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CN LAB - 7 : DNS and VLAN

PART 1: STUDY OF DNS SERVER

Q7.4) Configure the below topology to setup DNS server. R1 will use R2 as DNS server to make DNS resolutions.

First, let's begin with R1. We will setup hostname and IP related information.

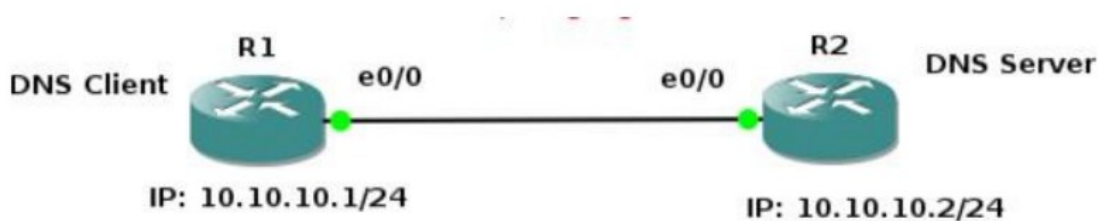


Figure 7.3 : Network Topology for DNS Configuration

R1 IP configurations:

```
#Enable
#configure terminal
#hostname R1
#interface e0/0
#ip address 10.10.10.1 255.255.255.0
#no shut
#do wr
#end
```

R2 IP and Hostname Configurations:

```
#enable
#config t
#hostname R2
#int e0/0
#ip address 10.10.10.2 255.255.255.0
```

#no shut

#do wr

#end

Setting up R2 as DNS Server

#config t

#ip dns server

#ip host loopback.R2.com 2.2.2.2

We mapped loopback.R2.com to ip address 2.2.2.2. Currently, we don't have 2.2.2.2, we could create loopback interface on R2 and assign ip 2.2.2.2.

#interface loopback 1

#ip address 2.2.2.2 255.255.255.255

#end

Let us verify that loop-back interface we just created is working. This will show us that the host name correctly setup locally on R2.

#ping loopback.R2.com

Now it's time to setup R1 to resolve hostnames using R2. On R1 type:

#config terminal

#ip domain lookup

#ip name-server 10.10.10.2

Set R1 to use R2 as default gateway to get to loopback interface on R2. So that after R1 resolve loopback.R2.com, it can reach 2.2.2.2 through its default route (R2).

on R1 type:

#config t

#ip route 0.0.0.0 0.0.0.0 10.10.10.2

#end

This tells our router that to get to any network not in its routing table, its next hop is 10.10.10.2 which is our router R2.

Now on R1, do a ping to loopback.R2.com and you should get a success message.

#ping loopback.R2.com repeat 3

If you captured the traffic, you will see DNS query and Answer as shown in Wireshark capture screen shot below.

DNS-IPv4.pcapng [Wireshark 1.10.2 (SVN Rev 51934 from /trunk-1.10)]

File Edit View Go Capture Analyze Statistics Telephony Tools Internals Help

Filter: Expression... Clear Apply Save

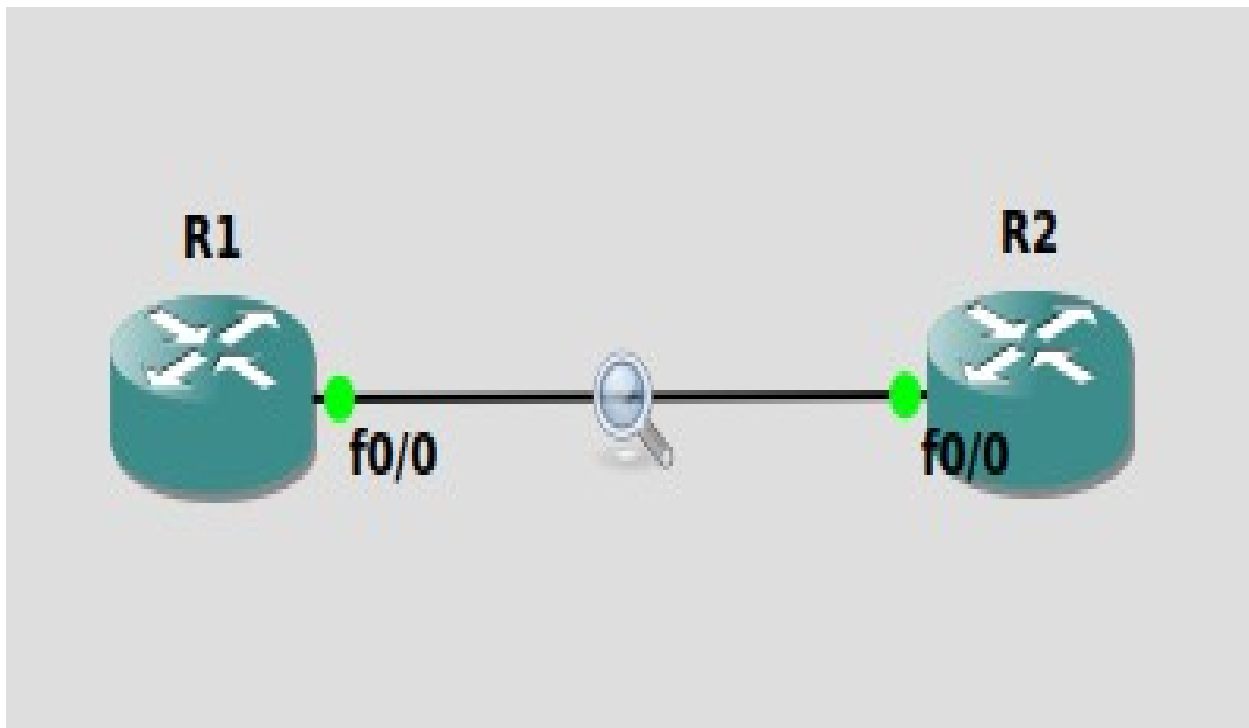
No.	Time	Source	Destination	Protocol	Length	Info
1	0.00000000	c8:02:1c:2d:00:00	c8:02:1c:2d:00:00	LOOP	60	Reply
2	2.799231000	c8:01:1c:1b:00:00	c8:01:1c:1b:00:00	LOOP	60	Reply
3	11.434102000	c8:02:1c:2d:00:00	c8:02:1c:2d:00:00	LOOP	60	Reply
4	11.726883000	10.10.10.1	10.10.10.2	DNS	75	Standard query 0x0001 A loopback.R2.com
5	11.747066000	10.10.10.2	10.10.10.1	DNS	91	Standard query response 0x0001 A 2.2.2.2

Frame 5: 91 bytes on wire (728 bits), 91 bytes captured (728 bits) on interface 0
 Ethernet II, Src: c8:02:1c:2d:00:00 (c8:02:1c:2d:00:00), Dst: c8:01:1c:1b:00:00 (c8:01:1c:1b:00:00)
 Internet Protocol Version 4, Src: 10.10.10.2 (10.10.10.2), Dst: 10.10.10.1 (10.10.10.1)
 User Datagram Protocol, Src Port: domain (53), Dst Port: 56482 (56482)
 Domain Name System (response)
 [Request ID: 4]
 [Time: 0.020203000 seconds]
 Transaction ID: 0x0001
 Flags: 0x8180 Standard query response, No error
 Questions: 1
 Answer RRs: 1
 Authority RRs: 0
 Additional RRs: 0
 Queries
 loopback.R2.com: type A, class IN
 Answers
 loopback.R2.com: type A, class IN, addr 2.2.2.2
 Name: loopback.R2.com
 Type: A (Host address)
 Class: IN (0x0001)
 Time to live: 10 seconds
 Data length: 4
 Addr: 2.2.2.2 10.0.0.0

Response Address [dns.resp.addr], ... Packets: 17 · Displayed: 17 (100.0%) · Load time: 0:00.024 Profile: Default

Figure 7.4 : Observation in WIRESHARK

Solution :



```
R1
*Mar  1 00:00:06.199: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
R1#
R1#
R1#enable
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#hostname R1
R1(config)#inter
R1(config)#interface f0/0
R1(config-if)#ip address 10.10.10.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#do wr
Building configuration...
[OK]
R1(config-if)#e
*Mar  1 00:01:13.895: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:01:14.895: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#end
R1#enab
*Mar  1 00:01:19.243: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

```
R2
*Mar  1 00:00:05.219: %LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
*Mar  1 00:00:06.115: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down
*Mar  1 00:00:06.219: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
R2#enable
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#hostname R2
R2(config)#int f0/0
R2(config-if)#ip address 10.10.10.2 255.255.255.0
R2(config-if)#no shut
R2(config-if)#do wr
Building configuration...

*Mar  1 00:01:49.991: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar  1 00:01:51.107: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up[OK]
R2(config-if)#end
R2#
*Mar  1 00:01:59.359: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip dns server
R2(config)#ip host loopback.R2.com 2.2.2.2
R2(config)#interface loopb
R2(config)#interface loopback 1
R2(config-if)#
*Mar  1 00:03:27.899: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1,
  changed state to up
R2(config-if)#ip address 2.2.2.2 255.255.255.255
R2(config-if)#end
R2#
*Mar  1 00:03:46.099: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip domain lookup
R1(config)#ip name-server 10.10.10.2
R1(config)#end
R1#reso
*Mar  1 00:09:46.907: %SYS-5-CONFIG_I: Configured from console by console
R1#resolve loopback.R2.com
  ^
% Invalid input detected at '^' marker.

R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ip route 0.0.0.0 0.0.0.0 10.10.10.2
R1(config)#end
R1#
*Mar  1 00:10:18.959: %SYS-5-CONFIG_I: Configured from console by console
R1#ping loopback.R2.com repeat 3

Translating "loopback.R2.com"...domain server (10.10.10.2) [OK]

Type escape sequence to abort.
Sending 3, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!
Success rate is 100 percent (3/3), round-trip min/avg/max = 60/61/64 ms
R1#
```

Wireshark capture window showing DNS traffic between R1 and R2.

Interface: phy0.mon, Channel: 1 - 2.412 GHz, 20 MHz, 802.11 Preferences

No.	Time	Source	Destination	Protocol	Length	Info
73	297.27...	10.10.10.1	10.10.10.2	DNS	75	Standard query 0x4b19 A loopback.R2.com
74	297.30...	10.10.10.2	10.10.10.1	DNS	91	Standard query response 0x4b19 A loopback.R2.com

Frame 74: 91 bytes on wire (728 bits), 91 bytes captured (728 bits) on interface -, id 0

Ethernet II, Src: c4:02:43:07:00:00 (c4:02:43:07:00:00), Dst: MaxMedia_f5:00:00 (c4:01:42:f5:00:00)

Internet Protocol Version 4, Src: 10.10.10.2, Dst: 10.10.10.1

User Datagram Protocol, Src Port: 53, Dst Port: 52413

Domain Name System (response)

Transaction ID: 0x4b19

Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 1

Authority RRs: 0

Additional RRs: 0

Queries

- loopback.R2.com: type A, class IN
 - Name: loopback.R2.com
 - [Name Length: 15]
 - [Label Count: 3]
 - Type: A (Host Address) (1)
 - Class: IN (0x0001)

Answers

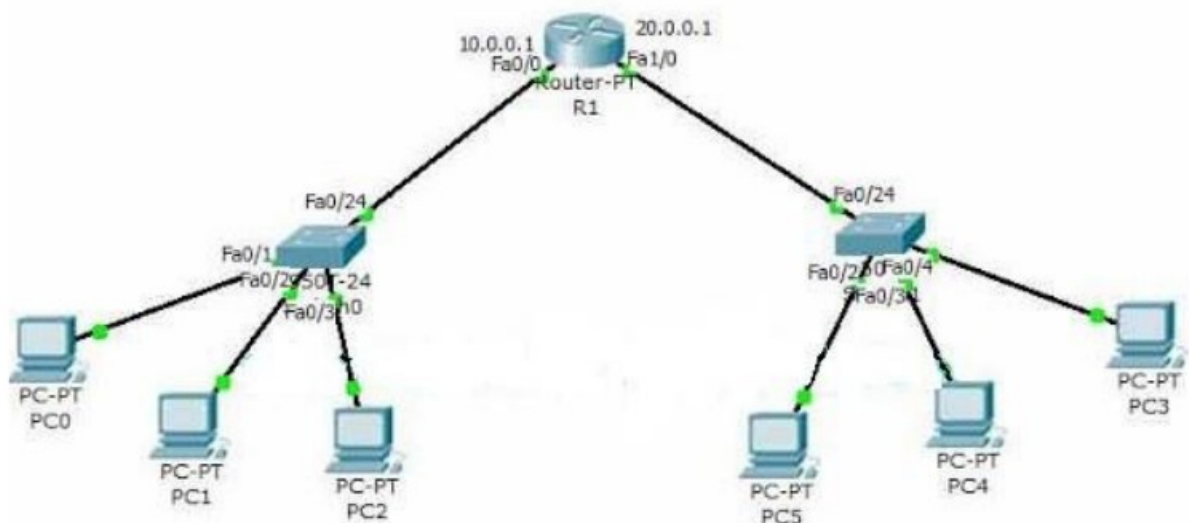
- loopback.R2.com: type A, class IN, addr 2.2.2.2

[Request In: 73]

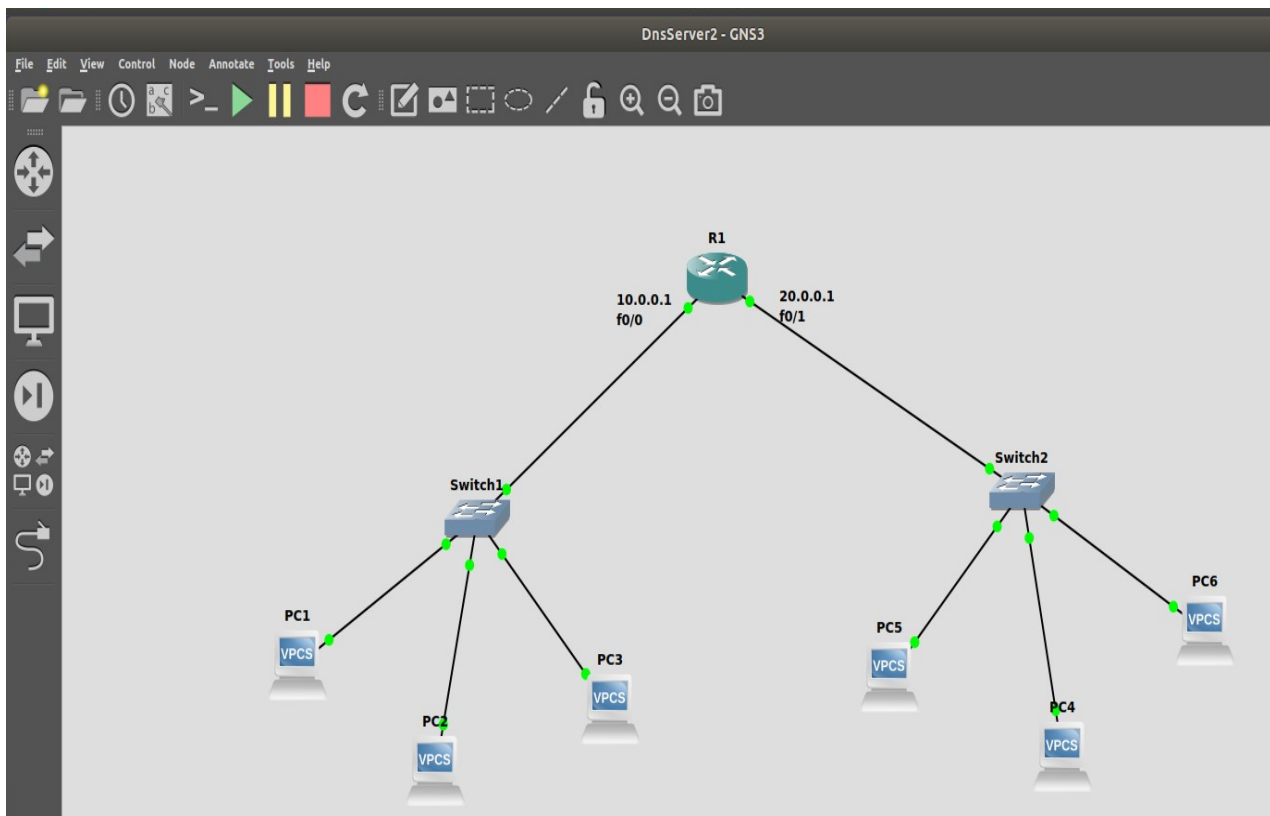
[Time: 0.022388000 seconds]

Domain Name System: Protocol, Packets: 103 · Displayed: 2 (1.9%), Profile: Default

Q7.5) Configure the topology shown below DNS Server and DNS Client. Test the setup. Analyse the Interaction.



Solution :



```
PC5
File Edit View Search Terminal Help
20.0.0.1 icmp_seq=1 timeout
84 bytes from 20.0.0.1 icmp_seq=2 ttl=255 time=1.329 ms
84 bytes from 20.0.0.1 icmp_seq=3 ttl=255 time=4.204 ms
84 bytes from 20.0.0.1 icmp_seq=4 ttl=255 time=13.754 ms
84 bytes from 20.0.0.1 icmp_seq=5 ttl=255 time=4.082 ms

PC5> ip dns 20.0.0.1

PC5> ping joy.moh.com
joy.moh.com resolved to 20.0.0.5
20.0.0.5 icmp_seq=1 ttl=64 time=0.001 ms
20.0.0.5 icmp_seq=2 ttl=64 time=0.001 ms
20.0.0.5 icmp_seq=3 ttl=64 time=0.001 ms
20.0.0.5 icmp_seq=4 ttl=64 time=0.001 ms
20.0.0.5 icmp_seq=5 ttl=64 time=0.001 ms

PC5> ping 10.0.0.3
10.0.0.3 icmp_seq=1 timeout
10.0.0.3 icmp_seq=2 timeout
84 bytes from 10.0.0.3 icmp_seq=3 ttl=63 time=18.323 ms
84 bytes from 10.0.0.3 icmp_seq=4 ttl=63 time=14.415 ms
84 bytes from 10.0.0.3 icmp_seq=5 ttl=63 time=14.524 ms

PC5> 
```

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dns server
R1(config)#ip host loopback.R1.com 2.2.2.2
R1(config)#interface loopback 1
R1(config-if)#ip address 2.2.2.2 255.255.255.255
R1(config-if)#end
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip host pp.PC2.com 10.0.0.4
R1(config)#end
```

```
PC2
File Edit View Search Terminal Help
PC2> ip dns 10.0.0.1

PC2> ping loopback.R1.com
host (96.105.114.0) not reachable
Cannot resolve loopback.R1.com

PC2> ip 10.0.0.4
Checking for duplicate address...
PC1 : 10.0.0.4 255.255.255.0

PC2> ip 10.0.0.4 255.255.255.0 10.0.0.1
Checking for duplicate address...
PC1 : 10.0.0.4 255.255.255.0 gateway 10.0.0.1

PC2> ip dns

PC2> ping loopback.R1.com
loopback.R1.com resolved to 2.2.2.2
84 bytes from 2.2.2.2 icmp_seq=1 ttl=255 time=9.271 ms
84 bytes from 2.2.2.2 icmp_seq=2 ttl=255 time=4.729 ms
84 bytes from 2.2.2.2 icmp_seq=3 ttl=255 time=4.469 ms
84 bytes from 2.2.2.2 icmp_seq=4 ttl=255 time=4.144 ms
84 bytes from 2.2.2.2 icmp_seq=5 ttl=255 time=3.950 ms
```



```
R1#ping joy.moh.com
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 20.0.0.5, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/13/20 ms
```

```
R1#
```

```
R1#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
R1(config)#ip host pp.PC2.com 10.0.0.4
```

```
R1(config)#interface pp 1
```

```
^
```

```
% Invalid input detected at '^' marker.
```

```
R1(config)#end
```

```
R1#pp
```

```
R1#ping pp.PC2.com
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.0.0.4, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/13/28 ms
```

```
R1#sh ip int brief
```

Interface	IP-Address	OK?	Method	Status	Prot
ocol					
FastEthernet0/0	10.0.0.1	YES	NVRAM	up	up

PC1

```
File Edit View Search Terminal Help
```

```
GATEWAY : 10.0.0.1
```

```
DNS : 10.0.0.1
```

```
DOMAIN NAME : lookup
```

```
MAC : 00:50:79:66:68:00
```

```
LPORT : 10024
```

```
RHOST:PORT : 127.0.0.1:10025
```

```
MTU: : 1500
```

```
PC1> ping 10.0.0.4
```

```
84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=0.159 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=0.243 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=0.171 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=0.144 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=0.177 ms
```

```
PC1> ping pp.PC2.com
```

```
pp.PC2.com resolved to 10.0.0.4
```

```
84 bytes from 10.0.0.4 icmp_seq=1 ttl=64 time=0.113 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=2 ttl=64 time=0.187 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=3 ttl=64 time=0.172 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=4 ttl=64 time=0.150 ms
```

```
84 bytes from 10.0.0.4 icmp_seq=5 ttl=64 time=0.182 ms
```

```
PC1> 
```