

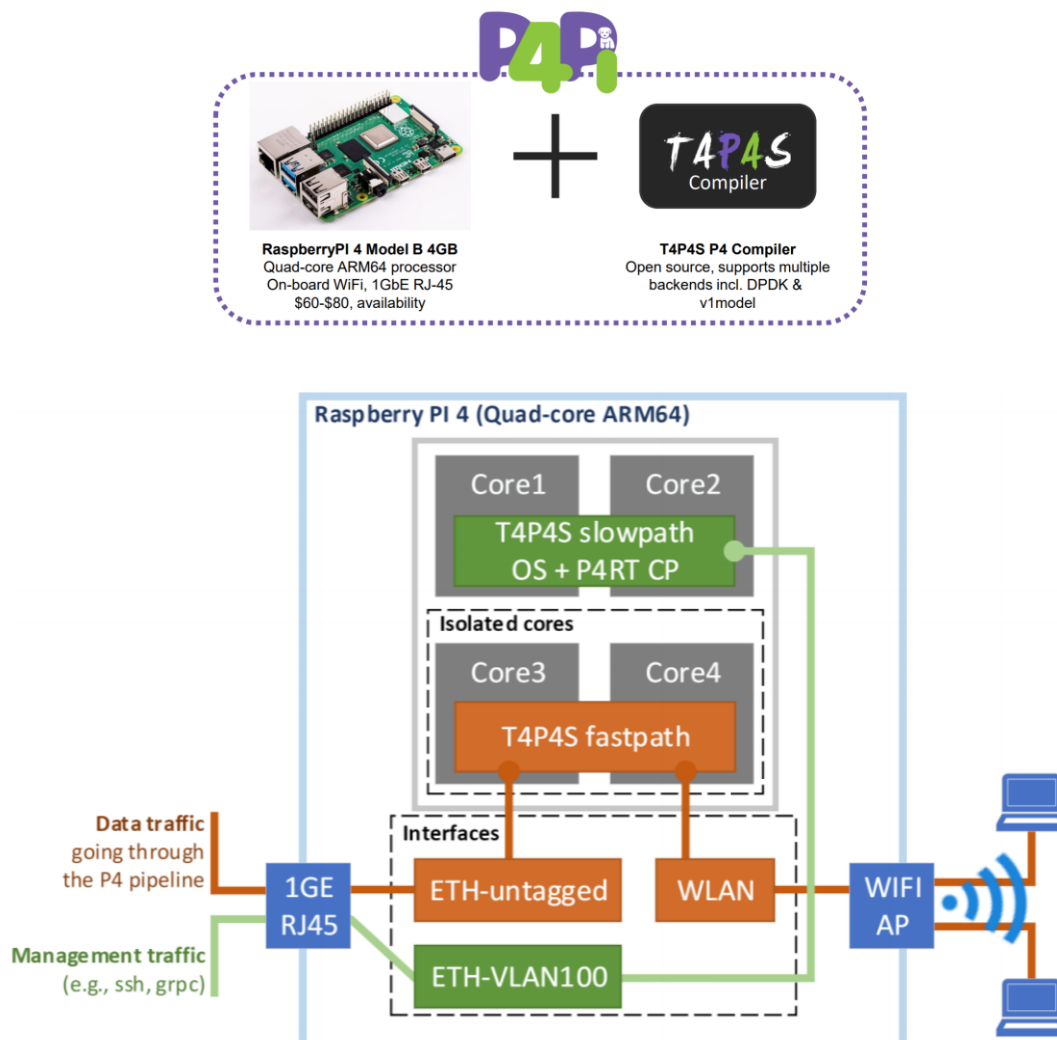


L3 Router Control Plane

Abstract

Routers are traditionally very expensive and complicated devices. In this project you will develop a modern layer 3 router using a novel Switch programmable language (P4). The hardware of the router is based on RaspberryPi 4 Single Board Computer(SBC) and the software is based on the P4 open source compiler T4PAS.

The Router's design is separated to a Data Plane – programmed in P4 and a Control Plane – programmed in python.



P4PI reference architecture:



Further information can be found in the P4Pi repo: <https://github.com/p4lang/p4pi>

Objective

The purpose of this project is to develop an Internet Router (Layer 3) on RaspberryPi SBC using P4 language for the data plane and Python for the control plane.

Project Overview

1. Rampup previous project (Data plane P4 router)
2. Study the P4 language: <https://github.com/p4lang/tutorials> and the videos: <https://www.youtube.com/playlist?list=PLf7HGRMAIJBw2uudODtQT2B7JRcNgm-vV>
3. Study the P4Pi and its components through executing the examples: <https://github.com/p4lang/p4pi/wiki/Running-P4-examples-on-P4Pi>
4. Install image file to the RaspberryPi SD card.
5. Develop the control plane of the router: Detailed instructions and Starter Code can be found at: <https://github.com/p4lang/p4pi/wiki/Building-an-Internet-Router-with-P4Pi>
6. Define KPIs (Key Performance Indicators) and analyze the performance of the system. Several routers can be connected in the lab to a private network.

Milestones

1. 02.04.2023 –
 - a. Rampup previous project
 - b. study the tutorials
 - c. Workplan for the rest of the semester
 - i. Goals
 - ii. Schedule
2. 03.07.2023 Final Presentation
 - a. PowerPoint Presentation (In person)
 - b. Final Report – Draft
 - c. Project Poster - Draft
3. 20.07.2023
 - d. Final Report
 - e. Project Poster



Notes

1. The above list is an estimate. Goals and tasks may be modified during the first few weeks of the semester.
2. General requirements for all LCCN Projects are specified at the lab website:
<https://lccn.cs.technion.ac.il/lab-courses/>

Prerequisites

Introduction to Computer Networks – 236334
Internet Networking - 236341

Instructor

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