Assignment
Network Design

B.Sc. Information Technology
CSA 2150- Techniques in Operating Systems
5th May 2007

This is the description for the Assignment of unit CSA 2150, Network Programming, for the year 2006/2007. This assignment is worth 15% of the total mark for this unit. The deadline for this project is 27th May, 2007 at 11:59pm. This is an individual assignment. Under no circumstances should the assignment be shared with others. You will submit your assignment using the ASS system (link on my website)! Please be reminded that you cannot copy and plagiarise to ease your way to a final submission. While you may discuss ideas with others, do not steal.

You can find more information at

http://www.cs.um.edu.mt/resources/plagiarism/

Read this information well since afterwards no excuses will save you. Anyone resorting to such methods will be considered as trying to cheat and will even risk the removal from the degree program.

Objectives

In this project you are required to design a network for a typical company that requires its computers to communicate with each other and on the internet.

Company Requirements

A new education centre has just opened up with the aim of offering IT related courses to its students, competing with University of Malta. It aims to provide student labs, provide computers for its education and administrative staff and also set up a web server. The company has just purchased one T1 connection providing 1.5Mbps for upload and download. It has also purchased the 193.188.34.128/26 network from its ISP.

It terms of PCs, the centre has the following plans:
- It wants to setup 1 web server to host the centre's website and also 1 file server on which its students can access course materials from home. Each of these will be allocated a different DNS name.
- The centre wants to set up two computer labs, each containing 15 PCs with each having internet connectivity.
- Additionally it wants to allocate 7 PCs, each of which will be placed in different classrooms and are to be used by the course tutor. These PCs also require internet connectivity.
- 2 PCS will be given to the system administrator, with the facility to provide any type of Internet services on them.

- Also 5 PCs will be made available for administration and another 3 for tutors. Please note that management have decided that these PCs should not get internet connectivity but should still be able to access the web and file server.
- And finally a wire-less network should be made available to students which can allow students internal access to the file and web server but not to the internet.

Your task is to come up with a logical, efficient and scalable network design that will be suitable for this centre. The company has allowed an adequate budget to purchase any switches and routers that may be required, yet obviously does not want to spend more than necessary.

Design Details

When drawing up your network designs make sure you split the design up in a way that emphasizes the function of the components. In addition, make sure that no malicious user would be able to circumvent the system. Additionally, make sure that all sub-networks are split up allowing them the fastest access possible depending on their requirements. Also keep the design as simple as possible allowing efficient troubleshooting while guaranteeing the least downtime in the system. As a hint always split up networks in terms of function, since PCs with similar function most probably will often communicate between themselves. Also do not forget about the ISP link**!!**

Deliverables

Build a document giving all the necessary network designs (enough information should be provided that will allow any technician to build your network structure from scratch). You are requested to depict the network setup by means of diagrams showing the division of the networks and their interconnections. You will submit on the online system a jpg file called Design.jpg in which you will place you network design. Please make use of standard depictions for components. Also include a .doc or .pdf file (called *tables.doc* or *table.pdf*) containing the routing tables of each and every router and PC in your network diagram. Make sure you include the subnet masks and the default route. Obviously the smaller the tables the better, since the cheaper the routers can be. Also include any other necessary information such as ranges of ports when using NAT, allocation policies if using DHCP, limitations of any technique used, etc. You are free to make use of any trick in the book to setup your system **!!**

Conclusion

Good luck and if you need anything, contact me on *joseph dot cordina at um.edu.mt*. Even better, make use of the discussion group to discuss ideas and ask questions. You can find a link to the discussion group on my website. Other students might help you out in the solution. Actually contact me as a last resort !!

Joseph Cordina