System Setup: Install Ubuntu / FreeBSD

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Outline

- System installation
  - Install FreeBSD 14.1-RELEASE (alternatively Ubuntu 24.04 LTS)
- Basic setup
  - Set hostname
  - Create user and group
- Motd
- Change mirror site
- Setup WireGuard®
- Rules
- Appendix: How to use NASA Online Judge

Basic Setup (1/2)

- Your machine should boot using UEFI (5%)

- Set hostname to `sa2024-${ID}` (5%)

- Create user

  - Create a user named `judge` for online judge
    - Should be a member of `wheel` group (or `sudo` on Ubuntu)
    - Should be able to execute `sudo` commands **without entering password** (15%)
    - Should use `sh` as the default shell (10%)
    - You should use this user instead of root for subsequent operations

- Create group

  - Create a group `nycusa` (5%)
  - Add `judge` user to this group (5%)

Basic Setup (2/2)

- Set your machine to [Taiwan Standard Time](#) (10%)
  - Sync time with servers from National Standard Time and Frequency Laboratory (國家時間與頻率標準實驗室)
- Secure Shell (15%)
  - Enable sshd
  - Install this public key to your `/home/judge/.ssh` for Online Judge

```
$ wget https://nasa.cs.nycu.edu.tw/sa/2024/nasakey.pub
$ cat nasakey.pub >> /home/judge/.ssh/authorized_keys
```

  - Verify the fingerprint of public key

```
$ ssh-keygen -l -f nasakey.pub
256 SHA256:l2xVg+C+hMjMldX6htc4SUPE5taFsxKkevTgiGmpeHA judge@sa-2024
(ED25519)
```

Motd

- Abbreviation of "message of the day"
- Shown upon login every time
- Example (Ubuntu)

```
$ ssh judge@localhost
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.0-41-generic x86_64)

  * Documentation:  https://help.ubuntu.com
  * Management:     https://landscape.canonical.com
  * Support:        https://ubuntu.com/pro


... (The rest of output is truncated for simplicity)
```
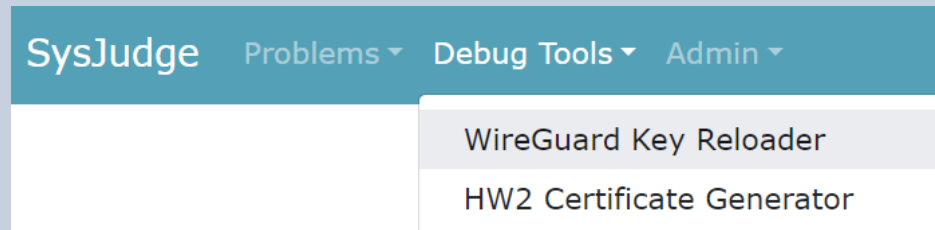
- Edit motd to show "NYCU-SA-2024-${ID}" (5%)
  - Hint: consult the manual motd(5)

Package Repository Mirror

- As a system administrator, you are responsible for managing packages on a system
- CSIT provides mirrors for a variety of Linux distributions, serving boot images, packages, and even Linux Kernel sources!
  - https://it.cs.nycu.edu.tw/equipment-linux-mirror
- Generally, choosing mirrors nearby improves download speed
- Configure your package manager to use CSIT mirror (10%)
  - For FreeBSD systems, use one of the mirror servers in Japan
  - http://pkg0.kwc.freebsd.org/
  - http://pkg0.bbt.freebsd.org/

Setup WireGuard® (1/3)

- Install WireGuard® on your system
    - Refer to Installation guide
- Log in to NASA Online Judge to get your configuration

Example WireGuard® Configuration

📄⚙ wg0.conf

```
[Interface]
PrivateKey = <PRIVATE KEY>
Address = 10.113.<ID>.11/32


[Peer]
PublicKey = <PUBLIC KEY OF SERVER>
AllowedIPs = 10.113.0.0/16
Endpoint = 140.113.168.131:51XXX
PersistentKeepalive = 15
```

Setup WireGuard® (2/3)

- Configure the connection
  - Configuration directory: `/usr/local/etc/wireguard/`
  - Place the downloaded configuration file to your system
  - Or configure manually:
    - Address: `10.113.${ID}.11/32`
    - Private Key
    - Server Endpoint: `140.113.168.131:51xxx`
    - Public Key
    - AllowedIPs: `10.113.0.0/16`

- Use `wg-quick` to start/stop the connection
  - For detailed usage, please consult the manuals of [wg-quick(8)](#) and [wg(8)](#)

Setup WireGuard® (3/3)

- Test connection
  - `ping -c 3 10.113.${ID}.254`
- Online Judge servers can ping your system (15%)

```
$ ping -c 3 10.113.11.254
PING 10.113.11.254 (10.113.11.254) 56(84) bytes of data.
64 bytes from 10.113.11.254: icmp_seq=1 ttl=51 time=3.95 ms
64 bytes from 10.113.11.254: icmp_seq=2 ttl=51 time=5.50 ms
64 bytes from 10.113.11.254: icmp_seq=3 ttl=51 time=5.12 ms


--- 10.113.11.254 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 3.951/4.855/5.498/0.658 ms
```

Rules

- TAs reserve the rights of final explanations
- **Open from 9/12 (Thu) 19:00**
- **Deadline: 9/26 (Thu) 23:59**
- Late submissions will **NOT** be accepted

Attention

- Your work will be scored by Online Judge system
  - Only the **LAST** submission will be scored
  - Late submission will **NOT** be accepted
- **ALWAYS BACKUP** your system before submission, as we may do malicious actions
- Make sure everything works after reboot

Tips

- Install your system on virtual machines to benefit from flexibility
  - Easy 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

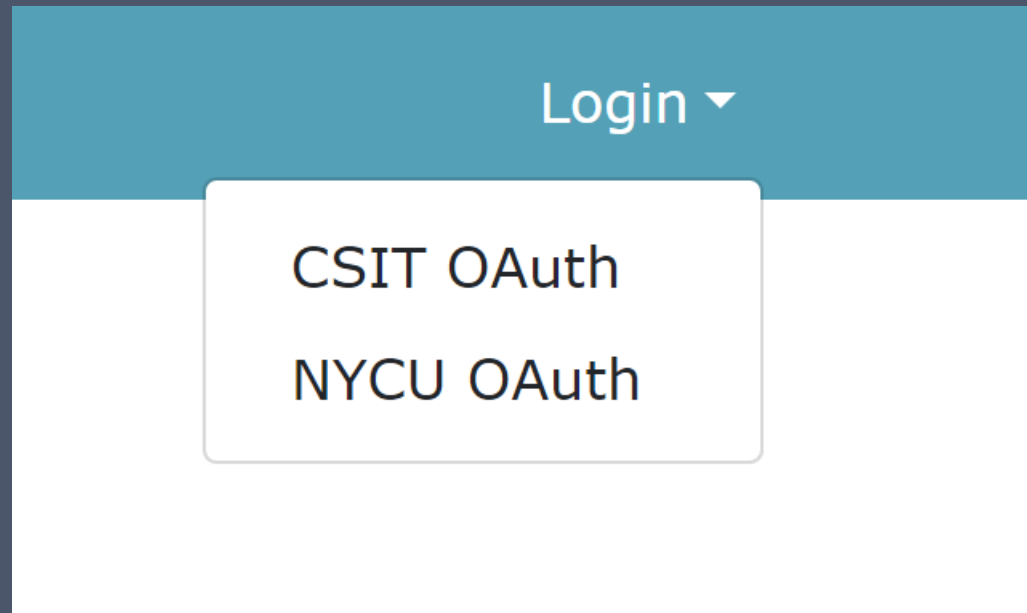SysJudge   Login ▾

SysJudge

自動化線上解題系統

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Login

Log in NASA Online Judge via either OAuth methods

Troubleshooting WireGuard® Issues

Use key reloader to regenerate configuration to solve VPN-related issues

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 (CD: 0)   Download

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