Azure Academic Materials Syllabus

Introduction and Intended Audience

This package contains eight 1.5-2 hours lessons on the principles of cloud computing. The target audience is the instructors of undergraduate classes in computer science or software engineering. It’s not Computer Science 101; we need the students to have some sort of idea as to what a queue is and what an object is and how to write a rudimentary program. But it’s not a senior-level enrichment project either. We wanted to bring cloud computing into the mainstream of academic instruction.

Course Module Contents

Each lesson consists of a PowerPoint deck, demos, and homework assignments. The PowerPoint decks discuss the principles of cloud computing at a block diagram level. They discuss the offerings of the three main cloud vendors, Amazon, Google, and Microsoft. Then we expand to architecture, storage, SQL, Mobile Service and Cloud Service etc. Each contains a homework assignment or suggestions for homework assignments.

Course Modules

1. Introduction.

This module introduces the concept of cloud computing. We examine the scale on which modern applications need to operate, and realize that the contemporary standard of care for a significant computing environment is now so high that it’s hard to reach on our own. We discuss outsourcing the operation of a data center, as the generation and distribution of electricity was outsourced in the early part of the 20th century. We define and discuss the terms platform as a service, infrastructure as a service, and software as a service. We examine the commercial cloud platforms offered by Amazon, Google, and Microsoft. We then discuss the types of problems that cloud computing solves well, and the difficulties that we could encounter in using cloud computing.

2. Basic Architecture

Now that we’ve decided that we want to run in the cloud, what adjustments do we need to make in our applications’ architecture? We first discuss certain concepts that are needed for all distributed programming, including virtualization, abstraction, statelessness, chunkiness, and message passing. We examine the commercial vendors’ cloud products in more detail. We then discuss some common usage scenarios that lend themselves well to cloud computing. We conclude with the examination of a code sample demonstrating a Web Role and a Worker Role in Windows Azure, the former passing commands to the latter by means of a queue.

3. Storage

Storage is a primary requirement of any enterprise system. We moved to the web in order to scale, so our storage needs to scale with us. In this module, we discuss relational storage versus non-relational storage, and examine the types of non-relational storage that are common in the cloud – blobs, tables, queues, drive. Then we examine the code examples of an Azure application that uses blobs.

4. SQL Azure basic

In this module, we mainly discuss the basic feature of SQL Azure. Firstly we talked about Architecture of Windows Azure SQL Database, the teacher can demo on the azure portal to show to students. Then we will have a feature comparison between SQL Azure and SQL Server. We also will mention some other cloud databases as a comparison. There are not too much coding work in this session.

5. SQL Azure Advance

In this module, we will discuss some advanced features about SQL Azure. Include Database Sharding, federation, reporting service and data sync. These are all advanced functions on SQL azure , some of coding work are needed in the session.

6. VM and Web Site

IaaS and PaaS are two dimension in Azure platform. In the part, we will introduce some Virtual Machine knowledge include Portability and different operation system supported. With that, we continue to introduce Virtual Network, that is very important part in enterprise scenarios.

Windows Azure Web Site is an easy to be understood session. There 3 topics will be included Web gallery (Wordpress, Blogengine, Orchart .etc ) , development environment and scalability capabilities.

7. Mobile Services

This is an important part for students to build solution based on Windows 8+ Azure, Windows Phone 8+ Azure, Android + Azure, Iphone + Azure. How to binding the data, how to push notification and what is the right way to make an authentication that will be introduced in session. We will also give some information on how to diagnose and Scale your solution.

8. Cloud Services

Web Role and Worker Role will be discussed in the session. Part of coding work are needed in this session.