SWE 304 PROJECT STUDY 3 (2024)

Due date: 23 May 2024, in class.

In this project, you are expected to create a Jenkins declarative pipeline to deploy a web application at AWS or AZURE cloud. You can use the web application developed in previous projects. You are expected to create a full pipeline, when a developer pushes an update (or merging occurs) on GitHub, the followings has to happen consecutively:

- A new jar file must be created,
- Docker image must be created,
- The docker image must be pushed to the DockerHub,
- The newly created image must be pulled to the cloud,
- There you must create a Kubernetes cluster,
- The updated application has to start automatically on the Kubernetes cluster.

Web application (name: app)
JVM: openJDK version 17-alpine
Dependencies:
Lombok
Spring Web
Thymeleaf
Spring Data JPA
PostgreSQL Driver

Database Server (name: db)
PostgreSQL
DB-name swe304
Table: person
id int
name varchar(16)
address varchar(32)
img_url varchar(1024)

The web application will have the following views:

- Show all people recorded in the DB in a table with their small images in the first column,
  - There will be CRUD operation buttons (add, update and delete) in the table (last column) and these buttons will show the following pages:
    - Add person,
    - Update person,
    - Delete person.
- Provide image file upload for the person table.
  - File storage location should be S3-object storage in AWS (Blob-storage in Azure) for production. Max. file size must be set 5 M.

You are expected to do the following tasks:

1) Use the web application that you developed for project 2. Use the Dockerfile that you did before for containerization.
2) Install Jenkins server on the cloud.
3) Install Docker server on cloud.
4) Install Nginx as web server and configure it properly.
5) Write a Jenkinsfile that does following stages:
   - Creating the jar file (upon update or merge) → You must show this in class.
   - Building Docker image
   - Pushes the “webapp” to the DockerHub
   - Pull the update on DockerHub to the cloud → You must show this in class.
   - Run your containerized applications (webapp and db) on the cloud.
6) Show that your application works as expected.

Your web application and DB server must accept external parameters (DB and http port etc.) while creating containers, so testing locally and testing on cloud should not need re-compilation. The web application and the pages must be accessible from public IP of the cloud instance in the presentation.

Jenkins:

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Grading:

No	Task (Jenkins labeled tasks must be done by Jenkins server)	Grade
1	Creating a cloud instance with Kubernetes cluster + S3 services	10
2	Install and start up: Docker, Jenkins, Nginx, Kubernetes servers on the cloud	10
3	Have your webapp ready for update to GitHub	10
4	Start the Kubernetes cluster on the cloud	10
5	The following steps will be done by Jenkins server: a - Building the jar and creating a Docker image b - Pushing the webapp image to Docker-Hub properly c - Pulling the docker images of app and the DB into the cloud from Docker-Hub. d – Run your pulled images on k8s cluster	20
6	Show that you have mounted DB on the cloud file.	10
7	Show that S3 (or blob) integration works properly.	10
8	Show that when you updated the source file and push to the GitHub, pipeline works as defined.	10
9	Show that the updated web application is seen from any web browsers properly.	

PS: Group presentation is required, group members must show up to in presentation to collect points.