Hackers Haven – Networking Basics

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About Hackers Haven https://hackershaven.tech/

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1. Introduction

-A network can be defined as a group of computers and other devices connected in some ways so as to be able to exchange data.

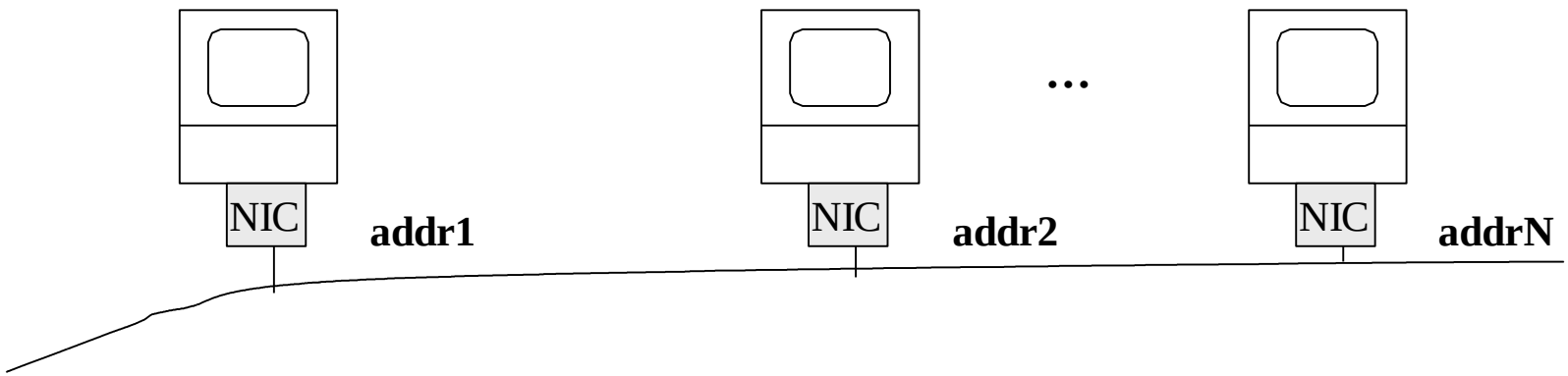
-Each of the devices on the network can be thought of as a node; each node has a unique address.

-Addresses are numeric quantities that are easy for computers to work with, but not for humans to remember.

Example: 204.160.241.98

-Some networks also provide names that humans can more easily remember than numbers.

Example: www.javasoft.com, corresponding to the above numeric address.



Addressing

Internet address

Consists of 4 bytes separated by periods

Example: 136.102.233.49

-The R first bytes (R= 1,2,3) correspond to the network address;

-The remaining H bytes (H = 3,2,1) are used for the host machine.

-**InterNIC Register**: organization in charge of the allocation of the address ranges corresponding to networks.

-Criteria considered:

→ Geographical area (country)

→ Organization, enterprise

→ Department

→ Host

Domain Name System (DNS)

-Mnemonic textual addresses are provided to facilitate the manipulation of internet addresses.

-DNS servers are responsible for translating mnemonic textual Internet addresses into hard numeric Internet addresses.

Ports

-An IP address identifies a host machine on the Internet.

-An IP port will identify a specific application running on an Internet host machine.

-A port is identified by a number, the *port number*.

-The number of ports is not functionally limited, in contrast to serial communications where only 4 ports are allowed.

-There are some port numbers which are dedicated for specific applications.

Applications	Port numbers
HTTP	80
FTP	20 and 21
Gopher	70
SMTP (e-mail)	25
POP3 (e-mail)	110
Telnet	23
Finger	79

Data Transmission

-In modern networks, data are transferred using *packet switching*.

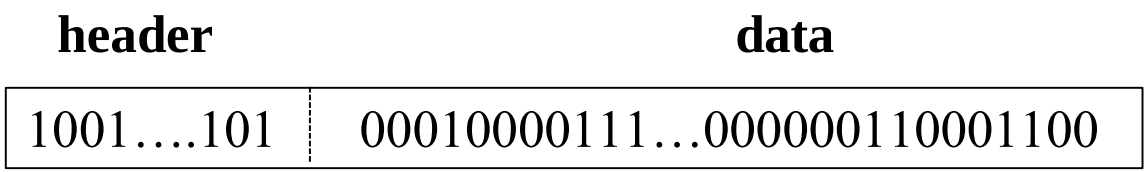
-Messages are broken into units called *packets*, and sent from one computer to the other.

-At the destination, data are extracted from one or more packets and used to reconstruct the original message.

-Each packet has a maximum size, and consists of a header and a data area.

-The header contains the addresses of the source and destination computers and sequencing information necessary to reassemble the message at the destination.

packet



Types of Networks

There are two principle kinds of networks: Wide Area Networks (WANs) and Local Area Networks (LANs).

WANs

-Cover cities, countries, and continents.

-Based on *packet switching* technology

-Examples of WAN technology: Asynchronous Transfer Mode (ATM), Integrated Services Digital Network (ISDN)

LANs

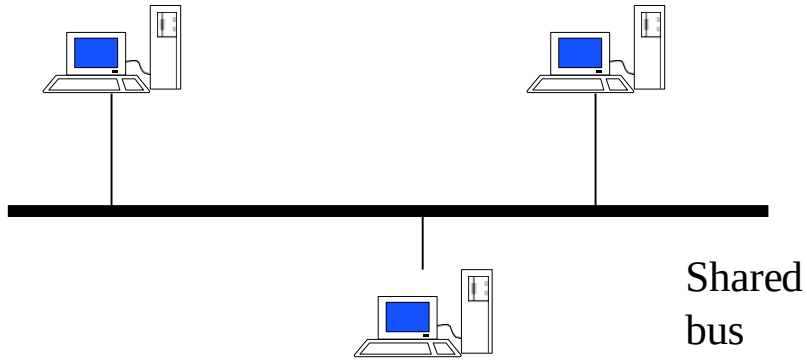
-Cover buildings or a set of closely related buildings.

-Examples of LAN technology: Ethernet, Token Ring, and Fibber Distributed Data Interconnect (FDDI).

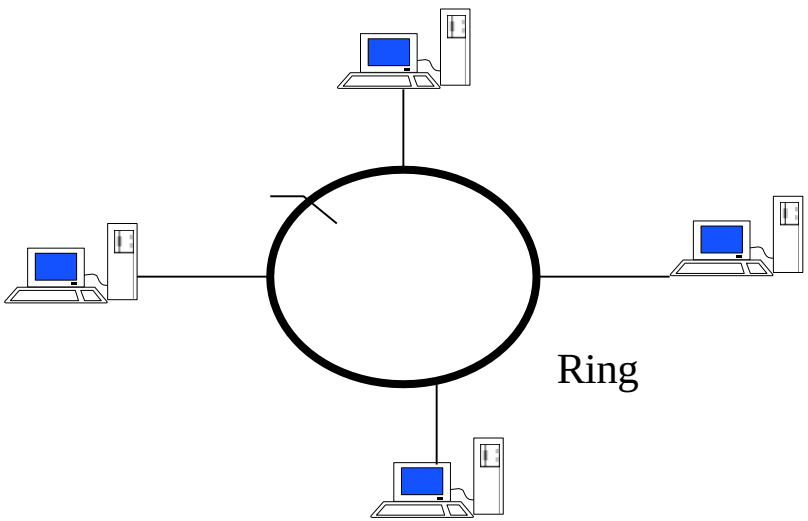
Ethernet LANs: based on a bus topology and broadcast communication

Token ring LANs: based on ring topology

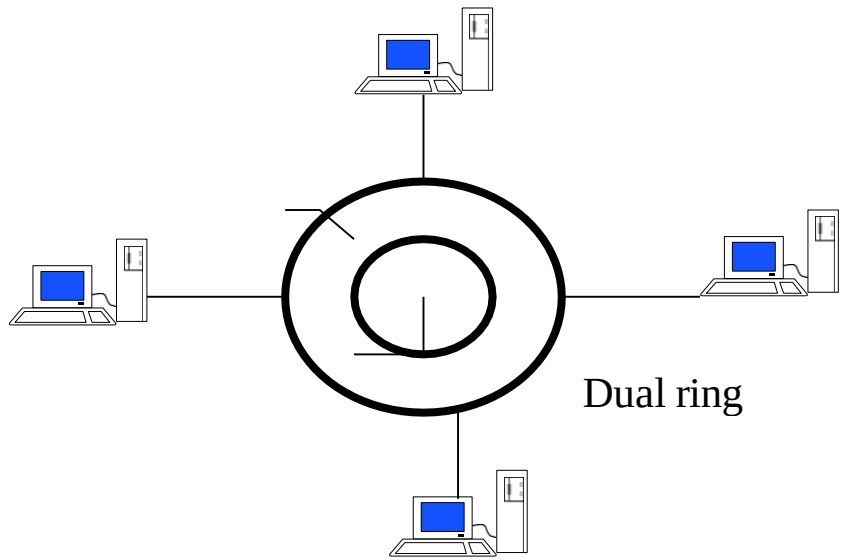
FDDI LANs: use optical fibbers and an improved token ring mechanism based on two rings flowing in opposite directions.



(a) Ethernet LAN



(b) Token Ring LAN



(c) FDDI LAN

Network connectivity type	Speed	Transmission time for 10 Mbytes
(Telephone) dial-up modem	14.4 Kbps	90 min
ISDN modem	56/128 Kbps	45/12min
T1 connection	1.54 Mbps	50s
Ethernet	10 Mbps	9s
Token ring	4/16 Mbps	
Fast Ethernet	100 Mbps	
FDDI	100 Mbps	
Gigabit Ethernet	1 Gbps	
ATM	25Mbps/2.4Gbs	