Abstract:

P4PI is P4 (Data plain programming language) on Raspberry PI SBC (Single Board Computer used in many implementations including IOT). P4PI is a small scale functional programmable switch/Router based on open source code (T4P4S P4 Complier) and open source hardware.

P4PI reference architecture:
The data plain is P4 programmable with several switch architectures available. We will use the V1 model architecture to program a L2 switch using T4P4S switch program.

Further information can be found in the P4PI repo: [https://github.com/p4lang/p4pi](https://github.com/p4lang/p4pi)

**Purpose of the Project:**

The purpose of this project is to program a L2 switch and modify it to do a creative task for home or class use, eg.

- Private encrypted network (Tunneling)
- Load Balancing
- Network telemetry
- IOT applications (Sensor management and data processing)
- …

**What will be done in this project?**

1. Study the basics of P4 language and the P4PI framework ([https://github.com/p4lang/p4pi/wiki](https://github.com/p4lang/p4pi/wiki)).
2. Ramp up several examples from: ([https://github.com/p4lang/p4pi/wiki/Running-P4-examples-on-P4Pi](https://github.com/p4lang/p4pi/wiki/Running-P4-examples-on-P4Pi))
3. Suggest define (write a spec.) and implement a creative modification to the basic switch to create a useful application.
4. Study the application:
   a. Verify the spec of your application
   b. Define KPI (Key Performance Indicators)
   c. Verify those KPI to the P4PI’s limitations
5. Prepare a single slide poster for Projects Fair.
6. Document all work at GitLab and prepare a fool-proof 'How-To' document for the next semester follow-up projects.

Important Remark:

The exact measurements and analysis to perform will be defined along the progress of the project.

Learning Goals:

2. P4 language and architecture basics.
3. Industry oriented developing practices including analysis and documentation skills.

Prerequisites:

1. Introduction to Computer Networks (#236334) – Mandatory.
2. Internet Protocols (#236341) – Nice to have.

Instructor: Eran Tavor (tavran@cs.technion.ac.il)