



## Explain Kubernetes Architecture

The Data Plane is where actual application workloads run, while the **Control Plane manages and orchestrates them**.

- The **Control Plane** makes scheduling and management decisions.
- The **Data Plane** (worker nodes) executes those decisions by running the actual workloads.
- **Networking and storage** in the Data Plane enable communication between services and persistent data storage.

### Core Components

- **Control Plane:** Manages cluster operations and scheduling.
  - **kube-apiserver:** Exposes the Kubernetes API.
  - **etcd:** Stores cluster state.
  - **kube-scheduler:** Assigns Pods to nodes.
  - **kube-controller-manager:** Runs controllers for nodes, jobs, services, etc. Watches over the cluster, ensures desired state
  - **cloud-controller-manager:** Manages cloud provider-specific integrations.

### Key Components of the Data Plane

The data plane consists of the components that run the actual workloads (applications, services, and networking) in a Kubernetes cluster. It primarily includes worker nodes and their components.

1. **Worker Nodes:** Machines where applications run.
2. **Pods:** The smallest deployable unit containing containers.
3. **kubelet:** Ensures that containers are running in a Pod.
4. **Container Runtime:** Runs the containers (e.g., docker, containerd, CRI-O).
5. **kube-proxy** (optional): Manages network traffic between Pods and services.

**1. What is the primary role of the Control Plane in Kubernetes?**

- A) Running containerized applications
- B) Scheduling and managing workloads
- C) Storing persistent data
- D) Managing network traffic

**Answer:** B) Scheduling and managing workloads

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**2. Which component of the Control Plane is responsible for exposing the Kubernetes API?**

- A) kube-scheduler
- B) etcd
- C) kube-apiserver
- D) kube-controller-manager

**Answer:** C) kube-apiserver

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**3. What is the function of etcd in a Kubernetes cluster?**

- A) Assigns Pods to nodes
- B) Stores cluster state and configuration
- C) Manages networking between Pods
- D) Ensures containers are running

**Answer:** B) Stores cluster state and configuration

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**4. Which component is responsible for assigning Pods to worker nodes?**

- A) kubelet
- B) kube-proxy
- C) kube-scheduler
- D) cloud-controller-manager

**Answer:** C) kube-scheduler