WELCOME
Mobile Applications Testing

Mobile Applications Testing
List of "MUST HAVE" to survive this class

- **Required**
- **ANDROID is mandatory**
- **(OS 4.4 and higher)**
- **Google Drive account**
- **Google email**
- **Flash Drive**
- **Mobile Phone (iPhone/Android)**

- **Desired**
- **Have your purpose to learn**
- **Ready to get out of "comfort zone"**
- **Motivation to become independent but reliable QA**
- **Not take everything for granted (because I paid for it)**

High Five

Mobile Ecosystem

Mobile World Statistics

Carriers

Networks

Manufactures
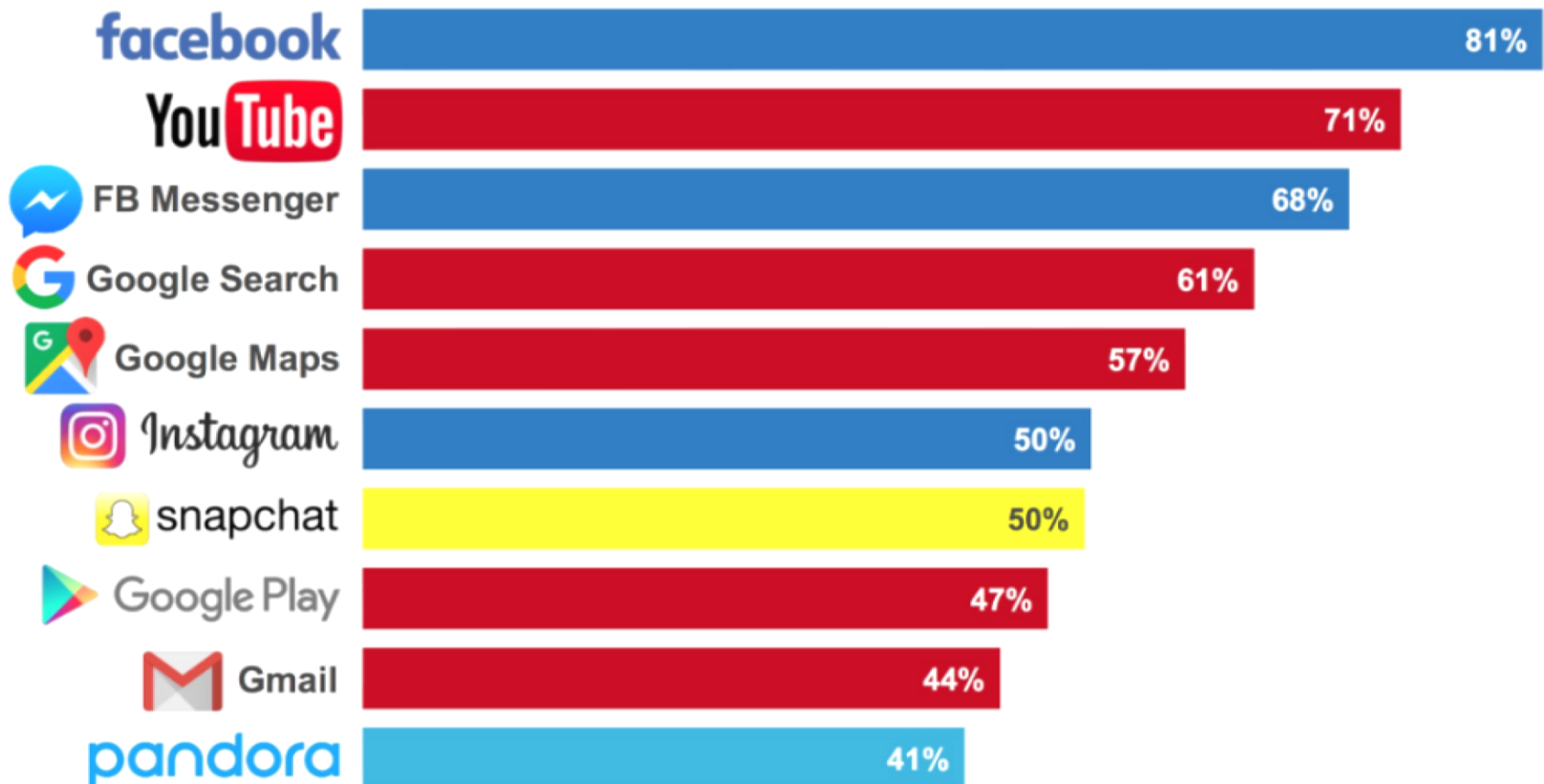
Devices

Platforms/OS

Frameworks

API-Apps

Services

Mobile World Statistics

Top 10 Mobile Apps by Penetration of App Audience
Source: comScore Mobile Metrix, U.S., Age 18+, June 2017

App	Penetration
facebook	81%
YouTube	71%
FB Messenger	68%
Google Search	61%
Google Maps	57%
Instagram	50%
snapchat	50%
Google Play	47%
Gmail	44%
pandora	41%

Mobile World Statistics

Mobile World Statistics

These Apps Are Putting a Strain on Mobile Networks
Breakdown of peak period mobile internet traffic in North America by application

YouTube — 19.59%

facebook — 16.35%

Instagram — 3.79%

NETFLIX — 3.22%

HTTP (Browsing) — 10.69%

Snapchat — 4.11%

Others — 33.97%

Google — 4.33%

PANDORA internet radio — 3.95%
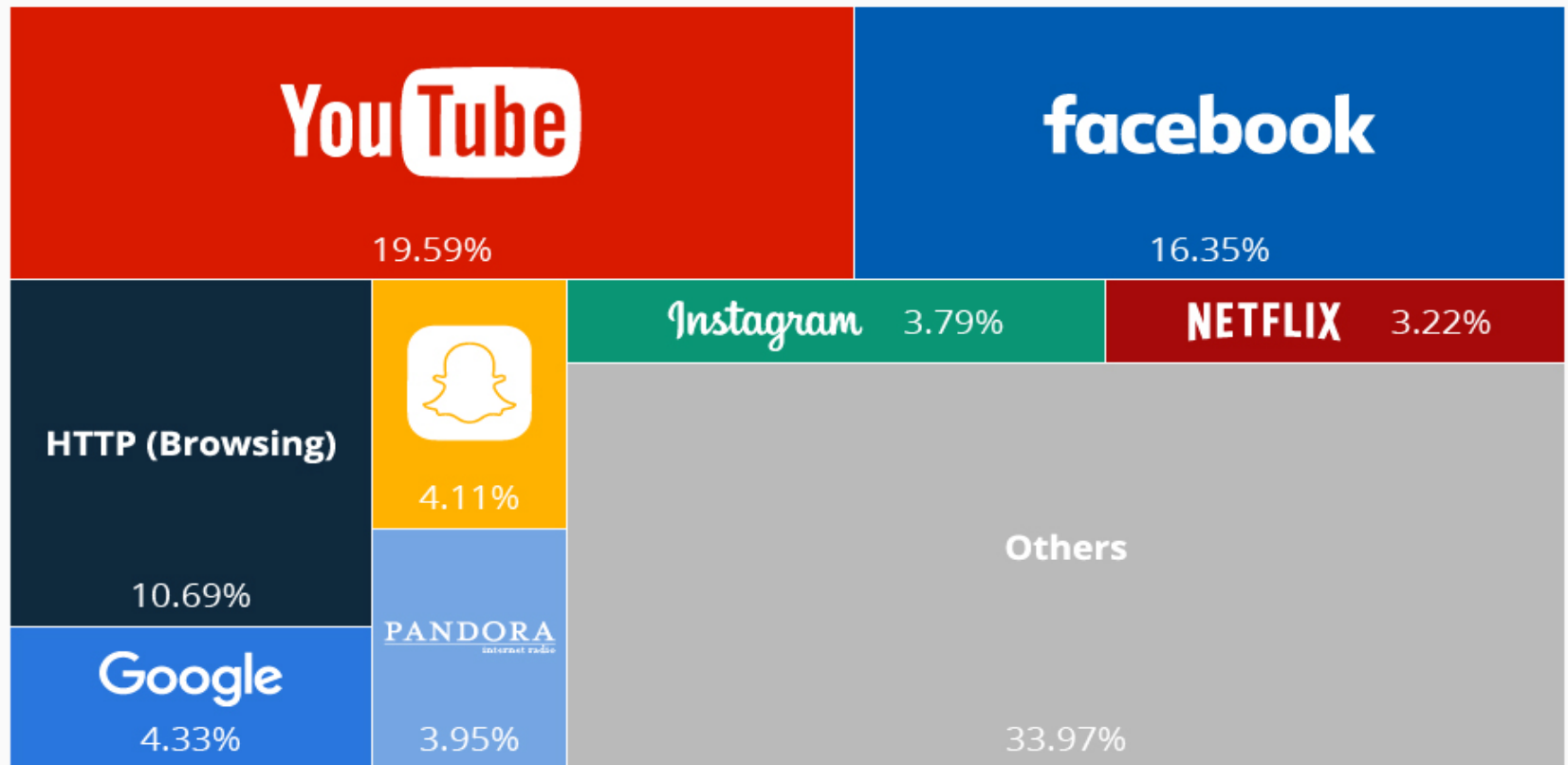
Data gathered in September and October 2015
Source: Sandvine
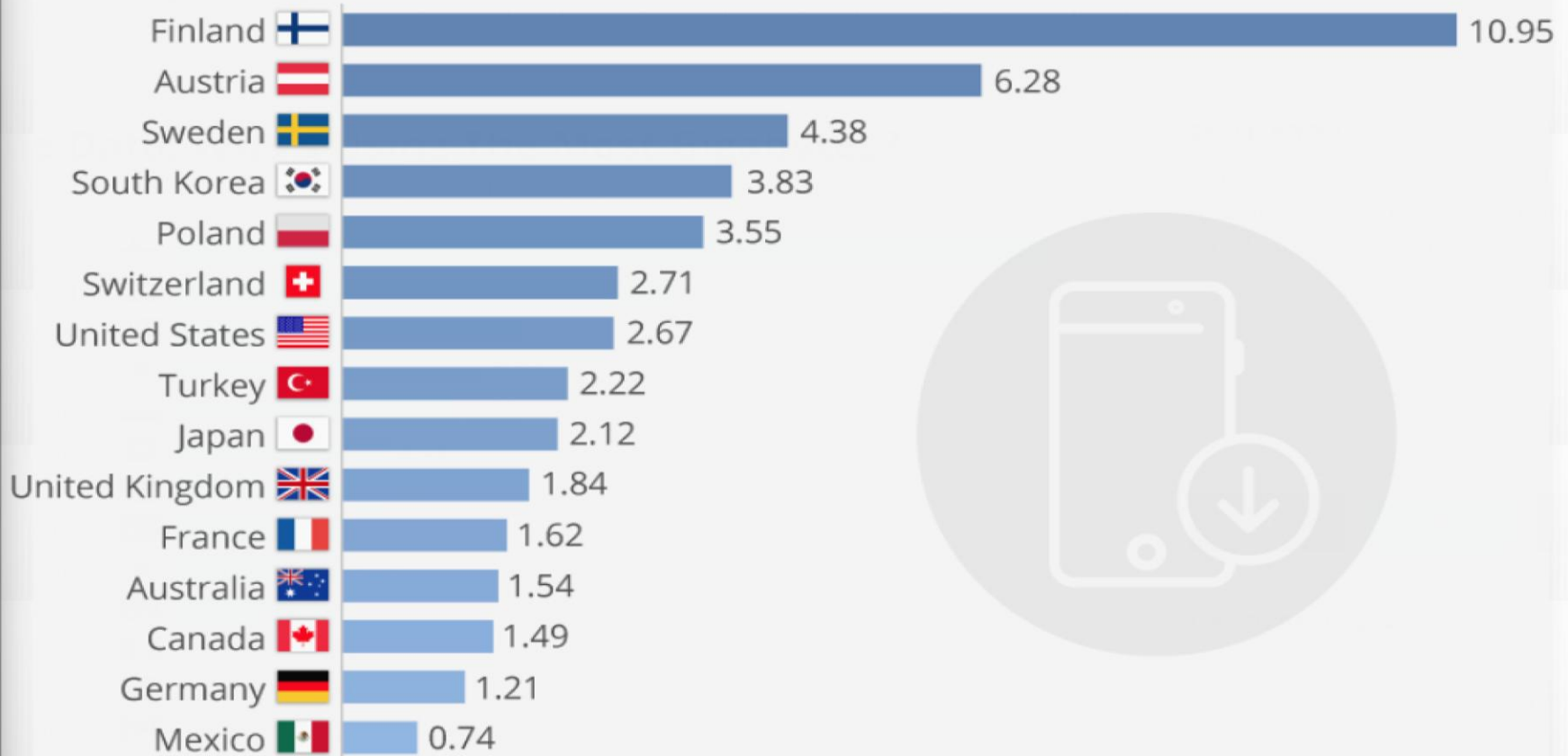
statista ⊿

Mobile World Statistics

Mobile Data: Who's Using The Most Gigabytes?

Mobile data usage per mobile broadband subscription in 2016 (gigabytes per month)*

Country	Gigabytes
Finland	10.95
Austria	6.28
Sweden	4.38
South Korea	3.83
Poland	3.55
Switzerland	2.71
United States	2.67
Turkey	2.22
Japan	2.12
United Kingdom	1.84
France	1.62
Australia	1.54
Canada	1.49
Germany	1.21
Mexico	0.74

* Selected OECD countries
Source: OECD

@StatistaCharts

statista

Mobile Ecosystem

Mobile World Statistics

Carriers/Service Providers

Network

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Services

Carriers/Service Providers

Carriers/Service Providers Subscriber Data (2017 in MM)

Verizon Wireless: 141.4

AT&T Mobility: 130.4

T-Mobile US: 65.5

Sprint Corp: 58.8

U.S. Cellular: 4.9

Carriers/Service Providers

Install Cellular Towers

Operate the Cellular Network

Responsibilities

Make Services (Internet) available for Mobile Subscribers

Handling Billing , Support and Sales

Mobile Ecosystem

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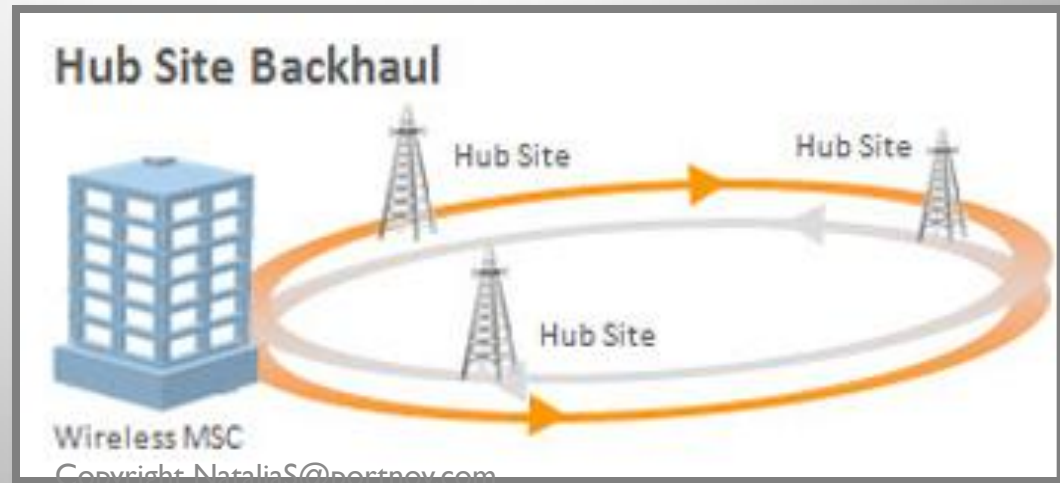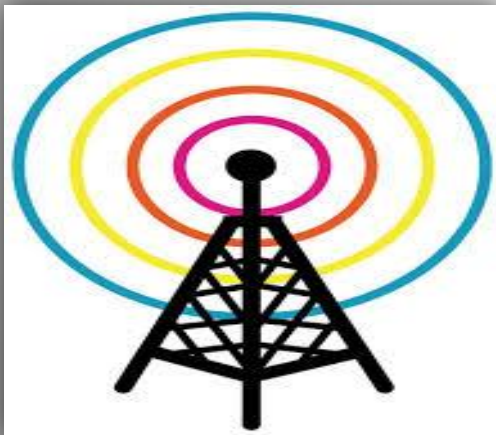
Network

Cellular Network Architecture – Overview

➢ **Mobile Equipment (ME) –** This refers to the physical phone itself. The phone must be able to operate on a cellular network.

➢ **Base Transceiver Station (BTS) –** It is actually the antenna that you see installed on top of the tower. The BTS is the Mobile Phone's access point to the network. It is responsible for carrying out radio communications between the network and the Mobile Phone.

➢ **What is a Cell –** A base station (transmitter) having a number of RF channels is called a cell. Each cell covers a limited number of mobile subscribers within the cell boundaries (Coverage area).

➢ **Cell Size and Capacity –** Cell size determines number of cells available to cover geographic area and (with frequency reuse) the total capacity available to all users. Capacity within cell limited by available bandwidth and operational requirements. Each network operator has to size cells to handle expected traffic demand

➢ **Base Station Controller (BSC) –** The BSC controls multiple BTSs.
It handles allocation of radio channels, frequency administration, power and signal measurements from the MS, and handovers from one BTS to another (if both BTSs are controlled by the same BSC).

➢ **Mobile Switching Center (MSC) –** The MSC is the heart of the GSM network. It handles call routing, call setup, and basic switching functions. An MSC handles multiple BSCs and also interfaces with other MSC's and registers.

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Cellular Network Architecture Simplified

Networks themselves are always about data transfer and technology dictates the transfer speed

➢ **CELL PHONE** - It is the radio transmitter that sends the signals to the towers in order to transmit digitized voice signals through the network.

➢ **Cell Site/TOWER** - is a cellular telephone site where antennas and electronic communications equipment are placed, usually on a radio mast, tower or other high place, to create a cell (or adjacent cells) in a cellular network.

➢ **HUB** - It is what the tower communicates with. These hubs will either connect to other hubs or use satellite dishes to provide network connections back to the phone via the cell tower.

Hub Site Backhaul

Hub Site

Hub Site

Hub Site

Wireless MSC

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GSM Standard - Global System for Mobile Communication

❖ **Service:** Voice calling, text, messaging, data service similar to CDMA

❖ **Feature:** One of the key features of GSM is the [Subscriber Identity Module](#), commonly known as a **SIM card**.

❖ The SIM is a detachable [smart card](#) containing the user's subscription information and phone book. This allows the user to retain his or her information after switching handsets.

❖ SIM card that identify the user on the network and could be used as a storage.

❖ SIM cards allowed users switch phones by simply moving their SIM's between the phones.

## CDMA Standard - Code Division Multiple Access

❖**Service:**   Voice calling, text, messaging, data transmission

❖**Features:** Five times up of GSM capacity. More secure –used by military.
❖QUALCOMM designs the chips for the CDMA air interface.

❖**CDMA** phones cannot roam internationally as extensively as GSM phones nor can they transmit voice and data at the same time like GSM handsets.

❖**CDMA** phones are locked to a carrier. It's usually **cheaper to buy unlocked GSM phones** than on-contract CDMA phones.

Network : CDMA vs GSM : What's a difference ?

Click here to watch a Video
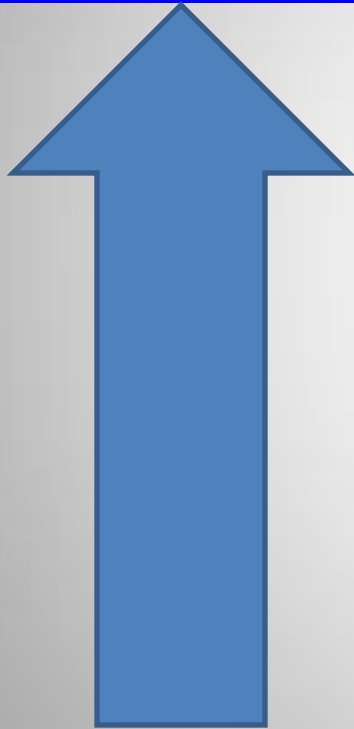
NETWORK: LTE

❖ An acronym for **Long Term Evolution**

❖ **LTE** is a 4G wireless communications standard developed by the 3rd Generation Partnership Project (3GPP) that's designed to provide up to 10x the speeds of 3G **networks** for mobile devices such as SmartPhones, Tablets, NetBooks, Notebooks and Wireless Hotspots.
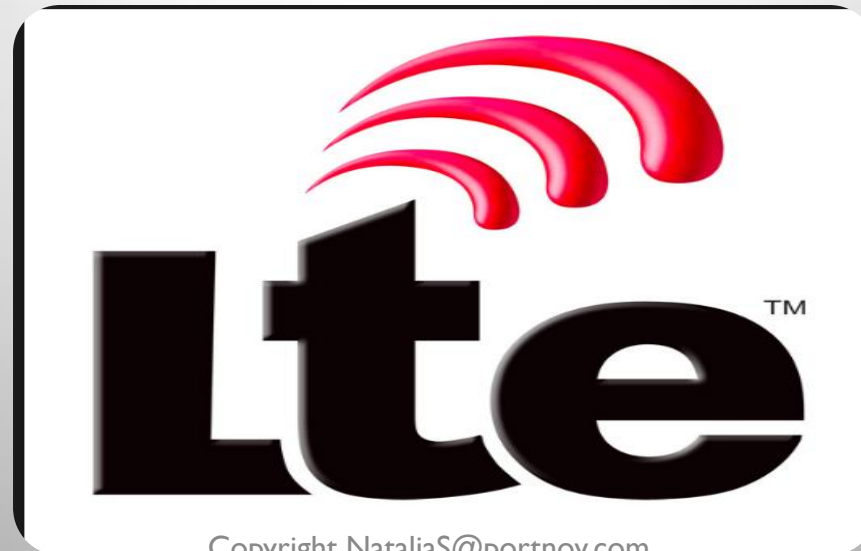
NETWORK: Satellite

❖ **SATTELITE** - artificial object which has been intentionally placed into orbit.

❖ Such objects are sometimes called **artificial satellites** to distinguish them from natural satellites such as Earth's Moon.

❖ The world's first artificial satellite, the Sputnik 1, was launched by the Soviet Union in 1957. Since then, thousands of satellites have been launched into orbit around the Earth.

❖ Common types include military and civilian Earth observation satellites, communications satellites, navigation satellites, weather satellites, and research satellites. Space stations and human spacecraft in orbit are also satellites.

❖ Satellite orbits vary greatly, depending on the purpose of the satellite, and are classified in a number of ways.

NETWORK: GPS

❖ The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense.

❖ The 24 satellites that make up the GPS space segment are orbiting the earth about 12,000 miles above us. They are constantly moving, making two complete orbits in less than 24 hours. These satellites are travelling at speeds of roughly 7,000 miles an hour.

❖ GPS satellites are powered by solar energy. They have backup batteries onboard to keep them running in the event of a solar eclipse, when there's no solar power. Small rocket boosters on each satellite keep them flying in the correct path.

NETWORK: WiFi

❖ **WiFi** is a technology that uses radio waves to provide network connectivity. WiFi- most widely accepted definition for the term in the tech community is **Wireless Fidelity**.

❖ Wireless technology has widely spread lately and you can get connected almost anywhere; at home, at work, in libraries, schools, airports, hotels and even in some restaurants.

❖ Like mobile phones, a **WiFi** network makes use of radio waves to transmit information across a network. The computer should include a wireless adapter that will translate data sent into a radio signal.

Wi Fi ™

PCI Desktop, Laptop PC Card, and USB Wi-Fi

EZ Networking
EZ Card 10/100
PC Card
SMC

http://www.computerhope.com

NETWORK: WiFi Frequencies

❖ Wireless networking is known as WiFi or 802.11 networking as it covers the IEEE 802.11 technologies. The major advantage of WiFi is that it is compatible with almost every operating system, game device, and advanced printer.

❖ A wireless network will transmit at a frequency level of 2.4 GHz or 5GHz to adapt to the amount of data that is being sent by the user. The 802.11 networking standards will somewhat vary depending mostly on the user's needs.

The **802.11a** will transmit data at a frequency level of 5GHz. The Orthogonal Frequency-Division Multiplexing (OFDM) used enhances reception by dividing the radio signals into smaller signals before reaching the router. You can transmit a maximum of 54 megabits of data per second.

The **802.11b** will transmit data at a frequency level of 2.4GHz, which is a relatively slow speed. You can transmit a maximum of 11 megabits of data per second.

The **802.11g** will transmit data at 2.4GHz but can transmit a maximum of 54 megabits of data per second as it also uses an OFDM coding.

The more advanced **802.11n** can transmit a maximum of 140 megabits of data per second and uses a frequency level of 5GHz.
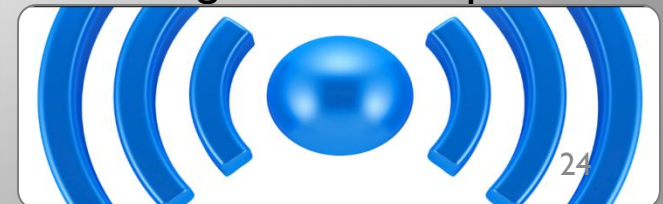
NETWORK: WiFi (Hotspots)

❖ A **HOTSPOT** is a physical location where people may obtain Internet access, typically using **Wi-Fi** technology, via a wireless local area network (WLAN) using a router connected to an internet service provider.

❖ A **WiFi connection** is established using a wireless adapter to create *HOTSPOTS* - areas in the vicinity of a wireless router that are connected to the network and allow users to access internet services.

❖ The term **HOTSPOT** is used to define an area where **WiFi** access is available. It can either be through a closed wireless network at home or in public places such as restaurants or airports.

Equipment is inexpensive (many newer computers have the needed hardware built in), and Wi-Fi hotspots remains free in some locales.
Availability can be a problem, specifically in most suburban and rural areas.

NETWORK: BLUETOOTH

❖ **Bluetooth** is a [wireless](#) technology standard for exchanging data over short distances

❖ You can use Bluetooth with cell phones, PDAs, laptops, palmtops, printers, baby monitors, garage openers and other external devices.

❖ Bluetooth networking transmits data via low-power radio waves. It communicates on a frequency of **2.45 gigahertz**

❖ This frequency band has been set aside by international agreement for the use of industrial, scientific and medical devices (ISM).

NETWORK: BLUETOOTH Facts

❖ The maximum distance for a Bluetooth network is about 30 feet

❖ Bluetooth requires very little power to use (befitting its design, which concentrates on battery-operated devices)

❖ Slow compared with the 802.11b network standard.

❖ No base station is required for Bluetooth communications between devices.

FUN FACT:

The **Bluetooth symbol** is a bind-rune, which means that it is formed from two runes that are merged together. Runes are the ancient Norse letters that, according to mythology, Odin discovered and gave to gods and humans. Runes have been used for over thousand years (probably a lot longer).
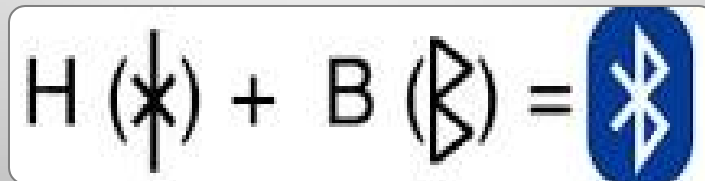
NETWORK: BROADBAND

❖ **MOBILE BROADBAND** is the marketing term for wireless Internet access through a portable modem, mobile phone, USB wireless modem, tablet or other mobile devices.

❖ A barrier to **MOBILE BROADBAND** use is the coverage provided by the mobile phone networks.

➢ *This may mean no mobile phone service or that service is limited to older and slower mobile broadband technologies.*

➢ *Customers will not always be able to achieve the speeds advertised due to mobile data coverage limitations including distance to the cell tower.*

➢ *In addition, there are issues with connectivity, network capacity, application quality, and mobile network operators' overall inexperience with data traffic.*

➢ *Peak speeds experienced by users are also often limited by the capabilities of their SmartPhone or other mobile device.*

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NETWORK: Cellular Modem

Three main types of cellular modems:

❖ **Cell phones** - using phones as modems to enable Internet access on computers, aka *__tethering__*

❖ **Cellular cards** - portable *__network adapters__* that plug into computers,aka *__aircards__*

❖ **Cellular routers** - portable *__network routers__* that contain built-in cellular modems