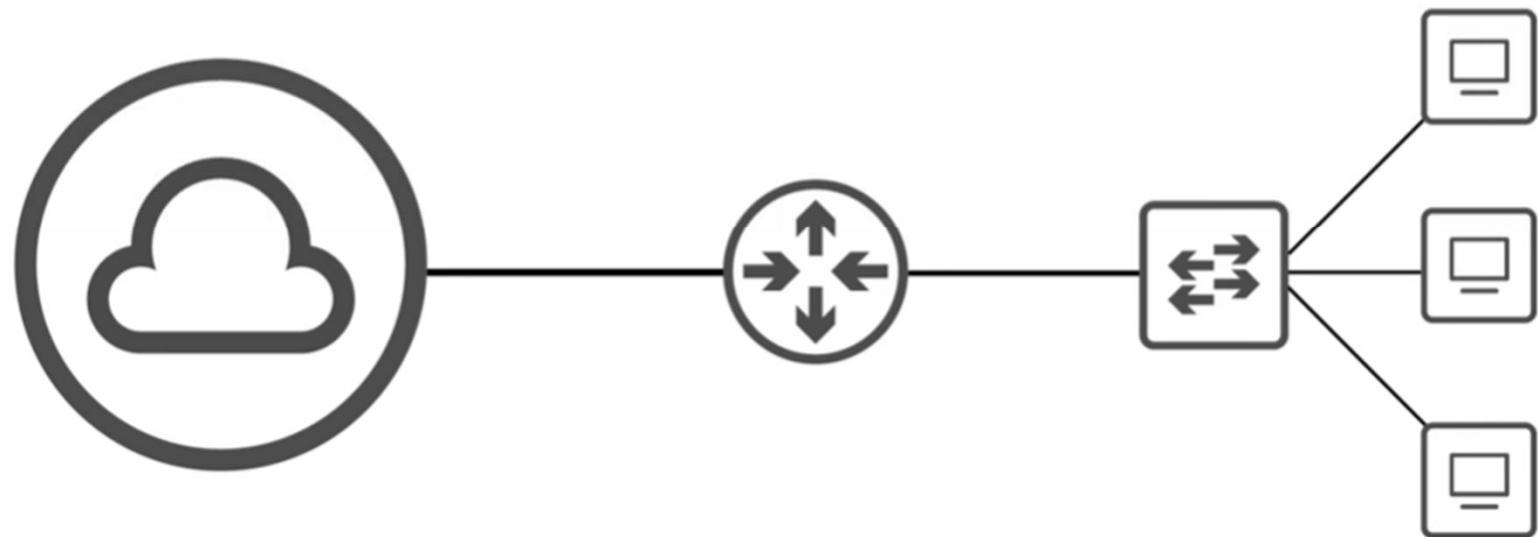


Life of a Packet



Life of a Packet





Jeremy's
IT Lab

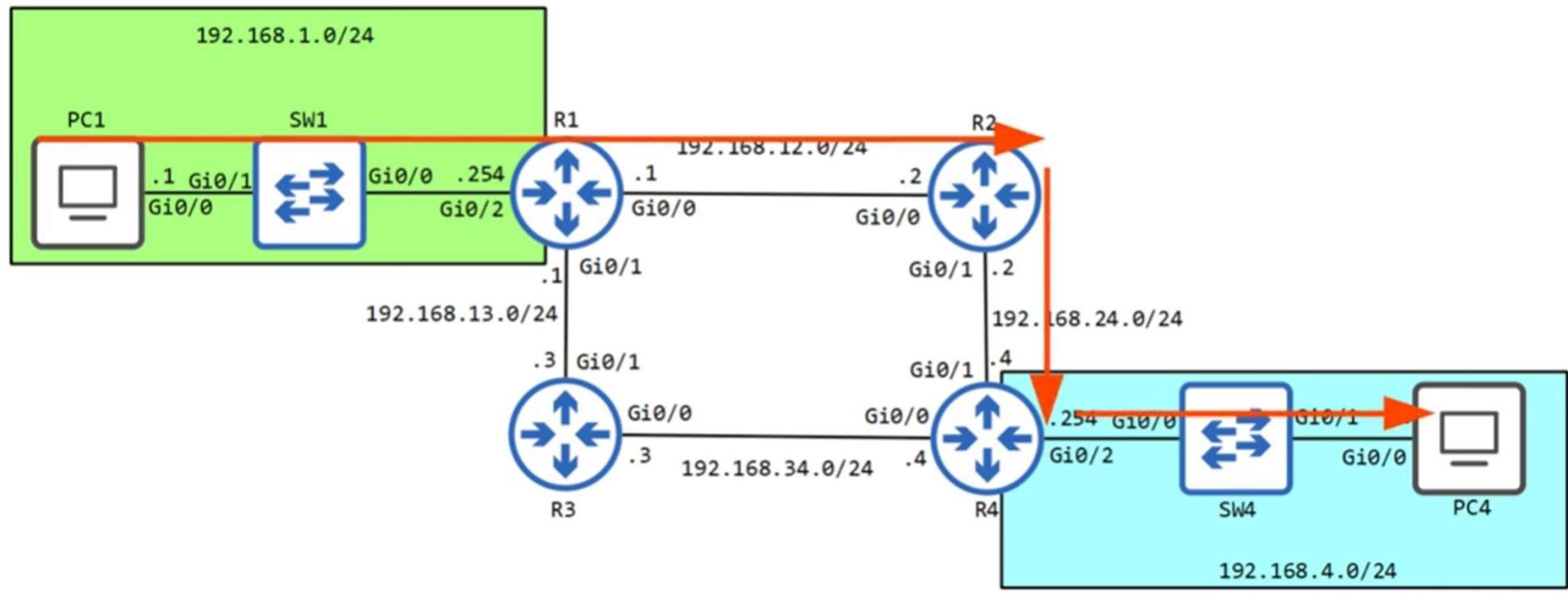
Things we'll cover



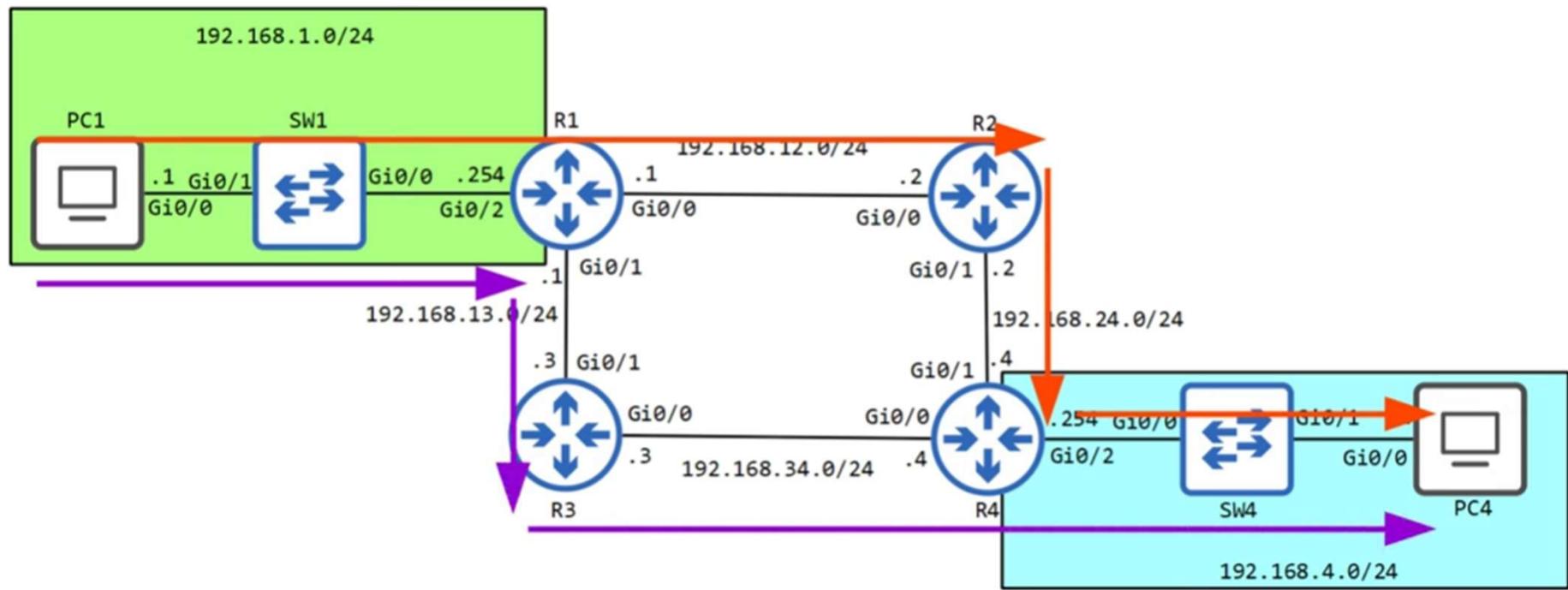
- The entire process of sending a packet to a remote destination.
- Including ARP, encapsulation, de-encapsulation, etc.



Network Topology



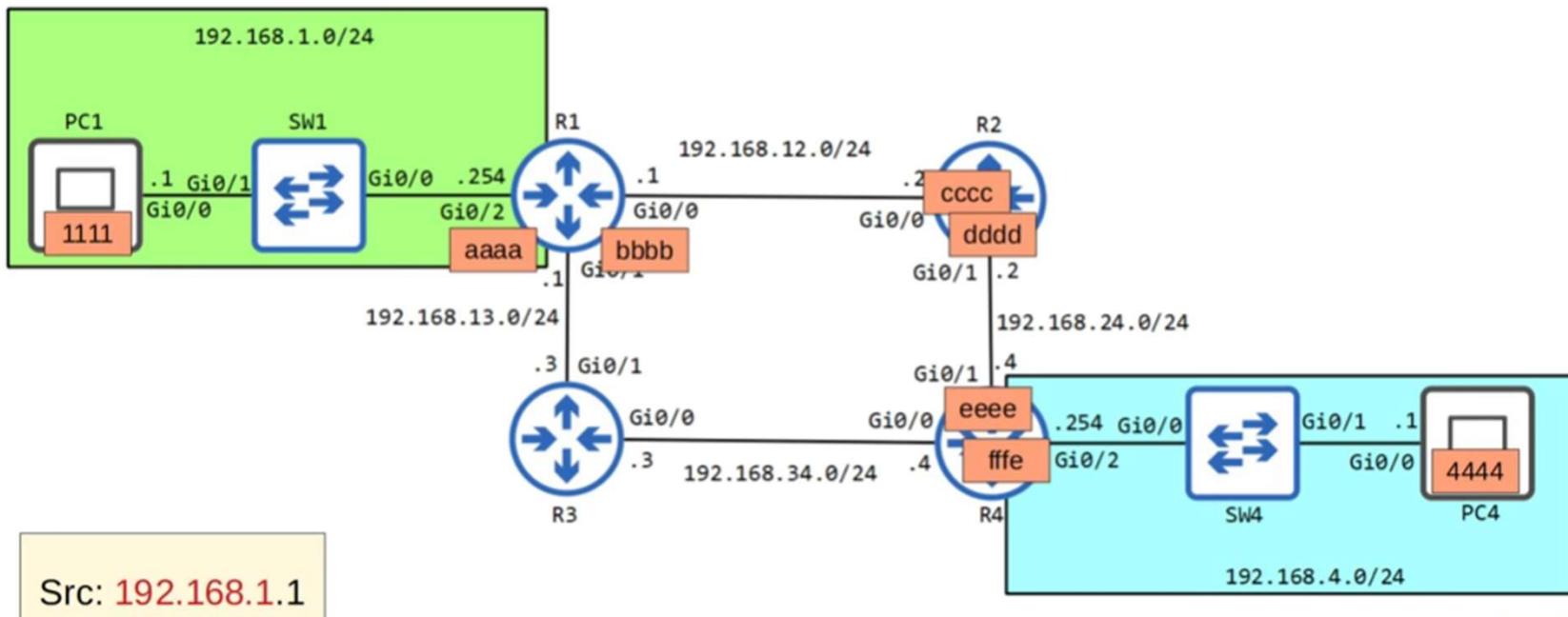
Network Topology





Jeremy's
IT Lab

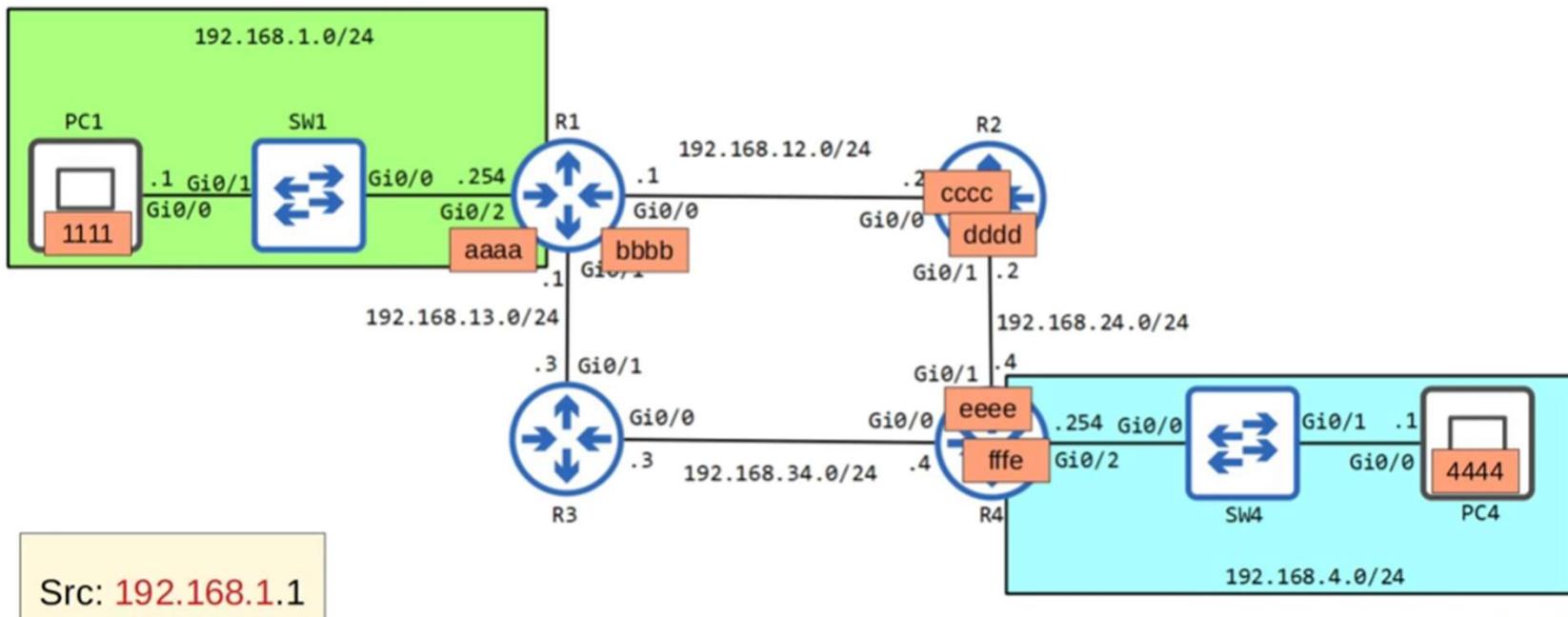
Network Topology





Jeremy's
IT Lab

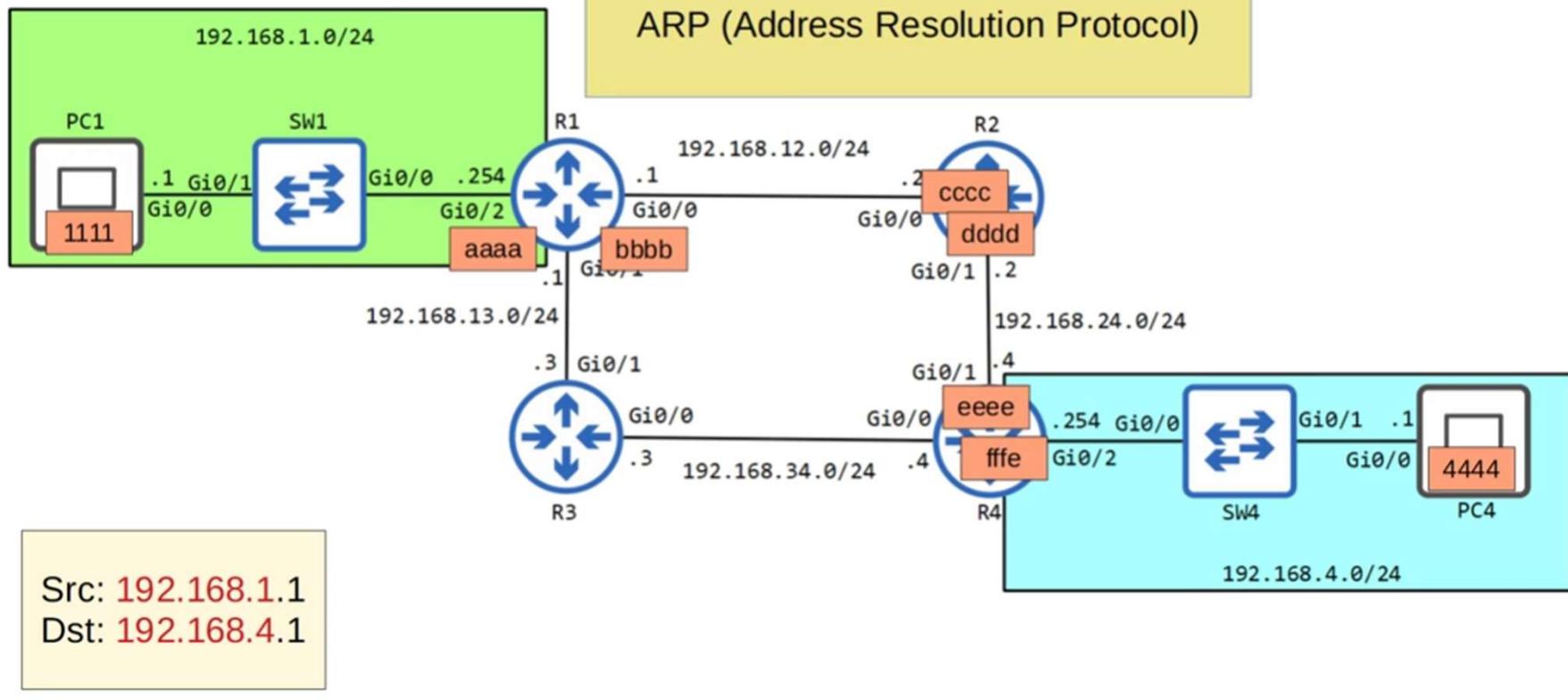
Network Topology





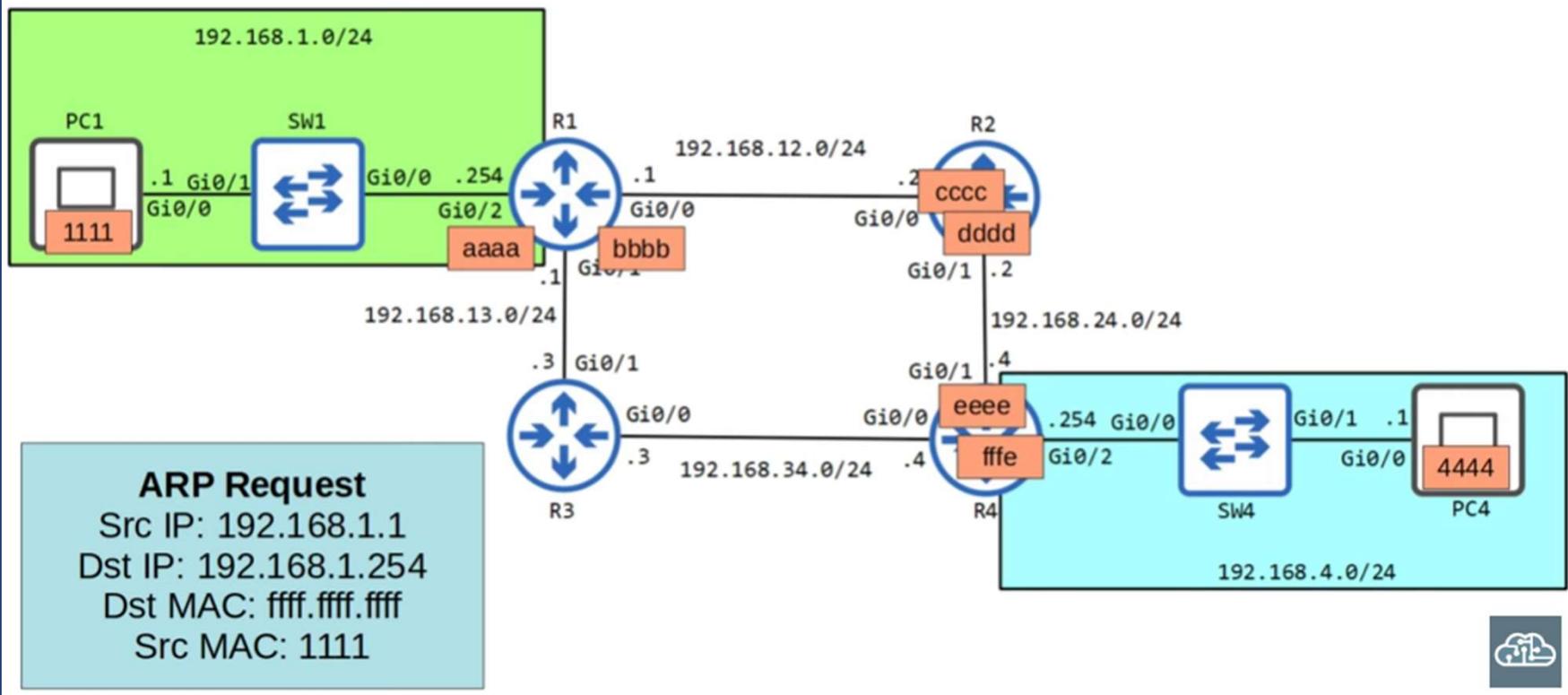
Network Topology

ARP (Address Resolution Protocol)





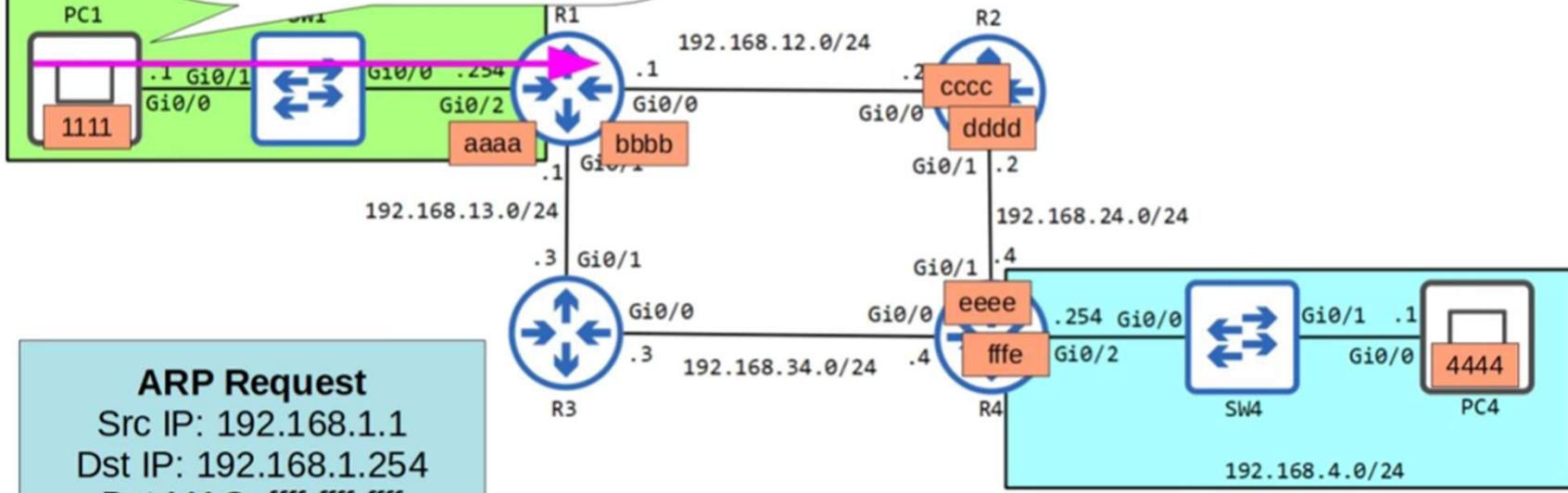
ARP (Address Resolution Protocol)





ARP (Address Resolution Protocol)

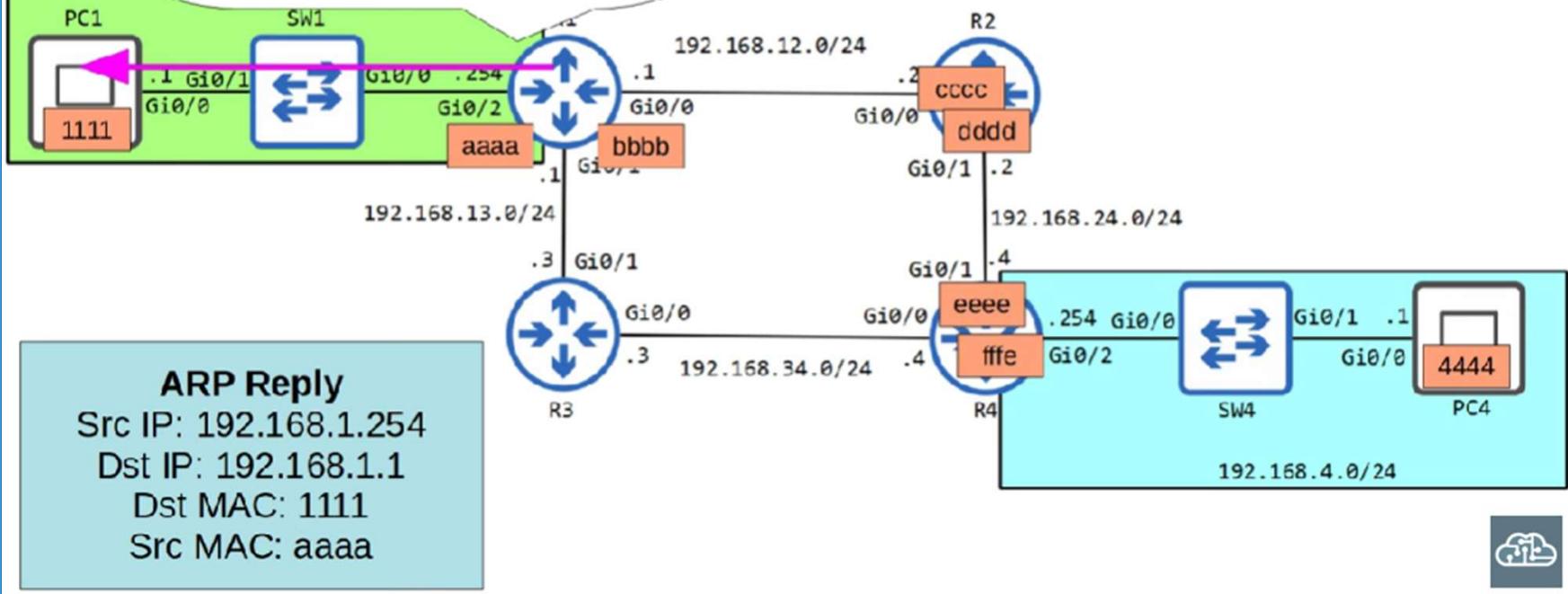
Hi 192.168.1.254.
What's your MAC address?



ARP (Address Resolution Protocol)

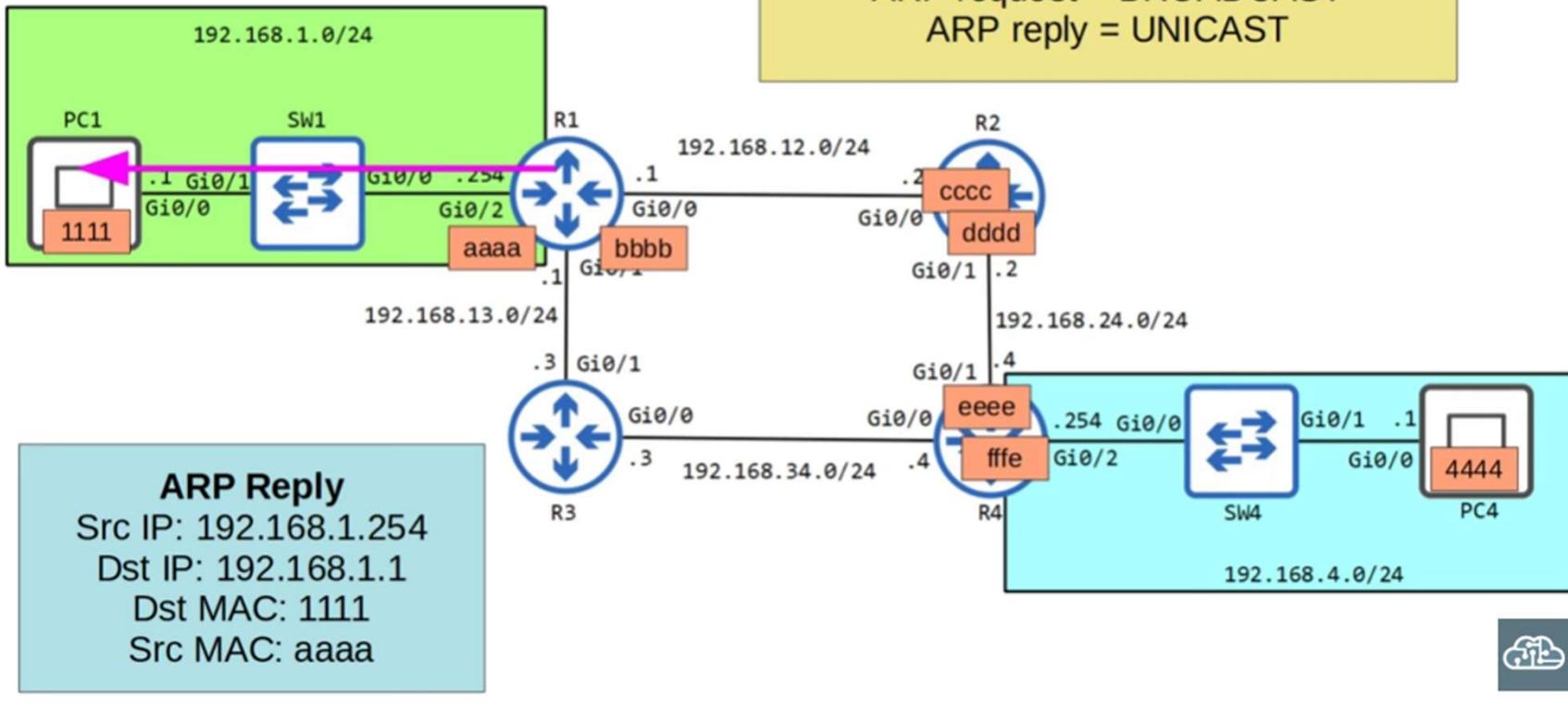
Hi 192.168.1.1.
This is 192.168.1.254.
My MAC address is aaaa.

ARP request = BROADCAST
ARP reply = UNICAST



ARP (Address Resolution Protocol)

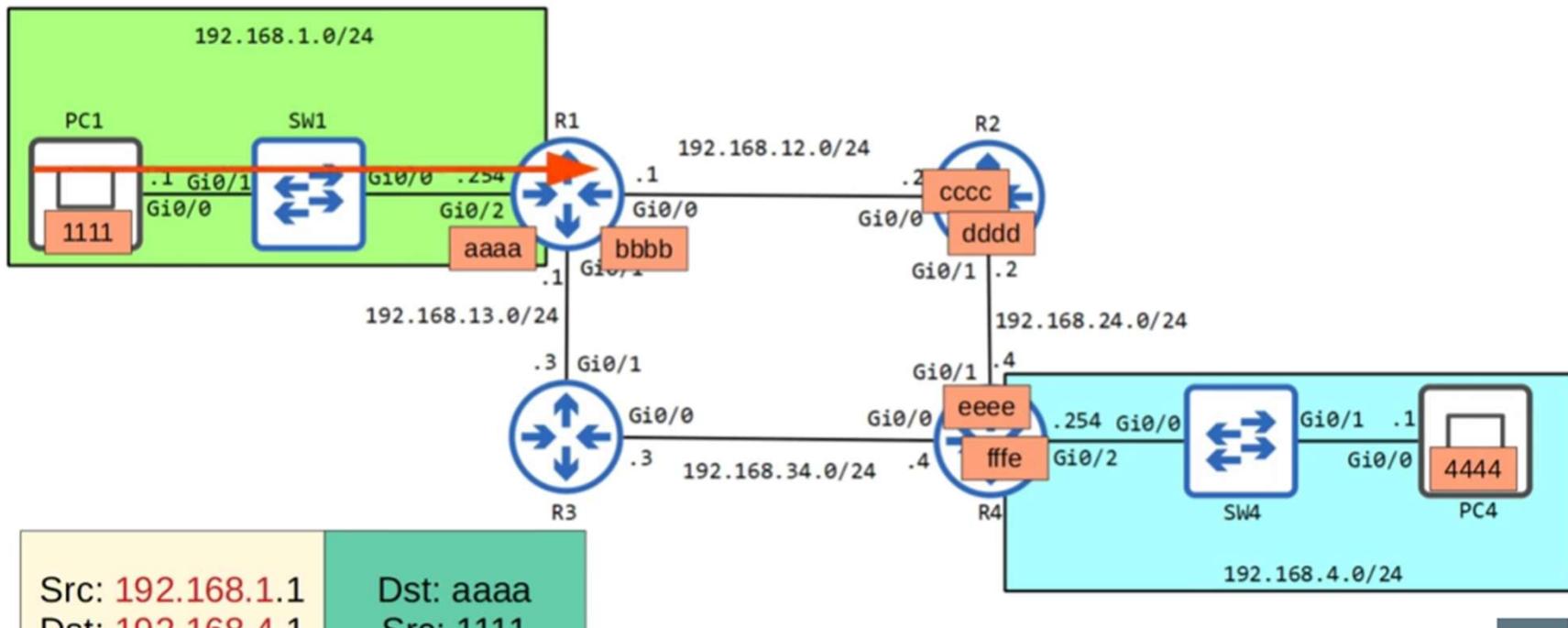
ARP request = BROADCAST
ARP reply = UNICAST





Jeremy's
IT Lab

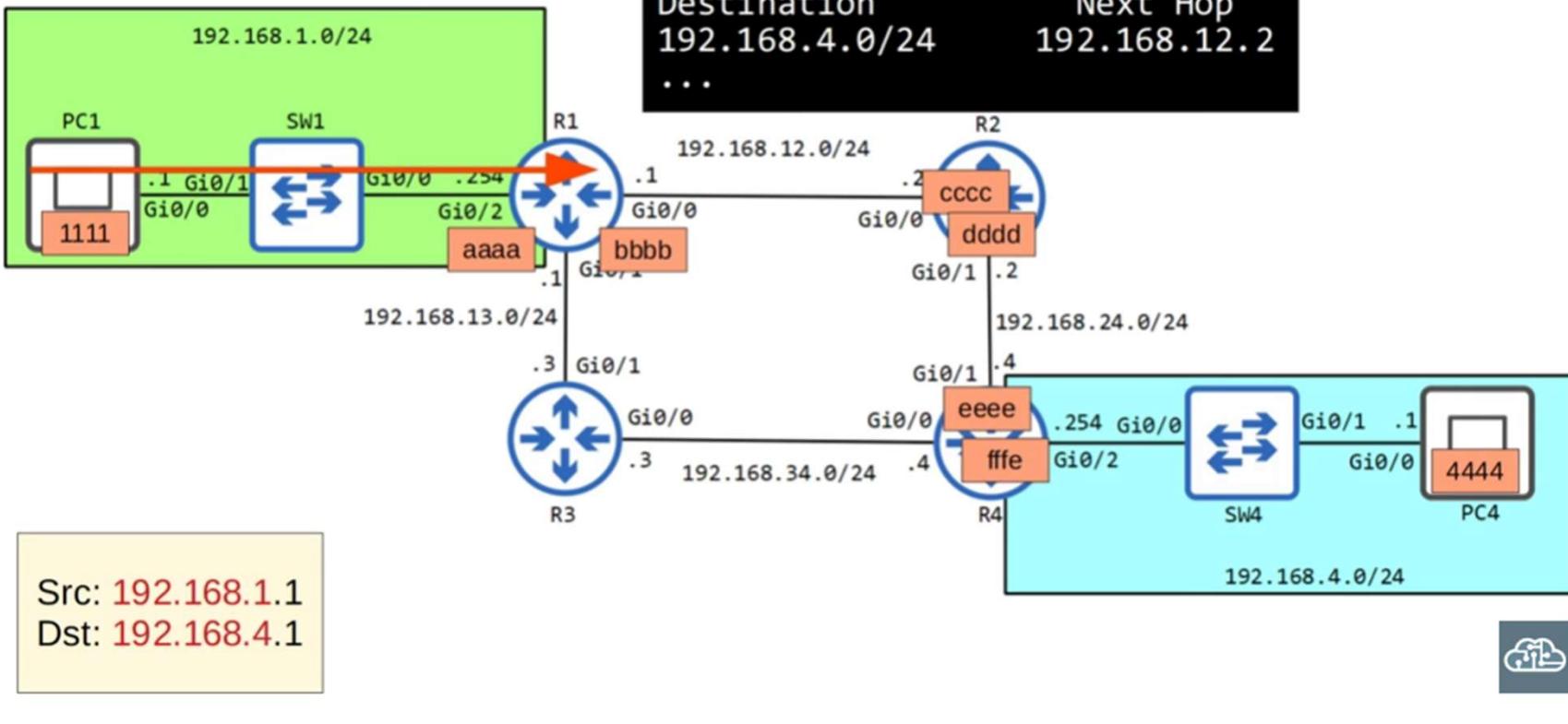
PC1 → R1





R1 → R2

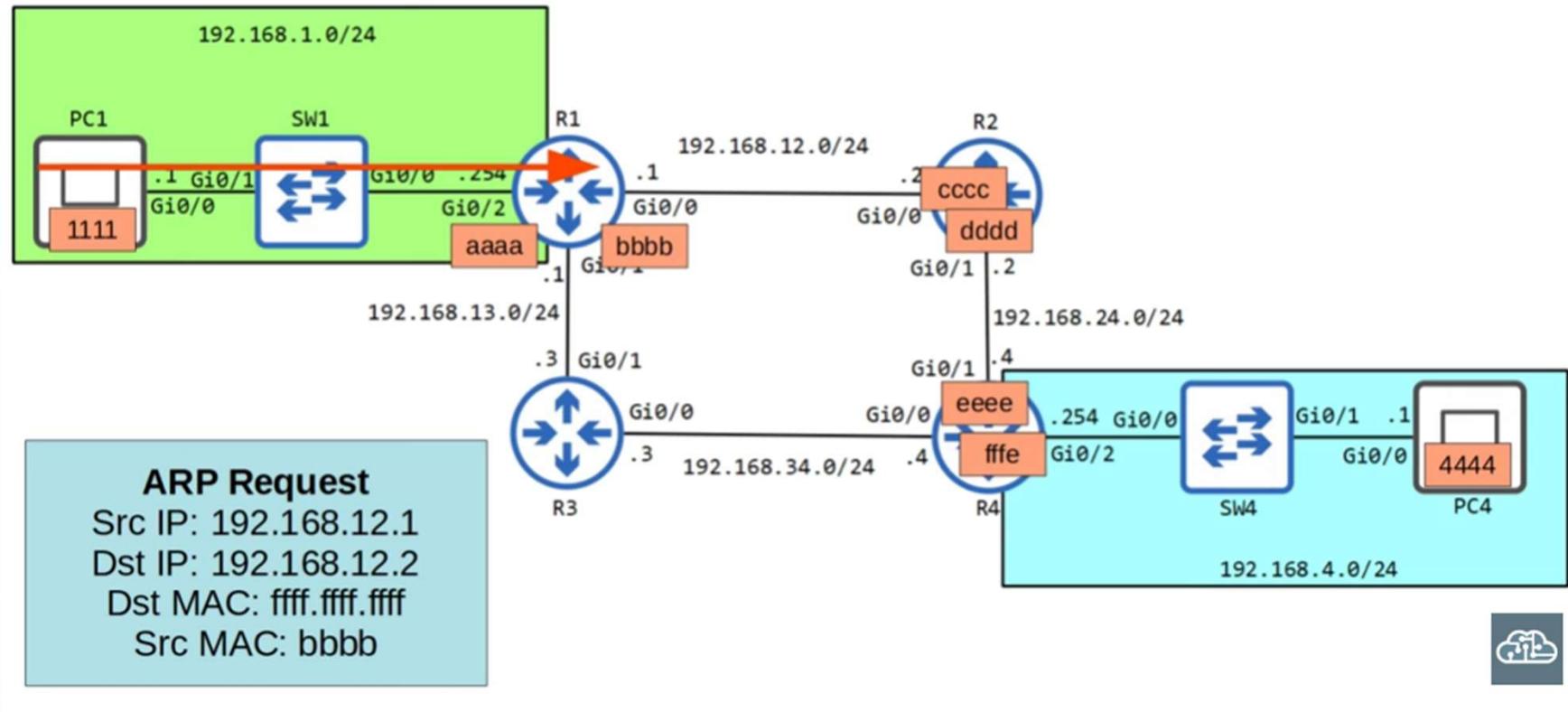
R1 Routing Table	
Destination	Next Hop
192.168.4.0/24	192.168.12.2
...	





Jeremy's
IT Lab

ARP

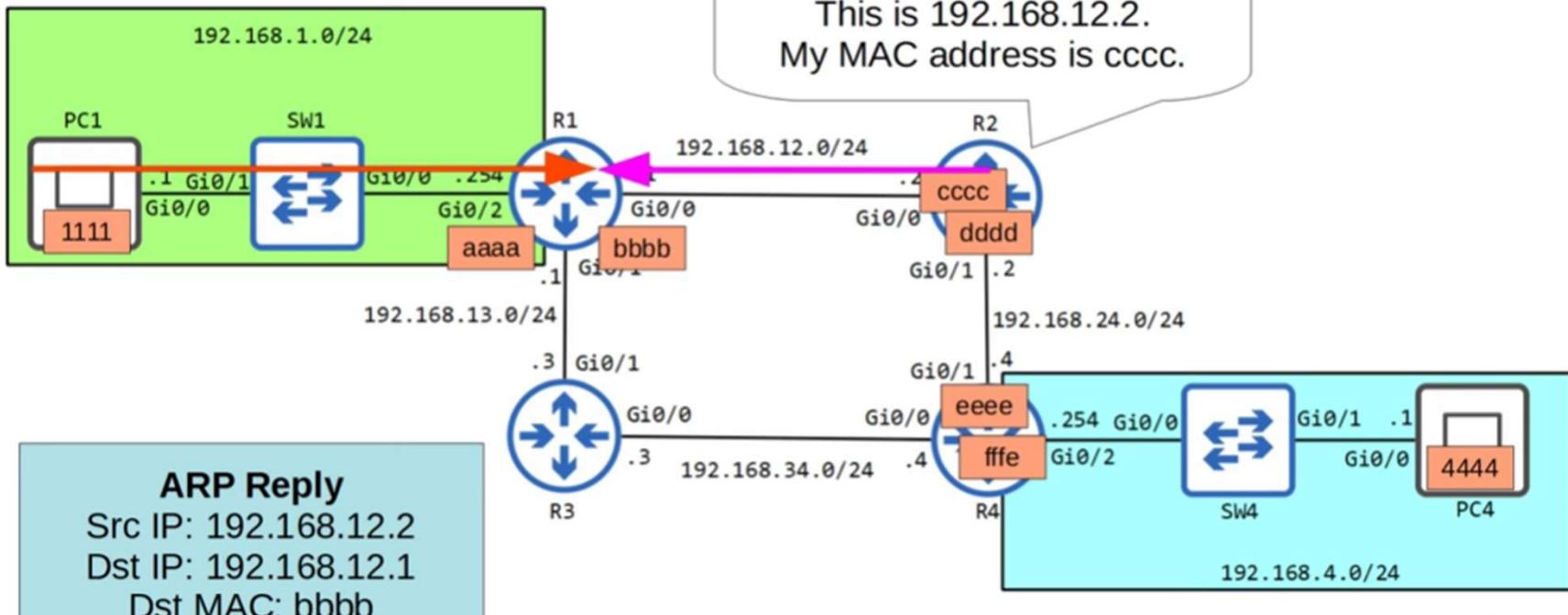




Jeremy's
IT Lab

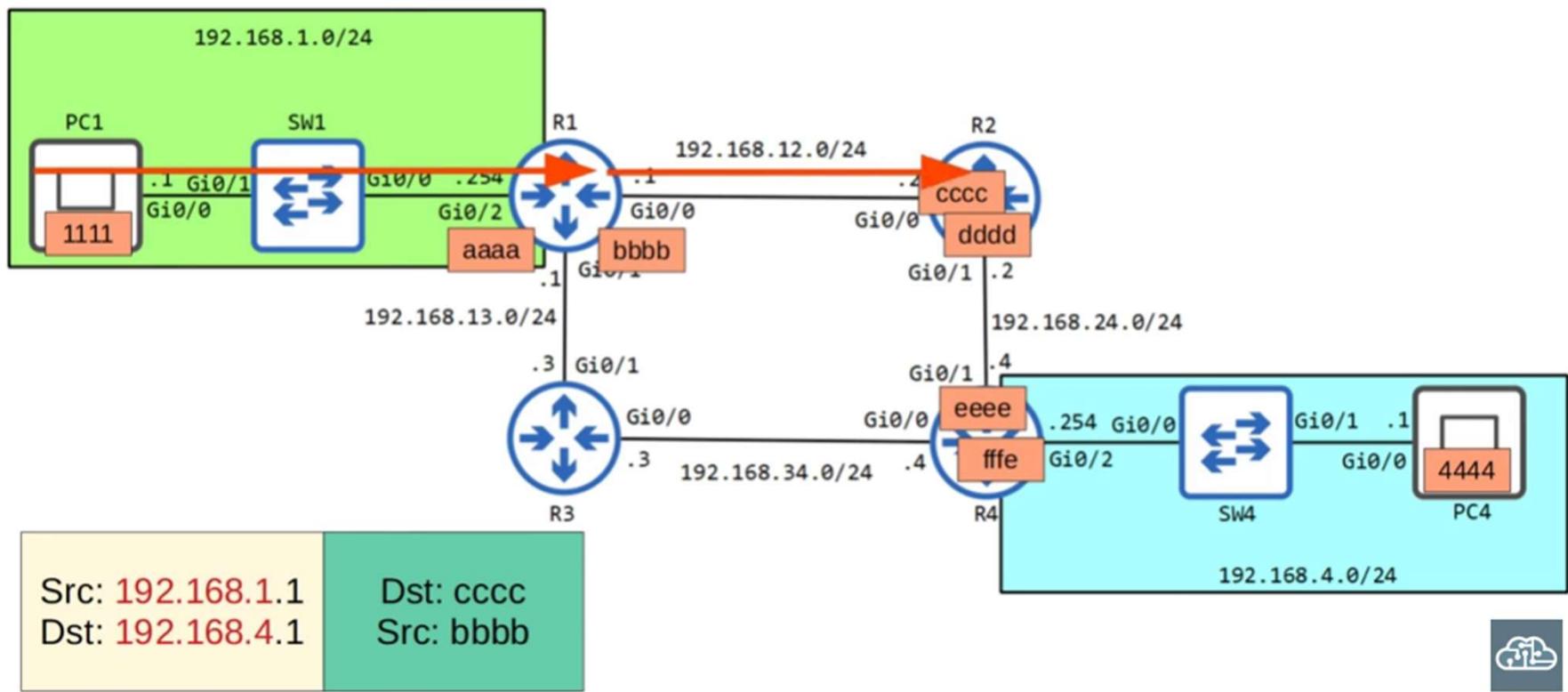
ARP

Hi 192.168.12.1.
This is 192.168.12.2.
My MAC address is cccc.





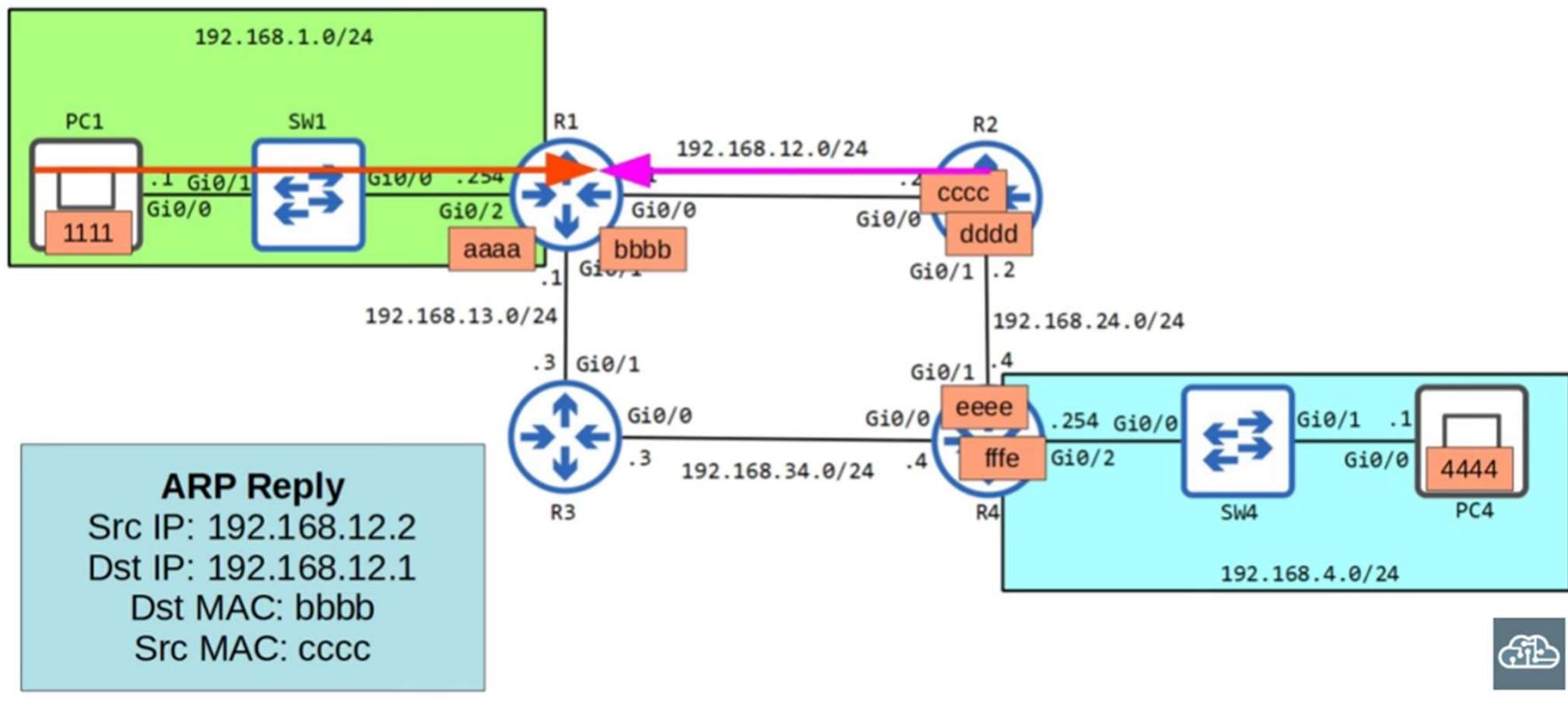
R1 → R2





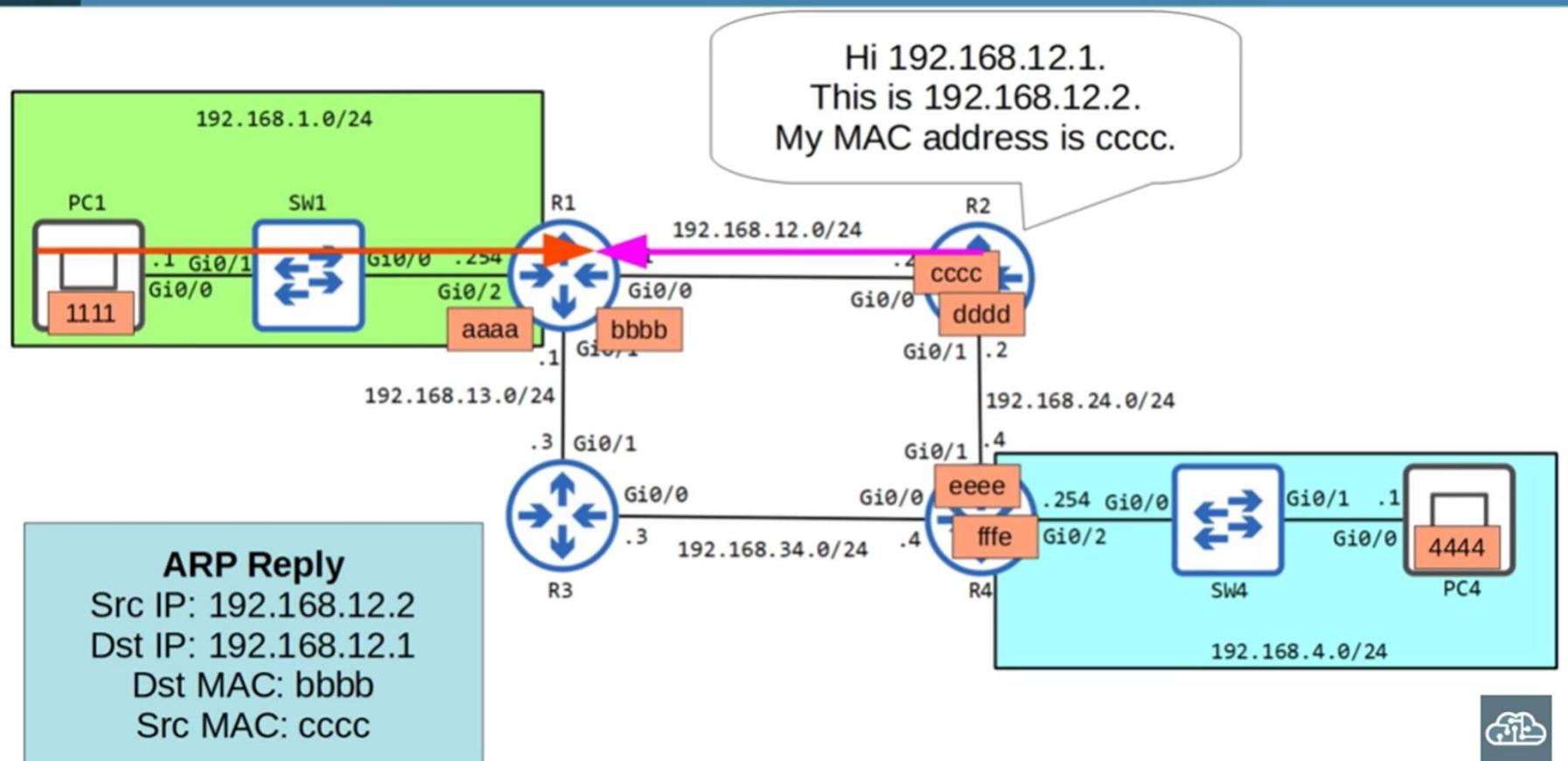
Jeremy's
IT Lab

ARP





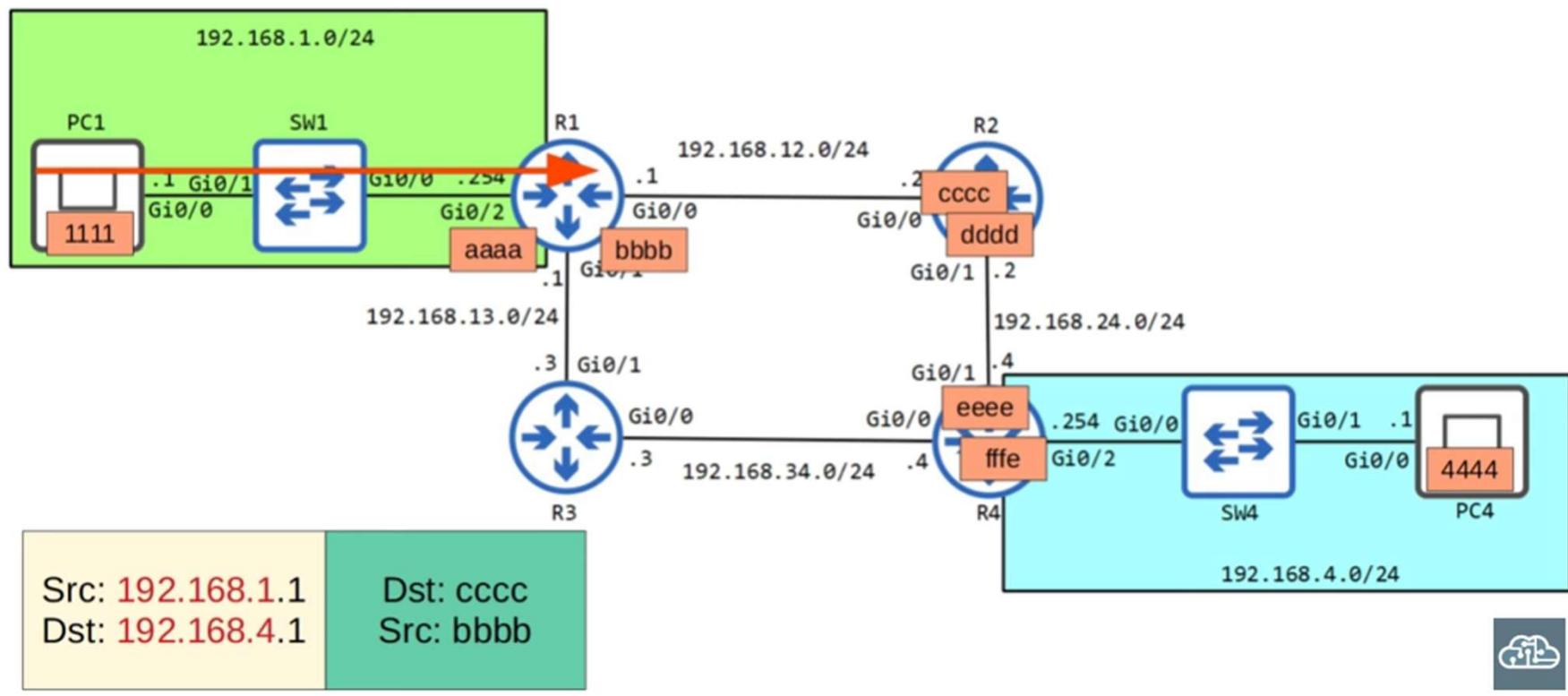
ARP





Jeremy's
IT Lab

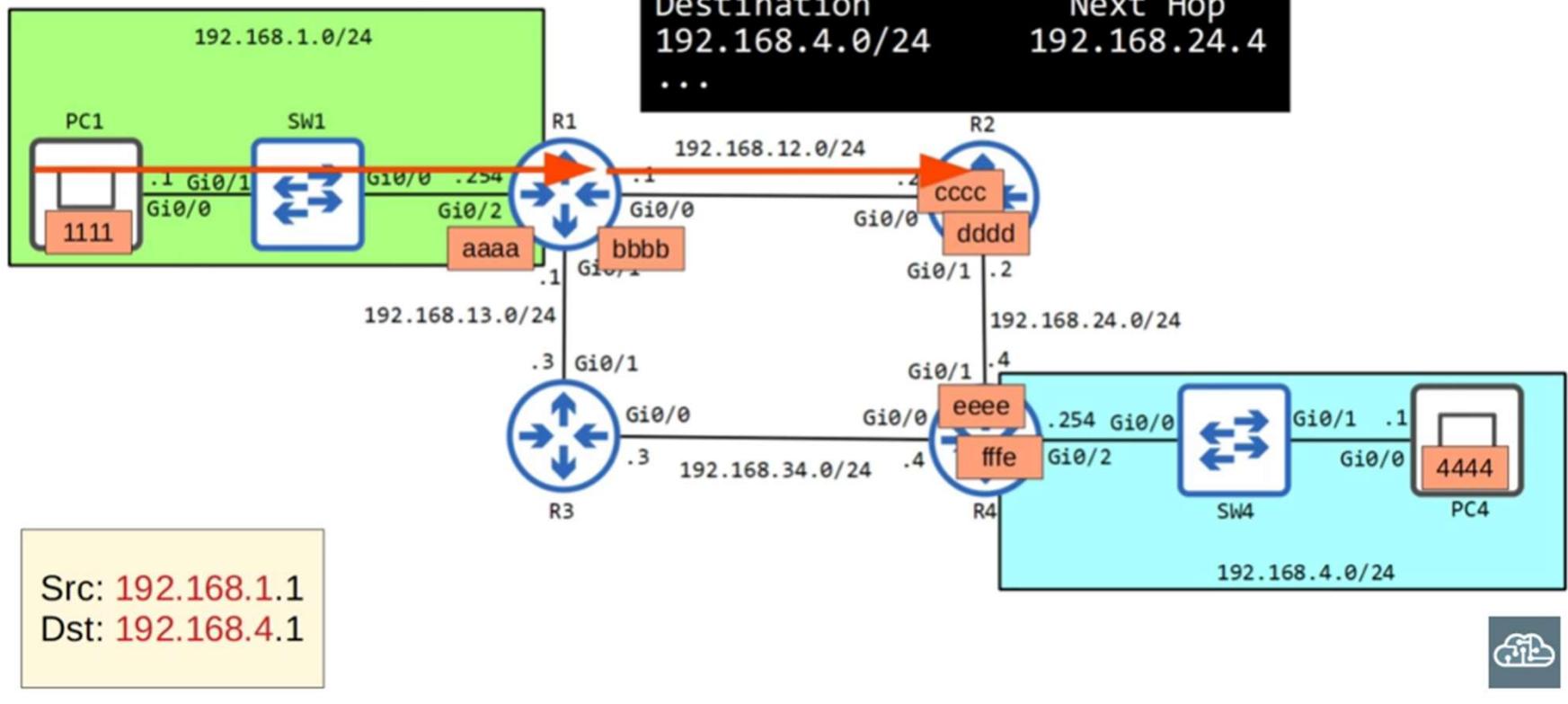
$R1 \rightarrow R2$



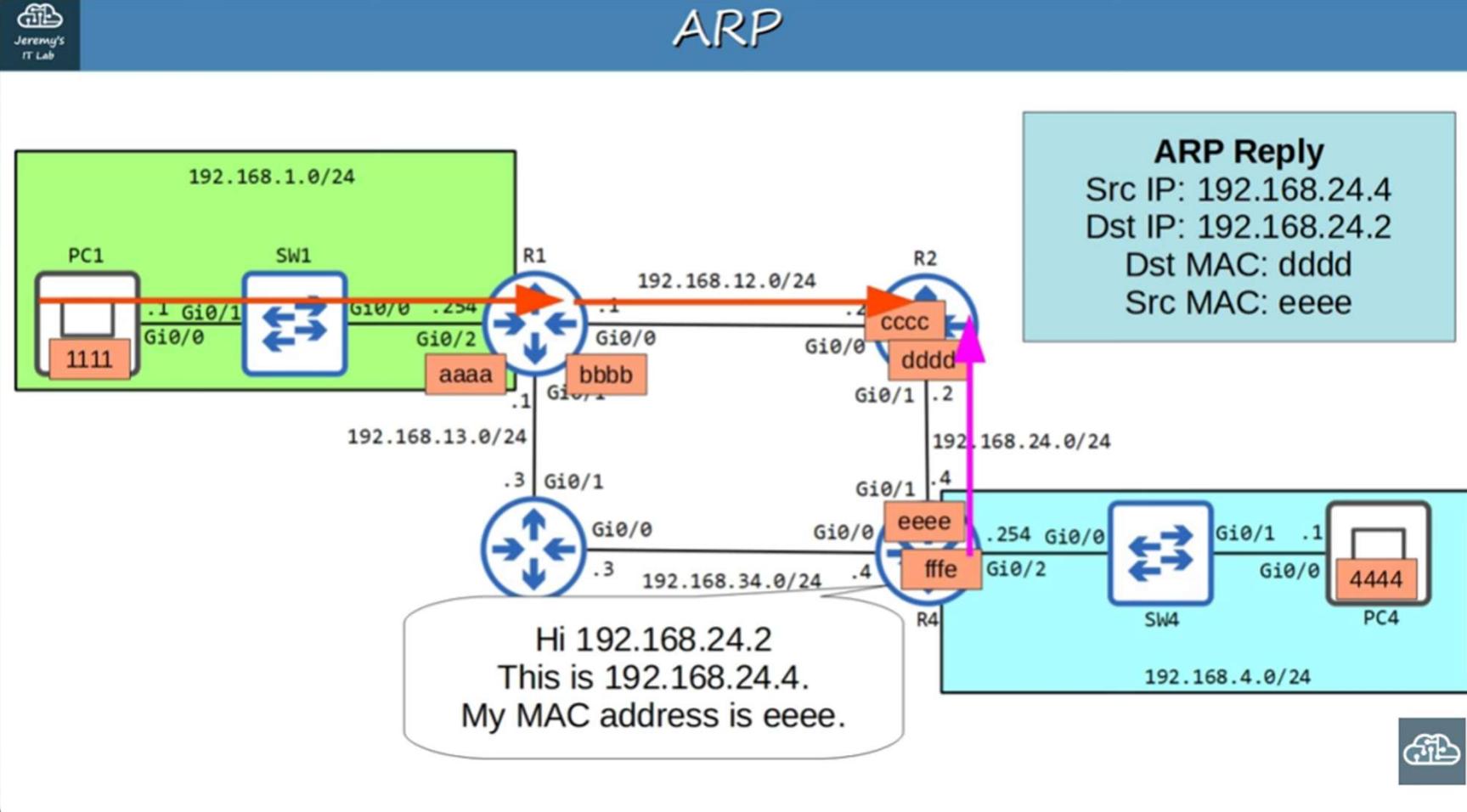


R2 → R4

R2 Routing Table	
Destination	Next Hop
192.168.4.0/24	192.168.24.4
...	



ARP

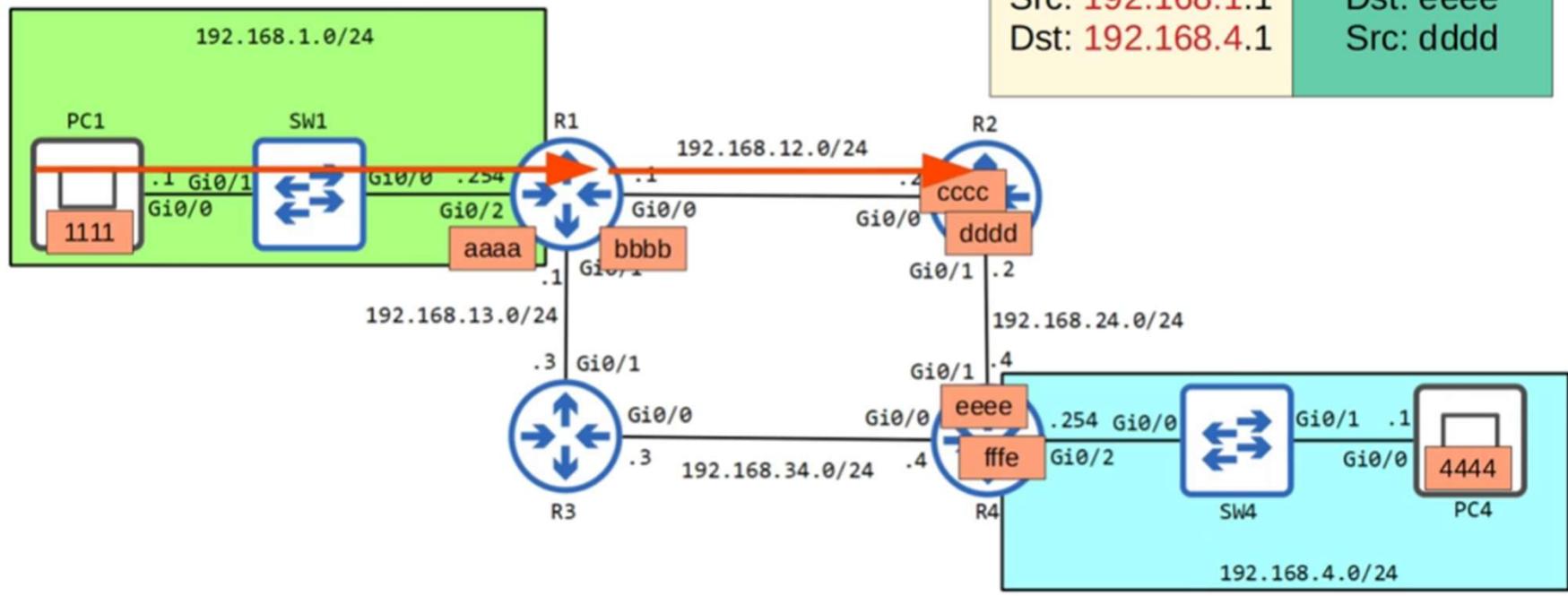




R2 → R4

Src: 192.168.1.1
Dst: 192.168.4.1

Dst: eeee
Src: dddd



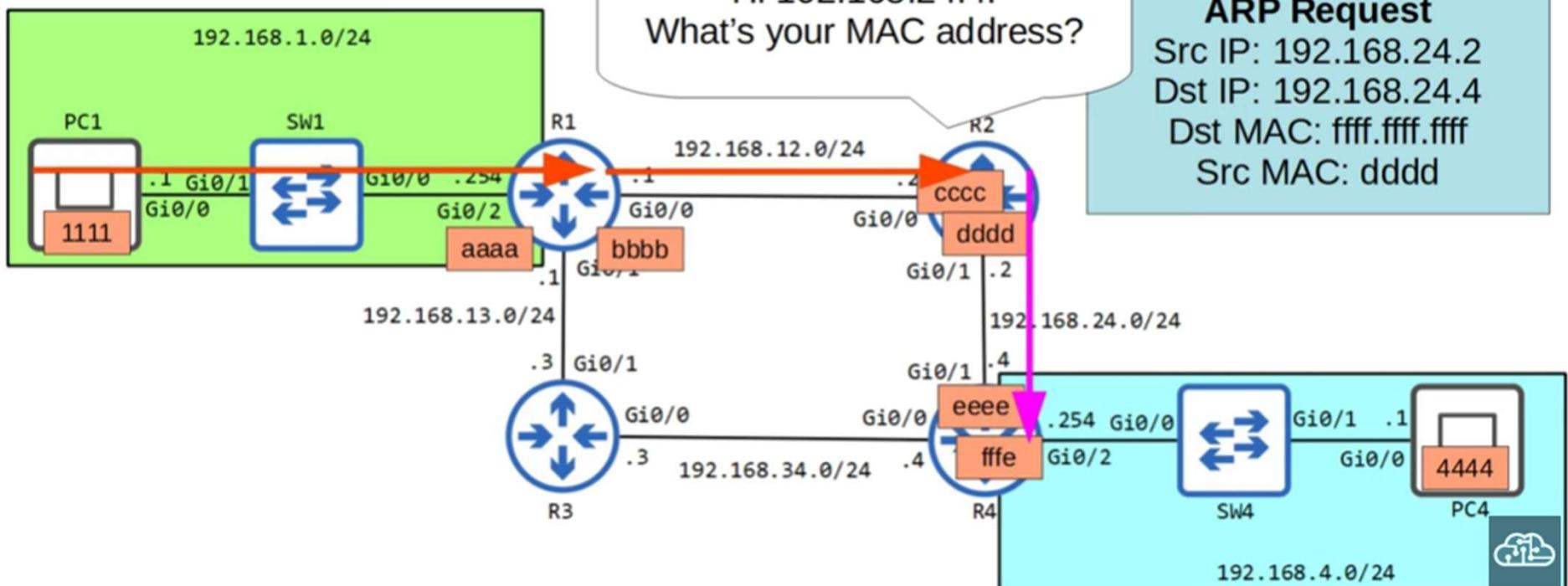
ARP



Hi 192.168.24.4.
What's your MAC address?

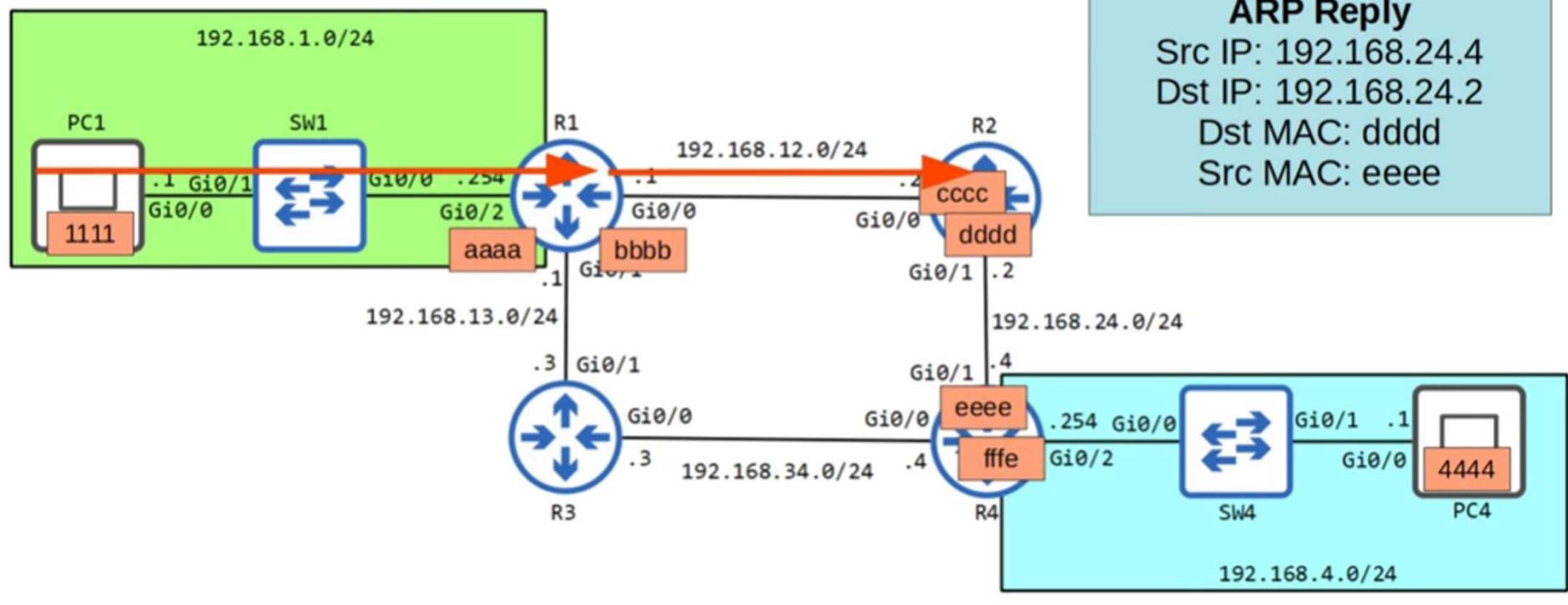
ARP Request

Src IP: 192.168.24.2
Dst IP: 192.168.24.4
Dst MAC: ffff.ffff.ffff
Src MAC: dddd

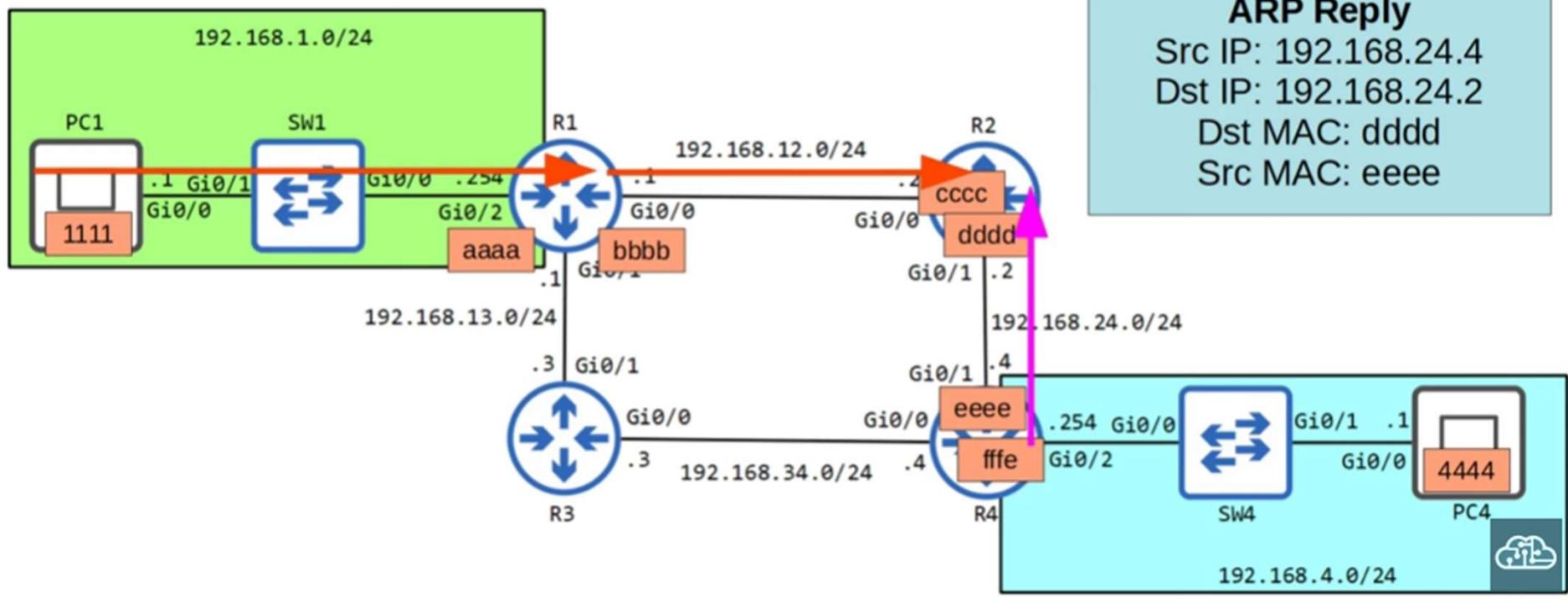




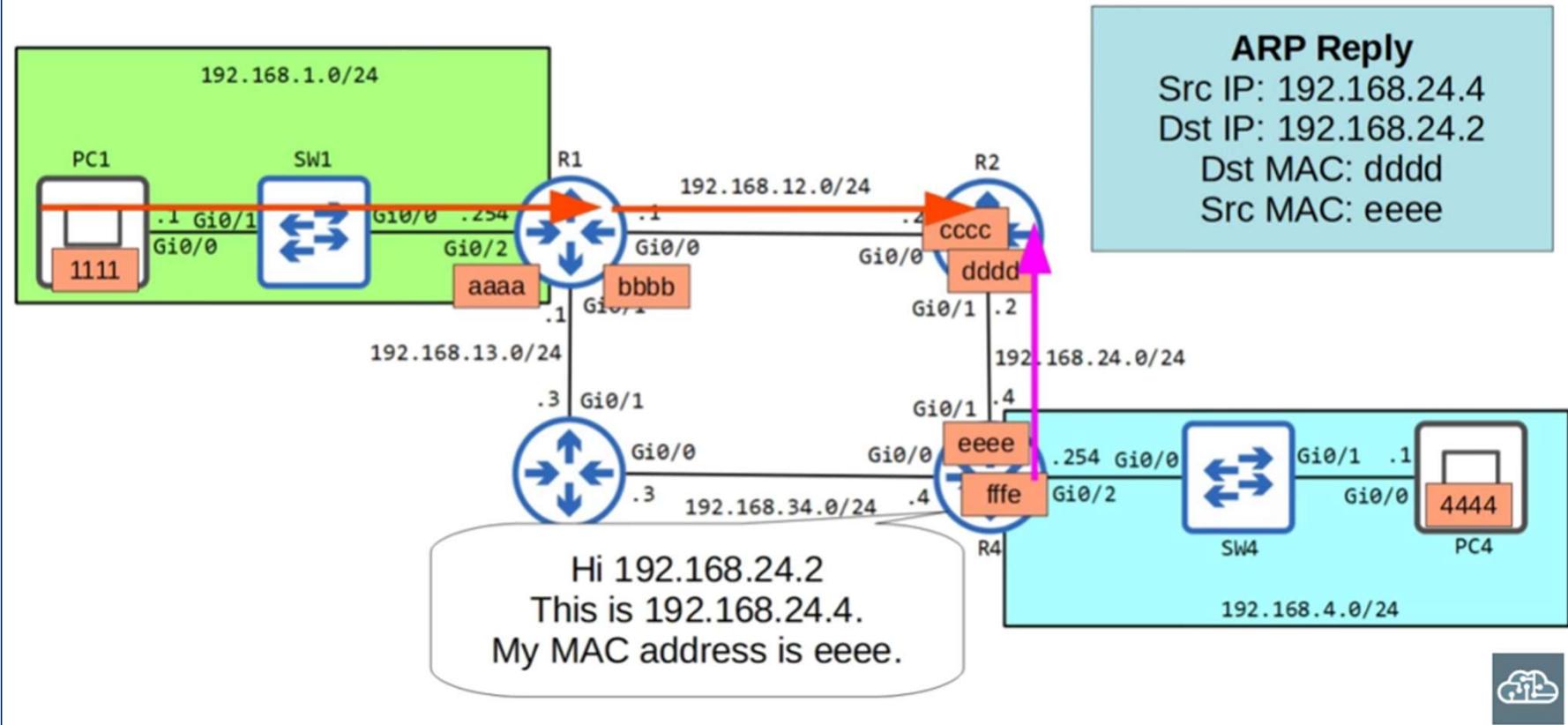
ARP



ARP



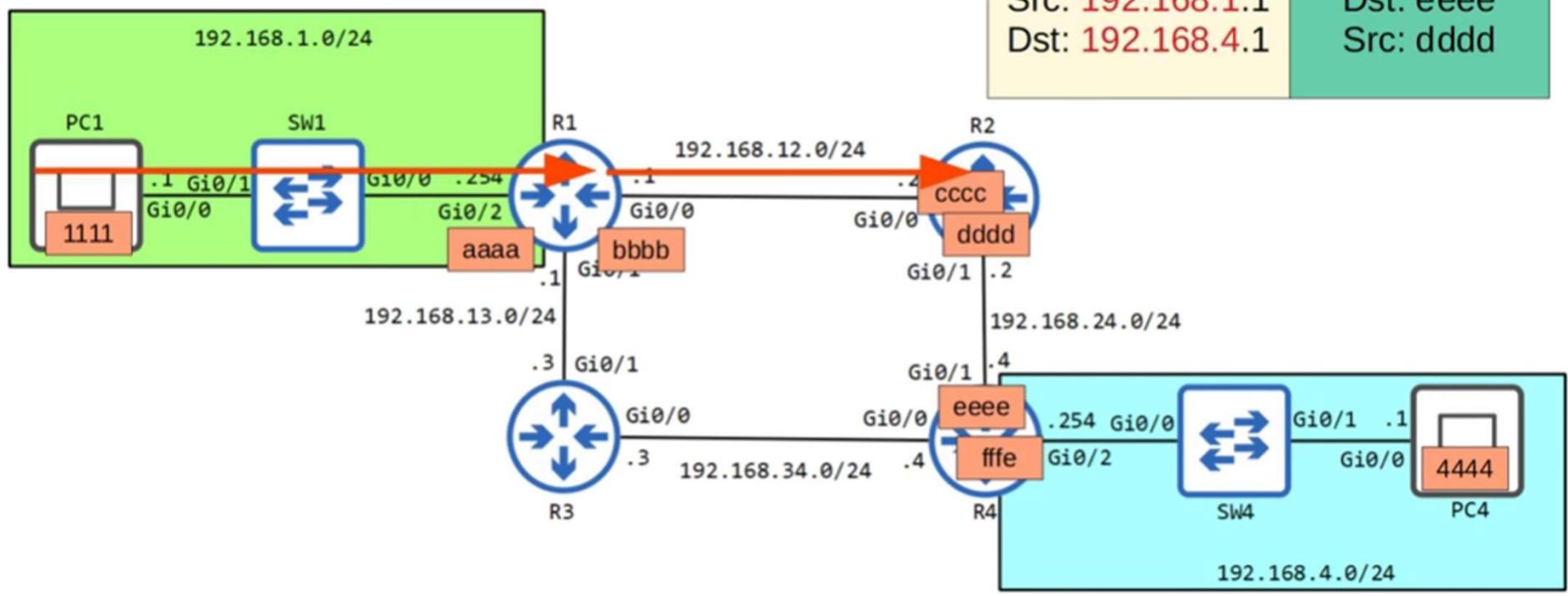
ARP



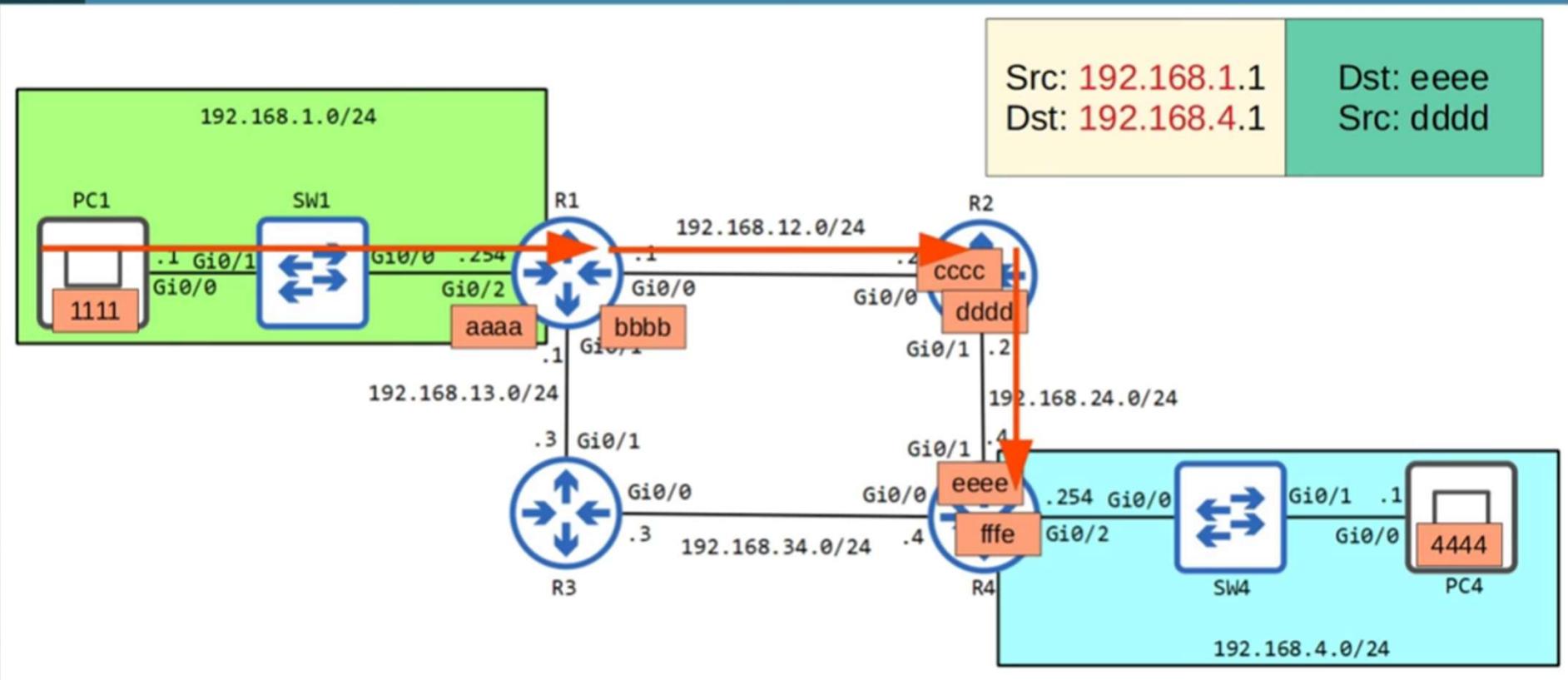


$R2 \rightarrow R4$

Src: 192.168.1.1
Dst: 192.168.4.1
Src: dddd



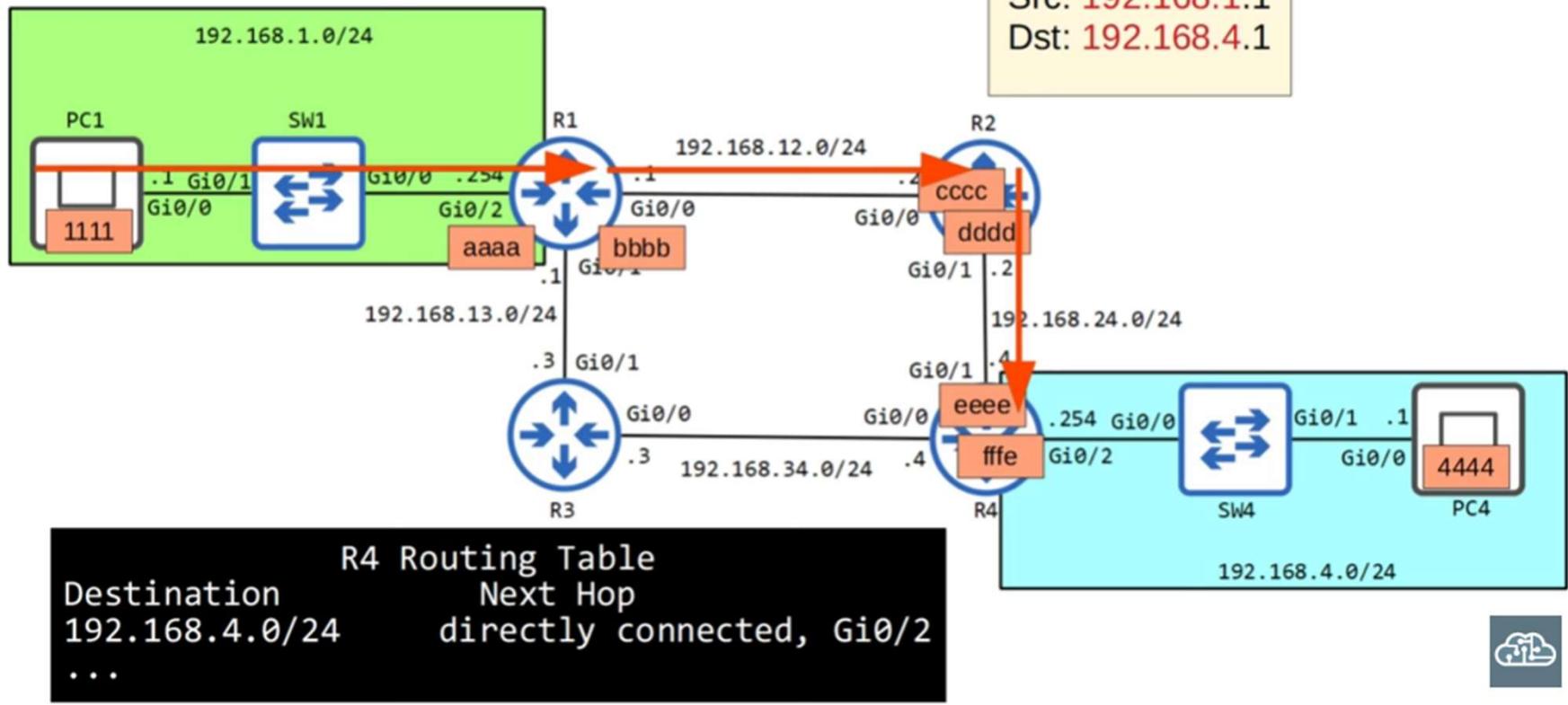
R2 → R4





R2 → R4

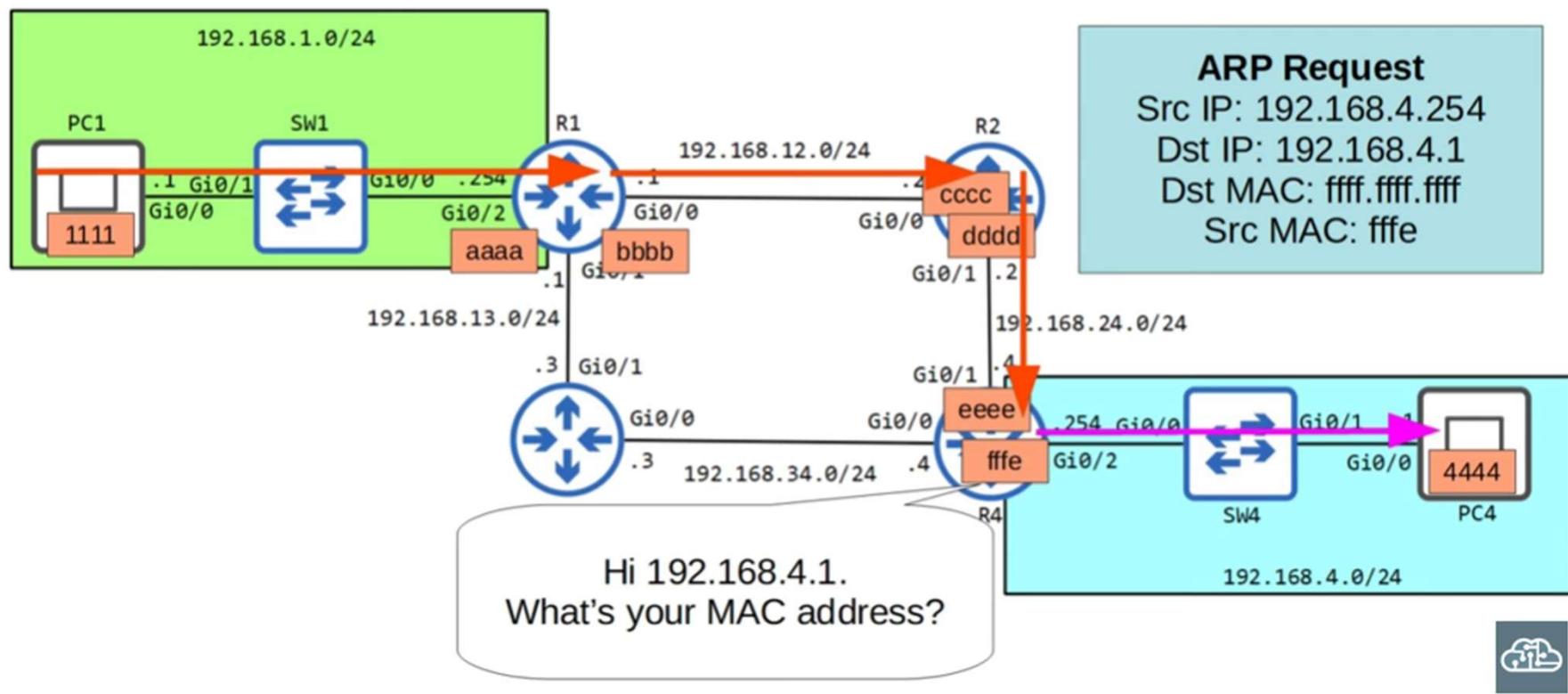
Src: 192.168.1.1
Dst: 192.168.4.1





Jeremy's
IT Lab

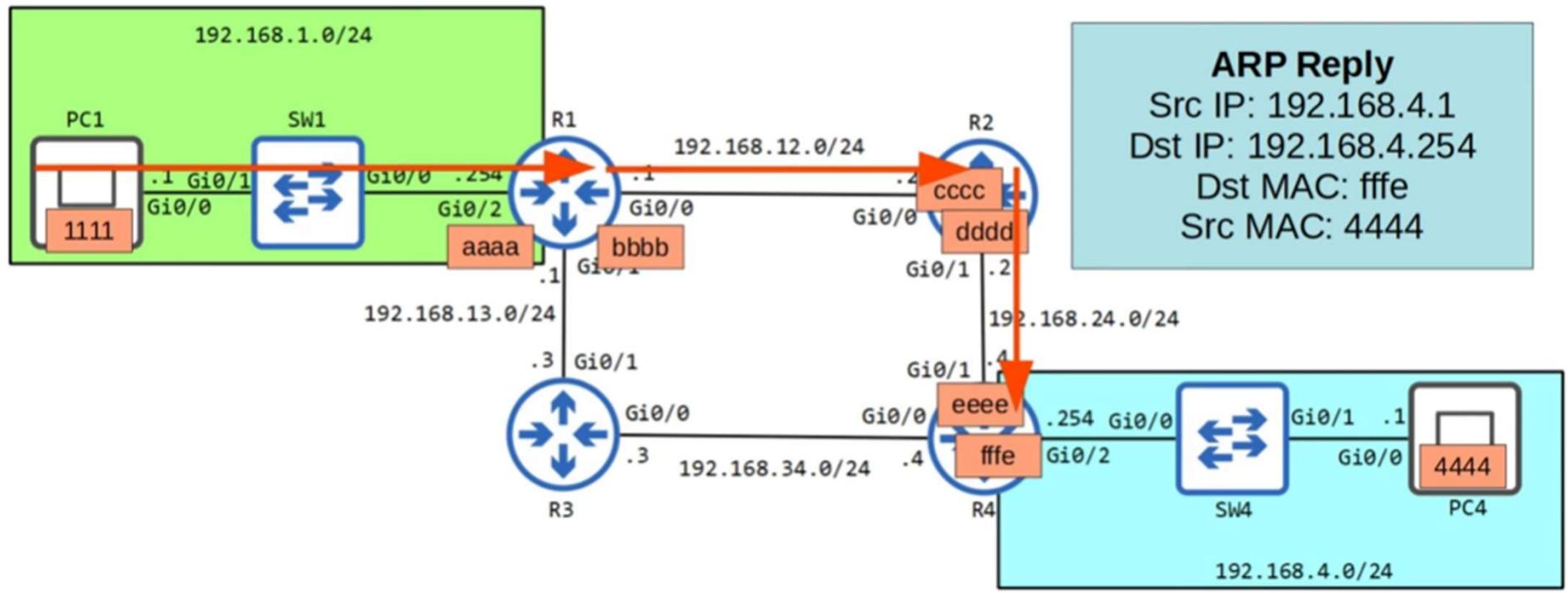
ARP



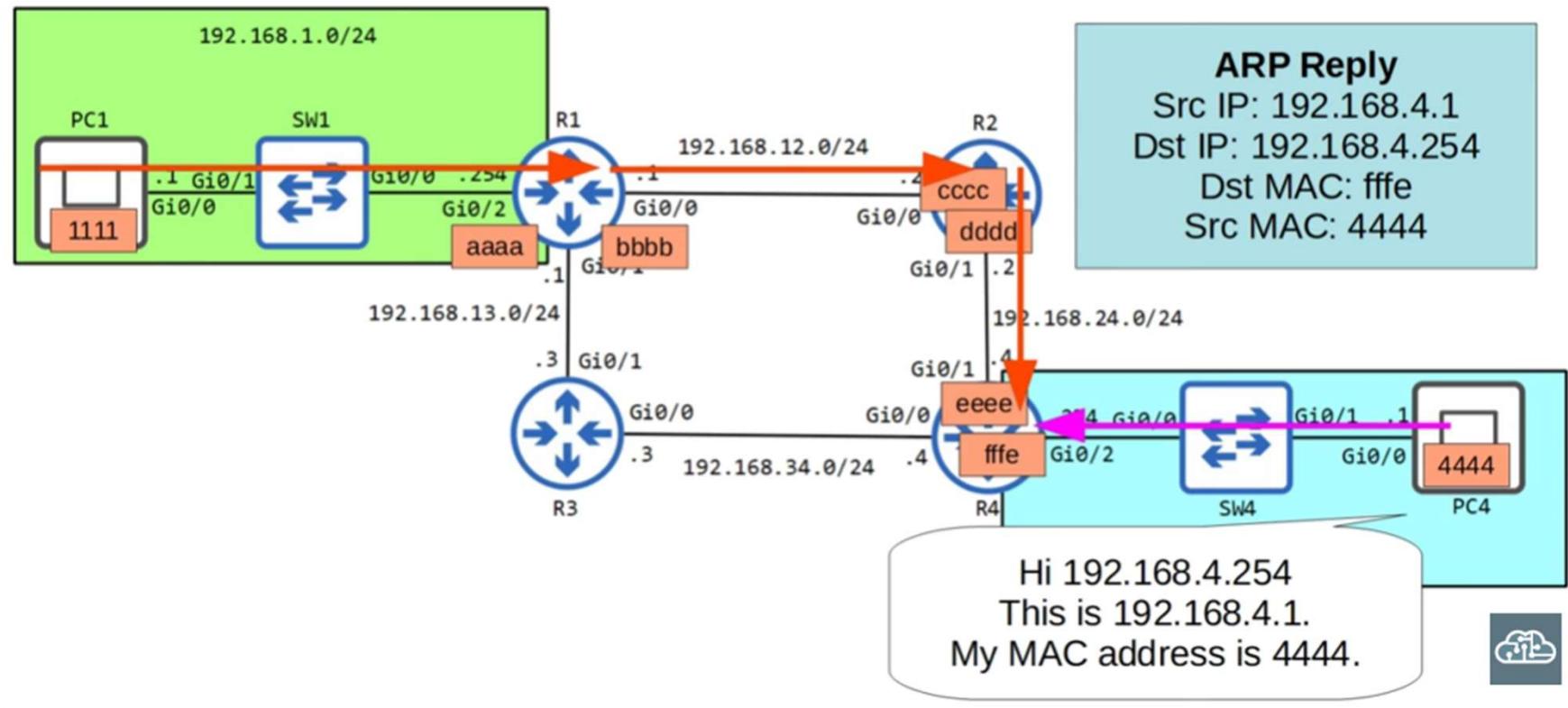


Jeremy's
IT Lab

ARP



ARP

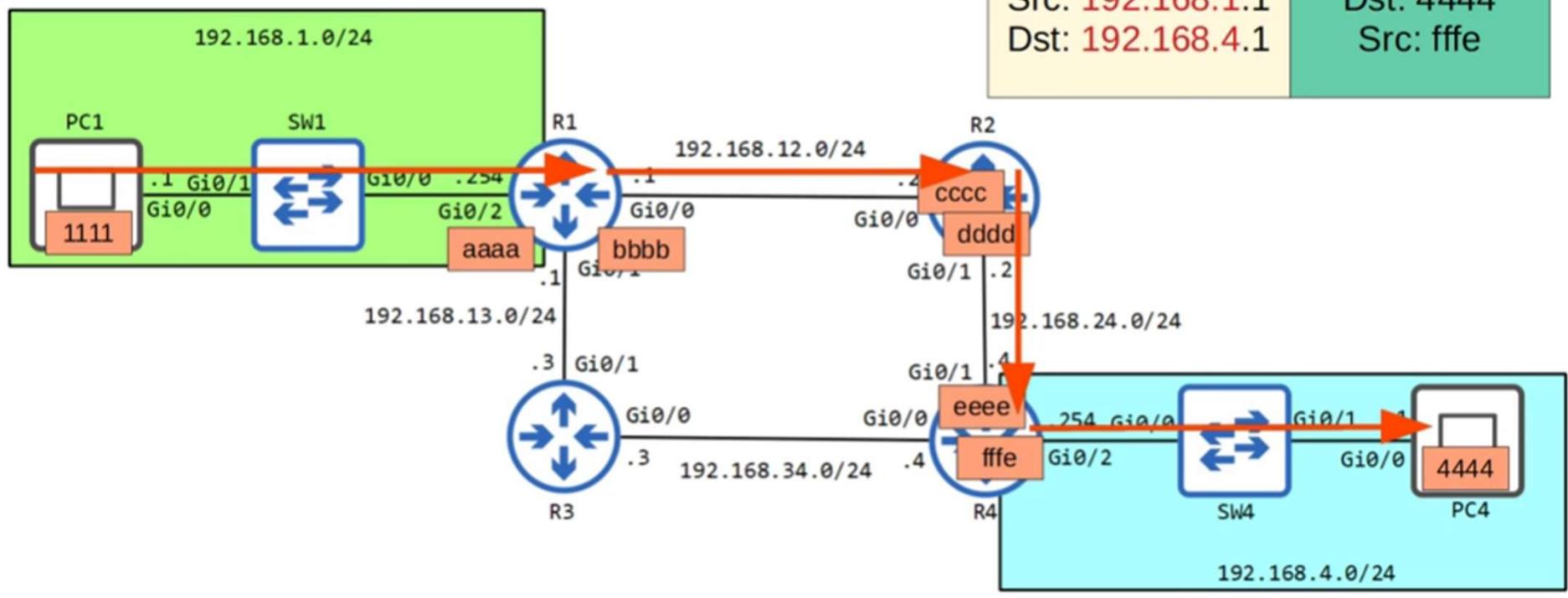




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IT Lab

R4 → PC4

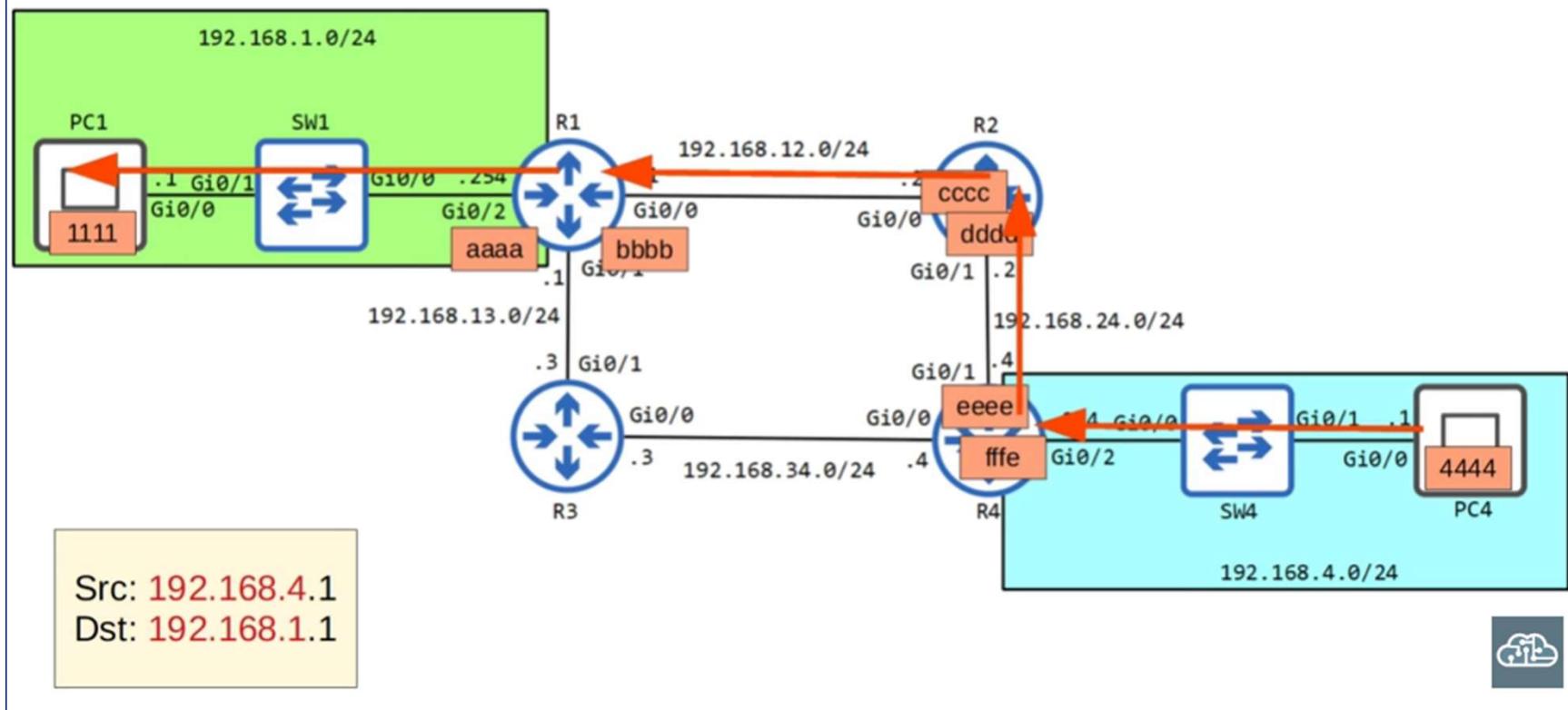
Src: 192.168.1.1
Dst: 192.168.4.1
Src: fffe





Jeremy's
IT Lab

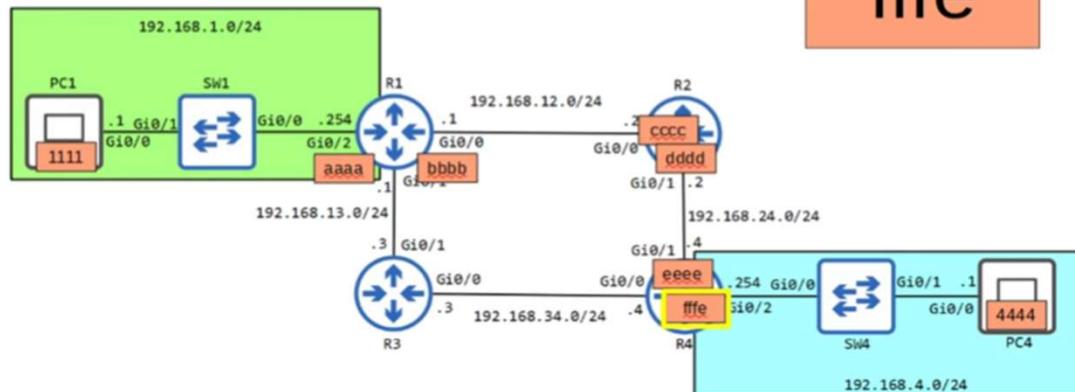
R4 → PC4



Quiz Question 1

PC4 sends a packet to PC1. What is the destination MAC address when it is sent from PC4's network interface?

fffe

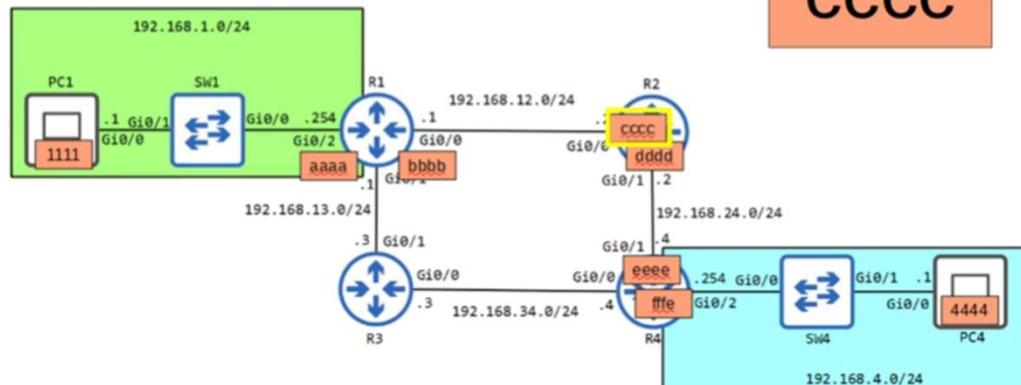




Quiz Question 2

PC4 sends a packet to PC1. What is the source MAC address when it is received on R1's Gi0/0 interface?

CCCC

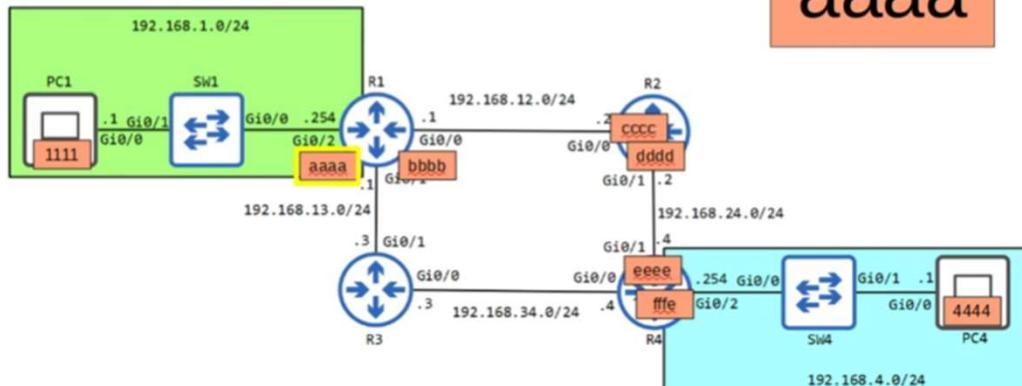




Quiz Question 3

PC4 sends a packet to PC1. What is the source MAC address when it is sent from SW1's Gi0/1 interface?

aaaa

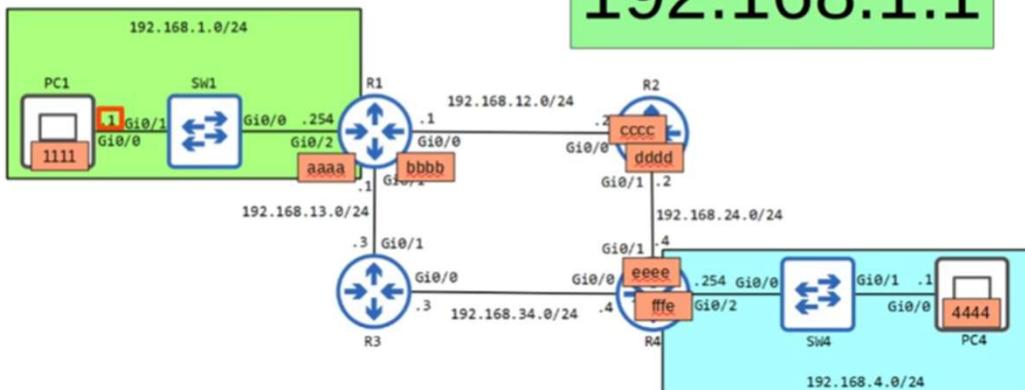




Quiz Question 4

PC4 sends a packet to PC1. What is the destination IP address when it is sent from R4's Gi0/1 interface?

192.168.1.1

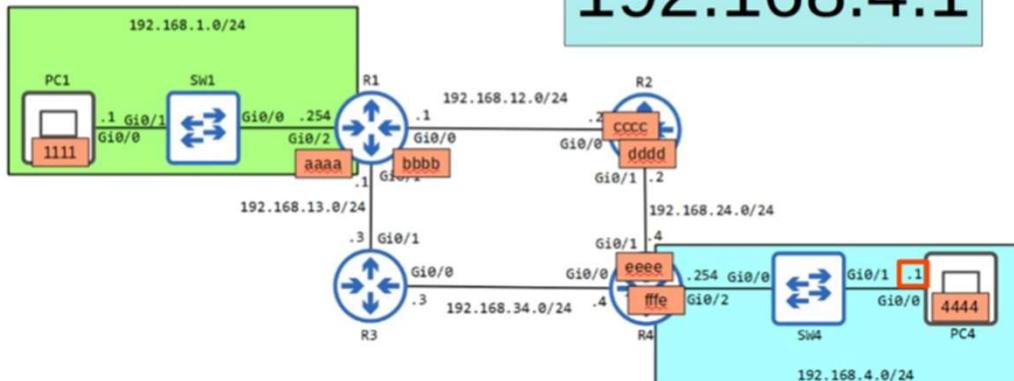




Quiz Question 5

PC4 sends a packet to PC1. What is the source IP address when it is received on R1's Gi0/0 interface?

192.168.4.1





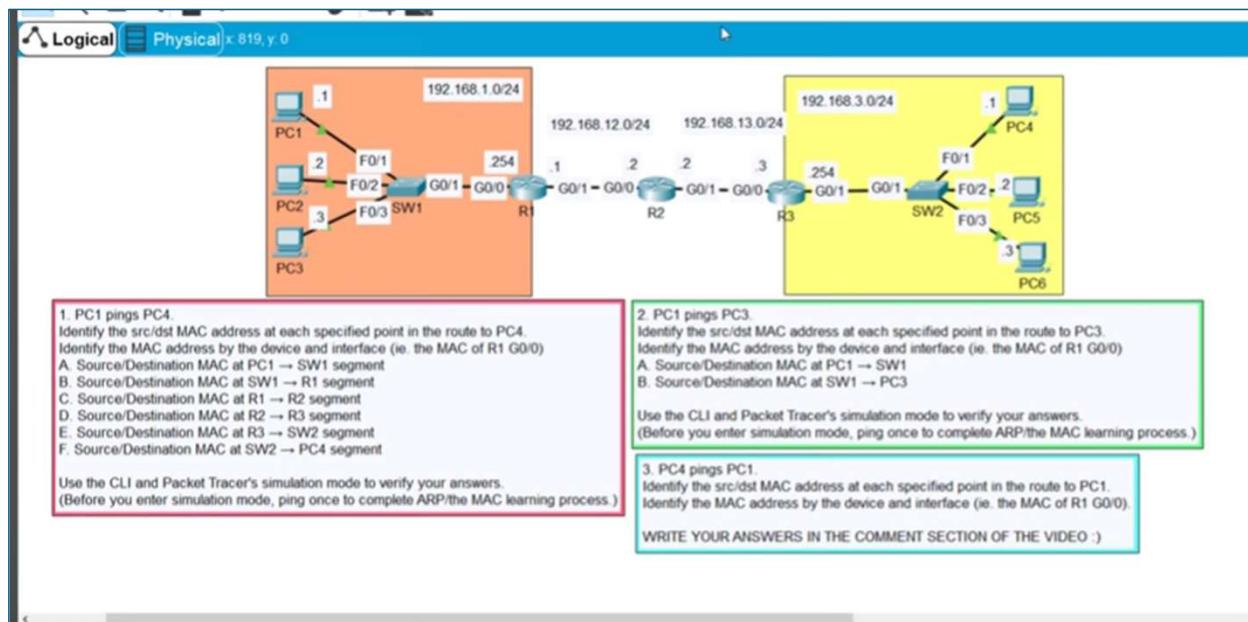
Life of a Packet

End of Session

Lab 10

In-class Exercise:

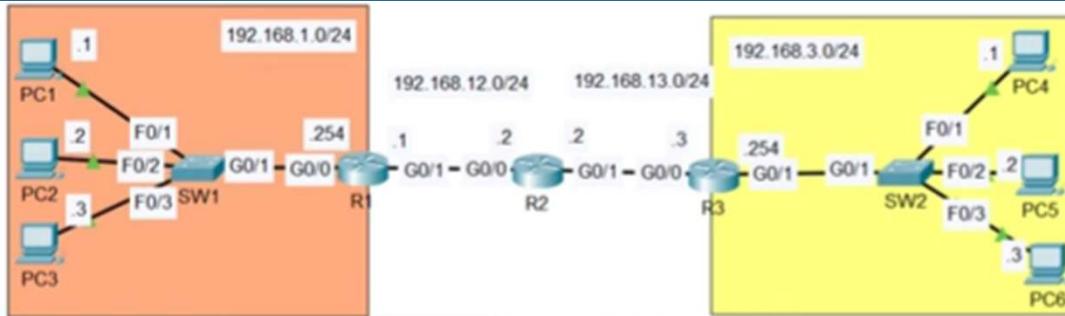
Life of a Packet



Let's get to work

Thank you

LAB 10 – Life of a Packet



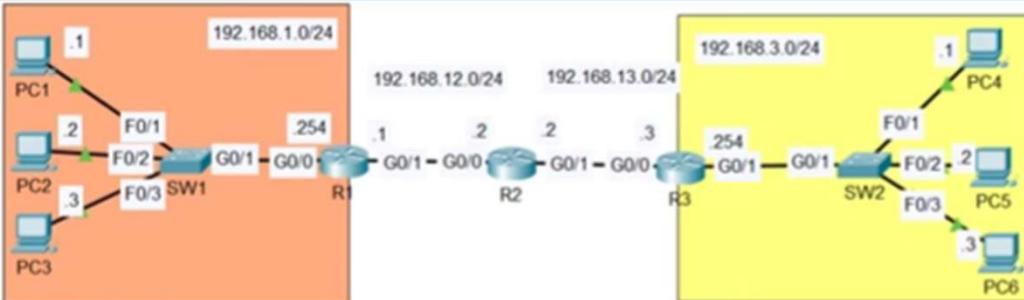
1. PC1 pings PC4.
Identify the src/dst MAC address at each specified point in the route to PC4.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
A. Source/Destination MAC at PC1 → SW1 segment
B. Source/Destination MAC at SW1 → R1 segment
C. Source/Destination MAC at R1 → R2 segment
D. Source/Destination MAC at R2 → R3 segment
E. Source/Destination MAC at R3 → SW2 segment
F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC3.
Identify the src/dst MAC address at each specified point in the route to PC3.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
A. Source/Destination MAC at PC1 → SW1
B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.
Identify the src/dst MAC address at each specified point in the route to PC1.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0).



1. PC1 pings PC4.

Identify the src/dst MAC address at each specified point in the route to PC4.
 Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
 A. Source/Destination MAC at PC1 → SW1 segment
 B. Source/Destination MAC at SW1 → R1 segment
 C. Source/Destination MAC at R1 → R2 segment
 D. Source/Destination MAC at R2 → R3 segment
 E. Source/Destination MAC at R3 → SW2 segment
 F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.

(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC3.

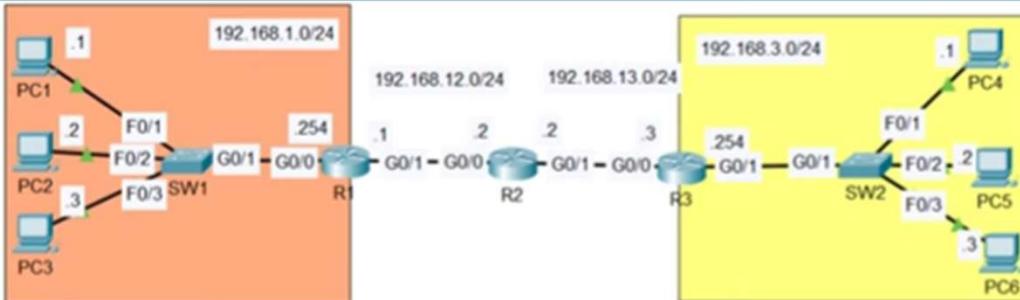
Identify the src/dst MAC address at each specified point in the route to PC3.
 Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
 A. Source/Destination MAC at PC1 → SW1
 B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.

(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.

Identify the src/dst MAC address at each specified point in the route to PC1.
 Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0).



1. PC1 pings PC4.

Identify the src/dst MAC address at each specified point in the route to PC4.

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

- A. Source/Destination MAC at PC1 → SW1 segment
- B. Source/Destination MAC at SW1 → R1 segment
- C. Source/Destination MAC at R1 → R2 segment
- D. Source/Destination MAC at R2 → R3 segment
- E. Source/Destination MAC at R3 → SW2 segment
- F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.

(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC3.

Identify the src/dst MAC address at each specified point in the route to PC3.

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

- A. Source/Destination MAC at PC1 → SW1
- B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.

(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.

Identify the src/dst MAC address at each specified point in the route to PC1.

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0).

<p>PC1 .1 192.168.1.0/24</p> <table border="1"> <tbody> <tr><td>Port</td><td>Link</td><td>IP Address</td><td>IPv6 Address</td></tr> <tr><td>FastEthernet0</td><td>Up</td><td>192.168.1.1/24</td><td><not set></td></tr> <tr><td>Bluetooth</td><td>Down</td><td><not set></td><td><not set></td></tr> <tr><td colspan="4">Gateway: 192.168.1.254</td></tr> <tr><td colspan="4">PC1 DNS Server: <not set></td></tr> <tr><td colspan="4">Line Number: <not set></td></tr> <tr><td colspan="4">Physical Location: Intercity, Home City, Corporate Office</td></tr> </tbody> </table> <p>PC3</p>	Port	Link	IP Address	IPv6 Address	FastEthernet0	Up	192.168.1.1/24	<not set>	Bluetooth	Down	<not set>	<not set>	Gateway: 192.168.1.254				PC1 DNS Server: <not set>				Line Number: <not set>				Physical Location: Intercity, Home City, Corporate Office				<p>PC6 .1 192.168.3.0/24</p> <table border="1"> <tbody> <tr><td>MAC Address</td><td>00D0.BA11.1111</td></tr> <tr><td>00D0.FF97.44A7</td><td></td></tr> </tbody> </table>	MAC Address	00D0.BA11.1111	00D0.FF97.44A7	
Port	Link	IP Address	IPv6 Address																														
FastEthernet0	Up	192.168.1.1/24	<not set>																														
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Identify the src/dst MAC address at each specified point in the route to PC4.

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

- A. Source/Destination MAC at PC1 → SW1 segment
- B. Source/Destination MAC at SW1 → R1 segment
- C. Source/Destination MAC at R1 → R2 segment
- D. Source/Destination MAC at R2 → R3 segment
- E. Source/Destination MAC at R3 → SW2 segment
- F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.

(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC3.

Identify the src/dst MAC address at each specified point in the route to PC3.

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

- A. Source/Destination MAC at PC1 → SW1
- B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.

(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.

Identify the src/dst MAC address at each specified point in the route to PC1.

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0).

WRITE YOUR ANSWERS IN THE COMMENT SECTION OF THE VIDEO :)

PC1

Physical Config Desktop Programming Attributes

Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:\>
C:\>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Reply from 192.168.3.1: bytes=32 time=1ms TTL=125

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 1, Lost = 3 (75% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

to PC3.
if R1 G0/0)

vers.
MAC learning process.)

to PC1.
of R1 G0/0).

IDEO :)

PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
Reply from 192.168.3.1. bytes=32 time=1ms TTL=125

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 1, Lost = 3 (75% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time=1ms TTL=125
Reply from 192.168.3.1: bytes=32 time<1ms TTL=125
Reply from 192.168.3.1: bytes=32 time<1ms TTL=125
Reply from 192.168.3.1: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

to PC3.
of R1 G0/0)

vers.
MAC learning process.)

to PC1.
of R1 G0/0).

IDEO :)

PC1

Physical Config Desktop Programming Attributes

Command Prompt

```
Approximate round trip times in milli seconds.
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

C:\>ipconfig /all

FastEthernet0 Connection: (default port)

Connection-specific DNS Suffix...:

Physical Address.....: 00D0.BA11.1111 I
Link-local IPv6 Address....: FE80::2D0:BAFF:FE1:6988
IP Address.....: 192.168.1.1
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 192.168.1.254
DNS Servers.....: 0.0.0.0
DHCP Servers.....: 0.0.0.0
DHCPv6 Client DUID.....: 00-01-00-01-09-99-E5-2C-00-D0-BA-11-11-11

Bluetooth Connection:

Connection-specific DNS Suffix...:

Physical Address.....: 00D0.FF97.44A7
Link-local IPv6 Address....: ::

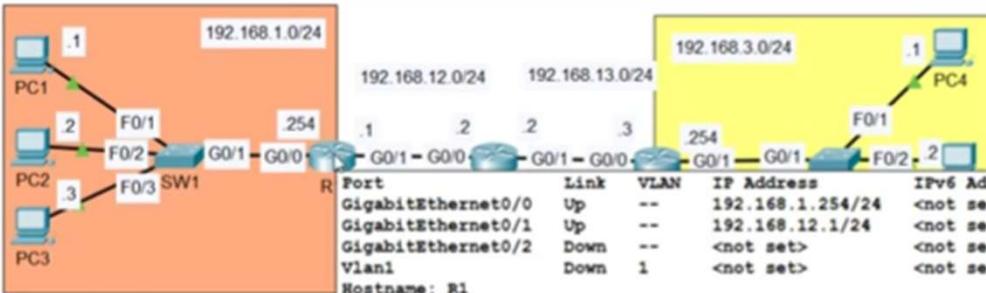
to PC3.
if R1 G0/0)

vers.
MAC learning process.)

to PC1.
of R1 G0/0).

IDEO :)

Logical [Physical] x 792, y 152 [Root] 



Port	Link	VLAN	IP Address	IPv6 Address	MAC Address
GigabitEthernet0/0	Up	--	192.168.1.254/24	<not set>	0000.01AA.AAAA
GigabitEthernet0/1	Up	--	192.168.12.1/24	<not set>	0000.01BB.BBBB
GigabitEthernet0/2	Down	--	<not set>	<not set>	00D0.FF77.0103
Vlan1	Down	1	<not set>	<not set>	0005.5EBB.C01E

Hostname: R1

Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet

1. PC1 pings PC4.
 Identify the src/dst MAC address at each specified point in the route to PC4.
 Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

A. Source/Destination MAC at PC1 → SW1 segment
 B. Source/Destination MAC at SW1 → R1 segment
 C. Source/Destination MAC at R1 → R2 segment
 D. Source/Destination MAC at R2 → R3 segment
 E. Source/Destination MAC at R3 → SW2 segment
 F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.
 (Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
 A. Source/Destination MAC at PC1 → SW1
 B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.
 (Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.
 Identify the src/dst MAC address at each specified point in the route to PC1.
 Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0).

WRITE YOUR ANSWERS IN THE COMMENT SECTION OF THE VIDEO :)

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Cisco CISCO2911/K9 (revision 1.0) with 491520K/32768K bytes of memory.  
Processor board ID FTX152400KS  
3 Gigabit Ethernet interfaces  
DRAM configuration is 64 bits wide with parity disabled.  
255K bytes of non-volatile configuration memory.  
249856K bytes of ATA System CompactFlash 0 (Read/Write)  
  
Press RETURN to get started!
```

I

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
```

```
R1>  
R1>en  
R1>enable  
R1#show int  
R1#show interfaces
```

Ctrl+F6 to exit CLI focus

Top

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R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1>en
R1>enable
R1#show int
R1#show interfaces g0/0
GigabitEthernet0/0 is up, line protocol is up (connected)
  Hardware is CN Gigabit Ethernet, address is 0000.01aa.aaaa (bia 00d0.ff77.0101)
  Internet address is 192.168.1.254/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 27 bits/sec, 0 packets/sec
  5 minute output rate 17 bits/sec, 0 packets/sec
```

Ctrl+F6 to exit CLI focus

Top

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R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1>en
R1>enable
R1#show int
R1#show interfaces g0/0
GigabitEthernet0/0 is up, line protocol is up (connected)
  Hardware is CN Gigabit Ethernet, address is 0000.01aa.aaaa (bia 00d0.ff77.0101)
  Internet address is 192.168.1.254/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 27 bits/sec, 0 packets/sec
  5 minute output rate 17 bits/sec, 0 packets/sec
```

Ctrl+F6 to exit CLI focus

Top

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R1

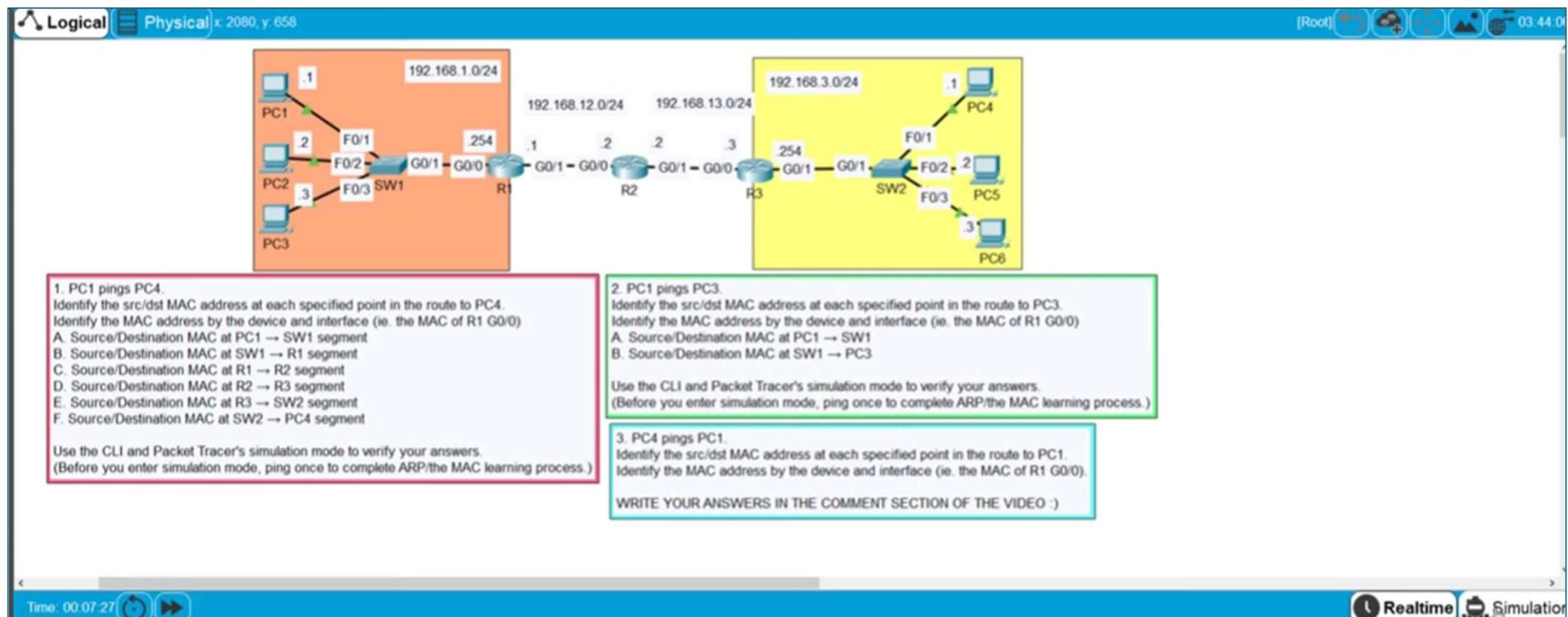
Physical Config **CLI** Attributes

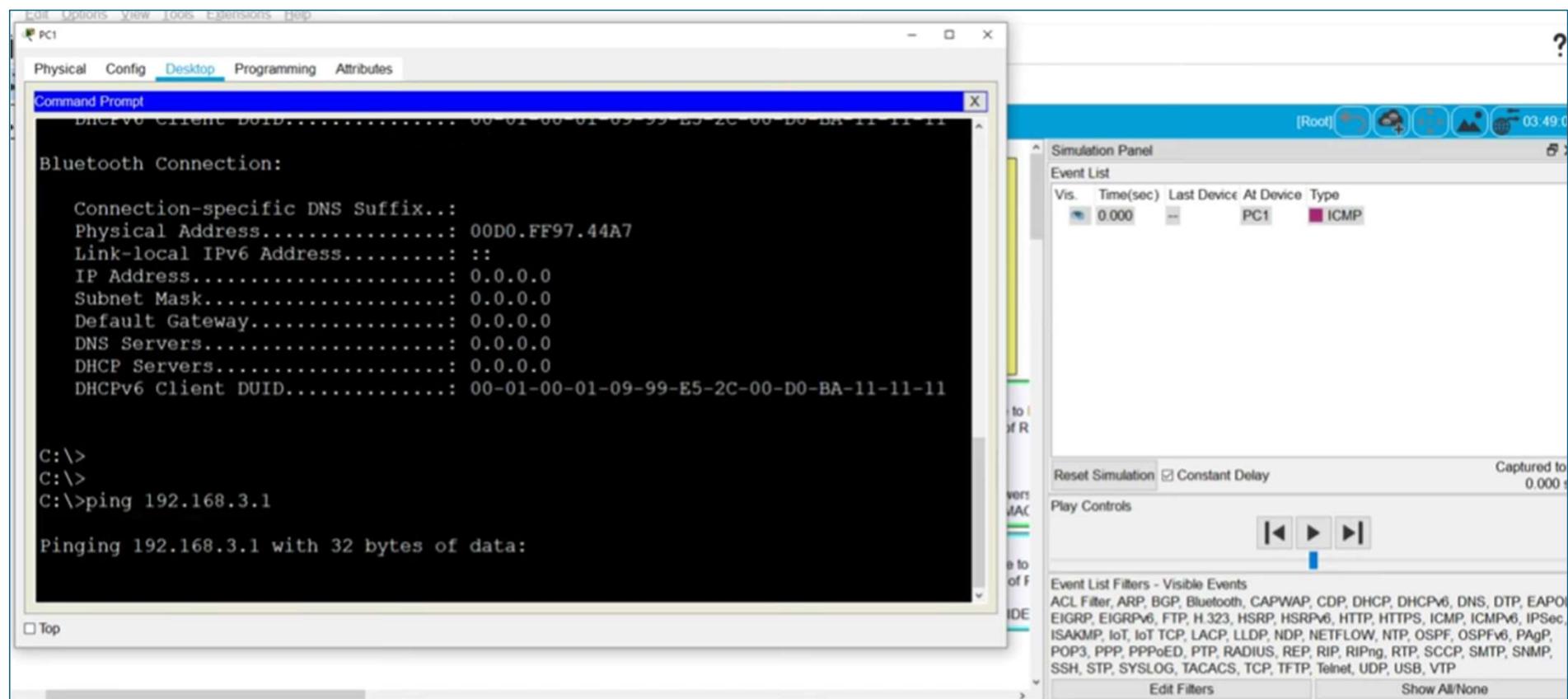
IOS Command Line Interface

```
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
mac-address 0000.01aa.aaaa
ip address 192.168.1.254 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/1
mac-address 0000.01bb.bbbb
ip address 192.168.12.1 255.255.255.0
duplex auto
speed auto
Ctrl+F6 to exit CLI focus
```

Top

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File Edit Options View Tools Extensions Help

Logical Physical x: 1425, y: 278

PDU Information at Device: SW1

OSI Model Inbound PDU Details Outbound PDU Details

At Device: SW1
Source: PC1
Destination: 192.168.3.1

In Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer 2: Ethernet II Header
00D0.BA11.1111 >>
0000.01AA.AAAA
- Layer 1: Port FastEthernet0/1

Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer 2: Ethernet II Header
00D0.BA11.1111 >>
0000.01AA.AAAA
- Layer 1: Port(s): GigabitEthernet0/1

Simulation Constant Delay Captured to: 0.001 s

Controls

Challenge Me

<< Previous Layer Next Layer >>

List Filters - Visible Events

filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, IP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

The screenshot shows a network simulation interface. On the left, a network diagram displays three hosts (PC1, PC2, PC3) connected to a switch (SW1). PC1 is at 192.168.1.0/24. A red box highlights a path from PC1 to PC4 (not shown in the diagram), with the question: "1. PC1 pings PC4. Identify the src/dst MAC address at each specified point in the route to PC4. Identify the MAC address by the device and interface (ie. the MAC of R1 is...)" followed by options A through F. Below this, a note says: "Use the CLI and Packet Tracer's simulation mode to verify your answers. (Before you enter simulation mode, ping once to complete ARP/the MAC table)." The main pane shows "PDU Information at Device: SW1" with tabs for OSI Model, Inbound PDU Details, and Outbound PDU Details. Under OSI Model, it shows the path from PC1 to PC4 through SW1. The Inbound PDU Details tab shows the incoming frame structure: Layer 2: Ethernet II Header (source 00D0.BA11.1111, destination 0000.01AA.AAAA) and Layer 1: Port FastEthernet0/1. The Outbound PDU Details tab shows the outgoing frame structure: Layer 2: Ethernet II Header (source 00D0.BA11.1111, destination 0000.01AA.AAAA) and Layer 1: Port(s): GigabitEthernet0/1. To the right, a timeline panel shows two events: at 0.000, PC1 sends an ICMP echo request to SW1; at 0.001, SW1 forwards the ICMP echo request to PC1. The bottom right shows simulation controls and event filters.

File Edit Options View Tools Extensions Help

Logical Physical x 831, y 207

Simulation Panel

Vis.	Time(sec)	Last Device	At Device	Type
0.000	--	PC1		ICMP
0.001	PC1	SW1		ICMP
0.002	SW1	R1		ICMP

Event List Filters - Visible Events: ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAoP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Play Controls: ▶, ▶, ▶, ▶, ▶

Event List

Reset Simulation Constant Delay Captured to: 0.002 s

WRITE YOUR ANSWERS IN THE COMMENT SECTION

1. PC1 pings PC4.
Identify the src/dst MAC address at each specified point in the route to PC4.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
A. Source/Destination MAC at PC1 → SW1 segment
B. Source/Destination MAC at SW1 → R1 segment
C. Source/Destination MAC at R1 → R2 segment
D. Source/Destination MAC at R2 → R3 segment
E. Source/Destination MAC at R3 → SW2 segment
F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC3.
Identify the src/dst MAC address at each specified point in the route to PC3.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
A. Source/Destination MAC at PC1 → SW1
B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.
Identify the src/dst MAC address at each specified point in the route to PC1.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

R1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1#
R1#show int
R1#show interfaces g0/1
GigabitEthernet0/1 is up, line protocol is up (connected)
  Hardware is CN Gigabit Ethernet, address is 0000.01bb.bbbb (bia 00d0.ff77.0102)
  Internet address is 192.168.12.1/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 17 bits/sec, 0 packets/sec
```

Ctrl+F6 to exit CLI focus

Top

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R2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R2>enable
R2#show int
R2#show interfaces g0/0
GigabitEthernet0/0 is up, line protocol is up (connected)
  Hardware is CN Gigabit Ethernet, address is 0000.01cc.cccc (bia 0001.4220.a501)
  Internet address is 192.168.12.2/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 23 bits/sec, 0 packets/sec
```

Ctrl+F6 to exit CLI focus

Top

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Cisco Packet Tracer - C:\Users\user\Desktop\videos\12-zlab\12lifeofapacket.pkt

File Edit Options View Tools Extensions Help

Logical Physical x: 1361, y: 247

The diagram shows a network topology with three hosts (PC1, PC2, PC3) connected to a switch (SW1). SW1 is connected to a router (R1). A ping path is highlighted from PC1 to PC4 (IP 192.168.3.1) via interface F0/1 of SW1 and interface G0/0 of R1. The subnet mask is 254. The IP address of the interface on R1 is 192.168.1.0/24.

PDU Information at Device: R1

OSI Model Inbound PDU Details Outbound PDU Details

At Device: R1	Source: PC1	Destination: 192.168.3.1
In Layers	Out Layers	
Layer7	Layer7	
Layer6	Layer6	
Layer5	Layer5	
Layer4	Layer4	
Layer 3: IP Header Src. IP: 192.168.1.1, Dest. IP: 192.168.3.1 ICMP Message Type: 8	Layer 3: IP Header Src. IP: 192.168.1.1, Dest. IP: 192.168.3.1 ICMP Message Type: 8	
Layer 2: Ethernet II Header 00D0.BA11.1111 >> 0000.01AA.AAAA	Layer 2: Ethernet II Header 0000.01BB.BBBB >> 0000.01CC.CCCC	
Layer 1: Port GigabitEthernet0/0	Layer 1: Port(s): GigabitEthernet0/1	

Last Device At Device Type

- PC1 ICMP
- PC1 SW1 ICMP
- SW1 R1 ICMP

Constant Delay Captured to: 0.002 s

Challenge Me << Previous Layer Next Layer >>

Visible Events

P, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, I3, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, TFTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, Telnet,

Logical **Physical** x: 253, y: 427

1. PC1 pings PC4.
Identify the src/dst MAC address at each specified point in the route to PC4.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
 A. Source/Destination MAC at PC1 → SW1 segment
 B. Source/Destination MAC at SW1 → R1 segment
 C. Source/Destination MAC at R1 → R2 segment
 D. Source/Destination MAC at R2 → R3 segment
 E. Source/Destination MAC at R3 → SW2 segment
 F. Source/Destination MAC at SW2 → PC4 segment

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC3.
Identify the src/dst MAC address at each specified point in the route to PC3.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
 A. Source/Destination MAC at PC1 → SW1
 B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.
Identify the src/dst MAC address at each specified point in the route to PC1.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

Simulation Panel

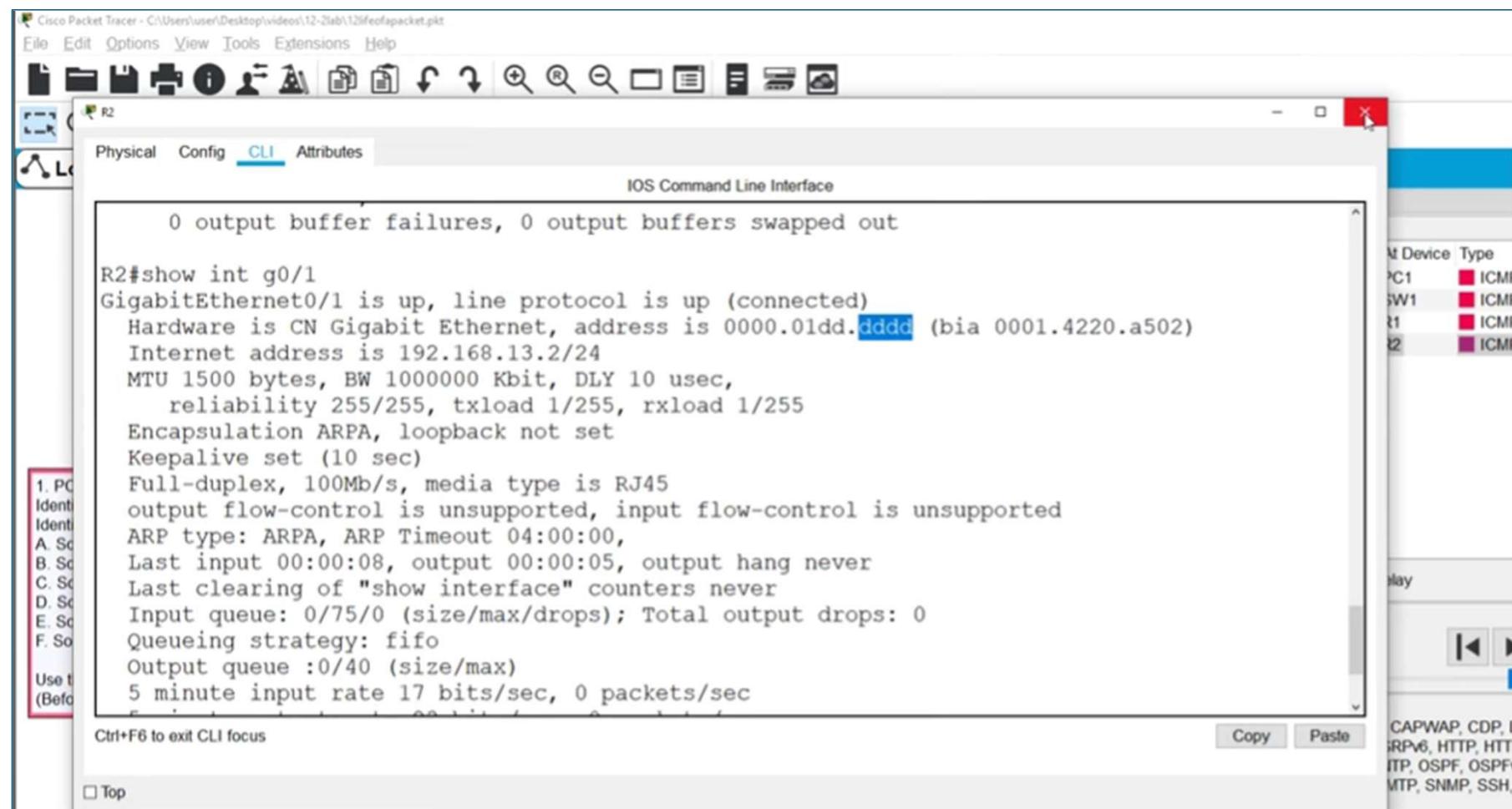
Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	—	PC1	ICMP
	0.001	PC1	SW1	ICMP
	0.002	SW1	R1	ICMP
	0.003	R1	R2	ICMP

Reset Simulation Constant Delay Captured to: 0.003 s

Play Controls: ▶◀ ▶▶ ▶

Event List Filters - Visible Events: All, ICMP, ARP, PING, LLDP, CDP, RSTP, STP, DTP, EIGRP, OSPF



R3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R3#
R3#show int
R3#show interfaces g0/0
GigabitEthernet0/0 is up, line protocol is up (connected)
  Hardware is CN Gigabit Ethernet, address is 0000.01ee.eeee (bia 0010.11e1.2301)
  Internet address is 192.168.13.3/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, media type is RJ45
  output flow-control is unsupported, input flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 20 bits/sec, 0 packets/sec
```

Ctrl+F6 to exit CLI focus

Top

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At Device Type

PC1	ICMP
SW1	ICMP
R1	ICMP
R2	ICMP

Delay

ts

1, CAPWAP, CDP, D

ISRPv6, HTTP, HTTP

NTP, OSPF, OSPFv

SMTP, SNMP, SSH,

Physical x 1359, y 209

PDU Information at Device: R2

OSI Model Inbound PDU Details Outbound PDU Details

Last Device	At Device	Type
PC1	PC1	ICMP
SW1	SW1	ICMP
R1	R1	ICMP
	R2	ICMP

In Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer 3: IP Header Src. IP: 192.168.1.1, Dest. IP: 192.168.3.1
ICMP Message Type: 8
- Layer 2: Ethernet II Header
0000.01BB.BBBB >>
0000.01CC.CCCC
- Layer 1: Port GigabitEthernet0/0

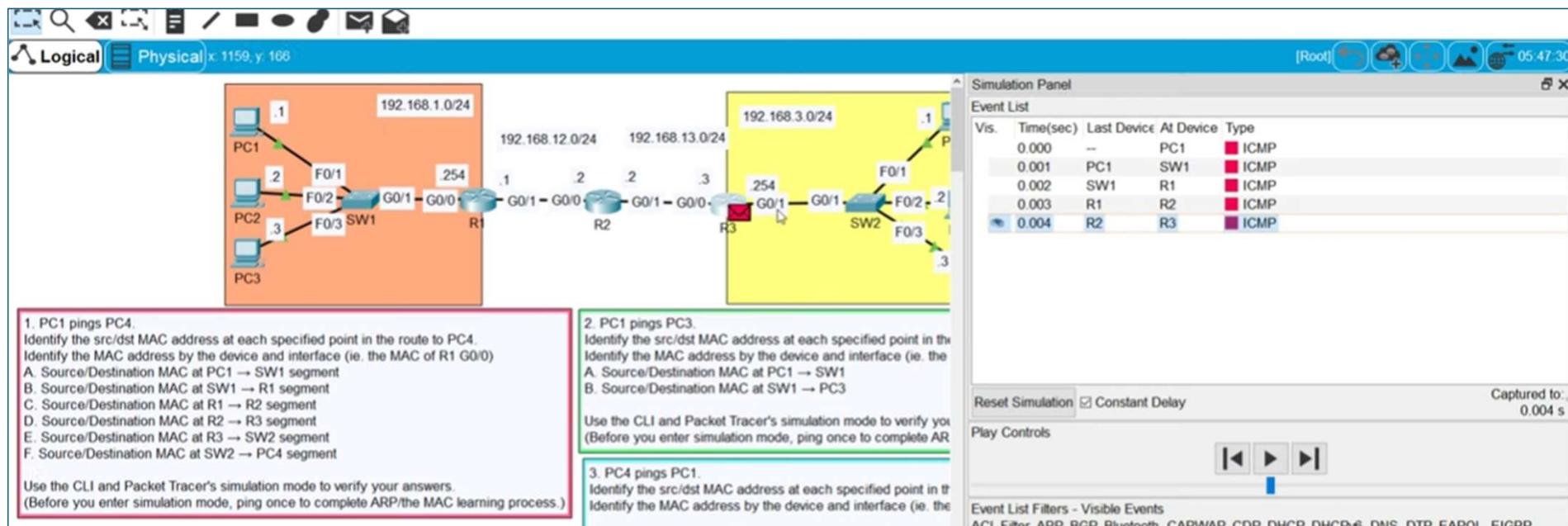
Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer 3: IP Header Src. IP: 192.168.1.1, Dest. IP: 192.168.3.1
ICMP Message Type: 8
- Layer 2: Ethernet II Header
0000.01DD.DDDD >>
0000.01EE.EEEE
- Layer 1: Port(s): GigabitEthernet0/1

1. GigabitEthernet0/0 receives the frame.

Constant Delay Captured to: 0.003 s

Visible Events



Physical [Root] 06.0

24.

dst MAC address at each specified point in the route to PC4.
C address by the device and interface (ie. the MAC of R1 G0/0)
nation MAC at PC1 → SW1 segment
nation MAC at SW1 → R1 segment
nation MAC at R1 → R2 segment
nation MAC at R2 → R3 segment
nation MAC at R3 → SW2 segment
nation MAC at SW2 → PC4 segment

Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC4.
Identify the src/dst MAC address at each specified point in the route to PC4.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)
A. Source/Destination MAC at PC1 → SW1
B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.
Identify the src/dst MAC address at each specified point in the route to PC1.
Identify the MAC address by the device and interface (ie. the MAC of R1 G0/0)

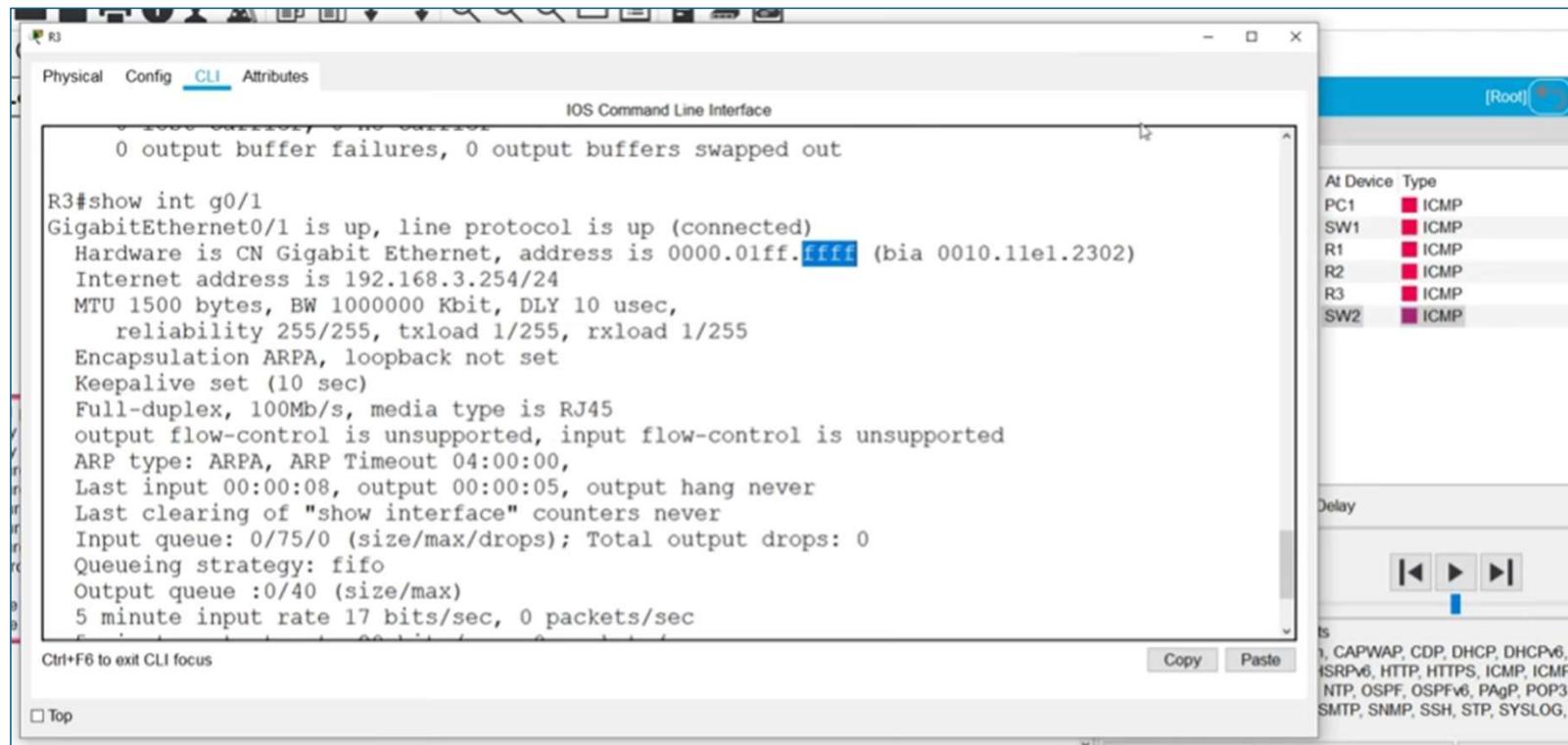
Simulation Panel

Vis.	Time(sec)	Last Device	At Device	Type
0.000	—	PC1		ICMP
0.001	PC1	SW1		ICMP
0.002	SW1	R1		ICMP
0.003	R1	R2		ICMP
0.004	R2	R3		ICMP
0.005	R3	SW2		ICMP

Reset Simulation Constant Delay Captured 0.00

Play Controls

Event List Filters - Visible Events



PC4

Physical Config Desktop Programming Attributes

Command Prompt

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

FastEthernet0 Connection: (default port)

  Connection-specific DNS Suffix...:
    Physical Address.....: 000C.8544.4444I
    Link-local IPv6 Address....: FE80::20C:85FF:FEC4:BDB4
    IP Address.....: 192.168.3.1
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: 192.168.3.254
    DNS Servers.....: 0.0.0.0
    DHCP Servers.....: 0.0.0.0
    DHCPv6 Client DUID.....: 00-01-00-01-2D-AC-7E-D8-00-0C-85-44-44-44

Bluetooth Connection:

  Connection-specific DNS Suffix...:
    Physical Address.....: 00D0.D3D9.A592
    Link-local IPv6 Address....: ::
```

Top

Physical x 1221, y 257

Simulation Panel

Event List				
Vis.	Time(sec)	Last Device	At Device	Type
0.000	—	PC1	PC1	ICMP
0.001	0.001	PC1	SW1	ICMP
0.002	0.002	SW1	R1	ICMP
0.003	0.003	R1	R2	ICMP
0.004	0.004	R2	R3	ICMP
0.005	0.005	R3	SW2	ICMP

C4.
dst MAC address at each specified point in the route to PC4.
C address by the device and interface (ie. the MAC of R1 G0/0)
nation MAC at PC1 → SW1 segment
nation MAC at SW1 → R1 segment
nation MAC at R1 → R2 segment
nation MAC at R2 → R3 segment
nation MAC at R3 → SW2 segment
nation MAC at SW2 → PC4 segment

Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

2. PC1 pings PC4.
Identify the src/dst MAC address at each specified point in the route to PC4.
Identify the MAC address by the device and interface (ie. the MAC address at the interface)
A. Source/Destination MAC at PC1 → SW1
B. Source/Destination MAC at SW1 → PC3

Use the CLI and Packet Tracer's simulation mode to verify your answers.
(Before you enter simulation mode, ping once to complete ARP/the MAC learning process.)

3. PC4 pings PC1.
Identify the src/dst MAC address at each specified point in the route to PC1.
Identify the MAC address by the device and interface (ie. the MAC address at the interface)

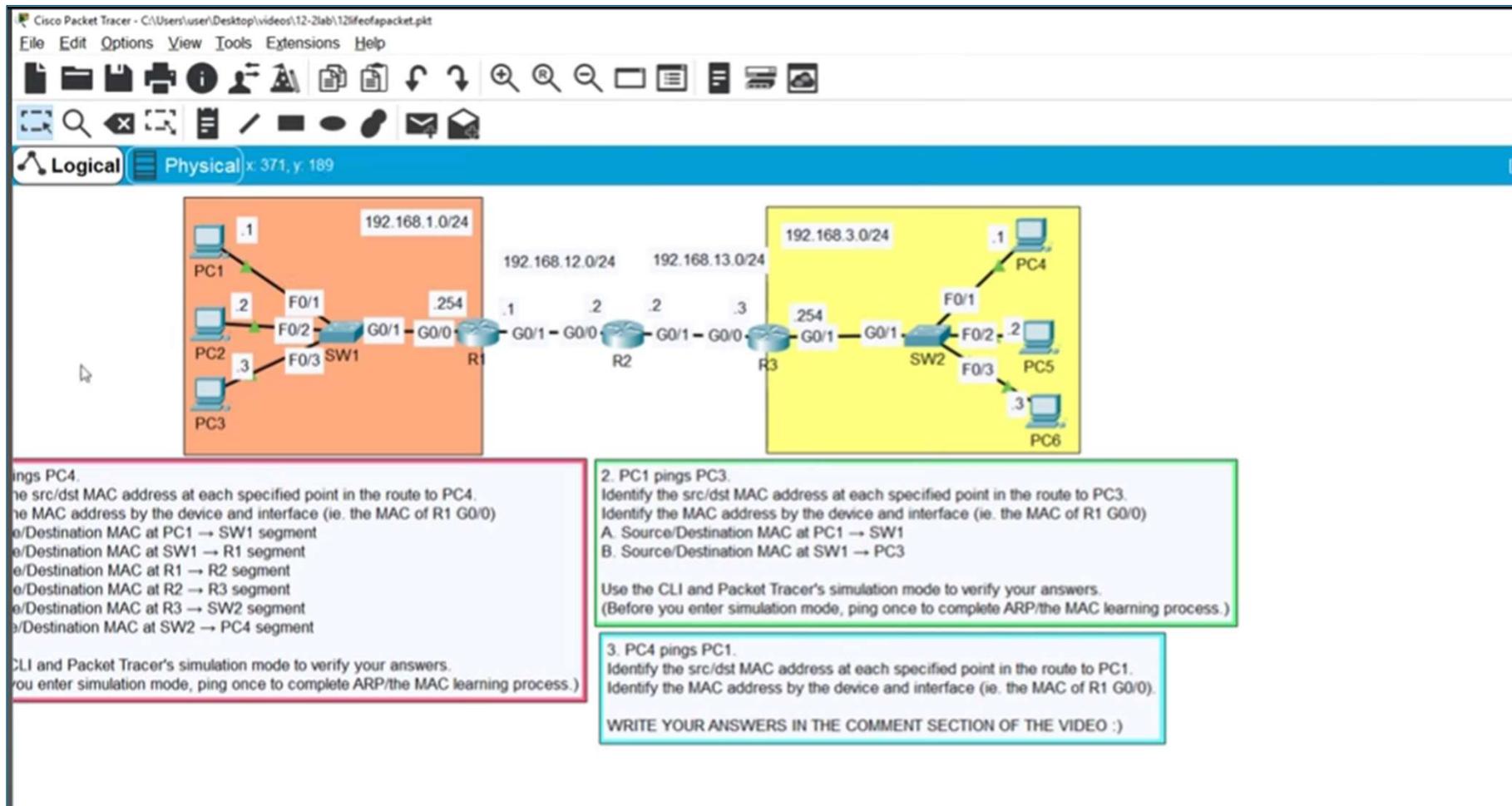
Reset Simulation Constant Delay Captured 0.000

Play Controls:

Event List Filters - Visible Events:

The screenshot shows the NetworkMiner interface with several panels:

- PDU Information at Device: SW2**: Shows details for Inbound PDU and Outbound PDU.
- OSI Model**: Displays layers from Layer 1 to Layer 7 for both In and Out directions.
- Simulation Panel**: Shows a network diagram with hosts PC1 through PC4 and switches SW1 and SW2. A timeline event list tracks ICMP messages between them.
- Event List**: A table listing events by visibility, time, last device, and source device, categorized by type (ICMP).
- Play Controls**: Buttons for navigating the simulation timeline.
- Event List Filters - Visible Events**: A list of visible events including ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PPTP, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, UDP, USB, VTP.



PC3

Physical Config Desktop Programming Attributes

Command Prompt

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

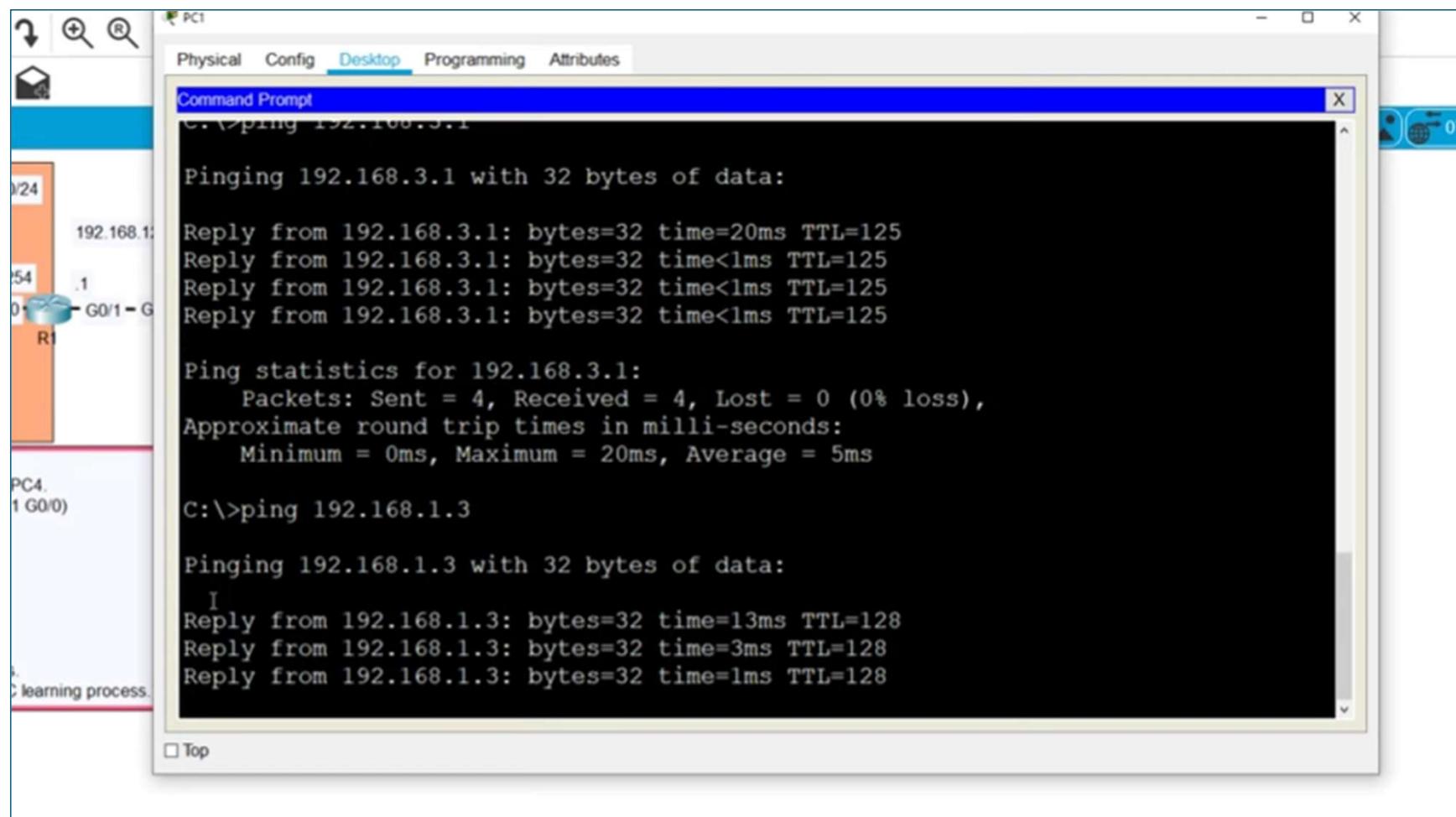
FastEthernet0 Connection: (default port)

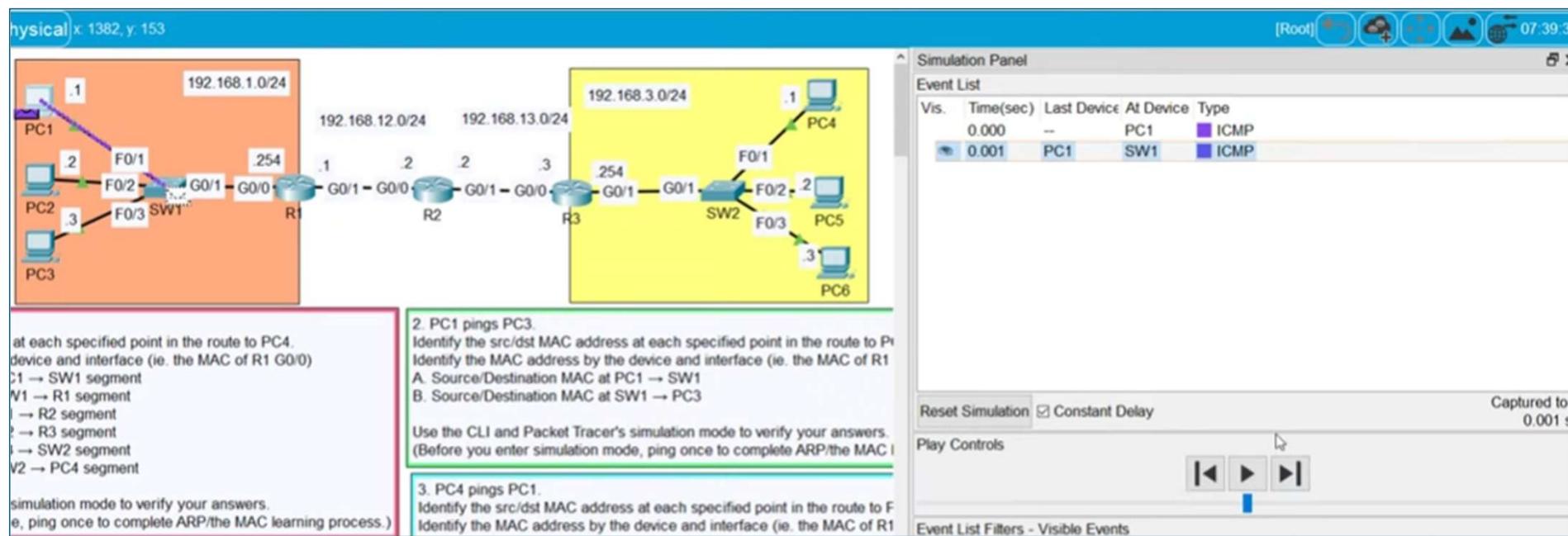
  Connection-specific DNS Suffix...: I
  Physical Address.....: 0010.1133.3333
  Link-local IPv6 Address.....: FE80::210:11FF:FEA8:EEA3
  IP Address.....: 192.168.1.3
  Subnet Mask.....: 255.255.255.0
  Default Gateway.....: 192.168.1.254
  DNS Servers.....: 0.0.0.0
  DHCP Servers.....: 0.0.0.0
  DHCPv6 Client DUID.....: 00-01-00-01-61-89-38-1E-00-10-11-33-33-33

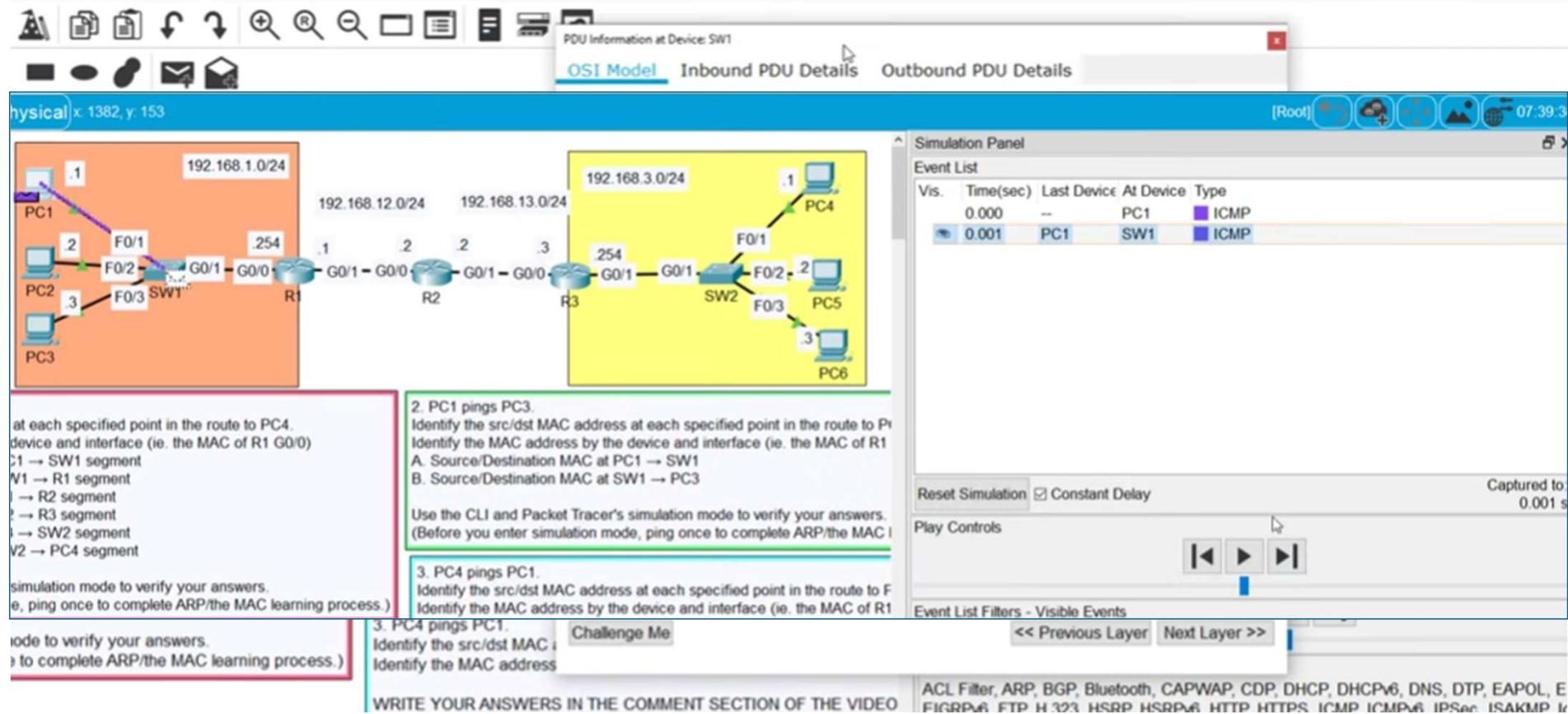
Bluetooth Connection:

  Connection-specific DNS Suffix...:
  Physical Address.....: 0005.5EA8.65C5
  Link-local IPv6 Address.....: ::
```

Top







Lab 10

In-class Exercise:

Life of a Packet

