What is Kubernetes?

It automates containerized application deployment, scaling, and management. By grouping containers that make up an application into logical units, Kubernetes enables easy and efficient management of those containers across a cluster of machines.

Core features of Kubernetes:

* **Automated deployment**: Kubernetes automated deployment of containerized applications, ensuring that the desired state of the application is achieved and maintained.
* **Scaling and management:** It allows for easy application scaling up or down as needed, managing resource distribution efficiently.
* **Self-healing mechanism:** Kubernetes automatically replaces, or restarts failed containers, ensuring the application runs as intended.

The architecture of Kubernetes:

It consists of several components, including:

* Nodes: These are the physical or virtual machine

Deployment process step below.

1. Create resource for SQL database on azure.
2. Create an Azure VM:
   1. During the creating the VM please refer the steps below
      1. Type: Make sure the VM type in azure supports hyper V which is required by docker.
      2. Select D2\_V3
      3. Security Type: It should be standard
      4. OS: Window 11 pro for support docker.
   2. Download the RDP file for connecting the VM
3. After connected the VM using the username and password. Install a few applications as mentioned below.
   1. Enable the Hyper-V from “on or off window feature” and configure by run this command “**WSL --install**” in command promote window.
   2. Download and install the application.
   3. Open docker with administrator.
   4. Sign in the docker with the GitHub account.
   5. Install the necessary applications like Desktop GitHub, Node JS, VS code, VS, for build creation.
4. Connection string should update with server’s name and its credential details. In appsetting component. Migrate the database using EF command
   1. “add-migration [name]” This will create a new migration with specific migration name.
   2. “update-database [name]” this will help to update database to specific migration name point.
5. Build the react app using the “npm run build” command
   1. After that, copy all items from the build folder and paste it in the wwwroot folder in .NET core project.
   2. Add the one controller method and build a logic that is redirected to index page.
   3. Add the staticfile middleware in configuration method in program file.
6. Server Build Using Docker file
   1. Docker image creation
      1. docker build -t mydockerimage .
   2. Docker run command
      1. docker run --rm -it -p 8080:80 mydockerimage:latest
7. Create an azure containter registery service
   1. Name is myappdockerregistery4demo
   2. CR url is myappdockerregistery4demo.azurecr.io
   3. az login
   4. az acr login --name myappdockerregistery4demo
   5. docker tag mydockerimage:latest myappdockerregistery4demo.azurecr.io/mydockerimage:latest
   6. docker push myappdockerregistery4demo.azurecr.io/mydockerimage:latest
8. Create an azure kubernetes service
   1. Name is myappkubernetesservice4demo
   2. Create deployment yaml file
   3. Deploy it in the kubernetes service.

Yaml file created:

