**Kubernetes Assignment 5**

1. How well do you understand Kube-proxy?

* In kubernetes there are Master node and worker node.
* So in Worker Node there is one component called **Kube proxy**
* It is used for network proxy
* It Manages network connectivity and maintains network rules across nodes. Implements the Kubernetes Service concept across every node in a given cluster.
* This service/component is responsible for the communication of pods within the cluster and to the outside network, which runs on every node.
* This service is responsible to maintain network protocols when your pod establishes a network communication.
* We can also say that Kube-proxy is an implementation of a load balancer and network proxy used to support service abstraction with other networking operations.
* Kube-proxy is responsible for directing traffic to the right container based on IP and the port number of incoming requests.

1. What does Kubernetes controller manager imply?
   * In kubernetes there are Master node and worker node.
   * controller manger is a part of Master node

* task of Control Manager is to create node, delete node, update.
* it keeps a track of each resources, ef. what no. of nodes are running. etc.
* Runs controller processes and reconciles the cluster’s actual state with its desired specifications. Manages controllers such as node controllers, endpoints controllers and replication controllers.
* The controller manager is a daemon that is used for embedding core control loops, garbage collection, and namespace creation.
* It enables the running of multiple processes on the master node even though they are compiled to run as a single process.
* is a control loop that watches the shared state of the cluster through the api server and makes changes attempting to move the current state towards the desired stable state

1. What exactly do you mean by ETCD?
   * In kubernetes there are Master node and worker node.
   * ETCD is a part of Master node
   * it uses server as a key value storage with track and store track of kubernetes architecture

Stores all cluster data. Consistent and highly available Kubernetes backuping store

* + Kubernetes uses etcd as a distributed key-value store for all of its data, including metadata and configuration data, and allows nodes in Kubernetes clusters to read and write data.
  + Although etcd was purposely built for CoreOS it also works on a variety of operating systems (eg. Linux, OS X) because it is open-source.
  + Etcd represents the state of a cluster at a specific moment in time and is a canonical hub for state management and cluster coordination of a Kubernetes cluster.

1. What does "control resource monitoring" imply?
   * I think there is a typo it should be container resource monitoring let me answer
   * If you are using kubernetes then it is very important to understand the performance of the application and resource utilization at all the different abstraction layer.
   * Kubernetes factored the management of the cluster by creating abstraction at different levels like container, pods, services and whole cluster
   * At each of these different levels can be monitored and this is done by Container resource monitoring.
   * In market there are various tools available to do that monitoring as below
   * **Heapster**: It is used to gather data and events from the containers and pods within the cluster.
   * **InfluxDB**: It is used along with heapster for visualizing data within the Kubernetes environment.
   * **Grafana**: It is a time series database used to store the data captured by all heapster pods.
   * **CAdvisor**: It is a built-in tool in a kubelet that automatically discovers all the active containers and monitors them.
   * **Prometheus**: It specifies a project of CNCF, which provides powerful querying, alerting, and visualization capabilities.
2. What are federated clusters and how do they work?

* Federated clusters are a set of multiple clusters that are managed as a single cluster.
* Federated clusters are a set of multiple clusters that are managed as a single cluster.
* or in simple words Multiple Kubernetes clusters can be managed as a single cluster with the help of federated clusters.
* so you can create multiple Kubernetes clusters within a zone or lets say data centre/cloud and use federation to control/manage them all at one place.
* A new command line tool called ‘kubefed’ was introduced to make getting started with Cluster Federation much simpler.
* One of the Kubernetes clusters must become a master by running a Federation Control Plane
* this is a controller that will monitor the health of all other clusters and it will provide a single entry point for administration. so from this single master we can do admin part which manage the whole cluster.
* The entry point behaves like a typical Kubernetes cluster.
* It allows creating Replica Sets, Deployments, Services, but the federated control plane passes the resources to underlying clusters.
* Let us understand in other words like if we request the federation control plane to create a Replica Set with 1000 replicas, it will spread the request across all underlying clusters.
* And now let say if we have 5 clusters, then by default each will get its share of 200 replicas.
* All configurations throughout a cluster are managed through one API. A configuration determines which clusters it applies to and what they should do. A set of policies, templates and overrides specific to individual clusters determines the content of a federated configuration.
* Federated configurations manage the DNS entries for all the multi-cluster services.
* In configuration it will have access to any cluster it is intended to get information in order to create configuration items and apply or remove them.
* Deployments usually have their own namespaces, which remain consistent across clusters.
* The federation control plane consists of a federation API server and a federation controller manager that collaborate.
* The federated API server forwards all requests to all the clusters in the federation.
* the federated controller manager performs the duties of the controller manager across all clusters by routing requests to the individual federation cluster members' changes.