Hosting a Static Website on Ubuntu Server Using Nginx and Cloudflare Tunnel Project Documentation

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Prepared By: John Elike Apomah

1. Introduction

This project demonstrates how to host a static website on a local Ubuntu server using the Nginx web server and make it publicly accessible through the internet using Cloudflare Tunnel. The setup eliminates the need for port forwarding and works even when the internet service provider used a Carrier-Grade NAT (CGNAT).

2. Objectives

The main objectives of this project were:

- To install and configure an Ubuntu Server
- To deploy a static website using the Nginx web server
- To make the website accessible from the internet
- Bypass ISP port restrictions using Cloudflare Tunnel
- To create a simple, secure and cost-effective hosting solution

3. System Requirements

Hardware

- Computer or virtual machine
- Minimum 2GB RAM
- 20GB (Personally used 40GB)

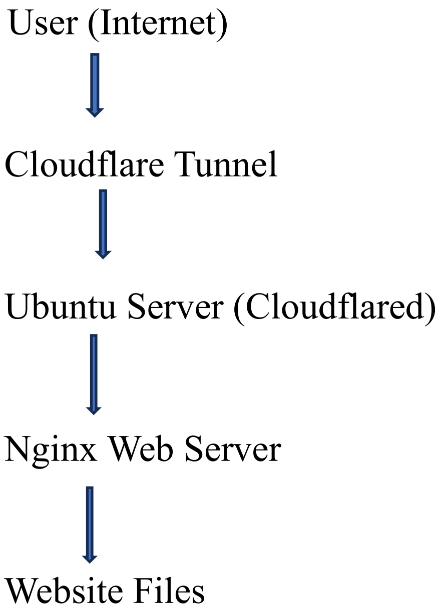
Software

- Ubuntu Server LTS 24.04
- Nginx web server
- Cloudflare (Cloudflare Tunnel client)
- CasaOS (optional file management interface)

4. Tools and Technologies Used

Tool	**Purpose**
Ubuntu Server	Operating system for hosting
Nginx	Web server to serve website files
Cloudflare Tunnel	Secure public access without port forwarding
SSH	Remote server management
CasaOS	Web-based server management

5. System Architecture



User (Internet)

Cloudflare Tunnel

Ubuntu Server (Cloudflared)

Nginx Web Server

Website Files

6. Installation and Configuration

6.1 Installing Ubuntu Server

Ubuntu Server was installed on a dedicated machine. Basic network configuration was completed to ensure internet connectivity

6.2 Installing Nginx

Nginx was installed using:

- **sudo apt update**
- **sudo apt install nginx -y**

Service status was verified:

- sudo systemctl status ngix

7. Website Deployment

7.1 Uploading Website Files

The website folder was uploaded to:

- **/var/www/**
- Example: **/var/www/ghanaculture**

7.2 Setting Permissions

- **sudo chown -R ww-data:www-data /var/www/ghanaculture**
- **sudo chmod -R 755 /var/www/ghanaculture**

7.3 Configuring Nginx

The Nginx configuration was edited: sudo nano/etc/nginx/sites-available/default

Server block example:

```
server{
      listen 5000;
      root /var/www/ghanaculture;
      index index.html;

      location / {
            try_files $uri $uri/ =404;
   }
}
```

Nginix was restarted: sudo systemctl restart nginx

8. Cloudlfare Tunnel Setup

8.1 Installing cloudflared

```
sudo apt install curl -y
curl -L
https://github.com/cloudflare/cloudflared/releases/latest/download/cloudflared-linux-amd64.deb -o
cloudflared.deb
sudo dpkg -I cloudflared.deb
```

8.2 Authentication

```
cloudflared tunnel login
```

The browser was used to authenticate the server with the Cloudflare account

8.3 Running the Tunnel

```
cloudflared tunnel –url http://localhost:5000
```

Cloudflare generated a public URL: https://randomname.trycloudflare.com. this URL allowed external users to access the website securely.

9. Firewall Configuration and Troubleshooting

During the setup process, the website was accessible locally but not from outside the server. This issue was traced to the firewall configuration on the Ubuntu Server.

By default, the firewall (UFW- Uncomplicated Firewall) was not allowing incoming traffic on the port used by the website (port 5000). As a result, external users could not access the site even though the web server was running correctly.

Steps Taken to Resolve the Issue

- Check the firewall status
  - **Sudo ufw status**
- Allow traffic on port 5000
  - **sudo ufw allow 5000/tcp**
- Enable the firewall (if it was inactive)
  - **sudo ufw enable**
- Confirm the rule was added
  - Sudo ufw status

- Expected output
  - 5000/tcp   ALLOW anywhere

After allowing port 5000 through the firewall, the server was able to accept incoming connections, and the website became accessible externally through the Cloudflare Tunnel.

Key Lesson

Even if the web server is running correctly, firewall rules can prevent external access. Always ensure the required ports are open when hosting services.

10. Testing and Results

Local Testing

Accessed via: http://192.168.0.50:5000
Result: website loaded successfully

External Testing

Accessed via: http://randomname.trycloudflare.com
Result: website accessible from outside the local network

11. Challenges and Solutions

Challenge	Solution
Port forwarding not working	Identified possible CGNAT or ISP restrictions
External access failed	Implemented Cloudflare Tunnel
SSH connection timeout	Restarted SSH service and checked network settings
Permission errors	Connected file ownership and permissions
Firewall problems	set up rules to allow port 5000 to accept incoming connections

12. References

- Ubuntu Official Documentation
- Nginx Documentation
- Cloudflare Tunnel Documentation