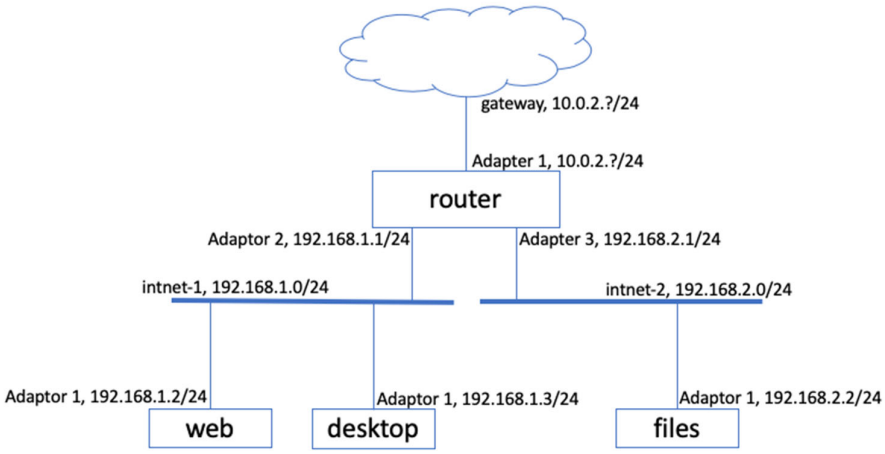
CSCI322

UNIVERSITY
OF WOLLONGONG
AUSTRALIA

ASSIGNMENT 3 – DUE BY 23:59 Wednesday 20/11/2024

Background

A start-up company decides to build its own information system infrastructure to host a web server and a file server for staff home directories. The system has planned as described by the following diagram. It has two internal networks deployed at two locations interconnected by a router that serves as a gateway to Internet as well. The web server and staff desktop(s) are connected to one internal network called `intnet-1` and file server is connected to the other called `intnet-2`. The subnets and IP addresses are proposed as indicated in the diagram.



Task:

Your task is to implement this plan by building the system and configure the system and networks including the router to meet the following requirements.

i. The router, web and file servers will use *Ubuntu Linux 20.04 server* as operating systems while the staff desktop will use *Ubuntu Linux 20.04 desktop*. This is to be simulated with virtual machines using Oracle VirtualBox manager. The host names are `router`, `web`, `files` and `desktop` as indicated in the diagram. Use *your email ID* as the *username* for all machines.

ii. The IP addresses will be statically configured as assigned in the diagram except those of the Adapter 1 of the router and the gateway to the outside network/Internet that are assigned automatically via the built-in DHCP server on the VirtualBox virtualisation platform.

iii. The `router` server will serve as a NAT router to outside network/Internet and a router for internal networks. It also hosts a DNS service for the domain `mycompany.com` for the company internal networks. The company needs to access the web server as `www.mycompany.com`, the DNS server as `dns.mycompany.com` and the file server as `home.mycompany.com`.

iv. The `web` server will host an Apache2 web service. The document root is `/www` that is mounted to a dataset called `/webpool/doc` from the ZFS pool `webpool` made from a VDEV of 2 disks in a

mirror. Create a simple home page for the assignment on the web server to show information on **subject name** and **code**, **assignment number**, **your name**, **student number** and **email ID**.

v. The `files` server will host a ZFS pool `datapool` made from a VDEV of 3 disks configured as double-parity RAID-Z pool. There is a dataset, `datapool/home` created from the pool. The dataset `datapool/home` is exported as a NFS share.

vi. The `desktop` machine will mount the `/home` directory to the NFS share from `home.mycompany.com` at boot. This is to be configured in `/etc/fstab`.

Report

You will create a report and submit it as a PDF document. The report should show information on **subject name** and **code**, **assignment number**, **your name**, **student number** and **email ID** on the first page.

The report contains the following content in sections as indicated.

1. Network configuration

    a. A screenshot of the output from the command `ip address` on the `router`, `web`, `files` and `desktop` machines, respectively.

    For instance,

    All your screenshots of output from commands in this report must show the *username* and *hostname* as indicated in the exemplar otherwise it will be disregarded and no mark would be given.

    (2 marks)

2. Routing configuration

    a. A screenshot of the output from the command `cat /etc/iptables/rules.v4` on the `router` machine.
    b. A screenshot of the output from the command `ping 192.168.1.2` on the `files` machine and `ping 192.168.2.2` on the `web` machine, respectively.

    (2 marks)

3. DNS service configuration

    a. Content of the file `/etc/bind/named.conf.local` and all forward and reverse zone files.
    b. A screenshot of the output from the command `dig home.mycompany.com` on the `web` machine and `dig www.mycompany.com` on the `files` machine, respectively.

c. A screenshot of the output from the command `dig -x 192.168.2.2 @dns.mycompany.com` on the `web` machine.

(2 marks)

4. File system configuration

   a. A screenshot of the output from the command `zpool status` on the `web` and `files` machines, respectively.
   b. A screenshot of the output from the command `zfs list` on the `web` and `files` machines, respectively.
   c. A screenshot of the output from the command `showmount -e home.mycompany.com` on the `desktop` machine.
   d. A screenshot of the output from the command `cat /etc/fstab` on the `desktop` machines.

(2 marks)

5. Web service configuration

   a. A screenshot of the output from the command `cat /etc/apache2/sites-available/000-default.conf` on the `web` machines.
   b. A screenshot of your assignment web page on Firefox pointing to `www.mycompany.com` on the `desktop` machine.

(2 marks)

Submission

Submit individual work as a PDF file called `a3_yourUserID.pdf` to Moodle submission drop box before the due time.