Microsoft

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

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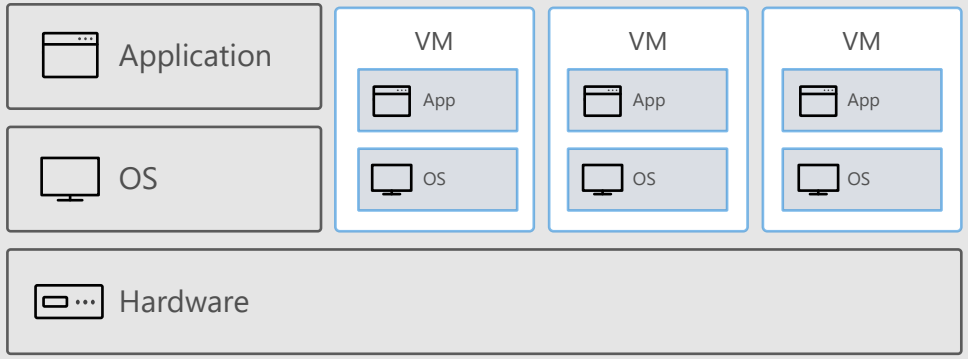
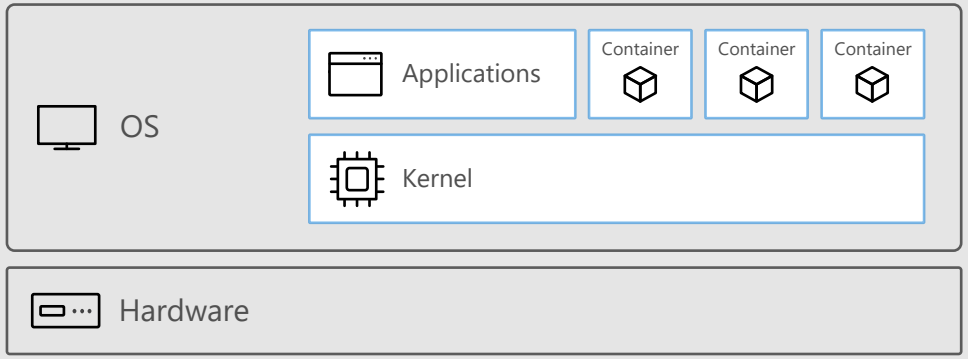
Docker

What is a container?

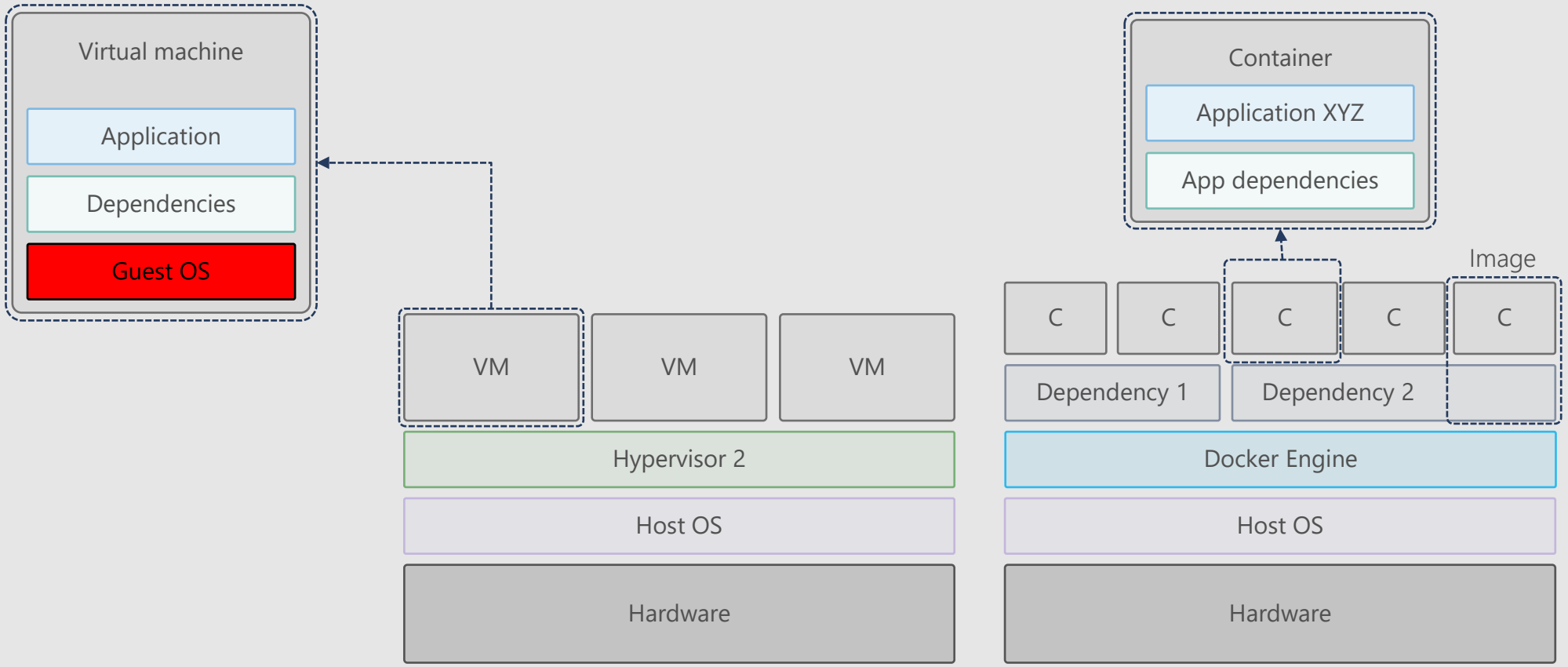
Virtual machines = hardware virtualization



Containers = OS virtualization



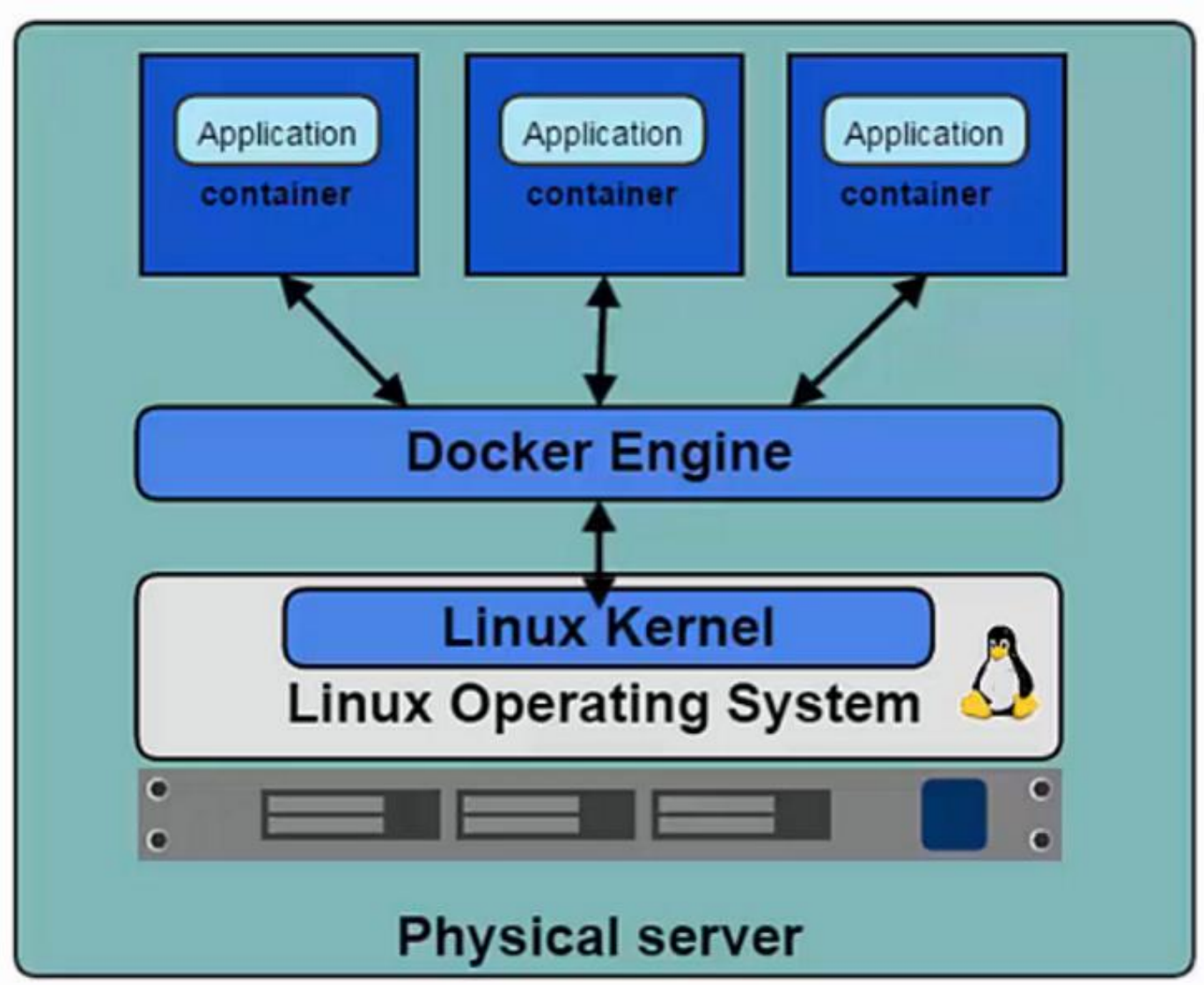
Virtualization versus containerization?



Virtualization

Containerization

Docker Platform



Docker In Action

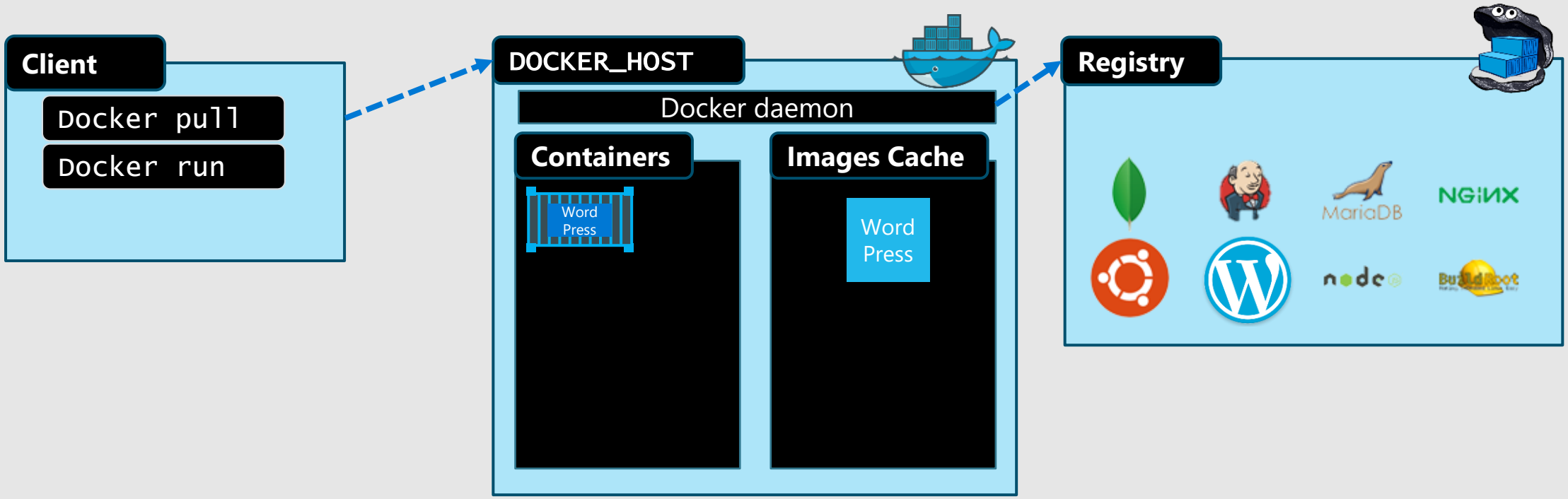
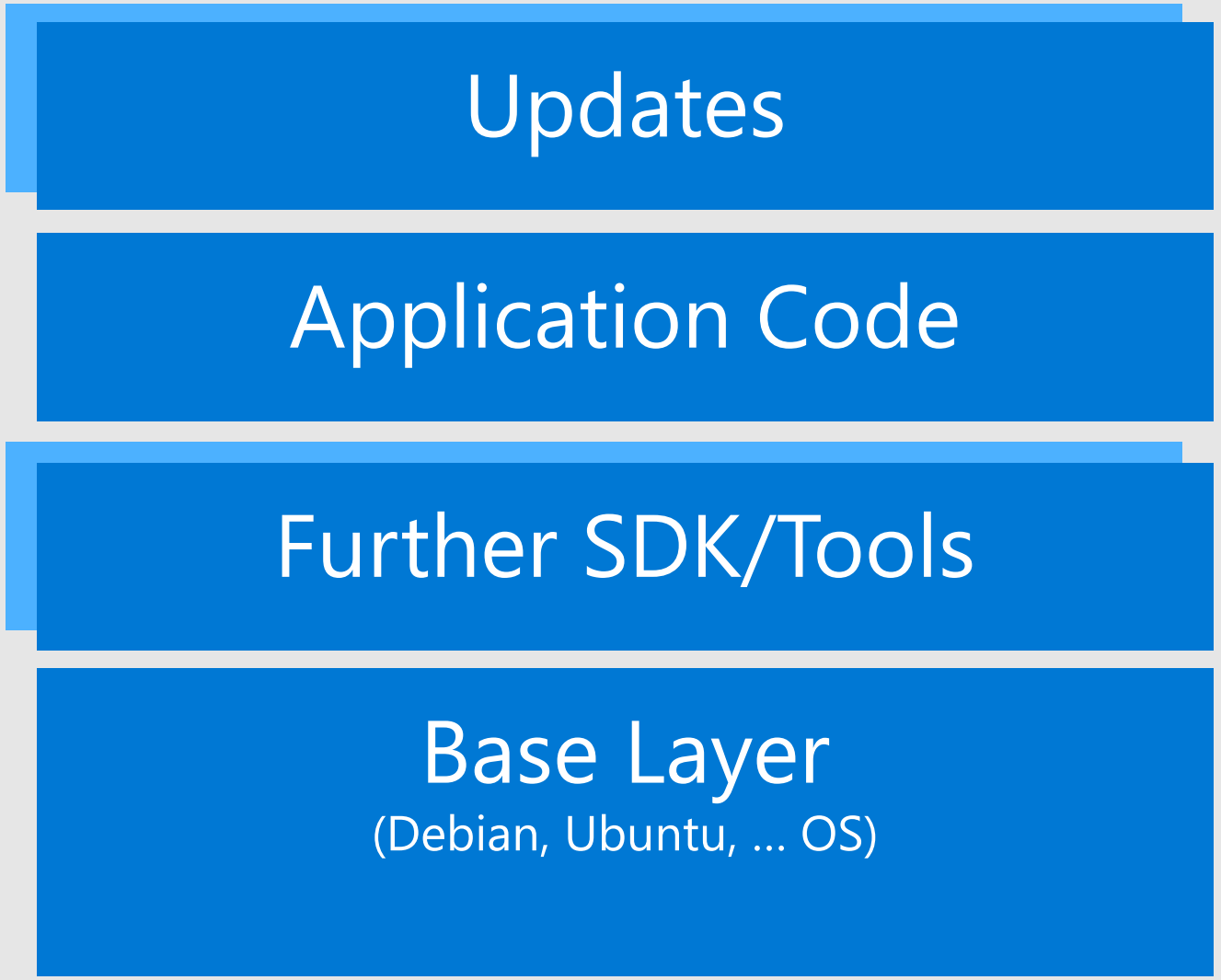
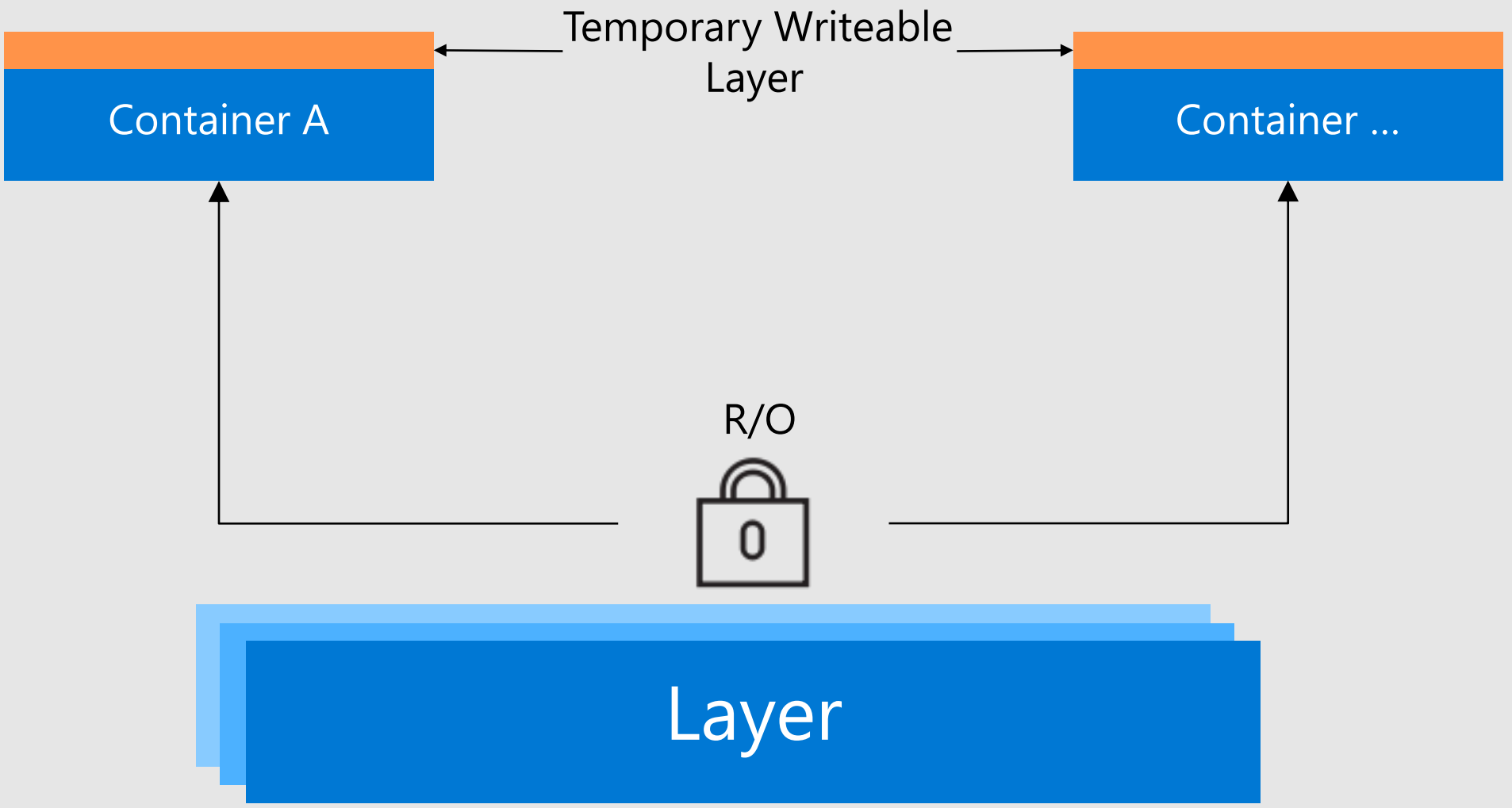


Image Anatomy




Temporary Writeable Layer
Container A
Container ...
R/O
Layer

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
f025bafc4ab8: 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

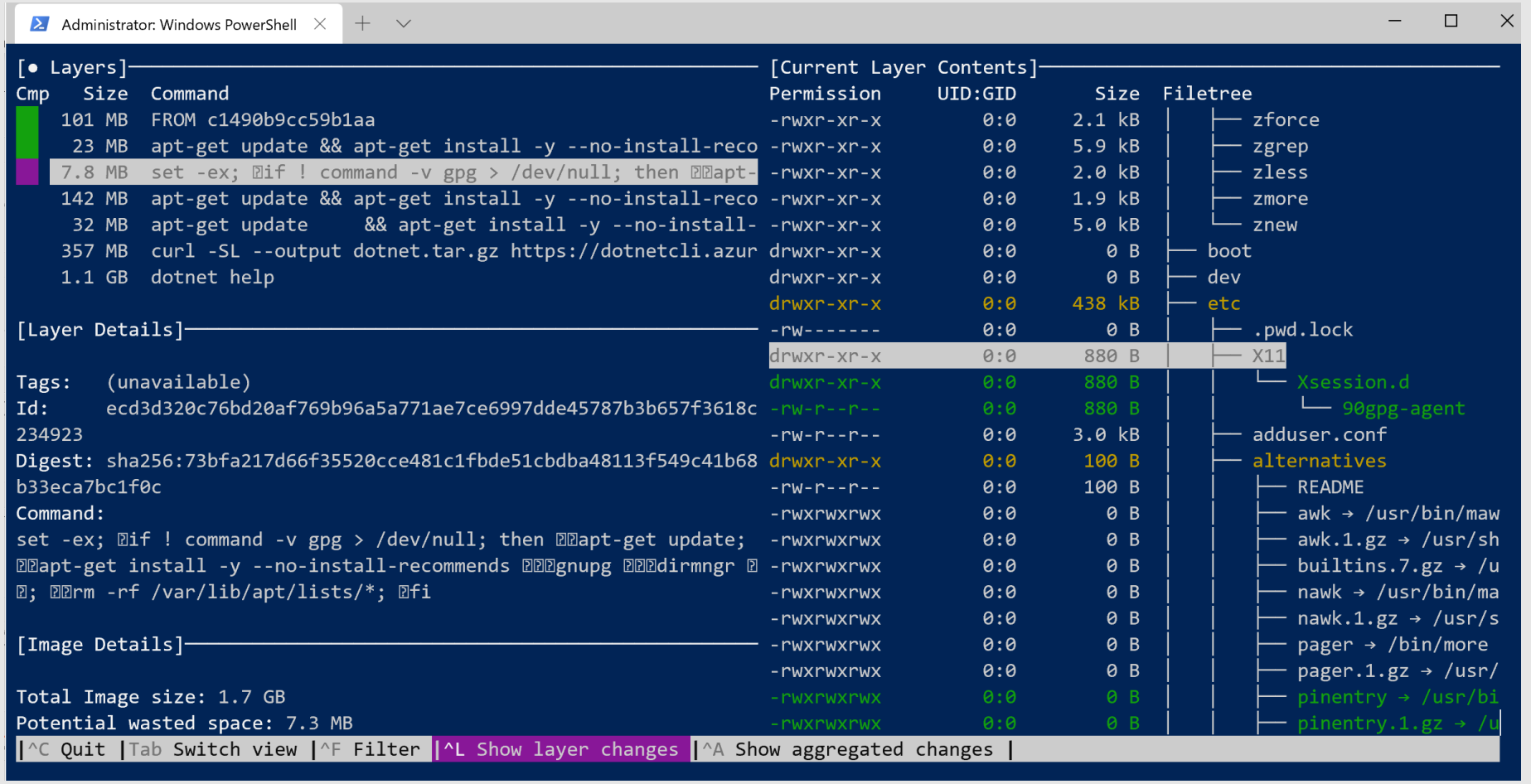
History

```
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`



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)?

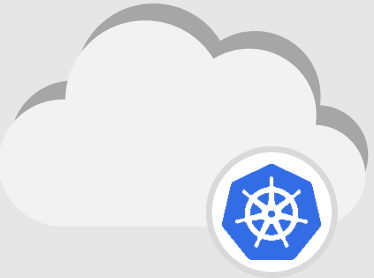
History

- 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



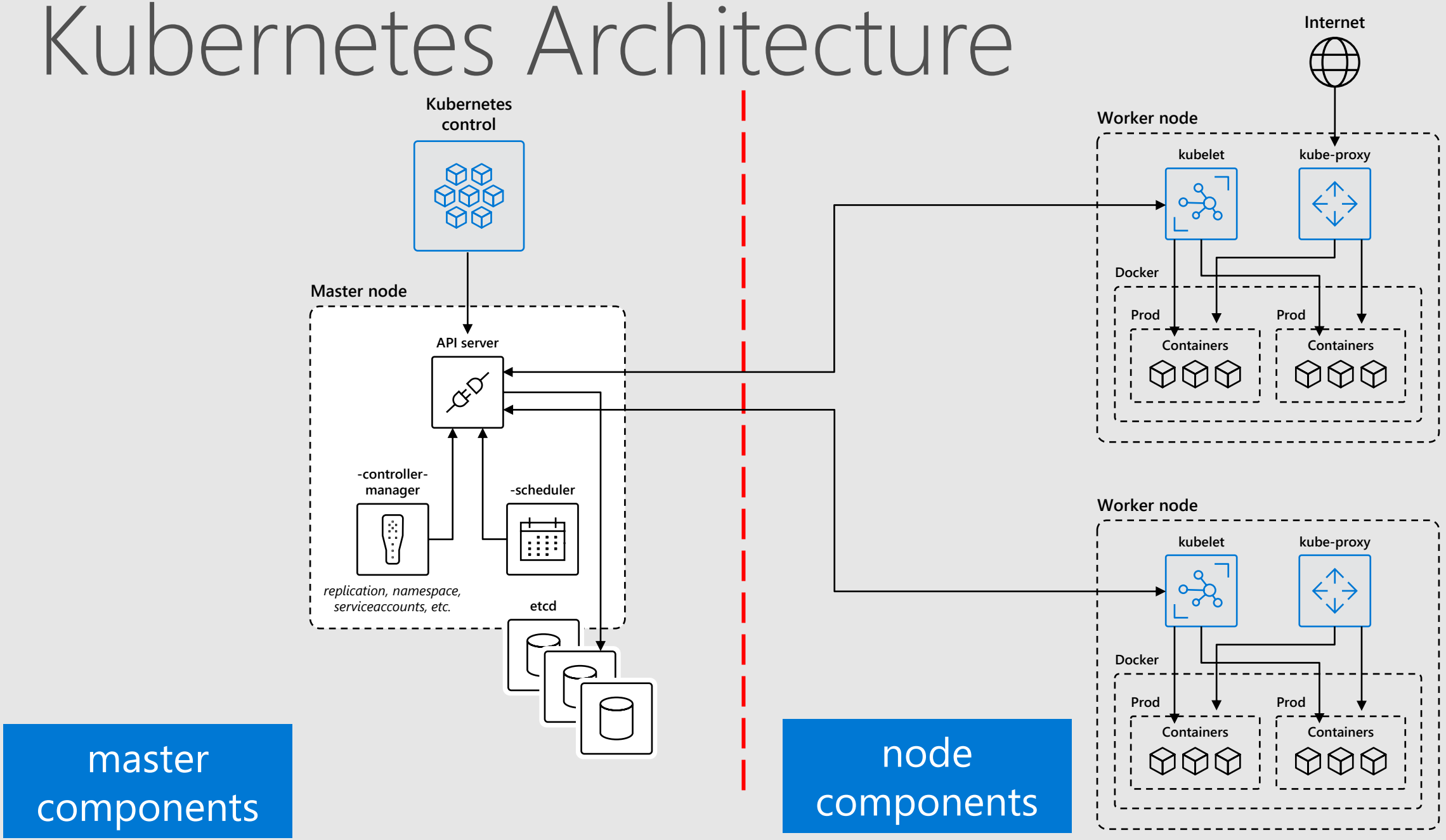
Pets vs Cattle

Pets

Cattle

Architektur

Kubernetes Architecture



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`

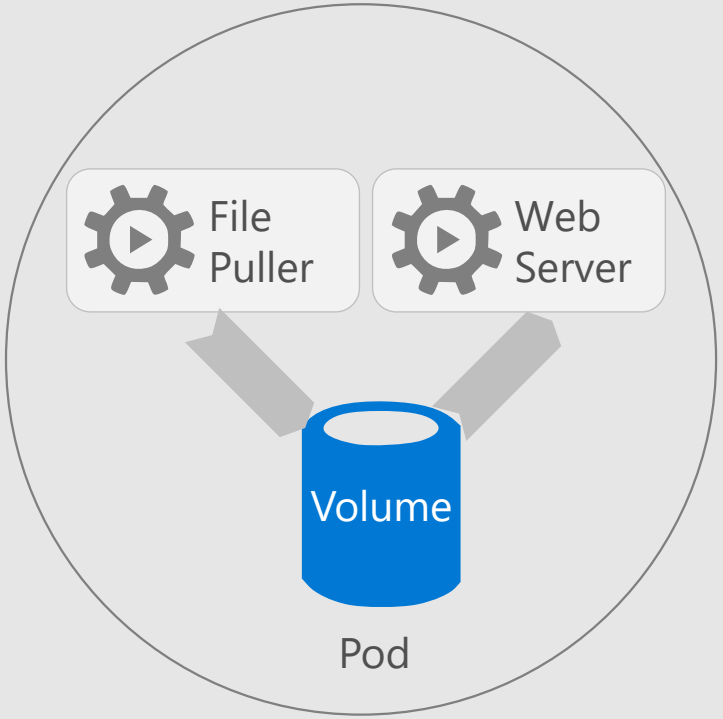
Contains:

- Credentials
- Clusters
- Contexts

Pods

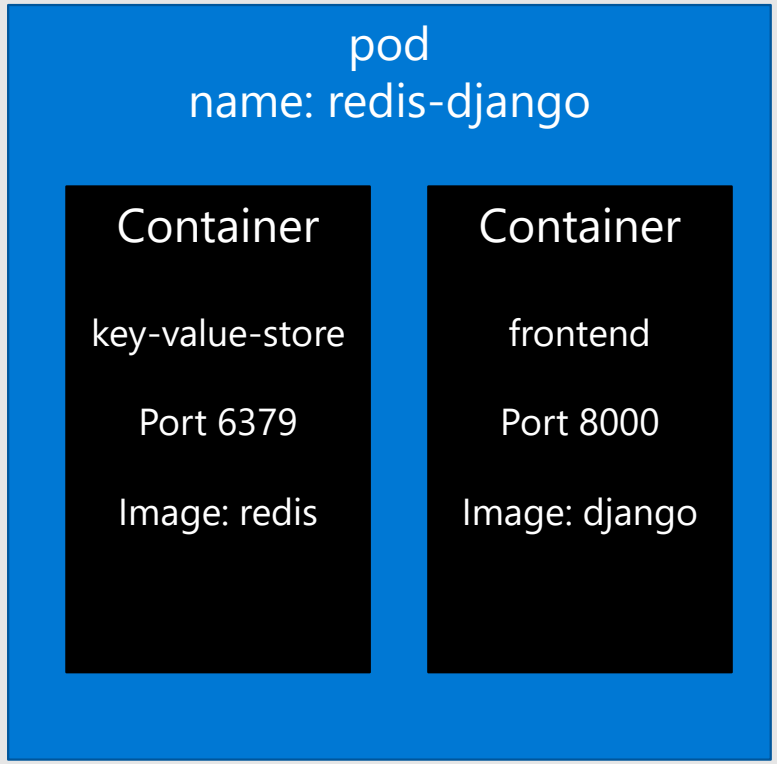
What is a pod?

- 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

Microsoft

Thank You!

ευχαριστώ Salamat Po متشكرم شكراً Grazie

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

ขอบคุณครับ Obrigado شكريه Terima Kasih Dziękuję

Hvala Köszönöm Tak Dank u Wel дякую Tack

Mulţumesc спасибо Danke Cám ơn Gracias

多謝晒 Ďakujem תודה நன்றி Děkuji 감사합니다

GFU Cyrus AG

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