Homework 1
Install FreeBSD / Ubuntu & WireGuard

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Requirements – General

- Basic (15%)
  - Install FreeBSD 13.2-RELEASE
  - Alternatively, Install Ubuntu 22.04
- Root on ZFS (15%)
  - Zpool name : zroot (rpool on Ubuntu)
- Add a user and a group
  - User should also be in the "wheel" group ("sudo" on Ubuntu)
  - Use this user to do this homework instead of root (using sudo)
- Add a user called "judge" for Online Judge
  - User should also be in the "wheel" ("sudo" on ubuntu) group
  - Please use "sh" as default shell (10%)
  - This user needs to **run sudo without password** (15%)

Requirements – General (Cont.)

- Set your machine to current time zone and adjust current time (10%)
  - CST
- Enable sshd (20%)
  - Install this public key to your `/home/judge/.ssh/` for Online Judge.

```
$ fetch https://nasa.cs.nctu.edu.tw/sa/2023/nasakey.pub
$ cat nasakey.pub >> /home/judge/.ssh/authorized_keys
```

  - You can use Fingerprint to check "`nasakey.pub`"

```
$ ssh-keygen -l -f nasakey.pub
256 SHA256:0LO0tdbs1Q5q4J8wa4Hidej2gkq9gqtLQeJwm98VYZk sa-2023 (ED25519)
```

Requirements – Wireguard

- Install WireGuard ([Installation Guide](#)) on your system
  - You can install WireGuard with pkg or port, and apt for Ubuntu
- Login into [NASA Online Judge](#).
- Use WireGuard Key Reloader on the Online Judge to get the key and configuration.

Requirements – Wireguard (Cont.)

- Example of downloaded WireGuard config

```
[Interface]
Address = 10.113.$ID.11/32
PrivateKey = [WG_PRIVATE_KEY]

[Peer]
PublicKey = [WG_SERVER_PUBLIC_KEY]
AllowedIPs = 10.113.0.0/16, 172.16.0.0/16
Endpoint = 140.113.168.131:51011
PersistentKeepalive = 25
```

wg0.conf

Requirements – Wireguard (Cont.)

- Configure the connection
  - Configuration directory: `/usr/local/etc/wireguard/`
  - Copy the downloaded configuration files to your system
  - Or configure manually:
    - Address: 10.113.$ID.11/32 (10.113.$ID.21/32 for Ubuntu)
    - Private Key
    - Server Endpoint: 140.113.168.131:51xxx
    - Public Key
    - AllowedIPs: 10.113.0.0/16, 172.16.0.0/16
- Use `wg-quick` to start/stop the connection
  - For detailed usage, please read the `wg-quick(8)` and `wg(8)` man page

Requirements – Wireguard (Cont.)

- You can use "`ping -c 3 10.113.$ID.254`" to test whether you have connected to WireGuard Server
- Online judge server can ping your server (15%)

```
$ ping -c 3 10.113.11.254
PING 10.113.11.254 (10.113.11.254): 56 data bytes
64 bytes from 10.113.11.254: icmp_seq=0 ttl=64 time=2.225 ms
64 bytes from 10.113.11.254: icmp_seq=1 ttl=64 time=5.325 ms
64 bytes from 10.113.11.254: icmp_seq=2 ttl=64 time=3.501 ms

--- 10.113.11.254 ping statistics ---
3 packets transmitted, 3 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 2.225/3.684/5.325/1.272 ms
```

Requirements – OS

- Online judge system is designed for FreeBSD 13.2-RELEASE and Ubuntu 22.04 only
- Doing your homework with other OS may not pass online judgement

Score

- 100% for one system
- Additional 20% for second system

Requirements – Other

- TAs reserve the right of final explanations
- **Start from 9/21 19:00**
- **Deadline 10/5 23:59**

Attention

- Your work will be tested by Online Judge system.
  - You can submit multiple judge requests. However, OJ will cool down for several minutes after each judge.
  - **We will take the last submitted score instead of the highest score.**
  - Late submissions will not be accepted.
- BACKUP your server before judge EVERY TIME
  - We may do something bad when judging.
- Make sure everything is fine after reboot.

`# rm -rf /*`

Suggestions

- Virtual machine is good for doing homeworks
  - Easy to install and backup
- Try to make your VM hardware configuration better
  - Disk controller
    - IDE → SATA, NVMe, …
  - NIC: paravirtualized net, ...

Appendix:
How to use Online Judge

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Online Judge

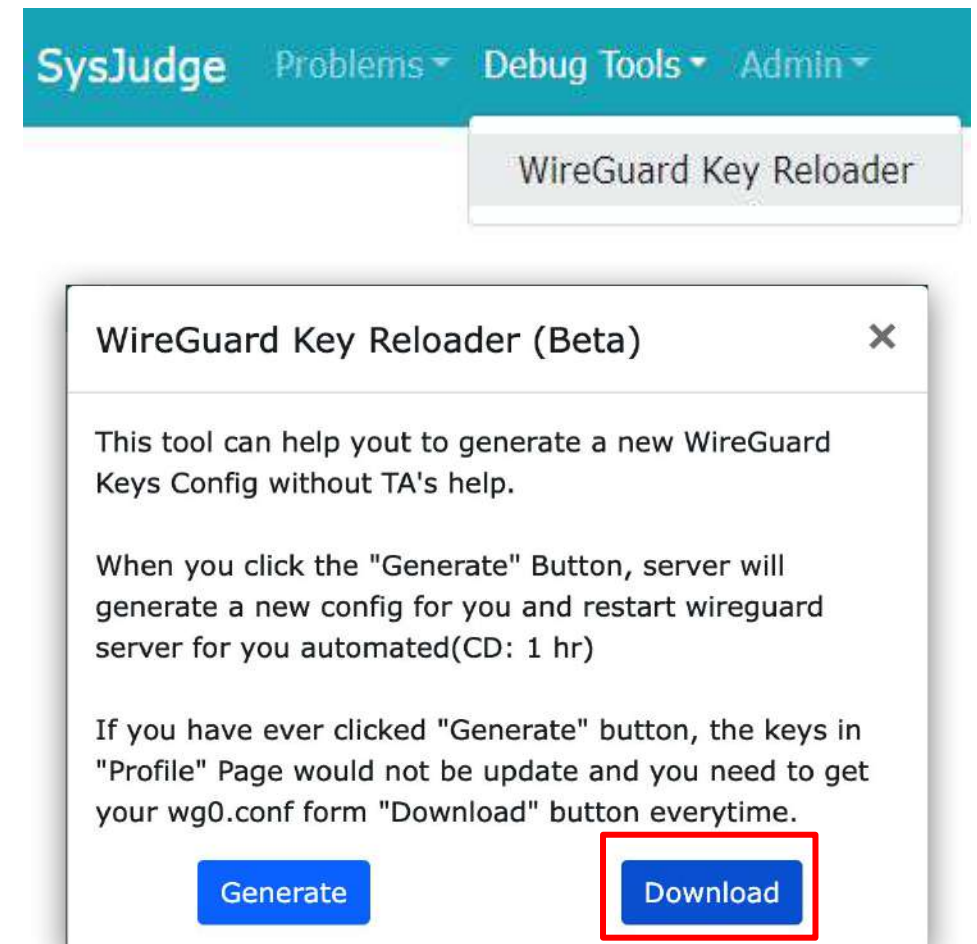- https://nasaoj.cs.nycu.edu.tw

Login

- You can login with NYCU portal account or CS account
  - You would login to the same account
   no matter which method you choose.

WireGuard – Get key and configuration

- Install WireGuard
- Configure VPN connection
  - Download configuration file
  - Apply it to connect VPN server

SysJudge   Problems ▾   Debug Tools ▾   Admin ▾

WireGuard Key Reloader

WireGuard Key Reloader (Beta)   ✕

This tool can help yout to generate a new WireGuard Keys Config without TA's help.

When you click the "Generate" Button, server will generate a new config for you and restart wireguard server for you automated(CD: 1 hr)

If you have ever clicked "Generate" button, the keys in "Profile" Page would not be update and you need to get your wg0.conf form "Download" button everytime.

Generate   Download

WireGuard – Regenerate key

- If you cannot connect to Wireguard
  - Regenerate key and configuration file
  - Download and apply it
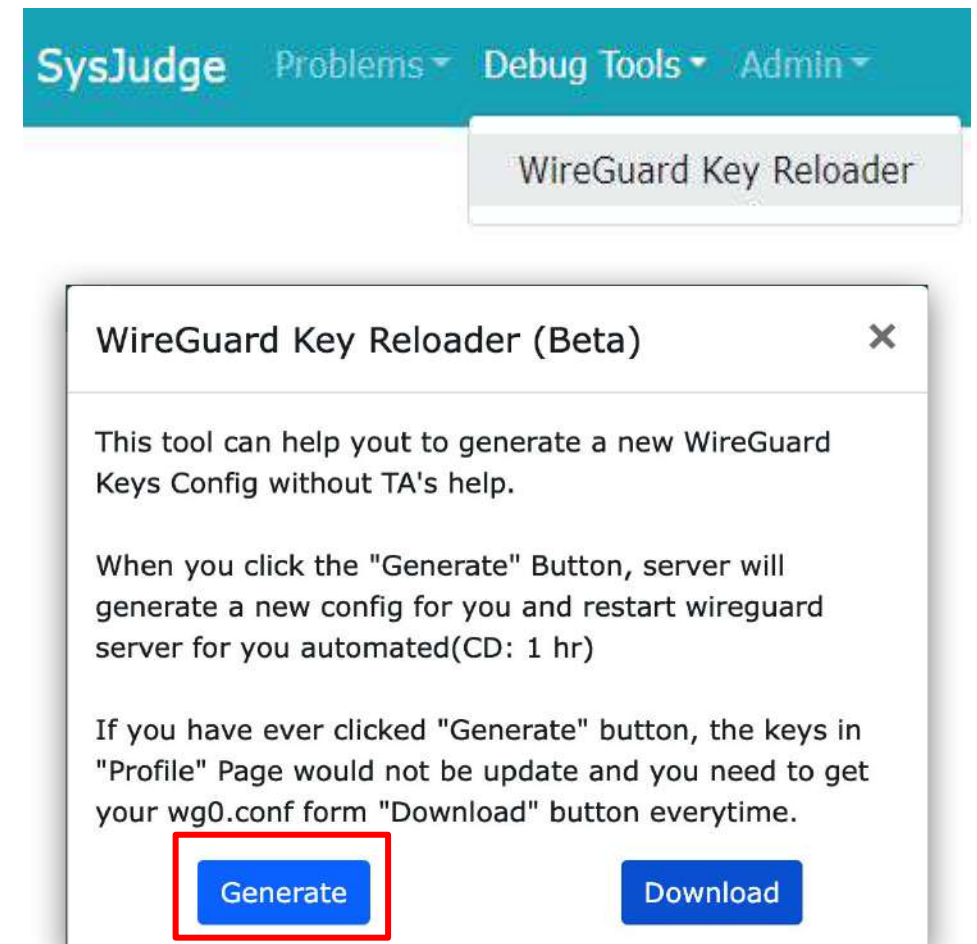
Help!

- Join NCTUNASA google group
  - If you have any question, you can post your problem in this group, TAs and Students will help you.
  - https://groups.google.com/g/nctunasa
- UNIX 常見指令教學
  - https://it.cs.nycu.edu.tw/unix-basic-commands
- How To Ask Questions The Smart Way
  - https://github.com/ryanhanwu/How-To-Ask-Questions-The-Smart-Way