

Spolufinancováno z programu Evropské unie Erasmus+

Computer Networking - Part 1

CS 1 - Worksheet

What is networking?

Communication!				
•An interconnection of computers and other devices includir	ng:			
-Client computers				
-Servers (computers)				
-Network Devices				
•Hubs and Switches				
•Routers				
•Firewall				
•A computer network				
Computer networks include:				
Ethernet LANs				
LAN – Local Area Network				
•LAN () - A netw	ork connecting computers at a single site			
•A LAN:				
–Operates within a				
–Controlled by <u>I</u>				
–Allows local users to:				
•				
Access local file servers with				
•Access the Internet				
Ethernet LANs				
•The most common LAN technology is				
•Ethernet allows computers, printers, and other devices, "	", to be able to			

communicate.

•For devices to be able to communicate with each other over an Ethernet network, they must be configured with:

-What??? (We will discuss this shortly)

-___

Creating an Ethernet Network

 To start, your computer must have an 	<u></u>
•Ethernet NICs have an	interface or port.
•	are used to connect computers, printers
and other devices in the Ethernet LAN.	
•, i.e. Cat	-5 or Cat-6 cables (Category 5, Category 6) are used to connect
computers to the hubs and switches.	
Cat-5 cable connects computer	
Configuring IP (Internet Protocol)	
IP Configuration	
•To communicate with other computers	you need to properly configure:
	(of your computer)
	(of your computer)
•To communicate with computers	you need to properly configure:
	IP Address
•To be able to	, like www.cabrillo.edu, instead of IP addresses you need to
properly configure:	
	(Domain Name System) Server IP Address

IP Configuration: IP Address & Mask

•To communicate with other computers on your network you need to properly configure:

-IP Address (of your computer)

-Subnet Mask (of your computer)

•IP – Internet Protocol

•IP Address is the unique address of your computer on your network.

•Subnet Mask is used by your computer to figure out what network it belongs to.

•Analogy:

-Name: RICKGRAZIANI

-Mask: FFFFLLLLLLL

-The Mask tells us which part of RICKGRAZIANI is the first name (F) and which part is the last name (L).

IP Configuration: Default Gateway

•To communicate with computers outside your network you need to properly configure:

-Default Gateway IP Address

_____, including the Internet.

•Any information that needs to be sent to IP Addresses outside your network is sent to the Default Gateway or Router.

IP Configuration: DNS

•To be able to use domain names, like www.cabrillo.edu, instead of IP addresses you need to properly configure:

-DNS_(Domain Name System) Server IP Address

•You could use **IP Addresses** when accessing other computers, but we would rather use **names (domain names).**

•Computer networks ______ such as: -66.94.230.47

•Computer networks such as:

-www.yahoo.com

-A domain name is a name that is entered into a computer (e.g. as part of a website or other URL, or

an email address) and then looked up in the global [Domain Name System] which informs the computer of the IP address(es) with that name. (Wikipedia.com)

•People are better with names than numbers, so we would rather use names when:

-Accessing a web page: www.yahoo.com

-Emailing a friend: Rick.Graziani@cabrillo.edu

•DNS (Domain Name System) servers (computers) are used to

•The details of how DNS works.

•If your DNS server does not know the answer, it will find out for you.

Setting the IP Configuration Information

•IP information can be configured:

•Using a DHCP (Dynamic Host Configuration Protocol) Server

IP Configuration: Static Configuration

•Static configuration is when the _____

the IP

Address, Subnet Mask, Default Gateway and DNS Server information.

IP Configuration: Dynamic Configuration

•Dynamic configuration is when the IP Address, Subnet Mask, Default Gateway and DNS Server information

is obtained	from a	
		Server.
The Internet and TCP/IP		

 The Internet was originally designed by 	(Defense Advanced Research
Projects Agency) in response to the	, the
first satellite.	

•Out of this came the Internet, a way for computers to communicate from different parts of the world.

•These computers can be any type of computer using any type of operating system, as long as they are using the ______.

What is TCP/IP? What is a protocol?

•A protocol is nothing more than an _____

•The sender and receiver, and everyone in between, must agree on the rules, the protocol.

•Protocol: An agreed form of communications.

•TCP/IP is a suite of protocols.

•IP (Internet Protocol) is used for sender and receiver addressing.

1	¢)	

Connecting Networks with Routers

•The Internet, or simply the Net, is the _____

•Routers are network devices that connect two or more networks together.

•

•Routers only need to care about where they send the packet next.

•"What is the next-hop router I need to send this packet to?"

DSL or Cable Modem: No Router

•Routers can help protect your DSL or Cable Modem Network.

The router is

•The router is between you and the Internet.

Networks: Bandwidth and Connections

Local Area Networks

- •DSL
- •Cable Modem
- •Leased Lines
- •Modems

Bandwidth

•Bandwidth - The amount of information that can flow through a network connection in a given period of time.

•Usually measured in bits per second (bps)

- -bps: bits per second
- -Kbps: thousands of bits per second
- -Mbps: millions of bits per second

LANs: _____ (or more)

Connection to ISP (Internet Service Provider)

Note: Bandwidth depends up provider, location, and service plan.

•DSL:

–Download: 600 Kbps to	(or more)
		/

-Upload: 256 Kbps (or more)

•Cable Modem:

-Download: 600 Kbps to _____ (or more)

–Upload: 256 Kbps (or more)

•Telephone Modem:

–Up to

•Leased Lines

-T1:

-T3:_____

Connection to ISP: DSL

•DSL (digital subscriber line) is a very high-speed connection that

DSL: From HowStuffWorks.com

•Advantages of DSL:

-You can leave your Internet connection open and _____.

-The speed is much _____

; it can use the phone line you already have. –DSL

-The company that offers DSL will usually provide the modem as part of the installation.

•But there are disadvantages:

-A DSL connection _____.

-The connection is ______ over the

Internet.

-The service is not available everywhere.

Connection to ISP: Cable Modem

•A cable modem is a special type of modem that is designed to modulate a data signal over cable television infrastructure.

•Cable Modem Advantages

-Fast data transfers, up to 30 Mbps if using a 100BaseT NIC

-Competitive pricing against competing technologies

–Easy to install - home prewired

•Cable Modem Disadvantages

-The available bandwidth depends on the number of users on the local cable TV line segment.

-There is an asymmetrical transfer rate. Upstream is slower than downstream.

-There can be a bottleneck at the communication server at the head end.

Connection to ISP: Telephone Modem

•A **telephone modem** is used to modulate and demodulate (translate) between the digital signals of the computer and the analog signals over the telephone line.

•Maximum bandwidth is only 53 Kbps.

•Need separate phone line if you want to use the phone while connected to the Internet Connection to ISP: Leased Lines

•Many companies and schools use leased lines to connect to their ISP.

•These are dedicated circuits between the provider and the customer.

•These include:

–T1: 1.5 Mbps

–T3: 44.736 Mbps