Transformation to Cloud Computing

Course Abstract:

For many enterprises, taking advantage of cloud computing involves migrating existing applications from the traditional IT (Information Technology) infrastructure to cloud, as opposed to merely developing new cloud applications. The existing applications have great value for an enterprise, often representing billions of dollars of investment and business intelligence. As the cost of the IT infrastructure increasing, enterprises see a real opportunity to reduce the cost and gain flexibility by using cloud. Critical to achieving the goal is an effective transformation of existing applications to cloud. There is science and engineering to the process.

In this course, students will learn the science behind the process and the engineering of successful transformation. In contrast to the incremental, organic, and routine changes to enterprise applications, transformation activities are planned, highly coordinated, and involve large-scale changes. Students will learn about the drivers for transformation, the economics of migration to cloud, the systematic approaches to transformations, and the steps involved in the process.

IBM researchers, who are experts in the transformation methodology and cloud computing, will teach the course. A key component of the course is the set of three homework assignments which provide the student an opportunity to practice the transformation steps exemplifying the conceptual and practical challenges involved.

Evaluation:

45% Assignments (3 total, 15% each)

20% Mid-term Exam

20% Final Exam

10% Class Attendance

Prerequisite for Enrollment: Introductory course in Operating Systems or Distributed Systems or equivalent. In the absence of actual coursework, practical experience in those areas is acceptable. Programming experience in any popular programming language is desirable, but not required.

Primary contact: Nikolai Joukov

Lecture Title	Lecturers	Date	Description
1. Transformation To Cloud Computing: Course and Projects Overview	Nikolai Joukov, Murthy Devarakonda, Hari Ramasamy, John Rofrano	09/03	Introduction to cloud, IT transformation, and need for transformation in enterprise infrastructures. Description of course projects.
2. Enterprise IT Today, IT Discovery	Nikolai Joukov	09/10	Enterprise IT today is a mix of technologies from 80s, 90s, 00's, and state-of-the-art technologies.
3. Clouds and Other Transformation Goals	Murthy Devarakonda	09/17	Economics of cloud, types of cloud.
4. Workload Placement: Analytics, Design, and Planning	John Rofrano	09/24	Analysis to identify which workloads are candidates for migration to cloud. Algorithms to optimize placement of such workloads on the target cloud platform.
5. Automatic migration	John Rofrano	10/01	Automation technologies for physical-to-virtual migration, re-installation, and re-platforming of OS instances and applications.
6. Student assignment #1 review		10/08	
7. Enterprise Storage Systems, DevOps Technologies	Nikolai Joukov	10/15	Deep dive into Enterprise Data Storage Systems
8. Transformation and the Enterprise Network	Hari Ramasamy	10/22	Most transformation activities will involve changes to the networking infrastructure. We'll cover automation techniques for network reconfiguration during transformation to cloud.
9. Mid-term Exam		10/29	Grades deadline is 11/03
10. Student assignment #2 review		11/05	
11. Experiences in Transformation to Hybrid Cloud: A Case Study for a Large Financial Enterprise	Hari Ramasamy	11/05	Nearly half of large enterprises will have hybrid cloud deployments by the end of 2017. We will describe a case study in hybrid cloud design spanning an on-premise private cloud, traditional IT infrastructure, and a public cloud.
12. AI approaches to Cloud Economics	Murthy Devarakonda	11/19	
14. Student Assignment #3 Review		12/03	
15. Final Exam		12/11	