DHCP Server On Router
CCNA Project-1

Case Study : DHCP Server on Router

Overview: In this case study, we implemented a DHCP (Dynamic Host Configuration Protocol) server on a Cisco router to enhance the efficiency of IP address assignment within a network.

Challenge: Facing challenges with time-consuming and error-prone manual IP configurations for devices, the objective was to introduce automation for a more efficient network management process

Solution:

Router Configuration: Accessed the router's command line interface, configuring the DHCP server in global mode.

DHCP Pool Creation: Established DHCP address pools, specifying IP ranges, subnet masks, default gateways, DNS server addresses, and lease durations.

IP Address Assignment: Devices now dynamically receive IP addresses from the router's DHCP server by DORA Process, eliminating the need for manual setups.

Results:

Efficiency Boost: Automated IP assignment significantly reduced manual workload.

Enhanced Reliability: Dynamic IP allocation ensured uninterrupted connectivity for all devices.

Conclusion: The implementation of the DHCP server on the router not only streamlined network management but also minimized errors associated with manual configurations, resulting in a more robust and efficient IP address management system.

DHCP Server on Router
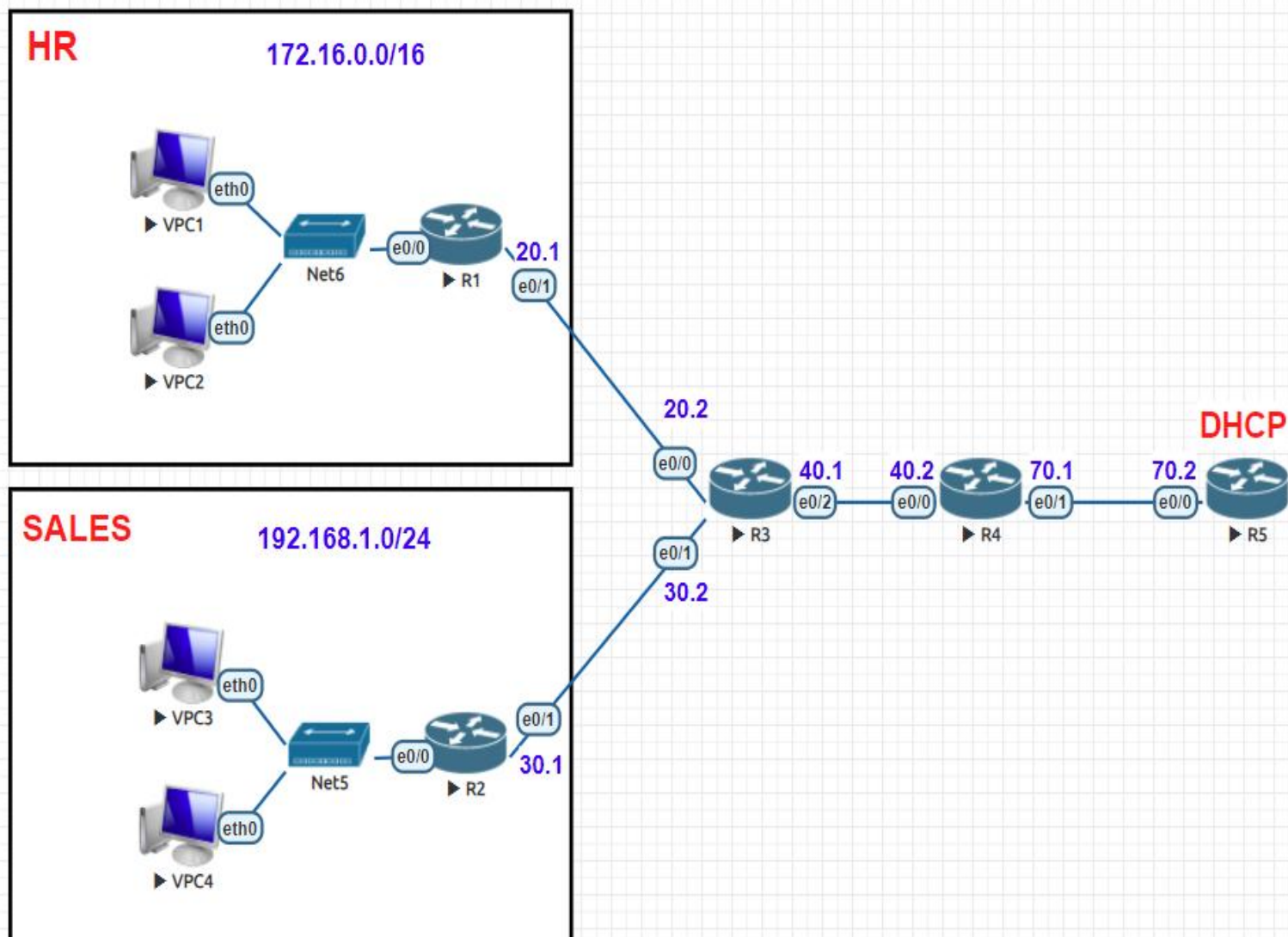

```
R5                                                    —   □   ✕
dhcp#
dhcp#sh ip dhcp po
dhcp#sh ip dhcp pool

Pool hr :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 65534
 Leased addresses               : 1
 Pending event                  : none
 1 subnet is currently in the pool :
 Current index        IP address range              Leased addresses
 172.16.0.52          172.16.0.1    - 172.16.255.254    1

Pool sales :
 Utilization mark (high/low)    : 100 / 0
 Subnet size (first/next)       : 0 / 0
 Total addresses                : 254
 Leased addresses               : 1
 Pending event                  : none
 1 subnet is currently in the pool :
 Current index        IP address range              Leased addresses
 192.168.1.52         192.168.1.1   - 192.168.1.254    1
dhcp#
```

```
VPC1                                          —   □   ✕
For more information, please visit wiki.f
Modified version for EVE-NG.

Press '?' to get help.

VPCS>
VPCS>
VPCS>
VPCS> ip dhcp
DDORA IP 172.16.0.51/16 GW 172.16.0.1

VPCS>
```

```
VPC3                                          —   □   ✕
For more information, please visit wiki.fr
Modified version for EVE-NG.

Press '?' to get help.

VPCS>
VPCS>
VPCS>
VPCS> ip dhcp
DDORA IP 192.168.1.51/24 GW 192.168.1.1

VPCS>
```

CONFIGURATION:

R1:
```
Router>en
Router#conf t
Router(config)#ho r1
r1(config)#int e0/0
r1(config-if)#ip add 172.16.0.1 255.255.0.0
r1(config-if)#no shut
r1(config-if)#int e0/1
r1(config-if)#ip add 20.0.0.1 255.0.0.0
r1(config-if)#no shut

r1(config)#router rip
r1(config-router)#version 2
r1(config-router)#no auto-summary
r1(config-router)#network 172.16.0.0
r1(config-router)#network 20.0.0.0

r1(config)#int e0/0
r1(config-if)#ip helper-address 70.0.0.2
```

R2:
```
Router>en
Router#conf t
Router(config)#ho r2
r2(config)#int e0/0
r2(config-if)#ip add 192.168.1.1 255.255.255.0
r2(config-if)#no shut
r2(config-if)#int e0/1
r2(config-if)#ip add 30.0.0.1 255.0.0.0
r2(config-if)#no shut

r2(config)#router rip
r2(config-router)#version 2
r2(config-router)#no auto-summary
r2(config-router)#network 192.168.1.0
r2(config-router)#network 30.0.0.0

r2(config)#int e0/0
r2(config-if)#ip helper-address 70.0.0.2
```

R3:
```
Router>en
Router#conf t
Router(config)#ho r3
r3(config)#int e0/0
r3(config-if)#ip add 20.0.0.2 255.0.0.0
r3(config-if)#no shut
r3(config-if)#int e0/1
r3(config-if)#ip add 30.0.0.2 255.0.0.0
r3(config-if)#no shut
r3(config-if)#int e0/2
r3(config-if)#ip add 40.0.0.1 255.0.0.0
r3(config-if)#no shut

r3(config)#router rip
r3(config-router)#version 2
r3(config-router)#no auto-summary
r3(config-router)#network 20.0.0.0
r3(config-router)#network 40.0.0.0
r3(config-router)#network 30.0.0.0
```

R4:
```
Router>en
Router#conf t
Router(config)#ho r4
r4(config)#int e0/0
r4(config-if)#ip add 40.0.0.2 255.0.0.0
r4(config-if)#no shut
r4(config-if)#int e0/1
r4(config-if)#ip add 70.0.0.1 255.0.0.0
r4(config-if)#no shut

r4(config)#router rip
r4(config-router)#version 2
r4(config-router)#no auto-summary
r4(config-router)#network 40.0.0.0
r4(config-router)#network 70.0.0.0
```

R5=>DHCP Server:
Router>en
Router#conf t
Router(config)#ho dhcp
dhcp(config)#int e0/0
dhcp(config-if)#ip add 70.0.0.2 255.0.0.0
dhcp(config-if)#no shut

dhcp(config)#router rip
dhcp(config-router)#version 2
dhcp(config-router)#no auto-summary
dhcp(config-router)#network 70.0.0.0

dhcp(config)#ip dhcp pool hr
dhcp(dhcp-config)#network 172.16.0.0 255.255.0.0
dhcp(dhcp-config)#default-router 172.16.0.1
dhcp(dhcp-config)#dns-server 8.8.8.8
dhcp(dhcp-config)#exi
dhcp(config)# ip dhcp excluded-address 172.16.0.2 172.16.0.50

dhcp(config)#ip dhcp pool sales
dhcp(dhcp-config)#network 192.168.1.0 255.255.255.0
dhcp(dhcp-config)#default-router 192.168.1.1
dhcp(dhcp-config)#dns-server 8.8.8.8
dhcp(config)#ip dhcp excluded-address 192.168.1.2 192.168.1.50

VERIFICATION:

Pool hr :
 Utilization mark (high/low)   : 100 / 0
 Subnet size (first/next)   : 0 / 0
 Total addresses   : 65534
 Leased addresses   : 1
 Pending event   : none
 1 subnet is currently in the pool :
 Current index   IP address range   Leased addresses
 172.16.0.52   172.16.0.1   - 172.16.255.254   1

Pool sales :
 Utilization mark (high/low)   : 100 / 0
 Subnet size (first/next)   : 0 / 0
 Total addresses   : 254
 Leased addresses   : 1
 Pending event   : none
 1 subnet is currently in the pool :
 Current index   IP address range   Leased addresses
 192.168.1.52   192.168.1.1   - 192.168.1.254

Project Summary:

- Implemented router as a DHCP server.
- Assigned dynamic IP addresses to PCs via two switches.
- Ensured correct default gateways for network segments.
- Optimized IP address management and network communication.
- Facilitated efficient connectivity among connected PCs.