Course Introduction

Cloud Computing and Big Data (CLO)

Oxford University
Software Engineering
Programme
Nov 2015

Introduction

- Aims
- Pre-requisites
- Contents
- Objectives
- Resources
- Rules of Engagement
- Introductions

Aims

- Understanding of Principles of Cloud Computing and Big Data
- Theoretical background and origins
- Practical experience of different technologies
- Architecture and Design
- Wider context

Pre-requisites

Covered by the Pre-Study Guide

- **Command line** tooling and Unix commands
- Some **Python programming** and **text editors**
- **SQL** and data manipulation
- **Understanding** of networking, servers and distributed computing

Format

- A mixture of lectures and practical labs
- Lectures aim to provide the wider context and background
  - Independent of specific technologies
- Labs are based on specific technologies
  - Designed to demonstrate the principles

Lab model

- Local Virtual Machine
  - Ubuntu
  - Pre-installed big data software
    - E.g. Apache Hadoop and Spark, Docker, etc
- Amazon Web Services
  - Virtual machines in the cloud

Contents

- Overview and Introduction
- Cloud Computing
  - Introduction and Case Studies
  - Cloud Computing Theory and Background
  - Containers and Docker
- Big Data
  - Introduction and Case Studies
  - Map Reduce and Hadoop
  - Apache Spark and in-memory big data
  - Realtime
  - Visualisation
  - NoSQL
  - Cassandra

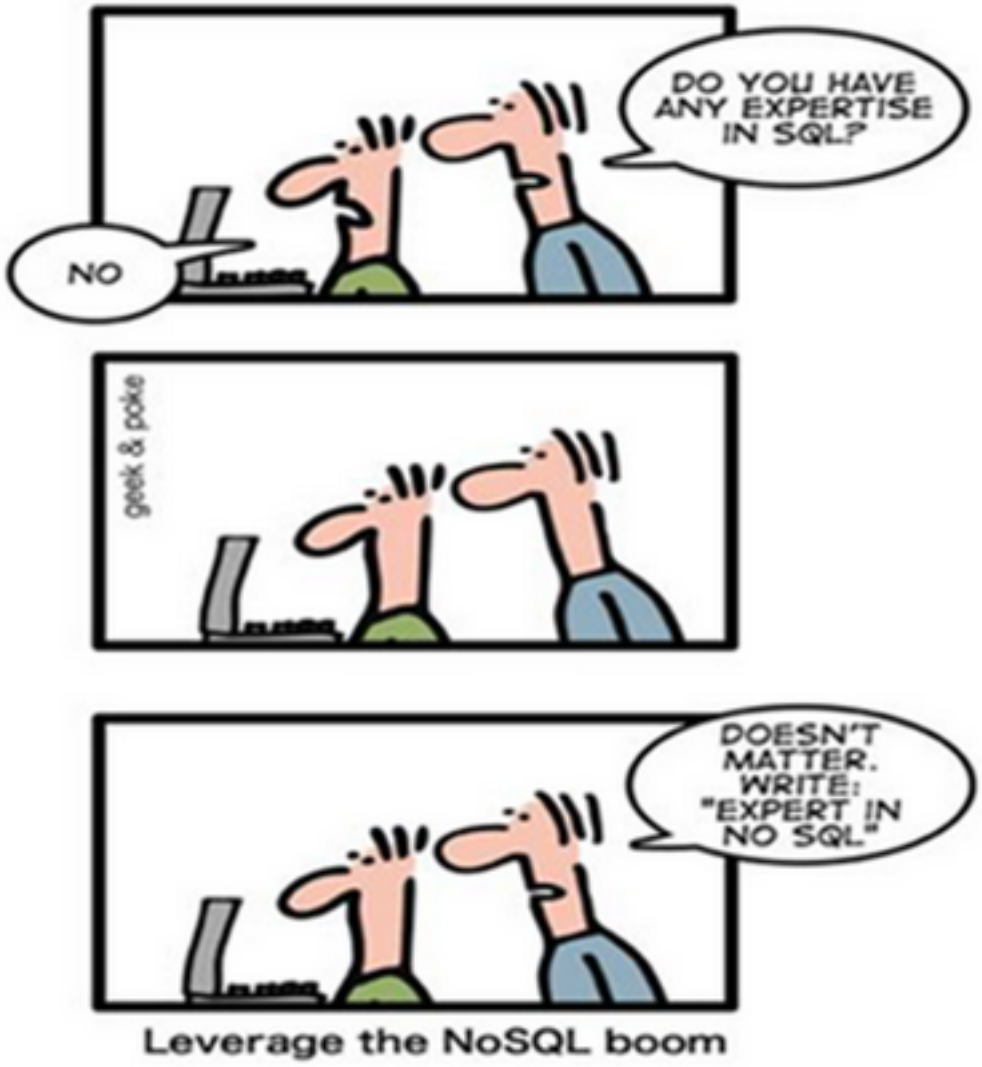
Practicals

- Using Cloud Services
- Elastic scaling
- Hadoop and Map Reduce
- Spark, SparkSQL
- Cassandra and NoSQL
- Spark and Cassandra together
- Realtime big data
- Containers
- Visualisation

Specific Objectives

- Understand the principles of cloud computing
  - Theory of scalability
  - Including scalability and deployment
  - IaaS frameworks, PaaS, containers
- Understand Big Data approaches, technologies and techniques
  - Theoretical background and approaches
  - Including Map Reduce, NoSQL, Realtime
- Be able to design and implement scalable cloud and big data systems
- Understand and implement effective Open Source systems on Amazon EC2

Improve your CV?



Leverage the NoSQL boom

Beyond the scope of this course

- Detailed Data Science techniques
- Implementing a private cloud
  - Although we will look at technologies for private cloud
- Understanding all of Hadoop, Spark, Mesos, CoreOS, etc

Rules of Engagement

- ***Ask questions as we go along***
  - We will "park" any that are better answered later
  - Don't wait till the end to ask or raise concerns
  - If you don't ask we can't help you

First Run!

- This is the first running of this course
- Please take that into consideration:
  - There will be bugs!
- Please help out:
  - Please create new issues on the Github repository
  - https://github.com/pzfreo/ox-clo/issues/new

Paul Fremantle

- CTO and Co-Founder of WSO2
  - Currently on study leave
- Previously Senior Technical Staff Member, IBM WebSphere architecture
- VP, Apache Synapse and Member of ASF
- MA in Maths and Philosophy
- MSc in Computation (1995)
- Teaches SOA module
- PhD Research Student

You?

Approximate Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
Overall Introductions First Cloud lab exercise	Introduction to Big Data and case studies Hadoop Lab 1	Spark and SQL SparkSQL Lab	Visualisation Visualisation Lab	Overview and Recap Presentation Group Exercise
Cloud Overview and case studies Elastic Cloud Lab	Hadoop details, Map-Reduce Hadoop Extras	Storage and NoSQL Cassandra Lab	Containers Docker Lab	Final Thoughts and Assignment
Cloud Theory Platform-as-a-Service, scaling Further Cloud Lab	Intro to Spark	Cassandra details Cassandra Lab2	Realtime Big Data Realtime Lab	

Let's get started