ICA-1123 (Online)
Simple L2 Data Plane Project

Course Prospectus

ICA-1123 is a Level-1 online, instructor-led course module that demonstrates how to combine multiple features and mechanisms present in P4$_{16}$/TNA in order to create a simple Layer 2 data plane program. In the process, participants will also be introduced to several new important externs and mechanisms, such as port metadata, learn digests and entry idle timeouts. This course is recommended to all data plane developers who want to expand their P4$_{16}$/TNA knowledge and skills.

ICA-1123 is a part of Intel® Connectivity Academy Online course series.

Course Goals

Upon the completion of the course, the students will:

1. Learn how to implement Layer 2, VLAN-aware data plane with hardware-assisted learning and aging
2. Understand multiple data plane optimization techniques, such as port metadata and asymmetric tables
3. Understand the functionality provided by the Digest extern, its role in L2 learning and related APIs
4. Understand the concept of entry idle timeout and its specific implementation in Intel® Tofino™
5. Learn about the APIs for entry aging and different aging modes
6. Learn about source pruning functionality available in PRE and its application to Layer 2 switching
7. Understand the impact of various P4 coding techniques on both the data plane resource consumption as well as the control plane interface
8. Understand the methodology behind the design of the higher-level semantic APIs

Target Audience

This course is most suitable for practicing data plane and control plane designers, tasked with design and development of data plane and control plane programs for modern networking equipment. It does require attendees to have sufficient pre-requisite knowledge.

What is included?

The course fee includes the following:

- A 3-hour lecture (with short breaks) conducted online via Zoom (Zoom account associated with your work email address is required)
- Lecture and lab materials in PDF format (we highly recommend printing them before the start of the class)
- Two or five consecutive days of access to a personal, preconfigured lab VM (depending on the ticket)
- Online support by the instructor via a dedicated Slack channel

Pre-requisites

- Understanding of network and telecommunications architecture and protocols, specifically IP and IP Multicast, LAG and ECMP (ICA-1001)
- Understanding of the basics of P4$_{16}$ language in TNA architecture (ICA-1111, ICA-1112 and ICA-1113)
- Understanding of the basics of Intel® Tofino™ ASIC architecture (ICA-1141)
- Understanding of the PRE functionality (ICA-1121)
- Knowledge of C and C++ languages, especially as it relates to embedded and NOS development
- Knowledge of Python language
- Experience in data or control plane design is extremely helpful
- Good and reliable Internet access for both online lectures and VM access is a must

How to Apply

The up-to-date training calendar with the registration links can be found on Intel Connectivity Academy Support Portal. Currently this portal is separate from Intel.com and requires a separate account.

If you represent a commercial customer:

- If you do have an account on the Resource and Design Center:
  - Fill in this form to request an Intel Connectivity Academy account
- If you do not have an account on the Resource and Design Center:

- o Please contact your Intel Sales Representative or reach out to barefootsales@intel.com to request one

If you represent an academic or a research institution:

- If you do have an account on the Resource and Design Center:
  - o You should already have an account. If you forgot your password, you can always request password reset
- If you do not have an account on the Resource and Design Center:
  - o Please visit the Intel® Connectivity Research Program page for more information on how to apply.
  - o If your institution is not a member of Intel® Connectivity Research Program, membership is free, you get access to a lot of information and will join a thriving community of fellow researchers all over the world.

If you represent a governmental organization, reach out to barefootsales@intel.com

Logistics

An event-specific link to ticket purchase site will be provided on Intel® Connectivity Academy Calendar page accessible in the Resource and Design Center.

To attend an online presentation, you will need to create a **free Zoom account, associated with your work email address**. Upon the registration, you will receive a link to the online event. You will also receive an invitation to establish a Slack account for lab support, also **associated with your work email address**.

A high-speed internet connection is required to attend the online presentation. Call-in numbers for higher voice quality might be provided, depending on the region. Please, connect to the online meeting 15 minutes before the start to work out all potential connection problems.

All necessary materials, including the presentation PDFs and lab exercises will be available through the Resource and Design Center a day before the start of the class. We highly recommend that you print the presentation PDFs and use them to take notes. Alternatively, these presentations can be loaded on a tablet, where the notes can be taken with an electronic pen.

The information about the lab Virtual Machines will be provided at the end of the lecture. VMs will be kept running for the next two or five days, depending on the ticket type. This time can be extended through a separate arrangement.

Contact
For more information, please contact connectivity.academy@intel.com.