# *Blueswitch*: Enabling Provably Consistent Configuration of Network Switches

**Multi-Service Networks Workshop**

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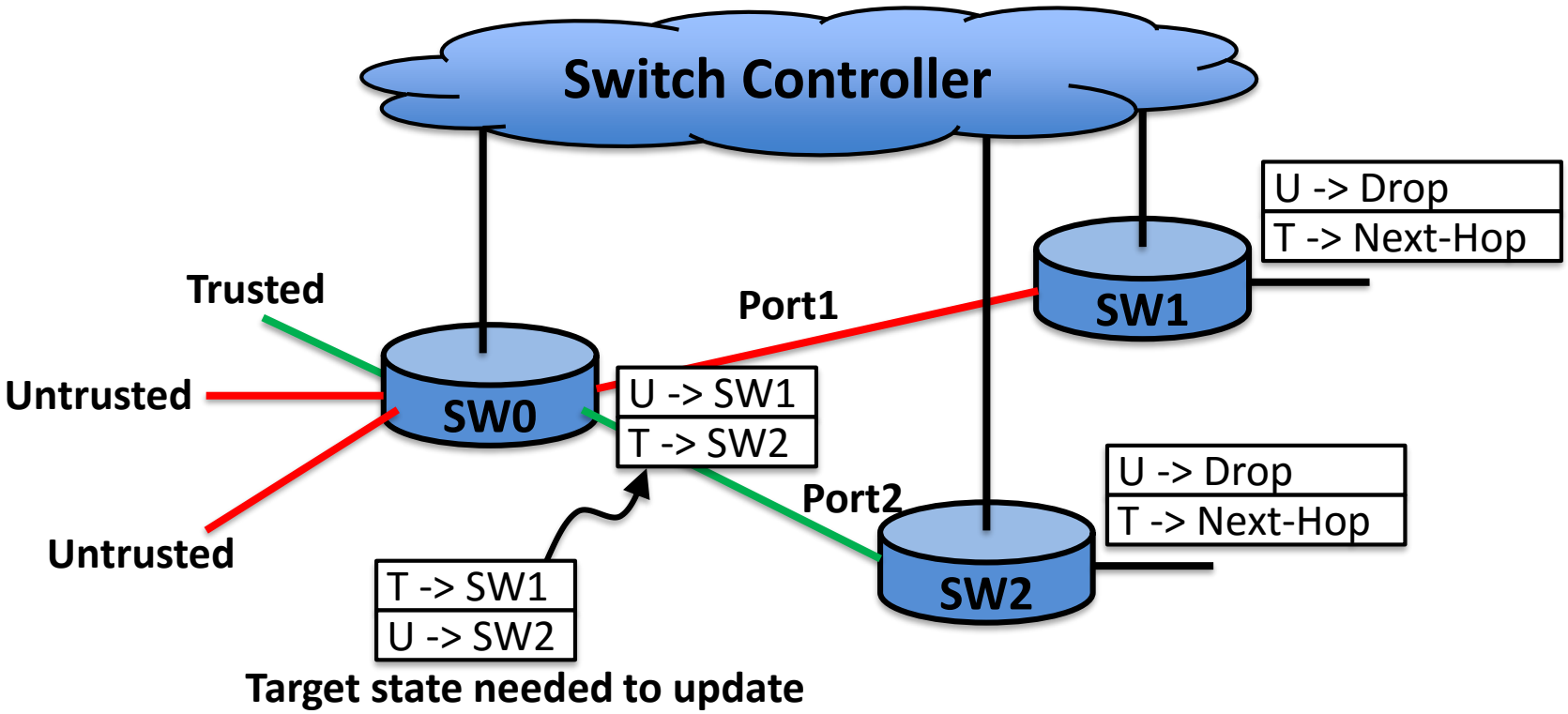
***Jong Hun Han, Prashanth Mundkur, Charalampos Rotsos, Gianni Antichi, Nirav Dave, Andrew W. Moore, Peter G. Neumann, Blueswitch: Enabling Provably Consistent Configuration of Network Switches, ANCS 2015***

# Introduction

- *Configuration changes can be a source of instability in networks, leading to broken connectivity, forwarding loops, etc*
- *Most research works for consistent updates in SDN focus on solutions for centralized network-configuration controllers*
- *A controller cannot guarantee consistent rule updates in switches*
- *A switch installs rules sent from a controller, affecting data-plane configuration*
- *Blueswitch - A prototype OF switch with double-TCAM on NetFPGA-SUME platform for atomic rule updates*
- *Demonstrate packet-consistent configuration in rule remove and insertion*

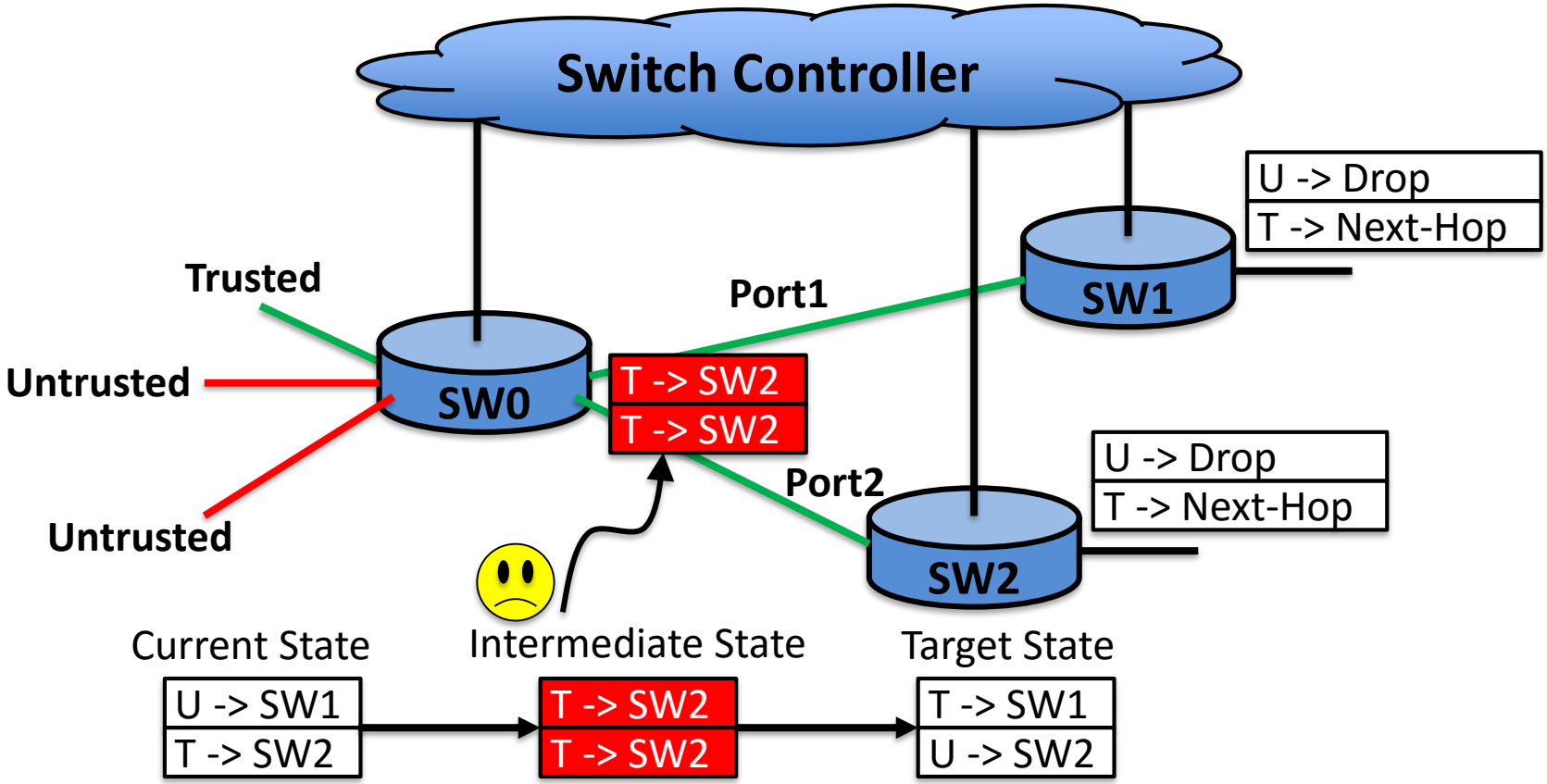
# Motivation

- *Consistent policy update affects security in SDN.*



# Motivation

- *Non-Atomic Rule Update I – Update per Rule*
- *Only one rule can be updated in every access*



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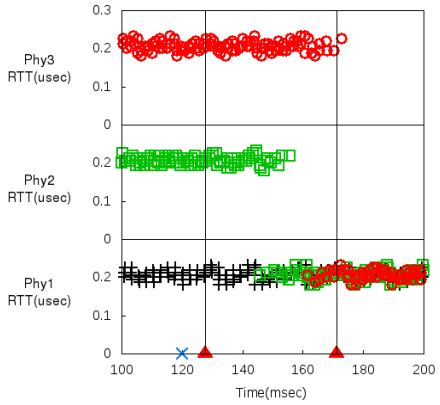
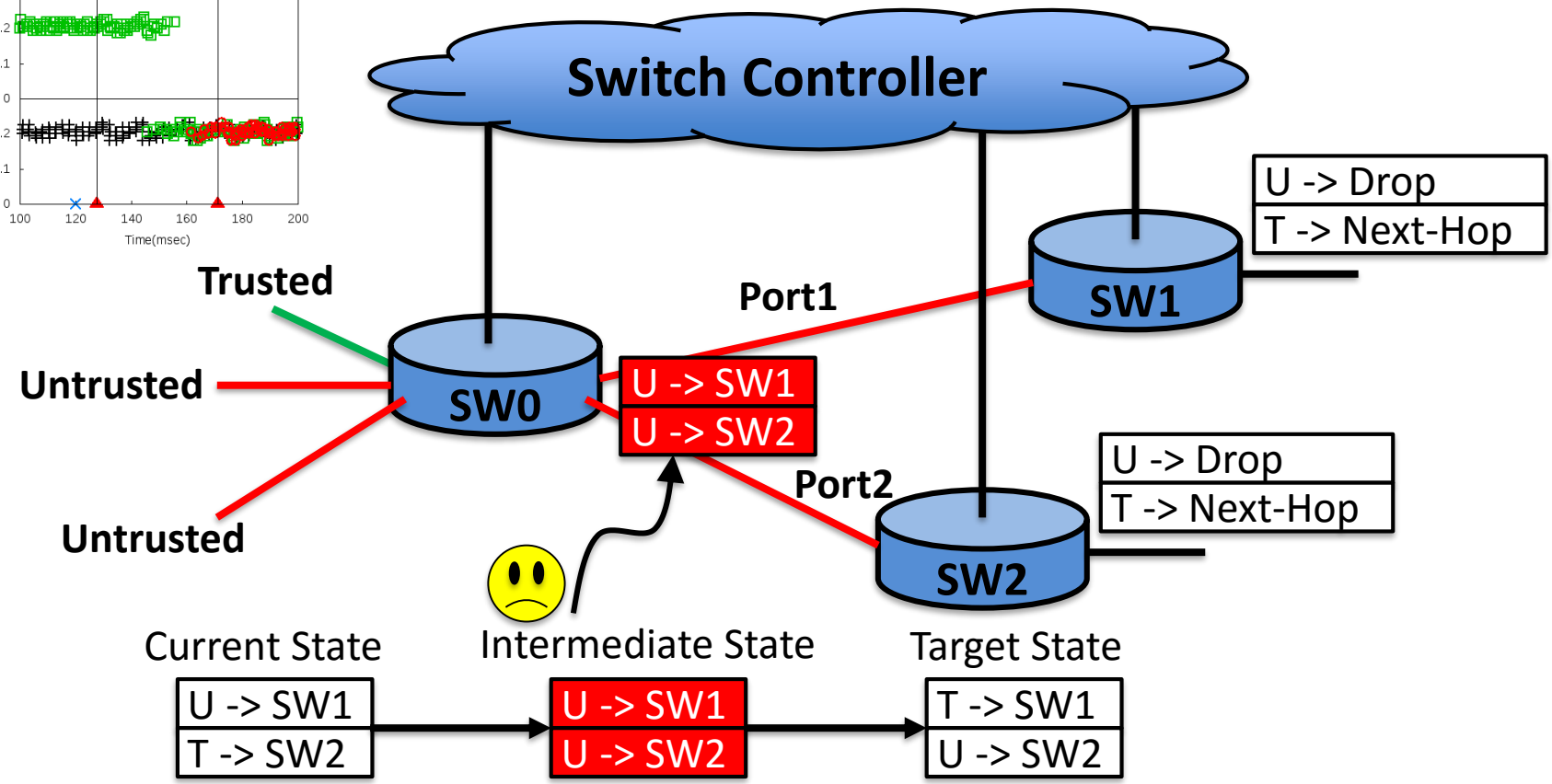
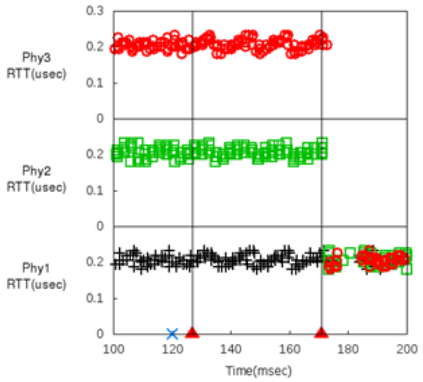
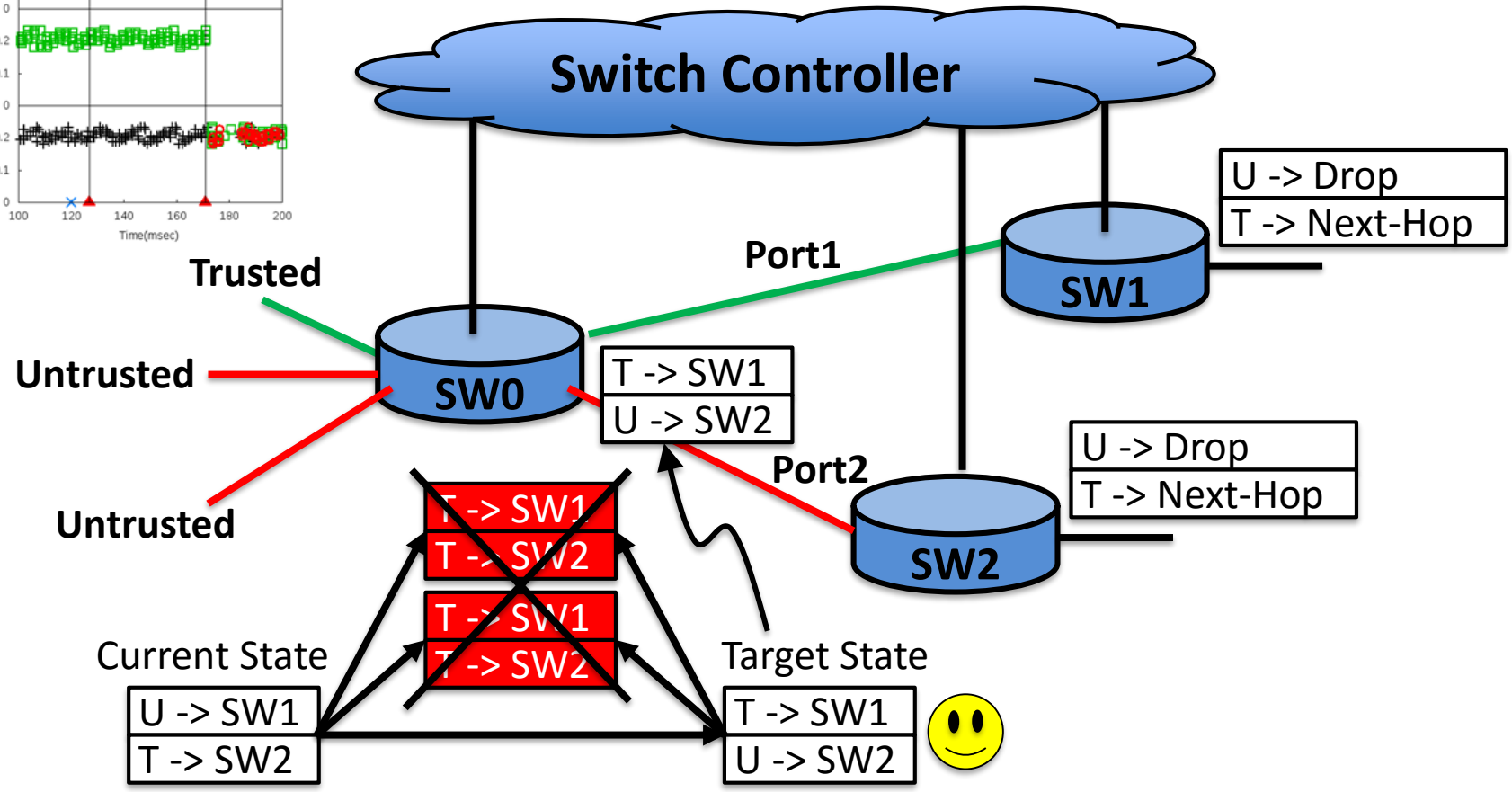


# Motivation

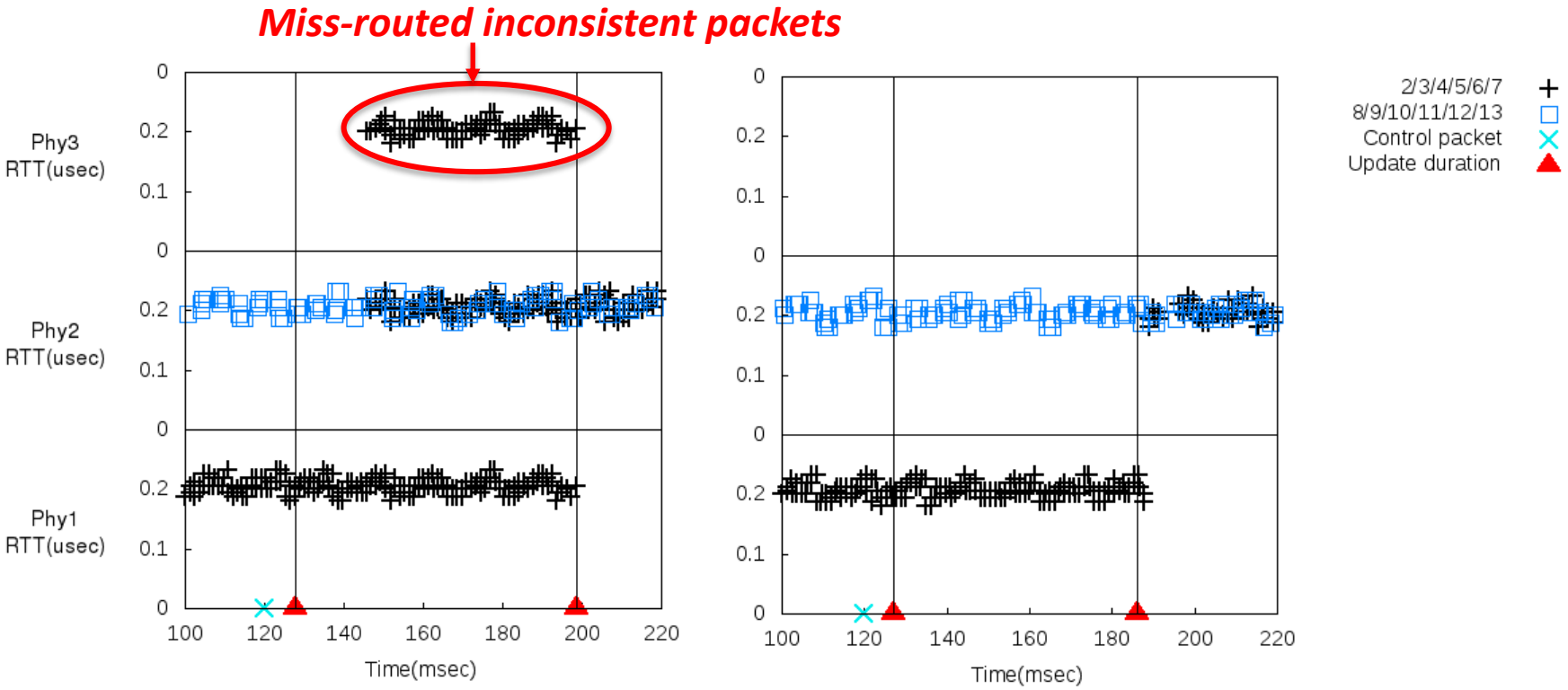
- *Atomic Update – Update All Rules with double-table*



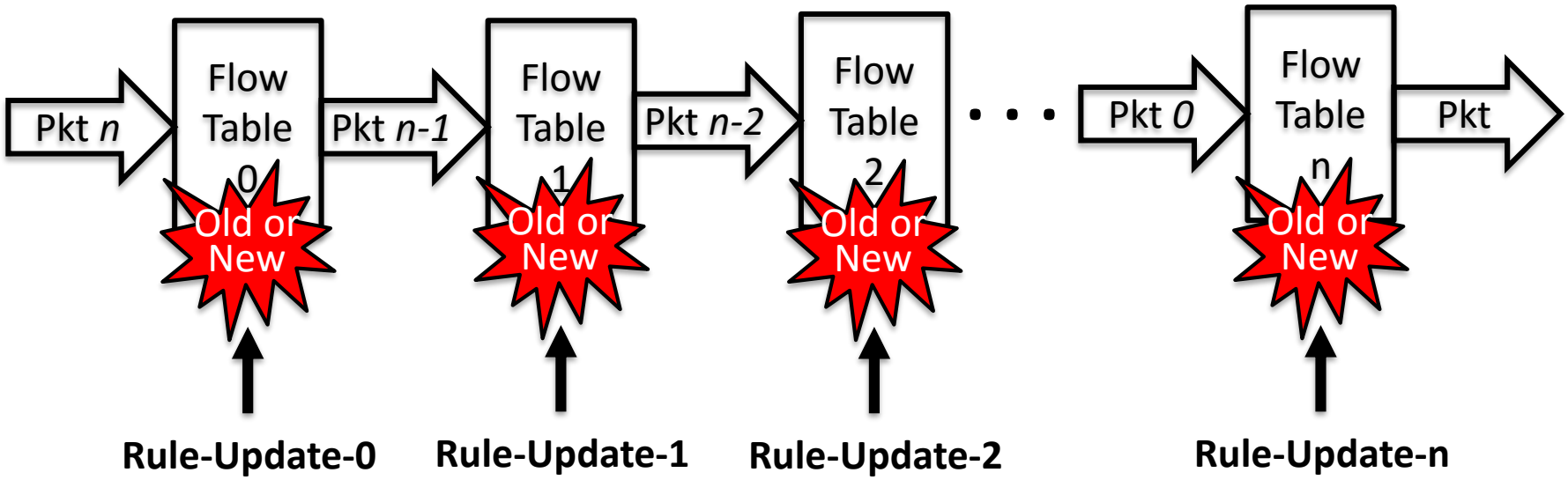
# Comparison of Rule Updates

- *Comparison of rule remove and insertion results of inconsistent and consistent flow tables*
- *Miss-routed packets appearing can cause security problems*



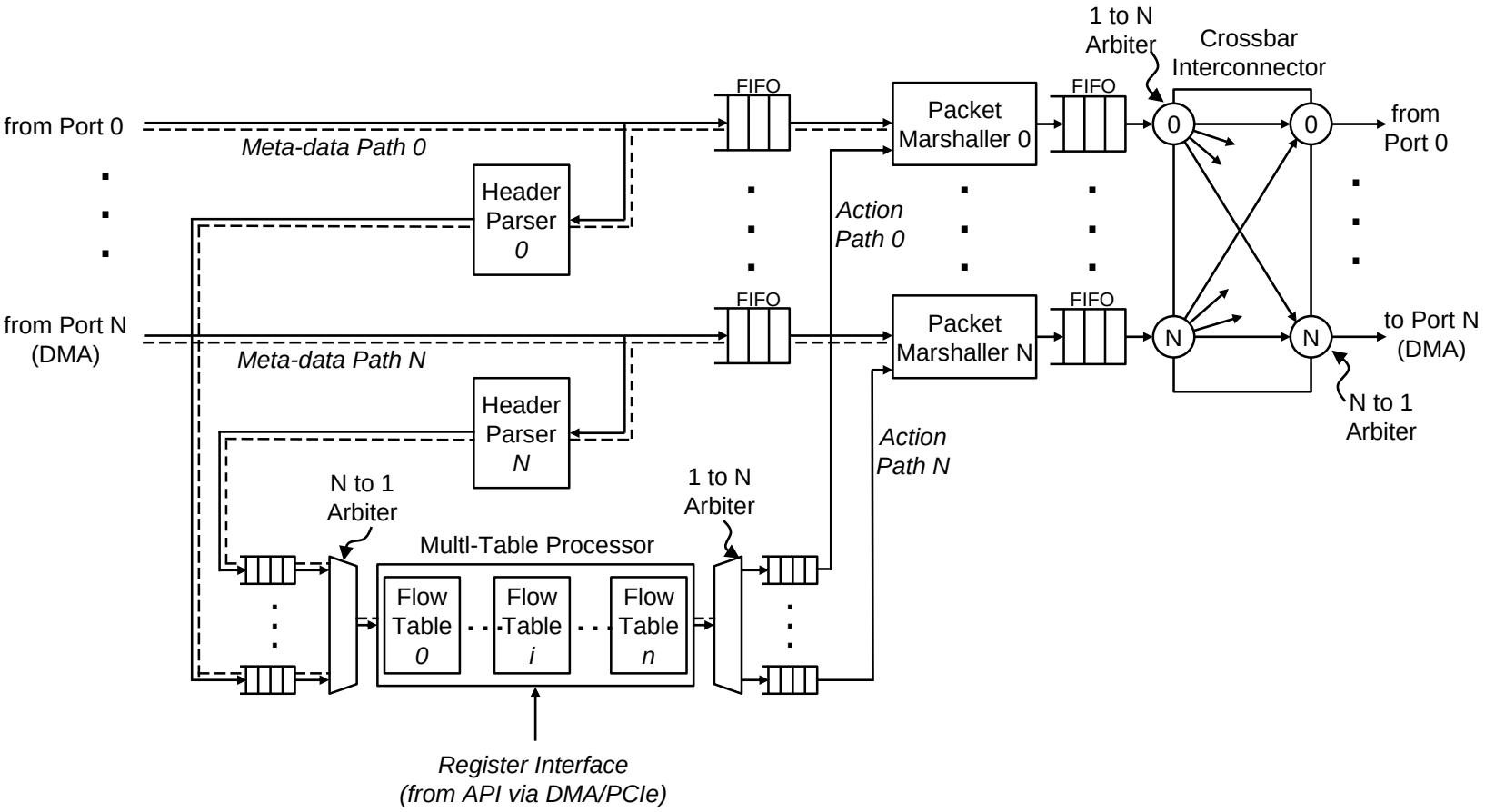
# Multi-Table OF Switch Structure

- *Multi-table structure adopted from Openflow switch specification 1.1*
- *Non-Atomicity Multi-Table Structures are vulnerable in consistent rule update*



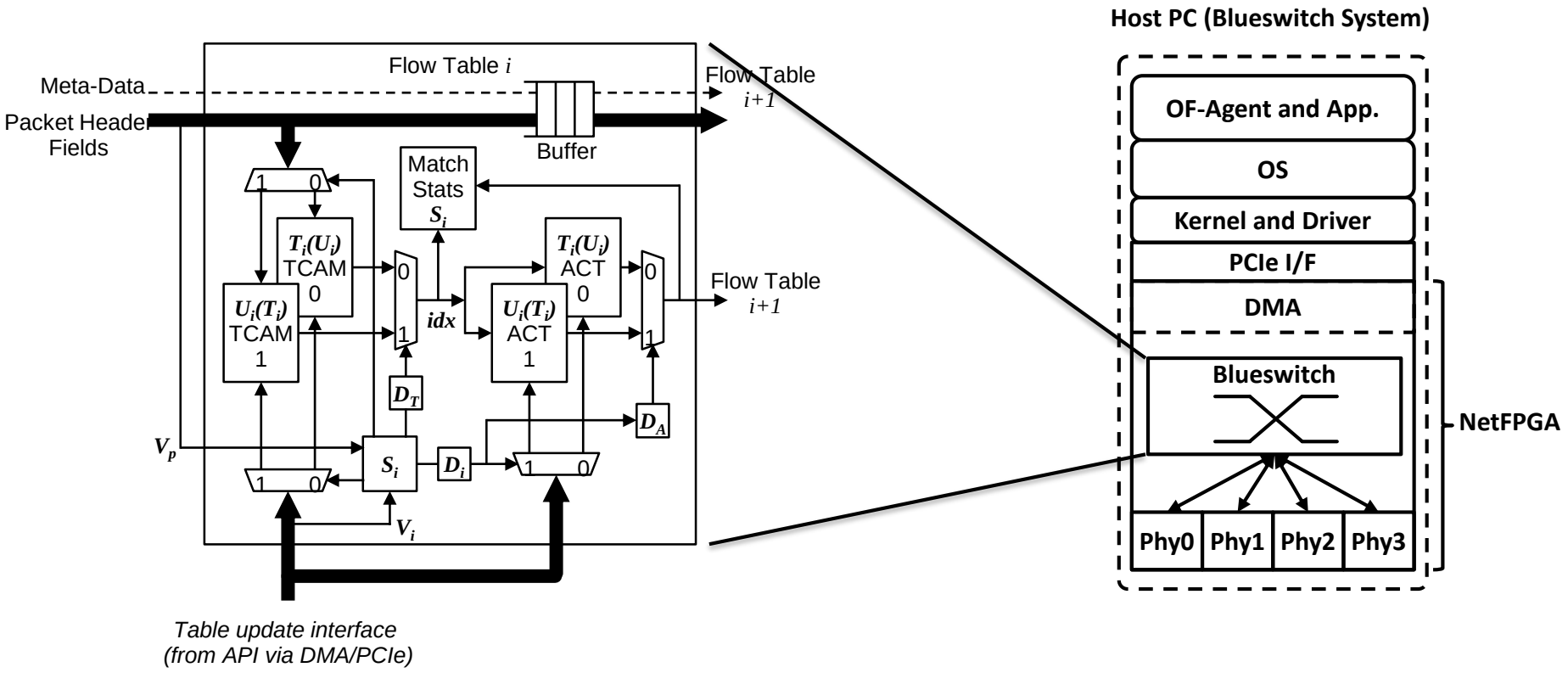
# Blueswitch Architecture

- *Blueswitch Data and Control Path Core Architecture*



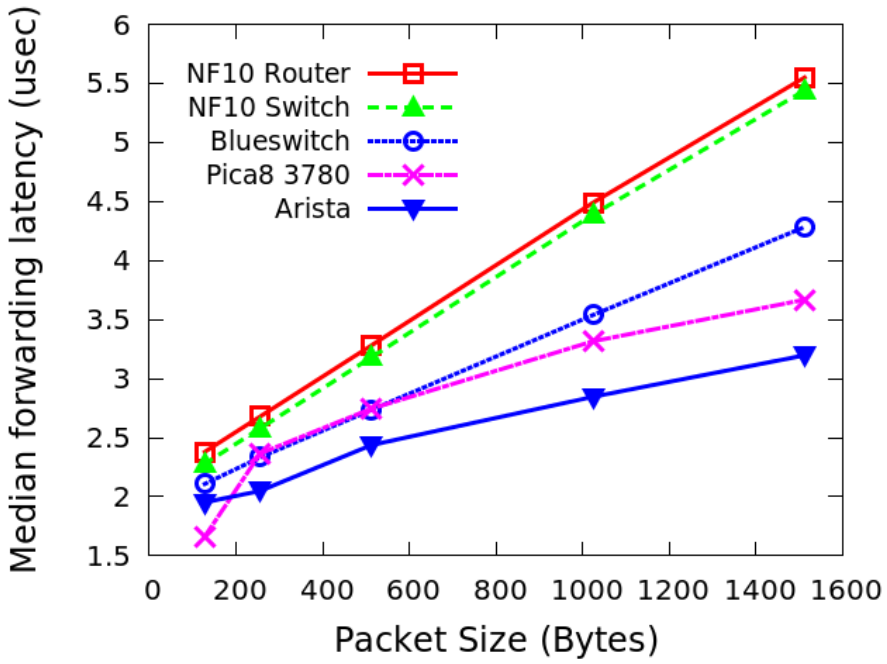
# Blueswitch Architecture

- *Double-buffer TCAM flow table structure*
- *Blueswitch implementation on NetFPGA-SUME*



# Performance Results

- *Latency of the switch measured RTT by OSNT packet generator and monitor*
- *Comparison between blueswitch, commodity switches and NF10 Router and Switch*



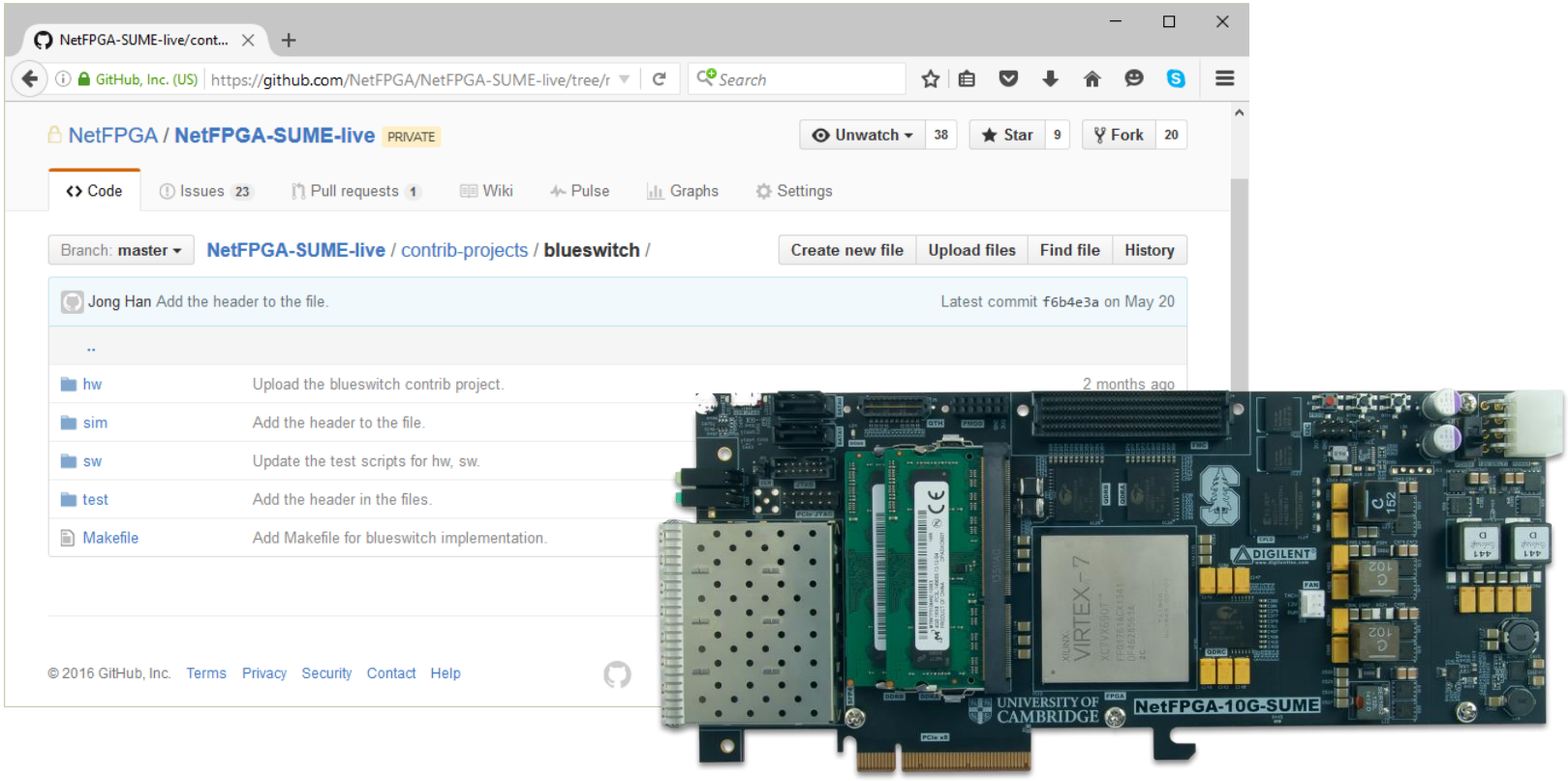
# Future Works

- *Developing OF-Agent for communication with OF controller, running on top of the switch*

- *Extending more flow-table – OF switch specification 1.5 requires 14 fields and can support up to 45 fields*

# Q & A

- *Blueswitch is available from NetFPGA-SUME-live github.*



# Experimental Setup

- *Experimental setup for consistency and inconsistency rule update tests.*
- *Blueswitch and OSNT packet generator on NetFPGA-SUME*