Mina Tahmasbi Arashloo

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RESEARCH INTERESTS

◇ **Networked Systems**; with an emphasis on *Software Defined Networks (SDNs)*

EDUCATION

◇ **Princeton University (2014–present)**.

- PhD in Computer Science (GPA: 4.0/4.0)
- M.A in Computer Science (GPA: 4.0/4.0)
- Advisor: Professor Jennifer Rexford

◇ **Sharif University of Technology (2010–2014)**.

- B.Sc. in Computer Engineering (GPA: 19.50/20.00)
- Thesis: A Distance-Vector Routing Protocol for Named Data Networks
- Thesis Supervisor: Professor Ali Movaghar

PUBLICATIONS

◇ **HotCocoa: Hardware Congestion Control Abstractions, HotNets 2017**
Mina Tahmasbi Arashloo, Monia Ghobadi, Jennifer Rexford, David Walker.

To share the data center infrastructure efficiently among their tenants, operators need to deploy their own congestion control scheme on the end hosts. Recent work has suggested deploying congestion control in the hypervisor which enables frequent updates as new congestion control schemes emerge. However, with NICs going from 10G to 40G, and 100G on the horizon, this approach cannot keep up with line rate at reasonable CPU cost. Thus, in this project, we argue for offloading the entire congestion control scheme to programmable NICs. We design a simple domain specific language for specifying congestion control schemes at a high-level, and a compiler to automatically derive their hardware implementation on the NIC.

◇ **SNAP: Stateful Network-wide Abstractions for Packet Processing, SIGCOMM 2016**
Mina Tahmasbi Arashloo, Yaron Koral, Michael Greenberg, Jennifer Rexford, David Walker.

SNAP is a high-level network programming language that can express a wide range of *stateful* network-wide packet processing functions. Users program their packet processing functions on top of one big switch connecting the edges of the network, and rely on the SNAP compiler to translate them to data plane configurations for each network device. The program state is handled locally on the switches as opposed to the controller, and the compiler decides state placement and forwarding paths in a way to minimize congestion. We employ various data-structures (e.g., stateful extensions to binary decision diagrams) and tools (e.g., Gurobi optimizer) for efficient compilation.

◇ **Compiling Path Queries, NSDI 2016**
Srinivas Narayana, Mina Tahmasbi Arashloo, Jennifer Rexford, David Walker.

Path queries is a new query system that enables efficient path-based traffic monitoring. Users specify queries in terms of regular expressions over predicates on packet locations and header values. A run-time system compiles the queries into a distributed finite automaton, which is used to collect

only and only those packets that satisfy user queries. We employ various data-structures (e.g., extensions to binary decision diagrams) and tools (e.g., Ragel state machine compiler) to significantly improve query compilation time.

◇ **A Scalable VPN Gateway for Multi-Tenant Cloud Services, SIGCOMM CCR 2018**
Mina Tahmasbi Arashloo, Pavel Shirshov, Rohan Gandhi, Guohan Lu, Lihua Yuan, Jennifer Rexford.

Today's Major cloud providers have hundreds of customers directly connected to the edge of their network. To connect to their private network of thousands of virtual machines on the cloud, customers tunnel their traffic to a VPN gateway, which internally tunnels traffic to the correct destination. A VPN gateways at the edge of the cloud needs to maintain information for millions internal tunnels, while providing a high enough port density to directly connect to customers. In this project, we build a hybrid VPN gateway with a switch and a server running DPDK, and show that it matches the requirements of today's cloud providers while processing packets at line rate.

Work Experience

◇ **Microsoft Research**
Research Intern (Summer 2017), supervised by Monia Ghobadi
Project: HotCocoa: Hardware Congestion Control Abstractions

◇ **Microsoft Azure**
Research Intern (Fall 2016), supervised by Lihua Yuan
Project: A Scalable VPN Gateway for Multi-Tenant Cloud Services

◇ **Princeton University**
Teaching Assistant
Courses: Computer Networks (Spring 2016), Functional Programming (Fall 2015)

◇ **Sharif University of Technology**
Teaching Assistant
Courses: Computer Networks (Spring 2014, Fall 2013), Theory of Machine Languages and Automata (Fall 2012 - Fall 2013), Artificial Intelligence (Spring 2014, Fall 2013, Head-TA), Design and Analysis of Algorithms (Fall 2012)

Honors and Awards

◇ **School of Engineering and Applied Science (SEAS) Award of Excellence**, Princeton University (2018).

◇ **Ranked 1st** in terms of cumulative GPA among students of Computer Engineering, 2010 beginners, Sharif University of Technology (2014).

◇ **Iranian National Elites Foundation** grant for undergraduate studies, for outstanding academic success (2010–2014).

◇ **Ranked 2nd** in Iran's national entrance exam for M.Sc in computer engineering (June 2014).

◇ **Ranked 33rd** in Iran's university entrance exam among over 400,000 participants (June 2010).

◇ **National Organization for Development of Exceptional Talents** (NODET) member (2003–2010).

CourseWork

◇ **Princeton University:** Advanced Computer Networks (Fall 2014), Reasoning about Networks (Spring 2014), Programming Languages (Spring 2014), Advanced Computer Systems (Fall 2015), Automated Reasoning about Software (Fall 2015), Fundamentals of Machine Learning (Spring 2016), Patterns in Network Architecture (Spring 2017), Foundations of Probabilistic Modeling (Fall 2017).

◇ **Sharif University of Technology:** Computer Networks (Spring 2012), Operating Systems (Spring 2012), Approximation Algorithms (Spring 2013, Graduate Course) Advance Topics in Theory of Computability, Complexity and Logic (Spring 2013), Database Design (Spring 2013).