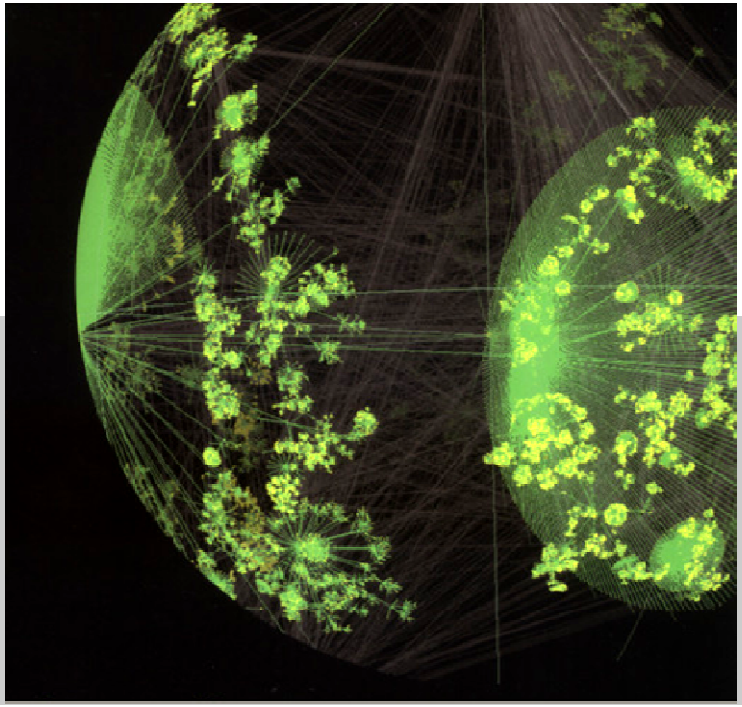
Chapter 1
Linux and TCP/IP Networking



TCP/IP Essentials

A Lab-Based Approach

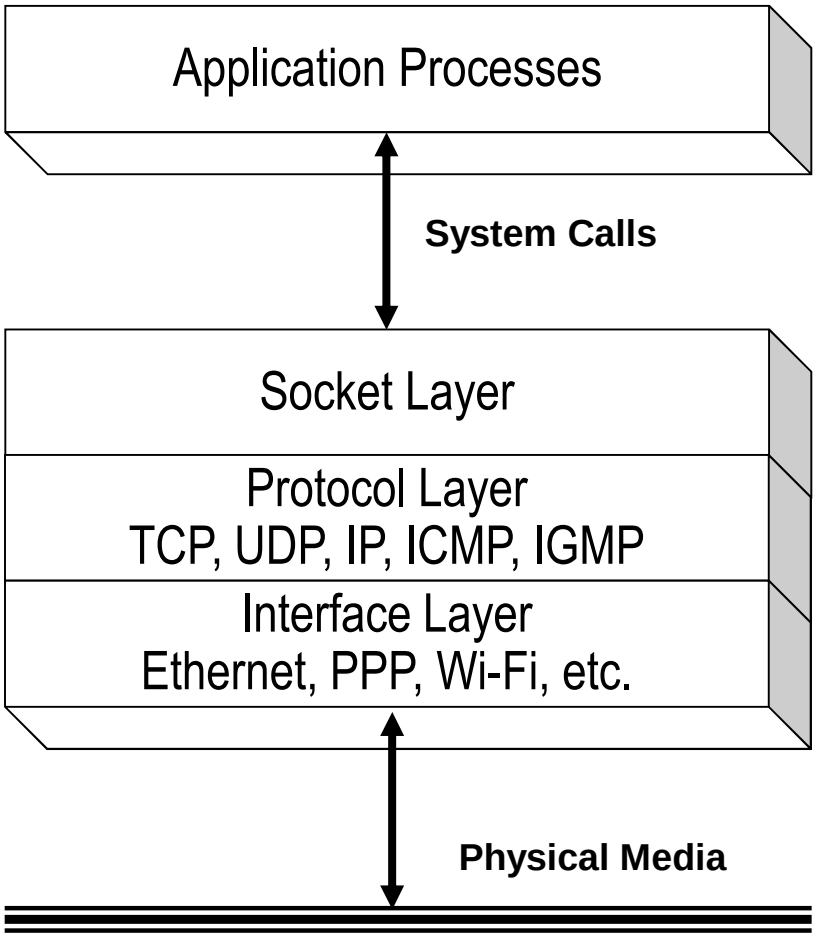
Fall 2015

Linux and TCP/IP Implementations

- The first widely available release of TCP/IP implementation
  - 4.2 Berkeley Software Distribution (BSD)
- Unix TCP/IP implementations
  - Solaris
  - FreeBSD
  - Linux

Networking Code Organization

- Most applications are implemented as *User Space* processes.
- Protocols are implemented in the system kernel
  - Socket layer
  - Protocol layer
  - Interface layer



Network Daemons and Services

- Daemon: a process running in the background of the system. Popular network daemons are managed by
  - inetd (most TCP/IP applications, xinetd in Red Hat Linux 9)
  - httpd (web service)
  - named (DNS service)
- Port numbers
  - Well-known port numbers, used by servers
  - Dynamic/private port numbers (per RFC 4340), used by clients
  - The Protocol Type, the IP address and port number pairs of the server and client preserve the uniqueness of a communication session → IP Five–Tuple information

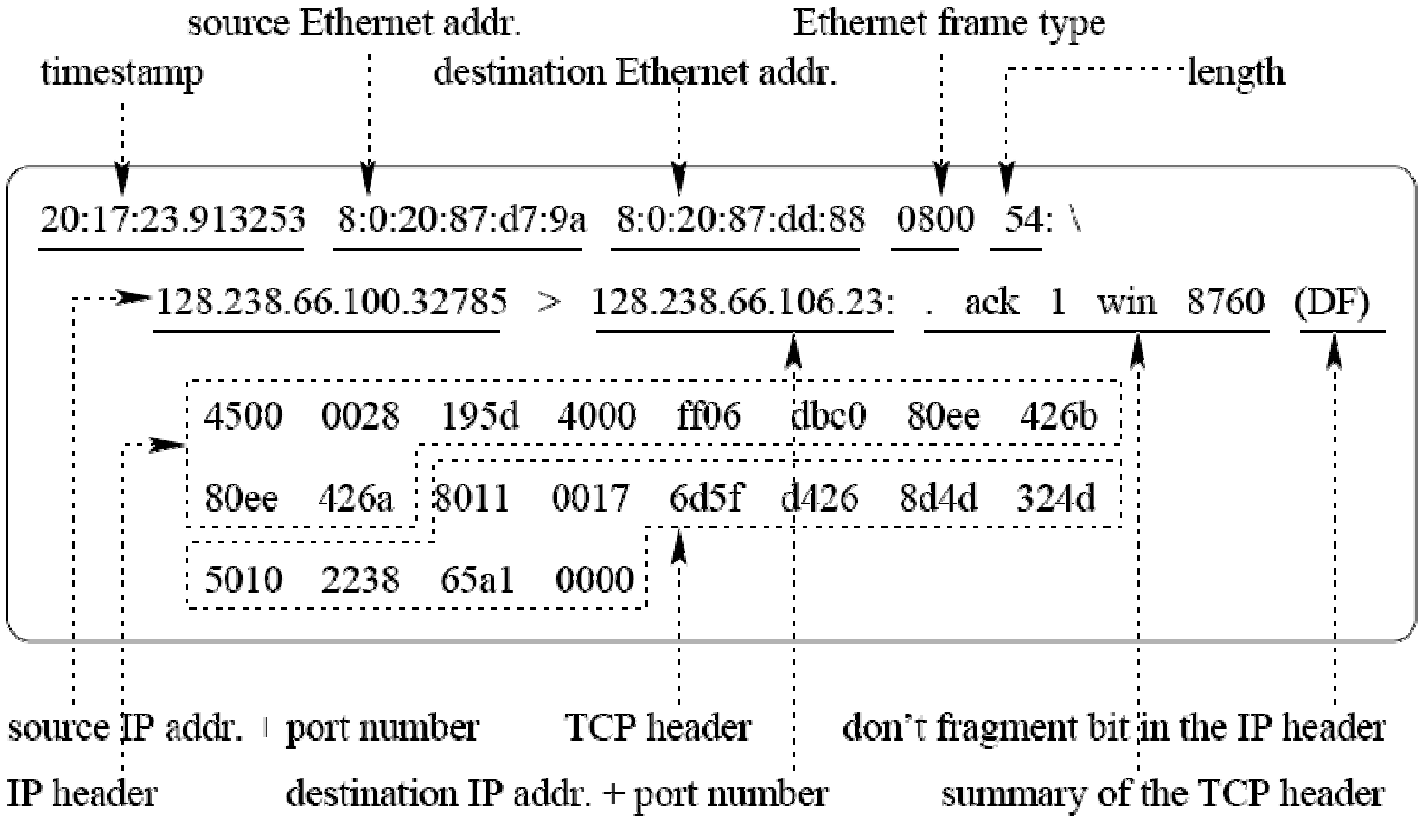
Network Configurations Files

- When a host is configured to boot locally, TCP/IP configuration parameters are stored in files.
  - /etc/services (well-known port numbers)
  - /etc/inetd.conf (inetd daemon parameters)
  - /etc/sysconfig/network (host name, default gateway IP address)
  - /etc/resolv.conf (IP addresses of DNS servers)
- When the system boots up, parameters are read from the files and used to configure the daemons and the network interface.
- A parameter may be changed by editing the corresponding configuration file.

Linux Commands and Tools

- Basic Linux commands: man, passwd, ls, … many more
- Text editor
  - vi
  - Other text editors: Emacs, gedit, OpenOffice.org
- Window Dump using PrintScreen key
- Using floppy disk, USB memory stick, …to collect lab data for reports

Diagnostic Tools



Tcpdump – a network traffic sniffer

Ethereal – a network protocol analyzer