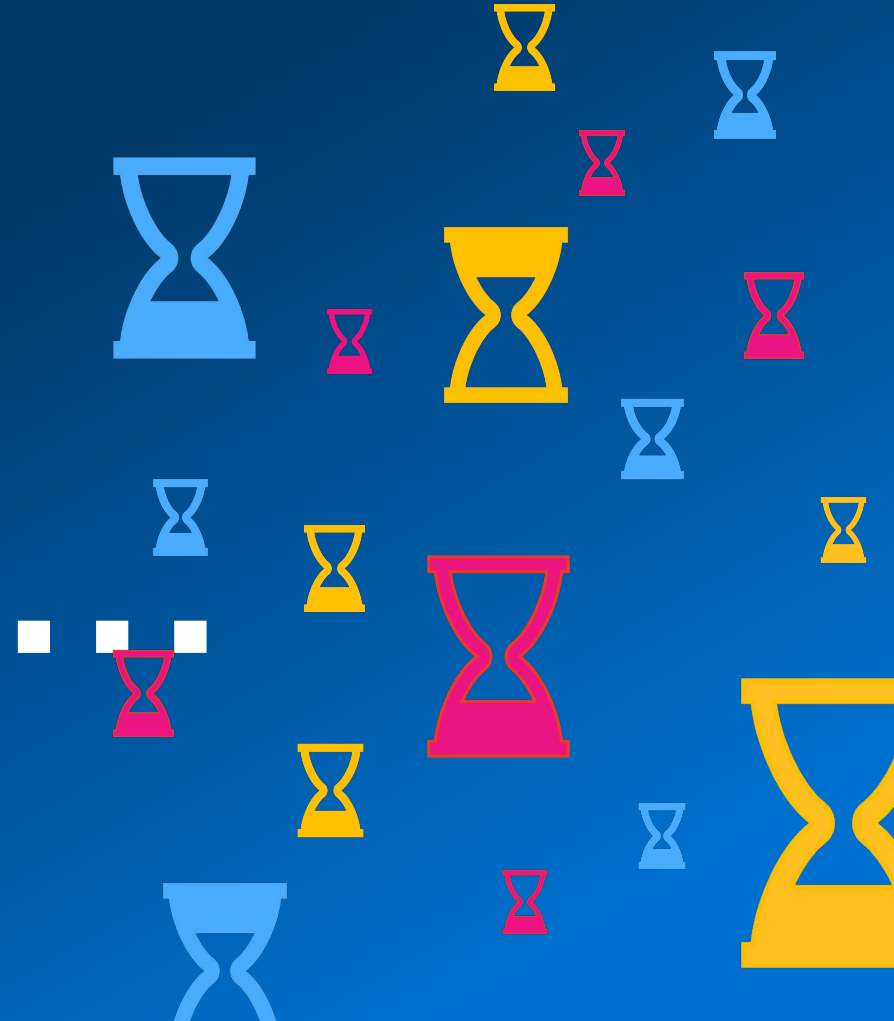


Seamless Customer Experience powered by Kubernetes @Edge at Walmart Stores

NOVEMBER 2019



Waiting . . .



Walmart





Our Mission

Save money. Live better.

Our Basic Beliefs



**Serve
the
Customer**



**Respect
the
Individual**



**Strive for
Excellence**



**Act with
Integrity**

Walmart Scale

2.2M

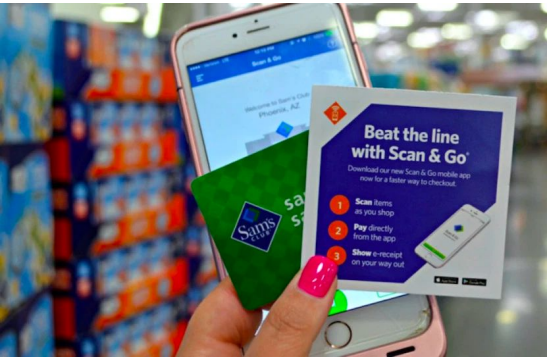
associates

265M

weekly customers

11K

stores worldwide



Point of Sale - Checkout

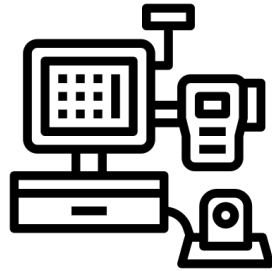




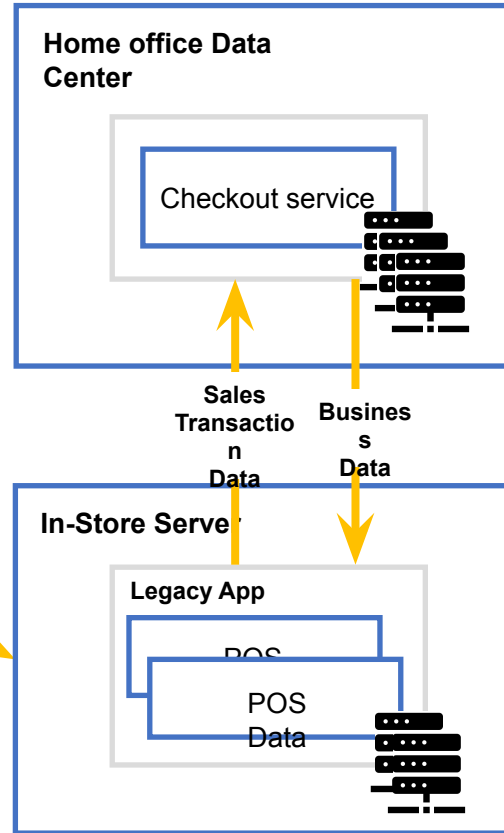
***Provide a seamless,
consistent checkout
experience... even under
non-ideal situations***

Legacy Point of Sale checkout

Started couple of decades ago
and going strong.



POS Checkout Register

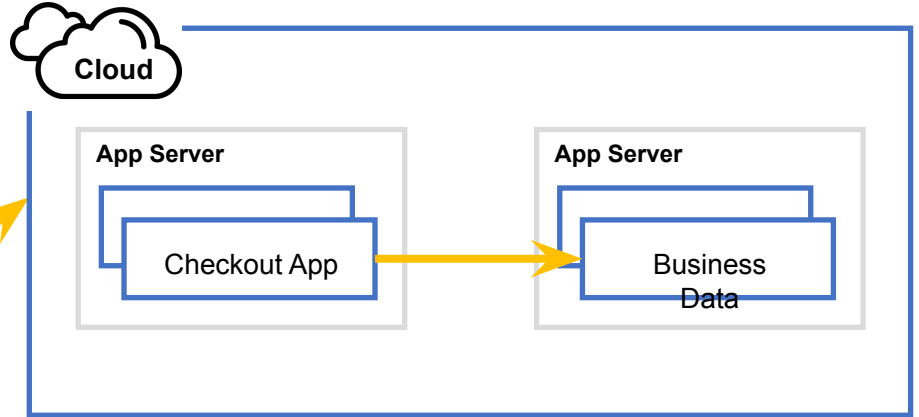


Cloud Native Point of Sale

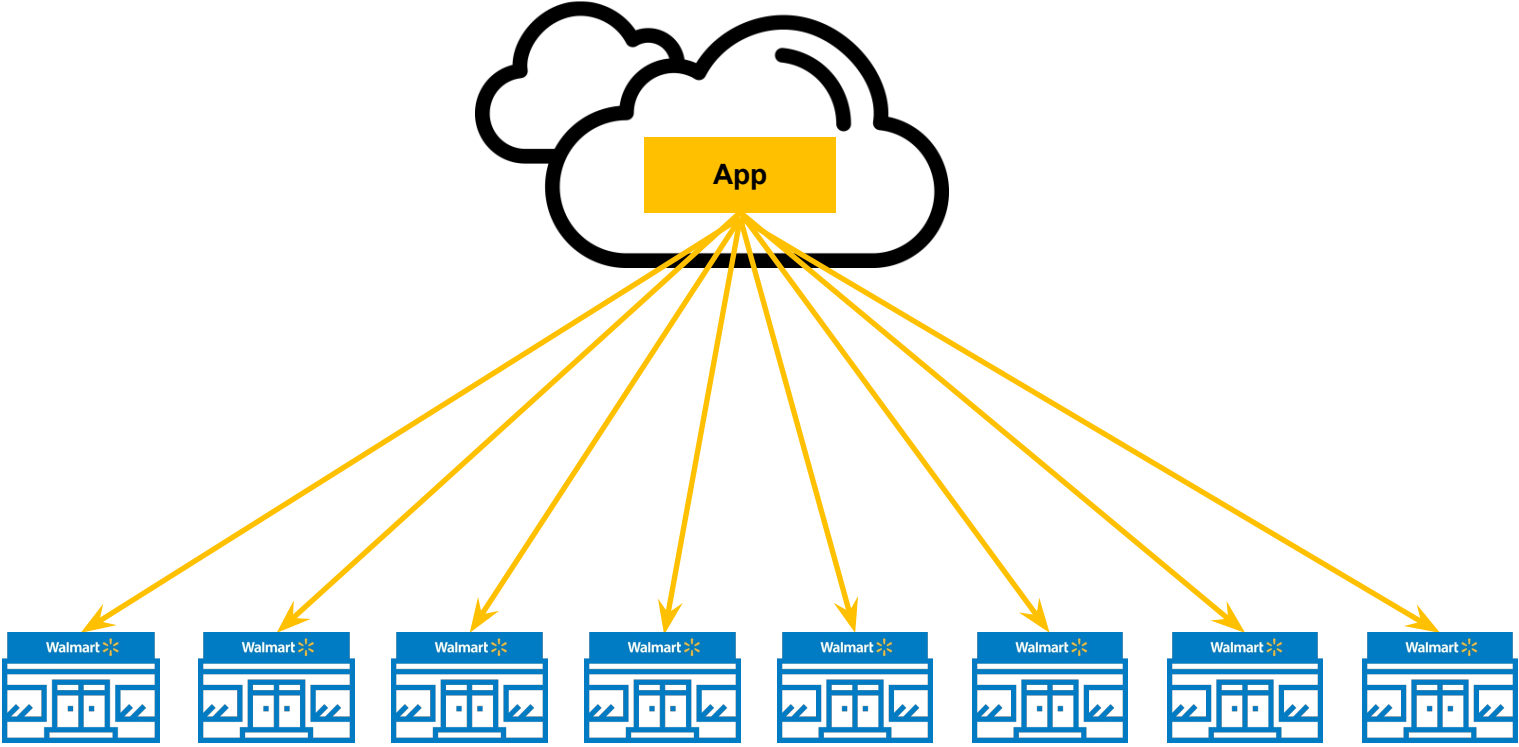
Rolled out 4 years ago



POS Checkout Register

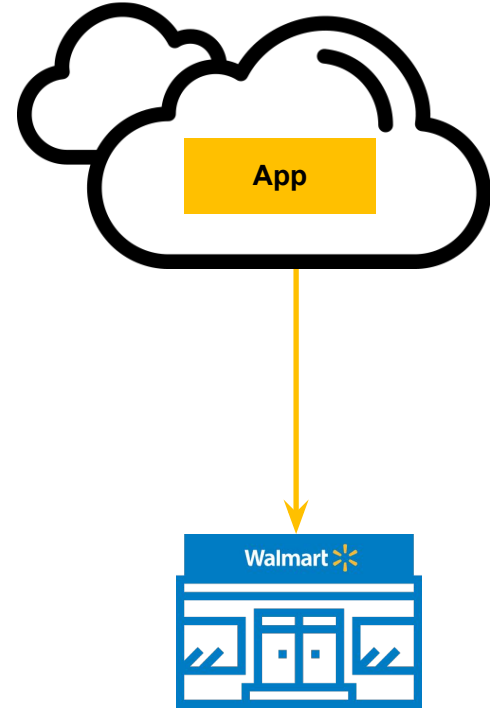


POS-Checkout In Cloud - Architecture



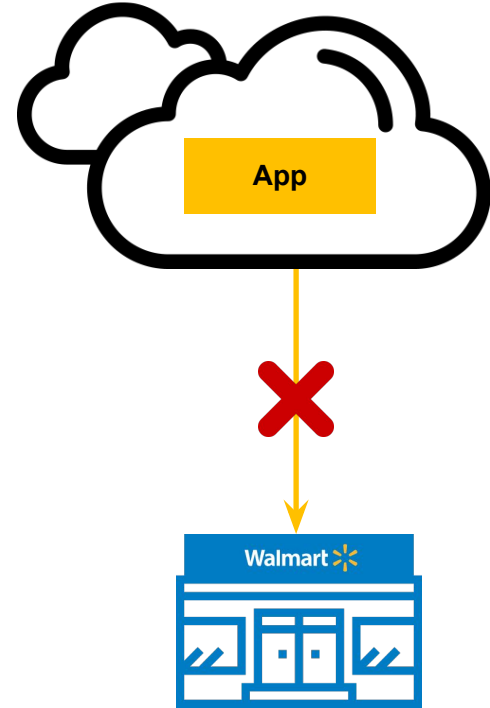
Limitations of just staying on cloud

App is remotely accessed over network.

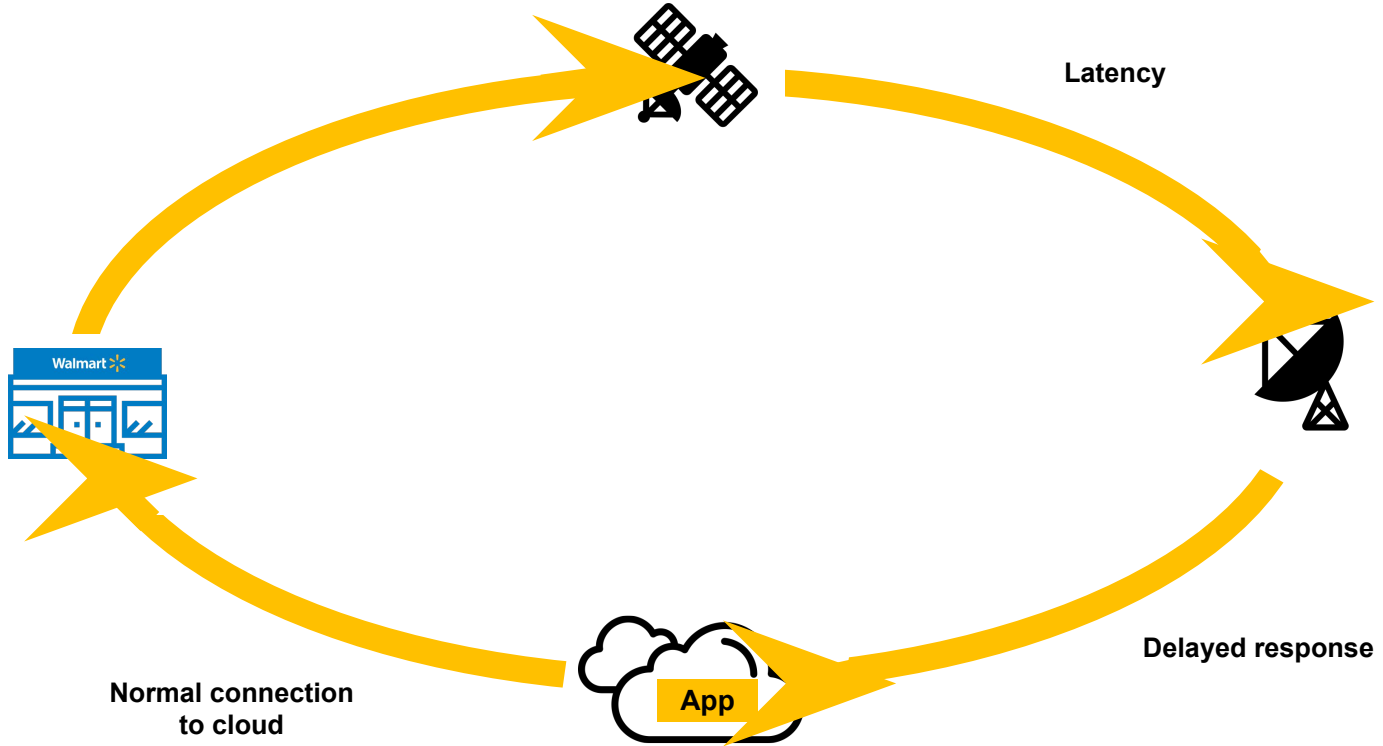


Business impacted by

- Regional network issue
- Bad changes



Fails over to satellite

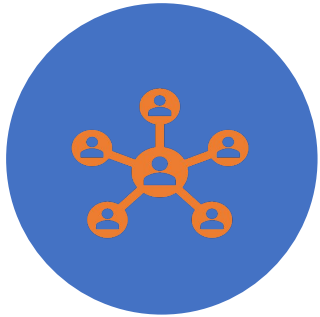




Solution Approach

Take app closer to customer at Edge

What is Edge



Connect



**Closer to
the
customers**



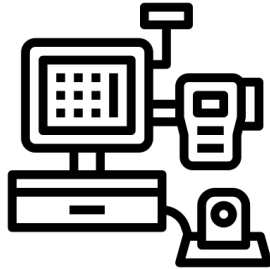
Autonomous



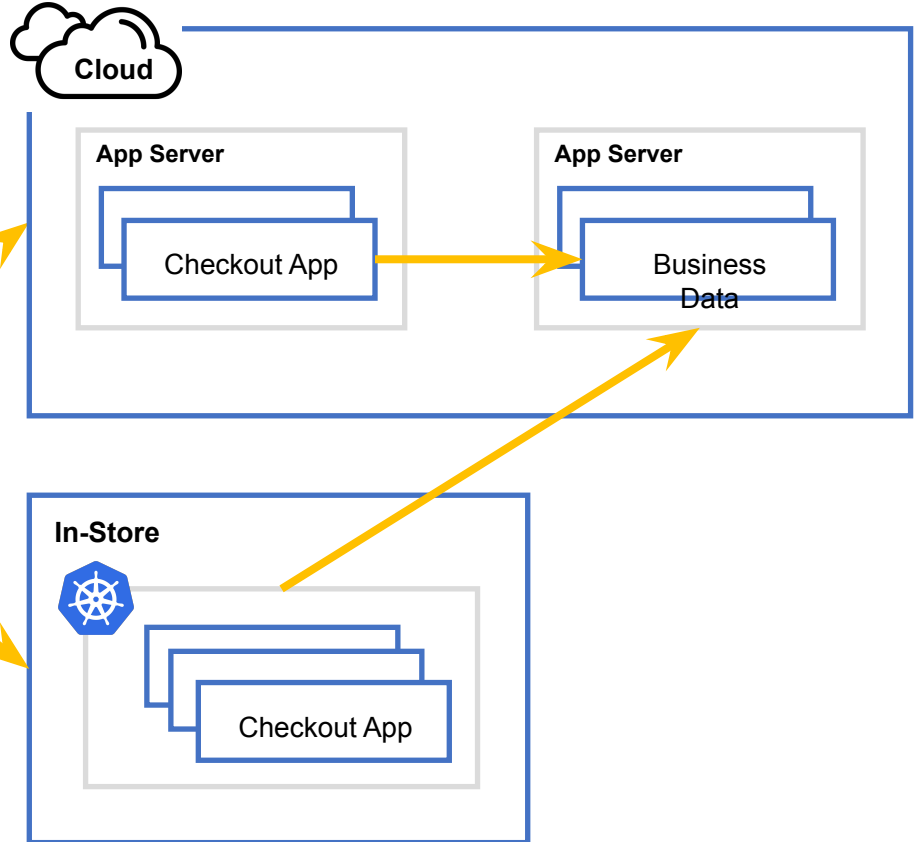
**Working
with
and without
the cloud**

Introducing Edge

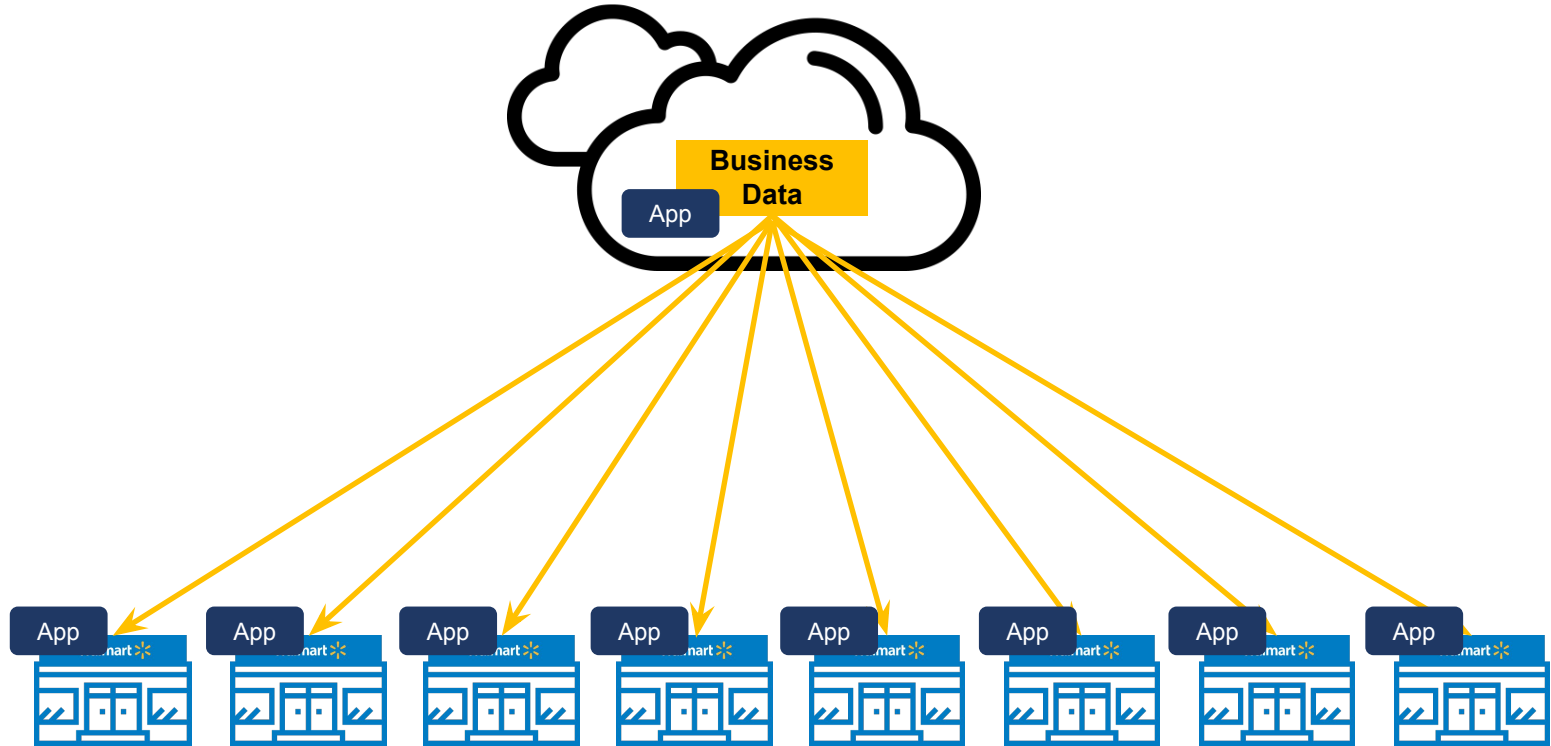
Started around 2 years ago to extend Cloud based POS System to the edge.



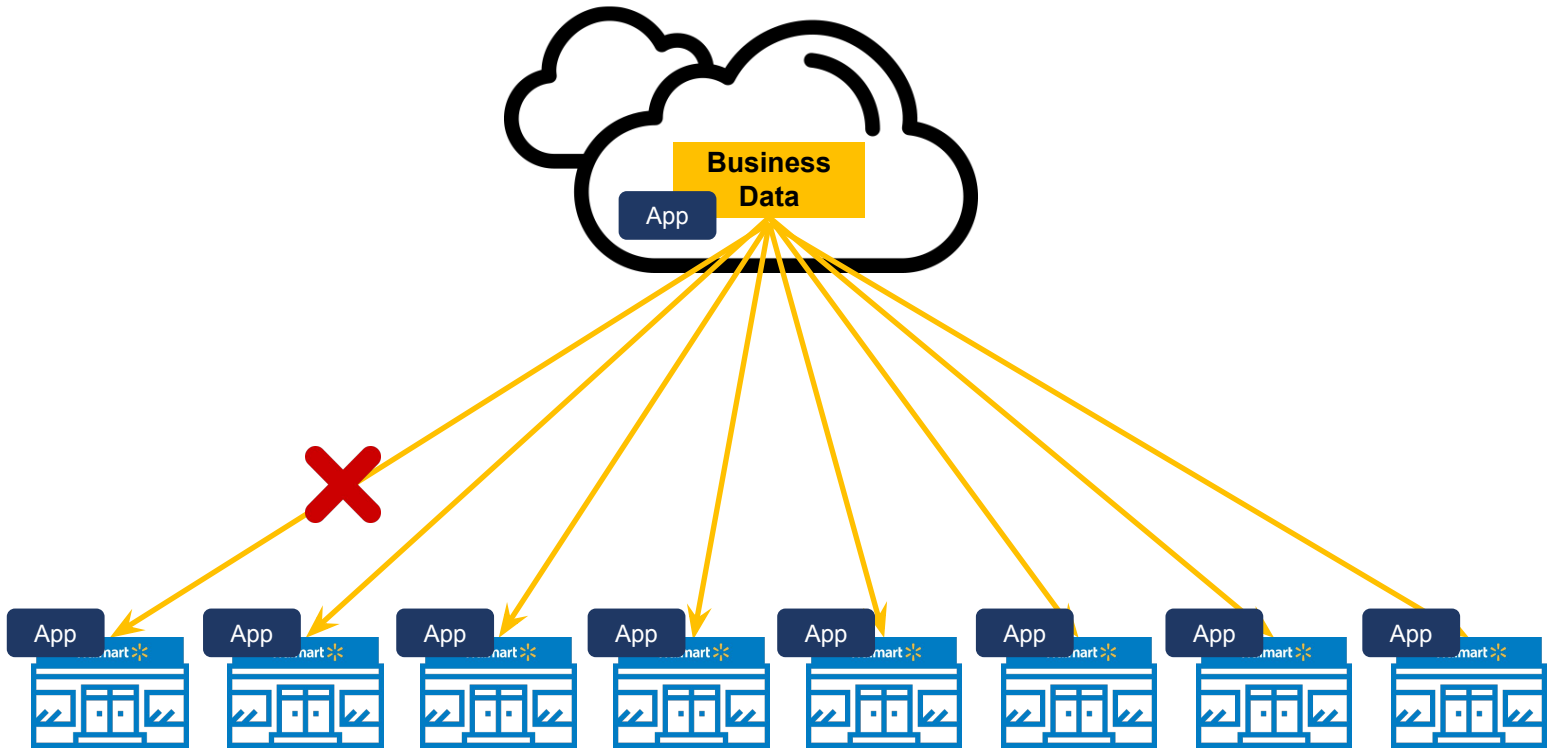
POS Checkout Register



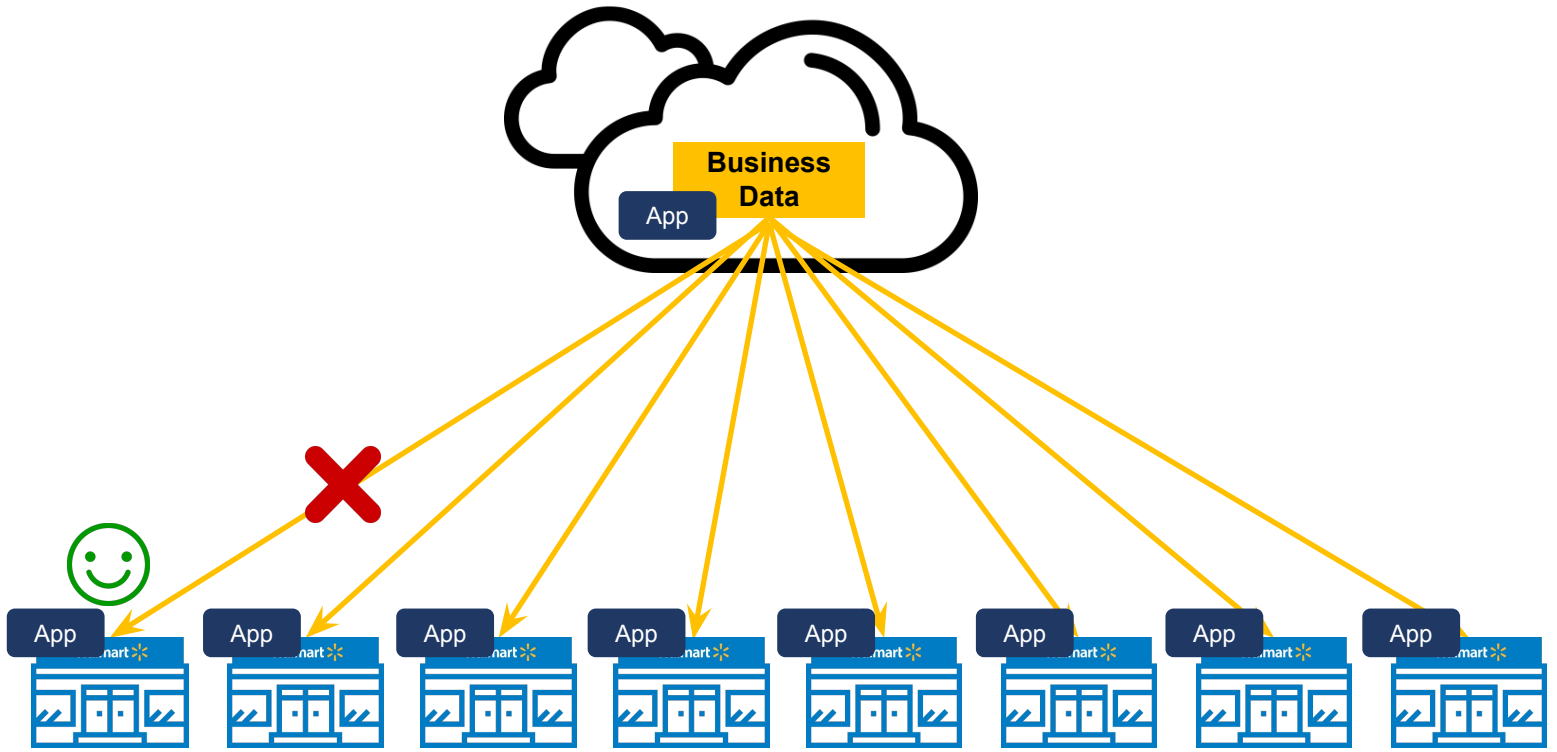
POS-Checkout Edge & Cloud - Architecture



During impact



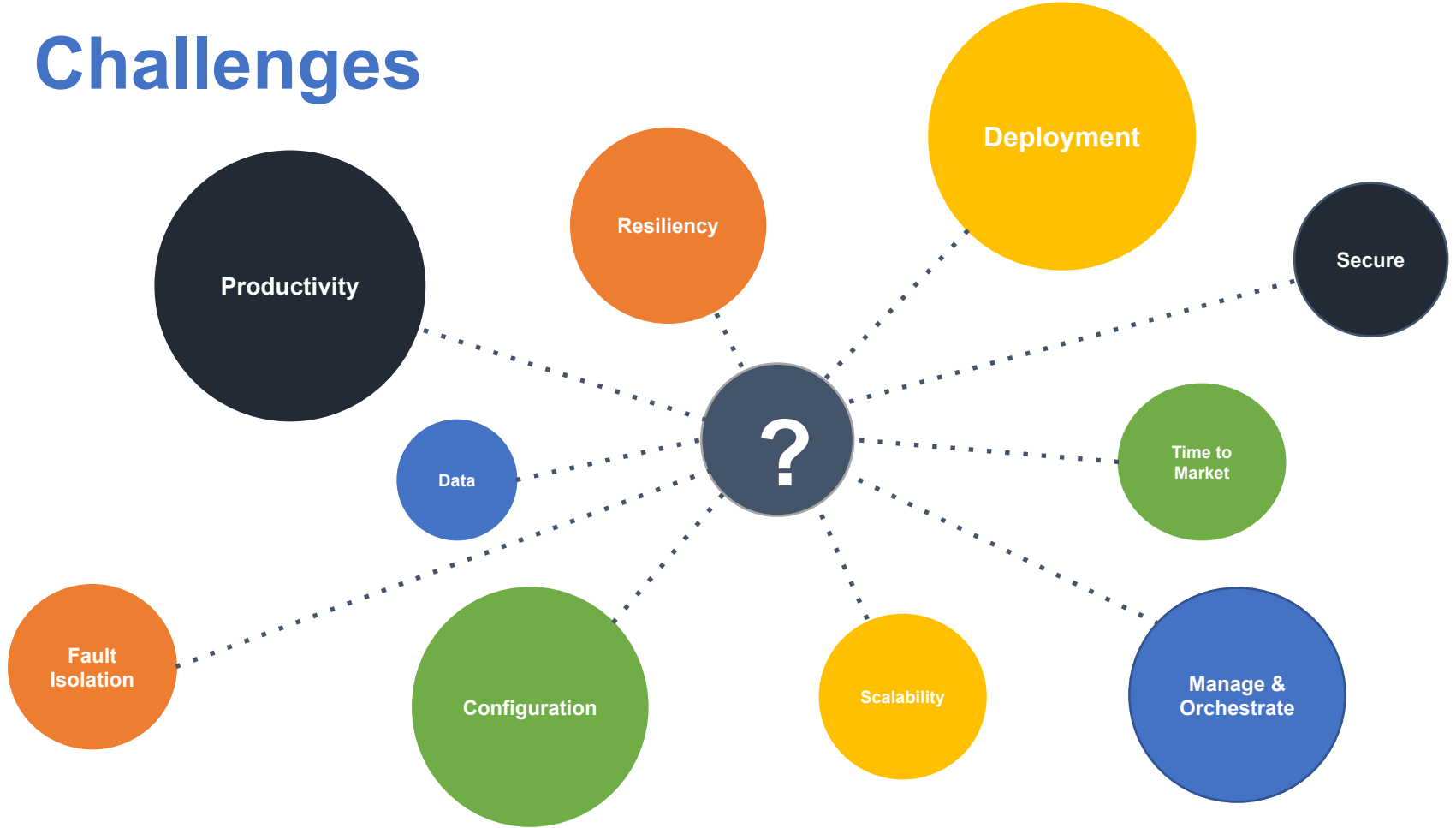
Edge is still functional



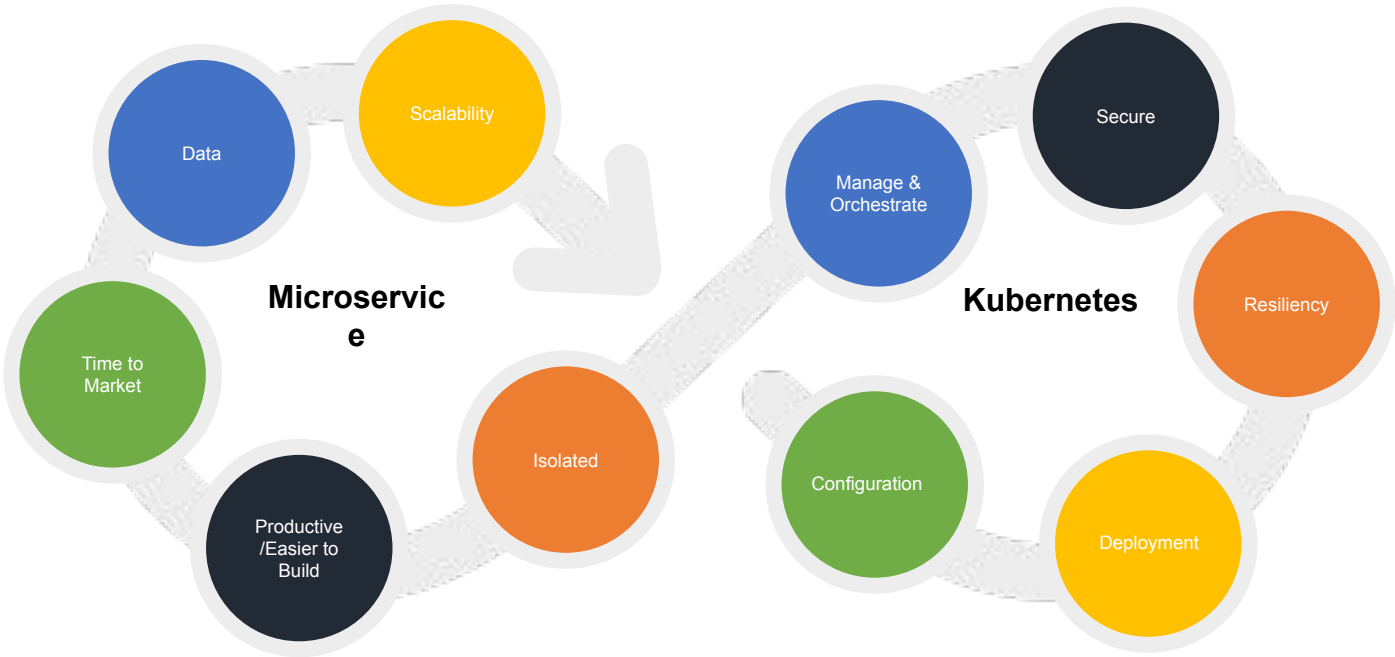


Challenges with the Approach

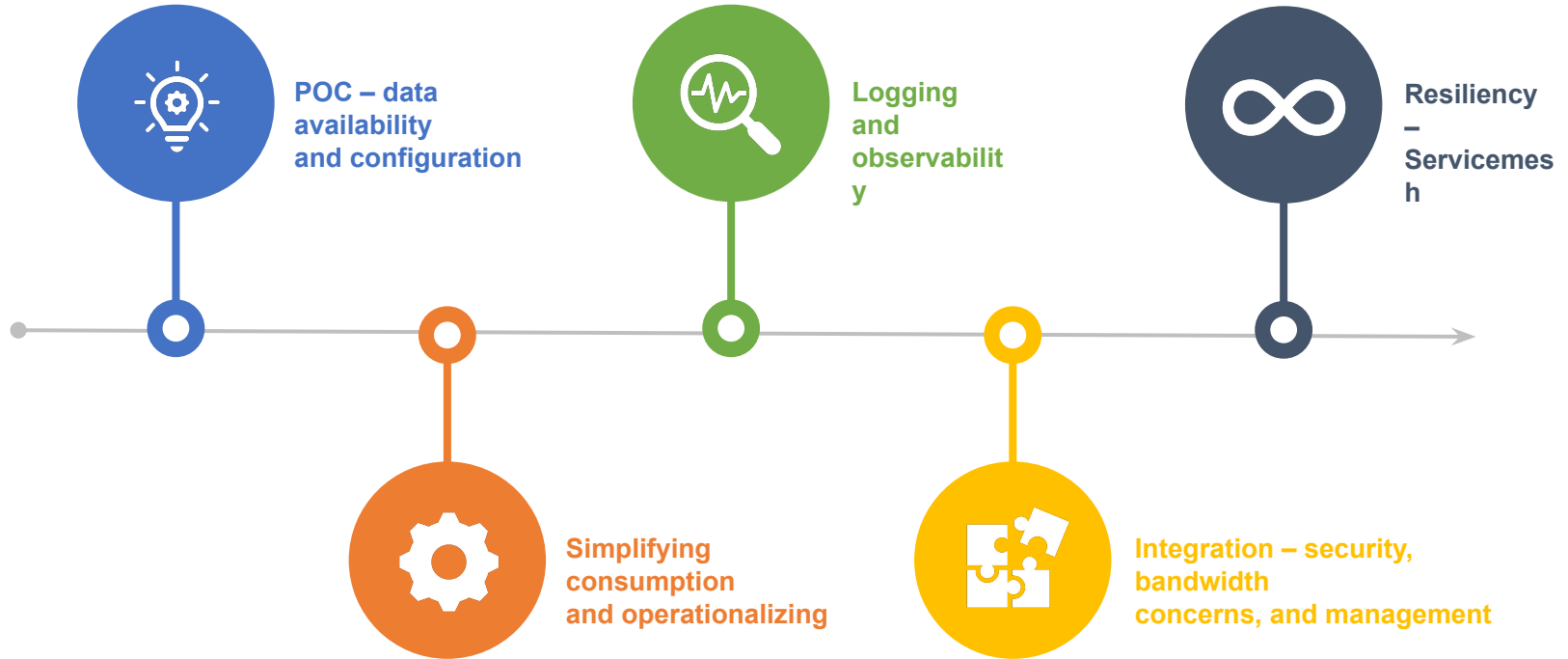
Challenges



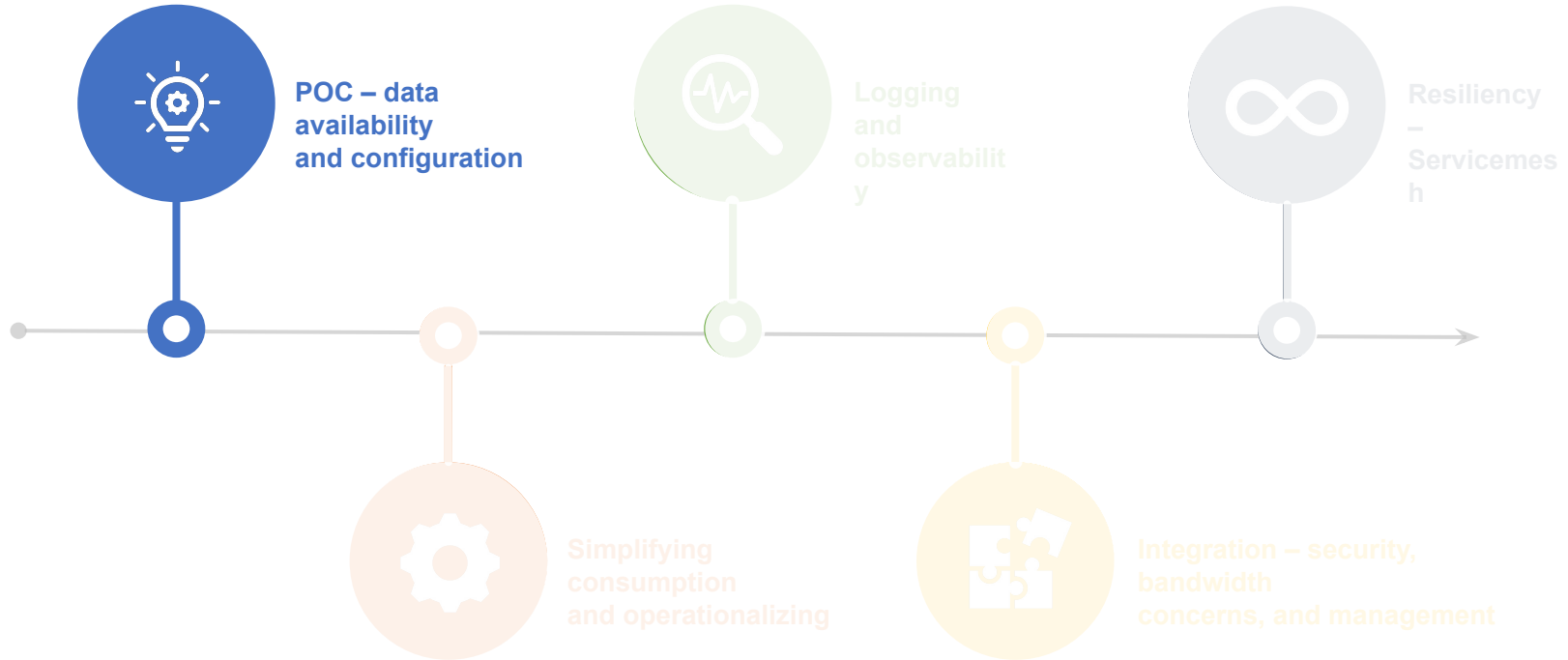
Solution – Microservice + Kubernetes



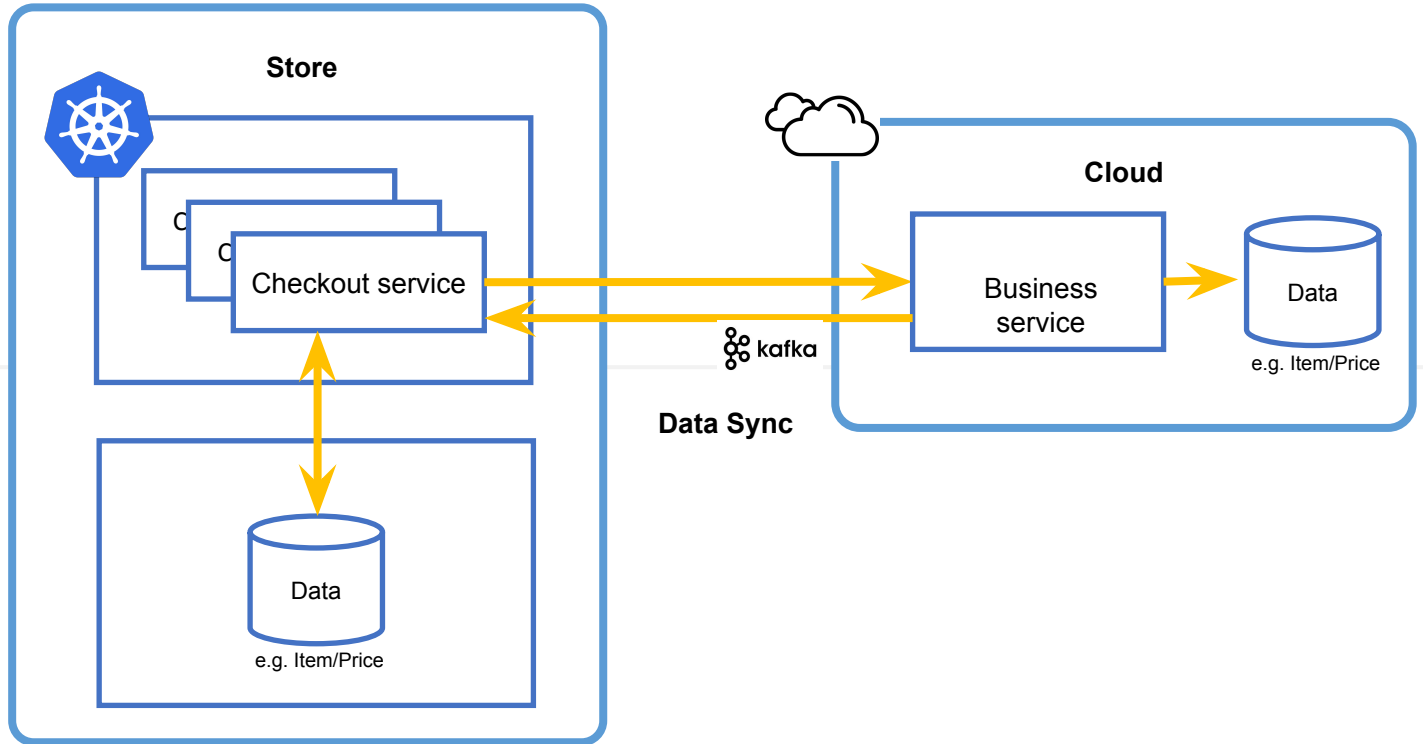
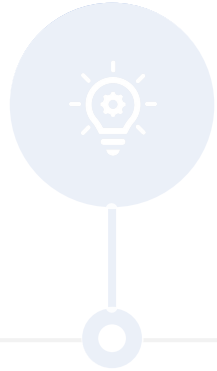
Journey



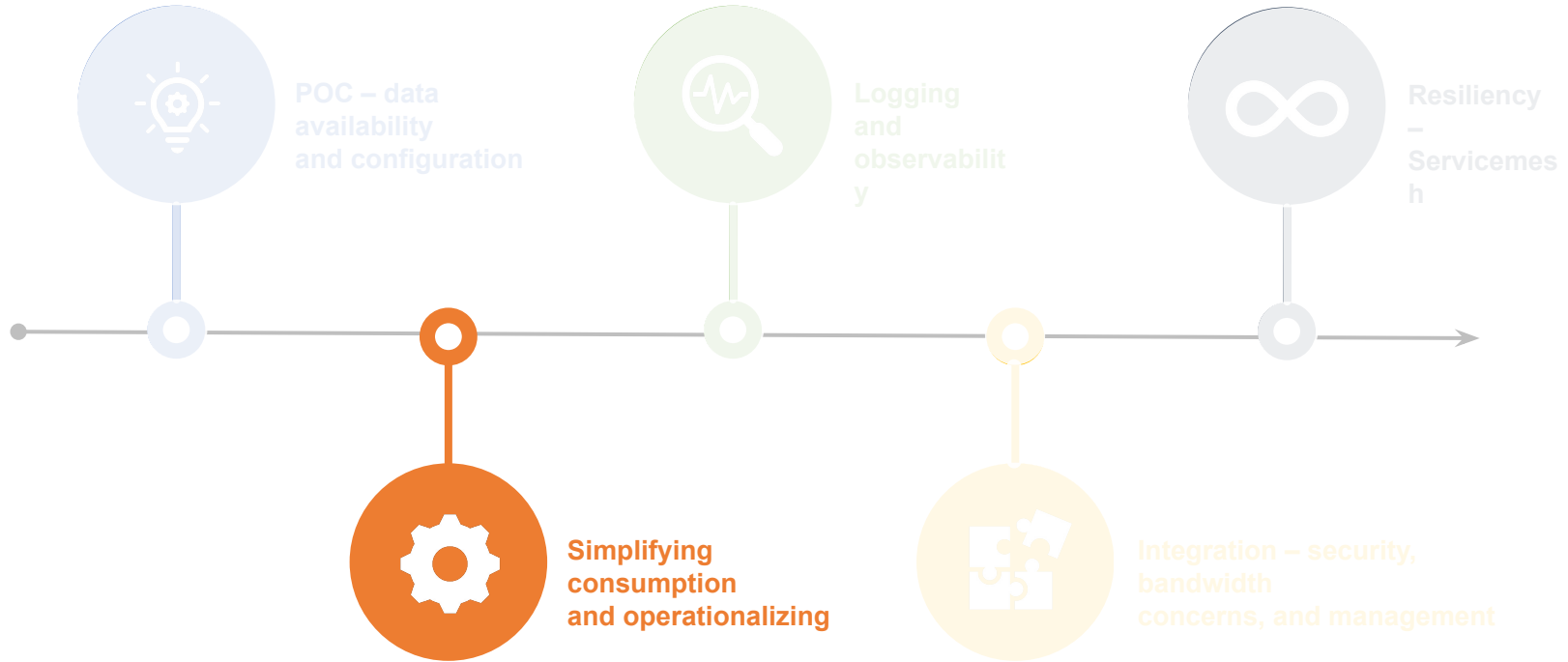
Journey



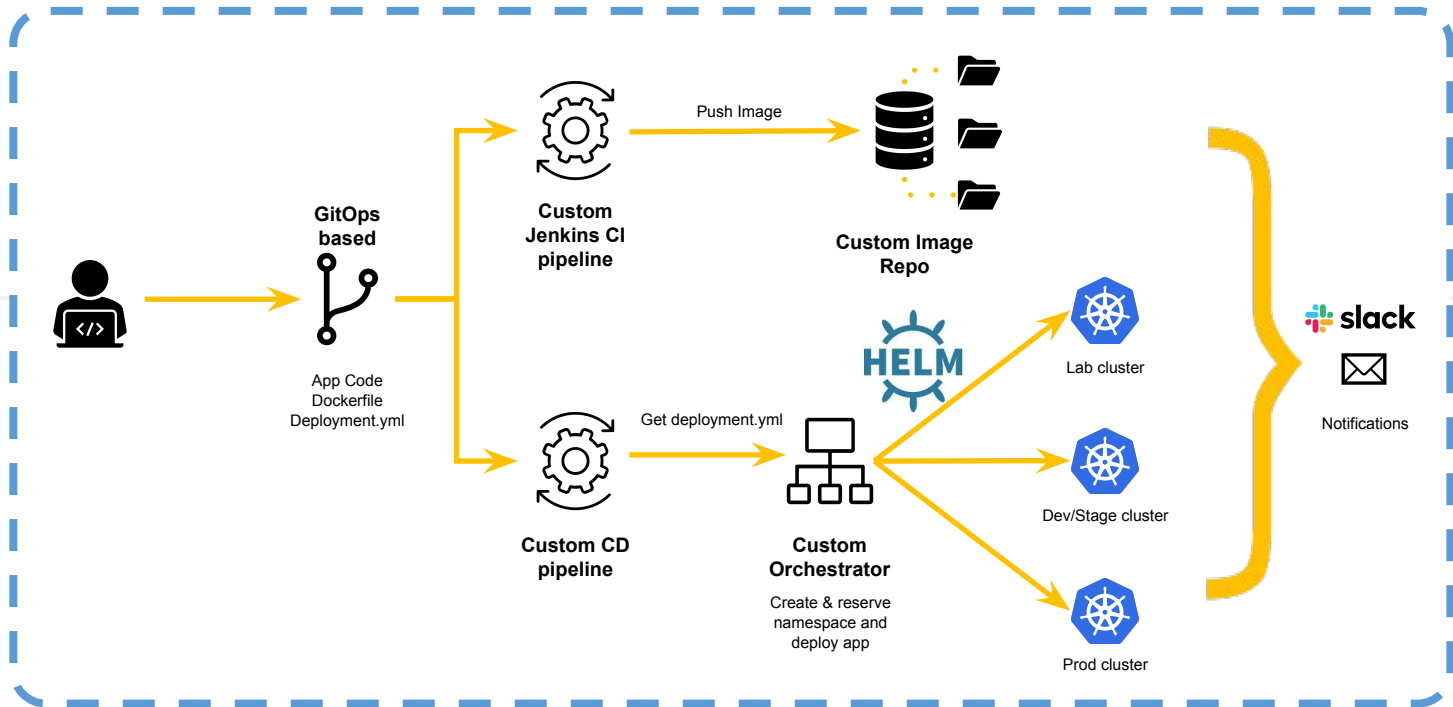
Data availability at edge



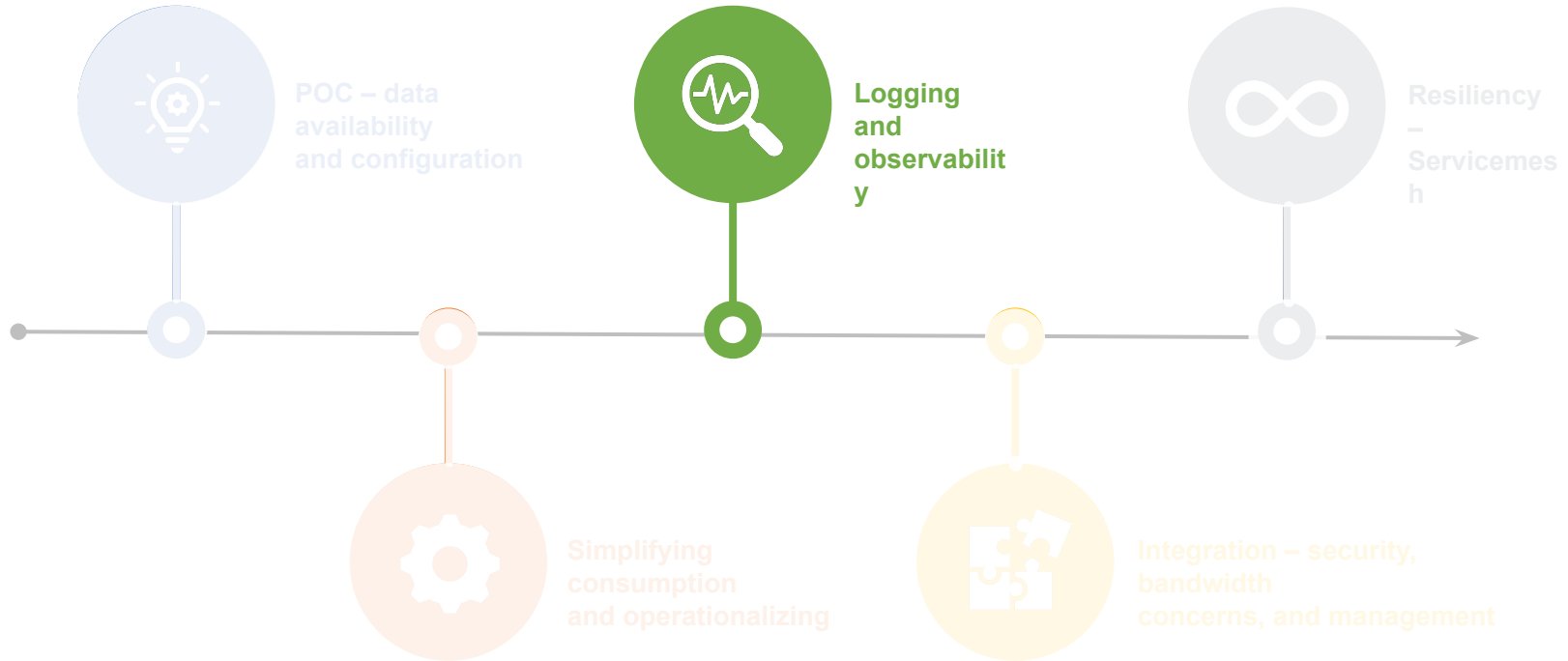
Journey



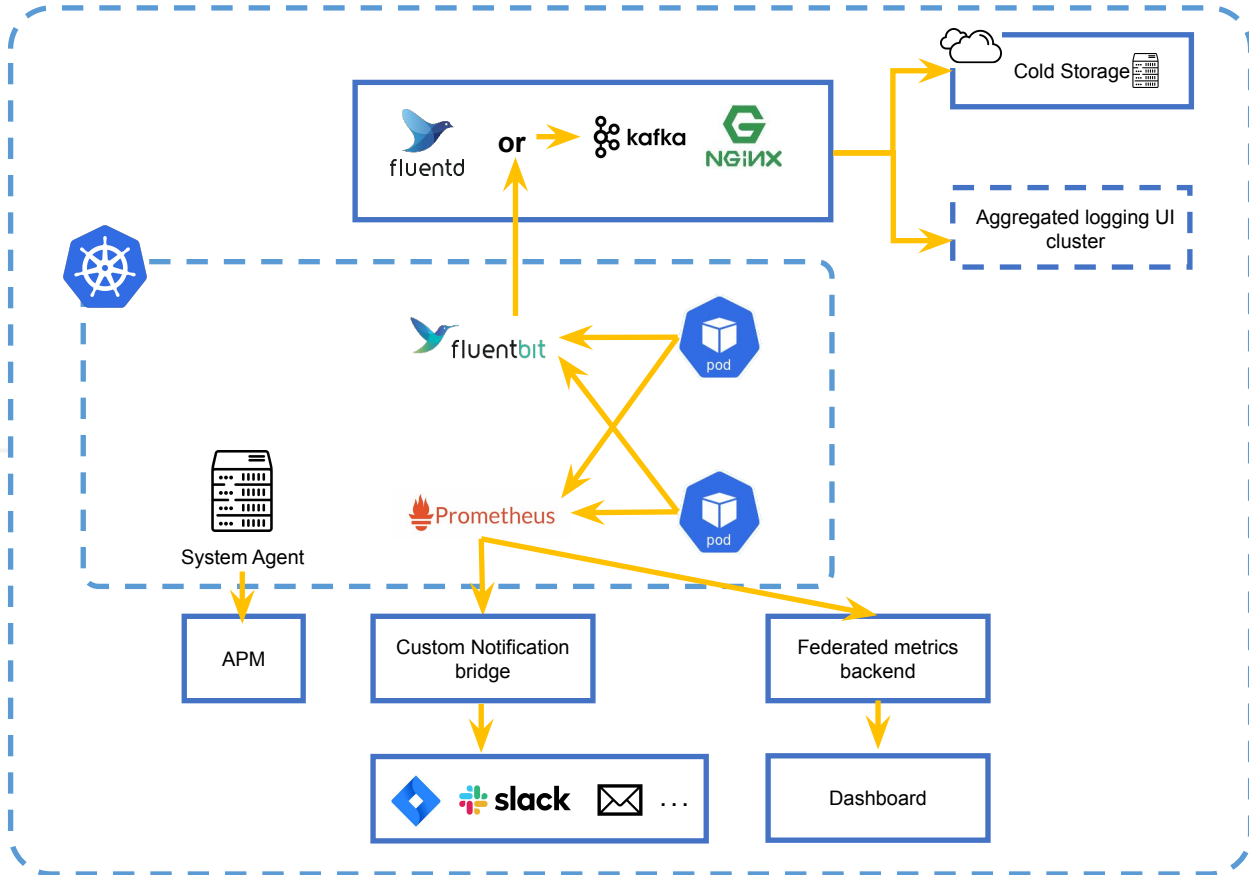
Simplifying consumption of Kubernetes



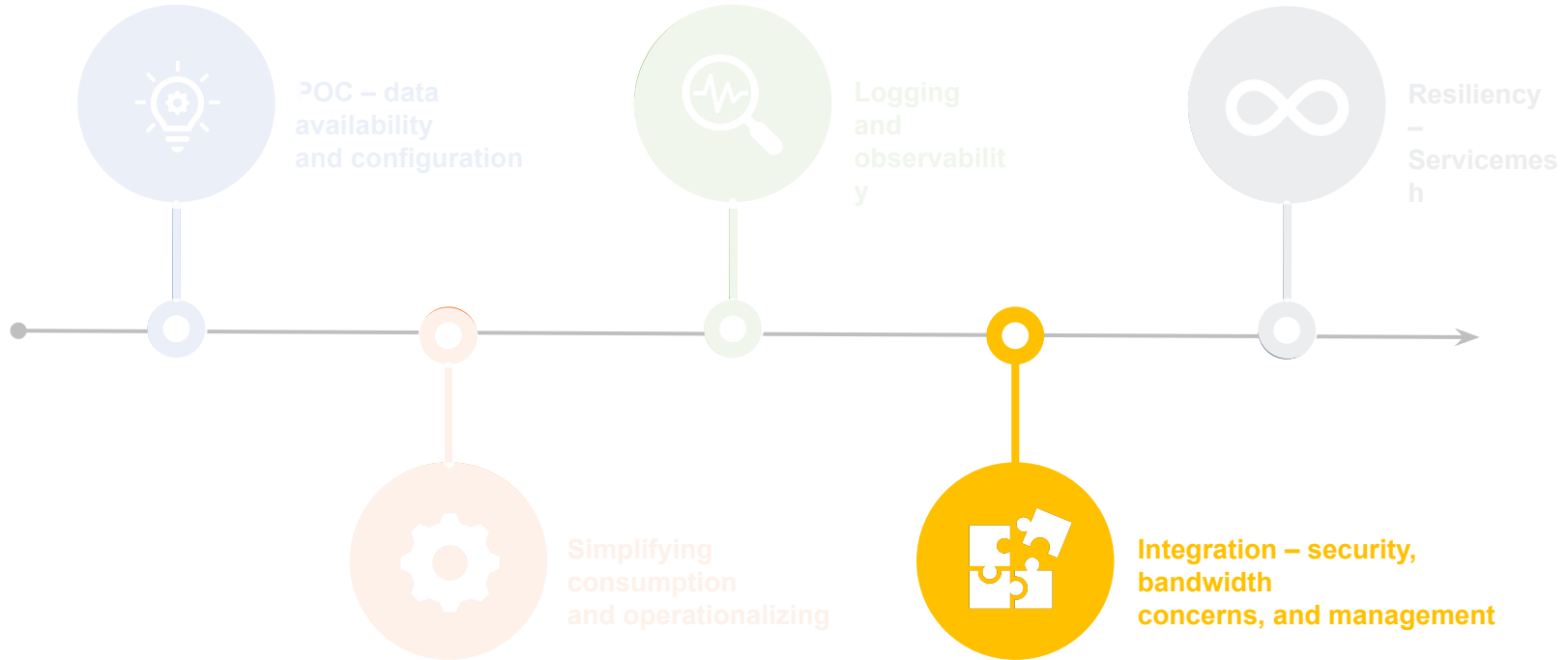
Journey



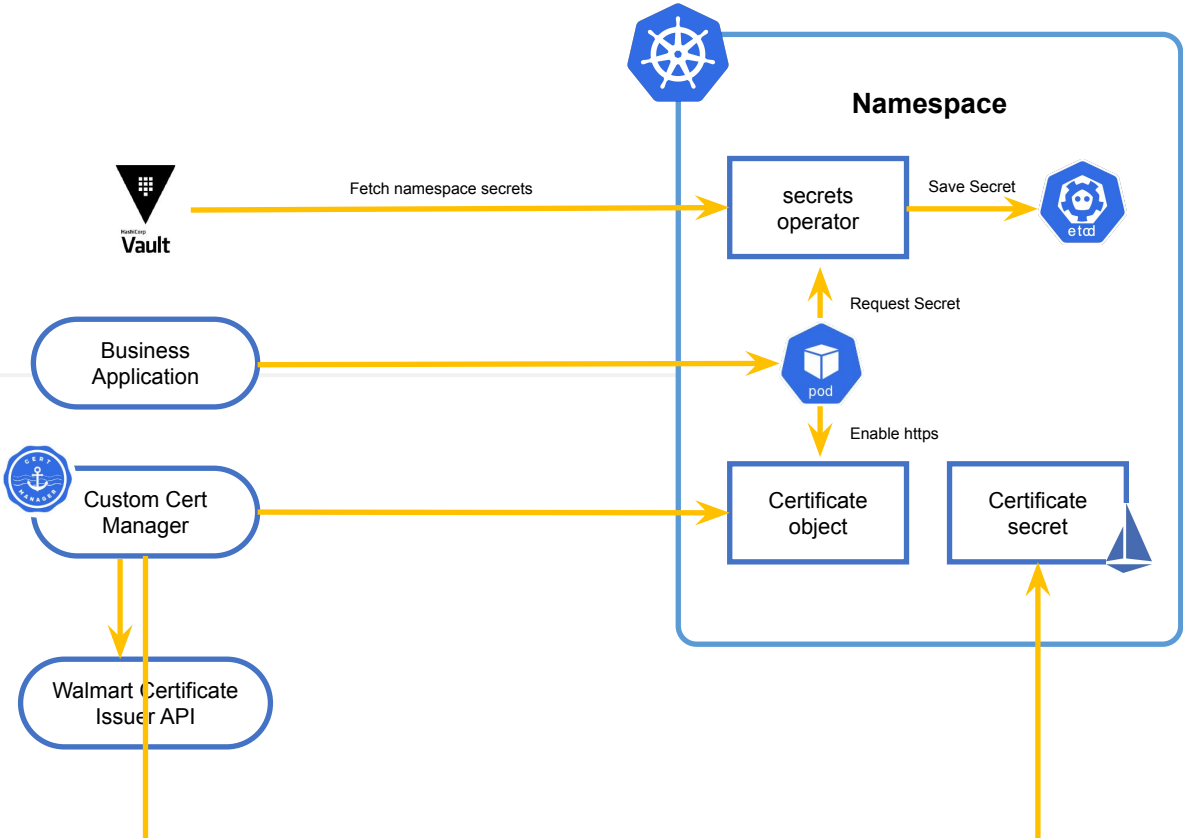
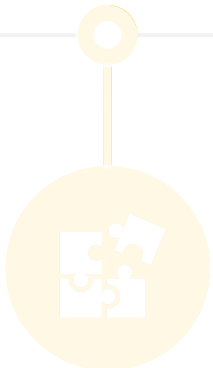
Observability



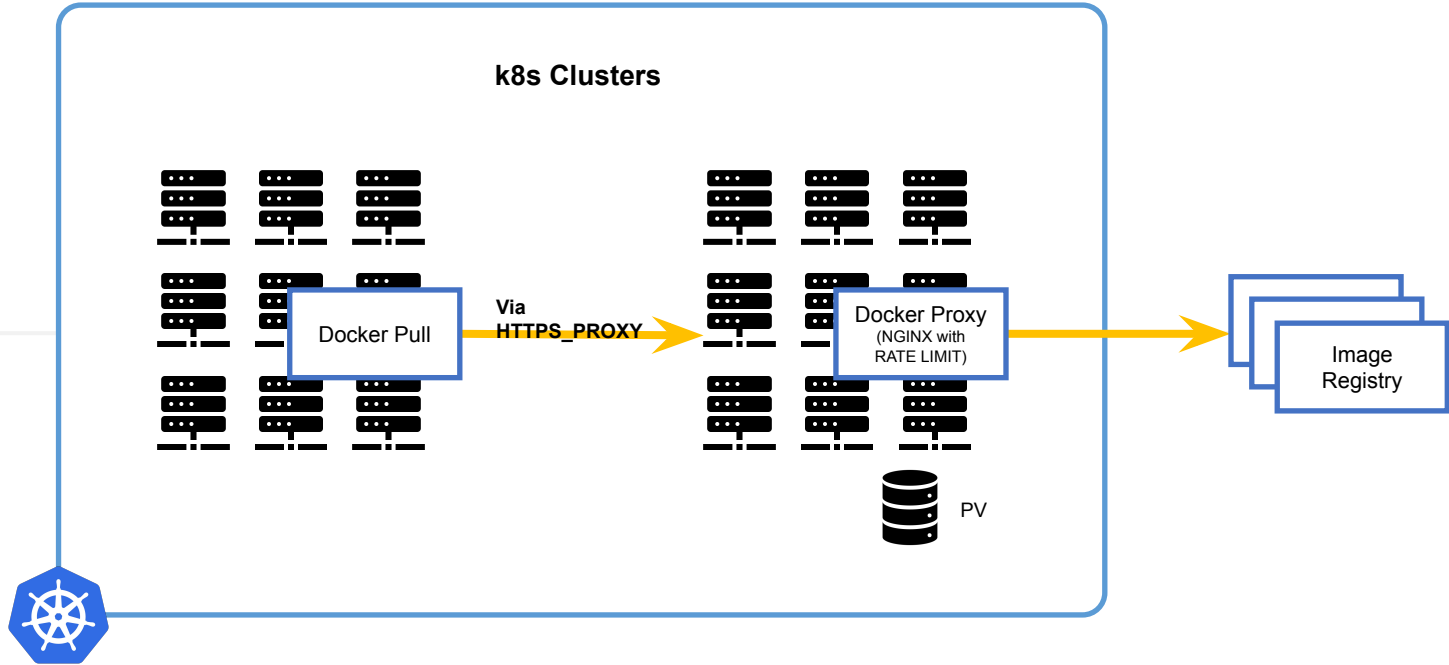
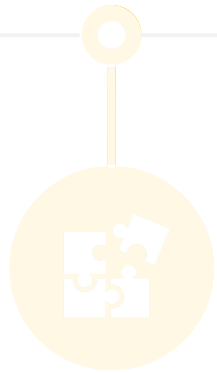
Journey



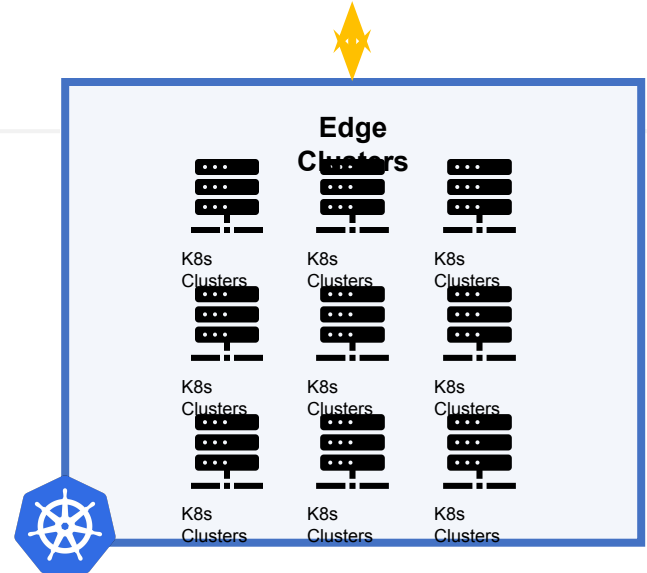
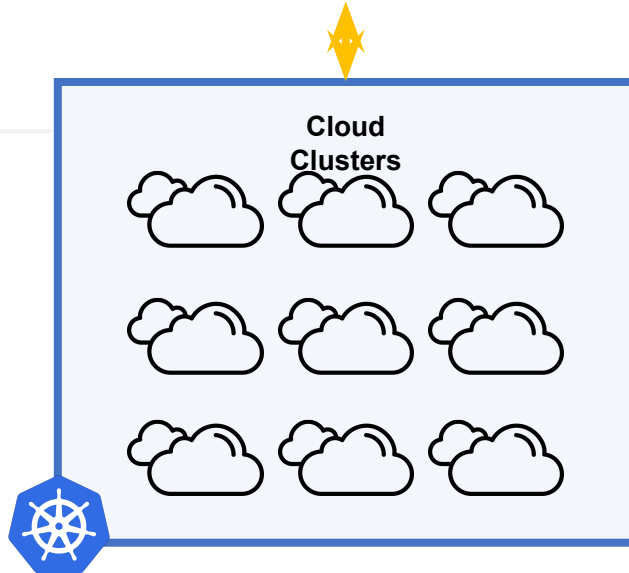
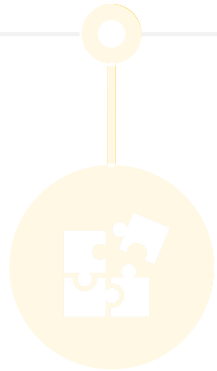
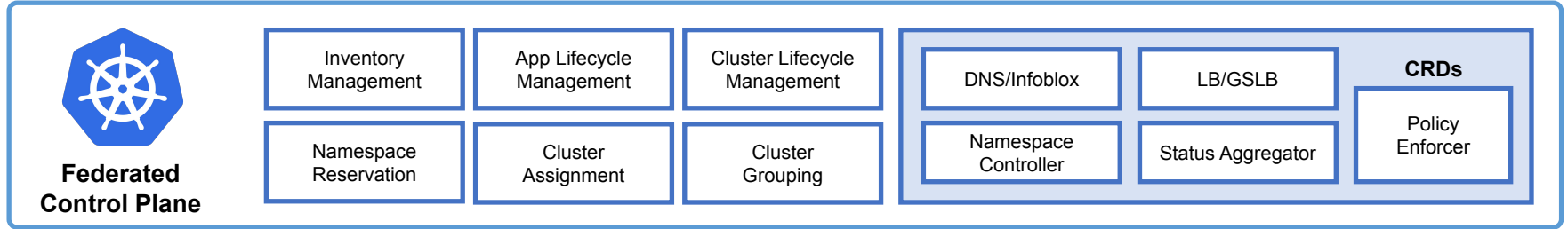
Security – Secrets & Certificate



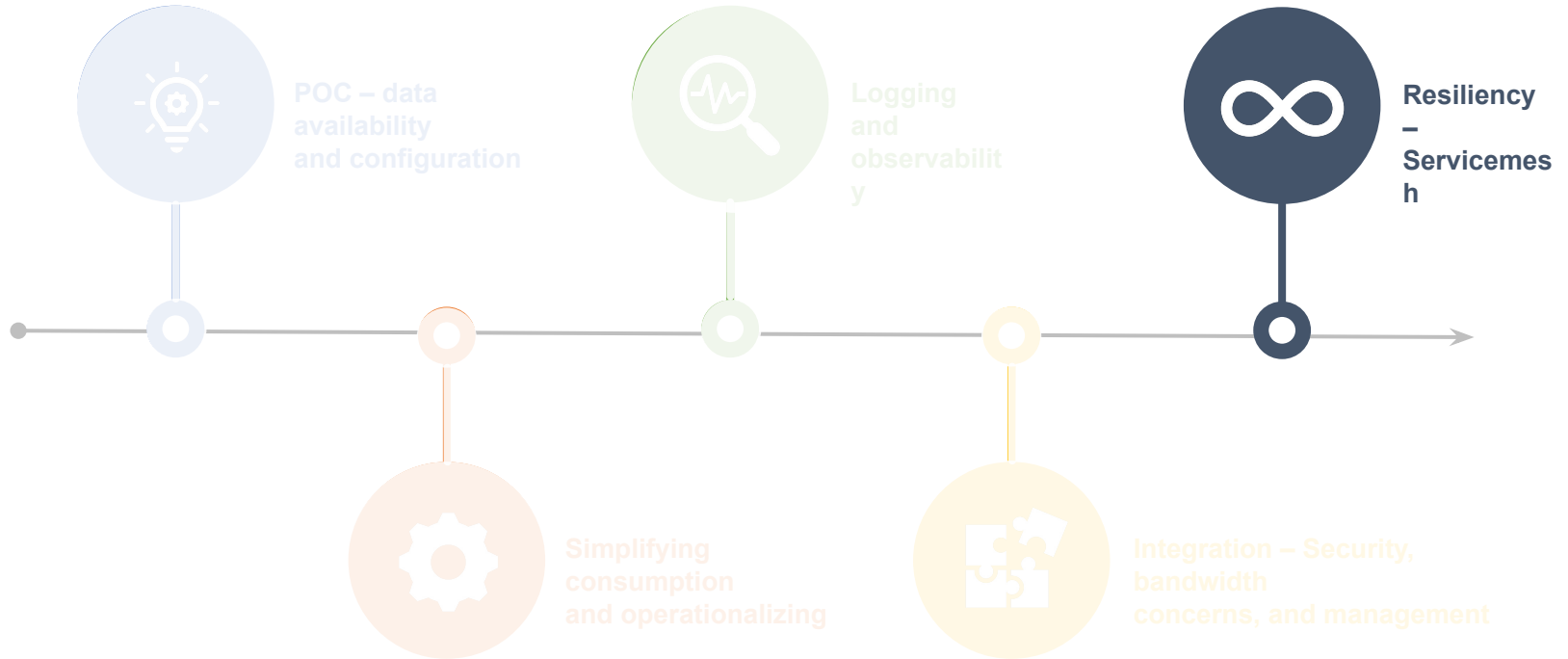
Bandwidth limitation



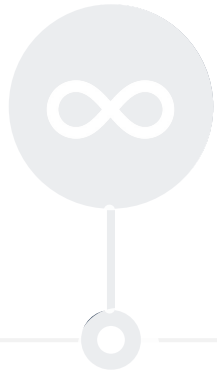
Managing fleet of Cluster



Journey

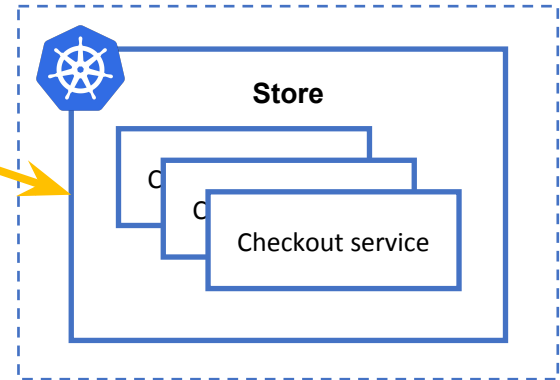
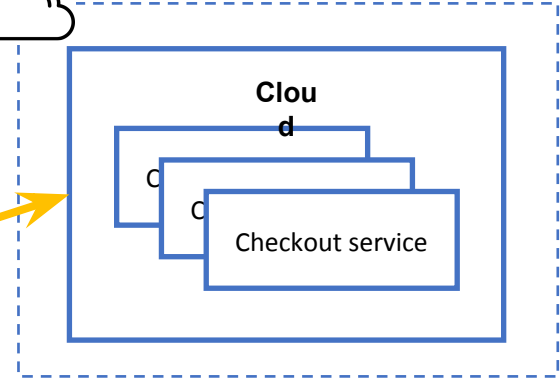


Resiliency across edge and cloud

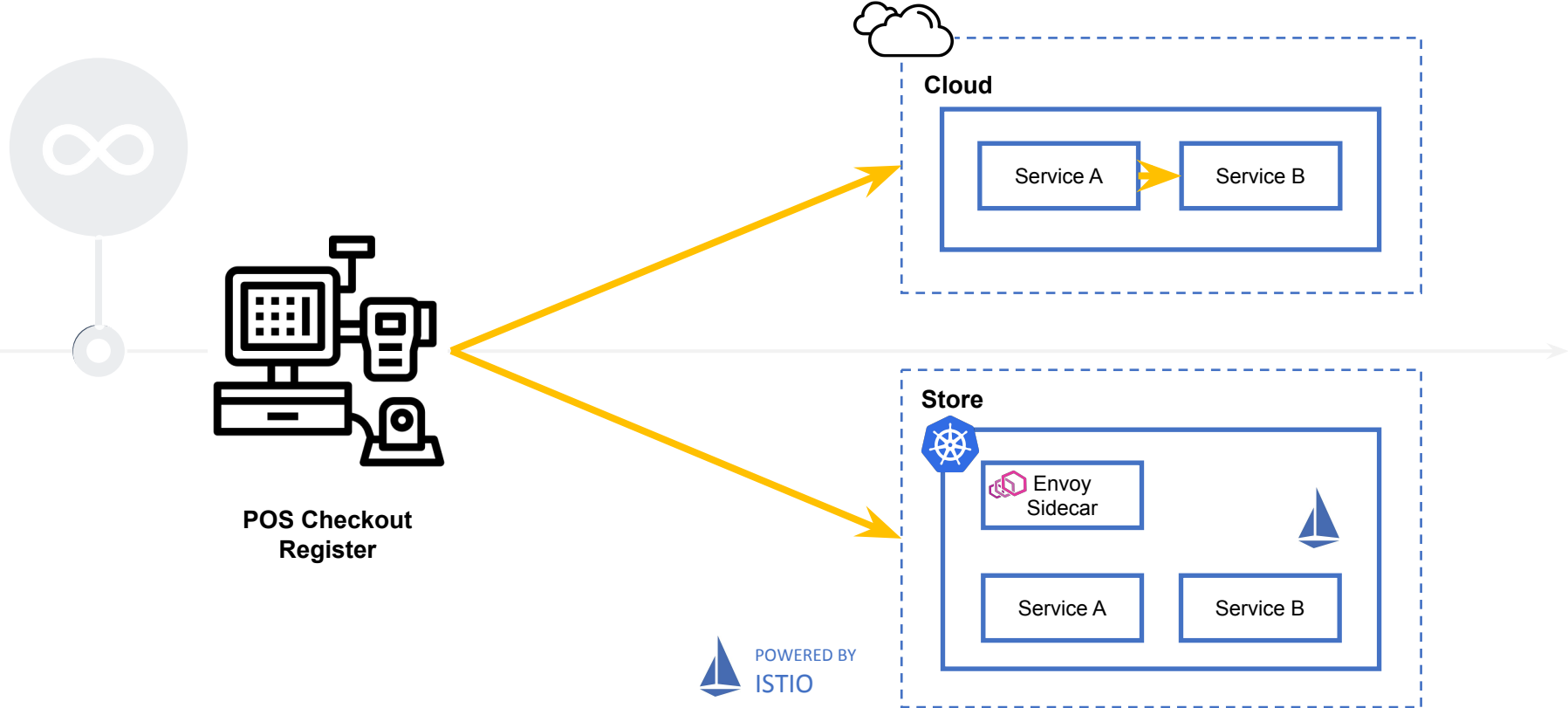


POS Checkout Register

Client side
Failover



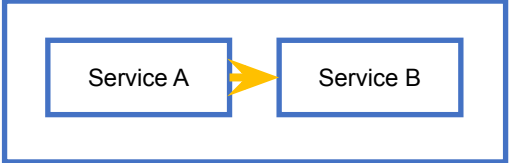
Resiliency – Service Mesh



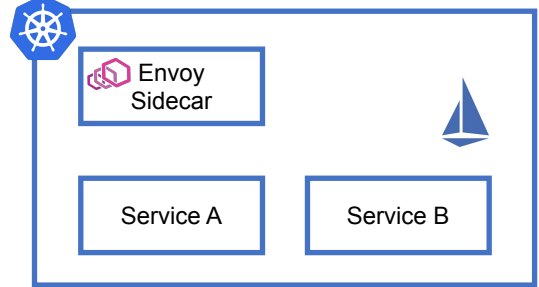
POS Checkout Register



Cloud



Store



Resiliency – Service Mesh



POS Checkout Register

Secondary



Cloud

Service A

Service B

Primary

Egress Call

Store

Envoy Sidecar

Service A

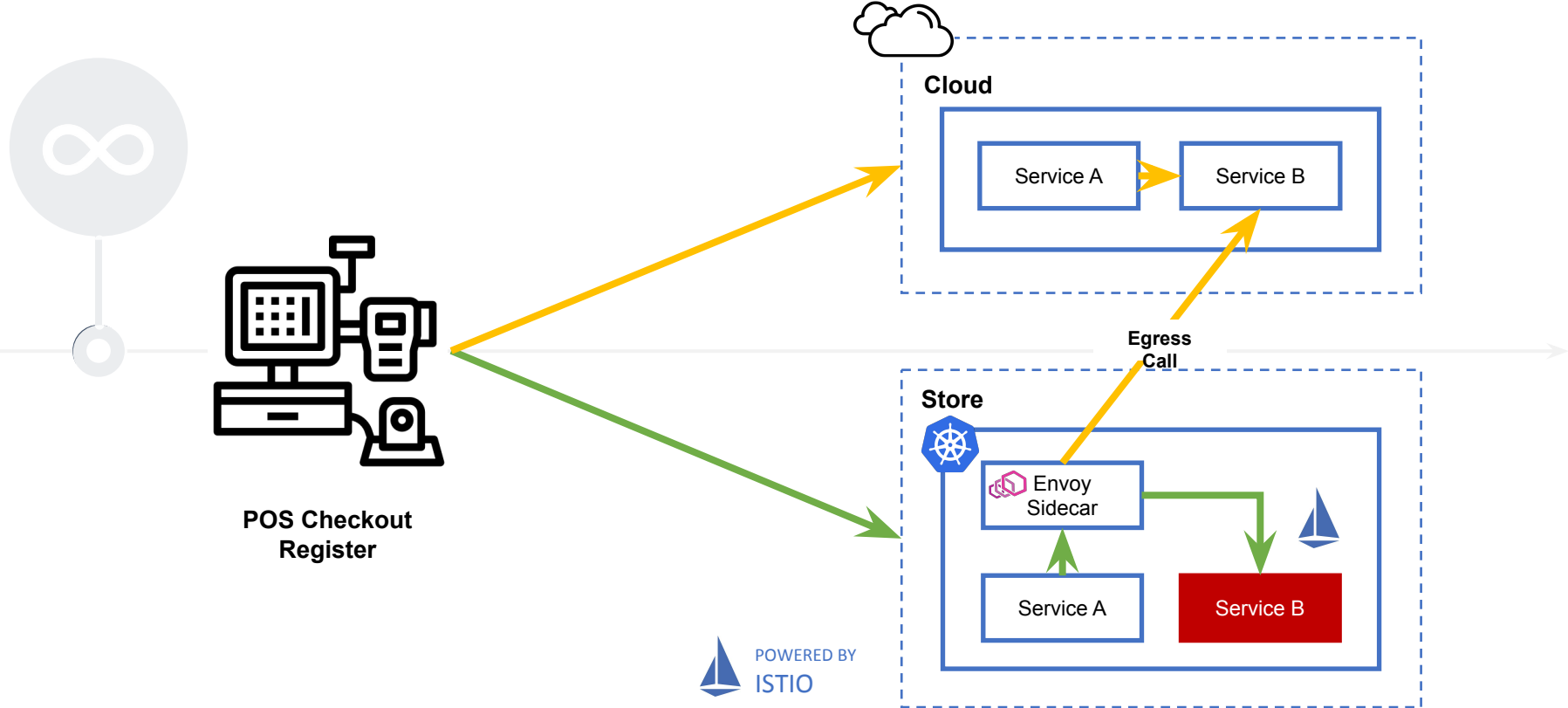
Service B



POWERED BY
ISTIO



Resiliency – Service Mesh



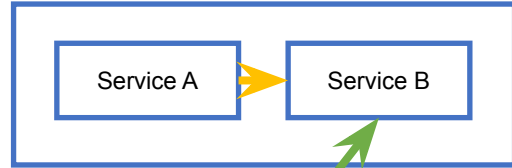
Resiliency – Service Mesh



POS Checkout Register

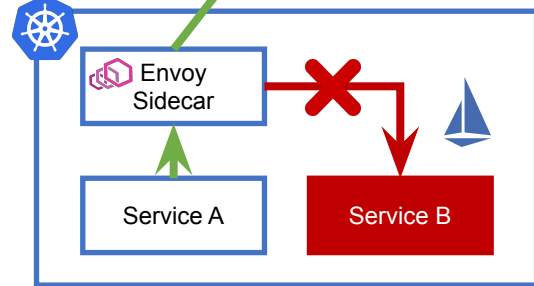


Cloud



Egress Call

Store



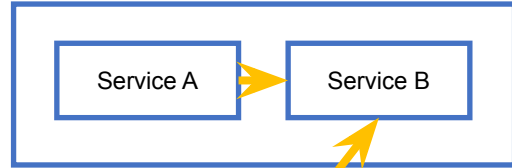
Resiliency – Service Mesh



POS Checkout Register

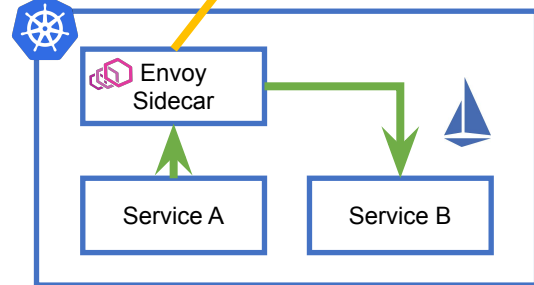


Cloud

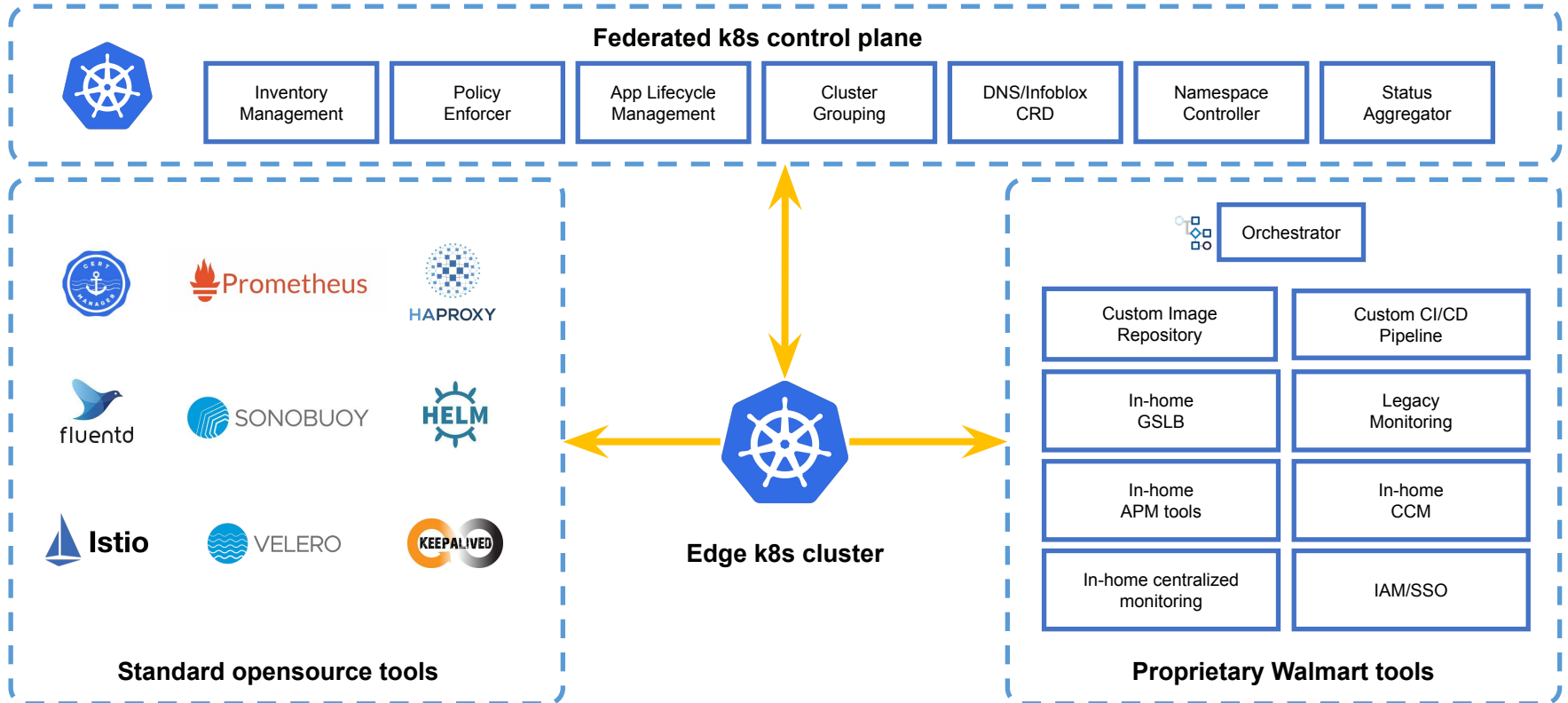


Egress Call

Store



Walmart K8s Platform



Key Takeaways



Integration is time consuming



Lift and shift isn't always the right answer, even for mundane services



Data needs to follow the services



Strategies and/or platform components will vary for edge



Make best practices default



Automate common workflows



Prepare for unexpected on edge

Open Challenges



**Data
persistence**



**Reducing
compute
footprint**



**Regionalize
d
deployment**



Thanks!
We are hiring