

CM50123 NETWORKING–COURSEWORK

NOVEMBER 2012 – V. 2

This assignment is worth 25% of the total marks for the course. It is to be executed partly in a lab session on 23 November 2012 and partly at home, with deadline 7 December 2012. Exceptions may only be granted by the Director of Studies.

Learning Outcomes

The successful student will be able, in a limited time, to connect a computer to the Internet, to retrieve and send files via FTP, to connect via SSH and to run a web server. Moreover, he or she will be able to analyse network traffic via analysis tools.

How the Coursework Takes Place

Each student is assigned an identical workstation with special software installed in the Lovelace lab. Students are supposed to complete the assigned lab tasks with no other support than their workstation, so, in particular, no other computers, notes and papers can be used. On 15 November 2011 there is a rehearsal session, where similar lab tasks in the same conditions will be performed with the assistance of the instructor.

Tasks in the Lab

- (1) Produce a bash script that is able to properly connect a Linux workstation to the Internet. In fact, the assigned machine will be booted from a CD that does not automatically connect it. Marks are given as follows:
 - Ping machines by number [4 mark].
 - Ping machines by name [4 mark].
 - Insightful comments and appropriate style of the script, error detection, built-in flexibility and portability (for example use variables for the requested network parameters) [20 marks].
- (2) Install by yum, or by any other method that you might prefer, an *Apache* http server, and run it. Then create a simple web page with the student's name and access it from a remote machine via an SSH session (the *Apache* log will testify to the success of these actions). The breakdown of marks is:
 - Setting up the http server [16 marks].
 - Accessing the web page [8 marks].
- (3) Repeat the downloading of the *Apache* distribution (being careful that whatever method you used before did not cache it) and the accessing of the web page via the remote SSH connection, but this time record in a file all the traffic via the tcpdump tool. After having done that, stop tcpdump. Perform a traceroute to the machine used for the SSH connection and record its output in the same file used for tcpdump [8 marks].

At the end of the lab session the script, the *Apache* log file and the tcpdump + traceroute file will have to be uploaded by FTP to a given server.

Task at Home

Analyse the file obtained in the third task in the lab (which will be emailed to you by the instructor at the end of the lab session) by commenting all the interesting records in the tcpdump output. Note that a lengthy sequence of related packets can be briefly described as a whole. Based on the traceroute output, show how the machines are connected. Provide a high level narrative of the various communication mechanisms. **[40 marks]**

The analysis, in the form of a commented file, will have to be sent by email to the course instructor before the deadline. Clarity and ease of reading are important factors.

Technical Details

- Username/password of the Linux machine: root/toor (press enter on 'run from image' if the machine is not booted already).
- Your host's IP number: (read it from the sticker on your machine).
- Your host's name: (read it from the sticker on your machine).
- Netmask: 255.255.255.128.
- Router: 138.38.110.126.
- Primary/secondary nameserver: 138.38.32.45/138.38.32.46.
- Address to ping: 138.38.0.49/bath.ac.uk.
- Let your BUCS username be $\langle username \rangle$ and your name be $\langle name \rangle$, then $\langle identifier \rangle$ is $\langle username \rangle - \langle name \rangle$ (for example, the instructor's $\langle identifier \rangle$ is ag248-Guglielmi).
- Name of the bash connection script: $\langle identifier \rangle$.script.
- FTP server: 138.38.108.168, user: networking, password: (will be given in class); IMPORTANT: change the directory to Public (write only directory).
- The tcpdump + traceroute file that has to be uploaded by FTP will be called $\langle identifier \rangle$.tcpdump.

Checklist Before Leaving the Lab

- My name: _____.
- My BUCS username: $\langle username \rangle =$ _____.
- My host's IP number: _____.

When you are ready with the web page, please call the instructor and give him the URL of your page. AS SOON AS YOU UPLOAD A FILE, PLEASE INFORM THE INSTRUCTOR (who will make a copy for safety). Please give this filled checklist to the instructor before leaving the lab.

- (1) ping 138.38.0.49 works: YES/NO.
- (2) ping bath.ac.uk works: YES/NO.
- (3) I have uploaded $\langle identifier \rangle$.script to the FTP server and it contains my name inside a comment: YES/NO.
- (4) The web server is running: YES/NO.
- (5) I have renamed the Apache log to $\langle identifier \rangle$.log and I have uploaded it to the FTP server: YES/NO.
- (6) I have called the commented tcpdump + traceroute file $\langle identifier \rangle$.tcpdump and I have uploaded it to the FTP server and it contains my name: YES/NO.

Date and signature: _____