

Advanced Track Agenda (morning session)

- **8:00 - 8:30am**
 - *Registration and Breakfast*
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- **8:30 - 9:00am**
 - Technical Set-up for Hands-on Lab
 - In order to complete the Developer Day exercises, we will distribute a virtual machine with all required software installed.
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- **9:00 - 9:10am**
 - Welcome and Introductions
 - Speaker: **Nate Foster** (Cornell University)
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- **9:10 - 10:30am (80 min)**
 - Tutorial overview: Building an SRv6-enabled fabric with P4 and ONOS
 - Session 1: Software tools basics
 - Hands on introduction to software tools used in this tutorial. Participants will be provided with a VM including a starter P4 program, PTF-based unit tests, skeleton ONOS app code, and Mininet script to emulate a fabric topology. In this session, students will be asked to apply changes to the P4 code and ONOS app to support controller packet-in/out for link discovery. The lesson will progressively introduce concepts around the use of arbitrary P4 programs with ONOS and how to re-use existing ONOS apps such as topology discovery with custom P4 programs. Students will also be introduced to using the PTF framework to write Python-based unit tests for their P4 program. By the end of this session, students will be able to run ONOS controlling a 2x2 fabric topology of stratum-bmv2 devices with links automatically discovered.
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- **10:30 - 11:00am**
 - *Break*
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- **11:00 - 12:30 (90 min)**
 - Session 2: Bridging
 - In this session students will have to extend both the P4 code and ONOS app to add support for L2 bridging for hosts connected to the same top of rack (ToR) switch, including host learning based on cloning of ARP/NDP packets, and set up of L2 forwarding entries. The lesson will cover concepts such as writing ONOS apps that react to events such as switch and host discovery, and programming of P4 table entries and packet replication groups.
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- **12:30 - 1:30pm**
 - *Lunch*
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Advanced Track Agenda (afternoon session)

- **1:30 - 1:50pm**
 - P4 Showcase:
 - Speaker: Dejan Vucinic, Western Digital Corporation

 - **1:50 - 2:10pm**
 - P4 Showcase:
 - Speaker: Ludovic Beliveau, Kaloom

 - **2:10-3:10 (60 min)**
 - Session 3: IPv6 routing
 - This session will focus on adding support for routing of IPv6 packets between different ToR switches. Students will have to modify their P4 program and ONOS app to handle IPv6 NDP Router Advertisement and Solicitation messages, as well as programming of P4 table entries and action profile groups to route packets across the fabric, using ECMP to distribute traffic between multiple spines.
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- **3:10 - 3:40pm**
 - *Break*
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- **3:40 - 4:40pm (60 min)**
 - Session 4: Segment Routing v6 (SRv6)
 - In the final session, students will focus on adding support for a simplified version of SRv6. By the end of the lesson students will be able to use the ONOS CLI to set waypoints across the fabric for specific flows.
 - **4:40 - 5:00pm**
 - P4 Showcase: "Leveraging P4 for Automated Switch Validation"
 - Speaker: Konstantin Weitz, Google

 - **5:00 - 5:20pm**
 - P4 Showcase:
 - Speaker: Arkdadiy Shapiro, Barefoot Networks

 - **5:20-5:30pm**
 - Closing Remarks
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- **5:30-6:30**
 - *Reception*