Vision

Co-Creating a Technology Advanced Greener Planet

Mission ESDS 4 B's

by 2027

1Billion

Connecting a billion people

1Billion

Connecting a billion Smart Devices

1Billion

Achieving $1B turnover

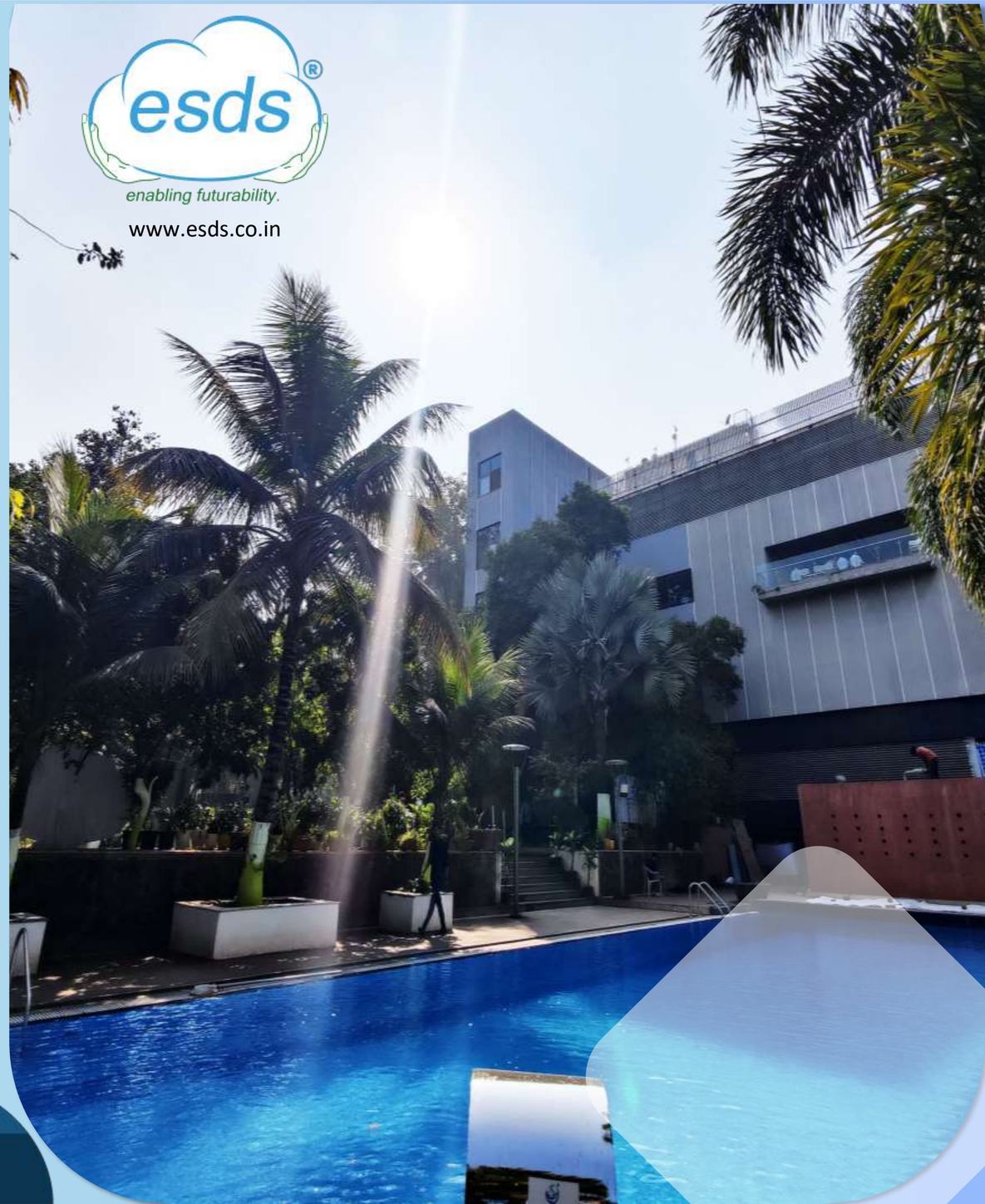
1Billion

Planting 1 Billion trees

esds®

enabling futurability.

www.esds.co.in



Kubernetes

Unite, Strategize, Achieve: Driving Sustainable Growth Together

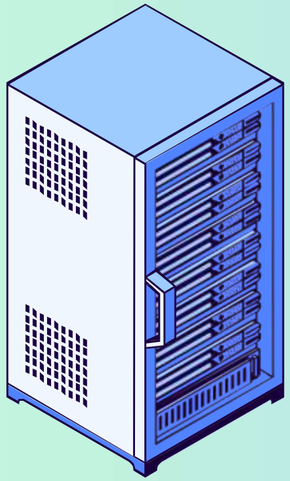
What is Kubernetes?

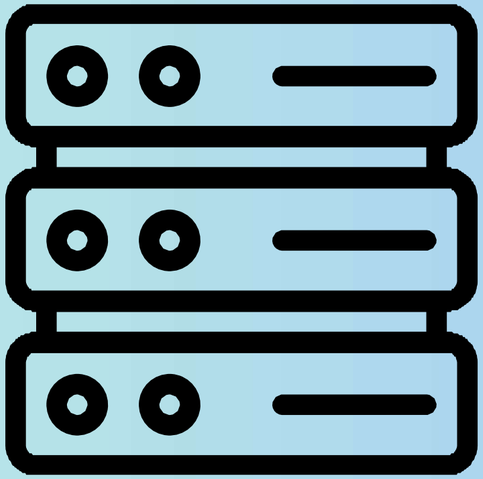
Also known as K8s,

It is an open-source system for -

- **Automating Deployment**
- **Management of Containerized apps**
- **Scaling**

Support different infra..





Developed by - GOOGLE

But now maintained by -

Cloud Native Computing Foundation (CNCF)

What is Container Orchestration?

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Orchestra

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Orchestra

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Orchestra

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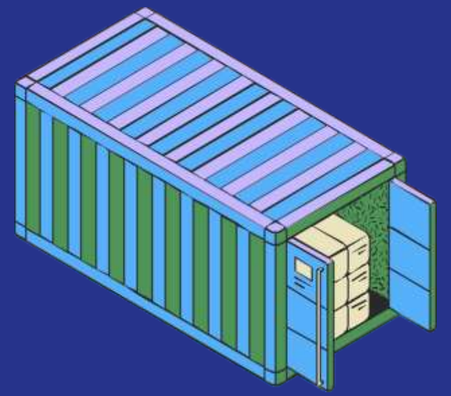
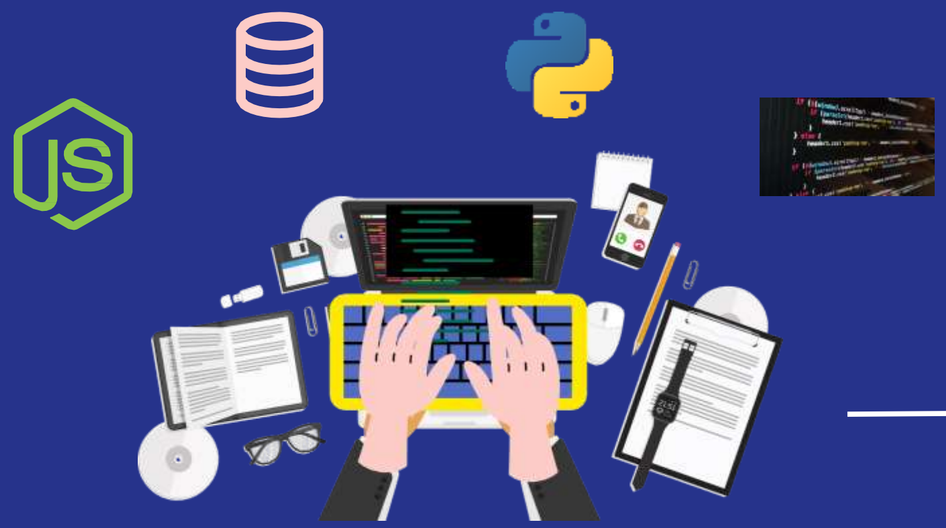
What is a Container?



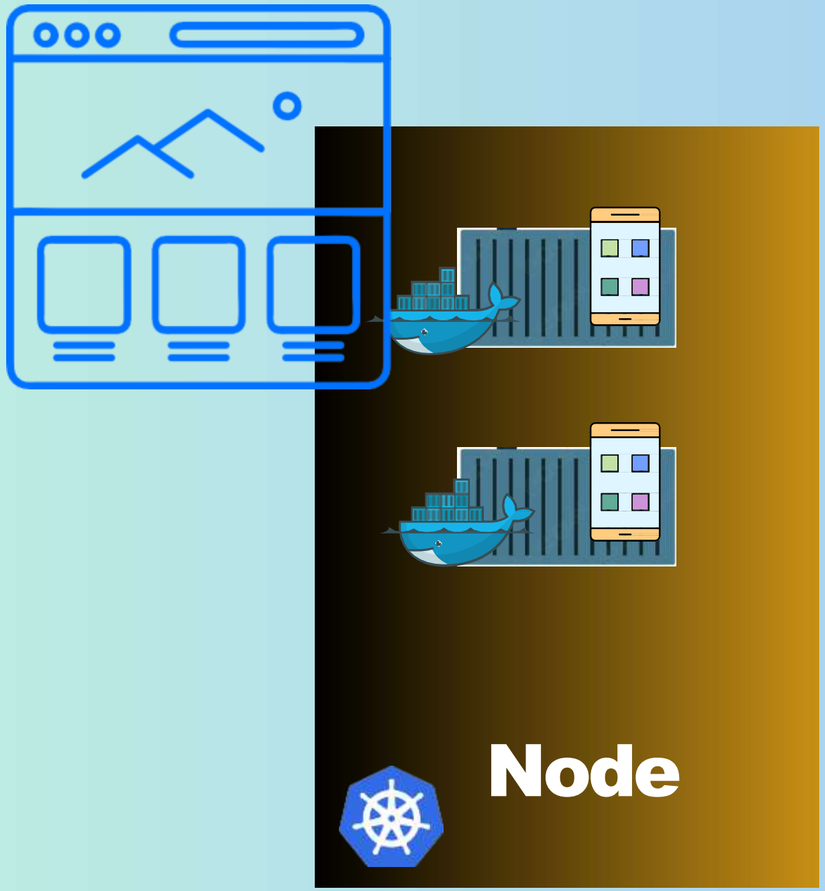
- A way to package an application with all the necessary dependencies and configuration.
- It can be easily shared
- Makes deployment and development efficient.

Developer

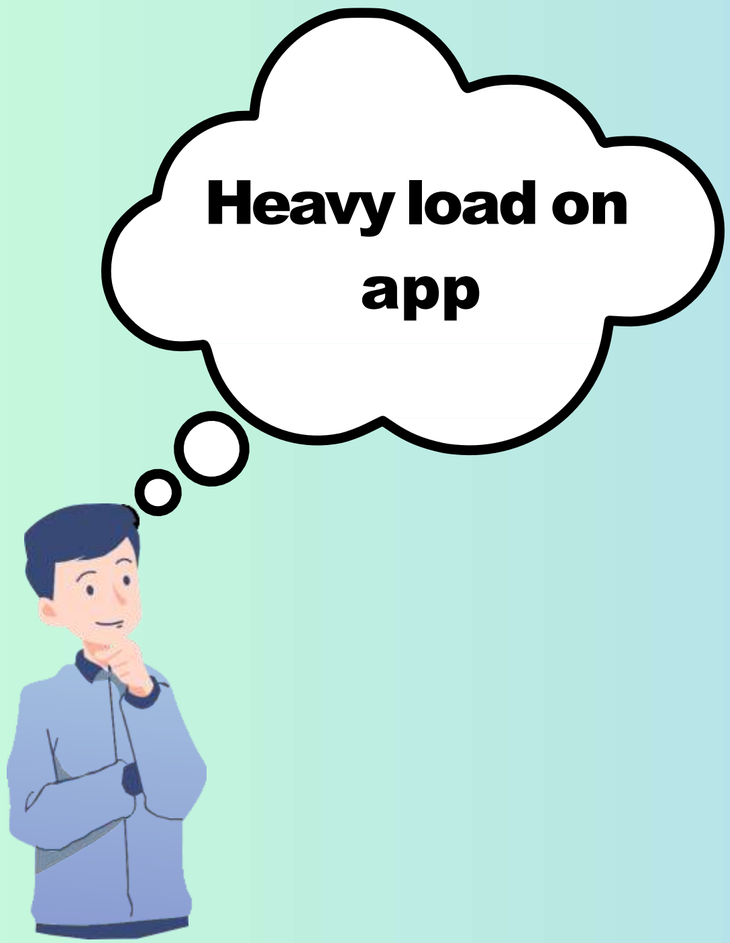


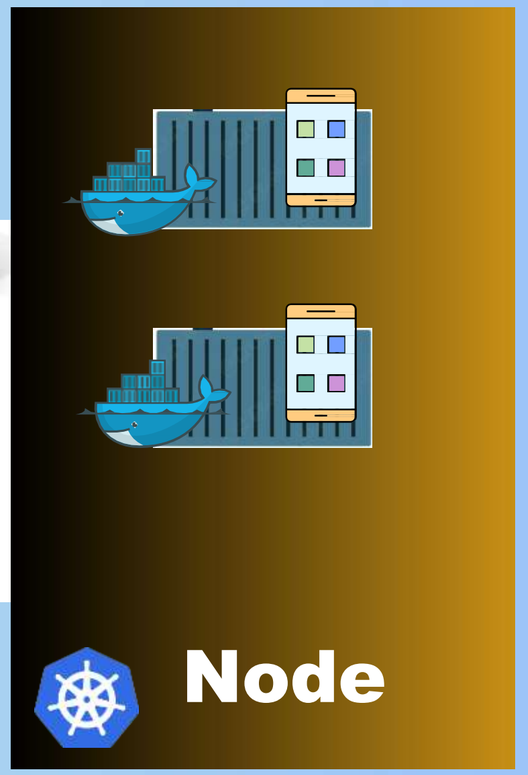
Developer

Packaging
Docker Image


Node
Server


esds

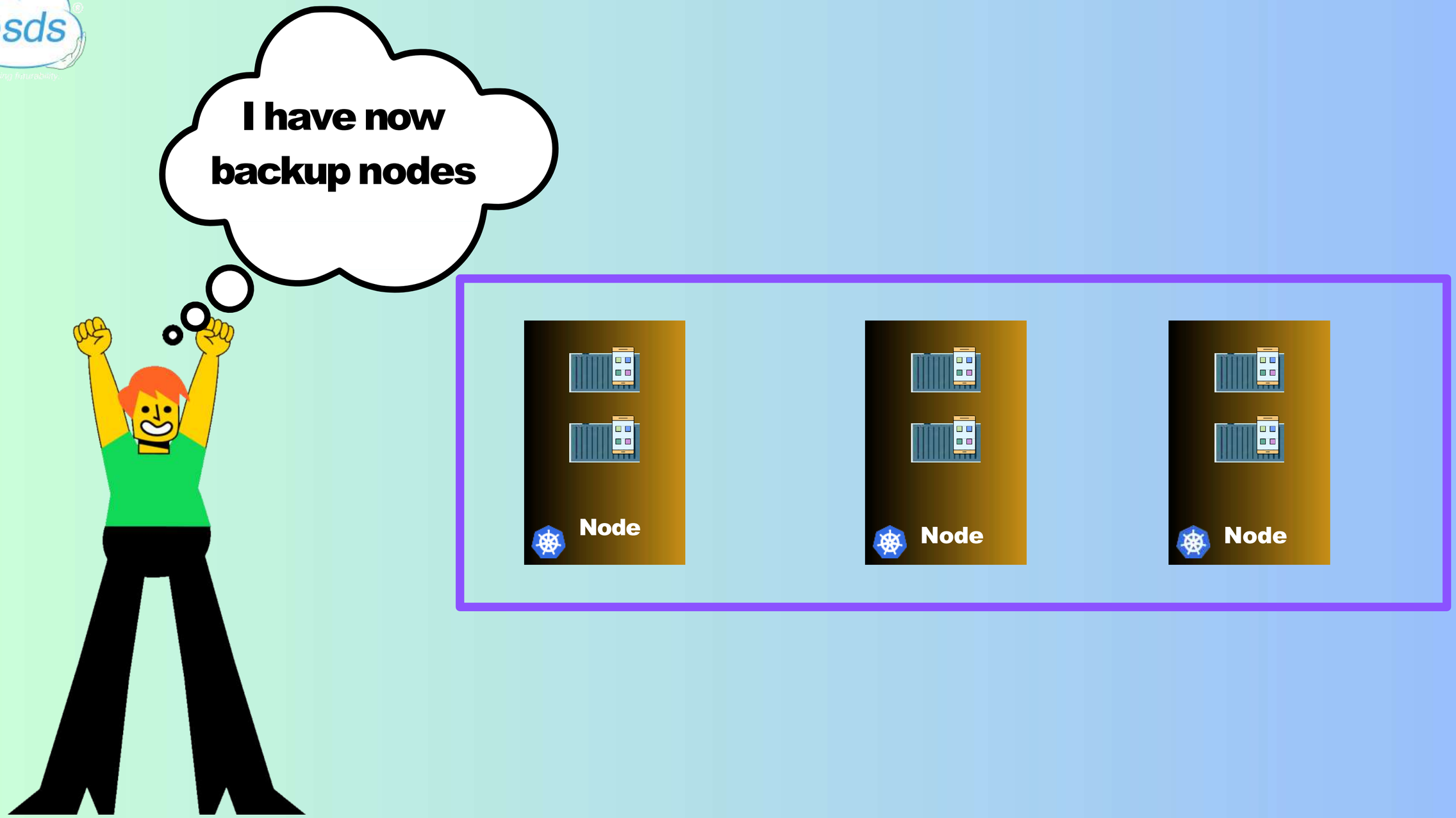

Heavy load on app

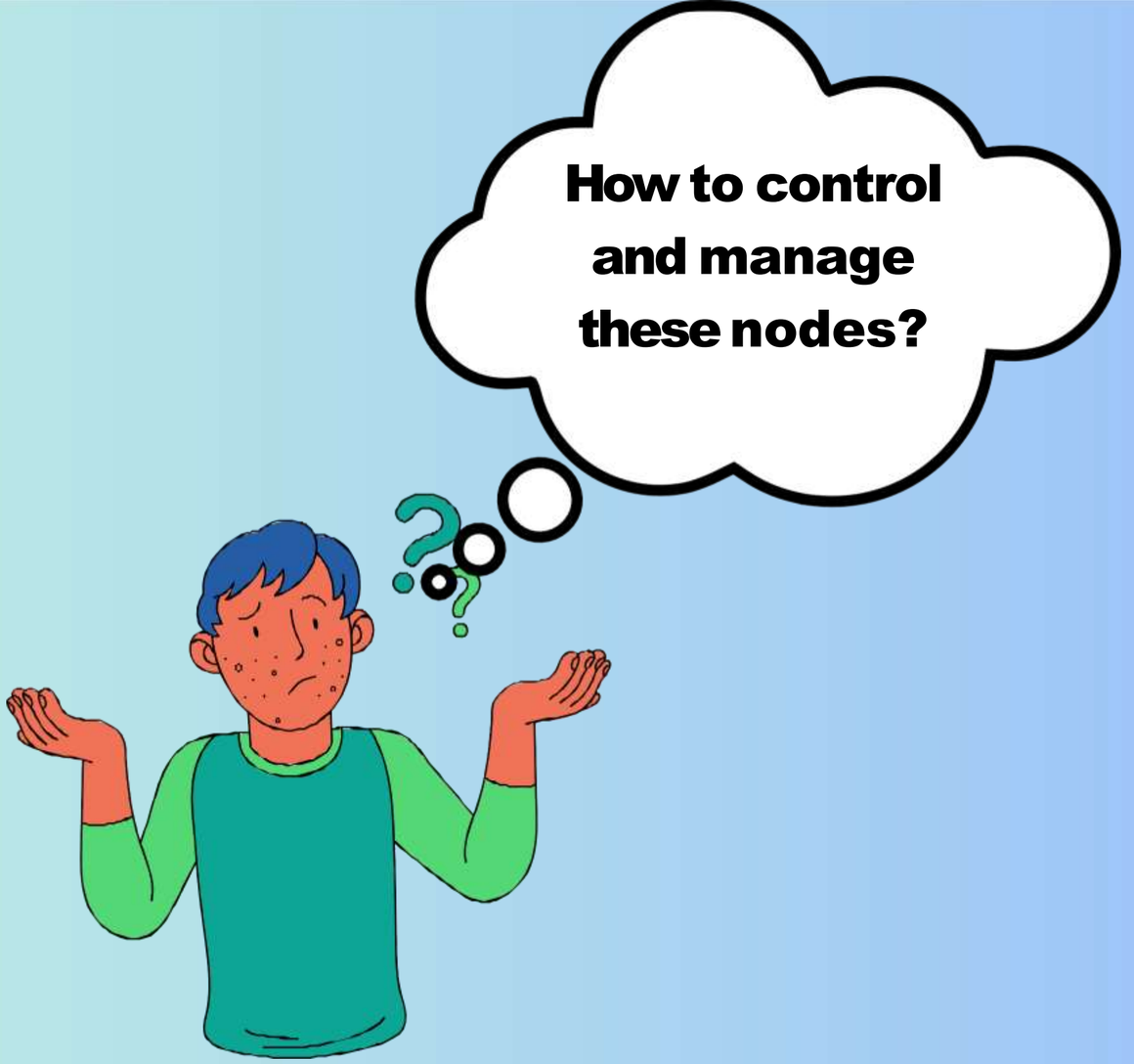

Node


What if this server fails?


Node


What should I do?


I have now backup nodes
Node
Node
Node


How to control and manage these nodes?

We have...

Kubernetes

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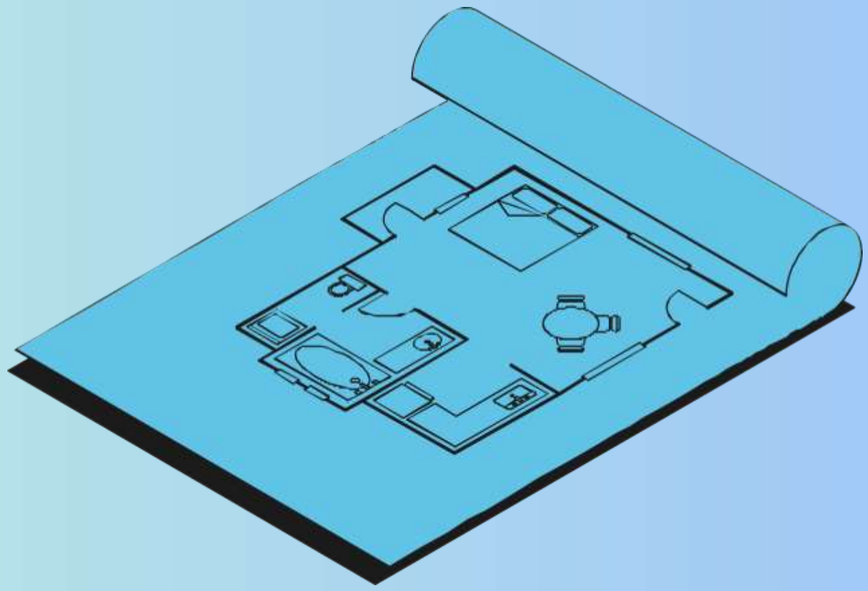
enabling futurability

Kubernetes



Architecture

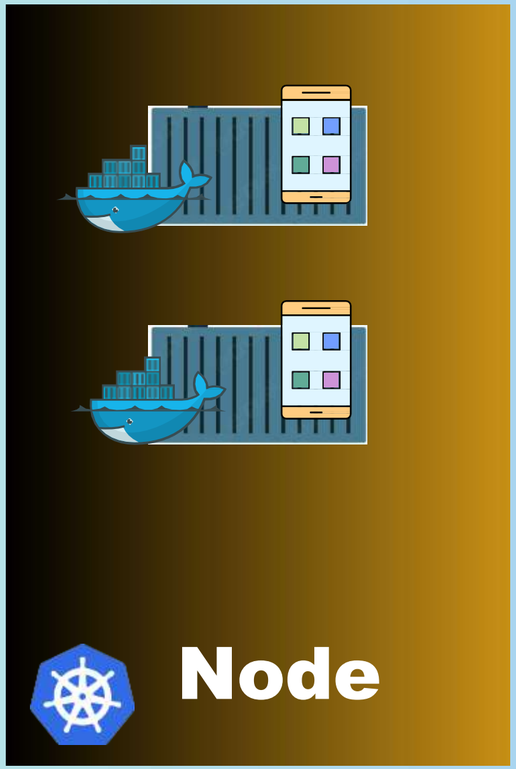
Kubernetes

When you deploy Kubernetes, you get a cluster.

Two important parts are:

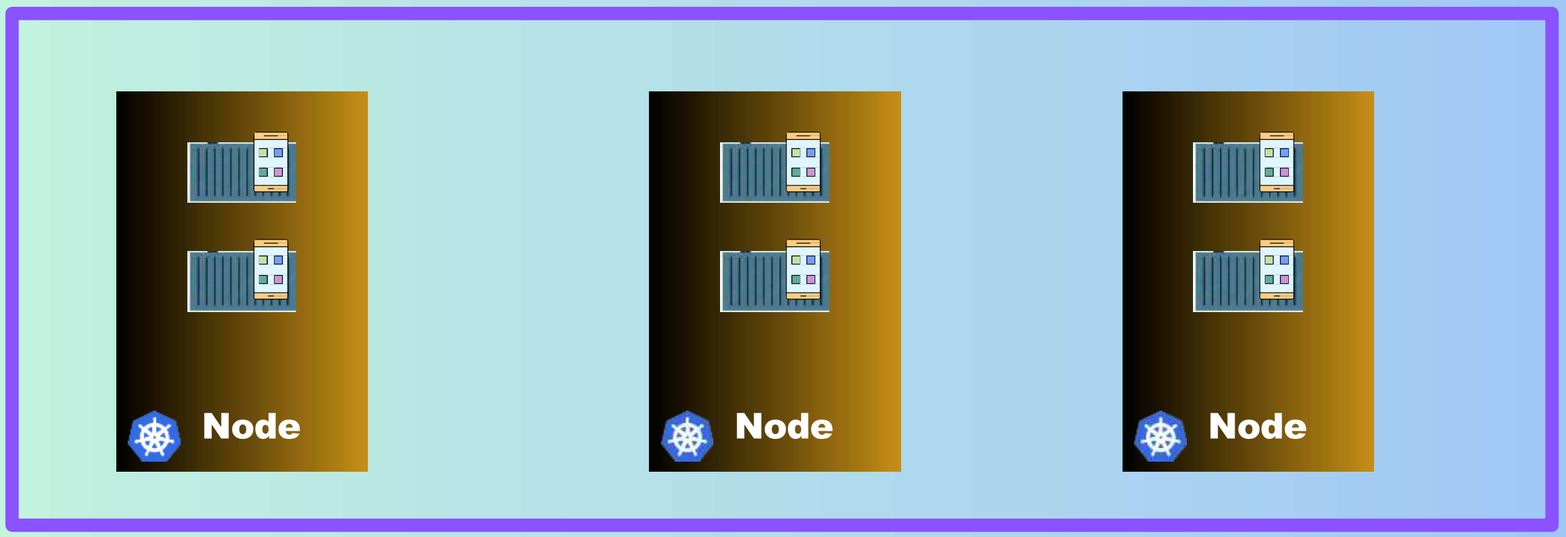
- **Master (Control Plane) &**
- **Worker nodes.**

Nodes (Minions)



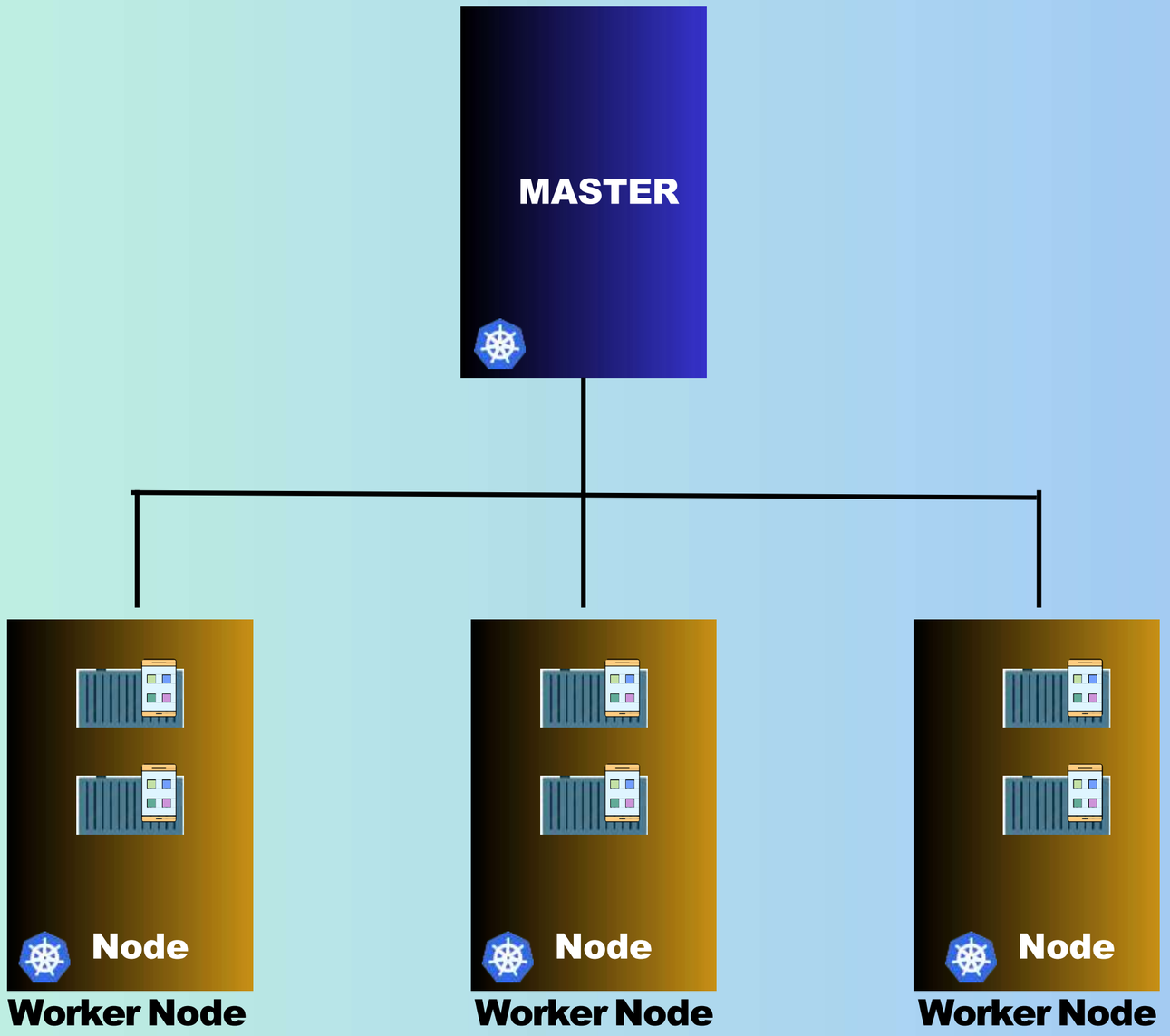
Server

We need a way to manage these nodes...

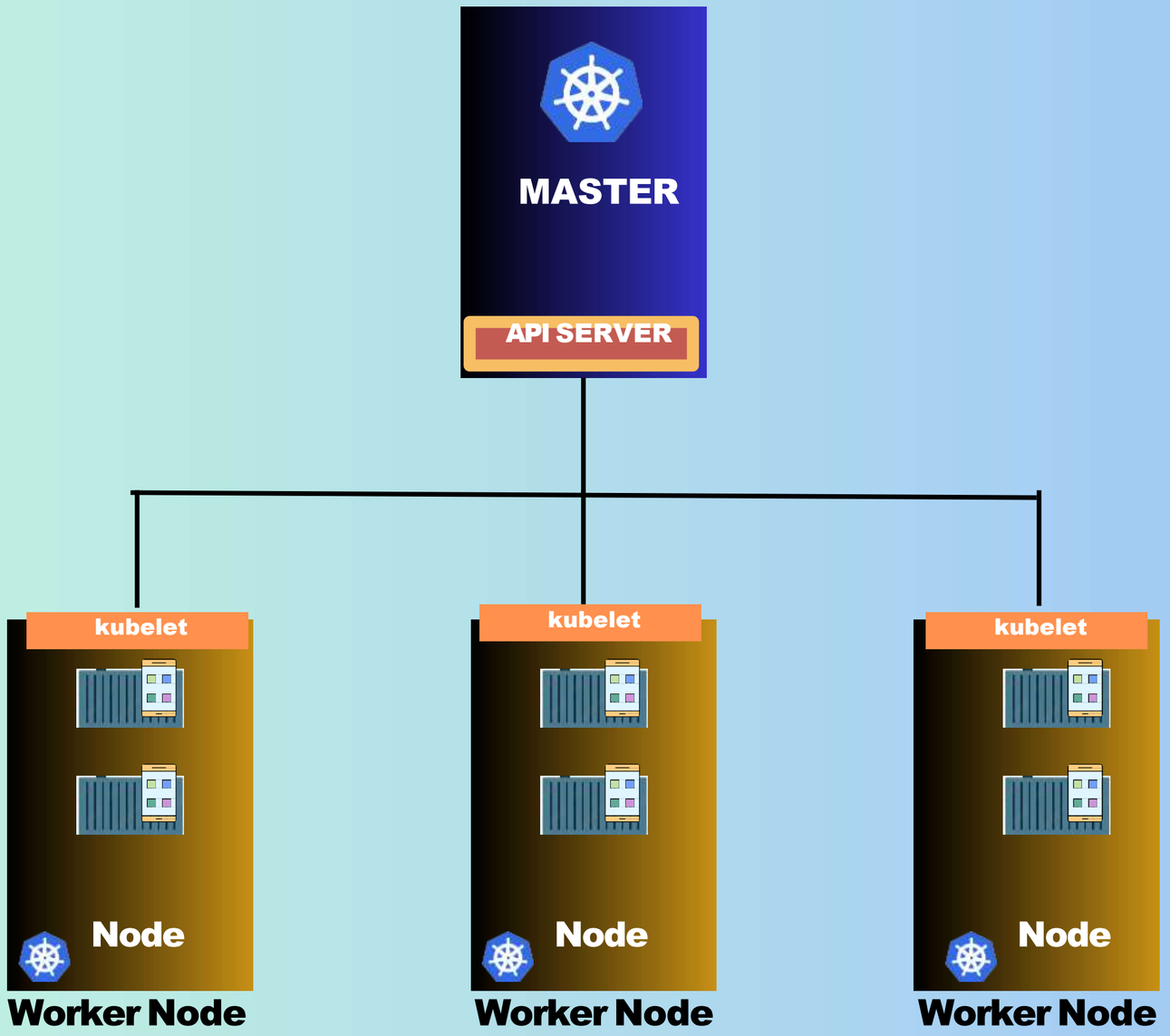


Cluster

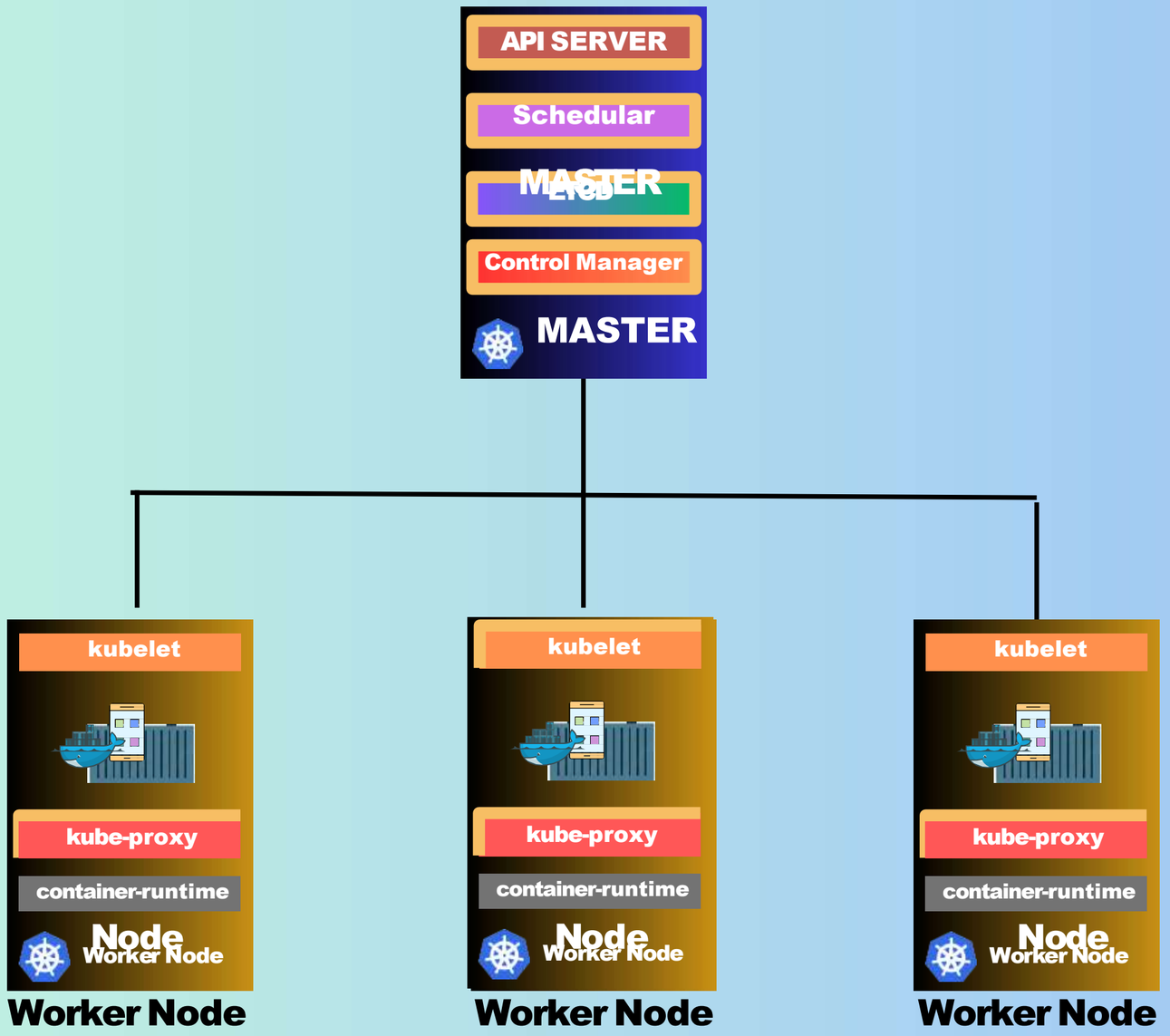
Cluster



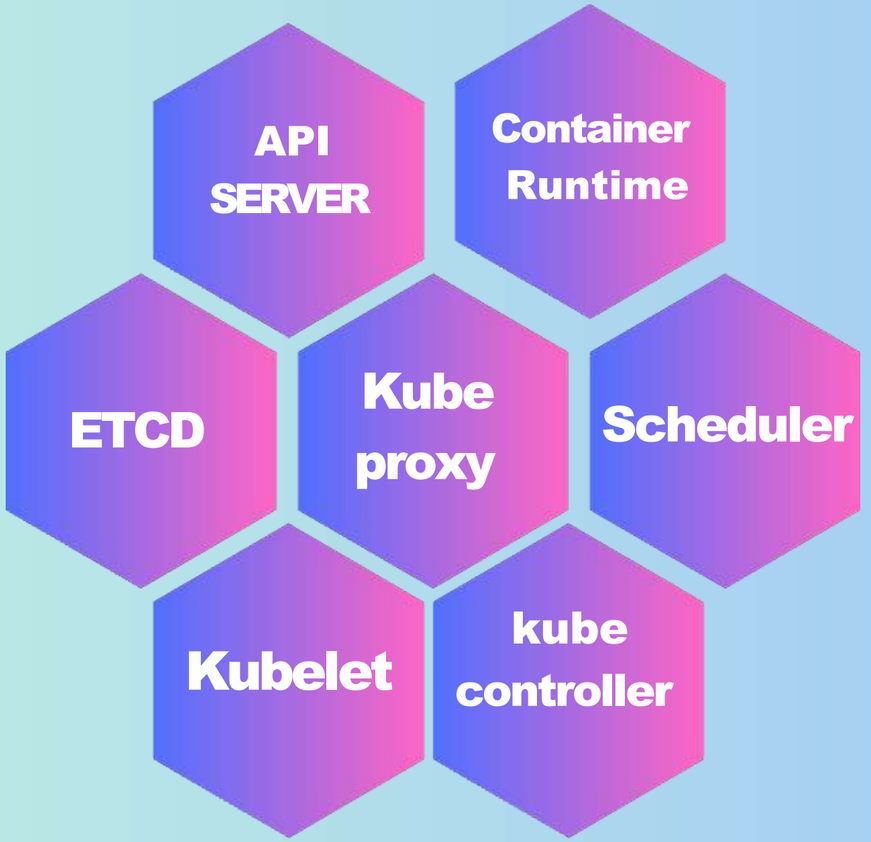
Cluster


MASTER
API SERVER
kubelet
Node
Worker Node
kubelet
Node
Worker Node
kubelet
Node
Worker Node

Cluster


API SERVER
Schedular
MASTER
Control Manager
MASTER
kubelet
kube-proxy
container-runtime
Node
Worker Node
Worker Node
kubelet
kube-proxy
container-runtime
Node
Worker Node
Worker Node
kubelet
kube-proxy
container-runtime
Node
Worker Node
Worker Node

Components

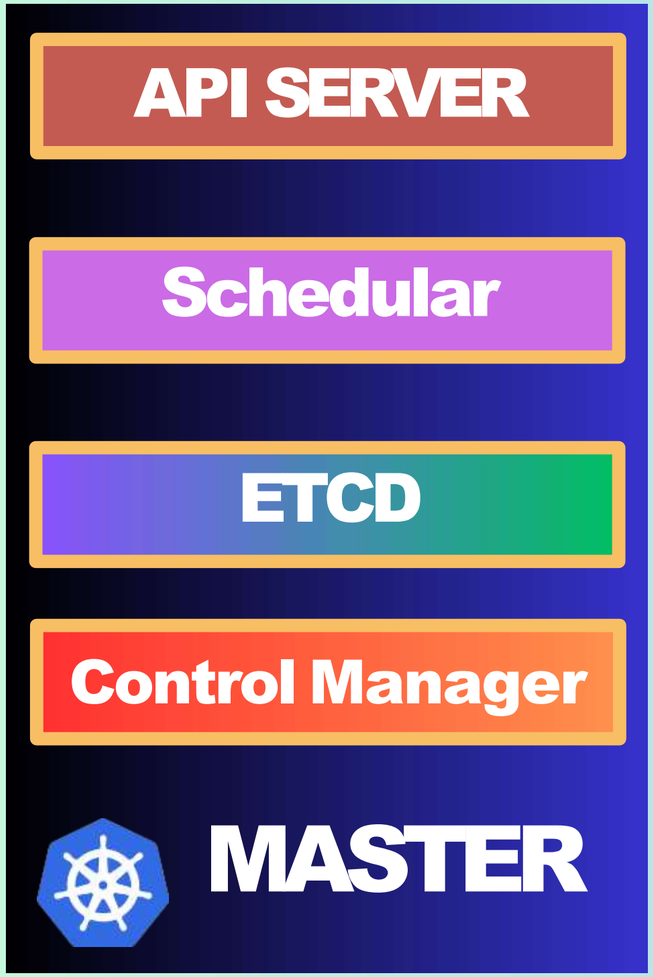

API SERVER
Container Runtime
ETCD
Kube proxy
Scheduler
Kubelet
kube controller

What is a pod?

A single instance of a running process in a cluster.

It can run one or more containers and share the same resources.


API SERVER
Schedular
ETCD
Control Manager
MASTER

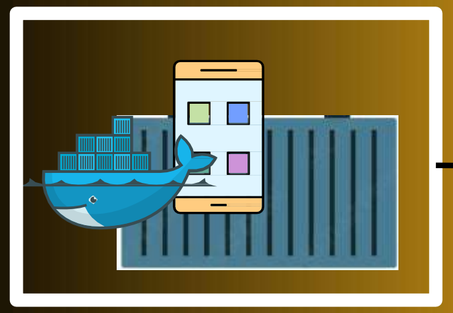


assign node to newly created Pods

key-value store, having all cluster data

responsible for managing the state of the cluster

kubelet



kube-proxy

container-runtime

Worker Node

Agent, make sure containers running in pods

POD, container run in a pod

Maintains network rules for communication with pods

A tool responsible for running containers

With  Kubernetes

- Container Orchestration
- Scalability
- Load Balancing
- High Availability
- Rollouts & Rollback

K8 Installation

Only for understanding how k8 installed on servers

- **Create 3 VM's/EC2's on any clod/virtualization platform followed by name master node,worker node1,worker node 2 for our understanding.**
- **Connect to the all the VM,s**
- **yum install docker –y**
- **systemctl start docker**
- **yum repolist**

Set SELinux in permissive mode (effectively disabling it)

```
sudo setenforce 0
sudo sed -i 's/^SELINUX=enforcing$/SELINUX=permissive/' /etc/selinux/config
```

- # This overwrites any existing configuration in /etc/yum.repos.d/kubernetes.repo

```
cat <<EOF | sudo tee /etc/yum.repos.d/kubernetes.repo
[kubernetes]
name=Kubernetes
baseurl=https://pkgs.k8s.io/core:/stable:/v1.32/rpm/
enabled=1
gpgcheck=1
gpgkey=https://pkgs.k8s.io/core:/stable:/v1.32/rpm/repodata/repomd.xml.key
exclude=kubelet kubeadm kubectl cri-tools kubernetes-cni
EOF
```

- sudo yum install -y kubelet kubeadm kubectl --disableexcludes=Kubernetes
- sudo systemctl enable --now kubelet
- Yum repolist