# ICA-1113 (Online)
# Layer 3 Processing.
# Counters, Meters and Registers.

### Course Prospectus

ICA-1113 is an introductory online, instructor-led course module that continues exploration of P416 in Intel® Tofino™ Native Architecture (TNA). It concentrates on stateful processing and the concept of a P4 extern, but also provides some exciting examples of taking P4 out of the realm of "traditional" switching. This module builds on top of ICA-1111 and ICA-1112. This course is recommended to anyone who wants to continue learning P4 language and is a required pre-requisite for other online courses.

ICA-1113 is a part of Intel® Connectivity Academy Online course series.

## Course Goals

Upon the completion of the course, the students will:

1. Learn to create more complex and realistic P4 programs that implement standard and non-standard IPv4 and IPv6 processing with emphasis on flexibility and target-independent optimization techniques
2. Understand the concepts of stateful objects and $P4_{16}$ externs
3. Learn how to use TNA stateful objects, both from the data and control plane perspective
4. Understand the difference between direct and indirect objects
5. Understand the details of Intel® Tofino™ implementation of counters and meters. Important Tofino2-specific enhancements are also discussed
6. Get basic introduction to general stateful processing in Intel® Tofino™ using registers

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## Target Audience

This course is most suitable for the data plane designers and architects as well as the engineers who plan to learn P4 programming in detail.

## 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

- General understanding of network and telecommunications architecture and protocols
- 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](#):
  - 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](#):
  - 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](#):
  - Please visit the [Intel® Connectivity Research Program](#) page for more information on how to apply.
  - 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](mailto: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](mailto:connectivity.academy@intel.com).