Lecture 1

CS 621
Mobile Computing

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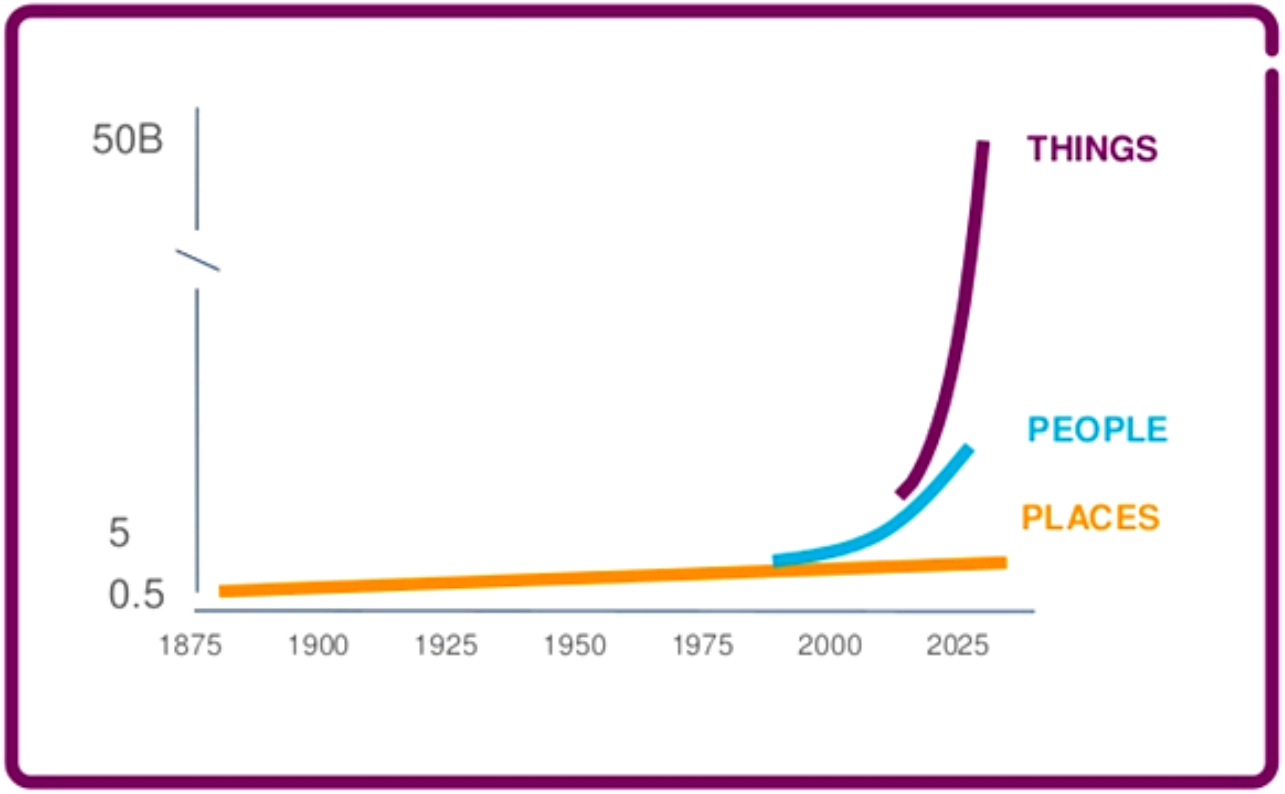
50 billion connected devices by 2025!

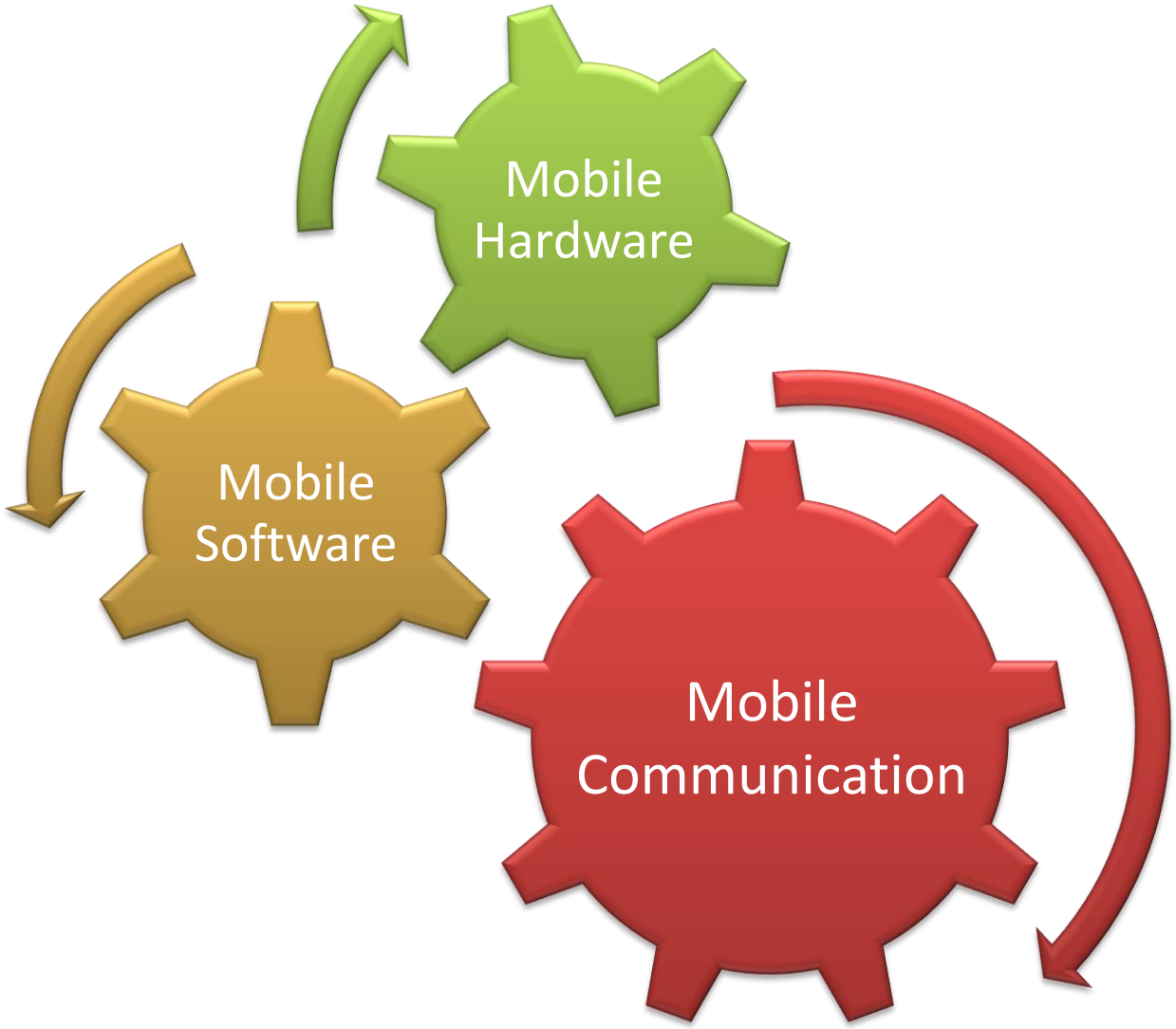


Everything that benefits from being connected will be connected

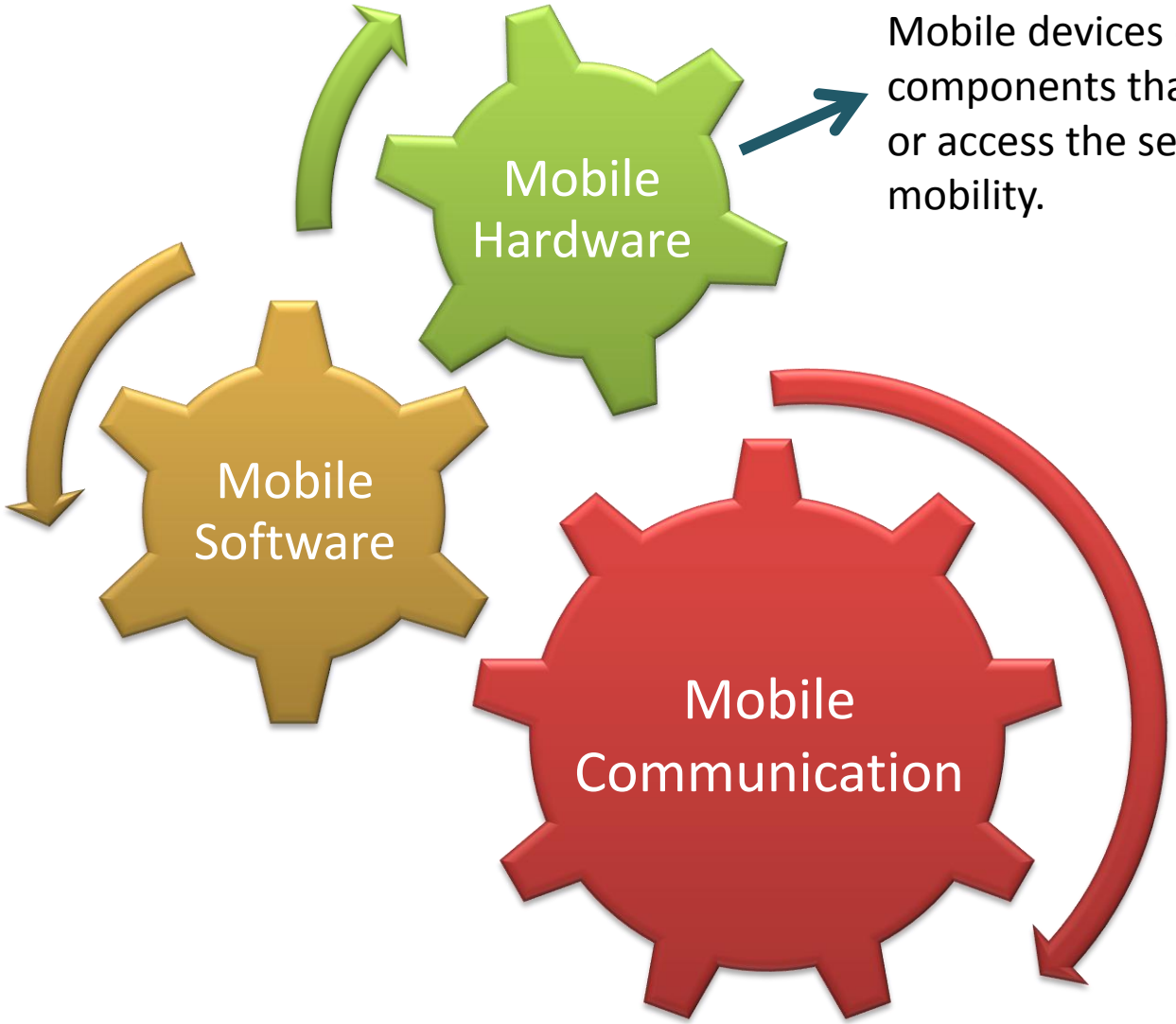
What is Mobile Computing

- An umbrella term referring to technology which allows transmission of data, voice and video via any other wireless enabled device without having to be connected to a fixed physical link.

Ingredients



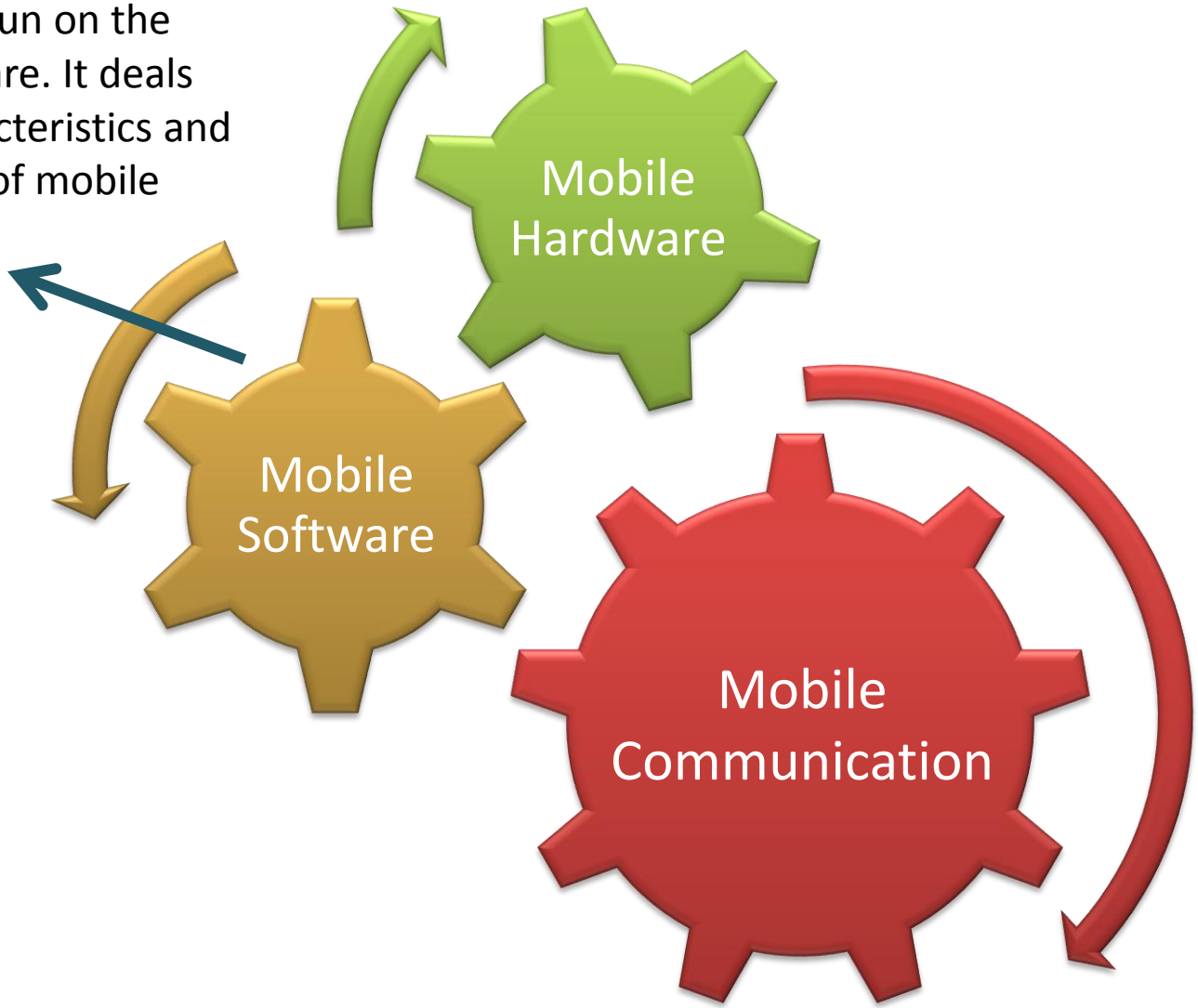
Ingredients



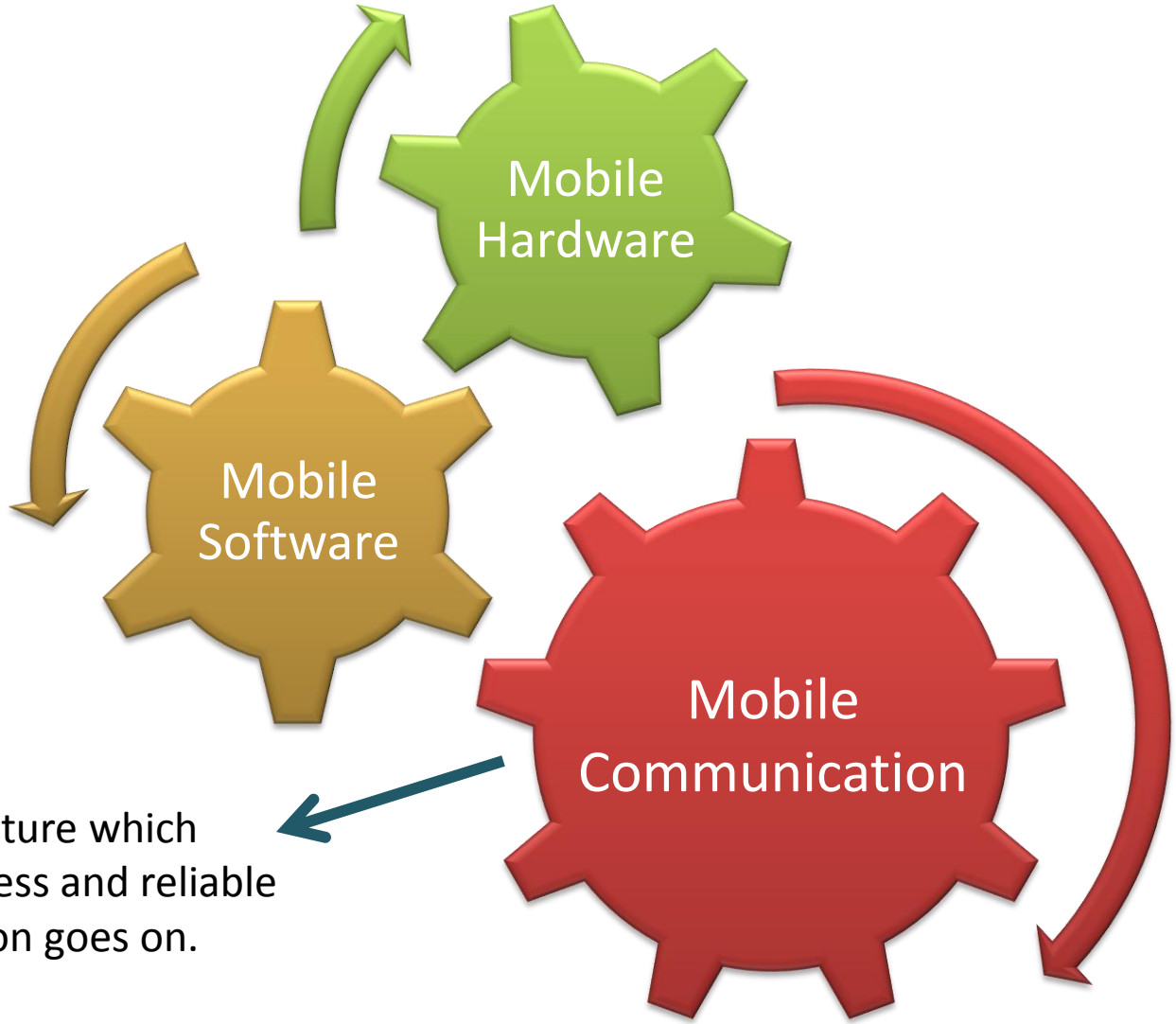
Mobile devices or device components that receive or access the service of mobility.

Ingredients

Program that run on the mobile hardware. It deals with the characteristics and requirements of mobile applications.

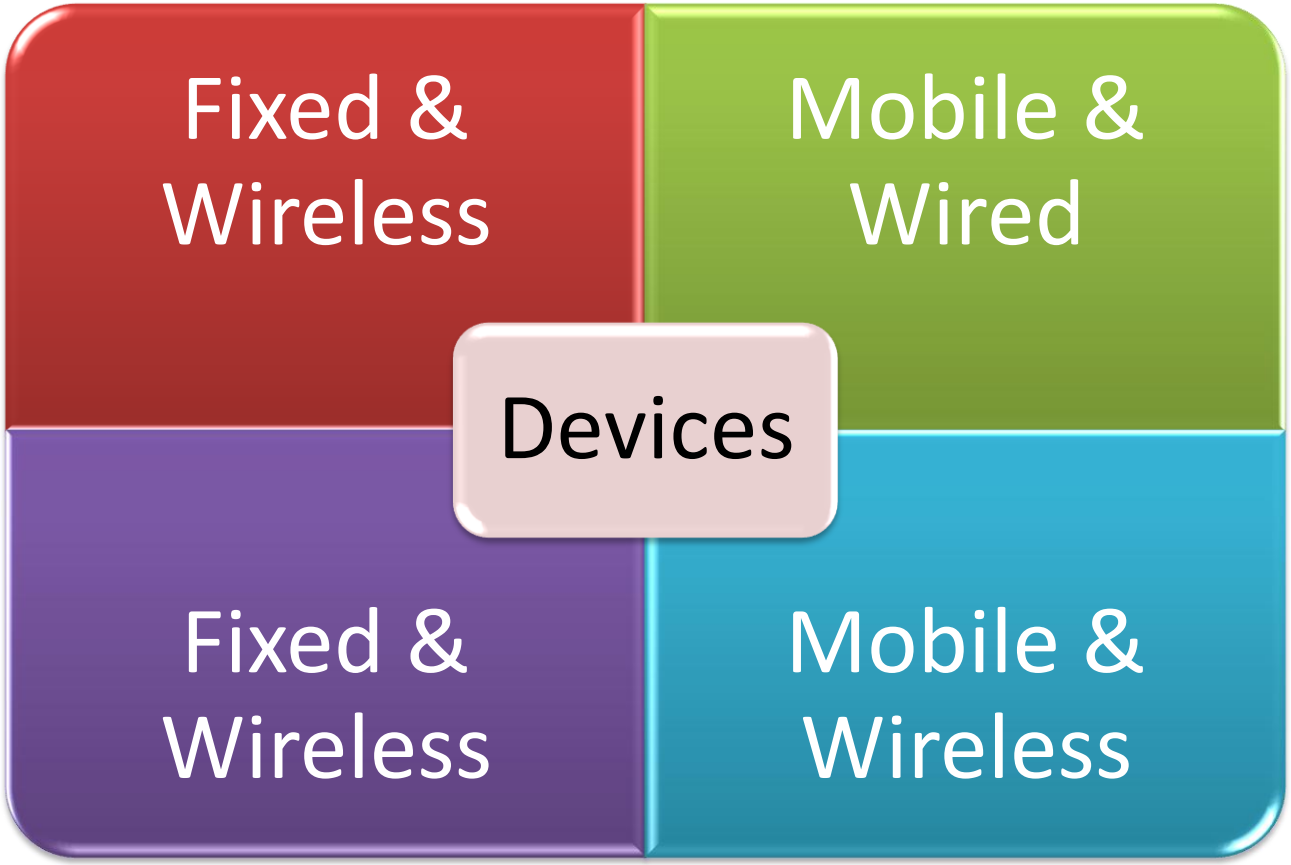


Ingredients



The infrastructure which ensure seamless and reliable communication goes on.

Devices


Fixed & Wireless
Mobile & Wired
Devices
Fixed & Wireless
Mobile & Wireless

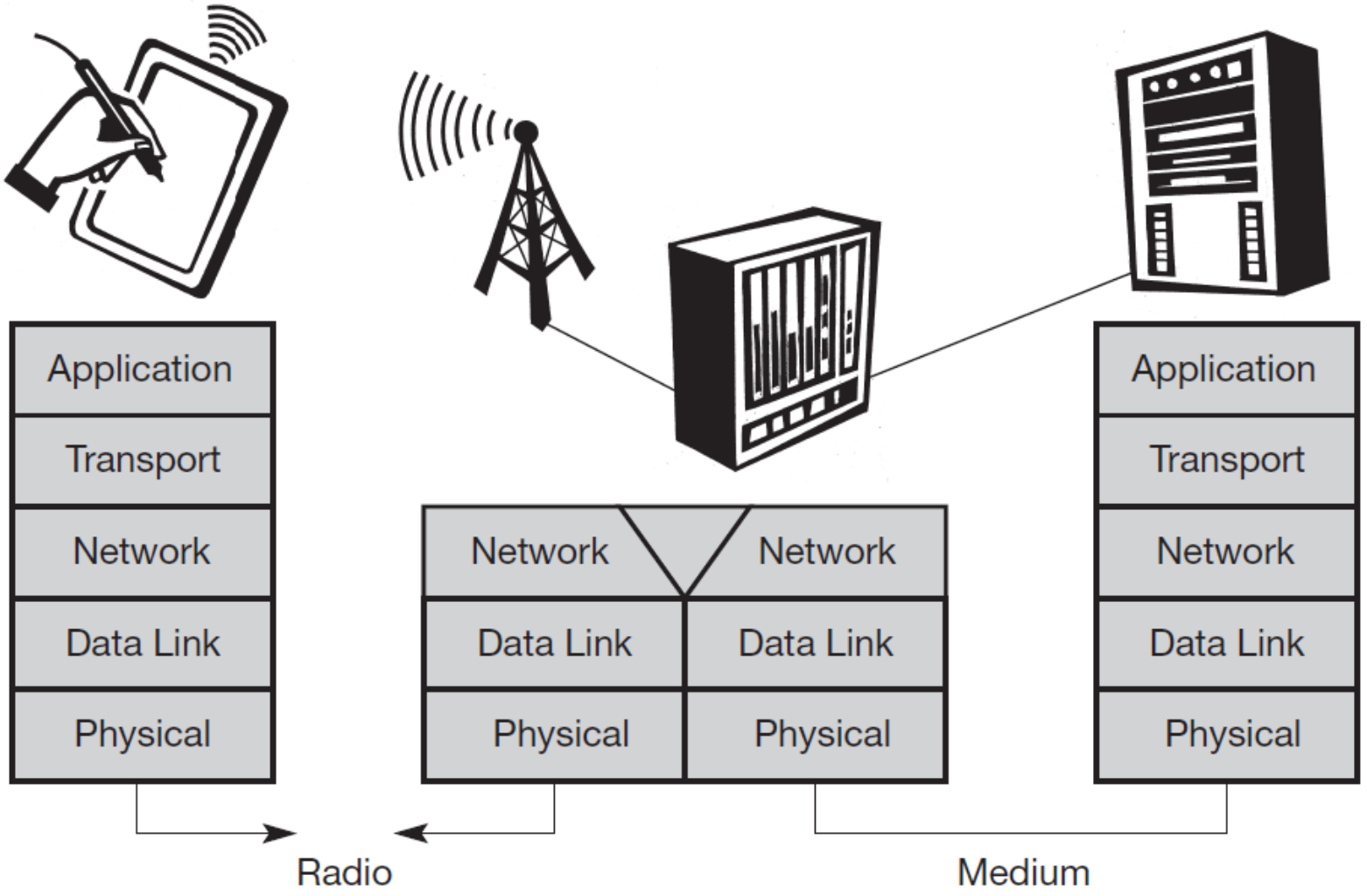
Mobile & Wireless: More power, less bulk

- Sensors
- Embedded Controllers
  - Keyboards, mouse, TV, coffee machines, …
- Computers (==Laptops)
- *Phones*
- …
- …
- CARS!

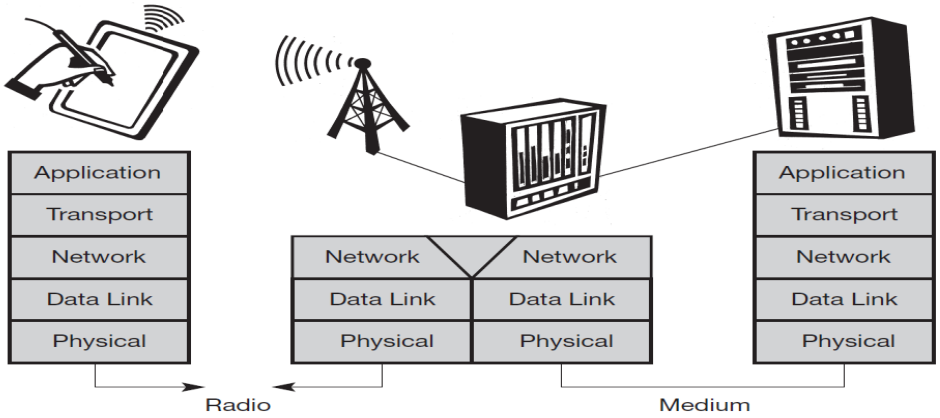
Areas

- Interference
- Bandwidth: Adapting applications and interfaces
- Spectrum regulations
- Security and attacks
- Ad-hoc networking
- Shared medium

Reference model

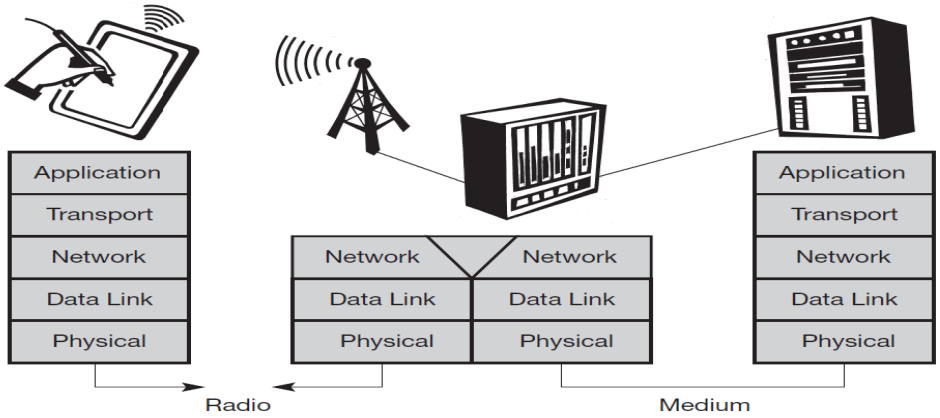


Physical Layer



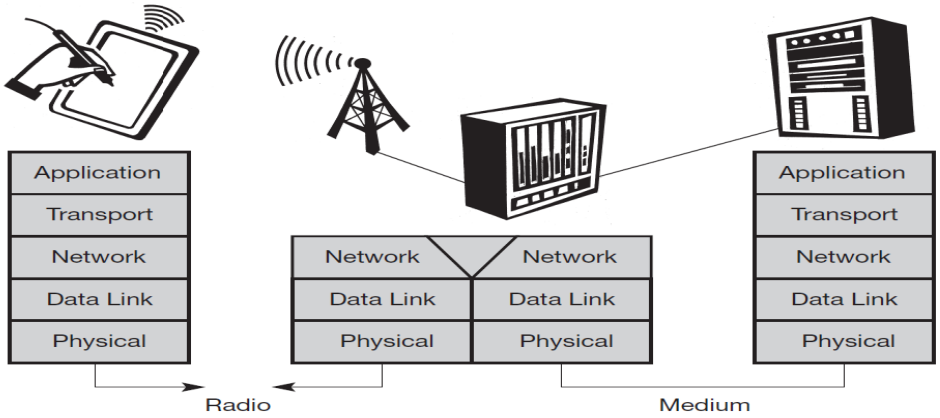
- The physical layer is the lowest layer in a communication system and is responsible for the conversion of a stream of bits into signals that can be transmitted on the sender side. The physical layer of the receiver then transforms the signals back into a bit stream.
- For wireless communication, it is responsible for frequency selection, generation of the carrier frequency, signal detection, modulation of data onto a carrier frequency and encryption.

Data Link Layer



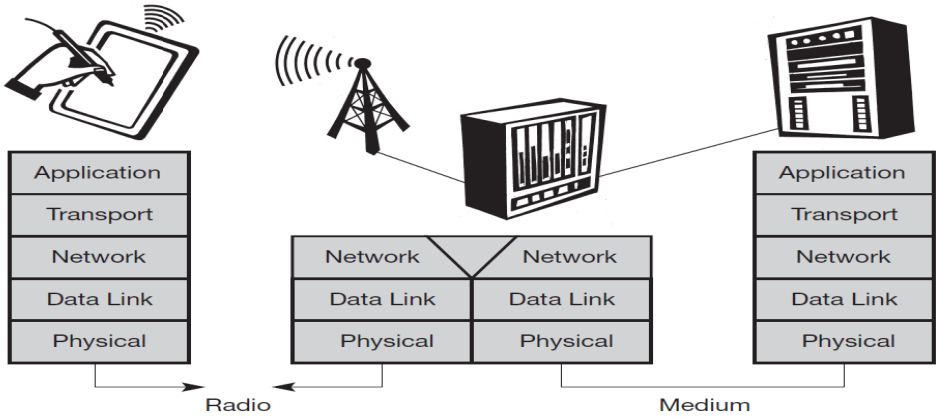
- The primary tasks of this layer include accessing the medium, multiplexing of different data streams, correction of transmission errors, and synchronization
  - i.e., detection of a data frame.
- It is responsible for a reliable point-topoint connection between two devices or a point-to-multipoint connection between one sender and several receivers.

Network Layer



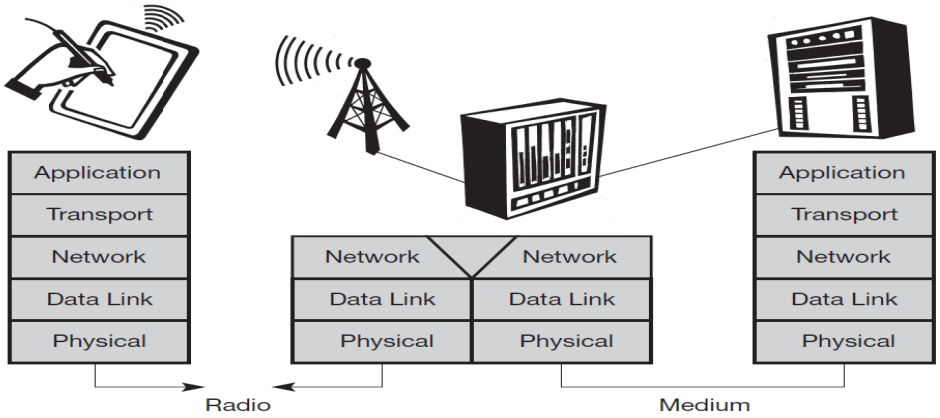
- This layer is responsible for routing packets through a network or establishing a connection between two entities over many other intermediate systems.
  - Addressing, routing, device location, and handover between different networks.

Transport Layer



- This layer establishes an end-to-end connection.
  - Quality of service, flow and congestion control are relevant.

Application Layer



- Situated on top of all transmission oriented layers.
- Topics of interest in this context are
  - service location, support for multimedia applications, adaptive applications that can handle the large variations in transmission characteristics, and wireless access to the world wide web using a portable device.

THANKS!

- Next class on Transmission using SIGNALS.