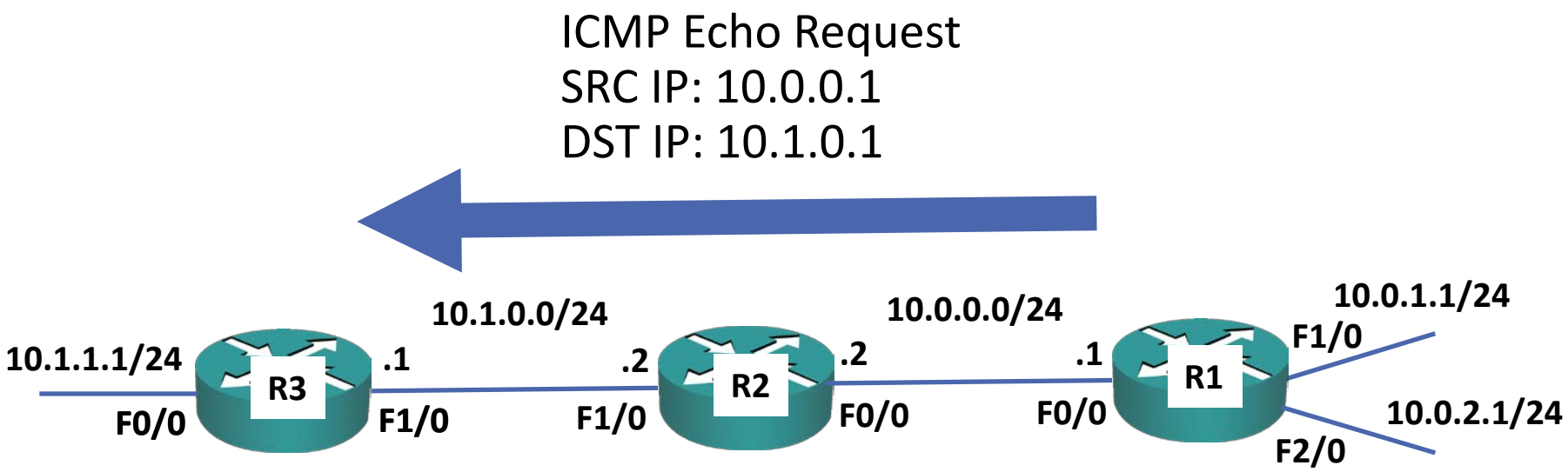
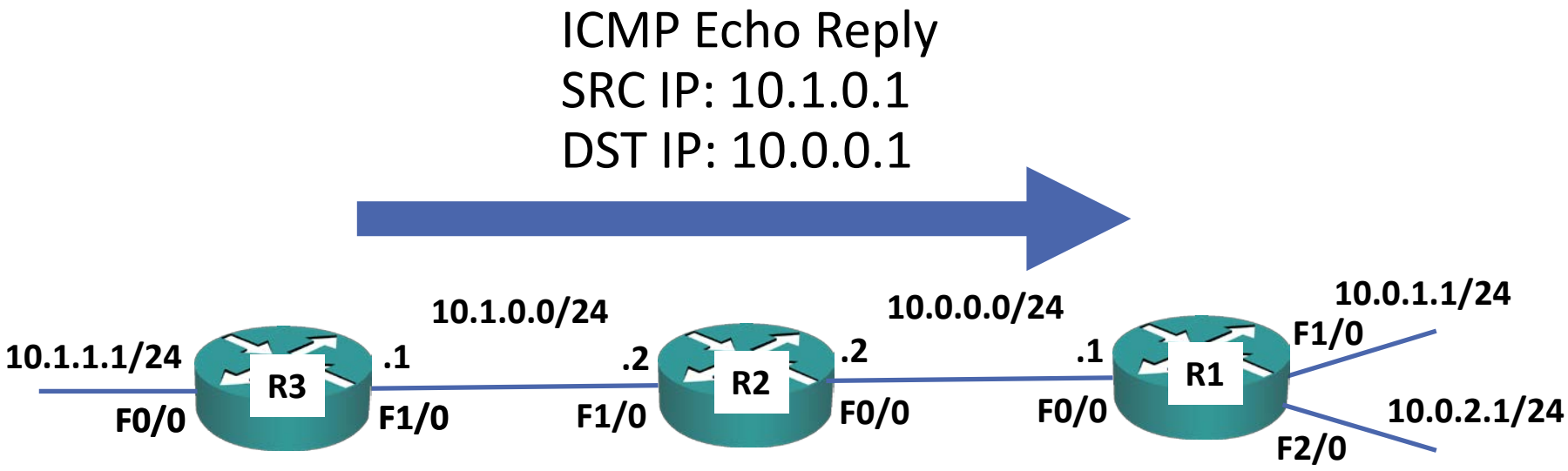
Ping

- ICMP: Internet Control Message Protocol



Ping

- ICMP: Internet Control Message Protocol



Ping Responses

- If the ping is successful:

```
R1#ping 10.1.0.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.0.1, timeout is 2
seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max =
68/322/1076 ms
```

Ping Responses

- If the router does not have a corresponding route or the destination IP address does not respond:

```
R1#ping 172.16.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.1, timeout is 2
seconds:
.....
Success rate is 0 percent (0/5)
```

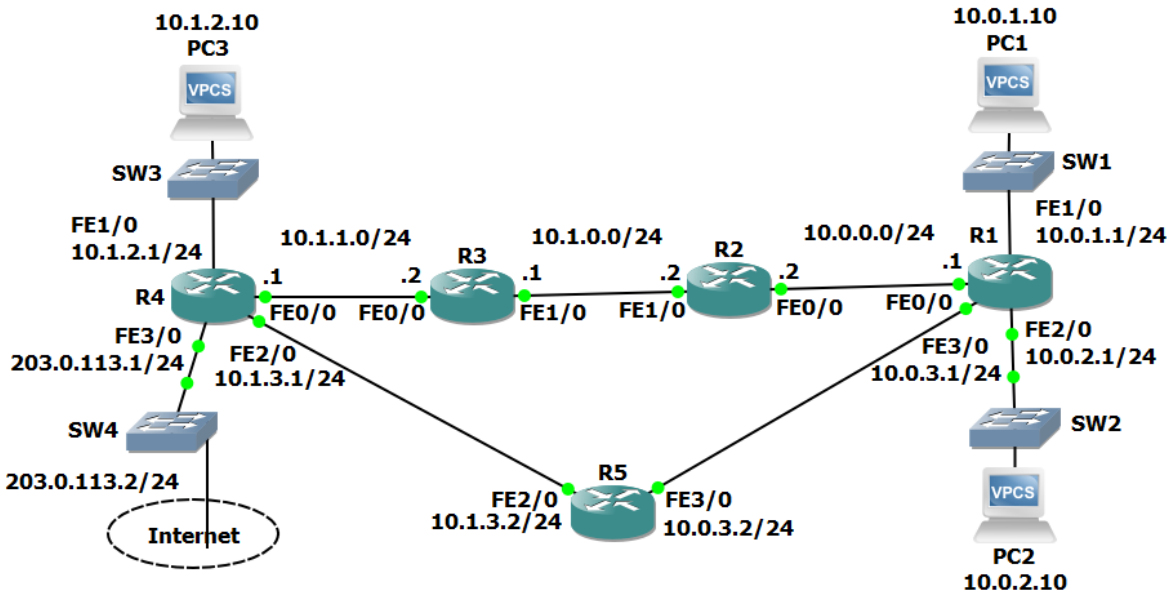
Ping Responses

- If the router discards the packet (for example it is blocked by an Access Control List):

```
R1#ping 172.16.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.1, timeout is 2
seconds:
UUUUU
Success rate is 0 percent (0/5)
```

Extended Ping

- Scenario: The user on PC1 complains that he can't access services on PC3
- The problem is R4 does not have a route to 10.0.1.0/24
- Traffic which originates from a router always uses the IP address on the outgoing interface as the source address
- A ping from R1 to 10.1.2.10 will succeed because R4 has a route to 10.0.0.1



Extended Ping

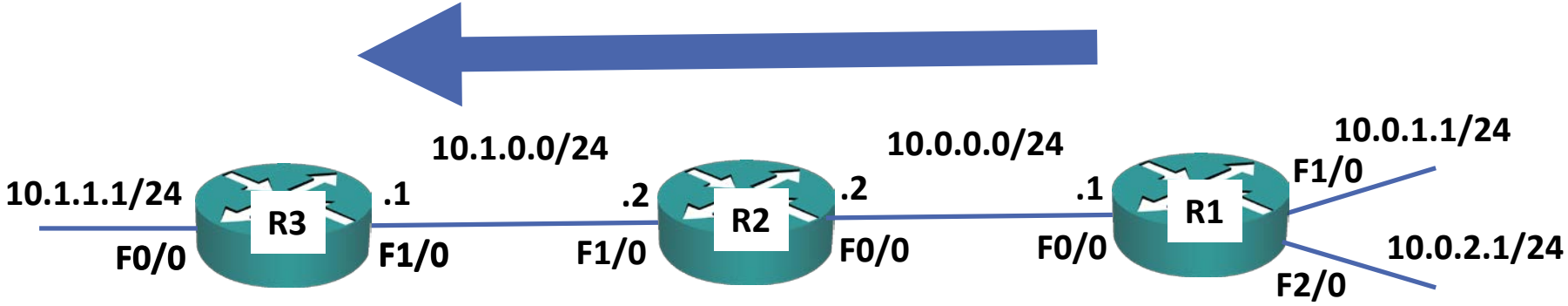
```
PC1> ping 10.1.2.10
10.1.2.10 icmp_seq=1 timeout
10.1.2.10 icmp_seq=2 timeout
10.1.2.10 icmp_seq=3 timeout
10.1.2.10 icmp_seq=4 timeout
10.1.2.10 icmp_seq=5 timeout

R1#ping 10.1.2.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.10, timeout is 2
seconds:
!!!!!
```

Extended Ping

```
R1#ping
Protocol [ip]:
Target IP address: 10.1.2.10
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: 10.0.1.1
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.2.10, timeout is 2 seconds:
Packet sent with a source address of 10.0.1.1
.....
Success rate is 0 percent (0/5)
```

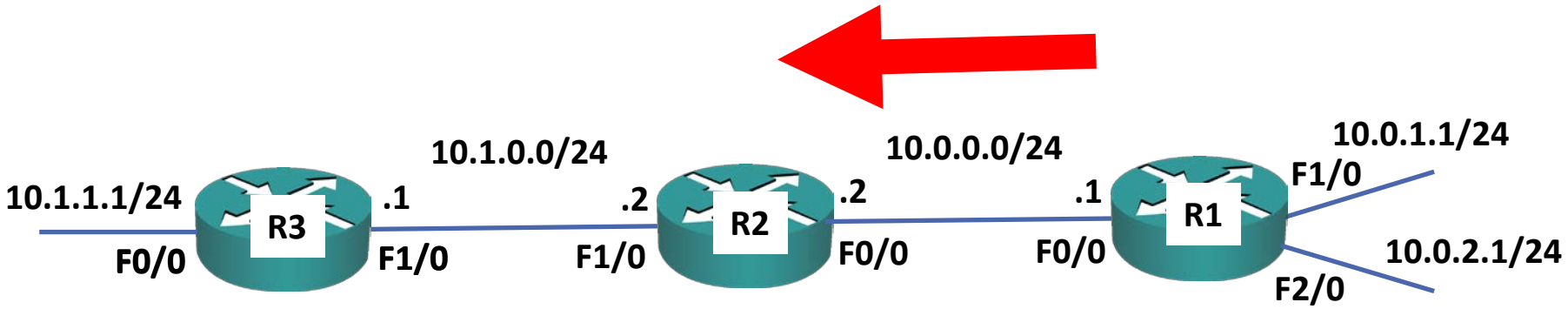
Traceroute

ICMP Echo Request
SRC IP: 10.0.0.1
DST IP: 10.1.0.1
TTL



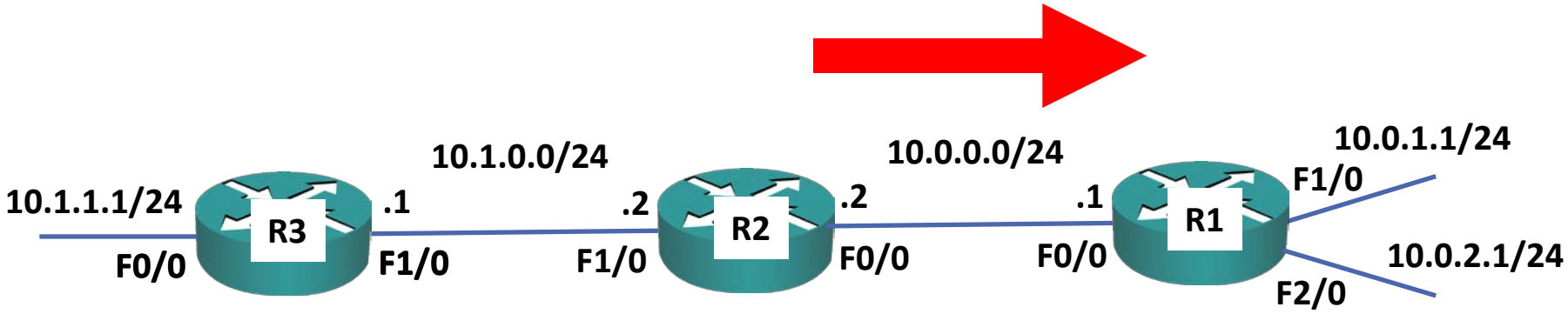
Traceroute

ICMP Echo Request
SRC IP: 10.0.0.1
DST IP: 10.1.0.1
TTL: 1



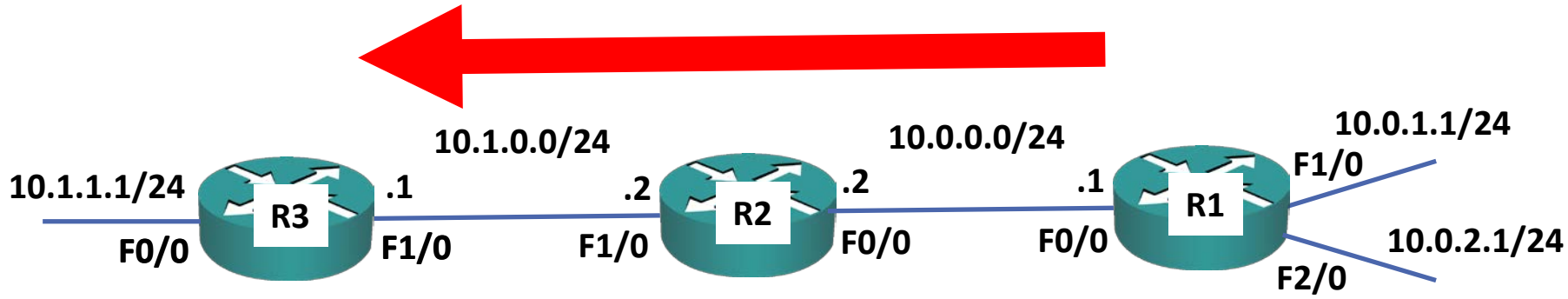
Traceroute

ICMP Time Exceeded
SRC IP: 10.0.0.2
DST IP: 10.0.0.1



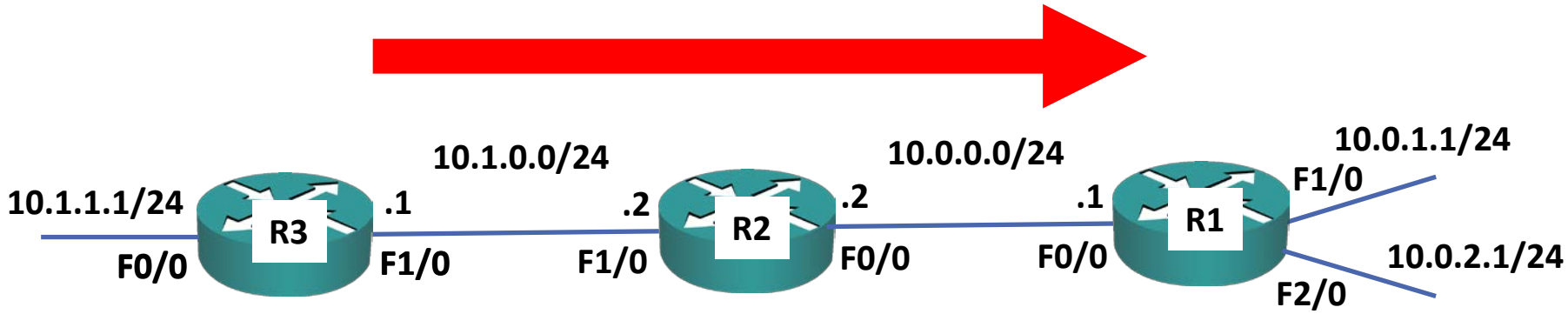
Traceroute

ICMP Echo Request
SRC IP: 10.0.0.1
DST IP: 10.1.0.1
TTL: 2



Traceroute

ICMP Echo Reply
SRC IP: 10.1.0.1
DST IP: 10.0.0.1



Traceroute Responses

- Successful Traceroute:

```
R1#traceroute 10.1.2.1
Type escape sequence to abort.
Tracing the route to 10.1.2.1
VRF info: (vrf in name/id, vrf out name/id)
  1 10.0.0.2 20 msec 16 msec 16 msec
  2 10.1.0.1 36 msec 40 msec 40 msec
  3 10.1.1.1 60 msec 64 msec 60 msec
```

Traceroute Responses

- The packet is getting as far as 10.1.0.1. Start troubleshooting there.
- Press Ctrl-Shift-6 to abort

```
R1#traceroute 10.1.2.1
Type escape sequence to abort.
Tracing the route to 10.1.2.10
VRF info: (vrf in name/id, vrf out name/id)
  1 10.0.0.2 28 msec 16 msec 16 msec
  2 10.1.0.1 36 msec 36 msec 40 msec
  3  *  *  *
  4  *  *  *
```

Other Tools – Layer 1

- Show ip interface brief
- Show interface

Other Tools – Layer 2

- Show arp
- Show mac address-table

Other Tools – Layer 4

- Telnet

Other Tools – DNS

- nslookup
- Ping by FQDN