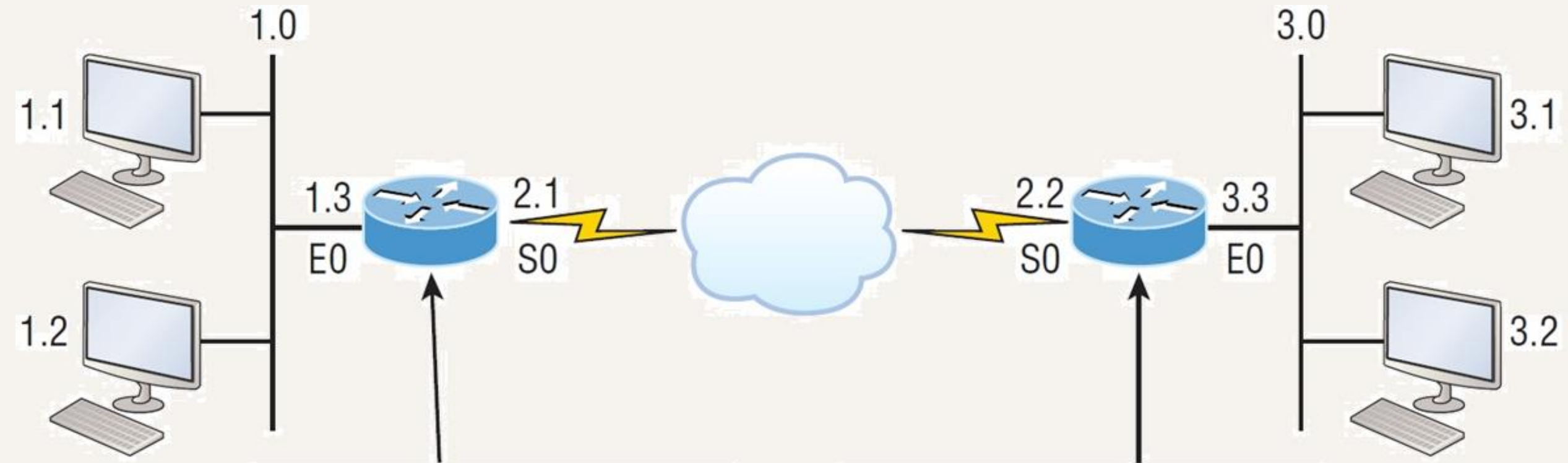# Static Routing

CyberQuince

Static vs. Dynamic Routing

Static: someone (an administrator) must manually enter all networks in a domain into the routing tables. If a change occurs within that domain, the administrator must manually update the tables.

Dynamic: a protocol on a router communicates to that same protocol on neighboring and other, adjacent routers in that domain. If a change occurs, the routers, using that protocol, inform each other of the change, and as a result, update their tables automatically.

Routing table		
NET	INT	Metric
1	E0	0
2	S0	0
3	S0	1

Routing table		
NET	INT	Metric
1	S0	1
2	S0	0
3	E0	0

Adding a Static Route to the Routing Table

`Router(config)# ip route `**`net2`**` net2_mask `**`first_hop`**
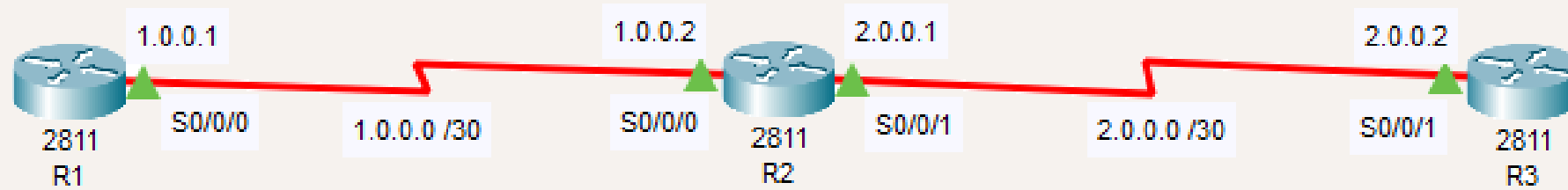
net2 is an adjacent network

first_hop is the IP address of the neighboring port on the link through which a packet should be sent towards **net2**

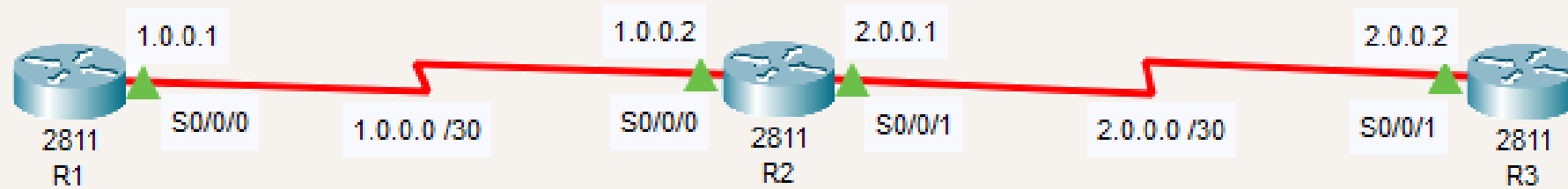**first_hop** može can also be the outgoing interface towards **net2**

Removing the route:

`Router(config)# no ip route `**`net2`**` net2_mask `**`first_hop`**

Static Routing - Example

1.0.0.1   S0/0/0   1.0.0.0 /30   1.0.0.2   S0/0/0   2.0.0.1   S0/0/1   2.0.0.0 /30   S0/0/1   2.0.0.2

2811   2811   2811
R1   R2   R3

Static Routing - Example

1.0.0.1   1.0.0.2   2.0.0.1   2.0.0.2

S0/0/0   1.0.0.0 /30   S0/0/0   S0/0/1   2.0.0.0 /30   S0/0/1

2811 R1   2811 R2   2811 R3
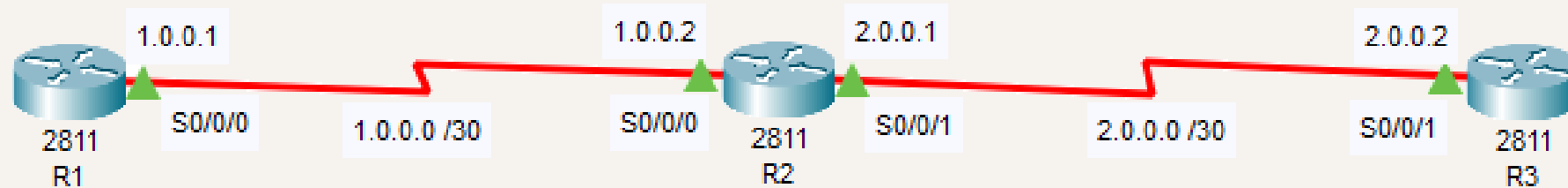
```
Router1(config)#ip route  2.0.0.0  255.255.255.252  1.0.0.2
```

Static Routing - Example


```
Router1(config)#ip route  2.0.0.0  255.255.255.252  1.0.0.2

Router3(config)#ip route  1.0.0.0  255.255.255.252  2.0.0.1
```
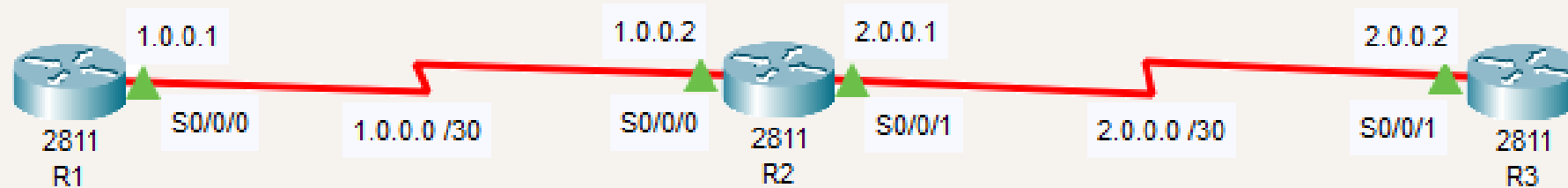
Static Routing - Example


```
Router1(config)#ip route  2.0.0.0  255.255.255.252  1.0.0.2

Router3(config)#ip route  1.0.0.0  255.255.255.252  2.0.0.1


Router#show ip route
```

Static Routing — The *Default* Route

Default routes can be set only for stub networks – in those networks which only have one exit path.

Static Routing — The *Default* Route

Default routes can be set only for stub networks – in those networks which only have one exit path.

```
R1(config)# ip route  0.0.0.0  0.0.0.0  exit_int
```
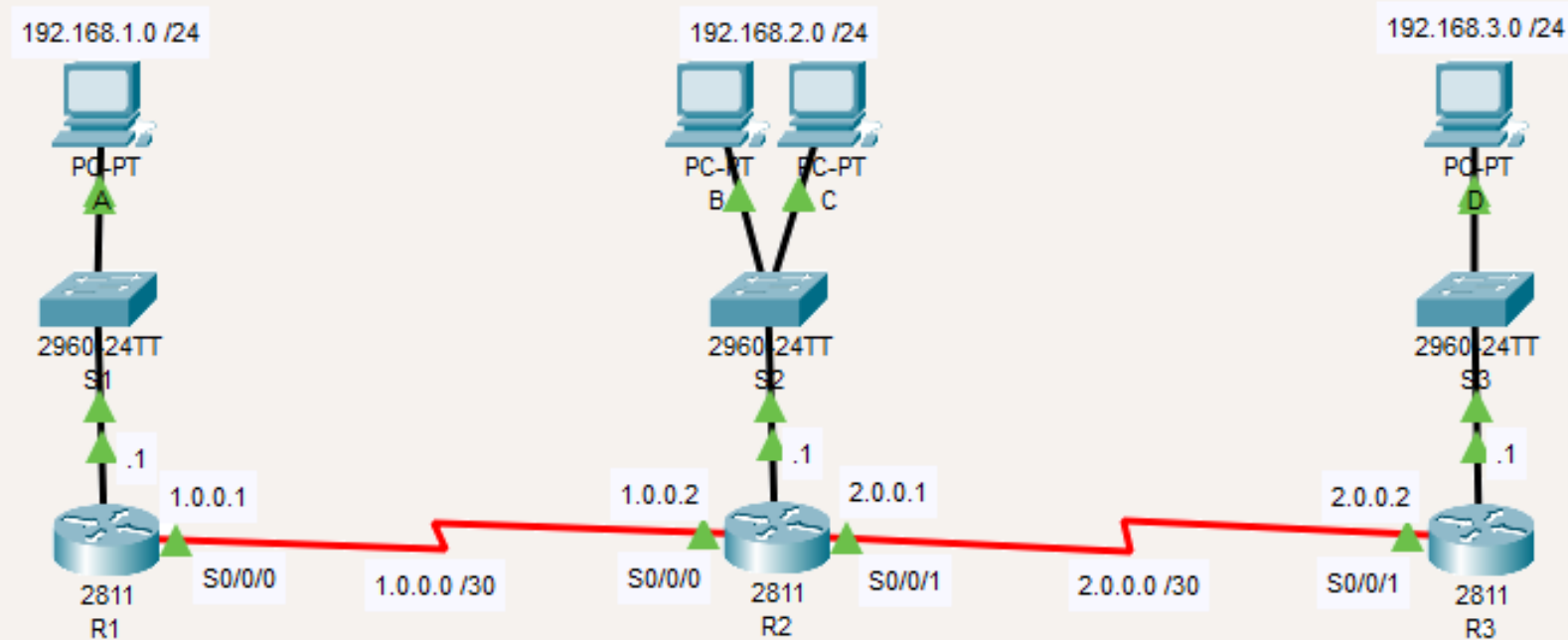
Static Routing — The *Default* Route

Default routes can be set only for stub networks – in those networks which only have one exit path.

```
R1(config)# ip route  0.0.0.0  0.0.0.0  exit_int
```
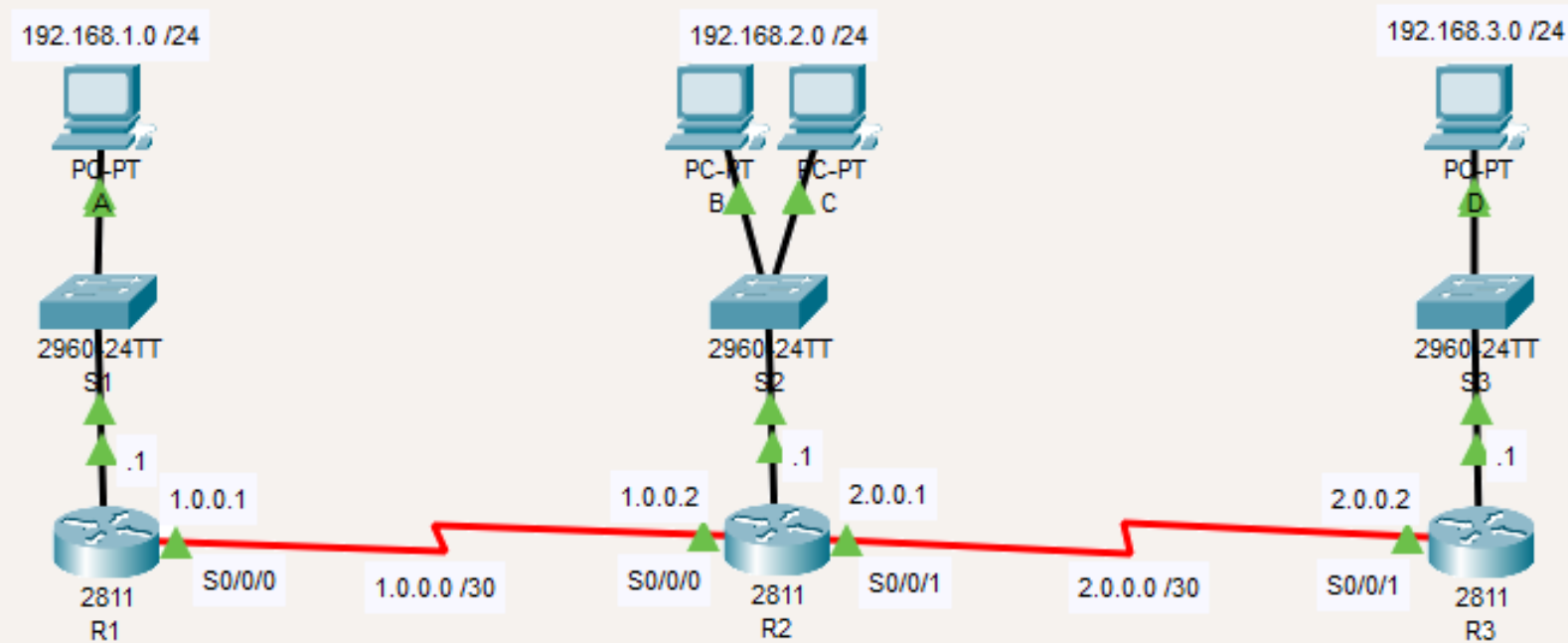
exit_int is the interface on R1 which leads to the network(s) to which all packets will be forwarded. In stead of an interface, the next hop IP address can be used.

Static Routing — Example

Challenge: list all of the static routes needed for all-to-all connectivity.

Static Routing — Example

Challenge: list all of the static routes needed for all-to-all connectivity.

Which of the routers can use the default route?

Static Routing — The AD Parameter

AD is short for "Administrative Distance", and it is value used to mark route preference / rank the routes available in the routing table.

```
R1(config)# ip route 2.0.0.0 255.255.255.252 S0/0/0 150
```

150 is an AD for network 2.0.0.0 through this ↑ route

A static route will by default get an AD of 0 or 1 (exit interface = 0, next hop IP = 1), where 0 is the best route, and 255 is the worst.

The default AD values for the routing protocols are:

– EIGRP AD: 90

– OSPF AD: 110

– RIP AD: 120

Static Routing

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