School of Enterprise Computing & Digital Transformation,
TU Dublin (Tallaght)
M.Sc. in DevOps
2022/2023

Enterprise Architecture Deployment

CA2 Project
Out: 14/02/2023
Due: 18/04/2023
Value: 70%

Lecturers: Karen Nolan

Overview:
You have previously deployed a web application (Blood Pressure Monitor) in a CI/CD Pipeline using Microsoft Azure's product suite. Although a small web application, it was deployed in the same manner as a monolithic application would. This Blood Pressure Monitor application contained a tightly coupled user facing and business logic, with no data layer.
DevOps is in the middle of a paradigm shift and many enterprises are now drawn to breaking their monolithic systems down into the microservice architectural style. The goal of this assignment is to fully investigate and implement an enterprise style CI/CD deployment based on the microservice architectural style, which contains at least two services and a data layer.
There are two components to this assignment, first your investigation along with its companion report, and second, a working loosely couple service-oriented application that is deployed using some or all of the components from your research. It must be deployed in a CI/CD pipeline that is provisioned in a truly automated manner.

Microservice Deployment:
You may deploy your own service-oriented application in a language of your choice, but the overall architecture of this must include at least two communicating services with a data layer (database or file system). Alternatively, you will be provided with some simple services that you can use, if you wish, to create and manage your CI/CD deployment. The architecture of the provided sample services includes a dynamic front-end (FE) service that communicates with a Web Service back-end (BE), and database. These services are transformed from a version of your previously deployed tightly coupled Blood Pressure Monitor web application. Which has been modified and decoupled to now include a RESTful Java web service BE, a Node.js FE service, and a MongoDB database (to store the users blood pressure readings) – that all communicate.

Research Details:
You are required to produce a detailed **Release Management Plan** for your enterprise style CI/CD deployment. This will entail investigating and researching options available for the development of your Continuous Integration/Test/Deployment Release Management Plan. The choice of tools will, and

should be, secondary. Choose tools that suit the work required. Do not decide how to work based on the tools.
There is a requirement to fully automate (IaC) the provisioning and release orchestration of your application. This means your provisioning and release orchestration needs to include a well thought out automated release management that includes automated infrastructure delivery, incorporating a continued configuration management plan. This will ensure a full realisation of the promise of Continuous Delivery. Until the processes associated with a release are fully automated, the pipeline continues to rely on manual processes that can lead to configuration drift.

There is a requirement to have a consistent and repeatable change management process is place. Your deployment should be able to destroy and replace your container orchestration system in a reliable automated manner. For example, if you use Terraform to provision your container orchestration architecture and its associated services, how are subsequent updates deployed. How can this be achieved while maintaining for example a blue / green deployment?

Some decisions that need to be made: your deployment strategy; should each service have its own separate code repository; should each service have its own CI/CI Pipeline; how can you make all versions (and tools) unified; how can you make your builds run in the same automated way; your backup and recovery strategy.

Research Report:

Produce a report for your **Release Management Plan**. It should detail the specification and justification of your deployment strategies. You must evaluate and critic this under a set of criteria which should include (***but not limited***) to:

- Performance
- Ease of configuration / installation
- Cost
- Licensing
- Monitoring and logging
- Scaling (in and out)
- Rollback plan
- Backup and restore strategy
- Security
- Support
- Vulnerability checks on images

Deliverables:

1. Fully automated CI/CD Pipeline — 45 Marks
2. Demonstration of pipeline and deployed services — 10 Marks
3. Written Release Management Plan Report — 35 Marks
4. Additional features — 10 Marks