

Bristol,
November,
19th to 22nd
2018

BA-101 Introduction to P4 Data Plane Development with Tofino and Capilano™ SDE

BA-101 is an intensive 4-day course that provides a robust introduction to data plane programming in P4, Tofino™ device architecture and Capilano™ Software Development Environment (SDE), including Barefoot APIs and development workflows.

Course Goals

Upon the completion of the course, the students will have gained the following skills:

1. P4_14 Language fluency, allowing them to program in P4_14 as well as being able to read and understand P4 code written by others
2. Understanding of basic data plane development approaches and ability to design fullyfunctional data plane programs
3. Understanding of the architecture of the Tofino™ programmable pipeline and its main resources as it pertains to efficient data plane program development. This includes the ability to make informed choices about various P4_14 coding styles and practices.
4. Understanding of the main fixed function Tofino components, such as MACs, SerDes, and Packet Replication Engine (PRE) and related APIs necessary for both data and control plane development
5. Detailed understanding of Capilano™ SDE components, APIs and tools as well as practical skills in using them for data and control plane development

The course includes both lectures and extensive hands-on labs, conducted in a virtual simulation environment.

Target Audience

This course is most suitable for designers and architects, tasked with design and development of data plane and control plane programs for the modern networking equipment.

Pre-requisites

- General understanding of network and telecommunications architecture and protocols
- Knowledge of C language, especially as it relates to embedded and NO development
- Basic understanding of Python
- Each training attendee is required to bring their own notebook, as the training is done using AWS.

Sample Day Schedule

All 4 days of training will adopt the general schedule shown below:

- 08:00AM – 08:15AM: Arrival and Registration (only on the first day)
- 08:15AM – 08:30AM: Welcome
- 08:30AM – 11:00AM: Lecture/Presentation
- 11:00AM – 11:15AM: Coffee/Break
- 11:15AM – 12:30AM: Lab
- 12:30PM – 01:30PM: Lunch (Labs can be continued)
- 01:30PM – 03:30PM: Lecture
- 03:30PM – 03:45PM: Coffee/Break
- 03:45PM – 06:00PM: Lab

Curriculum

Below is the list of topics that will be covered during the course. Theoretical material will be reinforced through the labs.

Notice that the material is interleaved and therefore the list below does not represent the actual schedule.

- Introduction to P4 Language
 - Programmable pipeline model
 - Basic Language constructs
 - Automatic API generation
 - P4 development tools (BMv2-Tofino toolchain)
- Introduction to Tofino™
 - Tofino device architecture
 - P4 programming on Tofino
 - Tofino-specific pipeline components and P4 extensions
 - Tofino-specific optimizations and P4 programming approaches
 - P4 debugging on Tofino
 - Fixed function components and their interfaces

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- Introduction to Capilano™ SDE
 - SDE components, development and deployment workflows
 - Program-Dependent (PD) APIs
 - Barefoot APIs
- Port, SerDes, Multicast, Packet DMA, Mirroring
 - SDE initialization and High-Availability approaches
 - Port Management and Link troubleshooting
- The Art of Data Plane Development
 - Unicast Forwarding
 - Multicast and Broadcast
 - Learning and Aging
 - Statistics
 - ACLs
 - Link aggregation
 - Metering and QoS
 - Interfacing with the control plane
 - Tunneling and header manipulation

Important Notes

BA-101 is an introductory course, designed to cover a variety of material, therefore allowing the students to jumpstart their development. For in-depth exploration of the selected topics, please ask about our upcoming “Level 2” classes and video training modules

The in-depth coverage of the “switch” package (switch.p4, switchAPI and switchSAI) is a subject of a separate course. However, taking BA-101 will allow the students to easily read, understand and modify switch.p4 and related APIs. Excerpts from switch.p4 will be discussed and used as examples throughout the course.

Barefoot Capilano™ SDE is a software product, developed independently from the software available via p4.org. Some components of the SDE were contributed by Barefoot to p4.org, but the goals of the projects, the main tools and the workflows are different. p4.org software is a community-supported project with many resources freely available. This class covers SDE and not p4.org software

The current version of P4 compiler for Tofino accepts programs, written in P4_14 with Barefoot-specific extensions. Therefore, the class focuses on P4_14 and not P4_16 language. Future versions of the tools will accept both versions of the language.

EVENING PROGRAMME

Tuesday, 20th

We would like to invite all of you to a joint evening meal. The evening meal will provide you with a further ability to exchange your thoughts and ideas with other training participants and the Barefoot trainer Vladimir Gurevich.

The Chophouse restaurant is located in the same hotel as the training. More information on <https://www.futureinns.co.uk/bristol/restaurant-bar/>

Logistics

Public classes are conducted at the *Frys Suite* of:
Hotel Future Inns Bristol
Cabot Circus, Bond St,
Bristol.BS1 3EN
UK

To register, please complete the attached form and send it via Email to: academy@stordis.com

Registration fee includes quality printed manuals, lunch, snacks and beverages.

Training participants are expected to have a laptop for the training (no special software is required).

Pricing & Registration

Academic Participant 795,00 EUR per person (excl. VAT)
Corporate Participant 2.995,00 EUR per person (excl. VAT)
To register please complete the registration on page three.

Barefoot Academy Registration Form

Company Name

Contact Person

Phone Number

E-Mail

Participants

Name and Surname	<input type="text"/>	E-Mail	<input type="text"/>
Name and Surname	<input type="text"/>	E-Mail	<input type="text"/>
Name and Surname	<input type="text"/>	E-Mail	<input type="text"/>
Name and Surname	<input type="text"/>	E-Mail	<input type="text"/>

Prices

Academic Participant: 795 EUR per Person (excl. VAT)

Corporate Participant: 2.995 EUR per Person (excl. VAT)

Invoice Address

Company Name

E-Mail

VAT No.

Address 1

Address 2

Postcode/City

Country

Restaurant Booking (Official part of the training)

The Chophouse Restaurant, November 20th from 19:00 p.m

yes no

If yes, please indicate the number of seats to be booked

Dietary restrictions

Please indicate any dietary requirements i.e. Vegetarian, Vegan, Halal etc.

First name & Last name

Date, Location

Sign