Project IT460 : Multi-Container Application Development

Overview:

The goal of this project is to design, implement, and deploy a multi-container application using containerization technologies, with a focus on the OpenShift container orchestration platform. The application should consist of multiple microservices or components that work together seamlessly within the OpenShift environment.

Objectives:

1. **Containerization with OpenShift:**
    - Containerize individual components of the application using OpenShift's containerization features.
    - Utilize OpenShift-specific tools for building and managing container images.
2. **Microservices Architecture:**
    - Design and implement the application as a set of loosely coupled microservices that align with OpenShift best practices.
    - Leverage OpenShift's support for deploying and scaling microservices.
3. **Communication Between Containers:**
    - Implement communication mechanisms between containers, such as OpenShift Routes or services.
    - Clearly document the communication protocols used.
4. **OpenShift Deployment Configuration:**
    - Use OpenShift DeploymentConfigs to define and manage the application's deployment.
    - Configure services, routes, and persistent storage within the OpenShift environment.
5. **Data Persistence:**
    - Implement data persistence using OpenShift-compatible databases or storage solutions.
    - Ensure that data can be stored and retrieved across container restarts within the OpenShift cluster.
6. **Scalability and Load Balancing:**
    - Explore OpenShift's features for scaling the application horizontally.
    - Implement load balancing using OpenShift Routes or other applicable methods.

Deliverables:

1. **Source Code:**
    - Provide the source code for each microservice and any OpenShift-specific configurations.
2. **Documentation:**
    - Create comprehensive documentation outlining the architecture, design decisions, and deployment instructions within the OpenShift environment.
    - Include a README file with clear setup and usage instructions specific to OpenShift.
3. **Demo/Presentation:**
    - Prepare a demo or presentation showcasing the application's functionality within the OpenShift cluster, deployment process, and any additional features implemented.
4. **Report:**
    - Submit a final project report summarizing the entire development process, challenges faced, and lessons learned within the context of OpenShift.

Evaluation Criteria:

The project will be evaluated based on the following criteria:

- Adherence to OpenShift containerization and microservices principles.
- Effectiveness of communication between containers within the OpenShift environment.
- Proper use of OpenShift features for deployment configuration.
- Implementation of data persistence and scalability features within OpenShift.
- Clarity and completeness of documentation tailored to OpenShift.

Timeline:

Deliverables submission : 28 th of Juanuary 2024

Project Defense : 29th &30th of Junuary 2024

Resources:

- DO101 : Multi-Container Application Development
- DO180 : Introduction to Containers, Kubernetes, and Red Hat OpenShift
- OpenShift documentation: https://docs.openshift.com/
- OpenShift GitHub repository: https://github.com/openshift/origin