CPSC 526 Winter 2024  
Assignment 5

Oscar campos

UCID: 30057153

Firewall Simulation Script (fwsim)

Description

This Python script is designed to simulate the behavior of a basic firewall using specified rules and packets. This version is a build on the started code provided by the professor, Pavol .The main function fwsim() takes two file names as inputs: one for firewall rules and another for packets to process. It checks each packet against the rules and determines the action to be taken based on matching criteria including direction, IP address, port number, and flag conditions.

Features

* Parsing and interpreting firewall rules and packet data from text files.
* Matching packets against rules based on:
* Direction (inbound or outbound)
* IP address range (including wildcard support)
* Port number (with support for specific ports and wildcards)
* TCP flag condition (specifically for established connections)
* Returning results for each packet that specify the action taken and the rule that was matched or if the default action is applied.

File Structure

* Firewall Rules File (rules\_fname): Each line in this file represents a rule, formatted with 4 or 5 fields (Direction, Action, IP Range, Ports, [Optional Flag]).
* Packets File (packets\_fname): Each line in this file represents a packet to be checked, formatted with 4 fields (Direction, IP, Port, Flag).

Error Handling

The script includes basic error handling for file parsing and rule/packet matching. It raises warnings if:

* The format of rules or packets is incorrect.
* An error occurs while reading files.