Software Engineering 102

Before we begin…

- Install kubectl
  - Search on google ‘kubectl install’ or type in following link https://kubernetes.io/docs/tasks/tools/install-kubectl/
  - Follow guide for your OS

- Install minikube
  - Search on google ‘minikube install’ or type in following link https://kubernetes.io/docs/tasks/tools/install-minikube/
  - You shouldn’t need to install a Hypervisor, that part is already completed by installing docker
  - Follow guide for your OS

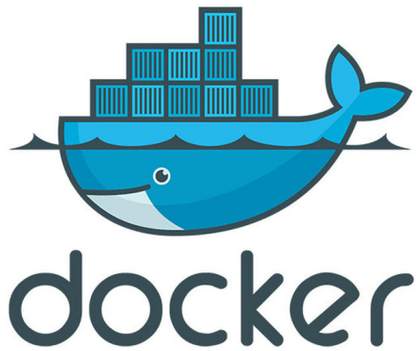
- Run minikube start

Software Engineering 102

Managing containers in Kubernetes

https://github.com/joelluijmes/Workshop-JADS

Docker

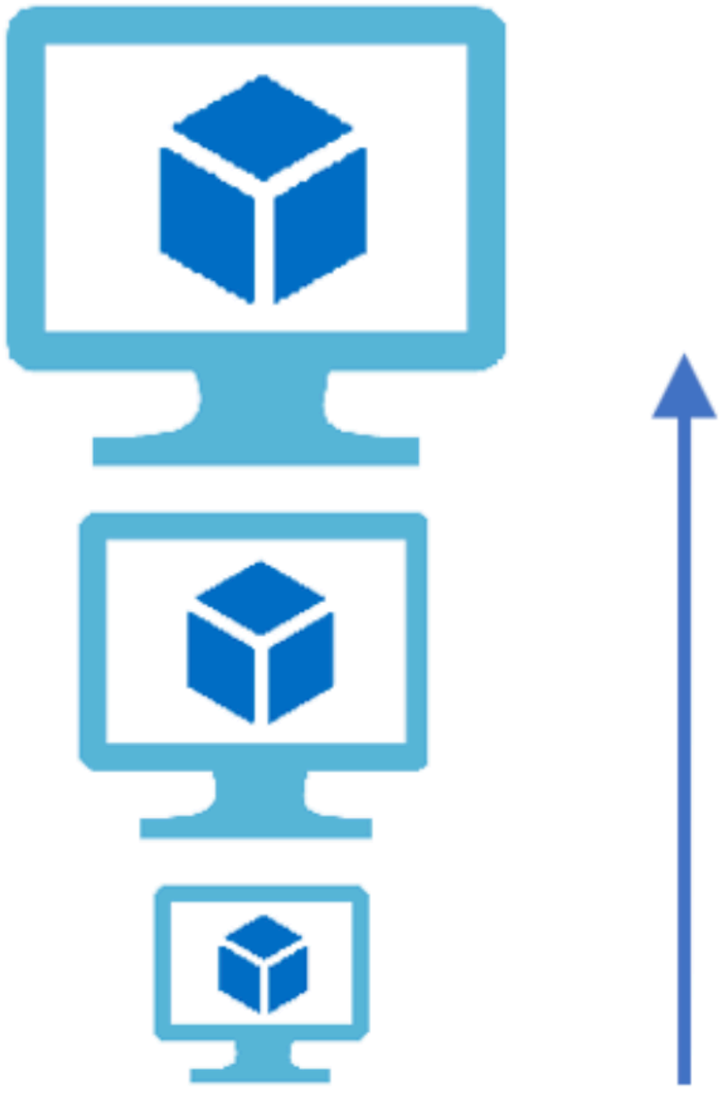


“A Docker container image is a lightweight, standalone, executable package of software that includes everything needed to run an application: code, runtime, system tools, system libraries and settings.”

https://www.docker.com/resources/what-container

Vertical Scaling

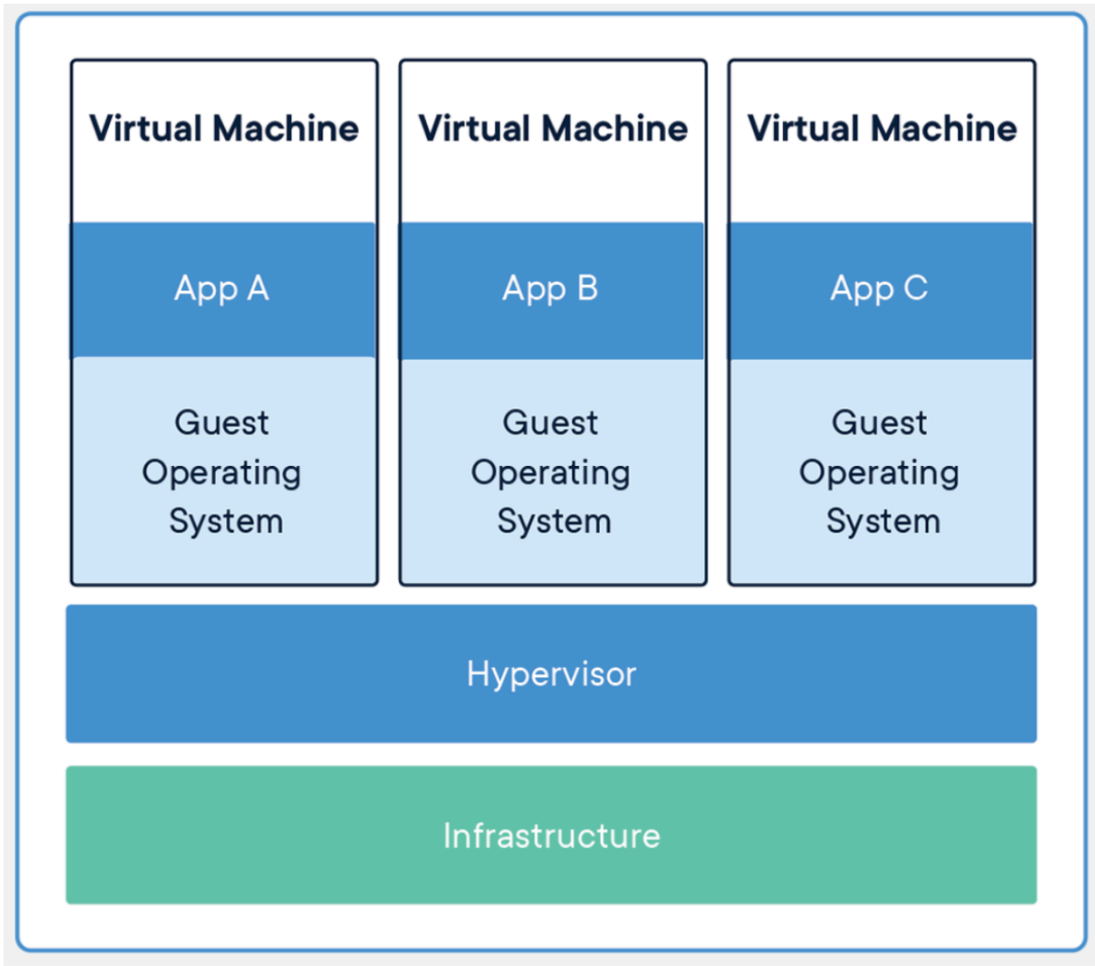
(Increase size of instance (RAM , CPU etc.))

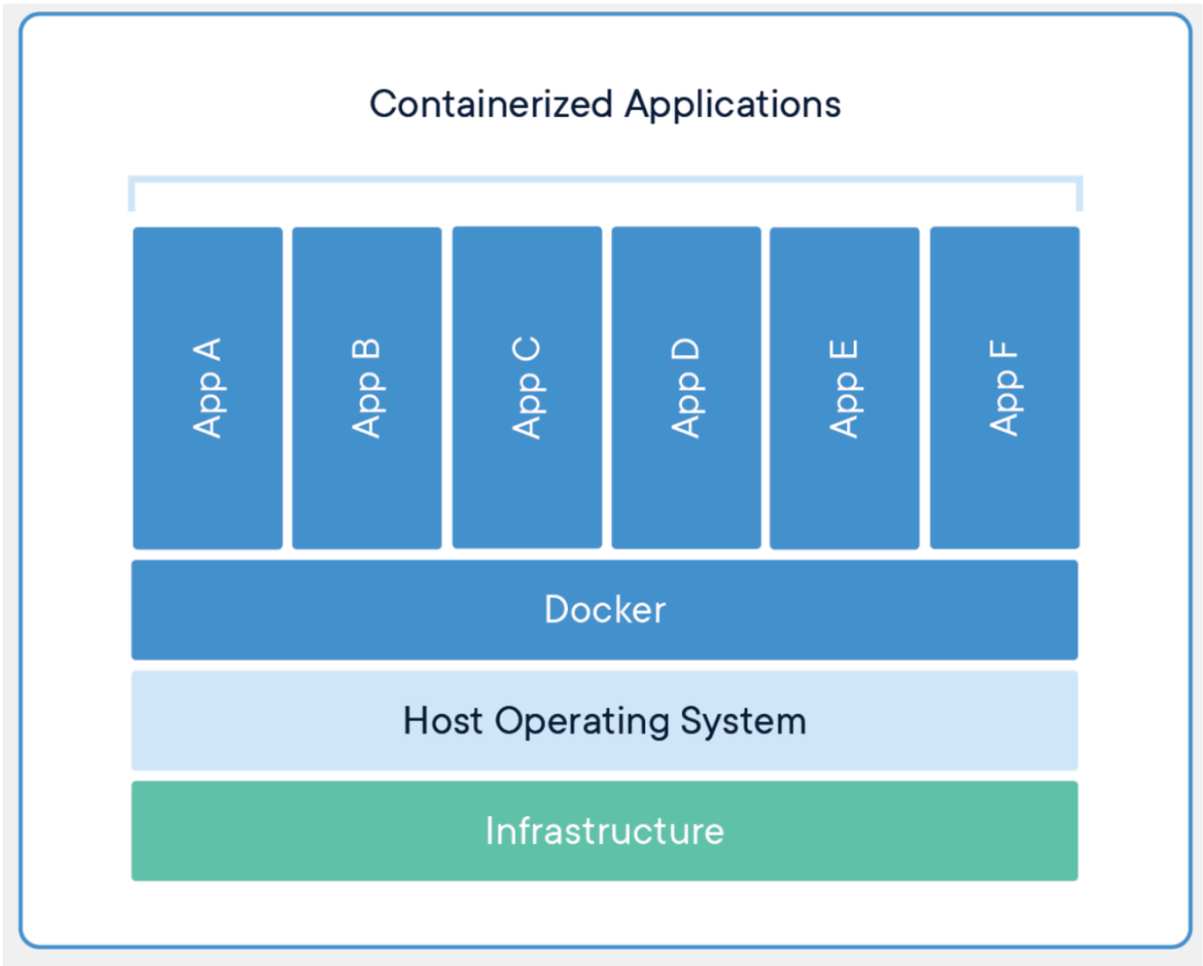


Horizontal Scaling

(Add more instances)

VM vs Container





Source: https://www.docker.com/resources/what-container

Network Basics

- **IP Address** is numerical label assigned to each device connected to internet (e.g. 127.0.0.1 or 89.200.32.168)

- **Port** maps internet to an application (e.g. 22, 80, 443, 53413)

- **DNS** resolves name to an IP address
  - joell.app —> 213.109.163.85
  - localhost —> 127.0.0.1

Accessing Containers

- **Docker networks are isolated from host**
  - Containers within network can find and communicate with each other. To access a container from host, we need to *publish* the port to the host (e.g. -p 8080:80).

- Windows Docker Toolbox - IP is mentioned when starting
  - 192.168.99.100:8080 —> myapp:80

- *Real* Docker - localhost
  - localhost:8080 —> myapp:80

- https://docs.docker.com/network/

Kubernetes

“Kubernetes (commonly stylized as **k8s**[3]) is an open-source container-orchestration system for automating application deployment, scaling, and management.”

https://kubernetes.io/docs/concepts/overview/what-is-kubernetes/

Architecture

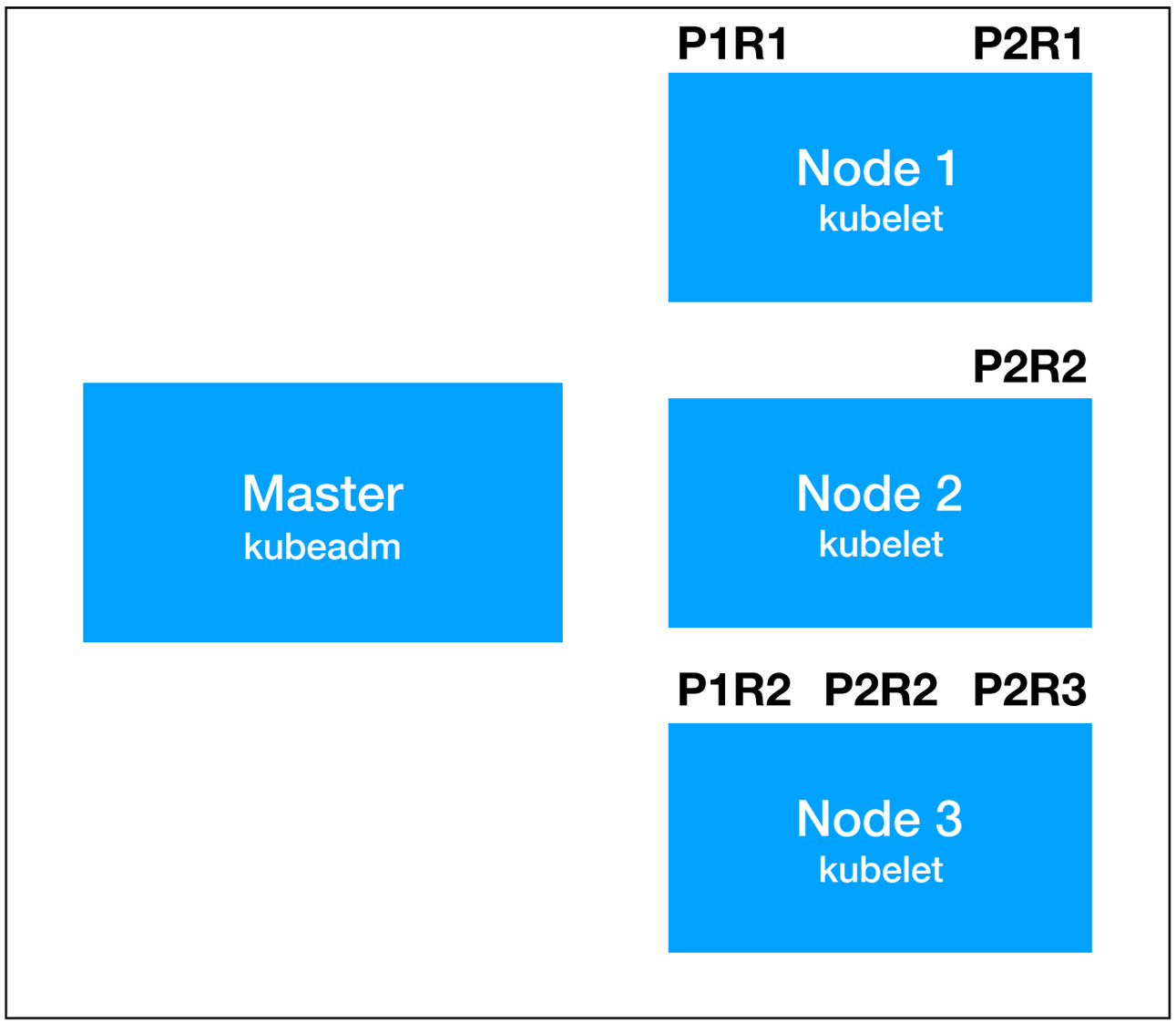
kubectl

Deployment.yaml

- PodSpec 1
  - Container X
  - Container Y
  Replicas: 2

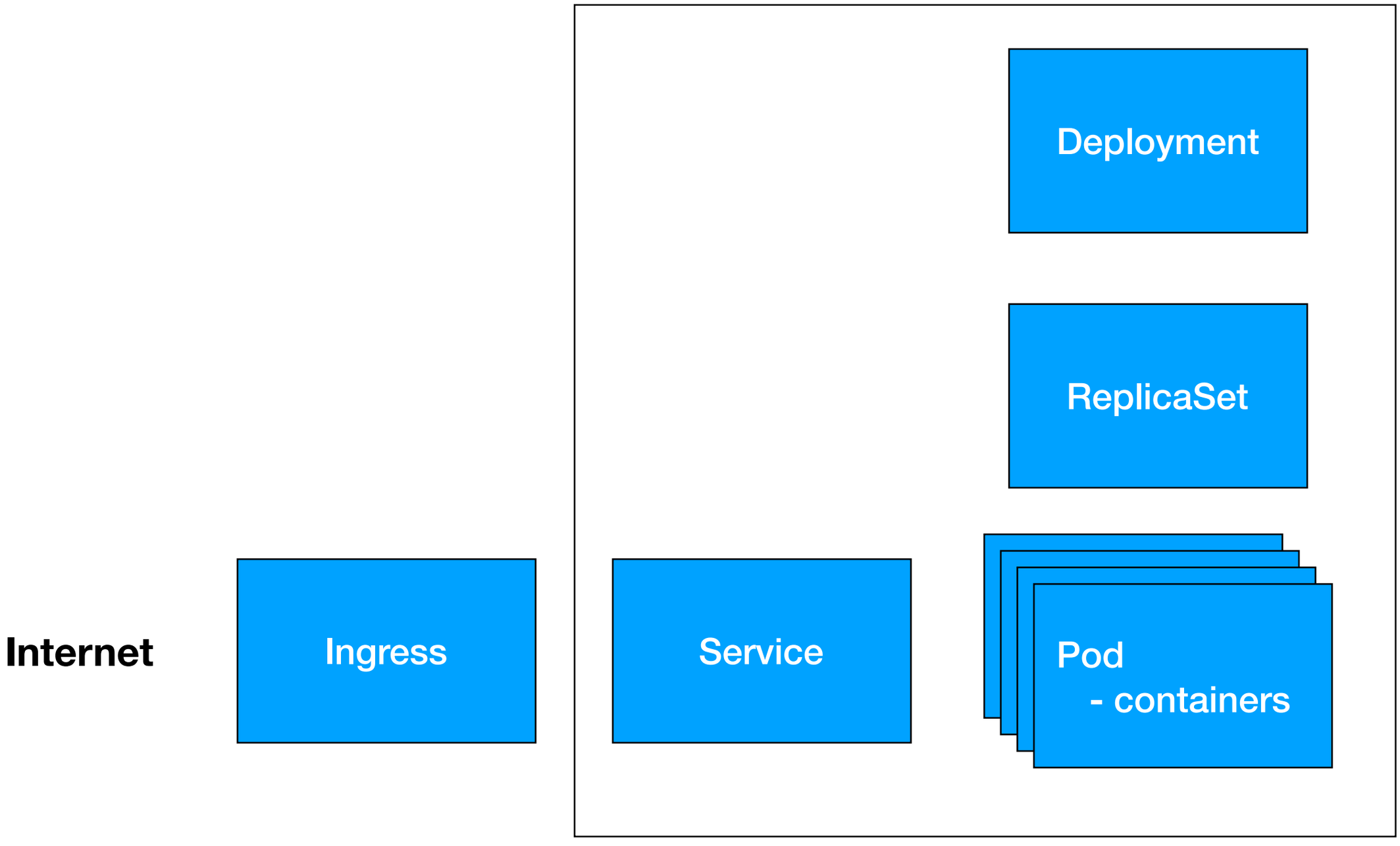
- PodSpec 2
  - Container A
  Replicas: 3

Kubernetes Cluster

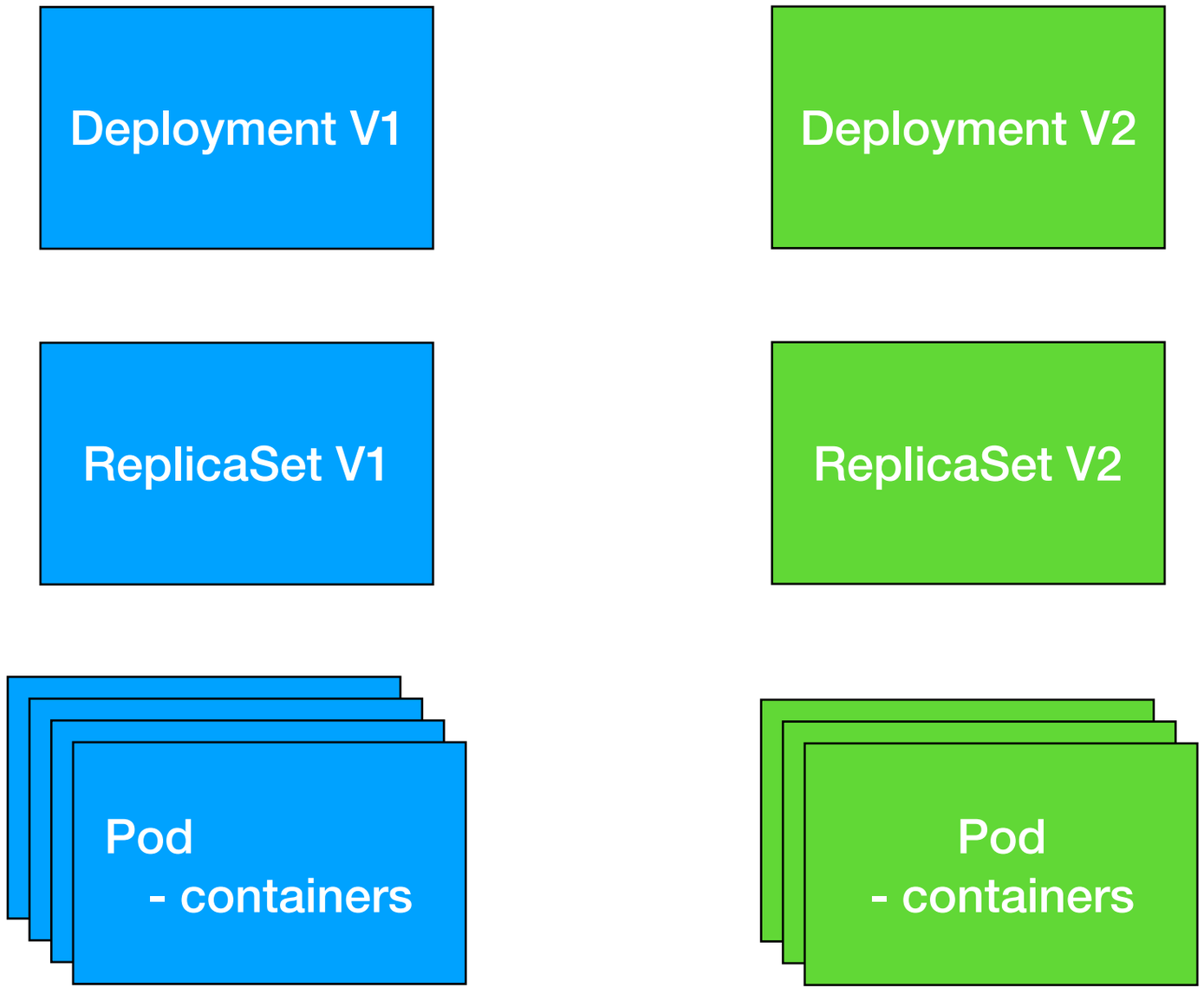


Source: https://www.youtube.com/watch?v=PH-2FfFD2PU

Kubernetes Objects



Updating a Deployment



Must haves

- Helm - Package manager for Kubernetes
  https://helm.sh

- Stern - Multi pod and container log tailing for Kubernetes
  https://github.com/wercker/stern