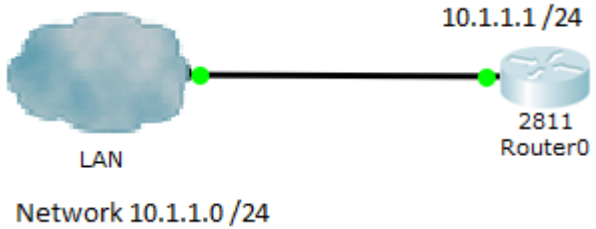
Lab6 - Guideline

Topics
A. DHCP
B. NAT

A. DHCP

a. DHCP IP Lease Process: Discover, Lease Offer, Lease Request, Lease Acknowledgement
b. Scope, Address Range, Reservation/Exclusion
c. Superscopes
d. Relay agent
e. DHCP on Windows Server 2008: http://www.windowsnetworking.com/articles-tutorials/windows-server-2008/How-to-Install-Configure-Windows-Server-2008-DHCP-Server.html

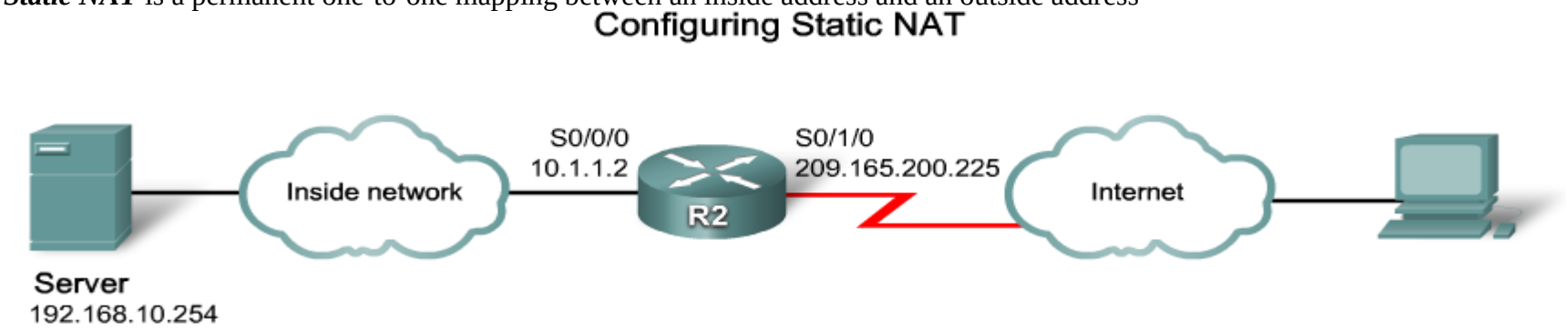
a. Configure the pool name Router(config)# **ip dhcp pool** name *b. Configure the addresses(specify the network address for the users to get addresses from)* Router(dhcp-config)# **network** network-number [mask|prefix-length] *c. Setting up the Domain Name for the Client (Address of the DNS server)* Router(dhcp-config)# **dns-server** address [address2 ...address5] *d. Configuring the Default Router (Gateway) for the Client (!the default router has to be on the same subnet as the DHCP client)* Router(dhcp-config)# **default-router** address *e. Configuring lease duration* Router(dhcp-config)#**lease** Days Hours Minutes *f. Exclude IP addresses* Router(config)#**ip dhcp excluded-address** start_address end_address (Exclude IP addresses that where statically assigned)	Example:  Router0(config)# **ip dhcp pool** LAN_IP Router0(dhcp-config)# **network** 10.1.1.0 255.255.255.0 Router0(dhcp-config)# **dns-server** 10.1.1.2 Router0(dhcp-config)# **default-router** 10.1.1.1 Router(config)#**ip dhcp excluded-address** 10.1.1.1 10.1.1.2

B. NAT

a. Purpose
b. NAT table
c. NAT types

NAT generally only translates IP addresses on a 1:1 correspondence between publicly exposed IP addresses and privately held IP addresses

Static NAT is a permanent one-to-one mapping between an inside address and an outside address

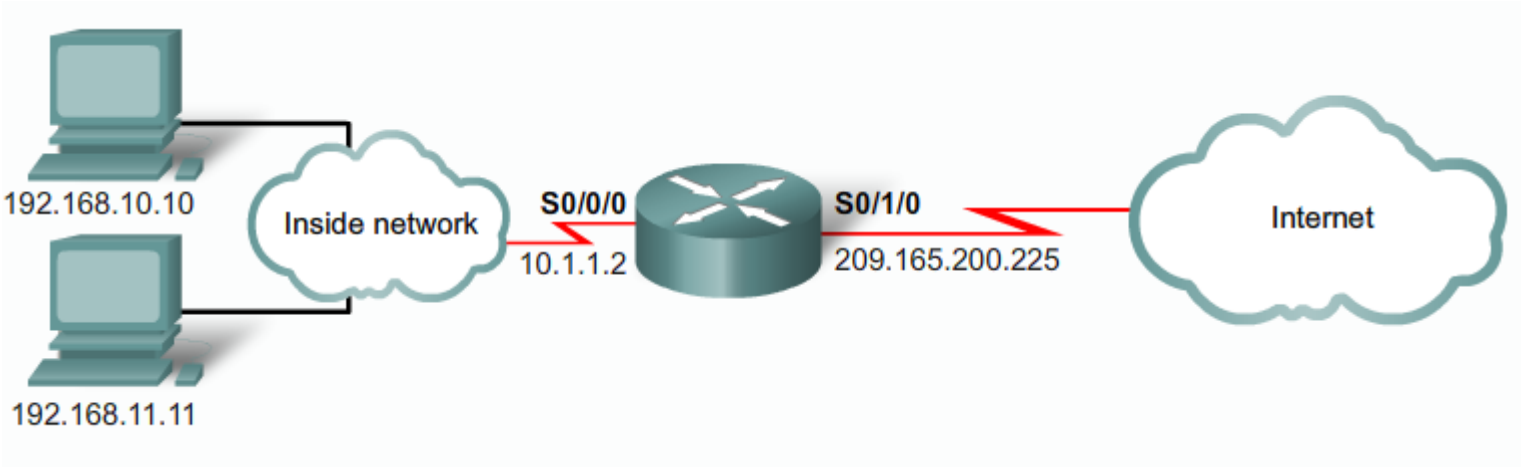



```
ip nat inside source static 192.168.10.254 209.165.200.254
!Establishes static translation between an inside local address and an inside global address.
interface serial 0/0/0
ip nat inside
!Identifies Serial 0/1/0 as an outside NAT interface.
interface serial 0/1/0
ip nat outside
!Identifies Serial 0/1/0 as an outside NAT interface.
```

With this configuration, 192.168.10.254 will always translate to 209.165.200.254.

Dynamic NAT maps private IP addresses to public addresses.

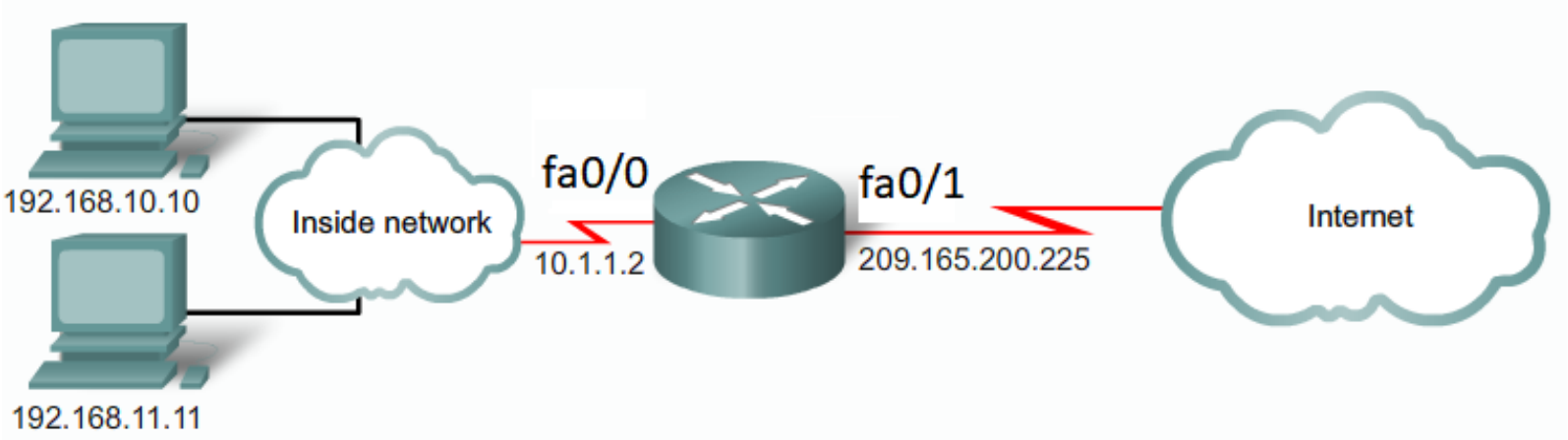
- public IP addresses come from a NAT pool




```
ip nat pool NAT-POOL1 209.165.200.226 209.165.200.240 netmask 255.255.255.224
!Defines a pool of public IP addresses under the pool name NAT-POOL1
access-list 1 permit 192.168.0.0 0.0.255.255
!Defines which addresses are eligible to be translated
ip nat inside source list 1 pool NAT-POOL1
!Binds the NAT pool with ACL 1
interface serial 0/0/0
  ip nat inside
!Identifies interface Serial 0/0/0 as an inside NAT interface
interface serial 0/1/0
  ip nat outside
!Identifies interface Serial 0/1/0 as the outside NAT interface
```

OBS: The access list can have several permit commands

NAT overloading (sometimes called Port Address Translation or PAT) maps multiple private IP addresses to a single public IP address or a few addresses

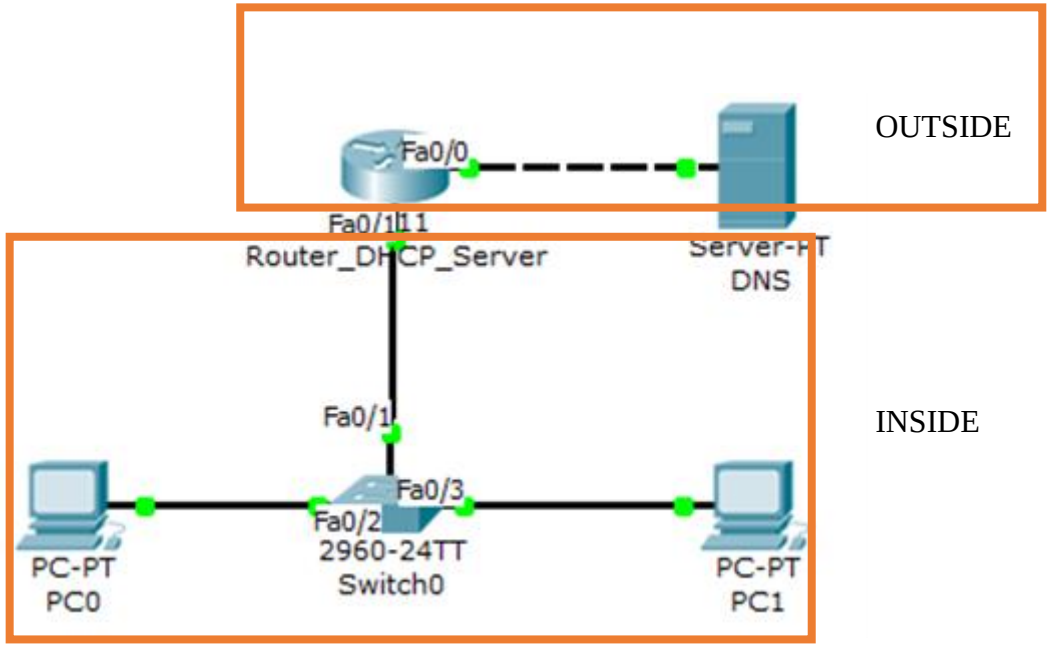



```
access-list 1 permit 192.168.0.0 0.0.255.255
! – Defines which addresses are eligible to be translated
ip nat pool NAT-POOL2 209.165.200.226 209.165.200.240 netmask 255.255.255.224
! – Defines a pool of addresses named NAT-POOL2 to be used in NAT translation
ip nat inside source list 1 pool NAT-POOL2 overload
! – Binds the NAT pool with ACL 1
interface fa0/0
ip nat inside
! – Indentifies interface Serial 0/0/0 as an inside NAT interface
interface fa0/1
ip nat outside
! – Indentifies interface Serial 0/1/0 as an outside NAT interface
```

OBS: The access list can have several permit commands

Verify NAT translations:
Router#show ip nat translations

Laboratory test configuration:



Device		**IP address**	**Subnet mask**	**Default Gateway**	**DNS address**
Router	Fa0/0	193.1.1.1	255.255.255.0	-	-
	Fa0/1	172.16.2.1	255.255.255.0	-	-
PCs		Dynamic (DHCP)	Dynamic (DHCP)	Dynamic (DHCP)	Dynamic (DHCP)
DNS Server		193.1.1.2	255.255.255.0	193.1.1.1	-

NAT Public IP Range	193.1.1.10 – 193.1.1.15

Test the connectivity.

a. ping <target IP> and tracert <target IP>
b. Verify NAT translations:

Router#show ip nat translations