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Because connections matter.

Enterprise Grade Deployment

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Agenda

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1. Deployment transformation
2. Kubernetes & OpenShift
3. Demo
4. Kubernetes operators
5. Summary

Monolithic Architecture

Monolithic architecture

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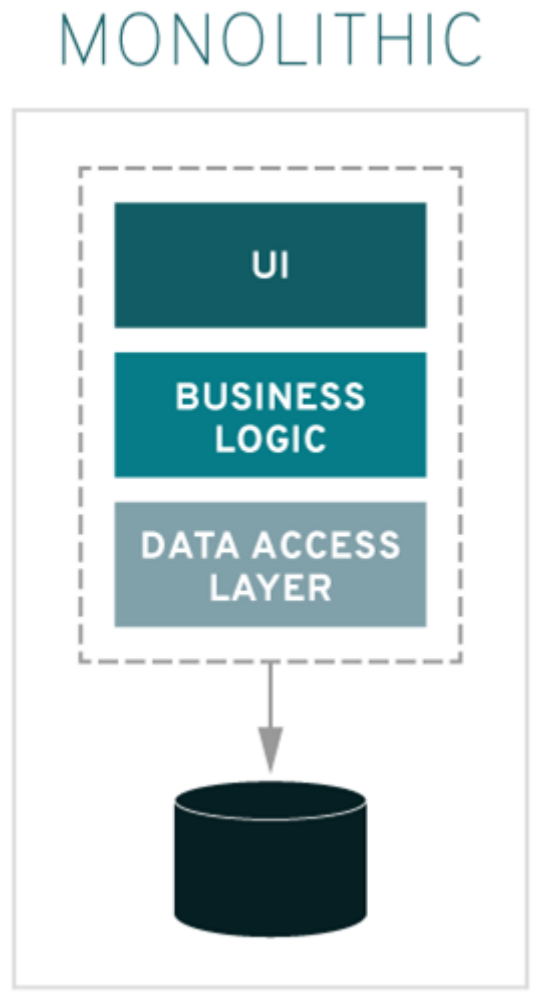
- One big code base
  - Hard maintenance
- One process
  - Single point of failure
  - Shared memory advantage
- Usually one platform supported



Monolithic architecture - Scaling

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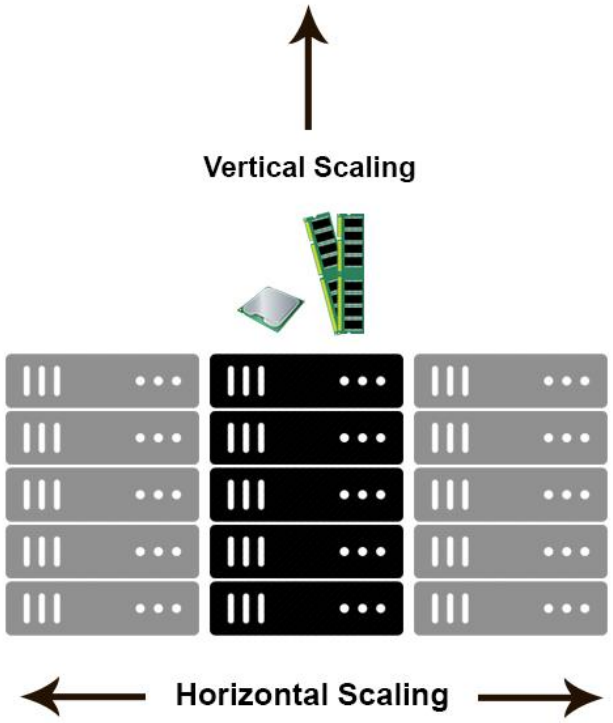
- Required horizontal and vertical scaling
- Complex custom load balancer configuration
- Installer wizard
  - Separate application



Docker

Docker

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- Containers
- Isolation/Security
- Same kernel as host system
  - Faster than VMs
- Image contains everything for run
- Useful for run of multiple applications simultaneously

Microservices

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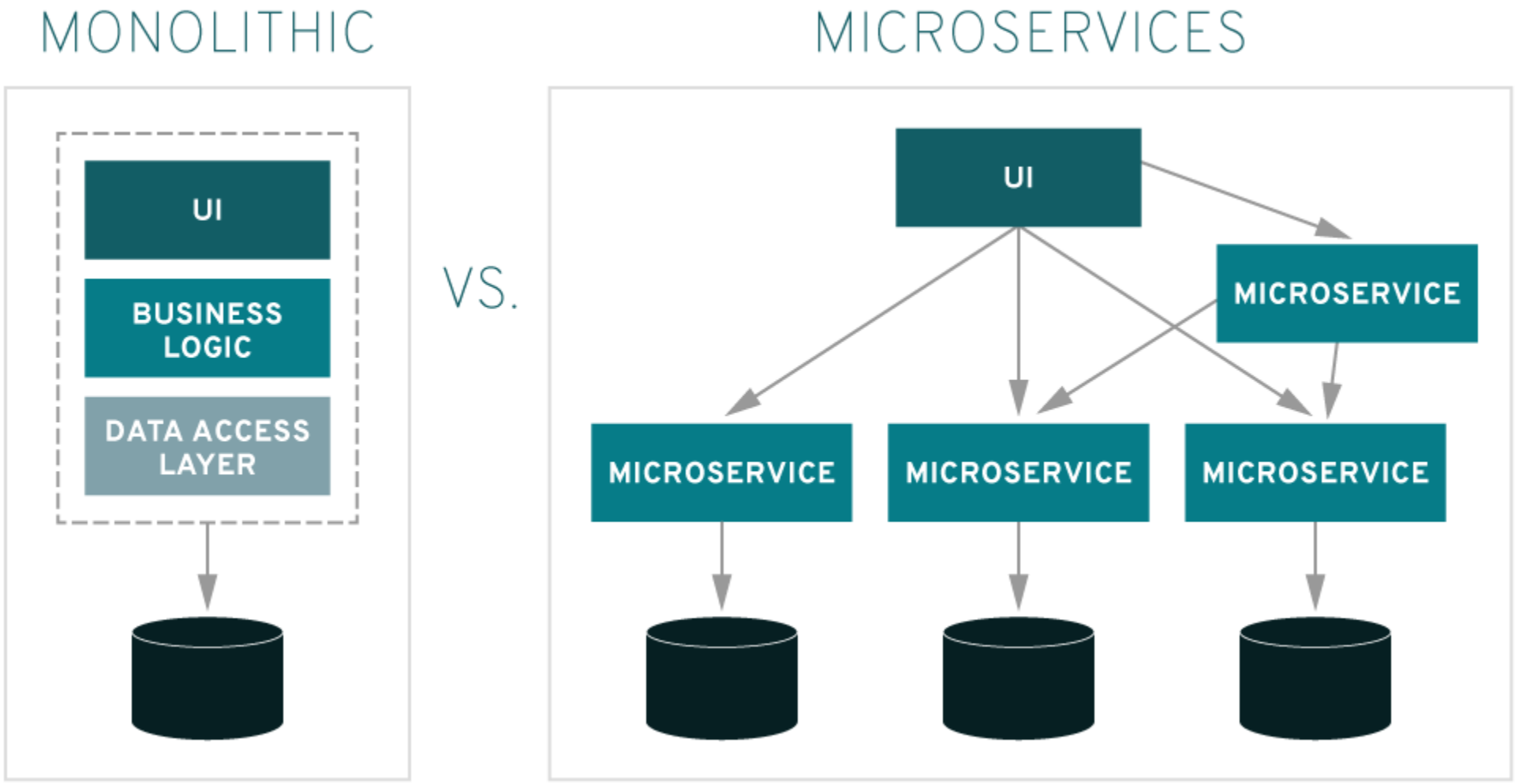

Container Orchestration

Container orchestration

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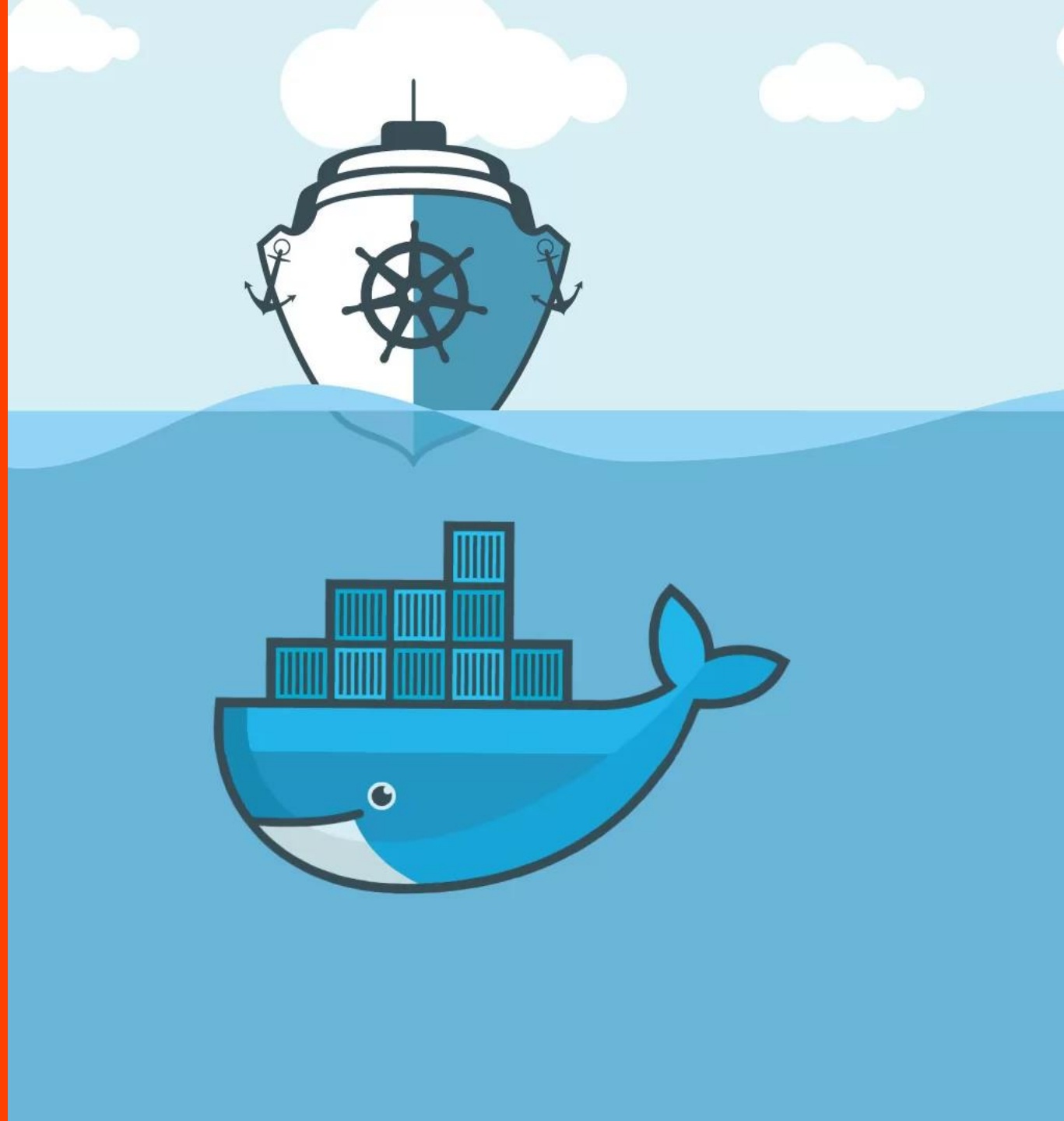
- Run and control more containers simultaneously
- Maintenance of application cluster state
- Examples
  - Docker Compose
  - Docker Swarm
  - Kubernetes/OpenShift

Kubernetes (K8s)



Kubernetes cluster

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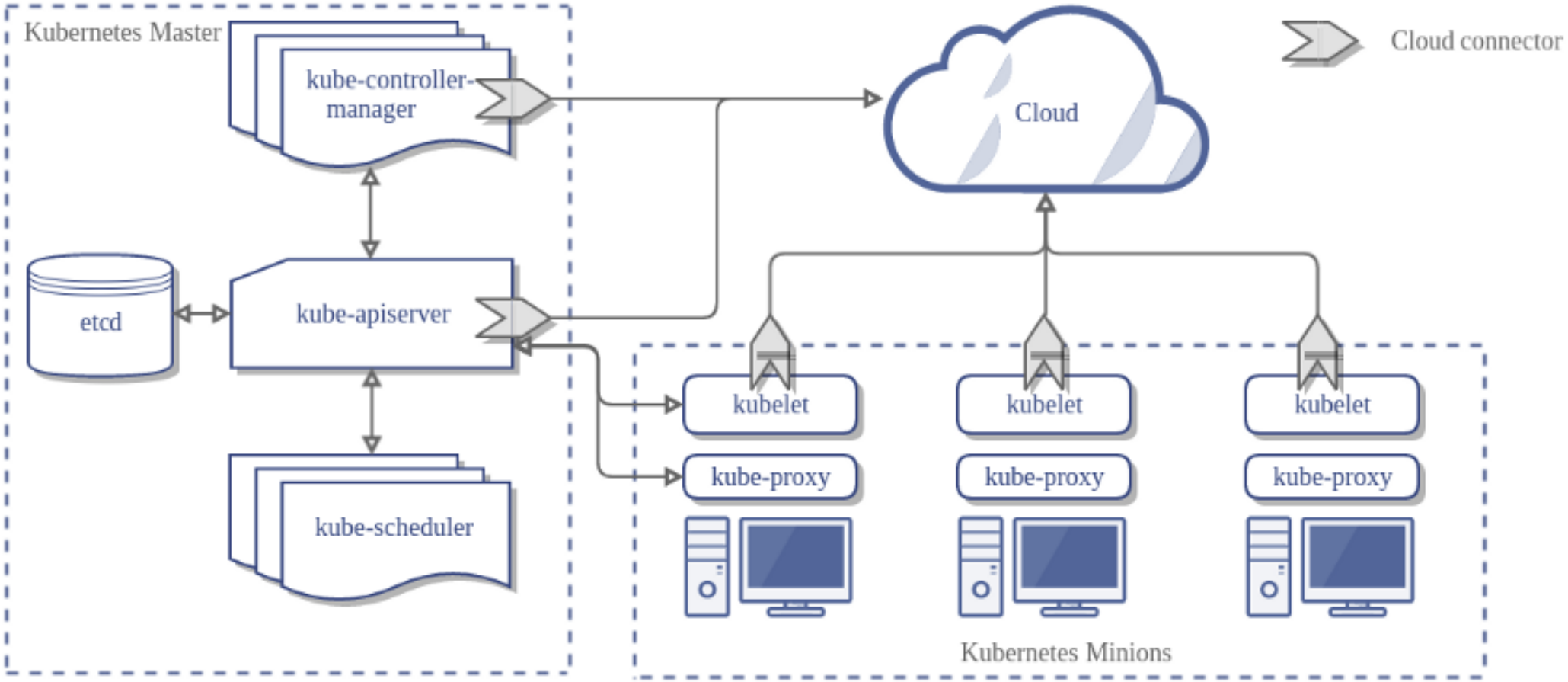

Kubernetes node

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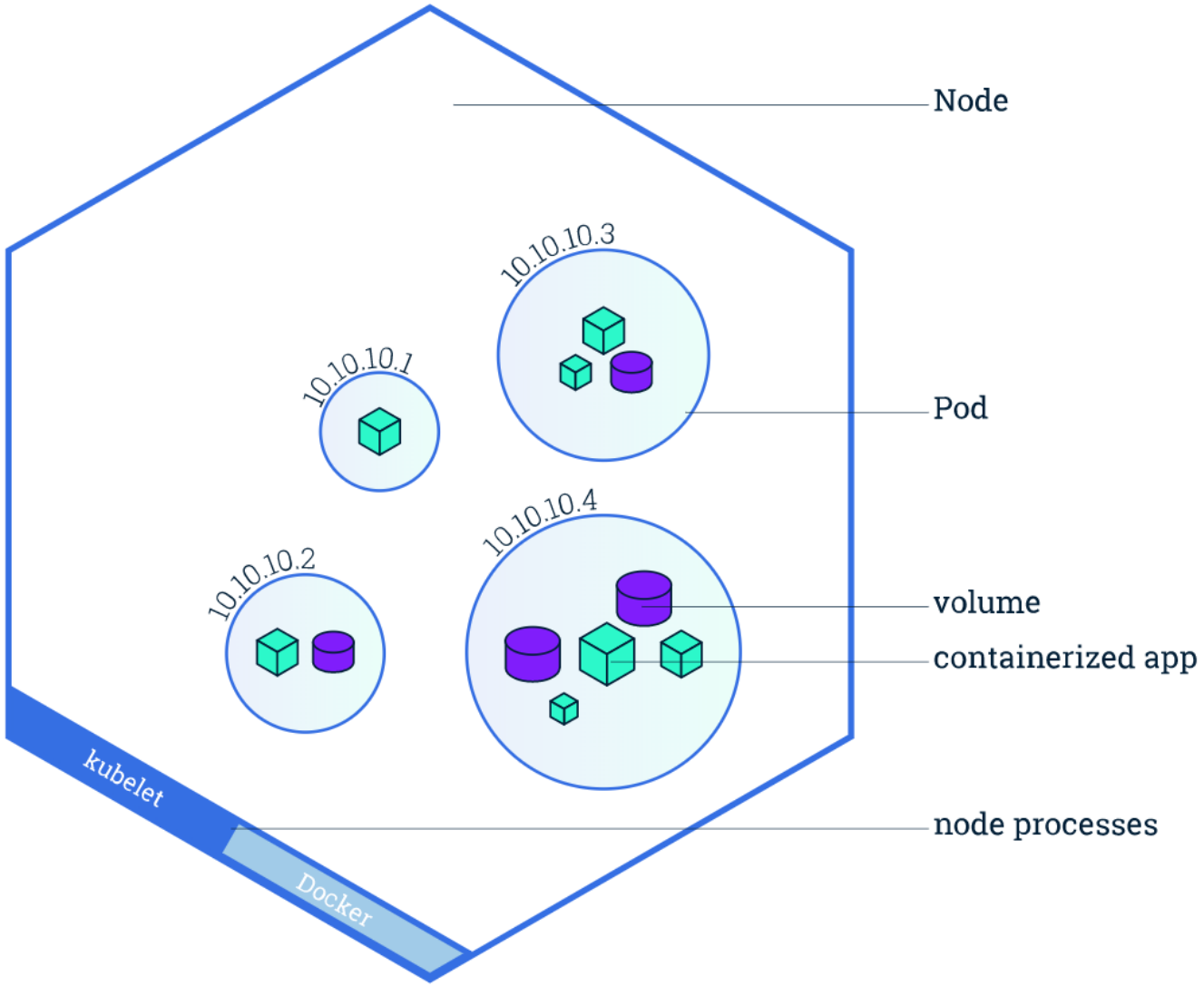

Kubernetes installation

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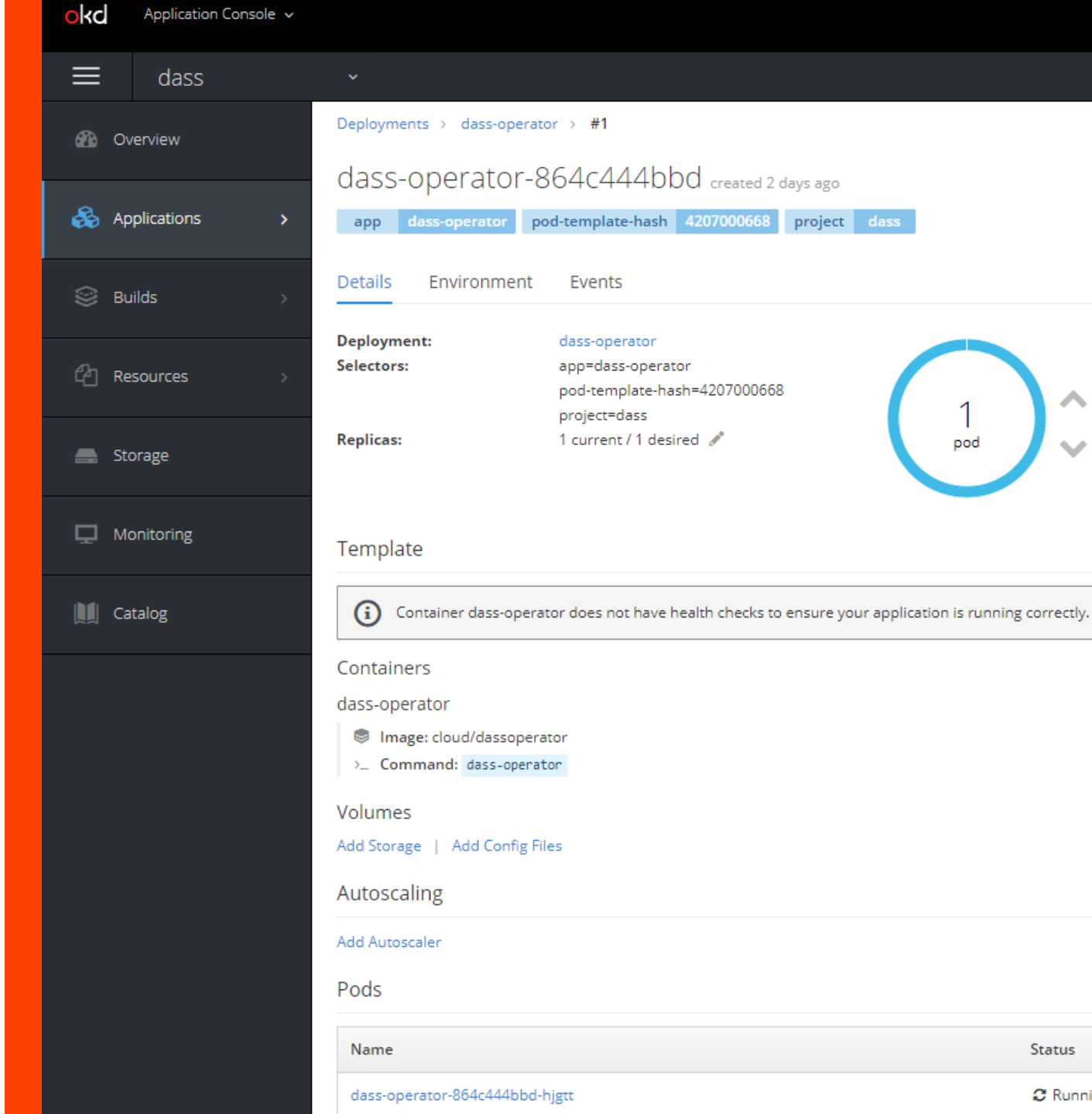
- Local machine
  - Minikube
    - https://github.com/kubernetes/minikube
- Cloud
  - Terraform/Ansible scripts
  - Azure Kubernetes Service (AKS)
  - Elastic Kubernetes Service (EKS)

OpenShift

OPENSHIFT by Red Hat



OpenShift

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- Enterprise Kubernetes
- Mainly security oriented
- Can be demanded by customers as the required application deployment
- Layer over k8s
- Templates almost the same as in k8s
- GUI

OpenShift cluster

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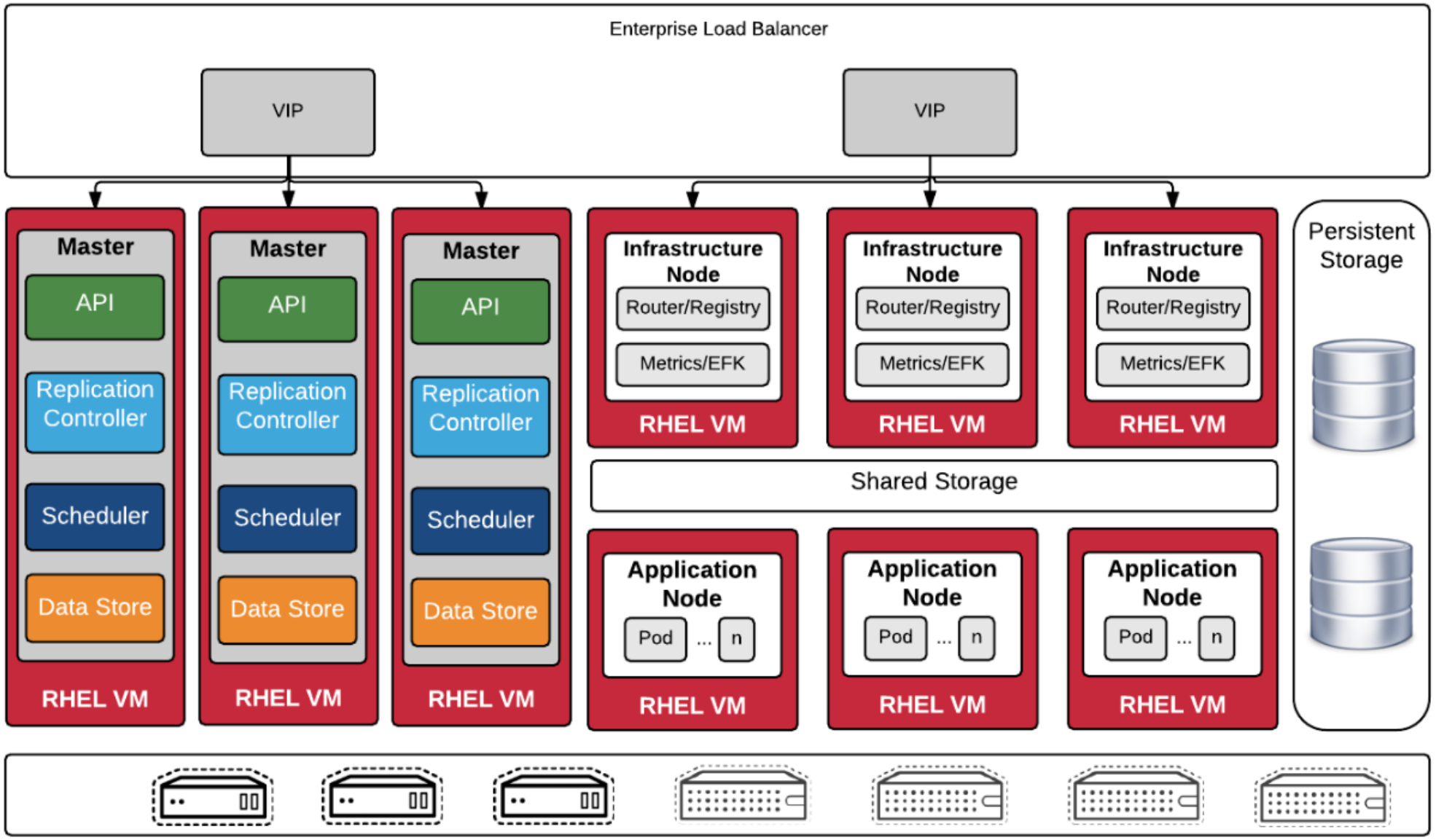

OpenShift installation

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- Local machine
  - Minishift
    - https://www.okd.io/minishift/
- Community version
  - https://www.okd.io
  - Azure templates 3.9/3.11 fork
- Paid versions on RedHat/Azure/Amazon servers

Demo

Kubernetes Operators

Kubernetes operators

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- Extensions of k8s/OpenShift API
- Operator framework
  - https://github.com/operator-framework/operator-sdk
  - Go language
  - Testing
- Autopilot of application
  - Installation, upgrades, restore, backups, auto scaling, self repair…

Operators

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- CustomResource of OpenShift

- Control loop
  - Watch on objects
  - OnChange: analyze difference between actual and desired state
  - Act on changes

- Example
  - https://github.com/operator-framework/operator-sdk-samples/tree/master/memcached-operator

Summary

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- Complex systems moves from monoliths to microservices
- Docker becomes software standard
- Kubernetes or OpenShif as an containers orchestrator
- Complex orchestrating logic via Kubernetes operators

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Thank you!

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Resources

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- https://kubernetes.io/
- https://medium.com/@adilsonbna/installing-a-highly-available-openshift-origin-cluster-f3493cbdb644
- https://pixabay.com/photos/moai-quarry-easter-island-history-3525785/
- https://pixabay.com/photos/container-port-loading-stacked-3118783/
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- https://pixabay.com/photos/hands-clay-potter-pottery-1139098/
- https://www.redhat.com/en/topics/microservices/what-are-microservices
- https://github.com/vaquarkhan/vaquarkhan/wiki/Difference-between-scaling-horizontally-and-vertically
- https://svitla.com/blog/kubernetes-vs-docker