Cluster contains nodes that are managed by the worker nodes

Kubernetes engine dashboard
Services and ingresses.
↳ Services give access to external resources that are deployd in Kubernetes

Configiration   1 Virtual Cpu
Storage   3.75 gb of memory

Stable cluster creation was difficult in the past.

- K8S → Kubernetes
- Koo-ber_Net-eez →
- Helmsman → direction of the Ship

AKS
Amazon EKS → elastic kubernetes Service
GKE

Kubernetes takes a cut of memory allocated.

Google cloud Shell :- Command line tool to access the cluster.

Kubectl → After Connecting to the Cluster, we have to run Some Commands on the cluster we use Kubectl for that. [Kube Controller]

-- image

docker image can be created, pushed into docker hub and can be included into the kubernetes. cluster.

Cluster size can be decreased to 0 when not in use. we can increase it to any size when we want to.

get events :- shows the list of events that has happened.

Pods , Replica Set, deployment, Service

Kubernetes uses *single responsibility principle*. One concept, one responsibility

Pods → Smallest deployable units
Container cannot be created without a pod.
Container lives inside a pod.

IP address of the pod.
1/1 → Number of containers of the pod and howmany of them are ready.

A pod can have multiple containers and can share resources. within the same pod, containers can communicate using local host.

Pod is a Collection of Containers that Can run on a host. (single Node)

Kubectl describe pod "name of the pod" is going to give indepth information about the pod.

Pods run in a default namespace - provides isolation.

Dev and QA environment, run in a Seperate cluster.

Seperate namespaces for QA and dev. and assocaite each of the namespace with that specific address

Labels are really important when tying a pod with a replicaset or a service

Annotation :- Meta information about the specific pod
Pod -> A pod provides a way to put your containers together.

Gives them an ip addresses and Categorises them based on labels

x — x — x

Step 08 - Understanding Replica Sets

Ensures a specific set of pods are running at all times.

when when a pod is killed, the application Continues to work.

The replica set always keeps monitoring the pods and if there are lesser number of pods than what is needed. It creates the pods.

Replicaset can contain higher number of pods as well.

Replica set can add more pods if the desired is set to the number of replicaset we want.

Replicaset ensures that a specified number of pods are running at any given time.

x — x - x

Step 09 → understanding deployment in kubernetes

Replicaset is tied to an image

when we try to update the image to an error image (a new replica set is created) and when get pods command line is run, Invalid Image name is shown as the status.

when deployed properly, first, a new replica set is created and the images are loaded into the pod, one by one while simultaneously deleting a pod in the first replica set. At any given point, there will be only the desired amount of pods running.

"Rolling update strategy -
updating one pod at a time.

x —— x —— x

Step 10 → Quick preview

Pod → wrapper for set of containers
ip address, labels, annotations

Replicaset → ensures n number of instances are running all the time. n can be defined by configura-tions.

Deployment → ensures that an upgrade from V_1 to V_2 happens without a hitch
There are a wide variety of deployment strategies

x — x — x

Step 11 - Services in Kubernetes

Every new pod created is going to have a new ip address.

In kubernetes world, pods are disposable. A pods can go down, pods can be deleted. Since the ip address of the pods change during these changes, Service provides this always available external interface to the application running inside pods.

Service has a permanent lifetime ip address. which is created during a expose deployment.

Services are constant frontend interface, irrespective of whatever changes are happening in the backend.

Important Components

1) etcd. → distributed database that stores the configuration environment.

Desired state is stored in distributed database

2) API Server → kubectl talks to the kubernetes cluster through API server.

3) Scheduler → Schedules the pods to the nodes taking into consideration several factors.

4) Controll Manager → Makes sure the actual state of the kubernetes cluster matches the desired state.

Components of worker Node.

All the user applications would be typically running in pods inside the worker nodes.

Node Agent. (Kubelets)

→ Monitors what is happening and communicates it to the master node

→ If a pod goes down, the Kubelets reports it to the controller manager.

Kube proxy :- Exposing Services around your nodes and your pods.

Container Runtime -> Docker.

Masternode -> doesn't run any application Code.
we can run any Container that conforms to the OCI.
Open Container interface

-> If a master node goes down, the application still works. because the application logic is taken Care of by worker nodes.