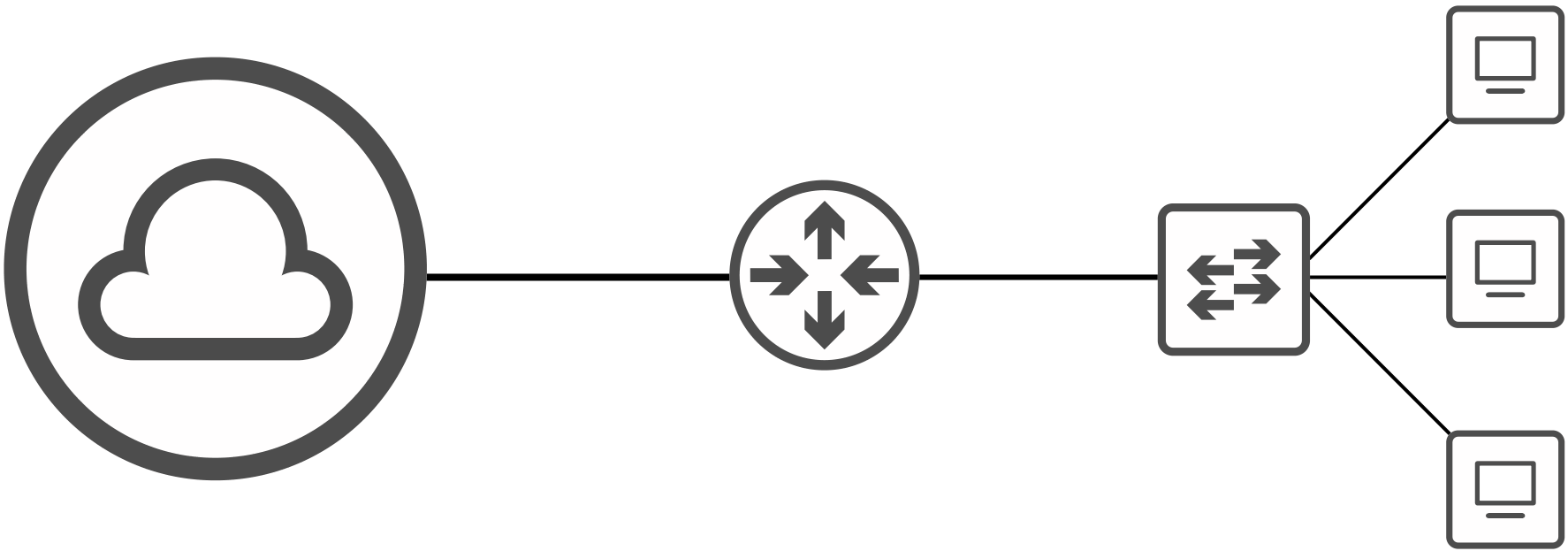
Jeremy's IT Lab

# CCNA 200-301 Day 12

## Life of a Packet

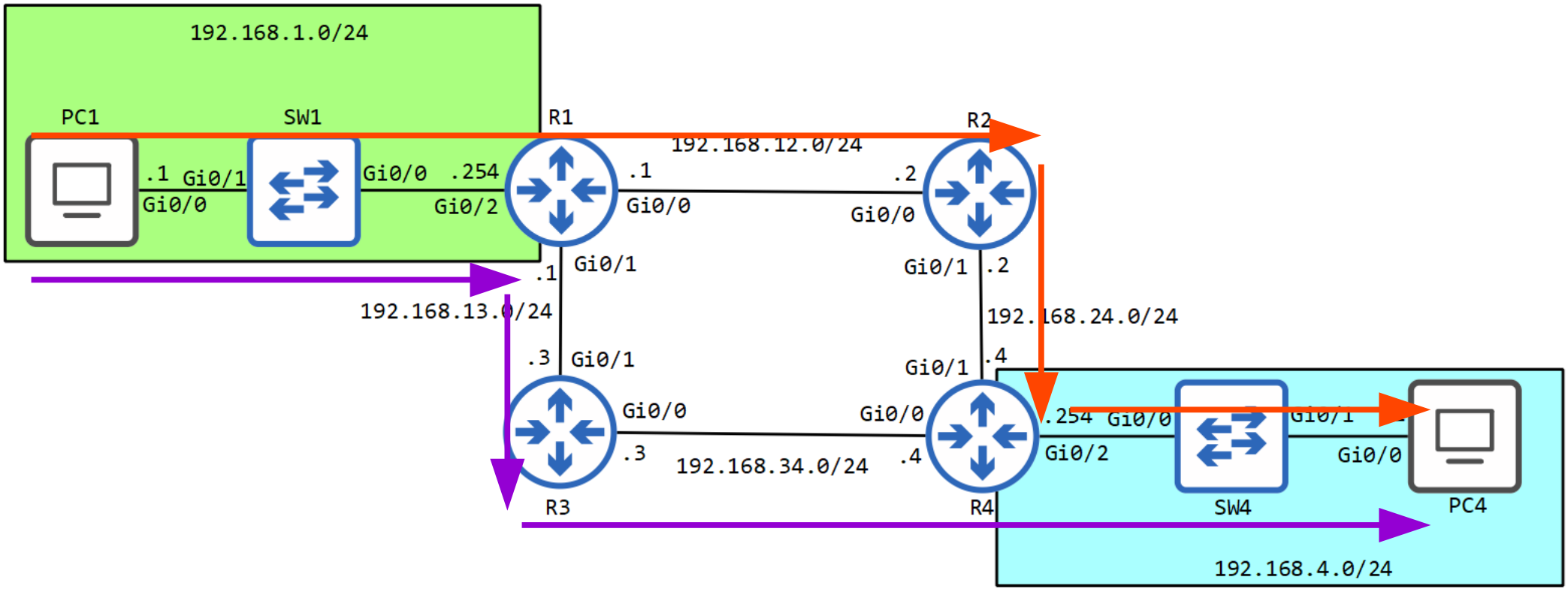


# Things we'll cover

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

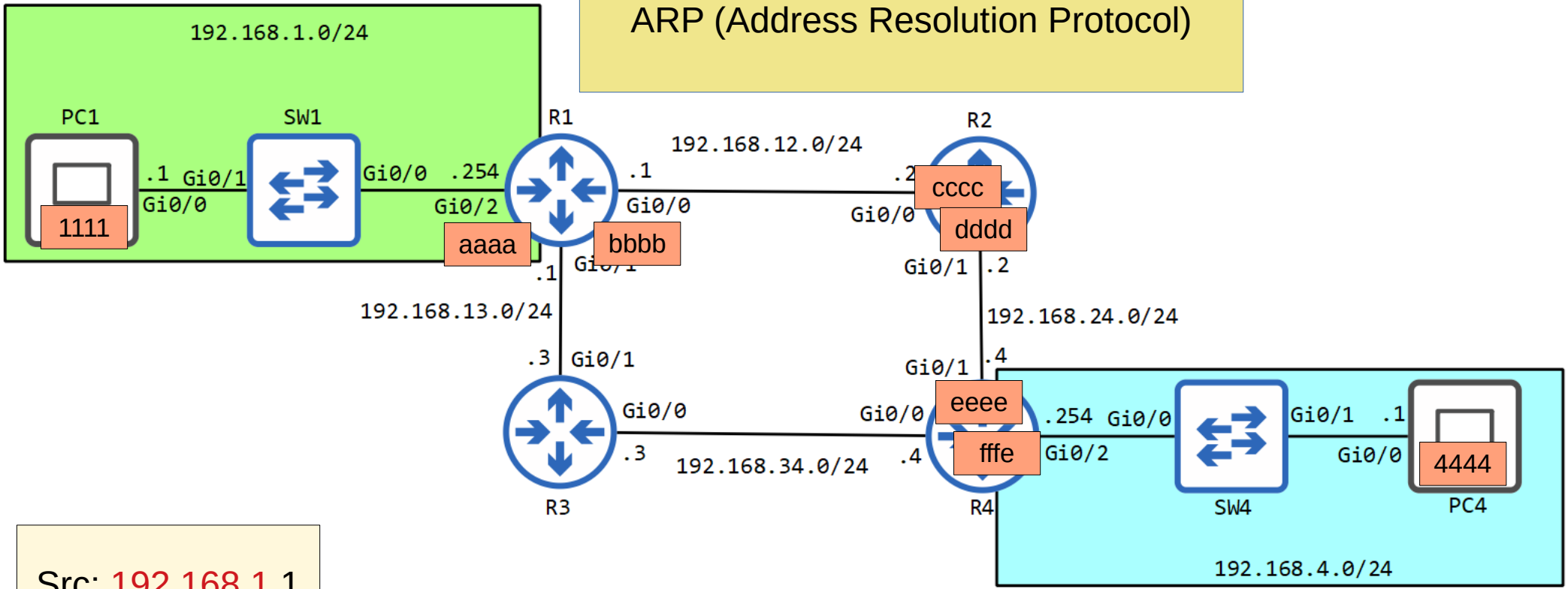
Jeremy's IT Lab

# Network Topology



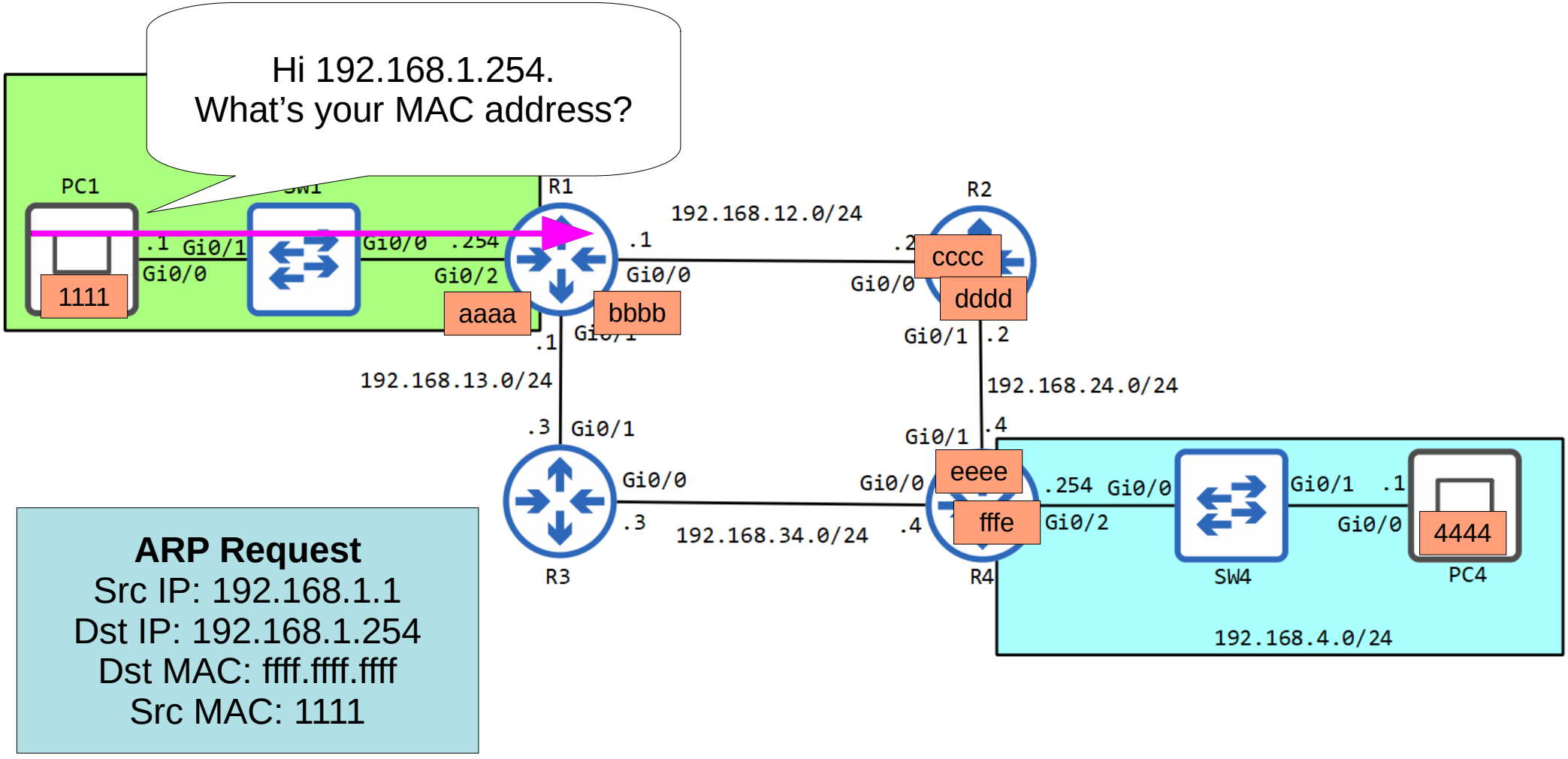
# Network Topology

ARP (Address Resolution Protocol)



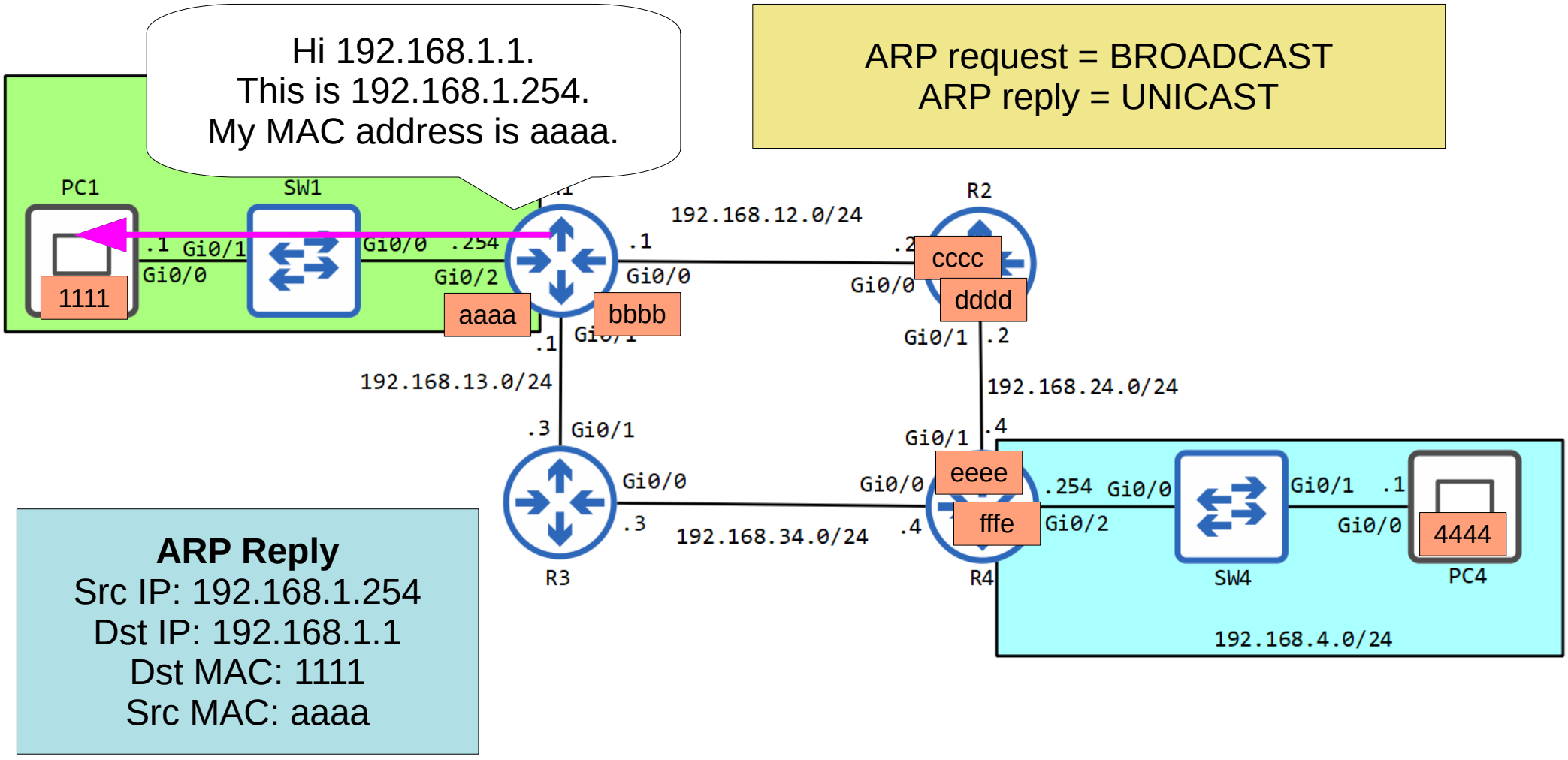

Src: 192.168.1.1
Dst: 192.168.4.1

# ARP (Address Resolution Protocol)

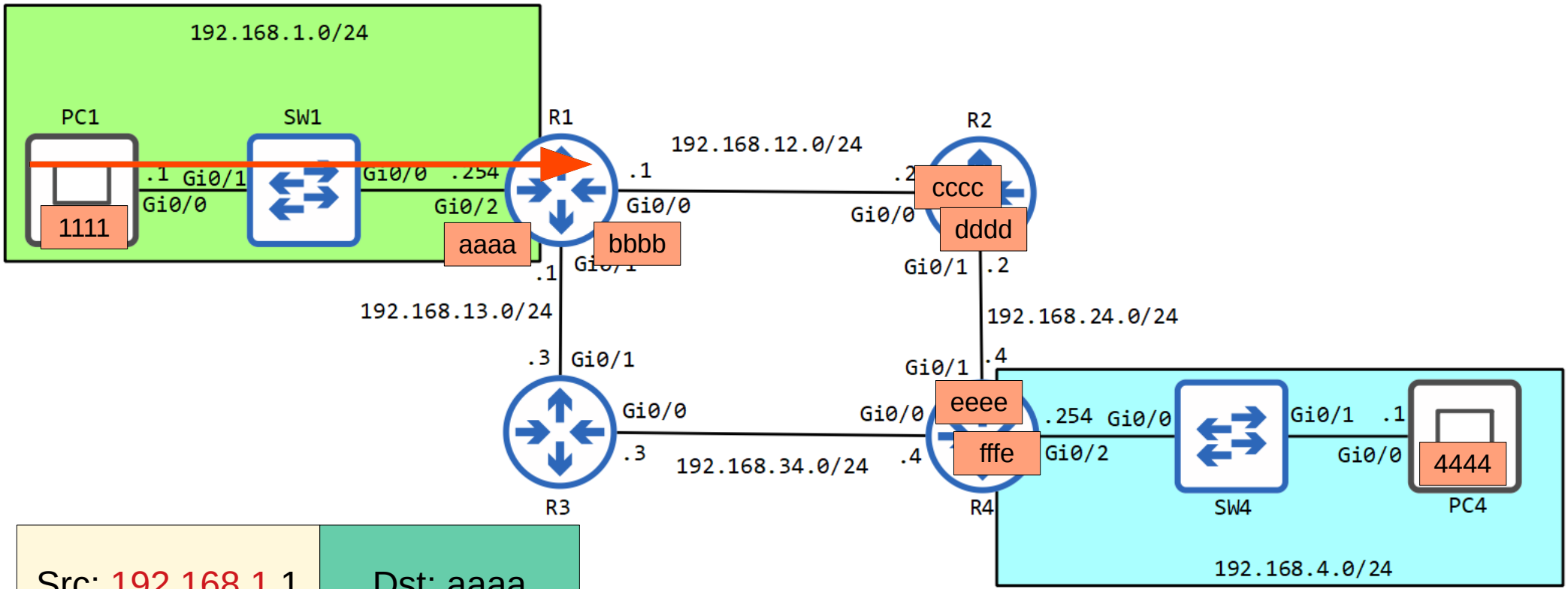



**ARP Request**
Src IP: 192.168.1.1
Dst IP: 192.168.1.254
Dst MAC: ffff.ffff.ffff
Src MAC: 1111

# ARP (Address Resolution Protocol)



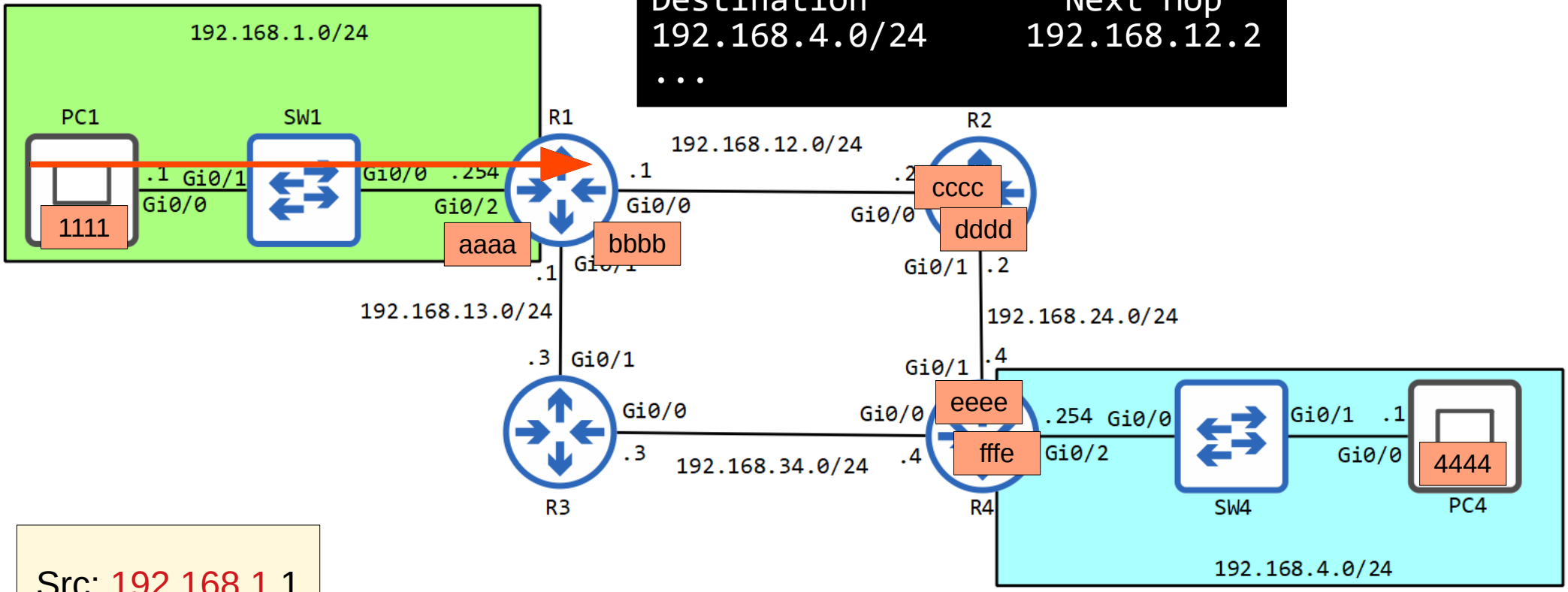
# PC1 → R1




| | |
|---|---|
| Src: 192.168.1.1<br>Dst: 192.168.4.1 | Dst: aaaa<br>Src: 1111 |

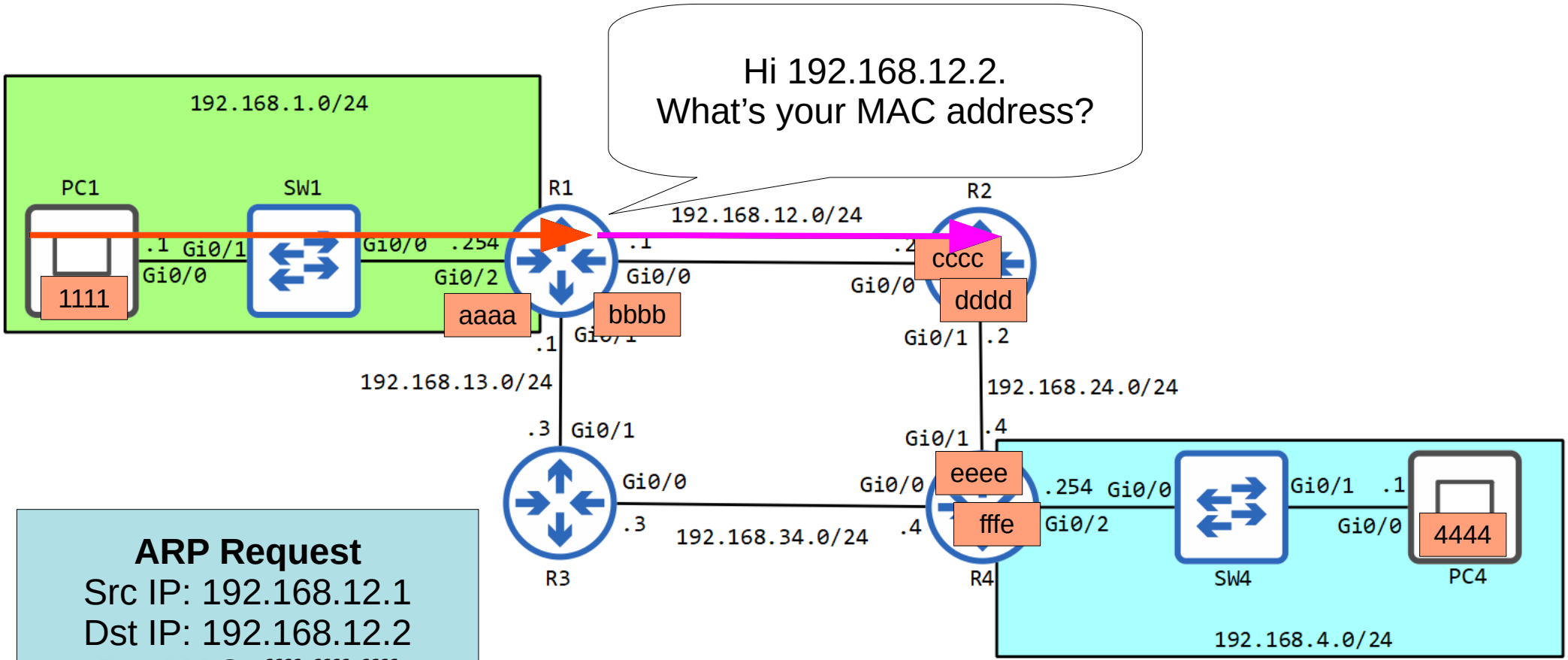
# R1 → R2

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



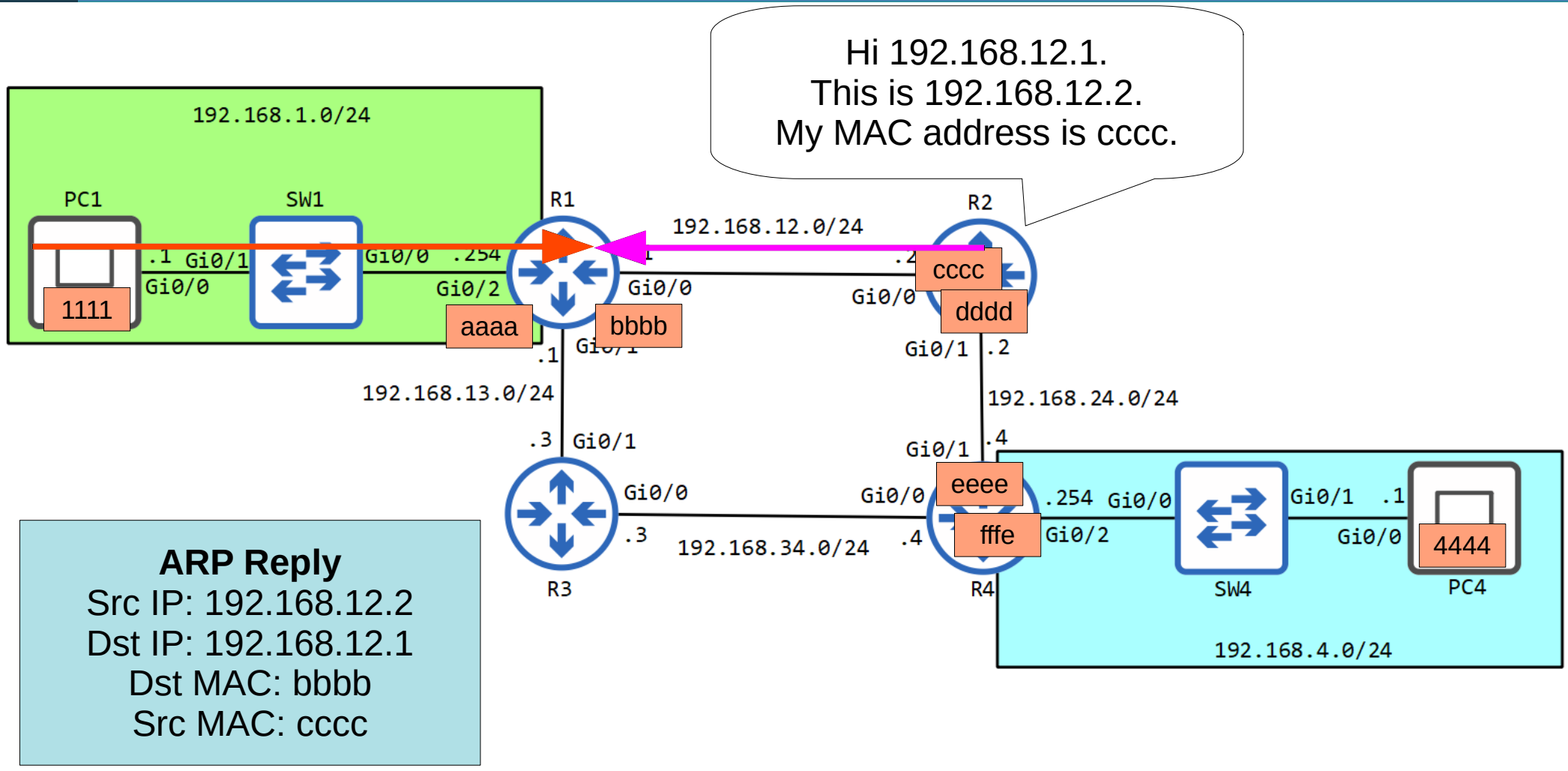

Src: 192.168.1.1
Dst: 192.168.4.1

# ARP



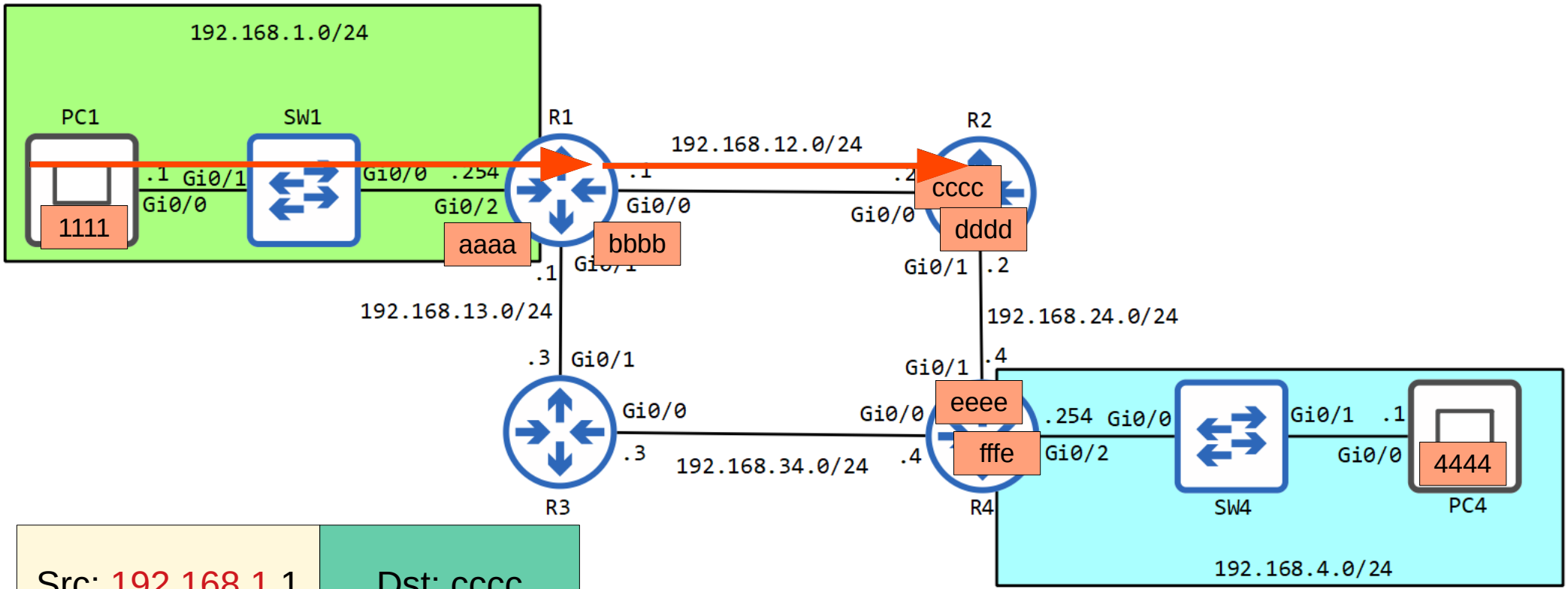

**ARP Request**
Src IP: 192.168.12.1
Dst IP: 192.168.12.2
Dst MAC: ffff.ffff.ffff
Src MAC: bbbb

# ARP




**ARP Reply**
Src IP: 192.168.12.2
Dst IP: 192.168.12.1
Dst MAC: bbbb
Src MAC: cccc

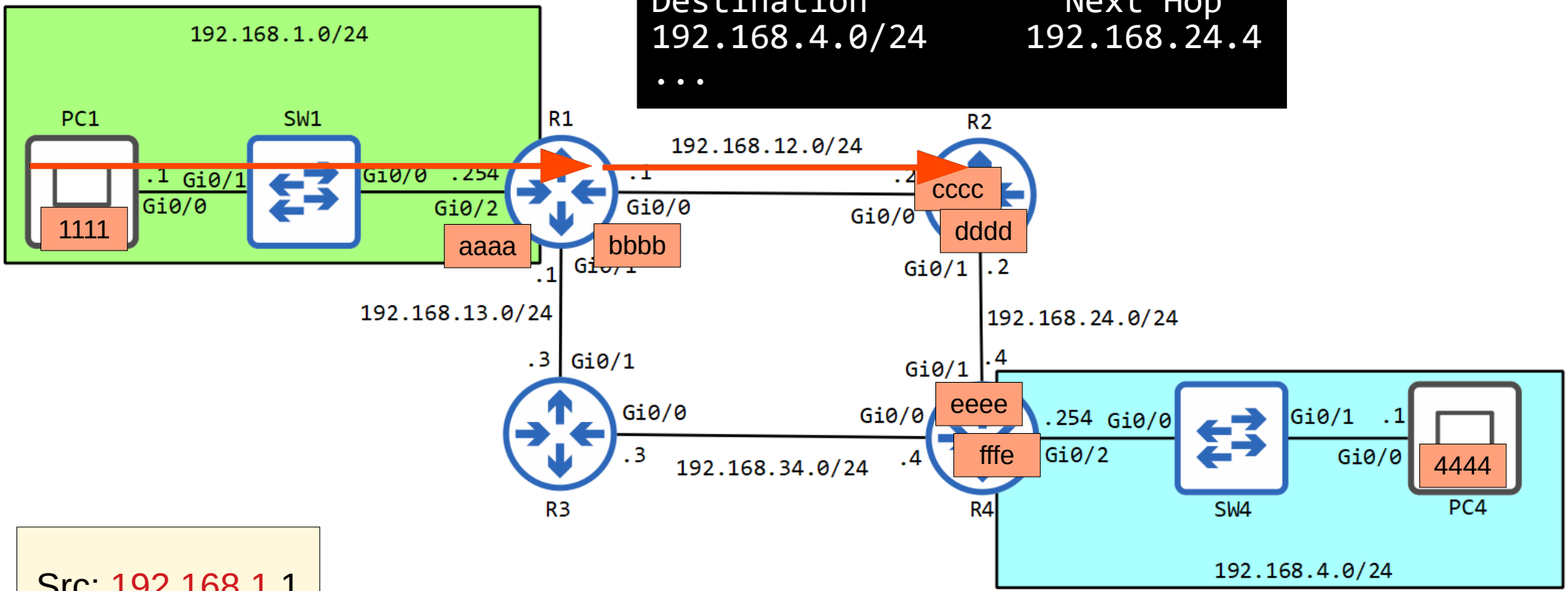
# R1 → R2




| | |
|---|---|
| Src: 192.168.1.1<br>Dst: 192.168.4.1 | Dst: cccc<br>Src: bbbb |

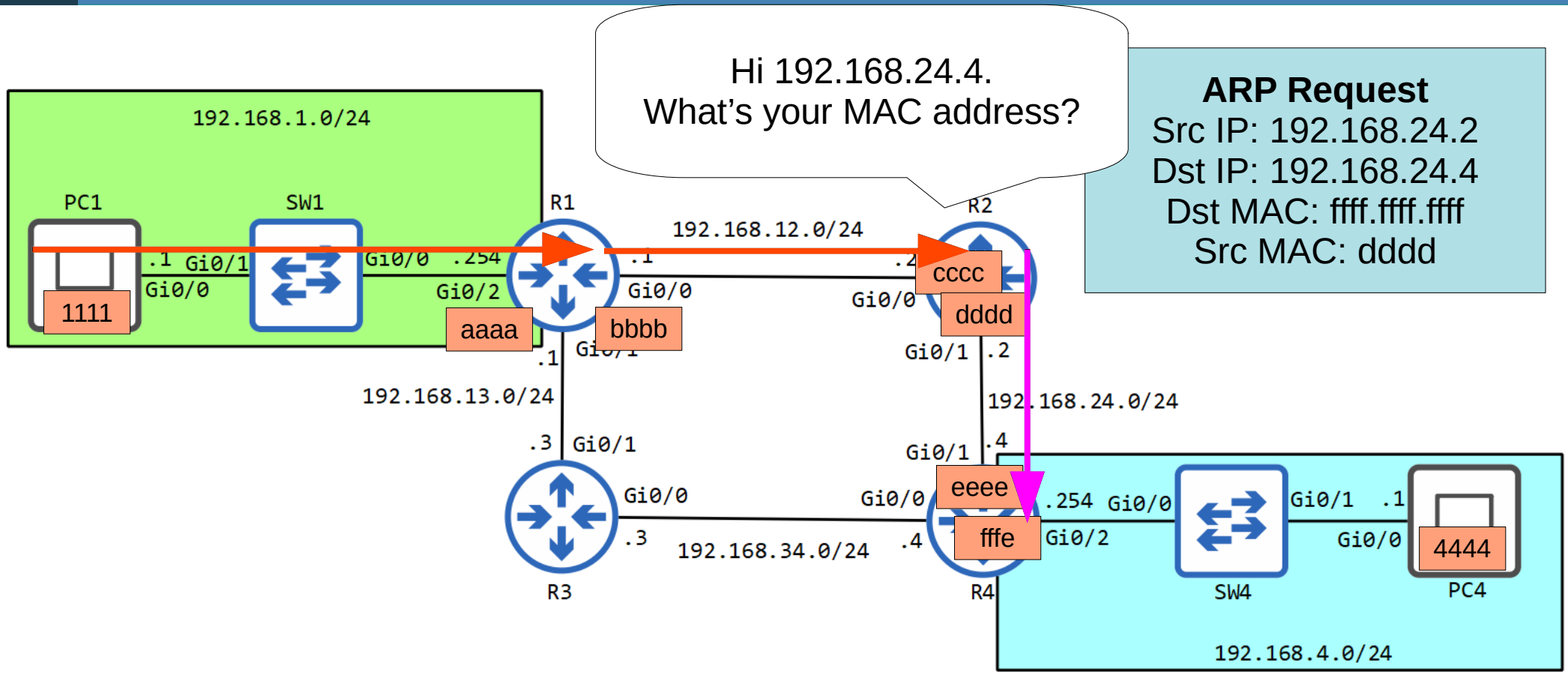
# R2 → R4

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

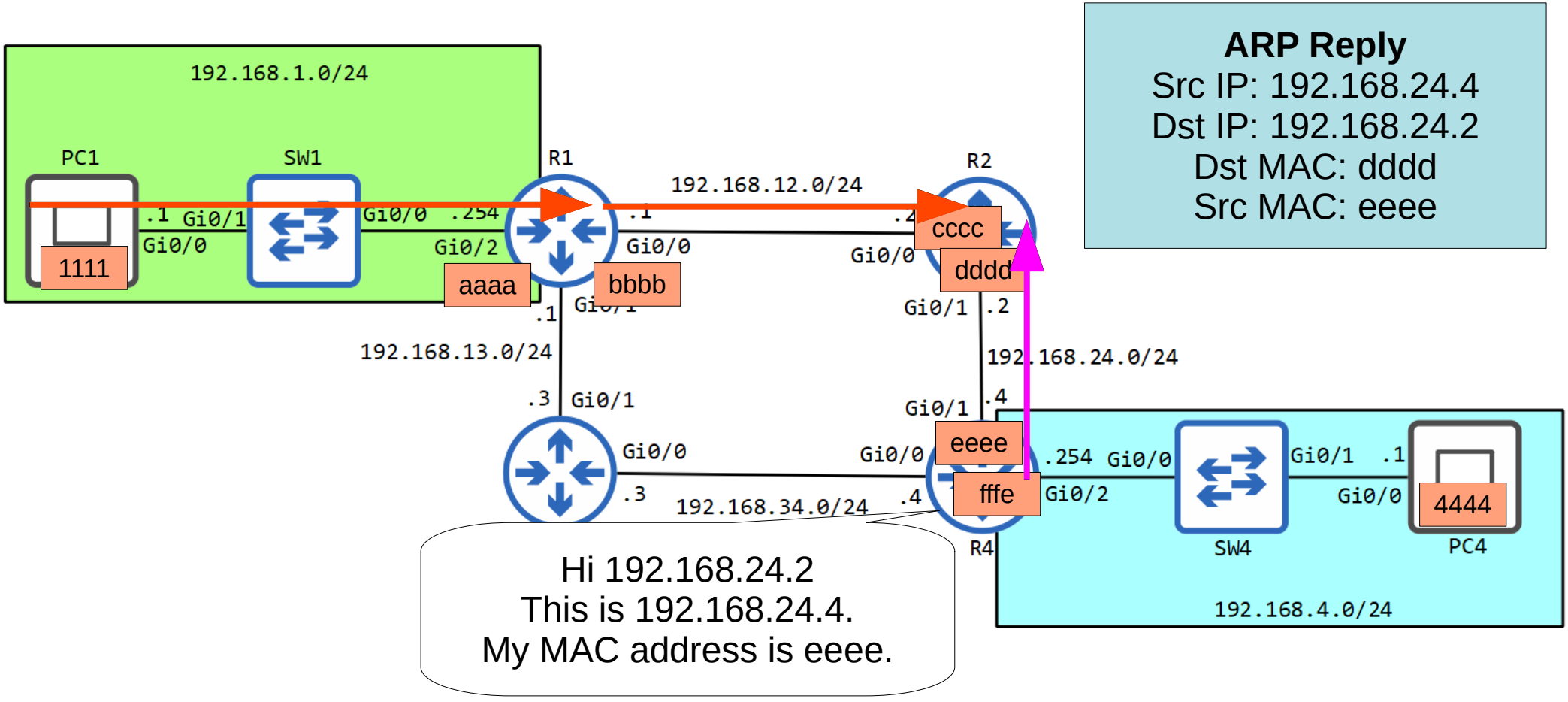



Src: 192.168.1.1
Dst: 192.168.4.1

# ARP

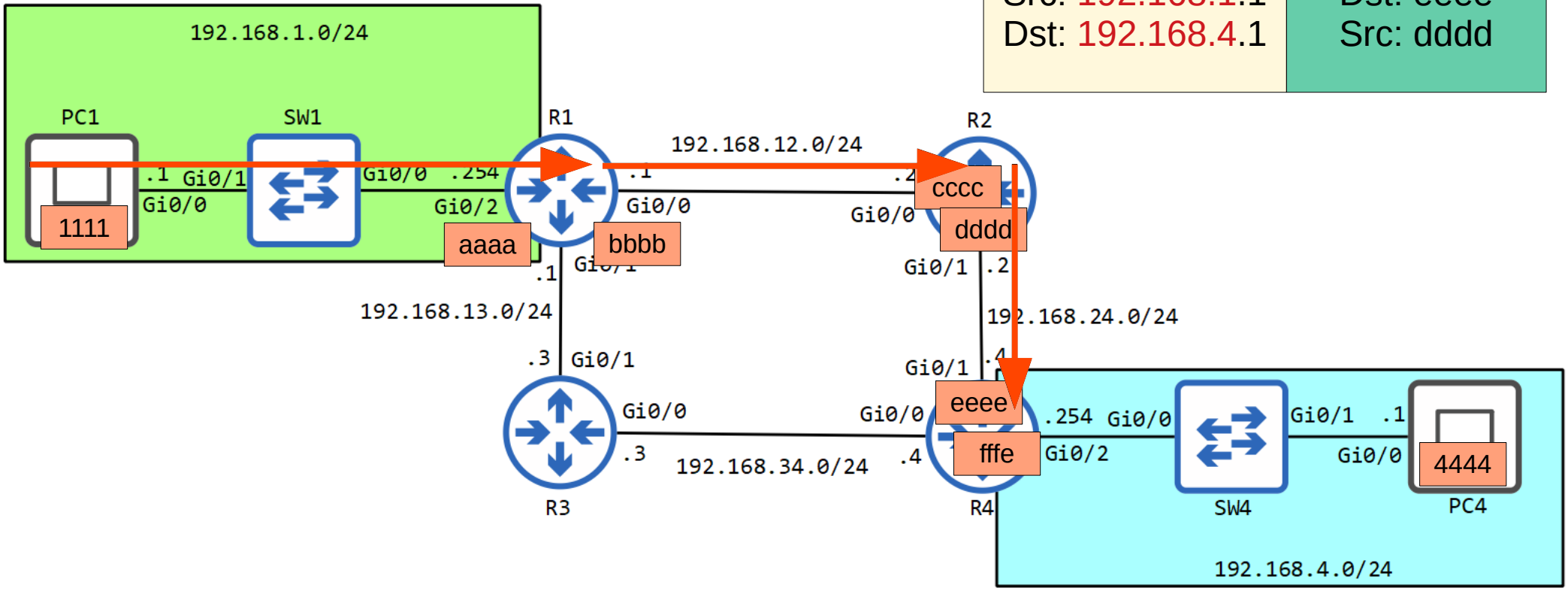

Hi 192.168.24.4.
What's your MAC address?
ARP Request
Src IP: 192.168.24.2
Dst IP: 192.168.24.4
Dst MAC: ffff.ffff.ffff
Src MAC: dddd
192.168.1.0/24
PC1
SW1
R1
R2
1111
.1 Gi0/1
Gi0/0
Gi0/0 .254
Gi0/2
aaaa
bbbb
192.168.12.0/24
.1
Gi0/0
.2
Gi0/0
cccc
dddd
Gi0/1 .2
192.168.24.0/24
.1
192.168.13.0/24
.3 Gi0/1
Gi0/1 .4
Gi0/0
.3
192.168.34.0/24
Gi0/0
.4
eeee
fffe
.254 Gi0/0
Gi0/2
Gi0/1 .1
Gi0/0
4444
R3
R4
SW4
PC4
192.168.4.0/24

# ARP

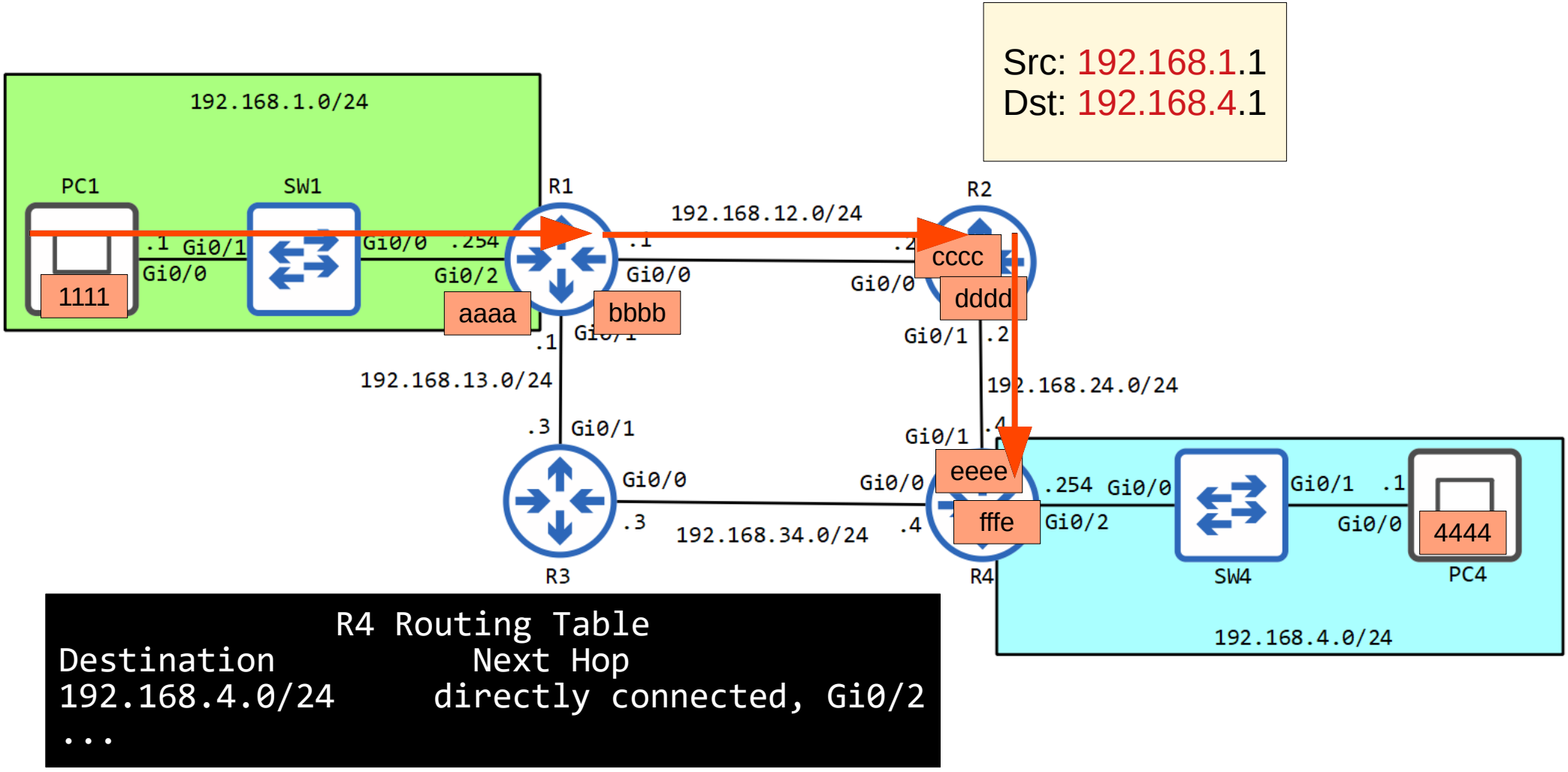

ARP Reply
Src IP: 192.168.24.4
Dst IP: 192.168.24.2
Dst MAC: dddd
Src MAC: eeee
192.168.1.0/24
PC1
SW1
R1
R2
1111
.1 Gi0/1
Gi0/0
Gi0/0 .254
Gi0/2
aaaa
bbbb
192.168.12.0/24
.1
.2
Gi0/0
Gi0/0
cccc
dddd
.1
192.168.13.0/24
Gi0/1
.2
192.168.24.0/24
.3
Gi0/1
.4
Gi0/1
Gi0/0
Gi0/0
eeee
.3
192.168.34.0/24
.4
fffe
.254 Gi0/0
Gi0/2
Gi0/1 .1
Gi0/0
4444
R4
SW4
PC4
192.168.4.0/24
Hi 192.168.24.2
This is 192.168.24.4.
My MAC address is eeee.

# R2 → R4

| Src: 192.168.1.1<br>Dst: 192.168.4.1 | Dst: eeee<br>Src: dddd |
|---|---|

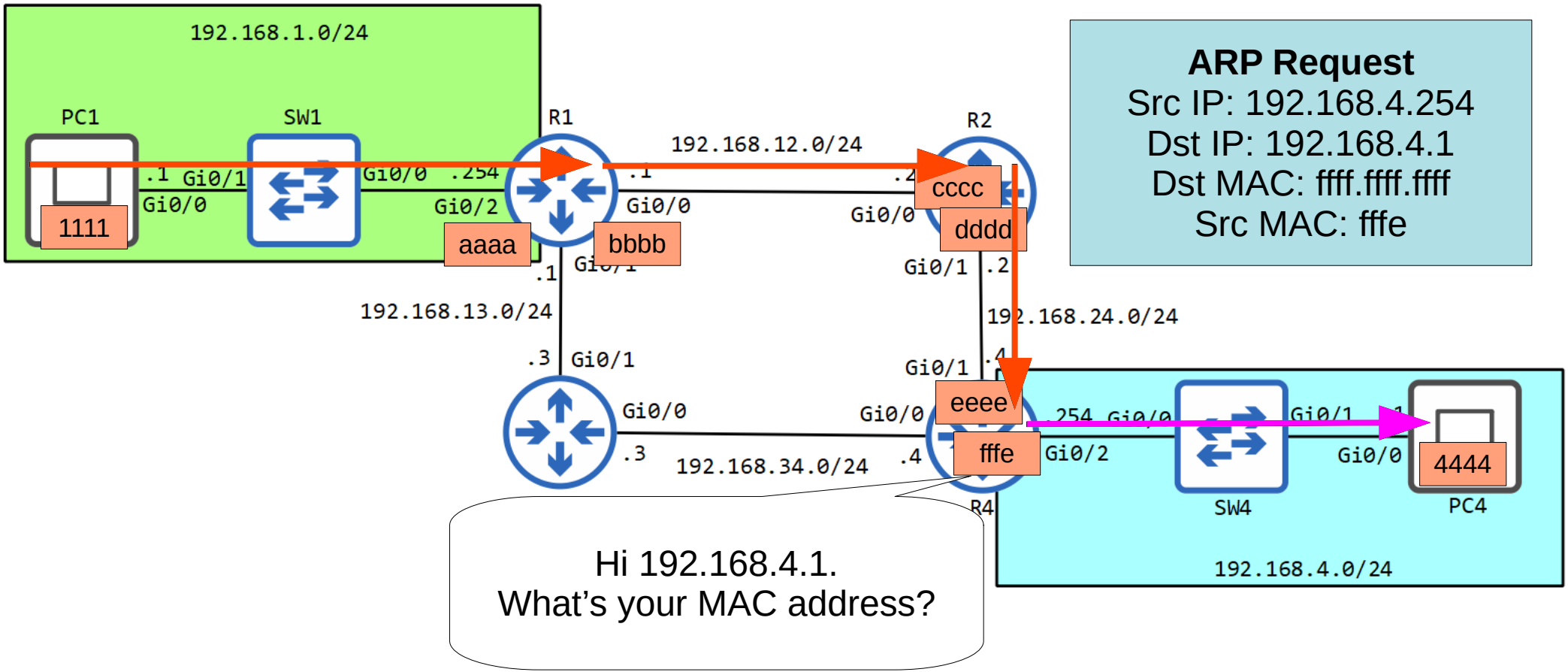


# R2 → R4

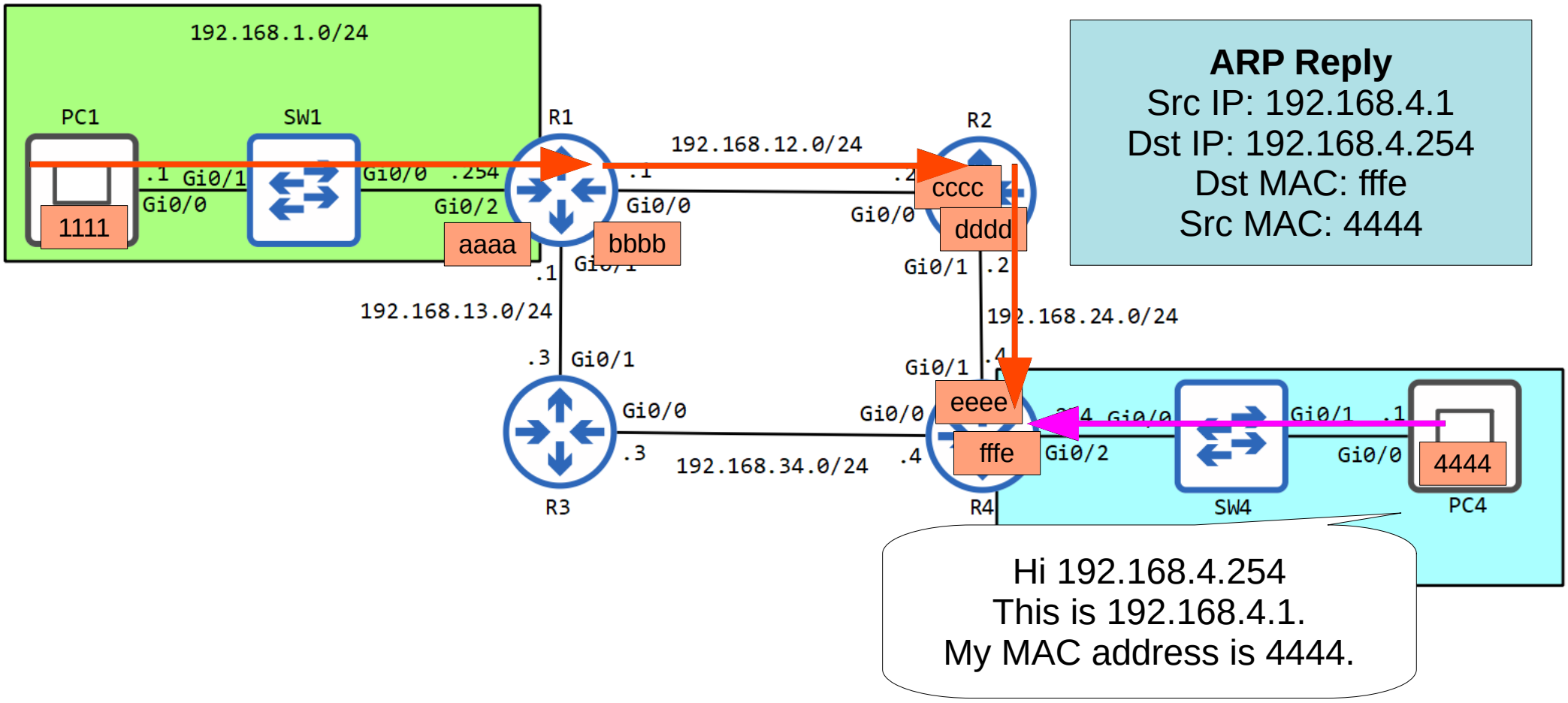



```
                R4 Routing Table
Destination                Next Hop
192.168.4.0/24        directly connected, Gi0/2
...
```

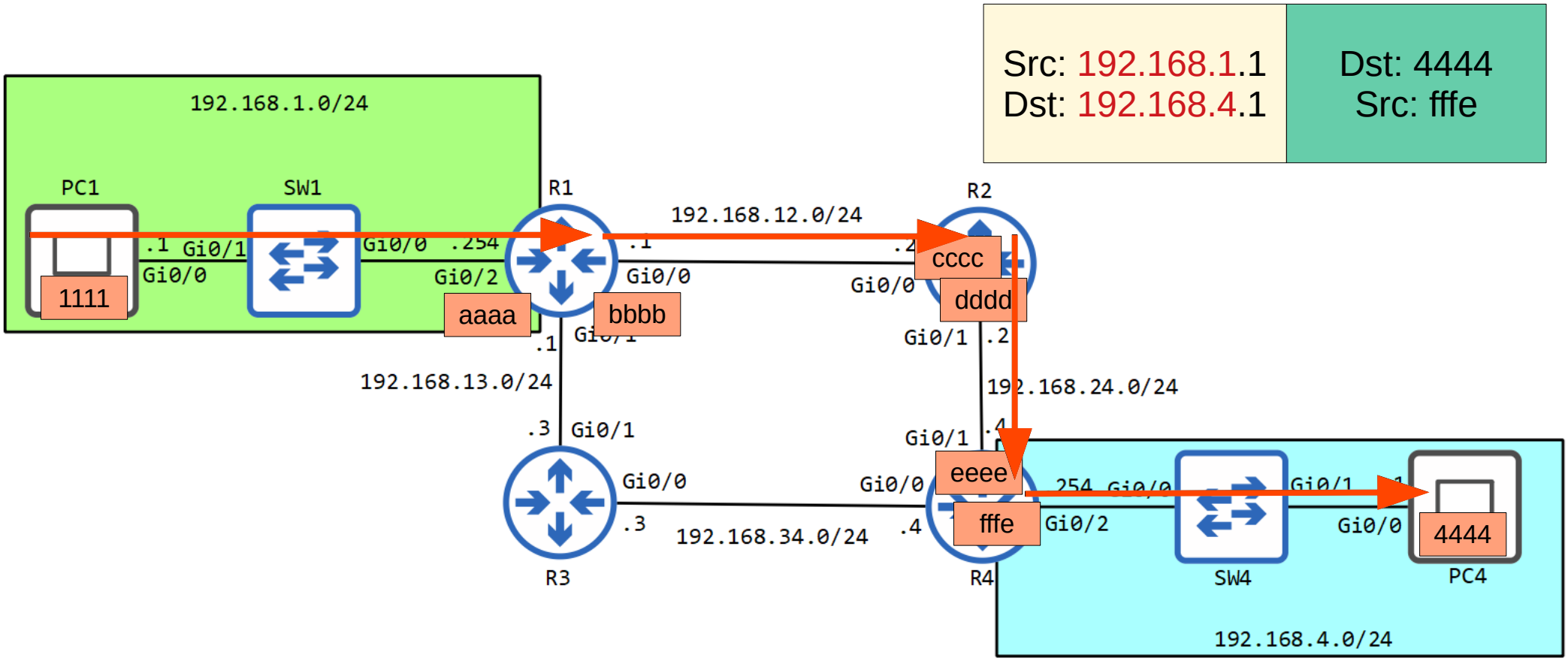
# ARP


192.168.1.0/24
PC1
SW1
R1
R2
1111
.1 Gi0/1
Gi0/0
Gi0/0 .254
Gi0/2
aaaa
bbbb
192.168.12.0/24
.1
Gi0/0
.2
Gi0/0
cccc
dddd
Gi0/1 .2
192.168.24.0/24
.1
192.168.13.0/24
.3 Gi0/1
Gi0/0
.3
192.168.34.0/24
Gi0/1
Gi0/0
.4
eeee
fffe
R4
.254 Gi0/0
Gi0/2
SW4
Gi0/1
Gi0/0
4444
PC4
192.168.4.0/24
ARP Request
Src IP: 192.168.4.254
Dst IP: 192.168.4.1
Dst MAC: ffff.ffff.ffff
Src MAC: fffe
Hi 192.168.4.1.
What's your MAC address?

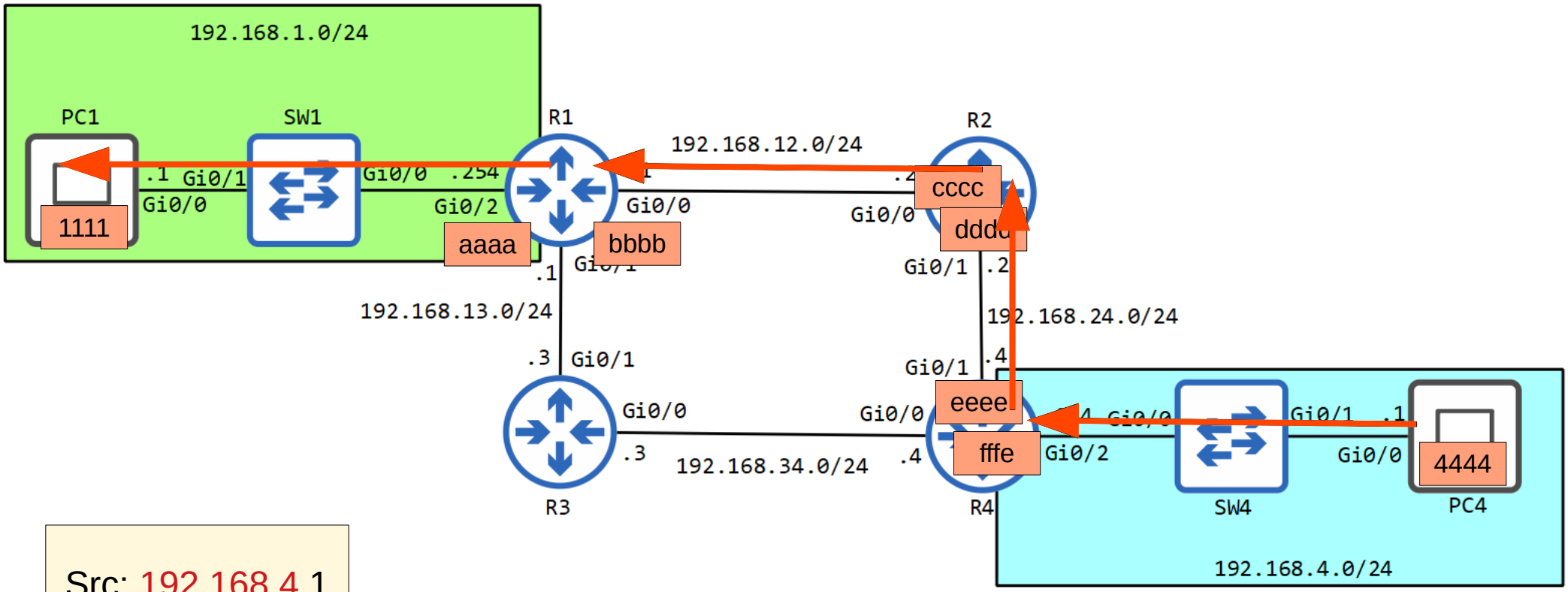
# ARP


192.168.1.0/24
PC1
SW1
R1
R2
1111
.1 Gi0/1
Gi0/0
Gi0/0 .254
Gi0/2
aaaa
bbbb
192.168.12.0/24
.1
Gi0/0
.2
Gi0/0
cccc
dddd
Gi0/1 .2
192.168.13.0/24
192.168.24.0/24
.3 Gi0/1
Gi0/1
Gi0/0
Gi0/0
eeee
.3
192.168.34.0/24
.4
fffe
Gi0/2
Gi0/1 .1
Gi0/0
4444
R3
R4
SW4
PC4
ARP Reply
Src IP: 192.168.4.1
Dst IP: 192.168.4.254
Dst MAC: fffe
Src MAC: 4444
Hi 192.168.4.254
This is 192.168.4.1.
My MAC address is 4444.

# R4 → PC4

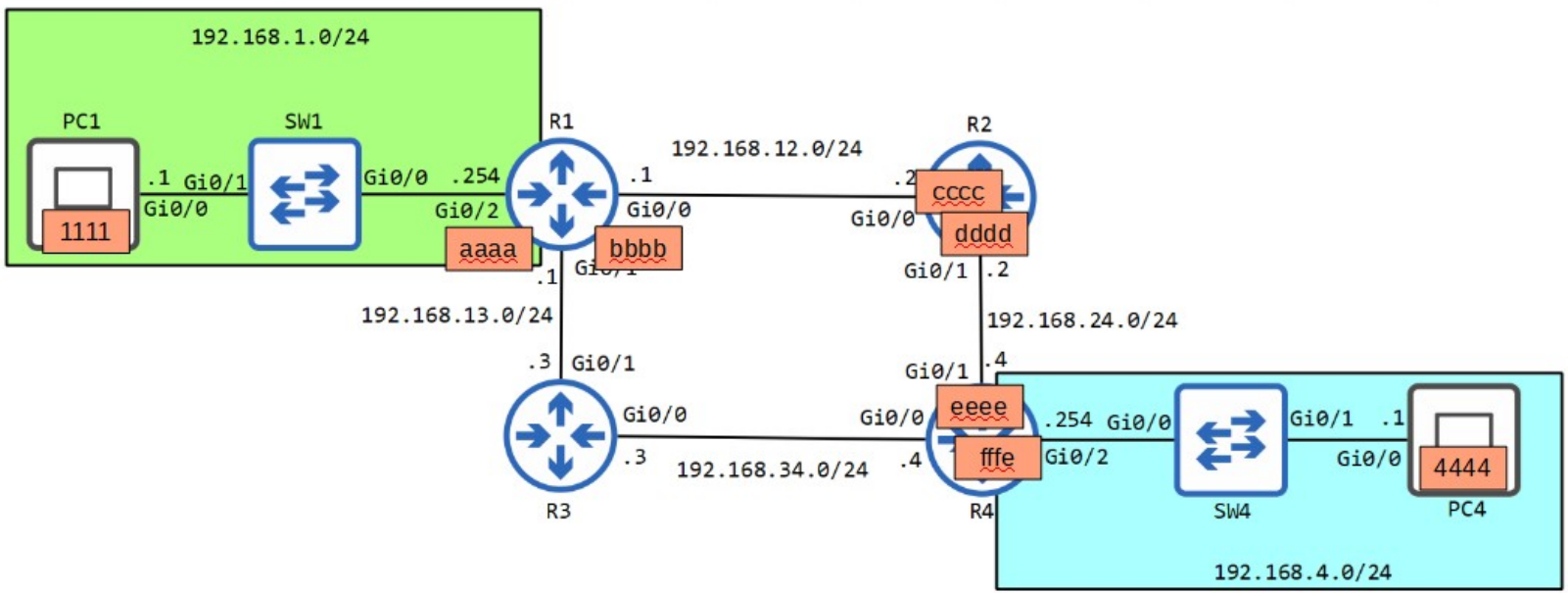

Src: 192.168.1.1
Dst: 192.168.4.1
Dst: 4444
Src: fffe
192.168.1.0/24
PC1
SW1
R1
R2
1111
.1 Gi0/1
Gi0/0
Gi0/0 .254
Gi0/2
aaaa
bbbb
192.168.12.0/24
.1
.2
Gi0/0
Gi0/0
cccc
dddd
Gi0/1 .2
.1
192.168.13.0/24
192.168.24.0/24
.3 Gi0/1
Gi0/1
Gi0/0
Gi0/0
eeee
fffe
.3
192.168.34.0/24
.4
254 Gi0/0
Gi0/1
Gi0/2
Gi0/0
4444
R3
R4
SW4
PC4
192.168.4.0/24

# R4 → PC4




Src: 192.168.4.1
Dst: 192.168.1.1

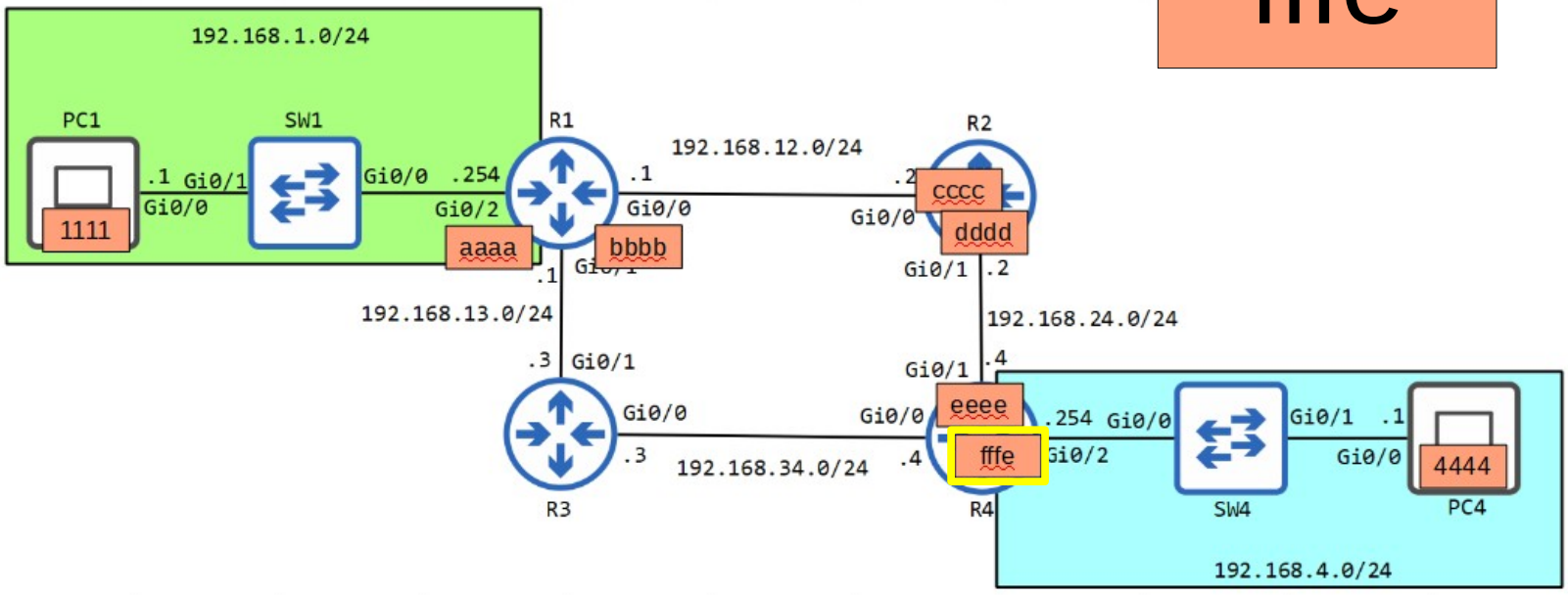
# QUIZ


192.168.1.0/24
PC1
SW1
R1
R2
1111
.1
Gi0/1
Gi0/0
Gi0/0
.254
Gi0/2
aaaa
bbbb
.1
192.168.12.0/24
.2
Gi0/0
cccc
Gi0/0
dddd
Gi0/1
.2
.1
192.168.13.0/24
192.168.24.0/24
.3
Gi0/1
Gi0/1
.4
Gi0/0
eeee
Gi0/0
.254
Gi0/0
Gi0/1
.1
.3
192.168.34.0/24
.4
fffe
Gi0/2
Gi0/0
4444
R3
R4
SW4
PC4
192.168.4.0/24

# Quiz Question 1

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

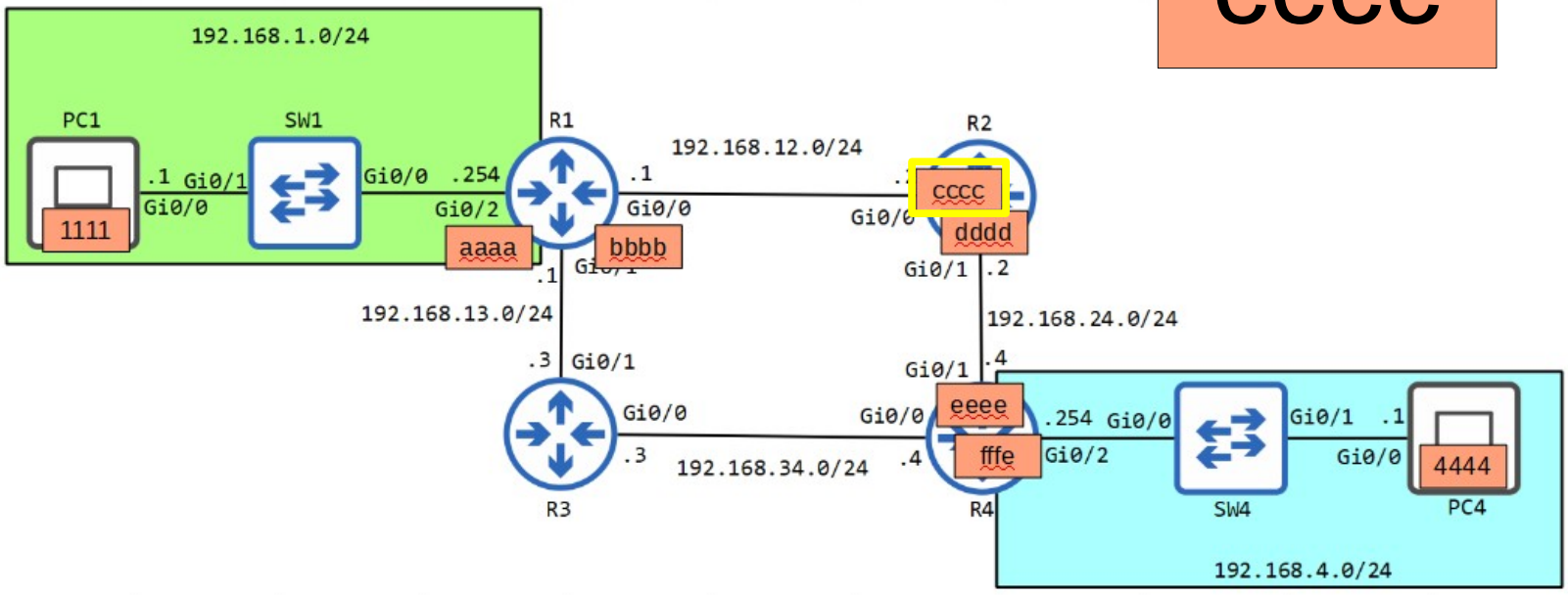
fffe



# 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?**

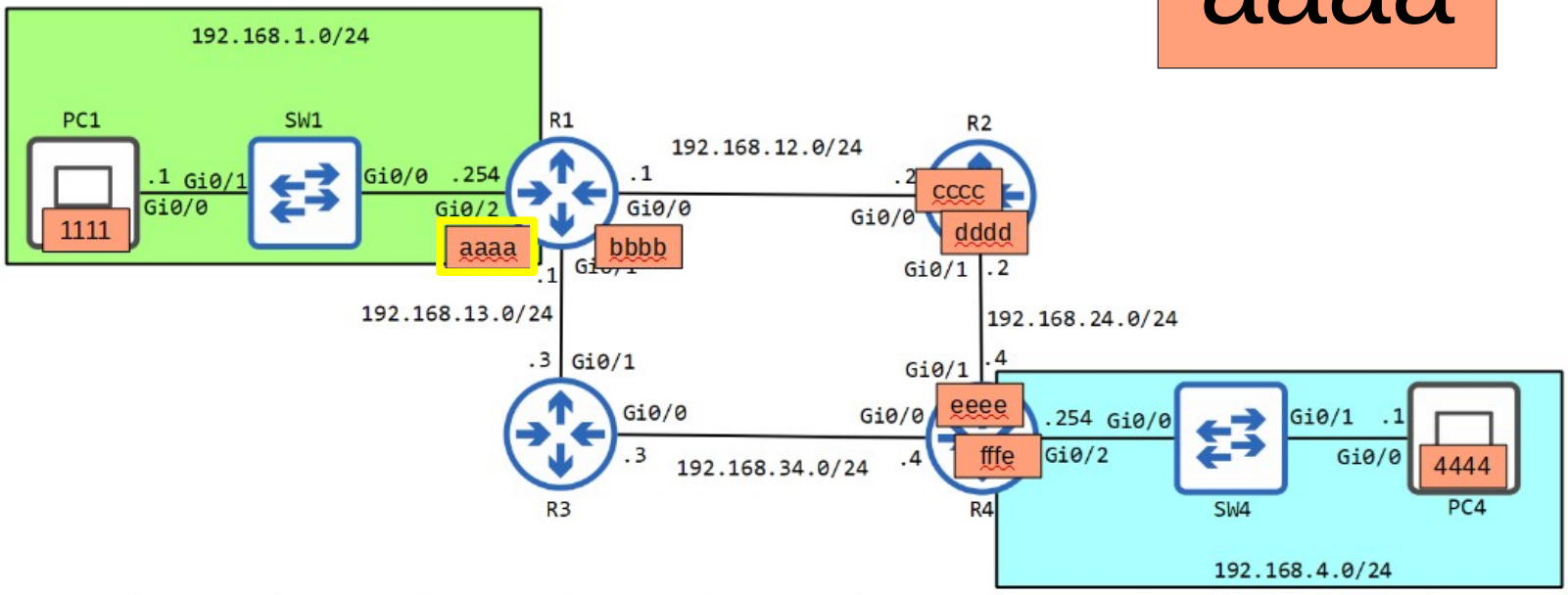
**CCCC**



# 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**?

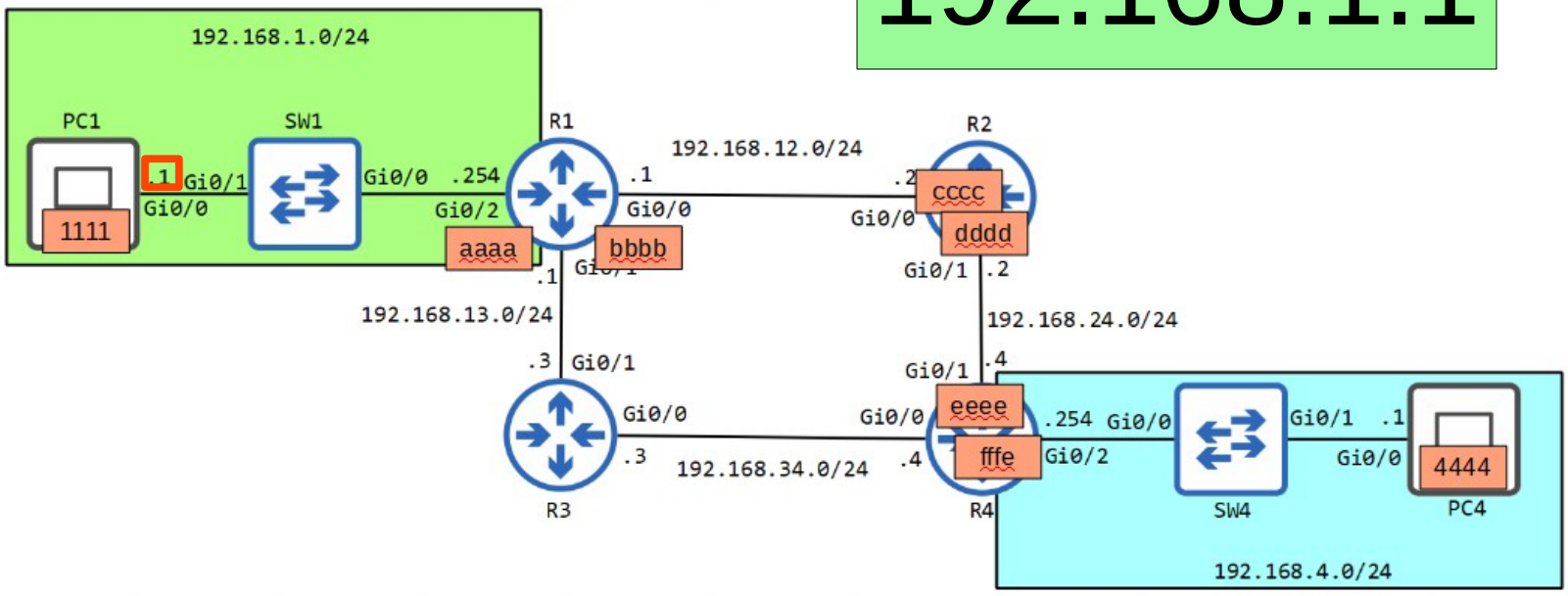
aaaa



# 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