**Firewall Project Report**

Submitted by: Posaram Dewasi

Date: August 2025

# 1. Introduction

A firewall is a network security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules. In this project, we implement a simple packet filtering firewall in Python using the Scapy library.

# 2. Objective of the Project

The objective of this project is to develop a custom firewall using Python that can allow or block network packets based on user-defined rules specified in a configuration file (rules.yml).

# 3. System Requirements

- Python 3.8 or higher  
- Libraries: scapy, pyyaml, rich, six  
- Operating System: Windows/Linux with administrator/root access

# 4. Methodology / Working

The firewall works on the principle of packet sniffing and filtering. It loads predefined rules from a configuration file (rules.yml) and applies them on every packet captured by Scapy.  
  
Steps:  
1. Load firewall rules from rules.yml.  
2. Capture network packets using Scapy's sniff() function.  
3. Match packets against rules (allow/block).  
4. Display the result using Rich library (colored output).

# 5. Implementation & Output

The rules.yml file defines packet filtering rules. Example:  
  
rules:  
 - action: block, proto: tcp, dst\_port: 23 (Blocks Telnet)  
 - action: block, src\_ip: 192.168.1.50 (Blocks noisy host)  
 - action: allow, proto: udp, dst\_port: 53 (Always allows DNS)  
  
The firewall.py script applies these rules in real time. Blocked packets are shown in red, and allowed packets in green.

# 6. Conclusion

This project successfully demonstrates the creation of a basic firewall using Python. It allows or blocks network traffic based on simple YAML-defined rules. In the future, the project can be extended with features such as logging, GUI interface, and integration with intrusion detection systems (IDS).

# 7. References

- Python Documentation (https://docs.python.org/)  
- Scapy Library Documentation (https://scapy.readthedocs.io/)  
- PyYAML Documentation (https://pyyaml.org/)