Kommunikationsnät
(Nätverkslabb 4)

Yasir Riyadh Jabbar (KTH feb 2022)
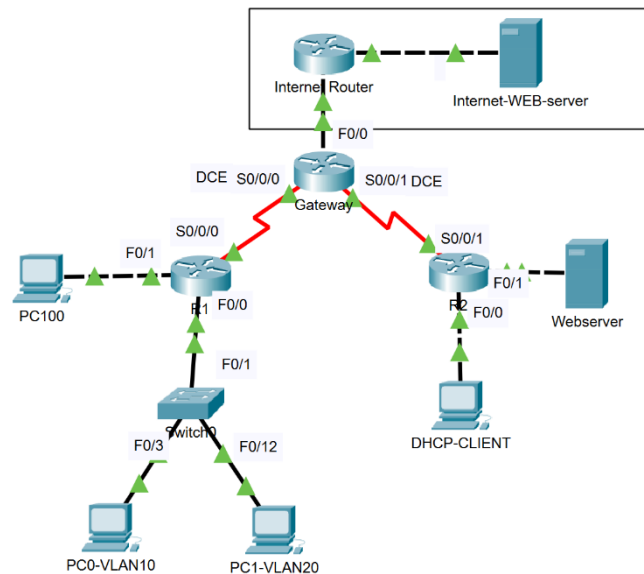
Score	: 58/58	
Item Count	: 58/58	
Component	**Items/Total**	**Score**
ACL	3/3	3/3
Ip	31/31	31/31
NAT	1/1	1/1
Other	2/2	2/2
Physical	10/10	10/10
Routing	5/5	5/5
Switching	6/6	6/6

Completion: 100%

Back　　1/1　　Next

Part 1: Create An Addressing Scheme   192.168.0.0/24

R2 - LAN(f0/0): Required 100 Hosts. Use the first subnet.　　`192.168.0.0`

100 Hosts. ⟹ 255.255.255.`1000 0000` ⟹ 255.255.255.128

network address = **192.168.0.0**

Fa0/0　192.168.0.1

VLAN10: Required 29 Hosts. Use the second subnet.　　`192.168.0.0` **+128**

29 Hosts ⟹ 255.255.255.`1110 0000` ⟹ 255.255.255.224

network address = **192.168.0.128**

f0/0.10　　　192.168.0.129
PC0-VLAN10　192.168.0.130

VLAN20: Required 28 Hosts. Use the third subnet　　`192.168.0.128` **+32**

28 Hosts ⟹ 255.255.255.`1110 0000` ⟹ 255.255.255.224

network address = **192.168.0.160**

f0/0.20　　　192.168.0.161
PC1-VLAN20　192.168.0.162

R1 - LAN(f0/1): Required 9 Hosts. Use the forth subnet.　　`192.168.0.160` **+32**

9 Hosts ⟹ 255.255.255.`1111 0000` ⟹ 255.255.255.240

network address = **192.168.0.192**

Fa0/1　192.168.0.193
PC100　192.168.0.194

R2 - LAN(f0/1): Required 8 Hosts. Use the fifth subnet.　　`192.168.0.192` **+16**

8 Hosts ⟹ 255.255.255.`1111 0000` ⟹ 255.255.255.240

network address = **192.168.0.208**

Fa0/1　192.168.0.209
Webserver　192.168.0.210

Link R1 and Gateway: **2 IP addresses** – Use the sixth subnet　`192.168.0.208` **+16**

2 IP ⟹ 255.255.255.`1111 1100` ⟹ 255.255.255.252

Link address = 192.168.0.224

IP address to R1's s0/0/0　192.168.0.225
IP address to Gateway's s0/0/0 192.168.0.226

Link Gateway and R2: **2 IP addresses** – Use the seventh subnet　`192.168.0.224` **+4**

2 IP ⟹ 255.255.255.`1111 1100` ⟹ 255.255.255.252

Link address = 192.168.0.228

IP address to Gateway's s0/0/1　192.168.0.229
IP address to R2's s0/0/1　192.168.0.230

Table 1

Device	Interface	Network Address	IP Address	Subnet Mask
R2	Fa0/0	192.168.0. 0	192.168.0.1	255.255.255.128
	Fa0/1	192.168.0. 208	192.168.0.209	255.255.255.240
	S0/0/1	192.168.0.228	192.168.0.230	255.255.255.252
R1	Fa0/0.10	192.168.0.128	192.168.0.129	255.255.255.224
	Fa0/0.20	192.168.0.160	192.168.0.161	255.255.255.224
	F0/1	192.168.0. 192	192.168.0.193	255.255.255.240
	S0/0/0	192.168.0. 224	192.168.0.225	255.255.255.252
Gateway	S0/0/0	192.168.0. 224	192.168.0.226	255.255.255.252
	S0/0/1	192.168.0. 228	192.168.0.229	255.255.255.252
	F0/0	130.237.83.0	130.237.83.1	255.255.255.0
Internet Router	F0/0	130.237.83.0	130.237.83.2	255.255.255.0
	F0/1	130.237.84.0	130.237.84.1	255.255.255.0

Table 2

Device	Interface	IP Address	Subnet Mask	Gateway
PC0-VLAN10	Fasteth.	192.168.0.130	255.255.255.224	192.168.0.129
PC1-VLAN20	Fasteth.	192.168.0.162	255.255.255.224	192.168.0.161
Webserver	Fasteth.	192.168.0. 210	255.255.255.240	192.168.0.209
PC100	Fasteth.	192.168.0. 194	255.255.255.240	192.168.0.193
Internet webser	Fasteth.	130.237.84.5	255.255.255.0	130.237.84.1

VLAN ID	NAME	Interface
10	students	F0/2-F0/3
20	teachers	F0/11-F0/12
Trunk		F0/1

Part 2: Configure Device Basic Settings

Step 1: Configure the PCs and the Webserver on R2 and DHCP-CLIENT

✓ PC0-VLAN10   ✓ PC1-VLAN20   ✓ PC100

PC0-VLAN10 — Physical | Config | Desktop | Programming | Attributes
IP Configuration
Interface: FastEthernet0
IP Configuration: ○ DHCP ● Static
IPv4 Address: 192.168.0.130
Subnet Mask: 255.255.255.224
Default Gateway: 192.168.0.129
DNS Server: 0.0.0.0

PC1-VLAN20 — Physical | Config | Desktop | Programming | Attributes
IP Configuration
Interface: FastEthernet0
IP Configuration: ○ DHCP ● Static
IPv4 Address: 192.168.0.162
Subnet Mask: 255.255.255.224
Default Gateway: 192.168.0.161
DNS Server: 0.0.0.0

PC100 — Physical | Config | Desktop | Programming | Attributes
IP Configuration
Interface: FastEthernet0
IP Configuration: ○ DHCP ● Static
IPv4 Address: 192.168.0.194
Subnet Mask: 255.255.255.240
Default Gateway: 192.168.0.193
DNS Server: 0.0.0.0

DHCP-CLIENT   ✓ Webserver on R2

DHCP-CLIENT — Physical | Config | Desktop | Programming | Attributes
IP Configuration
Interface: FastEthernet0
IP Configuration: ● DHCP ○ Static
IPv4 Address: 169.254.18.34
Subnet Mask: 255.255.0.0
Default Gateway: 0.0.0.0
DNS Server: 0.0.0.0

Webserver — Physical | Config | Services | Desktop | Programming | Attributes
IP Configuration
IP Configuration: ○ DHCP ● Static
IPv4 Address: 192.168.0.210
Subnet Mask: 255.255.255.240
Default Gateway: 192.168.0.209
DNS Server: 0.0.0.0

Step 2: Configure R1.

R1 — Physical | Config | CLI | Attributes
IOS Command Line Interface

```
Router>enable
Router#config t
Router(config)#hostname R1
R1(config)#interface f0/1
R1(config-if)#ip address 192.168.0.193 255.255.255.240
R1(config-if)#no shutdown
R1(config)#interface s0/0/0
R1(config-if)#ip address 192.168.0.225 255.255.255.252
R1(config-if)#no shutdown
```

Step 3: Configure R2.

R2 — Physical | Config | CLI | Attributes
IOS Command Line Interface

```
Router>enable
Router#config t
Router(config)#hostname R2
R2(config)#interface f0/0
R2(config-if)#ip address 192.168.0.1 255.255.255.128
R2(config-if)#no shutdown
R2(config)#interface f0/1
R2(config-if)#ip address 192.168.0.209 255.255.255.240
R2(config-if)#no shutdown
R2(config)#interface s0/0/1
R2(config-if)#ip address 192.168.0.230 255.255.255.252
R2(config-if)#no shutdown
```

Step 4: Configure Gateway

Configure the interface address S0/0/0, S0/0/1 and F0/0

Configure the name of the router

Set the clocking rate to 64000 on both serial interfaces.

Configure a static default route to 130.237.83.2

Gateway

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>enable
Router#config t
Router(config)#hostname Gateway
Gateway(config)#interface s0/0/0
Gateway(config-if)#ip address 192.168.0.226 255.255.255.252
Gateway(config-if)#clock rate 64000
Gateway(config-if)#no shutdown
Gateway(config)#interface s0/0/1
Gateway(config-if)#ip address 192.168.0.229 255.255.255.252
Gateway(config-if)#clock rate 64000
Gateway(config-if)#no shutdown
Gateway(config)#interface f0/0
Gateway(config-if)#ip address 130.237.83.1 255.255.255.0
Gateway(config-if)#no shutdown
Gateway(config-if)#exit
Gateway(config)#ip route 0.0.0.0 0.0.0.0 130.237.83.2
```

PC100	
✔ Default Gateway	Correct
Ports	
FastEthernet0	
✔ IP Address	Correct
✔ Subnet Mask	Correct

PC0-VLAN10	
✔ Default Gateway	Correct
Ports	
FastEthernet0	
✔ IP Address	Correct
✔ Subnet Mask	Correct

PC1-VLAN20	
✔ Default Gateway	Correct
Ports	
FastEthernet0	
✔ IP Address	Correct
✔ Subnet Mask	Correct

Gateway	
Routes	
Static Routes	
✔ Route0	Correct

DHCP-CLIENT	
Ports	
FastEthernet0	
✔ DHCP client enable	Correct

Gateway	
ACL	
DHCP Server	
NAT	
Ports	
FastEthernet0/0	
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct
Serial0/0/0	
✔ Clock Rate	Correct
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct
Serial0/0/1	
✔ Clock Rate	Correct
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct

R1	
Ports	
FastEthernet0/0	
FastEthernet0/0.10	
FastEthernet0/0.20	
FastEthernet0/1	
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct
Serial0/0/0	
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct

R2	
ACL	
Ports	
FastEthernet0/0	
Helper Addresses	
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct
FastEthernet0/1	
✖ Access-group Out	Incorrect
✔ IP Address	Correct
✔ Port Status	Correct
✔ Subnet Mask	Correct

Completion: 58%

Back 1/1 Next

Verify configuration

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
R1#sh ip route

     192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.0.192/28 is directly connected, FastEthernet0/1
C       192.168.0.224/30 is directly connected, Serial0/0/0
```

R2

Physical Config CLI Attributes

IOS Command Line Interface

```
R2#sh ip route

     192.168.0.0/24 is variably subnetted, 3 subnets, 3 masks
C       192.168.0.0/25 is directly connected, FastEthernet0/0
C       192.168.0.208/28 is directly connected, FastEthernet0/1
C       192.168.0.228/30 is directly connected, Serial0/0/1
```

Gateway

Physical Config CLI Attributes

IOS Command Line Interface

```
Gateway#sh ip route

Gateway of last resort is 130.237.83.2 to network 0.0.0.0

     130.237.0.0/24 is subnetted, 1 subnets
C       130.237.83.0 is directly connected, FastEthernet0/0
     192.168.0.0/30 is subnetted, 2 subnets
C       192.168.0.224 is directly connected, Serial0/0/0
C       192.168.0.228 is directly connected, Serial0/0/1
S*   0.0.0.0/0 [1/0] via 130.237.83.2
```

Step 5:   Verify network connectivity

From	To	Ping Results
R1	Gateway, S0/0/0	Connectivity OK
R2	Gateway, S0/0/1	Connectivity OK
Webserver	R2, F0/1	Connectivity OK

R1

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R1#ping 192.168.0.226
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.0.226, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/12 ms
```

R2

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R2#ping 192.168.0.229
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.0.229, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/20 ms
```

Webserver

Physical   Config   Services   Desktop   Programming   Attributes

Command Prompt

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ping 192.168.0.209

Pinging 192.168.0.209 with 32 bytes of data:

Reply from 192.168.0.209: bytes=32 time<1ms TTL=255
Reply from 192.168.0.209: bytes=32 time<1ms TTL=255
Reply from 192.168.0.209: bytes=32 time<1ms TTL=255
Reply from 192.168.0.209: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.0.209:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```
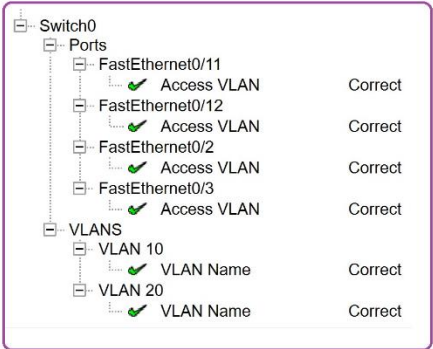
Part 3:   Configure VLANS, and Inter VLAN Routing

Step 1:   Configure Switch 0

Create each of the listed VLANs(*VLAN ID and Name*)

Assign ports F0/2-F0/3 to VLAN 10

Assign ports F0/11-F0/12 to VLAN 20

Configure the interface f0/1 as trunk.

Switch0

```
Switch0
  Ports
    FastEthernet0/11
       ✔ Access VLAN          Correct
    FastEthernet0/12
       ✔ Access VLAN          Correct
    FastEthernet0/2
       ✔ Access VLAN          Correct
    FastEthernet0/3
       ✔ Access VLAN          Correct
  VLANS
    VLAN 10
       ✔ VLAN Name            Correct
    VLAN 20
       ✔ VLAN Name            Correct
```

Completion: 68%

Back   1/1   Next

Switch0

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Switch>enable
Switch#config t
Switch(config)#vlan 10
Switch(config-vlan)#name students
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name teachers
Switch(config-vlan)#exit
Switch(config)#interface f0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface f0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface f0/12
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface f0/11
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface f0/1
Switch(config-if)#switchport mode trunk
```
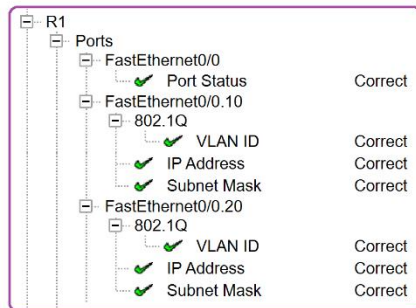
Step 2: Configure the subinterfaces on R1.

Assign proper VLAN number to interfaces on R1
- ✓ Subinterface f0/0.10 – Vlan 10
- ✓ Subinterface f0/0.20 – Vlan 20

Configure the correct interface address for F0/0.10 and F0/0.20 according to Table 1.

Active the fastethernet 0/0 interface

R1

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R1(config)#interface f0/0.10
R1(config-subif)#encapsulation dot1Q 10
R1(config-subif)#ip address 192.168.0.129 255.255.255.224
R1(config-subif)#exit
R1(config)#interface f0/0.20
R1(config-subif)#encapsulation dot1Q 20
R1(config-subif)#ip address 192.168.0.161 255.255.255.224
R1(config-subif)#exit
R1(config)#interface f0/0
R1(config-if)#no shutdown
```

Completion: 81%

Back   1/1   Next

R1
- Ports
  - FastEthernet0/0
    - ✔ Port Status   Correct
  - FastEthernet0/0.10
    - 802.1Q
      - ✔ VLAN ID   Correct
      - ✔ IP Address   Correct
      - ✔ Subnet Mask   Correct
  - FastEthernet0/0.20
    - 802.1Q
      - ✔ VLAN ID   Correct
      - ✔ IP Address   Correct
      - ✔ Subnet Mask   Correct

Step 3: Verify network connectivity

From	To	Ping Results
PC0-VLAN10	R1, f0/0.10	**Connectivity OK**
PC1-VLAN20	R1, f0/0.20	**Connectivity OK**

PC0-VLAN10

Physical   Config   Desktop   Programming   Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.129

Pinging 192.168.0.129 with 32 bytes of data:

Reply from 192.168.0.129: bytes=32 time<1ms TTL=255
Reply from 192.168.0.129: bytes=32 time<1ms TTL=255
Reply from 192.168.0.129: bytes=32 time<1ms TTL=255
Reply from 192.168.0.129: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.0.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC1-VLAN20

Physical   Config   Desktop   Programming   Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.161

Pinging 192.168.0.161 with 32 bytes of data:

Reply from 192.168.0.161: bytes=32 time<1ms TTL=255
Reply from 192.168.0.161: bytes=32 time<1ms TTL=255
Reply from 192.168.0.161: bytes=32 time=1ms TTL=255
Reply from 192.168.0.161: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.0.161:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Part 4:   Configure RIPv2 Dynamic Routing Protocol

Step 1:   Configure RIPv2 on each router (R1, R2 and Gateway)

> Configure and advertise all directly connected networks of R1, R2 and Gateway
>   (do not advertise the f0/0 network on the Gateway router)
> Use RIP version 2.
> Advertise a default route from the Gateway router to the other routers (R1 and R2)
> in the network using RIP.

R1

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 192.168.0.192
R1(config-router)#network 192.168.0.224
R1(config-router)#no auto-summary
```

R2

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 192.168.0.0
R2(config-router)#network 192.168.0.208
R2(config-router)#network 192.168.0.228
R2(config-router)#no auto-summary
```

Gateway

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Gateway(config)#router rip
Gateway(config-router)#version 2
Gateway(config-router)#network 192.168.0.224
Gateway(config-router)#network 192.168.0.228
Gateway(config-router)#default-information originate
```

```
R1
  RIP
    Networks
      ✔  Route0                                 Correct

Gateway
  RIP
      ✔  Default Information Originate  Correct
    Networks
      ✔  Route0                                 Correct
```

Completion: 86%

Back   1/1   Next

Step 2:   Verify RIP information.

R1

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R1#sh ip route
Gateway of last resort is 192.168.0.226 to network 0.0.0.0

     192.168.0.0/24 is variably subnetted, 7 subnets, 4 masks
R       192.168.0.0/25 [120/2] via 192.168.0.226, 00:00:09, Serial0/0/0
C       192.168.0.128/27 is directly connected, FastEthernet0/0.10
C       192.168.0.160/27 is directly connected, FastEthernet0/0.20
C       192.168.0.192/28 is directly connected, FastEthernet0/1
R       192.168.0.208/28 [120/2] via 192.168.0.226, 00:00:09, Serial0/0/0
C       192.168.0.224/30 is directly connected, Serial0/0/0
R       192.168.0.228/30 [120/1] via 192.168.0.226, 00:00:09, Serial0/0/0
R*   0.0.0.0/0 [120/1] via 192.168.0.226, 00:00:09, Serial0/0/0
```

R2

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
R2#sh ip route
Gateway of last resort is 192.168.0.229 to network 0.0.0.0

     192.168.0.0/24 is variably subnetted, 7 subnets, 4 masks
C       192.168.0.0/25 is directly connected, FastEthernet0/0
R       192.168.0.128/27 [120/2] via 192.168.0.229, 00:00:06, Serial0/0/1
R       192.168.0.160/27 [120/2] via 192.168.0.229, 00:00:06, Serial0/0/1
R       192.168.0.192/28 [120/2] via 192.168.0.229, 00:00:06, Serial0/0/1
C       192.168.0.208/28 is directly connected, FastEthernet0/1
R       192.168.0.224/30 [120/1] via 192.168.0.229, 00:00:06, Serial0/0/1
C       192.168.0.228/30 is directly connected, Serial0/0/1
R*   0.0.0.0/0 [120/1] via 192.168.0.229, 00:00:06, Serial0/0/1
```

Gateway

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Gateway#sh ip route
Gateway of last resort is 130.237.83.2 to network 0.0.0.0

     130.237.0.0/24 is subnetted, 1 subnets
C       130.237.83.0 is directly connected, FastEthernet0/0
     192.168.0.0/24 is variably subnetted, 7 subnets, 4 masks
R       192.168.0.0/25 [120/1] via 192.168.0.230, 00:00:17, Serial0/0/1
R       192.168.0.128/27 [120/1] via 192.168.0.225, 00:00:22, Serial0/0/0
R       192.168.0.160/27 [120/1] via 192.168.0.225, 00:00:22, Serial0/0/0
R       192.168.0.192/28 [120/1] via 192.168.0.225, 00:00:22, Serial0/0/0
R       192.168.0.208/28 [120/1] via 192.168.0.230, 00:00:17, Serial0/0/1
C       192.168.0.224/30 is directly connected, Serial0/0/0
C       192.168.0.228/30 is directly connected, Serial0/0/1
S*   0.0.0.0/0 [1/0] via 130.237.83.2
```

Part 5:   Implement DHCP and PAT

Step 1:   Configure Gateway as the DHCP server for the network of f0/0 on R2.
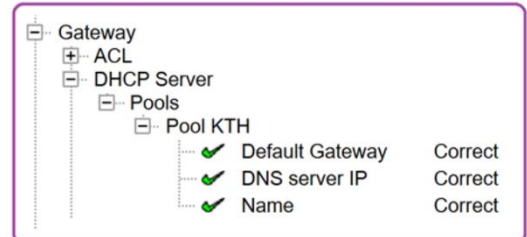
Create a DHCP pool named **KTH** on the gateway router

use network address of R2's f0/0 as the pool (192.168.0.0 255.255.255.128)

Configure proper **default-router** . (192.168.0.1)

Configure **dns- server** on the DHCP server (130.237.72.201**)**

Gateway

Physical	Config	CLI	Attributes

IOS Command Line Interface

```
Gateway(config)#ip dhcp pool KTH
Gateway(dhcp-config)#network 192.168.0.0 255.255.255.128
Gateway(dhcp-config)#default-router 192.168.0.1
Gateway(dhcp-config)#dns-server 130.237.72.201
```

- Gateway
  - ACL
  - DHCP Server
    - Pools
      - Pool KTH
        - ✔ Default Gateway   Correct
        - ✔ DNS server IP   Correct
        - ✔ Name   Correct

Completion: 91%

Back   1/1   Next

cannot get valid IP-address from DHCP server

(DHCP server and the DHCP clients are not on the same subnet)

DHCP-CLIENT

Physical	Config	Desktop	Programming	Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.........: FE80::20D:BDFF:FE8B:1222
   IPv6 Address....................: ::
   Autoconfiguration IPv4 Address..: 169.254.18.34
   Subnet Mask.....................: 255.255.0.0
   Default Gateway.................: ::
                                     0.0.0.0
```

using the **ip helper-address** interface configuration command.

R2

Physical	Config	CLI	Attributes

IOS Command Line Interface

```
R2(config)#interface f0/0
R2(config-if)#ip helper-address 192.168.0.229
```

- R2
  - ACL
  - Ports
    - FastEthernet0/0
      - Helper Addresses
        - ✔ Helper Address   Correct
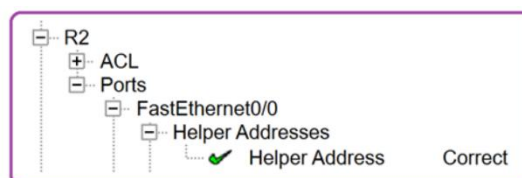
Completion: 93%

Back   1/1   Next

Step 2: Verify DHCP configuration

DHCP-CLIENT

Physical | Config | **Desktop** | Programming | Attributes

Command Prompt

```
C:\>ipconfig /release

    IP Address.....................: 0.0.0.0
    Subnet Mask....................: 0.0.0.0
    Default Gateway................: 0.0.0.0
    DNS Server.....................: 0.0.0.0

C:\>ipconfig /renew

    IP Address.....................: 192.168.0.2
    Subnet Mask....................: 255.255.255.128
    Default Gateway................: 192.168.0.1
    DNS Server.....................: 130.237.72.201
```

Gateway

Physical | Config | **CLI** | Attributes

IOS Command Line Interface

```
Gateway#show ip dhcp binding
IP address        Client-ID/            Lease expiration        Type
                  Hardware address
192.168.0.2       000D.BD8B.1222        --                      Automatic
Gateway#
```

Step 3: Configure PAT on Gateway

Configure PAT on Gateway to convert multiple internal addresses (whole 192.168.0.0/24 network) into the one usable public address (Gateway's f0/0)

Use the interface f0/0 as the source of the PAT and not IP address pool.

Use ACL 1 to allow 192.168.0.0/24 network to be translated to the public IP address.

Gateway

Physical | Config | **CLI** | Attributes

IOS Command Line Interface

```
Gateway(config)#access-list 1 permit 192.168.0.0 0.0.0.255
Gateway(config)#ip nat inside source list 1 interface f0/0 overload
Gateway(config)#interface s0/0/0
Gateway(config-if)#ip nat inside
Gateway(config-if)#exit
Gateway(config)#interface s0/0/1
Gateway(config-if)#ip nat inside
Gateway(config-if)#exit
Gateway(config)#interface f0/0
Gateway(config-if)#ip nat outside
```

- Gateway
  - ACL
    - ✔ 1   Correct
  - DHCP Server
  - NAT
    - Inside Source List
      - ✔ NAT Source Setting 1   Correct

Completion: 96%

Back   1/1   Next

Step 4: Verify the PAT configuration

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
🔴	Successful	PC0-VLAN10	192.168.0.210	ICMP		5.000	Y	0
🔴	Successful	PC1-VLAN20	192.168.0.210	ICMP		5.000	Y	1
🔴	Successful	PC0-VLAN10	130.237.84.5	ICMP		5.000	Y	2
🔴	Successful	PC1-VLAN20	130.237.84.5	ICMP		5.000	Y	3
🔴	Successful	DHCP-CLIENT	192.168.0.194	ICMP		5.000	Y	4
🔴	Successful	DHCP-CLIENT	130.237.84.5	ICMP		5.000	Y	5

Part 6: Configure and Verify Access Control Lists (ACLs)

Step 1:   Restrict access to the WEB server from the network address of R1's VLAN 10 network.

> Create a standard ACL named **blockvlan10** to prevent traffic from the network address of R1's VLAN 10 network to the web server connected to R2. All other traffic to the webserver should be allowed. Configure and place the ACL on the correct router which stops the denied traffic.

VLAN10: **29 Hosts**   network address = **192.168.0.128**

subnet mask: 255.255.255.111 0 0000 = 255.255.255. 224

wildcard mask: 0.0.0.0001 1111 = 0.0.0.31


```
R2(config)#ip access-list standard blockvlan10
R2(config-std-nacl)#deny 192.168.0.128 0.0.0.31
R2(config-std-nacl)#permit any
R2(config-std-nacl)#exit
R2(config)#interface f0/1
R2(config-if)#ip access-group blockvlan10 out
```

R2
- ACL
  - ✔ blockvlan10   Correct
- Ports
  - ⊞ FastEthernet0/0
  - FastEthernet0/1
    - ✔ Access-group Out   Correct
    - ✔ IP Address   Correct
    - ✔ Port Status   Correct
    - ✔ Subnet Mask   Correct

Completion: 100%

Step 2:   Verify ACL is working as expected

> Use the command prompt on the PC0-VLAN10 and PC1-VLAN20 to verify that
> - ✓ PC1-VLAN20 still can ping the R1's web server (**ping <ip-addr of web server >**)
> - ✓ PC0-VLAN10 can't access the web server using ping

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
●	Failed	PC0-VLAN10	192.168.0.210	ICMP		5.000	Y	0
●	Successful	PC1-VLAN20	192.168.0.210	ICMP		5.000	Y	1
●	Successful	PC0-VLAN10	130.237.84.5	ICMP		5.000	Y	2
●	Successful	PC1-VLAN20	130.237.84.5	ICMP		5.000	Y	3
●	Successful	DHCP-CLIENT	192.168.0.194	ICMP		5.000	Y	4
●	Successful	DHCP-CLIENT	130.237.84.5	ICMP		5.000	Y	5

Congratulations Guest! You completed the activity.

Overall Feedback   Assessment Items   Connectivity Tests

Congratulations on completing this activity! Check also the PDU List Window for the test packets. The first line should be Failed and the rest should be successful before submitting to the Instructor :)