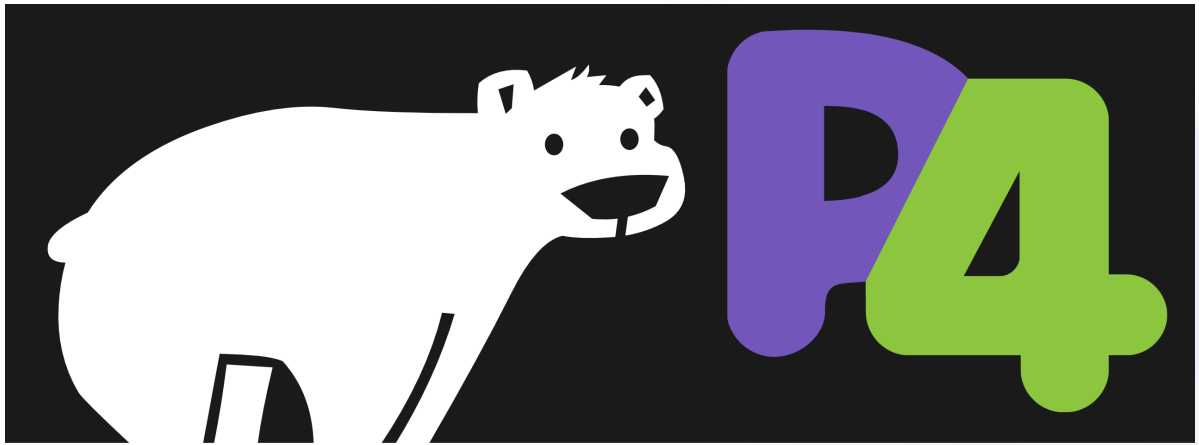

P4 Developer Day Tutorial Exercises

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Introduction

- Let's put what you've learned into practice by doing on a set of "hands-on" programming exercises.
- We've prepared a VM image with all the software you need. If you did not already download the VM, let us know.
- Work at your own pace. If you need help, ask one of the instructors or one of your neighbors.

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Getting Started

- **The VM username is p4 and password is p4.**
- **Open a terminal and type the following commands:**

```
$ cd p4_tutorial/P4D2_2017/exercises
$ git pull
```

- **Start Mozilla. The tutorial README is the home page.**

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Overview

- **There are four exercises:**
  - **L3 Forwarding**: *forwarding for IPv4*
  - **MRI**: *a scaled-down version of In-Band Network Telemetry*
  - **ARP/ICMP Responder***: the switch responds to ARP/ICMP requests*
  - **Calculator***: the switch will compute basic arithmetic expressions*
- **For each exercise, there is starter code and a test harness.**
- **Step-by-step instructions are in the README.md files.**

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Exercise 1

- **Exercise: IPv4 Forwarding**

- **Key tasks:**
  - **Update the source and destination MAC addresses**
  - **Decrement the TTL**
  - **Forward out the correct port**

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Exercise 2

- **Exercise: Multi-Hop Route Inspection (MRI)**

- **Key tasks:**
  - **Implement custom header that includes a switch ID**
  - **Add the header to every packet**
  - **At the destination, the sequence of switch IDs corresponds to the path the packet travelled through the network**

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Exercise 3

- **Exercise: ARP/ICMP Responder**

- **Key tasks:**
  - **Use the L3 forwarding table as a “database” for ARP/ICMP data**
  - **Add headers and logic to respond to ARP/ICMP requests**
  - **Respond to “pings” on behalf of hosts**

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Exercise 4

- **Exercise: Calculator**

- **Key tasks:**
  - **Implement custom header with operator and two operands**
  - **Switch performs the operation and returns the result**
  - **Network acts as a calculator**

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Getting Help

- There are several instructors in the room.
  If you get stuck, raise your hand.
- Feel free to work in pairs or small groups.
- Work at your own pace. You don't need to finish all the exercises today.
- Have fun!

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