Personal Firewall Using Python - Project Report

# Abstract

This project focuses on developing a personal firewall using Python that monitors and blocks network connections based on IP addresses and port numbers. The project includes three operational modes: CLI (Command Line Interface), GUI (Graphical User Interface) using Tkinter, and REST API using Flask. It demonstrates basic cybersecurity concepts and practical implementation with multi-platform support.

# Features

- Monitor incoming/outgoing network connections  
- Block specific IP addresses and ports  
- Modes: CLI, GUI (Tkinter), REST API (Flask)  
- Real-time connection logs  
- Docker deployment  
- Cross-platform (Windows/Linux)

# Architecture Overview

The firewall uses the psutil library to monitor live connections and blocklist configurations are handled via JSON files. CLI, GUI, and REST API allow users to interact with the firewall based on preference.

Basic Architecture:  
User --> Personal Firewall --> psutil (network monitor)  
 |-- CLI  
 |-- GUI  
 |-- API  
 |-- Docker

# Project Files Structure

├── api\_firewall.py  
├── gui\_firewall.py  
├── firewall.py  
├── rules.json  
├── requirements.txt  
├── Dockerfile  
└── firewall\_log.txt (auto-generated)

# Linux/Windows Blocking Commands

Linux:  
sudo iptables -A INPUT -s 192.168.1.100 -j DROP  
sudo iptables -A INPUT -p tcp --dport 445 -j DROP  
  
Windows:  
netsh advfirewall firewall add rule name="BlockIP" dir=in action=block remoteip=192.168.1.100  
netsh advfirewall firewall add rule name="BlockPort" dir=in action=block protocol=TCP localport=445

# Docker Commands

docker build -t personal-firewall .  
docker run -p 5000:5000 personal-firewall

# Conclusion

This project demonstrates how Python can be used to build a simple personal firewall supporting CLI, GUI, and REST API modes. It serves as a practical introduction to network security concepts and Python development.

# Future Scope

- Add advanced packet inspection  
- Real-time notifications (email/Telegram)  
- Integration with intrusion detection systems  
- Advanced logging and visualization