

Matric No: _____

NAPIER UNIVERSITY
SCHOOL OF COMPUTING

CO32034
SERVER ADMINISTRATION

ACADEMIC SESSION: 2004-2005

EXAMINATION DIET: JANUARY

TRIMESTER: ONE

EXAM DURATION: 2 HOURS

READING TIME: NONE

EXAM PAPER INFORMATION

Answer any THREE questions

Number of questions – FIVE

Number of pages – SEVEN

Number of sections – ONE

OPEN BOOK EXAMINATION

EXAMINERS: UTA PRISS & GORDON RUSSELL

PLEASE READ THE FULL INSTRUCTIONS BEFORE COMMENCING WRITING

1. NETWORKING

In answering this question, the following information may prove useful:

```
Usage: iptables -[AD] chain rule-specification [options]
iptables -[RI] chain rulenum rule-specification [options]
iptables -D chain rulenum [options]
iptables -[LFZ] [chain] [options]
iptables -[NX] chain
iptables -E old-chain-name new-chain-name
iptables -P chain target [options]
iptables -h (print this help information)
```

Commands:

Either long or short options are allowed.

```
--append -A chain          Append to chain

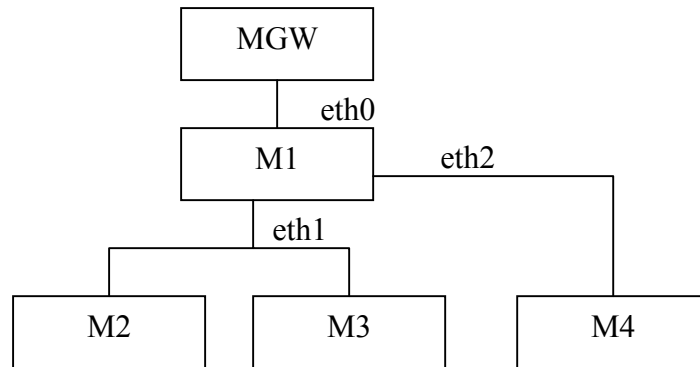
--replace -R chain rulenum Replace rule rulenum in chain

--list -L [chain]         List rules in a chain or all chains
--flush -F [chain]       Delete rules in chain or all chains
--zero -Z [chain]       Zero counters in chain or all chains
--new -N chain           Create a new user-defined chain
--delete-chain          Delete a user-defined chain
                        -X [chain]
--policy -P chain target Change policy on chain to target
```

Options:

```
--proto -p [!] proto     protocol: by name, eg. `tcp'
--source -s [!] address[/mask]
                        source specification
--destination -d [!] address[/mask]
                        destination specification
--in-interface -i [!] input name[+]
                        network interface name ([+] for wildcard)
--jump -j target         target for rule (may load target extension)
--match -m match        extended match (may load extension)
--numeric -n            numeric output of addresses and ports
--out-interface -o [!] output name[+]
                        network interface name ([+] for wildcard)
--table -t table        table to use (default: `filter')
--verbose -v            verbose mode
--line-numbers          print line numbers when listing
--exact -x             expand numbers (display exact values)
```

- (a) Consider the following network topology:



The ethernet devices shown are from the point of view of M1. Assume MGW is the gateway machine for this cluster of machines. M2 and M3 are connected to M1 via a simple network hub.

Also from the viewpoint of M1, the following is known:

Eth0 : 10.100.1.20/16
Eth1 : 10.101.1.3/24
Eth2 : 10.101.2.5/24

- (i) Create ifconfig instructions for M1. (3)
- (ii) Create ip instructions for M1 to perform standard routing. (4)
- (iii) M1 needs to have its firewall configured to support the following:
 - Running an externally visible http server (port 80)
 - Running an internally visible telnet server (port 23)
 - Supporting M4 running an http server (and log these packets)
 - All machines should be able to access the ntp time server.

Assuming that M1's INPUT, OUTPUT, and FORWARD chains are set to REJECT (and cannot be changed to ACCEPT) produce iptable commands to provide this.

(6)

- (b) Assume that the owners of machines M2 and M3 both require their networks to be 10.101.1.3/16.

- (i) Discuss any problem issues with doing this (2)
- (ii) How can this change be done so that only eth1 is modified? You can assume that the desired IP range does not have to be the same IP range once they have arrived at the gateway. Show any command usage which is required to achieve this. (6)

- (c) The network performance has been reduced significantly. Discuss what steps you would perform and the possible reasons for this based on this particular network topology and configuration, given that traffic is heavy on eth0 and eth2.

(4)

Total Marks [25]

2. PROCESSES AND SERVICES

- (a) (i) Discuss the differences and the philosophies behind running services using xinetd and init.d. (4)
- (ii) Services in init.d can usually take one of at least 3 different parameter values when executed, and usually understand 5. What are these parameters and what do they mean? (3)
- (b) Many Linux implementations still make use of the concept of a runlevel. Describe the Linux boot process, from BIOS to user login, making particular reference to runlevels and their implementation as links in /etc/rc?.d. (13)
- (c) Discuss five different events which can be handled by the init process, as defined in the inittab. These events should not include any of the runlevel events. (5)

Total Marks [25]

3. WEB SERVER CONFIGURATION

- (a) (i) Describe how virtual hosting functions, with reference to the http protocol. (5)
- (ii) What support does Apache offer for virtual hosting? (4)
- (b) In the apache configuration file, the tag <VirtualHost *:80> is used to define and identify a virtual host definition.
- (i) What is the significance of the * character? (2)
- (ii) Identify 7 of the attributes which would be used in a virtual host definition, together with their functions? (7)
- (c) There is a requirement to have a virtualhost definition for "grussell.org" to also support "www.grussell.org". When a browser attempts to access "www.grussell.org", the url in the browser should be rewritten to point instead to "grussell.org". Produce a mod_rewrite rule to achieve this. (7)

Total Marks [25]

4. DATABASE CONFIGURATION

- (a) When mysql is installed there are two important files:

`/usr/bin/mysql` and `/etc/init.d/mysql`

The file `/usr/bin/mysql` is available to ordinary users of the system. The file `/etc/init.d/mysql` is used by administrator (such as root). Describe the purpose of each of these files.

(4)

- (b) One way of adding a user to mysql is to issue an SQL command such as:

```
INSERT INTO mysql.user(user, host, password)
-> VALUES ('scott', 'localhost', PASSWORD('tiger'));
```

- (i) The mechanism used ensures that the password used may not be retrieved even by the root user. Explain how this is achieved.

(4)

- (ii) There are other steps that are required before the user Scott can create his own tables. Outline these steps – your answer should include typical statements, however you are not expected to get the syntax exactly right.

(6)

- (c) The mysql web site lists the following key advantages:

- Reliability and Performance
- Ease of Use and Deployment
- Freedom from Platform Lock-in
- Cross-Platform Support
- Millions of Trained and Certified Developers

Some of these claims might be made by any of MySQL competitors but some of the claims are specific to MySQL. Discuss each of the claims. For each claim consider how MySQL might be compared against another vendor – such as Oracle or Microsoft.

(11)

Total Marks [25]

5. NON-LINUX ADMINISTRATION

- (a) Discuss the differences between a standard Unix filesystem UFS and the Mac OS extended filesystem HFS+. (6)
- (i) Discuss the impact which the differences between UFS and HFS+ have on basic Unix commands. In doing so, Name three basic Unix commands that are not affected and three basic Unix commands, which are affected by these differences and explain how they are affected. (6)
- (ii) Discuss different solutions for coping with such differences with respect to basic Unix commands. These can be existing solutions or possible solutions. (6)
- (c) Critically analyse the broader impact that differences between flavours of Unix have on system administration using the example of filesystems. Include discussions on which general admin tasks are more seriously affected. Suggest strategies that can be implemented to overcome problems caused by unix differences. (7)

Total Marks [25]

END OF PAPER