Accelerated Training Program (ATP) Presentation:

Contributions to the Internet Protocols Testbed

Outline

- Why BSD? (Berkley Software Distribution UNIX)
- NetBSD
- FreeBSD
- Internet Protocols Testbed Setup

Why BSD?

- The de facto standard for TCP/IP (Internet Protocols) implementations is from the Computer Systems Research Group at the University of California at Berkley, which is distributed with the 4.x BSD system
- 4.2BSD was the first widely available release of TCP/IP

Why BSD?

- The standard TCP stack makes 4BSD UNIX the TCP researcher's preferred Operating System.
- 4BSD is in all modern implementations of UNIX
- Source code for standard TCP version and proposed changes are freely available

NetBSD

- Pros
  - Can be ported to several different architectures (DEC Alpha, Amiga, Atari, i386-family, Macintosh, PowerPC, Sun SPARC, etc.
- Cons
  - Not easy to install
  - Is not yet ported to Sun Ultras

NetBSD Installation

- Floppy Drive Installation Necessary
- Hard Drive Partitioning/Labeling Problems
- Device Driver Configuration Problems

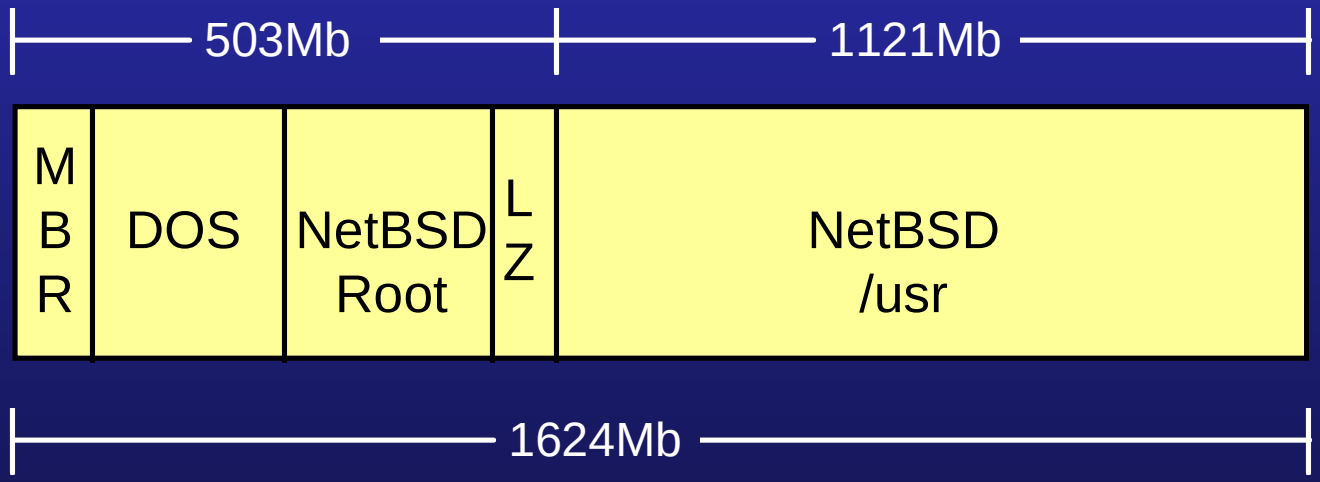
Floppy Drive Installation (1)

- Create Kernel Boot Floppy (1)
- Create Installation Floppy (1)
- Copy binary distribution sets (18)
- Partition Hard Drive
- Label Hard Drive partitions
- Boot Kernel Floppy
- Replace with Installation Floppy

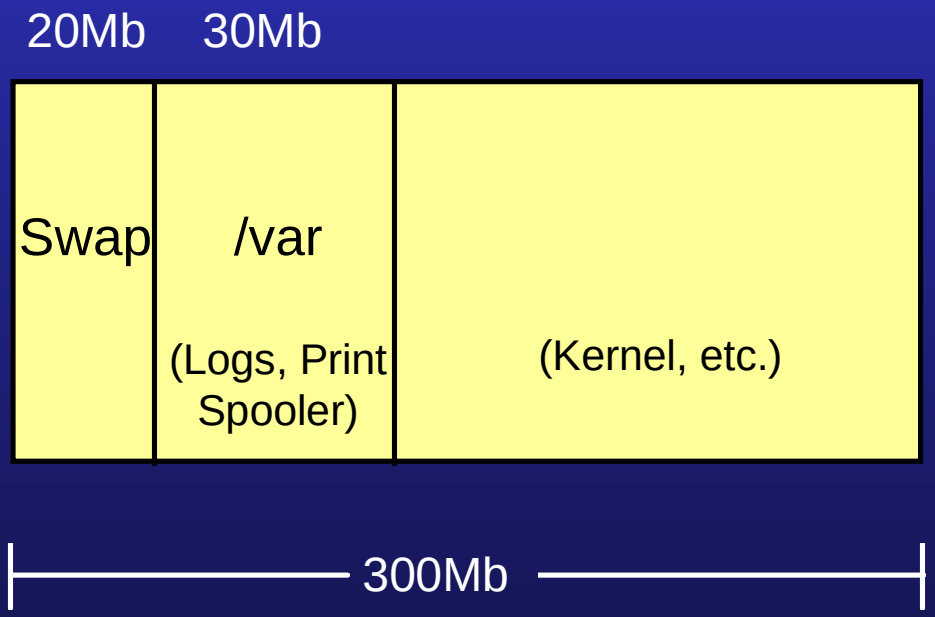
Floppy Drive Installation (2)

- Start Installation
- Input Hard Drive Parameters
- Reboot Kernel Floppy
- Copy Kernel from floppy to Hard Drive
- Reboot to NetBSD on Hard Drive
- Extract binary distribution sets
- Reboot

Hard Drive Geometry



NetBSD Root Partition



NetBSD

FreeBSD

FreeBSD

- Pros
  - Easier Installation
- Cons
  - Only available on i386-family architectures

FreeBSD Installation

- CD-ROM Installation
- Hard Drive Partitioning/Labeling Tool
- Device Driver Setup Menu

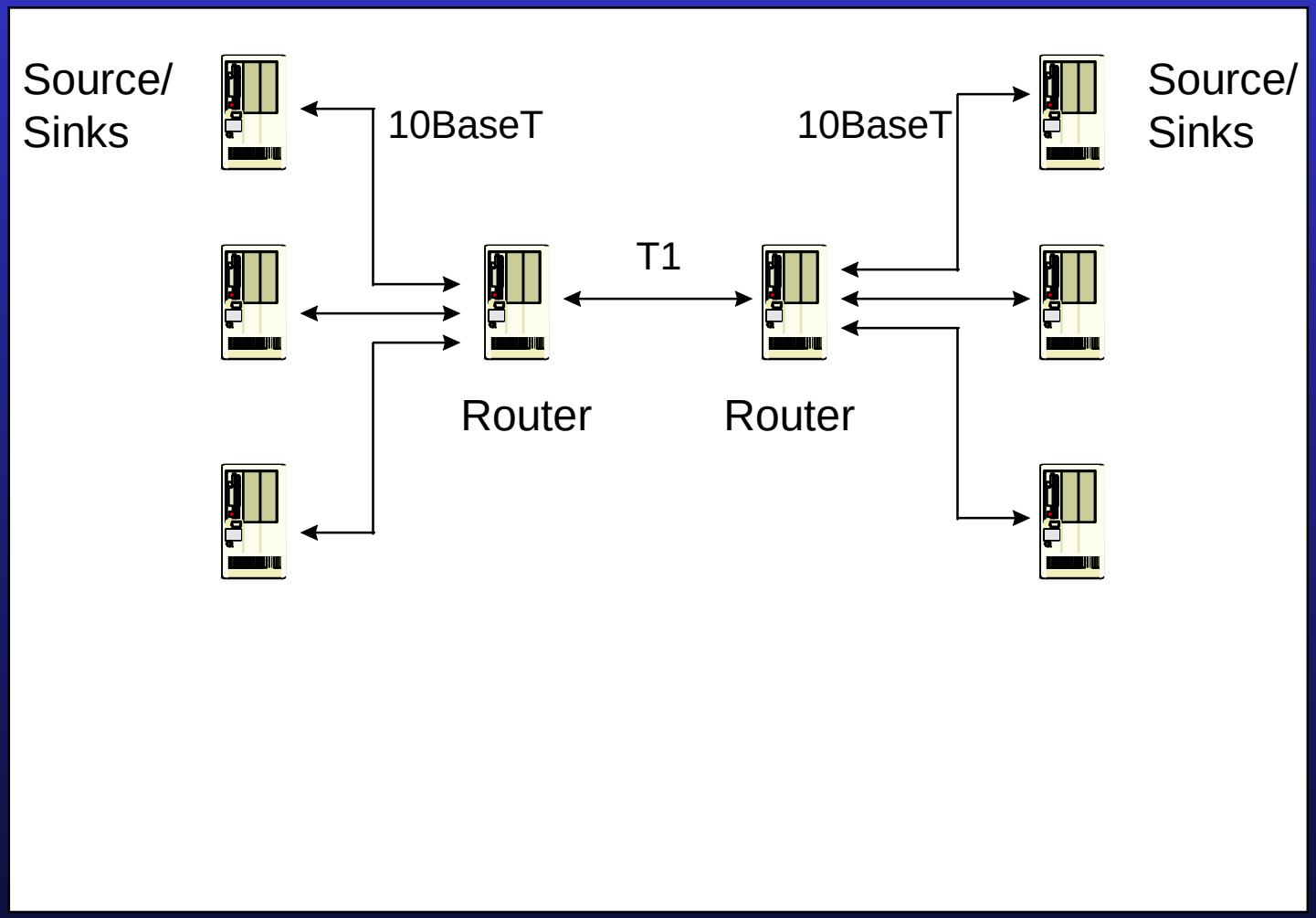
CD-ROM Installation

- Create bootable floppy with CD-ROM drivers
- Run install program on CD-ROM
- Change Hard Drive Partition information
- Change Hard Drive Partition Labels
- Select Binary distributions to install
- Reboot

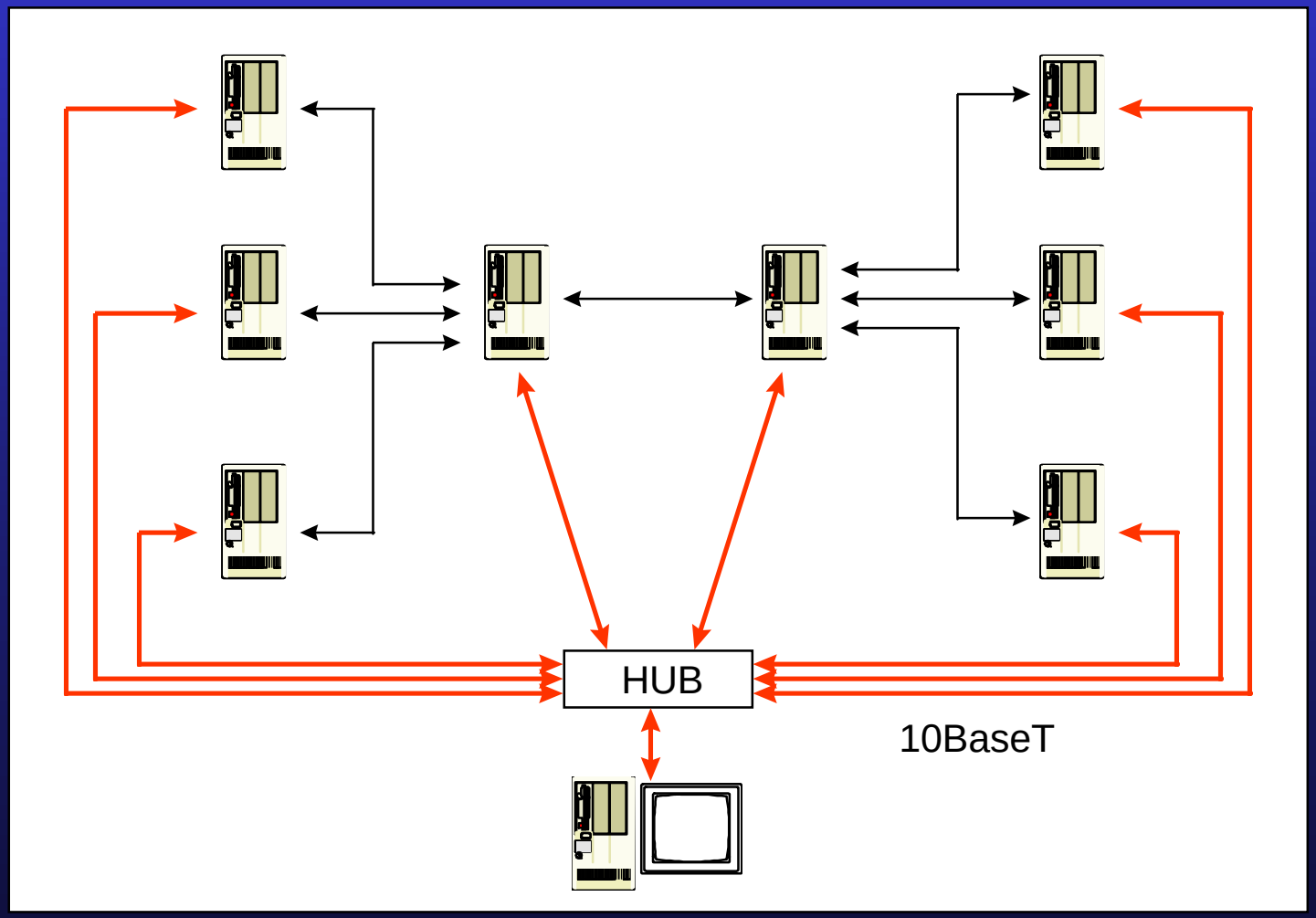
Internet Protocols Testbed

- Equipment
  - 9 Pentium Pro computers
  - 24 Ethernet cards
  - 1 Hub
- Running FreeBSD with University of Southern California's network emulator software and tcplib (traffic generation software)

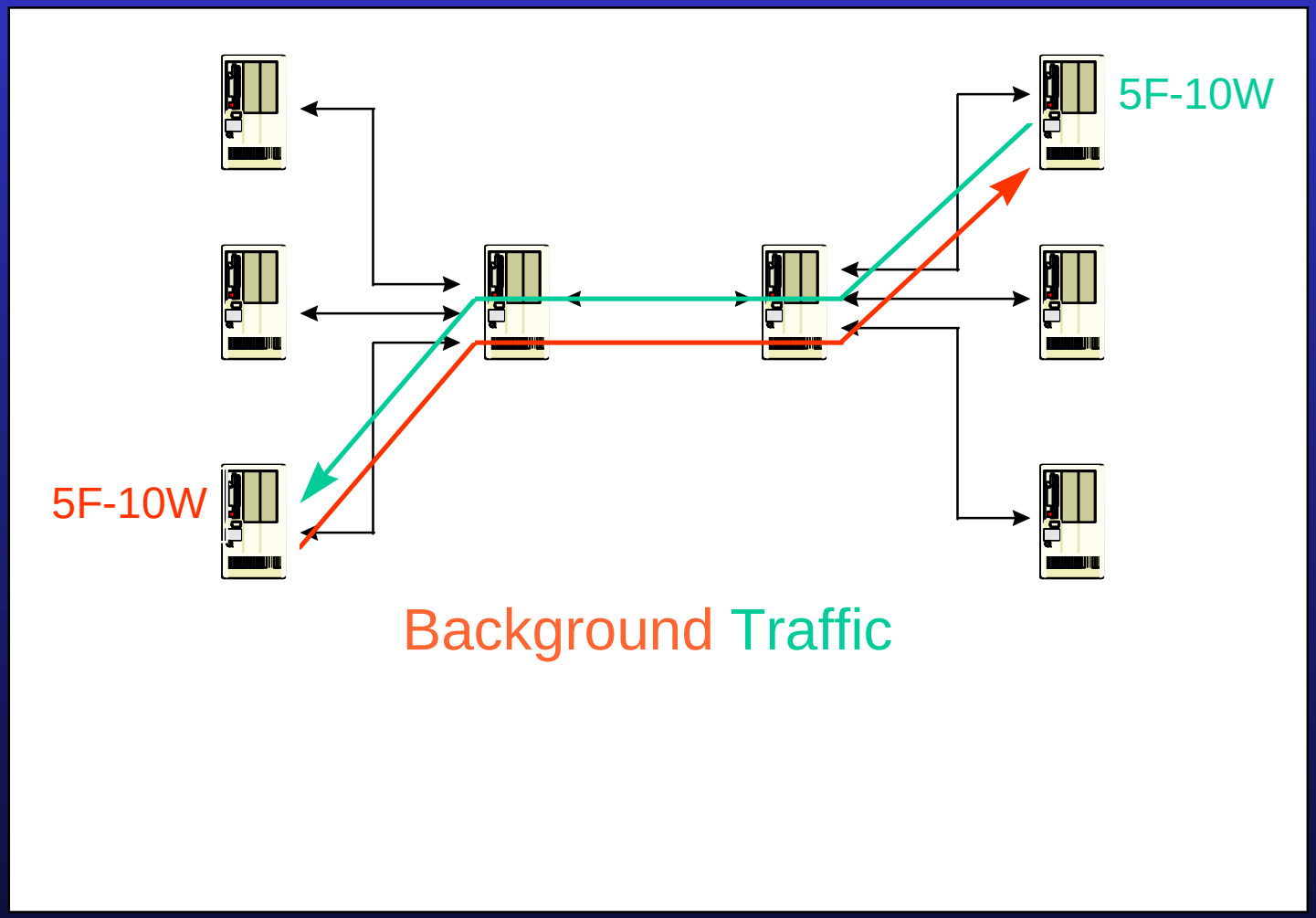
Internet Protocols Testbed



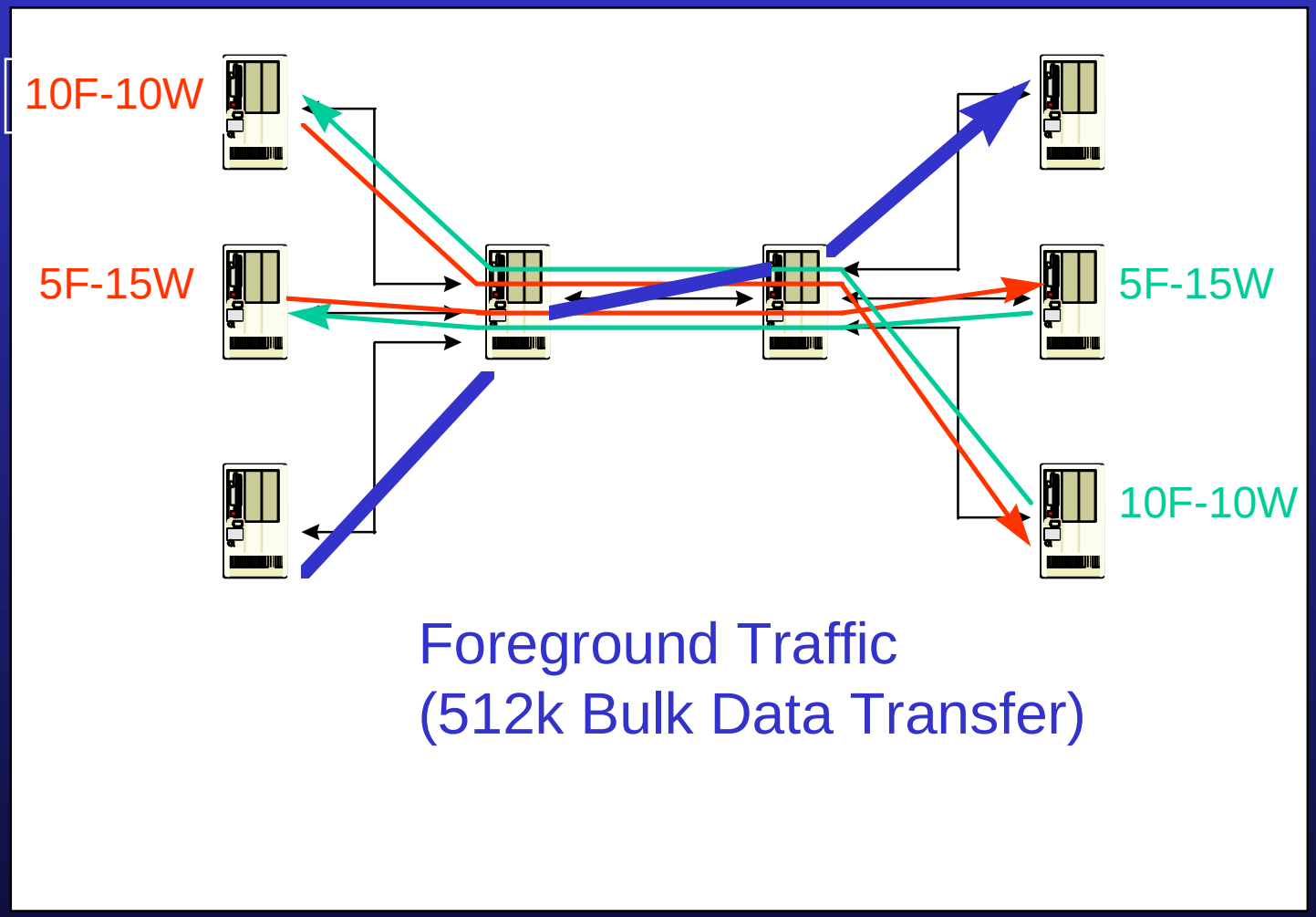
Internet Protocols Testbed



Internet Protocols Testbed



Internet Protocols Testbed



Foreground Traffic
(512k Bulk Data Transfer)

Traffic Scenarios

- 5F_10W = 5 flows of FTP and 10 flows of Web
- 5F_15W
- 10F_10W
- 10F_15W
- 10F_21W
- 10F_27W

TCP Versions

- Tahoe
- Reno
- Reno w/ SACK
- Vegas
- Janey Hoe
- 4k-Window

Goal

Recommend a TCP configuration that is satellite, as well as terrestrially-friendly

Timeframe

- PR started this week
- Equipment will hopefully arrive in June
- First results in July
- In the meantime, we are conducting simple experiments with Ohio University