- Lecturers
  - Dr. Cheryl Pope (course coordinator)
    cheryl@cs.adelaide.edu.au
    Office Hours – Monday 1:10-2pm
    or by appointment

- Textbook
  - Kurose & Ross - Computer Networking: A top-down approach featuring the Internet (7th or 6th ed.)

Expectations (*assessed items)

- 10 hours per week
  - Lecture time (2 hours per week)
    - Recorded but aim to attend
    - Group problem solving in class
  - *Weekly lab (1-2 hours per week)
  - *Practical assignments (3-4 hours per week)
  - *Tutorials (2 hours weeks: 3,6 and 9, preparation and attendance)
    - ***tailored to each session –*** not just going over answers!
  - Reading and review 1-3 hours per week
- Material builds, so you ***must*** keep up.

Expectations - Communication

- I will respond to course questions on discussion boards within 2 ***business*** days (generally faster).
- I will respond to e-mails within 5 ***business*** days
- You are expected to read course announcements within 2 days

Course Resources

- All course activities are on Canvas
  - myuni.adelaide.edu.au
- The textbook's website has self tests, applets and other tools. However, you have to have a subscription (comes free with textbook).
- *Lots* of examples, tutorials, demos, etc on the web.

Course Details

- Read “About this course” on Canvas for:
  - Assessment details (including hurdle requirements)
  - Late policy
  - Extension policy
  - Academic honesty policy

- Acknowledge the source of any code or design you did not write or think of yourself
- ***Write your code without referring to or viewing other solutions***

Violations to policy

- Plagiarism
  - Using another person's ideas, designs, words or works without appropriate acknowledgment.
- Collusion
  - Another person assisting in the production of an assessment submission without the express requirement, or consent, or knowledge of the assessor.

1. Do not submit any work or part thereof which is not yours.
2. Do not submit any work for which you have received unfair assistance.

Example 1

- I had finished my assignment, and a classmate was asking for help. Since I am a kind person, I
  - Gave the classmate a copy of my code (or part thereof).
  - Posted my solution on an online forum for his/her reference.
  - Allowed the classmate to have a look at my code on paper/screen.

Example 2

- I had finished my assignment, and a classmate was asking for help. Since I am a kind person, I
  - Gave a few high-level tips to my classmate.
  - Discussed high-level concepts regarding the assignment with my classmate.

Example 3

- My good friend/housemate/brother/twin and I are taking the same course. We have always worked together. When doing the assignment, we
  - Exchanged solutions to verify/compare our answers.
  - Divided the assignment work amongst ourselves to speed up progress.
  - Sat side-by-side and looked at each other's answers when doing the assignment.

Example 4

- The assignment seems to be the same as the one given last year. I contacted my friend who took the course last year and got a copy of his solution.

Example 5

- The assignment seemed to be similar to another given at a different university. So, I
  - Copied and submitted the model answers available at that university's website.
  - Took parts of the model answers and integrated them into my solution.

Example 6

- I studied at a school/college/university where doing _____ is acceptable. So I assumed doing this at The University of Adelaide is also acceptable.

How to avoid plagiarism/collusion

- If you get stuck, seek help from the lecturer, tutor or prac demonstrator rather than copying from someone else.
- Starting your work early will help you to avoid getting stuck at the last minute.

When in doubt, ask your lecturer.

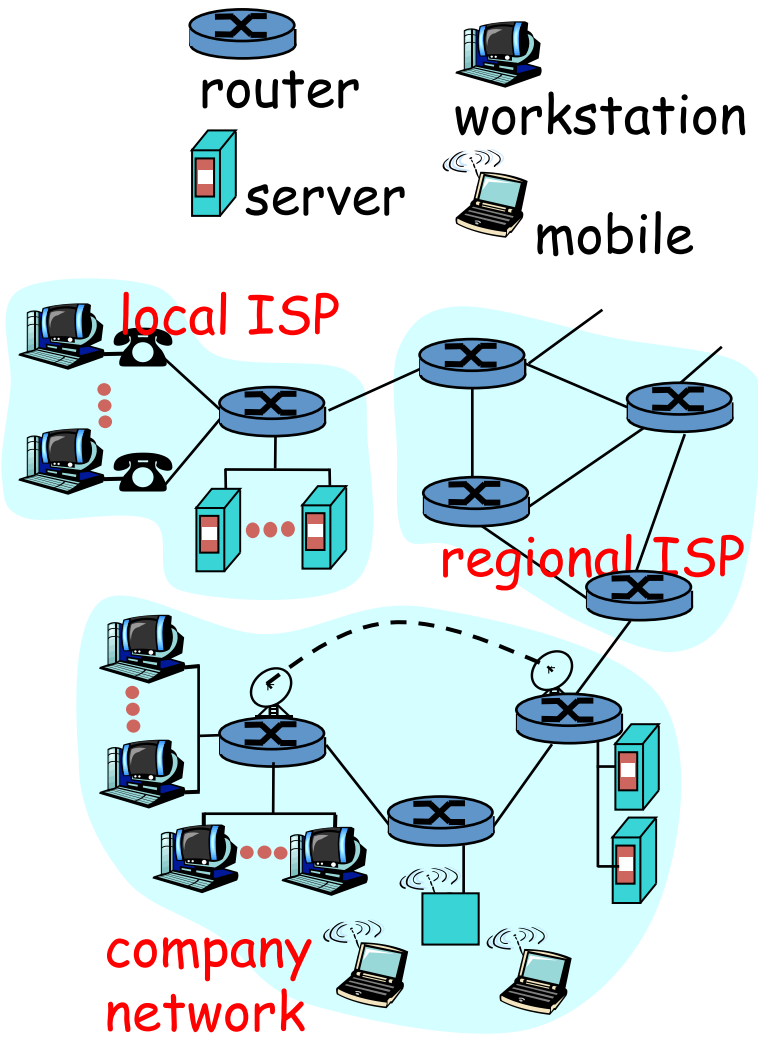
Introduction to Networks & the Internet

- Our aim in this lecture is to
  - see the "big picture" view of networking, we will be going into each of the areas in detail in later lectures.
  - learn some of the terminology used in networking, which we will see throughout the course.
- We will be looking at
  - network components and their roles
  - protocols
  - how data travels through a network
  - the structure of the Internet
  - layered protocol architecture of the Internet
  - a brief history of the Internet

Reading:
Kurose & Ross: Ch 1
extra info on website

Network nuts & bolts

- The purpose of networking is to communicate information
- Networks consist of:
  - hardware infrastructure
    - routers (switches)
    - hosts (end-systems)
    - links (capacity "bandwidth" b/s)
  - protocols
    - rules for exchanging messages
    - define format of messages and action(s) taken when a message is received.
    - TCP/IP for the Internet
    - HTTP for the Web
    - A lot of our course will be focused on protocols.



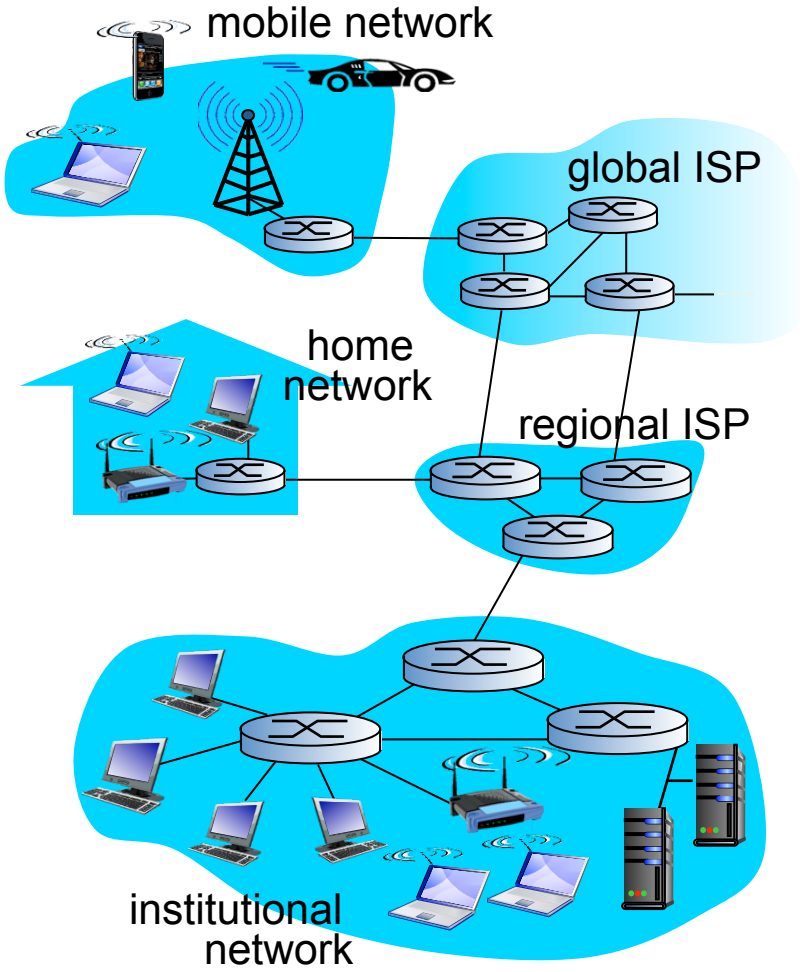
WANs, LANs & Internets

- A Local Area Network is a network of geographically close computers.
  - Ethernet
  - High bandwidth (1 Mbps -> 1 Gbps)
  - Low latency (mSec)
  - Low error rate (< 1 in 10^14)
  - Short geographical reach (<5km, usually less)
  - Sometimes broadcast
- A Wide Area Network is a network connecting geographically distant computers.
  - High latency (100 mSec >)
  - Higher error rates (1 in 10^4)
  - Span more than one organisation
  - AARNET, the Internet
- Note: in communication K=10^3 M = 10^6 G=10^9

- If we connect networks together, we get an internet.
  - The glue that holds them together are routers and common network protocols
  - intranets are internets within an organisation.

How data travels

- Hosts connected to network router by
  - ADSL
  - Cable modem
  - Wireless
  - Ethernet
  - Cellular
- Network applications send data.
- Protocols attach information in headers.
  - Where to send data.
  - How to send data (reliable delivery, best effort).



Measuring Performance

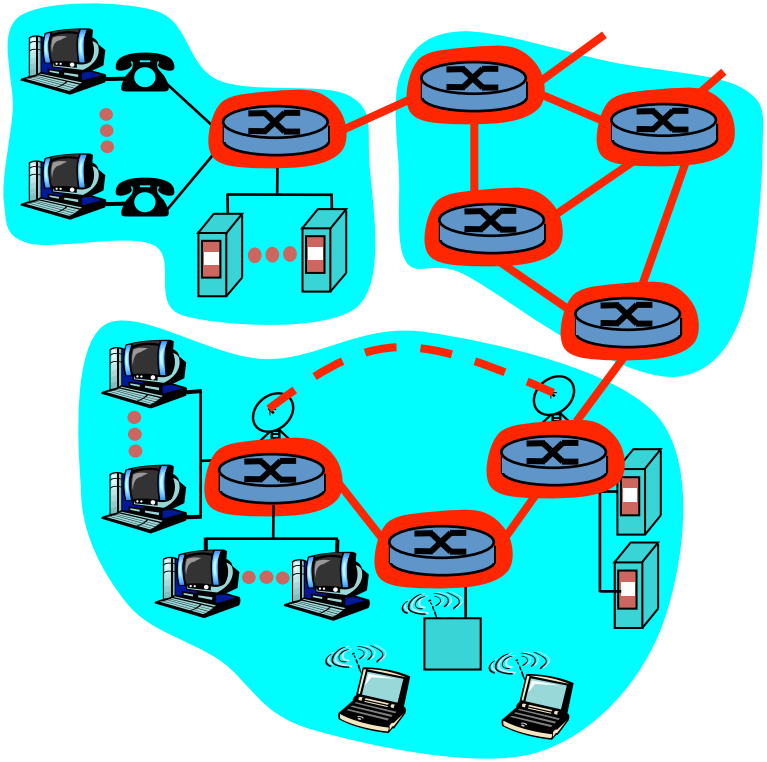
- Latency and Bandwidth
  - Which offers faster data transfer a pigeon or a data network?
  - http://news.bbc.co.uk/2/hi/africa/8248056.stm
  - How about a plane full of DVDs?

  - Propagation delay
  - Transmission delay
  - Queuing delay
  - Processing delay

In lecture problem solving in Echo 360

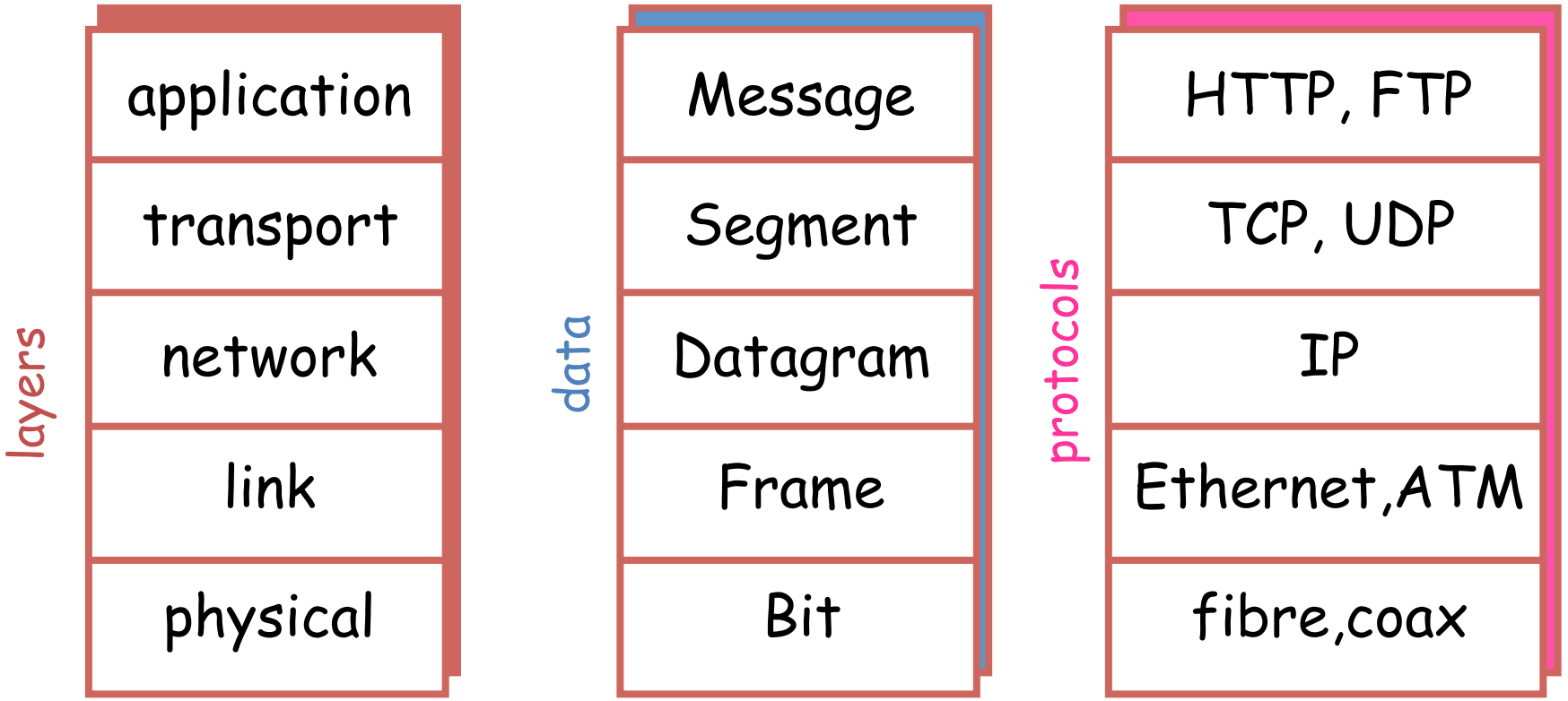
How data travels – two models

- routing
  - circuit switching
    - resources (bandwidth, switch) reserved. Idle when not in use.
    - Known, guaranteed performance.
    - Must set up circuit.
  - packet switching
    - Resources used as needed.
    - Good for bursty traffic
    - Contention may occur.
    - Data may have to be dropped (need to deal with this!).
    - No guarantees on delays, bandwidth.



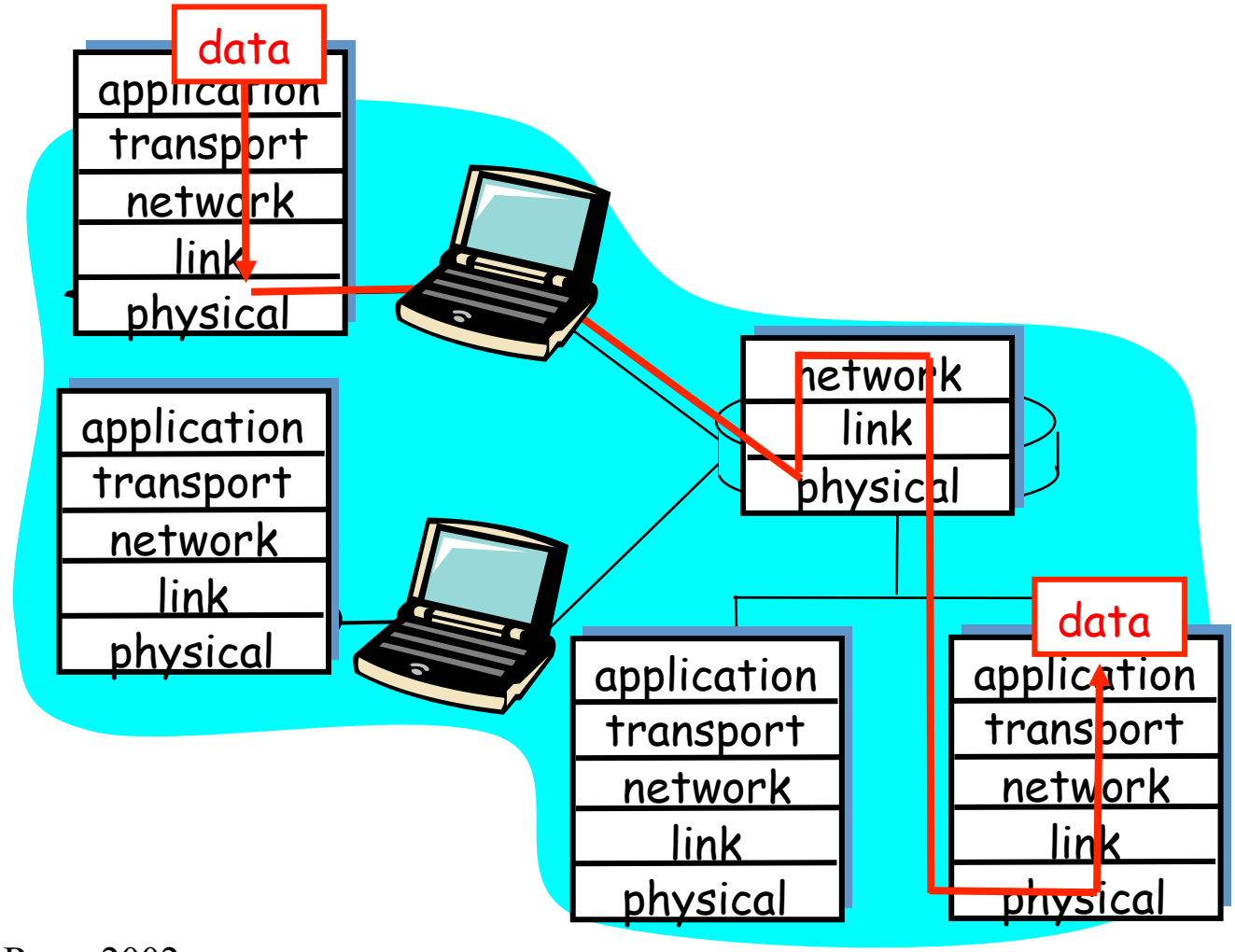
Protocol Layers

- There is a lot going on! Can we organise it in some way?
- The layer model breaks up the various tasks into services provided by different service layers.



- An alternative model (OSI) has session and presentation above application layer. These are part of the application layer in the Internet model.

Layering: physical communication



A brief history of the Internet