

Enhancing the Campus Network with NAT (Network Address Translation)

Project-3: Final Project Proposal

Team – 0to255

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Project Summary

Previous project was on Campus Network with OSPF routing, which provided smooth routing between the routers of the campus. In this project, we are going to make an enhancement. Which is, we're going to add NAT to the campus network. With the help of this, the hosts on the network will can go online and exchange packets with any IP address.

Introduction and Project Objectives

Network Address Translation (NAT) is a process that enables one, unique IP address to represent an entire group of computers. In network address translation, a network device, often a router or NAT firewall, assigns a computer or computers inside a private network a public address. In this way, network address translation allows the single device to act as an intermediary or agent between the local, private network and the public network that is the internet. NAT's main purpose is to conserve the number of public IP addresses in use, for both security and economic goals.

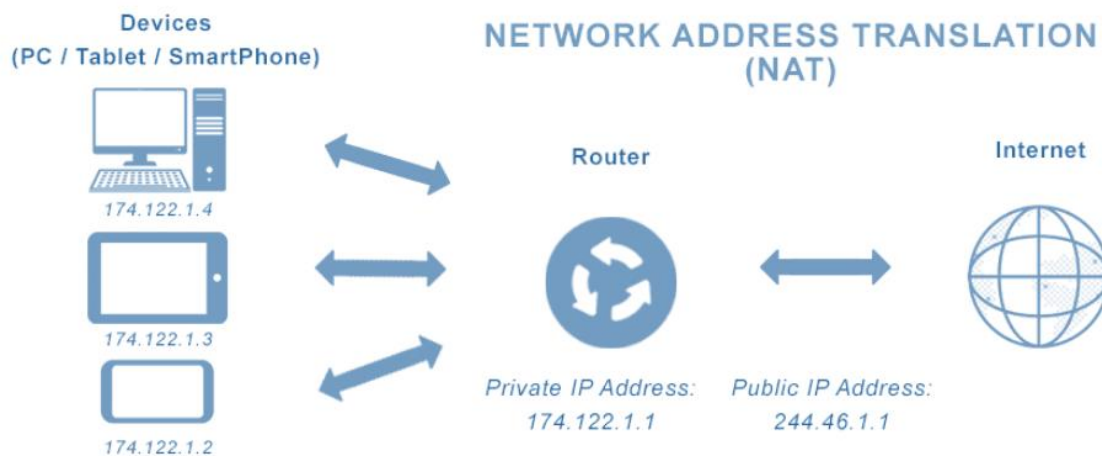


Figure-1

In our project we'll use DHCP. Dynamic Host Configuration Protocol (DHCP) is a network protocol that is used to configure network devices to communicate on an IP network. A DHCP client uses the DHCP protocol to acquire configuration information, such as an IP address, a default route, and one or more DNS server addresses from a DHCP server. The DHCP client then uses this information to configure its host. Once the configuration process is complete, the host is able to communicate on the Internet.

The DHCP server maintains a database of available IP addresses and configuration information. When it receives a request from a client, the DHCP server determines the network to which the

DHCP client is connected, and allocates an IP address or prefix appropriate for the client, and sends configuration information appropriate for that client.

Objectives:

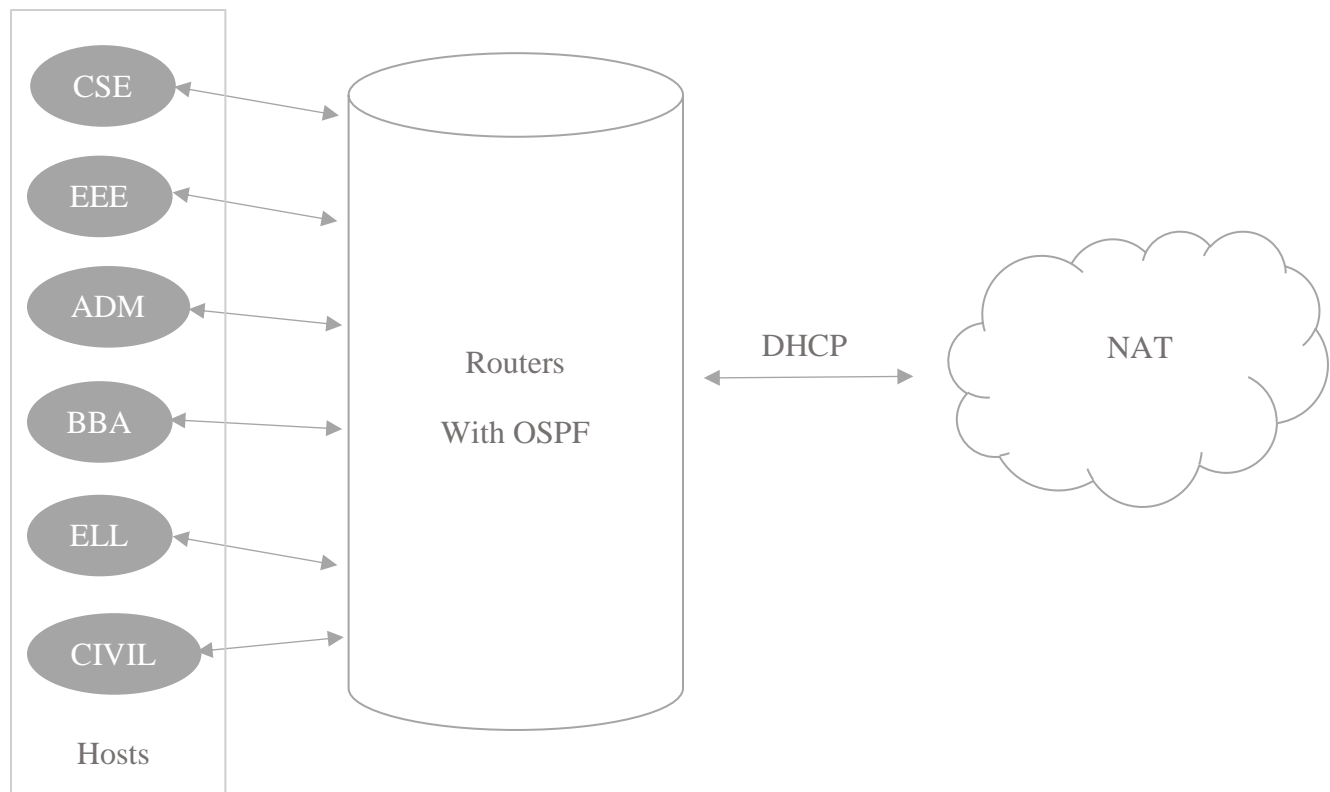
- *For hosts to exchange packets with any IP address across the world*
- *To make the Campus Network dynamic*
- *To optimize the use of IPs of the IP pool*

Modeling Plan

This project initially requires an extensive modeling plan which will form a context and provide necessary theoretical tools for the development of a Campus Network with NAT that will be verified through experimental testing of Ping samples.

Modeling

Modeling will be created in GNS3 along with the GNS3 VM. VMWare is required to use NAT in GNS3. The model will be created in GNS3 with necessary templates. The interfaces will be assigned to their respective IPs except interfaces which need to be assigned with DHCP. The usage of IPs will be optimized. VMWare receives its IP automatically when installed.



Experimental

When modeling is done, we will test the Hosts by pinging the other hosts on the network. If it fails, we'll revise the model and IP assigned to find the fault.

Pinging to 8.8.8.8 (google.com) will be tested to check if the hosts can exchange packets to Google IP. If they can, the project is a success, if not another revise will be held. If the faults are found, it will be fixed, even if we have to start everything from the scratch.

Risk Management

Risk Class	Description of risk	Likelihood	Consequences	Management Strategy
Environmental	GNS3 can collapse	Possible	Moderate	The project file backup will be maintained every day.
	GNS3 VM can collapse/not start	Probable	Moderate	Network adapters naming vmnet1 and vmnet8 can be restarted.
	Device that is used to make the project can get stolen/broken	Probable	Major	Backup file of the project will be kept online.
Financial	No significant effect	-	-	-
Project Outcomes	Ping doesn't reach 8.8.8.8	Probable	Moderate	Revise the assignment of IPs will fix the problem.
	Ping doesn't reach other hosts on the local network	Probable	Moderate	Revise the assignment of IPs will fix the problem.
	While assigning IP, terminal can show bad mask for IP address	Possible	Minor	IP table should be created with proper concentration

Appendix A

On the advice of our supervisor, Mr. Abdullahil Kafi, the project needs to be completed at the due time. The testing needs to be performed before submitting the project. Proper enhancement needs to be done.

Appendix B – Risk parameters

Likelihood	Description
Probable	The event is expected to occur within the time frame of the project
Possible	The event is not expected to occur in the time frame of the project
Improbable	Conceivable but highly unlikely to occur during the project
Consequence	Description
Severe	Most objectives cannot be achieved
Major	Some important objectives cannot be achieved
Moderate	Some objectives affected
Minor	Minor effects that are easily remedied
Negligible	Negligible impact on objectives

Guidelines for classifying the likelihood and consequences of risk factors. (Based on HB 436:2004 Risk Management Guidelines – companion to Australian Standard AS/NZ 4360:2004)