Course Announcement (CS 286: Topics in Data centers)

Instructor: Sriram Rao

We are excited to introduce a new experimental systems course on topics in Data centers. This course is based upon material from recent research to classical papers covering theory and practice of data center computing in three broad areas:

Compute In the first part of the course, we will learn about virtualization. From a classical perspective, we will cover the various virtualization paradigms of full virtualization, para virtualization, and hardware-assisted virtualization, for CPU, memory, and I/O. Building on this foundation, we will then learn about containers (and related concepts), which have enabled efficient serverless computing.

Storage In the second part of the course, we will study Non-volatile memory storage technologies (such as, SSD's) and its impact on system design. Using latency-sensitive applications (such as, key-value stores) as a driving application, we will learn about SSD designs and then discuss recent advances (such as Zoned Namespaces).

Energy In the last part of the course, we will study recent papers on carbon/energy efficient computing and how they are impacting data center designs.

Course Project: As part of this course, you will build a basic paravirtual hypervisor. In doing so, you will be bootstrapping a guest OS, programming extended page tables, emulating privileged instructions, and using hypercalls to implement hard drive emulation over a disk image file.

Lastly, this course is intended to significantly enhance your design and implementation skills. Given that we will be studying materials from recent papers, it should also give you ideas for a thesis.

Logistics:

Meeting time : 1:30-2:45pm on Tue/Thu

Room : DH 416

Class Number : 50199