Lowering the Barrier to Systems-level Networking Projects

Joel Sommers
Colgate University
jsommers@colgate.edu

Hands-on experience is essential to learning

- Many great systems and projects exist

  - Mininet, Netkit, Emulab, "Build an Internet Router", etc.

- Typical development environment is C/C++

- But … low-level language environments pose a major challenge for many undergrads

  - Testing and debugging are hard

  - Grading is a pain

Switchyard: a new Python-based framework

- Switchyard exposes a raw socket-like interface

  - Libraries for packet parsing and construction

- Built-in capabilities to support test-driven development and to facilitate debugging

  - TDD facilities make grading much easier

- Can run within a Mininet VM or on a bare *nix host, or in testing mode

- My students built a learning switch, a full IPv4 router with a rate-limiting firewall, and a DPI middlebox

For more information

- Some details in upcoming paper in SIGCSE '15

- https://github.com/jsommers/switchyard

  - Two versions

    - v1 (master branch) uses POX packet libraries

    - v2 (current development) has no external dependencies, home-grown packet libraries, topology simulation capabilities; Python 3-based

thanks!