MAC - 6 BYTES, FARA LITERE PESTE F

- guaranteed to be unique , not routable, can be changed, understood by switch but not by hub

- determined by arp , when ip is known;

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COMPUTATIONAL

CHECK IP/NM VALID => Binary both IP and NM. Where u have 0 in NM you must have 0 in IP

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IP + NM => NA = IP && NM | BA = IP || (!NM)

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NetMask given => hosts: 2^(nr 0)-2 | subnets: 31-(nr 1)

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can be broadcast address => 4k-1 | can be network address => 4k

----

2^(30-x) = number of /30 subnets that can be made from /x

----

how many subnets with minim dim contain 2 addresses: find how many bits are the same from left to right(ex 7)

find how many addresses can u have on that subnet mask ( ex 2^22)

=> 2^(32-22-7) = 8

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IP ADDRESS CLASSES:

A - 1.x.x.x-127.x.x.x | B - 128.x.x.x->191.x.x.x | C - 192-223 | D 224-239 multicast | E-240-255 experimental

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Private IPs ---- 127.0.0.1 - loopback addr

192.168.x.x /<=16 | 10.x.x.x/<=8 | 172.16.0.0-172.31.x.x /<=12

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TCP: SOCK\_STREAM

tcp header = 20

TCP HEADER = DCP HEADER + 12 BYTES (length)

TCP Header - Source/Dest port, seq num, ack numb, flags, data offset, checksum, urgent pointer

- hhtp, ftp, stmp - email

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UDP: SOCK\_DGRAM

UDP packets - encapsulated in IP datagram | HEADER = 8

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COMMANDS:

SERVER - accept, bind

Server - mandatory accept()

TCP server - bind mandatory, connect not mandatory, listen not mandatory

UDP server - connect not mandatory, bind mandatory

recvfrom() doesnt send data to the tcp server

CLIENT - nothing mandatory

Client - socket, listen, connect | bind - not mandatory , can be in tcp/udp, accept not mandatory

udp- connect not mandatory | sendto() sends data to udp client

tcp client doest get data from recvfrom() call;

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APP LAYERs: dns, ssh, ftp, http, smtp

Pres layer | session layer | transp layer = udp, tcp, https | netw layer = ip | data link = mac | phys

- OSI

TCP/IP - 4 layers

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IP(v4)

IP addr - 32bits/4bytes; first ip addr = network addr<----->broadcast adr =last ip address

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IP Protocol - unreliable, affects packet routing, defines the internet addressing sys

offset field - order of fragments | ICMP = Internet control message protocvol

IP routing is based on Destination Ip | ICMP packets are encapsulated within IP datagrams

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RIP = Routing Information Protocol

RIPv1 - same timers as v2; supports classless routing protocols; not < admin dist RIPV2; not easier to config

RIPv2 - maximum metric(hop count) of 15; >15 = unreachable

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Optical fiber - light waves, no limit in bandwith | wifi - electromagnetic waves

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CHECKSUM - ip header - computed on each router and source/dest hosts

a 16bit field used on header for error checking

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DHCP= clinet/sv protocol that provides an ip host with its ip address, subnetmask and gateway

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Switch > hub, switch - mac addr, sends to one, not to all; both have multiple ports

switches can transport tcp packets & ip packets & udp packets

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DOMAIN: (not every not used domain is free to claim)

ana.are.mere.ro => ro = top level dom; mere subdom of ro, are subdom of mere.ro; ana subdom of are.mere.ro

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TLD = Top Level Domain | ARP =Addr Res Prot | FTP = File Trans Prot | DHCP = Dyn Host Config Prot |

DNS= Dom Name Sys | ROTLD = Rom Top Lvl Dom | UDP = User Datagr Prot | TCP = Trans Contr Prot |

P2P = Peer to Peer | ISP = Internet Serv Provider | LAN = Local Area Network | MAC = Media Access Control

NAT = Network Address Translation | HTTP = HyperText Transfer Protocol | DSL = Digital Subscriber Line

SSH = Secure Shell | CLI= command line interface

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Bus - newtork topology = single cable that connects in series all computers from network

Star - network topology - Ring

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TTL = Time To Live -> number of routers the packet is allowed to pass

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Computer to switch = straight-through cable | PC to router = Cross-over cable

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SMB or SAMBA Protocol is a file transfer protocol

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Bandwidth = amount of data that can be carried in a given time; physical property of the transm medium

throughput = quantity of data over quantity of time which we send at a given time, through a trans channel

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listen system call = used by a sv process; indicates that sv is ready to accept incoming conections on the socket

- accept with "accept"

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Congestion window = sender impose window - avoid overrunning routers in a network path

below threshold -> grow exponentially | above threshold -> grow lineary

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Datagram = basic transfer unit used in packet-switched netws, providing a connectionless comm service

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++Routing Table: Interface, netmask, destination address, gateway

+ISP aggregates smaller networks into a larger one to reduce numb of entries in routing table of the router connecting the ISP to the Internet | HTTP +transfers encrypted data + client to sv with telnet

++Traceroute shows all IPs of the routers parsed until the current IP

+Ping uses the Protocol ICMP

++arp /a to check datalink layer

+NAT - causes loss of end-to-end IP traceability | configure NAT-static,dynamic, NAT overload

++Protocol defines when/how/what data is communicated

+Supernetting - 2^(net-supernet)

++DNS - can be def gateway - it's main function is to provide host names to TCP/IP addr res | runs on port 53 on both udp and tcp

+ FTP - uses data and control channels | doesnt provide encryption | on application layer

++ network adapter mac addr => ipconfig /all

+Whois Query -> domain name is already bought

++Duplicate ack-> NO congest win cut in half/cut in half & grow exp/set to 1mss

+Classless routing protocol -> supported by RIPv2 only, variable length mask and discontiguous netw

++ Internet API - set of rules that the sending program must follow - for delivery to destination program

+ localhost is 127.0.0.1, also the loopback address

++ AFTER translation=> Inside Global Host | Before Translation=> Outside Local Host

+SSH- app layer

++Computers can have more than one ip address

+

++

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INTREBARI:

1.A company has three departments: Offices, Public and Managers. The offices have 123 computers, Public Relationship has 29 computers and Managers have 5 computers. The company wants to make a network such that: - every computer has access to the internet - have minimum costs - it must be certainly known from which department some webpages are accessed from the HQ in another city Provide a good configuration for these requirements:

a) 3 subnetworks, 192.168.0.0/24, 192.168.1.0/24, 192.168.2.0/24 for every department and connect every subnet directly to the internet, using NAT, through a different provider

b) 1 subnetwork for all the company, 192.168.0.0/24, connect computers to internet through a router which translates every address IP to a public IP address with different class depending on department

c) 3 subnetworks, 192.168.0.0/25, 192.168.0.128/27, 192.168.0.160/29, one router which translates the first network to 30.0.0.1, second to 30.0.0.2, and third to 30.0.0.3

d) 3 subnetworks, 192.168.0.0/25, 192.168.0.128/27, 192.168.0.160/29 and connect them to a central router which translates all the IPs on 192.168.0.0/24 with the IP 30.0.0.5

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2.Two connected routers are configured with RIP routing. What will be the result when a router received a routing update that contains a higher-cost path to a network already in its routing table?

a) the updated information will be added to the existing routing table

b) the update will be ignored and no further action will occur

c) the updated information will replace the existing routing table entry

d) the existing routing table entry will be deleted from the routing table and all routers will exchange routing updates to reach convergence

asta ce sens are, daca e higher cost n-ar trebui sa o ignore sau ceva?

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3.Which of the following IP addresses cannot be broadcast addresses?

a) 192.168.0.255 || b) 200.0.0.33 ||| c) 10.0.1.254 ||| d) 25.0.2.31

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4.Consider the following network address: 192.0.2.64 . How many net masks can it be used with?

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5.Which of the following are valid IP addresses to mark a subnetwork?

a) 177.91.107.144/29 ||| b) 177.91.107.0/32 ||| c) 177.91.107.1/25 ||| d) 177.91.154/30

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6.Given the address 137.25.28.0/255.255.254.0 provide the maximum number of valid subnets that can be obtained from splitting this network

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7.In how many subclasses with the netmask 255.192.0.0 can the class of minimal dimension containing both IP addresses: 78.79.80.81 and 79.80.81.82, be divided?

a) 7 b) 10 c) 8 d) 9

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8.What happens if the Gateway in a Routing table entry is 0.0.0.0?

a) The router drops the packet as there is no such gateway IP address

b) This is not possible

c) All packets will be directed to 0.0.0.0

d) The router puts the packet on the associated network interface with this route

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9.Write as [network address]/[xx] - in the most compact and ordered way - the addressing space 62.255.254.224...63.64.0.31. (if multiple combinations are needed write them separated by comas without spaces or other characters)

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10.193.231.20.0/24 can be divided in exactly X subnets of equal sizes. X=?

a) 7 subnets ||| b) 14 subnets ||| c) 5 subnets ||| d) 8 subnets ||| e) 4 subnets

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11.Which of the following can be a mask, such that 62.244.89.16 is a valid network address?

a) 255,255,255,252 ||| b) /29 ||| c) 255,255,255,248 ||| d) /27 ||| e) 255.255.255.128

Your answer: abc Incorrect! The correct answer was abd

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12.Which of the following is correct regarding Class B address of IP address

a) Network 18 , Host 16 ||| b) Network 14 , Host 16 ||| c) Network 16 , Host 14 ||| d) Network 12 , Host 14

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13.What is the broadcast address of the following IP address 221.17.123.9 that has in its network 42 pcs?

a) 221.17.123.255 ||| b) 255.255.255.255 |||| c) 221.17.123.64 |||| d) 221.17.123.65

Your answer: a | Incorrect! | The correct answer was c

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14.What is the netmask of the minimum sized network that has as broadcast 70.71.79.255 and also contains the host IP address 70.71.79.240 ?

Your answer: 255.255.255.240 | Incorrect! The correct answer was 255.255.255.224

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15.Write the network mask (only as /x.y.z.t) of the minimum sized network that

contain both 80.81.82.83 and 80.83.84.85.

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16.What is the network address and mask of the smallest subnet that fits these two

IP addresses: 180.181.182.183 and 180.186.12.180? (addr/x.y.z.t format)

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17.Write the network mask (only as /x.y.z.t) of the minimum sized network that

contain both 80.81.82.83 and 80.83.84.85.

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18.You need to subnet a network that has 7 subnets, each with at least 16 hosts. Which classful subnet mask would you use?

a) 255.255.255.192

b) 255.255.255.224

c) 255.255.255.240

d) 255.255.255.252

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19. What is the network address and mask of the smallest subnet that fits these two IP addresses: 180.181.182.183 and 180.186.12.180? (addr/x.y.z.t format) => my answer 180.176.0.0/255.240.0.0