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Introducción a Docker y Kubernetes

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ABOUT ME

Pablo Chico De Guzman

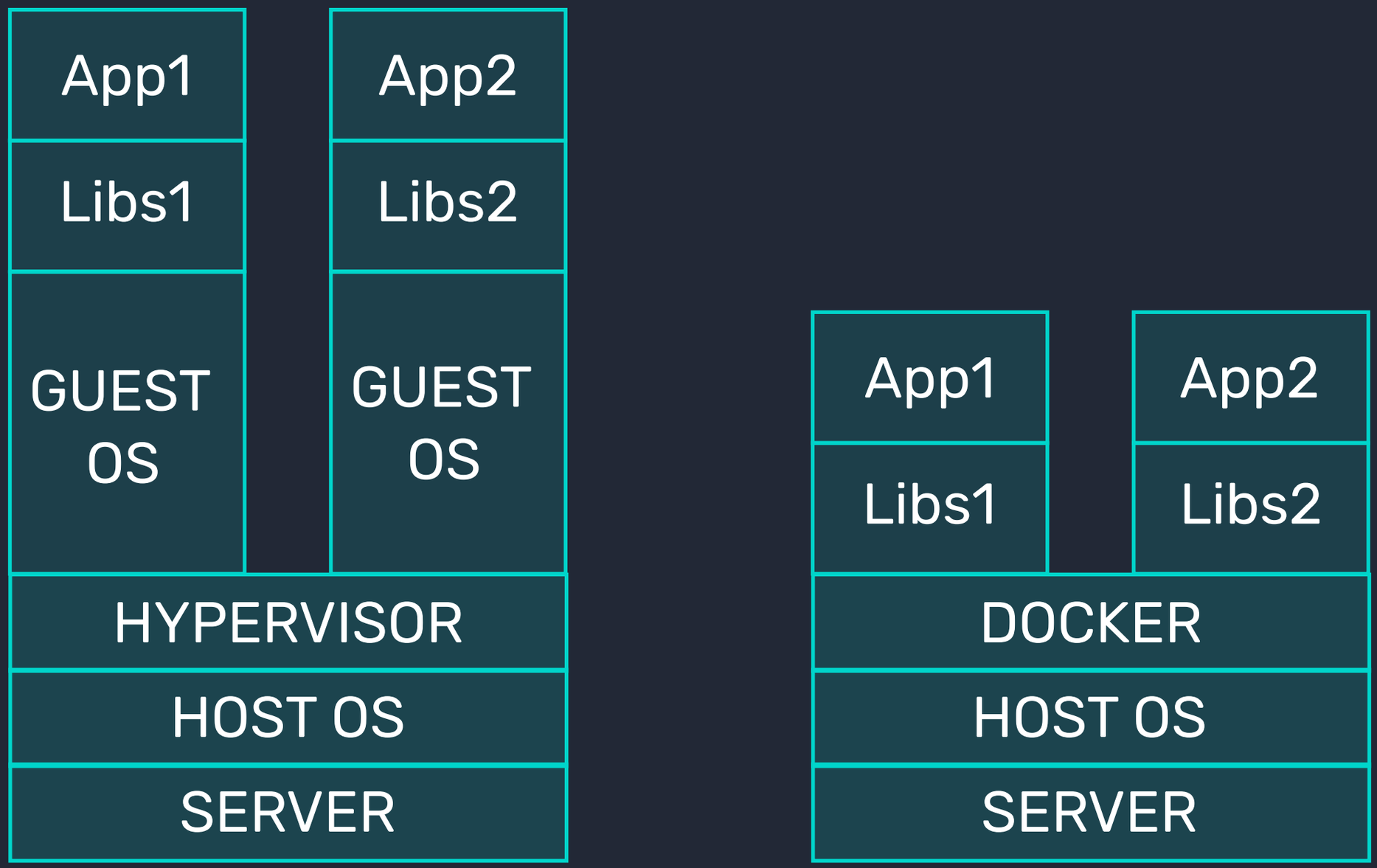
- Focused on container industry.
- Docker Madrid Meetup - 3.500 members.
- 4 years working @Docker.
- www.okteto.com
  CTO & Cofounder.
  Maximizing developer productivity for Kubernetes based applications.

What Is a Container?

What Is A Container?

- Simplicity for LXC containers (developers are lazy).
- Portable process.
- Dependency management.
- Easy of distributions.
- Lightweight.

What Is A Container?

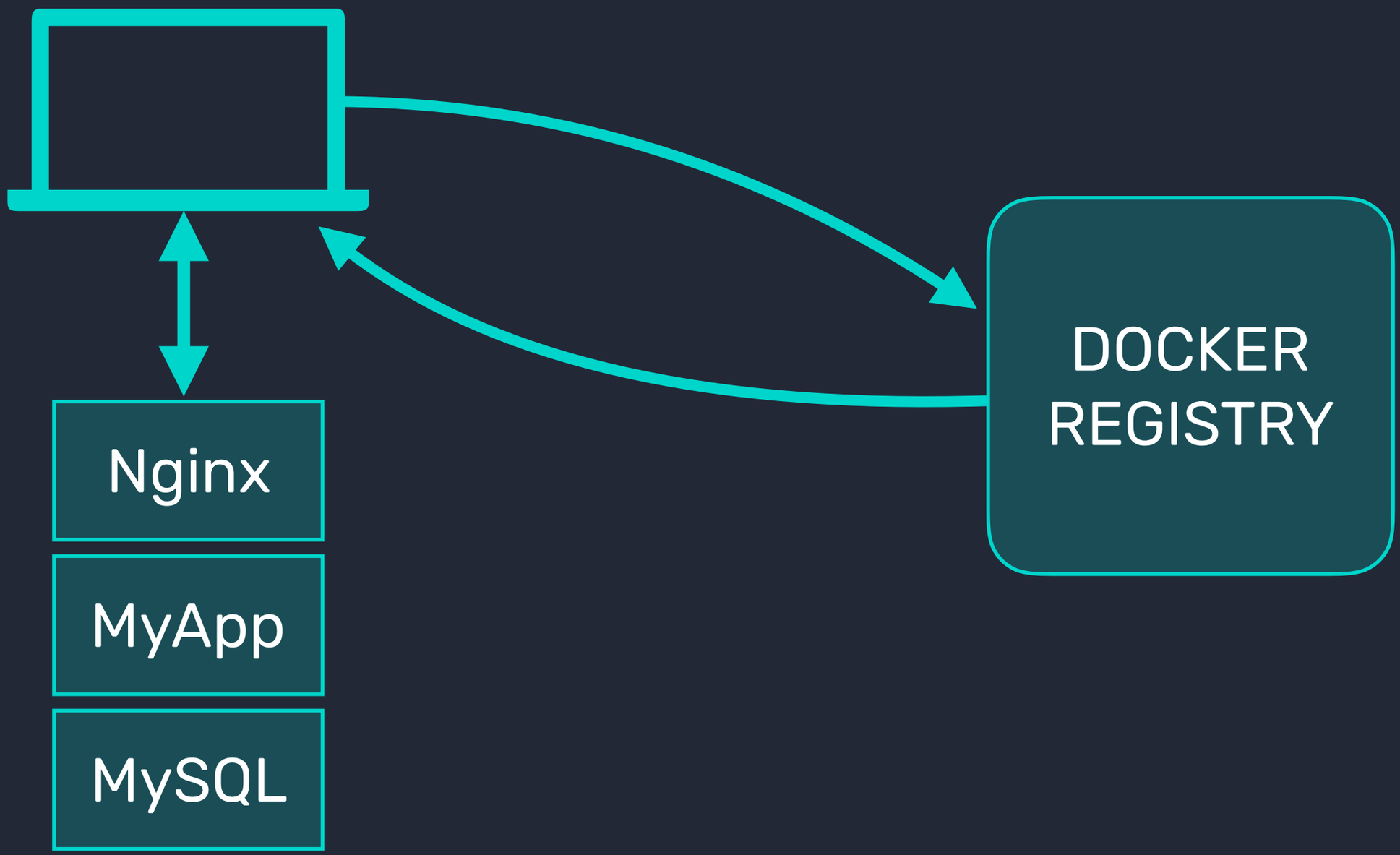


VMs

Docker

Why Are Containers Successful?

Why Are Containers Successful?



How to Deploy Containers?

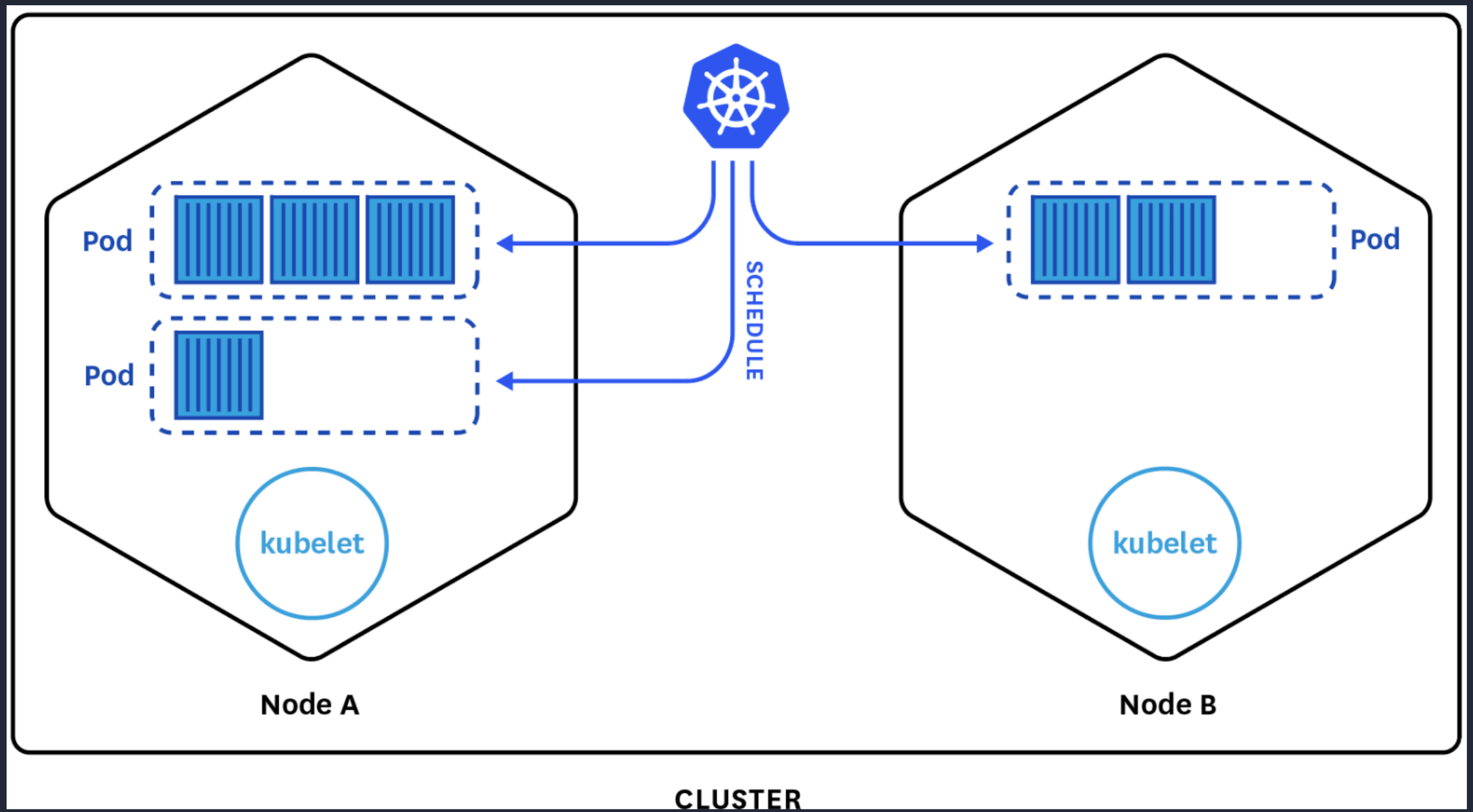
Some Examples

- Scripting, Ansible, Terraform…
- Docker Swarm.
- Mesosphere.
- ECS / AWS Fargate.
- Kubernetes.

Kubernetes

- Borg, Google.
- Declarative.
- Fault tolerance.
- Service Discovery.
- Networking.
- Scales to 5000 nodes.
- Multi Cloud.
- Community.
- Ecosystem.

Kubernetes



How To Run Kubernetes

- Docker for Mac, Minikube, microk8s.
- Kops / Rancher.
- AKS, EKS, GKE, Digital Ocean.
- Cloud Foundry / Openshift.

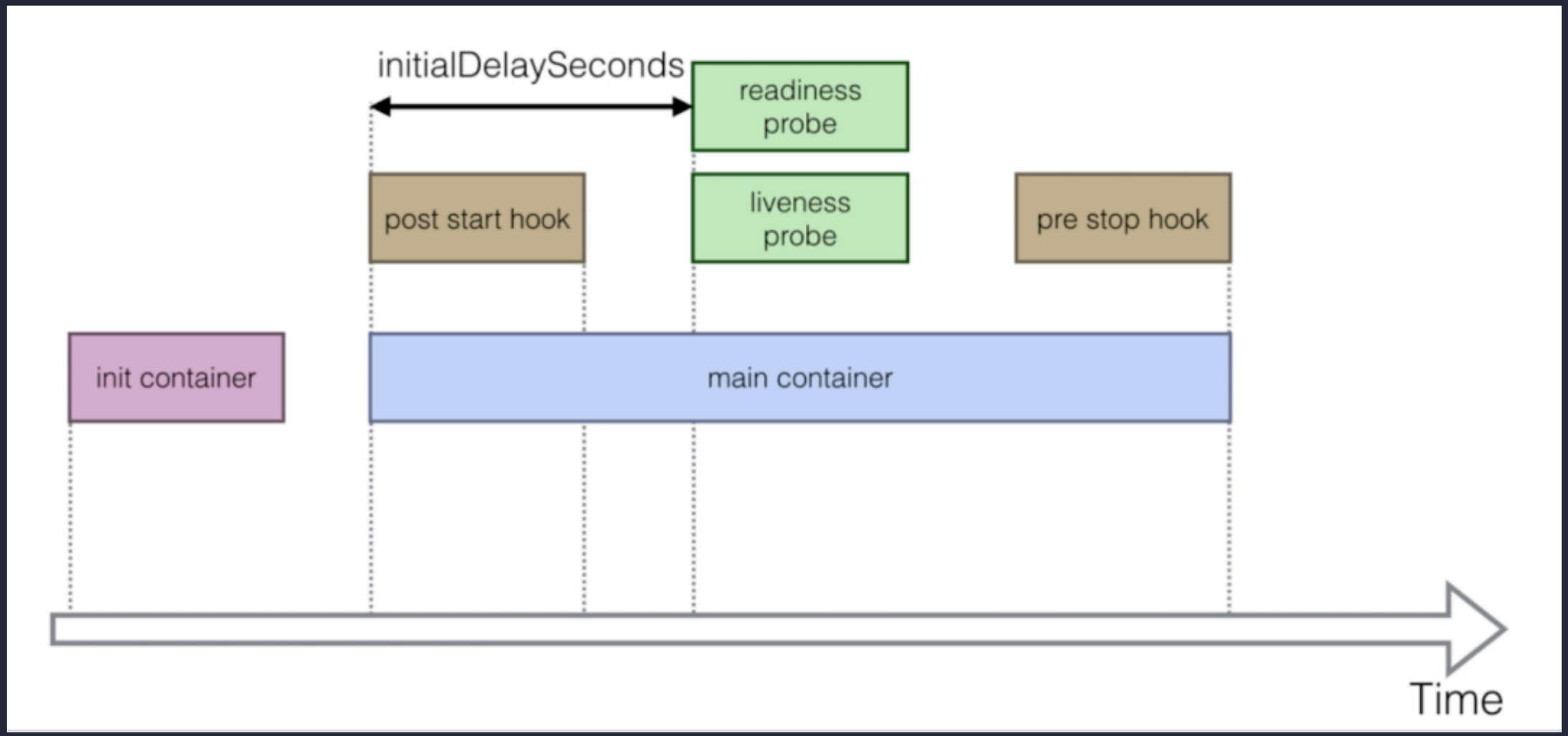
Working With Kubernetes

Pods

- Containers delayed as a unit.
- Localhost.
- Shared volumes.
- Sidecars.

```
1    apiVersion: v1
2    kind: Pod
3    metadata:
4      name: pod
5    spec:
6      containers:
7      - name: nginx
8        image: nginx:1.7.9
9        ports:
10       - containerPort: 80
```

Pod Lifecycle



Replica Sets

- Stateless.
- Scale pods.
- Fault tolerance.

```yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: replica-set
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
    matchExpressions:
      - {key: app, operator: In, values: [nginx]}
  template:
    metadata:
      name: nginx
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort: 80
```

Deployments

- Pods + Replica sets.
- Upgrades.
- Rollbacks / History.

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

Services

- Pods IPs are not reliable.
- Static endpoint.
- Load balancer.

```yaml
kind: Service
apiVersion: v1
metadata:
  name: service
spec:
  type: NodePort
  selector:
    app: nginx
  ports:
  - port: 80
    nodePort: 30080
```

Namespaces

- Virtual clusters
- Unique names per namespace.
- Useful for Teams.
- Same networking.
- Quotas.

Other Resources

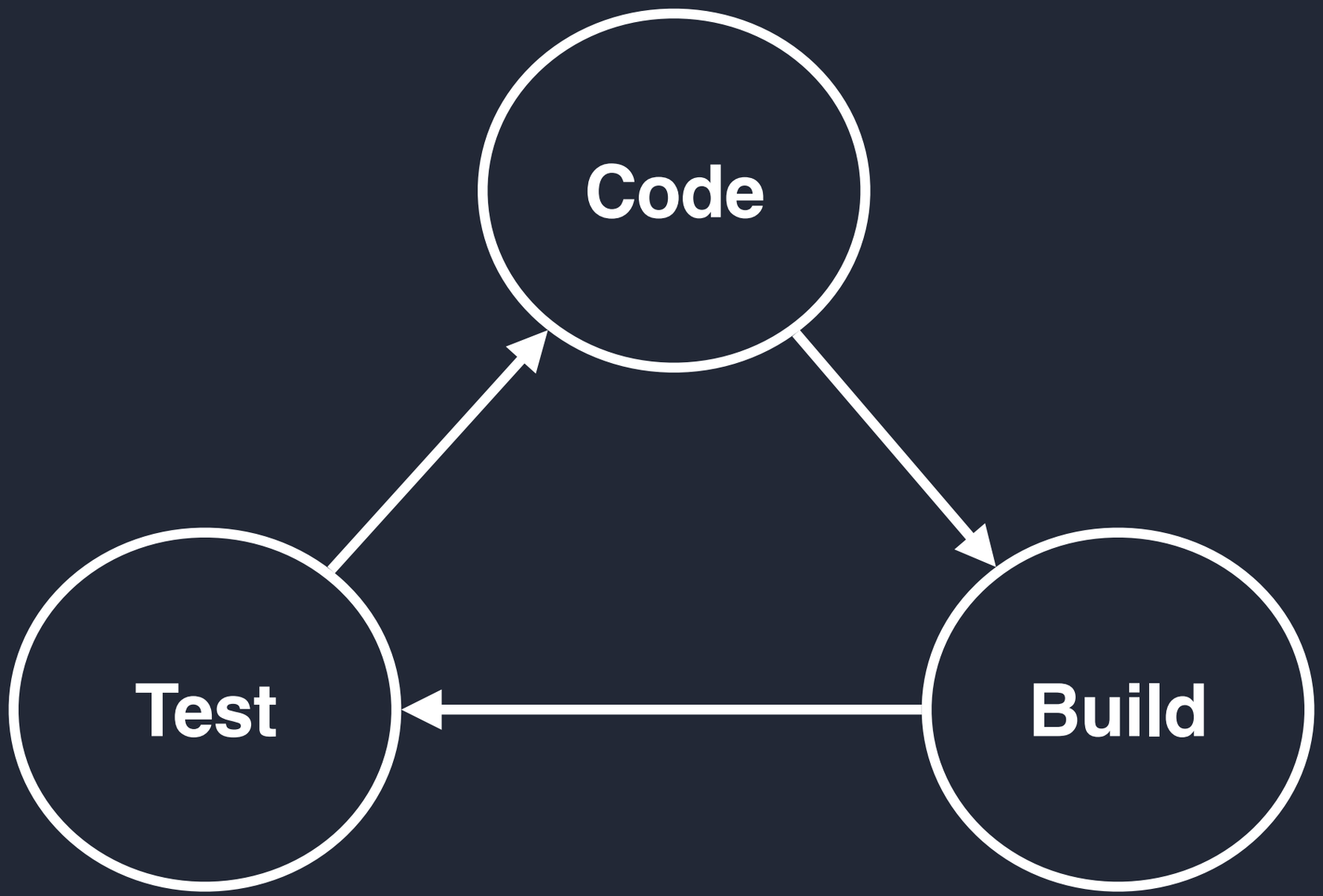
- Ingress Controllers.
- Volumes.
- Jobs.
- DaemonSets.
- StatefulSets.
- Secrets.
- Labels.
- Affinity.

Ecosystem

- Helm.
- Istio.
- Spinnaker.
- Open FaaS.
- Prometheus.

Docker and Kubernetes Come With Their Own Set of Problems

Local Development Cycle



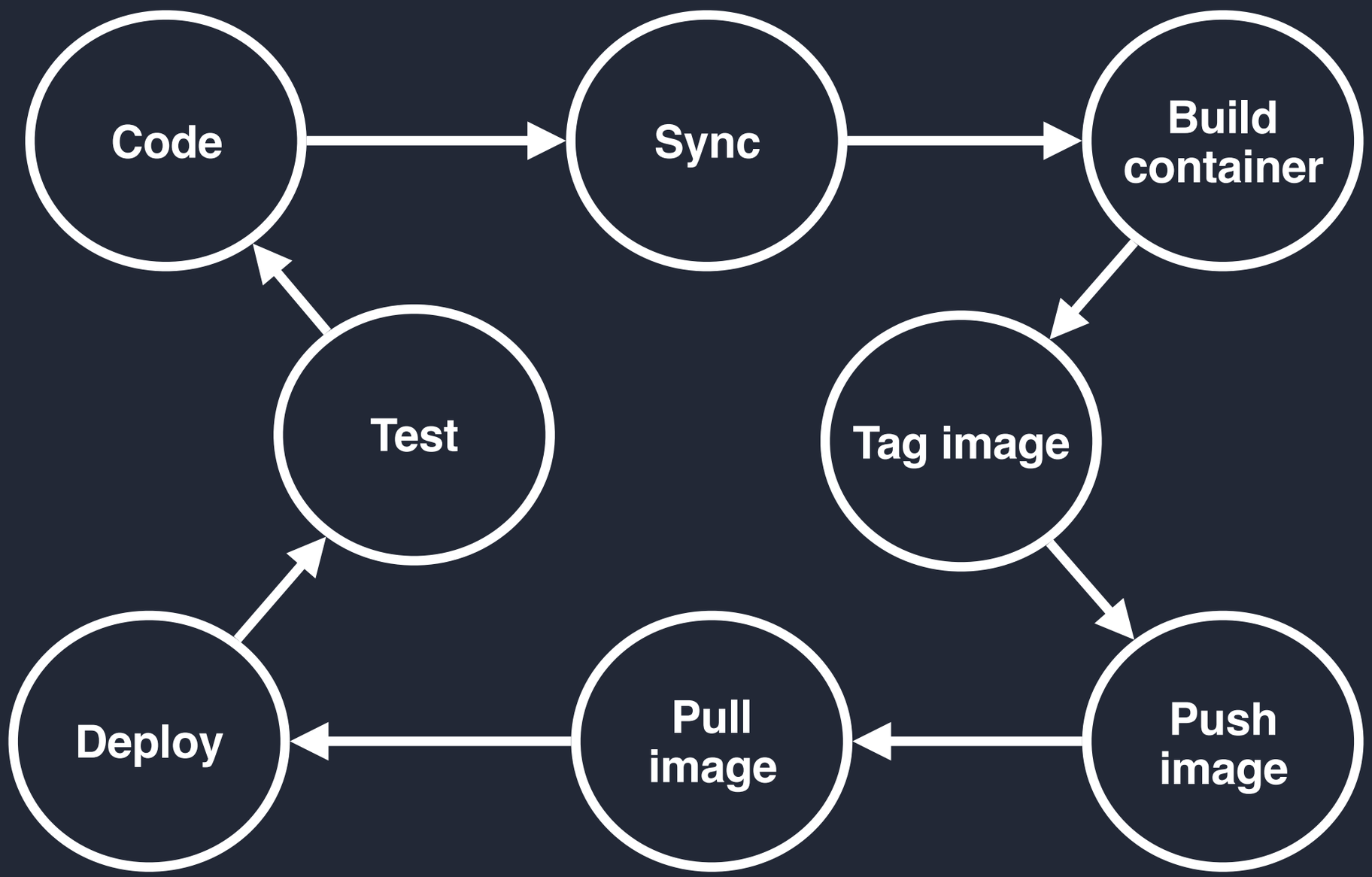
DEVELOPMENT

Develop Locally Without Kubernetes

- Fast.
- Programming language cache.
- Hot reloads.
- Integration is broken.
- Portability is broken.

Develop Locally Without Kubernetes

Kubernetes Development Cycle



Skaffold / Draft

- https://github.com/GoogleContainerTools/skaffold
- https://github.com/Azure/draft
- Automation for build/push/pull cycle.
- Works with build/redeploy.
- Automatic, but still slow.

Cloud Native Development

- Move your dev environment entirely to the cluster.
- No need for build/push/pull cycle.
- Uses programming language cache.
- Uses hot reloads.
- Kubernetes integrated from development.
- Telepresence/Eclipse Che/CND.
- More tomorrow at 15:10 in Room 2.