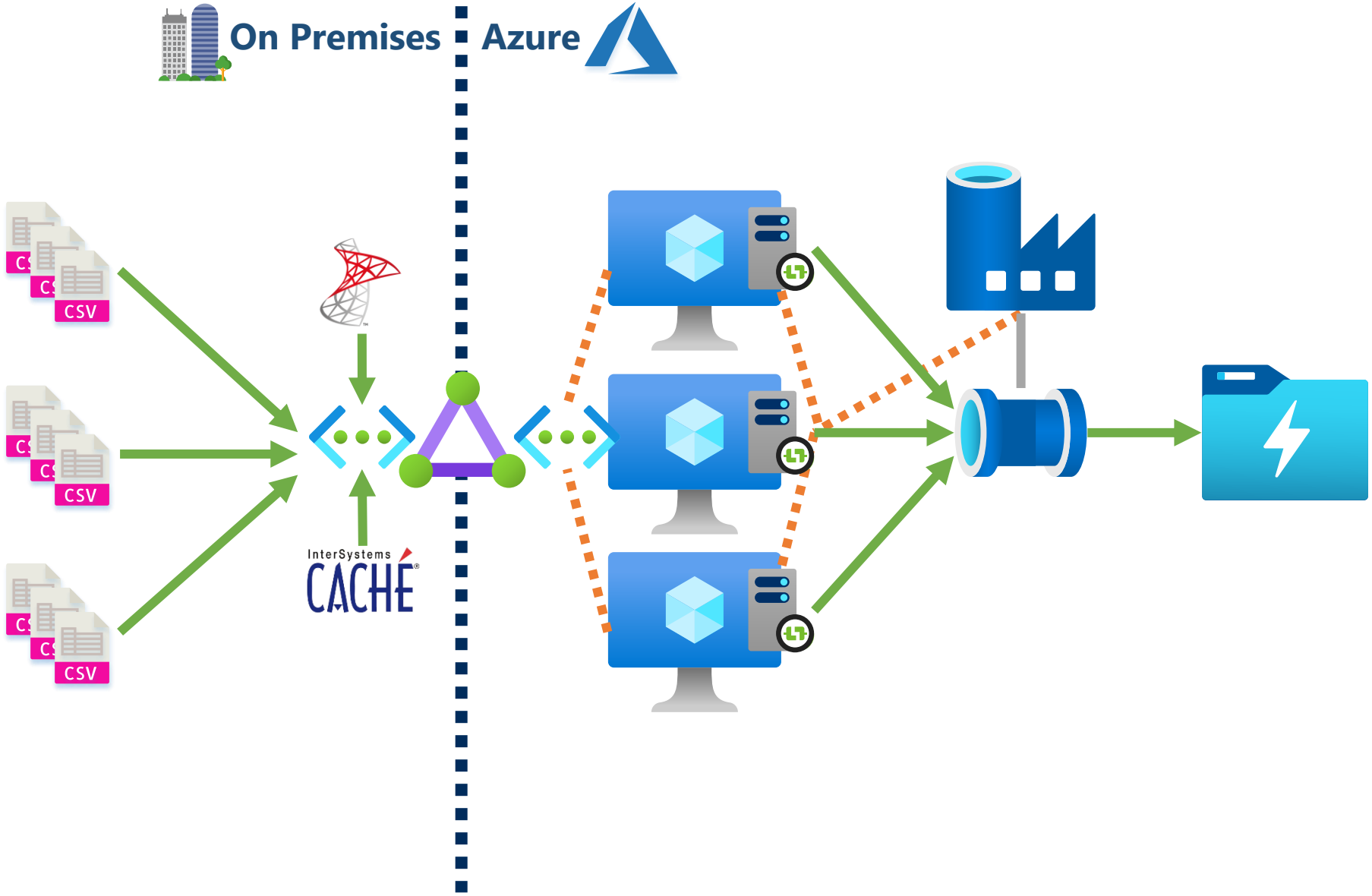
Data Sensitivity



Data Volume



Data Extraction & Ingestion – Solution 4

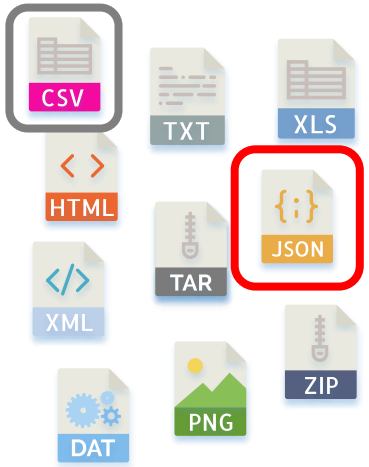


Requirements:

- Flat files
- From local storage & database tables
- Pulled from source
- Batch load
- Private connections
- No PII data
- Large data volumes

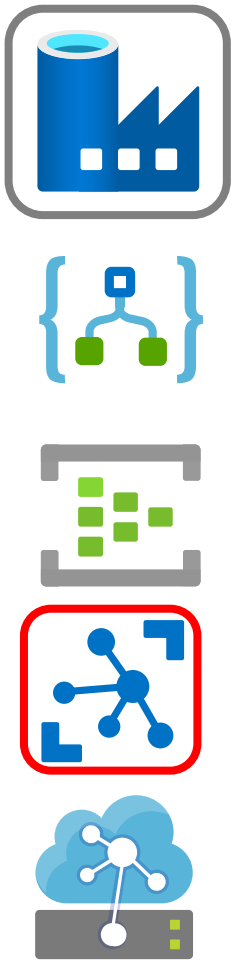
Data Extraction & Ingestion – Spec v5

Data Structure



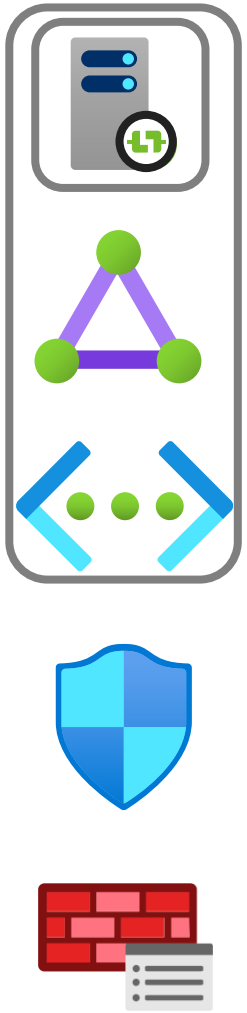
Data Source

Push or Pull

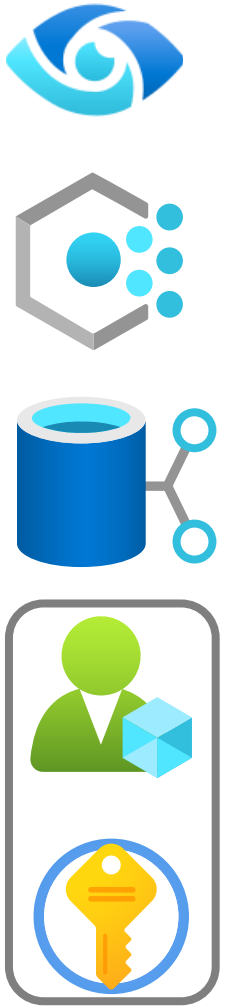


Batch or Speed

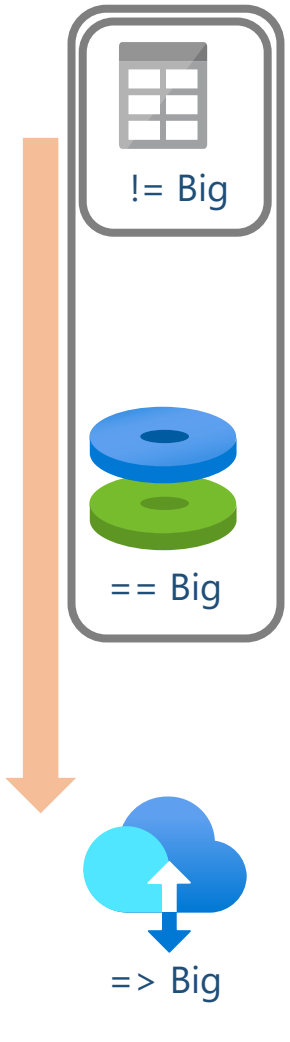
Public or Private Transfer



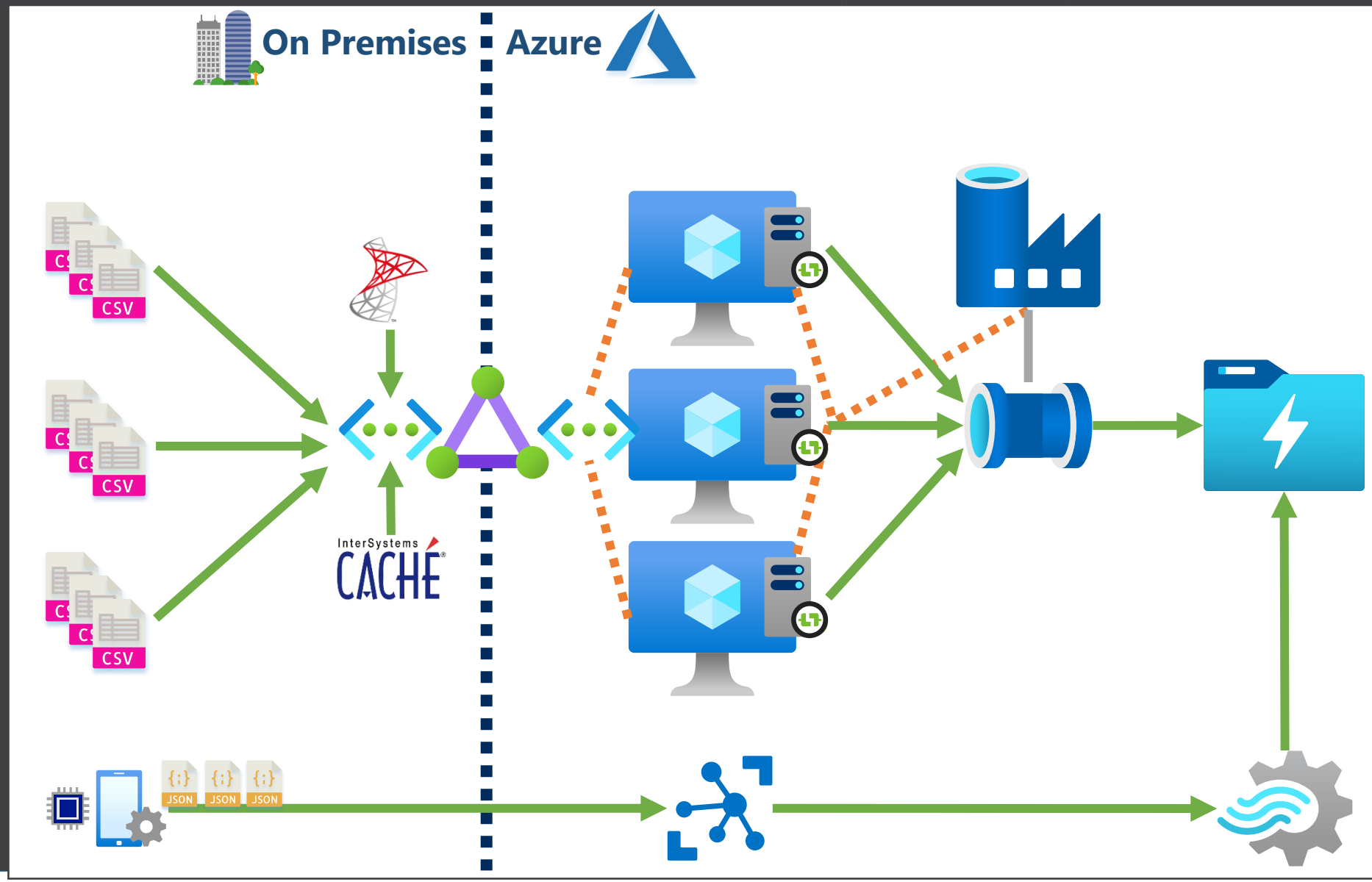
Data Sensitivity



Data Volume



Data Extraction & Ingestion – Solution 5



Requirements:

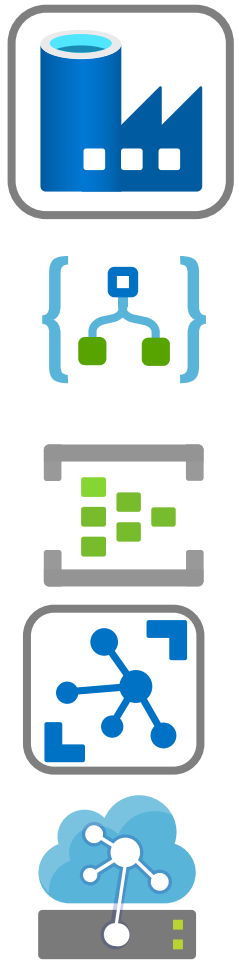
- Flat files & JSON
- From local storage & database tables
- Pulled from source & pushed
- Batch load & streamed
- Private connections
- No PII data
- Large data volumes

Data Extraction & Ingestion – Spec v6

Data Structure

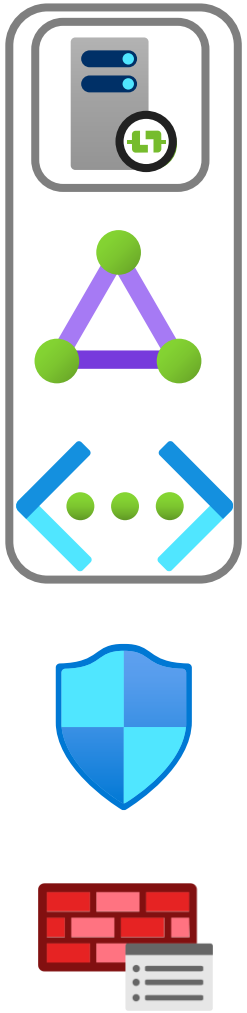
Data Source

Push or Pull

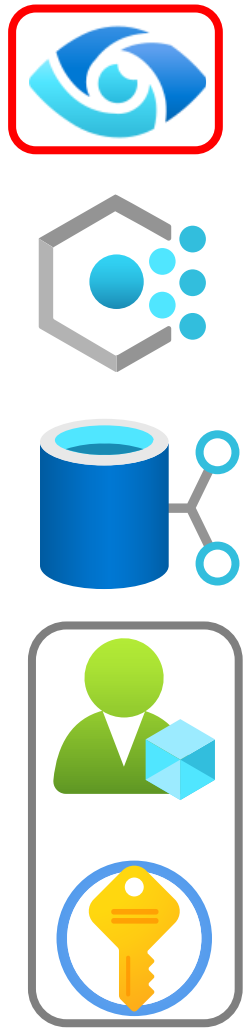


Batch or Speed

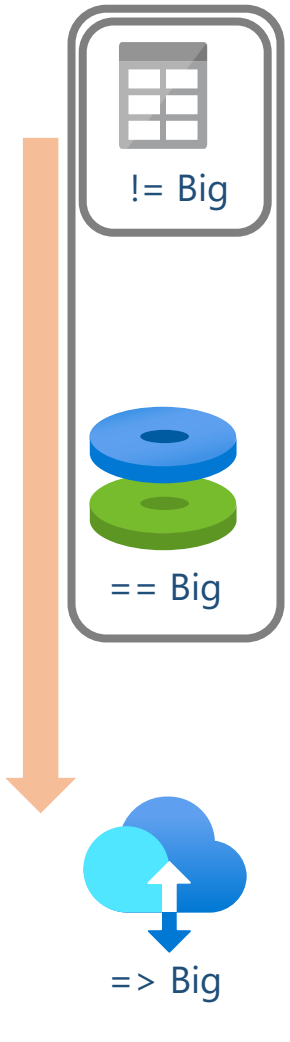
Public or Private Transfer



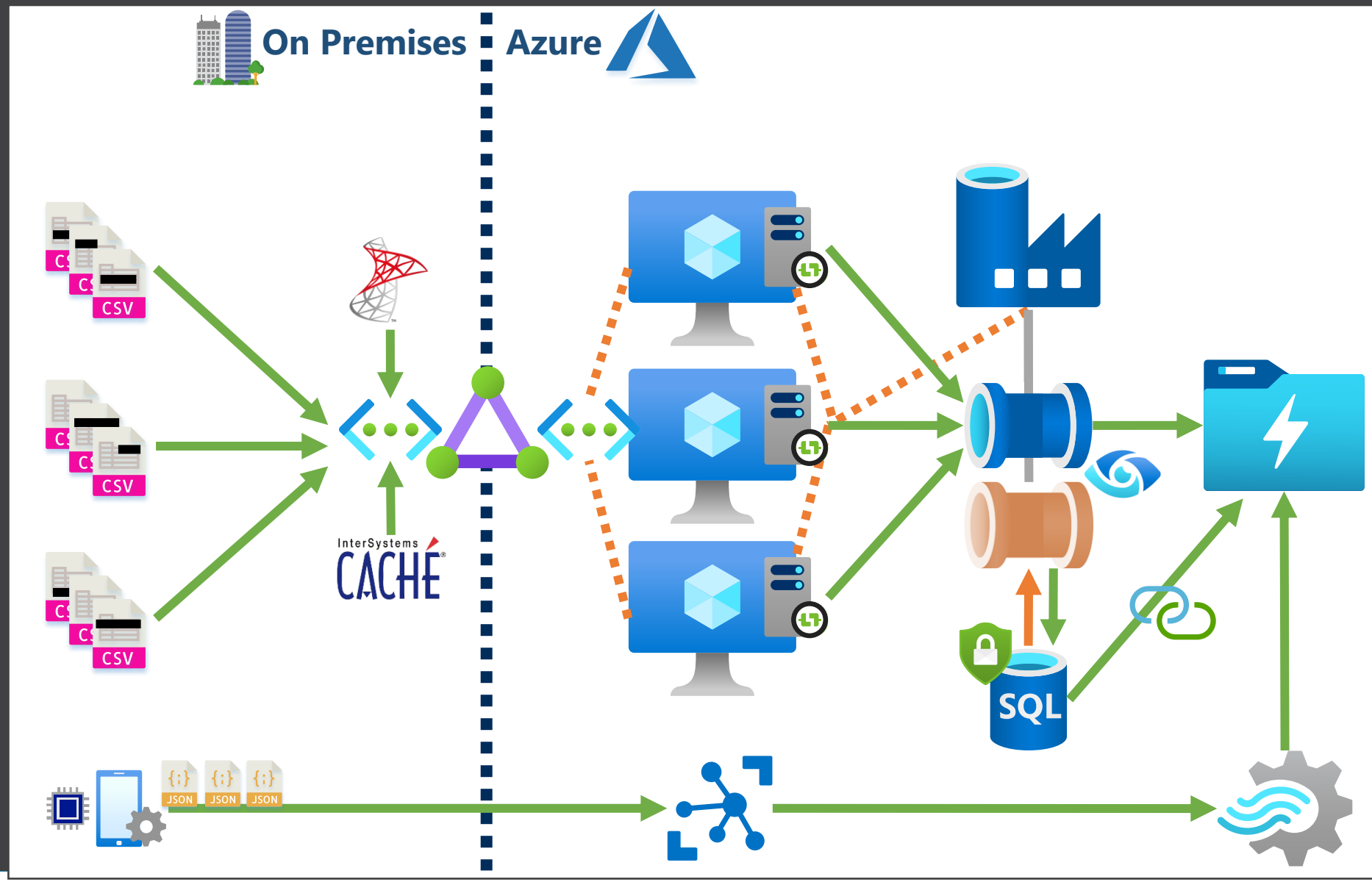
Data Sensitivity



Data Volume



Data Extraction & Ingestion – Solution 6

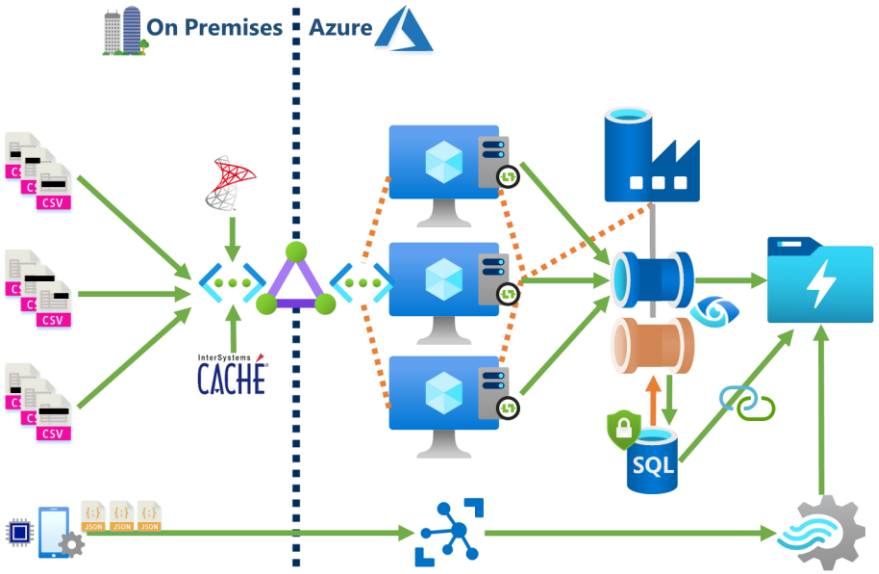


Requirements:

- Flat files & JSON
- From local storage & database tables
- Pulled from source & pushed
- Batch load & streamed
- Private connections
- Both PII & none PII data
- Large data volumes

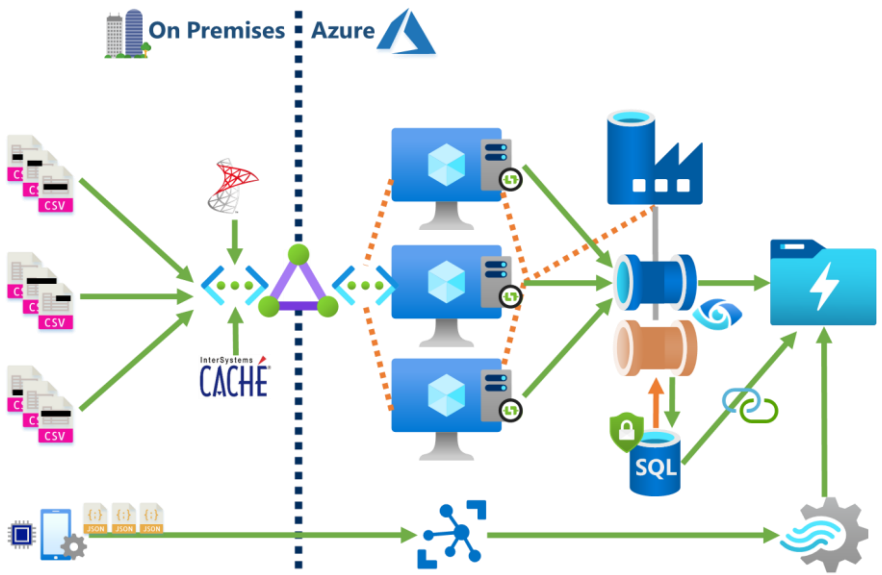
Overall Architecture

Extract | Transform | Load



Agenda

1. Design ✓
2. Extract ✓
3. Transform
4. Load



Agenda

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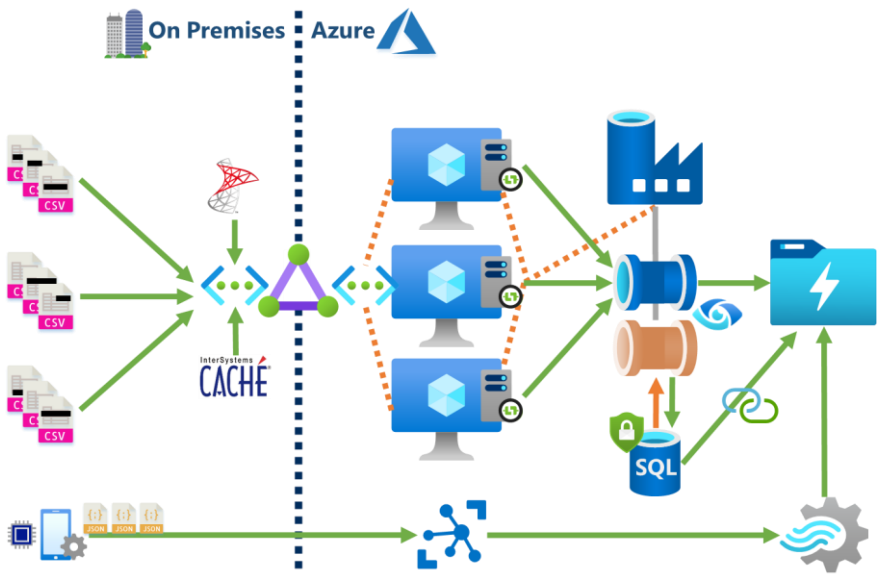
3. Transform
4. Load

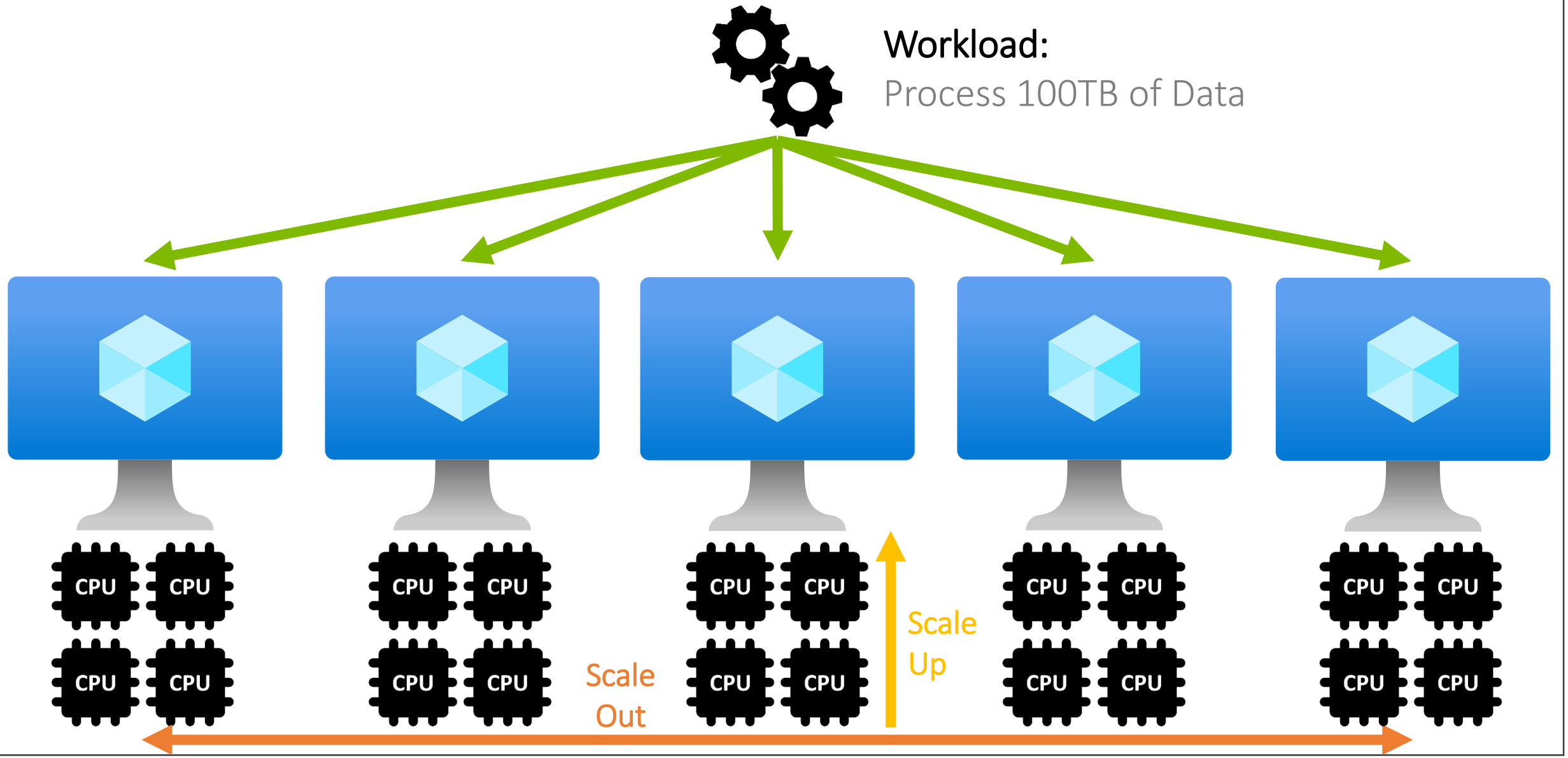


Agenda

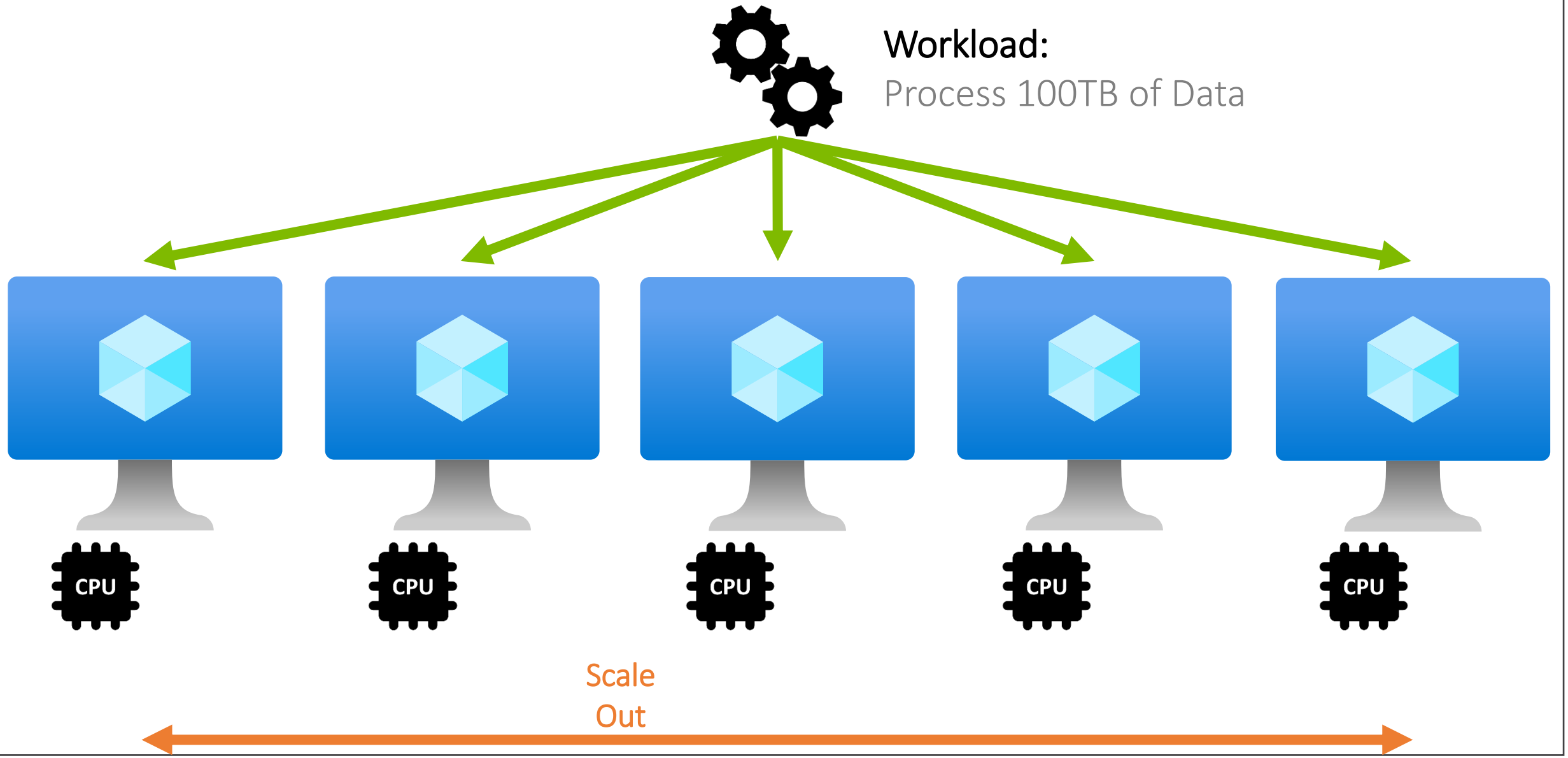
1. Design ✓
2. Extract ✓
3. Transform
4. Load

Compute
Storage, Structure
& Data Format

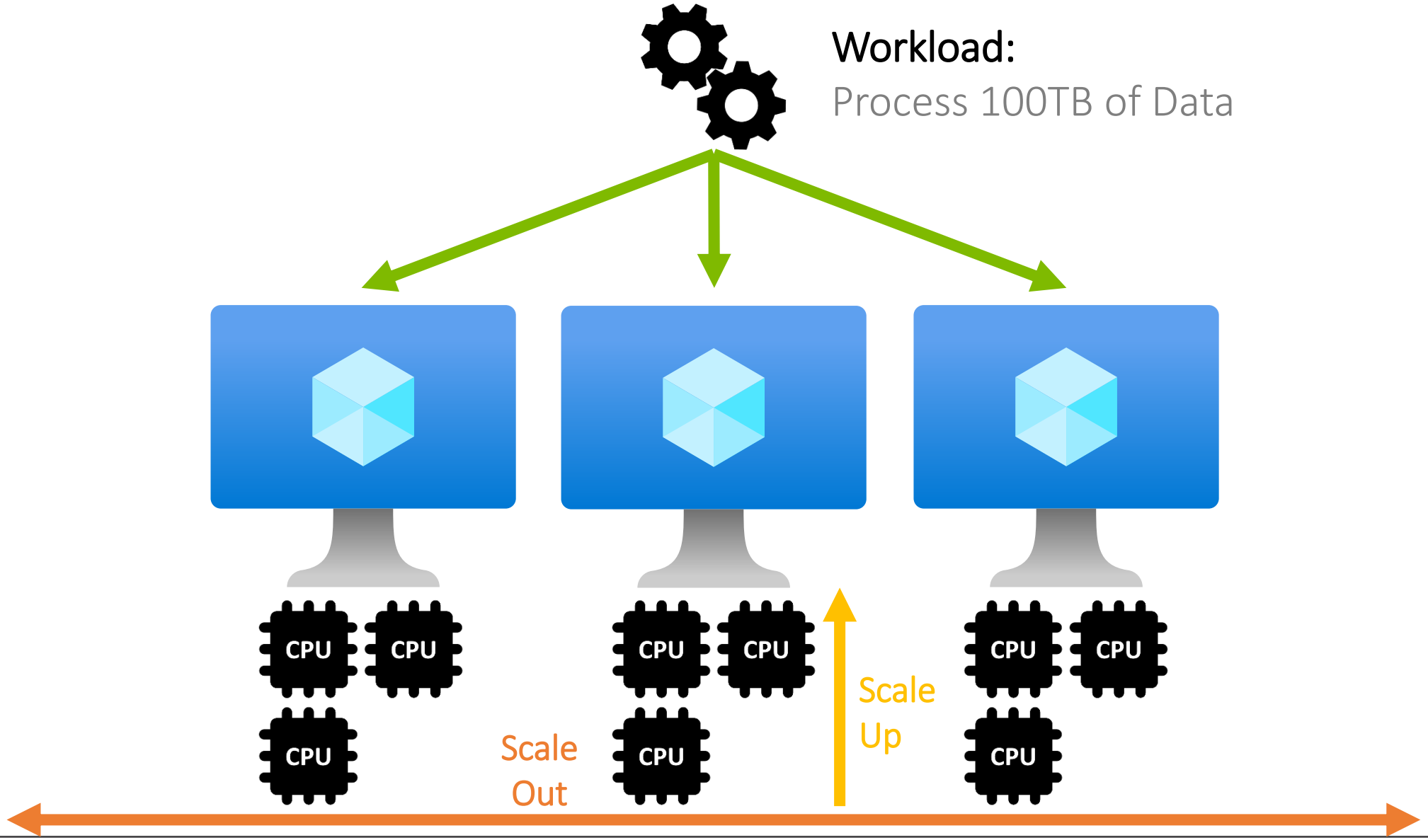
Scaling Up and/or Scaling Out



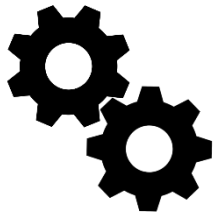
Scaling Up and/or Scaling Out



Scaling Up and/or Scaling Out



What Compute Type of Compute?



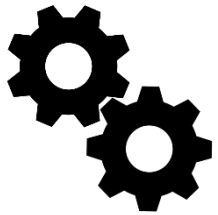
Workload:
Process 100TB of Data

Platform

Infrastructure

As
A
Service

What Compute Type of Compute?



Workload:
Process 100TB of Data

Platform

As
A
Service

IaaS	PaaS
Applications	Applications
Data	Data
Runtime	Runtime
Middleware	Middleware
Operating System	Operating System
Virtualization	Virtualization
Servers	Servers
Storage	Storage
Networking	Networking

Data Transformation – Compute

Data Lake Analytics

HDInsight

Relational Database

Synapse – SQL Pools or Spark Pools

Databricks

Batch Service

Data Explorer

Automation

Cosmos

Functions

Power BI Data Flows

Logic Apps

Data Factory Data Flows

Analysis Services

Data Transformation – Compute

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Power BI Data Flows

Logic Apps

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Analysis Services

Agenda

1. Design ✓
2. Extract ✓
3. Transform
4. Load

Compute ✓
Storage, Structure
& Data Format

Data Transformation – Storage & Format

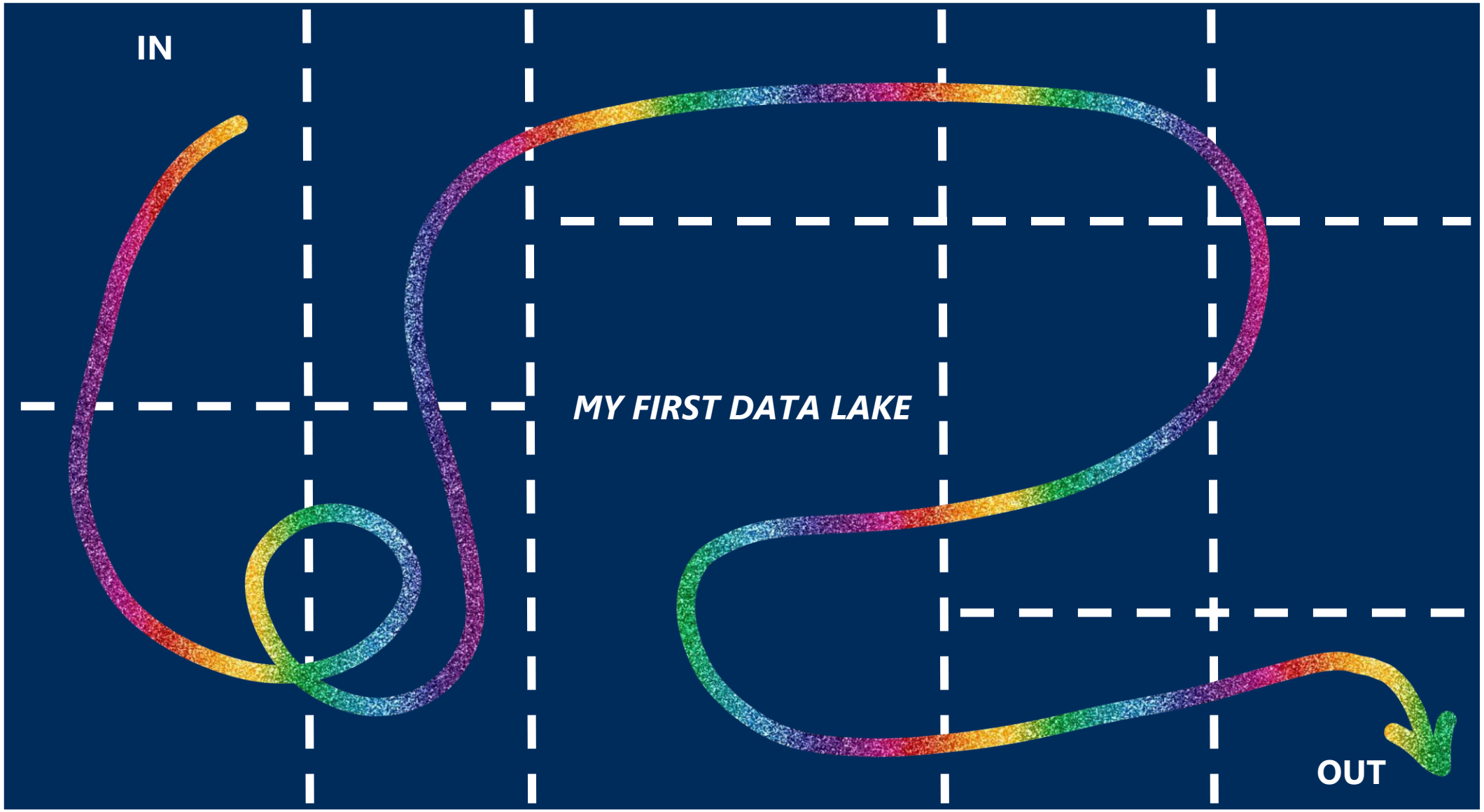
Azure Storage Account

Azure Data Lake Gen2

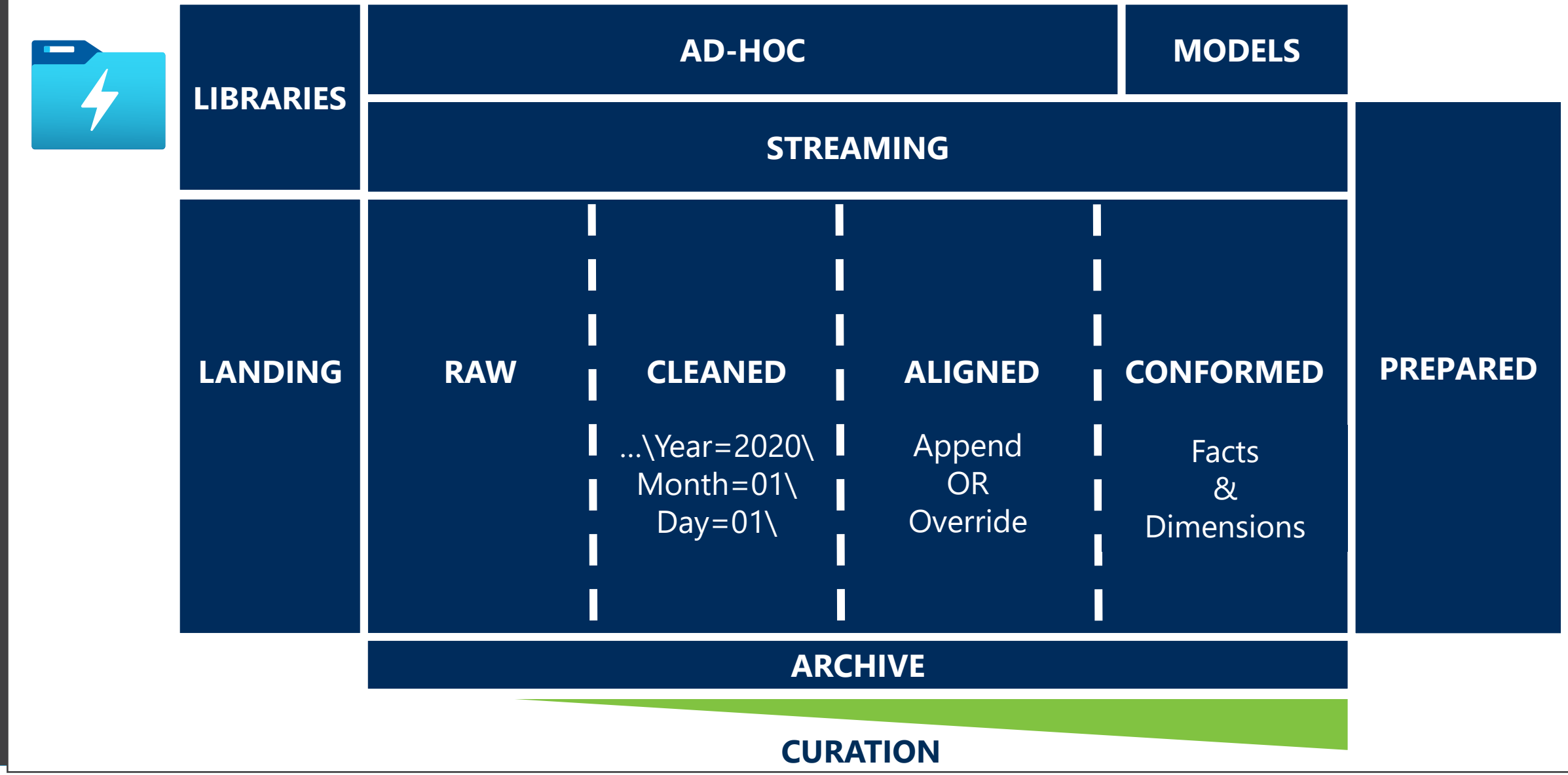
Hadoop Distributed File System (HDFS)

Data Transformation – Storage & Format

Data Transformation – Storage & Format



Data Transformation – Storage & Format



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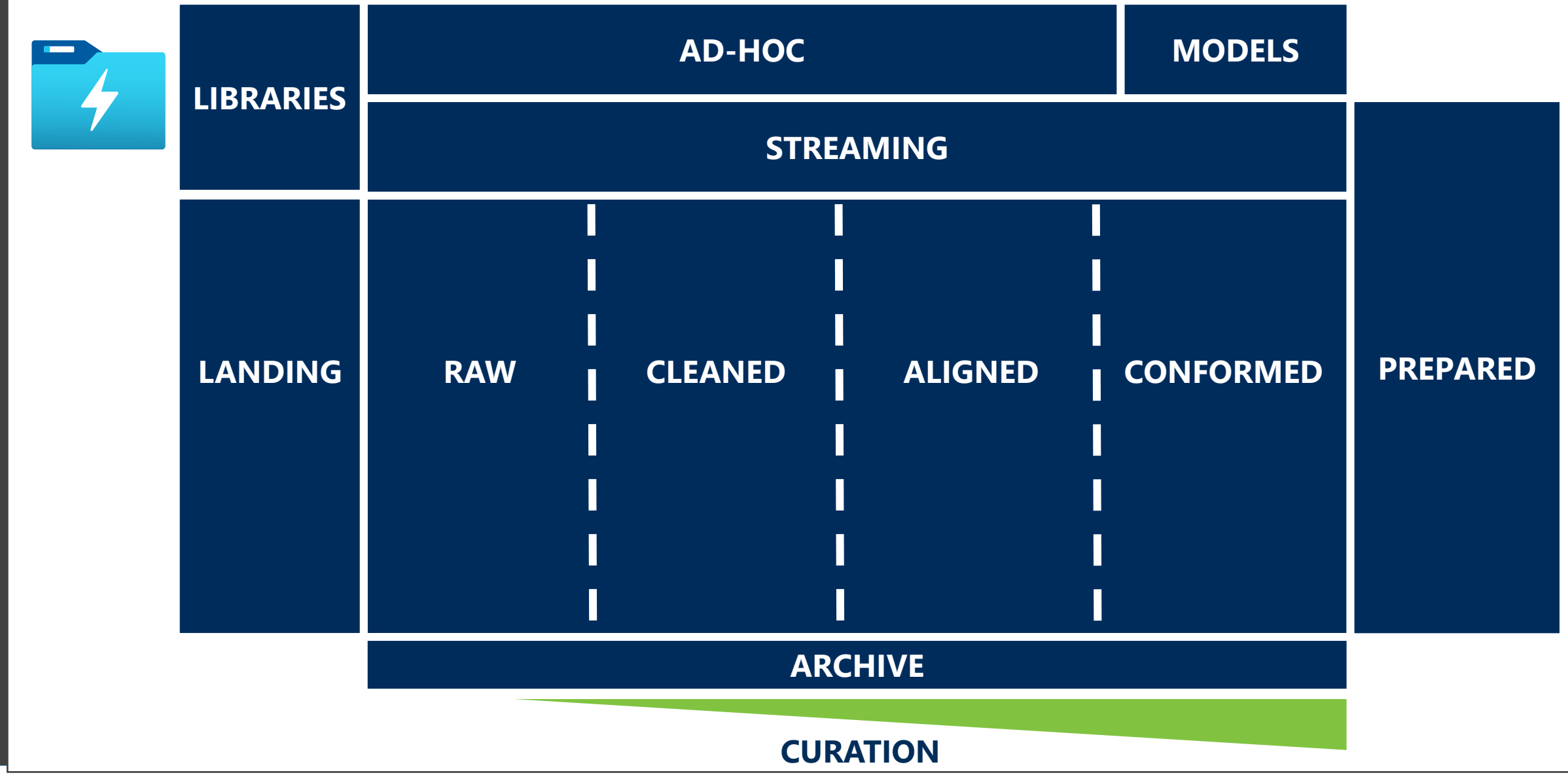

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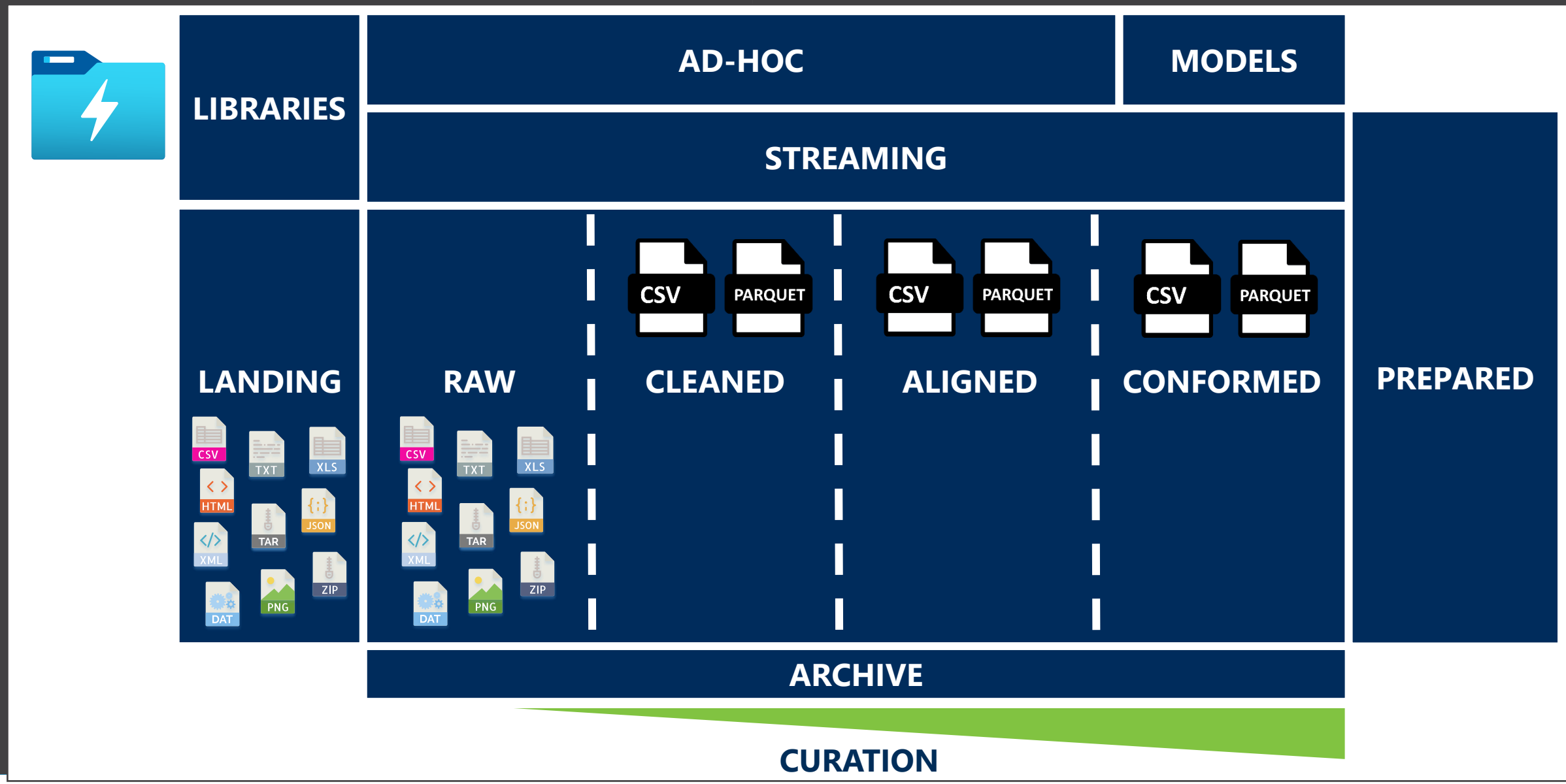
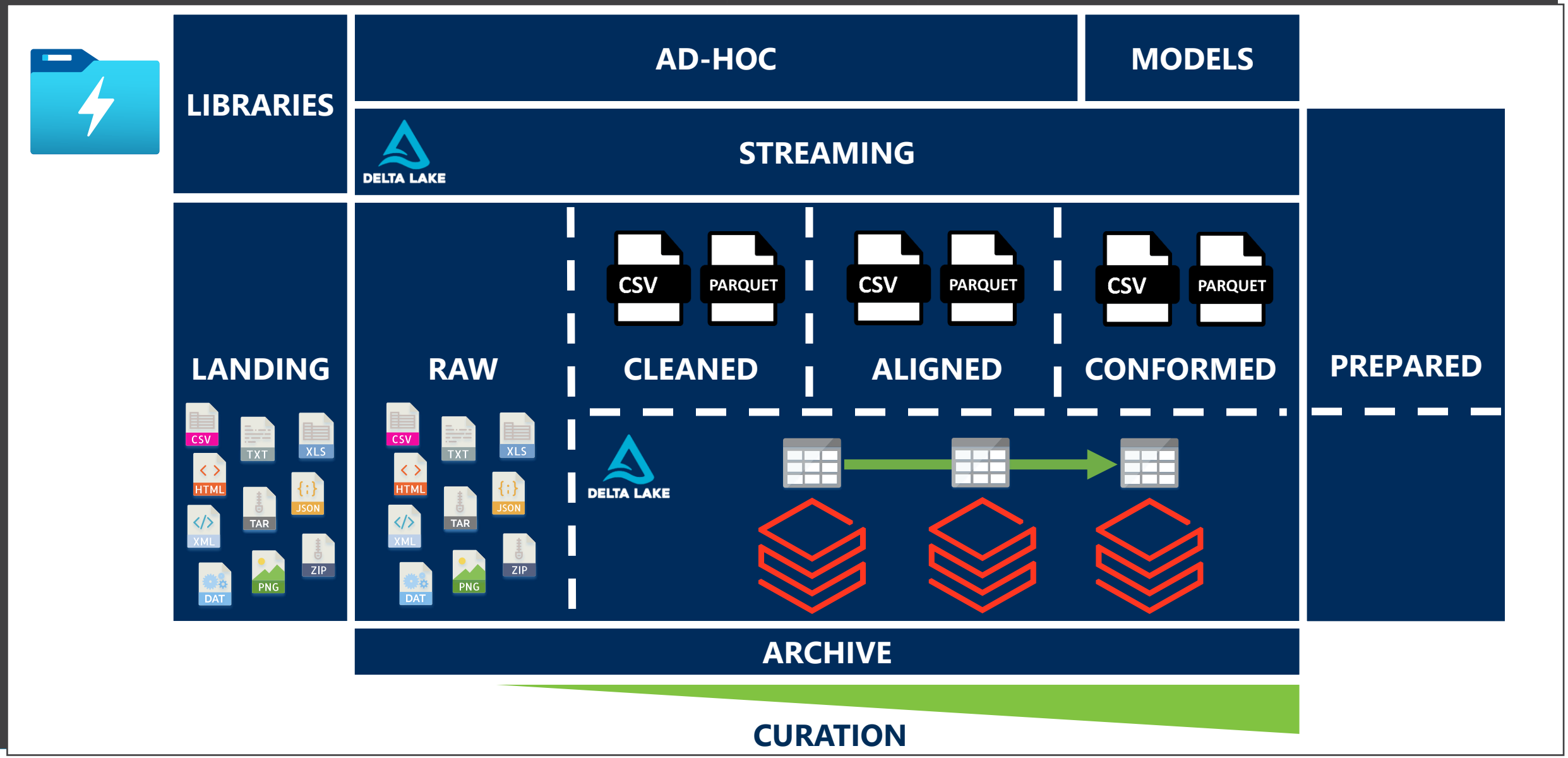


Data Transformation – Storage & Format



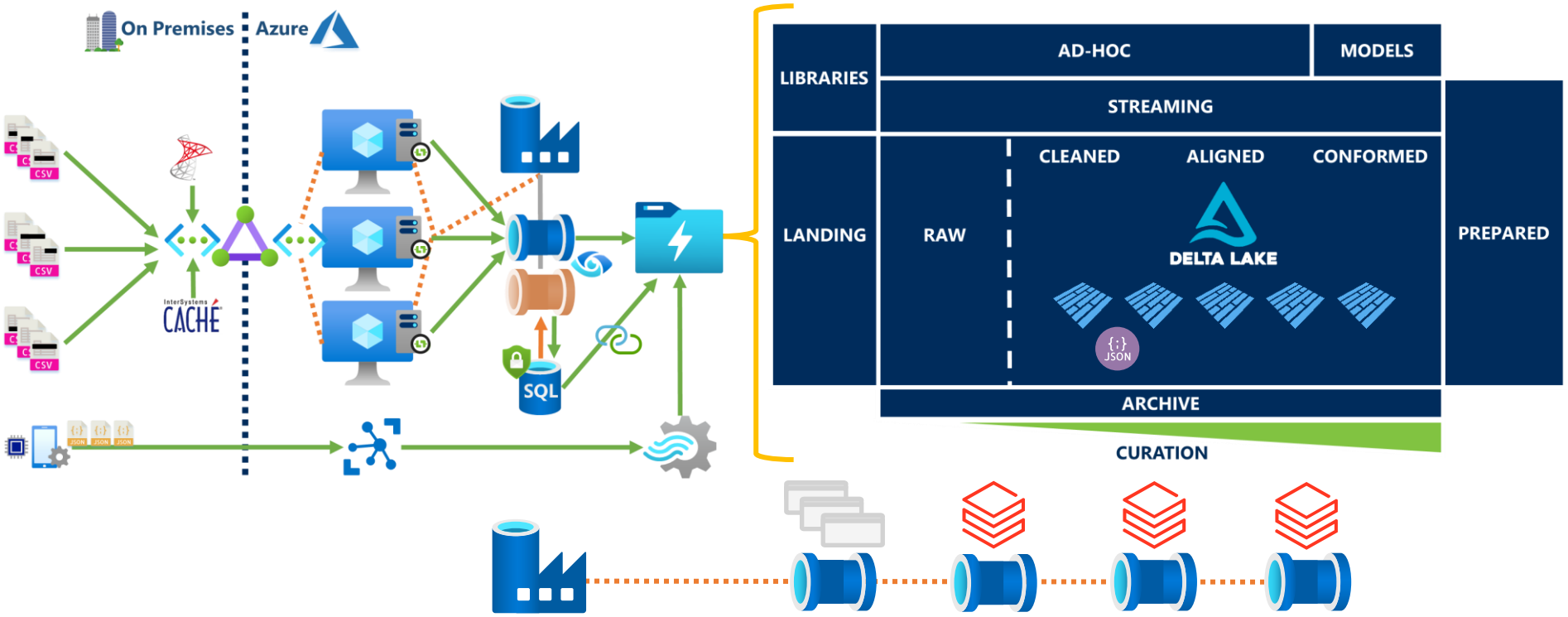
Agenda

1. Design ✓
2. Extract ✓
3. Transform
4. Load

Compute ✓
Storage, Structure
& Data Format ✓

Overall Architecture

Extract | Transform | Load



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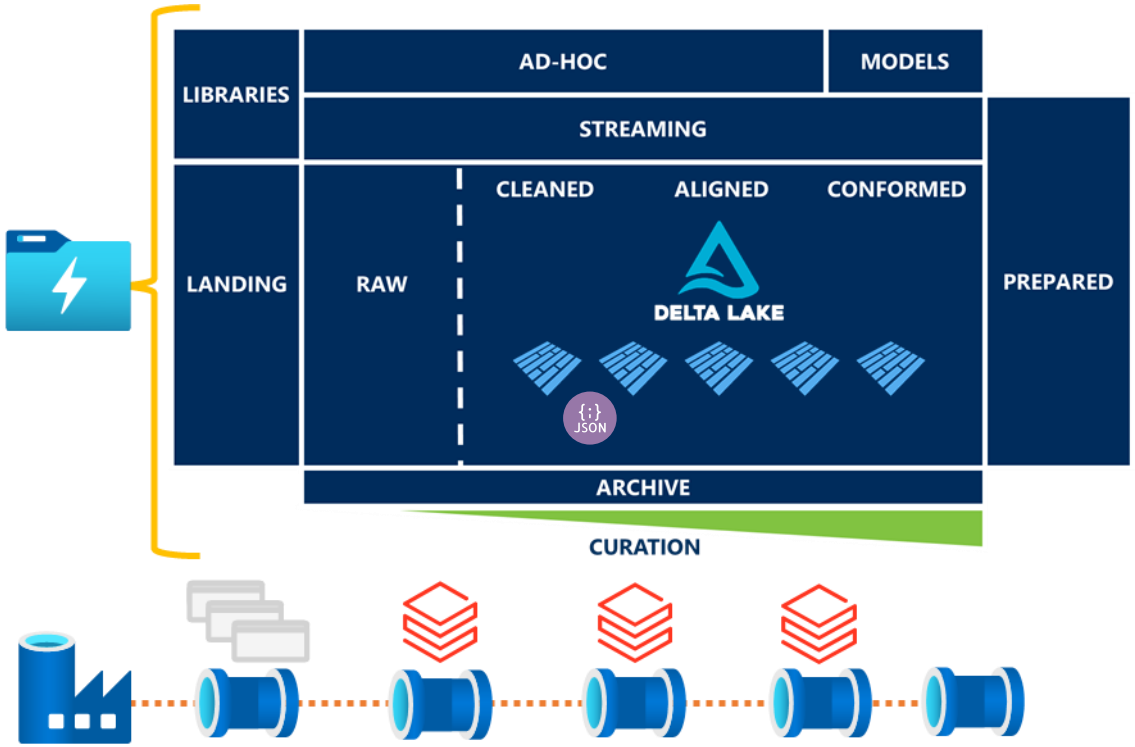

Agenda

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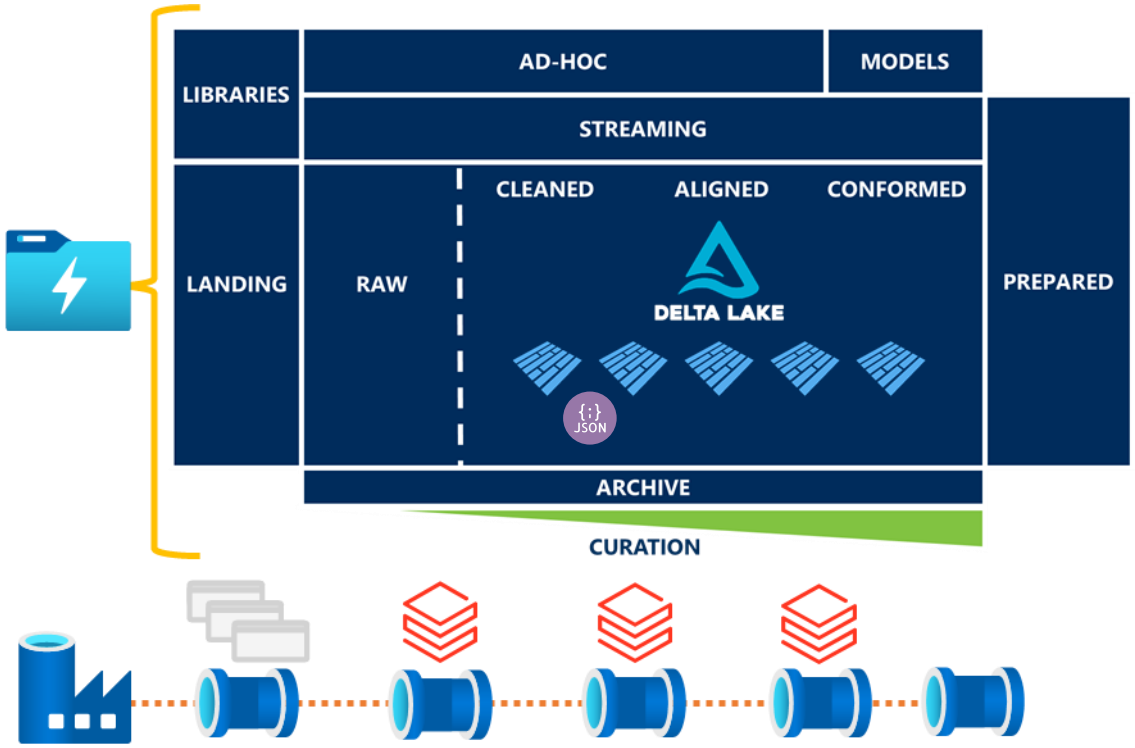
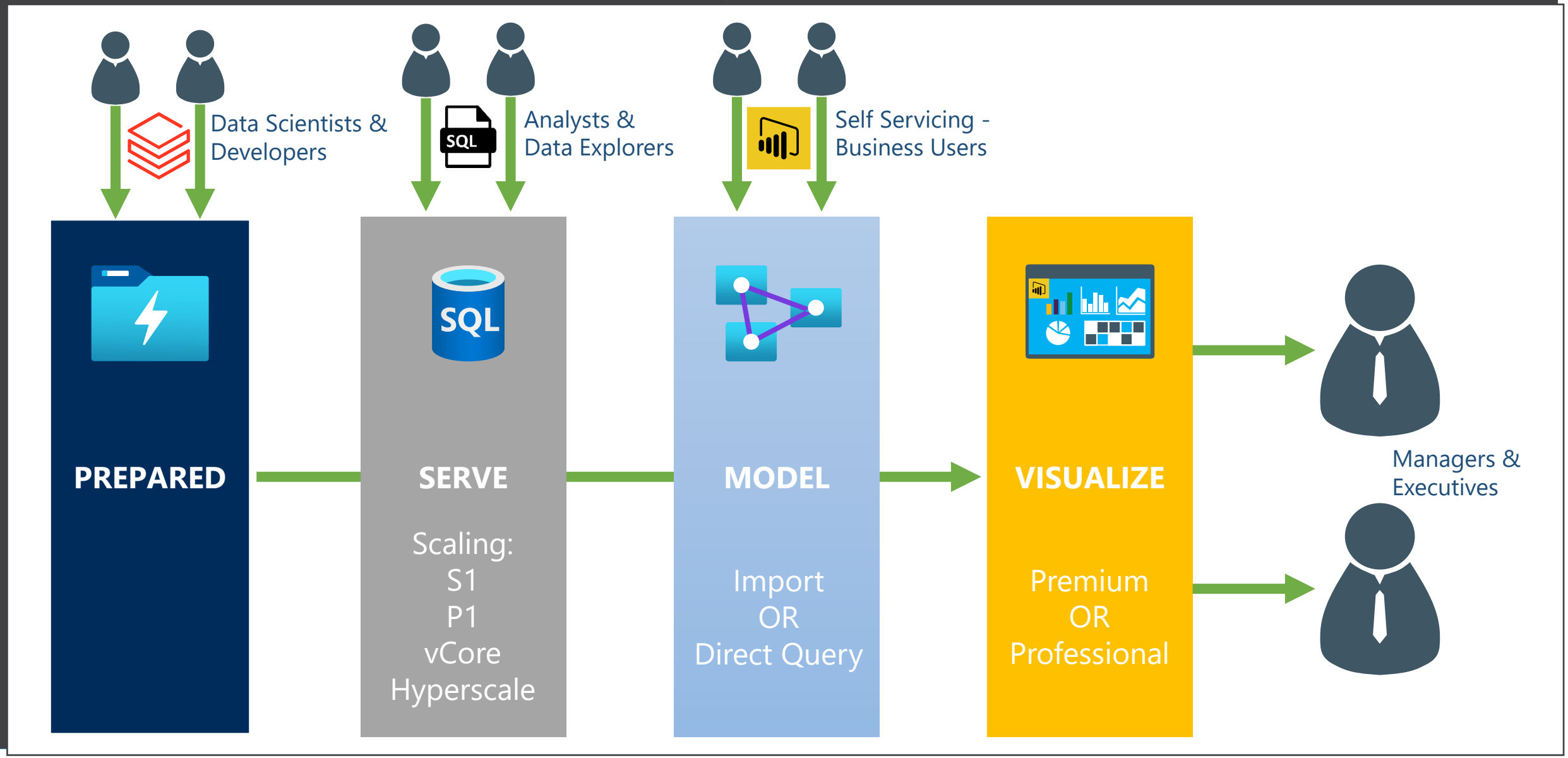
3. Transform ✓
4. Load



Loading & Consuming Data



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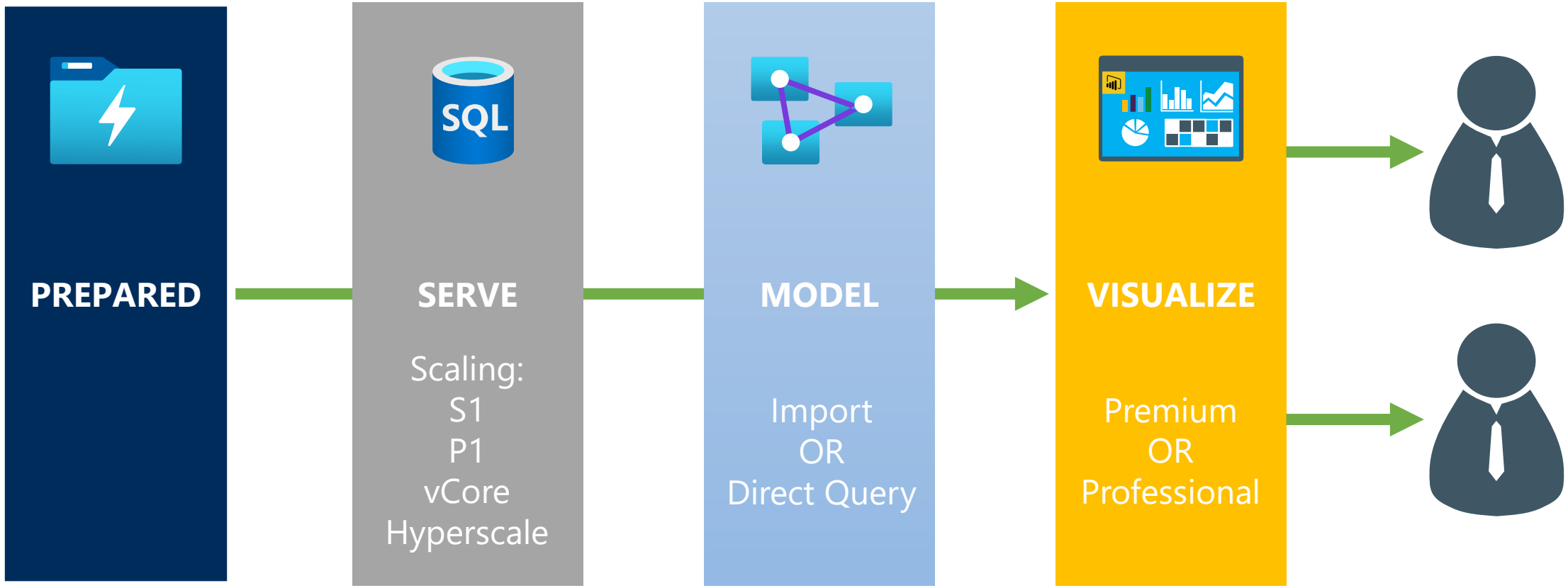

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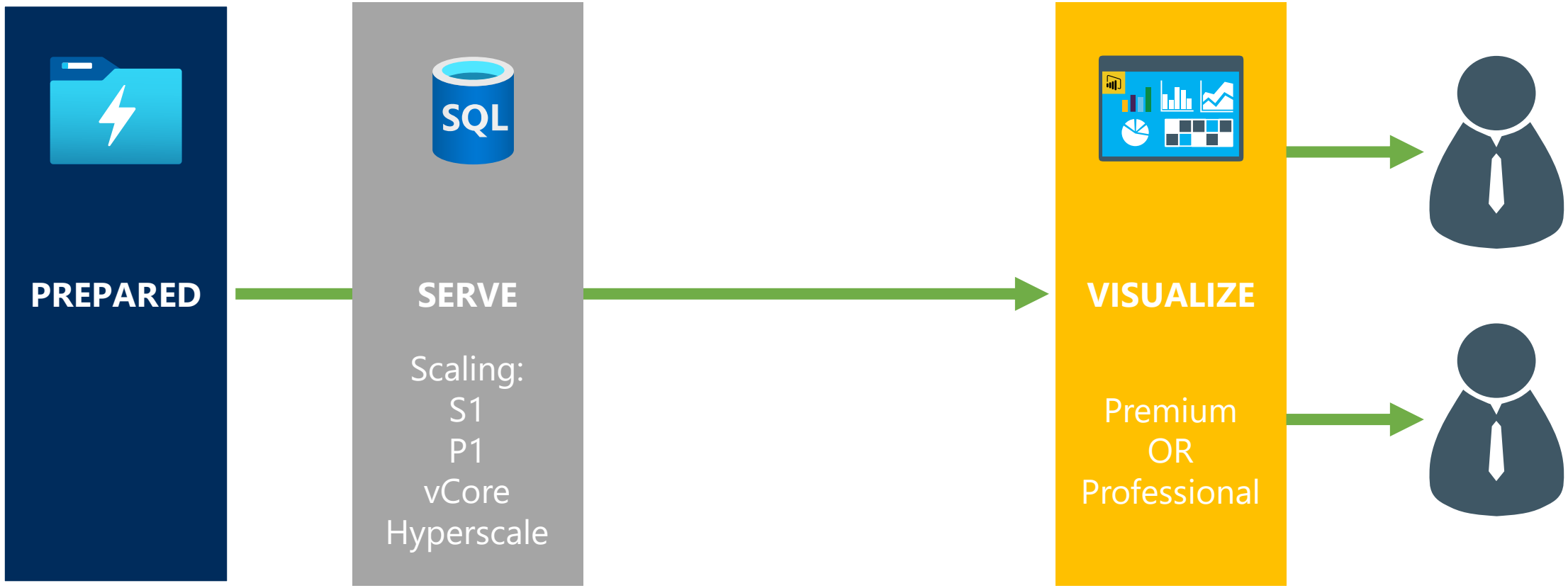

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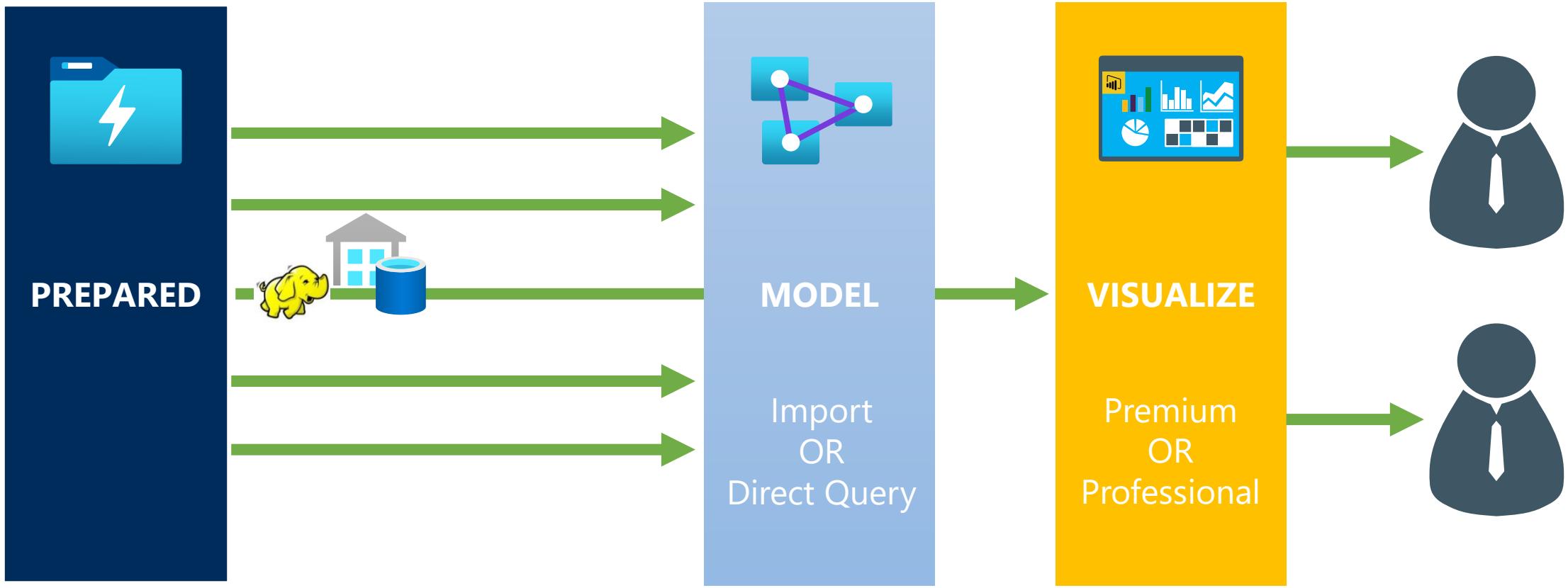

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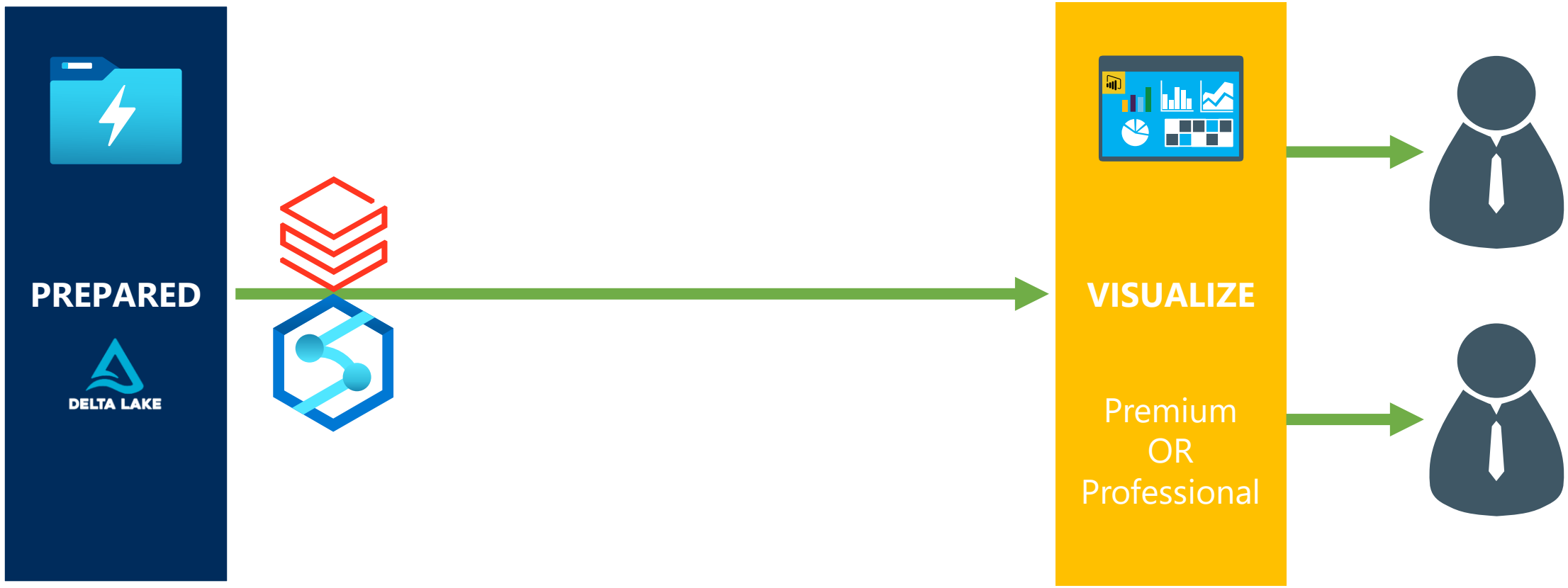
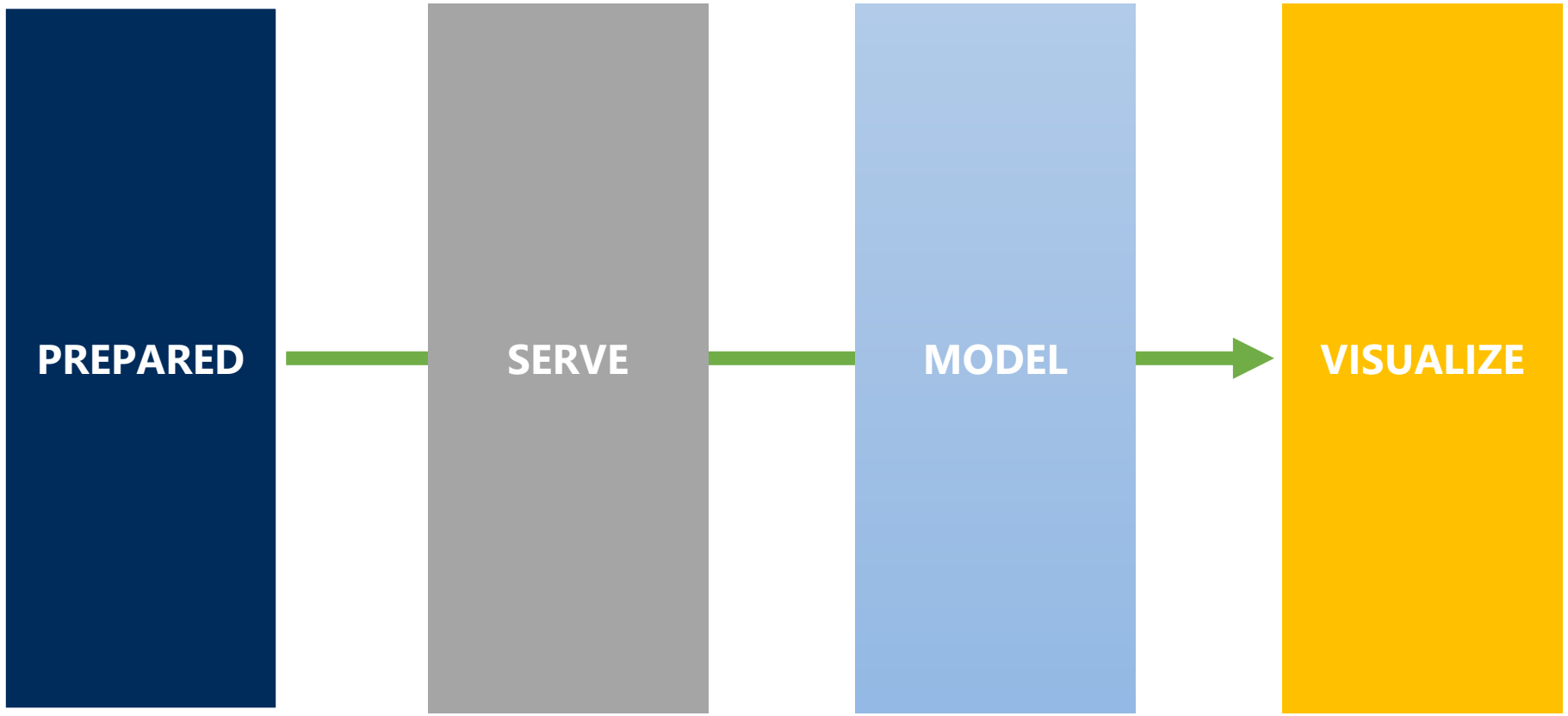
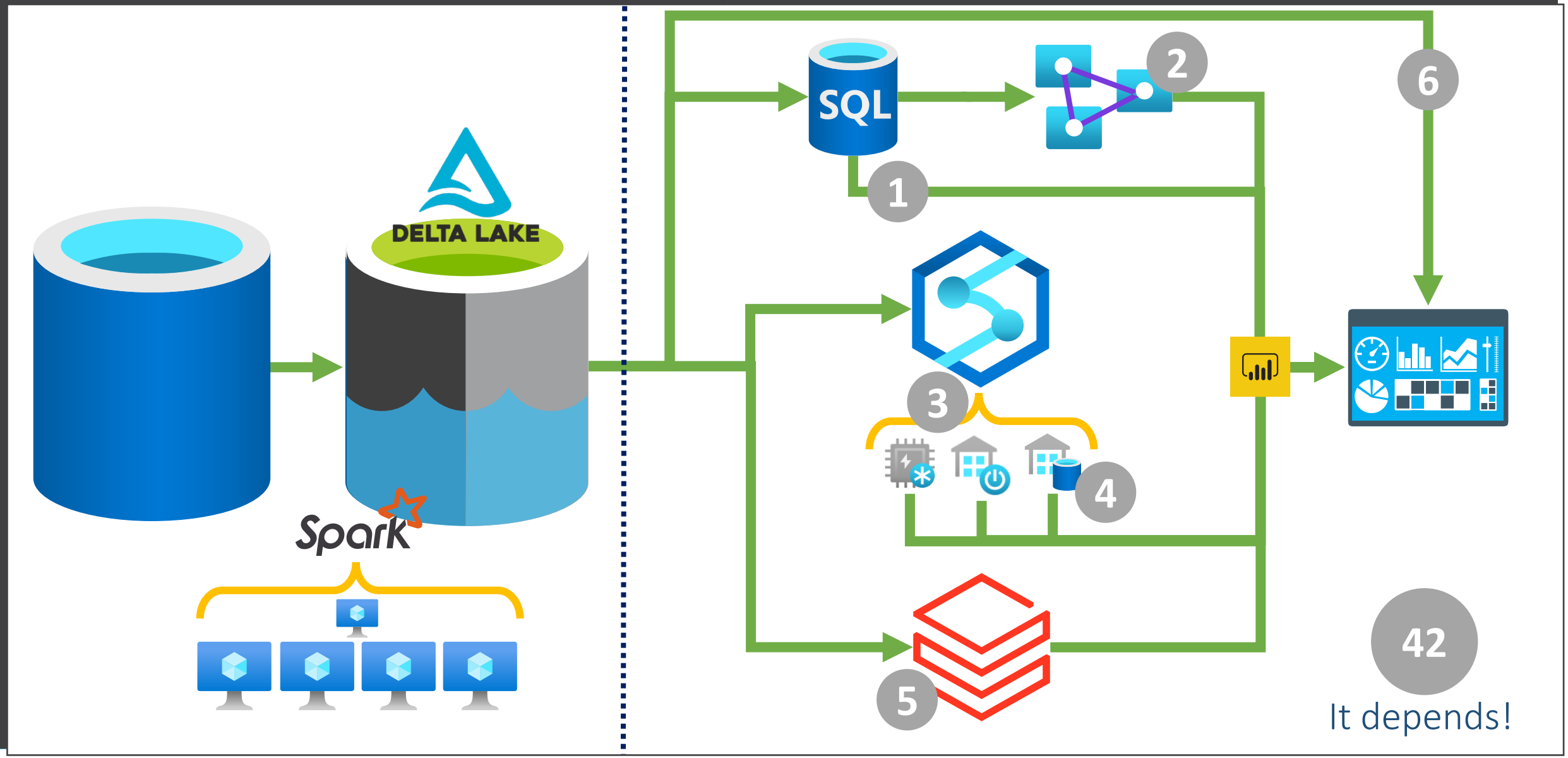


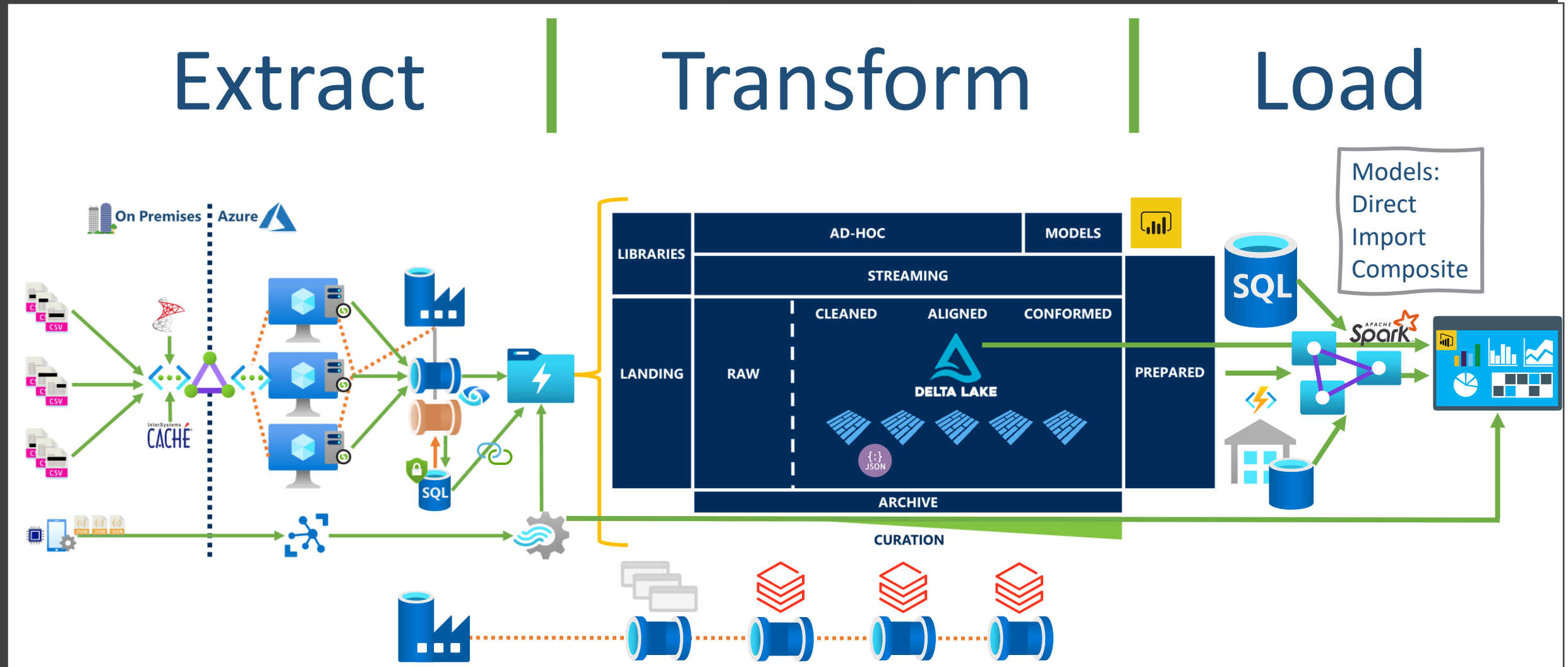
Consuming Our Lake House in Azure



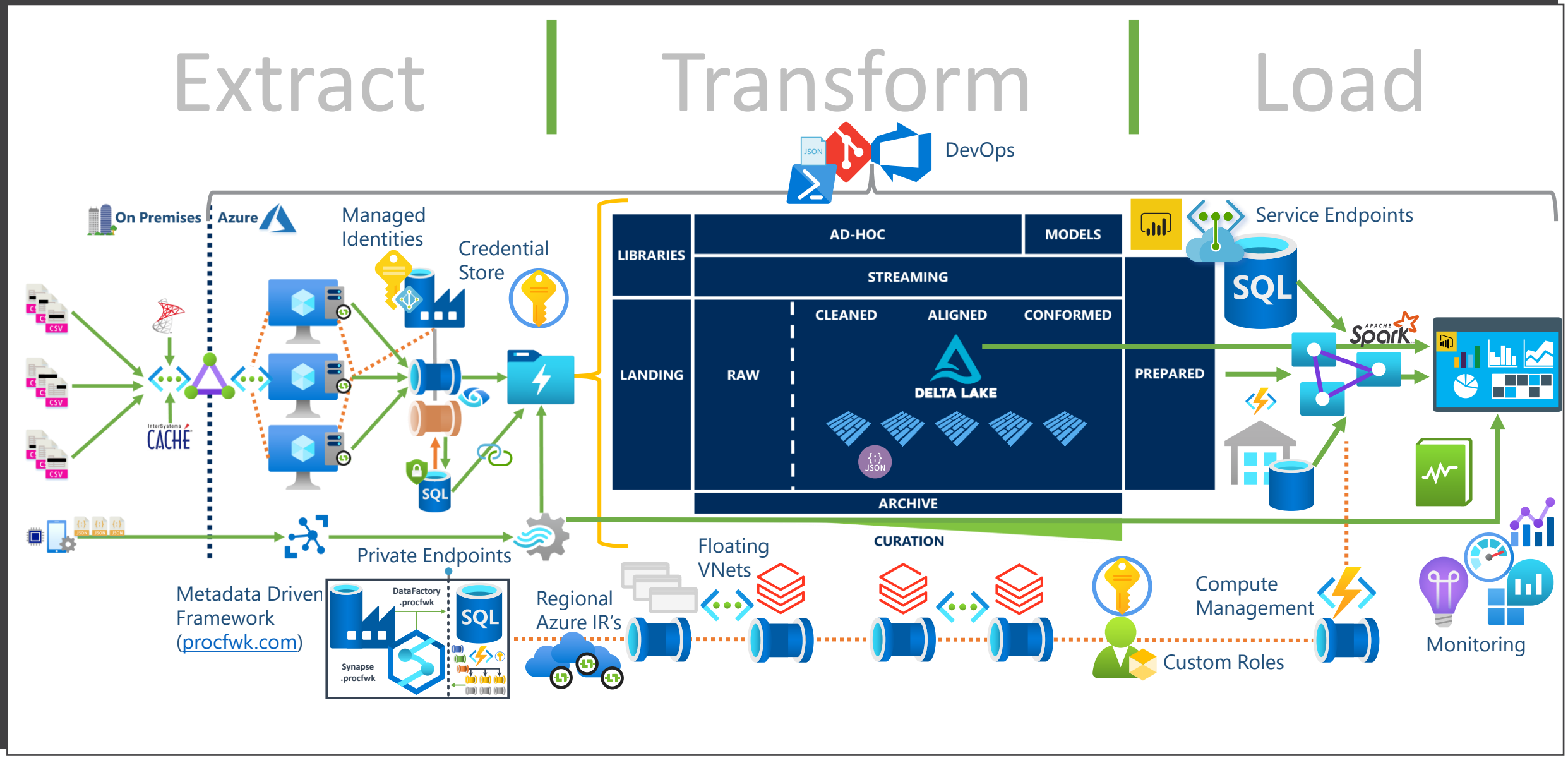
Consuming Our Lake House in Azure



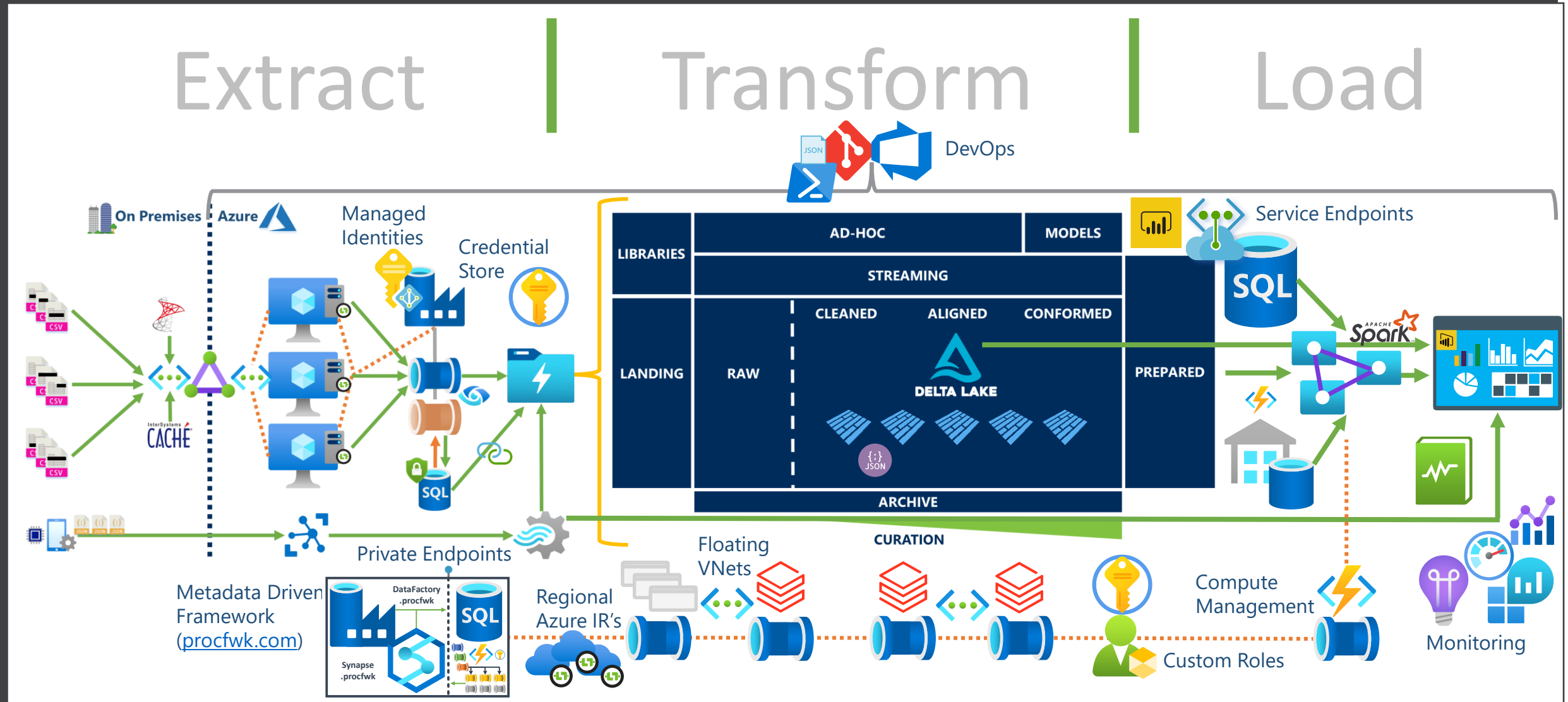
Overall Architecture



Overall Architecture



Overall Architecture



Q: Should we build our data platform solution like this?... A: It depends!

Thank you for listening…

Paul Andrew

Microsoft Most Valuable Professional

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