

Computer System Administration

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What System Administrator Should do?

- Ordinary list
 - Installing new system, programs and OS updates
 - Monitoring system and tuning performance
 - Adding and removing users
 - Adding and removing hardware
 - Backup and restore
 - Configuration management (Ansible, Chef, Puppet, SaltStack, ...)
 - Infrastructure management (Terraform, ...)

What System Administrator Should do?

- Ordinary list
 - Continuous Integration & Delivery (Jenkins, Travis CI, ...)
 - Log management (Fluentd, Papertrail, ...)
 - Security monitoring and reaction
 - Virtualization (VMWare, Xen, Bhyve, ...)
 - Containerization (Docker, ...)
 - Capacity planning
 - ...

What System Administrator Should do?

- Non-technique list
 - Helping users
 - Maintaining documentation
 - Moving furniture
 - Good communication and memorization
 - Leverage external memory
 - ~~Burning your liver~~

What System Administrator Should do?

- The best words to describe the job
 - Thankless job.
 - <https://sysadminday.com/>
 - System administration is like keeping the trains on time; no one notices it except when they're late.
 - When we do right, no one remembers; when we do wrong, no one forgets.

Two videos celebrating SysAdmin Day

- [Sysadrella \(2019\)](#)
- [This AI can do ANYTHING \(2022\)](#)

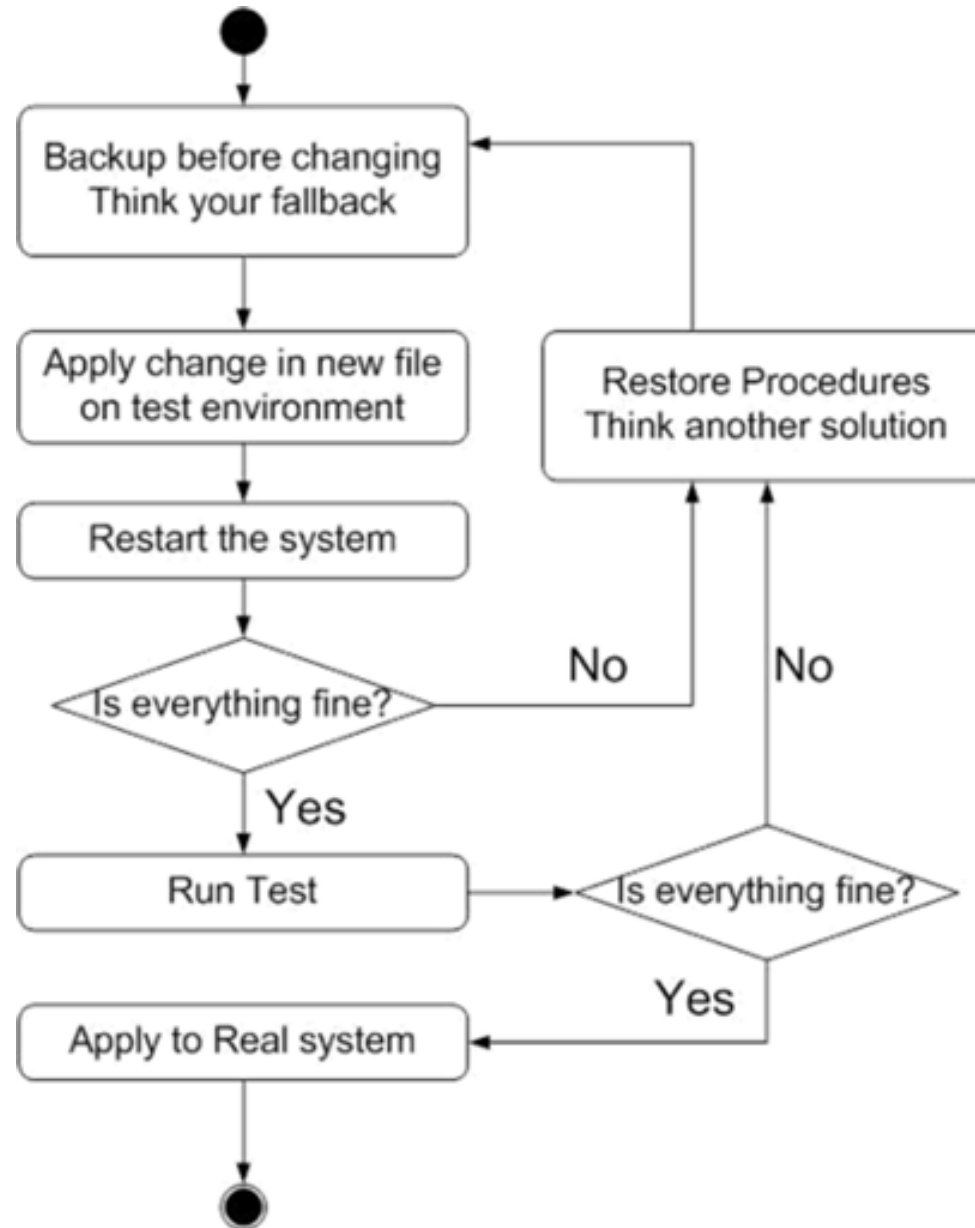


What System Administrator Must do?

- Philosophy of system administration
 - Know how things really work.
 - Plan it before you do it.
 - Make it revertible.
 - Make changes incrementally and backward-compatible.
 - Test thoroughly before unleash it.

What System Administrator Should do?

- Flow of Change



What System Administrator Should do?

- The skills to be a candidate of system administrator
 - We are not going to teach you cool & new things
 - But the how to master these skills
 - Find and read authoritative docs, not just copy & paste from an arbitrary webpage on Internet
- System Administration (in Fall semester)
 - Manage one server
- Network Administration (in Spring semester)
 - Manage a network consisting of multiple servers and devices

About the Operating System

- Most of the course materials will take FreeBSD as examples
 - Homework is guaranteed to be doable under FreeBSD
- Linux?
 - Lots of distributions
 - You are still allowed to use them in homework
 - **On your own risk**

Why FreeBSD

- Our goal is to learn "How it works"
 - FreeBSD is simple and easy to learn the internals
 - Unified environment is good for educational purpose
- BSDs are still popular in some ways
 - Apple MacOS, iOS and many other products or services are based or heavily using BSDs
 - [https://en.wikipedia.org/wiki/Darwin_\(operating_system\)](https://en.wikipedia.org/wiki/Darwin_(operating_system))

Attitude

- Attend every class
- Do every exercise
 - As early as possible
 - **On your own**
- Read book and practice at least 6 hours every week
 - Use unix-like environment
 - Recommend: more than 1.5 hours/day averagely.
- Collect information on the internet
 - The newer, the better.

Syllabus

- Instructor:
 - 蔡孟勳 (Adjunct Professor from NCKU)
tsaimh@nycu.edu.tw / tsaimh@csie.ncku.edu.tw
- Time:
 - Thu. abc (18:30 ~ 21:20)
- Place:
 - EC122

Syllabus

- Discussion Forum
 - <https://groups.google.com/forum/#!forum/nctunasa>
 - We suggest you to join - TAs might give homework hints there
 - Request join and tell us your student ID
 - Ask **course-related/technical questions** there
 - Everyone in the group can answer/vote
 - **But DON'T post answer/configuration there directly!**
 - You will be banned

Syllabus

- Lecture/Exam in Chinese
 - Not recommend for those do not speak Chinese
- TAs:
 - We might have about 5 TAs.
 - Email to TAs: ta@nasa.cs.nctu.edu.tw
 - Also received by the lecturer
 - Office hour
 - by appointment, @CSIT
 - Website:
 - <https://nasa.cs.nctu.edu.tw/sa/2022/>

Syllabus

- Email Policy (**IMPORTANT**)
 - Don't send course-related/technical questions to TAs
 - TAs won't answer you
 - Please ask them on course forum instead
 - Only ask TAs for personal/non-technical questions
 - Course registration/dropping
 - Grading
 - Office hour appointment
 - ~~Demo appointment~~

Syllabus – Text book outline

- Part I. Basic Administration
 - Chap 1 – Where to start.
 - Chap 2 – Booting and Shutting Down
 - Chap 3 – The Filesystem
 - Chap 4 – Access control and rootly powers
 - Chap 5 – Controlling processes
 - Chap 6 – User Management
 - Chap 7 – Storage
 - Chap 8 – Periodic processes
 - Chap 9 – Backups

Syllabus – Text book outline

- Part I. Basic Administration
 - Chap 10 – Syslog and log files
 - Chap 11 – Software installation and management
 - Chap 12 – The Kernel
 - Chap 13 – Scripting and the Shell
 - Chap 14 – Configuration Management

Syllabus – Text book outline

- Part II. Networking
 - Chap 19 – NFS: Network File System
 - Chap 20 – HTTP: Hypertext Transfer Protocol
- Operations
 - Chap 27 – Security
 - Chap 31 – Performance Analysis

Syllabus – Grade Policy

- Mid
 - 15%
- Final
 - 15%
- Homeworks
 - 70%
 - **No Delay Submission**
 - 5 homeworks

What you should prepare?

- Background knowledge
 - Basic knowledge of UNIX commands
 - Basic Programming skills
 - Basic of TCP/IP Networking
- Environment
 - Virtual Machine (Virtualbox, VMware)
 - Bare-metal Machine is also fine
- Yourself
 - Your hard study

Finally, Am I OK to take this course?

- Are you willing to devote yourself to exercise?
 - Yes! Please come
- Are you newbie in this area?
 - Yes!? It's ok, Please come
- Do you take more than 3 major courses?
 - Sometimes you may spend the whole weekend to just figure out what to do in the homework
 - Loading of this course **roughly equals to 2~3 major courses**
- **You will learn a lot if you study hard**

Some comments on the Internet

- **2010**

雖然這門課的作業確實有點重，但也因為這些作業，使得 SA 比任何一門課都更能測試與磨練解決問題以及學習的能力。有心想修的同學可以透過課程網頁開始自行預習和做作業，相信一定會有不少收獲。

- **2018**

這門課是一堂注重實務的課，只要肯認真寫作業、認真看 manual，一定可以給你滿滿的收穫。

- **2021**

雖然早有耳聞SA 和NA是交大兩大硬課，可作業拿到手上還是被嚇到了，hw1就花了不少功夫在寫，hw2更是到了現在還有bug沒修好。整個壓力山大，加上必修課和專題，還有個最致命的GPE（對沒錯我超爛 大三還沒考過QQ）。最近期中考周整個人快要死掉，連室友都被我的氣色嚇到那種。



國立交通大學

昨天面試工作，被問有沒有修過 SA。

B3 · 2021年10月29日

Basic knowledge in this course

國立陽明交通大學資工系資訊中心

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Play with Unix-Like system

- Our department has FreeBSD/Linux workstations for all students
 - `bsd{1,2,3,4}.cs.nctu.edu.tw`
 - `linux{1,2,3,4}.cs.nctu.edu.tw`
 - `alumni.cs.nctu.edu.tw`
 - About CS workstation
 - <https://it.cs.nycu.edu.tw/workstation-guide>
- Get familiar with CLI (command line interface)
 - Without GUI (graphics user interface)
 - Don't be afraid

Commands

- Useful commands
 - `ls`
 - `passwd`
 - `mkdir`, `rmdir`
 - `cp`, `mv`, `rm`
 - `poweroff`, `shutdown -p now`
 - `reboot`, `shutdown -r now`
 - ...
- Most important command: `man`
- Basic command tutorials
 - <https://it.cs.nycu.edu.tw/unix-basic-commands>

Conventions in man pages

- Syntax of commands:
 - Anything between "[" and "]" is optional.
 - Anything followed by "..." can be repeated.
 - {a | b} – you should choose one of them.
 - bork [-x] { on | off } filename...

Yes/No	Commands
O	bork on /etc/hosts
O	bork -x off /etc/hosts /etc/passwd
X	bork -x /etc/hosts
X	bork -h /etc/hosts

Q & A

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