

NETWORK BASICS

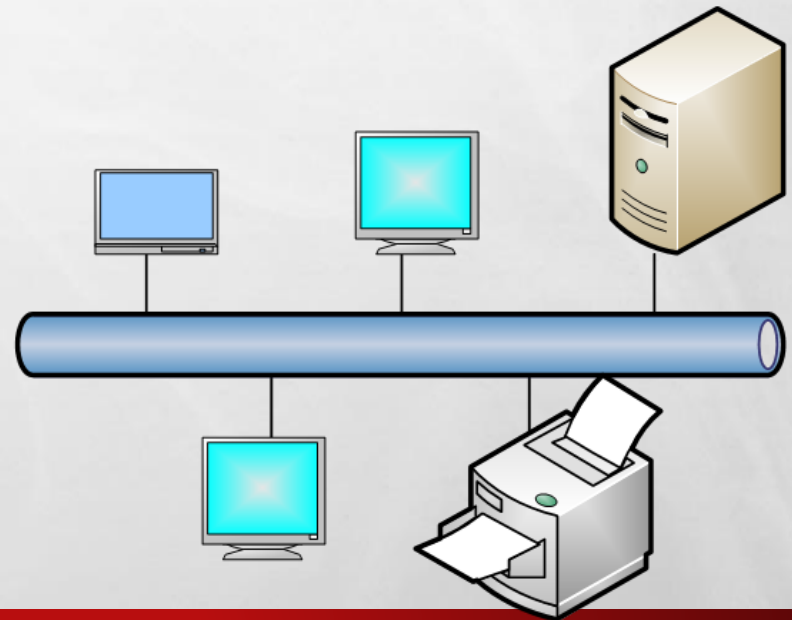
- **NETWORK***** - A COMMUNICATIONS SYSTEM CREATED BY LINKING TWO OR MORE DEVICES AND ESTABLISHING A STANDARD METHODOLOGY IN WHICH THEY CAN COMMUNICATE

UNIT OF MEASUREMENT FOR TELECOMMUNICATION DEVICES

- **BANDWIDTH**
 - MEASURED IN **BITS PER SECOND* (BPS)**
- **BROADBAND – (CABLE, DSL)**
- **NARROWBAND – (PHONE)**

CLIENT/SERVER NETWORKS

- **CLIENT*** - A COMPUTER THAT IS DESIGNED TO REQUEST INFORMATION FROM A SERVER (YOUR MACHINE)
- **SERVER*** - A COMPUTER THAT IS DEDICATED TO PROVIDING INFORMATION IN RESPONSE TO EXTERNAL REQUESTS



WHAT IS A LAN

- [HTTPS://WWW.YOUTUBE.COM/WATCH?V=RRESGLFFGNK](https://www.youtube.com/watch?v=RRESGLFFGNK)

MEDIA

- **NETWORK TRANSMISSION MEDIA - REFERS TO THE VARIOUS TYPES OF MEDIA USED TO CARRY THE SIGNAL BETWEEN COMPUTERS**
- **WIRE MEDIA (GUIDED - PHYSICAL)**
- **WIRELESS MEDIA (UNGUIDED)**



TELEPHONE LINES

- **ADVANTAGES-**

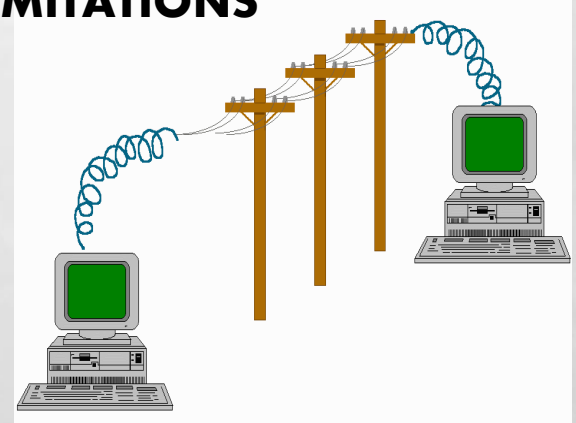
- **INEXPENSIVE**
- **WIDELY AVAILABLE**
- **EASY TO CONNECT**

Called "Twisted Pair"



- **DISADVANTAGES**

- **SLOWER SPEEDS (56 KBPS)**
- **DISTANCE LIMITATIONS**
- **SECURITY**
- **WEATHER**



COAXIAL CABLE

Cable into your house
200 Mbps to 1 Gbps
(download)
Uploads are slower

- **ADVANTAGES-**

- **WIDELY AVAILABLE**
- **EASY TO INSTALL**
- **FASTER THAN PHONE**

- **DISADVANTAGES**

- **SECURITY**
- **SHARED NETWORK –
MORE USERS SLOWER
SPEEDS**



FIBER OPTIC CABLE

- **ADVANTAGES-**

- **SPEED (UP TO 10 GB)**
- **SECURITY**
- **MULTIPLE TRANSMISSIONS**
- **NOT EFFECTED BY WEATHER**

- **DISADVANTAGES**

- **EXPENSIVE**
- **DIFFICULT TO INSTALL**



WIRELESS - UNGUIDED MEDIA

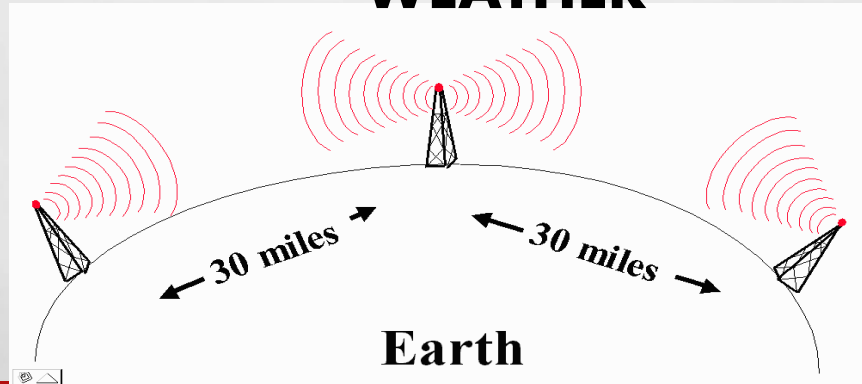
MICROWAVE

- **ADVANTAGES-**

- **DO NOT NEED PHYSICAL WIRE**
- **UP TO 56 MBPS**

- **DISADVANTAGES**

- **SECURITY**
- **LINE OF SITE RESTRICTIONS**
- **WEATHER**



SATELLITE - 22,000 MILES UP!



BLUETOOTH



- EMBEDS TINY RADIO TRANSMITTERS IN DEVICES
 - USES UNLICENSED RADIO BANDWIDTH
 - CHANGES FREQUENCY CONSTANTLY TO PREVENT INTERCEPTION
-
- **ADVANTAGES-**
 - WORLDWIDE USAGE DUE TO UNLICENSED RADIO BANDWIDTH
 - MANY DEVICES TO TALK TO EACH OTHER
 - **DISADVANTAGES**
 - 5 TO 10 METER DISTANCE

INFRARED

- **USES LIGHT WAVES TO TRANSMIT DATA**



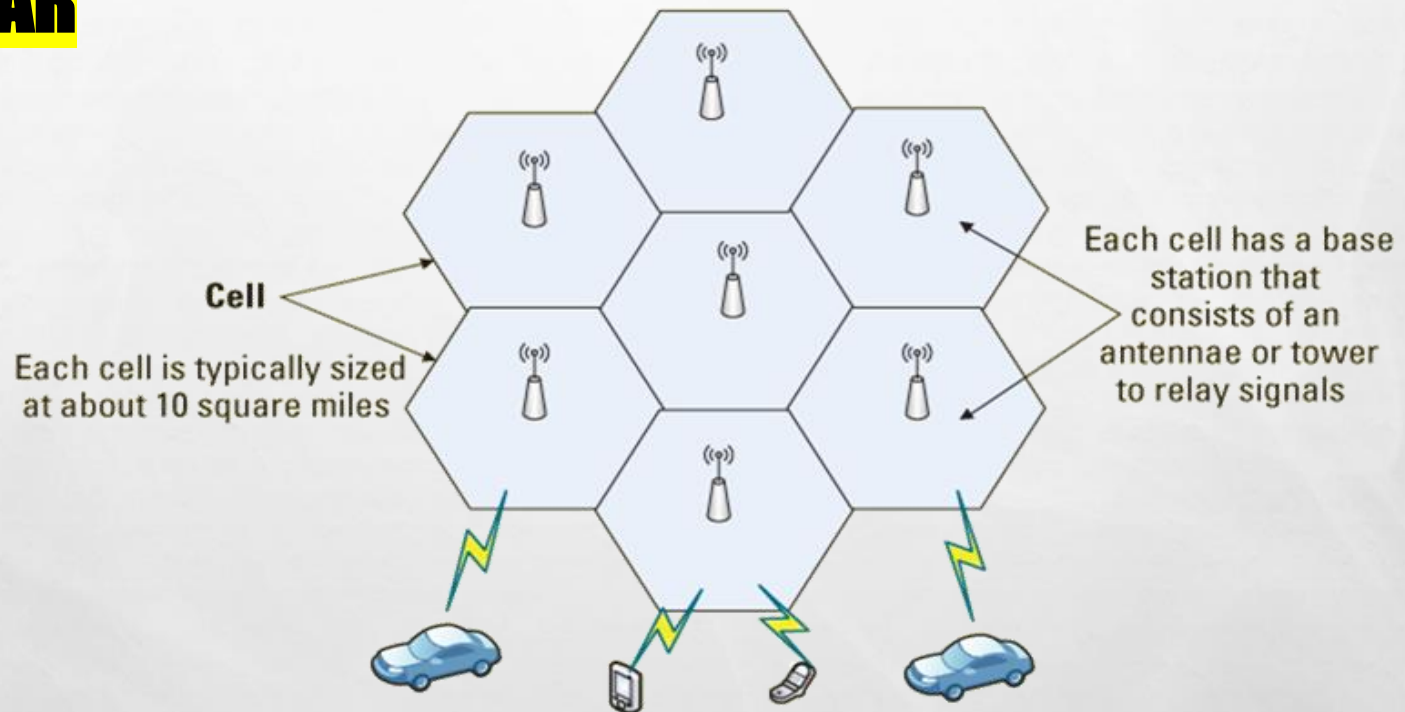
- **ADVANTAGES-**

- **INSTALLATION IS EASY**
- **CUBICLES IN OFFICES CAN EASILY BE RECONFIGURED**
- **WALLS STOP IT**

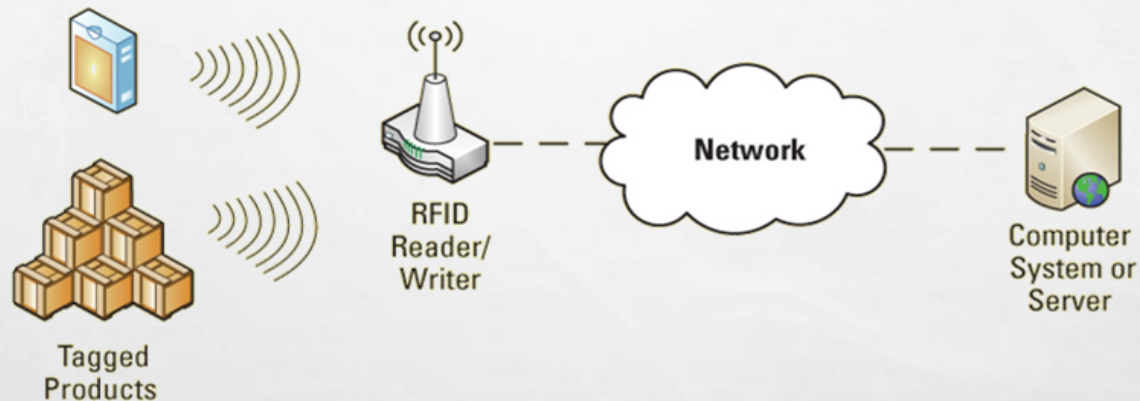
- **DISADVANTAGES**

- **LINE OF SITE**
- **WALLS STOP IT**

CELLULAR



RADIO FREQUENCY IDENTIFICATION (RFID)



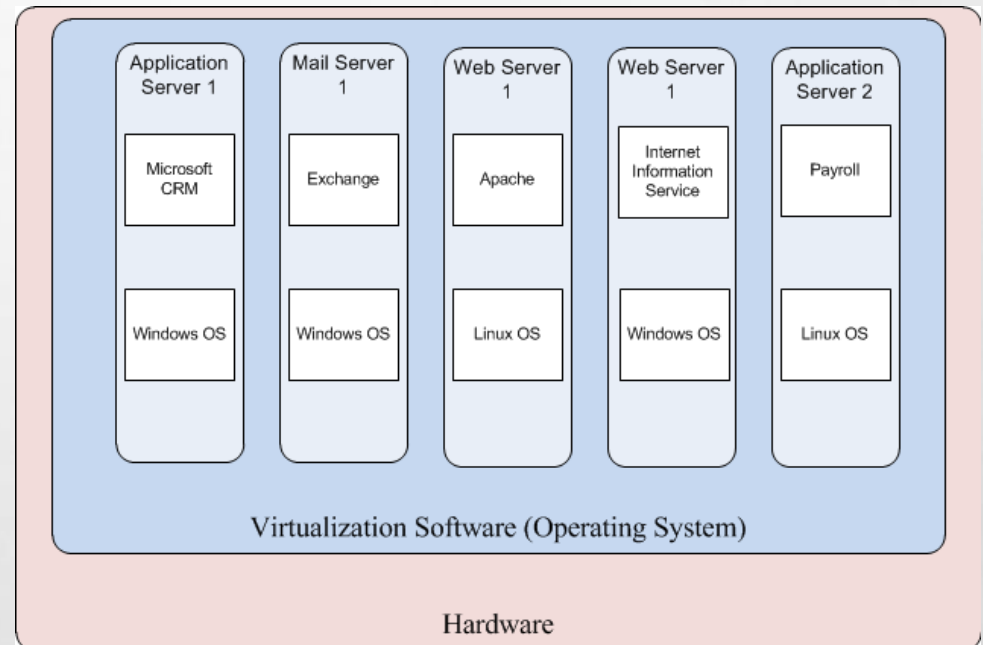
- **RADIO FREQUENCY IDENTIFICATION (RFID) - USES ELECTRONIC TAGS AND LABELS TO IDENTIFY OBJECTS WIRELESSLY OVER SHORT DISTANCES**

HOW DOES WIRELESS & BLUETOOTH WORK

- [HTTPS://WWW.YOUTUBE.COM/WATCH?V=MPMGRILSOVK](https://www.youtube.com/watch?v=MPMGRILSOVK)

VIRTUALIZATION

- Allows one physical device to operate as if it was several machines
- Each virtual machine can then run its own operating system and applications
- This is Horizon!!





SECURING INFORMATION

CHAPTER 7



RISK MANAGEMENT AND SECURITY

- **RISK MANAGEMENT**
 - **PROCESS OF IDENTIFYING, ASSESSING AND PRIORITIZING INFORMATION SYSTEMS SECURITY RISKS**
 - **OBJECTIVE: DEVISE THE OPTIMAL RISK MITIGATION STRATEGY**
 - **RESPONSE: ACCEPTANCE, MITIGATION, TRANSFERENCE**

SECURITY CONCEPTS

- **MANAGEMENT, NOT TECHNOLOGY ISSUE**
 - **TOP-TO-BOTTOM COMMITMENT**
- **ASYMMETRICAL WARFARE**
 - **ATTACKER ONLY HAS TO FIND ONE OPENING**
- **DEFENSE IN DEPTH**
 - **ATTACKER MUST GET PAST SEVERAL DEFENSES**



DENIAL OF SERVICE (DOS)

- **RENDER SYSTEMS UNAVAILABLE OR INOPERABLE, OR LIMIT THEIR OPERABILITY – DUE TO THE MULTIPLE NUMBER OF 'REQUESTS TO THE SERVER'**
- **EXAMPLE: [HTTPS://WWW.YOUTUBE.COM/WATCH?V=Z503NLSFE5S](https://www.youtube.com/watch?v=Z503NLSFE5S)**

MALICIOUS SOFTWARE (VIRUSES)

- **USUALLY TARGET-OF-OPPORTUNITY ATTACKS**
 - **FIND ANY WEAK SYSTEM; ANY VICTIM**
- **SIGNATURE: PARTICULAR BIT PATTERNS THAT CAN BE RECOGNIZED**



RANSOMWARE

- **INSTALLED ON VICTIM'S COMPUTER VIA VIRUSES, UNAUTHORIZED ACCESS, OR PHISHING**
- **ATTACKS COMPUTER BY ENCRYPTING DATA UNTIL AN APPROPRIATE PASSWORD IS PROVIDED, GIVEN WHEN A RANSOM IS PAID TO THE HACKER**
- **BITCOIN: MAIN CURRENCY USED**
 - **CRYPTOCURRENCY (USES ENCRYPTION) THAT RELIES ON BLOCKCHAIN**
 - **BLOCKCHAIN: NETWORK WHERE TRANSACTIONS DO NOT REQUIRE TRUST BETWEEN PARTIES. INDIVIDUALS DO NOT NEED TO KNOW WHO EACH OTHER ARE (ANONYMOUS TRANSACTIONS).**
- **EXAMPLE:**
- **[HTTPS://WWW.YOUTUBE.COM/WATCH?V=LISWPCMBXHQ](https://www.youtube.com/watch?v=LISWPCMBXHQ)**

SOCIAL ENGINEERING (AND PHISHING)

- **TRICKING SOMEONE INTO GIVING OUT INFORMATION OR TAKING AN ACTION THAT REDUCES SECURITY OR HARMS A SYSTEM**
 - **ASKING FOR PASSWORD CLAIMING TO BE SOMEONE WITH RIGHTS TO KNOW IT**
 - **ASKING FOR A FILE TO BE SENT TO YOU**
 - **LISTENING TO A LUNCH CONVERSATION**
 - **OPENING A LINK TO A DANGEROUS WEBSITE**

