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Patchwork: Towards Testbed wide Traffic Profiling for FABRIC

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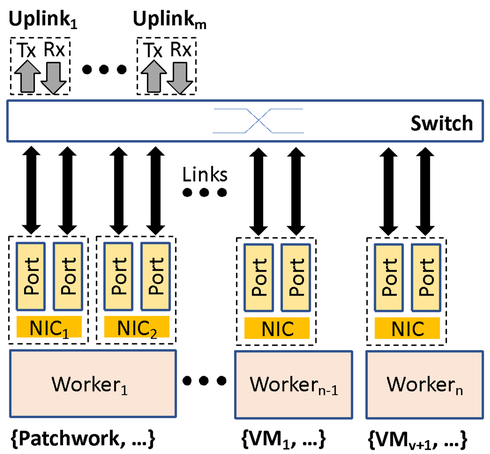
Introduction

- Increasing the observability of the dataplane of a large network testbed provides insights into the characteristics of the testbed's experiments through its network workloads. These insights also support debuggability for testbed users and operators, and help with capacity planning.
- Further, the state of traffic when experimenters run their workloads can help in ensuring **repeatability** of experiments that generated those workloads.

Motivation

1) Provide ***programmable*** observability into the FABRIC dataplane, useful for both operators and experimenters.

2) Create a user-friendly and low barrier implementation to achieve network profiling for FABRIC users.



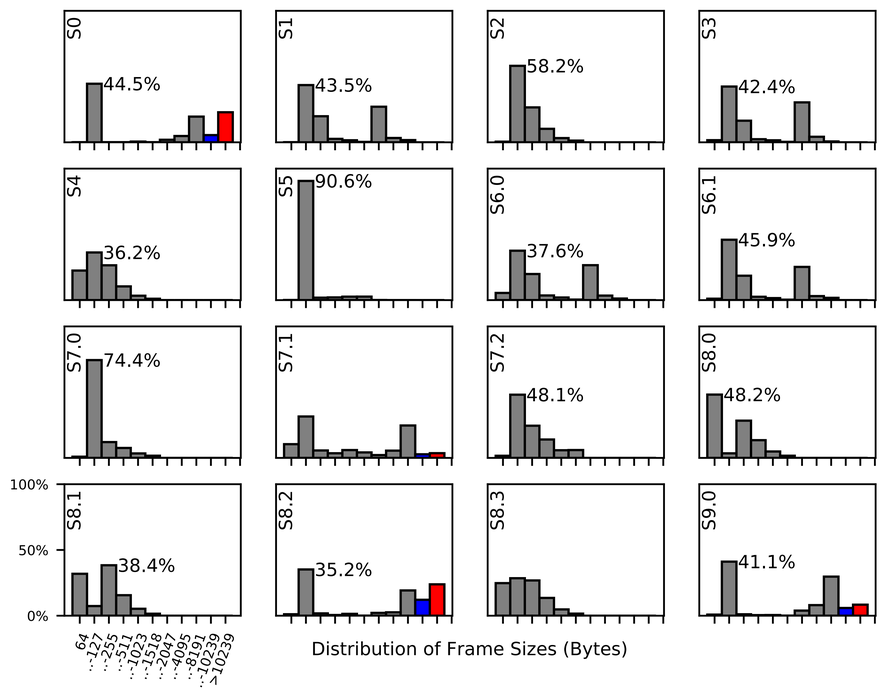
Reference

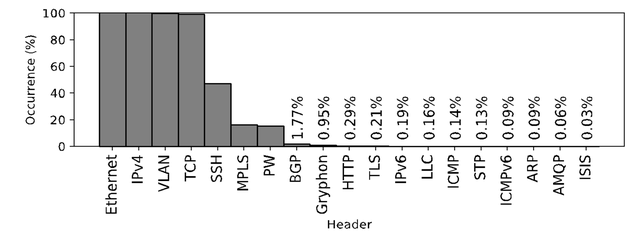
See our upcoming paper at CNERT'24:

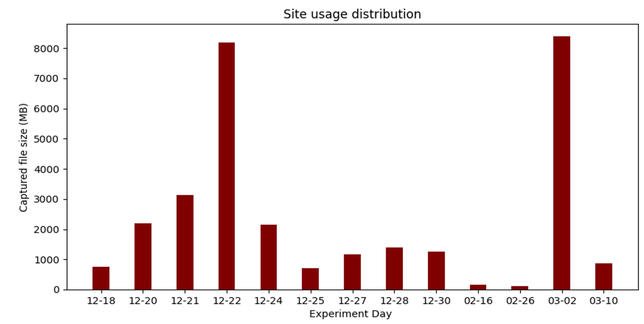
http://packetfilters.cs.iit.edu/patchwork/

Results

We create the first traffic profile for FABRIC. This includes frame size (left), header diversity (bottom), and cross-site activity (far bottom).







Approach

- Patchwork works in **three phases**: setup, sampling, and analysis.
- In the **setup phase**, the user provides sites to profile, and Patchwork sets up the network cards, CPUs, memory and port mirroring before submitting the request. Patchwork runs as **just another experiment** on the FABRIC testbed.
- For the **sampling phase**, we capture traffic and write a pcap file. Further scripts handle logging, archiving, compressing, and downloading the data from FABRIC.
- The **analysis phase** is where the pcap files are digested using high-quality packet parsers integrated in TShark. Finally, a profile of the network traffic is created. This profile describes different aspects of the traffic.

Acknowledgement

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