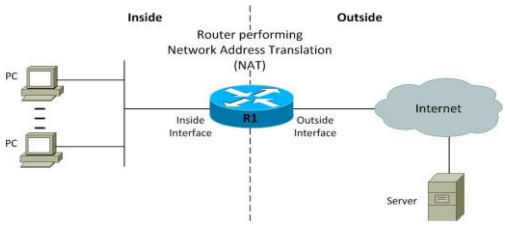
NAT & PAT

Network Address Translation - Port Address Translation

NAT (Network Address Translation)

- Translates Private address to Global address.
- Solve problem of IP depletion.



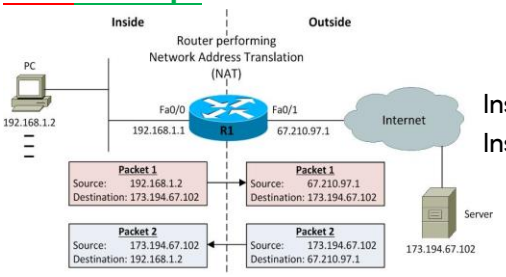
Private IP Addresses:

Class	Number of Networks	Private Address Space
A	1	10.0.0.0 – 10.255.255.255
B	16	172.16.0.0 – 172.31.255.255
C	256	192.168.0.0 – 192.168.255.255

NAT Addresses

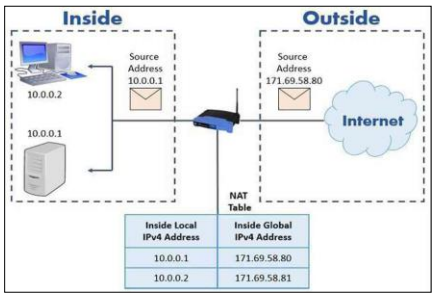
Inside local	- Assigned to inside devices - Are Not advertised to the outside **(Private IP address of the host).**
Inside global	- Are Known to the outside **(Public IP address of the host).**

NAT Concept



Inside local (Private address) 192.168.1.2

Inside Global (Public address) 67.210.97.1



NAT Types

Static NAT

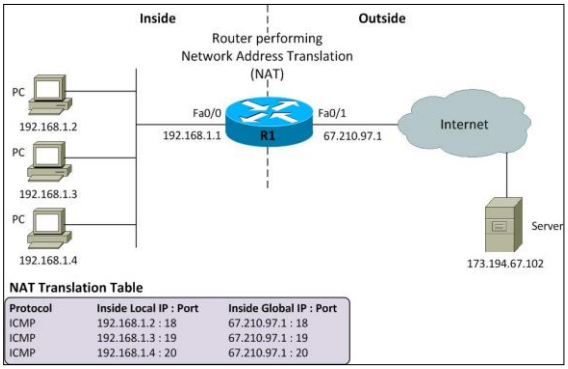
- **Mapping one-to-one between local and global addresses.**
  - Requires one registered public IP address for every host on your network.
  - Provides a degree of security by hiding the inside IP addresses from the outside world.
  - Has no benefit in terms of IP address conservation.

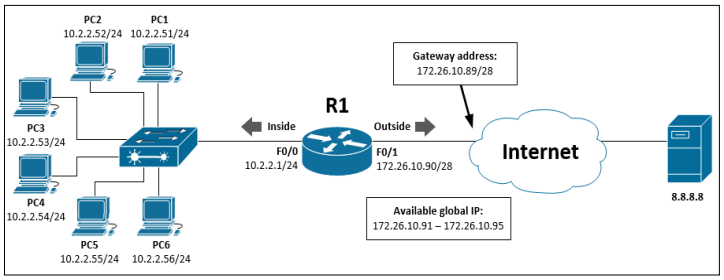
Dynamic NAT

- **Mapping unregistered private IP addresses to registered public IP addresses from Pool of available registered IP address.**
  - If all inside global IP addresses are exhausted, any new request from new host will be discarded.
  - After Timeout Value, the router remove host inside global from table if it is not in use.

PAT (Port Address Translation)

- **Mapping many-to-one between local and global addresses** and is accomplished using different port numbers.
  - Many users can be connected to the Internet using only **one real** global IP address.
  - Port number 16 bit (0 – 65535)
  - This is the most popular NAT type.





NAT Configuration

Static NAT

For interface S0/0

```
R1(config-if)# ip NAT outside
```

For assigning inside local and inside global

```
R1(config)# ip NAT inside source static 10.1.1.1 200.1.1.1
R1(config)# ip NAT inside source static 10.1.1.2 200.1.1.2
```

Dynamic NAT

For interface F0/0

```
R1(config-if)# ip NAT inside
```

For interface S0/0

```
R1(config-if)# ip NAT outside
```

For assigning inside local

```
R1(config)# access list 1 permit 10.1.1.1
R1(config)# access list 1 permit 10.1.1.2
```

For assigning inside global

```
R1(config)# ip NAT pool science 200.1.1.1 200.1.1.2 mask 255.255.255.252
```

For attaching inside local to inside global:

```
R1(config)# ip NAT inside source list 1 pool science.
```