

P4 Training

From January
28th to 31st 2020

Amsterdam, NL



BA-102 Introduction to Data Plane Development with P4₁₆ Tofino™ and P4Studio™ SDE

BA-102 is an intensive 4-day course that provides a robust introduction to data plane programming in P4, Tofino™ device architecture and P4Studio™ 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 (v.16) Language fluency, allowing them to program in P4 (v.16) 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 P416 Tofino Native Architecture (TNA) and its formal representation in P416 language
4. Understanding of the main pipeline hardware resources as it pertains to efficient data plane program development. This includes the ability to make informed choices about various P416/TNA coding styles and practices
5. Understanding of the BF-Runtime C++ APIs
6. Understanding of the main fixed function Tofino components, such as MACs, SerDes, and Packet Replication Engine (PRE) and related C and Python APIs necessary for both data and control plane development
7. Detailed understanding of P4Studio™ 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 the virtual simulation environment.

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
- Basic understanding of Python

Target Audience

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

Sample Day Schedule

All days of training follow the same general schedule:

07:45AM – 08:00AM: Arrival, Registration & Breakfast
 08:00AM – 11:00AM: Lecture
 11:00AM – 12:30PM: Lab
 12:30PM – 01:30PM: Lunch (Labs can be continued)
 01:30PM – 04:00PM: Lecture
 04:00PM – 06:00PM: Lab (Afternoon snack at 4pm)

Curriculum

The following topics 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 (v.16) Language
 - Programmable pipeline model
 - Basic Language constructs
 - Automatic API generation
 - P4 development tools
- 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 P4Studio™ SDE
 - SDE components, development and deployment workflows
 - BR-Runtime C++ APIs
 - Barefoot APIs for Fixed-Function Components
- Port, SerDes, Multicast, 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
 - Interfacing with the control plane
 - Tunneling and header manipulation

not covered are the Behavioral Model (BMv2), v1model and PSA P4 (v.16) architectures and P4Runtime.

P4 (v.16) compiler for Tofino and BF-Runtime APIs are still in beta and in active development as is BA-102 course material. While Barefoot Academy Team strives to introduce Barefoot customers to the leading-edge software, bugs, errors and omissions should be expected. The later versions of this course might significantly differ from the early ones.

Important Notes

BA-102 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.

In-depth coverage of the "switch-p4-16" package is a subject of a separate course. However, taking BA-102 course will allow students to easily read, understand, and modify switch.p4_16 and related APIs. Excerpts from switch.p4_16 will be discussed and used as examples throughout the course.

Barefoot P4Studio™ 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 tools, and the workflows are different. p4.org software is a community-supported project with many resources freely available. This class covers Barefoot SDE and not p4.org software. Specifically,

Logistics

Public classes are conducted at the premises of:
Delta Electronics (Netherlands) B.V.
Zandsteen 15
2132 MZ Hoofddorp
The Netherlands

Registration can be performed by filling out the attached formular and send via E-Mail 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 1.695,00 EUR per person (excl. VAT)
Corporate Participant 3.295,00 EUR per person (excl. VAT)

To register please complete the registration on page three.

Registration Form

Company Name	<input type="text"/>
Contact Person	<input type="text"/>
Phone Number	<input type="text"/>
E-Mail	<input type="text"/>

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 (without accommodation)

Academic Participant: 1.695,00 EUR per Person (excl. VAT)

Corporate Participant: 3.295,00 EUR per Person (excl. VAT)

Invoice Address

Company Name	<input type="text"/>
E-Mail	<input type="text"/>
VAT No.	<input type="text"/>
Address 1	<input type="text"/>
Address 2	<input type="text"/>
Postcode/City	<input type="text"/>
Country	<input type="text"/>

Restaurant Booking (Official part of the training) yes no
Denburgh Restaurant, January 29th from 19:00 p.m

Dietary restrictions

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

First name & Last name

Date, Location

Sign

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HOTELS ADDRESSES

We suggest you a list of 5 hotels to stay during the duration of the P4 Training

BASTION HOTEL AMSTERDAM AIRPORT



- Vuursteen 3, 2132 LZ Hoofddorp
- +31 (0)20 820 44 66
- 4 stars Hotel
- 900 m from the training location (10 min on foot)
- approx. 85€/night

HOTEL NH AMSTERDAM SCHIPHOL AIRPORT



- Kruisweg 495, 2132NA Hoofddorp
- +31 20 655 0550
- 4 stars Hotel
- 1000 m from the training location (12 min on foot)
- approx. 120€/night

BEST WESTERN AMSTERDAM AIRPORT HOTEL



- Vuursteen 1 , 2132 LZ Hoofddorp
- +31 (0)20 653 26 11
- 4 stars Hotel
- 900 m from the training location (10 min on foot)
- approx. 91€/night

HYATT PLACE AMSTERDAM AIRPORT



- Rijnlanderweg 800, 2132 NN Hoofddorp
- +31 20 542 1234
- 4 stars Hotel
- 200 m from the training location (2 min on foot)
- approx. 128€/night

CROWNE PLAZA AMSTERDAM - SCHIPHOL



- Planeetbaan 2, 2132 HZ Hoofddorp
- +31 23 565 0000
- 4 stars Hotel
- 1100 m from the training location (15 min on foot)
- approx. 151 €