📄 Project Report — Personal Firewall using Python

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1. Introduction

This project aims to build a **basic Personal Firewall using Python**. The firewall captures and monitors network traffic in **real-time**, identifies **malicious IP addresses or blocked ports**, and logs all activity. The project helps in understanding how packet filtering and basic network security works.

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2. Abstract

The Personal Firewall leverages Python's **Scapy library** to sniff packets, **filter unwanted connections**, and **log important events**. It uses a **JSON-based configuration** to allow flexible rule changes without touching the code, making it an ideal educational tool to understand packet-level filtering.

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3. Tools Used

Tool	Purpose
Python	Main programming language
Scapy	Packet sniffing and network analysis
JSON	Rules configuration (block/allow list)
VS Code	Code editing
Terminal/CMD	Running the firewall
Chat GPT	Exploring and achieving the Solutions

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4. Steps Involved in Building the Project

- ✅ Installed required Python libraries using pip.
- ✅ Created firewall.py to capture and process network packets.
- ✅ Designed rules.json for blocking IP addresses and ports.

- ✅ Implemented packet inspection and filtering logic.
- ✅ Added logging functionality to track traffic events.
- ✅ Tested on local machine by generating ICMP (ping), HTTP, and blocked port traffic.

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5. Conclusion

The project successfully demonstrates how a **basic personal firewall** operates using Python and Scapy. It provides hands-on experience in packet filtering, real-time traffic monitoring, and custom rule-based blocking. While it is not a replacement for enterprise firewalls, it provides foundational skills in **network security** and **packet analysis** for beginners.