Network Simulations Using the ns-3 Simulator

The ns-3 project: http://www.nsnam.org

ns-3 Project Overview
ns-3 is an open source project developing a new simulation environment for networking research, with two broad goals:
- Develop a tool aligned with the simulation needs of networking research;
- Provide an open-source project that encourages community contribution, peer review, and validation of the software.

- ns-3 basic information:
  - ns-3 is a new simulator (not backwards-compatible with ns-2);
  - C++ core with Python scripting;
  - ns-3 licensing is GPLv2;
  - First stable software release was in June 2008.

- Project Support:
  - NSF grants CNS-0551686, CNS-0551378, CNS-0551706;
  - Planete, INRIA Sophia Antipolis;
  - Georgia Institute of Technology;
  - The University of Washington;

What’s New in ns-3
ns-3 responds to trends in how Internet research is being conducted:
- Extensible software core: extensive use of C++ design patterns with components from yans, Georgia Tech Network Simulator (GTNetS) and ns-2;
- Attention to realism: use of IP addressing, APIs similar to real implementations;
- Software integration: use of real TCP implementation code, a novel ELF loader for integrating applications, reuse of pcap-based analyzers, etc.
- Support for virtualization and testbeds: several modes of virtual machine integration, including integration with testbeds;
- Flexible tracing and statistics: callback-based tracing architecture allows heavy customization of simulation data output;
- Attribute system: systematic documentation and configuration of most values and variables in the system;
- New models: new WiFi PHY/MAC models, IPv6 and WiMax under development.

Today’s Demo Overview
Designed to illustrate two views of ns-3
ns-3 Workflow
A look at a representative workflow of a networking researcher using simulation, and some aspects of ns-3 that may aid the process:
- Scenario and model development;
- Scenario scripting and simulation execution;
- Data output collection;
- Data analysis.

Mixed wireless scenario
A scenario illustrating some of the new features and models of ns-3:
- Multi-interface wireless nodes; adhoc and infrastructure WiFi;
- Real-time scheduler, emulation and virtual machine integration;
- ns-3 process environment for easily ported applications;
- Network Simulation Cradle port of Linux 2.6.18 stack to ns-3.