Devops - Assignment - 07

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Class: MSc. C.S. B-21

1. Explain kubernetes architecture in your own words.

Kubernetes is an open-source container orchestration platform that helps in automating deployment, scaling, and management of containerized applications. The architecture of Kubernetes is designed in a way that it is highly scalable, fault-tolerant, and extensible.

The core components of the Kubernetes architecture are:

- Master Nodes: It is responsible for managing the Kubernetes cluster and consists of components like API server, etcd, controller manager, and scheduler.
  - API Server: It receives and processes requests from clients, such as kubectl or other Kubernetes components, and then communicates with other components to execute those requests.
  - etcd: This is a distributed key-value store that is used to store all the configuration data and state of the Kubernetes cluster.
  - Controller Manager: This component is responsible for maintaining the desired state of the cluster by monitoring changes to the cluster's state and making appropriate updates. It includes several sub-controllers that manage specific aspects of the cluster's state, such as replication, endpoints, and services.
  - Scheduler: This component is responsible for scheduling pods onto worker nodes based on resource availability, placement constraints, and other policies.
- Worker Nodes: The worker node is responsible for running the application containers. Each worker node consists of a container runtime, kubelet, and kube-proxy.
  - Kubelet: This component runs on each worker node and is responsible for managing the lifecycle of pods and containers on that node. It communicates with the API server to receive instructions on what pods and containers should be running, and then ensures that they are started, stopped, or restarted as needed.
  - Kube-proxy: This component is responsible for managing network connectivity between pods and services within the cluster. It creates and manages virtual IP addresses for services, and routes traffic between pods and services as needed.
- Pods: A pod is the smallest unit in the Kubernetes architecture. It is a logical host for one or more containers. Containers in the same pod share the same network namespace and can communicate with each other using localhost.
- Services: A service provides a stable IP address and DNS name to a set of pods. It helps in load balancing traffic to the pods.
- StatefulSet: Manages deployment and scaling of a set of Pods with durable storage and presistent identifiers for each pod.
- DaemonSet: Ensures that all nodes run a copy of a Pod.

2. Use the Play with kubernetes and create pod of any image with your roll number. Upload the screenshot of “kubectl get pod” command in the pdf