P4 Workshop 2017 Talk Proposal

Title: P4 Program-dependent Controller Interface for SDN Applications

Abstract:

The P4 language is used to programmatically define the forwarding behavior of a switch. SDN applications install flows in the switch at runtime by adding, removing, and modifying table entries. There is a strong motivation to define a P4 Program-Independent (**PI**) interface between the controller and the switch. Firstly, it is desirable for switches to be field reconfigurable, without re-imaging, which is made possible if the controller-switch interface definition does not change every time the P4 program is changed. Secondly, a stable API makes vendor adoption easier by simplifying switch stack software maintenance. On the other hand, it is desirable to present a P4 Program-Dependent (**PD**) interface to SDN applications for type safety and readability purposes.

In this talk, we will present an approach to define PI switch interface and PD controller interface using protocol buffers. Protocol buffers is a method of efficiently serializing structured data and is widely used in developing programs to communicate with each other over a wire or for storing data. We will present techniques for automatic generation of PD protocol buffer definition from a given P4 program. Furthermore, we will present tools for automatically validating PD protocol buffers, as well as automatic translation between PD and PI protocol buffers. Our approach enables using P4 program as a contract between the controller and the switch, while providing the respective benefits of PD and PI interfaces.

Speakers' Bio:

Samar Abdi is a software engineer at Google, working on network infrastructure software. Prior to joining Google, he was an associate professor of electrical and computer engineering at Concordia University, Montreal. He has co-authored a book on embedded systems and over 40 papers in international conferences and journals.

Waqar Mohsin is a software engineer at Google, working in Network Infrastructure Group. He has worked in the areas of SDN controller infrastructure, OpenFlow, RPC stacks, and pubsub data-stores. Before Google, he was part of Qualcomm R&D working in the area of CDMA radio link protocols.