Network Segmentation & Security Workflow Documentation

Overview

In this project, I set up a basic network segmentation using VLANs, demonstrated Zero Trust principles, configured secure static routing, and connected two security tools in a simple workflow. The environment was simulated using GNS3 and Parrot OS to mimic a real-world secure network configuration.

A. Virtual Networking Setup

1. GNS3 Installation (Optional)

Although GNS3 was not strictly required, I installed it to better simulate the network:

bash

sudo apt install gns3-gui -y

Note: Parrot OS network settings can also be used for simple simulations.

B. VLAN Implementation

1. Switch Simulation with VLANs

- I created two virtual PCs: **PC1** and **PC2**.
- Configured two VLANs on a simulated switch:
  - **VLAN 10**: Assigned to PC1
  - **VLAN 20**: Assigned to PC2

2. Connectivity Test

- From PC1, I attempted to ping PC2.
- **Result:** No connectivity, confirming VLAN isolation.=

C. Zero Trust Principles

1. SSH Setup for Secure Access

- Installed the OpenSSH server on Parrot OS:

bash

sudo apt install openssh-server -y

2. User Creation for Access Control

- Created a new user for secure SSH access:

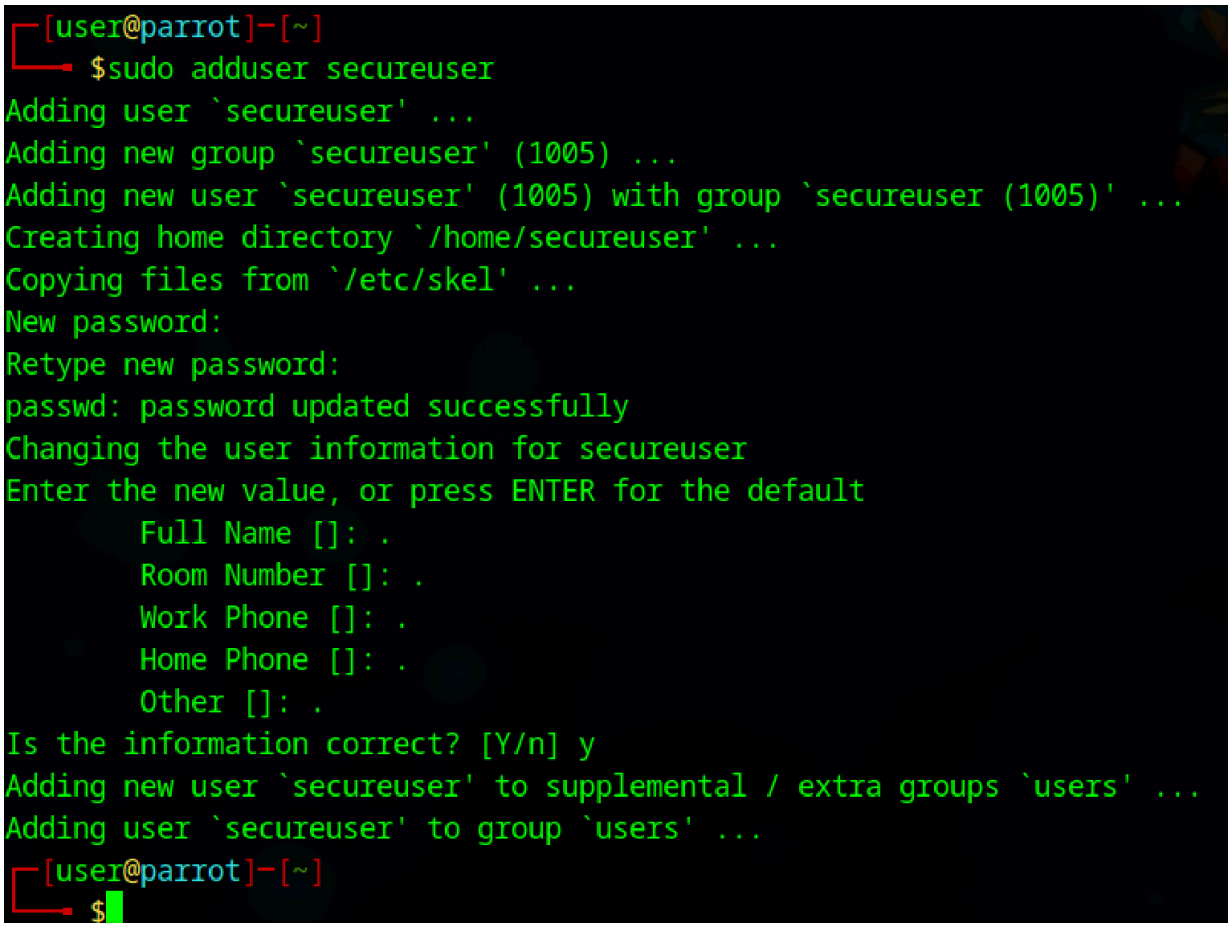
bash

sudo adduser secureuser

3. SSH Access Restriction

- Edited SSH configuration to restrict access to the new user:

bash



sudo nano /etc/ssh/sshd_config

- Modified line:

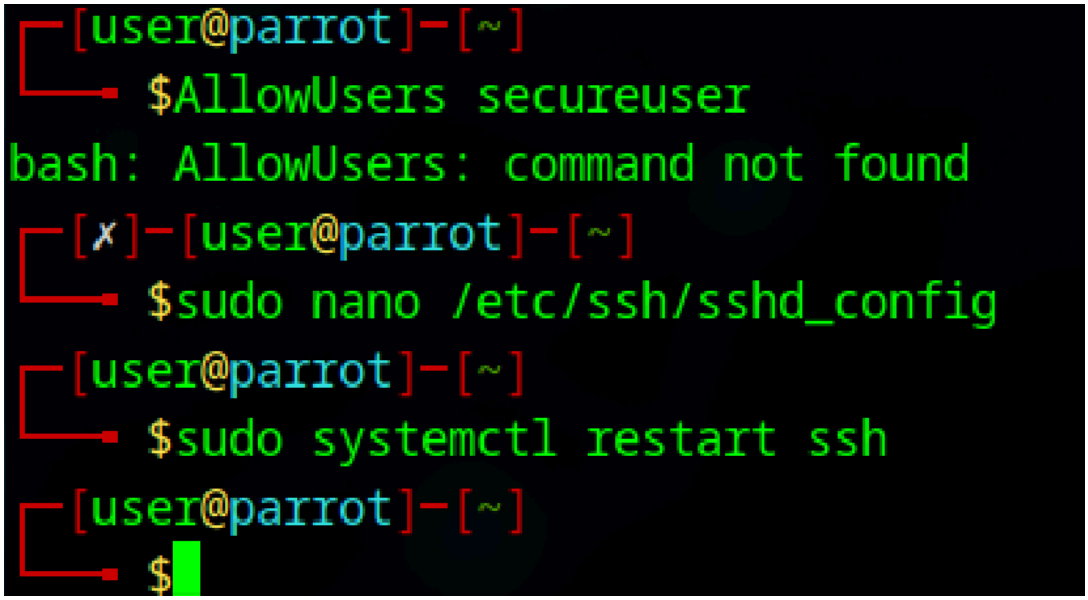
nginx

AllowUsers secureuser

- Restarted SSH to apply changes:

bash

sudo systemctl restart ssh



E. Security Tool Wo

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1. IDS + Defense Script Integration

- Simulated a basic work

- flow:
  - **Tool 1:** Snort detects a suspicious IP.
  - **Tool 2:** Manually triggered a defense script to block that IP.

2. Visual Diagram

- Created a simple flowchart showing the process:
  mathematica

  IDS Alert (Snort) → Manual Review → Run Block Script
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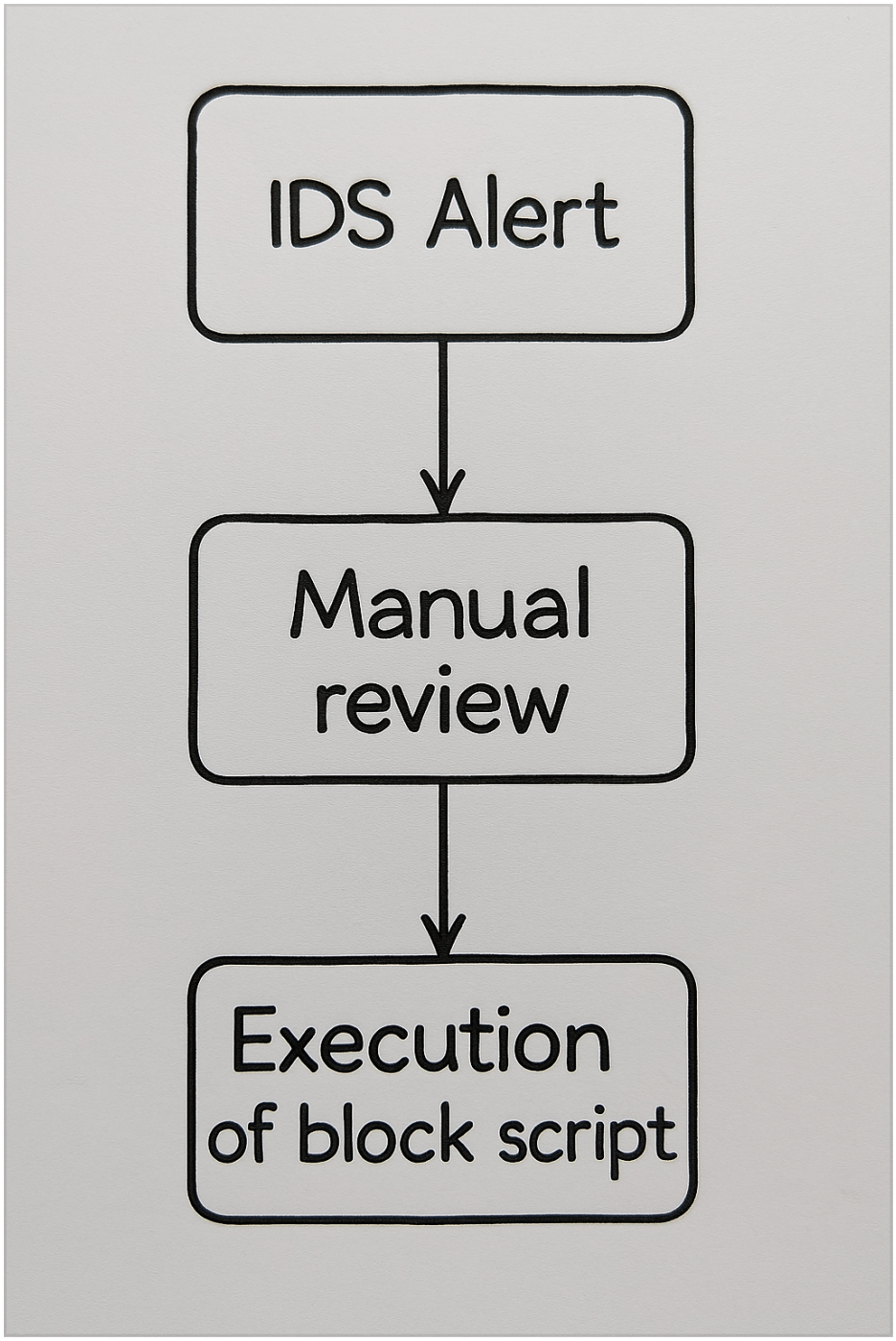
IDS Alert
Manual review
Execution of block script