Introduction to Laboratory Works

T-110.5100
Laboratory Works in Datacommunications Software

T-110.5200
Laboratory Works on Information Security

Part I
Course Arrangements

Course Personnel

Miika Komu (responsible teacher)
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Do not use personal addresses for contact!

Fastest way to contact us:

T-110.5100 (datacomm. software)
T-110.5200 (inf. security)
@ tkk.fi

IRC: !dcslabcourses @ ircnet

Contents of the Courses

- Web pages
  - https://noppa.tkk.fi/noppa/kurssi/t-110.5100/
  - https://noppa.tkk.fi/noppa/kurssi/t-110.5200/
- 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

Prerequisites

- Mandatory
  - T-110.4100 Computer networks
- Recommended
  - Basics of Linux system administration

Enrollment for the Course(s)

- Please register to the course(s) in Oodi during week 36 (this week)
- 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 21.9

Material

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

Plagiarism

- Plagiarism = copying the work of others
- Will not be tolerated in this course
- Will be tested by course personnel
  - Did you understand what you did in the assignment?
- Automatically leads to failing of the course
- Recorded by the council

Assignments

- T-110.5100
  - Network tools
  - DNS
  - Email server
  - IPv6
- T-110.5200
  - Network tools
  - Network file systems
  - Firewall
  - Crypto file system
  - VPN

Note: there will be minor changes to the details of the assignments during weeks 36 and 37

Environment for the Assignments

- Course provides you...
  - Three virtual machines (32-bit Debian Lenny)
  - 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
  - Bring your laptop to the sessions!
  - **Course assistants won't help you with problems with your own virtual machines**

Passing the Course

- T-110.5100 datacommunications software
  - Four (4) credits
  - Four (4) mandatory assignments
- T-110.5200 information security
  - Four (4) credits
  - Four (4) mandatory assignments
  - Assignment five is optional (for extra points)
- First assignment shared between the courses
  - Has to be completed only once!
- 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
- **Checking of assignments in demo sessions**

Demo and Reception Sessions

- Session = face-to-face time with assistant
  - At least one demo and one reception session per each assignment in **chronological order**
  - Reservation of session time to avoid overlap
  - Session room at A120 (aka playroom) at the CS building
  - Exact schedule: check course web pages later
- Reception sessions
  - Ask for hints from an assistant
- Demo sessions
  - Demonstrate your solution for the assignment
  - Do not ask help from the assistant (he asks questions from you)

Questions?

Part II
Tips on Basics of Linux

Traversing Directories

- cd - Change Directory
  - Change to a directory
  - Give the directory as an argument
  - With no arguments, goes 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
- Executable files
  - System apps: just type the command, e.g. “ls”
  - Non-system applications: “./my_binary”
- Text files
  - cat file – displays the contents
  - less file – displays the contents but scrollable
  - text editors: nano, emacs, vi

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?