



zero to
container
hero

configuration management

the process of systematically handling changes to a system in a way that it maintains integrity over time, often using automation

infrastructure-as-code

the process of managing and provisioning datacenters and services through machine-readable definition files

immutable infrastructure

a model in which no updates, security patches, or configuration changes happen “in-place” on production systems – relies heavily on IaC and configuration management

surrounding concepts

“ a container is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another.

docker.com

“ a standard package of software – known as a container – bundles an application’s code together with the related configuration files and libraries, and with the dependencies required for the app to run

microsoft.com

“ a Linux container is a set of 1 or more processes that are isolated from the rest of the system. All the files necessary to run them are provided from a distinct image, meaning Linux containers are portable and consistent as they move from development, to testing, and finally to production.

redhat.com

what is a container?



OPEN CONTAINER
INITIATIVE

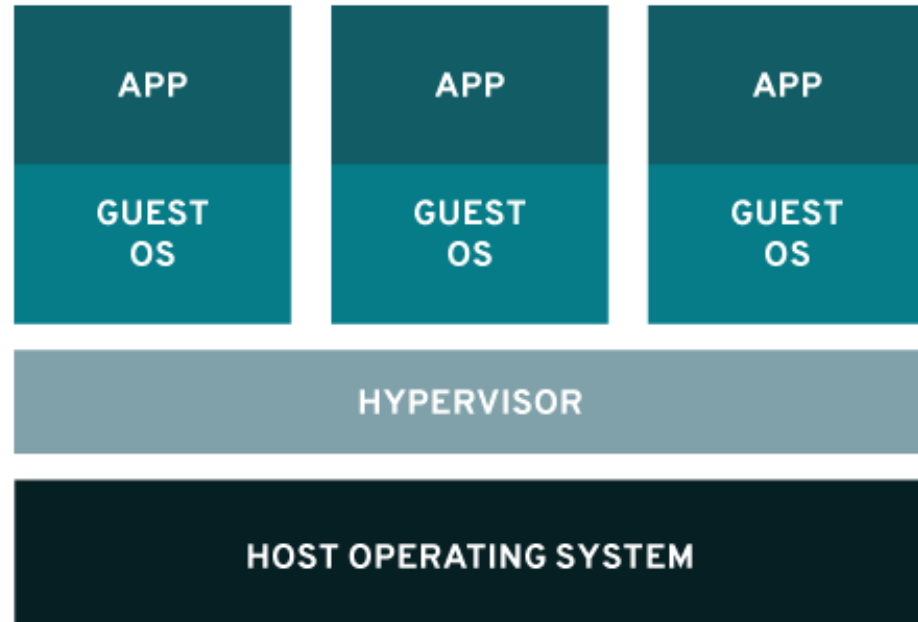
The OCI maintain specifications for container images and container runtimes

Generally, “container” means an Open Container Initiative (OCI) compliant image

An OCI image contains an image manifest, a filesystem (layer) serialization, and an image configuration

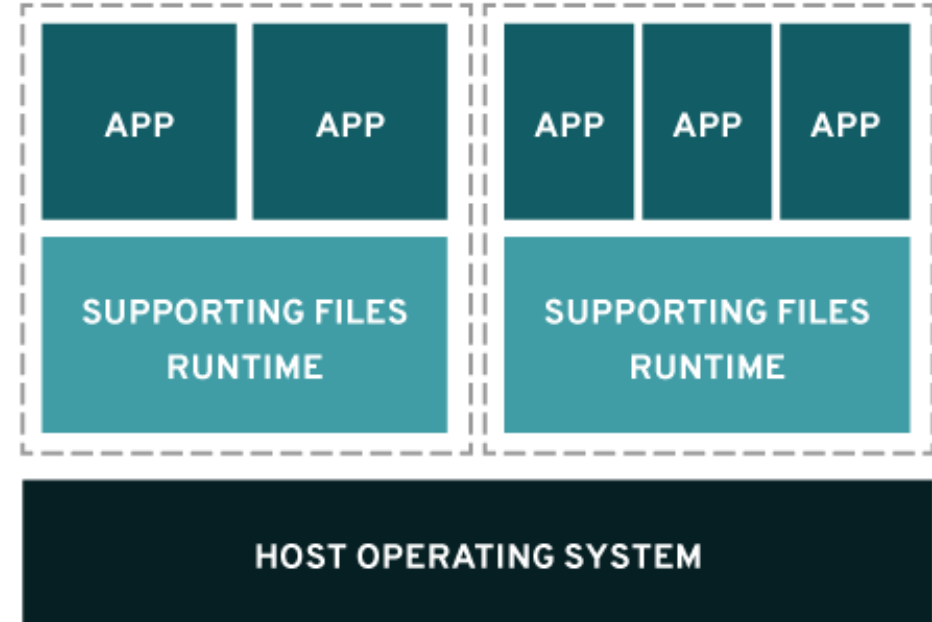
what is a container?

VIRTUALIZATION

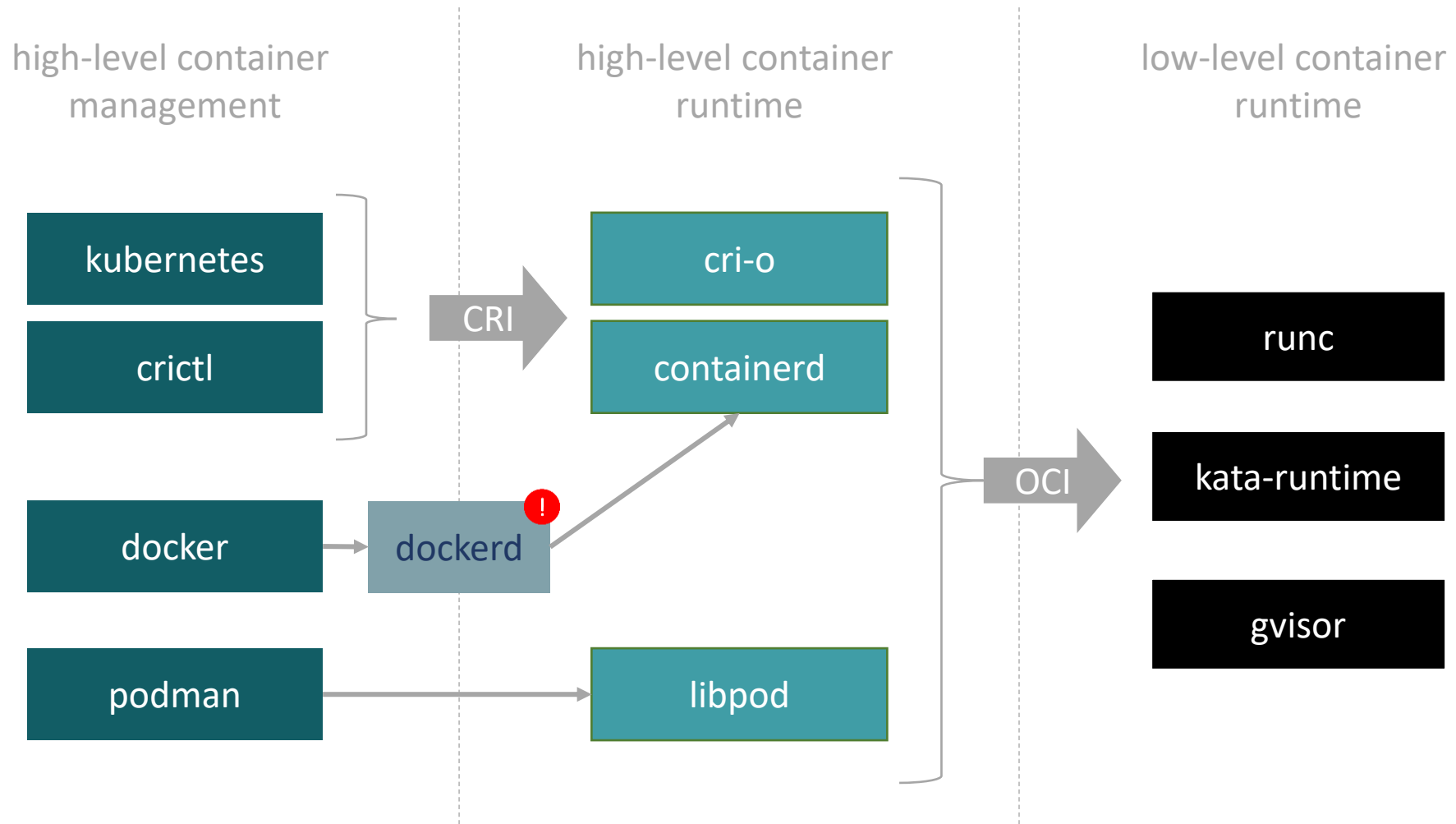


VS.

CONTAINERS



containers vs. virtual machines



what's needed to run a container?



“

kubernetes is a portable, extensible, open-source platform for managing containerized workloads and services, that facilitates both declarative configuration and automation

kubernetes.io

load balancing

orchestration

service discovery

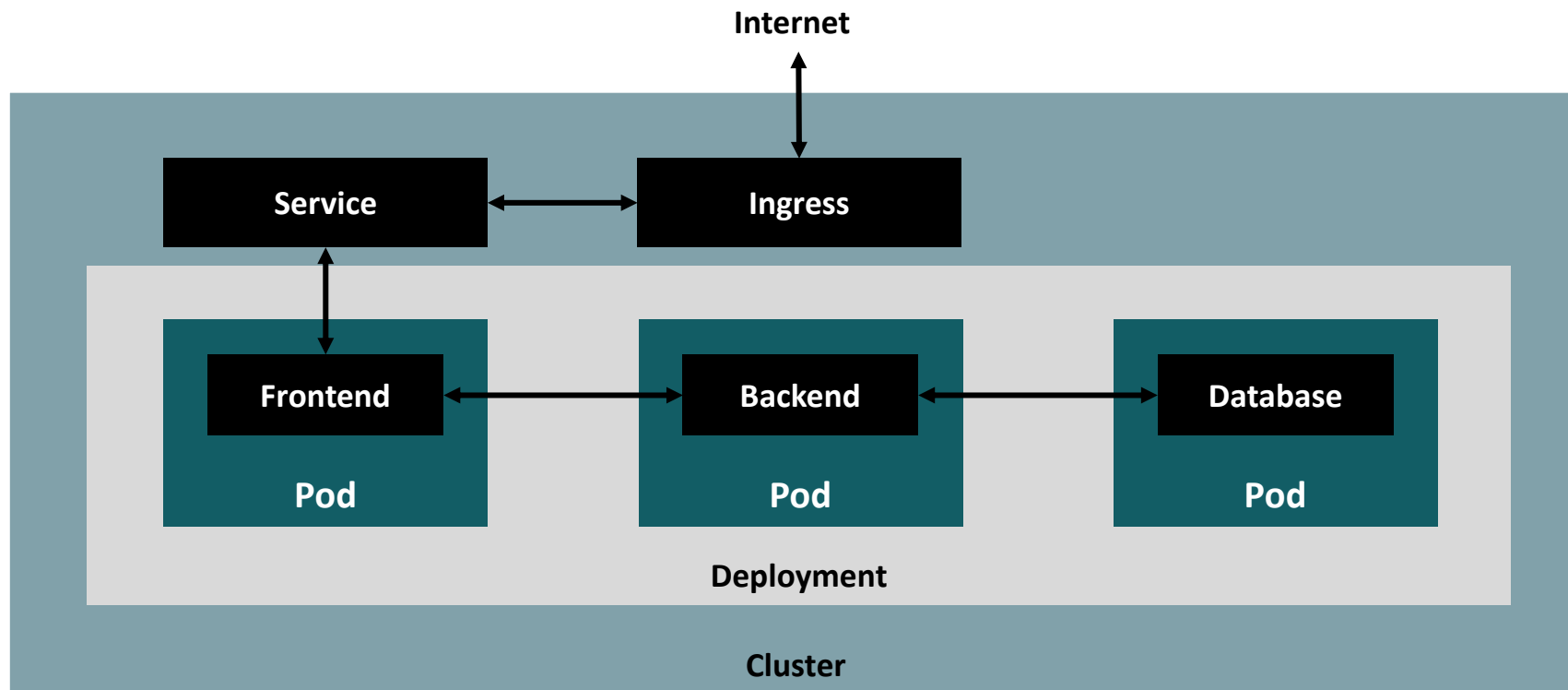
self-healing secret & config management

storage orchestration resource management

what is kubernetes?

Pod	The smallest deployable unit of compute. 1 or more containers.
ReplicaSet	A ReplicaSet (aims to) maintain a set of replica Pods running at any given time.
Deployment	An API object that manages a replicated application, typically by running Pods with no local state
Service	An abstract way to expose an application running on a set of pods
Ingress	Manages external access to resources in a cluster, typically over HTTP
ConfigMap	Used to store non-confidential data in key-value pairs. Pods can consume ConfigMaps in various ways
DaemonSet	Ensures an instance of a Pod is running across a set of nodes in the cluster

kubernetes primitives



sample deployment structure



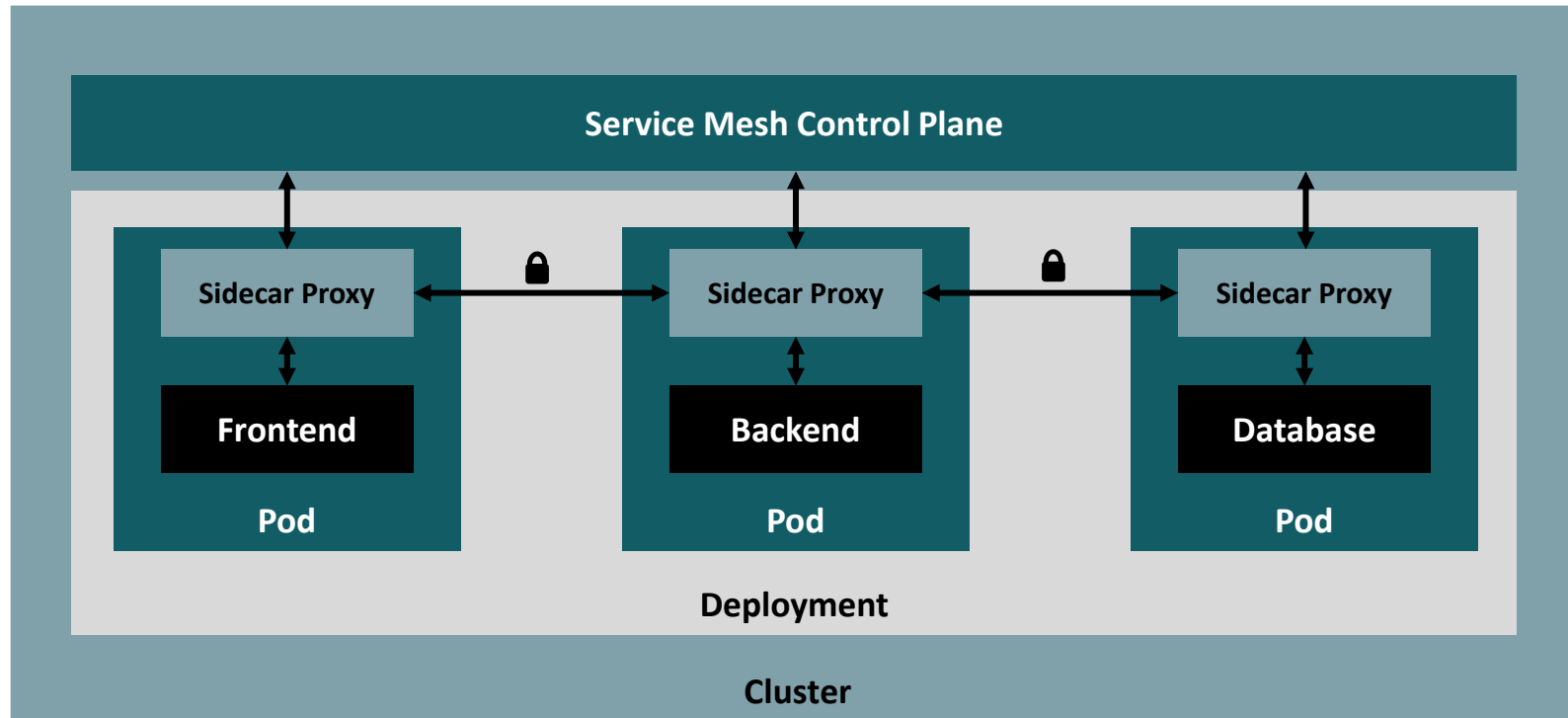
Separates cluster communication into a data plane and a control plane

Ensures fast, reliable and secure communication between services on the cluster

Increased observability of traffic on the cluster

Often works by utilizing the sidecar container pattern

service mesh



sample service mesh deployment

Configuration Management



ANSIBLE



SALTSTACK



User / Development Tools



docker



podman



buildah



docker
Compose

Scheduling & Orchestration



kubernetes



Apache
MESOS™



HashiCorp
Nomad

Enterprise K8s Distributions



OPENSIFT



Pivotal CF®



RANCHER

Container Runtimes



cri-o



kata
containers



lxd



Service Mesh



LINKERD



Istio



HashiCorp
Consul

App Packaging

