Mobile Phones

Session 2

INST 346

Agenda

- Mobile phones

- Cellular networks

- Sensors

Cellular network architecture

Mobile Switching Center

Mobile Switching Center

Public telephone network

wired network
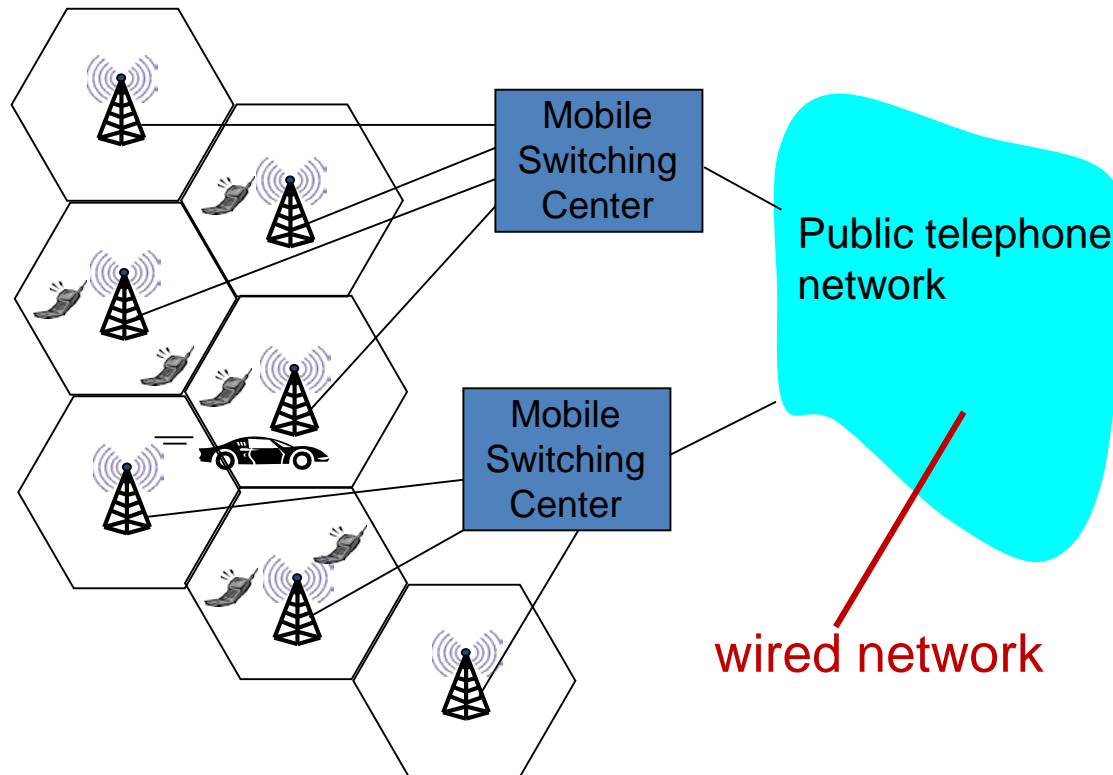
Communications Types

- Voice

- Mobile Data
  - 3G has separates voice and data
  - 4G uses data for everything (including voice)

- WiFi

- Bluetooth

Orientation Sensors

- Accelerometer (g-sensor)

- Gyroscope

- Compass (magnetometer)

Position Measurement

- GPS

- Cellular

- WiFi

Environmental Sensors

- Proximity (to your ear, to your pocket, …)

- Light (to adjust screen brightness)

- Barometric pressure (for elevation)

- Temperature

# Signal Acquisition

- Camera
  - Still images
  - Video

- Microphone

- FM Radio

- Fingerprint

User Interaction

- Touchscreen
  - Point
  - Gesture
  - Type
- Audio
  - Speech
  - Earcons
- Haptic
- Predictive analytics

Combain

Global Coverage. One API. There are millions of cell towers and wifi hot spots in the world. Thousands of new ones are published every day. We receive millions of measurements around the world every day that help us to keep the database up-to-date. Our global average coverage rate for cell-id is above 98% and above 90% for wifi. Mouse over the countries to get coverage details per country.

Peru
Wifi Coverage: 79.1

30.4   99.6
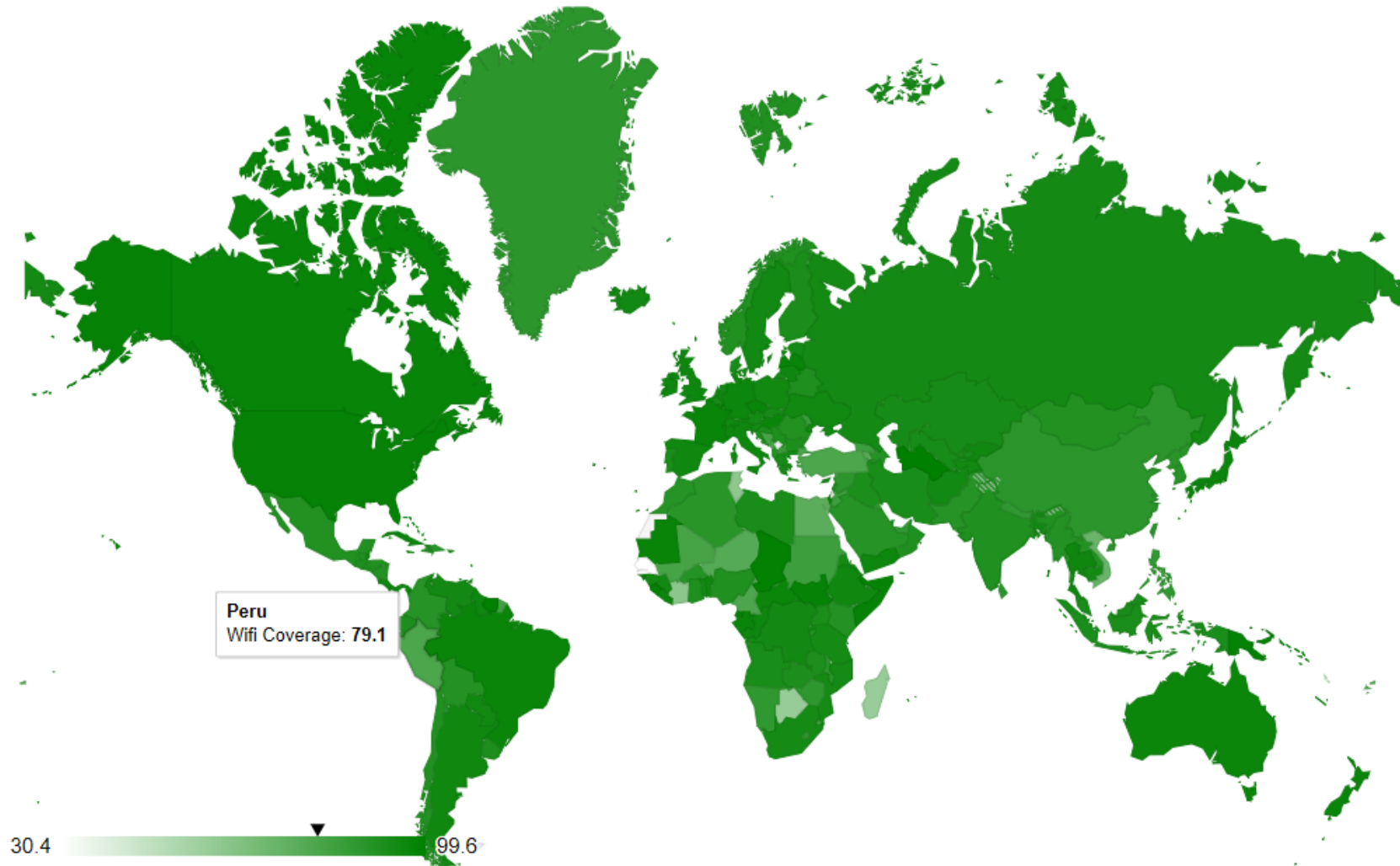
How Wi-Fi positioning works with GPS

Devices with both Wi-Fi and GPS can be used to send information about a Wi-Fi network back to a location service provider. This makes it possible to determine where the particular Wi-Fi network is. This is done by having the device send the access point's MAC address along with the location determined by GPS. If GPS is used to determine the location of a device it will also scan nearby networks that can be used to identify the network. When the location of Wi-Fi networks are found the information will be recorded for public access. Next time someone is close to one of those Wi-Fi networks, but lack a GPS-signal, this service will be used to determine a location as the network's location is recorded.

Vendors collecting Wi-Fi information

Wi-Fi positioning information is gathered by vendors to provide more accurate location services to users. Gathering this kind of network information is public knowledge, Wi-Fi passwords are not needed to do this. Determining user locations in this way is usually part of cell phone carrier's terms-of-service agreement though most phones allow the user to turn off location services.

Before You Go

On a sheet of paper, answer the following (ungraded) question (no names, please):

What was the muddiest point in today's class?