ns-3 Training

June 11-12, 2018, NITK Surathkal, Mangalore, India

The ns-3 Consortium[1] will offer training on the ns-3 simulator at its June 2018 annual meeting in Mangalore, prior to the Workshop on ns-3. While extensive documentation is available on the public website[2] of the project, this two-day training session offers users the opportunity to learn from several of the lead maintainers of ns-3 about the scope and capabilities of the tools, how to run simulations, and how to write new code for ns-3.

Instructors

Sessions will be taught by several of ns-3's open source maintainers. The following are planning to lead a session:

- **Sebastien Deronne.** Sebastien has been the Wi-Fi maintainer in ns-3 since 2015, and works professionally as Wireless Expert at Televic Conference. Sebastien has been active with ns-3 for eight years.
- **Tom Henderson.** Tom is an ns-3 project founder and lead maintainer of the open source project, and has been active with ns-2 and ns-3 for twenty years, most recently through the University of Washington.
- **Natale Patriciello**. Natale is currently a research scientist at CTTC (Centre Tecnològic de Telecomunicacions de Catalunya) in Barcelona (Spain). He is active in the development of TCP module of ns-3 and closely follows the development of 5G NR (New RAN) module in ns-3, and the Linux kernel networking stack evolution, with an emphasis on the TCP module.
- **Mohit P. Tahiliani.** Mohit, an Assistant Professor at NITK Surathkal, has been supervising many ns-3 related student projects on the topics of TCP, Active Queue Management (AQM) and Explicit Congestion Notification.

Topics

The two days of training will be organized around the basic simulator on Monday and more advanced topics and extensions on Tuesday. We will reserve a portion each day for interactive Q&A and guidance from the instructors, allowing deeper treatment of topics of particular interest.

Monday June 11	**Tuesday June 12**
• **ns-3 survey and overview tutorial**, starting from first principles and walking through the running of simulations, configuration management, architecture of the software core, network emulation, and development practices using ns-3. • Methodology and workflow for **developing new models in ns-3**, using a case study. • Several tools used to **extract and visualize data** from ns-3 simulations, including the flow monitor, network animator NetAnim, Python-based visualizer, and the ns-3 tracing system.	• Introduction to the **traffic control models** for priority queuing and explicit congestion notification in ns-3. • Advanced modes of the simulator, including **MPI-based distributed simulations**, an introduction to the **Direct Code Execution (DCE)** environment, and **emulation** modes. • A survey of the **Wi-Fi** models in ns-3, including model architecture for both MAC and PHY layers, network configurations for some typical use cases, and an overview of mobility and propagation models • A survey of the **LTE** models, including model architecture, propagation models, LTE Radio Protocol Stack and EPC model.

[1] http://www.nsnam.org/consortium/about
[2] http://www.nsnam.org

Prerequisites

Basic proficiency in C++ programming is considered a prerequisite for working with ns-3. A basic understanding of computer networking protocols and technology such as TCP/IP, and wireless and wired models (e.g. Ethernet, Wi-Fi, and LTE) is also assumed. Python or bash programming skills may also be helpful but are not required.

Participants will be shown how to compile, test, and debug programs using the Linux operating system and the GNU Compiler Collection (gcc). A basic capability to run programs from the Linux or Mac OS X command line is strongly recommended. The training will be conducted with a mix of Linux and OS X (depending on speaker preference).

Schedule

Training will run from 09h00-18h00 on Monday and Tuesday, with a morning and afternoon tea/coffee break and a lunch break. ns-3 training covers the first two days of a week-long event schedule, and attendees are welcome to attend other events later in the week. On Wednesday, the tenth annual Workshop on ns-3, in cooperation with the ACM, will be held; this single-track workshop will feature original research papers regarding the design and performance of ns-3 software. On Thursday, a poster session and lab tour will be held in the morning, and the ns-3 Consortium Annual Plenary will be held in the afternoon, and the balance of the week will be reserved for ns-3 developer discussions, talks by industry participants, and an educational workshop. Attendance is free and open for Thursday and Friday events.

Materials

A bootable Live-CD for an Intel x86 architecture, with ns-3 and related software pre-installed, will be provided. This can be run inside a virtual machine or native on x86-compatible laptops. However, attendees are encouraged to download and build ns-3 on their machine of choice prior to the workshop, and to review the online tutorial.

All other materials will be provided via the Internet. Guest WiFi access will be available to attendees.

Registration

Registration must be made with a credit card at: https://washington.irisregistration.com/Register?code=3911. Registration must be paid in full prior to attending the first session. To allow for proper planning, all attendees are requested to register by one week prior to the event, or to contact the organizers if within the one-week window.

All proceeds, after meeting costs are covered, will be deposited to the NS-3 Consortium gift account at the University of Washington, to support the open source project activities.

Local Information

WNS3 and the associated events will take place at NITK Surathkal, Mangalore, India. Local information, including links to accommodations and information about getting to NITK Surathkal is available at this local information page. Contact the meeting general chair, Prof. Mohit Tahiliani, with any logistical questions or concerns.

Meals

Tea / Coffee services (morning and afternoon) and a lunch will be provided at NITK Surathkal Canteen.