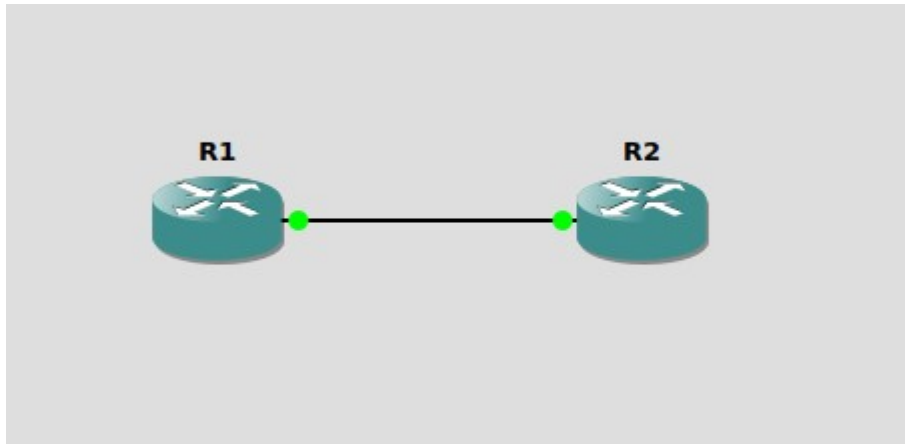


Q1) Configure the below topology to setup DNS server. R1 will use R2 as DNS server to make DNS resolutions. First, let's begin with R1. We will setup hostname and IP related information.

The topology:



Configuring R1:

```
R1#enable
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#hostname R1
R1(config)#interface e0/0
      ^
% Invalid input detected at '^' marker.

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
*Nov  2 08:05:45.955: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R1(config-if)#do
*Nov  2 08:05:45.955: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Nov  2 08:05:46.955: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R1(config-if)#do wr
Building configuration...
[OK]
R1(config-if)#end
R1#
*Nov  2 08:05:52.963: %SYS-5-CONFIG_I: Configured from console by console
R1#
```

Configuring R2:

```
R2#enable
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#hostname R2
R2(config)#interface f0/0
R2(config-if)#ip address 10.10.10.2 255.255.255.0
R2(config-if)#no shut
R2(config-if)#
*Nov  2 08:07:25.391: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
R2(config-if)#
*Nov  2 08:07:25.391: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Administrative State Down
*Nov  2 08:07:26.391: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R2(config-if)#do wr
Building configuration...
[OK]
R2(config-if)#end
R2#
*Nov  2 08:07:38.539: %SYS-5-CONFIG_I: Configured from console by console
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 loopback 1
R2(config-if)#
*Nov  2 08:08:28.727: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R2(config-if)#end
R2#
*Nov  2 08:08:34.903: %SYS-5-CONFIG_I: Configured from console by console
R2#
R2#
```

Ping:

```
R2#
R2#ping loopback.R2.com

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R2#
```

Ping:

```
R1#enable
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)#ip route 0.0.0.0 0.0.0.0 10.10.10.2
R1(config)#do wr
Building configuration...
[OK]
R1(config)#end
R1#
*Nov  2 08:16:04.439: %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:
UUU
Success rate is 0 percent (0/3)
R1#
```

Wireshark Output:

*Standard input [R1 FastEthernet0/0 to R2 FastEthernet0/0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Expression...

| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|-----------|-------------------|-------------------|------------------------|--------|---|
| 5 | 21.048768 | ca:02:13:f5:00:00 | ca:02:13:f5:00:00 | LOOP | 60 | Reply |
| 6 | 22.541579 | ca:01:13:e6:00:00 | ca:01:13:e6:00:00 | LOOP | 60 | Reply |
| 7 | 26.541974 | ca:02:13:f5:00:00 | ca:01:13:e6:00:00 | CDP/VTP/DTP/PagP/UD... | 338 | Device ID: R2 Port ID: FastEthernet0/0 |
| 8 | 31.576854 | ca:02:13:f5:00:00 | ca:02:13:f5:00:00 | LOOP | 60 | Reply |
| 9 | 33.090465 | ca:01:13:e6:00:00 | ca:01:13:e6:00:00 | LOOP | 60 | Reply |
| 10 | 37.804273 | ca:01:13:e6:00:00 | ca:02:13:f5:00:00 | CDP/VTP/DTP/PagP/UD... | 338 | Device ID: R1 Port ID: FastEthernet0/0 |
| 11 | 42.077625 | ca:02:13:f5:00:00 | ca:02:13:f5:00:00 | LOOP | 60 | Reply |
| 12 | 42.453607 | 10.10.10.1 | 10.10.10.2 | DNS | 75 | Standard query 0x0002 A loopback.R2.com |
| 13 | 42.464066 | 10.10.10.2 | 10.10.10.1 | DNS | 91 | Standard query response 0x0002 A loopback.R2.com A 2.2.2.2 |
| 14 | 42.473959 | 10.10.10.1 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=0/0, ttl=255 (no response found) |
| 15 | 42.484245 | 10.10.10.2 | 10.10.10.1 | ICMP | 70 | Destination unreachable (Host unreachable) |
| 16 | 42.494284 | 10.10.10.1 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=1/256, ttl=255 (no response found) |
| 17 | 42.504614 | 10.10.10.2 | 10.10.10.1 | ICMP | 70 | Destination unreachable (Host unreachable) |
| 18 | 42.514536 | 10.10.10.1 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=2/512, ttl=255 (no response found) |
| 19 | 42.524844 | 10.10.10.2 | 10.10.10.1 | ICMP | 70 | Destination unreachable (Host unreachable) |
| 20 | 43.407819 | ca:01:13:e6:00:00 | ca:01:13:e6:00:00 | LOOP | 60 | Reply |
| 21 | 52.278106 | ca:02:13:f5:00:00 | ca:02:13:f5:00:00 | LOOP | 60 | Reply |

Domain Name System (response)
Transaction ID: 0x0002
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: 12]
 [Time: 0.010459000 seconds]

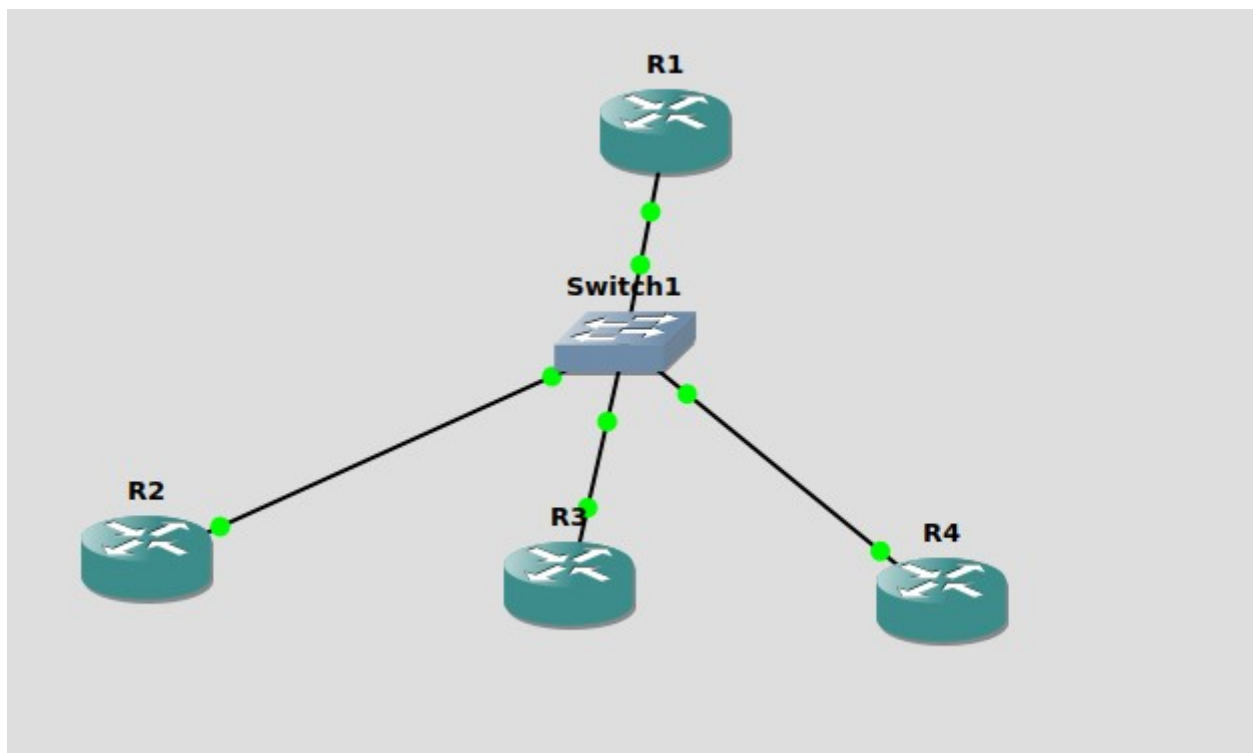
0000 ca 01 13 e6 00 00 ca 02 13 f5 00 00 08 00 45 00E..

wireshark - 20211102134807_jZ71Zb.pcapng

Packets: 45 · Displayed: 45 (100.0%) · Dropped: 0 (0.0%) Profile: Default

Q) Configure the below DNS Server and DNS Client. Test the setup. Analyze the interaction.

The topology:



Configuring R1:

```
R1#
R1#enable
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#ip address 10.0.10.1
% Incomplete command.

R1(config-if)#ip address 10.0.10.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#do wr
Building configuration...
[OK]
R1(config-if)#end
```

Configuring R2:

```
R2#
R2#enable
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int f0/0
R2(config-if)#ip address 10.0.10.2 255.255.255.0
R2(config-if)#no shut
R2(config-if)#do wr
Building configuration...
[OK]
R2(config-if)#end
R2#
*Nov  2 09:28:08.091: %SYS-5-CONFIG_I: Configured from console by console
R2#
```

Configuring R3:

```
R3#
R3#enable
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip address 10.0.10.3 255.255.255.0
      ^
% Invalid input detected at '^' marker.

R3(config)#int f0/0
R3(config-if)#ip address 10.0.10.3 255.255.255.0
R3(config-if)#no shut
R3(config-if)#do wr
Building configuration...
[OK]
R3(config-if)#end
R3#
*Nov  2 09:28:44.331: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

Configuring R4:

```
R4#
R4#enable
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#int f0/0
R4(config-if)#ip address 10.0.10.4 255.255.255.0
R4(config-if)#no shut
R4(config-if)#do wr
Building configuration...
[OK]
R4(config-if)#end
R4#
*Nov  2 09:29:12.699: %SYS-5-CONFIG_I: Configured from console by console
R4#
```

Configuring R1 to a DNS Server:

```
R1#
*Nov  2 09:27:37.507: %SYS-5-CONFIG_I: Configured from console by console
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 ad
*Nov  2 09:31:55.175: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R1(config-if)#ip address 2.2.2.2 255.255.255.255
R1(config-if)#end
R1#
*Nov  2 09:32:09.263: %SYS-5-CONFIG_I: Configured from console by console
R1#ping loopback.R1.com

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#
```


Configuring R2 as a DNS Client:

```
R2#
*Nov  2 09:28:08.091: %SYS-5-CONFIG_I: Configured from console by console
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip domain lookup
R2(config)#ip name-server 10.0.10.1
R2(config)#ip route 0.0.0.0 0.0.0.0 10.0.10.1
R2(config)#ping loopback.R1.com repeat 3
      ^
% Invalid input detected at '^' marker.

R2(config)#end
R2#conf t
*Nov  2 09:32:59.199: %SYS-5-CONFIG_I: Configured from console by console
R2#ping loopback.R1.com repeat 3

Translating "loopback.R1.com"...domain server (10.0.10.1) [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 = 28/49/60 ms
R2#
```

Configuring R3 as a DNS Client:

```
R3#
*Nov  2 09:28:44.331: %SYS-5-CONFIG_I: Configured from console by console
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip domain lookup
R3(config)#ip name-server 10.0.10.1
R3(config)#ip route 0.0.0.0 0.0.0.0 10.0.10.1
R3(config)#end
R3#
*Nov  2 09:34:07.735: %SYS-5-CONFIG_I: Configured from console by console
R3#ping loopback.R1.com repeat 3

Translating "loopback.R1.com"...domain server (10.0.10.1) [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 = 56/58/60 ms
R3#
```

Configuring R4 as a DNS Client:

```
R4#
*Nov  2 09:29:12.699: %SYS-5-CONFIG_I: Configured from console by console
R4#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#ip domain lookup
R4(config)#ip name-server 10.0.10.1
R4(config)#ip route 0.0.0.0 0.0.0.0 10.0.10.1
R4(config)#end
R4#pin
*Nov  2 09:34:44.259: %SYS-5-CONFIG_I: Configured from console by console
R4#ping loopback.R1.com repeat 3

Translating "loopback.R1.com"...domain server (10.0.10.1) [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 = 60/62/68 ms
R4#
```

Wireshark Output on pinging:

*Standard Input [R1 FastEthernet0/0 to Switch1 Ethernet0]

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Expression...

| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|--------------|-------------------|-------------------|----------|--------|--|
| 246 | 1008.770160 | ca:01:18:8e:00:00 | ca:01:18:8e:00:00 | LOOP | 60 | Reply |
| 247 | 1011.209344 | 10.0.10.3 | 10.0.10.1 | DNS | 75 | Standard query 0x0002 A loopback.R1.com |
| 248 | 1011.219452 | 10.0.10.1 | 10.0.10.3 | DNS | 91 | Standard query response 0x0002 A loopback.R1.com A 2.2.2.2 |
| 249 | 1011.229634 | 10.0.10.3 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=0/0, ttl=255 (reply in 250) |
| 250 | 1011.239599 | 2.2.2.2 | 10.0.10.3 | ICMP | 114 | Echo (ping) reply id=0x0001, seq=0/0, ttl=255 (request in 249) |
| 251 | 1011.249862 | 10.0.10.3 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=1/256, ttl=255 (reply in 252) |
| 252 | 1011.259883 | 2.2.2.2 | 10.0.10.3 | ICMP | 114 | Echo (ping) reply id=0x0001, seq=1/256, ttl=255 (request in 251) |
| 253 | 1011.270187 | 10.0.10.3 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=2/512, ttl=255 (reply in 254) |
| 254 | 1011.280179 | 2.2.2.2 | 10.0.10.3 | ICMP | 114 | Echo (ping) reply id=0x0001, seq=2/512, ttl=255 (request in 253) |
| 255 | 1015.060164 | 10.0.10.4 | 10.0.10.1 | DNS | 75 | Standard query 0x0002 A loopback.R1.com |
| 256 | 1015.070157 | 10.0.10.1 | 10.0.10.4 | DNS | 91 | Standard query response 0x0002 A loopback.R1.com A 2.2.2.2 |
| 257 | 1015.080544 | 10.0.10.4 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=0/0, ttl=255 (reply in 258) |
| 258 | 1015.090434 | 2.2.2.2 | 10.0.10.4 | ICMP | 114 | Echo (ping) reply id=0x0001, seq=0/0, ttl=255 (request in 257) |
| 259 | 1015.090905 | 10.0.10.4 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=1/256, ttl=255 (reply in 260) |
| 260 | 1015.0918752 | 2.2.2.2 | 10.0.10.4 | ICMP | 114 | Echo (ping) reply id=0x0001, seq=1/256, ttl=255 (request in 259) |
| 261 | 1015.0929034 | 10.0.10.4 | 2.2.2.2 | ICMP | 114 | Echo (ping) request id=0x0001, seq=2/512, ttl=255 (reply in 262) |
| 262 | 1015.0939119 | 2.2.2.2 | 10.0.10.4 | ICMP | 114 | Echo (ping) reply id=0x0001, seq=2/512, ttl=255 (request in 261) |
| 263 | 1018.963455 | ca:01:18:8e:00:00 | ca:01:18:8e:00:00 | LOOP | 60 | Reply |

Domain Name System (response)
Transaction ID: 0x0002
Flags: 0x0100 Standard query response, No error
Questions: 1
Answer RRs: 1
Authority RRs: 0
Additional RRs: 0
Queries
 loopback.R1.com: type A, class IN
 Name: loopback.R1.com
 [Name Length: 15]
 [Label Count: 3]
 Type: A (Host Address) (1)
 Class: IN (0x0001)
Answers
 loopback.R1.com: type A, class IN, addr 2.2.2.2
 [Request In: 255]
 [Time: 0.009993000 seconds]

0000 ca 04 18 ca 00 00 ca 01 18 8e 00 00 00 00 45 00E

wireshark_-_20211102150857_RUeG9N.pcapng Packets: 263 · Displayed: 263 (100.0%) · Dropped: 0 (0.0%) Profile: Default