Fall 2014

CS497/597

Cloud Computing

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Overview

This course begins with an introduction to Service Oriented Architecture (SOA) and Enterprise Service Bus (ESB) and delivers a hands-on experience in developing scalable SaaS solutions. It covers cloud-computing principles in great details and imparts skills necessary for design and development of cloud infrastructure solutions – fully in-house or a hybrid. Popular cloud solutions such as AWS, Microsoft Azure, Google App Engine, IBM SmartCloud and Salesforce.com are studied for their architectural choices and service offerings. Designs to incorporate external IaaS artifacts into hybrid cloud services are explored and implemented. The course also covers cloud security: challenges, models and practices. At the end of this course a student will be able to design, develop and deploy secure heterogeneous cloud services adhering to the specified SLA.

Text Book

To be decided

Milestones

09/12/2014 - Assignment 1

09/26/2014 – Assignment 2

10/31/2014 – Project I

12/05/2014 – Project II

Part I – Introduction to Cloud Computing

- Introduction to SOA and ESB
- Fundamentals of SOA – SOAP, WSDL, WS-Security
- Building Web Services (including RESTful Services) using Spring framework, JAXRPC, JAX-WS, .Net
- Using ESB to manage an ecosystem of enterprise services.
- Introduction to Cloud Computing - Virtualization, hypervisors (VMWare and Xen), Multi-tenancy, elastic provisioning, metering and monitoring resource usage
- Cloud Computing deployment models – IaaS, PaaS and SaaS
- Cloud infrastructure services – Storage services, Compute Services, Database as a service, Cloud brokers
- Migration approaches for existing applications
- Cloud computing SLA's – standards, models, provisioning and monitoring.

Part II – Developing, Deploying and Securing Cloud services

- Case Studies – OpenStack, AWS, Microsoft Azure, Google App Engine, Salesforce.com and IBM Smart Cloud Enterprise
- Developing, deploying cloud services using Chef™ and Puppet™, while maintain continuous availability.
- Deploying Hybrid Clouds within an enterprise
- Migrating existing applications to Cloud Platforms
- Cloud security challenges
- Cloud security approaches: encryption, tokenization or obfuscation, security models
- Securing the hybrid cloud

Part III – Projects

- Project I - Develop a BLOB Service offering using one of the existing platform – AWS/Microsoft Azure/IBM SmartCloud /Google App Engine and create a Tumblr™ like service for storing contents.
- Project II – Deploying and managing a hybrid cloud solution with automatic resource provisioning and monitoring for maintenance of SLA.

Evaluation

- Program Assignments: 300 points (30%)
- Project I: 300 points (30%)
- Project II**:** 400 points (40%)

Grades

- 890 <= A- < 900 <= A < 970 <= A+
- 790 <= B- < 800 <= B < 870 <= B+
- 690 <= C- < 700 <= C < 770 <= C+
- 590 <= D- < 600 <= D < 670 <= D+
- F < 590