Public IP

- Used on public network(INTERNET)
- Recognized on internet
- Given by the service provider (from IANA)
- Globally unique
- Pay to service provider (or IANA)
- Registered

Private IP

- Used with the LAN or within the organization
- Not recognized on internet
- Given by the administrator
- Unique within the network or organization
- Free
- Unregistered IP

Network address translation

- Method of translation of private IP to public IP address.
- In order to communicate with internet we must have registered public IP address.
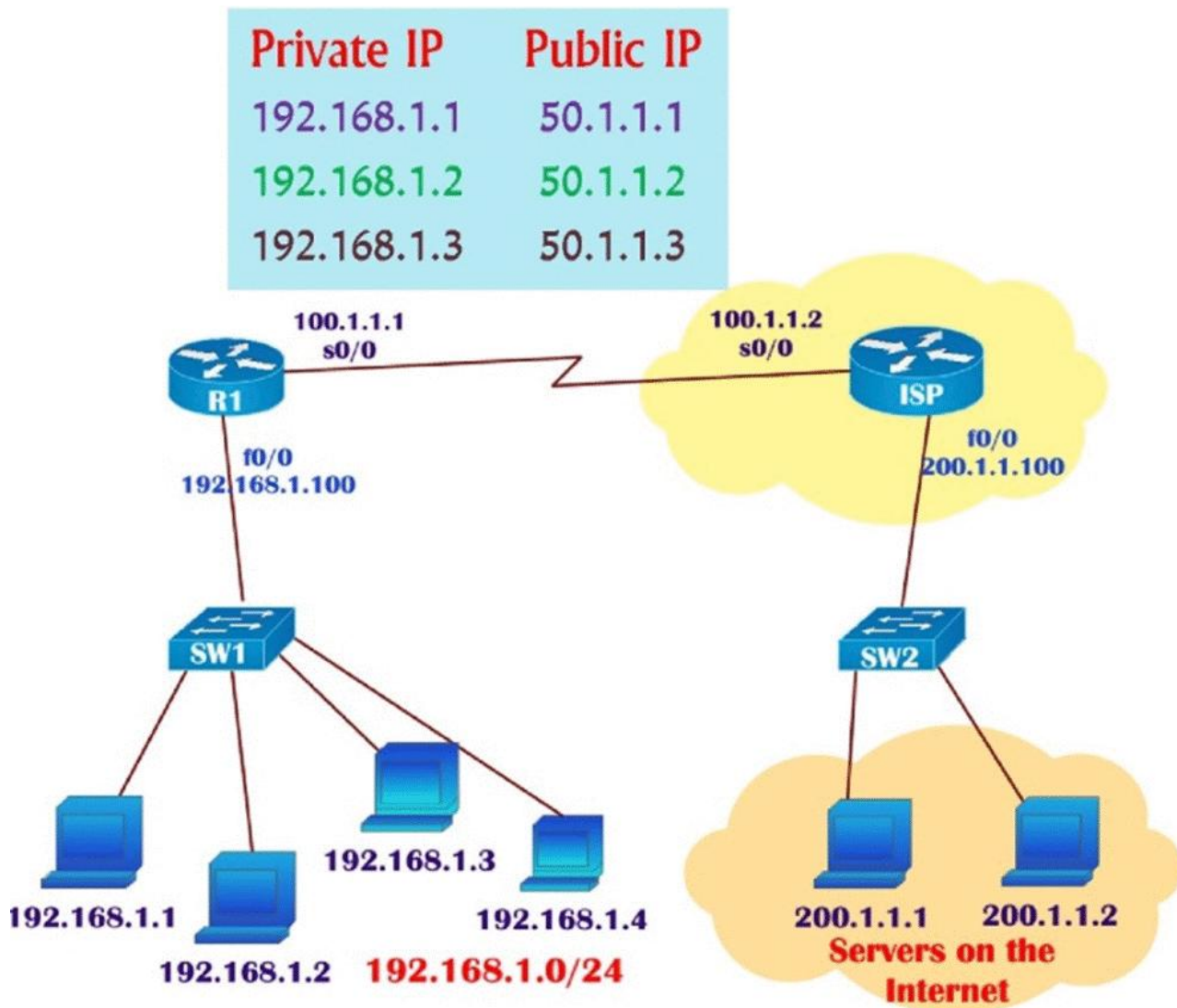- Can be configured on Routers, firewalls, servers.
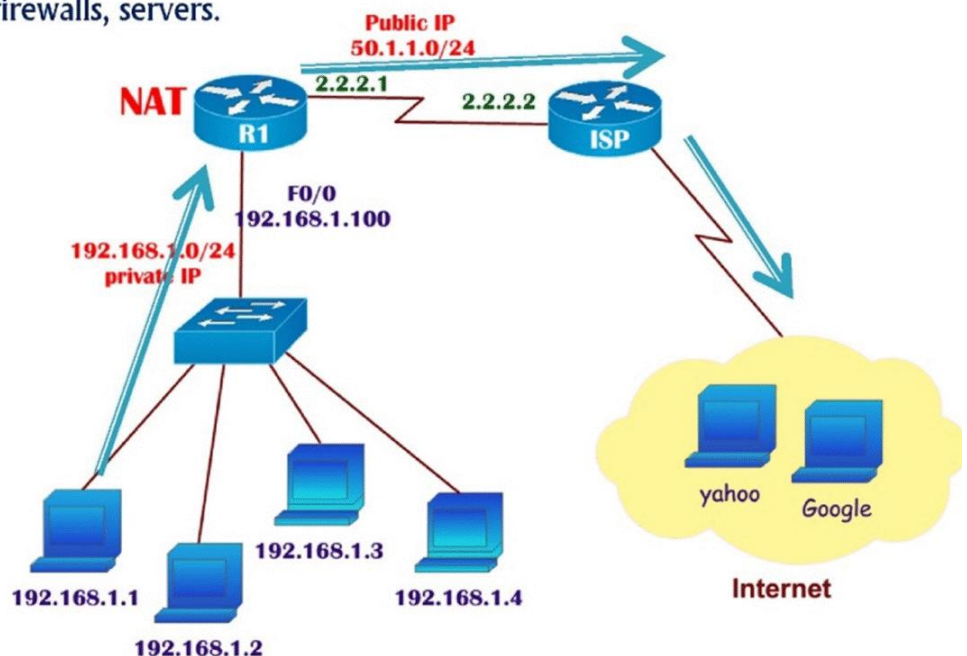
Types of NAT:-

- Static NAT
- Dynamic NAT
- Port Address Translation (PAT)

Static NAT

- One to one mapping done Manually
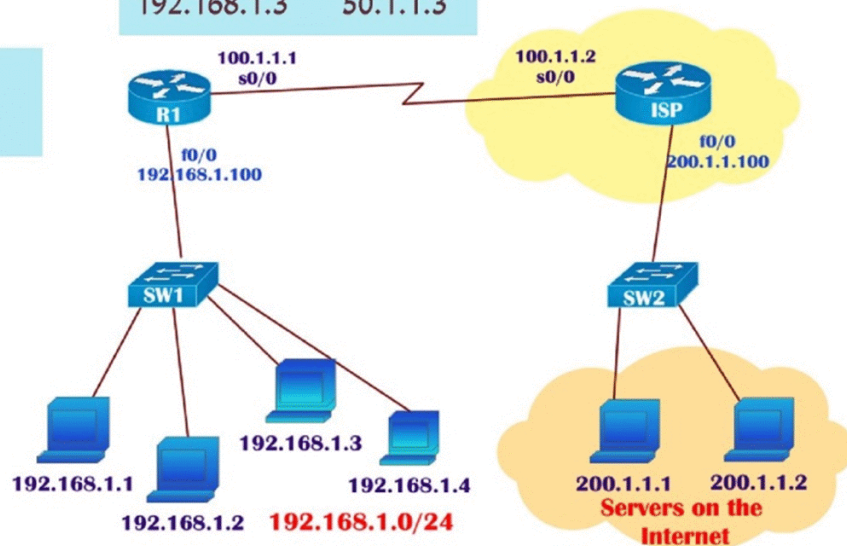- Every private IP needs one registered public IP address (one : one)

Dynamic NAT

▸ One to one mapping done automatically by NAT device.

▸ For every private IP needs on registered IP address (one : one)

Private IP	Public IP
192.168.1.1	50.1.1.1
192.168.1.2	50.1.1.2
192.168.1.3	50.1.1.3

| Private IP	Public IP
192.168.1.0/24	50.1.1.0/24

Port Address Translation (Dynamic NAT Overload)

▸ Thousands of private users – use single Public IP.

▸ Use port numbers mapped to single Public IP to differentiate connections.

▸ PAT is the real reason we haven't run out of valid IP address on the Internet

Private IP	Public IP
192.168.1.1	50.1.1.1 : 2000
192.168.1.2	50.1.1.1 : 2001
192.168.1.3	50.1.1.1 : 2002

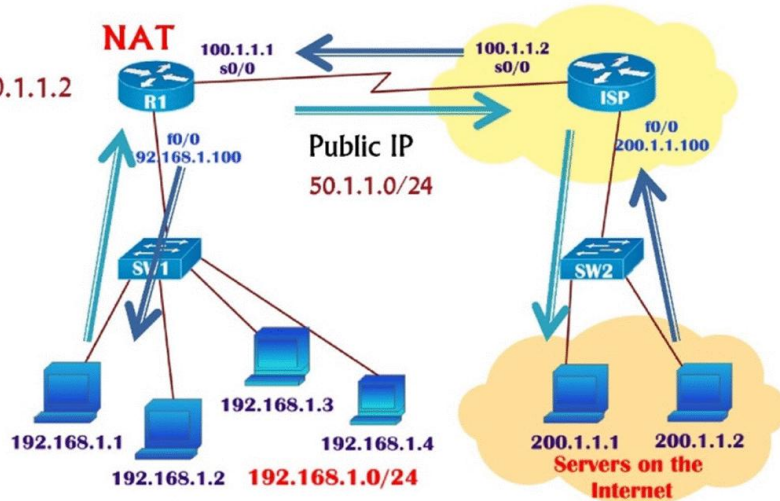| Private IP	Public IP
192.168.1.0/24	50.1.1.1/32
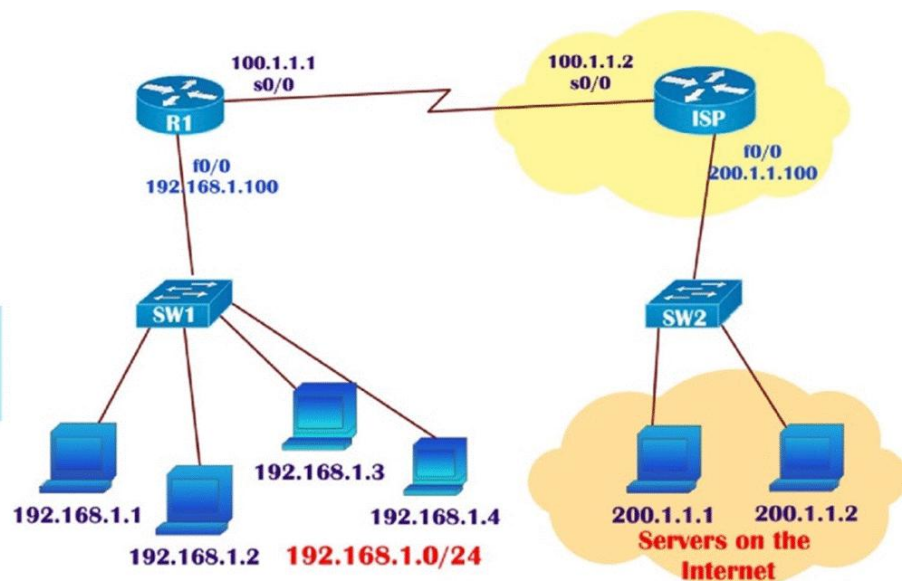
Lab setup for NAT

1. Configure IP address as per the diagram.
2. Configure default route towards ISP from R1
3. Configure static route from ISP to public IP used for translation

ISP(config)# Ip route 50.1.1.0   255.255.255.0   100.1.1.1

NAT

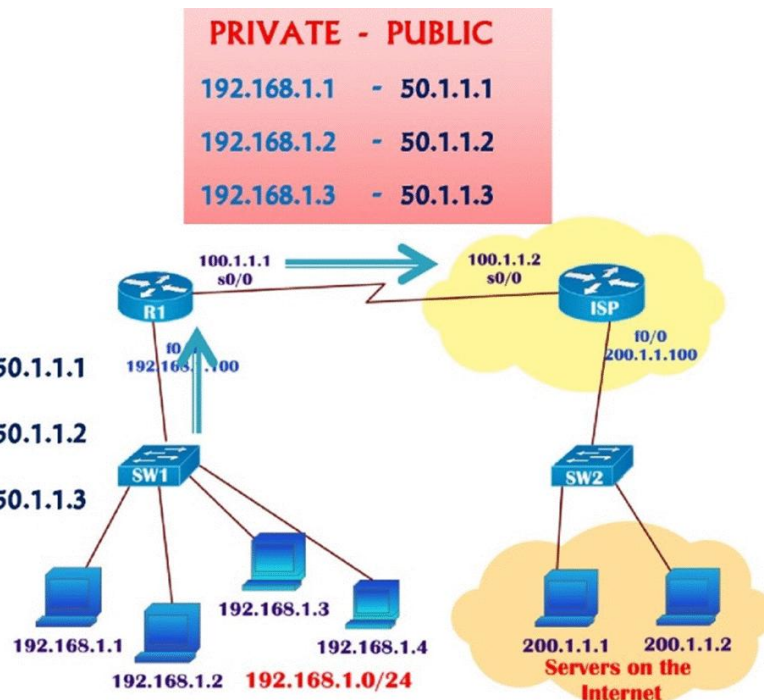R1(config)# Ip route 0.0.0.0   0.0.0.0   100.1.1.2

100.1.1.1
s0/0
R1

100.1.1.2
s0/0
ISP

f0/0
92.168.1.100

Public IP
50.1.1.0/24

f0/0
200.1.1.100

SW1

SW2

192.168.1.3

192.168.1.1

192.168.1.4

192.168.1.2   **192.168.1.0/24**

200.1.1.1   200.1.1.2
**Servers on the
Internet**

LAB : Static NAT

R-1(config)#ip nat inside source static <private-IP> <Public-IP>

PRIVATE - PUBLIC

192.168.1.1 - 50.1.1.1

192.168.1.2 - 50.1.1.2

192.168.1.3 - 50.1.1.3

100.1.1.1
s0/0
R1

100.1.1.2
s0/0
ISP

f0/0
200.1.1.100

R-1(config)#**ip nat inside source static** 192.168.1.1   50.1.1.1

R-1(config)#**ip nat inside source static** 192.168.1.2   50.1.1.2

R-1(config)#**ip nat inside source static** 192.168.1.3   50.1.1.3

f0
192.168.1.100

SW1

SW2

192.168.1.3

192.168.1.1

192.168.1.4

192.168.1.2   **192.168.1.0/24**

200.1.1.1   200.1.1.2
**Servers on the
Internet**

LAB : Static NAT

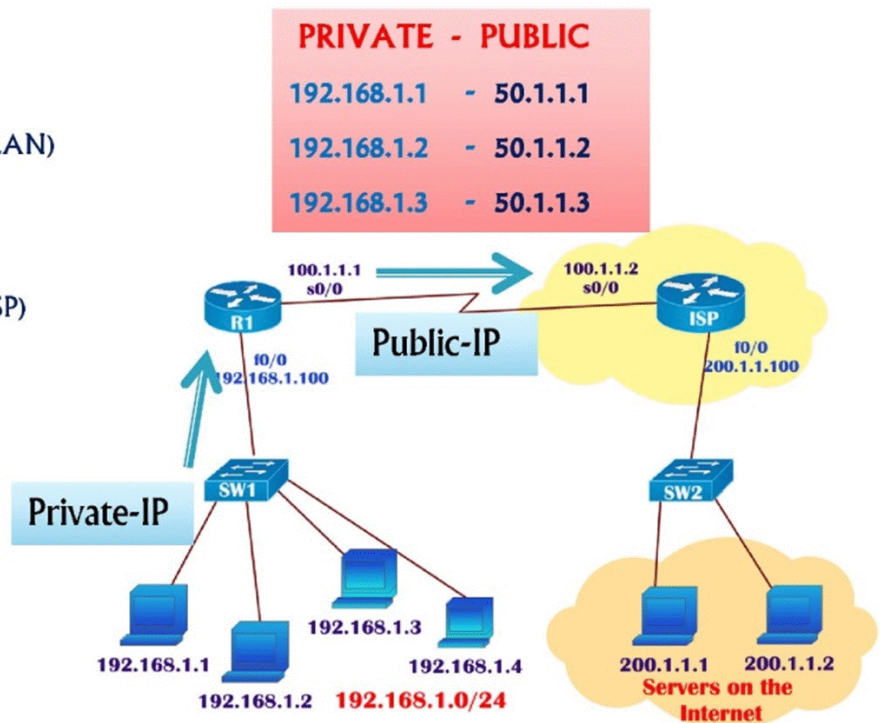## Implementation

R-1(config)#interface fastEthernet 0/0
R-1(config-if)#ip nat inside
R-1(config-if)#exit
                    (interface facing towards LAN)

R-1(config)#interface serial 0/0
R-1(config-if)#ip nat outside
                    (Interface facing towards ISP)

PRIVATE - PUBLIC	
192.168.1.1	- 50.1.1.1
192.168.1.2	- 50.1.1.2
192.168.1.3	- 50.1.1.3

To verify NAT

R-1#sh ip nat translations

LAB : Dynamic NAT

R-1(config)#access-list <no> permit <source > < Wildcardmask>

R-1(config)#ip nat pool <name> <start Pub-IP> <end-Pub-IP> netmask <subnet-mask>

R-1(config)#ip nat inside source list <ACL-no> <poolname>

R-1(config)#access-list 55 permit 192.168.1.0 0.0.0.255

R-1(config)#
ip nat pool CCNA 50.1.1.1 50.1.1.200 netmask 255.255.255.0

R-1(config)#ip nat inside source list 55 pool CCNA

PRIVATE -	PUBLIC
192.168.1.0/24 -	50.1.1.1 - 50.1.1.200/24