國立成功大學 111 學年度 第二學期 計算機系統管理

National Cheng Kung University

Computer System Administration 2023 Spring

Homework 1 - Install FreeBSD & WireGuard

Description

1. **Deadline: 2023-03-09 (Thu.) 23:59 (UTC+8)**
2. Operating system: FreeBSD 13.1-RELEASE
3. Online Judge: https://sa.imslab.org
4. TA's email: nasa@imslab.org
5. Total: 100 points.

General Goals

- Install FreeBSD 13.1-RELEASE and apply security patches.
- Add users and groups.
- Setup judge environment via WireGuard.

Precautions

- **DO NOT ATTACK JUDGE SYSTEM OTHERWISE YOU WILL FAIL THIS COURSE!!!**
- You can use other linux distro, but we only guarantee you can get 100% points on FreeBSD 13.1-RELEASE.
- You can submit multiple judge requests. However, OJ will cool down for several minutes after each judge.
- Late submissions will not be accepted.
- **BACKUP** or **SNAPSHOT** your server before judging **EVERY TIME**.
- Make sure everything is fine after reboot.

Tasks & Requirements

General

- Install FreeBSD 13.1-RELEASE (VM is recommended).
  - Setup VM on M1/M2 chip
- Apply the latest security patch.
- Set your machine's current time zone to **UTC+8** (a.k.a. CST 中原標準時間) and adjust current time.
- Enable `sshd` service.

- Use [pkg(8)](#) to install `curl sudo wireguard vim python3`.

Users & Groups

- Add a user called `judge` for online judge.
  - Add the judge user into the `wheel` group.
  - Use `sh` as the default shell.
  - This user should run the `sudo` command without password.
  - Import the downloaded ssh public key for OJ.
    - Public keys can be downloaded from https://sa.imslab.org/pubkey.
- Create your own user account.
  - Your user account should also be in the `wheel` group.
  - Use this user to do this homework instead of root (using `sudo`).

WireGuard

- Install WireGuard on your BSD ([guide](#)).
  - Is recommended to install WireGuard by port.
- Download wireGuard configuration file from online judge.
- Import config and setup the connection via `wg-quick`.

Grading

Tasks	Check Condictions	Testing Commands	Score
General (40%)		3	
SSH Public Key and judge User	WireGuard connect		15
Install FreeBSD 13.1-RELEASE and apply the security patch	SSH can login	`freebsd-version` #return 13.1-RELEASE-p7	15
Time Zone	SSH can login	`date` #contains CST	10
Users & Groups (30%)			
Judge User's shell	SSH can login	`echo $SHELL` #return /bin/sh	15
Run sudo without password	SSH can login	`sudo whoami` #should run without password	15
WireGuard (30%)			
Judge can ping your machine through WireGuard		`ping $VPN_IP -c 1`	30
Total			**100**

* $VPN_IP depend on your WireGuard connection's IP

Appendix

How to use online judge

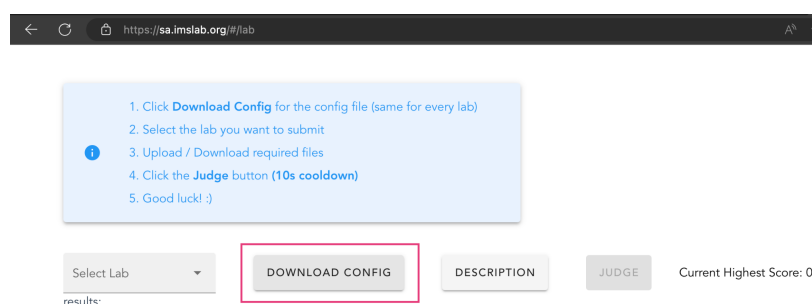1. Go to https://sa.imslab.org/ and click **SIGN UP**

2. Fill-up your email, password and student ID.
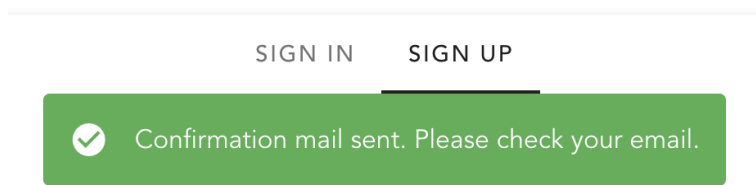
3. You will receive an email. Click the activate link to enable your judge account.
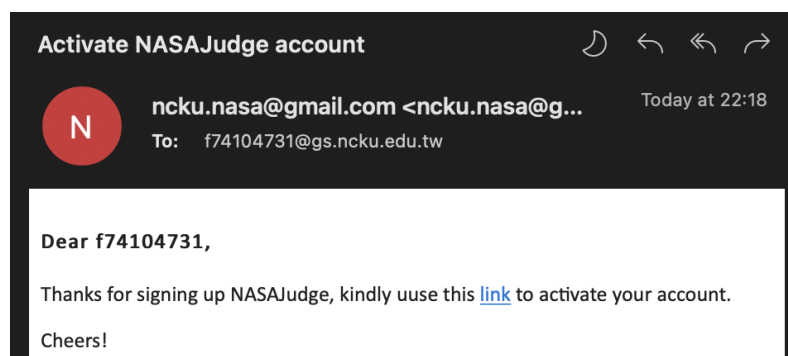
4. Login to online judge.
5. Download the WireGuard configuration files.

6. Import the WireGuard configuration files into your homework/exam machine.
7. Start the WireGuard connection.
8. Select a lab and click **JUDGE**.
9. Good luck!

Import SSH public key

1. Download the public key from the judge server.
2. Copy the public key into `/home/$USER/.ssh/authorized_keys`
   a. `$USER` is your username (e.g. judge).

```
$ mkdir ~/.ssh
$ curl https://sa.imslab.org/pubkey | tee ~/.ssh/authorized_keys
```

WireGuard setup guideline

1. Download your own WireGuard config file from judge.

```
# an example of WireGuard config
[Interface]
Address = 10.187.96.$ID/20
PrivateKey = [WG_PRIVATE_KEY]
DNS = 10.187.96.254
MTU = 1500

[Peer]
AllowedIPs = 0.0.0.0/1,128.0.0.0/1
Endpoint = sa.chummydns.com:7654
PreSharedKey = [WG_PRESHARE_KEY]
PublicKey = [WG_SERVER_PUBLIC_KEY]
PersistentKeepalive = 25
```

2. Copy the configuration file into `/usr/local/etc/wireguard/`.
3. Use `wg-quick` to start/stop the connection.

Useful Resources

- [FreeBSD Handbook | FreeBSD Documentation Portal](#)
- [FreeBSD Installation handbook](#)
- [Quick Start - WireGuard](#)
- [FreeBSD Manual Pages](#)
- [Chapter 25. Updating and Upgrading FreeBSD | FreeBSD Documentation Portal](#)
- [wg-quick(8) (freebsd.org)](#)
- [tzsetup(8) (freebsd.org)](#)
- [sshd (freebsd.org)](#)