

NATIONAL UNIVERSITY OF SINGAPORE

School of Computing

C S S E M I N A R

Title: **Scenario-based Programming of SDN Policies**

Speaker: Associate Professor Boon Thau Loo
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 University of Pennsylvania

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Venue: Video Conference Room, COM1-02-13

Chaired by: Dr Tan Kian Lee, Shaw Senior Professor, School of Computing
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Abstract:

Recent emergence of software-defined networks offers an opportunity to design domain-specific programming abstractions aimed at network operators. In this talk, I present scenario-based programming, a framework that allows network operators to program network policies by describing representative example behaviors. Given these scenarios, a synthesis algorithm automatically infers the controller state that needs to be maintained along with the flow-table rules to process network events and update state. We have developed the NetEgg scenario-programming tool, which can execute the generated policy implementation on top of a centralized controller, but also automatically infers rules that can be pushed to switches to improve throughput. We study a range of policies considered in the literature and report our experience regarding specifying these policies using scenarios. We evaluate NetEgg based on the computational requirements of our synthesis algorithm as well as the overhead introduced by the generated policy implementation. Our results show that our synthesis algorithm can generate policy implementations in seconds, and the automatically generated policy implementations have performance comparable to their hand-crafted implementations.

Biodata:

Boon Thau Loo is an Associate Professor in the Computer and Information Science (CIS) department at the University of Pennsylvania. He holds a secondary appointment in the Electrical and Systems Engineering (ESE) department. He is also the CIS Masters Chair, overseeing all masters programs within the CIS department, and Director of the Master of Science in Engineering in CIS program. He received his Ph.D. degree in Computer Science from the University of California at Berkeley in 2006. Prior to his Ph.D, he received his

M.S. degree from Stanford University in 2000, and his B.S. degree with highest honors from UC Berkeley in 1999. His research focuses on distributed data management systems, Internet-scale query processing, and the application of data-centric techniques and formal methods to the design, analysis and implementation of networked systems. He was awarded the 2006 David J. Sakrison Memorial Prize for the most outstanding dissertation research in the Department of EECS at UC Berkeley, and the 2007 ACM SIGMOD Dissertation Award. He is a recipient of the NSF CAREER award (2009) and the Air Force Office of Scientific Research (AFOSR) Young Investigator Award (2012). He has published 100+ peer reviewed publications and has supervised 7 Ph.D dissertations. His graduated Ph.D. students include 3 tenure-track faculty members and winners of 3 dissertation awards. He is also an active entrepreneur, currently co-founder and Chief Scientist at Termaxia, a big data storage startup based in Philadelphia.