# Management of I/O request & Communication among devices

Munz

# Management of I/O Requests

- Although most users think of an I/O request as an elementary machine action, the Device Manager actually divides the task into three parts with each one handled by a specific software component of the I/O subsystem.
- The I/O traffic controller watches the status of all devices, control units, and channels. The I/O scheduler implements the policies that determine the allocation of, and access to, the devices, control units, and channels. The I/O device handler performs the actual transfer of data and processes the device interrupts.

- The I/O traffic controller monitors the status of every device, control unit, and channel. It’s a job that becomes more complex as the number of units in the I/O subsystem increases and as the number of paths between these units increases. The traffic controller has three main tasks:

(1) it must determine if there’s at least one path available;

(2) if there’s more than one path available, it must determine which to select; and

(3) if the paths are all busy, it must determine when one will become available.

- To do all this, the traffic controller maintains a database containing the status and connections for each unit in the I/O subsystem, grouped into Channel Control Blocks, Control Unit Control Blocks, and Device Control Blocks.

- To choose a free path to satisfy an I/O request, the traffic controller traces backward from the control block of the requested device through the control units to the channels. If a path is not available, a common occurrence under heavy load conditions, the process (actually its Process Control Block) is linked to the queues kept in the control blocks of the requested device, control unit, and channel.
- This creates multiple wait queues with one queue per path. Later, when a path becomes available, the traffic controller quickly selects the first PCB from the queue for that path.

- The I/O scheduler performs the same job as the Process Scheduler described in Chapter 4 on processor management—that is, it allocates the devices, control units, and channels. Under heavy loads, when the number of requests is greater than the number of available paths, the I/O scheduler must decide which request to satisfy first.
- Many of the criteria and objectives discussed in Chapter 4 also apply here. In many systems, the major difference between I/O scheduling and process scheduling is that I/O requests are not pre-empted.

- Once the channel program has started, it’s allowed to continue to completion even though I/O requests with higher priorities may have entered the queue. This is feasible because channel programs are relatively short, 50 to 100 ms. Other systems subdivide an I/O request into several stages and allow pre-emption of the I/O request at any one of these stages.

- Some systems allow the I/O scheduler to give preferential treatment to I/O requests from high-priority programs. In that case, if a process has high priority, then its I/O requests would also have high priority and would be satisfied before other I/O requests with lower priorities.
- The I/O scheduler must synchronize its work with the traffic controller to make sure that a path is available to satisfy the selected I/O requests.

- Some systems allow the I/O scheduler to give preferential treatment to I/O requests from high-priority programs. In that case, if a process has high priority, then its I/O requests would also have high priority and would be satisfied before other I/O requests with lower priorities. The I/O scheduler must synchronize its work with the traffic controller to make sure that a path is available to satisfy the selected I/O requests.
- The **I/O device handler** processes the I/O interrupts, handles error conditions, and provides detailed scheduling algorithms, which are extremely device dependent. Each type of I/O device has its own device handler algorithm.

# What is communication

- It is a process in which one computer or device transfers data, instruction and information to another computer.
  - What communication requires?

    Sending device

    Communication Channel

    Receiving device

# Communication History

- The Telegraph- Samuel Morse
- The Telephone- A. Bell
- Teletypewriter
- Network

# Distance & Speed

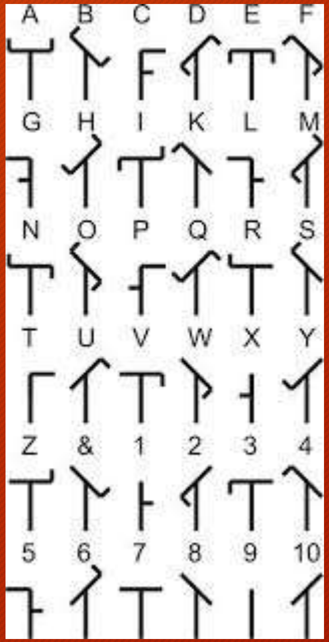
# The telegraph

# Telegraph

- is the long-distance transmission of textual or symbolic (as opposed to verbal or audio) messages without the physical exchange of an object bearing the message.
  - The vertical bar can be moved to four positions(only two were used)
  - The two boards(one on each end)could each be moved into seven positions.

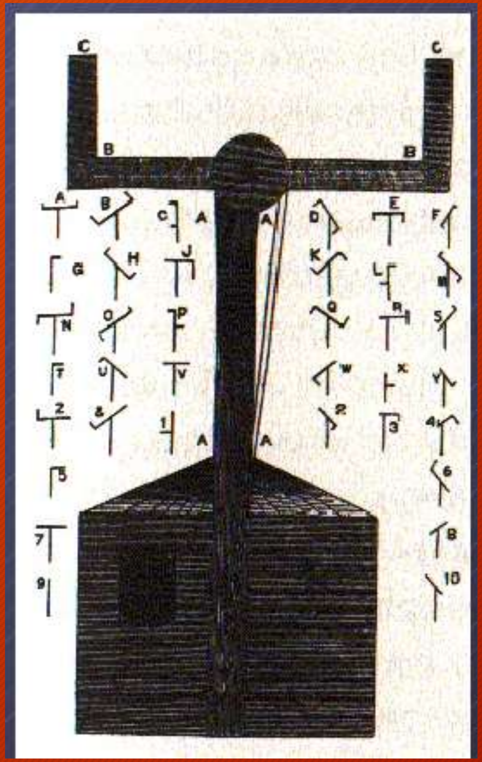
# The codes

- 98 possible positions
- Six position reserved for insruction
- With a codebook, the 92 positions could be made to represent 8,464 words or phrases (not letters)



# Hardware & Software

- The hardware was slow
- The software made it more efficient
- The human factor:
  - Two men required at each station had to repeat(accurately) the signal sent by the previous station

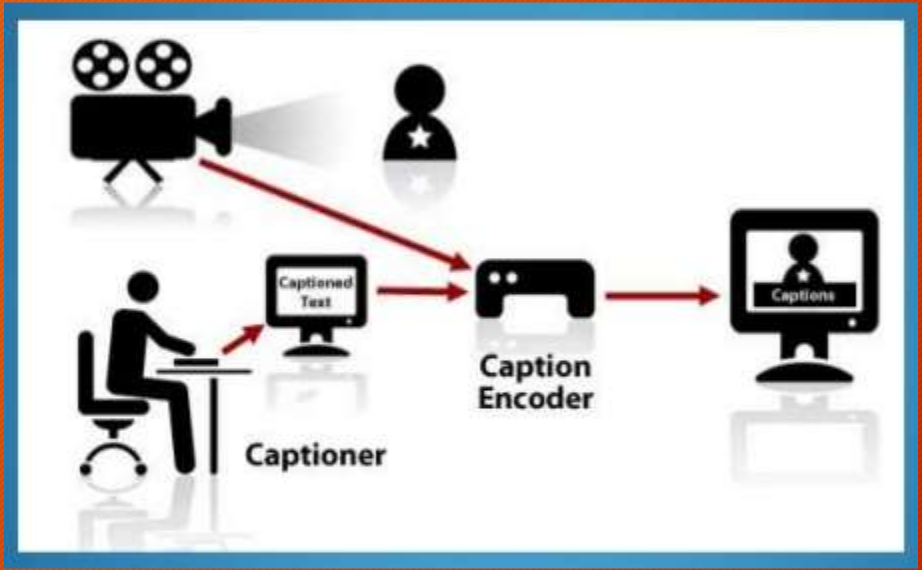


# The telephone

- His research on hearing and speech further led him to experiment with hearing devices which eventually culminated in Bell being awarded the first U.S. patent for the telephone in 1876.

# Teletypewriter

- Also called tele printer is whereby the conversation is conveyed in written form between two people who possess the machine



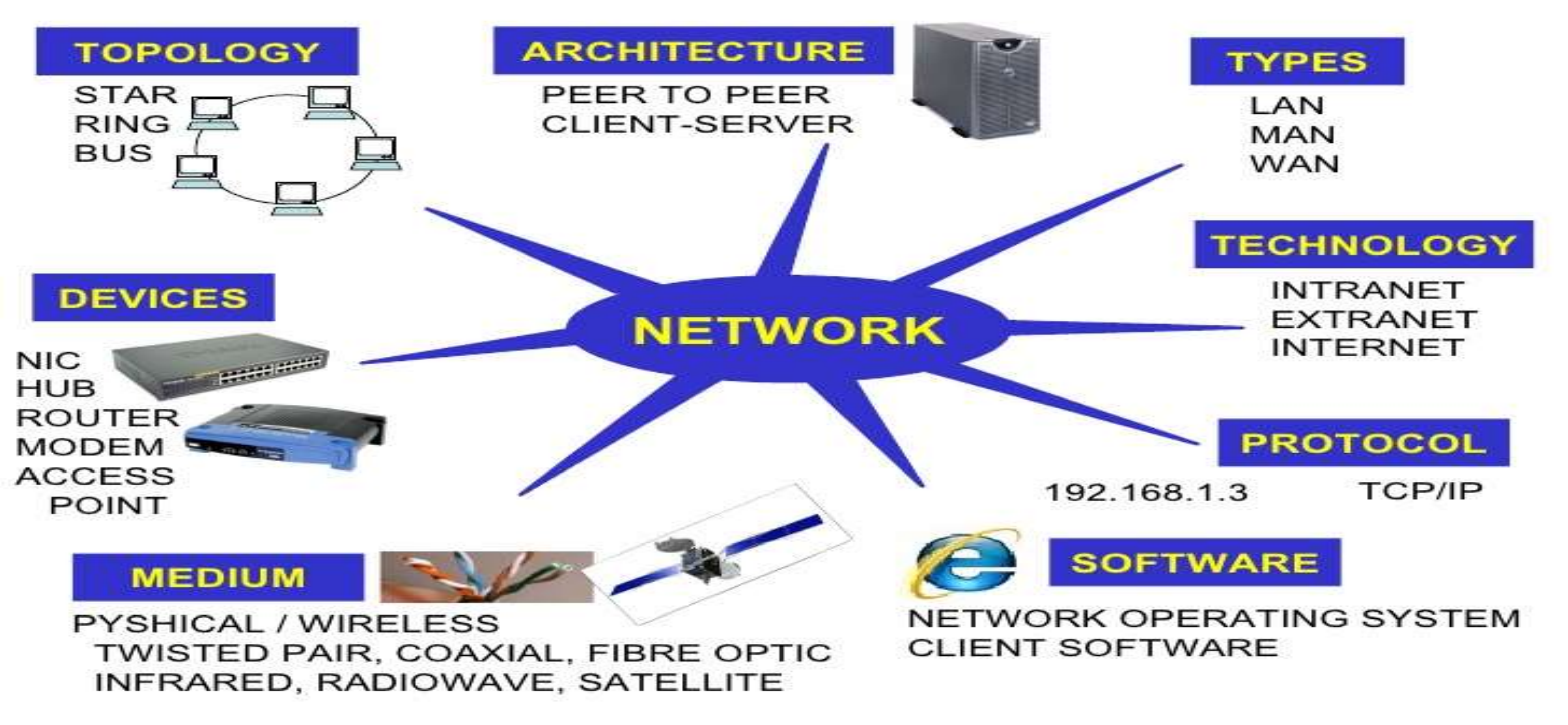

# Computer Network

- Collection of computers and devices interconnected by communication channels that facilitate communication among usesrs and allow users to share resources

# The History Network

- Network of communicating computers included the military radar system (SAGE) and its relative the commercial airline reservation system (SABRE)
- Came about in the late 1950’s
- Although in the 1960’s the (ADRPA) started funding the design of the ADRPA to perfect networks for the US department of defence.

# Modern technology



# References


- http://www.uspto.gov/trademarks/process/search/
- http://en.wikipedia.org/wiki/Computernetworks
- www.google.ca/teleprinter
- www.google.ca/telegraph
- http://wiki.answers.com/Q/Thepurposeofatelegraph
- http://en.wikipedia.org/wiki/Thefirsttelephone