PA2530 Cloud Computing Lecture Plan

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2015-12-16

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1 Overview

For this course we are evaluating a new publishing framework – the Morea Framework – that shows promise to further emphasize the students' learning in a modularised way. Therefore, this course is not available as the usual set of PDF files, but is instead published online at:

    `http://mickesv.github.io/PA2530-Spring2016/`

2 Assignments

The course is structured around a series of assignments, that are in turn further broken down into smaller modules akin to Agile "sprints". The assignments are:

1. Deployment of a Cloud Application

2. Construction of a Cloud Application

3. Simple Load Balancing

4. Investigation of a Cloud Topic

Below, we briefly present each of these assignments.

2.1 Deployment of a Cloud Application (1.5 ECTS)

In this assignment the students get hands on experience in how to set up a deployment environment such that they can develop and test a cloud application locally on their own computer using virtual machines. They learn how to provision their machines with the necessary software for their application to run. Ultimately, they deploy their environment with a cloud provider.

2.2 Construction of a Cloud Application (3 ECTS)

This assignment is run as a mini-project. The students pick an application and develop a business case, an architecture, and a test plan, and then implement and deploy it with a cloud provider.

2.3 Simple Load Balancing (1 ECTS)

In this assignment the students "step behind the scenes" and look at a simple setup as it would appear for a cloud provider. The assignment is to conduct a simple and typical maintenance task, where the cloud provider does load balancing and migrates a virtual machine to another hardware unit.

2.4 Investigation of a Cloud Topic (2 ECTS)

This assigment is a reflective report where the students pick a particular topic in cloud computing, conducts an in-depth investigation of the topic (possible including empirical experimentation), and summarise their findings in a report.

3 Lectures

The lectures are hooked in to the different course modules as follows.

3.1 Course Formalia

3.1.1 Course Structure   SCREENCAST

Introduces how the course is organised into different modules and assigments.

3.1.2 Course Formalia   LECTURE

Introduction to the course, the lectures, the assignments, and the work distribution. Discussion about collaboration rules, and the normal course caveats.

3.1.3 Background to Cloud Computing   LECTURE

Describes the history and the motivations behind cloud computing, and the principles used to define cloud applications. Briefly introduces legal considerations that need to be addressed when building a cloud application.

3.2 Getting Started with Virtualisation   LAB1

3.2.1 Lab 1 Introduction   SCREENCAST

Puts the lab into context by introducing the concept of different deployment environments and how to build and run a "local" cloud application before deploying it on the real cloud. Explains the different steps in the lab.

3.3 Provisioning LAB1

3.4 Multiple Machines LAB1

3.5 Enter The Cloud LAB1

3.6 The Cloud Business Case LAB2:PROJECT

3.6.1 Project Introduction SCREENCAST

Introduces the project assignment and its overall learning goals.

3.6.2 Reasons for Using a Cloud Solution LECTURE

Expands upon different reasons when a cloud solution might be desirable.

3.6.3 Constructing a Cloud Business Case LECTURE

Introduces different cloud platforms, SAAS, IAAS, PAAS,etc., benefits and liabilities of these. Discusses Total Cost of Ownership, and a simple model for how to assess and compare different cloud providers.

3.7 Cloud Application Architecture LAB2:PROJECT

3.7.1 Cloud Architectures LECTURE

Introduces and discusses quality attributes that are in particular focus for cloud applications, such as scalability, reliability, efficiency, network usage, cost effectiveness, security, and privacy. Discusses how to construct a software architecture that "plays well" with the cloud specific parts of an application as well as the parts run locally.

3.8 Implement Cloud Application LAB2:PROJECT

3.8.1 Design Solutions/Patterns LECTURE

Introduces more low-level design solutions and design patterns that e.g. deals with web application design, database design, cloudbursting, cloudfront design, and exponentially expanding storage. Also discusses particularities introduced by the requirements on testing and deployment of cloud appliications.

3.9 Deploy your Cloud Application LAB2:PROJECT

3.10 Simple Loadbalancing LAB3

3.10.1 Lab 3 Introduction SCREENCAST

Introduces the loadbalancing assignment and its overall learning outcomes.

3.11 Cloud Investigation

3.11.1 Introduction to Investigation

Introduces the empirical investigation of a cloud topic, and its overall learning outcomes.

3.12 When Things Go South

4 Company Collaboration

We plan to have guest lectures from City Cloud (a company in Karlskrona) and Compuverde (a company in Karlskrona) and maybe Ericsson. We will probably also do demonstartions using equipment from City Cloud and/or Compuverde.

Moreover, we have commitment from another cloud provider, DigitalOcean to be involved in the development and execution of the course. They have also promised to give a starting voucher to the students so they can do their lab assignments using their services.