



Spring 2013 Colloquium

Computer and Information Sciences

Automated Formal Analysis of Internet Routing Systems

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Thursday, March 28, 11:00 AM, Wachman 1015D

Abstract:

The past twenty years have witnessed significant advances in formal modeling, system verification and testing of network protocols. However a long-standing challenge in these approaches is the decoupling of formal reasoning process and the actual distributed implementation. This talk presents my thesis work on bridging formal reasoning and actual implementation in the context of today's Internet routing. I will present the Formally Safe Routing (FSR) toolkit, that combines the use of declarative networking, routing algebra, and SMT solver techniques, in order to synthesize faithful distributed routing implementations from verified network models. Next, I will describe our work on scaling up formal analysis of Internet-scale configurations. Our core technique uses a configuration rewriting calculus for transforming large network configurations into smaller instances, while preserving routing behaviors. Finally, I conclude with a discussion of my ongoing and future work, on synthesizing provably correct network configurations for the emerging Software Defined Networking (SDN) platforms.

Bio:

Anduo Wang is a Ph.D. candidate in the Computer and Information Science Department at the University of Pennsylvania. She received her M.S. degree in Computer Science from the University of Pennsylvania in 2009, and her B.S. degree in Computer Science from Tianjin University in 2004. Her research interests center on the application of formal methods and programming languages techniques that enable us to create network systems that are functionally correct, scalable, and easy to manage.