

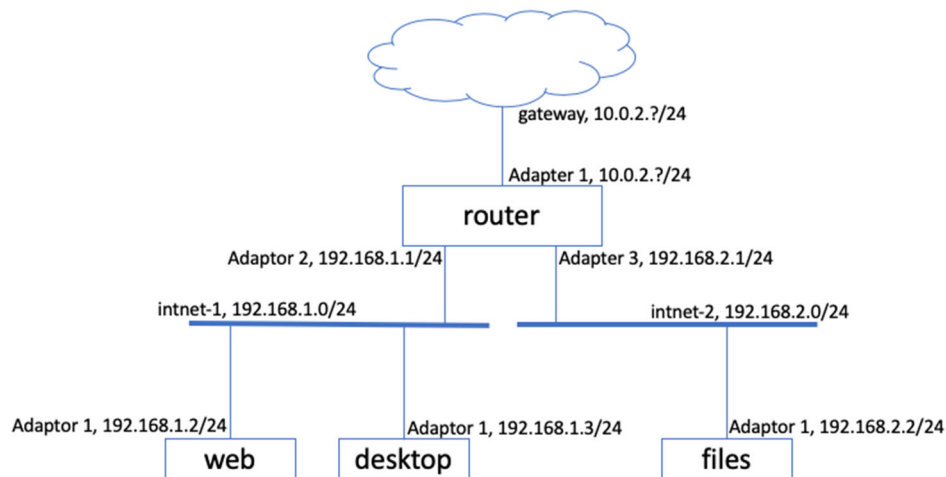
Assignment 2

This assignment should be completed individually and is worth 35 marks.

This assignment will be marked in the class.

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.

- 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.
- 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.
- 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.
- 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 **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.

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.

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.

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.

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.

Submission

Submit group work as a PDF file to the teacher for marking by the due date. Your teacher may ask you questions or ask you to demonstrate the work when marking.