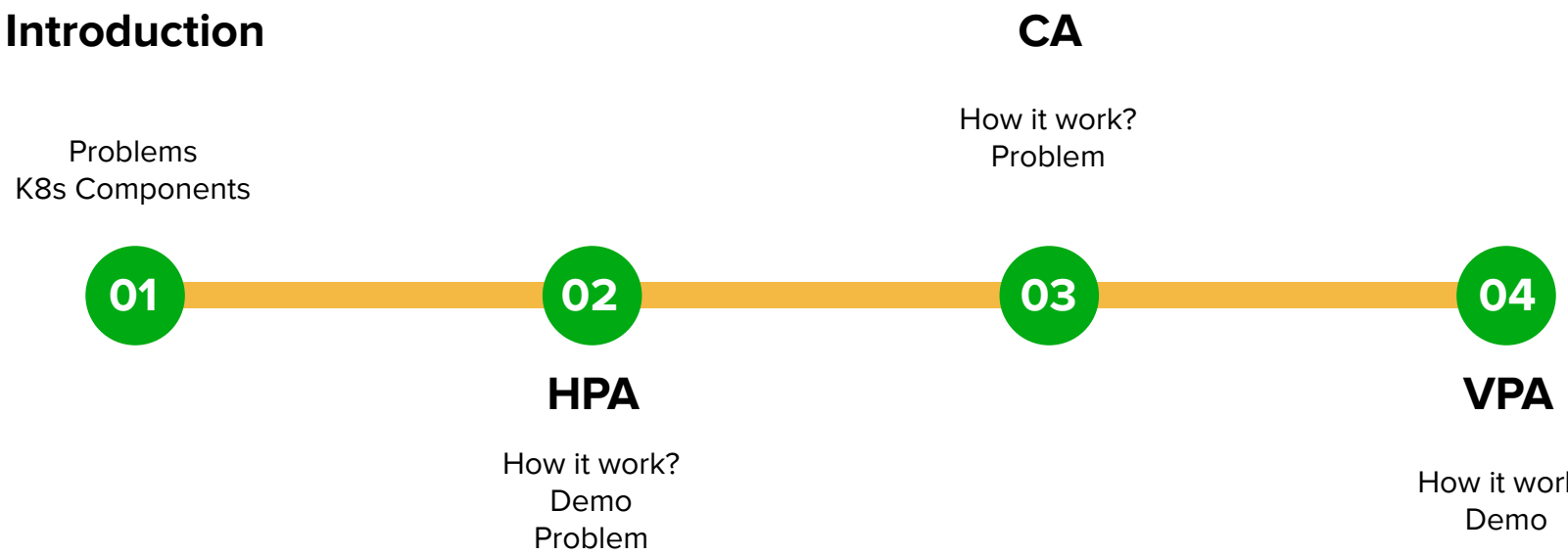
Intro to Kubernetes Autoscaling

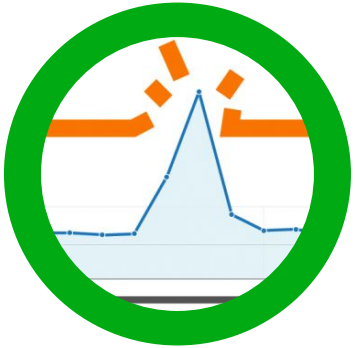
HPA, VPA, CA and beyond

William Albertus Dembo

Outline

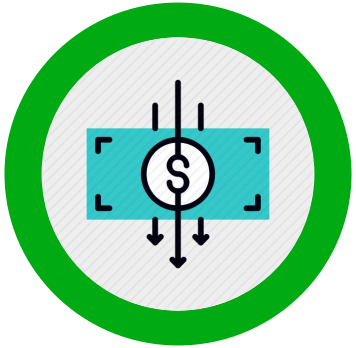

Introduction
Problems
K8s Components
01
02
HPA
How it work?
Demo
Problem
CA
How it work?
Problem
03
04
VPA
How it work?
Demo

Problems



Traffic Spike

Lorem Ipsum is simply dummy text of the printing and typesetting industry.



Cost saving

Lorem Ipsum is simply dummy text of the printing and typesetting industry.

Maintenance

Lorem Ipsum is simply dummy text of the printing and typesetting industry.

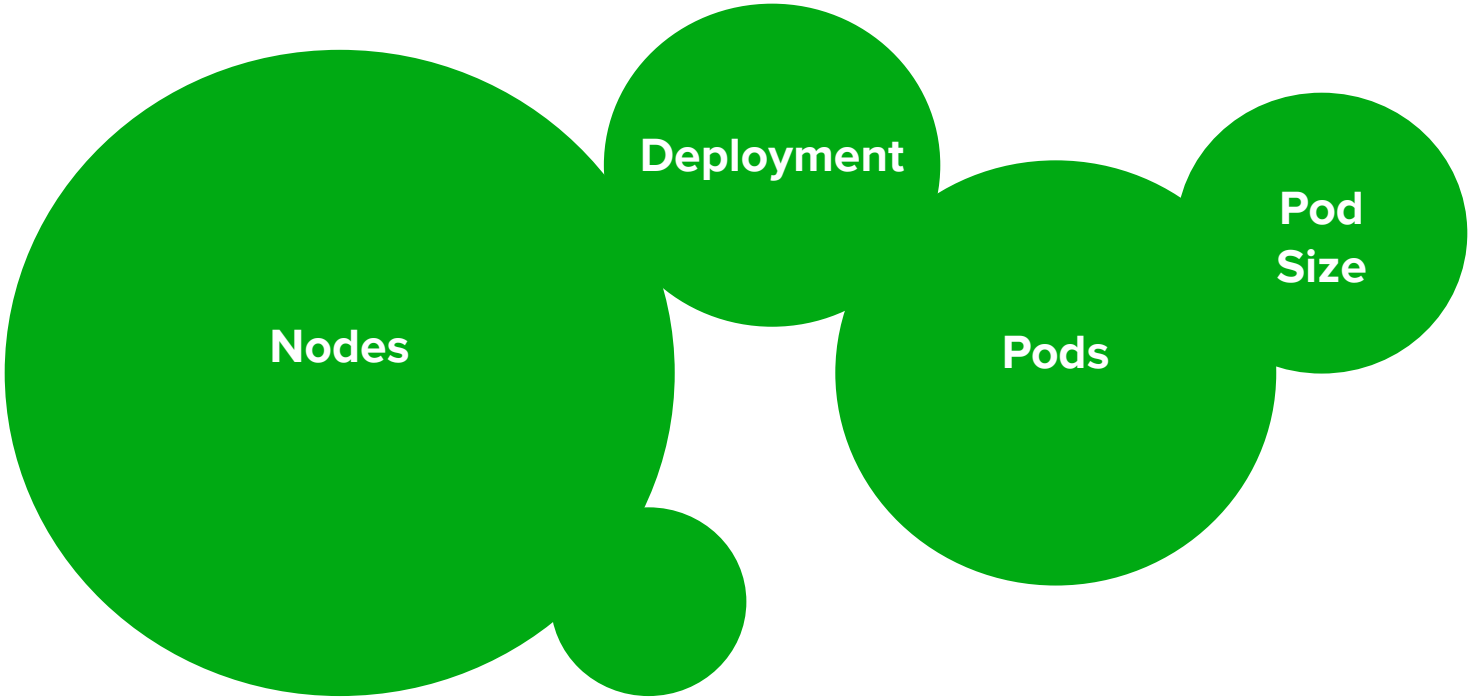
gojek

Scaling Dimensions

Horizontal Scaling

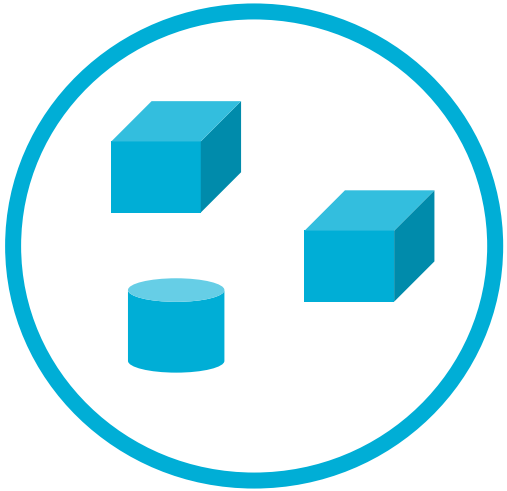
Vertical Scaling

Kubernetes Components



gojek

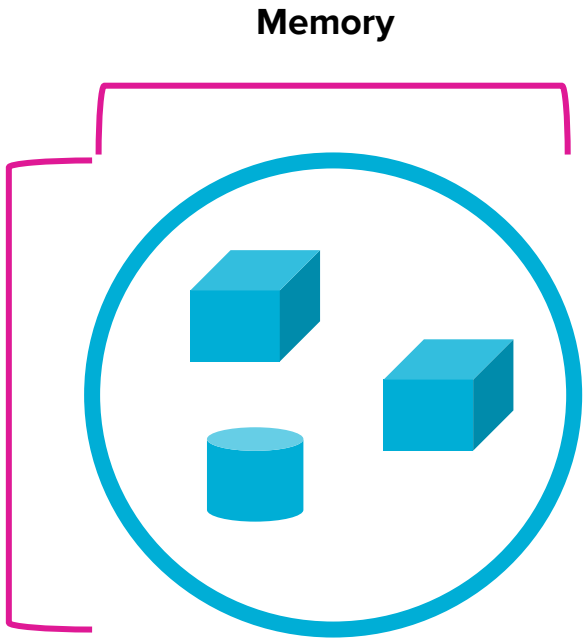
Pod



A Pod: Group of containers deployed together on same host

gojek

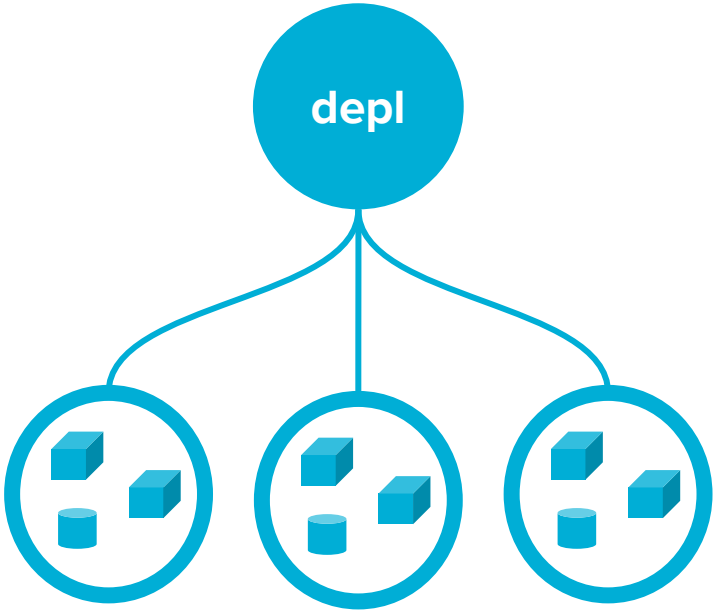
Pod Size



Pod size: Request and Limit assigned to Pod (Not actual usage)

gojek

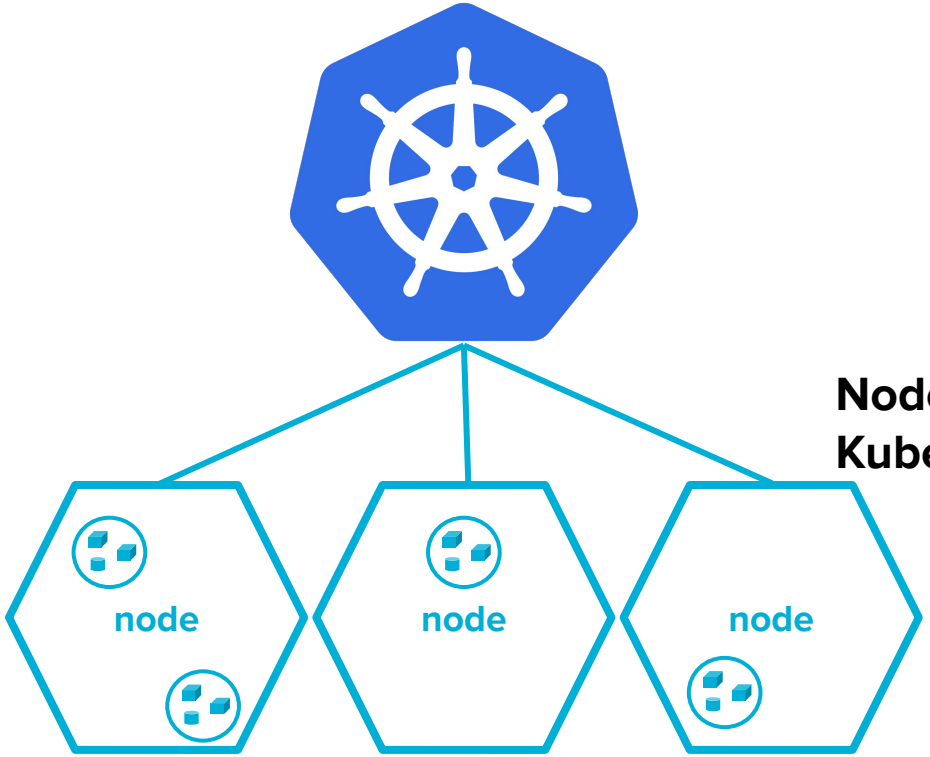
Deployment



Deployment: Maintains homogenous set of pods

gojek

Node



Node: Worker machine in Kubernetes cluster

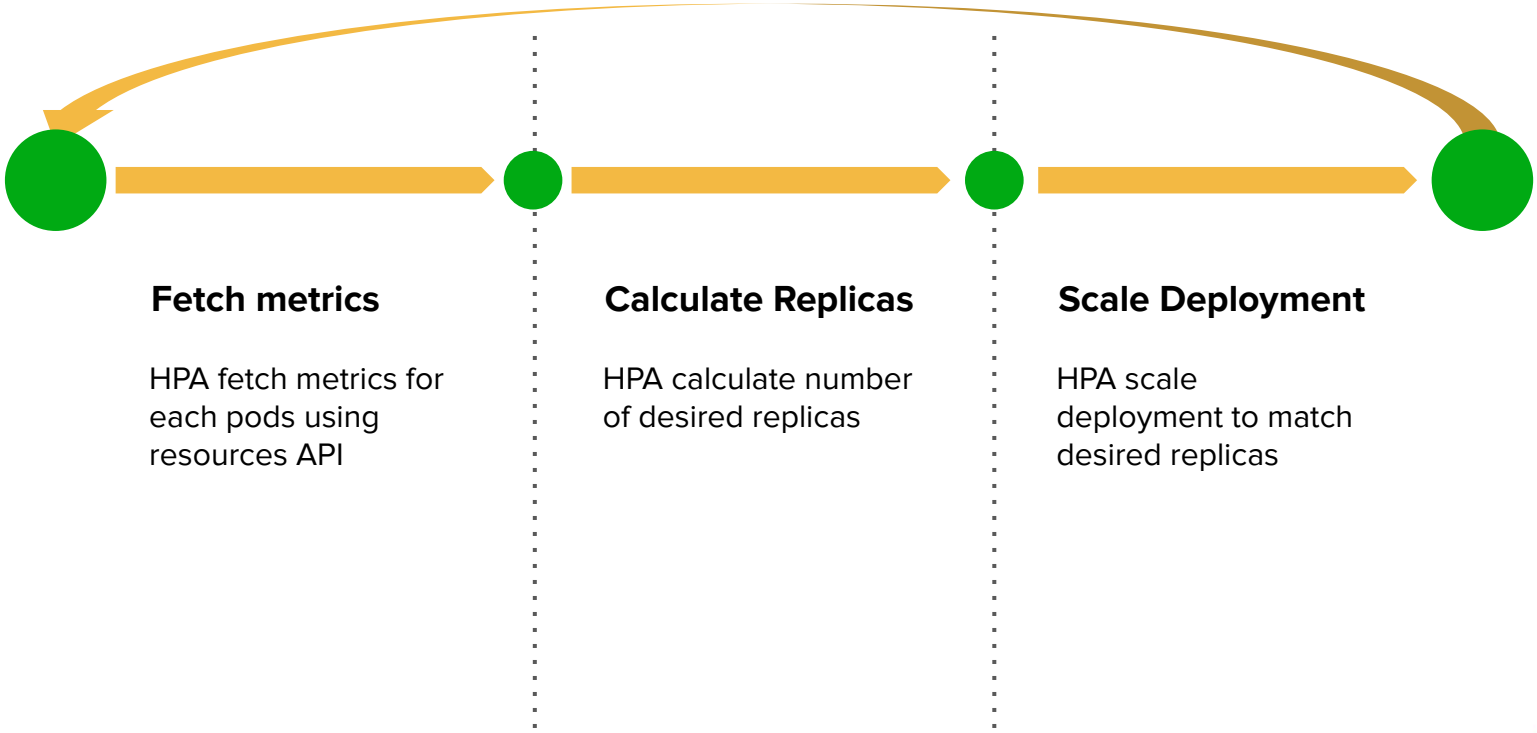
gojek

Kubernetes Scaling Dimensions

	Nodes	Pods
Horizontal	Number of nodes	Number of pods
Vertical	Size of node	Size of pod

Horizontal Pod Autoscaler

How it work?



Fetch metrics

HPA fetch metrics for each pods using resources API

Calculate Replicas

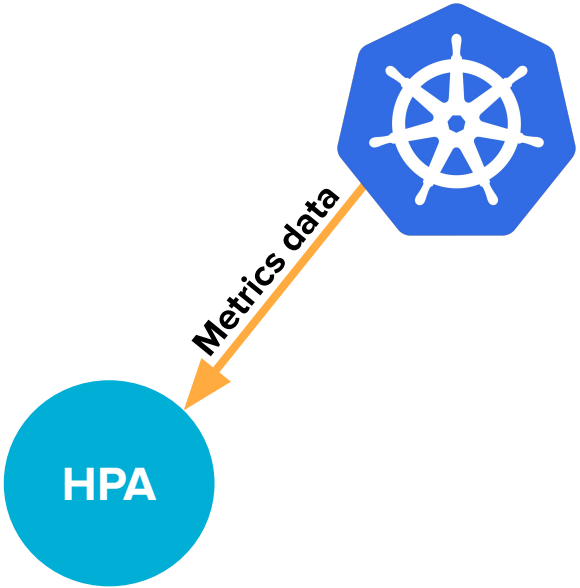
HPA calculate number of desired replicas

Scale Deployment

HPA scale deployment to match desired replicas

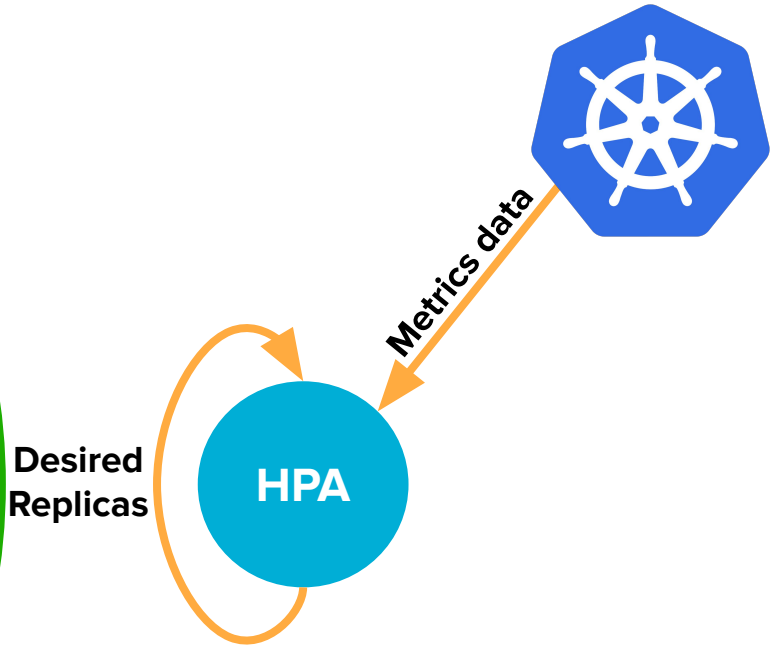
gojek

HPA



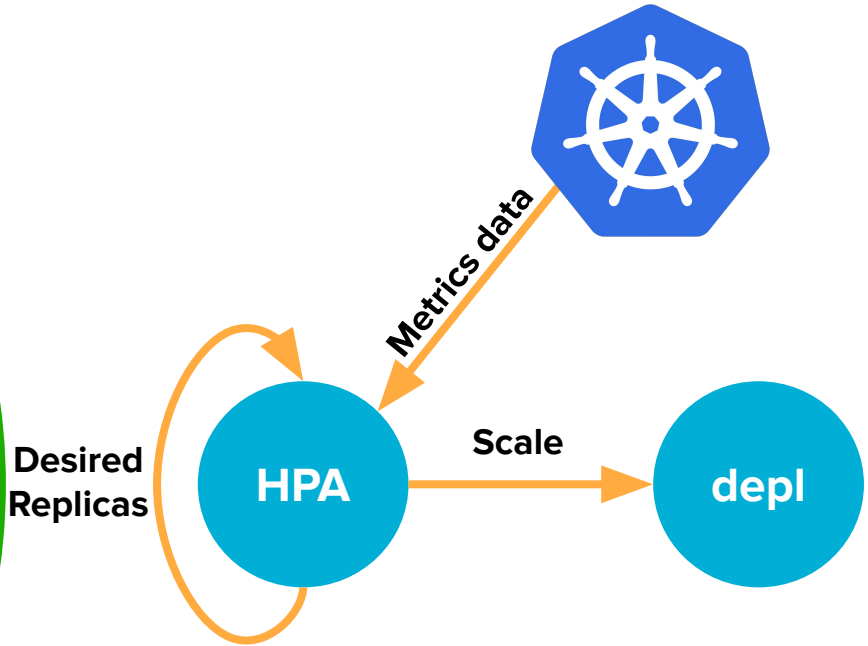
gojek

HPA



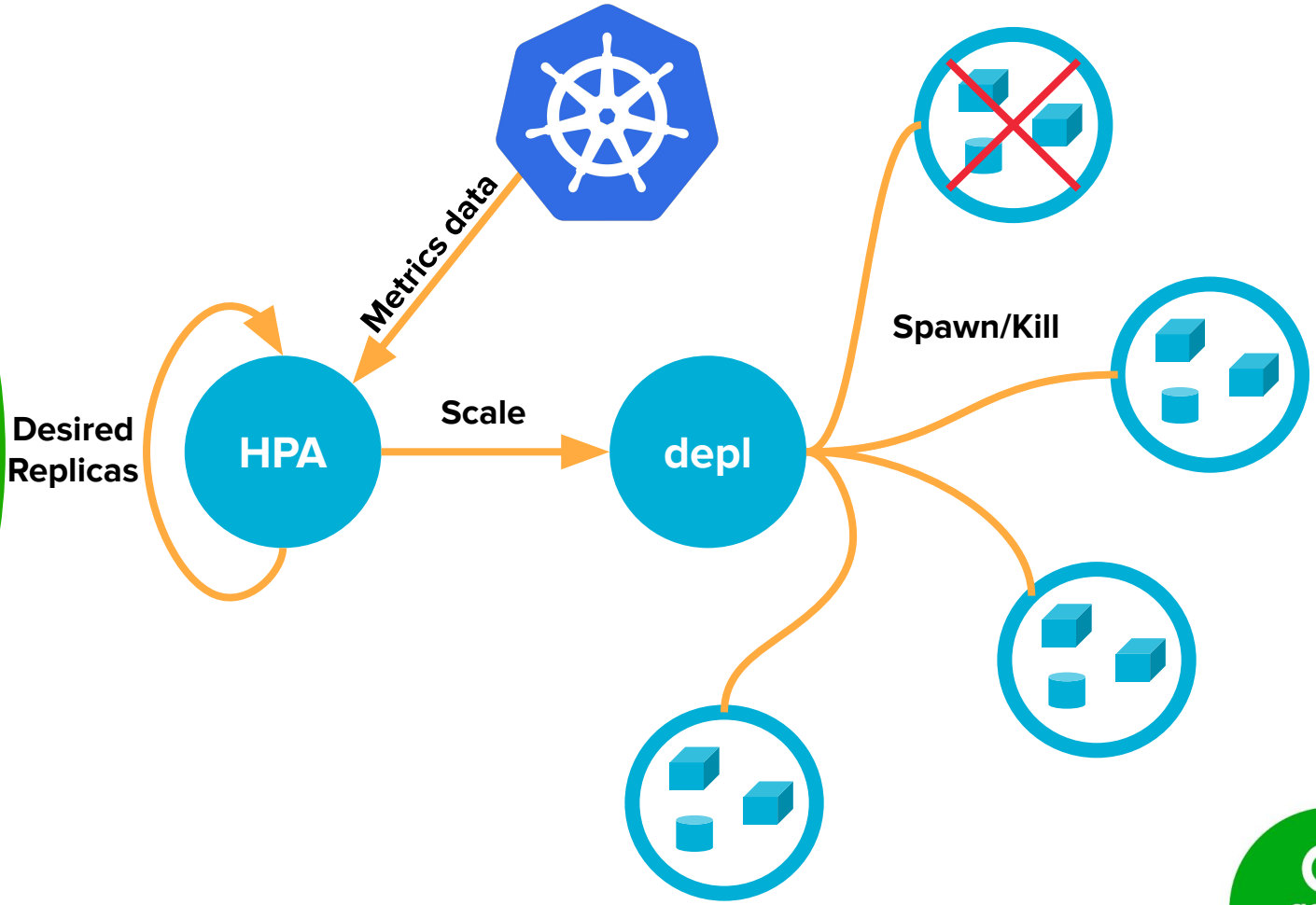
gojek

HPA



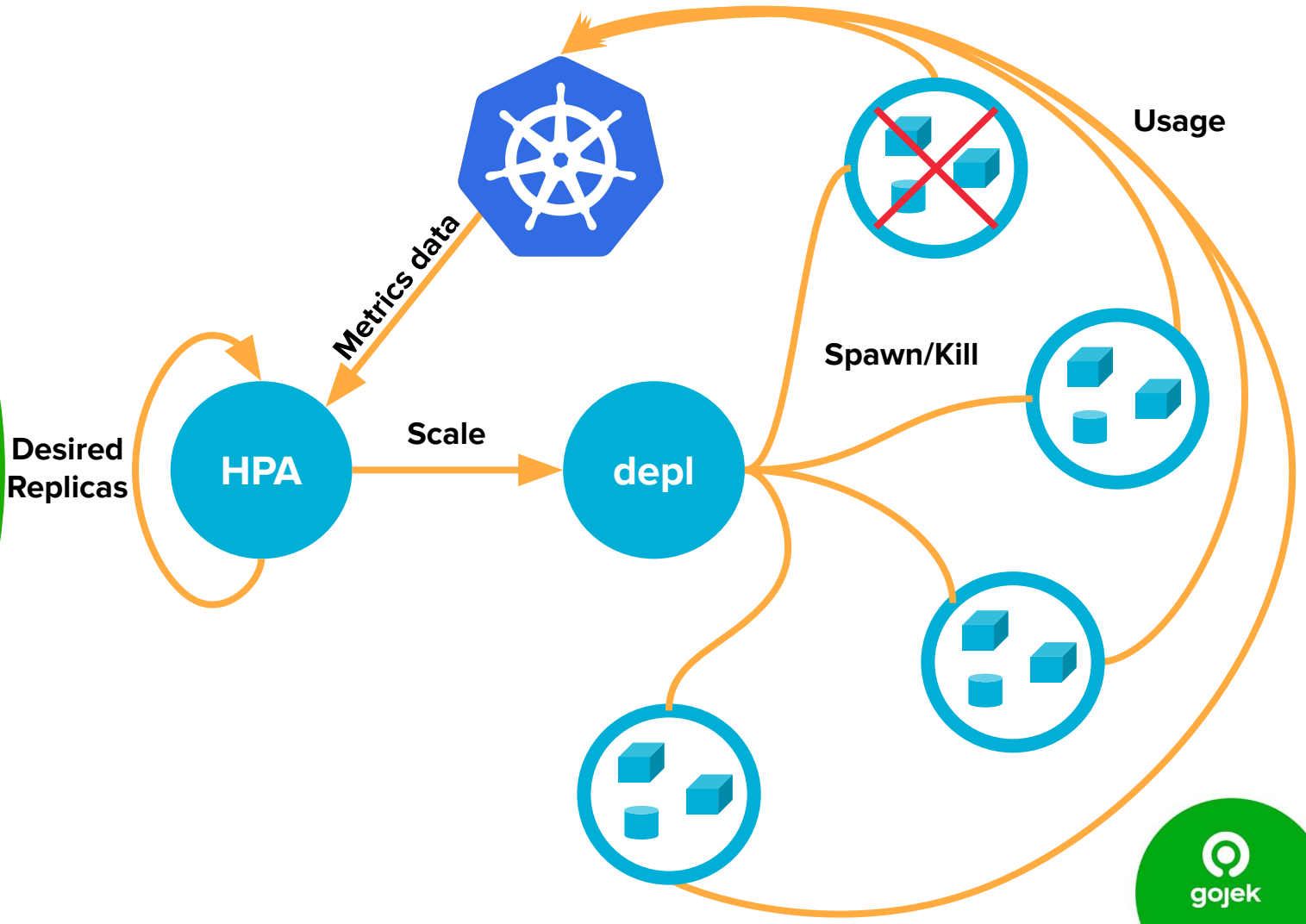
gojek

HPA

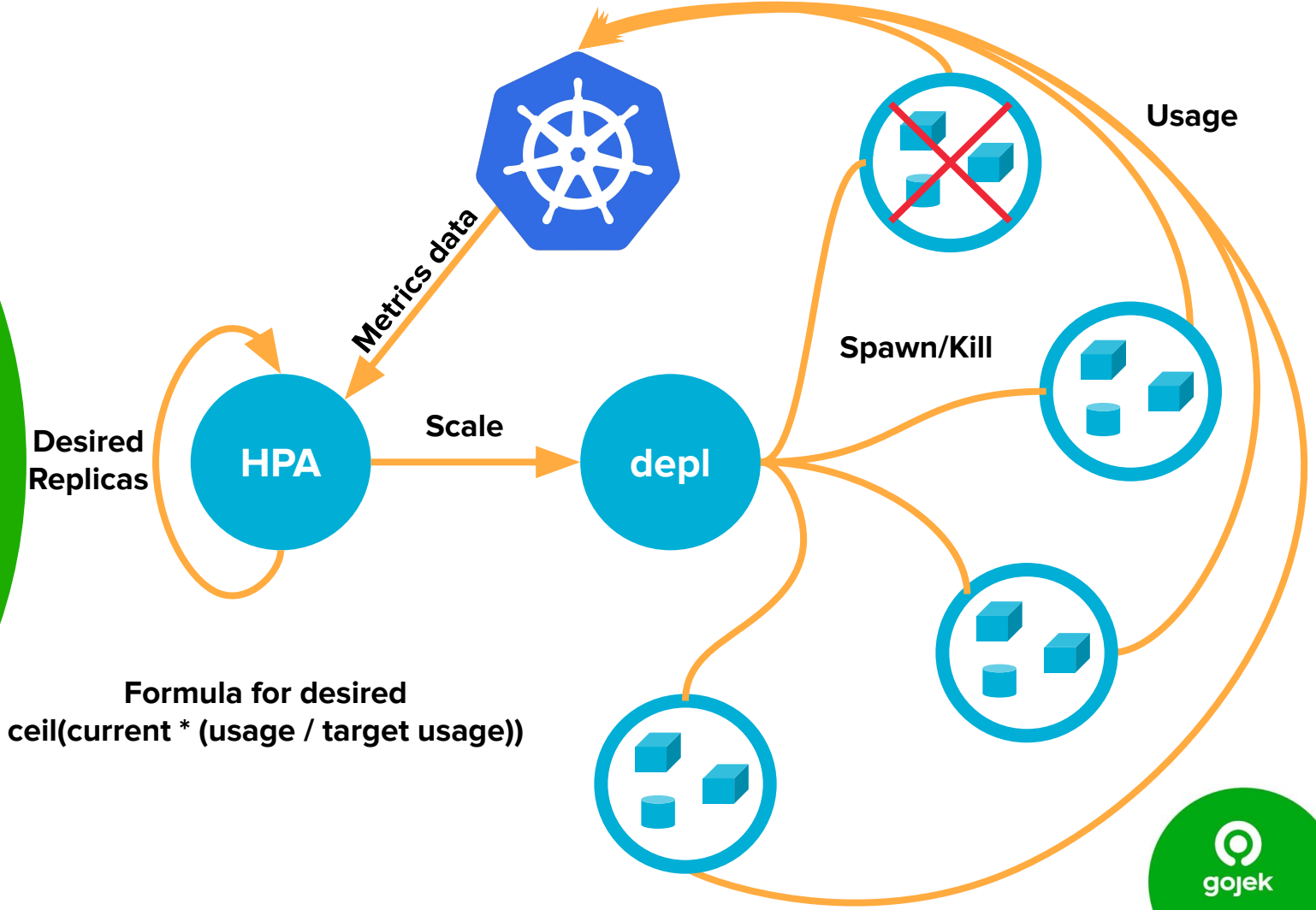


gojek

HPA


Usage
Metrics data
Spawn/Kill
Desired
Replicas
HPA
Scale
depl

HPA

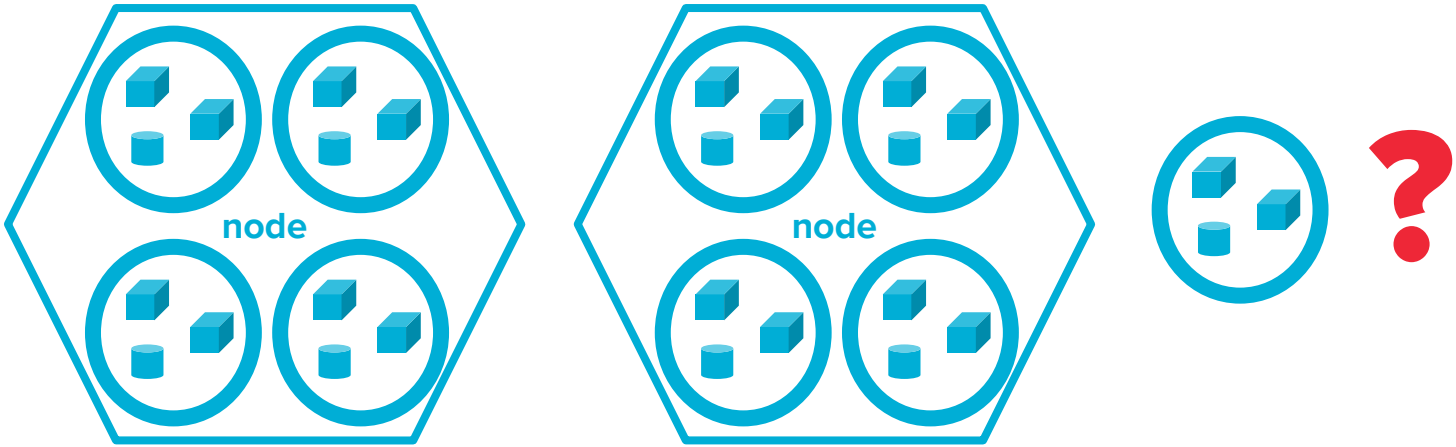


Formula for desired
ceil(current * (usage / target usage))

gojek

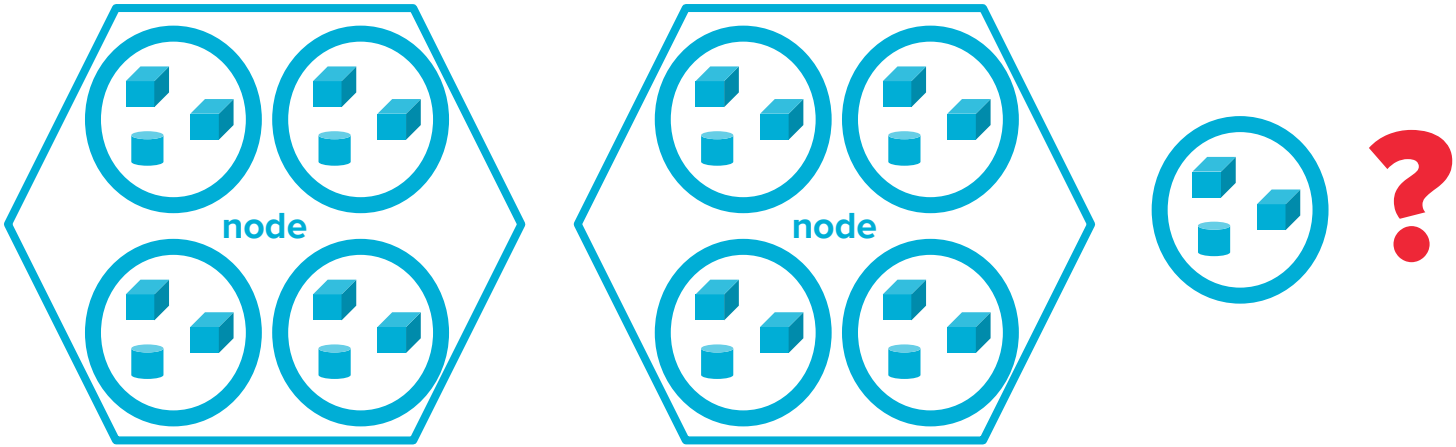

D
E
M
O

HPA Problem

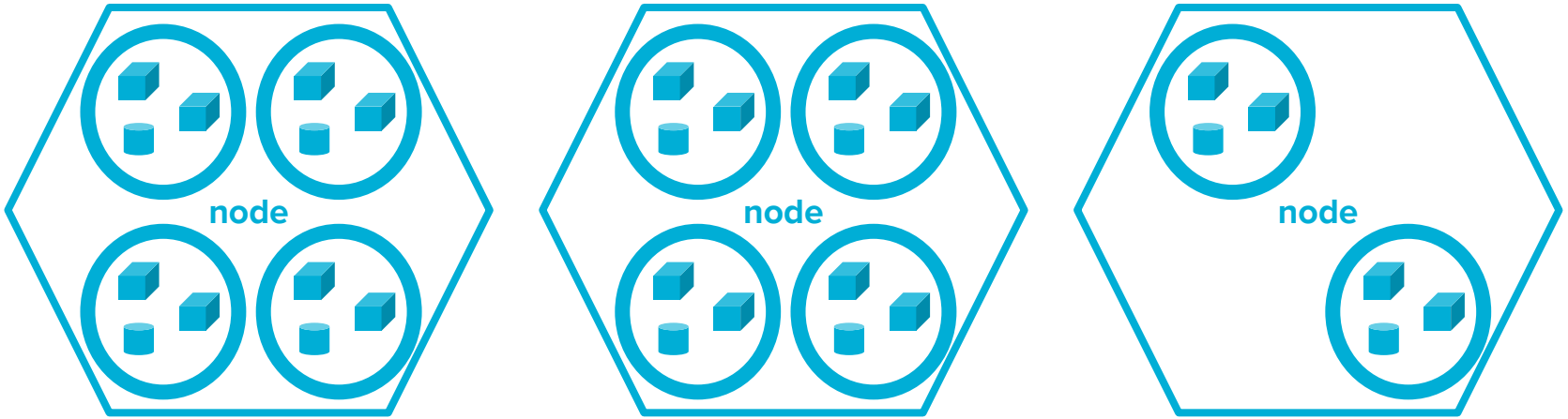


Cluster Autoscaler

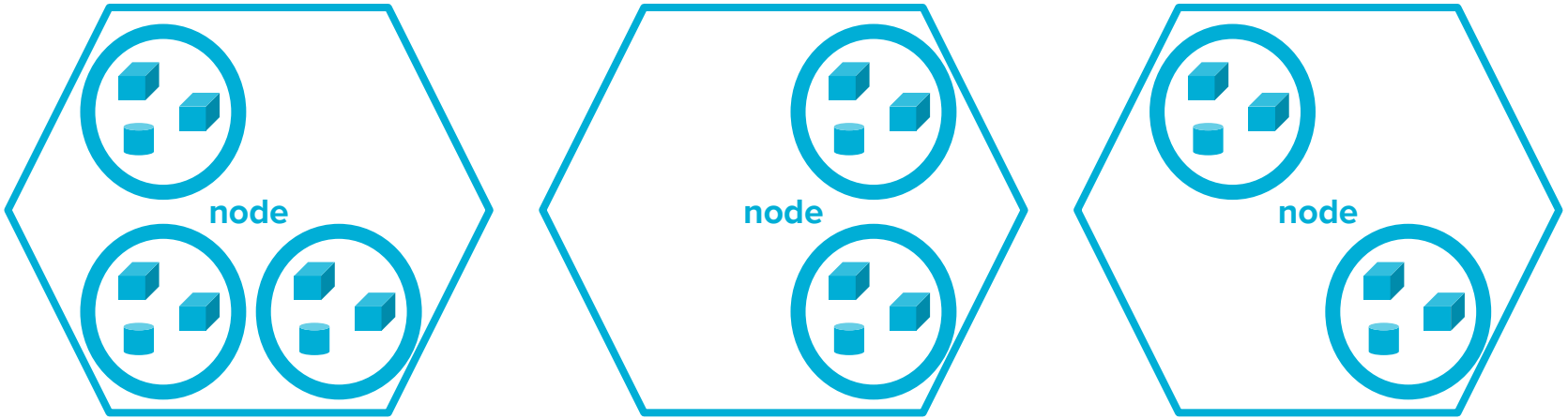
Solution?



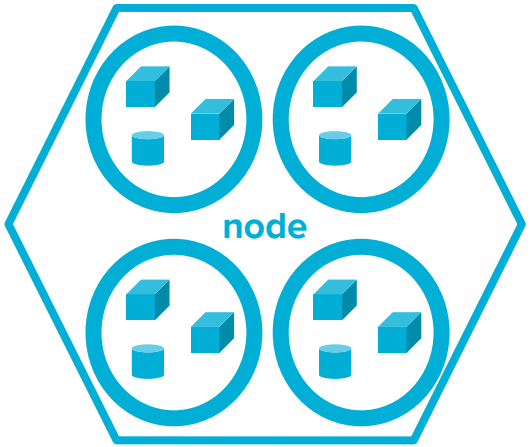
Spawn more node!

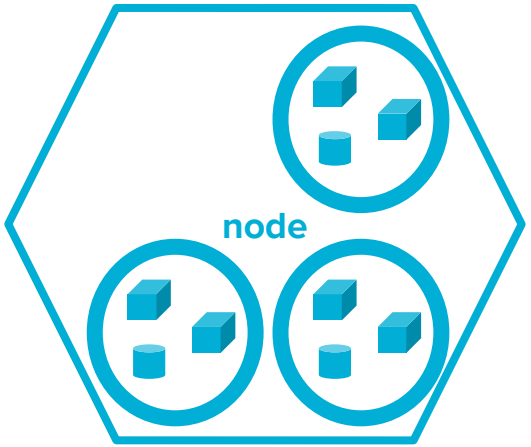


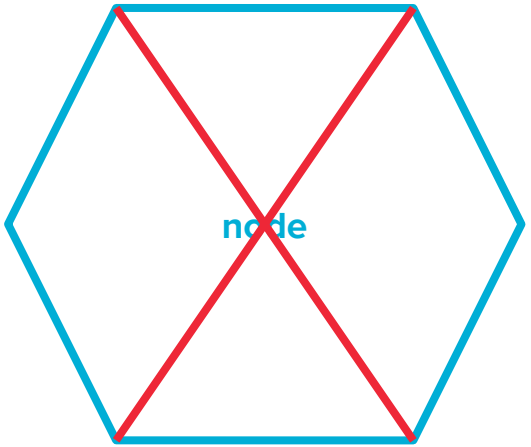
Underutilized resource?



Delete node



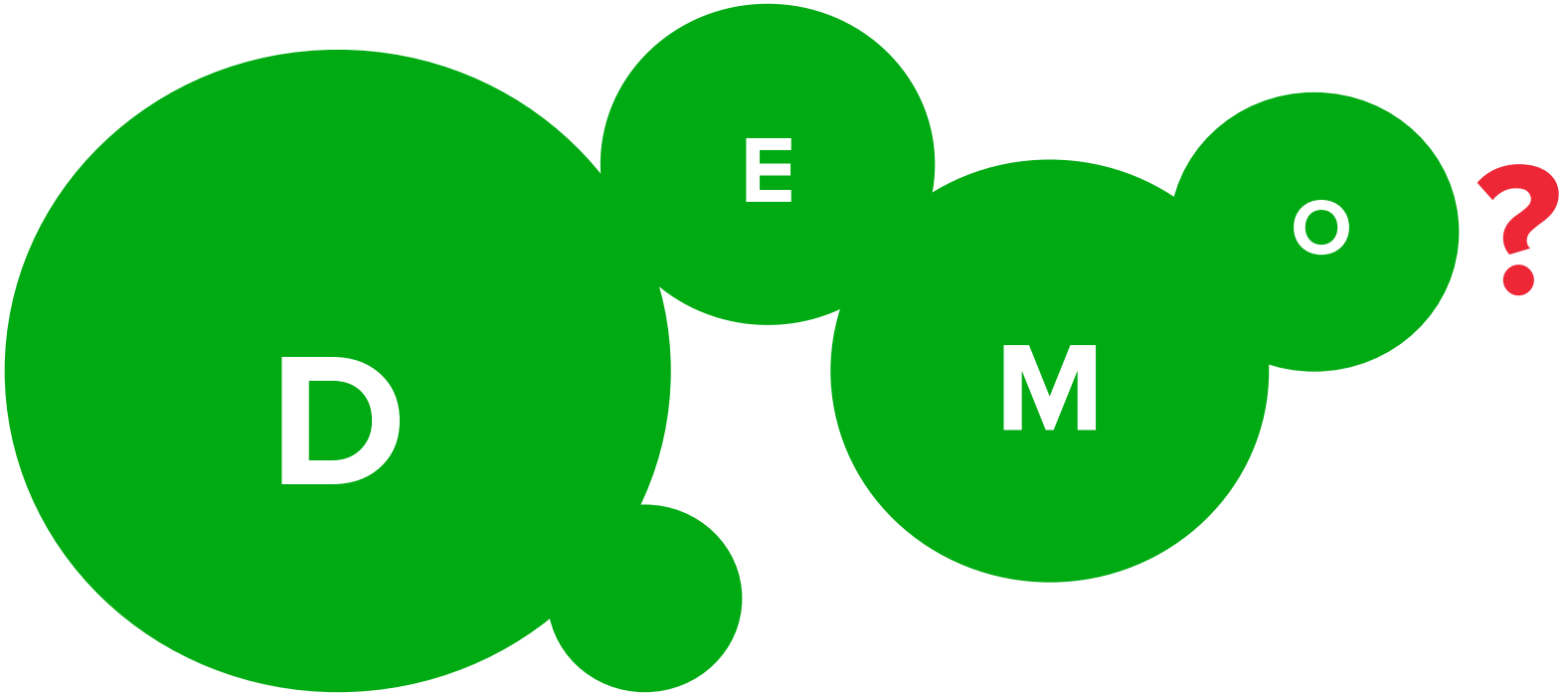




CA rules

Spawn node when there are pods that are unable to schedule due to insufficient resource

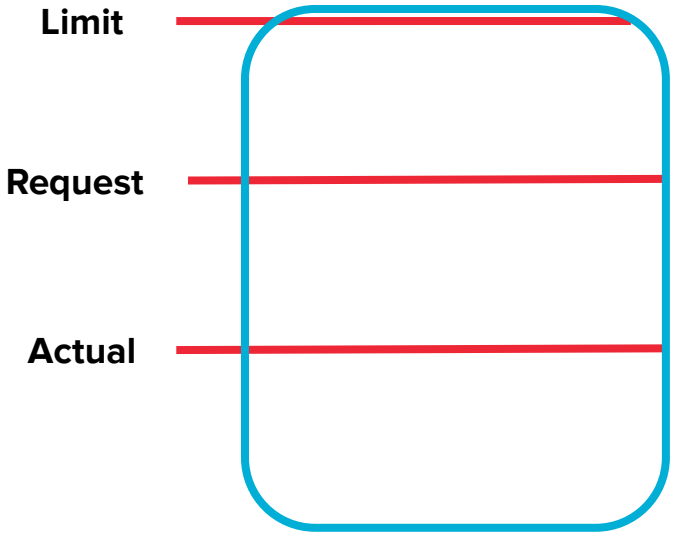
Kill node when some nodes are consistently unneeded for a significant amount of time. Unneeded nodes mean that it has low utilization and important pods are able to relocate to other nodes


D
E
M
O
?

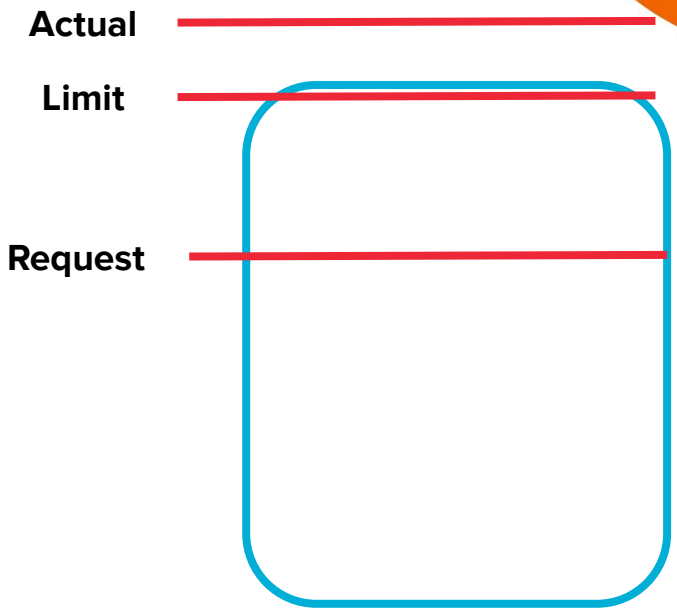
CA resources

- https://github.com/kubernetes/autoscaler/tree/master/cluster-autoscaler
- https://aws.amazon.com/premiumsupport/knowledge-center/eks-cluster-autoscaler-setup/
-

Utilization Problem



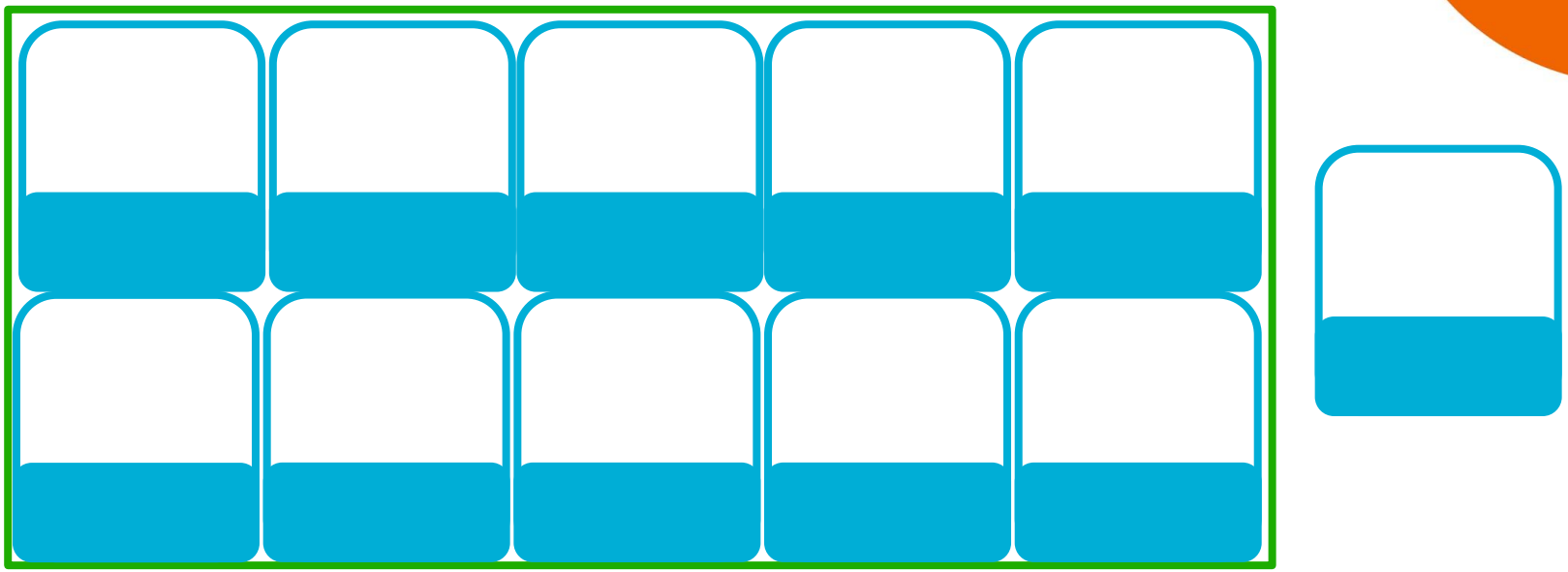
Too much



Not enough

Size does matter

Node



Vertical Pod Autoscaler

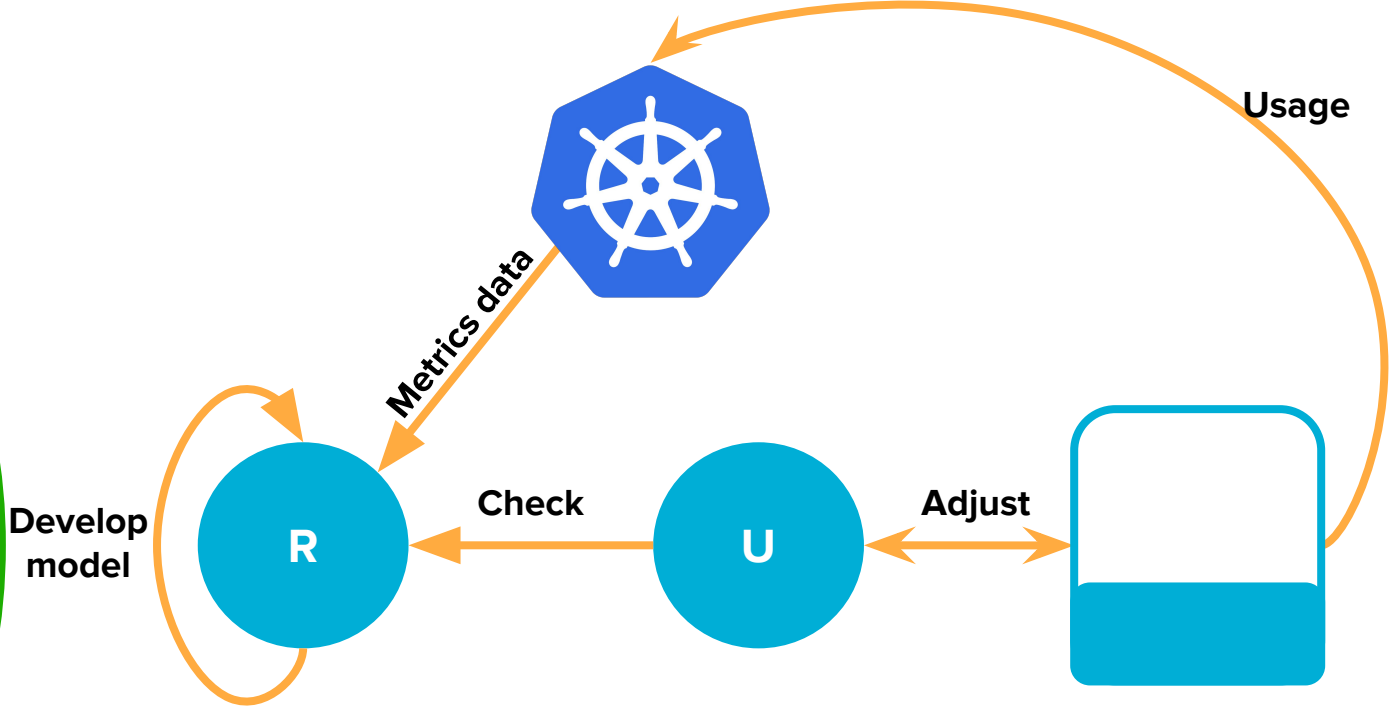
VPA Components

Monitors resources consumption and provides recommended values.

Check which pods doesn't have correct resources set and update them.

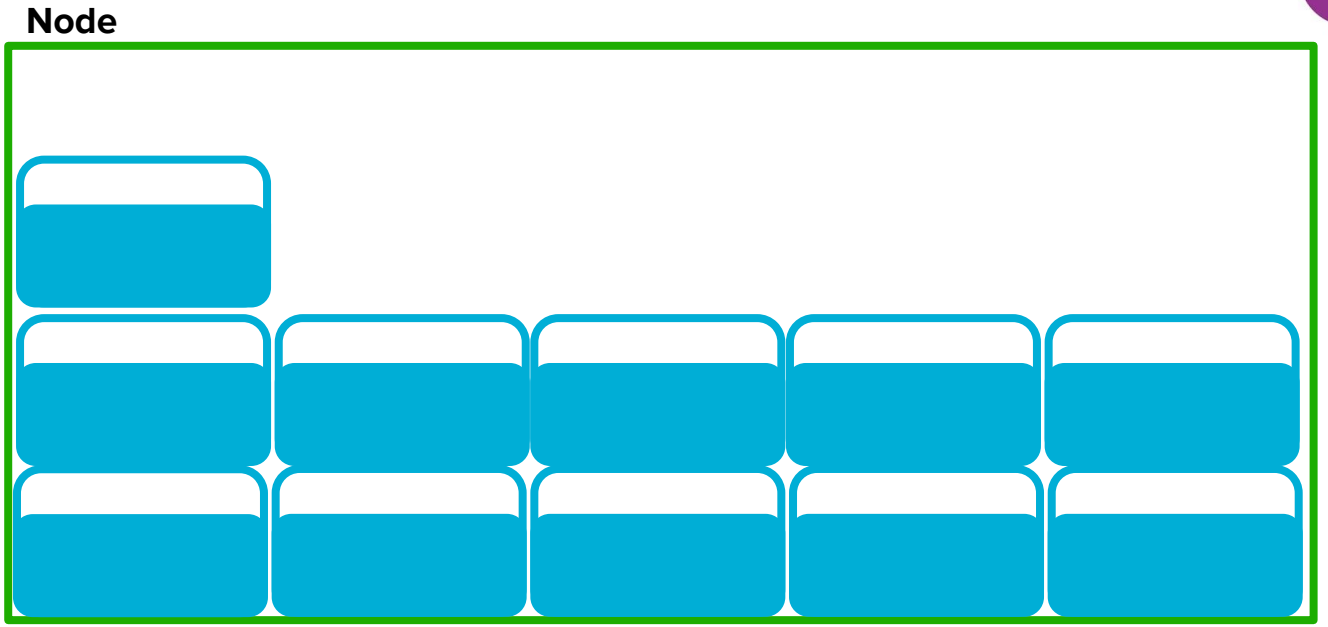
gojek

VPA



gojek

Result



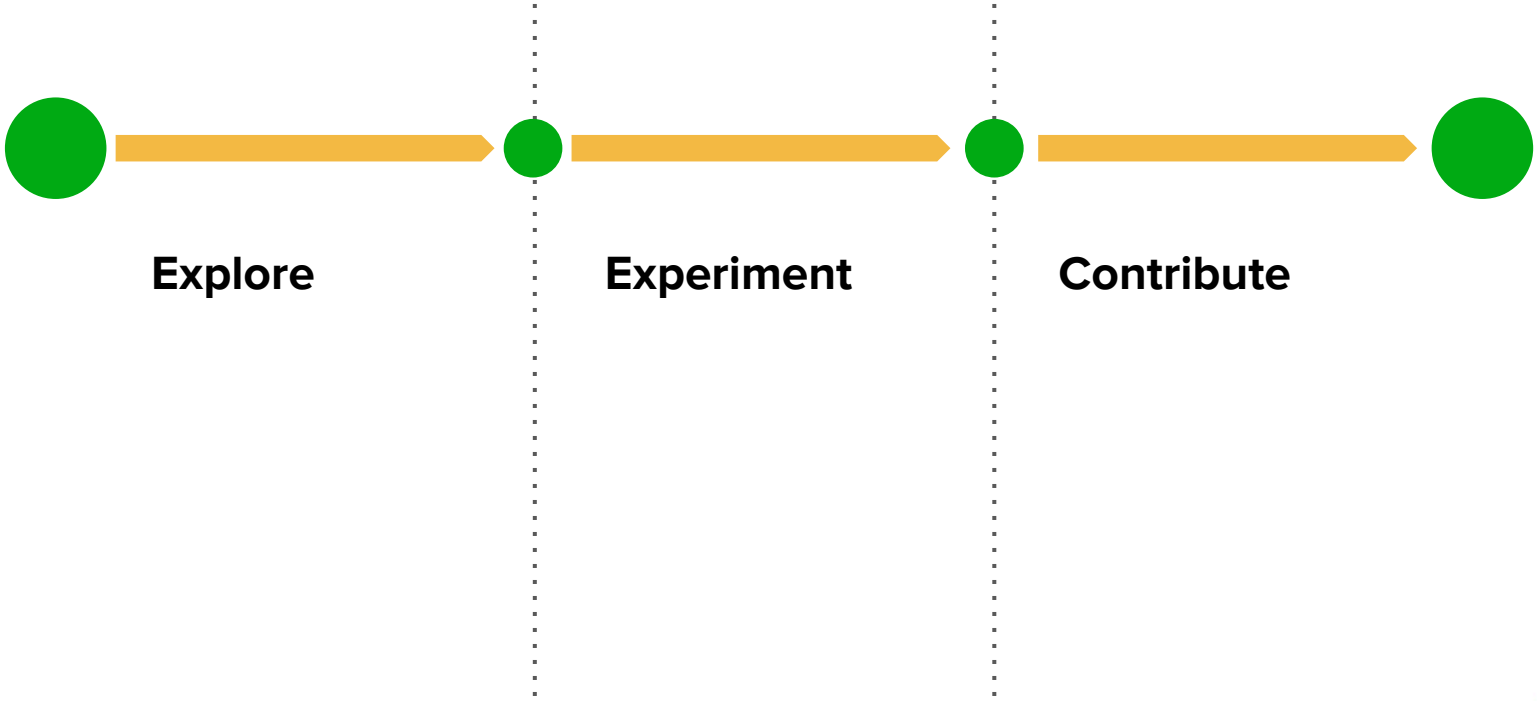

D
E
M
O

Limitations

- Cannot use HPA and VPA together
- VPA is beta (some features might introduce downtime)
- HPA stable only support CPU (v2beta2 support memory and custom)
- CA depends on Cloud Provider
- ....

gojek

Beyond



gojek

Thank You!

FAQ

#	Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s
#	Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s
#	Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s
#	Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s