NS-3 Consortium Annual Meeting

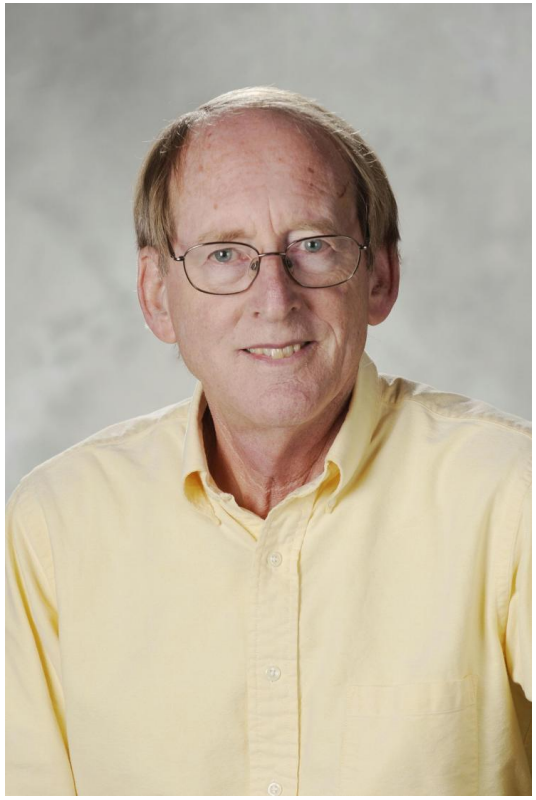
NS-3 Annual Meeting June 2019

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/

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

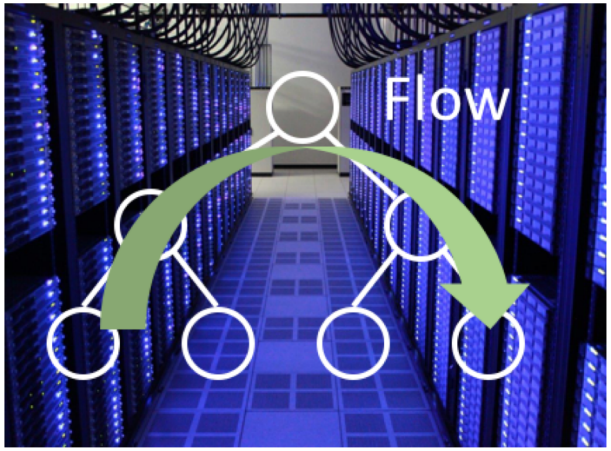
- App store launched in September 2018
- Project repositories moved from Mercurial to Git (GitLab.com) in December 2018
  - Thanks to Natale Patriciello and Zoraze Ali
- New static web site (based on Jekyll framework) installed
  - Documentation licensed to CC BY-SA 4.0
- Google Code-In attracted 46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

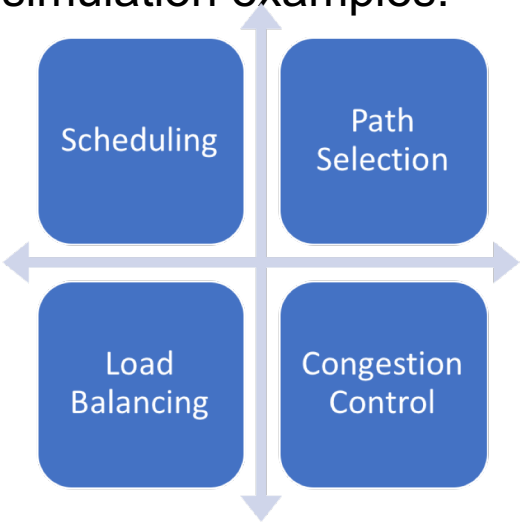
Open source project status

- 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)

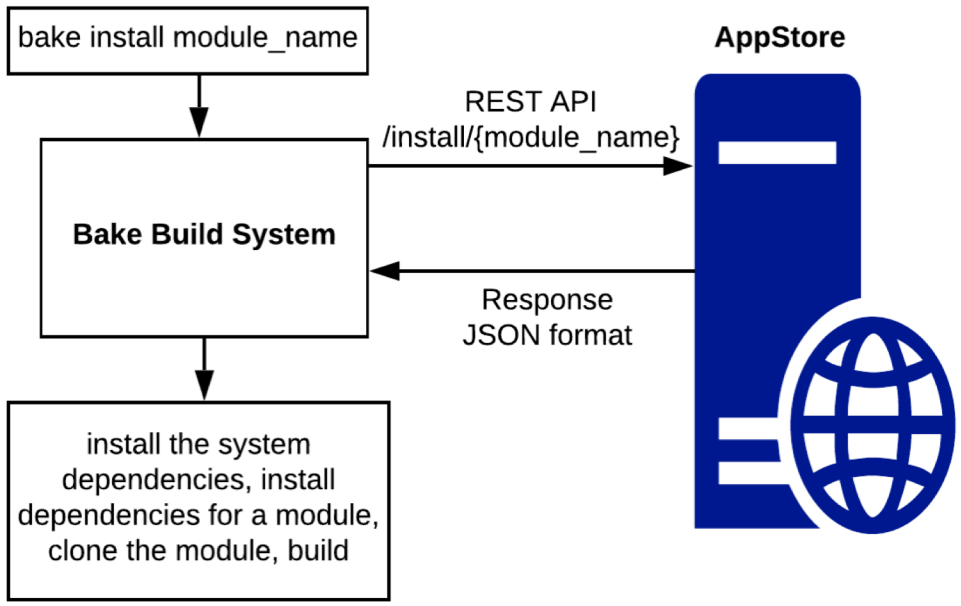
- **Student:** Liangcheng Yu, University of Pennsylvania, USA.
- **Mentor:** Dizhi Zhou, Mohit P. Tahiliani
- **Project goal:** Enhance NS-3 for DCN, specifically flow-based performance optimization
- **Benefit to ns-3:** Support NS-3 further for DCN research.
- **Main Milestones:**
  - **Phase 1:** 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.

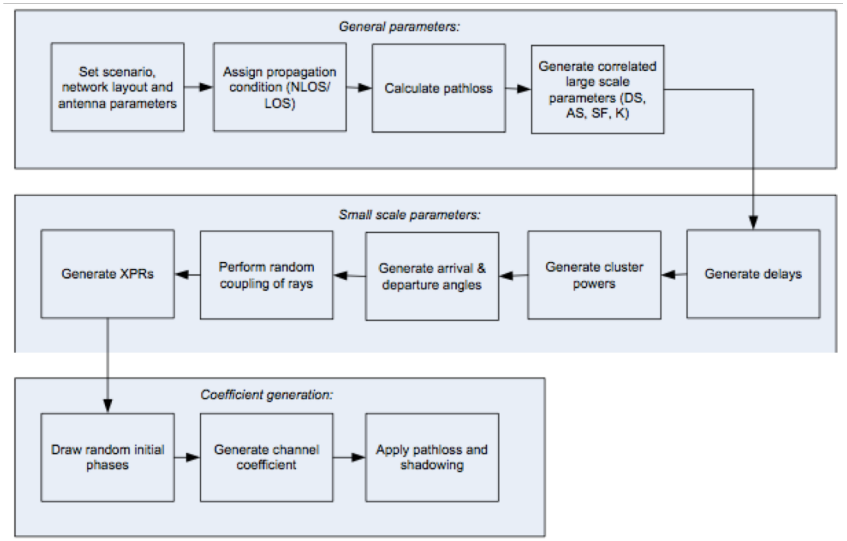


GSOC: TCP Testing and Alignment

- **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.

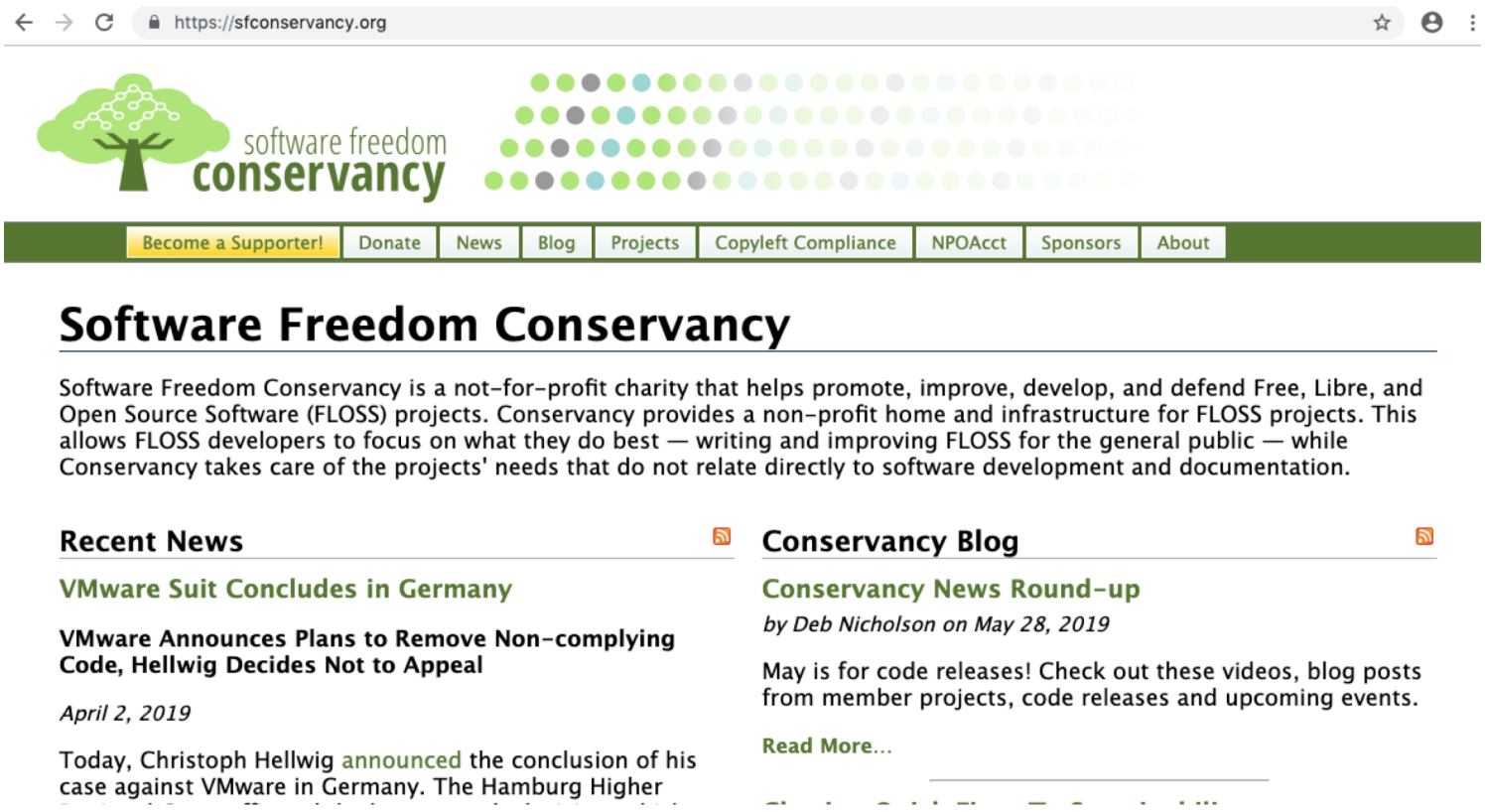
GSOC: Integration of the 3GPP TR 38.901 channel model

- **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