NS-3 Consortium
Annual Meeting

NS-3 Annual Meeting June 2019
Agenda

• Consortium overview
  – History, structure, membership
  – Budget status
  – Recognition
  – WNS3 2019 (review) and future plans

• Open source project status and discussion
  – Summary of recent software activity
  – Future directions

• Any other business
Remembrance

• Project co-founder George Riley

Major ns-3 contributions from his prior work on PDNS and GTNetS
• MPI-based distributed simulation
• Initial TCP implementation
• OnOffApplication, BulkSendApplication
• NetAnim
• NixVector routing
• Key network stack elements (Node, Socket, Ipv4 objects)

Supervised or led many early contributors including:
• John Abraham, Raj Bhattacharjea, Jared Ivey, Josh Pelkey, Brian Swenson
Consortium organization

- Original agreement established in 2012 (Inria and UW) to help sustain the open source project
  - Provide an interface for industrial and academic members to contribute and interact with the open source project
  - Organize an annual workshop and meeting
  - Handle funding for the project
  - Handle administrative and logistical issues for the project
- Recently reconstituted as “University of Washington NS-3 Consortium”

More details at [https://www.nsnam.org/consortium/](https://www.nsnam.org/consortium/)
Current and recent membership

• Founding Executive Members
  – INRIA, University of Washington

• Additional Executive Members
  – CTTC, Georgia Tech, INESC TEC, NITK Surathkal

• Consortium Members (through 2018)
  – Lawrence Livermore National Laboratory
  – Huazhong University of Science and Technology (HUST)
  – CMMB Vision
  – CableLabs
Classes of Consortium Members

- **Class I Consortium Members:**
  - For-profit entities with more than 500 employees
  - Annual Dues: $15,000

- **Class II Consortium Members:**
  - For-profit entities with 20 or more and less than 500 employees
  - Annual Dues: $7,500

- **Class III Consortium Members:**
  - For-profit entities with less than 20 employees
  - Annual Dues: $1,500

- **Class IV Consortium Members:**
  - Non-Profit Organizations, governmental organizations, and U.S. Federally Funded Research and Development Centers (FFRDCs)
  - Annual Dues: $1,500
Current Advisory Board

- Tom Henderson * (University of Washington)
- Sumit Roy ** (University of Washington)
- Walid Dabbous (INRIA)
- Damien Saucez (INRIA)
- Lorenza Giupponi (CTTC)
- Manuel Ricardo (INESC TEC)
- Doug Blough (Georgia Institute of Technology)
- Mohit Tahiliani (NITK Surathkal)

* Director

** Associate Director
Budget status

• Consortium raises small amounts of funding, to pay for annual meeting and low-cost infrastructure/services

• Income sources
  – Google Summer of Code and GCI
  – Consortium membership fees
  – WNS3 registration fees

• Consortium accounts hold roughly $22,000, prior to WNS3 and web design revenue/expenses
WNS3 past and present

• Thanks to Matt Coudron and Damien Saucez for WNS3 2019
  – Eric Gamess served as Proceedings Chair
  – No significant issues arose during WNS3 review process

• Initiating plans for WNS3 2020 in North America

• Damien has completed a two-year term
  – Eric plans to stay on as Proceedings Chair
Open source recognition

• High levels of activity in the past year (> 25 commits since WNS3 2018)
  – Zoraze Ali
  – Stefano Avallone
  – Sebastien Deronne (107 commits!)
  – Tom Henderson
  – Alexander Krotov
  – Manuel Requena
  – Natale Patriciello
  – Tommaso Pecorella
Open source project highlights

• App store launched in September 2018
• Project repositories moved from Mercurial to Git (GitLab.com) in December 2018
  – Thanks to Natale Patriciello and Zoraze Ali
• New static web site (based on Jekyll framework) installed
  – Documentation licensed to CC BY-SA 4.0
• Google Code-In attracted 46 students who worked on 380 tasks
• Google Summer of Code 2019 awarded us four students
Open source project status

• ns-3.29 (September 2018)
  – TCP PRR and ECN
  – Wi-Fi PCF
  – PRIO queue disc
  – 3GPP HTTP traffic model

• ns-3.30 (shortly)
  – LTE Radio Link Failure (RLF)
  – Enhanced EPC and backhaul
  – Wi-Fi preamble detection model and PHY upgrades
  – Cobalt queue disc
  – Full Python 3 support

• Apps
  – QUIC, sem, NDN, OpenAI Gym, mmWave, LTE PS
GSOC: NS-3 Data Center Networking (DCN)

- **Student:** Liangcheng Yu, University of Pennsylvania, USA.
- **Mentor:** Dizhi Zhou, Mohit P. Tahiliani
- **Project goal:** Enhance NS-3 for DCN, specifically flow-based performance optimization
- **Benefit to ns-3:** Support NS-3 further for DCN research.
- **Main Milestones:**
  - **Phase 1:** Implementation and testing of DCN scheduling (MLFQ).
  - **Phase 2:** Implementation and testing of DCN environment (spine-leaf).
  - **Phase 3:** Documentation and DCN simulation examples.
GSOC: Improving the ns-3 App Store and Linking with Bake

- **Student:** Mishal Shah, National Institute of Technology Karnataka, India.
- **Mentors:** Abhijith Anilkumar, Ankit Deepak
- **Project goal:** The project aims to link the Bake build system with the ns-3 AppStore and add features to the ns-3 AppStore.
- **Benefit to ns-3:** Ease the process of installing new modules to have a smaller ns-3 core.
- **Milestones:**
  - **Phase 1:** Port ns-3 AppStore to python3, build REST APIs for install, search options.
  - **Phase 2:** Bake integration for install, update, search command.
  - **Phase 3:** Download stats, multi thread comments on AppStore.
GSOC: TCP Testing and Alignment

- **Student**: Apoorva Bhargava
- **Mentors**: Tom Henderson, Vivek Jain, Mohit Tahiliani
- **Project Goal**: Alignment and Testing of ns-3 TCP with Linux TCP using ns-3 Direct Code Execution (DCE) framework

- **Benefit to ns-3**:
  - Provides users a more realistic implementation of TCP
  - Documentation of the differences between ns-3 TCP and Linux TCP

- **Milestones**:
  - **Phase 1**: Align ns-3 implementation of PRR, ECN and DCTCP with Linux and test it.
  - **Phase 2**: Align ns-3 implementation of SACK and DSACK with Linux and test it.
  - **Phase 3**: Align ns-3 implementation of RACK and Paced Chirping with Linux and test it.
GSOC: Integration of the 3GPP TR 38.901 channel model

- **Student:** Tommaso Zugno, University of Padova
- **Mentor:** Natale Patriciello, CTTC
- **Project goal:** to integrate the channel modelling framework described by 3GPP TR 38.901
- **Benefit to ns-3:** inclusion of a new channel model supporting the modelling of wireless channels between 0.5 and 100 GHz in different propagation environments
- **Milestones:**
  - **Phase 1:** channel condition model
  - **Phase 2:** pathloss and shadowing models
  - **Phase 3:** fading model
Software Freedom Conservancy

• Considering applying to the SFC
Project priorities

- GUI and ease-of-use
  - animators not maintained
- DCE sorely in need of update
  - stuck on kernel 4.4 (Jan. 2016) and Ubuntu 16
- More code into the app store
- Documentation updating
- Missing models (Switched Ethernet, modern HTTP, Linux default TCP, ...)
  - Also ‘simple’ models (see ease-of-use above)
- Onboarding projects and educational scripts
- Others?

“A goal without a plan is just a wish.” Antoine St. Exupery