

Computer Network Experiments, Spring 2010

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Course Objective:

This undergraduate course aims to reinforce the knowledge and skills taught in the traditional computer network courses. A series of experiments are designed to get students well exposed to the protocol issues ranging from the overall networking hardware and software architectures, adaptor and protocol drivers, LAN MAC protocols, TCP/IP protocol suite, to planning and configuration of LAN and WAN.

Experiments are to be done by 2-person teams. Each team needs to conduct 6 experiments where 3 of them are pre-selected (see * in the list below) and 3 are chosen by students. For each experiment report and presentation, the student in charge of writing up the report receives up to 18 points, while his/her teammate receives up to 9 points, thus the 6 experiment reports account for 81 points, i.e. $3 \times 18 + 3 \times 9$. The report should cover experiment records and problem discussions. Students need to present their experiment reports within 3 weeks after the lecture of the experiment. Each in-class presentation is allocated 15 minutes. At the end of the semester, a hands-on individual (not in a team) quiz accounts for 19 points. In the hands-on quiz, the TA picks 3 questions, on the experiments a student has done, for the student to operate and explain on the computer or testbed. A mail alias, cne09@speed.cis.nctu.edu.tw, is established to facilitate the after-class discussions.

Pre-requisite: Computer Networks (undergraduate) or equivalent

Textbook: 林盈達, 計算機網路實驗, 交大出版社, 9/2007.

Course homepage: <http://www.cis.nctu.edu.tw/~ydlin/course/cn/exp/index.html>

Grade: 81% for 6 reports and presentations ($3 \times 18 + 3 \times 9 = 81$), 19% for hands-on quiz.

Lecture: 10:10AM-12:00NN Tue. at ED117 (3:40-4:30PM Thur. shifted to 12-1PM Tue.)

Student Presentations: 12:00-1:00PM Tue. (if any)

List of Experiments

I. Access Devices

1. 區域網路線材製作 (Preparing LAN wiring)
2. 網路協定觀察與分析 (Observing and analyzing protocols)
3. * Linux 網路協定程式追蹤 (Tracing Linux network protocol drivers)
4. Linux 子網域分割之設定與觀察 (Setting and observing Linux subnetting)
5. 媒介存取協定模擬 (Simulating MAC protocols)

II. Core Devices

6. 路由器操作設定 (Configuring IP routers)
7. * Linux 路由器之建構與追蹤 (Building and tracing Linux routers)
8. 網路探測：路徑、延遲與流量統計 (Probing Internet: path, latency, and traffic statistics)

III. Edge Devices

9. * 建置網路安全閘道器 (Building network security gateways)
10. 以 Linux 架設 Internet/Intranet 伺服器 (Building Internet/intranet servers)
11. 建置防範病毒信及廣告信之郵件伺服器 (Building anti-virus and anti-spam gateways)
12. 建置入侵偵測防禦系統及弱點偵測掃描系統 (Building intrusion detection/prevention gateways and vulnerability assessment systems)

IV. Device Testing

13. 使用 SmartBits 來測試 Layer 2/3 交換器 (Testing Layer2/3 switches with Smartbits)