K8's interview Preparation

Questions

1. Explain K8S Architecture? Explain Each Components of K8S Master & Worker Node Components?
   - The architecture of the k8's deals with the master node, worker node
   - The master node controls the worker nodes and the worker nodes control all the container application in it

   Master node:

   - Master node is like an responsible part of the process to manage the whole cluster and make the process go well
   - The 4 key parts of the master nodes are the API server, key value store, Control manager and the scheduler
   - API server uses kubctl to take the user request and passes them to the other components present in the Master node
   - Controller manager usually takes care of the node present in the master node
   - Scheduler is the component that decides which of the node must be working as the new node because they take this action based on the availability of the resources
   - Key value store is the place where all the cluster information is stored in the database

   Worker node:

   - The components present in the worker nodes are the kubelet, container runtime and the kube proxy
   - Kubelet is the part of the worker node that takes the instructions from the master node and manages the pods present
   - Container runtime basically docker is used to run pods inside it
   - Kube-proxy they manage the network connected and the security inside the pods and outside the cluster
   - Pods are an small unit of deployments present in k8's

   Networking:

   - ClusterIP – allows communication between Pods inside the cluster
   - NodePort – they are used for exposing application in each node
   - LoadBalancer – they are used to balancer traffic in the multiple nodes

2. Diff btw Control Plane & Data Plane?
    - Control plane and the data plane are basically used as decision maker and the action maker in k8's
    - Control plane – control plane is basically a part of the master node where they help in taking important decisions to process the purpose in the clusters, Components of the control plane are API server, Scheduler, Controller manager, Key store manager
    - Data plane – is also know as the place where the action Is taken they are basically based on the process happening after the master node , data plane always get help the worker node to take the process from the master node and process it .

3. What is NameSpace in K8s and types of Namespace?
    - Namespace is like an virtual server in the physical server where they are helping in managing components of the pods , services and deployment in the cluster
    - Name space types are: default,kube-system,kube-public
    - Default – they are the place where the resources are created without the namespace they are created in the default
    - Kube-system – they are used to store the system level component like kube-proxy , controller manager
    - Kube-public – they are used to store the public resources

4. Types of Services in k8s?
    - Services in the k8's are mostly used to expose the pods to the stable networks communication
    - ClusterIP – the clusterIP are used to provide the cluster with the stable internet connection to the cluster , they are used to only provide the network inside the cluster they are used in the pods to make the services to communicate with each other (like services to communicate with each other)
    - NodePort – they are used to expose the node application, they are used to expose the application in each nodes
    - LoadBalancer – they are used to distribute traffic between the multiple nodes and also distribute the external traffic between the multiple nodes
    - ExternalName – they are used to give out an external name for the k8's in the service

5. What is POD?
    - Pod is an unit of the K8's which is used for the deployment of an application and they are maintained in the cluster where these clusters are having nodes where the pods are created

6. What is Deployment?
    - The deployment is the process where they help to manage and automates the lifecycle for the process with the help of pods
    - They help in the process to create the application to be running equally

7. Diff btw POD vs Deployment?
    - Pods: The smallest unit in k8's that are usually processed in the containers, the pods are basically run single on instance on an application, Pods are usually are basically scaled up manually, Pods are basically based on rolling update and they do not ensure rollback
    - Deployment: Deployment are used to manage multiple pods at once, they always ensure high availability and they are ensure high scaled automatic, the deployment always ensure high availability so when the pods fails replace when the pods are replaces, they ensure smooth rollbacks and updates

8. Diff btw ConfigMap & Secrets?
    - Both config and secrets are used to store the data and information needed
    - Configmap – they are always used to store non-sensitive information , they are like key values and basic plain text that are used to store data , they are mostly used to store data such as the environmental variables, Website URL etc , they can be accessed by any pod with permission to use it , they are usually used by mounting them on an volume of the pod
    - Secrets – they are used to store sensitive type data, they have encoded values so they are mostly having security to protect them, they are mostly used to store passwords API tokens etc, they have an additional part to give access to it, they are also the same mounted on an volume

9. Diff btw NodePort & ClusterIP?
- Nodeport – is used to make the applications in the pods or clusters to be exposed to internet
- ClusterIP – they are used to provide an stable internet connection to the cluster and the pods inside so the microservices present can be communicating with each other

10. Diff btw Stateful set & Deployment?
    - Statefull set is used to manage statefull applications
    - Deployments are used to manage stateless applications
    - Statefull set – they are used to manage statefull application where they need stable internet connection , storage and automatic scaling , the pod identity here are having different names to know them easily , they have PVC presistant

volume claims that is used for storage purposes, the scaling of pods are happening in an ordered manner, here when an pod crashes they create an same pod with the same name as that of the crashed pod

- Deployment – they are used to run stateless applications where they are identical to each other and they are running easily, the pods are always having different names for easy identification, the pod scaling are always happening in an order , when an pod crashes an new pod with different name is created

11. Diff btw loadbalancer and ingress?
    - Load balancer is used to divert and maintain network traffic at the time of high traffic , load balancer can only be used works on 4 layers(tcp/udp) . they are used to expose database and etc
    - Ingress is used for the same purpose but they can be used for multiple service at once , they work on 6 layers(http/https) . They are used to expose multiple services under an same domain

12. Diff btw PV & PVC?

- Persistent volume and persistent volume claim the both deals with the storage category of the k8's
- Persistent volumes - they are like the actual storage that are been created , they are mainly created by the host or the admin and they just wait till the pvc claims them
- Persistent volume claims – they are ones who request the pv to get the requested amount of storage to allocate for the application, they are mostly made by the application to maintain storage

13. Diff btw replicaset vs deployment?
    - Replica set and deployment are used to maintain the replicas of the pods that are present in the cluster
    - But additionally the deployment works on the versioning of the pods and also allocates them with rollback features
    - REPLICASET – they are used to handle an specified number of pods and ensure they are running , they do not support scaling because they work oon an fixed scaled pod numbers, do not support rolling or rollback updates , selectors used or equality based and set based
    - DEPLOYMENT – they help in managing unlimited number of pods, they automatically scale the number of pods present, they help in rollback and rolling updates

14. Diff btw replica set and a replication controller?
    - Replicaset and replication controller are used to manage and secure the specified number of pods are running safely at all times
    - Replicaset is just an advance version with higher features
    - REPLICATION CONTROLLER – they are used to ensure that the specified number of pods are running at all times, they have selector matching but only selects equality-based selector

15. Diff btw Replicaset vs Daemonset?
    - They both are used to manage pods in k8's
    - Daemonset – they only ensure one pod to one node, they ensure that always one node must only run one pod, they automatically scale with the number of nodes present, they are mostly allocating node specific services such as logging, networking etc
    - Replicaset – they only ensure fixed number of pods present, autoscaling cannot happen because they only allocate fixed number of pods, they are majorly used to run stateless application

16. What is Scheduler in k8s and how it works?
    - Scheduler is the part of the control plane or the master node where they help in assigning pods to the nodes or the cluster correctly to manage workloads and they ensure they are distributed successfully

17. How control manager will work?
    - Control manager is used to manage and ensure that pods of the cluster are working properly and safely and they always monitor the cluster and ensure there is no faults happening in the process
    - Control manager is an part of the control plane or the master node
    - They watch for changes, ensures all the pods are running correctly or some crashed
    - Types of controller present are:
        - Node controller – detects failed node and processed node
        - Replication controller – ensure the desired number of pods are running
        - Deployment controller – they help in managing rollbacks and rolling updates

18. What is k8s job?
    - K8's jobs help the pods to run to completion
    - Single job – they are used to run job until the jobs complete

- Parallel job – run multiple pods in the parallel, they wait till the works are completed to each other

19. Diff btw job & pod?
    - Jobs are used to run task until the process takes to completion and they ensure they take the task to the pods and ensure they are completed and they ensure the pods are safe and not failed, they have the process of parallel execution
    - Pod unit of execution that can run on any part and they can also run-on deployment, they are defined restart of the pods so they always ensure them

20. Diff btw job & Deployment?
    - Job is ensuring the task runs to completion in the pods, they can be run once or multiple times, ensure to create pods and ensure the completion, ensure to take care of fault tolerance
    - Deployment is used to make long term application, they are used to make application to run continuously, they ensure pods safety

21. What is Side car container and how it works in k8s?
    - Side car containers are those where there is an second container that is being runned parallel to the primary container to increase the performance of the primary container
    - They are used for logging monitoring and security purposes and are not indulged into the primary application deployment phase

22. What is init car container and how it works in k8s?
    - Init container also known as an initialisation container which is stated before the main container that is used to check the environment is safe for the main application to be hosted

23. What are probes in k8s?
    - Probes are used for the purpose of monitoring the pods and the containers present in the cluster are checking out which one to restart , remove of to stop sending traffic too
    - Types are: liveness probes, readiness probes, startup probes
    - Liveness probes – they check the container and if they fail the test they restart the container
    - Readiness probes – they check the container till the endpoints are ready if not they remove the container to form an new container

- Startup probes – they are checking how much time they take to initialise the pods if they take more amount of time they kill the container

24. Diff btw Readiness Probe & Liveness Probe & Startup probe?
    - Readiness – they check the container till their endpoints so the application can be deployed without any problem when there is an problem they remove the whole container and form an new one
    - Liveness – they check the container fails or not with test , if they fail they restart the container
    - Startup probe – they are the once check the containers run time and when they have an more amount of run time the kill the container

25. What are k8s deployment strategies?
    - Blue green deployment
    - Canary deployment
    - Roll back updates

26. What is HPA in K8s? and How it works?
    - Horizontal pod autoscaler they help to scale the number of pods present in deployment, replicaset
    - These autoscaling are mostly done based on the CPU memory and other metrics
    - They first check the metrics and compares the threshold
    - Based on the threshold the autoscaling happens

27. Diff btw HPA & VPA?
    - HPA is used to scale the pods in the container based on their usage and the metrics threshold the autoscaling happens , this is mostly used in the place of stateless apps
    - VPA is used to adjust the memory and the metrics for the existing pods , they are mostly used in the place of statefull applications like databases

28. What is helm and how it works?
    - Helm is the package manager that is used to manage the libraries of the k8's
    - This helps in deploying applications easily and manage them
    - They have helm charts which are like an pre-defined template for the k8s so they are mostly usefull for deploying applications