Introduction to Kubernetes

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Software Engineers @ SUSE

SUSE Academic Training Program

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Speakers

Who is who

- **Antonio Gámez Díaz, PhD**
  - Sr. Software Engineer @ SUSE
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- ➔ Bringing the power of **Kubernetes** to **SAP solutions** in SUSE since 2024. Now focusing on AI solutions.
- ➔ **PhD** in **Software Engineering** by the Universidad de **Sevilla**.
- ➔ Loves **APIs** and **SLAs**.

Speakers

Who is who

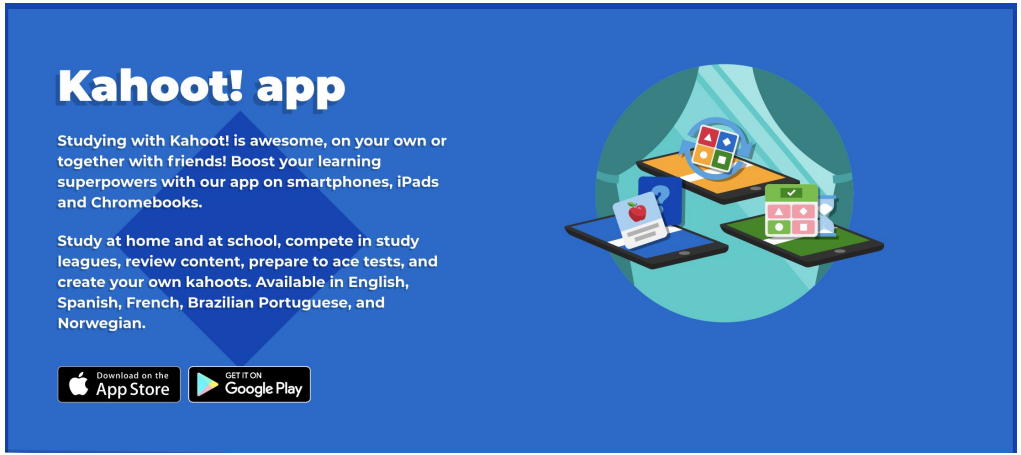
- **Ibone González Mauraza**
  - Software Engineer @ SUSE
  - ibone.gonzalez@suse.com

- ➔ Full-stack engineer at the **SUSE Customer Center** team since 2024.
- ➔ **CKAD**-certified by the CNCF.
- ➔ Passionate about **Kubernetes** and **lettering**.

Stay tuned for the Kahoot

We might have some prizes for you :)

- At the end of the session we will provide a **Kahoot PIN**
  - Join using the Kahoot app or kahoot.it



Agenda

For today's session

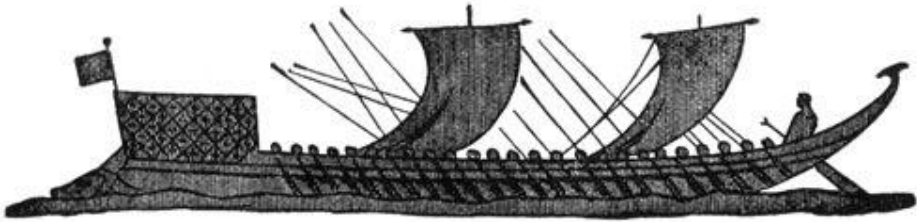
1. Introduction to Kubernetes.
2. Kubectl and the K8s API.
3. Deploying apps on K8s: Pods and Deployments.
4. Accessing to our apps: Services.

1. Introduction to Kubernetes

SUSE

κυβερνήτης

kube...what?



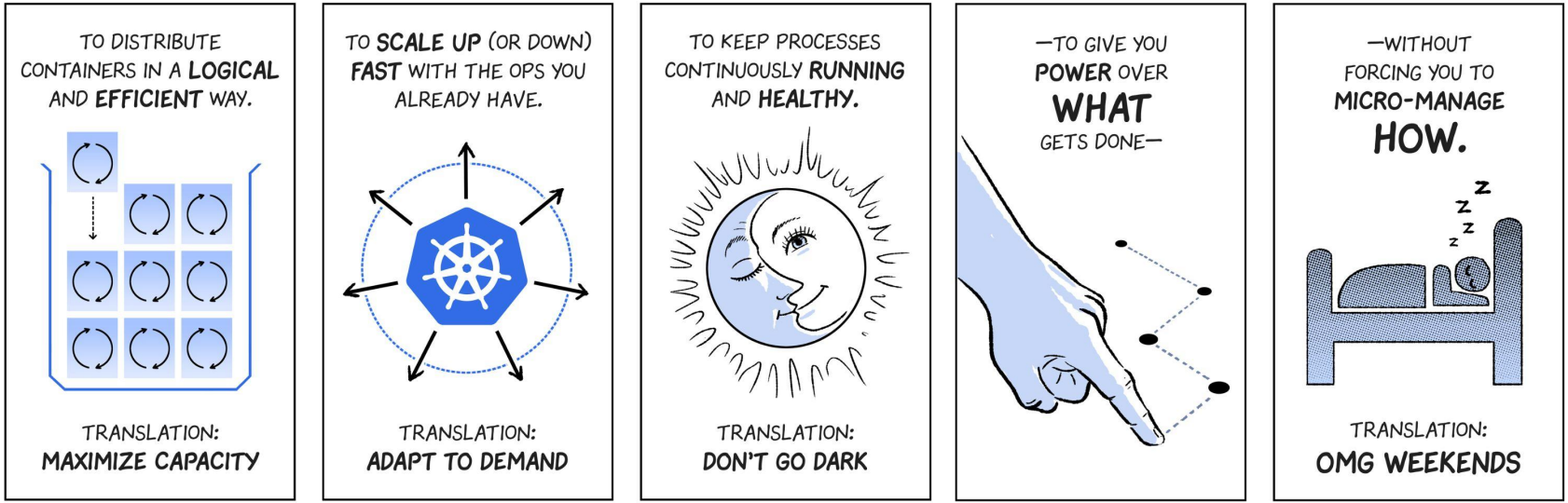
κυβερνήτης (kyvernítis)
m (*plural* **κυβερνήτες**)
1. governor (leader of a region or state)
2. (*nautical*) captain, skipper
3. pilot (of an aircraft)

kubernetes

Picture from karenswhimsy.com/ancient-greek-ships

Introduction

Why do I need Kubernetes?



Picture from cloud.google.com/kubernetes-engine/kubernetes-comic

Introduction

What is Kubernetes

- Kubernetes is an open-source software for automating **deployment**, **scaling**, and **management** of **containerized** applications.
- Provides a powerful API to manage distributed applications.
- Built on 15 years of experience at **Google.**
- Apache Software License.
- Now governed by the CNCF (Cloud Native Computing Foundation) at the **Linux Foundation.**
    - landscape.cncf.io
- Several Special Interest Groups (SIG).
- Open to everyone.
- Weekly hangouts.

Introduction

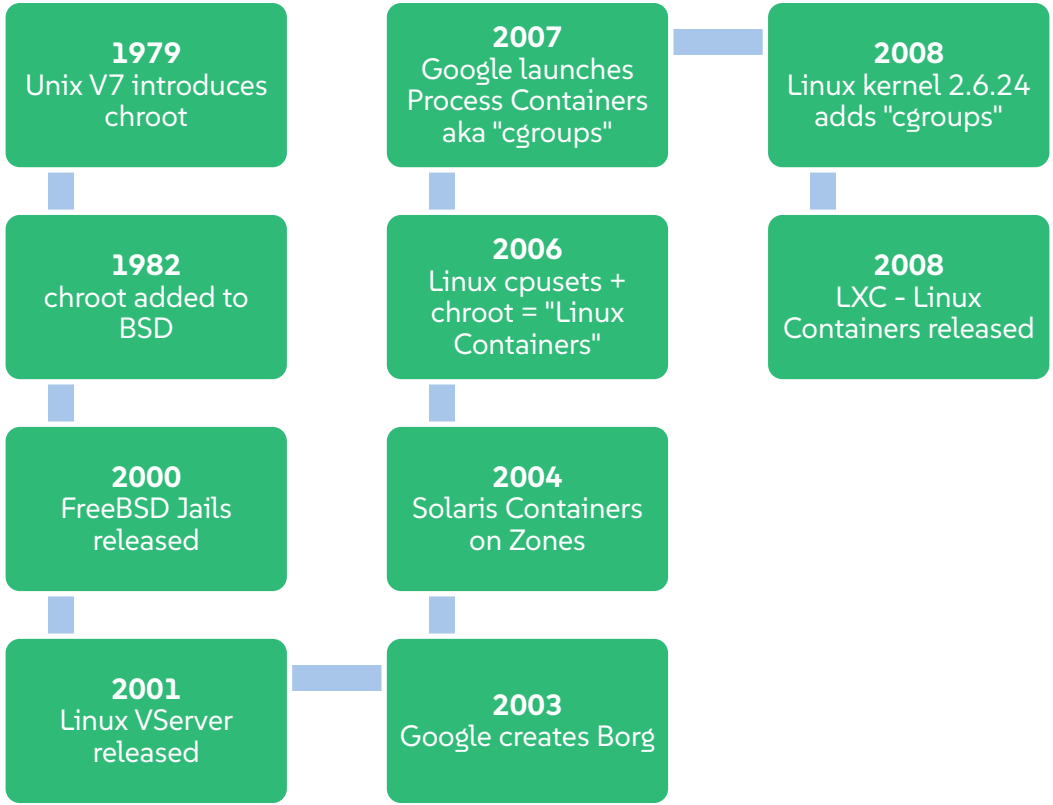
The Kubernetes project

- Open-sourced in **June 2014 (11+ years old).**
- +3.9K **contributors.**
- ~134K **commits.**
- Google and other companies are lead contributors
  - Check contributions by company.
  - **SUSE** has **~150 commits** in the project
- +218K **people** on Slack (kubernetes.slack.com).
- 1 major release every 3 months (currently 1.34).

Data extracted on Nov'25

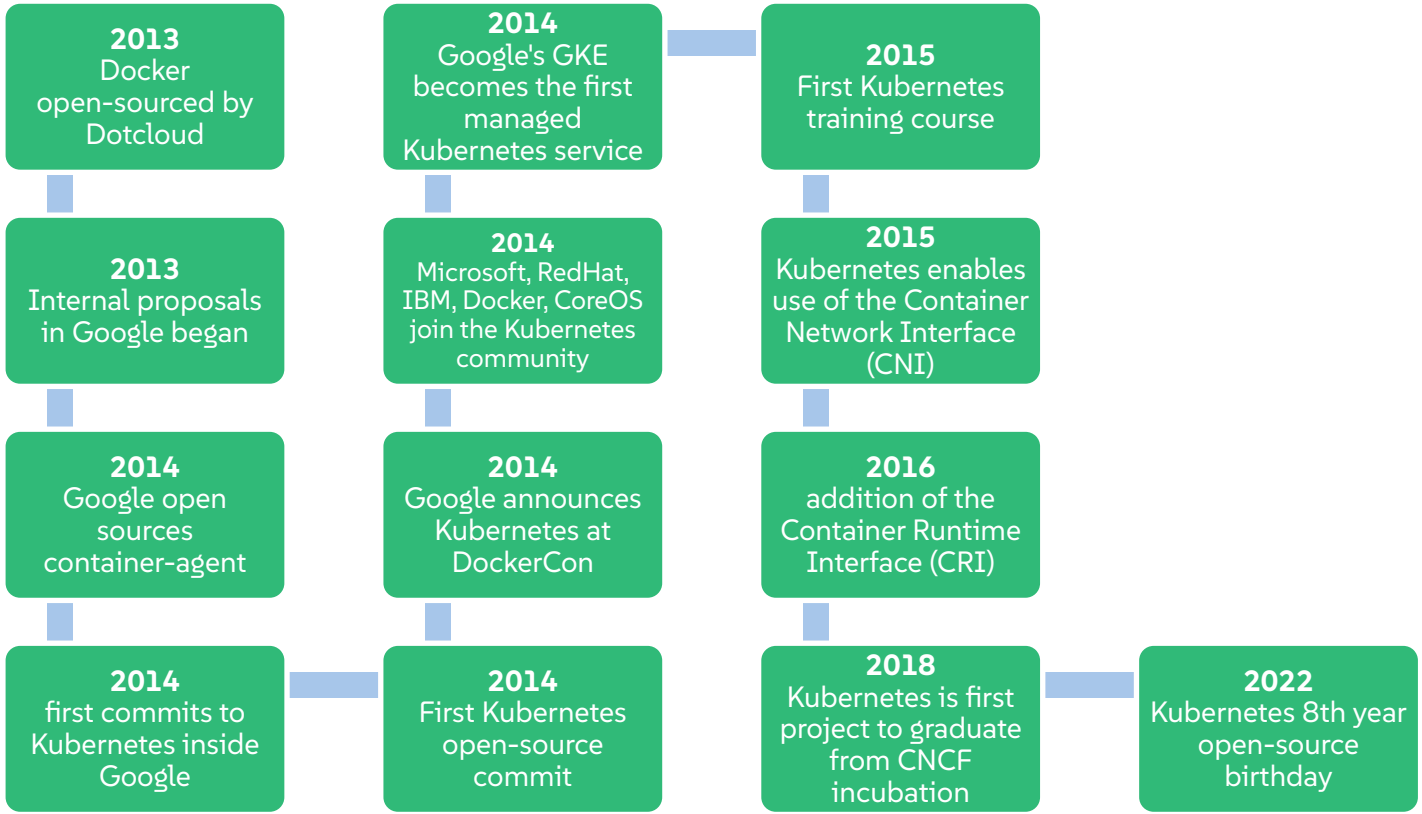
Introduction

The Kubernetes project



Introduction

The Kubernetes project



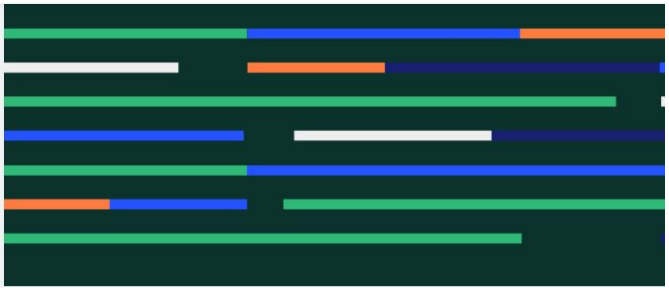
Introduction

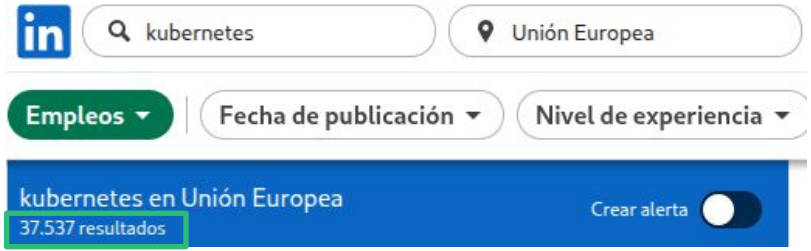
Used in several projects

and more...

Introduction

Should I learn Kubernetes?





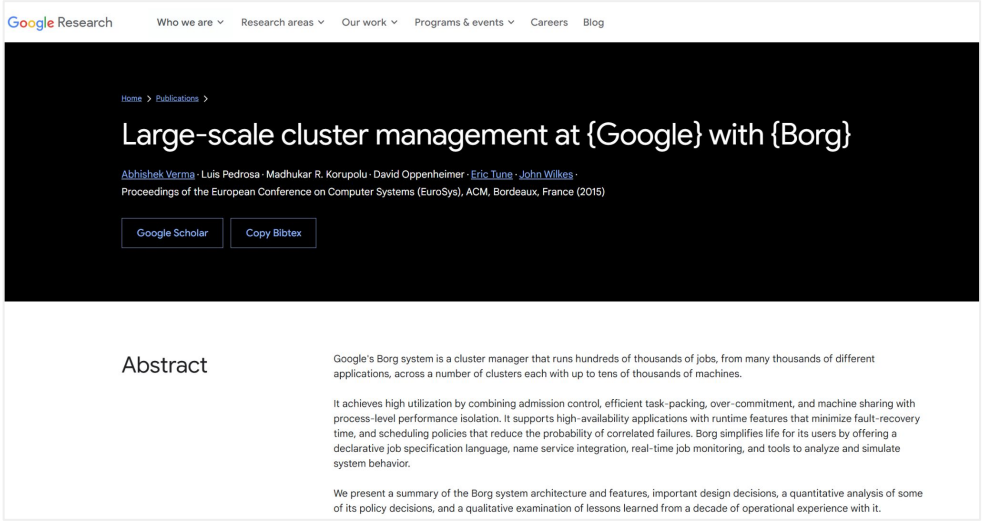
jobs.suse.com

Data extracted on Nov'25

Introduction

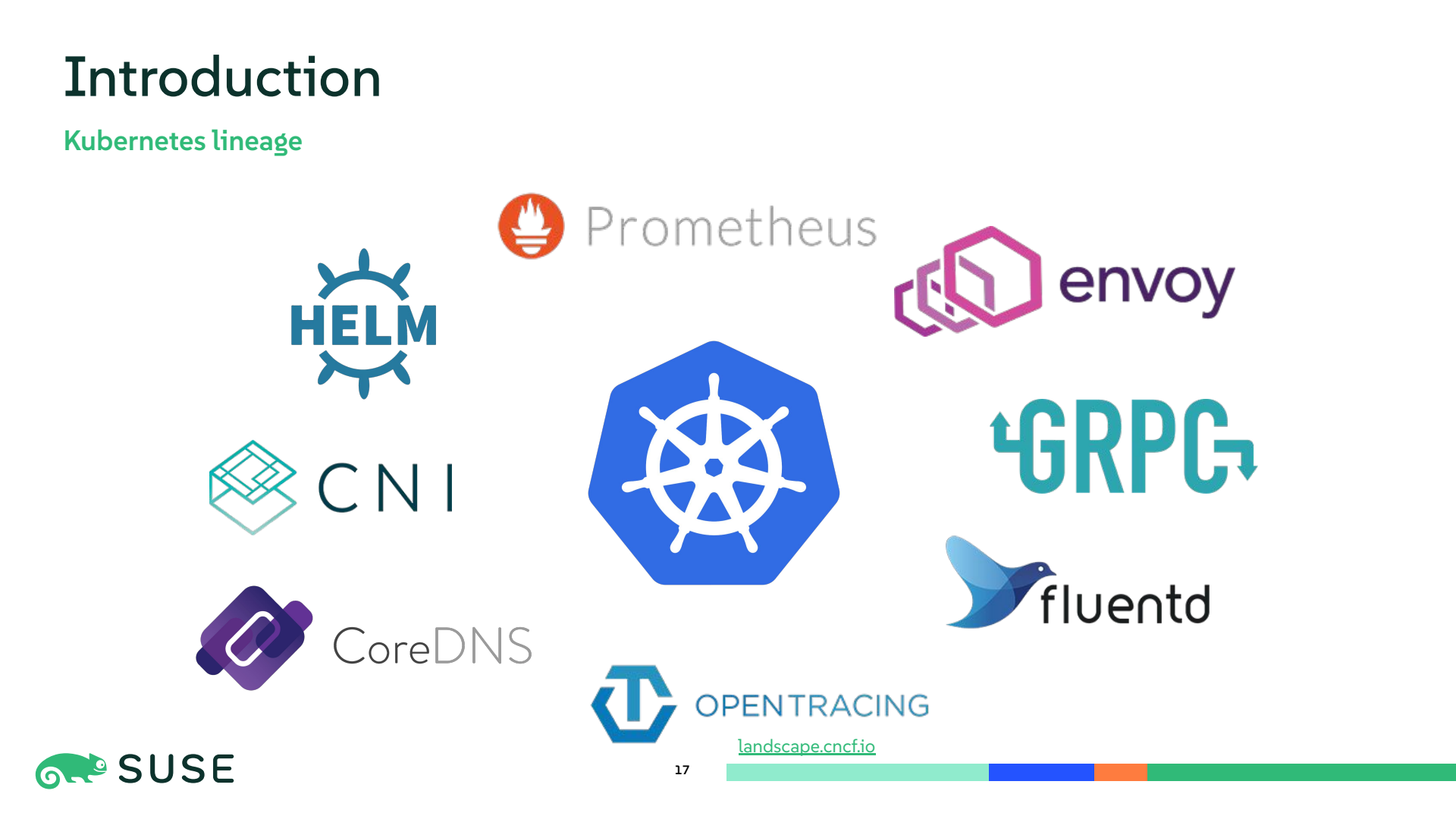
Origin of K8s: Borg

- **Borg** was a **Google** secret for a long time.
- Orchestration system to **manage all Google applications** at scale.
- Finally described publicly in **2015.**
- Paper explaining ideas behind Kubernetes.



Introduction

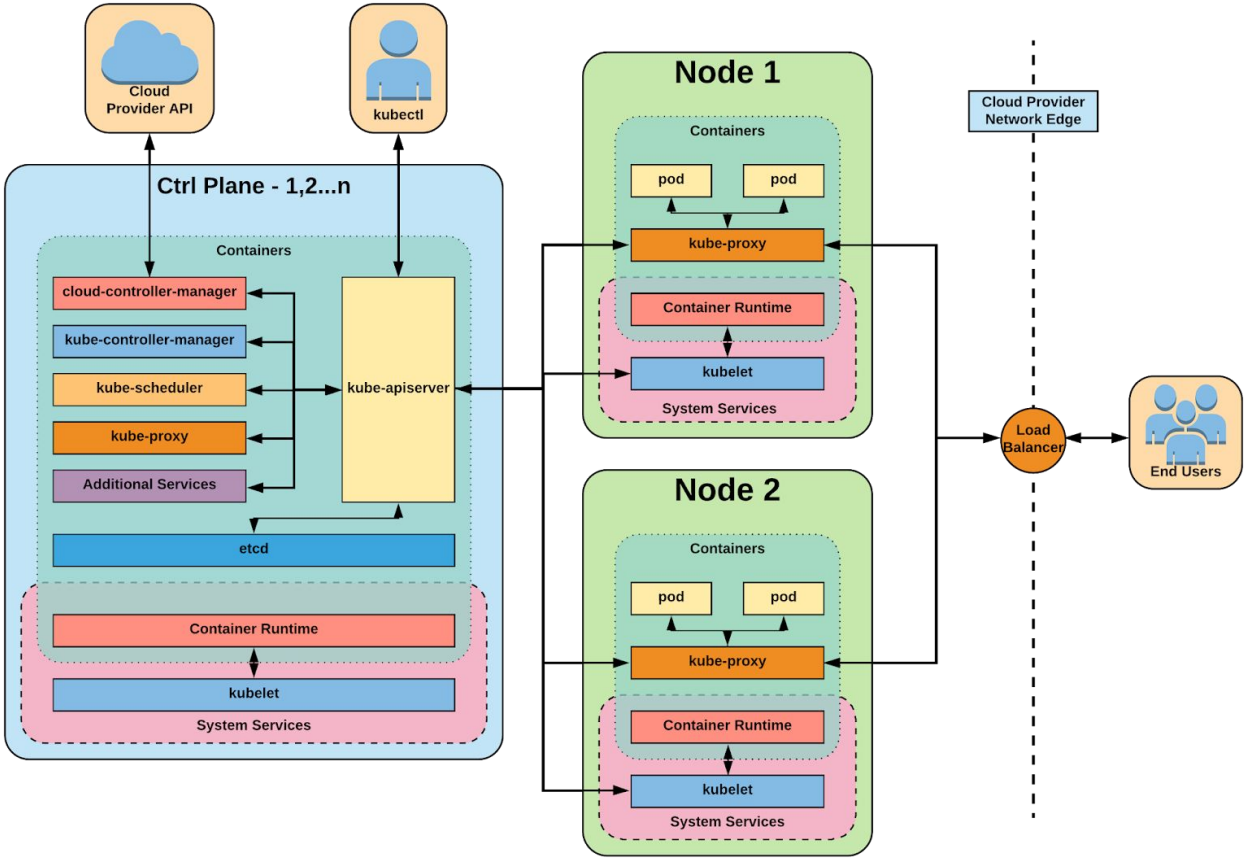
Kubernetes lineage



landscape.cncf.io

Introduction

Architectural overview

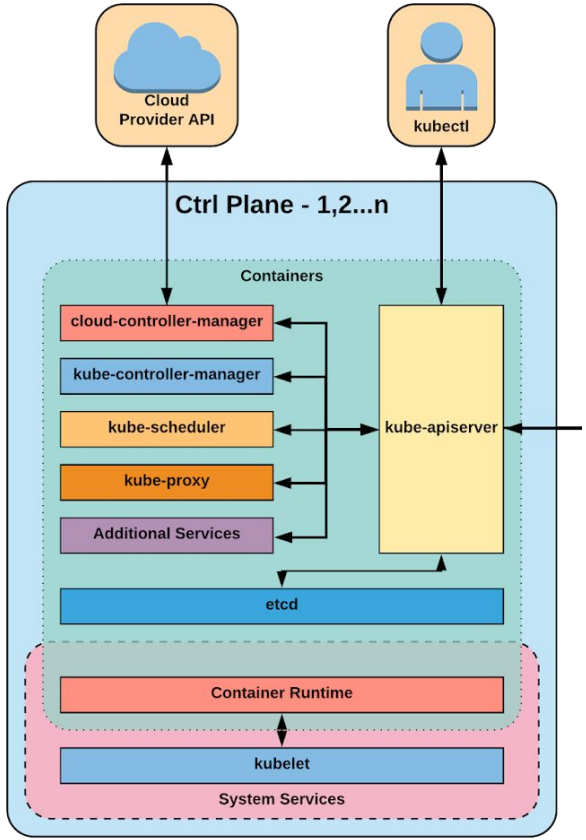


Picture from Introduction to Kubernetes

Introduction

Inside a control plane

- **kube-apiserver:**
  - It is where the cluster is **administered**, it implements a **REST API** (*kubectl* talks to this API).
- **etcd:**
  - Lightweight and distributed **key-value storage**.
- **kube-controller-manager:**
  - Monitors the **cluster state** and steers the cluster towards the **desired state**.
- **kube-scheduler:**
  - **Assigns workloads** to each node, selecting the best one.

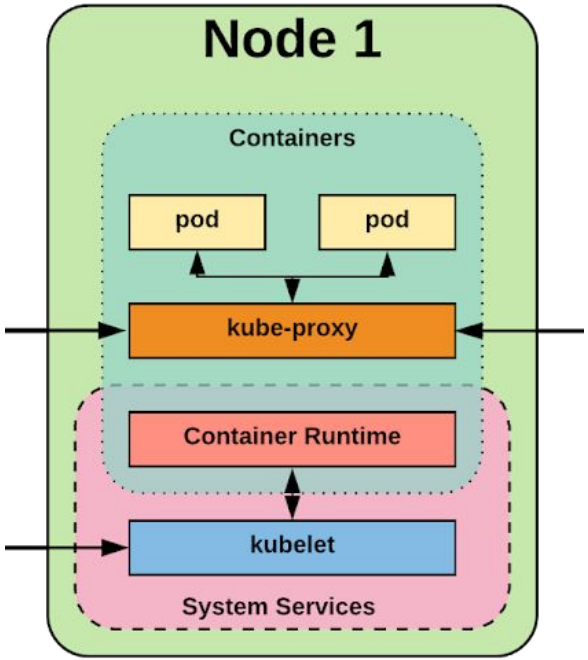


Picture from Introduction to Kubernetes

Introduction

Inside a node

- **kubelet**:
  - Interacts with the control plane and **etcd** and receives **workloads**.
- **kube-proxy**:
  - **Forward the workloads** to the container.
- **Container Runtime Engine**:
  - It is the **container runtime**, such as *Containerd* (~Docker), *Rkt*, *CRI-o*, *Kata*, *Virtlet*, etc...



Picture from Introduction to Kubernetes

Introduction

A tour of web resources

- Kubernetes Documentation.
- Cloud Native Computing Foundation.
- Kubernetes · GitHub.
- Rancher Academy. 

2.
Kubectl and the K8s API

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Kubectl and the K8s API

API overview: everything is an API object

```
Format:
/apis/<group>/<version>/<resource>

Examples:
/apis/apps/v1/deployments
/apis/batch/v1beta1/cronjobs
```

Everything in k8s is an API object.

```
apiVersion: v1
kind: Pod

metadata
  name: pod-example
  namespace: default
  uid: ...
...
```

YAML files.

kubernetes.io/docs/reference

Kubectl and the K8s API

API overview: kubectl

- **kubectl** is the way to interact with the k8s API:

```
kubectl <command> <type> <name> <flags>>
```

  - `command` – operation to execute.
  - `type` – k8s API resource.
  - `name` – name of the resource.
  - `flags` – optional arguments.

kubernetes.io/docs/tasks/tools/#kubectl

Kubectl and the K8s API

Install kubectl

- Install the **kubectl** binary:

```
# Linux
> curl -Lo "https://dl.k8s.io/release/$(curl -L -s
https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl"
> chmod +x ./kubectl
> sudo mv ./kubectl /usr/local/bin/kubectl

# MacOS
> curl -Lo "https://dl.k8s.io/release/$(curl -L -s
https://dl.k8s.io/release/stable.txt)/bin/darwin/amd64/kubectl"
> chmod +x ./kubectl
> sudo mv ./kubectl /usr/local/bin/kubectl
```

Find detailed instructions to install it on Linux, MacOS or Windows on the Kubernetes documentation.

Kubectl and the K8s API

But... I need a k8s cluster!

- For **learning** and **developing**:
  - Killercoda
  - Kind
  - Minikube
  - Kubeadm
  - Microk8s
  - K3s
  - k3d

- **Production-grade** Kubernetes distributions:
  - On-premise k8s (~private cloud)
    - Bare-metal deployment
    - RKE2
  - Managed-clusters on public clouds
    - GKE, EKS, AKS, ...
- Managing multiple Kubernetes clusters in a consolidated way:
  - Rancher

Kubectl and the K8s API

Bootstrapping a simple cluster: k3d

- k3d is a lightweight wrapper to **run a Kubernetes cluster** (k3s) in a **container**.
  - It's able to create single and multi node clusters.
- **Prerequisite**: install Docker.
  - Or any container management tool, like Podman (extra configuration required)

Kubectl and the K8s API

Using k3d: installing the binary and creating a cluster

- Install the **k3d binary** and create a **cluster**:

```
# Linux
> curl -s
"https://raw.githubusercontent.com/k3d-io/k3d/main/install.sh"| bash

# Create/delete a cluster
> k3d cluster create
> k3d cluster delete
```

Find detailed instructions to install it on Linux, MacOS or Windows on the k3d website.

Kubectl and the K8s API

Using k3d: installing the binary and creating a cluster (with custom config)

- If you want to use **NodePort** or **Ingress** services,
  - the k3d cluster must be created with:

```
# Exposing NodePort 30000 in the host system, port 30000
> k3d cluster create -p "30000:30000@agent:0" --agents 1

# Exposing Ingress controller in the host system, port 8080
> k3d cluster create -p "8080:80@loadbalancer" --agents 1
```

Find detailed instructions on how to expose services on the k3d documentation.

Kubectl and the K8s API

Inspect the cluster

- Check the Kubernetes cluster is **up and running**:

```
> kubectl cluster-info
Kubernetes control plane is running at https://0.0.0.0:65392
CoreDNS is running at
https://0.0.0.0:65392/api/v1/namespaces/kube-system/services/kube-d
ns:dns/proxy
Metrics-server is running at
https://0.0.0.0:65392/api/v1/namespaces/kube-system/services/https:
metrics-server:https/proxy

> kubectl get nodes
NAME                  STATUS   ROLES                  AGE   VERSION
k3d-k3s-cl-agent-0    Ready    <none>                 9h    v1.30.4
k3d-k3s-cl-server-0   Ready    control-plane,master   9h    v1.30.4
```

3. Deploying apps on K8s: Pods and Deployments

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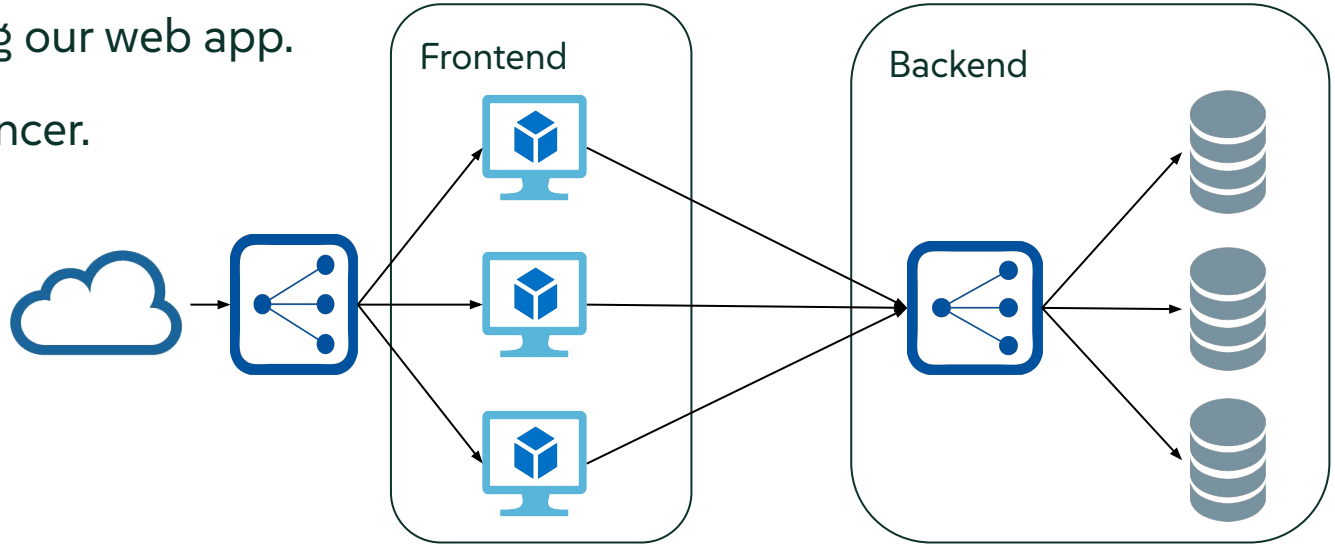
Application Deployment

A common scenario: web application (frontend) using a database (backend)

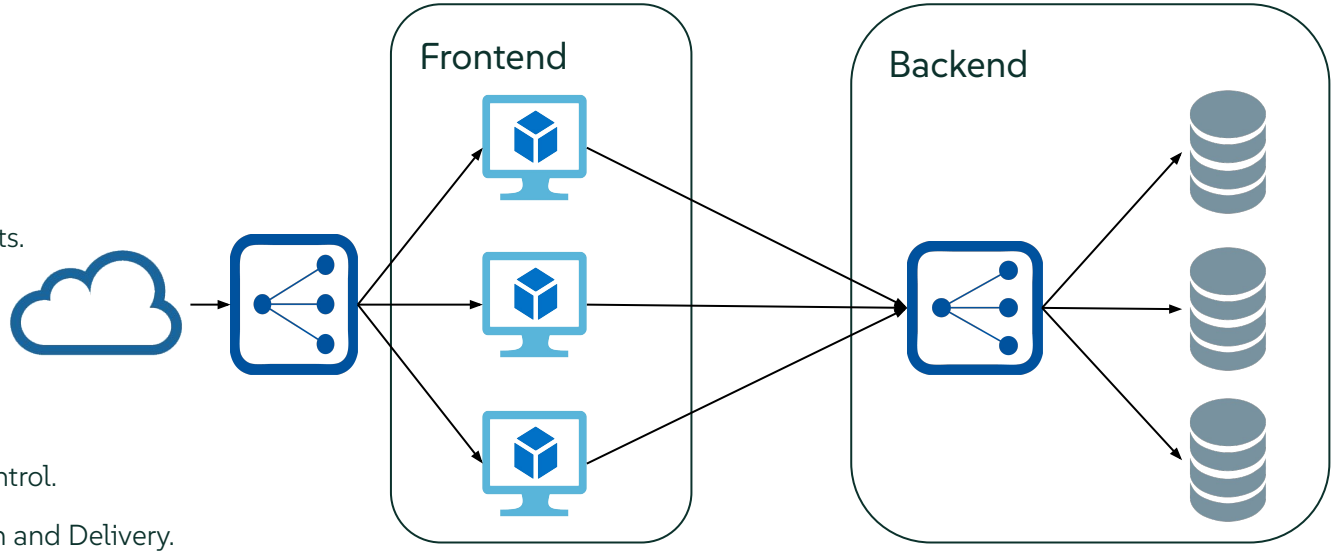
- External load balancer.
- Set of VMs running our web app.
- Internal load balancer.
- Set of databases.



Application Deployment

A common scenario: web application (frontend) using a database (backend)

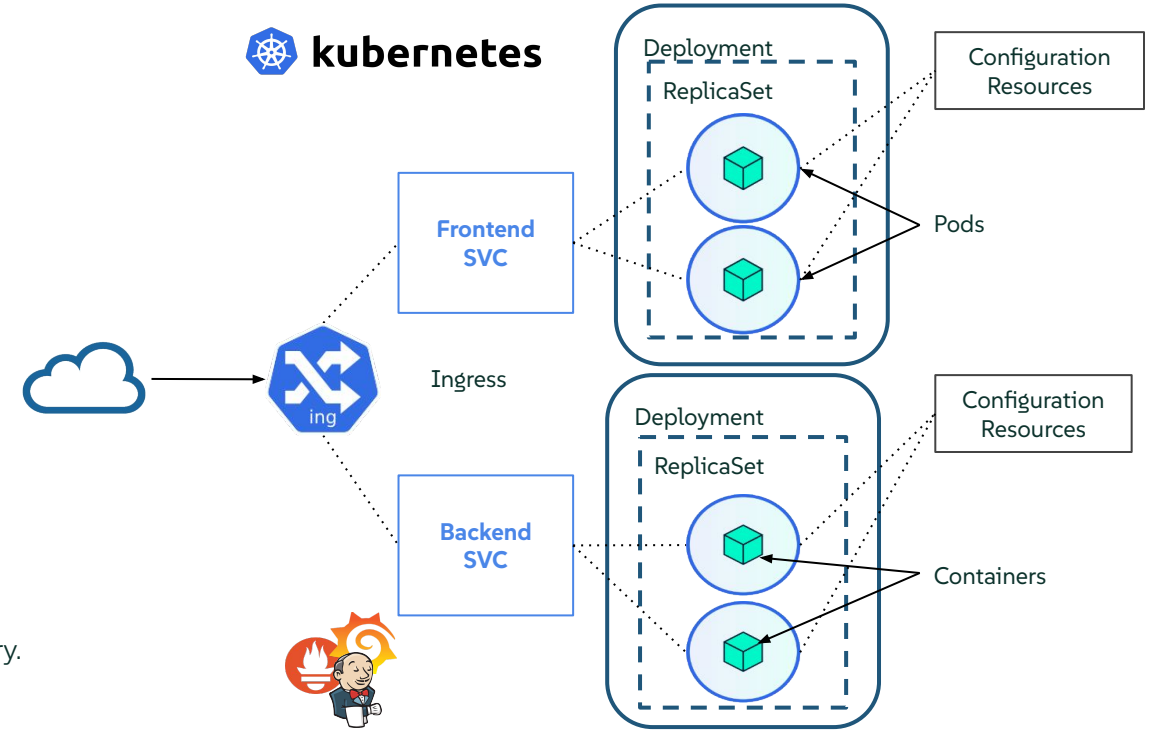
- However, this is not enough, we want:
  - Zero downtime.
  - Failover mechanisms.
  - Dynamic scalability.
  - Rolling updates.
  - Automatic deployments.
  - Load Balancing.
  - Easy migration.
  - Monitoring.
  - Role-Based Access Control.
  - Continuous Integration and Delivery.



Application Deployment

A common scenario: web application (frontend) using a database (backend)

- With Kubernetes we get:
  - Zero downtime.
  - Failover mechanisms.
  - Dynamic scalability.
  - Rolling updates.
  - Automatic deployments.
  - Load Balancing.
  - Easy migration.
  - Monitoring.
  - Role-Based Access Control.
  - Continuous Integration and Delivery.



Pets vs Cattle

A different approach for your servers

- **Pets:**
  - Treated as unique.
  - Typically, manually built managed and updated.
  - Indispensable, can't be down.

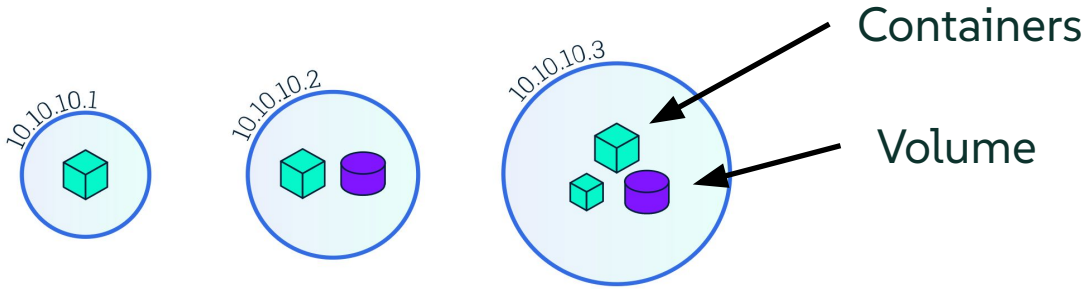
- **Cattle:**
  - Treated as "just one more".
  - Automatically built.
  - Designed for failure.

Read more at [The History of Pets vs Cattle and How to Use the Analogy Properly]

Basic Objects: Pod

What is a Pod?

- **Smallest** compute unit in Kubernetes.
  - Top level API object to run containers.
- Represents a **group** of collocated containers sharing **storage** resources and **IP**.
  - Pod's containers get restarted if they fail.
- Pods are **EPHEMERAL**.



kubernetes.io/docs/concepts/workloads/pod

Basic Objects: Pod

Why pods?

- K8s is supposed to **manage containers**, but pods are the basic building block...
  - "one process, one container" principle.
    - No more VMs with dozens of applications. Use **a container per process**.
    - But... I need more than one app/process cooperating to run my service:
      - more than one container **sharing storage** and **IP** ensuring efficient communication between them.

kubernetes.io/docs/concepts/workloads/pod

Basic Objects: Pod

Why pods?

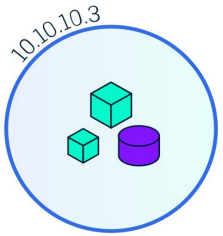
- Pods as a **new layer of abstraction**:
  - A **container** can not only be a Docker container, but also a *Rocket container* or a *VM managed by Virtlet*. Each solution has different requirements/specifications.
  - K8s needs **additional information** that a sole container doesn't have:
    - **Restart** policies.
    - Readiness/Liveness **probes**.

kubernetes.io/docs/concepts/workloads/pod

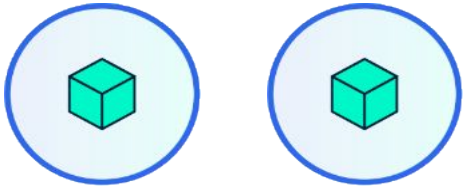
Hands-on!

Question: multi-container or multiple pods?

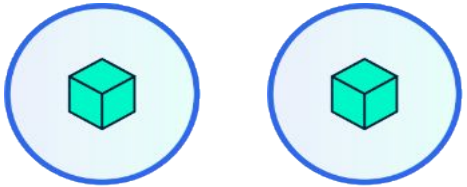
- **NGINX** and its **PHP-FPM** module.



- **Wordpress** and its **MariaDB** database.



- MongoDB **primary** and **secondaries** nodes.



kubernetes.io/docs/concepts/workloads/pod

Describing K8s objects

How does a K8s object look like? - Metadata and Spec

```
apiVersion: v1
# required field
kind: Pod
# required field
metadata:
  # required field
  name: my-pod
  # required field
  namespace: default
  labels:
    app: my-pod
  ...
spec:
  # required field
  containers:
    - image: myImage:latest
  ...
status:
  hostIP: X.X.X.X
  phase: Running
  ...
```

metadata:
Data that helps uniquely identify the K8s object.

spec:
Different on every K8s object
Describes the characteristics of the K8s object.

```
> kubectl get pod my-pod
```

kubernetes.io/docs/concepts/overview/working-with-objects

Describing K8s objects

How does a K8s object look like? - Labels

```
apiVersion: v1
# required field
kind: Pod
# required field
metadata:
  # required field
  name: my-pod
  # required field
  namespace: default
  labels:
    app: my-pod
  ...
spec:
  # required field
  containers:
    - image: myImage:latest
  ...
status:
  hostIP: X.X.X.X
  phase: Running
  ...
```

labels:
You can define your labels in the object specifications.

Labels are **key/value pairs** that are attached to objects, such as pods.

```
> kubectl get pod my-pod
```

kubernetes.io/docs/concepts/overview/working-with-objects/labels

SUSE

Hands-on!

Creating a pod

mongo-pod.yaml

```
apiVersion: v1
kind: Pod
metadata:
  name: mongo
spec:
  containers:
    - image: mongo
      name: mongo
```

Have a look at the Pod specification.

- Create your first Pod:

```
> kubectl create -f mongo-pod.yaml
pod/mongo created

> kubectl get pod mongo
NAME    READY   STATUS    RESTARTS   AGE
mongo   1/1     Running   0          9s
```

kubernetes.io/docs/concepts/workloads/pod

Hands-on!

Managing labels

```
# Create a new label on-the-fly
> kubectl label pods mongo my-label=my-value
pod/mongo-labels labeled

# Show labels in the output
> kubectl get pods --show-labels
NAME            READY   STATUS    RESTARTS   AGE   LABELS
mongo           1/1     Running   0          9m    my-label=my-value

# Find pods having label "my-label" equals to "my-value"
> kubectl get pods -l my-label=foo
NAME            READY   STATUS    RESTARTS   AGE
mongo           1/1     Running   0          9m

# List pods with a new column showing the label value "my-label"
> kubectl get pods -L my-label
NAME            READY   STATUS    RESTARTS   AGE   MY-LABEL
mongo           1/1     Running   0          9m    my-value
```

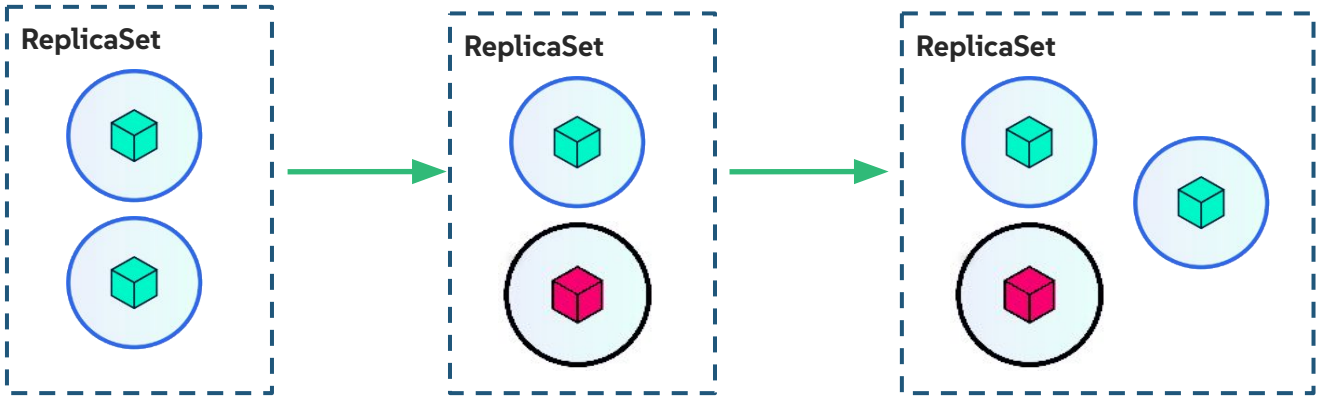
- **Why use labels?**
  - For **querying** and **selecting** resources
  - e.g., force the scheduling of a Pod on a specific Node (using nodeSelector in a Pod definition).

kubernetes.io/docs/concepts/overview/working-with-objects/labels

Basic Objects: ReplicaSet

What it is?

- A **ReplicaSet** ensures that a specified number of **pod "replicas"** are running at any one time.
    - The replication controller ensures that a pod(s) are always up and available.
- We usually don't interact with a ReplicaSet, but with a higher-level object: **Deployments**.

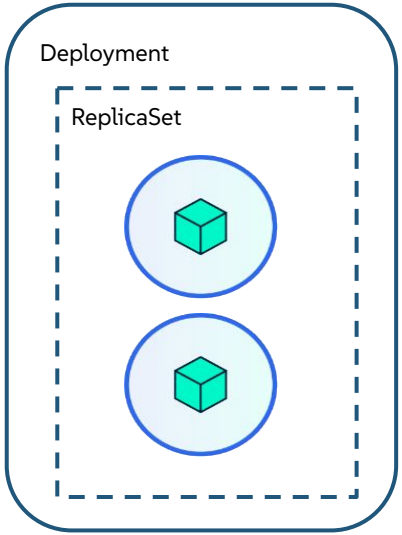


kubernetes.io/docs/concepts/workloads/controllers/replicaset

Basic Objects: Deployment

What it is?

- A **Deployment** is a higher-level concept that **manages ReplicaSets**.
- It allows several management operations like:
  - Replica management.
  - Pod scaling.
  - Rolling updates.
  - Rollback to a previous version.
  - Clean-up policies.
- Extra! - **StatefulSet**: like a Deployment, but...
  - provides guarantees about the **ordering** and **uniqueness** of the Pods.
  - offers **stable network identities** (even if the pod is rescheduled) - headless service required.
  - also offers **persistent storage** (PVC) for each Pod.



kubernetes.io/docs/concepts/workloads/controllers/deployment

Hands-on!

Creating our first deployment: a simple web server with nginx

nginx-deploy.yaml

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx
  labels:
    app: nginx
spec:
  replicas: 1
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginxdemos/hello
```

replicas:
number of desired instances of our apps.

matchLabels:
We are selecting pods matching "app=nginx".

label:
"app=nginx"

containers[]
array of containers that are part of our pod.

kubernetes.io/docs/concepts/workloads/controllers/deployment

Hands-on!

Creating our first deployment: a simple web server with nginx

nginx-deploy.yaml

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx
  labels:
    app: nginx
spec:
  replicas: 1
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginxdemos/hello
```

```
# Create a new deployment
> kubectl apply -f nginx-deploy.yaml
deployment.apps/nginx

# Show all the deployments
> kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
nginx               1/1     1            1           30s
```

What if... we want more replicas?

kubernetes.io/docs/concepts/workloads/controllers/deployment

Hands-on!

Modifying the deployment replicas

nginx-deploy.yaml

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginxdemos/hello
```

```
# Scale up our deployment
> kubectl scale deployment nginx --replicas=3
deployment.apps/nginx scaled

# Show all the deployments again
> kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
nginx               3/3     3            3           30s
```

Now we have 3 replicas

What if... we want to change the image in all the replicas?

kubernetes.io/docs/concepts/workloads/controllers/deployment

Hands-on!

Changing the image used in our deployment

nginx-deploy.yaml

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.25.5
```

```
# Replace the image used in the container "nginx"
> kubectl set image deployment nginx nginx=nginx:1.26.2-alpine --all
deployment.apps/nginx image updated

# Describe the deployment
> kubectl describe deployment nginx
...
Pod Template:
  Labels:  app=nginx
  Containers:
   nginx:
    Image:       nginx: nginx:1.26.2-alpine

# Get all replicasets
> kubectl get replicasets
NAME                DESIRED   CURRENT   READY   AGE
nginx-67c9d5bc66    3         3         3       30s
nginx-6c46465cc6    0         0         0       9m
```

The image has been changed

A new ReplicaSet is created

kubernetes.io/docs/concepts/workloads/controllers/deployment

Hands-on!

Rolling back a deployment


```
# Create a deployment without writing any YAML file :)
> kubectl create deployment bad-nginx --image=nginx
deployment.apps/bad-nginx created

# But.. everything is a YAML
> kubectl get deployment/bad-nginx -o yaml
...

# Replace the image with a non-existent one and record the changes in log
> kubectl set image deployment bad-nginx nginx=nginx:bad --all --record
deployment.apps/nginx image updated

# The pod will be in "ErrImagePull" since the image does not exist
> kubectl get pods -l app=bad-nginx
NAME                          READY   STATUS         RESTARTS   AGE
bad-nginx-69cbfbf986-4754v    0/1     ErrImagePull   0          9s
bad-nginx-8ff678449-vsd4l     1/1     Running        0          49s
```

kubernetes.io/docs/concepts/workloads/controllers/deployment

Hands-on!

Rolling back a deployment

```
# Get the deployment rollout history
# In revision 1 we created the deployment
> kubectl rollout history deployment/bad-nginx
REVISION  CHANGE-CAUSE
1         <none>
2         kubectl set image deployment bad-nginx nginx=nginx:bad --all=true --record=true

# Let's undo and come back to the previous revision
> kubectl rollout undo deployment/bad-nginx
deployment.apps/bad-nginx rolled back

# Get the pods again, now it is working again
> kubectl get pods
NAME                         READY   STATUS    RESTARTS   AGE
bad-nginx-8ff678449-vsd4l    1/1     Running   0          6m22s
```

kubernetes.io/docs/concepts/workloads/controllers/deployment

Kubectl Tips and Tricks

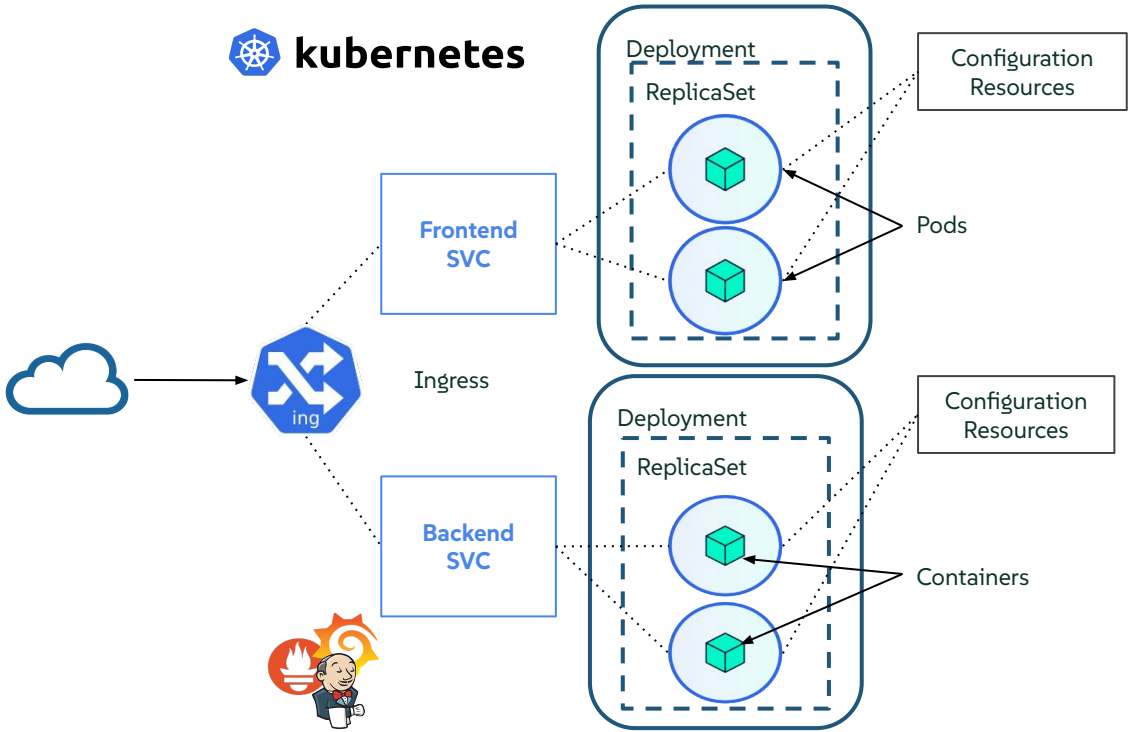
Mastering kubectl

- A few things to remember about **kubectl**.
  - And if you don't, check the cheat sheet.

```
> kubectl config view
> kubectl config use-context
> kubectl annotate
> kubectl label
> kubectl create -f ./<DIR>
> kubectl create -f <URL>
> kubectl edit ...
> kubectl proxy ...
> kubectl exec ...
> kubectl logs ...
> kubectl get pods, deployments, services
> kubectl --v=99 ...
> kubectl describe ...
```

Quick recap

Kubernetes – Kubectl – Pods – Deployments



4. Accessing to our apps: Services

Basic Objects: Services

What it is?

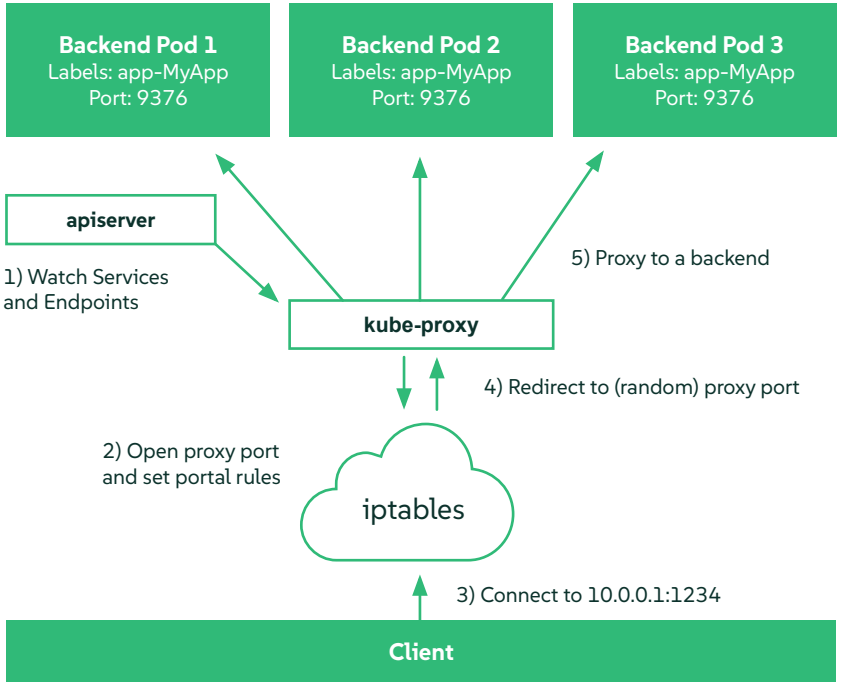
- The key question is: how do you **access your applications**?
- The answer is **Services**, yet another Kubernetes object.
  - An abstract way to **expose an application** running on a set of Pods as a network service.
  - They provide a **stable virtual endpoint** for **ephemeral Pods** in the cluster.
    - This way, other Services can target them and will be redirected to the endpoints matching the service Pod selection.

kubernetes.io/docs/concepts/services-networking/service

Basic Objects: Services

What it is?

- Implemented via **iptables**.
- **kube-proxy** watches K8s API for new Services and Endpoints being created.
- It opens **random ports** on Nodes listening on ClusterIP:Port.
    - Then forwards to a random* service endpoints.
        - * defaults to round-robin in userspace.



kubernetes.io/docs/concepts/services-networking/service

Basic Objects: Services

Different types of Services

ClusterIP

- Exposes the Service on a **cluster-internal IP**.
- It is the **default** type.
- Only provides access **internally**.
  - except if manually creating an external endpoint.
  - To access, run "kubectl proxy".
- Great for development.

NodePort

- Exposes the Service on each **Node's IP** at a **static port**.
  - Defaults ports: 30000-32767.
  - The port may have to be open in the firewall.
- Great for debugging.
- Used for manually creating load balancers.

LoadBalancer

- Exposes the Service externally using a **cloud provider's load balancer** (like GKE, AKS, AWS, ...).
  - Usually add extra charges for its usage.
- Private clouds may also implement it with a **Cloud Provider Plugin**.
  - e.g., Kind + Metalib or k3s's klipper-lb.

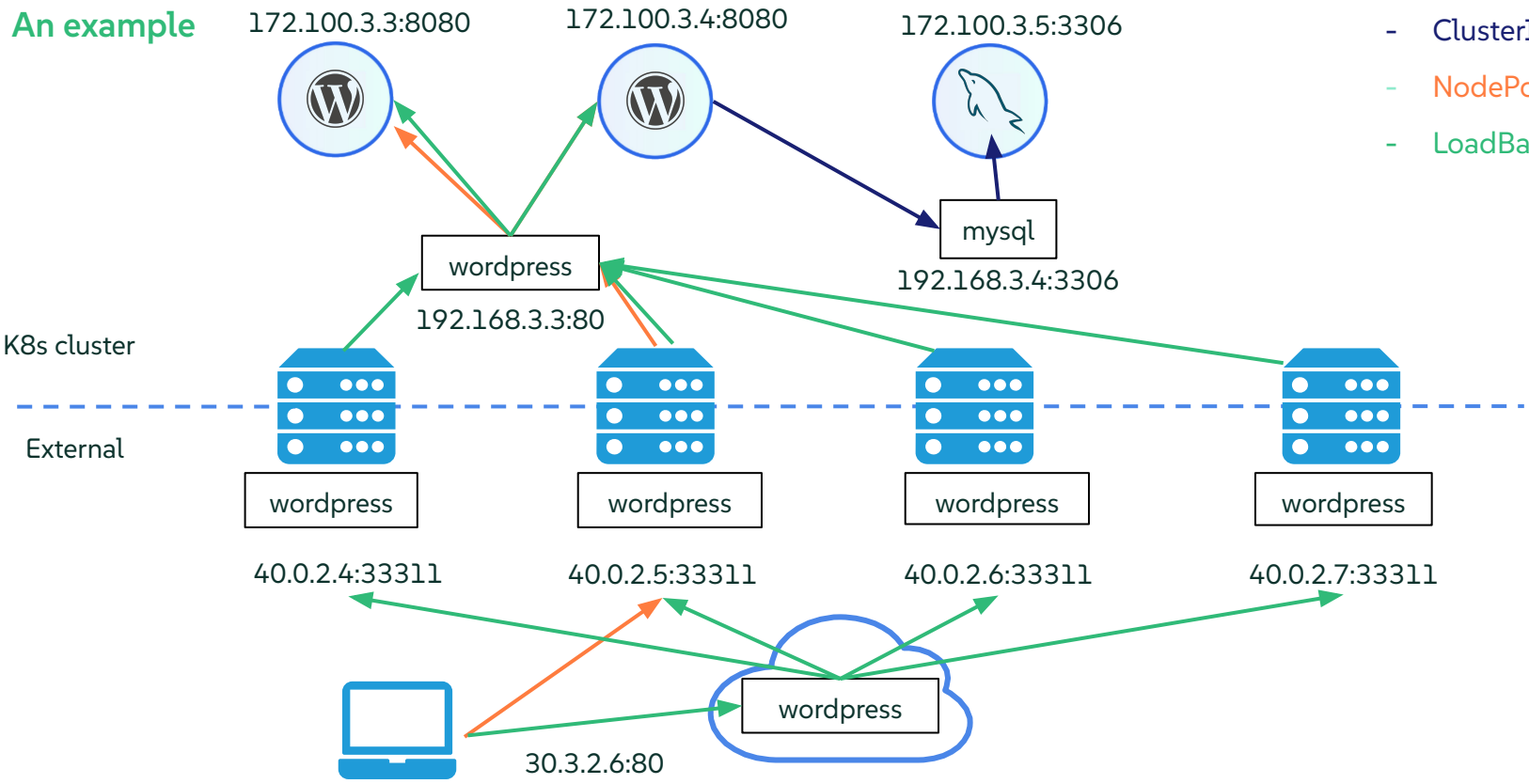
kubernetes.io/docs/concepts/services-networking/service

Basic Objects: Services

Types:

- ClusterIP
- NodePort
- LoadBalancer

An example



Hands-on!

Creating a service: ClusterIP + port-forwarding

```
# Create a new deployment (or use an existent one)
> kubectl create deployment nginx-exposed --image=nginxdemos/hello
deployment.apps/nginx-exposed created

# Create a service with a command
# The service listens on :8080, but the container (our app) does on :80
> kubectl expose deployment/nginx-exposed --name nginx-clusterip --port=8080 --target-port=80
--type=ClusterIP
service/nginx-clusterip exposed

# Local port forwarding (the service is still internal, though)
# The service listened on :8080, but we will port-forward it through the :7777
> kubectl port-forward service/nginx-clusterip 7777:8080
```

http://localhost:7777

kubernetes.io/docs/concepts/services-networking/service

Hands-on!

Creating a service

nginx-svc.yaml

```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-nodeport
spec:
  selector:
      app: nginx-exposed
  type: NodePort
  ports:
    - protocol: TCP
      port: 80
      nodePort: 30000
```

port:
the port that the container is listening to.

nodePort:
if none, it will be auto-generated.

```
# Create a service
# The service listens on :30000, but the container does on :80
> kubectl apply -f nginx-svc.yaml
service/nginx-nodeport created

# Get all the services
> kubectl get services
NAME              TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)
nginx-clusterip   ClusterIP   10.96.45.45     <none>        8080/TCP
nginx-nodeport    NodePort    10.96.161.114   <none>     80:30000/TCP

# Find out which is the IP of our cluster
> kubectl cluster-info
Kubernetes control plane is running at https://127.0.0.1:57589
```

http://127.0.0.1:30000

kubernetes.io/docs/concepts/services-networking/service

Basic Objects: Services

Extra: DNS

- A **DNS service** is provided as a Kubernetes add-on in clusters.
  - On many distributions, this DNS service is provided **by default**.
- When a **Service** is created it **gets registered** in the DNS.
  - The DNS lookup will direct traffic to **one of the matching Pods** via the ClusterIP of the Service.
- Interesting read about **Headless** services.
  - Services **without a Cluster IP** will resolve to a **set of IPs** (round-robin).

kubernetes.io/docs/concepts/services-networking/service/#dns

Hands-on!

Accessing a ClusterIP service from inside!

```
# Get the service "nginx-clusterip", note that it listens on :8080
> kubectl get service nginx-clusterip
NAME              TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)
nginx-clusterip   ClusterIP   10.96.45.45     <none>        8080/TCP
...

# Run curl inside a Pod that will get deleted after running the command
> kubectl run -it --rm --restart=Never busybox --image=busybox wget http://nginx-clusterip:8080
Connecting to nginx-clusterip:8080 (10.96.45.45:8080)
saving to 'index.html'
index.html           100% |********************************|  7237  0:00:00 ETA
'index.html' saved
pod "busybox" deleted
```

kubernetes.io/docs/concepts/services-networking/service/#dns

That is just the beginning...

Welcome to the cloud!

Much more to know about...

- Ingress.
- Persistence.
- Jobs, CronJobs and initContainers.
- Configuring your applications.
- Pod patterns.
- Packaging applications: Helm.
- Extra: multi-cluster management with Rancher.

Certifications:

- CKA, CKAD, CKS, KCNA, KCSA.

CKAD Curriculum

20% - Application Design and Build

- Define, build and modify container images
- Understand Jobs and CronJobs
- Understand multi-container Pod design patterns (e.g. sidecar, init and others)
- Utilize persistent and ephemeral volumes

20% - Application Deployment

- Use Kubernetes primitives to implement common deployment strategies (e.g. blue/green or canary)
- Understand Deployments and how to perform rolling updates
- Use the Helm package manager to deploy existing packages

15% - Application observability and maintenance

- Understand API deprecations
- Implement probes and health checks
- Use provided tools to monitor Kubernetes applications
- Utilize container logs
- Debugging in Kubernetes

25% - Application Environment, Configuration and Security

- Discover and use resources that extend Kubernetes (CRD)
- Understand authentication, authorization and admission control
- Understanding and defining resource requirements, limits and quotas
- Understand ConfigMaps
- Create & consume Secrets
- Understand ServiceAccounts
- Understand SecurityContexts

20% - Services & Networking

- Demonstrate basic understanding of NetworkPolicies
- Provide and troubleshoot access to applications via services
- Use Ingress rules to expose applications

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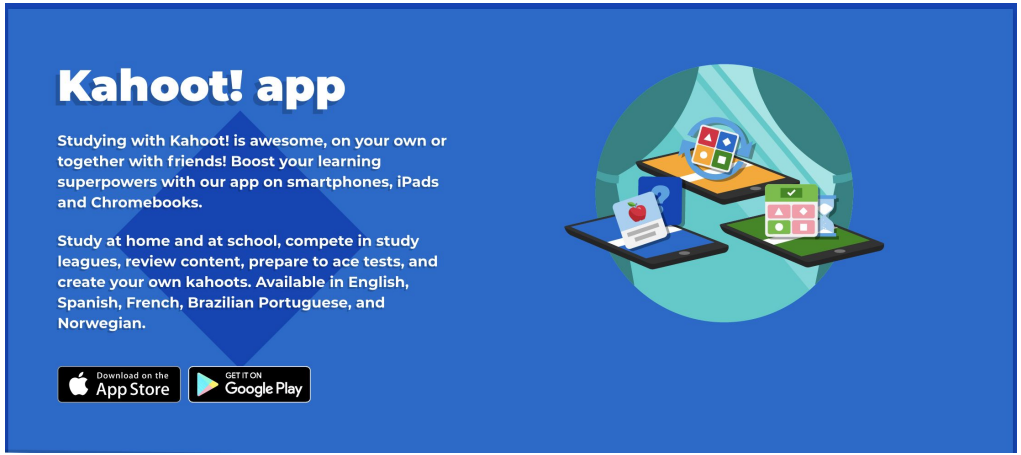
Quiz time!

We might have some prizes for you :)

- Join using the Kahoot app or kahoot.it



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Thanks!

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