



DevOps

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40 Top Kubernetes Interview Questions and Answers for 2023

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Kubernetes comes from a Greek word meaning 'captain,' 'helmsman,' or 'governor.' The term is now also used in the [DevOps](#) and on-premises software development world to refer to a powerful bundle of solutions that equips operations engineers to scale and service server (and box) setups effortlessly.

This Kubernetes interview questions article will help you prepare for any interview or certification exam that you may need to take once you've completed the Kubernetes training. So, without further ado, let's jump right in and learn the top Kubernetes interview questions and answers.

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Top 40 Kubernetes Interview Questions and Answers

1. What is Kubernetes?

This is one of the most basic Kubernetes interview questions yet one of the most important ones! [Kubernetes](#) is an open-source container orchestration tool or system that is used to automate tasks such as the management, monitoring, scaling, and deployment of containerized applications. It is used to easily manage [several containers](#) (since it can handle grouping of containers), which provides for logical units that can be discovered and managed.

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2. What are K8s?

K8s is another term for Kubernetes.

3. What is orchestration when it comes to software and DevOps?

Orchestration refers to the integration of multiple services that allows them to automate processes or synchronize information in a timely fashion. Say, for example, you have six or seven microservices for an application to run. If you place them in separate containers, this would inevitably create obstacles for communication. Orchestration would help in such a situation by enabling all services in individual containers to work seamlessly to accomplish a single goal.

4. How are Kubernetes and Docker related?

This is one of the most frequently asked Kubernetes interview questions, where the interviewer might as well ask you to share your experience working with any of them. [Docker is an open-source](#) platform used to handle software development. Its main benefit is that it packages the settings and dependencies that the software/application needs to run into a container, which allows for portability and several other advantages. Kubernetes allows for the manual linking and orchestration of several containers, running on multiple hosts that have been created using Docker.

5. What are the main differences between the Docker Swarm and Kubernetes?

Docker Swarm is Docker's native, open-source container orchestration platform that is used to cluster and schedule Docker containers. Swarm differs from Kubernetes in the following ways:

- [Docker Swarm](#) is more convenient to set up but doesn't have a robust cluster, while Kubernetes is more complicated to set up but the benefit of having the assurance of a robust cluster
- Docker Swarm can't do auto-scaling (as can Kubernetes); however, Docker scaling is five times faster than Kubernetes
- Docker Swarm doesn't have a GUI; Kubernetes has a GUI in the form of a dashboard
- Docker Swarm does automatic load balancing of traffic between containers in a cluster, while Kubernetes requires manual intervention for load balancing such traffic
- Docker requires third-party tools like ELK stack for logging and monitoring, while Kubernetes has integrated tools for the same
- Docker Swarm can share storage volumes with any container easily, while Kubernetes can only share storage volumes with containers in the same pod
- Docker can deploy rolling updates but can't deploy automatic rollbacks; Kubernetes can deploy rolling updates as well as automatic rollbacks

6. What is the difference between deploying applications on hosts and containers?

Deploying Applications consist of an architecture that has an operating system. The operating system will have a kernel that holds various libraries installed on the operating system needed for an application.

Whereas container host refers to the system that runs the containerized processes. This kind is isolated from the other applications; therefore, the applications must have the necessary libraries. The binaries are separated from the rest of the system and cannot infringe any other application.

7. What are the features of Kubernetes?

- [Kubernetes](#) places control for the user where the server will host the container. It will control how to launch. So, Kubernetes automates various manual processes.
- Kubernetes manages various clusters at the same time.
- It provides various additional services like management of containers, security, networking, and storage.
- Kubernetes self-monitors the health of nodes and containers.
- With Kubernetes, users can scale resources not only vertically but also horizontally that too easily and quickly.

8. What are the main components of Kubernetes architecture?

There are two primary components of [Kubernetes Architecture](#): the master node and the worker node. Each of these components has individual components in them.

9. Explain the working of the master node in Kubernetes?

The master node dignifies the node that controls and manages the set of worker nodes. This kind resembles a cluster in Kubernetes. The nodes are responsible for the cluster management and the API used to configure and manage the resources within the collection. The master nodes of Kubernetes can run with Kubernetes itself, the asset of dedicated pods.

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10. What is the role of Kube-apiserver?

This kind validates and provides configuration data for the API objects. It includes pods, services, replication controllers. Also, it provides REST operations and also the frontend of the cluster. This frontend cluster state is shared through which all other component interacts.

11. What is a node in Kubernetes?

A node is the smallest fundamental unit of computing hardware. It represents a single machine in a cluster, which could be a physical machine in a data center or a virtual machine from a cloud provider. Each machine can substitute any other machine in a Kubernetes cluster. The master in Kubernetes controls the nodes that have containers.

12. What does the node status contain?

The main components of a node status are Address, Condition, Capacity, and Info.

13. What process runs on Kubernetes Master Node?

The Kube-api server process runs on the master node and serves to scale the deployment of more instances.

14. What is a pod in Kubernetes?

In this Kubernetes interview question, try giving a thorough answer instead of a one-liner. **Pods are high-level structures** that wrap one or more containers. This is because containers are not run directly in Kubernetes. Containers in the same pod share a local network and the same resources, allowing them to easily communicate with other containers in the same pod as if they were on the same machine while at the same time maintaining a degree of isolation.

15. What is the job of the kube-scheduler?

The kube-scheduler assigns nodes to newly created pods.

16. What is a cluster of containers in Kubernetes?

A cluster of containers is a set of machine elements that are nodes. Clusters initiate specific routes so that the containers running on the nodes can communicate with each other. In Kubernetes, the container engine (not the server of the Kubernetes API) provides hosting for the API server.

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17. What is the Google Container Engine?

The Google Container Engine is an open-source management platform tailor-made for [Docker containers](#) and clusters to provide support for the clusters that run in Google public cloud services.

18. What are Daemon sets?

A Daemon set is a set of pods that runs only once on a host. They are used for host layer attributes like a network or for monitoring a network, which you may not need to run on a host more than once.

19. What is 'Heapster' in Kubernetes?

In this Kubernetes interview question, the interviewer would expect a thorough explanation. You can explain what it is and also it has been useful to you (if you have used it in your work so far!). A Heapster is a performance monitoring and metrics collection system for data collected by the Kubelet. This aggregator is natively supported and runs like any other pod within a Kubernetes cluster, which allows it to discover and query usage data from all nodes within the cluster.

20. What is Minikube?

With the help of Minikube, users can run Kubernetes locally. This process lets the user run a single-node

Kubernetes cluster on your personal computer, including Windows, macOS, and Linux PCs. With this, users can try out Kubernetes also for daily development work.

21. What is a Namespace in Kubernetes?

Namespaces are used for dividing cluster resources between multiple users. They are meant for environments where there are many users spread across projects or teams and provide a scope of resources.

22. Name the initial namespaces from which Kubernetes starts?

- Default
- Kube – system
- Kube – public

23. What is the Kubernetes controller manager?

The controller manager is a daemon that is used for embedding core control loops, garbage collection, and Namespace creation. It enables the running of multiple processes on the master node even though they are compiled to run as a single process.

24. What are the types of controller managers?

The primary controller managers that can run on the master node are the endpoints controller, service accounts controller, namespace controller, node controller, token controller, and replication controller.

25. What is etcd?

Kubernetes uses etcd as a distributed key-value store for all of its data, including metadata and configuration data, and allows nodes in Kubernetes clusters to read and write data. Although etcd was purposely built for CoreOS, it also works on a variety of operating systems (e.g., Linux, BSD, and OS X) because it is open-source. Etcd represents the state of a cluster at a specific moment in time and is a canonical hub for state management and cluster coordination of a Kubernetes cluster.

26. What are the different services within Kubernetes?

26. What are the different services within Kubernetes?

Different types of Kubernetes services include:

- Cluster IP service
- Node Port service
- External Name Creation service and
- Load Balancer service

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27. What is ClusterIP?

The ClusterIP is the default Kubernetes service that provides a service inside a cluster (with no external access) that other apps inside your cluster can access.

28. What is NodePort?

The NodePort service is the most fundamental way to get external traffic directly to your service. It opens a specific port on all Nodes and forwards any traffic sent to this port to the service.

29. What is the LoadBalancer in Kubernetes?

The LoadBalancer service is used to expose services to the internet. A Network load balancer, for example, creates a single IP address that forwards all traffic to your service.

30. What is the Ingress network, and how does it work?

An ingress is an object that allows users to access your Kubernetes services from outside the Kubernetes cluster. Users can configure the access by creating rules that define which inbound connections reach which services.

How does it work- This is an API object that provides the routing rules to manage the external users' access to the services in the Kubernetes cluster through HTTPS/ HTTP. With this, users can easily set up the rules for routing traffic without creating a bunch of load balancers or exposing each service to the nodes.

31. What do you understand by Cloud controller manager?

You must have heard about Public, Private and [hybrid clouds](#). With the help of cloud infrastructure technologies, you can run Kubernetes on them. In the context of Cloud Controller Manager, it is the control panel component that embeds the cloud-specific control logic. This process lets you link the cluster into the cloud provider's API and separates the elements that interact with the cloud platform from components that only interact with your cluster.

This also enables the cloud providers to release the features at a different pace compared to the main Kubernetes project. It is structured using a plugin mechanism and allows various cloud providers to integrate their platforms with Kubernetes.

32. What is Container resource monitoring?

This refers to the activity that collects the metrics and tracks the health of containerized applications and microservices environments. It helps to improve health and performance and also makes sure that they operate smoothly.

33. What is the difference between a replica set and a replication controller?

A replication controller is referred to as RC in short. It is a wrapper on a pod. This provides additional functionality to the pods, which offers replicas.

It monitors the pods and automatically restarts them if they fail. If the node fails, this controller will respawn all the pods of that node on another node. If the pods die, they won't be spawned again unless wrapped around a replica set.

Replica Set, on the other hand, is referred to as rs in short. It is told as the next-generation

replication controller. This kind of support has some selector types and supports the equality-based and the set-based selectors.

It allows filtering by label values and keys. To match the object, they have to satisfy all the specified label constraints.

34. What is a headless service?

A headless service is used to interface with service discovery mechanisms without being tied to a ClusterIP, therefore allowing you to directly reach pods without having to access them through a proxy. It is useful when neither load balancing nor a single Service IP is required.

35. What are federated clusters?

The aggregation of multiple clusters that treat them as a single logical cluster refers to cluster federation. In this, multiple clusters may be managed as a single cluster. They stay with the assistance of federated groups. Also, users can create various clusters within the data center or cloud and use the federation to control or manage them in one place.

You can perform cluster federation by doing the following:

Cross cluster that provides the ability to have DNS and Load Balancer with backend from the participating clusters.

Users can sync resources across different clusters in order to deploy the same deployment set across the various clusters.

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36. What is Kubelet?

The kubelet is a service agent that controls and maintains a set of pods by watching for pod specs through the Kubernetes API server. It preserves the pod lifecycle by ensuring that a given set of containers are all running as they should. The kubelet runs on each node and enables the communication between the master and slave nodes.

37. What is Kubectl?

Kubectl is a CLI (command-line interface) that is used to run commands against Kubernetes clusters. As such, it controls the Kubernetes cluster manager through different create and manage commands on the Kubernetes component

38. Give examples of recommended security measures for Kubernetes.

Examples of standard Kubernetes security measures include defining resource quotas, support for auditing, restriction of etcd access, regular security updates to the environment, network segmentation, definition of strict resource policies, continuous scanning for security vulnerabilities, and using images from authorized repositories.

39. What is Kube-proxy?

Kube-proxy is an implementation of a load balancer and network proxy used to support service abstraction with other networking operations. Kube-proxy is responsible for directing traffic to the right container based on IP and the port number of incoming requests.

40. How can you get a static IP for a Kubernetes load balancer?

A static IP for the Kubernetes load balancer can be achieved by changing DNS records since the Kubernetes Master can assign a new static IP address.

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Having a good [understanding of DevOps](#) and on-premises [software development](#) can be quite useful in helping you gain a holistic view of the subject matter. Ultimately, taking the [Post Graduate Program in DevOps](#) course and taking your time to study and understand what you've learned while preferably putting it into practice is the best way to prepare for an Kubernetes interview, and the Kubernetes interview questions that you've learned here are the icing on the cake. The more familiar you are with these types of Kubernetes interview questions, the better able you will be to show off your skills and Kuberenetes knowledge.

In addition to these Kubernetes interview questions, there are many other helpful [DevOps interview questions](#) that deserve to be looked at.

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