SWE30004 - Software Deployment and Evolution

Assignment 1 - Team Assignment, Due: Friday 5:30pm, 28-Oct-2016, Worth: 30%

Team Size: The size of the team can be 1, 2 or 3 students.

Task

The assignment task is to:

1. Construct a simple data driven web application and deploy it.
2. Apply the software deployment model to analyse the deployment process for a simple data driven application that is deployed to the Heroku cloud platform (http://heroku.com), as well as to a local Vagrant (http://www.vargantup.com) development environment.
3. Reflect on the maturity of the deployment automation offered by Ansible (http://www.ansible-works.com/) using the deployment model proposed by Carzaniga.
4. Describe *ideal* deployment requirements for the final year project (or a large project you were involved in) taking into consideration all issues that arise during deployment planning. Assume, you have no time and resource constraints while defining these requirements.

Note: Single person teams can skip Task 4.

Task 1 - Detailed Description of Web Application to Build

You are required to create *two* versions of simple web application.

Version 1 will compute 'how many days a person has been alive', given a date of birth. The birth date, person name and the timestamp of when the data was entered must be stored in a database system (can be Postgres, or MySql, or any other database management system). You must also provide a way to view the history of inputs provided (i.e a table showing a list of {timestamp, person name, input birth-date, days-alive }).

Version 2 will improve by providing two new features (i) it shows the age in martian days, and (ii) records both given and family name in separate fields (including in the back-end database).

You can use any web technology stack that will be suitable for the deployment platforms that you must work with (see below).

Task 2 - Deployment to Cloud (Platform as a Service)

In this assignment you are required to build and work with two different deployment platforms.

1. Platform A: Heroku is a cloud infrastructure that allows you to build, deploy and run applications written in a range of languages. The deployment process and complexity depends on which language, framework and tool chains you use. You are free to choose any language/framework that works with Heroku as long as it helps you complete the following tasks.
   a. Once you have created your web application, you must deploy Version 1 to Heroku for use.
   b. You must document all steps of the deployment process for your application including how you Package it, Install it (Transfer, Configure), Activate, De-Activate and De-Install within the context of Heroku. The documentation should include the specific steps you have undertaken as well as the technology stack you used.

c. You must also deploy Version 2 to Heroku and document how the 'Update' process works. After the re-deploy process, all old data should have migrated across to the new database design — you need to carefully consider and implement a method to map the name properly (since the initial version does not separate family name and first name).

2. Platform B: Vagrant provides an configurable, reproducible and portable work environment that is increasingly popular among many developers (esp. in start-ups, and technology companies). For the second platform, you must setup Vagrant with Ubuntu and also deploy the web application fully. However, in the context of Vagrant, you must use Ansible to automate you entire deployment. You can use a different technology stack for your web application (compared to the one used in Heroku if you prefer).

Task 3 - Reflection on Deployment Automation

Ansible is a tool that helps manage infrastructure and application deployment/management. Based on the experience gained via use of Ansible in deploying your web application, you must reflect on the maturity against the deployment model as well as the characterization framework proposed by Carzaniga in his 1998 paper. The paper contains how well various installers satisfy the various components of the models (summarised in Table 1 and Table 2 of the paper). You are expected to repeat a similar process for Ansible. The Carzaniga paper was written over 15 years ago and hence the model / experiment approach needs to be adapted for current generation deployment tools. The broad deployment tasks, and the general principles still apply, but the external environment and context has changed. You are expected to take this into consideration. Your reflection is going to be limited to the experience of the relatively small deployment and this will be taken into consideration when grading the report you produce.

Task 4 - Deployment Checklist for Final Year Team Project

Define the deployment requirements for the final year project by completing the partial document provided on Blackboard (Word Document). A full data collection check list is also provided. By working through this check list you will collect the information that you need to put into the Deployment Requirements document.

Report

You must present your findings in a single report. The report must use a readable font (12-point is ideal) and must be no longer than 15 pages, excluding references and appendices.

The report must contain the following sections:

I. Report Overview: A brief summary of what this report contains, including a summary of your main findings -- *max. 1 page*

II. Software Deployment Model: This section must explain what a deployment model is and why such models are needed -- *max. 1 page*

III. Deploying to Heroku: This section should indicate the language/framework used to construct your web application, the URL where the Heroku application can be accessed, as well as the full process used for deploying the 'Alive time calculator application' to Heroku. In particular, you must address how you Package, Install, Activate, De-Activate, Update and De-Install. You

must include screen shots of both versions (before the update and after update) of your application running on Heroku. -- *max. 4 pages*

IV. Deploying with Vagrant and Ansible: This section should provide a brief description of the deployment environment (Vagrant) as well as the automation tool (Ansible). The Ansible script should be provided, and you must address how your deployment process mapped to the Carzaniga model (i.e. Package, Install, Activate, De-Activate, Update, and De-install). Your deployment automation should be capable of all key steps in the deployment model — *max 3 pages*.

V. Reflection: You are expected to reflect on Carzaniga model, highlighting potential limitations or aspects that the 1998 paper did not anticipate/overlooked based on your experience with Vagrant/Ansible. -- *max. 2 pages*

VI. Deployment Requirements for Final Year Project: These requirements must be made against the deployment model considering all activities. Recommendations must be made if multiple target environments would be needed (that is, for testing/staging/development/production). Tooling and packing format must be clearly indicated, you must also state if scripts shall be used for configuration or if it shall be performed by the installation tool. Also, indicate all steps that can be manual as well as aspects that need to be automated with tools. -- *max. 4 pages*

VII. References (Citations must use either Harvard style, or IEEE style)

VIII. Appendix

Submission

A PDF copy of the report including the cover sheet must be submitted via Blackboard (cover sheet must include Assignment title, subject code, tutors name, the team members names as well as the Student IDs)

All pages must be numbered. A zip file of all source code should also be submitted.

Penalties will apply for late submissions, refer to the Unit outline for details.

Supporting Documents

There are supporting documents provided along with this handout to help complete your assignment task. This documents provide a starting point to complete Section 5 of the report.

Demonstration

Teams may be required to demonstrate their Heroku as well as Vargant installations and hence should keep copies till the end of the semester.

Marking Scheme

Following is the general break-down for assessment.

Introduction / Deployment Model: 10 marks

References and citation: 5 marks

Heroku Deployment: 15 marks

Ansible Deployment and Reflection: 12 marks

Final Year Project Deployment Requirements: 8 marks

A more detailed marking guide will be released on BB.

References

Carefully read the following references before attempting this assignment task.

1. Carzaniga, 1998: A Characterization Framework for Software Deployment Technologies, Carzaniga, A. and Fuggetta, A. and Hall, R.S. and Heimbigner, D.
2. Heroku - http://heroku.com (The free developer account will be sufficient for the task you need to complete)
3. http://www.ansibleworks.com/ - Ansible
4. http://vargantup.com — Vargant
5. Harvard Style Citations - http://www.swinburne.edu.au/lib/researchhelp/harvard_style.html