

INTRODUCTION TO KUBERNETES



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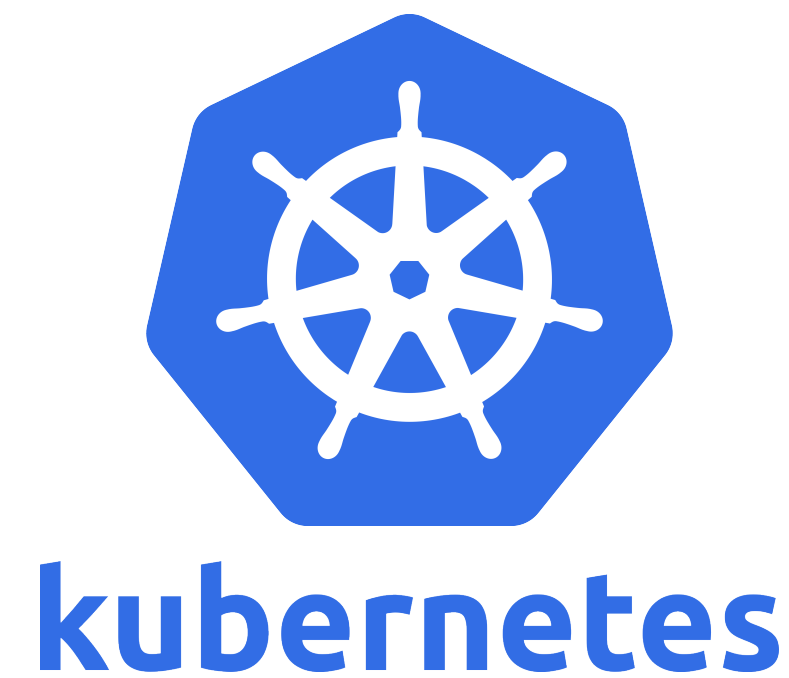
What is Kubernetes

WHAT'S KUBERNETES

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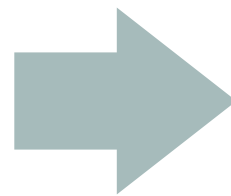
Kubernetes is a portable, extensible, **open-source platform** for **managing containerized workloads and services**, that **facilitates both declarative configuration and automation**. It has a large, rapidly growing ecosystem. Kubernetes services, support, and tools are widely available.



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helmsman
pilot

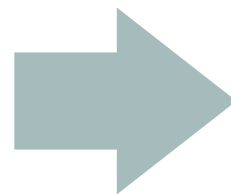


kubernetes

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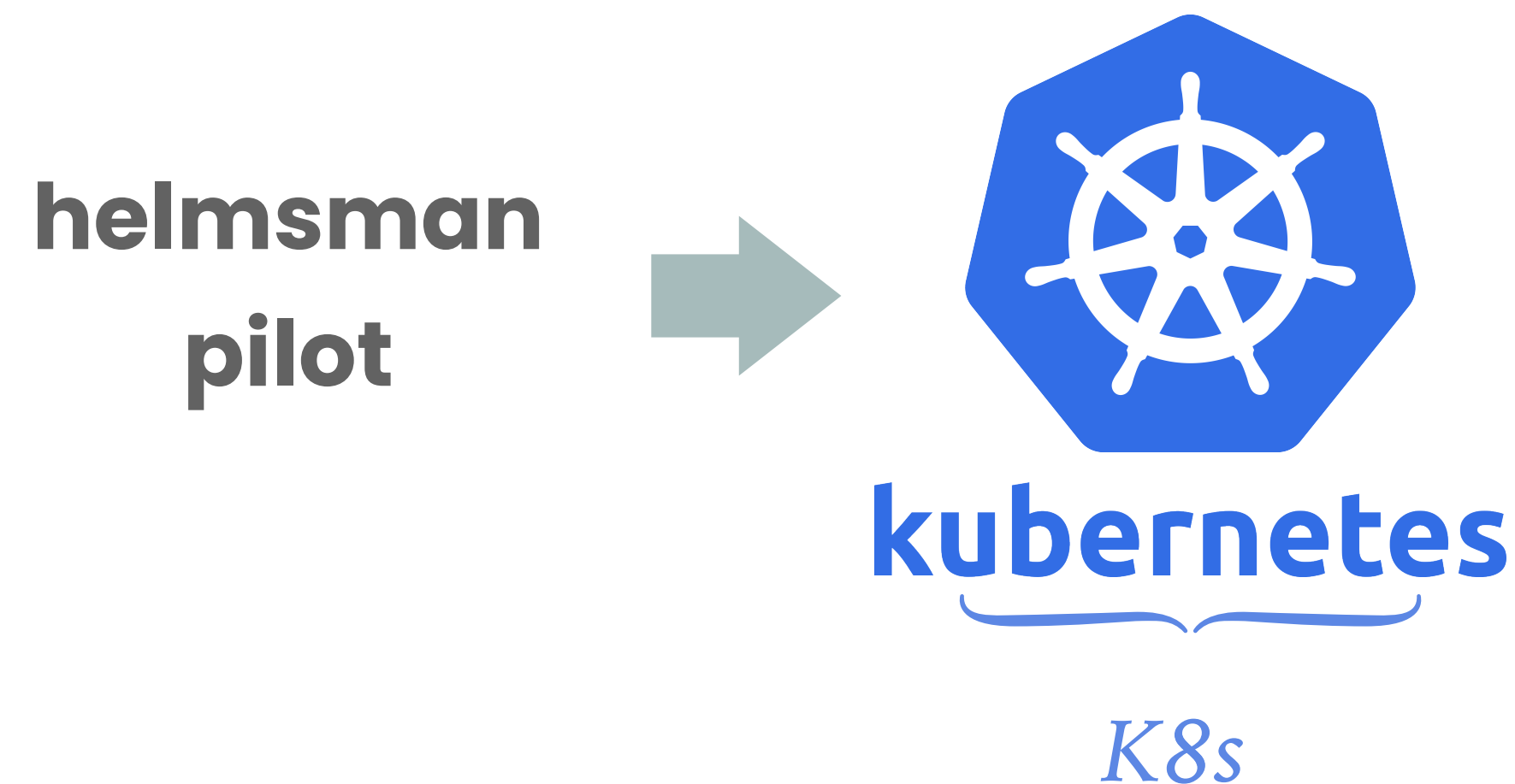
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kubernetes

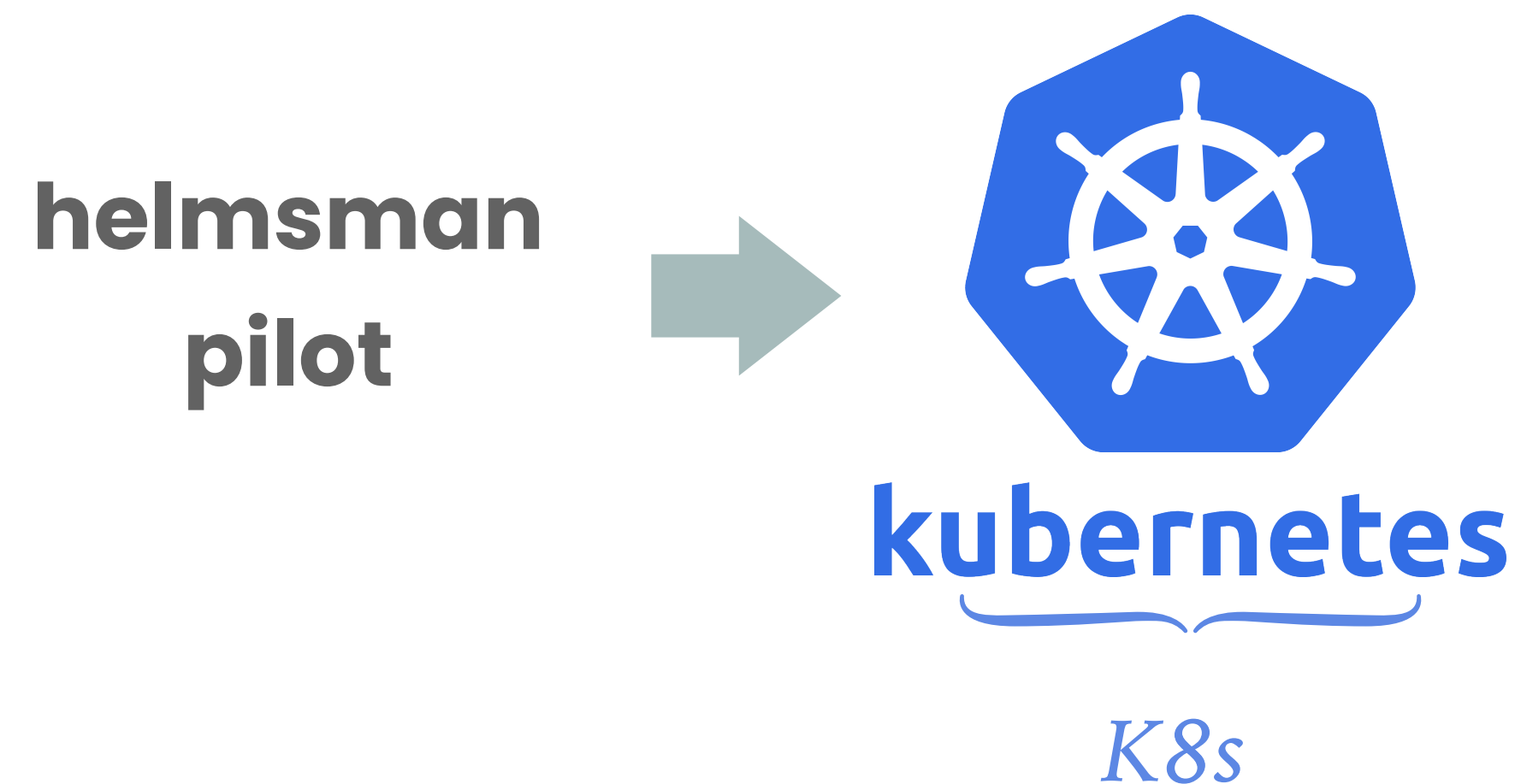
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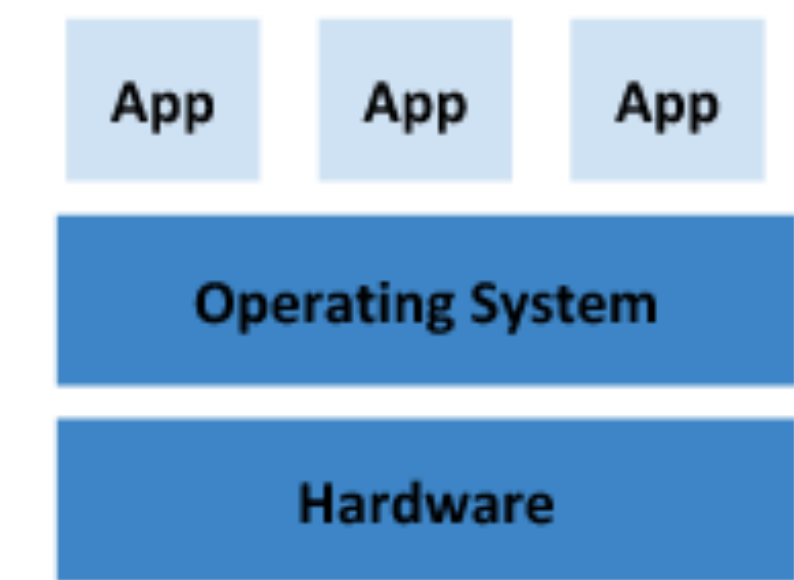
Google originally designed Kubernetes, but the



now maintains the project.

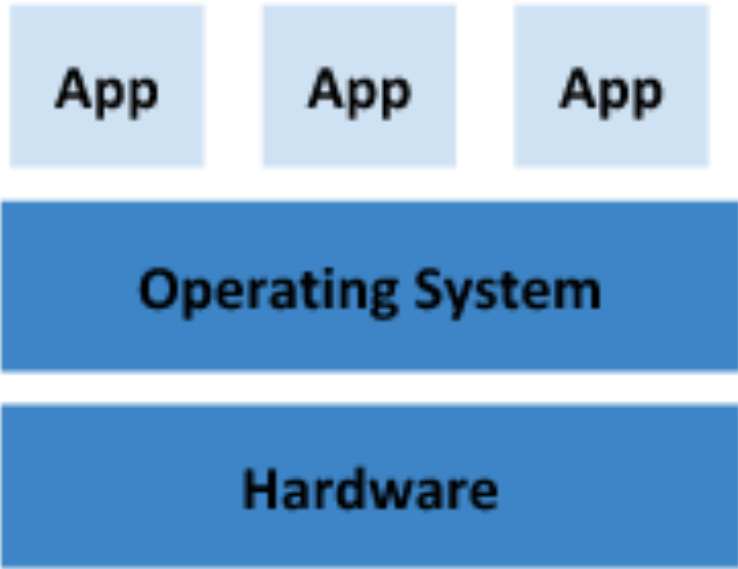
WHAT IS KUBERNETES

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Traditional Deployment

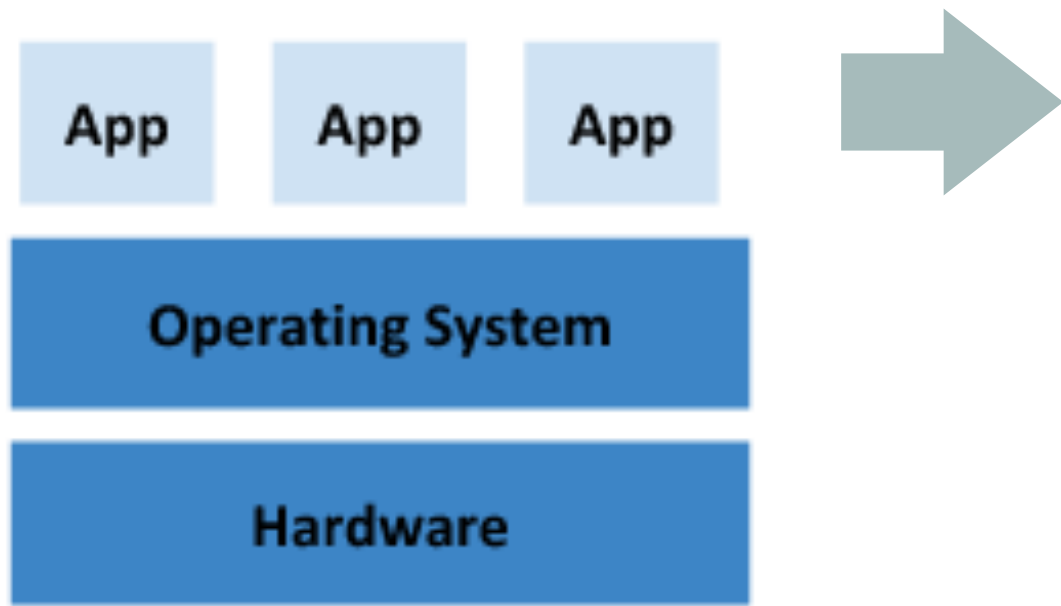
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Traditional Deployment

ran applications on **physical servers**. no way to define resource boundaries for applications in a physical server, and this caused resource allocation issues.

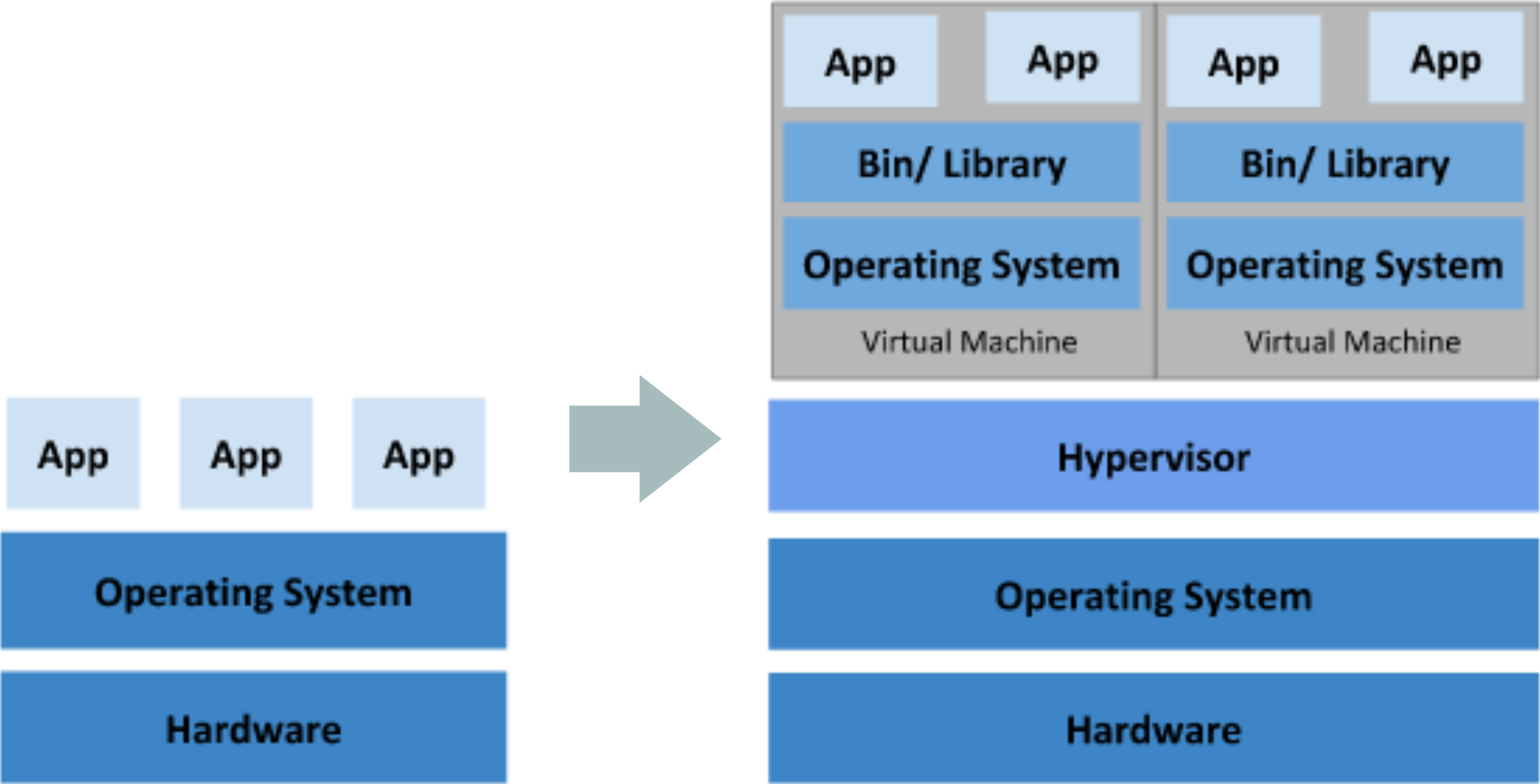
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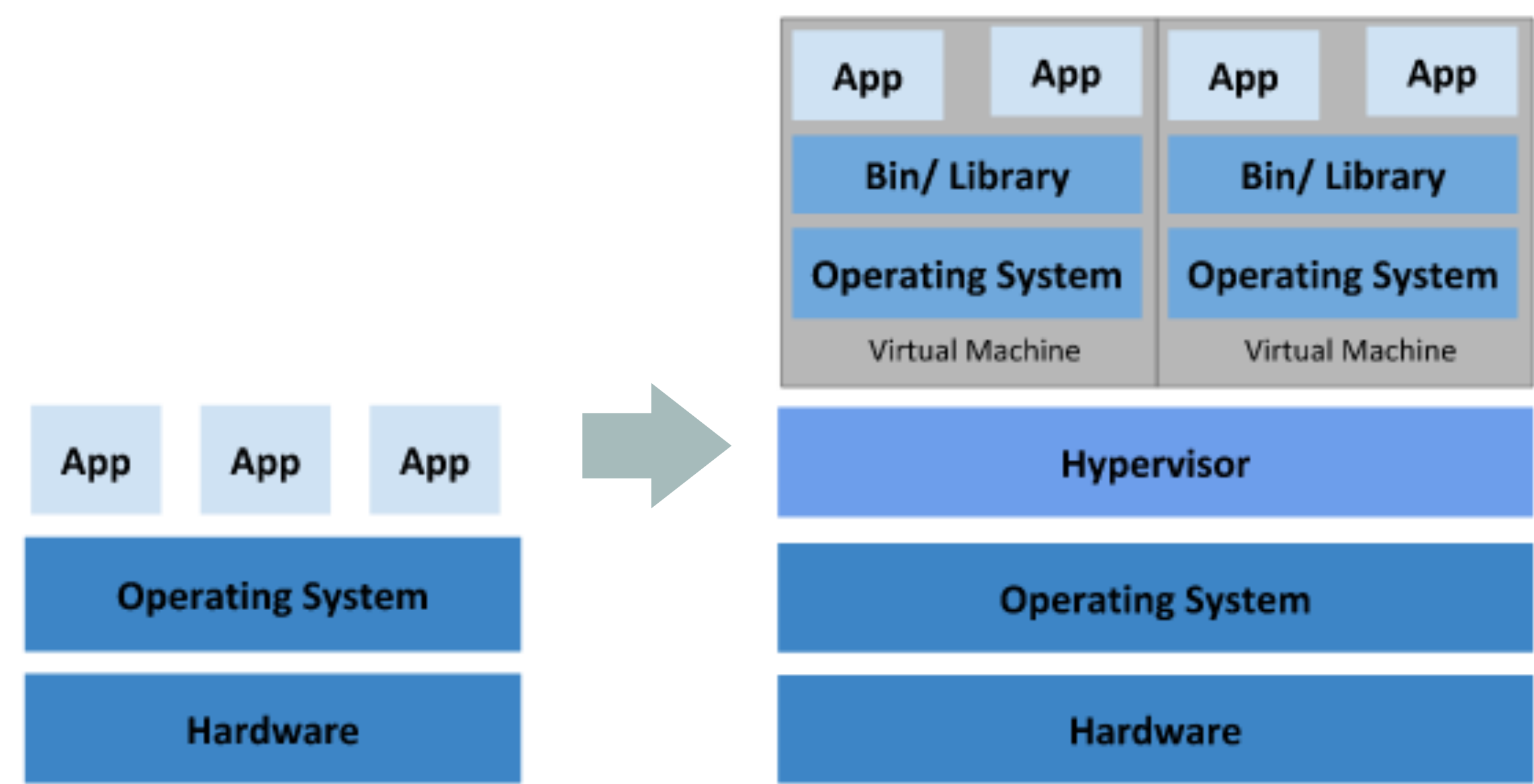


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Virtualized Deployment

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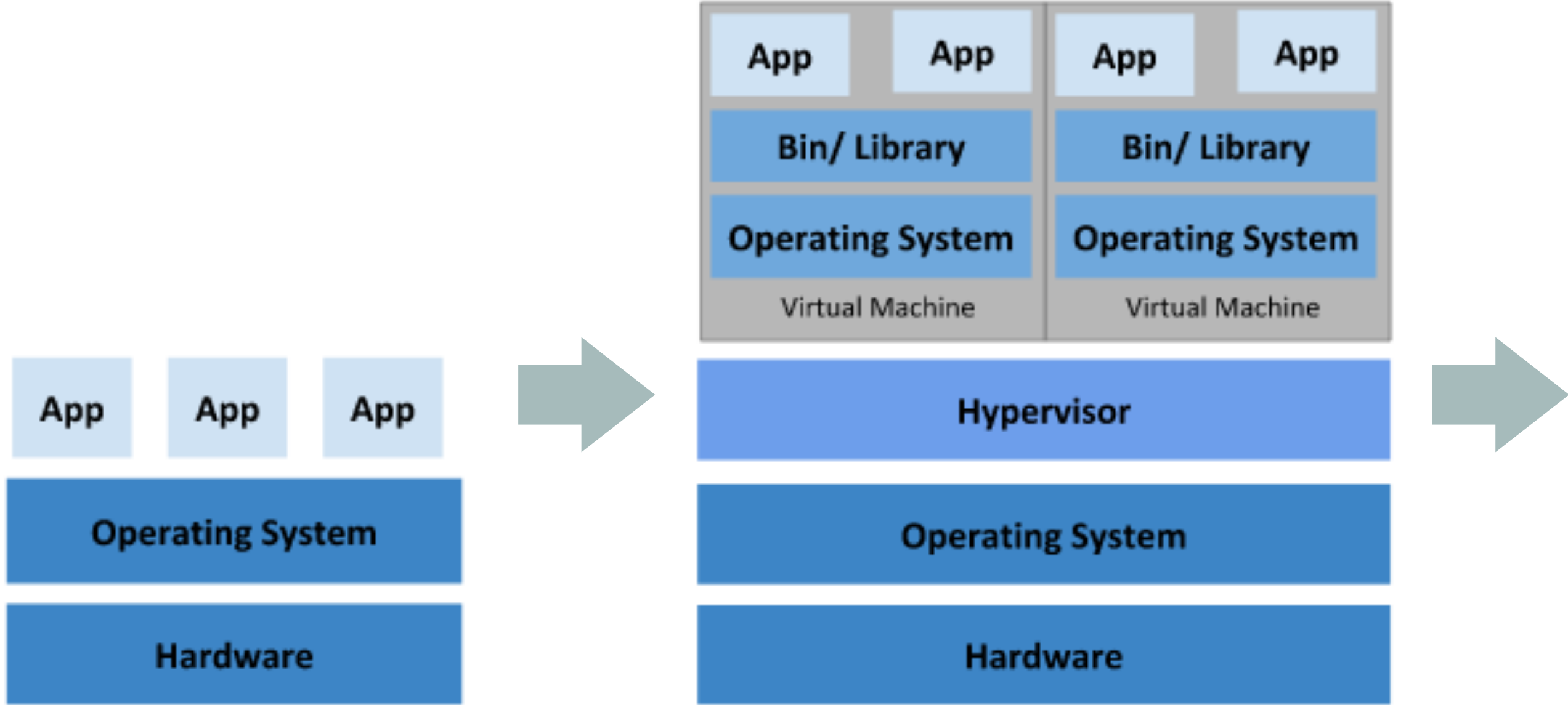
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Virtualized Deployment

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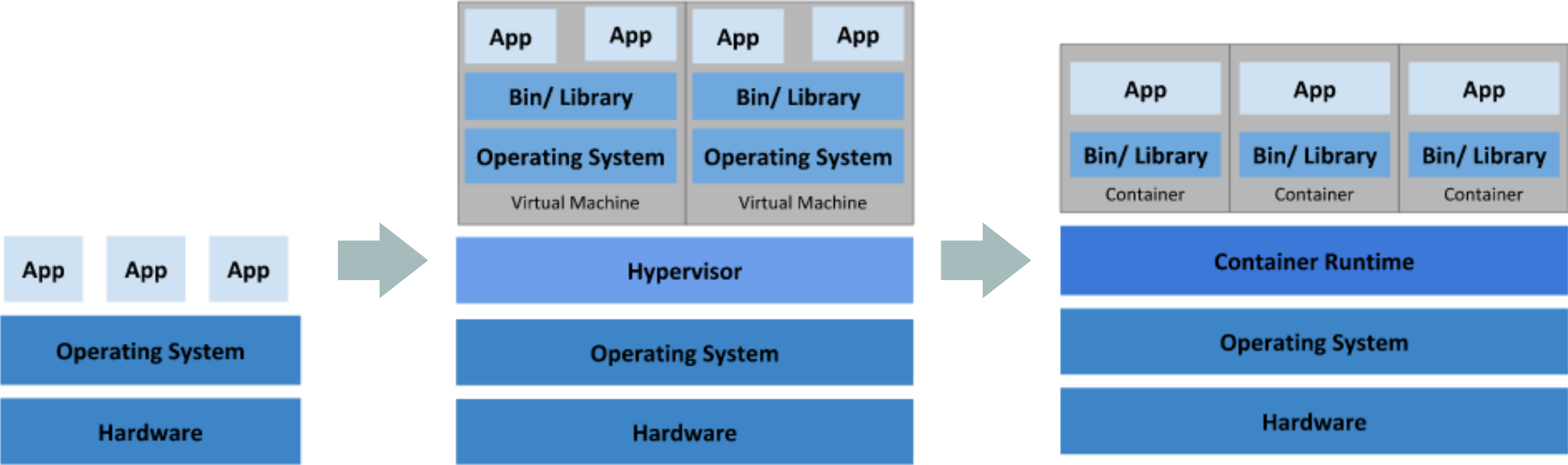
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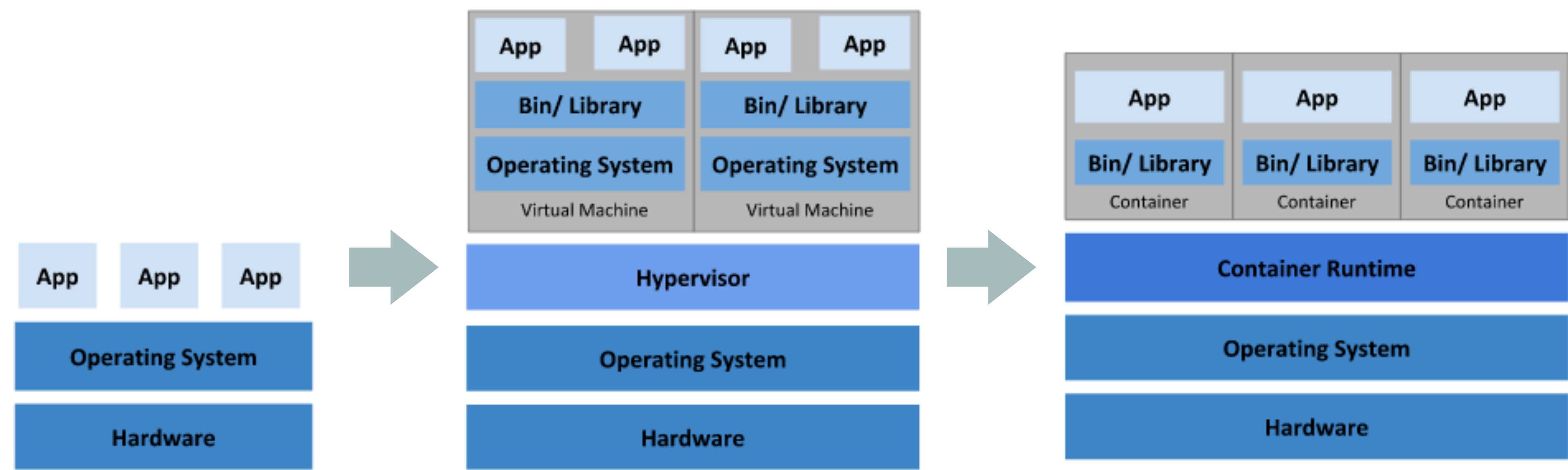
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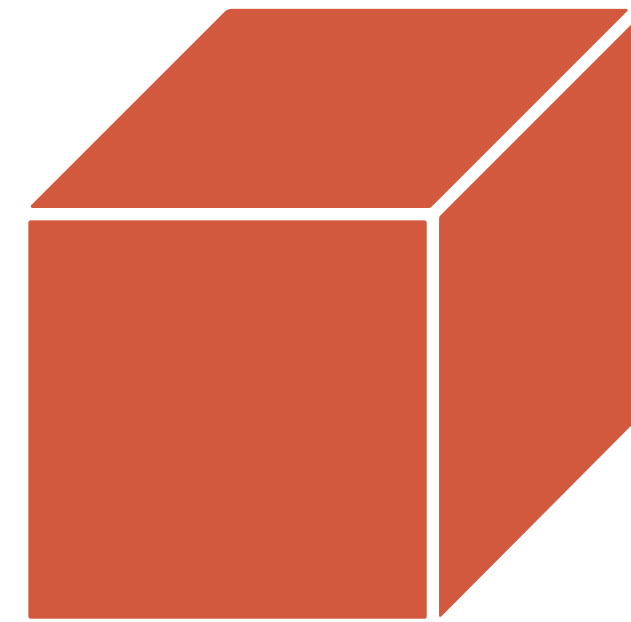
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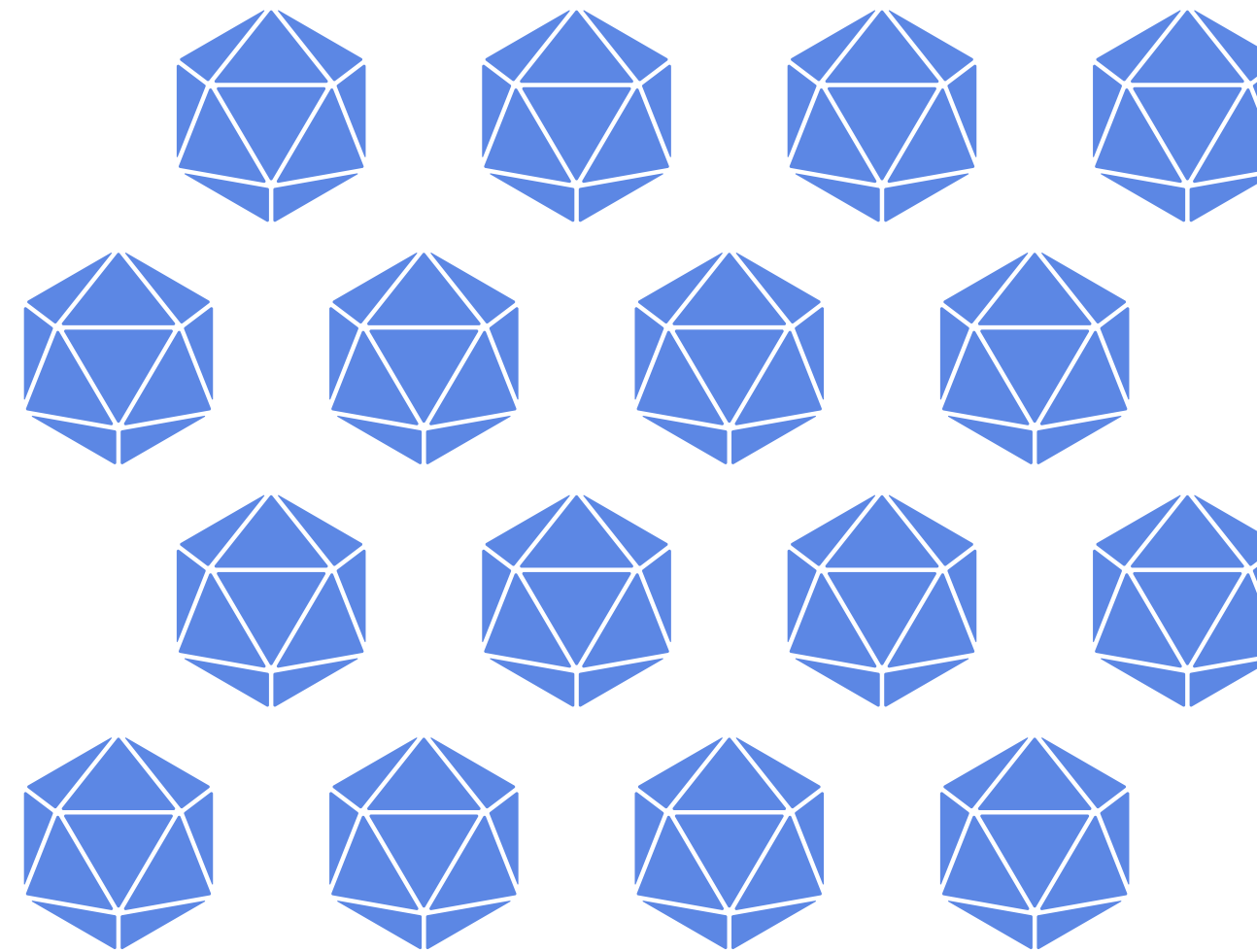
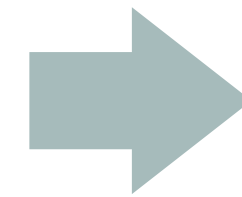
similar to VMs, but they have **relaxed isolation** properties to **share the Operating System (OS)** among the applications. Therefore, containers are considered **lightweight**.

PROBLEM AND SOLUTION FOR KUBERNETES

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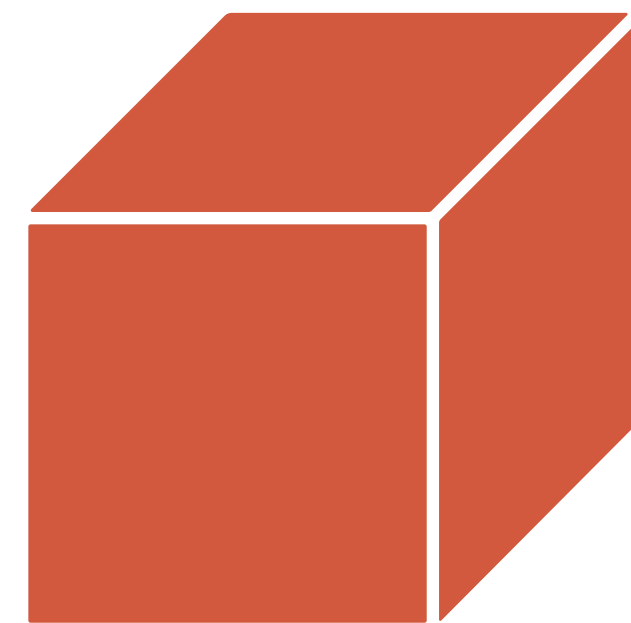


Monolith

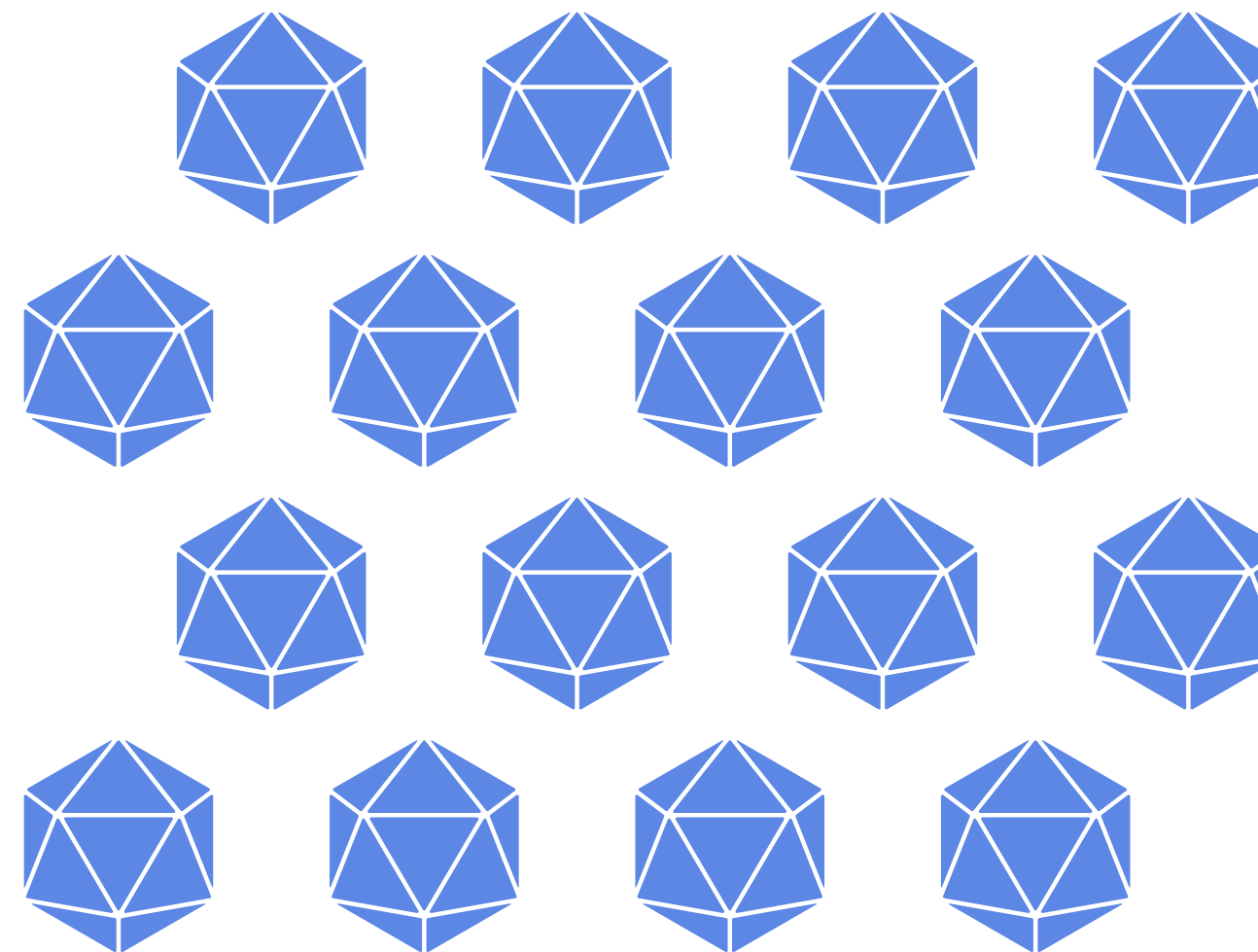
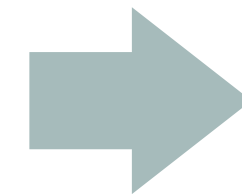


Microservices

PROBLEM AND SOLUTION FOR KUBERNETES



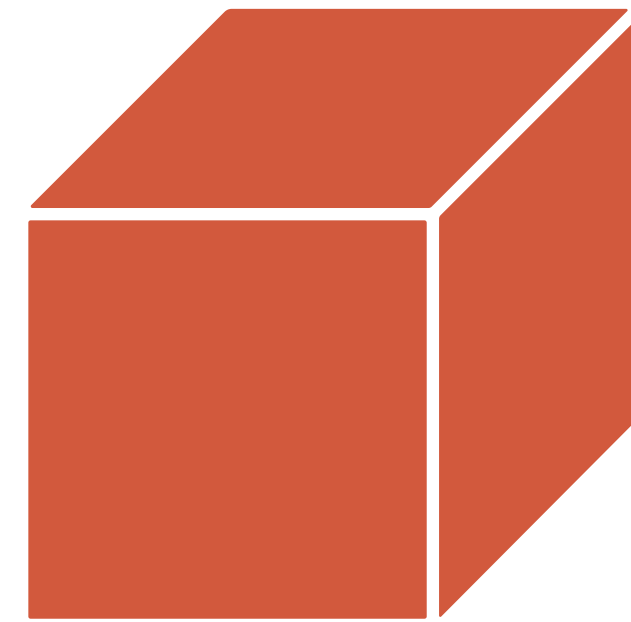
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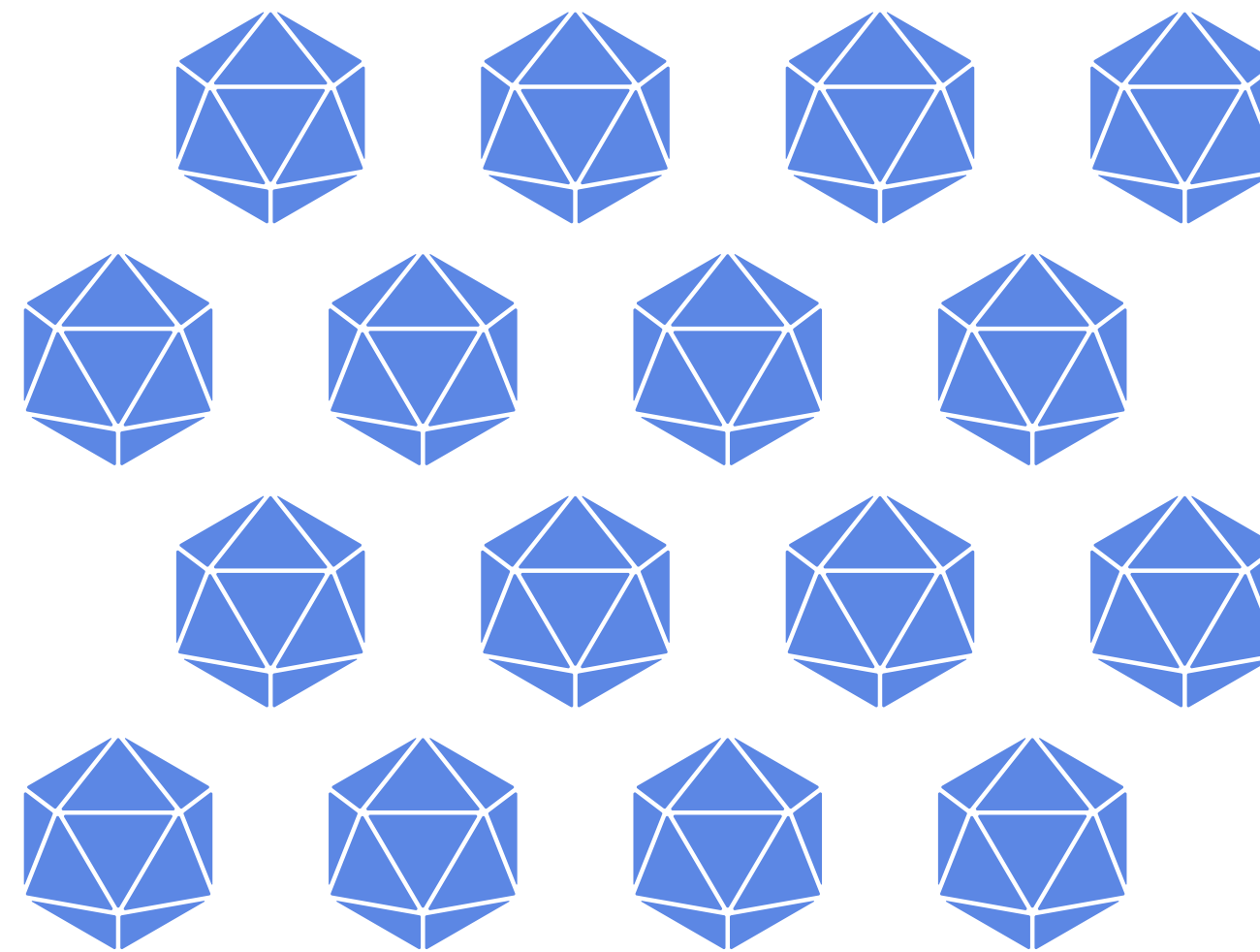
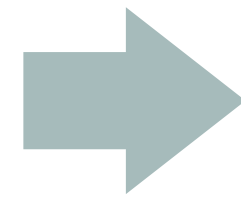
Microservices

Rises of Microservices

PROBLEM AND SOLUTION FOR KUBERNETES



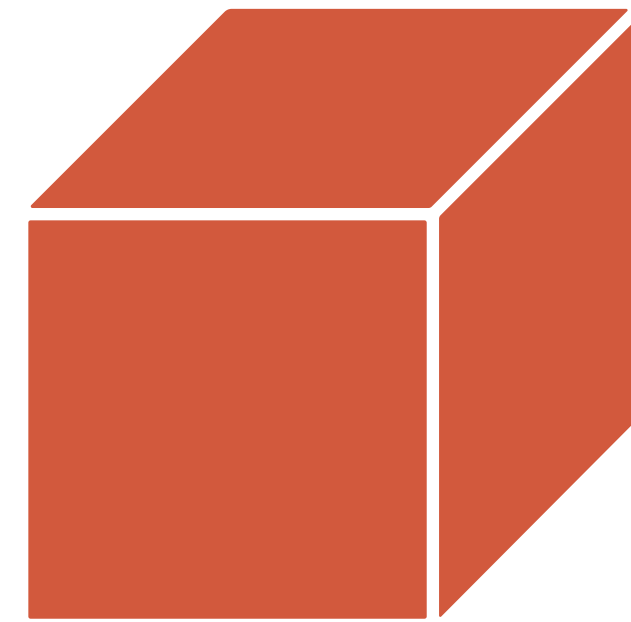
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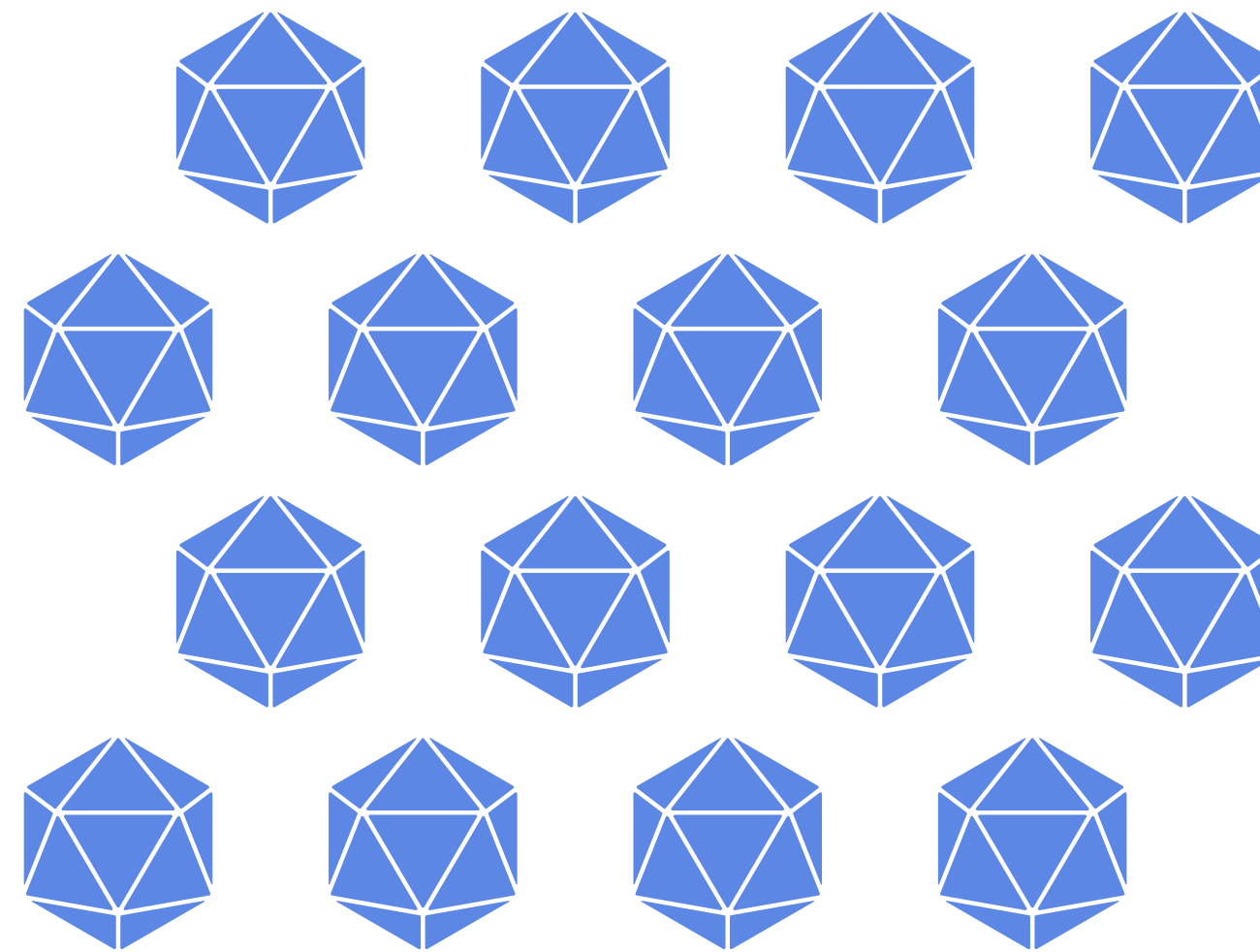
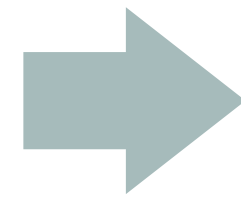
Microservices

Rises of Microservices
Increase Usage of Containers

PROBLEM AND SOLUTION FOR KUBERNETES



Monolith

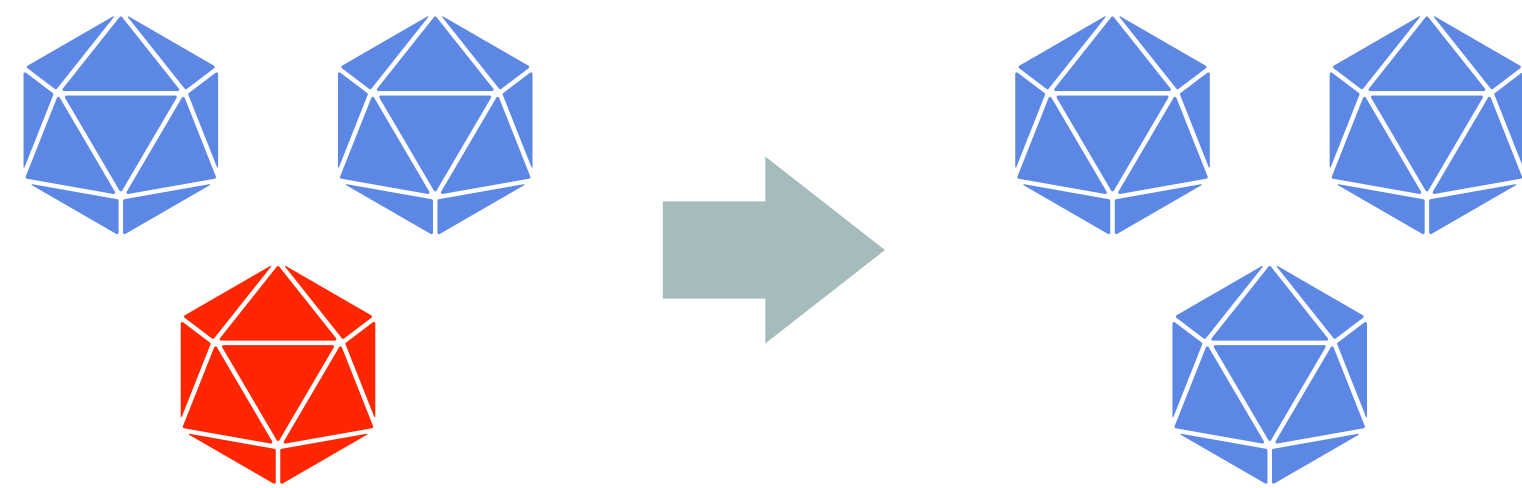


Microservices

Rises of Microservices
Increase Usage of Containers
Proper way to manage hundreds of containers

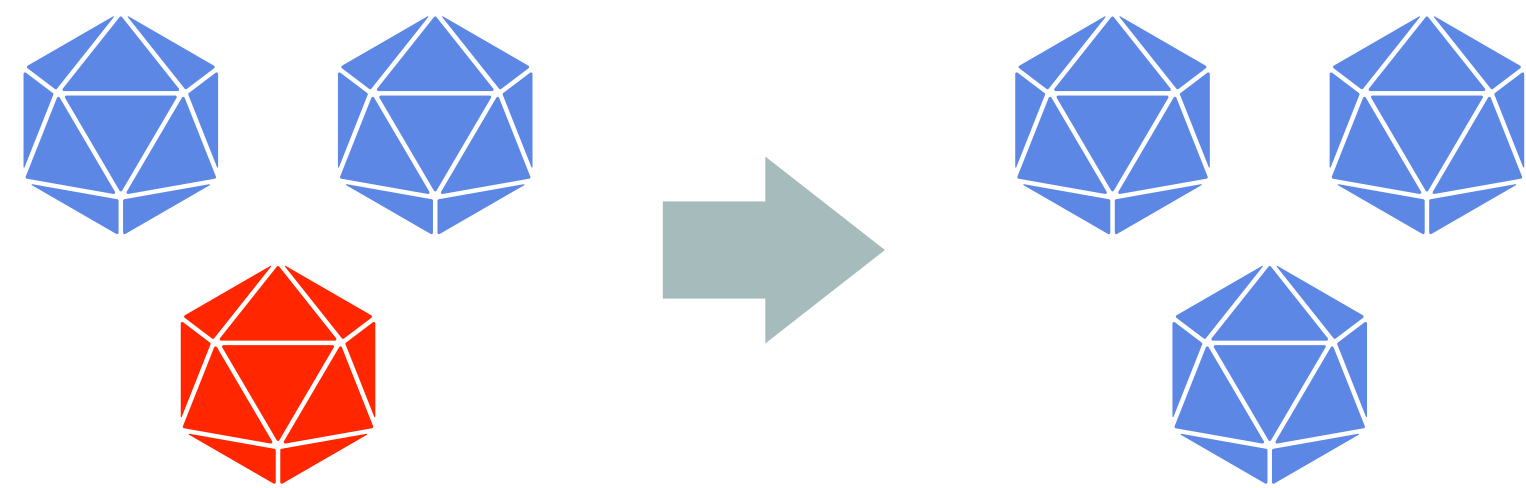
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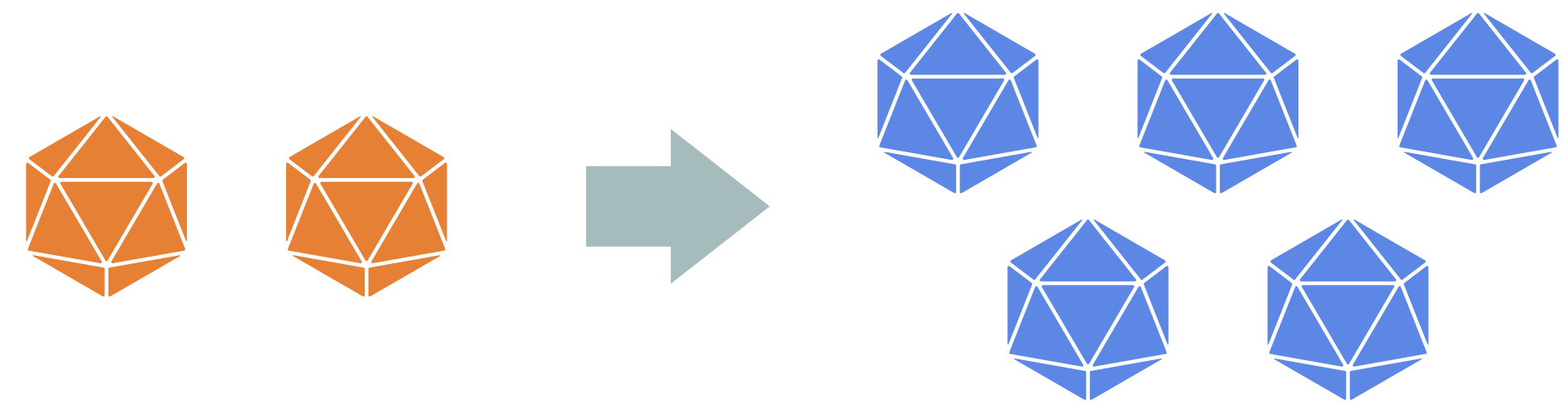


High Availability or No Downtime

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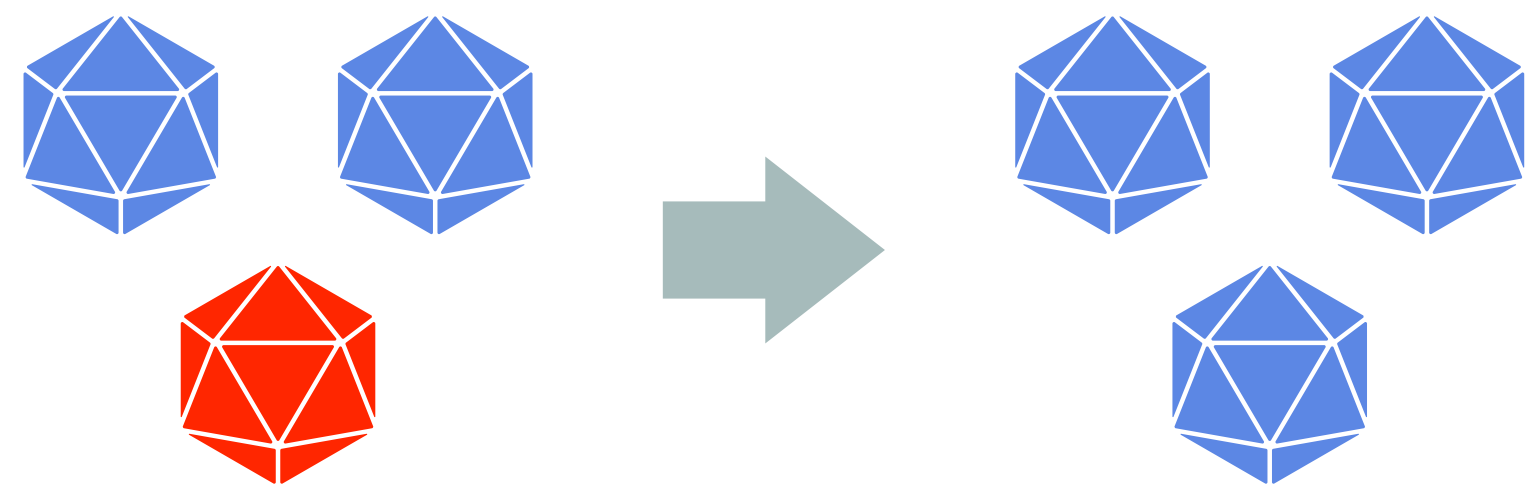


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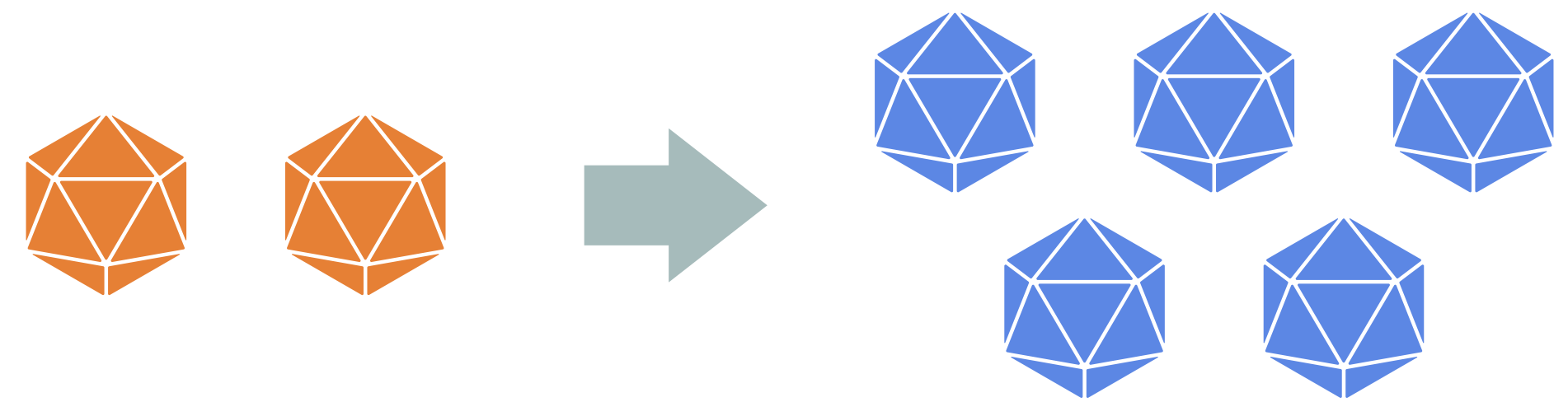


Scalability or High Performance

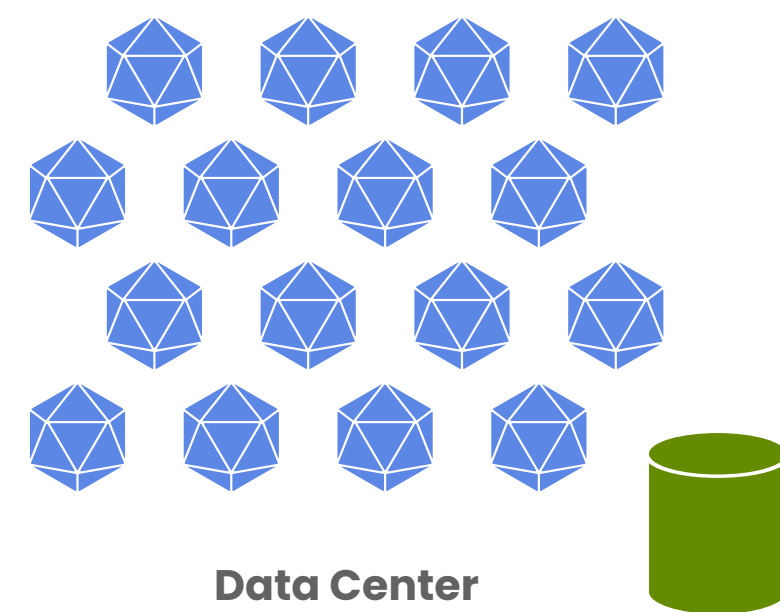
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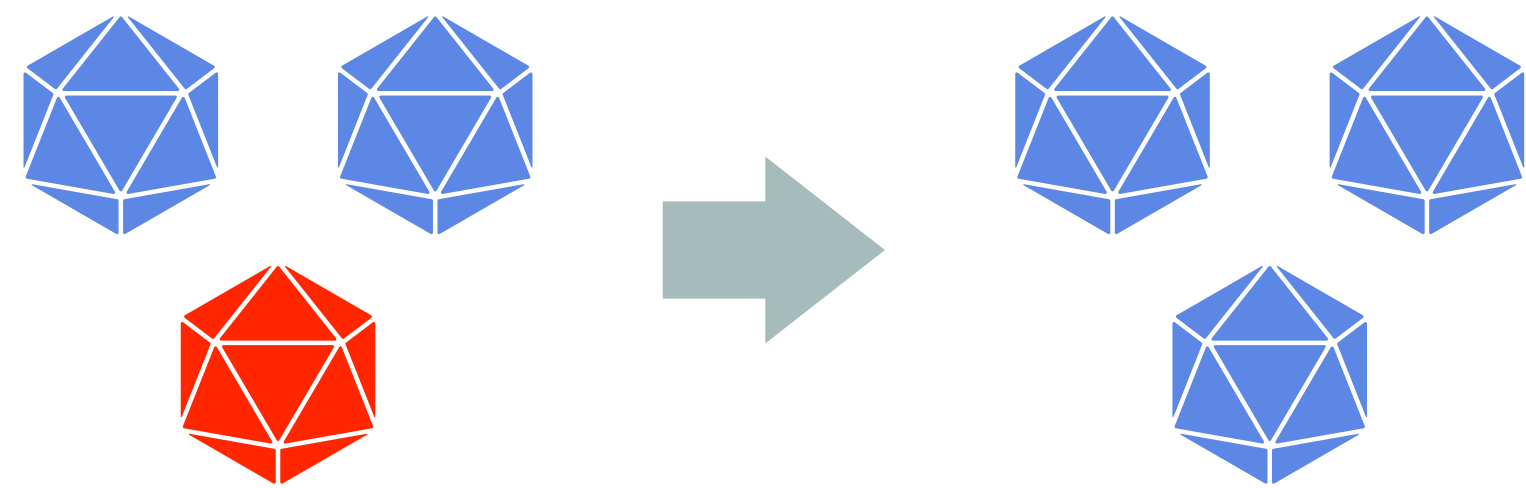
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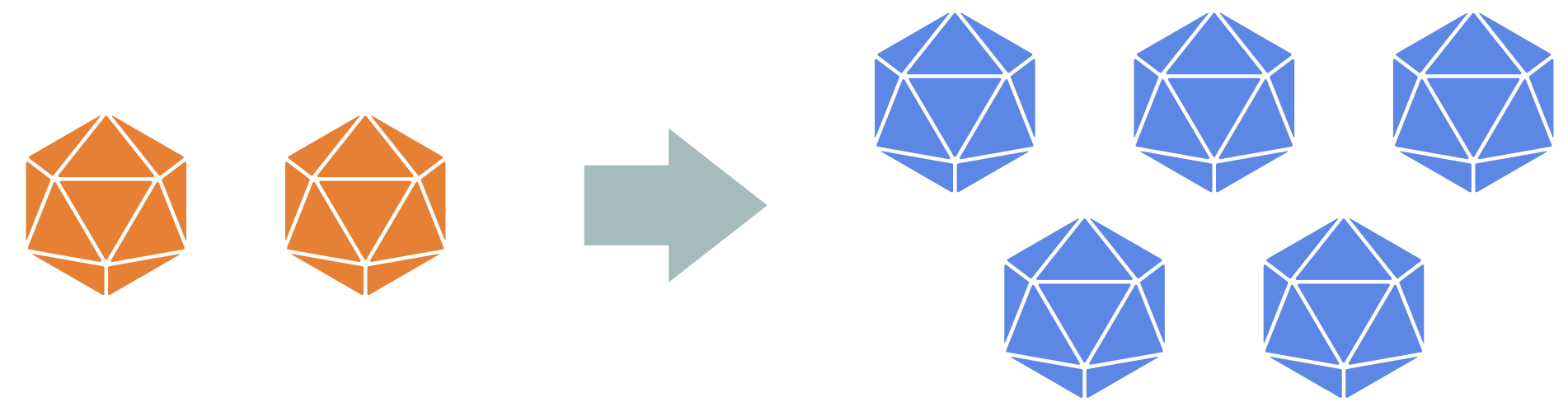
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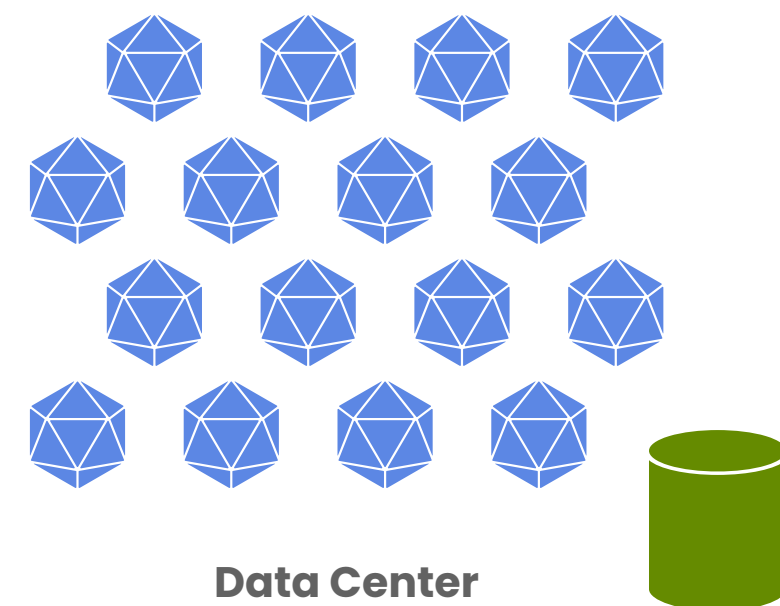
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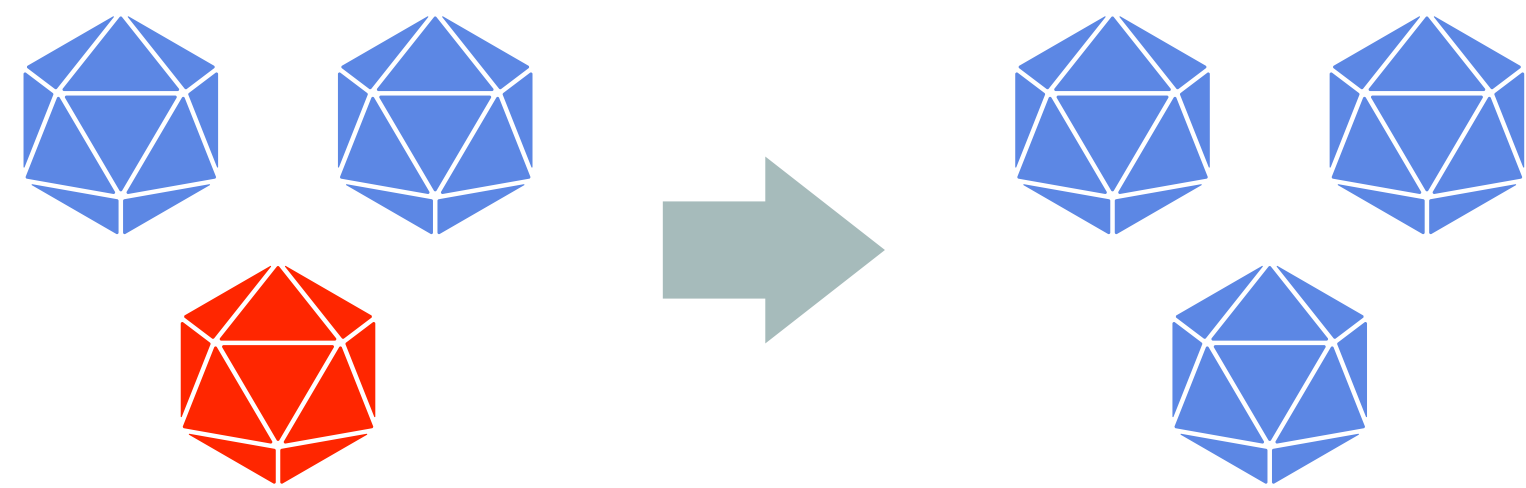


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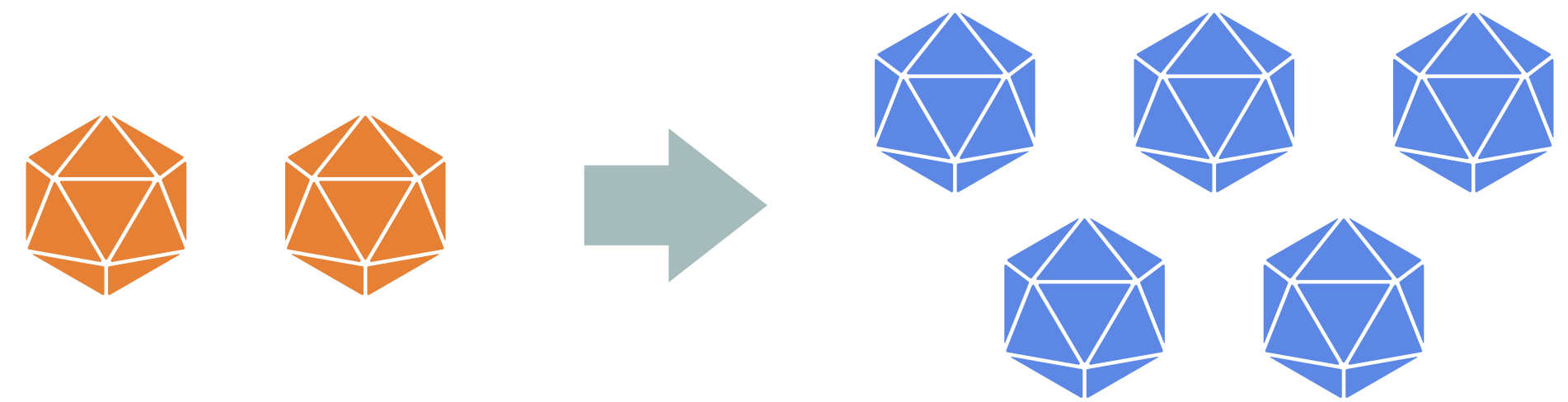


Disaster Recovery – backup and restore

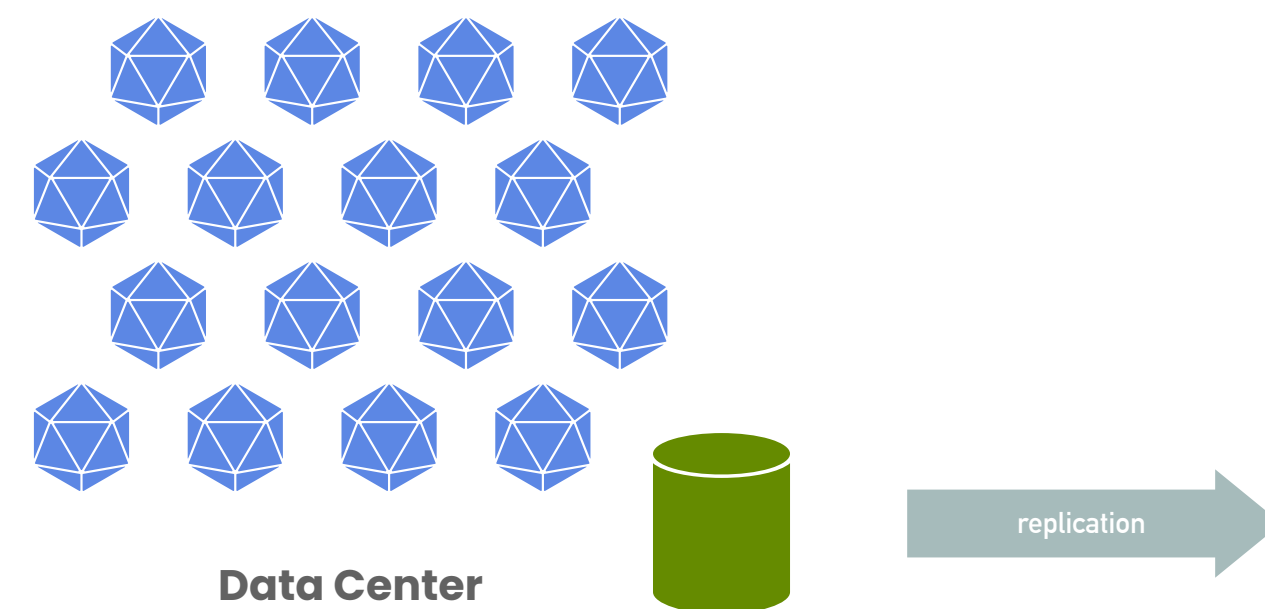
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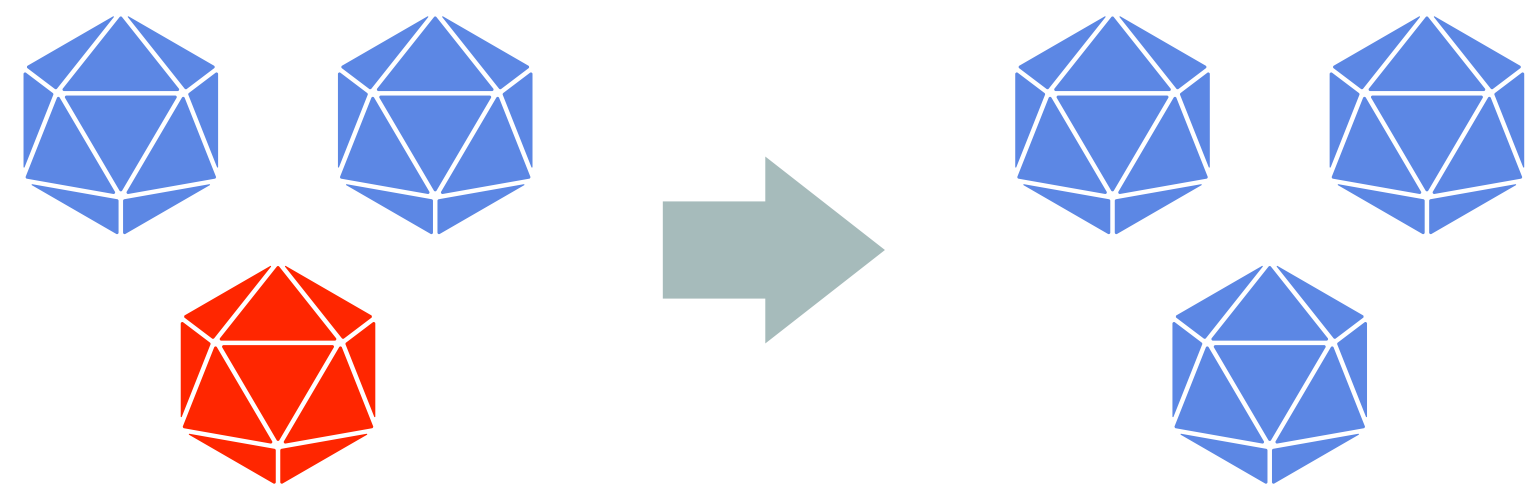


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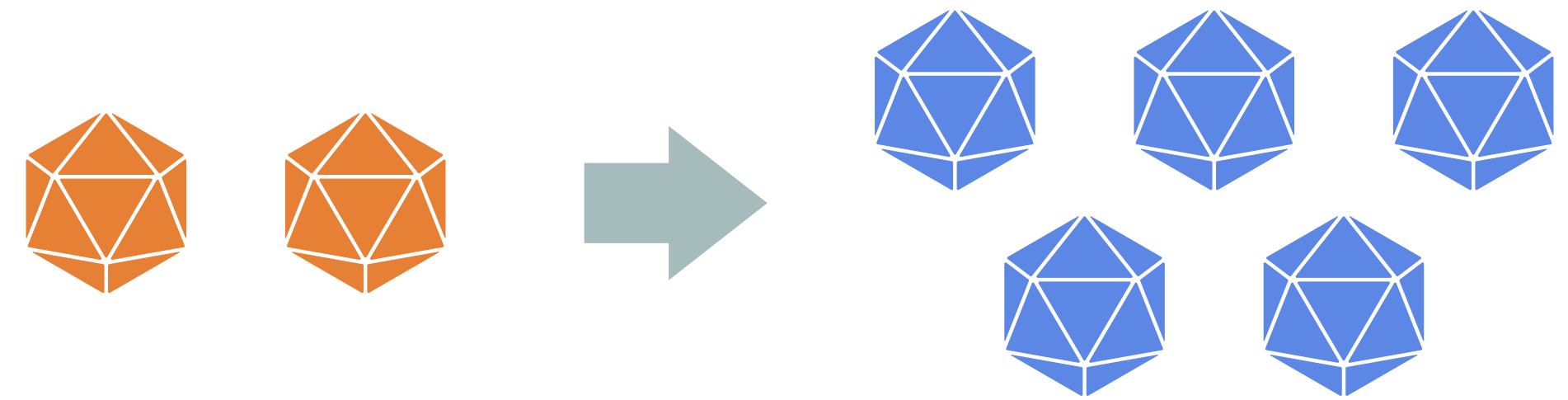


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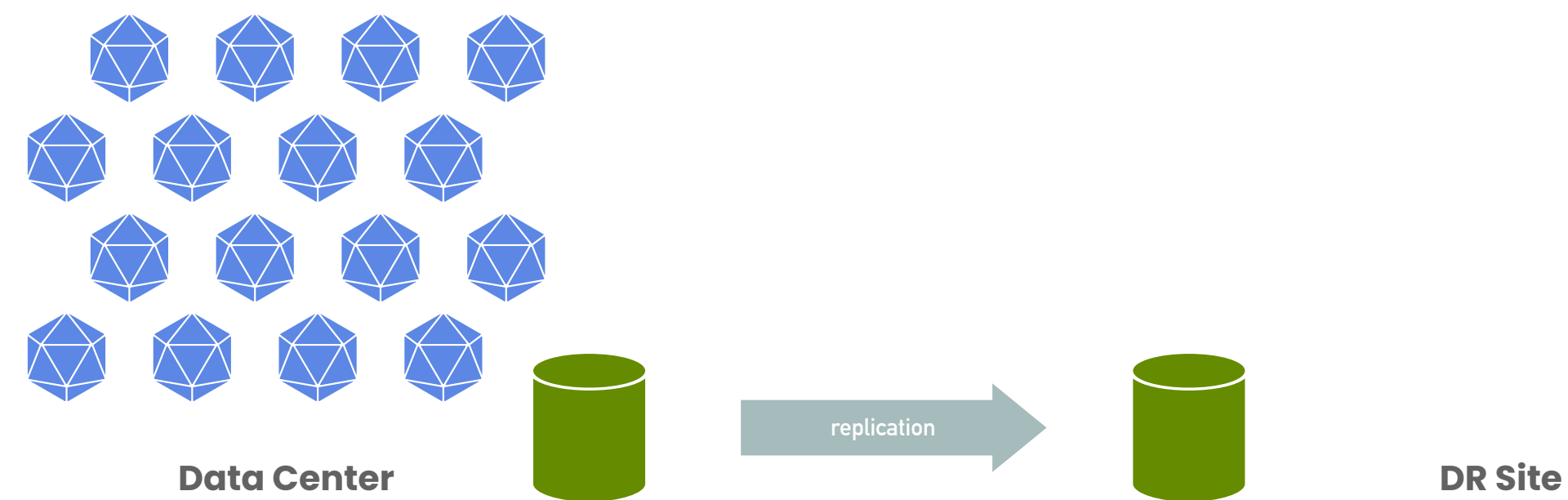
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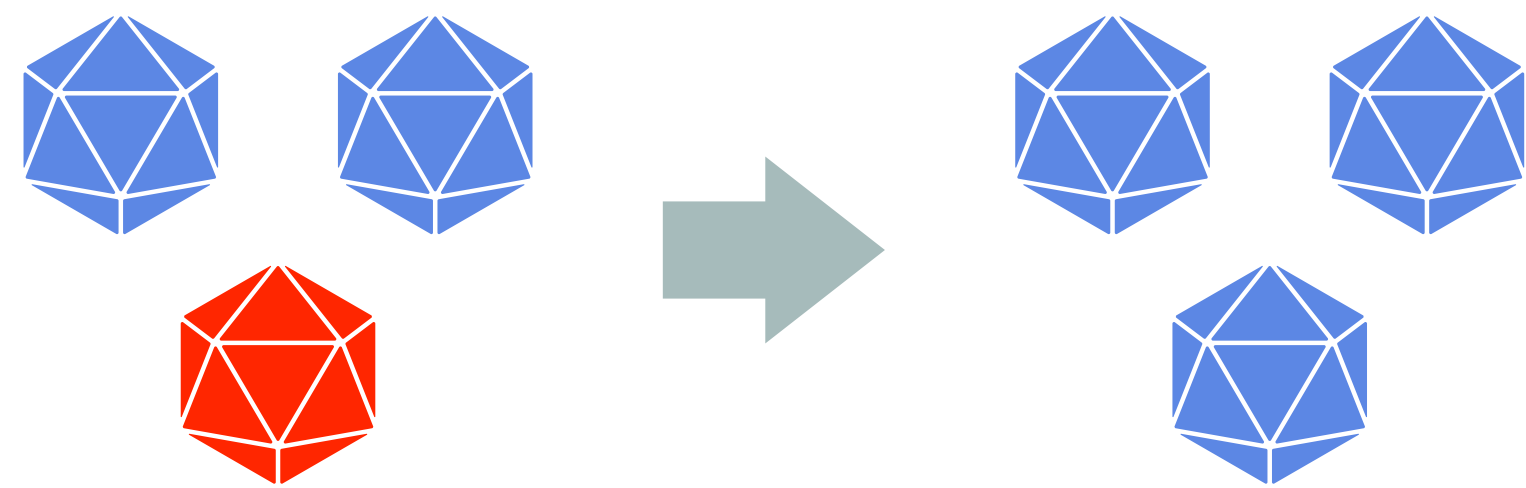


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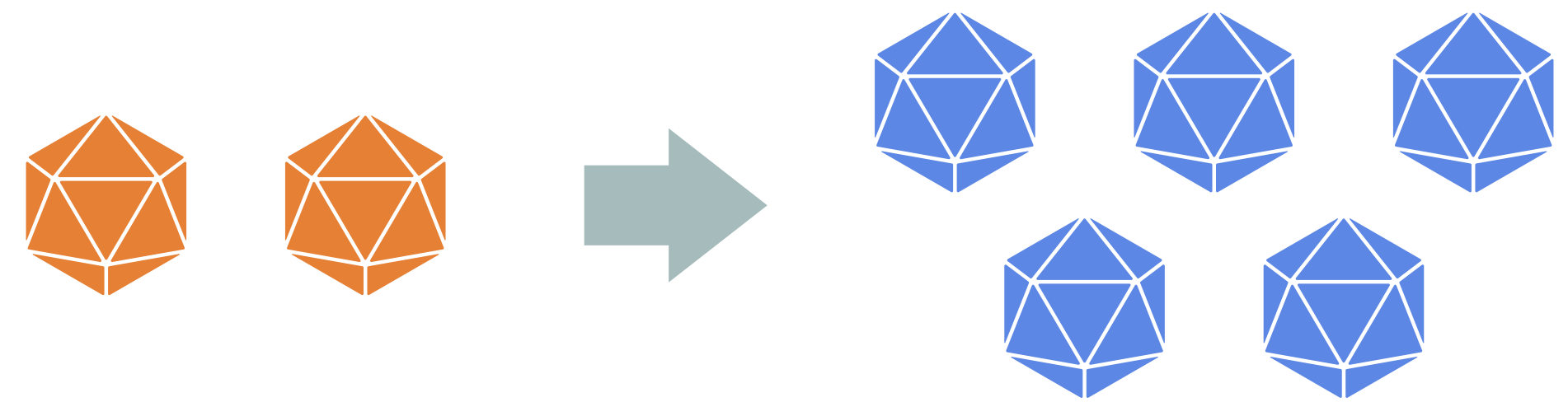


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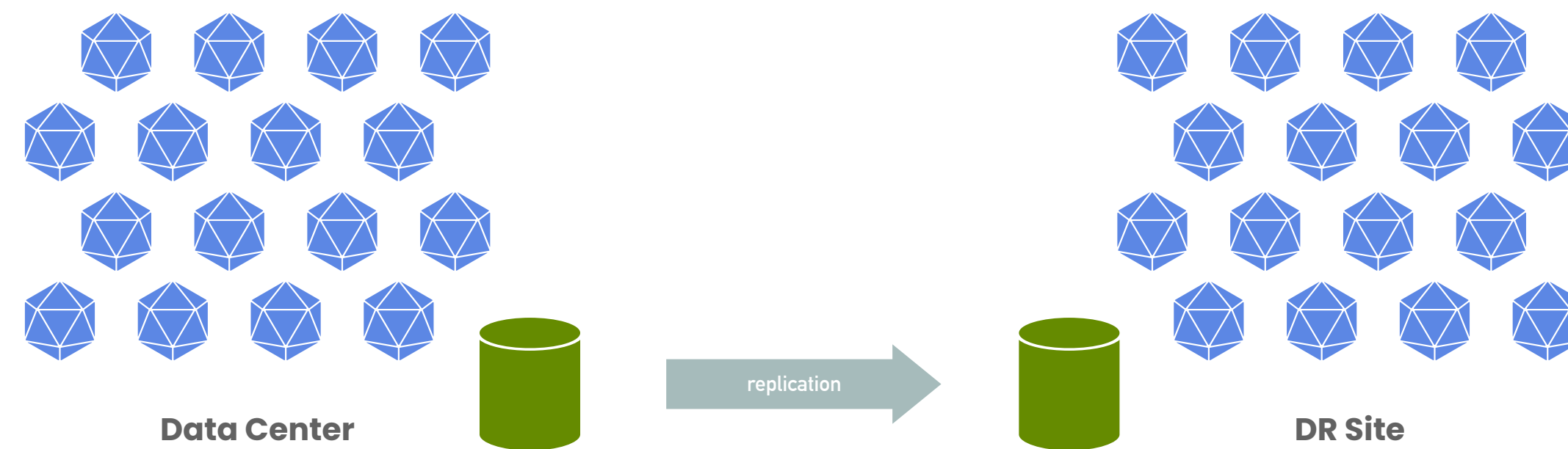
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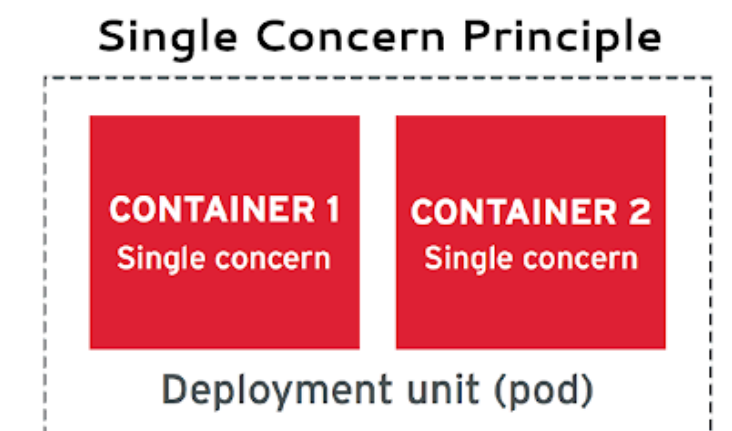
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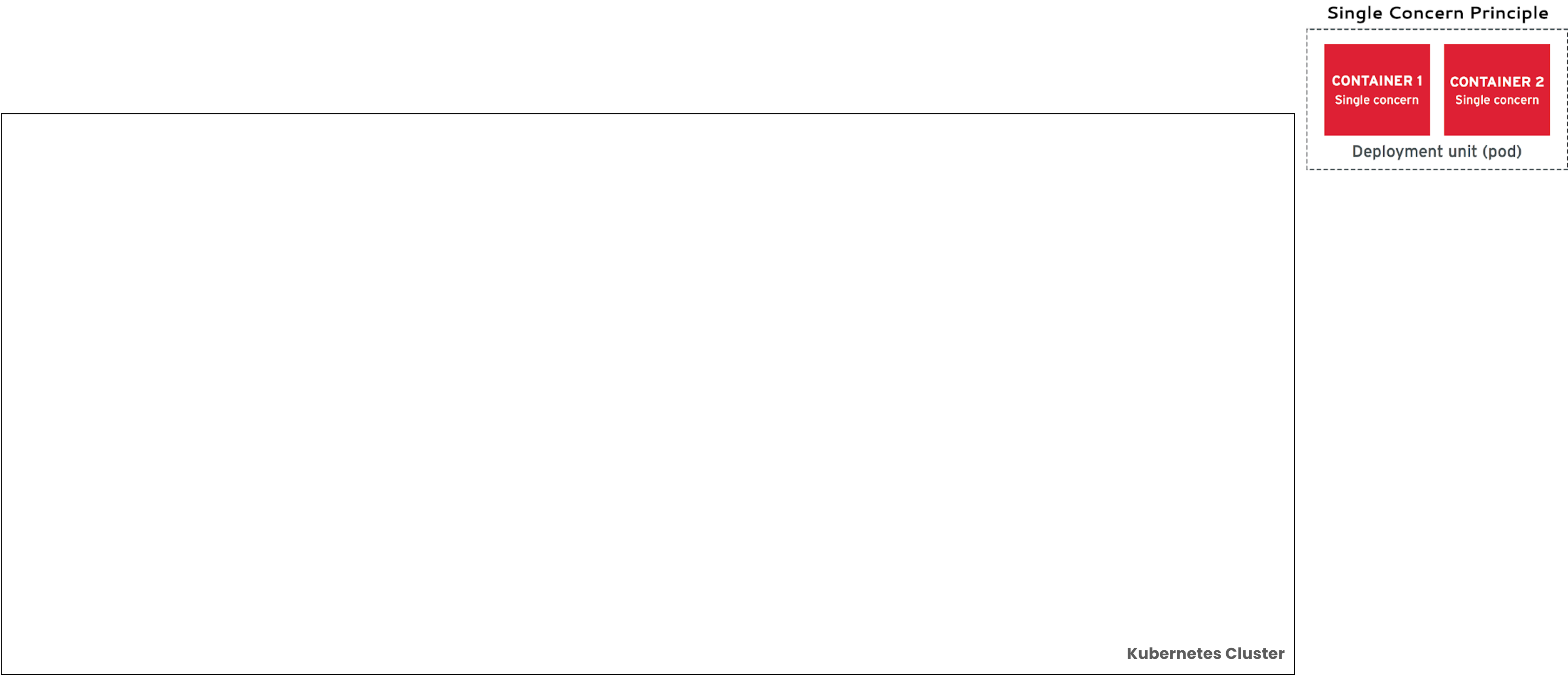
WHY YOU NEED KUBERNETES

- **Service discovery and load balancing** Kubernetes can expose a container using the DNS name or using their own IP address. If traffic to a container is high, Kubernetes is able to load balance and distribute the network traffic so that the deployment is stable.



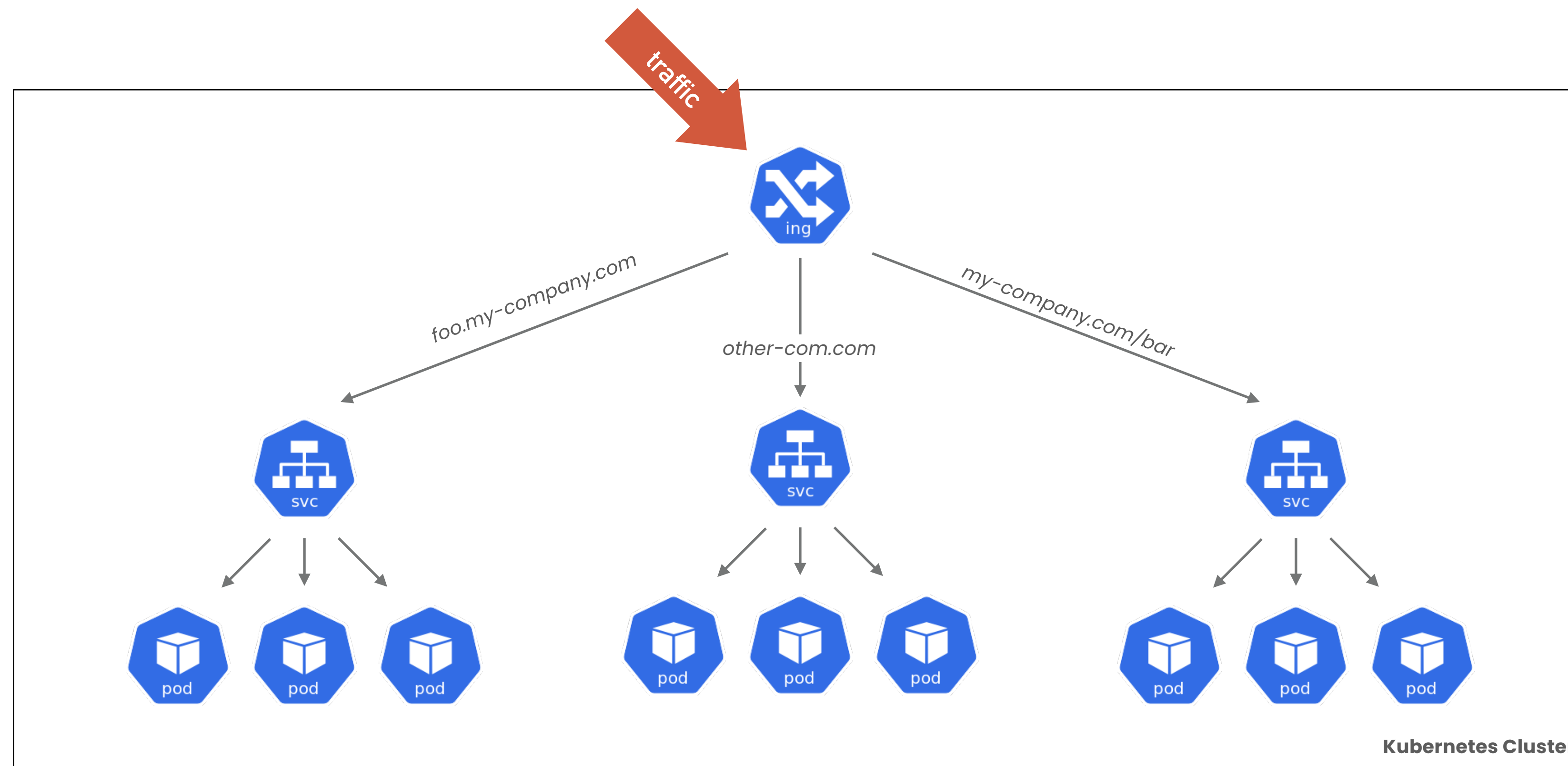
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Single Concern Principle

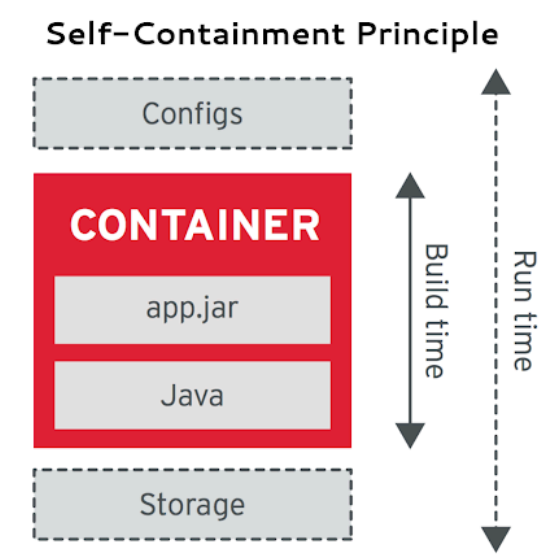
CONTAINER 1
Single concern

CONTAINER 2
Single concern

Deployment unit (pod)

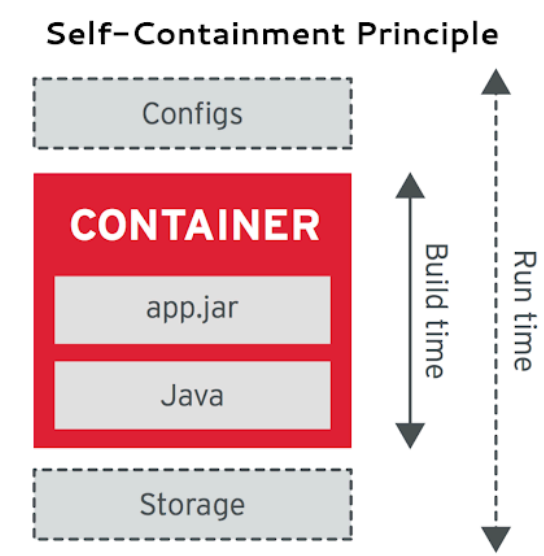
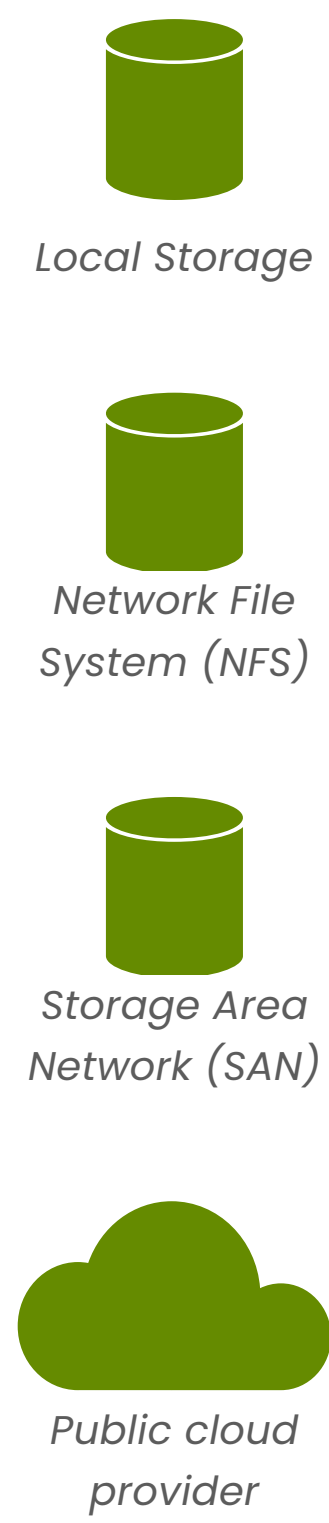
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- **Storage orchestration** Kubernetes allows you to automatically mount a storage system of your choice, such as local storages, public cloud providers, and more.



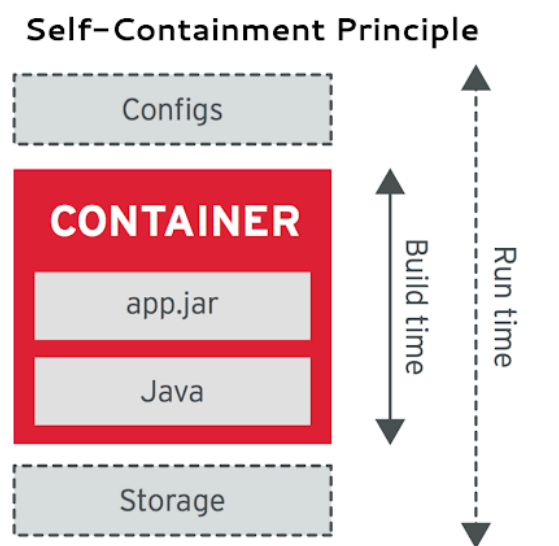
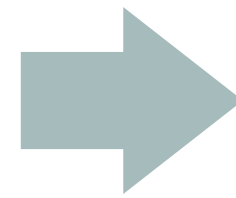
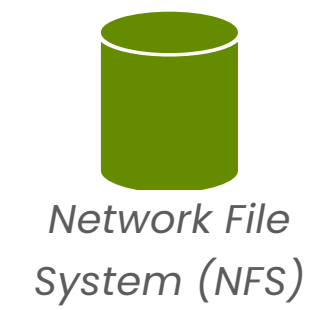
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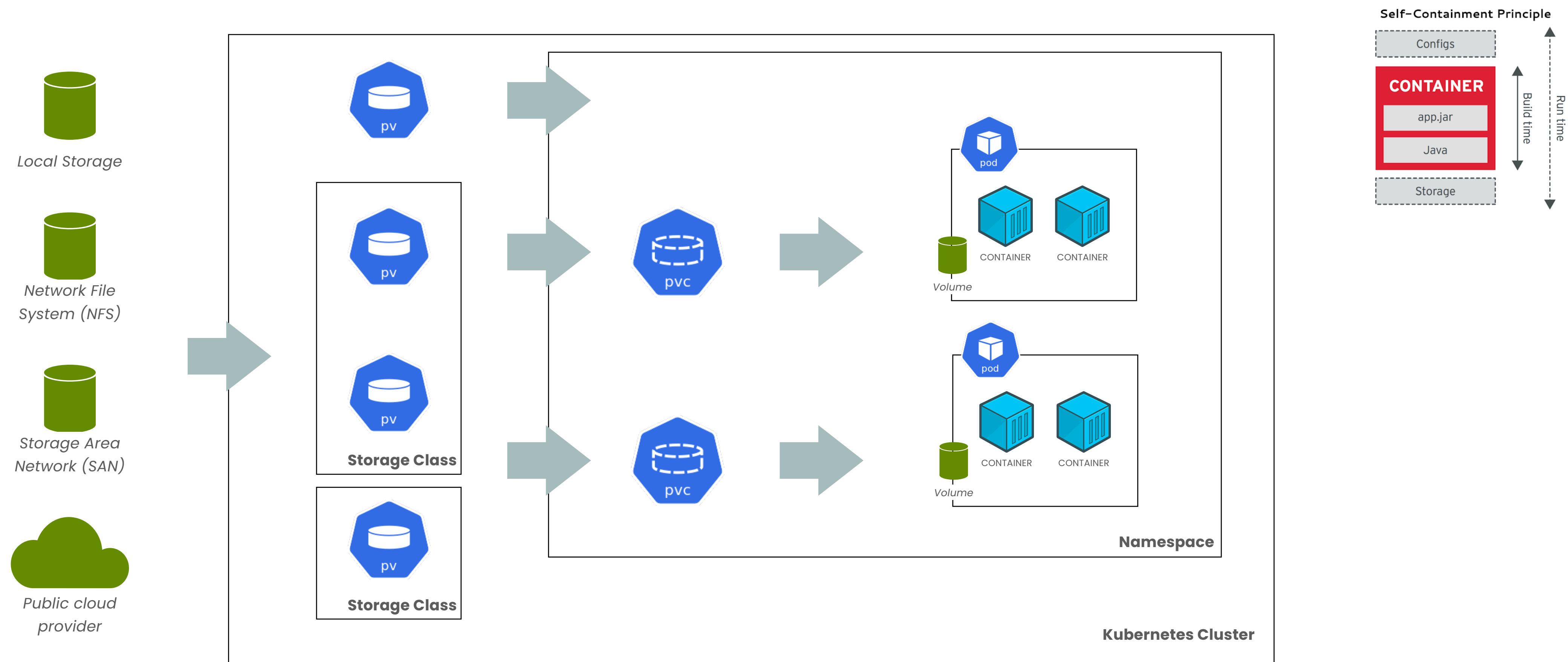
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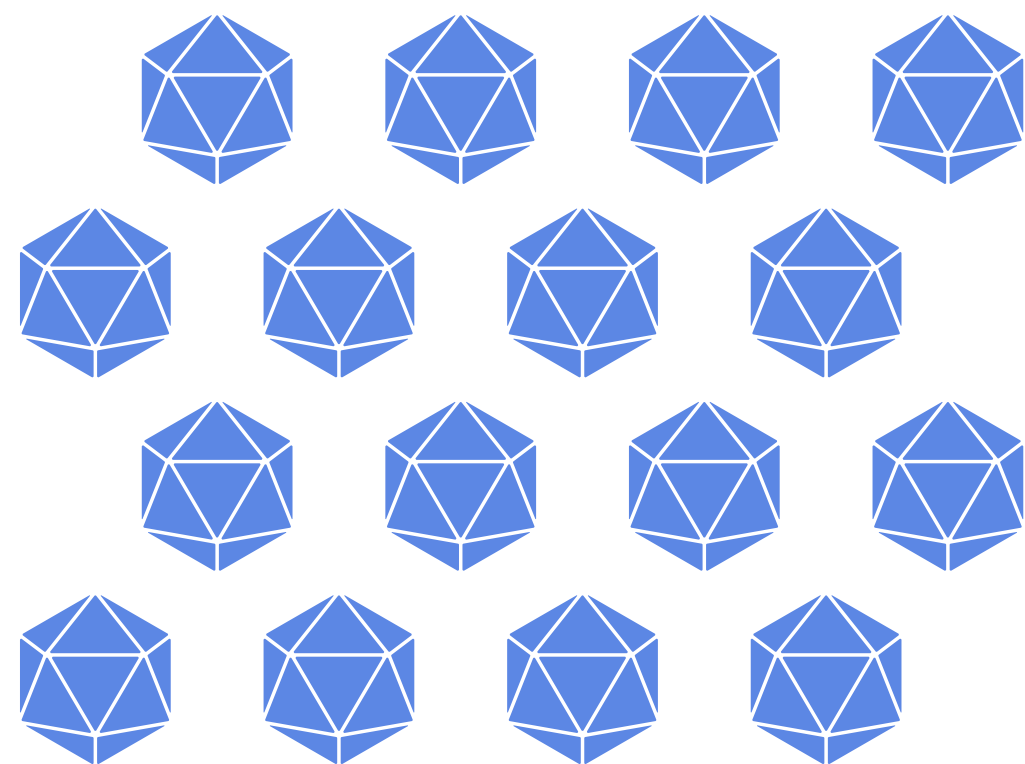
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- **Automated rollouts and rollbacks** You can describe the desired state for your deployed containers using Kubernetes, and it can change the actual state to the desired state at a controlled rate. For example, you can automate Kubernetes to create new containers for your deployment, remove existing containers and adopt all their resources to the new container.

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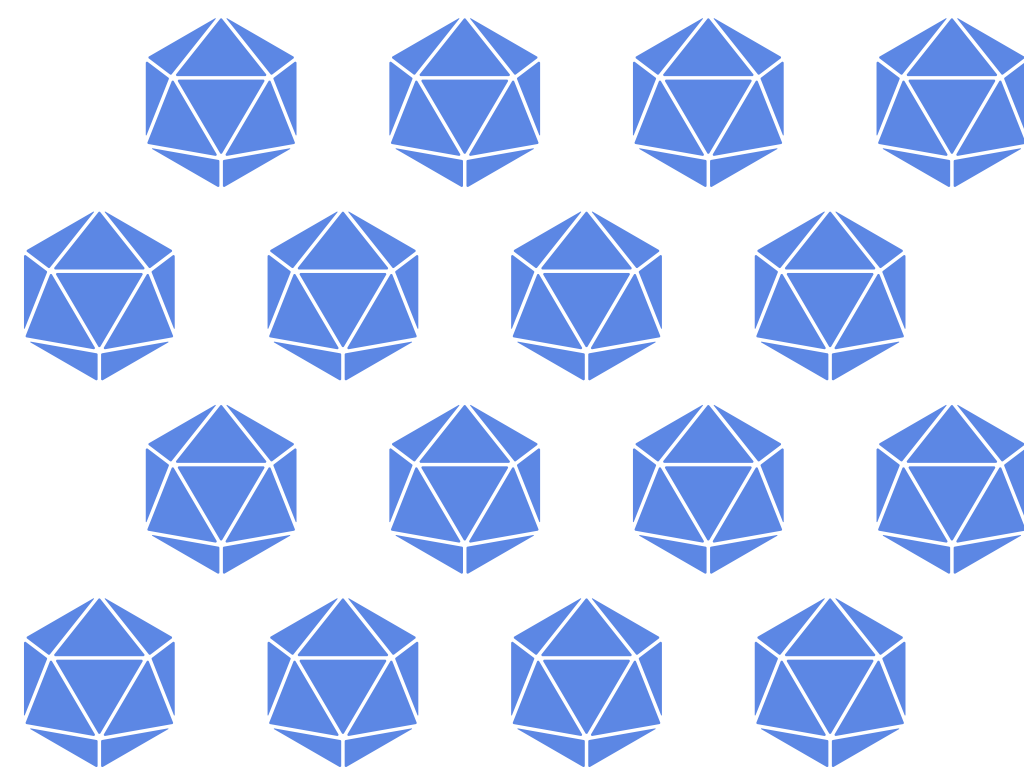


V 1.0

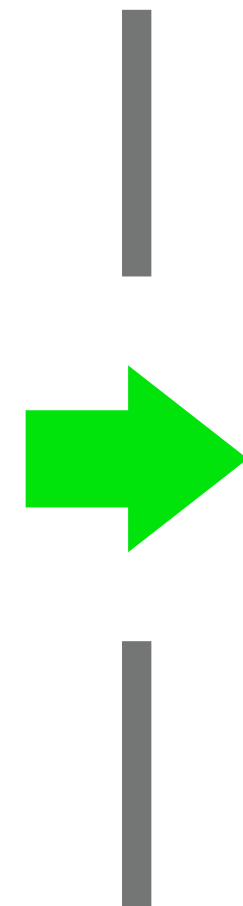
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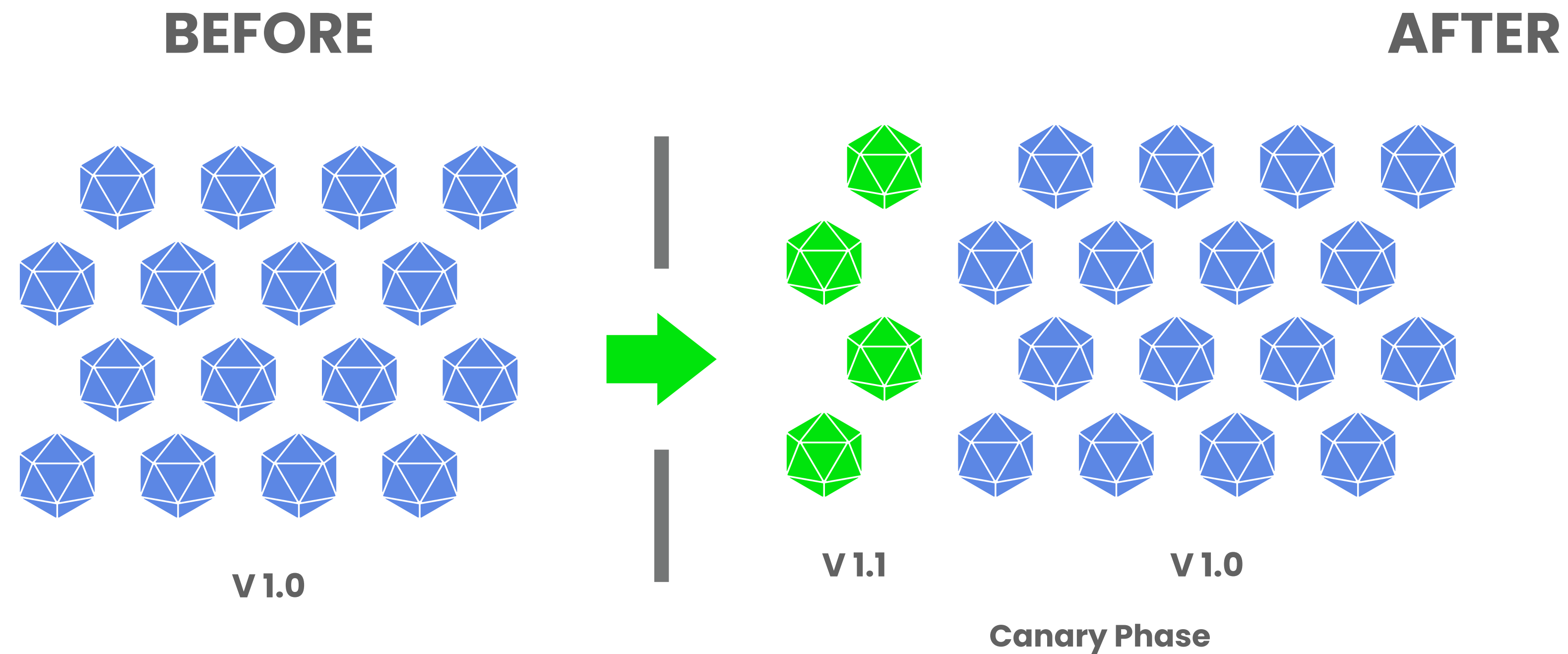
v 1.0



AFTER

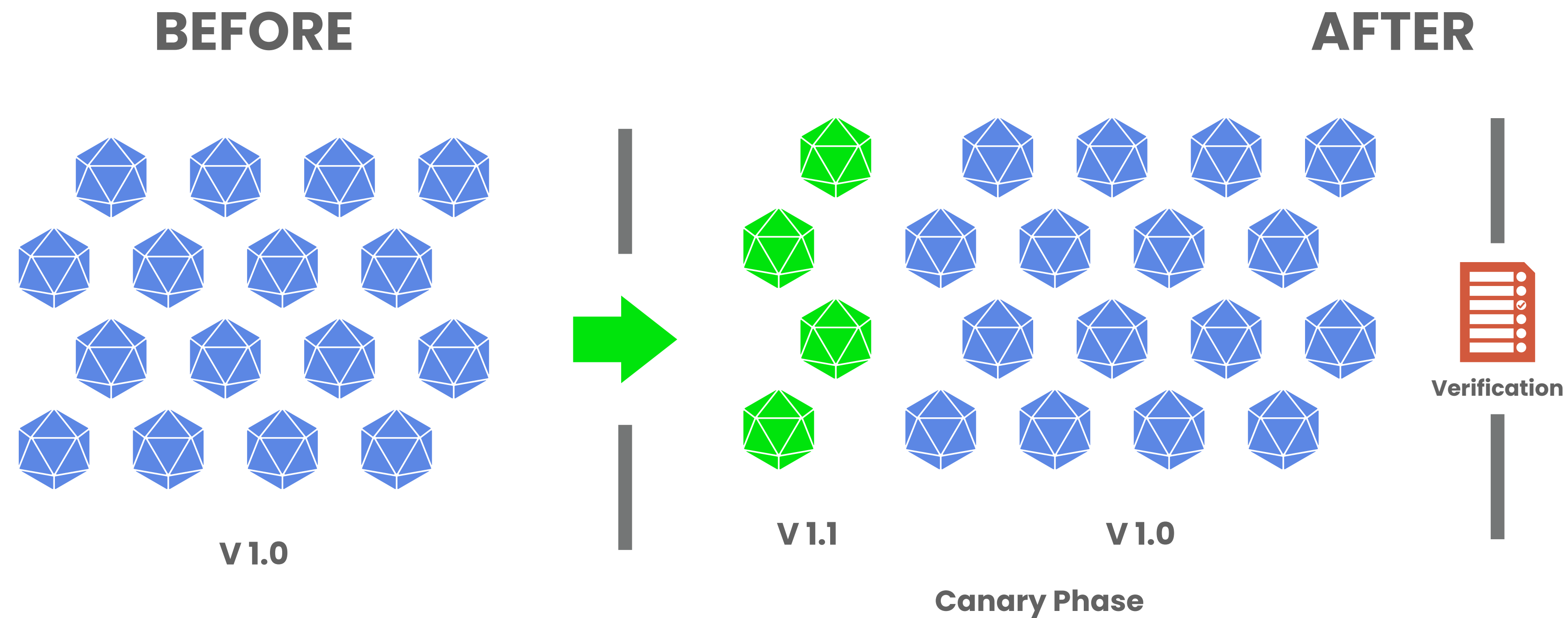
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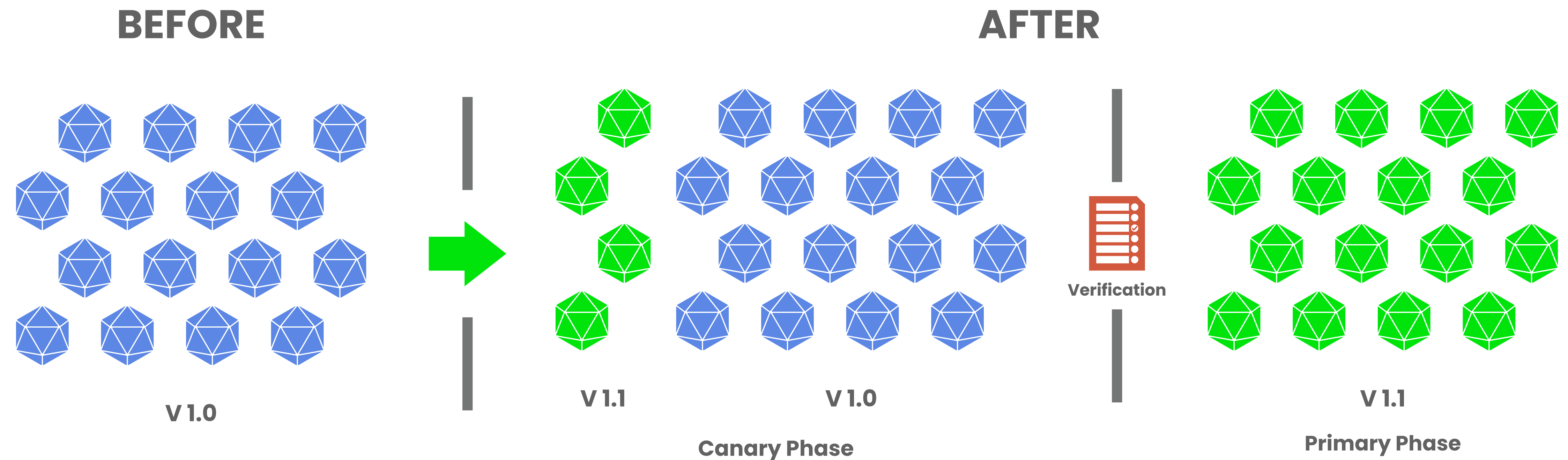
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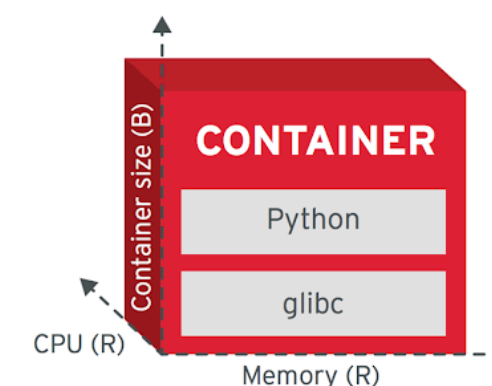
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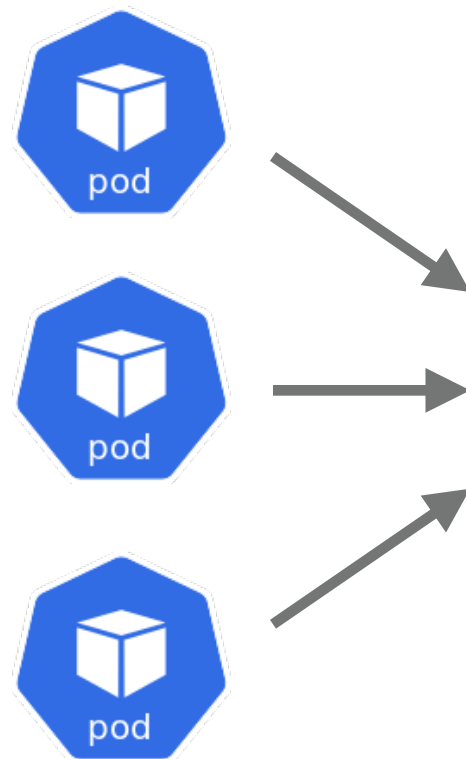
- **Automatic bin packing** You provide Kubernetes with a cluster of nodes that it can use to run containerized tasks. You tell Kubernetes how much CPU and memory (RAM) each container needs. Kubernetes can fit containers onto your nodes to make the best use of your resources.

Runtime Confinement Principle

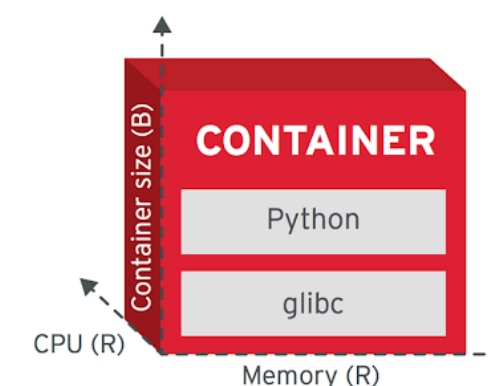


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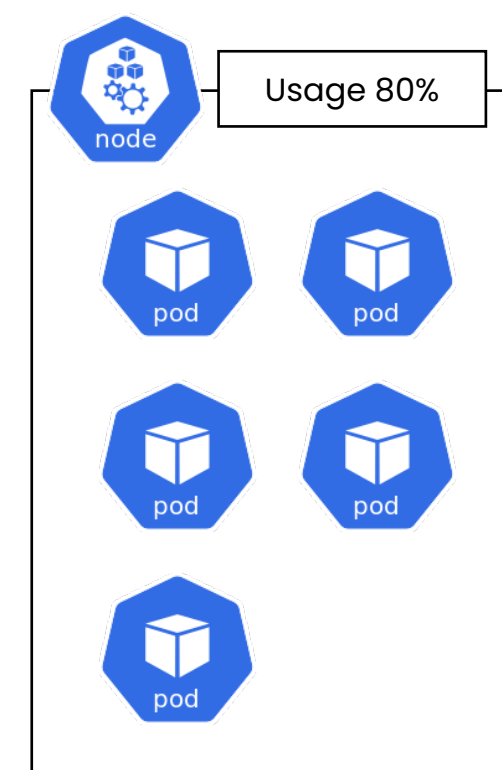
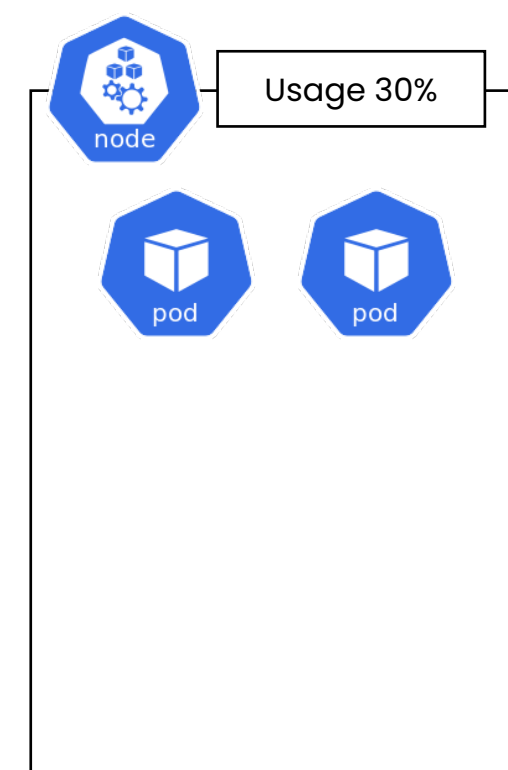
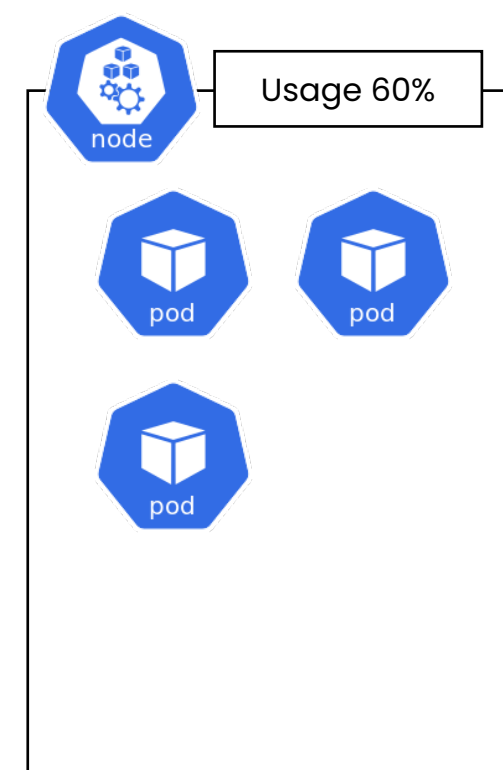
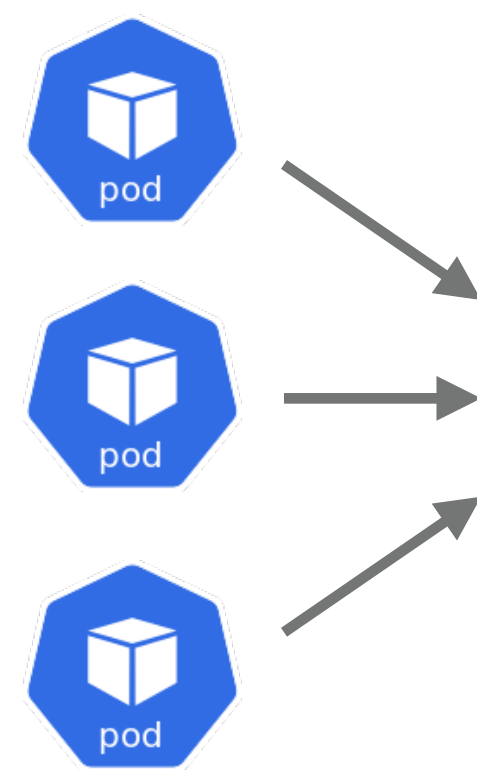


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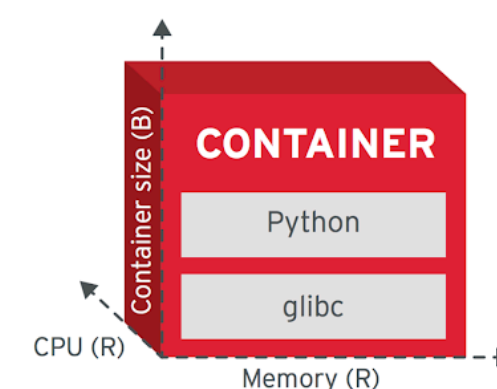


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- **Automatic bin packing** You provide Kubernetes with a cluster of nodes that it can use to run containerized tasks. You tell Kubernetes how much CPU and memory (RAM) each container needs. Kubernetes can fit containers onto your nodes to make the best use of your resources.

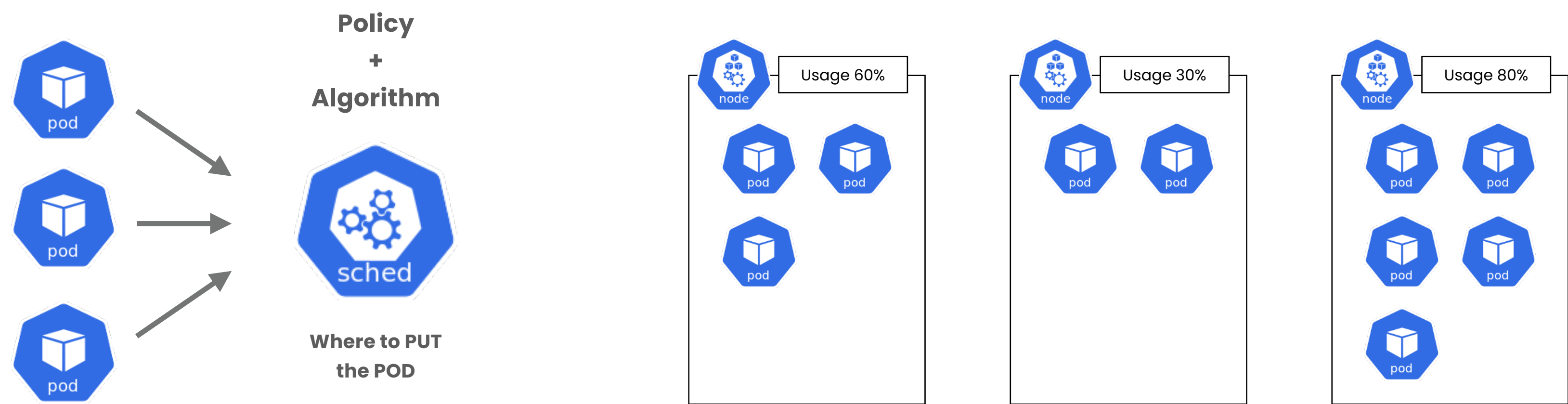


Runtime Confinement Principle

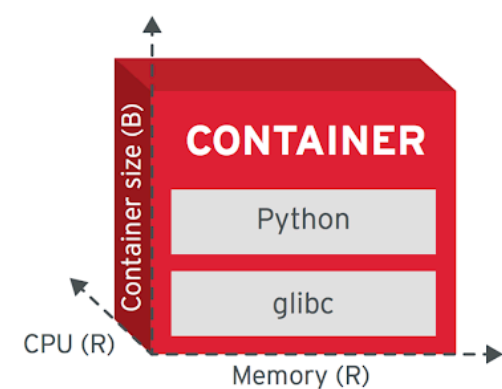


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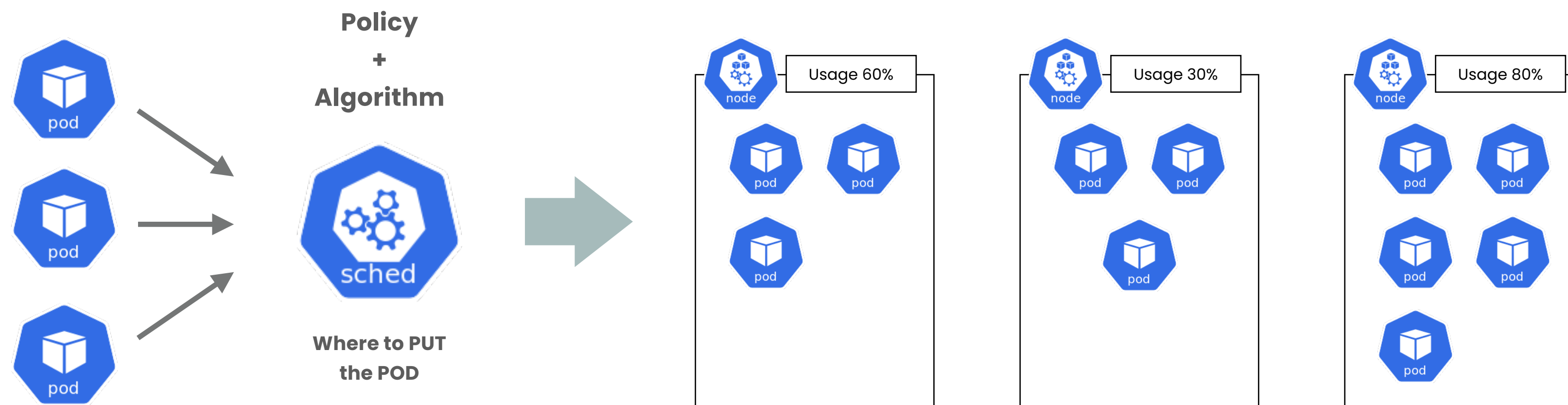


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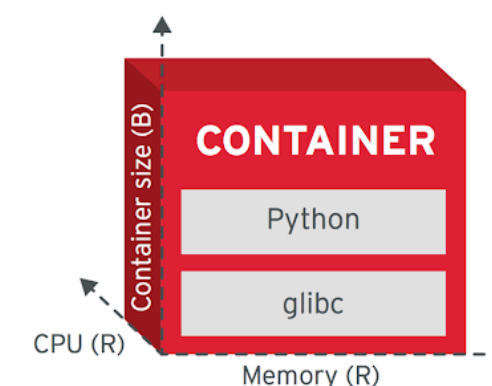


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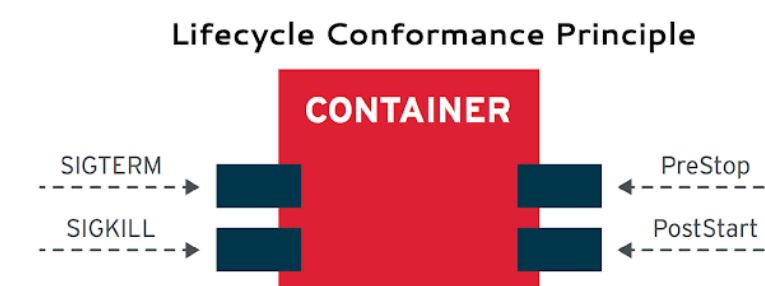
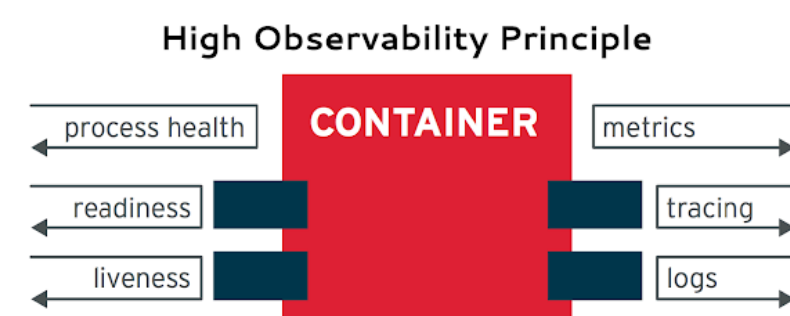
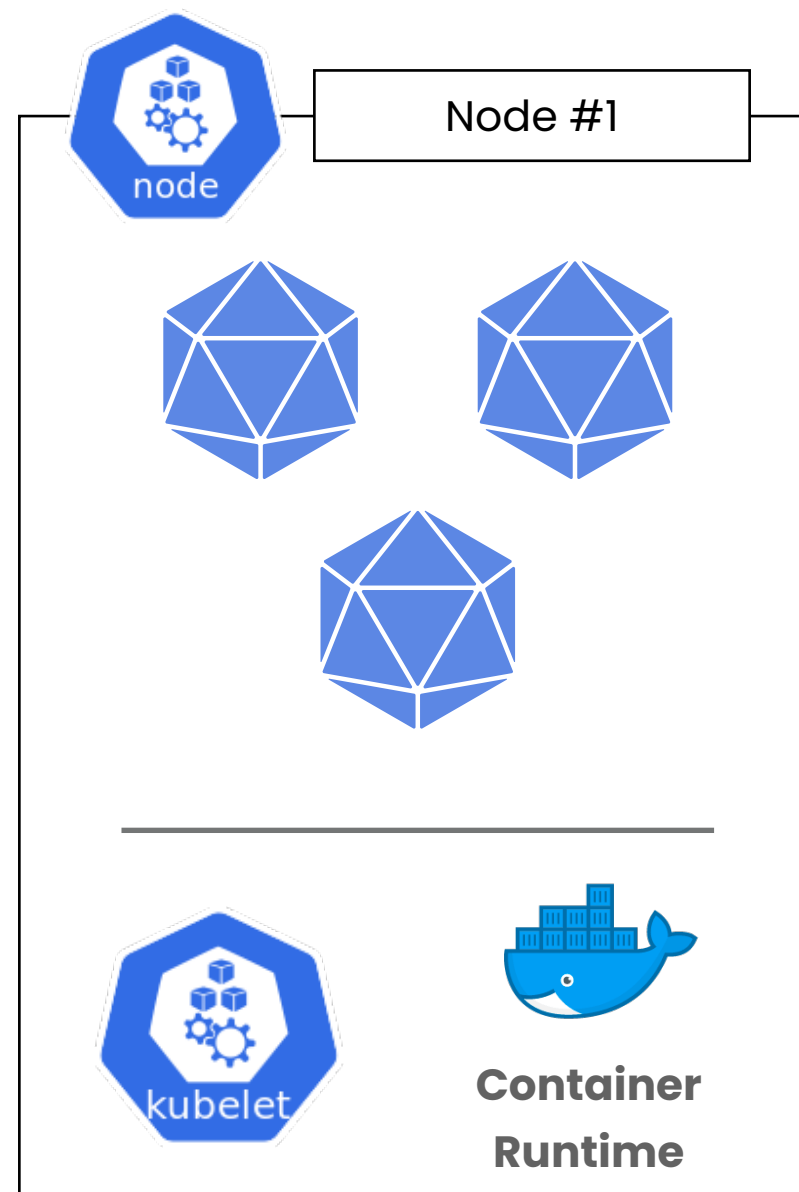


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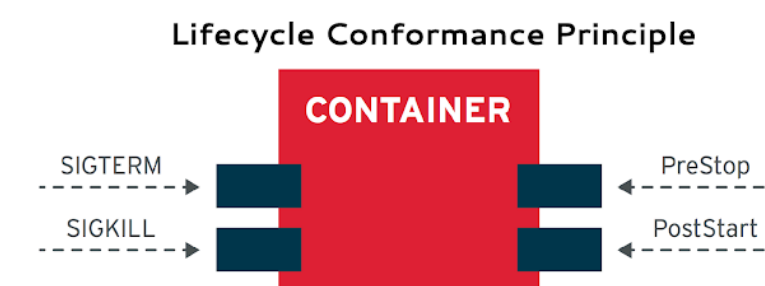
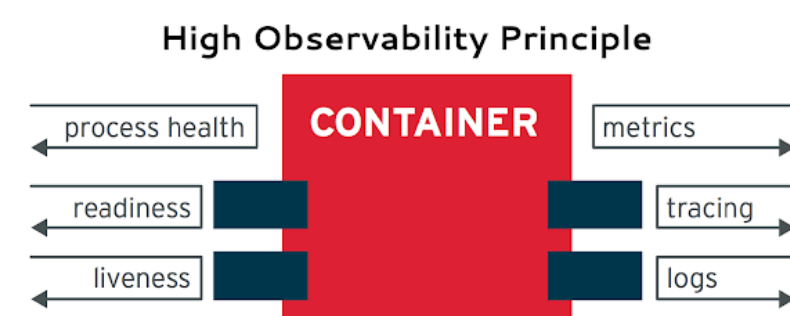
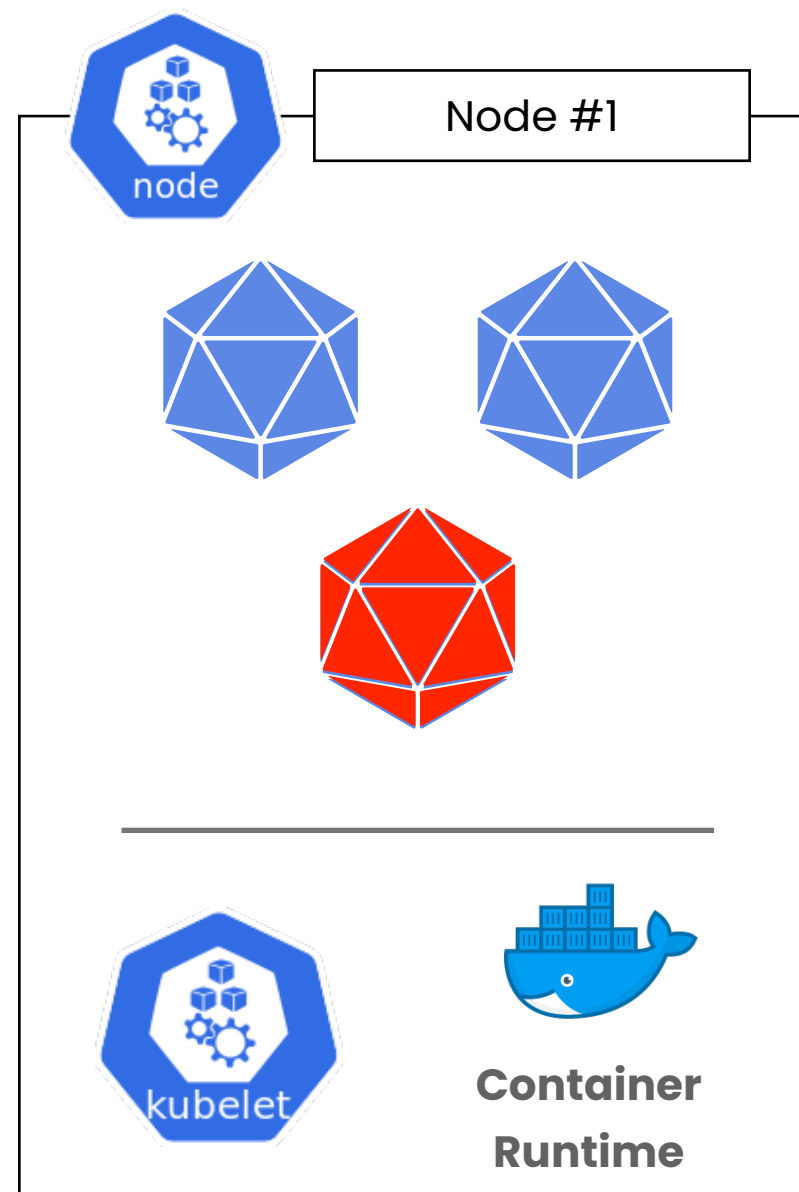
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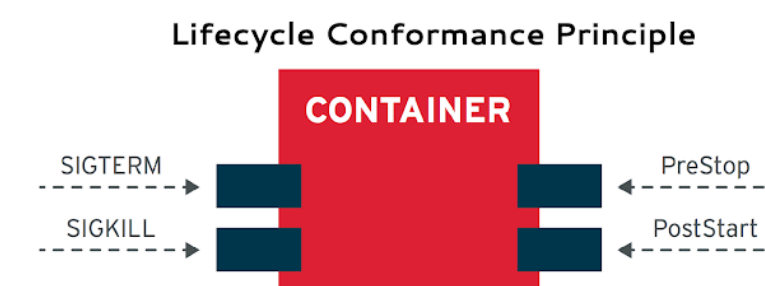
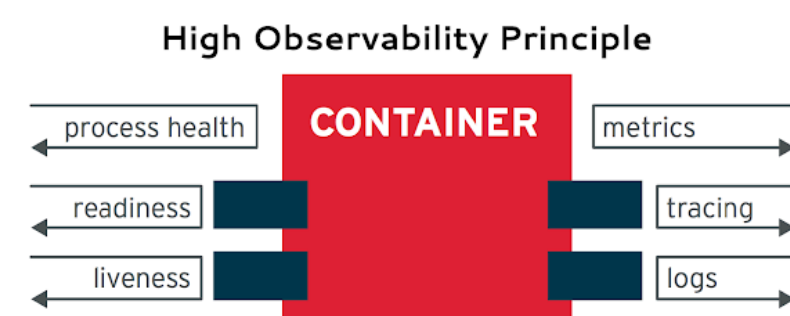
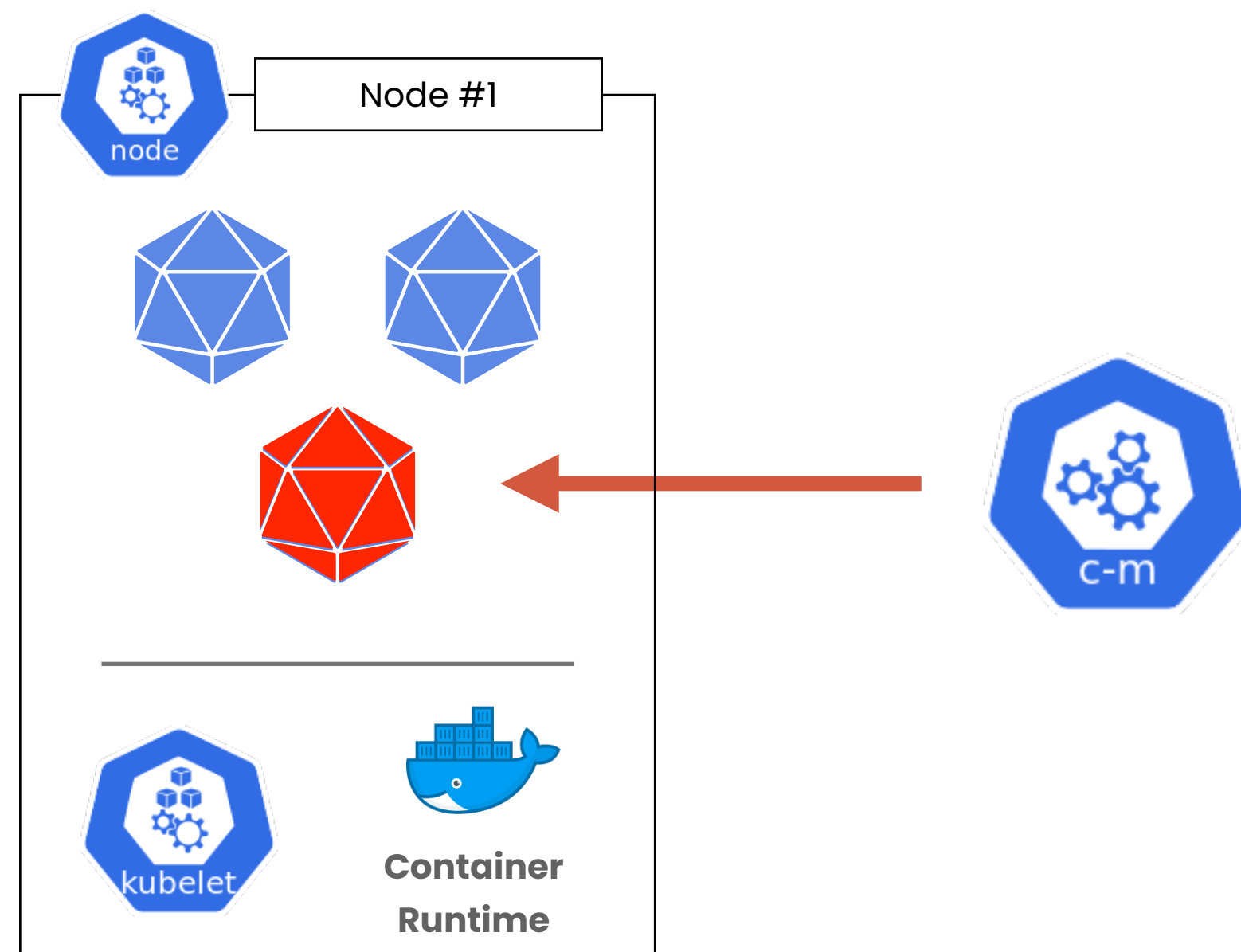
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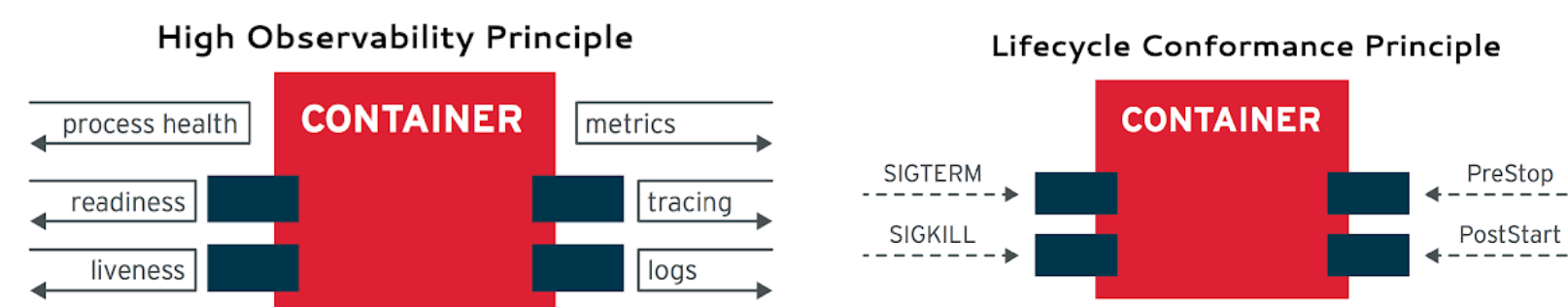
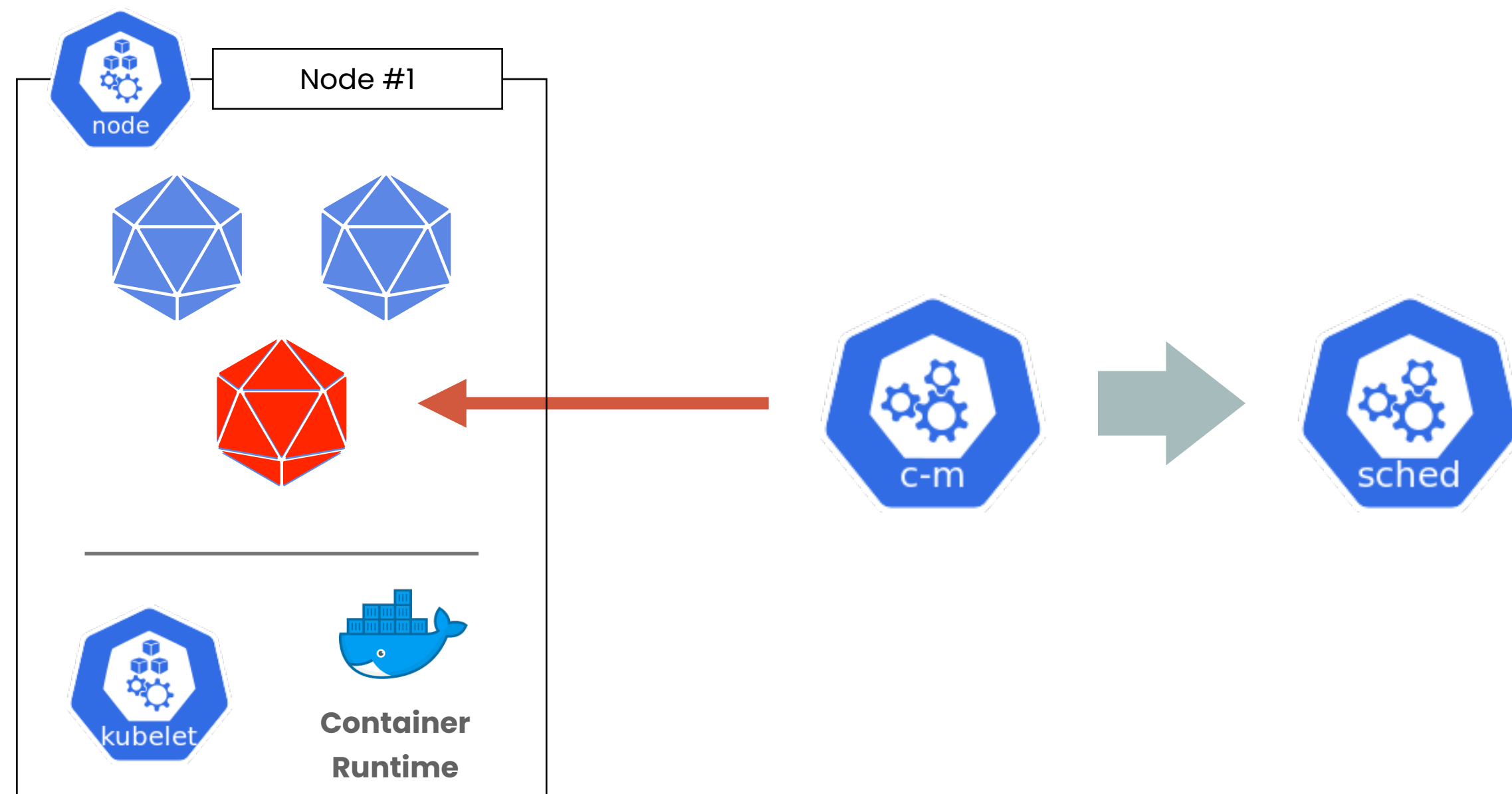
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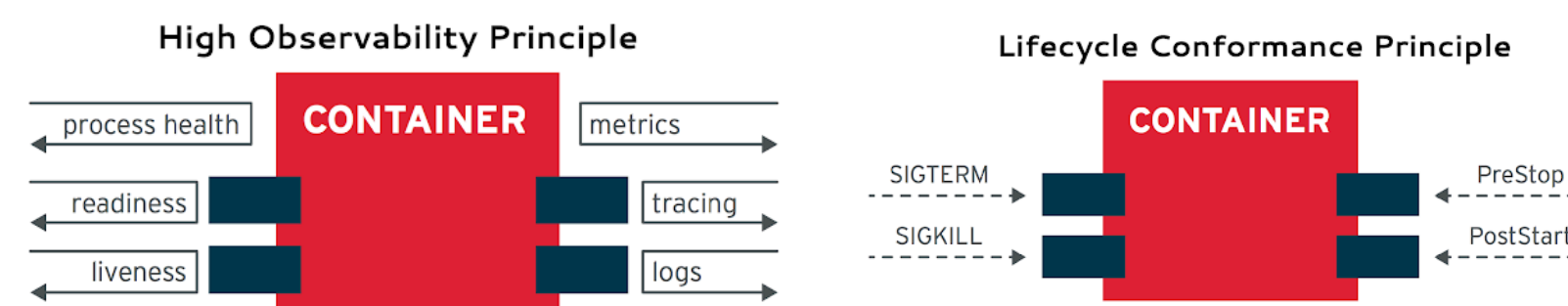
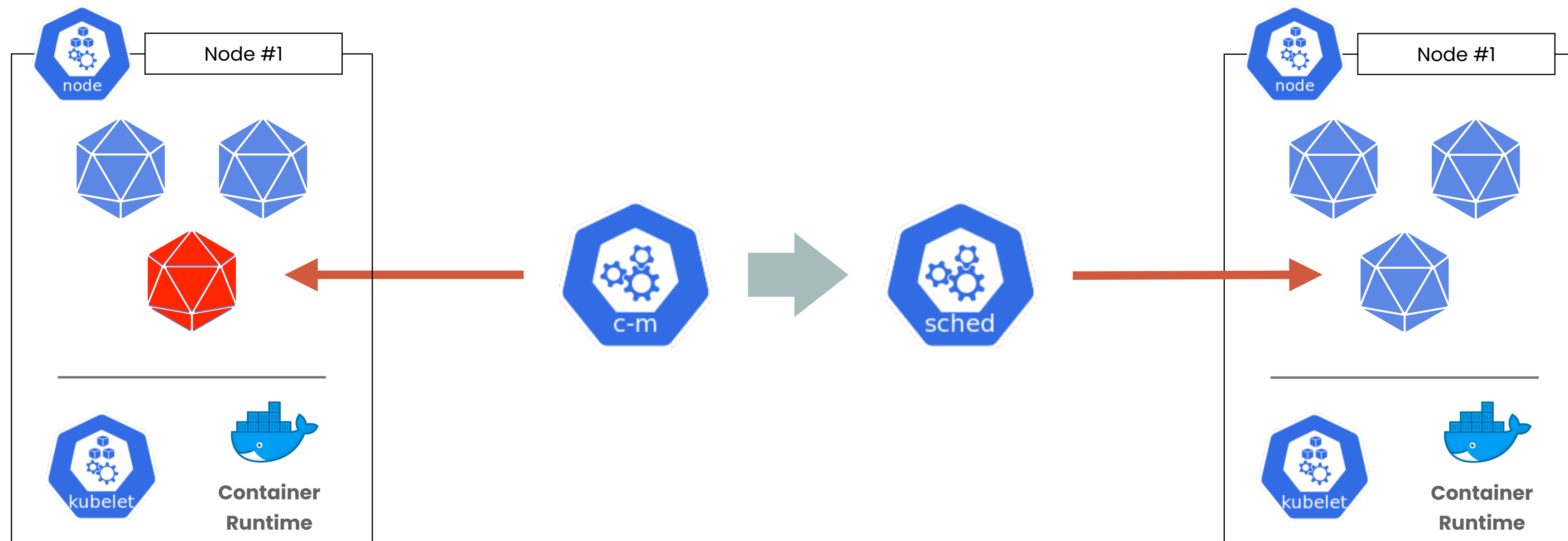
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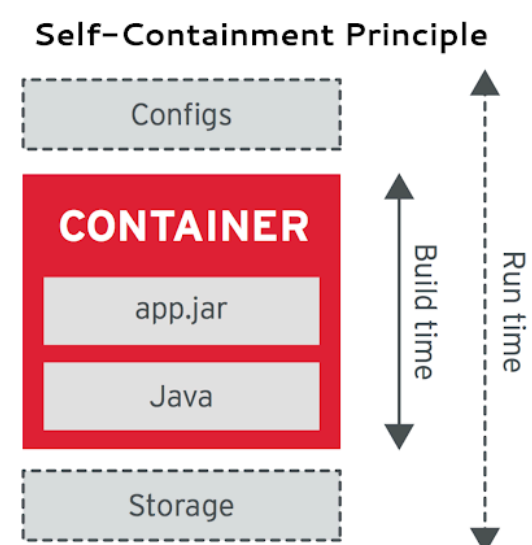
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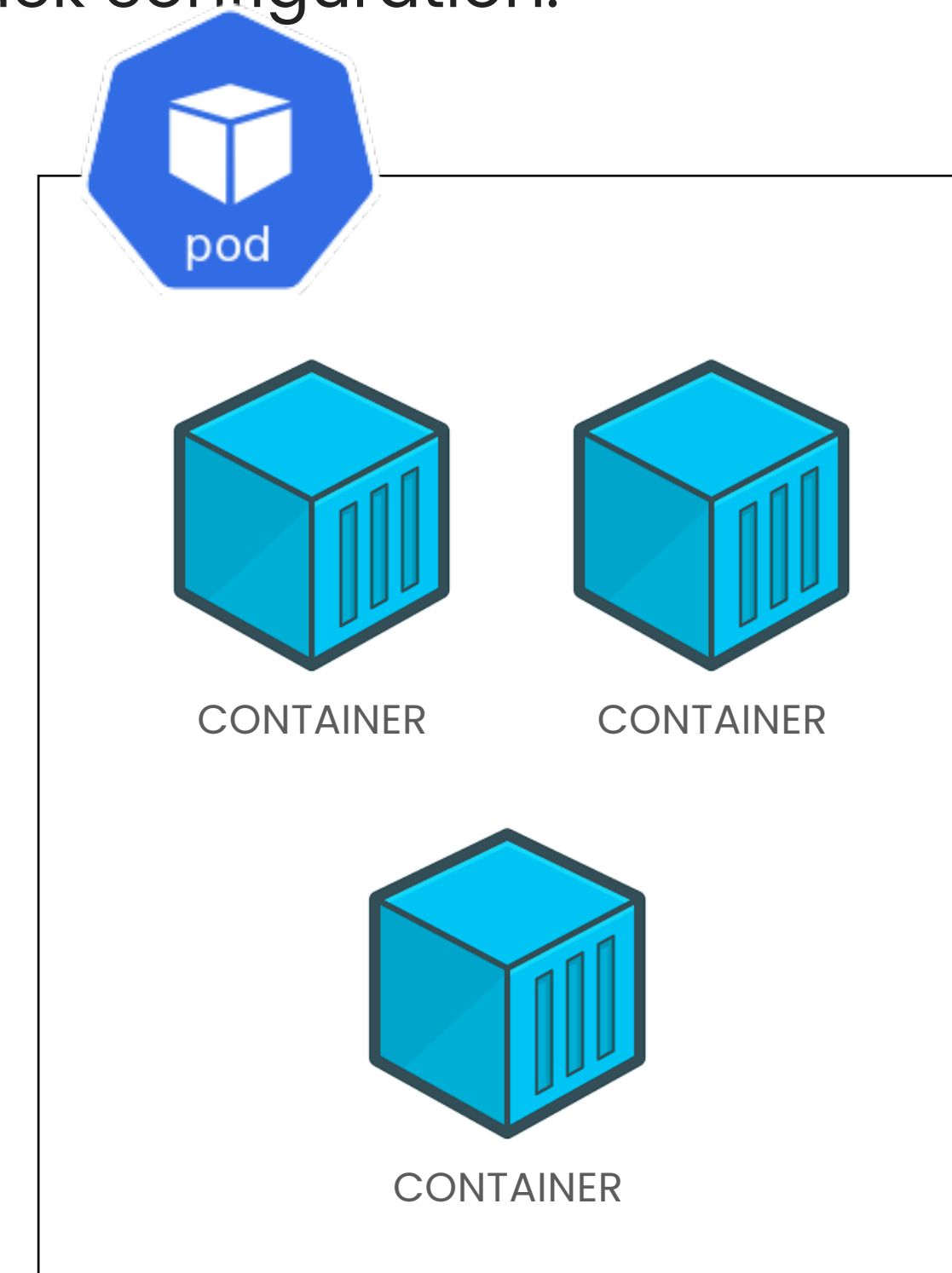
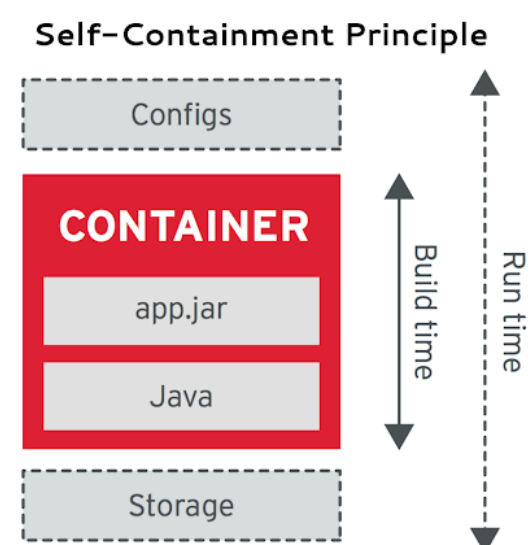
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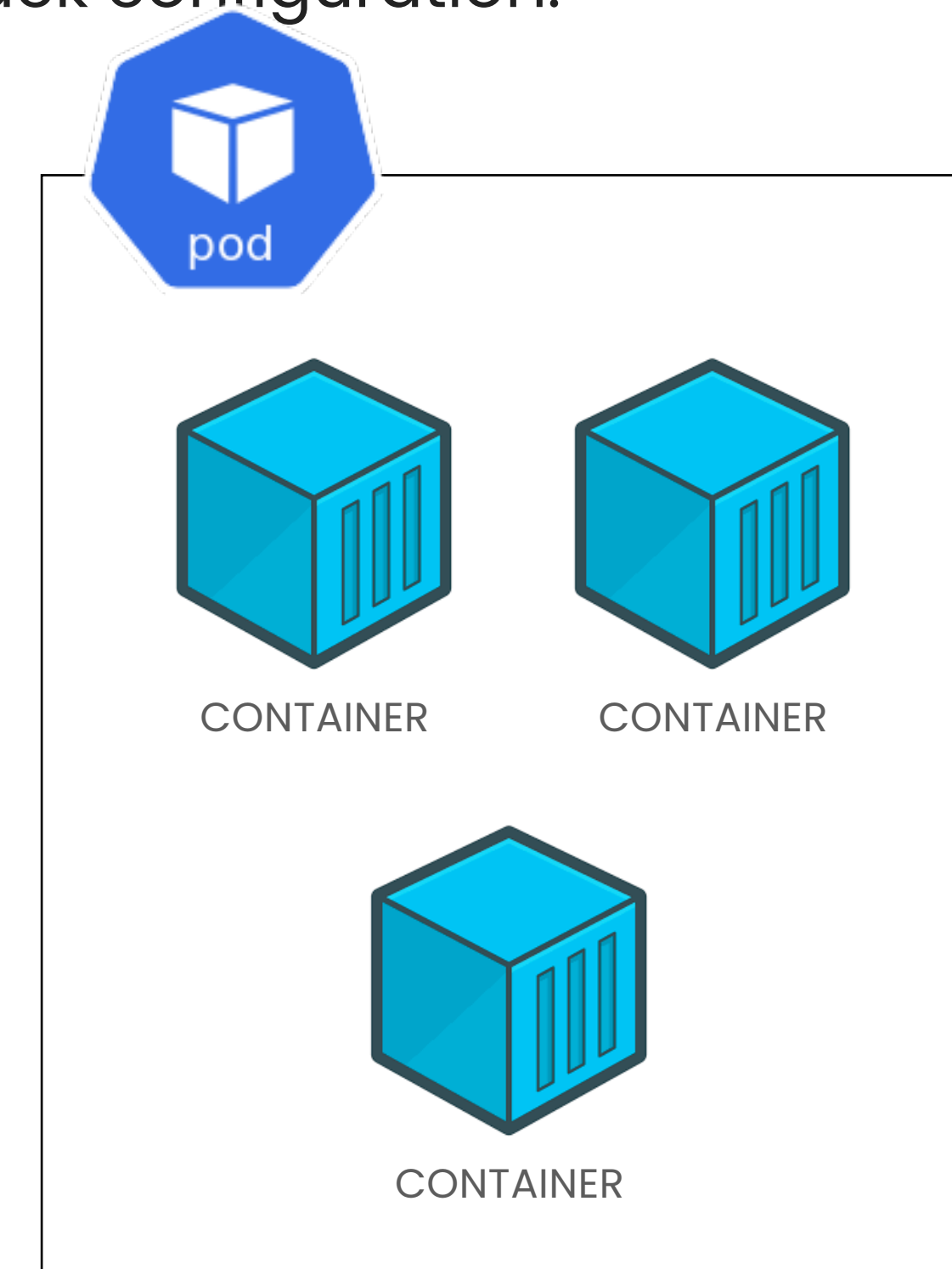
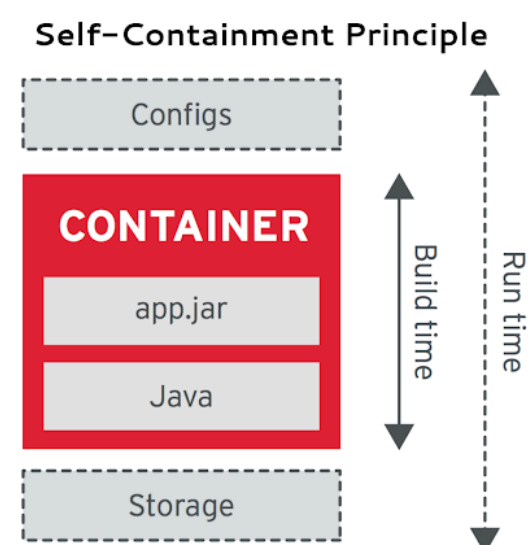
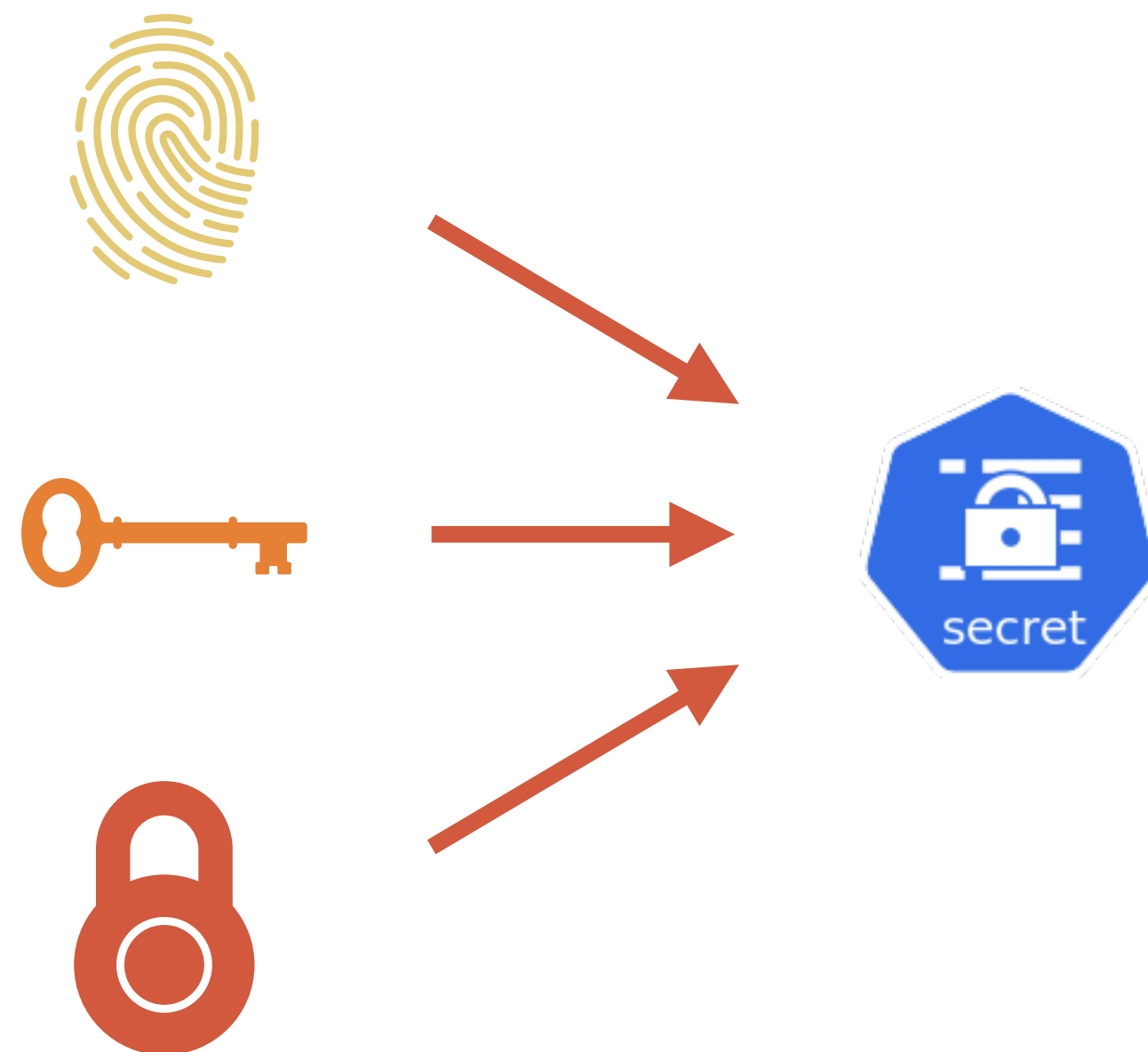
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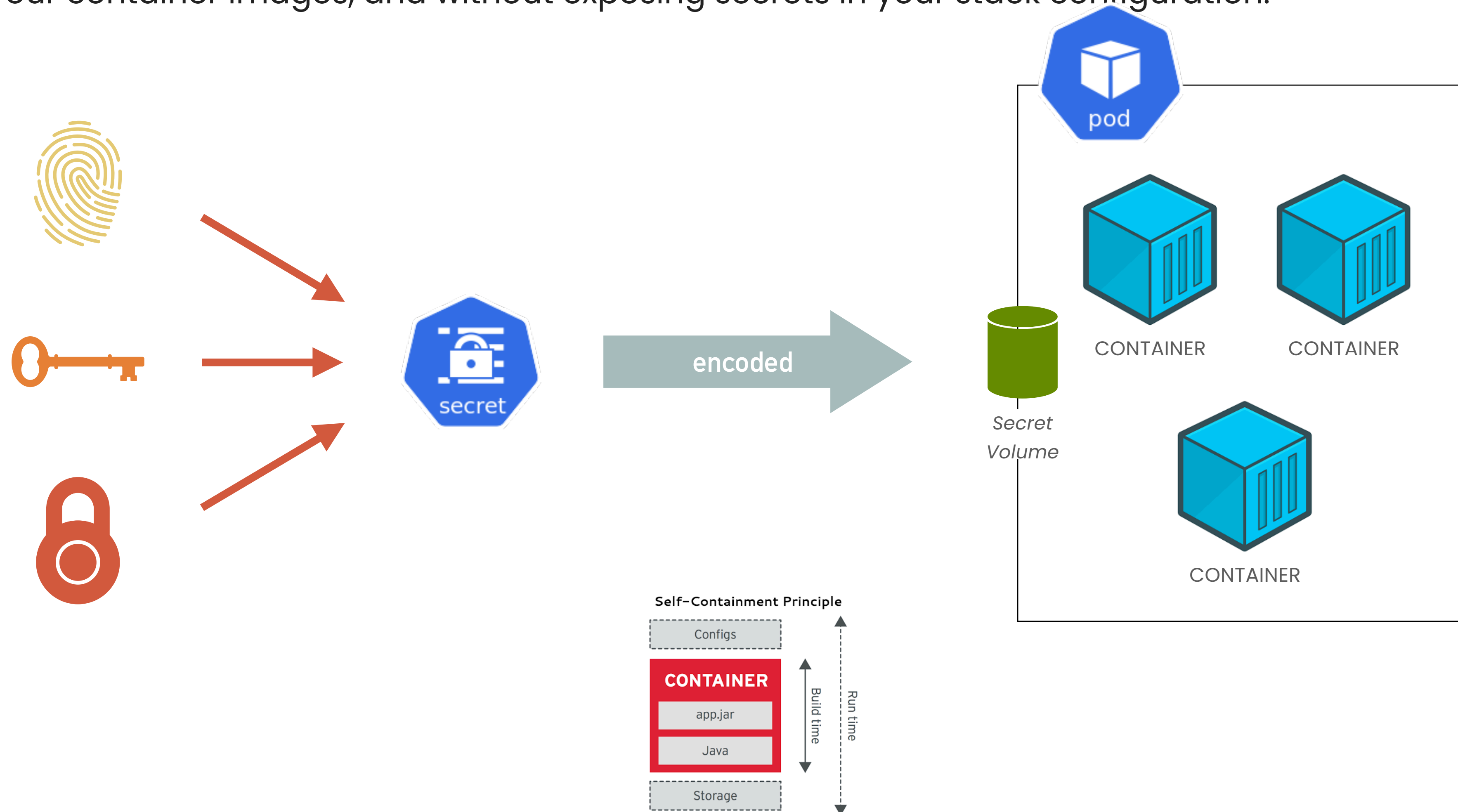
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WHAT KUBERNETES IS NOT

Kubernetes is not a traditional, all-inclusive PaaS (Platform as a Service) system.

Kubernetes operates at the container level, it provides some generally applicable features common to PaaS offerings, such as deployment, scaling, load balancing, and lets users integrate their logging, monitoring, and alerting solutions.

Kubernetes: does not

- Limit the types of applications supported.
- Deploy source code and does not build your application.
- Provide application-level services.
- Dictate logging, monitoring, or alerting solutions.
- Provide nor mandate a configuration language/system (for example, Jsonnet).
- Provide nor adopt any comprehensive machine configuration, maintenance, management, or self-healing systems.
- Is not a mere orchestration system. It comprises a set of independent, composable control processes

THANK YOU