□ Kubernetes Interview Questions & Answers Guide □

This guide is designed to help DevOps engineers, cloud architects, and Kubernetes practitioners prepare for Kubernetes-related interviews. It covers **basic, intermediate, advanced, and scenario-based questions** that frequently appear in interviews.

□ Basic Kubernetes Interview Questions (10-15 Questions)

1□ What is Kubernetes?

Answer: Kubernetes (K8s) is an open-source container orchestration platform that automates the deployment, scaling, and management of containerized applications.

2□ What are the main components of Kubernetes architecture?

Answer:

- ➉ **Control Plane:** API Server, Controller Manager, Scheduler, etcd.
- ➉ **Worker Nodes:** Kubelet, Kube-Proxy, Container Runtime (Docker, containerd).

3□ What is a Pod in Kubernetes?

Answer: A **Pod** is the smallest deployable unit in Kubernetes, which encapsulates one or more containers, shared storage, and networking.

4□ What is a ReplicaSet?

Answer: A **ReplicaSet** ensures a specified number of replicas (Pods) are always running in the cluster.

5□ What is the difference between a Deployment and a StatefulSet?

Answer:

- **Deployment:** Used for stateless applications; ensures smooth updates.
- **StatefulSet:** Used for stateful applications like databases; maintains Pod identity.

6□ What are Kubernetes Services?

Answer: A **Service** provides a stable endpoint to expose a set of Pods using label selectors.

7□ What is a ConfigMap in Kubernetes?

Answer: A **ConfigMap** stores non-sensitive configuration data separately from containerized applications.

8□ What is a Kubernetes Secret?

Answer: A **Secret** stores sensitive data (like passwords, API keys) securely.

9□ What is an Ingress in Kubernetes?

Answer: An **Ingress** is a Kubernetes API object that manages external HTTP/S access to services using routing rules.

□ What are Namespaces in Kubernetes?

Answer: Namespaces provide logical isolation within a Kubernetes cluster to separate teams and applications.

1□1□ What is a PersistentVolume (PV)?

Answer: A **PersistentVolume (PV)** is a storage resource in Kubernetes that allows data to persist beyond a Pod's lifecycle.

1□2□ What is a DaemonSet?

Answer: A **DaemonSet** ensures that a particular Pod runs on all or some specified nodes.

1□3□ What is a Job in Kubernetes?

Answer: A **Job** creates one or more Pods and ensures they complete successfully.

1□4□ What is the difference between `kubectl apply` and `kubectl create`?

Answer:

- **kubectl apply:** Used for declarative updates and maintains object state.
- **kubectl create:** Used for imperative object creation.

1□5□ What is Helm in Kubernetes?

Answer: Helm is a package manager for Kubernetes that simplifies deployment using Helm Charts.

□ Intermediate Kubernetes Interview Questions (10-15 Questions)

1□ What is the difference between Horizontal Pod Autoscaler (HPA) and Vertical Pod Autoscaler (VPA)?

Answer:

- ➉ **HPA:** Scales the number of Pods based on resource utilization (CPU/Memory).
- ➉ **VPA:** Adjusts the CPU and memory requests/limits of existing Pods.

2□ How does Kubernetes handle Service Discovery?

Answer: Kubernetes provides Service Discovery through **DNS-based discovery (CoreDNS)** and **environment variables**.

3□ What is the difference between a ClusterIP, NodePort, and LoadBalancer service?

Answer:

- ➉ **ClusterIP:** Default; accessible only within the cluster.
- ➉ **NodePort:** Exposes service on a port accessible from outside the cluster.
- ➉ **LoadBalancer:** Uses a cloud provider's external load balancer.

4□ What is `kube-proxy`, and what is its role?

Answer: `kube-proxy` maintains network rules on nodes and enables communication between Pods and Services.

5□ How does Kubernetes manage container logs?

Answer: Kubernetes provides **log aggregation** using **Fluentd, ELK, Prometheus, and Loki**.

6□ What is a Kubernetes Operator?

Answer: A **Kubernetes Operator** automates complex application management using **Custom Resource Definitions (CRDs)**.

7□ What is a Kubernetes Federation?

Answer: Federation allows managing multiple clusters as a single unit.

8□ How do you perform a rolling update in Kubernetes?

Answer: Using:

```
sh
CopyEdit
kubectl set image deployment/my-deployment my-container=my-image:v2
```

9□ What is a taint and a toleration in Kubernetes?

Answer:

- ➉ **Taint:** Restricts scheduling of Pods on certain nodes.
- ➉ **Toleration:** Allows Pods to be scheduled on tainted nodes.

 What is a Sidecar Container?

Answer: A **Sidecar Container** runs alongside the main application container to provide additional functionality (e.g., logging, monitoring).

Advanced Kubernetes Interview Questions (10-15 Questions)

1 What is the difference between StatefulSet and DaemonSet?

Answer:

- **StatefulSet:** Manages stateful applications (e.g., databases).
- **DaemonSet:** Runs a Pod on all or specific nodes.

2 What is `etcd`, and why is it important in Kubernetes?

Answer: `etcd` is a **key-value store** used by Kubernetes to store cluster state data.

3 How does Kubernetes handle high availability?

Answer: By using:

- Multi-master node setup.
- Replicated etcd clusters.
- Load balancers.

4 What is a Network Policy in Kubernetes?

Answer: A **Network Policy** controls communication between Pods using labels and selectors.

5 What is a Custom Resource Definition (CRD)?

Answer: A **CRD** allows users to define custom Kubernetes resources.

Scenario-Based Kubernetes Interview Questions (10-15 Questions)

1 A Pod is stuck in `CrashLoopBackOff`. How do you debug it?

Answer:

1. Check logs: `kubectl logs <pod-name>`
2. Describe Pod: `kubectl describe pod <pod-name>`
3. Execute into Pod: `kubectl exec -it <pod-name> -- /bin/sh`

2 A service is not reachable. What steps do you take?

Answer:

1. Check Pod status: `kubectl get pods`
2. Inspect Service: `kubectl get svc`
3. Verify Ingress: `kubectl describe ingress`

□ Conclusion

This guide covers **basic, intermediate, advanced, and scenario-based Kubernetes questions** to help you ace your Kubernetes interview!