



ns-2 Tutorial

Haobo Yu, Nader Salehi
USC/ISI
{haoboy,salehi}@isi.edu

Overview

- ◆ Project goals and status
- ◆ What is ns
- ◆ History and status

- ◆ Seminar schedule

Goals

- ◆ VINT: Virtual InterNet Testbed
- ◆ A **collaborative** simulation platform
 - Provide common reference → promote sharing
 - Test suites → increase confidence in results
- ◆ Intended audience
 - Researchers
 - Developers
 - Educators

What is NS

- ◆ Discrete event simulator
- ◆ Packet-level
- ◆ Link layer and up
- ◆ Wired and wireless

History and Status

- ◆ Columbia NEST
- ◆ UCB REAL
- ◆ ns-1
- ◆ ns-2
 - 100K lines of C++
 - 70K lines of OTcl
 - 30K lines of test suite
 - 20K lines of documentation

Platforms

- ◆ Most UNIX and UNIX-like systems
 - ✓ FreeBSD or *BSD
 - ✓ Linux
 - ✓ Sun Solaris
 - ? HP, SGI
- ◆ Window 95/98/NT
 - Some work, some does not
- ◆ (Emulation only for FreeBSD for now)

Related Research

- ◆ intserv/diffserv
- ◆ Multicast
 - Routing
 - Reliable multicast
- ◆ Transport
 - TCP
 - Congestion control
- ◆ Application
 - Web caching
 - Multimedia

Installation

◆ Getting the pieces

- Tcl/TK 8.x (8.0.5 preferred):
<http://dev.scriptics.com>
- OTcl, TclCL, ns-2, nam-1:
<http://www.isi.edu/nsnam/dist>

◆ Other utilities

- <http://www.isi.edu/nsnam/ns/ns-build.html>
- Tcl-debug, GT-ITM, xgraph, ...

Getting Help

- ◆ ns-2 build questions
 - <http://www.isi.edu/nsnam/ns/ns-build.html>
- ◆ ns-users@isi.edu (previously ns-users@mash.cs.berkeley.edu)
 - ns-users-request@isi.edu
 - "subscribe ns-users" in body
 - Archive: <http://www.isi.edu/nsnam/ns>

Resources

- ◆ Tcl (Tool Command Language)
 - <http://dev.scriptics.com/scripting>
- ◆ OTcl (MIT Object Tcl)
 - `~otcl/doc/tutorial.html` (in distribution)
- ◆ ns manual
 - Included in distribution: `~ns/doc`
 - http://www.isi.edu/~salehi/ns_doc.ps.gz

Cautions

- ◆ People tried best to validate ns with regression tests
- ◆ **However:** abstraction of the real world is necessary for a simulator
- ➔ You must justify the usage of this simulator based on your research goals

Workshop Goals

- ◆ Capability of the simulator
 - Design and implementation
 - Complete examples of its usage
- ◆ We try to avoid:
 - Detailed research results

Workshop Schedule

- ◆ Day 1: OTcl-based simulations
 - Fundamentals: wired and wireless worlds
 - Supporting tools
 - Lab
- ◆ Day 2: C++ and ns
 - ns internal
 - Extending ns
 - Lab

History and Status

- ◆ Users from approximately
 - 600 institutes
 - 50 countries
- ◆ Releases
 - Periodic releases (currently 2.1b6, Jan 2000)
 - Nightly snapshots (probably compiles and works, but “unstable”)
 - Available from: USC/ISI, UC Berkeley, UK mirror

Functionality of ns

- ◆ Wired world
 - Point-to-point link, LAN
 - Unicast/multicast routing
 - Transport
 - Application layer
- ◆ Wireless
 - Mobile IP
 - Ad hoc routing
- ◆ Tracing, visualization, various utilities