

# Kubernetes Terminology

**Cluster:** A group of connected computers (nodes) that run applications.

**Node:** A single computer in a cluster that runs applications.

**Pod:** The smallest unit in Kubernetes that can run one or more containers.

**Namespace:** A way to divide resources in a cluster for different projects or teams.

**Deployment:** Manages a set of identical pods to ensure the correct number are running.

**ReplicaSet:** Ensures a specified number of pod copies are running at all times.

**DaemonSet:** Ensures a pod runs on all or some nodes.

**StatefulSet:** Manages stateful applications, keeping track of each pod's identity.

**Job:** Runs a task until it completes successfully.

**CronJob:** Runs tasks on a scheduled basis, like a cron job in Unix.

**Service:** Exposes a set of pods as a network service.

**Ingress:** Manages external access to services, usually HTTP.

**ConfigMap:** Stores configuration data as key-value pairs.

**Secret:** Stores sensitive data, like passwords and tokens.

**Volume:** Provides storage for containers.

**PersistentVolume** (PV): A piece of storage that an administrator sets up.

**PersistentVolumeClaim** (PVC): A request for storage by a user.

**Kubelet:** The agent that runs on each node to manage pods.

**Kube-Proxy:** Manages network rules on nodes.

**Controller Manager:** Manages controllers that regulate the state of the cluster.

**Scheduler:** Decides which nodes will run new pods.

**Etcd:** A key-value store that stores all cluster data.

**Kubectl:** The command-line tool to interact with the Kubernetes API.

**Helm:** A package manager for Kubernetes applications.

**Label:** Key-value pairs attached to objects for organizing and selecting them.

**Annotation:** Metadata attached to objects to provide additional information.

**Taints:** Prevents specific pods from running on certain nodes.

**Tolerations:** Allows pods to run on nodes with specific taints.

**Affinity/Anti-Affinity:** Rules that specify which nodes can or cannot run specific pods.

**Role-Based Access Control (RBAC):** Manages who can do what in the cluster.

**ServiceAccount:** An identity for processes running in pods to interact with the Kubernetes API.

**ClusterRole:** Defines permissions that apply across the entire cluster.

**Role:** Defines permissions within a specific namespace.

**NetworkPolicy:** Controls the traffic between pods in the cluster.

**PodSecurityPolicy:** Defines security rules that pods must follow.

**PodDisruptionBudget** (PDB): Limits the number of pods that can be unavailable during maintenance.

**Ingress Controller:** Manages Ingress resources to provide HTTP and HTTPS routing.

**CoreDNS:** A DNS server for the cluster, providing name resolution for services.

**StorageClass:** Describes different types of storage available in the cluster.

**Init Containers:** Special containers that run before the main containers in a pod start.

**Sidecar Container:** A helper container that runs alongside the main container in a pod.

**Readiness Probe:** Checks if a container is ready to start accepting traffic.

**Liveness Probe:** Checks if a container is still running and should be restarted if not.

**Headless Service:** A service without a cluster IP, used to directly access pods.

**LoadBalancer Service:** Exposes a service externally using a cloud provider's load balancer.

**ClusterIP Service:** Exposes a service internally within the cluster.

**NodePort Service:** Exposes a service on a static port on each node.

**Endpoints:** A list of IP addresses and ports that a service forwards traffic to.

**Resource Quotas:** Limits the amount of resources a namespace can use.

**LimitRange:** Defines resource usage limits for containers in a namespace.

**Finalizer:** Ensures that specific cleanup steps are completed before an object is deleted.

**Horizontal Pod Autoscaler (HPA):** Automatically scales the number of pods based on CPU/memory usage.

**Vertical Pod Autoscaler (VPA):** Adjusts the resource limits and requests for running pods.

**Cluster Autoscaler:** Automatically adjusts the size of the Kubernetes cluster by adding or removing nodes.

**Affinity Rules:** Specify rules about which nodes can host a pod.

**Anti-Affinity Rules:** Specify rules about which nodes should not host a pod.

**Init Containers:** Special containers that run before the main containers in a pod start.

**Sidecar Containers:** Helper containers that run alongside the main container in a pod.

**Resource Requests:** Specify the minimum amount of resources a container needs.

**Resource Limits:** Specify the maximum amount of resources a container can use.

**PersistentVolumeClaim (PVC):** A request for storage by a user.

**EmptyDir:** A temporary directory that is created when a pod is assigned to a node.

**Security Context:** Defines security settings for a pod or container.

**ServiceAccount:** Provides an identity for processes running in pods.

**ClusterRoleBinding:** Binds a ClusterRole to a user or group for the entire cluster.

**RoleBinding:** Binds a Role to a user or group within a namespace.

**Pod Preset:** Injects certain information, like secrets or volume mounts, into pods at creation.

**Priority Class:** Specifies the priority of pods to influence their scheduling.

**Self-healing:** Automatically replaces and reschedules failed containers.

**Secrets Management:** Manages sensitive information like passwords and API keys.

**Default Namespace:** The default namespace for Kubernetes objects without a specified namespace.

**Master Node:** Controls and manages the Kubernetes cluster.

**Worker Node:** Runs applications and workloads in pods.

**Helm Chart:** Pre-configured Kubernetes resources packaged for easy deployment.

**Kustomize:** Tool for customizing Kubernetes YAML configurations.

**Admission Controller:** Intercepts requests to the Kubernetes API for validation and mutation.

**Custom Resource Definition (CRD):** Extends Kubernetes by defining custom resources.

**Operator:** Custom controllers for managing complex applications.

**Kubeadm:** Tool for initializing and managing Kubernetes clusters.

**Minikube:** Tool for running a single-node Kubernetes cluster locally for testing and development.