Mock Interview Guide - Kubernetes

🗃️ Instructions for Interviewer:

- You are playing the role of interviewer. Use this guide as a script.
- Ask each question one at a time. Follow the steps: Definition → Details → Scenario → Follow-up.
- If the interviewee struggles, use the hint.
- The goal is to keep it conversational and practical. Help the interviewee think and express their learning.
- **colors assigned:** **Questions** **Answers** **Hint**

Freshers - Level

Kubernetes (10 Easy DevOps Interview Questions)

1. **Ask: 🗣️ "What is Kubernetes and what problem does it solve?"**

   ✅ Expected Answer: "Kubernetes is an open-source platform that automates container deployment, scaling, and management. It solves the problem of managing large-scale containerized applications."

   💡 Hint: "Think of it as a container orchestration system."

2. **Ask: 🗣️ "What is a Pod in Kubernetes?"**

   ✅ Expected Answer: "A Pod is the smallest deployable unit in Kubernetes. It can hold one or more containers that share storage, network, and context."

   💡 Hint: "Think of a Pod as a wrapper around containers."

3. **Ask: 🗣️ "What is the role of kubelet?"**

   ✅ Expected Answer: "The kubelet is an agent that runs on each node and ensures containers are running in a Pod."

   💡 Hint: "It's the component that communicates between the control plane and the node."

4. **Ask: 🗣️ "What is a Deployment in Kubernetes?"**

   ✅ Expected Answer: "A Deployment provides declarative updates to Pods and ReplicaSets."

   💡 Hint: "It helps in scaling and rolling updates."

5. **Ask: 🗣️ "What command is used to view running Pods?"**

   ✅ Expected Answer: "kubectl get pods"

   💡 Hint: "It starts with 'kubectl get ...'"

6. **Ask: 🗣️ "What is a Service in Kubernetes?"**

   ✅ Expected Answer: "A Service exposes an application running on a set of Pods as a network service."

   💡 Hint: "Think of it as a stable endpoint for accessing Pods."

7. **Ask: 🗣️ "What types of Services are there in Kubernetes?"**

   ✅ Expected Answer: "ClusterIP, NodePort, LoadBalancer, ExternalName."

   💡 Hint: "Think about how services can be exposed inside or outside the cluster."

8. **Ask: 🗣️ "What is a ConfigMap used for?"**

   ✅ Expected Answer: "ConfigMap is used to store non-sensitive configuration data such as key-value pairs."

   💡 Hint: "Used to pass environment-specific values into Pods."

9. **Ask: 🗣️ "What is the function of a namespace in Kubernetes?"**

   ✅ Expected Answer: "Namespaces allow you to divide cluster resources between users or teams."

   💡 Hint: "Useful for managing multi-tenant clusters."

10. **Ask: 🗣️ "How do you scale a Deployment?"**

    ✅ Expected Answer: "Use 'kubectl scale deployment --replicas=' or update the YAML file."

    💡 Hint: "Scaling means increasing or decreasing the number of Pod replicas."

Scenario-Based Questions

1. 🗣️Ask: “You want to run your app in Kubernetes. What’s the first thing you need to create?”

✅ Expected: “A Pod or a Deployment using a YAML file.”

💡 Hint: “What object actually runs the container?”

2. 🗣️Ask: “Your container keeps restarting again and again. What would you check?”

✅ Expected: “Check pod status using kubectl describe or logs to find crash loop reason.”

💡 Hint: “Use kubectl get pods and then describe/logs.”

3. 🗣️ Ask: “You want to expose your pod so it can be accessed from outside. What would you use?”

✅ Expected: “Use a Service (type NodePort or LoadBalancer).”

💡 Hint: “Think about networking in Kubernetes.”

4. 🗣️ Ask: “You made a change to your container image. How can you make Kubernetes pull the new version?”

✅ Expected: “Update the image version in the deployment and do a rollout.”

💡 Hint: “Use kubectl set image or edit the deployment.”

Project-Based Questions

5. 🗣️ Ask: “Suppose you built a simple Python Flask app. How would you run it on Kubernetes?”

> **✅ Expected: “Create a Docker image, push to Docker Hub, write a Deployment YAML, and apply it.”**
>
> **💡 Hint: “Think: Docker + YAML + kubectl apply.”**

6. 🗣️ Ask: “You want to deploy a static website using NGINX. How would you do that in Kubernetes?”

> **✅ Expected: “Use an NGINX image in a pod or deployment and expose it via a Service.”**
>
> **💡 Hint: “Use official NGINX image + NodePort service.”**

Medium-Level

(DevOps Interview Questions - 1 to 2 Years Experience)

1. **Ask: 🗣️ "What are the main components of the Kubernetes control plane?"**

> **✅ Expected Answer: "API Server, Scheduler, Controller Manager, and etcd are the key components."**
>
> **💡 Hint: "These components manage the state and desired behavior of the cluster."**

2. **Ask: 🗣️ "What is the role of kube-proxy in Kubernetes?"**

   ✅ Expected Answer: "kube-proxy maintains network rules and enables communication between pods across nodes."

   💡 Hint: "It handles routing of traffic inside the cluster."

3. **Ask: 🗣️ "How does Kubernetes handle container restarts when a pod fails?"**

   ✅ Expected Answer: "The kubelet on the node restarts the container based on the pod's restart policy."

   💡 Hint: "Check the restartPolicy in the pod spec (Always, OnFailure, Never)."

4. **Ask: 🗣️ "What is a ReplicaSet and how is it related to Deployments?"**

   ✅ Expected Answer: "A ReplicaSet ensures the desired number of pod replicas. Deployments manage ReplicaSets."

   💡 Hint: "Deployment is a higher-level object managing ReplicaSets."

5. **Ask: 🗣️ "How would you update a running application in Kubernetes?"**

   ✅ Expected Answer: "Use 'kubectl apply -f deployment.yaml' or update image with 'kubectl set image'."

   💡 Hint: "Think rolling updates using Deployments."

6. **Ask: 🗣️ "What is the difference between ConfigMap and Secret in Kubernetes?"**

   ✅ Expected Answer: "Both store configuration, but Secrets are used for sensitive data and are base64 encoded."

   💡 Hint: "Use Secret for passwords or tokens."

7. **Ask: 🗣️ "What is a StatefulSet and when would you use it?"**

   ✅ Expected Answer: "StatefulSet is used for stateful applications requiring stable identities and storage."

   💡 Hint: "Databases like MongoDB, Cassandra use StatefulSets."

8. **Ask: 🗣️ "What is the difference between a DaemonSet and a Deployment?"**

   ✅ Expected Answer: "A DaemonSet runs one pod per node, while a Deployment manages replicas of pods."

   💡 Hint: "DaemonSet is for background services like monitoring agents."

9. **Ask: 🗣️ "What is a namespace in Kubernetes and why is it useful?"**

   ✅ Expected Answer: "Namespaces help organize cluster resources and isolate teams/projects."

   💡 Hint: "Useful in multi-tenant clusters."

10. Ask: 🗣️ "What is the use of liveness and readiness probes?"

✅ Expected Answer: "Liveness checks if app is running; readiness checks if app is ready to serve traffic."

💡 Hint: "Helps Kubernetes restart or route traffic based on app state."

Scenario-Based Questions

1.🗣️ Ask: “You need to make your deployment scale automatically when traffic increases. What would you use?”

✅ Expected: “Use a Horizontal Pod Autoscaler based on CPU or custom metrics.”

💡 Hint: “Think metrics + replicas.”

2🗣️. Ask: “One of your pods isn’t scheduling on any node. What do you check first?”

✅ Expected: “Check node resources, taints, tolerations, or pod affinity rules.”

💡 Hint: “Describe the pod and check events.”

3.🗣️ Ask: “You want to give a pod access to secrets or config. How would you do that?”

✅ Expected: “Use ConfigMaps and Secrets mounted as env vars or volumes.”

💡 Hint: “Which object stores environment-specific values?”

4.🗣️ Ask: “Your app needs to persist data even if the pod restarts. What would you use?”

✅ Expected: “Use Persistent Volumes and Persistent Volume Claims.”

💡 Hint: “Ephemeral vs Persistent storage?”

Project-Based Questions

5.🗣️ Ask: “You want to deploy a web app and a database together that talk to each other. How would you design it in Kubernetes?”

✅ Expected: “Use 2 deployments (e.g., Node.js + MySQL), expose using internal services, configure using env variables or secrets.”

💡 Hint: “Think of multi-container design + Services.”

6.🗣️ Ask: “How would you create a reusable setup for development and testing environments using Kubernetes?”

✅ Expected: “Use Helm charts or Kustomize to manage configs for each environment.”

💡 Hint: “Templating and configuration management tools?”

Advanced-Level

(DevOps Interview Questions - 3+ Years Experience)

1. **Ask: 🗣️ "How does Kubernetes handle high availability in the control plane?"**

   ✅ Expected Answer: "By running multiple control plane nodes with leader election and etcd clustering."

   💡 Hint: "Look into how etcd and kube-API-server achieve HA."

2. **Ask: 🗣️ "Explain the role of etcd in Kubernetes."**

   ✅ Expected Answer: "etcd is a distributed key-value store used for storing all cluster configuration data."

   💡 Hint: "It's the source of truth for the cluster state."

3. **Ask: 🗣️ "How do network plugins (CNI) work in Kubernetes?"**

   ✅ Expected Answer: "CNI plugins configure network interfaces in pods and manage IP addresses."

   💡 Hint: "Examples include Calico, Flannel, Cilium."

4. **Ask: 🗣️ "What is a sidecar container and where is it used?"**

   ✅ Expected Answer: "A sidecar runs alongside the main container to provide additional features like logging or proxy."

   💡 Hint: "Used in service mesh or log collectors."

5. **Ask: 🗣️ "How would you debug a node issue in Kubernetes?"**

   ✅ Expected Answer: "Use kubectl describe node, journalctl for kubelet logs, and check resource utilization."

   💡 Hint: "Start with kubectl describe and check node taints."

6. **Ask: 🗣️ "How does Kubernetes perform a rolling update?"**

   ✅ Expected Answer: "It gradually replaces pods with new ones, ensuring availability during updates."

   💡 Hint: "Check strategy in Deployment: RollingUpdate."

7. **Ask: 🗣️ "What is a Custom Resource Definition (CRD)?"**

   ✅ Expected Answer: "CRDs allow users to define their own resource types in Kubernetes."

   💡 Hint: "Used to extend Kubernetes API."

8. **Ask: 🗣️ "What is a Pod Disruption Budget (PDB)?"**

   ✅ Expected Answer: "PDB ensures a minimum number of pods are always running during voluntary disruptions."

   💡 Hint: "Used for high availability during upgrades or maintenance."

9. **Ask: 🗣️ "How do you secure Kubernetes clusters?"**

✅ Expected Answer: "Use RBAC, TLS encryption, network policies, and restrict access to API server."

💡 Hint: "Start with RBAC and secrets management."

10. Ask: 🗣️ "What tools can you use to monitor a Kubernetes cluster?"

✅ Expected Answer: "Prometheus, Grafana, ELK Stack, and tools like kube-state-metrics."

💡 Hint: "Look into open-source observability stacks."

Scenario-Based Questions

1.🗣️ Ask: “You notice a memory leak in a container. How can Kubernetes help you recover automatically?”

✅ Expected: “Set resource limits and liveness probes to restart unhealthy containers.”

💡 Hint: “How does Kubernetes detect unhealthy states?”

2.🗣️ Ask: “You need to schedule pods only on specific nodes. How would you achieve that?”

✅ Expected: “Use node selectors, affinity/anti-affinity, or taints and tolerations.”

💡 Hint: “Think node-specific rules.”

3.🗣️ Ask: “A rollout failed in production. How do you roll back your deployment safely?”

✅ Expected: “Use kubectl rollout undo deployment <name>.”

💡 Hint: “Kubernetes tracks past versions of deployments.”

4.🗣️ Ask: “Your app needs to scale during peak hours and also reduce costs at night. How would you automate this?”

✅ Expected: “Use scheduled jobs or CronJob + autoscaler + possibly custom controller.”

💡 Hint: “Combine time-based triggers + HPA.”

Project-Based Questions

5.🗣️ Ask: “You are tasked to build a production-grade cluster for a microservices app. What components would you include?”

✅ Expected: “Use Ingress, ConfigMaps, Secrets, resource limits, monitoring (Prometheus), and centralized logging.”

💡 Hint: “Think full stack – not just pods.”

6.🗣️ Ask: “You want to migrate a legacy app to Kubernetes without downtime. How would you plan it?”

✅ Expected: “Use blue-green or canary deployments, health checks, and readiness probes.”

💡 Hint: “Safe rollout techniques?”