



DISSERTATION DEFENSE



MUHAMMED ULUYOL

Predictable Performance and Low Cost for Geo-Distributed Applications

Friday, March 25th

10:00am – 12:00pm

[Virtual](#)

ABSTRACT: Applications that run in the cloud must be geo-distributed to achieve high reliability, minimize delays, and follow data localization laws. However, geo-distributed applications face many challenges in achieving these goals due to a key bottleneck: the wide-area network (WAN). Without enough, cheaply-available WAN bandwidth, applications are forced to degrade the service they provide or shut down altogether. Additionally, the latency between data centers limits how quickly an application can serve user requests.

My dissertation makes two contributions to better serve providers of geo-distributed applications. First, I present a new architecture, HEYP, for sharing a private WAN across many tenants. HEYP offers more predictable bandwidth guarantees to tenants without sacrificing the efficiency achieved by state-of-the-art approaches. Next, I characterize the impact that latency has on read and write operations when manipulating data that is stored in multiple data centers, and how there exists a three-way tradeoff between optimizing for read latency, write latency, and cost. I then describe the design of Pando, a system that I have developed to offer nearly all achievable combinations of read latency, write latency, and cost tradeoffs.

CHAIR: Prof. Harsha Madhyastha