Introduction to Laboratory Works

T-110.5101
Laboratory Works in Datacommunications Software

T-110.5201
Laboratory Works on Information Security

6.9.2011 Otaniemi

Part I

Course Arrangements

Course Personnel

Course organizer:
Miika Komu

Part-time assistants:
Matti Kemppainen
Artturi Karila
Janne Savikko
Eetu Jalonen
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Do not use personal addresses for contact!
Use mailing list for faster response.

Contact Information

Course material and news:

https://noppa.aalto.fi/noppa/kurssi/t-110.5101/

https://noppa.aalto.fi/noppa/kurssi/t-110.5201/

Course personnel mailing list:

T-110.5101 or T-110.5201

@ list.aalto.fi

IRC: /join !dcslabcourses (ircnet)

Contents of the Courses

- Web pages
  - https://noppa.aalto.fi/noppa/kurssi/t-110.5101/
  - https://noppa.aalto.fi/noppa/kurssi/t-110.5201/
- Get your hands dirty!
  - With the topics already learned on Computer Networks course
- We hope you will learn basics of...
  - Configuring, monitoring and diagnosing of computer networks and services
  - Configuring and inspection of network security
  - No coding!
- What's new?
  - Now five credits (instead of four) → prepare for more work!

Prerequisites

- Mandatory
  - T-110.4100 Computer networks
- Highly recommended
  - Basics of Linux system administration
    - Command line
    - System commands
  - Otherwise more work for you!

Enrollment for the Course(s)

- Please register to the course(s) in Oodi during week 36 (this week)
  - Even if you're not sure to participate
  - You can unregister later
- If you register later...
  - There will be more delay in setting up a virtual machine for you
  - You will have less time for the assignments
- Hard deadline for course registration is week 37 (18.9.2011)

Material

- Various RFCs at the IETF
- Linux man pages (man -k keyword)
- O'Reilly's Safari books at http://nelliportaali.fi
- Linux Documentation Page
- Google

Assignments

- T-110.5101
  1. Network tools
  2. DNS
  3. Email server
  4. IPv6
  5. Web services
  6. Extra: router simulator
- T-110.5201
  1. Network tools
  2. Network file systems
  3. Firewall
  4. Crypto file system
  5. VPN
  6. Extra: LDAP

NB: course personnel may do minor corrections to the assignments

Schedule

Week	Date	Action
35	1.9-4.9	Registration opens
36	5.9-11.9	Starting lecture, registration ends
37	12.9-16.9	Round 1 reception
38	19.9-23.9	Round 1 demos
39	26.9-30.9	Round 2 reception
40	3.10-7.10	Round 2 demos
41	10.10-14.10	Round 3 reception
42	17.10-21.10	Round 3 demos
43	24.10-28.10	Exam week
44	31.10-4.11	Round 4 reception
45	7.11-11.11	Round 4 demos
46	14.11-18.11	Round 5 reception
47	21.11-25.11	Round 5 demos
48	28.11-2.12	Extra round reception
49	5.12-9.12	Extra round demos

Environment for the Assignments

- Course provides you...
  - Three virtual machines (32-bit Ubuntu Natty)
  - Each virtual machine has three network interfaces
  - **Don't touch eth0!**
  - Personnel will send you accounts by email
- You can use your own virtual machines but...
  - Bring your laptop to the sessions!
  - **Course assistants won't help you with problems with your own virtual machines**

Passing the Course

- T-110.5101 datacommunications software
  - Five (5) credits
  - Five (5) mandatory assignments + 1 extra
- T-110.5201 information security
  - Five (5) credits
  - Five (5) mandatory assignments + 1 extra
- First assignment shared between the courses
  - Has to be completed only once!
- Extra assignment
  - Missed one of the mandatory assignments?
  - Grade 5 requires the five mandatory assignments **and** the extra assignment
- Points published on the course web pages
  - To pass a course, you need to score at least 75 percent of total points
  - Grading by normal distribution
  - To get a final grade from the course, you have to give feedback to the course
- **You have demonstrate each assignment to assistant**

Demo and Reception Sessions

- Weekly schedule for demo and reception sessions
  - Reservation of session time to avoid overlap
  - Session room at A120 (aka playroom) at the CS building
  - Reservation system at https://playground.cs.hut.fi/kaiku/
- Reception session = face-to-face time with assistant
  - Troubleshoot difficult obstacles with assistant
  - The assistant will not do the whole exercise for you
  - Ask your questions during the reception week, not demo week!
- Demo sessions (also in room A120)
  - Demonstrate your solution for the assignment face-to-face
  - Do not ask help from the assistant; he asks questions!

On Course Policies

- Can I bring paper notes? Or can I use electronic notes and copy paste?
  - Yes but you should leave all material you brought to course personnel
- Can I script?
  - You can but not often useful (and you'll have to explain the script to assistant)
- Can I work with a pair?
  - Yes but you will have to demo with your own virtual machines without your pair!
  - See also the next question!
- Can I just reuse the work of some other student?
  - Identical configuration files can lead to failing of the whole course
  - The course personnel will ask “quiz” questions related to the topic (unlisted in the assignment)
  - Did you understand what you were doing and why things work as they do?
- Plagiarism cases are notified to the department

Extra Penalties and Rewards

- Generic penalty -2
  - Unreachable/unusable virtual machine
  - Fail to cancel reception time 1 hour before
  - Late arrival to demo (more than 5 mins)
  - Exceeding of demo time due to demo effects
- Miss reservation of a demo time
  - Extra essay
  - Must be done 24 hrs before demo
  - Fastest reservers get the best times!
- A reward of +2

Questions?

Part II

A Brief Introduction to Linux Command Line Usage

Traversing Directories

- cd - Change Directory
  - Change to a directory
  - Give the directory as an argument
  - With no arguments, changes to your home directory
- pwd (Print Working Directory)
  - Displays your current working directory
- Use the tab key for autocompletion!

Files and Directories on Linux

- By default, all file names are case sensitive!
  - Foo.txt is different from foo.txt
- Dot “.”
  - Means current directory
  - Example: find .
- Double dot “..”
  - The previous directory
  - Example: cd ..
- Asterisk “*”
  - Matches zero or more characters
  - Example (list all files ending in “txt”): ls *.txt

Access Privileges

- Check file permissions
  - ls -ld filename
  - ls -la
- Change file permissions
  - chmod ugo+rwx
  - u=user, g=group,o=others
  - +=add,-=del
  - r=read, w=write, x=execute
- What are my groups?
  - groups

- Change ownership
  - chown – change user
  - chgrp – change group
- Switch to root shell
  - sudo -s
  - su

Important Directories

- Your personal home directory is tilde: “~”
  - Usually maps to /home/myaccount
- Super user home directory is /root
- Temporary storage in /tmp
  - Wiped out on reboot!
- Configuration files usually located in /etc
  - Sometimes in /var (as with “bind” DNS server)
- Log files in /var/log
  - Important in diagnosing problems with services

Usage of Files

- What kind of type file is it?
  - file filename – displays file type
- System executables
  - System apps: just type the command, e.g. “ls”
  - Non-system applications: “./my_binary”
- Text files
  - cat file – displays the contents
  - less file – displays scrollable contents (q=quit)
  - text editors: nano, emacs, vi(m)

Searching for Files

- Locate
  - Searches file names using a precreated index
  - Fast, but may not be up-to-date
  - Example: locate foo.txt
- Find
  - Searches file names without a precreated index
  - Slow but always up-to-date
  - Example: find /etc -name '*cfg'
- Grep
  - Search file contents (always up-to-date)
  - Example: grep -r ssh /etc

Searching for Tools

- Where is tool xyz located?
  - Which xyz – displays the path of xyz
- What was the tool related to “keyword”?
  - man -k keyword
- What was the command I used yesterday?
  - history – displays all typed command lines

Installing Software in Debian

- aptitude or apt-get
  - Use one of them but don't mix them!
  - Here, the format is the same for both
- Searching
  - aptitude search softwarename
- Installation
  - aptitude install softwarename
- Uninstall
  - aptitude remove softwarename

Volumes and Disks

- mount – attaches a volume to a directory
- umount – detaches a volume
- df – how full is the disk?

Reading and Writing I/O

- Read from an unnamed input stream
  - Example: grep “abc” <file
- Redirect normal output of a tool to a file “>”
  - Example: find . >file
- Redirect error output of a tool to a file “2>”
  - Example: find /etc 2>file
- Just redirect everything to a file
  - Example: find /etc >file 2>&1
- Appending is “>>”
  - echo “foo” >>file
  - Note: > overwrites the file
- Piping “|”
  - find /etc | less

Process Management

- Process running?
  - ps axu | grep ssh
  - or just “top”
- Kill process
  - kill processnumber
  - kill `pidof name`
  - killall name
- Start background process: app &
- Bring a background application on foreground
  - “fg”
- Put it back to background
  - “bg”
- Suspend: ctrl+z
- Interrupt: ctrl+k

Service Management

- Is “cups” service running?
  - service cups status
- Stop “cups” service
  - service cups stop
- Start it
  - service cups start
- Stop + start
  - service cups restart
- Reload configuration
  - service cups reload

- Old style of invocation
  - /etc/init.d/cups start
- Services are listed in
  - /etc/rc2.d/

Ssh Access

- Login
  - Ssh myaccount@hostname.domain
- Upload
  - Scp local_file myaccount@remotemachine:
- Download
  - Scp myaccount@remotemachine:remote_file .
- Annoyed by password prompts?
  - man ssh-keygen, man authorized_keys
  - Make sure ~/.ssh permissions are correct!

Questions?