Building an Azure Data Analytics Platform

End-to-End

Paul Andrew | Technical Architect in Azure CoE

Microsoft® Most Valuable Professional

avanade

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MrPaulAndrew.com

c/MrPaulAndrew

https://github.com/mrpaulandrew

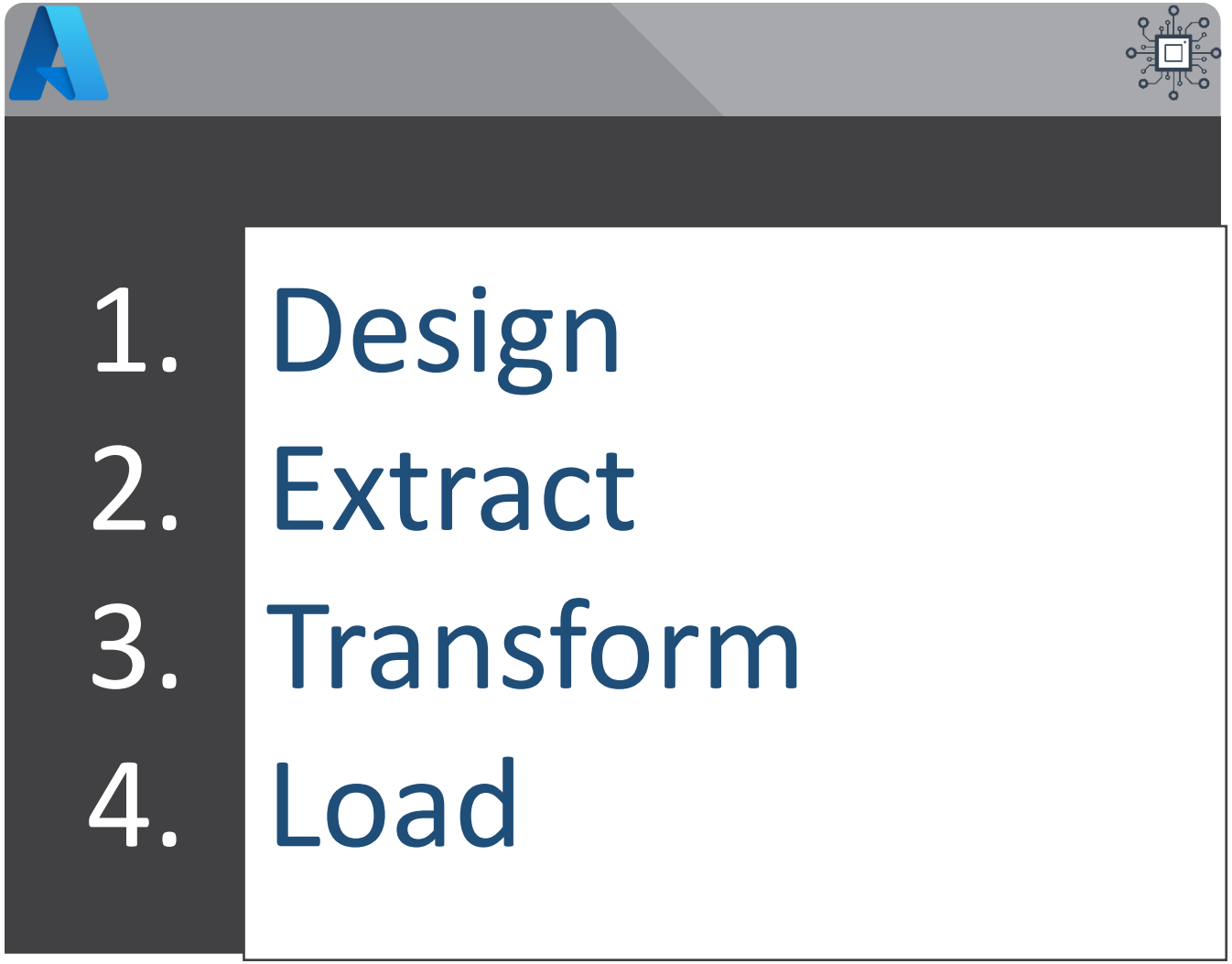
CommunityEvents

Demo code, content and slides from various community events.

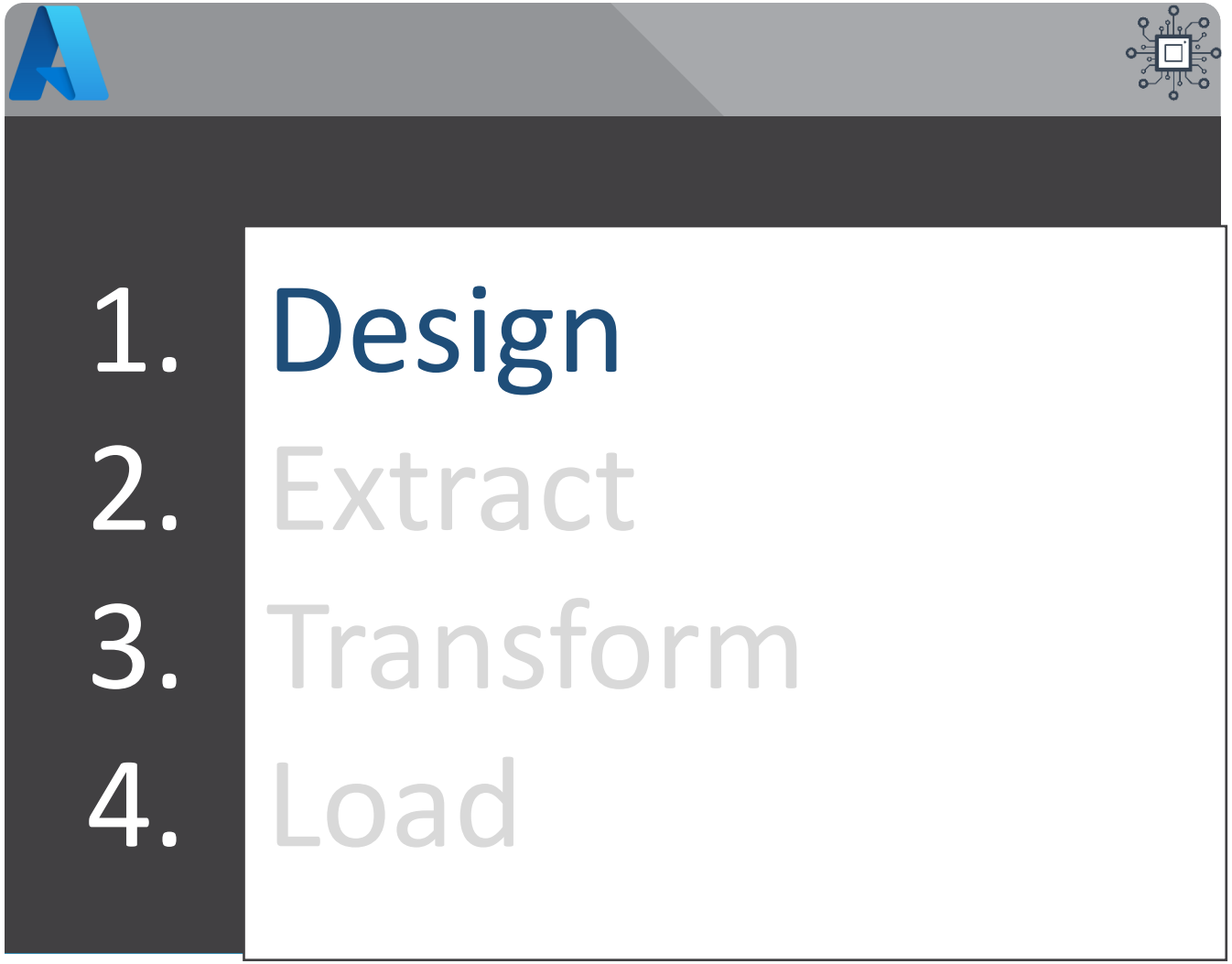
C++

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

Agenda



Agenda



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

Answer:
42 ✗

Answer:
It depends! ✓

Question:
What is big data?

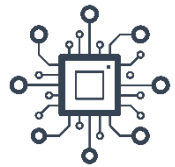
Answer:
It depends!

Volume
Velocity
Variety
Veracity
Value

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

- Buck Woody

@BuckWoodyMSFT



Question: What is our goal?

Paul's Magic Box -
From the Hogwarts!

Data Sources

Data Warehouse

Data Insights

Data = Information = Knowledge = Power

Question: What is our goal?

Clean
Enrich
Conform
Translate
Transform
Curate
Analyse
Model
Predict
Master

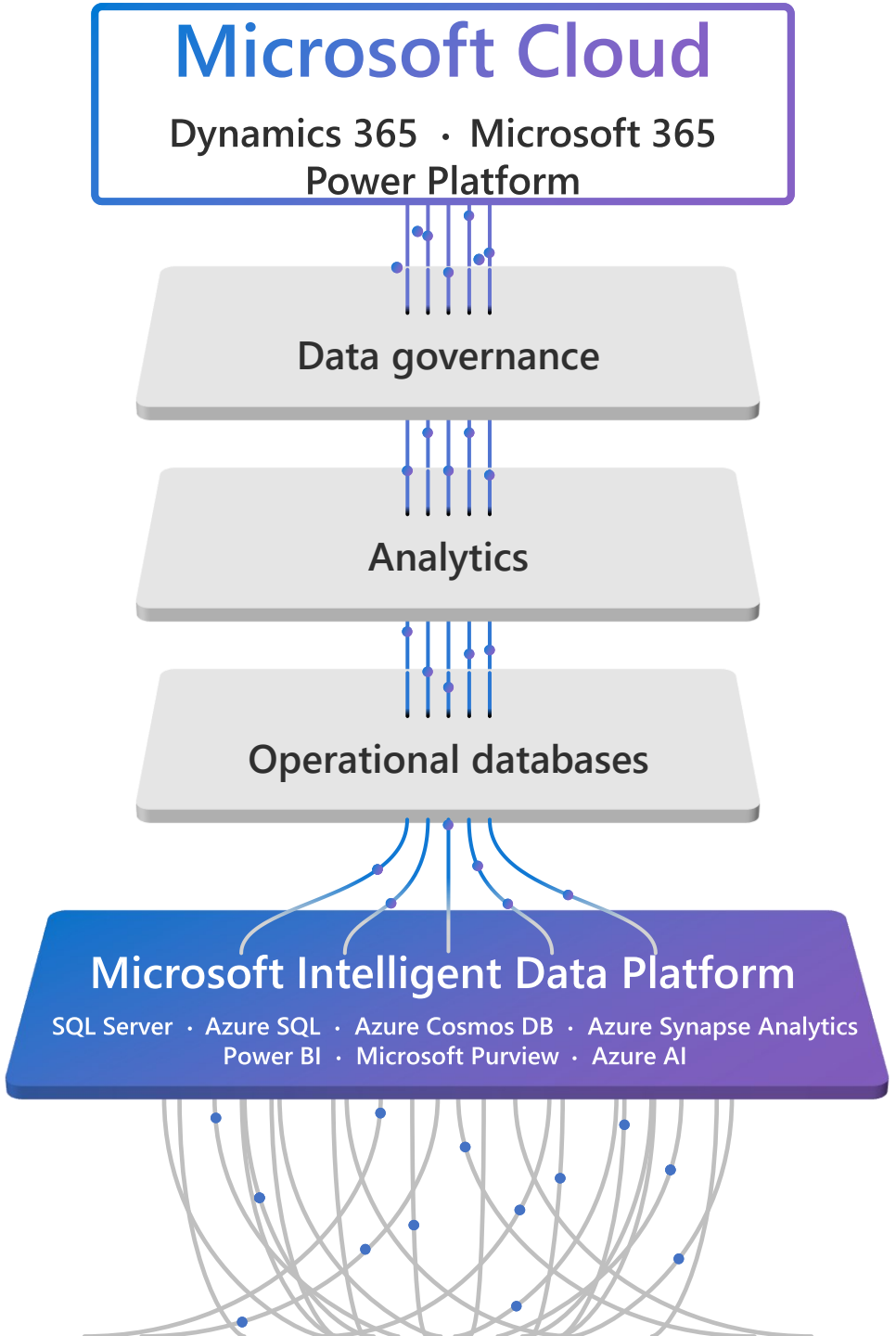
Data Sources → Data Warehouse → Data Insights

Data = Information = Knowledge = Power

Paul's Reference Architecture

Data = Information = Knowledge = Power

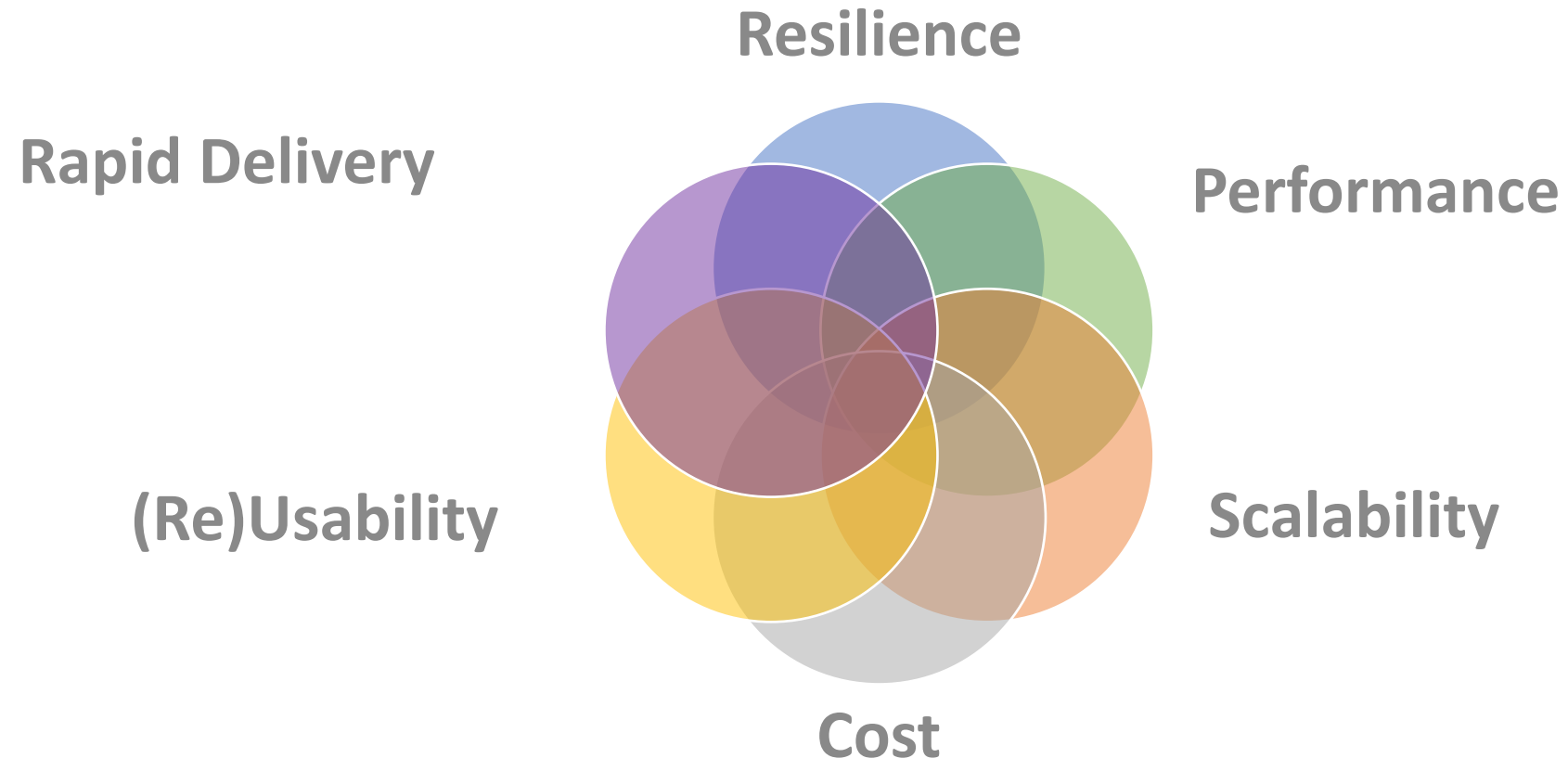
Microsoft's Intelligent Data Platform



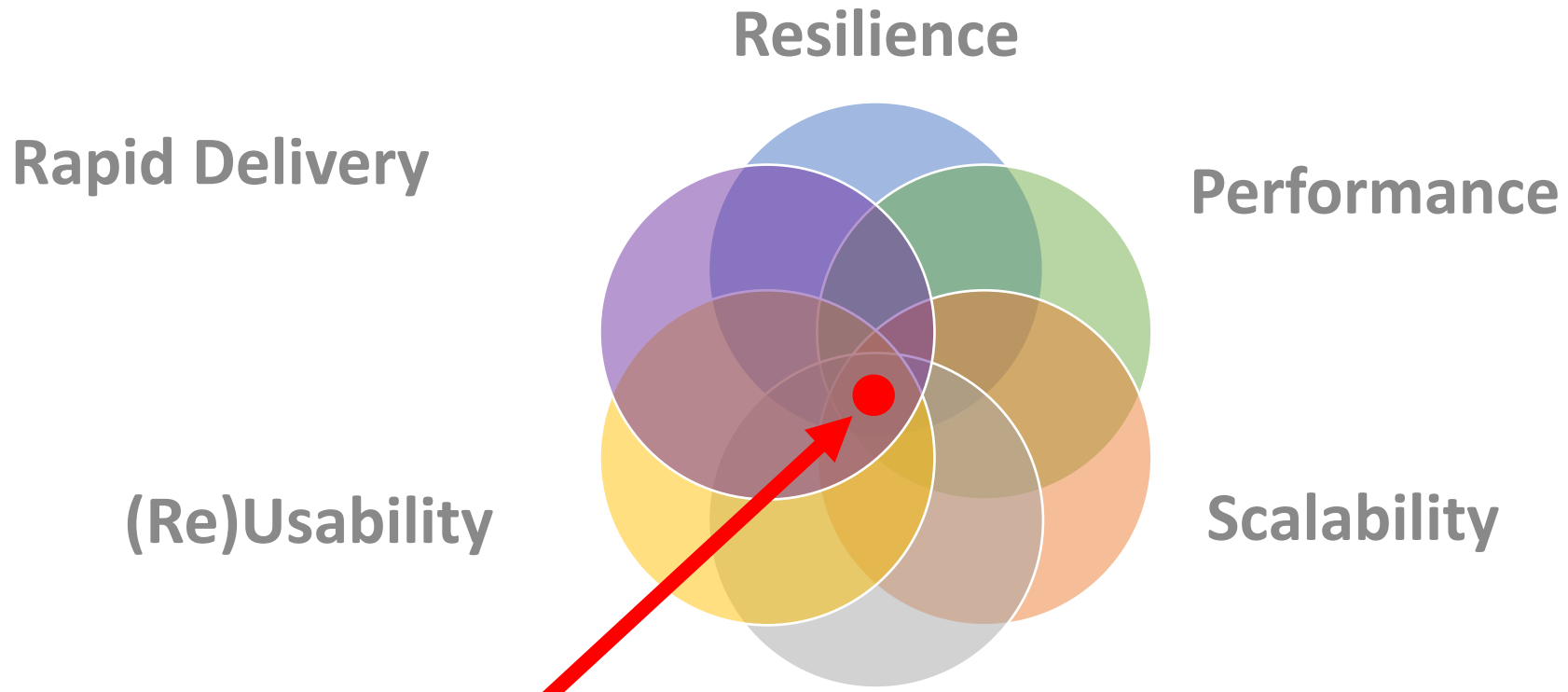
Paul's Reference Architecture

Data = Information = Knowledge = Power

What is your primary design focus?



What is your primary design focus?



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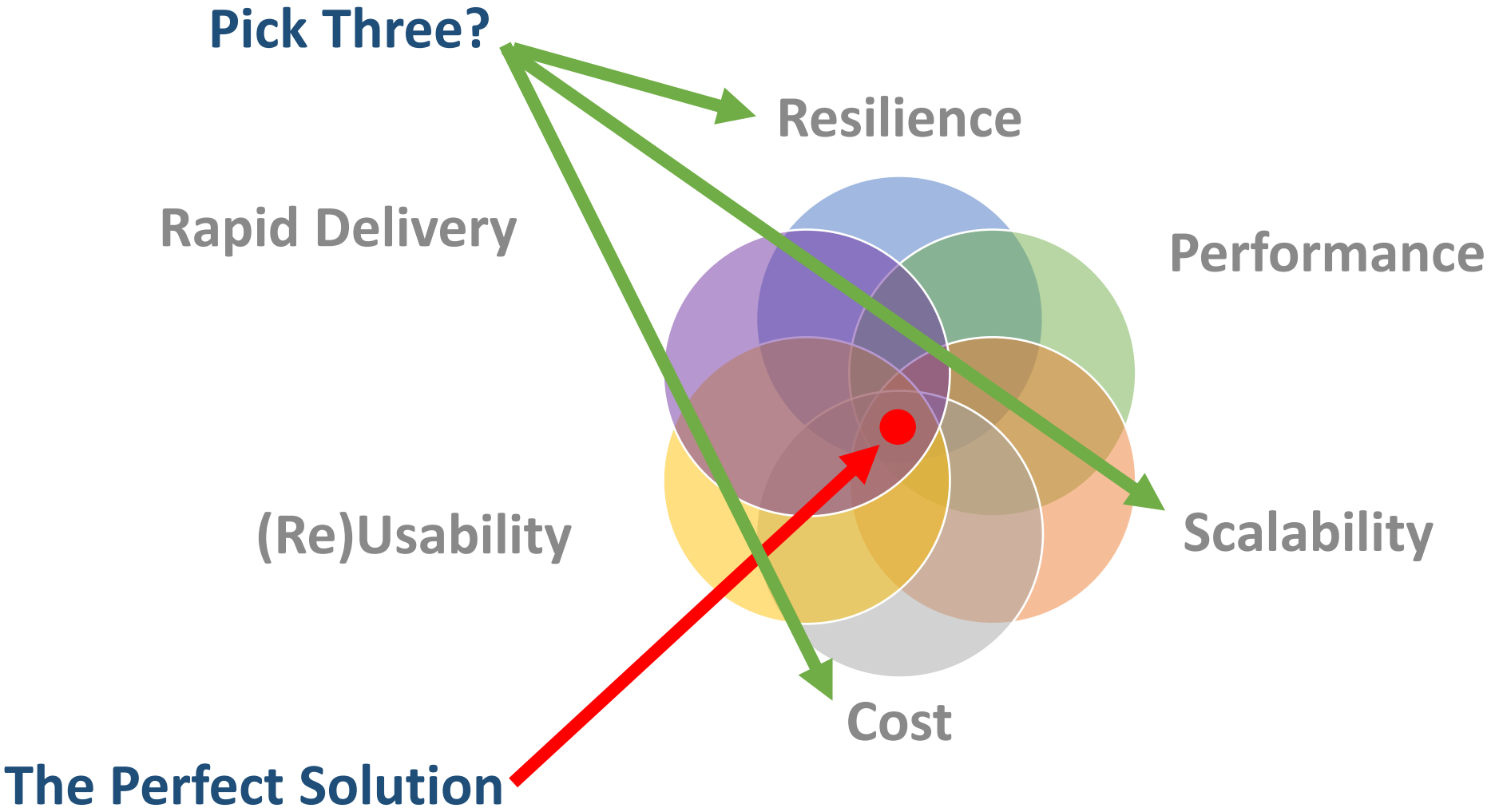
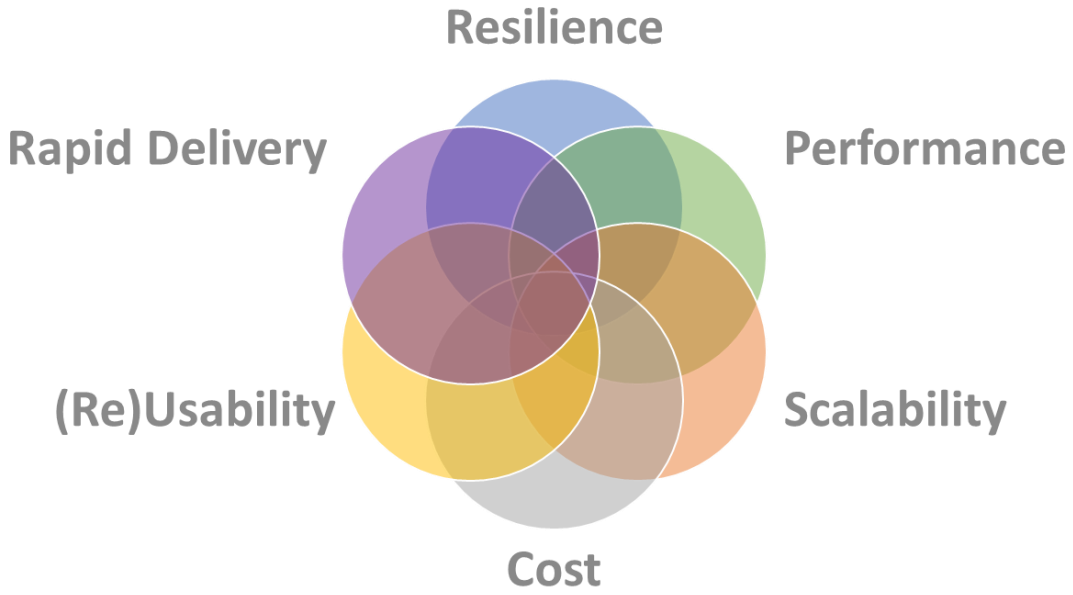


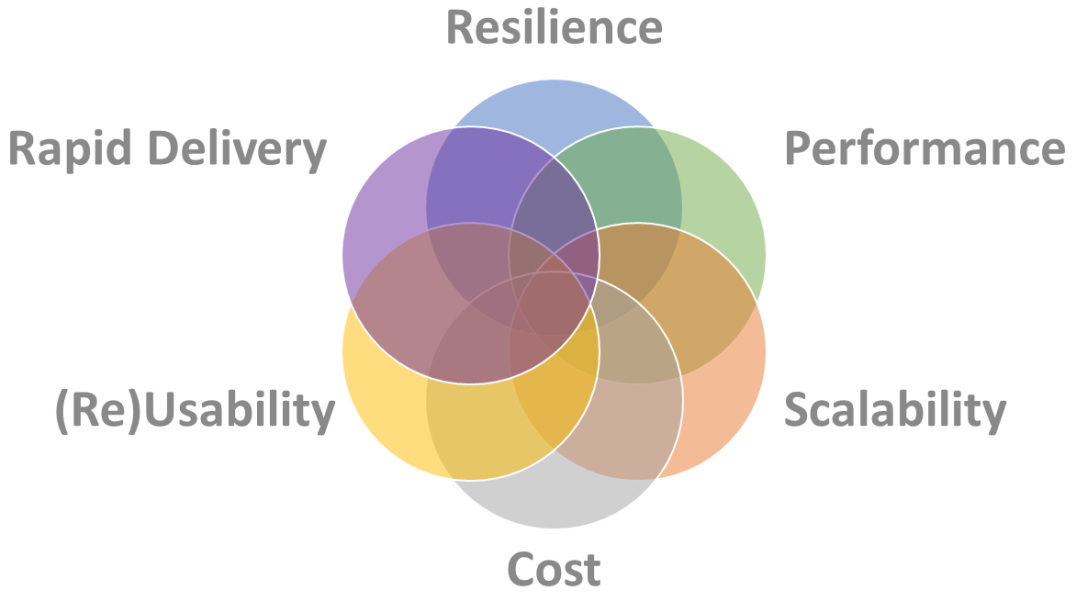
Agenda

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



Agenda

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



Data Extraction & Ingestion

Data Structure

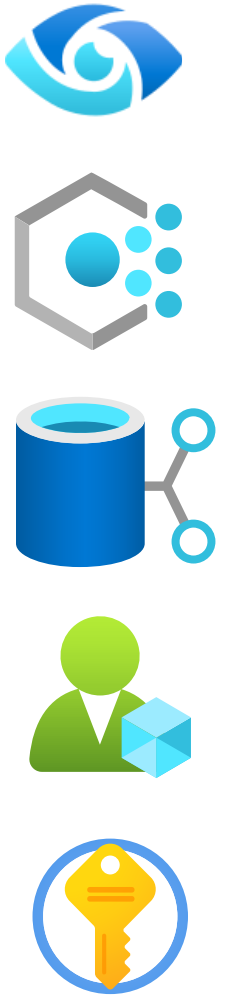
Data Source

Push or Pull

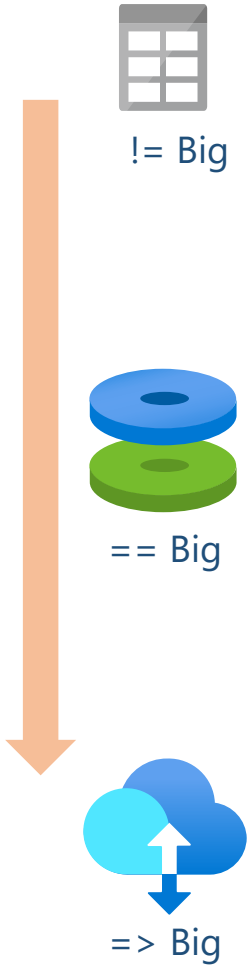
Batch or Speed

Public or Private Transfer

Data Sensitivity



Data Volume



Data Extraction & Ingestion – Spec v1

Data Structure

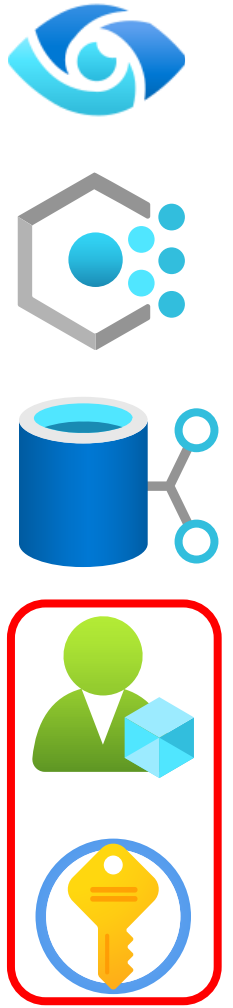
Data Source

Push or Pull

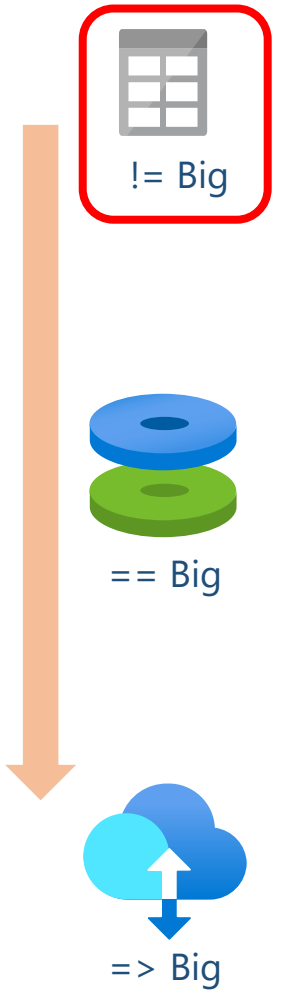
Batch or Speed

Public or Private Transfer

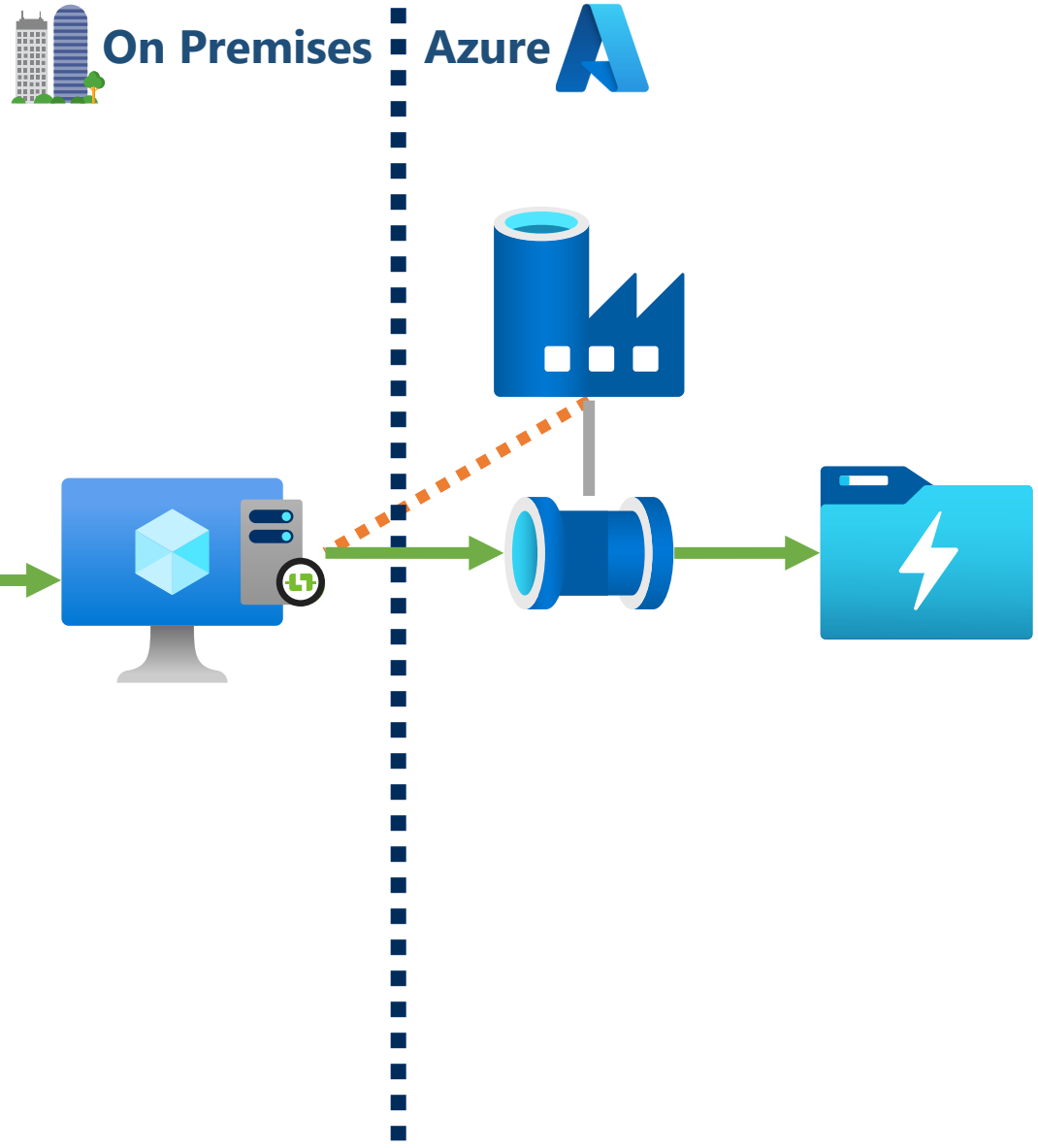
Data Sensitivity



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

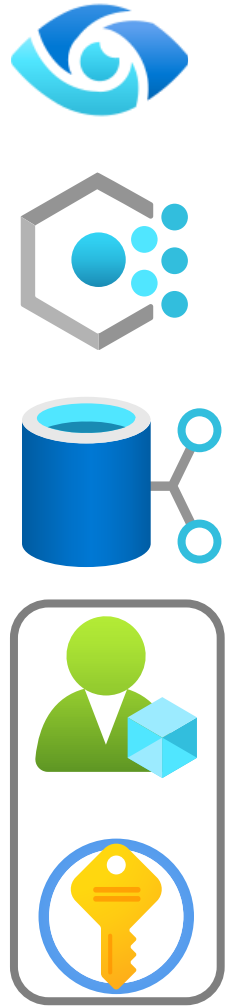
Data Source

Push or Pull

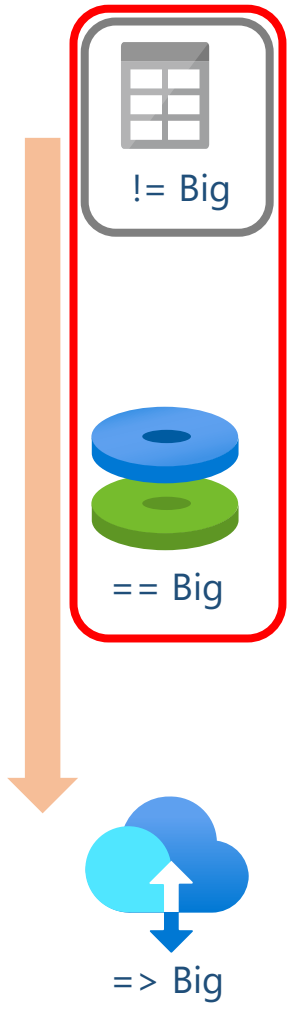
Batch or Speed

Public or Private Transfer

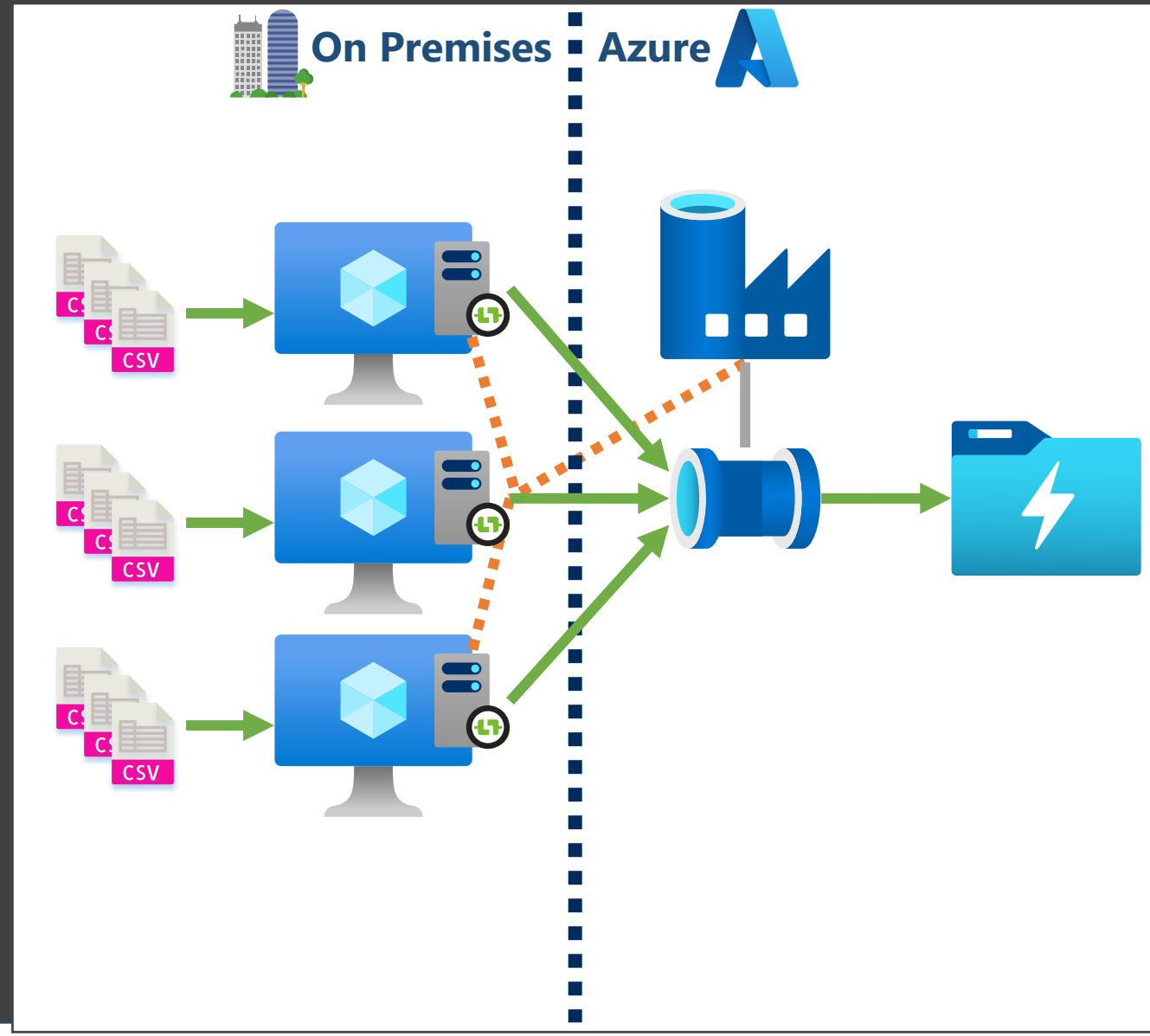
Data Sensitivity



Data Volume



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

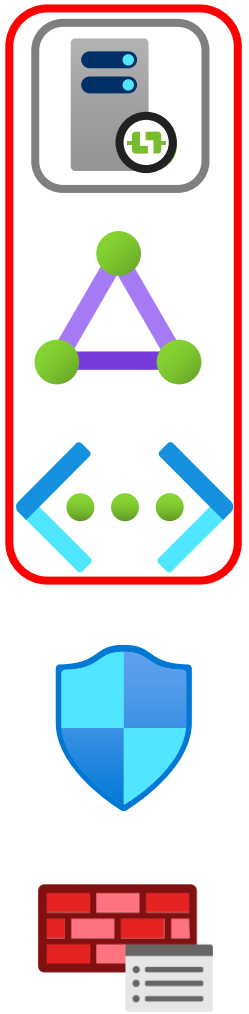
Data Structure

Data Source

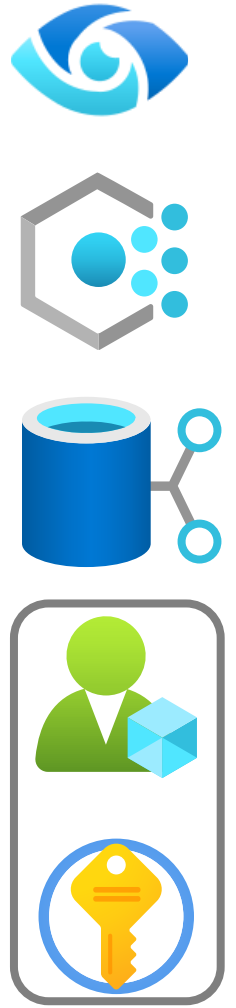
Push or Pull

Batch or Speed

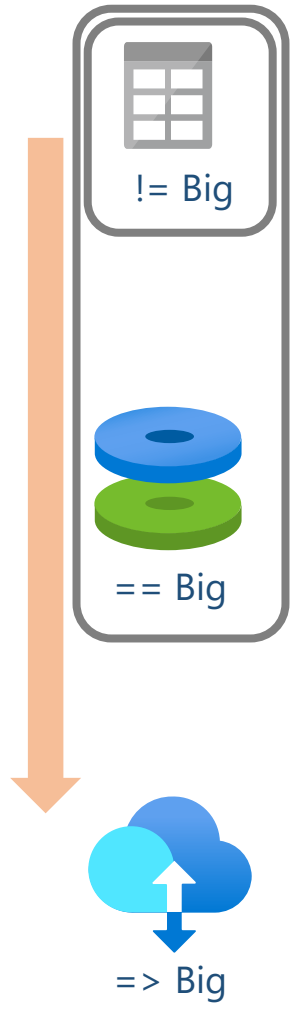
Public or Private Transfer



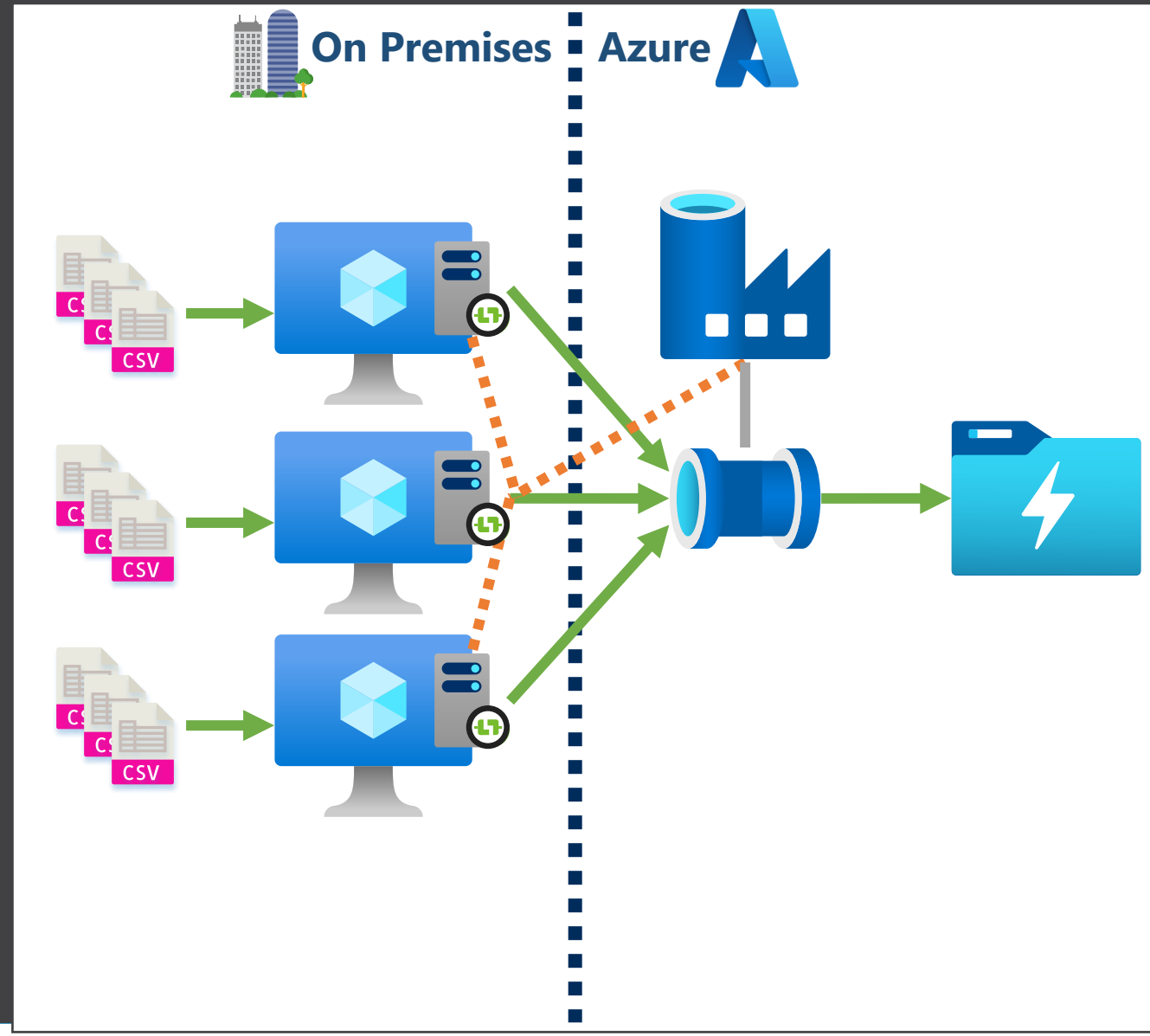
Data Sensitivity



Data Volume



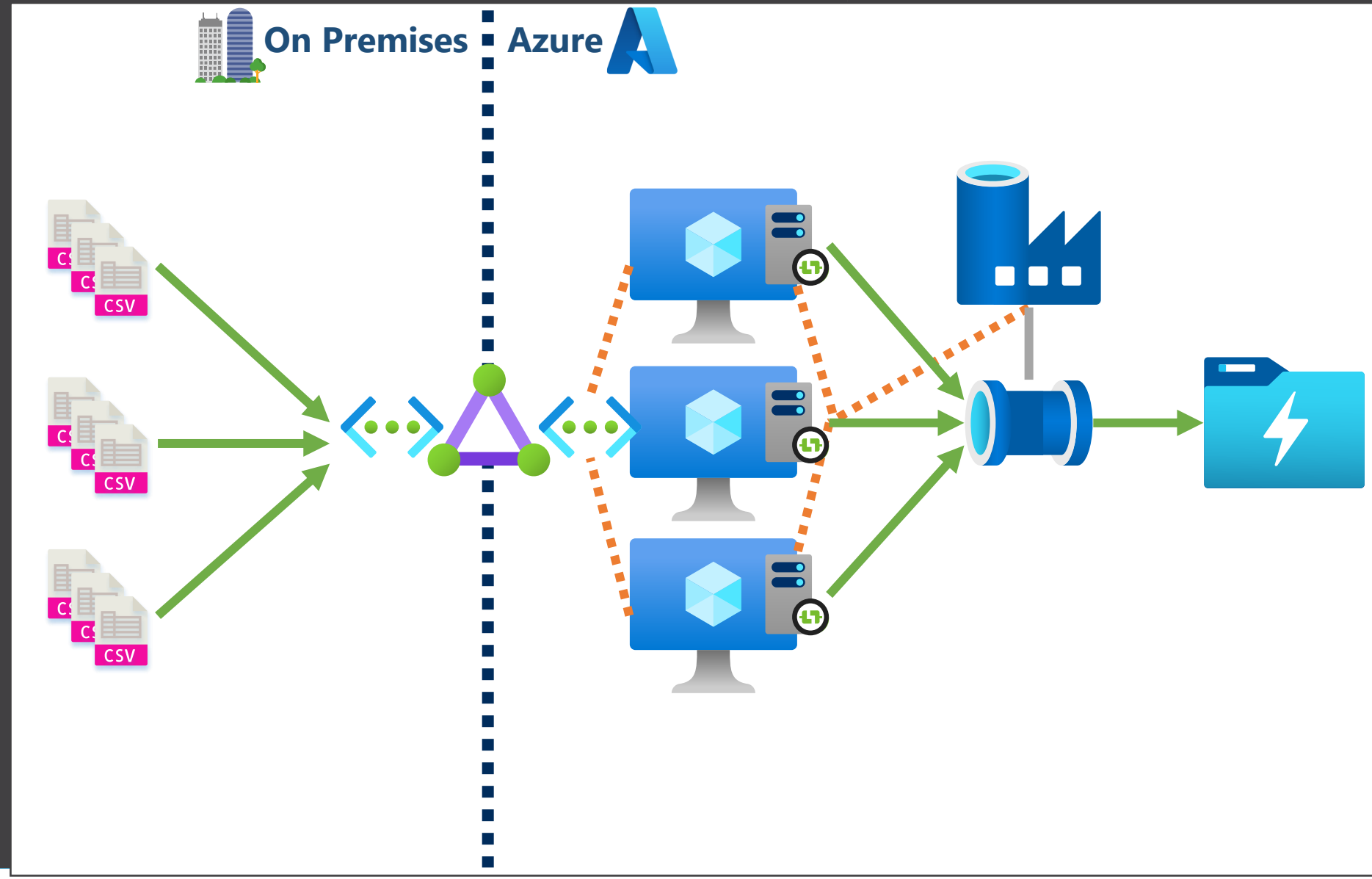
Data Extraction & Ingestion – Solution 3



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

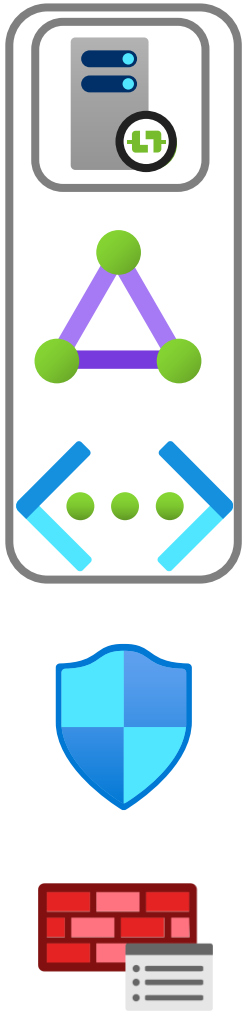
Data Structure

Data Source

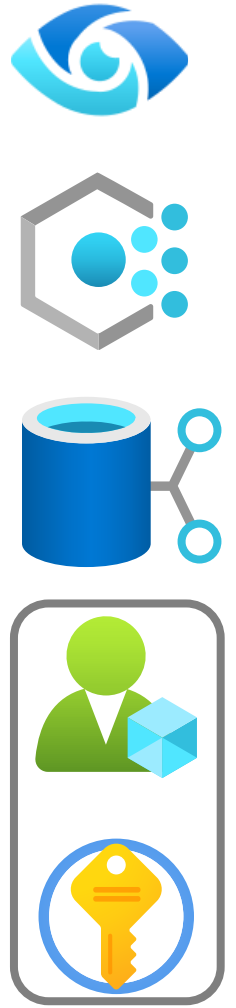
Push or Pull

Batch or Speed

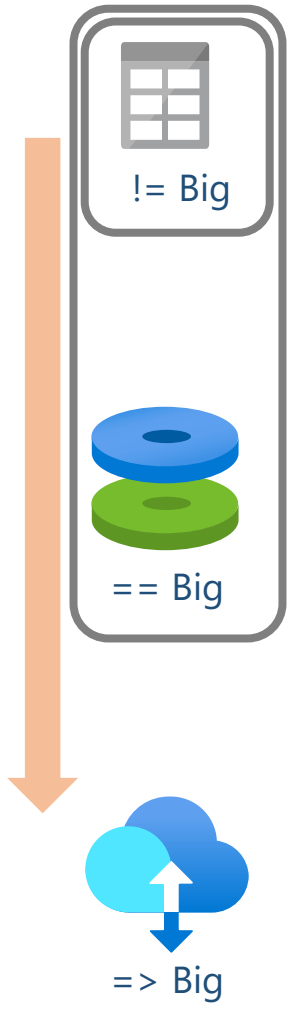
Public or Private Transfer



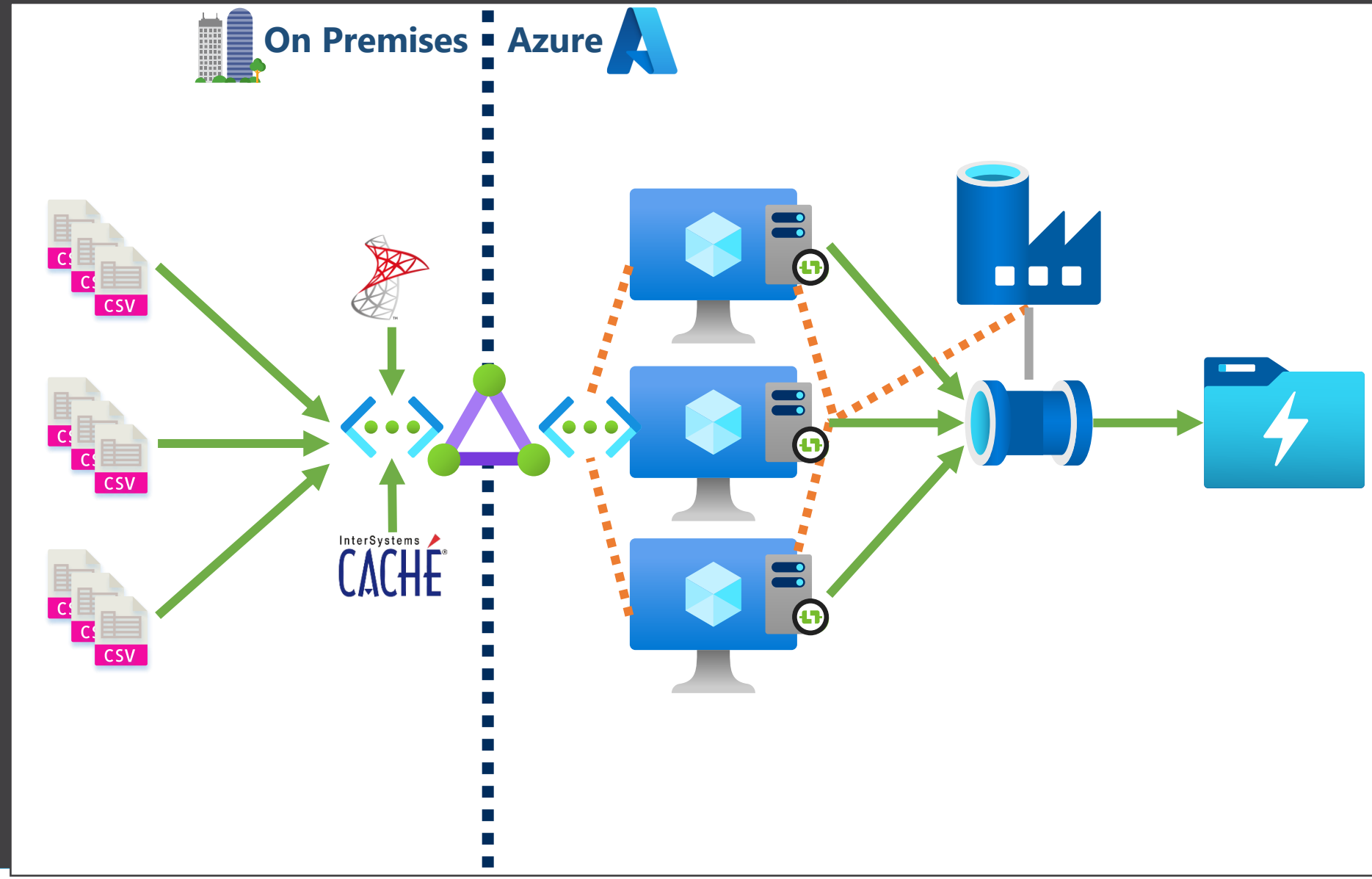
Data Sensitivity



Data Volume



Data Extraction & Ingestion – Solution 4

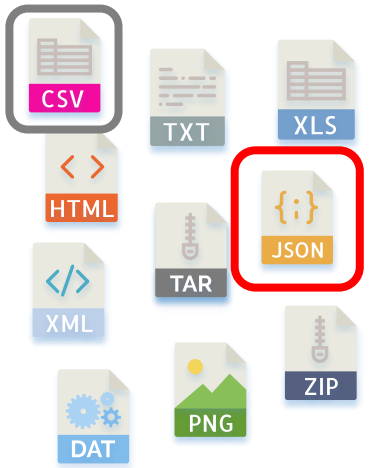


Requirements:

- 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

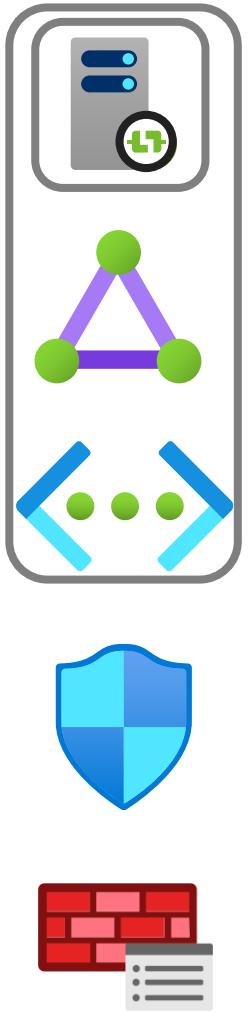


Data Source

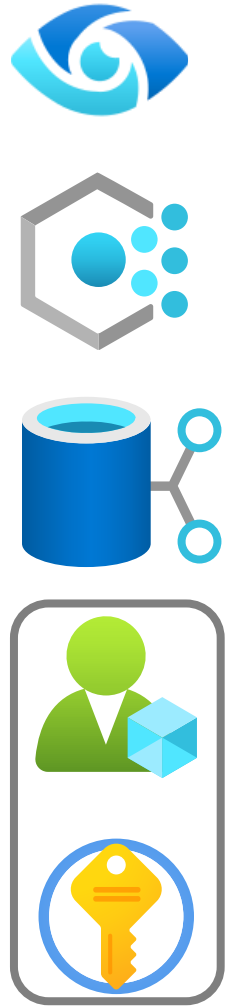
Push or Pull

Batch or Speed

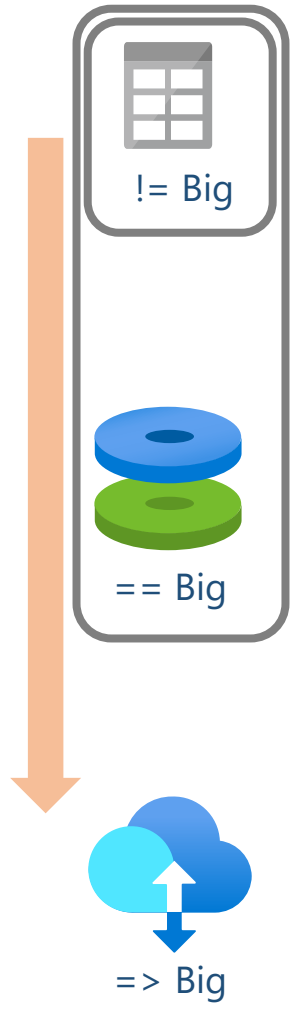
Public or Private Transfer



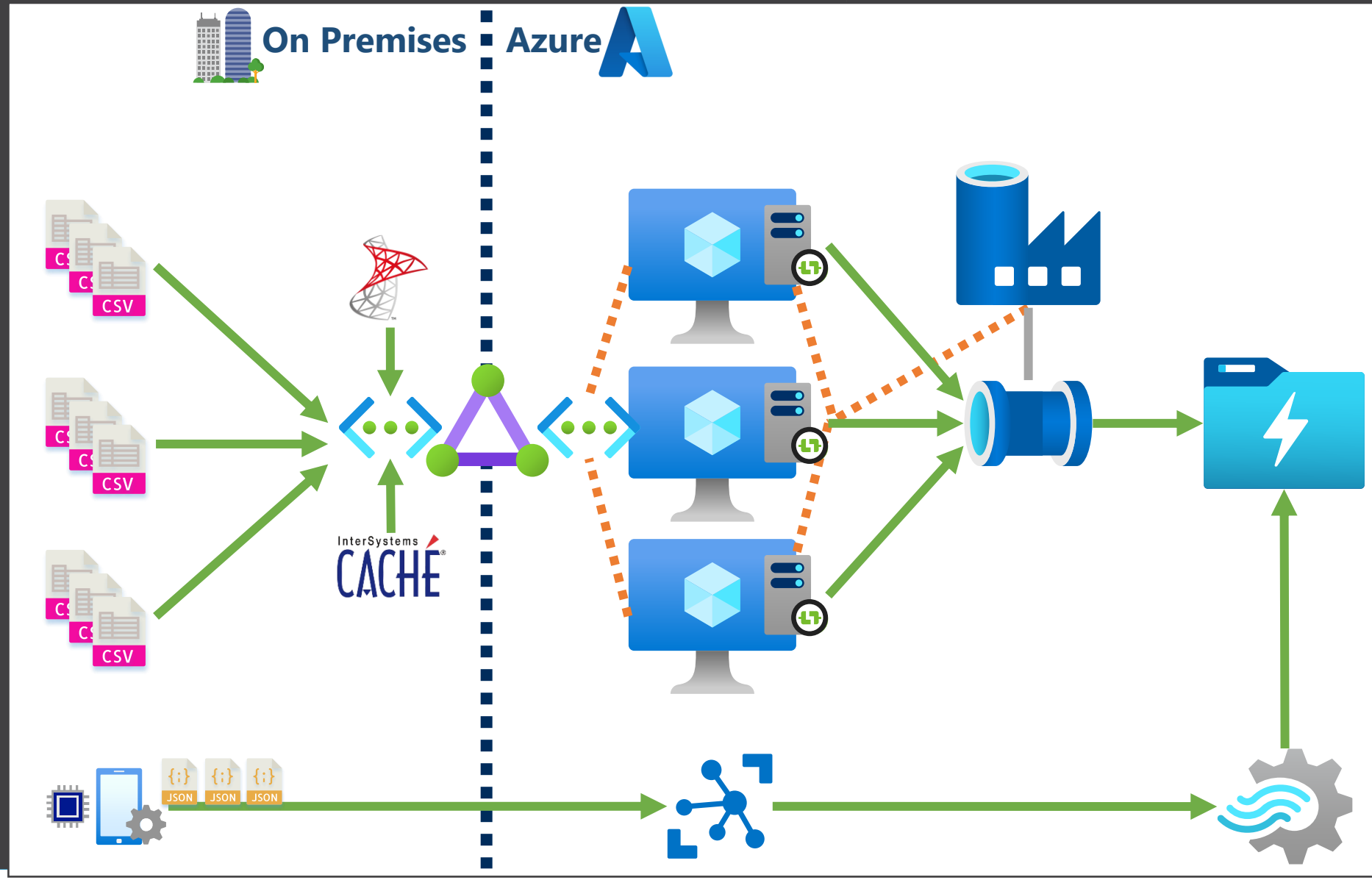
Data Sensitivity



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

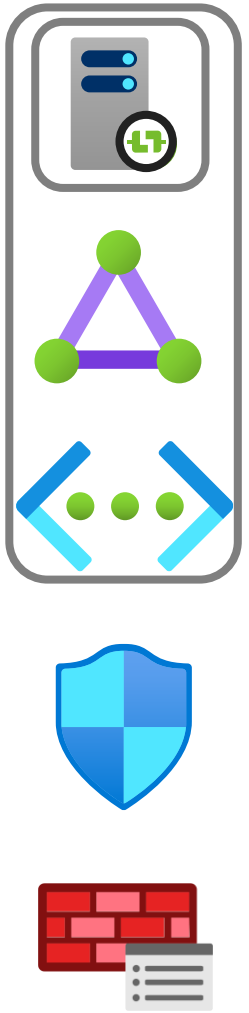
Data Structure

Data Source

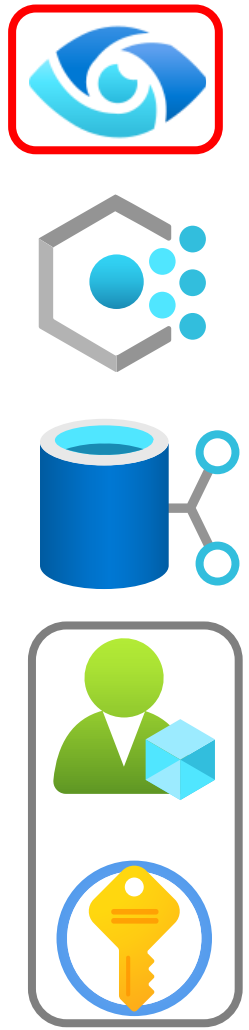
Push or Pull

Batch or Speed

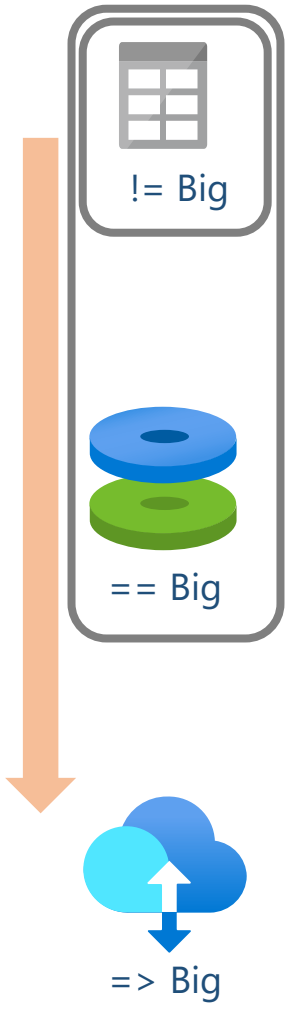
Public or Private Transfer



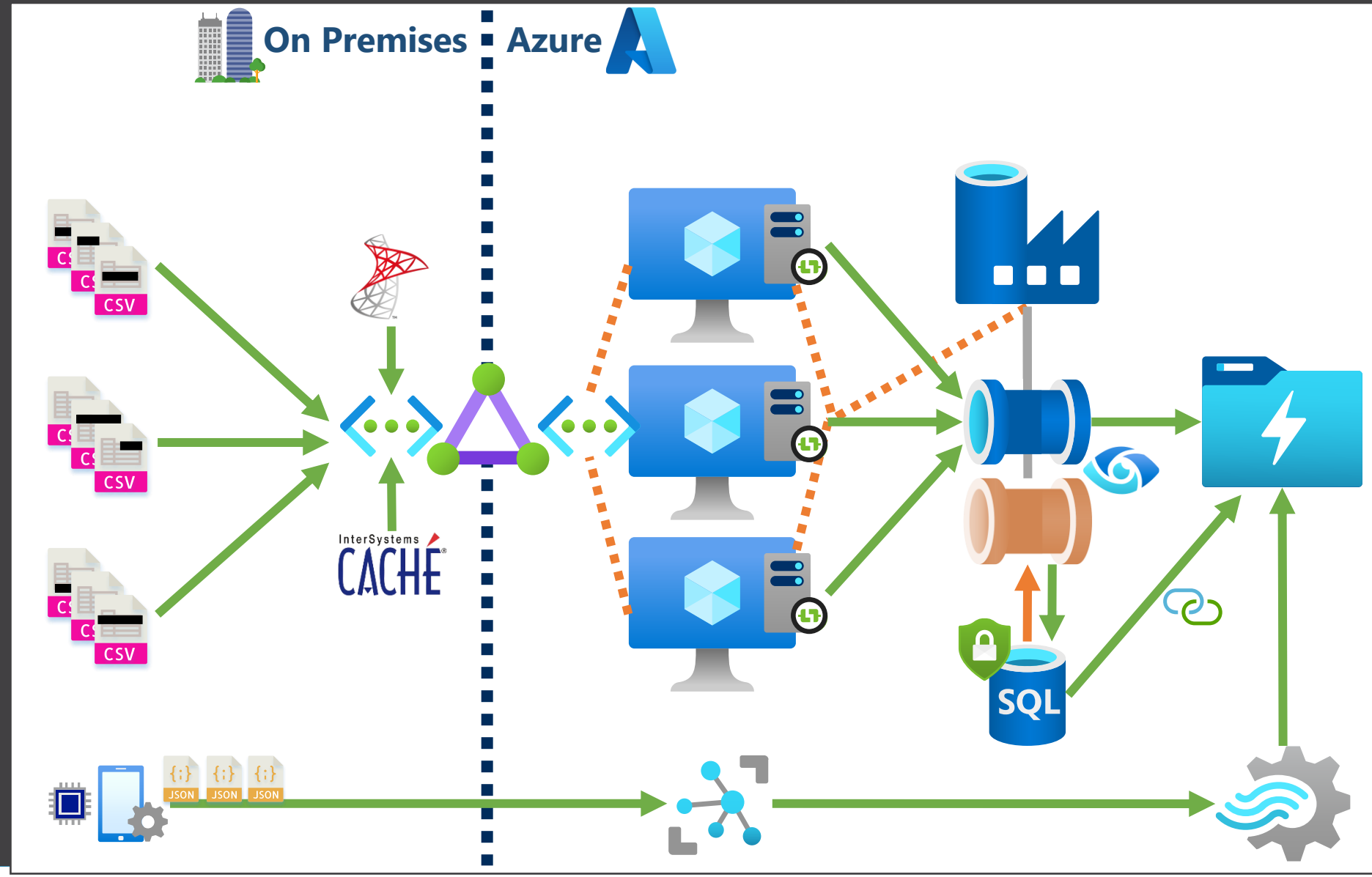
Data Sensitivity



Data Volume



Data Extraction & Ingestion – Solution 6

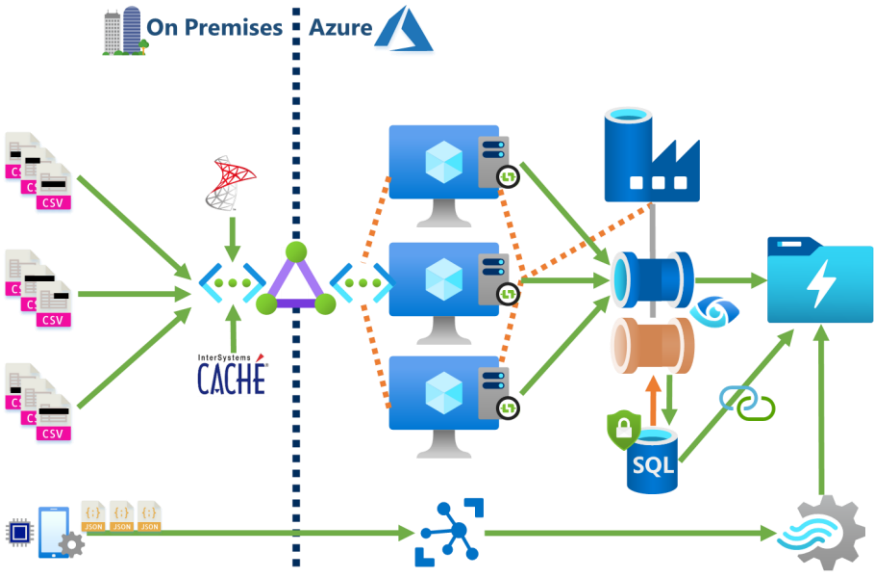


Requirements:

- 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

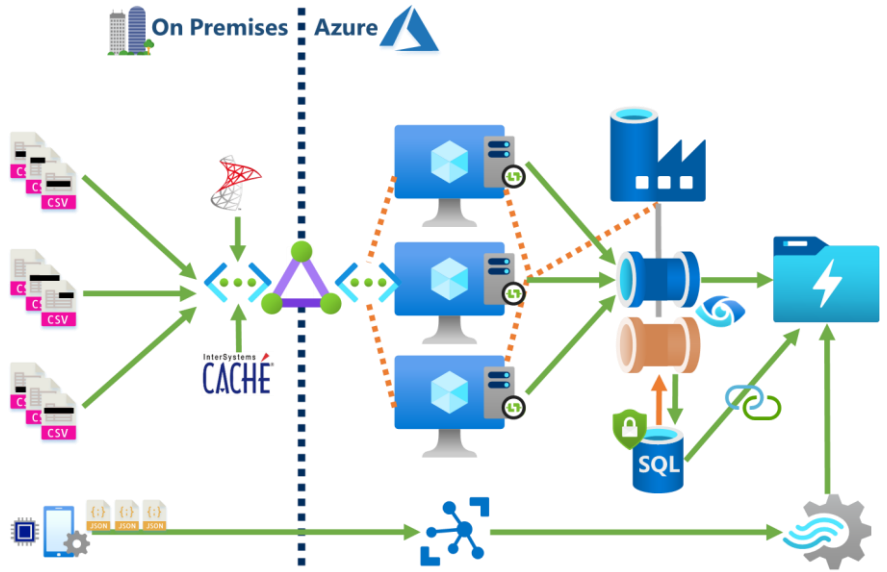
Overall Architecture

Extract | Transform | Load



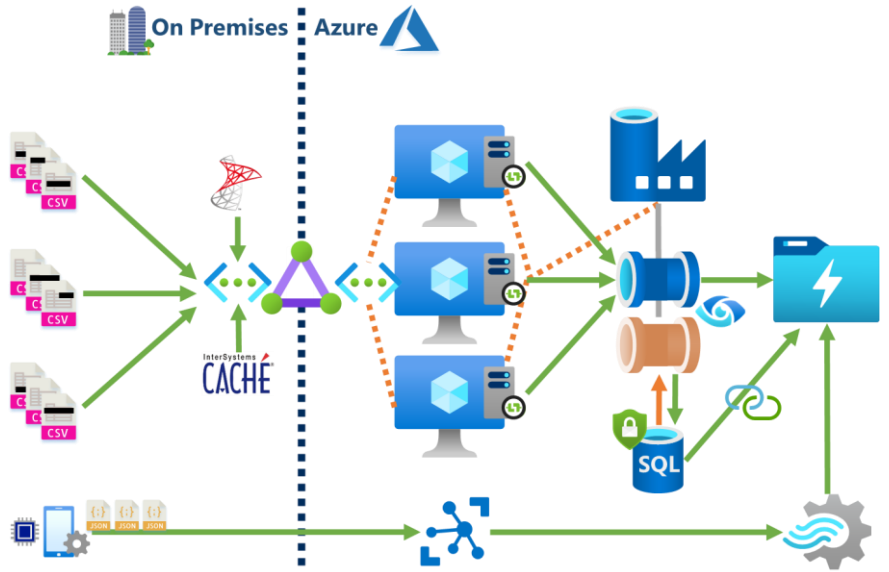
Agenda

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

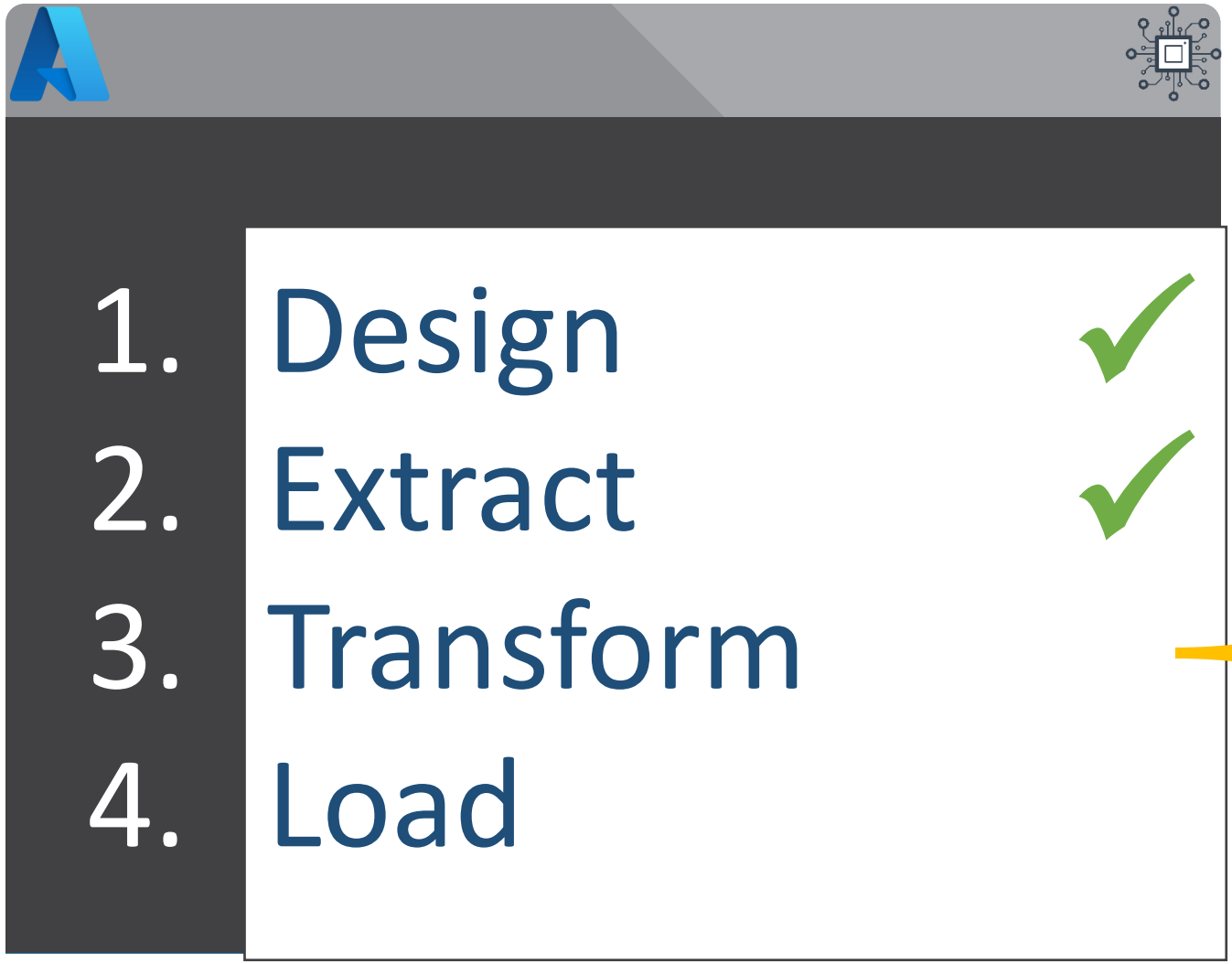


Agenda

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



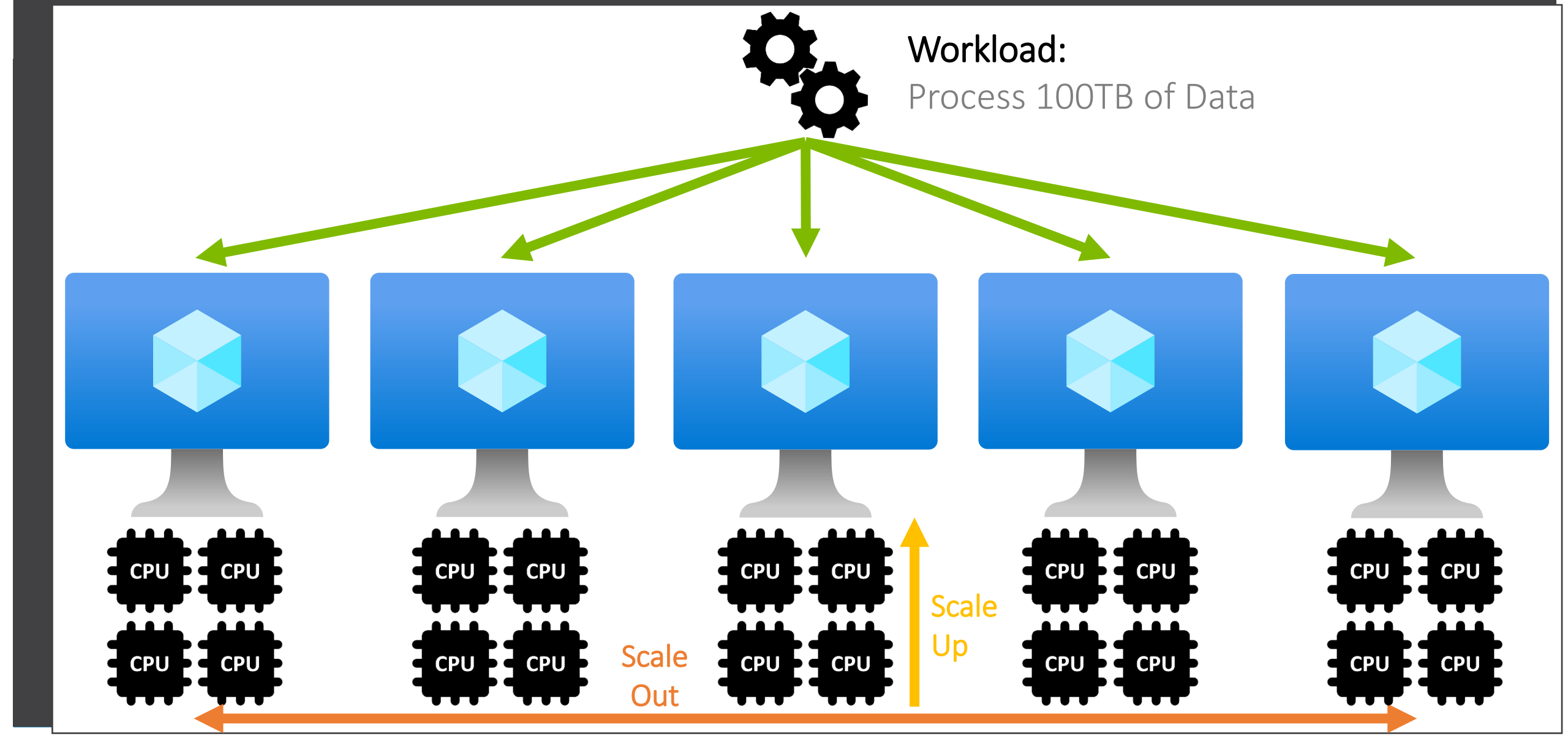
Agenda



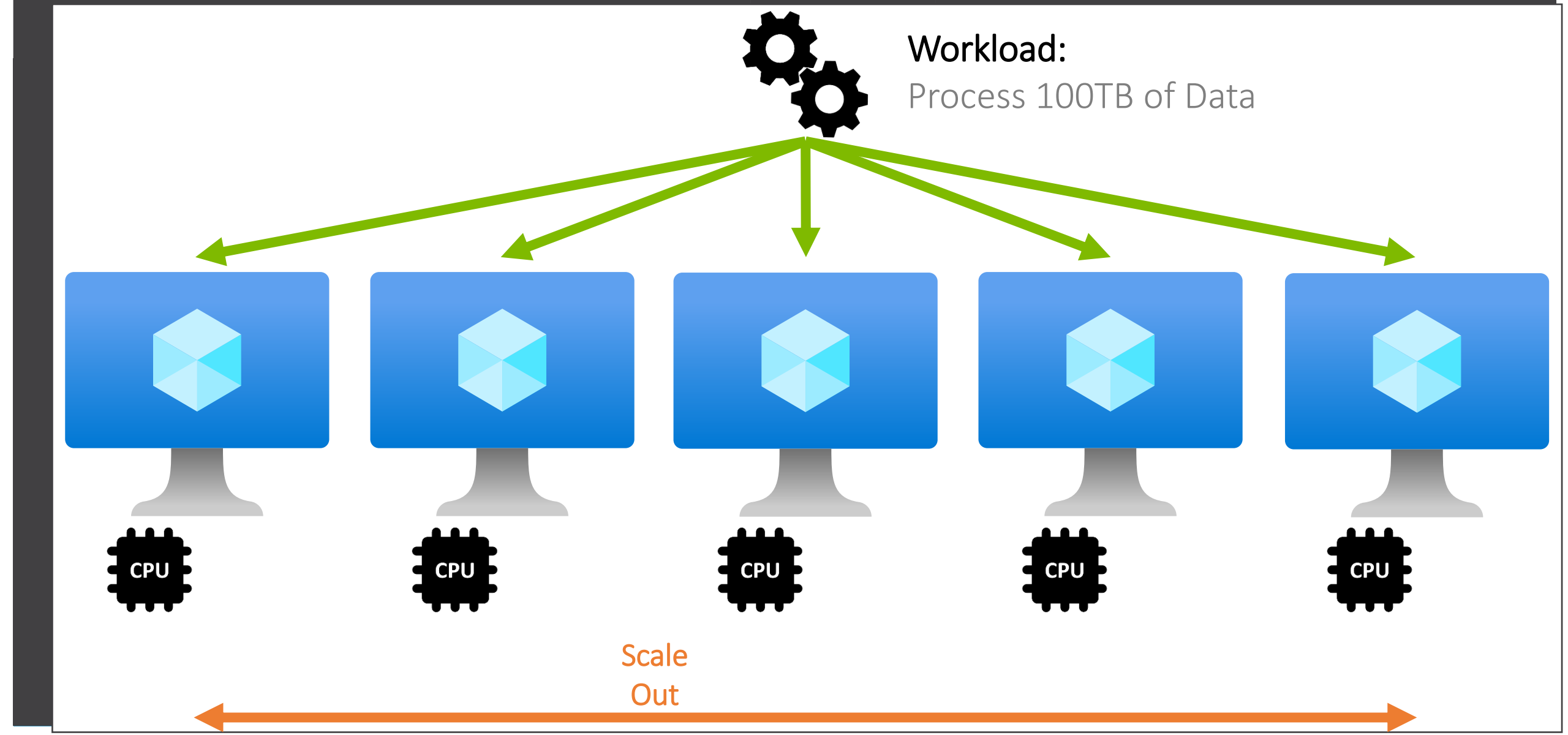
1. Design ✓
2. Extract ✓
3. Transform
4. Load

Compute
Storage, Structure
& Data Format

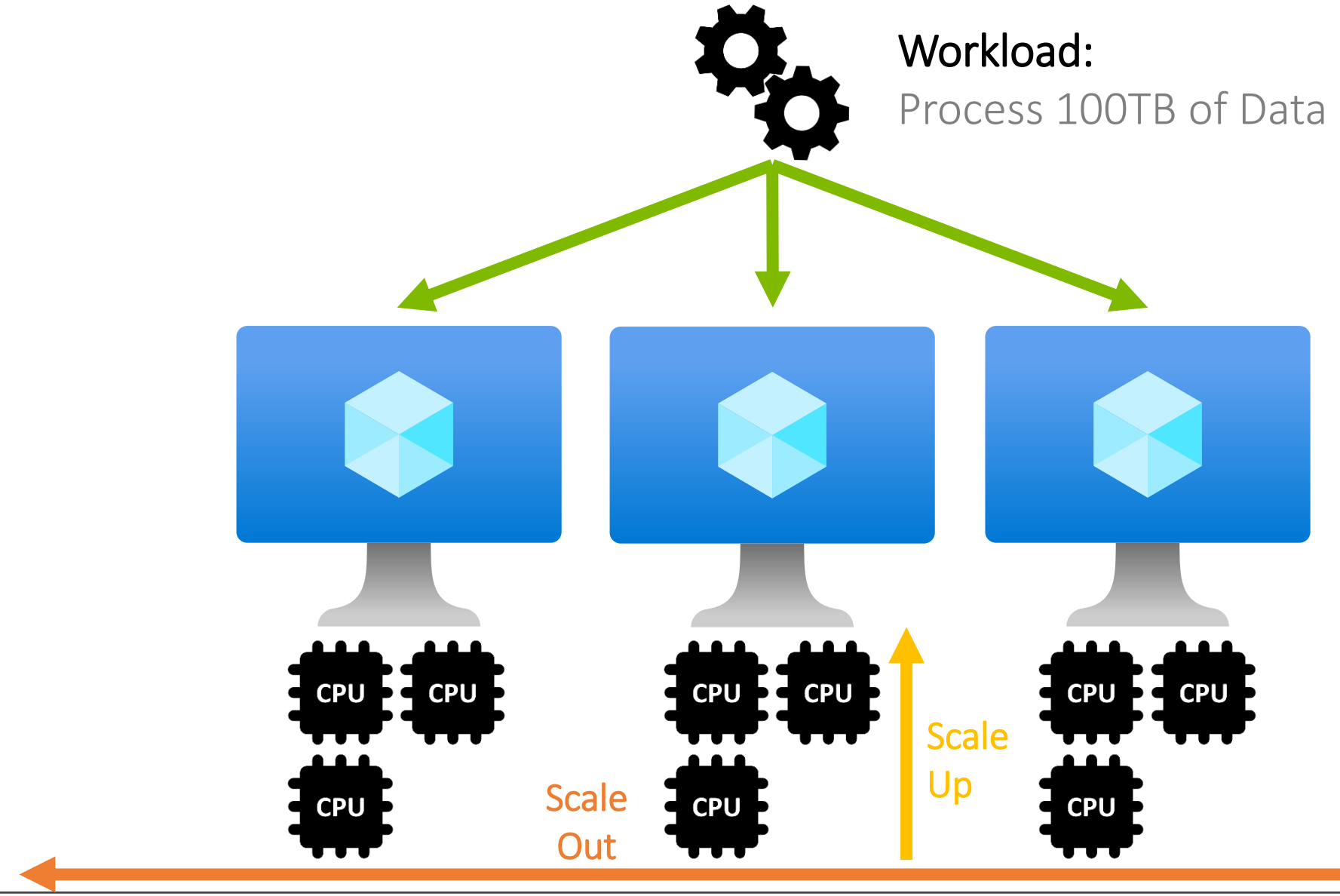
Scaling Up and/or Scaling Out



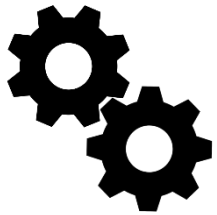
Scaling Up and/or Scaling Out



Scaling Up and/or Scaling Out



What Compute Type of Compute?



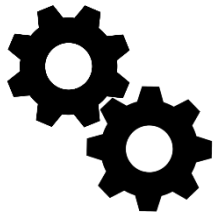
Workload:
Process 100TB of Data

Platform

Infrastructure

As
A
Service

What Compute Type of Compute?



Workload:
Process 100TB of Data

Platform

As
A
Service

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

Data Transformation – Compute

Data Lake Analytics

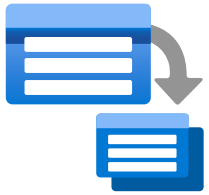
HDInsight

Relational Database

Synapse – SQL Pools or Spark Pools

Databricks

Batch Service



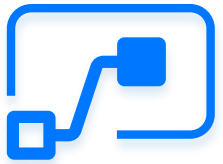
Data Explorer

Automation

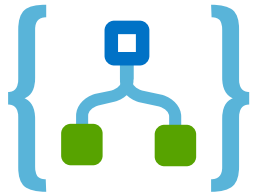
Cosmos

Functions

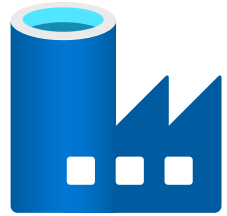
Power BI Data Flows



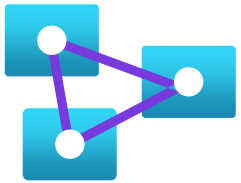
Logic Apps



Data Factory Data Flows



Analysis Services



Data Transformation – Compute

Data Lake Analytics

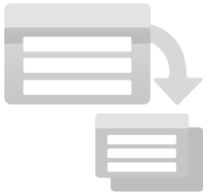
HDInsight

Relational Database

Synapse – SQL Pools or Spark Pools

Databricks

Batch Service



Data Explorer

Automation

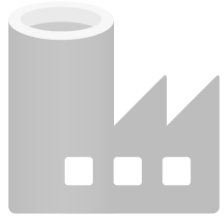
Cosmos

Functions

Power BI Data Flows

Logic Apps

Data Factory Data Flows



Analysis Services

Data Transformation – Compute

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HDInsight

Relational Database

Batch Service

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Power BI Data Flows

Logic Apps

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Analysis Services

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Español
Français

The Lake House (film)

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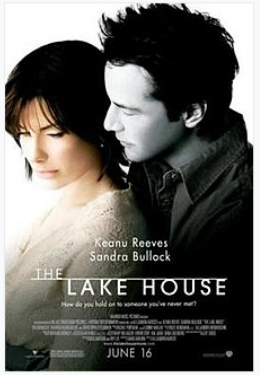
This article includes a list of general references, but it remains largely unverified because **it lacks sufficient corresponding inline citations**. Please help to improve this article by introducing more precise citations. *(October 2017) (Learn how and when to remove this template message)*

The Lake House is a 2006 American fantasy romantic drama film directed by Alejandro Agresti, starring Keanu Reeves and Sandra Bullock (who had previously appeared together in the box office hit *Speed*). It was written by David Auburn.[2] A remake of the South Korean motion picture *Il Mare* (2000), it centers on an architect living in 2004 and a doctor living in 2006 who meet via letters left in a mailbox at the lake house where they have lived at separate points in time. They carry on correspondence over two years, remaining separated by their original difference of two years.[3]

Contents [hide]

1 Plot
2 Cast
3 Production
4 Music
5 Reception
5.1 Box office
5.2 Critical response
5.3 Home media
5.4 Awards
6 References
7 External links

The Lake House



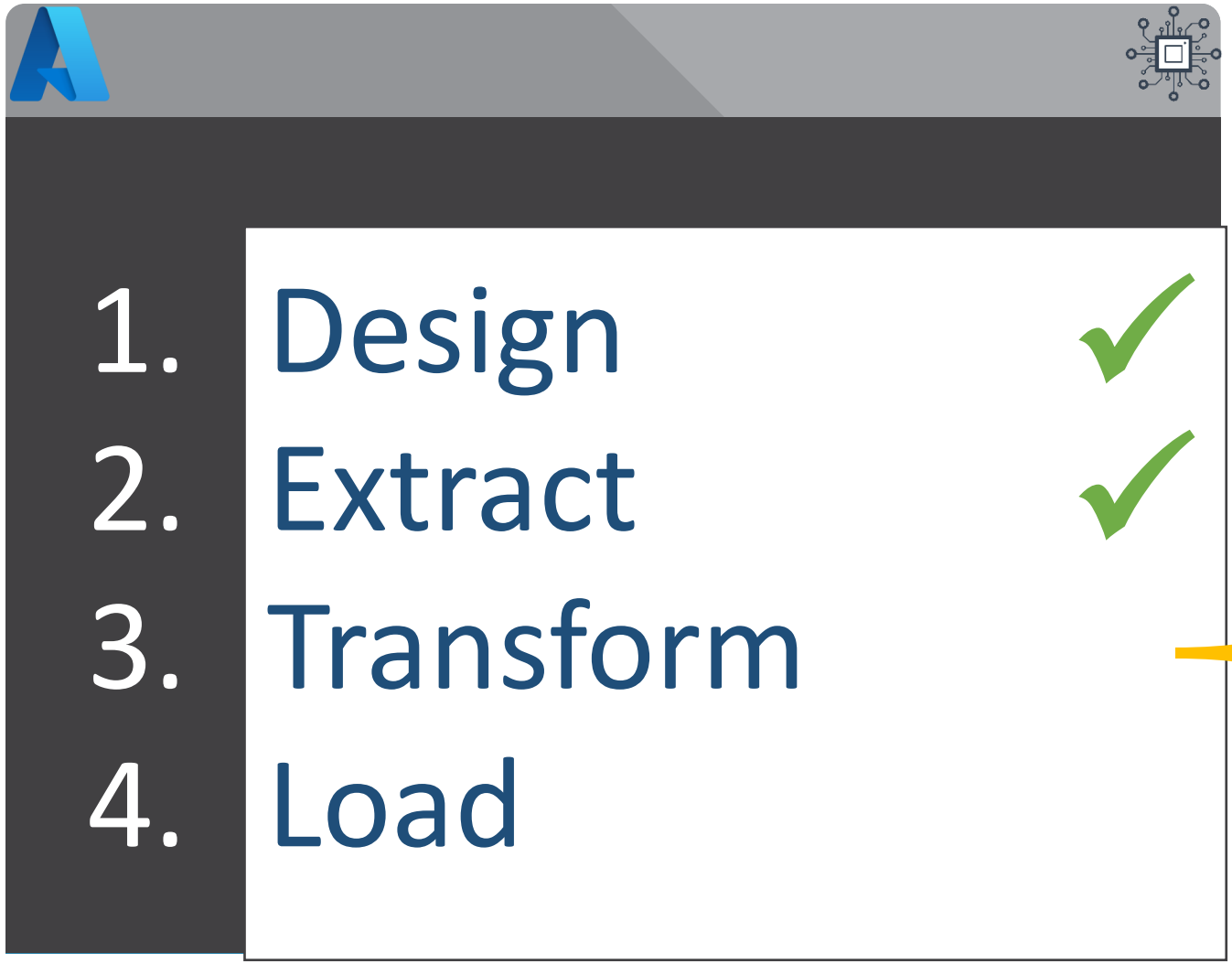
Theatrical release poster

Directed by	Alejandro Agresti
Written by	David Auburn
Based on	*Il Mare* by Kim Eun-jeong Kim Mi-yeong
Produced by	Doug Davison Roy Lee
Starring	Keanu Reeves

Plot [edit]

In 2006, Dr. Kate Forster (Sandra Bullock) is leaving a lake house that she has been renting in Chicago. Kate leaves a note in the mailbox for the next tenant to forward her mail, adding that the paint-embedded pawprints on the path leading to the house were already there when she arrived.

Agenda

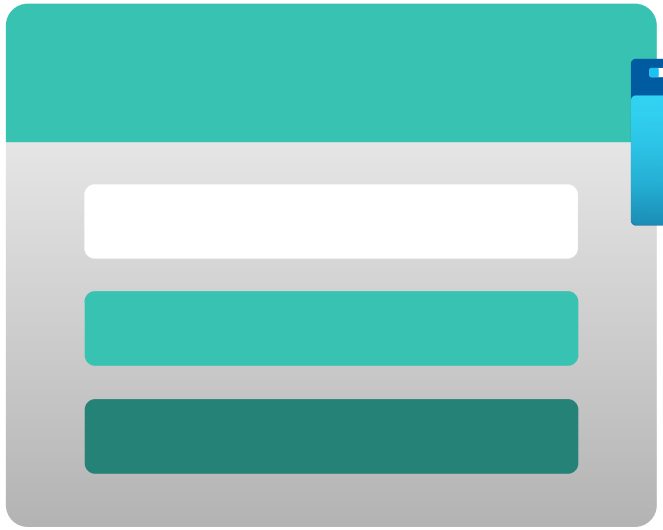


1. Design ✓
2. Extract ✓
3. Transform
4. Load

Compute ✓
Storage, Structure & Data Format

Data Transformation – Storage & Format

Azure Storage Account

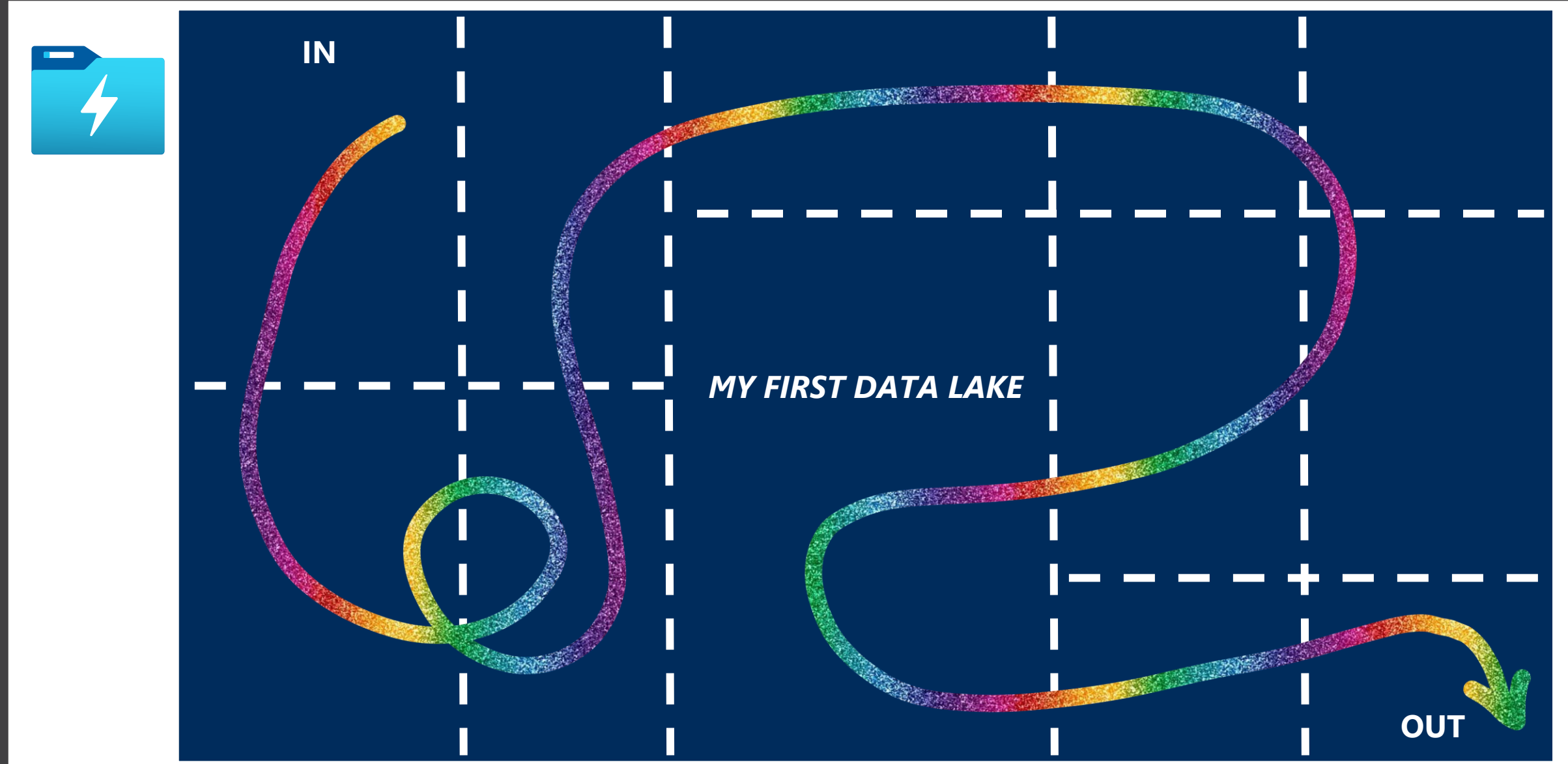


Azure Data Lake Gen2

Hadoop Distributed File System (HDFS)

Data Transformation – Storage & Format

Data Transformation – Storage & Format



Data Transformation – Storage & Format

LIBRARIES

AD-HOC

MODELS

STREAMING

LANDING

RAW

CLEANED

...\Year=2020\
Month=01\
Day=01\

ALIGNED

Append
OR
Override

CONFORMED

Facts
&
Dimensions

PREPARED

ARCHIVE

CURATION

Data Transformation – Storage & Format

LIBRARIES

AD-HOC

MODELS

STREAMING

LANDING

RAW

CLEANED

ALIGNED

CONFORMED

PREPARED

ARCHIVE

CURATION

Data Transformation – Storage & Format

LIBRARIES

AD-HOC

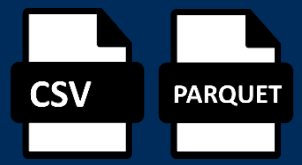
MODELS

STREAMING

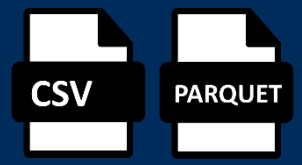
LANDING

RAW

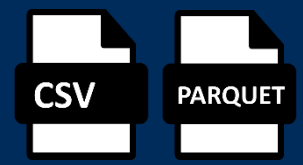
CLEANED



ALIGNED



CONFORMED

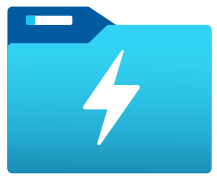


PREPARED

ARCHIVE

CURATION

Data Transformation – Storage & Format



LIBRARIES

AD-HOC

MODELS

DELTA LAKE

STREAMING

LANDING

RAW

CLEANED

ALIGNED

CONFORMED

PREPARED

CSV PARQUET CSV PARQUET CSV PARQUET

CSV TXT XLS HTML JSON XML TAR ZIP PNG DAT

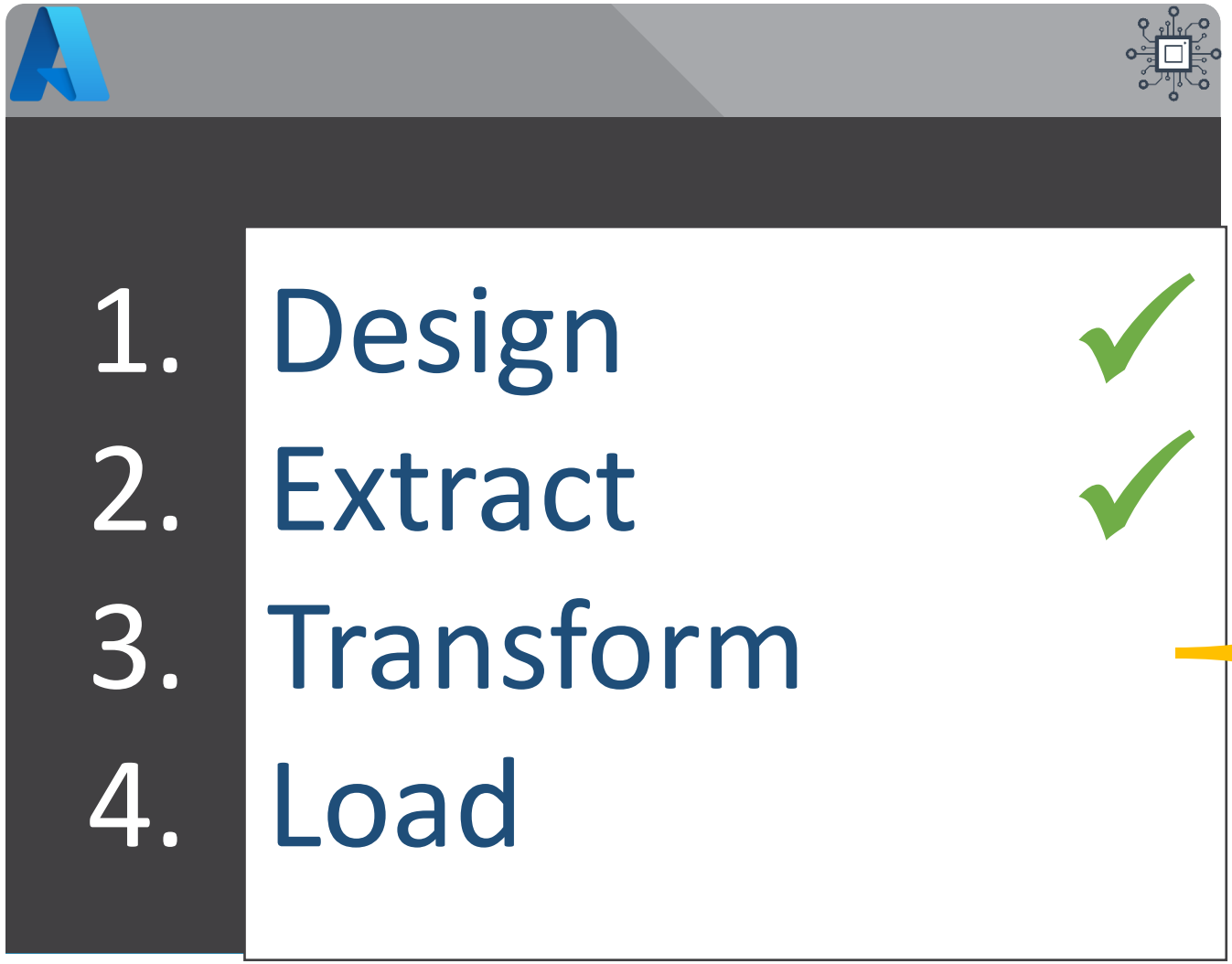
CSV TXT XLS HTML JSON XML TAR ZIP PNG DAT

DELTA LAKE

ARCHIVE

CURATION

Agenda

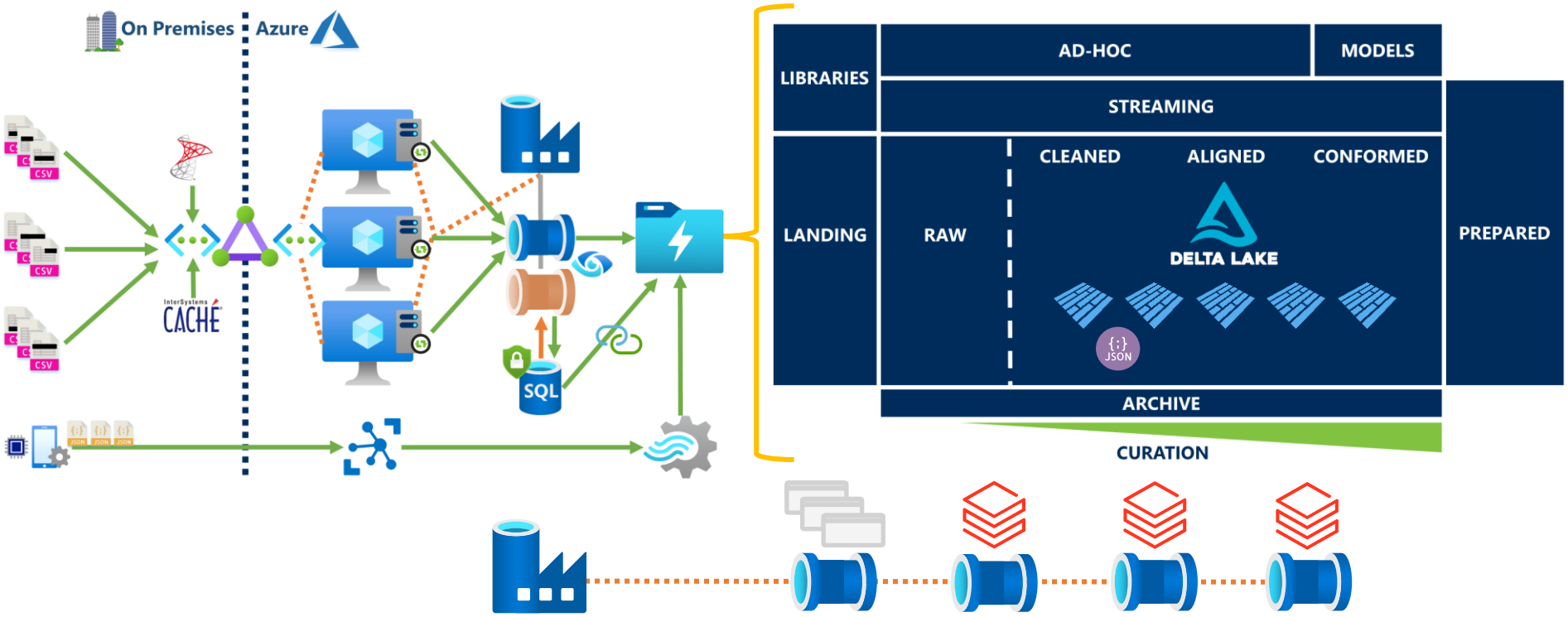


1. Design ✓
2. Extract ✓
3. Transform
4. Load

Compute ✓
Storage, Structure & Data Format ✓

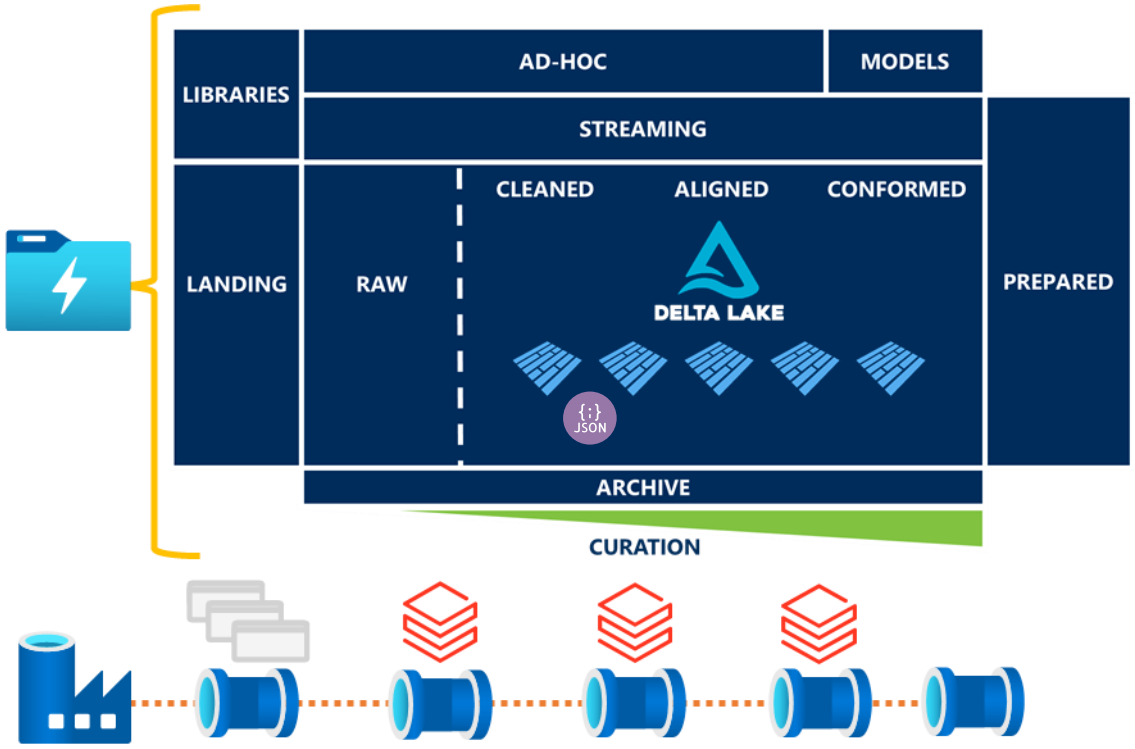
Overall Architecture

Extract | Transform | Load



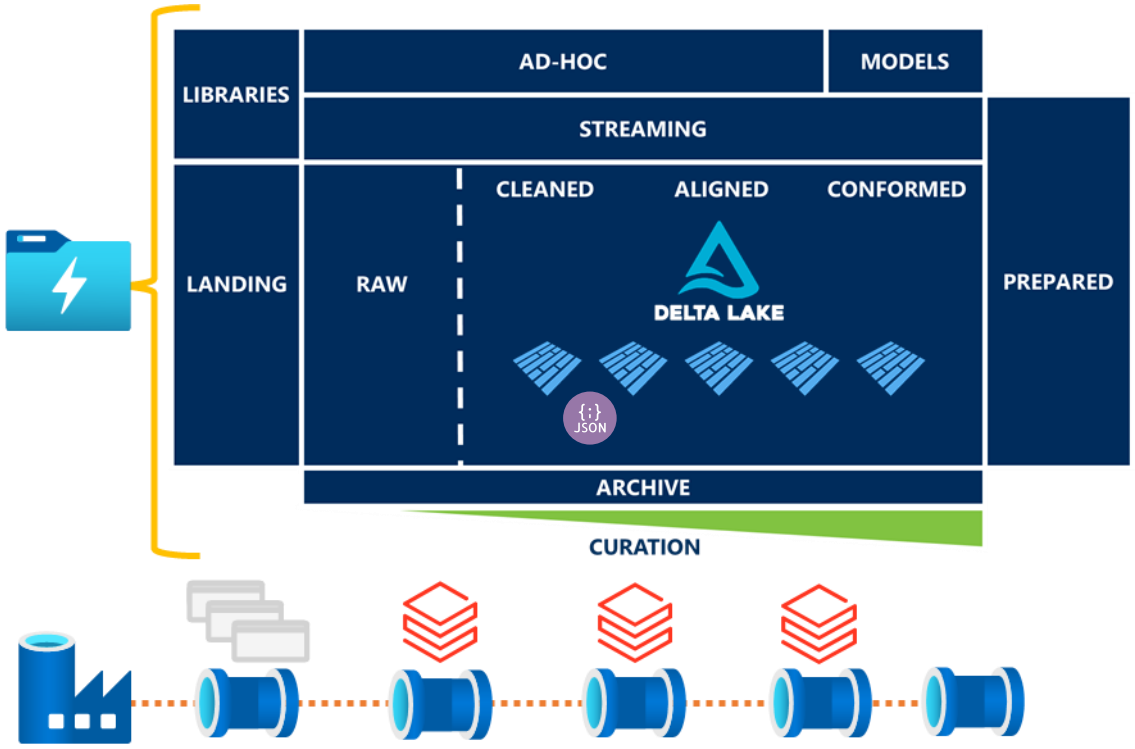
Agenda

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

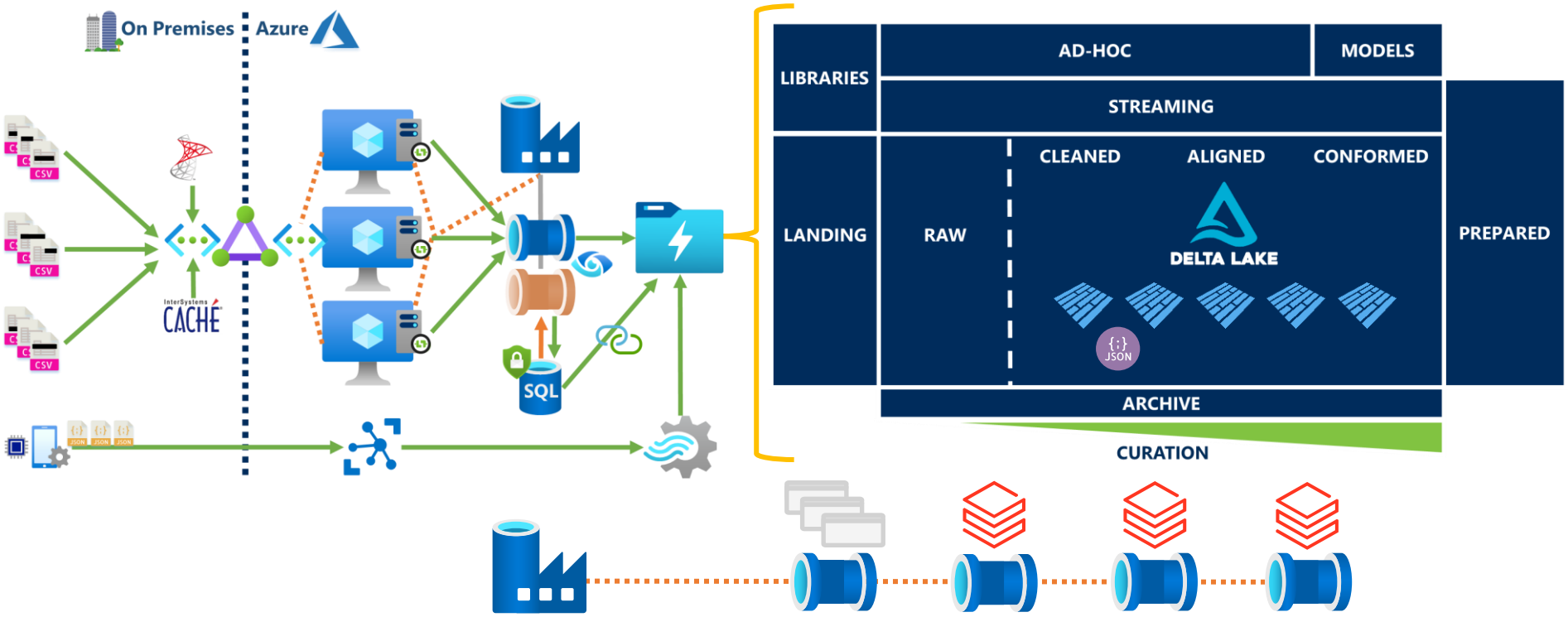


Agenda

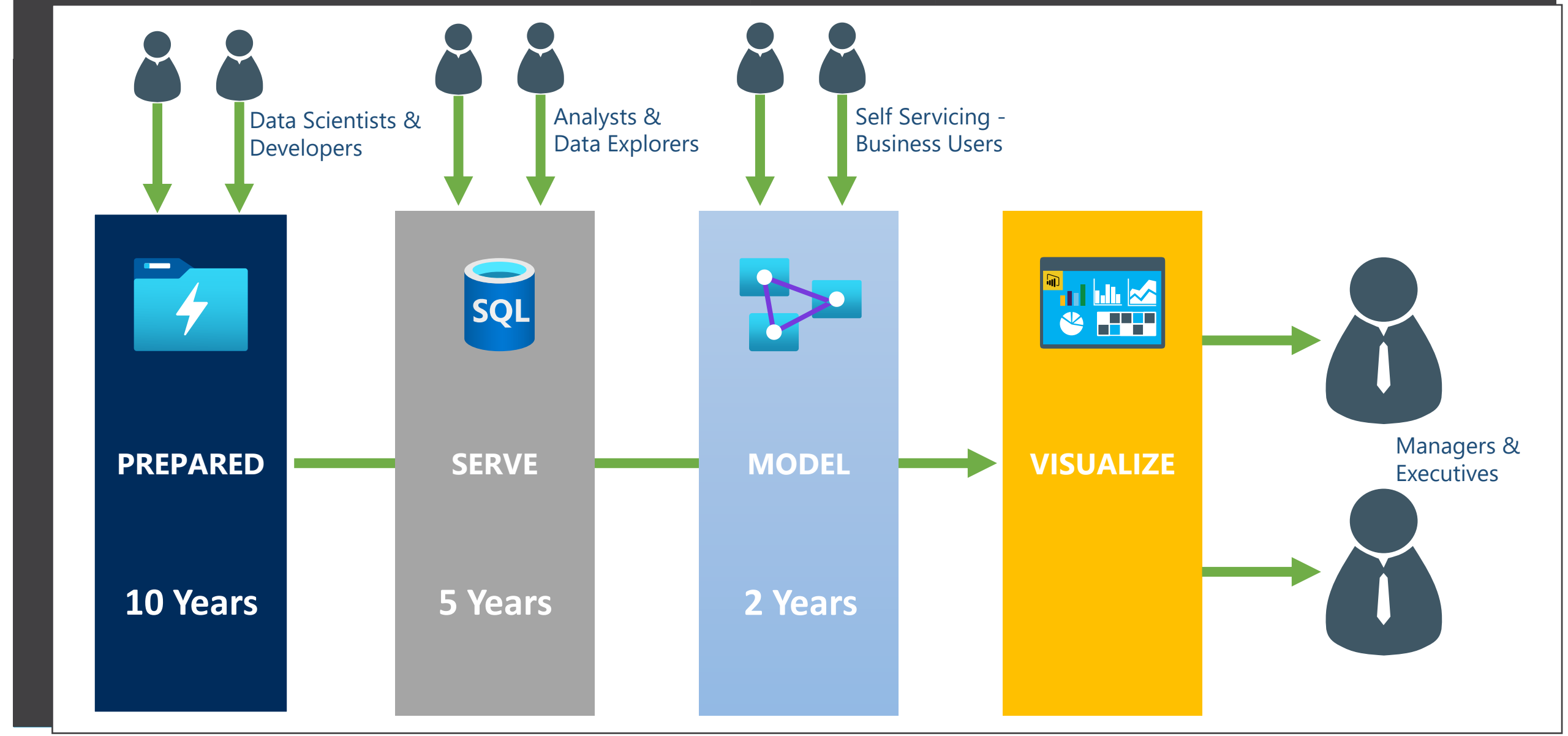
1. Design ✓
2. Extract ✓
3. Transform ✓
4. **Load**



Overall Architecture



Loading & Consuming Data



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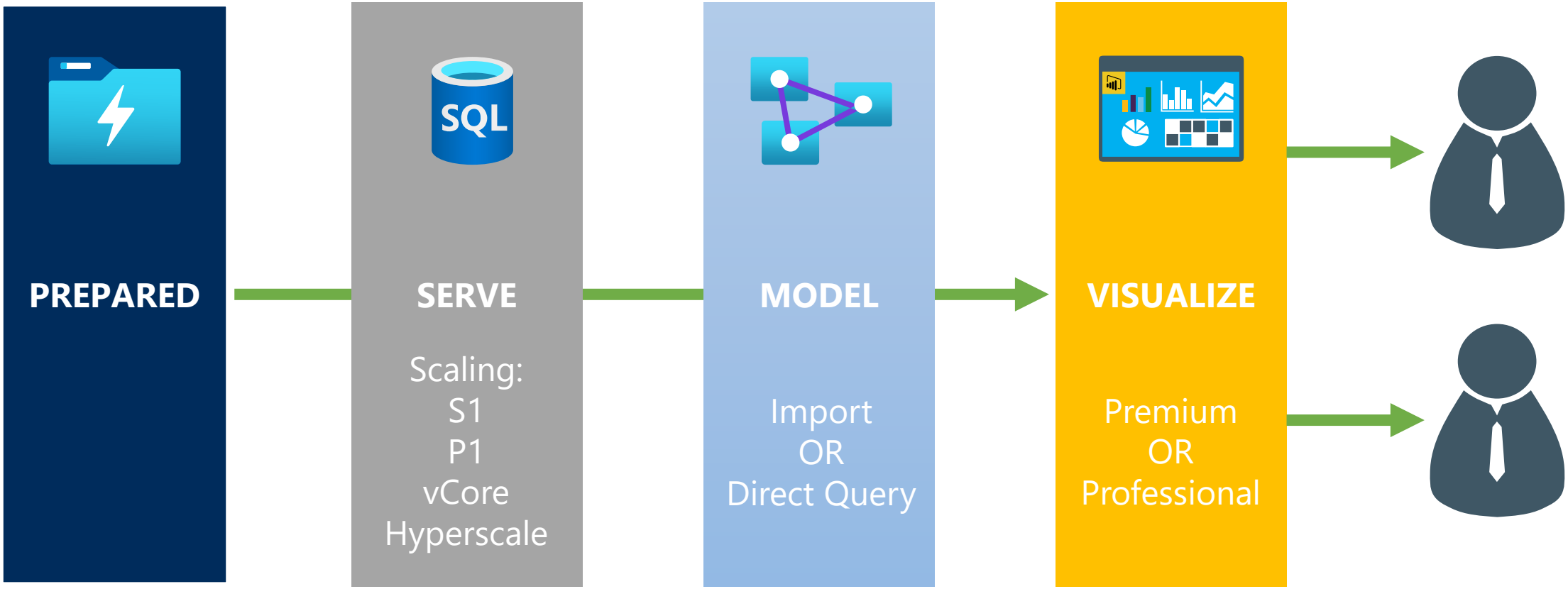

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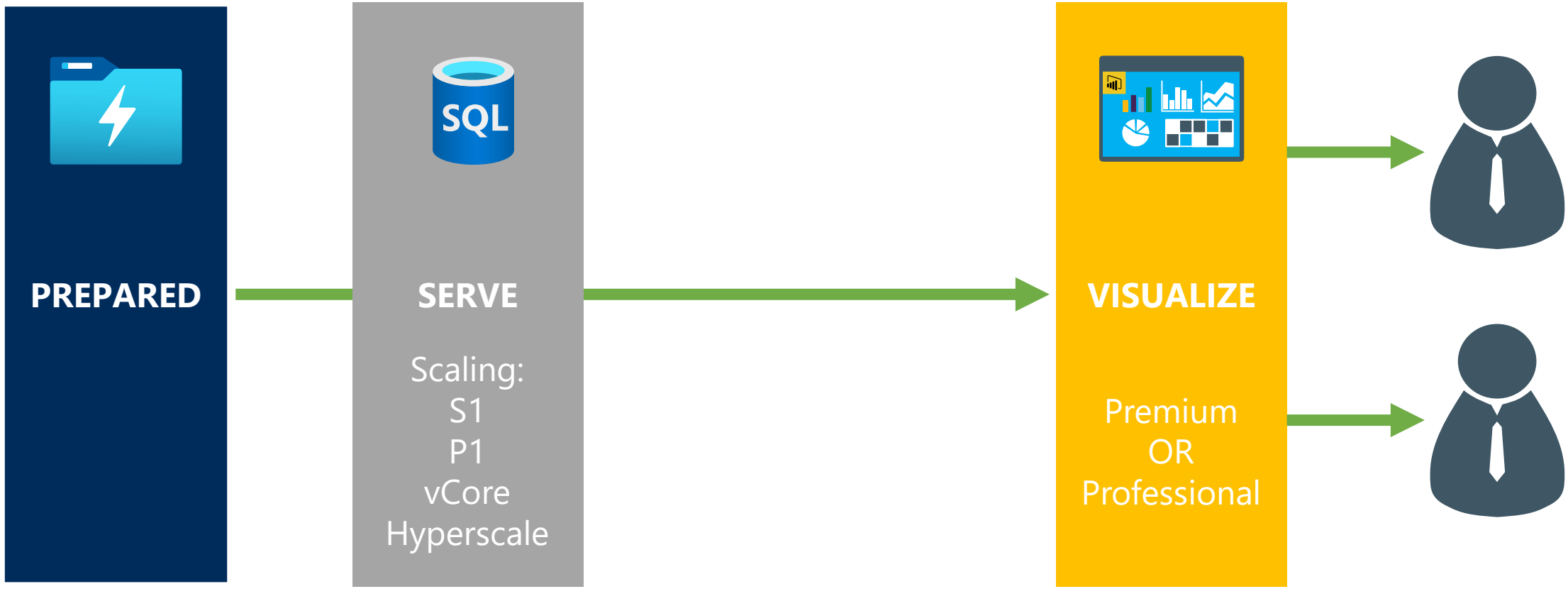

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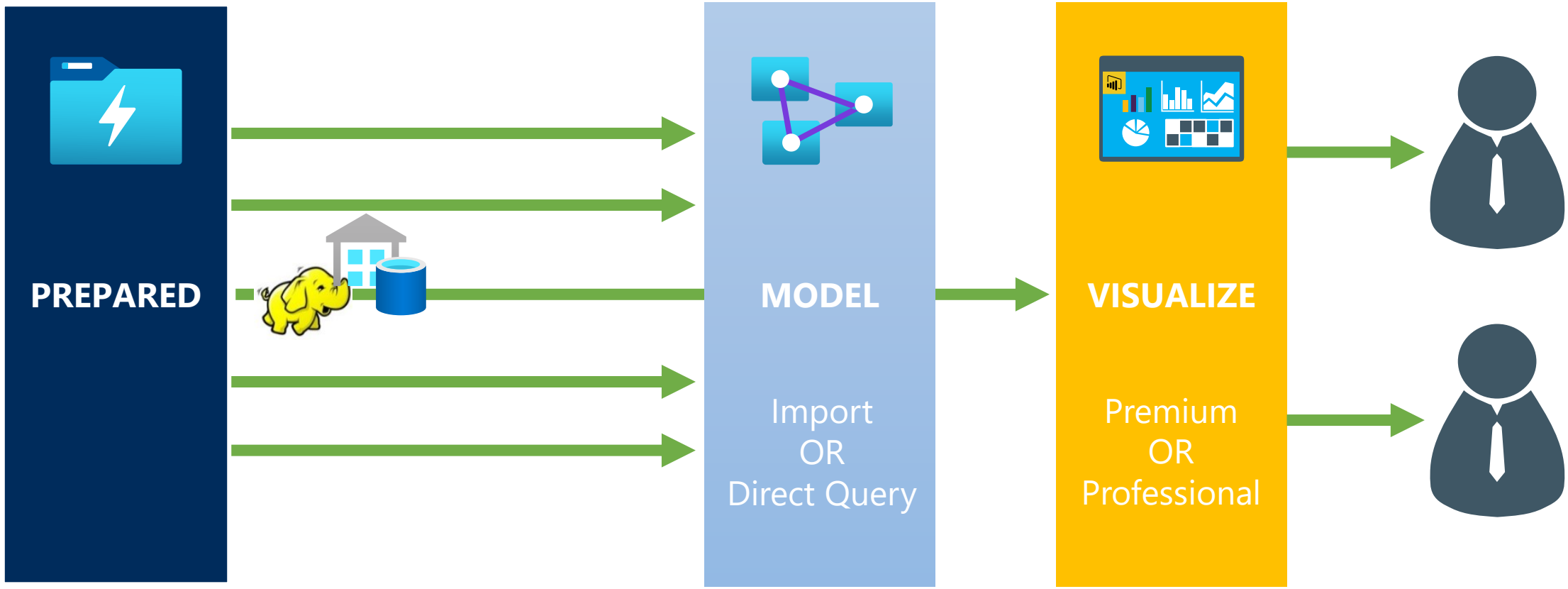

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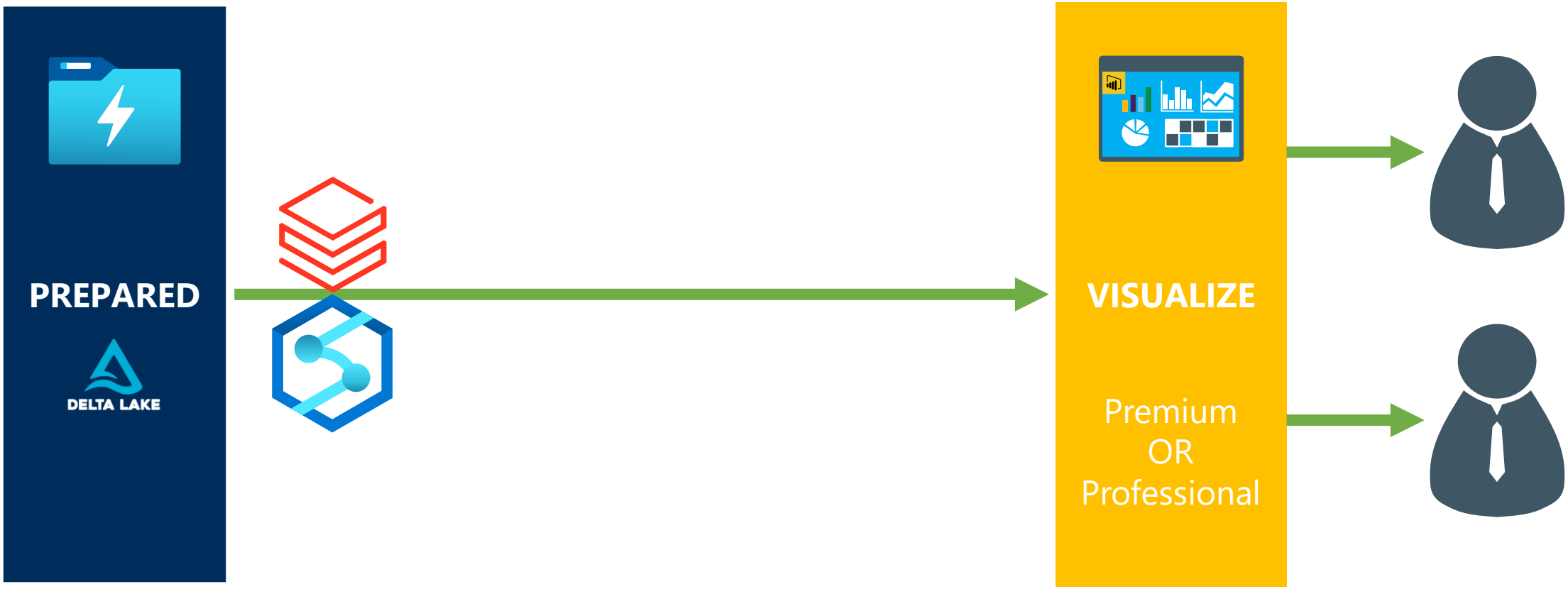
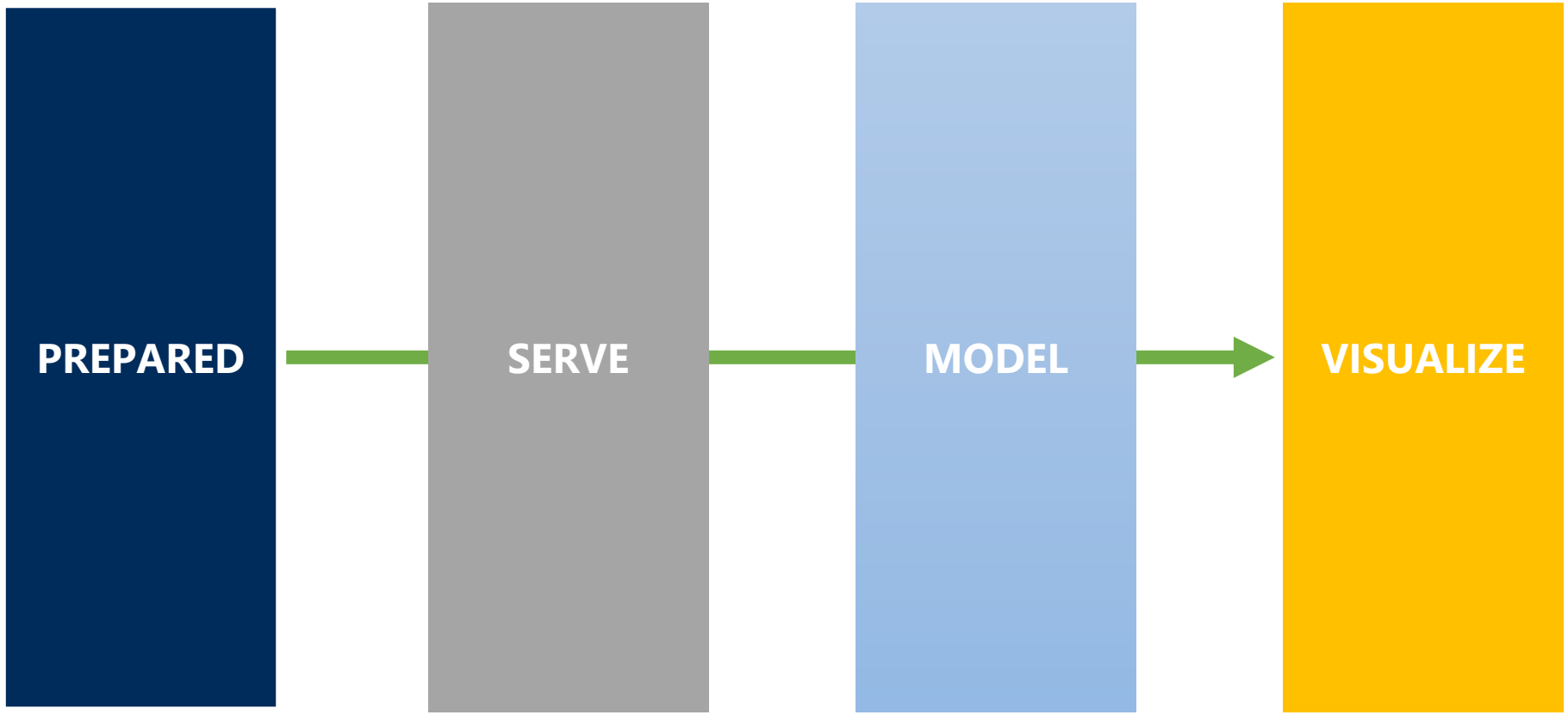


Consuming Our Lake House in Azure



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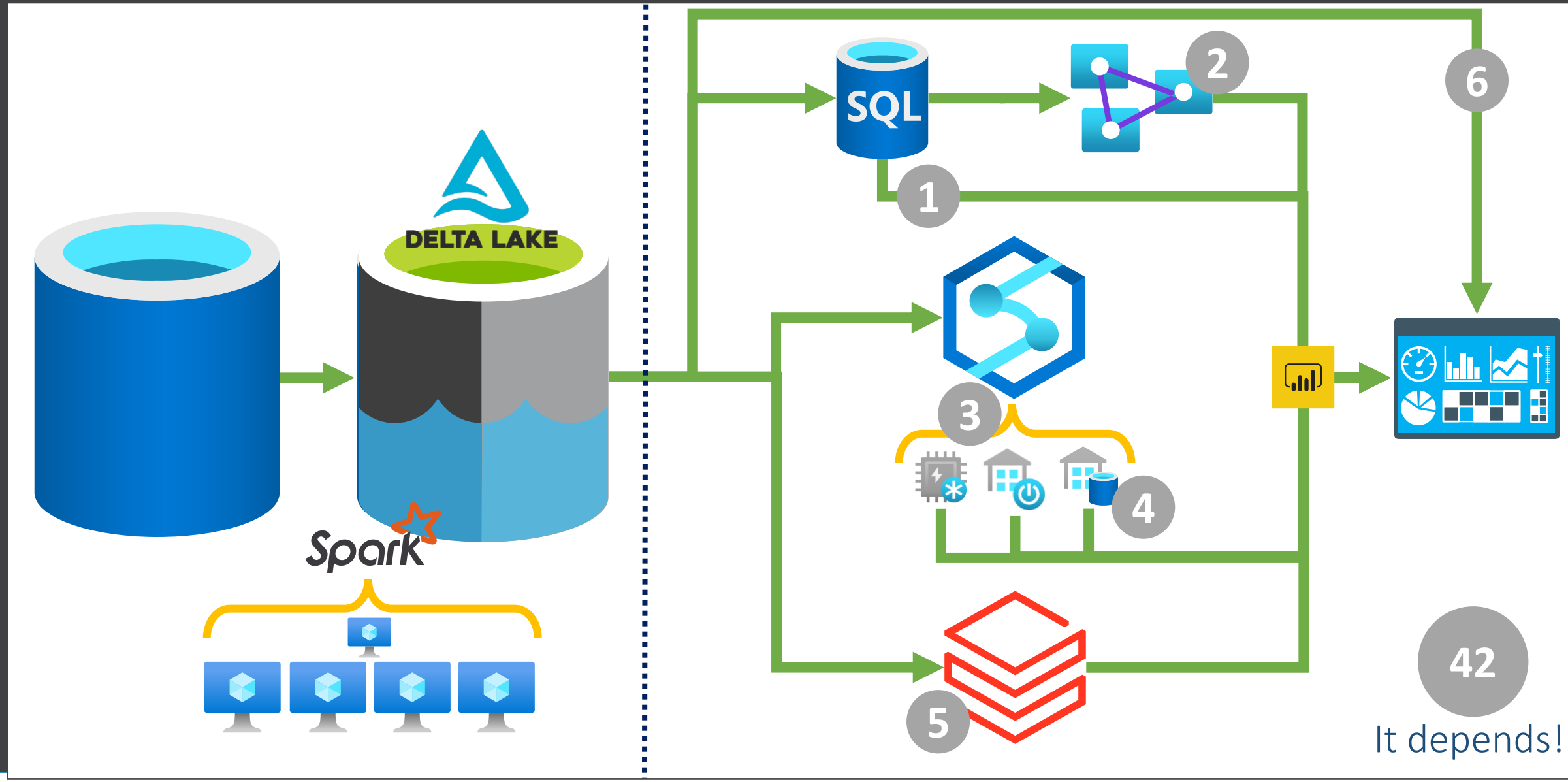
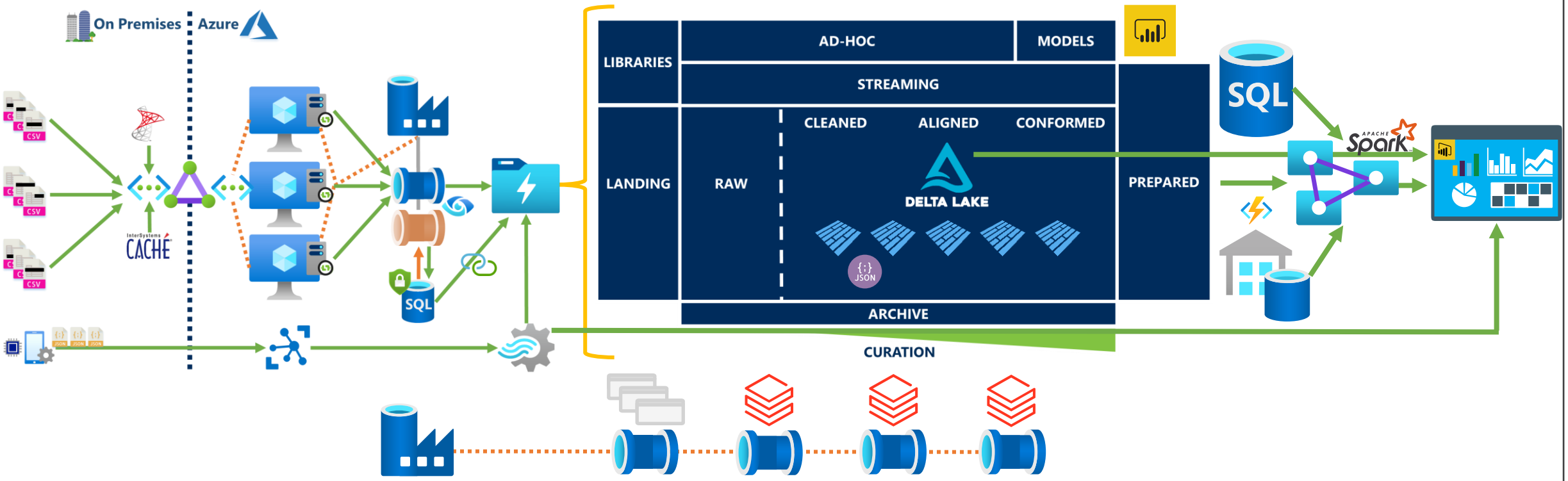
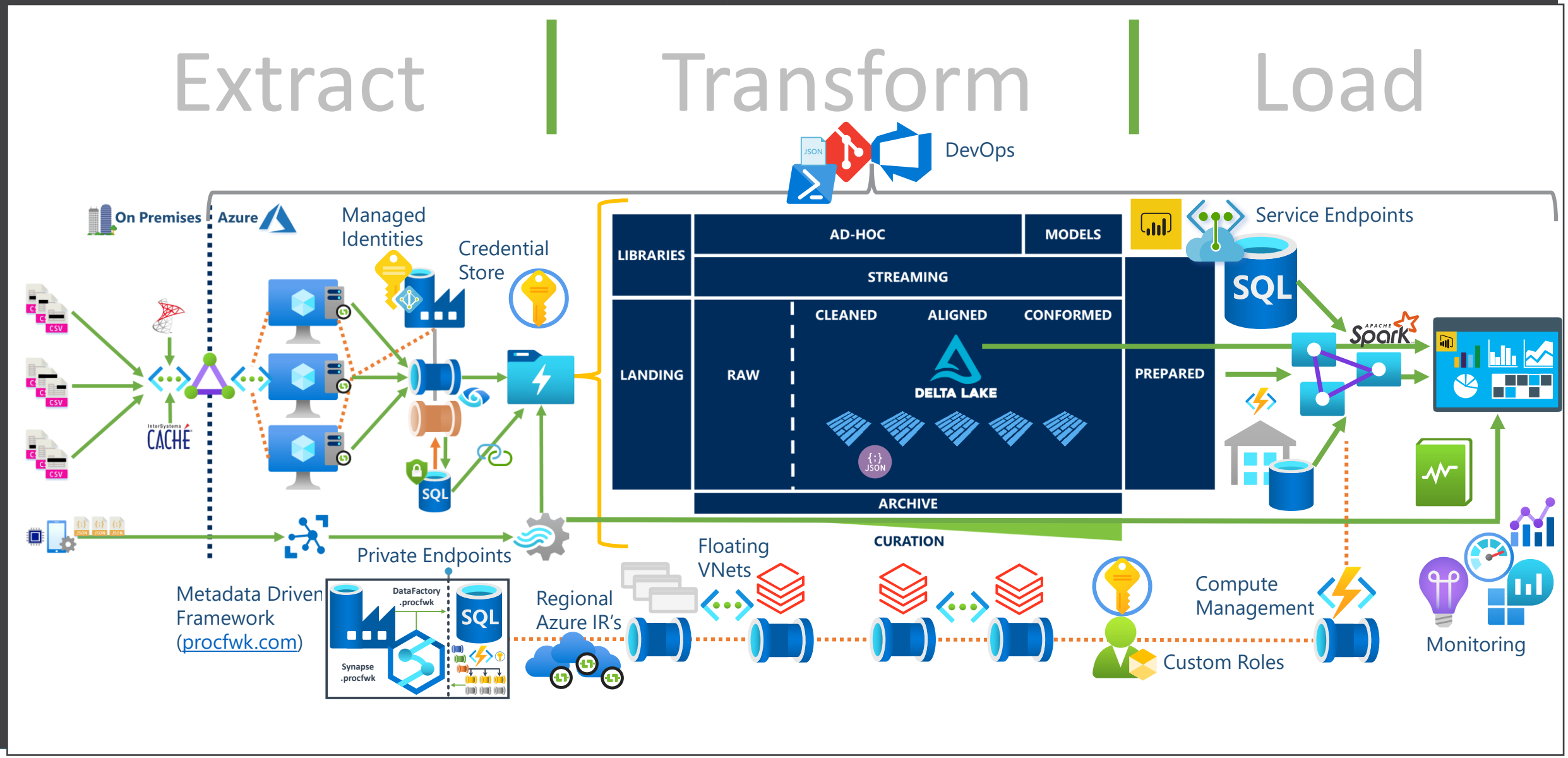


Overall Architecture

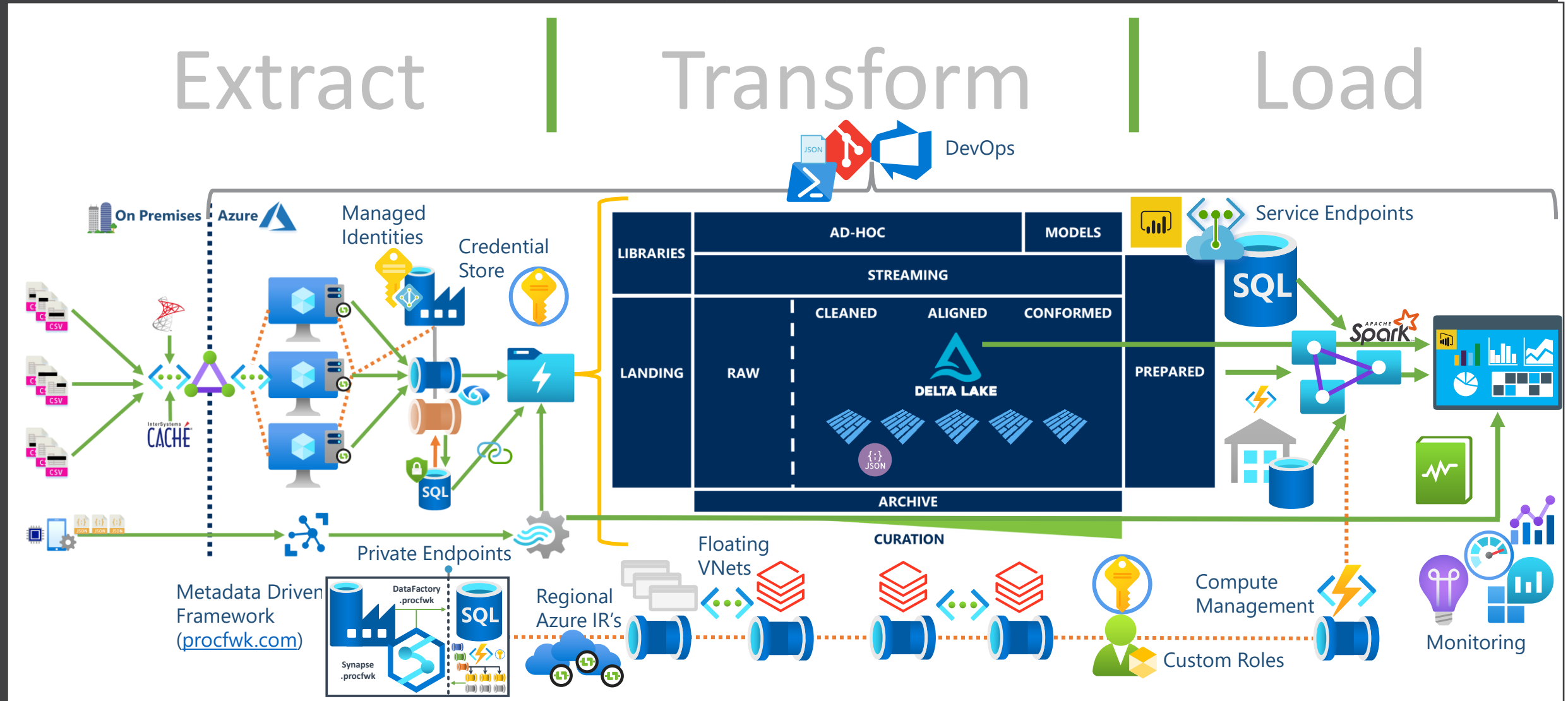
Extract | Transform | Load



Overall Architecture



Overall Architecture



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

Thank you for listening…

Paul Andrew

Microsoft® MVP Most Valuable Professional

avanade

mrpaulandrew.tech

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