



Certified Kubernetes Application Developer

Webinar Series 1/3



Session duration: 4:00 PM to 6:15 PM

Online Meeting Rules

- If not muted, mute yourself.
- Ask your questions in the chat window.
- Use mic if you are explicitly asked.
- If you want to show something, we will make you a presenter
- If you like you can activate your camera. We love to see you all 😊
- Please do not spam the chat window.
- Do not post inappropriate content.
- Have a fun. 😊





Azure Meetup

FRANKFURT



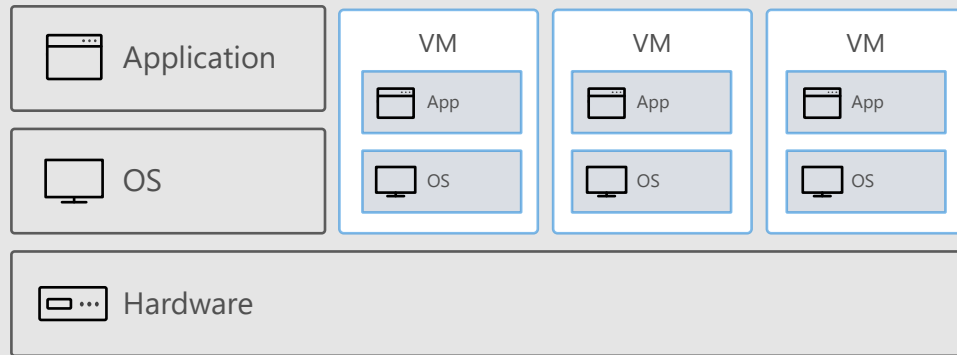
DEVELOPERS.DE

Docker

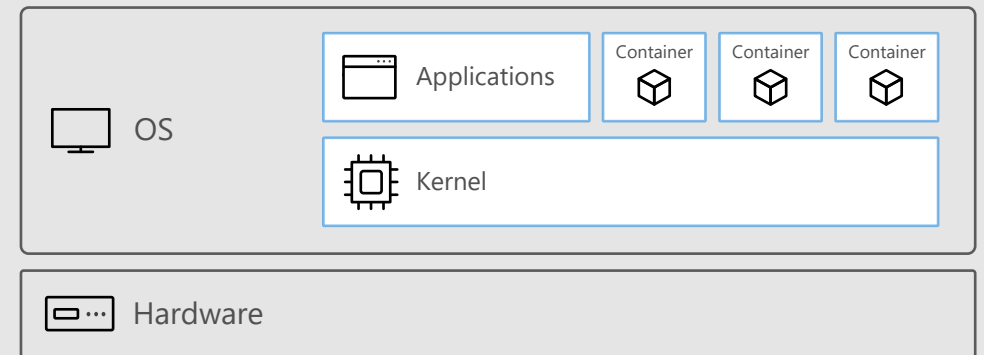


What is a **container**?

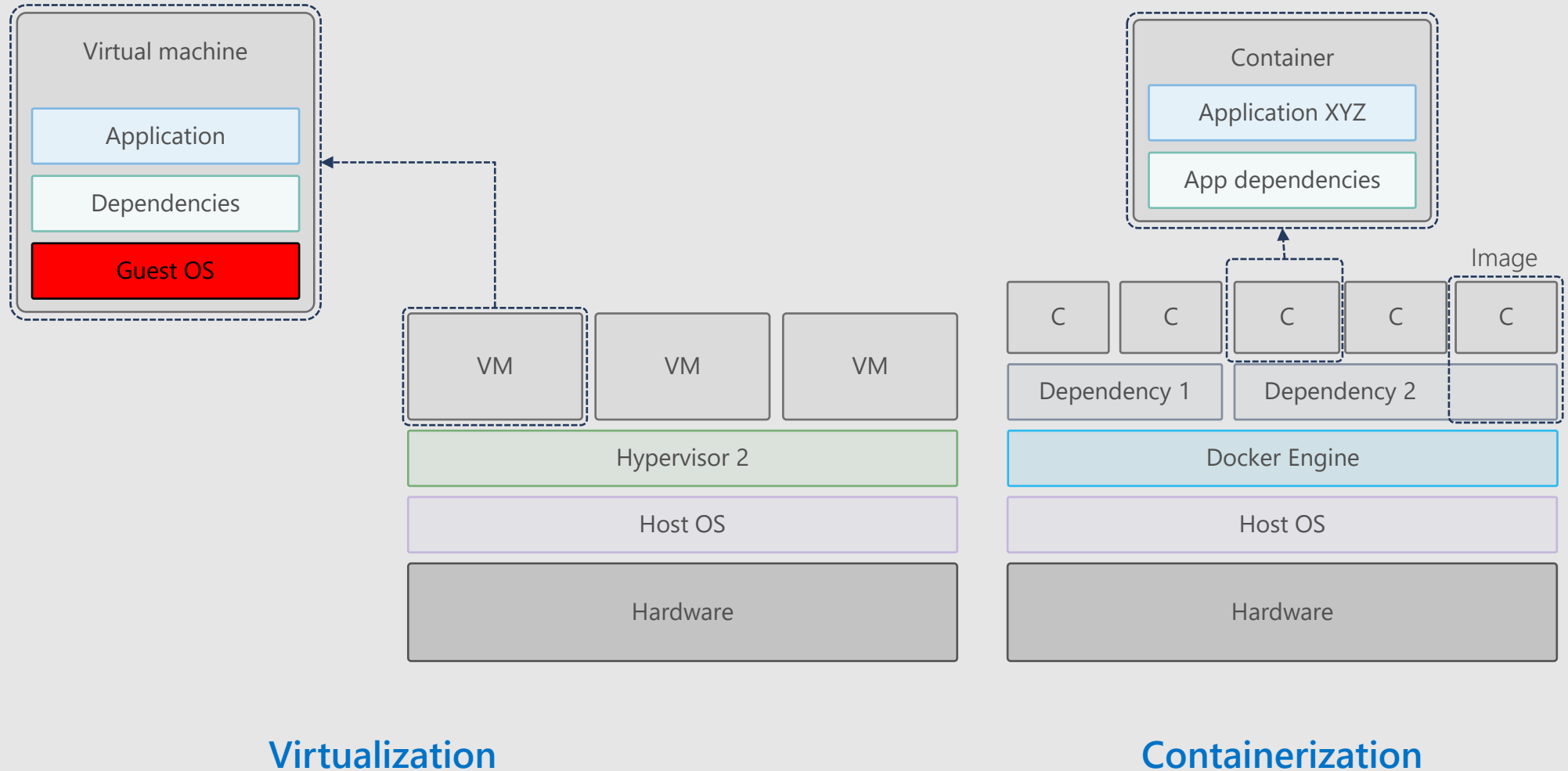
Virtual machines = hardware virtualization



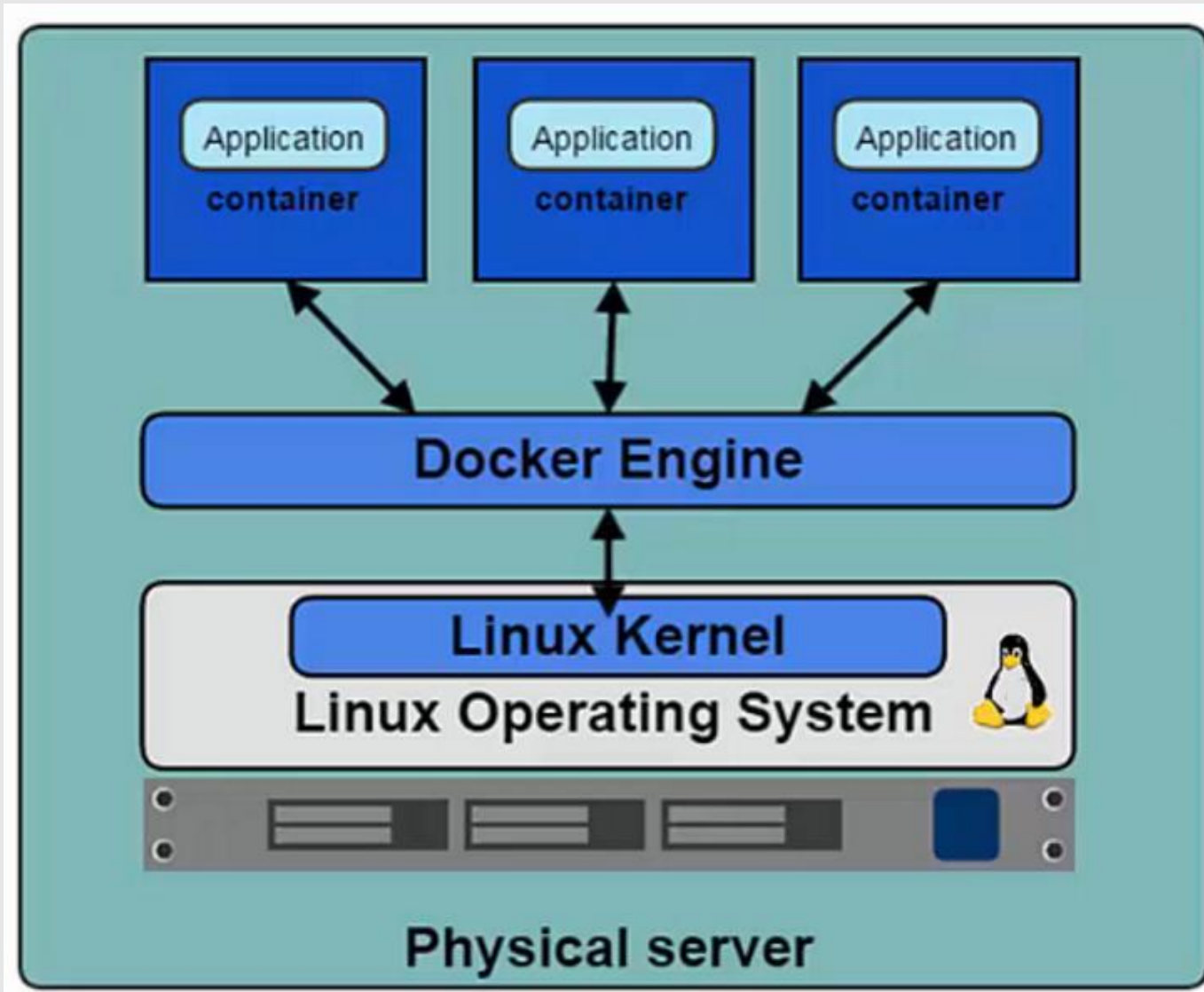
Containers = OS virtualization



Virtualization versus containerization?



Docker Platform



Docker In Action

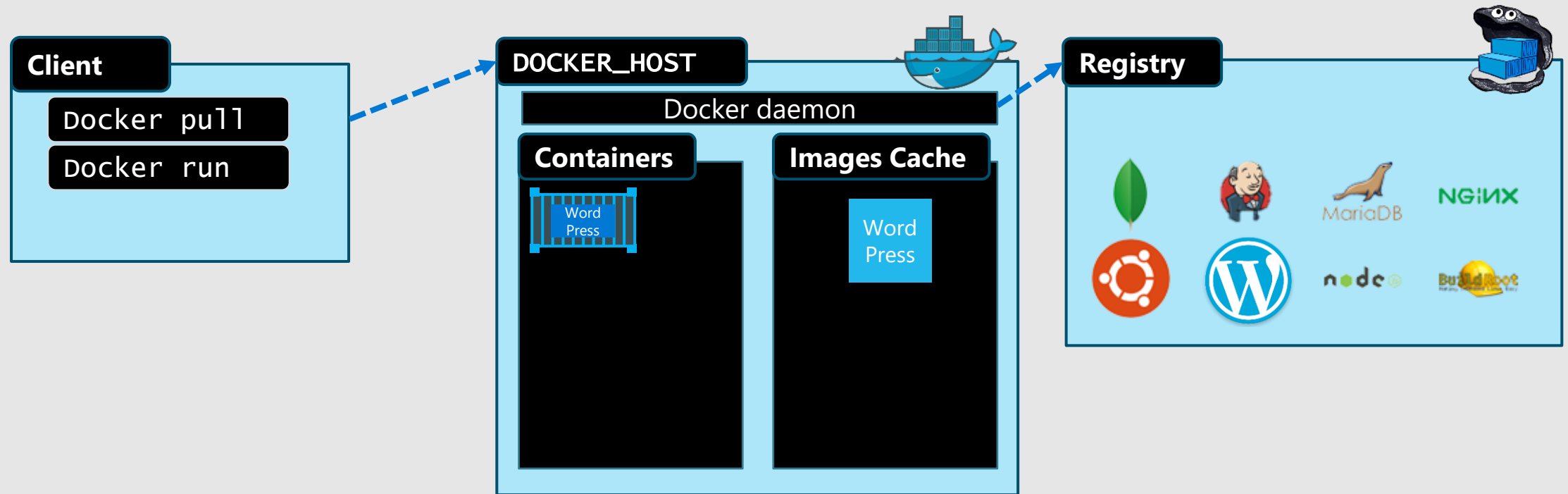


Image Anatomy

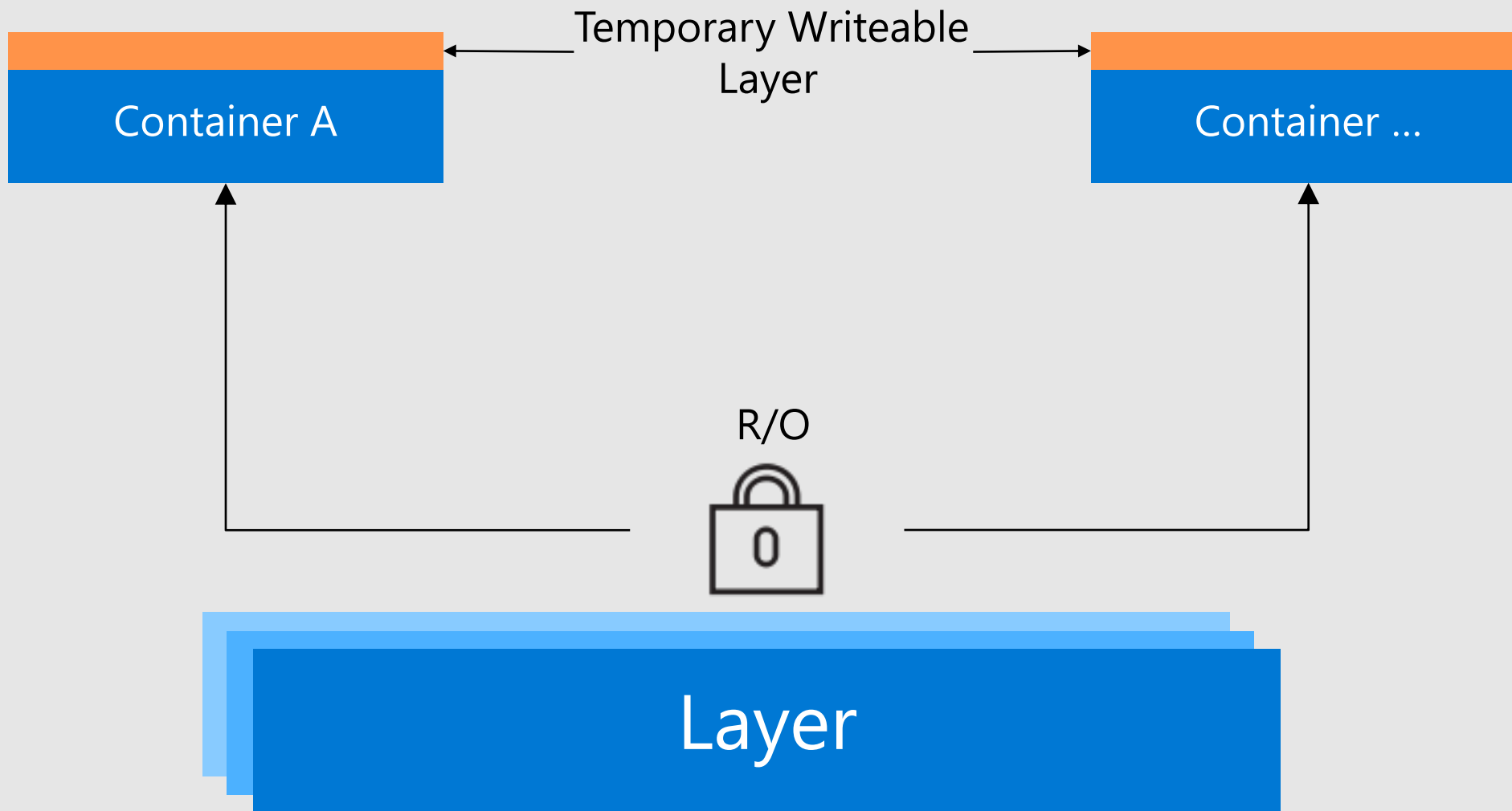
```
graph TD; Updates[Updates] --- ApplicationCode[Application Code]; ApplicationCode --- FurtherSDK[Further SDK/Tools]; FurtherSDK --- BaseLayer[Base Layer  
(Debian, Ubuntu, ... OS)];
```

Updates

Application Code

Further SDK/Tools

Base Layer
(Debian, Ubuntu, ... OS)



Pull Image

```
docker image pull microsoft/dotnet
```

```
PS C:\Users\nimix> docker image pull microsoft/dotnet
Using default tag: latest
latest: Pulling from microsoft/dotnet
844c33c7e6ea: Downloading [=====>] 27.56MB/45.38MB
ada5d61ae65d: Download complete
f8427fdf4292: Download complete
f025bafdc4ab8: Downloading [=====>] 39.23MB/50.07MB
5d3d4cac47a9: Download complete
43eaebee7afb: Downloading [=====>] 33.37MB/173.4MB
7d9d607114c9: Waiting
```

The Manifest

```
docker manifest inspect microsoft/dotnet
```

Inspect Anatomy of Manifest for different Platforms

History

docker history microsoft/dotnet

| IMAGE | CREATED | CREATED BY | SIZE |
|--------------|-------------|---|--------|
| 84120c6c3491 | 9 days ago | /bin/sh -c dotnet help | 1.08GB |
| <missing> | 9 days ago | /bin/sh -c #(nop) ENV ASPNETCORE_URLS=http:... | 0B |
| <missing> | 9 days ago | /bin/sh -c curl -SL --output dotnet.tar.gz h... | 357MB |
| <missing> | 9 days ago | /bin/sh -c #(nop) ENV DOTNET_SDK_VERSION=2... | 0B |
| <missing> | 9 days ago | /bin/sh -c apt-get update && apt-get ins... | 32.5MB |
| <missing> | 9 days ago | /bin/sh -c apt-get update && apt-get install... | 142MB |
| <missing> | 9 days ago | /bin/sh -c set -ex; if ! command -v gpg > /... | 7.81MB |
| <missing> | 9 days ago | /bin/sh -c apt-get update && apt-get install... | 23.2MB |
| <missing> | 10 days ago | /bin/sh -c #(nop) CMD ["bash"] | 0B |
| <missing> | 10 days ago | /bin/sh -c #(nop) ADD file:152359c10cf61d800... | 101MB |

Tooling - Dive

dive microsoft/dotnet

Administrator: Windows PowerShell

[• Layers]

| Cmp | Size | Command |
|--------|---|---------|
| 101 MB | FROM c1490b9cc59b1aa | |
| 23 MB | apt-get update && apt-get install -y --no-install-reco | |
| 7.8 MB | set -ex; if ! command -v gpg > /dev/null; then apt- | |
| 142 MB | apt-get update && apt-get install -y --no-install-reco | |
| 32 MB | apt-get update && apt-get install -y --no-install- | |
| 357 MB | curl -SL --output dotnet.tar.gz https://dotnetcli.azure | |
| 1.1 GB | dotnet help | |

[Layer Details]

Tags: (unavailable)

Id: ecd3d320c76bd20af769b96a5a771ae7ce6997dde45787b3b657f3618c234923

Digest: sha256:73bfa217d66f35520cce481c1fbde51cbdba48113f549c41b68b33eca7bc1f0c

Command: set -ex; if ! command -v gpg > /dev/null; then apt-get update; apt-get install -y --no-install-recommends gnupg dirmngr; rm -rf /var/lib/apt/lists/*; fi

[Image Details]

Total Image size: 1.7 GB

Potential wasted space: 7.3 MB

[Current Layer Contents]

| Permission | UID:GID | Size | Filetree |
|------------|---------|--------|--------------------|
| -rwxr-xr-x | 0:0 | 2.1 kB | zforce |
| -rwxr-xr-x | 0:0 | 5.9 kB | zgrep |
| -rwxr-xr-x | 0:0 | 2.0 kB | zless |
| -rwxr-xr-x | 0:0 | 1.9 kB | zmore |
| -rwxr-xr-x | 0:0 | 5.0 kB | znew |
| drwxr-xr-x | 0:0 | 0 B | boot |
| drwxr-xr-x | 0:0 | 0 B | dev |
| drwxr-xr-x | 0:0 | 438 kB | etc |
| -rw----- | 0:0 | 0 B | .pwd.lock |
| drwxr-xr-x | 0:0 | 880 B | X11 |
| drwxr-xr-x | 0:0 | 880 B | Xsession.d |
| -rw-r--r-- | 0:0 | 880 B | 90gpg-agent |
| -rw-r--r-- | 0:0 | 3.0 kB | adduser.conf |
| drwxr-xr-x | 0:0 | 100 B | alternatives |
| -rw-r--r-- | 0:0 | 100 B | README |
| -rwxrwxrwx | 0:0 | 0 B | awk → /usr/bin/maw |
| -rwxrwxrwx | 0:0 | 0 B | awk.1.gz → /usr/sh |
| -rwxrwxrwx | 0:0 | 0 B | builtins.7.gz → /u |
| -rwxrwxrwx | 0:0 | 0 B | nawk → /usr/bin/ma |
| -rwxrwxrwx | 0:0 | 0 B | nawk.1.gz → /usr/s |
| -rwxrwxrwx | 0:0 | 0 B | pager → /bin/more |
| -rwxrwxrwx | 0:0 | 0 B | pager.1.gz → /usr/ |
| -rwxrwxrwx | 0:0 | 0 B | pinentry → /usr/bi |
| -rwxrwxrwx | 0:0 | 0 B | pinentry.1.gz → /u |

^C Quit | Tab Switch view | ^F Filter | ^L Show layer changes | ^A Show aggregated changes

Inspect Built Images

```
docker image inspect microsoft/dotnet
```

Full Qualified Docker Name



docker.io/redis:1.13.0

docker.io/redis:1.13.0

docker.io/redis:latest

(default) (default)

List local Docker Images

```
docker image ls
```

| | | | | |
|------------------------------------|---------------|--------------|---------------|--------|
| 01-docker-build | 0.0.3 | 50dccf72c4d1 | 2 days ago | 18.4MB |
| 01-docker-build | 0.0.2 | 82052f7a3dcf | 2 days ago | 18.4MB |
| <none> | <none> | 9e2e64f8cd0d | 2 days ago | 330MB |
| microsoft/dotnet | latest | 84120c6c3491 | 9 days ago | 1.74GB |
| node | 10-alpine | a0708430821e | 13 days ago | 75.4MB |
| ubuntu | latest | 775349758637 | 4 weeks ago | 64.2MB |
| k8s.gcr.io/kube-apiserver | v1.14.8 | 1e94481e8f30 | 6 weeks ago | 209MB |
| k8s.gcr.io/kube-scheduler | v1.14.8 | f1e3e5f9f93e | 6 weeks ago | 81.6MB |
| k8s.gcr.io/kube-proxy | v1.14.8 | 849af609e0c6 | 6 weeks ago | 82.1MB |
| k8s.gcr.io/kube-controller-manager | v1.14.8 | 36a8001a79fd | 6 weeks ago | 158MB |
| docker/kube-compose-controller | v0.4.23 | a8c3d87a58e7 | 6 months ago | 35.3MB |
| docker/kube-compose-api-server | v0.4.23 | f3591b2cb223 | 6 months ago | 49.9MB |
| k8s.gcr.io/coredns | 1.3.1 | eb516548c180 | 10 months ago | 40.3MB |
| k8s.gcr.io/etcd | 3.3.10 | 2c4adeb21b4f | 12 months ago | 258MB |
| nginx | 1.14.1-alpine | 77bae8d00654 | 13 months ago | 17.7MB |
| k8s.gcr.io/pause | 3.1 | da86e6ba6ca1 | 23 months ago | 742kB |
| nginx | 1.13.5 | 1e5ab59102ce | 2 years ago | 108MB |
| nginx | 1.7.9 | 84581e99d807 | 4 years ago | 91.7MB |

Kubernetes

What is Kubernetes (**k8s**)?

- **Kubernetes** is "an open-source software for automating deployment, scaling, and management of containerized applications".
- **Kubernetes**, in Greek κυβερνήτης, means the Helmsman, or pilot of the ship.
- Keeping with the maritime theme of **Docker** containers, **Kubernetes** is the pilot of a ship of containers.



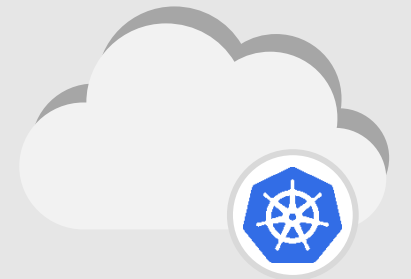
What is Kubernetes (k8s)?

History

- Originally designed by Google and is now maintained by the Cloud Native Computing Foundation (CNCF).
- Google still actively involved
- Kubernetes v1.0 was released on July, 2015 by Joe Beda, Brendan Burns and Craig McLuckie
- Over 1,700 authors and releases every three month
- To learn more about the ideas behind Kubernetes: read the Large-scale cluster management at Google with Borg paper

Kubernetes Features

- Self-Healing
- Horizontal Scaling
- Automated rollouts and rollbacks
- Service Discovery and Load Balancing
- Automatic bin packing
- Storage orchestration
- Secret and configuration management



Pets vs Cattle

Pets

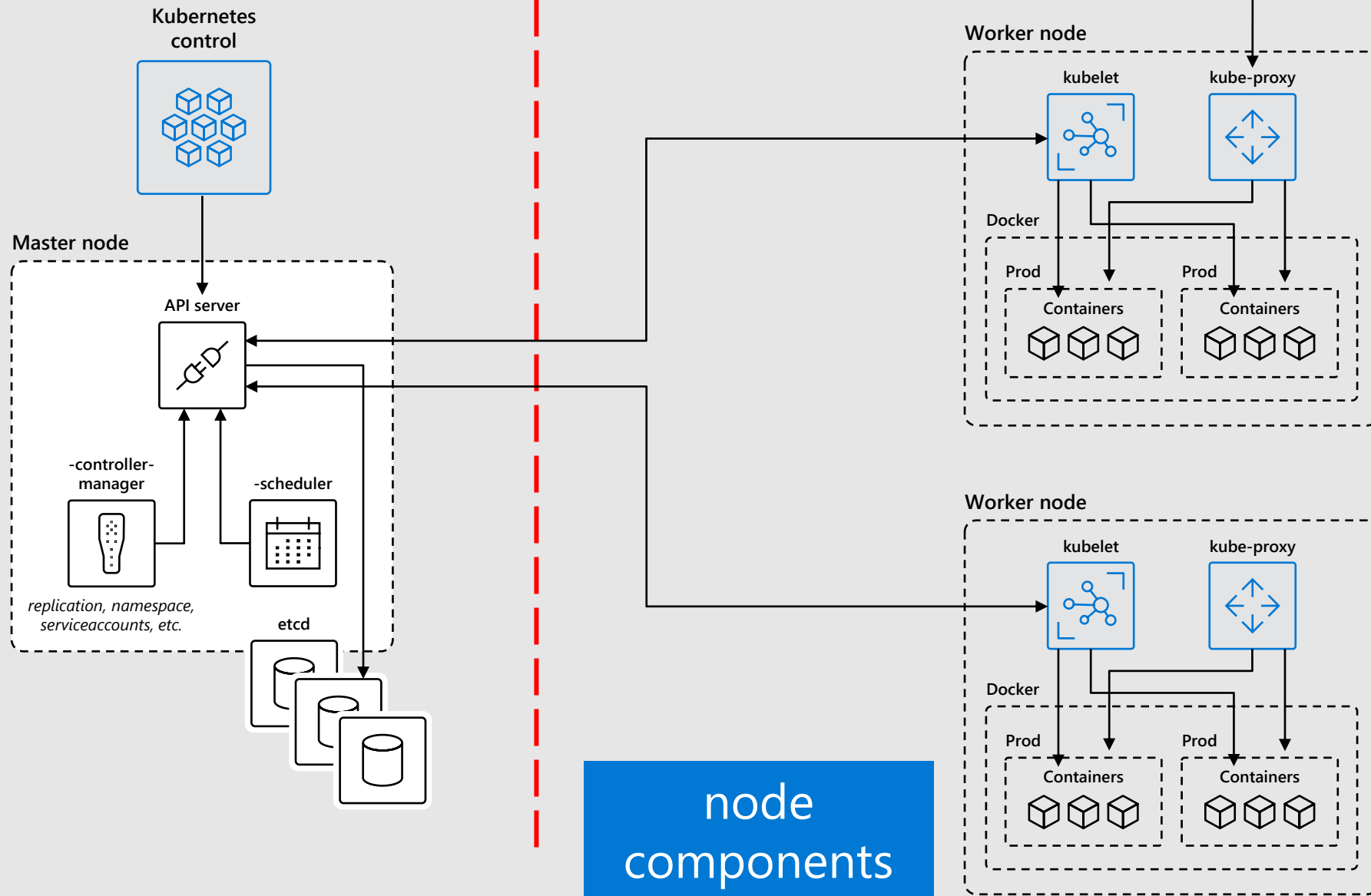


Cattle



Architektur

Kubernetes Architecture



master
components

node
components

YAML

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  spec:
    containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
          - containerPort: 80
```

Kubectl

```
kubectl cluster-info
```

Controls the Cluster via the Kubernetes API Server

Configuration

%USERPROFILE%\.kube\config

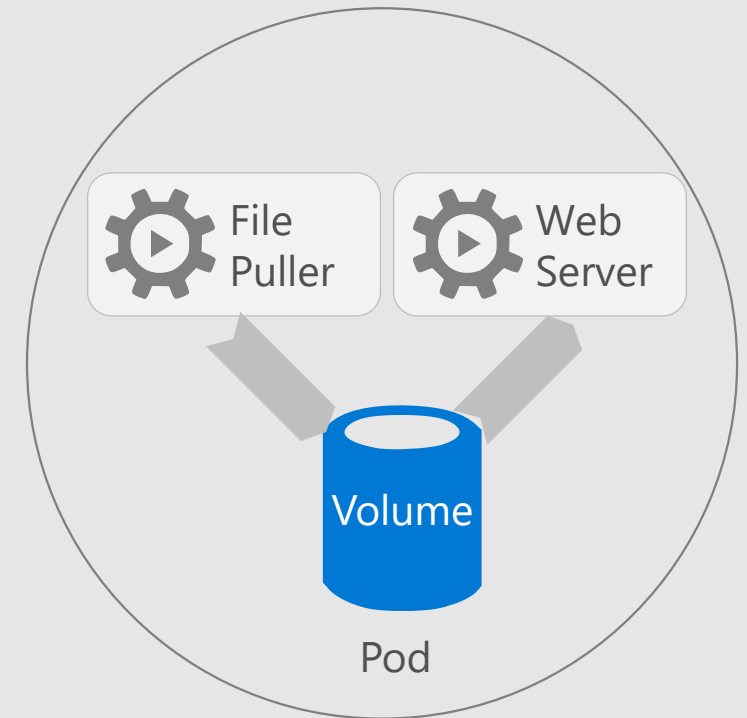
Contains:

- Credentials
- Clusters
- Contexts

Pods

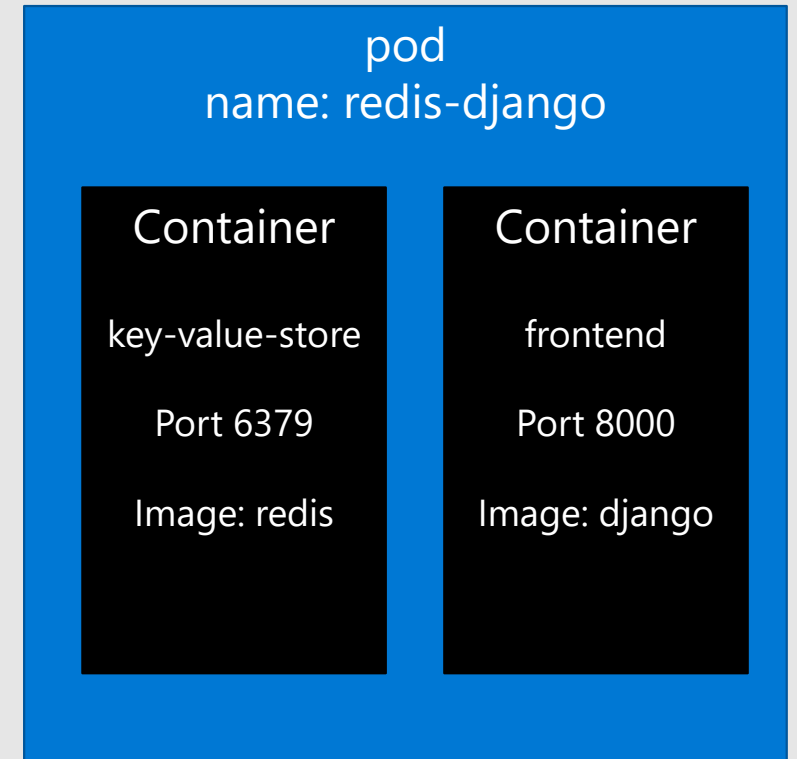
What is a pod?

- Pod is the basic building block in Kubernetes
- Pods are how containers are delivered
- Can be multiple containers (side car)
- Encapsulates container(s), storage, network IP, and options on how to run



Kubernetes manifest: Pod

```
apiVersion: v1
kind: Pod
metadata:
  name: redis-django
  labels:
    app: web
spec:
  containers:
    - name: key-value-store
      image: redis
      ports:
        - containerPort: 6379
    - name: frontend
      image: django
      ports:
        - containerPort: 8000
```



Q &A



Thank You!

ευχαριστώ Salamat Po متشکرم شکراً Grazie

благодаря ありがとうございます Kiitos Teşekkürler 谢谢

ໂພນດຸຣຸນດຳ Obrigado شكریه Terima Kasih Dziękuję

Hvala Köszönöm Tak Dank u Wel дякую Tack

Mulțumesc спасибо Danke Cám ơn Gracias

多謝晒 Ďakujem תודה நன்றி Děkuji 감사합니다





