

CS 3204 Operating Systems

Lecture 40
Godmar Back

Announcements

- Project 4 due **Wed, May 3, 11:59pm**
- Read chapter 13 (networking)

Networking

(Most slides from Kurose/Ross:
Computer Networking – A Top
Approach Featuring The Internet)

traceroute

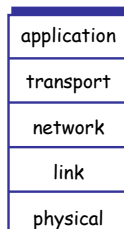
Provides delay measurement from source to router
along end-end Internet path towards destination

- Problem:
 - Don't know which route is taken
- How:
 - Send probes to destination
 - Tell probes to die off after i hops, $i = 1..30$
 - Ask router to send echo packets if packets dies
 - Measure RTT



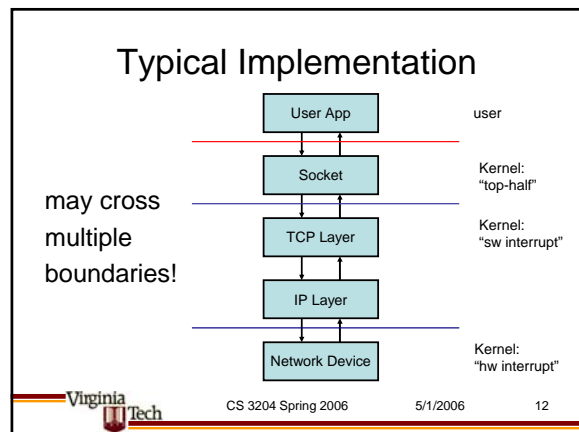
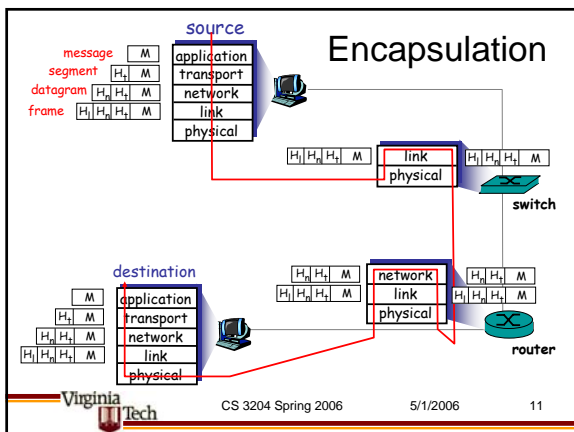
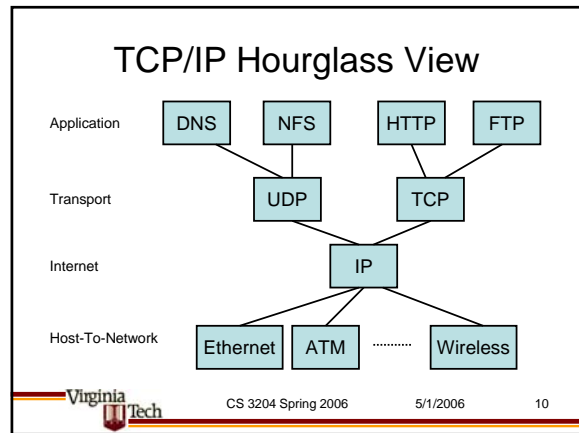
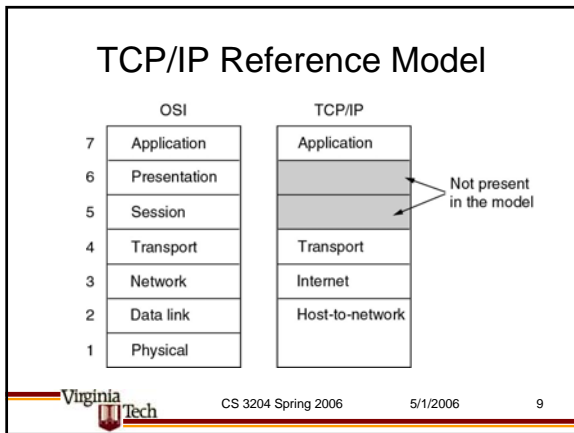
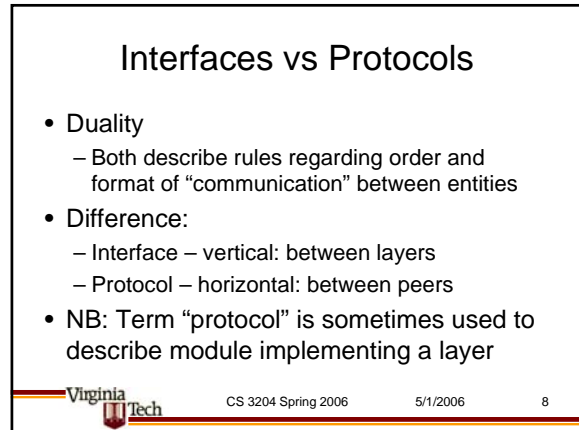
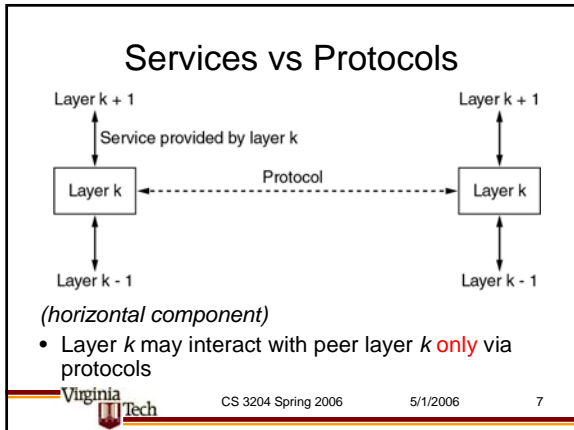
Layered Protocol Architecture

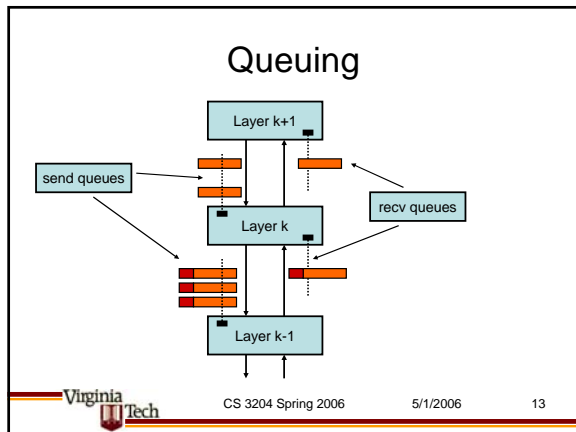
- What is a layered architecture?
- Motivation
- Terminology
- Reference Models
- Implementation Issues



Advantages of Layering

- Decomposition
 - Masters complexity
- Encapsulation
 - Hiding of implementation details
- Evolution
 - Layers can change/be replaced
 - Alternative implementations can be added, possibly coexist
- Robustness
 - Testing layers independently increases confidence





- ### General Implementation Issues
- Who schedules a layer's processing:
 - On send: application thread
 - What if queues are full? Blocking vs. nonblocking
 - Who does retransmit if necessary?
 - On receive: interrupt-driven
 - Not all processing done right away; some delayed processing
 - Sometimes interrupts can be too slow; polling based approach used instead
 - Memory management/Protection Issues:
 - How do you prepend headers?
 - How do you strip headers?
 - When are copies needed?
 - Who allocates and frees packet buffers?
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