

Introductory and Advanced Topics on P4 Programmable Data Plane Switches

Jose Gomez, Elie Kfoury
University of South Carolina
<http://ce.sc.edu/cyberinfra>
gomezgaj@email.sc.edu, ekfoury@email.sc.edu

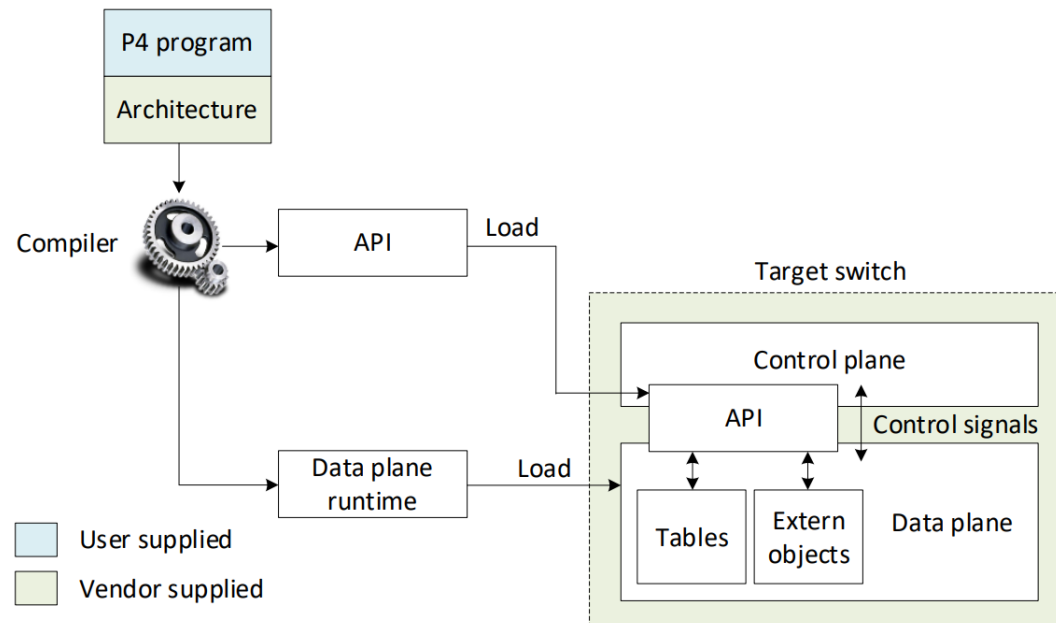
WASTC 2022 virtual Faculty Development Weeks (vFDW)
June 13, 2022

Introduction to P4 and BMv2

Lab activities are described in Lab 2, P4 Programmable Data Plane Switches (BMv2) lab series

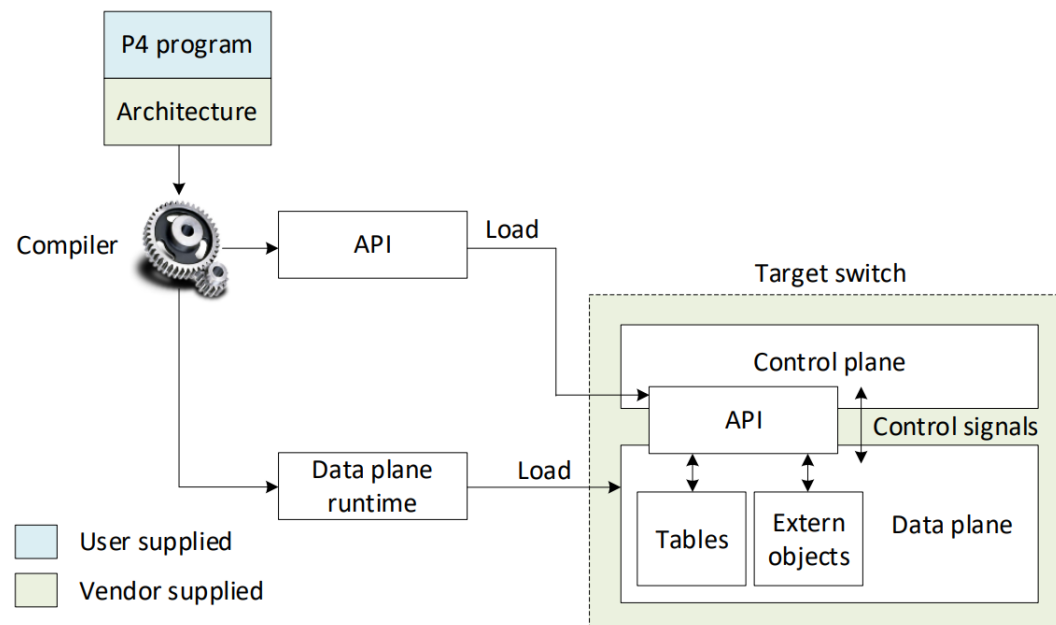
Workflow of a P4 Program

- The software development environment includes a compiler that maps P4 programs to a specific platform
- The compiler, the architecture model, and the target device are vendor specific
- The P4 source code is supplied by the user



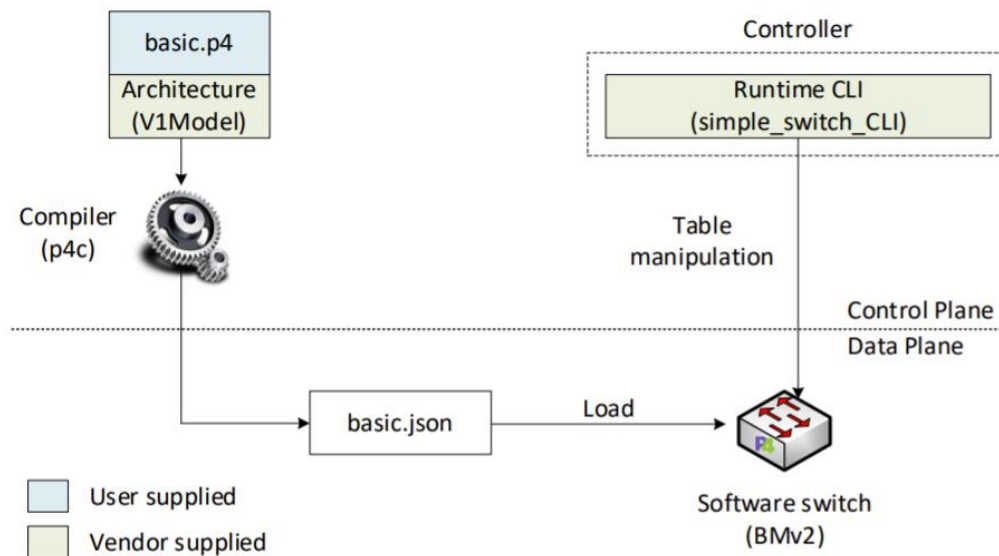
Workflow of a P4 Program

- The compiler generates a data plane configuration (Data plane runtime)
- It also generates runtime APIs that are used by the control plane / user to interact with the data plane
- The APIs contain the information needed by the control plane to manipulate tables and objects in the data plane



Workflow of a P4 Program

- Workflow used to program the BMv2 switch
- The labs use the V1Model architecture, the p4c compiler, and the BMv2 software switch



Workflow used in the lab series

Lab Topology and Objectives

- The topology consists of two hosts: h1 and h2; one P4 switch: s1
- Compiling a P4 program and pushing the output to the data plane
- Starting the switch daemon and allocating interfaces
- Testing and verifying the P4 program

```
root@s1: /behavioral-model
root@s1:/behavioral-model# simple_switch -i 0@s1-eth0 -i 1@s1-eth1 basic.json &
[1] 34
root@s1:/behavioral-model# Calling target program-options parser
Adding interface s1-eth0 as port 0
Adding interface s1-eth1 as port 1
```

