

Network Simulation Lab using GNS3

Introduction

The purpose of this lab exercise was to set up a virtual network simulation environment using GNS3 on Ubuntu and design three basic computer networks without using routers. These topologies—Simple LAN, Star, and Multi-Switch Mesh—help in understanding switching concepts, IP addressing, broadcast domains, and connectivity testing. The lab also required exporting GNS3 projects and submitting all work through a GitHub repository.

Environment Setup – GNS3 Installation and Verification

GNS3 was installed on Ubuntu using the official package repository.

After installation:

- The GNS3 application was launched.
 - The GNS3 VM displayed a green indicator, meaning it was functioning properly and ready for simulations.
 - A screenshot of the dashboard was captured for documentation.
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Network Topology Design and Implementation

Topology 1 – Simple LAN

Steps:-

1. Two virtual PCs were added to the workspace.
2. Both PCs were connected to a single switch using Ethernet cables.
3. IP addresses assigned to the PCs belonged to the same network .
4. The ping command was executed from one PC to the other.

Result:

The ping was successful, confirming correct IP addressing, functioning interfaces, and switch forwarding.

Topology 2 – Star Topology

Steps:-

1. Four PCs were placed in the workspace.
2. All PCs were connected to one central switch.

3. Each device was assigned an IP address within the same subnet
4. Connectivity tests were performed from PC1 to all other PCs.

Result:

All ping tests were successful, proving that the central switch enabled every device to communicate with each other.

Topology 3 – Multi-Switch Mesh Topology

Steps:-

1. Three switches—SW1, SW2, and SW3—were added and connected in a loop (mesh).
2. A PC was connected to each switch.
3. All PCs were configured with IPs from the same subnet.
4. End-to-end pings were performed between all systems.

Result:

All PCs could communicate successfully, showing that GNS3's default switching layer prevents broadcast storms even in loops.

Exporting Projects

Each topology was saved and exported as a Portable Project using the steps:

File → Export → Portable Project

This created self-contained project folders that can be imported on any system running GNS3. These exported folders were included in the GitHub submission.

GitHub Submission

A new GitHub repository named **NetworkSimLab - Sivani J Biju** was created.

Uploaded items included:

- The exported GNS3 portable project folders
- A folder named Screenshots/ containing:
 - GNS3 installation verification
 - Topology diagrams
 - Ping test results
- This Summary Report (PDF format)

The public GitHub URL was submitted as required.

Conclusion

This lab provided hands-on experience with network design and simulation using GNS3. By building three different topologies, configuring IP addresses, and performing connectivity tests, a practical understanding of LAN switching and basic network communication was achieved. The task also strengthened documentation and version control skills through project export and GitHub submission.