

From Theory to Practice - Building a Data Mesh Architecture in Azure

Paul Andrew

Co-Founder



Cloud Formations

Our Offerings



Supporting you on every level. Providing stakeholders with transparent reviews and feedback on planning, rollout and platform architecture.

Advisory



Strategy

Ensuring business value in everything, motivated by use cases, people and process. Aligned to the latest industry standards and concepts.

Partnering for the long term. From development to operations, monitoring and alerting. We'll support your business-critical platforms.

Lifecycle Support



Design

Scalable platform design using cloud native technology, reducing time to insight for batch, stream and event driven workloads for fabric and mesh architectures.

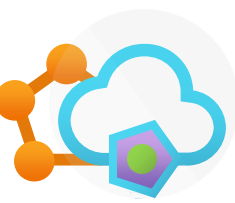
Knowledge sharing from the experts. Ensuring skills remain relevant for emerging cloud technologies and techniques.

Training



Delivery

Highly experienced engineers to support your implementation, with a full complement of continuous deployment practices and reusable assets.



What is the answer...

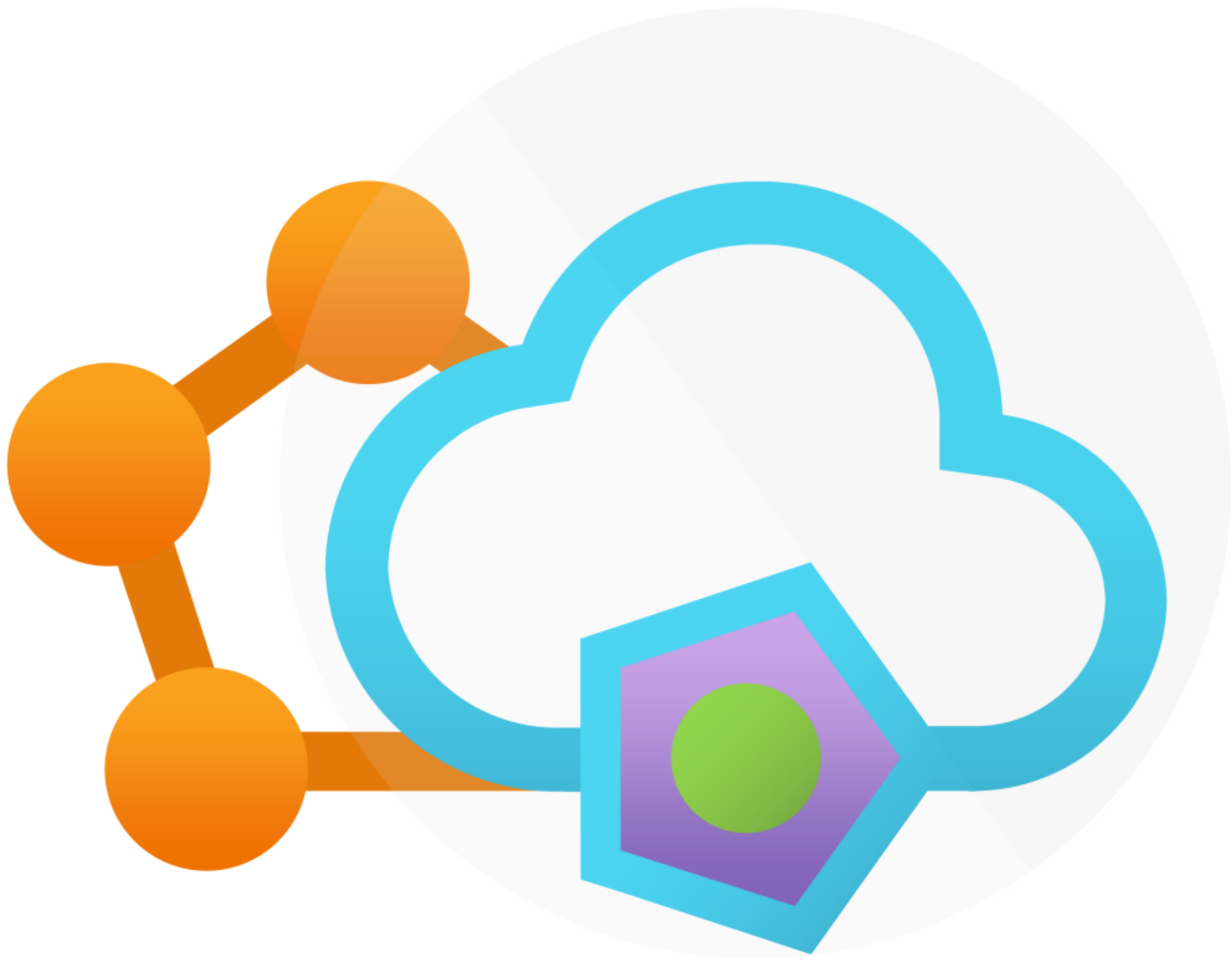
to life...
the universe...
and everything?

Answer:
42



Answer:
It depends!





Data Mesh:

What*

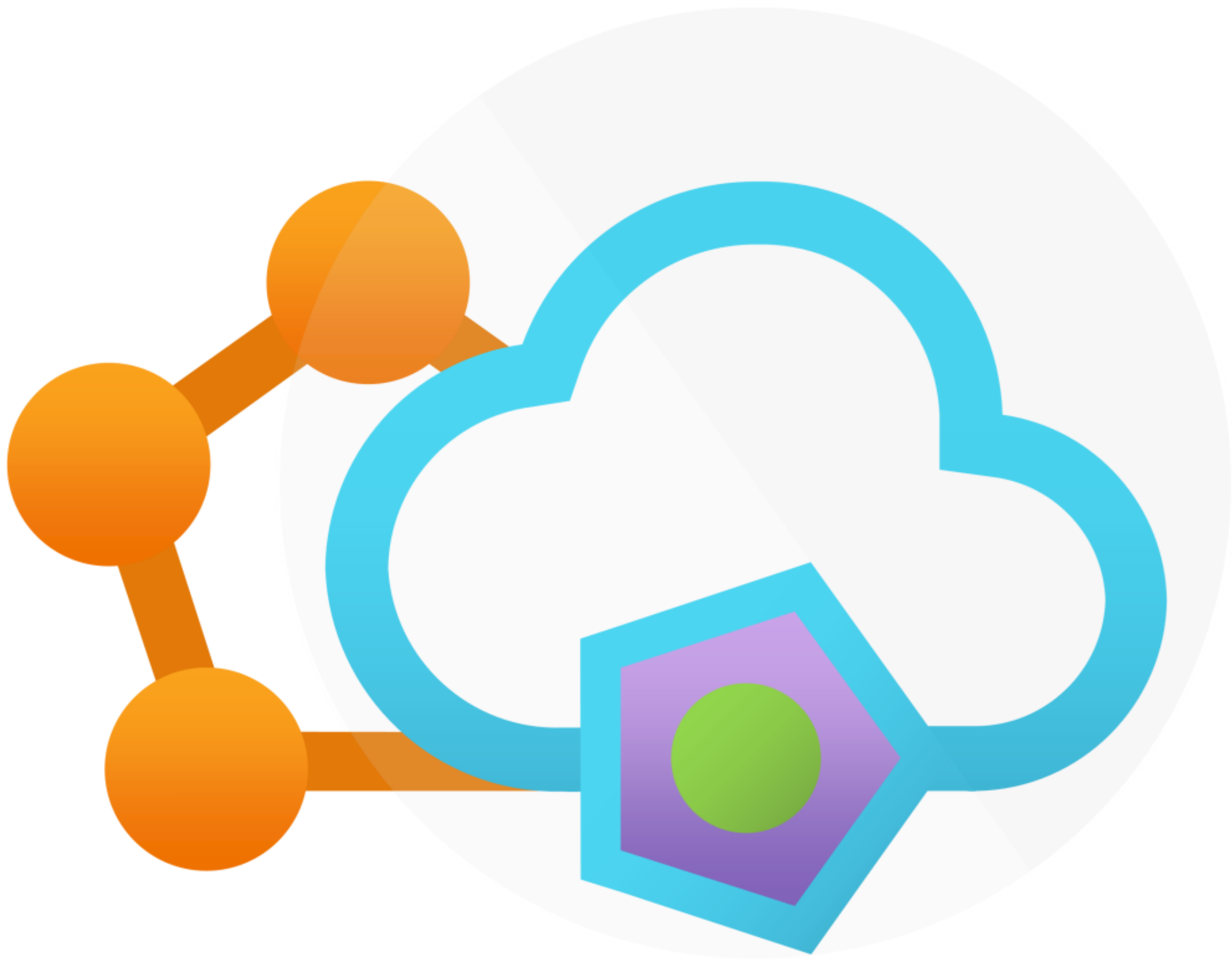
Why*

How*

*

It depends.

It's hard.



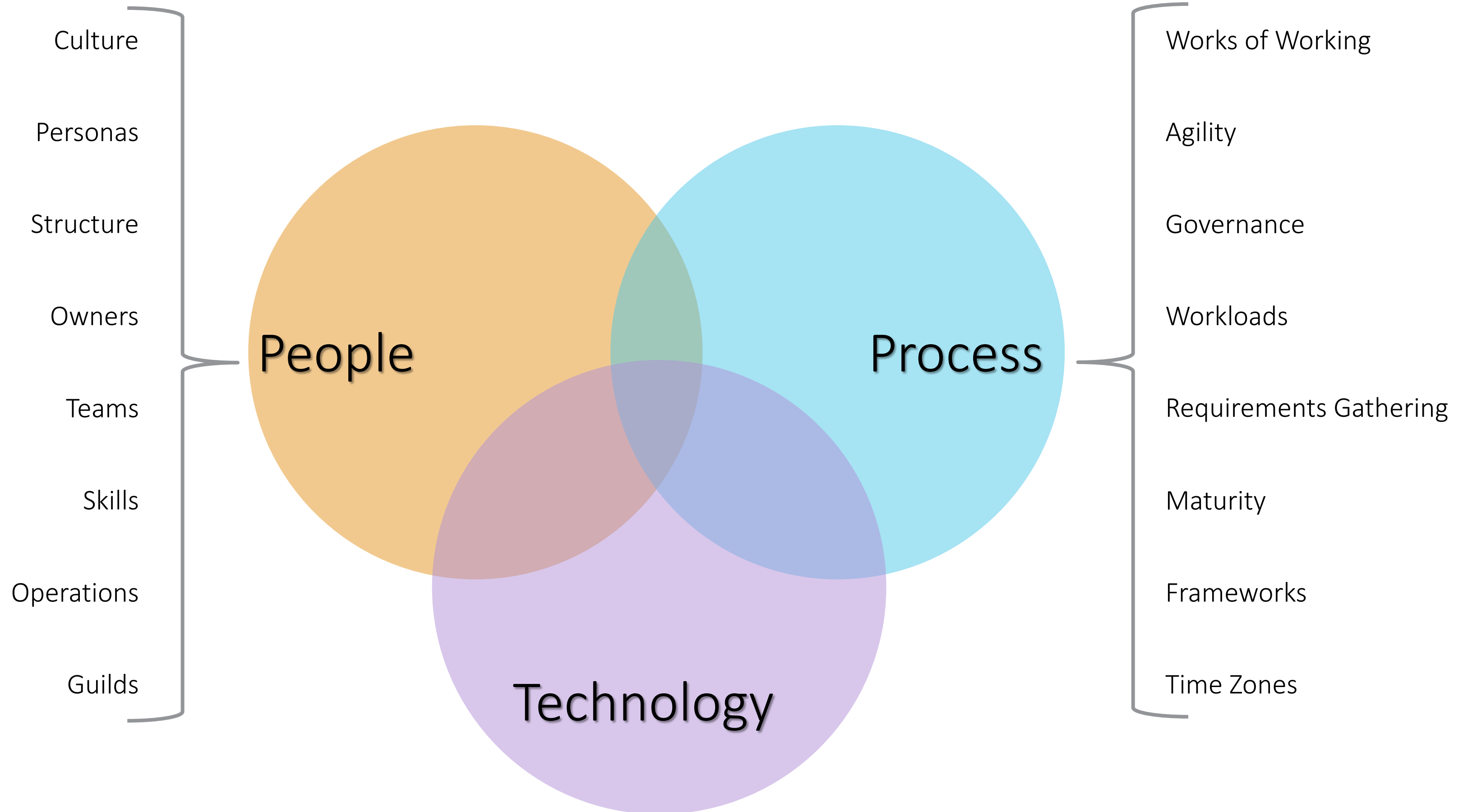
Data Mesh:

What is Data Mesh?

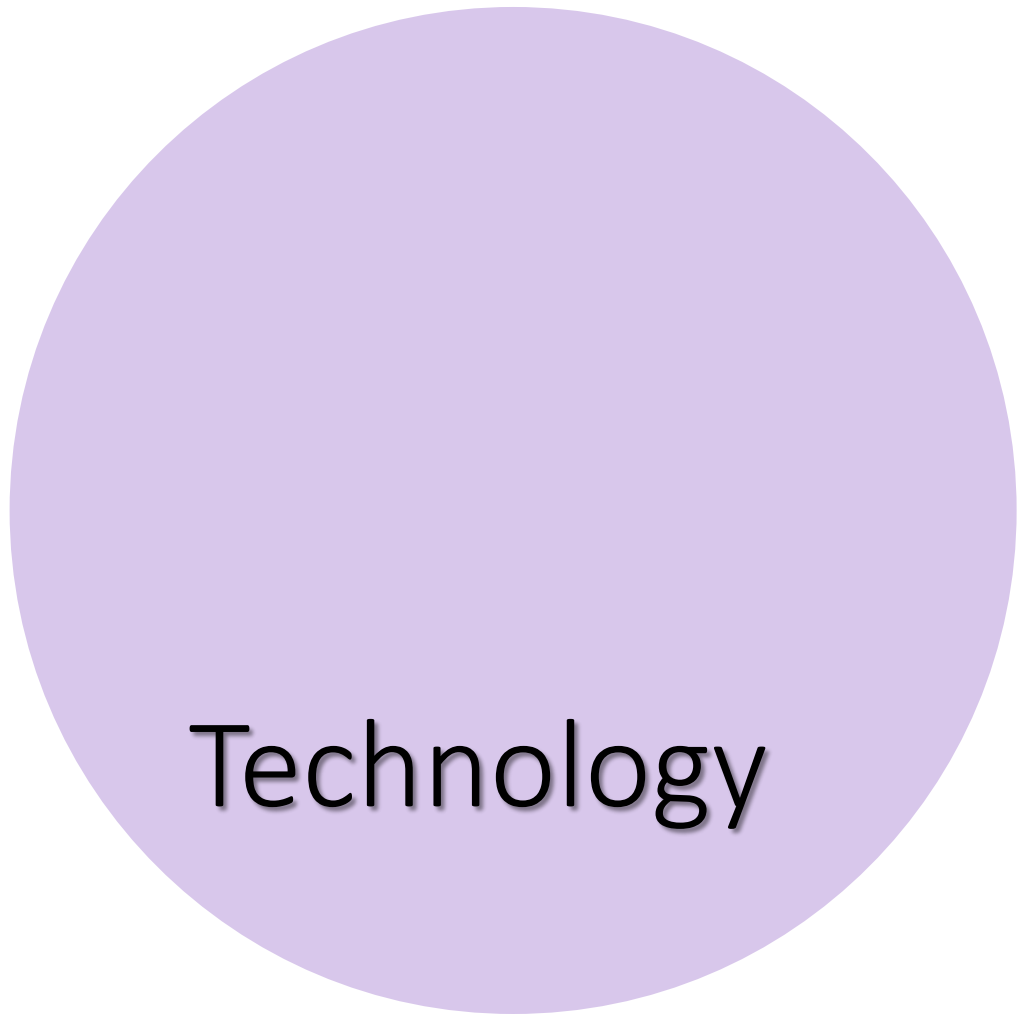
Why...

How...

Data Mesh – What is it about?



Data Mesh – What is it about?



Data Mesh – What is it about?



Zhamak Dehghani

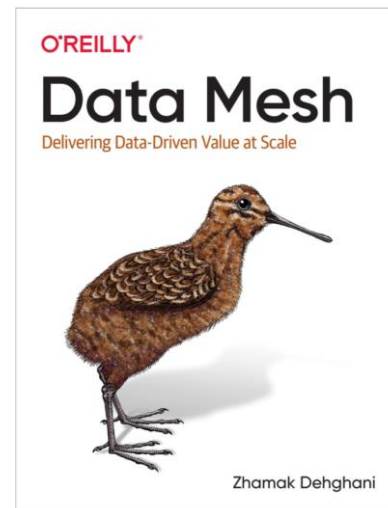
@zhamakd



<https://martinfowler.com/articles/data-mesh-principles.html>

ISBN-10
1492092398

ISBN-13
978-1492092391



1. Domain-oriented decentralised data ownership and architecture.
2. Data as a product.
3. Self-serve data infrastructure as a platform.
4. Federated computational governance.

Data Mesh – What is it about?



1. Domain-oriented decentralised data ownership and architecture.
2. Data as a product.
3. Self-serve data infrastructure as a platform.
4. Federated computational governance.

Data Mesh – Principles



Data as a product.

Federated computational governance.

Domain-oriented decentralised data ownership and architecture.

Self-serve data infrastructure as a platform.

Data Mesh – Principles



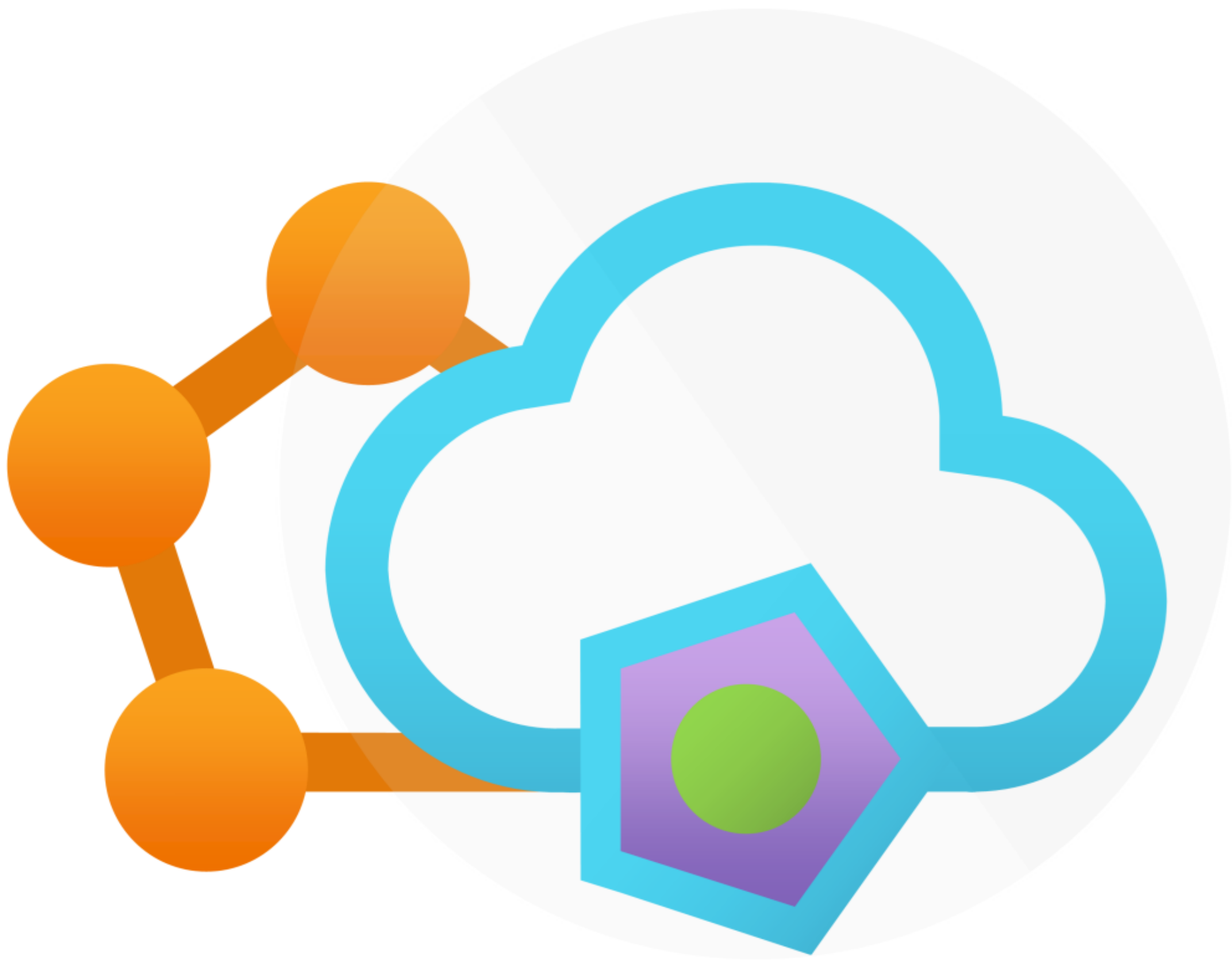
Data as a product.

Federated computational governance.



Domain-oriented decentralised data ownership and architecture.

Self-serve data infrastructure as a platform.



Data Mesh:

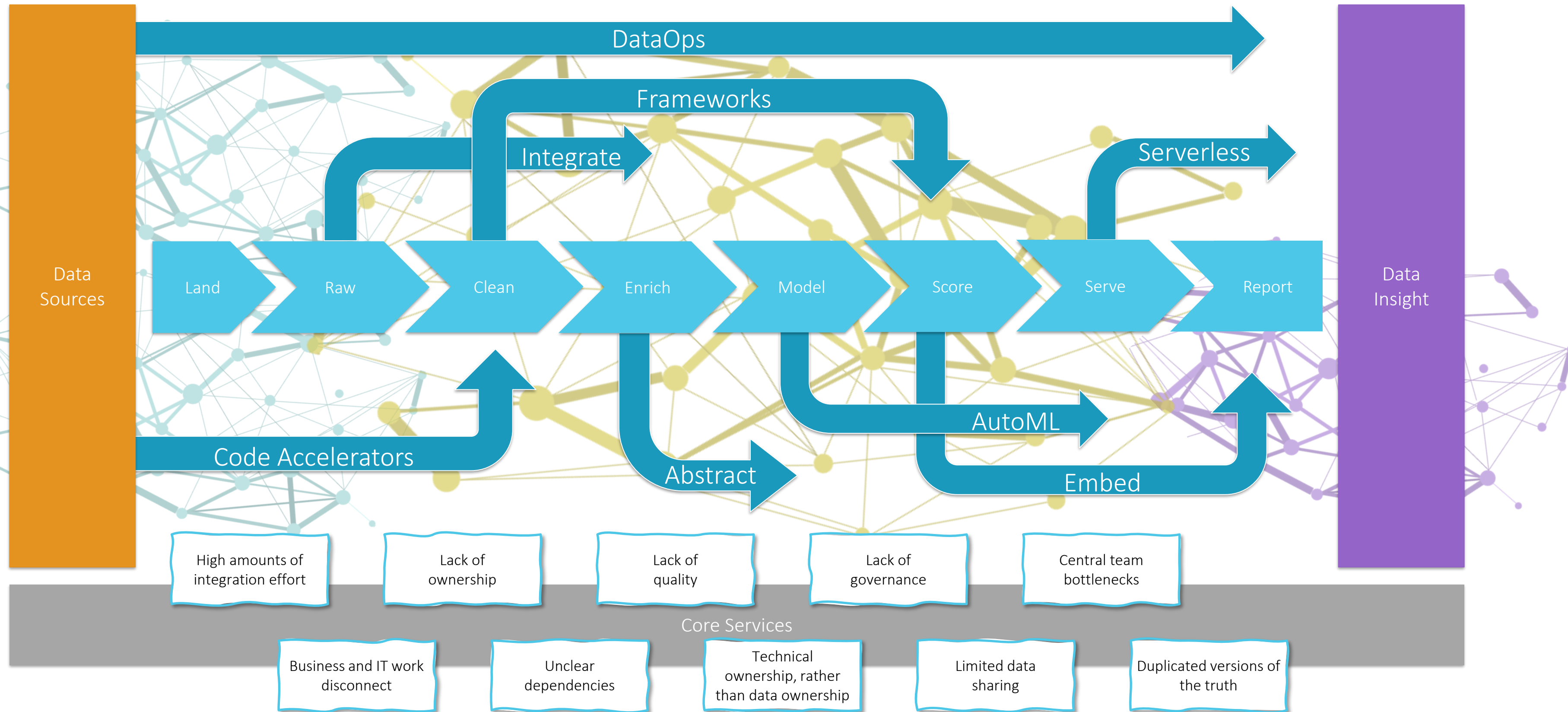
What...

Why Data Mesh?

How...

Data Mesh – Why should we build it?

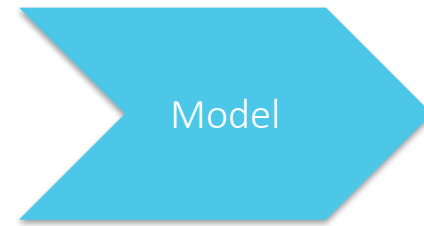
Using a **traditional centralised approach**, enhanced with cloud scale technologies to create a modern data analytics platform.



Data Mesh – Why should we build it?



Data Sources



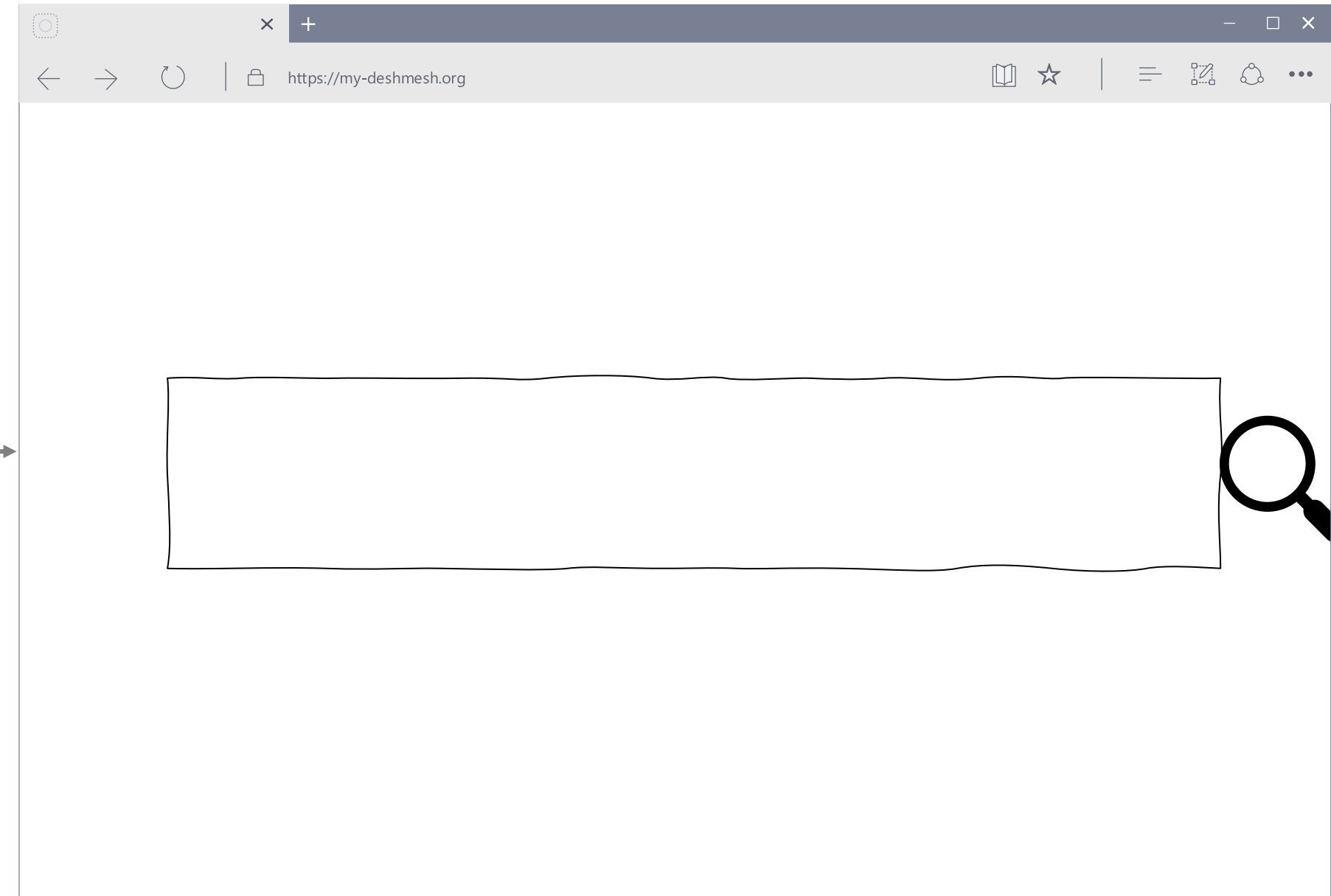
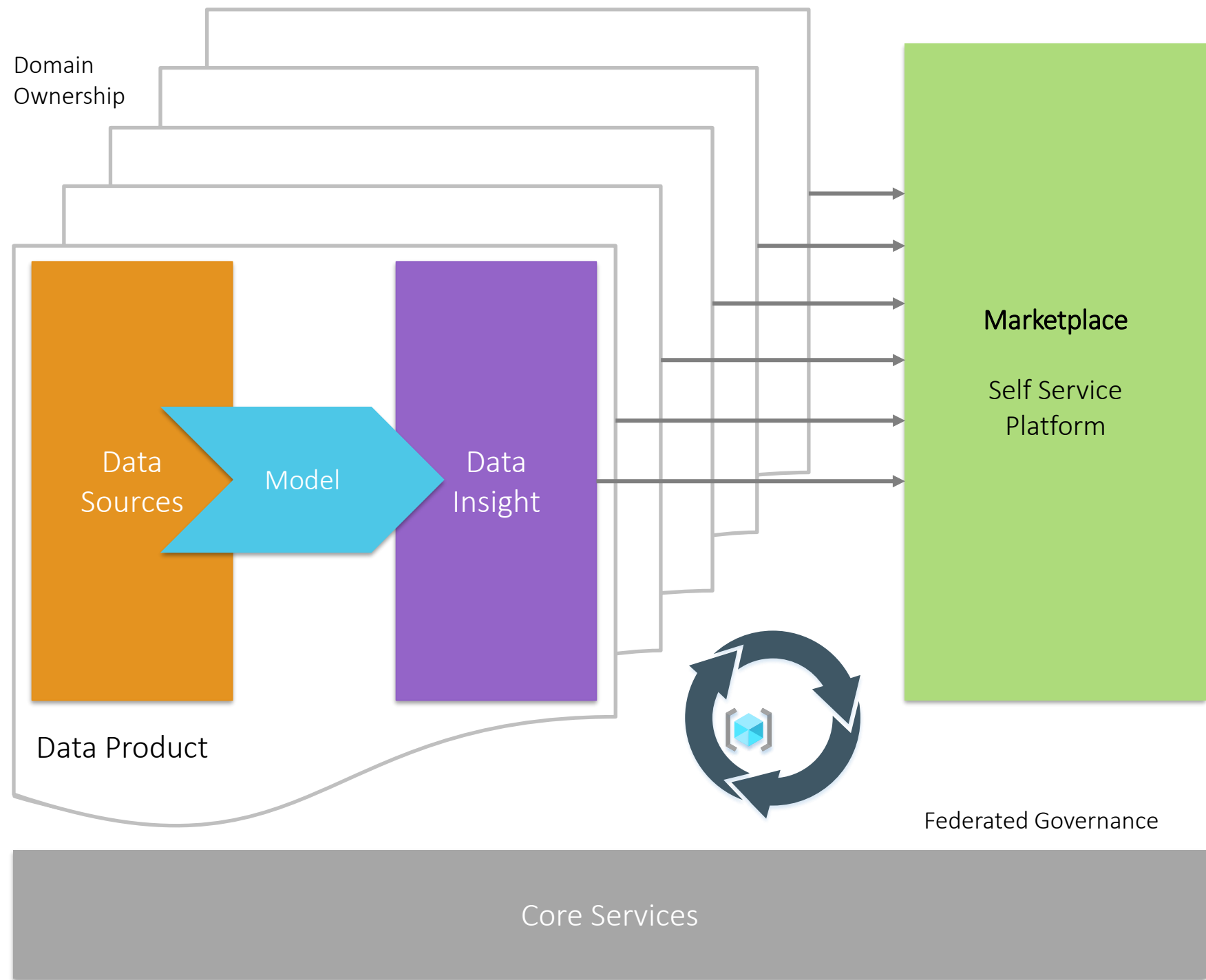
Model



Data Insight

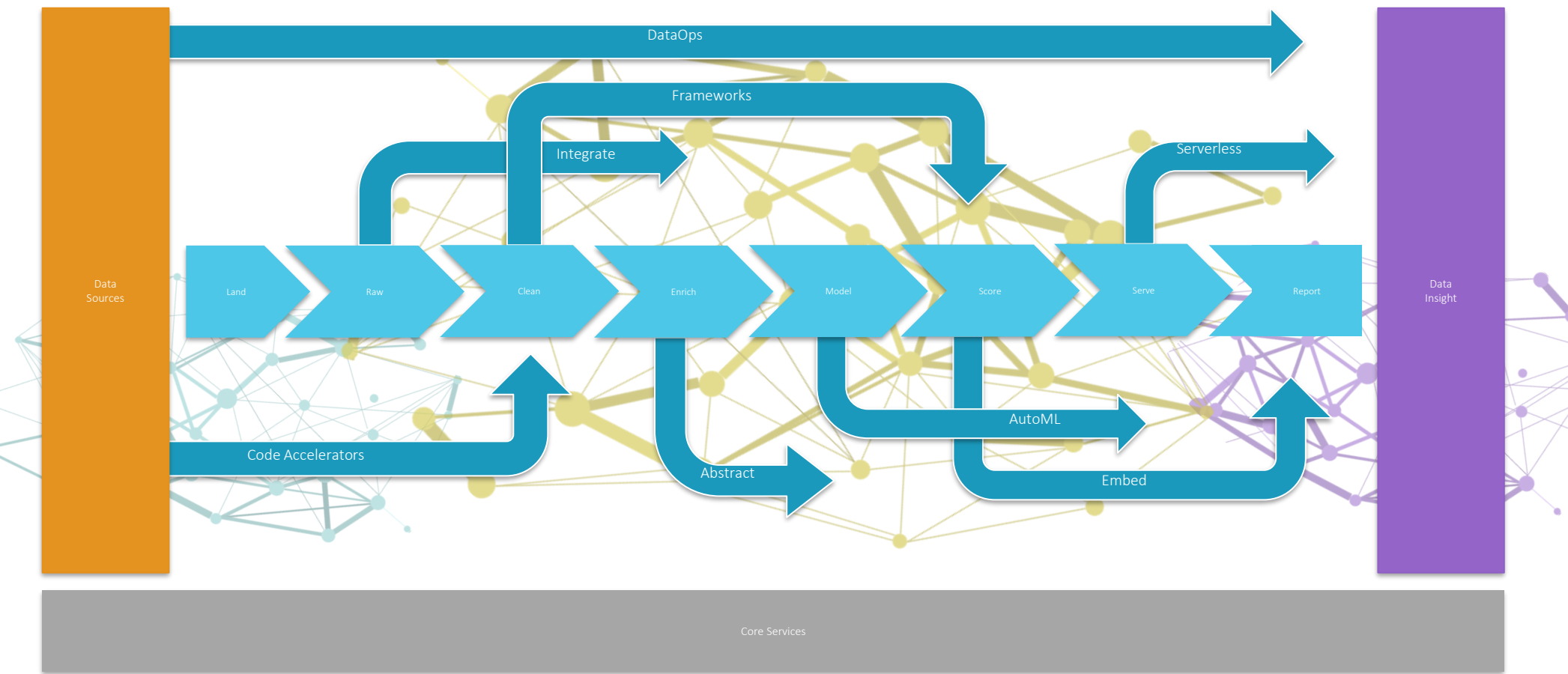
Data Mesh – Why should we build it?

Using a **de-centralised** approach to cloud scale analytics, empowering users to rapidly gain insights to make strategic business decisions.



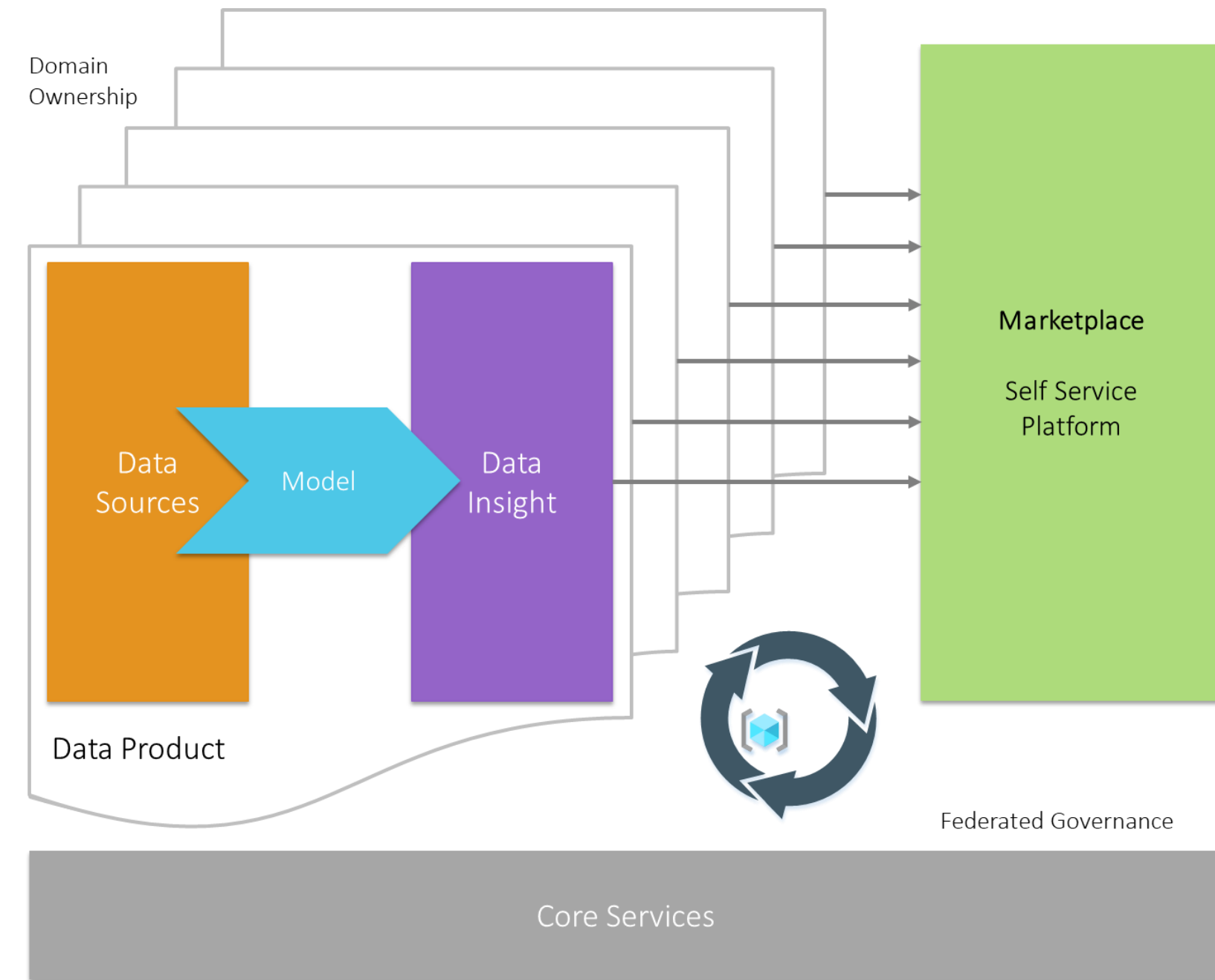
Data Mesh – Why should we build it? A: Time to Insight

Using a **traditional centralised approach**, enhanced with cloud scale technologies to create a modern data analytics platform.

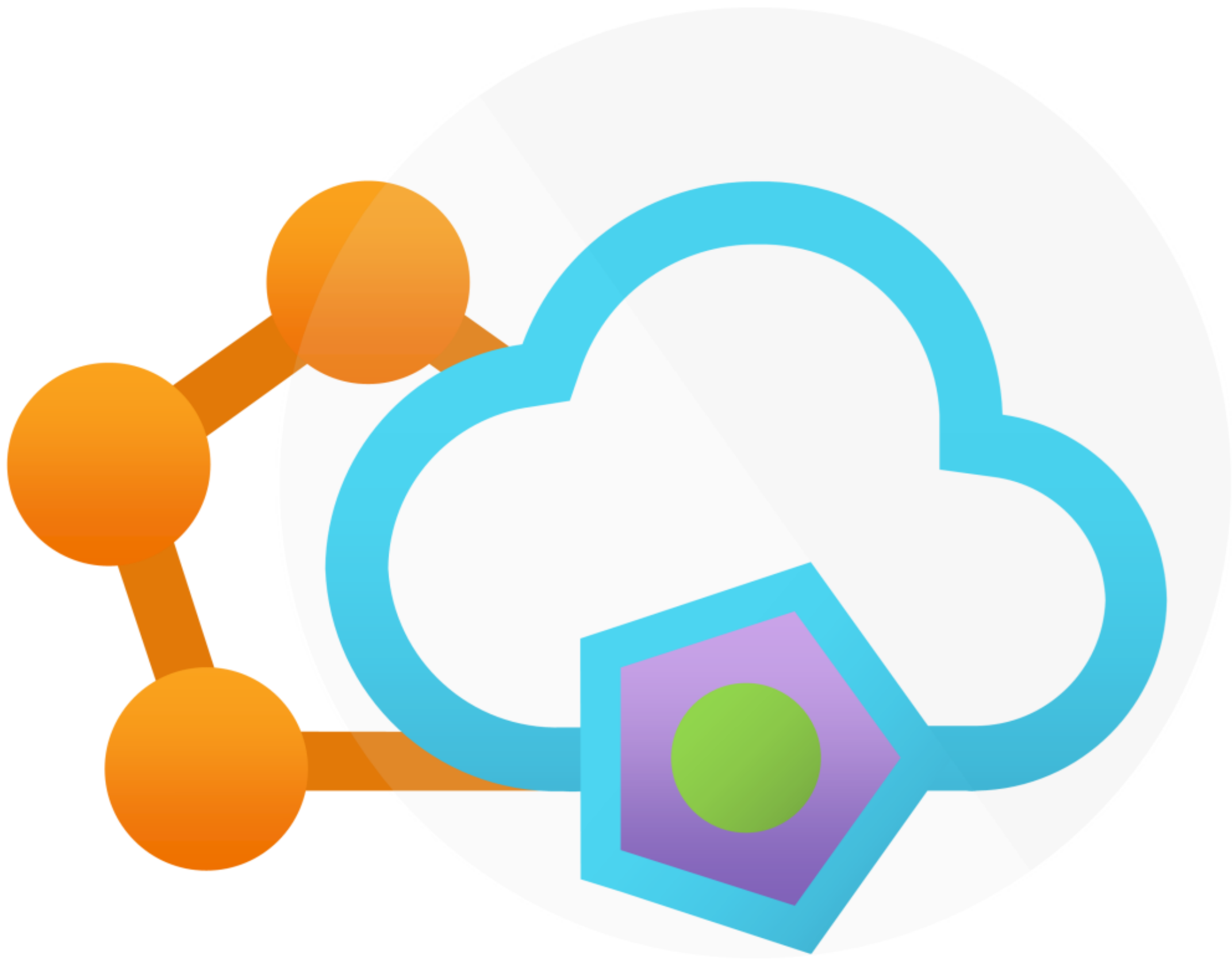


... Weeks/Months

Using a **de-centralised** approach to cloud scale analytics, empowering users to rapidly gain insights to make strategic business decisions.



... Hours/Days

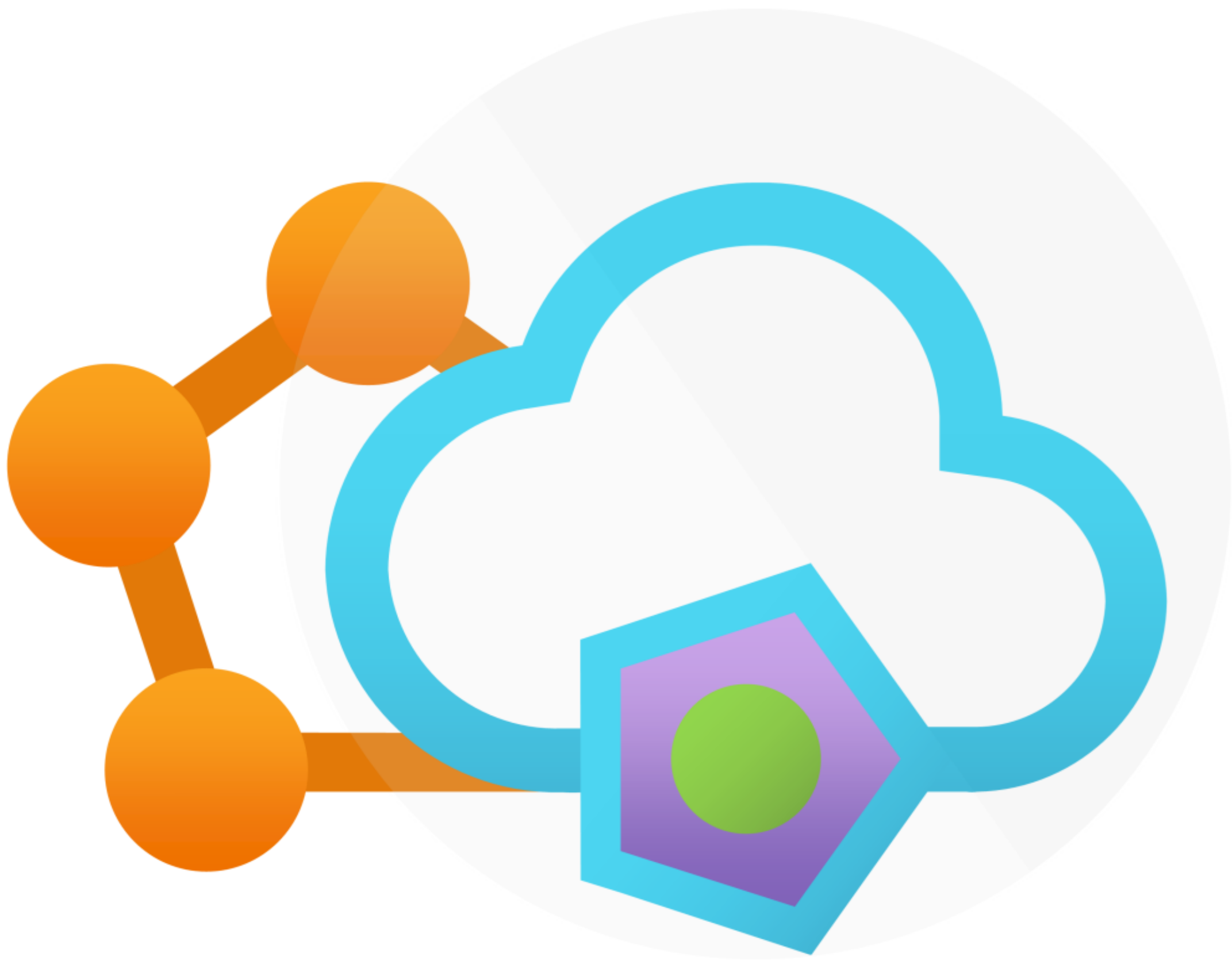


Data Mesh:

What...

Why...

How to build it?



Data Mesh:

What...

Why...

How do we build data
product(s)?

Data Mesh – Theory vs Practice



Data as a product.

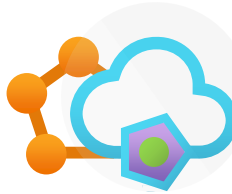
Federated computational governance.



Domain-oriented decentralised data ownership and architecture.

Self-serve data infrastructure as a platform.

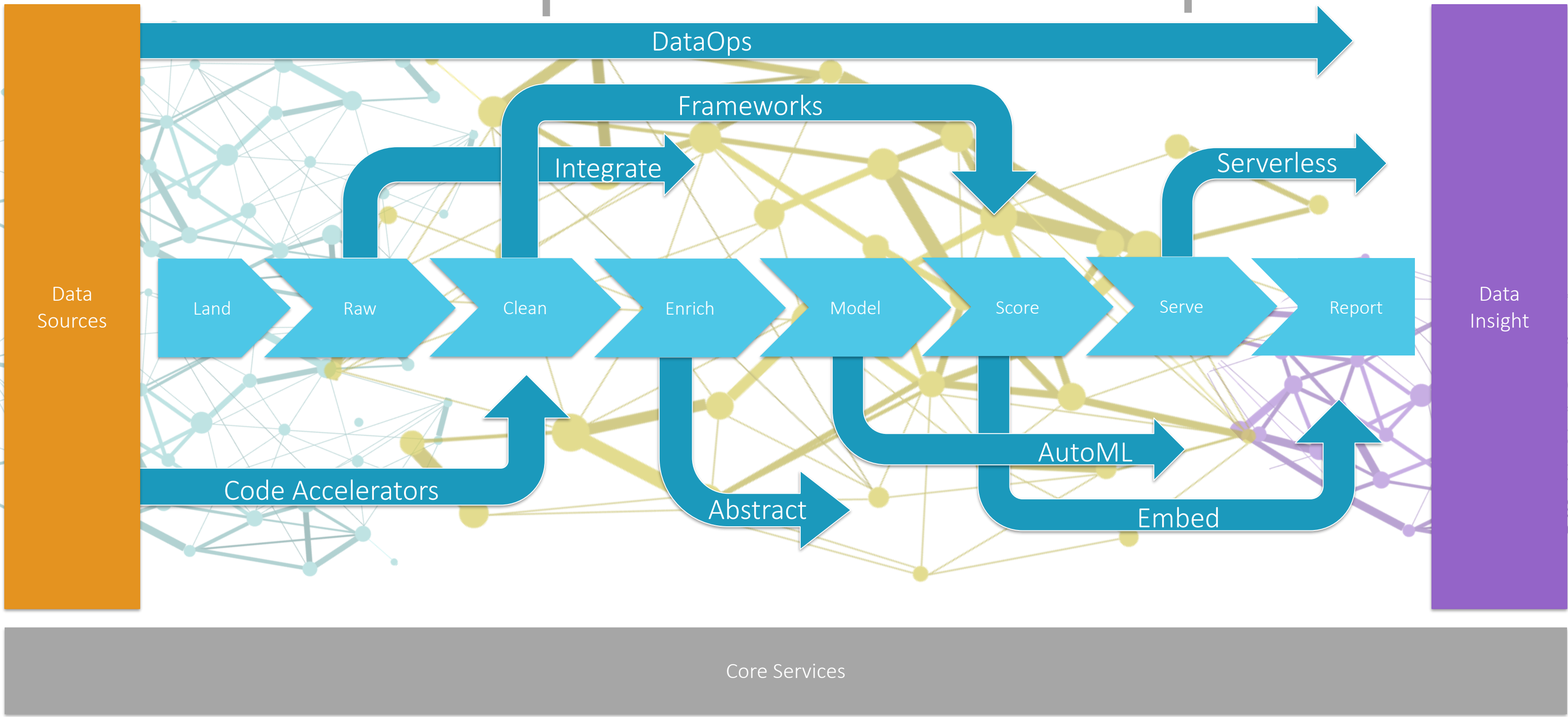
Data Mesh – Theory vs Practice



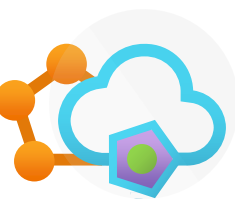
Extract

Transform

Load



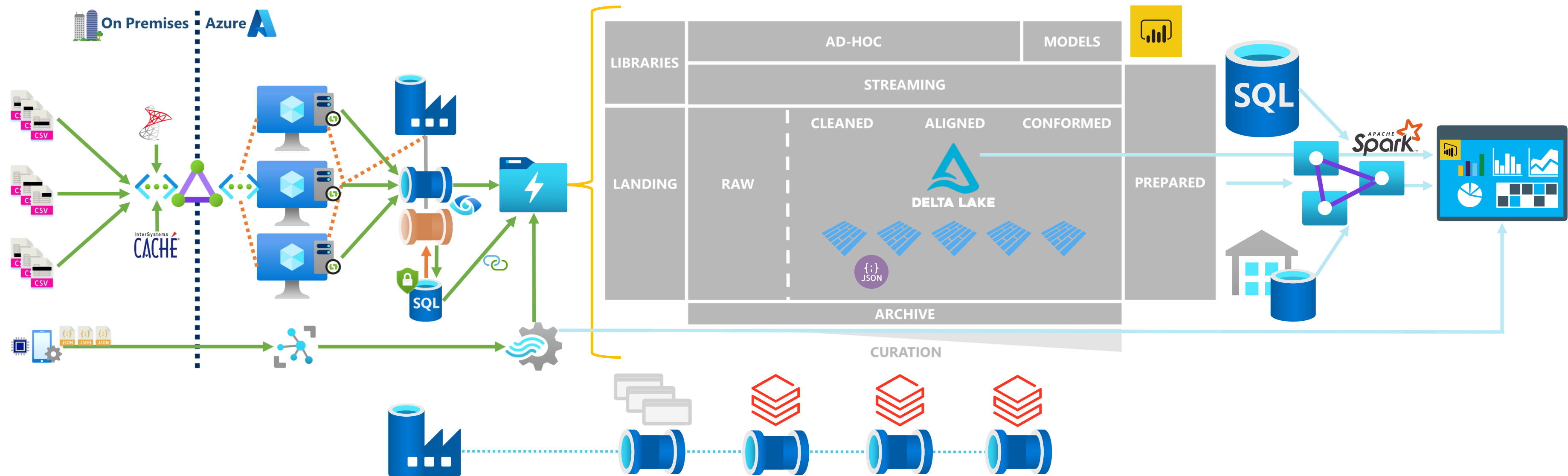
Data Mesh – Theory vs Practice



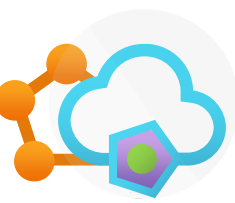
Extract

Transform

Load



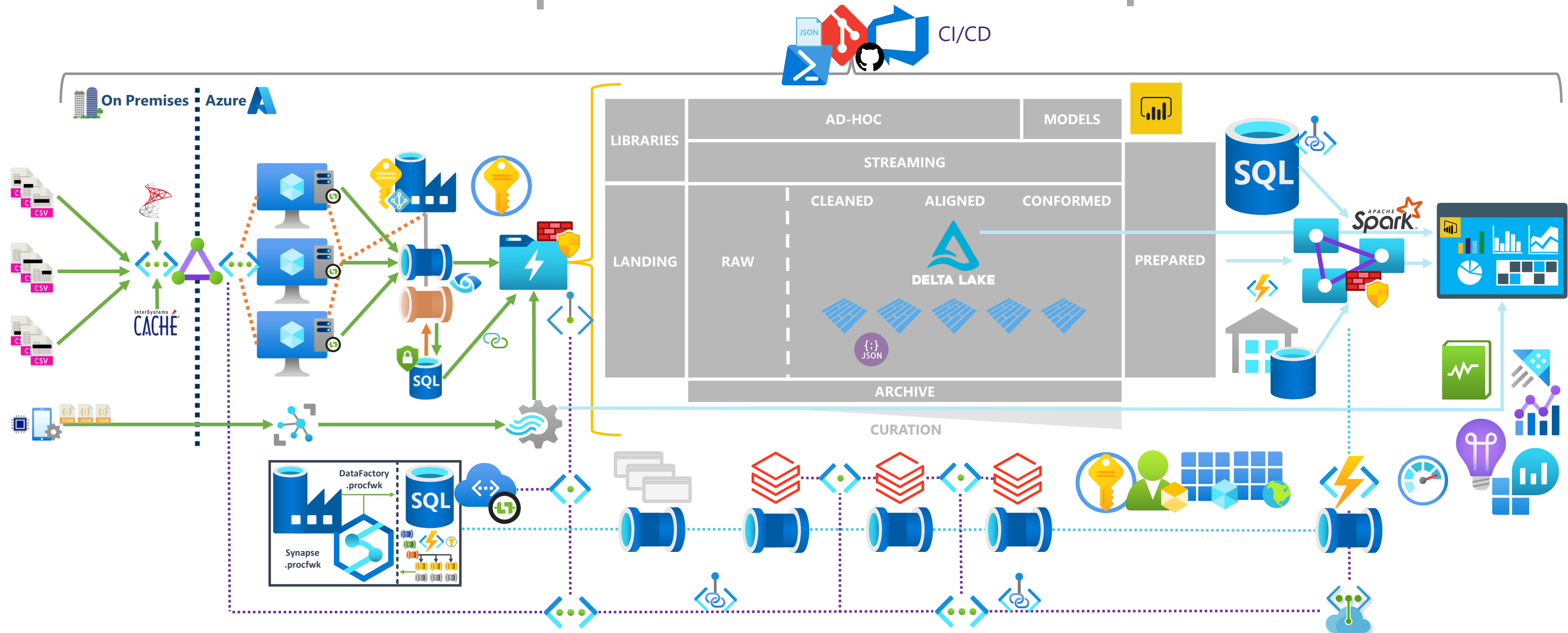
Data Mesh – Theory vs Practice



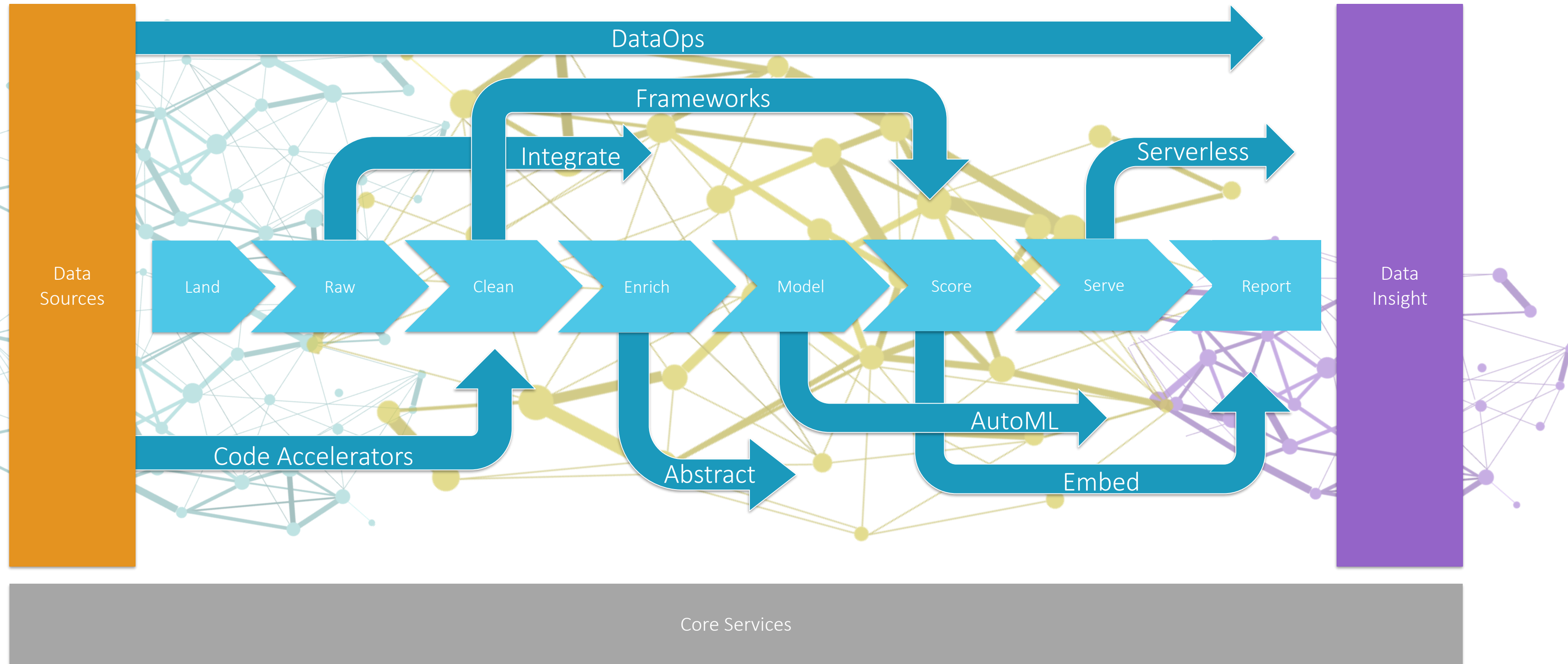
Extract

Transform

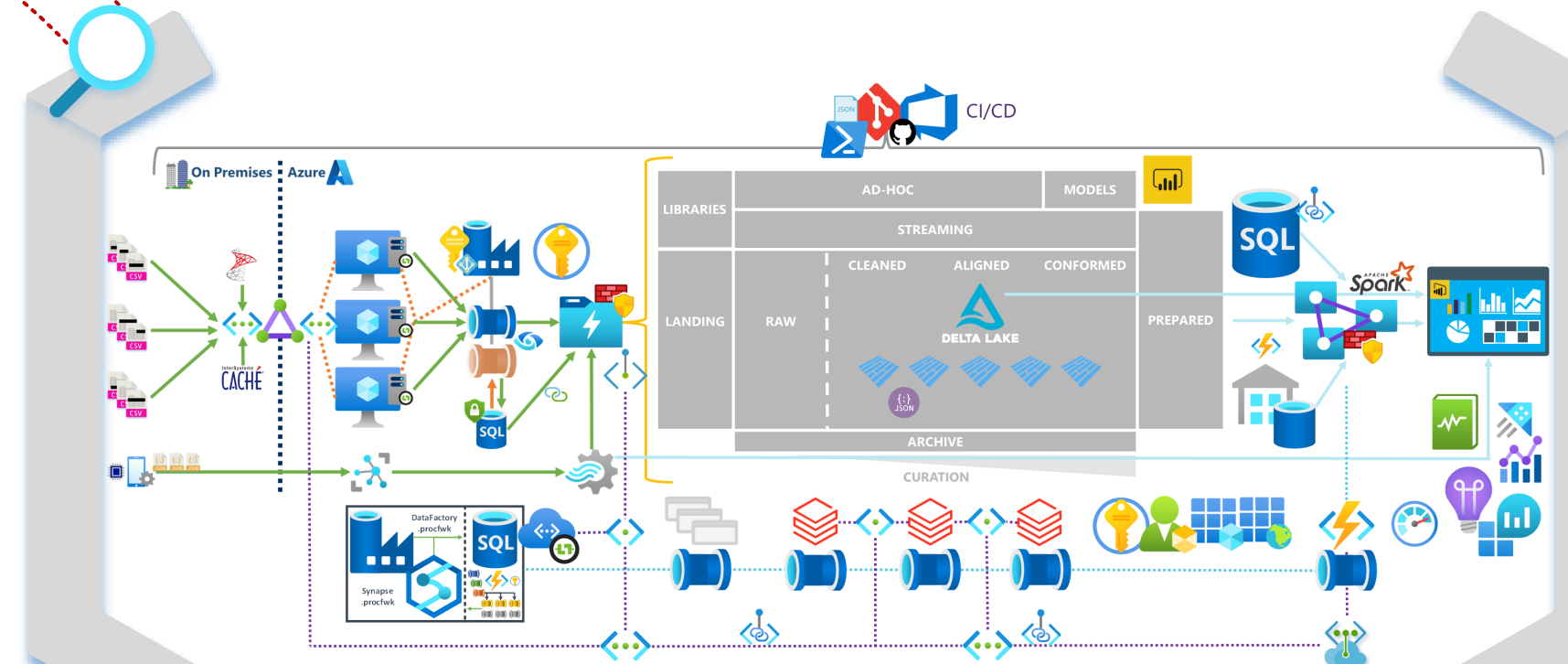
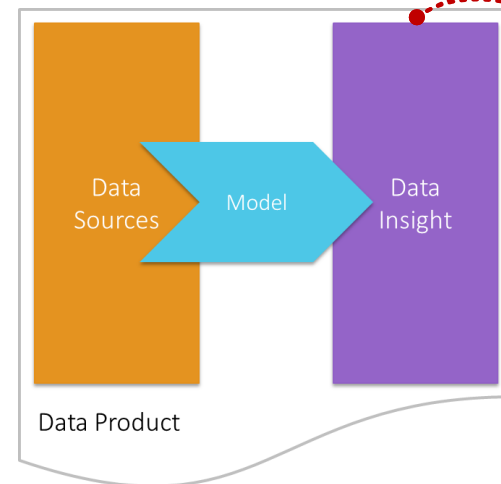
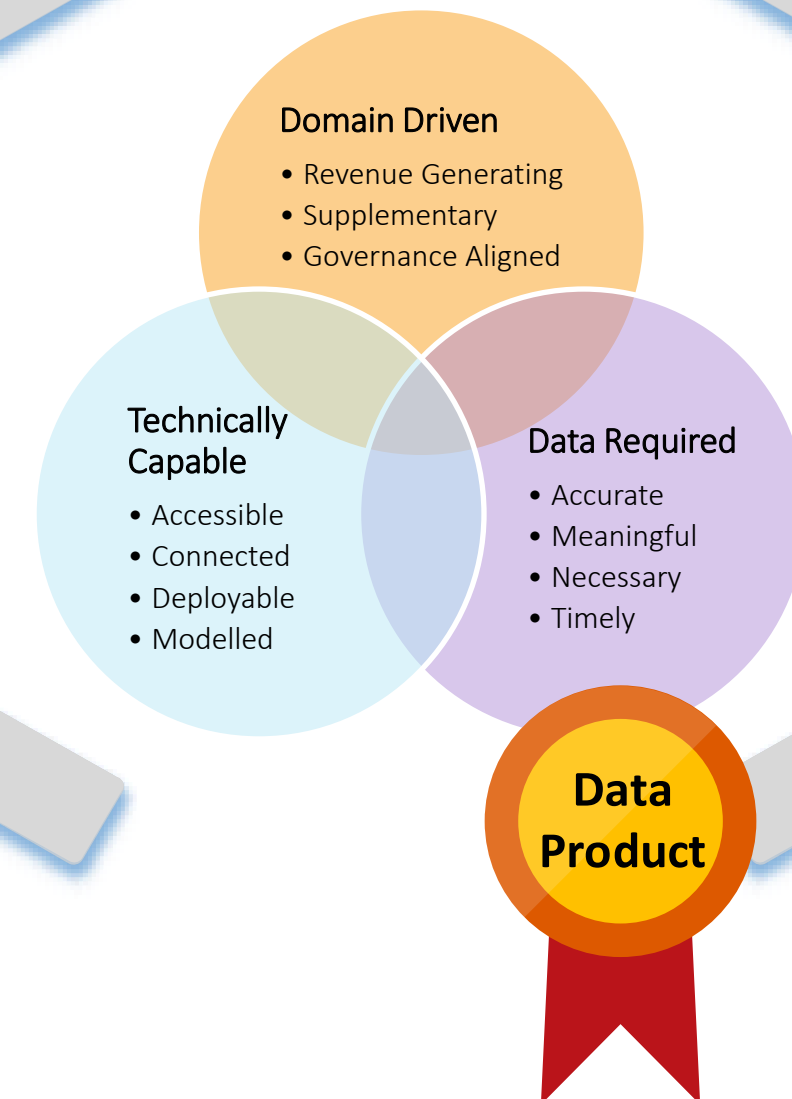
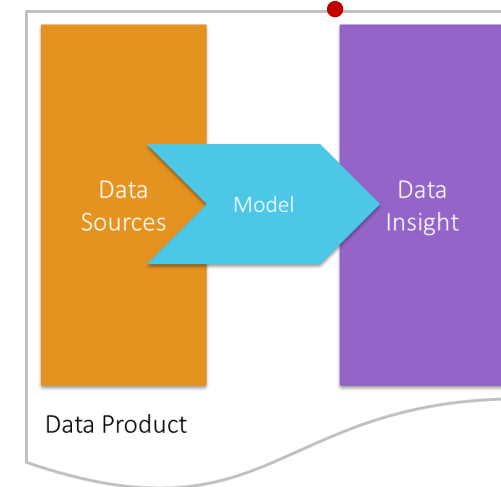
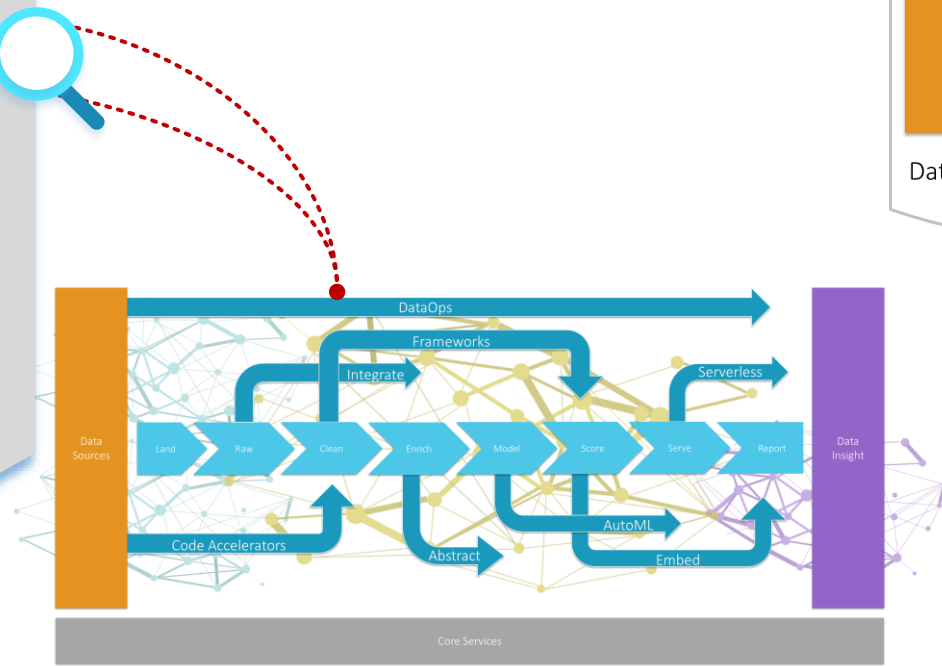
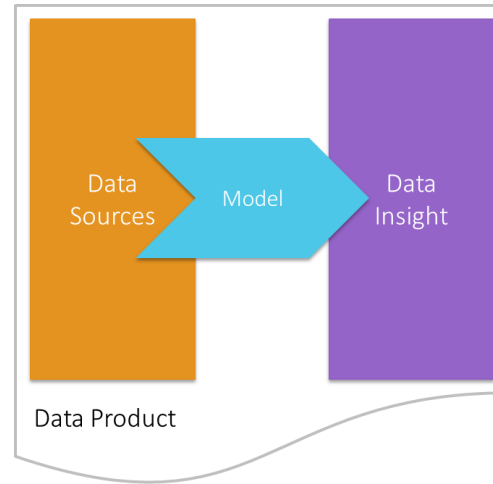
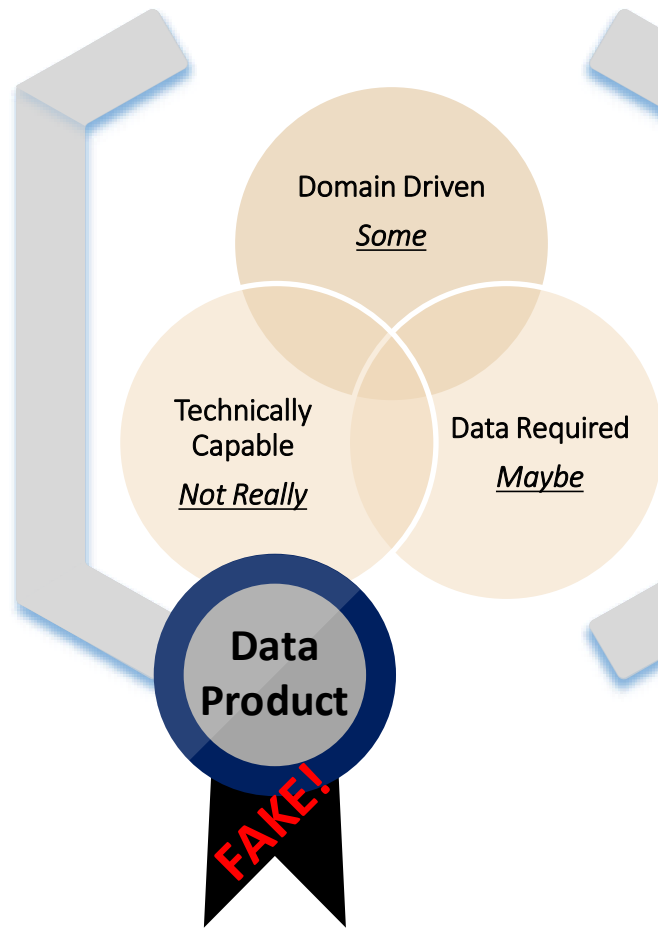
Load



Data Mesh – Theory vs Practice

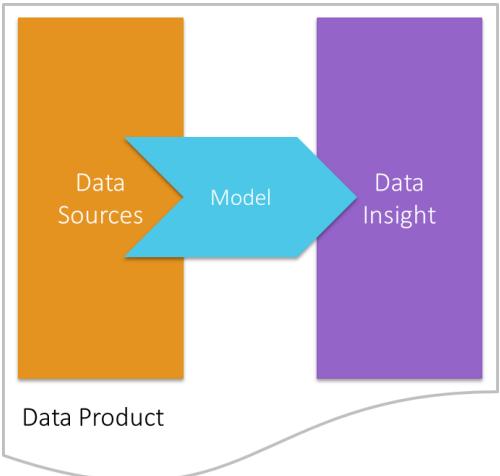
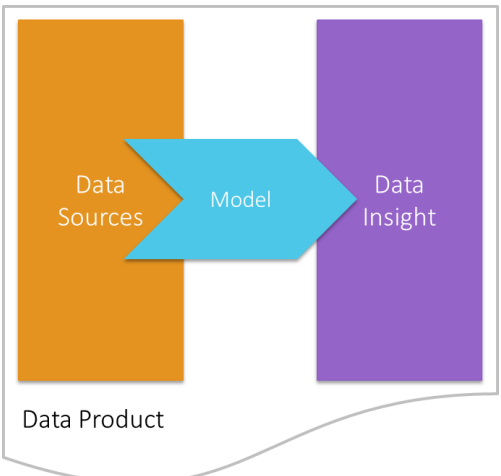
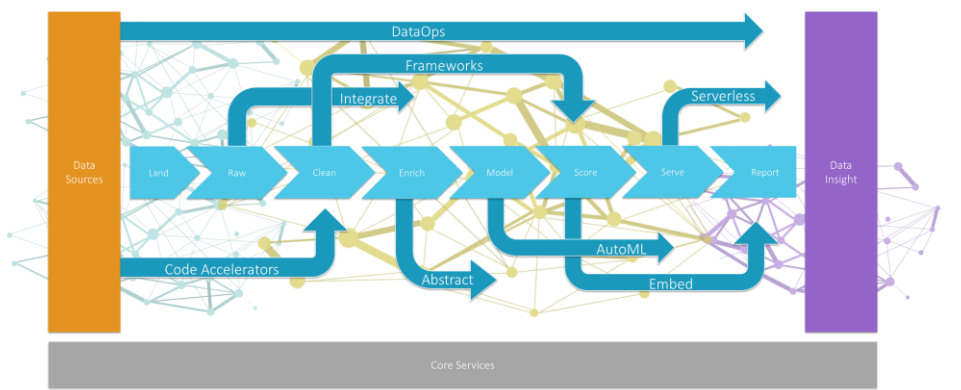
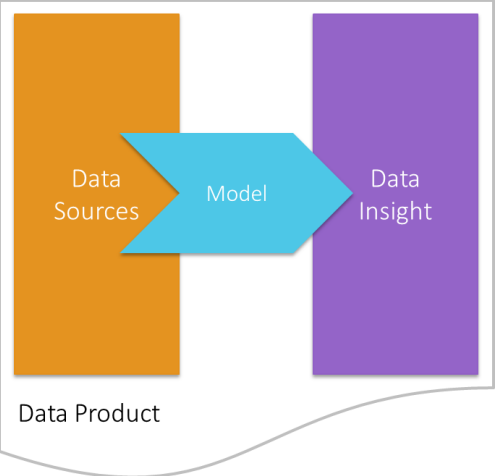


Data Mesh – Data Products

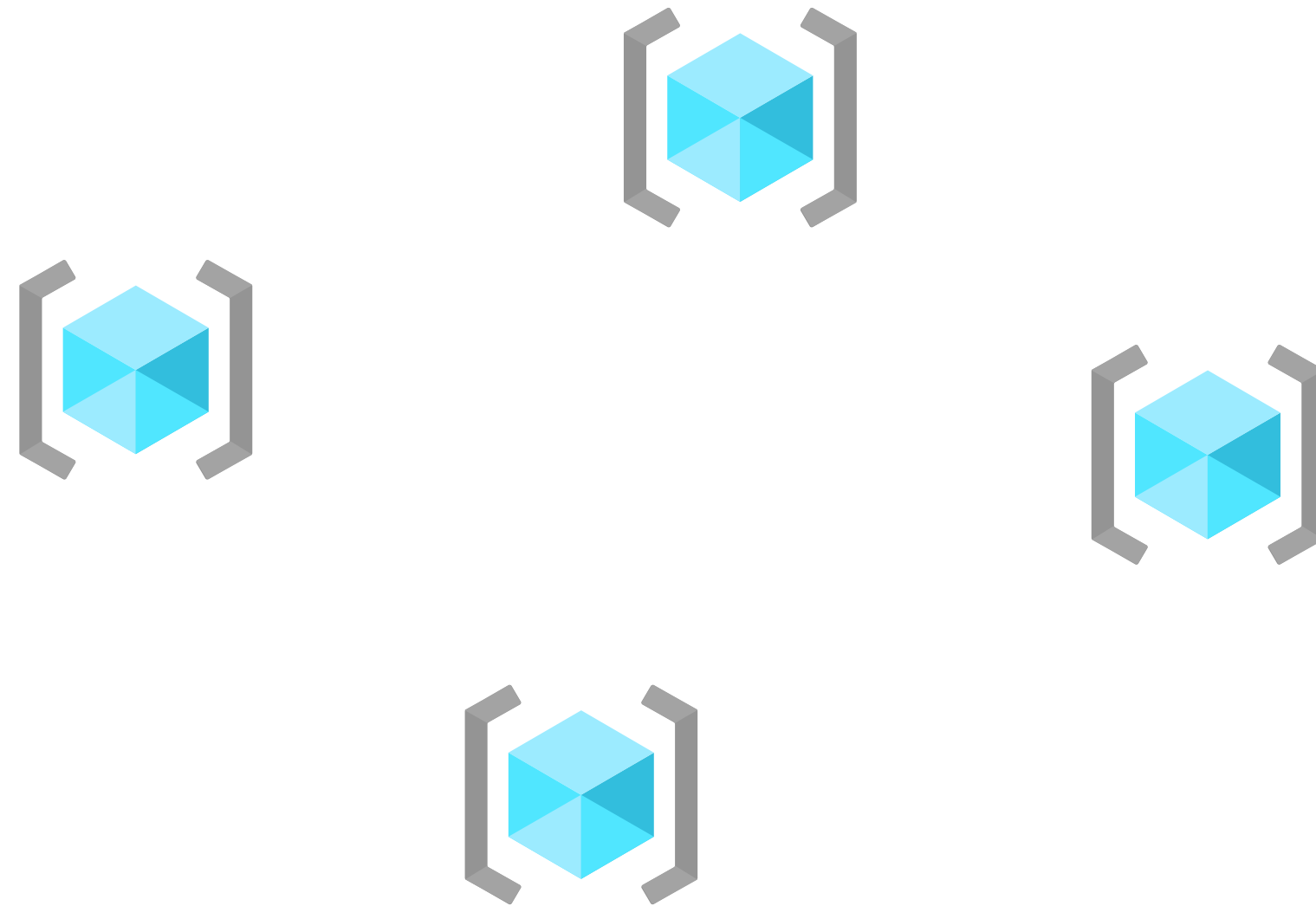


Q1: Should a data product handle both transactional/operational and analytical data?

Data Mesh – Data Products in Azure

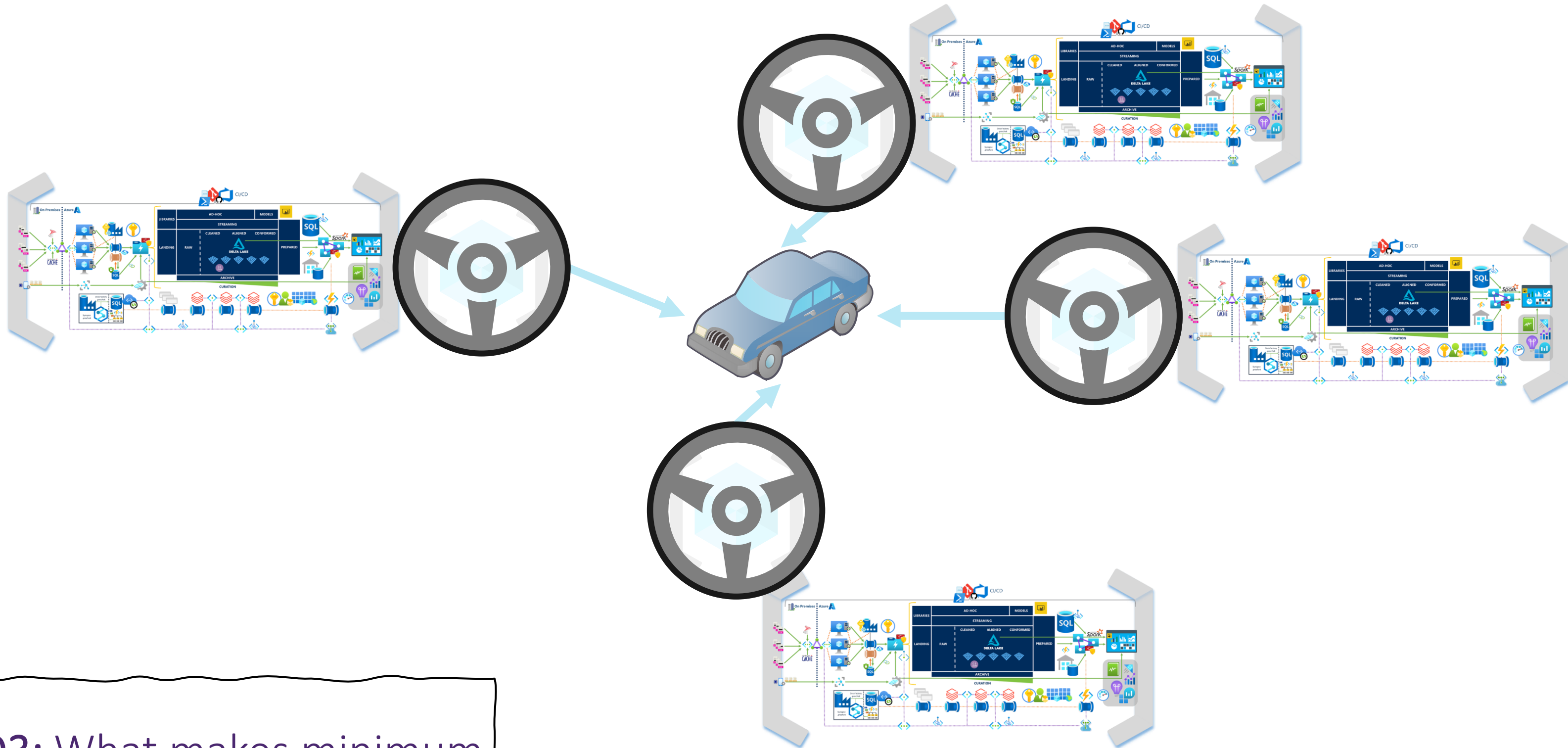


Data Mesh – Data Products in Azure



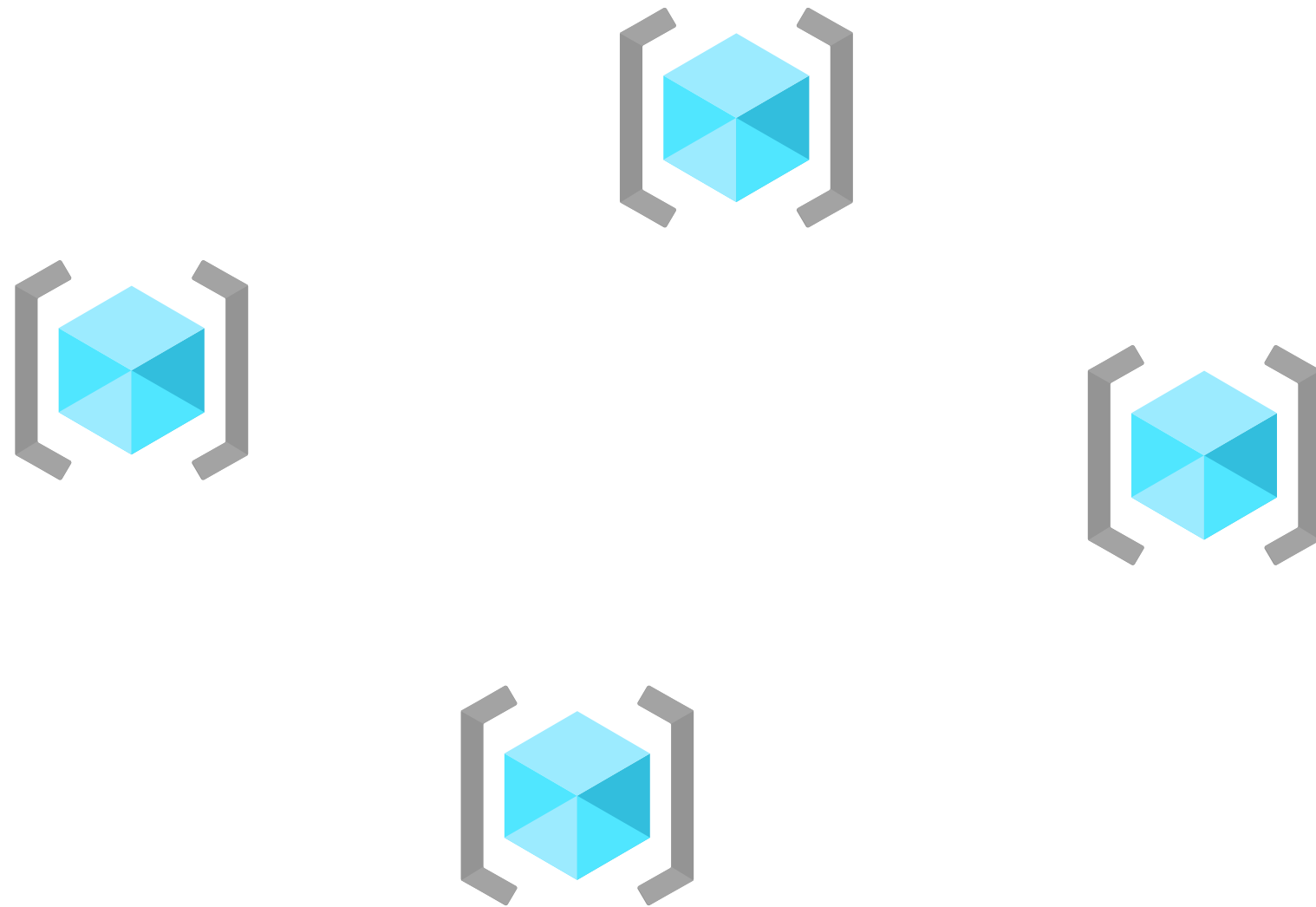
Q2: When does a data solution become a Data Mesh?

Data Mesh – Data Products in Azure

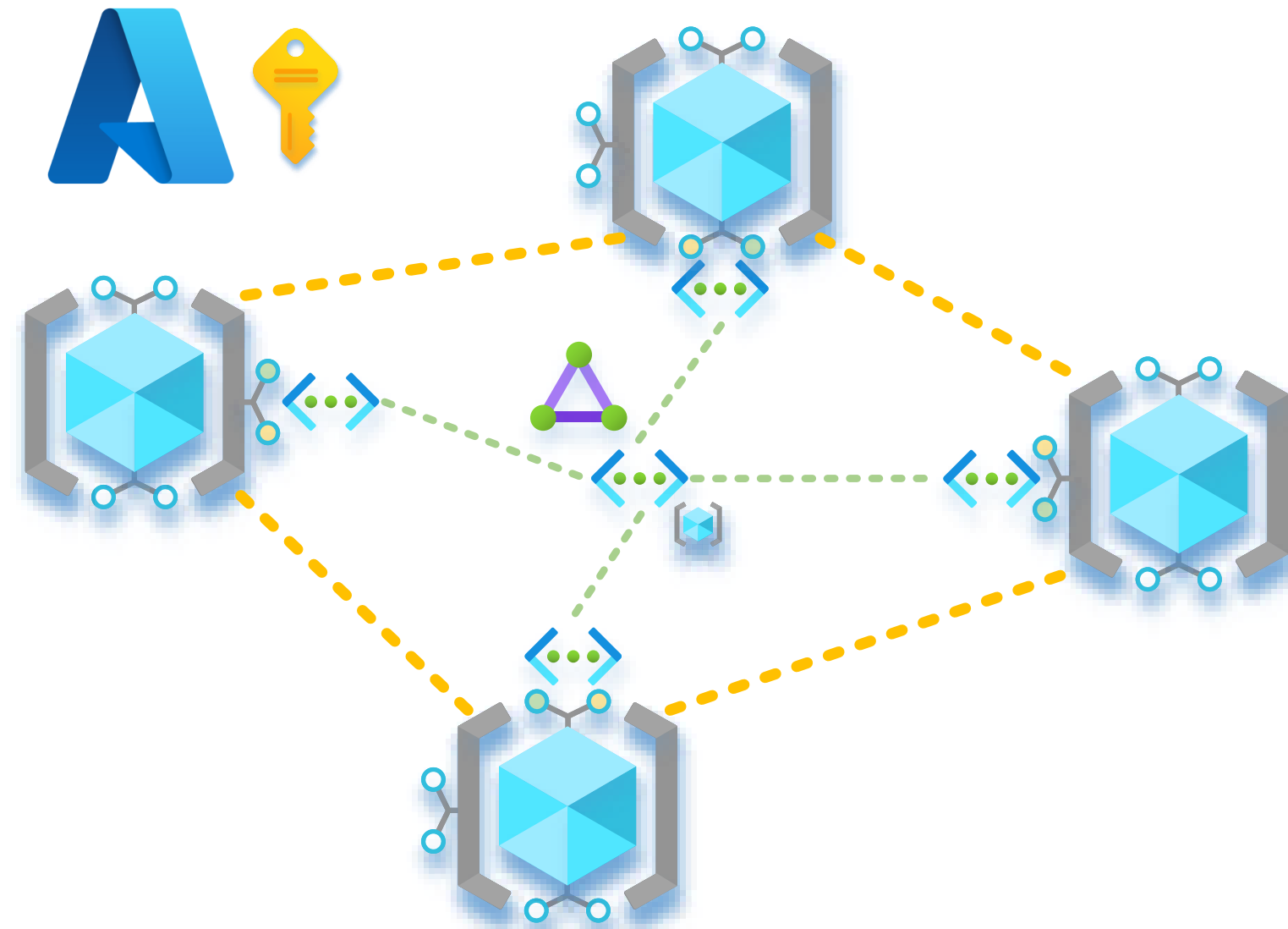


Q3: What makes minimum viable Data Mesh contain?

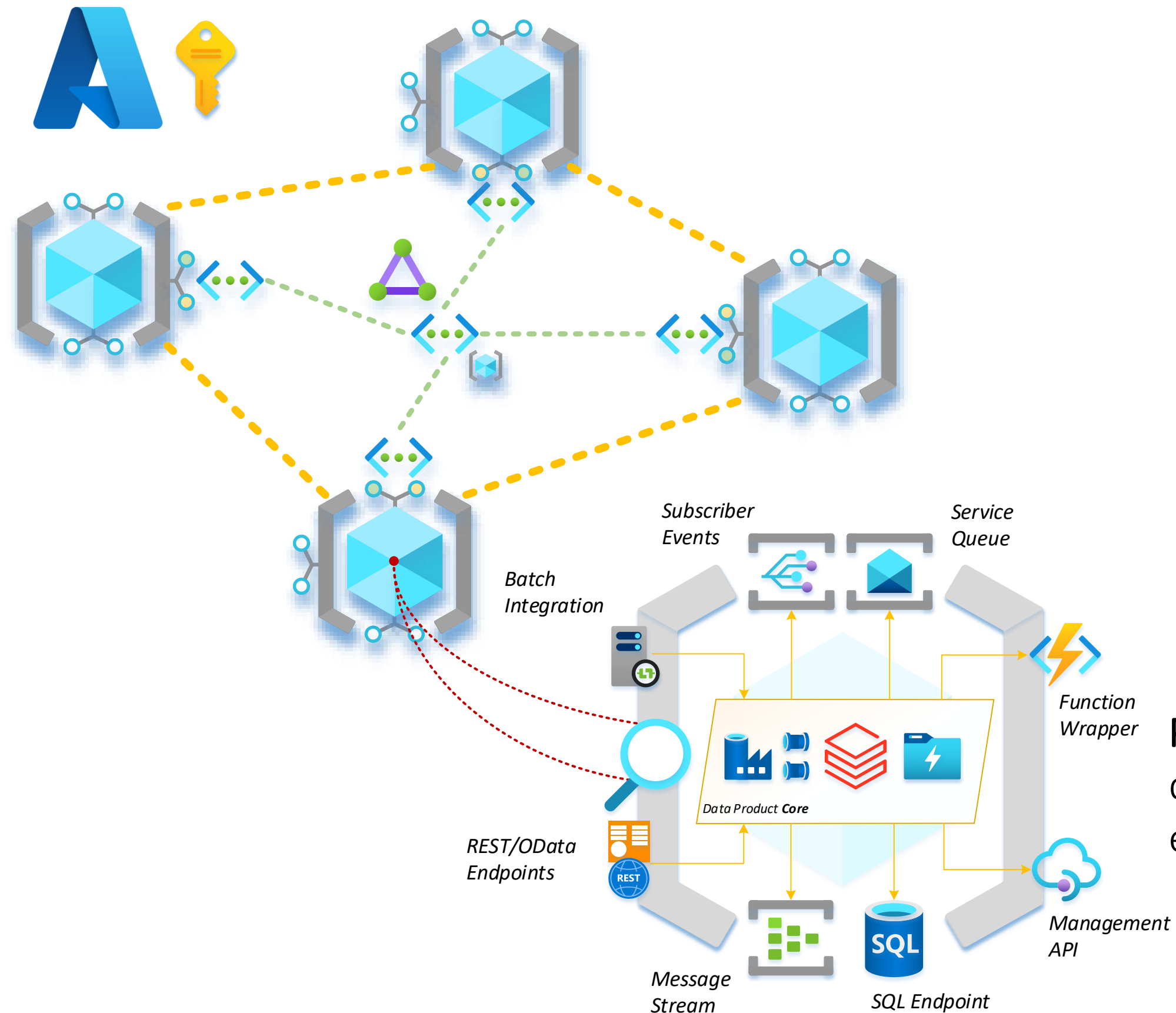
Data Mesh – Data Products in Azure



Data Mesh – Data Products in Azure with Interfaces

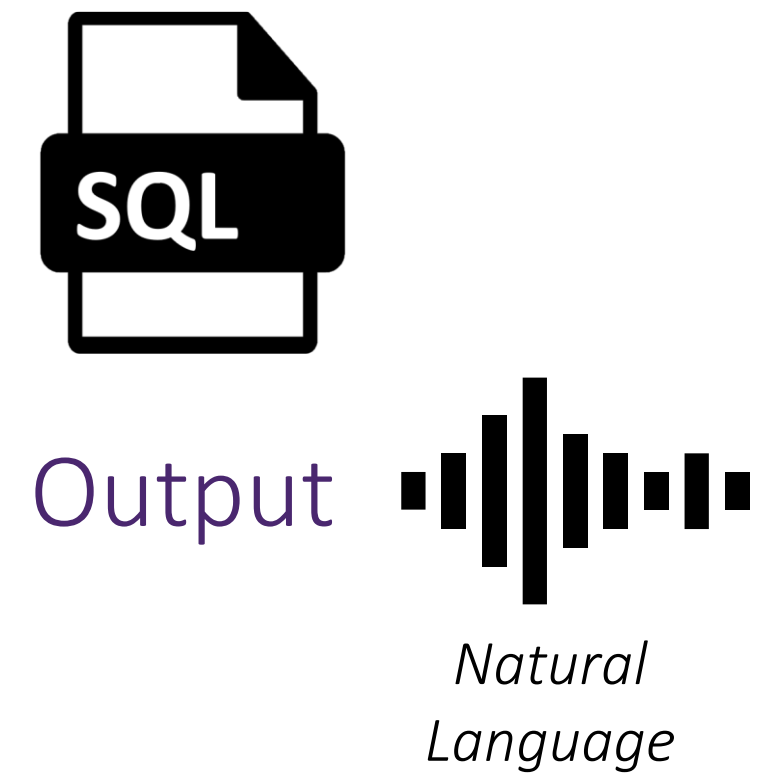
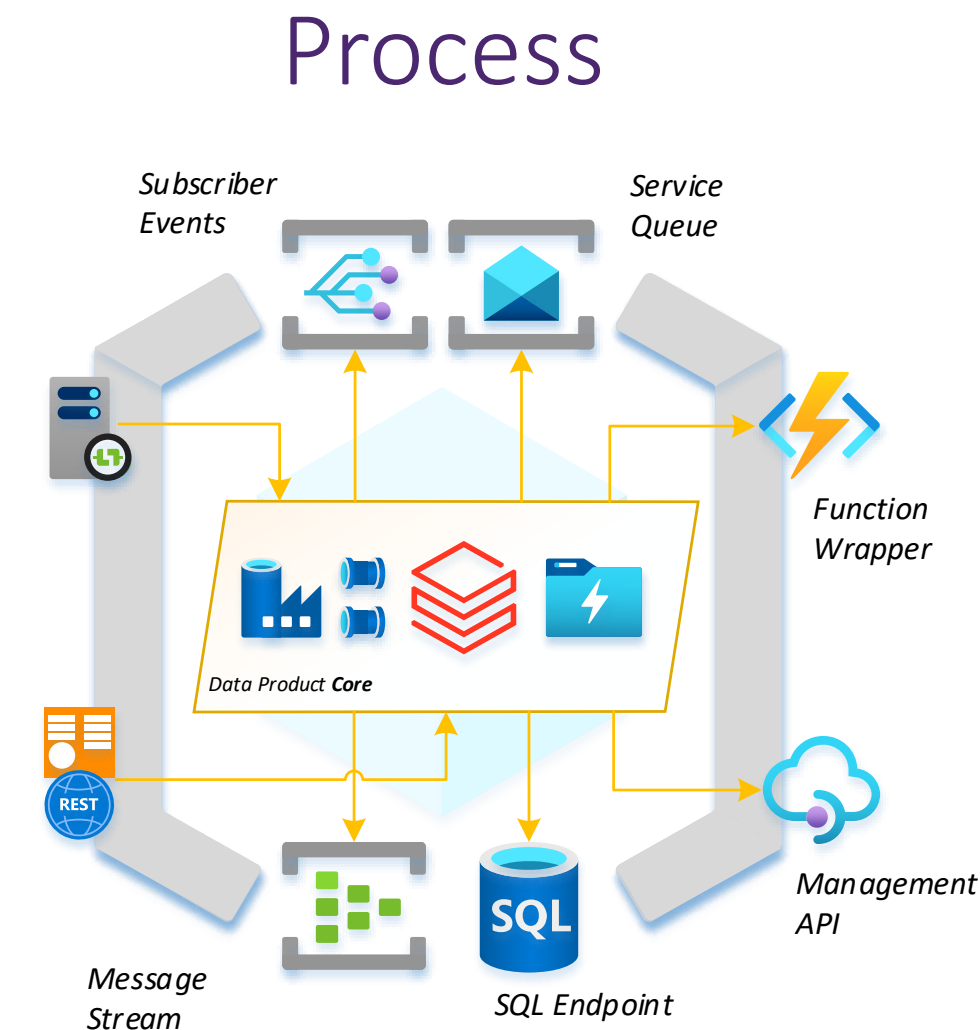
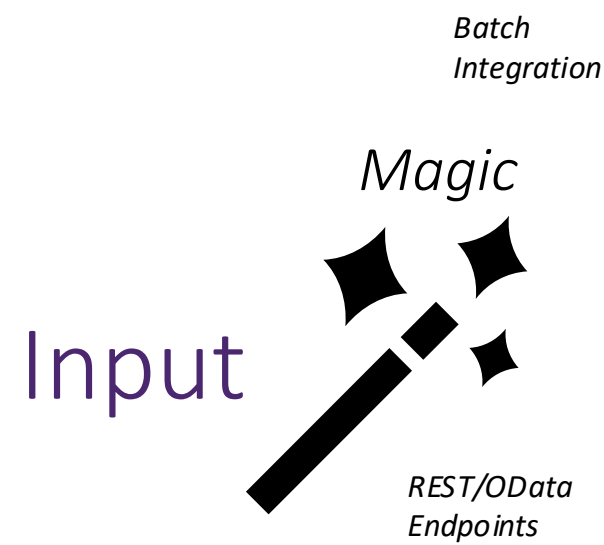
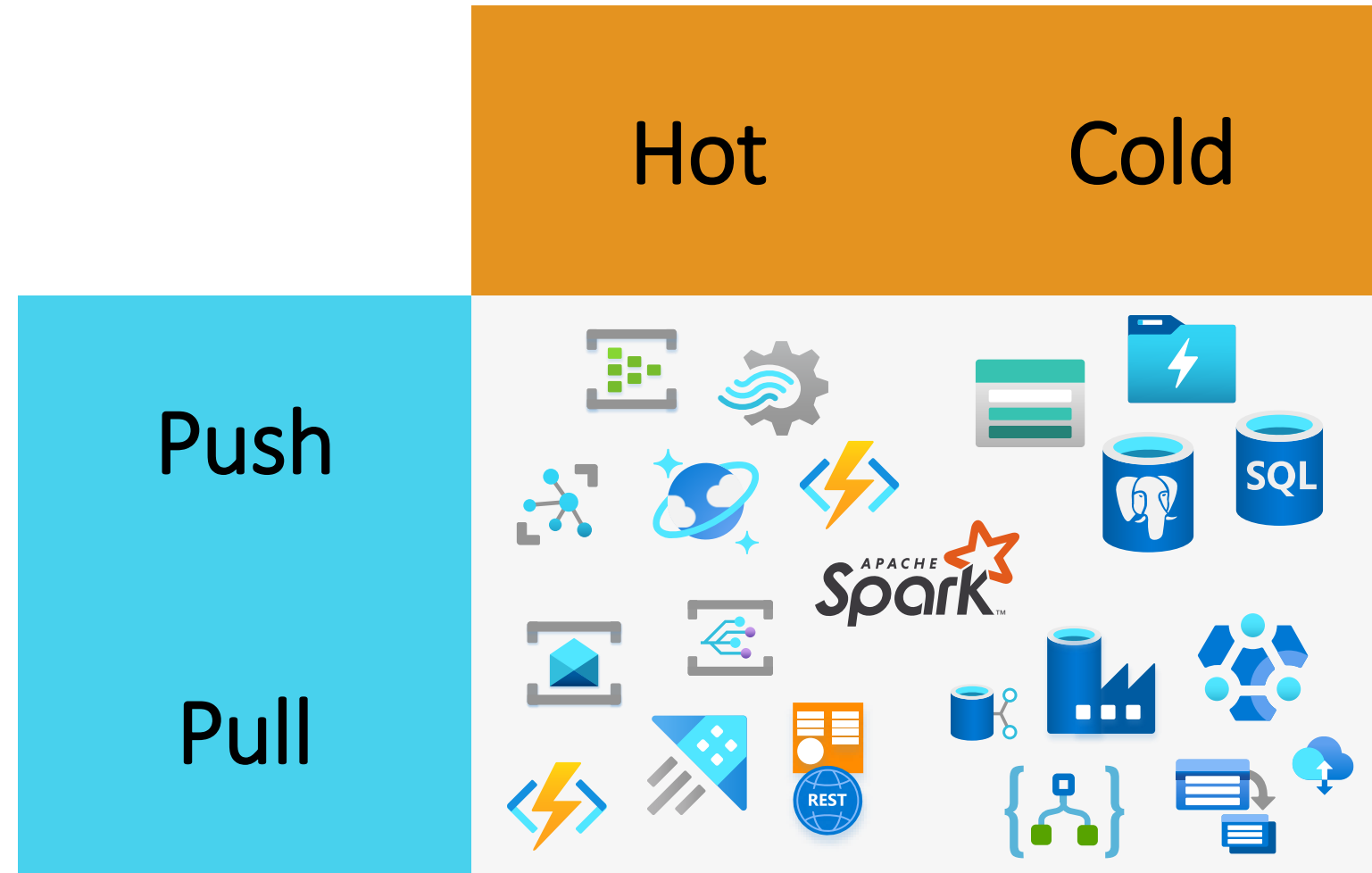


Data Mesh – Data Products in Azure with Interfaces

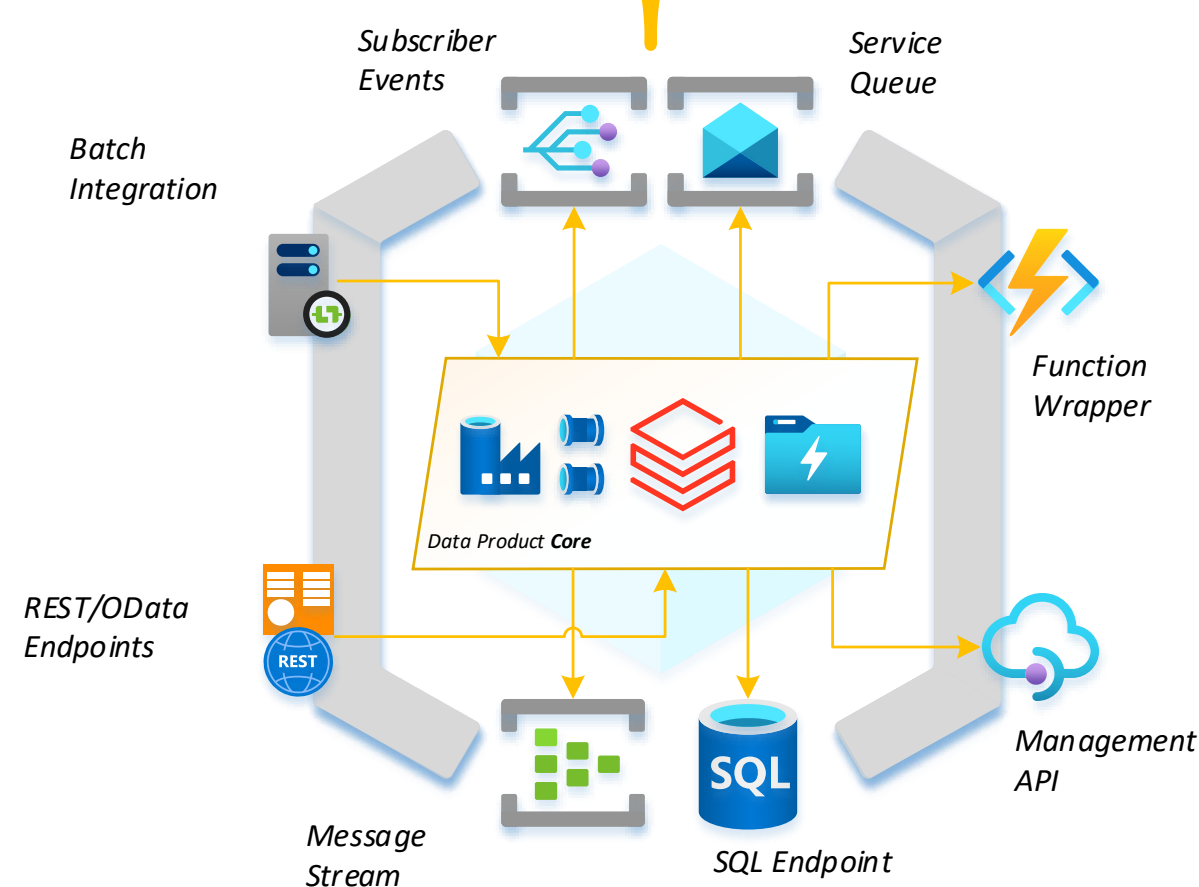
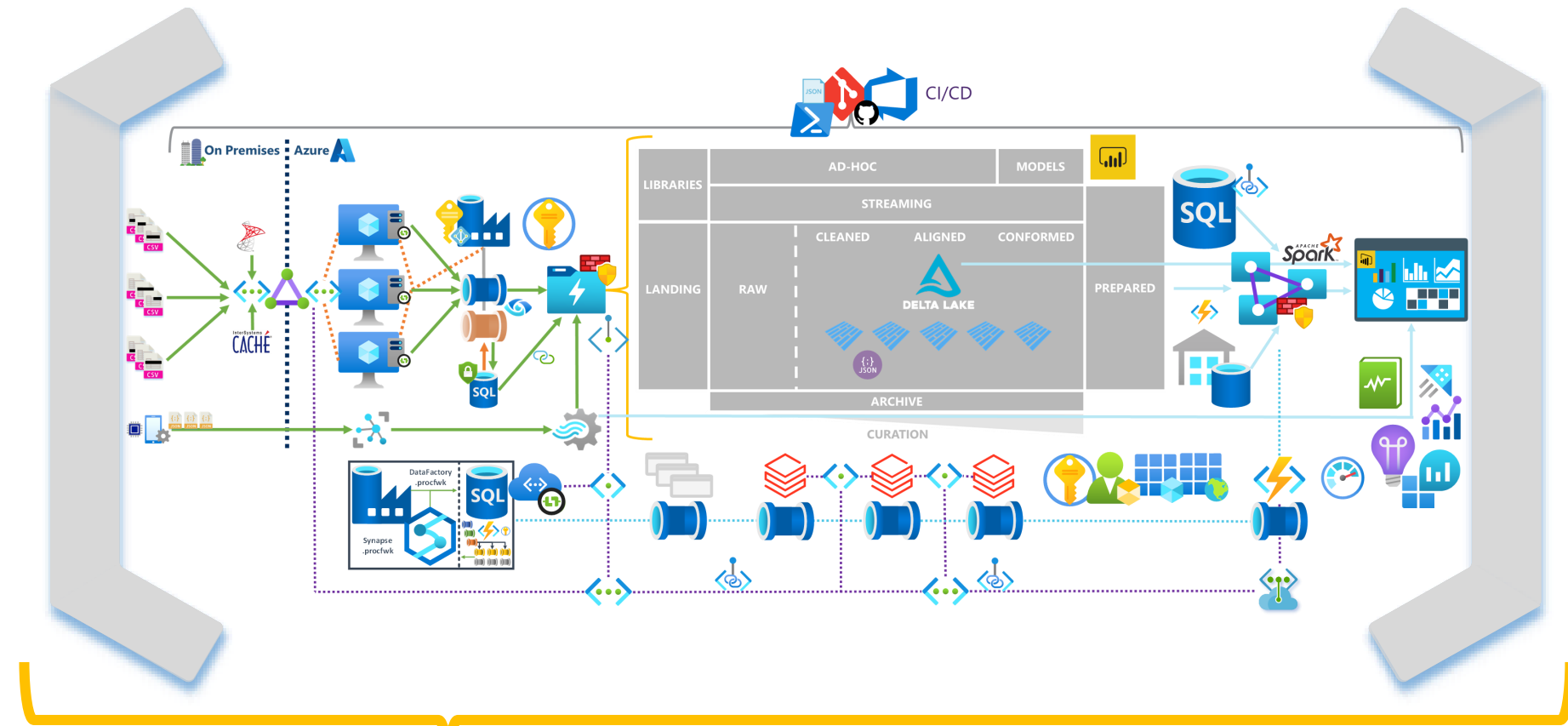


Primary Interfaces –
data integration and
exchange.

Data Mesh – Data Products in Azure with Interfaces



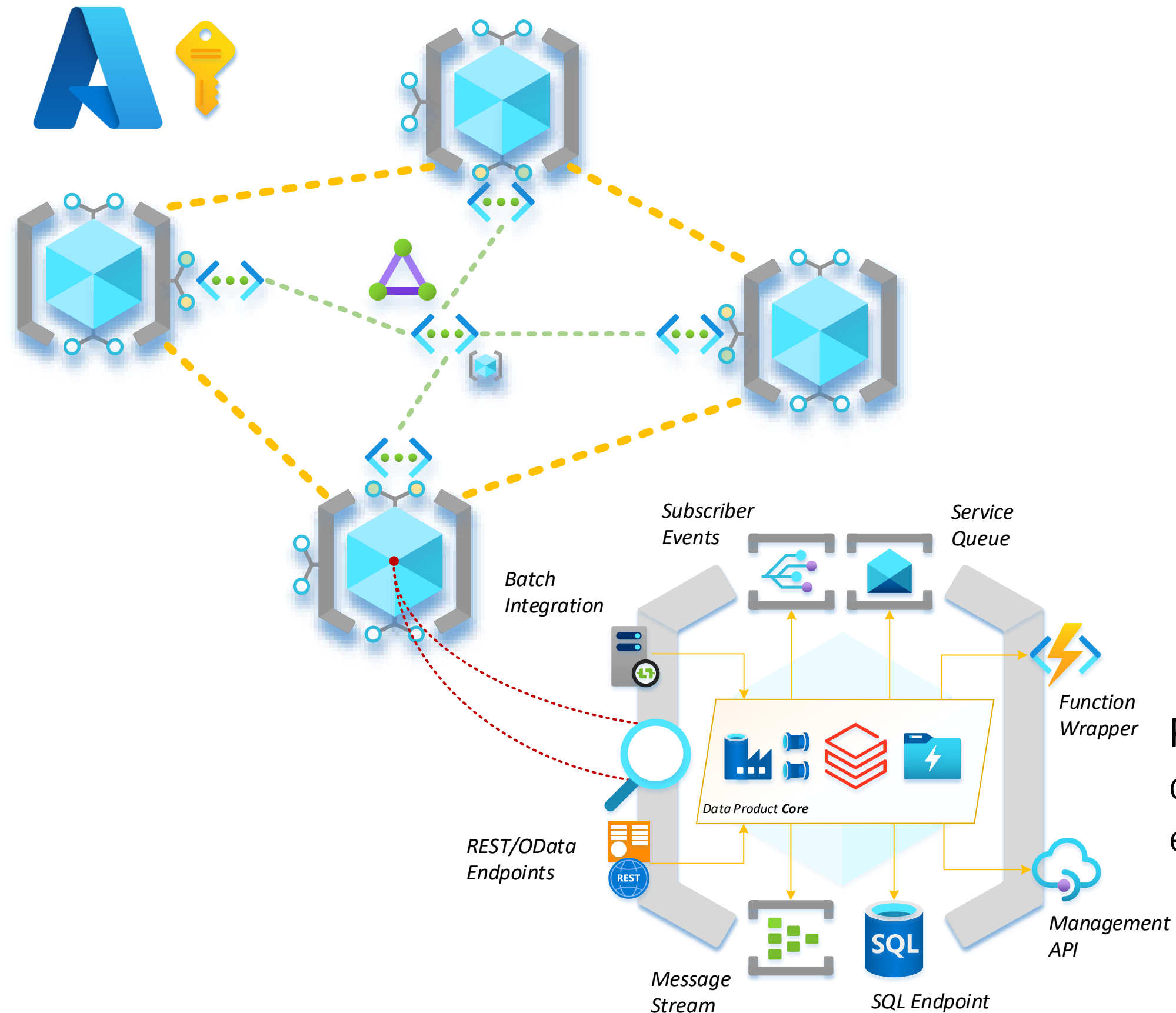
Data Mesh – Data Products in Azure with Interfaces



SQL

Primary Interfaces – data integration and exchange.

Data Mesh – Data Products in Azure with Interfaces

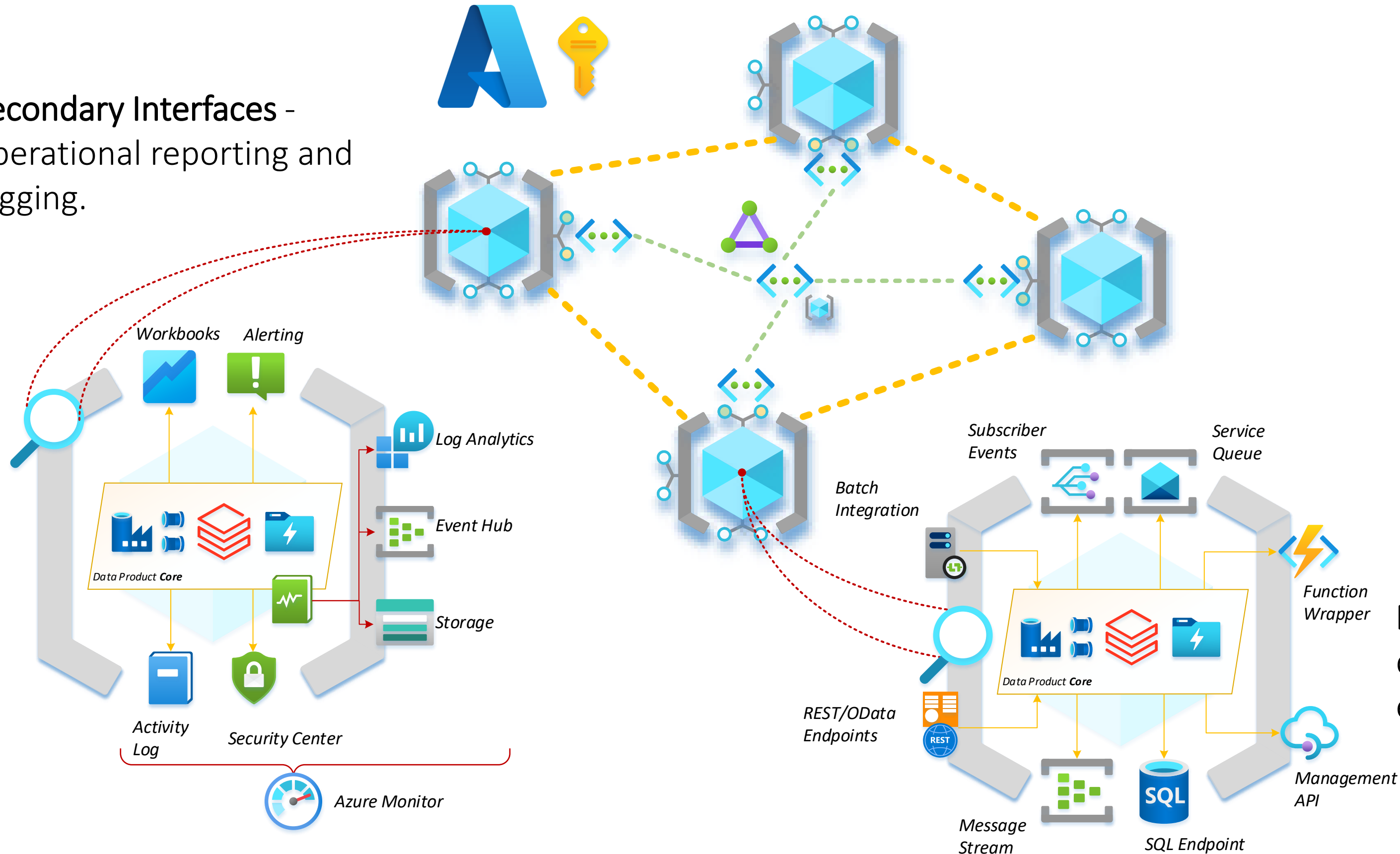


Primary Interfaces –
data integration and
exchange.

Data Mesh – Data Products in Azure with Interfaces



Secondary Interfaces -
operational reporting and logging.

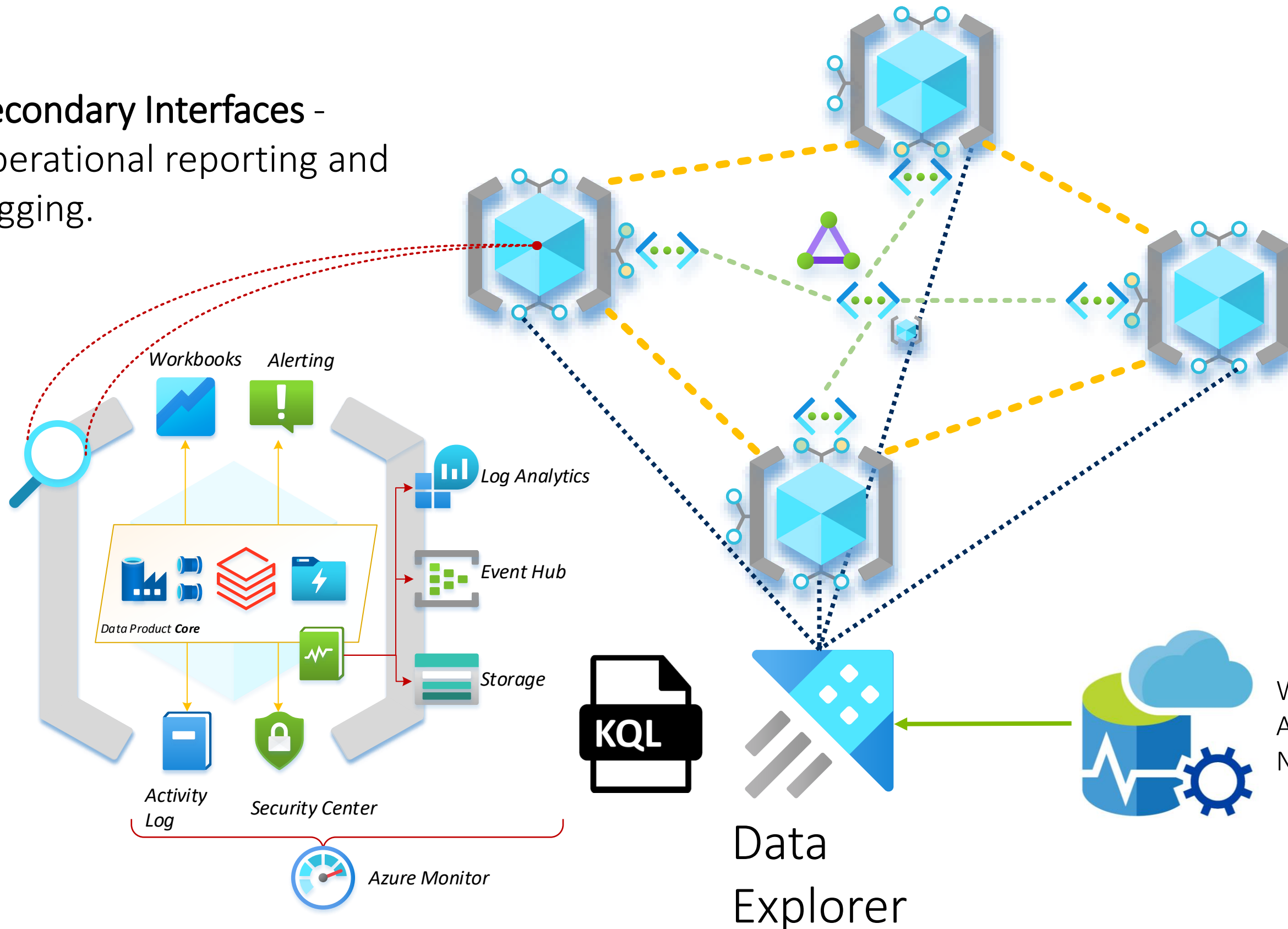


Primary Interfaces –
data integration and exchange.

Data Mesh – Data Products in Azure with Interfaces



Secondary Interfaces - operational reporting and logging.

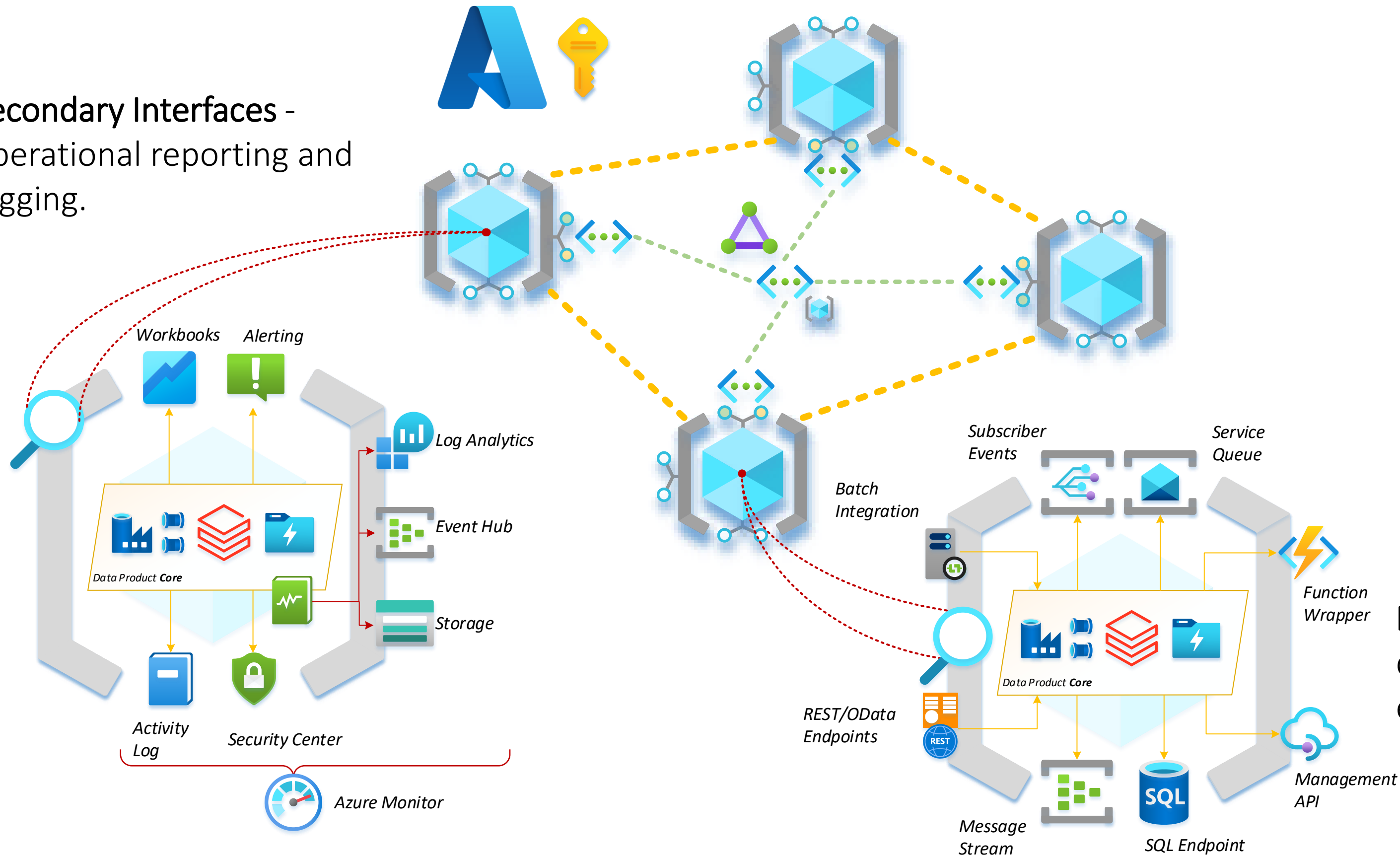


Q4: Should all Data Mesh capabilities be decentralised?

Data Mesh – Data Products in Azure with Interfaces



Secondary Interfaces -
operational reporting and logging.

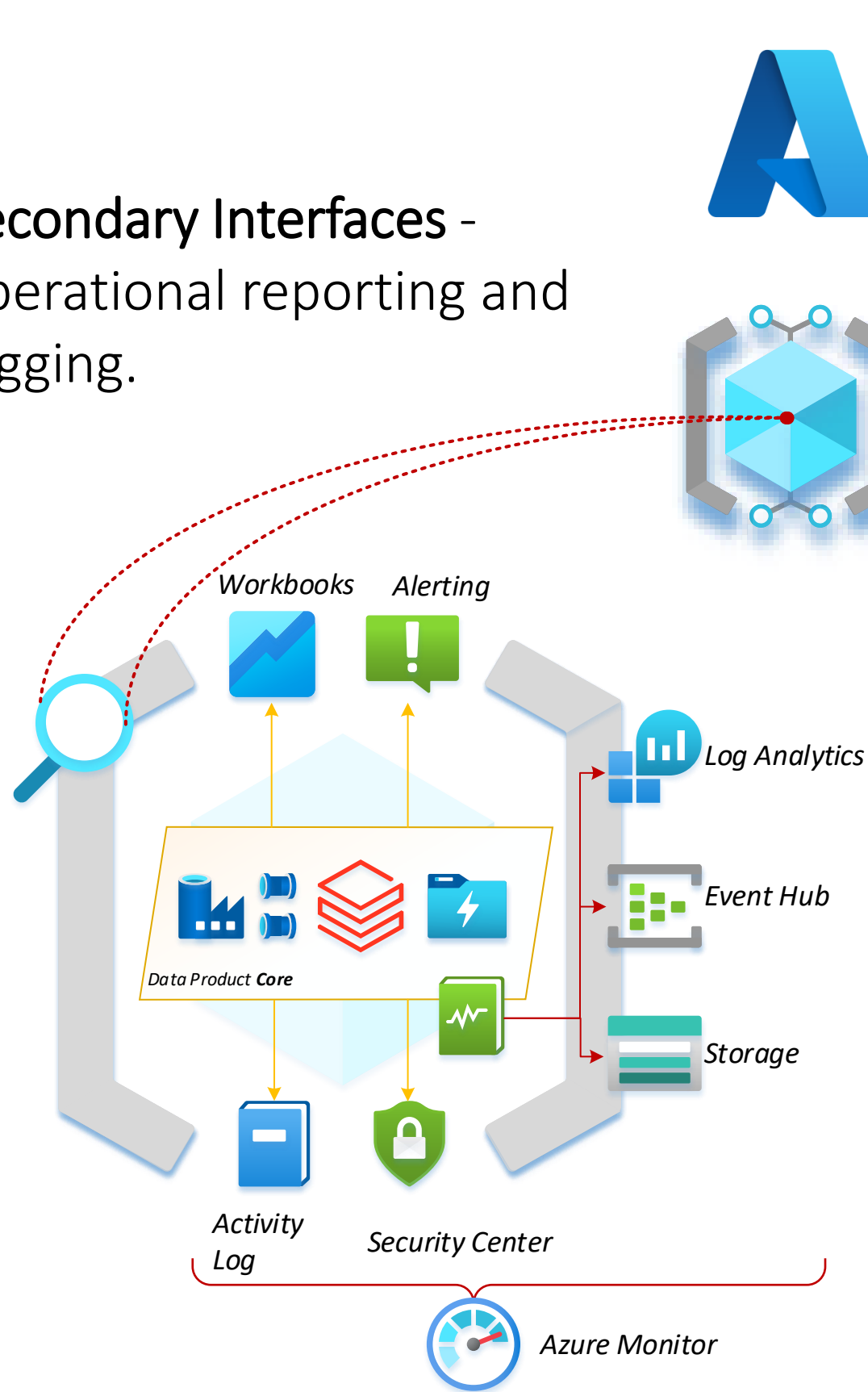


Primary Interfaces –
data integration and exchange.

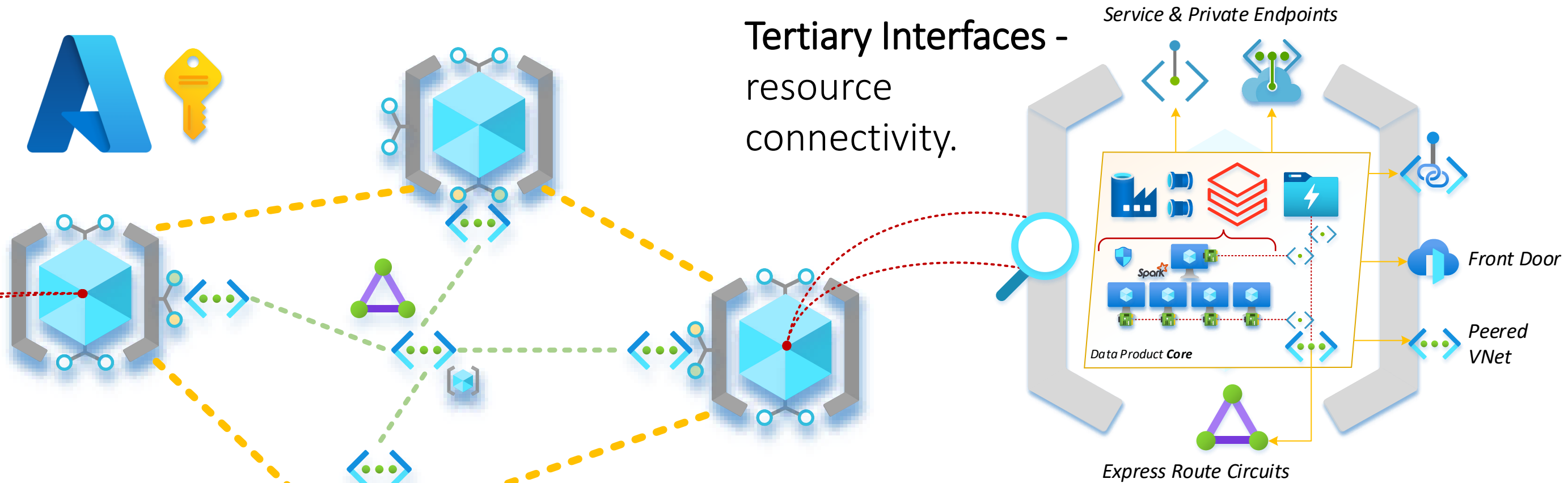
Data Mesh – Data Products in Azure with Interfaces



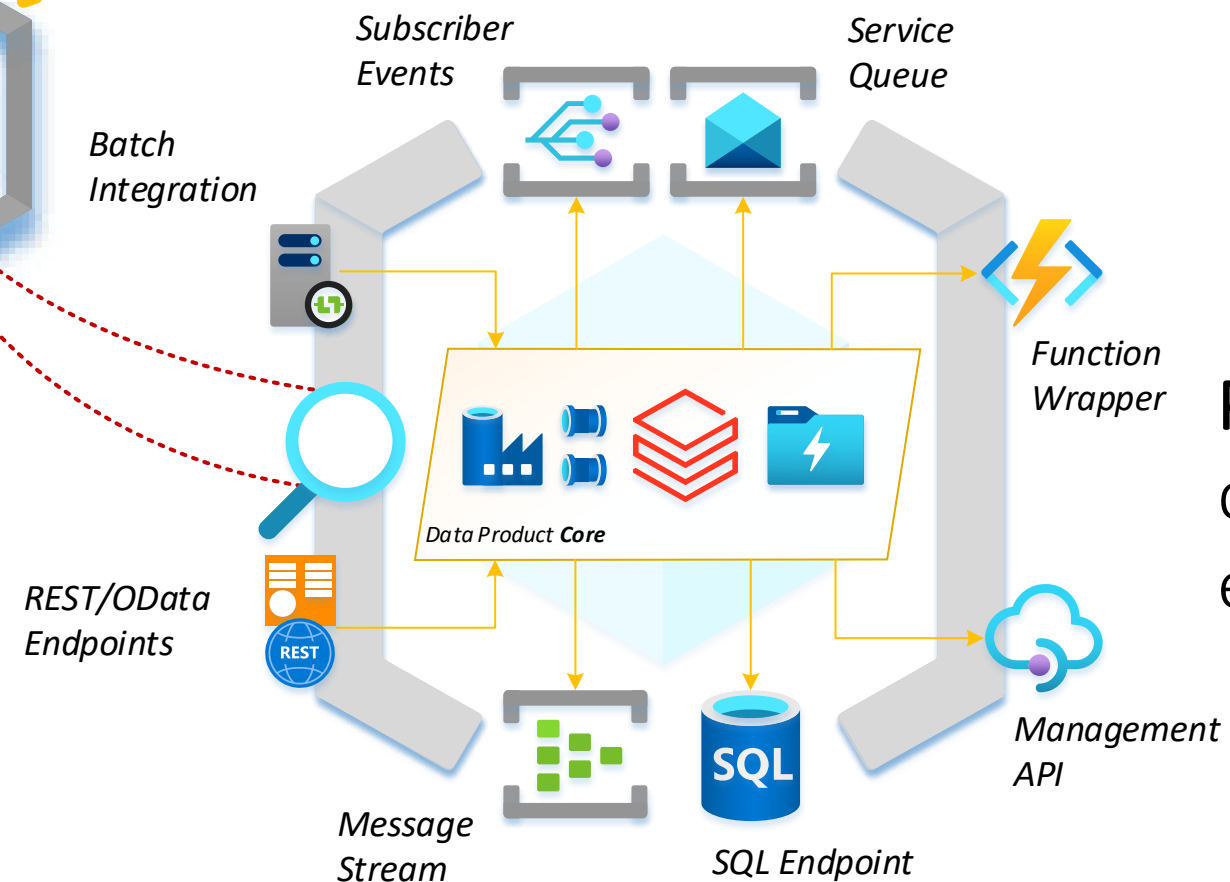
Secondary Interfaces -
operational reporting and logging.



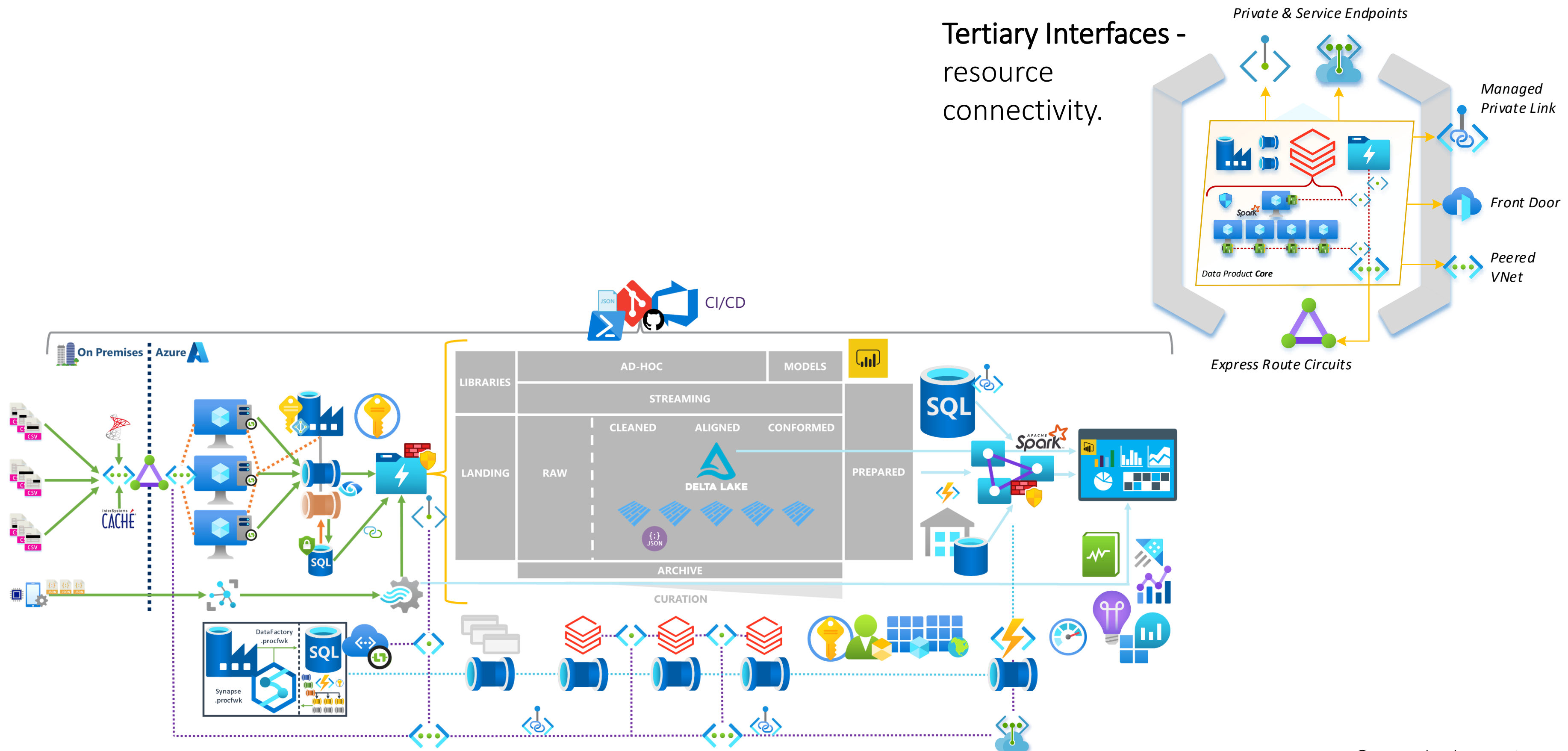
Tertiary Interfaces -
resource connectivity.



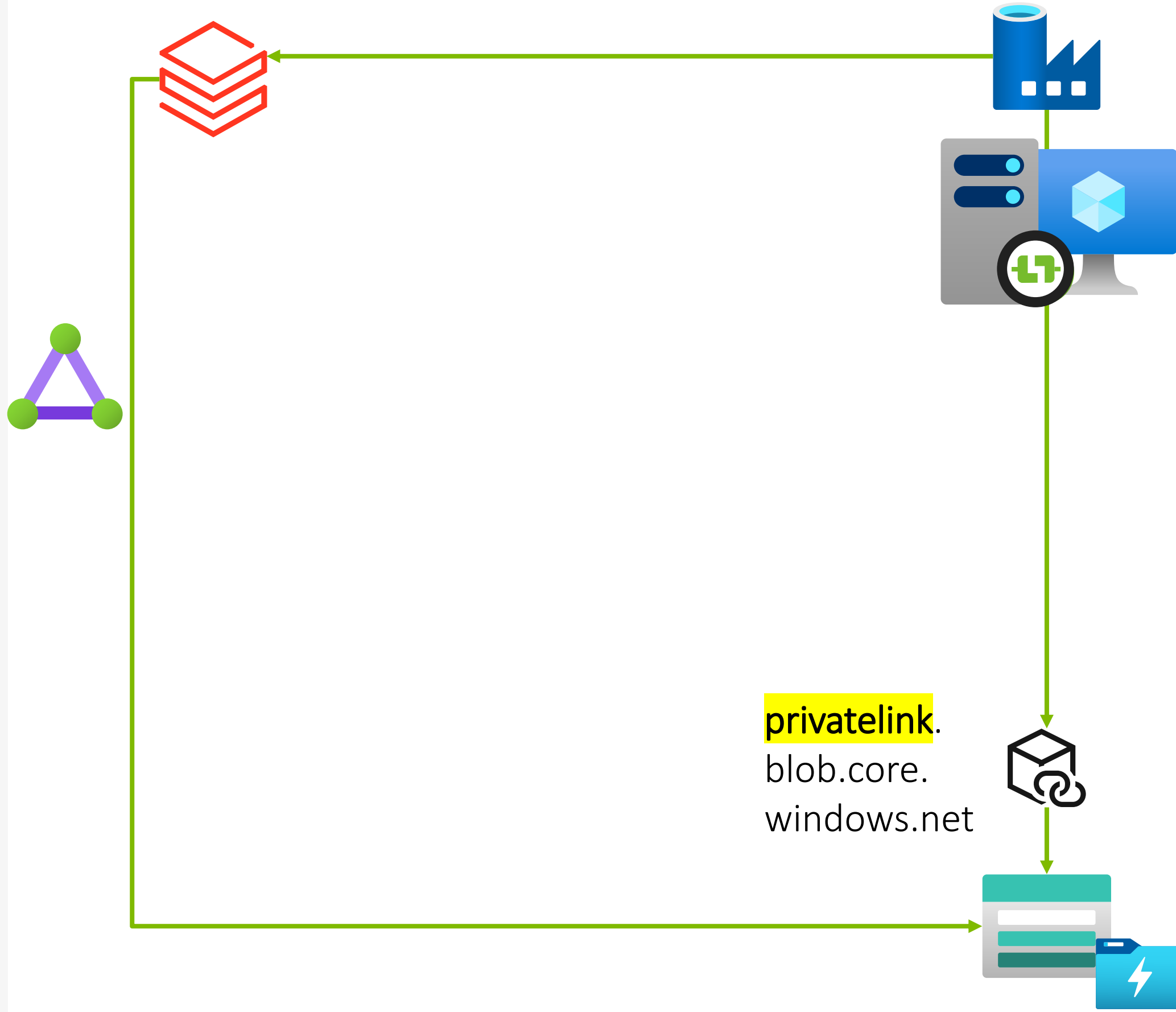
Primary Interfaces -
data integration and exchange.



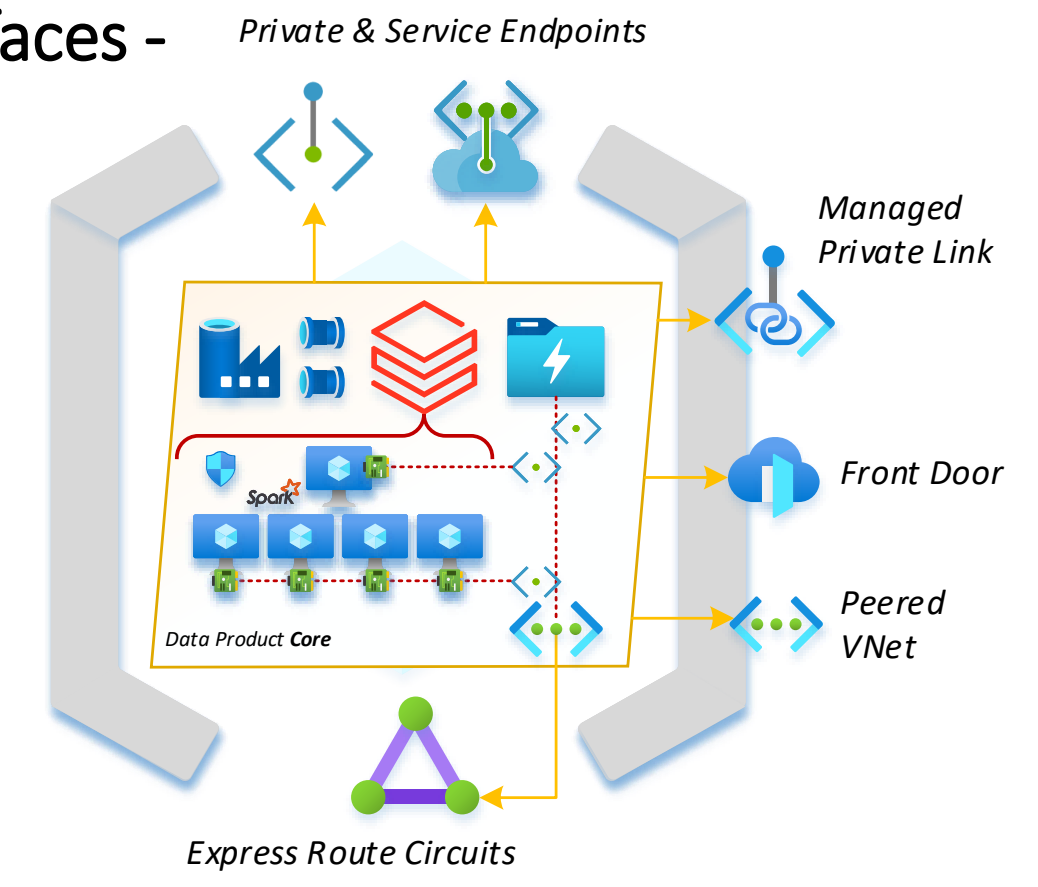
Data Mesh – Data Products in Azure with Interfaces



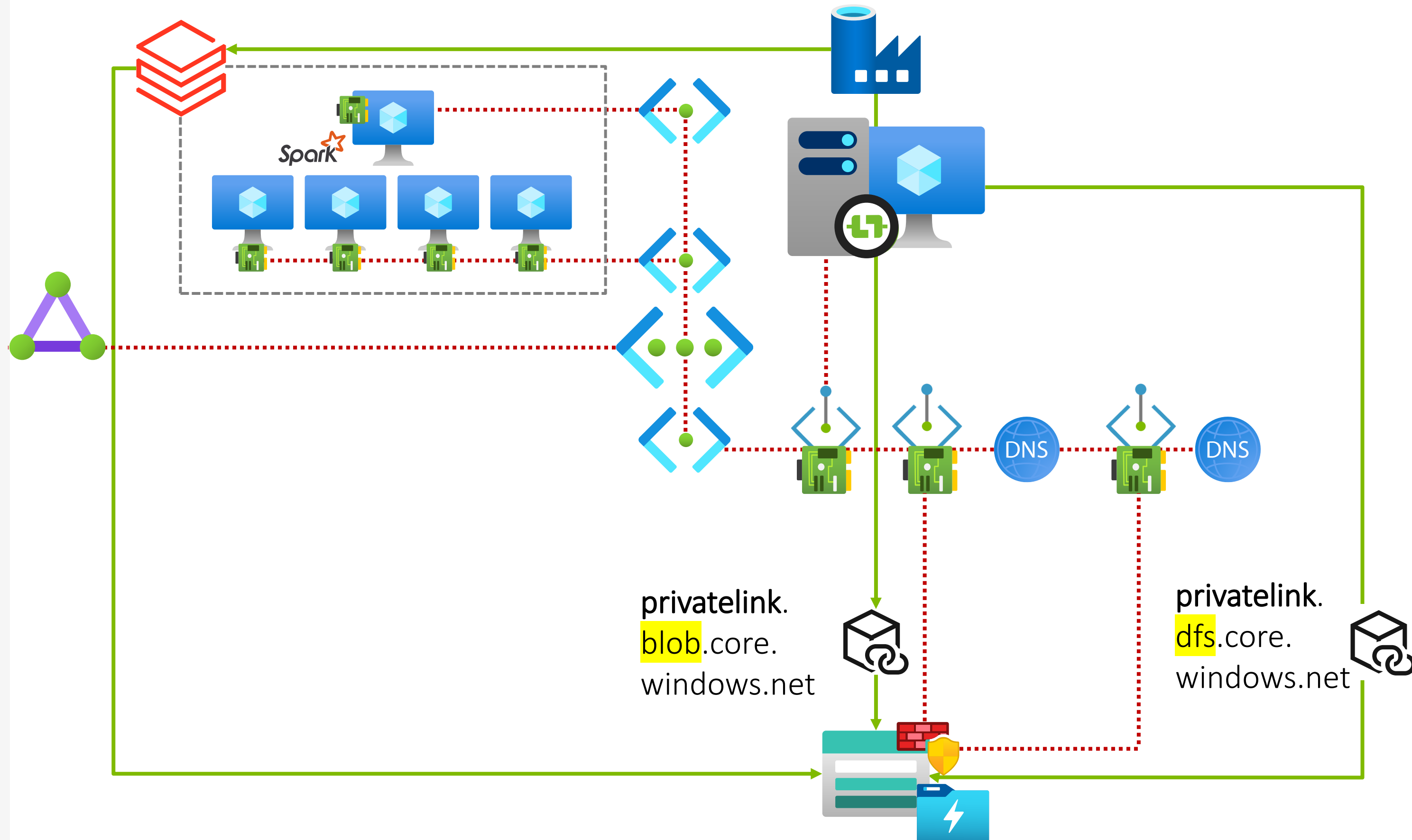
Data Mesh – Data Products in Azure with Interfaces



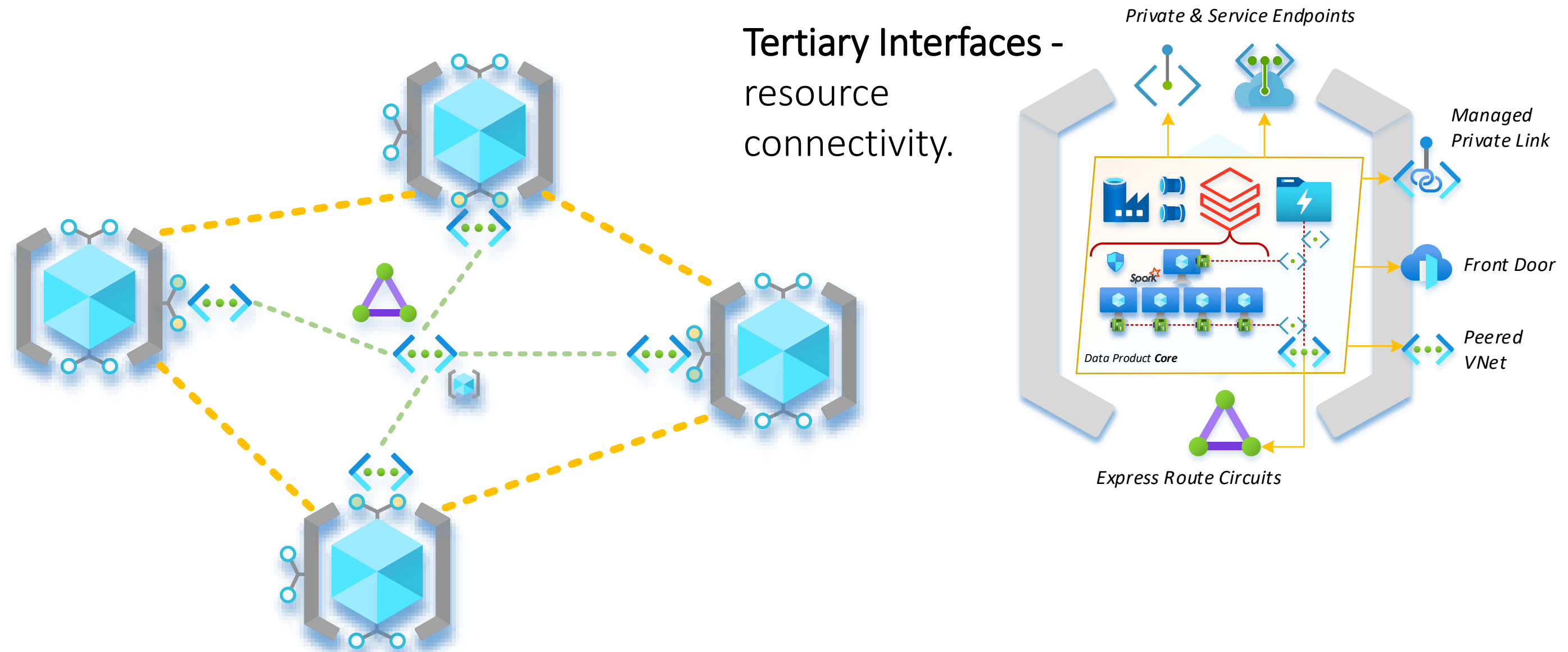
Tertiary Interfaces - resource connectivity.



Data Mesh – Data Products in Azure with Interfaces



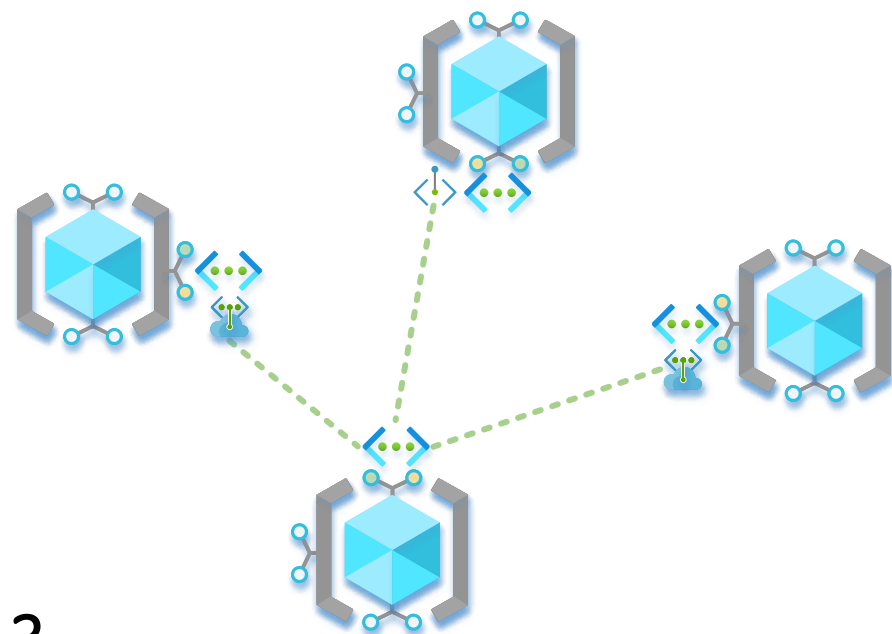
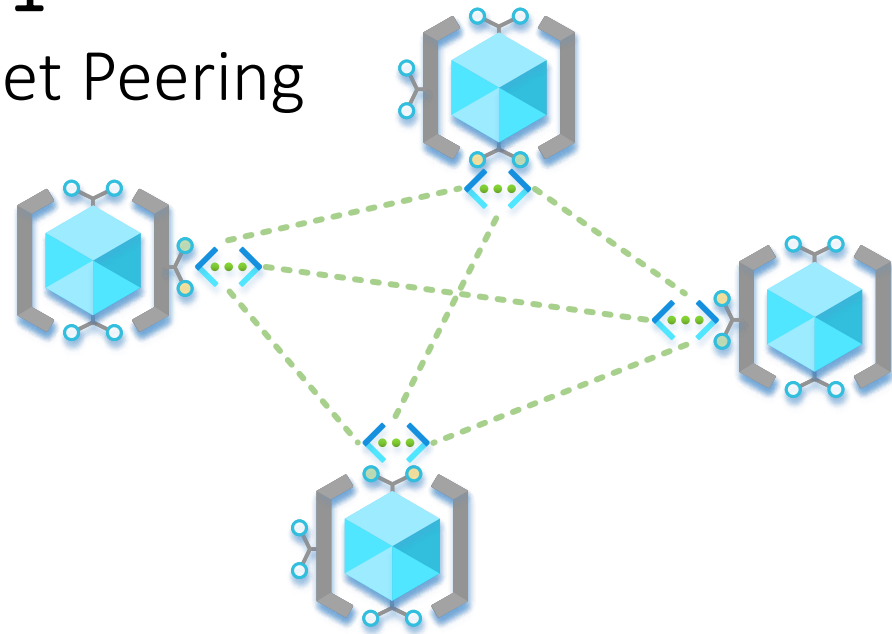
Data Mesh – Data Products in Azure with Interfaces



Data Mesh – Data Products in Azure with Interfaces

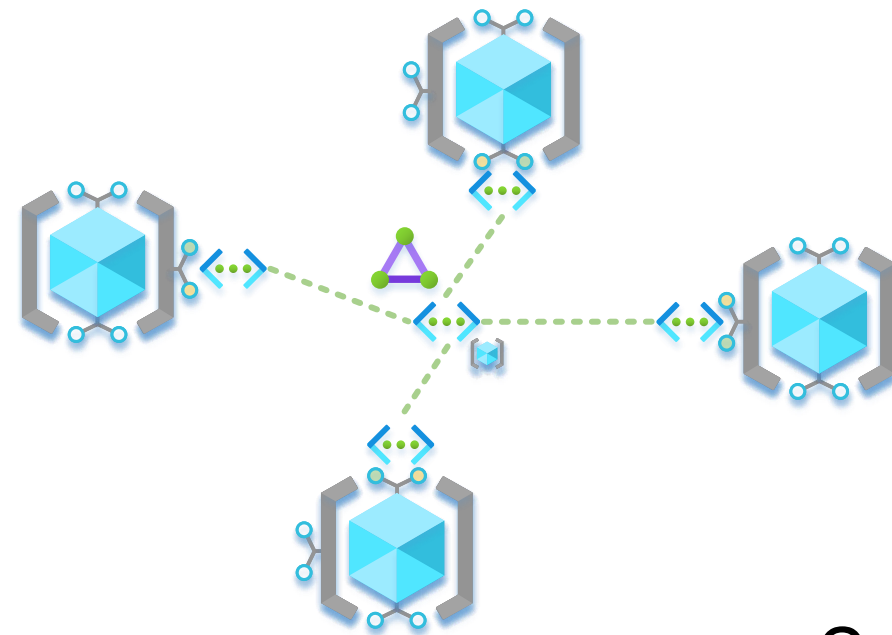


Option 1
Full VNet Peering

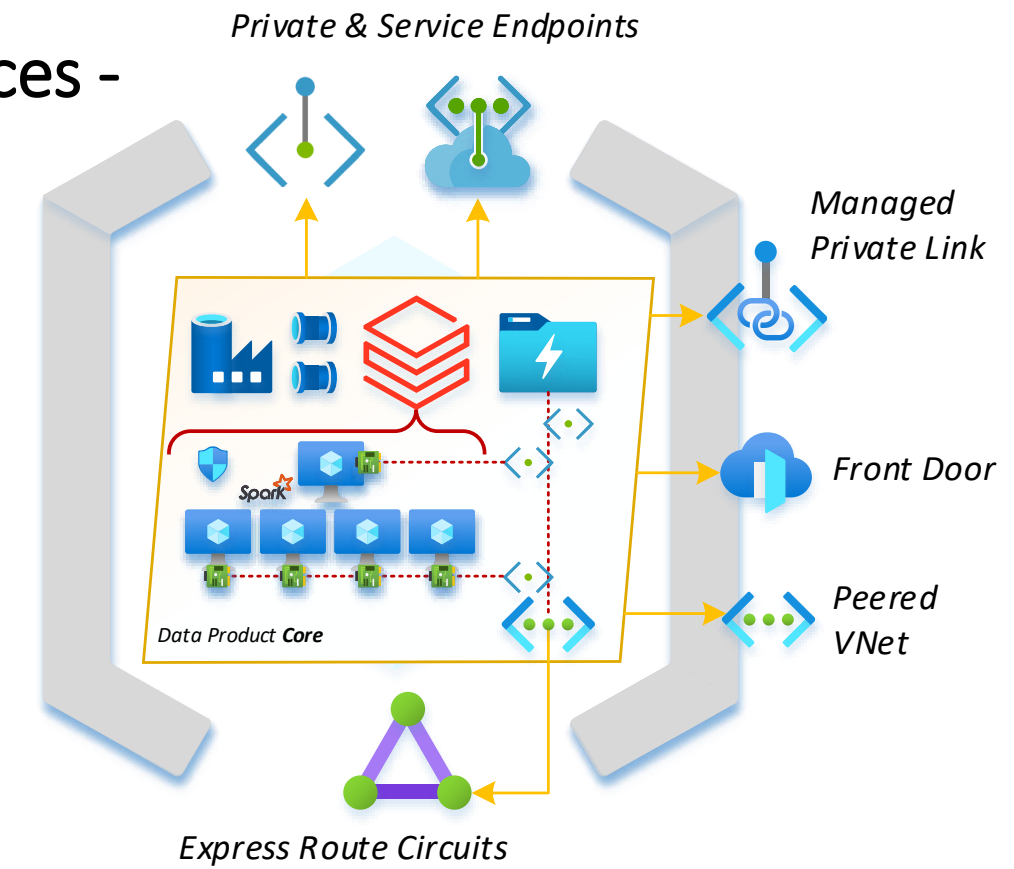


Option 3
Targeted Service/Private Endpoints

Tertiary Interfaces -
resource
connectivity.



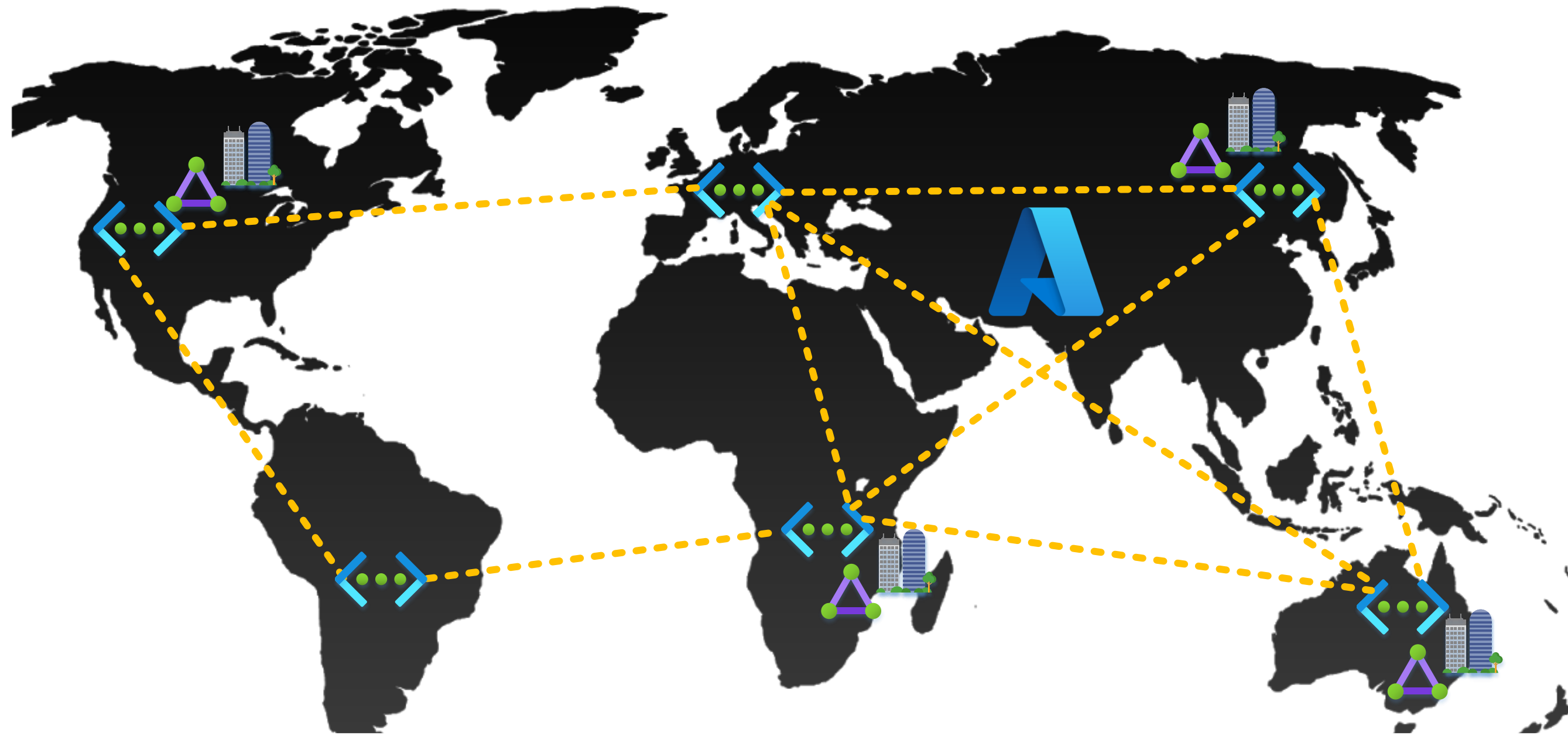
Option 2
Hub and Spoke VNet Peering



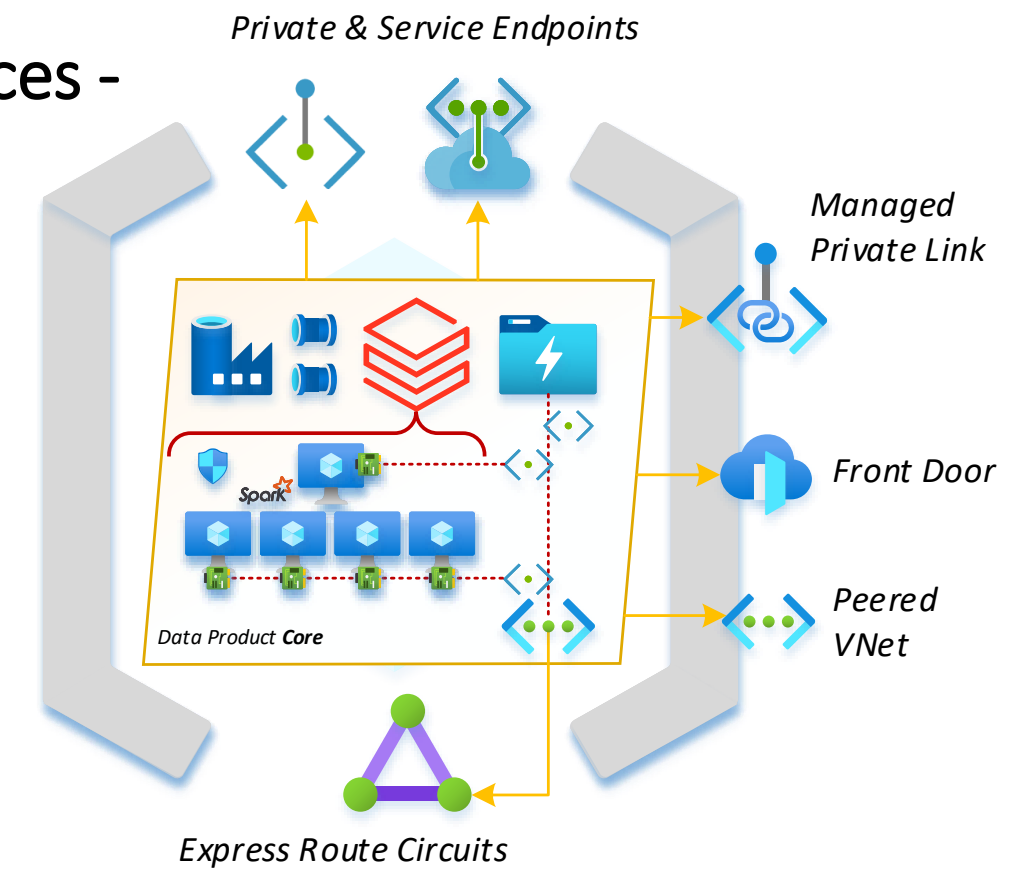
Other Options

- Use public endpoints.
- Use local resource firewalls.
- Use Managed Private Links

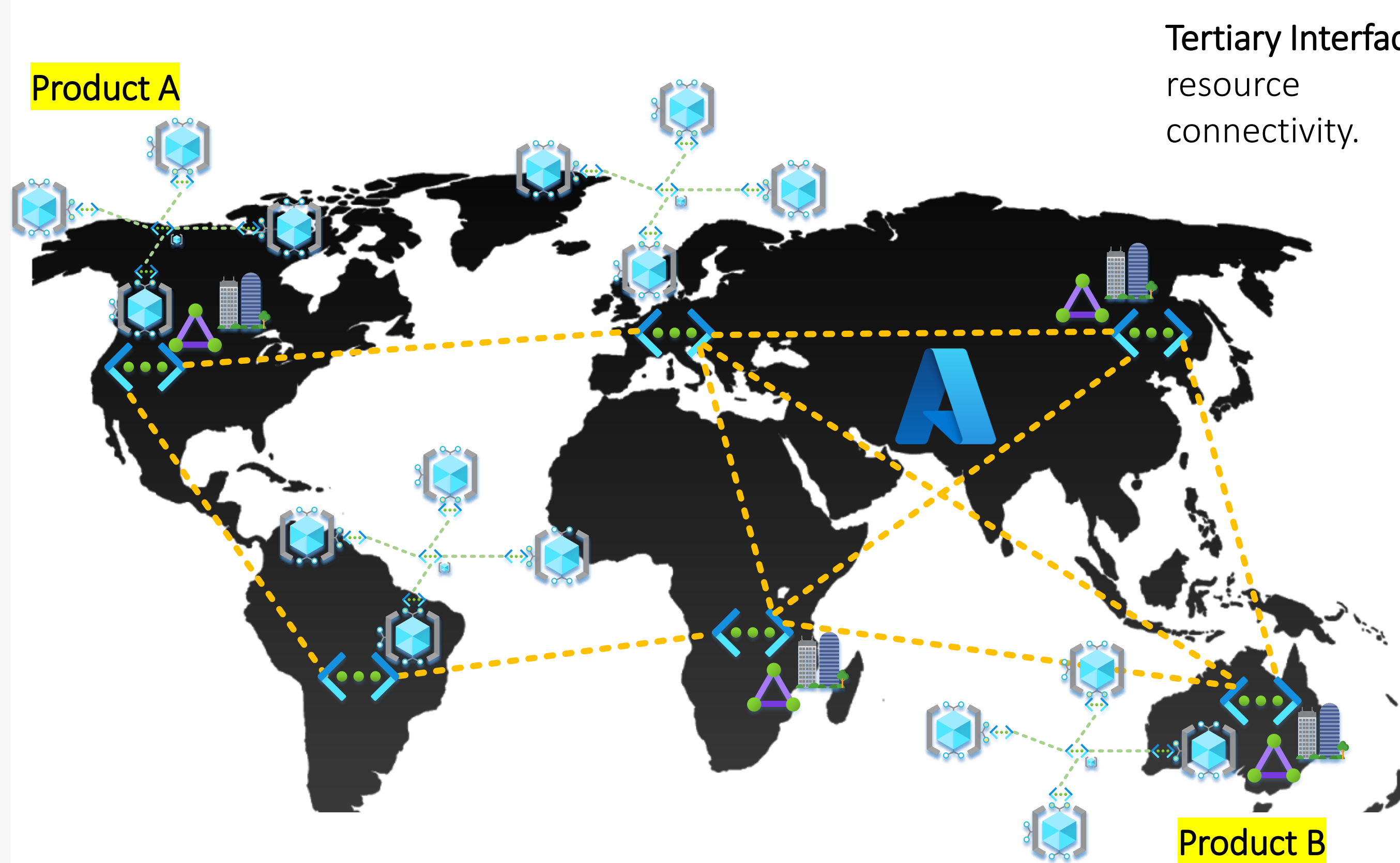
Data Mesh – Data Products in Azure with Interfaces



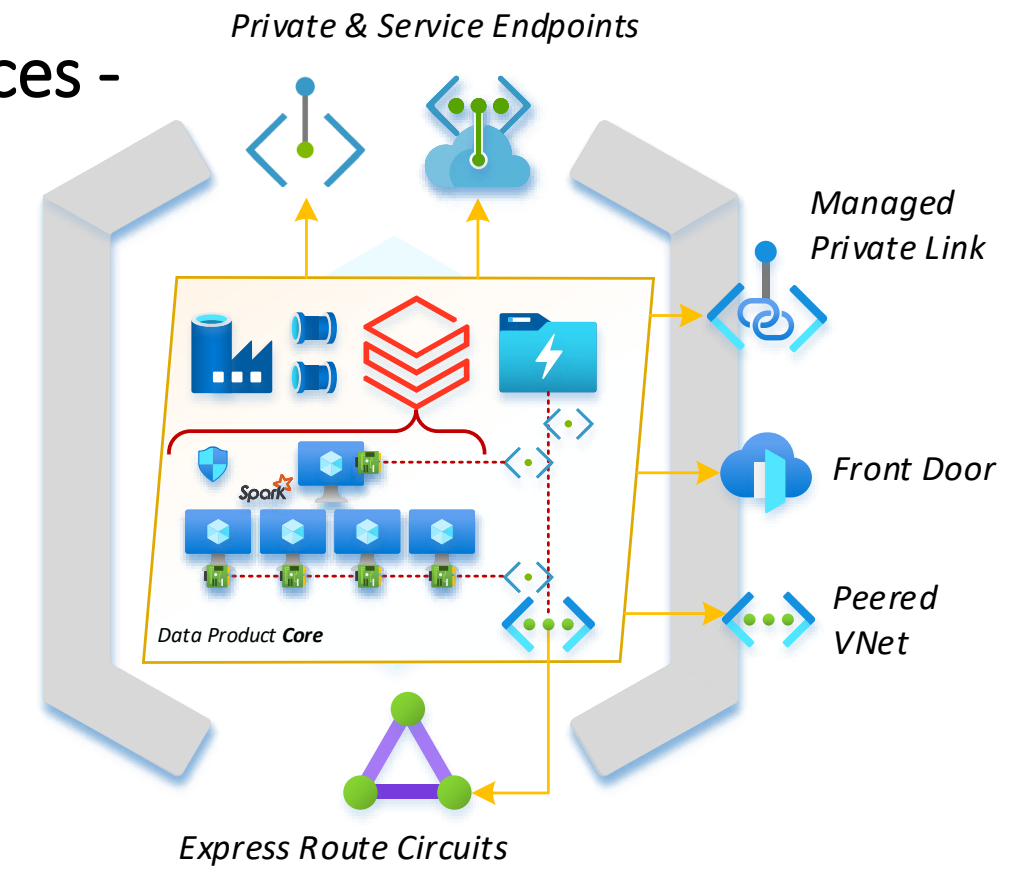
Tertiary Interfaces - resource connectivity.



Data Mesh – Data Products in Azure with Interfaces



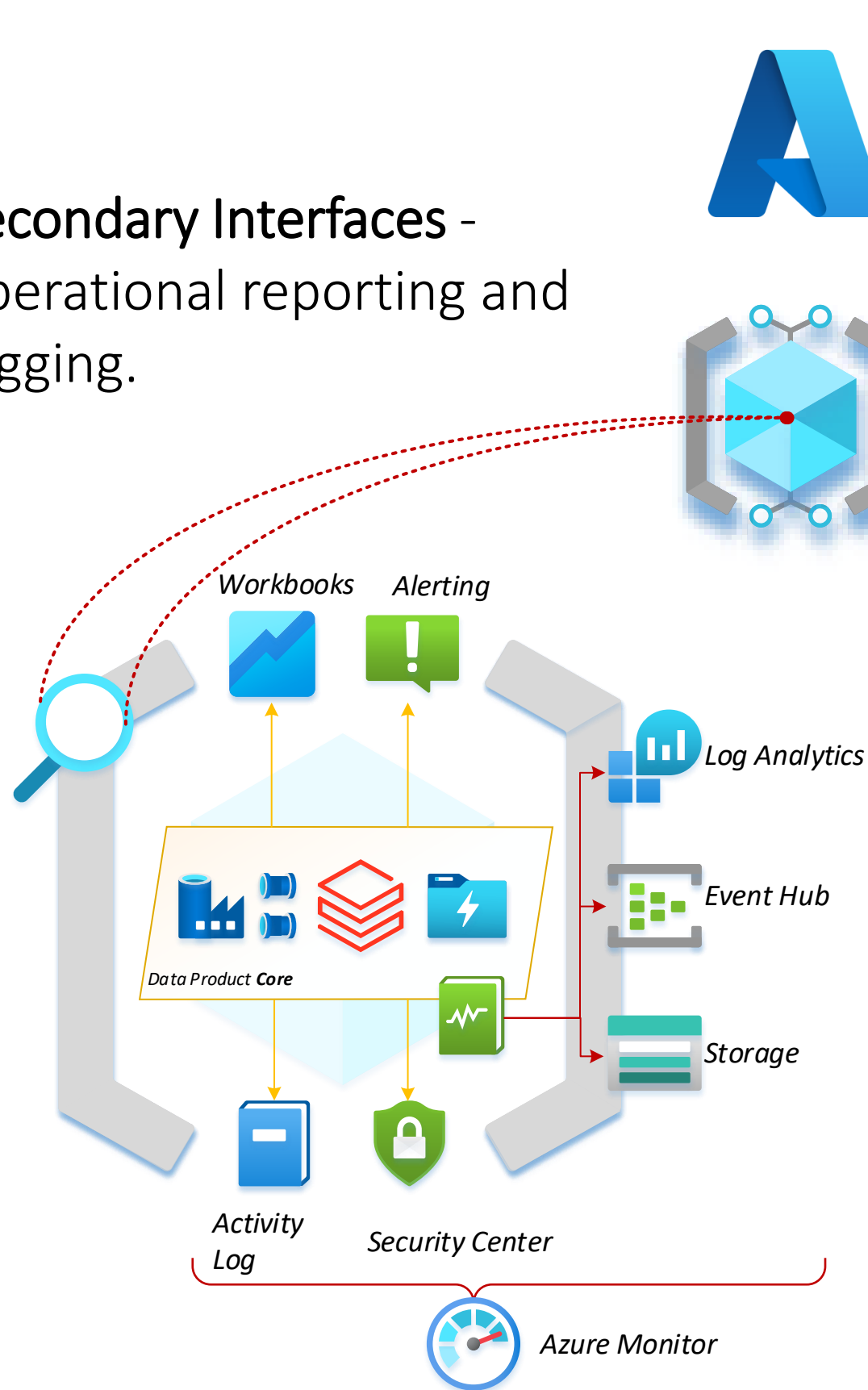
Tertiary Interfaces - resource connectivity.



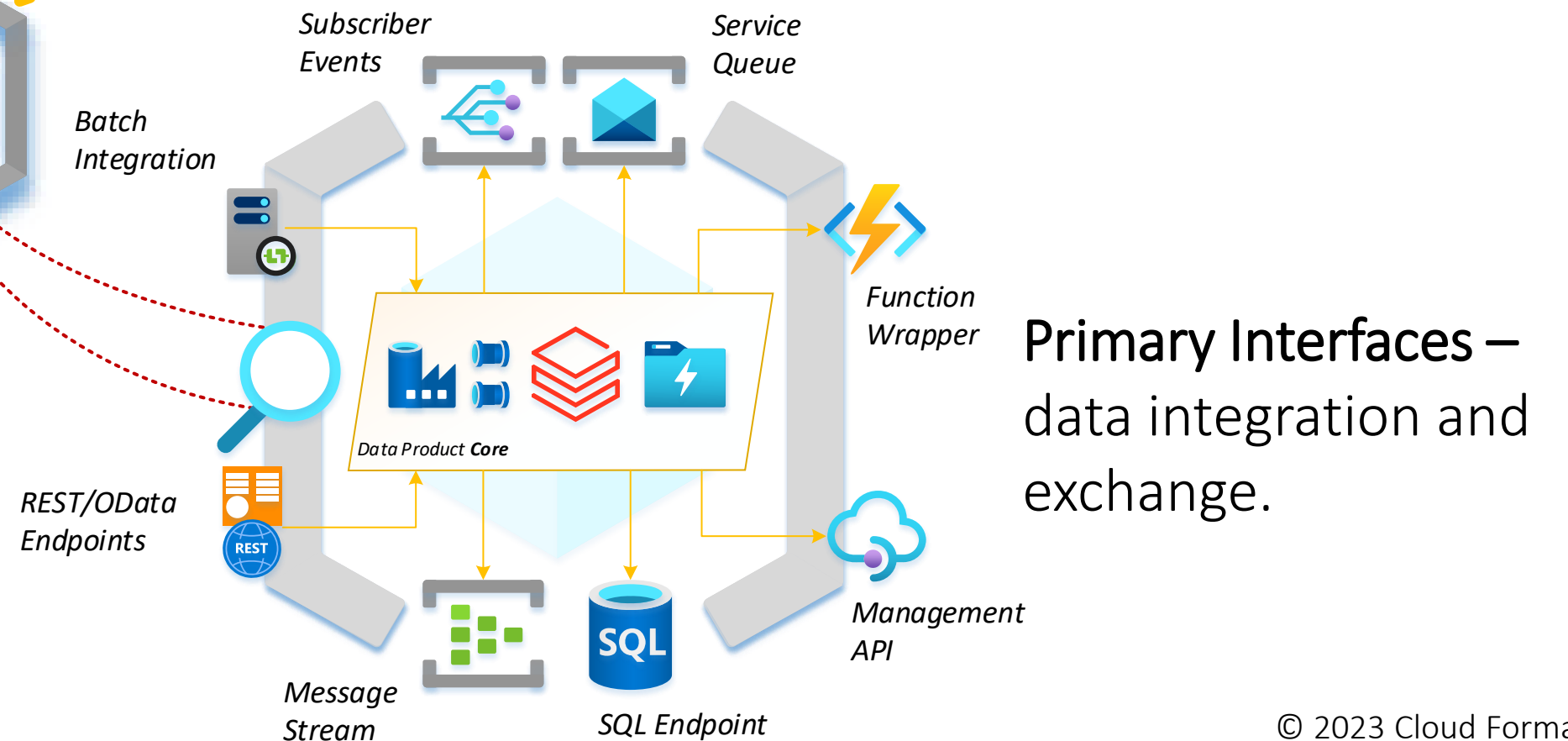
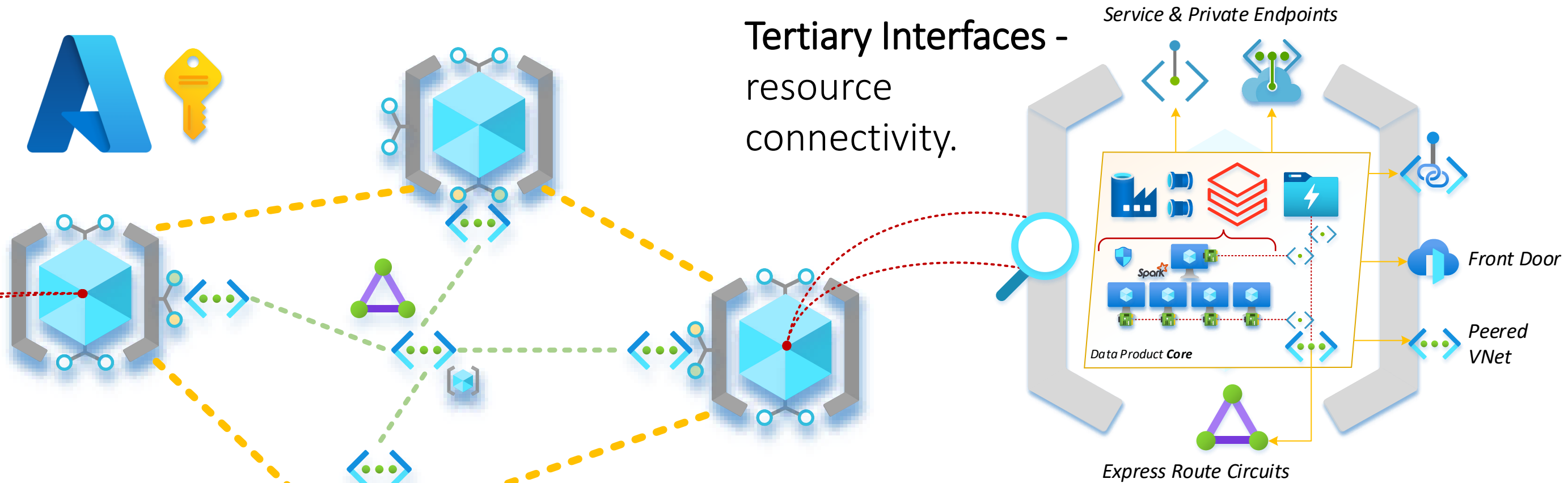
Data Mesh – Data Products in Azure with Interfaces



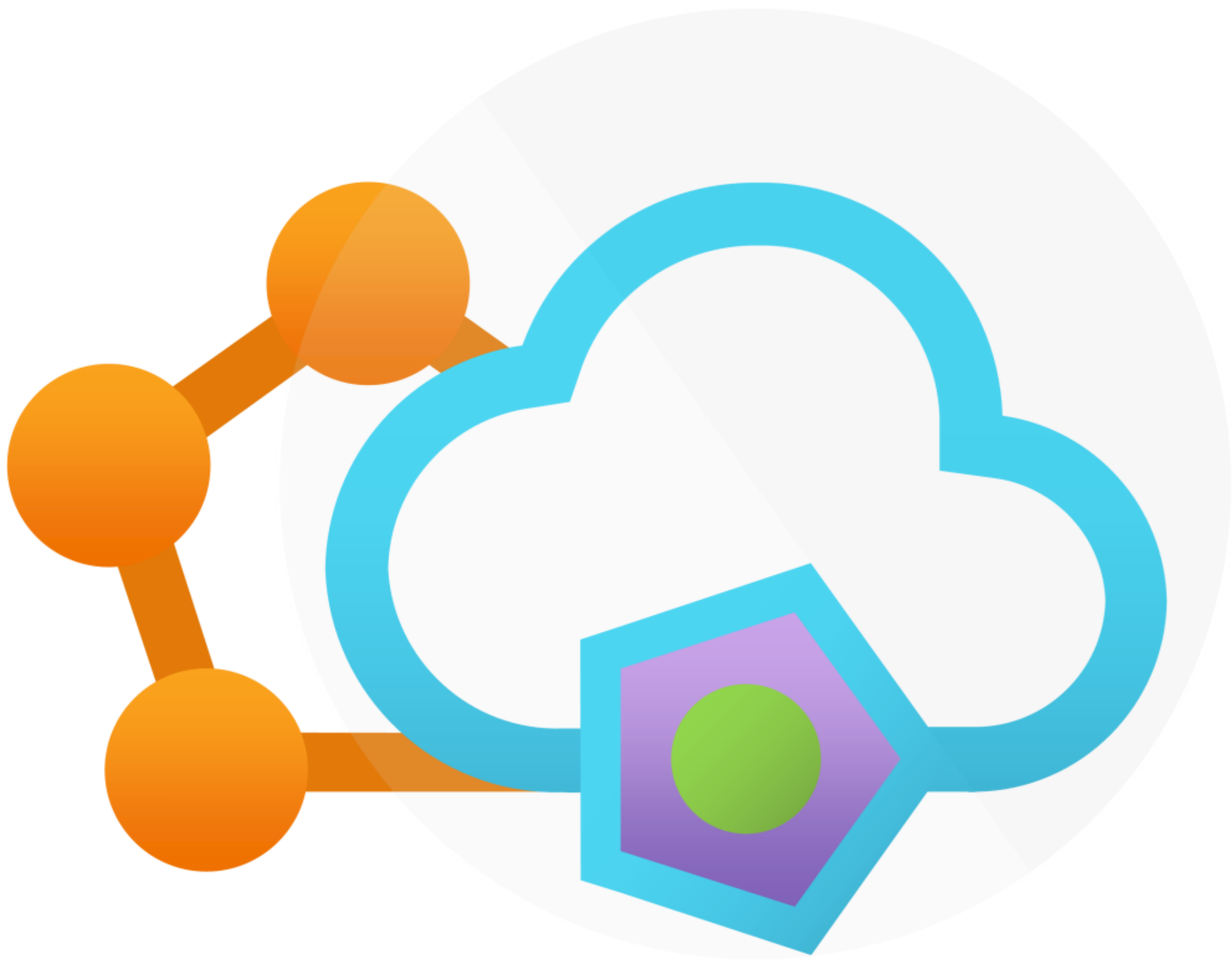
Secondary Interfaces -
operational reporting and logging.



Tertiary Interfaces -
resource connectivity.



Primary Interfaces –
data integration and exchange.



Data Mesh:

What...

Why...

How do we build data domains(s)?

Data Mesh – Principles



Data as a product.

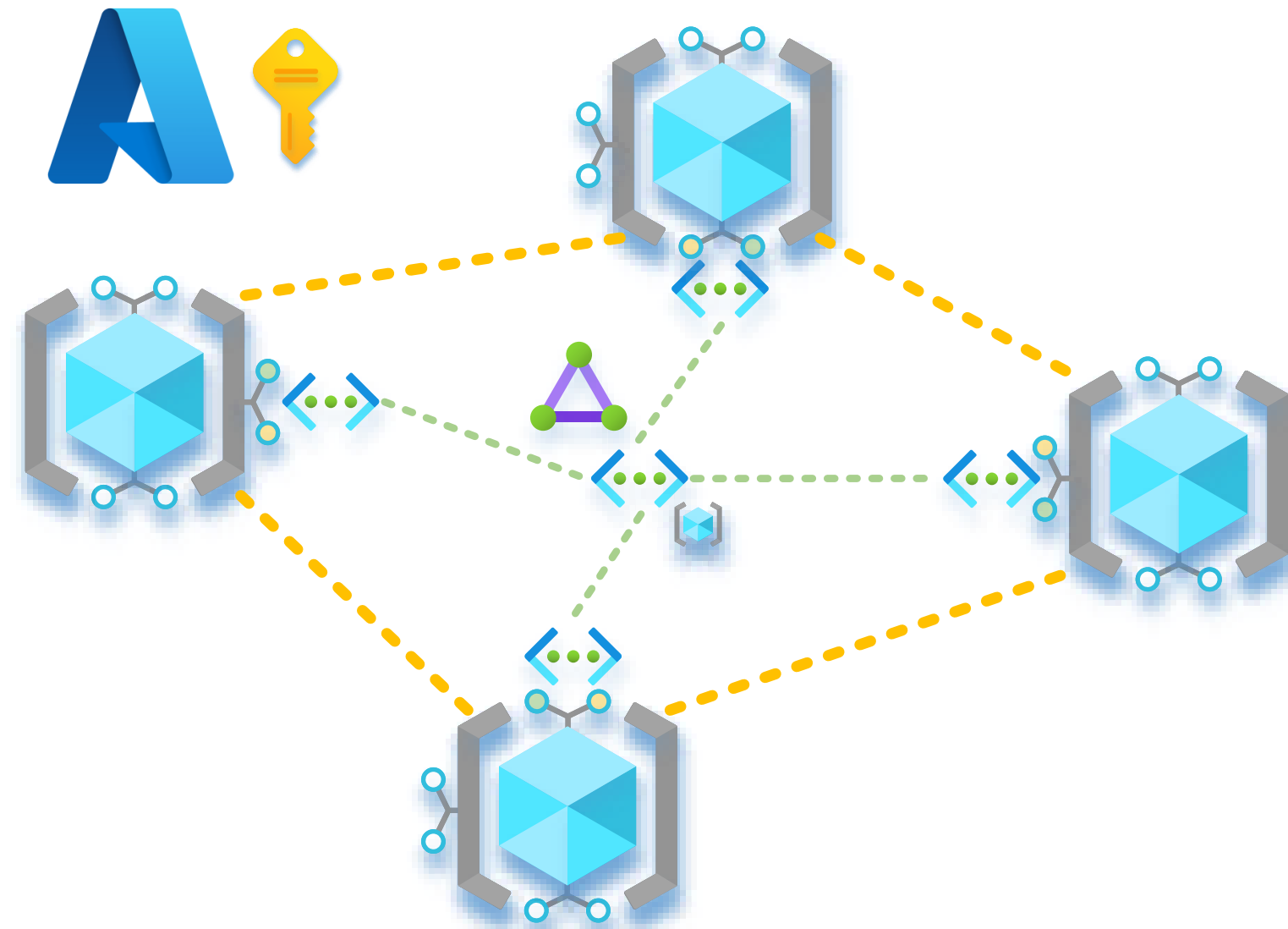
Federated computational governance.

Domain-oriented decentralised data ownership and architecture.

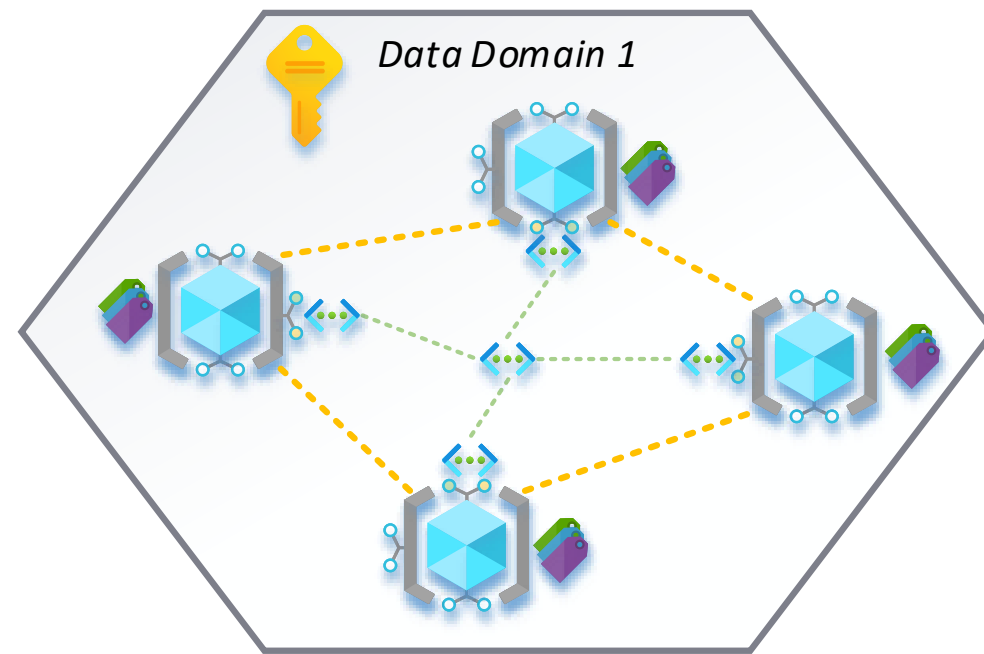


Self-serve data infrastructure as a platform.

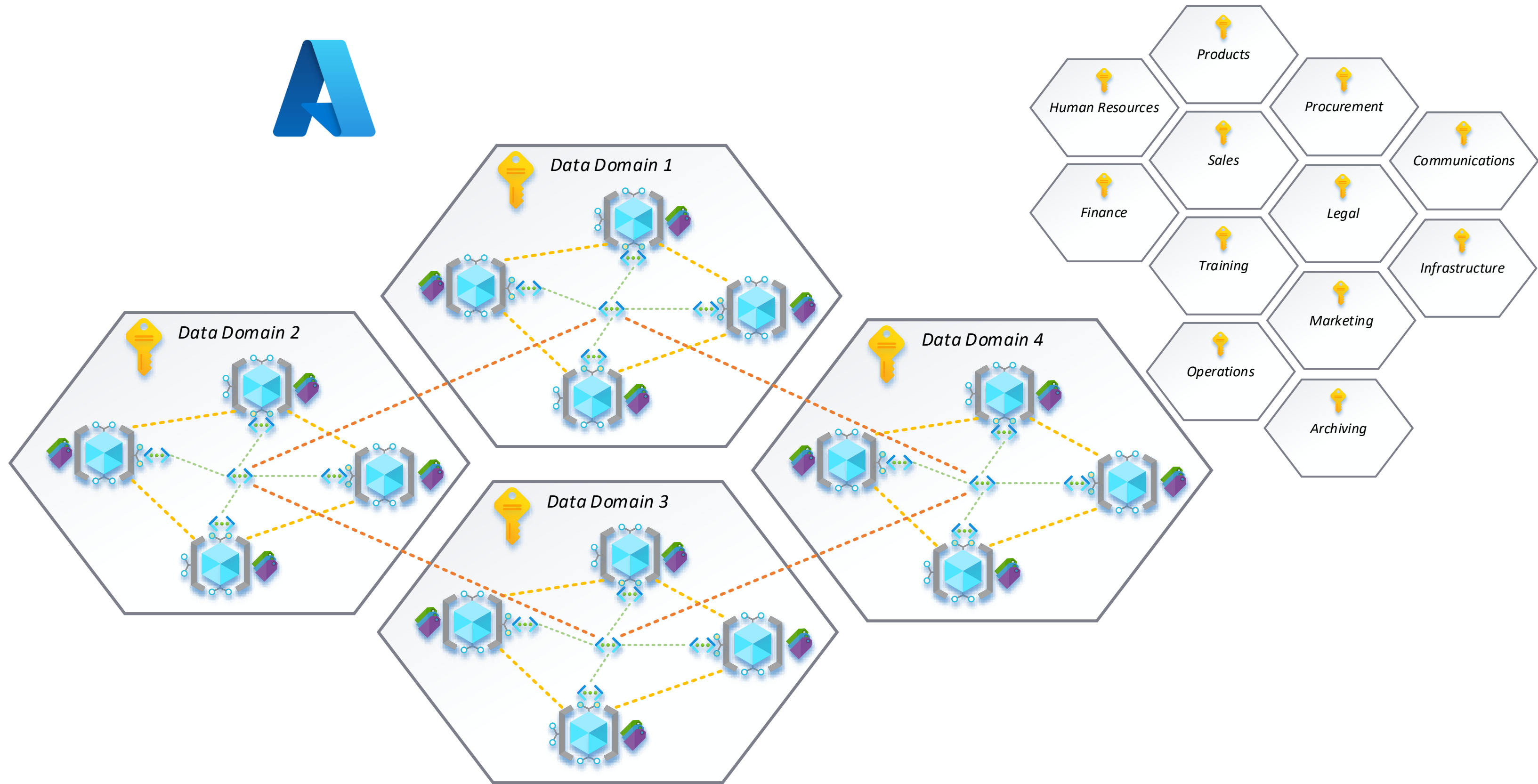
Data Mesh – Data Domains in Azure

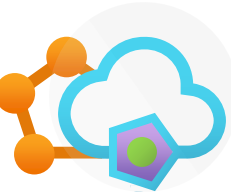


Data Mesh – Data Domains in Azure

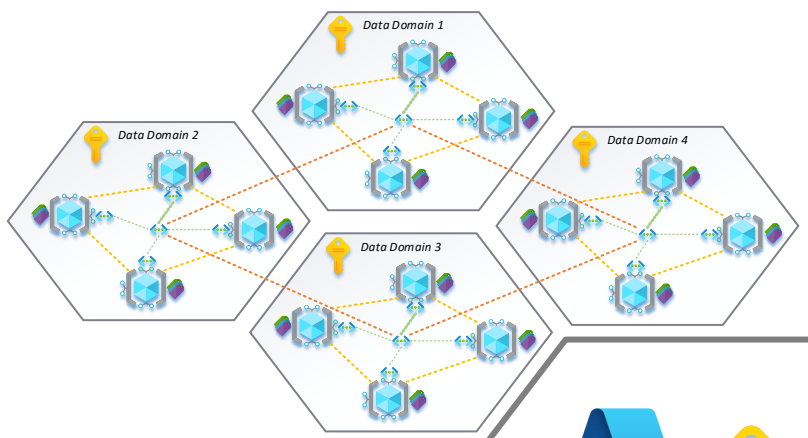


Data Mesh – Data Domains in Azure

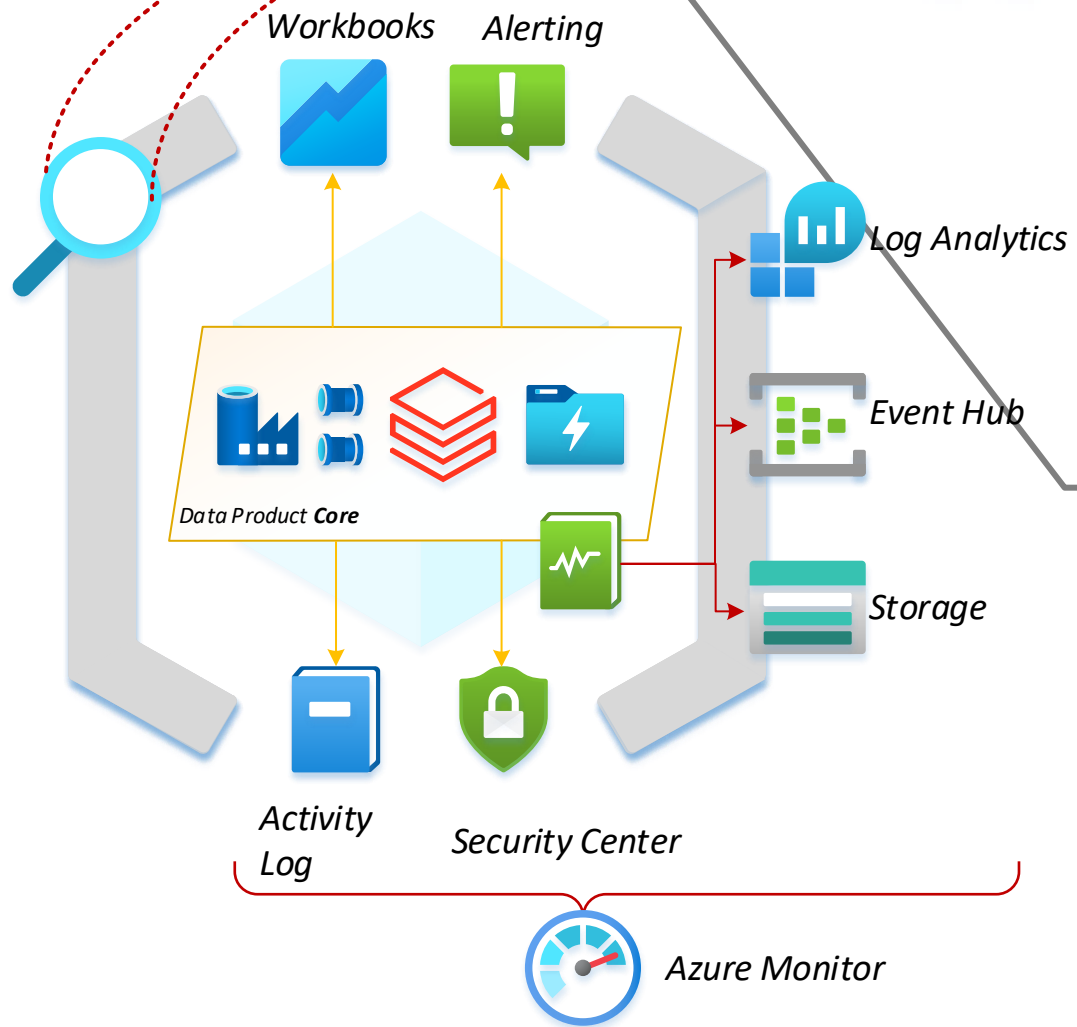




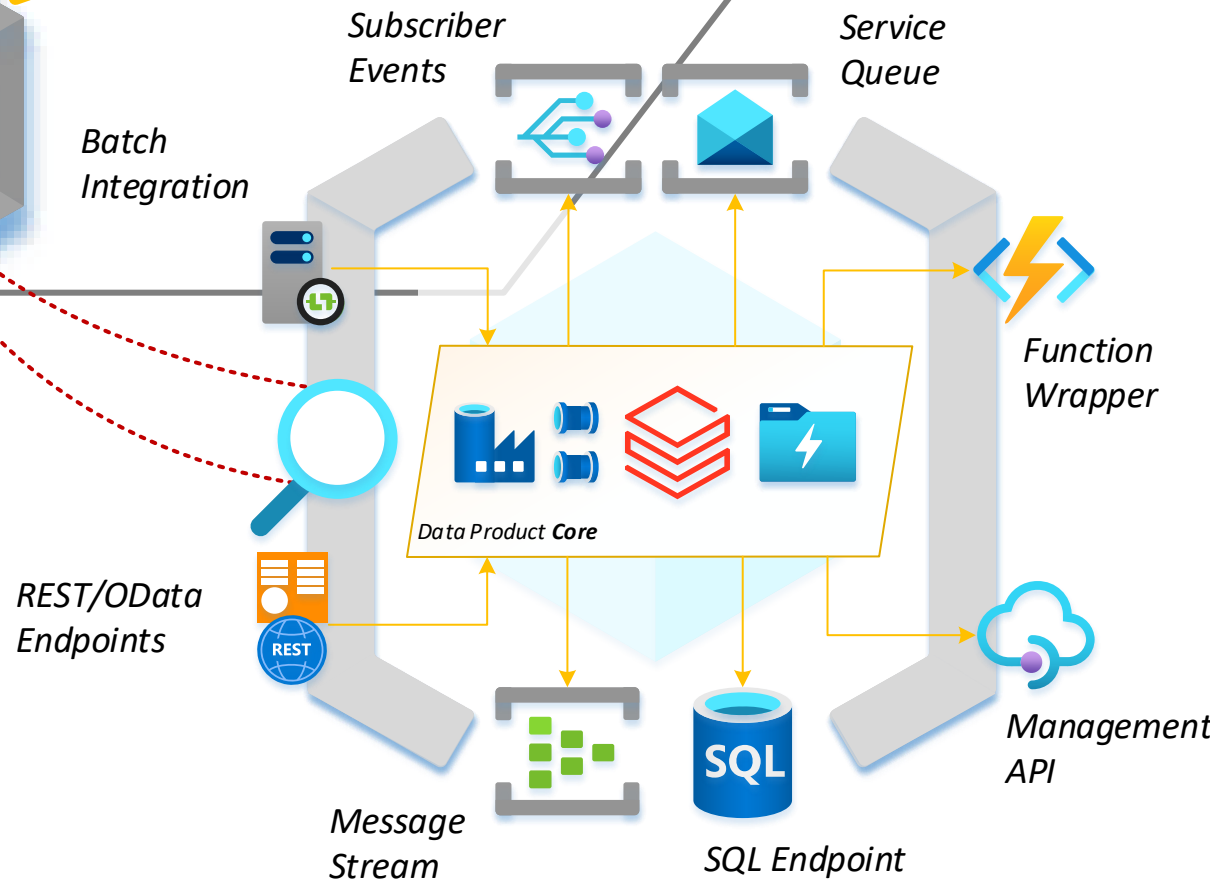
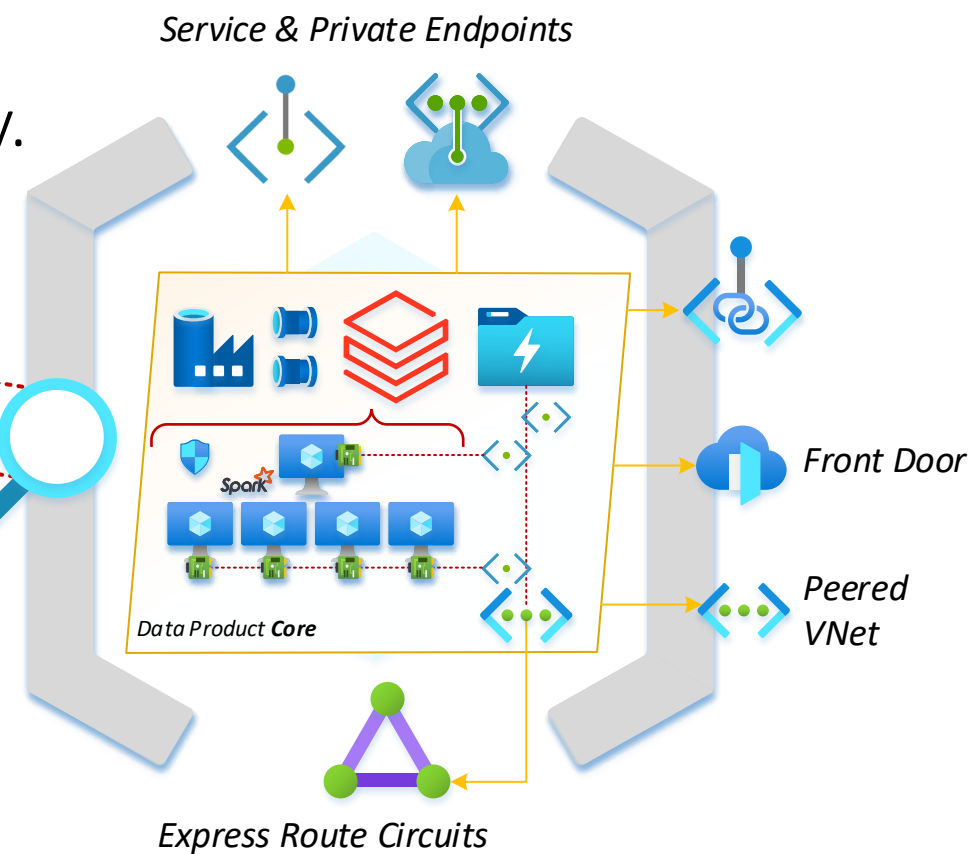
Data Mesh – Data Product & Domains in Azure



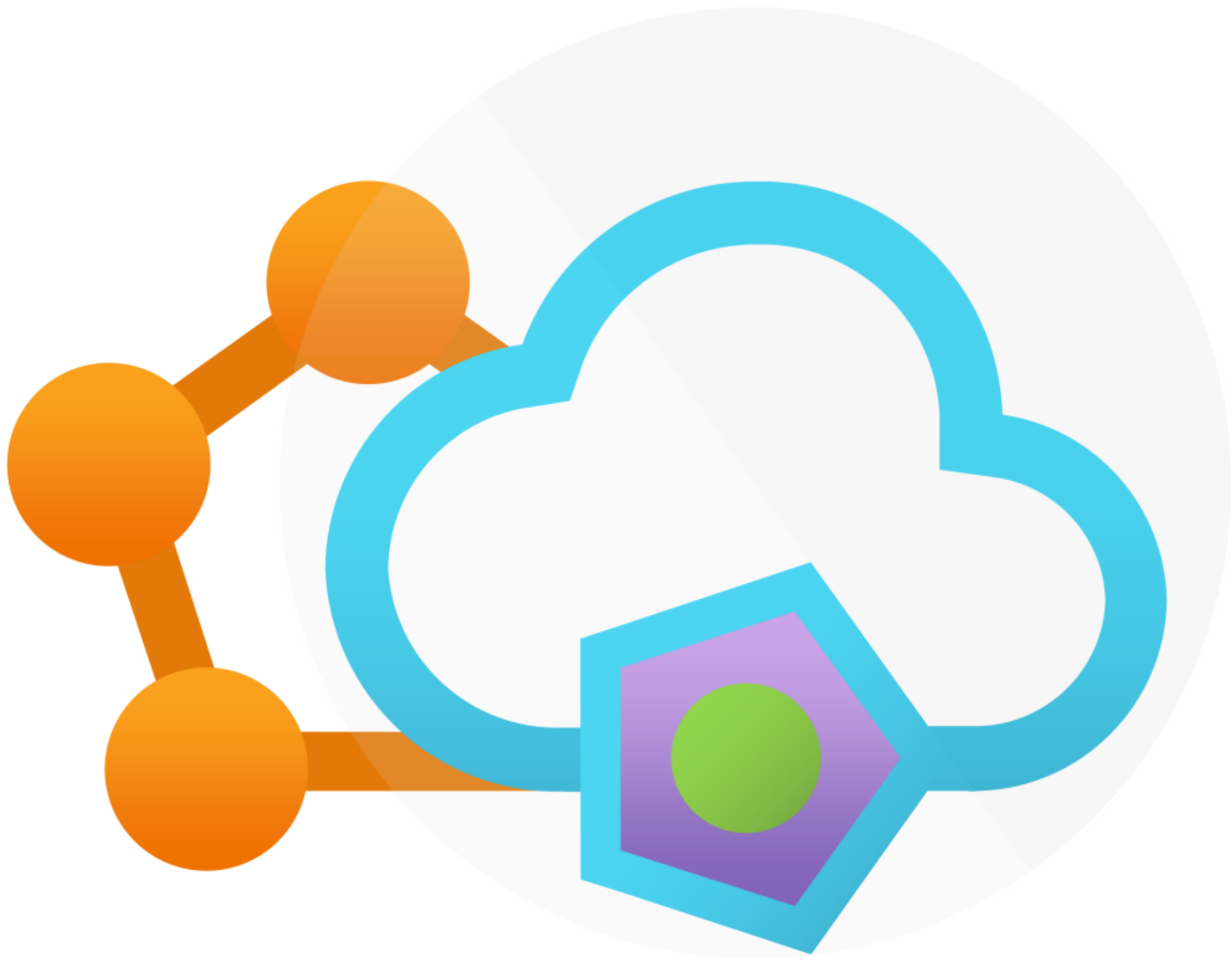
Secondary Interfaces -
operational reporting
and logging.



Tertiary Interfaces -
resource
connectivity.



Primary Interfaces –
data integration and
exchange.



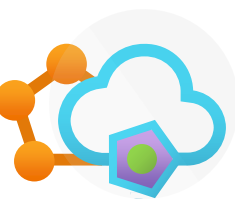
Data Mesh:

What...

Why...

How to handle governance
& platform infrastructure?

Data Mesh – Principles



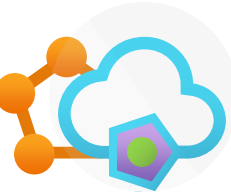
Data as a product.

Federated computational governance.

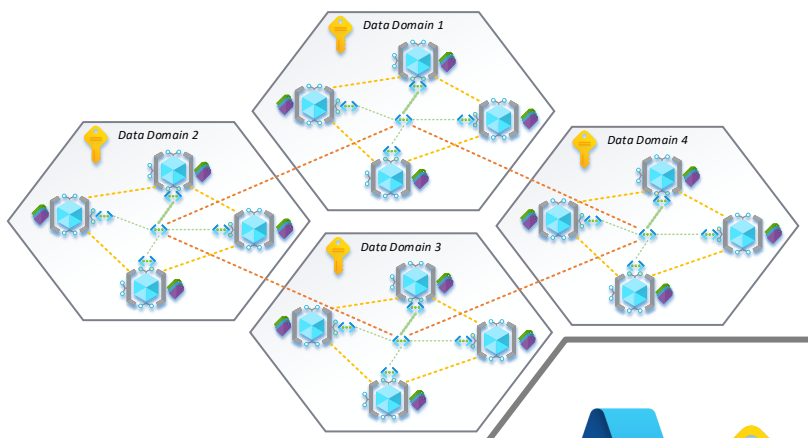


Domain-oriented decentralised data ownership and architecture.

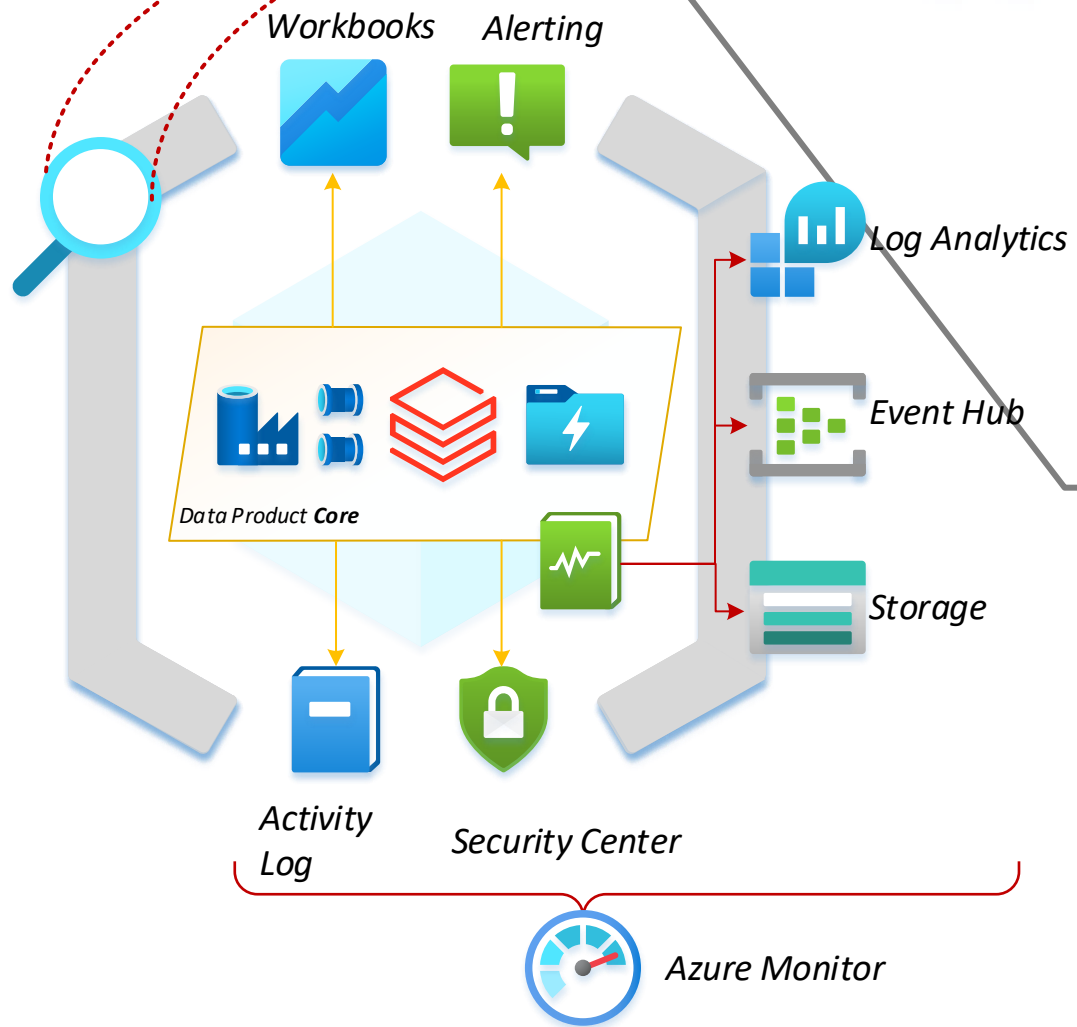
Self-serve data infrastructure as a platform.



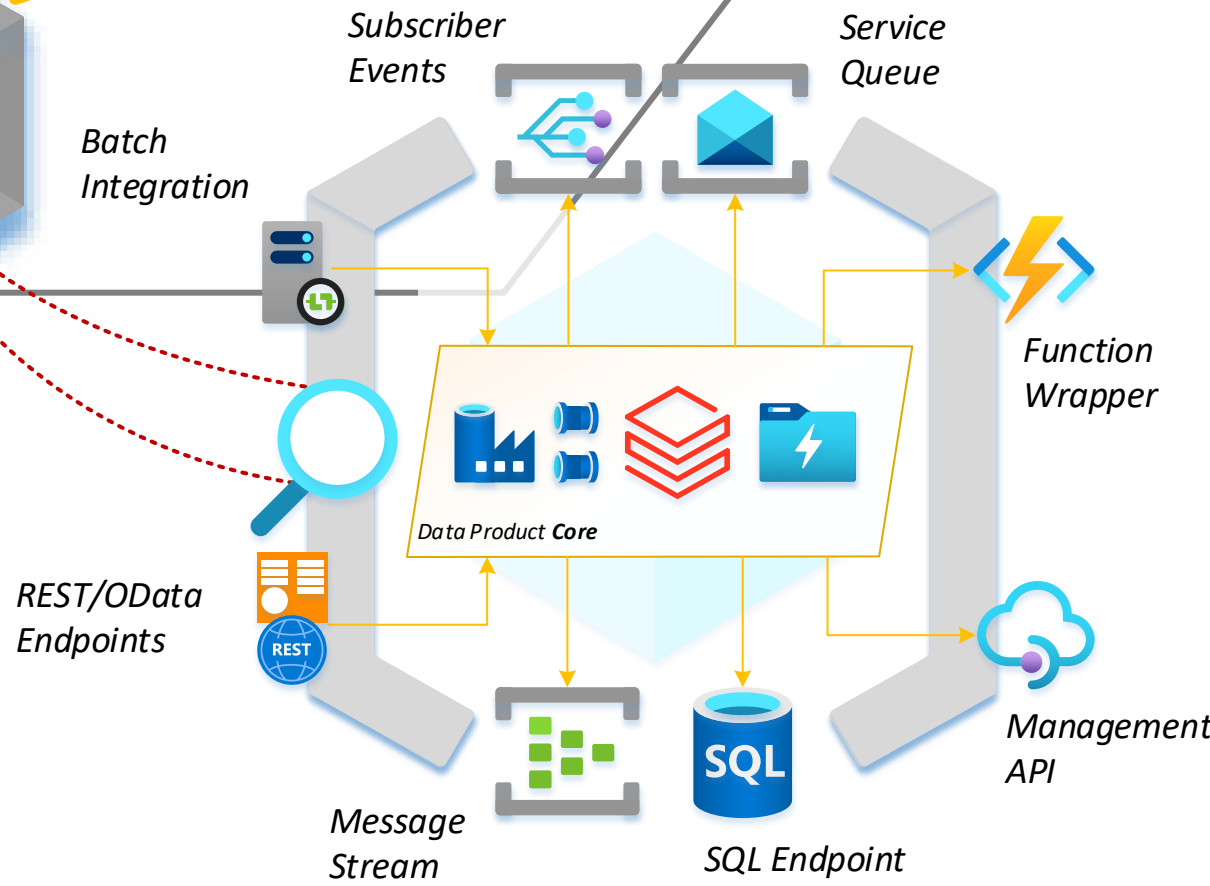
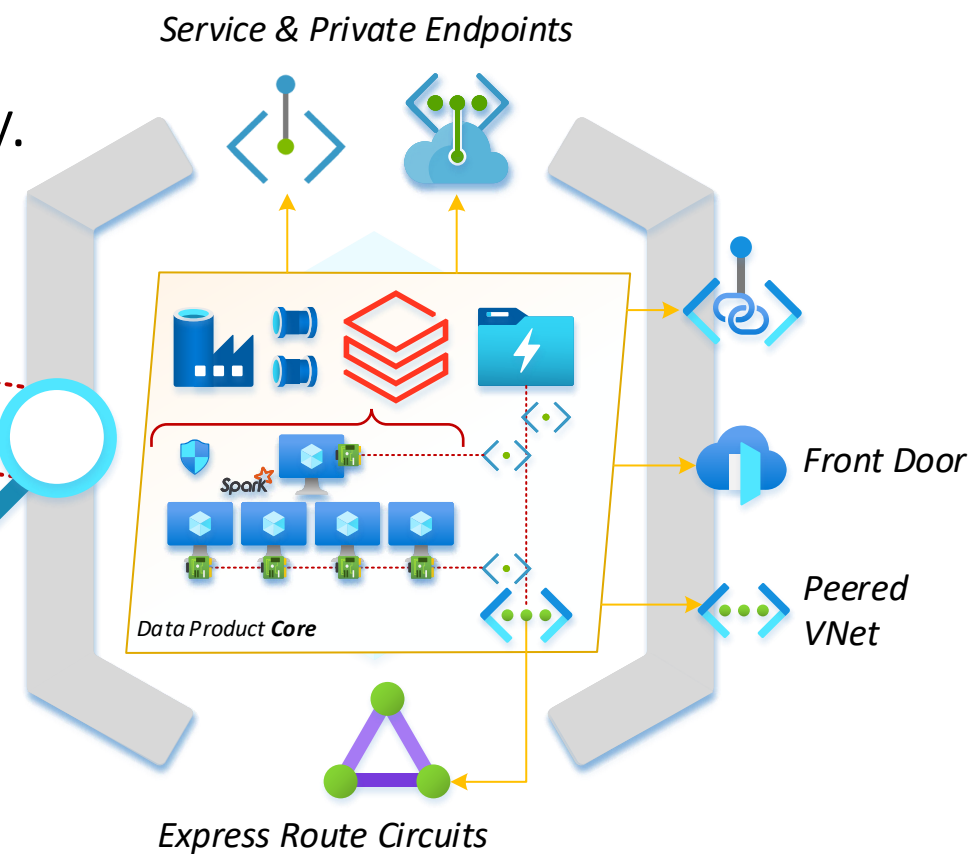
Data Mesh – Data Product & Domains in Azure



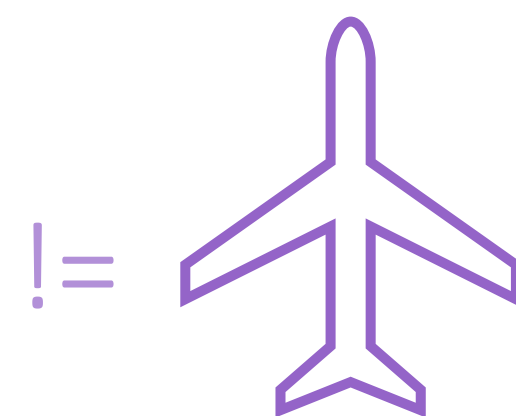
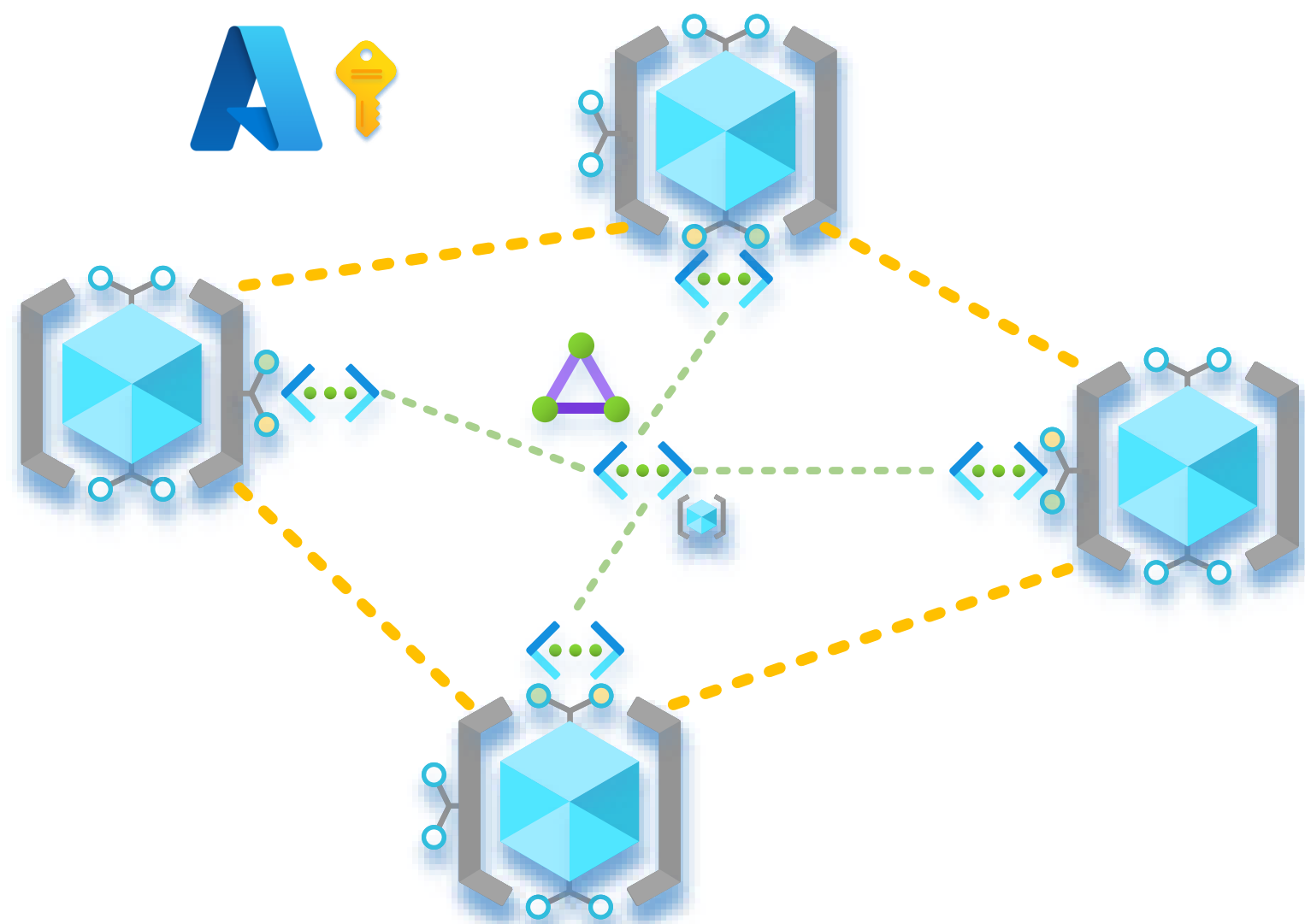
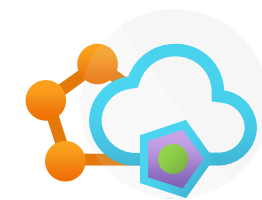
Secondary Interfaces -
operational reporting
and logging.



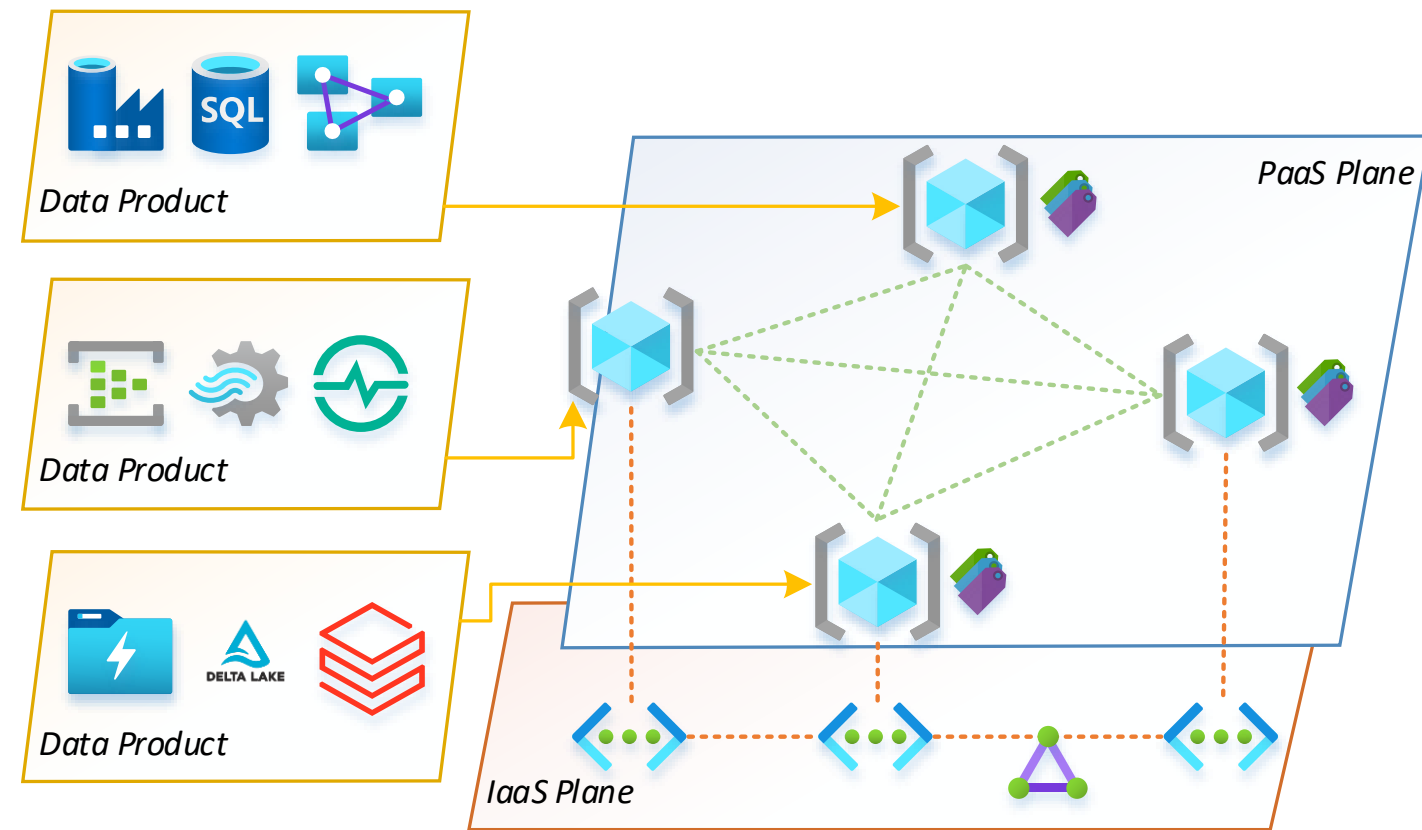
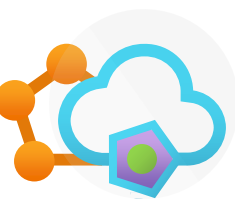
Tertiary Interfaces -
resource
connectivity.

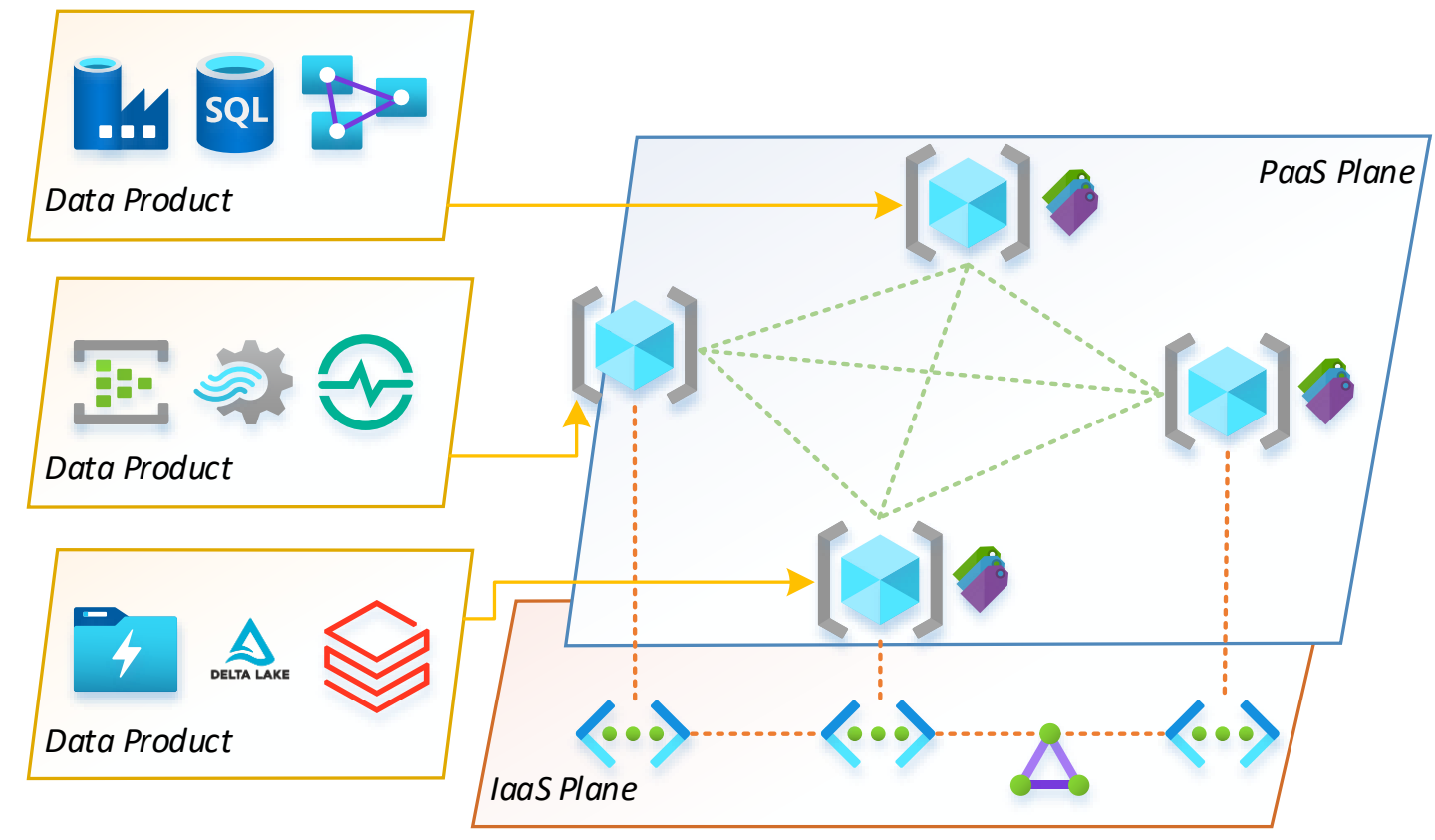
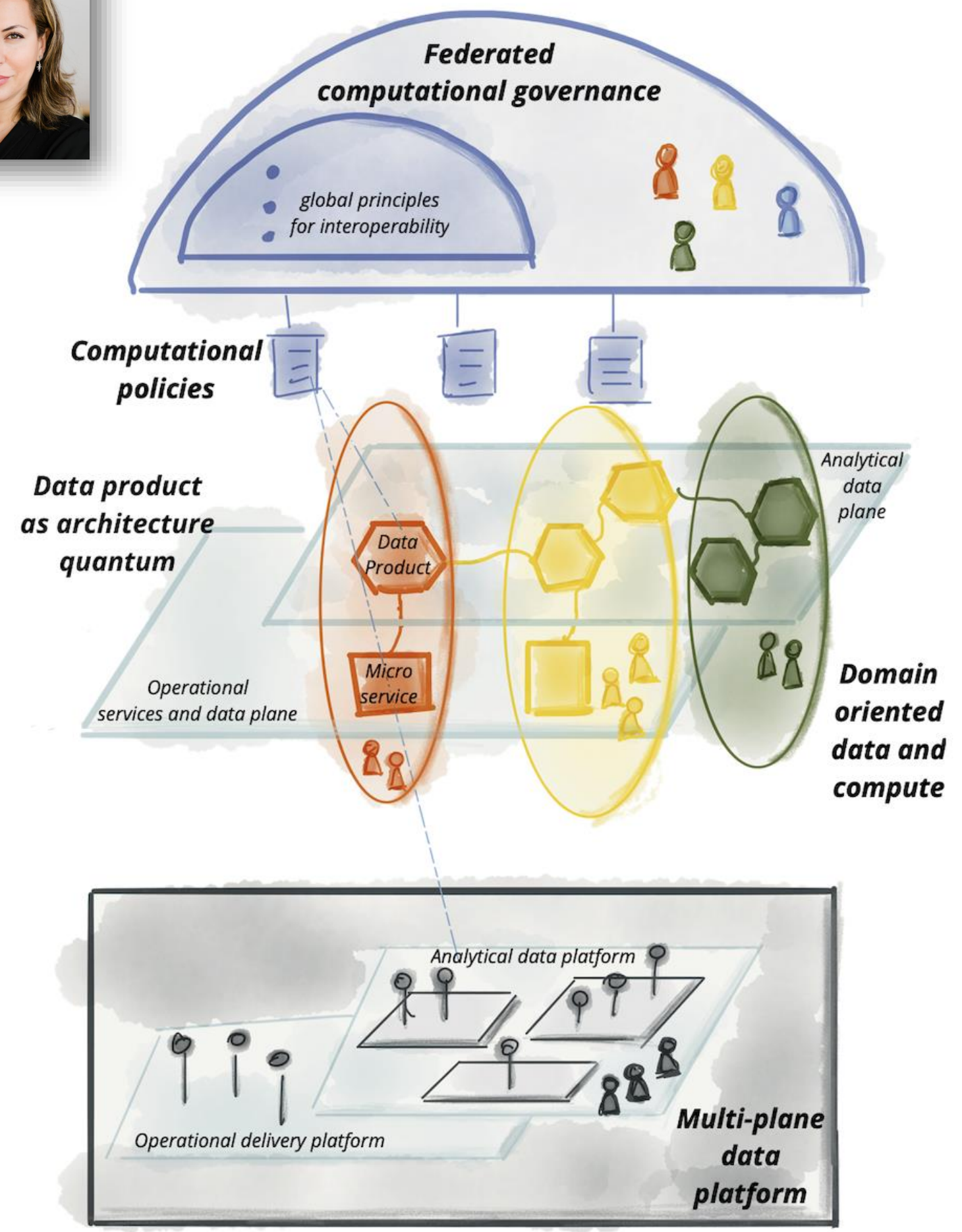
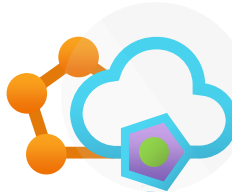


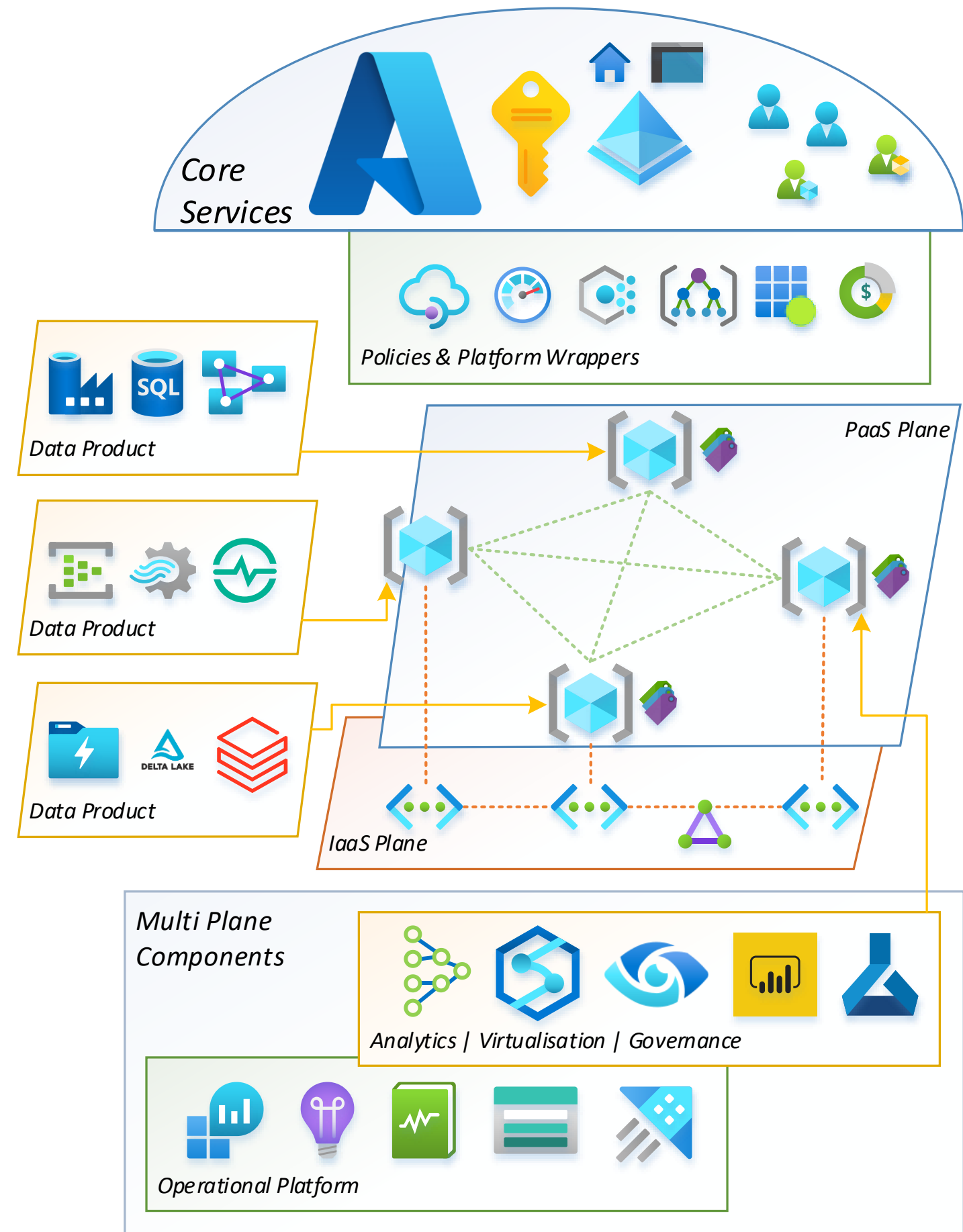
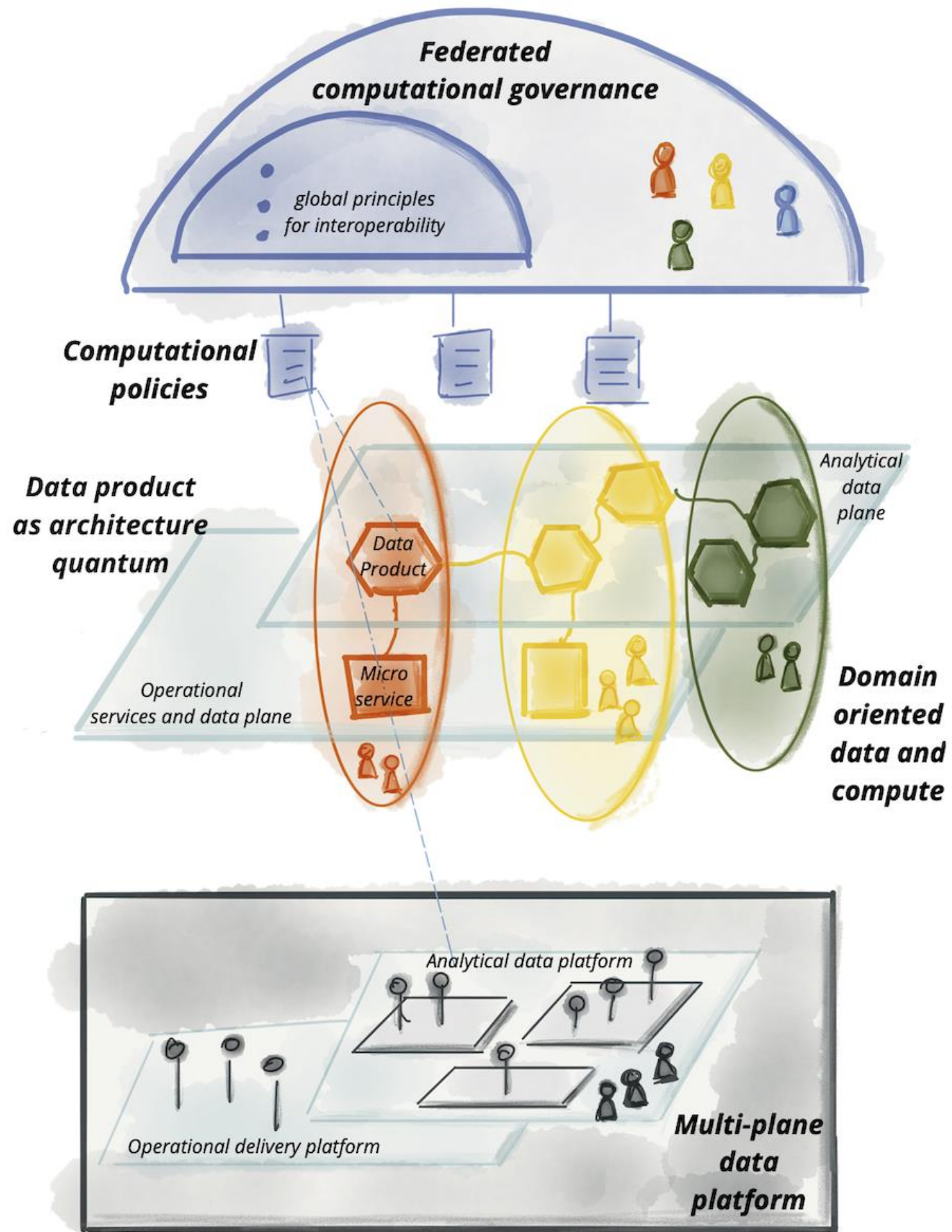
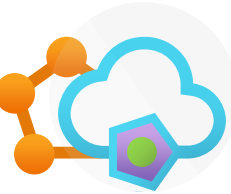
Primary Interfaces –
data integration and
exchange.

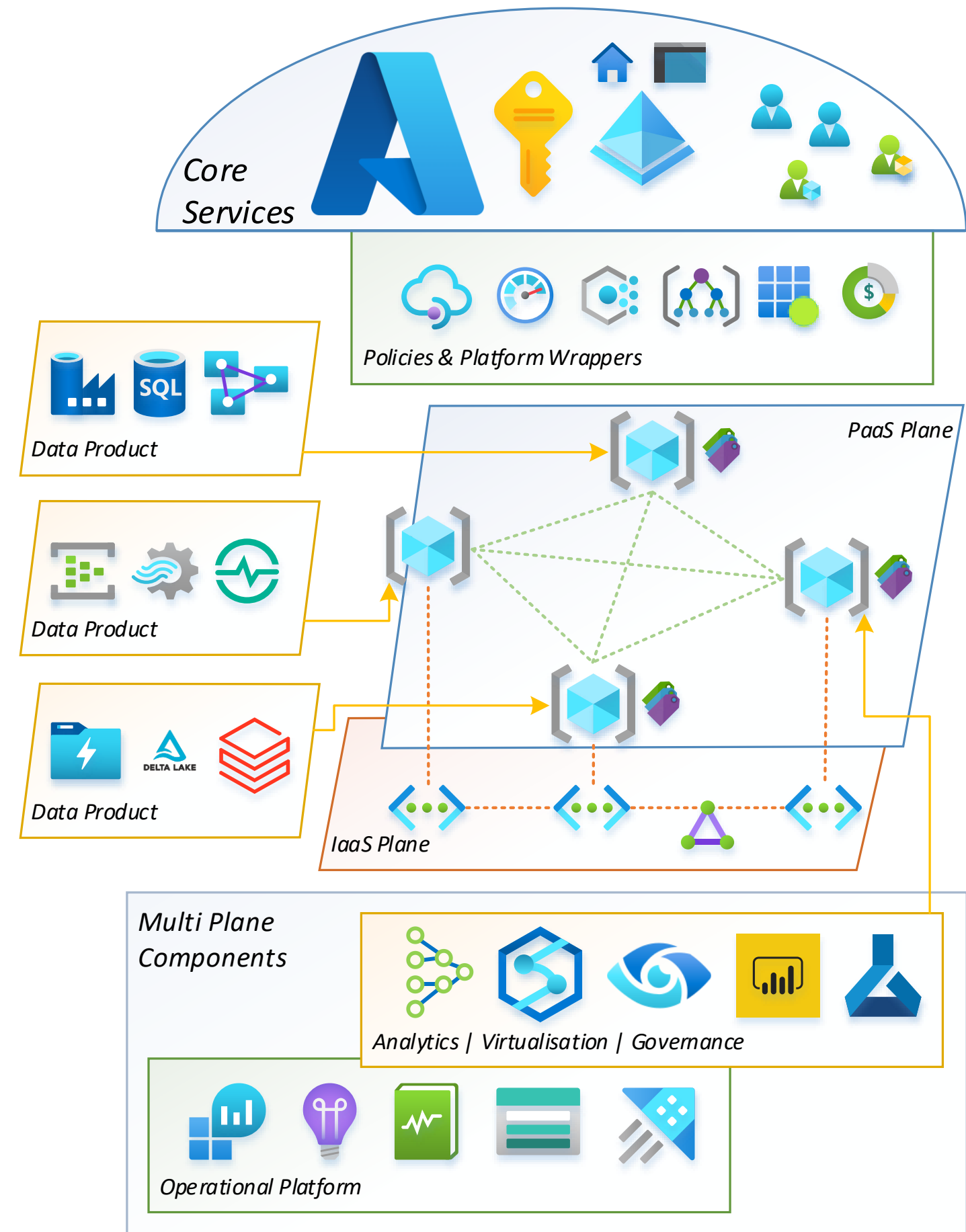
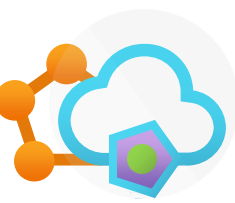


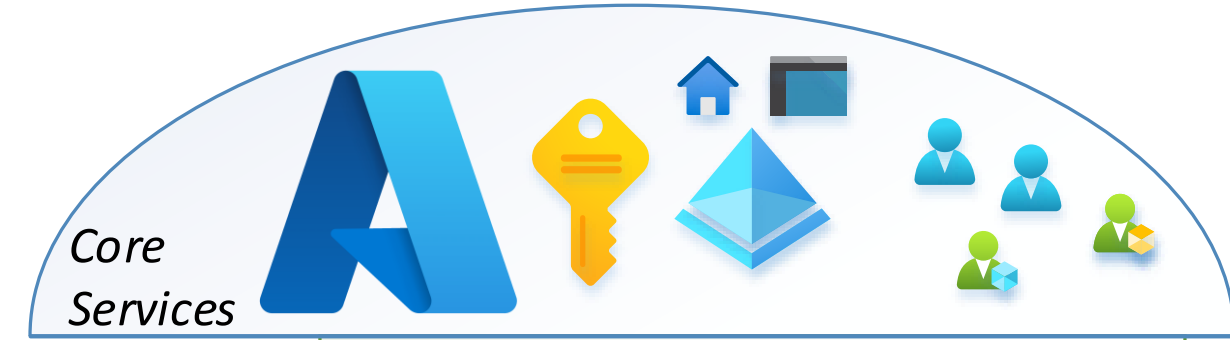
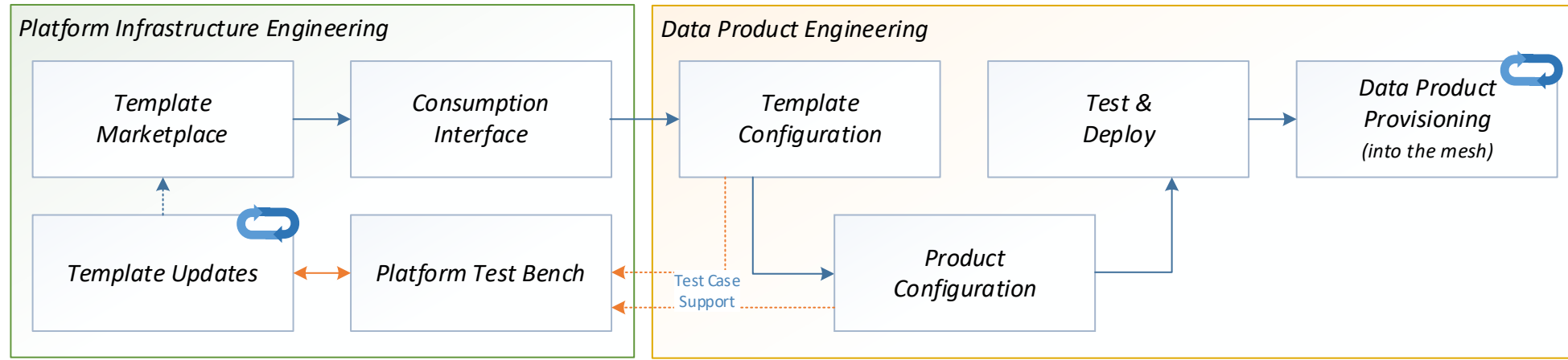
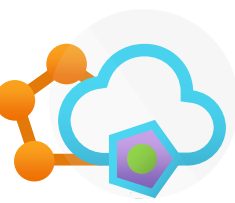
Data Mesh – In Azure



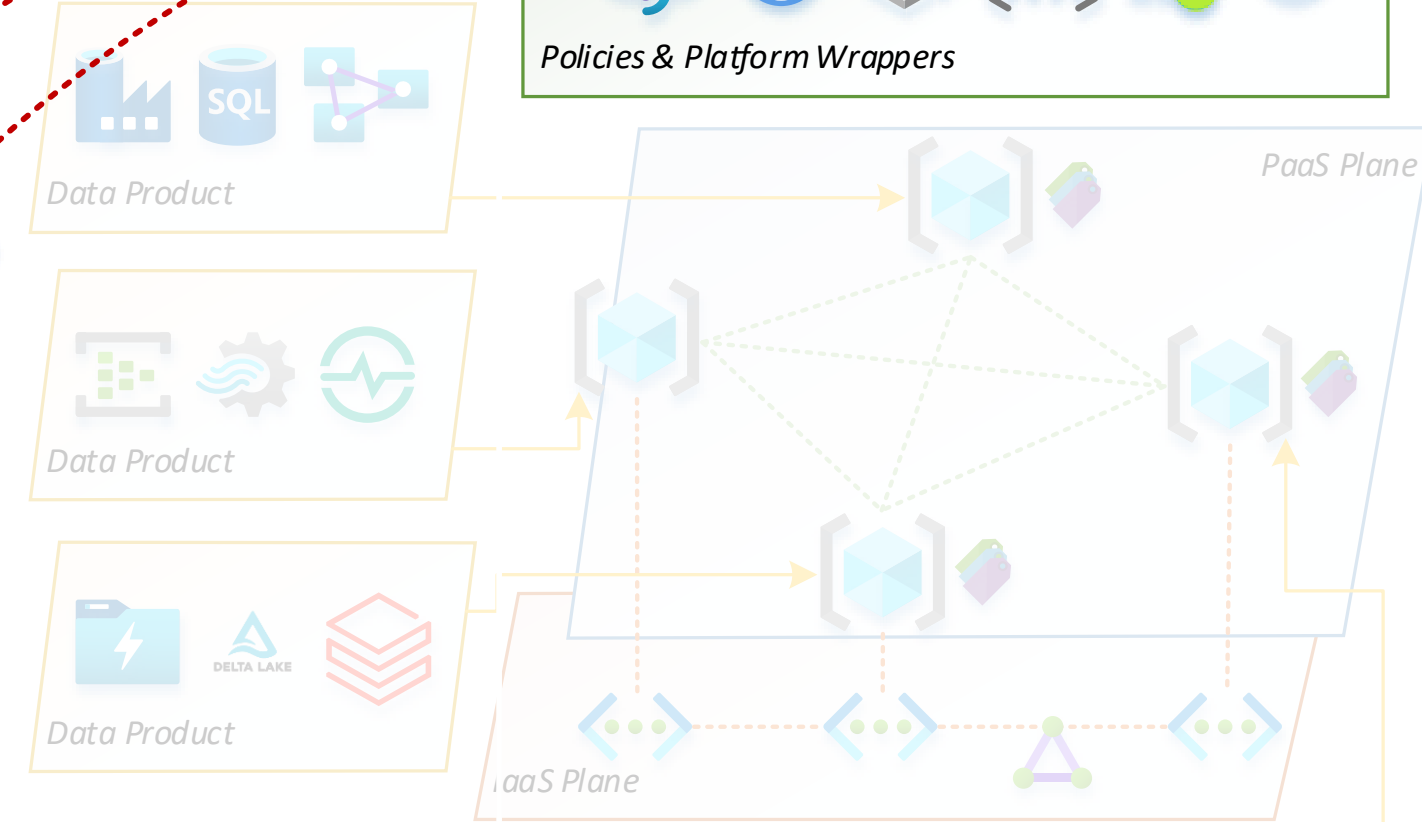
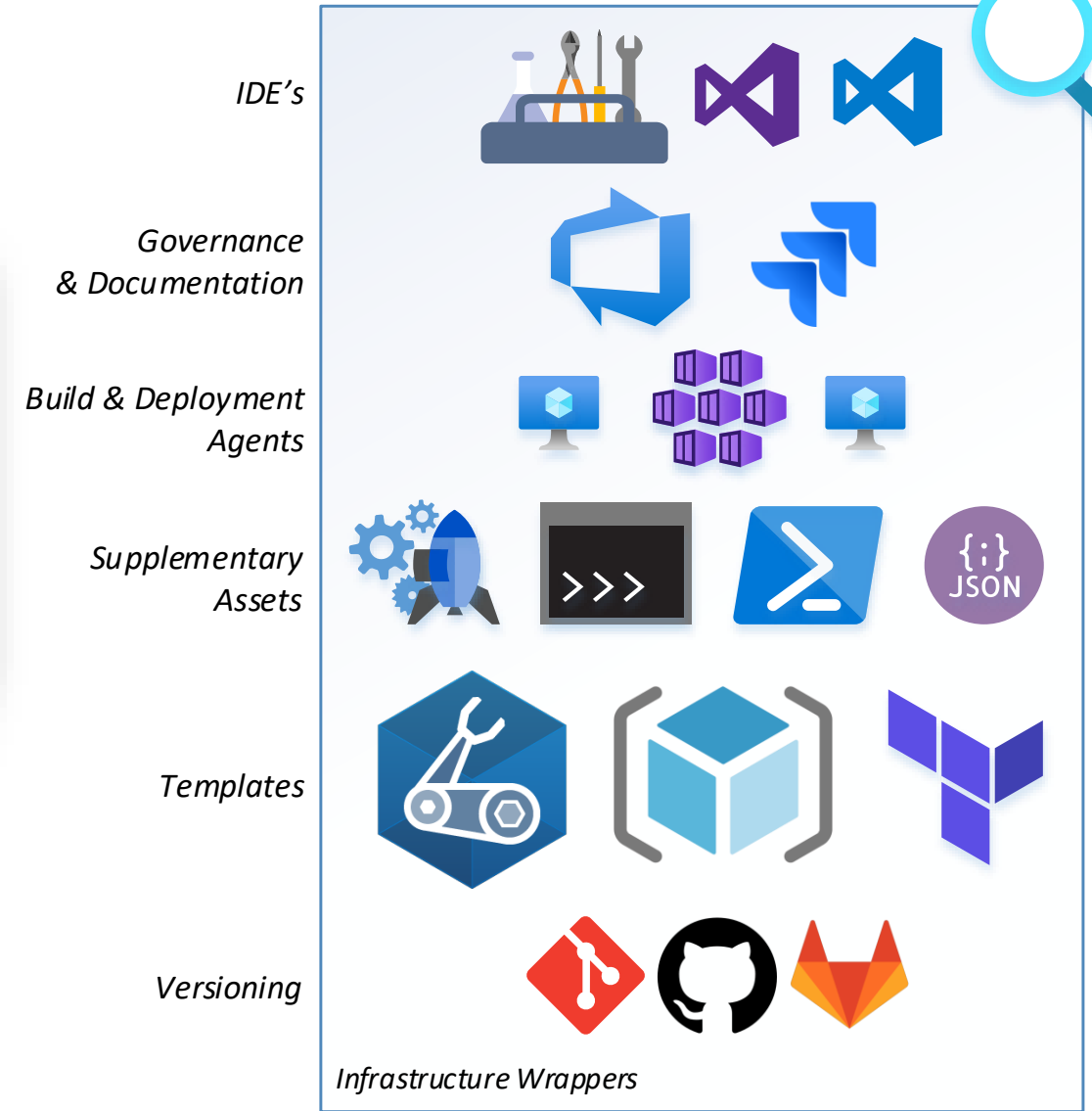


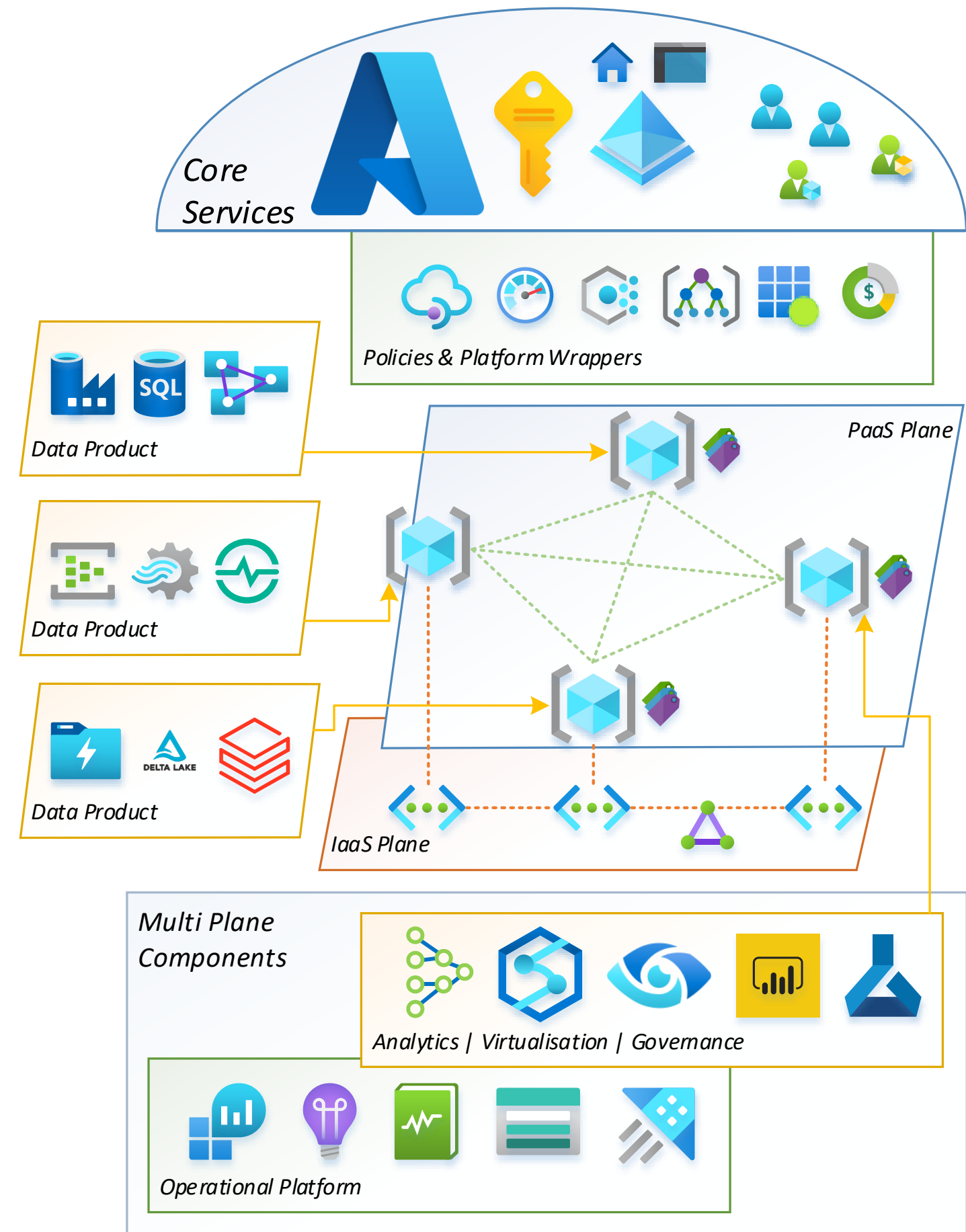
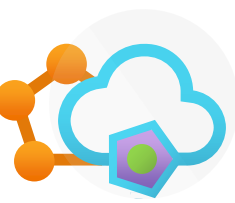


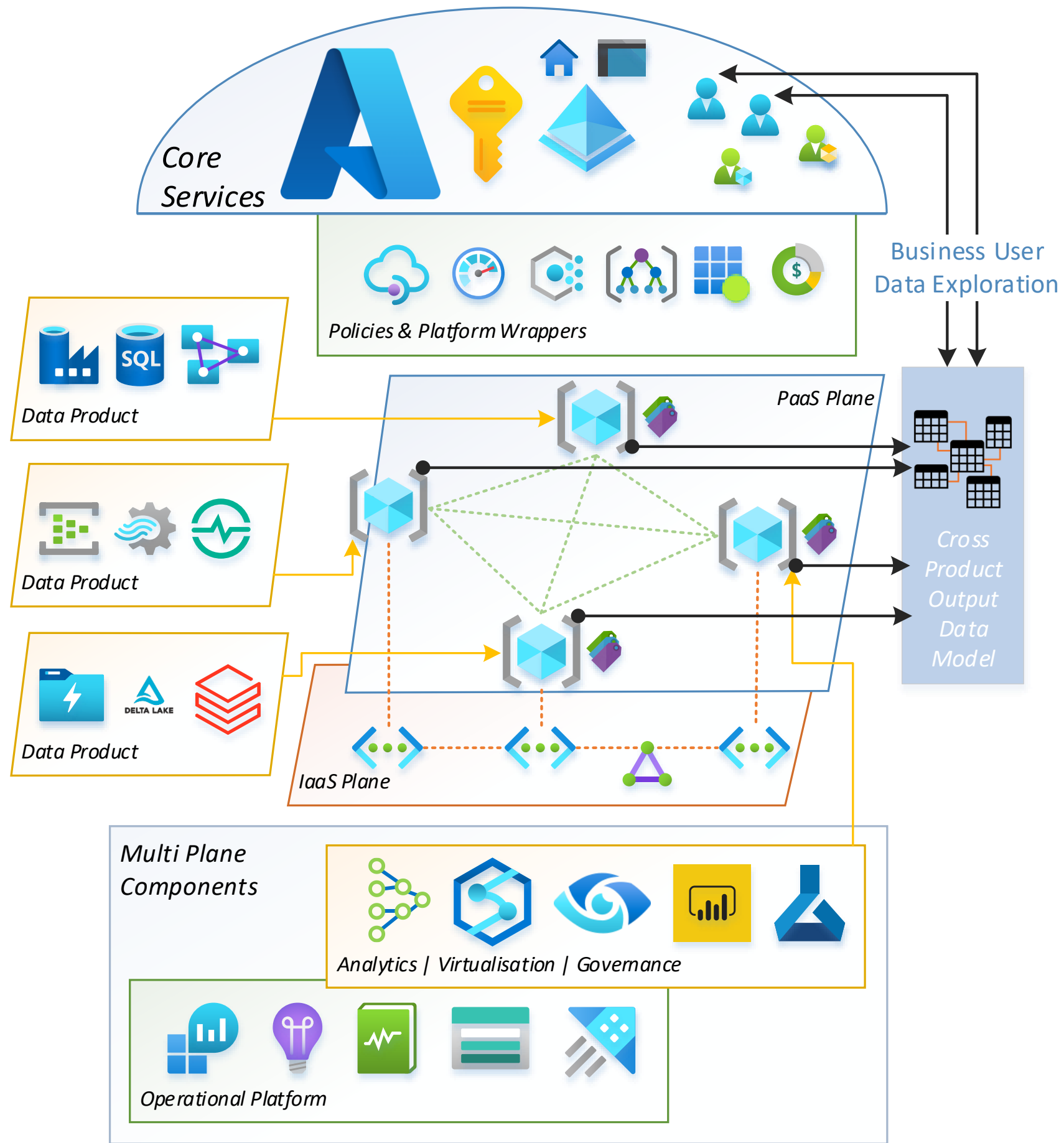




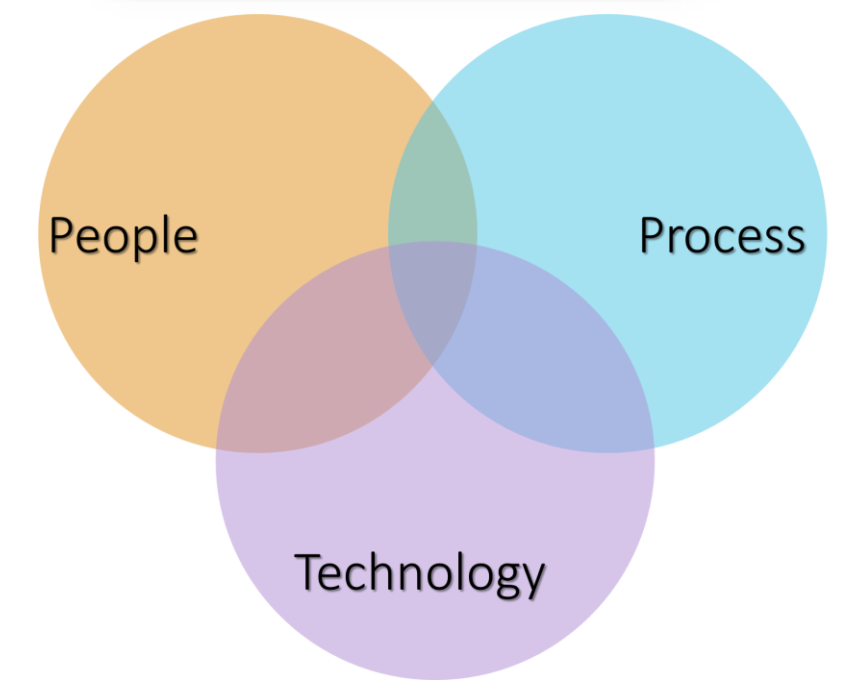
Self-serve data infrastructure as a platform.

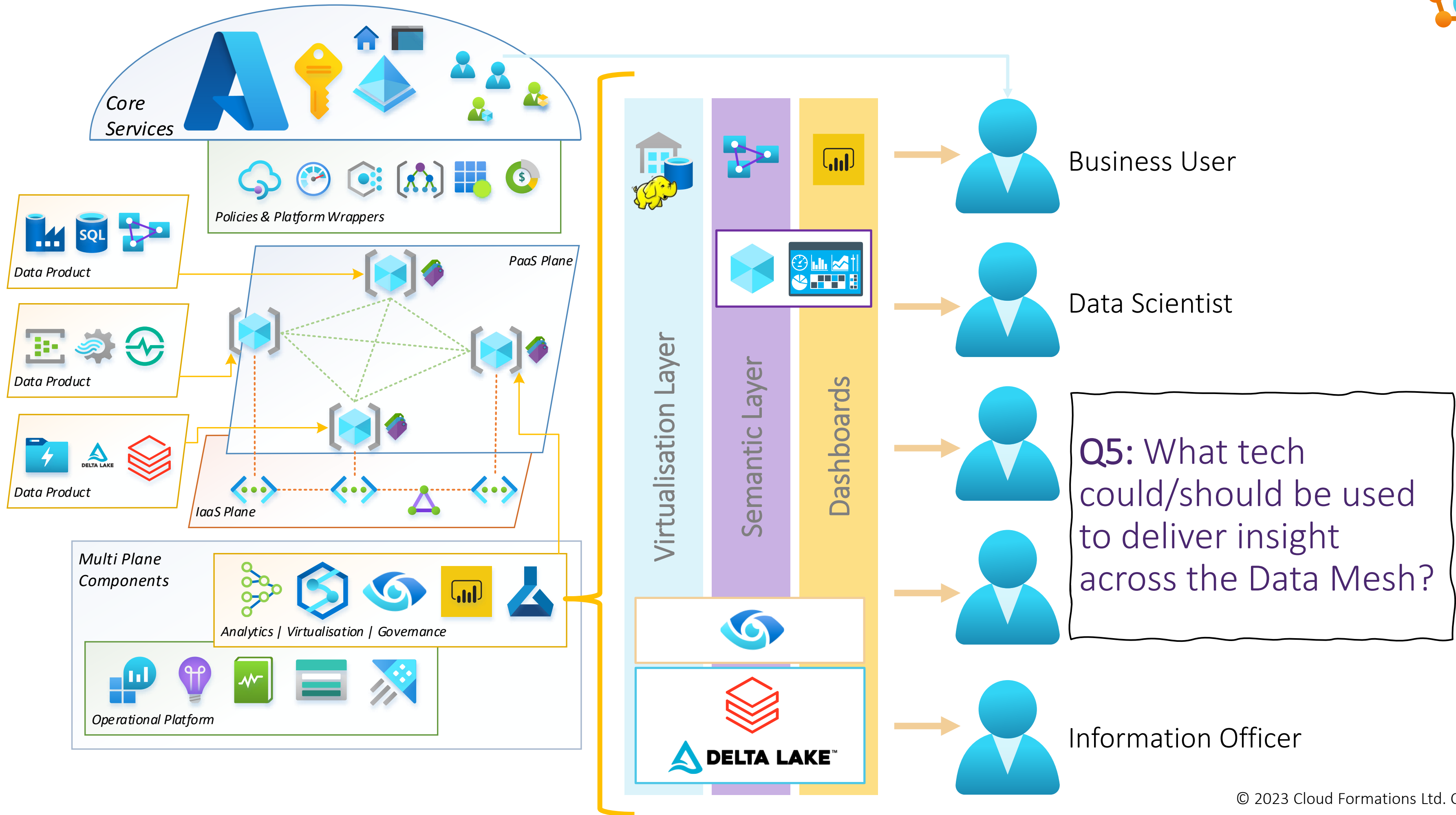


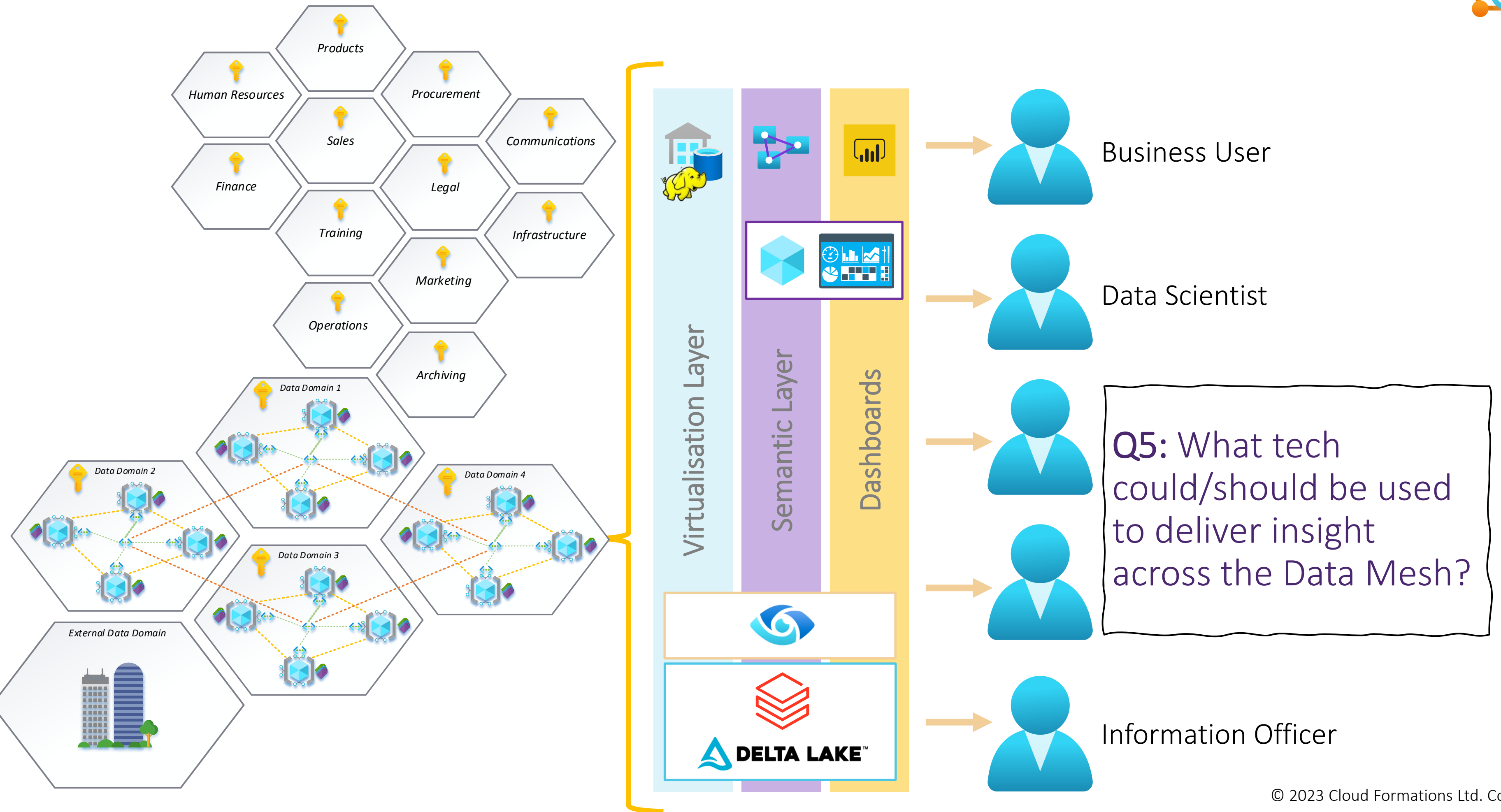
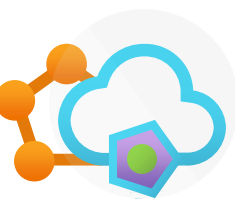


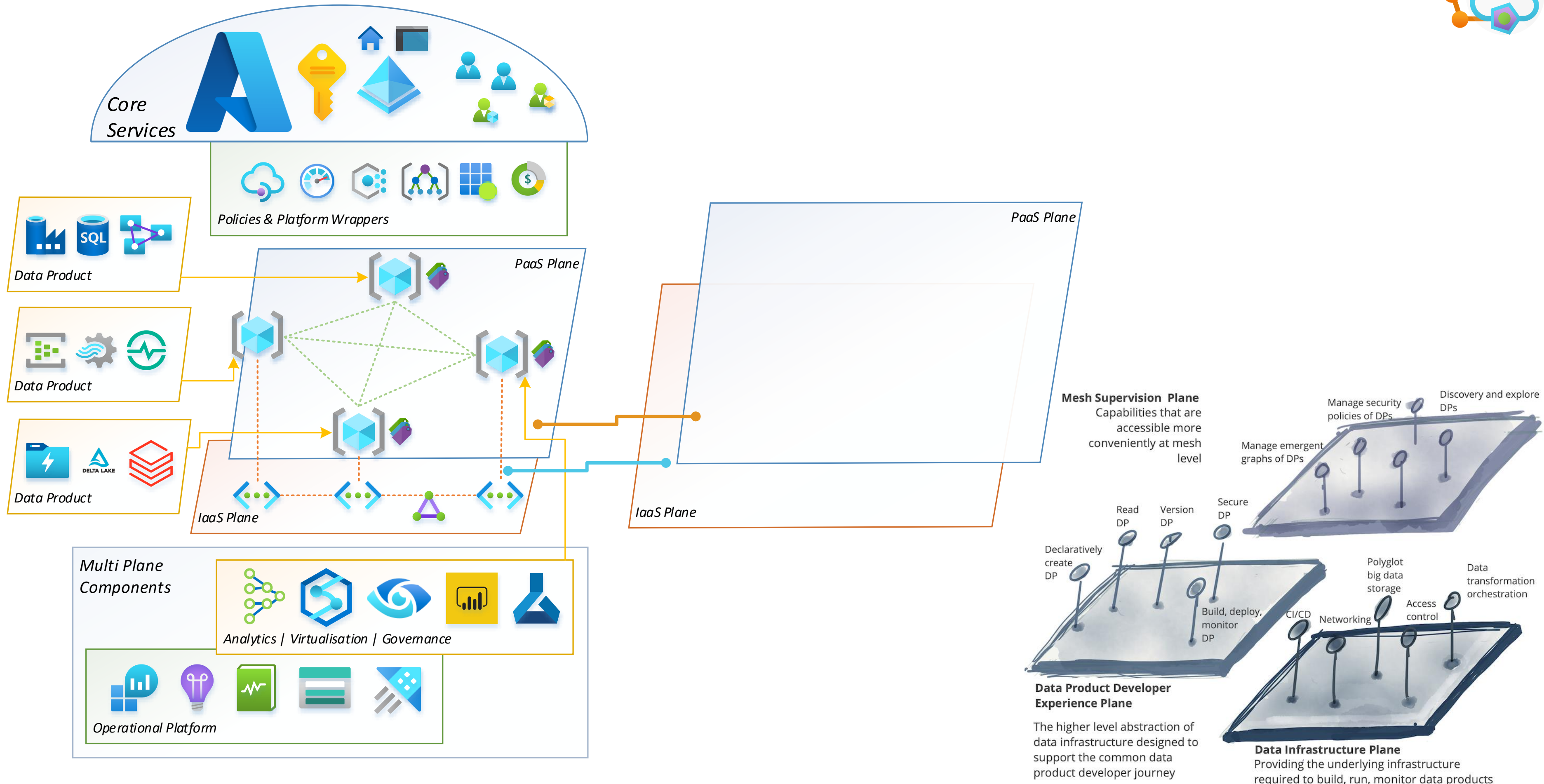
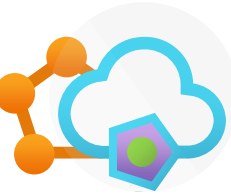


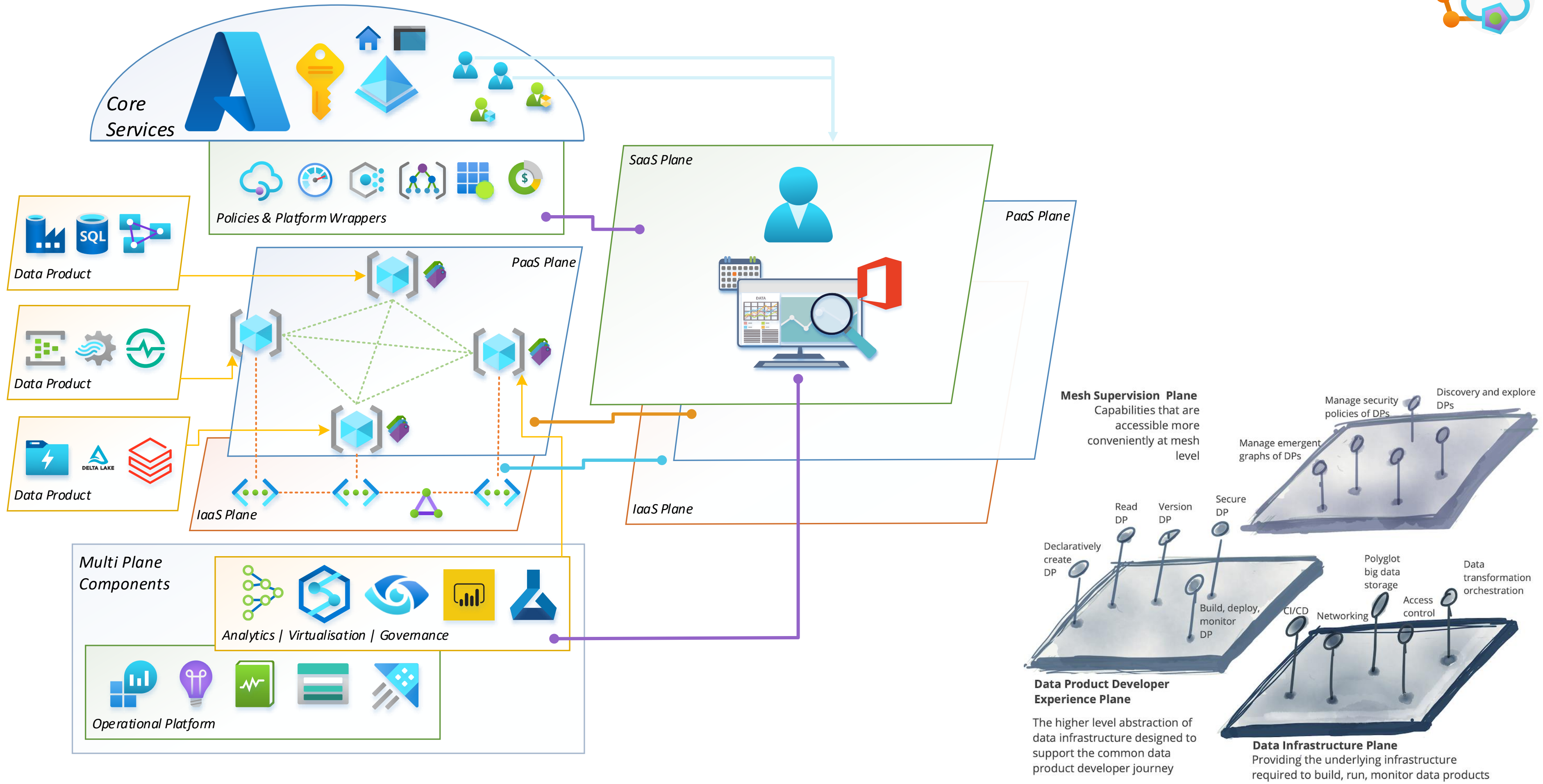
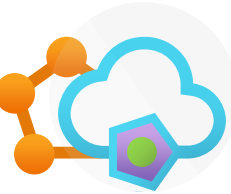
Federated computational governance.

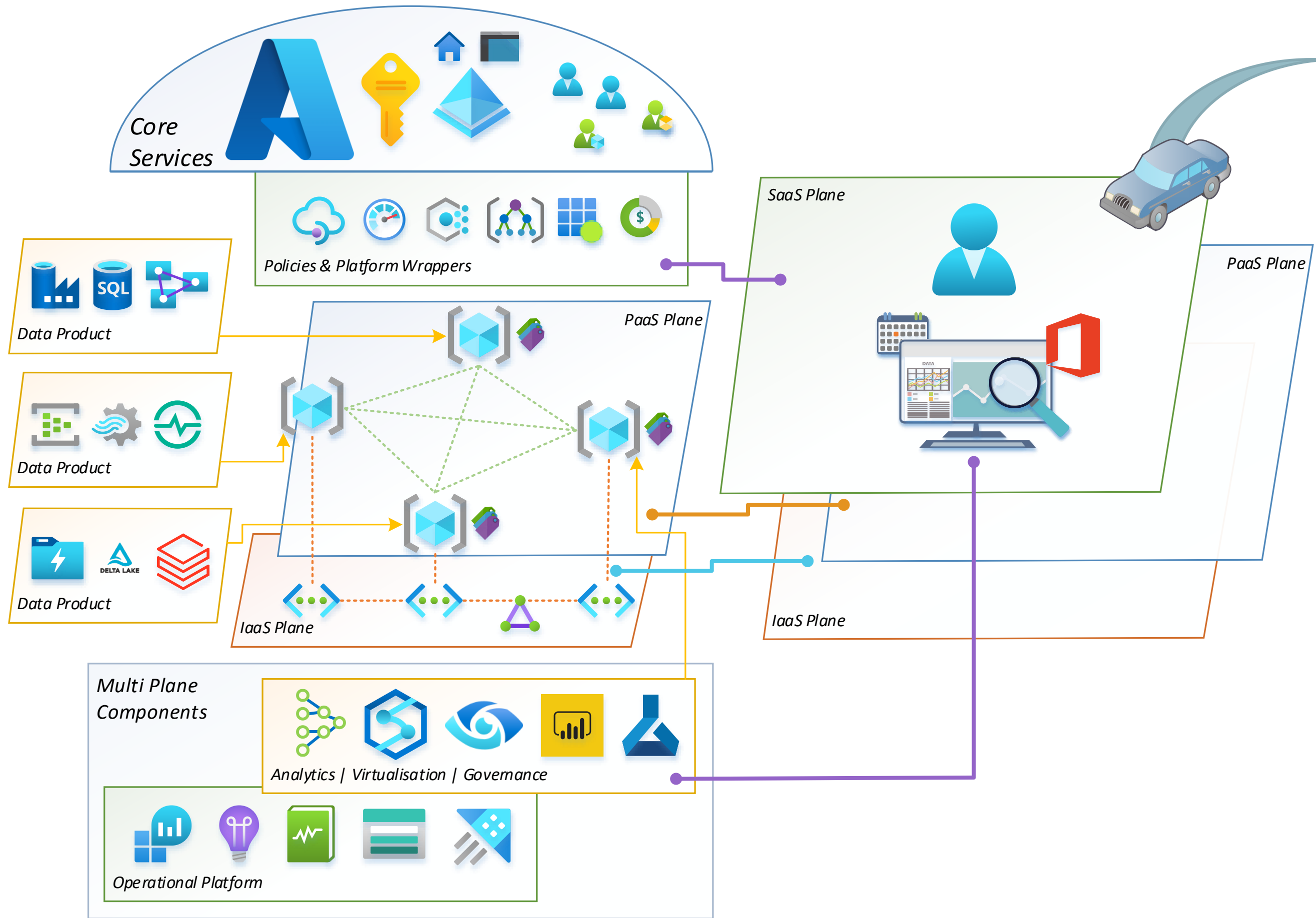
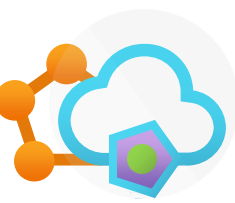








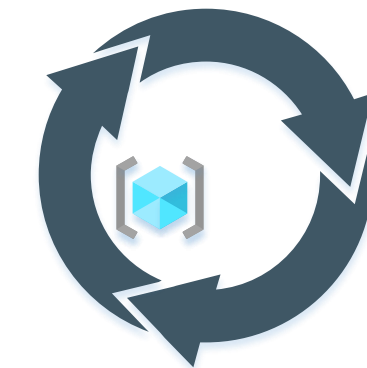




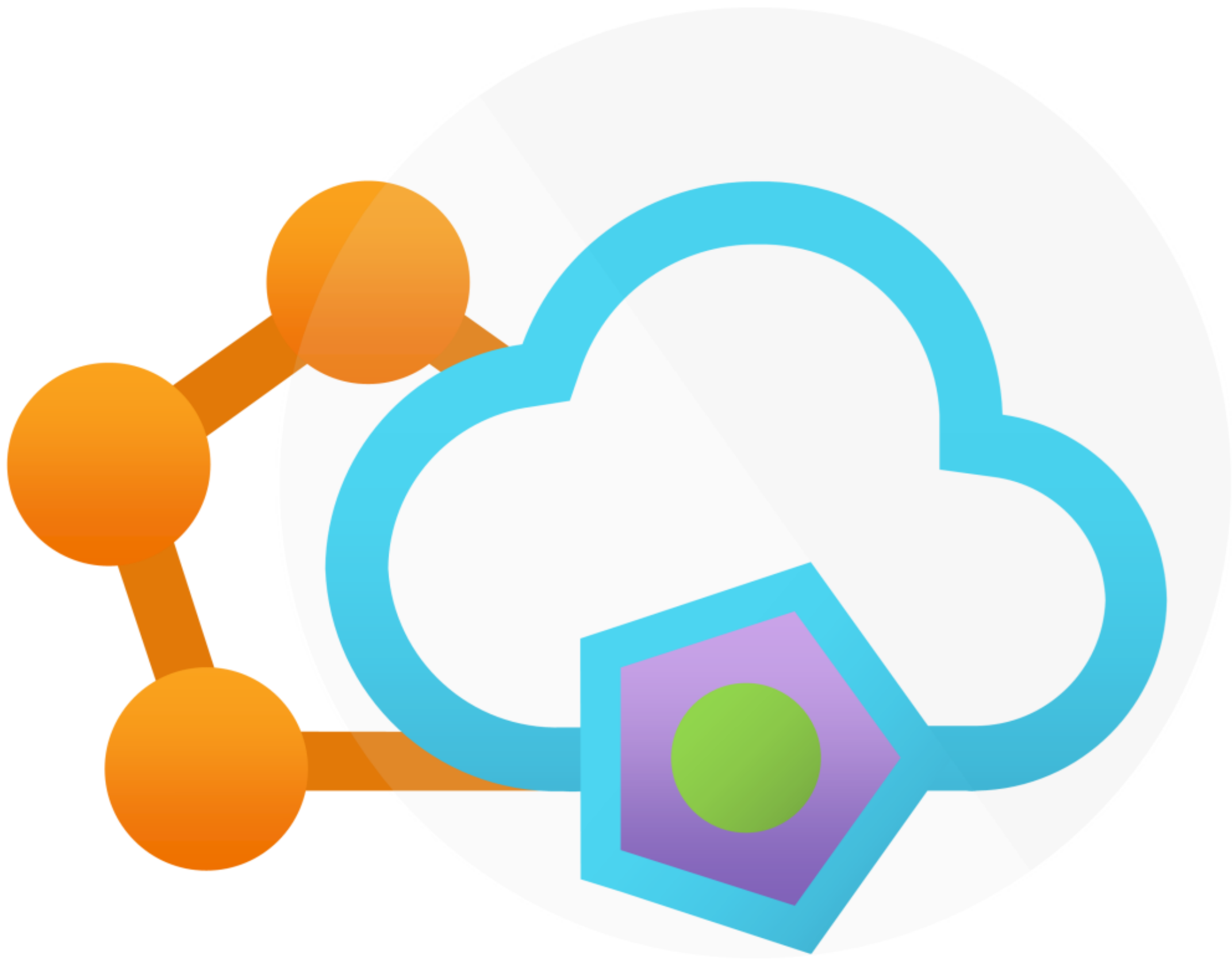
A Mesh Asset Marketplace



A Self-Service Analytics Canvas



Data Product Onboarding Framework



Data Mesh:

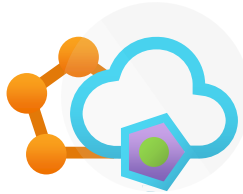
What...

Why...

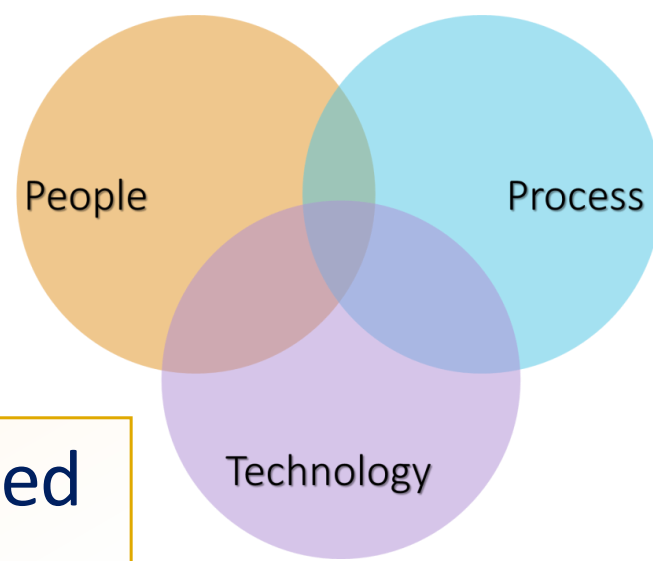
How...

Conclusions &
Next Steps

Data Mesh Principals - Theory vs Practice



Conclusions & Next Steps



Q1: Should a data product handle both transactional/operational and analytical data?

Data as a product.

Q2: When does a data solution become a Data Mesh?

Domain-oriented decentralised data ownership and architecture.

Q3: What makes minimum viable Data Mesh contain?



Q6: Is every Data Mesh implementation the same?

Self-serve data infrastructure as a platform.

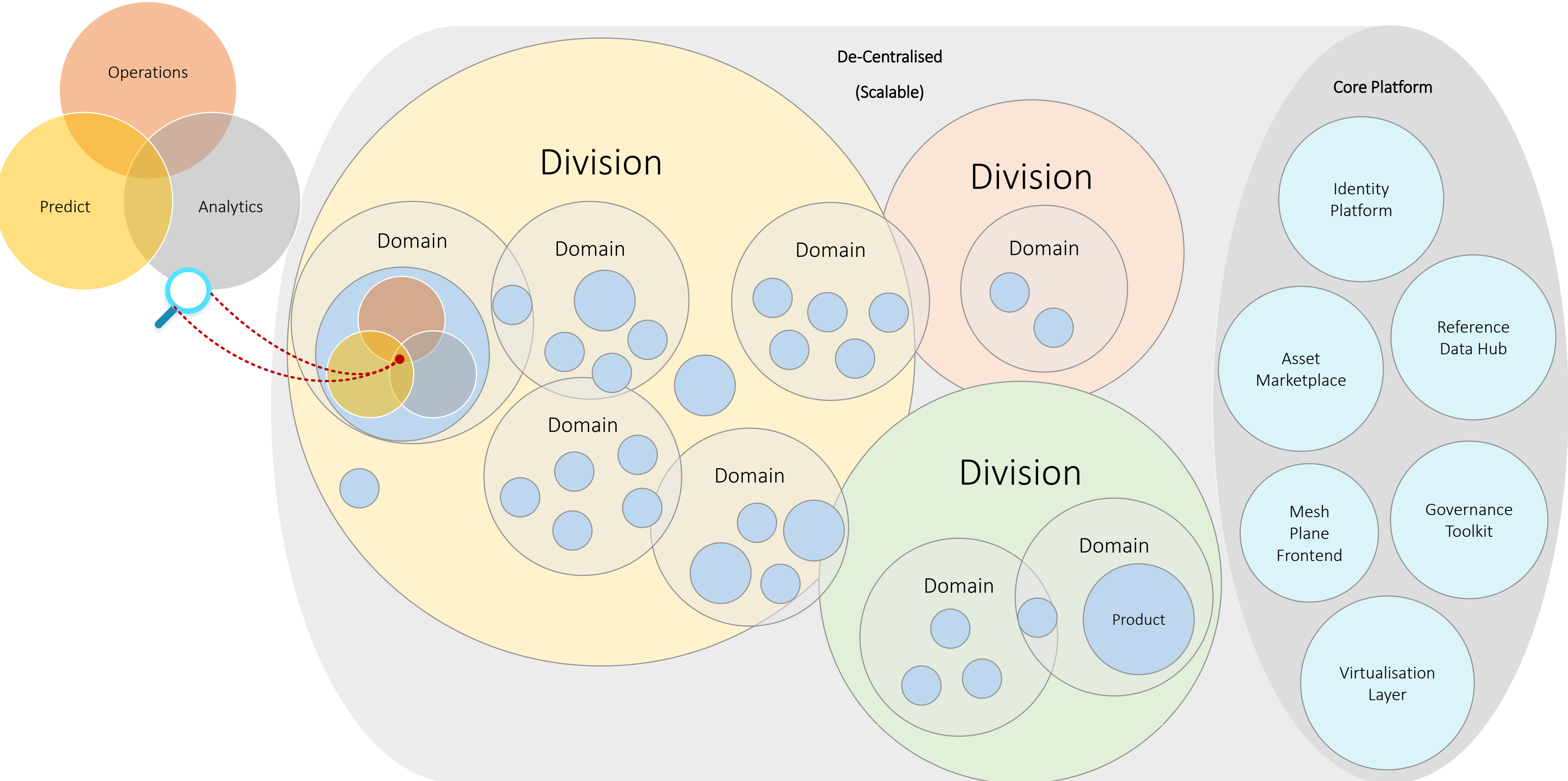
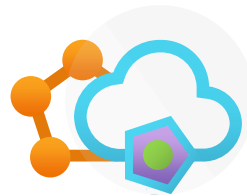
Q5: What tech could/should be used to deliver insight across the Data Mesh?

Federated computational governance.

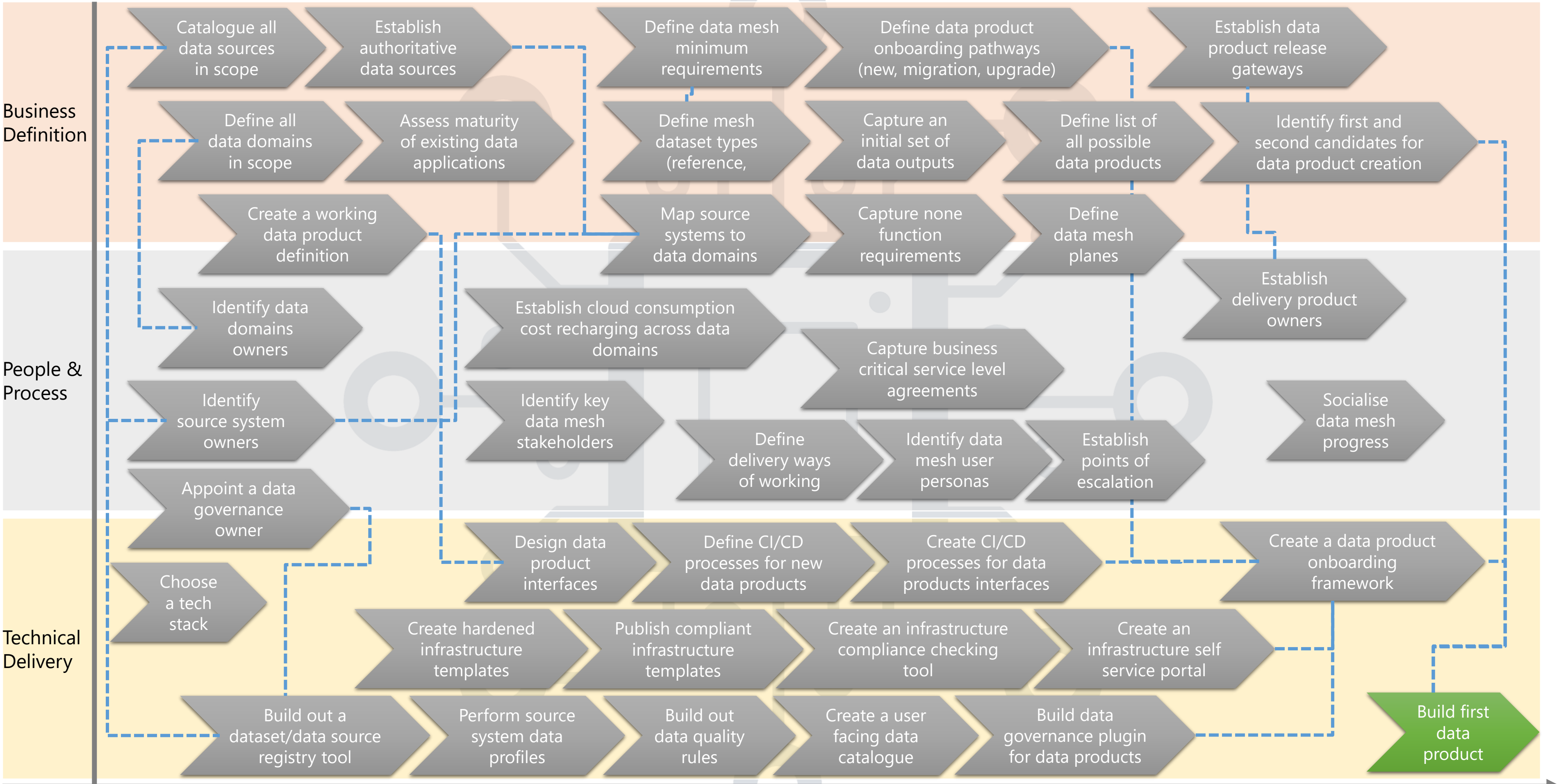
Q4: Should all Data Mesh capabilities be de-centralised?

Q: What next?....

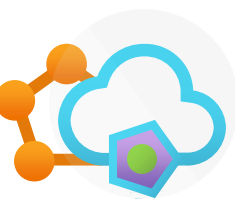
A Logical Data Mesh Architecture



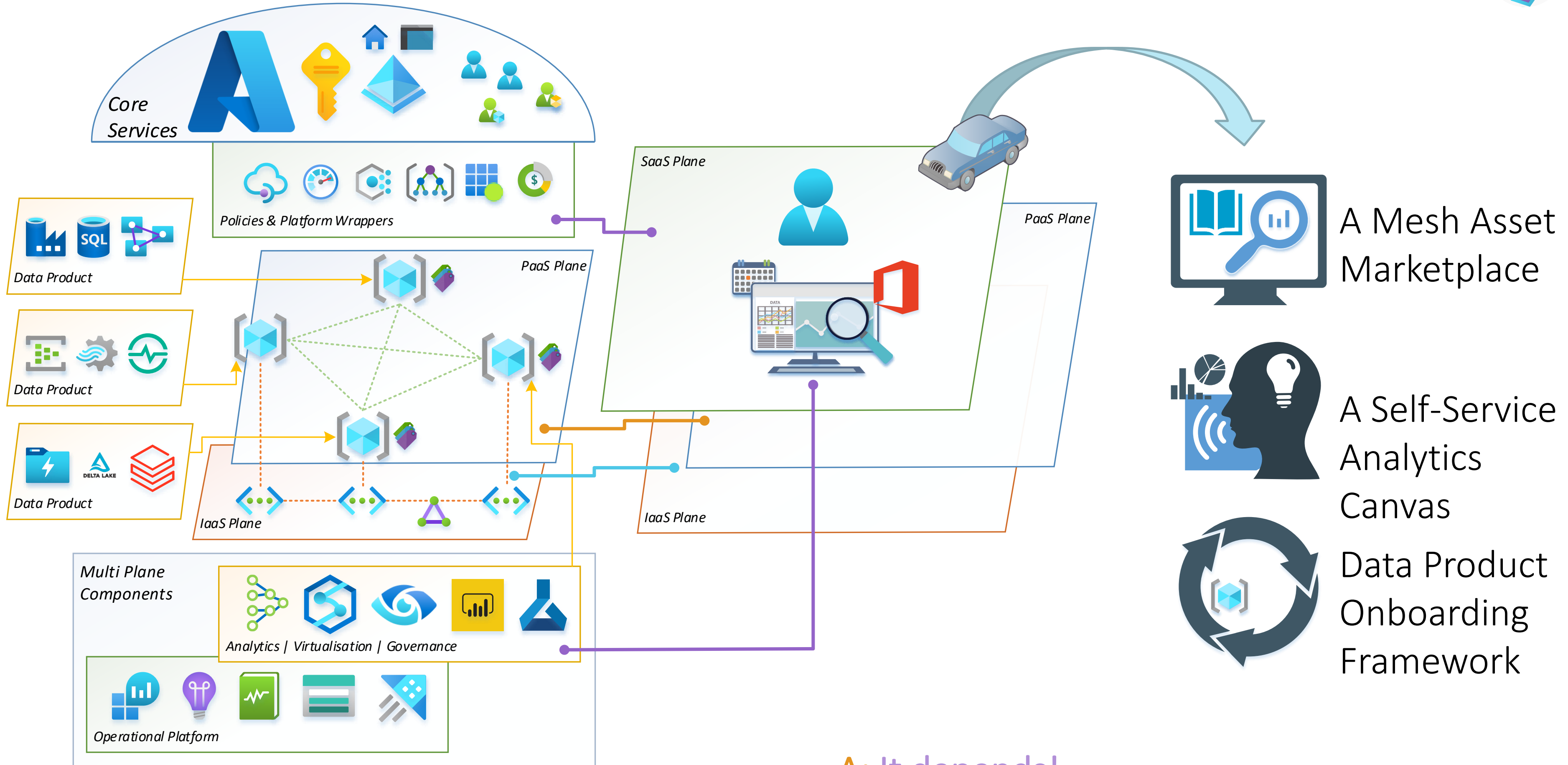
Data Mesh Roadmap - Starting Point



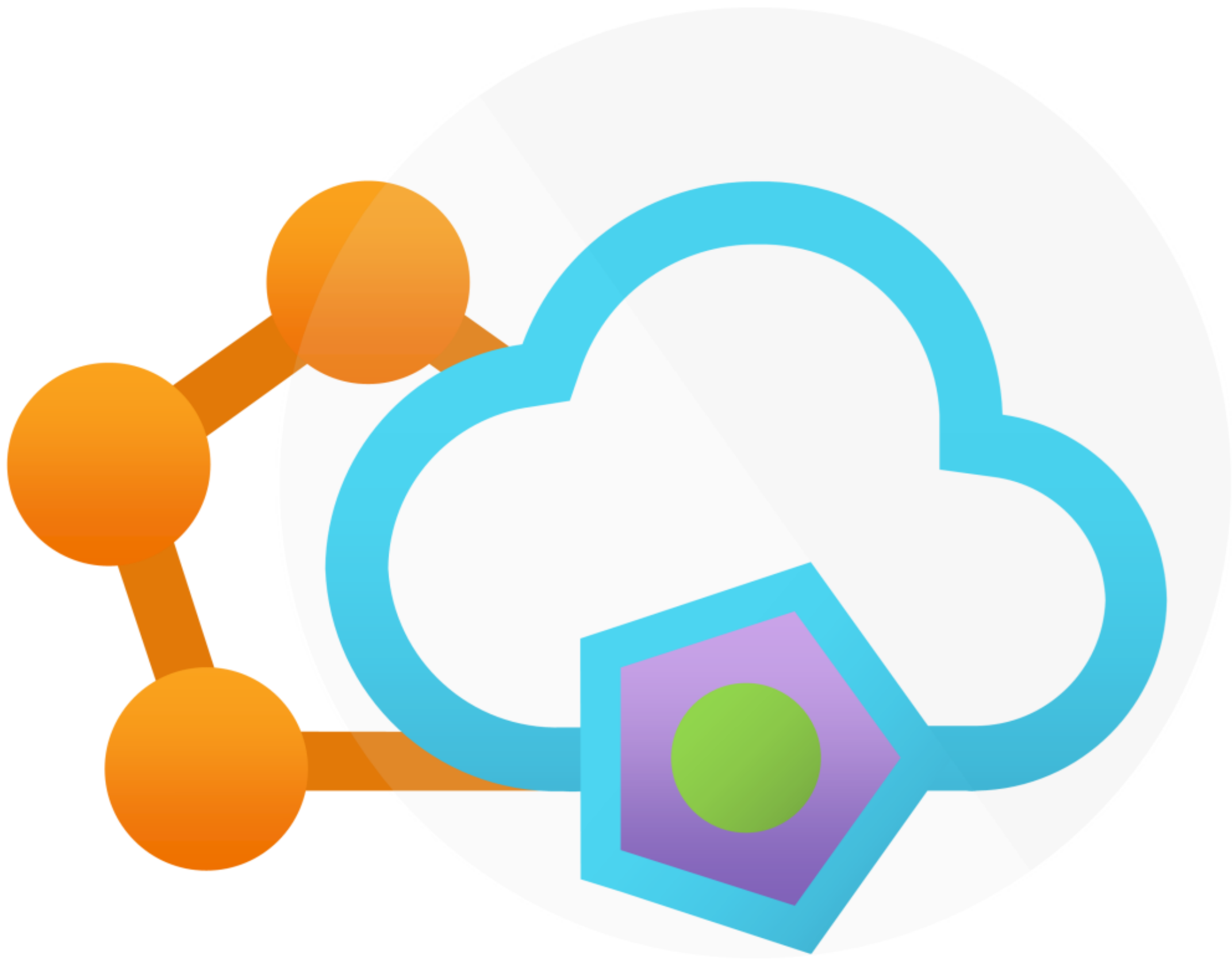
Tasks | **Time**



Q: Should we implement a data mesh architecture like this?



A: It depends!



Thank You



mrpaulandrew.com
paul@mrpaulandrew.com
[In/mrpaulandrew](https://www.linkedin.com/in/mrpaulandrew)
[@mrpaulandrew](https://twitter.com/mrpaulandrew)



<https://cloudformations.org>
contactus@cloudformations.org
[In/CloudFormations](https://www.linkedin.com/company/cloudformations)
[@CloudFormsLtd](https://twitter.com/CloudFormsLtd)
[CloudFormationsLtd](https://www.facebook.com/CloudFormationsLtd)

Cloud Formations