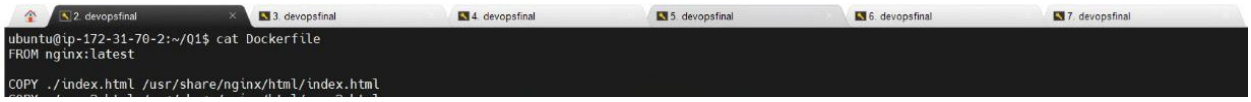
Final Exam (DevOps for Cloud Computing)- Part 1

NOTE: Please provide the files and scripts for each question in separate zip archives with names such as Q1 part1.zip, Q2 part2.zip, etc. You will present your work in class via sharing the screen, however I require that all of your files be uploaded to Blackboard prior to your presentation time.

You have 5 minutes to provide me with all the answers. To save time, I recommend keeping the commands you wish to execute in separate tabs of your terminal, such as one tab for each question that requires executing commands.



Please refrain from configuring or installing anything during the lecture. Ensure that everything is exhibit-ready.

Question 1

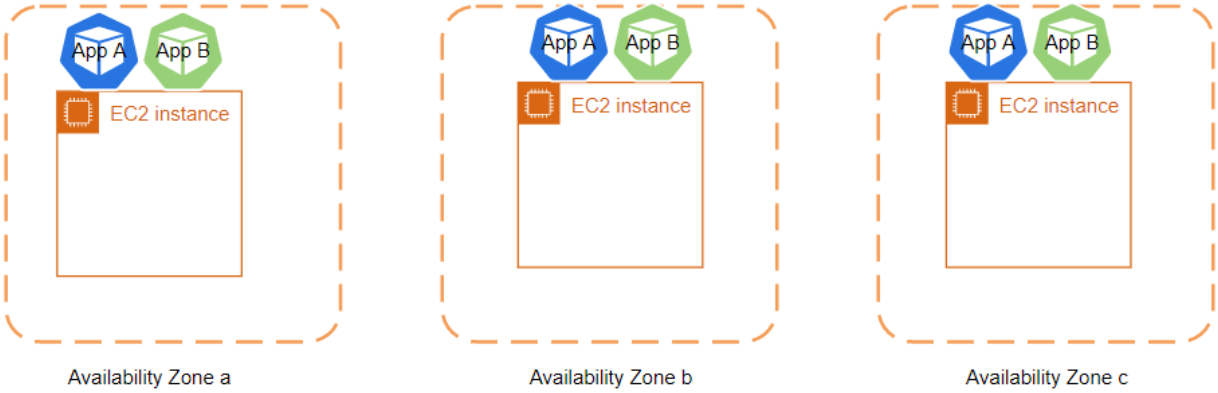
You are employed as a DevOps engineer in a business. Recently, we acquired a software package with two application components A and B from a third-party vendor. Therefore, each solution implementation consists of two components. We refer to them as application A and application B. They are so interdependent that running them on different servers would result in performance issues. The application vendor has also informed us that we cannot operate two components of application A on the same server. The identical holds true for application B. Therefore, colocation of two identical components on the same server is prohibited.

Our company, on the other hand, has a "container-first" philosophy and has requested that you execute the software solution on Kubernetes. We will run three instances of the application. The necessity for three instances of the software solution stems from 1) the presence of HA and 2) the huge volume of work.

You already possess an EKS cluster with three nodes. There are three distinct availability zones for the nodes. You have containerized the applications A and B. Therefore, we want applications A and B to execute on the same worker node. If we have three worker nodes in three availability zones, we must ensure that they are all operational according to the following conditions.:

1- Every worker node receives a single instance of application A.
2- Every worker node receives a single instance of application B.
3- No two application A instances share the same node.
4- On the same node, no two applications B are co-located.
5- Each node has a pair of applications A and B.

The intended topology appears as follows:



I will test your solution by removing the deployments of application A and application B several times to ensure that the desired architecture will function as intended. Please call pods Pod A and Pod B so that they may be readily identified.

Both application A and application B can utilize Nginx. In this assessment, the contents of the containers are irrelevant. We wish to ensure that the desired topology is implemented **(8 marks).**

Question 2

You are instructed to closely watch the aforementioned software solution. To address this, you've chosen to monitor these with Prometheus and visualize the results with Grafana. Utilize this solution. Scale the apps and show them using Grafana.

If you elect to utilize AWS cloud shell with Helm, you may be requested to change VERIFY CHECKSUM to false at some time. Please do so by using the command below:

export VERIFY_CHECKSUM=false

Please ensure that both Prometheus and Grafana are accessible via Classical Load Balancer rather than node port. You do not receive credit if you access them via the node port **(7 marks).**

NOTE: If I see similarity in responses that appears to violate academic integrity, I shall notify the office. Please refrain from consulting with one another, since it will result in identical replies, which is problematic.