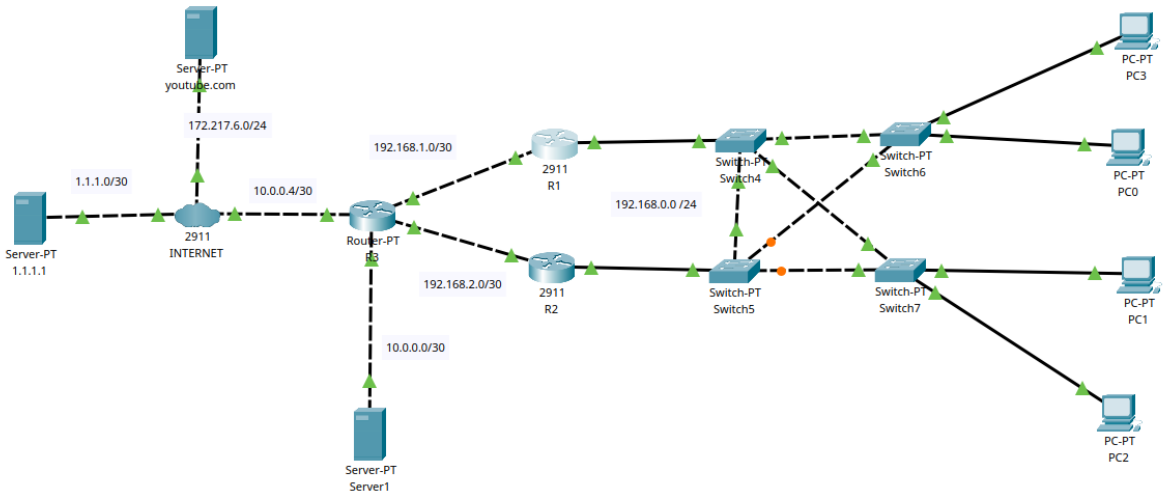
LAB 5

Topology:



Details:

1- DHCP.
2-DNS.
3-Routing protocol: ospf.
4-HSRP.
5-Dynamic NAT.
6-CDP/LLDP.
7-QOS.

Router 1

Router (config)# Hostname R1
R1 (config)# lin con 0
R1 (config-line)# logging synchronous
R1 (config-line)# no exec-timeout
R1 (config-line)# int gi0/0
R1 (config -if)# no sh
R1 (config -if)#ip address 192.168.0.1 255.255.255.0
R1(config -if)# ip helper-address 10.0.0.1 (DHCP relay agent)
R1 (config-if)# int gi0/1
R1 (config -if)# no sh
R1 (config -if)#ip address 192.168.1.1 255.255.255.252
R1 (config- if)# exit
R1(config)#ro ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 192.168.0.0 0.0.0.255 a 0
R1(config-router)#network 192.168.1.0 0.0.0.3 a 0
R1(config-router)#exit

HSRP

R1(config)# int gi0/0
R1 (config -if)#standby version 2
R1 (config -if)#standby 1 ip 192.168.0.244
R1 (config -if)#standby 1 priority 200
R1 (config -if)#preempt
R1 (config -if)#exit
R1 (config)#exit

CDP/LLDP

R1# sh cdp

```
Global CDP information:
    Sending CDP packets every 60 seconds
    Sending a holdtime value of 180 seconds
    Sending CDPv2 advertisements is enabled
```

R1# sh cdp interface

```
R1#sh cdp interface
Vlan1 is administratively down, line protocol is down
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
GigabitEthernet0/0 is up, line protocol is up
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
GigabitEthernet0/1 is up, line protocol is up
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
GigabitEthernet0/2 is up, line protocol is down
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

R1#sh cdp neighbors detail

```
Device ID: Switch
Entry address(es):
Platform: cisco PT3000, Capabilities: Switch
Interface: GigabitEthernet0/0, Port ID (outgoing port): FastEthernet3/1
Holdtime: 135

Version :
Cisco Internetwork Operating System Software
IOS (tm) PT3000 Software (PT3000-I6Q4L2-M), Version 12.1(22)EA4, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2006 by cisco Systems, Inc.
Compiled Fri 12-May-06 17:19 by pt_team

advertisement version: 2
Duplex: full
---------------------------

Device ID: R3
Entry address(es):
  IP address : 192.168.1.2
Platform: cisco PT1000, Capabilities: Router
Interface: GigabitEthernet0/1, Port ID (outgoing port): FastEthernet0/0
Holdtime: 135

Version :
Cisco Internetwork Operating System Software
IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 27-Apr-04 19:01 by miwang

advertisement version: 2
Duplex: full
```

Router 2

Router (config)# Hostname R2
R2 (config)# lin con 0
R2 (config-line)# logging synchronous
R2 (config-line)# no exec-timeout
R2 (config-line)# int gi0/0
R2 (config -if)# no sh
R2 (config -if)#ip address 192.168.0.2 255.255.255.0
R2 (config -if)# no sh
R2(config -if)# ip helper-address 10.0.0.1 (DHCP relay agent)
R2 (config-if)# int gi0/1
R2 (config -if)# no sh
R2 (config -if)#ip address 192.168.2.1 255.255.255.252
R2 (config- if)# exit
R2(config)#ro ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#network 192.168.0.0 0.0.0.255 a 0
R2(config-router)#network 192.168.2.0 0.0.0.3 a 0
R2(config-router)#exit

HSRP

R2(config)# int gi0/0
R2 (config -if)#standby version 2
R2 (config -if)#standby 1 ip 192.168.0.244
R2 (config -if)#standby 1 priority 50
R2 (config -if)#exit
R2 (config)#exit

CDP

R2# sh cdp
R2# sh cdp interface
R2#sh cdp neighbors detail

to enable LLDP

R2(config)#lldp run
R2(config)#interface range gi0/0, gi0/1
R2(config-if-range)# lldp transmit
R2(config-if-range)# lldp receive
R2(config-if-range)# lldp timer (in sec)
R2(config-if-range)# lldp holdtime (in sec)
R2(config-if-range)# lldp reint (in sec)

R2#sh lldp
R2#sh cdp interface
R2#sh cdp neighbors detail

Router 3

Router (config)# Hostname R3
R3 (config)# lin con 0
R3 (config-line)# logging synchronous
R3 (config-line)# no exec-timeout
R3 (config-line)# int fi0/0
R3 (config -if)# no sh
R3 (config -if)#ip address 192.168.1.2 255.255.255.0
R3(config -if)# ip helper-address 10.0.0.1 (DHCP relay agent)
R3 (config -if)#ip nat inside (NAT)
R3 (config-if)# int fi0/1
R3 (config -if)# no sh
R3 (config -if)#ip address 192.168.2.2 255.255.255.252
R3(config -if)# ip helper-address 10.0.0.1 (DHCP relay agent)
R3 (config -if)#ip nat inside (NAT)
R3 (config-if)# int fi0/6
R3 (config -if)# no sh
R3 (config -if)#ip address 10.0.0.5 255.255.255.252
R3 (config -if)#ip nat outside (NAT)
R3 (config -if)#service-policy output R3_OUT (QOS)
R3 (config-if)# int fi0/7
R3 (config -if)# no sh
R3 (config -if)#ip address 10.0.0.2 255.255.255.252
R3 (config- if)# exit
R3(config)#ro ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 192.168.1.0 0.0.0.255 a 0
R3(config-router)#network 192.168.2.0 0.0.0.3 a 0
R3(config-router)#network 10.0.0.0 0.0.0.255 a 0
R3(config-router)#network 10.0.0.4 0.0.0.3 a 0
R3(config-router)#exit

Dynamic NAT

R3(config)# access-list 1 permit 192.168.0.0 0.0.0.255
R3 (config)#ip nat pool POOL1 100.0.0.1 100.0.0.3 netmask 255.255.255.0
R3 (config)#ip nat inside source list 1 pool POOL1

QOS

R3(config)# class-map HTTPS_MAP
R3(config-cmap)# match protocol https
R3(config)# policy-map R3_OUT
R3(config-pmap)# class HTTPS_MAP
R3(config-pmap-c)# set ip dscp af31
R3(config-pmap-c)# priority percent 50

R3(config)# class-map ICMP_MAP
R3(config-cmap)# match protocol icmp
R3(config)# policy-map R3_OUT
R3(config-pmap)# class ICMP_MAP

R3(config-pmap-c)# set ip dscp af21
R3(config-pmap-c)# bandwidth percent 10

DNS

ip name-server 1.1.1.1

INTERNET

Router (config)# Hostname INTERNET
INTERNET (config)# lin con 0
INTERNET (config-line)# logging synchronous
INTERNET (config-line)# no exec-timeout
INTERNET (config-line)# int gi0/0
INTERNET (config -if)# no sh
INTERNET (config -if)#ip address 10.0.0.6 255.255.255.252
INTERNET (config-if)# int gi0/1
INTERNET (config -if)# no sh
INTERNET (config -if)#ip address 1.1.1.2 255.255.255.252
INTERNET (config-if)# int gi0/2
INTERNET (config -if)# no sh
RINTERNET3 (config -if)#ip address 172.217.6.1 255.255.255.0
INTERNET (config- if)# exit
INTERNET(config)#ro ospf 1
INTERNET(config-router)#router-id 4.4.4.4
INTERNET(config-router)#network 10.0.0.4 0.0.0.3 a 0
INTERNET(config-router)#network 1.1.1.0 0.0.0.3 a 0
INTERNET(config-router)#network 172.217.6.0 0.0.0.255 a 0
R3INTERNETconfig-router)#exit
INTERNET (config)# ip route 100.0.0.0 255.255.255.0 10.0.0.5