Computer Network Administration

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The Romantic of Network Admin

Source: https://twitter.com/realvictrid/status/1758795387052360054?s=46&t=e

Why this course?

- NYCU CS has the only one “complete” departmental information technology center (called NYCU CSIT; a.k.a. computer center) in Taiwan.
- To cultivate professionals capable of operating CSIT, we offered two elective courses since 1996 (NCKU 2012-2022, NTU 2014-, NTHU 2019-) :
  - Computer System Administration (Fall semester) introduces basic Unix system administration skills, primarily in a one-server scenario.
  - Computer Network Administration (Spring semester) introduces advanced skills to operate the entire information technology center with multiple servers and network equipment.

NYCU CSIT - one of the main origins of Taiwan's Internet startups

- Wretch (無名小站)
- PIXNET (痞客邦)
- funP (雲沛創新集團)
- Appier (沛星互動科技)
- …

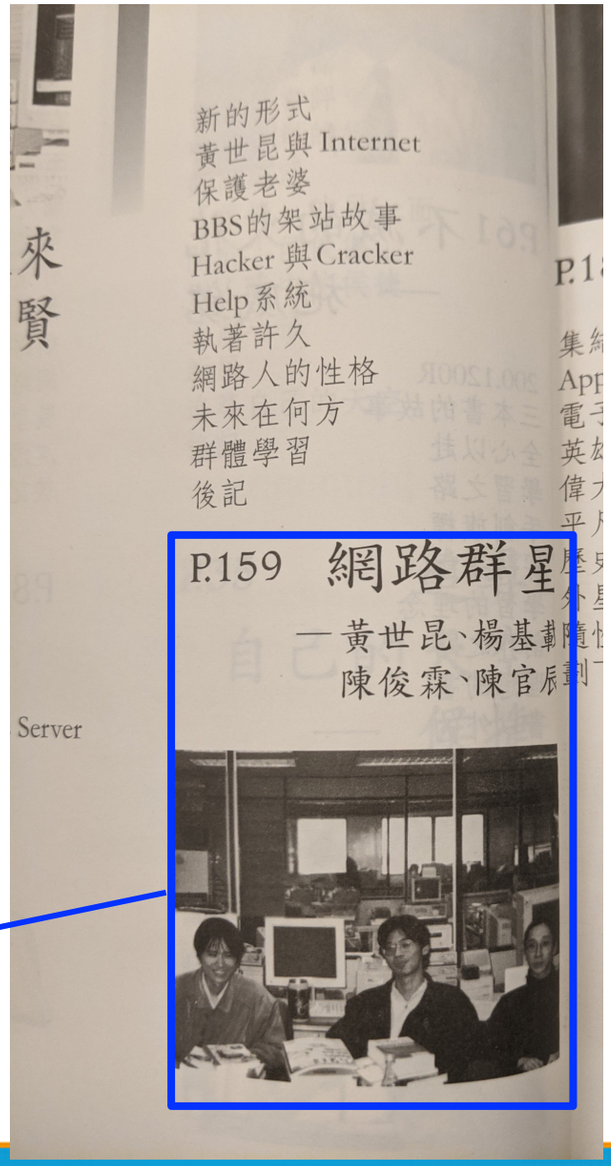
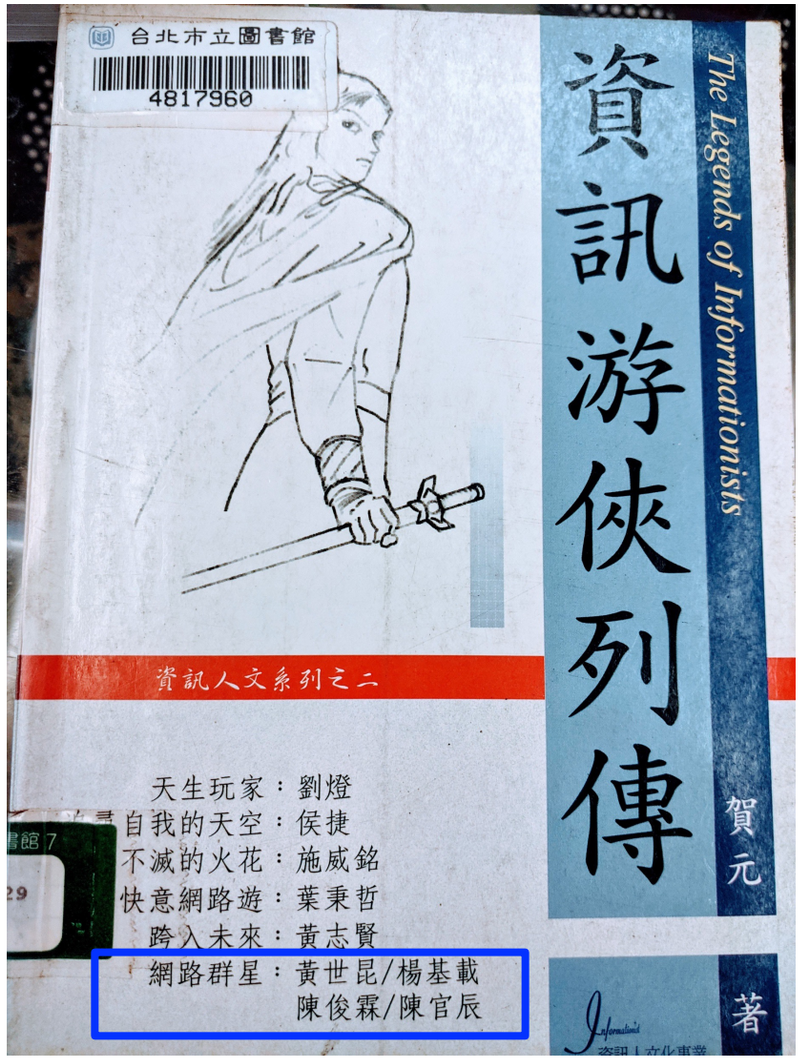
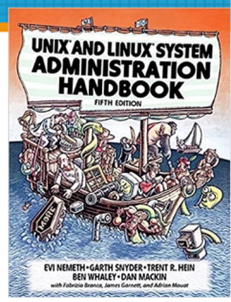


Photo taken at NYCU CSIT



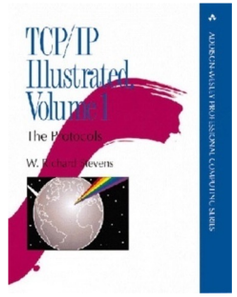
NASA = SA + NA

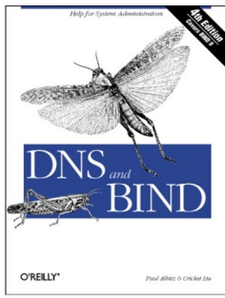


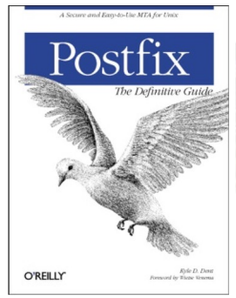
NASA Course Website

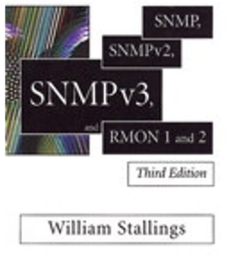
Computer System and Network Administration, NYCU CSCC

HOMEPAGE ▾ COURSES ▾ PROGRAMS









Graduate Courses

System Administration Practice (**SAP**, 2015~2017)
Network Administration Practice (**NAP**, 2015~2018)

Undergraduate Courses

Computer System Administration (**SA**, 1996~)
Computer Network Administration (**NA**, 2009~)
(Computer) Network Management (**NM**, 1997~2008)

Useful Articles

提問的智慧 (**zh-tw**)
How To Ask Questions The Smart Way (**en**)

Three-year trial for graduates

NYCU CSCC (Computer Center, Department of Computer Science, National Yang Ming Chiao Tung University)

NYCU CSIT is powered by Open Source

- Thanks to all the open-source contributors.
- This course is supported by MoE ITSA project.
- Let me know if you have open source contribution (bonus).

Syllabus

- Website:
  - https://nasa.cs.nycu.edu.tw/na/2024/
- Instructors:
  - 蔡孟勳 tsaimh@cs.nycu.edu.tw
- Time:
  - Rabc (Thu. 18:30 ~ 21:20)
- Place:
  - EC115

Syllabus

- Discussion Forum
  - https://groups.google.com/g/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 direct answer/configuration there!
    - You will be banned

Syllabus

- Lecture/Exam in Chinese
  - Not recommend for those who do not speak Chinese
- TAs:
  - We might have about 6 TAs.
  - Email to TAs: ta@nasa.cs.nctu.edu.tw
    - Also received by the lecturer
  - Office hour
    - Wed., 15:30 ~ 17:20, by appointment, @CSIT

Syllabus

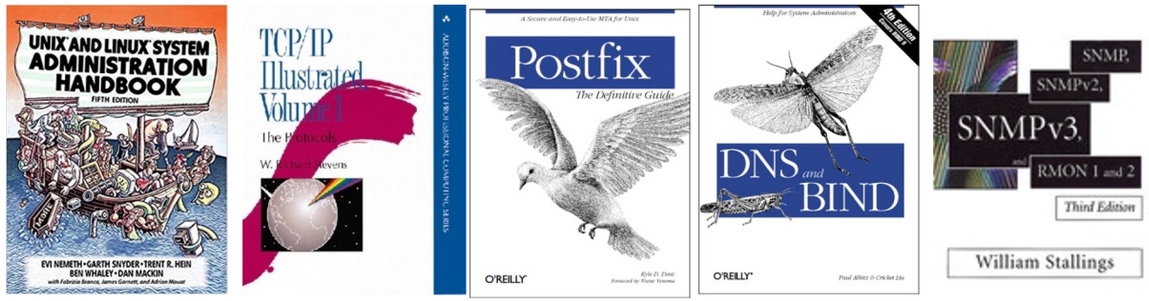
- Email Policy (IMPORTANT)
  - Don't send course-related/technical questions to TAs
    - TAs won't answer you
    - Please ask them on course forum instead
  - Only ask TAs for personal/non-technical questions
    - Course registration/dropping
    - Grading
    - Office hour appointment
    - Demo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

Syllabus – Course Overview

- Main topics
  - Networking
    - TCP/IP Networking Environment
    - NAT, DHCP, Firewall, VPN, Load Balancer, …
  - DNS – BIND (Berkeley Internet Name Domain)
  - Mail System - Postfix
    - SPF (Sender Policy Framework)
    - DKIM (Domain Keys Identified Mail)
    - DMARC (Domain-based Message Authentication, Reporting & Conformance)
  - Network Management/Authentication/Authorization
    - LDAP, SNMP
    - Configuration Management (Ansible, Puppet)

Syllabus – Course Textbook and Reference

- Textbook
  - Unix and Linux System Administration Handbook (5th Edition)
  - Course slides
- Reference book
  - TCP/IP Illustrated Volume 1
  - Postfix
  - DNS and BIND
  - SNMP, SNMPv2, SNMPv3 and RMON 1, 2



Syllabus – Text book outline

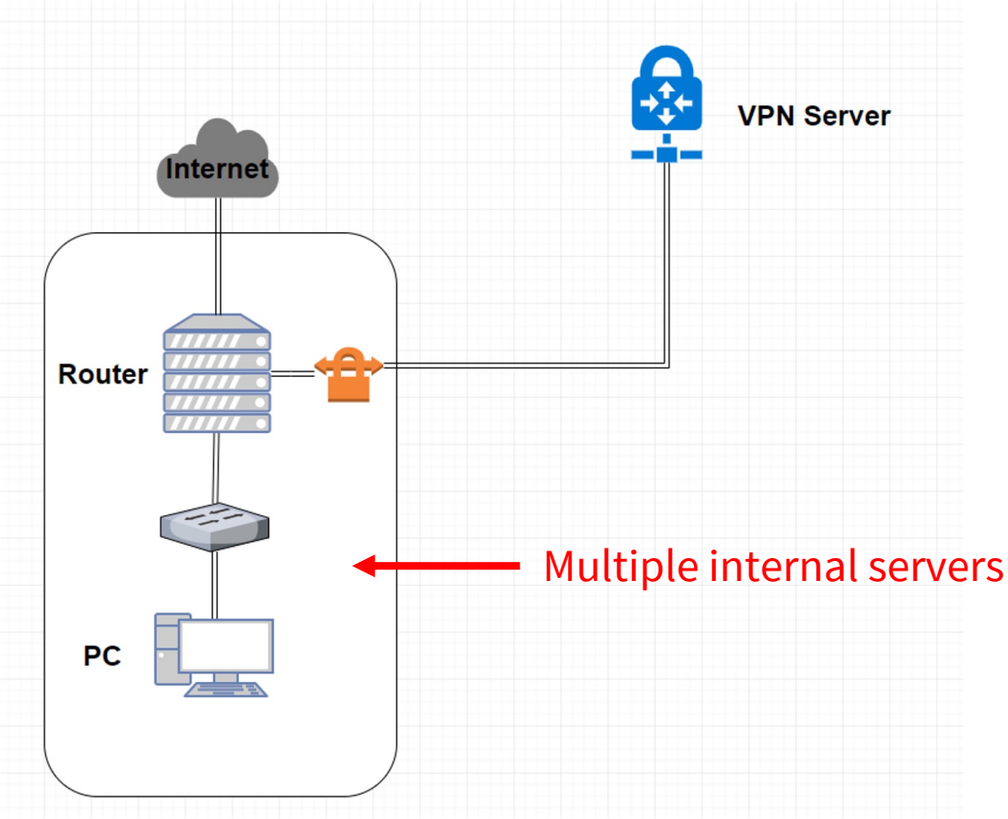
- Part II. Networking
  - Chap 16 – TCP/IP
  - Chap 17 – Routing
  - Chap 18 – DNS: Domain Name System
  - Chap 21 – SMTP: Simple Mail Transfer Protocol
  - Chap 22 – Directory Services
  - Chap 23 – Electronic Mail
  - Chap 25 – Network Management and Debugging
- Operations
  - Chap 30 – Monitoring

Syllabus – Grade Policy

- Mid
  - 15 %
- Final
  - 15 %
- Homework/Project
  - 70%
    - No Delay Work
    - 4 homework + 1 term project

Syllabus – Homework Outline

- Building an intranet with DHCP, NAT, VPN, DNS, LDAP, Mail, WWW… services
- Understanding and managing all these services



Syllabus – Homework Outline

- Every homework is based on previous one
- Homework 1
  - Setup Intranet
  - DHCP, NAT, VPN
- Homework 2
  - + DNS Service
- Homework 3
  - + Mail Service
- Homework 4
  - Authorization, Authentication, Monitoring, Management
  - + LDAP, SNMP
- Term project: TBA

Syllabus – Prerequisite

- Background Knowledge
  - We recommend that you should take these first
    - "Computer System Administration" (計算機系統管理)
    - "Introduction to Networking" (計算機網路概論)
- About OS
    - You can use any POSIX-compliant Unix-like OS for homework
    - FreeBSD is used for lecturing
- Environment
  - A dedicated (powerful?) PC that can run multiple VMs
    - VirtualBox, VMware
    - 2~3 Unix-like system running at the same time

Attitude

- Attend every class
- Do every exercise
  - As early as possible
  - On your own
- Collect information on the Internet
  - The newer, the better.
- Not recommended for those who have more than 3 major courses in this semester
  - Sometimes your 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

- 交大修課心得 - 網路管理實務(計算機網路管理) **NAP2018**

  修這門課時，我是第一次接觸網路、伺服器架設... 等等，平常上完課根本一知半解，於是就花了很多時間在網路上查資料，然後和同學討論；作業更是如此，因為我們都是用 Ubuntu 在做作業，所以還要查各種資料把 FreeBSD 的指令搬到 Linux 上。

  這門課應該是這學期花最多時間的一門課了，但同時也是收穫最多的一門課，感覺碰到很多以前完全不會嘗試去碰的知識，是真的學到滿多東西的。

  總之，這門課如果是沒有基礎的人，修得時候可能會有點辛苦，但修過了就會覺得成就感滿滿吧！（至少我是滿喜歡這門課的XD）

- **[心得] 曾亮齊 計算機網路管理(NA)**

  NA2020

教授剛開學的時候有放話說這門課的loading相當於9學分的必修課

個人覺得這種說法有點誇張了

應該差不多是15甚至18學分

每一份作業都要花費至少30-40小時來完成

不過學到的東西真的很多

就算你是個網路白癡

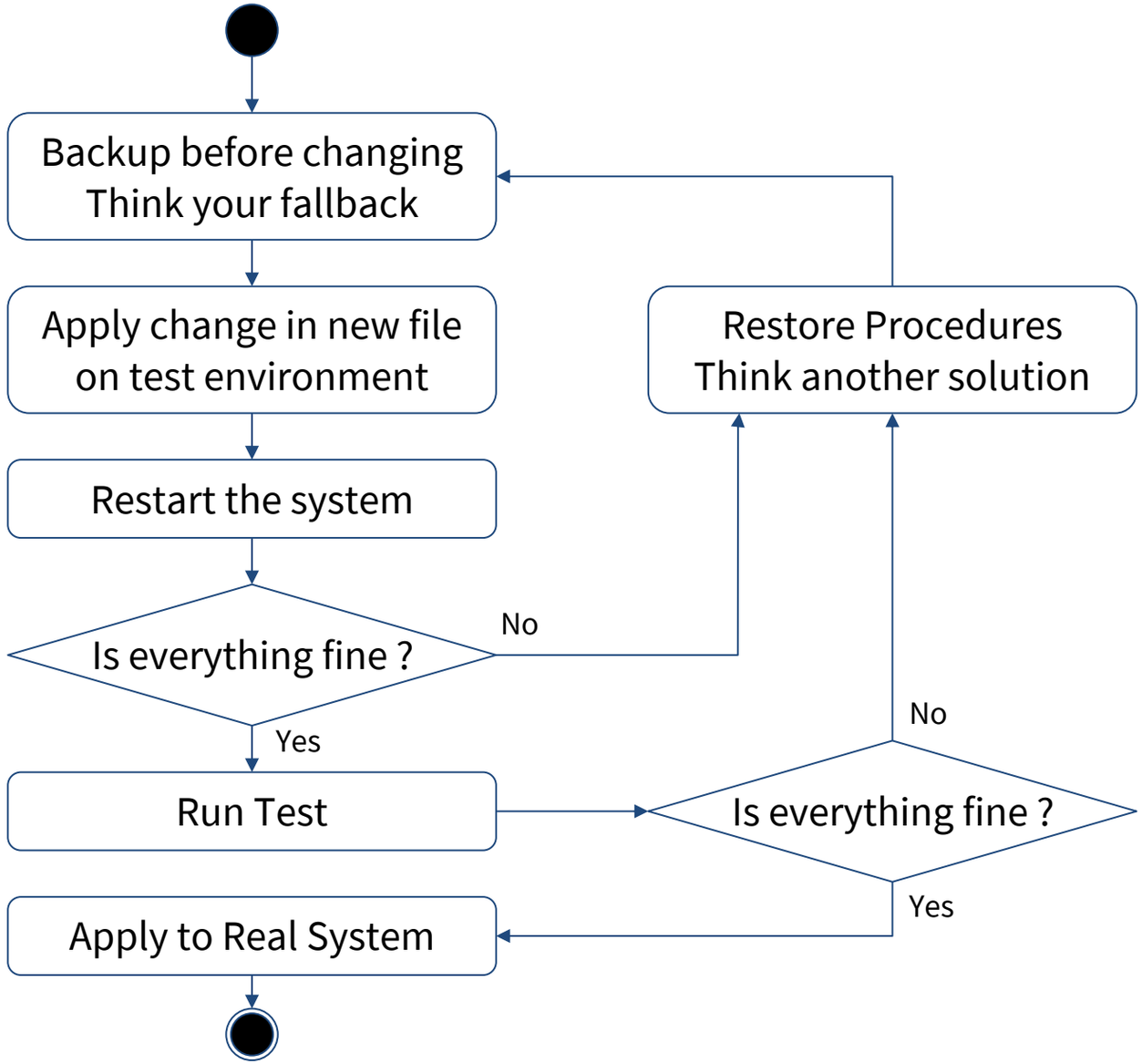
修完這門課你就甚麼都懂了

大概是這樣

真的很硬，不過收獲也很多

When You Perform Any Changes…

- Flow of Change



SA-NA Junction

- FreeBSD
  - 13.2-RELEASE
- Self-study for the SA course
  - https://nasa.cs.nycu.edu.tw/sa/2023/

Q & A

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