

Speaking Notes  
PADM 5501  
Week 5 -- Networks and Communications  
Dr. Neubauer

## WHERE WE ARE

- The material relates to chapter 4 of our textbook.
- I need to write your Discussion Forum 2A prompt and begin working on the midterm exam.

## QUICK REVIEW OF LAST WEEK

Data are the foundation of information and knowledge.

Data are facts without context. An application "hits" a database (using a database management systems like Oracle) and aggregates data up into information. Information becomes knowledge in the mind of a user and can be used to make a decision and take actions.

Ideally there is one version of the truth across the entire organization. If facts are store in many little databases all over the place, the organization does not have one version of the truth. All the functions in an ERP share the same common database in which the one "true truth" resides.

Transaction processing systems (like the one at Amazon.com) are continually being updated.

Decision support systems contain historic data.

Different databases are designed and optimized for different purposes.

Most modern databases are RELATIONAL DATABASES. **Flat file** "databases" are very limited and have serious shortcomings. A flat file may be used to "support" a stovepipe application, but not an enterprise system (ERP).

## NEW MATERIAL THIS WEEK

The early mainframe computers were awesome but were centralized. An entire university might have one computer, but if it could not easily share data with (and "talk to") other computers at other universities, its value was limited.

Imagine that you have the only telephone in the world. What good is it? The potential value of a telephone increases as the number of other telephones in the world increases.

The value of a network of computers becomes potentially greater as NETWORKS evolve to connect them in purposeful ways.

Email was the early "killer app" that made networks valuable in organizations.

An organization can have its own peer-to-peer computer network, in which each workstation is the same (no specialization) and it is possible to share data (like email) among the peer machines.

On a PEER-TO-PEER network in an organization, every computer that needs to print to paper needs its own dedicated printer. And every computer that needs to use Microsoft Excel (for example) needs its own license to Excel (and the software physically installed on the machine).

A CLIENT-SERVER network in an organization is a big step forward. Instead of every machine being a peer, some of the machines are SPECIALIZE servers. If you have 100 workstations in an organization and everyone needs to print to paper only occasionally, make ONE of the computers a PRINT SERVER and connect it to one (or two) printers and be done with it.

And make one computer a FILE SERVER and put the Excel program on it. You still need licenses, but maintenance of Excel on one machine is easier than separate installations on 100 computers.

To have a network, the computers have to be connected to one another in some way. There are several ways to do this.

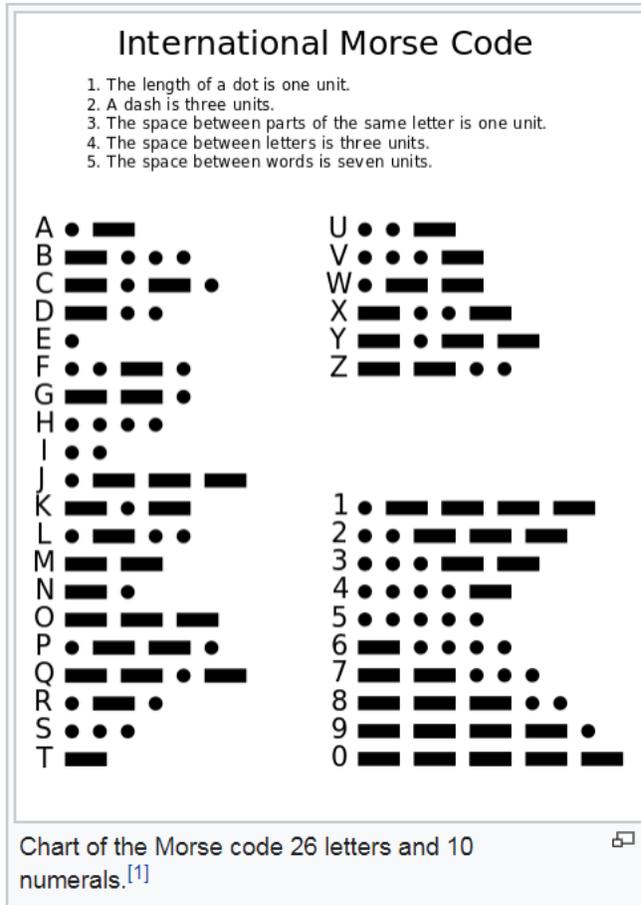
- Telephone wires and modems.
- Ethernet wires
- Coax cable
- Radio waves and wireless modems
- My network at home runs on the electrical wires in my walls.
- And, of course, cell towers.

You can get DSL service from a telephone provider and no longer tie up your wired home telephone line, if you still have a wired telephone at home.

Higher bandwidth is better. Reliability is very important, especially for businesses.

Remember, the "signal" is digital. It is all zeros and one's.

Binary communications is like Morse code. Communication is possible based only on two symbols, like 0 and 1; or the dots and dashes of Morse code.



Source: [https://en.wikipedia.org/wiki/Morse\\_code](https://en.wikipedia.org/wiki/Morse_code)

There has to be a PROTOCOL used for machines to make sense of all those zeros and ones.

And getting something down to the wire is complicated.

[https://en.wikipedia.org/wiki/OSI\\_model](https://en.wikipedia.org/wiki/OSI_model)

PACKETS of groups of zeros and ones move across the network.

Every computer on a network has a IP address. A message is broken down into packets and the packets move across the network and are reassembled at the receiver.

Before the Internet, businesses would use microwave towers to connect two local area networks (LANs) to became a wide area network (WAN).

The Internet (and World Wide Web) is based on the TCP/IP PROTOCOL and now it has becomes the "commons" that everyone uses and shares.

There are MANY internet ROUTERS and the Internet has a "backbone" just as the aviation system has major international airports. PACKETS moved INDIVIDUALLY across the Internet

"hopping" from router to router until they arrive at their destinations and are REASSEMBLED on the computer the IP address of the destination machine. This is the meaning of STREAMING MEDIA. It is like drinking from a water fountain.

If a router fails other routers figure that out and send packets to detour around the failed router.

[https://en.wikipedia.org/wiki/Internet\\_backbone](https://en.wikipedia.org/wiki/Internet_backbone)

There is an Achilles' heel in the system. I think there are 13 DOMAIN NAME SERVERS in the world. They contain tables that translate DOMAIN NAMES into IP addresses. If they fail, we are in serious trouble.

I don't know how some nations manage to limit Internet access to their citizens.

-----

The point is that not only people communicate with one another. MACHINES/COMPUTERS communicate with each other also. And a lot of communications within and among organizations happen at the machine-to-machine level. The machines call out to humans when necessary.

When I overdraw on my "gift card" on Amazon.com their system talks to my bank's system and if I have available credit, my bank makes a payment to my gift card account at Amazon.com. Amazon.com's system sends me an email saying that my gift card has been, "recharged."

As artificial intelligence (AI) continues to evolve organizations are going to change rapidly and in ways we probably do not now anticipate.

[https://www.youtube.com/watch?v=5dZ\\_lvDgevk](https://www.youtube.com/watch?v=5dZ_lvDgevk)