

Basics

Define :it is a container management technology developed by GOOGLE (later made open source in 2015) to manage containerized application(orchestration).

Why

- | | |
|--|----------------------------------|
| 1.Service discovery and load balancing | 2.Automated rollbacks |
| 1.Service discovery and load balancing | |
| 3.Self-healing | 4.Auto Scaling |
| 5.Canary updates and Rolling updates | 6.Open source & Community driven |
| 7.High Availability | |

Kubernetes Concepts

Node	machine in the cluster
Docker	helps in creation of containers that includes apps and its binaries.
Pods	A Pod is the basic building block of Kubernetes—the smallest and simplest unit in the Kubernetes object model that you create or deploy, is also a group of containers (1 or more). Only containers of same pod can share shared storage.
Service	is an abstraction which defines a logical set of Pods and a policy by which to access them.
Jobs	Creates pod(s) and ensures that a specified number successfully completed. When a specified number of successful run of pods is completed, then the job is considered complete.
Cronjob	job scheduler in K8s
Replis-casets	ensures how many replica of pod should be running.

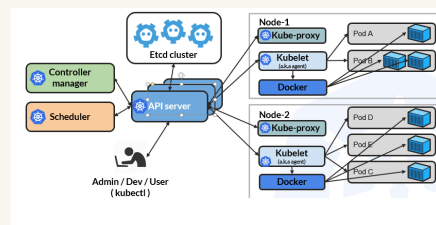
Kubernetes Concepts (cont)

Namespaces	Logical separation between teams and their environments. It allows various teams (Dev, Prod) to share k8s cluster by providing isolated workspace.
Deployment	Desired state of pods for declarative updates
daemonset	ensures a particular pod to be run on some or all nodes
persistent-volume	Persistent storage in the cluster with an independent lifecycle.
persistent-volume-claim	Request for storage (for a PersistentVolume) by a user
ingress	An Ingress is a collection of rules that allow inbound connections to reach the cluster services.

Namespaces

kubectl get all --all-namespaces	shows all objects of all namespaces
kubectl get pods --all-namespaces	shows pods of all namespaces
kubectl get pods -n <name>	shows pods of a namespace eg. kubectl get all -n kube-system :shows objects of system namespace
kubectl get namespaces	(show all namespaces)
default:	default name spaces of user
kube-public:	Namespace for resources that are publicly available/readable by all
kube-system:	Namespace for objects/resources created by Kubernetes systems

Components Architecture Diagram



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Page 1 of 2.

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Components Basic

Components in Manager Nodes:

Controller manager: Runs various controllers to help move running state to desired state.

Node Controller: Responsible for noticing and responding when nodes go down.

Replication Controller: Responsible for maintaining the correct number of pods for every replication controller object in the system.

Endpoints Controller: Populates the Endpoints object (i.e, joins Services & Pods).

Service Account & Token Controllers: Create default accounts and API access tokens for new namespaces.

Scheduler: Watches newly created pods that have no node assigned, and selects a node for them to run on.

Api Server: The front-end for the Kubernetes control plane. It is designed to scale horizontally. Every other component contact with this to communicate.

Etcd Cluster: key/value backing store for cluster data, it stores state of the cluster (what nodes exist in the cluster, what pods should be running, which nodes they are running on, and a whole lot more) at any given point of time.

Components in Worker Nodes:

Kubelet: Agent that continuously watches API server. It makes sure that containers are running in a pod.

Kube-proxy: a proxy service that runs on each worker node to deal with individual host subnetting and expose services to the external world. It performs request forwarding to the correct pods/containers across the various isolated networks in a cluster.

Various Ways of installing K8s

minikube single node cluster

kubeadm multinode cluster (doesn't support kubenet, hence require CNI [container network interface] plugin eg. flannel.

GKE multi node

Important: The network must be deployed before any applications. Also, CoreDNS will not start up before a network is installed. kubeadm only supports Container Network Interface (CNI) based networks (and does not support kubenet).

Output format in get

-o wide width wise details output

-o yaml details output in yaml format

-o json details output in json format



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