CEN 5086 Cloud Computing

Credits: 3 credits

Text book, Title, Author, and Year: Class notes/slides placed in Blackboard (bb9.fau.edu)

Reference Materials: Selection of papers placed in Blackboard, including notes on UML.

Specific Course Information:

Catalog Description: Cloud computing is concerned with the use and architecture of this model of computation. We study the services provided by clouds, their internal structure, and their possibilities and limitations. We use UML as a language to describe architectures and patterns to help the design of software applications using clouds and to describe cloud architectures.

Prerequisites: Background on software engineering. Basic knowledge of UML.

Specific Goals for the Course: Understanding of the issues in using existing cloud services and in designing cloud applications. Analysis of cloud components and security, reliability, and governance aspects. Study of the value of the services provided by clouds.

1. Describe the possibilities and limitations of cloud computing from the point of view of users and designers
2. Estimate the security and reliability levels of systems running different types of applications and in different environments. Define requirements and defenses to provide appropriate security and reliability levels.
3. Analyze examples of real cloud architectures with respect to their structure and function.
4. Apply UML and patterns to describe and design cloud systems.
5. Be able to understand what components and tools are used to deal with clouds
6. Be able to log into real clouds, open accounts, and select services from them.
7. Given a set of application requirements, students should be able to select the most convenient cloud product from a set of commercial offerings, and write appropriate service contracts.

Brief List of Topics to be Covered:

1. **Motivation and Objectives -** Objectives of cloud computing. Advantages and problems. Applications appropriate for clouds. Typical services.
2. **Types of Clouds -** Infrastructure as a Service**,** Middleware (Platform) as a Service Software as a Service.   Advantages and problems of each type of service. SOA and its   relationship to cloud computing. Application as a Service.
3. **Infrastructure as a Service -** Virtualization approaches. Desktop and server virtualization. Examples: Amazon EC2, Eucalyptus
4. **Middleware as a Service -** Platform approaches. Agnostic middleware. Example: Microsoft Azure.
5. **Software as a Service -** Example: Google Apps. Applications using multiple clouds.
6. **Service-oriented Architectures -** Web services and their standards.
7. **Security -** Attacks and their defenses. Misuse patterns.
8. **Reliability -** Providing reliability, availability, and fault tolerance in cloud systems.
9. **Identity Management -** Importance and examples.
10. **Governance -** Policies and management.
11. **Wireless Clouds -** Effect on security and functionality.