Lowering the Barrier to Systems-level Networking Projects

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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!