Are You Really a Kubernetes Expert? Take This 10-Question Challenge to Find Out

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🧠 Introduction

Kubernetes has become the backbone of modern cloud-native applications. But let's face it — just deploying a few Pods and Services doesn't make someone a Kubernetes expert.

Whether you're a developer, DevOps engineer, SRE, or architect, mastering Kubernetes means understanding its deeper workings — from container orchestration and scaling to networking, probes, and

troubleshooting.

So here's a quick challenge:

> Can you answer 10 questions that test your real-world Kubernetes knowledge?

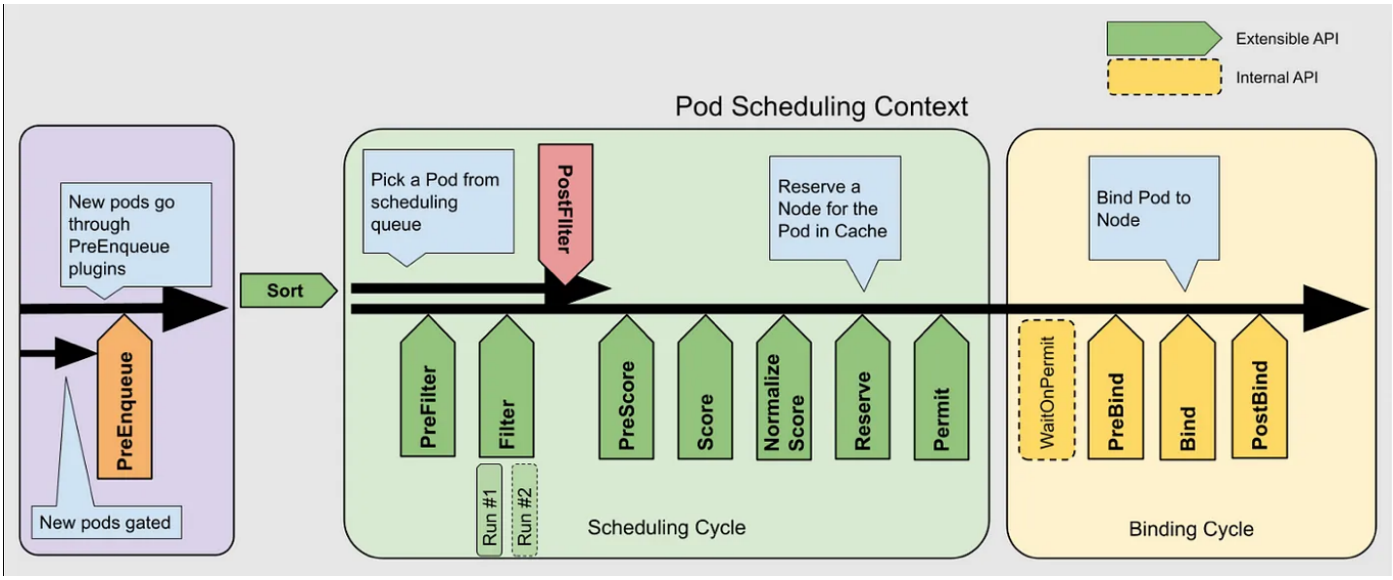
This isn't your average multiple-choice quiz — it's a **hands-on knowledge check** designed to separate casual users from true pros.

Let's see how much you really know about Kubernetes.
👇 Scroll down and start the quiz!

1. In a cluster with two nodes, one with pods and the other without, which node will a new pod be scheduled to?

🧠 Situation:

- You have **two shelves** (nodes).
- **Shelf A** already has some boxes (pods).
- **Shelf B** is completely **empty**.
- A **new box** (pod) comes in.
- Now, you ask: **Which shelf will it go to?**


Extensible API
Internal API
Pod Scheduling Context
New pods go through PreEnqueue plugins
PreEnqueue
New pods gated
Sort
Pick a Pod from scheduling queue
PostFilter
Reserve a Node for the Pod in Cache
Bind Pod to Node
PreFilter
Filter
Run #1
Run #2
PreScore
Score
Normalize Score
Reserve
Permit
WaitOnPermit
PreBind
Bind
PostBind
Scheduling Cycle
Binding Cycle

📦 How Kubernetes Thinks:

Kubernetes acts like a **smart organizer**. When a new box (pod) needs to be placed:

1. It checks **both shelves**.
2. It looks at **available space**, **resources (CPU/memory)**, and a few other conditions.
3. If **Shelf B is empty** and has **more free space**, Kubernetes will **usually choose the empty shelf**.

Why?

Because it tries to:

- **Balance the load** across shelves.
- Use resources **efficiently**.
- Avoid putting too much on one shelf while the other one is empty.

✅ So, in simple words:

> If you have two computers (nodes), and one already has apps (pods) running while the other is doing nothing, Kubernetes will typically put the next app (pod) on the **empty one** — to keep things balanced.

🛠️ Caveat:

This assumes both nodes are **healthy**, **ready**, and **have enough resources**. If the empty node is not working or doesn't meet the pod's needs, Kubernetes **won't use it**, even if it's empty.

2. If an application running in a container encounters an OOM (Out-of-Memory) error, will the container restart, or will the entire Pod be recreated?

🧠 Situation:

- You're running an **application** inside a **container**, and it's part of a **Pod** in Kubernetes.
- The app uses **more memory than allowed**, and hits an **OOM (Out-of-Memory) error**.

🚨 What happens next?

🔄 Will the container restart?

✅ **Yes** — Kubernetes will **restart the container** inside the pod.

🏗️ Will the whole Pod be recreated?

❌ **No**, the **Pod is not recreated** (unless there's some other issue).

🔧 Why is that?

Think of a Pod like a **house**, and a container like an **appliance inside it (like a microwave)**.

- If the **microwave blows a fuse** (OOM error), you **replace or restart the microwave**, but you don't **rebuild the entire house**.
- Similarly, Kubernetes will **restart the container** that failed, **not the whole pod**, unless something more serious happens.

✅ In short:

> If a container hits an OOM error, **only that container restarts, not the whole pod**. The pod remains the same — Kubernetes just gives the container another shot.

3. Can application configurations such as environment variables or ConfigMap updates be applied dynamically without recreating the Pod?

🔴 For Environment Variables:

❌ **No**, you **cannot change environment variables dynamically** for a running pod.

- When you define environment variables in a pod spec, they get **injected only at pod startup**.
- To apply changes, you need to **recreate the Pod** (either manually or through a deployment rollout).

➡️ Think of it like baking a cake with some ingredients (env vars). Once baked, you can't change the sugar level — you need to bake a new cake.

🟡 For ConfigMaps:

It depends on **how your application consumes them:**

✅ Mounted as Volumes (Recommended Way):

- If your ConfigMap is mounted as a **volume**, and you **update the ConfigMap**, the **file contents in the Pod can update** automatically **(usually within a few seconds)**.
- BUT: the **application must re-read the file** to reflect the changes.

✅ **Pod restart not needed, if your app watches the file.**

❌ Used as Environment Variables:

- If you use ConfigMap values as **env vars**, they behave **just like normal env vars.**
- So: ❌ You **must recreate the Pod** to see the changes.

4. Is a Pod stable once created, even if the user takes no further action?

🟡 The honest answer:

"It depends."
A Pod is **not guaranteed to be permanently stable** just because it's created. Here's why:

✅ When is a Pod stable?

A Pod is *stable* **only as long as:**

- The **node it's running on stays healthy**

- The **container inside doesn't crash**
- There are **no external forces** (like eviction or scaling events)
- It's not affected by **resource pressure** (memory, CPU, disk)

🧠 TL;DR:

> A pod **can run stably** for a while if nothing goes wrong, but it is **not inherently stable or self-healing.**
> Use controllers (like Deployments) to ensure **long-term stability and auto-recovery.**

5. Can a Service of type ClusterIP ensure load balancing for TCP traffic?

🔷 What is a ClusterIP Service?

- It's the **default type** of Service in Kubernetes.
- It exposes a group of pods **internally** (within the cluster).
- Other services or pods inside the cluster can **access it via a stable virtual IP.**

🔄 Does it Load Balance?

✅ **Yes**, it **automatically load balances** traffic across all healthy pod endpoints **behind the service.**

This applies to:

- ✅ TCP traffic

- ✅ **UDP traffic**
- ✅ **HTTP/HTTPS traffic** (since they're built on TCP)

⚙️ How it works (TCP context):

1. You create a `Service` with `ClusterIP` type and point it to a `selector`.
2. Kubernetes keeps track of all the **pods matching the selector**.
3. When a pod inside the cluster sends a **TCP request to the service IP**, Kubernetes (via **kube-proxy**) uses **round-robin** or similar strategy to **load balance** that TCP connection to one of the backend pods.

🧠 TL;DR:

> Yes, a `ClusterIP` service **does load balancing** for **TCP traffic**, across all matching pods inside the cluster. It's automatic, internal, and built-in.

6. How should application logs be collected, and is there a risk of losing logs?

📤 1. Standard Practice: Write logs to stdout/stderr

- Your app should **not write to files inside the container** (like `/var/log/app.log`).
- Instead, it should log to **standard output (stdout)** and **standard error (stderr)**.
- This is because Kubernetes captures these logs **automatically** via the container runtime.

🧠 TL;DR:

> ✔️ **Log to stdout/stderr,**
> ❌ **Don't rely on local logs inside the container,**
> 🛡️ **Use centralized log collection tools** (like Fluent Bit, Loki, etc.) to ensure logs are saved and searchable even if pods crash or nodes go down.

7. If an HTTP Server Pod's `livenessProbe` is functioning correctly, does it mean the application is problem-free?

🔍 **No**, a passing `livenessProbe` does **not necessarily mean** the application is **problem-free**.

Let's explain that clearly:

✅ What a `livenessProbe` actually checks:

- It **only checks if the container is alive** — i.e., it's not stuck, crashed, or frozen.
- If the liveness check passes, **Kubernetes assumes the app is still running** — but it doesn't mean everything is working perfectly.

📍 Real-world example:

Imagine your app has an HTTP endpoint `/healthz` used by `livenessProbe`.

- The endpoint simply returns 200 OK if the server is running.

- BUT… your app's real business logic (like DB queries or user APIs) might be:
- Returning 500 errors
- Failing to connect to the database
- Timing out due to internal issues

> Kubernetes **won't know any of that** unless your liveness probe is smart enough to check those too — which it usually isn't (and shouldn't).

✅ Best Practice:

- Use **livenessProbe** to check:
  👉 *Is the process running and not stuck?*
- Use **readinessProbe** to check:
  👉 *Can the app serve traffic right now?*
- Use **external monitoring** or application-level health checks to track **real issues**.

🧠 TL;DR:

> ✅ A working `livenessProbe` just means the container is **alive**.
> ❌ It does **not** mean the application is problem-free, healthy, or ready to serve real user requests.

8. How can an application scale to handle traffic fluctuations?

✅ The answer: Auto-scaling mechanisms

In Kubernetes, the most common and effective way to scale applications is by using:

🔷 1. Horizontal Pod Autoscaler (HPA)

> Automatically **adds or removes pods** based on resource usage like **CPU**, **memory**, or **custom metrics**.

🛠️ How it works:

- If traffic increases ➡️ CPU goes up ➡️ HPA adds more pods.
- If traffic decreases ➡️ CPU drops ➡️ HPA reduces pods.

🔷 2. Cluster Autoscaler

> Dynamically **adds/removes nodes** in the cluster based on pod demands.

- If there aren't enough nodes to run new pods, Kubernetes will request the cloud provider to **add nodes**.
- When nodes are underused, they can be **terminated** to save cost.

🧠 Used together with HPA = full-stack scaling.

🔷 3. Vertical Pod Autoscaler (VPA)

> Adjusts **CPU and memory requests/limits** of pods.

- Less common in high-fluctuation traffic cases.
- More useful for optimizing stable workloads (e.g., batch jobs, cron jobs).

🔷 4. Custom Metrics Autoscaler

> You can also scale based on **application-specific metrics** like:

- Request rate (RPS)
- Queue length
- Latency
- Business metrics (e.g., number of active users)

This uses the **Kubernetes Metrics Server** or **Prometheus Adapter**.

9. When you execute `kubectl exec -it <pod> -- bash`, are you logging into the pod?

✅ **Yes**, when you run:

```
bash
```

```
CopyEdit
```

```
kubectl exec -it <pod> -- bash
```

You are essentially **"logging into" the pod's container**, but let's explain **what that really means.**

✅ So are you logging in?

✔️ **Yes — in practical terms:**
You're getting a **shell inside the container** running in the pod — so it **feels like you're logged in**, similar to SSH.

❌ **But technically:**
You're **not logging into the pod itself**, you're running a command (`bash`) **inside one container of the pod.** You're not touching the pod object; you're entering **one of its containers.**

10. How would you troubleshoot if a container in a Pod repeatedly exits and restarts?

🧠 TL;DR Troubleshooting Flow:

1. 🔍 `kubectl get pods` → Check status and restarts
2. 📝 `kubectl describe pod` → Look for exit codes, events
3. 📜 `kubectl logs --previous` → Analyze crash logs
4. ⚙️ Check config, env, entrypoint, resources
5. 🧪 Use `kubectl exec` if possible
6. 🛠️ Fix, redeploy, and monitor

🏁 Conclusion

So, how did you do?

If you aced the quiz — congratulations! You've likely spent some serious time in the trenches with Kubernetes. If you stumbled on a few questions, that's okay too — Kubernetes is vast, and there's always more to learn.

Whether you're preparing for a certification, a job interview, or just leveling up your cloud-native skills, the key is **continuous learning and hands-on practice.**

✅ Stay curious.
✅ Keep exploring.
✅ And remember: even the best engineers are always learning.

If you found this quiz helpful, share it with your network and challenge your colleagues too — let's see who the real Kubernetes experts are! 🚀

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Written by Dheeman Das

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Rox

What are your thoughts?

Sergey
13 hours ago

It's not the questions for expert.

3 Reply

Steve Atkinson
2 days ago

What a great set of questions! I think the correct answer to 9 should be no... you are not execing to the pod - this is covered in the explanation but if I asked that question of a candidate I would expect them to say no. I'm giving myself 9.5 out of 10 because of that!

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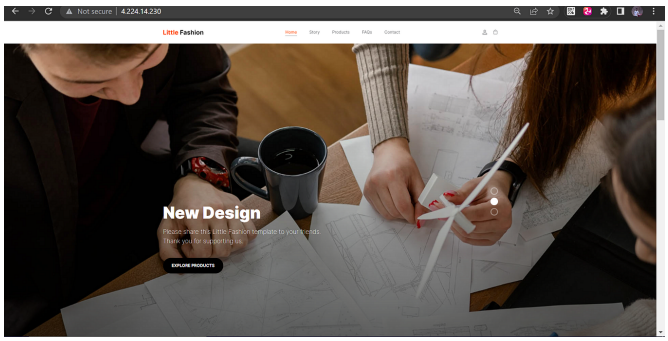

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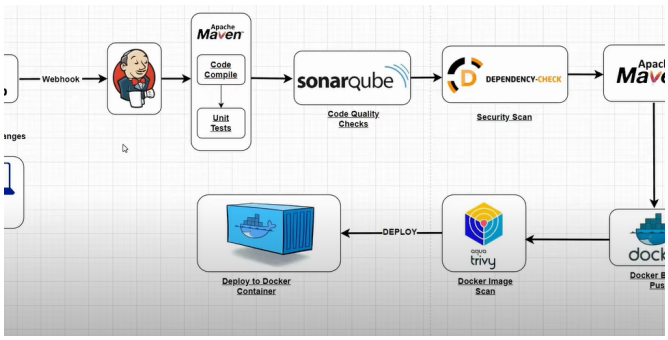

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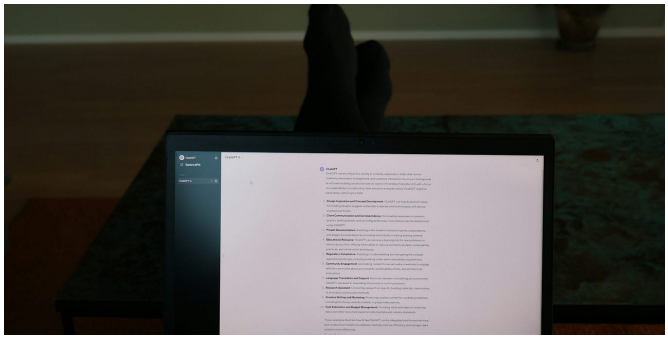

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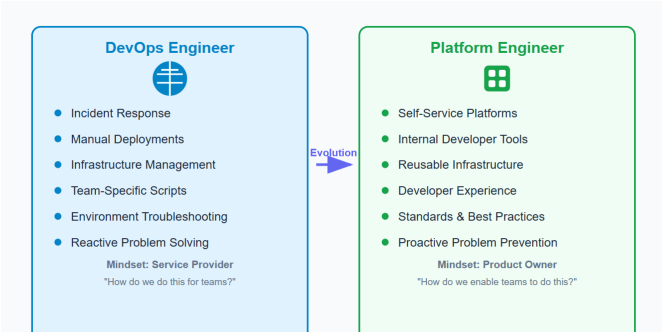

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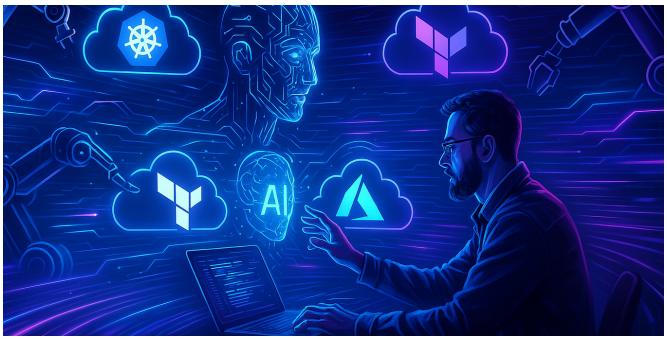

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