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Topic- KUBERNETES



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OVERVIEW

- **What is Kubernetes?**
- **Why Kubernetes?**
- **Kubernetes Components**
- **The Kubernetes API**
- **Kubernetes Objects**
- **Pods**

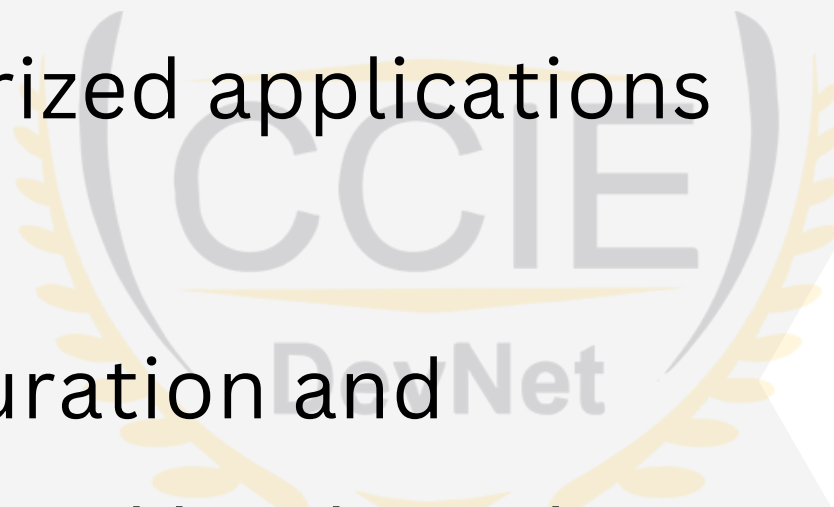
What is Kubernetes?

- An open source container orchestration engine
- Used for automating the deployment, scaling and management of containerized applications
- It is portable and extensible
- Facilitates declarative configuration and automation of containerized workloads and services
- Has a large, rapidly growing ecosystem of services, support and tools



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Why Kubernetes?

- In traditional deployment, multiple applications were deployed on a single large server.
- There was no way to define resource boundaries between applications.
- Any application hogging up server resources used to slow down other applications.
- Deploying each application in its own physical server was not cost effective and practical.
- This led to the advent of virtualization.



Why Kubernetes? (cont.)

- In virtualization, many virtual machines (VMs) run on a single physical server.
- Virtualization allowed applications to be isolated between VMs.
- It also allowed better utilization of resources and better scalability.
- A set of physical resources can now be converted into a cluster of disposable VMs.
- Each VM is a full machine running all the components including its own OS.
- So there is still scope for optimization which led to the era of containerization.



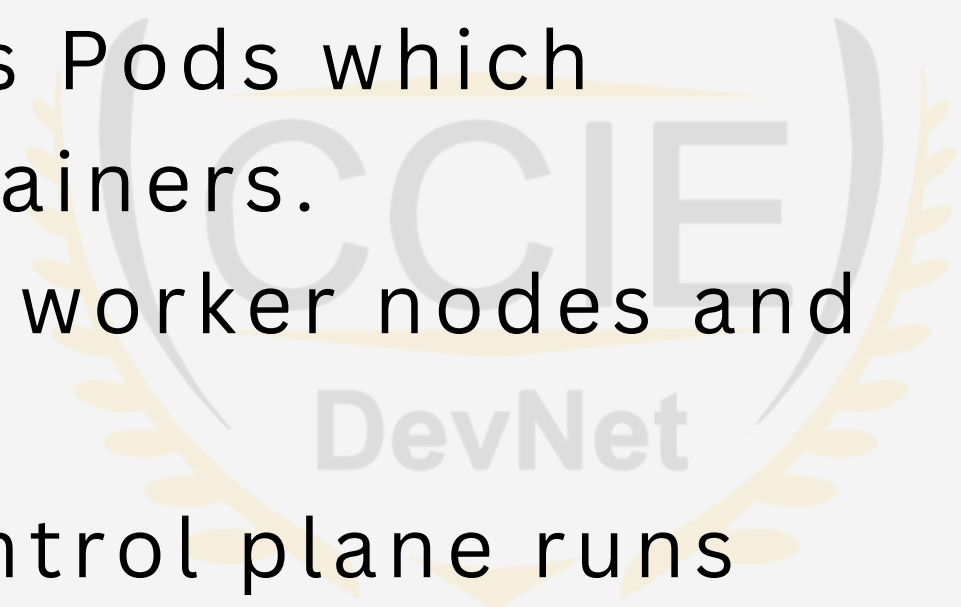
Why Kubernetes? (cont.)

- Containers are similar to VMs but with relaxed isolation properties
- Containers can share OS of the physical machine
- Hence they are lightweight with its own file system and a share of CPU, memory and process space
- They are decoupled from the underlying architecture, hence portable across clouds and OS distributions



Kubernetes Components.

- A Kubernetes cluster consists of a control plane and a set of worker nodes.
- Each worker node hosts Pods which represent running containers.
- Control plane manages worker nodes and pods.
- In production envs, control plane runs across multiple computers and the cluster spans multiple worker nodes.
- This provides fault-tolerance and high availability.



Kubernetes Components. (cont.)

Control Plane consists of

- kube-api server - which is the front end of the control plane
- etcd - a high available backing store for all the cluster data
- kube-scheduler - watches for newly created pods and assigns them to nodes to run on
- kube-controller-manager - runs control processes for nodes jobs, endpoints etc.
- cloud-controller-manager - embeds cloud specific control logic by managing the cloud specific dependencies for node controller, route controller and service controller.



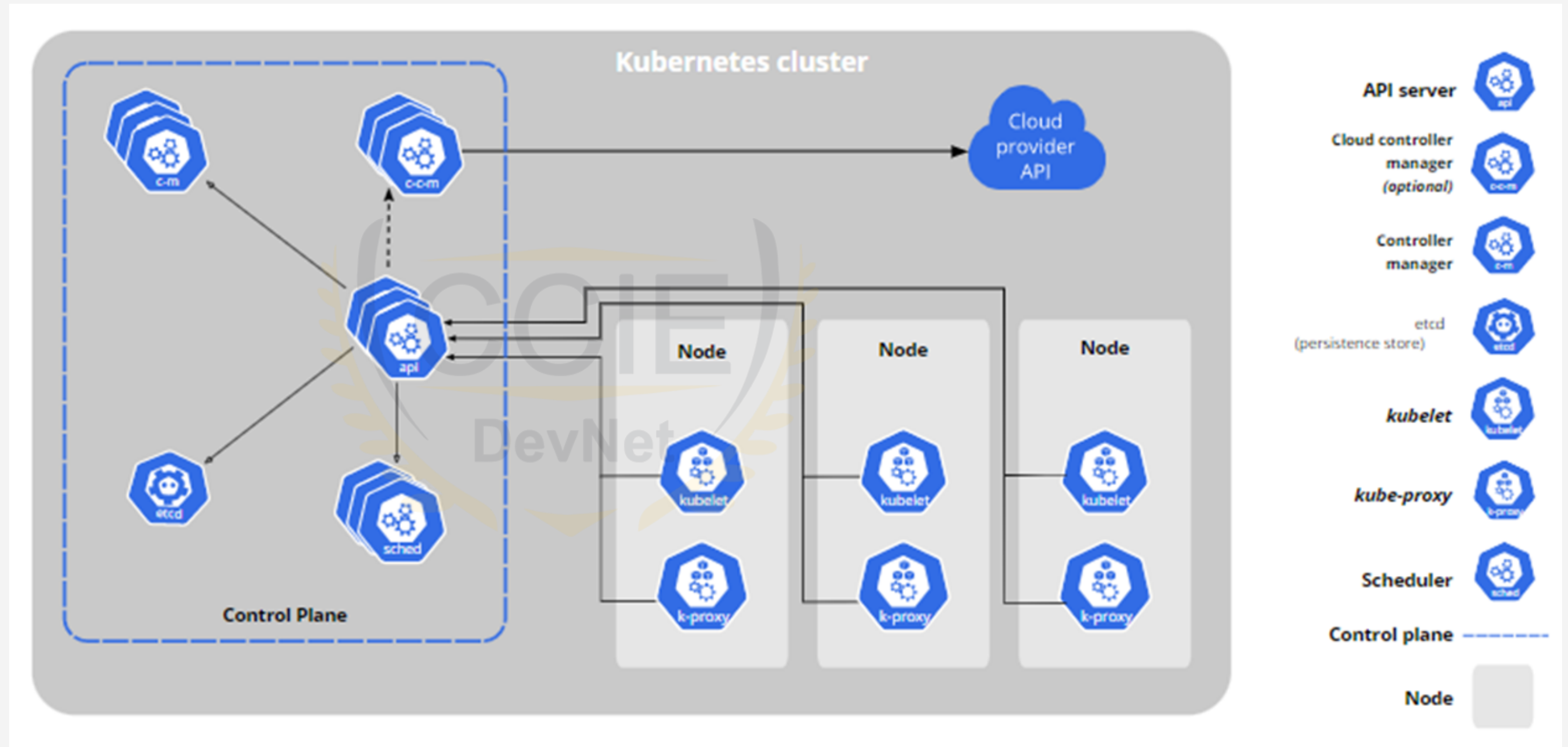
Kubernetes Components. (cont.)

Node Components

- kubelet - an agent that runs on each node in the cluster to ensure that the containers in the pod are running
- kube-proxy - a network proxy that runs on each node in the cluster and maintains network rules on nodes
- Container runtime - A software that is responsible for running the containers.



Kubernetes Components.





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DEMO.