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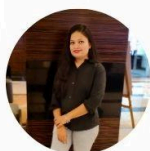


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# 50 Kubernetes

## REALTIME SCENARIO BASED QUESTIONS

### PART 1



Sonali



techopsbysonali



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1. You need to gracefully terminate pods to avoid disrupting ongoing processes during a deployment. How would you configure Kubernetes to ensure graceful pod termination? What role do preStop hooks and termination grace periods play in this process?
2. Your team has implemented a custom resource definition (CRD), but it isn't behaving as expected. How would you debug and resolve issues with a CRD?  
What tools (e.g., kubectl describe, logs, webhook configurations) can help you identify the problem?
3. The Kubernetes API server becomes unresponsive in your cluster. How would you diagnose and restore API server functionality?  
What precautions can you take to minimize the impact of API server downtime?
4. Dealing with Node Affinity and Anti-Affinity Conflicts You've configured node affinity and anti-affinity rules for a workload, but pods are not being scheduled as expected. How would you troubleshoot these scheduling issues? What are best practices for using affinity and anti-affinity to manage workload placement?
5. Application pods in your cluster are generating large log files, causing storage issues. How would you manage log rotation and retention for pods?  
What Kubernetes features or external tools can assist in log management?
6. Your team is migrating to Helm for application deployment, but some charts require custom values. How would you manage and deploy custom values for Helm charts? What strategies can you use to handle versioning and rollbacks for Helm releases?
7. A StatefulSet for your database application is failing to create pods. How would you debug why the StatefulSet is failing? What are the specific considerations for storage and network configurations in StatefulSets?
8. Your cluster uses a mix of third-party and custom container images. How would you ensure that only secure and compliant images are used in the cluster? What tools (e.g., image scanners, policies) can assist with this process?
9. You deployed a Terraform module that creates a Kubernetes cluster along with necessary resources for an application. However, one of your Pods is stuck in a "CrashLoopBackOff" state. How would you troubleshoot this issue using Terraform and Kubernetes?



10. Your organization wants to ensure no single team can overuse cluster resources. How would you implement resource quotas and limits using Terraform in a multi-namespace Kubernetes cluster?

11. You have an e-commerce application running on Kubernetes, managed via Terraform. During a flash sale, the application faces high traffic, and the Pods are unable to handle the load. How would you configure horizontal scaling to handle this spike?

12. A deployment managed via Terraform fails, and the new version of your application is not stable. The rollout is stuck, impacting the service. How would you identify and mitigate the issue while ensuring minimal downtime?

13. You've deployed a microservices-based architecture using Terraform, but one service cannot communicate with another. How would you debug and resolve the networking issue?

14. A service configured with a LoadBalancer type is not accessible from outside the cluster. How would you debug and resolve this issue?

What are the key components and configurations to check?

15. You've enabled the Cluster Autoscaler in your cloud provider's Kubernetes cluster, but it isn't adding nodes even when resources are insufficient.

How would you debug why the Cluster Autoscaler isn't working?

What configurations and prerequisites are necessary for the autoscaler to function correctly?

16. You observe that certain nodes in your cluster are underutilized, leading to resource wastage. How would you identify and address the issue of underutilized nodes? What strategies, like overprovisioning or pod scheduling, can optimize resource usage?

17. Your team wants to test new application versions with a small percentage of users before a full rollout. How would you implement a canary deployment in Kubernetes? What tools (e.g., Argo Rollouts, Flagger) can assist in this process, and how do they work?

18. You need to manage application configurations that change frequently without redeploying the application. How would you use ConfigMaps and Secrets to achieve this? What are the differences between these resources, and how do you securely manage them?

19. A production application deployed on Kubernetes is experiencing intermittent failures. How would you debug a live application without disrupting other users? Which Kubernetes tools (e.g., kubectl debug, logs, metrics) would you leverage?



20. Your organization requires a highly available application that spans multiple regions. How would you design and deploy a Kubernetes-based solution for cross-region high availability? What challenges would you face, and how would you mitigate them?

21. You discover that Kubernetes certificates in your cluster are about to expire. How would you identify and renew expiring certificates? What tools or steps would you use to prevent this from happening in the future?

22. Your organization mandates encrypted communication between pods. How would you implement pod-to-pod encryption in a Kubernetes cluster? What tools, such as mTLS or service meshes, would you use, and why?

23. Your cluster's scheduler is taking too long to assign pods to nodes. How would you debug and optimize scheduler performance? What Kubernetes features (e.g., PriorityClass, scheduler configuration) can improve scheduling efficiency?

24. Your application is set up with a Horizontal Pod Autoscaler (HPA), but scaling is not happening even under high load. How would you troubleshoot why the HPA is not scaling the pods? What are the prerequisites for HPA to function properly?

25. You are deploying a stateful application, such as a database, on Kubernetes. What are the key differences between StatefulSets and Deployments, and why would you choose one over the other? How do you handle scaling and backups for stateful workloads?

26. Your cluster's API server is responding slowly, impacting other components. How would you diagnose and resolve API server performance bottlenecks? What are the common causes of high API server latency?

27. A pod is stuck waiting for its Persistent Volume Claim (PVC) to be bound. How do you debug and resolve PVC binding issues? What are the key considerations when provisioning storage dynamically in Kubernetes?

28. You need to configure a Kubernetes cluster for multi-tenancy to isolate workloads from different teams. How would you implement multi-tenancy in Kubernetes? What tools or features would you use to enforce resource isolation and security?

29. Your application pods are taking too long to start. What could be causing the slow startup, and how would you debug the issue? How do liveness and readiness probes impact pod startup?



30. Pods in your cluster are unable to resolve external domain names.

How would you debug and resolve DNS resolution failures in Kubernetes?

What are the key components involved in DNS resolution in a Kubernetes cluster?

31. A namespace in your cluster has reached its resource quota, and new pods can't be scheduled.

How would you diagnose and resolve the issue?

32. Your security team mandates that only images from a trusted private registry can be used in your Kubernetes cluster. How would you enforce this policy in your cluster? What Kubernetes features or tools can be used to achieve this?

33. Your team decides to implement a service mesh for better observability, security, and traffic control between microservices. How would you introduce a service mesh like Istio or Linkerd into your Kubernetes environment? What challenges would you expect during implementation, and how would you address them?

34. You are tasked with upgrading your Kubernetes cluster to a newer version.

What challenges might you face during a cluster upgrade?

How would you plan and execute a seamless upgrade without impacting running applications?

35. Your organization requires stricter security controls for pod deployments.

How would you enforce pod security policies to restrict permissions, such as root access or privileged containers?

What alternatives to PSPs would you consider since they are deprecated?

36. You need to monitor application performance and resource usage in your cluster. Which tools would you use to monitor Kubernetes clusters effectively?

How would you implement monitoring for resource usage, application logs, and network traffic?

37. A critical application is deployed on your Kubernetes cluster, and you are required to implement disaster recovery. How would you design a backup and recovery solution for the application and cluster?

What tools or strategies would you use to back up etcd, persistent data, and application configurations?

38. You need to perform maintenance on a node in your cluster, but it runs critical application pods.

How would you drain the node without causing downtime for the applications? What would you do if some pods fail to evict during the drain?



39. You have applications running in two separate Kubernetes clusters, and they need to communicate securely. How would you establish secure communication between applications across clusters? What tools or practices would you use for cross-cluster networking?

40. Your team demands zero downtime during deployments.  
How would you configure your deployment strategy to achieve zero downtime?  
Compare and contrast the use of RollingUpdate and Blue/Green Deployments.

41. You need to expose an application securely over HTTPS using an ingress controller. How would you configure an ingress resource with SSL termination?  
What considerations would you make for managing SSL certificates in Kubernetes?

42. You have been asked to review the security posture of your Kubernetes cluster. What steps would you take to harden the cluster?  
How would you ensure RBAC policies, network policies, and secure communication between components are implemented?

43. A pod is failing to start because it can't pull the required container image.  
How would you debug the image pull issue? What are the possible reasons for such failures, and how can you mitigate them?

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