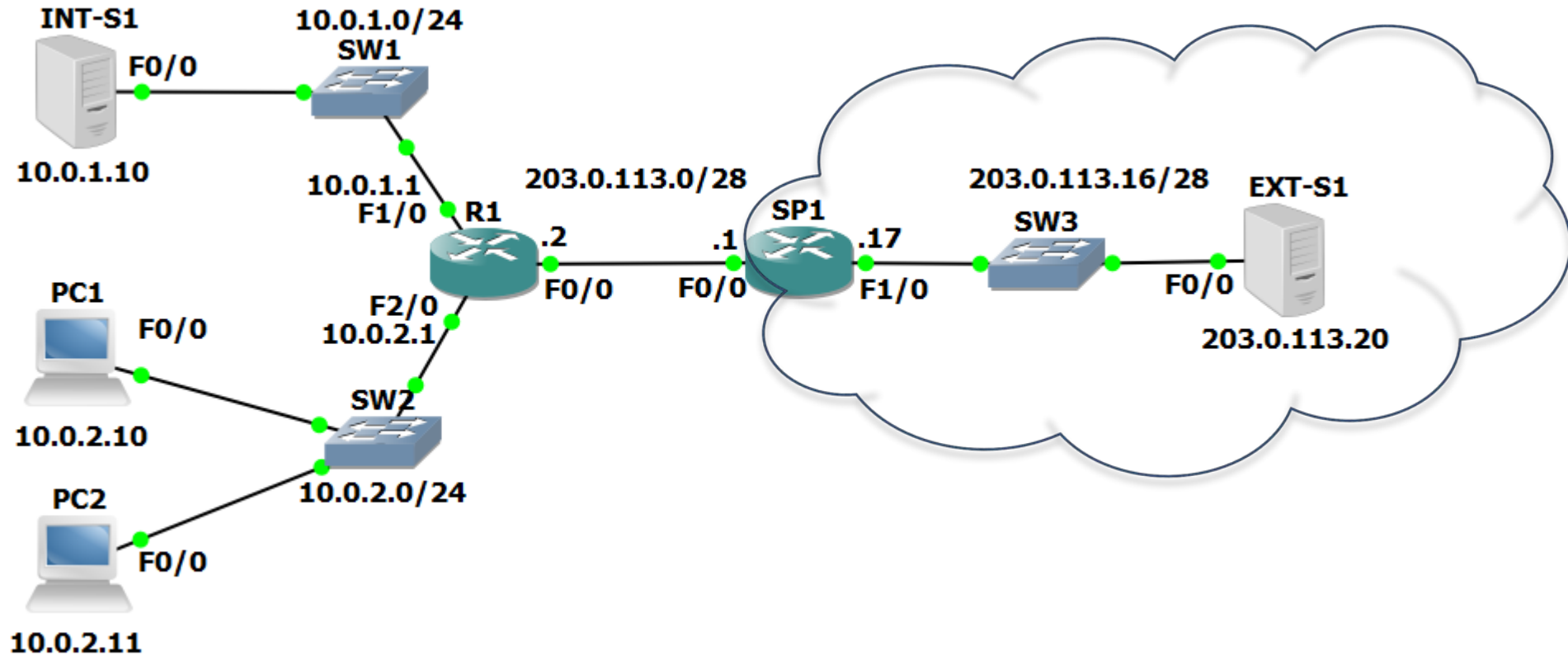


# NAT Types



- Static NAT – permanent one-to-one mapping usually between a public and private IP address. Used for servers which must accept incoming connections.
- **Dynamic NAT – uses a pool of public addresses which are given out on an as needed first come first served basis. Usually used for internal hosts which need to connect to the Internet but do not accept incoming connections.**
- PAT (Port Address Translation) – allows the same IP address to be reused.

# NAT Lab



# Dynamic NAT Scenario

- We have bought the range of public IP addresses 203.0.113.0/28 from our service provider
- 203.0.113.2 is used on the outside interface on our Internet edge router R1
- 203.0.113.1 is used as the default gateway address. It is the SP1 router on the other side of the link
- 203.0.113.3 is used for a static NAT translation for the 10.0.1.10 web server
- 203.0.113.4 – 203.0.113.14 remain available

# Dynamic NAT Scenario



- The hosts in the 10.0.2.0/24 network do not accept incoming connections so they don't need a fixed public IP address with a static NAT translation
- They do need outbound connectivity to the Internet so need to be translated to a public IP address
- We will use the remaining public addresses 203.0.113.4 - 14 as a NAT pool
- The inside hosts will be translated to the public IP addresses on a first come first served basis when they send traffic out
- The first host to send traffic out will be translated to 203.0.113.4, the second host to 203.0.113.5 etc., up to 203.0.113.14 at the end of the pool

# Dynamic NAT Scenario



- With standard dynamic NAT you need a public IP address for every inside host which needs to communicate with the outside
- If you have 30 hosts, you need 30 public IP addresses
- When all the addresses in the pool have been used, new outbound connections from other inside hosts will fail because there will be no addresses left to translate them to
- These hosts would have to wait for existing connections to be torn down and the translations to be released back into the pool when they time out

# Dynamic NAT Configuration



```
R1(config)#int f0/0
R1(config-if)#ip nat outside
R1(config)#int f2/0
R1(config-if)#ip nat inside
```

Configure the pool of global addresses.

```
R1(config)#ip nat pool Flackbox 203.0.113.4 203.0.113.14 netmask 255.255.255.240
```

Create an access list which references the internal IP addresses we want to translate.

```
R1(config)#access-list 1 permit 10.0.2.0 0.0.0.255
```

Associate the access list with the NAT pool to complete the configuration.

```
R1(config)#ip nat inside source list 1 pool Flackbox
```

# NAT Verification – show ip nat translation

```
R1#sh ip nat translation
```

Pro	Inside global	Inside local	Outside local	Outside global
---	203.0.113.3	10.0.1.10	---	---
<b>icmp</b>	<b>203.0.113.4:1</b>	<b>10.0.2.10:1</b>	<b>203.0.113.20:1</b>	<b>203.0.113.20:1</b>
---	203.0.113.4	10.0.2.10	---	---

# clear ip nat translation



- R1#clear ip nat translation can be used to remove translations from the translation table
- This can be useful when troubleshooting
- It is also often required if you want to edit your NAT configuration—the router will not allow changes when there are active translations
- clear ip nat translation \* will remove all dynamic translations



# NAT Verification – show ip nat statistics

```
R1#show ip nat statistics
Total active translations: 2 (0 static, 2 dynamic; 2 extended)
Outside interfaces:
  FastEthernet0/0
Inside interfaces:
  FastEthernet2/0
Hits: 148  Misses: 0
CEF Translated packets: 148, CEF Punted packets: 0
Expired translations: 7
Dynamic mappings:
-- Inside Source
[Id: 2] access-list 1 interface FastEthernet0/0 refcount 2
nat-limit statistics:
  max entry: max allowed 0, used 0, missed 0
```