**❓ 3. What are Multiple Schedulers in Kubernetes?**

**🧠 Simple Definition:**

By default, Kubernetes comes with **one scheduler** — it’s like the **traffic manager** that decides **which pod should go to which node**.

But here’s the cool part: **you can have more than one scheduler** running in your cluster. This is called using **multiple schedulers**.

Each scheduler can have **different rules** or preferences for choosing nodes.

**🎯 Use Cases**

**📌 1. Special Preferences for Certain Pods**

You may want:

* Some pods to run only on **GPU nodes** for AI/ML tasks.
* Some pods to go on **low-cost nodes** for testing.
* Some pods to follow **custom business rules** — like placing a pod only on nodes with specific labels.

You can create a **custom scheduler** that understands these special rules.

**📌 2. Resource Optimization**

Let’s say:

* The default scheduler is overloaded and taking too long to place pods.
* You want to separate **critical workloads** (like customer-facing apps) from **low-priority jobs** (like data crunching).

➡️ You can run **two schedulers**:

* One for high-priority jobs
* One for background jobs

This avoids resource conflicts and improves cluster efficiency.

**⚙️ How It Works (in simple steps)**

1. You write a pod YAML and **tell it which scheduler to use** like this:

spec:

schedulerName: my-custom-scheduler

1. Your custom scheduler reads the pod and applies its own logic to choose the best node.
2. Kubernetes lets **only that scheduler** handle the pod — no interference.

So, each scheduler handles **only the pods assigned to it**.

**🧠 Combining Multiple Schedulers**

You can run:

* ✅ Kubernetes default scheduler (kube-scheduler)
* ✅ One or more **custom schedulers** you build (using Go, Python, or existing open-source ones)

Each one listens for specific pods and makes placement decisions based on their own logic.

Think of it like:

* **One school counselor for science students**
* **One counselor for arts students**
* Each student (pod) is assigned to the right counselor (scheduler) based on their interest (schedulerName)

**✅ Advantages of Using Multiple Schedulers**

| **Feature** | **Benefit** |
| --- | --- |
| 🎯 Customized Pod Placement | You can apply **your own rules** to decide where a pod should run. |
| 🧠 Specialized Scheduling | Different schedulers can be made for different apps (AI, batch jobs, frontend apps, etc.) |
| 📊 Better Resource Management | Helps avoid overloading nodes and improves performance. |
| 🚀 Faster Scheduling | Distributes scheduling work between multiple schedulers — less delay. |
| 🔐 Safer Clustering | High-priority and low-priority workloads stay isolated. |

**🧒 Kid-Level Analogy:**

"Imagine a school has 3 sports coaches: one for basketball, one for football, and one for swimming. Each student picks their coach. Each coach knows how to train their students best — **that’s like having multiple schedulers in Kubernetes!**"