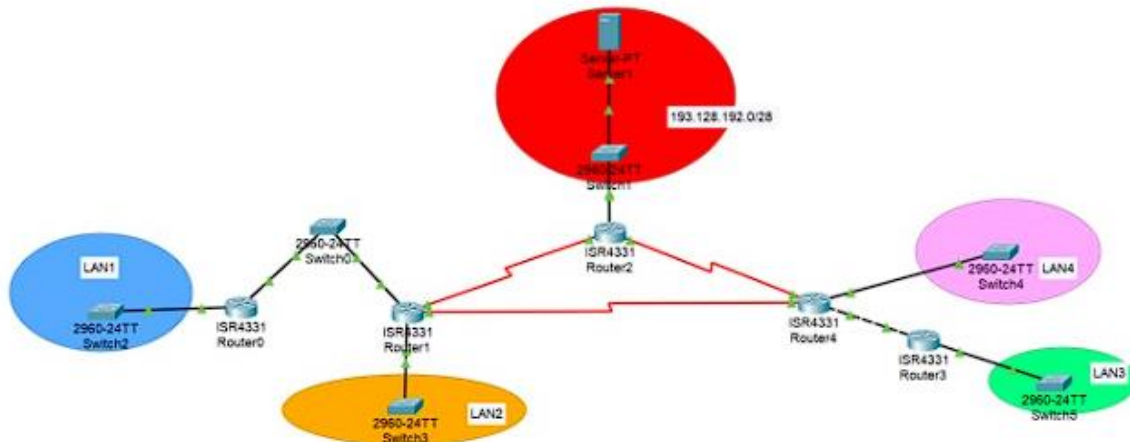


Computer networks
Packet tracker laboratory exam

Date: 08.01.2024
Allotted time: 1h 30 min



(3p) All the IPs from the local area networks (LAN1, LAN2, LAN3 and LAN4) are allocated from the range 179.26.224.0/19. Perform subnetting (using the minimum subnet size) such that:

- LAN1 can store 2048 hosts
- LAN2 can store 1021 hosts
- LAN3 can store 256 hosts
- LAN4 can store 125 hosts

For each subnetwork write (in a document or on a piece of paper): the ip address of the network, the network mask, the number of hosts it can store and the broadcast address.

For the networks connecting the routers should come from the address range 10.10.128.0/26.

(2p) Add at least two hosts in each local area network and assign IPs in the following manner: for LAN3 use DHCP and also set the DNS server to the server *Server0*. For the other local area networks use static IP addressing and set *Server0* as the DNS server.

(1p) Setup the server *Server 0* to be both a web server and a DNS server. The address of the server should be mapped to the name *cs.ubbcluj.ro*. Prove

(2p) Configure routing using Routing Information Protocol.

(1p) Configure NAT on a router, such that all the packets coming from LAN3 and going to the server *Server0* are translated.

Default: 1p

Network: 179.26.224.0/19

Netmask: 1111 1111 1111 1111 1110 0000 0000 0000 – 255.255.224.0

Network routers: 10.10.128.0/26

Netmask: 255.255.255.192

LAN1: 2048 hosts

LAN2: 1021 hosts

LAN3: 256 hosts

LAN4: 125 hosts

N01: 2 hosts

N12: 2 hosts

N24: 2 hosts

N14: 2 hosts

N43: 2 hosts

Networks masks:

*LAN1: $2048 + 3 = 2051 < 4096 = 2^{12} \rightarrow / (32-12) = /20$

*LAN2: $1021 + 3 = 1024 < 1024 = 2^{10} \rightarrow /22$

*LAN3: $256 + 3 = 259 < 512 = 2^9 \rightarrow /23$

*LAN4: $125 + 3 = 128 < 128 = 2^7 \rightarrow /25$

*N01: $2 + 2 = 4 < 4 = 2^2 \rightarrow /30$

*N12: $\rightarrow /30$

*N24: $\rightarrow /30$

*N14: $\rightarrow /30$

*N43: $\rightarrow /30$

Networks:

*Lan1: 179.26.224.0/20

$$BA = 179.26.224.0 + 4096 - 1 = 179.26.1110\ 0000.0000\ 0000 + 0001\ 0000\ 0000\ 0000 - 1 =$$

$$= 179.26.1111\ 0000.0000\ 0000 - 1 = 179.26.1110\ 1111.1111\ 1111 = 179.26.239.255$$

$$*Lan2: 179.26.240.0/22$$

$$BA = 179.26.240.0 + 1024 - 1 = 179.26.1111\ 0000.0000\ 0000 + 0000\ 0100\ 0000\ 0000 - 1 =$$

$$= 179.26.1111\ 0100.0000\ 0000 - 1 = 179.26.1111\ 0011.1111\ 1111 = 179.26.243.255$$

$$*Lan3: 179.26.244.0/23$$

$$BA = 179.26.244.0 + 512 - 1 = 179.26.1111\ 0100.0000\ 0000 + 0000\ 0010\ 0000\ 0000 - 1 =$$

$$= 179.26.1111\ 0110.0000\ 0000 - 1 = 179.26.1111\ 0101.1111\ 1111 = 179.26.245.255$$

$$*Lan4: 179.26.246.0/25$$

$$BA = 179.26.246.0 + 128 - 1 = 179.26.246.127$$

$$*N01: 10.10.128.0/30$$

$$BA = 10.10.128.0 + 4 - 1 = 10.10.128.3$$

$$*N12: 10.10.128.4/30$$

$$BA = 10.10.128.7$$

$$*N24: 10.10.128.8/30$$

$$BA = 10.10.128.11$$

$$*N14: 10.10.128.12/30$$

$$BA = 10.10.128.15$$

*N43: 10.10.128.16/30

BA =10.10.128.19

Network masks:

/20 = 255.255.240.0

/22 = 255.255.252.0

/23 = 255.255.254.0

/25 =255.255.255.128

/30 = 255.255.255.252